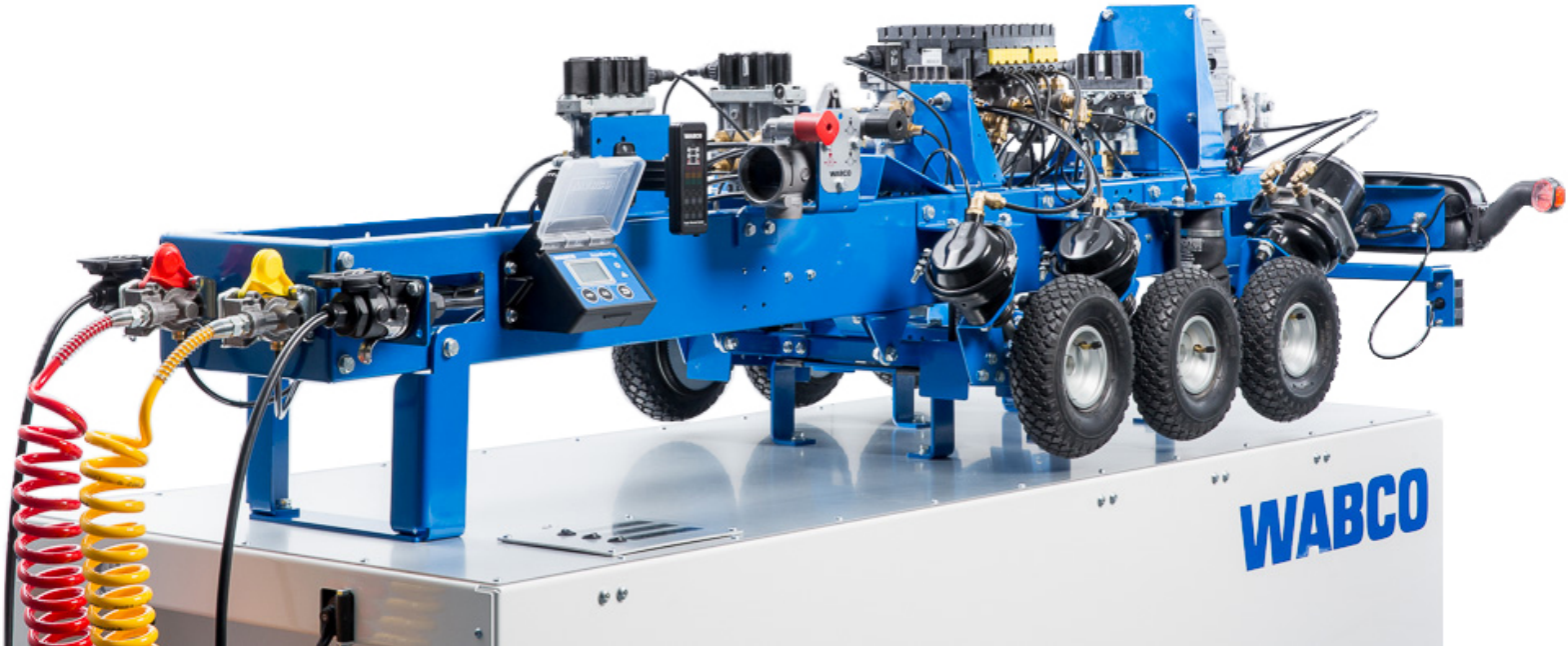
Trailer
Training Model

Operating Instructions



WABCO

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1 List of abbreviations

Abbreviation	Meaning
4S/3M	4 Sensors/3 Modulators
ABS	Anti-Lock Braking System
CAN	Controller Area Network; serial bus system
ECAS	Electronically Controlled Air Suspension
ECU	Electronic Control Unit
GIO	Generic Input/Output
ISO	International Organization for Standardization
LSV	Load Sensing Valve
PREV	Park Release Emergency Valve
PUK	Personal Unblocking Key
TEBS	Electronic Braking System for Trailers

2 Information about this document

2.1 General equal treatment

In this document, the masculine form, according to grammar, is used in a neutral sense. This serves to make the text more understandable and easier to read. People of all genders are always addressed in the same way. We ask for your understanding for this simplification in the text.

2.2 Symbols used

i	These information boxes contain important information, hints and/or tips.

Descriptive text

- For individual action steps

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

- Listing

➲*See: Cross-reference*

3 Basic safety instructions

3.1 Proper use

The trailer training model is a scaled-down model of a 3-axle semitrailer that serves to impart knowledge about WABCO's braking and air suspension systems.

The training model can be used in conjunction with the truck training model or alone.

The training model is intended for professional use and not for private use. Intended use also includes that you have read and understood this document completely.

3.2 Obvious misuse

The training model must not be used as a vehicle.

Any use other than that described in the intended use is not in accordance with the intended use and is therefore not permitted.

WABCO accepts no liability for damage caused by improper use. The risks of improper use lie solely with the user.

3.3 Qualification and knowledge of the personnel

The activities described in this documentation require basic knowledge of mechanics, electrics, pneumatics and knowledge of the associated technical terms.

To ensure operational safety, the training model may only be used by trained persons with demonstrable technical expertise in an educational environment for training or demonstration purposes.

3.4 Structure and explanation of the warning notes

3.4.1 Structure of the warning notes

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

3.4.2 Explanation of the warning notes

⚠ 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.

3.5 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.
- Ensure cleanliness throughout the application.
- Keep this document and other documentation supplied with the product.
- Make sure your workplace is dry as well as adequately lit and ventilated.
- Only place the training model on a stable and level surface.
- Ensure that the compressed air lines are connected safely and correctly.
- Ensure that all the training model's connecting cables are laid in such a way that there is no risk of people tripping over them.
- Apply the brakes on the swivel castors to prevent the training model from rolling away. Only release the brakes if the training model is to be moved. If the training model moves uncontrolled, these castors can cause crushing.
- Keep hands and fingers away from all moving parts (e.g. lifting axle, chassis, brake cylinder) of the training model when operating.
- Always keep loose-fitting clothing, long, open hair, necklaces and limbs away from the moving parts of the training model as they can be pulled in.
- Use the training model indoors only.
- Do not make any changes to the training model as this will invalidate the warranty.
- Repairs may only be carried out by authorised personnel of the manufacturer or by authorised personnel of WABCO.

3.6 Personal protective equipment

- Wear personal protective equipment to prevent injury:
  - Safety boots
  - Safety goggles
  - Ear protectors

4 Introduction

The trailer training model is a scaled-down model of a 3-axle semitrailer that serves to impart knowledge about, amongst other things, WABCO's braking and air suspension systems.

The training model is equipped with the following systems/components:

- Braking system Trailer EBS E (Generation 5) with ABS configuration (4S/3M)
- Electronically controlled air suspension system ECAS
- TailGUARD™ reverse monitoring system
- Immobilizer
- Electronic Extension Module
- Park release emergency valve (PREV)
- Lifting axle control valve
- External remote control unit:
  - Trailer Remote Control
  - SmartBoard
  - OptiLink™

WABCO braking system Trailer EBS E

The braking system Trailer EBS E (TEBS E) is an electronically controlled braking system with load-dependent braking pressure control, automatic anti-locking system (ABS) and electronic stability control (RSS).

TEBS E controls and monitors all available functions in the training model.

> i You can find detailed information on the Trailer EBS E System here:
> http://www.wabco.info/i/1371

5 Technical description

5.1 Scope of supply

The scope of supply includes:

- training model on a trolley
- external power supply

> i Accessories such as cable or diagnostic cases are not part of the scope of supply and must be ordered separately.

5.2 Technical data

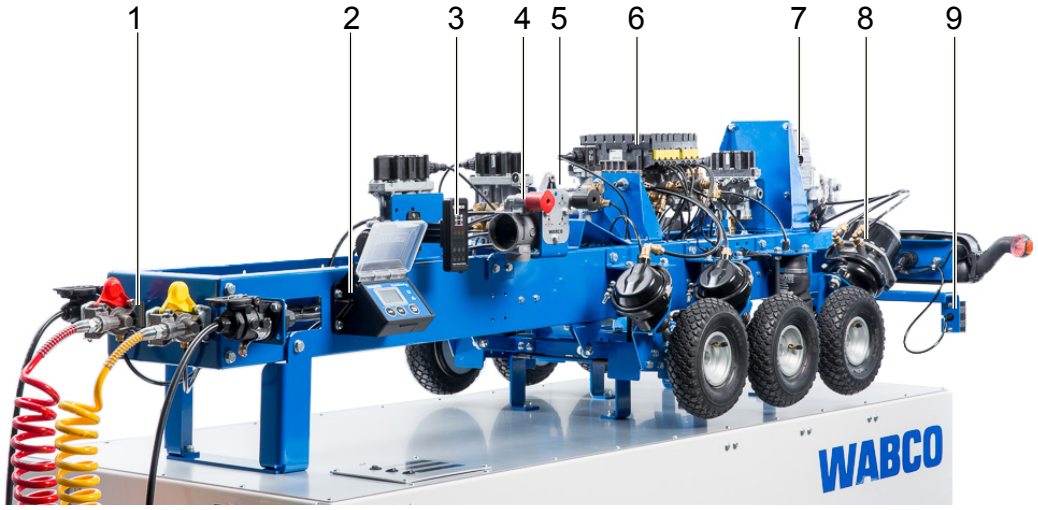
WABCO part number	300 000 002 0
Weight	308.5 kg
Substructure dimensions (L x W x H)	220 cm x 85.5 cm x 70 cm
Dimensions of substructure and trailer without coupling heads and rear outline marker lamps (L x W x H)	220 cm x 85.5 cm x 131.5 cm
Dimensions of substructure and trailer with coupling heads and rear outline marker lamps (L x W x H)	238 cm x 130 cm x 131.5 cm
Mains connection (via separate power supply unit)	230 V, 50 Hz
Compressed air supply	plug nipple NW 7.2
Permissible ambient temperature	0 °C to 35 °C
Max. permissible humidity	80 %

5.3 Overview graphics

5.3.1 Structure

The trailer training model consists of the substructure and the trailer training model. The substructure has four swivel castors, which allow easy movement of the training model. Each swivel castor has a locking mechanism that secures the training model against unintentional rolling away.

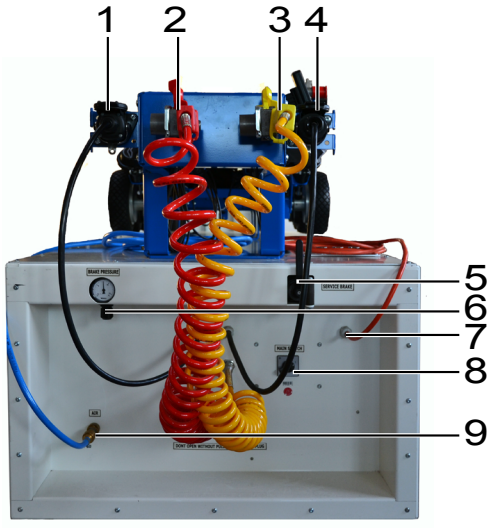
The substructure contains two air tanks with a capacity of 30 l each and a 3-way stopcock instead of a brake valve. The substructure also contains two pressure reducing valves with pressure gauges to reduce the external pressure to a maximum of 8.5 bar. This pressure reduction prevents damage caused by excess pressure on the TEBS E modulator.



Position no.	Element
1	Coupling heads/ISO connections
2	SmartBoard
3	Trailer Remote Control
4	Park release emergency valve (PREV)
5	OptiLink ECU
6	TEBS E
7	Electronic Extension Module
8	Tristop brake cylinder
9	TailGUARD

5.3.2 Connections and operating elements on the training model

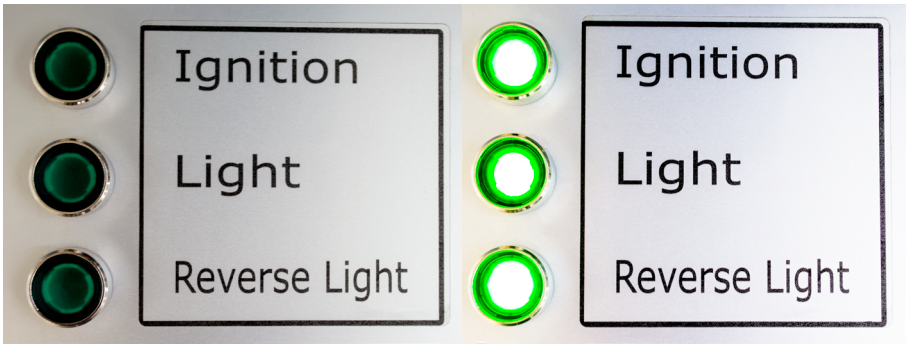
The following connections and operating elements are located on the side of the substructure and trailer.



Position no.	Element	Description
1	Connection ISO 7638, 7-pin	Transmission of CAN signals
2	Coupling head red	Supply with supply pressure
3	Coupling head yellow	Supply with control pressure
4	Connection ISO 12098, 15-pin	Transmission of light signals
5	Brake lever	Actuating/releasing the brake
6	Pressure limiter with pressure gauge	Setting and controlling the control pressure
7	Power supply	Connection for power supply via included power supply unit
8	Rotary switch	On/off rotary switch for main power supply
9	External compressed air supply	Connection for external compressed air supply via NW 7.2 plug nipple

Technical description

Three buttons are provided on the substructure for operating the training model. If the buttons light up, the functions are active.



Switch	Function
Ignition	Switches the training model to operating mode
Light	Switches on rear area lighting and rear outline marker lamps
Reverse Light	Switches the TEBS E into reverse gear and activates the integrated reverse monitoring system TailGUARD

5.4 Installed systems/components

This section briefly describes the systems/components installed on the training model.

