



N.T. 3025A

X06X

**A.B.S. MARK 20 on the
Twingo Phase II**

For the sections not described in this note, refer to M.R. 305.

77 11 200 495

JUNE 1998

Edition Anglaise

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

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

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Renault 1998

Contents

Page

0 General vehicle information

07 VALUES AND SETTINGS

Tyres and wheels	07-1
Brakes	07-2
Braking compensator	07-3

3 Chassis

30 GENERAL

Tightening torques (in daN.m)	30-1
Composition and dimensions of principle braking components	30-3

38 ELECTRONICALLY CONTROLLED HYDRAULIC SYSTEM

Special notes	38-1
Connector - Computer	38-2
Allocation of tracks	38-3
Wiring diagram	38-4
Key to components	38-5
Hydraulic assembly	38-6
Computer	38-7
Bleeding	38-8
Hydraulic braking check	38-9
Checking the wheel speed sensors	38-9

Fault finding

Introduction	38-10
XR25 fiche	38-11
Interpretation of XR25 bargraphs	38-13
Checking conformity	38-26
Aid	38-27
Customer complaints	38-29
Fault charts	38-30

VALUES AND SETTINGS

Tyres and wheels

Vehicle	Rim	Tyres	Inflation pressure when cold (in bars) (1)	
			Front	Rear
X06X	4.5 B 13	145/70 R 13 145/80 R 13 155/70 R 13	2.2	2

(1) Fully laden and motorway use.

Special notes for vehicles used when fully laden (Maximum all up weight) **and towing a trailer:**
Maximum speed should be restricted to **62.5 mph** (100 km/h) and tyre pressure increased by **0.2 bar**.


Tightening torque for wheel nuts: **9 daN.m**
Lateral run-out: **1.2 mm**

Vehicle	Drum diameter or disc thickness (in mm)				Maximum disc run-out (in mm)	
	Front		Rear			
	Normal	Minimum	Normal	Maximum (1)	Front	Rear
X06X	12	10.5	180.25	181.25	0.07	-

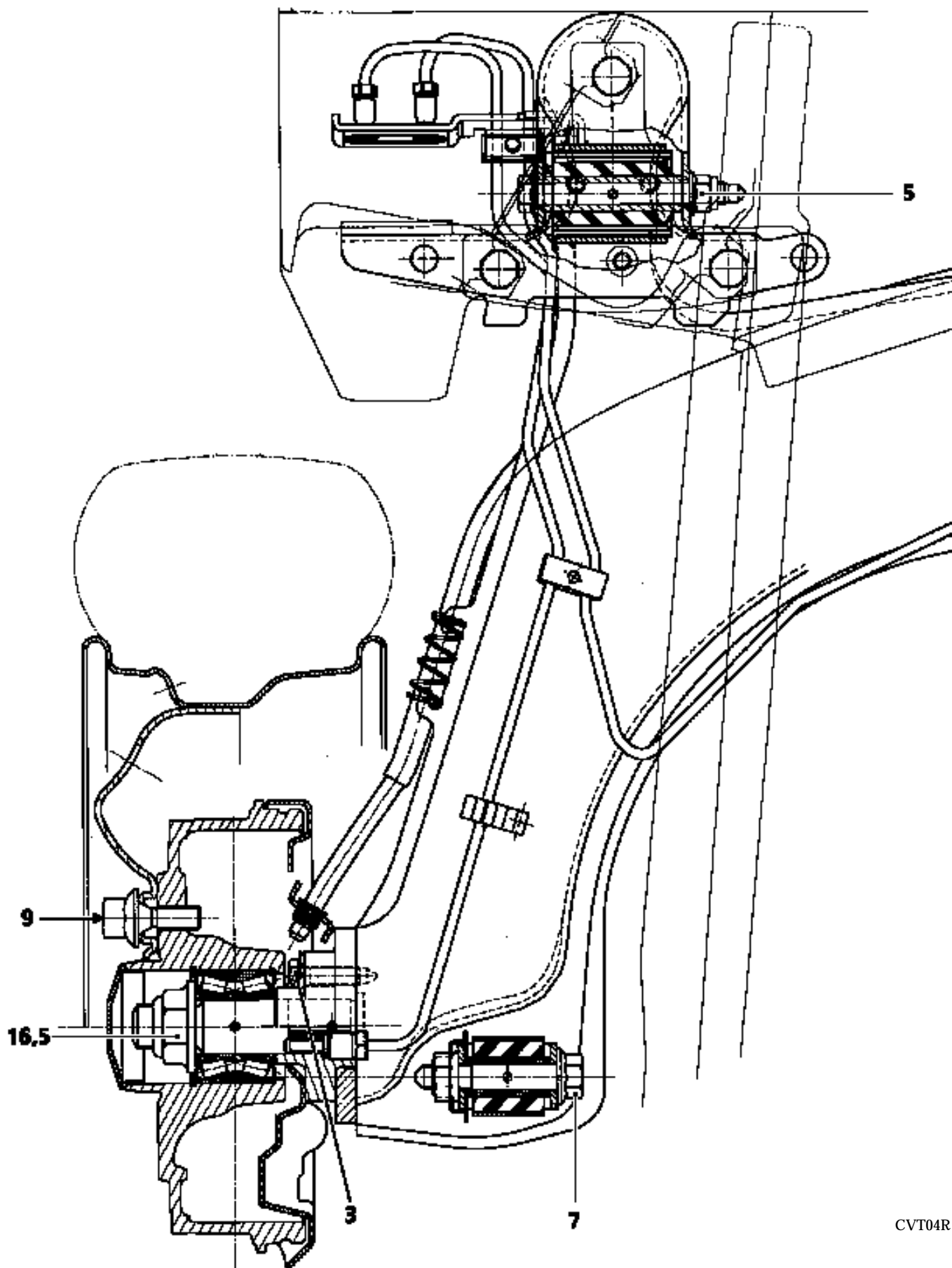
(1) Drum: Maximum wear diameter.

Vehicle	Lining thickness (in mm) (including backing plate)				Brake fluid
	Front		Rear		
	New	Minimum	New	Minimum	
X06X	18	6	6.5	2.5	SAE J1703 DOT 4

BRAKING PRESSURE (Vehicles with adjustable compensator)

Vehicle	Fullness of fuel tank (driver in the vehicle)	Test pressure (1) (in bars)	
		Front	Rear
X06X	 90966S1	100	→ 31.4 ⁺⁰ ₋₈

(1) Checking is carried out with two pressure gauges arranged in an X formation.



CVT04R



	DIMENSIONS	TIGHTENING TORQUE
Bleed screw	M 7 × 100	0.4 to 0.8
Hoses in the front brake caliper pistons	M 10 × 100	1.7
Hoses in the rear suspension arms	M 10 × 100	1.7
Rear wheel cylinder feed	M 12 × 100	1.7
Master cylinder outlets	M 10 × 100	1.7

Composition and dimensions of principle braking components

	X06X
FRONT BRAKE (in mm)	
Diameter of brake cylinders	48
Diameter of discs	238
Thickness of discs	12
Minimum disc thickness	10.5
Thickness of linings (including backing plate)	18
Minimum thickness of linings (backing plate)	6
Maximum disc run-out	0.07
REAR BRAKE (in mm)	
Diameter of brake cylinders	20.6
Diameter of drums	203.45
Maximum diameter of drums after regrinding	204.45
Width of linings	36
Thickness of linings (including backing plate) secondary	5.6
primary	7.2
Minimum thickness of linings (including backing plate)	2.5
MASTER CYLINDER (in mm)	
Diameter	20.6

This vehicle is equipped with **TEVES ABS MARK 20** of the 3 additional channel type; the conventional braking equipment and ABS equipment are separated.

SPECIAL FEATURES

The system consists of four speed sensors. Each hydraulic braking channel has a sensor at each wheel. Therefore, the front wheels are regulated separately.

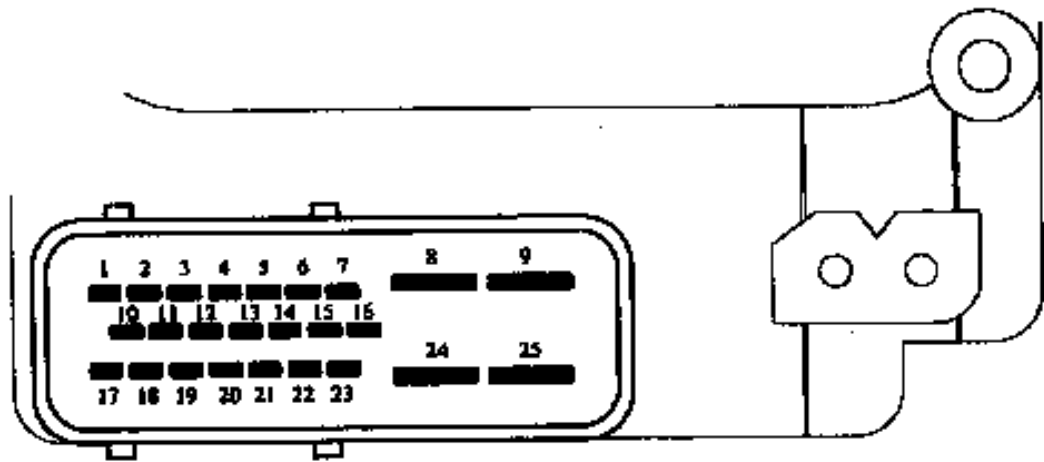
On the other hand, the rear wheels are simultaneously regulated in the same way according to the low selection principle known as "**select low**" (the first wheel which tends to lock, causes immediate regulation on the complete axle assembly).

