



Technical Note 3588A

XBXX

Basic manual: Workshop Repair Manual 345

Special notes on Clio II vehicles from June 2001 fitted with ABS and ESP

77 11 309 942

FEBRUARY 2002

EDITION ANGLAISE

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

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

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INTRODUCTION

The **BOSCH 5.7** system comprises the ABS and ESP systems.

AFTER CARRYING OUT ANY WORK ON THE ESP SYSTEM, IT IS ESSENTIAL TO CONFIRM THE REPAIRS BY PERFORMING A ROAD TEST.

DESCRIPTION

The ESP system consists of:

- a brake servo assembly,
- a pump unit consisting of:
 - a hydraulic pump,
 - a pressure modulation unit (twelve solenoid valves),
 - a computer,
 - a pressure sensor,
- a steering wheel angle sensor,
- a combined yaw speed and lateral acceleration sensor,
- four wheel speed sensors,
- an ESP disconnection push-button.

OPERATING PRINCIPLE

The reference state is calculated continuously from measurements of the wheel speeds and the steering wheel angle.

The reference state represents the desired vehicle behaviour.

This reference state is compared to the actual state of the vehicle from measurements of the yaw speed and lateral acceleration.

If there is a difference between the desired trajectory and the actual trajectory, braking is applied to the appropriate wheel. The application of the brake causes the vehicle to follow its desired trajectory.

In some cases, the system (anti-skid control) has an affect on the engine torque.

REPLACEMENT

If you replace the **ABS/ESP** computer, you must also replace the entire hydraulic unit (see the **hydraulic unit** removal-refitting method).

REFITTING

Proceed in the reverse order to removal.

When replacing a computer, it is vital after refitting, to carry out the following:

- the calibration of the steering wheel angle sensor. Configure the vehicle's tachometric index. Refer to the Workshop Fault Finding Manual **Section 38C**;
- the configuration of the tachometric index. Refer to the Fault Finding manual in **Section 38C**.

To do this:

- connect a diagnostic tool (**NXR, OPTIMA 5800 or CLIP**),
- switch on the ignition.

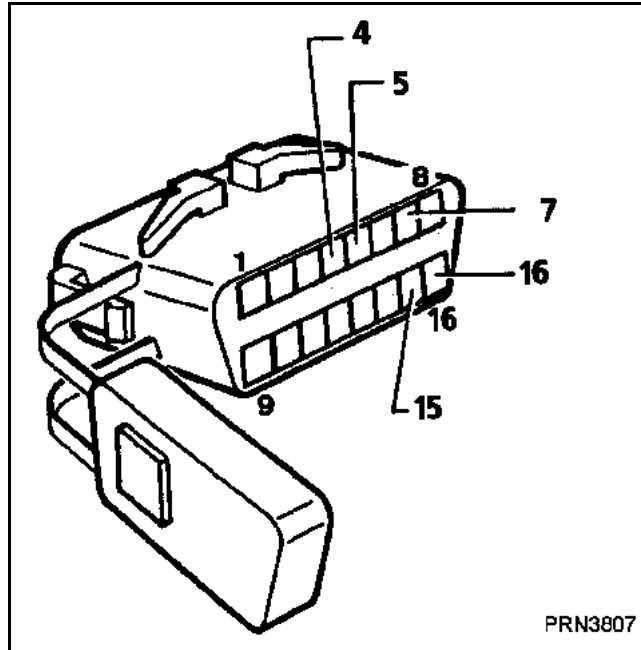
- 1 Select the **Renault vehicle fault finding** menu.
- 2 Select and confirm the vehicle type.
- 3 Select and confirm the system to be diagnosed **ABS/ABR**.
- 4 Select the **Command mode** menu.
- 5 Select the **Parameter** menu.

Select and confirm these lines in succession to configure the computer:

- 1 Select and confirm the line **VP003** or **Steering wheel angle sensor** and follow the procedure described on the tool for calibrating the steering wheel angle sensor.
- 2 Select and confirm the line **VP007** or **Tachometric index** and follow the procedure described on the tool for configuring the tachometric index.
- 3 Select and confirm the line **VP004** or **Vehicle parameter** and follow the procedure described on the tool for configuring the vehicle type.

Clear any faults that have been stored in the computer.

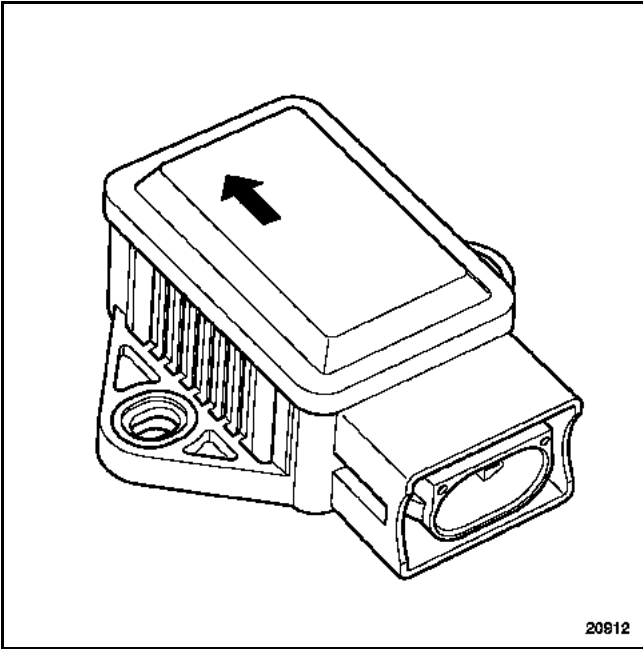
ROAD TEST THE VEHICLE TO CONFIRM REPAIR.




