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## **3 Chassis**

### **38B ANTI-LOCK BRAKING SYSTEM**

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***CB1U***

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**77 11 319 922**

**DECEMBER 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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## Contents

	Page
<b>38C ANTI-LOCK BRAKING SYSTEM</b>	
Special features	38C-1
Location of components	38C-2
Hydraulic control unit description	38C-3
Wiring diagram	38C-4
Connections	38C-6
Diagnostic socket	38C-7
Hydraulic circuit	38C-8
Hydraulic braking test	38C-9
Bleeding procedure	38C-10
Wheel speed sensor test	38C-11

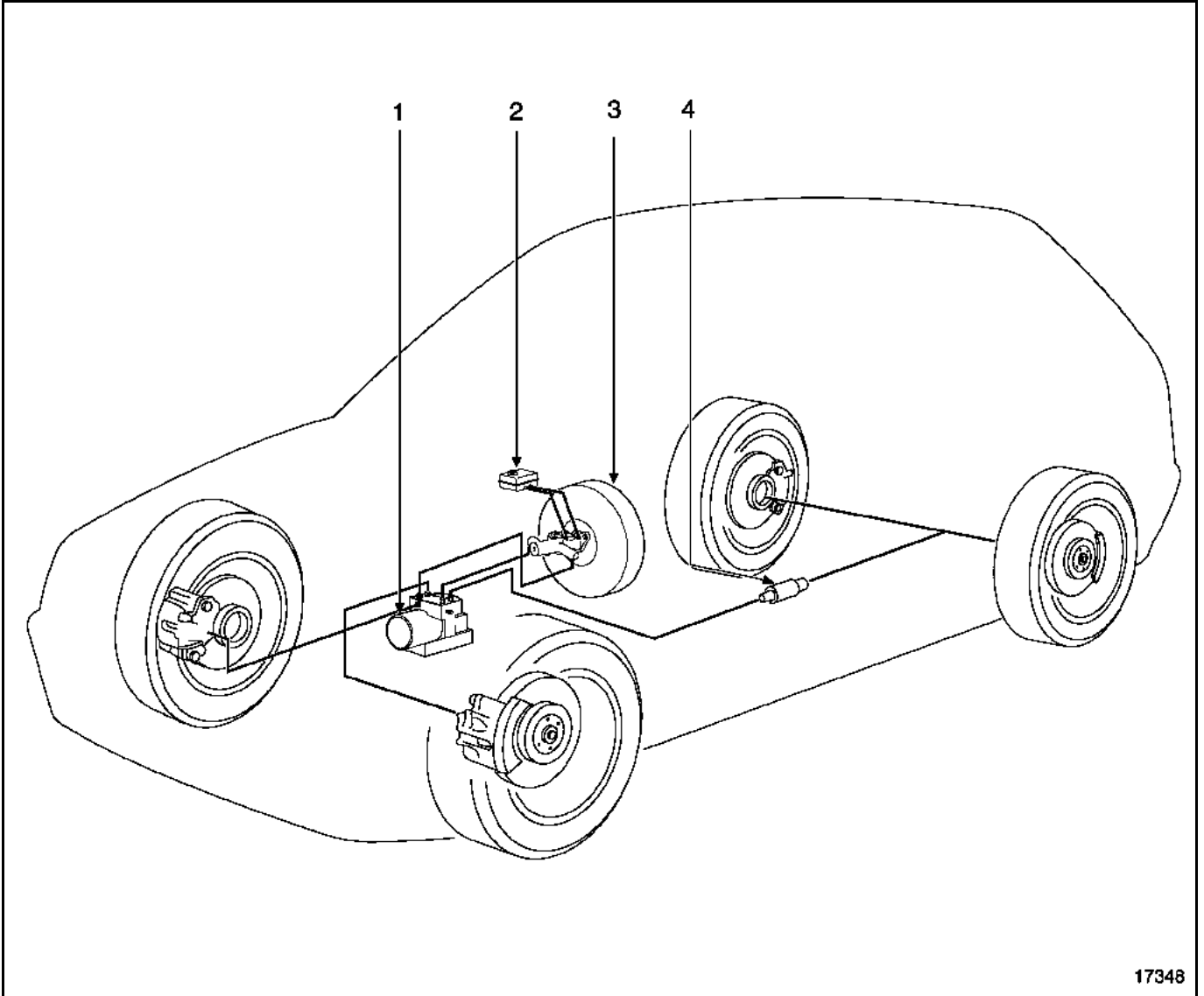
This vehicle is fitted with a **BOSCH 5.3 ABS** of the four channel additional type; the conventional braking equipment and the **ABS** equipment are separate.