> Further information on the installed systems can be found here:
> http://www.wabco.info/i/1365

Element	Description
TEBS E5	• Main component of the trailer training model • Electronically controlled braking system • Features load-dependent braking pressure control, anti-lock braking system (ABS) and electronic stability control (RSS) • ABS configuration 4S/3M (4 sensors/3 modulators)
ECAS	Electronically controlled air suspension
Electronic Extension Module	Enables the following function extensions in connection with TEBS E: • TailGUARD • Connection to ISO 12098 • ECAS 2-point control • Battery supply and battery charging • Terminal extensions • Control of the trailer from the driver's cabin by means of the Trailer Remote Control
TailGUARD	• Electronic reverse monitoring system • Monitors the rear of the vehicle over the entire width of the vehicle using 3 ultrasonic sensors
Lifting axle	Liftable and lowerable axle
Park release emergency valve (PREV)	• Combines the functions of the trailer brake valve and the double release valve in one • Includes emergency brake function
Immobilizer	• Electronic locking system for trailers • Blocks the wheels of a parked trailer, thus securing it against theft or unauthorised use • Locking/unlocking the trailer brake via PIN
Rear lighting with rear outline marker lamps	• Fully functional rear area lighting with rear outline marker lamp • Used for the reverse monitoring system with TailGUARD

5.5 External remote control units

External remote control units include:

- SmartBoard
- Trailer Remote Control
- OptiLink app

> To use all functions of the external remote control units, the following must be ensured:
> - Compressed air supply and power supply are established
> - Ignition is on

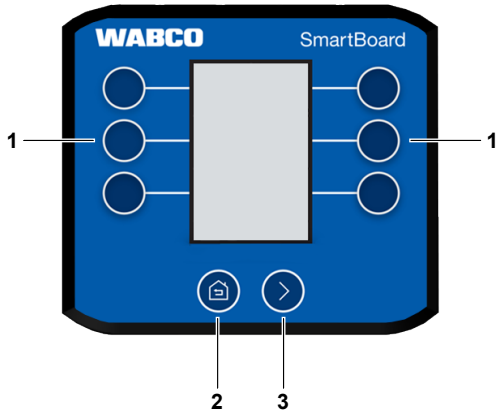
5.5.1 SmartBoard

The SmartBoard is a display and control panel and is used to monitor and control numerous trailer functions. The SmartBoard is connected to TEBS E and displays the data transmitted by TEBS E.

The functional scope of the SmartBoard depends on the components installed on the vehicle. The SmartBoard automatically recognises the installed components and displays the corresponding functions in the menu.

> You can find detailed information about the SmartBoard here:
> http://www.wabco.info/i/1646

The SmartBoard functions are accessed via icons in the main menu. Navigation in the menus is via eight buttons as standard:



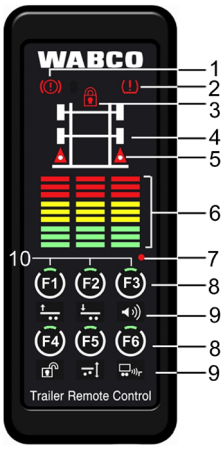
Position no.	Element
1	**Function buttons:** selection and/or execution of the adjacent function
2	**Home button:** one menu level back or save settings
3	**Next button:** selecting the next menu item or next page in the menu

5.5.2 Trailer Remote Control

The Trailer Remote Control is a display and operating console and is mounted in the driver's cab of the towing vehicle. The driver can use the Trailer Remote Control to control and display functions.

The Trailer Remote Control only provides functions that have been parameterised in the TEBS E modulator of the trailer vehicle via the TEBS E Diagnostic Software. In the trailer training model, the Trailer Remote Control is mounted on the frame of the trailer.

Trailer Remote Control user interface



Position no.	Element
1	Warning indicator for brake lining
2	Warning indicator for tire pressure
3	LED for the Immobilizer
4	Trailer symbol
5	LEDs for the reverse gear
6	LED rows for TailGUARD
7	Button press confirmation
8	Configurable buttons for activating/deactivating functions
9	Changeable symbols depending on button programming
10	Activation confirmation for the function, with green illumination of the upper part of the ring

> **i** Please note that due to the configuration of the training model not all functions of the Trailer Remote Control may be available.

5.5.3 OptiLink app

OptiLink is a free application (app) for mobile devices which, in conjunction with the OptiLink ECU, enables the functions of the trailer vehicle to be controlled. The app provides easy access to the functions of the TEBS E.

The OptiLink ECU and the mobile device (smartphone) communicate via WLAN. To send control commands to the trailer vehicle, an additional authentication (pairing) is required in which the

Technical description

OptiLink ECU of a trailer vehicle is coupled with a specific mobile device. This authentication (pairing) ensures that only commands are sent to a trailer.

To use the OptiLink app with the OptiLink ECU installed on the training model, the following steps must be carried out.

> i For detailed information on performing the necessary steps and operating the OptiLink app, refer to the OptiLink User's Guide at:
> http://www.wabco.info/i/1300

Required steps

Requirements:

1. Switch on the main power supply to the training model.
2. Switch on the ignition.
3. Install the OptiLink app on your mobile device.
4. Connect your mobile device to the WLAN of the training model.
5. Carry out authentication (pairing) between the training model and the OptiLink app on your mobile device.

The ability to control trailer functions via the OptiLink App depends on the equipment of the trailer. Accordingly, only the available functions are displayed in the OptiLink app for the training model.

6 Setting up

1. Remove the packaging.

NOTICE

Damage to the training model

The training model can be damaged if transported with a forklift without the protection of the original packaging.

- Only transport the training model with the forklift if it is still in its original packaging.

⚠ CAUTION

Crushing hazard for feet

If the training model moves uncontrollably, your feet can be crushed by the castors.

- Apply the brakes on the swivel castors to prevent rolling away.

2. Move the training model to the desired location.
   - Only move the training model using the swivel castors attached to the substructure.
3. Operate the locking mechanism of the swivel castors.
4. Mount the rear outline marker lamps with the 2 screws at the rear of the training model.
   - The training model can now be put into operation.

7 Start-up

Once the training model has been placed in the desired location, follow the steps below to prepare the training model for use.

7.1 Establishing the compressed air supply

To be able to use the full functionality of the training model, the training model must be supplied with external compressed air. For this purpose there is a connection for compressed air (NW 7.2) on the side of the substructure.

> i For faultless operation the set pressure should be between 7 and 8 bar.
>
> To prevent damage to the training model by excessive external pressure, a pressure limiter is built into the training model. Pressures > 8.5 bar are throttled by the pressure limiter.

- Connect the compressed air line of the compressor to the **Air** connection on the side of the substructure.
- Operate the pressure limiter integrated in the training model on the side of the substructure to pre-set the pressure controlled via the yellow control line.

Two pressure relief valves are installed in the training model so that the training model cannot be destroyed by too much pressure from the in-house system.

To initiate braking, a pressure regulator is located on the outside of the training model.

7.2 Connecting the coupling heads

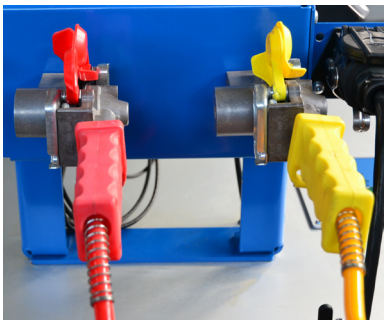
NOTICE

Damage to the training model

If dirt gets into the interior of the training model via the compressed air connections, damage, faults or malfunctions can result.

- Cover the compressed air connections with the dust flaps when the coupling heads are not connected.

1. Pay attention to the correct sequence when connecting and disconnecting the coupling heads.



2. First connect the brake line (yellow coupling head).
3. Then connect the supply line (red coupling head).
4. Make sure that no escape of compressed air can be heard.

7.3 Establishing the electrical connections

1. Connect the 7-pin ISO 7638 connector to the 7-pin connection on the training model.

   The 7-pin connection is located on the left-hand side in the direction of travel.
2. Fasten the connector via the integrated clamping mechanism.
3. Connect the 15-pin ISO 12098 connector to the 15-pin connection on the training model.

   The 15-pin connection is located on the right-hand side in the direction of travel.
4. Fasten the connector via the integrated clamping mechanism.

7.4 Preparing the reverse monitoring system

The two outer sensors of the reverse monitoring system are mounted on an extendable rail for space reasons. To ensure the full functionality of the reverse monitoring system, there must be a distance of at least 1.6 m between the outer sensors.

NOTICE

Damage to the cable

When pulling out the sensors, the cables can become tangled and pinched.

- Be careful not to damage the cables when pulling them out.

- Pull out the two outer sensors by hand to the left and right as far as they will go.

7.5 Establishing the power supply

To be able to use all the electrical functions of the training model, the training model must be connected to a power supply.

The power supply required by the training model can be found in the technical data.

➲*See: chapter "5.2 Technical data", page 10*

The training model is powered by an external power supply unit and is only live when switched on (24 V). A CE-certified power supply unit, which ensures the power supply with low voltage, is part of the scope of delivery.

NOTICE

Damage to the power supply unit

Do not switch on the mains unit immediately if it has been moved from a cold to a warm room. The temperature difference can cause condensation to form and possibly damage or destroy the power supply unit.

- Wait until the power supply unit has warmed up to room temperature before switching it on.

1. Check the power cable for visible damage before performing the following steps.
2. Connect the power cable of the training model to the power supply unit via the two connectors.

   - Insert the plus plug into the left-hand, red connector.
   - Insert the minus plug into the right-hand, blue connector.
3. Insert the connector of the power supply unit into a socket.
4. Switch on the power supply unit.

On the side of the substructure there is a rotary **Main Switch** for switching on the power supply.

5. Turn the rotary **Main Switch** to position 1.
   - The power supply is on.

7.6 Switching on the ignition

⚠ CAUTION

Risk of crushing fingers and hands

When the ignition of the training model is switched on, the level of the training model may change and the lifting axle may move.

- Keep fingers and hands away from the moving parts of the training model.

- Press the **Ignition** button.

↳ The ignition is switched on.

i Each time the ignition is switched on, an automatic test sequence is initiated by the TEBS E modulator. During this test sequence, all solenoid valves installed in the system are actuated and switched once and the air suspension is recalibrated.

During the test sequence, characteristic clicking noises can be heard on the training model due to the switching of the solenoid valves.

Run the automatic test sequence.

You will hear a beep and crackle as the sequence goes through.

↳ When the sounds stop, the test sequence has run through and the training model is ready for operation.

7.7 Initial start-up of TEBS E

WABCO offers TEBS E as a universal system that must be adapted to the respective vehicle type during start-up based on vehicle parameters. TEBS E cannot function without such a configuration.

When the training model is delivered, TEBS E is parameterised with an implausible standard parameter set for safety reasons. Before using the training model for the first time, a one-off start-up of TEBS E via the WABCO Diagnostic Software must be carried out. During start-up, the parameters for the components installed on the training model are set.

i Information on the installation and activation of the Diagnostic Software as well as the required hardware can be found here:

➲*See: chapter "9 Diagnosis and parameter setting", page 36*

i A TEBS E system training is required in order to obtain a PIN/PIN2 for parameterisation or creation of a parameter set.

You can find more information here:

➲*See: chapter "9 Diagnosis and parameter setting", page 36*

Start-up

Carrying out the initial start-up

1. Connect the PC or laptop on which the Diagnostic Software is installed to the training model via a Diagnostic Interface.
2. Switch on the ignition of the training model.
3. Start the Diagnostic Software.
4. Select the menu item **Start-up**.
5. Start the parameter setting.

There are two options for parameterising the training model:

- Loading an encrypted parameter set into the ECU
- Manual parameterisation (creation of your own parameter set)

After starting the start-up procedure, a menu can be used to select which steps are to be carried out. Some steps are mandatory and cannot be deselected.

Required steps:

- Parameter setting
- EBS pressure test
- Redundancy test
- ABS sensor assignment
- Test of warning lamp control

Optional:

- Testing the CAN lines

Only after a fully completed and successful start-up can all functions of the training model be used.

8 Functions and operation

> To use the functions of the training model, first carry out the following steps. You can find the relevant information here:
>
> 1. Start-up
>
> ➲*See: Start-up: chapter "7.2 Start-up", page 18*
>
> 2. Switching on the ignition
>
> ➲*See: Switch on the ignition: chapter "7.3 Switching on the ignition", page 21*
>
> 3. Parameterisation of TEBS E (only required for initial start-up)
>
> ➲*See: chapter "7.7 Initial start-up of TEBS E", page 23*

The versatile functions of a modern trailer can be demonstrated on the training model.

The training model has the following functions:

- ECAS air suspension including liftable and lowerable lifting axle
- Brakes
- Immobilizer
- Lighting
- TailGUARD reverse monitoring system
- Park release emergency valve (PREV)
- External remote control unit:
  - SmartBoard
  - Trailer Remote Control
  - OptiLink

8.1 Functions without external remote control units

Some of the functions of the training model are operated without the external remote control units.

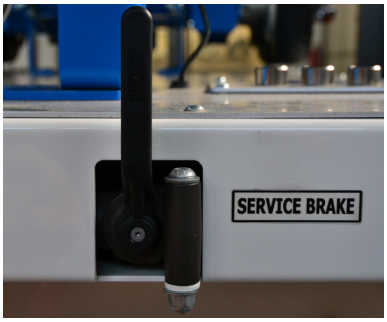
These include:

- Brake
- Lighting
- TailGUARD reverse monitoring system
- Park-release emergency valve

8.1.1 Brake

The brake of the trailer can be applied or released.

In the starting position the lever for activating the trailer brake points upwards and the brakes on each axle are released.



Apply and release the brake

⚠ CAUTION

Risk of crushing fingers and hands

When the ignition of the training model is switched on, the level of the training model may change and the lifting axle may move.

- Keep fingers and hands away from the moving parts of the training model.

- Turn the brake lever to the left to operate the brake.
  - The trailer brake is activated and all axles are braked.
- Turn the brake lever upwards to release the brake.
  - The brake is released.

i If necessary, an adapter (coupling head with pressure control valve) from the WABCO test kit for air brake systems (435 002 007 0) can be used to control the applied braking pressure.

TEBS E standstill function

TEBS E has an integrated standstill function. The standstill function serves to avoid unnecessary power consumption when the vehicle is parked with the parking brake engaged and the ignition switched on. When the vehicle is at a standstill, the system switches from electro-pneumatic to pneumatic pressure control after 5 seconds.

The standstill function is also active in the training model.

TEBS E emergency brake function

TEBS E has an integrated emergency brake function. The emergency brake function is used to apply the maximum possible braking force.

If the driver's braking request (electric or pneumatic) is more than 90 % of the available supply pressure or > 6.4 bar, i.e. panic braking, the braking pressures are increased up to the available supply pressure. This function is also effective if a bellows of the air suspension system should burst.

TEBS E test mode

TEBS E has an integrated test mode that is used to check the braking pressure distribution during vehicle standstill.