On this vehicle, the braking compensator is suppressed (on versions equipped with **ABS**) and its role is ensured by a special programme in the **ABS** assembly computer, called **REF** (Electronic Braking Distributor).

IMPORTANT: when the **ABS** fuse is removed, be careful not to brake sharply during a road test as the **REF** function is no longer activated (front and rear pressure is identical), so there is a risk that the vehicle will spin.

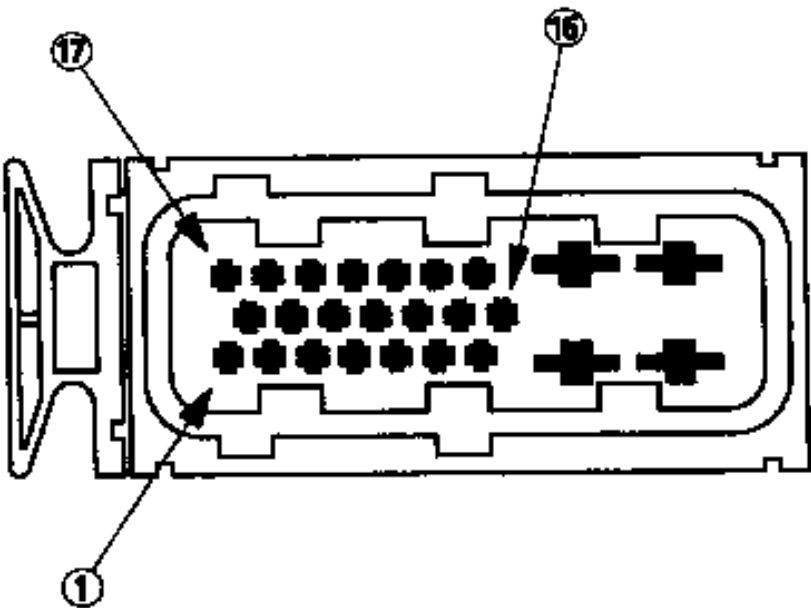
CONNECTOR - COMPUTER

COMPUTER



PRN3805

CONNECTOR

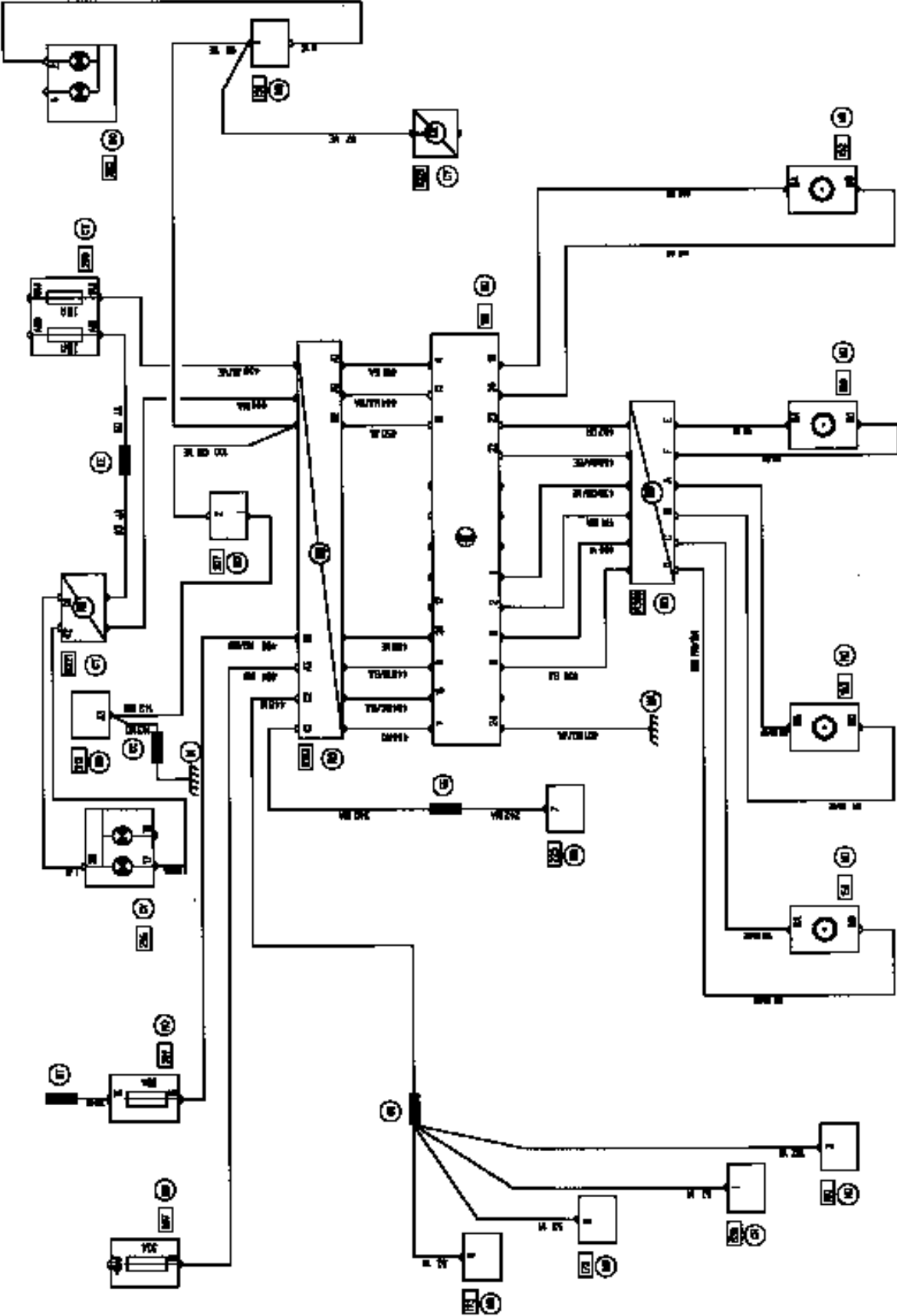


PRN3806

ALLOCATION OF TRACKS

- 1 Front left hand sensor signal
- 2 Front left hand sensor earth
- 3 Not connected
- 4 main + after ignition feed
- 5 Rear left hand sensor signal
- 6 Rear left hand sensor earth
- 7 Fault finding line K
- 8 Not connected
- 9 + battery
- 10 Not connected
- 11 Not connected
- 12 Not connected
- 13 Not connected
- 14 Not connected
- 15 ABS warning light
- 16 Brake fault warning light
- 17 Front right wheel speed signal
- 18 Stop lights switch
- 19 Front right sensor signal
- 20 Front right sensor earth
- 21 Not connected
- 22 Rear right sensor earth
- 23 Rear right sensor signal
- 24 Earth
- 25 Pump motor +before ignition feed


WIRING DIAGRAM



KEY TO COMPONENTS

- 118 ABS computer
- 150 Rear right wheel sensor
- 151 Rear left wheel sensor
- 152 Front right wheel sensor
- 153 Front left wheel sensor
- 160 Stop switch
- 260 Fuse box
- 295 Warning lights unit
- 597 Engine fuse box

