

B110 R



5.907-038.0 (12/20)

Contents

| | | | |
|--|----|--|-----------|
| 1 Foreword | 4 | 8.6 060 Fault diagnosis..... | 24 |
| 2 Safety instructions..... | 4 | 8.7 070 Special features / other..... | 24 |
| 2.1 Hazard levels | 4 | 9 Water system service group | 25 |
| 2.2 Warning symbols | 5 | 9.1 010 Safety instructions..... | 25 |
| 3 Safety devices | 5 | 9.2 020 Overview | 25 |
| 3.1 Safety switch..... | 5 | 9.3 030 Function | 26 |
| 3.2 Seat switch | 5 | 9.3.1 Auto-fill-in | 26 |
| 3.3 Symbols on the device | 5 | 9.3.2 Filling the fresh water tank | 26 |
| 4 Shown in this service handbook..... | 6 | 9.3.3 Draining fresh water..... | 26 |
| 4.1 Structure of function groups..... | 6 | 9.3.4 Allengra water valve..... | 27 |
| 4.2 Textual display | 6 | 9.3.5 Side scrubbing deck water pump..... | 27 |
| 5 Technical features..... | 6 | 9.4 040 Service activities | 28 |
| 5.1 Function | 6 | 9.4.1 Bringing the waste water tank into the servicing posi- | 28 |
| 5.1.1 Filling quantities | 6 | tion | 28 |
| 5.1.2 Working width | 6 | 9.4.2 Removing/installing Auto-fill-in | 29 |
| 5.1.3 Drive | 6 | 9.4.3 Removing/installing the water pump | 29 |
| 5.1.4 Climbing ability..... | 6 | 9.4.4 Removing/installing the water valve..... | 30 |
| 5.1.5 Key..... | 6 | 9.4.5 Removing/installing the fresh water tank | 31 |
| 5.1.6 Maintenance interval display..... | 6 | 9.5 050 Service and inspection..... | 31 |
| 5.1.7 Service timer | 6 | 9.6 060 Fault diagnosis..... | 31 |
| 5.1.8 Operation | 7 | 9.7 070 Special features / other | 31 |
| 5.1.9 Water dosing valve | 7 | 10 Detergent dosing unit service group | 32 |
| 5.1.10 Suction turbine | 7 | 10.1 010 Safety instructions..... | 32 |
| 5.1.11 Waste water tank | 7 | 10.2 020 Overview | 32 |
| 5.1.12 Fresh water tank | 7 | 10.3 030 Function | 33 |
| 5.1.13 Cleaning head drive | 7 | 10.3.1 Detergent dosing unit (DOSE) | 33 |
| 5.1.14 Suction bar..... | 7 | 10.4 040 Service activities | 34 |
| 5.1.15 Charger | 7 | 10.4.1 Removing/installing the detergent dosing hose | 34 |
| 5.1.16 Battery | 7 | 10.4.2 Removing/installing the detergent dosing pump | 35 |
| 5.1.17 Options | 7 | 10.5 050 Service and inspection | 35 |
| 5.2 Scope..... | 7 | 10.6 060 Fault diagnosis..... | 35 |
| 5.3 Safety devices | 7 | 10.7 070 Special features / other | 35 |
| 5.4 Freewheel function | 8 | 11 Suction system service group | 36 |
| 5.5 Type plate | 8 | 11.1 010 Safety instructions..... | 36 |
| 6 Overview of the unit..... | 8 | 11.2 020 Overview | 36 |
| 6.1 Front view | 9 | 11.3 030 Function | 37 |
| 6.2 Rear view | 9 | 11.3.1 Suction system | 37 |
| 6.3 Side view | 10 | 11.3.2 Suction turbine | 37 |
| 6.4 Functional chart | 11 | 11.3.3 Waste water tank flushing system | 37 |
| 6.5 Flow chart | 12 | 11.3.4 Waste water tank float | 37 |
| 6.6 Intelligent Key | 13 | 11.3.5 Waste water tank float switch | 37 |
| 6.7 Colour coding | 14 | 11.4 040 Service activities | 38 |
| 6.8 Symbols on the device | 15 | 11.4.1 Removing/installing the waste water tank float switch | 38 |
| 7 Setup service group | 15 | 11.4.2 Removing/installing the waste water tank float | 38 |
| 7.1 010 Safety instructions | 16 | 11.4.3 Removing/installing the waste water tank spray noz- | 39 |
| 7.2 020 Overview | 16 | zles | 39 |
| 7.3 030 Function | 17 | 11.4.4 Removing/installing the waste water tank cover | 39 |
| 7.4 040 Service activities | 17 | 11.4.5 Removing/installing the waste water tank | 40 |
| 7.4.1 Place the device on its side | 17 | 11.4.6 Removing/installing the suction bar | 41 |
| 7.4.2 Removing/installing the driver's seat | 17 | 11.4.7 Removing/installing the suction lips | 41 |
| 7.4.3 Removing/installing the seat contact switch | 18 | 11.4.8 Removing/installing the suction bar suspension | 42 |
| 7.5 050 Service and inspection..... | 18 | 11.4.9 Removing/installing the suction bar lifting motor | 43 |
| 7.6 060 Fault diagnosis..... | 18 | 11.4.10 Removing/installing the suction bar clamps | 44 |
| 7.7 070 Special features / other | 18 | 11.4.11 Removing/installing the suction turbine | 44 |
| 8 Control panel service group | 19 | 11.4.12 Removing/installing the suction turbine sliding con- | 45 |
| 8.1 010 Safety instructions | 19 | tacts | 45 |
| 8.2 020 Overview | 19 | 11.4.13 Removing/installing the dirt sieve | 46 |
| 8.3 030 Function | 20 | 11.4.14 Removing/installing the waste water drain hose | 46 |
| 8.3.1 Control panel | 20 | 11.4.15 Removing/installing the suction hose | 46 |
| 8.3.2 Program switch | 20 | 11.5 050 Service and inspection | 47 |
| 8.4 040 Service activities | 21 | 11.5.1 Suction bar standard setting | 47 |
| 8.4.1 Removing/installing the control panel | 21 | 11.5.2 Cleaning the suction bar | 47 |
| 8.4.2 Removing/installing the display | 21 | 11.6 060 Fault diagnosis | 47 |
| 8.4.3 Removing/installing the trigger | 22 | 11.7 070 Special features / other | 47 |
| 8.4.4 Removing/installing the diagnostic connector | 22 | 12 Steering service group | 48 |
| 8.4.5 Removing/installing the program selection switch | 23 | 12.1 010 Safety instructions | 48 |
| 8.4.6 Removing/installing the RFID reader | 24 | 12.2 020 Overview | 48 |
| 8.5 050 Service and inspection..... | 24 | 12.3 030 Function | 49 |

| | | | |
|---|-----------|---|------------|
| 12.4 040 Service activities | 49 | 16.1 010 Safety instructions..... | 81 |
| 12.4.1 Removing/installing the steering wheel..... | 49 | 16.2 020 Overview | 81 |
| 12.4.2 Removing/installing the steering column | 50 | 16.3 030 Function | 82 |
| 12.4.3 Removing/installing the steering ring gear..... | 51 | 16.3.1 Side scrubbing deck..... | 82 |
| 12.5 050 Service and inspection..... | 52 | 16.4 040 Service activities | 82 |
| 12.6 060 Fault diagnosis..... | 52 | 16.4.1 Removing/installing the side scrubbing deck | 82 |
| 12.7 070 Special features / other | 52 | 16.4.2 Removing/installing the side scrubbing deck water pump..... | 84 |
| 13 Chassis and suspension service group | 53 | 16.4.3 Venting the side scrubbing deck | 84 |
| 13.1 010 Safety instructions | 53 | 16.4.4 Removing/installing the side scrubbing deck brush | 85 |
| 13.2 020 Overview | 54 | 16.4.5 Removing/installing side scrubbing deck lifting motor | 85 |
| 13.3 030 Function | 54 | 16.4.6 Removing/installing side scrubbing deck drive chain | 86 |
| 13.3.1 Driving motor and parking brake..... | 54 | 16.4.7 Removing/installing the side scrubbing deck motor | 86 |
| 13.3.2 Opening the brake mechanically..... | 55 | 16.4.8 Removing/installing the skid | 87 |
| 13.4 040 Service activities | 55 | 16.4.9 Adjusting the swivel range of the side scrubbing deck | 87 |
| 13.4.1 Removing/installing the accelerator pedal | 55 | 16.5 Adjusting the side scrubbing deck | 87 |
| 13.4.2 Removing/installing the accelerator pedal potentiometer | 56 | 16.6 060 Fault diagnosis..... | 89 |
| 13.4.3 Removing/installing the rear wheel | 56 | 16.7 070 Special features / other | 89 |
| 13.4.4 Removing/installing the driving motor | 56 | 17 Electrical system service group | 90 |
| 13.4.5 Removing/installing the driving motor sliding contacts | 57 | 17.1 010 Safety instructions..... | 90 |
| 13.4.6 Removing/installing the driving motor brake | 59 | 17.2 020 Overview | 90 |
| 13.4.7 Removing/installing the driving motor tyres | 60 | 17.3 030 Function | 91 |
| 13.5 050 Service and inspection..... | 61 | 17.3.1 Control unit connections | 91 |
| 13.6 060 Fault diagnosis..... | 61 | 17.3.2 Controller overview | 92 |
| 13.7 070 Special features / other | 61 | 17.3.3 Terminating resistor/bus systems..... | 95 |
| 14 R cleaning head service group | 62 | 17.3.4 Battery indicator | 96 |
| 14.1 010 Safety instructions | 62 | 17.3.5 Taking batteries out of service | 96 |
| 14.2 020 Overview | 62 | 17.4 040 Service activities | 97 |
| 14.3 030 Function | 62 | 17.4.1 Disconnecting/connecting the power supply | 97 |
| 14.3.1 R cleaning head | 63 | 17.4.2 Removing/installing the batteries | 97 |
| 14.4 040 Service activities | 63 | 17.4.3 Removing/installing the battery terminal fuse | 98 |
| 14.4.1 Removing/installing the roller brushes | 63 | 17.4.4 Removing/installing the Telematic Control Unit (TCU) | 99 |
| 14.4.2 Removing/installing the squeegee blade | 64 | 17.4.5 Removing/installing the controller fan | 100 |
| 14.4.3 Removing/installing the cleaning head | 64 | 17.4.6 Removing/installing the controller | 101 |
| 14.4.4 Removing/installing the cleaning head lifting linkage | 64 | 17.4.7 Removing/installing the charger | 102 |
| 14.4.5 Removing/installing the cleaning head lifting motor | 65 | 17.4.8 Checking the charger | 103 |
| 14.4.6 Removing/installing the roller brushes drive belts.. | 66 | 17.4.9 Removing/installing the driving lights and sidelights | 103 |
| 14.4.7 Removing/installing the transmission belt pulley ... | 67 | 17.5 050 Service and inspection | 104 |
| 14.4.8 Removing/installing the roller brush drive pulley.... | 68 | 17.5.1 Test cable set for CCN controller | 104 |
| 14.4.9 Removing/installing the brush holder axle | 68 | 17.5.2 Unpin the JST plug | 105 |
| 14.4.10 Removing/installing the brush motor..... | 69 | 17.6 070 Special features / other | 105 |
| 14.4.11 Removing/installing the brush motor sliding contacts | 70 | 18 Diagnostics/Software | 106 |
| 14.4.12 Removing/installing the roller brush drive axle | 70 | 18.1 KÄRCHER Diagnostics | 106 |
| 14.4.13 Removing/installing the gearbox housing | 71 | 18.2 Install the KÄRCHER Diagnostics software | 106 |
| 14.5 050 Service and inspection..... | 71 | 18.3 Diagnostics software..... | 107 |
| 14.5.1 Cleaning the water distribution strip | 72 | 19 Troubleshooting guide | 109 |
| 14.5.2 Checking/adjusting the brush pattern | 72 | 19.1 Malfunctions without information shown on the display | 109 |
| 14.6 060 Fault diagnosis..... | 72 | 19.2 Measurement results of electrical components..... | 111 |
| 14.7 070 Special features / other | 72 | 20 Software diagrams and parameter overview..... | 113 |
| 15 D cleaning head service group | 73 | 20.1 Control elements | 113 |
| 15.1 010 Safety instructions | 73 | 20.2 Factory setting | 113 |
| 15.2 020 Overview | 74 | 20.3 Intelligent Key functional overviews | 114 |
| 15.3 030 Function | 74 | 20.4 Function overview: Yellow Intelligent Key | 114 |
| 15.3.1 D cleaning head | 74 | 20.5 Function overview: Grey Intelligent Key | 116 |
| 15.4 040 Service activities | 76 | 20.6 Function overview: Red Intelligent Key | 119 |
| 15.4.1 Removing/installing the disc brush holder | 76 | 20.7 Overview of special functions and standard settings | 121 |
| 15.4.2 Removing/installing the disc brush replacement bracket..... | 77 | 20.8 Submenus | 122 |
| 15.4.3 Removing/installing the brush motor with transmis- sion | 77 | 20.9 Event code | 129 |
| 15.4.4 Removing/installing the brush motor sliding contacts | 77 | 21 Technical documentation | 158 |
| 15.4.5 Removing/installing the squeegee blade | 79 | 21.1 Technical data | 158 |
| 15.4.6 Removing/installing the deflection roller | 80 | 21.2 Special tools | 160 |
| 15.4.7 Adjusting the D cleaning head | 80 | 22 Circuit diagram | 160 |
| 15.5 050 Service and inspection..... | 80 | 23 Charging characteristics/discharge characteristics | 161 |
| 15.6 060 Fault diagnosis..... | 80 | | |
| 15.7 070 Special features / other | 80 | | |
| 16 Side scrubbing deck service group | 81 | | |