The automatic load-dependent braking force control can be checked in this test mode depending on the coupling head pressure and the current axle load or the current bellows pressure. The standstill function and the emergency brake function are deactivated for test purposes.

Simulation start

- Switch on the ignition with the control line vented (service brake system and parking brake system not actuated) to switch the electronic braking system to test mode.

Simulation by diagnosis

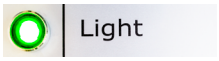
With the TEBS E diagnostic software you can simulate this safety function via the Control menu.

8.1.2 Lighting

The training model has fully functional rear area lighting with rear outline marker lamps. When the TailGUARD reverse monitoring system is used, rear outline marker lamps indicate the distance to any obstacles in the rear of the vehicle.

- Press the **Light** button on the control panel of the training model.

↳ The lighting is switched on.



8.1.3 TailGUARD reverse monitoring system

The reverse monitoring system TailGUARD uses ultrasonic sensors to detect objects that are outside the driver's field of vision behind the trailer. The detection takes place over the entire width of the vehicle. This prevents damage to the vehicle, loading ramps and cargo.

TailGUARD is controlled via the Electronic Extension Module.

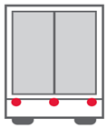
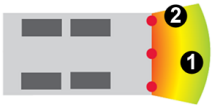
TailGUARD is activated by engaging the reverse gear of the vehicle. When activated, the rear outline marker lamps on the trailer are activated by the Electronic Extension Module and flash. The driver sees the rear outline marker lamps in the rear-view mirror. The flashing frequency of the rear outline marker lamps increases as the distance between the vehicle and an object decreases.

If the value falls below the parameterised stopping distance, the vehicle is braked for three seconds and then the brake is released again. The stopping distance can be set in the Diagnostic Software.

The distance information determined by TailGUARD can also be displayed as coloured bars via the external remote control unit Trailer Remote Control.

Functions and operation

System configuration

Features	TailGuard
Number of ultrasonic sensors (red dot = sensor)	3x 
Area covered by sensors (top view of the vehicle)	Complete rear of the vehicle is covered by sensors. 1 and 2 indicate objects behind the vehicle. 
Area accessed by sensors (side view)	
Sensitivity of sensors	Big moving objects are detected independent of one another and displayed.
Display via Trailer Remote Control (if parameterised in TEBS E): Each bar represents a distance of 50 cm. Red: 0 to 150 cm Yellow: 150 to 300 cm Green: 300 to 450 cm In close proximity (red LEDs) the following also applies: Each LED has two states, constant and flashing. This indicates the distance with a precision of 25 cm.	

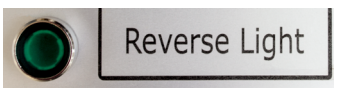
Use of TailGUARD on the training model

Requirement

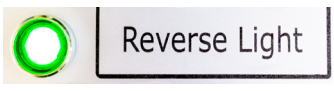
To use TailGUARD, the rear outline marker lamps must be fitted and the two outer ultrasonic sensors must be extended.

➲*See: chapter "7.4 Preparing the reverse monitoring system", page 21*

- Press the **Reverse Light** switch on the control panel of the training model to put TEBS E in reverse gear.



↳ TailGUARD is activated.



↳ The rear outline marker lamps are activated and flash.

- Move a person or object into the detection range of the ultrasonic sensors on the training model.
  - The flashing frequency of the rear outline marker lamps increases the closer the person or object is to the ultrasonic sensors.
  - If the value falls below the parameterised stopping distance, the training model automatically brakes audibly for three seconds and then releases the brake again.

8.1.4 Park release emergency valve (PREV)

The park release emergency valve fulfils the functions of emergency braking in the event of a break in the pneumatic supply line and the function of the double release valve.

With the black actuation button (release button of the service brake system), the service brake can be released manually after automatic braking with the vehicle parked without compressed air supply, if sufficient supply pressure is available in the air reservoir.

With the red actuation button (actuation of the parking brake system) the parking brake can be applied or released by venting the spring chambers.

Using the park release emergency valve on the training model

The PREV has a red button to operate the parking brake and another black button to release the service brake which is automatically applied when the trailer is uncoupled.

Red actuation button:

- Pull the red actuation button towards you.
  - The parking brake is engaged.
- Press the red actuation button.
  - The parking brake is released.

Black actuation button:

- Press the black actuation button.
  - The service brake is released.

8.2 Functions via external operating elements

The lifting axle, air suspension and Immobilizer functions of the training model are operated via the external operating elements. The following external operating elements are available on the trailer training model:

- SmartBoard
- Trailer Remote Control
- OptiLink app

> Details on how to use the external remote control units can be found here:
> ➲*See: chapter "5.5 External remote control units", page 15*

8.2.1 Lifting and lowering the lifting axle

The training model is equipped with a lifting axle that can be raised and lowered. This lifting axle can be used to demonstrate the functions and operation of a lifting axle. The lifting axle can be raised and lowered using the SmartBoard, Trailer Remote Control or the OptiLink app.

▸ Switch on the Ignition.

Operation via SmartBoard

1. Select the **Air Suspension** menu on the SmartBoard.
   ↳ Press the OK button on the SmartBoard.
2. Select the menu item **Lifting and lowering the lifting axle**.
   ↳ Press the OK button on the SmartBoard.

⚠ CAUTION

Risk of crushing fingers and hands

When lifting or lowering the lifting axle, fingers or hands can be trapped.

▸ Keep fingers and hands away from the lifting axle of the training model.

When the axle is lowered:

▸ Press the OK button on the SmartBoard to lift the axle.

When the axle is lifted:

▸ Press the → button on the SmartBoard to lower the axle.

Operation via Trailer Remote Control

⚠ CAUTION

Risk of crushing fingers and hands

When lifting or lowering the lifting axle, fingers or hands can be trapped.

- Keep fingers and hands away from the lifting axle of the training model.

When the axle is lifted:

- Touch the function button for more than 5 seconds (forced lowering) to lower the lifting axle.
- Touch the function button again to deactivate the forced lowering function again and to activate the lifting axle control (lifting the lifting axle depending on the load).

Operation via OptiLink app

1. Access the OptiLink app on your mobile device.
2. Tap on the icon **Lifting axle(s)** .

Alternatively, you can also select the desired function by wiping right/left in the sliding window in the upper part of the app.

⚠ CAUTION

Risk of crushing due to moving parts

When lifting or lowering the lifting axle, fingers or hands can be trapped.

- Keep fingers and hands away from the lifting axle of the training model.

- Raise or lower the lifting axle with the arrow buttons .

8.2.2 Lifting and lowering the air suspension (ECAS)

ECAS is an electronic level control for air-suspended trailers. For this purpose, displacement sensors record the distance between vehicle axle and vehicle body at certain intervals. ECAS uses the measured values of the displacement sensors to control the air suspension via solenoid valves.

The ECAS basic function is to compensate for level changes caused by a change in the load status or by new nominal value specifications (e.g. via the remote control unit). These control deviations cause a change in the distance between the vehicle axle and the vehicle body. ECAS balances these control deviations by means of level control.

In addition to controlling the driving level, ECAS also allows the control of enhanced functions via the external remote control units, such as the storage of different target levels (memory level function).

On the training model, the vehicle body can be lifted and lowered using the air suspension via the SmartBoard, the Trailer Remote Control or the OptiLink app.

Operation via SmartBoard

3. Select the **Air Suspension** menu on the SmartBoard.
   - Press the OK button on the SmartBoard.

4. Select the menu item **Lifting and Lowering** .
   ↳ Press the OK button on the SmartBoard.

⚠ CAUTION

Risk of crushing fingers and hands

Fingers or hands can be trapped when lifting or lowering the vehicle body.

- Keep fingers and hands away from the moving parts of the training model.

Lifting the vehicle body:

- Press the OK button to lift the vehicle body.

Lowering the vehicle body:

- Press and hold the → button to lower the vehicle body.

Stop lifting/lowering:

- Press the ⮌ button to exit the menu item.

Operation via Trailer Remote Control

The assignment of the buttons can be changed in the Diagnostic Software.

⚠ CAUTION

Risk of crushing fingers and hands

Fingers or hands can be trapped when lifting or lowering the vehicle body.

- Keep fingers and hands away from the moving parts of the training model.

Lifting the vehicle body:

- Touch the ⇧ button to lift the vehicle body.

Lowering the vehicle body:

- Touch the ⇩ button to lower the vehicle body.

Operation via OptiLink app

1. Access the OptiLink app on your mobile device.
2. Tap the icon **OptiLevel** .

Alternatively, you can also select the desired function by wiping right/left in the sliding window in the upper part of the app.

⚠ CAUTION

Risk of crushing fingers and hands

Fingers or hands can be trapped when lifting or lowering the vehicle body.

- Keep fingers and hands away from the moving parts of the training model.

- Lift or lower the vehicle body with the arrow buttons .
  - The vehicle body is lifted or lowered.
- Stop lifting or lowering by tapping the **Stop** button.

Using the **MORE OPTIONS** button in the app you can also select predefined levels.

8.2.3 Immobilizer

The Immobilizer is a function for towed vehicles to reduce the risk of theft. By means of a built-in pulse-controlled lifting axle valve, the wheels of a parked vehicle can be locked via the Tristop brake cylinders.

The function can also be used as an electric parking brake. The parked vehicle is thus secured against rolling away in case unauthorised persons intentionally or unintentionally press the red button on the park release emergency valve.

The Immobilizer can be activated or deactivated by entering a defined PIN via the SmartBoard, Trailer Remote Control or the OptiLink app.

The functions of the Immobilizer can be demonstrated on the training model.

Enabling and activating the Immobilizer function

To enable the Immobilizer function for the first time after parameterisation, the serial number of the TEBS E modulator and the PUK (Personal Unblocking Key) are required.

PUK

One PUK must be requested per activation procedure/vehicle. For this you need the serial number of the TEBS E modulator and an individual voucher code (1x per vehicle).

Purpose of the PUK

- Activating the Immobilizer function in the TEBS E modulator
- Setting/changing the user PIN
- Definition of a new PIN after incorrect entry

Serial number of the TEBS E Modulator

The 13-digit serial number of the TEBS E modulator (S/N) including check digit (last position) can be viewed as follows:

- SmartBoard
- EOL log
- System label

Requesting the PUK

1. Go to the following website: https://immobilizer.wabco-auto.com/immobilizer/
2. Register on the portal or log in.
3. Request your PUK by entering the serial number and other information.
   ↳ You will receive the PUK by e-mail.

Once you have received the PUK, you can enable the Immobilizer function via the Diagnostic Software, SmartBoard or OptiLink app. You can define your own PIN when you activate the account.

After activation, you can use the Immobilizer function.

Operation via SmartBoard

- On the SmartBoard, select the menu **Immobilizer** .
  ↳ Press the OK button on the SmartBoard.

Activating the Immobilizer:

- Use the OK button on the SmartBoard to select the numbers 0 ... 9.
- Press the → button to switch to the next digit position.
- Confirm the entry with the button ↩.
  ↳ The Immobilizer is activated.

Deactivating the Immobilizer

> i Before deactivating the Immobilizer, the parking brake (red button of the Park Release Safety Valve) of the trailer must be activated, if this has been parameterised.

- Use the OK button on the SmartBoard to select the numbers 0 ... 9.
- Press the → button to switch to the next digit position.
- Confirm the entry with the button ↩.
  ↳ The Immobilizer is deactivated.

Operation via Trailer Remote Control

When the Immobilizer is activated, all other functions of the Trailer Remote Control are deactivated. The Immobilizer icon on the Trailer Remote Control flashes.

- Activate the function by touching the button for the Immobilizer .

Activating/deactivating the Immobilizer

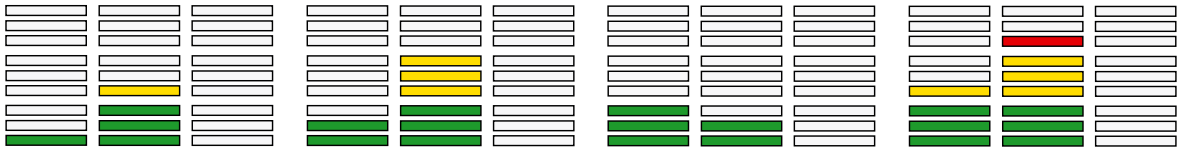
> i Before deactivating the Immobilizer, the parking brake (red button of the Park Release Safety Valve) of the trailer must be activated, if this has been parameterised.

- Touch the button for more than 2 seconds.
  ↳ The PIN entry screen is displayed.
  ↳ You will hear a beep to confirm.

The left LED row indicates which position of the PIN is changed. The value of the digit of the PIN is displayed in the middle row of LEDs and is set on the Trailer Remote Control using the F2 and F5 keys.

- Change the positions with the F1 key on the Trailer Remote Control.
- After successfully entering the PIN, press and hold the button for more than 2 seconds.
  - You will hear two long beeps to confirm.
  - The Immobilizer is activated/deactivated.

Example: PIN input 4627



1. PIN no. 4 **2. PIN no. 6** **3. PIN no. 2** **4. PIN no. 7**

Operation via OptiLink app

1. Access the OptiLink app on your mobile device.
2. Tap on the icon **Immobilizer**.

Alternatively, you can also select the desired function by wiping right/left in the sliding window in the upper part of the app.

Disable

- To disable, enter the PIN in the displayed fields using the keypad on your mobile device.
  - The Immobilizer is activated.
  - **DISABLED** is displayed under the icon **Immobilizer** on the start screen of the OptiLink app.

Enable

- To enable, enter the PIN in the displayed fields using the keypad on your mobile device.
  - The Immobilizer is deactivated.
  - **ENABLED** is displayed under the icon **Immobilizer** on the start screen of the OptiLink app.

9 Diagnosis and parameter setting

9.1 Introduction

The training model is fully diagnosable.

The WABCO Diagnostic Software for TEBS E is required for diagnosis and parameterisation of the training model. The Diagnostic Software offers numerous possibilities for carrying out diagnoses and demonstrating the parameterisation of the TEBS E braking system.

The Diagnostic Software provides numerous possibilities for carrying out diagnoses and demonstrating the parameterisation of the TEBS E braking system.

The graphic user interface of the Diagnostic Software is clearly structured and intuitive to operate. Extensive help is also available within the Diagnostic Software.

