

## 2006 Porsche Cayenne

2003-08 TRANSMISSION Transfer Box - 9pa\_Cayenne

### 2003-08 TRANSMISSION

#### Transfer Box - 9pa\_Cayenne

## TRANSFER BOX

### INTRODUCTION

Transfer box (VG)

Diagnosis software number: VG 0101

Cayenne model year 2003

General instructions/safety instructions

**CAUTION:** *Danger of damage due to improper handling of batteries and control module plug connections!*

- *Never disconnect battery with engine running.*
- *Never start engine if battery terminal clamps are not connected securely.*
- *Never pull off or push on plug connections for the control modules or other electronic components when the ignition is switched on.*
- *Always disconnect the negative terminal of the battery and pull off all plug connections to the 'vehicle electrical system control module' when carrying out welding work on the vehicle.*

**WARNING:** *Danger of injury and damage due to unusual vehicle handling when plugs or components are disconnected!*

- *Never disconnect plugs when the vehicle is in motion or drive the vehicle with plugs disconnected.*
- *Drive only with all parts fully installed and connected.*

Communication between transfer box control module and Porsche System Tester II No. 9588

**NOTE:** *The following conditions must be met in order to establish communication between the transfer box control module and the Porsche System Tester II No. 9588:*

- Porsche System Tester II No. 9588 connected to data link connector
- The battery voltage must be greater than 6.5 V

General information on the fault memory

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The fault memory of the control module can save up to (X) different faults simultaneously. If all (X) fault memories are full, the new fault overwrites the oldest fault. The fault memory content of the 'transfer box control module' is maintained even in removed state.

#### Fault code setting conditions

Fault codes can be set in various circumstances, e.g.:

- battery disconnected
- plug connections disconnected
- faulty coding
- power failure
- etc.

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

#### Troubleshooting procedure

Troubleshooting can only be performed when the fault is present. In other words, specific troubleshooting can only be performed in accordance with instructions (given under Diagnosis/troubleshooting for each fault code) if the entry has the status 'present' in the fault memory.

If the fault is currently 'not present', please check the following:

- Diagnostic conditions are met
- All plug connections and ground points of the affected current path are OK
- View the fault frequency counter in the Porsche System Tester II No. 9588 using the fault memory Info key [F8] under 'Extended fault memory' and try to reach conclusions about eliminating any loose contacts in the system.

#### Diagnostic conditions

**IMPORTANT:** Always connect a suitable battery charging device to the vehicle electrical system battery before starting diagnosis. All unnecessary loads must also be switched off.

**NOTE:** *The fault can only be identified if the requirements listed under 'Diagnostic conditions' are met. For this reason, the specified procedure must be observed after a fault is repaired:*

1. Erase fault memory
2. Satisfy the requirements listed under 'Diagnostic conditions'.
3. Read out fault memory again.

#### Possible causes of fault

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**NOTE:** *The 'possible causes of fault' that are responsible for the fault are listed here. Please note that in certain circumstances further faults can be stored in the fault memory after troubleshooting (e.g. if plugs are disconnected). After carrying out repairs, read out the fault memory of all control modules and erase any faults.*

### Diagnosis/troubleshooting

**NOTE:** *The fault memory Info key [F8] on the Porsche System Tester II No. 9588 can be used to access the 'extended fault memory'. The following information can be displayed:*

### Fault type

The following fault types are possible:

- no display
- upper limit value exceeded
- lower limit value not reached
- mechanical fault
- no signal/communication
- no or incorrect basic setting/adaptation
- short circuit to B+
- short circuit to ground
- implausible signal
- open circuit/short circuit to ground
- open circuit/short circuit to B+
- open circuit
- electrical fault in electric circuit
- please read out fault memory
- faulty
- cannot be checked now

### Fault status

The following status types are possible:

- present
- not present

This information should be saved using the Save key [F4] and printed out.

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**NOTE:** *Visual inspection: During troubleshooting, please check first that the affected pins on the control module plug connection are neither damaged nor corroded. The wires and plugs of the affected components must also be checked for external damage and correct contacts. Repair damaged or corroded pins if possible, otherwise replace affected pins. Repair or replace damaged wires.*

**NOTE:** *Battery voltage: A battery voltage of between 11.4 and 14.5 V is required for troubleshooting. This must be checked and provided if necessary. Voltages to components or fuses (input side) must be guaranteed on the vehicle electrical system.*

### Freeze frame (frozen fault boundary conditions)

Freeze frame data is standardised and records operating conditions in the event of a fault. Freeze frames have different priorities, which can be important when output to a Scan Tool. These can be viewed in the "extended fault memory" of the Porsche System Tester II No. 9588.

Furthermore, various operating conditions can be stored for each fault. These can provide reference points for determining the cause of a fault in the case of difficult diagnoses. These can be viewed in the "extended fault memory" of the Porsche System Tester II No. 9588.

### Fault deletion counter

An individual deletion counter runs for every fault detected. It determines the storage duration of the related fault.

When a fault is first detected, the deletion counter is set to 80, for example (suspected fault).

If an unshedded fault is detected as having been remedied, the deletion counter is set to 10, for example (fault did not occur often enough to be confirmed).

Whenever a shedded fault is detected, the deletion counter is set to 40, for example. This value is retained until the fault is detected as having been remedied.

The deletion counter is decremented by 1 after every warm-up cycle if the fault in question is an unshedded fault or is detected as having been remedied (faults that are confirmed, but are not detected as having been remedied are not decremented in the deletion counter). If the deletion counter reaches the value 0, the fault is deleted from the memory.

### Fault frequency counter

This counter shows how often a fault has recurred following its first occurrence. If the frequency value is 1, the fault has only occurred once. It can now be either "present" or "not present". The fault frequency counter is incremented whenever this fault recurs (the fault healing counter was decremented in the meantime, i.e. a check was performed and found to be OK). A higher value in the fault frequency counter can therefore indicate a loose contact.

## TOOLS - TRANSFER BOX

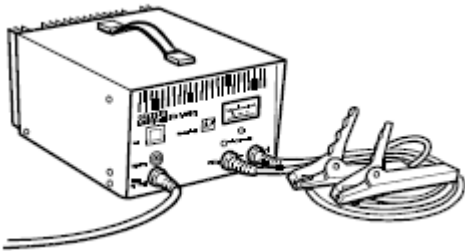
**WARNING:** Danger of personal injury while driving with special tools

- Never hang the Porsche System Tester II No. 9588 over the steering wheel!

**NOTE:**

- Before starting the diagnosis a suitable charging device must be connected to maintain battery capacity.
- Plug contacts are optimally designed to suit the plug system. Operations on pins can cause contact problems. Always use suitable measurement tools for adapter plugs and test cables.

### BATTERY CHARGING DEVICE



**Fig. 1: Identifying Battery Charging Device**  
Courtesy of PORSCHE OF NORTH AMERICA, INC.

### PORSCHE SYSTEM TESTER II NO. 9588



**Fig. 2: Identifying Porsche System Tester (9588)**  
Courtesy of PORSCHE OF NORTH AMERICA, INC.

### COMMERCIALLY AVAILABLE DIGITAL MULTIMETER

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**Fig. 3: Identifying Commercially Available Digital Multimeter**  
Courtesy of PORSCHE OF NORTH AMERICA, INC.

### MEASUREMENT TOOL SET NO. 9684

97



9684

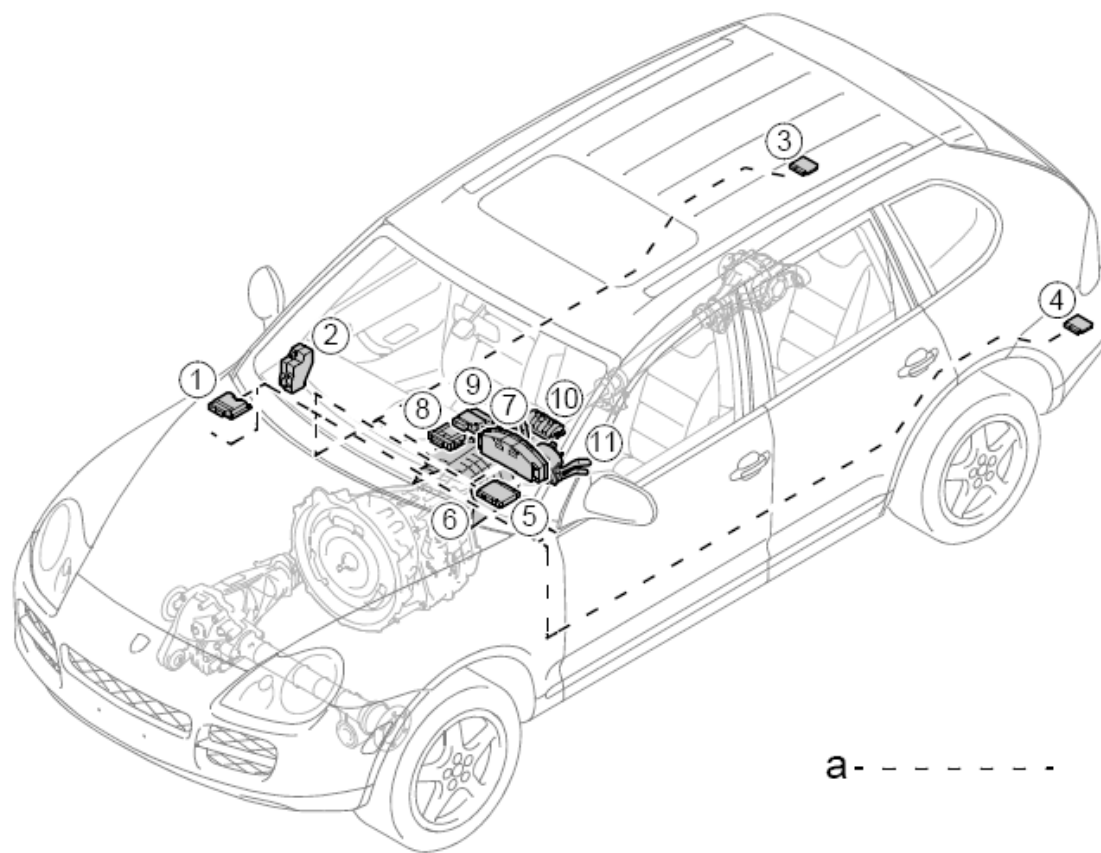
000 721 968 40

**Fig. 4: Identifying Measurement Tool Set (9684)**  
Courtesy of PORSCHE OF NORTH AMERICA, INC.

### COMPONENT ARRANGEMENT - TRANSFER BOX

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a - - - - -

### a - CAN drive (CAN-C)

#### 1 - DME control module

- ☐ Located in right radiator tank, above hydraulic unit with PSM control unit

#### 2 - Fuse carrier at right of dashboard

- ☐ Integrated into right side of dashboard

#### 3 - Level control unit

- ☐ Located between rear right wheel housing and closing panel

#### 4 - Transverse lock control unit

- ☐ Located between rear left wheel housing and closing panel

#### 5 - Vehicle electrical system control unit (connected to CAN comfort)

- ☐ Located on right side of steering column (footwell) near KESSY control unit

#### 6 - Transfer box with components

- ☐ Servo motor

#### 7 - Instrument cluster (includes the gateway)

- ☐ Integrated into dashboard

#### 8 - Tiptronic control module

- ☐ Located on vehicle floor under passenger's seat (LHD) (front right)

#### 9 - Transfer box control unit

- ☐ Located on vehicle floor under passenger's seat (LHD) (front right)

#### 10 - Selector switch (running gear control module)

- ☐ Located near selector lever module (Tiptronic)

**Fig. 5: Identifying Transfer Box Component Arrangement**

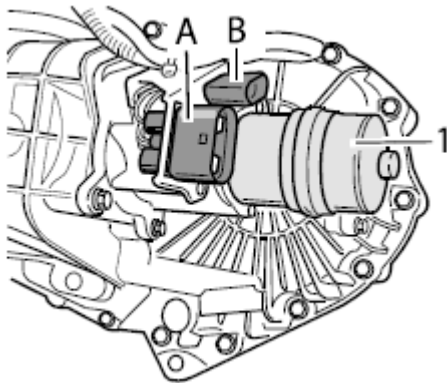
Courtesy of PORSCHE OF NORTH AMERICA, INC.

**Component arrangement 'Item 6' Transfer box with components**

**1** - Transfer box servo motor

**A** - Servo motor plug connection (power and ground supply for brake and motor)

**B** - Sensor plug connection



**Fig. 6: Identifying Transfer Box Servo Motor And Servo Motor Plug Connection**

Courtesy of PORSCHE OF NORTH AMERICA, INC.