1 Foreword

Good service work requires extensive and practical training and clear documentation. This is why we offer all service technicians regular basic training and advanced training for the entire product range.

We also create service handbooks for the important units that can initially be used as instructions and later as reference material.

Furthermore, we provide regular service information on the development of the products.

If you have amendments, corrections or queries regarding this document, please send them to the international service department.

The corresponding product specialist will be take care of your concerns.

Copying and duplication of the texts and pictures as well as passing them on to third parties require the explicit authorization of the company:

Alfred Kärcher SE & Co. KG

Postfach 160

D-71349 Winnenden

www.kaercher.com

2 Safety instructions

Note

Service and maintenance work may only be performed by suitably qualified and specially trained personnel.

Observe the safety instructions in the chapters!

△ DANGER

Risk of injury due to the device starting and due to rotating parts

A risk of injury exists due to the device starting unexpectedly and from rotating parts such as motors, suction turbine, drive wheels and brushes.

Turn the program selection switch to the "Off" position and remove the Intelligent Key before performing any work on the device. Disconnect the battery connector and disconnect the minus terminal before working on electrical or electronic components.

△ DANGER

Risk of injury through heat and explosion if the batteries are short-circuited!

If batteries are short-circuited, very high currents flow that can strongly heat objects and cause fires. Heat and sparks can cause hydrogen gas explosions.

Do not short-circuit the batteries. Do not place any objects on the batteries.

ATTENTION

Risk of damage due to electrostatic discharge (ESD)!

Electrostatic discharge (ESD) can damage electronic components.

Take suitable measures to discharge the electrostatic charge before all work on the device electronics.

ATTENTION

Risk of damage due to sharp-edged objects and soiling!

Sharp-edged or dirty objects can cause damage such as scratches, notches and deformation when coming into contact with device components. Dirty tools, cloths and work surfaces can cause irreversible soiling and discolouration.

Use only suitable, undamaged and clean tools and auxiliary materials and exercise care when working. Place components and devices only on clean, padded surfaces.

△ CAUTION

Risk of injury or damage due to the device tipping over when removing heavy components!

The centre of gravity of the device can shift and cause the device to fall or tip over when removing heavy components, such as e.g. the cleaning head or batteries.

Ensure the stability of the device, e.g. by hanging, supporting or bracing it, before removing heavy components.

2.1 Hazard levels

△ DANGER

- Indication of an imminent threat of danger that will lead to severe injuries or even death.

△ WARNING

- Indication of a potentially dangerous situation that may lead to severe injuries or even death.

△ CAUTION

- Indication of a potentially dangerous situation that may lead to minor injuries.

ATTENTION

- Indication of a potentially dangerous situation that may lead to damage to property.

2.2 Warning symbols

Observe the following warnings when handling the batteries:

| | |
|--|--|
|  | Observe notes in the instructions for the battery, on the battery and in these operating instructions. |
|  | Wear eye protection. |
|  | Keep acids and batteries away from children. |
|  | Risk of explosion |
|  | Fire, sparks, open flames and smoking are prohibited. |

| | |
|---|------------------------------------|
|  | Risk of acid burns |
|  | First aid. |
|  | Warning |
|  | Disposal |
|  | Do not throw batteries in the bin. |

3 Safety devices

⚠ CAUTION

Never modify or bypass safety devices.

Missing or modified safety devices

Safety devices are provided for your own protection.

3.1 Safety switch

For immediate shutdown of all functions: Set the safety switch to "0".

- The device brakes hard when the safety switch is switched off.
- The safety switch acts directly on all device functions

3.2 Seat switch

If the operator leaves the seat during work or while driving, the seat switch switches off the engine after a short delay.

3.3 Symbols on the device

ATTENTION

Risk of damage

Water will damage the suction turbine.

Do not fill or splash water into this opening.

⚠ CAUTION

Danger of burns

Components marked with this notice become hot during operation.

Do not touch components marked in this way. Let these components cool down before working on the device.

⚠ DANGER

Danger of accident

On slopes, there is an increased risk of tipping over at high speed.

Drive slowly downhill.

Do not turn on a slope.

When driving fast, avoid jerky steering with a large steering angle.

4 Shown in this service handbook

4.1 Structure of function groups

| | | | |
|-----|---------------------|-----|------------------------|
| 010 | Safety instructions | 050 | Service and inspection |
| 020 | Overview | 060 | Fault diagnosis |
| 030 | Function | 070 | Special features/other |
| 040 | Service activities | | |

4.2 Textual display

- Preparatory tasks
- ① Numerical legend

1. Guideline

ATTENTION

Safety instructions

Note on dangers, source of errors.

5 Technical features

5.1 Function

This scouring and vacuum machine is used for wet cleaning or polishing of level floors.

The device can be adjusted to suit the respective cleaning task by setting the water volume and detergent volume appropriately. The detergent dosage is adjusted by adding detergent to the tank or via a dosing device ("Dose" option).

Brush irrigation is either speed-dependent or constant.

The working width and the capacity of the fresh and waste water tanks (see chapter "Technical data") enable effective cleaning with a long working time.

The device has a drive motor.

Note

The device can be equipped with various accessories to suit the respective cleaning task. Request a copy of our catalogue or visit our Internet website at www.kaercher.com.

5.1.1 Filling quantities

- Fresh water tank: 110 l

- Waste water tank: 110 l

5.1.2 Working width

65 - 75 cm, depending on the cleaning head used.

5.1.3 Drive

- The unit is self-propelled, the driving motor is powered by a battery.
- Maximum speed of 6 km/h.

5.1.4 Climbing ability

- max. 10%

5.1.5 Key

KIK system (KÄRCHER INTELLIGENT KEY).

5.1.6 Maintenance interval display

Maintenance interval displays are shown to the operator at defined time intervals in order to obtain an optimum cleaning result.

Displays after 20 hours:

- Clean the suction bar!
- Check the suction lip!

Display after 50 hours:

- Clean the fresh water filter!
- Clean the turbine sieve!

Display after 100 hours:

- Check the brush wear!

5.1.7 Service timer

- First service after 200 hours.
- Each subsequent service after 400 hours.

The maintenance counter can be cleared with any Intelligent Key in the counter program.

The service timer can be reset with the red Intelligent Key.

5.1.8 Operation

- New operating system for even easier operation (KIK-KÄRCHER INTELLIGENT KEY)
 - Colour coding of the operating and maintenance elements.
- Control elements for the cleaning process are yellow.
 - Control elements for maintenance and servicing are light grey.

5.1.9 Water dosing valve

The water dosing valve is controlled electronically.

5.1.10 Suction turbine

Encapsulated quiet turbine.

5.1.11 Waste water tank

- 2-tank system
 - Waste water tank flushing system
- Coarse dirt filter
 - The waste water tank can be swivelled to the rear.

5.1.12 Fresh water tank

Auto fill-in (option)

5.1.13 Cleaning head drive

- Both brushes run against each other.
- The cleaning head is raised and lowered by a lifting motor.

5.1.14 Suction bar

- The suction bar is raised and lowered by a lifting motor.
- The unit can be operated with a curved or straight suction bar.

5.1.15 Charger

- The 1 ~ 50-60 Hz charger is suitable for a mains voltage of 100 to 240 volts.
- The charger parameters can be adapted to the built-in battery.

5.1.16 Battery

The unit can be operated with max. 285 Ah batteries.

5.1.17 Options

- Homebase system
- DOSE system
- Rotating beacon warning lamp
- Side scrubbing deck
- Cleaning head

5.2 Scope

This service handbook applies for the following units:

B110 R 65

B110 D 65

B110 R 75

B110 D 75

5.3 Safety devices

Safety devices protect the user and may not taken out of operation or functionally circumvented.

Adhere to the safety instructions in the chapters!

5.4 Freewheel function



- ① Neutral lever
- ② Washers or two 1 cent coins

△ CAUTION

Risk of injury or damage due to the device rolling away!

When the freewheel function is switched on, the device can start moving and can overrun, clamp or crush parts of your body. Material damage can be caused if the device runs into other objects.

Secure the device, e.g. using wedges, to prevent it from rolling away before you actuate the freewheel lever.

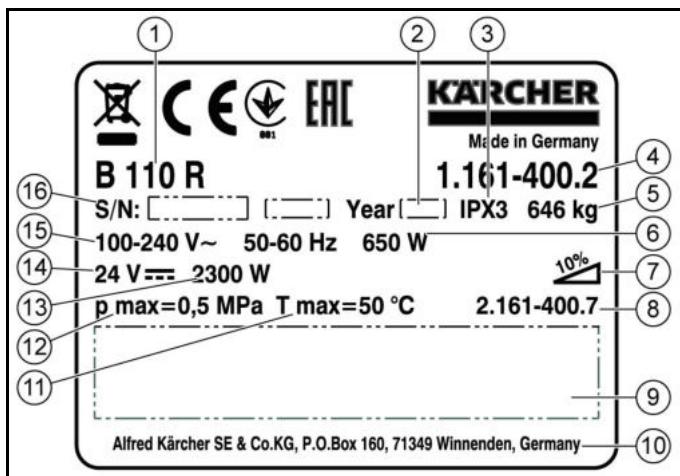
Washers inserted: Freewheel function activated, drive train disconnected, the device can be manually pushed in an emergency.

Note

The freewheel function may only be switched on in an emergency. In this case, the device may only be pushed slowly for a short distance.

No washer inserted: Normal position with drive train connected.