The diagnostic cable is connected to the EBS-ECU via the CAN data bus. To carry out a diagnosis, the Diagnostic Software must be installed on the connected laptop/PC.

9.2 System training and PIN

The diagnosis of the training model with the Diagnostic Software may be performed by any user.

> i For more information on WABCO Academy training courses, please visit:
> http://www.wabco-academy.com/

For start-up and parameterisation of TEBS E you need an authorisation in the form of a PIN. You will receive this PIN after completing a TEBS E system training.

After successful completion of the training, WABCO will send you a PIN and a personal user ID for the Diagnostic Software.

You can use this PIN to activate enhanced functions in the Diagnostic Software and thus carry out the start-up of the training model or change the parameter settings.

9.3 Hardware

The Diagnostic Software can run on any standard PC with a Windows operating system (Microsoft Windows 7 or higher).

There are no special requirements for the hardware. The PC must have a free USB port for the Diagnostic Interface however.

WABCO recommends the following hardware:

Hardware part number	Description
WABCO Laptop "Toughbook" 446 301 999 0 	• Suitable for the workshop: shock- and dirt-resistant • On request it can also be supplied with the Diagnostic Software already installed.
Diagnostic Interface Set 446 301 030 0 	• Diagnostic Interface 2 • USB connecting cable to PC/Notebook USB driver/Installation instructions: http://www.wabco.info/i/840
Diagnostic Interface Set 300 400 104 0 	• Diagnostic Interface 3 • USB connecting cable to PC/Notebook • Bluetooth and Wi-Fi ®

The vehicle connection on the Diagnostic Interface matches the connection for the Diagnostic Controller and earlier versions of the Diagnostic Interface, permitting the continued use of connecting cables used in the past.

Depending on which WABCO system you want to test, you will need appropriate connection cables. You can find an overview of the connection cables in our WABCO product catalogue under:
www.wabco-customercentre.com

The USB driver required to install the Diagnostic Interface is installed together with the WABCO Diagnostic Software.

You can still use the earlier versions of the Diagnostic Interface with serial connection (446 301 021 0) and USB interface (446 301 022 0).

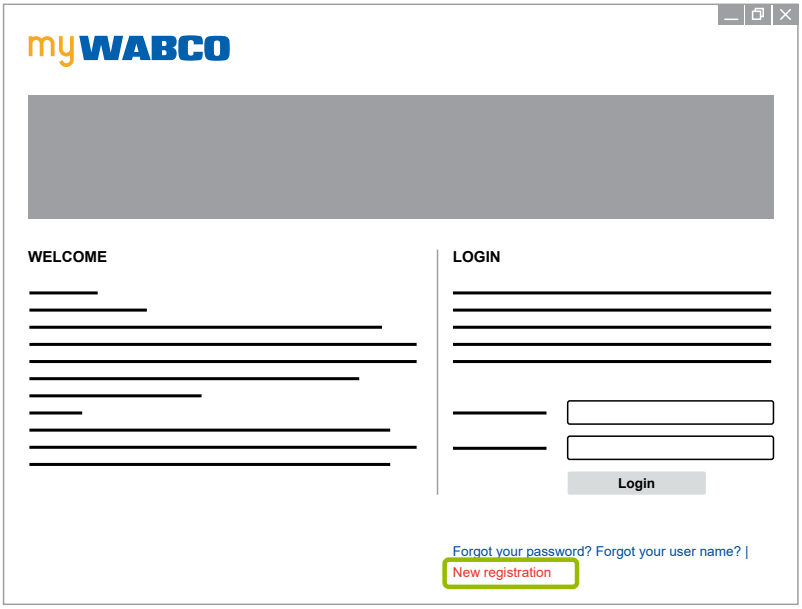
9.4 Installation and activation

Before use, the Diagnostic Software must be installed and activated.

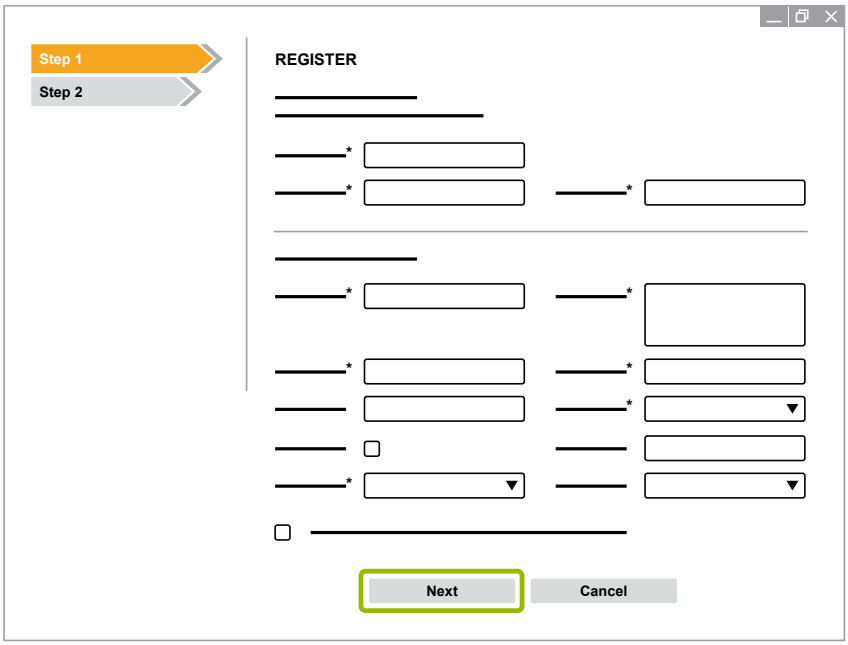
9.4.1 Registration at myWABCO

The first step is to register with myWABCO.

1. Enter the following link in your internet browser to access the myWABCO page: https://www.am.wabco-auto.com
2. Click on **New registration**.

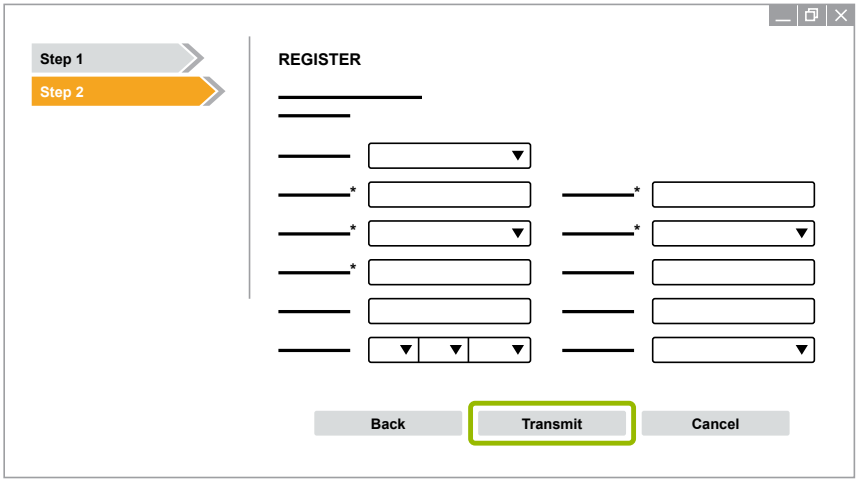


3. Fill in the required fields (marked with an asterisk *).
4. Click on **Next**.



5. Fill in the required fields (marked with an asterisk *).

6. Click on **Transmit**.
   ↳ You will promptly receive an e-mail to confirm your e-mail address.

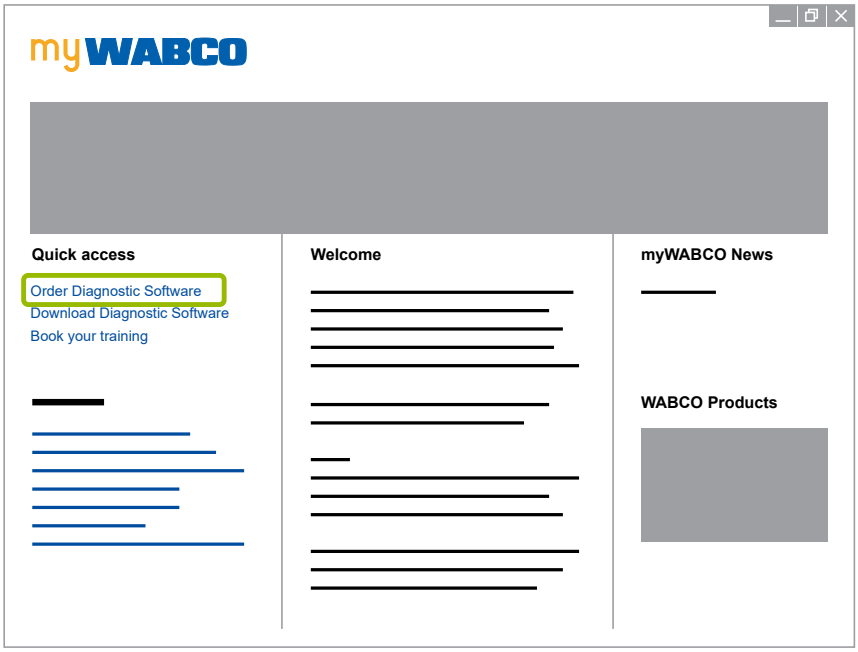


7. Click on the link in the confirmation e-mail to activate your account.
8. Log into your myWABCO account with your user name and password.
   ↳ You are now registered.

9.4.2 Ordering the Diagnostic Software

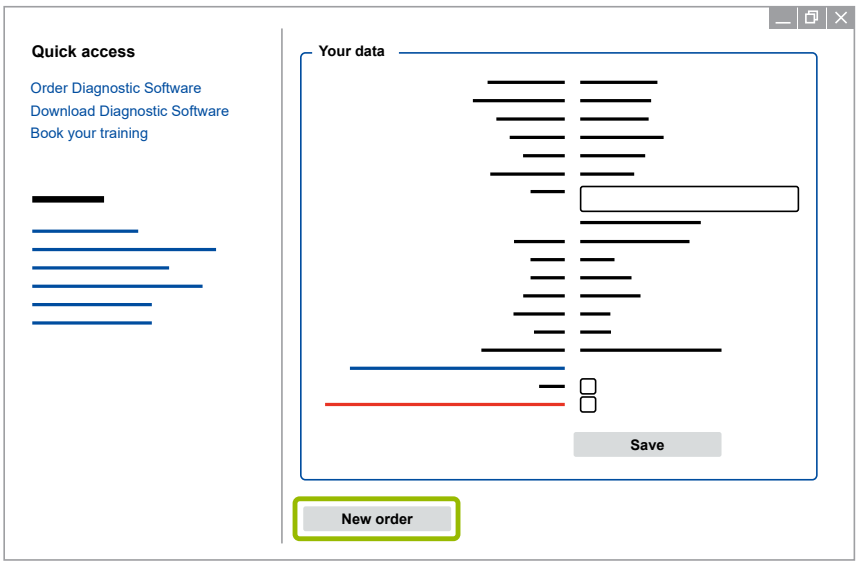
1. Login with your myWABCO account.
2. Click on **Order Diagnostic Software** in the **Quick Access** area.

> i If a security warning from your internet browser appears at this point, select the option to also display unsafe objects.

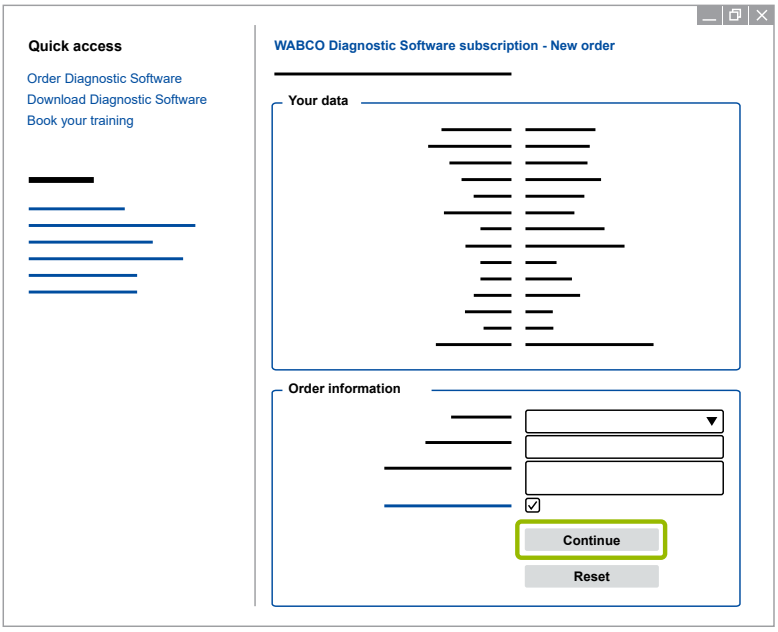


3. Enter your sales tax identification number (VAT-ID).

4. Click on **New order**.



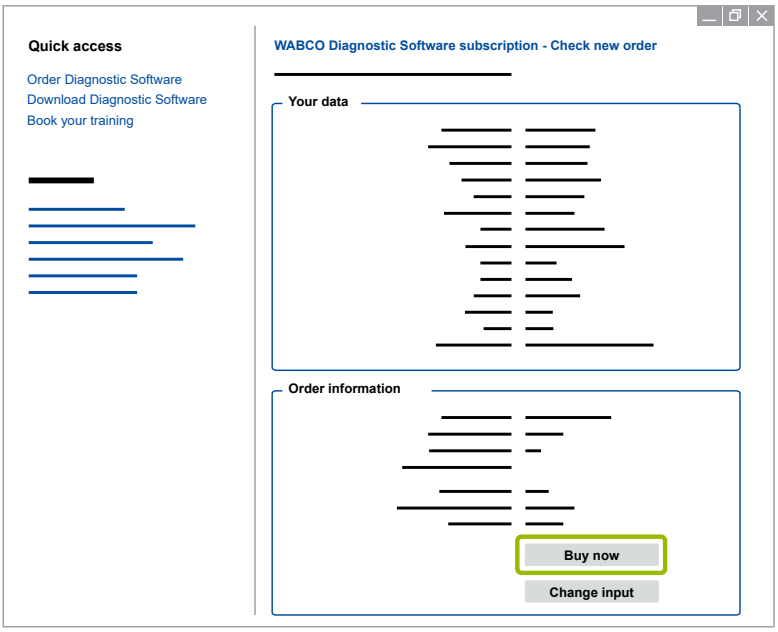
5. Enter your order data.
6. Confirm that you agree to the terms of use.
7. Click on **Continue**.