**Component arrangement 'Item 10' Selector switch (running gear control module)**

**1** - Selector switch housing

**2** - Selector switch housing lower part

**3** - Symbols 'Level control LED'

**4** - Slider 'Manual set level'

**5** - Switch 'PASM running gear tuning'

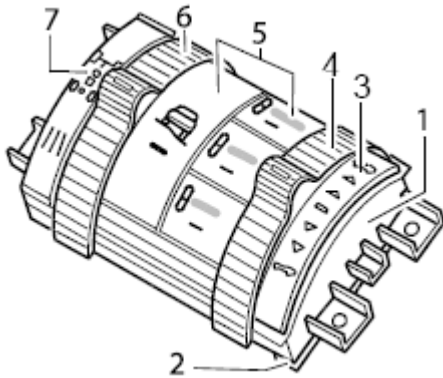
**6** - Slider 'Manual set longitudinal lock/transverse lock/gear reduction'

**7** - Symbols 'Longitudinal lock/transverse lock/gear reduction LED'



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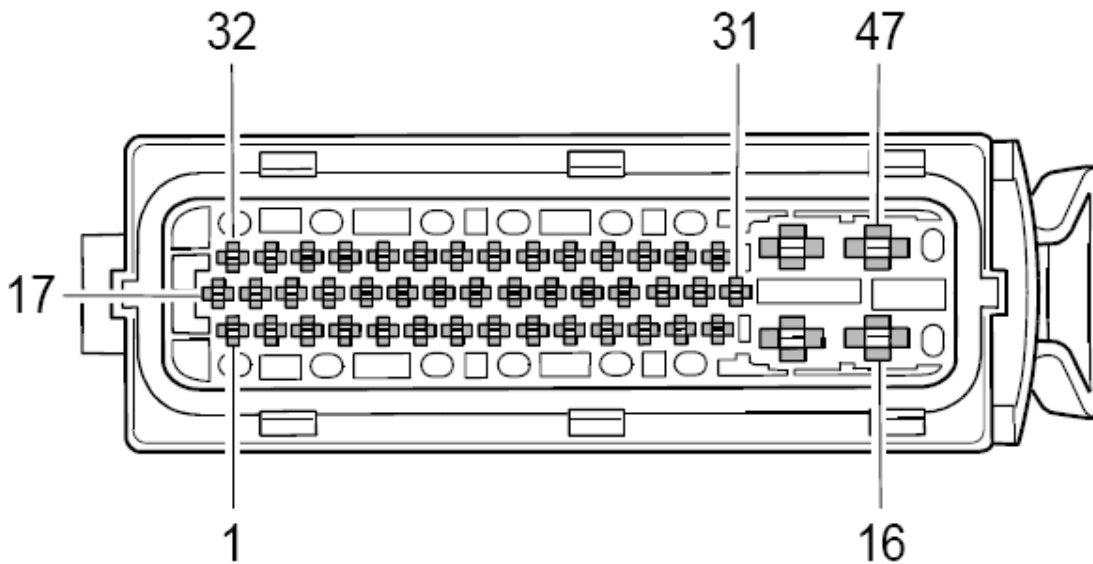
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**Fig. 7: Identifying Selector Switch Component Arrangement**  
Courtesy of PORSCHE OF NORTH AMERICA, INC.

### CONNECTOR ASSIGNMENT - TRANSFER BOX CONTROL UNIT

PLUG '47-PIN'



**Fig. 8: Identifying Transfer Box Control Unit Plug Connector 47-Pins**  
Courtesy of PORSCHE OF NORTH AMERICA, INC.

### CONNECTOR TERMINALS REFERENCE CHART

Pin	Designation	Pin	Designation
1	Potentiometer '1' (sensor 1) 5 V	2	Ground, potentiometer '1' (sensor 1)
3	Not assigned	4	Gear reduction LED
5	Not assigned	6	Not assigned
7	PWM switch (Pulse Width Modulation)	8	Switch contact for transverse lock, left
9	Neutral switch MT (manual transmission only)	10	Not assigned
11	CAN drive (low)	12	Input signal, potentiometer '1' (sensor 1)

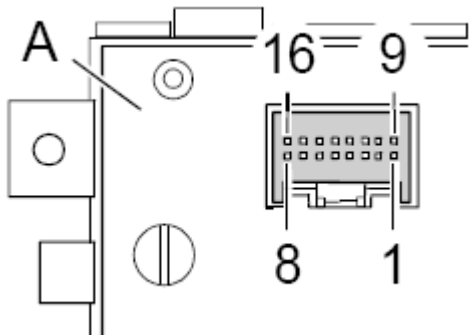
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13	Not assigned	14	Not assigned
15	Servo motor (A)	16	Servo motor (B)
17	Terminal 30 (electronics)	18	Potentiometer '2' (sensor 2) 5 V
19	Not assigned	20	LED longitudinal lock
21	Voltage supply to brake for servo motor (A)	22	Not assigned
23	K-line (diagnosis)	24	Not assigned
25	MOST switch	26	Parking brake
27	Not assigned	28	Not assigned
29	Voltage supply (5V) for servo motor temperature sensor	30	Not assigned
31	Input signal, potentiometer '2' (sensor 2)	32	Not assigned
33	Ground output, potentiometer '2' (sensor 2)	34	Not assigned
35	LED transverse lock	36	Ground supply to brake for servo motor (B)
37	Not assigned	38	Not assigned
39	Not assigned	40	Switch contact for transverse lock, right
41	Terminal 15	42	CAN drive (high)
43	Longitudinal lock oil temperature	44	Ground, servo motor temperature sensor
45	Not assigned	46	Terminal 30
47	Ground		

### Gear selection switch connector assignment (running gear control module), '16-pin'

A - Plug connection for 'gear selection switch (running gear control module)' (at underside of housing)



**Fig. 9: Identifying Gear Selection Switch Connector 16-Pins**

Courtesy of PORSCHE OF NORTH AMERICA, INC.

### CONNECTOR TERMINALS REFERENCE CHART

Pin	Designation	Pin	Designation
1	Not assigned	2	Not assigned
3	Button for transverse lock switch 'neutral'	4	PWM locks
5	Not assigned	6	LED transverse lock

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7	K-line (diagnosis)	8	Terminal 31, ground pin 'MB 22'
9	Not assigned	10	Not assigned
11	Output from transverse lock button 'negative'	12	Output from transverse lock button 'positive'
13	Gear reduction LED	14	LED longitudinal lock
15	Terminal 58d, orientation light	16	Terminal 15

## CONTROL MODULE FUNCTION (CODING/PROGRAMMING)

### INTEGRATED FUNCTIONS

The transfer box control module includes the functions listed below:

- Computer identification
- Computer configuration with ignition ON
- Checking the fault memory for fault entries, even in diagnostic mode
- Deleting the fault memory
- Reading measured values from switches and sensors

### Supported functions:

- Diagnosis software number
- Drive link test with active fault checking

### Basic setting:

- Adaptation/Resetting adaptation values
- Read memory
- Write memory
- Update programme
- Flash programme (end of volume)
- Protected against unauthorised access

## COMMISSIONING

When the ignition 'terminal 15' is switched on, an internal function test (initialisation phase) is performed in the transfer box control module. When the internal function test is completed successfully, all functions integrated into the transfer box control module are released.

## OPERATING MODE

The transfer box control module is in operating mode once the ignition is switched on and the internal function test is completed successfully. Within the defined limits for power supply and temperature, all incoming signals are processed by the integrated software and the appropriate monitoring and control processes are performed.

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### DATA TRANSFER

The transfer box control module sends and receives data/information via the following 'CAN data bus':

- CAN drive (C)
- Gateway (in instrument cluster)

### DIAGNOSIS

#### Fault memory

Faults that occur during operation are stored in a non-volatile memory (e.g. EEPROM). The faults remain in the memory even if terminal 15 and terminal 30 are not live. The fault memory is designed in such a way that the occurring faults, data source, fault type and fault deletion counter can be saved. The transfer box control module sends messages and checks the CAN drive cyclically for messages from other control modules. If no messages are received for a certain time period, a fault is stored in the fault memory.

### ADAPTATION

#### Work to be carried out after replacing a control module:

- Delete the adaptation values using the Porsche System Tester II No. 9588

### CODING

**NOTE:**        *The transfer box control module does not have to be coded!*

## FAULT OVERVIEW - TRANSFER BOX CONTROL UNIT

### FAULT REFERENCE CHART

Fault code	Fault text	Fault effects
<b><u>0532</u></b>	Power supply	<ul style="list-style-type: none"><li>• The functions available in the transfer box control unit cannot be enabled.</li></ul>
<b><u>0659</u></b>	Self-test	<ul style="list-style-type: none"><li>• The functions available in the transfer box control unit cannot be enabled.</li></ul>
<b><u>0778</u></b>	Steering-angle sensor	<ul style="list-style-type: none"><li>• -</li></ul>
<b><u>1312</u></b>	CAN drive	<ul style="list-style-type: none"><li>• -</li></ul>
<b><u>1314</u></b>	DME control unit	<ul style="list-style-type: none"><li>• -</li></ul>
<b><u>1315</u></b>	Tiptronic control unit	<ul style="list-style-type: none"><li>• -</li></ul>
<b><u>1316</u></b>	PSM control unit	<ul style="list-style-type: none"><li>• -</li></ul>
<b><u>1317</u></b>	Instrument cluster	<ul style="list-style-type: none"><li>• -</li></ul>

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<b><u>1336</u></b>	CAN comfort OFF	• -
<b><u>2025</u></b>	Power supply	• -
<b><u>2033</u></b>	Potentiometer 2, transfer box	• -
<b><u>2038</u></b>	Power supply, sensors	• -
<b><u>2039</u></b>	Potentiometer, transfer box	• -
<b><u>2040</u></b>	Voltage supply to transfer box servo motor	• -
<b><u>2041</u></b>	Ground supply to transfer box servo motor	• -
<b><u>2042</u></b>	Activation of transfer box servo motor	• -
<b><u>2046</u></b>	Gear reduction LED (in control module)	• -
<b><u>2047</u></b>	Centre-differential lock LED (in control module)	• -
<b><u>2048</u></b>	Rear-differential lock LED (in control module)	• -
<b><u>2050</u></b>	Transfer box switching fault	• -
<b><u>2051</u></b>	Tiptronic control unit - incorrect software version	• -
<b><u>2052</u></b>	Control unit switched off due to excess temperature	• -
<b><u>2053</u></b>	Transfer box control unit	• -
<b><u>2054</u></b>	Rear-differential lock control unit	• -
<b><u>2057</u></b>	Power supply to brake servo motor (A)	• -
<b><u>2058</u></b>	Ground supply to brake servo motor (B)	• -
<b><u>2059</u></b>	Servo motor temperature sensor	• -
<b><u>2060</u></b>	Power supply to servo motor temperature sensor	• -
<b><u>2373</u></b>	Current sensor in control unit	• -
<b><u>2409</u></b>	Servo motor, brake	• -
<b><u>2411</u></b>	Centre-differential lock	• -
<b><u>16344</u></b>	Control unit faulty	• The functions available in the transfer box control unit cannot be enabled.
<b><u>16346</u></b>	Control unit faulty	• The functions available in the transfer box control unit cannot be enabled.
<b><u>16347</u></b>	Control unit faulty	• The functions available in the transfer box control

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		unit cannot be enabled.
<b><u>16353</u></b>	Control unit malfunction	<ul style="list-style-type: none"><li>• The functions available in the transfer box control unit cannot be enabled.</li></ul>
<b><u>16366</u></b>	Control unit malfunction	<ul style="list-style-type: none"><li>• The functions available in the transfer box control unit cannot be enabled.</li></ul>

## FAULT CODE 0532

### VOLTAGE SUPPLY

#### Diagnostic conditions

- Ignition on
- Internal transfer box control module function test

#### Possible causes of fault

- 'Below lower limit', battery discharged or faulty
- 'Lower limit value not reached', fuse faulty
- 'Below lower limit', line short circuit to ground or open circuit
- 'Below lower limit', alternator faulty
- 'Below lower limit', transfer box control unit faulty
- 'Above upper limit', alternator faulty
- 'Above upper limit', transfer box control unit faulty

#### Affected pins

Transfer box control module plug:

- Pin 46 'terminal 30', from fuse carrier at right of dashboard 'fuse 57'
- Pin 47 'ground', from ground pin 'MB26'

### DIAGNOSIS/TROUBLESHOOTING

**NOTE:**        **Visual inspection:** In the next troubleshooting section, please check first that the affected 'pin' of the transfer box control unit plug connection and the 'pin' of the plug connections are neither damaged nor corroded. Remove any soiling or corrosion/oxidation. Replace damaged parts/wires.

**NOTE:**        **Control unit replacement:** Before replacing the 'transfer box control unit', the ground connections, power supply and plug connections on the control unit must be checked as OK. After the test drive, read out the fault memory with the 9588 Porsche System Tester II again. Additional causes of faults that could

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**damage the 'transfer box control unit' should be detected and remedied.**

**Before carrying out the work instruction, check fuse '57', voltage supply terminal 30 for the transfer box control unit, in the fuse carrier to the right of the dashboard and replace if necessary. After replacing the fuse, determine and remedy the cause of the fault in accordance with the work instruction below!**

### DIAGNOSIS TROUBLESHOOTING PROCEDURE

Work instruction			Display OK	If not OK
1	Check battery voltage/current and charge voltage/current on three-phase generator:	<ul style="list-style-type: none"><li>• Engine speed &gt; 2,000 rpm.</li><li>• Measure charge voltage/current of generator.</li></ul>	11.4 to 14.5 V Go to Step 2	Charge battery if necessary, replace if faulty. Wiring/regulator or diodes faulty. Repair wiring or generator. After carrying out repairs, erase the fault memory and then read out the fault memory again while observing the diagnostic conditions. If no fault stored, then: --> End If fault reappears, then: Go to Step 2
2	Check terminal 30 voltage supply and ground supply line to transfer box control unit:	Measurement '2a': <ul style="list-style-type: none"><li>• Ignition off</li><li>• Pull plug off the transfer box control unit</li><li>• Measure voltage between 'pin 46' and ground on transfer box control unit plug.</li></ul>	10.5 to 14.5 V continue with measurement '2b'	Check fuse '57' in fuse carrier at right of dashboard (resistance measurement). Check voltage supply line for short circuit to ground: Go to Step 3
		Measurement '2b': <ul style="list-style-type: none"><li>• Measure voltage between 'pin 47' and battery terminal 30 on transfer box control unit plug.</li></ul>	10.5 to 14.5 V Go to Step 3	Check ground supply line for short circuit to B+: Go to Step 3
3	Check power supply line for short circuit to ground:	Measurement '3a': <ul style="list-style-type: none"><li>• Measure voltage between 'pin 46 and battery positive' on transfer box control unit plug.</li></ul>	< 0.3 V Measurement '3b'	Short circuit to ground between transfer box control unit plug leads 'pin 46 and fuse 57' in fuse carrier at right of dashboard. Repair wiring and replace faulty fuse. --> End
	Check ground supply	Measurement '3b':		Short circuit to B+ between transfer box control unit plug leads 'pin 47'