5.5 Type plate



- ① Device designation
- ② Year of manufacture
- ③ Protection type/protection class
- ④ Part number
- ⑤ Typical operating weight
- ⑥ Charger connected load
- ⑦ Maximum permissible gradient
- ⑧ Part number of the base unit
- ⑨ Barcode containing serial number and part number
- ⑩ Manufacturer's address
- ⑪ Maximum input temperature
- ⑫ Maximum operating pressure
- ⑬ Power rating
- ⑭ Machine battery connection
- ⑮ Power supply charger
- ⑯ Serial number

6 Overview of the unit

6.1 Front view



- (1)Rotating beacon warning lamp
- (2)Driver's seat with seat contact switch
- (3)Control panel
- (4)Release mechanism for waste water tank
- (5)Auto fill-in
- (6)Electronics cover
- (7)Daytime running light
- (8)Collision guard
- (9)Accelerator pedal
- (10)Fresh water tank
- (11)Fresh water tank cap
- (12)Steering wheel

6.2 Rear view



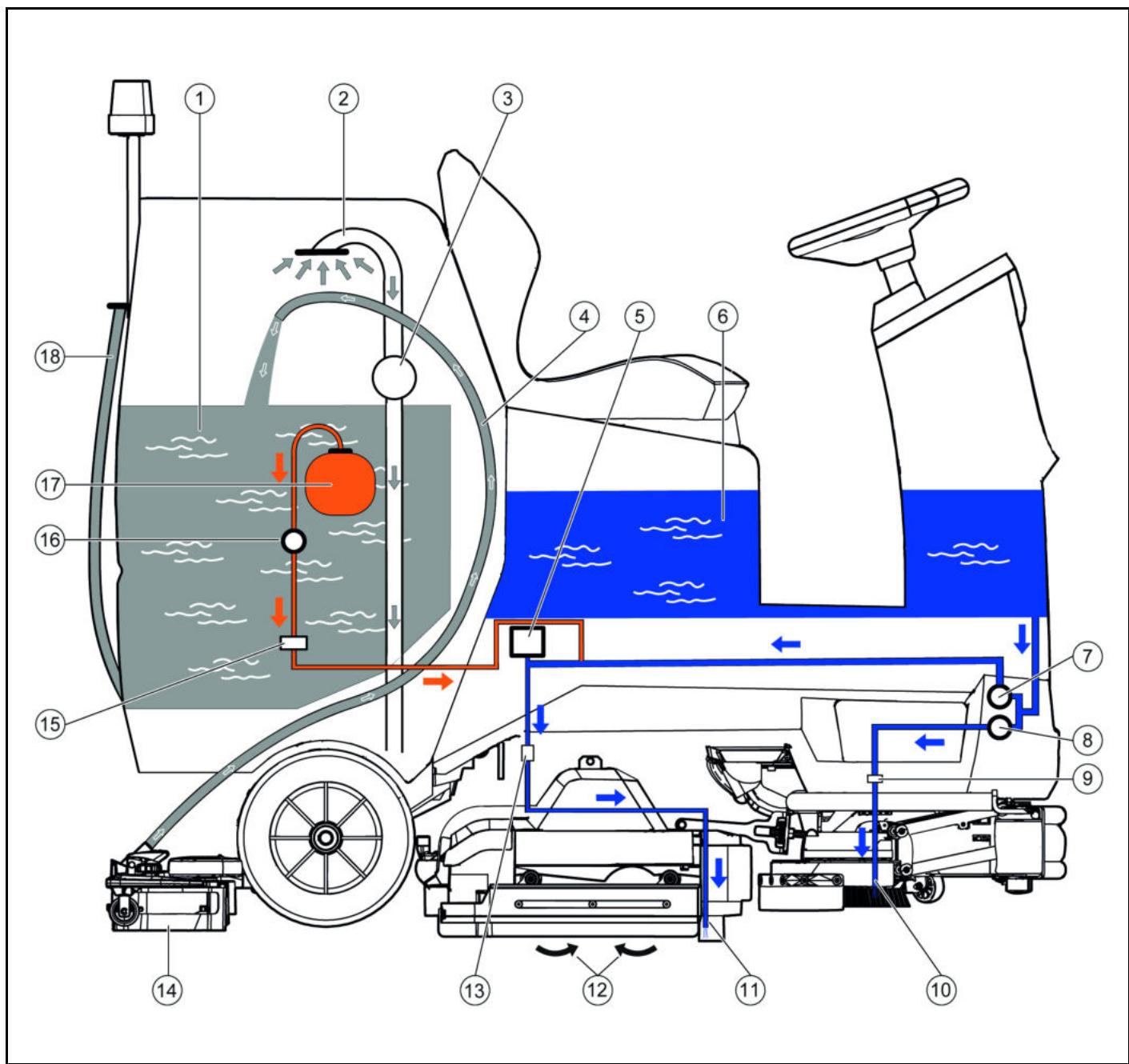
- (1)Waste water tank cap
- (2)Waste water tank
- (3)Suction bar lock
- (4)Suction bar upper and lower part clamping screws
- (5)Scraper roll
- (6)Suction lip
- (7)Suction bar support roller
- (8)Waste water tank cap
- (9)Drain hose for waste water
- (10)Waste water tank flushing system connection

6.3 Side view



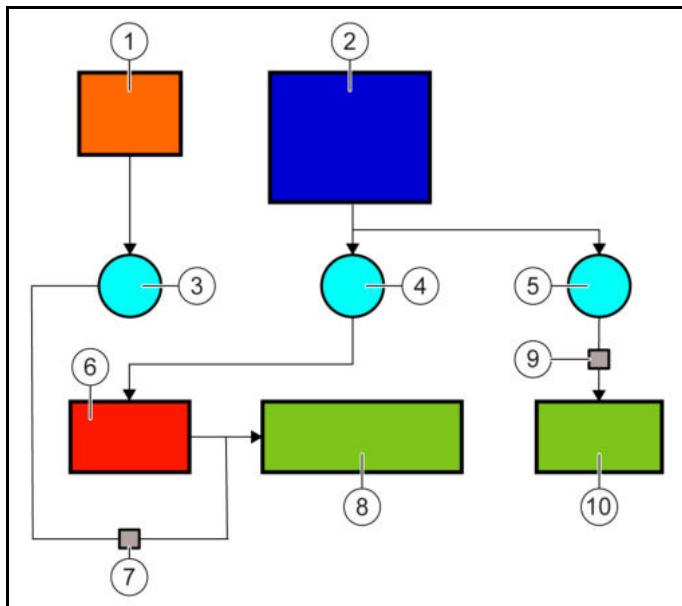
- (1)Control panel
- (2)Steering wheel
- (3)Auto fill-in
- (4)Fresh water tank filling level indicator
- (5)Waste water tank lock
- (6)Waste water tank
- (7)Driver's seat with seat contact switch
- (8)Accelerator pedal
- (9)Side scrubbing deck
- (10)Rear wheel
- (11)Cleaning fluid pump
- (12)Cleaning fluid container
- (13)Cleaning head
- (14)Fresh water tank lock
- (15)Collision guard

6.4 Functional chart



- (1)Waste water
- (2)Suction duct
- (3)Suction turbine
- (4)Suction hose
- (5)Water valve
- (6)Fresh water
- (7)Fresh water pump
- (8)Side scrubbing deck fresh water pump
- (9)Side scrubbing deck check valve
- (10)Side scrubbing deck water distribution
- (11)Water distribution strip
- (12)Roller brush rotation direction
- (13)Hose coupling
- (14)Suction bar
- (15)Detergent check valve
- (16)Detergent pump
- (17)Detergent container
- (18)Waste water drain hose

6.5 Flow chart



- (1)Detergent tank
- (2)Fresh water tank
- (3)Detergent pump
- (4)Fresh water pump
- (5)Side scrubbing deck fresh water pump
- (6)Control valve
- (7)Detergent check valve
- (8)Cleaning head
- (9)Side scrubbing deck check valve
- (10)Side scrubbing deck

6.6 Intelligent Key

User-specific releases are stored on the Intelligent Key. The unit can only be put into operation after inserting the Intelligent Key. There are three different key types, which differ in colour and corresponding user group.

Note

- The controller may malfunction if two Intelligent Keys are used lying on top of each other.
- Always use the Intelligent Keys individually.

| Key colour | User group |
|------------|------------------------------|
| Yellow | Operator |
| Grey | Foreman/Facility Manager (M) |
| Red | Service technician (S) |
| White | Operator |



Yellow Intelligent Key

Adjustment of unit functions is blocked. When starting work, the operator can work with preset programs using the program selection switch. No adjustment possible.



Grey Intelligent Key

The foreman/facility manager can define authorizations/releases of unit functions for the yellow operator key. The foreman/facility manager has access to almost all relevant unit functions, but not for service parameters.



Red Intelligent Key

The service technician has access to all parameters and unit functions. The service technician can also assign authorizations for the yellow operator key.



White Intelligent Key

The unit cleans with the program set on the white Intelligent Key and independently of the set cleaning program. A setting for specific floor coverings/applications/areas is possible.

Note

- The settings can be changed with the red and grey Intelligent Key.
- Key fobs are used to distinguish the programs on the individual Intelligent Keys.

6.7 Colour coding

- Control elements for the cleaning process are yellow.
- Control elements for maintenance and servicing are light grey.

6.8 Symbols on the device



Fresh water tank drain opening



Waste water tank drain opening



Fresh water tank filling level (50%)



Lashing point



* Mop holder



Filling system water connection



Waste water tank flushing system water connection



Brush replacement

* optional

7 Setup service group

7.1 010 Safety instructions

Note

Service and maintenance work may only be performed by suitably qualified and specially trained personnel.

Observe the safety instructions in the chapters!

⚠ DANGER

Risk of injury due to the device starting and due to rotating parts

A risk of injury exists due to the device starting unexpectedly and from rotating parts such as motors, suction turbine, drive wheels and brushes.

Turn the program selection switch to the "Off" position and remove the Intelligent Key before performing any work on the device. Disconnect the battery connector and disconnect the minus terminal before working on electrical or electronic components.

⚠ CAUTION

Risk of burns from hot surfaces.

Allow the device to cool down prior to all work.

7.2 020 Overview



- ① 7.4.1 Place the device on its side
- ② 7.4.2 Removing/installing the driver's seat
- ③ 7.4.3 Removing/installing the seat contact switch

7.3 030 Function

No special functional features.

7.4 040 Service activities

Note

Unless otherwise described, installation is performed in reverse order.

7.4.1 Place the device on its side

Note

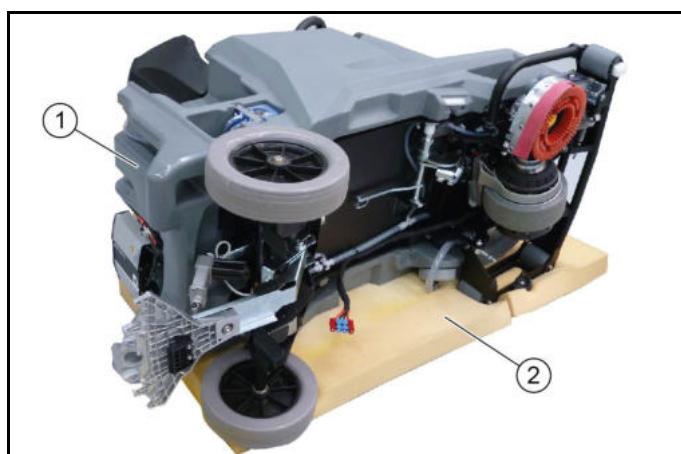
The unit can be placed on its side for service work.

- Draining fresh water and waste water
- 11.4.6 Removing/installing the suction bar
- 11.4.4 Removing/installing the waste water tank cover
- 11.4.15 Removing/installing the suction hose
- 11.4.5 Removing/installing the waste water tank
- 17.4.2 Removing/installing the batteries



① Surface

1. Place a sufficiently large underlay on the left side of the device.



① Device

② Surface

2. Carefully place the unit on its left-hand side.

7.4.2 Removing/installing the driver's seat



① Driver's seat

② Guides

③ Screws

1. Push the driver's seat backwards.
2. Unscrew 3 screws each from the guides on the left and right.
(Tightening torque: 2.5 Nm)
3. Remove the guides.
4. Raise the driver's seat and lift it sideways out of the guide rail.