8. Check your data.

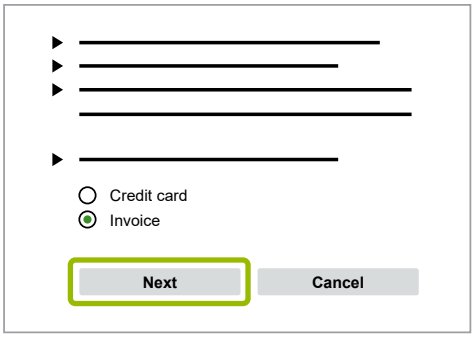
> If the data is incorrect, you can correct the data by clicking on **Change input**.

9. Click on **Buy now**.



Paying for the Diagnostic Software by invoice

1. Select **Invoice**.
2. Click on **Next**.



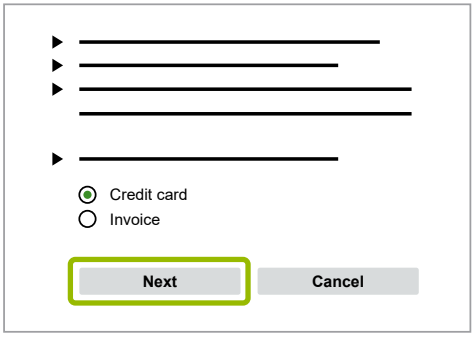
   ↳ You will receive an invoice by e-mail and by post.

   ↳ When we receive payment we will send you an e-mail as confirmation.

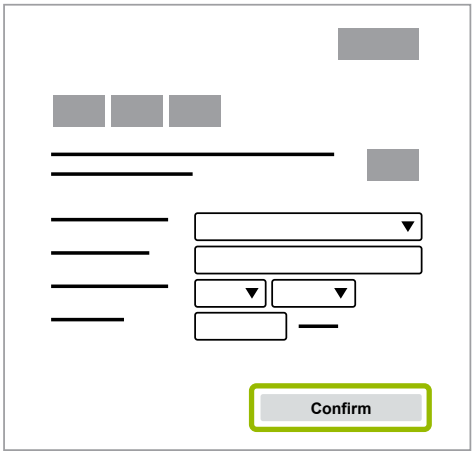
3. Log in to myWABCO.
4. Download the Diagnostic Software.

Paying for the Diagnostic Software by credit card

1. Select **Credit card**.
2. Click on **Next**.



3. Enter your credit card details.
4. Click on **Confirm**.

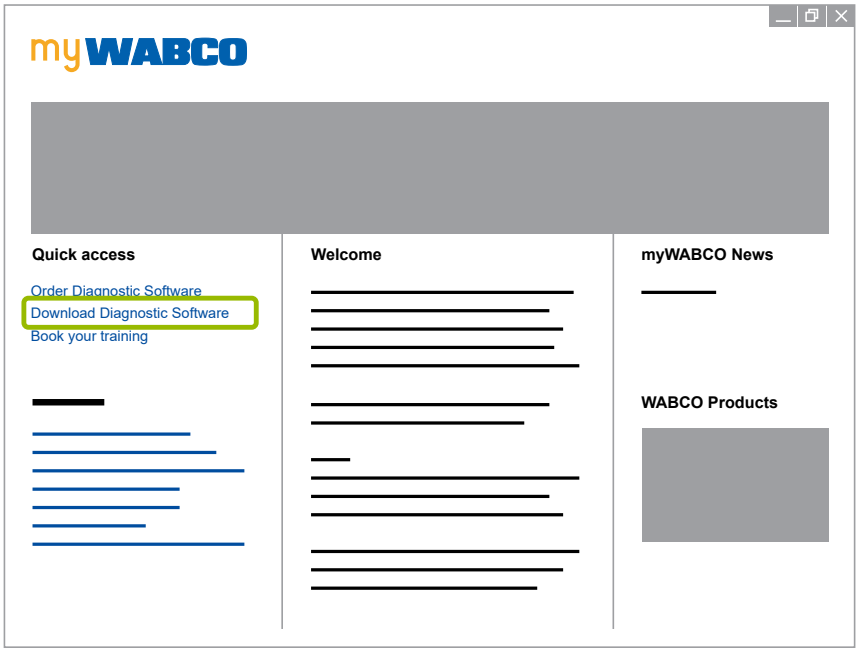


5. Download the Diagnostic Software.

9.4.3 Installing the Diagnostic Software

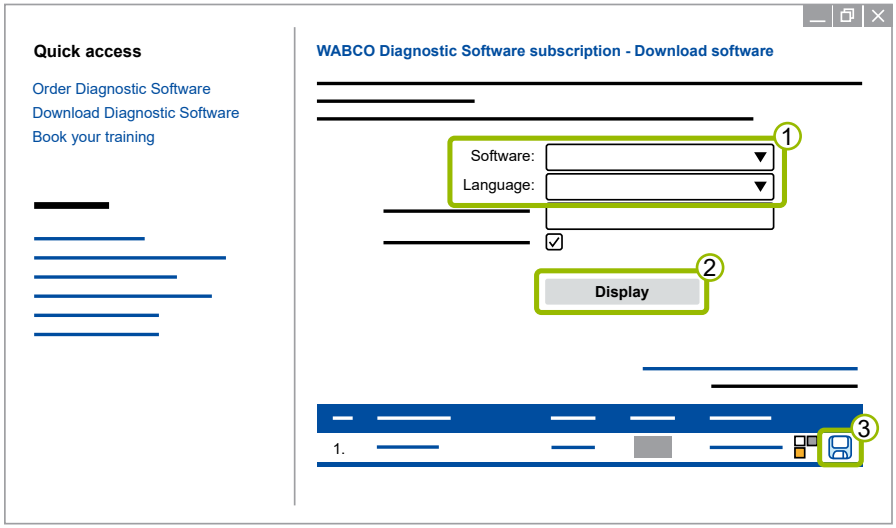
Downloading the Diagnostic Software

1. Enter the following link in your internet browser to access the myWABCO page: https://www.am.wabco-auto.com
2. Login with your myWABCO account.
3. Click on **Download Diagnostic Software**.



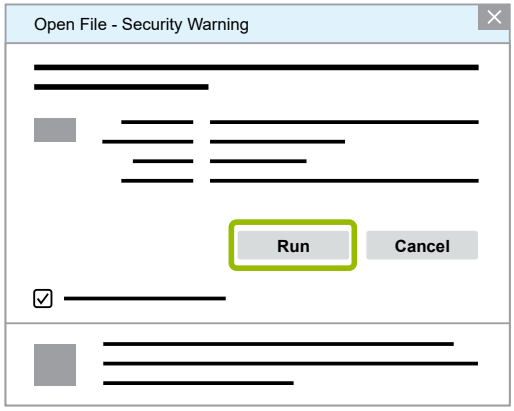
4. Select the **Software** and the **Language** ①.
5. Click on **Display** ②.
   ↳ The selected software is displayed.

6. Click on the **Download button** ③.
   ↳ The software will be downloaded.

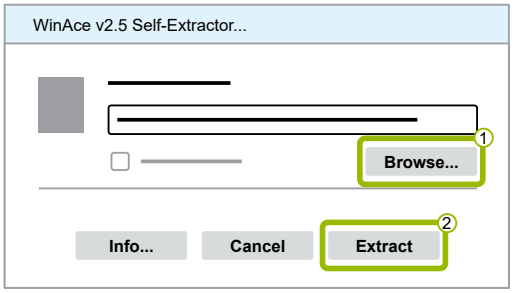


Installing the Diagnostic Software

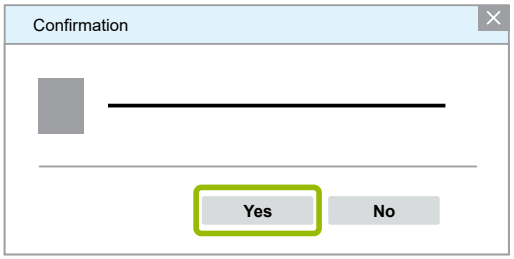
1. Double-click on the EXE file of the Diagnostic Software.
2. Accept the security warning by clicking on **Run**.



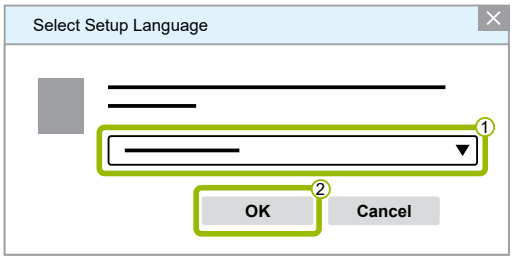
3. Click on **Browse...** ①.
4. Select a file path to extract the file.
5. Click on **Extract** ②.



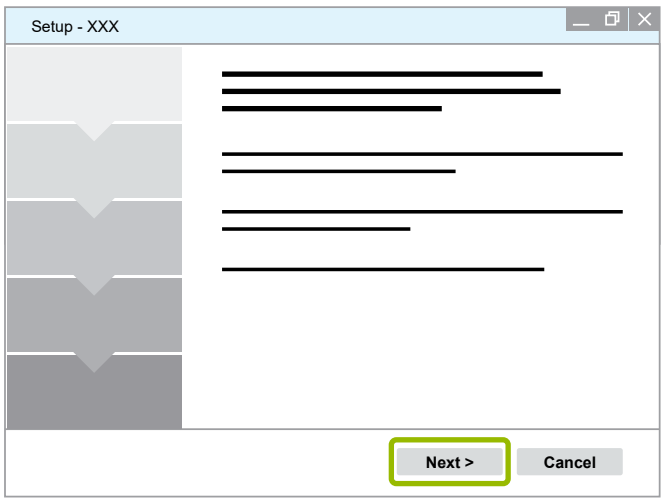
6. Click on **Yes** to start the installation.



7. Select the desired language in the language selection dialogue box ①.
8. Click on **OK** ②.



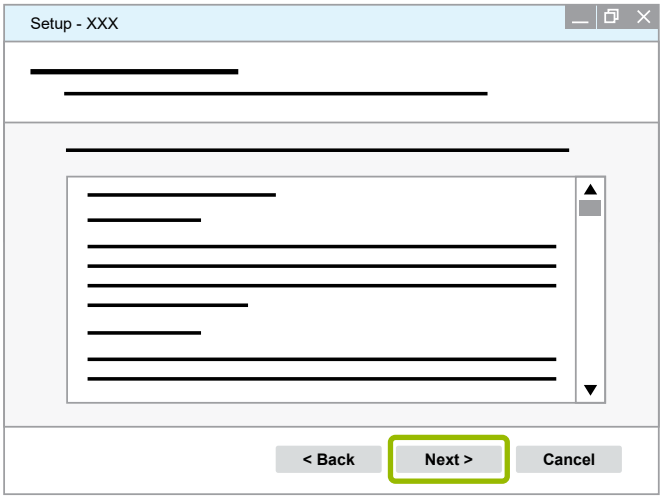
9. Click on **Next**.



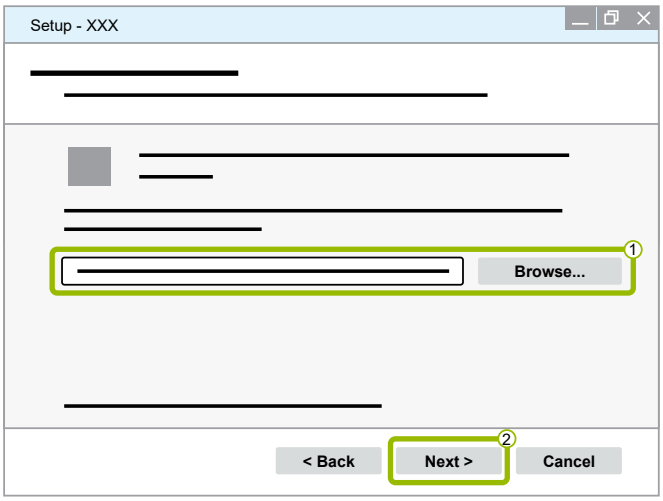
10. Accept the licence agreement ①.

11. Click on **Next** ②.

12. Read the important information.
13. Click on **Next**.

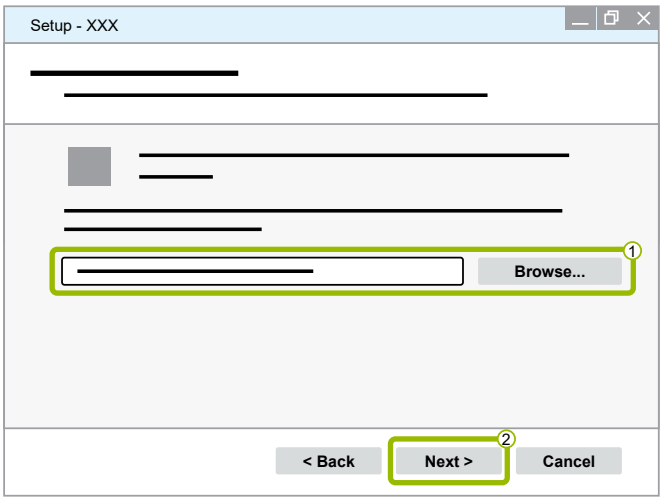


14. Select the destination folder for installation ①.
15. Click on **Next** ②.

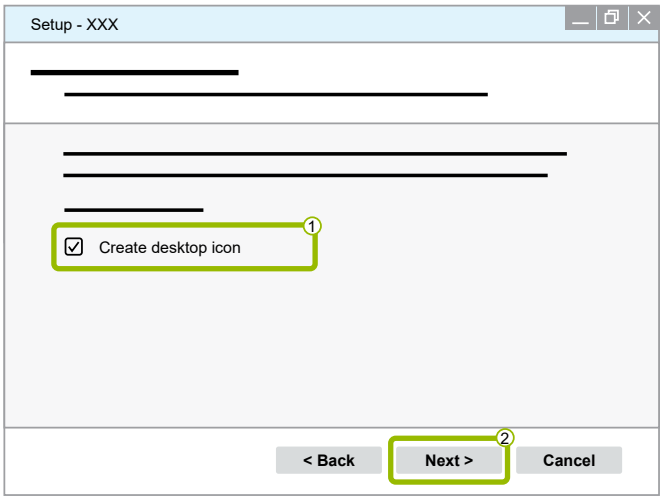


16. Select a folder in which the program shortcut is to be created ①.

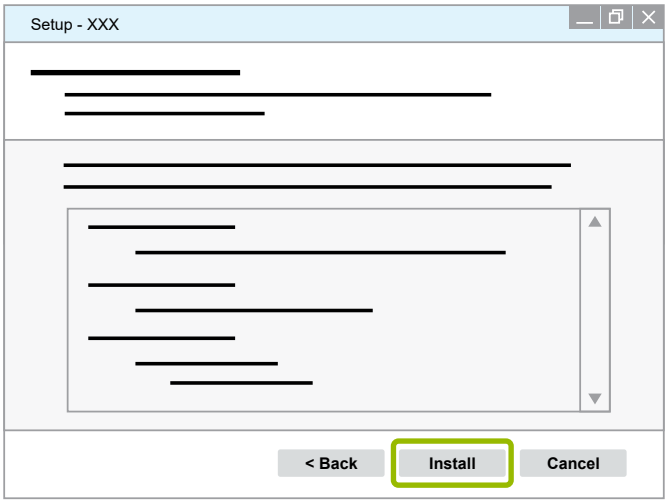
17. Click on **Next** ②.



