



N.T. 2628A

X066 - X067

Basic Manual: M.R. 305

THE AUTOMATIC CLUTCH
is a clutch which is controlled by a computer.

77 11 190 785

OCTOBER 1996

Edition Anglaise

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

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

All copyrights reserved by the Régie Nationale des Usines Renault.

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



Régie Nationale des Usines Renault S.A. 1996

Contents

Page

20 AUTOMATIC CLUTCH

Introduction	20-1
Recommendations	20-2
Special notes	20-3
Location on the vehicle	20-4
Pump-hydraulic jack assembly	20-5
Accumulator	20-17
Gear lever sensor (728)	20-19
Engaged gear sensor (726)	20-23
Vehicle speed sensor (250)	20-25
Bonnet switch	20-26
Accelerator position information	20-26
Engine speed sensor (120)	20-27
Air conditioning information (319)	20-27
Door switch (180)	20-27
Computer (730)	20-28
Operational wiring diagram	20-30
Pump assembly relay (762)	20-32
Starter relay (232)	20-33
Buzzer (763)	20-34
Operation	20-35
Clutch identification	20-38
Computer identification	20-39
Hydraulic fluid level	20-40
Discharging the accumulator	20-41
Programming full load and no load positions	20-42
Programming the gears	20-43
Programming neutral position for the solenoid and the jack position	20-45
Reading clutch wear	20-47
Reading the date of After Sales operations	20-48
Entering the date of After Sales operations	20-49
Fault finding	20-50

Introduction

The design of the whole vehicle, including the clutch, is continually being improved. The latest technological advances have allowed a computer controlled automatic clutch to be developed.

The special feature of this clutch is that to perform the clutch - declutch operation, a clutch pedal no longer needs to be used.

The automatic system used in the clutch control requires the use of the following components :

- an electro-pump and hydraulic jack assembly which carries out the clutch - declutch action at the mechanism control,
- a computer to control the assembly,
- various sensors, one of which is located in the gear lever knob.
- information provided by the injection computer

MAINTENANCE (to be carried out at each visit to the workshop)

Check:

- the level of the hydraulic fluid (see section "Hydraulic fluid level").
- the correct operation of the buzzer
 - start the vehicle,
 - engage a gear,
 - open the driver's door, and the buzzer should sound.
- the safety devices preventing the engine from starting :
 - apply the handbrake,
 - engage a gear,
 - try to start the engine, the starter should not operate.
- the safety devices preventing the vehicle from moving with the bonnet open:
 - apply the handbrake,
 - with the engine running:
 - open the bonnet and hold it in position with the stay,
 - engage 1st gear (from inside the vehicle),
 - accelerate, the vehicle should not move, the buzzer should sound,
 - to return to normal operation, close the bonnet and select neutral.

SPECIAL NOTES FOR REMOVAL-REFITTING OPERATIONS

Apply the handbrake before any operation on the vehicle.

The connectors for the various components may only be disconnected when the ignition is off, the engine has stopped completely and the vehicle is stationary.

All operations carried out on the automatic clutch must be carried out by qualified, trained personnel.

All operations carried out in the engine compartment must be carried out with the gear lever in neutral.

Pump-jack assembly

Before carrying out any operation on the pump-jack assembly discharge the accumulator (to do this see section "Discharging the accumulator").

To check the hydraulic fluid level refer to the section "Hydraulic fluid level".

When handling the pump-jack assembly, always hold it by the motor or the accumulator.

The pump-jack assembly supplied by the Parts Department is filled with fluid.

To prevent leakage of hydraulic fluid during transport, the breather plug on the reservoir is blocked by a small rubber ring which should be removed only after the pump-jack assembly has been fitted to the vehicle.

Operations to be carried out using the XR25 after the removal-refitting operations.

Programme the neutral position for the solenoid and the jack position (see section "Programming neutral position for the solenoid and the jack position"):

- each time the pump-jack assembly is removed,
- each time a modification is made to the adjustment at the fork.

Programme the full-load and no-load positions (see section "Programming full-load and no-load positions") :

- when the computer is replaced,
- when each operation on the accelerator control has been carried out (adjustment),
- when the injection potentiometer is replaced.

Programme the gears (see section "Programming the gears") :

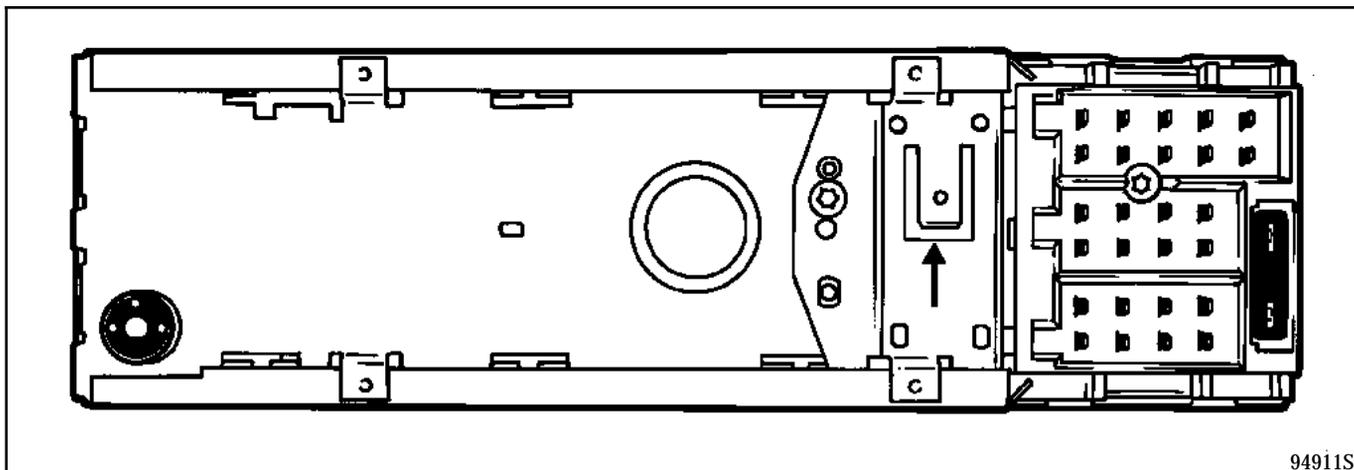
- when the computer is replaced,
- when the gear lever or gear linkage is removed,
- when the gear box is removed,
- when the engaged gear sensor is removed.

Erase the computer memory after every operation on the automatic clutch (see section "Fault finding").

Store the date of the After Sales operation in the computer after each operation on the automatic clutch (see section "Entering the date of After Sales operations").

CONNECTING A CAR RADIO

The pump assembly causes interference which may cause problems with the reception of certain radio frequencies. To remedy this, when fitting a radio as an After Sales operation, the radio housing should be connected to earth. Certain radios have a special terminal for this purpose (see example below).



94911S

REMOVAL OF AND/OR REPAIRS TO THE GEAR BOX

To remove the gearbox, you must first remove the pump-jack assembly, its mounting and the engaged gear sensor.

Before repairing a JB type gear box, **the engaged gear sensor must be removed.**

This sensor is replaced once the refitting operations have been completed.

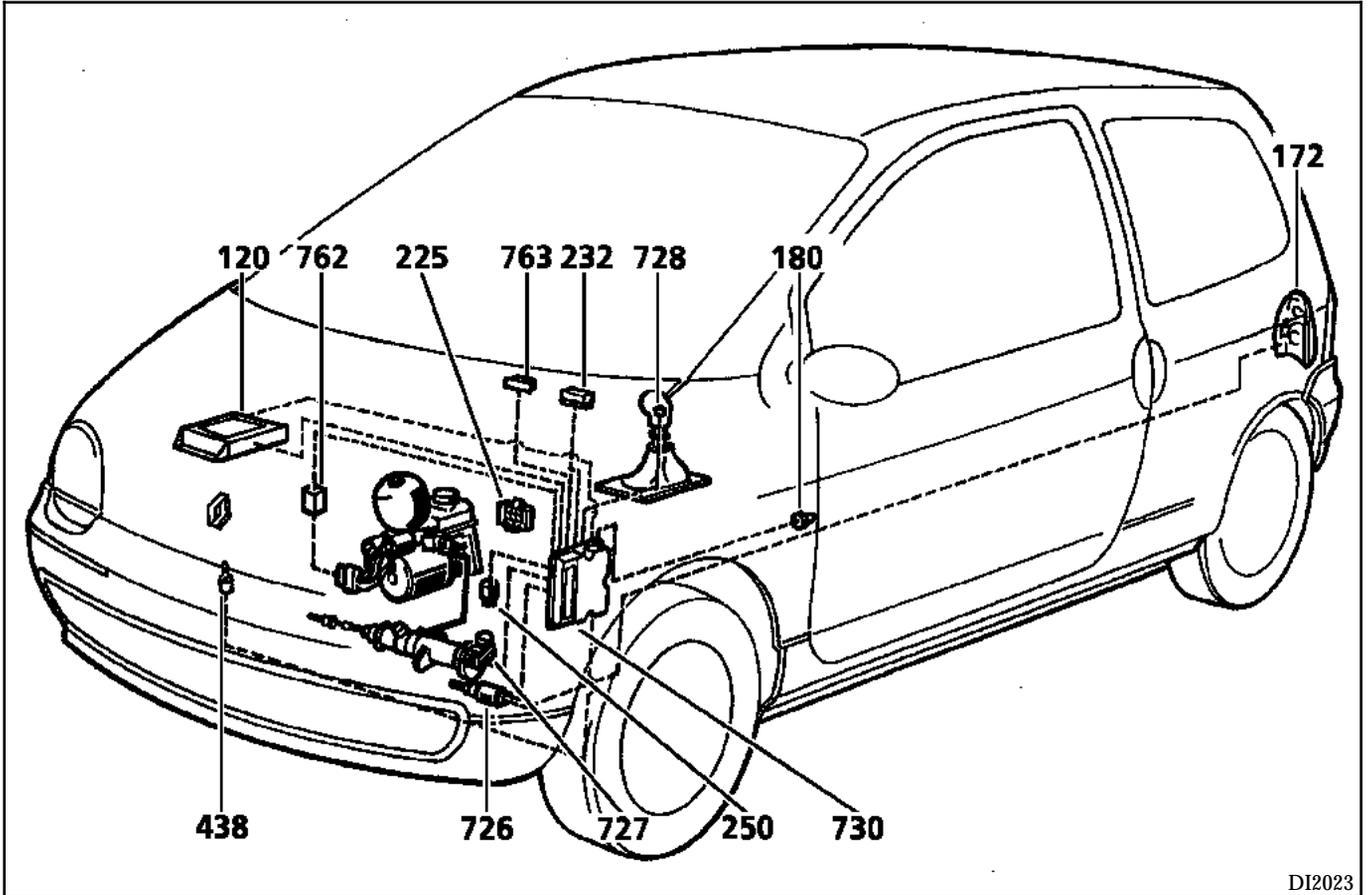
ATTENTION :

Whenever any work is carried out on the gearbox or the gear selector linkage, and before turning over the engine, check the consistency of the information given by the engaged gear sensor in #01. This sensor is fragile, its deterioration could result in serious damage to the gearbox, to the extent of it being irreparable.

AUTOMATIC CLUTCH

Location on the vehicle

20



DI2023

- 107 Battery
- 120 Injection computer
- 155 Reversing light switch
- 172 Reversing light
- 180 Driver's door switch
- 213 Front courtesy light
- 225 Diagnostic socket
- 232 Starter relay
- 236 Fuel pump relay
- 250 Vehicle speed sensor
- 260 Fuse box
- 299 Accessories board
- 319 Air conditioning control panel

- 438 Bonnet switch
 - 597 Engine fuse box
 - 724 Pump assembly
 - 725 Solenoid valve
 - 726 Engaged gear sensor
 - 727 Clutch position sensor
 - 728 Gear lever sensor
 - 730 Computer
 - 762 Pump assembly relay
 - 763 Buzzer
 - 835 Pressostat
- Hydraulic connections
 - - - - - Electrical connections

Note: Not all components are shown in the above diagram; see page 20-6.

DESCRIPTION

The pump and hydraulic jack assembly cannot be separated.

It comprises (see following page):

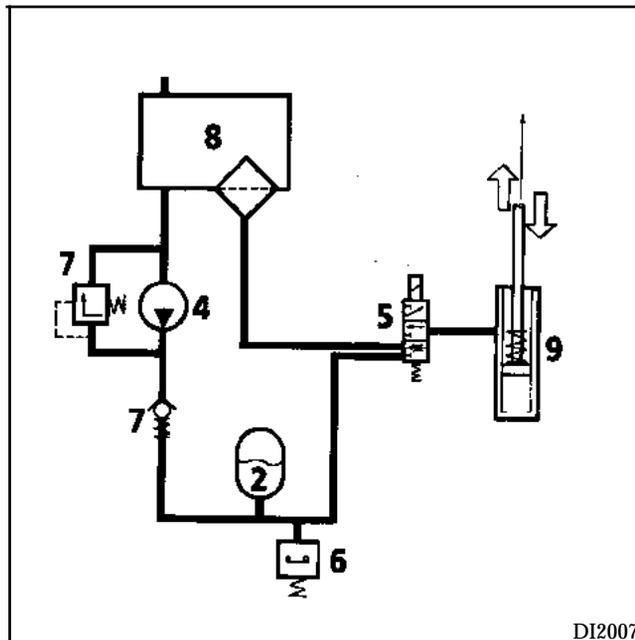
I an electro-pump assembly (724) comprising:

- 1 a connector
- 2 a pressure accumulator
- 3 an electric motor
- 4 a hydraulic pump
- 5 a solenoid valve (725)
- 6 a pressostat (835)
- 7 a hydraulic unit (integrating the hydraulic circuits, a pressure release valve and a non-return valve)
- 8 a reservoir and a filter

II and a HYDRAULIC JACK, comprising :

- 9 a jack (slave cylinder)
- 10 a clutch position sensor (727)

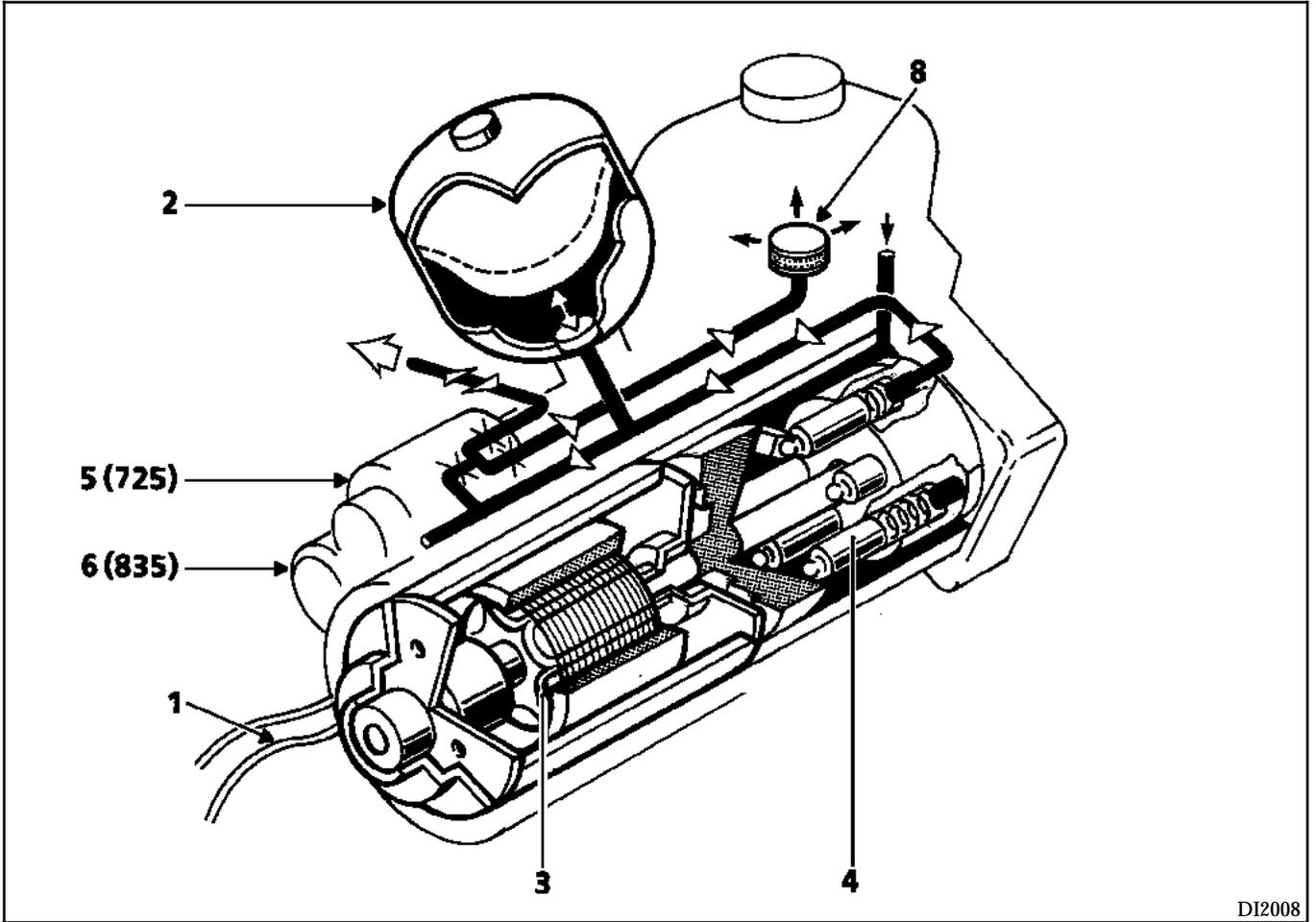
HYDRAULIC DIAGRAM



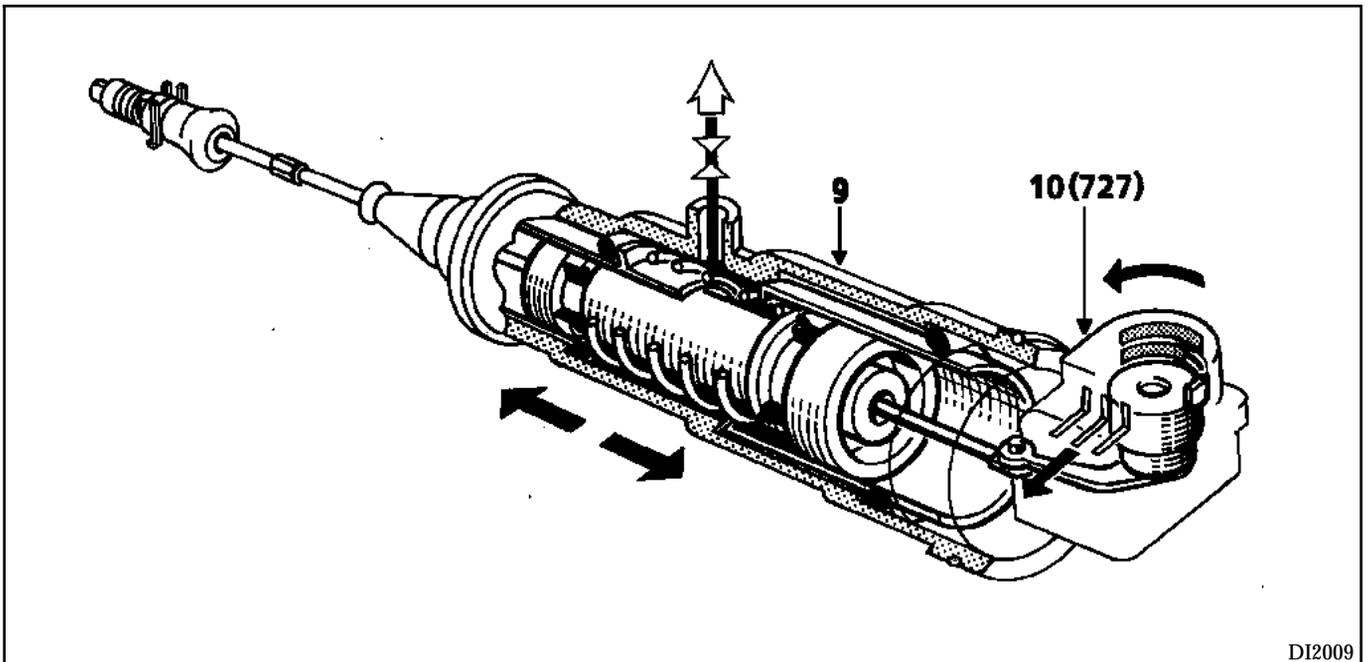
AUTOMATIC CLUTCH

Pump-hydraulic jack assembly

20



DI2008



DI2009

I PUMP ASSEMBLY

1 - 5 track connector

Track **A**: + before ignition motor feed
Track **B**: Pressostat
Track **C**: Pressostat
Track **D**: Solenoid valve
Track **E**: Solenoid valve
Terminal for motor electrical earth

2 - Accumulator

The accumulator permits intermittent operation of the pump motor.