7.4.3 Removing/installing the seat contact switch

① Electrical socket plug connections

② Seat contact switch

③ Cable ties

5. Remove the cable ties.

6. Disconnect the electrical socket plug connections.

7. Remove the driver's seat.

Installation information

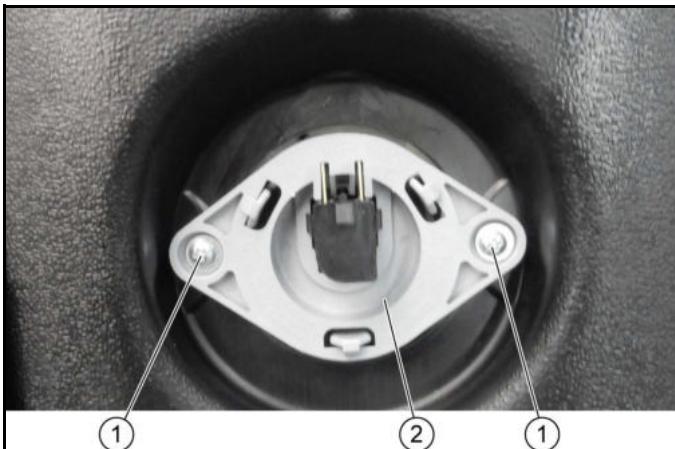
When installing, pull new cable ties through the eyelets.

Note

Before replacing the seat contact switch, check that the pressure plate is working properly and that the spring is present.

Another source of error can be the connector of the connection cable.

- 7.4.2 Removing/installing the driver's seat

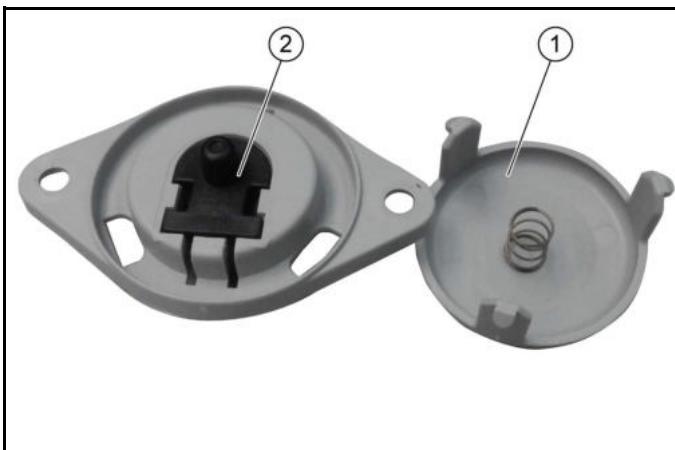


① Screws

② Casing with seat contact switch

1. Unscrew the screws.

2. Remove the casing.



① Pressure plate

② Seat contact switch

3. Remove the pressure plate.

Note

• If the seat is vacated during operation, the message "Seat contact switch open" must appear in the display within 1 second and the machine must brake within 3 seconds.

• If the seat contact switch is operated continuously for more than 90 minutes, the motors switch off and the display shows "Seat contact switch open"

7.5 050 Service and inspection

Service group does not contain any maintenance and inspection points.

7.6 060 Fault diagnosis

This service group does not have fault diagnosis.

7.7 070 Special features / other

This service group does not have any special features.

8 Control panel service group

8.1 010 Safety instructions

Note

Service and maintenance work may only be performed by suitably qualified and specially trained personnel.

Observe the safety instructions in the chapters!

⚠ DANGER

Risk of injury due to the device starting and due to rotating parts

A risk of injury exists due to the device starting unexpectedly and from rotating parts such as motors, suction turbine, drive wheels and brushes.

Turn the program selection switch to the "Off" position and remove the Intelligent Key before performing any work on the device. Disconnect the battery connector and disconnect the minus terminal before working on electrical or electronic components.

ATTENTION

Risk of damage due to electrostatic discharge (ESD)!

Take suitable measure to discharge the electrostatic charge before all work on the unit electronics.

Wear ESD shoes.

Touch one battery pole with your hand for potential equalisation.

Do not remove the electronics from the packaging until immediately before installation.

Do not damage the insulation of the conductors or the coating on the circuit boards when performing measurements on electronic components.

ATTENTION

Risk of damage due to sharp-edged objects and soiling!

Sharp-edged or dirty objects can cause damage such as scratches, notches and deformation when coming into contact with device components. Dirty tools, cloths and work surfaces can cause irreversible soiling and discolouration.

Use only suitable, undamaged and clean tools and auxiliary materials and exercise care when working. Place components and devices only on clean, padded surfaces.

8.2 020 Overview



① 8.4.1 Removing/installing the control panel

② 8.4.2 Removing/installing the display

③ 8.4.3 Removing/installing the trigger

④ 8.4.4 Removing/installing the diagnostic connector

⑤ 8.4.5 Removing/installing the program selection switch

⑥ 8.4.6 Removing/installing the RFID reader

8.3 030 Function

8.3.1 Control panel



- ① Display
- ② Info button
- ③ Safety switch
- ④ Side scrubbing deck switch
- ⑤ Horn
- ⑥ Travel direction switch
- ⑦ Diagnostic tool connection
- ⑧ Program selection switch
- ⑨ KIK system (Kärcher Intelligent Key)

Safety switch

Switches the unit on/off and is used as an Emergency Off switch.

Program selection switch

Turn the program selection switch to switch the unit on and off and select the individual cleaning programs.

Info button

In conjunction with the grey and red Intelligent Key, the Info button can be used to access menus and unit settings. Various settings can be adjusted on the device, depending on the application and local conditions. Depending on the access authorization, device-specific data can be displayed.

Display

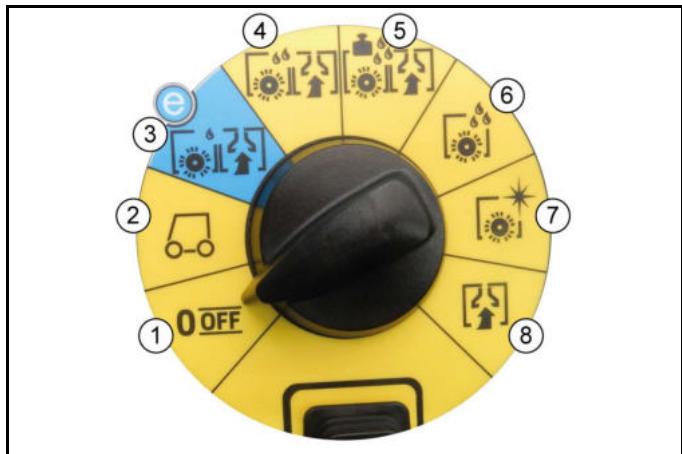
All menus and unit settings that can be called up via the Info button are shown on the display, as well as the battery status, error messages and maintenance interval displays.

Display lighting

The display is backlit in colour. The display colour changes depending on the KIK used:

- Operator (yellow) = yellow
- Foreman/facility manager (grey) = grey
- Service technician (red) = red
- Malfunction/error message = red
- Individual KIK (white) = white

8.3.2 Program switch



- ① OFF
Device is switched off.
- ② Transport journey
Drive to the operating location.
- ③ Eco program
Clean the floor wet (with a reduced amount of water and a reduced brush speed) and vacuum up waste water (with reduced suction power).
- ④ Scour and vacuum
Clean the floor wet and vacuum up waste water.
- ⑤ Increased brush contact pressure
Clean the floor wet (with increased brush contact pressure) and vacuum up waste water.
- ⑥ Scouring / pre-cleaning without vacuuming
Clean the floor wet and let the detergent act.
- ⑦ Vacuuming
Vacuum up the dirty waste.
- ⑧ Polishing
Polish the floor at a high brush speed without applying liquid.

8.4 040 Service activities

Note

Unless otherwise described, installation is performed in reverse order.

8.4.1 Removing/installing the control panel

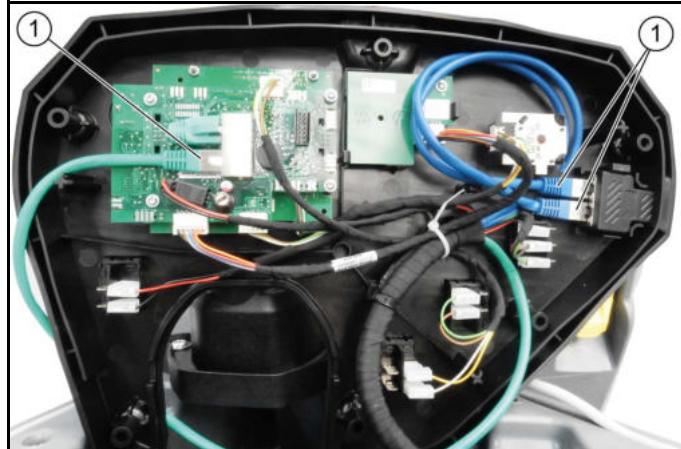
- 17.4.1 Disconnecting/connecting the power supply
- 12.4.1 Removing/installing the steering wheel



① Info button

② Screws

1. Pull the info button off.
2. Unscrew the screws.
(Tightening torque: 3 Nm)
3. Remove the control panel and turn it towards the driver's seat.

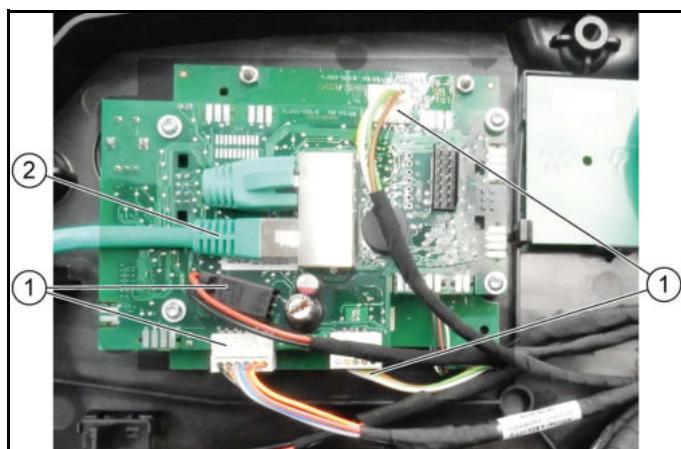


① LAN plug

4. Unplug the LAN plug.

8.4.2 Removing/installing the display

- 8.4.1 Removing/installing the control panel



① Electrical socket plug connections

② LAN plug

1. Disconnect the electrical socket plug connections.
2. Unplug the LAN plug.



- ① Screws
 - ② Circuit board with display
3. Unscrew the screws.
4. Remove the circuit board with display.

Installation information

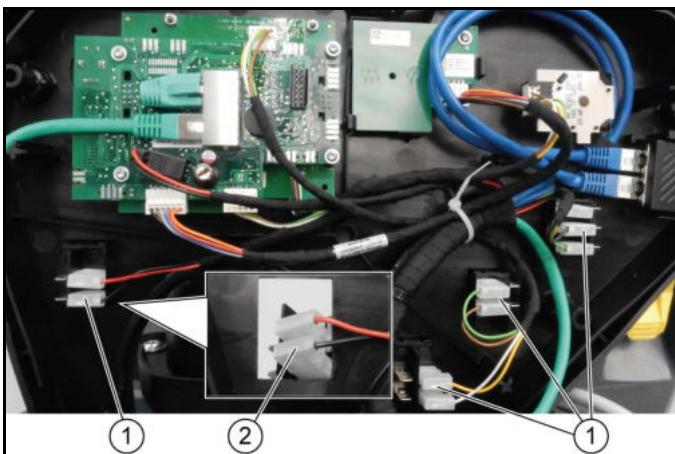
Tightening torque: 0.5 Nm.

