# SmartBoard

## System description



**WABCO**

## Table of contents

## Table of contents

# 1 Information about this document

## 1.1 Validity

This document applies to the following WABCO part numbers:

**446 192 210 0**

**446 192 211 0**

## 1.2 Symbols used

> **i** Important information, notes and/or tips

Descriptive text

– for action steps

1. Action step 1
2. Action step 2
   ⇨ Consequence of an action

• Listing

# 2 Basic security information

## 2.1 Proper use

The SmartBoard is an electronic remote control unit that is designed for use on trailer vehicles with electronic braking systems (TEBS).

## 2.2 Obvious misuse

The SmartBoard with an integrated battery (446 192 210 0) may not be installed on hazardous goods vehicles. For more information on this, please see chapter "2.8 SmartBoard for ADR (GGVS) vehicles", page 9.

## 2.3 Qualification and knowledge of personnel

This publication is meant for commercial vehicle workshop personnel with knowledge of automotive electronics, as well as vehicle drivers.

## 2.4 Structure and explanation of warnings

Warnings are structured as follows:
- Signal word and pictogram
- Correct naming of the hazard
- Description of the consequences if the hazard is ignored
- Description of the measure(s) to prevent the danger

| ⚠ DANGER |
| --- |
| Indicates a hazard that will result in death or serious injury if not avoided. |

| ⚠ WARNING |
| --- |
| Indicates a hazard that may result in death or serious injury if not avoided. |

| ⚠ CAUTION |
| --- |
| Indicates a hazard that may result in slight or moderately serious injury if not avoided. |

| NOTICE |
| --- |
| Indicates a hazard that may result in material damage if not avoided. |

## 2.5 General safety instructions

- Follow all safety information, instructions and notices in this document to avoid personal injury and material damage.
- Follow regional and national regulations on accident prevention.
- Follow the respective vehicle manufacturer's specifications and instructions.
- Ensure the utmost cleanliness throughout installation.
- Make sure your workplace is dry as well as adequately lit and ventilated.
- Secure the vehicle against rolling by using chocks.
- Ensure that the service brake is not being actuated when working on the brake. Attach a notice to the steering wheel stating that work is being carried out on the vehicle.
- Only use spare parts approved by WABCO or the vehicle manufacturer.
- Do not use motor-powered screwdriver or torque tools.
- Never open the SmartBoard housing (with the exception of the battery compartment on unit 446 192 210 0 to change the battery) as this will invalidate the warranty.

## 2.6 Personal protection equipment

- Please wear personal protection equipment during installation to prevent injuries:
  - Safety boots
  - Safety goggles
  - Protective gloves
  - Ear protectors

## 2.7 Avoiding electrostatic charge and uncontrolled discharging (ESD)

> **⚠ WARNING**
>
> **Fire hazard due to lithium-ion battery!**
>
> In the event of an accident or improper handling, damaged or defective lithium-ion batteries can cause fires that are difficult to extinguish. Use of the battery-operated SmartBoard (product number 446 192 210 0) on hazardous goods vehicles is therefore prohibited.
>
> – Only install the battery-free SmartBoard (product number 446 192 211 0) on hazardous goods vehicles.

**Note during construction and building of the vehicle:**

– Prevent potential differences between components (e.g. axles) and the vehicle frame (chassis).
  Make sure that the resistance between metallic parts of the components and the vehicle frame is less than 10 Ohm (< 10 Ohm).
  Establish an electrically conductive connection between moving or insulated vehicle parts, such as axles, and the frame.

– Prevent potential differences between the towing vehicle and the trailer.
  Make sure that an electrically conductive connection is made between metal parts in the towing vehicle and the coupled trailer via the coupling (king pin, fifth wheel, claws with pins), even without a cable being connected.

– Use electrically conductive bolted connections when fastening the ECUs to the vehicle frame.

– Use only cable conforming to WABCO specifications or original WABCO cable.

– Run the cable in metallic casing if at all possible (e.g. inside the U-beam) or behind metallic and grounded protective plating to minimise the influence of electro-magnetic fields.

– Avoid the use of plastic materials if they can cause electrostatic charging.

**While carrying out repair or welding work on the vehicle, observe the following:**

– Disconnect the battery (if installed in the vehicle).

– Disconnect cable connections to devices and components and protect connectors and ports against contamination.

– Always connect the grounding electrode directly with the metal next to the welding point when welding to prevent magnetic fields and current flow via the cable or components. Make sure that current is well conducted by removing paint or rust.

– Prevent heat influences on devices and cabling when welding.

## 2.8 SmartBoard for ADR (GGVS) vehicles

A version of the SmartBoard has been developed for use on hazardous goods vehicles that is not equipped with an internal battery (product number 446 192 211 0).

The connection dimensions, cable connections and mounting are unchanged (see chapter "4 Assembly", page 15).

Operation is identical to the standard version (product number 446 192 210 0). Some functions are restricted by battery-free operation of the SmartBoard 446 192 211 0:

• No date and time function

• No saving of messages

• No internal odometer in the SmartBoard (the odometer reading of the Trailer EBS is still displayed)

• Information shown on the display only when the trailer is powered up



| SmartBoard<br>446 192 210 0 | SmartBoard for ADR vehicles<br>446 192 211 0 |
|---|---|
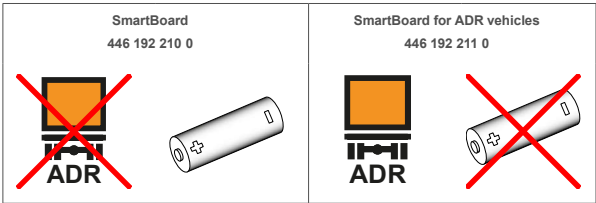
> **i** **ADR/GGVSE certificates for hazardous goods vehicles**
>
> WABCO provides ADR/GGVSE certificates for a range of hazardous goods vehicles.
>
> Please contact your WABCO partner to request an ADR/GGVSE certificate for your vehicle.

# 3 System description

## 3.1 Technical data

The SmartBoard is an on-board display for monitoring data from connected electronic systems. Malfunctions, the odometer, load information, the pad wear indicator and other information are displayed on a monochrome LCD graphic display. In addition, several trailer functions can be controlled (e.g. air suspension functions).

The SmartBoard is mounted on the frame of the trailer. The unit has a cable that connects it to the diagnostic plug on the trailer or directly to a control unit.

It is supplied with power via the diagnostic cable from the connected system or via the integrated battery (SmartBoard 446 192 210 0). Some of the data from the connected system (e.g. error messages, brake lining wear or operating data) is stored on the SmartBoard while the system is running. This data can be read if the connected system has no power supply.

The SmartBoard can replace various devices that are optionally installed on trailers, such as an odometer in a wheel hub, axle load indicator, brake lining wear indicator and tyre pressure indicator (OptiTire™).

Optionally, the SmartBoard can operate as a stand-alone odometer by using the wheel speed measured by a connected ABS wheel speed sensor. In this case the SmartBoard must be powered by an integrated battery (SmartBoard 446 192 210 0).

The SmartBoard is compatible with TEBS E (version E 4 or higher).



90° alignment      55° alignment

| | |
|---|---|
| **L x W x H dimensions (mm)** | 229.2 x 171.0 x 86.5 (90° alignment)<br>222.4 x 171.0 x 116.0 (55° alignment) |
| **Weight (kg)** | 0.50 (446 192 211 0)<br>0.53 (446 192 210 0) |
| **Operating voltage (V)** | 8 – 32 |
| **Operating temperature (°C)** | -40 – 65 |
| **Display operating temperature (°C)** | -30 – 65 |
| **Short-term temperature resistance (°C)** | max. 85 (1 hour) |
| **Protection class** (with the protective cover closed) | IP6K9K |

## System description

### 3.2 Connection

The SmartBoard must be connected to an 8-pin HDSCS (Heavy Duty Sealed Connector) plug (MCP, code B) for industrial and commercial vehicles.
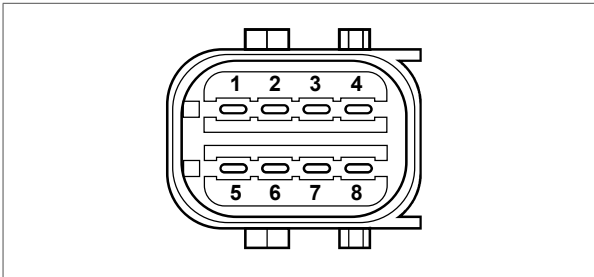


| Pin | Assignment |
|-----|------------|
| 1 | CAN low |
| 2 | CAN high |
| 3 | Wheel speed sensor |
| 4 | Wheel speed sensor |
| 5 | Not used |
| 6 | Not used |
| 7 | Supply connection (electrical) |
| 8 | Ground |

## System description

### 3.3 System configuration

The range of SmartBoard functions depends on the Trailer EBS / Trailer ABS version and on the components installed on the trailer.

The SmartBoard is compatible with the following components (available separately):

- Lift Axle Control Valve
- ECAS solenoid valve
- OptiTire™
- Brake lining wear indicator (BVA)

## 3.4 Compliance with standards

| Document | Name | Version |
|---|---|---|
| ISO 10605 | Road vehicles - Test methods for electrical disturbances from electrostatic discharge | 2008 - 07 |
| ISO 16750 - 2 | Road vehicles - Environmental conditions and testing for electrical and electronic equipment - Part 2: Electrical loads | 2012 - 11 |
| ISO 16750 - 3 | Road vehicles - Environmental conditions and testing for electrical and electronic equipment - Part 3: Mechanical loads | 2012 - 12 |
| ISO 16750 - 4 | Electrical and electronic vehicle equipment - Environmental conditions - Part 4: Climatic loads | 2010 - 04 |
| ISO 16750 - 5 | Electrical and electronic vehicle equipment - Environmental conditions - Part 5: Chemical loads | 2010 - 04 |
| ISO 7637 - 2 | Road vehicles - Electrical disturbances from conduction and coupling - Part 2: Electrical conduction disturbances along supply lines | 2011 - 03 |
| ISO 7637 - 3 | Road vehicles - Electrical disturbances from conduction and coupling - Part 3: Electrical transient transmission by capacitive and inductive coupling via lines other than supply lines | 2007 - 07 |
| CISPR 25 | Vehicles, boats and internal combustion engines - Radio disturbance characteristics - Limits and methods of measurement for the protection of on-board receivers | 2008 - 03 |
| ISO 11452 - 4 | Road vehicles - Component test methods for electrical disturbances from narrowband radiated electromagnetic energy - Part 4: Harness excitation methods | 2011 - 12 |
| ISO 20653 | Road vehicles - Degrees of protection (IP code) - Protection of electrical equipment against foreign objects, water and access | 2013 - 02 |

# 4 Assembly

Only install the battery-free SmartBoard on hazardous goods vehicles (see chapter "2.8 SmartBoard for ADR (GGVS) vehicles", page 9).

## 4.1 Preparatory measures

– Before you begin installing, upgrading, repairing or replacing the SmartBoard, follow the instructions in chapter "2 Basic security information", page 6.

– Disconnect the power supply to the towing vehicle.

– Secure the vehicle against the risk of short-circuit. To do so, follow the instructions in chapter "2.7 Avoiding electrostatic charge and uncontrolled discharging (ESD)", page 8.

– Select an installation location on the vehicle frame that is easily accessible for the user and that can be reached by the planned connecting cable.

– Select an installation location that is protected from spray water.

## 4.2 Alignment

The SmartBoard can be aligned at two different angles (90° and 55°):



90° alignment          55° alignment
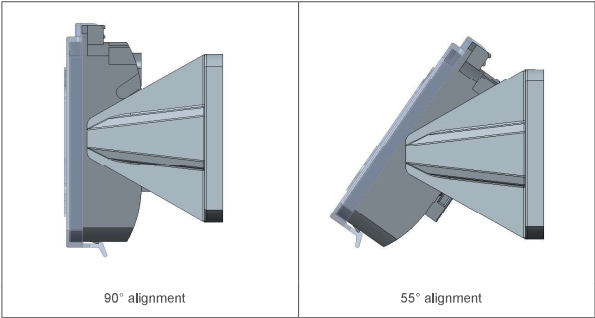
## Assembly

**Changing the alignment**



– Push the two retaining clips on the back of the SmartBoard outwards (1) while pulling the brackets out of the guides.
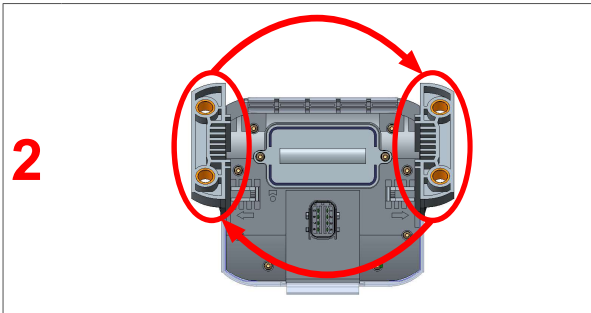


– Switch the brackets from one side to the other (2).
– Push the brackets into the guides until you hear them click into place.
  ⇨ The orientation of the SmartBoard is changed.