The system comprises four speed sensors. Each hydraulic braking channel is associated with a sensor at each wheel. The front wheels are therefore regulated separately. The rear wheels however are regulated at the same time and in the same way according to the **select low** principle (the first wheel tending to lock causes immediate regulation on the complete axle assembly).

# BOSCH ANTI-LOCK BRAKING SYSTEM

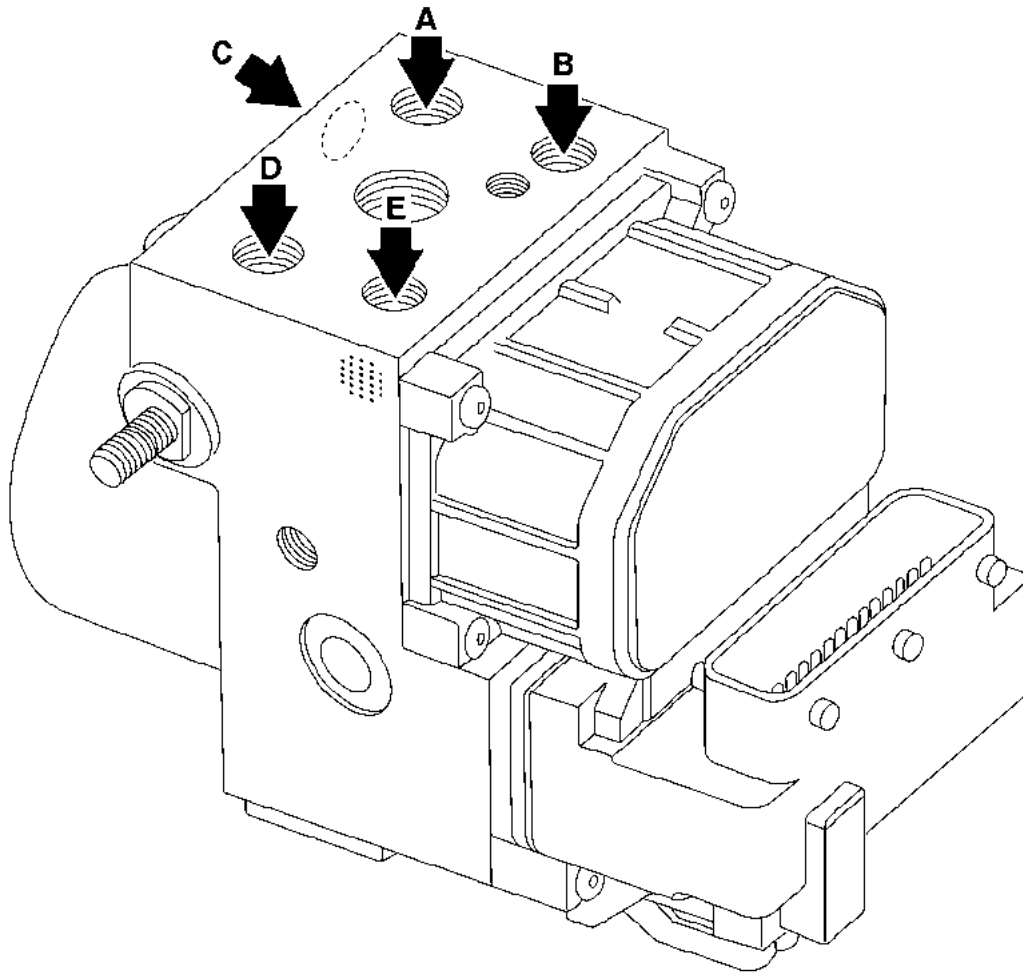
## Location of components

**38C**



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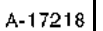
- 1 ABS hydraulic unit
- 2 Master cylinder
- 3 Brake servo
- 4 Proportioning valve



A-16947

- A Inlet from rear master cylinder
- B Left front wheel
- C Right front wheel
- D Inlet from front master cylinder
- E Rear wheels