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	line for short circuit to B+:	<ul style="list-style-type: none"><li>• Measure voltage between 'pin 47' and ground on transfer box control unit plug.</li></ul>	< 0.3 V Go to Step 4	and ground pin MB26. Repair wiring and replace faulty fuse(s). --> End
4	Check for open circuit of terminal 30 voltage supply line and ground supply line for ground pin MB26:	<ul style="list-style-type: none"><li>• Measure resistance on transfer box control unit plug between 'pin 46 and fuse 57' in fuse carrier at right of dashboard.</li><li>• Measure resistance between 'pin 47' and ground pin MB26 on transfer box control unit plug.</li></ul>	< 0.5 ohms Go to Step 5	Open circuit in wire to fuse carrier at right of dashboard. Open circuit in wire to ground pin MB26. Repair wire(s). Also check fuse. --> End
5	Check terminal 30 power supply at fuse:	<ul style="list-style-type: none"><li>• Measure voltage between fuse plug '57 and body ground' in fuse carrier at right of dashboard.</li></ul>	10.5 V to 14.5 V Go to Step 6	Short circuit/contact resistance/corroded or loose connections near or in fuse carrier. Repair if possible, otherwise replace fuse carrier at right of dashboard. --> End
6	Replace transfer box control module		See note on replacing control units! --> End	

## FAULT CODE 0659

### SELF-TEST

#### Diagnostic conditions

- Ignition on
- Internal control module function test not completed successfully

#### Possible causes of fault

- When the ignition is switched on, an internal function test is performed in the transfer box control module, but this was not completed successfully (implausible signal)

**NOTE:**     *The internal function test must be completed successfully before the functions in the transfer box control module can be released.*

#### Affected pins

Transfer box control module plug:



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### DIAGNOSIS/TROUBLESHOOTING VG 0101

**NOTE:** *Before replacing the control module, the ground connections, power supply and plug connections on the control module must be checked. After the test drive, read out the fault memory again with the Porsche System Tester II No. 9588. Additional causes of faults that could damage the transfer box control module should be detected and remedied.*

### DIAGNOSIS TROUBLESHOOTING PROCEDURE

Work instruction		Display OK	If not OK
1	Delete the fault memory for the transfer box control module and restart the internal function test (ignition ON/test is performed automatically)	--> End	Go to Step 2
2	Replace transfer box control module	--> End	

## FAULT CODE 0778

### STEERING-ANGLE SENSOR

#### Diagnostic conditions

- Ignition on
- Internal control module function test

#### Possible causes of fault

- No message from steering-angle sensor (no signal/communication)

#### Affected pins

Transfer box control module plug:

- Pin 11 'CAN drive (low)'
- Pin 42 'CAN drive (high)'

### DIAGNOSIS/TROUBLESHOOTING VG 0101

**NOTE:** *If there is no incoming signal/message via the CAN drive using several control modules, the CAN drive must be checked for open or short circuits. Refer to 'CHECKING INSTRUCTIONS/CAN DATA BUS '.*

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### DIAGNOSIS TROUBLESHOOTING PROCEDURE

Work instruction	Display OK	If not OK
1 Read out fault memory for steering column switch (fault localisation)	For further fault localisation, please follow the diagnosis/troubleshooting instructions for the PSM control module, refer to the <b><u>ANTI-LOCK BRAKE SYSTEM (ABS)</u></b> article . The troubleshooting description '0778 Steering-angle sensor' must be used from this. --> End	
2 <b><u>CHECKING INSTRUCTIONS/CAN DATA BUS .</u></b>	--> End	

### FAULT CODE 1312

#### CAN DRIVE

##### Diagnostic conditions

- Ignition on
- Internal transfer box control module function test

##### Possible cause of fault

Communication problem with all control modules via CAN drive.

- CAN drive is faulty
- No signal/communication

##### Affected pins

Transfer box control module plug:

- Pin 11 'CAN drive (low)'
- Pin 42 'CAN drive (high)'

### DIAGNOSIS/TROUBLESHOOTING VG 0101

**NOTE:** *If there is no incoming signal/message via the CAN drive using several control modules, the CAN drive must be checked for open or short circuits. Refer to **'CHECKING INSTRUCTIONS/CAN DATA BUS '**.*

### DIAGNOSIS TROUBLESHOOTING PROCEDURE

Work instruction	Display OK	If not OK
1 <b><u>CHECKING INSTRUCTIONS/CAN DATA BUS .</u></b>	--> End	

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### FAULT CODE 1314

#### DME CONTROL MODULE

##### Diagnostic conditions

- Ignition on
- Internal control module function test

##### Possible cause of fault

Communication problem with all control modules via CAN drive.

- To localise the fault, read out the fault memory for the 'DME control module' (Please read out fault memory)
- No message from DME control module on CAN drive (no signal/ communication)

##### Affected pins

Transfer box control module plug:

- Pin 11 'CAN drive (low)'
- Pin 42 'CAN drive (high)'

#### DIAGNOSIS/TROUBLESHOOTING VG 0101

**NOTE:** *If there is no incoming signal/message via the CAN drive using several control modules, the CAN drive must be checked for open or short circuits. Refer to 'CHECKING INSTRUCTIONS/CAN DATA BUS '.*

#### DIAGNOSIS TROUBLESHOOTING PROCEDURE

Work instruction	Display OK	If not OK
1 Read out fault memory for DME control module (fault localisation)	To eliminate further faults, please follow the diagnosis/troubleshooting instructions for the DME control module, refer to the <b><u>OBD (II)</u></b> and <b><u>FUEL SYSTEM, ELECTRONIC INJECTION</u></b> articles . --> End	
2 <b><u>CHECKING INSTRUCTIONS/CAN DATA BUS</u></b> .	--> End	

### FAULT CODE 1315

#### TIPTRONIC CONTROL MODULE

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### Diagnostic conditions

- Ignition on
- Internal control module function test

### Possible cause of fault

- To localise the fault, read out the 'Tiptronic control module' fault memory (Please read out fault memory)
- No message from Tiptronic control module on CAN drive (no signal/communication)

### Affected pins

Transfer box control module plug:

- Pin 11 'CAN drive (low)'
- Pin 42 'CAN drive (high)'

## DIAGNOSIS/TROUBLESHOOTING VG 0101

**NOTE:** *If there is no incoming signal/message via the CAN drive using several control modules, the CAN drive must be checked for open or short circuits. Refer to 'CHECKING INSTRUCTIONS/CAN DATA BUS '.*

### DIAGNOSIS TROUBLESHOOTING PROCEDURE

Work instruction	Display OK	If not OK
1 Read out fault memory for Tiptronic control module (fault localisation)	For further fault localisation, please follow the diagnosis/troubleshooting instructions for the Tiptronic control module, refer to the <b><u>TIPTRONIC</u></b> and <b><u>AUTOMATIC - ACTUATION, ASSEMBLY HOUSING</u></b> articles. . --> End	
2 <b><u>CHECKING INSTRUCTIONS/CAN DATA BUS</u></b> .	--> End	

## FAULT CODE 1316

### PSM CONTROL MODULE

#### Diagnostic conditions

- Ignition on
- Internal control module function test
- Vehicle speed greater than 0 km/h

#### Possible cause of fault

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- To localise the fault, read out the fault memory for the 'PSM control module' (Please read out fault memory)
- No message from PSM control module on CAN drive (no signal/ communication)

### Affected pins

Transfer box control module plug:

- Pin 11 'CAN drive (low)'
- Pin 42 'CAN drive (high)'

### DIAGNOSIS/TROUBLESHOOTING VG 0101

**NOTE:**      ***If there is no incoming signal/message via the CAN drive using several control modules, the CAN drive must be checked for open or short circuits. Refer to 'CHECKING INSTRUCTIONS/CAN DATA BUS'.***

### DIAGNOSIS TROUBLESHOOTING PROCEDURE

Work instruction	Display OK	If not OK
1 Read out fault memory for PSM control module (fault localisation)	To eliminate further faults, please follow the diagnosis/troubleshooting instructions for the PSM control module, refer to the <u><b>ANTI-LOCK BRAKE SYSTEM (ABS)</b></u> article . --> End	
2 <u><b>CHECKING INSTRUCTIONS/CAN DATA BUS</b></u> .	--> End	

## FAULT CODE 1317

### INSTRUMENT CLUSTER

#### Diagnostic conditions

- Ignition on
- Internal control module function test

#### Possible cause of fault

- Signal from instrument cluster does not correspond to expected signal (please read out fault memory).
- Signal from instrument cluster does not appear on CAN drive (no signal/communication).

### Affected pins

Transfer box control module plug:

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- Pin 11 'CAN drive (low)'
- Pin 42 'CAN drive (high)'

### DIAGNOSIS/TROUBLESHOOTING VG 0101

**NOTE:** *If there is no incoming signal/message via the CAN drive using several control modules, the CAN drive must be checked for open or short circuits. Refer to 'CHECKING INSTRUCTIONS/CAN DATA BUS '.*

### DIAGNOSIS TROUBLESHOOTING PROCEDURE

Work instruction	Display OK	If not OK
1 Read out instrument cluster fault memory	For further troubleshooting, please follow the diagnosis instructions for the instrument cluster, refer to the <b><u>INSTRUMENT CLUSTER</u></b> article . --> End	
2 <b><u>CHECKING INSTRUCTIONS/CAN DATA BUS</u></b> .	--> End	

## FAULT CODE 1336

### CAN COMFORT OFF

#### Diagnostic conditions

- Ignition on
- Internal control module function test

#### Possible cause of fault

- To localise the fault, read out the fault memory for the 'gateway (in instrument cluster)' (Please read out fault memory)
- No message from CAN comfort (the messages are transferred to the CAN drive via the 'gateway' interface in the instrument cluster) on CAN drive (no signal/communication)

#### Affected pins

Transfer box control module plug:

- Pin 11 'CAN drive (low)'
- Pin 42 'CAN drive (high)'

### DIAGNOSIS/TROUBLESHOOTING VG 0101

### DIAGNOSIS TROUBLESHOOTING PROCEDURE

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Work instruction	Display OK	If not OK
1 Read out fault memory for gateway (in instrument cluster) (fault localisation)	For further fault localisation, please follow the diagnosis/troubleshooting instructions for the gateway (in instrument cluster), refer to the <b><u>INSTRUMENT CLUSTER</u></b> article . --> End	
2 <b><u>CHECKING INSTRUCTIONS/CAN DATA BUS</u></b> .	--> End	

## FAULT CODE 16344

### CONTROL MODULE FAULTY

#### Diagnostic conditions

- Ignition on
- Internal transfer box control module function test

#### Possible cause of fault

- Transfer box control module faulty

#### Affected pins

### DIAGNOSIS/TROUBLESHOOTING VG 0101

#### NOTE:

- ***Before replacing the control module, the ground connections, power supply and plug connections on the control module must be checked.***
- ***After the test drive, read out the fault memory again with the Porsche System Tester II No. 9588. Additional causes of faults that could damage the transfer box control module should be detected and remedied.***

### DIAGNOSIS TROUBLESHOOTING PROCEDURE

Work instruction	Display OK	If not OK
1 Replace transfer box control module	--> End	

## FAULT CODE 16346

### CONTROL MODULE FAULTY

#### Diagnostic conditions

- Ignition on
- Internal transfer box control module function test

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### Possible cause of fault

- Transfer box control module faulty

### Affected pins

### DIAGNOSIS/TROUBLESHOOTING VG 0101

#### NOTE:

- *Before replacing the control module, the ground connections, power supply and plug connections on the control module must be checked.*
- *After the test drive, read out the fault memory again with the Porsche System Tester II No. 9588. Additional causes of faults that could damage the transfer box control module should be detected and remedied.*

### DIAGNOSIS TROUBLESHOOTING PROCEDURE

Work instruction	Display OK	If not OK
1 Replace transfer box control module	--> End	

## FAULT CODE 16347

### CONTROL MODULE FAULTY

#### Diagnostic conditions

- Ignition on
- Internal transfer box control module function test

### Possible cause of fault

- Transfer box control module faulty

### Affected pins

### DIAGNOSIS/TROUBLESHOOTING VG 0101

#### NOTE:

- *Before replacing the control module, the ground connections, power supply and plug connections on the control module must be checked.*
- *After the test drive, read out the fault memory again with the Porsche System Tester II No. 9588. Additional causes of faults that could damage the transfer box control module should be detected and remedied.*

### DIAGNOSIS TROUBLESHOOTING PROCEDURE

Work instruction	Display OK	If not OK
1 Replace transfer box control module	--> End	



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### FAULT CODE 16353

#### CONTROL UNIT MALFUNCTION

This fault causes the power/voltage supply to the servo motor 'A/B', brakes 'A/B', sensors and CAN communication to switch off.

#### Diagnostic conditions

**NOTE:** The internal function test must be completed successfully before the functions stored in the transfer box control unit can be activated.

- Ignition on
- Internal transfer box control unit function test

#### Possible causes of fault

- 'Implausible signal': fault detected in computer during internal function test in transfer box control unit.

#### Affected pins

Transfer box control unit plug:

- Pin '-'

#### DIAGNOSIS/TROUBLESHOOTING

**NOTE:** Before replacing the control unit, the ground connections, power supply and plug connections on the control unit must be checked. After the test drive, read out the fault memory with the Porsche System Tester II No. 9588 again. Additional causes of faults that could damage the transfer box control unit should be detected and remedied.

#### DIAGNOSIS TROUBLESHOOTING PROCEDURE

Work instruction		Display OK	If not OK
1	Delete the fault memory for the transfer box control unit and restart the internal function test (ignition ON/test is performed automatically)	--> End	If fault is repeated, then: Go to Step 2
2	Replace transfer box control unit	--> End	

### FAULT CODE 16366

#### CONTROL UNIT MALFUNCTION

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### 2003-08 TRANSMISSION Transfer Box - 9pa\_Cayenne

This fault causes the power/voltage supply to the servo motor 'A/B', brakes 'A/B', sensors and CAN communication to switch off.

#### Diagnostic conditions

**NOTE:** The internal function test must be completed successfully before the functions stored in the transfer box control unit can be activated.