8.4.3 Removing/installing the trigger

- 8.4.1 Removing/installing the control panel

- ① Electrical socket plug connections
- ② Power switch

1. Disconnect the electrical socket plug connections.
2. Press the power switch out of the control panel.

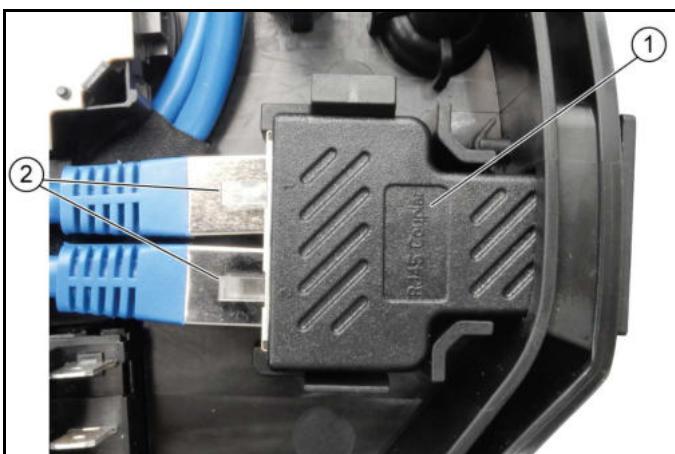


8.4.4 Removing/installing the diagnostic connector

- 8.4.1 Removing/installing the control panel

- ① LAN plug
- ② Diagnostic connector

1. Unplug the LAN plug.
2. Push the diagnostic connector out inwards.



8.4.5 Removing/installing the program selection switch

- 8.4.1 Removing/installing the control panel



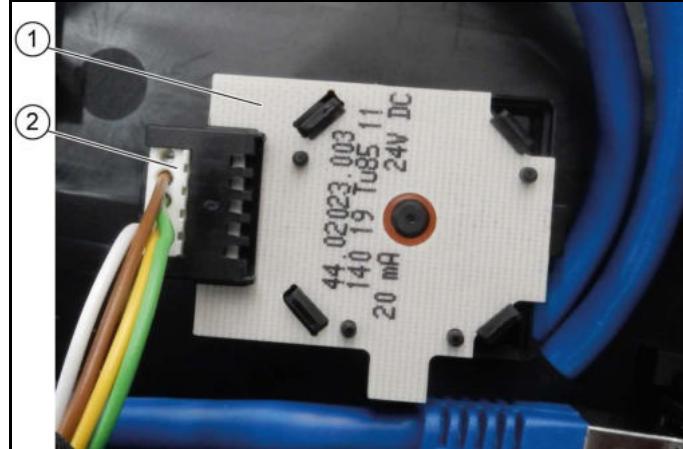
① Selector switch

1. Pull the selector switch off.



① Screws

2. Unscrew the screws.



① PCB

② Electrical connector

3. Disconnect the electrical connector.

4. Remove the printed board.

Note

Check the program selection switch.

| | | |
|------------------------------------|---|--|
| Off | - | - |
| Transport | White: Yellow | Approx. > 50 Ω |
| Eco | White: Yellow White: Green | Approx. > 50 Ω Approx. > 50 Ω |
| Scour and vacuum | White: Green | Approx. > 50 Ω |
| Heavy scouring and vacuum cleaning | White: Green White: Brown | Approx. > 50 Ω Approx. > 50 Ω |
| Wet scrubbing | White: Yellow White: Green White: Brown | Approx. > 50 Ω Approx. > 50 Ω Approx. > 50 Ω |
| Polishing | White: Yellow White: Brown | Approx. > 50 Ω Approx. > 50 Ω |
| Vacuuming | White: Brown | Approx. > 50 Ω |

8.4.6 Removing/installing the RFID reader

- 8.4.1 Removing/installing the control panel



① Screw

② Electrical connector

1. Disconnect the electrical connector.
2. Unscrew the screw.

8.5 050 Service and inspection

Service group does not contain any maintenance and inspection points.

8.6 060 Fault diagnosis

This service group does not have fault diagnosis.

8.7 070 Special features / other

This service group does not have any special features.

9 Water system service group

9.1 010 Safety instructions

Note

Service and maintenance work may only be performed by suitably qualified and specially trained personnel.

Observe the safety instructions in the chapters!

⚠ DANGER

Risk of injury due to the device starting and due to rotating parts

A risk of injury exists due to the device starting unexpectedly and from rotating parts such as motors, suction turbine, drive wheels and brushes.

Turn the program selection switch to the "Off" position and remove the Intelligent Key before performing any work on the device. Disconnect the battery connector and disconnect the minus terminal before working on electrical or electronic components.

ATTENTION

Risk of damage due to electrostatic discharge (ESD)!

Take suitable measure to discharge the electrostatic charge before all work on the unit electronics.

Wear ESD shoes.

Touch one battery pole with your hand for potential equalisation.

Do not remove the electronics from the packaging until immediately before installation.

Do not damage the insulation of the conductors or the coating on the circuit boards when performing measurements on electronic components.

ATTENTION

Risk of damage due to sharp-edged objects and soiling!

Sharp-edged or dirty objects can cause damage such as scratches, notches and deformation when coming into contact with device components. Dirty tools, cloths and work surfaces can cause irreversible soiling and discolouration.

Use only suitable, undamaged and clean tools and auxiliary materials and exercise care when working. Place components and devices only on clean, padded surfaces.

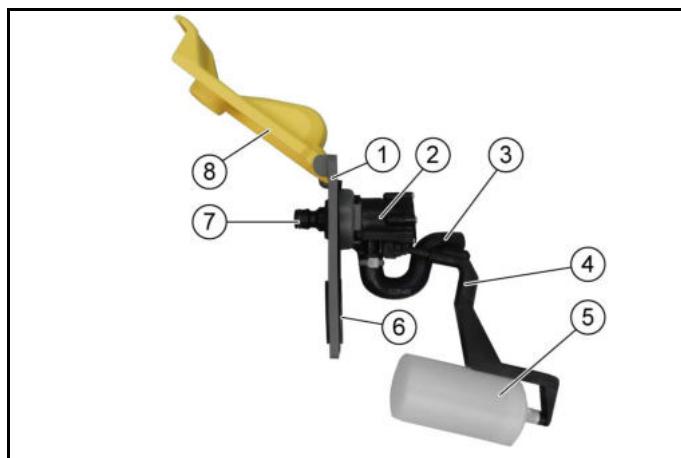
9.2 020 Overview



- ① 9.4.3 Removing/installing the water pump
- ② 9.4.4 Removing/installing the water valve
- ③ 9.4.5 Removing/installing the fresh water tank
- ④ 9.4.2 Removing/installing Auto-fill-in
- ⑤ 9.4.1 Bringing the waste water tank into the servicing position

9.3 030 Function

9.3.1 Auto-fill-in



① Front panel

② Valve

③ Shaped hose

④ Float linkage

⑤ Float

⑥ Round cord seal

⑦ Quick coupling

⑧ Bar cover

For quick filling of the fresh water tank.

The water runs via the quick coupling and the water filter through the valve and into the tank.

The water flows through the small membrane bore, simultaneously pushes the membrane backwards and opens the valve.

When the fresh water tank is full, the float is pushed upwards. After the seal of the float linkage closes the outlet opening, a stronger water pressure builds up behind the membrane and closes the valve.

If the automatic switch-off does not react, the water flows out of the safety overflow.

Note

If the shaped hose is not installed, water will splash out of the safety overflow opening while the tank is being filled.

9.3.2 Filling the fresh water tank



① Bar cover

② Water connection

③ Safety overflow

1. Open cover.

2. Connect the water hose with the quick coupling.

3. Turn on the tap.

Filling stops automatically as soon as the tank is full.

4. Close the tap.

5. Pull off the water hose.

9.3.3 Draining fresh water



① Cap

1. Park the vehicle over a floor drain.
2. Release the cap.
3. Drain the water.
4. Remove the sieve from the cap and clean if necessary.

Note

The cap contains a sieve to protect the fresh water pipe system and the fresh water pump.

9.3.4 Allengra water valve

Components of the water valve and functional principle

- Pressure sensor for determining the water volume in the fresh water tank.

When the ball tap is closed, the pressure sensor measures the pressure in the line and shows the current water volume on the display.

- Flow sensor for determining the actual water quantity.

The flow sensor transmits the frequency signal to the controller. Speed-dependent water dispensing, the display of the residual water quantity in the unit and the detergent dosage are calculated in this way. The speed-dependent water dispensing can be switched to manual setting if necessary.

The water dosing is also influenced by the setting of the respective cleaning program (0 ... 100%).

- Ball tap as a control valve that outputs the desired water quantity.

- An arrow symbol on the casing cover indicates the direction of flow.

- The water valve automatically detects a blockage and the end of the blockage. Three attempts are made to eliminate the blockage.

The boost function provides a short-term increase in torque to remove the blockage. The boost function cannot be controlled manually, it is automatically switched internally during the 3 adjustment attempts in the case of a blockage.

The water valve closes during the following actions:

- Safety switch actuation
- Program selection switch "OFF"
- Removing the KIK
- Battery empty
- Brush overload
- Brush stop
- Release the foot pedal (B110R, -> Ride On) or pedals (B50W -> Walk Behind)

The following voltage measurements have been determined on the water valve. See circuit diagram.

| | |
|--------------------------|--|
| Pin 1 + BAT: Pin 2 GND | UBAT (25.35 V) no consumers switched on |
| Pin 2 GND: Pin 3 release | 25.1 VDC Accelerator pedal depressed (regardless of the depressed position) |

Water quantity on the brush head dependent on the speed:

75 cm Brush head/water quantity in ml/min

| Setting | 2 km/h | 4 km/h | 6 km/h |
|---------|--------|--------|--------|
| 5 % | 237 | 329 | 390 |
| 10 % | 319 | 460 | 563 |
| 20 % | 458 | 741 | 1050 |
| 40 % | 723 | 1472 | 2103 |
| 60 % | 1083 | 2210 | 3169 |
| 80 % | 1453 | 2958 | 4228 |
| 100 % | 1804 | 3697 | 5263 |

Water quantity on the brush head not dependent on the speed:

75 cm Brush head/water quantity in ml/min

| Setting | 2 km/h | 4 km/h | 6 km/h |
|---------|--------|--------|--------|
| 5 % | 458 | 442 | 437 |
| 10 % | 698 | 679 | 666 |
| 20 % | 1347 | 1340 | 1343 |
| 40 % | 2702 | 2684 | 2698 |
| 60 % | 4072 | 4066 | 4087 |
| 80 % | 5400 | 5447 | 5431 |
| 100 % | 6788 | 6750 | 6781 |

9.3.5 Side scrubbing deck water pump

The side scrubbing deck water pump function is not active in the polishing and vacuum cleaning programs.

The side scrubbing deck water pump draws the water between the unit water pump and the water valve, i.e. the side scrubbing deck is supplied with the liquid (with or without detergent) from the fresh water tank.

The dosage cannot be changed and is fixed.

Ratio of speed to water quantity:

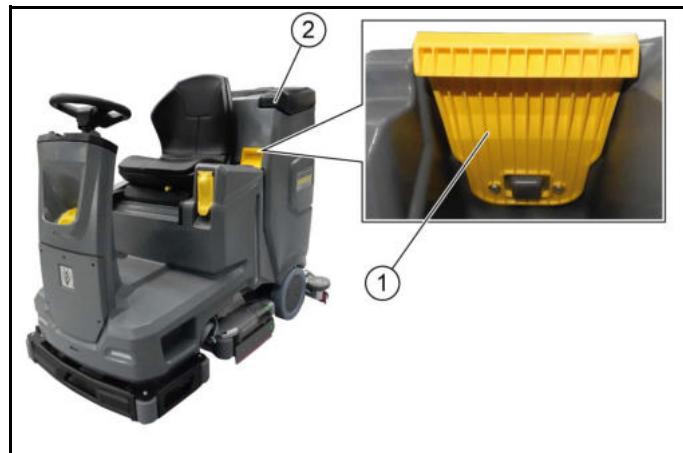
| Speed | Water quantity to SSD in ml/min |
|----------|---------------------------------|
| 6 km/h | 1862 |
| 5 km/h | 1882 |
| 4 km/h | 1906 |
| 3 km/h | 1912 |
| 2 km/h | 1484 |
| 1 km/h | 556 |
| 0.5 km/h | 223 |
| 0 km/h | 0.0 |

9.4 040 Service activities

Note

Unless otherwise described, installation is performed in reverse order.