When the accumulator is full, the clutch may operate through 4 or 5 cycles before the accumulator requires refilling.

3 - Motor

The electric motor drives the hydraulic pump.

The computer operates the motor depending on:

- the information from the pressostat,
- + after ignition information

Feed voltage: 13.5 V
Average current: 7 A
Motor current when cold: 25 A
Resistance : 1 Ω

4 - Pump

This is driven by the electric motor.

It is of an axial type with 5 pistons.

It generates the hydraulic pressure required to supply the jack and fill the accumulator.

5 - Solenoid valve (725)

This is controlled by the computer.

The solenoid valve determines the position of the clutch by altering the flow.

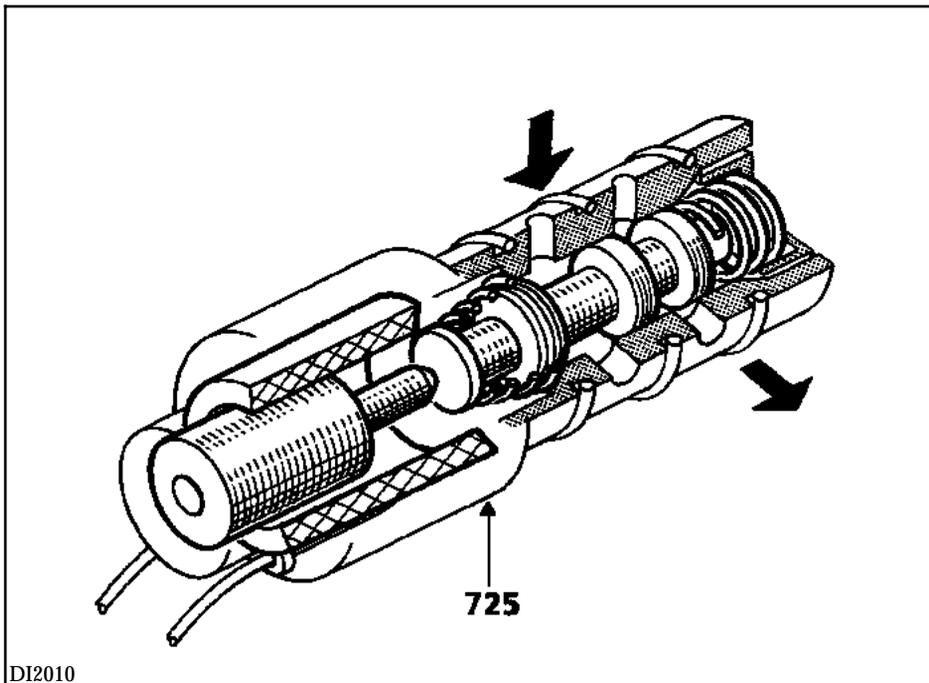
The valve has 4 main positions :

- hydraulic supply to the jack (increase in pressure),
- hydraulic isolation of the jack (maintenance of pressure),
- return to reservoir (decrease in pressure),
- defect mode position (fluid passes through a restrictor to return to the reservoir. This restrictor allows the fluid to leave the jack slowly, allowing the clutch to engage progressively).

Feed voltage: 12 V

Current: 0.9 A

Resistance: 6 Ω



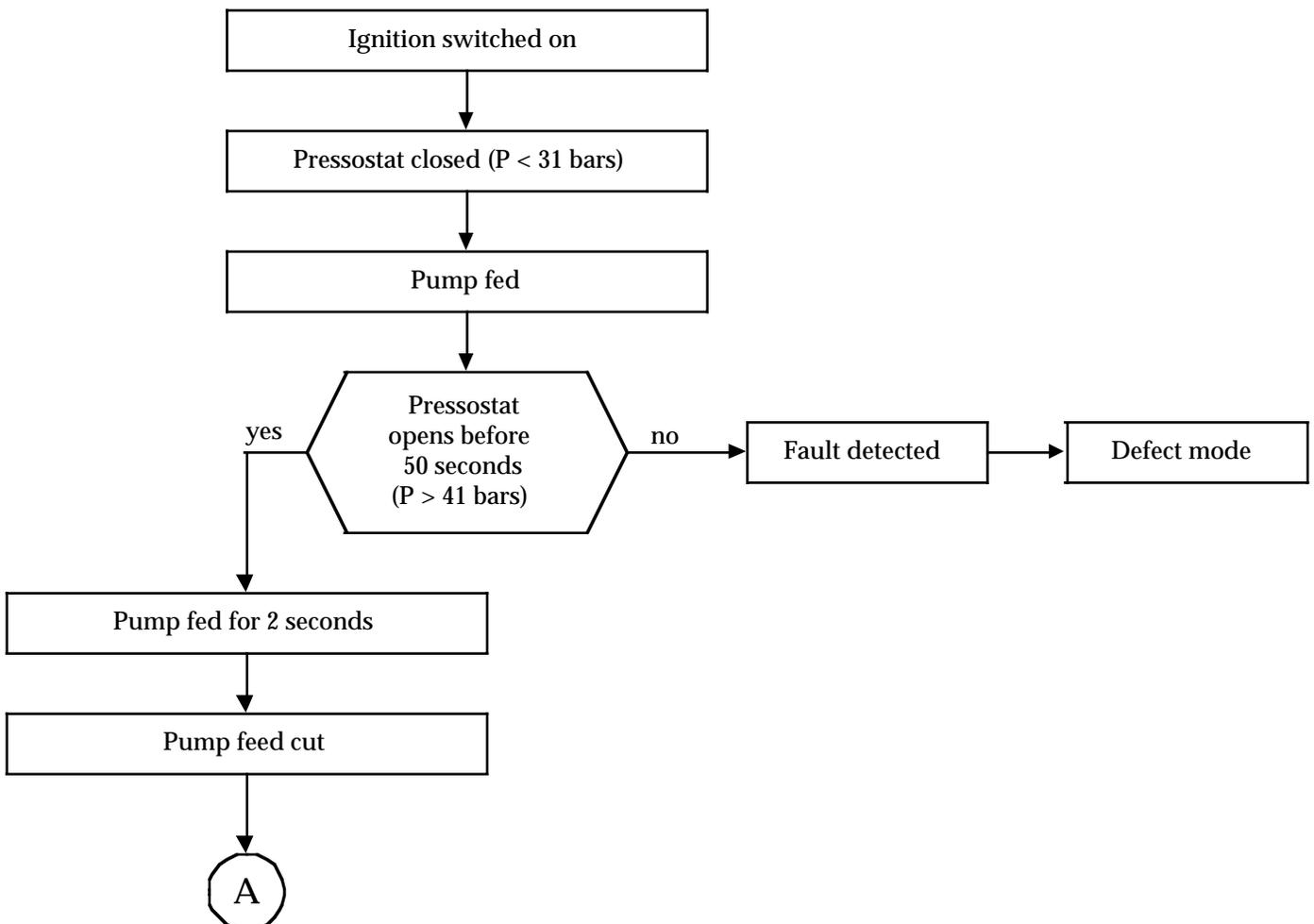
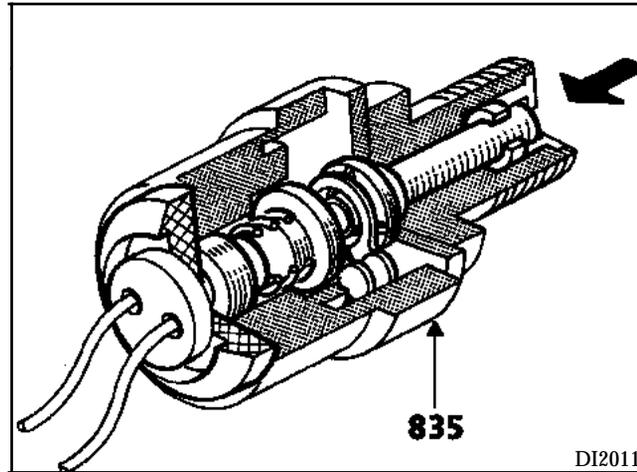
DI2010

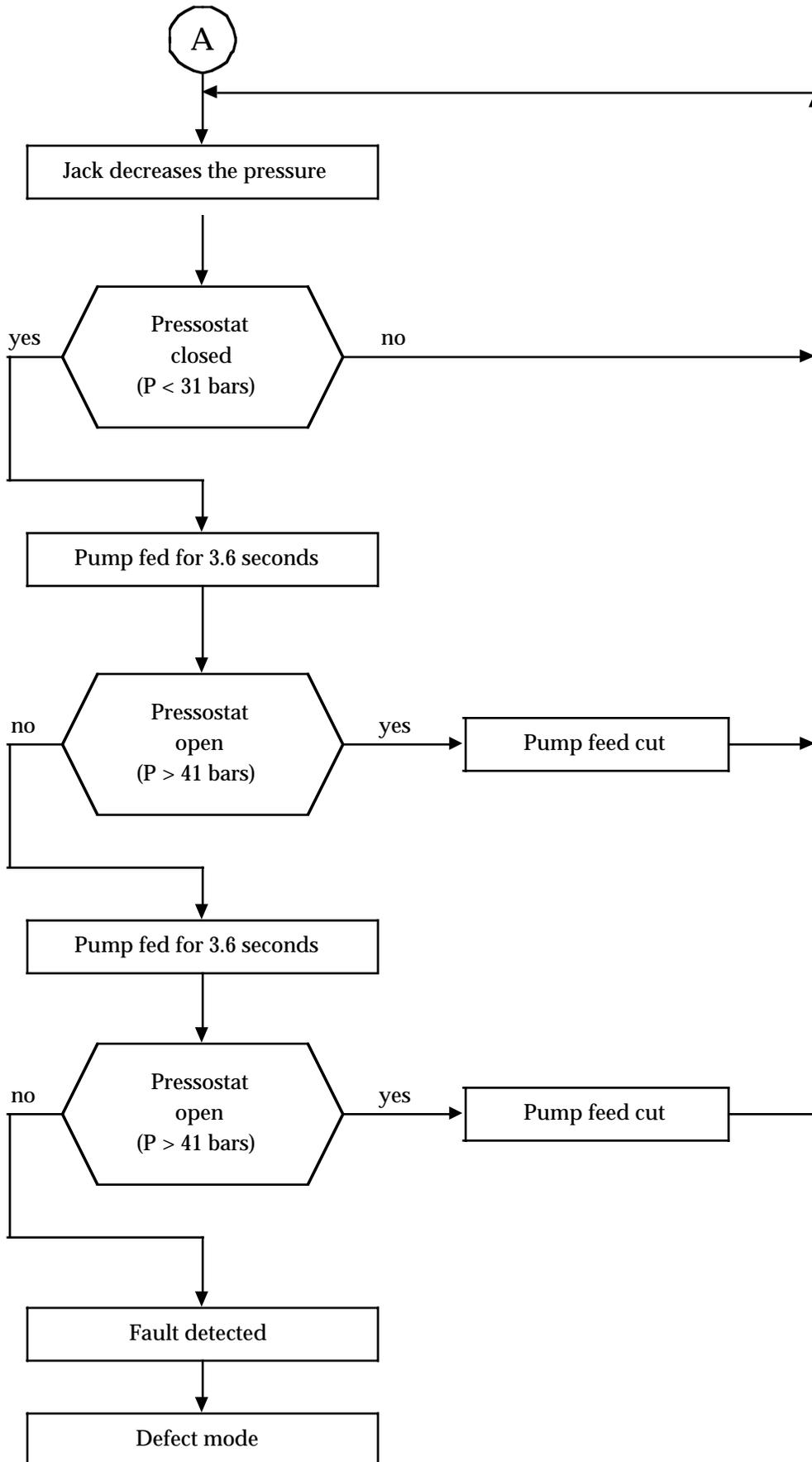
6 - Pressostat (835)

The change in state of the pressostat depends on the hydraulic pressure:

- Opens at 41 bars.
- Closes at 31 bars.

This information allows the operation of the hydraulic pump to be controlled.





7 - Pressure release valve

This protects the various components from excess pressure.

This valve opens at **70 bars** (the operating pressure of the system is **41 bars**).

8 - Reservoir

This contains the hydraulic fluid. Its size is such that it is able to cope with the variations in level due to :

- the position of the jack,
- the fill level of the accumulator,
- clutch wear.

To check the level refer to the section "Hydraulic fluid level".

II HYDRAULIC JACK

9 - Jack (slave cylinder)

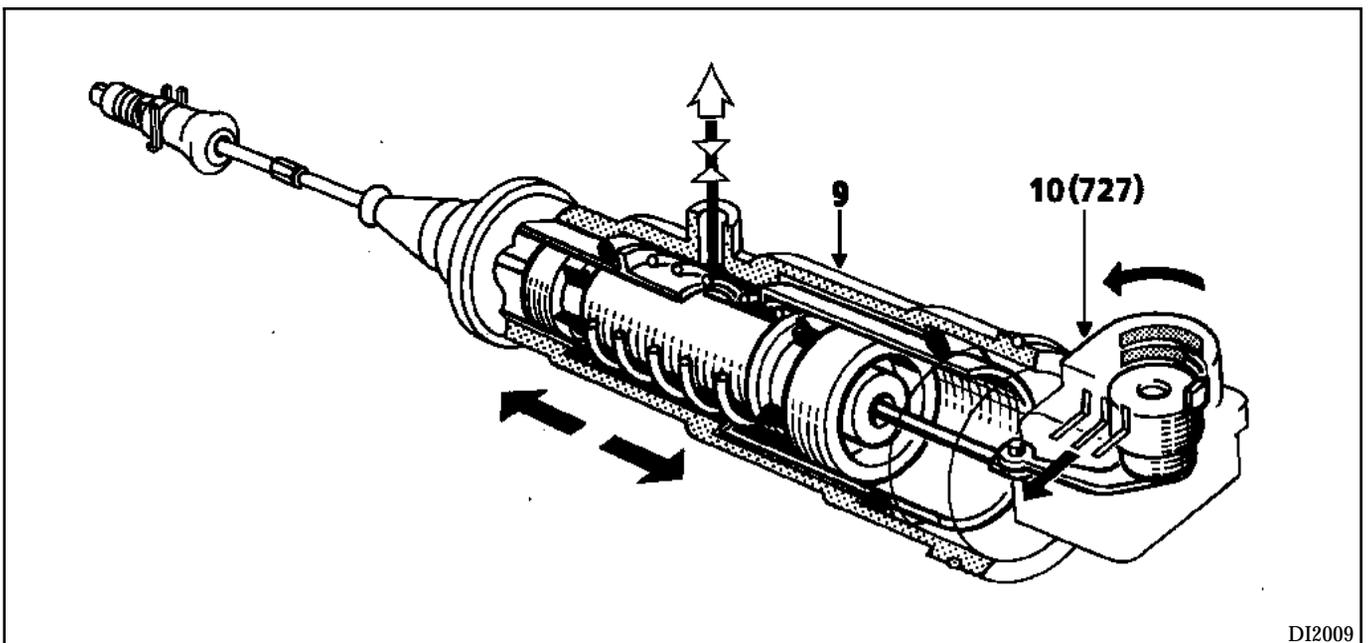
The jack receives hydraulic pressure from the pump assembly and controls the clutch fork.

The jack may have one of many positions. There are however 3 stable control positions:

- Clutch out position (vehicle stationary, no gear engaged).
- Slipping position (vehicle stationary, gear engaged during gear changing operation). This position gives a rapid response time.
- Clutch in position (vehicle moving, gear engaged; vehicle stationary, ignition off).

The variations in clutch position are compensated for by a grooved adjustment device. This device should be adjusted each time the pump-jack assembly is replaced (see section "Removal-refitting of the pump-jack assembly").

Clutch wear is compensated for by the automatic clutch system. This wear may be read (see section "Reading clutch wear").



DI2009

10 - Clutch position sensor (727)

The sensor (727), which is mechanically connected to the piston, informs the computer of the position of the clutch. (It cannot be separated from the jack).

3 track connector:

- A : Earth
- B : Clutch position information
- C : + 5 Volts

REMOVAL - REFITTING

Special notes

Apply the handbrake before any operation on the vehicle.

The connectors for the various components may only be disconnected when the ignition is off, the engine has stopped completely and the vehicle is stationary.

Before carrying out any operation on the pump-jack assembly discharge the accumulator (to do this see section "Discharging the accumulator").

It is forbidden to :

- separate the pump assembly from the jack,
- dismantle the various components of the pump assembly or the jack (assembly is under pressure).

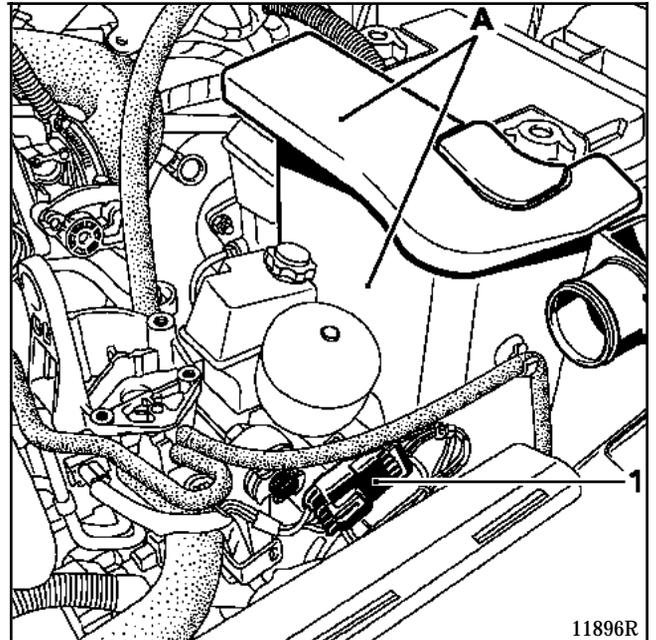
REMOVAL

Put the vehicle on a 2 post lift.

Disconnect the battery.

Remove the air intake pipe and its support.

Remove the injection computer after taking off its protective plastic cover (A).



11896R

Disconnect the pump connector (1).

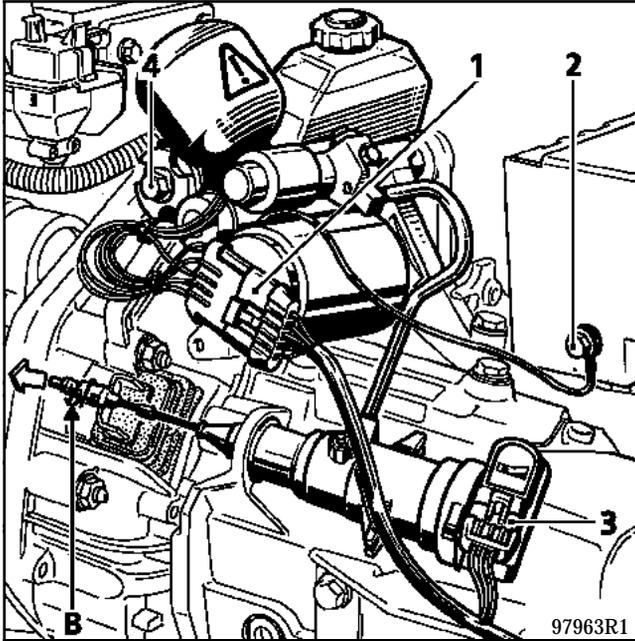
Separate the fork/ jack connection.

AUTOMATIC CLUTCH

Pump-hydraulic jack assembly

20

Remove adjusting clip (B) having first marked its position (by counting the number of grooves). This will prevent you having to adjust the clutch mechanism (applies only to the reassembly of the same electro-pump assembly).



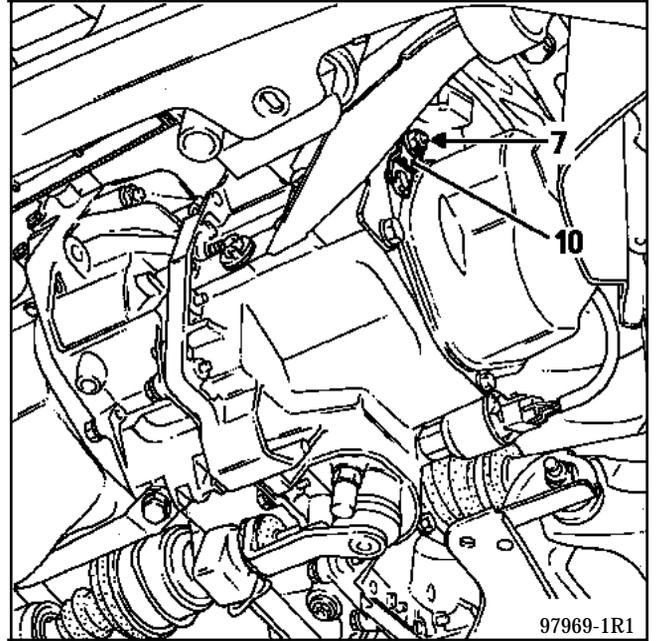
Raise the vehicle.

Remove the engine undertray.

Remove the clip and the left wheel arch bolt (this allows access to the jack mounting nut).