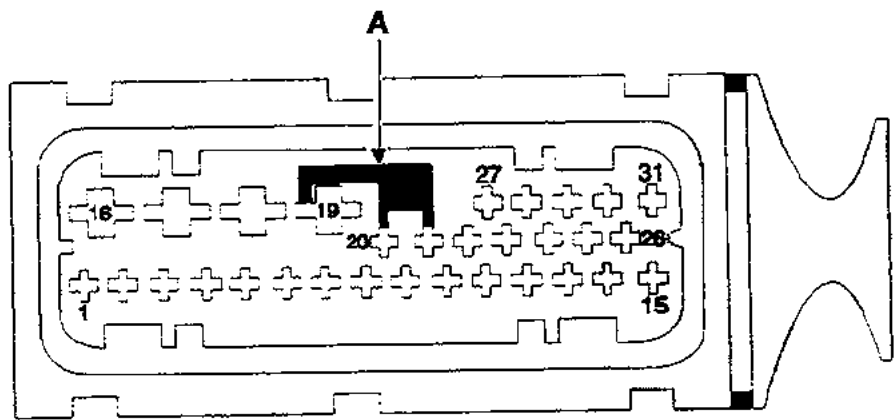
## 38C



### PARTS LIST

103	Alternator
118	ABS computer
120	Injection computer
150	Rear right wheel sensor
151	Left rear wheel sensor
152	Front right wheel sensor
153	Front left wheel sensor
160	Brake switch
225	Diagnostic socket
247	Instrument panel
250	Vehicle speed sensor
429	ABS backup relay (ABS warning light)
645	Passenger compartment connection unit
777	Power feed fuse board
R20	38-track connector, connection to engine attachment
R107	Instrument panel/front of engine
R115	Engine/engine wiring
R139	Engine/ABS
R219	Instrument panel/rear left door

31-TRACK CONNECTOR:

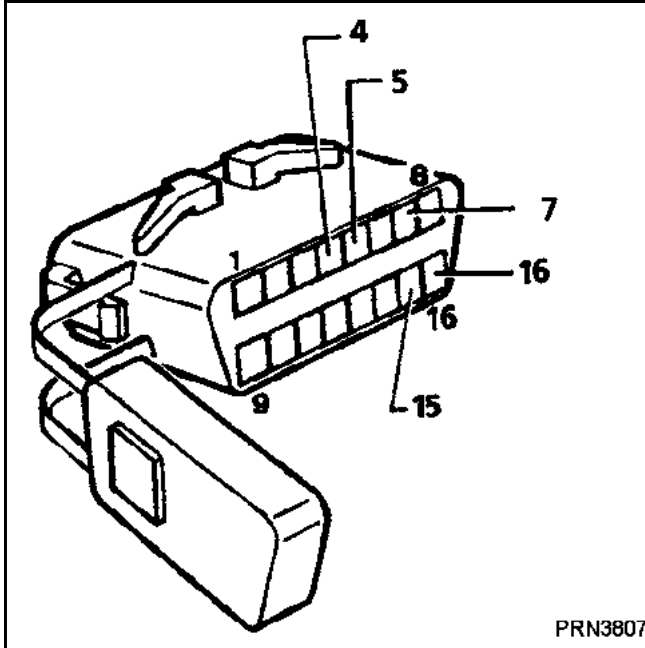


PRN3813

A Micro-spring connecting earth (terminal 19) to pins 20 and 21 (**ABS** and **brake fluid level** warning lights) if the connector is disconnected.


Track	Description	Track	Description
1	Rear right-hand <b>earth sensor</b>	17	+ Battery (solenoid valves and pump motor)
2	<b>Rear right-hand</b> sensor signal	18	+ Battery (solenoid valves and pump motor)
3	Not used	19	Earth
4	<b>Front right-hand</b> earth sensor	20	Not connected
5	<b>Front right-hand</b> sensor signal	21	ABS warning light
6	<b>Front left-hand</b> sensor signal	22	Not connected
7	<b>Front left-hand</b> sensor signal	23	<b>Left rear</b> speed signal output
8	<b>Rear left-hand</b> earth sensor	24	<b>Right rear</b> speed signal output
9	<b>Rear left-hand</b> sensor signal	25	Not used
10	Alternator load	26	Not used
11	Diagnostic line <b>K</b>	27	Not used
12	Not used	28	Not used
13	Not used	29	Not used
14	Information on brake light switch	30	Not used
15	+ after ignition data	31	Not used
16	Pump motor earth		





