

Technical Manual

*911 Carrera* (996)

Technical Information

Repair

Contents:

Group 0

Diagnosis

Part 1 (up to Repair Group 45)

### Foreword

The workshop documentation for the 911 Carrera (996) model has the designation

#### **"911 Carrera (996)" Technical Manual**

and contains **Technical Information** as well as instructions on **Repairs**.

The integration of the technical information published in the "911 Carrera (996)" Technical Manual with the instructions on repairs provides the user with a complex reference work that combines into one book associated or cross-referenced material of relevance to workshops and originating from various information media.

The "911 Carrera (996)" Technical Manual consists of 15 folders, subdivided into the following Groups

0	Entire vehicle – General
0	Diagnosis, part 1 (up to Repair Group 45) * <sup>1</sup>
0	Diagnosis, part 2 (as of Repair Group 61) * <sup>2</sup>
1	Engine, part 1 (up to Repair Group 13) * <sup>3</sup>
1	Engine, part 2 (as of Repair Group 15) * <sup>4</sup>
2	Fuel, exhaust, engine electronics
3	Transmission, manual transmission
3	Transmission, automatic transmission
4	Running gear
5	Body
6	Body equipment, exterior
7	Body equipment, interior
8 / 9	Air conditioning / Electrics
9	Circuit diagrams, part 1 (up to and including the '99 model) * <sup>5</sup>
9	Circuit diagrams, part 2 (as of the '00 model) * <sup>6</sup>

\*<sup>1</sup> The two folders with Group 0 are to be regarded as one folder; i.e. file the "Technical Information" notices only in front of the repair descriptions in the folder "Group 0 – Diagnosis, part 1" (**up to Repair Group 45**).

\*<sup>2</sup> The **second folder** "Group 0 – Diagnosis, part 2" (**as of Repair Group 61**) includes the further Repair Groups belonging to Group 0.

\*<sup>3</sup> The two folders with Group 1 are to be regarded as one folder; i.e. file the "Technical Information" notices only in front of the repair descriptions in the folder "Group 1 – Engine, part 1" (**up to Repair Group 13**).

\*<sup>4</sup> The **second folder** "Group 1 – Engine, part 2" (**as of Repair Group 15**) includes the further Repair Groups belonging to Group 1.



- \*5 The two folders with Group 9 are to be regarded as one folder; i.e. file the "Technical Information" notices only in front of the repair descriptions in the folder "Group 9 – Circuit diagrams, part 1" (**up to and including the '99 model**).
- \*6 The **second folder** "Group 9 – Circuit diagrams, part 2" (**as of the '00 model**) includes the further circuit diagrams belonging to Group 9.

The "911 Carrera (1996)" Technical Manual has the same structure in each folder, with the following breakdown for all Groups:

**Title page: "911 Carrera (1996)" Technical Manual**

> Foreword

**Title page: "Technical Information"**

> Table of Contents, Technical information

> Technical information

**Title page: "Repair"**

> Repair Groups: overview

> Table of Contents, repairs

> General / technical data

> Instructions on repairs

As can be seen from the breakdown, the published Technical Information is in the front part of each folder – numbered according to the Groups. The Table of Contents assigned to each Group will be periodically updated.

Following the Technical Information, separated by a title page, the instructions on repairs – assigned according to the Groups or broken down into Repair Groups – are included in the folders.

The instructions on repairs will be extended and updated by means of supplements.

### Note

Sheets that already exist in the "911 Carrera (1996)" Technical Manual and are updated or revised and thereby exchanged by a supplement are designated "replacement sheet". Revisions or technical modifications on pages of these replacement sheets are identified for the user with a vertical bar at the margin.

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## 0 Diagnosis, part 1 (up to Repair Group 45)

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### 45 Anti-lock brake system diagnosis

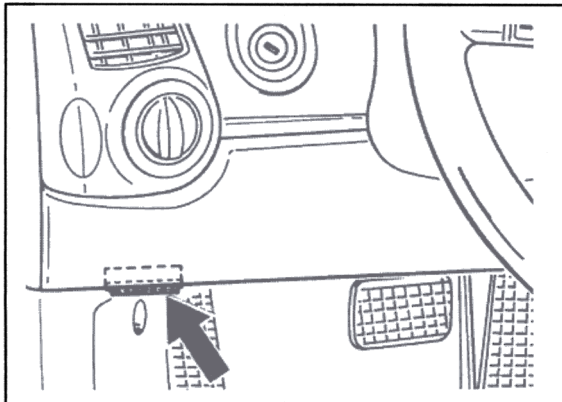
45 02	System PSM 5.3 and ABS/TC 5.3 .	45 - D 1
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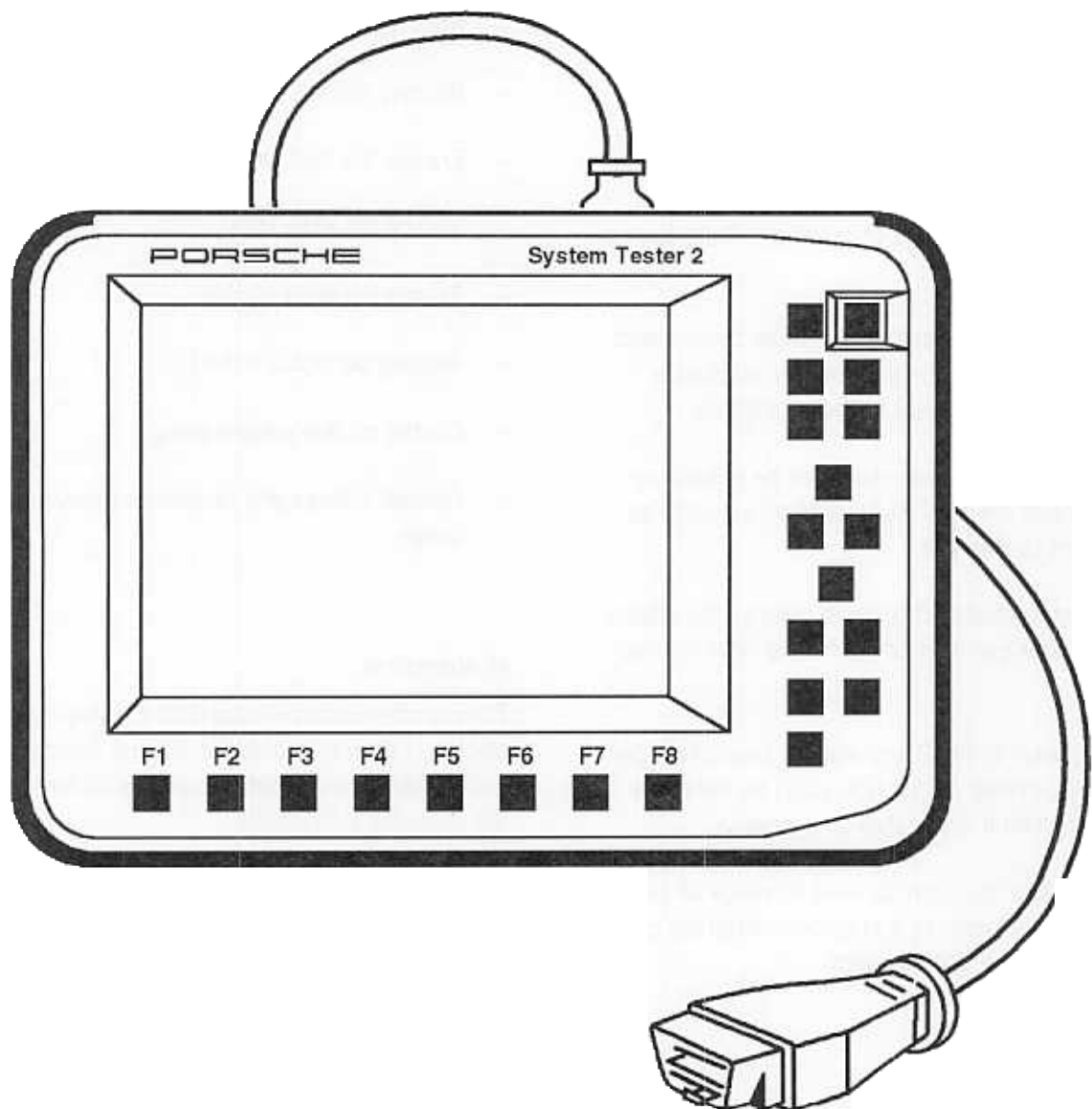
### Installation location, diagnostic socket

The diagnostic socket for the Porsche System Tester 2 is located inside the vehicle near to the driver (left-hand drive vehicles) or the passenger (right-hand drive vehicles) below the instrument panel.



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## Operating instructions, Porsche System Tester 2



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## General information

### Use

The Porsche System Tester 2 is a modular, portable diagnostic and measuring system. It can be used in any location to perform diagnostic tests on electronic control modules.

It consists of a computer unit, a main memory, a hard disk, a VGA display panel, a rechargeable nickel metal hydride battery and a measuring unit for measurement of current, voltage and resistance values.

The Porsche System Tester 2 can be operated with the built-in keys or using a connectable country-specific PS/2 keyboard (option).

Data and measured values can be printed out on one of the ten DIN A4 printers currently approved by Porsche.

The integrated LCD panel is used as the display. A monitor can also be connected (VGA connection).

If a printer or PS/2 keyboard is connected, the corresponding device type must be set under Configuration in the start-up screen.

The Tester thus can be used to check all systems that possess a diagnostic interface conforming with the ISO standard.

The following tasks can be performed:

Reading out the control-module identification

Reading out the fault memory

Erasing the fault memory

Testing the drive links

Testing the input signals

Reading out actual values

Control module programming

Current, voltage and resistance measurements

### Malfunctions

The Porsche System Tester 2 is a high-quality electronic device. In order to prevent damage to the unit due to improper use, please observe the operating instructions.

If the Tester no longer responds when any key is pressed, it must be set to a defined state:

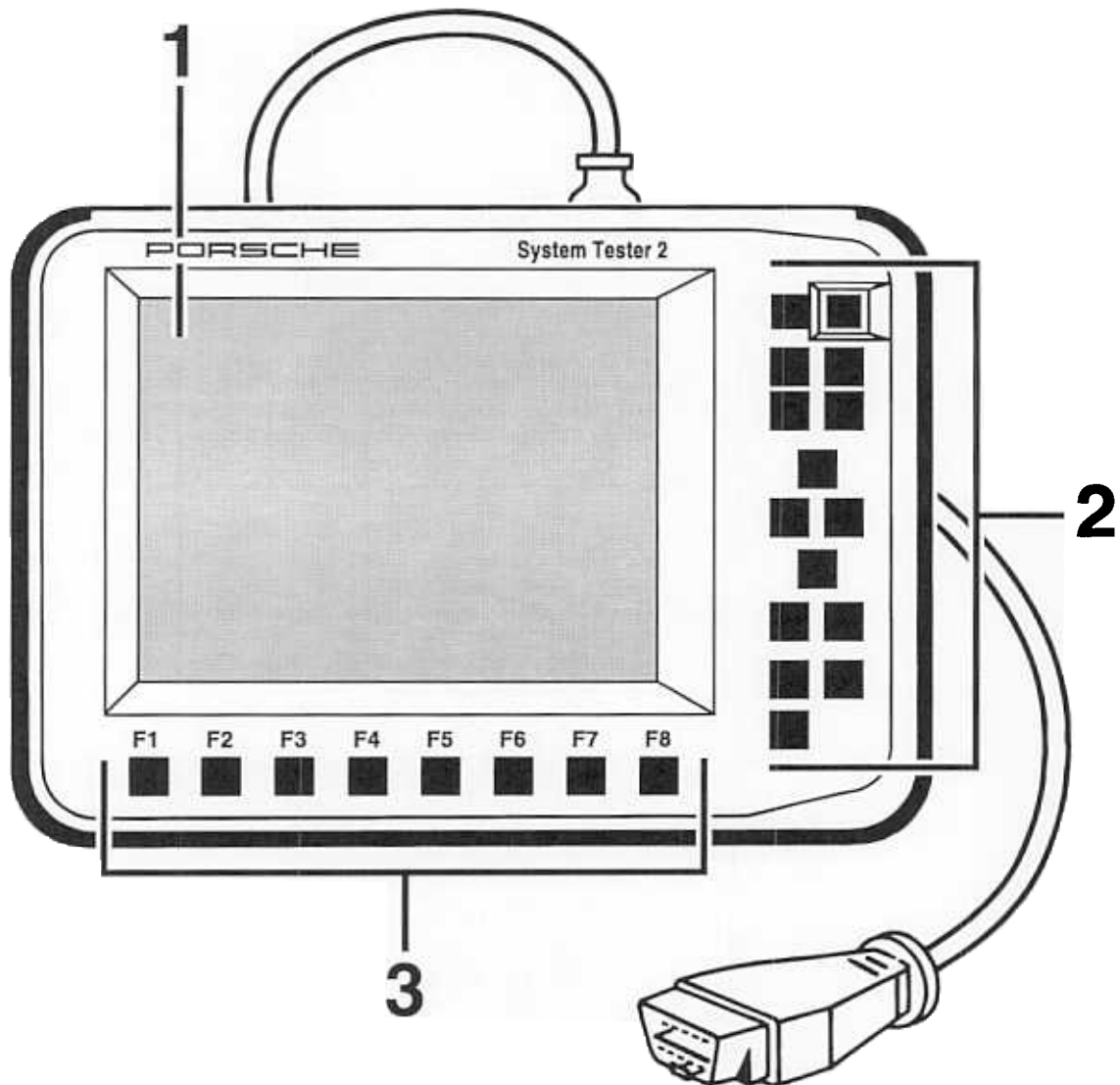
1. Press the F1 and F8 keys in addition to the "ON/OFF" key.
2. Release the "ON/OFF" key, then the F1 and F8 keys.

Perform this switch-off procedure only if the unit no longer responds when any key is pressed.

This procedure can damage the hard disk under certain circumstances if it is performed during normal operation. It may be necessary to repeat input of data created within this diagnostic application.

Problems during operation are indicated to the user via the information line (info line). Example: "Diagnosis Card not inserted".



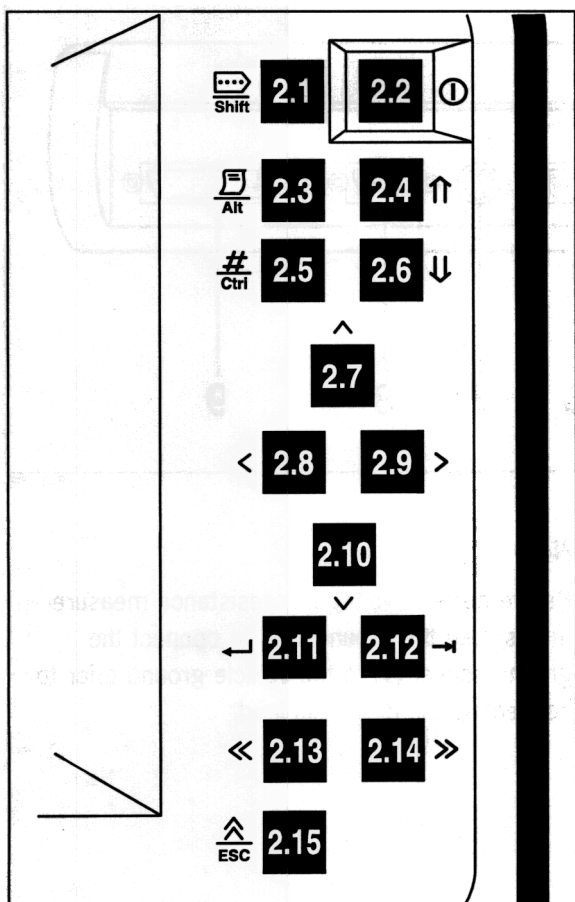


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## Design of the Tester

- 1 9.5" LCD panel,**  
monochrome  
Resolution: 640 x 480 pixels (picture elements)



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- 2.3 Print key**  
To print out data, measured values, screen display (hardcopy), working log and warranty log
- 2.4** This key is used to jump to the beginning
- 2.5** Used in combination with key 2.4 or 2.6 to control the brightness
- 2.6** This key is used to jump to the end
- 2.7** Used to move the cursor up
- 2.8** Used to move the cursor to the left
- 2.9** Used to move the cursor to the right **and** to select drive links, input signals and actual values
- 2.10** Used to move the cursor down
- 2.11** Enter key
- 2.12** Used to change the active screen part
- 2.13** Back key
- 2.14** Continue key
- 2.15** Escape key

## 2 Keypad

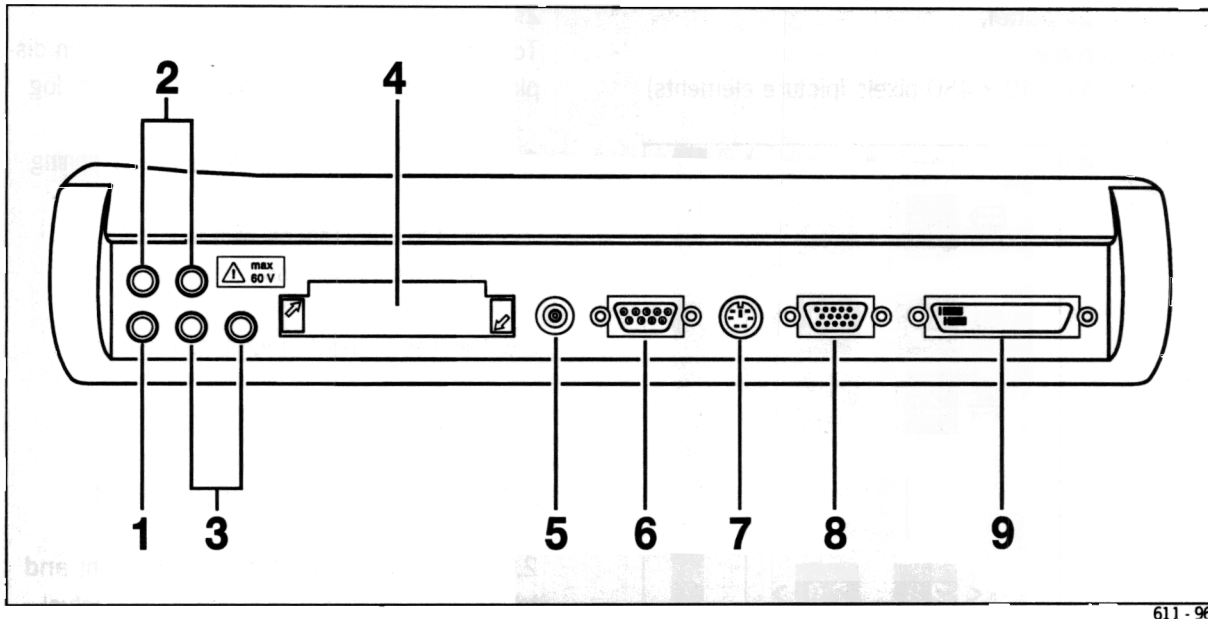
- 2.1** Jump key  
Used to change to the selection menu for control module-specific functions

- 2.2** On/Off switch

## 3 Softkeys

Softkeys can have different functions. The functions are displayed at the bottom edge of the screen.

## Connections

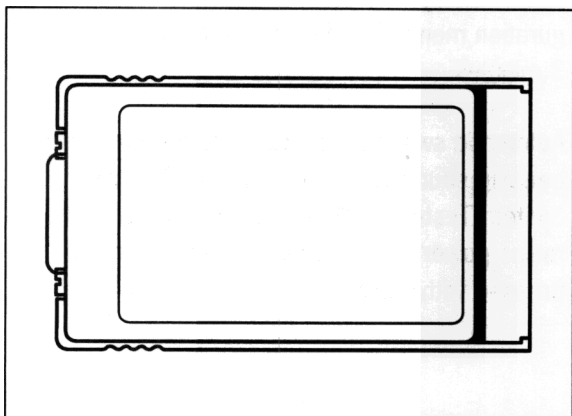


- 1 – Ground connection
- 2 – Connections for voltage and resistance measurements.
- 3 – Connections for current measurements with a clamp-on ammeter.
- 4 – Two slots for PCMCIA cards. The upper slot is for the Diagnosis Card.
- 5 – Socket for mains power supply unit.
- 6 – Serial port for connection of a mouse
- 7 – Connection socket for a PS/2 keyboard.
- 8 – Socket for VGA monitor.
- 9 – Parallel port for connection of a printer or a CD-ROM drive.

### Note

Before current, voltage or resistance measurements: Use the ground lead to connect the ground socket (1) to the vehicle ground prior to connecting the diagnosis lead.

## Diagnosis Card



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The Diagnosis Card is the interface between the Porsche System Tester 2 and the vehicle.

The Diagnosis Card is responsible for diagnostic reports, control-module programming voltage and for voltage supply to the Porsche System Tester 2 via the vehicle battery.

The Diagnosis Card can be left in the Tester.

## Voltage supply

Three types of voltage supply are possible for the Porsche System Tester 2:

Internal rechargeable battery (operating time approx. 20 min)

Vehicle battery (supply via plugged-on diagnosis lead, Diagnosis Card)

Mains power supply.

Before putting the unit into operation, make sure that the mains voltage and the voltage specified on the mains power supply unit are the same.

## Adjusting illumination of LCD panel

Press key 2.5 and key 2.4

➡ Display brighter

Press key 2.5 and key 2.6

➡ Display darker

## Working log

During diagnosis, e.g. when the fault memory is being read out, a "save" symbol appears near the softkeys. This item is saved in the working log if the corresponding softkey is pressed. The working log can be printed out with key 2.3. It is thus possible to document all stored faults, for example.

### Starting diagnosis

1. Connect the Porsche System Tester 2 to the diagnostic socket (data link connector) in the vehicle.
2. Switch on the Porsche System Tester 2 (it will be ready for operation in approx. 60 seconds).
3. Switch on ignition.

4. Select the vehicle type and initiate diagnosis with key 2.14.

The Porsche System Tester 2 starts to search for control modules and then lists all control modules it finds. Control modules that are not installed (e.g. Tiptronic control module on vehicles with manual transmission) are displayed in grey.

### Note

If no control modules are detected, check whether the ignition is on or whether terminal 15 is present on the diagnostic socket.

If faults are stored in a control module, this is identified with the # symbol as before.

### Automatic switch-off

The Porsche System Tester 2 switches itself off after an Off-delay if

no voltage is supplied via the mains power supply unit or via the vehicle battery

or

no data are being transferred via an interface (no key pressed, no communication with control module).

The Off-delay time can be changed in the Configuration menu. The default Off-delay time is 3 minutes.

Automatic switch-off is preceded by a rhythmic beeping sound (10 seconds). The Porsche System Tester 2 will remain switched on if the mains power supply is connected or a key is pressed within this time.

### Software update

The software can be updated using the supplied CD-ROM.

1. Connect CD-ROM drive with the Porsche System Tester 2.
2. Connect Porsche System Tester 2 and the CD-ROM drive to the mains power supply unit.
3. Load CD-ROM in the drive and close the drive.
4. Switch on the Porsche System Tester 2.
5. Select "Software installation" in the Configuration menu.

**24 01      Diagnosis/troubleshooting**

## **Diagnosis/troubleshooting**

### **DME**

### **System M 11**

**Contents overview**

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## 24 70 Programming DME control module

### General

When a DME control module is replaced, the new DME control module must be programmed. This sets the new DME control module to the catalytic converter version installed, among other things.

Three catalytic converter versions are available in the Porsche System Tester 2:

1. OBD II control module
2. RoW control module
3. German control module  
(tri-metal catalytic converter)

### Work preparation

The following vehicle data must be provided before programming of the new DME control module can begin:

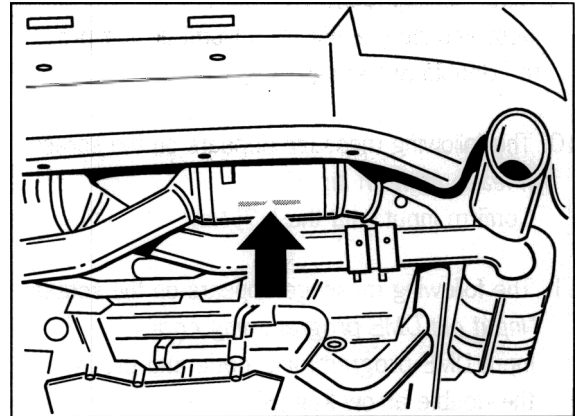
Vehicle Ident. No.

Catalytic converter item No. corresponding to the catalytic converter version used

DME and immobilizer programming codes (from the Porsche IPAS system)

With the information about the *Vehicle Ident. Number* and *catalytic converter item number*, the associated programme can be selected from the allocation table.

Figure 307\_98 shows where the catalytic converter item number can be found on the vehicle.



Catalytic converter item number

307\_98

### Programming

1. Connect and switch on the Porsche System Tester 2 and switch on the ignition.
2. Select **911 (1996)** in the *Vehicle type* menu.
3. Select **DME** in the *Control unit* menu and press the double arrow key [ $\rightarrow$ ].
4. Select **Program control unit** in the *DME function selection* menu and press the double arrow key [ $\rightarrow$ ].
5. Select "Read control units" and press the double arrow key [ $\rightarrow$ ].
6. Install new DME control module.



7. Select **Program control unit** in the *Control unit programming* menu and press the double arrow key [ $\rightarrow$ ].
8. Ensure that all requirements requested on the screen are fulfilled and then press the double arrow key [ $\rightarrow$ ].
9. The following message appears on the screen:  
*"Input Vehicle Ident. Number"*.  
Input Vehicle Identification Number and press the double arrow key [ $\rightarrow$ ].
10. The following message appears on the screen:  
*"Please confirm input"*  
Confirm input with the [F7] key.
11. The following message appears on the screen:  
*"Input old DME programming code"*  
Input DME programming code and press the double arrow key [ $\rightarrow$ ].
12. The following message appears on the screen:  
*"Please confirm input"*  
Confirm input with the [F7] key.
13. The following message appears on the screen:  
*"Input new programming code"*  
Input new DME programming code and press the double arrow key [ $\rightarrow$ ].
14. The following message appears on the screen:  
*"Please confirm input"*  
Confirm input with the [F7] key.
15. The following message appears on the screen:  
*"Input new immobilizer code"*  
Input immobilizer code and press the double arrow key [ $\rightarrow$ ].
16. The following message appears on the screen:  
*"Please confirm input"*  
Confirm input with the [F7] key.
17. The following message appears on the screen:  
*"Select data record"*  
Select data record according to the allocation table and press the double arrow key [ $\rightarrow$ ].
18. The following message will appear after the programming time has elapsed:  
*"Programming was completed successfully"*  
Press the double arrow key [ $\rightarrow$ ], switch the ignition off and then on again.

**Warning:**

- > Never interrupt the programming process

The control module will now be programmed.  
Programming will take approx. 5 minutes.

This completes programming of the DME control module.

Catalytic converter version	Vehicle Ident. Number	Catalytic converter item number
OBd II control module	WPOxx2xxxWxxxxxxx	996.113.021.53 996.113.022.53
RoW control module	WPOZZZxxxWxxxxxxx	996.113.021.52 996.113.022.52
German control module (tri-metal catalytic converter)	WPOZZZxxxWxxxxxxx	996.113.021.54 996.113.022.54
OBd II control module	WPOxx2xxxXxxxxxxx	996.113.021.53 996.113.022.53
RoW control module	WPOZZZxxxXxxxxxxx	996.113.021.52 996.113.022.52
German control module (tri-metal catalytic converter)	WPOZZZxxxXxxxxxxx	996.113.021.54 996.113.022.54

Allocation table

**Note:**

The DME control module can also be reprogrammed using the Porsche System Tester 2. In this case, the old data record will be overwritten by a new record (e.g. RoW instead of Germany)

Program map/data must be selected in Step 7 if reprogramming is necessary.

**Warning:**

**Risk of damage if allocation is incorrect!**

- > Ensure correct allocation of the data record in the control module to the installed catalytic converter (refer to the allocation table)

**24 01 DME setpoints****Boundary conditions**

– Ambient temperature approx. 20° C

Engine temperature 90 - 95° C

All loads switched off

Engine idling

**Nominal values**

	Value	Unit	Deviation
Idle speed	680	rpm	±20
Load signal	1.3	ms	±0.3
Mass air flow	17	kg/h	±2.5
Hot film mass air flow meter	1.3	V	±0.2
Voltage	13.6	V	±0.5
Engine temperature	90	°C	±5.0
Throttle plate angle	0.0	%	±0.5
Ignition timing	5.3	°crk	±0.7
Spec. air mass	17	kg/h	±1.0
Spec. air adaptation	3.0	kg/h	±1.0
Injection time	3.0	ms	±0.4
Oil temperature	90.0	°C	±5

	Value	Unit	Deviation
Oxygen sensing cylinder			+0.05
Oxygen sensing cylinder			+0.05
Range cylinder (FRA)	02		+0.04
Range cylinder (FRA 2)	.0		+0.05
Range cylinder (TRA)	0.00		+0
Range cylinder (TRA 2)	00		+0
lambda sensor voltage ahead of cat. conv	0.04	UL 79	
O2 sensor voltage ahead of cat	0.04	UL2 79	
O2 sensor voltage behind cat. conv	0.04	UL 79	
O2 sensor voltage behind cat. conv	0.04	UL2 79	
Crankshaft position deviation		crk	+6
Crankshaft position deviation	0.	crk	+6
Rough-running threshold		./s <sup>2</sup>	+1.3
Rough-running		./r	
Segment (A)	.0		
Segment (B)	.0		
Learning progress, sensor wheel adaptation	0.000		
Misfire detection			

	Value	Unit	Deviation
Engine compartment temperature	63.0	°C	±8.0
Oxygen sensor heat resistance ahead of cat. conv.	3.1	Ω	±0.4
* Oxygen sensor heat resistance behind cat. conv.	3.1	Ω	±0.4

\* **Only for OBDII vehicles**

**Note:**

The stated values are the result of measurements of vehicles with different mileages and in perfect condition.

Different values can result from diagnosis in the workshop because of mileage and environmental influence. For DME diagnosis, it is important to look at several values simultaneously and in a collective group during troubleshooting.

**Example:**

An important collective group is formed by the following values:

Group	Values in normal state	Change caused by secondary air (oil filler cap)
Range 2 cylinder 1 - 3 (FRA)	0.96	0.96
Range 2 cylinder 4 - 6 (FRA 2)	0.96	0.96
Range 1 cylinder 1 - 3 (TRA)	0.08	0.36
Range 1 cylinder 4 - 6 (TRA 2)	0.01	0.36
Ignition timing	5.3 °crk	3.8 °crk
Mass air flow	15.5 kg/h	11.25 kg/h
Engine speed	680 rpm	720 rpm

**37 01      Diagnosis/Troubleshooting, Tiptronic**

# **Diagnosis/Troubleshooting**

## **Tiptronic**

## **System G 50**

**Contents overview**

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### Notes on on-board diagnostic

An on-board diagnostic system with fault memory is integrated in the Tiptronic control module. It can detect and store certain faults on the electronic transmission control system (see fault overview on Page 37 - D 17).

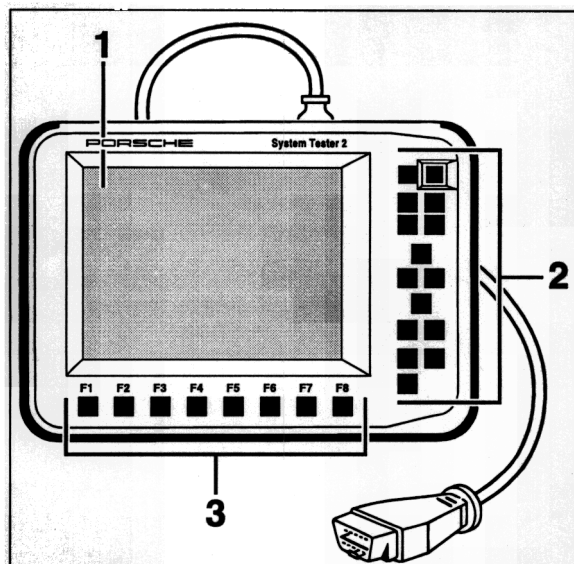
If a fault is present, it is first stored as a **static** fault. If the fault no longer exists, it first becomes a **sporadic** fault and "Fault not present" appears on the display of the tester. The counter is set to 40 in this case.

Sporadic faults are deleted automatically after 40 cold starts of the engine (followed by transmission warm-up).



## Tools

### Porsche System Tester 2

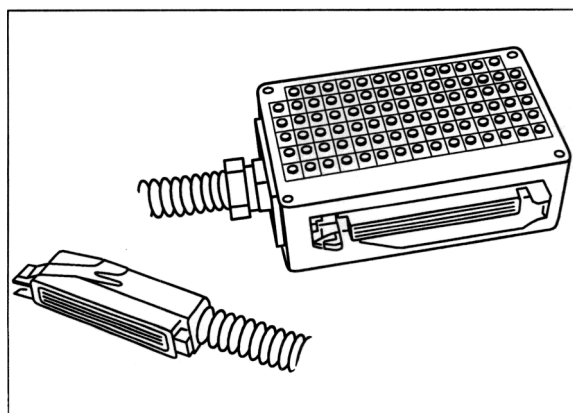


96-547

### Note

The test adapter must be used for all tests on electrical wiring (e.g. transmission control module - connectors/sensors). It does not damage the plug-in contacts and facilitates location of the individual pins.

### Test adapter 9616



569\_97

## Function selection with the Porsche System Tester 2 (software G 50)

The following menus can be called up with the tester:

Identification

Fault memory

Erase fault memory

Drive links

Drive links active

Input signals

Actual values

Coding

### Identification

The diagnosis software number and the control module part number are displayed here.

### Fault memory

All faults detected by the control module are stored in the fault memory according to the respective Diagnostic Trouble Code (DTC).

### Erase fault memory

The fault memory can be erased with this menu

### Drive links

Drive links can be controlled with this menu. Functions of the drive links can be determined very quickly in this way.

### Note

Drive link diagnosis can only be performed when the selector level is in position "P", the engine is not running and the vehicle is stationary.

The following drive links can be controlled:

Solenoid valve 1

Solenoid valve 2

Solenoid valve 3

Coolant shutoff valve

### Drive links active

With this menu, the coolant shutoff valve can be actuated with the **engine running**.

**Input signals**

Input signals can be checked and read out with this menu:

- Selector lever position
- Selected gear
- Multi-function switch
- Kick-down switch
- Downshift switch
- Upshift switch
- Manual program switch
- Stop light switch

Traction Control

**Actual values**

The following actual values can be read out with this menu:

- Engine rpm
- Transmission input speed
- Speed, transmission
- Speed, front right
- Speed, front left
- Throttle valve angle
- Transverse acceleration
- Supply voltage
- 1-2 shift, lower engine speed range
- 1-2 shift, middle engine speed range
- 1-2 shift, upper engine speed range
- 2-3 shift, lower engine speed range
- 2-3 shift, middle engine speed range
- 2-3 shift, upper engine speed range

- 3-4 shift, lower engine speed range
- 3-4 shift, middle engine speed range
- 3-4 shift, upper engine speed range
- 4-5 shift, lower engine speed range
- 4-5 shift, middle engine speed range
- 4-5 shift, upper engine speed range
- 5-4 shift, lower engine speed range
- 5-4 shift, middle engine speed range
- 5-4 shift, upper engine speed range
- 2-1 shift, lower engine speed range
- 2-1 shift, middle engine speed range
- 2-1 shift, upper engine speed range
- Map

**Coding**

Control modules can be coded to the prescribed country version with this menu.

Three country versions are available:

- **RoW**
- **Taiwan**
- **Korea**

### Adaptive pressure limit values

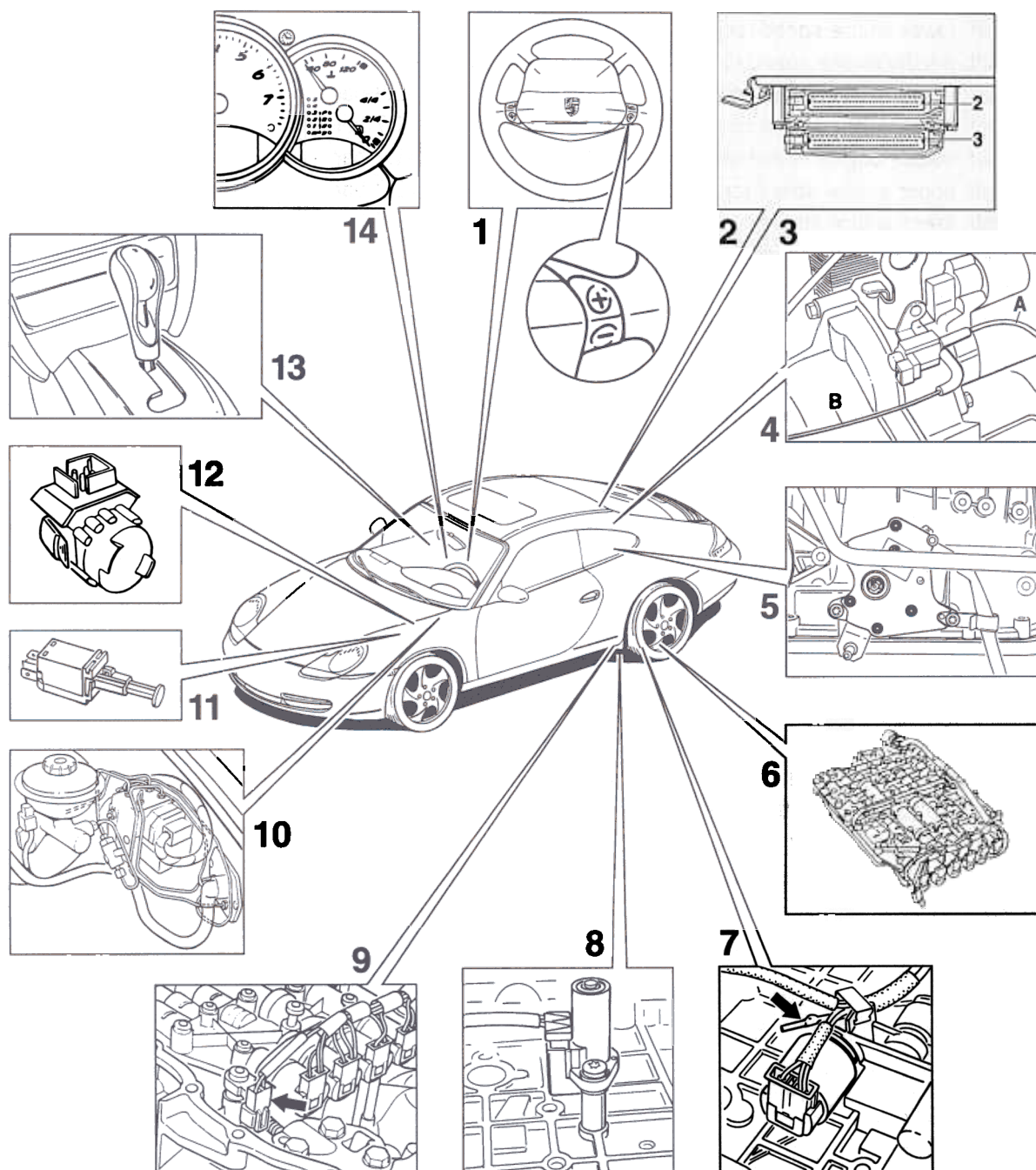
1-2 shift, lower engine speed range	= -0.7 to +0.8 bar
1-2 shift, middle engine speed range	= -0.7 to +0.8 bar
1-2 shift, upper engine speed range	= -0.7 to +0.8 bar
2-3 shift, lower engine speed range	= -0.7 to +1.7 bar
2-3 shift, middle engine speed range	= -0.7 to +1.7 bar
2-3 shift, upper engine speed range	= -0.7 to +1.7 bar
3-4 shift, lower engine speed range	= -0.7 to +1.4 bar
3-4 shift, middle engine speed range	= -0.7 to +1.4 bar
3-4 shift, upper engine speed range	= -0.7 to +1.4 bar
4-5 shift, lower engine speed range	= -0.7 to +1.2 bar
4-5 shift, middle engine speed range	= -0.7 to +1.2 bar
4-5 shift, upper engine speed range	= -0.7 to +1.2 bar
5-4 shift, lower engine speed range	= -0.7 to +0.8 bar
5-4 shift, middle engine speed range	= -0.7 to +0.8 bar
5-4 shift, upper engine speed range	= -0.7 to +0.8 bar
2-1 shift, lower engine speed range	= -0.7 to +0.8 bar
2-1 shift, middle engine speed range	= -0.7 to +0.8 bar
2-1 shift, upper engine speed range	= -0.7 to +0.8 bar

### Note

The adaptive pressure limit values can be read out with the **Porsche System Test 2** (Actual values menu) and used for troubleshooting.



# Component arrangement



558\_97

## Function of individual components

### 1. Upshift and downshift switches

Installation position: In the steering wheel.

In the manual gate, they connect ground to the Tiptronic control module, which initiates upshifting or downshifting, depending on the speed.

### 2. DME control module

Installation position: In the passenger compartment behind the right-hand emergency seat recess.

The DME control module is connected to the Tiptronic control module. It transmits the following information via a control line (CAN bus):

Rpm,

torque,

throttle position,

engine temperature.

### 3. Tiptronic control module

Installation position: In the passenger compartment behind the right-hand emergency seat recess.

The Tiptronic control module is the information and command centre of the entire system. From a large volume of incoming information (measured variables), which are compared with stored driving and shifting programs, the Tiptronic control module selects the characteristic suitable for the type of driving and sends commands to the transmission to shift or not to shift.

### 4. Coolant changeover valve

Installation position: On the engine (transport eye).

Depending on the ATF and coolant temperature, the changeover valve is activated by the Tiptronic control module and routes vacuum to the shutoff valve, which opens or closes the transmission coolant circuit.

### 5. Multi-function switch

Installation position: On the transmission.

The multi-function switch is actuated directly by the selector lever via a cable and transmits the selector lever position to the transmission control module. It controls the reversing lights and disables the starter when a transmission range is selected.

A defective signal results in "Reduced driving program".

### 6. Solenoid valves (SV)

Installation position: On the hydraulic control unit in the transmission.

The electronic transmission controls the transmission functions via the SV's. SV's 1, 2 and 3 are On-Off valves. Their task is to switch over valves in the hydraulic system.

The SV's (pressure regulators 1 ... 4) are electronic pressure-control valves. They convert an electric current into a proportional hydraulic pressure, and actuate the valves of the shifting elements.

## 7. Sensor for ATF temperature

Installation position: The sensor is integrated in the transmission wiring harness. If it is damaged, the entire wiring harness must be replaced.

The sensor controls the modulation pressure of the transmission in accordance with the ATF temperature. This keeps shifting operations very comfortable across the entire temperature range

If the ATF temperature is too high, the control module selects a map with the least power loss possible and closes the torque converter clutch. In addition, downshifting takes place at higher engine speeds. This reduces converter slip, and the ATF can cool down.

The sensor is regarded as defective if the signal voltage exceeds or falls below the prescribed signal voltage range. Shifting then takes place with a substitute value of 80 °C.

## 8. Sensor for transmission input speed

Installation position: On the hydraulic control unit in the transmission.

The sensor (inductive pickup) transmits the transmission input speed to the transmission control module.

## 9. Sensor for transmission speed

Installation position: Beside the hydraulic control unit in the transmission.

The sensor (inductive pickup) transmits the transmission speed (output speed) to the transmission control module. The control module calculates the vehicle speed from the transmission output speed.

## 10. ABS control module

Installation position: In the front luggage compartment.

The ABS control module is connected to the Tiptronic control module. It transfers the front wheel speeds, which are required for slip monitoring and for calculation of the transverse acceleration. Furthermore, on vehicles with Traction Control (TC), the Tiptronic control module is signalled whether TC is active. The Tiptronic control module goes to a special map when this information is received.

## 11. Brake light switch

Installation position: In front of the brake pedal

The transmission control module needs the signal from the brake light switch in order to trigger downshifting before bends and to actuate the shiftlock solenoid.

## 12. Kick-down switch

Installation position: In the accelerator pedal box in front of the accelerator pedal.

### Note

As the accelerator pedal box must not be opened, the complete accelerator pedal box must be replaced if the kick-down switch is defective.