9.4.1 Bringing the waste water tank into the servicing position



① Lock

② Waste water tank

1. Empty waste water tank completely.
2. Release the lock and swivel the waste water tank to the rear.



① Screw

② Tab

3. Release the screw.
(Tightening torque: 1.8 Nm)
4. Turn the tab downwards.



① Bolt with tether

5. Insert the tethered bolt in the rear position.

9.4.2 Removing/installing Auto-fill-in



① Screws

② Auto-fill-in

1. Unscrew the screws.

(Tightening torque: 2.0 Nm)

2. Obtain Auto Fill-In from the fresh water tank.

Installation information

The shaped hose must not be kinked during installation.

If the shaped hose is not installed, water will splash out of the overflow opening during filling.

When installing, make sure that the float can move freely.



① Quick coupling

3. Unscrew the quick coupling.



① Water filter

Note

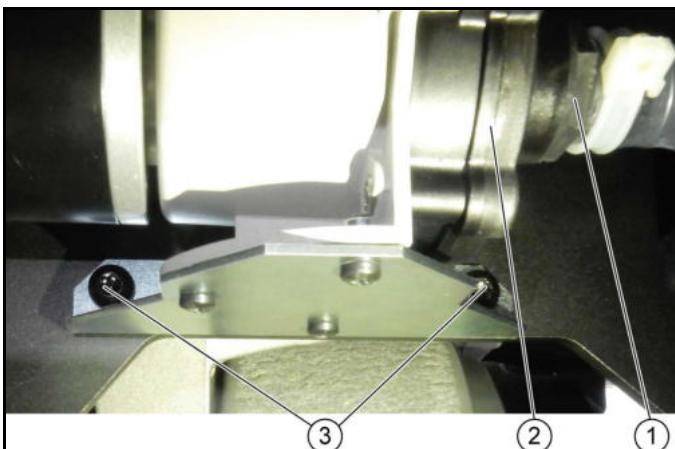
The water filter cannot be replaced.

4. To clean, actuate the valve and rinse with clear water.

9.4.3 Removing/installing the water pump

Note

The side impact protection can be folded away so that the water pump is more accessible.



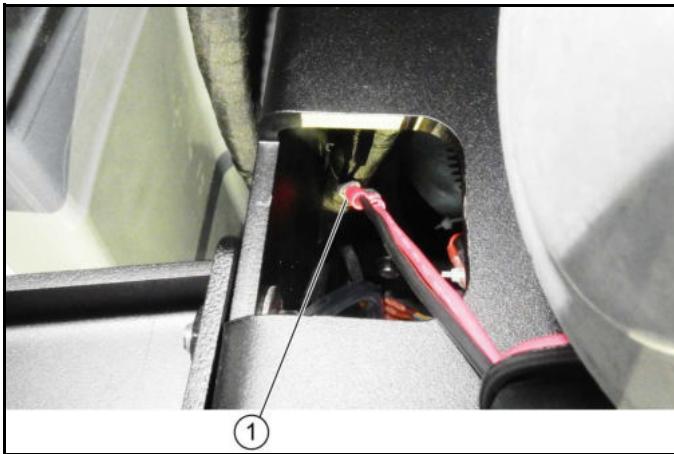
① Water connection

② Water pump

③ Screws

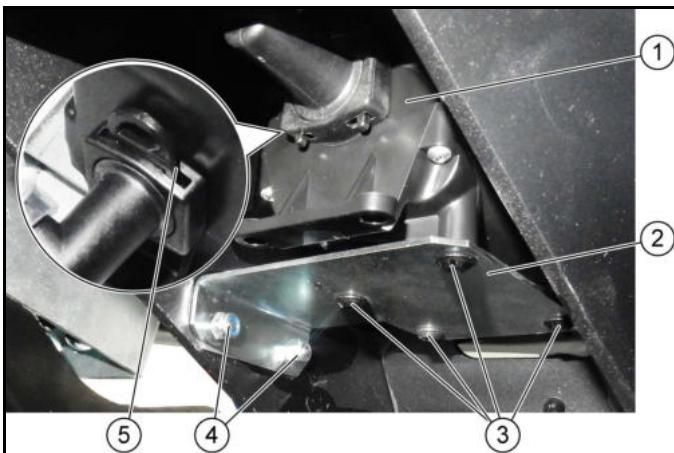
1. Unscrew the screws.

2. Disconnect the water connections.

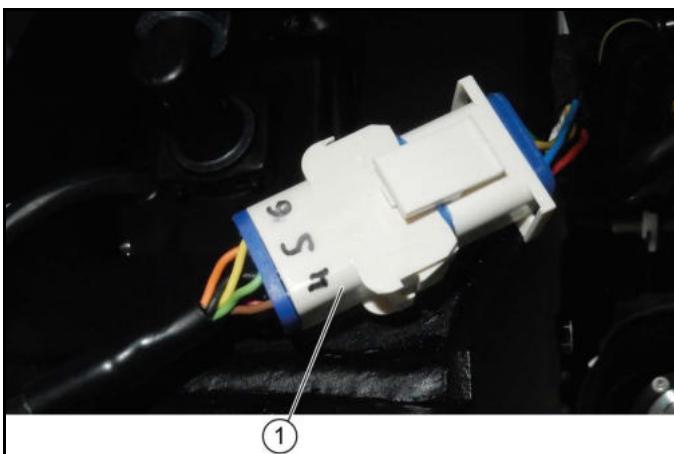


- ① Electrical socket plug connections
- 3. Disconnect the electrical socket plug connections.
- 4. Remove the water pump.

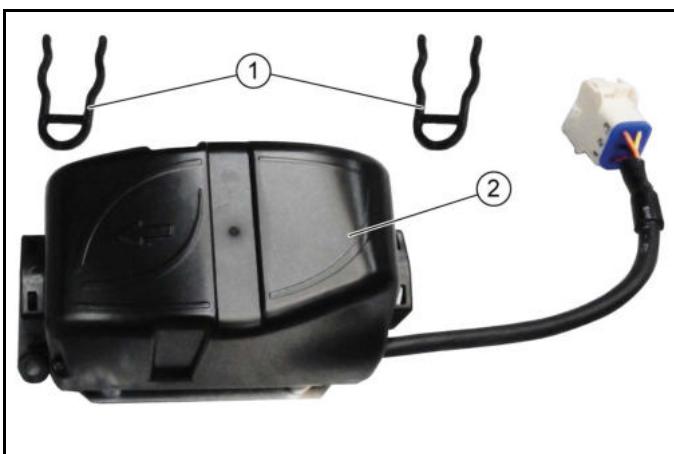
9.4.4 Removing/installing the water valve



- ① Water valve
- ② Support
- ③ Screws
- ④ Nuts
- ⑤ Safety clip
- 1. Unscrew the nuts.
- 2. Turn the water valve with the support and pull it down slightly.
- 3. Remove the safety clips upwards on both sides.



- ① Electrical connector
- 4. Disconnect the electrical connector.



- ① Safety clips
- ② Water valve
- 5. Unscrew the support screws.
- 6. Remove the water valve.

9.4.5 Removing/installing the fresh water tank

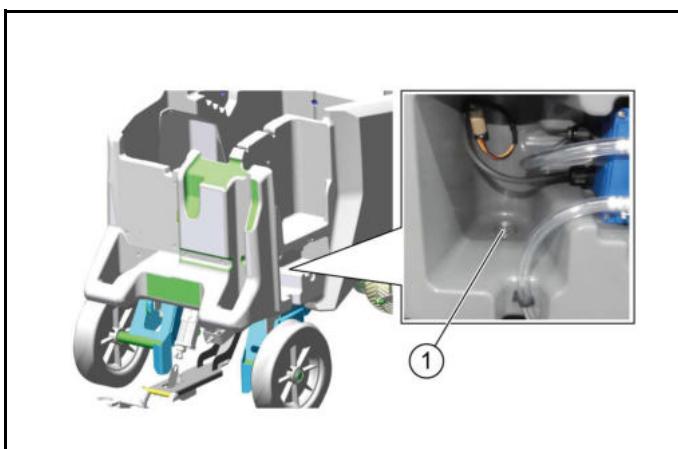
- 9.3.3 Draining fresh water
- 7.4.2 Removing/installing the driver's seat
- 17.4.7 Removing/installing the charger
- 17.4.2 Removing/installing the batteries
- 11.4.5 Removing/installing the waste water tank
- 12.4.1 Removing/installing the steering wheel
- 17.4.6 Removing/installing the controller



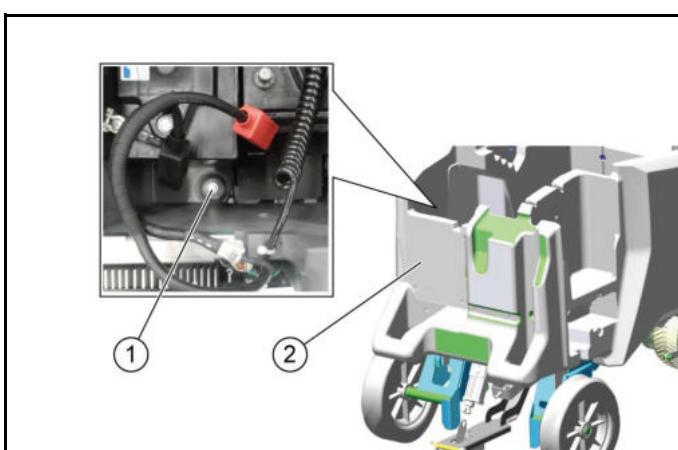
Note

The fresh water tank is attached to the frame with 3 screws.

- ① Screw under the unit electronics
1. Unscrew the screw.



- ① Screw on the detergent dosing pump
2. Unscrew the screw.



- ① Screw next to the battery
- ② Fresh water tank
3. Unscrew the screw.

Note

Always remove the fresh water tank using two persons.

9.5 050 Service and inspection

Service group does not contain any maintenance and inspection points.

9.6 060 Fault diagnosis

This service group does not have fault diagnosis.

9.7 070 Special features / other

This service group does not have any special features.

10 Detergent dosing unit service group

10.1 010 Safety instructions

Note

Service and maintenance work may only be performed by suitably qualified and specially trained personnel.

Observe the safety instructions in the chapters!

⚠ DANGER

Risk of injury due to the device starting and due to rotating parts

A risk of injury exists due to the device starting unexpectedly and from rotating parts such as motors, suction turbine, drive wheels and brushes.

Turn the program selection switch to the "Off" position and remove the Intelligent Key before performing any work on the device. Disconnect the battery connector and disconnect the minus terminal before working on electrical or electronic components.

ATTENTION

Risk of damage due to electrostatic discharge (ESD)!

Take suitable measure to discharge the electrostatic charge before all work on the unit electronics.

Wear ESD shoes.

Touch one battery pole with your hand for potential equalisation.

Do not remove the electronics from the packaging until immediately before installation.

Do not damage the insulation of the conductors or the coating on the circuit boards when performing measurements on electronic components.

ATTENTION

Risk of damage due to sharp-edged objects and soiling!

Sharp-edged or dirty objects can cause damage such as scratches, notches and deformation when coming into contact with device components. Dirty tools, cloths and work surfaces can cause irreversible soiling and discolouration.

Use only suitable, undamaged and clean tools and auxiliary materials and exercise care when working. Place components and devices only on clean, padded surfaces.