- 4 Chassis earth
- 5 Electronic earth
- 7 Diagnostic line K
- 15 Diagnostic line L
- 16 + Battery

Track allocation:

Track	Description
1	Yaw speed sensor reference signal
2	Yaw sensor test signal
3	+After ignition supply
4	Yaw speed signal
5	Lateral acceleration signal
6	Lateral acceleration sensor earth



This sensor is located between the gear lever and the handbrake lever.

TIGHTENING TORQUE (in daNm) 	
Sensor mounting nut	0.8 ± 0.1

REMOVAL

IMPORTANT: this sensor should be handled with care. It must be fitted facing the vehicle's direction of travel.

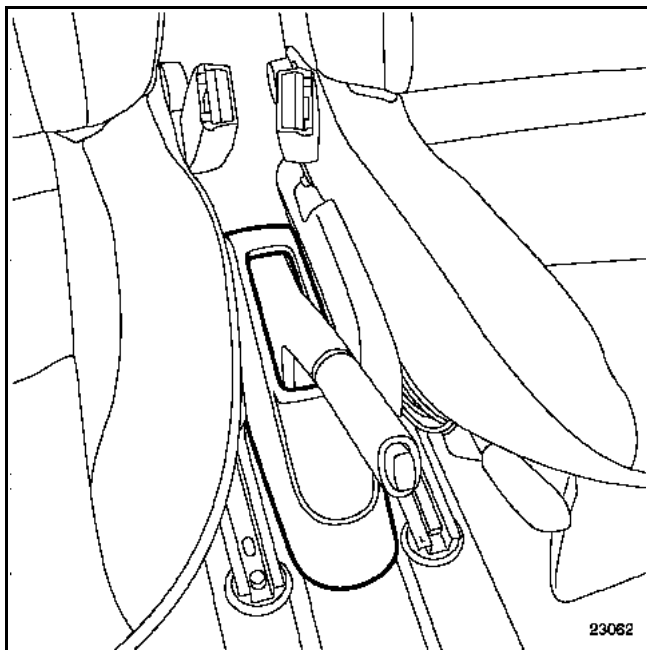
Disconnect the battery.

ANTI-LOCK BRAKING SYSTEM

Yaw speed and lateral acceleration sensor

38C

Remove the handbrake lever cover.



Disconnect the lateral acceleration and yaw speed sensor.

Remove:

- the sensor mounting nuts,
- the sensor.

REFITTING

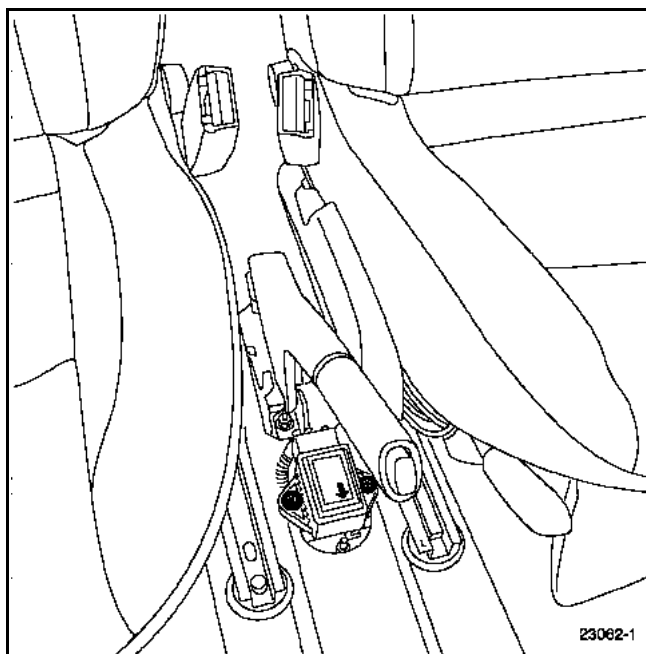
Refit the sensor in the correct direction **FACING THE FRONT** ←

Position the sensor on the vehicle axis.

Tighten the mounting bolts to the recommended torque.

It is necessary to confirm the repairs by carrying out a road test and check using the diagnostic tool.

Refit the sensor mounting nuts.




ANTI-LOCK BRAKING SYSTEM

Steering wheel angle sensor

38C

ESP uses a steering wheel angle sensor to measure the trajectory selected by the driver.

TIGHTENING TORQUE (in daNm)	
Steering wheel bolt	4.5

IMPORTANT: before removal, carry out a check and adjustment, if necessary, of the front axle geometry.

REMOVAL

Before starting any work on the air bag system, it is vital to unlock the computer using the diagnostic tools.

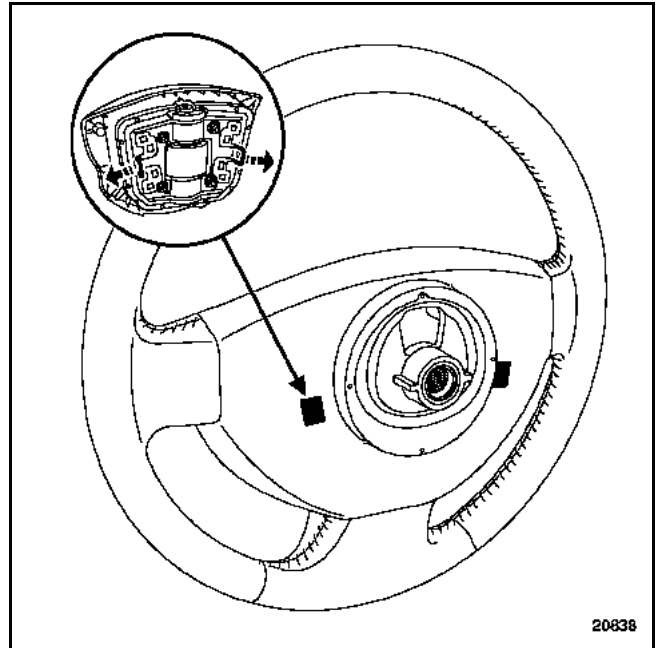
Using the NXR, CLIP or OPTIMA tool:

- 1 Select the **Renault vehicle fault finding** menu.
- 2 Select and confirm the vehicle type.
- 3 Select and confirm the **Air bag** system to be checked
- 4 Select the **Command** menu.
- 5 Select and confirm the **Parameter** (NXR) or **Actuators** (Clip) function.
- 6 Confirm the **VP0066 Computer locking** line.
- 7 In the **State** menu, check that the unit is locked. The state **ET073 Computer locked by tool** should be active. The air bag indicator light should come on.

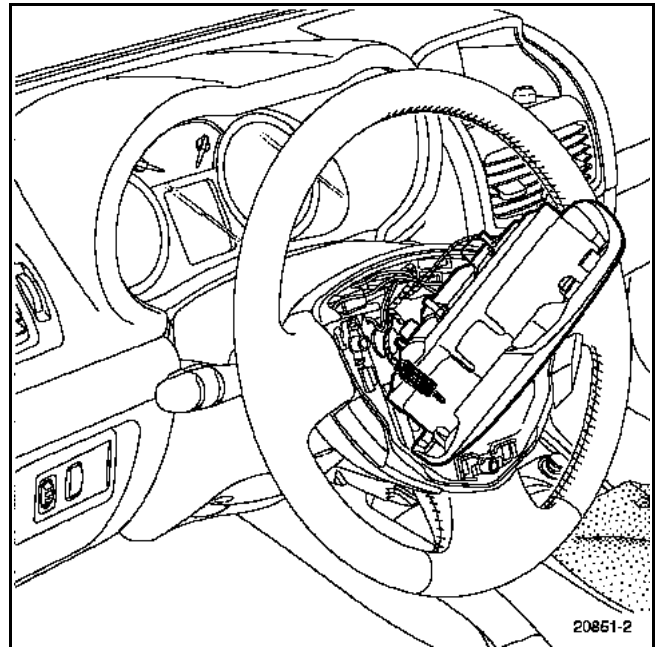
Disconnect the battery.

Straighten the wheels.

Unclip the air bag using a flat screwdriver.



Disconnect the two air bag supply connectors.



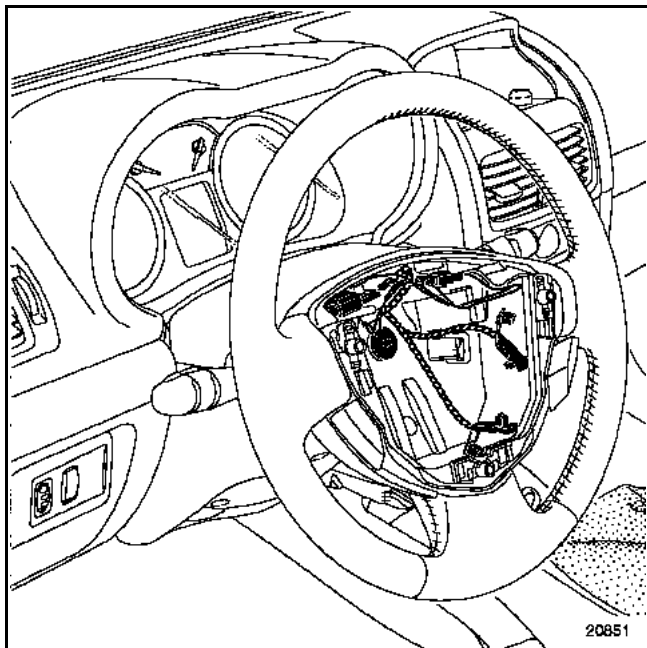
ANTI-LOCK BRAKING SYSTEM

Steering wheel angle sensor

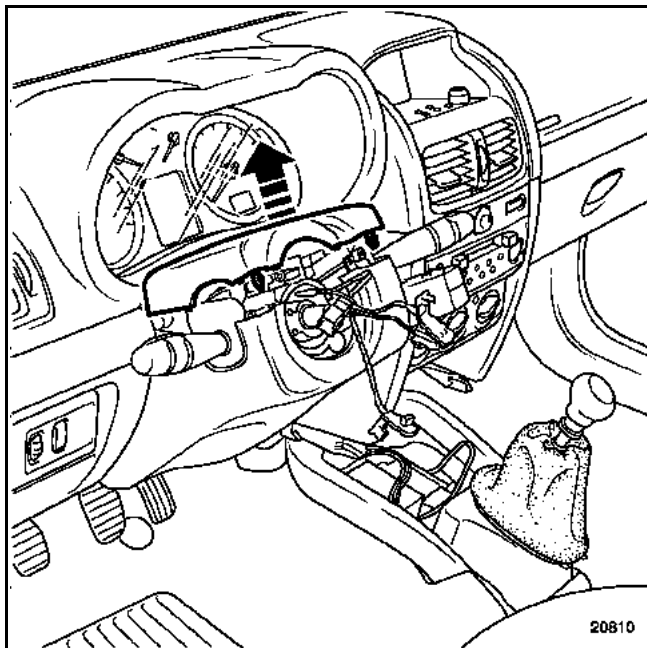
38C

Remove:

- the steering wheel bolt,
- the steering wheel,

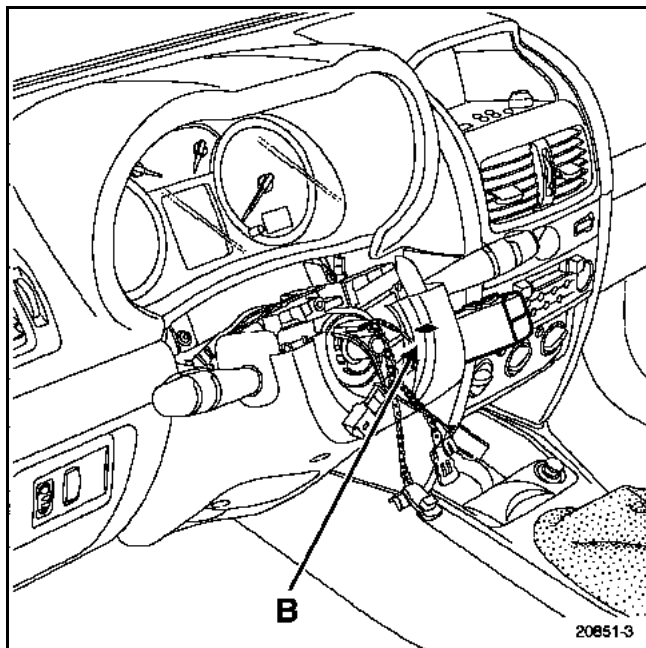


- the steering column upper half-cowling.

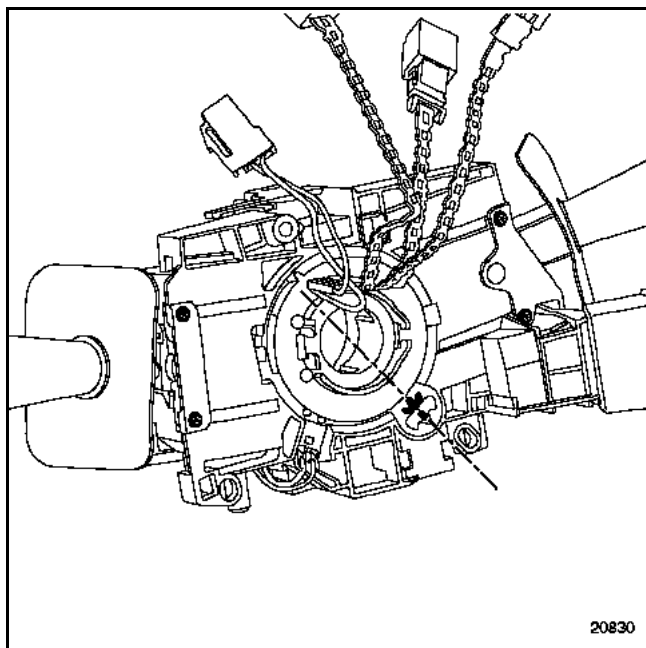


Press clip (B). Remove the radio satellite control with a flat screwdriver.

Remove the three mounting bolts from the steering wheel lower half-cowling.



Disconnect all the connectors.



Remove the mounting bolt from the rotary switch assembly.

The rotary switch mounting bolt is accessible from the centre point of the air bag sensor.

Remove:

- the rotary switch mounting bolt,
- the rotary switch,
- the steering wheel angle sensor.

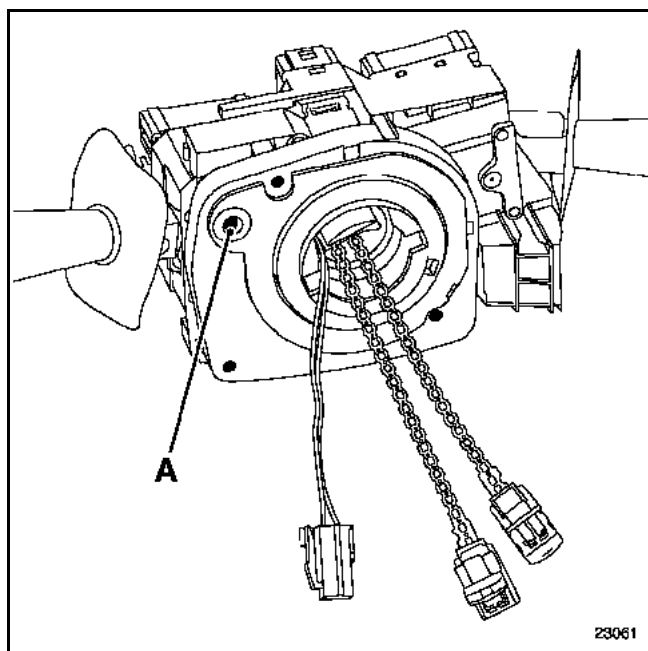
REFITTING

Special notes on the steering wheel angle sensor

Make sure the a yellow dot appears in window (A).

If this is not the case, proceed as follows:

Turn the sensor ring from end to end and count the number of turns. Position the steering wheel angle sensor at its centre point so that the window is yellow.



IMPORTANT: if **replacing** the steering wheel angle sensor, a pin holds together the two sections of the new sensor.

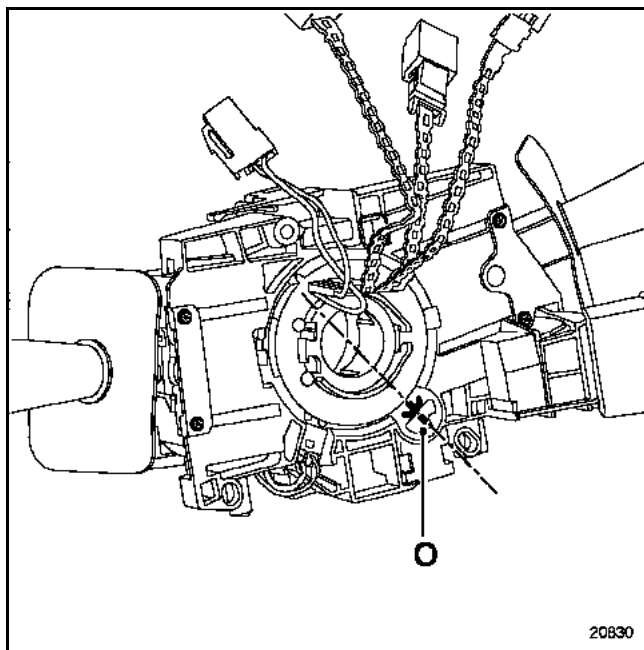
Fit the sensor, lift off the pin.