Remove the jack mounting nut (7).

Remove the jack mounting plate (10).



Disconnect the clutch position sensor connector (3).

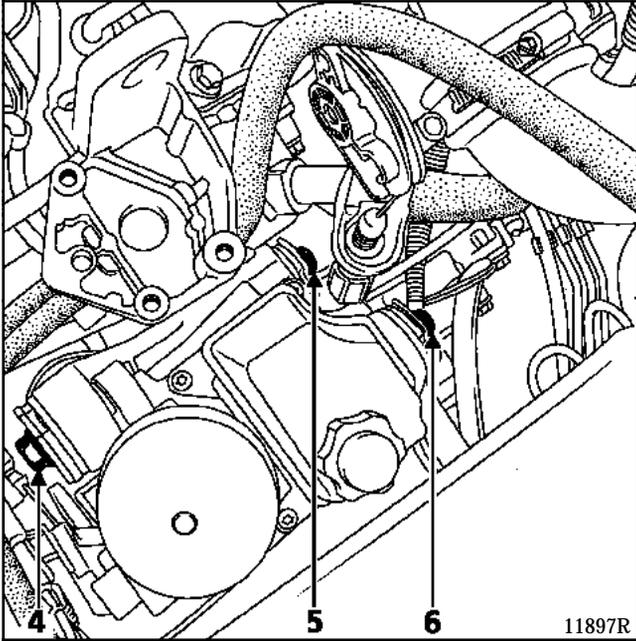
Lower the vehicle.

AUTOMATIC CLUTCH

Pump-hydraulic jack assembly

20

Remove the three pump mounting nuts (4, 5 and 6).



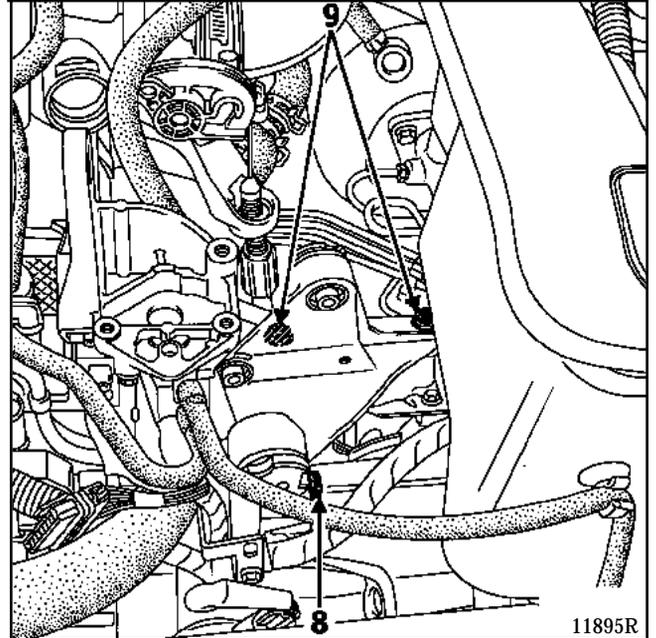
Lift the pump and then remove the earthing wire by unscrewing its mounting nut (2).

Lower the vehicle.

Pull back the jack to allow removal of the cable and the ball joint through the jack pressure ring.

Extract the pump-jack assembly (handle the assembly by the motor or the accumulator to avoid damaging it).

To remove the pump assembly mounting, unscrew the nut on the edge of the gear box (8) and the two bolts (9) on the housing.



REFITTING

To refit the pump assembly mounting, tighten the nut (8) on the edge of the gearbox to a torque of **4 daN.m.**, then tighten the bolts (9) on the housing to a torque of **4 da N.m.**

Reposition the pump assembly in its housing. The pump assembly is supplied filled with fluid. Before fitting it, secure the earthing wire by tightening its mounting nut.

Thread the cable through the jack pressure ring (having first removed the adjustment shim and memorised its position for new pump-jack assemblies).

Refit the three pump assembly mounting bolts (4), (5) and (6). Tighten them to a torque of **2.5 daN.m.**

Remove the rubber ring on the reservoir breather (this prevents leakage of hydraulic fluid during transport).

To carry out other refitting operations, proceed in reverse order to removal.

ADJUSTING THE CLUTCH MECHANISM (after replacing the pump-jack assembly)

To adjust the clutch mechanism the adjusting sleeve (10), delivered with the pump-jack assembly, must be used. (It is grey, and has also been supplied with this documentation).

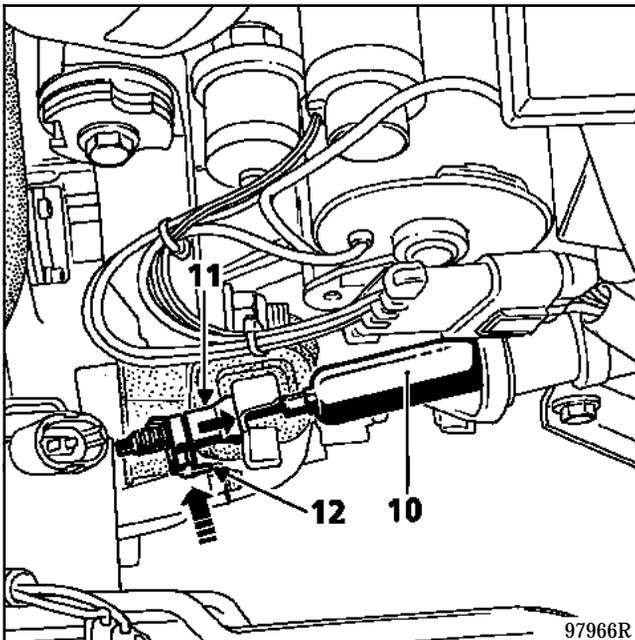
This sleeve is correctly positioned when it touches the body of the jack at one end and the steel washer on the cable at the other end (it is necessary to pull slowly on the cable in order to position the shim).

Position the cable and the ball joint (11) on the fork.

Slide the ball-joint (11) until it touches the fork (push against the fork very gently to eliminate any play).

Press the retaining clips (12) into the adjustment groove which is closest to the ball joint (11).

Remove the plastic adjustment shim (10) and retain it as a special tool.

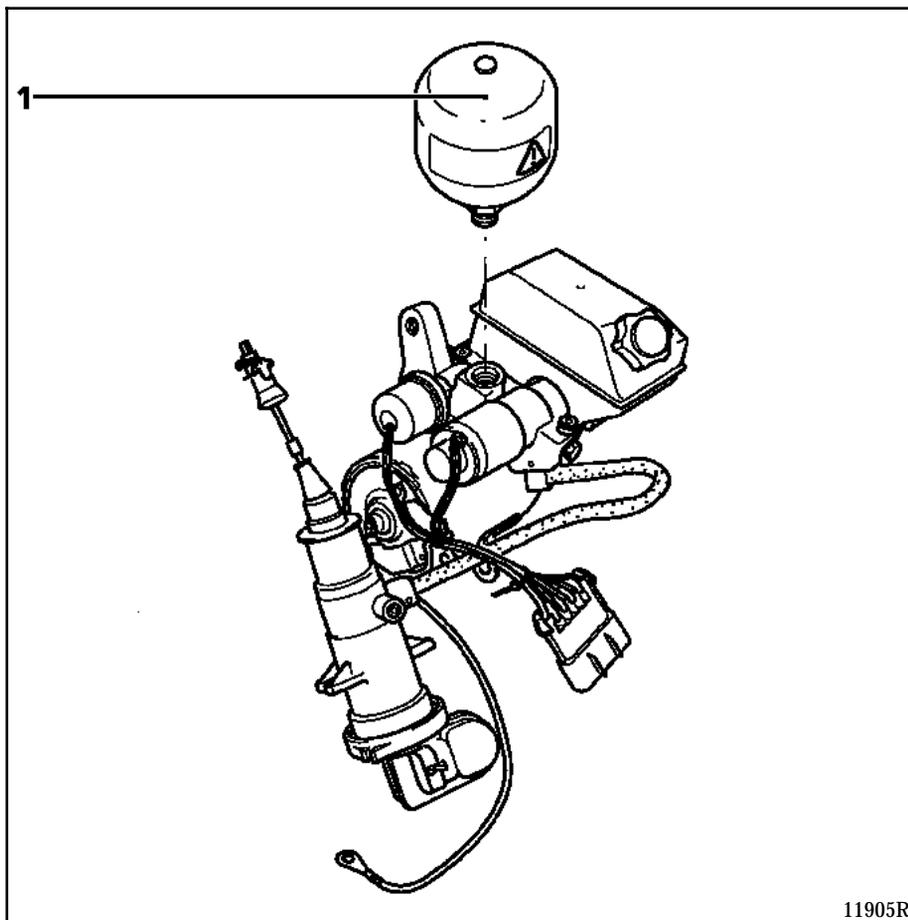


Reconnect the battery

IMPORTANT :

After each replacement of the pump-jack assembly it is necessary to :

- programme the neutral position for the solenoid valve and the position of the jack (see section "Programming the neutral position for the solenoid and the jack position "),
- enter the date of the After Sales operation (see section "Entering the date of After Sales operations"),
- erase the computer memory (see section "Fault finding").



REMOVAL

Discharge the pressure in the accumulator (see section "Discharging the accumulator").

Remove the pump-jack assembly (see section "Pump-jack assembly").

Protect eyes with grinding goggles.

Thoroughly clean the part connecting the accumulator with the pump assembly.

Unscrew the accumulator (1) a half-turn.

Wrap a cloth around the lower part of the accumulator (the part mounted on the pump assembly) (this is to catch any hydraulic fluid escaping due to residual pressure).

Carefully unscrew the accumulator by hand.

REFITTING

Remove the protective plug of the new accumulator.

Check that the surfaces of the accumulator and the pump assembly connecting parts are clean.

Position the accumulator and tighten to a torque of 3.5 ± 0.5 daN.m.

Stick the safety label on the accumulator (one is supplied with the accumulator).

Refit the pump-jack assembly to the vehicle (see section "Pump-jack assembly").

Refill the reservoir approximately three-quarters full with Castrol Dot 3 brake fluid.

CHECKING THAT THE SYSTEM OPERATES CORRECTLY

Connect the XR25.

Switch the ignition on and then off again (repeat the operation 10 times, waiting 10 seconds each time the ignition is switched off).

Switch the ignition on. Connect the automatic clutch computer to the XR25 (enter D26).

Fully press down slowly and release the clutch 20 times.

Check the level of hydraulic fluid (see section "Hydraulic fluid level").

Carry out a road test using all the gears.

Recheck the hydraulic fluid level.

Check that no fault is stored in the automatic clutch computer.

Check that there is no leakage at the surfaces of the accumulator-pump connection.

DESCRIPTION

There are two switches in the gear lever knob:

- a pull switch (switch closes when the gear lever is pulled),
- a push switch (switch closes when the gear lever is pushed).

A force applied to the gear lever knob by the driver which is greater than a predetermined threshold closes one of the two switches, connecting it to earth.

This information tells the computer that the driver wishes to change gear. If there is a fault with the sensor, the information is taken from the signal from the gear engaged sensor.

When this sensor is replaced, the gears must be programmed (see section "Programming the gears")

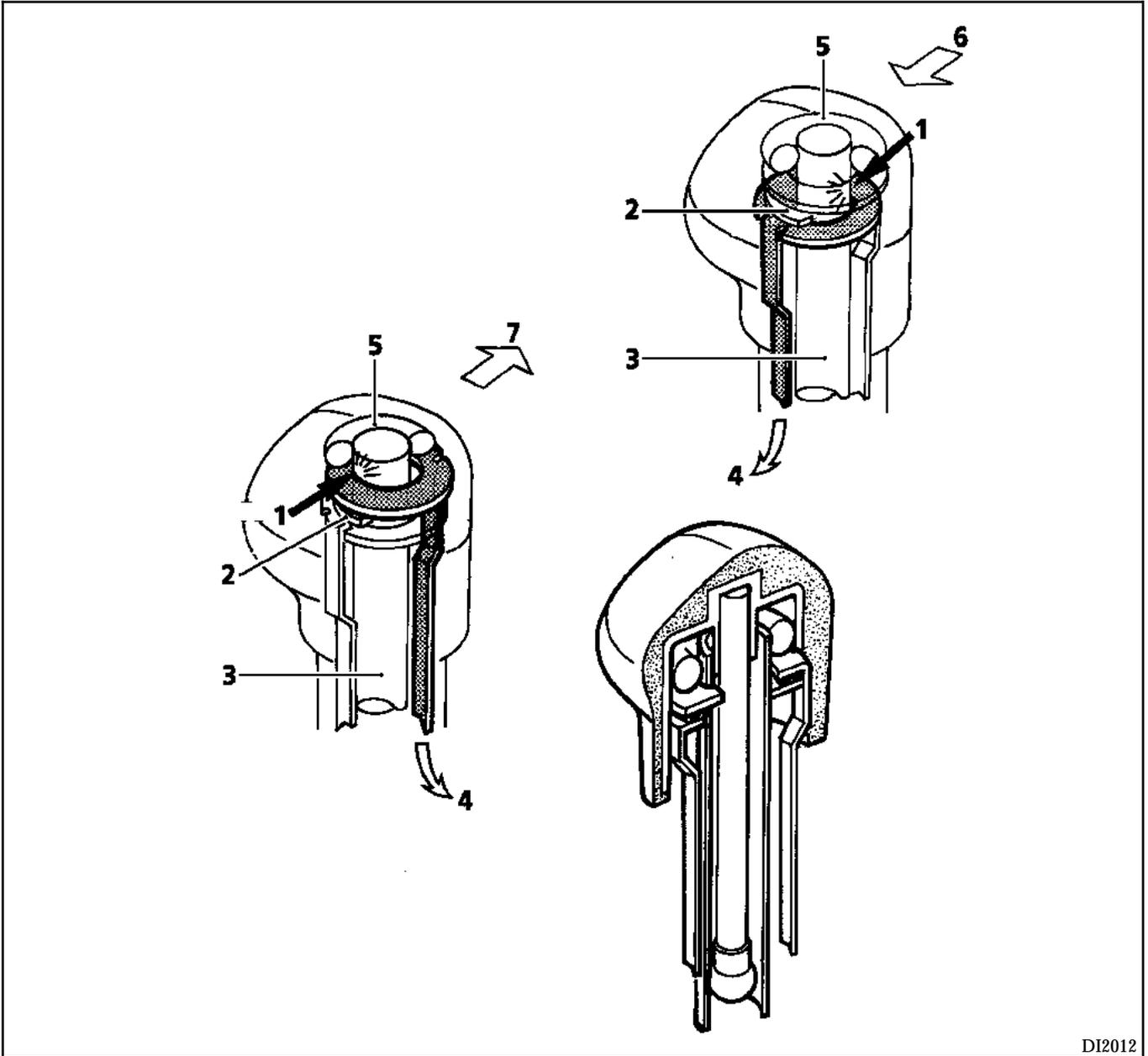
3 track connector:

- A** : Push information
- B** : Pull information
- C** : Earth

AUTOMATIC CLUTCH

Gear lever sensor (728)

20



DI2012

KEY

- 1 Switch
- 2 Insulation
- 3 Earth
- 4 To computer
- 5 Load ring
- 6 Push force
- 7 Pull force

AUTOMATIC CLUTCH

Gear lever sensor (728)

20

REMOVAL

Switch off the ignition and disconnect the battery.

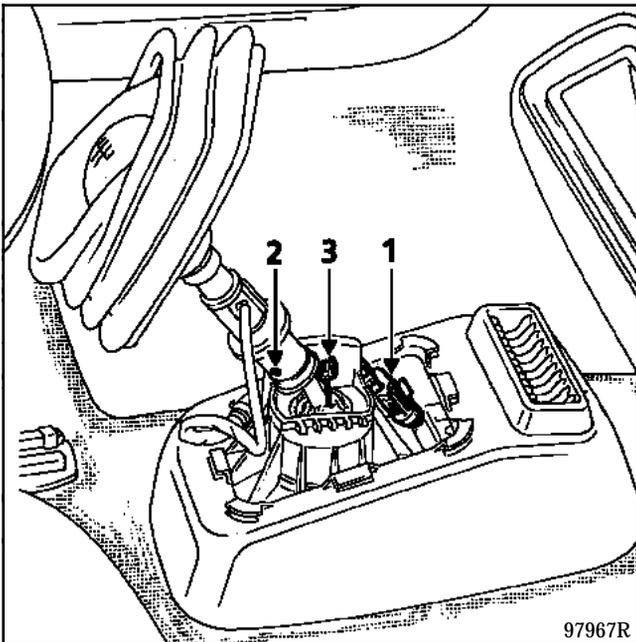
Unclip the protective boot.

Disconnect the electrical connection (1).

Unclip the reverse gear safety cable (3).

Put the gear lever in 4th gear; use a punch to extract the roll pin (2).

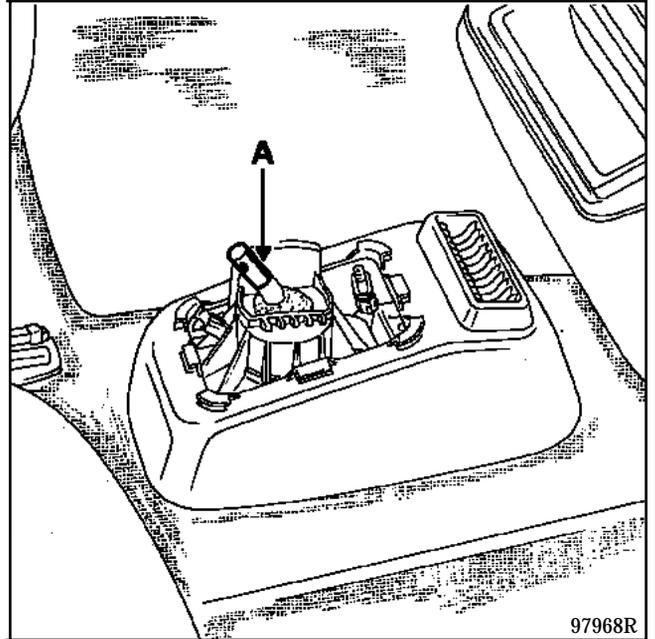
Extract the upper section of the gear lever. Take care as this is bonded as well as being secured by a roll pin.



REFITTING

Clean section (A) of the lever using **solvent S 56 (Part Number 77 01 421 513)**.

On section (A) of the lever apply a thin bead of **Loctite SCELBLOC (Part Number 77 01 394 072)**.



Replace the lever. Check the alignment of the holes in the upper and lower sections through which the roll pin is fitted.

If any excess adhesive is present, wipe it off using a cloth.

Replace the roll pin (2).

AUTOMATIC CLUTCH

Gear lever sensor (728)

20

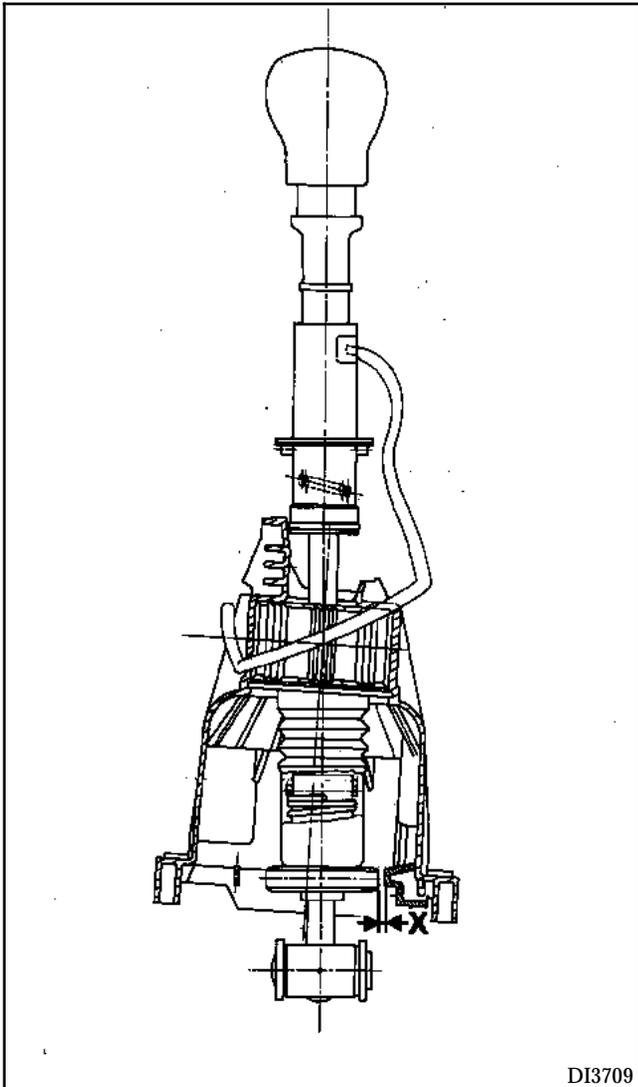
Refit the reverse gear safety cable (3).

Reconnect the electrical connection.