10.2 020 Overview

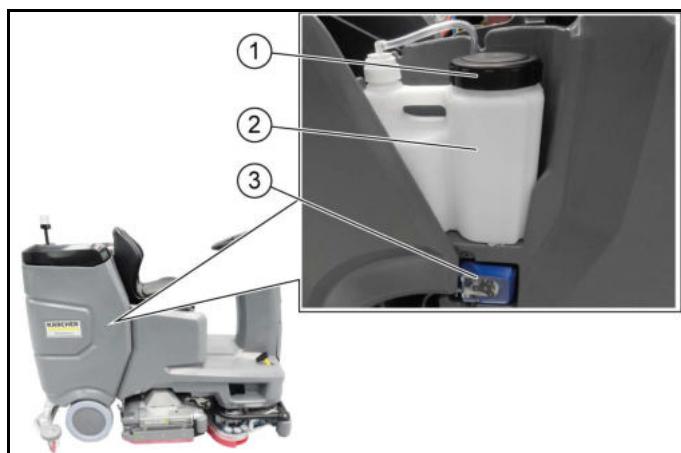


- ① 10.4.2 Removing/installing the detergent dosing pump
- ② 10.4.1 Removing/installing the detergent dosing hose

10.3 030 Function

10.3.1 Detergent dosing unit (DOSE)

Detergent is added to the fresh water on the way to the cleaning head by a dosing device.



- (1) Refilling opening
- (2) Detergent container
- (3) Detergent dosing pump

Note

A maximum of 3% detergent can be added with the dosing device. If the dosage is higher, the detergent must be added to the fresh water tank.

⚠ CAUTION

Danger of clogging due to dried detergent

The flow meter of the dosing unit can stick together with dried-on detergent and hinder the function of the dosing device.

If the detergent has dried out, rinse the fresh water tank and the unit with clear water.

Note

The unit has a fresh water level indicator on the display. Detergent dosing is stopped when the fresh water tank is empty. The cleaning head continues to work without a supply of liquid.

Detergent dosage quantity

The flow sensor in the water valve transmits the frequency signal to the controller. This calculates the speed-dependent water dispensing and the detergent dosage.

Detergent dosage at the maximum dosage setting and at the following speeds:

| Speed | RM dosage in ml/min |
|----------|---------------------|
| 6 km/h | 159 |
| 5 km/h | 153 |
| 4 km/h | 135 |
| 3 km/h | 119 |
| 2 km/h | 63 |
| 1 km/h | 30 |
| 0.5 km/h | 17 |
| 0 km/h | 0.0 |

10.4 040 Service activities

Note

Unless otherwise described, installation is performed in reverse order.

10.4.1 Removing/installing the detergent dosing hose

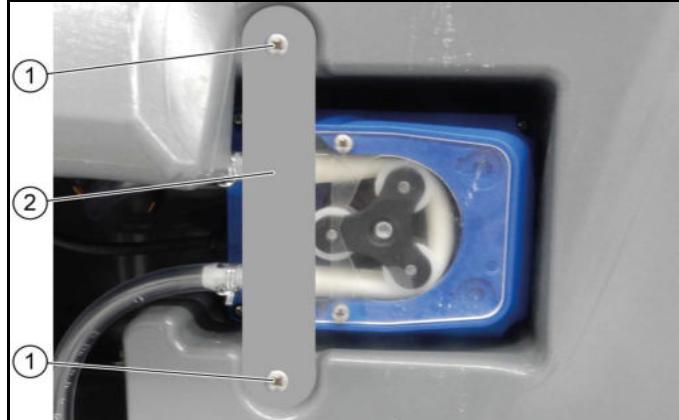
- 9.4.1 Bringing the waste water tank into the servicing position

① Screws

② Fastening plate

1. Unscrew the screws.

2. Remove the cable holder.

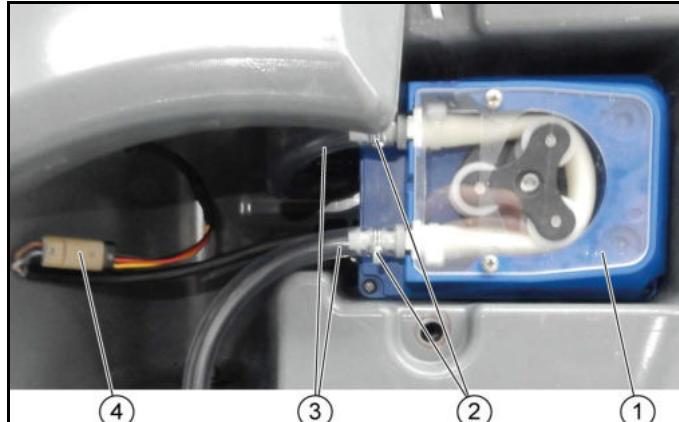


① Screws

② Bar cover

3. Unscrew the screws.

4. Remove the cover.



① Detergent dosing pump

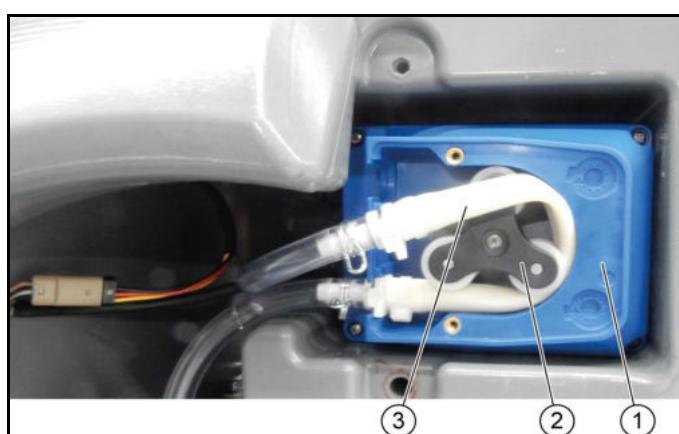
② Impeller

③ Dosing hose

④ Hose clamps

5. Pull out the dosing hose at the top.

6. Turn the pump wheel clockwise until the pump hose is completely unwound.

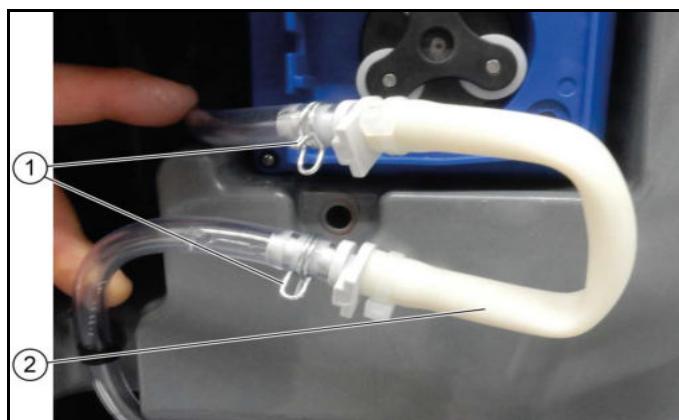


① Hose clamps

② Dosing hose

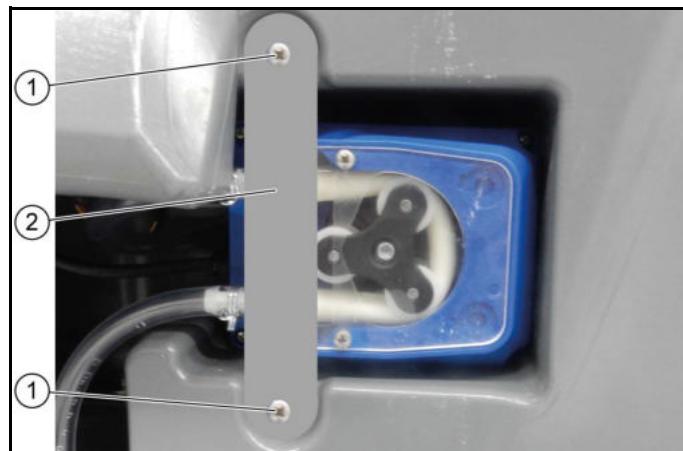
7. Undo the hose clamps.

8. Remove the dosing hose.

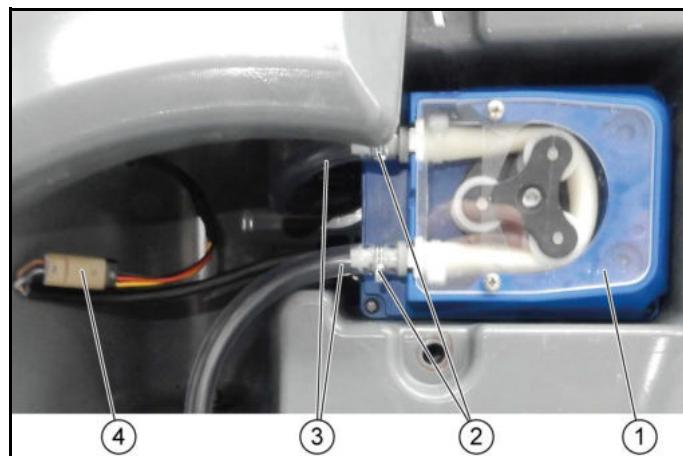


10.4.2 Removing/installing the detergent dosing pump

- 9.4.1 Bringing the waste water tank into the servicing position



- (1) Screws
 - (2) Fastening plate
1. Unscrew the screws.
 2. Remove the cable holder.
 3. Disconnect the hose connections.



- (1) Detergent dosing pump
 - (2) Hose clamps
 - (3) Hoses
 - (4) Electrical connector
4. Remove the detergent dosing pump.
 5. Undo the hose clamps.
 6. Detach the hoses.
 7. Disconnect the electrical connector.

10.5 050 Service and inspection

Service group does not contain any maintenance and inspection points.

10.6 060 Fault diagnosis

This service group does not have fault diagnosis.

10.7 070 Special features / other

This service group does not have any special features.

11 Suction system service group

11.1 010 Safety instructions

Note

Service and maintenance work may only be performed by suitably qualified and specially trained personnel.

Observe the safety instructions in the chapters!

⚠ DANGER

Risk of injury due to the device starting and due to rotating parts

A risk of injury exists due to the device starting unexpectedly and from rotating parts such as motors, suction turbine, drive wheels and brushes.

Turn the program selection switch to the "Off" position and remove the Intelligent Key before performing any work on the device. Disconnect the battery connector and disconnect the minus terminal before working on electrical or electronic components.

⚠ CAUTION

Risk of burns from hot surfaces.

Allow the device to cool down prior to all work.

11.2 020 Overview



- ① 11.4.4 Removing/installing the waste water tank cover
- ② 11.4.9 Removing/installing the suction bar lifting motor
- ③ 11.4.11 Removing/installing the suction turbine
- ④ 11.4.12 Removing/installing the suction turbine sliding contacts
- ⑤ 11.4.6 Removing/installing the suction bar
- ⑥ 11.4.5 Removing/installing the waste water tank
- ⑦ 11.4.1 Removing/installing the waste water tank float switch
- ⑧ 11.4.2 Removing/installing the waste water tank float
- ⑨ 11.4.8 Removing/installing the suction bar suspension
- ⑩ 11.4.15 Removing/installing the suction hose
- ⑪ 11.4.7 Removing/installing the suction lips
- ⑫ 11.4.10 Removing/installing the suction bar clamps
- ⑬ 11.4.14 Removing/installing the waste water drain hose
- ⑭ 11.4.13 Removing/installing the dirt sieve

- ⑯ 11.4.3 Removing/installing the waste water tank spray nozzles

11.3 030 Function

11.3.1 Suction system

The suction bar lifting motor regulates the height of the suction bar. The suction bar can be lowered to the ground or raised via a tension spring.

The upper and lower position is switched off respectively using a microswitch. When the appliance is reversing, the suction bar lifts up automatically.