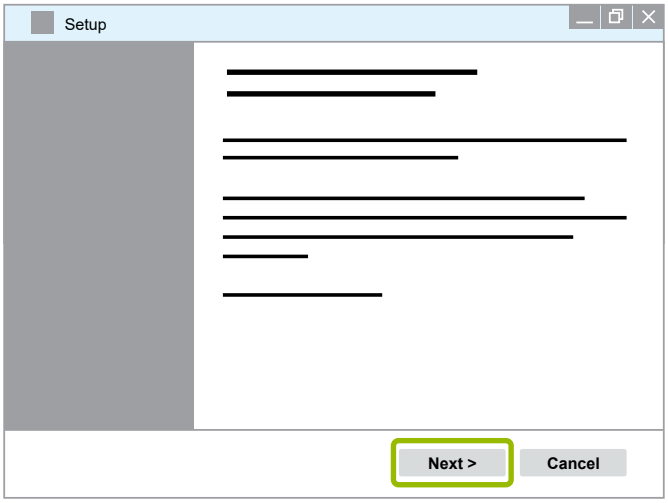
18. If you want to create a desktop icon, check **Create desktop icon** ①.
19. Click on **Next** ②.



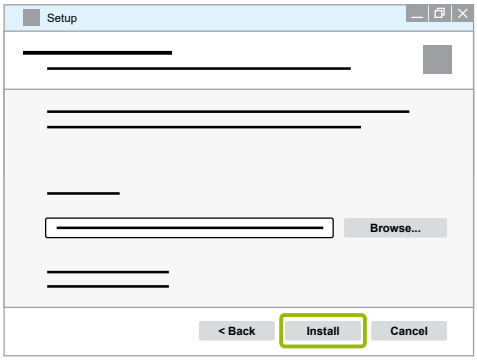
20. Click on **Install**.



21. Click on **Next**.

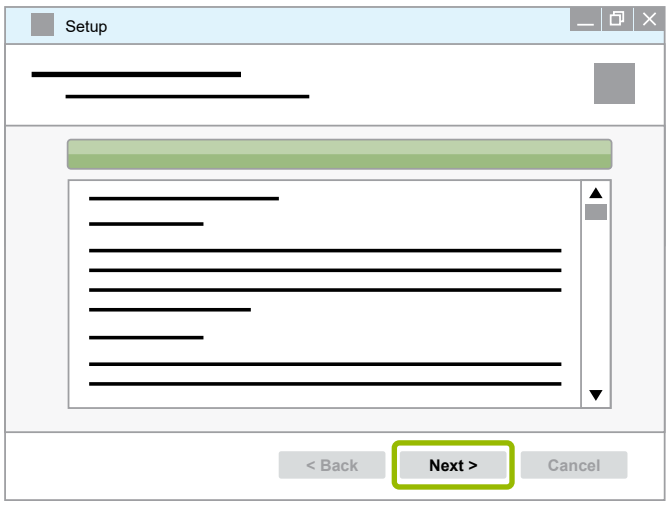


22. Click on **Install**.

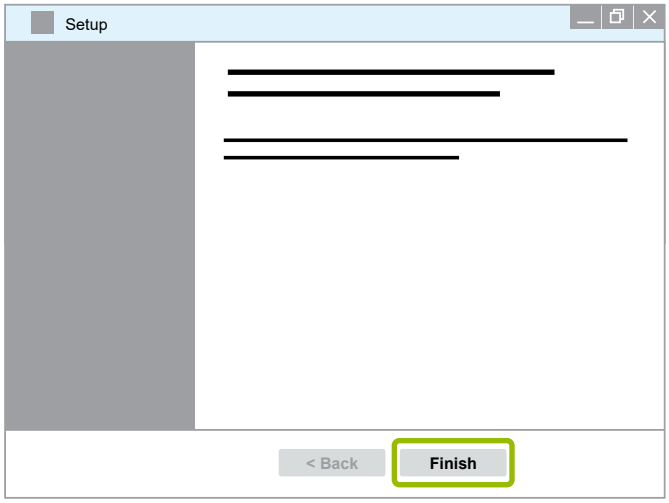


↳ The installation is executed.

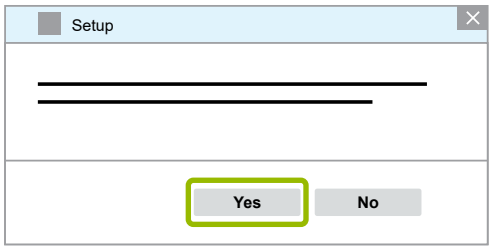
23. Click on **Next**.



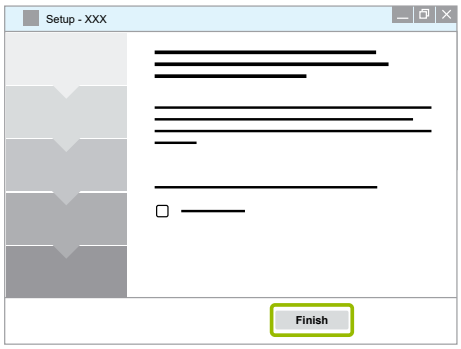
24. Click on **Finish**.



25. Click on **Yes**.



26. Click on **Finish**.



↳ The software is now installed.

9.4.4 Activating the Diagnostic Software

After installation and registration, you can test the Diagnostic Software for 10 days without restriction. After these 10 days have expired, you must activate the Diagnostic Software.

> i After activation, the licence of the Diagnostic Software is bound to a PC and the licence is used up.
>
> Therefore, only activate the Diagnostic Software on the PC or laptop on which you want to use the Diagnostic Software.

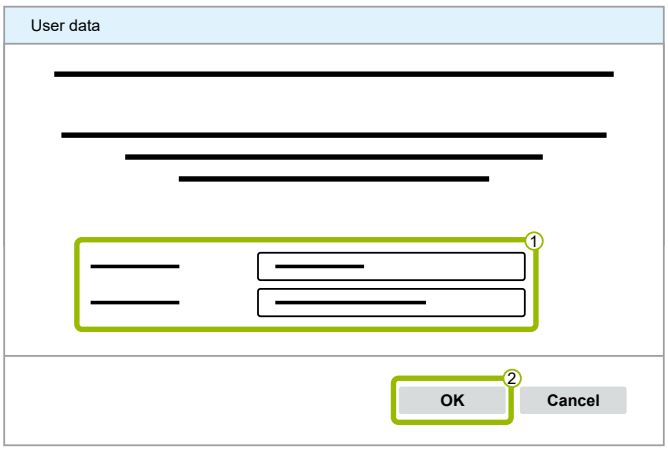
> i You can find more information about activating and registering the diagnostic software on the internet at:
> https://www.am.wabco-auto.com/amsso/user_manual/deusermanual.pdf

The following options are available for activating the Diagnostic Software:

- Activation via internet
- Activation with Activation@Web

Registering the Diagnostic Software

1. Start the Diagnostic Software.
2. Fill in the required user data ①.
3. Click on **OK** ②.

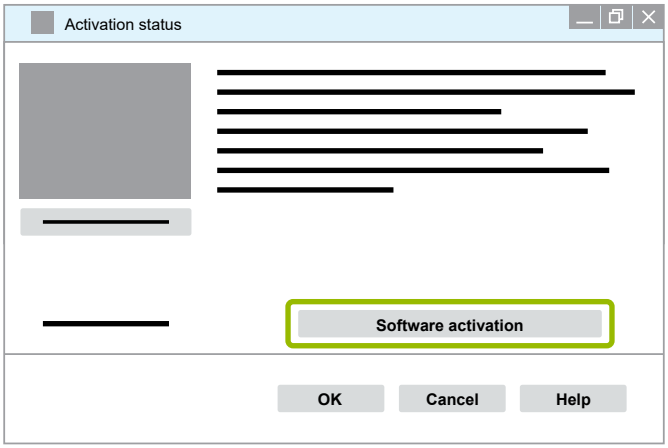


Testing the Diagnostic Software

1. After starting the Diagnostic Software, click on **OK** in the dialogue window **Activation Status**.
2. Read the licence agreement and click on **Yes** to accept the licence agreement.
3. In the dialogue window **Connection selection of the Diagnostic Interface** select **Serial port** or **USB**.
4. Click on **OK**.
5. Read the warning note displayed and click on **Yes**.
   ↳ You can now test the Diagnostic Software.

Activating the Diagnostic Software

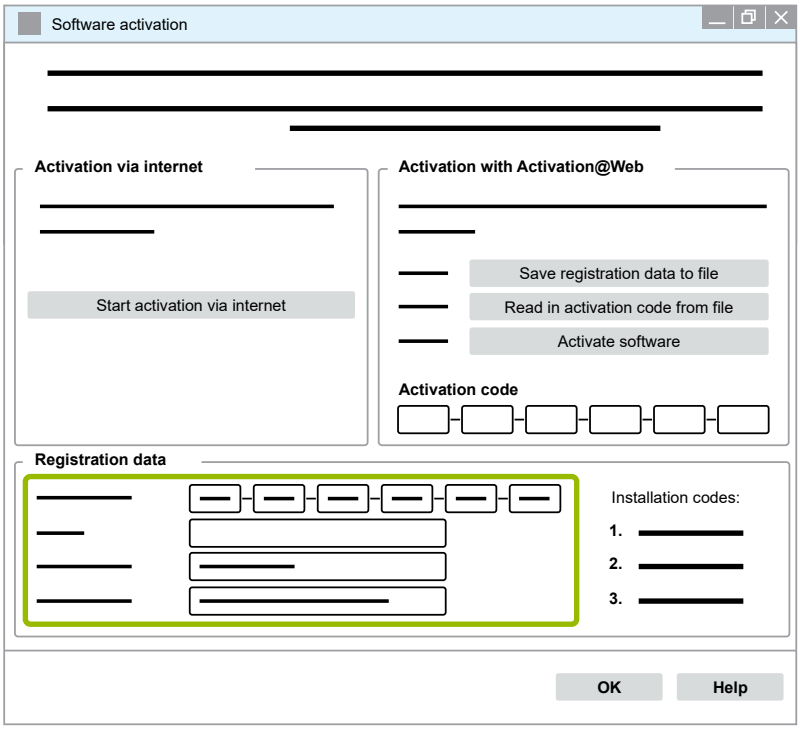
1. Click on **Software activation**.



2. Check your registration data.

You now have two options to request an activation code:

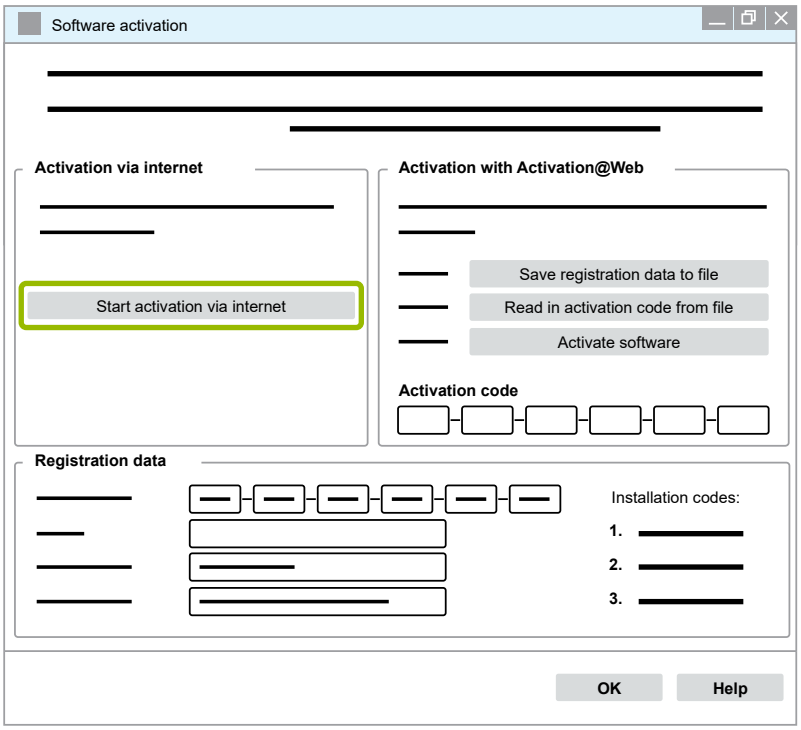
- Activation via internet
- Activation with Activation@Web



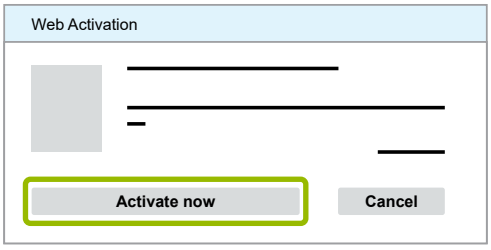
Activation via internet

Online activation requires an internet connection on the computer on which the software is to be installed.

1. Click on **Start activation via internet**.

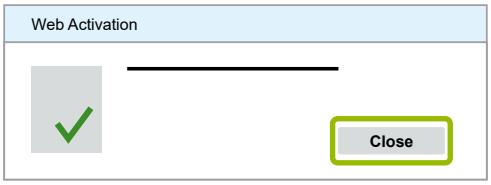


2. Click on **Activate now**.



↳ The activation starts.