HYDRAULIC ASSEMBLY

TIGHTENING TORQUES (in daN.m)			
Pipe union	M10 x 100	1.7	
	M12 x 100	1.7	

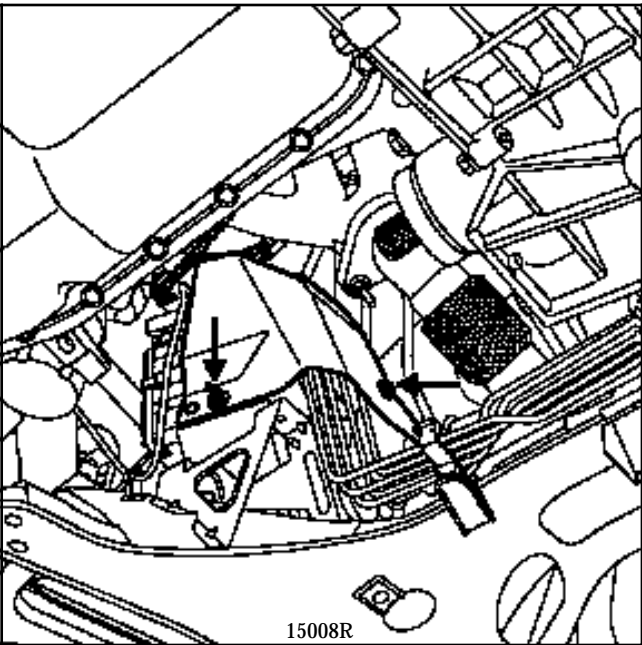
REMOVAL

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

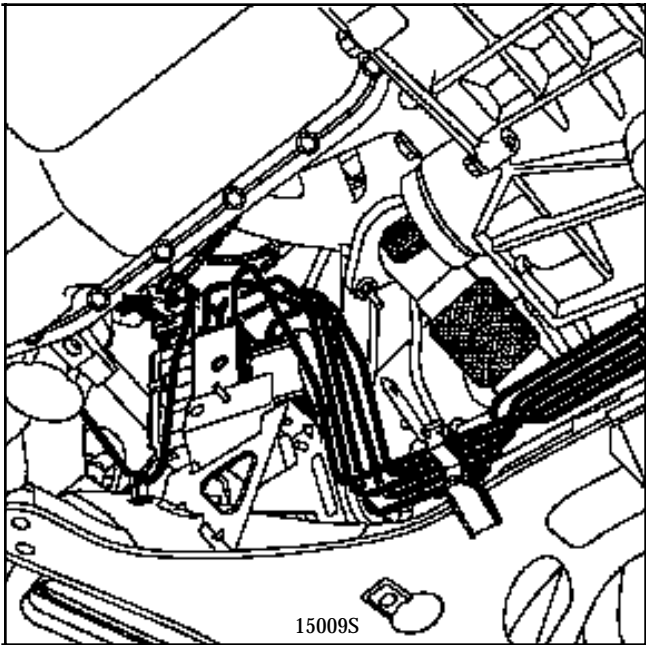
- Remove:
- the engine undertray,
 - the front right wheel.

Partially detach the right hand driveshaft, without removing it completely and attach it to the bodys-hell.

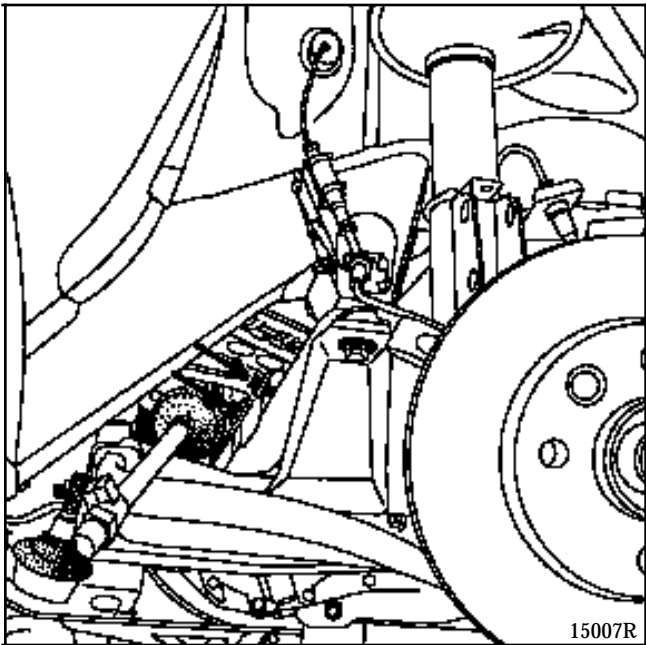
Remove the hydraulic assembly heat shield (one bolt, one nut).



- Disconnect:
- the hydraulic assembly pipes,
 - the computer connector by pulling the red locking device.



Remove the two hydraulic assembly mounting bolts and remove it.



REFITTING

Refitting is the reverse of removal.

Reconnect the pipes, observing the colours which are attributed to each.

NOTE: the new hydraulic assembly is supplied pre-filled.

Remove the pedal press and connect the master cylinder pipes to the hydraulic assembly.


Fill the brake fluid reservoir to the "MAX" mark (new **DOT 4** brake fluid).

Correctly reconnect the connectors.

Bleed the circuit. The correct order of operations **MUST BE OBSERVED** (see method described below).

Check the system using the G functions on the XR25.

COMPUTER

TIGHTENING TORQUES (in daN.m) 	
Computer mounting bolts	0.3

REMOVAL

Disconnect:

- the battery,
- the computer connector by pulling the red locking device.

Remove the four torx mounting bolts (type T30).

Disconnect the pump connector.

Remove the computer.

REFITTING

Refitting is the reverse of removal. Ensure the computer is correctly connected and tightened.

Check the system using the G functions on the XR25.

PURGE

A bleed bottle and a transparent hose are required for bleeding. Filling equipment supplying **1 bar + 0.5 bar**, should also be used. Otherwise, ensure that there is always enough fluid in the reservoir.

a) Conventional bleeding following replacement of the master cylinder

- Connect the hose and the bleed bottle to the bleed screw for the front left caliper and open the screw.
- Fully depress the brake pedal and hold for approximately **2 seconds**, then release it.
- Wait approximately **2 seconds** and repeat this operation until there are no air bubbles in the bleed hose.
- Close the bleed screw on the caliper when the pedal is pressed down.
- Raise the pressure by pressing on the pedal and open the bleed screw. Repeat this operation **3 to 5 times**.

NOTE: if filling is carried out without filling equipment, constantly monitor the level of brake fluid in the reservoir, adding more if necessary.

- Repeat the previously described operations for the front right, rear left and rear right brake calipers.

b) Bleeding after replacement of the hydraulic assembly

- Connect the hose and the bleed bottle to the bleed screw for the front left hand caliper and open the screw.
- Fully depress the brake pedal and use a pedal press to hold it. This closes the central valves of the master cylinder and stops fluid running out through the open system.
- Close the front left hand bleed screw and disconnect the bleed hose.
- Remove and refit the hydraulic assembly (see methods described earlier).
- Bleed the braking circuit (follow the method described in **a**).

NOTE: if brake pedal travel is too long after the bleeding operation, carry out an operation using the **XR25** by entering **G 15 * --**. This controls the hydraulic assembly solenoid valves and removes any residual air bubbles.

HYDRAULIC BRAKING CHECK

Place the vehicle on a two post lift.

One of the operators should be in the driver's seat with an **XR25** test kit.

Switch on the ignition, vehicle in neutral, in fault finding mode and press the brake pedal.

The second operator should apply a torque to the wheel being tested with two hands to try to rotate the locked wheel.

The operator generates an appropriate command on the **XR25** which performs the cycle **ten times**: alternate decrease then increase in pressure on the wheel being checked. These actions on the **ABS** result in the wheel alternately releasing and locking up ten times. The vibrating movements on the wheel, recorded qualitatively by the operator show that the hydraulic circuit for this wheel is correctly connected.

The programme installed on the **XR25** to perform this sequence is as follows:

- Cycle on the wheel to be tested:
 - . a pressure drop of **200 ms** with the pump starting simultaneously,
 - . a pressure rise of **300 ms** with the pump starting simultaneously.

(10 cycles are performed on the wheel being tested)

- A pressure rise to the master cylinder pressure in the four wheels.
- Hydraulic pump motor stopped.
- The operator releases the brake pedal.

The hydraulic test of the wheel in question is now finished, restart the test for the other three wheels.

CHECKING THE WHEEL SPEED SENSORS

The checking procedure cannot be carried out as a sequence. It will be necessary to carry out:

- 1) A resistance check of the wiring to the sensor connectors:
 - **from the computer connector to the 2 track speed sensor connector.**
- 2) When possible, a visual check of the target teeth: if it is faulty, replace it.
- 3) A check of the air gap using a set of feeler gauges.
- 4) A check of the sensor mounting.

Front: **Z = 1.7 mm** maximum

Rear: **Z = 2.3 mm** maximum (cannot be checked)

FAULT FINDING - INTRODUCTION

Conditions for applying the checks defined in this fault finding:

The checks defined in this fault finding are only to be applied to a vehicle when the description of the fault being dealt with corresponds exactly to the display on the XR25.

If a fault is dealt with due to a bargraph flashing, the conditions for confirming the actual presence of the fault (and the need to apply fault finding) are given in the "Notes" box or at the start of the bargraph interpretation procedure.

If a bargraph is only interpreted when it is permanently illuminated, applying the tests recommended in the fault finding when the bargraph is flashing will not allow the origin of fault memorisation to be located. In this case, only the wiring of the faulty component should be checked (the fault is simply memorised since it was not present at the time of the test).

The ignition must have been switched off before use of the XR25.

Special tooling required for operations on the ABS system:

- XR25.
- XR25 cassette n° 18.

- Note:**
- Bargraphs 10 LH side, 11 LH side, 12 right hand side, 14 LH side and 15 LH side on the XR25 n° 31 as well as #10 and 14 do not concern this vehicle (specific to the Laguna).
 - When memorising an intermittent speed sensor fault, the ABS warning light will illuminate the next time the vehicle is started until the vehicle speed reaches **12.5 mph** (20 km/h). When this sensor fault is memorised, a counter associated with the fault is initialised at 40. This counter will be reduced by one every time the vehicle is started if the fault is not present when the vehicle speed exceeds **12.5 mph** (20 km/h). When the counter value equals 0, the fault memory is erased.