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## Assembly

**4.3 Installation on the vehicle**



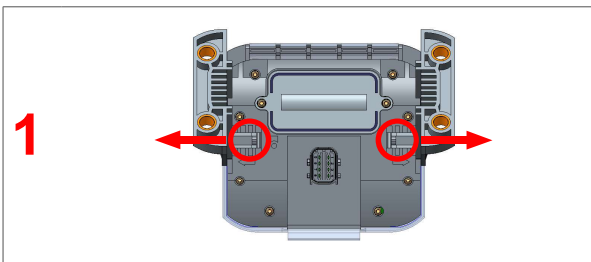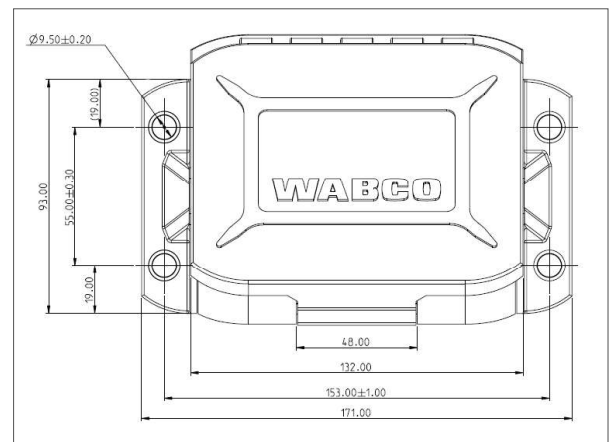– Use the dimensions in the technical drawing to drill the holes (chapter "5 Operation", page 18).
– Fasten the SmartBoard to the vehicle frame with four M8 screws and tighten the screws. Maximum tightening torque: 15 Nm.
– Install cables according to the circuit diagram in parallel with already existing wiring harnesses. Form large loops from ample lengths.
– Cable the SmartBoard with the Trailer EBS modulator. Press the cable plug-connector into the slot applying a little initial force. All connections must be assigned a cable or have a closing cap.
– Fasten the cable only on solid elements that are connected with the components, e.g. the vehicle frame. Fastening cables to flexible elements can cause cable breakages and the seal could break.
– Fasten the cables and connectors so that the plug connections are not subjected to any tensile stress or lateral forces. Avoid laying cables across sharp edges or near aggressive media (acids for example).
– Fasten the cable a maximum of 30 cm after the device, e.g. with a cable tie.

# 5 Operation

– Press any button to start the SmartBoard.

⇨ The main menu is displayed.

| i | If the charge level of the internal battery is too low, the battery-operated SmartBoard (product number 446 192 210 0) may not start. |
|---|---|

**Symbols**

Active functions are displayed with the opposite colouring.

| Active function | Inactive function |
|---|---|
| ⏻ | ⏻ |

**Using the SmartBoard main menu**
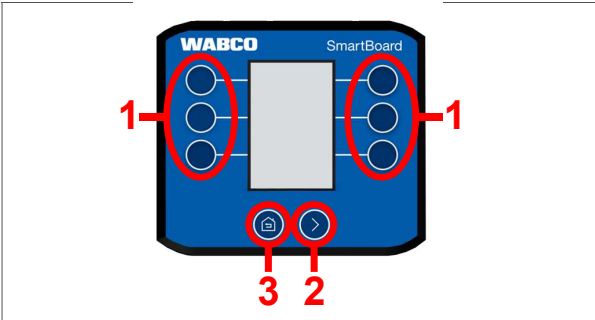


The keys carry out the following functions in the main menu:

– Press one of the **1** keys to select the SmartBoard function displayed next to each key.

– Press key **2** to navigate through the different pages of the main menu.

– Press key **3** to return to the first page of the main menu.

**Using a SmartBoard submenu**
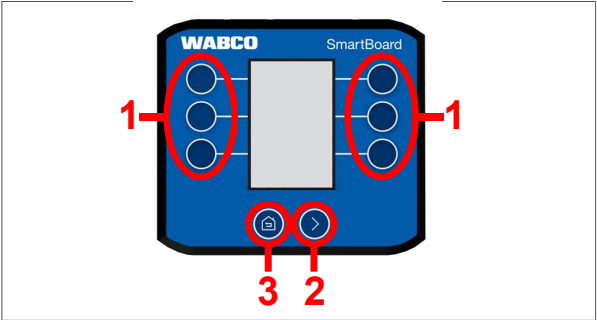


The keys carry out the following functions in a submenu:

– Press one of the **1** keys to select the SmartBoard function displayed next to each key.

– Press key **2** to navigate through the different pages of the function.

– Press key **3** to return to the next menu level up.

– Hold down key **3** for two seconds to go back to the last page displayed in the main menu.

**Display**



The different areas of the display show the following information:

**1** Functions/information.

**2** Diagnostic messages and active systems. A submenu also shows which submenu the user is in. Warnings are also shown here.

**3** Current page of the respective menu.
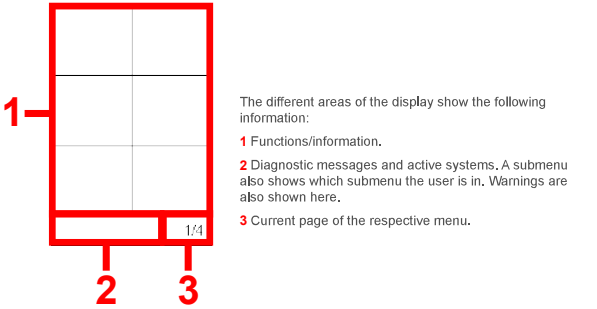
# 6 Functions

> **i** The illustrations shown in this chapter may differ in places from the actual illustrations. Depending on the configuration of the vehicle (drawbar trailer, central axle trailer, semitrailer, number of axles, etc.), the illustrations on the display or individual functions may change.

In order to illustrate how the SmartBoard works, the keys in the following chapters are assigned names according to the diagram shown below:
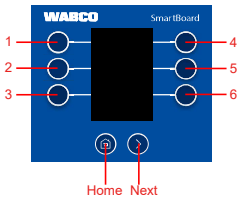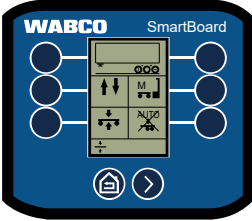


## 6.1 ECAS air suspension

> **i** If ECAS is installed, it must first be brought to the normal level. Installed lifting axles must be lowered.
>
> For proper operation of the system, all load statuses must be calibrated. See also chapter "6.17.3 Axle load calibration", page 39.

Select air suspension (ECAS) manual lifting / lowering or predefined levels.

| SmartBoard – ECAS | | | |
|---|---|---|---|
| Key | Description | Description | Key |
| 1 | Without function | Without function | 4 |
| 2 | Lifting/Lowering chassis | Memory level | 5 |
| 3 | Normal level | Unloading level off switch | 6 |
| Home | Back to the main menu | Without function | Next |

### 6.1.1 1-point control

| SmartBoard – ECAS > Lifting/lowering chassis | | | |
|---|---|---|---|
| Key | Description | Description | Key |
| 1 | Without function | Without function | 4 |
| 2 | Lowering chassis | Lifting chassis | 5 |
| 3 | Without function | ECAS Stop | 6 |
| Home | Back to ECAS menu | Without function | Next |

### 6.1.2 2-point control Drawbar trailer

| SmartBoard – ECAS > Lifting/lowering chassis | | | |
|---|---|---|---|
| Key | Description | Description | Key |
| 1 | Control front | Control rear | 4 |
| 2 | Lowering chassis | Lifting chassis | 5 |
| 3 | Without function | ECAS Stop | 6 |
| Home | Back to ECAS menu | Next page | Next |
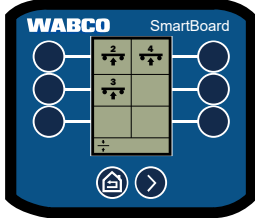
## Functions

### 6.1.3    2-point control Semitrailer

| SmartBoard – ECAS > Lifting/lowering chassis | | | |
|---|---|---|---|
| Key | Description | Description | Key |
| 1 | Control left | Control right | 4 |
| 2 | Lowering chassis | Lifting chassis | 5 |
| 3 | Without function | ECAS Stop | 6 |
| Home | Back to ECAS menu | Next page | Next |

### 6.1.4    Normal level
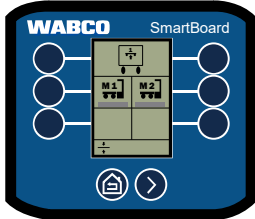
| SmartBoard – ECAS > Normal level | | | |
|---|---|---|---|
| Key | Description | Description | Key |
| 1 | Select normal level 2 | Select normal level 4 | 4 |
| 2 | Select normal level 3 | Without function | 5 |
| 3 | Without function | Without function | 6 |
| Home | Back to ECAS menu | Without function | Next |

## Functions

### 6.1.5    Memory level

| SmartBoard – ECAS > Memory level | | | |
|---|---|---|---|
| Key | Description | Description | Key |
| 1 | Without function | Without function | 4 |
| 2 | Memory level 1 – select / save (hold down) | Memory level 2 – select / save (hold down) | 5 |
| 3 | Without function | Without function | 6 |
| Home | Back to ECAS menu | Without function | Next |

### 6.2    Axle load indicator

Display axle load and status (lifted/lowered).

| SmartBoard – Axle load | | | |
|---|---|---|---|
| Key | Description | Description | Key |
| 1 | Without function | Without function | 4 |
| 2 | Without function | Without function | 5 |
| 3 | Without function | Without function | 6 |
| Home | Back to the main menu | Without function | Next |

**Functions**

## 6.3    Bounce Control

| SmartBoard – Bounce Control | | | |
|---|---|---|---|
| Key | Description | Description | Key |
| 1 | Without function | Without function | 4 |
| 2 | Without function | Without function | 5 |
| 3 | Activate/deactivate bounce control | Without function | 6 |
| Home | Back to the main menu | Without function | Next |

## 6.4    Brake lining wear

Display brake lining status.

| Brake lining wear OK | Wear threshold for brake lining reached |
|---|---|

**Functions**

## 6.5    Release brakes

Temporarily release brakes.

| SmartBoard – Release brake | | | |
|---|---|---|---|
| Key | Description | Description | Key |
| 1 | Without function | Without function | 4 |
| 2 | Without function | Without function | 5 |
| 3 | Release brake (hold down) | Without function | 6 |
| Home | Back to the main menu | Without function | Next |

## 6.6    Trailer length

Show trailer length.

| SmartBoard – Trailer length | | | |
|---|---|---|---|
| Key | Description | Description | Key |
| 1 | Without function | Without function | 4 |
| 2 | Without function | Without function | 5 |
| 3 | Without function | Without function | 6 |
| Home | Back to the main menu | Without function | Next |

## Functions

### 6.7　Diagnostic memory

Show current and saved error messages.

**SmartBoard – Diagnostic memory**

| Key | Description | | Description | Key |
|-----|-------------|---|-------------|-----|
| 1 | Without function | | Without function | 4 |
| 2 | Without function | | Without function | 5 |
| 3 | Previous message | | Next message | 6 |
| Home | Back to the main menu | | Next message | Next |

| Figure | Description |
|--------|-------------|
| System | System issuing the message (e.g. TEBS E) – appears at upper left in the display. |
| Warning lamp | Warning lamp displayed: Current message (the fault must be rectified). No warning lamp displayed: Not a current message (saved in ECU diagnostic memory). |
| Code | Message code. |
| Date | Date at the time of message output. |
| Time | Time of message output. |
| Occurrence | Odometer reading at time of message output. |
| Status | Current or saved message. |

## Functions

### 6.8　Electronic parking brake

> **i** The electronic parking brake can be configured to be disabled temporarily or permanently. If the parking brake cannot be disabled permanently, the option does not appear in the menu.