- Ignition on
- Internal transfer box control unit function test

#### Possible causes of fault

- 'Implausible signal': fault detected in computer during internal function test in transfer box control unit.

#### Affected pins

Transfer box control unit plug:

- Pin '-'

### DIAGNOSIS/TROUBLESHOOTING

**NOTE:** Before replacing the control unit, the ground connections, power supply and plug connections on the control unit must be checked. After the test drive, read out the fault memory with the Porsche System Tester II No. 9588 again. Additional causes of faults that could damage the transfer box control unit should be detected and remedied.

#### DIAGNOSIS TROUBLESHOOTING PROCEDURE

Work instruction		Display OK	If not OK
1	Delete the fault memory for the transfer box control unit and restart the internal function test (ignition ON/test is performed automatically)	--> End	If fault is repeated, then: Go to Step 2
2	Replace transfer box control unit	--> End	

## FAULT CODE 2025

### POWER SUPPLY

#### Diagnostic conditions

- Ignition on
- Internal function test on transfer box control unit

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### Possible causes of fault

- 'Short circuit to B+' between 'PWM (Pulse Width Modulation) switch' and 'selector switch (in running gear control module)'
- 'Short circuit to ground' between 'PWM (Pulse Width Modulation) switch' and 'selector switch (in running gear control module)'
- 'Open circuit' between 'PWM (Pulse Width Modulation) switch' and 'selector switch (in running gear control module)'

### Affected pins

Transfer box control unit connector:

- Pin 7 'PWM (Pulse Width Modulation) switch' to 'pin 4' 'selector switch (in running gear control module)'

### DIAGNOSIS/TROUBLESHOOTING

**NOTE:**      **Visual inspection:** In the next troubleshooting section, please check first that the affected 'pins' on the transfer box control unit plug connection and the 'pins' on the plug connections on the 'selector switch (in running gear control module)' are neither damaged nor corroded. Remove any soiling or corrosion/oxidation. Replace damaged parts/wiring.

**NOTE:**      **Control unit replacement:** before replacing the 'transfer box control unit', the ground connections, power supply and plug connections on the control unit must be checked and found to be OK. After test-driving the vehicle, read out the fault memory again using the 9718 PIWIS tester. Additional causes of faults that could damage the 'transfer box control unit' should be detected and remedied.

### DIAGNOSIS TROUBLESHOOTING PROCEDURE

Work instruction		Display OK	If not OK
1	Carry out the following checks on the wiring between 'pin 7' 'transfer box control unit' and 'pin 4' 'selector switch (in running gear control module)': <ul style="list-style-type: none"><li>• Short circuit to B+</li><li>• Short circuit to ground</li><li>• Open circuit</li></ul>	Go to Step 2	Repair or replace connector/wiring. --> End
2	Replace selector switch (running gear control module)	--> End	

## FAULT CODE 2033

### POTENTIOMETER 2, TRANSFER BOX

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**NOTE:** This fault code relates to the signal of potentiometer '2' (sensor 2) which, together with potentiometer '1' (sensor 1) and the temperature sensor, is integrated as a unit in the servo motor.

### Diagnostic conditions

- Ignition on
- Internal transfer box control module function test

### Possible causes of fault

- 'Short circuit to B+': signal line of potentiometer '2' (sensor 2) short circuit to B+(12 V)
- 'Short circuit to B+': transfer box control unit faulty
- 'Open circuit/short circuit to ground': signal line of potentiometer '2' (sensor 2) open circuit or short circuit to ground
- 'Short circuit to ground': potentiometer faulty
- 'Open circuit/short circuit to ground': transfer box control unit faulty

### Affected pins

Transfer box control module plug:

- Pin 31 'input signal to potentiometer 2 (sensor 2)', from pin B8 of 'servo motor sensor plug'

## DIAGNOSIS/TROUBLESHOOTING

**NOTE:** Visual inspection: In the next troubleshooting section, please check first that the affected 'pins' of the transfer box control unit plug connection and the 'pins' of the plug connections on the servo motor are neither damaged nor corroded. Remove any soiling or corrosion/oxidation. Replace damaged parts/wires.

**NOTE:** Control unit replacement: Before replacing the 'transfer box control unit', the ground connections, power supply and plug connections on the control unit must be checked as OK. Please observe the coding of the control module. After the test drive, read out the fault memory with the 9588 Porsche System Tester II again. Additional causes of faults that could damage the 'transfer box control unit' should be detected and remedied.

Troubleshooting fault type: 'short circuit to B+'

## DIAGNOSIS TROUBLESHOOTING PROCEDURE

Work instruction		Display OK	If not OK
	Measurement '1a': <ul style="list-style-type: none"><li>• Ignition off</li></ul>	< 0,3 V	Repair wiring

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1	Check short circuit to B+:	<ul style="list-style-type: none"> <li>• Pull plug off the transfer box control unit</li> <li>• Ignition on</li> <li>• Measure voltage between 'pin 31' of transfer box control unit plug and ground.</li> </ul> <p>Measurement '1b':</p>	go to measurement '1b'	harness to servo motor. --> End
		<ul style="list-style-type: none"> <li>• Ignition off</li> <li>• Pull plugs 'A' and 'B' off servo motor</li> <li>• Measure resistance between 'pin B8 and pins A1, A2, A3, A4' of servo motor plugs 'A and B'.</li> <li>• Measure resistance between 'pin B8 and pin B4' of servo motor plug 'B'.</li> </ul> <p>Measurement '1c':</p> <ul style="list-style-type: none"> <li>• Measure resistance between 'pin 31' and pins '1, 15, 16, 18, 21, 36' of transfer box control unit plug.</li> </ul>	<p>infinity ohms go to measurement '1c'</p> <p>infinity ohms Go to Step 3</p>	<p>Short circuit between servo motor leads. Go to Step 2</p> <p>Repair wiring harness to servo motor. --&gt; End</p>
2	Replace transfer box servo motor		--> End	
3	Replace transfer box control module		See note on replacing control units! --> End	

**Troubleshooting fault type: 'Open circuit/short circuit to ground'**

### DIAGNOSIS TROUBLESHOOTING PROCEDURE

Work instruction		Display OK	If not OK
1	Check short circuit to ground:	Measurement '1a':	
		<ul style="list-style-type: none"> <li>• Ignition off</li> <li>• Pull plug off transfer box control unit</li> <li>• Measure resistance between 'pin 31 and pins 2, 15, 16, 44, 47' of transfer box control unit plug.</li> </ul> <p>Measurement '1b':</p> <ul style="list-style-type: none"> <li>• Pull plugs 'A' and 'B' off servo motor</li> <li>• Measure resistance between 'pin 31 and pins 2, 15, 16, 33, 44, 47' of transfer box control unit plug.</li> </ul>	<p>infinity ohms Go to Step 2</p> <p>infinity ohms Go to Step 3</p> <p>go to measurement '1b'</p> <p>Repair wiring harness to servo motor. --&gt; End</p>
		Measurement '2a':	
		<ul style="list-style-type: none"> <li>• Pull plug 'B' off servo motor</li> <li>• Measure resistance between 'pin B8' and</li> </ul>	<p>1.1 to 2.2 kohms go to measurement</p> <p>Go to Step 3</p>

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2	Check open circuit:	'pin B10' of servo motor plug 'B'. Measurement '2b': <ul style="list-style-type: none"><li>Measure resistance between 'pin 31' of transfer box control unit plug and 'pin B8' of removed sensor plug 'B'.</li></ul>	'2b'  < 5 ohms Go to Step 4	Repair wiring harness to servo motor. --> End
3	Replace transfer box servo motor		--> End	
4	Replace transfer box control module		See note on replacing control units! --> End	

## FAULT CODE 2038

### VOLTAGE SUPPLY TO SENSORS

**NOTE:** This fault code relates to the voltage supply to sensors: potentiometer '1' (sensor 1), potentiometer '2' (sensor 2) and the servo motor temperature sensor, which are integrated as a unit in the servo motor.

#### Diagnostic conditions

- Ignition on
- Internal transfer box control unit function test

#### Possible causes of fault

- 'Above upper limit': voltage supply line (5 V) short circuit to B+ (12 V)
- 'Above upper limit': transfer box control unit faulty
- 'Below lower limit': voltage supply line (5 V) short circuit to ground
- 'Below lower limit': transfer box control unit faulty

#### Affected pins

Transfer box control unit plug:

- Pin 1 'potentiometer 1 (sensor 1) 5 V to pin B4 of 'servo motor sensor plug'
- Pin 18 'potentiometer 2 (sensor 2) 5 V to pin B10 of 'servo motor sensor plug'
- Pin 29 'voltage supply (5 V) for servo motor temperature sensor' to pin B6 of 'servo motor sensor plug'

## DIAGNOSIS/TROUBLESHOOTING

**NOTE:** Visual inspection: In the next troubleshooting section, please check first that the affected 'pins' of the transfer box control unit plug connection and the 'pins' of the plug connections on the servo motor are neither damaged nor corroded. Remove any soiling or corrosion/oxidation. Replace damaged parts/wires.

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**NOTE:** Control unit replacement: Before replacing the 'transfer box control unit', the ground connections, power supply and plug connections on the control unit must be checked as OK. Please observe the coding of the control unit. After the test drive, read out the fault memory again with the Porsche System Tester II No. 9588. Additional causes of faults that could damage the 'transfer box control unit' should be detected and remedied.

### DIAGNOSIS TROUBLESHOOTING PROCEDURE

Work instruction		Display OK	If not OK
1	Check voltage supply of potentiometer '1' and potentiometer '2': <ul style="list-style-type: none"><li>• Ignition off</li><li>• Pull sensor plug 'B' off servo motor</li><li>• Ignition on</li><li>• Measure voltage at sensor plug 'B' on the wiring harness side between: 'pin B4 and pin B3', 'pin B10 and pin B9' and 'pin B6 and ground'.</li></ul>	approx. 5 V Go to Step 2, measurement '2a'	Measured voltage > 5 V Go to Step 2, measurement '2b' Measured voltage < 5 V Go to Step 3
2	Check short circuit to B+:  Measurement '2a': <ul style="list-style-type: none"><li>• Ignition off</li><li>• Pull plug 'A' off servo motor</li><li>• Measure resistance at servo motor plugs 'A and B' between: 'pin B10 and pin A1, A2, A3, A4', 'pin B4 and pin A1, A2, A3, A4' and 'pin B6 and pin A1, A2, A3, A4'.</li></ul> Measurement '2b': <ul style="list-style-type: none"><li>• Ignition off</li><li>• Pull plug 'A' off servo motor</li><li>• Pull plug off transfer box control unit</li><li>• Ignition on</li><li>• Measure voltage between 'pins 1, 18, 29' of transfer box control unit plug and ground.</li></ul> Measurement '2c': <ul style="list-style-type: none"><li>• Ignition off</li><li>• Measure resistance at transfer box control unit plug between 'pin 1 and pin 15, 16, 21, 36', 'pin 18 and pin 15, 16, 21, 36' and 'pin 29 and pin 15, 16, 21, 36'.</li></ul>	infinity ohms Measurement '2b'  < 0.3 V Measurement '2c'  infinity ohms Go to Step 5	Short circuit between servo motor leads. Go to Step 4  Repair wiring harness to servo motor. --> End  Repair wiring harness to servo motor. --> End
	Measurement '3a':		

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3	Check short circuit to ground:	<ul style="list-style-type: none"><li>• Ignition off</li><li>• Measure resistance between 'pins 1, 18, 29' of transfer box control unit plug and ground.</li></ul> Measurement '3b': <ul style="list-style-type: none"><li>• On servo motor, pull off sensor plug 'B' and servo motor plug 'A'</li><li>• Measure resistance between 'pins 1, 18, 29' of transfer box control unit plug and ground.</li></ul>	infinity ohms Go to Step 5	Measurement '3b'
			infinity ohms Go to Step 4	Repair wiring harness to servo motor. --> End
4	Replace transfer box servo motor		--> End	
5	Replace transfer box control unit		See note on replacing control units! --> End	

## FAULT CODE 2039

### POTENTIOMETER, TRANSFER BOX

**NOTE:** This fault code relates to the signal of potentiometer '2' (sensor 2) and potentiometer '1' (sensor 1) which, together with the temperature sensor, are integrated as a unit in the servo motor.

#### Diagnostic conditions

- Ignition on
- Internal transfer box control module function test

#### Possible causes of fault

- 'Short circuit to B+': signal line of potentiometer '1/2' (sensor 1/ 2) short circuit to B+(12 V)
- 'Short circuit to B+': transfer box control unit faulty
- 'Open circuit/short circuit to ground': signal line of potentiometer '1/2' (sensor 1/2) open circuit or short circuit to ground
- 'Short circuit to ground': potentiometer faulty
- 'Open circuit/short circuit to ground': transfer box control unit faulty
- 'Implausible signal': potentiometer faulty

#### Affected pins

Transfer box control module plug:

- Pin 12 'input signal to potentiometer 1 (sensor 1)', from pin B5 of 'servo motor sensor plug'



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- Pin 31 'input signal to potentiometer 2 (sensor 2)', from pin B8 of 'servo motor sensor plug'

### DIAGNOSIS/TROUBLESHOOTING

**NOTE:** Visual inspection: In the next troubleshooting section, please check first that the affected 'pins' of the transfer box control unit plug connection and the 'pins' of the plug connections on the servo motor are neither damaged nor corroded. Remove any soiling or corrosion/oxidation. Replace damaged parts/wires.

**NOTE:** Control unit replacement: Before replacing the 'transfer box control unit', the ground connections, power supply and plug connections on the control unit must be checked as OK. Please observe the coding of the control module. After the test drive, read out the fault memory with the 9588 Porsche System Tester II again. Additional causes of faults that could damage the 'transfer box control unit' should be detected and remedied.