Do not turn the sensor.

The sensor must be programmed after it has been removed or replaced.

Special notes on the rotary switch

Ensure that the wheels are still straight.



Check that the rotary switch is positioned correctly. Ensure that mark 0 is aligned with the centre of the steering wheel column.

Special notes on the steering wheel

IMPORTANT: the steering wheel splines have location notches which ensure that the steering wheel can only be fitted one way. The steering wheel should be able to fit freely to the splines and the steering wheel angle sensor notches.

NOTE: clear any faults from the diagnostic tool.

Unlock the air bag computer.

Use the same procedure as for locking.

Confirm the **VP007 Computer locking** line. The state **ET073 Computer locked by tool** should no longer be active. The indicator light on the instrument panel should go out.

ANTI-LOCK BRAKING SYSTEM

Front wheel speed sensor

38C

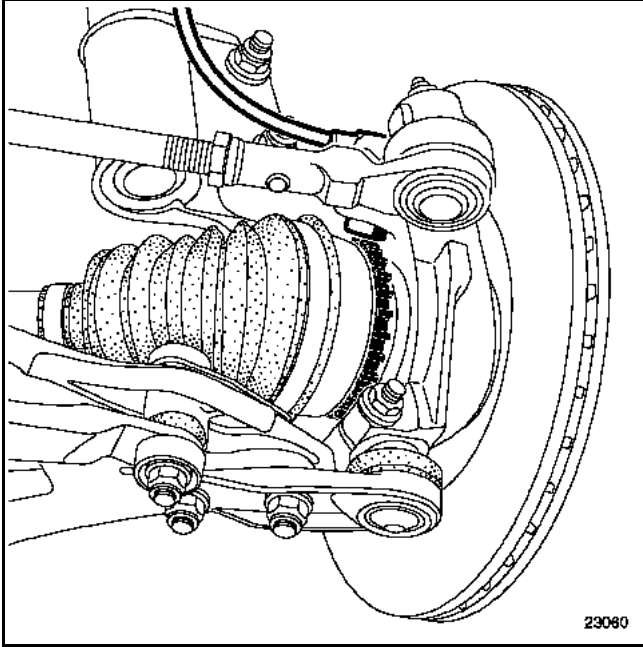
TIGHTENING TORQUE (in daNm)



Sensor mounting bolt

0.8 ± 0.2

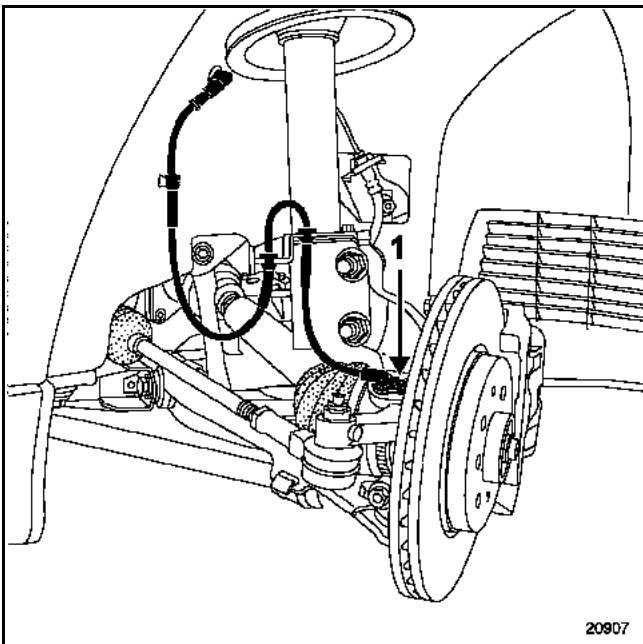
The Target/Sensor gap must be between **0.44 mm** and **2.14 mm**.



REMOVAL

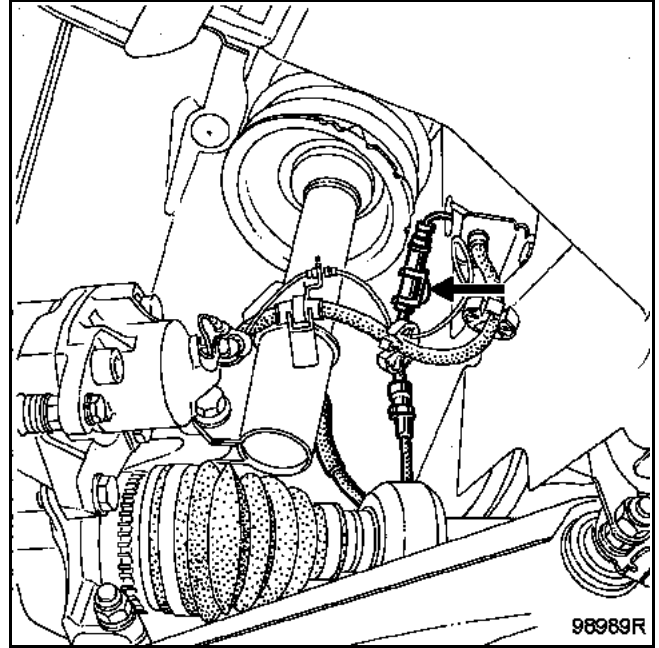
Remove:

- the wheel,
- the **T30** sensor mounting bolt (1) (with T30 Torx indentation).