The kick-down switch detects when the accelerator pedal is floored past the full-throttle position. It connects ground to the Tiptronic control module, which shifts the shifting times for faster acceleration. The transmission

shifts down immediately, depending on the engine speed, and shifts up again only when the highest permissible engine speed is reached.

Kick-down is not performed if the switch is defective.

### **13. Selector lever with manual switch**

The selector lever transmits the selector lever positions to the transmission and the multi-function switch via a cable.

In the manual gate, the manual switch connects ground to the Tiptronic control module, which enables manual tip shifting.

### **14. Instrument cluster**

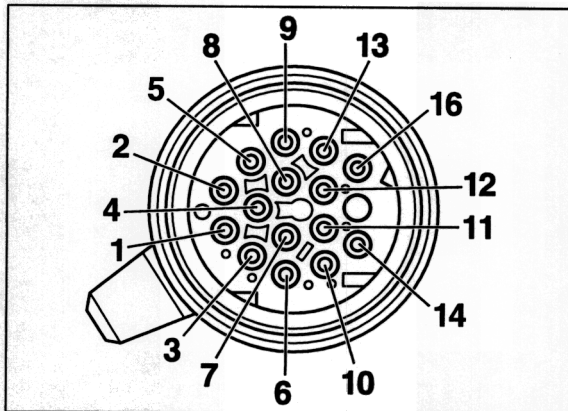
The respective selector lever position and the engaged gear are displayed in the instrument cluster.

In the "Reduced driving program", the position display and 4th gear flash alternately.



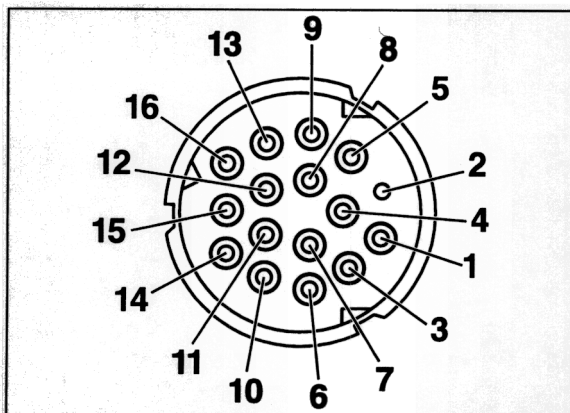
## Connector diagrams and ground points

### Transmission plug



575\_97

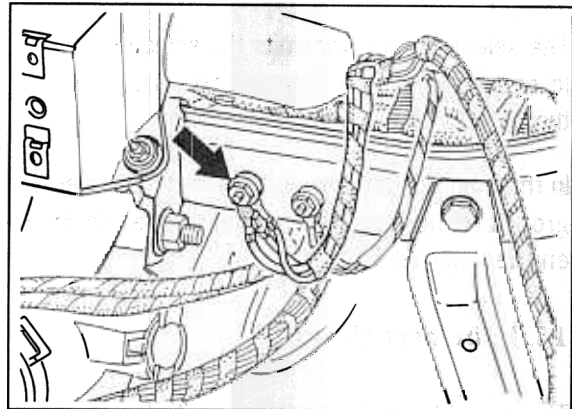
### Transmission socket



576\_97

### Ground point 4

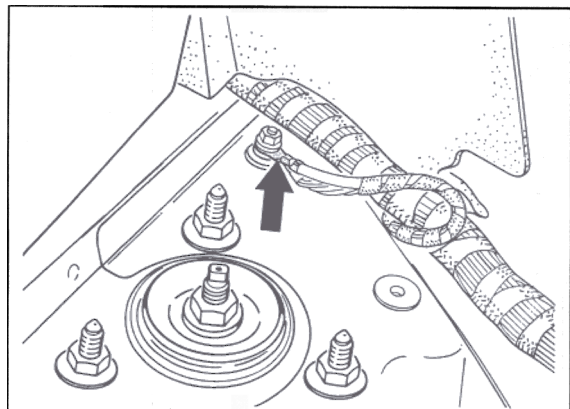
Ground point 4 is located in front of the instrument cluster on the dashboard support frame.



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### Ground point 9

Ground point 9 (arrow) is located in the passenger compartment behind the right-hand spring strut attachment.



567\_97

**Tiptronic connector assignment**

- Pressure regulator 2	22 - ATF temperature
2 - Shiftlock solenoid	23 - Shield, turbine speed
3 - Free	24 - Free
4 - Pressure regulator 4	25 - Display, manual mode
5 - Pressure regulator 1	26 - Terminal 30
6 - Power ground	27 - Cruise control
7 - Free	28 - Electronics ground
8 - Multi-function switch, line 2	29 - Pressure regulator 3
9 - Multi-function switch, line 4	30 - Solenoid valve 1
10 - Brake light	31 - Free
1 - Free	32 - Solenoid valve 3
12 - Pin code 1	33 - Solenoid valve 2
13 - Manual program switch	34 - Power ground
14 - Output shaft speed ( - )	35 - Free
15 - Shield, output shaft speed	36 - Multi-function switch, line 1
16 - Turbine speed ( + )	37 - Multi-function switch, line 3
17 - Free	38 - Front wheel speed, left
18 - Kick-down	39 - Front wheel speed, right
19 - TC active	40 - Free
20 - Free	41 - Free
21 - Sensor ground	42 - Output shaft speed ( + )

ree

Gr turbo speed

46 Up:

Downshift

48 ree

50

oolant sh valve

Plus: pro to plenor il

Plus: press tor hiftlock

rninal

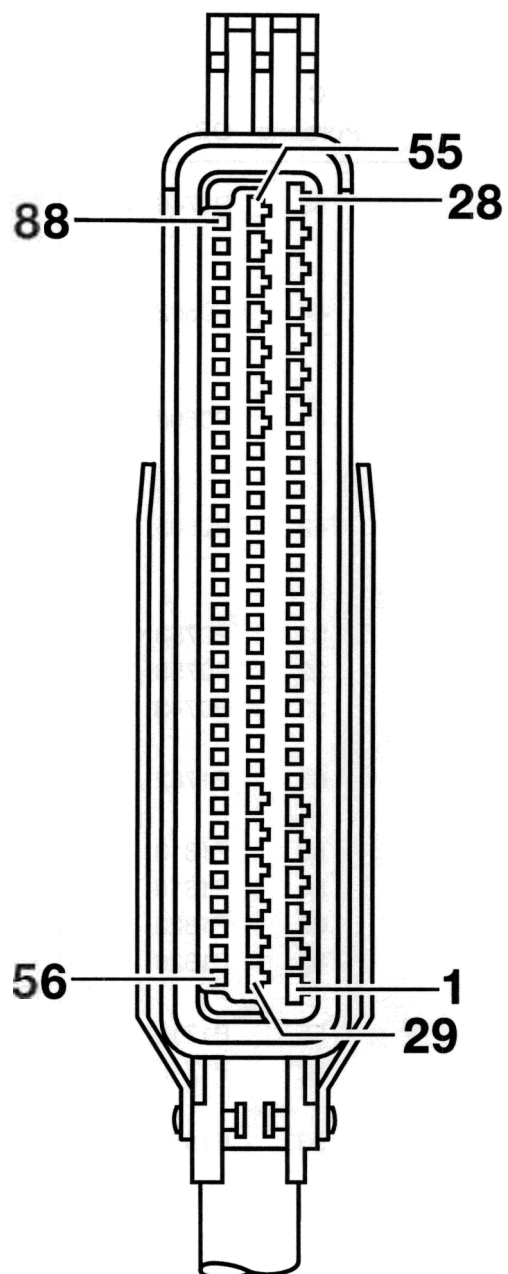
inal

84 ree

CAN low

CAN gh

ree



## Fault overview

Test point	DTC Porsche	OBD II	Fault text	Page
	43	P1746	Control module faulty (relay)	37 - D 21
2	44	P0602	Control module faulty (watchdog)	37 - D 21
3	49	P0603	Control module faulty (EEPROM)	37 - D 22
4	42	P0605	Control module faulty (checksum)	37 - D 22
5	31	P0753	Solenoid valve 1	37 - D 22
	32	P0758	Solenoid valve 2	
	33	P0743	Solenoid valve 3	
6	63	P1762	Shiftlock P/N lock	37 - D 23
7	80	P1813	Pressure regulator 1	37 - D 24
	81	P1818	Pressure regulator 2	
	82	P1823	Pressure regulator 3	
	83	P1828	Pressure regulator 4	
8	55	P1710	Speed signal	37 - D 25
	62	P1715	front right/front left	
9	93	P1656	Coolant shutoff valve	37 - D 26
10	35	P0706	Multi-function switch	37 - D 26
11	21	P0727	Rpm signal from DME control module	37 - D 28
12	46	P0725	Governor	37 - D 29
13	36	P0722	Speed sensor	37 - D 29

Test point	DTC Porsche	OBD II	Fault text	Page
14	90	P0722	Gear sel. monitor, output drive	37 - D 30
15	91	P0717	Stall speed, transmission input	37 - D 31
16	92	P0717	Gear sel. monitor, transmission input speed	37 - D 33
17	72 73 74 75	P0732 P0733 P0734 P0735	Gear sel. monitor, 2nd, 3rd, 4th and 5th gear	37 - D 34
18	22	P0770	Load signal from DME control module	37 - D 35
19	23	P1765	Throttle information fault	37 - D 35
20	53	P1704	Kick-down switch	37 - D 36
21	56	P1764	Instrument cluster activation	37 - D 36
22	11	P1750	Supply voltage, solenoid valve/pressure regulator	37 - D 38
23	12	P1602	Terminal 30, open circuit	37 - D 38
24	51	P1744	Manual program switch	37 - D 39
25	37	P0710	Transmission temperature sensor	37 - D 39
26	70	P0740	Torque converter clutch fault	37 - D 41
27	100	P0600	CAN timeout	37 - D 42
28	101	P0600	CAN bus fault	37 - D 42



Test point	DTC		Fault text	Page
	Porsche	OBd II		
29	61	P1749	Version coding	37 - D 43

## Fault overview

### General information

- **Never** pull off or push on the control module connector with the ignition switched on.
- Stored faults can be erased only with the Porsche System Tester 2.
- Faults may be stored under certain circumstances if, for troubleshooting purposes, electrical connections are loosened or disconnected with the ignition switched on.
- If terminal 15 (pin 54/55) fails, the "Reduced driving program" will be activated. It is not possible to start diagnosis in this case.
- Erase the fault memory with the Porsche System Tester 2 and perform a test drive each time after performing troubleshooting or repairs. During the test drive, drive the vehicle under different loads and at different speeds so that all shift operations (manual and automatic programs) take place at least once.
- After the test drive, read out the fault memory with the Porsche System Tester 2.

### Fault, DTC

### Possible causes, elimination, notes

#### Test point 1

Faulty control module  
(short to B+ in supply  
to solenoid valve/pressure  
regulator, relay sticks  
or cannot pick up)

#### DTC 43

Fault effect:

Reduced driving program.

1. Check supply wires (pin 52/53) for solenoid valve/pressure regulator for short circuit to B+.

If O.K. = Replace control module.

#### Test point 2

Faulty control module  
(watchdog)

#### DTC 44

Fault effect:

Reduced driving program.

Replace control module.

**Fault, DTC****Possible causes, elimination, notes****Test point 3**

Faulty control module  
(EEPROM)

**DTC 49**

Fault effect:

Reduced driving program.

Replace control module.

**Test point 4**

Faulty control module  
(checksum)

**DTC 42**

Fault effect:

Reduced driving program.

Replace control module.

**Test point 5**

Solenoid valves 1, 2, 3  
Open circuit/short to  
ground,  
short to B+

**DTC's 31, 32, 33**

Fault effect:

Reduced driving program.

**Note**

The functions of the solenoid valves (SV's) can be checked with the Porsche System Tester 2 (Drive links/ Solenoid valves 1, 2, 3). The activation pulses of the valves can be heard as a clicking sound near the transmission.

1. Check function of the SV's with the tester.
2. Check SV with wiring. To do this, connect an ohmmeter to the control module connector and measure the resistance:

SV1 = Pin 52 and pin 30

SV2 = Pin 52 and pin 33

SV3 = Pin 52 and pin 32

Nominal value: 24    36  $\Omega$



**Fault, DTC****Possible causes, elimination, notes**

3. Check wiring from the control module connector pins 30, 32 and 33 to the 16-pole transmission connector pins 8, 4 and 9 for continuity, short to ground and short to B+.
4. Check SV. To do this, remove the ATF pan, disconnect plug connection from the SV and measure the resistance.

Nominal value: 24    36  $\Omega$

**Test point 6**

Shiftlock P/N lock  
Open circuit/short to  
ground,  
short to B+  
**DTC 63**

Fault effect:

Fault is only entered in the fault memory.

**Note**

When the ignition is on, a transmission range can be selected from the selector lever position P or N only if the foot brake is pressed in addition.

Check lifting solenoid with wiring. To do this, connect an ohmmeter to control module connector pins 2 and 53 and measure the resistance.

Nominal value: 60 ... 90  $\Omega$

2. Check wire from control module connector pin 2 to the lifting solenoid connector pin 5 for continuity, short to ground and short to B+.

**Note**

The lifting solenoid connector is accessible only if the centre console is removed.

**Fault, DTC****Possible causes, elimination, notes****Test point 7**

Pressure regulators

1, 2, 3, 4

Open circuit/short to ground,

short to B+

**DTC's 80, 81, 82, 83**

Fault effect:

Reduced driving program.

When there is a short to B+ at pressure regulator 4, the torque converter clutch is always open.

**Note**

The pressure regulators (PR) are pressure-control solenoid valves. They convert an electric current into a proportional, hydraulic pressure.

1. Check pressure regulator with wiring. To do this, connect an ohmmeter to the control module connector and measure the resistance:

PR1 = Pin 52 and pin 5

PR2 = Pin 52 and pin 1

PR3 = Pin 52 and pin 29

PR4 = Pin 52 and pin 4

Nominal value: 5 ... 10  $\Omega$ 

2. Check wiring from the control module connector pins 1, 4, 5 and 29 to the 16-pole transmission connector pins 3, 11, 2 and 7 for continuity, short to ground and short to B+.
3. Check the pressure regulator. To do this, remove the ATF pan, remove plug connection from the pressure regulator and measure the resistance.

Nominal value: 5 ... 10  $\Omega$ **Note**

The hydraulic control unit must be removed before the PR1 (modulation pressure) can be tested.

**Fault, DTC****Possible causes, elimination, notes****Test point 8**

Speed signal  
front right/left  
Signal implausible  
**DTC's 55, 62**

Fault effect:

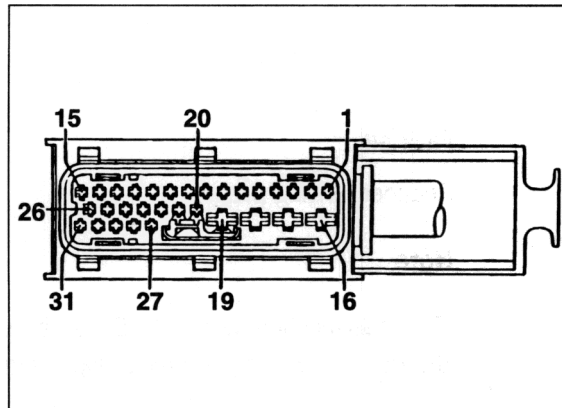
No manual program.  
Upshifting is not prevented during braking.  
No downshifting during braking.  
Substitute value for transverse acceleration.

**Note**

The wheel speeds can be checked with Porsche System Tester 2 (Actual values/Speed signal FR/FL).

To do this, raise the vehicle and spin the right or left front wheel by hand.

1. Check wheel speed with the tester.
2. Read out fault memory of the ABS/TC control module and remedy the fault according to the ABS test plan.
3. Check wiring from the Tiptronic control module connector pin 38 (or 39) to the ABS/TC control module connector pin 25 (or 26) for open circuit, short to ground and short to B+.



ABS/TC control module connector

540\_96

**Fault, DTC****Possible causes, elimination, notes****Test point 9**

Coolant shutoff valve  
Open circuit/short to ground,  
short to B+

**DTC 93****Fault effect:**

The reduced driving program is activated if there is an open circuit/short to ground. In the event of a short to B+, the fault is only entered in the fault memory.

**Note**

The function of the coolant shutoff valve can be tested with the Porsche System Tester 2 (Drive links/Coolant shutoff valve).

1. Check valve with the tester.
2. Check internal resistance of the valve. To do this, pull off plug connection of the valve and connect ohmmeter to pins 1 and 2.

Nominal value: 25 35  $\Omega$

3. Check wire from the Tiptronic control module connector pin 51 to the coolant shutoff valve connector pin 1 for open circuit, short to ground and short to B+.

**Test point 10**

Multi-function switch  
Signal implausible

**DTC 35****Fault effect:**

Reduced driving program.

**Note**

The multi-function switch (MFS) can be tested with the Porsche System Tester 2 (Input signals/Multi-function switch).

1. Test the MFS with the tester. To do this, shift through all selector lever positions in steps and check whether the position display in the instrument cluster and the display on the tester agree.

## Fault, DTC

## Possible causes, elimination, notes

**Note**

As the tester display appears after a delay due to the functional principle of the unit, do not shift through the positions too quickly.

## 2. Check MFS with wiring.

To do this, pull off the Tiptronic control module connector and test the MFS for continuity according to the table.

	Pin 8	Pin 9	Pin 36	Pin 37
P	–	–	0	–
R	0	–	–	–
N	0	–	0	0
D	–	0	0	0

Ohmmeter display:

– = Open circuit

0 = Continuity

## 3. Check MFS without wiring.

To do this, disconnect the MFS connector and test the MFS for continuity according to the table.

	Pin E - A	Pin E - B	Pin E - C	Pin E - D
P	0	–	–	–
R	–	0	–	–
N	0	0	0	–
D	0	–	0	0

Ohmmeter display:

– = Open circuit

0 = Continuity

**Fault, DTC****Possible causes, elimination, notes**

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4. Check wiring from the Tiptronic control module connector pins 8, 9, 36 or 37 to the MFS connector pins B, D, A or C for continuity, short to ground and short to B+.
5. Check adjustment of selector lever cable (refer to Service No. 37 15 15).

**Test point 11**

Rpm signal from  
DME control module  
Signal implausible

**DTC 21**

Fault effect:

Reduced driving program.

**Notes**

The DME control module signals a fault directly to the Tiptronic control module via a data lead (CAN bus).

The rpm signal can be checked with the Porsche System Tester 2 (Actual values/Rpm).

1. Check rpm signal with the tester.
2. Read out fault memory of the DME control module and remedy the fault according to the DME test plan.
3. Check wiring from Tiptronic control module connector pin 86 (or 85) to the DME control module connector pin 86 (or 85) for open circuit, short to ground and short to B+.

**Fault, DTC****Possible causes, elimination, notes**

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**Test point 12**

Governor  
Signal implausible  
**DTC 46**

Fault effect:

Reduced driving program.

**Note**

The "Governor" function is activated to prevent the engine from overrevving in the event of falsified rpm signals.

Possible faults:

Wrong transmission speed signals.

Stuck spool valves in the transmission.

**Test point 13**

Speed sensor  
Signal implausible  
**DTC 36**

Fault effect:

Reduced driving program.

**Note**

The ratio of transmission output speed/engine speed is monitored.

1. Check sensor for the transmission speed on Tiptronic control module connector pins 14 and 42 with an ohmmeter.

Nominal value: 0.80    1.2 k $\Omega$

2. Check wiring from the control module connector pin 42 (or 14) to the 16-pole transmission connector pin 10 (or 1) for open circuit, short circuit to ground and short to B+.
3. Check shield on control module connector pin 15.

Fault, DTC	Possible causes, elimination, notes
	<p>4. Test sensor on transmission socket pins 10 and 1 with an ohmmeter.</p> <p>Nominal value: 0.80    1.2 k<math>\Omega</math></p> <p><b>Note</b></p> <p>The ATF pan must be removed before the sensor can be replaced.</p> <p>5. If items 1 ... 4 are OK and no other faults are stored, there is a mechanical/hydraulic fault in the transmission (e.g. ATF level not OK, defective converter, slipping clutches or brakes).</p>

**Test point 14**

Gear sel. monitor,  
output drive  
Signal implausible

**DTC 90**

Fault effect:

Reduced driving program.

The ratio of transmission input speed/transmission output speed is monitored.

1. Check sensor for the transmission speed on Tiptronic control module connector pins 14 and 42 with an ohmmeter.

Nominal value: 0.80    1.2 k $\Omega$

2. Check wiring from the control module connector pin 42 (or 14) to the 16-pole transmission connector pin 10 (or 1) for open circuit, short circuit to ground and short to B+.
3. Check shield on control module connector pin 15.



**Fault, DTC****Possible causes, elimination, notes**

4. Test sensor on transmission socket pins 10 and 1 with an ohmmeter.

Nominal value: 0.80 ... 1.2 k $\Omega$

**Note**

The ATF pan must be removed before the sensor can be replaced.

5. If items 1 ... 4 are OK and no other faults are stored, there is a mechanical/hydraulic fault in the transmission (e.g. ATF level not OK, slipping clutches or brakes).

**Test point 15**

Stall speed,  
transmission input  
Signal implausible

**DTC 91**

Fault effect:

Reduced driving program.

**Note**

The ratio of transmission input speed/engine speed is monitored

1. Check sensor for the transmission input speed on Tiptronic control module connector pins 16 and 44 with an ohmmeter.

Nominal value: 230 ... 300  $\Omega$

2. Check wiring from control module pin 16 (or 44) to the 16-pole transmission connector pin 5 (or 6) for open circuit, short to ground and short to B+.

Fault, DTC	Possible causes, elimination, notes
	<ol style="list-style-type: none"><li>3. Check shield on control module connector pin 23.</li><li>4. Check sensor on transmission socket pins 5 and 6 with an ohmmeter.  Nominal value: 230    300 <math>\Omega</math></li></ol> <p><b>Note</b></p> <p>The hydraulic control unit must be removed before the sensor can be tested.</p> <ol style="list-style-type: none"><li>5. If items 1 ... 4 are OK and no other faults are stored, there is a mechanical/hydraulic fault in the transmission (e.g. ATF level not OK, defective converter, slipping clutches or brakes).</li></ol>

**Fault, DTC****Possible causes, elimination, notes****Test point 16**

Gear sel. monitor,  
transmission input speed  
Signal implausible  
**DTC 92**

Fault effect:

Reduced driving program.

**Note**

The ratio of transmission input speed/transmission output speed is monitored.

1. Check sensor for the transmission input speed on Tiptronic control module connector pins 16 and 44 with an ohmmeter.

Display: 230    300  $\Omega$

2. Check wiring from control module pin 16 (or 44) to the 16-pole transmission connector pin 5 (or 6) for open circuit, short to ground and short to B+.

3. Check shield on control module connector pin 23.

4. Check sensor on transmission socket pins 5 and 6 with an ohmmeter.

Display: 230 ... 300  $\Omega$

**Note**

The hydraulic control unit must be removed before the sensor can be tested.

5. If items 1 ... 4 are OK and no other faults are stored, there is a mechanical/hydraulic fault in the transmission (e.g. ATF level not OK, slipping clutches or brakes).

## Fault, DTC

## Possible causes, elimination, notes

**Test point 17**

Gear sel. monitor,  
2nd, 3rd, 4th, and 5th gear  
Signal implausible  
**DTC's 72, 73, 74, 75**

Fault effect:

Reduced driving program.

**Note**

In gear selection monitoring of 2nd to 5th gear, the ratio of engine speed/output shaft speed is monitored. In the case of deviations from nominal values, the Tiptronic control module detects whether shifting was performed mechanically or hydraulically.

If no other faults are stored, there is a mechanical/hydraulic fault in the transmission.

The following procedure can be used to check whether the transmission actually shifted to the correct gear in each case:

- The ATF temperature must be between 40 °C and 95 °C.
- Hold gears 2 ... 5 in the manual gate.

Drive at a constant vehicle speed on level ground (not on the roller test stand) and read off the engine speed.

The following values must be achieved during this test:

	Vehicle speed		Rpm
	Speedo display	Tester display	Nmin ... Nmax
2nd gear	50 km/h	45 km/h	3000 ... 3400
3rd gear	60 km/h	55 km/h	2600 ... 2900
4th gear	70 km/h	65 km/h	2100 ... 2500
5th gear	80 km/h	74 km/h	1600 ... 2000

**Fault, DTC****Possible causes, elimination, notes****Test point 18**

Load signal from  
DME control module  
**DTC 22**

Fault effect:

Fixed map.

**Note**

The DME control module signals a fault directly to the Tiptronic control module via a data lead (CAN bus).

1. Read out fault memory of the DME control module and remedy the fault according to the DME test plan.
2. Check wiring from Tiptronic control module connector pin 85 (or 86) to the DME control module connector pin 85 (or 86) for open circuit, short to ground and short to B+.

**Test point 19**

Throttle information fault  
**DTC 23**

Fault effect:

Throttle substitute value (approx. 15 %).

Fixed shift map.

No manual program.

**Notes**

The DME control module signals a fault directly to the Tiptronic control module via a data lead (CAN bus).

- The throttle valve angle can be checked with the Porsche System Tester 2 (Actual values/Throttle valve angle).
1. Read out fault memory of the DME control module and remedy the fault according to the DME test plan.
  2. Check wiring from Tiptronic control module connector pin 85 (or 86) to the DME control module connector pin 85 (or 86) for open circuit, short to ground and short to B+.

**Fault, DTC****Possible causes, elimination, notes****Test point 20**

Kick-down switch  
Short to ground  
**DTC 53**

Fault effect:  
No kick-down.

**Note**

The function of the kick-down switch can be tested with the Porsche System Tester 2 (Input signals/Kick-down).

1. Test function of the switch with the tester.

**Note**

As the accelerator pedal box must not be opened, the complete box must be replaced if the kick-down switch is defective.

2. Check wire from control module connector pin 18 to the kick-down switch for short to ground.

Nominal value:

Accelerator pedal in idle position (kick-down switch open) =  $\infty \Omega$

Accelerator pedal to the stop (kick-down) = **0 ... 5  $\Omega$**

**Test point 21**

Instrument cluster  
Activation  
No signal change  
**DTC 56**

Fault effect:  
Reduced driving program.

**Note**

The Tiptronic control module (pin 25) is connected to the instrument cluster (pin II/17) via a serial data lead.

Specification:

Signal type = PWM

Frequency = 50 Hz

Level = 0 ... 12 V

## Fault, DTC

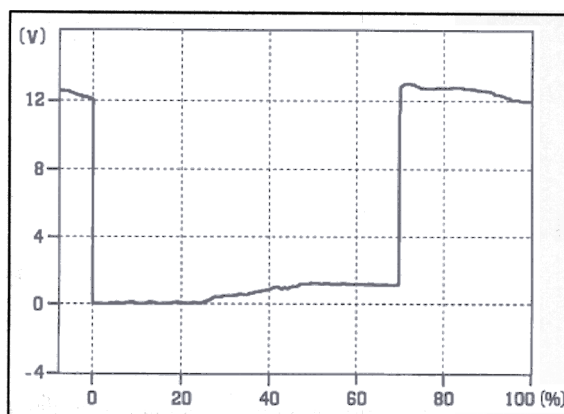
## Possible causes, elimination, notes

Signal coding:

Actual gear	1	2	3	4	5
Pulse width in "D"	10 %	20 %	30 %	40 %	50 %
in "M"	15 %	25 %	35 %	45 %	55 %

### Note

There is no fault if the pulse width is 70 % with the engine running and with the selector lever in position "P".



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1. Check the PWM signal with an oscilloscope.
2. Check wire from Tiptronic control module connector pin 25 to the instrument cluster connector II (white) pin 17 for open circuit, short to ground and short to B+.

**Fault, DTC****Possible causes, elimination, notes****Test point 22**

Supply voltage to solenoid  
valve/pressure regulator  
Open circuit/short to  
ground

**DTC 11**

Fault effect:

Reduced driving program.

**Note**

The coils of the solenoid valves (SV) are supplied directly with positive potential on one side and with ground on the other side via an output stage in the control module.

1. Check supply leads of the solenoid valves (pins 52 and 53) for open circuit and short to ground.
2. If the test described in 1 is not OK, check wiring from control module connector pin 52 (or 53) to the 16-pole transmission connector pin 12 (or 16) for open circuit and short to ground.
3. Check the transmission wiring harness at transmission socket pins 16 and 12 for open circuit and short to ground.

**Test point 23**

Terminal 30, open circuit  
Open circuit/short  
to ground

**DTC 12**

Fault effect:

Fault is only entered in the fault memory.

**Note**

The Tiptronic control module is continuously supplied with battery voltage via pin 26 (+ 30).

1. Test voltage at control module connector pin 26.  
If no battery voltage is displayed, check fuses B1 and F6 and the wire from the battery to the control module.



## Fault, DTC

## Possible causes, elimination, notes

**Test point 24**

Manual program switch  
Short to ground  
**DTC 51**

Fault effect:

No manual program.

**Note**

The manual program switch can be checked with the Porsche System Tester 2 (Input signals/Manual program switch).

1. Check switch with the tester.
2. Check whether ground is connected to control module connector pin 13.

Nominal value:

In the automatic gate =  $\infty \Omega$

In the manual gate = **0 ... 5  $\Omega$**

If display is OK = Control module faulty.

3. Check wire from control module connector pin 13 to the manual switch for short to ground.

**Test point 25**

Transmission temperature sensor  
Open circuit/short to B+  
**DTC 37**

Fault effect:

Reduced driving program.

Substitute value of 80 °C for ATF temperature.

No activation of the coolant switchover valve (transmission always cooled).

**Notes**

The ATF temperature can be checked with the Porsche System Tester 2 (Actual values/Transmission temp.).

- A fault is stored if an ATF temperature outside the limit range below – 50 °C or above + 180 °C is detected.

## Fault, DTC

Possible causes, elimination, notes

---

1. Check ATF level (refer to Service No. 37 02 35).
  2. Check sensor for ATF temperature with wiring. To do this, connect an ohmmeter to control module connector pins 21 and 22.  
  
Nominal value:  
At 20 °C = approx. 1.00 k $\Omega$   
At 40 °C = approx. 1.15 k $\Omega$   
At 60 °C = approx. 1.30 k $\Omega$
  3. Check wiring from control module connector pin 21 (or 22) to the 16-pole transmission connector pin 14 (or 13) for continuity, short circuit to ground and short to B+.
  4. Check sensor for ATF temperature with transmission wiring harness. To do this, connect an ohmmeter to transmission socket pins 13 and 14.  
  
Nominal value:  
At 20 °C = approx. 1.00 k $\Omega$   
At 40 °C = approx. 1.15 k $\Omega$   
At 60 °C = approx. 1.30 k $\Omega$
- If the nominal value is not OK = the transmission wiring harness or ATF temperature sensor is defective.

**Note**

As the ATF temperature sensor is integrated in the transmission wiring harness, the transmission wiring harness must be replaced if the sensor is damaged.

**Fault, DTC****Possible causes, elimination, notes****Test point 26**

Torque converter clutch fault  
Open circuit/short  
to ground

**DTC 70**

Fault effect:

Torque converter clutch always open.

1. Check ATF level (refer to Service No. 37 02 35) and erase fault memory.
2. Perform a test drive and read out the fault memory.

**Note**

Diagnosis conditions for fault detection are:

Torque converter clutch activated.

- No engine speed fault, spider shaft speed fault, transmission ratio fault or pressure regulator 4 fault entered as present.

Gear 4 or 5.

No shifting operation taking place.

3. If the fault recurs after the test drive and no other faults are stored, the following possible faults may be present:

Electrical activation of pressure regulator 4 not OK  
(diagnostic trouble codes 83 and 11 present?).

- Mechanical defect in pressure regulator 4.
- ATF supply to the torque converter clutch not OK.

Converter defective.

**Fault, DTC****Possible causes, elimination, notes**

---

**Test point 27**

CAN timeout

**DTC 100**

Fault effect:

Reduced driving program.

**Notes**

The Tiptronic control module is connected with the DME control module via a data lead (CAN bus).

- Never pull off or push on the control module connector with the ignition switched on.  
If the DME control module connector is pulled off with the ignition switched on, for example, the on-board diagnostic system may, in certain circumstances, detect a "CAN timeout" fault.
- 1. Read out the DME fault memory. If the "CAN timeout" fault is also stored here, check the wiring from the Tiptronic control module to the DME control module.
- 2. Check the wiring from Tiptronic control module pin 85 (or 86) to DME control module pin 85 (or 86) for continuity, short to ground and short to B+.

**Note**

If the wiring is OK and the fault is stored in one control module only, the fault may lie in another control module.

**Test point 28**

CAN bus fault

**DTC 101**

Fault effect:

Reduced driving program.

**Note**

The Tiptronic control module is connected with the DME control module via a data lead (CAN bus).

**Fault, DTC****Possible causes, elimination, notes**

Never pull off or push on the control module connector with the ignition switched on.

If the DME control module connector is pulled off with the ignition switched on, for example, the on-board diagnostic system may, in certain circumstances, detect a "CAN : Bus fault".

1. Read out the DME fault memory. If the fault "CAN : Bus fault" is also stored here, check the wiring from the Tiptronic control module to the DME control module.
2. Check the wiring from Tiptronic control module pin 85 (or 86) to DME control module pin 85 (or 86) for continuity, short to ground and short to B+.

**Note**

If the wiring is OK and the fault is stored in one control module only, the fault may lie in another control module.

**Test point 29**

Version coding

Signal implausible

**DTC 61**

Fault effect:

Reduced driving program.

**Note**

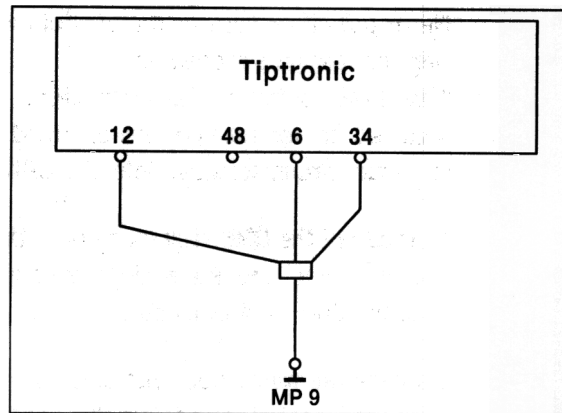
As transmission damage can result if the control modules are confused, there is a code in the vehicle wiring harness that must agree with the code programmed in the Tiptronic control module.

Pin code 2	Open	Ground	Ground	Open
Pin code 1	Ground	Open	Ground	Open
Reaction	Function	Reduced driving program		



## Fault, DTC

## Possible causes, elimination, notes



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- 6 = Power ground
- 34 = Power ground
- 48 = Pin code 2
- 12 = Pin code 1

1. Use the Porsche System Tester 2 (Control modules/Identification) to check whether the prescribed control module is installed. (Refer to the parts catalog for details of the allocation.)
2. Check whether ground is connected to control module connector pin 12. If this is the case, the control module is faulty.
3. Check wire from control module connector pin 12 to ground point 9 for open circuit.

**Note**

Ground point 9 (MP 9) is located in the passenger compartment behind the right-hand spring strut attachment.

**45 02      Diagnosis/troubleshooting**

## **Diagnosis/Troubleshooting**

### **Anti-lock brake system**

#### **System ABS 5.3 and System ABS/TC 5.3**

**Contents overview**

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Fault memory (overview of possible faults)	45 - D 19
Fault overview / troubleshooting (diagnosis test plan)	45 - D 20
Drive links (drive link diagnosis and test plan)	45 - D 36
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**Contents overview**

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## Important information about ABS 5.3 and ABS/TC 5.3

### General

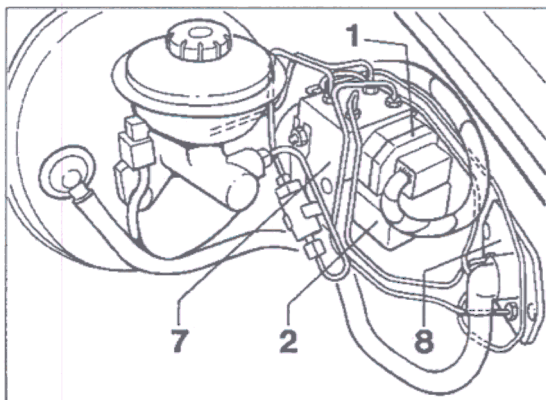
The 911 Carrera (1996) is fitted **as standard** with an anti-lock brake system (ABS 5.3).

**"Traction Control (TC)"** can be obtained on **special request** on the basis of ABS 5.3.

**Traction Control (TC)** is a combination of anti-slip control (ASR) and Automatic Brake Differential (ABD).

**TC is a further system for increasing driving safety.**

**ABS 5.3** is optimised with regard to installed volume and weight **compared with** the **ABS 5** (ABS 5 on the 993). Control module (No. 1), hydraulic unit (No. 7), pump motor relay and valve relay (No. 2) of ABS 5.3 and ABS/TC 5.3 **are a unit** that is positioned next to the master brake cylinder.



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**Diagnosis and system checks** on both systems are carried out with the **Porsche System Tester 2**.

### Differences between ABS 5.3 and ABS/TC 5.3

ABS 5.3 = **3-channel** system  
(diagram: see Page 45 - D 7).

ABS/TC 5.3 = **4-channel** system  
(diagram: see Page 45 - D 9).

The essential **distinguishing features** between ABS and ABS/TC **are:**

Number of brake lines at intermediate piece  
(No. 8 / Figure 181\_96):

ABS 5.3	=	3 brake lines
ABS/TC 5.3	=	4 brake lines

TC OFF switch for switching driving stability control on and off is not available on vehicles with Solo ABS (ABS 5.3).

**TC (ASR/ABD) MIL** and **TC (ASR/ABD) function light** (information light) in vehicles **with ABS/TC**. These lights are lit when the ignition is switched on (lamp check).

In vehicles **with ABS 5.3** (Solo ABS) these lamps are **not fitted** in the instrument cluster.

A figure showing the warning (MIL) and function lights is on Page 45 - D 10.

### ABS 5.3 (3-channel system) system description

#### ABS operation

The ABS control module receives a signal from the stop-light switch and the AC voltage signals from the four speed sensors. These signals are converted into digital wheel-speed signals independently of each other by two micro-processors. The wheel slip (approximately proportional to the computed vehicle reference speed) is formed from these wheel-speed signals.

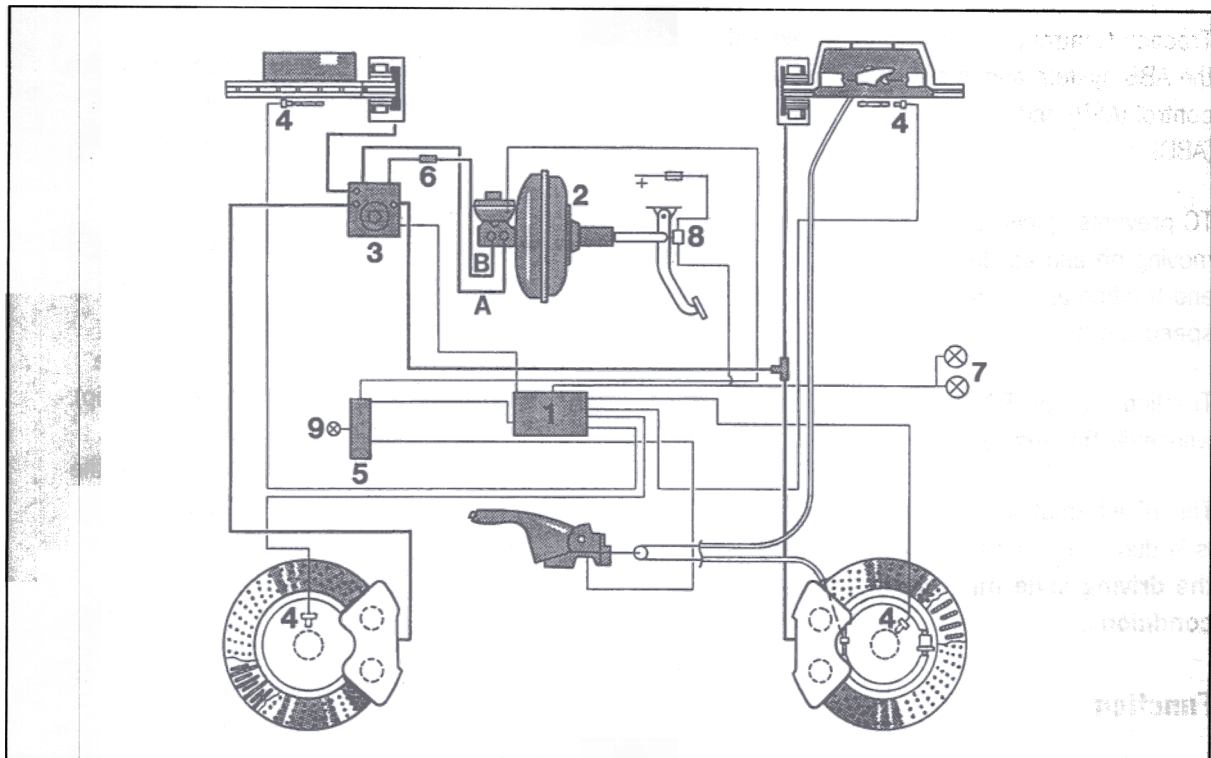
If vehicle deceleration and excess slip at a wheel are detected, the pressure-holding phase is initiated as the first step, i.e. the inlet valve for the relevant wheel is closed to prevent a further increase in pressure. If in spite of the pressure being held constant the wheel tends to continue to lock up, the pressure in the wheel cylinder is reduced. For this purpose, the outlet valve is opened and the brake fluid is pumped back to the master brake cylinder via the return pump (pressure-reduction phase) until the wheel turns again.) Then, depending on the control cycle, further appropriate cycles are initiated.

In addition, whenever a trip is begun and a speed of 6 km/h is exceeded, a test programme is started.) The solenoid valves and the pump motor are electrically actuated and checked. If a fault is detected, the control module switches the ABS function off, the ABS MIL is switched on and the fault is stored.

Function of the individual components on  
Page 45 - D 11

This function and the input signals are continuously monitored. If a fault is detected, the control module switches the ABS function off, switches on the ABS MIL and stores the fault in a non-volatile memory in the control module.

**Diagram: ABS 5.3 (3-channel system)**



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- |   |  |   |                            |
|---|--|---|----------------------------|
| 1 | ABS control module *   | 7 | Brake light                |
| 2 | Brake unit (brake booster with tandem master brake cylinder) | 8 | Stop-light switch          |
| 3 | ABS hydraulic unit * (3 hydraulic outputs)                   | 9 | ABS MIL (yellow)           |
| 4 | ABS speed sensors  | A | Front-axle braking circuit |
| 5 | Instrument cluster   | B | Rear-axle braking circuit  |
| 6 | Brake proportioning valve (1x)                               |   |                            |

\* Control module, hydraulic unit, pump-motor relay and valve relay form a unit, which is located next to the master brake cylinder.

### ABS/TC 5.3 (4-channel system) system description

#### Note)

Traction Control (TC) represents an extension of the ABS system and is a combination of anti-slip control (ASR) and Automatic Brake Differential (ABD).

TC prevents spinning of the drive wheels when moving off and accelerating. Driving stability and traction are improved over the entire speed range.

Traction Control (TC) is ready for operation whenever the engine is started.

The TC information light in the instrument panel is lit during a control process **and warns that the driving style must be matched to road conditions.**

#### Function

##### Driving-stability control:

If Traction Control (TC) detects that a certain speed difference between the wheels has been exceeded (wheel spin), engine power is automatically reduced.

##### Brake control:

In addition to reducing the engine power (driving-stability control), the TC (via the ABD) brakes the drive wheel that is spinning.

Since this control requires the drive wheels to be individually controlled, the **ABS/TC system is a 4-channel system.**

#### Switching off driving stability control \*

Press the "TC OFF" logo of the rocker switch. Driving stability control cannot be switched off during a TC control process (information light on).

**One-sided** wheel spin on the drive axle is further prevented by brake control up to a speed of 100 km/h.

Driving stability is not monitored, since the drive wheels can spin at the same rpm (slip).

With driving stability control switched off, the TC MIL in the instrument panel and the indicator light in the rocker switch are lit.