Troubleshooting fault type: 'short circuit to B+'

### DIAGNOSIS TROUBLESHOOTING PROCEDURE

Work instruction		Display OK	If not OK
1	Check short circuit to B+:		
	Measurement '1a': <ul style="list-style-type: none"><li>• Ignition off</li><li>• Pull plug off the transfer box control unit</li><li>• Ignition on</li><li>• Measure voltage between 'pins 12, 31' of transfer box control unit plug and ground.</li></ul> Measurement '1b': <ul style="list-style-type: none"><li>• Ignition off</li><li>• Pull plugs 'A' and 'B' off servo motor</li><li>• Measure resistance between 'pins B5, B8 and pins A1, A2, A3, A4' of servo motor plugs 'A and B'.</li><li>• Measure resistance between 'pins B5 and B10, pin B4 and B8' of servo motor plug 'B'.</li></ul> Measurement '1c': <ul style="list-style-type: none"><li>• Measure resistance between 'pins 12, 31' and pins '1, 15, 16, 18, 21, 36' of transfer box control unit plug.</li></ul>	< 0.3 V go to measurement '1b'	Repair wiring harness to servo motor. --> End
		infinity ohms go to measurement '1c'	Short circuit between servo motor leads. Go to Step 2
		infinity ohms Go to Step 3	Repair wiring harness to servo motor. --> End
2	Replace transfer box servo motor	--> End	
3	Replace transfer box control module	See note on replacing control units! --> End	

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Troubleshooting fault type: 'Open circuit/short circuit to ground'

### DIAGNOSIS TROUBLESHOOTING PROCEDURE

Work instruction		Display OK	If not OK
1	Check short circuit to ground:		
	Measurement '1a': <ul style="list-style-type: none"><li>• Ignition off</li><li>• Pull plug off transfer box control unit</li><li>• Measure resistance between 'pins 12 and 15, 16, 33, 44, 47 as well as between pins 31 and 2, 15, 16, 44, 47' of transfer box control unit plug.</li></ul> Measurement '1b': <ul style="list-style-type: none"><li>• Pull plugs 'A' and 'B' off servo motor</li><li>• Measure resistance between 'pins 12, 31 and pins 2, 15, 16, 33, 44, 47' of transfer box control unit plug.</li></ul>	infinity ohms Go to Step 2	go to measurement '1b'
2	Check open circuit:		
	Measurement '2a': <ul style="list-style-type: none"><li>• Pull plug 'B' off servo motor</li><li>• Measure resistance between 'pin B5' and 'pin B4' and 'pin B8' and 'pin B10' of servo motor plug 'B'.</li></ul> Measurement '2b': <ul style="list-style-type: none"><li>• Measure resistance between 'pins 12 and B5' of transfer box control unit plug and 'pins 31 and B8' of removed sensor plug 'B'.</li></ul>	1.1 to 2.2 kohms go to measurement '2b'	Go to Step 3
3	Replace transfer box servo motor	--> End	
4	Replace transfer box control module	See note on replacing control units! --> End	
			Repair wiring harness to servo motor. --> End

Troubleshooting for fault type: 'implausible signal'

### DIAGNOSIS TROUBLESHOOTING PROCEDURE

Work instruction	Display OK	If not OK
1 Replace transfer box servo motor (potentiometer faulty)	--> End	

## FAULT CODE 2040

### VOLTAGE SUPPLY TO TRANSFER BOX SERVO MOTOR

Diagnostic conditions

- Ignition on
- Internal transfer box control module function test
- Engine running
- Selector lever position 'P'
- Engage longitudinal lock/gear reduction

Possible causes of fault

- 'Short circuit to B+': short circuit in wiring harness (servo motor runs continuously)
- 'Short circuit to B+': control unit faulty (servo motor runs continuously)
- 'Short circuit to ground': short circuit in wiring harness (servo motor does not function)
- 'Short circuit to ground': short in servo motor winding or short circuit in servo motor leads (servo motor does not function)
- 'Short circuit to ground': control unit faulty (servo motor does not function)

Affected pins

Transfer box control module plug:

- Pin 15 'servo motor (A)', to pin A1 of 'servo motor plug A'
- Pin 16 'servo motor (B)', to pin A4 of 'servo motor plug B'

DIAGNOSIS/TROUBLESHOOTING

- NOTE:

Visual inspection: In the next troubleshooting section, please check first that the affected 'pins' of the transfer box control unit plug connection and the 'pins' of the plug connections on the servo motor are neither damaged nor corroded. Remove any soiling or corrosion/oxidation. Replace damaged parts/wires.
- NOTE:

Control unit replacement: Before replacing the 'transfer box control unit', the ground connections, power supply and plug connections on the control unit must be checked as OK. Please observe the coding of the control module. After the test drive, read out the fault memory with the 9588 Porsche System Tester II again. Additional causes of faults that could damage the 'transfer box control unit' should be detected and remedied.

TRUBLESHOOTING FAULT TYPE: 'SHORT CIRCUIT TO B+'

DIAGNOSIS TROUBLESHOOTING PROCEDURE

Work instruction		Display OK	If not OK
	Measurement '1a': <ul style="list-style-type: none"><li>• Ignition off</li></ul>		Repair wiring

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1	Check short circuit to B+:	<ul style="list-style-type: none"> <li>• Pull plug off the transfer box control unit</li> <li>• Ignition on</li> <li>• Measure voltage between 'pins 15, 16' of transfer box control unit plug and ground.</li> </ul> <p>Measurement '1b':</p> <ul style="list-style-type: none"> <li>• Ignition off</li> <li>• Connect plug to transfer box control unit</li> <li>• Pull plug 'A' off servo motor</li> <li>• Ignition on</li> <li>• Measure voltage between 'pins A1, A4' of servo motor plug 'A' (wiring harness side) and ground.</li> </ul>	<p>&lt; 0.3 V go to measurement '1b'</p> <p>&lt; 5 V Short circuit between servo motor leads. Go to Step 2</p>	<p>harness to servo motor. --&gt; End</p> <p>Go to Step 3</p>
2	Replace transfer box servo motor		--> End	
3	Replace transfer box control module		See note on replacing control units! --> End	

Troubleshooting fault type: 'short circuit to ground'

### DIAGNOSIS TROUBLESHOOTING PROCEDURE

Work instruction			Display OK	If not OK
1	Check short circuit to ground:	<p>Measurement '1a':</p> <ul style="list-style-type: none"><li>• Ignition off</li><li>• Pull plug off transfer box control unit</li><li>• Measure resistance between 'pins 15, 16 and pins 2, 33, 36, 44, 47' of transfer box control unit plug.</li></ul> <p>Measurement '1b':</p> <ul style="list-style-type: none"><li>• Pull plugs 'A' and 'B' off servo motor</li><li>• Measure resistance between 'pins 15 and 16' and 'pins 15, 16 and pins 2, 33, 36, 44, 47' of transfer box control unit plug.</li></ul>	<p>infinity ohms Go to Step 3</p> <p>infinity ohms Go to Step 2</p>	<p>go to measurement '1b'</p> <p>Repair wiring harness to servo motor. --&gt; End</p>
2	Replace transfer box servo motor		--> End	
3	Replace transfer box control module		See note on replacing control units! --> End	

**FAULT CODE 2041**

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### GROUND SUPPLY TO TRANSFER BOX SERVO MOTOR

#### Diagnostic conditions

- Ignition on
- Internal transfer box control module function test
- Engine running
- Selector lever position 'P'
- Engage longitudinal lock/gear reduction

#### Possible causes of fault

- 'Short circuit to B+': short circuit in wiring harness (servo motor does not function)
- 'Short circuit to B+': control unit faulty (servo motor does not function)
- 'Short circuit to ground': short circuit in wiring harness (servo motor runs continuously)
- 'Short circuit to ground': short in servo motor winding or short circuit in servo motor leads (servo motor runs continuously)
- 'Short circuit to ground': control unit faulty (servo motor runs continuously)

#### Affected pins

Transfer box control module plug:

- Pin 15 'servo motor (A)', to pin A1 of 'servo motor plug A'
- Pin 16 'servo motor (B)', to pin A4 of 'servo motor plug B'

### DIAGNOSIS/TROUBLESHOOTING

**NOTE:** Visual inspection: In the next troubleshooting section, please check first that the affected 'pins' of the transfer box control unit plug connection and the 'pins' of the plug connections on the servo motor are neither damaged nor corroded. Remove any soiling or corrosion/oxidation. Replace damaged parts/wires.

**NOTE:** Control unit replacement: Before replacing the 'transfer box control unit', the ground connections, power supply and plug connections on the control unit must be checked as OK. Please observe the coding of the control module. After the test drive, read out the fault memory with the 9588 Porsche System Tester II again. Additional causes of faults that could damage the 'transfer box control unit' should be detected and remedied.

Troubleshooting fault type: 'short circuit to B+'

### DIAGNOSIS TROUBLESHOOTING PROCEDURE

Work instruction	Display OK	If not OK

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1	Check short circuit to B+:	<p>Measurement '1a':</p> <ul style="list-style-type: none"><li>• Ignition off</li><li>• Pull plug off the transfer box control unit</li><li>• Ignition on</li><li>• Measure voltage between 'pins 15, 16' of transfer box control unit plug and ground.</li></ul> <p>Measurement '1b':</p> <ul style="list-style-type: none"><li>• Ignition off</li><li>• Connect plug to transfer box control unit</li><li>• Pull plug 'A' off servo motor</li><li>• Ignition on</li><li>• Measure voltage between 'pins A1, A4' of servo motor plug 'A' (wiring harness side) and ground.</li></ul>	<p>&lt; 0.3 V go to measurement '1b'</p> <p>&lt; 5 V Short circuit between servo motor leads. Go to Step 2</p>	<p>Repair wiring harness to servo motor. --&gt; End</p> <p>Go to Step 3</p>
2	Replace transfer box servo motor	--> End		
3	Replace transfer box control module	See note on replacing control units! --> End		

Troubleshooting fault type: 'short circuit to ground'

### DIAGNOSIS TROUBLESHOOTING PROCEDURE

Work instruction			Display OK	If not OK
1	Check short circuit to ground:	<p>Measurement '1a':</p> <ul style="list-style-type: none"><li>• Ignition off</li><li>• Pull plug off transfer box control unit</li><li>• Measure resistance between 'pins 15,16 and pins 2, 33, 36, 44, 47' of transfer box control unit plug.</li></ul> <p>Measurement '1b':</p> <ul style="list-style-type: none"><li>• Pull plugs 'A' and 'B' off servo motor</li><li>• Measure resistance between 'pins 15 and 16' and 'pins 15, 16 and pins 2, 33, 36, 44, 47' of transfer box control unit plug.</li></ul>	<p>infinity ohms Go to Step 2</p> <p>infinity ohms Go to Step 3</p>	<p>go to measurement '1b'</p> <p>Repair wiring harness to servo motor. --&gt; End</p>
2	Replace transfer box servo motor		--> End	
3	Replace transfer box control module		<p>See note on replacing control units!</p> <p>--&gt; End</p>	

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### FAULT CODE 2042

#### ACTIVATION OF TRANSFER BOX SERVO MOTOR

##### Diagnostic conditions

- Ignition on
- Internal transfer box control unit function test
- Engine running
- Selector lever position 'P'
- Engage longitudinal lock/gear reduction

##### Possible causes of fault

- 'Open circuit': open circuit between leads (servo motor does not function)
- 'Open circuit': control unit faulty (servo motor does not function)
- 'Open circuit': open circuit in servo motor winding (servo motor does not function)

##### Affected pins

Transfer box control unit plug:

- Pin 15 'servo motor (A)', to pin A1 of 'servo motor plug A'
- Pin 16 'servo motor (B)', to pin A4 of 'servo motor plug B'

#### DIAGNOSIS/TROUBLESHOOTING

**NOTE:** Visual inspection: In the next troubleshooting section, please check first that the affected 'pins' of the transfer box control unit plug connection and the 'pins' of the plug connections on the servo motor are neither damaged nor corroded. Remove any soiling or corrosion/oxidation. Replace damaged parts/wires.

**NOTE:** Control unit replacement: Before replacing the 'transfer box control unit', the ground connections, power supply and plug connections on the control unit must be checked as OK. Please observe the coding of the control unit. After the test drive, read out the fault memory again with the Porsche System Tester II No. 9588. Additional causes of faults that could damage the 'transfer box control unit' should be detected and remedied.

#### DIAGNOSIS TROUBLESHOOTING PROCEDURE

Work instruction		Display OK	If not OK
	Measurement '1a': <ul style="list-style-type: none"><li>• Ignition off</li></ul>	0.8 ohms	If infinity ohms

1	<div>Check open circuit:</div> <div>Measurement</div> <ul style="list-style-type: none"> <li>• Pull plug 'A' off servo motor</li> <li>• Measure resistance (servo motor winding) between 'pins A1 and A4' of servo motor plug 'A'.</li> <li>• Pull plug off transfer box control unit</li> <li>• Measure resistance between 'pins 15, 16' of transfer box control unit plug and 'pins A1, A4' of removed lock plug 'A'.</li> </ul>	<div>go to measurement '1b'</div> <div>&lt; 5 ohms</div> <div>Go to Step 3</div>	<div>then: Go to Step 2</div> <div>Repair wiring harness to servo motor.</div> <div>--&gt; End</div>
2	Replace transfer box servo motor	--> End	
3	Replace transfer box control unit	<div>See note on replacing control units!</div> <div>--&gt; End</div>	

## FAULT CODE 2046

### GEAR REDUCTION LED (IN CONTROL MODULE)

#### Diagnostic conditions

- Ignition on
- Internal transfer box control module function test

#### If short circuit to B+:

Engage gear reduction.

#### If short circuit to ground:

Do not engage gear reduction.

#### Possible causes of fault

'Gear reduction LED' is activated by transfer box control unit on the ground side.

- 'Short circuit to B+': gear reduction LED does not light
- 'Short circuit to ground': gear reduction LED permanently lit

#### Affected pins

Transfer box control module plug:

- Pin 4 'gear reduction LED', to gear reduction LED (in running gear control module) 'pin 13'

### DIAGNOSIS/TROUBLESHOOTING



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**NOTE:** Visual inspection: In the next troubleshooting section, please check first that the affected 'pins' of the transfer box control unit plug connection and the 'pins' of the plug connections on the servo motor are neither damaged nor corroded. Remove any soiling or corrosion/oxidation. Replace damaged parts/wires.