FAULT FINDING - XR25 FICHE

XR25 FICHE N° 31, cassette n° 18

N°31

S8

code : D 1 1

read : 3XX5

1		COMPUTER	CODE PRESENT	
2		*02 FR LH	INLET SOLENOID CIRCUIT	FR RH *22
3		RR LH RR (if x70)		RR RH
4		*04 FR LH	EXHAUST SOLENOID CIRCUIT	FR RH *24
5		RR LH RR (if x70)		RR RH
6		FR LH	WHEEL SPEED SENSOR CIRCUIT	FR RH
7		RR LH		RR RH
8		FR LH	WHEEL SPEED SENSOR SIGNALS	FR RH
9		RR LH		RR RH
10		HYDRAULIC	PUMP MOTOR CIRCUITS	

TEVES A.B.S.

Erase fault memory : G 0 **

End of test : G13 *

11		PEDAL TRAVEL SENSOR	MAIN RELAY	
12		*12 MAIN	SUPPLY SECONDARY	
13		DEPRESSED	RELEASED	
14		SPEEDO FUNCTION NOT PROGRAMMED (see Manuel)		
15		*15 TARGET FOR ONE WHEEL		
16				
17				
18				
19				
20		XR25 MEMORY 0		

ADDITIONAL CHECKS : # . .

SEE NOTE :

01 FR RH wheel speed Km/h

02 FR LH wheel speed Km/h

03 RR RH wheel speed Km/h

04 RR LH wheel speed Km/h

10 Brake pedal position

14 Speed Km/h

90 Fiche identification

IDENTIFICATION

3 30 5 : MASTER

3 20 5 : MEGANE

3005 / 3015 / 3025 : LAGUNA

3035 / 3205

3 175 : TWINGO

CONTROL MODES : G...*

(If vehicle speed zero and press brake
pedal for solenoid tests)

02 Tell-tale fault test

03 FR LH solenoid test

04 FR RH solenoid test

05 RR LH solenoid test

06 RR RH solenoid test

07 Nivocode tell-tale test

08 Pump motor relay test

Help : V 9

Return to diag mode: D

18 ANG

NOTE : for safety, the computer can exit fault-finding when driving along

FAULT FINDING - XR25 FICHE

BARGRAPH SYMBOLS

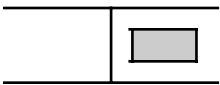
- Faults (always on coloured background):



If illuminated, indicates a fault on the product tested. The associated text defines the fault.
This bargraph may be:

- Illuminated : fault present.
- Flashing : fault memorised.
- Extinguished : fault absent or not detected.

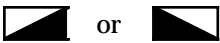
- Status (always on white background):



Bargraphs always located on top right hand side.
If illuminated, indicates that dialogue is established with the product computer.
If it remains extinguished:

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

The representation of the following bargraphs gives their initial status:
Initial status: (ignition on, engine stopped, no operator action).



or



Undefined

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



Extinguished



Illuminated

extinguished when the function or condition specified on the fiche is no longer being met.

Additional details:

Some bargraphs have a *. The command *.., when the bargraph is illuminated which is used to display additional information about the type of fault or status present.

FAULT FINDING - INTERPRETATION OF XR25 BARGRAPHS

<div>1</div> <div><div></div><div></div></div>	<div>Fiche n° 31</div> <div>Bargraph 1 RH side extinguished</div> <div><u>Code present</u></div>
------------------------------------------------	--------------------------------------------------------------------------------------------------

<div>NOTES</div>	<div>None.</div>
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Ensure that the XR25 is not the cause of the fault by trying to communicate with a computer on another vehicle. If the XR25 is not faulty and dialogue cannot be established with another computer on the same vehicle, a faulty computer may be disrupting fault finding line **K**. Disconnect each computer in turn to locate the faulty one.

Check that the ISO selector is in position **S8**, that you are using XR25 cassette 18 and the correct access code.

Check the battery voltage and carry out the operations necessary to obtain the correct voltage (9.5 volts < U battery < 18.5 volts).

Check for the presence and the condition of the **ABS fuse** on the passenger compartment connection unit (10A).

Check the connection of the computer connector and the condition of its connections.

Check the connection of the intermediate connectors. Check the condition of the connections.

Check the ABS earth (tightness of the earth bolt on the front right hand wing).

Check that the computer is correctly fed:

- **Earth** on track **24** of the 25 track connector.
- **+ after ignition feed** on track **4** of the 25 track connector.

Check that the diagnostic socket is correctly fed:

- **+ before ignition feed** on track **16**.
- **Earth** on track **5**.

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

- between track **14** of the computer connector and track **15** of the diagnostic socket,
- between track **7** of the computer connector and track **7** of the diagnostic socket.

If dialogue is still not established after these various checks, replace the ABS computer.

<div>AFTER REPAIR</div>	<div>When communication has been established, deal with any illuminated fault bargraphs.</div>
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FAULT FINDING - INTERPRETATION OF XR25 BARGRAPHS

<div>1</div> <div><div></div><div></div></div>	<div>Fiche n° 31</div> <div>Bargraph 1 LH side illuminated</div> <div>Computer</div>
------------------------------------------------	--------------------------------------------------------------------------------------

NOTES	None.
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Check the connections on the 25 track computer connector.
Check the tightness and condition of the battery terminals.
Check the ABS earth (earth bolt on the front right hand wing) and visually check all the ABS wiring.

If the "computer" fault persists, replace the ABS computer.

AFTER REPAIR	After replacing the computer, carry out another check using the XR25.
--------------	-----------------------------------------------------------------------

FAULT FINDING - INTERPRETATION OF XR25 BARGRAPHS

<div>2 - 3 - 4 - 5</div> <div><div><div></div><div></div></div><div><div></div><div></div></div></div>	<div>Fiche n° 31</div> <div>Bargraphs 2, 3, 4 and 5 RH side or LH side illuminated</div> <div><u>Solenoid valve circuit</u></div>
<div>NOTES</div>	<div>None.</div>
<div><div>Check the ABS earth (tightness of the earth bolt on the front right hand wing).</div><div>Check the condition and positioning of the 2 30A ABS fuses on the engine connection unit (1 conventional fuse + 1 "maxi fuse").</div><div>Check the condition of the connections on the 25 track computer connector.</div><div>Check that the computer is correctly mounted on the ABS assembly.</div></div>	
<div>If the "solenoid valve circuit" fault persists, replace the ABS computer.</div>	

<div>AFTER REPAIR</div>	<div>Erase the computer memory (G0**).</div> <div>Carry out a road test then a check using the XR25.</div>
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FAULT FINDING - INTERPRETATION OF XR25 BARGRAPHS

<div>6</div> <div><div></div><div></div></div>	<div>Fiche n° 31</div> <div>Bargraph 6 LH side illuminated</div> <div>Front LH wheel sensor circuit</div>
------------------------------------------------	-----------------------------------------------------------------------------------------------------------

NOTES	<div>If the bargraph is flashing, check the condition of the wiring and the sensor connections.</div>
-------	-------------------------------------------------------------------------------------------------------

Check the connection and condition of the sensor connections.

Check and ensure the continuity of the connections between the sensor connector and the computer connector:

- between one track of the sensor and track 1 of the computer connector,
- between the other sensor track and track 2 of the computer connector.

Also check the insulation between these connections.

Visually check the sensor wiring and check the quality of the connections on the 25 track computer connector.

If all the checks are correct, reconnect the computer and the wheel speed sensor then erase the computer memory. Exit fault finding mode (G13*) and switch off the ignition.

Switch the ignition on again and replace the sensor if the fault reappears.

If the fault reappears after the sensor is replaced, replace the computer.

AFTER REPAIR	<div>Erase the computer memory (G0**).</div> <div>Carry out a road test then a check using the XR25.</div>
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FAULT FINDING - INTERPRETATION OF XR25 BARGRAPHS

<div>6</div> <div><div></div><div></div></div>	<div>Fiche n° 31</div> <div>Bargraph 6 RH side illuminated</div> <div><u>Front right wheel sensor circuit</u></div>
------------------------------------------------	---------------------------------------------------------------------------------------------------------------------

NOTES	If the bargraph is flashing, check the condition of the wiring and the sensor connections.
-------	--------------------------------------------------------------------------------------------

Check the connection and condition of the sensor connections.

Check and ensure the continuity of the connections between the sensor connector and the computer connector:

- between one track of the sensor and track **19** of the computer connector,
- between the other sensor track and track **20** of the computer connector.

Also check the insulation between these connections.
Visually check the sensor wiring and check the quality of the connections on the 25 track computer connector.

If all the checks are correct, reconnect the computer and the wheel speed sensor then erase the computer memory. Exit fault finding mode (G13*) and switch off the ignition.
Switch the ignition on again and replace the sensor if the fault reappears.
If the fault reappears after the sensor is replaced, replace the computer.