Enable and (permanently) disable the electronic parking brake.

**SmartBoard – Electronic parking brake**

| Key | Description | | Description | Key |
|-----|-------------|---|-------------|-----|
| 1 | Without function | | Without function | 4 |
| 2 | Permanently disable | | Without function | 5 |
| 3 | Disable | | Enable | 6 |
| Home | Back to the main menu | | Without function | Next |

### 6.9　Lifting axle control

Manually lift/lower, OptiTurn™, use traction help and OptiLoad™, disable lifting axle.

**SmartBoard – Lifting axle control**

| Key | Description | | Description | Key |
|-----|-------------|---|-------------|-----|
| 1 | Lifting axle control | | OptiLoad™ | 4 |
| 2 | OptiTurn™ | | Without function | 5 |
| 3 | Traction help | | Without function | 6 |
| Home | Back to the main menu | | Without function | Next |

## Functions

### 6.9.1 Lifting axle control

| SmartBoard – Lifting axle control > Control lifting axle | | | | |
|---|---|---|---|---|
| Key | Description | | Description | Key |
| 1 | Without function | | Without function | 4 |
| 2 | Without function | | Without function | 5 |
| 3 | Lift lifting axle | | Lower lifting axle | 6 |
| Home | Back to lifting axle control | | Without function | Next |

### 6.9.2 Disable lifting axle(s)
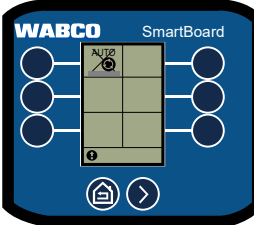
| SmartBoard – Lifting axle control > Disable lifting axle | | | | |
|---|---|---|---|---|
| Key | Description | | Description | Key |
| 1 | Without function | | Without function | 4 |
| 2 | Without function | | Without function | 5 |
| 3 | Enable/disable lifting axle 1 | | Enable/disable lifting axle 2 | 6 |
| Home | Back to lifting axle control | | Without function | Next |

## Functions

### 6.9.3 OptiTurn™

| SmartBoard – Lifting axle control > OptiTurn™ | | | | |
|---|---|---|---|---|
| Key | Description | | Description | Key |
| 1 | Without function | | Without function | 4 |
| 2 | Without function | | Without function | 5 |
| 3 | Enable/disable | | Options | 6 |
| Home | Back to lifting axle control | | Without function | Next |

**OptiTurn™ options**

| SmartBoard – Lifting axle control > OptiTurn™ > Options | | | | |
|---|---|---|---|---|
| Key | Description | | Description | Key |
| 1 | Enable/disable automatically | | Without function | 4 |
| 2 | Without function | | Without function | 5 |
| 3 | Without function | | Without function | 6 |
| Home | Back to OptiTurn™ | | Without function | Next |

## Functions

### 6.9.4 Traction help

| SmartBoard – Lifting axle control > Traction help | | | | |
|---|---|---|---|---|
| Key | Description | | Description | Key |
| 1 | Without function | | Without function | 4 |
| 2 | Without function | | Without function | 5 |
| 3 | Enable/disable | | Options | 6 |
| Home | Back to lifting axle control | | Without function | Next |

**Traction help options**

| SmartBoard – Lifting axle control > Traction help > Options | | | | |
|---|---|---|---|---|
| Key | Description | | Description | Key |
| 1 | Enable/disable automatically | | Seasonal traction help | 4 |
| 2 | Show season period | | Without function | 5 |
| 3 | Without function | | Without function | 6 |
| Home | Back to lifting axle control | | Without function | Next |
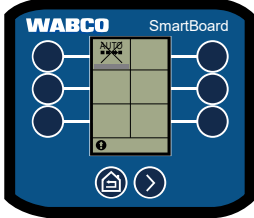
## Functions

### 6.9.5 OptiLoad™

| SmartBoard – Lifting axle control > OptiLoad™ | | | | |
|---|---|---|---|---|
| Key | Description | | Description | Key |
| 1 | Without function | | Without function | 4 |
| 2 | Without function | | Without function | 5 |
| 3 | Enable/disable | | Options | 6 |
| Home | Back to lifting axle control | | Without function | Next |

**OptiLoad™ options**

| SmartBoard – Lifting axle control > OptiLoad™ > Options | | | | |
|---|---|---|---|---|
| Key | Description | | Description | Key |
| 1 | Enable/disable automatically | | Without function | 4 |
| 2 | Without function | | Without function | 5 |
| 3 | Without function | | Without function | 6 |
| Home | Back to OptiLoad™ | | Without function | Next |

## Functions

### 6.9.6 Odometer

| i | If the configured values of the tyre circumference and flywheel number do not match the values of the modulator, a "!" appears before "Odometer". |

**SmartBoard – Lifting axle control > Odometer**

| Key | Description | | Description | Key |
|-----|-------------|---|-------------|-----|
| 1 | Without function | | Without function | 4 |
| 2 | Without function | | Without function | 5 |
| 3 | Without function | | Reset odometer | 6 |
| Home | Back to the main menu | | Without function | Next |

### 6.10 SafeStart
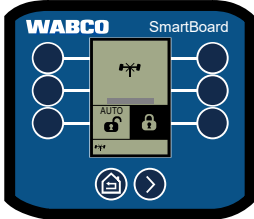
Limit speed when loading/unloading a tipping or tank trailer.

**SmartBoard – SafeStart**

| Key | Description | | Description | Key |
|-----|-------------|---|-------------|-----|
| 1 | Without function | | Without function | 4 |
| 2 | Without function | | Without function | 5 |
| 3 | Enable/disable | | Without function | 6 |
| Home | Back to the main menu | | Without function | Next |
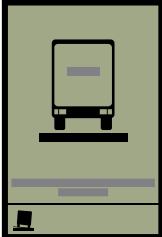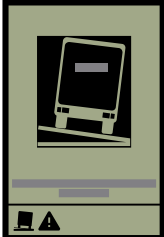
## Functions

### 6.11 Automatic steering axle

Enable or lock the automatic steering axle.

**SmartBoard – Steering axle lock**

| Key | Description | | Description | Key |
|-----|-------------|---|-------------|-----|
| 1 | Without function | | Without function | 4 |
| 2 | Without function | | Without function | 5 |
| 3 | Enable automatic steering axle | | Lock automatic steering axle | 6 |
| Home | Back to the main menu | | Without function | Next |

### 6.12 Vehicle inclination

Show angle of inclination warning.

| Vehicle inclination within tolerance range | Max. vehicle inclination exceeded |
|---|---|

**Functions**

## 6.13 Work light control

| SmartBoard - Work light control | | | |
|---|---|---|---|
| **Key** | **Description** | **Description** | **Key** |
| 1 | Without function | Without function | 4 |
| 2 | Without function | Without function | 5 |
| 3 | Enable/disable work light | Without function | 6 |
| Home | Back to the main menu | Without function | Next |

## 6.14 Road finisher brake

| SmartBoard - Road finisher brake | | | |
|---|---|---|---|
| **Key** | **Description** | **Description** | **Key** |
| 1 | Without function | Without function | 4 |
| 2 | Reduce braking pressure | Increase braking pressure | 5 |
| 3 | Enable/disable | Without function | 6 |
| Home | Back to the main menu | Without function | Next |

## 6.15 OptiTire™

Show tyre pressures, reference pressures, tyre temperature, wheel IDs, battery status and signal strength.

– To change reference pressures and wheel IDs, see chapter "6.17.8 OptiTire™ functions", page 43.

– Press the *Next* key to display the various data.

– Press the *Home* key to return to the main menu.

**Functions**

## 6.16 Freely configurable GIO functions (GIO FCF)

In addition to the analogue and digital functions, it is also possible to store what are known as GIO function modules via the diagnosis. These are capable of processing internal signals (CAN bus, internal pressures, speeds) as well as external input variables (such as switch, pressure sensor, SmartBoard).

Output signals as well as internal functions such as saving events to the event recorder can be controlled according GIO function module programming. The function can therefore be used to implement small customer-specific applications.

**Freely configurable digital function**

Free programming by the manufacturer of a GIO digital input or output depending on speeds and times.

**Freely configurable analogue function**

Free programming by the manufacturer of a GIO analogue input or output depending on speeds and times.

With both analogue and digital functions, an Event (for example) can be stored or a GIO output switched as a function of a switch signal and the vehicle speed.

**Parameter setting**

The function is loaded into the diagnostic software using a *.FCF or *.ECU file.

> **i** Please speak with your WABCO partner about parameters for the freely configurable functions. Only files created by WABCO can be loaded into the ECU.

**Controlling GIO FCF with the SmartBoard**

Control of the GIO functions can be configured in the diagnostic software so that they are operated either by a button or a rocker switch.

| Button switch | Rocker switch |
|---|---|
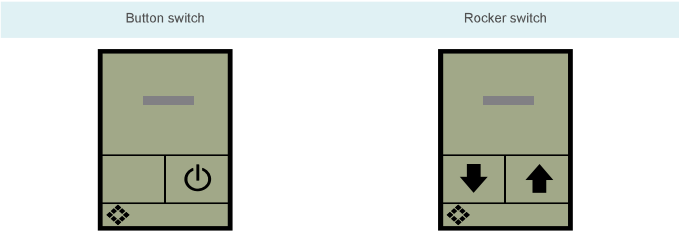
## Functions

### 6.17 Settings

| SmartBoard – Settings | | | | |
|---|---|---|---|---|
| Key | Description | | Description | Key |
| 1 | Units | | Brightness | 4 |
| 2 | Screen saver | | Time / date | 5 |
| 3 | Axle load calibration | | Start screen | 6 |
| Home | Back to the main menu | | Next page | Next |

| SmartBoard – Settings > Page 2 | | | | |
|---|---|---|---|---|
| Key | Description | | Description | Key |
| 1 | Axle overload | | Sort functions | 4 |
| 2 | Language | | Reset to factory settings | 5 |
| 3 | CAN termination | | Odometer settings | 6 |
| Home | Back to the main menu | | Next page | Next |

| SmartBoard – Settings > Page 3 | | | | |
|---|---|---|---|---|
| Key | Description | | Description | Key |
| 1 | Immobilizer settings | | Without function | 4 |
| 2 | OptiTire™ functions | | Without function | 5 |
| 3 | Without function | | Without function | 6 |
| Home | Back to the main menu | | Next page | Next |

## Functions

### 6.17.1 Units

| SmartBoard – Settings > Units | | | | |
|---|---|---|---|---|
| Key | Description | | Description | Key |
| 1 | Without function | | Without function | 4 |
| 2 | Up | | Down | 5 |
| 3 | Save and back | | Without function | 6 |
| Home | Back to settings | | Without function | Next |

### 6.17.2 Screen saver

When inactive, display the "Trailer Info" screen or an image you have created yourself ("Splash Screen").

> **i** The SmartBoard diagnostic software is required to use a self-created image in the SmartBoard. You can find this at:
> https://www.am.wabco-auto.com/

| SmartBoard – Settings > Screen saver | | | | |
|---|---|---|---|---|
| Key | Description | | Description | Key |
| 1 | Without function | | Without function | 4 |
| 2 | Without function | | Without function | 5 |
| 3 | Enable/disable | | Set inactivity time | 6 |
| Home | Back to settings | | Forward to "Select screen saver" | Next |

## Functions

### Set inactivity time

The screen saver is launched on expiry of a specified inactivity time. The duration of the inactivity time is set in seconds.

| SmartBoard – Settings > Screen saver | | | |
|---|---|---|---|
| Key | Description | Description | Key |
| 1 | Without function | Without function | 4 |
| 2 | Reduce time | Increase time | 5 |
| 3 | Save and back | Without function | 6 |
| Home | Back to screen saver | Without function | Next |

### Splash screen

The SmartBoard can be configured so that a self-generated image is used as a screen saver instead of the "Trailer Info" screen.

| SmartBoard – Settings > Screen saver | | | |
|---|---|---|---|
| Key | Description | Description | Key |
| 1 | Without function | Without function | 4 |
| 2 | Without function | Without function | 5 |
| 3 | Enable/disable | Select screen saver | 6 |
| Home | Back to settings | Forward to "Set inactivity time" | Next |

## Functions

### Select screen saver

Switch between "Trailer Info" and "Splash Screen".

| SmartBoard – Settings > Screen saver page 2 | | | |
|---|---|---|---|
| Key | Description | Description | Key |
| 1 | Without function | Without function | 4 |
| 2 | Down | Up | 5 |
| 3 | Save and back | Without function | 6 |
| Home | Back to settings | Without function | Next |

### 6.17.3 Axle load calibration

| SmartBoard – Settings > Axle load calibration | | | |
|---|---|---|---|
| Key | Description | Description | Key |
| 1 | Without function | Without function | 4 |
| 2 | Without function | Without function | 5 |
| 3 | Reset calibration | Start calibration | 6 |
| Home | Back to the main menu | Without function | Next |

## Functions

**Run axle load calibration**

Calibrate axle loads in empty, partially loaded and loaded state.