Refit the protective boot.

Check that reverse gear engages correctly.

Check the play **X**. In 1st and 2nd gears it should be **4 mm ± 0.7**.



ATTENTION

The sensor in the gear lever knob is extremely fragile and should be handled with care.

IMPORTANT

After removing the gear lever, it is necessary to:

- programme the gears (see section "Programming the gears"),
- erase the computer memory (see section "Fault finding"),
- enter the date of the After Sales operation (see section "Entering the date of After Sales operations").

AUTOMATIC CLUTCH

Engaged gear sensor (726)

20

DESCRIPTION

The sensor comprises:

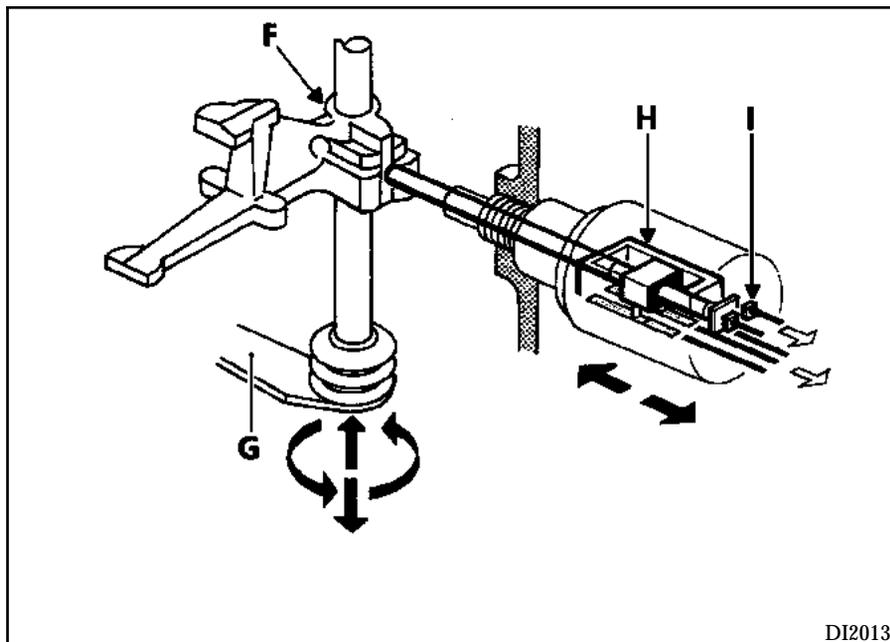
- a linear potentiometer,
- a reversing light switch

It is mounted on the gearbox housing.

A cam which is part of the selection device actuates the potentiometer follower. A switch at the end of travel stop feeds the reversing light.

5 track connector:

- A : + 5 Volts feed
- B : Gear engaged information
- C : Earth
- D : } Reversing light switch
- E : }



Key:

- F : Selection finger with cam
- G : Gear control
- H : Potentiometer
- I : Reversing light switch

AUTOMATIC CLUTCH

Engaged gear sensor (726)

20

The engaged gear sensor optimises the operation of the automatic clutch by informing the computer of:

- the beginning and end of gear changing operations,
- the gear engaged.

For each gear, the computer has a predetermined memorised value range. If the information received does not correspond to the set range, the computer is able to initiate a defect mode and to warn the driver with a buzzer message.

GEAR SELECTED	Predetermined gear range (no units) value between 0 and 255
Neutral	113 - 142
1st - 2nd	147 - 200
3rd - 4th	72 - 115
5th	12 - 71
Reverse	199 - 242

To determine the difference between gears:

- from 1st to 2nd
- from 3rd to 4th

the computer uses the "push or pull" information.

REMOVAL

Put the vehicle on a 2 post lift.

Switch the ignition off and disconnect the battery.

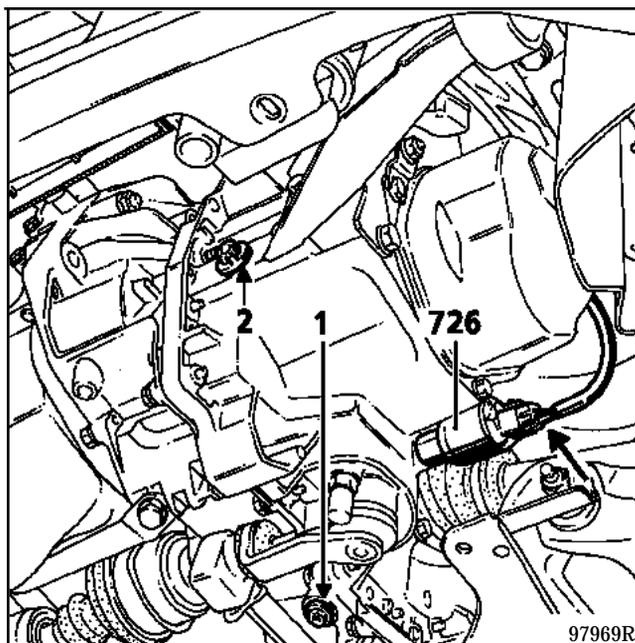
Lift the vehicle.

Remove the engine undertray.

Drain the gearbox (plug 1)

Disconnect the engaged gear sensor.

Unscrew the sensor (726).



REFITTING

Screw the engaged gear sensor (726) back into position using **Loctite FRENETANCH**. Tighten it to a torque of **2 daN.m**.

Reconnect the connector to the sensor (726).

Fill the gear box and check the level (plug 2). The level is measured by overflow.

Refit the engine undertray.

IMPORTANT :

After removing the engaged gear sensor it is necessary to:

- programme the gears (see section "Programming the gears"),
- erase the computer memory (see section "Fault finding"),
- enter the date of the After Sales operation (see section "Entering the date of After Sales operations").

AUTOMATIC CLUTCH

Vehicle speed sensor (250)

20

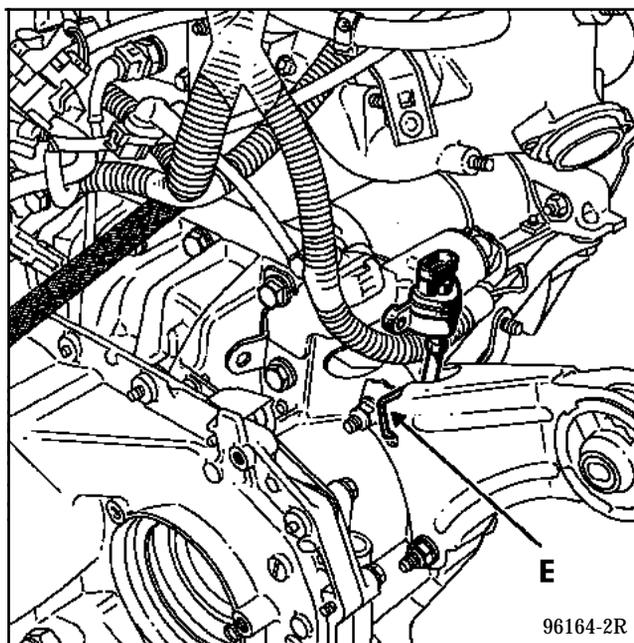
DESCRIPTION

This sensor informs the computer of the vehicle's speed.

REMOVAL

When the engine is not running, disconnect the electrical connector.

Remove pin (E) and disconnect the speedometer cable.

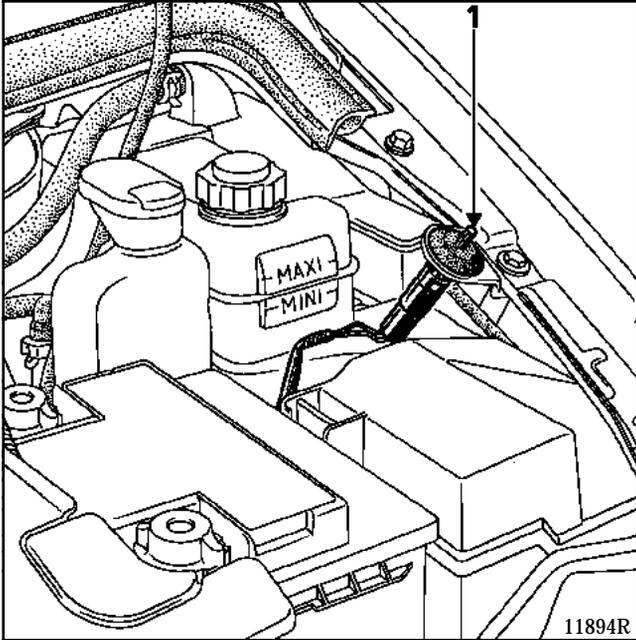


REFITTING

Refitting is the reverse of removal.

Bonnet switch

The function of the bonnet switch is to protect the operator or the user working under the bonnet. It is possible to accelerate the engine from the engine compartment. If a gear is engaged, the vehicle will move. The bonnet switch (1) prevents this type of problem. When the bonnet is open, the bonnet switch closes and the computer receives an earth on track 19. The computer will not engage a gear while it receives the bonnet open signal.



The bonnet switch of the automatic clutch is purpose built. Its casing is brown with black rubber parts. It is essential never to replace it with a door switch, if there is a problem.

Never use the bonnet switch for any other use than that for which it was designed (e.g alarm).

CHECKING THE CORRECT OPERATION OF THE BONNET SWITCH

Apply the handbrake.

With the engine running:

- open the bonnet and hold it in position with the stay,
- engage 1st gear (from inside the vehicle),
- accelerate, the vehicle should not move, the buzzer should sound,

To return to normal operation, close the bonnet and select neutral.

Accelerator position information

The accelerator position information is transmitted by the injection computer (track 41) to the automatic clutch computer (track 10).

If you replace the injection throttle position sensor, you must:

- programme no-load and full-load positions (see section "Programming no-load and full-load positions"),
- erase the computer memory (see section "Fault finding"),
- enter the date of After Sales operation (see section "Entering the date of After Sales operations").

Check that for #02 in no-load position, the value is between 15 and 60.

AUTOMATIC CLUTCH

Engine speed sensor (120)

20

DESCRIPTION

This information is provided by the injection computer.

The information is taken from the fuel pump relay.

Air conditioning information (319)

DESCRIPTION

The air conditioning computer provides the information:

- 12 Volts : compressor engaged
- 0 Volt : compressor not engaged

to the injection computer and the automatic clutch computer on track 17.

The injection computer uses this information to modify its reference value for the idle speed.

The automatic clutch computer uses this information to determine whether a change in the engine speed is due to a change in operation of the air conditioning compressor or an action by the driver.

Door switch (180)

DESCRIPTION

The door switch is used for safety reasons. The computer operates the buzzer when the following information is received :

- driver's door open,
- gear engaged,
- engine running.

This warning is given to remind the driver to select neutral before leaving the vehicle.

The driver's door switch earths track 25 on the computer when the door is open.

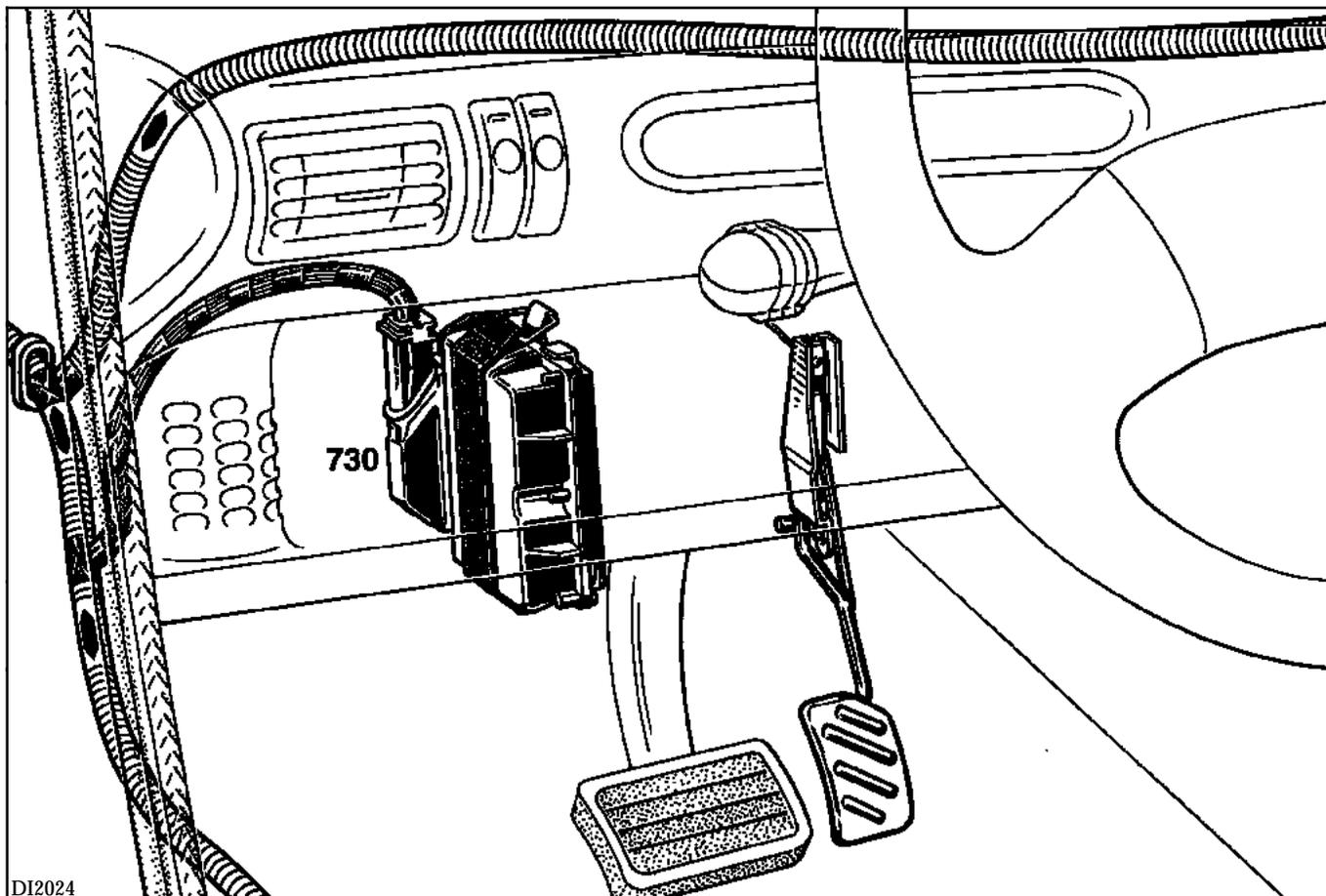
REMOVAL-REFITTING

Before any operation on the computer, switch the ignition off and disconnect the battery.

Remove the elastic strap.

Disconnect the computer 25 track connector.

Remove the computer.



IMPORTANT :

Following replacement of the computer it is necessary to:

- programme the full-load and no-load positions (see section "Programming the full-load and no-load positions"),
- programme the gears (see section "Programming the gears"),
- enter the date of the After Sales operation (see section "Entering the date of After Sales operations").

Programming of the neutral position for the solenoid and the position of the jack occurs automatically when the ignition is switched on. When programming is complete, the buzzer will beep. The values are stored 10 seconds after switching the ignition off.

If bargraph 10 RH side remains illuminated after the above have been programmed (2 dEF for *30), it means that the computer has a new function enabling the clutch slip point to be programmed (see section "Programming neutral position for the solenoid and the jack position").

AUTOMATIC CLUTCH Computer (730)

20

DESCRIPTION

The computer is connected to the harness by a 25 track computer.

Computer tracks:

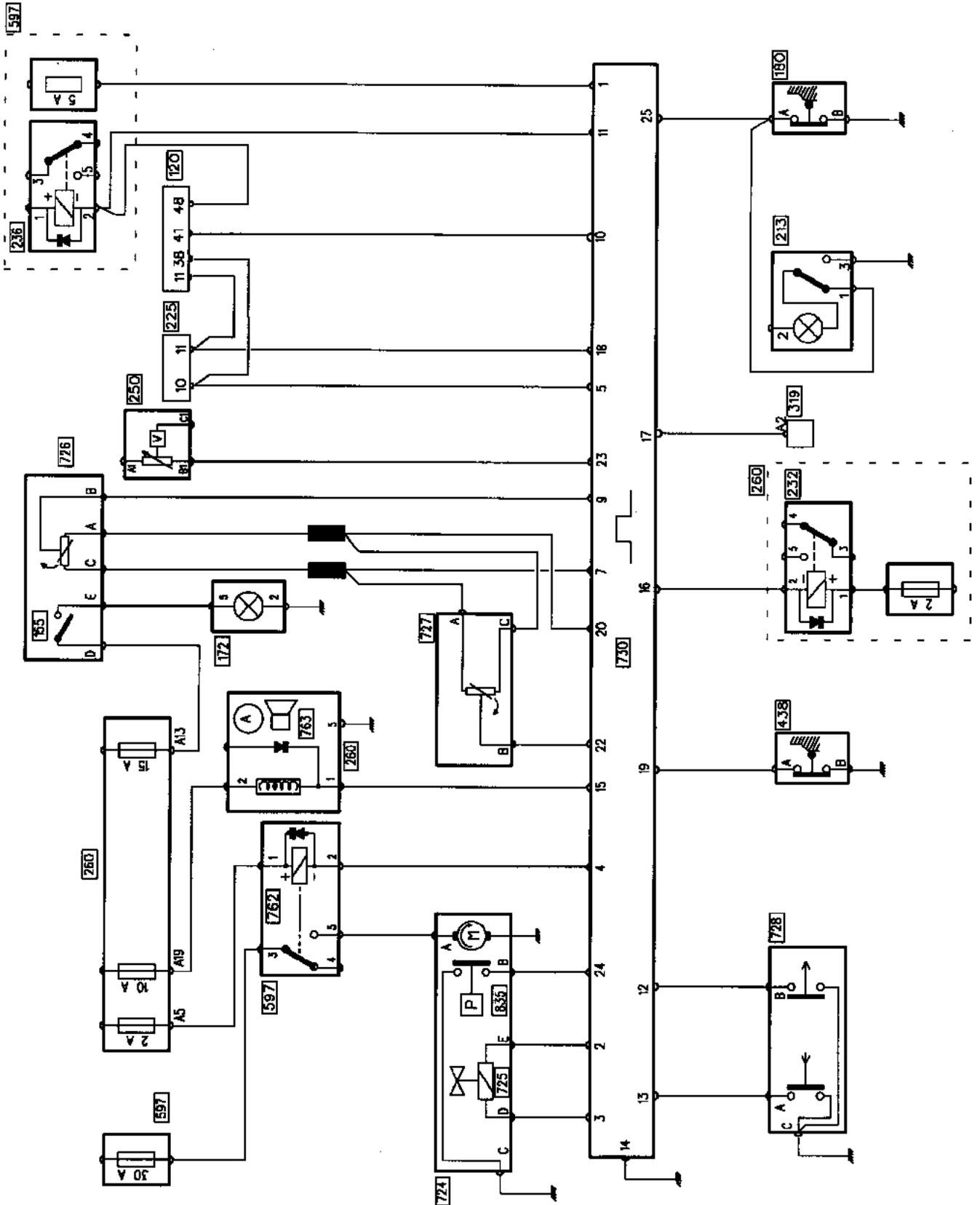
Track no,	Allocation	Track no.	Allocation
1	+ 12 V battery	13	Gear lever sensor (push)
2	Solenoid valve- (track E)	14	Computer earth
3	Solenoid+ (track D)	15	Buzzer control
4	Pump assembly relay control	16	Starter relay control
5	Diagnostic line L	17	Information on air conditioning operation
6	Not used	18	Diagnostic line K
7	Earth for engaged gear sensor and clutch position sensor	19	Information from bonnet switch
8	Not used	20	Feed (+ 5 V) - engaged gear sensor and clutch position sensor
9	Information for engaged clutch sensor	21	Not used
10	Information from accelerator position retransmitted by the injection computer	22	Information from clutch position sensor
11	Engine speed information from injection computer	23	Information from vehicle speed sensor
12	Gear lever sensor (pull)	24	Pressostat switch (Pump assembly)
		25	Door switch

The computer controls the various components in the automatic clutch system.

The computer receives + after ignition information on track 4 from the pump relay coil (762) (It earths the relay to activate the pump).