Remove the connector from the support.

Disconnect the wheel sensor connector.



Remove the sensor.

REFITTING

Coat the sensor with multifunction grease

Part number: **77 01 422 308**.

Refit the sensor in the reverse order to removal.

The gap on a sensor turn can be checked using a set of shims.

NOTE: It is vital to make sure that the connectors are perfectly connected to prevent risk of breakdowns.

The sensor must be fitted manually. Do not knock it during installation.

Do not hold or pull the sensor wiring.

ANTI-LOCK BRAKING SYSTEM

Rear wheel speed sensor

38C

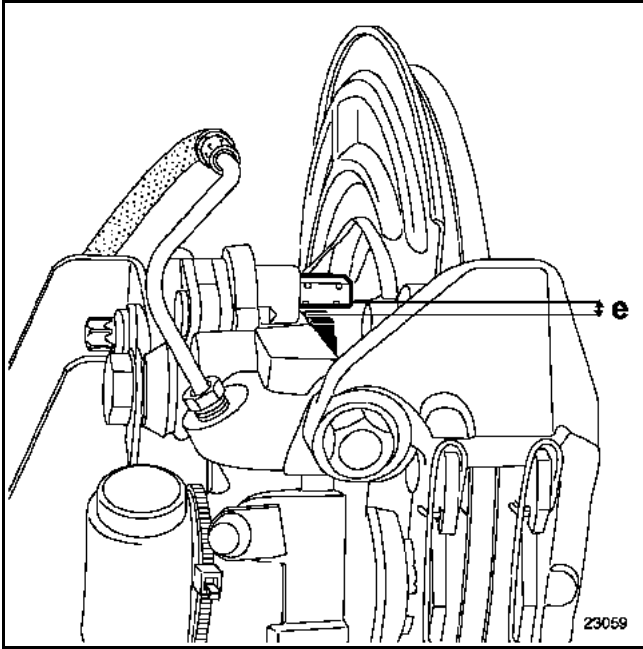
TIGHTENING TORQUE (in daNm)



Sensor mounting bolt

0.8 ± 0.2

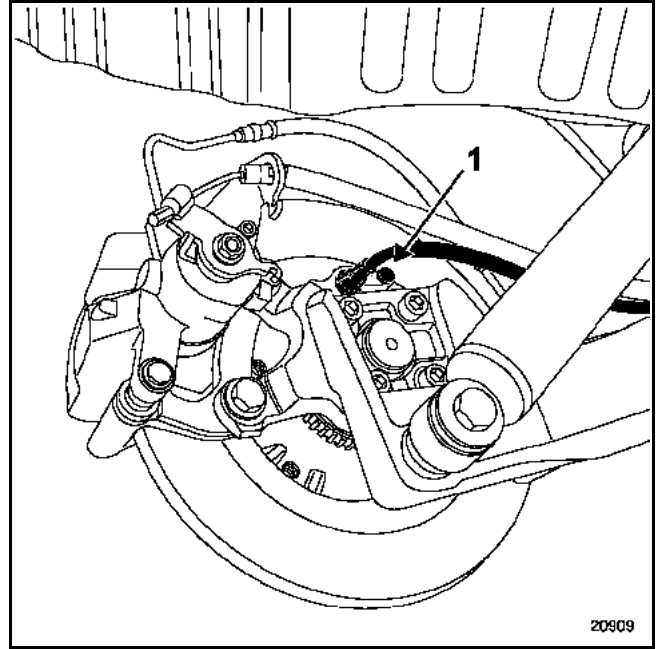
The Target/Sensor gap (e) must be between **0.21 mm** and **1.5 mm**.



REMOVAL

Remove:

- the wheel,
- the **T30** sensor mounting bolt (1) (with T30 Torx indentation).



Remove the connector from the support.

Disconnect the wheel sensor connector.

Remove the sensor.

REFITTING

Coat the sensor with multifunction grease

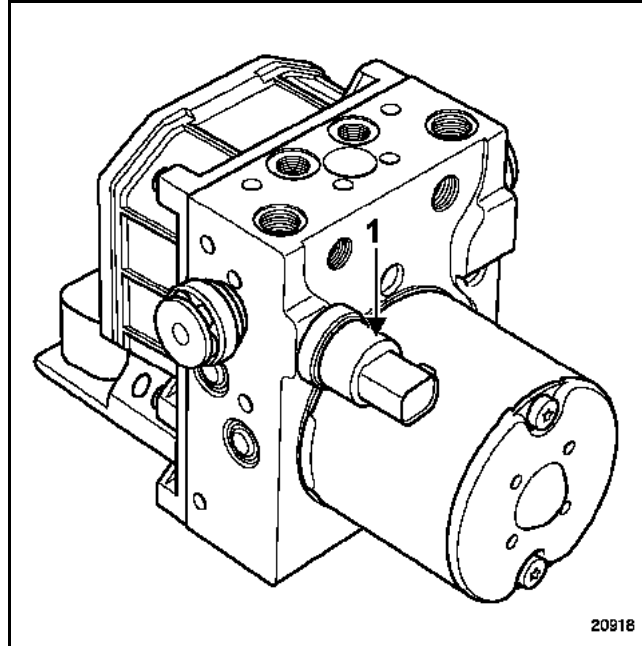
Part number: **77 01 422 308**.

Refit the sensor in the reverse order to removal.

The gap on a sensor turn can be checked using a set of shims.