**NOTE:** Control unit replacement: Before replacing the 'transfer box control unit', the ground connections, power supply and plug connections on the control unit must be checked as OK. After the test drive, read out the fault memory with the 9588 Porsche System Tester II again. Additional causes of faults that could damage the 'transfer box control unit' should be detected and remedied.

### DIAGNOSIS TROUBLESHOOTING PROCEDURE

Work instruction		Display OK	If not OK
1 Check gear reduction LED activation line for short circuit to B+:	Measurement '1a': <ul style="list-style-type: none"><li>• Switch off ignition</li><li>• Pull plug off transfer box control unit</li><li>• Pull plug off selector switch switch (running gear control module)</li><li>• Switch on ignition</li><li>• Measure voltage between 'pin 13' of selector switch plug (running gear control module) and ground.</li></ul>	< 0.3 V go to measurement '1c'	go to measurement '1b'
	Measurement '1b': <ul style="list-style-type: none"><li>• Switch off ignition</li><li>• Pull plug off the transfer box control unit</li><li>• Switch on ignition</li><li>• Measure voltage between 'pin 4' of transfer box control unit plug and ground.</li></ul>	< 0.3 V Go to Step 6	Repair wiring. --> End
	Measurement '1c': <ul style="list-style-type: none"><li>• Switch off ignition</li><li>• Connect plug to selector switch (running gear control module)</li><li>• Pull plug off the transfer box control unit</li><li>• Switch on ignition</li><li>• Measure voltage between 'pin 4' of transfer box control unit plug and ground.</li></ul>	< 0.3 V Go to Step 2	Go to Step 5

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2	Check gear reduction LED activation line for short circuit to ground:	Measurement '2a': <ul style="list-style-type: none"><li>• Switch off ignition</li><li>• Measure voltage between 'pin 4' of transfer box control unit plug and battery positive.</li></ul>	< 0.3 V go to measurement '2c'	go to measurement '2b'
		Measurement '2b': <ul style="list-style-type: none"><li>• Pull plug off selector switch switch (running gear control module)</li><li>• Measure resistance between 'pin 4' of transfer box control unit plug and ground.</li></ul>	infinity ohms Go to Step 5	Repair wiring. --> End
		Measurement '2c': <ul style="list-style-type: none"><li>• Pull plug off selector switch switch (running gear control module)</li><li>• Measure voltage between 'pin 13' of selector switch plug (running gear control module) and battery positive.</li></ul>	< 0.3 V Go to Step 3	Go to Step 6
3	Check for short circuit in the wiring to selector switch (running gear control module):	<ul style="list-style-type: none"><li>• Pull plug off selector switch switch (running gear control module)</li><li>• Pull plug off the transfer box control unit</li><li>• Measure resistance between 'pin 13' of selector switch plug (running gear control module) and 'pins: 3, 4, 6, 7, 8, 11, 12, 14, 15, 16'.</li></ul>	infinity ohms Go to Step 4	Repair wiring. --> End
4	Check gear reduction LED activation line for open circuit:	<ul style="list-style-type: none"><li>• Measure resistance between 'pin 13' of selector switch plug (running gear control module) and 'pin 4' of transfer box control unit.</li></ul>	< 0.5 ohms Go to Step 6	Repair wire. --> End
5	Replace selector switch (running gear control module)		--> End	
6	Replace transfer box control module		See note on replacing control units! --> End	

## FAULT CODE 2047

### LONGITUDINAL LOCK LED (IN CONTROL MODULE)

#### Diagnostic conditions

- Ignition on

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- Internal transfer box control module function test

### If short circuit to B+:

Engage longitudinal lock.

### If short circuit to ground:

Do not engage longitudinal lock.

### Possible causes of fault

'Longitudinal lock LED' is activated by transfer box control unit on the ground side.

- 'Short circuit to B+': longitudinal lock LED does not light
- 'Short circuit to ground': longitudinal lock LED permanently lit

### Affected pins

Transfer box control module plug:

- Pin 20 'longitudinal lock LED', to longitudinal lock LED (in running gear control module) 'pin 14'

## DIAGNOSIS/TROUBLESHOOTING

**NOTE:** Visual inspection: In the next troubleshooting section, please check first that the affected 'pins' of the transfer box control unit plug connection and the 'pins' of the plug connections on the servo motor are neither damaged nor corroded. Remove any soiling or corrosion/oxidation. Replace damaged parts/wires.

**NOTE:** Control unit replacement: Before replacing the 'transfer box control unit', the ground connections, power supply and plug connections on the control unit must be checked as OK. After the test drive, read out the fault memory with the 9588 Porsche System Tester II again. Additional causes of faults that could damage the 'transfer box control unit' should be detected and remedied.

## DIAGNOSIS TROUBLESHOOTING PROCEDURE

Work instruction		Display OK	If not OK
	Measurement '1a': <ul style="list-style-type: none"><li>• Switch off ignition</li><li>• Pull plug off selector switch switch (running gear control module)</li><li>• Pull plug off the transfer box control unit</li></ul>	< 0.3 V go to measurement	go to measurement '1b'

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<p>Check longitudinal lock 1 LED activation line for short circuit to B+:</p>	<ul style="list-style-type: none"> <li>• Switch on ignition</li> <li>• Measure voltage between 'pin 14' of selector switch plug (running gear control module) and ground.</li> </ul> <p>Measurement '1b':</p> <ul style="list-style-type: none"> <li>• Switch off ignition</li> <li>• Pull plug off the transfer box control unit</li> <li>• Switch on ignition</li> <li>• Measure voltage between 'pin 20' of transfer box control unit plug and ground.</li> </ul> <p>Measurement '1c':</p> <ul style="list-style-type: none"> <li>• Switch off ignition</li> <li>• Connect plug to selector switch (running gear control module)</li> <li>• Pull plug off the transfer box control unit</li> <li>• Switch on ignition</li> <li>• Measure voltage between 'pin 20' of transfer box control unit plug and ground.</li> </ul>	<p>'1c'</p> <p>&lt; 0.3 V Go to Step 6</p> <p>&lt; 0.3 V Go to Step 2</p>	<p>Repair wiring. --&gt; End</p> <p>Go to Step 5</p>
<p>Check longitudinal lock 2 LED activation line for short circuit to ground:</p>	<p>Measurement '2a':</p> <ul style="list-style-type: none"> <li>• Switch off ignition</li> <li>• Measure voltage between 'pin 20' of transfer box control unit plug and battery positive.</li> </ul> <p>Measurement '2b':</p> <ul style="list-style-type: none"> <li>• Pull plug off selector switch switch (running gear control module)</li> <li>• Measure resistance between 'pin 20' of transfer box control unit plug and ground.</li> </ul> <p>Measurement '2c':</p> <ul style="list-style-type: none"> <li>• Pull plug off selector switch switch (running gear control module)</li> <li>• Measure voltage between 'pin 14' of selector switch plug (running gear</li> </ul>	<p>&lt; 0.3 V go to measurement '2c'</p> <p>infinity ohms Go to Step 5</p> <p>&lt; 0.3 V Go to Step 3</p>	<p>go to measurement '2b'</p> <p>Repair wiring. --&gt; End</p> <p>Go to Step 6</p>

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		control module) and battery positive.		
3	Check for short circuit in the wiring to selector switch (running gear control module):	<ul style="list-style-type: none"><li>• Pull plug off selector switch (running gear control module)</li><li>• Pull plug off the transfer box control unit</li><li>• Measure resistance between 'pin 14' of selector switch plug (running gear control module) and 'pins: 3, 4, 6, 7, 8, 11, 12, 13, 15, 16'.</li></ul>	infinity ohms Go to Step 4	Repair wiring. --> End
4	Check longitudinal lock LED activation line for open circuit:	<ul style="list-style-type: none"><li>• Measure resistance between 'pin 14' of selector switch plug (running gear control module) and 'pin 20' of transfer box control unit.</li></ul>	< 0.5 ohms Go to Step 6	Repair wiring. --> End
5	Replace selector switch (running gear control module)		--> End	
6	Replace transfer box control module		See note on replacing control units! --> End	

## FAULT CODE 2048

### TRANSVERSE LOCK LED, REAR (IN CONTROL MODULE)

#### Diagnostic conditions

- Ignition on
- Internal transfer box control module function test

#### If short circuit to B+:

Engage transverse lock.

#### If short circuit to ground:

Do not engage transverse lock.

#### Possible causes of fault

'Transverse lock LED' is activated by transfer box control unit on the ground side.

- 'Short circuit to B+': transverse lock LED does not light
- 'Short circuit to ground': transverse lock LED permanently lit

#### Affected pins

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Transfer box control module plug:

- Pin 35 'transverse lock LED', to transverse lock LED (in running gear control module) 'pin 6'

### DIAGNOSIS/TROUBLESHOOTING

**NOTE:**      **Visual inspection:** In the next troubleshooting section, please check first that the affected 'pins' of the transfer box control unit plug connection and the 'pins' of the plug connections on the servo motor are neither damaged nor corroded. Remove any soiling or corrosion/oxidation. Replace damaged parts/wires.

**NOTE:**      **Control unit replacement:** Before replacing the 'transfer box control unit', the ground connections, power supply and plug connections on the control unit must be checked as OK. After the test drive, read out the fault memory with the 9588 Porsche System Tester II again. Additional causes of faults that could damage the 'transfer box control unit' should be detected and remedied.

### DIAGNOSIS TROUBLESHOOTING PROCEDURE

Work instruction		Display OK	If not OK
1 Check transverse lock LED activation line for short circuit to B+:	Measurement '1a': <ul style="list-style-type: none"><li>• Switch off ignition</li><li>• Pull plug off selector switch switch (running gear control module)</li><li>• Pull plug off the transfer box control unit</li><li>• Switch on ignition</li><li>• Measure voltage between 'pin 6' of selector switch plug (running gear control module) and ground.</li></ul>	< 0.3 V go to measurement '1c'	go to measurement '1b'
	Measurement <ul style="list-style-type: none"><li>• Switch off ignition</li><li>• Pull plug off the transfer box control unit</li><li>• Switch on ignition</li><li>• Measure voltage between 'pin 35' of transfer box control unit plug and ground.</li></ul>	< 0.3 V Go to Step 6	Repair wiring. --> End
	Measurement '1c': <ul style="list-style-type: none"><li>• Switch off ignition</li><li>• Connect plug to selector switch (running gear control module)</li></ul>		

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		<ul style="list-style-type: none"> <li>• Pull plug off the transfer box control unit</li> <li>• Switch on ignition</li> <li>• Measure voltage between 'pin 35' of transfer box control unit plug and ground.</li> </ul>	< 0.3 V Go to Step 2	Go to Step 5
2	Check transverse lock LED activation line for short circuit to ground:	<p>Measurement '2a':</p> <ul style="list-style-type: none"> <li>• Switch off ignition</li> <li>• Measure voltage between 'pin 35' of transfer box control unit plug and battery positive.</li> </ul> <p>Measurement '2b':</p> <ul style="list-style-type: none"> <li>• Pull plug off selector switch switch (running gear control module)</li> <li>• Measure resistance between 'pin 35' of transfer box control unit plug and ground.</li> </ul> <p>Measurement '2c':</p> <ul style="list-style-type: none"> <li>• Connect plug to transfer box control unit</li> <li>• Pull plug off selector switch switch (running gear control module)</li> <li>• Measure voltage between 'pin 6' of selector switch plug (running gear control module) and battery positive.</li> </ul>	<p>&lt; 0.3 V go to measurement '2c'</p> <p>infinity ohms Go to Step 5</p> <p>&lt; 0.3 V Go to Step 3</p>	<p>go to measurement '2b'</p> <p>Repair wiring. --&gt; End</p> <p>Go to Step 6</p>
3	Check for short circuit in the wiring to selector switch (running gear control module):	<ul style="list-style-type: none"> <li>• Pull plug off selector switch switch (running gear control module)</li> <li>• Pull plug off the transfer box control unit</li> <li>• Measure resistance between 'pin 6' of selector switch plug (running gear control module) and 'pins: 3, 4, 7, 8, 11, 12, 13, 14, 15, 16'.</li> </ul>	Go to Step 4	Repair wiring. --> End
4	Check transverse lock LED activation line for open circuit:	<ul style="list-style-type: none"> <li>• Measure resistance between 'pin 6' of selector switch plug (running gear control module) and 'pin 35' of transfer box control unit.</li> </ul>	< 0.5 ohms Go to Step 6	Repair wiring. --> End
5	Replace selector switch (running gear control module)		--> End	
6	Replace transfer box control module		See note on replacing control units!	

**FAULT CODE 2050**

**TRANSFER BOX SWITCHING FAULT**

**NOTE:** After successful read out the fault memory must be erased and after satisfying the diagnostic conditions below must be read out again!