AFTER REPAIR	Erase the computer memory (G0**). Carry out a road test then a check using the XR25.
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FAULT FINDING - INTERPRETATION OF XR25 BARGRAPHS

<div>7</div> <div><div></div><div></div></div>	<div>Fiche n° 31</div> <div>Bargraph 7 LH side illuminated</div> <div>Rear left wheel sensor circuit</div>
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NOTES	If the bargraph is flashing, check the condition of the wiring and the sensor connections.
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Check the connection and condition of the sensor connections.

Check and ensure the continuity of the connections between the sensor connector and the computer connector:

- between one track of the sensor and track 5 of the computer connector,
- between the other sensor track and track 6 of the computer connector.

Also check the insulation between these connections.

Visually check the sensor wiring and check the quality of the connections on the 25 track computer connector.

If all the checks are correct, reconnect the computer and the wheel speed sensor then erase the computer memory. Exit fault finding mode (G13*) and switch off the ignition.

Switch the ignition on again and replace the sensor if the fault reappears.

If the fault reappears after the sensor is replaced, replace the computer.

AFTER REPAIR	Erase the computer memory (G0**).
	Carry out a road test then a check using the XR25.

FAULT FINDING - INTERPRETATION OF XR25 BARGRAPHS

<div>7</div> <div><div></div><div></div></div>	<div>Fiche n° 31</div> <div>Bargraph 7 RH side illuminated</div> <div>Rear right hand wheel sensor circuit</div>
------------------------------------------------	------------------------------------------------------------------------------------------------------------------

NOTES	<div>If the bargraph is flashing, check the condition of the wiring and the sensor connections.</div>
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Check the connection and condition of the sensor connections.

Check and ensure the continuity of the connections between the sensor connector and the computer connector:

- between one track of the sensor and track **22** of the computer connector,
- between the other sensor track and track **23** of the computer connector.

Also check the insulation between these connections.
Visually check the sensor wiring and check the quality of the connections on the 25 track computer connector.

If all the checks are correct, reconnect the computer and the wheel speed sensor then erase the computer memory. Exit fault finding mode (G13*) and switch off the ignition.
Switch the ignition on again and replace the sensor if the fault reappears.
If the fault reappears after the sensor is replaced, replace the computer.

AFTER REPAIR	<div>Erase the computer memory (G0**).</div> <div>Carry out a road test then a check using the XR25.</div>
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FAULT FINDING - INTERPRETATION OF XR25 BARGRAPHS

<div>8</div> <div><div><div></div></div><div><div></div></div></div>	<p>Bargraph 8 RH side or LH side flashing</p> <p><u>Front RH or front LH wheel sensor signal</u></p>
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<p>NOTES</p>	<p>Even if present at the time of testing, these faults will always be declared by BG 8 LH or RH flashing.</p> <p>To confirm their presence and therefore the need to apply the fault finding below, carry out a road test. The fault is present if the bargraph illuminates during the test.</p> <p>If bargraphs 6 and 8 LH side are both illuminated, deal with bargraph 6 first.</p> <p>If bargraphs 6 and 8 RH side are both illuminated, deal with bargraph 6 first.</p>
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<p>Check the quality of the wheel speed sensor mounting (position and that it is tightened to the correct torque).</p> <p>Check the condition and the conformity of the ABS target (38 teeth).</p> <p>Check the sensor / target air gap over one wheel revolution: 1.7 mm maximum.</p>	
------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--

<p>If all the checks are correct, reconnect the computer and the wheel speed sensor then erase the computer memory.</p> <p>Exit fault finding mode (G13*) and carry out a road test.</p> <p>Replace the sensor if the fault reappears.</p>	
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<p>If the fault reappears after the sensor is replaced, it may be caused by a solenoid valve operating fault. It is therefore necessary to carry out a hydraulic check of the solenoid valves using the XR25 and commands G03* or G04* (consult the "aid" section).</p> <p>If ten releasing / locking cycles are not performed on the wheel tested, replace the hydraulic assembly.</p> <p>If the hydraulic assembly is not faulty, replace the computer.</p>	
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<p>AFTER REPAIR</p>	<p>Erase the computer memory (G0**).</p> <p>Carry out a road test then a check using the XR25.</p>
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FAULT FINDING - INTERPRETATION OF XR25 BARGRAPHS

<div>9</div> <div><div><div></div></div><div><div></div></div></div>	<div>Fiche n° 31</div> <div>Bargraph 9 RH side or LH side flashing</div> <div><u>Rear RH or rear LH wheel sensor signal</u></div>
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<div>NOTES</div>	<div>Even if present at the time of testing, these faults will always be declared by BG 9 LH side or RH side flashing.</div> <div>To confirm their presence and therefore the need to apply the fault finding below, carry out a road test. The fault is present if the bargraph illuminates during the test.</div> <div>If bargraphs 7 and 9 LH side are both illuminated, deal with bargraph 7 first.</div> <div>If bargraphs 7 and 9 RH side are both illuminated, deal with bargraph 7 first.</div>
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<div>Check the quality of the wheel speed sensor mounting (position and that it is tightened to the correct torque).</div> <div>Check the condition and conformity of the ABS target (38 teeth).</div>

<div>If all the checks are correct, reconnect the computer and the wheel speed sensor then erase the computer memory.</div> <div>Exit fault finding mode (G13*) and carry out a road test.</div> <div>Replace the sensor if the fault reappears.</div>

<div>If the fault reappears after the sensor is replaced, it may be caused by a solenoid valve operating fault. It is therefore necessary to carry out a hydraulic check of the solenoid valves using the XR25 and commands G05* or G06* (consult the "aid" section).</div> <div>If ten releasing / locking cycles are not performed on the wheel tested, replace the hydraulic assembly.</div> <div>If the hydraulic assembly is not faulty, replace the computer.</div>

<div>AFTER REPAIR</div>	<div>Erase the computer memory (G0**).</div> <div>Carry out a road test then a check using the XR25.</div>
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FAULT FINDING - INTERPRETATION OF XR25 BARGRAPHS

<div>10</div> <div><div></div><div></div></div>	<div>Fiche n° 31</div> <div>Bargraph 10 RH side flashing</div> <div>Pump motor circuit</div>
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<div>NOTES</div>	<div>Even if present at the time of testing, this fault will always be declared by BG 10 RH side flashing.</div> <div>To confirm their presence and therefore the need to apply the fault finding below, carry out a road test. The fault is present if the bargraph illuminates during the test.</div>
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<div>Check the 30A pump motor fuse (conventional fuse in the engine connection unit).</div> <div>Check the ABS earth (tightness of the earth bolt on the front right hand wing).</div> <div>Ensure the continuity between the 30A fuse and track 25 of the computer connector.</div> <div>Ensure the continuity between the ABS earth and track 24 of the computer connector.</div>	
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<div>Check the connection and condition of the pump motor connector and the connection between the computer and the motor.</div> <div>If the connector is correct, check the resistance of the motor coil. Replace the hydraulic assembly if the resistance is not approximately 0.4 / 0.5 ohm.</div>	
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<div>If all the checks are correct, reconnect the computer and the pump motor then erase the computer memory.</div> <div>Exit fault finding mode (G13*) and carry out a road test. Replace the computer if the fault reappears.</div> <div>If the fault persists, replace the hydraulic assembly.</div>	
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<div>AFTER REPAIR</div>	<div>Erase the computer memory (G0**).</div> <div>Carry out a road test then a check using the XR25.</div>
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FAULT FINDING - INTERPRETATION OF XR25 BARGRAPHS

<div>11</div> <div><div></div><div></div></div>	<div>Fiche n° 31</div> <div>Bargraph 11 RH side illuminated</div> <div><u>Main relay</u></div>
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NOTES	None.
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Check the tightness and condition of the battery terminals.
Check the **30A** solenoid valve feed fuse ("maxi fuse" on the engine connection unit).
Check the ABS earth (tightness of the earth bolt on the front right hand wing).
Carry out the necessary operations to obtain the correct voltage + **after ignition feed** between **tracks 9** and **24** of the computer connector (9.5 volts < correct voltage < 18.5 volts).

If all the checks are correct, reconnect the computer then erase the computer memory.
Exit fault finding mode (G13*) and carry out a road test. Replace the computer if the fault reappears.