1. Select *Start calibration*.
2. Read and follow the instructions on the screen.
3. Press Next (key 6).
   ⇨ The screen for selecting the load status is displayed.

| SmartBoard – Settings > Axle load calibration | | | | |
|---|---|---|---|---|
| Key | Description | | Description | Key |
| 1 | Without function | | Calibrate as loaded | 4 |
| 2 | Without function | | Calibrate as partially loaded | 5 |
| 3 | Without function | | Calibrate as empty | 6 |
| Home | Back to axle load calibration | | Without function | Next |

4. Select the load status you want to calibrate.
   ⇨ The screen for entering the measured value is displayed.

| SmartBoard – Settings > Axle load calibration | | | | |
|---|---|---|---|---|
| Key | Description | | Description | Key |
| 1 | Select left | | Select right | 4 |
| 2 | Decrease value | | Increase value | 5 |
| 3 | Save and back | | Without function | 6 |
| Home | Back to axle load calibration | | Without function | Next |

## Functions

**Drawbar trailer**

| SmartBoard – Settings > Axle load calibration | | | | |
|---|---|---|---|---|
| Key | Description | | Description | Key |
| 1 | Select front axle(s) | | Select rear axle(s) | 4 |
| 2 | Decrease value | | Increase value | 5 |
| 3 | Save and back | | Without function | 6 |
| Home | Back to axle load calibration | | Without function | Next |

### 6.17.4 Brightness

| SmartBoard – Settings > Brightness | | | | |
|---|---|---|---|---|
| Key | Description | | Description | Key |
| 1 | Without function | | Without function | 4 |
| 2 | Decrease brightness | | Increase brightness | 5 |
| 3 | Save and back | | Without function | 6 |
| Home | Back to settings | | Without function | Next |
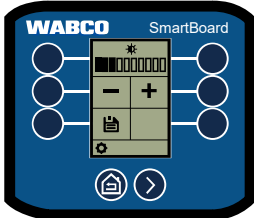
## Functions

### 6.17.5    Time / date

| SmartBoard – Settings > Time/Date | | | |
|---|---|---|---|
| **Key** | **Description** | **Description** | **Key** |
| 1 | Without function | Without function | 4 |
| 2 | Set time | Set date | 5 |
| 3 | Select time zone | Without function | 6 |
| Home | Back to settings | Without function | Next |

### 6.17.6    Start screen

Select the screen to be displayed when the SmartBoard is first started.

| SmartBoard – Settings > Start screen | | | |
|---|---|---|---|
| **Key** | **Description** | **Description** | **Key** |
| 1 | Without function | Without function | 4 |
| 2 | Down | Up | 5 |
| 3 | Save and back | Without function | 6 |
| Home | Back to settings | Without function | Next |

## Functions

### 6.17.7    Axle overload

Set warning messages for axle overload according to the number of axles.

| SmartBoard – Settings > Axle overload | | | |
|---|---|---|---|
| **Key** | **Description** | **Description** | **Key** |
| 1 | Without function | Without function | 4 |
| 2 | Without function | Without function | 5 |
| 3 | Select number of axles | Set max. mass | 6 |
| Home | Back to settings | Without function | Next |

### 6.17.8    OptiTire™ functions

Set reference pressure by axle or by pair (with twin tyres) and change wheel ID.

**Set reference pressure**

| SmartBoard – Settings > OptiTire™ | | | |
|---|---|---|---|
| **Key** | **Description** | **Description** | **Key** |
| 1 | Without function | Without function | 4 |
| 2 | Without function | Without function | 5 |
| 3 | Change reference pressure | Switch axles / tyre pair (twin tyre) | 6 |
| Home | Back to settings | Next page | Next |

## Functions

### Change wheel ID

| i | With sensors with an 8-digit ID, the first two numbers must be set to 0. |
|---|---|

**SmartBoard – Settings > OptiTire™**

| Key | Description | | Description | Key |
|---|---|---|---|---|
| 1 | Without function | | Without function | 4 |
| 2 | Without function | | Without function | 5 |
| 3 | Change wheel ID | | Select wheel | 6 |
| Home | Back to settings | | Without function | Next |

## Functions

### 6.17.9 Reorder functions in the main menu

| i | The factory settings specify that frequently used functions are automatically arranged in the main menu. This function can be disabled in the settings. |
|---|---|

1. Press the key next to the function whose position you want to change.
2. Press the key next to the function in the place where you want to put the selected function.
3. Press the *Home* key to save or cancel the allocation.
   ⇨ The functions have been rearranged.

**SmartBoard – Settings > Arrange Functions**

| Key | Description | | Description | Key |
|---|---|---|---|---|
| 1 | Select function | | Select function | 4 |
| 2 | Select function | | Select function | 5 |
| 3 | Select function | | Select function | 6 |
| Home | Save and back | | Next page | Next |

## Functions

### 6.17.10  Odometer settings

Set wheel circumference and number of flywheel teeth.

| SmartBoard – Settings > Odometer | | | |
|---|---|---|---|
| Key | Description | Description | Key |
| 1 | Without function | Without function | 4 |
| 2 | Down | Up | 5 |
| 3 | Edit selection | Transfer parameter from modulator | 6 |
| Home | Back to settings | Without function | Next |

#### Change tyre circumference

| SmartBoard – Settings > Odometer > Tyre circumference | | | |
|---|---|---|---|
| Key | Description | Description | Key |
| 1 | Without function | Without function | 4 |
| 2 | Reduce number | Increase number | 5 |
| 3 | Save and back | Transfer parameter from modulator | 6 |
| Home | Back to odometer | Switch position | Next |

## Functions

#### Change flywheel number

| SmartBoard – Settings > Odometer > Flywheel number | | | |
|---|---|---|---|
| Key | Description | Description | Key |
| 1 | Without function | Without function | 4 |
| 2 | Reduce number | Increase number | 5 |
| 3 | Save and back | Transfer parameter from modulator | 6 |
| Home | Back to odometer | Switch position | Next |

### 6.17.11  CAN termination

Enable/disable the SmartBoard CAN resistance.

| SmartBoard – Settings > CAN termination | | | |
|---|---|---|---|
| Key | Description | Description | Key |
| 1 | Without function | Without function | 4 |
| 2 | Without function | Without function | 5 |
| 3 | Enable/disable | Without function | 6 |
| Home | Back to settings | Without function | Next |

## Functions

### 6.17.12 Language

| SmartBoard – Settings > Language | | | |
|---|---|---|---|
| Key | Description | Description | Key |
| 1 | Without function | Without function | 4 |
| 2 | Down | Up | 5 |
| 3 | Save and back | Without function | 6 |
| Home | Back to settings | Without function | Next |

### 6.17.13 Change immobilizer PIN/PUK

Set new PIN by entering the current PIN or PUK.

| SmartBoard – Settings > Change PIN/PUK | | | |
|---|---|---|---|
| Key | Description | Description | Key |
| 1 | Without function | Without function | 4 |
| 2 | Down | Up | 5 |
| 3 | Edit | Without function | 6 |
| Home | Back to info | Without function | Next |

## Functions

### 6.17.14 Reset to factory settings

| SmartBoard – Settings > Factory Settings | | | |
|---|---|---|---|
| Key | Description | Description | Key |
| 1 | Without function | Without function | 4 |
| 2 | Without function | Without function | 5 |
| 3 | Reset | Without function | 6 |
| Home | Back to settings | Without function | Next |

### 6.18 Info

View various sets of system information.

| SmartBoard - Info | | | |
|---|---|---|---|
| Key | Description | Description | Key |
| 1 | Trailer info | Temperature | 4 |
| 2 | System info | "Terminal 30" function | 5 |
| 3 | ODR data | Without function | 6 |
| Home | Back to the main menu | Without function | Next |

## Functions

### 6.18.1 Trailer info

Display an overview of the trailer configuration.

| SmartBoard - Info > Trailer info | | | |
|---|---|---|---|
| **Key** | **Description** | **Description** | **Key** |
| 1 | Without function | Without function | 4 |
| 2 | Without function | Without function | 5 |
| 3 | Without function | Without function | 6 |
| Home | Back to info | Without function | Next |

### 6.18.2 System info

Display information on the installed systems.

| SmartBoard - Info > System info | | | |
|---|---|---|---|
| **Key** | **Description** | **Description** | **Key** |
| 1 | Without function | Without function | 4 |
| 2 | Without function | Without function | 5 |
| 3 | Without function | Without function | 6 |
| Home | Back to info | Show next ECU | Next |

## Functions

### 6.18.3 ODR data

Display ODR data (Operating Data Recorder).

| SmartBoard - Info > ODR data | | | |
|---|---|---|---|
| **Key** | **Description** | **Description** | **Key** |
| 1 | Without function | Without function | 4 |
| 2 | Without function | Without function | 5 |
| 3 | Without function | Without function | 6 |
| Home | Back to info | Next page | Next |

### 6.18.4 Operating temperature

Display operating temperature.

| SmartBoard - Info > Temperature | | | |
|---|---|---|---|
| **Key** | **Description** | **Description** | **Key** |
| 1 | Without function | Without function | 4 |
| 2 | Without function | Without function | 5 |
| 3 | Without function | Without function | 6 |
| Home | Back to info | Without function | Next |

## Functions

### 6.18.5 Terminal 30 (tl. 30)

Display the supply voltage for the trailer via the towing vehicle battery.

| SmartBoard - Info > Tl. 30 | | | | |
|---|---|---|---|---|
| Key | Description | | Description | Key |
| 1 | Without function | | Without function | 4 |
| 2 | Without function | | Without function | 5 |
| 3 | Without function | | Without function | 6 |
| Home | Back to info | | Without function | Next |

### 6.19 Immobilizer

Enable/disable the immobilizer; manage PIN and PUK.

> **i** If the Personal Identification Number (PIN) is entered incorrectly three times, the next entry is delayed by a waiting period. The waiting time can be interrupted by entering the Personal Unblocking Key (PUK).

**Activate/deactivate immobilizer**

| SmartBoard - Info > Immobilizer | | | | |
|---|---|---|---|---|
| Key | Description | | Description | Key |
| 1 | Without function | | Without function | 4 |
| 2 | Reduce number | | Increase number | 5 |
| 3 | Enable/disable | | Without function | 6 |
| Home | Back to info | | Select next number | Next |
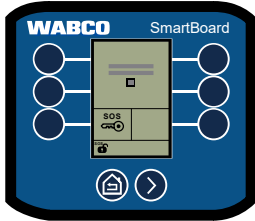
## Functions

### 6.20 Emergency release (immobilizer)

The emergency release allows the brake to be released up to 3 times, even when the immobilizer is enabled. As soon as the vehicle stops the immobilizer is activated again. The remaining releases are displayed. The function is active while the immobilizer is disabled.

| SmartBoard – Emergency release | | | | |
|---|---|---|---|---|
| Key | Description | | Description | Key |
| 1 | Without function | | Without function | 4 |
| 2 | Without function | | Without function | 5 |
| 3 | Confirm emergency release | | Without function | 6 |
| Home | Back to the main menu | | Without function | Next |

# 7 Maintenance and care

## 7.1 Maintenance

The SmartBoard 446 192 211 0 is maintenance-free. The SmartBoard 446 192 210 0 battery must be replaced at an interval of approx. six years.