It can be advantageous to switch off driving stability control:

- on a loose surface and in deep snow
- when "rocking" the vehicle free
- when using snow chains.

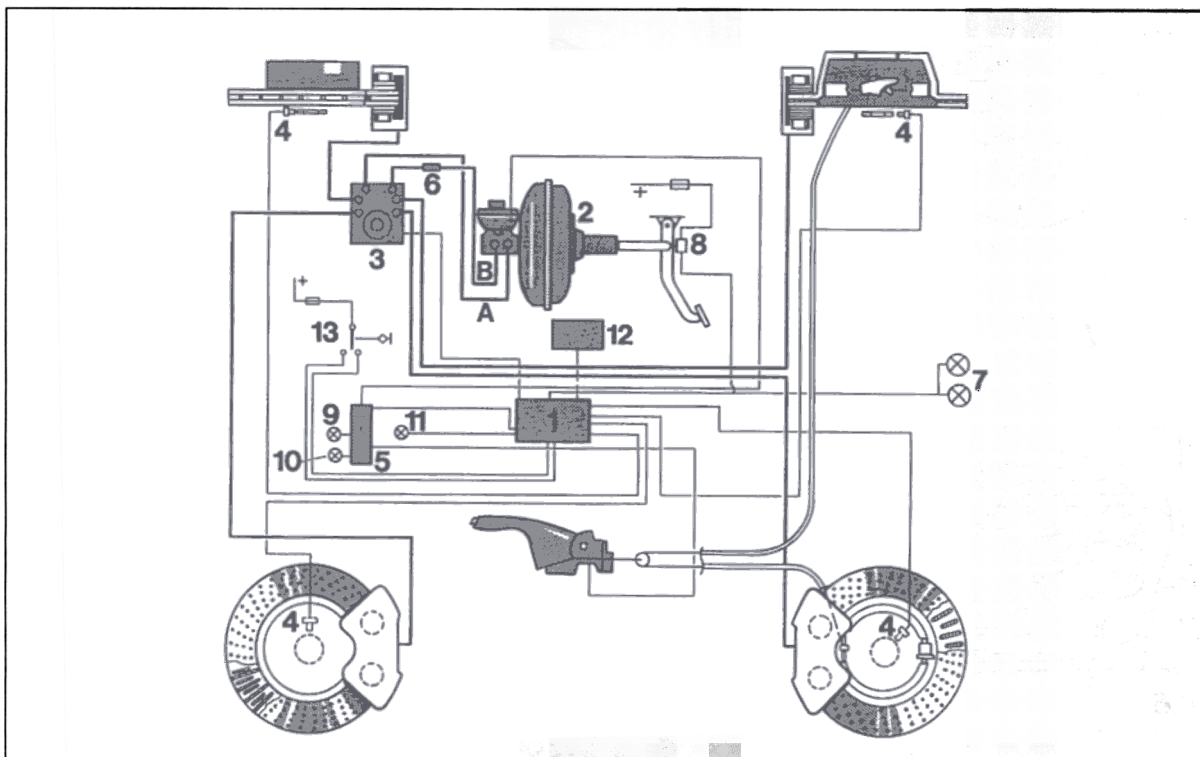
#### Switching driving stability control back on \*

Press the indicator light in the rocker switch.

Driving stability control cannot be switched on again during a TC control process (information light on).

- \* Press the switch for at least 0.1 second. Then a further 0.3 second will pass until the routine is complete. Only then is driving stability control switched off or on.

**Diagram: ABS/TC 5.3 (4-channel system)**

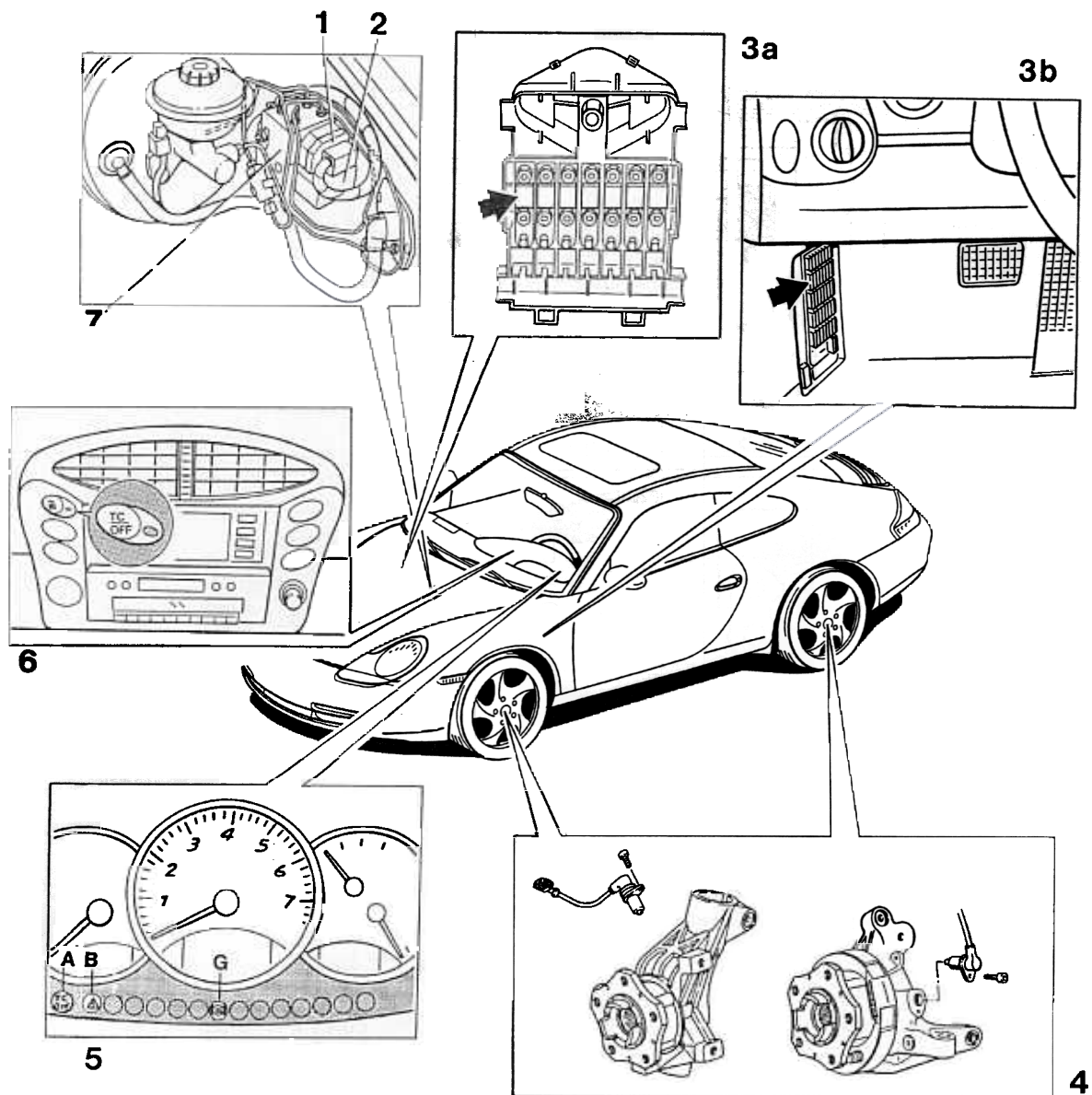


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- |   |   |
|---|---|
| <b>1</b> ABS/TC control module *                                      | <b>9</b> ABS MIL (yellow)   |
| <b>2</b> Brake unit (brake booster with tandem master brake cylinder) | <b>10</b> TC MIL (TC/yellow)  |
| <b>3</b> <b>ABS/TC</b> hydraulic unit * (4 hydraulic outputs)         | <b>11</b> TC function light (yellow/ or green on some vehicles of the initial production run) |
| <b>4</b> ABS speed sensors  | <b>12</b> <b>DME control module</b>   |
| <b>5</b> Instrument cluster   | <b>13</b> TC rocker switch (see Page 45 - D 10)   |
| <b>6</b> Brake proportioning valve (1x)                               | <b>A</b> Front-axle braking circuit   |
| <b>7</b> Brake light  | <b>B</b> Rear-axle braking circuit  |
| <b>8</b> Stop-light switch  |   |

\* Control module, hydraulic unit, pump-motor relay and valve relay form a unit, which is located next to the master brake cylinder.

**Component arrangement (ABS 5.3 and ABS/TC 5.3)**



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## Function of individual components

### 1. Control module (ABS 5.3 and ABS / TC 5.3)

This module processes incoming signals and actuates the solenoid valves or/and the return pump in the hydraulic unit when wheel slip is excessive (see also System description).

If the ABS or ABS/TC switches off when a system fault is detected, it actuates the MIL and stores the fault in a non-volatile memory.

#### Note

The control module and relay are not supplied individually.) In the event of replacement, the complete hydraulic unit must be replaced.

### 2. Relay

**The solenoid valve relay** is actuated by the control module (closes) as soon as the control module receives voltage from the generator (D+/terminal 61). As soon as the relay has closed (picked up), battery positive voltage (terminal 30) is present at the valve coils of all solenoid valves of the hydraulic unit.

If the ABS or the TC (ABD) begins to control, the control module applies negative voltage to the appropriate valve coil of the valve to be controlled at the appropriate wheel.

**The return pump relay** is actuated (with a negative voltage) by the control module if required, and closes.

As soon as the relay has closed / picked up, battery positive voltage (terminal 30) is present at the return pump, which then runs.

#### Note

The relays cannot be exchanged.  
In the event of replacement, the complete hydraulic unit must be replaced.

### 3. Fuses)

**3a.** A 50-A fuse in the **current distributor (F1 / arrow)** protects the return pump and the solenoid valves.

The current distributor is located under the instrument panel.) The fastening points are accessible from the luggage-compartment side.

**3b.** The 15-A fuse **B 9** (fuse holder B / fuse No. 9) on the **central electrical board** protects the control module's electrical supply (ABS and ABS/TC).

The arrow points to fuse holder B (field 2).

On vehicles with Traction Control (TC), the 15-A fuse **B 1** (fuse holder B / fuse No. 1) on the central electrical board protects the supply to the "TC OFF" rocker switch (switch for switching driving stability control on and off).

### 4. Speed sensors

The speed sensors provide wheel speed information (speed information for each wheel) to the control module. These speed sensors operate according to the inductive principle, in which sinusoidal alternating voltages are generated in accordance with the number of teeth on a pulse wheel and at a frequency that is a measure of the wheel speed.



## 5. MILs and information lights

### Note

B = TC information light (see Page 45 - D 10)

A = TC MIL (see Page 45 - D 10)

G = ABS MIL (see Page 45 - D 10)

### Information light for TC (B)

- Lights for a lamp check when ignition is switched on

Indicates control process (even when driving stability control is switched off).

### MIL for TC (A)

- Lights in combination with the indicator light in the rocker switch (TC OFF) for a lamp check when the ignition is switched on.

In combination with the indicator light in the rocker switch, indicates that driving stability control is off.

Indicates defect: TC is out of order.

Lights together with the ABS MIL if there is an **ABS fault**.

### MIL for ABS (G)

- Lights up for a lamp check when ignition is switched on

If the ABS MIL lights up **with the engine running**, the ABS has switched off due to a fault.

## 6. TC (OFF) rocker switch with light

**For switching driving stability control on and off.**

The rocker switch has one contact for switching off and another for switching on.

**To switch off**, press the "TC OFF" logo on the rocker switch.} This applies a positive voltage to the control module while the switch is pressed. This switches off driving-stability control. Driving stability control cannot be switched off during a TC control process (information light on).

When driving stability control is off, the TC MIL in the instrument panel and the indicator light in the rocker switch are lit.

**To switch on** driving stability control, press the indicator light in the rocker switch. This applies a positive voltage to the control module while the switch is pressed. This switches on driving stability control.

Driving-stability control cannot be switched back on during a TC control process (information light on).

Driving stability control is ready for operation, i.e. is switched on automatically, whenever the engine is started.

System description on Page 45 - D 8.

## 7. Hydraulic unit

The hydraulic unit essentially consists of fast-switching electromagnetic valves and a return pump.) Regardless of the pressure in the master brake cylinder, the hydraulic unit can change the fluid pressure to the wheel brake cylinders (holding or reducing pressure). Increasing the pressure above that of the master brake cylinder is not possible, however.

**The ABS 5.3 hydraulic unit has three hydraulic outputs (3-channel system)** and six electromagnetic valves (three inlet and three outlet valves).

**The ABS / TC 5.3 hydraulic unit has four hydraulic outputs (4-channel system)** and ten electromagnetic valves (four inlet valves / four outlet valves, one switch-over valve and one intake valve).

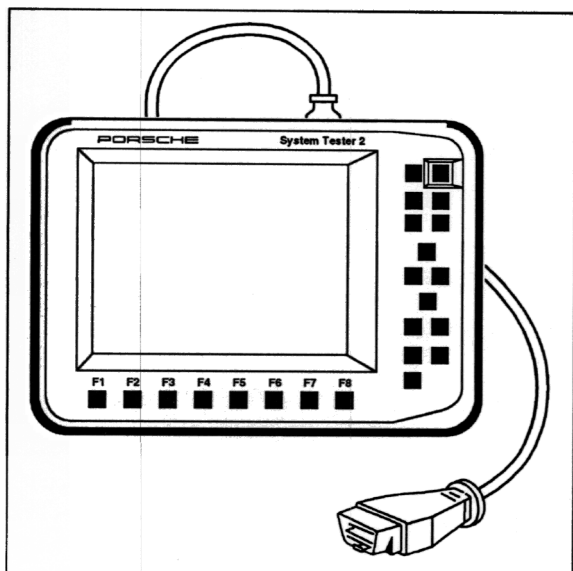
The intake and switch-over valves are required so that the return pump can perform **two tasks**:

1. Return flow to the master brake cylinder (pressure reduction) during ABS control.
2. Supply (pressure increase) to the right or left rear-wheel brake cylinder during **TC control (ABD control)**.

In the case of **ABS control** at the rear axle, the solenoid valves for both rear wheels are actuated in parallel (joint control as in Solo ABS control (3-channel system).

## Tools

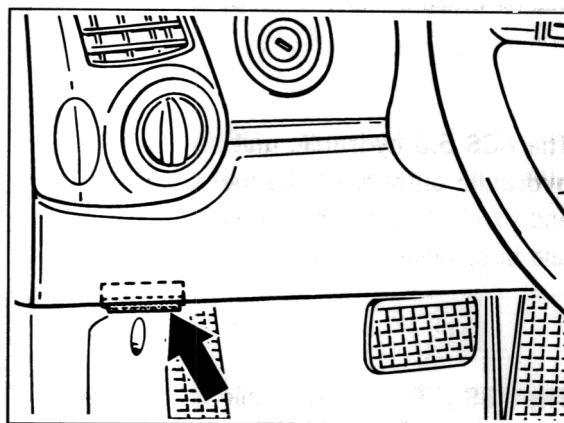
1. Porsche System Tester 2 with integrated digital multimeter.



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## Connecting Porsche System Tester 2

The diagnostic socket (arrow) to which the Porsche System Tester 2 is connected is located in the driver's footwell (left-hand drive vehicles) or passenger's footwell (right-hand drive vehicles) near the fuse box.



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2. When performing measurements on the control module connector with a multimeter, use measuring leads (e.g. commercially available leads from Messrs. Bosch or shop-made leads) in order to avoid damaging the contacts in the control module connector.

### Normal pins:}

1 to 2 measuring leads with 2,5 mm flat connectors.

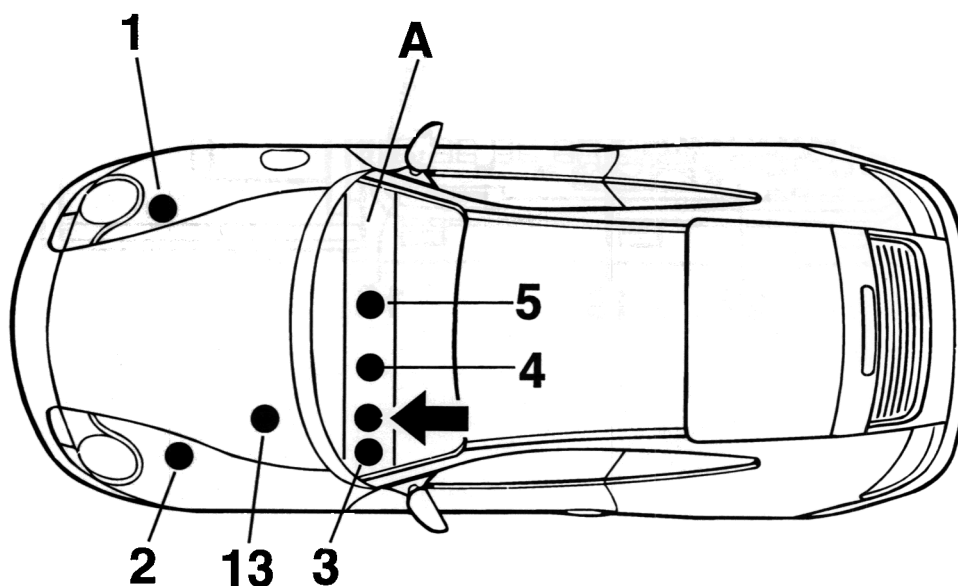
### Mini pins:}

1 to 2 measuring leads with 1.6 mm flat connectors.

### Ground points for ABS and ABS/TC

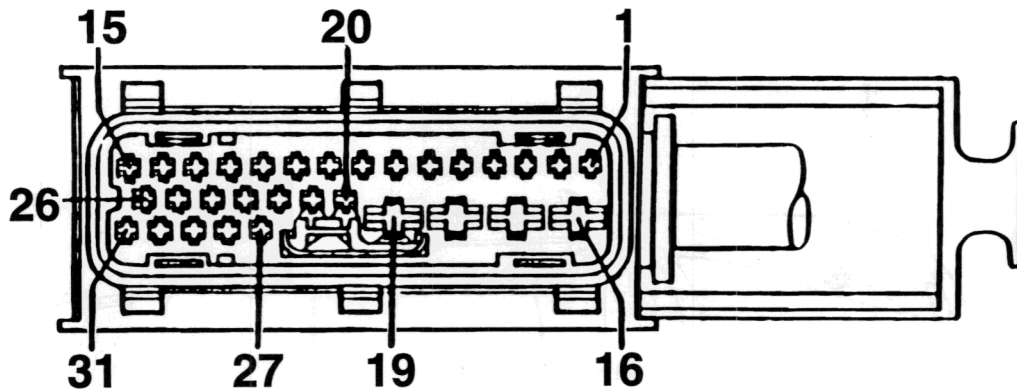
Ground point 2 = The ground point is located on the left in the luggage compartment

Electronics ground = The ground point (arrow) is located on the dashboard support frame (A)



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# Connector assignment, control module (ABS and ABS/TC)



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1	Ground from speed sensor, rear right	12	TC OFF from rocker switch (activation by positive)
2	Signal from speed sensor, rear right	13	Signal to the DME control module (setpoint engine torque / MMR)
3	Not used	14	Stop-light switch signal (vehicle voltage when brake actuated)
4	Ground from speed sensor, front right	15	Control module power supply (terminal 15 / from fuse B9)
5	Signal from speed sensor, front right	16	Ground
6	Ground from speed sensor, front left	17/18	Voltage for return pump relay and valve relay
7	Signal from speed sensor, front left	19	Ground
8	Ground from speed sensor, rear left	20	Activation of TC MIL (ground)
9	Signal from speed sensor, rear left		
10	D +, terminal 61 K-line from diagnosis		

- 21    Activation of ABS MIL (ground)
- 22    TC switch indicator light (activation by ground)
- 23    Output signal (speed sensor, rear left)  
to the instrument cluster (speedometer  
signal) and to the DME
- 24    Activation of TC information light (ground)
- 25    On Tiptronic vehicles = output signal  
(speed sensor, front left) **to** the Tiptronic  
control module
- 26    On Tiptronic vehicles = output signal  
(speed sensor, front right) **to** the Tiptronic  
control module
- 27\*   Signal from DME control module  
(actual engine  
  
torque / MMI)
- 28\*   Signal **to** the Tiptronic-control module  
during TC control, for activation of a  
specific Tiptronic map
- 29    Not used
- 30\*   Signal from the DME control module  
(engine speed)
- 31\*   TC ON from rocker switch (activation by  
positive)

\* Only on vehicles with Traction Control (TC)

**Function selection (menu selection), ABS 5.3 and ABS/TC 5.3****Overviews of available menus**

Identification	Identification:	Display of the diagnosis software number and the control module part number.
Fault memory		
Erase fault memory	Fault memory:	see Page 45 - D 19
Drive links	Drive links:	see Page 45 - D 36
Actual values	Actual values:	see Page 45 - D 39
Input signals	Input signals:	see Page 45 - D 41
Static test	Static test:	see Page 45 - D 42
Bleed*	Bleed:	see Page 45 - D 43
Coding (extract / modify)*	Extract coding/ Modify coding	see Page 45 - D 45

\* In the case of ABS 5.3 (Solo ABS), the menus are not necessary and are therefore not present.

## Fault memory

Overview of possible faults with ABS 5.3 and ABS / TC 5.3

Control unit faulty	Intake valve
	Switch-over valve
Rear left speed sensor, signal implausible	Version coding
Front right speed sensor, signal implausible	Electrical connection between TC and Tiptronic
Rear right speed sensor, signal implausible	Engine rpm information missing
Front left speed sensor, signal implausible	Electrical connection between TC and DME (MMI)
	Electrical connection between TC and DME (MMR)
Rear left speed sensor wire, open circuit/short to ground/short to B+	Fault stored in DME control module
Front right speed sensor wire, open circuit/short to ground/short to B+	
Rear right speed sensor wire, open circuit/short to ground/short to B+	
Front left speed sensor wire, open circuit/short to ground/short to B+	
Valve supply voltage	
Return pump	
Stop-light switch	
Incorrect gear wheel	
Undervoltage	



**Fault overview / troubleshooting (diagnosis / test plan)**

Test point	DTC	Fault display (short fault text)	Page
1	4607	Control module faulty	45 - D 23
2	4206	Front left speed sensor, signal implausible	45 - D 24
3	4201	Front right speed sensor, signal implausible	45 - D 25
4	4211	Rear right speed sensor, signal implausible	45 - D 25
5	4216	Rear left speed sensor, signal implausible	45 - D 25
6	4205	Front left speed sensor wire *	45 - D 26
7	4200	Front right speed sensor wire *	45 - D 27
8	4210	Rear right speed sensor wire *	45 - D 27
9	4215	Rear left speed sensor wire *	45 - D 27
10	4256	Control module faulty **	45 - D 28
10	4261	Control module faulty **	45 - D 28
10	4226	Control module faulty **	45 - D 28
10	4231	Control module faulty **	45 - D 28
10	4246	Control module faulty **	45 - D 28
10	4251	Control module faulty **	45 - D 28
10	4236	Control module faulty **	45 - D 28
10	4241	Control module faulty **	45 - D 28

Open circuit / short to ground / short to B+

\*\* ABS solenoid valve fault. As only the complete hydraulic unit with control module can be replaced, a solenoid valve fault is interpreted as a control module fault.

Test point	DTC	Fault display (short fault text)	Page
11	4276	Valve supply voltage	45 - D 29
12	4266	Return pump fault	45 - D 30
13	4340	Stop-light switch	45 - D 31
14	4225	Wrong gear wheel	45 - D 31
15	4802	Undervoltage	45 - D 32
16	5260	Intake valve	45 - D 32
17	5265	Switch-over valve	45 - D 32
18	5281	Version coding	45 - D 33
19	5282	Electrical connection between ABS/TC and Tiptronic	45 - D 34
20	5283	Engine rpm information missing	45 - D 34
21	5284	Electrical connection between TC and DME (MMI)	45 - D 34
22	5285	Electrical connection between TC and DME (MMR)	45 - D 35
23	5286	Fault stored in the DME control module	45 - D 35

**Notes on fault memory / troubleshooting**

Never pull off or push on the control module connector with the ignition switched on.

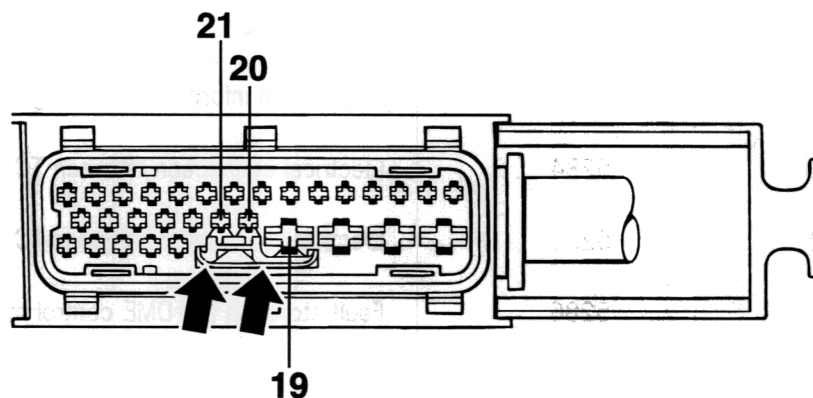
Faults may be stored under certain circumstances if, for troubleshooting purposes, electrical connections are loosened or disconnected with the ignition switched on.

The ABS MIL or TC MIL can light up although no fault is stored in the fault memory. The following faults are possible in this case:

Mechanical switching contacts (arrows) in the control module connector bent. As a consequence, these contacts are permanently connected to ground (ground of PIN 19 connected to PIN 20 and PIN 21).

**Explanation:** Normally, these contacts are grounded only when the connector is pulled off. This causes the ABS MIL or the TC MIL to be activated when the engine is running.

When the engine is running, the "terminal 61" signal is missing at the control module. This can be checked with the Porsche System Tester 2 via the **Input signals** menu (see P. 45 - D 41).



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**Work after fault elimination**

The fault memory must be erased after a fault occurs in the anti-lock brake system and is eliminated. Then perform a short **test drive** and **perform a TC control operation, taking the road conditions into consideration**. Then read out the fault memory again.

Fill/bleed the system after the hydraulic unit has been replaced or removed and reinstalled. **Then perform a system test.**

**Fault, DTC****Possible causes, elimination, notes****Test point 1**

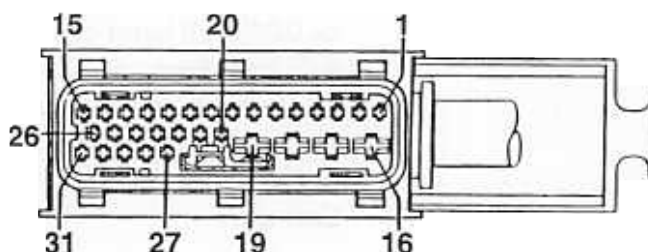
Control module faulty  
**DTC 4607**

If "Control module faulty" is displayed in combination with DTC 4226, 4231, 4236, 4241, 4246, 4251, 4256, or 4261, test point 10 (Page 45 - D 28) is relevant.

If the control module is damaged, the complete hydraulic unit with integrated control module must be replaced.

**Important:** Before replacing the hydraulic unit, check whether:

1. there are voltage differences due to contact resistance (missing or poor ground connections).  
**Important:** Poor ground connections can be present not only on the affected parts, but also at other important ground points.
2. ground is connected to control module connector PIN 16 (from ground point 2) and PIN 19 (from electronics ground). The locations of the ground points are shown on the wiring diagram Ground points.
3. plus (vehicle voltage) is connected to control module connector PIN 17 and PIN 18.



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**Fault, DTC****Possible causes, elimination, notes****Test point 2**

Front left  
speed sensor,  
signal implausible

**DTC 4206**

Control module receives a false / unrealistic speed sensor signal.

**Procedure:**

**Check** the speed sensor signal with the System Tester 2 via the "Actual values" menu. To do this, call up the front left wheel speed.

**Two tests are possible here.**

Test 1 with raised vehicle.

(Swap of speed sensors and test of the speed sensor signal quality.)

Test 2 with vehicle driving straight at approx. 2 - 4 km/h.

(Comparison of wheel speed signal qualities with each other.)

Test 2 is a better measure of the signal quality than is test 1.

**Further to test 1**

To perform the test, manually rotate the left front wheel at a speed of approx. 2 - 3 km/h (observe display in the Tester screen).

Slowly increase the speed and simultaneously observe the speed increase (display).

Nominal values/required display

Speed steps of approx. 0.06 km/h. First display at 1.81 km/h.

This means: From the value measured last, the next value must be 0.06 km/h higher or, if the wheel is rotating slower, must be 0.06 km/h lower.

The Tester rounds the value down to 0.05 km/h or up to 0.07 km/h in some cases.

**Example**

First measured value = 1.81 km/h

Second nominal value = 1.87 km/h

Third nominal value = 1.93 km/h

etc.

**Fault, DTC**

**Possible causes, elimination, notes**

**Further to test 2**

Display all four wheels in the Tester display. Drive straight ahead at a uniform speed of approx. 2-4 km/h and have a second person observe the Tester display. Required display: Deviation between the wheel speeds of the four wheels **max. 1 km/h**.

Further details about tests 1 and 2 are given under "Actual values menu" on P. 45 - D38.

**Possible faults (cause in the event of deviation):**

1. Air gap between speed sensor and gear wheel (pulse wheel) too large or, due to wear (chip formation), too small (check installation).
2. Pulse wheel defective or corroded.
3. Wheel bearing damage (wheel bearing not adjustable).
4. Plug connection in wiring from the speed sensor to the control module or PIN on the control module connector not OK.

**Test point 3**

Front right  
speed sensor,  
signal implausible  
**Fault code 4201**

General procedure as for test point 2/diagnostic trouble code 4206 (check speed sensor signal with the Porsche System Tester 2).

- Speed sensor signal: Go to the Actual values menu. There, select the front right wheel speed.

**Test point 4**

Rear right  
speed signal,  
signal implausible  
**Fault code 4211**

General procedure as for test point 2/diagnostic trouble code 4206 (check speed sensor signal with the Porsche System Tester 2).

- Speed sensor signal: Go to the Actual values menu. There, select the rear right wheel speed.

**Test point 5**

Rear left  
speed signal,  
signal implausible  
**Fault code 4216**

General procedure as for test point 2/diagnostic trouble code 4206 (check speed sensor with the Porsche System Tester 2).

- Speed sensor signal: Go to the Actual values menu. There, select the rear left wheel speed.

Fault, DTC

Possible causes, elimination, notes

**Test point 6**

Front left  
speed sensor,  
open circuit/  
short to ground/  
short to B+

**Fault code 4205**

Wire/plug connection between control module and speed sensor not OK (open circuit, short to B+ or short to ground) or the speed sensor itself is damaged.

- Check the speed sensor wire and plug connection in the wheel area for damage (visual inspection).
- Check the speed sensor signal with the Porsche System Tester 2 via the Actual values menu (see test point 2/diagnostic trouble code 4206). If no speed is displayed when the left front wheel is turned, check the wiring from the control module connector to the speed sensor (following test step).

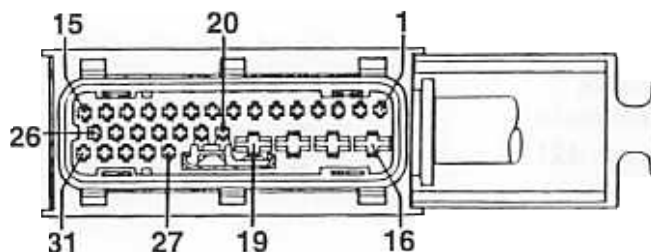
Pull off control module connector. Measure internal resistance/continuity between PIN 6 and PIN 7 on the connector (see connector assignment on Page 45 - D 16/17).

Nominal value 1600...1800  $\Omega$ .

If the nominal value is not achieved, check wires and plug connection in the wiring from the front left speed sensor.

If the nominal value (1600...1800  $\Omega$ ) is not achieved and the wiring /plug connection is in order, replace the speed sensor.

Check PIN 6 and PIN 7 of the control module connector (visual inspection for deformation).



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## Fault, DTC

## Possible causes, elimination, notes

**Test point 7**

Front right  
speed sensor,  
open circuit/  
short to ground/  
short to B+  
**DTC 4200**

General procedure as for test point 6/diagnostic trouble code 4205.

- Speed sensor signal: Check with the Porsche System Tester 2 via the Actual values menu (call up front right wheel speed).
- Internal resistance/continuity between PIN 4 and PIN 5 on the control module connector.

**Test point 8**

Rear right  
speed sensor,  
open circuit/  
short to ground/  
short to B+  
**DTC 4210**

General procedure as for test point 6/diagnostic trouble code 4205.

- Speed sensor signal: Check with the Porsche System Tester 2 via the Actual values menu (call up rear right wheel speed).
- Internal resistance/continuity between PIN 1 and PIN 2 on the control module connector.

**Test point 9**

Rear left  
speed sensor,  
open circuit /  
short to ground /  
short to B+  
**DTC 4215**

General procedure as for test point 6/diagnostic trouble code 4205.

- Speed sensor signal: Check with the Porsche System Tester 2 via the Actual values menu (call up rear left wheel speed).
- Internal resistance/continuity between PIN 8 and PIN 9 on the control module connector.



**Fault, DTC****Possible causes, elimination, notes**

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**Test point 10**

Control module faulty:

**DTCs 4226, 4231, 4236, 4241, 4246, 4251, 4256, 4261**

**Actual fault: ABS solenoid valve faulty.**

The System Tester 2 can be used to check the function of the ABS solenoid valves via the Drive links menu, sub-menu **Maintain pressure and Reduce pressure**.

If the control module or ABS solenoid valve is damaged, the complete hydraulic unit with integrated control module must be replaced.

**Important:** Before replacing the hydraulic unit, check whether:

ground is connected to control module connector PIN 16 (from ground point 2) and PIN 19 (from electronics ground). The locations of the ground points are shown on the wiring diagram Ground points.

plus (vehicle voltage) is connected to control module connector PIN 17 and PIN 18.

Use the System Tester 2 to test the function of the ABS solenoid valves via the Drive links menu (reaction at the front left, front right, rear left and rear right wheels).

**If the reaction is not OK**, check the hydraulic allocation (text below).

**Allocation test using example of left front wheel:**

In the Drive links menu, sub-menu **Reduce pressure, front left**, the left front wheel must alternately lock up and then rotate freely (also see P. 45 - D 35/36).

The allocation is wrong if the activated wheel does **not** alternately lock up and rotate freely again, but a **different wheel** does this instead.

The hydraulic unit must be replaced if the aforementioned drive link test is not OK but the hydraulic lines are **not** swapped.

## Fault, DTC

## Possible causes, elimination, notes

**Test point 11**

Valve supply  
voltage

**DTC 4276**

**Required display: Valve relay picked up.**

The System Tester 2 can be used to determine whether the valve relay has picked up or dropped out. Select "Valve relay" in the Input signals menu. "Valve relay picked up" or "Valve relay dropped out" then appears in the Tester display.

If the control module connector was pulled off, first switch off the ignition before the test and then switch it on again, as the valve relay will otherwise not pick up.

The valve relay also can be in the dropped-out state if there is another system fault. (ABS valve fault.)

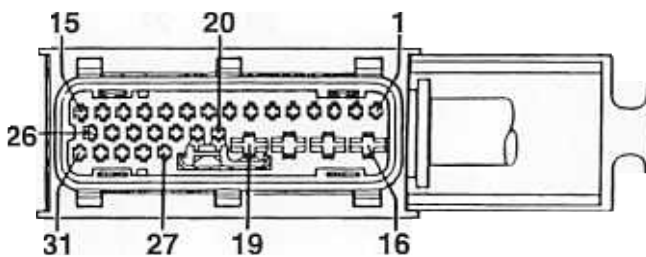
The complete hydraulic unit with integrated valve relay must be replaced if the valve relay is damaged.

**Important:** Before replacing the hydraulic unit, check whether:

ground is connected to control module connector PIN 16 (from ground point 2) and PIN 19 (from electronics ground). The locations of the ground points are shown on the wiring diagram Ground points.

plus (vehicle voltage) is connected to control module connector PIN 17 and PIN 18.

If all test steps are OK, replace the hydraulic unit.



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**Fault, DTC****Possible causes, elimination, notes****Test point 12**

Return pump fault

**DTC 4266****No feedback signal (return-pump monitoring) to the control module.**

The Porsche System Tester 2 can be used to test the function of the return pump via the Drive links menu.

To do this, call up the return pump in the Drive links menu and activate the pump (required function: return pump runs).

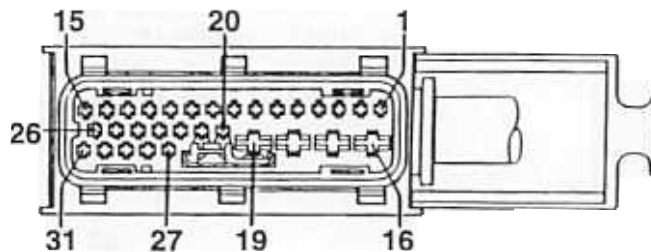
The complete hydraulic unit must be replaced if the return pump is damaged.

**Important:** Before replacing the hydraulic unit, check whether:

ground is connected to control module connector PIN 16 (from ground point 2). The locations of the ground points are shown on the wiring diagram Ground points.

plus (vehicle voltage) is connected to control module connector PIN 17 and PIN 18.

the plug connection on the return pump is OK.



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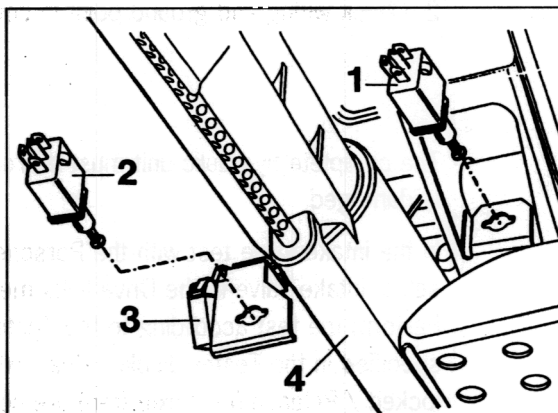
**Fault, DTC****Possible causes, elimination, notes****Test point 13**

Stop light switch

**DTC 4340**

- Check with the System Tester 2 via the **"Input signals"** menu. Press the brake pedal after selection of the stop-light switch. Required display: Display on screen changes from "not actuated" to "actuated".

Pull off wires on the stop light switch (No. 1). Test the stop-light switch with a multimeter (remove switch for the test if necessary).



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Check stop-light switch adjustment (operating point)  
(see Volume 4, Running gear, Repair Group 46).

Check wiring according to the wiring diagram.

**Test point 14**

Wrong gear wheel

**DTC 4225**

**The ABS gear wheels possess 48 teeth. Not all 48 teeth are detected during a revolution of the wheel.**

Check ABS gear wheels (clamping pins on the front axle / pulse strip on the rear axle) for dirt or damage. Replace damaged parts.

Check wheels and tyres (extreme tyre differences or impermissible wheel/tyre combination).

## Fault, DTC

## Possible causes, elimination, notes

**Test point 15**

Undervoltage

**DTC 4802****Control module supply voltage too low (less than 9.5 V).**

Normally, this fault occurs only when the engine is started in combination with a discharged battery.

1. Pull off the control module connector and measure the voltage between PIN 15 (plus) and PIN 19 (ground).

**Nominal value: Vehicle voltage.**

2. Check wiring and ground point in combination with the wiring diagram.

**Test point 16**

Intake valve

**DTC 5260**

The complete hydraulic unit must be replaced if the intake valve is damaged.

In the intake valve test with the Porsche System Tester 2, select Intake valve in the Drive links menu.

Perform the test according to the Tester instructions. If the functions specified in the Tester display: Rear axle locked up / Rear axle still locked / Release (rear axle free) are not achieved, the following faults are possible:

1. Test sequence not observed.
2. ABD secondary circuit poorly bled. Bleeding: see Page 45 - D 43.
3. Function of the intake valve not OK.
4. Return pump operation not OK.  
Check pump operation. To do this, select return pump in the Drive links menu (pump must then run).
5. Intake or switch-over valve leaks.

**Fault, DTC****Possible causes, elimination, notes**

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**Test point 17**

Switch-over valve  
**DTC 5265**

The complete hydraulic unit must be replaced if the switch-over valve is damaged.

In the switch-over valve test with the Porsche System Tester 2, select switch-over valve in the Drive links menu and perform the test according to the Tester instructions.

If the functions specified in the Tester display: Rear axle locked up / Rear axle free are not achieved, the following faults are possible:

Brake not actuated at the start of the test

Test sequence not observed

Function of the switch-over valve not OK

**Test point 18**

Version coding  
**DTC 5281**

Wrong version coding in the control module. Change coding.

The active transmission version (Tiptronic or manual transmission) can be read out under menu item "Extract coding".

The ABS/TC control module can be adapted to the transmission version under menu item "Modify coding".

## Fault, DTC

## Possible causes, elimination, notes

**Test point 19**

Electrical connection  
between ABS/TC and  
Tiptronic  
**DTC 5282**

Tiptronic control module B (Figure 209\_98) does not receive a signal from the ABS/TC control module.

- Check wire for open circuit, short to B+ and to ground (PIN 28 on the ABS/TC control module and PIN 19 on the Tiptronic control module).

**Test point 20**

Engine rpm information  
missing  
**DTC 5283**

The ABS/TC control module does not receive any speed information (rpm signal) from the DME control module A (Figure 209\_98). The rpm signal is checked with the Porsche System Tester 2 via the Actual values menu.

1. Check the rpm signal (indication of the current engine speed) via the Actual values menu with the engine running.  
Then select the DME system and also check the rpm signal there via the Actual values menu. If the signal is present in the DME system but not in the ABS/TC system, the fault lies in the wiring between the ABS/TC control module and the DME control module.
2. Check wiring (wire, connectors on the control modules) (PIN 30 on the ABS/TC control module and PIN 80 on the DME control module).

**Test point 21**

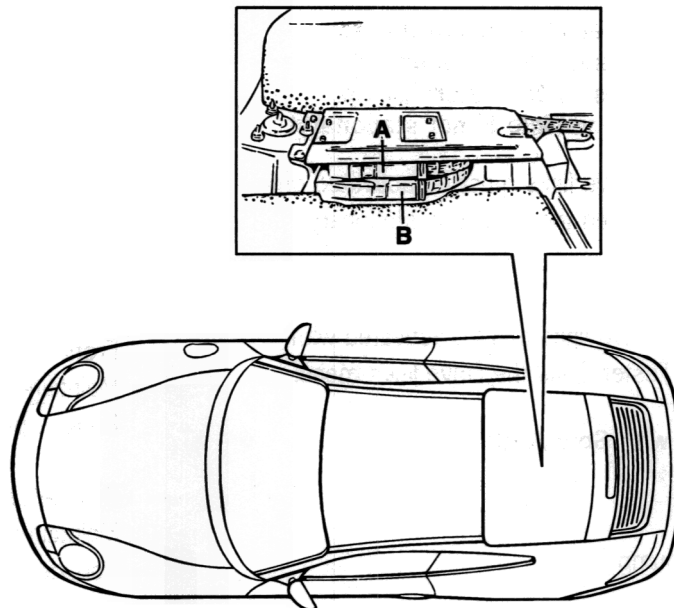
Electrical connection between  
TC and DME (MMI)  
**DTC 5284**

The ABS/TC control module does not receive any signal (actual engine torque) from the DME control module A (Figure 209\_98).

- Check wire for open circuit, short to B+ and to ground (PIN 27 on the ABS/TC control module and PIN 58 on the DME control module).

Fault, DTC

Possible causes, elimination, notes



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A = DME control module

B = Tiptronic control module

### Test point 22

Electrical connection between  
TC and DME (MMR)

**DTC 5285**

DME control module does not receive any signal from the ABS/TC  
control module (setpoint engine torque).

Check wire for open circuit, short to B+ and short to ground  
(PIN 13 on the ABS/TC control module connector and PIN 48  
on the DME control module connector).

### Test point 23

Fault stored in the  
DME control module

**DTC 5286**

Read out fault memory in the DME control module and remedy the fault  
according to the DME test plan (DME troubleshooting).



**Drive links (ABS and ABS/TC)****Caution!**

**Danger of accident due to activation of the solenoid valves or the return pump if the vehicle is not stationary!**

> Drive links must be activated only when the vehicle is stationary.