AFTER REPAIR	Erase the computer memory (G0**). Carry out a road test then a check using the XR25.
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FAULT FINDING - INTERPRETATION OF XR25 BARGRAPHS

<div>12</div> <div><div></div><div></div></div>	<div>Fiche n° 31</div> <div>Bargraph 12 LH side illuminated</div> <div>Feed</div> <div>XR25 aid: * 12 :<div>1.dEF : voltage too low</div><div>2.dEF : excess voltage</div></div>
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NOTES	None.
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<div>Carry out the operations necessary to obtain the correct + after ignition computer feed voltage: 9.5 volts < correct voltage < 18.5 volts.</div> <div><div>- Check the battery charge.</div><div>- Check the charging circuit.</div><div>- Check the tightness and condition of the battery terminals.</div><div>- Check the ABS earth (tightness of the earth bolt on the front right hand wing).</div></div> <div>Check the presence of + after ignition feed on track 4 of the computer connector (10A fuse).</div>

AFTER REPAIR	<div>Erase the computer memory (G0**).</div> <div>Carry out a road test then a check using the XR25.</div>
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FAULT FINDING - INTERPRETATION OF XR25 BARGRAPHS

<div>13</div> <div><div></div><div></div></div>	<div>Fiche n° 31</div> <div>Bargraph 13 RH side and LH side</div> <div><div>Brake pedal</div><div>Illuminated on LH side if pedal pressed down Illuminated on RH side if pedal not pressed down</div></div>
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NOTES	Apply the checks below if bargraph illumination is not consistent with pedal position.
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Bargraph 13 LH side extinguished brake pedal pressed down

- Check the condition and adjustment of the stop switch and the **15A** stop lights fuse (on the passenger compartment connection unit). Replace it if necessary.
- Disconnect the stop switch then check / ensure the presence of + **after ignition feed** on track **1** of the connector.
- Check the stop switch contact operation (closed contact between tracks 1 and 3).
- Check and ensure the continuity between track **3** of the stop switch connector and track **18** of the ABS computer connector.

Bargraph 13 illuminated permanently on LH side

- Check the condition and adjustment of the stop switch. Replace it if necessary.
- Check the stop switch contact operation (closed contact between tracks 1 and 3). Replace the stop switch if there is permanent continuity between these two tracks.
- Check and ensure the insulation from **12 volts** of the connection between track **3** of the stop switch connector and track **18** of the ABS computer connector.

AFTER REPAIR	Carry out a road test followed by a check using the XR25.
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FAULT FINDING - CHECKING CONFORMITY

NOTES	Only carry out this conformity check after a complete check using the XR25.
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Order of operations	Function to be checked	Action	Bargraph	Display and notes
1	XR25 dialogue	D11 (selector on S8)		<div>317.5</div> Consult fault finding if dialogue is not established
2	ABS and brake warning light operation and computer initialisation check	Ignition switched on		Illumination of brake warning light for 1 second and of ABS warning light for 2.5 seconds when the ignition is switched on (consult fault finding if they remain illuminated or do not illuminate).
3	Stop switch operation		<div>13</div> <div><div></div><div></div></div>	Bargraph 13 RH side illuminated pedal not pressed. Bargraph 13 LH side illuminated pedal pressed.

FAULT FINDING - AID

Using the command modes

Operating the solenoid valves for a hydraulic test: G03* to G06*

Raise the vehicle so as to be able to rotate the wheels and check that they rotate freely. Keep the brake pedal pressed down to prevent the wheel to be tested from rotating if it is being propelled by hand (do not brake too hard so as to be at the releasing limit).

Enter G0X*  Ten releasing/locking cycles should be performed on the wheel in question (X = 3 front left wheel; X = 4 front right wheel; X = 5 rear left wheel; X = 6 rear right wheel).


Operating the ABS warning light : G02*

Enter G02*  The ABS warning light should flash.

Operating the brake warning light : G07*


Enter G07*  The brake warning light should illuminate.

Operating the pump motor : G08*

Enter G08*  The motor should operate for 3 seconds.

Operating the exhaust solenoid valves and the pump motor to bleed the hydraulic assembly : G15*

Pump the brake pedal and hold it pressed down.

Enter G15*  The brake pedal should move down then up again when the pump is activated.

Note: This command mode should only be used as part of fault finding (customer complaint), observing the bleed method described in the Technical Note.

FAULT FINDING - CUSTOMER COMPLAINTS

NOTES	Only consult this customer complaint after a complete check using the XR25.
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FAULTS NOTICED IN WARNING LIGHT OPERATION

The ABS warning light does not illuminate for 2.5 seconds when the ignition is switched on.	Chart 1
The brake fault warning light does not illuminate for 2.5 seconds when the ignition is switched on.	Chart 2
Permanent illumination of the ABS warning light, ignition on (without memorised fault).	Chart 3
Permanent illumination of the brake fault warning light, ignition on.	Chart 4
Permanent illumination of ABS and brake fault warning lights, ignition on.	Chart 5
Re-illumination of the ABS warning light after starting the engine (+ possible brake fault).	Chart 6
Intermittent illumination of the ABS warning light when driving.	Chart 7

BRAKING FAULTS NOTICED WITH ABS REGULATION

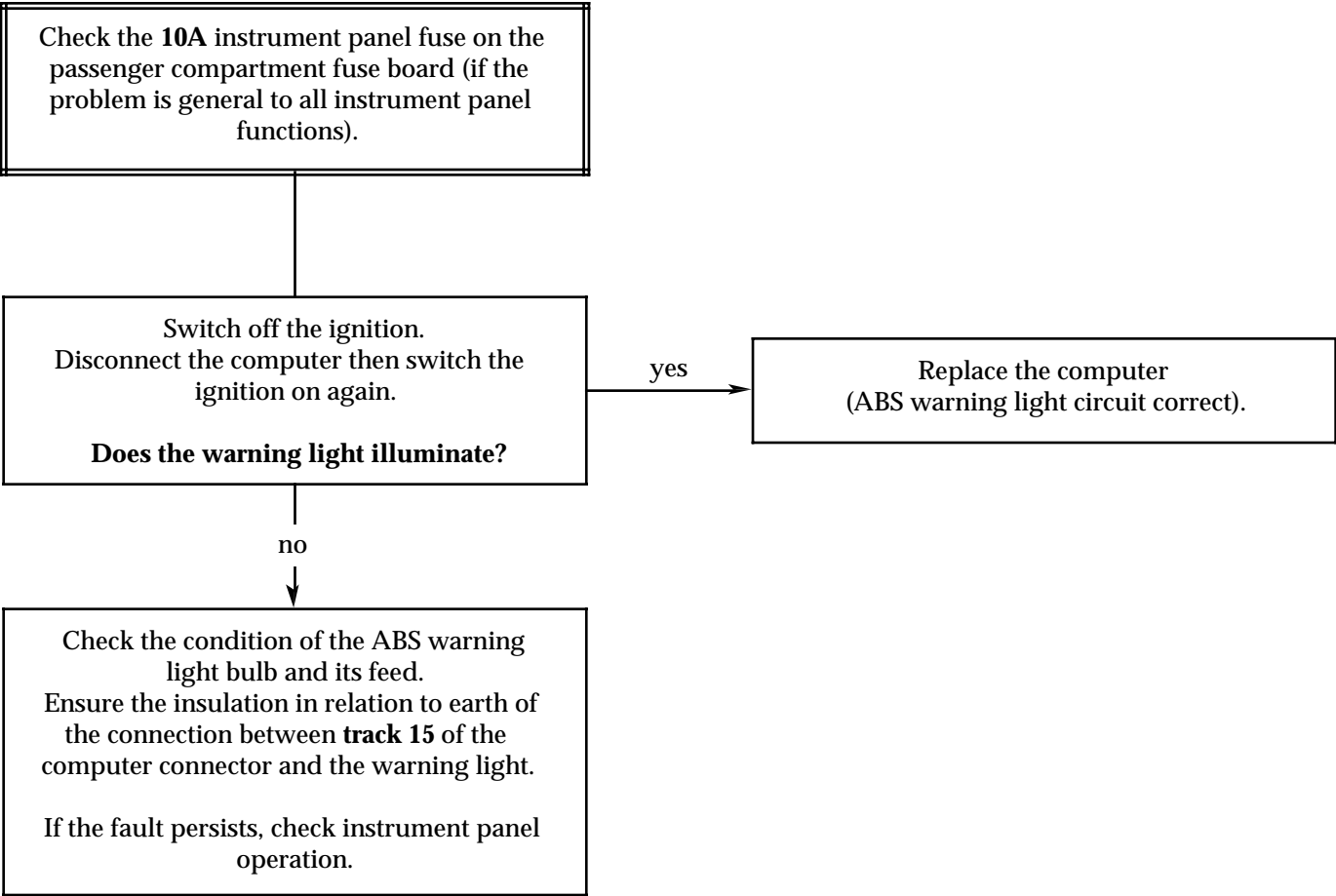
Locking of one or more wheels.	Chart 8
Pulling.	Chart 9
Slewing.	Chart 10
Unexpected ABS operation at low speed and low pedal force.	Chart 11
Unexpected ABS operation on poor road.	Chart 12
Unexpected ABS operation when using special equipment (carphone, CB...).	Chart 13
Extension of brake pedal travel following a regulation phase (with irregular pedal when entering the regulation phase).	Chart 14
Spongy pedal.	Chart 15
Brake pedal vibration/ jerky operation	Chart 16
Noise from the pump, pipework or hydraulic assembly.	Chart 17

OTHER CASES

The brake fault warning light does not illuminate, computer disconnected.	Chart 18
No communication with the ABS computer.	Chart 19

FAULT FINDING - FAULT CHARTS

Chart 1	THE ABS WARNING LIGHT DOES NOT ILLUMINATE FOR 2.5 SECONDS WHEN THE IGNITION IS SWITCHED ON
NOTES	Only consult this customer complaint after a complete check using the XR25.