## 7.2 Replacement part sets

The following replacement part sets are available for the SmartBoard:

| Description | WABCO part number |
|---|---|
| Replacement battery | 446 192 930 2 |
| Brackets | 446 192 931 2 |

## 7.3 Changing the battery

The SmartBoard 446 192 210 0 contains a special battery that supplies power to the unit in the event of an interruption in the trucks/trailer power supply. Only change the battery in a dry and clean environment. The replacement battery is supplied with two replacement screws that must be used when changing the battery.

1. If necessary, remove the SmartBoard from the vehicle.
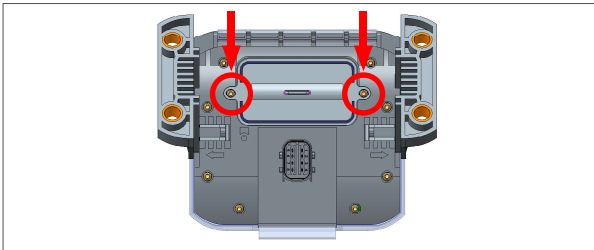


2. Unscrew the two Torx® screws on the battery cover.
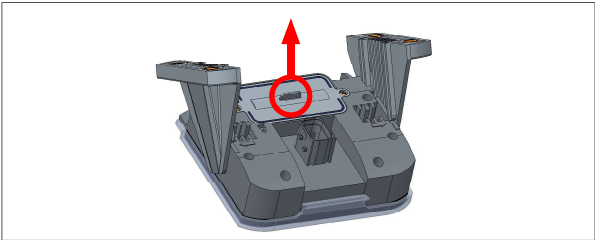
3. Remove the battery cover with a pair of flat nose pliers.
4. Carefully unplug the battery (avoid sideways movements).
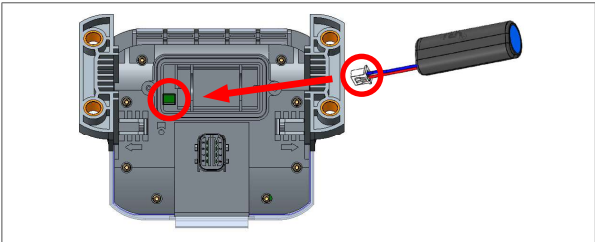


5. Push the replacement battery plug into the slot provided for it with the correct polarity and insert the replacement battery.
6. Insert the battery cover.
7. Insert the replacement screws.
8. Tighten the replacement screws (max. torque 0.6 Nm ± 0.1 Nm).
   ⇨ The battery change is complete.

## 7.4 Cleaning

Use only a damp cloth to clean the SmartBoard. Never use cleaning agents. Detergents and other chemicals can damage the display and the keyboard and must never come into contact with the SmartBoard.

# 8 Storage

Do not store the SmartBoard in a location where there is the possibility of it being exposed to water, salt or oil.

Do not store the SmartBoard in a location where the air contains dangerous gases such as hydrogen sulphide, sulphuric acid, nitrous acid, chlorine or ammonia.

Do not store the SmartBoard in a location where there is the possibility of it being exposed to direct sunlight, ultraviolet rays, ozone or radiation.

Operate the SmartBoard every two years to maintain the electrolytic capacitors on the inside. When doing so, only connect the SmartBoard to the power supply for half an hour.

Only store the SmartBoard for the duration and at the temperatures specified in the following table, to prevent damage.

| Storage temperatures | | |
|---|---|---|
| SmartBoard | Temperature (°C) | Duration (years) |
| 446 192 210 0 | -20 – 45 | 1 |
| 446 192 211 0 | -20 – 50 | 2 |
| | 5 – 35 | 15 |

# 9 Disposal

- The final and professional decommissioning and disposal of the product must be carried out in accordance with the applicable legal regulations of the user country. In particular, the regulations for the disposal of batteries, equipment and the electrical system must be observed.
- Electrical appliances must be collected separately from household or commercial waste and recycled or disposed of in accordance with regulations.
- If applicable, take the old device to the company's internal disposal department, which will then forward it to specialist companies (specialist disposal companies).
- In principle, it is also possible to return the old device to the manufacturer. For this purpose, contact the manufacturer's customer service. Any special agreements must be observed.
- Electrical and electronic equipment must be collected separately from unsorted municipal waste and recycled or disposed of properly, because harmful substances can cause lasting damage to health and the environment if disposed of improperly.
- Detailed information can be obtained from specialist waste management companies or the responsible authorities.
- The packaging must be disposed of separately. Paper, cardboard and plastics must be recycled.

# 10 Fault codes

| | | | |
|---|---|---|---|
| Example: | SmartBoard display | 1. Numerical block | 2. Numerical block |
| | | Component | Type of fault |
| | Code 001 07 | 001 – wheel sensor a | 07 – driving route too large |

| Code | Message |
|---|---|
| **Component: TEBS E** | |
| 001 | Wheel sensor a |
| 002 | Wheel sensor b |
| 003 | Wheel sensor c |
| 004 | Wheel sensor d |
| 005 | Wheel sensor e |
| 006 | Wheel sensor f |
| 007 | EBS (ABS) relay valve / solenoid valve control |
| 009 | Trailer modulator / solenoid valve control |
| 010 | Trailer modulator / solenoid control |
| 058 | EBS relay valve / redundancy |
| 059 | EBS relay valve / pressure sensor |
| 061 | Trailer modulator / redundancy |
| 062 | Trailer modulator / pressure sensors |
| 069 | Axle load sensor, internal |
| 075 | Wear sensor |
| 076 | Error when selecting the nominal value / redundant braking |
| 077 | Nominal pressure sensor, internal |
| 078 | Nominal pressure sensor, external |
| 080 | Demand pressure sensor, internal |
| 081 | Braking pressure sensor (axle c-d) |
| 082 | Switch 1 for trailer length |
| 083 | Switch 2 for trailer length |
| 084 | Switch 3 for trailer length |
| 085 | Switch 4 for trailer length |
| 086 | Switch for overload indication |
| 088 | Lateral acceleration sensor |
| 089 | Proximity switch |

| Code | Message |
|---|---|
| 090 | Freely configurable function 8 |
| 091 | Freely configurable function 7 |
| 092 | Freely configurable function 6 |
| 093 | Freely configurable function 5 |
| 094 | Freely configurable function 4 |
| 095 | Freely configurable function 3 |
| 096 | Freely configurable function 2 |
| 097 | Freely configurable function 1 |
| 099 | IN/OUT port |
| 100 | GIO - freely configurable analogue function |
| 101 | GIO - freely configurable digital function |
| 102 | Slot GIO5 |
| 103 | Slot GIO4 |
| 104 | Slot GIO3 |
| 105 | Slot GIO2 |
| 106 | Slot GIO1 |
| 107 | Slot GIO6 |
| 108 | Slot GIO7 |
| 109 | ABS sensor / memory bit |
| 110 | Slot Subsystems |
| 111 | Axle relaxation switch |
| 112 | Automatic lowering of lifting axle switch |
| 113 | SmartBoard |
| 114 | Diagnosis power supply |
| 115 | Telematics unit |
| 116 | OptiTire™ |
| 117 | ECAS Remote Control Unit / Box |
| 118 | Axle load sensor, external (axle c-d) |
| 119 | Axle load sensor, external (axle e-f) |
| 120 | Distance sensor axle load (axle c-d) |
| 121 | Distance sensor axle load (axle e-f) |

| Code | Message |
|---|---|
| 122 | Freely programmable function 3 |
| 123 | Freely programmable function 2 |
| 124 | Freely programmable function 1 |
| 125 | Unloading level switch |
| 126 | Output speed signal |
| 127 | Distance sensor 2 (axle e-f) |
| 128 | Distance sensor 1 (axle c-d) |
| 129 | ECAS valve block |
| 130 | Output steady positive voltage 2 |
| 131 | Output steady positive voltage 1 |
| 132 | Output RSS active signal |
| 133 | Output ABS active signal |
| 134 | Road finisher brake |
| 135 | Not used |
| 136 | LIN bus |
| 137 | Speed switch 2 (ISS 2) |
| 138 | Speed switch 1 (ISS 1) for manoeuvring assistance |
| 139 | Residual pressure maintenance valve |
| 140 | Residual pressure maintenance valve for traction help |
| 141 | Lifting axle valve 2 |
| 142 | Lifting axle valve 1 |
| 143 | Pneumatic control line |
| 144 | Supply pressure sensor |
| 145 | External electronic air suspension module |
| 146 | External ECAS |
| 148 | Internal ECAS / calibration |
| 156 | Not used |
| 157 | Normal level 2 switch |
| 158 | Up switch |
| 159 | Down switch |
| 160 | Brake release function |
| 163 | Axle load calibration |
| 164 | Not used |
| 165 | Trailer length proximity switch 1 |
| 167 | Output steering axle lock |

| Code | Message |
|---|---|
| 168 | Switch output steering axle lock |
| 169 | Immobilizer PIN invalid |
| 170 | Output tilt warning |
| 178 | Immobilizer valve |
| 179 | Buzzer Immobilizer |
| 180 | Demand pressure on CAN router/repeater |
| 181 | CAN router/repeater power supply local system |
| 182 | CAN router/repeater power supply to the next system |
| 183 | CAN router/repeater to the local system |
| 184 | CAN router/repeater to the next system |
| 185 | ECAS deactivation switch |
| 186 | Normal level 4 switch |
| 187 | Forklift control switch |
| 188 | Second axle load sensor, external (axle c-d) |
| 189 | SafeStart |
| 190 | SafeStart pressure sensor |
| 191 | SafeStart warning lamp |
| 192 | Emergency brake light |
| 193 | Green warning lamp |
| 194 | Brake temperature |
| 195 | eTASC rear axle |
| 196 | eTASC front axle |
| 197 | ECAS monoblock 2 |
| 198 | ECAS front axle valve |
| 199 | Driving level limitation switch |
| 200 | GIO service indication |
| 201 | Shared buzzer |
| 202 | Shared warning lamp |
| 203 | Service mode |
| 204 | GIO operating hours counter warning lamp |
| 205 | Output overload indication |
| 206 | Output overload indication 3rd modulator |
| 207 | Electronic parking brake switch |
| 208 | Spring brake valve |
| 209 | 2nd switch |
| 210 | Electronic parking brake valve |

| Code | Message |
|---|---|
| 211 | Door locking system |
| 212 | Lifting axle off switch |
| 213 | Monitoring system rear switch |
| 214 | Trailer length proximity switch 2 |
| 215 | Trailer length proximity switch 3 |
| 216 | Trailer length proximity switch 4 |
| 217 | Input switch ECAS ramp height control |
| 220 | Data link towing vehicle / trailer |
| 250 | Not used |
| 251 | Power supply |
| 253 | Parameter setting |
| 254 | Trailer modulator |
| **OptiTire™ components** | |
| 639 | CAN (short-circuit / bus off) |
| 927 | Warning lamp 2 (optional / pin 4) |
| 928 | Warning lamp 1 (standard / pin 2) |
| 929 | Tyre data cannot be analysed |
| 1121 | Data on the CAN data bus |
| 3011… 3054 | Pressure in tyre |
| 3111… 3154 | Leakage in tyre and valve |
| 3410… 3500 | Tyre Pressure Deviation |
| **Type of fault** | |
| 00 | Value too high |
| 01 | Value too low |
| 02 | Data is irregular or incorrect |
| 03 | Overvoltage / short-circuit to 24 V |
| 04 | Undervoltage / short-circuit to ground |
| 05 | Break in supply cable |
| 06 | Current too high or circuit grounded |
| 07 | Distance too great |
| 08 | Slip |
| 09 | Signal failure |
| 10 | Jump up / jump down |
| 11/12 | See failure note |

| Code | Message |
|---|---|
| 13 | Characteristic curve error |
| 14 | Special fault / see fault info |
| 15 | See fault info |