**Note**

The following drive links can be activated with the System Tester 2 via the Drive links menu:

**Drive links with Solo ABS**

- ABS MIL

Return pump

Front left ABS solenoid valves via:  
Maintain pressure, front left  
Reduce pressure, front left

Front right ABS solenoid valves via:  
Maintain pressure, front right  
Reduce pressure, front right

Rear ABS solenoid valves via:  
Maintain pressure, rear (rear axle)  
Reduce pressure, rear (rear axle)

**Drive links with ABS/TC**

- ABS MIL

TC MIL

TC information light

TC switch indicator light

Return pump

Intake valve

Switch-over valve

Front left ABS solenoid valves via:  
Maintain pressure, front left  
Reduce pressure, front left

Front right ABS solenoid valves via:  
Maintain pressure, front right  
Reduce pressure, front right

Rear left ABS solenoid valves via:  
Maintain pressure, rear left  
Reduce pressure, rear left

Rear right ABS solenoid valves via:  
Maintain pressure, rear right  
Reduce pressure, rear right

**Note**

In the solenoid valve test, it is possible to check both the function and the allocation (test to determine whether electrical or hydraulic lines are swapped).

**The test is menu-prompted (observe System Tester Display).**

If the selected drive link does not function correctly (reaction) after activation with the Porsche System Tester 2, perform troubleshooting according to the test plan (troubleshooting list) in the following text.

**Diagnosis / test plan (troubleshooting) for drive links****Further to MILs and information light**

The corresponding MIL or information light (depending on selection) does not flash.

On vehicles with TC, the TC-OFF MIL also flashes when the ABS MIL is activated.

Check bulb.

Check wiring from the instrument cluster to the control module according to the wiring diagram.

**Further to the return pump**

Return pump does not run after activation.

Perform troubleshooting analogous to test point 12 (diagnostic trouble code 4266) on Page 45 - D 30.

**Further to front and rear ABS solenoid valves  
(Maintain pressure and Reduce pressure)**

The function of the solenoid valves or the return pump is not OK. If a solenoid valve has a mechanical fault, the fault is **not** stored in the fault memory.

Hydraulic or electrical lines could be swapped.

If a fault is stored in the fault memory, first eliminate this fault.

**Test step "Maintain pressure" not OK:**

- Brake pedal not pressed or not pressed at the right time.

Electrical or hydraulic lines swapped if the activated wheel locks up (precondition: corresponding inlet valve activated with the F8 key).

Inlet valve faulty.

**Test step "Reduce pressure" not OK:**

- Brake pedal not actuated.

If the activated wheel does **not** alternately lock up and then rotate freely again but another wheel (precondition: the parking brake is not engaged and the selector lever of Tiptronic vehicles is in position "N"), the hydraulic lines are swapped.

Outlet valve defective.

**Further to the intake and switch-over valves  
(solenoid valves for ABD)**

Solenoid valves not OK (function or leakage).

**Note**

A correct test on the ABD solenoid valves is possible only if there is no fault on an ABS inlet valve or ABS outlet valve.

Therefore, read out the fault memory beforehand and remedy this fault first if necessary.

**Test step "Intake valve" not OK:**

- Test sequence not observed.

Function of the intake valve not OK.

Return pump operation not OK. Check pump operation. To do this, select return pump in the Drive links menu (pump must then run).

ABD secondary circuit poorly bled.  
Bleeding: see Page 45 - D 43.

Intake or switch-over valve leaks.

**Test step "Switch-over valve" not OK:**

- Test sequence not observed.

Function of the switch-over valve not OK.

**Actual values (ABS and ABS/TC)**

The following actual values can be checked with this menu (with this function):

1. Speed (wheel speed / test possible up to 18 km/h)

Speed, front left

Speed, front right

Speed, rear left

Speed, rear right

2. Engine rpm (not present with Solo ABS)

**Further to speed:**

Select, activate and call up the desired wheel using the arrow keys. The wheel speed is displayed according to the wheel rpm.

All four wheels are displayed if all speeds are activated and called up.

**Example (front left wheel)**

Speed, front left 15.00 km/h

**Example (all wheels)**

Speed, front left 15.00 km/h

Speed, front right 15.00 km/h

Speed, rear left 15.00 km/h

Speed, rear right 15.00 km/h

**Procedure:**

**Two tests** are possible to determine the speed-sensor signal.

**Test 1** with the vehicle raised. (Swapping the speed sensors and checking the quality of the speed sensor signal.)

**Test 2** when driving straight ahead at approx. 2 - 4 km/h.  
(Signal qualities of the individual wheels are compared with each other.)

Test 2 is a better measure of the signal quality than is test 1.

**Further to test 1**

1. In order to perform the test, manually turn the left front wheel at a uniform speed of approx. 2 - 3 km/h (observe display in the Tester screen).
2. Slowly increase the speed and simultaneously observe the speed increase (display).

**Nominal values/required display**

Speed steps of approx. 0.06 km/h. First display at 1.81 km/h. This means: From the value measured last, the next value must be 0.06 km/h higher or, if the wheel is rotating slower, must be 0.06 km/h lower. The Tester rounds the value down to 0.05 km/h or up to 0.07 km/h in some cases.

**Example**

First measured value	= 1.81 km/h
Second nominal value	= 1.87 km/h
Third nominal value	= 1.93 km/h
etc.	

**Note**

When performing the test on the rear axle,  
lock up (hold) the opposite wheel.

**Further to test 2**

1. Display all four wheels in the Tester display.
2. Drive straight ahead at a uniform speed of approx. 2-4 km/h and have a second person observe the Tester display.

**Required display:** Deviation between the four wheel speeds **max. 1 km/h.**

**Further to engine speed:**

Requirement: engine running.  
Display of the current engine speed.

**Input signals (ABS and ABS/TC)**

The following input signals can be checked with this menu (with this function):

Stop-light switch

Valve relay

Return pump

Signal, terminal 61

TC switch

**Note**

Select, activate and call the input signal to be tested.

The five input signals can also be displayed simultaneously.

**Further to the stop-light switch:**

Press the brake pedal.

Required display:

Changes from "not actuated" to "actuated".

**Further to the valve relay:**

The following appears in the display panel if the ignition is switched on or the engine is running and if the system is intact: "Valve relay picked up".

**Further to the return pump:**

Display: Return pump not running

(Display if the pump were running: Return pump running).

**Further to signal terminal 61:**

Required display:

with engine not running - not present

with engine running - present

**Further to the TC switch:**

Required display without actuation:

TC switch not actuated.

Required display, depending on actuation:  
(Switching Traction Control off or on):

TC switch ON actuated or

TC switch OFF actuated.



### Static test (ABS and ABS/TC)

Electrical test of the system (advance check),  
e.g. after replacement of the hydraulic unit  
or if connectors were pulled off.

This test is menu-prompted (procedure  
according to Tester instructions).

**Important:** This **is not** a substitute for the  
system test, as **no check for swapped  
electrical and hydraulic lines** is performed.  
Furthermore, the **mechanical** function of the  
solenoid valves is **not** tested.

If a fault is displayed, perform troubleshooting  
with the diagnosis/test plan on  
P. 45 - D 20/21 ff.

## Menu: Bleed (ABS/TC 5.3)

### Bleeding

#### Important notes

The Bleed menu is not available with the Solo ABS (it is not required).

On vehicles with Traction Control, this menu can be used to bleed the ABD secondary circuit in the hydraulic unit.

This additional bleeding is necessary **only** after **conventional** bleeding has been performed and only if the hydraulic unit is replaced or was removed.

The secondary circuit also can be bled in the event that the brake pedal travel is too large if the system was properly bled by the conventional method beforehand.

#### Bleeding the ABD circuit

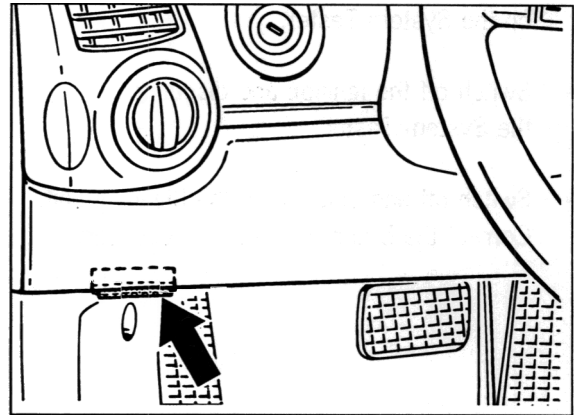
- Preliminary work: Bleed brakes by conventional method (repair group 47, Volume 4, Running gear).

The bleeding unit remains connected (switched on) when the ABD circuit is being bled.

Bleeding pressure approximately 1.5...2.0 bar.

Connect the **Porsche System Tester 2** to the diagnostic socket. The diagnostic socket is located in the driver's footwell (left-hand drive vehicles) or passenger's footwell (right-hand drive vehicles) near the fuse box.

Switch on the ignition. Select the "Bleed" menu in the ABS/TC system.



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Open the rear right bleeder valve (use collection bottle).

Press the Start key on the System Tester. This initiates certain functions in the hydraulic control unit (return pump, outlet solenoid valve and switch-over solenoid valve are activated).

Bleed the system until the brake fluid emerges without bubbles.

In addition (during the entire bleeding process), fully depress the brake pedal to the stop (pump) at least ten times.

**Important:** Double the number of pumping cycles for vehicles with extremely high mileage or for very old vehicles, and use only half of the master brake cylinder stroke (damage could be caused to the master brake cylinder / primary boots).



Close the right rear bleeder valve.  
Then immediately press Stop key  
on the System Tester.

Switch off the ignition and disconnect  
the System Tester.

Switch off and disconnect the bleeding unit.  
Correct the brake fluid level if necessary.

### **Menu: Coding (ABS/TC 5.3)**

#### **Extract coding**

The transmission version (manual transmission or Tiptronic) activated in the ABS/TC control module can be read out (highlighted in black) under menu item "Extract coding".

#### **Modify coding**

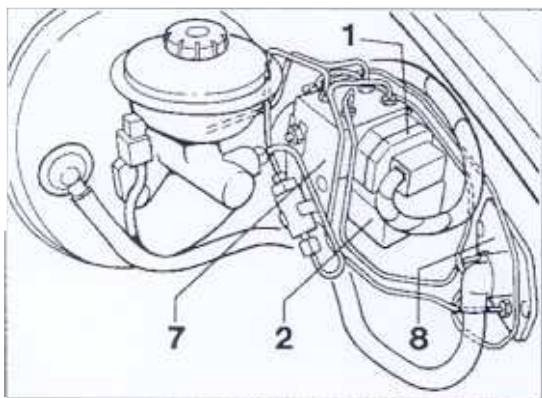
The ABS/TC control module can be adapted to the transmission version under menu item "Modify coding". To do this, select the transmission version with the arrow keys and code it with the F 8 key.

The coding must be adapted to the transmission version when the hydraulic unit is replaced.

## System test (ABS and ABS/TC)

### Important notes

1. A **system test (function test)** must be performed if work is performed on the hydraulic unit No. 7, the speed sensors and the wiring harness or if the hydraulic unit is exchanged. This is the case after accident repairs, for example. This prevents electrical and hydraulic lines from being swapped and ensures **flawless operation of the system**.
2. A **system test also has to be performed** if certain brake lines are replaced, e.g. on the intermediate piece No. 8. Unintentional bending of the brake lines could lead to **incorrect hydraulic allocation**, despite the different thread sizes used (M12 x 1 and M 10 x 1).



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3. The system test is **not** menu-prompted (program-guided).

The system test consists of several test steps and is performed via different menus. Observe the specified sequence when performing the system test.

**The static test must be performed at the start of the system test.**

Remedy any detected fault before proceeding with the system test. On vehicles with TC, the version coding must be checked or corrected **before the static test is performed**.

4. As fewer test steps are required on vehicles with Solo ABS (without TC) (several components are not installed), the TC-specific test steps are not displayed in the corresponding menu during the Solo ABS system test. Test steps No. 1, Nos. 6...10, Nos. 18...19 and No. 24 are therefore not necessary (not possible) with the Solo ABS.
5. After the system test, take the vehicle on a test drive and make sure that a controlled braking operation (ABS control operation) is performed.

**System test overview (ABS and ABS/TC)****Note**

The static test must be performed at the start of the system test. Locate and remedy any detected fault. Proceed with the system test only after the static test has been completed successfully.

**Necessary test steps with ABS/TC 5.3 (4-channel system):**

## Test step

1	Version coding (start of the test/possible only on vehicles with TC)
2	Static test
3...4	Stop-light switch and terminal 61 signal
5...8	MIL and information lights
9	Intake valve
10	Switch-over valve
11	Return pump operation
12...19	ABS solenoid valves (8 ea./function and incorrect allocation)
20...23	Speed sensors (function and incorrect allocation)
24	Engine speed information to ABS/TC control module

**Necessary test steps with ABS 5.3 (3-channel system):****Note**

On vehicles with **Solo ABS**, the test begins with the static test (test step 2). The test steps in brackets are not necessary (possible only with a 4-channel system).

## Test step

(1)	Not necessary
2	<b>Static test (start of test)</b>
3...4	Stop-light switch and terminal 61 signal
5	ABS MIL
(6...10)	Not necessary
11	Return pump operation
12...17	ABS solenoid valves (6 ea. / function and incorrect allocation)
(18...19)	Not necessary
20...23	Speed sensors (function and incorrect allocation)
(24)	Not necessary

**System test ABS and ABS/TC**

System test	Possible causes, elimination, notes
<b>Test step 1</b> Select and call up the version coding. Display according to transmission version (Tiptronic or manual transmission).	Present only for vehicles with Traction Control. If necessary, select the Modify coding menu to change the coding
<b>Test step 2</b> Select and perform the static test. Required display: 0 faults	This test checks whether all parts of the system are present or whether all electrical components are connected. If necessary, remedy any existing fault before proceeding with the system test.
<b>Test step 3</b> Call up the Input signals menu and select the stop-light switch. Briefly actuate the brake. The stop-light switch status (open or closed) is checked. <b>Required display:</b> Change from "not actuated" to "actuated".	Perform troubleshooting analogous to test point 13 (stop-light switch / DTC 4340) on Page 45 - D 31.

**System test****Possible causes, elimination, notes****Test step 4**

Call up Input signals menu and select terminal 61 signal. Start the engine.

Required display: Signal present (engine not running; not present).

For troubleshooting, the status of terminal 61 (present or not present) also can be checked in the system "Alarm system" via the Input signals menu.

1. If "not present" appears in the Tester display with the engine running, call up the **system "Alarm system"** and also check the status of terminal 61 there in the Input signals menu.

If the signal is present **there**, the fault lies in the wire between the ABS control module and the other control module. For troubleshooting, consult the wiring diagram.

If the terminal 61 signal is also **not present** with the system "Alarm system", continue with the next point.

2. Bulb of Generator (MIL) in the instrument cluster faulty.  
Perform a lamp test (lamp must light up when the ignition is switched on).
3. Check the generator.

**Test step 5**

Call up the Drive links menu and activate the ABS MIL. The display must flash. With the ABS/TC, the TC-MIL is activated as well

1. Check bulb
2. Check wiring between the instrument cluster and control module according to the wiring diagram.

**Test step 6**

Activate the TC-MIL in the Drive links menu. The display must flash.

Only on vehicles with TC.

For vehicles with Solo ABS, continue with test step 11.

Troubleshooting analogous to test step 5

**System test****Possible causes, elimination, notes**

---

**Test step 7**

Activate the TC information light in the Drive links menu. Display must flash.

Only on vehicles with TC.

For vehicles with Solo ABS, continue with test step 11.

Troubleshooting analogous to test step 5

**Test step 8**

Activate the TC switch information light in the Drive links menu. Display must flash.

Only on vehicles with TC.

For vehicles with Solo ABS, continue with test step 11

Troubleshooting analogous to test step 5

**Test step 9**

In the Drive links menu, test function of the **intake valve** in the hydraulic unit.

Only on vehicles with TC.

On vehicles with Solo ABS, continue with test step

Perform troubleshooting analogous to test point 16 (diagnostic trouble code 5260) on Page 45 - D 32.

**Test step 10**

In the Drive links menu, test function of the **switch-over valve** in the hydraulic unit.

Only on vehicles with TC.

On vehicles with Solo ABS, continue with test step 11.

Perform troubleshooting analogous to test point 17 (diagnostic trouble code 5265) on Page 45 - D 33.

**Test step 11**

In the Drive links menu, activate the return pump. Return pump runs audibly.

Perform troubleshooting analogous to test point 12 (return pump fault / DTC 4266) on Page 45 - D 30.

If necessary, open the front lid in order to hear the pump run.

**System test****Possible causes, elimination, notes****Test steps 12 - 19**

In the Drive links menu, check the inlet and outlet ABS solenoid valves in the hydraulic unit **for function and incorrect allocation**. Rotate all four wheels individually (one after the other according to the test-step sequence). When doing this, carefully follow the instructions in the Tester display.

On the Solo ABS, the test of the rear-axle valves (test steps 16...17) can be performed on the right or left wheel.

**Test step 12: Maintain pressure, front left**

**Test step 13: Reduce pressure, front left**

**Test step 14: Maintain pressure, front right**

**Test step 15: Reduce pressure, front right**

**Test step 16: Maintain pressure, rear left (or rear with Solo ABS)**

**Test step 17: Reduce pressure, rear left (or rear with Solo ABS)**

**Test step 18: Maintain pressure, rear right**

**Test step 19: Reduce pressure, rear right**

(Test steps 18 and 19 only on vehicles with TC)

**Test step "Maintain pressure" not OK:**

1. Hydraulic lines incorrectly allocated if the activated wheel locks up (precondition: inlet valve activated with the F8 key). Incorrect allocation of electrical wires is another possibility if impermissible repairs were made on the wiring harness after accident repairs.
2. Inlet valve faulty.

**Test step "Reduce pressure" not OK:**

1. **If the activated wheel does not alternately lock up** and then rotate freely again but another wheel does this (precondition: the parking brake is not engaged and the selector lever of Tiptronic vehicles is in position "N"), the hydraulic lines are swapped.
2. Outlet valve defective.

**Troubleshooting:**

Perform troubleshooting analogous to test point 10 on P. 45 - D 28.



**System test****Possible causes, elimination, notes****Test steps 20 - 23**

Check speed sensors for function and incorrect allocation.

To do this, go to the **Actual values** menu and select the wheel speeds there.

Rotate all four wheels **individually**. When each wheel is rotated, the speed allocated to the wheel must be displayed. The non-tested wheel must be held when the test is performed on the driven axle.

Test step No.:

- 20 = Front left wheel
- 21 = Front right wheel
- 22 = Rear left wheel
- 23 = Rear right wheel

1. Rotate the wheel on which the test step is not OK.  
The non-tested wheel must be held when the test is performed on the driven axle.  
If an indication for a **different** wheel now appears in the Tester display, the electrical wires are swapped (incorrect allocation of the speed sensors). This is normally not possible, but could occur if an impermissible repair was performed on the wiring harness after an accident repair.
2. Perform troubleshooting analogous to test points 2 to 9 (depending on the wheel in question) on Page 45 - D 24 ff.

**Test step 24**

Check the engine speed in the Actual values menu.

The current engine speed is displayed if the engine is running.

Perform troubleshooting analogous to test point 20 (Engine rpm information missing / DTC 5283) on Page 45 - D 34.

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**I. Definitions and abbreviations**

ABD	automatic brake differential
ABS	anti-lock brake system
ASR	anti-slip control
CAN bus	Controller Area Network; serial bus system designed specially for use in motor vehicles.
DME	engine control module
EBV	electronic brake distributor
EEPROM	Electrically Erasable Programmable Read Only Memory
FC	fault code
FDR	driving dynamics control
g	gravitational acceleration [ $\text{m/s}^2$ ]
LWS	steering-angle sensor
ME 7.2	Motronic with E-gas (electronic accelerator)
MSR	engine drag torque control
PSM	Porsche Stability Management
PST 2	Porsche System Tester 2
RoW	rest of world
SAE	Society of Automotive Engineers

TC Traction Control

V Volt



## 1. Introduction

The manual contains the diagnosis for the following system:

PSM (Porsche Stability Management)

The system is installed in the following vehicle:

911 Carrera 4 (996) as of model year '99

Apart from general information about the system (testers, component arrangement, etc.), the manual also contains a guided diagnosis procedure. This guided diagnosis should lead the technician to the fault source.

In order to locate a faulty component, the instructions for the main diagnosis test must be followed exactly.

### 1.1 General instructions / safety instructions

The following points must be observed during vehicle diagnosis:

- After the battery is connected, volatile memories must be reprogrammed. In the case of radio coding and tuning, the customer must be informed of decoding and the deleted tuner memory.
- When replacing a PSM control module, observe the coding and calibration of the steering-angle sensor.
- After troubleshooting or repairs, erase the fault memory with the Porsche System Tester 2 and carry out a test drive.
- After the test drive, read out the fault memory with Porsche System Tester 2 again.



**Warning:**

**Danger of damage!**

- > Never disconnect battery with engine running.
- > Never start engine without securely connected battery.
- > Never use boost chargers to start the engine.
- > Disconnect the negative terminal of the battery before welding work on the vehicle.
- > Never pull off or push on the wiring harness plugs of the control modules or other electronic components when the ignition is switched on.

## 1.2 General information on fault memory

### Fault code setting conditions

Fault codes can be set in several circumstances:

e.g.

power failure

- plug connections disconnected
- battery disconnected

etc.

In these circumstances, no fault is present in the system and the fault memory must be erased.

#### Note:

The fault memory of the PSM control module is maintained even in removed state.

### Fault memory Info key F8

In order to be able to assess the fault exactly, the fault memory Info key F8 must be pressed. This information should be saved using the Save key F4 and printed out. If a fault code is stored with "not present" status and no other problems are present, then the fault memory must be erased.

1. Signal implausible / no signal change / open circuit or short to ground / short to B+

#### Signal implausible:

The incoming signal to the control module deviates from the signal expected.

#### No signal change:

The incoming signal to the control module does not change.

Open circuit or short to ground:

There is (present) or was (not present) a short circuit to ground or an open circuit in the circuit to the control module terminal.

Open circuit or short to B+:

There is (present) or was (not present) a short circuit to voltage or an open circuit in the circuit to the control module terminal.

Short to ground:

There is (present) or was (not present) a short circuit to ground in the circuit to the control module terminal.

Short to B+:

There is (present) or was (not present) a short circuit to voltage in the circuit to the control module terminal.

2. Light on

PSM light switched on

3. Present / not present

Fault is detected as present or not present

### 1.3 General user's guide

The following description explains how to carry out the test steps.

#### Step 1:

In the main diagnosis test (7.), the individual test steps must be worked through one after the other. If a fault code is set under test step 4, the subsequent test steps are omitted. References in the tables enable a directed diagnosis which leads to the cause of the fault.

Example: 7. Main diagnosis test; test step 3

3	<ul style="list-style-type: none"> <li>Establish communication with the PSM control module</li> </ul> See table "7.1 Connecting diagnostic tester and establishing communication"
---	---

The work instruction contains a reference to table 7.1, **Connecting diagnostic tester and establishing communication**. The next work steps are described here.

Test	Work instruction	Tester display	Remedy
T01	<ul style="list-style-type: none"> <li>Ignition off</li> <li>Connect diagnostic tester to diagnostic plug.</li> <li>Ignition on</li> <li>Switch on diagnostic tester</li> <li>Engine off</li> </ul>	The diagnostic tester displays the start menu in the respective language.  Yes: <b>T02</b>	No: check diagnostic tester!
T02	<ul style="list-style-type: none"> <li>Select vehicle type: 911 (996)</li> <li>Start control module search.</li> </ul>	Control module search is active!!!  Yes: <b>T03</b>	No: <b>8.1</b>
...			

This table enables testing to be carried out in steps. If the test T01 is completed successfully, the next test T02 follows. If this test is also completed successfully, then T03 follows, etc. If the control module search does not function in the case above, then a remedy for the problem is provided in 8.1.

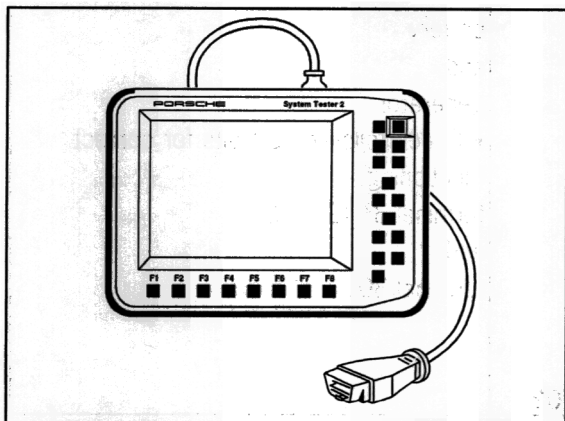
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If no fault is stored with "present" status, test steps 6 - 11 must be carried out until the cause of the fault has been found.

## 2. Testers (tools)

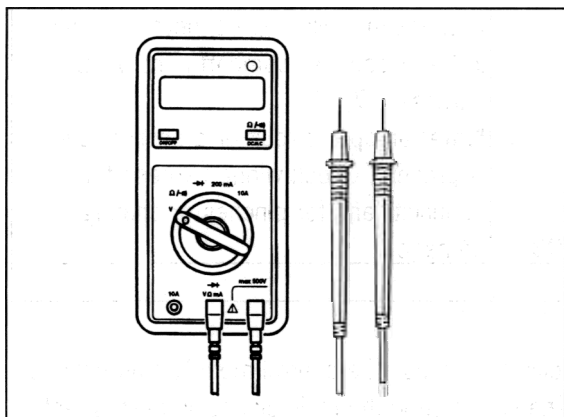
The following testers are required for vehicle diagnosis:

### Porsche System Tester 2 (PST 2)



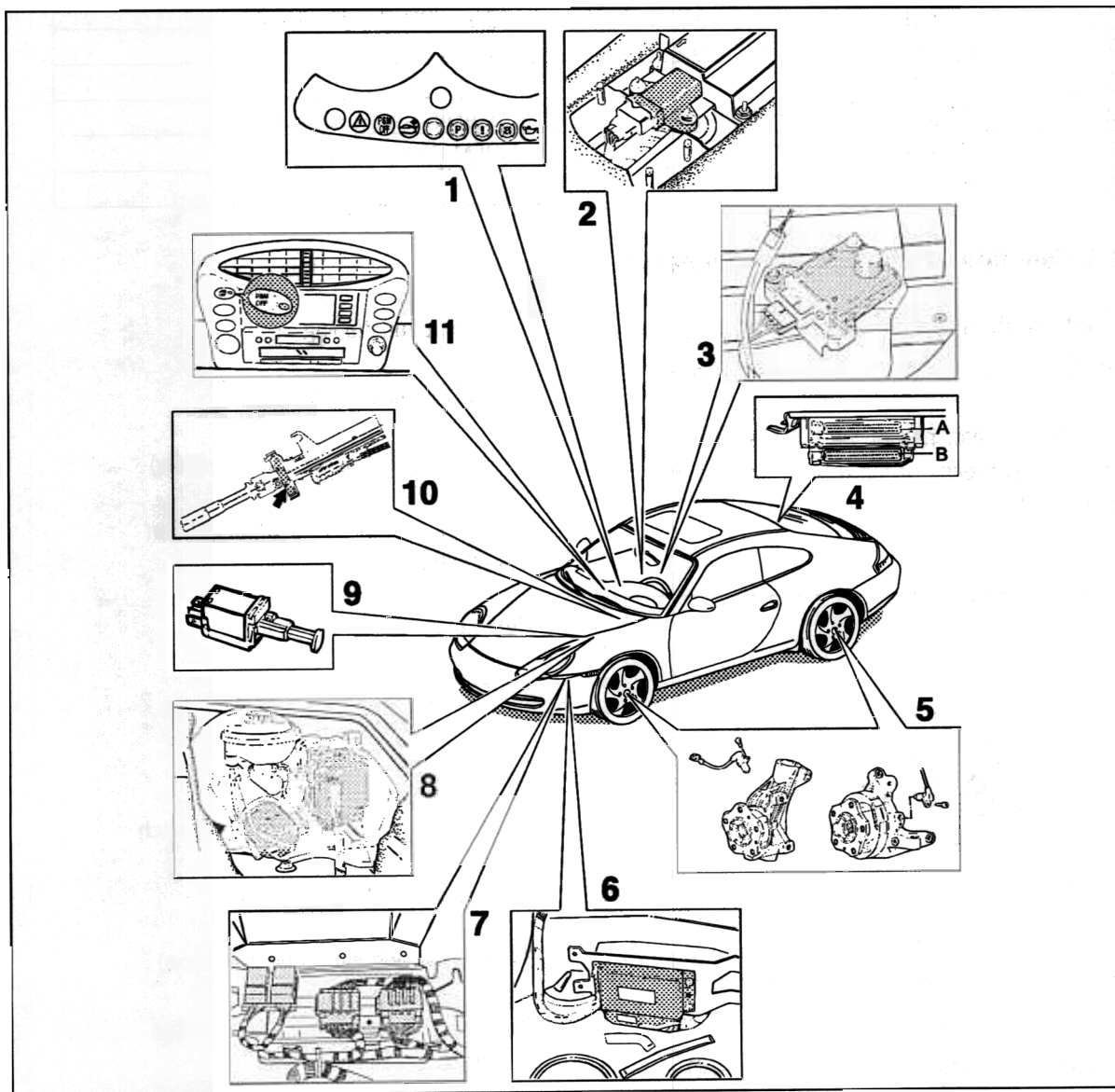
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### Commercially available digital multimeter



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### 3. Component arrangement



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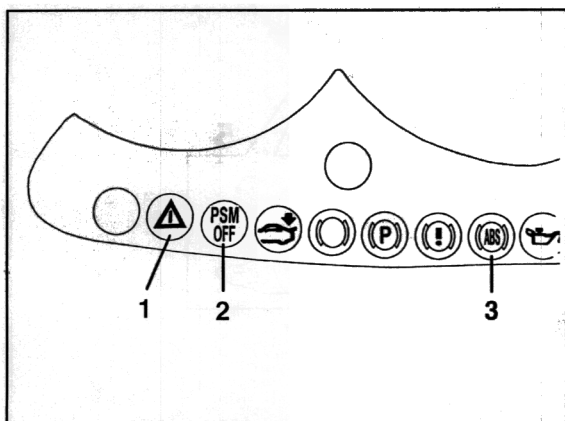
No.	Legend	No.	Legend
1	Information and warning lights	7	Plug connections and relays
2	Transverse acceleration sensor	8	Brake system
3	Rate-of-turn sensor	9	Stop light switch
4	DME and Tiptronic control module	10	Steering-angle sensor
5	Speed sensor	11	PSM OFF switch
6	PSM control module		

### 3.1 Function of individual components

#### 1. Information and warning lights

Installation position: in the instrument cluster

The driver is informed of the PSM control activities by means of the display lights in the instrument cluster.



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**1** - Information light for FDR, ASR and ABD (colour: yellow)

Lights for a lamp check when ignition is switched on.

Flashes when:

FDR is functioning

ASR is functioning

ABD is functioning

**2** - PSM warning light (colour: yellow)

Lights for a lamp check when ignition is switched on.

Lights if:

FDR faulty

ABS faulty

FDR switched off by rocker switch

ABD is functioning

**3** - ABS warning light (colour: yellow)

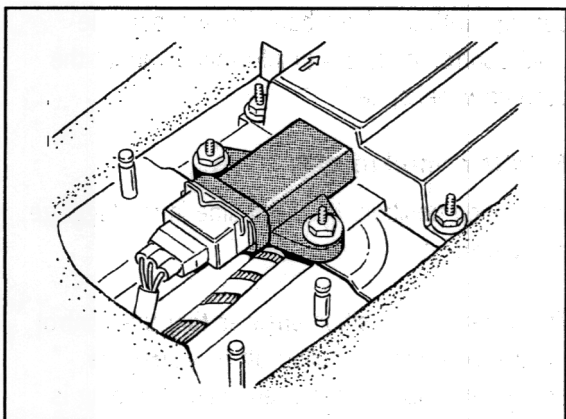
Lights for a lamp check when ignition is switched on.

Lights if:

ABS faulty

## 2. Transverse acceleration sensor

Installation position: on the centre console in longitudinal direction



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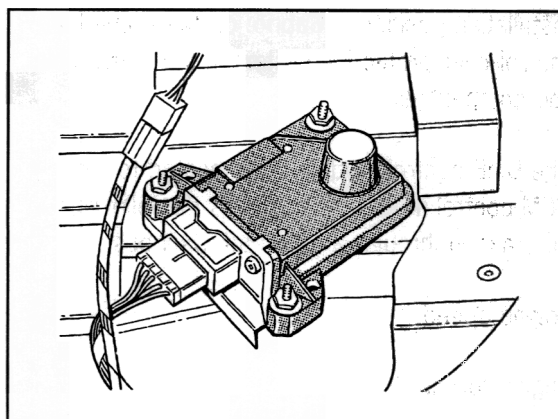
The transverse acceleration sensor supplies information about the transverse accelerations occurring in the vehicle to the PSM control module.

Together with the information from the steering-angle sensor and the rate-of-turn sensor, the current handling behaviour with respect to its transverse dynamics is calculated.

The sensor element is a damped spring-and-mass system. Its deflection is detected magnetically using a linear Hall element. The deflection is a direct measure of the occurring transverse accelerations.

## 3. Rate-of-turn sensor

Installation position: the rate-of-turn sensor is located underneath the seat on the right.



4\_16\_99

The rate-of-turn sensor supplies the PSM control module with an analog voltage signal which corresponds to the yaw speed of the vehicle.



#### 4.A DME control module

Installation position in Coupe: in the passenger compartment behind the emergency seat well on the right.

Installation position in Cabrio: on the frame for the roll-over protection system in the convertible top compartment.

The DME control module is connected to the PSM control module. It transfers the following information through a data lead (CAN bus):

engine speed,

engine torque,

acceleration pedal position

#### 4.B Tiptronic control module

Installation position in Coupe: in the passenger compartment behind the emergency seat well on the right.

Installation position in Cabrio: on the frame for the roll-over protection system in the convertible top compartment.

The Tiptronic control module receives commands through the CAN bus to execute or not to execute shift operations as necessary.

#### 5. Speed sensors

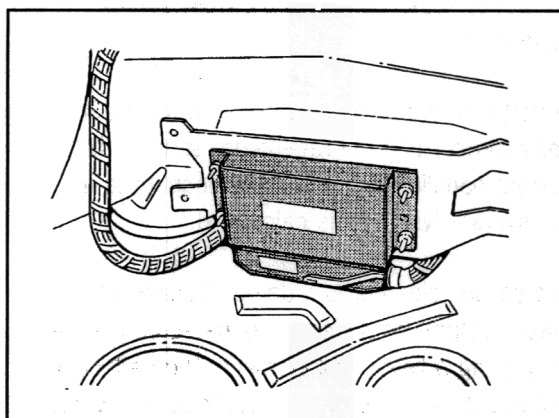
Installation position: on the front and rear wheel carriers.

The speed sensors are conventional passive sensors with a pulse wheel. They supply the PSM control module with information about the current wheel speed.

#### 6. PSM control module

Installation position: front left side in the luggage compartment

The installation position ensures that the control module plug can be pulled off only after the control module has been removed. The plug is designed so that the warning lights are activated if the connection is incorrect. (Short circuit jumper.)

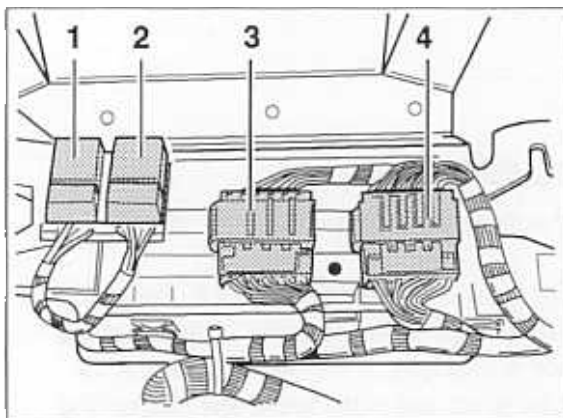


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## 7. Plug connections and relays

Installation position: in the front end behind the PSM control module

The plug connections X1/3, X1/4 and both relays are located on a holder behind the control module.



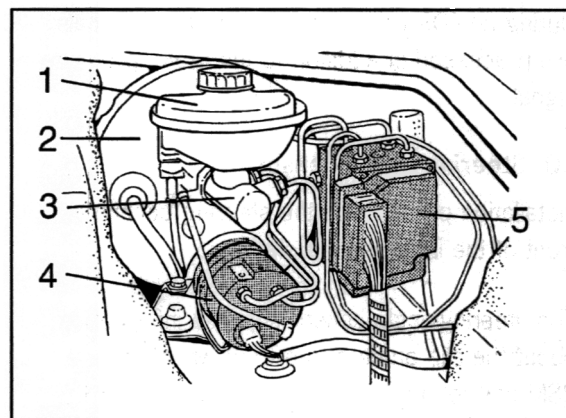
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- 1 Relay for solenoid valve
- 2 - Relay for return pump
- 3 - X1/4 21-pole, white
- 4 - X1/3 21-pole, black

## 8. Brake system

Installation position: in the front end

The brake master cylinder, the vacuum brake booster, the hydraulic unit and the booster pump are installed in the front end. The brake master cylinder is a tandem brake master cylinder with modified central valve.



4\_15\_99

- 1 - Expansion tank
- 2 - Vacuum booster
- 3 - Brake master cylinder
- 4 - Booster pump
- 5 - Hydraulic unit

### 9. Stop light switch

Installation position: in front of the brake pedal

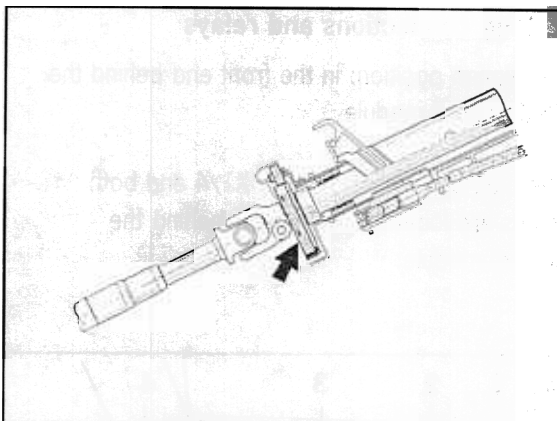
When the brake is actuated, signals from the twin contact (make and break) are detected and evaluated by the control module. If the brake is actuated during an ASR control operation, this procedure is immediately interrupted in order to initiate an ABS control operation.

During an FDR control operation, these signals are processed in addition to the brake pressure signal.

### 10. Steering-angle sensor

Installation position: on the steering column in front of the intermediate shaft

The steering-angle sensor supplies information about the slip angle of the front wheels to the PSM control module (intention of driver in relation to direction of travel). In the PSM control module this signal is used to calculate the required vehicle behaviour with respect to its transverse dynamics by means of the calculation of the vehicle speed. The sensor has its own micro-controller. The information is transmitted to the PSM control module by means of a CAN data bus.

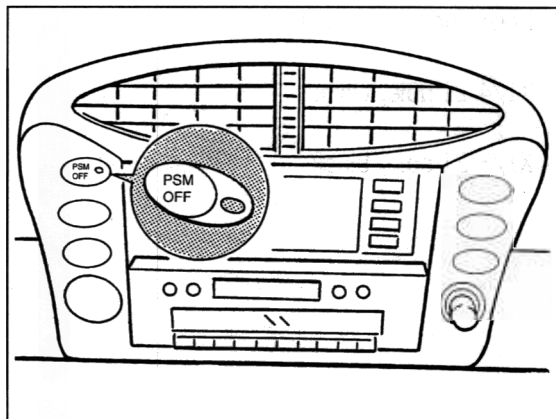


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### 11. PSM OFF switch

Installation position: in the centre console

The system can be switched off by means of a switch in the centre console. System deactivation is displayed by the indicator lights in the PSM switch and in the instrument cluster. The ABD function (automatic brake differential) is maintained when the PSM is switched off.



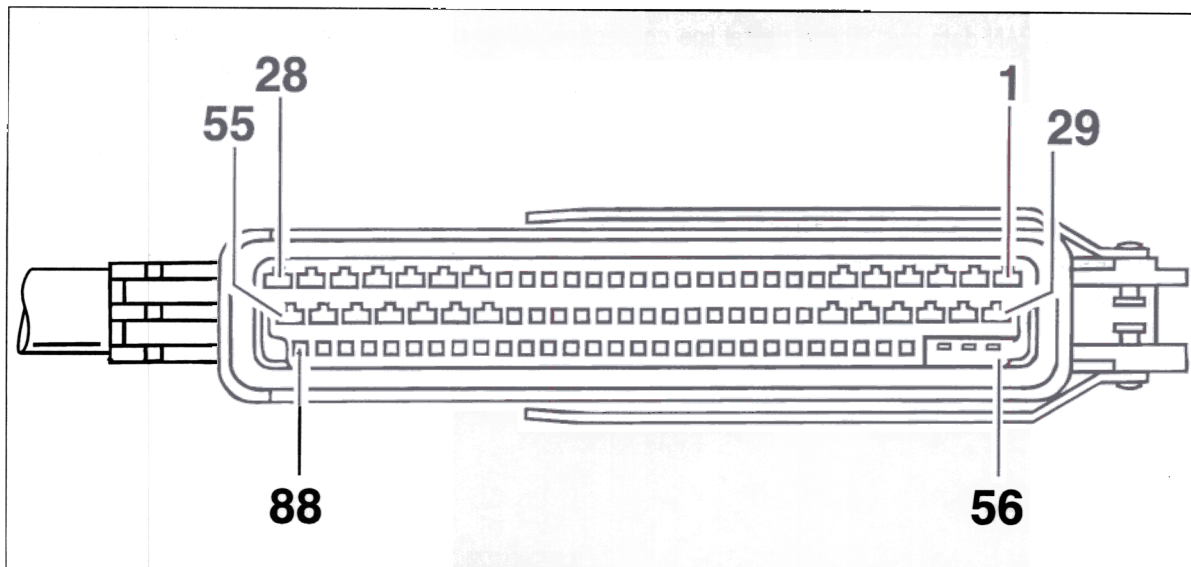
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#### 4. System description

The wheel speeds, steering angle, vehicle speed, transverse acceleration and the brake pressure in the brake master cylinder are measured and processed in the PSM control module. The control module is connected with the control modules of the engine – and for Tiptronic with the transmission management – by means of a CAN data bus. These digital line connections allow rapid data exchange between the PSM, DME and Tiptronic control modules. The control module is constantly supplied with current data about the engine torque, accelerator pedal position and transmission ratio (for Tiptronic). The rate-of-turn and transverse acceleration sensors detect the forces which act to turn the vehicle around its centre of gravity. The longitudinal and transverse forces on the wheels can be calculated from the value measurements listed. If these values exceed certain control thresholds, the control module triggers the appropriate solenoid valves and the return pump in the hydraulic unit in order to specifically apply defined brake pressure to one wheel or to several wheels.