NOTE: It is vital to make sure that the connectors are perfectly connected to prevent risk of breakdowns.

The sensor must be fitted manually. Do not knock it during installation.



ALLOCATION OF SENSOR TRACKS

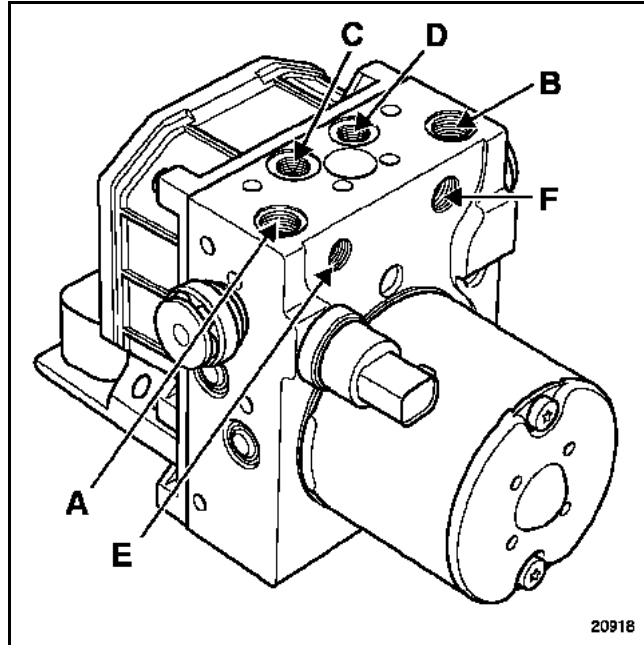
Track	Description
1	Earth
2	Pressure signal
3	Stabilized supply

Pressure sensor (1) informs the computer of the brake fluid pressure at the hydraulic unit inlet.


REPLACEMENT

If you replace the sensor, you must also replace the hydraulic unit (see the **hydraulic unit** removal-refitting method).

The **Bosch 5.7** hydraulic unit is made up of twelve solenoid valves.



- A MC1 : master cylinder primary circuit (black)
- B MC2 : master cylinder secondary circuit (green)
- C VG : output to left-hand front wheel (green)
- D VD : output to the right-hand front wheel (black)
- E RD : output to the right-hand front wheel (black)
- F RG : output to left-hand rear wheel (green)

TIGHTENING TORQUES (in daNm)	
Wheel bolt	9
Unit brake pipes	1.4

REMOVAL

Put the vehicle on a two-post lift.

Disconnect the battery.

Remove:

- the front right wheel,
- the front right-hand mudguard.

Fit a pedal press to limit the amount of brake fluid which will run out.

From above

Unclip the heat shield.

Remove:

- the heat shield,
- the ABS computer earth terminals mounting bolt,
- the computer connector,
- the hydraulic unit pressure sensor,
- the six pipes on the hydraulic unit.

From the side

Unclip the wheel speed sensor connector.

Remove:

- the hydraulic unit mounting bolts,
- the bolts securing the hydraulic unit to the mounting.

From below

Remove:

- the hydraulic unit through the steering box and the propeller shaft,
- the hydraulic unit mounting.

REFITTING

Position the hydraulic unit mounting without securing it.

Refit:

- the hydraulic unit to its mounting,
- the bolts securing the hydraulic unit to the mounting,
- the pressure sensor,
- the mounting bolts,
- the pipes on the hydraulic unit,
- the computer connector,
- the earth terminals.

Clip on the wheel speed sensor connector.

Refit:

- the mudguard,
- the wheel,
- the heat shield.

TIGHTENING TORQUES (in daNm)



Pipe unions	M10 x 100	1.7
	M12 x 100	1.7

Put the vehicle on a two-post lift.

REMOVAL

Disconnect the battery.

Fit a pedal press to limit the amount of brake fluid which will run out.

Remove:

- the engine undertray,
- the front right-hand mudguard.

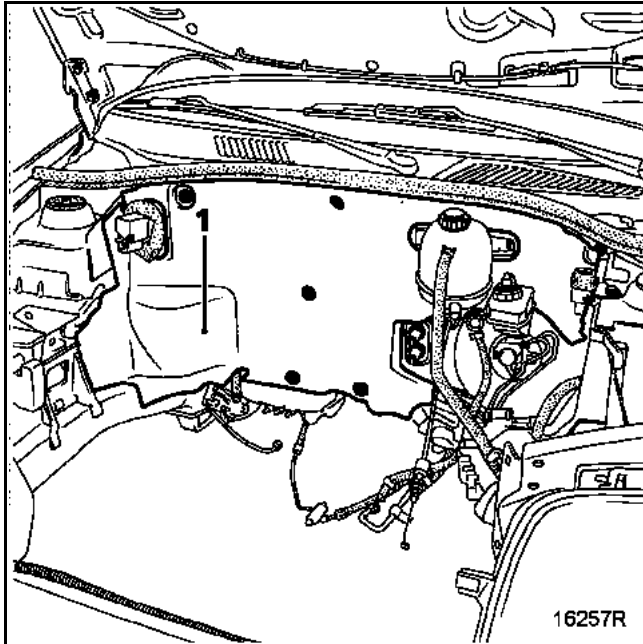
Disconnect the accelerator cable.

Remove both the expansion bottle mounting nuts and move them to the front.

Move the power assisted steering reservoir forwards.

Remove:

- the felt scuttle panel soundproofing,
- the heat shield.