AFTER REPAIR	Carry out a road test then a check using the XR25.
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FAULT FINDING - FAULT CHARTS

Chart 2	THE BRAKE FAULT WARNING LIGHT DOES NOT ILLUMINATE FOR 2.5 SECONDS WHEN THE IGNITION IS SWITCHED ON
NOTES	Only consult this customer complaint after a complete check using the XR25.

Ensure the continuity of the connection between track 16 of the computer connector and the brake fault warning light on the instrument panel.
Check the condition of the brake fault warning light bulb and its feed.

AFTER REPAIR	Carry out a road test then a check using the XR25.
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FAULT FINDING - FAULT CHARTS

Chart 3	PERMANENT ILLUMINATION OF THE ABS WARNING LIGHT IGNITION ON (NO FAULT MEMORISED)
NOTES	Only consult this customer complaint after a complete check using the XR25. See Chart 19 if dialogue is not established with the computer.

Ensure the continuity of the connection between track 15 of the computer connector and the ABS warning light.

AFTER REPAIR	Carry out a road test then a check using the XR25.
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FAULT FINDING - FAULT CHARTS

Chart 4	PERMANENT ILLUMINATION OF THE BRAKE FAULT WARNING LIGHT, IGNITION ON
NOTES	Only consult this customer complaint after a complete check using the XR25.

Check the position of the hand brake and the circuit for its switch. Check the brake fluid level in the reservoir. Check the level of brake pad wear.	
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Disconnect the ABS computer connector and ensure the presence on the computer base of the connector shunt opening pin (the shunt allows illumination of the brake warning light if the computer is not connected). Ensure the insulation in relation to earth of the connection between track 16 of the computer connector and the brake warning light.	
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AFTER REPAIR	Carry out a road test then a check using the XR25.
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FAULT FINDING - FAULT CHARTS

Chart 5	PERMANENT ILLUMINATION OF THE ABS AND BRAKE FAULT WARNING LIGHTS, IGNITION ON
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NOTES	Only consult this customer complaint after a complete check using the XR25. Consult Chart 19 if dialogue is not established with the computer.
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Consult Chart 3 and Chart 4.

AFTER REPAIR	Carry out a road test then a check using the XR25.
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FAULT FINDING - FAULT CHARTS

Chart 6	RE-ILLUMINATION OF THE ABS WARNING LIGHT AFTER THE ENGINE IS STARTED (+ POSSIBLE BRAKE FAULT)
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NOTES	Only consult this customer complaint after a complete check using the XR25.
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<p>Check the computer feed voltage (correct voltage if >9.5 volts). If necessary, carry out the following operations:</p> <ul style="list-style-type: none">- Check the battery charge (check the charging circuit if necessary).- Check the tightness and condition of the battery terminals.- Check the ABS earth (tightness of the earth bolt on the front right hand wing). <p>Disconnect the computer and check the condition of the connections.</p>

AFTER REPAIR	Carry out a road test then a check using the XR25.
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FAULT FINDING - FAULT CHARTS

Chart 7	INTERMITTENT ILLUMINATION OF THE ABS WARNING LIGHT WHILE DRIVING
NOTES	Only consult this customer complaint after a complete check using the XR25.

<p>Check the the computer feed voltage: 9.5 volts < correct voltage < 18.5 volts.</p> <ul style="list-style-type: none">- Check the battery charge (check the charging circuit if necessary).- Check the tightness and condition of the battery terminals.- Check the ABS earth (tightness of the earth bolt on the front right hand wing).

AFTER REPAIR	Carry out a road test then a check using the XR25.
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FAULT FINDING - FAULT CHARTS

Chart 8	LOCKING OF ONE OR MORE WHEELS
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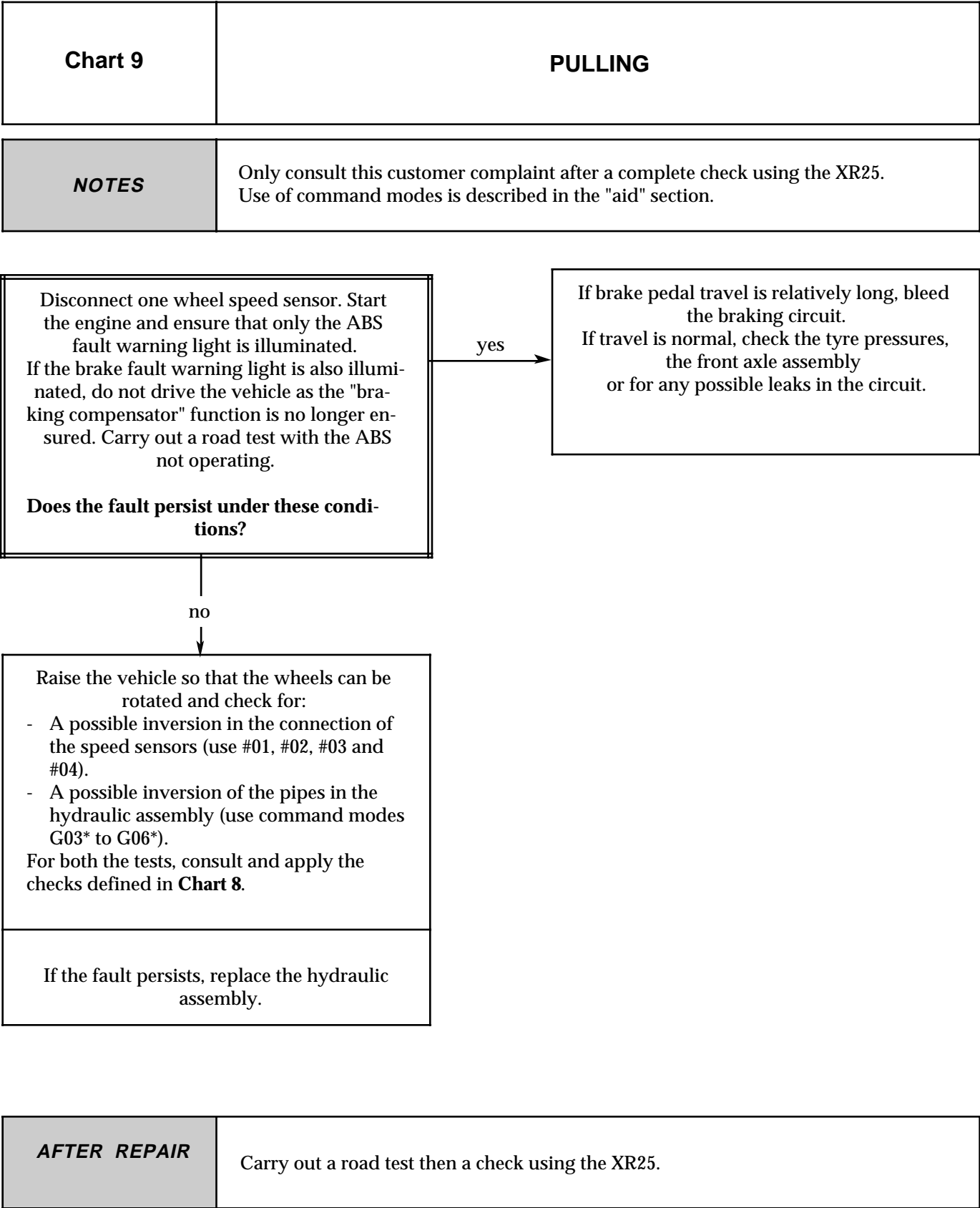
NOTES	Only consult this customer complaint after a complete check using the XR25.
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Reminder:	<p>Locking of the wheels on a vehicle equipped with ABS or tyre squeal, which the customer perceives to be the wheels locking, can be linked to a normal reaction of the system and should not systematically be considered to be a fault:</p> <ul style="list-style-type: none">- Locking is allowed below 3.75 mph (6 km/h) (the system no longer triggers regulation).- Braking with ABS regulation on very poor roads (high degree of tyre squeal).- -----
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	<p>However, to check that the wheels really are locking , raise the vehicle so as to be able to rotate the wheels and check for:</p> <ul style="list-style-type: none">- A possible inversion in the connection of the speed sensors. Use functions #01, #02, #03 and #04 while rotating the associated wheels and ensure the coherence of the results obtained (dialogue is interrupted below 3.75 mph (6 km/h)). If the value measured is zero, turn the other wheels to confirm an electrical inversion of the sensors and repair the wiring.- A possible inversion of the hydraulic assembly pipework. Use functions G03*, G04*, G05* and G06* whilst pressing the brake pedal and check for the presence of ten locking/releasing cycles on the wheel in question. If the ten cycles do not occur on the wheel tested (wheel remains locked), check whether they occur on another wheel (if inversion is confirmed: repair). If the ten cycles do not occur on a wheel and the pipes are not incorrectly connected, replace the hydraulic assembly. Also check the sensor / target air gap over one revolution of each of the front wheels: Air gap < 1.7 mm (check impossible on rear axle assembly with drums). <p>If the fault persists after these checks, replace the hydraulic assembly.</p>
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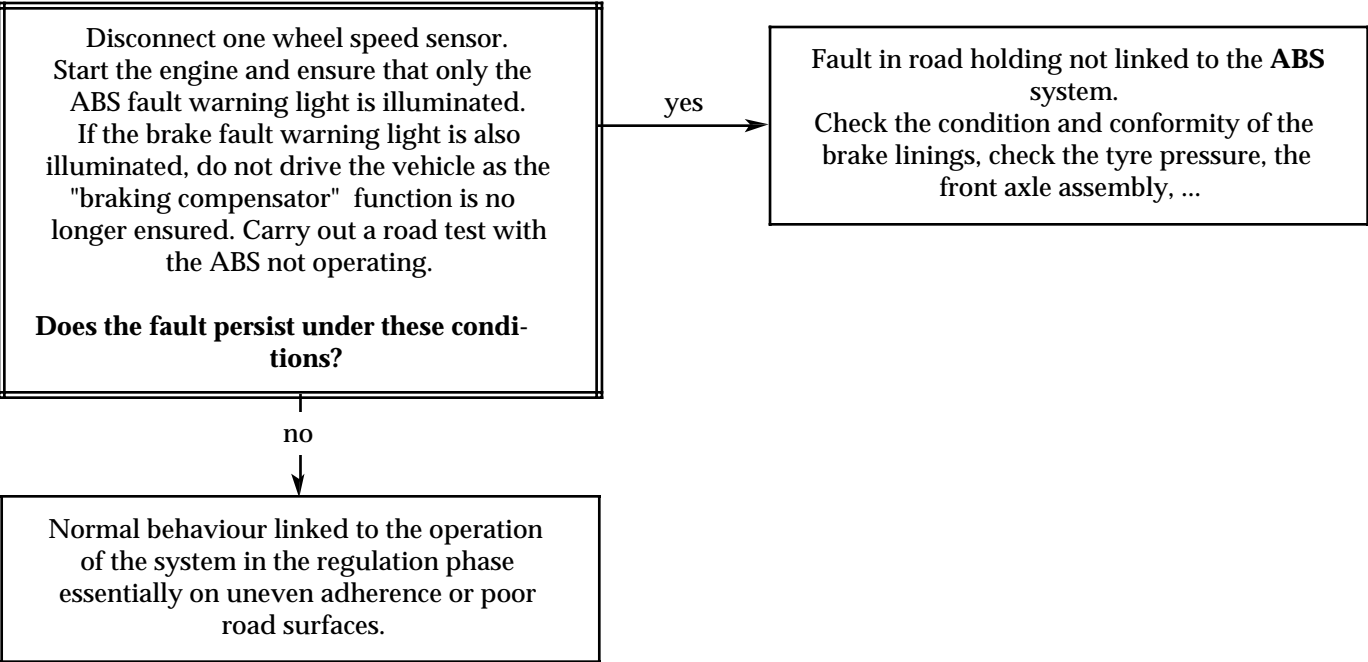
AFTER REPAIR	Carry out a road test then a check using the XR25.
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FAULT FINDING - FAULT CHARTS