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

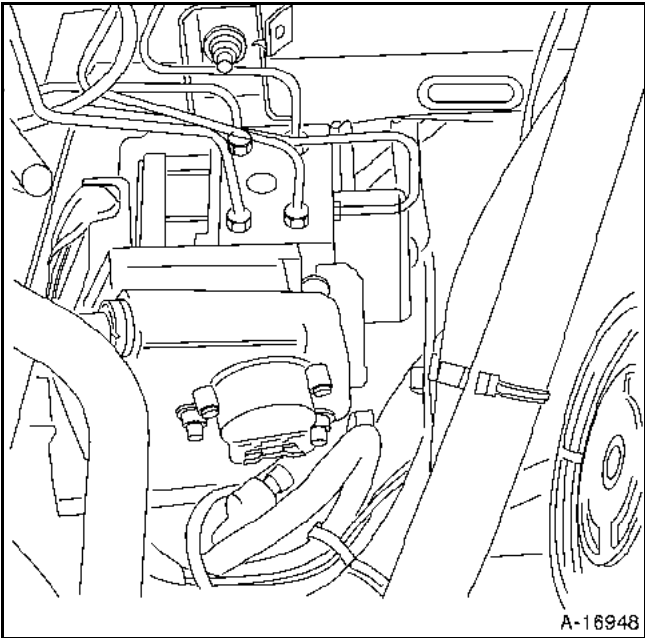
**HYDRAULIC CIRCUIT**

TIGHTENING TORQUES (in daNm)		
Pipes	M10 X 100	1.7
	M 12 X 100	1.7

Disconnect the connector of the ABS computer.

Remove the two earth wire screws.

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



Remove the two mounting nuts of the hydraulic circuit on its bracket.

Remove the hydraulic circuit.

**REFITTING**

Proceed in the reverse order to removal.

Listen for the click that indicates the fuel pipe union is correctly fastened.

Bleed the brake circuit, for this refer to the following pages.

**NOTE:** the computer must not be removed, if faulty, replace the entire hydraulic unit.

This section describes the test to be carried out with the diagnostic tool to check the installation of the ABS system on the vehicle and in particular the hydraulic circuit.

**IMPORTANT:** Two mechanics are required for this test and the vehicle must be placed on a two post lift.

### Test method

Place the vehicle on the lift and raise the wheel to be tested. One of the mechanics must be seated in the driver's seat with the diagnostic tool. Switch on ignition, vehicle in neutral, in fault search mode, and apply the brakes. The second mechanic must apply a torque to the wheel and try to turn it.

The mechanic performs on the diagnostic tool an appropriate control action which automatically reproduces the following cycle ten times: alternating increase and decrease of pressure on the wheel being checked. These ABS actions are noted at the wheel as ten locking/releasing operations. The jerky movement of the wheel (the quality of which is noted by the mechanic) indicates that the hydraulic circuit is connected correctly.

**For this sequence, the diagnostic tool program is as follows:**

- Cycle on the wheel to be tested:
  - one pressure drop of 200 ms when the pump starts at the same time,
  - one pressure increase of 300 ms when the pump starts at the same time (ten cycles are performed for the wheel in question).
- The pressure reaches that of the master cylinder for the four wheels.
- The hydraulic pump motor stops.
- The mechanic releases the brake pedal.

This completes the hydraulic test for the wheel in question. Start the test for the other three wheels.

**IMPORTANT:** The hydraulic unit is already filled.

This bleeding operation must be followed when one of the following components has been removed:

- the hydraulic assembly,
- the master cylinder,
- the circuit (between the hydraulic assembly and the master cylinder).

1) The braking system is usually bled using the pedal.

**IMPORTANT:** If, after an ABS control test, the pedal travel is not correct, bleed the hydraulic circuit.

2) Bleed the hydraulic circuit.

**IMPORTANT:** The bleed sequence must be followed (see General Information 30-8).

a) Bleed the **rear right** brake by bleeding the secondary hydraulic circuit using the diagnostic tool:

- Prepare the bleed container and the pipe, then unscrew the bleed screw.
- Pump the brake pedal (around ten times).
- Run the bleed command on the diagnostic tool.
- **Pump the brake pedal during the bleed phase on the diagnostic tool.**
- **At the end of the bleed cycle using the diagnostic tool, continue to pump the brake pedal and close the brake bleed screw.**

b) Repeat the procedure as described in a) for the **rear left, front left** and **front right** brakes.

c) Check if the brake pedal travel is correct. If not, restart the bleed procedure.

**IMPORTANT:** Check that there is enough brake fluid in the reservoir.

a) Check the resistance of the sensor connection (from the computer to the 2 pin speed sensor).

b) Visually inspect the teeth (48 teeth) on the target. If they are worn, replace the shaft and the target.

c) Check the air inlet using a set of feeler gauges. Only the front sensors can be checked.

**Front: A = 1.0 mm** + 0.5 mm  
- 0.0 mm