AUTOMATIC CLUTCH

Operational wiring diagram



KEY

120	:	Injection computer
155	:	Reversing light switch
172	:	Reversing light
180	:	Driver's door switch
213	:	Front courtesy light
225	:	Diagnostic socket
232	:	Starter relay
236	:	Fuel pump relay
250	:	Speed sensor
260	:	Fuse box
299	:	Accessories board
319	:	Air conditioning control panel
438	:	Bonnet switch
597	:	Engine fuse box
724	:	Pump assembly
725	:	Solenoid valve
726	:	Engaged gear sensor
727	:	Clutch position sensor
728	:	Gear lever sensor
730	:	Automatic clutch sensor
762	:	Pump assembly relay
763	:	Buzzer
835	:	Pressostat

AUTOMATIC CLUTCH

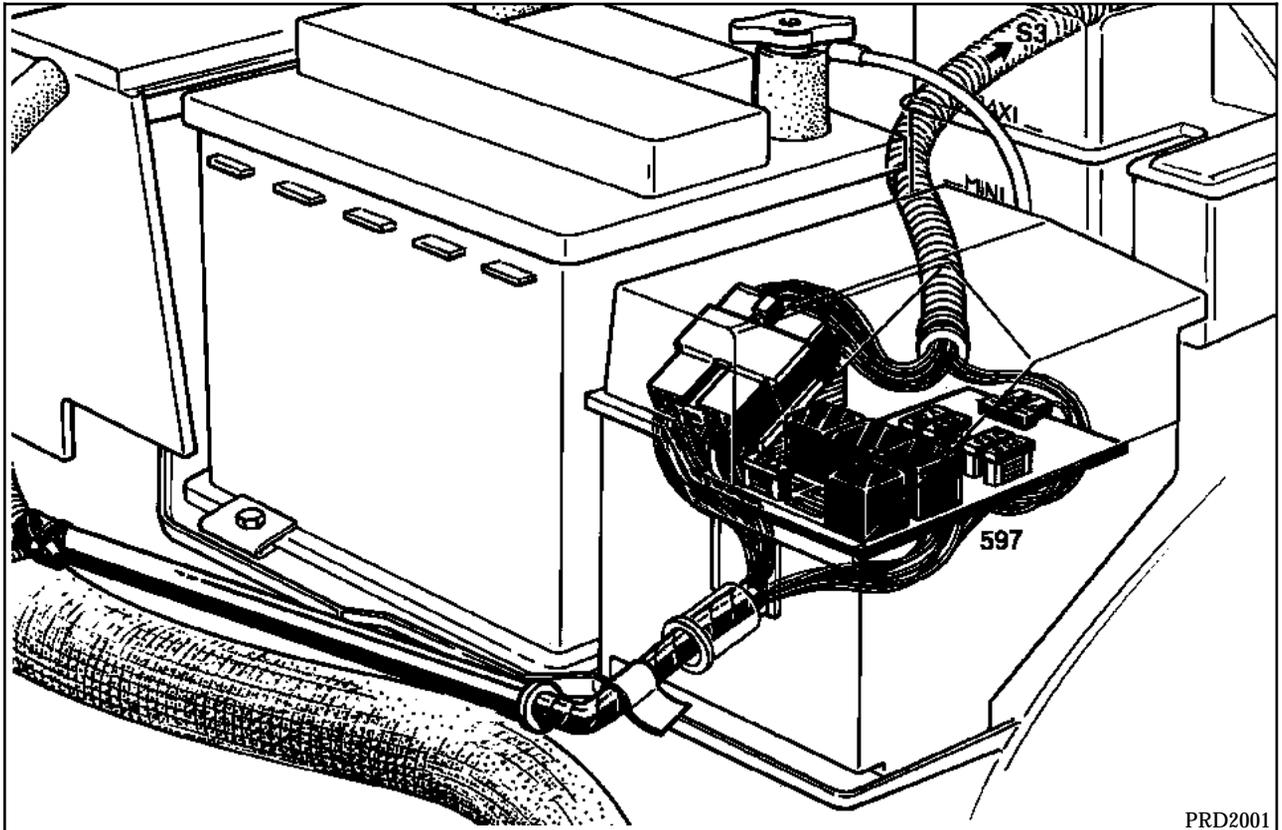
Pump assembly relay (762)

20

DESCRIPTION

The computer controls the pump assembly by earthing the pump assembly relay coil (762) on track 4.

This is located on the board (597).



AUTOMATIC CLUTCH

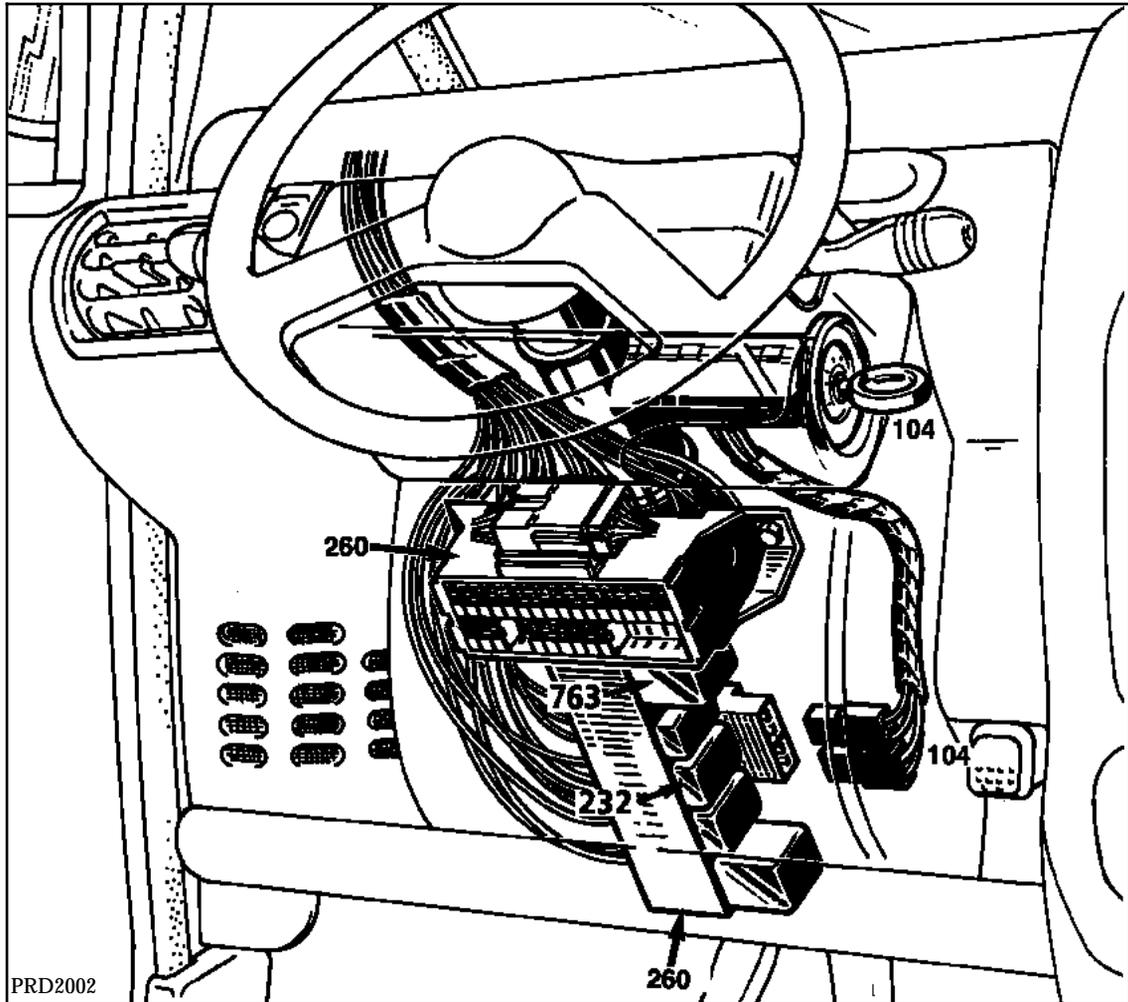
Starter relay (232)

20

DESCRIPTION

The computer authorises the engine to be started by earthing the starter relay coil (232) on track 16 :

- if the engine is stationary,
- if the gear box is in neutral,
- if there is no pressure on the gear lever (push and pull switches open),
- if no major fault is detected.



DESCRIPTION

The computer uses the buzzer to alert the driver in the case of :

- manoeuvres which are dangerous for the clutch or the driver. It must be emphasised that the driver must heed the message informing him that the vehicle must not be left with the engine running and a gear engaged.
- faults being detected.

Refer to the section "Fault finding" for information on the audible messages given and their meaning.

The computer controls the buzzer on track 15.

If the connection between the buzzer and computer track 15 is cut, the buzzer is sounded continuously until the electrical wiring is repaired (for the location on the vehicle, see the previous page).

VEHICLE AND ENGINE STATIONARY (STOPPED)

When the vehicle and engine are stopped, the clutch is engaged (clutch locked).

When the ignition is switched on, the automatic clutch computer makes the following checks:

- push / pull switch not activated,
- engine not running,
- no critical fault was detected during the last period of operation.

If the checks are correct, the computer earths the coil of the pump motor relay (762). The pump then generates hydraulic pressure.

To be able to start the engine, **neutral must be engaged**. If neutral is engaged, the computer uses the solenoid to :

- control the clutch,
- earth the coil of the starter relay (232) (the engine may be started before there is sufficient pressure to completely disengage the clutch).

If the vehicle has been left with a gear engaged (on a slope for example), the above checks are carried out and the system is activated.

However the clutch is disengaged only when the driver exerts a pressure on the gear lever . This pressure allows the clutch to be disengaged and allows neutral to be selected. The engine may then be started.

VEHICLE STATIONARY, ENGINE RUNNING

The clutch is engaged (clutch locked) when the vehicle is:

- in neutral,
- stationary - parked,
- engine running at idle speed.

The clutch is disengaged (clutch slip) when:

- there is a gear engaged,
- stationary -parked,
- engine running at idle speed.

In this position, the vehicle is immobilised.

STARTING THE VEHICLE MOVING

To start the vehicle the driver selects a gear.

To begin the clutch operation phase the computer requires two pieces of information:

- accelerator pedal position greater than a pre-determined threshold,
- engine speed greater than **400 rpm** above the memorised idle speed (the engine speed varies according to engine temperature; warm engine, it is **740 rpm**). An engine speed of **740 + 400**, or **1140 rpm** is therefore required.

The automatic clutch computer memorises the idle speed when the vehicle is stationary, engine running.

When the air conditioning is selected, the injection computer specifies an idle speed of **880 rpm** for a warm engine. In order to be able to differentiate between an increase in engine speed caused by the air conditioning computer or one requested by the driver, the automatic clutch computer receives air conditioning selected information.

If the gear selected, ie, 2nd or 3rd, to start the vehicle moving causes excessive slip, the computer sounds the buzzer during the period of slippage.

To reduce clutch slip, the automatic clutch computer compares engine speed information with vehicle speed information according to the gear engaged.

If a stationary vehicle with a gear engaged and the engine running is left to descend a slope and gain speed, at a given speed the clutch will be engaged (clutch locked) progressively.

CHANGING UP THE GEARS

To change gear, the driver applies a pressure to the gear lever either by pushing or pulling it, and releases the pressure at the accelerator pedal at the same time. These actions cause the clutch to be disengaged (clutch slip) and a new gear to be selected.

The end of the gear changing operation is detected when the signal from the engaged gear sensor lies within a range allocated to a given gear.

From this moment on the clutch is once more engaged (clutch locked).

No account is taken of pressure applied to the gear lever in the same direction as the last pressure to change gear, and this will not cause the clutch to be disengaged. In addition, the pressure exerted by a driver's hand left on the gear lever knob inadvertently is not sufficient to earth one of the two switches. These two features prevent the clutch from operating at the incorrect moment.

CHANGING DOWN THE GEARS

This operation is carried out in the same manner as changing up, described above (pressure is applied to the gear lever knob, pressure at the accelerator pedal is released and the gear lever is moved to the required position). If the driver wishes to increase the gear changing comfort, and is used to increasing the engine speed slightly before selecting a lower gear, this manoeuvre may be carried out by accelerating when the gear lever is in neutral (double de-clutching).

If the driver selects a gear which may cause over-revving of the engine (example : changing from 5th to 2nd), the clutch is engaged in a controlled manner to limit engine speed (6,000 rpm for petrol engines).

The clutch will slip until the vehicle speed and engine speed are compatible for the gear selected.

The driver is warned by the buzzer.

STOPPING AFTER DRIVING

When the vehicle stops, the clutch disengages to stop the engine from stalling.

If the driver takes his foot off the accelerator pedal the vehicle is slowed by engine braking until the memorised idle speed plus 200 rpm is reached. From this moment, the clutch begins to slip.

SWITCHING THE IGNITION OFF

After turning the ignition key to the "Stop" position, the computer remains operational for a few seconds to carry out the following functions:

- Storage of faults noted previously (or present in the system) in the permanent memory.
- Maintenance of the clutch in the disengaged (clutch slip) position for a short period to allow the engine to stop.
- Authorisation for the clutch to engage (clutch lock) progressively.

PUSH STARTING THE VEHICLE

This assumes that the battery voltage is within acceptable limits > 7 volts.

If the ignition key is put in the "Running" position the automatic clutch system is able to reach operating pressure and disengage the clutch if the gear box is in neutral and a gear needs to be engaged.

If the battery does not have sufficient voltage, the clutch will not disengage. It is then inadvisable to push the vehicle or tow it in order to start it.

If the clutch is disengaged (clutch slip) and the gear box is in neutral, the vehicle may be pushed or towed. At a speed of 4 mph (7 km/h) a beep will be heard which means that 2nd gear may be selected, causing the clutch to engage and the engine to be driven. Once the engine has started, neutral may be selected and the engine speed may be increased as necessary.

OPERATION IN DEFECT MODE

The vehicle may still be driven even if minor faults have been detected. In the case of intermittent minor faults, the computer is programmed to resume normal operation as soon as the faults have disappeared.

If there is a major fault, the system turns off. In most cases this is seen by the slow engagement of the clutch (the clutch remains engaged (clutch locked) if it was already in that position). However, under certain circumstances: if the vehicle is moving at a speed less than 2.5 mph (4 km/h), and if the accelerator pedal is depressed by less than 10% of its complete travel, the clutch will disengage (slip).

If the system's electrical feed is accidentally cut, the clutch will engage (lock). The time taken for the clutch/system to reactivate is defined by the passage of hydraulic fluid through a restrictor.

If a fault was noted during the last check, when the ignition is switched on again, the buzzer will sound three times. If the fault does not reappear during this check, the warning will be cancelled when the ignition is next switched on.

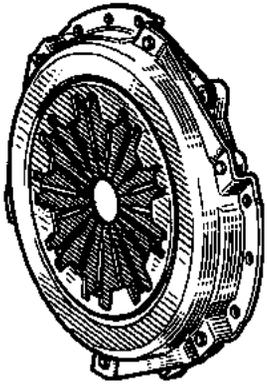
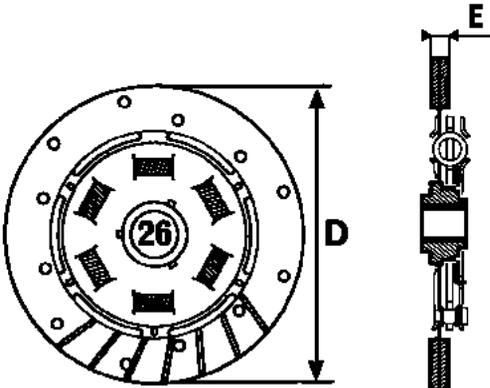
SPECIAL NOTE

The system compensates for clutch wear.

To read this wear refer to section "Reading clutch wear".

AUTOMATIC CLUTCH

Clutch identification

VEHICLE TYPE	GEARBOX TYPE	ENGINE TYPE	MECHANISM	PLATE
X06	JB1 137 JB1 188*	D7F	 <p style="text-align: right; margin-right: 50px;">85873S</p> <p style="text-align: center;">180 DST 3050 180 CP 3300</p>	 <p style="text-align: center;">90693R7</p> <p style="text-align: center;">26 splines E = 7.6 mm D = 180 mm</p> <p style="text-align: right;">76906R</p>

* Vehicle fitted with air conditioning.

AUTOMATIC CLUTCH

Computer identification

The computer is identified using the Parts Department Part Number.

Connect the XR25 to the diagnostic socket.

Set the selector to S8.

Switch the ignition on.

Enter the code for the automatic clutch.

D
2
6

The display shows:

1
E
P

Enter:

G
7
0
*

The display shows the first 4 figures of the Part Number (example):

7
7
0
0

Then the next 3 figures:

X
X
X

Then the last 3 figures:

X
X
X

The Part Number is shown in the same manner for a second time.

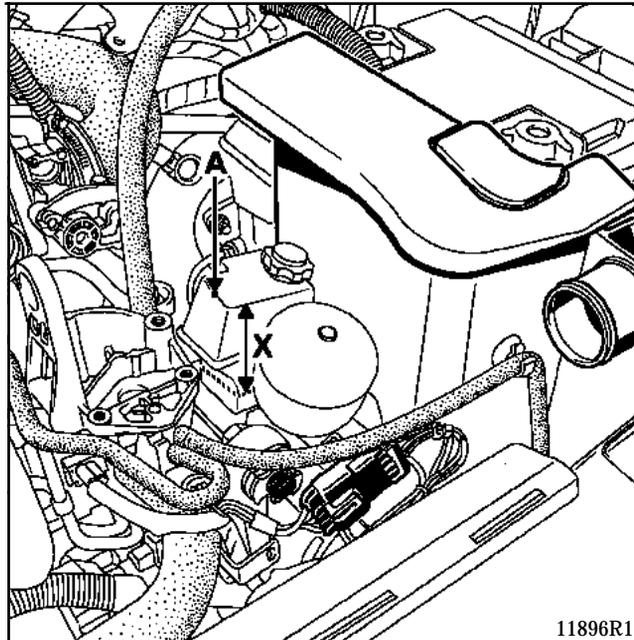
Vehicle type	Engine type	Gear box type	Computer identification
X06	D7F	JB1 137 (A)	77 00 102 016
		JB1 188 (B)	77 00 103 880

- A : vehicle without air conditioning
- B : vehicle with air conditioning

CHECKING THE LEVEL

The level is checked after discharging the accumulator (see following page), with the vehicle stationary and on horizontal ground.

The level of the hydraulic fluid should not be lower than $X=5\text{cm}$ in relation to mark (A). If the level is low, top up with Castrol Dot 3 (check that there is no leakage).



AUTOMATIC CLUTCH

Discharging the accumulator

20

The pressure in the accumulator must be discharged:

- before any operation is carried out on the pump-jack assembly.
- to check the level of the hydraulic fluid.

CONDITIONS FOR DISCHARGING

- Engine speed zero,
- Vehicle speed zero.

DISCHARGE METHOD USING THE XR25

Connect the XR25 to the diagnostic socket.

Set the selector to S8.

Switch the ignition on.

Enter the code for the automatic clutch:

D 2 6

The display shows:

1.EP

Enter:

G 0 6 *

If the conditions are observed, the display shows:

ACT

Then 10 times:

On

OFF

Then:

Fin

Then:

1.EP

Repeat the operation by entering **G06*** (the jack actuates the clutch fork when under pressure).

The accumulator is discharged.

Switch the ignition off and carry out the required operation.

MANUAL DISCHARGE METHOD

Remove the 30 A fuse for the hydraulic assembly located on board 597 in the engine compartment.

Switch the ignition on, press and release the accelerator pedal until the jack is immobilised. Switch the ignition off and replace the fuse after carrying out the required operation.

IMPORTANT :

Discharging the accumulator will cause pressure faults to be memorised. The computer memory must therefore be erased (see section "Fault finding").

AUTOMATIC CLUTCH

Programming full-load and no-load positions

20

To ensure correct operation of the automatic clutch the full-load and no-load positions must be programmed after replacing:

- the automatic clutch computer,
- the injection throttle position potentiometer.

CONDITIONS FOR PROGRAMMING

- Engine speed zero,
- Vehicle speed zero,
- Gear box in neutral.

Connect the XR25 to the diagnostic socket.

Set the selector to S8.

Enter the code for the automatic clutch:

D 2 6

The display shows:

.EP

Enter:

G 2 0 *

The display shows:

APP

If the programming conditions have been observed, the display flashes:

PF

Validate full-load (PF) by pressing the accelerator pedal down fully for 5 seconds and waiting until a beep is heard.

The display flashes:

PL

Validate the no-load position (PL) by releasing the accelerator pedal and waiting until a beep is heard.

The display shows:

ban

Then:

.EP

IMPORTANT :

Erase the computer memory (see section "Fault finding").

Switch the ignition off for 10 seconds to store the new values.

Switch the ignition on again.

Enter the code for the automatic clutch.

Check the full-load and no-load positions have been validated correctly. Bargraph 9 RH side should be extinguished.

Fully depress the accelerator pedal - bargraph 11 RH side should extinguish and bargraph 11 LH side should illuminate.

AUTOMATIC CLUTCH

Programming the gears

20

To ensure correct operation of the automatic clutch the gears must be programmed after:

- replacing the computer,
- removing the gear lever or the linkage,
- removing the gear box,
- removing the engaged gear sensor.

PROGRAMMING CONDITIONS

- Vehicle speed zero.
- Engine speed zero.
- Full-load and no-load positions programmed correctly.

Connect the XR25 to the diagnostic socket.

Set the selector to S8.

Switch the ignition on.

Enter the code for the automatic clutch.