## 5. Connector assignment

### 5.1 PSM control module wiring harness plug



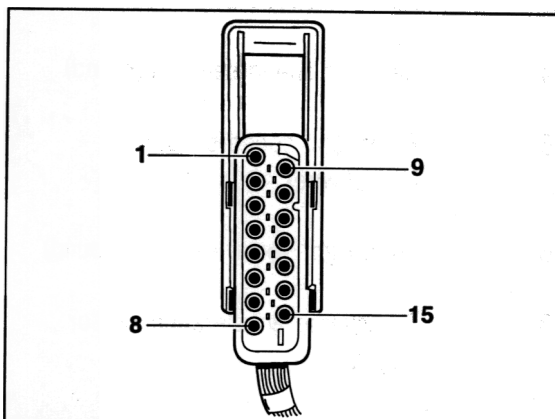
226\_99

Pin	Designation	Pin	Designation
	Power supply terminal 15	6	Activation of rear right inlet valve; PSM hydraulic unit (ground)
2	Voltage for solenoid valve relay	7	Activation of return pump relay (ground)
	Voltage for return pump relay	8	Front left speed sensor (signal wire)
	Voltage for steering-angle sensor	10	Front left speed sensor (ground)
3	Activation of front left outlet valve; PSM hydraulic unit (ground)	11	Rear right speed sensor (signal wire)
4	Activation of rear right outlet valve; PSM hydraulic unit (ground)	12	Rear right speed sensor (ground)
5	Activation of front left inlet valve; PSM hydraulic unit (ground)		

Pin	Designation	Pin	Designation
13	Rear left speed sensor (signal wire)	37	Activation of valve relay (ground)
14	Rear left speed sensor (ground)	38	Battery charge terminal 61, instrument cluster
15	Front right speed sensor (signal wire)	42	Stop light switch (open)
16	Front right speed sensor (ground)	44	PSM off (from PSM button)
18	Transverse acceleration sensor (signal wire)	46	Diagnosis communication wire
19	Transverse acceleration sensor (ground)	48	Stop light switch (close)
20	Motor monitoring, return pump relay (voltage)	49	Switch-over valve 1; PSM hydraulic unit (ground)
22	Booster pump (voltage)	50	Switch-over valve 2; PSM hydraulic unit (ground)
24	Booster pump (ground)	51	Power supply terminal 30
25	Activation of rear left outlet valve (PSM hydraulic unit) (ground)	52	Booster valve 2 PSM hydraulic unit (ground)
26	Activation of front right inlet valve PSM hydraulic unit (ground)	53	Activation of rear left inlet valve PSM hydraulic unit (ground)
28	Ground GP 2	54	Booster valve 1 PSM hydraulic unit (ground)
29	Ground GP 2	55	Activation of front right outlet valve; PSM hydraulic unit (ground)
31	PSM/ASR/ABD signal light, instrument cluster	61	CAN bus (high)
32	ABS signal light, instrument cluster	62	CAN shield
34	Rate-of-turn sensor (voltage)	63	CAN bus (low)

Pin	Designation
67	Booster pump pressure sensor (ground)
68	Booster pump pressure sensor (signal wire)
69	Booster pump pressure sensor (voltage)
70	Speed signal output rear left speed sensor (instrument cluster)
75	Transverse acceleration sensor (voltage)
76	Parking brake contact
77	Rate-of-turn sensor (test signal)
78	Rate-of-turn sensor (reference signal)
79	Rate-of-turn sensor (signal wire)
80	Rate-of-turn sensor (ground)
83	PSM monitor button off
86	PSM on (from PSM button)
88	PSM/ASR/ABD information signal light

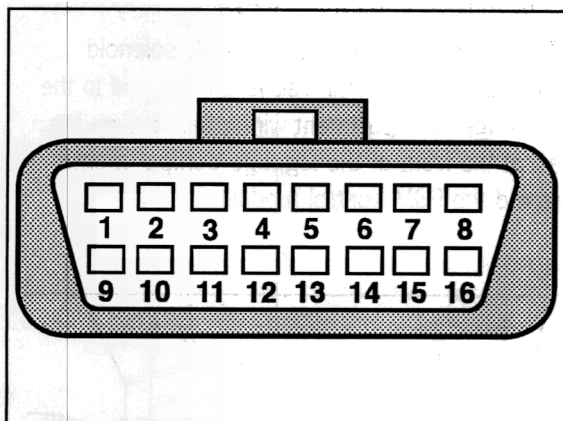
## 5.2 PSM hydraulic unit wiring harness plug



223\_99

Pin	Designation
1	Booster valve 1
2	Front right inlet solenoid valve
3	Rear right inlet solenoid valve
4	Booster valve 2
5	Rear left inlet solenoid valve
6	Switch-over valve 2
7	Switch-over valve 1
8	Front left inlet solenoid valve
9	Rear left outlet solenoid valve
11	Rear right outlet solenoid valve
12	Front right outlet solenoid valve
15	Front left outlet solenoid valve

## 5.3 Diagnosis wiring harness plug



137\_99

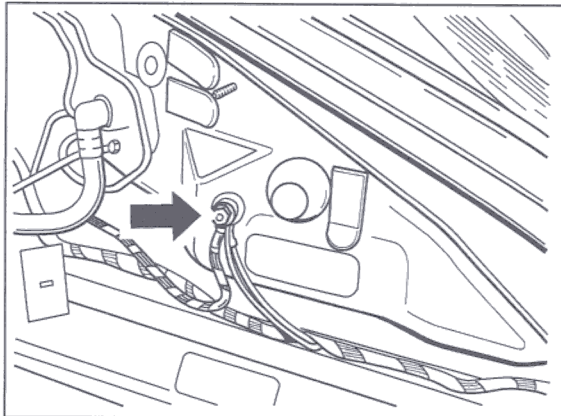
Pin	Designation
	Terminal 15
2	Bus positive line
3	Vehicle bus
4	Power ground
5	Signal ground
7	K-line
10	Bus negative line
11	Vehicle bus
12	Vehicle bus shield
14	Data wire
15	L-line
16	Terminal 30



## 6. Ground points/plug connections

### Ground point 2

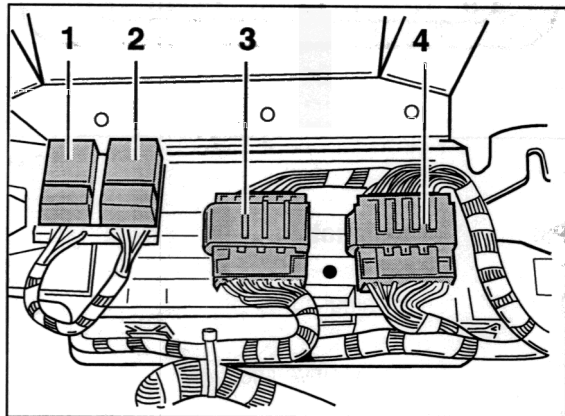
Ground point 2 is located on the left at the front of the luggage compartment (KS front left)



225\_99

### Plug connections and relays

The plug connections X1/3, X1/4, solenoid valve and return pump relays are located in the passenger compartment wiring harness on the left at the front of the luggage compartment behind the PSM control module.



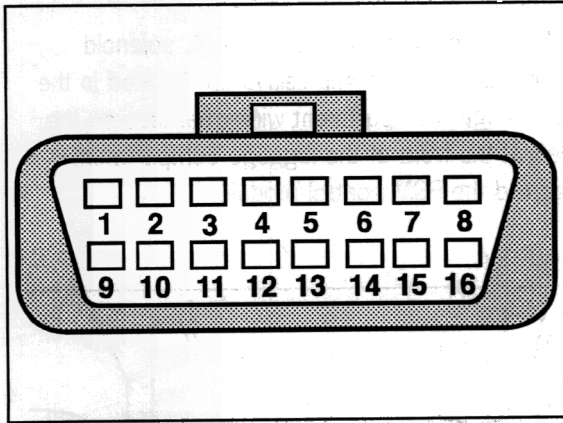
224\_99

- Relay for solenoid valve
- 2 - Relay for return pump
- 3 - Plug connection X1/4 (21-pin white)
- 4 - Plug connection X1/3 (21-pin black)

## 7. Main diagnosis test

Test step	Work instruction
1	<ul style="list-style-type: none"> <li>• <b>Customer complaint</b> Record the complaint from the customer for evaluation at a later stage</li> </ul>
2	<ul style="list-style-type: none"> <li>• <b>Introductory visual inspection</b> Check brake fluid reservoir for correct level Check system for leaks Check wheel bearings Check tyre size, pressure and condition <b>Note:</b> spacers must not be installed!</li> </ul>
3	<ul style="list-style-type: none"> <li>• <b>Establish communication with the PSM control module</b> See table "7.1 Connecting diagnostic tester and establishing communication"</li> </ul>
4	<ul style="list-style-type: none"> <li>• <b>Read out fault memory</b> See table "7.2 Fault memory" If no fault code is stored with "present" status, continue with test step 5</li> </ul>
5	<ul style="list-style-type: none"> <li>• <b>Actual values test</b> See table "7.3 Actual values"</li> </ul>
6	<ul style="list-style-type: none"> <li>• <b>Input signals test</b> See table "7.4 Input signals"</li> </ul>
7	<ul style="list-style-type: none"> <li>• <b>Drive links test</b> See table "7.5 Drive links"</li> </ul>
8	<ul style="list-style-type: none"> <li>• <b>Static test</b> See "7.6 Static test"</li> </ul>
9	<ul style="list-style-type: none"> <li>• <b>Swap test</b> See "7.7 Swap test"</li> </ul>

## 5.3 Diagnosis wiring harness plug



137\_99

Pin	Designation
1	Terminal 15
2	Bus positive line
3	Vehicle bus
4	Power ground
5	Signal ground
7	K-line
10	Bus negative line
11	Vehicle bus
12	Vehicle bus shield
14	Data wire
15	L-line
16	Terminal 30

## 7.2 Fault memory

FC - fault code

FC	Tester display fault text	Remedy
4200	<b>Front right speed sensor wire</b> <ul style="list-style-type: none"> <li>• Short circuit to voltage or open circuit in the circuit to control module terminals 15, 16</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• Wire/plug connection between control module and speed sensor faulty</li> <li>• Speed sensor faulty</li> </ul> <b>Affected terminals:</b> 15, 16	8.7
4201	<b>Front right speed sensor</b> <ul style="list-style-type: none"> <li>• Incorrect signal from speed sensor</li> <li>• Vehicle speed is greater than 6 km/h</li> <li>• Condition above must be fulfilled for at least 20 s</li> <li>• Short circuit to ground in the circuit to control module terminals 15, 16</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• Toothed disc/speed sensor soiled or damaged</li> <li>• Speed sensor faulty</li> </ul> <b>Affected terminals:</b> 15, 16	8.7

FC	Tester display fault text	Remedy
4205	<b>Front left speed sensor wire</b> <ul style="list-style-type: none"> <li>• Short circuit to voltage or open circuit in the circuit to control module terminals 8, 10</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• Wire/plug connection between control module and speed sensor faulty</li> <li>• Speed sensor faulty</li> </ul> <b>Affected terminals:</b> 8, 10	8.6
4206	<b>Front left speed sensor</b> <ul style="list-style-type: none"> <li>• Incorrect signal from speed sensor</li> <li>• Vehicle speed is greater than 6 km/h</li> <li>• Condition above must be fulfilled for at least 20 s</li> <li>• Short circuit to ground in the circuit to control module terminals 8, 10</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• Toothed disc/speed sensor soiled or damaged</li> <li>• Speed sensor faulty</li> </ul> <b>Affected terminals:</b> 8, 10	8.6
4210	<b>Rear right speed sensor wire</b> <ul style="list-style-type: none"> <li>• Short circuit to voltage or open circuit in the circuit to control module terminals 11, 12</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• Wire/plug connection between control module and speed sensor faulty</li> <li>• Speed sensor faulty</li> </ul> <b>Affected terminals:</b> 11, 12	8.9



FC	Tester display fault text	Remedy
4211	<b>Rear right speed sensor</b> <ul style="list-style-type: none"> <li>• Incorrect signal from speed sensor</li> <li>• Vehicle speed is greater than 6 km/h</li> <li>• Condition above must be fulfilled for at least 20 s</li> <li>• Short circuit to ground in the circuit to control module terminals 11, 12</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• Toothed disc/speed sensor soiled or damaged</li> <li>• Speed sensor faulty</li> </ul> <b>Affected terminals:</b> 11, 12	8.9
4215	<b>Rear left speed sensor wire</b> <ul style="list-style-type: none"> <li>• Short circuit to voltage or open circuit in the circuit to control module terminals 13, 14</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• Wire/plug connection between control module and speed sensor faulty</li> <li>• Speed sensor faulty</li> </ul> <b>Affected terminals:</b> 13, 14	8.8
4216	<b>Rear left speed sensor</b> <ul style="list-style-type: none"> <li>• Incorrect signal from speed sensor</li> <li>• Vehicle speed is greater than 6 km/h</li> <li>• Condition above must be fulfilled for at least 20 s</li> <li>• Short circuit to ground in the circuit to control module terminals 13, 14</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• Toothed disc/speed sensor soiled or damaged</li> <li>• Speed sensor faulty</li> </ul> <b>Affected terminals:</b> 13, 14	8.8

FC	Tester display fault text	Remedy
4226	<b>Front right ABS outlet valve</b> <ul style="list-style-type: none"> <li>Valve voltage actual value is evaluated and displays an implausible value (valve circuit or driver output malfunction)</li> <li>Short circuit to ground or open circuit in the circuit to control module terminal 55</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>PSM function is switched off</li> <li>ABS function is switched off</li> <li>ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>Wire faulty</li> <li>PSM hydraulic unit faulty</li> </ul> <b>Affected terminals:</b> 55	8.14
4231	<b>Front right ABS inlet valve</b> <ul style="list-style-type: none"> <li>Valve voltage actual value is evaluated and displays an implausible value (valve circuit or driver output malfunction)</li> <li>Short circuit to ground or open circuit in the circuit to control module terminal 26</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>PSM function is switched off</li> <li>ABS function is switched off</li> <li>ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>Wire/plug connection faulty</li> <li>PSM hydraulic unit faulty</li> </ul> <b>Affected terminals:</b> 26	8.15

FC	Tester display fault text	Remedy
4236	<b>Front left ABS outlet valve</b> <ul style="list-style-type: none"> <li>Valve voltage actual value is evaluated and displays an implausible value (valve circuit or driver output malfunction)</li> <li>Short circuit to ground or open circuit in the circuit to control module terminal 3</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>PSM function is switched off</li> <li>ABS function is switched off</li> <li>ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>Wire/plug connection faulty</li> <li>PSM hydraulic unit faulty</li> </ul> <b>Affected terminals:</b> 3	8.16
4241	<b>Front left ABS inlet valve</b> <ul style="list-style-type: none"> <li>Valve voltage actual value is evaluated and displays an implausible value (valve circuit or driver output malfunction)</li> <li>Short circuit to ground or open circuit in the circuit to control module terminal 5</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>PSM function is switched off</li> <li>ABS function is switched off</li> <li>ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>Wire/plug connection faulty</li> <li>PSM hydraulic unit faulty</li> </ul> <b>Affected terminals:</b> 5	8.17



FC	Tester display fault text	Remedy
4246	<b>Rear right ABS outlet valve</b> <ul style="list-style-type: none"> <li>Valve voltage actual value is evaluated and displays an implausible value (valve circuit or driver output malfunction)</li> <li>Short circuit to ground or open circuit in the circuit to control module terminal 4</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>PSM function is switched off</li> <li>ABS function is switched off</li> <li>ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>Wire/plug connection faulty</li> <li>PSM hydraulic unit faulty</li> </ul> <b>Affected terminals:</b> 4	8.18
4251	<b>Rear right ABS inlet valve</b> <ul style="list-style-type: none"> <li>Valve voltage actual value is evaluated and displays an implausible value (valve circuit or driver output malfunction)</li> <li>Short circuit to ground or open circuit in the circuit to control module terminal 6</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>PSM function is switched off</li> <li>ABS function is switched off</li> <li>ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>Wire/plug connection faulty</li> <li>PSM hydraulic unit faulty</li> </ul> <b>Affected terminals:</b> 6	8.19

FC	Tester display fault text	Remedy
4256	<b>Rear left ABS outlet valve</b> <ul style="list-style-type: none"> <li>Valve voltage actual value is evaluated and displays an implausible value (valve circuit or driver output malfunction)</li> <li>Short circuit to ground or open circuit in the circuit to control module terminal 25</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>PSM function is switched off</li> <li>ABS function is switched off</li> <li>ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>Wire/plug connection faulty</li> <li>PSM hydraulic unit faulty</li> </ul> <b>Affected terminals:</b> 25	8.20
4261	<b>Rear left ABS inlet valve</b> <ul style="list-style-type: none"> <li>Valve voltage actual value is evaluated and displays an implausible value (valve circuit or driver output malfunction)</li> <li>Short circuit to ground or open circuit in the circuit to control module terminal 53</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>PSM function is switched off</li> <li>ABS function is switched off</li> <li>ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>Wire/plug connection faulty</li> <li>PSM hydraulic unit faulty</li> </ul> <b>Affected terminals:</b> 53	8.21

FC	Tester display fault text	Remedy
4266	<p><b>Return pump fault</b></p> <ul style="list-style-type: none"> <li>Return pump and valve relay voltage actual values are evaluated and display implausible values</li> <li>Short circuit to ground or open circuit in the circuit to control module terminals 7, 20</li> </ul> <p><b>Effect:</b></p> <ul style="list-style-type: none"> <li>PSM function is switched off</li> <li>ABS function is switched off</li> <li>ASR function is switched off</li> </ul> <p><b>Possible cause of fault:</b></p> <ul style="list-style-type: none"> <li>Return pump motor blocked/runs too freely</li> <li>Wiring control module valve and motor relays faulty</li> <li>Wire/plug connector faulty</li> <li>PSM hydraulic unit faulty</li> </ul> <p><b>Affected terminals:</b> 7, 20</p>	8.12
4276	<p><b>Valve relay</b></p> <ul style="list-style-type: none"> <li>Actual values of the solenoid valves are evaluated and display implausible values</li> <li>Valve relay does not pick up, drops out or sticks</li> <li>Short circuit to ground or open circuit in the circuit to control module terminal 37</li> </ul> <p><b>Effect:</b></p> <ul style="list-style-type: none"> <li>PSM function is switched off</li> <li>ABS function is switched off</li> <li>ASR function is switched off</li> </ul> <p><b>Possible cause of fault:</b></p> <ul style="list-style-type: none"> <li>Fuse E9 faulty</li> <li>Line connection faulty</li> <li>Valve relay faulty</li> </ul> <p><b>Affected terminals:</b> 2, 37</p>	8.11

FC	Tester display fault text	Remedy
4340	<b>Stop light switch</b> <ul style="list-style-type: none"> <li>Incorrect voltage state at control module terminals 42, 48</li> <li>Short circuit to ground/voltage or open circuit in the circuit to control module terminals 42, 48</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>PSM function is switched off</li> <li>ABS function is switched off</li> <li>ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>Wiring/plug connection faulty</li> <li>Pressure sensor plausibility</li> </ul> <b>Affected terminals:</b> 42 48	8.5
4400	<b>Transverse acceleration sensor</b> <ul style="list-style-type: none"> <li>Transverse acceleration sensor actual value is evaluated and displays an implausible value</li> <li>Short circuit to ground/voltage or open circuit in the circuit to control module terminals 18, 19, 75</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>PSM function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>Wiring/plug connection faulty</li> <li>Transverse acceleration sensor faulty</li> </ul> <b>Affected terminals:</b> 18, 19, 75	8.26
	<b>Rate-of-turn sensor</b> <ul style="list-style-type: none"> <li>Rate-of-turn sensor actual value is evaluated and displays an implausible value</li> <li>Short circuit to ground/voltage or open circuit in the circuit to control module terminals 34, 77, 78, 79, 80</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>PSM function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>Wiring/plug connection faulty</li> <li>Rate-of-turn sensor faulty</li> <li>PSM control module faulty</li> </ul> <b>Affected terminals:</b> 34, 77, 78, 79, 80	8.28

FC	Tester display fault text	Remedy
4440	<b>Steering-angle sensor</b> <ul style="list-style-type: none"> <li>Steering-angle sensor actual value is evaluated and displays an implausible value</li> <li>Short circuit to ground or open circuit in the circuit to control module terminal 2</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>PSM function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>Steering-angle sensor calibration incorrect</li> <li>Wiring/plug connection faulty</li> <li>Steering-angle sensor faulty</li> </ul> <b>Affected terminals:</b> 2, 61, 63	8.27
4460	<b>Pressure sensor</b> <ul style="list-style-type: none"> <li>Pressure sensor actual value is evaluated and displays an implausible value</li> <li>Short circuit to ground/voltage or open circuit in the circuit to control module terminals 67, 68, 69</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>PSM function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>Wiring faulty</li> <li>Pressure sensor faulty (replace booster pump)</li> </ul> <b>Affected terminals:</b> 67, 68, 69	8.29
4480	<b>Booster pump</b> <ul style="list-style-type: none"> <li>Booster pump voltage actual value is evaluated and displays an implausible value</li> <li>Short circuit to ground/voltage or open circuit in the circuit to control module terminals 22, 24, 51</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>PSM function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>Booster pump motor blocked/faulty</li> <li>Wiring/plug connection faulty</li> </ul> <b>Note:</b> Do not jumper the pump; it must not run dry under any circumstances! <b>Affected terminals:</b> 22, 24, 51	8.13



FC	Tester display fault text	Remedy
4607	<b>Control module faulty</b> <ul style="list-style-type: none"> <li>Internal functional check</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>PSM function is switched off</li> <li>ABS function is switched off</li> <li>ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>PSM control module faulty</li> </ul> <b>Affected terminals:</b> <p>-</p>	Replace control module
4802	<b>Undervoltage</b> <ul style="list-style-type: none"> <li>Internal functional check for control module</li> <li>Voltage is less than 9.8 V (control module, rate-of-turn sensor, and steering-angle sensor power supply)</li> <li>Vehicle speed is greater than 6 km/h</li> </ul> <b>Note:</b> once the vehicle voltage is within the permissible voltage range again, the PSM system is switched back on and the indicator lights go out. <b>Effect:</b> <ul style="list-style-type: none"> <li>PSM function is switched off</li> <li>ABS function is switched off</li> <li>ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>Vehicle voltage was too low</li> <li>Connection to the PSM control module faulty</li> </ul> <b>Affected terminals:</b> <p>1, 28, 29</p>	8.2
5024	<b>No CAN message from Tiptronic</b> <ul style="list-style-type: none"> <li>Engine running</li> <li>No CAN messages from the Tiptronic control module</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>PSM function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>CAN bus connection faulty</li> <li>Tiptronic control module faulty</li> <li>Incorrect version coded</li> </ul> <b>Affected terminals:</b> <p>61, 63</p>	8.4

FC	Tester display fault text	Remedy
5260	<b>Booster valve 1</b> <ul style="list-style-type: none"> <li>Booster valve voltage actual value is evaluated and displays an implausible value (valve circuit or driver output malfunction)</li> <li>Short circuit to ground/voltage or open circuit in the circuit to control module terminal 54</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>PSM function is switched off</li> <li>ABS function is switched off</li> <li>ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>Wiring/plug connection faulty</li> <li>PSM hydraulic unit faulty</li> </ul> <b>Affected terminals:</b> 54	8.22
5262	<b>Booster valve 2</b> <ul style="list-style-type: none"> <li>Booster valve voltage actual value is evaluated and displays an implausible value (valve circuit or driver output malfunction)</li> <li>Short circuit to ground/voltage or open circuit in the circuit to control module terminal 52</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>PSM function is switched off</li> <li>ABS function is switched off</li> <li>ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>Wiring/plug connection faulty</li> <li>PSM hydraulic unit faulty</li> </ul> <b>Affected terminals:</b> 52	8.23

FC	Tester display fault text	Remedy
5265	<b>Switch-over valve 1</b> <ul style="list-style-type: none"> <li>• Switch-over valve voltage actual value is evaluated and displays an implausible value (valve circuit or driver output malfunction)</li> <li>• Short circuit to ground/voltage or open circuit in the circuit to control module terminal 49</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• Wiring/plug connection faulty</li> <li>• PSM hydraulic unit faulty</li> </ul> <b>Affected terminals:</b> 49	8.24
5267	<b>Switch-over valve 2</b> <ul style="list-style-type: none"> <li>• Switch-over valve voltage actual value is evaluated and displays an implausible value (valve circuit or driver output malfunction)</li> <li>• Short circuit to ground/voltage or open circuit in the circuit to control module terminal 50</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• Wiring/plug connection faulty</li> <li>• PSM hydraulic unit faulty</li> </ul> <b>Affected terminals:</b> 50	8.25



FC	Tester display fault text	Remedy
5281	<b>Version coding fault</b> <ul style="list-style-type: none"> <li>• Ignition on</li> <li>• Discrepancy between required coding in the control module and actual coding of the vehicle version</li> <li>• The fault code is present in the delivery status of the control module. It does not display an existing fault, but ensures that the system indicator light remains activated after the first installation of the control module in the vehicle until the control module has been correctly programmed.</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• PSM control module newly installed</li> <li>• Coding not O.K.</li> </ul> <b>Affected terminals:</b> <p>-</p>	Code control module
5500	<b>Wheel speed monitoring</b> <ul style="list-style-type: none"> <li>• The fault is stored if the average speed of one wheel is at least 5 % greater than the speed of the other wheels for longer than 20 s.</li> <li>• Vehicle speed is greater than 6 km/h</li> <li>• ABS control not active</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• Toothed discs soiled/damaged</li> <li>• Tyre pressure, wheel size (spare wheel) incorrect</li> </ul> <b>Affected terminals:</b> <p>-</p>	8.10

FC	Tester display fault text	Remedy
5504	<b>Extraordinary operating condition</b> <ul style="list-style-type: none"> <li>The fault is stored if the PSM control module is in control for longer than 60 s. (Extreme driving situation: snow-covered circular paths, icy roads, constant braking)</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>PSM function is switched off</li> <li>ABS function is switched off</li> <li>ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>Vehicle was in an extraordinary operating condition</li> </ul> <b>Affected terminals:</b>	Erase fault memory
5520	<b>CAN data bus (drive)</b> <ul style="list-style-type: none"> <li>Engine running</li> <li>DME control module transmits incorrect signal</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>PSM function is switched off</li> <li>ABS function is switched off</li> <li>ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>Fault in DME control module</li> </ul> <b>Affected terminals:</b>	See DME diagnosis
5521	<b>Incorrect data exchange</b> <ul style="list-style-type: none"> <li>Engine running</li> <li>DME communication incorrect</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>PSM function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>Fault in the DME</li> </ul> <b>Affected terminals:</b> 61, 63	See DME diagnosis

FC	Tester display fault text	Remedy
5522 5523	<b>DME does not transmit CAN message</b> <ul style="list-style-type: none"> <li>• Engine running</li> <li>• No CAN message from the DME control module</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• DME control module pulled off</li> <li>• CAN bus connection faulty</li> <li>• DME control module faulty</li> </ul> <b>Affected terminals:</b> 61, 63	See DME diagnosis
5524	<b>Incorrect CAN speed signal from the DME</b> <ul style="list-style-type: none"> <li>• Engine running</li> <li>• Fault is transmitted from the DME control module through CAN</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• Fault in the DME</li> </ul> <b>Affected terminals:</b> 61, 63	See DME diagnosis
5525	<b>Inaccurate torque information from the DME</b> <ul style="list-style-type: none"> <li>• Engine running</li> <li>• Fault is transmitted from the DME control module through CAN</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• Fault in the DME</li> </ul> <b>Affected terminals:</b> 61, 63	See DME diagnosis

FC	Tester display fault text	Remedy
5526	<b>Incorrect pedal value from the DME</b> <ul style="list-style-type: none"> <li>• Engine running</li> <li>• Fault is transmitted from the DME control module through CAN</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• Fault in the DME</li> </ul> <b>Affected terminals:</b> 61, 63	See DME diagnosis
5527	<b>Not possible to transmit by means of CAN</b> <ul style="list-style-type: none"> <li>• Battery voltage &gt; 10V</li> <li>• Electrical test of the CAN bus</li> <li>• Short circuit to ground or open circuit in the circuit to control module terminals 61, 63</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• CAN bus connection faulty</li> </ul> <b>Affected terminals:</b> 61, 63	8.3
5528	<b>Software status of DME not plausible</b> <ul style="list-style-type: none"> <li>• Internal check of control module</li> <li>• Incorrect software status detection</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• Fault in DME control module software</li> </ul> <b>Affected terminals:</b> 61, 63	See DME diagnosis

FC	Tester display fault text	Remedy
5529	<b>Fault in the CAN message from Tiptronic</b> <ul style="list-style-type: none"> <li>• Engine running</li> <li>• Fault is transmitted from the Tiptronic control module through CAN</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> Tiptronic control module is in the reduced driving program (electrically) <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• Fault in the Tiptronic</li> </ul> <b>Affected terminals:</b> 61, 63	See Tiptronic diagnosis
5540	<b>Fault stored in the DME</b> <ul style="list-style-type: none"> <li>• Internal check of control module</li> <li>• DME fault memory contains a fault</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• Fault in the DME</li> </ul> <b>Affected terminals:</b> 61, 63	See DME diagnosis

### 7.2.1 Erase fault memory

This menu item is used to erase the fault memory after it has been read out.

**Note:** The fault memory is maintained even when the control module is removed.

### 7.3 Actual values

Checking the actual values:

Test	Tester display	Work instruction	Tester display	Remedy
<b>T01</b>	Speed, front left	<ul style="list-style-type: none"> <li>• Engine off</li> <li>• Vehicle jacked up and appropriate wheel turned slowly by hand</li> </ul>	Greater than 1 km/h  Yes: T02	No: 8.6
<b>T02</b>	Speed, front right	<ul style="list-style-type: none"> <li>• Engine off</li> <li>• Vehicle jacked up and appropriate wheel turned slowly by hand</li> </ul>	Greater than 1 km/h  Yes: T03	No: 8.7
<b>T03</b>	Speed, rear left	<ul style="list-style-type: none"> <li>• Engine off</li> <li>• Vehicle jacked up and appropriate wheel turned slowly by hand</li> </ul>	Greater than 1 km/h  Yes: T04	No: 8.8
<b>T04</b>	Speed, rear right	<ul style="list-style-type: none"> <li>• Engine off</li> <li>• Vehicle jacked up and appropriate wheel turned slowly by hand</li> </ul>	Greater than 1 km/h  Yes: T05	No: 8.9
<b>T05</b>	Steering-angle sensor	<ul style="list-style-type: none"> <li>• Steering wheel in straight-ahead position</li> </ul>	0° +/- 3°  Yes: T06	No: 8.27



Test	Tester display	Work instruction	Tester display	Remedy
<b>T07</b>	Power supply	<ul style="list-style-type: none"> <li>• Ignition on</li> <li>• Engine off</li> <li>• All loads switched off</li> </ul>	Display corresponds approx. to battery voltage > 11 V  Yes: T08	No: 8.2
<b>T08</b>	Engine speed	<ul style="list-style-type: none"> <li>• Ignition on</li> <li>• Engine off</li> <li>• Engine runs at idle speed</li> </ul>	0 rpm  Tester display approx. equal to actual engine speed  Yes: T09	No: See DME diagnosis
<b>T09</b>	Throttle (accelerator pedal position)	<ul style="list-style-type: none"> <li>• Ignition on</li> <li>• Engine off</li> <li>• Accelerator not actuated</li> <li>• Accelerator fully actuated</li> </ul>	0 % approx. 95...100 %  Yes: T10	No: See DME diagnosis
<b>T10</b>	Driver setpoint torque	<ul style="list-style-type: none"> <li>• Engine runs at idle speed</li> <li>• Accelerator not actuated</li> <li>• Accelerator actuated briefly</li> </ul>	approx. 8...12 %  > 12 %  Yes: 7.4	No: See DME diagnosis
	Safety code	<ul style="list-style-type: none"> <li>• The safety code is required to calibrate the steering-angle sensor</li> </ul>	XXXX	-

## 7.4 Input signals

Checking the input signals

Test	Tester display	Work instruction	Tester display	Remedy
<b>T01</b>	Terminal L (61)	<ul style="list-style-type: none"> <li>• Ignition on</li> <li>• Engine running</li> </ul>	not present present  Yes: T02	No: 8.30
<b>T02</b>	PSM OFF	<ul style="list-style-type: none"> <li>• Ignition on</li> <li>• PSM OFF button not actuated</li> <li>• PSM OFF button actuated</li> </ul>	not actuated actuated  Yes: T03	No: 8.32
<b>T03</b>	PSM ON	<ul style="list-style-type: none"> <li>• Ignition on</li> <li>• PSM ON button not actuated</li> <li>• PSM ON button actuated</li> </ul>	not actuated actuated  Yes: T04	No: 8.32
<b>T04</b>	Brake pedal	<ul style="list-style-type: none"> <li>• Ignition on</li> <li>• Brake pedal not actuated</li> <li>• Brake pedal actuated</li> </ul>	not actuated actuated  Yes: T05	No: 8.5
<b>T05</b>	Parking brake	<ul style="list-style-type: none"> <li>• Ignition on</li> <li>• Vehicle secured against rolling away</li> <li>• Parking brake engaged</li> <li>• Parking brake not engaged</li> </ul>	engaged not engaged  Yes: 7.5	No: 8.31



## 7.5 Drive links

The following drive links can be triggered by the PST2. Their functioning must be checked when doing this.

**Note:** The clicking noises of the valves in the hydraulic unit are very quiet

Test	Tester display	Work instruction	Test	Remedy
<b>T01</b>	PSM warning light	• Drive link actuated with F8 key (Start)	Visual inspection light flashing  Yes: T02	No: -
<b>T02</b>	PSM key indicator light	• Drive link actuated with F8 key (Start)	Visual inspection light flashing  Yes: T03	No: -
<b>T03</b>	Front axle pressure increase	• Drive link actuated with F8 key (Start)	Jack vehicle up so that the wheels can turn freely. Follow the instructions of the diagnostic tester  Yes: T04	No: -
<b>T04</b>	Rear axle pressure increase	• Drive link actuated with F8 key (Start)	Jack vehicle up so that the wheels can turn freely. Follow the instructions of the diagnostic tester  Yes: T05	No: -

Test	Tester display	Work instruction	Test	Remedy
<b>T05</b>	Return pump	• Drive link actuated with F8 key (Start)	Noise inspection: return pump running  Yes: T06	No: 8.12
<b>T06</b>	Switch-over valve 1	• Drive link actuated with F8 key (Start)	Noise inspection: clicking noises at the valve  Yes: T07	No: 8.24
<b>T07</b>	Switch-over valve 2	• Drive link actuated with F8 key (Start)	Noise inspection: clicking noises at the valve  Yes: T08	No: 8.25
<b>T08</b>	Booster pump	• Drive link actuated with F8 key (Start)	Noise inspection: booster pump running  Yes: T09	No: 8.13
<b>T09</b>	Booster valve 1	• Drive link actuated with F8 key (Start)	Noise inspection: clicking noises at the valve  Yes: T10	No: 8.22
<b>T10</b>	Booster valve 2	• Drive link actuated with F8 key (Start)	Noise inspection: clicking noises at the valve  Yes: 7.6	No: 8.23

## 7.6 Static test

The menu item Static test carries out an electrical check of the system (advance check). This test can be carried out for example after the hydraulic unit has been exchanged. Follow the instructions of the diagnostic tester.

Test O.K., continue with **7.7**

## 7.7 Swap test

The Swap test is used to check the allocation of the brake pressure lines to the wheel brake cylinders. A hydraulic and an electrical test are carried out. Follow the instructions of the diagnostic tester.

## 7.8 Identification

Checking the installed control module

Work instruction	Tester display
• Select Identification	Diagnosis software number: PSM04 Part No: 996 618 140 XX

**Note:** The allocation of the part number can be taken from the corresponding Parts Catalogue.

The following blocks are displayed after actuating the **Info key F8**.

Content of the blocks:

**Block 1:** control module identification

**Block 2:** software version

## 7.9 Bleed

The brake system can be bled using this menu item. Refer to the Technical Manual, Group 47, Service No. 47 01 07.

## 7.10 Extract coding

The following items are displayed under this menu item:

Steer.-angle sensor calib. by:   xxxxxxx  
Version coded by:               xxxxxxx

(The workshop number from the diagnosis card is stored.

Veh. Ident. No.                   xxxxxxxxxxxxxxxx  
Transmission:                   manual transmission/automatic transmission



### 7.11 Modify coding

Follow the instructions of the diagnostic tester.

The tester displays the current coding as follows:

Veh. Ident. No.                      xxxxxxxxxxxxxxxx  
Transmission:                      manual transmission/automatic transmission

Step	Work instruction	Tester display
1	<ul style="list-style-type: none"> <li>• Ignition on</li> <li>• Engine off</li> <li>• Select Coding from the function selection.</li> </ul> Follow the instructions of the diagnostic tester.	Veh. Ident. No. Transmission:
2	<ul style="list-style-type: none"> <li>• Select transmission and confirm with the Coding key (F8)</li> <li>• Ignition off</li> <li>• Ignition on (coding is adopted)</li> </ul>	Transmission:

### 7.12 Steering-angle sensor calibration

Calibration of the steering-angle sensor is described in the Technical Manual, Group 45, Serv. No. 45 60  
Calibrating steering-angle sensor



Test	Work instruction	Result	Possible causes of fault
<b>T03</b>	<b>Test: open circuit in ground circuit</b> <ul style="list-style-type: none"> <li>Measure voltage between the following terminals: diagnosis wiring harness plug (wiring harness side) terminal 16 and diagnosis wiring harness plug (wiring harness side) terminals 4, 5</li> </ul>	Greater than 11 V  Yes: <b>T04</b>	No: - Open circuit between: diagnosis wiring harness plug terminals 4, 5 and ground point 3.1 (electronics ground)
<b>T04</b>	<b>Test: component</b> <ul style="list-style-type: none"> <li>Check diagnostic tester for correct functioning</li> </ul>	O.K.  Yes: <b>T05</b>	No: - Faulty component: diagnostic tester
<b>T05</b>	<b>Test: Short to ground/open circuit in power supply circuit</b> <p>Pull wiring harness plug off of: PSM control module</p> <ul style="list-style-type: none"> <li>Ignition on</li> <li>Measure voltage between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 1 and ground</li> </ul>	Greater than 11 V  Yes: <b>T06</b>	No: <ul style="list-style-type: none"> <li>Check the following components for correct functioning: fuse B9</li> </ul> <p><b>Note:</b> an open circuit or a short circuit is present. Disconnect the plug connection X1/3 (terminal 3) for further troubleshooting. Check wiring harness for continuity and for pinches or chafing damage.</p>

<b>Test</b>	<b>Work instruction</b>	<b>Result</b>	<b>Possible causes of fault</b>
<b>T06</b>	<p><b>Test: open circuit in ground circuit</b></p> <ul style="list-style-type: none"> <li>• Measure voltage between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 1 and PSM control module wiring harness plug (wiring harness side) terminals 28, 29</li> </ul>	<p>Greater than 11 V</p> <p>Yes: <b>T07</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Open circuit between: PSM control module wiring harness plug terminals 28, 29 and ground point 2</li> </ul>
<b>T07</b>	<p><b>Test: component</b></p> <ul style="list-style-type: none"> <li>• Ignition off</li> <li>• Pull wiring harness plug off of: DME control module</li> <li>• Connect wiring harness plug to: PSM control module</li> <li>• Connect diagnostic tester</li> <li>• Ignition on</li> <li>• Establish communication with: PSM control module</li> </ul> <p><b>Note:</b> disconnect all control modules which are connected with the communication line one after the other and establish communication with the PSM control module.</p>	<p>Not O.K.</p> <p>Yes: <b>T08</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Faulty component: control module which was disconnected directly before the test.</li> </ul>



Test	Work instruction	Result	Possible causes of fault
<b>T08</b>	<b>Test: voltage short in signal circuit</b> <ul style="list-style-type: none"> <li>• Ignition off</li> <li>• Pull wiring harness plug off of: diagnostic tester and PSM control module</li> <li>• Ignition on</li> <li>• Measure voltage between the following terminals: <ul style="list-style-type: none"> <li>• diagnosis wiring harness plug (wiring harness side) terminal 7 and ground</li> </ul> </li> </ul>	<p>Less than 0.3 V</p> <p>Yes: <b>T09</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Short circuit to voltage between: PSM control module wiring harness plug (wiring harness side) terminal 46 and diagnosis wiring harness plug (wiring harness side) terminal 7 and affected terminals of all wiring harness plugs which are electrically connected with the corresponding wire.</li> </ul> <p><b>Note:</b> check the wiring harness for pinching or chafing damage.</p>
<b>T09</b>	<b>Test: short to ground/open circuit in signal circuit</b> <ul style="list-style-type: none"> <li>• Ignition off</li> <li>• Measure resistance between the following terminals: diagnosis wiring harness plug (wiring harness side) terminal 7 and ground</li> </ul>	<p>Greater than 500 kOhm</p> <p>Yes: <b>T10</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Short circuit to ground between: PSM control module wiring harness plug (wiring harness side) terminal 88 and diagnosis wiring harness plug (wiring harness side) terminal 7 and affected terminals of all wiring harness plugs which are electrically connected with the corresponding wire.</li> </ul> <p><b>Note:</b> check the wiring harness for pinching or chafing damage.</p>

<b>Test</b>	<b>Work instruction</b>	<b>Result</b>	<b>Possible causes of fault</b>
<b>T10</b>	<b>Test: open circuit in signal circuit</b> <ul style="list-style-type: none"> <li>• Measure resistance between the following terminals: diagnosis wiring harness plug (wiring harness side) terminal 7 and PSM control module wiring harness plug (wiring harness side) terminal 46</li> </ul>	<p>Less than 5 Ohm</p> <p>Yes: <b>E01</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Open circuit between: PSM control module wiring harness plug (wiring harness side) terminal 46 and diagnosis wiring harness plug (wiring harness side) terminal 7</li> </ul>

<b>E01</b>	- PSM control module faulty
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Test	Work instruction	Result	Possible causes of fault
<b>T03</b>	<b>Test: short circuit in signal circuit</b> <ul style="list-style-type: none"> <li>• Measure resistance between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 61 and PSM control module wiring harness plug (wiring harness side) terminal 63</li> </ul>	Greater than 500 kOhm  Yes: <b>T04</b>	No: - Short circuit in wiring harness between: PSM control module wiring harness plug (wiring harness side) terminals 61, 63 and PSM steering-angle sensor wiring harness plug (wiring harness side) terminals 2, 1 and DME control module wiring harness plug IV (wiring harness side) terminals 36, 37 <b>Note:</b> The connection points 136, 137 are located between the PSM control module and the DME control module. These must also be checked.
<b>T04</b>	<b>Test: open circuit in signal circuit</b> <ul style="list-style-type: none"> <li>• Measure resistance between the following terminals: PSM control module wiring harness plug (wiring harness side) terminals 61, 63 and DME control module wiring harness plug IV (wiring harness side) terminals 36, 37</li> </ul>	Less than 5 Ohm  Yes: <b>E01</b>	No: - Open circuit between: PSM control module wiring harness plug (wiring harness side) terminals 61, 63 and DME control module wiring harness plug IV (wiring harness side) terminals 36, 37 <b>Note:</b> The connection points 136, 137 are located between the PSM control module and the DME control module. These must also be checked.