3. Click on **Close** to complete the activation.

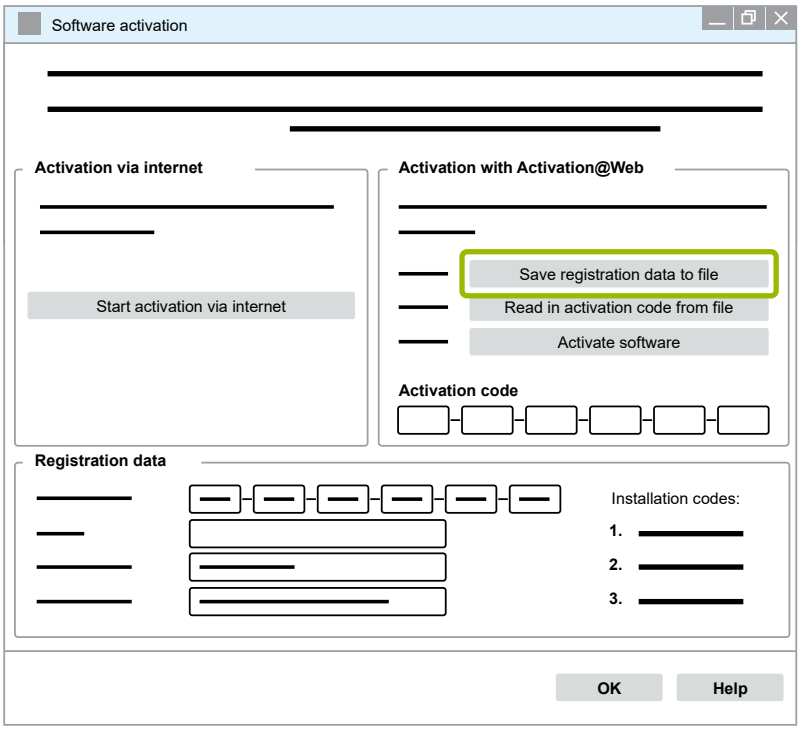


↳ The Diagnostic Software is now activated.

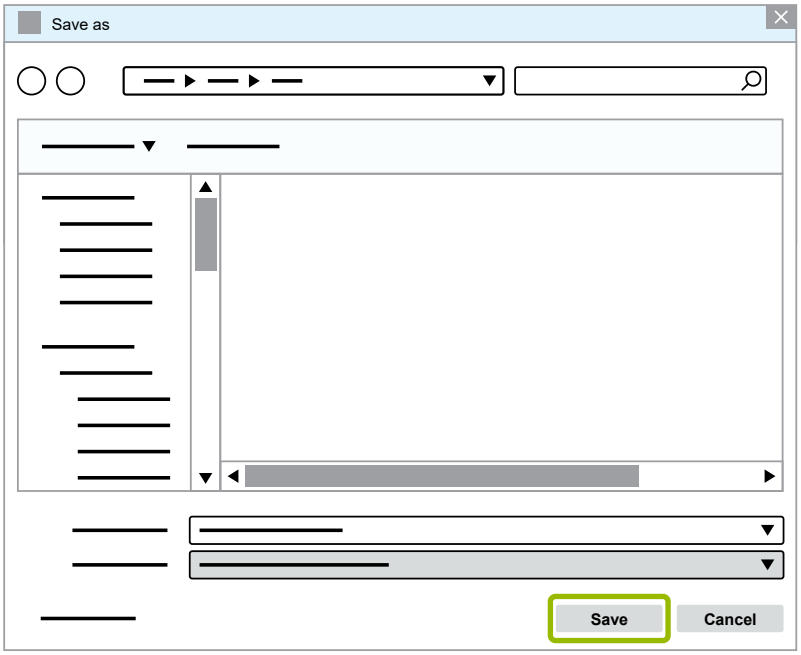
Activation of the Diagnostic Software with Activation@Web

Activation@Web is a continually available Internet portal that can generate activation codes at any time of day or night. For this purpose you only need a PC with an internet connection. You do not need to use the PC on which the software is to be installed for this.

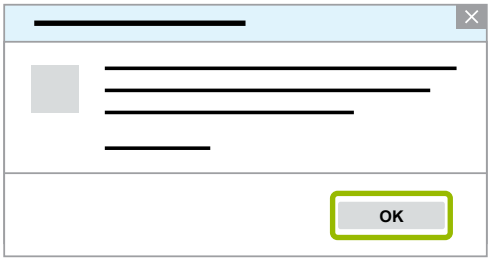
1. Click on **Save registration data to file**.



2. Select a removable storage device (USB) as the storage location.
3. Click on **Save**.



4. Click on **OK**.



5. Connect the data carrier to a computer with Internet access.
6. Start your browser of the computer with internet.
7. Enter https://abo.wabco.info/software_activation.php in the address bar.

You now have two options to request an activation code:

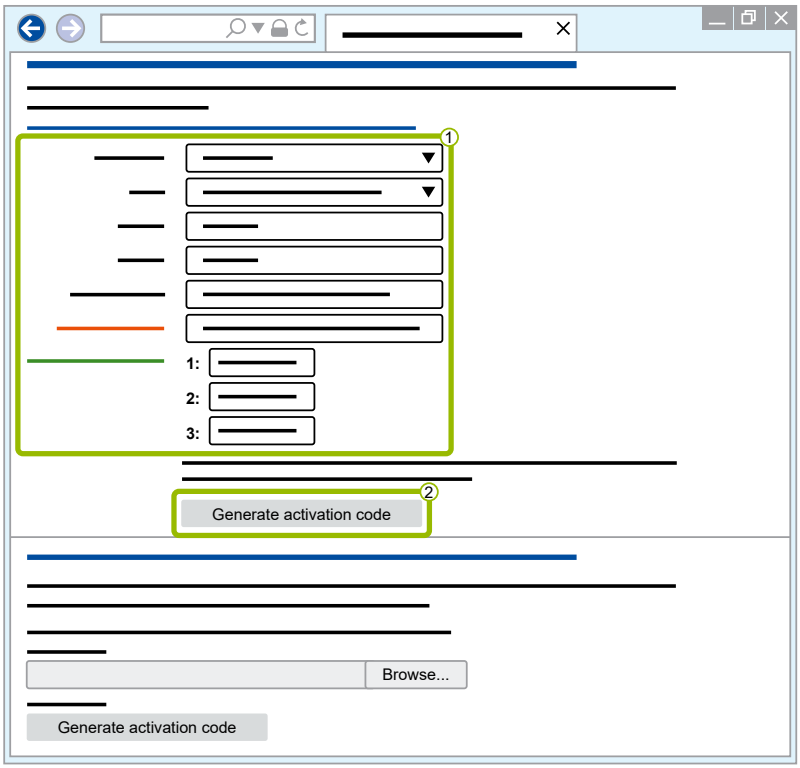
- Activation by e-mail
- Activation via removable storage device (USB)

Activation of the Diagnostic Software by e-mail

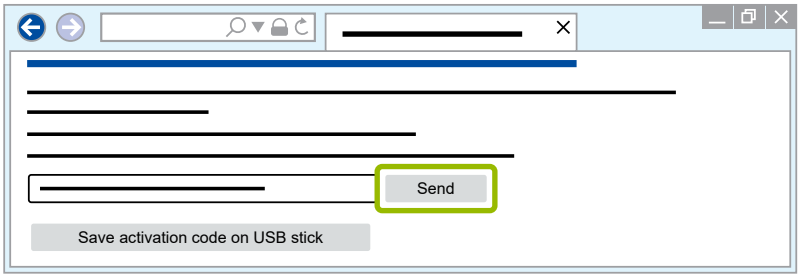
1. Fill in the fields in the form manually or transfer the data using a removable storage device (USB) ①.

➲*See: chapter "9.4.4 Activating the Diagnostic Software", page 49*

2. Click on **Generate activation code** ②.

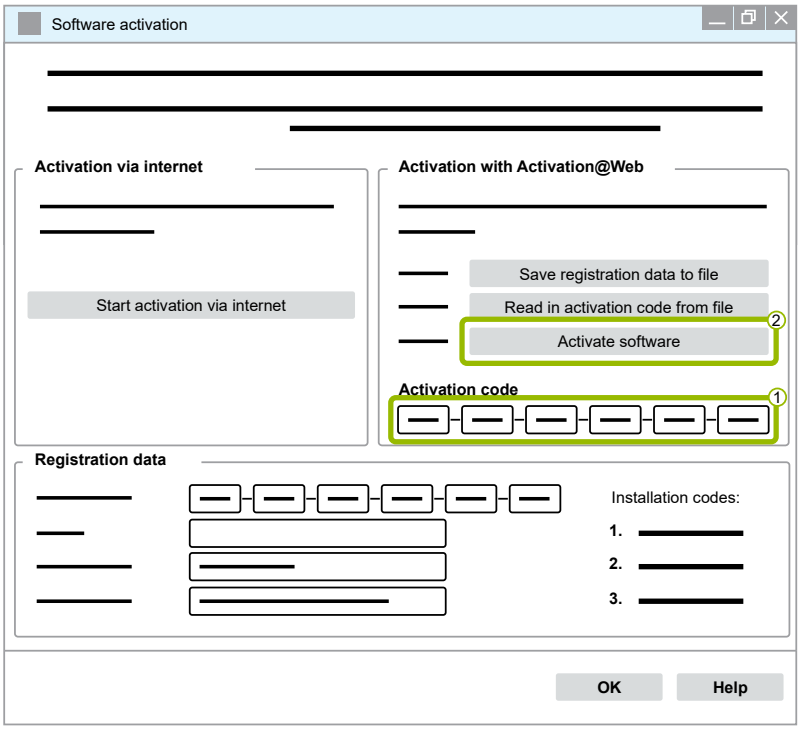


3. Enter your email address.
4. Click on **Send**.

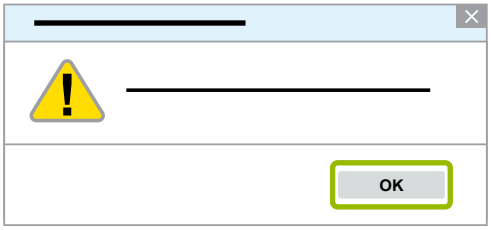


↳ The activation code will be sent to the specified e-mail address.

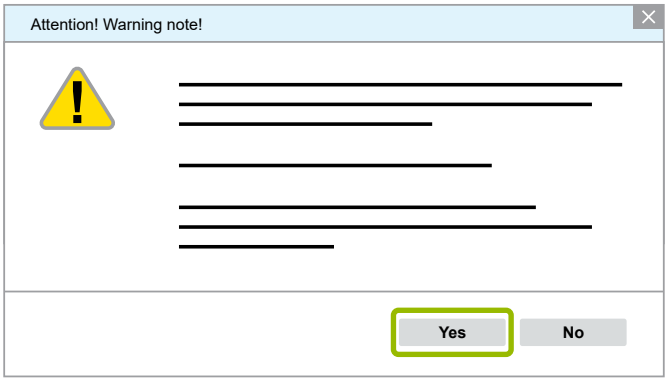
5. Enter the **Activation code** ①.
6. Click on **Activate software** ②.



7. Click on **OK**.



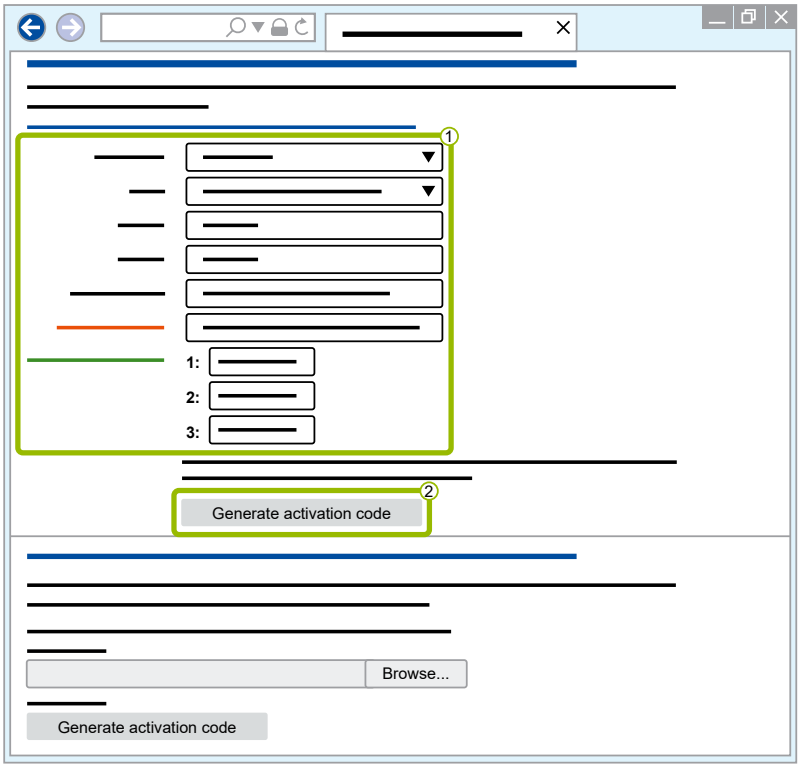
8. Read the warning note.
9. Click on **Yes**.



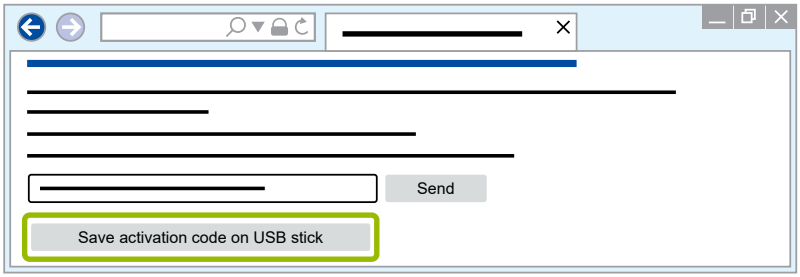
↳ The Diagnostic Software is now activated.