FAULT FINDING - FAULT CHARTS

Chart 10	SLEWING
NOTES	Only consult this customer complaint after a complete check using the XR25.



AFTER REPAIR	Carry out a road test then a check using the XR25.
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FAULT FINDING - FAULT CHARTS

Chart 11	UNEXPECTED ABS OPERATION AT LOW SPEED AND LOW PEDAL FORCE
NOTES	Only consult this customer complaint after a complete check using the XR25.

Vibrations can be felt at the brake pedal which are linked to reactions of the system in specific conditions:

- driving over speed bumps.
- rear inside wheel lifts off the ground on tight bends.

This feeling may be linked to the operation of the "**braking compensator**" when the pressure is limited at the rear axle assembly.

AFTER REPAIR	Carry out a road test then a check using the XR25.
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FAULT FINDING - FAULT CHARTS

Chart 12	UNEXPECTED ABS OPERATION UNDER POOR ROAD CONDITIONS
NOTES	Only consult this customer complaint after a complete check using the XR25.

On poor roads, it is normal to feel juddering and vibrations at the pedal as well as more tyre squeal than when on a good road surface.
The result is an impression of a variation in efficiency which should be considered as being normal.

AFTER REPAIR	Carry out a road test then a check using the XR25.
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FAULT FINDING - FAULT CHARTS

Chart 13	UNEXPECTED ABS OPERATION WHEN USING SPECIAL EQUIPMENT (carphone, CB...)
NOTES	Only consult this customer complaint after a complete check using the XR25.

Check that the equipment causing the problem when being used is approved.
Check that this equipment has been correctly installed without modification to the original wiring, especially that of the ABS (connections to earth and +after ignition ABS feed not authorised).

AFTER REPAIR	Carry out a road test then a check using the XR25.
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FAULT FINDING - FAULT CHARTS

Chart 14	EXTENSION OF BRAKE PEDAL TRAVEL FOLLOWING A REGULATION PHASE (WITH IRREGULAR PEDAL WHEN ENTERING A REGULATION PHASE)
NOTES	Only consult this customer complaint after a complete check using the XR25.

Air leaking into the braking circuits from the regulation channels of the hydraulic assembly.
Bleed the circuits according to the procedure recommended in the Technical Note, then use command mode **G15*** on the XR25 while pressing the brake pedal.
After the operation, carry out a road test with ABS regulation.

If the fault persists, carry out the previous operation once or twice again.
If the customer complaint is particularly serious and if bleeding does not improve the situation, replace the hydraulic assembly.

AFTER REPAIR	Carry out a road test then a check using the XR25.
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FAULT FINDING - FAULT CHARTS

Chart 15	SPONGY PEDAL
NOTES	Only consult this customer complaint after a complete check using the XR25.

Air in the braking circuits.
Bleed the circuits. The recommendations given in the Technical Note MUST be observed.
Repeat the operation if necessary.

AFTER REPAIR	Carry out a road test then a check using the XR25.
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FAULT FINDING - FAULT CHARTS

Chart 16	BRAKE PEDAL VIBRATION/ JERKY OPERATION
NOTES	Only consult this customer complaint after a complete check using the XR25.

Normal reaction at the brake pedal during an ABS regulation phase or when pressure is limited on the rear axle ("braking compensator" function).

AFTER REPAIR	Carry out a road test then a check using the XR25.
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FAULT FINDING - FAULT CHARTS

Chart 17	NOISE FROM THE PUMP, PIPES OR HYDRAULIC ASSEMBLY
NOTES	Only consult this customer complaint after a complete check using the XR25.

<div><div>- Vibration of the assembly: check the presence and condition of the insulating rubber assembly mounting blocks.</div><div>- Vibration of the pipes: check that all pipes are properly clipped into their mounting clips and that there is no contact between pipes or between the pipes and bodywork.</div><div>To determine the source of the noise, the functions G03*, G04*, G05* and G06* on the XR25 can be used.</div></div>

AFTER REPAIR	Carry out a road test then a check using the XR25.
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FAULT FINDING - FAULT CHARTS

Chart 18	THE BRAKE FAULT WARNING LIGHT DOES NOT ILLUMINATE, COMPUTER DISCONNECTED
NOTES	Only consult this customer complaint after a complete check using the XR25.

- Disconnect the ABS computer.
 - Check the presence and operation of the shunt for the connection between **track 16** and **track 24** of the computer connector when disconnecting the computer.

AFTER REPAIR	Carry out a road test then a check using the XR25.
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FAULT FINDING - FAULT CHARTS

Chart 19	NO COMMUNICATION WITH THE ABS COMPUTER
NOTES	Only consult this customer complaint after a complete check using the XR25.

Ensure that the XR25 is not the cause of the fault by trying to communicate with a computer on another vehicle. If the XR25 is not faulty and dialogue is not established with another computer on the same vehicle, it may be that a faulty computer is disrupting fault finding line **K**. Disconnect each computer in turn to locate the faulty one.

Check that the ISO selector is in position **S8**, that you are using XR25 cassette 18 and the correct access code.

Check the battery voltage and carry out the operations necessary to obtain the correct voltage (9.5 volts < U battery < 18.5 volts).

Check the presence and condition of the **ABS fuse** on the passenger compartment connection unit (10A).

Check the connection of the computer connector and the condition of its connections.

Check the connection of the intermediate connectors. Check the condition of the connections.

Check the ABS earth (tightness of the earth bolt on the front right hand wing).

Check that the computer is correctly fed:

- **Earth** on **track 24** of the 25 track connector.
- **+ after ignition feed** on **track 4** of the 25 track connector.

Check that the diagnostic socket is correctly fed:

- **+ before ignition feed** on **track 16**.
- **Earth** on **track 5**.

Check the continuity and insulation of the lines connecting the diagnostic socket and the ABS computer:

- between **track 14** of the computer connector and **track 15** of the diagnostic socket,
- between **track 7** of the computer connector and **track 7** of the diagnostic socket.

If dialogue is still not established after these various checks, replace the ABS computer.

AFTER REPAIR	Carry out a road test then a check using the XR25.
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