# 11 Electronic Extension Module fault codes

| Code in SmartBoard | Diagnostic Code | Description |
|---|---|---|
| 1552-03 | 2483503 | The component or the cable on analogue input 1 (GIO14) has a short-circuit to 24 V. |
| 1552-04 | 2483604 | The component or the cable on analogue input 1 (GIO14) has a short-circuit to ground. |
| 1568-03 | 2509103 | The component or the cable on analogue input 2 (GIO13) has a short-circuit to 24 V. |
| 1568-04 | 2509204 | The component or the cable on analogue input 2 (GIO13) has a short-circuit to ground. |
| 1632-03 | 2611503 | The component or the cable on plug-connector GIO14, pin 1, has a short-circuit to 24 V. |
| 1632-04 | 2611604 | The component or the cable on plug-connector GIO14, pin 1, has a short-circuit to ground. |
| 1632-05 | 2611705 | The component or the cable at plug-connector GIO14, pin 1, is not connected. |
| 1632-11 | 2612311 | A component for which there are no parameter settings was detected at slot GIO14, pin 1. |
| 1648-03 | 2637103 | The component or the cable on plug-connector GIO16, pin 1, has a short-circuit to 24 V. The fault can also occur in a system with battery supply (TEBS In/Out on GIO16 connected), then ignore. |
| 1648-04 | 2637204 | The component or the cable on plug-connector GIO16, pin 1, has a short-circuit to ground. |
| 1648-05 | 2637305 | The component or the cable at plug-connector GIO16, pin 1, is not connected. |
| 1648-11 | 2637911 | A component for which there are no parameter settings was detected at slot GIO16, pin 1. |
| 1664-03 | 2662703 | The component or the cable on plug-connector GIO16, pin 4, has a short-circuit to 24 V. |
| 1664-04 | 2662804 | The component or the cable on plug-connector GIO16, pin 4, has a short-circuit to ground. |
| 1664-05 | 2662905 | The component or the cable at plug-connector GIO16, pin 4, is not connected. |
| 1664-11 | 2663511 | A component for which there are no parameter settings was detected at slot GIO16, pin 4. |
| 1680-03 | 2688303 | The component or the cable on plug-connector GIO15, pin 1, has a short-circuit to 24 V. |
| 1680-04 | 2688404 | The component or the cable on plug-connector GIO15, pin 1, has a short-circuit to ground. |
| 1680-05 | 2688505 | The component or the cable on plug-connector GIO15, pin 1, has a short-circuit to ground. |
| 1680-11 | 2689111 | A component for which there are no parameter settings was detected at slot GIO15, pin 1. |
| 1696-03 | 2713903 | The component or the cable on plug-connector GIO13, pin 4, has a short-circuit to 24 V. |
| 1696-04 | 2714004 | The component or the cable on plug-connector GIO13, pin 4, has a short-circuit to ground. |
| 1696-05 | 2714105 | The component or the cable at plug-connector GIO13, pin 4, is not connected. |
| 1696-11 | 2714711 | A component for which there are no parameter settings was detected at slot GIO13, pin 4. |

## Electronic Extension Module fault codes

| Code in SmartBoard | Diagnostic Code | Description |
|---|---|---|
| 1712-03 | 2739503 | The component or the cable on plug-connector GIO15, pin 3, has a short-circuit to 24 V. |
| 1712-04 | 2739604 | The component or the cable on plug-connector GIO15, pin 3, has a short-circuit to ground. |
| 1712-05 | 2739705 | The component or the cable at plug-connector GIO15, pin 3, is not connected. |
| 1712-11 | 2740311 | A component for which there are no parameter settings was detected at slot GIO15, pin 3. |
| 1728-03 | 2765103 | The component or the cable on plug-connector GIO15, pin 4, has a short-circuit to 24 V. |
| 1728-04 | 2765204 | The component or the cable on plug-connector GIO15, pin 4, has a short-circuit to ground. |
| 1728-05 | 2765305 | The component or the cable at plug-connector GIO15, pin 4, is not connected. |
| 1728-11 | 2765911 | A component for which there are no parameter settings was detected at slot GIO15, pin 4. |
| 1744-03 | 2790703 | The component or the cable on plug-connector GIO13, pin 1, has a short-circuit to 24 V. |
| 1744-04 | 2790804 | The component or the cable on plug-connector GIO13, pin 1, has a short-circuit to ground. |
| 1744-05 | 2790905 | The component or the cable at plug-connector GIO13, pin 1, is not connected. |
| 1744-11 | 2791511 | A component for which there are no parameter settings was detected at slot GIO13, pin 1. |
| 1760-03 | 2816303 | The component or the cable on plug-connector Subsystems pin 5 (tl. 15) has a short-circuit to 24 V. |
| 1760-04 | 2816404 | The component or the cable on plug-connector Subsystems pin 5 (tl. 15) has a short-circuit to ground. |
| 1760-05 | 2816505 | No components are connected on the plug-connector Subsystems pin 5 (tl. 15). |
| 1760-11 | 2817111 | A component for which there are no parameter settings was detected on slot Subsystems pin 5 (tl. 15). |
| 1905-03 | 3048303 | The supply voltage to the Electronic Extension Module is below 9 V. |
| 1905-04 | 3048404 | The supply voltage to the Electronic Extension Module is above 30 V. |
| 1920-02 | 3072202 | No echo signal received from ultrasonic sensor 1 (left). Sensor or sensor cable defective or not plugged in. |
| 1920-03 | 3072303 | The cable to the ultrasonic sensor 1 (left) cable has a short-circuit to 24 V. |
| 1920-04 | 3072404 | The cable to the ultrasonic sensor 1 (left) cable has a short-circuit to ground. |
| 1921-03 | 3073903 | The cable for the power supply for the ultrasonic sensor(s) on the GIO17 cable has a short-circuit to 24 V. |
| 1921-04 | 3074004 | The cable for the power supply for the ultrasonic sensor(s) on the GIO17 or GIO18 has a short-circuit to ground. |
| 1936-02 | 3097802 | No echo signal received from ultrasonic sensor 2 (right). Sensor or sensor cable defective or not plugged in. |
| 1936-03 | 3097903 | The cable to ultrasonic sensor 2 (right) cable has a short-circuit to 24 V. |
| 1936-04 | 3098004 | The cable to ultrasonic sensor 2 (right) cable has a short-circuit to ground. |
| 1937-03 | 3099503 | The cable for the power supply for the ultrasonic sensor(s) on the GIO18 cable has a short-circuit to 24 V. |

## Electronic Extension Module fault codes

| Code in SmartBoard | Diagnostic Code | Description |
|---|---|---|
| 1937-04 | 3099604 | The cable for the power supply for the ultrasonic sensor(s) on the GIO17 or GIO18 cable has a short-circuit to ground. |
| 1952-12 | 3124412 | TailGUARD™ function cancelled because of a sensor error. This error can also occur with heavy parasitic noises. |
| 1968-12 | 3150012 | TailGUARD™ function cancelled because of a sensor error in the main level. This error can also occur with heavy parasitic noises. |
| 1968-14 | 3150214 | TailGUARD™ was deactivated while reversing. |
| 1969-12 | 3151612 | TailGUARD™ function cancelled because of a sensor error in the expanded level. This error can also occur with heavy parasitic noises. |
| 1984-12 | 3175612 | TailGUARD™ function cancelled because of a fault in the Trailer EBS. |
| 1985-12 | 3177212 | General termination of the TailGUARD™ function due to excessive reversing speed or faults in the TailGUARD™ components during operation. Note the additional information ("Info" button). |
| 2032-02 | 3251402 | Implausible signal from distance sensor 2. |
| 2032-03 | 3251503 | The cable to distance sensor 2 has a short-circuit to 24 V. |
| 2032-04 | 3251604 | The cable to distance sensor 2 has a short-circuit to ground. |
| 2032-05 | 3251705 | The cable to distance sensor 2 is not connected or is defective. This fault can also occur in combination with the fault "Power supply too low", then ignore. |
| 2032-11 | 3252311 | A component for which there are no parameter settings was detected at slot GIO13, pin 4. |
| 2048-02 | 3277002 | Implausible signal from distance sensor 1. |
| 2048-03 | 3277103 | The cable to distance sensor 1 has a short-circuit to 24 V. |
| 2048-04 | 3277204 | The cable to distance sensor 1 has a short-circuit to ground. |
| 2048-05 | 3277305 | The cable to distance sensor 1 is not connected or is defective. |
| 2048-11 | 3277911 | A component for which there are no parameter settings was detected at slot GIO14, pin 4. |
| 2080-03 | 3328303 | The LIN bus to the ultrasonic sensors (GIO17 or GIO18) was interrupted by excessive voltage. Check the sensor cable. |
| 2080-04 | 3328404 | The LIN bus to the ultrasonic sensors (GIO17 or GIO18) has a short to ground. Check the sensor cable. |
| 2080-05 | 3328505 | No sensor is connected on the line of the LIN bus to the ultrasonic sensors (GIO17 or GIO18). |
| 2080-09 | 3328909 | The LIN bus to the ultrasonic sensors is having communication problems. Switch the ignition off and on again. |
| 2081-03 | 3329903 | The LIN bus to the ultrasonic sensors (GIO17 or GIO18) was interrupted by excessive voltage. Check the sensor cable. |
| 2081-04 | 3330004 | The LIN bus to the ultrasonic sensors (GIO17 or GIO18) has a short to ground. Check the sensor cable. |
| 2081-13 | 3330913 | The ultrasonic sensors are not configured. |
| 2097-12 | 3356412 | Ultrasonic sensor 1 (main level left) has an internal error. If the fault occurs frequently, replace the sensor. |
| 2098-00 | 3356800 | Ultrasonic sensor 1 (main level left) has an internal error. If the fault occurs frequently, replace the sensor. |
| 2099-00 | 3358400 | Ultrasonic sensor 1 (main level left) has an internal error. If the fault occurs frequently, replace the sensor. |
| 2100-12 | 3361212 | Ultrasonic sensor 1 (main level left) has an internal error. If the fault occurs frequently, replace the sensor. |
| 2101-12 | 3362812 | Ultrasonic sensor 1 (main level left) has an internal error. If the fault occurs frequently, replace the sensor. |

## Electronic Extension Module fault codes

| Code in SmartBoard | Diagnostic Code | Description |
|---|---|---|
| 2102-12 | 3364412 | Ultrasonic sensor 1 (main level left) has a sensor membrane error. Make sure that the sensor membrane is clean and the sensor has a free view. If the error continues to occur, replace the sensor. |
| 2103-05 | 3365305 | The cable to the ultrasonic sensor 1 (main level left) was interrupted or a new ultrasonic sensor has not been learned yet. If the fault occurs during TailGUARD™ start-up, ignore the fault and repeat the start-up procedures. |
| 2113-12 | 3382012 | Ultrasonic sensor 2 (main level right) has an internal error. If the fault occurs frequently, replace the sensor. |
| 2114-00 | 3382400 | Ultrasonic sensor 2 (main level right) has an internal error. If the fault occurs frequently, replace the sensor. |
| 2115-00 | 3384000 | Ultrasonic sensor 2 (main level right) has an internal error. If the fault occurs frequently, replace the sensor. |
| 2116-12 | 3386812 | Ultrasonic sensor 2 (main level right) has an internal error. If the fault occurs frequently, replace the sensor. |
| 2117-12 | 3388412 | Ultrasonic sensor 2 (main level right) has an internal error. If the fault occurs frequently, replace the sensor. |
| 2118-12 | 3390012 | Ultrasonic sensor 2 (main level right) has a sensor membrane error. Make sure that the sensor membrane is clean and the sensor has a free view. If the error continues to occur, replace the sensor. |
| 2119-05 | 3390905 | The cable to ultrasonic sensor 2 (main level right) is interrupted or a new ultrasonic sensor has not been learned yet. If the fault occurs during TailGUARD™ start-up, ignore the fault and repeat the start-up procedures. |
| 2129-12 | 3407612 | Ultrasonic sensor 3 (main level middle) has an internal error. If the fault occurs frequently, replace the sensor. |
| 2130-00 | 3408000 | Ultrasonic sensor 3 (main level middle) has an internal error. If the fault occurs frequently, replace the sensor. |
| 2131-00 | 3409600 | Ultrasonic sensor 3 (main level middle) has an internal error. If the fault occurs frequently, replace the sensor. |
| 2132-12 | 3412412 | Ultrasonic sensor 3 (main level middle) has an internal error. If the fault occurs frequently, replace the sensor. |
| 2133-12 | 3414012 | Ultrasonic sensor 3 (main level middle) has an internal error. If the fault occurs frequently, replace the sensor. |
| 2134-12 | 3415612 | Ultrasonic sensor 3 (main level middle) has a sensor membrane error. Make sure that the sensor membrane is clean and the sensor has a free view. If the error continues to occur, replace the sensor. |
| 2135-05 | 3416505 | The cable to ultrasonic sensor 3 (main level middle) is interrupted or a new ultrasonic sensor has not been learned yet. If the fault occurs during TailGUARD™ start-up, ignore the fault and repeat the start-up procedures. |
| 2145-12 | 3433212 | Ultrasonic sensor 4 (additional level left) has an internal error. If the fault occurs frequently, replace the sensor. |
| 2146-00 | 3433600 | Ultrasonic sensor 4 (additional level left) has an internal error. If the fault occurs frequently, replace the sensor. |
| 2147-00 | 3435200 | Ultrasonic sensor 4 (additional level left) has an internal error. If the fault occurs frequently, replace the sensor. |
| 2148-12 | 3438012 | Ultrasonic sensor 4 (additional level left) has an internal error. If the fault occurs frequently, replace the sensor. |
| 2149-12 | 3439612 | Ultrasonic sensor 4 (additional level left) has an internal error. If the fault occurs frequently, replace the sensor. |