Activation of the Diagnostic Software via removable storage device (USB)

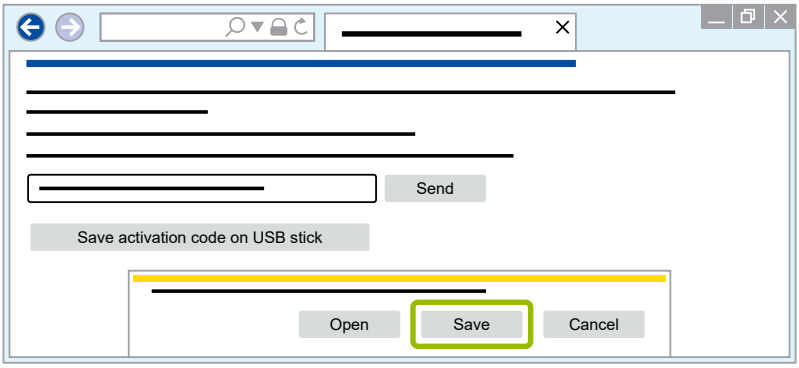
1. Fill in the fields in the form ①.
2. Click on **Generate activation code** ②.



3. Click on **Save activation code on USB stick**.

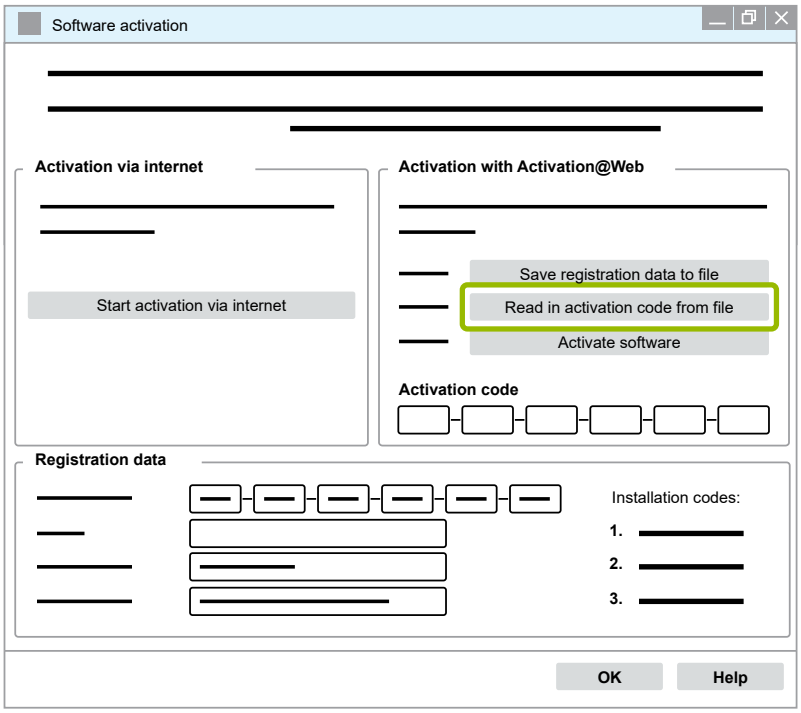


4. Click on **Save**.



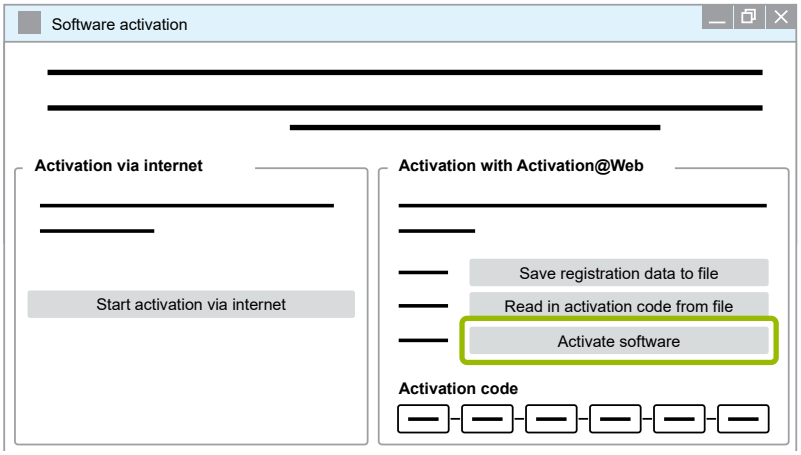
↳ The activation code will be downloaded.

5. Save the downloaded activation code on your removable storage device (USB).
6. Insert the removable storage device (USB) into the PC where the Diagnostic Software is used.
7. Click on **Read in activation code from file**.

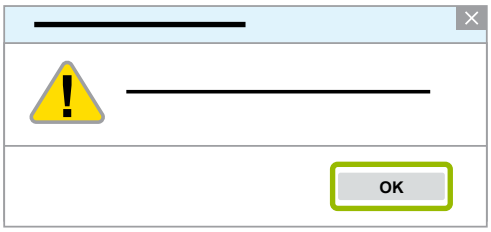


↳ The activation code is entered automatically.

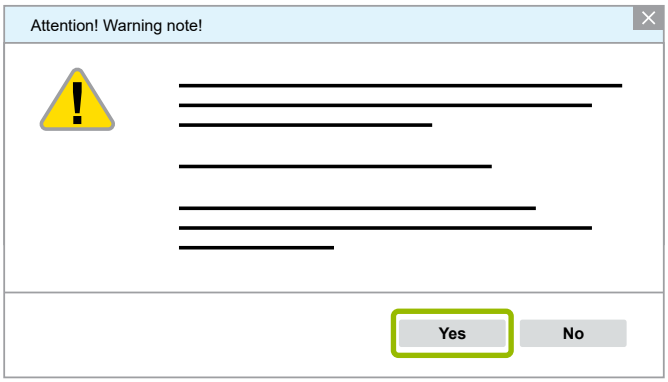
8. Click on **Activate software**.



9. Click on **OK**.



10. Read the warning note.
11. Click on **Yes**.



↳ The Diagnostic Software is now activated.

9.5 Starting the diagnosis

In order to carry out a diagnosis of TEBS E on the training model, a complete and successful start-up must have been carried out using the Diagnostic Software.

The TEBS E enables diagnosis via the 7-pin CAN connection of ISO 7638.

When starting the Diagnostic Software, the ignition on the training model must be switched.

Establishing a diagnostic connection

1. Disconnect the training model's 7-pin ISO 7638 connector from the connector on the trailer.
2. Connect the diagnostic cable to the 7-pin ISO 7638 connector on the trailer.
3. Connect the 7-pin ISO 7638 connector of the training model to the junction box on the diagnostic cable.
4. Connect the 4-pin connector on the trailer side of the diagnostic cable to the Diagnostic Interface.
5. Connect the Diagnostic Interface to the laptop on which the Diagnostic Software is installed.
6. Start the Diagnostic Software.
7. Start the diagnosis via the **Diagnosis** menu in the Diagnostic Software.
   - The Diagnostic Software checks the individual components and logs any faults that have occurred.
   - The Diagnostic Software collects all faults that have occurred in the diagnostic memory.

9.6 Calling up the diagnostic memory

The diagnostic memory of the TEBS E and, if available, of the Electronic Extension Module, can be read out and searched for stored faults. When messages are detected, the messages with information are displayed.

Current faults are shown in red in the overview, non-current faults are highlighted in blue.

▸ Call up the diagnostic memory in the Diagnostic Software via the **Diagnostic memory** command in the **Messages** menu or the button.

The **Diagnostic memory** dialogue box provides information and notes on the stored faults.
In addition, extensive information on the respective fault codes and repair aids can be viewed via the **Info** button.

9.7 Parameter setting

The system parameters of TEBS E can be read from the ECU or from a file. All data can be modified and saved in the ECU or as a file.

You can start the parameter setting in the Diagnostic Software via the **Start-up** menu or call up the parameters with the command **Parameters** in the **System** menu.

Alternatively, you can use the following buttons in the Diagnostic Software.

Symbol	Function
	Start-up
	Parameter setting

Overview of parameters

Extensive parameters are available in the Diagnostic Software. The following section therefore only provides a basic overview.

Explanations of the individual parameters as well as the functions and settings of the parameters can be found in the Diagnostic Software help.

The parameters are set according to the functions in the individual tabs. The tabs are numbered and can be selected as required. To write the data into the ECU of the TEBS E all tabs must have been selected once. Whether a tab has already been selected can be seen from the colour of the tab. After selecting the tab, the tab changes its colour.

The number of selectable functions depends on the variant of the TEBS E.

Tab	Configurable parameters
(1) Start	• This tab contains a general note on parameter setting. • The tab can be hidden.
(2) Vehicle	• Vehicle type • Number of axles • ABS system • Axle definition • Modulator mounting • URL for vehicle information • Suspension
(3) Brake data	• Input of vehicle data (brake data) • Tires and pole wheel teeth • RSS parameter • Braking pressures
(4) Standard functions	• Standard functions • Subsystems • Show or hide parameters for "General functions" tab • Show or hide parameters for "Function modules" tab

Diagnosis and parameter setting

Tab	Configurable parameters
(5) Lifting axle control	This tab appears automatically if a lifting axle has been assigned on the Vehicle tab. • Configuration of the lifting axle control • Configuration of OptiTurn
(6) Brake functions	This tab only appears if the brake functions are activated on the Standard Functions tab. • Configuration of special brake functions • Special functions for special vehicles
(7) Air suspension	This tab only appears if the ECAS or eTASC function was selected during vehicle configuration. • Level control • Parameters for ECAS with eTASC/rotary slide valve • Parameters for green ECAS warning lamp • Additional tab with settings for advanced ECAS parameters
(8) General functions	This tab only appears if the general functions are activated for the standard functions. • Pressure sensors • General functions • CAN messages ISO 11992 • Warning lamp function • Service interval • ECU stand-by time
(9) Function modules	This tab only appears if the function modules are activated in the standard functions. • Configuration of parameters for GIO function modules
(10) Electronic Extension Module	This tab only appears if an Electronic Extension Module is connected or active. • Reverse systems • Trailer battery • Deactivate TailGUARD • Options for reverse systems
(11) Connector	• Configuration of parameters for GIO connector assignments

10 Procedure in case of accidents or malfunctions

For safety reasons, emergency stop switches are fitted on both sides, which interrupt the power supply and vent the air bellows for the lifting axle when actuated.

Unlocking the emergency stop switches

1. Before unlocking, make sure that no one is in a danger zone (indicated by yellow information stickers).
2. Turn off the ignition.
3. Turn the emergency stop switch to the right.
4. If the malfunction occurs on the brakes, additionally disconnect the compressed air supply and vent it.

   ➲*See: chapter "11.3 Disconnecting the compressed air supply", page 62*
5. Contact your WABCO contact person after a malfunction.

Putting back into operation

1. Turn the emergency stop switch to the left.
2. Switch on the ignition.

▸ Contact your WABCO contact person after a malfunction.

11 Taking out of operation

11.1 Switching off the ignition

- Press the **Ignition** button.

↳ The ignition is switched off.

11.2 Switching off the power supply

On the side of the substructure there is a rotary **Main Switch** for switching off the power supply.

- Turn the rotary **Main Switch** to position 0.

↳ The power supply is switched off.

11.3 Disconnecting the compressed air supply

- Disconnect the compressed air hose of the compressor from the connection **Air**.

↳ The compressed air supply is disconnected.

11.4 Venting the compressed air tanks

To vent the compressed air tanks, first follow the step below:

➲*See: chapter "11.3 Disconnecting the compressed air supply", page 62*

1. Turn open the **Air Exhaust** switch on the left side of the training model.
2. Turn open the four **Air Exhaust** switches on the back of the training model.

↳ The compressed air tanks are vented.

11.5 Disconnecting the power supply

1. Switch off the power supply unit.
2. Pull the plus plug out of the left-hand, red connector.
3. Pull the minus plug out of the right-hand, blue connector.
4. Unplug the power supply unit connector from the socket.

   ↳ The power supply is disconnected.

11.6 Disconnecting the coupling heads

1. First disconnect the supply line (red coupling head).
2. Then disconnect the brake line (yellow coupling head).

11.7 Resetting the reverse monitoring system

▸ Push the two outer sensors back to the centre by hand.

12 Maintenance

12.1 Maintenance and cleaning

The training model is maintenance-free.

WABCO recommends that the training model be cleaned with a dry or slightly moistened cloth when necessary. Only use solvent-free cleaning agents for cleaning.

NOTICE

Damage due to soiling

If dirt gets into the interior of the training model via the compressed air connections, damage, malfunctions or malfunctions can result.

- Cover the compressed air connections when cleaning the device if the coupling heads are not connected.

Follow these steps before cleaning:

1. Switch off the power supply.

   ➲*See: chapter "11.2 Switching off the power supply", page 62*

2. Disconnect the compressed air supply.

   ➲*See: chapter "11.3 Disconnecting the compressed air supply", page 62*

12.2 Repairs

⚠ CAUTION

Injuries due to structural changes

Structural changes can lead to incorrect behaviour of individual components and an increased risk of injury.

- Do not make any structural changes to the training model.

Repairs may only be carried out by authorised personnel of the manufacturer or by authorised personnel of WABCO.

Please contact your WABCO contact person for further information.

13 EEC declaration of conformity

EG-Konformitätserklärung

gemäß der EG-Maschinenrichtlinie 2006/42/EG vom 17.Mai 2006

Der Hersteller:

Berger Truck Service GmbH
Gewerbepark 16
AT-6300 Wörgl

erklärt hiermit, dass die Maschine:

Typ: Schulungsmodell
Bezeichnung: Trailer-Schulungsmodell
Beschreibung: Modell eines Dreiachs-Sattelaufliegers in verkleinertem Maßstab, das zur Vermittlung von Wissen zu Brems- und Luftfederungssystemen von WABCO dient
Teilenummer: 300 000 002 0
Seriennummer: MR39newopti-TEBSE
Baujahr: 2020

allen einschlägigen Bestimmungen der Maschinenrichtlinie 2006/42/EG sowie den grundlegenden Sicherheits- und Gesundheitsschutzanforderungen entspricht.

Die Maschine entspricht weiterhin allen Bestimmungen der folgenden Richtlinien:

- EMV-Richtlinie 2014/30/EU vom 26. Februar 2014

Folgende sonstige technische Normen und Spezifikationen wurden angewendet:

- EN ISO 12100:2010 Sicherheit von Maschinen - Allgemeine Gestaltungsleitsätze - Risikobeurteilung und Risikominderung

Mit der Zusammenstellung der technischen Unterlagen ist beauftragt:

Christian Nunner
Gewerbepark 16
AT-6300 Wörgl

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14 WABCO Contact

You can find your local WABCO contact via the following page:
http://www.wabco.info/i/1489

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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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