D	2	6
---	---	---

The display shows:

		1	E	P
--	--	---	---	---

Enter:

G	2	2	*
---	---	---	---

The display shows:

		A	P	P
--	--	---	---	---

If the programming conditions have been observed, the display flashes:

			0
--	--	--	---

Put the gear lever in neutral and wait for the beep.

The display shows:

		b	o	n
--	--	---	---	---

Then flashes:

			r
--	--	--	---

Engage reverse gear, keeping pressure on the gear lever and wait for the beep.

The display shows:

		b	o	n
--	--	---	---	---

Then flashes:

			1
--	--	--	---

Engage 1st gear keeping pressure on the gear lever and wait for the beep.

The display shows:

		b	o	n
--	--	---	---	---

Then flashes:

			2
--	--	--	---

Engage 2nd gear keeping pressure on the gear lever and wait for the beep.

The display shows:

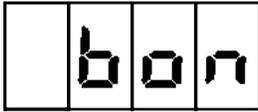


Then flashes:



Engage 3rd gear keeping pressure on the gear lever and wait for the beep .

The display shows:

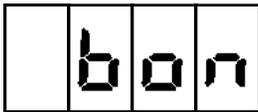


Then flashes:



Engage 4th gear keeping pressure on the gear lever and wait for the beep .

The display shows:

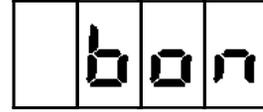


Then flashes:

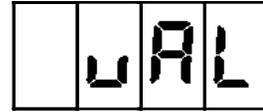


Engage 5th gear keeping pressure on the gear lever and wait for the beep .

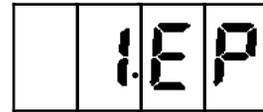
The display shows :



Then:



Then:



IMPORTANT :

Switch the ignition off for 10 seconds to store the new values.

Switch the ignition on again.

Enter the code for the automatic clutch.

Check that the gears have been correctly programmed. Bargraph 9 LH side should be extinguished.

Change from neutral through 1st, 2nd, 3rd, 4th, 5th and reverse in succession - bargraphs 12 LH side - 13 LH side - 13 RH side - 14 LH side - 14 RH side - 15 LH side - 15 RH side should illuminate in turn.

Erase the computer memory (see section "Fault finding").

Enter the date of the After Sales operation (see section "Entering the date of After Sales operations").

Programming neutral position for the solenoid and the jack position

The neutral position for the solenoid and the position of the jack must be programmed :

- each time the pump-jack assembly is removed,
- each time a modification is made to the fork adjustment.

This operation is carried out to compensate for variations:

- in pressure from one pump assembly to another,
- in position of the jack due to the groove adjustment system.

IMPORTANT :

After this operation has been carried out the clutch wear information is no longer valid. The date of the After Sales operation must be entered on completion of the operation (see section "Entering the date of After Sales operations").

PROGRAMMING CONDITIONS

- Engine speed zero.
- Vehicle speed zero.
- Gear lever in neutral.

Connect the XR25 to the diagnostic socket.

Set the selector to S8.

Switch the ignition on.

Enter the code for the automatic clutch:

D 2 6

The display shows:

. E P

Enter:

G 2 3 *

The display shows:

E F F

If the programming conditions have been observed, the display shows:

b o n

Then:

. E P

Bargraph 10 LH side should illuminate.

Enter

G 2 4 *

The display shows:

E F F

If the programming conditions have been observed, the display shows:

b o n

Then:

. E P

Bargraph 10 RH side should then illuminate (bargraph 10 LH side should remain illuminated).

IMPORTANT :

Switch the ignition off for 10 seconds to validate the erasing of the values.

When the ignition is switched on again, the values are programmed automatically.

The buzzer will sound when the computer has stored the new values correctly.

Enter the code for the automatic clutch.

Check that the neutral position for the solenoid and the position of the jack have been memorised. Bargraphs 10 LH side and 10 RH side should be extinguished.

If bargraph 10 RH side remains illuminated (2 dEF for *30), check the Part Number of the computer

- if the part number is **77 00 102 016** or **77 00 103 880**, ignore the illumination of bargraph 10 RH side,
- if the reference is different, programme the clutch slip point by the following procedure:
 - warm up the engine until the engine cooling fan is activated,
 - switch off the ignition,
 - disconnect the XR25,
 - close the bonnet,
 - sit in the driver's seat,
 - close all the doors,
 - apply the handbrake,
 - start the engine,
 - press the brake pedal,
 - engage 5th gear (do not accelerate),
 - programming is complete when the buzzer sounds,
 - switch off the ignition,
 - reconnect the XR25.

Erase the computer memory (see section "Fault finding"). Only bargraphs 1 RH side - 11 RH side - 12 LH side - 18 LH side should be illuminated (For computers with Part Numbers **77 00 102 016** or **77 00 103 880** bargraph 10 RH side will also be illuminated).

AUTOMATIC CLUTCH

Reading clutch wear

20

The automatic clutch computer allows the level of clutch wear to be read.

For the reading to be valid, the following conditions must be observed:

- the original computer must still be fitted,
- the pump-jack assembly must not have been removed since fitting in the factory,
- the position of the jack should not have been programmed since the vehicle left the factory.

Use the XR25 to determine whether these factors are correct.

Read the date of the last After Sales operation, (see section "Reading the date of After Sales operations").

If the date read is 00-00-00, the level of wear shown by the XR25 is valid.

TO READ THE WEAR

Connect the XR25 to the diagnostic socket.

Set the selector to S8.

Switch the ignition on.

Enter the code for the automatic clutch:

D 2 6

The display shows:

1. EP

Enter:

0 8

The wear value (no units) is shown on the display:

57

This may be used for fault finding:

- new clutch : 0
- worn clutch : 59

AUTOMATIC CLUTCH

Reading the date of After Sales operations

20

It is possible to read the date of the last operation on the automatic clutch, which is stored in the computer memory.

To do this:

Connect the XR25 to the diagnostic socket.

Set the selector to S8.

Switch the ignition on.

Enter the code for the automatic clutch:

D	2	6
---	---	---

The display shows:

	1	E	P
--	---	---	---

Enter:

G	7	3	*
---	---	---	---

The display shows the day:

	J	X	X
--	---	---	---

J = Day

Then the month:

	n	X	X
--	---	---	---

n = Month

Then the year:

	A	X	X
--	---	---	---

A = Year

Then the day, month and year again.

Then:

	F	i	n
--	---	---	---

Then:

	1	E	P
--	---	---	---

Entering the date of After Sales operations

After each operation on the automatic clutch, the date of the operation MUST be entered:

Connect the XR25 to the diagnostic socket.

Set the selector to S8.

Switch the ignition on.

Enter the code for the automatic clutch:

D	2	6
---	---	---

The display shows:

	.	E	P
--	---	---	---

Enter:

G	7	2	*
---	---	---	---

The display shows:

	J		P
--	---	--	---

Enter the day of the operation (tens, then units).

x	x
---	---

Validate by pressing:

*

The display shows:

	n		P
--	---	--	---

Enter the month of the operation (tens, then units)

x	x
---	---

Validate by pressing:

*

The display shows:

	A		P
--	---	--	---

Enter the year of the operation (tens, then units) :

x	x
---	---

Validate by pressing:

*

The display shows:

	J	X	X
--	---	---	---

Then:

	n	X	X
--	---	---	---

Then:

	A	X	X
--	---	---	---

Then the day, month and year again.

Then:

	F	i	n
--	---	---	---

Then:

	.	E	P
--	---	---	---

GENERAL

The computer has a management system for controlling the peripheral components of the automatic clutch system.

If there is a fault with one of these peripheral components, the computer warns the driver by sounding the buzzer.

At the same time, it sends the automatic clutch into defect mode.

The fault which triggered the sounding of the buzzer may be visualised using the XR25.

Visualised faults are stored in the permanent memory and are therefore saved after the ignition is switched off.

USING BORNIER Elé. 1332

If information obtained using the XR25 requires verification of electrical continuity, connect bornier **Elé. 1332** in place of the automatic clutch computer to facilitate access to the various contact points .

(Bornier **Elé 1332** has a solid 25 track base integrated with a printed circuit on which are 25 copper coated contacts, numbered from 1 to 25).

IMPORTANT:

- All tests using the **Elé. 1332** may only be carried out after disconnecting the battery.
- The bornier is designed to be used only with an ohmmeter. Under no circumstances should 12 Volts be applied to the contact points.

USING THE XR25

The XR25 must be used for fault finding on the automatic clutch, regardless of the origin of the faults.

It has a microprocessor which permits:

- all the information from the various sensors to be read:
- diagnostic messages from the computer to be read,
- various values to be programmed,
- the computer permanent memory to be erased.

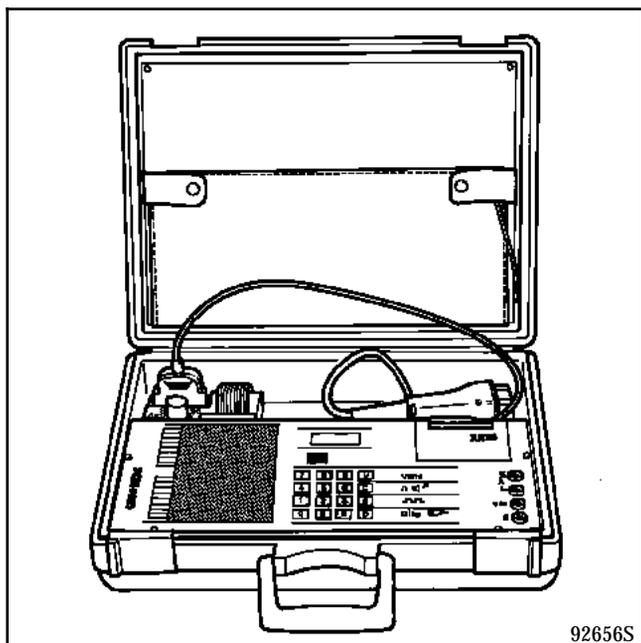
AUTOMATIC CLUTCH

Fault finding

20

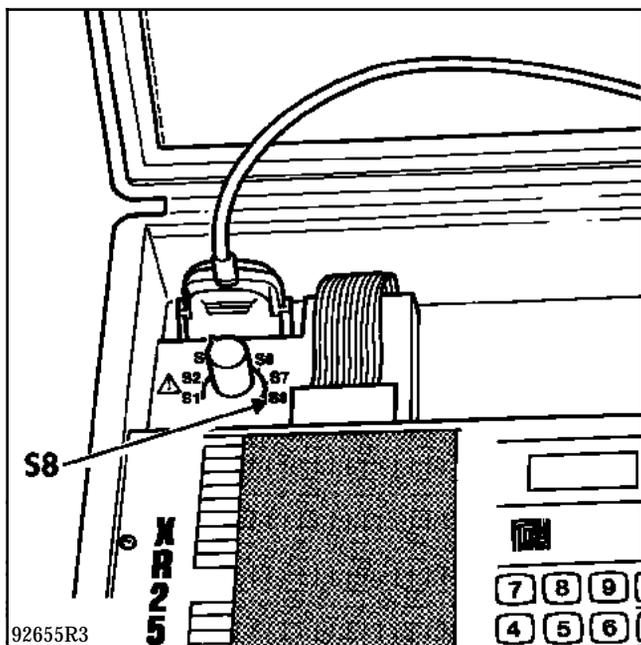
USING DIAGNOSTIC FICHE No. 29

Connect the XR25 to the diagnostic socket.



Switch the ignition on but do not start the engine.

Set the selector to S8.



Enter the code for the automatic clutch:

D 2 6

The display shows:

1EP

AUTOMATIC CLUTCH

Fault finding

20

BUZZER MESSAGES

If there is a fault with one of the automatic clutch components or if a dangerous manoeuvre is being carried out, the computer sounds the buzzer.

If a fault occurs (0.8 of a second beep)

	Fault detected		
	Major	Minor	Intermittent (major or minor)
When the ignition is switched on	9 beeps	3 beeps	3 beeps
While driving	9 beeps every 3 minutes	none	none

If there is an intermittent fault, the warning message disappears when the ignition is switched on for a second time after the fault appeared (major or minor fault), as long as the fault has not reappeared.

During a dangerous manoeuvre (0.4 of a second beep during the complete manoeuvre)

Dangerous manoeuvres:

- Starting the engine with a gear engaged. This action is prohibited, but if the starter relay is faulty (eg. relay switch stuck) the engine may be started with a gear engaged.
- Engine running, gear engaged, driver's door open (for driver safety)
- Attempting to move the vehicle (gear engaged, engine running) with the bonnet open. The computer is programmed to prevent the driver being run over by his own vehicle, should he inadvertently accelerate the engine by moving the throttle from inside the engine compartment.
- Clutch overheating:
 - during gear changing,
 - when starting (inappropriate gear engaged),
 - when anti-overrevving programming is effective (clutch slip).

When starting the vehicle by pushing

When the vehicle speed is greater than 4 mph (7 km/h), the buzzer sounds. When this beep is heard, the engine may be started. To do this, engage 2nd gear.

DEFECT MODES IN THE CASE OF FAULTS

If there is a fault with one of the components of the automatic clutch system, the computer initiates defect mode operation.

Depending on the type of fault present (major or minor), the system may select various defect modes :

- Defect mode selected for minor faults:

The system is still active, the clutch remains controlled but the faulty component is ignored. If the fault disappears, the system returns to normal operation.

The buzzer sounds three 0.8 second beeps when the ignition is next switched on.

- Defect mode selected for major faults:

The system is deactivated in the following manner:

- if the vehicle speed is < 2.5 mph (4 km/h) and if the accelerator pedal position is < 10 %, the clutch is disengaged (clutch slip),
- otherwise it is progressively engaged (locked).

In addition, the vehicle may not be started.

The buzzer sounds nine 0.8 second beeps every 3 minutes from when the fault appears.

If the fault disappears, the ignition must be switched off to cancel the major fault defect mode. In this case the system returns to normal operation, and the buzzer sounds three 0.8 seconds beeps when the ignition is switched on again for the first time.

Faulty component	Type of fault	Fault memorised	Notes
Engaged gear sensor	Major	yes	-
Computer	Major	yes	-
Gear lever sensor	Minor	yes	Replacement information is extracted from the engaged gear sensor stored values
Starter authorisation relay	Minor	yes	The engine cannot be started
Pump relay	Minor	yes	Normal operation if residual pressure is sufficient

AUTOMATIC CLUTCH

Fault finding

20

Faulty component	Type of fault	Fault memorised	Notes
Accelerator position sensor	Minor	yes	Half load replacement value
Clutch position sensor	Major	yes	-
Solenoid	Major	yes	-
Jack adjustment	Major	yes	Gear changing becomes worse
Vehicle speed	Minor	yes	The system is in starting mode, the vehicle speed is recalculated each time the gear is changed
Clutch plate	Minor	yes	Clutch slips
Pump assembly (pump motor or pressostat)	Minor	yes	Normal if the residual pressure is sufficient
Engine speed	Major	yes	-
Bonnet switch	Minor	yes	Detected if the switch condition changes when the vehicle moves.

The computer may regard faults with the pump relay, clutch position sensor and the pump assembly as major faults if they are detected during certain phases of operation.

APPLICATION CONDITIONS FOR CHECKS DEFINED IN THIS FAULT FINDING

The tests described in this fault finding section are only to be applied if the description of the fault corresponds exactly to the display on the XR25.

If a fault is dealt with as a result of a flashing bargraph, the conditions confirming the actual presence of a fault (and the necessity for applying fault finding) appear in the "NOTES" box, or at the beginning of the bargraph interpretation.

If a bargraph is only interpreted when it is permanently illuminated, the application of the tests recommended in the fault finding section for the flashing bargraph will not determine the cause of the memorised fault. In this case, only the wiring and connections for the faulty component should be checked.

NOTE: The ignition should be switched off before the XR25 is used.

SPECIAL TOOLING REQUIRED FOR OPERATIONS ON THE AUTOMATIC CLUTCH SYSTEM

- XR25
- XR25 cassette no. 15 minimum
- 25 track test bornier **Elé. 1332.**

Special Note:

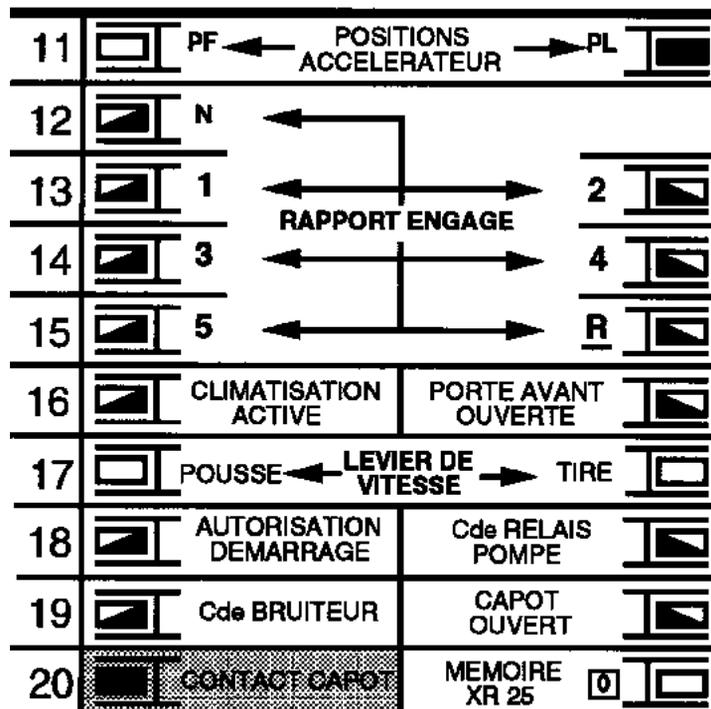
After replacing the computer, programme full-load and no-load values and gear lever positions. Neutral position for the solenoid and the jack position are programmed automatically when the ignition is switched on.

N° 29	S8	code : D 2 6	lire : I E P
1	<input type="checkbox"/> CALCULATEUR	CODE PRESENT <input type="checkbox"/>	
2	<input type="checkbox"/> *02 REGLAGE VERIN EMBRAYAGE	CIRCUIT ELECTROVANNE <input type="checkbox"/>	
3	<input type="checkbox"/> *03 SYSTEME Cde EMBRAYAGE	PATINAGE EMBRAYAGE	*23 <input type="checkbox"/>
4	<input type="checkbox"/> CIRCUIT Cde RELAIS POMPE	AUTORISATION DEMARRAGE	*24 <input type="checkbox"/>
5	<input type="checkbox"/> LEVIER DE VITESSE	CIRCUITS CAPTEURS	RAPPORT ENGAGE <input type="checkbox"/>
6	<input type="checkbox"/> POSITION VERIN EMBRAYAGE	PEDALE ACCELERATEUR <input type="checkbox"/>	
7	<input type="checkbox"/> REGIME MOTEUR	VITESSE VEHICULE <input type="checkbox"/>	
8	<input type="checkbox"/> MONTEE EN PRESSION	PRESSION MINI <input type="checkbox"/>	
9	<input type="checkbox"/> RAPPORT	PL ou PF <input type="checkbox"/>	
10	<input type="checkbox"/> POINT NUL ELECTROVANNE	VERIN EMBRAYAGE *30 <input type="checkbox"/>	

EMBRAYAGE PILOTE

Effacement mémoire défauts : G 0 * *

Fin de diagnostic : G 1 3 *



CONTROLES ANNEXES : # . . *

- 01 Mesure et N° du rapport engagé
- 02 Position pédale d'accélérateur (brute)
- 05 Vitesse véhicule 8mm
- 06 Régime moteur 110mm
- 07 Position verin embrayage (brute)
- 08 Verin embrayage
- 12 Position pédale d'accélérateur (calculée)
- 17 Position verin embrayage (calculée)

MODES COMMANDES : G . . *

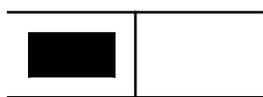
- 01 Test bruiteur
- 02 Test pompe
- 03 Relais autorisation démarrage
- 06 Décharge pression accu
- 07 Fin de Cde actuators
- 20 Apprentissage PL et PF
- 22 Apprentissage rapports
- 72 Ecriture date APV
- 73 Lecture date APV

REI. MPR : G 7 0 *

16 FRA

BARGRAPH SYMBOLS

FAULTS (always on a coloured background)

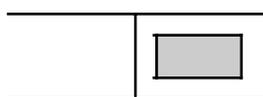


If illuminated, there is a fault with the product tested. The associated text defines the fault.

This bargraph may be:

- Permanently illuminated : fault present
- Flashing : fault memorised
- Extinguished : no fault or not diagnosed

STATUS (always on a white background)



Bargraph always on the top right hand side.

If illuminated, dialogue has been established with the product computer.

If it remains extinguished:

- The code does not exist.
- There is a fault with the tool, the computer or the XR25 / computer connection.

The representation of the following bargraphs indicates their initial status:

Initial status: (ignition on, engine stopped, no operator action)

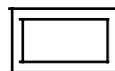


or



Indefinite

illuminated when the function or condition on the fiche is met.