<b>E01</b>	- PSM control module faulty
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## 8.4 Tiptronic CAN bus communication circuit

[illegible]



Test	Work instruction	Result	Possible causes of fault
<b>T03</b>	<b>Test: short circuit in signal circuit</b> <ul style="list-style-type: none"> <li>• Measure resistance between the following terminals: Tiptronic control module wiring harness plug (wiring harness side) terminal 85 and Tiptronic control module wiring harness plug (wiring harness side) terminal 86</li> </ul>	<p>Greater than 500 kOhm</p> <p>Yes: <b>T04</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Short circuit in wiring harness between: Tiptronic control module wiring harness plug (wiring harness side) terminals 85, 86 and DME control module wiring harness plug II (wiring harness side) terminals 3, 4</li> </ul>
<b>T04</b>	<b>Test: open circuit in signal circuit</b> <ul style="list-style-type: none"> <li>• Measure resistance between the following terminals: Tiptronic control module wiring harness plug (wiring harness side) terminals 85, 86 and DME control module wiring harness plug II (wiring harness side) terminals 3, 4</li> </ul>	<p>Less than 5 Ohm</p> <p>Yes: <b>E01</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Open circuit between: Tiptronic control module wiring harness plug (wiring harness side) terminals 85, 86 and DME control module wiring harness plug II (wiring harness side) terminals 3, 4</li> </ul>

<b>E01</b>	- DME control module faulty
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## 8.5 Stop light switch circuit

Test	Work instruction	Result	Possible causes of fault
<b>T01</b>	<b>Test: short to ground/open circuit in signal circuit</b> <ul style="list-style-type: none"> <li>• Ignition off</li> <li>• Pull wiring harness plug off of: PSM control module</li> <li>• Ignition on</li> <li>• Measure voltage between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 42 and ground</li> </ul>	<p>Greater than 11 V</p> <p>Yes: <b>T02</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Short circuit to ground or open circuit between: PSM control module wiring harness plug (wiring harness side) terminal 42 and plug connection X 1/3 terminal 4 and ignition lock terminal 15 or</li> <li>- Stop light switch faulty</li> </ul> <p><b>Note:</b> The plug connection X 1/3 (terminal 4), stop light switch terminals 4, 1, jumper plug 14/2, fuse B7 and the connection point 124 are located in the wiring harness. Check the wiring harness for pinching or chafing damage.</p>
<b>T02</b>	<b>Test: voltage short in signal circuit</b> <ul style="list-style-type: none"> <li>• Brake pedal actuated</li> <li>• Measure voltage between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 42 and ground</li> </ul>	<p>Less than 0.3 V</p> <p>Yes: <b>T03</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Short circuit to voltage between: PSM control module wiring harness plug (wiring harness side) terminal 42 and stop light switch terminal 4 or</li> <li>- Stop light switch faulty</li> </ul> <p><b>Note:</b> The plug connection X 1/3 (terminal 4) is located in the wiring harness.</p>



<b>E01</b>	- PSM control module faulty
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## 8.6 Front left wheel-speed sensor circuit

Test	Work instruction	Result	Possible causes of fault
T01	<b>Test: voltage short in signal circuit</b> <ul style="list-style-type: none"> <li>• Ignition off</li> <li>• Pull wiring harness plug off of: PSM control module</li> <li>• Ignition on</li> <li>• Measure voltage between the following terminals: PSM control module wiring harness plug terminal 8 and ground</li> </ul>	Less than 0.3 V	No: - Short circuit to voltage in the circuit between: PSM control module wiring harness plug (wiring harness side) terminals 8, 10 and plug connection X 1/4 terminals 14, 15 and front left speed sensor terminals 5, 4  <b>Note:</b> Disconnect the plug connection X 1/4 (terminals 14, 15) for further troubleshooting. The connection points 141 and 142 are located in the wiring harness. Check the wiring harness for pinching or chafing damage.  Yes: T02
T02	<b>Test: short to ground in signal circuit</b> <ul style="list-style-type: none"> <li>• Ignition off</li> <li>• Measure resistance between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 8 and ground</li> </ul>	Greater than 500 kOhm	No: - Short circuit to ground in the circuit between: PSM control module wiring harness plug (wiring harness side) terminals 8, 10 and plug connection X 1/4 terminals 14, 15 and front left speed sensor terminals 5, 4  <b>Note:</b> Disconnect the plug connection X 1/4 (terminals 14, 15) for further troubleshooting. The connection points 141 and 142 are located in the wiring harness. Check the wiring harness for pinching or chafing damage.  Yes: T03

<b>Test</b>	<b>Work instruction</b>	<b>Result</b>	<b>Possible causes of fault</b>
<b>T03</b>	<b>Test: open circuit in signal circuit</b> <ul style="list-style-type: none"> <li>• Measure resistance between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 8 and PSM control module wiring harness plug (wiring harness side) terminal 10</li> </ul>	1...2 kOhm	<p>No:</p> <ul style="list-style-type: none"> <li>- Greater than 2 kOhm: Open circuit between: PSM control module wiring harness plug (wiring harness side) terminals 8, 10 and plug connection X 1/4 terminals 14, 15 and front left speed sensor terminals 5, 4</li> <li>- Less than 1 kOhm: Short circuit in wiring harness between: PSM control module wiring harness plug (wiring harness side) terminal 8 and PSM control module wiring harness plug (wiring harness side) terminal 10</li> </ul> <p><b>Note:</b> Disconnect the plug connection X 1/4 (terminals 14, 15) for further troubleshooting. The connection points 141 and 142 are located in the wiring harness. Check the wiring harness for pinching or chafing damage.</p>
<b>T04</b>	<b>Test: component</b> <ul style="list-style-type: none"> <li>• Set the measuring range to alternating voltage on the multimeter.</li> <li>• Vehicle jacked up and front left wheel turned slowly by hand</li> <li>• Measure voltage between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 8 and PSM control module wiring harness plug (wiring harness side) terminal 10</li> </ul>	Less than 0.1 V	<p>No:</p> <ul style="list-style-type: none"> <li>- PSM control module faulty</li> </ul>

Test	Work instruction	Result	Possible causes of fault
<b>T05</b>	<b>Test: mechanical functionality</b>  <ul style="list-style-type: none"> <li>• Check front left speed sensor and toothed disc for soiling and damage</li> </ul>	O.K.  Yes: <b>E01</b>	No: - Speed sensor or toothed disc faulty

<b>E01</b>	- Front left speed sensor faulty
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Test	Work instruction	Result	Possible causes of fault
T01	<b>Test: voltage short in signal circuit</b> <ul style="list-style-type: none"> <li>• Ignition off</li> <li>• Pull wiring harness plug off of: PSM control module</li> <li>• Ignition on</li> <li>• Measure voltage between the following terminals: PSM control module wiring harness plug terminal 15 and ground</li> </ul>	Less than 0.3 V	No: - Short circuit to voltage in the circuit between: PSM control module wiring harness plug (wiring harness side) terminals 15, 16 and plug connection X 1/4 terminals 16, 17 and front right speed sensor terminals 5, 4  <b>Note:</b> Disconnect the plug connection X 1/4 (terminals 16, 17) for further troubleshooting. The connection points 143 and 144 are located in the wiring harness. Check the wiring harness for pinching or chafing damage.
T02	<b>Test: short to ground in signal circuit</b> <ul style="list-style-type: none"> <li>• Ignition off</li> <li>• Measure resistance between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 15 and ground</li> </ul>	Greater than 500 kOhm	No: - Short circuit to ground in the circuit between: PSM control module wiring harness plug (wiring harness side) terminals 15, 16 and plug connection X 1/4 terminals 16, 17 and front right speed sensor terminals 5, 4  <b>Note:</b> Disconnect the plug connection X 1/4 (terminals 14, 15) for further troubleshooting. The connection points 143 and 144 are located in the wiring harness. Check the wiring harness for pinching or chafing damage.

[illegible]



Test	Work instruction	Result	Possible causes of fault
<b>T05</b>	<b>Test: mechanical functionality</b> <ul style="list-style-type: none"> <li>• Check front right speed sensor and toothed disc for soiling and damage</li> </ul>	O.K.  Yes: <b>E01</b>	No: - Speed sensor or toothed disc faulty

<b>E01</b>	- Front right speed sensor faulty
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## 8.8 Rear left wheel-speed sensor circuit

Test	Work instruction	Result	Possible causes of fault
T01	<b>Test: voltage short in signal circuit</b> <ul style="list-style-type: none"> <li>• Ignition off</li> <li>• Pull wiring harness plug off of: PSM control module</li> <li>• Ignition on</li> <li>• Measure voltage between the following terminals: PSM control module wiring harness plug terminal 13 and ground</li> </ul>	<p>Less than 0.3 V</p> <p>Yes: <b>T02</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Short circuit to voltage in the circuit between: PSM control module wiring harness plug (wiring harness side) terminals 13, 14 and rear left speed sensor terminals 5, 4</li> </ul> <p><b>Note:</b> Disconnect plug connection X 1/4 (terminals 20, 21) and plug connection X 2/4 (terminals 16, 17) for further troubleshooting. Check the wiring harness for pinching or chafing damage.</p>
T02	<b>Test: short to ground in signal circuit</b> <ul style="list-style-type: none"> <li>• Ignition off</li> <li>• Measure resistance between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 13 and ground</li> </ul>	<p>Greater than 500 kOhm</p> <p>Yes: <b>T03</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Short circuit to ground in the circuit between: PSM control module wiring harness plug (wiring harness side) terminals 13, 14 and rear left speed sensor terminals 5, 4</li> </ul> <p><b>Note:</b> Disconnect plug connection X 1/4 (terminals 20, 21) and plug connection X 2/4 (terminals 16, 17) for further troubleshooting. Check the wiring harness for pinching or chafing damage.</p>



Test	Work instruction	Result	Possible causes of fault
<b>T03</b>	<p><b>Test: open circuit in signal circuit</b></p> <ul style="list-style-type: none"> <li>• Measure resistance between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 13 and PSM control module wiring harness plug (wiring harness side) terminal 14</li> </ul>	<p>1...2 kOhm</p> <p>Yes: <b>T04</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Greater than 2 kOhm: Open circuit between: PSM control module wiring harness plug (wiring harness side) terminals 13, 14 and plug connection X 1/4 terminals 20, 21 and plug connection X 2/4 terminals 16, 17 and rear left speed sensor terminals 5, 4</li> <li>- Less than 1 kOhm: Short circuit in wiring harness between: PSM control module wiring harness plug (wiring harness side) terminal 13 and PSM control module wiring harness plug (wiring harness side) terminal 14</li> </ul> <p><b>Note:</b> Disconnect plug connection X 1/4 (terminals 20, 21) and plug connection X 2/4 (terminals 16, 17) for further troubleshooting. Check the wiring harness for pinching or chafing damage.</p>

[illegible]

<b>E01</b>	- Rear left speed sensor faulty
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Test	Work instruction	Result	Possible causes of fault
<b>T01</b>	<b>Test: voltage short in signal circuit</b> <ul style="list-style-type: none"> <li>• Ignition off</li> <li>• Pull wiring harness plug off of: PSM control module</li> <li>• Ignition on</li> <li>• Measure voltage between the following terminals: PSM control module wiring harness plug terminal 11 and ground</li> </ul>	Less than 0.3 V	No: - Short circuit to voltage in the circuit between: PSM control module wiring harness plug (wiring harness side) terminals 11, 12 and rear right speed sensor terminals 5, 4  <b>Note:</b> Disconnect plug connection X 1/4 (terminals 18, 19) and plug connection X 2/4 (terminals 18, 19) for further troubleshooting. Check the wiring harness for pinching or chafing damage.
<b>T02</b>	<b>Test: short to ground in signal circuit</b> <ul style="list-style-type: none"> <li>• Ignition off</li> <li>• Measure resistance between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 11 and ground</li> </ul>	Greater than 500 kOhm	No: - Short circuit to ground in the circuit between: PSM control module wiring harness plug (wiring harness side) terminals 11, 12 and rear right speed sensor terminals 5, 4  <b>Note:</b> Disconnect plug connection X 1/4 (terminals 18, 19) and plug connection X 2/4 (terminals 18, 19) for further troubleshooting. Check the wiring harness for pinching or chafing damage.

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Test	Work instruction	Result	Possible causes of fault
<b>T05</b>	<b>Test: mechanical functionality</b>  <ul style="list-style-type: none"> <li>• Check rear right speed sensor and toothed disc for soiling and damage</li> </ul>	O.K.  Yes: <b>E01</b>	No: - Speed sensor or toothed disc faulty

<b>E01</b>	- Rear right speed sensor faulty
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## 8.10 Wheel-speed sensor circuits

Test	Work instruction	Result	Possible causes of fault
<b>T01</b>	<b>Test: mechanical functionality</b> <ul style="list-style-type: none"> <li>• Check front left speed sensor and toothed disc for soiling and damage</li> </ul>	O.K.  Yes: <b>T02</b>	No: - Speed sensor or toothed disc faulty
<b>T02</b>	<b>Test: mechanical functionality</b> <ul style="list-style-type: none"> <li>• Check front right speed sensor and toothed disc for soiling and damage</li> </ul>	O.K.  Yes: <b>T03</b>	No: - Speed sensor or toothed disc faulty
<b>T03</b>	<b>Test: mechanical functionality</b> <ul style="list-style-type: none"> <li>• Check rear left speed sensor and toothed disc for soiling and damage</li> </ul>	O.K.  Yes: <b>T04</b>	No: - Speed sensor or toothed disc faulty
<b>T04</b>	<b>Test: mechanical functionality</b> <ul style="list-style-type: none"> <li>• Check rear right speed sensor and toothed disc for soiling and damage</li> </ul>	O.K.  Yes: <b>E01</b>	No: - Speed sensor or toothed disc faulty
<b>E01</b>	- PSM control module faulty		

[illegible]





<b>E01</b>	- Relay for solenoid valves faulty
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Test	Work instruction	Result	Possible causes of fault
<b>T03</b>	<p><b>Test: voltage short / open circuit in signal circuit</b></p> <ul style="list-style-type: none"> <li>• Ignition on</li> <li>• Measure voltage between the following terminals: Relay for return pump socket terminal 4 and relay for return pump socket terminal 6</li> </ul>	<p>Greater than 11 V</p> <p>Yes: <b>T04</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Short circuit to voltage/open circuit in circuit between: Relay for return pump socket terminal 6 and PSM control module wiring harness plug (wiring harness side) terminal 7 or</li> <li>- PSM control module faulty</li> </ul>
<b>T04</b>	<p><b>Test: short to ground/open circuit in power supply circuit</b></p> <ul style="list-style-type: none"> <li>• Measure voltage between the following terminals: Relay for return pump socket terminal 2 and ground</li> </ul>	<p>Greater than 11 V</p> <p>Yes: <b>T05</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Short circuit to ground/open circuit in circuit between: fuse F1 output-side contact and relay for return pump socket terminal 2</li> </ul> <p><b>Note:</b> The plug connection X 1/3 (terminal 1) is located in the wiring harness. Check the wiring harness for pinching or chafing damage.</p>

[illegible]

E01	- Relay for return pump faulty
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### 8.13 Booster pump circuit

<b>Test</b>	<b>Work instruction</b>	<b>Result</b>	<b>Possible causes of fault</b>
<b>T01</b>	<b>Test: short to ground/ open circuit in power supply circuit</b> <ul style="list-style-type: none"> <li>• Ignition off</li> <li>• Pull wiring harness plug off of: PSM control module</li> <li>• Measure voltage between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 51 and ground</li> </ul>	Greater than 11 V	No: - Short circuit to ground or open circuit between: PSM control module wiring harness plug (wiring harness side) terminal 51 and plug connection X 1/3 terminal 20 and fuse E10  <b>Note:</b> Check the voltage at the input side of fuse E 10 or the output side of fuse F 7 for further troubleshooting.
<b>T02</b>	<b>Test: voltage short in signal circuit</b> <ul style="list-style-type: none"> <li>• Ignition on</li> <li>• Measure voltage between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 24 and ground</li> </ul>	Less than 0.3 V	No: - Short circuit to voltage between: PSM control module wiring harness plug (wiring harness side) terminal 24 and PSM booster pump wiring harness plug (wiring harness side) terminal 1  <b>Note:</b> Check the wiring harness for pinching or chafing damage.



Test	Work instruction	Result	Possible causes of fault
<b>T03</b>	<b>Test: short to ground in signal circuit</b> <ul style="list-style-type: none"> <li>• Ignition off</li> <li>• Measure resistance between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 24 and ground</li> </ul>	<p>Greater than 500 kOhm</p> <p>Yes: <b>T04</b></p>	<p>No:</p> <p>- Short circuit to ground between: PSM control module wiring harness plug (wiring harness side) terminal 24 and PSM booster pump wiring harness plug (wiring harness side) terminal 1</p> <p><b>Note:</b> Check the wiring harness for pinching or chafing damage.</p>
<b>T04</b>	<b>Test: voltage short in signal circuit</b> <ul style="list-style-type: none"> <li>• Ignition on</li> <li>• Measure voltage between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 22 and ground</li> </ul>	<p>Less than 0.3 V</p> <p>Yes: <b>T05</b></p>	<p>No:</p> <p>Short circuit to voltage between: PSM control module wiring harness plug (wiring harness side) terminal 22 and PSM booster pump terminal 2</p> <p><b>Note:</b> Check the wiring harness for pinching or chafing damage.</p>
<b>T05</b>	<b>Test: short to ground in signal circuit</b> <ul style="list-style-type: none"> <li>• Ignition off</li> <li>• Measure resistance between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 22 and ground</li> </ul>	<p>Greater than 500 kOhm</p> <p>Yes: <b>T06</b></p>	<p>No:</p> <p>- Short circuit to ground between: PSM control module wiring harness plug (wiring harness side) terminal 22 and PSM booster pump wiring harness plug (wiring harness side) terminal 2</p> <p><b>Note:</b> Check the wiring harness for pinching or chafing damage.</p>

Test	Work instruction	Result	Possible causes of fault
T06	<p><b>Test: component</b></p> <ul style="list-style-type: none"> <li>• Connect wiring harness plug to: PSM control module</li> <li>• Pull wiring harness plug off of: PSM booster pump</li> <li>• Ignition on</li> <li>• Start diagnostic tester drive link test for booster pump</li> <li>• Measure voltage between the following terminals: PSM booster pump wiring harness plug (wiring harness side) terminal 1 and PSM booster pump wiring harness plug (wiring harness side) terminal 2</li> </ul>	<p>Greater than 11 V</p> <p>Yes: <b>E01</b></p>	<p>No: - PSM control module faulty</p>

<b>E01</b>	- PSM booster pump faulty	0
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Test	Work instruction	Result	Possible causes of fault
T03	<p><b>Test: open circuit in signal circuit</b></p> <ul style="list-style-type: none"> <li>• Measure resistance between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 55 and PSM hydraulic unit wiring harness plug (wiring harness side) terminal 12</li> </ul>	<p>Less than 5 Ohm</p> <p>Yes: <b>E01</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Open circuit between: PSM control module wiring harness plug (wiring harness side) terminal 55 and PSM hydraulic unit wiring harness plug (wiring harness side) terminal 12</li> </ul> <p><b>Note:</b> Check the wiring harness for pinching or chafing damage.</p>

<b>E01</b>	- PSM hydraulic unit faulty
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[illegible]

<b>E01</b>	- PSM hydraulic unit faulty
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<b>E01</b>	- PSM hydraulic unit faulty
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<b>Test</b>	<b>Work instruction</b>	<b>Result</b>	<b>Possible causes of fault</b>
<b>T01</b>	<b>Test: voltage short in signal circuit</b> <ul style="list-style-type: none"> <li>• Ignition off</li> <li>• Pull wiring harness plug off of: PSM control module and PSM hydraulic unit</li> <li>• Ignition on</li> <li>• Measure voltage between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 5 and ground</li> </ul>	Less than 0.3 V	No: - Short circuit to voltage between: PSM control module wiring harness plug (wiring harness side) terminal 5 and PSM hydraulic unit wiring harness plug (wiring harness side) terminal 8  <b>Note:</b> Check the wiring harness for pinching or chafing damage.
<b>T02</b>	<b>Test: short to ground in signal circuit</b> <ul style="list-style-type: none"> <li>• Ignition off</li> <li>• Measure resistance between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 5 and ground</li> </ul>	Greater than 500 kOhm	No: - Short circuit to ground between: PSM control module wiring harness plug (wiring harness side) terminal 5 and PSM hydraulic unit wiring harness plug (wiring harness side) terminal 8  <b>Note:</b> Check the wiring harness for pinching or chafing damage.

Test	Work instruction	Result	Possible causes of fault
<b>T03</b>	<b>Test: open circuit in signal circuit</b>  • Measure resistance between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 5 and PSM hydraulic unit wiring harness plug (wiring harness side) terminal 8	Less than 5 Ohm          Yes: <b>E01</b>	No: - Open circuit between: PSM control module wiring harness plug (wiring harness side) terminal 5 and PSM hydraulic unit wiring harness plug (wiring harness side) terminal 8  <b>Note:</b> Check the wiring harness for pinching or chafing damage.

<b>E01</b>	- PSM hydraulic unit faulty
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[illegible]

<b>E01</b>	- PSM hydraulic unit faulty
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Test	Work instruction	Result	Possible causes of fault
<b>T03</b>	<p><b>Test: open circuit in signal circuit</b></p> <ul style="list-style-type: none"> <li>• Measure resistance between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 6 and PSM hydraulic unit wiring harness plug (wiring harness side) terminal 3</li> </ul>	<p>Less than 5 Ohm</p> <p>Yes: <b>E01</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Open circuit between: PSM control module wiring harness plug (wiring harness side) terminal 6 and PSM hydraulic unit wiring harness plug (wiring harness side) terminal 3</li> </ul> <p><b>Note:</b> Check the wiring harness for pinching or chafing damage.</p>

<b>E01</b>	- PSM hydraulic unit faulty
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Test	Work instruction	Result	Possible causes of fault
T03	<p><b>Test: open circuit in signal circuit</b></p> <ul style="list-style-type: none"> <li>• Measure resistance between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 25 and PSM hydraulic unit wiring harness plug (wiring harness side) terminal 9</li> </ul>	<p>Less than 5 Ohm</p> <p>Yes: <b>E01</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Open circuit between: PSM control module wiring harness plug (wiring harness side) terminal 25 and PSM hydraulic unit wiring harness plug (wiring harness side) terminal 9</li> </ul> <p><b>Note:</b> Check the wiring harness for pinching or chafing damage.</p>

<b>E01</b>	- PSM hydraulic unit faulty
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Test	Work instruction	Result	Possible causes of fault
T03	<p><b>Test: open circuit in signal circuit</b></p> <ul style="list-style-type: none"> <li>• Measure resistance between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 53 and PSM hydraulic unit wiring harness plug (wiring harness side) terminal 5</li> </ul>	<p>Less than 5 Ohm</p> <p>Yes: <b>E01</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Open circuit between: PSM control module wiring harness plug (wiring harness side) terminal 53 and PSM hydraulic unit wiring harness plug (wiring harness side) terminal 5</li> </ul> <p><b>Note:</b> Check the wiring harness for pinching or chafing damage.</p>

<b>E01</b>	- PSM hydraulic unit faulty
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[illegible]

Test	Work instruction	Result	Possible causes of fault
<b>T03</b>	<b>Test: open circuit in signal circuit</b>  • Measure resistance between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 54 and PSM hydraulic unit wiring harness plug (wiring harness side) terminal 1	Less than 5 Ohm          Yes: <b>E01</b>	No: - Open circuit between: PSM control module wiring harness plug (wiring harness side) terminal 54 and PSM hydraulic unit wiring harness plug (wiring harness side) terminal 1  <b>Note:</b> Check the wiring harness for pinching or chafing damage.

<b>E01</b>	- PSM hydraulic unit faulty
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Test	Work instruction	Result	Possible causes of fault
<b>T01</b>	<p><b>Test: voltage short in signal circuit</b></p> <ul style="list-style-type: none"> <li>• Ignition off</li> <li>• Pull wiring harness plug off of: PSM control module and PSM hydraulic unit</li> <li>• Ignition on</li> <li>• Measure voltage between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 52 and ground</li> </ul>	<p>Less than 0.3 V</p> <p>Yes: <b>T02</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Short circuit to voltage between: PSM control module wiring harness plug (wiring harness side) terminal 52 and PSM hydraulic unit wiring harness plug (wiring harness side) terminal 4</li> </ul> <p><b>Note:</b> Check the wiring harness for pinching or chafing damage.</p>
<b>T02</b>	<p><b>Test: short to ground in signal circuit</b></p> <ul style="list-style-type: none"> <li>• Ignition off</li> <li>• Measure resistance between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 52 and ground</li> </ul>	<p>Greater than 500 kOhm</p> <p>Yes: <b>T03</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Short circuit to ground between: PSM control module wiring harness plug (wiring harness side) terminal 52 and PSM hydraulic unit wiring harness plug (wiring harness side) terminal 4</li> </ul> <p><b>Note:</b> Check the wiring harness for pinching or chafing damage.</p>

Test	Work instruction	Result	Possible causes of fault
T03	<p><b>Test: open circuit in signal circuit</b></p> <ul style="list-style-type: none"> <li>• Measure resistance between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 52 and PSM hydraulic unit wiring harness plug (wiring harness side) terminal 4</li> </ul>	<p>Less than 5 Ohm</p> <p>Yes: <b>E01</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Open circuit between: PSM control module wiring harness plug (wiring harness side) terminal 52 and PSM hydraulic unit wiring harness plug (wiring harness side) terminal 4</li> </ul> <p><b>Note:</b> Check the wiring harness for pinching or chafing damage.</p>

<b>E01</b>	- PSM hydraulic unit faulty
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<b>Test</b>	<b>Work instruction</b>	<b>Result</b>	<b>Possible causes of fault</b>
<b>T01</b>	<b>Test: voltage short in signal circuit</b> <ul style="list-style-type: none"> <li>• Ignition off</li> <li>• Pull wiring harness plug off of: PSM control module and PSM hydraulic unit</li> <li>• Ignition on</li> <li>• Measure voltage between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 49 and ground</li> </ul>	Less than 0.3 V	No: - Short circuit to voltage between: PSM control module wiring harness plug (wiring harness side) terminal 49 and PSM hydraulic unit wiring harness plug (wiring harness side) terminal 7  <b>Note:</b> Check the wiring harness for pinching or chafing damage.
<b>T02</b>	<b>Test: short to ground in signal circuit</b> <ul style="list-style-type: none"> <li>• Ignition off</li> <li>• Measure resistance between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 49 and ground</li> </ul>	Greater than 500 kOhm	No: - Short circuit to ground between: PSM control module wiring harness plug (wiring harness side) terminal 49 and PSM hydraulic unit wiring harness plug (wiring harness side) terminal 7  <b>Note:</b> Check the wiring harness for pinching or chafing damage.





[illegible]

<b>E01</b>	- PSM hydraulic unit faulty
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## 8.26 Transverse acceleration sensor circuit

Test	Work instruction	Result	Possible causes of fault
<b>T01</b>	<p><b>Test: short to ground/ open circuit in power supply circuit</b></p> <ul style="list-style-type: none"> <li>• Ignition off</li> </ul> <p>Pull wiring harness plug off of: Transverse acceleration sensor</p> <ul style="list-style-type: none"> <li>• Ignition on</li> <li>• Measure voltage between the following terminals: Transverse acceleration sensor wiring harness plug (wiring harness side) terminal 3 and ground</li> </ul>	approx. 5 V	<p>No:</p> <ul style="list-style-type: none"> <li>- Display 0 V: Short circuit to ground/open circuit in circuit between: PSM control module wiring harness plug (wiring harness side) terminal 75 and transverse acceleration sensor wiring harness plug (wiring harness side) terminal 3</li> <li>- Display greater than 11 V: Short circuit to voltage between: PSM control module wiring harness plug (wiring harness side) terminal 75 and transverse acceleration sensor wiring harness plug (wiring harness side) terminal 3 or - PSM control module faulty</li> </ul> <p><b>Note:</b> The plug connection X1/4 (terminal 8) is located in the wiring harness. Check the wiring harness for pinching or chafing damage.</p>
		<b>Yes: T02</b>	

Test	Work instruction	Result	Possible causes of fault
<b>T02</b>	<b>Test: open circuit in ground circuit</b> <ul style="list-style-type: none"> <li>• Measure voltage between the following terminals: Transverse acceleration sensor wiring harness plug (wiring harness side) terminal 3 and transverse acceleration sensor wiring harness plug (wiring harness side) terminal 1</li> </ul>	approx. 5 V	No: - Open circuit in circuit between: PSM control module wiring harness plug (wiring harness side) terminal 19 and transverse acceleration sensor wiring harness plug (wiring harness side) terminal 1 or - PSM control module faulty  <b>Note:</b> The plug connection X1/4 (terminal 6) is located in the wiring harness. Check the wiring harness for pinching or chafing damage.
<b>T03</b>	<b>Test: open circuit in signal circuit</b> <ul style="list-style-type: none"> <li>• With the diagnostic tester, select the actual values for transverse acceleration sensor</li> <li>• Connect wiring harness jumper to: Transverse acceleration sensor wiring harness plug (wiring harness side) terminal 3 and transverse acceleration sensor wiring harness plug (wiring harness side) terminal 2</li> </ul>	Tester display approx. $-24 \text{ m/s}^2$	No: - Open circuit between: transverse acceleration sensor wiring harness plug (wiring harness side) terminal 2 and PSM control module wiring harness plug (wiring harness side) terminal 18 or - PSM control module faulty  <b>Note:</b> The plug connection X1/4 (terminal 7) is located in the wiring harness. Check the wiring harness for pinching or chafing damage.

Test	Work instruction	Result	Possible causes of fault
<b>T04</b>	<b>Test: component</b> <ul style="list-style-type: none"> <li>• Connect wiring harness jumper to: Transverse acceleration sensor wiring harness plug (wiring harness side) terminal 1 and transverse acceleration sensor wiring harness plug (wiring harness side) terminal 2</li> </ul>	Tester display approx. $-24 \text{ m/s}^2$  Yes: <b>E01</b>	No: - PSM control module faulty

<b>E01</b>	- Transverse acceleration sensor faulty
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<b>E01</b>	- Steering-angle sensor faulty or - PSM control module faulty
------------	---





<b>Test</b>	<b>Work instruction</b>	<b>Result</b>	<b>Possible causes of fault</b>
<b>T03</b>	<b>Test: voltage short in signal circuit</b> <ul style="list-style-type: none"> <li>• Pull wiring harness plug off of: PSM control module</li> <li>• Measure voltage between the following terminals: rate-of-turn sensor wiring harness plug (wiring harness side) terminals 3, 4, 5 and ground</li> </ul>	Less than 0.3 V	No: - Short circuit to voltage between: rate-of-turn sensor wiring harness plug (wiring harness side) terminals 3, 4, 5 and PSM control module wiring harness plug (wiring harness side) terminals 79, 78, 77  <b>Note:</b> The plug connection X1/4 (terminals 3, 4, 5) is located in the wiring harness. Check the wiring harness for pinching or chafing damage.
<b>T04</b>	<b>Test: short to ground in signal circuit</b> <ul style="list-style-type: none"> <li>• Ignition off</li> <li>• Measure resistance between the following terminals: rate-of-turn sensor wiring harness plug (wiring harness side) terminals 3, 4, 5 and ground</li> </ul>	Less than 5 Ohm	No: - Short circuit to ground between: rate-of-turn sensor wiring harness plug (wiring harness side) terminals 3, 4, 5 and PSM control module wiring harness plug (wiring harness side) terminals 79, 78, 77  <b>Note:</b> The plug connection X1/4 (terminals 3, 4, 5) is located in the wiring harness. Check the wiring harness for pinching or chafing damage.

<b>E01</b>	- Rate-of-turn sensor faulty or - PSM control module faulty
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## 8.29 Pressure sensor circuit

Test	Work instruction	Result	Possible causes of fault
<b>T01</b>	<b>Test: short to ground/ open circuit in power supply circuit</b> <ul style="list-style-type: none"> <li>• Ignition off</li> </ul> Pull wiring harness plug off of: Pressure sensor <ul style="list-style-type: none"> <li>• Ignition on</li> <li>• Measure voltage between the following terminals: pressure sensor wiring harness plug (wiring harness side) terminal 3 and ground</li> </ul>	approx. 5 V	No: - Display 0 V: Short circuit to ground/open circuit in circuit between: PSM control module wiring harness plug (wiring harness side) terminal 69 and pressure sensor wiring harness plug (wiring harness side) terminal 3  - Display greater than 11 V: Short circuit to voltage between: PSM control module wiring harness plug (wiring harness side) terminal 69 and pressure sensor wiring harness plug (wiring harness side) terminal 3 or - PSM control module faulty
<b>T02</b>	<b>Test: open circuit in ground circuit</b> <ul style="list-style-type: none"> <li>• Measure voltage between the following terminals: pressure sensor wiring harness plug (wiring harness side) terminal 3 and pressure sensor wiring harness plug (wiring harness side) terminal 1</li> </ul>	approx. 5 V	No: - Open circuit in circuit between: PSM control module wiring harness plug (wiring harness side) terminal 67 and pressure sensor wiring harness plug (wiring harness side) terminal 1 or - PSM control module faulty
		Yes: <b>T02</b>	
		Yes: <b>T03</b>	

Test	Work instruction	Result	Possible causes of fault
<b>T03</b>	<b>Test: open circuit in signal circuit</b> <ul style="list-style-type: none"> <li>With the diagnostic tester, select actual values for pressure sensor</li> <li>Connect wiring harness jumper to: pressure sensor wiring harness plug (wiring harness side) terminal 1 and pressure sensor wiring harness plug (wiring harness side) terminal 2</li> </ul>	Tester display approx. 290 bar  Yes: <b>T04</b>	No: - Open circuit between: pressure sensor wiring harness plug (wiring harness side) terminal 2 and PSM control module wiring harness plug (wiring harness side) terminal 68 or - PSM control module faulty
<b>T04</b>	<b>Test: component</b> <ul style="list-style-type: none"> <li>Connect wiring harness jumper to: pressure sensor wiring harness plug (wiring harness side) terminal 1 and pressure sensor wiring harness plug (wiring harness side) terminal 2</li> </ul>	Tester display approx. -38 bar  Yes: <b>E01</b>	No: - PSM control module faulty

<b>E01</b>	- Pressure sensor faulty (replace booster pump)
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Test	Work instruction	Result	Possible causes of fault
T01	<p><b>Test: voltage short in signal circuit</b></p> <ul style="list-style-type: none"> <li>• Ignition off</li> <li>• Pull wiring harness plug off of: PSM control module</li> <li>• Ignition on</li> <li>• Measure voltage between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 38 and ground</li> </ul>	<p>Less than 1.5 V</p> <p>Yes: T02</p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Short circuit to voltage between: PSM control module wiring harness plug (wiring harness side) terminal 38 and generator terminal L and instrument cluster wiring harness plug (wiring harness side) terminal II/3 or</li> <li>- generator faulty</li> </ul> <p><b>Note:</b> The plug connection X 1/3 (terminal 6), connection point 39, plug connection X 2/3 (terminal 5) and plug connection X 59/1 (terminal 12) are located in the wiring harness. Check the wiring harness for pinching or chafing damage.</p>

Test	Work instruction	Result	Possible causes of fault
T02	<p><b>Test: open circuit in signal circuit</b></p> <ul style="list-style-type: none"> <li>• Engine runs at idle speed</li> <li>• Measure voltage between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 38 and ground</li> </ul>	<p>Greater than 11 V</p> <p>Yes: <b>E01</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Open circuit between: PSM control module wiring harness plug (wiring harness side) terminal 38 and generator terminal L or - generator faulty</li> </ul> <p><b>Note:</b> The plug connection X 1/3 (terminal 6), connection point 39, plug connection X 2/3 (terminal 5) and plug connection X 59/1 (terminal 12) are located in the wiring harness. Check the wiring harness for pinching or chafing damage.</p>

<b>E01</b>	- PSM control module faulty
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Test	Work instruction	Result	Possible causes of fault
<b>T01</b>	<p><b>Test: short to ground in signal circuit</b></p> <ul style="list-style-type: none"> <li>• Ignition off</li> <li>• Pull wiring harness plug off of: PSM control module</li> <li>• Vehicle secured against rolling away</li> <li>• Parking brake released</li> <li>• Measure resistance between the following terminals: PSM control module wiring harness plug terminal 76 and ground</li> </ul>	<p>Greater than 500 kOhm</p> <p>Yes: <b>T02</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Short circuit to ground between: PSM control module wiring harness plug (wiring harness side) terminal 76 and plug connection X 1/3 terminal 7 and jumper plug 6/1 and parking brake contact switch terminal 1 and instrument cluster wiring harness plug (wiring harness side) terminal I/2 or</li> <li>- parking brake contact switch faulty</li> </ul> <p><b>Note:</b> Check the wiring harness for pinching or chafing damage.</p>

<b>Test</b>	<b>Work instruction</b>	<b>Result</b>	<b>Possible causes of fault</b>
<b>T02</b>	<b>Test: open circuit in signal circuit</b> <ul style="list-style-type: none"> <li>• Parking brake engaged</li> <li>• Measure resistance between the following terminals: PSM control module wiring harness plug terminal 76 and ground</li> </ul>	<p>Less than 5 V</p> <p>Yes: <b>E01</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Open circuit between: PSM control module wiring harness plug terminal 76 and plug connection X 1/3 terminal 7 and jumper plug 6/1 and parking brake contact switch terminal 1 and parking brake contact switch terminal 2 and ground point 4 or - parking brake contact switch faulty</li> </ul> <p><b>Note:</b> Check the wiring harness for pinching or chafing damage.</p>

<b>E01</b>	- PSM control module faulty
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Test	Work instruction	Result	Possible causes of fault
<b>T03</b>	<b>Test: open circuit in signal circuit</b> <ul style="list-style-type: none"> <li>• Ignition on</li> <li>• PSM switch On actuated</li> <li>• Measure voltage between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 86 and ground</li> </ul>	<p>Greater than 12 V</p> <p>Yes: <b>T04</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Open circuit between: PSM control module wiring harness plug (wiring harness side) terminal 5 and PSM switch wiring harness plug (wiring harness side) terminal 2 or - PSM switch faulty</li> </ul> <p><b>Note:</b> The plug connection X 1/3 (terminal 9) is located in the wiring harness. Check the wiring harness for pinching or chafing damage.</p>
<b>T04</b>	<b>Test: voltage short in signal circuit</b> <ul style="list-style-type: none"> <li>• Measure voltage between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 44 and ground</li> </ul>	<p>Less than 0.3 V</p> <p>Yes: <b>T05</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Short circuit to voltage between: PSM control module wiring harness plug (wiring harness side) terminal 44 and PSM switch wiring harness plug (wiring harness side) terminal 1</li> </ul> <p><b>Note:</b> The plug connection X 1/3 (terminal 10) is located in the wiring harness. Check the wiring harness for pinching or chafing damage.</p>



<b>E01</b>	- PSM control module faulty
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**4503**      **Diagnosis/troubleshooting PSM System PSM05XX**

## **Diagnosis/Troubleshooting**

### **PSM**

### **System PSM05XX**

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**I. Definitions and abbreviations**

ABD	automatic brake differential
ABS	anti-lock brake system
ASR	anti-slip control
CAN bus	Controller Area Network; serial bus system designed specially for use in motor vehicles.
DME	engine control module
EBV	electronic brake distributor
EEPROM	Electrically Erasable Programmable Read Only Memory
FC	fault code
FDR	driving dynamics control
$g$	gravitational acceleration [ $\text{m/s}^2$ ]
LWS	steering-angle sensor
ME 7.2	Motronic with E-gas (electronic accelerator)
MSR	engine drag torque control
PSM	Porsche Stability Management
PST 2	Porsche System Tester 2
RoW	rest of world
SAE	Society of Automotive Engineers



TC                      Traction Control

V                      Volt

## 1. Introduction

The manual contains the diagnosis for the following system:

PSM 5.7 (Porsche Stability Management)

The system is installed in the following vehicle:

911 Carrera (1996) / 911 Carrera 4 (1996) as from model year 2000 (Y)

Apart from general information about the system (testers, component arrangement, etc.), the manual also contains a guided diagnosis procedure. This guided diagnosis should lead the technician to the fault source.

In order to locate a faulty component, the instructions for the main diagnosis test must be followed exactly.

### 1.1 General instructions / safety instructions

The following points must be observed during vehicle diagnosis:

- If the control module is damaged, the complete hydraulic unit with integrated control module must be replaced. When replacing a PSM control module, observe the coding of the control module and calibration of the steering-angle sensor.

- After troubleshooting or repairs, erase the fault memory with the Porsche System Tester 2 and carry out a test drive.
- After the test drive, read out the fault memory with Porsche System Tester 2 again.



#### **Caution!** **Danger of damage!**

- > Never disconnect battery with engine running.
- > Never start engine without securely connected battery.
- > Never use boost chargers to start the engine.
- > Disconnect the negative terminal of the battery before welding work on the vehicle.
- > Never pull off or push on the wiring harness plugs of the control modules or other electronic components when the ignition is switched on.



## 1.2 General information on fault memory

The fault memory of the control module can save up to three different faults simultaneously. If all three fault memories are occupied, the new fault overwrites the oldest fault. It is possible to reset faults in the control module only after an "ignition off - on" procedure. The fault memory of the PSM control module is maintained even in removed state.

### F8 key

In order to be able to assess the fault exactly, the F8 key must be pressed. This information should be saved using the Save key F4 and printed out. If a fault code is stored with "not present" status and no other problems are present, then the fault memory must be erased.

**1. - - - - / Signal implausible / no signal change / open circuit or short to ground / short to B+**

No details available.

Signal implausible:

The incoming signal to the control module deviates from the signal expected.

No signal change:

The incoming signal to the control module does not change.

Open circuit or short to ground:

There is (present) or was (not present) a short-circuit to ground or an open circuit in the circuit to the control module terminal.

Open circuit or short to B+:

There is (present) or was (not present) a short-circuit to voltage or an open circuit in the circuit to the control module terminal.

Short to ground:

There is (present) or was (not present) a short-circuit to ground in the circuit to the control module terminal.

Short to B+:

There is (present) or was (not present) a short-circuit to voltage in the circuit to the control module terminal.

## 2. Light on

PSM light switched on

## 3. present/not present

The fault is detected as present or not present.

### 1.3 General user's guide

The following description explains how to carry out the test steps

#### Step 1:

In the main diagnosis test (7.), the individual test steps must be worked through one after the other. If a fault code is set under test step 4, the subsequent test steps are omitted. References in the tables enable a directed diagnosis which leads to the cause of the fault.

Example: 7. Main diagnosis test; test step 3

3	<ul style="list-style-type: none"> <li>Establish communication with the PSM control module</li> </ul> See table "7.1 Connecting diagnostic tester and establishing communication"
---	---

The work instruction contains a reference to table 7.1, **Connecting diagnostic tester and establishing communication**. The next work steps are described here.

Test	Work instruction	Tester display	Remedy
T01	<ul style="list-style-type: none"> <li>Ignition off</li> <li>Connect diagnostic tester to data link connector.</li> <li>Ignition on</li> <li>Switch on diagnostic tester</li> <li>Engine off</li> </ul>	The diagnostic tester displays the start menu in the respective language.  Yes: <b>T02</b>	No: check diagnostic tester!
T02	<ul style="list-style-type: none"> <li>Select vehicle type: 911 (1996)</li> <li>Start control module search.</li> </ul>	Control module search is active!!!  Yes: <b>T03</b>	No: <b>8.1</b>
...			

This table enables testing to be carried out in steps. If the test T01 is completed successfully, the next test T02 follows. If this test is also completed successfully, then T03 follows, etc. If the control module search does not function in the case above, then a remedy for the problem is provided in 8.1.

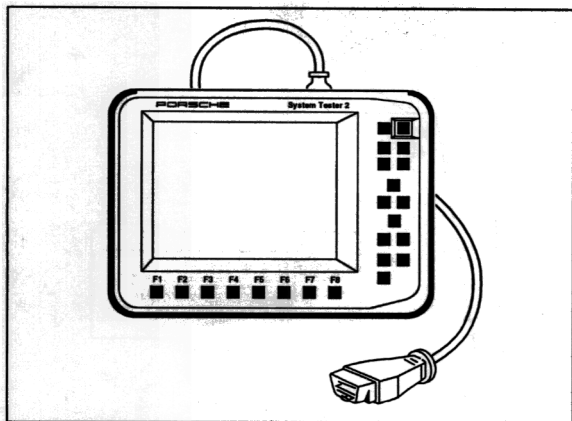
Test	Work instruction	Result	Possible causes of fault
T01	<p><b>Test: short to ground in power supply circuit</b></p> <ul style="list-style-type: none"> <li>• Ignition off</li> <li>• All loads switched off</li> <li>• Pull wiring harness plug off of diagnostic tester</li> <li>• Measure voltage between the following terminals: battery wiring harness plug (component side) terminal 30 and ground</li> </ul>	<p>Greater than 11 V</p> <p>Yes: T02</p>	<p>No:</p> <ul style="list-style-type: none"> <li>• Check the following components for correct functioning: battery and generator</li> <li>• Check following circuits for correct functioning: terminal 31 (GP 13) and terminal 30</li> </ul>
T02	<p><b>Test: short to ground/open circuit in power supply circuit</b></p> <ul style="list-style-type: none"> <li>• Measure voltage between the following terminals: diagnosis wiring harness plug (wiring harness side) terminal 16 and ground</li> </ul>	<p>Greater than 11 V</p> <p>Yes: T03</p>	<p>No:</p> <ul style="list-style-type: none"> <li>• Check the following components for correct functioning: fuse B1, fuse F6</li> <li>• Check the following connection points in the passenger compartment wiring harness: 17, 120</li> </ul> <p><b>Note:</b> an open circuit or a short circuit is present. Check wiring harness for continuity and for pinches or chafing damage.</p>
...			

If no fault is stored with "present" status, test steps 6 - 11 must be carried out until the cause of the fault has been found.