## Electronic Extension Module fault codes

| Code in SmartBoard | Diagnostic Code | Description |
|---|---|---|
| 2150-12 | 3441212 | Ultrasonic sensor 4 (additional level left) has a sensor membrane error. Make sure that the sensor membrane is clean and the sensor has a free view. If the error continues to occur, replace the sensor. |
| 2151-05 | 3442105 | The cable to ultrasonic sensor 4 (additional level left) is interrupted or a new ultrasonic sensor has not been learned yet. If the fault occurs during TailGUARD™ start-up, ignore the fault and repeat the start-up procedures. |
| 2161-12 | 3458812 | Ultrasonic sensor 5 (additional level right) has an internal error. If the fault occurs frequently, replace the sensor. |
| 2162-00 | 3459200 | Ultrasonic sensor 5 (additional level right) has an internal error. If the fault occurs frequently, replace the sensor. |
| 2163-00 | 3460800 | Ultrasonic sensor 5 (additional level right) has an internal error. If the fault occurs frequently, replace the sensor. |
| 2164-12 | 3463612 | Ultrasonic sensor 5 (additional level right) has an internal error. If the fault occurs frequently, replace the sensor. |
| 2165-12 | 3465212 | Ultrasonic sensor 5 (additional level right) has an internal error. If the fault occurs frequently, replace the sensor. |
| 2166-12 | 3466812 | Ultrasonic sensor 5 (additional level right) has a sensor membrane error. Make sure that the sensor membrane is clean and the sensor has a free view. If the error continues to occur, replace the sensor. |
| 2167-05 | 3467705 | The cable to ultrasonic sensor 5 (additional level right) is interrupted or a new ultrasonic sensor has not been learned yet. If the fault occurs during TailGUARD™ start-up, ignore the fault and repeat the start-up procedures. |
| 2177-12 | 3484412 | Ultrasonic sensor 6 (additional level middle) has an internal error. If the fault occurs frequently, replace the sensor. |
| 2178-00 | 3484800 | Ultrasonic sensor 6 (additional level middle) has an internal error. If the fault occurs frequently, replace the sensor. |
| 2179-00 | 3486400 | Ultrasonic sensor 6 (additional level middle) has an internal error. If the fault occurs frequently, replace the sensor. |
| 2180-12 | 3489212 | Ultrasonic sensor 6 (additional level middle) has an internal error. If the fault occurs frequently, replace the sensor. |
| 2181-12 | 3490812 | Ultrasonic sensor 6 (additional level middle) has an internal error. If the fault occurs frequently, replace the sensor. |
| 2182-12 | 3492412 | Ultrasonic sensor 6 (additional level right) has a sensor membrane error. Make sure that the sensor membrane is clean and the sensor has a free view. If the error continues to occur, replace the sensor. |
| 2183-05 | 3493305 | The cable to ultrasonic sensor 6 (additional level middle) is interrupted or a new ultrasonic sensor has not been learned yet. If the fault occurs during TailGUARD™ start-up, ignore the fault and repeat the start-up procedures. |
| 2192-03 | 3507503 | The cable to the trip recorder speed signal has a short-circuit to supply voltage. |
| 2208-02 | 3533002 | The speed signal is invalid. Move the vehicle. Should the fault persist, check the cabling of the speed signal. |
| 2209-10 | 3535410 | The speed signal is invalid. Switch the ignition off and on again and move the vehicle. Should the fault persist, check the cabling of the speed signal. |
| 2224-03 | 3558703 | Brake valve 1 has a short-circuit to supply voltage. Check the cabling. |

## Electronic Extension Module fault codes

| Code in SmartBoard | Diagnostic Code | Description |
|---|---|---|
| 2224-04 | 3558804 | Brake valve 1 has a short-circuit to ground. Check the cabling. |
| 2224-05 | 3558905 | Brake valve 1 is not connected. Check the cabling. |
| 2224-12 | 3559612 | Brake valve 1 possibly has a leak or does not vent the brake line. |
| 2225-03 | 3560303 | Brake valve 2 has a short-circuit to supply voltage. Check the cabling. |
| 2225-04 | 3560404 | Brake valve 2 has a short-circuit to ground. Check the cabling. |
| 2225-05 | 3560505 | Brake valve 2 is not connected. Check the cabling. |
| 2225-12 | 3561212 | Brake valve 2 possibly has a leak or does not vent the brake line. |
| 2243-11 | 3589911 | Internal fault, the relay for the position lamps has a fault. |
| 2257-12 | 3612412 | Ultrasonic sensor 1 (GIO16) has an internal fault. If the fault occurs frequently, replace the sensor. |
| 2260-12 | 3617212 | Ultrasonic sensor 1 (GIO16) has an internal fault. If the fault occurs frequently, replace the sensor. |
| 2261-12 | 3618812 | Ultrasonic sensor 1 (GIO16) has an internal fault. If the fault occurs frequently, replace the sensor. |
| 2262-12 | 3620412 | Ultrasonic sensor 1 (GIO16) has a sensor membrane fault. Make sure that the sensor membrane is clean and the sensor has a free view. If the error continues to occur, replace the sensor. |
| 2263-12 | 3622012 | The cable to the ultrasonic sensor 1 (GIO16) was interrupted or a new ultrasonic sensor has not been learned yet. If the fault occurs during TailGUARD™ start-up, ignore the fault and repeat the start-up procedures. |
| 2273-12 | 3638012 | Ultrasonic sensor 2 (GIO16) has an internal fault. If the fault occurs frequently, replace the sensor. |
| 2276-12 | 3642812 | Ultrasonic sensor 2 (GIO16) has an internal fault. If the fault occurs frequently, replace the sensor. |
| 2277-12 | 3644412 | Ultrasonic sensor 2 (GIO16) has an internal fault. If the fault occurs frequently, replace the sensor. |
| 2278-12 | 3646012 | Ultrasonic sensor 2 (GIO16) has a sensor membrane fault. Make sure that the sensor membrane is clean and the sensor has a free view. If the error continues to occur, replace the sensor. |
| 2279-12 | 3647612 | The cable to the ultrasonic sensor 2 (GIO16) was interrupted or a new ultrasonic sensor has not been learned yet. If the fault occurs during TailGUARD™ start-up, ignore the fault and repeat the start-up procedures. |
| 2289-12 | 3663612 | Ultrasonic sensor 3 (GIO16) has an internal fault. If the fault occurs frequently, replace the sensor. |
| 2292-12 | 3668412 | Ultrasonic sensor 3 (GIO16) has an internal fault. If the fault occurs frequently, replace the sensor. |
| 2293-12 | 3670012 | Ultrasonic sensor 3 (GIO16) has an internal fault. If the fault occurs frequently, replace the sensor. |
| 2294-12 | 3671612 | Ultrasonic sensor 3 (GIO16) has a sensor membrane fault. Make sure that the sensor membrane is clean and the sensor has a free view. If the error continues to occur, replace the sensor. |
| 2295-12 | 3673212 | The cable to the ultrasonic sensor 3 (GIO16) was interrupted or a new ultrasonic sensor has not been learned yet. If the fault occurs during TailGUARD™ start-up, ignore the fault and repeat the start-up procedures. |

## Electronic Extension Module fault codes

| Code in SmartBoard | Diagnostic Code | Description |
|---|---|---|
| 2305-12 | 3689212 | Ultrasonic sensor 4 (GIO16) has an internal fault. If the fault occurs frequently, replace the sensor. |
| 2308-12 | 3694012 | Ultrasonic sensor 4 (GIO16) has an internal fault. If the fault occurs frequently, replace the sensor. |
| 2309-12 | 3695612 | Ultrasonic sensor 4 (GIO16) has an internal fault. If the fault occurs frequently, replace the sensor. |
| 2310-12 | 3697212 | Ultrasonic sensor 4 (GIO16) has a sensor membrane fault. Make sure that the sensor membrane is clean and the sensor has a free view. If the error continues to occur, replace the sensor. |
| 2311-12 | 3698812 | The cable to the ultrasonic sensor 4 (GIO16) was interrupted or a new ultrasonic sensor has not been learned yet. If the fault occurs during TailGUARD™ start-up, ignore the fault and repeat the start-up procedures. |
| 2321-12 | 3714812 | Ultrasonic sensor 5 (GIO16) has an internal fault. If the fault occurs frequently, replace the sensor. |
| 2324-12 | 3719612 | Ultrasonic sensor 5 (GIO16) has an internal fault. If the fault occurs frequently, replace the sensor. |
| 2325-12 | 3721212 | Ultrasonic sensor 5 (GIO16) has an internal fault. If the fault occurs frequently, replace the sensor. |
| 2326-12 | 3722812 | Ultrasonic sensor 5 (GIO16) has a sensor membrane fault. Make sure that the sensor membrane is clean and the sensor has a free view. If the error continues to occur, replace the sensor. |
| 2327-12 | 3724412 | The cable to the ultrasonic sensor 5 (GIO16) was interrupted or a new ultrasonic sensor has not been learned yet. If the fault occurs during TailGUARD™ start-up, ignore the fault and repeat the start-up procedures. |
| 2337-12 | 3740412 | Ultrasonic sensor 6 (GIO16) has an internal fault. If the fault occurs frequently, replace the sensor. |
| 2340-12 | 3745212 | Ultrasonic sensor 6 (GIO16) has an internal fault. If the fault occurs frequently, replace the sensor. |
| 2341-12 | 3746812 | Ultrasonic sensor 6 (GIO16) has an internal fault. If the fault occurs frequently, replace the sensor. |
| 2342-12 | 3748412 | Ultrasonic sensor 6 (GIO16) has a sensor membrane fault. Make sure that the sensor membrane is clean and the sensor has a free view. If the error continues to occur, replace the sensor. |
| 2343-12 | 3750012 | The cable to the ultrasonic sensor 6 (GIO16) was interrupted or a new ultrasonic sensor has not been learned yet. If the fault occurs during TailGUARD™ start-up, ignore the fault and repeat the start-up procedures. |
| 2352-03 | 3763503 | The LIN bus to the ultrasonic sensors (GIO16) was interrupted by excessive voltage. Check the sensor cable. |
| 2352-04 | 3763604 | The LIN bus to the ultrasonic sensors (GIO16) has a short to ground. Check the sensor cable. |
| 2352-05 | 3763705 | No sensor is connected on the line of the LIN bus to the ultrasonic sensors (GIO16). |
| 2352-09 | 3764109 | The LIN bus to the ultrasonic sensors (GIO16) is having communication problems. Switch the ignition off and on again. |
| 2353-13 | 3766113 | The ultrasonic sensors (GIO16) are not configured. |
| 2368-02 | 3789002 | The reversing signal is not available or is outside the valid range. Check the CAN connections of the 24 V CAN on port GIO12 to the vehicle. |