**Diagnostic conditions**

- Ignition on
- Internal transfer box control unit function test
- Vehicle stationary
- Engine running
- Brake actuated
- Selector lever position 'N'
- Via the left rocker switch on the 'selector switch (running gear control module)', alternately select the functions 'off-road driving program' and 'on-road driving program' (see Driver's Manual)

**Possible causes of fault**

- 'Mechanical fault': mechanical wear in transfer box

**Affected pins**

Transfer box control unit plug:

- Pin '-'

**DIAGNOSIS/TROUBLESHOOTING**

**DIAGNOSIS TROUBLESHOOTING PROCEDURE**

Work instruction		Display OK	If not OK
1	If the fault recurs after repeatedly erasing the fault memory, then: Repair/replace transfer box	--> End	

**FAULT CODE 2051**

**TIPTRONIC CONTROL MODULE, INCORRECT SOFTWARE VERSION**

**Diagnostic conditions**

- Ignition on



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- Internal control module function test

### Possible causes of fault

- Incorrect software version (no display)

### Affected pins

Tiptronic control module plug:

- -
- -

## DIAGNOSIS/TROUBLESHOOTING VG 0101

### DIAGNOSIS TROUBLESHOOTING PROCEDURE

Work instruction	Display OK	If not OK
1  Check software version of Tiptronic control module and correct it if necessary	--> End	

## FAULT CODE 2052

### CONTROL UNIT SWITCHED OFF DUE TO EXCESS TEMPERATURE

**NOTE:** This fault may be stored after extreme off-road driving. This does not necessarily mean a fault is present!

### Diagnostic conditions

- Ignition on
- Internal transfer box control unit function test
- Engine running
- Selector lever position 'P'
- Engage longitudinal lock

### Possible causes of fault

- 'Above upper limit': heavy demand on servo motor (mechanical stress)
- 'Above upper limit': mechanical wear of servo motor
- 'Above upper limit': transfer box control unit faulty

### Affected pins

Transfer box control unit plug:

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- Pin

### DIAGNOSIS/TROUBLESHOOTING

**NOTE:** Visual inspection: In the next troubleshooting section, please check first that the affected 'pins' of the transfer box control unit plug connection and the 'pins' of the plug connections on the servo motor are neither damaged nor corroded. Remove any soiling or corrosion/oxidation. Replace damaged parts/wires.

**NOTE:** Control unit replacement: Before replacing the 'transfer box control unit', the ground connections, power supply and plug connections on the control unit must be checked as OK. Please observe the coding of the control unit. After the test drive, read out the fault memory again with the Porsche System Tester II No. 9588. Additional causes of faults that could damage the 'transfer box control unit' should be detected and remedied.

### DIAGNOSIS TROUBLESHOOTING PROCEDURE

Work instruction			Display OK	If not OK
1	Check fault memory:	<ul style="list-style-type: none"><li>• Erase fault memory</li><li>• Check function of lock</li><li>• Read out fault memory again</li></ul>	No fault stored. --> End	Go to Step 2
2	Replace servo motor:	<ul style="list-style-type: none"><li>• Erase fault memory</li><li>• Check function of lock</li><li>• Read out fault memory again</li></ul>	--> End	If fault is not remedied by replacing the servo motor: Go to Step 3
3	Replace control unit		See note on replacing control units! --> End	

## FAULT CODE 2053

### TRANSFER BOX CONTROL MODULE

#### Diagnostic conditions

- Ignition on
- Internal control module function test

#### Possible cause of fault

Communication problem with all control modules via CAN drive.

- No message via CAN drive (no signal/communication)

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- Internal fault in transfer box control module (faulty)

### Affected pins

Transfer box control module plug:

- Pin 11 'CAN drive (low)'
- Pin 42 'CAN drive (high)'

### DIAGNOSIS/TROUBLESHOOTING VG 0101

**NOTE:** *If there is no incoming signal/message via the CAN drive using several control modules, the CAN drive must be checked for open or short circuits. Refer to 'CHECKING INSTRUCTIONS/CAN DATA BUS'.*

### DIAGNOSIS TROUBLESHOOTING PROCEDURE

Work instruction	Display OK	If not OK
1 <u>CHECKING INSTRUCTIONS/CAN DATA BUS</u> .	--> End	
2 Replace transfer box control module	If CAN drive check is OK: => End	

## FAULT CODE 2054

### TRANSVERSE LOCK CONTROL MODULE

#### Diagnostic conditions

- Ignition on
- Internal control module function test

#### Possible cause of fault

- To localise the fault, read out the fault memory for the 'transverse lock control module' (Please read out fault memory)
- No message from transverse lock control module on CAN drive (no signal/communication)

### Affected pins

Transfer box control module plug:

- Pin 11 'CAN drive (low)'
- Pin 42 'CAN drive (high)'

### DIAGNOSIS/TROUBLESHOOTING VG 0101

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**NOTE:** *If there is no incoming signal/message via the CAN drive using several control modules, the CAN drive must be checked for open or short circuits. Refer to 'CHECKING INSTRUCTIONS/CAN DATA BUS'.*

### DIAGNOSIS TROUBLESHOOTING PROCEDURE

Work instruction	Display OK	If not OK
1 Read out fault memory for transverse lock control module (fault localisation)	To eliminate further faults, please follow the diagnosis/troubleshooting instructions for the transverse lock control module, refer to the <b><u>FINAL DRIVE, DIFFERENTIAL, DIFFERENTIAL LOCK</u></b> article. . --> End	
2 <b><u>CHECKING INSTRUCTIONS/CAN DATA BUS</u></b> .	--> End	

## FAULT CODE 2057

### VOLTAGE SUPPLY TO BRAKE FOR SERVO MOTOR (A)

#### Diagnostic conditions

- Ignition on
- Internal transfer box control module function test
- Engine running
- Selector lever position 'P'
- Engage longitudinal lock/gear reduction

#### Possible causes of fault

- 'Short circuit to B+': short circuit in wiring harness (brake for servo motor continuously activated)
- 'Short circuit to B+': control unit faulty (brake for servo motor continuously activated)
- 'Short circuit to ground': short circuit in wiring harness (brake for servo motor does not activate)
- 'Short circuit to ground': short in servo motor winding or short circuit in servo motor leads (brake for servo motor does not activate)
- 'Short circuit to ground': control unit faulty (brake for servo motor does not activate)

#### Affected pins

Transfer box control module plug:

- Pin 21 'supply voltage to brake for servo motor (A)', to pin A2 of 'servo motor plug A'

### DIAGNOSIS/TROUBLESHOOTING

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**NOTE:** Visual inspection: In the next troubleshooting section, please check first that the affected 'pins' of the transfer box control unit plug connection and the 'pins' of the plug connections on the servo motor are neither damaged nor corroded. Remove any soiling or corrosion/oxidation. Replace damaged parts/wires.

**NOTE:** Control unit replacement: Before replacing the 'transfer box control unit', the ground connections, power supply and plug connections on the control unit must be checked as OK. Please observe the coding of the control module. After the test drive, read out the fault memory with the 9588 Porsche System Tester II again. Additional causes of faults that could damage the 'transfer box control unit' should be detected and remedied.

Troubleshooting fault type: 'short circuit to B+'

### DIAGNOSIS TROUBLESHOOTING PROCEDURE

Work instruction		Display OK	If not OK	
1	Check short circuit to B+:	Measurement '1a': <ul style="list-style-type: none"><li>• Ignition off</li><li>• Pull plug off the transfer box control unit</li><li>• Ignition on</li><li>• Measure voltage between 'pin 21' of transfer box control unit plug and ground.</li></ul>	< 0.3 V go to measurement '1b'	Repair wiring harness to servo motor. --> End
		Measurement '1b': <ul style="list-style-type: none"><li>• Ignition off</li><li>• Connect plug to transfer box control unit</li><li>• Pull plug 'A' off servo motor</li><li>• Ignition on</li><li>• Measure voltage between 'pin A2' of servo motor plug 'A' (wiring harness side) and ground.</li></ul>		
2	Replace transfer box servo motor	--> End		
3	Replace transfer box control module	See note on replacing control units! --> End		

Troubleshooting fault type: 'short circuit to ground'

### DIAGNOSIS TROUBLESHOOTING PROCEDURE

Work instruction	Display OK	If not OK
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1	Check short circuit to ground:	Measurement '1a': <ul style="list-style-type: none"><li>• Ignition off</li><li>• Pull plug off transfer box control unit</li><li>• Measure resistance between 'pin 21 and pins 2, 15, 16, 33, 44, 47' of transfer box control unit plug.</li></ul>	infinity ohms Go to Step 2	go to measurement '1b'
		Measurement '1b': <ul style="list-style-type: none"><li>• Pull plugs 'A' and 'B' off servo motor</li><li>• Measure resistance between 'pin 21 and pins 2, 15, 16, 33, 44, 47' of transfer box control unit plug.</li></ul>	infinity ohms Go to Step 3	Repair wiring harness to servo motor. --> End
2	Replace transfer box servo motor		--> End	
3	Replace transfer box control module		See note on replacing control units! --> End	

## FAULT CODE 2058

### GROUND SUPPLY TO BRAKE FOR LOCK MOTOR (B)

#### Diagnostic conditions

- Ignition on
- Internal transfer box control unit function test
- Engine running
- Selector lever position 'P'
- Engage longitudinal lock/gear reduction

#### Possible causes of fault

- 'Short circuit to B+': short circuit in wiring harness (brake for servo motor does not activate)
- 'Short circuit to B+': short circuit in wiring harness (brake for servo motor does not activate)
- 'Short circuit to B+': control unit faulty (brake for servo motor does not activate)

#### Affected pins

Transfer box control unit plug:

- Pin 36 'ground supply to brake for servo motor (B)', to pin A3 of 'servo motor plug A'

## DIAGNOSIS/TROUBLESHOOTING

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**NOTE:** Visual inspection: In the next troubleshooting section, please check first that the affected 'pins' of the transfer box control unit plug connection and the 'pins' of the plug connections on the servo motor are neither damaged nor corroded. Remove any soiling or corrosion/oxidation. Replace damaged parts/wires.

**NOTE:** Control unit replacement: Before replacing the 'transfer box control unit', the ground connections, power supply and plug connections on the control unit must be checked as OK. Please observe the coding of the control unit. After the test drive, read out the fault memory again with the Porsche System Tester II No. 9588. Additional causes of faults that could damage the 'transfer box control unit' should be detected and remedied.

Troubleshooting fault type: 'short circuit to B+'

### DIAGNOSIS TROUBLESHOOTING PROCEDURE

Work instruction		Display OK	If not OK
1	Check short circuit to B+:		
	<p>Measurement '1a':</p> <ul style="list-style-type: none"><li>• Ignition off</li><li>• Pull plug off transfer box control unit</li><li>• Ignition on</li><li>• Measure voltage between 'pin 36' of transfer box control unit plug and ground.</li></ul> <p>Measurement</p> <ul style="list-style-type: none"><li>• Ignition off</li><li>• Connect plug to transfer box control unit</li><li>• Pull plug 'A' off servo motor</li><li>• Ignition on</li><li>• Measure voltage between 'pin A3' of servo motor plug 'A' (wiring harness side) and ground.</li></ul>	<p>&lt; 0.3 V go to measurement '1b'</p> <p>&lt; 0.3 V Short circuit between servo motor leads. Go to Step 2</p>	<p>Repair wiring harness to servo motor. --&gt; End</p> <p>Go to Step 3</p>
2	Replace transfer box servo motor	--> End	
3	Replace transfer box control unit	See note on replacing control units! --> End	

## FAULT CODE 2059

### SERVO MOTOR TEMPERATURE SENSOR

**NOTE:** The servo motor temperature sensor is integrated with potentiometer '1' (sensor

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### 1) and potentiometer '2' (sensor 2) as a unit in the servo motor.

#### Diagnostic conditions

- Ignition on
- Internal transfer box control module function test

#### Possible causes of fault

- 'Open circuit/short circuit to B+': short circuit to B+ (12 V) in the voltage supply (5 V)/ground supply wiring
- 'Open circuit/short circuit to B+': open circuit in the voltage supply (5 V)/ground supply wiring
- 'Short circuit to ground': short circuit to ground in the voltage supply (5 V)/ground supply wiring
- 'Above upper limit': short circuit to B+ (12 V) in the voltage supply (5 V) wiring
- 'Above upper limit', servo motor temperature sensor faulty

#### Affected pins

Transfer box control module plug:

- Pin 29 'voltage supply (5 V) for servo motor temperature sensor' to pin B6 of 'servo motor sensor plug'
- Pin 44 'ground for servo motor temperature sensor' to pin B7 of 'servo motor sensor plug'

### DIAGNOSIS/TROUBLESHOOTING

**NOTE:** Visual inspection: In the next troubleshooting section, please check first that the affected 'pins' of the transfer box control unit plug connection and the 'pins' of the plug connections on the servo motor are neither damaged nor corroded. Remove any soiling or corrosion/oxidation. Replace damaged parts/wires.

**NOTE:** Control unit replacement: Before replacing the 'transfer box control unit', the ground connections, power supply and plug connections on the control unit must be checked as OK. Please observe the coding of the control module. After the test drive, read out the fault memory with the 9588 Porsche System Tester II again. Additional causes of faults that could damage the 'transfer box control unit' should be detected and remedied.