## 2. Testers

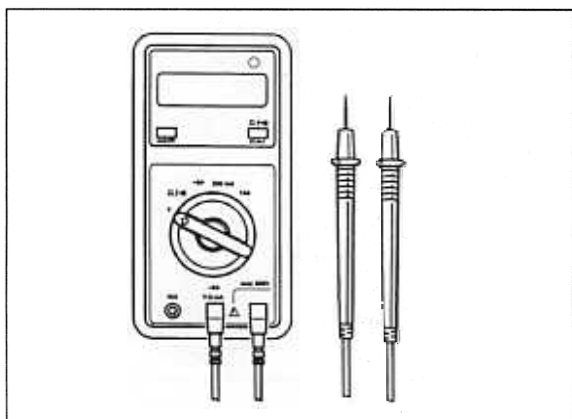
The following testers are required for vehicle diagnosis:

Porsche System Tester 2 (PST 2)



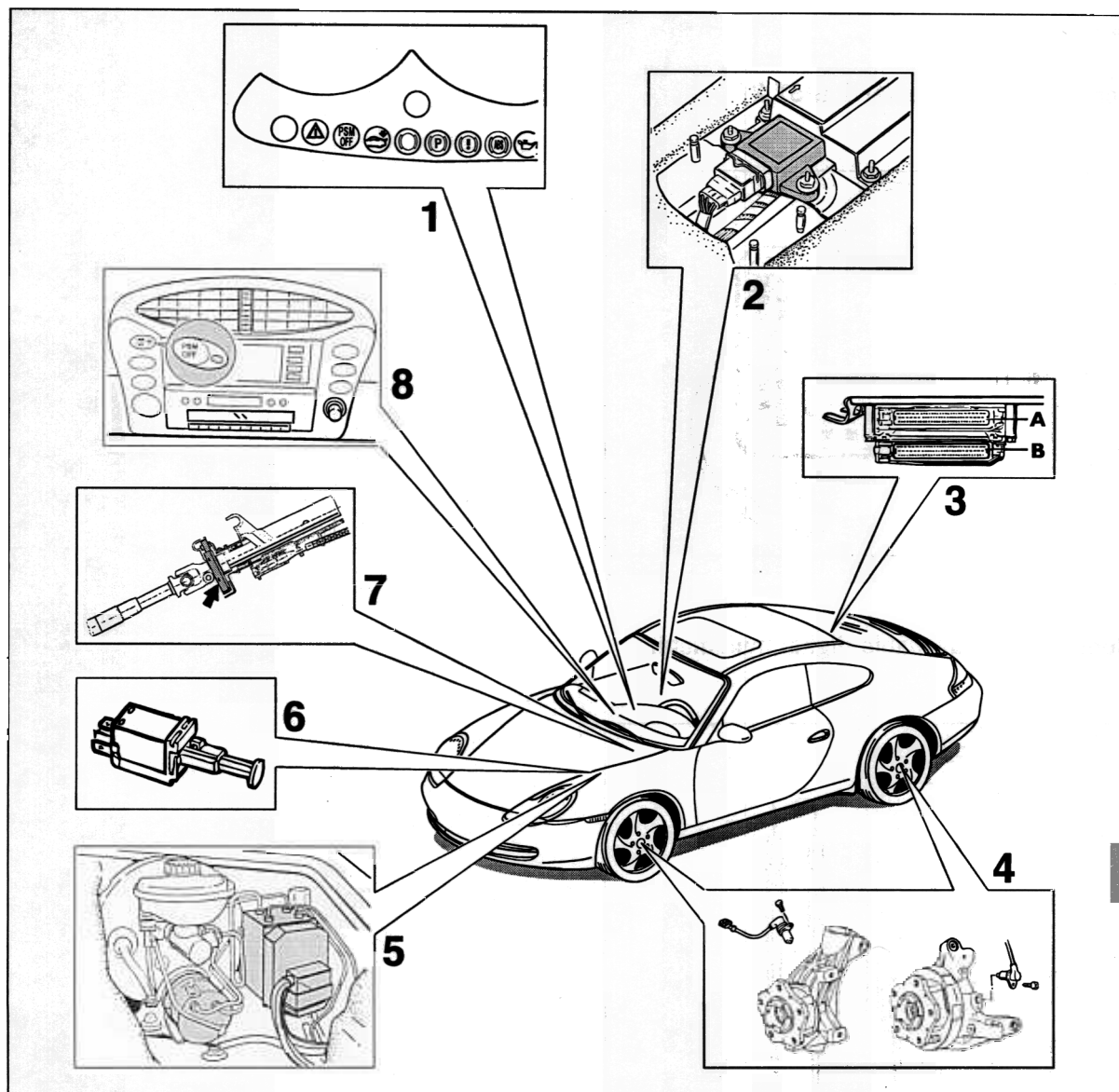
547\_96

Commercially available digital multimeter



2178\_28

### 3. Component arrangement



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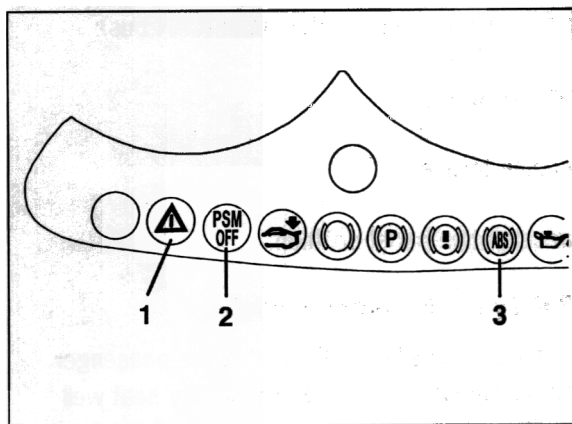
No.	Legend	No.	Legend
1	Information and warning lights	5	Brake system
2	Rate-of-turn sensor with integrated transverse acceleration sensor	6	Stop light switch
3	A- DME control module B- Tiptronic control module	7	Steering-angle sensor
4	Speed sensor	8	PSM OFF switch

### 3.1 Function of individual components

#### 1. Information and warning lights

Installation position: in the instrument cluster

The driver is informed of the PSM control activities by means of the display lights in the instrument cluster.



4\_30\_99

**1** - Information light for FDR, ASR and ABD (colour: yellow)

Lights for a lamp check when ignition is switched on.

Flashes when:

FDR is functioning

ASR is functioning

ABD is functioning

#### **2** - PSM warning light (colour: yellow)

Lights for a lamp check when ignition is switched on.

Lights if:

FDR faulty

ABS faulty

FDR switched off by rocker switch

ABD is functioning

#### **3** - ABS warning light (colour: yellow)

Lights for a lamp check when ignition is switched on.

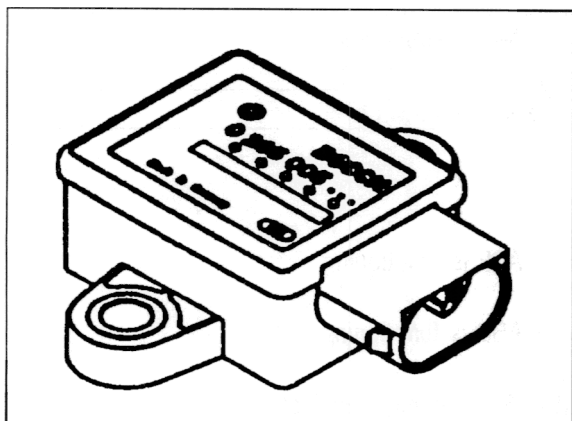
Lights if:

ABS faulty



## 2. Rate-of-turn sensor

Installation position: on the centre console in longitudinal direction



.46\_00

The rate-of-turn sensor and the transverse acceleration sensor are combined in one housing in the PSM 5.7. The components are fitted on a printed circuit board and operate according to the micromechanic principle. The sensor is connected via a six-pole plug. The transverse acceleration is measured according to a capacitive principle. The rate of turn is recorded by measuring the occurring Coriolis acceleration.

Together with the information from the steering-angle sensor and the rate-of-turn sensor, the current handling behaviour with respect to its transverse dynamics is calculated.

Effects in the case of failure of the:

### Rate-of-turn sensor

Without measurement of the yaw speed, it is not possible for the PSM control module to detect whether the vehicle is developing a tendency for spinning. The PSM function is switched off.

### Transverse acceleration sensor

Without the transverse acceleration measurement, it is impossible for the PSM control module to calculate the actual vehicle condition. The PSM function is switched off.

## 3.A DME control module

Installation position in Coupe: in the passenger compartment behind the emergency seat well on the right.

Installation position in Cabrio: on the frame for the roll-over protection system in the convertible top compartment.

The DME control module is connected to the PSM control module. It transfers the following information through a data lead (CAN bus):

engine speed,

engine torque,

acceleration pedal position.

## 3.B Tiptronic control module

Installation position in Coupe: in the passenger compartment behind the emergency seat well on the right.

Installation position in Cabrio: on the frame for the roll-over protection system in the convertible top compartment.

The Tiptronic control module receives commands through the CAN bus to execute or not to execute shift operations as necessary.

#### 4. Speed sensors

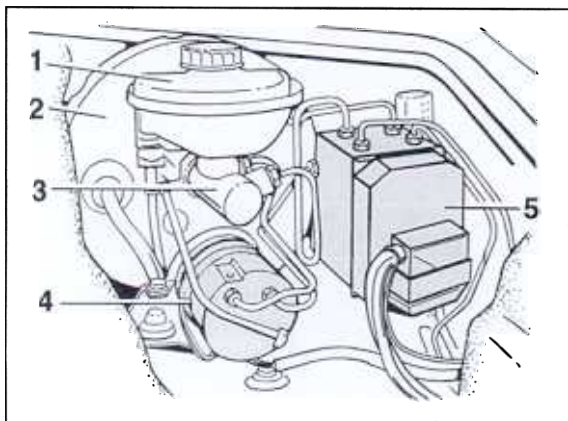
Installation position: on the front and rear wheel carriers.

The speed sensors are conventional passive sensors with a pulse wheel. They supply the PSM control module with information about the current wheel speed.

#### 5. Brake system

Installation position: in the front end

The brake master cylinder, the vacuum brake booster, the hydraulic unit and the booster pump are installed in the front end. The brake master cylinder is a tandem brake master cylinder with modified central valve. The figure shows configuration of the Carrera 4.



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1 - Expansion tank with brake fluid level switch

2 - Vacuum booster

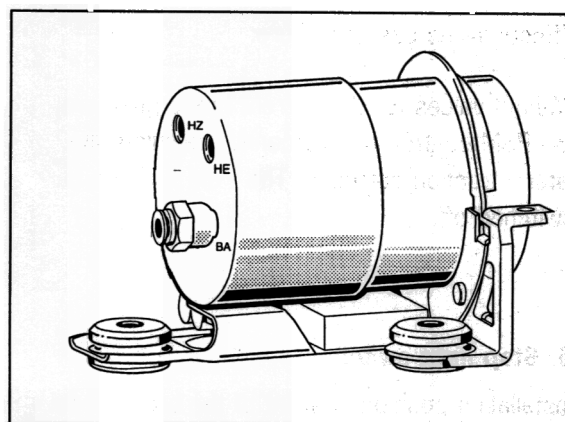
3 - Brake master cylinder

4 - Booster pump

5 - Hydraulic unit with control module

#### Booster pump

Installation position: Carrera 4, on the left side of the front end. Carrera 2, on the right side of the front end.



4\_230\_99

A sufficiently fast pressure increase in the wheel brakes is important for perfect control of the driving dynamics. In order to guarantee a secure flow capacity of the return pump across the entire temperature range, the booster pump is switched in the case of driving dynamics control and an admission pressure of up to 20 bar is built up in front of the return pumps.

Effects in the case of failure:

The PSM function is switched off.



### Brake pressure sensor

Installation position: on the PSM hydraulic unit

The brake pressure sensor records the brake pressure (desired deceleration), which is used by the PSM control module to calculate the wheel brake forces (longitudinal forces). If driving dynamics control is necessary during the braking procedure, the existing wheel brake forces are included to calculate the lateral traction.

Effects in the case of failure:

Without values for the current brake pressure, the PSM control module cannot calculate the lateral traction correctly. The PSM function is switched off.

### 6. Stop light switch

Installation position: in front of the brake pedal

When the brake is actuated, signals from the twin contact (make and break) are detected and evaluated by the control module. If the brake is actuated during an ASR control operation, this procedure is immediately interrupted in order to initiate an ABS control operation.

During an FDR control operation, these signals are processed in addition to the brake pressure signal.

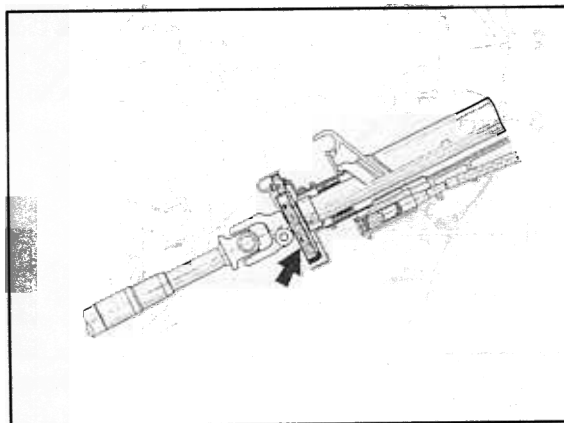
### 7. Steering-angle sensor

Installation position: on the steering column in front of the intermediate shaft

The steering-angle sensor supplies information about the slip angle of the front wheels to the PSM control module (intention of driver in relation to direction of travel). In the PSM control module this signal is used to calculate the required vehicle behaviour with respect to its transverse dynamics by means of the calculation of the vehicle speed. The sensor has its own microcontroller. The information is transmitted to the PSM control module by means of a CAN data bus.

Effects in the case of failure:

Without the information from the steering-angle sensor, the PSM control module cannot produce a picture of the desired direction of travel. The PSM function is switched off in this case.

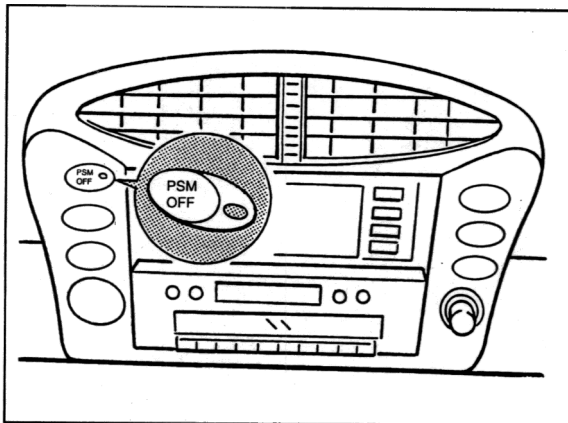


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### 8. PSM OFF switch

Installation position: in the centre console

The system can be switched off by means of a switch in the centre console. System deactivation is displayed by the indicator lights in the PSM switch and in the instrument cluster. The ABD function (automatic brake differential) is maintained when the PSM is switched off. For safety reasons, the driving dynamics control is reactivated temporarily for the duration of one brake pedal actuation.



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### 5. Switch for parking brake control

Installation position: on the parking brake

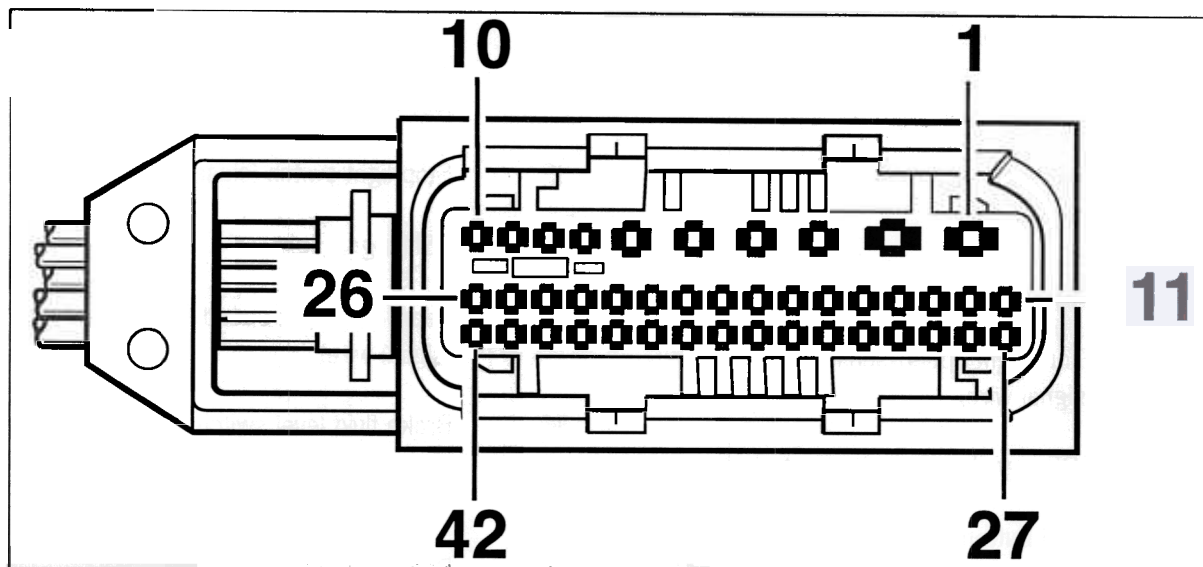
When the parking brake is engaged, the parking brake contact closes and sends a ground signal to the PSM control module. In order to avoid an excessive increase of the torque on the drive wheels, engine drag torque control operation is not permitted if a signal is present.

#### 4. System description

The wheel speeds, steering angle, vehicle speed, transverse acceleration and the brake pressure in the brake master cylinder are measured and processed in the PSM control module. The control module is connected with the control modules of the engine - and for Tiptronic with the transmission management - by means of a CAN data bus. These digital line connections allow rapid data exchange between the PSM, DME and Tiptronic control modules. The control module is constantly supplied with current data about the engine torque, accelerator pedal position and transmission ratio (for Tiptronic). The rate-of-turn and transverse acceleration sensors detect the forces which act to turn the vehicle around its centre of gravity. The longitudinal and transverse forces on the wheels can be calculated from the value measurements listed. If these values exceed certain control thresholds, the control module triggers the appropriate solenoid valves and the return pump in the hydraulic unit in order specifically to apply defined brake pressure to one wheel or to several wheels.

## 5. Connector assignment

### 5.1 PSM control module wiring harness plug

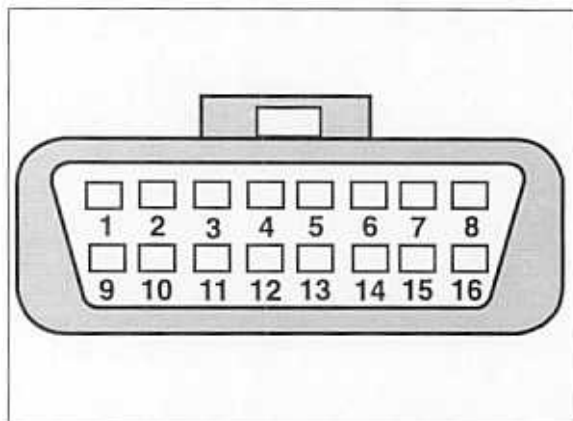


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Pin	Designation	Pin	Designation
1	Ground for booster pump relay Ground for return pump	6	Voltage of terminal 30 valve relay
2	Voltage for solenoid valve relay Voltage for return pump relay	7	PSM/ASR/ABD signal light, instrument cluster (ground)
3	Voltage for booster pump	8	Transverse acceleration sensor signal wire
4	Ground for booster pump	9	Rate-of-turn sensor (test signal)
5	Ground for PSM control module and rate-of-turn sensor	10	Rate-of-turn sensor (reference signal) Diagnosis communication wire

Pin	Designation	Pin	Designation
12	Front left speed sensor (signal wire)	29	Rear left speed sensor (ground)
13	Applies to 911 Carrera 2: Front left speed sensor (ground)	30	Rear right speed sensor (ground)
14	Rear left speed sensor (signal wire)	31	Rear right speed sensor (signal wire)
15	Front right speed sensor (ground)	32	Stop light switch (close)
16	Front right speed sensor (signal wire)	33	PSM signal light
17	ABS signal light, instrument cluster	34	Rear left output speed sensor (signal wire)
18	PSM button lighting	36	Brake fluid level switch
19	Rear right speed sensor (signal wire)	37	Stop light switch (open)
20	PSM on (from PSM button)	38	Parking brake switch (ground)
21	Rate-of-turn sensor (ground)	39	Rate-of-turn sensor (voltage)
22	Battery charge terminal 61	40	CAN bus (low)
23	Power supply terminal 15	41	Rate-of-turn sensor (signal wire)
24	CAN bus (high)	42	Pressure sensor (voltage)
25	Pressure sensor (ground)		
26	Pressure sensor (signal wire)		
27	PSM off (from PSM button)		
28	Applies to 911 Carrera 4: Front left speed sensor (ground)		

## 5.2 Diagnosis wiring harness plug



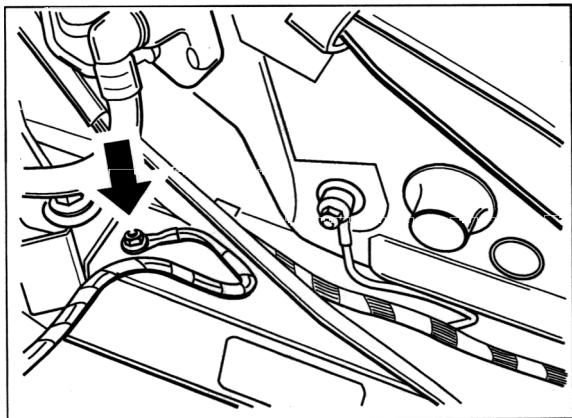
137\_99

Pin	Designation
	Terminal 15
2	Bus positive line
3	Vehicle bus
4	Power ground
5	Signal ground
7	
10	Bus negative line
11	Vehicle bus
12	Vehicle bus shield
14	Data wire
15	
16	Terminal 30

## 6. Ground points

### Ground point 2

Ground point 2 is located on the left at the front of the luggage compartment.



45030004

## 7. Main diagnosis test

Test step	Work instruction
1	<ul style="list-style-type: none"> <li>• <b>Customer complaint</b> Record the complaint from the customer for evaluation at a later stage</li> </ul>
2	<ul style="list-style-type: none"> <li>• <b>Introductory visual inspection</b> Check brake fluid reservoir for correct level Check system for leaks Check wheel bearings Check tyre size, pressure and condition <b>Note:</b> spacers must not be installed!</li> </ul>
3	<ul style="list-style-type: none"> <li>• <b>Establish communication with the PSM control module</b> See table "7.1 Connecting diagnostic tester and establishing communication"</li> </ul>
4	<ul style="list-style-type: none"> <li>• <b>Identification test</b> See table "7.2 Identification"</li> </ul>
5	<ul style="list-style-type: none"> <li>• <b>Read out fault memory</b> See table "7.3 Fault memory" If no fault code is stored with "present" status, continue with test step 6</li> </ul>
6	<ul style="list-style-type: none"> <li>• <b>Actual values test</b> See table "7.4 Actual values"</li> </ul>
7	<ul style="list-style-type: none"> <li>• <b>Input signals test</b> See table "7.5 Input signals"</li> </ul>
8	<ul style="list-style-type: none"> <li>• <b>Drive links test</b> See table "7.6 Drive links"</li> </ul>
9	<ul style="list-style-type: none"> <li>• <b>Static test</b> See "7.7 Static test"</li> </ul>
10	<ul style="list-style-type: none"> <li>• <b>Swap test</b> See "7.8 Swap test"</li> </ul>



## 7.1 Connecting diagnostic tester and establishing communication

The instructions in the operating instructions of the diagnostic tester must be read before the diagnostic tester is connected.

Work instruction		Tester display	Remedy
<b>1</b>	<ul style="list-style-type: none"> <li>Ignition off</li> <li>Connect diagnostic tester to data link connector.</li> <li>Ignition on</li> <li>Switch on diagnostic tester</li> <li>Engine off</li> </ul>	<p>The diagnostic tester displays the start menu in the respective language.</p> <p>Yes: continue with 2</p>	No: check diagnostic tester!
<b>2</b>	<ul style="list-style-type: none"> <li>Select vehicle type: 911 (1996)</li> <li>Start control module search.</li> </ul> <p><b>Note:</b> select automatic control module search!</p>	<p>Control module search is active!!!</p> <p>Yes: continue with 3</p>	No: <b>8.1</b>
<b>3</b>	<ul style="list-style-type: none"> <li>Select control module: PSM</li> </ul>	<p>The diagnostic tester displays the function selection of the control module.</p> <p>Yes: continue with <b>7.2</b></p>	No: <b>8.1</b>

**Note:** The PSM control module requires the terminals 5 (ground), 11 (K-line) and 23 (terminal 15, voltage) to establish communication. The ignition should not be switched off during diagnosis, as this would interrupt communication between the diagnostic tester and the control module. Communication is interrupted if the vehicle speed exceeds 20 km/h.

## 7.2 Identification

Checking the installed control module:

Work instruction		Tester display
1	• Select Identification	Diagnosis software number: PSM05XX Part No: 996 XXX XXX XX

**Note:** The allocation of the part number can be taken from the corresponding Parts Catalogue.

The following blocks are displayed after actuating the **F8** key.

Content of the blocks:

**Block 1:** control module identification

**Block 2:** software version

### 7.3 Fault memory

FC - fault code

FC	Tester display fault text	Remedy
4200	<b>Front right speed sensor wire</b> <ul style="list-style-type: none"> <li>• Short circuit to voltage or open circuit in the circuit to control module terminals 15, 16</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• Wire/plug connection between control module and speed sensor faulty</li> <li>• Speed sensor faulty</li> </ul> <b>Affected terminals:</b> <p>15, 16</p>	8.7
4201	<b>Front right speed sensor</b> <ul style="list-style-type: none"> <li>• Incorrect signal from speed sensor</li> <li>• Vehicle speed is greater than 6 km/h</li> <li>• Condition above must be fulfilled for at least 20 s</li> <li>• Short circuit to ground in the circuit to control module terminals 15, 16</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• Toothed disc/speed sensor soiled or damaged</li> <li>• Speed sensor faulty</li> </ul> <b>Affected terminals:</b> <p>15, 16</p>	8.7

FC	Tester display fault text	Remedy
4205	<b>Front left speed sensor wire</b> <ul style="list-style-type: none"> <li>• Short circuit to voltage or open circuit in the circuit to control module terminal 28 for 911 Carrera 4, 13 for 911 Carrera 2, 12</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• Wire/plug connection between control module and speed sensor faulty</li> <li>• Speed sensor faulty</li> </ul> <b>Affected terminals:</b> 28 for 911 Carrera 4, 13 for 911 Carrera 2, 12	8.6
4206	<b>Front left speed sensor</b> <ul style="list-style-type: none"> <li>• Incorrect signal from speed sensor</li> <li>• Vehicle speed is greater than 6 km/h</li> <li>• Condition above must be fulfilled for at least 20 s</li> <li>• Short circuit to ground in the circuit to control module terminal 28 for 911 Carrera 4, 13 for 911 Carrera 2, 12</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• Toothed disc/speed sensor soiled or damaged</li> <li>• Speed sensor faulty</li> </ul> <b>Affected terminals:</b> 28 for 911 Carrera 4, 13 for 911 Carrera 2, 12	8.6
4210	<b>Rear right speed sensor wire</b> <ul style="list-style-type: none"> <li>• Short circuit to voltage or open circuit in the circuit to control module terminals 30, 31</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• Wire/plug connection between control module and speed sensor faulty</li> <li>• Speed sensor faulty</li> </ul> <b>Affected terminals:</b> 30, 31	8.9

FC	Tester display fault text	Remedy
	<b>Rear right speed sensor</b> <ul style="list-style-type: none"> <li>• Incorrect signal from speed sensor</li> <li>• Vehicle speed is greater than 6 km/h</li> <li>• Condition above must be fulfilled for at least 20 s</li> <li>• Short circuit to ground in the circuit to control module terminals 30, 31</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• Toothed disc/speed sensor soiled or damaged</li> <li>• Speed sensor faulty</li> </ul> <b>Affected terminals:</b> 30, 31	8.9
4215	<b>Rear left speed sensor wire</b> <ul style="list-style-type: none"> <li>• Short circuit to voltage or open circuit in the circuit to control module terminals 14, 29</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• Wire/plug connection between control module and speed sensor faulty</li> <li>• Speed sensor faulty</li> </ul> <b>Affected terminals:</b> 14, 29	8.8
4216	<b>Rear left speed sensor</b> <ul style="list-style-type: none"> <li>• Incorrect signal from speed sensor</li> <li>• Vehicle speed is greater than 6 km/h</li> <li>• Condition above must be fulfilled for at least 20 s</li> <li>• Short circuit to ground in the circuit to control module terminals 14, 29</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• Toothed disc/speed sensor soiled or damaged</li> <li>• Speed sensor faulty</li> </ul> <b>Affected terminals:</b> 14, 29	8.8

FC	Tester display fault text	Remedy
	<p><b>Hydraulic control unit faulty</b></p> <ul style="list-style-type: none"> <li>• Front right outlet valve voltage actual value is evaluated and shows implausible value (valve circuit or driver output malfunction)</li> </ul> <p><b>Effect:</b></p> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> <p><b>Possible cause of fault:</b></p> <ul style="list-style-type: none"> <li>• PSM hydraulic unit faulty</li> </ul> <p><b>Affected terminals:</b></p> <p>—</p>	<p>Replace hydraulic unit</p>
4231	<p><b>Hydraulic control unit faulty</b></p> <ul style="list-style-type: none"> <li>• Front right inlet valve voltage actual value is evaluated and shows implausible value (valve circuit or driver output malfunction)</li> </ul> <p><b>Effect:</b></p> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> <p><b>Possible cause of fault:</b></p> <ul style="list-style-type: none"> <li>• PSM hydraulic unit faulty</li> </ul> <p><b>Affected terminals:</b></p> <p>—</p>	<p>Replace hydraulic unit</p>
4236	<p><b>Hydraulic control unit faulty</b></p> <ul style="list-style-type: none"> <li>• Front left outlet valve voltage actual value is evaluated and shows implausible value (valve circuit or driver output malfunction)</li> </ul> <p><b>Effect:</b></p> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> <p><b>Possible cause of fault:</b></p> <ul style="list-style-type: none"> <li>• PSM hydraulic unit faulty</li> </ul> <p><b>Affected terminals:</b></p> <p>—</p>	<p>Replace hydraulic unit</p>

FC	Tester display fault text	Remedy
	<b>Hydraulic control unit faulty</b> <ul style="list-style-type: none"> <li>• Front left inlet valve voltage actual value is evaluated and shows implausible value (valve circuit or driver output malfunction)</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• PSM hydraulic unit faulty</li> </ul> <b>Affected terminals:</b> <p>—</p>	Replace hydraulic unit
4246	<b>Hydraulic control unit faulty</b> <ul style="list-style-type: none"> <li>• Rear right outlet valve voltage actual value is evaluated and shows implausible value (valve circuit or driver output malfunction)</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• PSM hydraulic unit faulty</li> </ul> <b>Affected terminals:</b> <p>—</p>	Replace hydraulic unit
4251	<b>Hydraulic control unit faulty</b> <ul style="list-style-type: none"> <li>• Rear right inlet valve voltage actual value is evaluated and shows implausible value (valve circuit or driver output malfunction)</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• PSM hydraulic unit faulty</li> </ul> <b>Affected terminals:</b> <p>—</p>	Replace hydraulic unit

FC	Tester display fault text	Remedy
4256	<b>Hydraulic control unit faulty</b> <ul style="list-style-type: none"> <li>• Rear left outlet valve voltage actual value is evaluated and shows implausible value (valve circuit or driver output malfunction)</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• PSM hydraulic unit faulty</li> </ul> <b>Affected terminals:</b> –	Replace hydraulic unit
4261	<b>Hydraulic control unit faulty</b> <ul style="list-style-type: none"> <li>• Rear left inlet valve voltage actual value is evaluated and shows implausible value (valve circuit or driver output malfunction)</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• PSM hydraulic unit faulty</li> </ul> <b>Affected terminals:</b> –	Replace hydraulic unit



FC	Tester display fault text	Remedy
	<b>Return pump fault</b> <ul style="list-style-type: none"> <li>Return pump and valve relay voltage actual values are evaluated and display implausible values</li> <li>Open circuit in the circuit to control module terminal 1</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>PSM function is switched off</li> <li>ABS function is switched off</li> <li>ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>Return pump motor blocked/runs too freely</li> <li>Wire/plug connector faulty</li> <li>PSM hydraulic unit faulty</li> </ul> <b>Affected terminals:</b> 1	8.12
4276	<b>Valve relay</b> <ul style="list-style-type: none"> <li>Actual values of the solenoid valves are evaluated and display implausible values</li> <li>Valve relay does not pick up, drops out or sticks</li> <li>Short circuit to ground or open circuit in the circuit to control module terminal 6</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>PSM function is switched off</li> <li>ABS function is switched off</li> <li>ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>Fuse E9 faulty</li> <li>Wire/plug connection faulty</li> <li>PSM hydraulic unit faulty</li> </ul> <b>Affected terminals:</b> 6	8.11

FC	Tester display fault text	Remedy
4281	<b>Brake fluid level</b> <ul style="list-style-type: none"> <li>• Status is evaluated and displays an implausible value</li> <li>• Short circuit to ground/voltage or open circuit in the circuit to control module terminal 36</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• Brake fluid level too low</li> <li>• Wiring/plug connection faulty</li> <li>• Brake fluid level switch faulty</li> </ul> <b>Affected terminals:</b> 36	8.14
4340	<b>Stop light switch</b> <ul style="list-style-type: none"> <li>• Incorrect voltage state at control module terminals 32, 37</li> <li>• Short circuit to ground/voltage or open circuit in the circuit to control module terminals 32, 37</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• Wiring/plug connection faulty</li> <li>• Stop light switch mechanism not O.K.</li> <li>• Pressure sensor plausibility</li> </ul> <b>Affected terminals:</b> 32, 37	8.5
4400	<b>Transverse acceleration sensor</b> <ul style="list-style-type: none"> <li>• Transverse acceleration sensor (rate-of-turn sensor) actual value is evaluated and displays an implausible value</li> <li>• Short circuit to ground/voltage or open circuit in the circuit to control module terminals 8, 39</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• Wiring/plug connection faulty</li> <li>• Transverse acceleration sensor (rate-of-turn sensor) faulty</li> </ul> <b>Affected terminals:</b> 8, 39	8.15

FC	Tester display fault text	Remedy
	<b>Rate-of-turn sensor</b> <ul style="list-style-type: none"> <li>• Rate-of-turn sensor actual value is evaluated and displays an implausible value</li> <li>• Short circuit to ground/voltage or open circuit in the circuit to control module terminals 9, 10, 21, 39, 41</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• Wiring/plug connection faulty</li> <li>• Rate-of-turn sensor faulty</li> <li>• PSM control module faulty</li> </ul> <b>Affected terminals:</b> 9, 10, 21, 39, 41	8.17
4440	<b>Steering-angle sensor</b> <ul style="list-style-type: none"> <li>• Steering-angle sensor actual value is evaluated and displays an implausible value</li> <li>• Short circuit to ground or open circuit in the circuit to control module terminals 21, 39</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• Steering-angle sensor calibration incorrect</li> <li>• Wiring/plug connection faulty</li> <li>• Steering-angle sensor faulty</li> </ul> <b>Affected terminals:</b> 21, 39	8.16
4460	<b>Pressure sensor</b> <ul style="list-style-type: none"> <li>• Pressure sensor actual value is evaluated and displays an implausible value</li> <li>• Short circuit to ground/voltage or open circuit in the circuit to control module terminals 25, 26, 42</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• Wiring faulty</li> <li>• Pressure sensor faulty (replace hydraulic unit)</li> </ul> <b>Affected terminals:</b> 25, 26, 42	8.18

FC	Tester display fault text	Remedy
4480	<b>Booster pump</b> <ul style="list-style-type: none"> <li>Booster pump voltage actual value is evaluated and displays an implausible value</li> <li>Short circuit to ground/voltage or open circuit in the circuit to control module terminals 2, 3, 4</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>PSM function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>Booster pump motor blocked/faulty</li> <li>Wiring/plug connection faulty</li> </ul> <b>Note:</b> Do not jumper the pump; it must not run dry under any circumstances! <b>Affected terminals:</b> 2, 3, 4	8.13
4607	<b>Control module faulty</b> <ul style="list-style-type: none"> <li>Internal functional check</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>PSM function is switched off</li> <li>ABS function is switched off</li> <li>ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>PSM control module faulty</li> </ul> <b>Affected terminals:</b> —	Replace hydraulic unit
4802	<b>Undervoltage</b> <ul style="list-style-type: none"> <li>Internal functional check for control module</li> <li>Voltage is less than 9.8 V (control module, rate-of-turn sensor, and steering-angle sensor power supply)</li> <li>Vehicle speed is greater than 6 km/h</li> </ul> <b>Note:</b> once the vehicle voltage is within the permissible voltage range again, the PSM system is switched back on and the indicator lights go out. <b>Effect:</b> <ul style="list-style-type: none"> <li>PSM function is switched off</li> <li>ABS function is switched off</li> <li>ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>Vehicle voltage was too low</li> <li>Connection to the PSM control module faulty</li> </ul> <b>Affected terminals:</b> 1, 5, 23	8.2

FC	Tester display fault text	Remedy
5024	<b>No CAN message from Tiptronic</b> <ul style="list-style-type: none"> <li>• Engine running</li> <li>• No CAN messages from the Tiptronic control module</li> <li>• Short circuit to ground/voltage or open circuit in the circuit to control module terminals 24, 40</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• CAN bus connection faulty</li> <li>• Tiptronic control module faulty</li> <li>• Incorrect version coded</li> </ul> <b>Affected terminals:</b> 24, 40	8.4
5260	<b>Booster valve 1</b> <ul style="list-style-type: none"> <li>• Booster valve voltage actual value is evaluated and shows implausible value (valve circuit or driver output malfunction)</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• Wiring/plug connection faulty</li> <li>• PSM hydraulic unit faulty</li> </ul> <b>Affected terminals:</b> -	Replace hydraulic unit
5262	<b>Booster valve 2</b> <ul style="list-style-type: none"> <li>• Booster valve voltage actual value is evaluated and shows implausible value (valve circuit or driver output malfunction)</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• Wiring/plug connection faulty</li> <li>• PSM hydraulic unit faulty</li> </ul> <b>Affected terminals:</b> -	Replace hydraulic unit

FC	Tester display fault text	Remedy
5265	<b>Switch-over valve 1</b> <ul style="list-style-type: none"> <li>Switch-over valve voltage actual value is evaluated and shows implausible value (valve circuit or driver output malfunction)</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>PSM function is switched off</li> <li>ABS function is switched off</li> <li>ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>Wiring/plug connection faulty</li> <li>PSM hydraulic unit faulty</li> </ul> <b>Affected terminals:</b> —	Replace hydraulic unit
5267	<b>Switch-over valve 2</b> <ul style="list-style-type: none"> <li>Switch-over valve voltage actual value is evaluated and shows implausible value (valve circuit or driver output malfunction)</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>PSM function is switched off</li> <li>ABS function is switched off</li> <li>ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>Wiring/plug connection faulty</li> <li>PSM hydraulic unit faulty</li> </ul> <b>Affected terminals:</b> —	Replace hydraulic unit

FC	Tester display fault text	Remedy
5281	<b>Version coding fault</b> <ul style="list-style-type: none"> <li>• Ignition on</li> <li>• Discrepancy between required coding in the control module and actual coding of the vehicle version</li> <li>• The fault code is present in the delivery status of the control module. It does not display an existing fault, but ensures that the system indicator light remains activated after the first installation of the control module in the vehicle until the control module has been correctly programmed</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• PSM control module newly installed</li> <li>• Coding not O.K.</li> </ul> <b>Affected terminals:</b> -	Code control module
5500	<b>Wheel speed monitoring</b> <ul style="list-style-type: none"> <li>• The fault is stored if the average speed of one wheel is at least 5 % greater than the speed of the other wheels for longer than 20 s</li> <li>• Vehicle speed is greater than 6 km/h</li> <li>• ABS control not active</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• Toothed discs soiled/damaged</li> <li>• Tyre pressure, wheel size (spare wheel) incorrect</li> </ul> <b>Affected terminals:</b> -	8.10



FC	Tester display fault text	Remedy
	<b>Extraordinary operating condition</b> <ul style="list-style-type: none"> <li>The fault is stored if a control operation lasts for longer than 60 s. (Extreme driving situation: snow-covered circular paths, icy roads, constant braking)</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>PSM function is switched off</li> <li>ABS function is switched off</li> <li>ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>Vehicle was in an extraordinary operating condition</li> </ul> <b>Affected terminals:</b> <p>–</p>	Delete fault memory and carry out test drive.
5505	<b>Electrical system (steering-angle sensor)</b> <ul style="list-style-type: none"> <li>Ignition on</li> <li>The fault is stored if the electrical system of the steering-angle sensor is faulty</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>PSM function is switched off</li> <li>ABS function is switched off</li> <li>ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>Wiring faulty</li> <li>Steering-angle sensor faulty</li> </ul> <b>Affected terminals:</b> <p>21, 39</p>	8.16
5506	<b>Rate-of-turn sensor, electrical system</b> <ul style="list-style-type: none"> <li>Ignition on</li> <li>The fault is stored if the electrical system of the rate-of-turn sensor is faulty</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>PSM function is switched off</li> <li>ABS function is switched off</li> <li>ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>Wiring faulty</li> <li>Rate-of-turn sensor faulty</li> </ul> <b>Affected terminals:</b> <p>9, 10, 21, 39, 40</p>	8.17



FC	Tester display fault text	Remedy
5520	<b>CAN data bus (drive)</b> <ul style="list-style-type: none"> <li>• Engine running</li> <li>• DME control module transmits incorrect signal</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• Fault in DME control module</li> </ul> <b>Affected terminals:</b> <p>–</p>	See DME diagnosis
5521	<b>Incorrect data exchange</b> <ul style="list-style-type: none"> <li>• Engine running</li> <li>• DME communication incorrect</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• Fault in the DME</li> </ul> <b>Affected terminals:</b> <p>24, 40</p>	See DME diagnosis
5522 5523	<b>DME does not transmit CAN message</b> <ul style="list-style-type: none"> <li>• Engine running</li> <li>• No CAN message from the DME control module</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• DME control module pulled off</li> <li>• CAN bus connection faulty</li> <li>• DME control module faulty</li> </ul> <b>Affected terminals:</b> <p>24, 40</p>	See DME diagnosis

FC	Tester display fault text	Remedy
	<p><b>incorrect CAN speed signal from the DME</b></p> <ul style="list-style-type: none"> <li>• Engine running</li> <li>• Fault is transmitted from the DME control module through CAN</li> </ul> <p><b>Effect:</b></p> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> <p><b>Possible cause of fault:</b></p> <ul style="list-style-type: none"> <li>• Fault in the DME</li> </ul> <p><b>Affected terminals:</b> 24, 40</p>	<p>See DME diagnosis</p>
5525	<p><b>Inaccurate torque information from the DME</b></p> <ul style="list-style-type: none"> <li>• Engine running</li> <li>• Fault is transmitted from the DME control module through CAN</li> </ul> <p><b>Effect:</b></p> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> <p><b>Possible cause of fault:</b></p> <ul style="list-style-type: none"> <li>• Fault in the DME</li> </ul> <p><b>Affected terminals:</b> 24, 40</p>	<p>See DME diagnosis</p>
5526	<p><b>Incorrect pedal value from the DME</b></p> <ul style="list-style-type: none"> <li>• Engine running</li> <li>• Fault is transmitted from the DME control module through CAN</li> </ul> <p><b>Effect:</b></p> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> <p><b>Possible cause of fault:</b></p> <ul style="list-style-type: none"> <li>• Fault in the DME</li> </ul> <p><b>Affected terminals:</b> 24, 40</p>	<p>See DME diagnosis</p>

FC	Tester display fault text	Remedy
	<p><b>Not possible to transmit by means of CAN</b></p> <ul style="list-style-type: none"> <li>• Battery voltage &gt; 10V</li> <li>• Electrical test of the CAN bus</li> <li>• Short circuit to ground/voltage or open circuit in the circuit to control module terminals 24, 40</li> </ul> <p><b>Effect:</b></p> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> <p><b>Possible cause of fault:</b></p> <ul style="list-style-type: none"> <li>• CAN bus connection faulty</li> </ul> <p><b>Affected terminals:</b> 24, 40</p>	8.3
5528	<p><b>Software status of DME not plausible</b></p> <ul style="list-style-type: none"> <li>• Internal check of control module</li> <li>• Incorrect software status detection</li> </ul> <p><b>Effect:</b></p> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> <p><b>Possible cause of fault:</b></p> <ul style="list-style-type: none"> <li>• Fault in DME control module software</li> </ul> <p><b>Affected terminals:</b> 24, 40</p>	See DME diagnosis

FC	Tester display fault text	Remedy
5529	<b>Fault in the CAN message from Tiptronic</b> <ul style="list-style-type: none"> <li>• Engine running</li> <li>• Fault is transmitted from the Tiptronic control module through CAN</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> <li>• Tiptronic control module is in the reduced driving program (electrically)</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• Fault in the Tiptronic</li> </ul> <b>Affected terminals:</b> 24, 40	See Tiptronic diagnosis
5540	<b>Fault stored in the DME</b> <ul style="list-style-type: none"> <li>• Internal check of control module</li> <li>• DME fault memory contains a fault</li> </ul> <b>Effect:</b> <ul style="list-style-type: none"> <li>• PSM function is switched off</li> <li>• ABS function is switched off</li> <li>• ASR function is switched off</li> </ul> <b>Possible cause of fault:</b> <ul style="list-style-type: none"> <li>• Fault in the DME</li> </ul> <b>Affected terminals:</b> 24, 40	See DME diagnosis

### 7.3.1 Erase fault memory

This menu item is used to erase the fault memory after it has been read out.