## Electronic Extension Module fault codes

| Code in SmartBoard | Diagnostic Code | Description |
|---|---|---|
| 2368-12 | 3790012 | The reverse signal is implausible. Switch the ignition off and on again. Drive the vehicle and then engage the reverse gear while stationary. Check the reverse signal for a short-circuit to supply voltage. |
| 2384-03 | 3814703 | The pressure sensor input has a short-circuit to supply voltage. Check the cabling. |
| 2384-04 | 3814804 | The pressure sensor input has a short-circuit to ground. Check the cabling. |
| 2384-14 | 3815814 | The pressure sensor detects a braking pressure although no brake is being applied. Check the proper function of the pressure sensor and the solenoid valves if applicable and the Select-High valve for tightness. |
| 2385-03 | 3816303 | The supply cable for the pressure sensor has a short-circuit to supply voltage. Check the cabling. |
| 2385-04 | 3816404 | The supply cable for the pressure sensor has a short-circuit to ground. Check the cabling. |
| 2400-05 | 3840505 | The supply cable for the stop light (GIO12, pin 1) is not connected. The stop light cannot be actuated. Check the cabling. |
| 2416-00 | 3865600 | Supply pressure of the reverse monitoring system is too high. Check the supply pressure, the pressure limiting valve and the pressure sensor. |
| 2416-01 | 3865701 | Supply pressure of the reverse monitoring system is too low. |
| 2432-12 | 3892412 | The pressure sensor detects a braking pressure at a vehicle speed that is too high or invalid. Check the TailGUARD™ valves for leaks as well as the valves and the pressure sensor and their cables for short circuits to supply. |
| 2448-03 | 3917103 | The status lamp or its cable has a short-circuit to supply voltage. Check the cabling. |
| 2448-04 | 3917204 | The status lamp or its cable has a short-circuit to ground. Check the cabling. |
| 2448-05 | 3917305 | The status lamp or its cable is not connected. Check the cabling; if an LED is installed, install and additional 1 kOhm resistor to ground. |
| 2464-03 | 3942703 | The warning lamp or its cable has a short-circuit to supply voltage. Check the cabling. |
| 2464-04 | 3942804 | The warning lamp or its cable has a short-circuit to ground. Check the cabling. |
| 2464-05 | 3942905 | The warning lamp or its cable is not connected. Check the cabling. |
| 2480-03 | 3968303 | The cable for the brake signal has a short-circuit to supply voltage. Check the cabling. |
| 2480-04 | 3968404 | The cable for the brake signal has a short-circuit to ground. Check the cabling. |
| 2480-05 | 3968505 | The cable for the brake signal is not connected. Check the cabling. |
| 2496-09 | 3994509 | Trailer Remote Control communication switched off because an existing Trailer Remote Control communication was detected via another electronic extension module. Disable all Trailer Remote Control communications in all Electronic Extension Modules except the first one (with the TailGUARD™ system). |
| 2512-12 | 4020412 | The brake request from the TailGUARD™ system was not acknowledged by the towing vehicle. Check the cabling of GIO13, pin 1 (brake signal), and GIO13, pin 3 (brake status signal). It is possible that the fault can be ignored (additional information under "Info"). |

## Electronic Extension Module fault codes

| Code in SmartBoard | Diagnostic Code | Description |
|---|---|---|
| 2513-12 | 4022012 | The truck indicates confirmation of a TailGUARD™ braking action even though the TailGUARD™ system has not requested braking. Note the additional information ("Info" button), it may be possible to ignore the fault. |
| 2514-12 | 4023612 | The brake signal has a short-circuit to the brake confirmation signal (short-circuit GIO13, pin 1, to GIO13, pin 3). Check the cabling. |
| 2944-09 | 4711309 | No CAN connection to Trailer EBS. |
| 2945-09 | 4712909 | No CAN connection to truck. Check the cabling of the CAN lines of the Electronic Extension Module power cable (pins 2 and 3 / white-green and white-brown lines) to the vehicle (body manufacturer CAN port). |
| 3520-09 | 5632909 | CAN connection to towing vehicle via ISO 12098 interrupted. |
| 4000-03 | 6400303 | The supply voltage of the ultrasonic sensors is too high. |
| 4000-04 | 6400404 | The supply voltage of the ultrasonic sensors is too low. This fault can also occur in combination with the fault "Power supply too low", then ignore. |
| 4016-03 | 6425903 | The supply voltage to the Electronic Extension Module is above 30 V. |
| 4016-04 | 6426004 | The supply voltage to the Electronic Extension Module is below 9 V. |
| 4017-03 | 6427503 | The supply voltage to the Electronic Extension Module is too high. The reverse monitoring system was switched off. |
| 4017-04 | 6427604 | The supply voltage for the Electronic Extension Module is below 19 V. The reverse monitoring system was switched off. |
| 4048-14 | 6478214 | The TailGUARD™ system has not been learned or tested yet. Please run initial start-up routine. |
| 4049-02 | 6478602 | The parameter settings are incorrect. For more information: Read out parameter set and write back into the ECU. |
| 4064-12 | 6503612 | The port expansion was deactivated. Too many 12 V components were defined on the Electronic Extension Module in multi-voltage operation. Reduce the number to max. 3 components. |
| 4065-12 | 6505212 | Switch ignition off for at least 5 s. If the fault is still current after the ignition reset, contact your WABCO partner. |
| 4066-12 | 6506812 | Switch ignition off for at least 5 s. If the fault is still current after the ignition reset, contact your WABCO partner. |
| 4067-12 | 6508412 | Switch ignition off for at least 5 s. If the fault is still current after the ignition reset, contact your WABCO partner. |
| 4068-12 | 6510012 | Switch ignition off for at least 5 s. If the fault is still current after the ignition reset, contact your WABCO partner. |
| 4069-12 | 6511612 | Switch ignition off for at least 5 s. If the fault is still current after the ignition reset, contact your WABCO partner. |
| 4088-12 | 6542012 | Switch ignition off for at least 5 s. If the fault is still current after the ignition reset, contact your WABCO partner. |

## 12 WABCO regional offices

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| 🇨🇭 | WABCO Headquarters, Giacomettistrasse 1, 3006 Bern 31, Switzerland, Tel.: +32-2663 98 00 |

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|---|---|---|
| WABCO Europe BVBA<br>Chaussée de la Hulpe 166<br>1170 Brüssel<br>Belgium<br>Tel.: +32 2 663 9800<br>Fax: +32 2 663 9896 | WABCO Belgium BVBA/<br>SPRL<br>'t Hofveld 6 B1-3<br>1702 Groot-Bijgaarden<br>Belgium<br>Tel.: +32 2 481 09 00 | WABCO Austria GesmbH<br>Rappachgasse 42<br>1110 Wien<br>Austria<br>Tel.: +43 1 680 700 |
| WABCO GmbH<br>Am Lindener Hafen 21<br>30453 Hannover<br>Germany<br>Tel.: +49 511 9220 | WABCO GmbH<br>Gartenstraße 1<br>31028 Gronau<br>Germany<br>Tel.: +49 511 922 3000 | WABCO Radbremsen GmbH<br>Bärlochweg 25<br>68229 Mannheim<br>Germany<br>Tel.: +49 621 48310 |
| WABCO brzdy k vozidlúm<br>spol. s r.o.<br>Sourcing & Purchasing Office<br>U Trezorky 921/2<br>Prague 5 Jinonice<br>158 00 Prag<br>Czech Republic<br>Tel.: +420 226 207 010 | WABCO brzdy k vozidlúm<br>spol. s r.o.<br>Pražákova 1008/69, Štýřice,<br>639 00 Brno<br>Czech Republic<br>Tel.: +420 543 428 800 | WABCO Automotive BV<br>Rhijnspoor 263<br>Capelle aan den IJssel<br>(Rotterdam) 2901 LB<br>The Netherlands<br>Tel.: +31 10 288 86 00 |
| WABCO (Schweiz) GmbH<br>Morgenstrasse 136<br>Bern 3018<br>Switzerland<br>Tel.: +41 31 997 41 41 | WABCO International<br>Sourcing & Purchasing<br>Office<br>Harmandere Mh. Dedepasa<br>Cd. 24<br>Atlas Park B/5 Pendik,<br>34912 Istanbul<br>Turkey<br>Tel.: +90 216 688 81 72<br>Fax: +90 216 688 38 26 | WABCO Sales Office<br>Halide Edip Adivar Mh.<br>Ciftecevizler Deresi Sok. 2/2<br>Akin Plaza, Sisli,<br>34382 Istanbul<br>Turkey<br>Tel.: +90 212 314 20 00<br>Fax: +90 212 314 20 01 |
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| WABCO España S. L. U.<br>Av de Castilla 33<br>San Fernando de Henares<br>Madrid 28830<br>Spain<br>Tel.: +34 91 675 11 00 | WABCO Automotive AB<br>Drakegatan 10, Box 188<br>SE 401 23 Gothenburg<br>Sweden<br>Tel.: +46 31 57 88 00 | WABCO Automotive U.K. Ltd<br>Unit A1 Grange Valley<br>Grange Valley Road, Batley,<br>W Yorkshire,<br>United Kingdom, WF17 6GH<br>Tel.: +44 (0)1924 595 400 |

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|---|---|---|
| WABCO Australia Pty Ltd<br>Unit 3, 8 Anzed Court<br>Mulgrave, Victoria 3170<br>Australia<br>Tel.: +61 3 8541 7000<br>Hotline: 1300-4-WABCO | WABCO do Brasil Indústria<br>e Comércio De Freios Ltda<br>Rodovia Anhanguera,<br>km 106<br>CEP 13180-901<br>Sumaré-SP<br>Brazil<br>Tel.: +55 19 2117 4600<br>Tel.: +55 19 2117 5800 | WABCO Hong Kong Limited<br>14/F Lee Fund Centre<br>31 Wong Chuk Hang Road<br>Hong Kong<br>China<br>Tel.: +852 2594 9746 |
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| WABCO (China) Co. Ltd<br>Guangdong WABCO FUHUA<br>Automobile Brake System<br>Co. Ltd.<br>Building E, No. 1 North,<br>Santai Av, Taishan City<br>Guangdong 529200<br>China<br>Tel.: +86 750 5966 123 | Shanghai G7 WABCO IOT<br>Technology Co. Ltd<br>Room 503, Liguo Building,<br>No. 255 Wubao Road,<br>Minhang Dist.<br>Shanghai 201100<br>China<br>Tel.: 021-64058562/826 | China-US RH Sheppard<br>Hubei Steering Systems<br>Co. Ltd<br>No. 18, Jingui Road,<br>Xianning City<br>Hubei 437000<br>China |
| WABCO India Limited<br>Plot No. 3 (SP), III Main<br>Road<br>Ambattur Industrial Estate<br>Chennai 600 058<br>India<br>Tel.: +91 44 42242000 | WABCO Japan Inc<br>Gate City Ohsaki W. Tower<br>2F,<br>1-11-1, Osaki,<br>Shinagawa-ku,<br>Tokyo 141-0032<br>Japan<br>Tel.: +81 3 5435 5711 | WABCO Korea Ltd<br>23, Cheongbuksandan-ro,<br>Cheongbuk-eup<br>Pyongtaek-si<br>Gyeonggi-do, 17792<br>Korea<br>Tel.: +82 31 680 3707 |
| WABCO Asia Private Ltd<br>25 International Business<br>Park<br>#03-68/69 German Centre<br>609916<br>Singapore<br>Tel.: +65 6562 9119 | WABCO Automotive SA<br>10 Sunrock Close<br>Sunnyrock Ext 2,<br>Germison 1401<br>PO Box 4590, Edenvale<br>1610<br>South Africa<br>Tel.: +27 11 450 2052 | WABCO Middle East and<br>Africa FZCO Vehicle Control<br>System<br>DWC Business Park,<br>Building A3, Room NO: 115,<br>PO Box 61231,<br>Dubai<br>United Arab Emirates<br>E-mail:<br>info.dubai@wabco-auto.com |

**Notes**

## ZF Friedrichshafen AG

ZF is a global technology company and supplies systems for passenger cars, commercial vehicles and industrial technology, enabling the next generation of mobility. ZF allows vehicles to see, think and act. In the four technology domains Vehicle Motion Control, Integrated Safety, Automated Driving, and Electric Mobility, ZF offers comprehensive solutions for established vehicle manufacturers and newly emerging transport and mobility service providers. ZF electrifies different kinds of vehicles. With its products, the company contributes to reducing emissions and protecting the climate.

ZF, which acquired WABCO Holdings Inc. on May 29, 2020, now has 162,000 employees worldwide with approximately 260 locations in 41 countries. In 2019, the two then-independent companies achieved sales of €36.5 billion (ZF) and $3.4 billion (WABCO).

With the integration of WABCO, the leading global supplier of braking control systems and other advanced technologies that improve the safety, efficiency and connectivity of commercial vehicles ZF will create a new level of capability to pioneer the next generation of solutions and services for original equipment manufacturers and fleets globally. WABCO, with almost 12,000 people in 40 locations worldwide, will now operate under the ZF brand as its new Commercial Vehicle Control Systems division.

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