Extinguished



Illuminated

extinguishes when the function or condition on the fiche is no longer met.

ADDITIONAL NOTES

Certain bargraphs have a *. The XX command, when the bargraph is illuminated, allows additional information on the type of fault or status to be displayed.

Fault finding - Interpretation of XR25 bargraphs

1 	<p style="text-align: right;">Fiche no. 29</p> <p>Bargraph 1 RH side extinguished</p> <p><u>Code present</u></p>
--	---

NOTES	None
--------------	------

Ensure the XR25 is not the cause of the fault by trying to establish dialogue with the computer on another vehicle.

Check that the ISO switch is on position S8 and that the latest cassette and the correct access code (D26) are being used.

Check the battery voltage and carry out any necessary operations to obtain the correct voltage (U battery > 10.5 volts).

Check that the 5A fuse (located on the engine interconnection unit) and 2A fuse (located on the passenger compartment interconnection unit) have not blown.

Check the connection and condition of the connections on the computer.

Check the computer is correctly fed:

- Electronic earth on track 14 .
- + after ignition on track 4 (across the pump relay coil).
- + before ignition on track 1.

Check the diagnostic socket is correctly fed:

- Earth on track 2.
- + before ignition on track 6.

Check and ensure the continuity and insulation of the lines in the connection diagnostic socket / computer:

- Between track 5 on the computer connector and track 10 on the diagnostic socket.
- Between track 18 on the computer connector and track 11 on the diagnostic socket.

If dialogue is still not established after these various operations, replace the computer and erase the fault memory after the operation.

Refer to the Workshop Repair Manual to follow the procedures for programming the values after replacing the computer.

AFTER REPAIR	When communication has been established, deal with any fault bargraphs illuminated.
---------------------	---

<p style="text-align: center;">1</p> 	<p style="text-align: right;">Fiche no. 29</p> <p>Bargraph 1 LH side illuminated</p> <p><u>Computer fault</u></p>
---	--

<p>NOTES</p>	<p>None</p>
---------------------	-------------

Replace the automatic clutch computer, then erase the memory of the new computer (G0**).
Refer to the Workshop Repair Manual to follow the procedures for programming the values after replacing the computer.

<p>AFTER REPAIR</p>	<p>After replacing the computer, carry out another test with the XR25.</p>
----------------------------	--

<p>2</p> 	<p>Bargraph 2 RH illuminated</p> <p><u>Solenoid valve circuit fault</u></p>	Fiche no. 29
---	--	--------------

NOTES	None
--------------	------

Switch the ignition off and disconnect the 5 track connector for the hydraulic assembly.

Measure the resistance of the solenoid coil between tracks D and E on the hydraulic assembly.

If the resistance is not 6 ohms ± 1 , replace the pump-jack assembly then clear the computer fault memory. Then follow the procedures for programming the neutral position for the solenoid and the jack position.

If the resistance is about 6 ohms between terminals D and E, disconnect the computer connector and check/ensure the following continuities:

- Between track 3 on the computer connector and track D on the hydraulic assembly connector.
- Between track 2 on the computer connector and track E on the hydraulic assembly connector

Check the insulation between these 2 connecting lines.

Also check the insulation between these 2 connecting lines and other computer / hydraulic assembly connecting lines (tracks A, B and C on the assembly connector).

Check that the solenoid valve is not short-circuited to earth (insulation from earth of terminals D and E on the hydraulic assembly).

Check the computer and hydraulic assembly connectors.

Clear the computer fault memory and switch the ignition off for 10 seconds.

If the fault persists, replace the computer and refer to the Workshop Repair Manual to follow the procedures for programming the values after replacing the computer.

AFTER REPAIR	<p>Erase the computer memory (G0**), switch off the ignition, then carry out a road test.</p> <p>End the operation by checking using the XR25.</p>
---------------------	--

3	
	
Continued	

2.dEF

NOTES

None

Check there is no oil on the clutch plate.

Read the clutch wear value for #08.

NOTE: This value is not representative of actual clutch wear if the jack position has been programmed without the clutch being replaced (wear value is reset to zero). The theoretical wear value for a completely worn clutch is 59.

- Replace the clutch if the wear value is close to 59 and follow the procedure for programming the neutral position for the solenoid and the jack position (refer to this Workshop Repair Manual).
- If the wear value is relatively below 59, a measurement must be made of the actual clutch wear to confirm the reading. This measurement is made between the pressure surface of the jack on the gear box housing and the end of the cable end section, when the clutch is engaged (ignition off).

The dimension is 123 mm when the clutch is new if the jack is correctly fitted and adjusted with a special shim.

Replace the clutch if the dimension is approximately 140 mm (without modifying the adjustment) and follow the procedure for programming the neutral position for the solenoid and the jack position (refer to the Workshop Repair Manual).

AFTER REPAIR

Erase the computer memory (G0**), switch off the ignition, then carry out a road test.
End the operation by checking using the XR25.

<p>3</p>  <p>Continued</p>	
--	--

2.dEF**NOTES**

Treat any other illuminated bargraph first.

Check the clutch cable is not broken or unclipped.

Look for a short circuit in the solenoid or the solenoid wiring:

- Measure the resistance of the solenoid coil between tracks D and E of the assembly and replace the assembly if the resistance is not approximately 6 ohms \pm 1.
- Ensure the insulation between the 2 lines on the solenoid and the insulation of these 2 lines from other computer / hydraulic assembly connecting lines.
- Ensure the insulation from earth of terminals D and E on the hydraulic assembly.

Check / ensure continuity between earth and track C on the hydraulic assembly connector and between track B on the assembly connector and track 24 on the computer connector.

Check the connections on the hydraulic assembly and on the computer. If the connections, continuities and insulation are correct, erase the computer memory then switch the ignition off for 10 seconds.

Replace the hydraulic assembly / clutch jack if the fault reappears (solenoid or jack seized, pressostat faulty,...) and follow the procedure for programming the solenoid neutral position and the jack position (refer to the Workshop Repair Manual).

AFTER REPAIR

Erase the computer memory (G0**), switch off the ignition, then carry out a road test.
End the operation by checking using the XR25.

<p>4</p> 	<p>Bargraph 4 LH side illuminated <u>Pump relay control circuit fault</u></p>	Fiche no. 29
---	--	--------------

NOTES	The electro-pump assembly relay is located on the engine board.
--------------	---

If bargraph 4 LH side is permanently illuminated after switching the ignition off and using the XR25, the only fault which may be present on the vehicle is a permanent + after ignition feed fault on track 4 of the computer connector (short circuit relay coil, ...).

An open circuit or short circuit fault to earth on the line will not be detected by the XR25 as a check puts the computer out of service if there is not + after ignition feed on track 4 when the ignition is switched

- Replace the pump motor relay.
- Ensure insulation of the line between track 4 of the computer connector and terminal 2 of the pump motor relay base.

After the operation, erase the computer memory then switch the ignition off for 10 seconds.

Replace the computer if the fault reappears and refer to the Workshop Repair Manual for application of the procedures for programming the values after replacing the computer.

AFTER REPAIR	<p>Erase the computer memory (G0**), switch off the ignition, then carry out a road test.</p> <p>End the operation by checking using the XR25.</p>
---------------------	--

<p>5</p> 	Fiche no. 29
<p>Bargraph 5 RH side illuminated</p> <p><u>Engaged gear potentiometer circuit fault</u></p>	

NOTES	None
--------------	------

Is bargraph 6 LH side also illuminated?

YES

The fault is caused by a short circuit on one of the 2 potentiometers, a fault on the potentiometer 5 volt feed line (track 20 on the computer) or on their earth (track 7 on the computer).

- Switch the ignition off and check the 2 potentiometers.
Replace the potentiometer with a short circuit between tracks A and C.
- Check and ensure continuity and insulation of the following lines:
 - Between track 20 on the computer connector and tracks A on the engaged gear potentiometer connector and C on the jack position potentiometer connector.
 - Between track 7 on the computer connector and tracks C of the gear engaged potentiometer connector and A on the jack position potentiometer connector.
- Also check / ensure insulation between tracks 7 and 20 on the computer connector.

After the operation, erase the computer memory then switch the ignition off for 10 seconds.

Replace the computer if the fault reappears and follow the procedures for programming the values after replacing the computer.

AFTER REPAIR	<p>Erase the computer memory (G0**), switch off the ignition, then carry out a road test.</p> <p>End the operation by checking using the XR25.</p>
---------------------	--

Fault finding- Interpretation of XR25 bargraphs

5	
Continued	

NO

Use function #01 on the XR25 with the gear lever in neutral.

If the value for #01 is consistent (between 113 and 142), move the lever to see if the value changes to a value in the range for a sensor fault (value < 5 or > 250).

In this case check the gearbox control, the mounting and tightening of the sensor.

Replace the engaged gear sensor if necessary.

Erase the computer memory, switch the ignition off for 10 seconds then follow the procedure for programming the gears.

If the value for #01 equals 0.=, 255.= or 255.r, carry out the following tests:

- Check the condition of the engaged gear sensor connector and the quality of its connections.
- Ensure the continuity and insulation of the following lines:
 - Between track 20 on the computer connector and track A on the sensor connector.
 - Between track 9 on the computer connector and track B on the sensor connector.
- Ensure continuity between track 7 on the computer connector and track C on the sensor connector
- Also ensure insulation between the sensor lines.
- Ensure insulation from earth of the line between track 20 on the computer connector and track C on the clutch jack position potentiometer connector.
- Replace the engaged gear sensor, erase the computer memory, then follow the procedure for programming the gears (before draining the gear box to make the replacement, use function #01 to test the correct operation of the system by connecting the new sensor in place of the old one and actuating the follower).

After the operation, erase the computer memory then switch the ignition off for 10 seconds.

Replace the computer if the fault reappears and follow the procedures for programming the values after replacing the computer.

AFTER REPAIR

Erase the computer memory (G0**), switch off the ignition, then carry out a road test.
End the operation by checking using the XR25.

<p>5</p> 	Fiche no. 29
<p>Bargraph 5 LH side illuminated or flashing</p> <p><u>Gear lever sensor circuit fault</u></p>	
NOTES	None

BARGRAPH 5 LH SIDE PERMANENTLY ILLUMINATED

If bargraph 5 LH side is permanently illuminated after the ignition has been switched off and the XR25 set up, there is a permanent earth on tracks 12 and 13 on the computer (CC.0 on the 2 lines for the push and pull switches, which corresponds to the lever being in a pushed and pulled condition at the same time). In this case bargraphs 17 LH and RH sides are extinguished as the fault is present.

Disconnect the 3 track connector located at the bottom of the gear lever and check the condition of the switches in the knob without touching the lever.

- If there is continuity between tracks C and A and between tracks C and B, replace the lever
- If the lever is not faulty, ensure insulation from earth for the following lines:
 - Between track 12 on the computer connector and track B on the 3 track lever connector.
 - Between track 13 on the computer connector and track A on the 3 track lever connector.

BARGRAPH 5 LH SIDE FLASHING

In this case, bargraphs 17 LH and RH sides are operational as the lever is not in a pushed and pulled condition at the same time.

Is either bargraph 17 LH or RH side illuminated with no action on the lever ?

- If bargraph 17 RH side is permanently illuminated : "Pull" switch is faulty or short circuit to earth on the line between track 12 on the computer connector and track B on the 3 track lever connector. Replace the lever if there is continuity between tracks C and B on the lever connector or repair the wiring.
- If bargraph 17 LH side is permanently illuminated : "Push" switch is faulty or short circuit to earth on the line between track 13 on the computer connector and track A on the 3 track lever connector. Replace the lever if there is continuity between tracks C and A on the lever connector or repair the wiring.
- If neither side of bargraph 17 is illuminated: move the lever and check to see if there is alternate right / left illumination.
If one side of bargraph 17 is illuminated without action on the lever, carry out the checks specified above for the appropriate bargraph illuminated.

AFTER REPAIR

Erase the computer memory (G0**), switch off the ignition, then carry out a road test.
End the operation by checking using the XR25.

6 	Fiche no. 29
Bargraph 6 RH side illuminated <u>Accelerator pedal sensor circuit fault</u> (load information via injection)	

NOTES	None.
--------------	-------

Ensure continuity and insulation of the connection between track 10 of the automatic clutch computer connector and track 41 of the injection computer connector.

Check the connections of the 2 computers.

Erase the computer memory then switch the ignition off for 10 seconds.

If the fault persists, replace the computer and refer to the Workshop Repair Manual and follow the procedures for programming the values after replacing the computer.

AFTER REPAIR	Erase the computer memory (G0**), switch off the ignition, then carry out a road test. End the operation by checking using the XR25.
---------------------	---

6 	Fiche no. 29
Bargraph 6 LH side illuminated <u>Clutch jack position sensor circuit fault</u>	

NOTES	Refer to the fault finding for bargraph 5 RH side if it is also illuminated.
--------------	--

Use the function #07 on the XR 25, clutch engaged (lever in neutral+ accelerator pedal not depressed).

If the value for #07 is consistent (between 20 and 155 clutch out) :

- Press the accelerator pedal down completely to let the clutch disengage fully.
- Replace the jack if the value for #07 is in the range for a potentiometer fault (value is > 250).

Erase the computer memory, then switch the ignition off for 10 seconds.

Refer to the Workshop Repair Manual and follow the procedure for programming the neutral position for the solenoid and the jack position

If the value for #07 is incorrect or is equal to 0 or 255 :

- Check the jack position potentiometer connector and the quality of its connections.
- Ensure continuity and insulation of the line between track 22 on the computer connector and track B on the jack position potentiometer connector.
- Ensure continuity and insulation from earth of the line between track 20 on the computer connector and track C on the jack position potentiometer connector.
- Ensure continuity between track 7 on the computer connector and track A on the jack position potentiometer connector.

Also ensure insulation between the potentiometer lines.

If all these tests are correct, erase the computer memory, switch the ignition off for 10 seconds then follow the procedure for programming the neutral position for the solenoid and the jack position.

If the fault reappears, replace the clutch control jack and follow the procedure for programming the neutral position for the solenoid and the jack position.

Replace the computer if the fault reappears and follow the procedures for programming the values after replacing the computer.

AFTER REPAIR	Erase the computer memory (G0**), switch off the ignition, then carry out a road test. End the operation by checking using the XR25.
---------------------	---

<p>7</p> 	Fiche no. 29
<p>Bargraph 7 RH side flashing <u>Vehicle speed information fault</u></p>	

NOTES	<p>If bargraph 5 RH side is also illuminated, treat that bargraph before bargraph 7 RH side.</p>
--------------	--

Even if this fault is present on the vehicle during the test, it may only be signalled by a flashing bargraph on the XR25 (under the conditions specified at the start of this fault finding section) as it is taken into account by the computer only when the vehicle is moving.

A road test must be carried out to determine the origin of the fault.

For information, the vehicle speed for #05 is 10 times the value shown on the instrument panel (50 km/h -> 500 wheel revolutions per minute for #05).

If, during a road test, the vehicle speed information on the instrument panel is not consistent or is zero, carry out a complete test of the vehicle speed sensor :

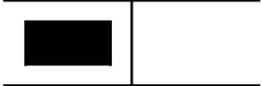
- Check the connections on the sensor connector.
- + after ignition on track A1 of the sensor connector.
- Earth on track C1 of the sensor connector.

Replace the sensor if necessary.

If, during the road test, the vehicle speed information for #05 is zero but this is consistent with the instrument panel, the following tests should be carried out:

- Check / ensure continuity and insulation of the line between track 23 on the computer connector and track B1 of the vehicle speed sensor connector.
- Also check the condition of the connections along the whole length of the line.

AFTER REPAIR	<p>Erase the computer memory (G0**), switch off the ignition, then carry out a road test.</p> <p>End the operation by checking using the XR25.</p>
---------------------	--

<p>7</p> 	<p>Bargraph 7 LH side flashing <u>Engine speed information fault</u></p>	Fiche no. 29
---	---	--------------

NOTES	None
--------------	------

The engine speed signal is sent by the injection computer on the fuel pump relay control line. Even if this fault is present on the vehicle during the test, it may only be signalled by a flashing bargraph on the XR25 (under the conditions specified at the start of this fault finding section) as it is taken into account by the computer only when the vehicle is moving.

If the engine does not start there is a short circuit to earth on this line.

If the vehicle starts but is immobilised as the clutch jack is not engaged, the computer is not receiving TDC information.

In both of these cases the following checks should be made:

- Check / ensure continuity and insulation from earth of the line between track 11 on the automatic clutch computer connector and terminal 2 on the fuel pump relay base.
- Also check the condition of the connections along the whole length of the line.
- Check / ensure continuity and insulation from earth of the line between terminal 2 of the fuel pump relay base and track 48 of the injection computer connector.

After the operation, erase the computer memory then switch the ignition off for 10 seconds.

Replace the computer if the fault reappears and follow the procedures for programming the values after replacing the computer

AFTER REPAIR	<p>Erase the computer memory (G0**), switch off the ignition, then carry out a road test.</p> <p>End the operation by checking using the XR25.</p>
---------------------	--

8 	Fiche no. 29
Bargraph 8 RH side illuminated continuously or flashing <u>Minimum pressure information fault</u>	

NOTES	If bargraph 2 LH side is also illuminated, treat that bargraph before bargraph 8 RH side.
--------------	---

This fault may occur after using the command mode for discharging the pressure in the hydraulic assembly. In this case, just erase the computer memory.

If the command mode has not been used:

- Replace the pump motor relay if the pump motor is running continuously (in this case the motor runs very noisily due to the action of the pressure release valve).
- Check the condition of the connections at the relay base (sealing, ...).
- Check / ensure continuity between earth and track C on the hydraulic assembly connector and between track B on the assembly connector and track 24 on the computer connector.
- Check the connections on the hydraulic assembly and the computer.

If the connections and continuity are good, wait for 5 minutes with the ignition off while the pressure drops in the hydraulic assembly then check the continuity between tracks B and C on the assembly connector, on the assembly side.

- If there is no continuity between the two tracks, replace the hydraulic assembly (pressostat faulty).
- If continuity is present, erase the computer memory and switch the ignition off for 10 seconds.

Replace the computer if the fault reappears and refer to the Workshop Repair Manual to follow the procedures for programming the values after replacing the computer

AFTER REPAIR	Erase the computer memory (G0**), switch off the ignition, then carry out a road test. End the operation by checking using the XR25.
---------------------	---

<p>8</p> 	<p>Bargraph 8 LH side illuminated <u>Pressure increase information fault</u></p>	Fiche no. 29
--	--	--------------

NOTES	None
--------------	------

This fault may occur after using the command mode for discharging the pressure in the hydraulic assembly. In this case, just erase the computer memory.

If the command mode has not been used:
 - Start command mode G02* on the XR25.

Does the pump operate after the jack has been actuated 5 times?

YES

Check for leaks in the hydraulic circuit and repair them (check the level in the reservoir).

Check the operation of the pressostat :

- Switch the ignition off then on again.
- When the pump stops operating, switch the ignition off and disconnect the 5 track hydraulic assembly connector and use a multimeter to check the condition of the pressostat switch between tracks C and B.

Replace the hydraulic assembly if there is continuity between tracks C and B with pressure maintained.

Ensure the insulation from earth of the line between track B on the hydraulic assembly connector and track 24 on the computer connector.

Check the connections on the hydraulic assembly and the computer.

After the operation, erase the computer memory then switch the ignition off for 10 seconds.

Replace the computer if the fault reappears and refer to the Workshop Repair Manual to follow the procedures for programming the values after replacing the computer

AFTER REPAIR

Erase the computer memory (G0**), switch off the ignition, then carry out a road test.
 End the operation by checking using the XR25.

8



Continued

NO

Check the condition of the 30 A pump motor fuse.

Check that the pump motor earth wire is correctly fitted to the pump mounting.

Ensure continuity / insulation of the following lines:

- Between terminal 3 on the motor relay mounting and + battery.
- Between terminal 5 on the motor relay mounting and track A of the 5 track hydraulic assembly connector, harness side.

Check the condition of the connections on the relay base.

Use function G02* on the XR25 again and replace the motor relay if the pump motor still does not operate.

Replace the hydraulic assembly and follow the procedure for programming the neutral position for the solenoid and the jack position.

AFTER REPAIR

Erase the computer memory (G0**), switch off the ignition, then carry out a road test.

End the operation by checking using the XR25.

<p style="text-align: center;">9</p> 	<p style="text-align: right;">Fiche no. 29</p> <p>Bargraph 9 RH side illuminated</p> <p><u>Full-load and no-load positions for the accelerator pedal are not programmed</u></p>
NOTES	<p>Treat any other fault present first, then erase the computer memory and switch the ignition off for 10 seconds.</p>

Start command mode G20* on the XR25 (conditions for operation: vehicle and engine speed zero, gear lever in neutral).

Depress the accelerator pedal fully when the display shows a flashing PF (full-load)

Release the accelerator pedal when the buzzer beeps (PL flashes on the XR25 - no-load). The following should then be displayed "Bon", "Fin" then "I.EP" when the procedure has been completed successfully. Bargraph 9 RH side should be extinguished.