**Note:** The fault memory is maintained even when the control module is removed.

## 7.4 Actual values

Checking the actual values:

Tester display		Work instruction	Tester display	Remedy
1	Speed, front left	<ul style="list-style-type: none"> <li>• Engine off</li> <li>• Vehicle jacked up and appropriate wheel turned slowly by hand</li> </ul>	Greater than 1 km/h  Yes: 2	No: 8.6
2	Speed, front right	<ul style="list-style-type: none"> <li>• Engine off</li> <li>• Vehicle jacked up and appropriate wheel turned slowly by hand</li> </ul>	Greater than 1 km/h  Yes: 3	No: 8.7
3	Speed, rear left	<ul style="list-style-type: none"> <li>• Engine off</li> <li>• Vehicle jacked up and appropriate wheel turned slowly by hand</li> </ul>	Greater than 1 km/h  Yes: 4	No: 8.8
4	Speed, rear right	<ul style="list-style-type: none"> <li>• Engine off</li> <li>• Vehicle jacked up and appropriate wheel turned slowly by hand</li> </ul>	Greater than 1 km/h  Yes: 5	No: 8.9
5	Steering-angle sensor	<ul style="list-style-type: none"> <li>• Wheels in straight-ahead position</li> </ul>	0° +/- 3°  Yes: 6	No: 8.16
6	Power supply	<ul style="list-style-type: none"> <li>• Ignition on</li> <li>• Engine off</li> <li>• All loads switched off</li> </ul>	Display corresponds approx. to battery voltage > 11 V  Yes: 7.5	No: 8.2
	Safety code	<ul style="list-style-type: none"> <li>• The safety code is required to calibrate the steering-angle sensor</li> </ul>	XXXX	-

## 7.5 Input signals

Checking the input signals:

Tester display		Work instruction	Tester display	Remedy
<b>1</b>	Terminal L (61)	<ul style="list-style-type: none"> <li>• Ignition on</li> <li>• Engine running</li> </ul>	not present present  Yes: 2	No: 8.19
<b>2</b>	PSM OFF	<ul style="list-style-type: none"> <li>• Ignition on</li> <li>• PSM OFF button not actuated</li> <li>• PSM OFF button actuated</li> </ul>	not actuated actuated  Yes: 3	No: 8.21
<b>3</b>	PSM ON	<ul style="list-style-type: none"> <li>• Ignition on</li> <li>• PSM ON button not actuated</li> <li>• PSM ON button actuated</li> </ul>	not actuated actuated  Yes: 4	No: 8.21
<b>4</b>	Brake pedal	<ul style="list-style-type: none"> <li>• Ignition on</li> <li>• Brake pedal not actuated</li> <li>• Brake pedal actuated</li> </ul>	not actuated actuated  Yes: 5	No: 8.5
<b>5</b>	Parking brake	<ul style="list-style-type: none"> <li>• Ignition on</li> <li>• Vehicle secured against rolling away</li> <li>• Parking brake engaged</li> <li>• Parking brake not engaged</li> </ul>	engaged not engaged  Yes: 7.6	No: 8.20

## 7.6 Drive links

The following drive links can be triggered by the PST2. Their functioning must be checked when doing this.

**Note:** The clicking noises of the valves in the hydraulic unit are very quiet.

Tester display		Work instruction	Test	Remedy
1	PSM warning light	• Drive link actuated with F8 key (Start)	Visual inspection: light flashing  Yes: 2	No: —
2	PSM key indicator light	• Drive link actuated with F8 key (Start)	Visual inspection: light flashing  Yes: 3	No: —
3	Front axle pressure increase	• Drive link actuated with F8 key (Start)	Jack vehicle up so that the wheels can turn freely. Follow the instructions of the diagnostic tester  Yes: 4	No: —
4	Rear axle pressure increase	• Drive link actuated with F8 key (Start)	Jack vehicle up so that the wheels can turn freely. Follow the instructions of the diagnostic tester  Yes: 5	No: —



Tester display		Work instruction	Test	Remedy
5	Return pump	• Drive link actuated with F8 key (Start)	Noise inspection: return pump running  Yes: 6	No: 8.12
6	Switch-over valve 1	• Drive link actuated with F8 key (Start)	Noise inspection: clicking noises at the valve  Yes: 7	No: –
7	Switch-over valve 2	• Drive link actuated with F8 key (Start)	Noise inspection: clicking noises at the valve  Yes: 8	No: –
8	Booster pump	• Drive link actuated with F8 key (Start)	Noise inspection: booster pump running  Yes: 9	No: 8.13
9	Switch-over valve 1	• Drive link actuated with F8 key (Start)	Noise inspection: clicking noises at the valve  Yes: 10	No: –
10	Switch-over valve 2	• Drive link actuated with F8 key (Start)	Noise inspection: clicking noises at the valve  Yes: 7.7	No: –



## 7.7 Static test

This test involves carrying out the valve and pump motor test. The test is normally not started until the vehicle moves off. The valve and pump motor test includes actuating all ABS valves and the pump motor, and checking their feedback. It only makes sense to carry out the "Static test" function if no fault has previously been detected as present, i.e. the system has not switched off.

This test can be carried out for example after the hydraulic unit has been exchanged.

Follow the instructions of the diagnostic tester.

Test O.K., continue with **7.8**

## 7.8 Swap test

The Swap test is used to check the allocation of the brake pressure lines to the wheel brake cylinders. A hydraulic and an electrical test are carried out. Follow the instructions of the diagnostic tester.

## 7.9 Bleed

The brake system can be bled using this menu item. Refer to the Technical Manual, Group 47, Service No. 47 01 07.

## 7.10 Extract coding

The following items are displayed under this menu item:

Steer.-angle sensor calib. by:   xxxxxxx

Version coded by:               xxxxxxx

(The workshop number from the diagnosis card is stored.)

Veh. Ident. No.                   xxxxxxxxxxxxxxxx

Transmission:                   Manual transmission/Tiptronic

### 7.11 Modify coding

Follow the instructions of the diagnostic tester.

The tester displays the current coding as follows:

Veh. Ident. No.                      XXXXXXXXXXXXXXXX  
Transmission:                      Manual transmission/Tiptronic

Step	Work instruction	Tester display
1	<ul style="list-style-type: none"><li>• Ignition on</li><li>• Engine off</li><li>• Select Coding from the function selection.</li></ul> Follow the instructions of the diagnostic tester.	<b>Veh. Ident. No.</b> <b>Transmission:</b>
2	<ul style="list-style-type: none"><li>• Select Vehicle Identification No. or transmission and confirm with the Coding key (F8)</li><li>• Ignition off</li><li>• Ignition on (coding is adopted)</li></ul>	<b>Transmission:</b>

### 7.12 Steering-angle sensor calibration

Calibration of the steering-angle sensor is described in the Technical Manual, Group 45, Serv. No. 45 60  
Calibrating steering-angle sensor.



Test	Work instruction	Result	Possible causes of fault
T03	<b>Test: open circuit in ground circuit</b> <ul style="list-style-type: none"> <li>Measure voltage between the following terminals: diagnosis wiring harness plug (wiring harness side) terminal 16 and diagnosis wiring harness plug (wiring harness side) terminals 4, 5</li> </ul>	Greater than 11 V  Yes: <b>T04</b>	No: - Open circuit between: diagnosis wiring harness plug terminals 4, 5 and ground point 3.1, electronics ground
T04	<b>Test: component</b> <ul style="list-style-type: none"> <li>Check diagnostic tester for correct functioning</li> </ul>	O.K.  Yes: <b>T05</b>	No: - Faulty component: diagnostic tester
T05	<b>Test: short to ground/open circuit in power supply circuit</b> <p>Pull wiring harness plug off of: PSM control module</p> <ul style="list-style-type: none"> <li>Ignition on</li> <li>Measure voltage between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 23 and ground</li> </ul>	Greater than 11 V  Yes: <b>T06</b>	No: <ul style="list-style-type: none"> <li>Check the following components for correct functioning: fuse B9</li> </ul> <p><b>Note:</b> an open circuit or a short circuit is present. Check wiring harness for continuity and for pinches or chafing damage.</p>

Test	Work instruction	Result	Possible causes of fault
T06	<p><b>Test: open circuit in ground circuit</b></p> <ul style="list-style-type: none"> <li>• Measure voltage between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 23 and PSM control module wiring harness plug (wiring harness side) terminal 5</li> </ul>	<p>Greater than 11 V</p> <p>Yes: <b>T07</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Open circuit between: PSM control module wiring harness plug terminal 5 and ground point PSM</li> </ul>
T07	<p><b>Test: component</b></p> <ul style="list-style-type: none"> <li>• Ignition off</li> <li>• Pull wiring harness plug off of: Air conditioning control module</li> <li>• Connect wiring harness plug to: PSM control module</li> <li>• Connect diagnostic tester</li> <li>• Ignition on</li> <li>• Establish communication with: PSM control module</li> </ul> <p><b>Note:</b> disconnect all control modules which are connected with the communication line one after the other and establish communication with the PSM control module.</p>	<p>Not O.K.</p> <p>Yes: <b>T08</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Faulty component: control module which was disconnected directly before the test.</li> </ul>

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E01	- PSM control module faulty
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<b>E01</b>	- Erase fault memory and read out again after test drive
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Test	Work instruction	Result	Possible causes of fault
T03	<p><b>Test:</b> short circuit in signal circuit</p> <ul style="list-style-type: none"> <li>Measure resistance between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 24 and PSM control module wiring harness plug (wiring harness side) terminal 40</li> </ul>	<p>Greater than 500 kOhm</p> <p>Yes: T04</p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Short circuit in wiring harness between: PSM control module wiring harness plug (wiring harness side) terminals 24, 40 and PSM steering-angle sensor wiring harness plug (wiring harness side) terminals 2, 1 and DME control module wiring harness plug IV (wiring harness side) terminals 36, 37</li> </ul> <p><b>Note:</b> The connection points 135, 136 are located between the PSM control module and the DME control module. These must also be checked.</p>
T04	<p><b>Test:</b> open circuit in signal circuit</p> <ul style="list-style-type: none"> <li>Measure resistance between the following terminals: PSM control module wiring harness plug (wiring harness side) terminals 24, 40 and DME control module wiring harness plug IV (wiring harness side) terminals 36, 37</li> </ul>	<p>Less than 5 Ohm</p> <p>Yes: E01</p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Open circuit between: PSM control module wiring harness plug (wiring harness side) terminals 24, 40 and DME control module wiring harness plug IV (wiring harness side) terminals 36, 37</li> </ul> <p><b>Note:</b> The connection points 135, 136 are located between the PSM control module and the DME control module. These must also be checked.</p>
E01	- PSM control module faulty		



Test	Work instruction	Result	Possible causes of fault
T03	<b>Test: short circuit in signal circuit</b> <ul style="list-style-type: none"> <li>Measure resistance between the following terminals: Tiptronic control module wiring harness plug (wiring harness side) terminal 85 and Tiptronic control module wiring harness plug (wiring harness side) terminal 86</li> </ul>	Greater than 500 kOhm  Yes: <b>T04</b>	No: - Short circuit in wiring harness between: Tiptronic control module wiring harness plug (wiring harness side) terminals 85, 86 and DME control module wiring harness plug II (wiring harness side) terminals 3, 4
T04	<b>Test: open circuit in signal circuit</b> <ul style="list-style-type: none"> <li>Measure resistance between the following terminals: Tiptronic control module wiring harness plug (wiring harness side) terminals 85, 86 and DME control module wiring harness plug II (wiring harness side) terminals 3, 4</li> </ul>	Less than 5 Ohm  Yes: <b>E01</b>	No: - Open circuit between: Tiptronic control module wiring harness plug (wiring harness side) terminals 85, 86 and DME control module wiring harness plug II (wiring harness side) terminals 3, 4

<b>E01</b>	- DME control module faulty
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## 8.5 Stop light switch circuit

Test	Work instruction	Result	Possible causes of fault
T01	<b>Test: short to ground/open circuit in signal circuit</b> <ul style="list-style-type: none"> <li>• Ignition off</li> <li>• Pull wiring harness plug off of: PSM control module</li> <li>• Ignition on</li> <li>• Measure voltage between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 37 and ground</li> </ul>	<p>Greater than 11 V</p> <p>Yes: <b>T02</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Short circuit to ground or open circuit between: PSM control module wiring harness plug (wiring harness side) terminal 37 and ignition lock terminal 15 or</li> <li>- Stop light switch faulty</li> </ul> <p><b>Note:</b> The jumper plug 14/2, fuse B7 and the connection point 124 are located in the wiring harness. Check the wiring harness for pinching or chafing damage.</p>
T02	<b>Test: voltage short in signal circuit</b> <ul style="list-style-type: none"> <li>• Brake pedal actuated</li> <li>• Measure voltage between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 37 and ground</li> </ul>	<p>Less than 0.3 V</p> <p>Yes: <b>T03</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Short circuit to voltage between: PSM control module wiring harness plug (wiring harness side) terminal 37 and stop light switch terminal 4 or</li> <li>- Stop light switch faulty</li> </ul>

Test	Work instruction	Result	Possible causes of fault
T03	<b>Test: short to ground/ open circuit in signal circuit</b> <ul style="list-style-type: none"> <li>• Brake pedal actuated</li> <li>• Measure voltage between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 32 and ground</li> </ul>	Greater than 11 V	No: - Short circuit to ground or open circuit between: PSM control module wiring harness plug (wiring harness side) terminal 32 and stop light switch terminal 2 or - Stop light switch faulty  <b>Note:</b> The jumper plug 6/2 is located in the wiring harness. Check the wiring harness for pinching or chafing damage.
		Yes: T04	
T04	<b>Test: voltage short in signal circuit</b> <ul style="list-style-type: none"> <li>• Brake pedal not actuated</li> <li>• Measure voltage between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 32 and ground</li> </ul>	Less than 0.3 V	No: - Short circuit to voltage between: PSM control module wiring harness plug (wiring harness side) terminal 32 and stop light switch terminal 2 or - Stop light switch faulty  <b>Note:</b> The jumper plug 6/2 is located in the wiring harness. Check the wiring harness for pinching or chafing damage.
		Yes: E01	

<b>E01</b>	- PSM control module faulty
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Test	Work instruction	Result	Possible causes of fault
T03	<p><b>Test: open circuit in signal circuit</b></p> <ul style="list-style-type: none"> <li>• Measure resistance between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 12 and PSM control module wiring harness plug (wiring harness side) terminal 13 for Carrera 2, 28 for Carrera 4</li> </ul>	<p>1 .2 kOhm</p> <p>Yes: T04</p>	<p><b>No:</b></p> <ul style="list-style-type: none"> <li>- Greater than 2 kOhm: open circuit between: PSM control module wiring harness plug (wiring harness side) terminals 12, 13 for Carrera 2, 28 for Carrera 4 and front left speed sensor terminals 5, 4</li> <li>- Less than 1kOhm: Short circuit in wiring harness between: PSM control module wiring harness plug (wiring harness side) terminal 12 and PSM control module wiring harness plug (wiring harness side) terminal 13 for Carrera 2, 28 for Carrera 4</li> </ul> <p><b>Note:</b> The connection points 141 and 142 are located in the wiring harness. Check the wiring harness for pinching or chafing damage.</p>
T04	<p><b>Test: component</b></p> <ul style="list-style-type: none"> <li>• Set the measuring range to alternating voltage on the multimeter.</li> <li>• Vehicle jacked up and front left wheel turned slowly by hand</li> <li>• Measure voltage between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 12 and PSM control module wiring harness plug (wiring harness side) terminal 13 for Carrera 2, 28 for Carrera 4</li> </ul>	<p>Less than 0.1 V</p> <p>Yes: T05</p>	<p><b>No:</b></p> <ul style="list-style-type: none"> <li>- PSM control module faulty</li> </ul>



Test	Work instruction	Result	Possible causes of fault
<b>T05</b>	<b>Test: mechanical functionality</b> <ul style="list-style-type: none"> <li>• Check front left speed sensor and toothed disc for soiling and damage</li> </ul>	O.K.  Yes: <b>E01</b>	No: - Speed sensor or toothed disc faulty

<b>E01</b>	- Front left speed sensor faulty
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Test	Work instruction	Result	Possible causes of fault
<b>T03</b>	<p><b>Test: open circuit in signal circuit</b></p> <ul style="list-style-type: none"> <li>• Measure resistance between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 15 and PSM control module wiring harness plug (wiring harness side) terminal 16</li> </ul>	<p>1...2 kOhm</p> <p>Yes: <b>T04</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Greater than 2 kOhm: Open circuit between: PSM control module wiring harness plug (wiring harness side) terminals 15, 16 and front right speed sensor terminals 4, 5</li> <li>- Less than 1 kOhm: Short circuit in wiring harness between: PSM control module wiring harness plug (wiring harness side) terminal 15 and PSM control module wiring harness plug (wiring harness side) terminal 16</li> </ul> <p><b>Note:</b> The connection points 143 and 144 are located in the wiring harness. Check the wiring harness for pinching or chafing damage.</p>
<b>T04</b>	<p><b>Test: component</b></p> <ul style="list-style-type: none"> <li>• Set the measuring range to alternating voltage on the multimeter.</li> <li>• Vehicle jacked up and front right wheel turned slowly by hand</li> <li>• Measure voltage between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 15 and PSM control module wiring harness plug (wiring harness side) terminal 16</li> </ul>	<p>Less than 0.1 V</p> <p>Yes: <b>T05</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- PSM control module faulty</li> </ul>

Test	Work instruction	Result	Possible causes of fault
<b>T05</b>	<b>Test: mechanical functionality</b> <ul style="list-style-type: none"> <li>• Check front right speed sensor and toothed disc for soiling and damage</li> </ul>	O.K.  Yes: <b>E01</b>	No: - Speed sensor or toothed disc faulty

<b>E01</b>	- Front right speed sensor faulty
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Test	Work instruction	Result	Possible causes of fault
T03	<p><b>Test: open circuit in signal circuit</b></p> <ul style="list-style-type: none"> <li>• Measure resistance between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 14 and PSM control module wiring harness plug (wiring harness side) terminal 29</li> </ul>	<p>1...2 kOhm</p> <p>Yes: <b>T04</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Greater than 2 kOhm: Open circuit between: PSM control module wiring harness plug (wiring harness side) terminals 14, 29 and plug connection X 2/4 terminals 16, 17 and rear left speed sensor terminals 5, 4</li> <li>- Less than 1 kOhm: Short circuit in wiring harness between: PSM control module wiring harness plug (wiring harness side) terminal 14 and PSM control module wiring harness plug (wiring harness side) terminal 29</li> </ul> <p><b>Note:</b> Disconnect the plug connection X 2/4 (terminals 16, 17) for further troubleshooting. Check the wiring harness for pinching or chafing damage.</p>

<b>E01</b>	- Rear left speed sensor faulty
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Test	Work instruction	Result	Possible causes of fault
T01	<p><b>Test: voltage short in signal circuit</b></p> <ul style="list-style-type: none"> <li>• Ignition off</li> <li>• Pull wiring harness plug off of: PSM control module</li> <li>• Ignition on</li> <li>• Measure voltage between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 31 and ground</li> </ul>	<p>Less than 0.3 V</p> <p>Yes: <b>T02</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Short circuit to voltage in the circuit between: PSM control module wiring harness plug (wiring harness side) terminals 31, 30 and rear right speed sensor terminals 5, 4</li> </ul> <p><b>Note:</b> Disconnect the plug connection X 2/4 (terminals 18, 19) for further troubleshooting. Check the wiring harness for pinching or chafing damage.</p>
T02	<p><b>Test: short to ground in signal circuit</b></p> <ul style="list-style-type: none"> <li>• Ignition off</li> <li>• Measure resistance between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 31 and ground</li> </ul>	<p>Greater than 500 kOhm</p> <p>Yes: <b>T03</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Short circuit to ground in the circuit between: PSM control module wiring harness plug (wiring harness side) terminals 31, 30 and rear right speed sensor terminals 5, 4</li> </ul> <p><b>Note:</b> Disconnect the plug connection X 2/4 (terminals 18, 19) for further troubleshooting. Check the wiring harness for pinching or chafing damage.</p>





Test	Work instruction	Result	Possible causes of fault
<b>T05</b>	<b>Test: mechanical functionality</b> <ul style="list-style-type: none"> <li>• Check rear right speed sensor and toothed disc for soiling and damage</li> </ul>	O.K.  Yes: <b>E01</b>	No: - Speed sensor or toothed disc faulty

<b>E01</b>	- Rear right speed sensor faulty
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## 8.10 Wheel-speed sensor circuits

Test	Work instruction	Result	Possible causes of fault
<b>T01</b>	<b>Test: mechanical functionality</b> <ul style="list-style-type: none"> <li>• Check front left speed sensor and toothed disc for soiling and damage</li> </ul>	O.K.  Yes: <b>T02</b>	No: - Speed sensor or toothed disc faulty
<b>T02</b>	<b>Test: mechanical functionality</b> <ul style="list-style-type: none"> <li>• Check front right speed sensor and toothed disc for soiling and damage</li> </ul>	O.K.  Yes: <b>T03</b>	No: - Speed sensor or toothed disc faulty
<b>T03</b>	<b>Test: mechanical functionality</b> <ul style="list-style-type: none"> <li>• Check rear left speed sensor and toothed disc for soiling and damage</li> </ul>	O.K.  Yes: <b>T04</b>	No: - Speed sensor or toothed disc faulty
<b>T04</b>	<b>Test: mechanical functionality</b> <ul style="list-style-type: none"> <li>• Check rear right speed sensor and toothed disc for soiling and damage</li> </ul>	O.K.  Yes: <b>E01</b>	No: - Speed sensor or toothed disc faulty

<b>E01</b>	- PSM control module faulty
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### 8.11 Valve relay circuit

Test	Work instruction	Result	Possible causes of fault
<b>T01</b>	<p><b>Test: short to ground/ open circuit in power supply circuit</b></p> <ul style="list-style-type: none"> <li>• Ignition off</li> <li>• Pull wiring harness plug off of: PSM control module</li> <li>• Measure voltage between the following terminals: PSM control module wiring harness plug terminal 6 and ground</li> </ul>	<p>Greater than 11 V</p> <p>Yes: <b>E01</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Check following components: Fuse E9, Fuse F7</li> </ul> <p><b>Note:</b> an open circuit or a short circuit to ground is present. Check wiring harness for continuity and for pinches or chafing damage.</p>

<b>E01</b>	- Hydraulic unit faulty
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### 8.13 Booster pump circuit

Test	Work instruction	Result	Possible causes of fault
T01	<p><b>Test: short to ground/ open circuit in power supply circuit</b></p> <ul style="list-style-type: none"> <li>• Ignition off</li> <li>• Pull wiring harness plug off of: PSM control module</li> <li>• Measure voltage between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 2 and ground</li> </ul>	<p>Greater than 11 V</p> <p>Yes: <b>T02</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Short circuit to ground or open circuit between: PSM control module wiring harness plug (wiring harness side) terminal 2 and fuse F1</li> </ul> <p><b>Note:</b> Check fuse F1 and the voltage at the input side of fuse F1 for further troubleshooting. Check the wiring harness for pinching or chafing damage.</p>
T02	<p><b>Test: voltage short in signal circuit</b></p> <ul style="list-style-type: none"> <li>• Ignition on</li> <li>• Measure voltage between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 4 and ground</li> </ul>	<p>Less than 0.3 V</p> <p>Yes: <b>T03</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Short circuit to voltage between: PSM control module wiring harness plug (wiring harness side) terminal 4 and PSM booster pump wiring harness plug (wiring harness side) terminal 1</li> </ul> <p><b>Note:</b> Check the wiring harness for pinching or chafing damage.</p>

Test	Work instruction	Result	Possible causes of fault
T03	<b>Test: short to ground in signal circuit</b> <ul style="list-style-type: none"> <li>• Ignition off</li> <li>• Measure resistance between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 4 and ground</li> </ul>	Greater than 500 kOhm  Yes: <b>T04</b>	No: - Short circuit to ground between: PSM control module wiring harness plug (wiring harness side) terminal 4 and PSM booster pump wiring harness plug (wiring harness side) terminal 1  <b>Note:</b> Check the wiring harness for pinching or chafing damage.
T04	<b>Test: voltage short in signal circuit</b> <ul style="list-style-type: none"> <li>• Ignition on</li> <li>• Measure voltage between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 3 and ground</li> </ul>	Less than 0.3 V  Yes: <b>T05</b>	No: - Short circuit to voltage between: PSM control module wiring harness plug (wiring harness side) terminal 3 and PSM booster pump terminal 2  <b>Note:</b> Check the wiring harness for pinching or chafing damage.
T05	<b>Test: short to ground in signal circuit</b> <ul style="list-style-type: none"> <li>• Ignition off</li> <li>• Measure resistance between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 3 and ground</li> </ul>	Greater than 500 kOhm  Yes: <b>T06</b>	No: - Short circuit to ground between: PSM control module wiring harness plug (wiring harness side) terminal 3 and PSM booster pump wiring harness plug (wiring harness side) terminal 2  <b>Note:</b> Check the wiring harness for pinching or chafing damage.

Test	Work instruction	Result	Possible causes of fault
T06	<p>Test: component</p> <ul style="list-style-type: none"> <li>• Connect wiring harness plug to: PSM control module</li> <li>• Pull wiring harness plug off of: PSM booster pump</li> <li>• Ignition on</li> <li>• Start diagnostic tester drive link test for booster pump</li> <li>• Measure voltage between the following terminals: PSM booster pump wiring harness plug (wiring harness side) terminal 1 and PSM booster pump wiring harness plug (wiring harness side) terminal 2</li> </ul>	<p>Greater than 11 V</p> <p>Yes: <b>E01</b></p>	<p>No: - PSM hydraulic unit faulty</p>

<b>E01</b>	- PSM booster pump faulty
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Test	Work instruction	Result	Possible causes of fault
<b>T01</b>	<b>Test: Brake fluid</b> <ul style="list-style-type: none"> <li>• Check brake fluid level</li> </ul>	O.K. Yes: <b>T02</b>	No: - Correct level
<b>T02</b>	<b>Test: Open circuit in signal circuit</b> <ul style="list-style-type: none"> <li>• Ignition off</li> <li>• Pull wiring harness plug off of: Brake fluid level switch</li> <li>• Measure resistance between the following terminals: Brake fluid level switch wiring harness plug (wiring harness side) terminal 2 and ground</li> </ul>	Less than 5 Ohm Yes: <b>T03</b>	No: - Open circuit between: Brake fluid level switch wiring harness plug (wiring harness side) terminal 2 and ground point 3  <b>Note:</b> Check the wiring harness for pinching or chafing damage.
<b>T03</b>	<b>Test: component</b> <ul style="list-style-type: none"> <li>• Measure resistance between the following terminals: Brake fluid level switch wiring harness plug (component side) terminal 1 and brake fluid level switch wiring harness plug (component side) terminal 2</li> </ul>	Yes: <b>T04</b>	No: - Display less than 100 Ohm: Short circuit in circuit between: brake fluid level switch terminal 1 and brake fluid level switch terminal 2  - Display greater than 100 Ohm: Open circuit between: brake fluid level switch terminal 1 and brake fluid level switch terminal 2  <b>Note:</b> Replace reservoir for brake fluid.

<b>Test</b>	<b>Work instruction</b>	<b>Result</b>	<b>Possible causes of fault</b>
<b>T04</b>	<b>Test: open circuit in signal circuit</b> <ul style="list-style-type: none"> <li>• Pull wiring harness plug off of: PSM control module</li> <li>• Measure resistance between the following terminals: PSM control module wiring harness plug terminal 36 and brake fluid level switch terminal 1</li> </ul>	Less than 5 V	No: - Open circuit between: PSM control module wiring harness plug terminal 36 and brake fluid level switch terminal 1  <b>Note:</b> Check the wiring harness for pinching or chafing damage.
<b>T05</b>	<b>Test: voltage short in signal circuit</b> <ul style="list-style-type: none"> <li>• Pull wiring harness plug off of: instrument cluster (plug II)</li> <li>• Ignition on</li> <li>• Measure voltage between the following terminals: PSM control module wiring harness plug terminal 36 and ground</li> </ul>	Yes: T05  Less than 0.3 V	No: - Short circuit to voltage between: PSM control module wiring harness plug (wiring harness side) terminal 36 and brake fluid level switch terminal 1 and instrument cluster wiring harness plug (wiring harness side) terminal II/4  <b>Note:</b> Check the wiring harness for pinching or chafing damage.

Test	Work instruction	Result	Possible causes of fault
T06	<p><b>Test: short to ground in signal circuit</b></p> <ul style="list-style-type: none"> <li>• Ignition off</li> <li>• Measure resistance between the following terminals: PSM control module wiring harness plug terminal 36 and ground</li> </ul>	<p>Greater than 500 kOhm</p> <p>Yes: <b>E01</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Short circuit to ground between: PSM control module wiring harness plug (wiring harness side) terminal 36 and brake fluid level switch terminal 1 and instrument cluster wiring harness plug (wiring harness side) terminal II/4</li> </ul> <p><b>Note:</b> Check the wiring harness for pinching or chafing damage.</p>

<b>E01</b>	- PSM control module or instrument cluster faulty
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Test	Work instruction	Result	Possible causes of fault
<b>T02</b>	<b>Test: open circuit in circuit ground</b> <ul style="list-style-type: none"> <li>• Measure voltage between the following terminals: Transverse acceleration sensor (rate-of-turn sensor) wiring harness plug (wiring harness side) terminal 3 and transverse acceleration sensor (rate-of-turn sensor) wiring harness plug (wiring harness side) terminal 6</li> </ul>	<p>Greater than 11 V</p> <p>Yes: <b>T03</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- open circuit in circuit between: PSM control module wiring harness plug (wiring harness side) terminal 21 and transverse acceleration sensor (rate-of-turn sensor) wiring harness plug (wiring harness side) terminal 6 or</li> <li>- PSM control module faulty</li> </ul> <p><b>Note:</b> The connection point 148 is located in the wiring harness. Check the wiring harness for pinching or chafing damage.</p>
<b>T03</b>	<b>Test: voltage short in signal circuit</b> <ul style="list-style-type: none"> <li>• Ignition off</li> <li>• Pull wiring harness plug off of: PSM control module</li> <li>• Ignition on</li> <li>• Measure voltage between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 8 and ground</li> </ul>	<p>Less than 0.3 V</p> <p>Yes: <b>T04</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Short circuit to voltage between: PSM control module wiring harness plug (wiring harness side) terminal 8 and transverse acceleration sensor (rate-of-turn sensor) wiring harness plug (wiring harness side) terminal 5</li> </ul> <p><b>Note:</b> Check the wiring harness for pinching or chafing damage.</p>

Test	Work instruction	Result	Possible causes of fault
T04	<b>Test: short to ground in signal circuit</b> <ul style="list-style-type: none"> <li>• Ignition off</li> <li>• Measure resistance between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 8 and ground</li> </ul>	<p>Greater than 500 kOhm</p> <p>Yes: <b>T05</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Short circuit to ground between: PSM control module wiring harness plug (wiring harness side) terminal 8 and transverse acceleration sensor (rate-of-turn sensor) wiring harness plug (wiring harness side) terminal 5</li> </ul> <p><b>Note:</b> Check the wiring harness for pinching or chafing damage.</p>
T05	<b>Test: open circuit in signal circuit</b> <ul style="list-style-type: none"> <li>• Measure resistance between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 8 and transverse acceleration sensor (rate-of-turn sensor) wiring harness plug (wiring harness side) terminal 5</li> </ul>	<p>Less than 5 Ohm</p> <p>Yes: <b>E01</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Open circuit between: PSM control module wiring harness plug (wiring harness side) terminal 8 and transverse acceleration sensor (rate-of-turn sensor) wiring harness plug (wiring harness side) terminal 5</li> </ul> <p><b>Note:</b> Check the wiring harness for pinching or chafing damage.</p>
<b>E01</b>	- Transverse acceleration sensor (rate-of-return sensor) faulty		

[illegible]



Test	Work instruction	Result	Possible causes of fault
<b>T03</b>	<b>Test: open circuit in ground circuit</b> <ul style="list-style-type: none"> <li>• Measure voltage between the following terminals: Steering-angle sensor wiring harness plug (wiring harness side) terminal 3 and steering-angle sensor wiring harness plug (wiring harness side) terminal 4</li> </ul>	<p>Greater than 11 V</p> <p>Yes: <b>T04</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Open circuit between: PSM control module wiring harness plug (wiring harness side) terminal 21 and steering-angle sensor wiring harness plug (wiring harness side) terminal 4 or</li> <li>- PSM control module faulty</li> </ul> <p><b>Note:</b> The connection point 148 is located in the wiring harness. Check the wiring harness for pinching or chafing damage.</p>
<b>T04</b>	<b>Test: Open circuit in signal circuit</b> <ul style="list-style-type: none"> <li>• Ignition off</li> <li>• Pull wiring harness plug off of: PSM control module</li> <li>• Measure resistance between the following terminals: steering-angle sensor wiring harness plug (wiring harness side) terminal 2 and PSM control module wiring harness plug (wiring harness side) terminal 24</li> </ul>	<p>Less than 5 Ohm</p> <p>Yes: <b>T05</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Open circuit between: steering-angle sensor wiring harness plug (wiring harness side) terminal 2 and PSM control module wiring harness plug (wiring harness side) terminal 24</li> </ul> <p><b>Note:</b> The connection point 136 is located in the wiring harness. Check the wiring harness for pinching or chafing damage.</p>



Test	Work instruction	Result	Possible causes of fault
T05	<p>Test: open circuit in signal circuit</p> <ul style="list-style-type: none"> <li>• Measure resistance between the following terminals: steering-angle sensor wiring harness plug (wiring harness side) terminal 1 and PSM control module wiring harness plug (wiring harness side) terminal 40</li> </ul>	<p>Less than 5 Ohm</p> <p>Yes: <b>E01</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Open circuit between: steering-angle sensor wiring harness plug (wiring harness side) terminal 1 and PSM control module wiring harness plug (wiring harness side) terminal 40</li> </ul> <p><b>Note:</b> The connection point 135 is located in the wiring harness. Check the wiring harness for pinching or chafing damage.</p>
<b>E01</b>	<ul style="list-style-type: none"> <li>- Steering-angle sensor faulty or</li> <li>- PSM control module faulty</li> </ul>		



Test	Work instruction	Result	Possible causes of fault
T03	<p><b>Test: voltage short in signal circuit</b></p> <ul style="list-style-type: none"> <li>• Ignition off</li> <li>• Pull wiring harness plug off of: PSM control module</li> <li>• Ignition on</li> <li>• Measure voltage between the following terminals: rate-of-turn sensor wiring harness plug (wiring harness side) terminals 1, 2, 4 and ground</li> </ul>	<p>Less than 0.3 V</p> <p>Yes: T04</p>	<p>No:</p> <p>- Short circuit to voltage between: rate-of-turn sensor wiring harness plug (wiring harness side) terminals 1, 2, 4 and PSM control module wiring harness plug (wiring harness side) terminals 10, 9, 41</p> <p><b>Note:</b> Check the wiring harness for pinching or chafing damage.</p>
T04	<p><b>Test: short to ground in signal circuit</b></p> <ul style="list-style-type: none"> <li>• Ignition off</li> <li>• Measure resistance between the following terminals: rate-of-turn sensor wiring harness plug (wiring harness side) terminals 1, 2, 4 and ground</li> </ul>	<p>Less than 5 Ohm</p> <p>Yes: T05</p>	<p>No:</p> <p>- Short circuit to ground between: rate-of-turn sensor wiring harness plug (wiring harness side) terminals 1, 2, 4 and PSM control module wiring harness plug (wiring harness side) terminals 10, 9, 41</p> <p><b>Note:</b> Check the wiring harness for pinching or chafing damage.</p>

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## 8.18 Booster pump pressure sensor circuit

Test	Work instruction	Result	Possible causes of fault
T01	<b>Test: short to ground/ open circuit in power supply circuit</b> <ul style="list-style-type: none"> <li>• Ignition off</li> </ul> Pull wiring harness plug off of: Booster pump pressure sensor <ul style="list-style-type: none"> <li>• Ignition on</li> <li>• Measure voltage between the following terminals: Booster pump pressure sensor wiring harness plug (wiring harness side) terminal 3 and ground</li> </ul>	Approx. 5 V	No: - Display 0 V: Short circuit to ground/open circuit in circuit between: PSM control module wiring harness plug (wiring harness side) terminal 42 and booster pump pressure sensor wiring harness plug (wiring harness side) terminal 3  - Display greater than 11 V: Short circuit to voltage between: PSM control module wiring harness plug (wiring harness side) terminal 42 and booster pump pressure sensor wiring harness plug (wiring harness side) terminal 3 or - PSM control module faulty
T02	<b>Test: open circuit in ground circuit</b> <ul style="list-style-type: none"> <li>• Measure voltage between the following terminals: booster pump pressure sensor wiring harness plug (wiring harness side) terminal 3 and booster pump pressure sensor wiring harness plug (wiring harness side) terminal 1</li> </ul>	Approx. 5 V	No: - Open circuit in circuit between: PSM control module wiring harness plug (wiring harness side) terminal 25 and booster pump pressure sensor wiring harness plug (wiring harness side) terminal 1 or - PSM control module faulty

Yes: **T02**Yes: **T03**

[illegible]

Test	Work instruction	Result	Possible causes of fault
T05	Test: open circuit in signal circuit <ul style="list-style-type: none"> <li>• Ignition off</li> <li>• Measure resistance between the following terminals:                booster pump pressure sensor wiring harness plug (wiring harness side) terminal 2                and                PSM control module wiring harness plug (wiring harness side) terminal 26</li> </ul>	Less than 5 Ohm	No: - Open circuit between: booster pump pressure sensor wiring harness plug (wiring harness side) terminal 2 and PSM control module wiring harness plug (wiring harness side) terminal 26  <b>Note:</b> Check the wiring harness for pinching or chafing damage.

<b>E01</b>	- Replace hydraulic unit
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## 8.19 Battery charge circuit

Test	Work instruction	Result	Possible causes of fault
T01	<p>Test: voltage short in signal circuit</p> <ul style="list-style-type: none"> <li>• Ignition off</li> <li>• Pull wiring harness plug off of: PSM control module</li> <li>• Ignition on</li> <li>• Measure voltage between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 22 and ground</li> </ul>	<p>Less than 1.5 V</p> <p>Yes: <b>T02</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Short circuit to voltage between: PSM control module wiring harness plug (wiring harness side) terminal 22 and generator terminal L and instrument cluster wiring harness plug (wiring harness side) terminal II/23 or - generator faulty</li> </ul> <p><b>Note:</b> The connection point 39, plug connection X 2/3 (terminal 5) and plug connection X 59/1 (terminal 12) are located in the wiring harness. Check the wiring harness for pinching or chafing damage.</p>



Test	Work instruction	Result	Possible causes of fault
T02	<b>Test: open circuit in signal circuit</b> <ul style="list-style-type: none"> <li>• Engine runs at idle speed</li> <li>• Measure voltage between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 22 and ground</li> </ul>	<p>Greater than 11 V</p> <p>Yes: <b>E01</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Open circuit between: PSM control module wiring harness plug (wiring harness side) terminal 22 and generator terminal L or - generator faulty</li> </ul> <p><b>Note:</b> The connection point 39, plug connection X 2/3 (terminal 5) and plug connection X 59/1 (terminal 12) are located in the wiring harness. Check the wiring harness for pinching or chafing damage.</p>

<b>E01</b>	- PSM control module faulty
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## 8.20 Parking brake circuit

Test	Work instruction	Result	Possible causes of fault
<b>T01</b>	<p>Test: short to ground in signal circuit</p> <ul style="list-style-type: none"> <li>• Ignition off</li> <li>• Pull wiring harness plug off of: PSM control module</li> <li>• Vehicle secured against rolling away</li> <li>• Parking brake released</li> <li>• Measure resistance between the following terminals: PSM control module wiring harness plug terminal 38 and ground</li> </ul>	<p>Greater than 500 kOhm</p> <p>Yes: <b>T02</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Short circuit to ground between: PSM control module wiring harness plug (wiring harness side) terminal 38 and jumper plug 6/1 and parking brake contact switch terminal 1 and instrument cluster wiring harness plug (wiring harness side) terminal 1/2 or - parking brake contact switch faulty</li> </ul> <p><b>Note:</b> Check the wiring harness for pinching or chafing damage.</p>

<b>E01</b>	- PSM control module faulty
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Test	Work instruction	Result	Possible causes of fault
T03	<b>Test: short to ground in signal circuit</b> <ul style="list-style-type: none"> <li>• Ignition off</li> <li>• Measure resistance between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 20 and ground</li> </ul>	<p>Greater than 500 kOhm</p> <p>Yes: <b>T04</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Short circuit to ground between: PSM control module wiring harness plug (wiring harness side) terminal 20 and PSM switch wiring harness plug (wiring harness side) terminal 2</li> </ul> <p><b>Note:</b> Check the wiring harness for pinching or chafing damage.</p>
T04	<b>Test: open circuit in signal circuit</b> <ul style="list-style-type: none"> <li>• Ignition on</li> <li>• PSM switch Off actuated</li> <li>• Measure voltage between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 20 and ground</li> </ul>	<p>Greater than 12 V</p> <p>Yes: <b>T05</b></p>	<p>No:</p> <ul style="list-style-type: none"> <li>- Open circuit between: PSM control module wiring harness plug (wiring harness side) terminal 20 and PSM switch wiring harness plug (wiring harness side) terminal 2 or</li> <li>- PSM switch faulty</li> </ul> <p><b>Note:</b> Check the wiring harness for pinching or chafing damage.</p>

<b>Test</b>	<b>Work instruction</b>	<b>Result</b>	<b>Possible causes of fault</b>
<b>T05</b>	<b>Test: voltage short in signal circuit</b> <ul style="list-style-type: none"> <li>• Measure voltage between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 27 and ground</li> </ul>	Less than 0.3 V	No: - Short circuit to voltage between: PSM control module wiring harness plug (wiring harness side) terminal 27 and PSM switch wiring harness plug (wiring harness side) terminal 1  <b>Note:</b> Check the wiring harness for pinching or chafing damage.
<b>T06</b>	<b>Test: short to ground in signal circuit</b> <ul style="list-style-type: none"> <li>• Ignition off</li> <li>• Measure resistance between the following terminals: PSM control module wiring harness plug (wiring harness side) terminal 27 and ground</li> </ul>	Greater than 500 kOhm	No: - Short circuit to ground between: PSM control module wiring harness plug (wiring harness side) terminal 27 and PSM switch wiring harness plug (wiring harness side) terminal 1  <b>Note:</b> Check the wiring harness for pinching or chafing damage.

E01	- PSM control module faulty
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