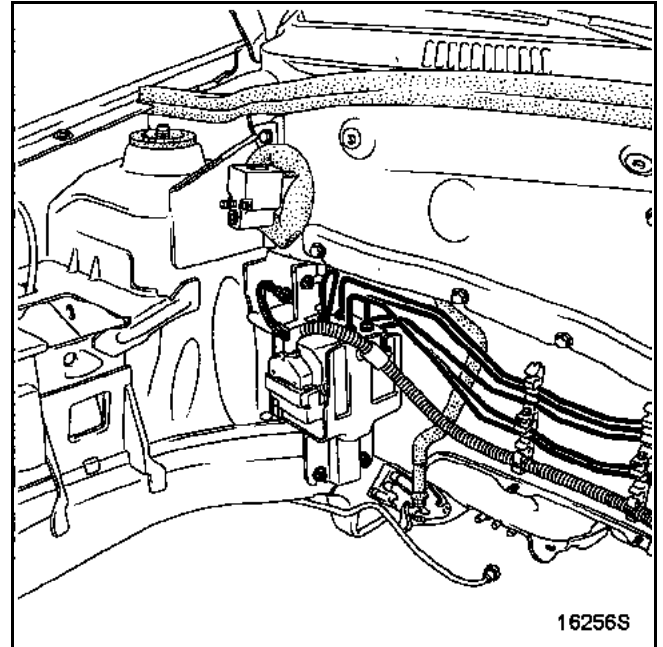
NOTE: cut the felt soundproofing at (1).

Remove:

- the earth wire bolt,
- the three hydraulic unit bolts.

Disconnect the six pipes from the hydraulic assembly, marking their position for refitting.

Unclip the scuttle panel pipes. Move the unit forwards to access the pipe nuts. These pipes can be accessed through the front right-hand wheel arch.



Completely remove the hydraulic unit from above, by moving it towards the master cylinder.

TOOLING REQUIRED

Brake bleeding device recommended by Renault
--

NOTE: the hydraulic unit is supplied prefilled.

Prerequisites for any bleeding of air from the brake circuit:

- make sure that there are no leaks in the fuel system,
- fill the brake fluid reservoir* to its maximum level,
- depress the brake pedal several times, so that the moving components of the braking system (pistons, brake shoes, discs or drums) all make contact with each other,
- adjust the brake fluid level* in the reservoir,
- adjust the bleeding device brake fluid level* to its maximum level, adjust the pressure to between **2 and 2.5 bar** (refer to the driver's handbook).

SAEJ 1703 DOT4 brake fluid

For optimized operation on vehicles fitted with dynamic driving control, Renault recommends a brake fluid with low viscosity in cold conditions (maximum **750 mm²/s at - 40°C**).

There are two different methods for bleeding from the brake circuit:

- ***bleeding the brake circuit outside the regulation system***, known as classic or conventional. It does not allow air to be bled from the circuits inside the ABS system hydraulic unit.
- bleeding the air from circuits inside the ABS hydraulic unit, known as ***bleeding the brake control circuit***.

Precautions to be taken during the brake circuit bleeding operation:

- check the brake fluid levels of the brake circuit and the bleeding device,
- the brake adjustment circuit must be free of all hydraulic and electrical faults.

Bleeding the brake circuit outside the control circuit

Special precautions to be taken during the brake circuit bleeding operation:

- The vehicle ignition must be off to ensure that the hydraulic unit solenoid valves do not operate.

This procedure, known as conventional bleeding, can be applied after removal or during replacement of:

- a rigid pipe,
- a hose,
- a calliper.

Put the vehicle on a two-post lift.

Connect the bleeding device to the vehicle brake fluid tank, paying attention to the features of this equipment (refer to the driver's handbook).

Fit the bleed reservoirs to the bleed screws.

Bleed the circuit by opening the bleed screws in the following order (remember to close them after the operation):

- rear right-hand circuit,
- front left-hand circuit,
- rear left-hand circuit,
- front right-hand circuit.

With the engine switched off, check the pedal travel.

If it is not correct, start the bleeding procedure again.

Top up the brake fluid level in the reservoir having disconnected the bleeding device. Check the tightness of the bleed screws and that the sealing caps are all present.

Check that the adjustment of the brakes is satisfactory by carrying out a road test. If the pedal travel becomes incorrect during the road test, apply the ***brake control circuit bleeding*** procedure.

The efficiency and balance of a vehicle braking system may be checked on a brake test bench or by performing a road test.

Bleeding the brake control circuit

IMPORTANT: this bleed can only be carried out after bleeding the brake circuit outside the control circuit (see previous page).

This procedure must be used after one of the following components has been removed or replaced:

- the master cylinder,
- the hydraulic unit,
- the brake fluid,
- the fluid reservoir.

Put the vehicle on a two-post lift.

Connect:

- the vehicle brake fluid reservoir air bleeding device (refer to the driver's handbook),
- the diagnostic tool.

Fit the bleed reservoirs.

A bleeding cycle consists of the following:

Open the bleed screw of the rear right-hand wheel.

Activate the solenoid valve of the rear right-hand wheel (command **AC156**).

While the solenoid valve is operational, gently depress the brake pedal (without it reaching its travel limit) and release slowly.

This action on the pedal allows the brake circuit to be kept at a pressure equal to or above **15 bar**.

Close the bleed screw concerned.

Carry out these operations on the next calliper.

It is essential to respect the order:

- left-hand rear wheel (command **AC155**)
- left-hand front wheel (command **AC153**)
- right-hand front wheel (command **AC154**)

Disconnect the bleeding device. Top up the brake fluid level in the reservoir. Check the tightness of the bleed screws and that the sealing caps are all present.

During a road test, trigger brake control to confirm that the brake pedal travel is correct.

If the travel becomes spongy, **repeat bleeding of the brake circuit outside the brake control circuit and bleeding of the brake control circuit** until a correct brake pedal travel is obtained.

It is consequently possible to use a larger quantity of brake fluid than the capacity of the circuit.