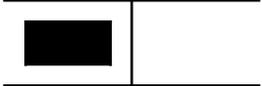
Switch the ignition off for 10 seconds.

If the values cannot be programmed, a load value is outside the permitted value range (value for #02 less than 150 for full-load or greater than 110 for no-load).

In this case, repeat the programming sequence.

- If the values cannot be programmed again, check the operation of the accelerator position potentiometer on the injection side.
- If the values obtained for #02 are both correct in relation to the thresholds specified above, replace the computer and follow the procedures for programming the values after replacing the computer (refer to the Workshop Repair Manual).

AFTER REPAIR	<p>Erase the computer memory (G0**), switch off the ignition, then carry out a road test.</p> <p>End the operation by checking using the XR25.</p>
---------------------	--

<p style="text-align: center;">9</p> 	<p style="text-align: right;">Fiche no. 29</p> <p>Bargraph 9 LH side illuminated</p> <p><u>Gear engagement positions are not programmed</u></p>
NOTES	<p>Treat any other fault present first, then erase the computer memory and switch the ignition off for 10 seconds.</p>

Start command mode G22* on the XR25 (conditions for operation: vehicle and engine speed zero, full-load and no-load positions programmed).

Follow the display on the XR25 for changing the gears.

0 :Neutral, r : Reverse, 1 : 1st, ...

During programming the lever must be held by the knob and must be held against the gear stop (pushed or pulled) for each of the gears (the buzzer beeps after each gear has been programmed).

Switch the ignition off for 10 seconds.

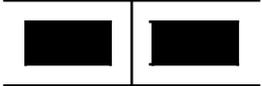
If a gear position cannot be programmed, the value obtained is outside the permitted value range for this gear. In this case begin the programming procedure again.

If a gear cannot be programmed for a second time, check the value for #01 for the gear which is causing the fault and compare it to the table of permitted values in the Workshop Repair Manual.

If the value obtained for #01 is correct, replace the computer and follow the programming procedures for replacing the computer (refer to the Workshop Repair Manual).

If the value is outside the range, check the mounting and tightening of the potentiometer and the gear-box control.

AFTER REPAIR	<p>Erase the computer memory (G0**), switch off the ignition, then carry out a road test.</p> <p>End the operation by checking using the XR25.</p>
---------------------	--

<p>10</p> 	Fiche no. 29
<p>Bargraph 10 RH side or LH side illuminated</p> <p><u>Clutch jack position and neutral position for the solenoid not programmed (+ clutch slip point)</u></p>	

NOTES	<p>In order to improve smoothness of gear change certain computers incorporate a modification enabling the clutch slip point to be programmed. If bargraph 10 RH remains illuminated (with 2.dEF after entering code*30) after the neutral position for the solenoid and the jack position have been programmed, follow the procedure for clutch slip point programming (see section "Programming neutral position for the solenoid and the jack position").</p>
--------------	--

The replacement of the hydraulic assembly, jack or clutch means that the neutral position for the solenoid and the position of the jack must be reprogrammed.

These two values are programmed automatically when the ignition is switched on for the first time after replacement of a computer or following erasure of the previous values by two separate XR25 commands.

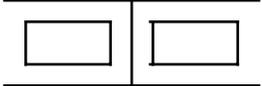
Treat any other fault present first, then erase the computer memory and switch the ignition off for 10 seconds.

Follow the the specified procedure in the Workshop Repair Manual.

These two bargraphs are used only to show that the previous values stored during programming have been erased.

NOTE: When the jack position is programmed, the clutch wear value is reset to zero.
Never carry out this programming unless the hydraulic assembly, the jack or the clutch has been replaced.

AFTER REPAIR	<p>Erase the computer memory (G0**), switch off the ignition, then carry out a road test.</p> <p>End the operation by checking using the XR25.</p>
---------------------	--

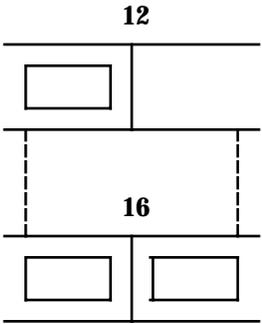
<p>11</p> 	Fiche no. 29
<p>Bargraph 11 LH and RH side</p> <p><u>Accelerator position:</u> Illuminated on right hand side: no-load position recognised.</p> <p> Illuminated on left hand side: full-load position recognised.</p>	

NOTES	None
--------------	------

If bargraph 11 does not illuminate alternately on the left and right hand sides, check the operation of the accelerator position potentiometer, injection side, then reprogramme the no-load and full-load positions (command G20* with vehicle and engine speed zero, gear lever in neutral).

Note: Both sides of bargraph 11 are extinguished in the majority of cases where there is an accelerator position potentiometer fault (bargraph 6 RH side illuminated).

AFTER REPAIR	
---------------------	--

	Bargraph 12 to Bargraph 16	Fiche no. 29
--	-----------------------------------	--------------

NOTES	None
--------------	------

Bargraphs 12, 13, 14 and 15

These bargraphs show the gear engaged in the gear box and the neutral position of the gear lever.

Bargraph 16 RH side

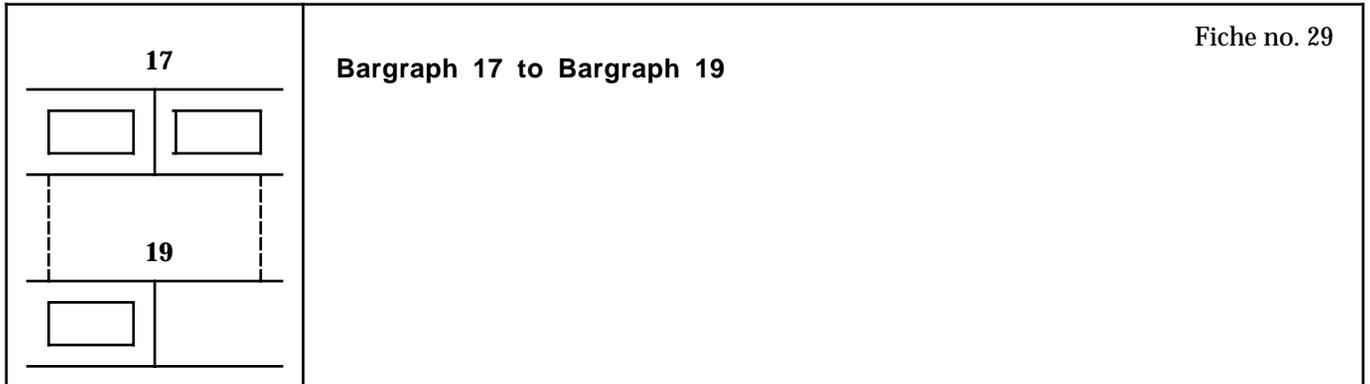
Door open / closed status	Door open	:	Bargraph illuminated.
	Door closed	:	Bargraph extinguished.

Bargraph 16 LH side

Air conditioning status:	Air conditioning on	:	Bargraph illuminated
	Air conditioning off	:	Bargraph extinguished

This bargraph allows visualisation of the recognition of "air conditioning on" information by the automatic clutch computer as part of its programming which takes account of idle speed.

AFTER REPAIR



NOTES	None
--------------	------

Bargraphs 17 RH and LH side

Gear lever condition if it is moved by the knob.

Illuminated on right hand side : "Pull" switch in lever knob closed.

Illuminated on left hand side : "Push" switch in lever knob closed.

These 2 bargraphs allow the operation of the 2 switches in the gear lever knob to be checked.

Note: If one of the bargraphs remains illuminated when there is no action on the gear lever knob, look for a short circuit to earth on the line for the switch concerned.

Bargraph 18 RH side

Pump motor relay control.

This bargraph allows visualisation of the pump motor control by the computer.

Bargraph 18 LH side

Conditions for starting the engine are correct.

This bargraph shows that all the conditions for starting the engine have been met and the computer authorises the engine to be started : gear lever in neutral and push/pull switches in gear lever knob are open (bargraph 17 RH and LH sides extinguished when no pressure is applied to the gear lever knob).

Bargraph 19 LH side

Buzzer control.

This bargraph allows visualisation of buzzer control by the computer.

AFTER REPAIR

<p>20</p> 	Fiche no. 29
<p>Bargraph 20 LH side flashing <u>Bonnet switch</u></p>	

NOTES	None
--------------	------

This fault is dealt with, if the bonnet does not recognise "closed" when the vehicle is moving at more than 2.5 mph (4 km/h)
A switch earths track 19 of the computer when the bonnet is open.

Is bargraph 19 RH side "bonnet open" illuminated when the bonnet is closed?

YES

Press the bonnet switch button.

- If bargraph 19 extinguishes, check the mounting and fit of the bonnet (ensure that the switch is open when the bonnet is closed).
- If bargraph 19 remains illuminated, check/ensure the insulation from earth of the line between track A of the switch connector and track 19 of the computer connector.
Replace the switch if there is continuity (switch permanently closed).

NO

An open bonnet was detected when the vehicle was last driven (fault not present on the vehicle).

- Check the operation of the switch (switch open).
- Check the mounting of the bonnet.
- Check the line between track A of the switch connector and track 19 of the computer connector (short circuit to earth).

AFTER REPAIR

Erase the computer memory (G0**), switch off the ignition, then carry out a road test.
End the operation by checking using the XR25.

NOTES

Only consult these charts after a complete check has been carried out using the XR25.

No dialogue between the XR25 and the computer.

Chart 1

Permanent operation of the buzzer when the ignition is switched on and no dialogue between the XR25 and the computer.

Chart 2

Permanent operation of the buzzer (dialogue between the XR25 and the computer is correct).

Chart 3

Buzzer does not operate.

Chart 4

Noise when changing gear quickly.

Chart 5

Clutch is slow to engage or does not engage after changing gear (the clutch engages when the lever is pressed repeatedly).

Chart 6

Vehicle is immobilised as the jack does not engage on acceleration (the XR25 does not indicate the fault).

Chart 7

**Problems when changing gear (changing out of a gear is difficult).
Abnormal pump noise (+ significant frequency of operation).
Oil level too low but no external leaks.**

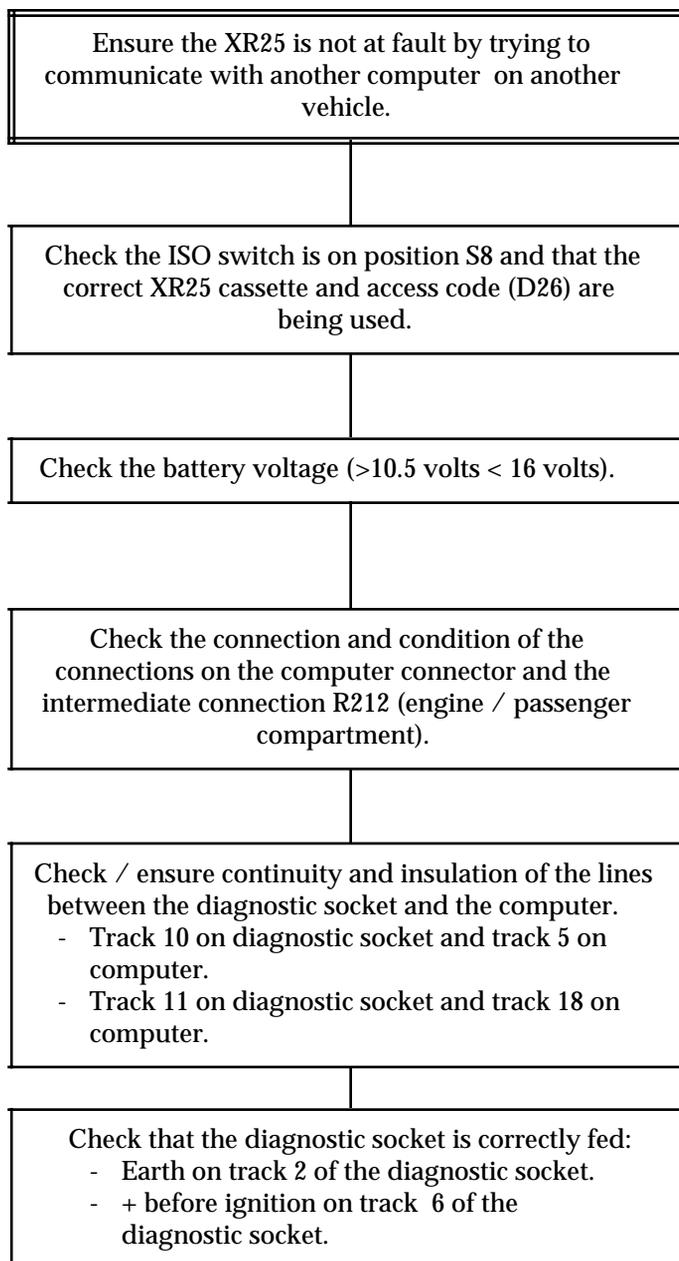
Chart 8

Chart 1

NO DIALOGUE BETWEEN THE XR25 AND THE COMPUTER.

NOTES

None

**AFTER REPAIR**

Refer to the section "Interpretation of XR25 bargraphs", if the XR25 indicates that there are faults present.

Chart 2	PERMANENT OPERATION OF THE BUZZER WHEN THE IGNITION IS SWITCHED ON AND NO DIALOGUE BETWEEN THE XR25 AND THE COMPUTER.
NOTES	None

Check the battery voltage (>10.5 volts < 16 volts).
Check the 2A and 5A fuses of the automatic clutch computer feed.

Check the connection and condition of the connections on the computer connector and the intermediate connection R212 (engine / passenger compartment).

Check that the computer is correctly fed:

- Electronic earth (0 V) on track 14 of the 25 track connector.
- + before ignition on track 1 of the 25 track connector.
- + after ignition on track 4 of the 25 track connector (across the pump motor relay coil).

AFTER REPAIR

Chart 3	PERMANENT OPERATION OF THE BUZZER (dialogue between the XR25 and the computer is correct).
NOTES	Only consult this chart after a complete check has been carried out using the XR25.

Ensure continuity and insulation from earth of the line between track 15 on the computer connector and terminal 1 of the buzzer base.

AFTER REPAIR	
---------------------	--

Chart 4

BUZZER DOES NOT OPERATE

NOTES

Only consult this chart after a complete check has been carried out using the XR25.

Ensure the vehicle meets the conditions required for buzzer operation:

- Door open, engine running and a gear engaged.
- Starting in 3rd gear.

If the buzzer does not operate in these two cases ensure the buzzer is correctly fed:

- + after ignition on terminal 2 on the buzzer base.
- Earth on terminal 5 on the buzzer base.

Replace the buzzer if necessary.

If, in the two cases, the buzzer fails to operate only when the door is open, check the operation of the door switch.

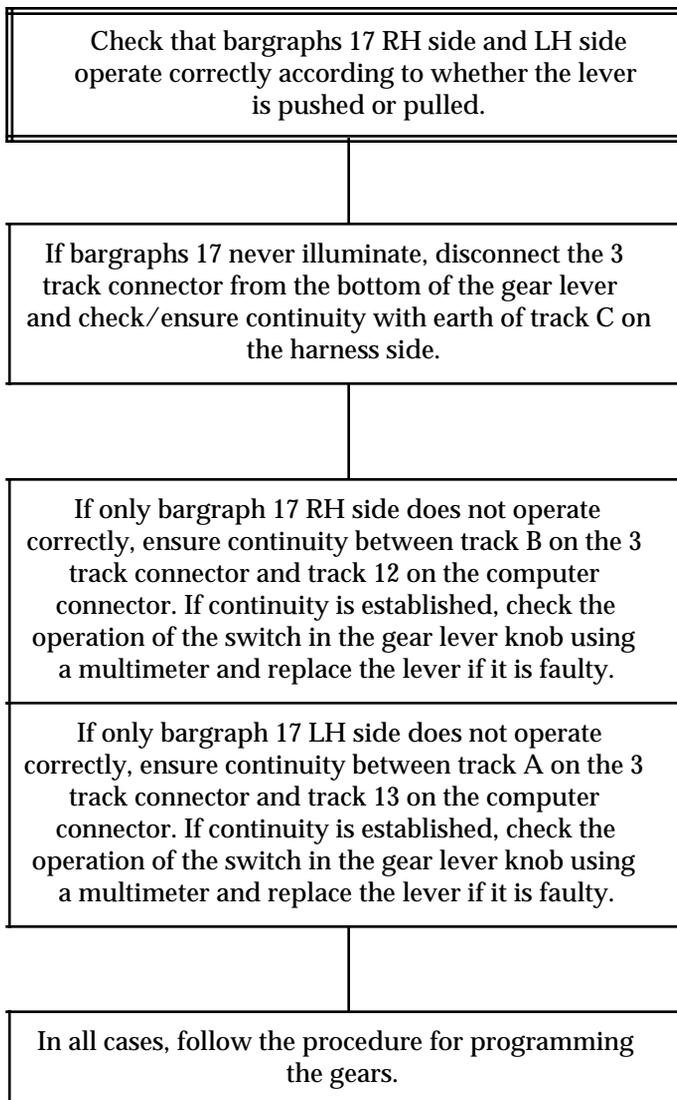
AFTER REPAIR

Chart 5

NOISE WHEN CHANGING GEAR QUICKLY.

NOTES

Only consult this chart after a complete check has been carried out using the XR25.



AFTER REPAIR

AUTOMATIC CLUTCH

Fault finding - customer complaints

Chart 6

CLUTCH IS SLOW TO ENGAGE OR DOES NOT ENGAGE AFTER CHANGING GEAR (the clutch engages when the lever is pressed repeatedly).

NOTES

Only consult this chart after a complete check has been carried out using the XR25.

Follow the procedure for programming the gears.

AFTER REPAIR

Chart 7**VEHICLE IS IMMOBILISED AS THE JACK DOES NOT ENGAGE ON ACCELERATION (the XR25 does not indicate the fault)****NOTES**

Only consult this chart after a complete check has been carried out using the XR25.

This customer complaint is characterised by an absence of engine speed information or by the detection of an open bonnet

- Ensure that bargraph 19 RH side is extinguished when the bonnet is shut (if not, refer to bargraph 20 LH side).
- Ensure continuity and insulation of the line between track 11 of the computer connector and terminal 2 of the fuel pump relay base.

AFTER REPAIR

Chart 8

PROBLEMS WHEN CHANGING GEAR
(changing out of a gear difficult).

ABNORMAL PUMP NOISE
(+ significant frequency of operation).
OIL LEVEL TOO LOW BUT NO EXTERNAL LEAKS

NOTES

Only consult this chart after a complete check has been carried out using the XR25.

Test the operation of the accumulator using the following procedure:

- Set up the XR25.
- Carry out successive G05* commands to control the pump.
- At the end of the pump operation, carry out 10 successive G05* commands and count the number of times the pump is activated.

If the pump is activated more than 5 times during the 10 commands, replace the accumulator.

If the pump is noisy during operation (activation of the pressure release valve), replace the accumulator.

(It is essential to refer to the section "Accumulator" to carry out this replacement).

Check that bargraphs 17 RH side and LH side operate correctly according to whether the lever is pushed or pulled.

If bargraphs 17 never illuminate, disconnect the 3 track connector from the bottom of the gear lever and check / ensure continuity with earth of track C on the harness side.

AFTER REPAIR

NOTES

Carry out this conformity check only after a complete check with the XR25.

Order of operations	Function to check	Action	Bargraph	Display and notes
1	Engine immobiliser safety device	Engage a gear. Actuate the starter.		The engine should not start
	Jack engagement immobiliser safety device	Engine running, 1st gear engaged, bonnet open, accelerate.		The vehicle should not move The buzzer should sound
2	Buzzer operation	Start the engine. Engage a gear. Open the driver's door		The buzzer should sound
3	Accelerator position information	#02 no-load #02 full-load	11  	15 < no-load value < 60 with full-load value > no-load value + 100
4	Interpretation of bargraphs normally illuminated (gear lever in neutral and no operator intervention).		1  11  12  18 	Code present Accelerator pedal not depressed Gear lever in neutral Starter authorisation
5	Gear engaged sensor		#01	Neutral : 113 to 142 1st/2nd : 147 to 200 3rd/4th : 72 to 115 5th : 12 to 71 Reverse : 199 to 242
6	Clutch wear		#08	New clutch: 00 Old clutch : 59

Programming to be carried out according to the type of operation:**Programme gears using the G22* command after**

Replacing the computer.
Replacing/removing the engaged gear sensor.
Removing the gearbox.
Removing the gear lever or linkage.

Programme full-load and no-load positions for the accelerator using the G20* command after

Replacing the computer.
Replacing/removing the injection potentiometer - modifying the accelerator control adjustment.

Programme the neutral position for the solenoid / clutch slip point and jack position after

(NOTE: this programme resets "clutch wear" information, available on #08, to zero)

Replacing/removing the clutch jack
Replacing/removing the hydraulic assembly
Replacing the clutch
Modifying the jack cable adjustment on the fork.