Troubleshooting fault type: 'Open circuit/short circuit to B+' and 'above upper limit'

### DIAGNOSIS TROUBLESHOOTING PROCEDURE

Work instruction		Display OK	If not OK
Check voltage/ground	<ul style="list-style-type: none"><li>• Ignition off</li><li>• Pull sensor plug 'B' off servo motor</li></ul>	Approx. 5 V	Measured voltage > 5 V Go to Step 2,



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1	supply of servo motor temperature sensor:	<ul style="list-style-type: none"> <li>Ignition on</li> <li>Measure voltage between 'pins B6 and B7' of sensor plug 'B' (wiring harness side).</li> </ul>	Go to Step 2, measurement '2a'	measurement '2b' Measured voltage < 5 V Go to Step 3
2	Check short circuit to B+/above upper limit:	<p>Measurement '2a':</p> <ul style="list-style-type: none"> <li>Ignition off</li> <li>Pull plug 'A' off servo motor</li> <li>Measure resistance on servo motor between: 'pins B6, B7 and pins A1, A2, A3, A4'.</li> </ul> <p>Measurement '2b':</p> <ul style="list-style-type: none"> <li>Ignition off</li> <li>Pull plug 'A' off servo motor</li> <li>Pull plug off the transfer box control unit</li> <li>Ignition on</li> <li>Measure voltage between 'pins 29, 44' of transfer box control unit plug and ground.</li> </ul> <p>Measurement '2c':</p> <ul style="list-style-type: none"> <li>Ignition off</li> <li>Measure resistance between 'pins 29, 44 and pins 15, 16, 21' of transfer box control unit plug.</li> </ul>	<p>infinity ohms Go to Step 3</p> <p>&lt; 0.3 V Measurement '2c'</p> <p>infinity ohms Go to Step 5</p>	<p>Short circuit between servo motor leads. Go to Step 4</p> <p>Repair wiring harness to servo motor. --&gt; End</p> <p>Repair wiring harness to servo motor. --&gt; End</p>
3	Check open circuit:	<p>Measurement '3a':</p> <ul style="list-style-type: none"> <li>Measure resistance between 'pin B6' and 'pin B7' of servo motor plug 'B'.</li> </ul> <p>Measurement '3b':</p> <ul style="list-style-type: none"> <li>Measure resistance between 'pins 29, 44' of transfer box control unit plug and 'pins B6, B7' of removed sensor plug 'B'.</li> </ul>	<p>1.1 kohms at 21°C go to measurement '3b'</p> <p>&lt; 5 ohms Go to Step 5</p>	<p>Go to Step 4</p> <p>Repair wiring harness to servo motor. --&gt; End</p>
4	Replace transfer box servo motor	--> End		
5	Replace transfer box control module	See note on replacing control units! --> End		

Troubleshooting fault type: 'short circuit to ground'

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### DIAGNOSIS TROUBLESHOOTING PROCEDURE

Work instruction		Display OK	If not OK
1	Check short circuit to ground:  Measurement '1a': <ul style="list-style-type: none"><li>• Ignition off</li><li>• Pull plug off transfer box control unit</li><li>• Measure resistance between 'pin 29' of transfer box control unit plug and ground.</li></ul> Measurement: <ul style="list-style-type: none"><li>• On servo motor, pull off sensor plug 'B' and servo motor plug 'A'</li><li>• Measure resistance between 'pin 29' of transfer box control unit plug and ground.</li></ul>	Go to Step 3  infinity ohms Go to Step 2	Measurement '1b'  Repair wiring harness to servo motor. --> End
2	Replace transfer box servo motor	--> End	
3	Replace transfer box control module	See note on replacing control units! --> End	

## FAULT CODE 2060

### VOLTAGE SUPPLY FOR SERVO MOTOR TEMPERATURE SENSOR

**NOTE:** The servo motor temperature sensor is integrated with potentiometer '1' (sensor 1) and potentiometer '2' (sensor 2) as a unit in the servo motor.

#### Diagnostic conditions

- Ignition on
- Internal transfer box control module function test

#### Possible causes of fault

- 'Short circuit to B+': voltage supply line (5 V) short circuit to B+ (12 V)
- 'Short circuit to B+': transfer box control unit faulty
- 'Short circuit to ground': voltage supply line (5 V) short circuit to ground
- 'Short circuit to ground': transfer box control unit faulty

#### Affected pins

Transfer box control module plug:

- Pin 29 'voltage supply (5 V) for servo motor temperature sensor' to pin B6 of 'servo motor sensor plug'

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### DIAGNOSIS/TROUBLESHOOTING

**NOTE:** Visual inspection: In the next troubleshooting section, please check first that the affected 'pins' of the transfer box control unit plug connection and the 'pins' of the plug connections on the servo motor are neither damaged nor corroded. Remove any soiling or corrosion/oxidation. Replace damaged parts/wires.

**NOTE:** Control unit replacement: Before replacing the 'transfer box control unit', the ground connections, power supply and plug connections on the control unit must be checked as OK. Please observe the coding of the control module. After the test drive, read out the fault memory with the 9588 Porsche System Tester II again. Additional causes of faults that could damage the 'transfer box control unit' should be detected and remedied.

### DIAGNOSIS TROUBLESHOOTING PROCEDURE

Work instruction			Display OK	If not OK
1	Check voltage supply for servo motor temperature sensor:	<ul style="list-style-type: none"><li>• Ignition off</li><li>• Pull sensor plug 'B' off servo motor</li><li>• Ignition on</li><li>• Measure voltage between 'pin B6 and ground' of sensor plug 'B' (wiring harness side).</li></ul>	Approx. 5 V Go to Step 2, measurement '2a'	Measured voltage > 5 V Go to Step 2, measurement '2b' Measured voltage < 5 V Go to Step 3
2	Check short circuit to B+:	Measurement '2a':  <ul style="list-style-type: none"><li>• Ignition off</li><li>• Pull plug 'A' off servo motor</li><li>• Measure resistance on servo motor between: 'pins B6 and pins A1, A2, A3, A4'.</li></ul> Measurement '2b':  <ul style="list-style-type: none"><li>• Ignition off</li><li>• Pull plug 'A' off servo motor</li><li>• Pull plug off the transfer box control unit</li><li>• Ignition on</li><li>• Measure voltage between 'pin 29' of transfer box control unit plug and ground.</li></ul> Measurement '2c':  <ul style="list-style-type: none"><li>• Ignition off</li></ul>	infinity ohms Measurement '2b'	Short circuit between servo motor leads. Go to Step 4
			< 0.3 V Measurement '2c'	Repair wiring harness to servo motor. --> End
			infinity ohms	Repair wiring harness to servo

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		<ul style="list-style-type: none"><li>• Measure resistance between 'pin 29 and pins 15,16, 21, 36' of transfer box control unit plug.</li></ul>	Go to Step 5	motor. --> End
3	Check short circuit to ground:	Measurement '3a': <ul style="list-style-type: none"><li>• Ignition off</li><li>• Measure resistance between 'pin 29' of transfer box control unit plug and ground.</li></ul> Measurement '3b': <ul style="list-style-type: none"><li>• On servo motor, pull off sensor plug 'B' and servo motor plug 'A'</li><li>• Measure resistance between 'pin 29' of transfer box control unit plug and ground.</li></ul>	infinity ohms Go to Step 5  infinity ohms Go to Step 4	Measurement '3b'  Repair wiring harness to servo motor. --> End
4	Replace transfer box servo motor		--> End	
5	Replace transfer box control module		See note on replacing control units! --> End	

## FAULT CODE 2373

### CURRENT SENSOR IN CONTROL UNIT

**NOTE:** The current sensor is integrated in the transfer box control unit and can not be separately replaced.

#### Diagnostic conditions

- Ignition on
- Internal transfer box control unit function test

#### Possible causes of fault

- 'implausible signal'

#### Affected pins

Transfer box control unit plug:

- Pin

### DIAGNOSIS/TROUBLESHOOTING

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**NOTE:** Visual inspection: In the next troubleshooting section, please check first that the affected 'pins' of the transfer box control unit plug connection and the 'pins' of the plug connections on the servo motor are neither damaged nor corroded. Remove any soiling or corrosion/oxidation. Replace damaged parts/wires.

**NOTE:** Control unit replacement: Before replacing the 'transfer box control unit', the ground connections, power supply and plug connections on the control unit must be checked as OK. Please observe the coding of the control unit. After the test drive, read out the fault memory again with the Porsche System Tester II No. 9588. Additional causes of faults that could damage the 'transfer box control unit' should be detected and remedied.

### DIAGNOSIS TROUBLESHOOTING PROCEDURE

Work instruction			Display OK	If not OK
1	Check fault memory:	<ul style="list-style-type: none"><li>• Erase fault memory</li><li>• Check function of lock</li><li>• Read out fault memory again</li></ul>	If only fault '2373' stored. Go to Step 2	If, additionally, fault codes 2057 or 2058 stored, then diagnose/troubleshoot these codes. --> End
2	Replace control unit		See note on replacing control units! --> End	

## FAULT CODE 2409

### SERVO MOTOR BRAKE

#### Diagnostic conditions

- Ignition on
- Internal transfer box control module function test
- Engine running
- Selector lever position 'P'
- Engage longitudinal lock/gear reduction

#### Possible causes of fault

- 'Open circuit/short circuit to ground': open circuit/short circuit in wiring harness (brake for servo motor does not activate)
- 'Open circuit/short circuit to ground': short in servo motor winding (brake) or open circuit/short circuit in servo motor leads (brake for servo motor does not activate)
- 'Open circuit/short circuit to ground': control unit faulty (brake for servo motor does not activate)

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### Affected pins

Transfer box control module plug:

- Pin 21 'supply voltage to brake for servo motor (A)', to pin A2 of 'servo motor plug A'
- Pin 36 'ground supply to brake for servo motor (B)', to pin A3 of 'servo motor plug A'

### DIAGNOSIS/TROUBLESHOOTING

**NOTE:**      **Visual inspection:** In the next troubleshooting section, please check first that the affected 'pins' of the transfer box control unit plug connection and the 'pins' of the plug connections on the servo motor are neither damaged nor corroded. Remove any soiling or corrosion/oxidation. Replace damaged parts/wires.

**NOTE:**      **Control unit replacement:** Before replacing the 'transfer box control unit', the ground connections, power supply and plug connections on the control unit must be checked as OK. Please observe the coding of the control module. After the test drive, read out the fault memory with the 9588 Porsche System Tester II again. Additional causes of faults that could damage the 'transfer box control unit' should be detected and remedied.

Troubleshooting fault type: 'electrical fault in electric circuit'

### DIAGNOSIS TROUBLESHOOTING PROCEDURE

Work instruction		Display OK	If not OK	
1	Check short circuit to B+:	Measurement '1a': <ul style="list-style-type: none"><li>• Ignition off</li><li>• Pull plug off the transfer box control unit</li><li>• Ignition on</li><li>• Measure voltage between 'pins 21, 36' of transfer box control unit plug and ground.</li></ul>	< 0.3 V go to measurement '1b'	Repair wiring harness to servo motor. --> End
		Measurement '1b': <ul style="list-style-type: none"><li>• Ignition off</li><li>• Connect plug to transfer box control unit</li><li>• Pull plug 'A' off servo motor</li><li>• Ignition on</li><li>• Gear reduction/longitudinal lock not engaged</li><li>• Measure voltage between 'pins A2, A3' of servo motor plug 'A' (wiring harness side) and ground.</li></ul>	< 0.3 V Go to Step 2	Go to Step 5

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2	Check short circuit to ground:	Measurement '2a': <ul style="list-style-type: none"><li>• Ignition off</li><li>• Pull plug off transfer box control unit</li><li>• Ignition off</li><li>• Measure voltage between 'pin A2' of transfer box servo motor plug 'A' (wiring harness side) and battery positive.</li></ul>	< 0.3 V go to measurement '2c'	go to measurement '2b'
		Measurement '2b': <ul style="list-style-type: none"><li>• Pull plug off transfer box control unit</li><li>• Measure resistance between 'pin 21 and pins 2, 15, 16, 33, 44, 47' of transfer box control unit plug.</li></ul>	infinity ohms Go to Step 5	Repair wiring harness to servo motor. --> End
		Measurement '2c': <ul style="list-style-type: none"><li>• Measure resistance between 'pin A2 and ground' of servo motor plug 'A'.</li></ul>	Go to Step 3	Go to Step 4
3	Check open circuit/winding short circuit:	Measurement '3a': <ul style="list-style-type: none"><li>• Measure resistance between 'pins A2 and A3' of servo motor plug 'A'.</li></ul>	Approx. 20 ohms go to measurement '3b'	Go to Step 4
		Measurement '3b': <ul style="list-style-type: none"><li>• Pull plug off the transfer box control unit</li><li>• Measure resistance between 'pins 21, 36' of transfer box control unit plug and 'pins A2, A3' of servo motor plug 'A' (wiring harness side).</li></ul>	< 5 ohms Go to Step 5	Repair wiring harness to servo motor. --> End
4	Replace transfer box servo motor		--> End	
5	Replace transfer box control module		See note on replacing control units! --> End	

**Troubleshooting fault type: 'Open circuit/short circuit to ground'**

### DIAGNOSIS TROUBLESHOOTING PROCEDURE

Work instruction			Display OK	If not OK
1	Check short circuit to ground:	Measurement '1a': <ul style="list-style-type: none"><li>• Ignition off</li><li>• Pull plug off transfer box control unit</li><li>• Measure resistance between 'pins 21, 36 and</li></ul>	infinity ohms Go to Step 2	go to measurement '1b'

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		pins 2, 15, 16, 33, 44, 47' of transfer box control unit plug.		
		Measurement '1b': <ul style="list-style-type: none"><li>• Pull plugs 'A' and 'B' off servo motor</li><li>• Measure resistance between 'pins 21, 36 and pins 2, 15, 16, 33, 44, 47' of transfer box control unit plug.</li></ul>	infinity ohms Go to Step 3	Repair wiring harness to servo motor. --> End
2	Check open circuit:	Measurement '2a': <ul style="list-style-type: none"><li>• Pull plug 'A' off servo motor</li><li>• Measure resistance between 'pin A2' and 'pin A3' of servo motor plug 'A'.</li></ul>	Approx. 20 ohms go to measurement '2b'	Go to Step 3
		Measurement '2b': <ul style="list-style-type: none"><li>• Measure resistance between 'pins 21, 36' of transfer box control unit plug and 'pins A2, A3' of removed servo motor plug 'A' (wiring harness side).</li></ul>	< 5 ohms Go to Step 4	Repair wiring harness to servo motor. --> End
3	Replace transfer box servo motor		--> End	
4	Replace transfer box control module		See note on replacing control units! --> End	

## FAULT CODE 2411

### LONGITUDINAL LOCK

**NOTE:** After successful read out the fault memory must be erased and after satisfying the diagnostic conditions below must be read out again!

#### Diagnostic conditions

- Ignition on
- Internal transfer box control unit function test
- Vehicle stationary
- Engine running
- Brake actuated
- Selector lever position 'N'
- Via the left rocker switch on the 'selector switch (running gear control module)', alternately select the functions LOW RANGE and longitudinal lock LOW RANGE 100% (see Driver's Manual)

#### Possible causes of fault



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- 'Mechanical fault': mechanical wear in transfer box

### Affected pins

Transfer box control unit plug:

- Pin '-'

## DIAGNOSIS/TROUBLESHOOTING

### DIAGNOSIS TROUBLESHOOTING PROCEDURE

Work instruction		Display OK	If not OK
1	If the fault recurs after repeatedly erasing the fault memory, then: Repair/replace transfer box	--> End	