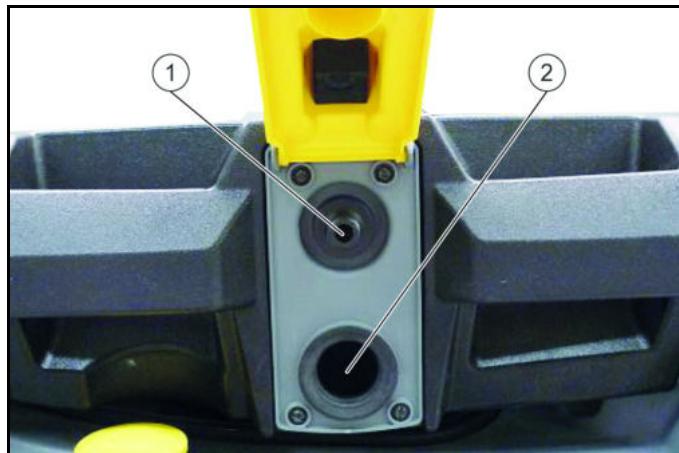
The suction bar sucks up the water emitted by the cleaning head and guides it through a hose line into the waste water tank.

The suction bar is movably attached to a suspension so that it can be swivelled when cornering. The water sucked off by the suction bar is collected in the waste water tank, which must be emptied via the waste water drainage hose when it is full.

11.3.2 Suction turbine

The suction turbine has an after-running time of 10 seconds after the program selection switch is set to a program without suction.

11.3.3 Waste water tank flushing system



11.3.4 Waste water tank float

The float is built into the waste water tank.

The suction turbine creates a vacuum in the waste water tank.

As a result, the waste water is pumped from the suction bar through the suction hose into the waste water tank.

When the waste water tank is at its maximum filling level, the float closes the suction opening.

Note

The suction turbine switches off automatically when the waste water tank is full.

After the unit has been switched off, the suction turbine continues to run, in order to suck the residual water out of the suction hose (after-running time).

The suction turbine is installed in the waste water tank under the suction duct cover.

① Waste water tank flushing system connection

② Overflow

The waste water tank must be cleaned via the nozzle system or with a water hose after the cleaning work has been completed.

11.3.5 Waste water tank float switch

A float switch is built into the waste water tank to monitor the filling level.

The magnetic float closes the reed switch contact when the waste water tank is full. 10 seconds after the contact is triggered, the suction turbine is switched off and a message is shown on the display.

To prevent waste water from entering the suction turbine, the suction opening is closed by a float when the waste water tank is full.

11.4 040 Service activities

Note

Unless otherwise described, installation is performed in reverse order.

11.4.1 Removing/installing the waste water tank float switch



① Nut

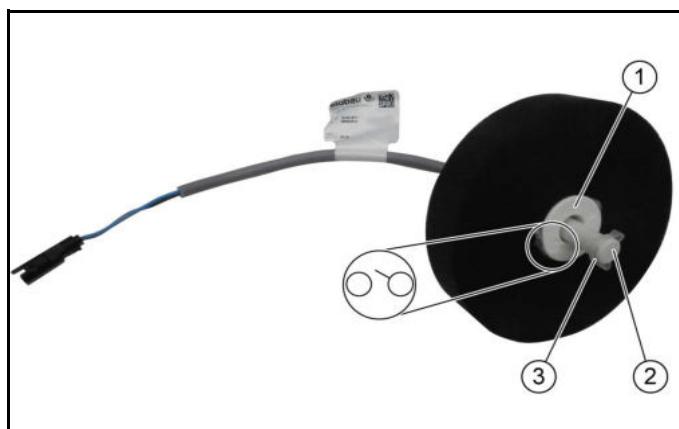
② Electrical connector

1. Tilt the waste water tank backwards.
2. Unscrew the nut.
3. Disconnect the electrical connector.



① Casing

4. Open the waste water tank cover.
5. Remove the casing with the float and float switch.



① Float switch magnet

② Float switch

③ Fuse

6. Remove the fuse.
7. Pull out the float switch.

Installation information

Note the installation position of the float switch magnet (see symbol on magnet).

An incorrectly installed float switch switches off the suction turbine when the waste water tank is empty.

11.4.2 Removing/installing the waste water tank float



① Screws

② Casing

③ Float

1. Open the waste water tank cover.
2. Unscrew the screws.
3. Remove the casing together with the float.

Note

Clean the float regularly to avoid functional impairment.

Note

If the suction turbine bearing is damaged, check the function of the float.

11.4.3 Removing/installing the waste water tank spray nozzles



- ① Screws
 - ② Retaining plate
1. Unscrew the screws.
(Tightening torque: 1.8 Nm)
 2. Remove the retaining plate.



- ① Spray nozzle bar
3. Take the spray nozzle bar out of the guide.

11.4.4 Removing/installing the waste water tank cover



- ① Waste water tank cap
 - ② Screwdriver
1. Clamp a screwdriver with a thick handle under the cover on the left.



- ① Cover support
2. The cover support must not be locked in place.
 3. Close the cover.
The cover is pushed out of the hinge on the left.

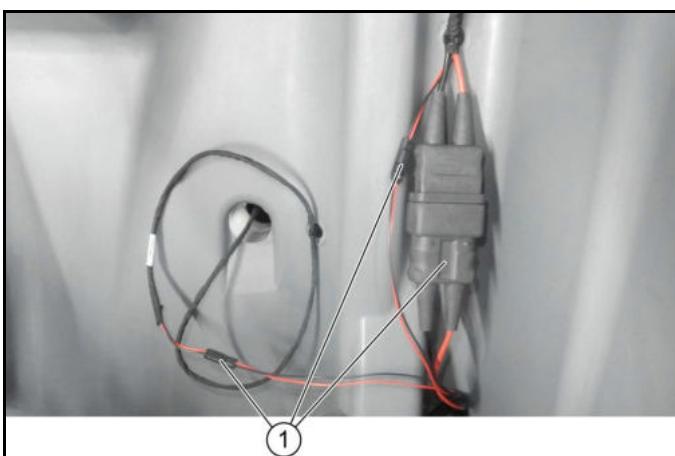


① Cover

4. Push the cover to the right so that it slides out of the right hinge.
5. Remove the cover.

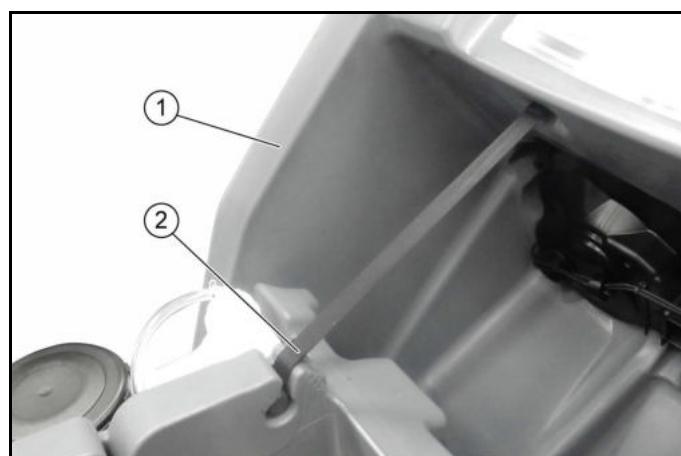
11.4.5 Removing/installing the waste water tank

- Empty the waste water tank
- *9.4.1 Bringing the waste water tank into the servicing position*



① Electrical socket plug connections

1. Disconnect the electrical socket plug connections.



① Waste water tank

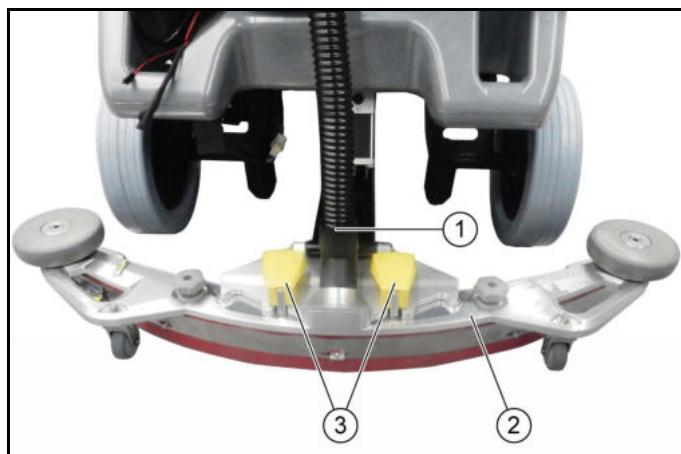
② Service rope

2. Two people hold the waste water tank on the left and right.
3. Release the service rope from the support.
4. Lift the waste water tank out of the hinge and set it down to the rear.

5. Set the waste water tank down on the back.



11.4.6 Removing/installing the suction bar



① Suction hose branch

② Suction bar

③ Clamp

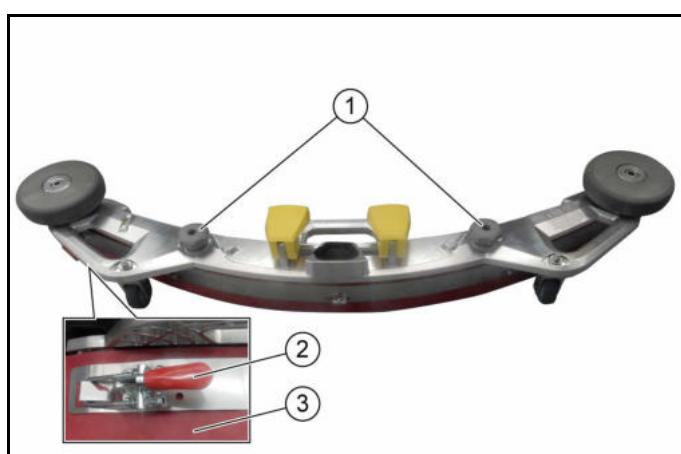
1. Raise the suction bar.

2. Pull off the suction hose branch at the suction mouth of the suction bar.

3. Release the clamp.

4. Remove the suction bar.

11.4.7 Removing/installing the suction lips



- 11.4.6 Removing/installing the suction bar

① Star handle

② Strap clamping lever

③ Squeegee blade

1. Release the strap clamping lever.

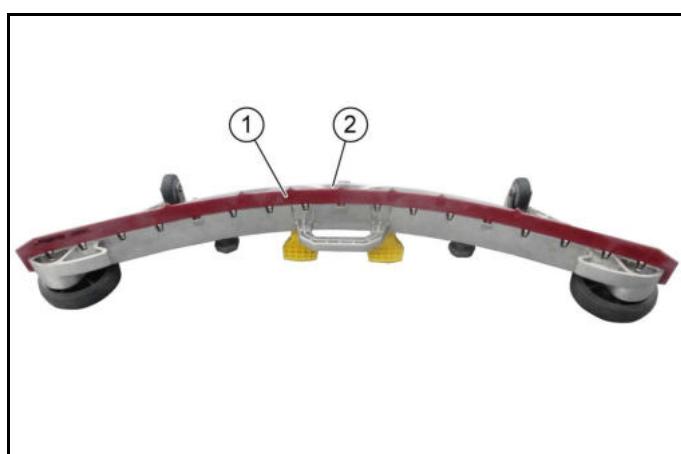
2. Remove the strap with the squeegee blade.

3. Release the star handles.

Note

A hexagon drive at the bottom allows easier releasing of the star handles.

Grease the threaded pin so that the star handle nut does not stick to the threaded pin.



① Support lip

② Inner part of the suction bar

4. Turn the suction bar over.

5. Pull out the inner part of the suction bar with the support lip.



① Strap

② Squeegee blade

③ Support rollers

④ Suction bar

⑤ Support lip with suction bar inner part

Note

The suction lips can be turned until all edges are worn. A new suction lip is then required.

6. Turn the suction lips over and reinstall.

Installation information

Adjust the support rollers so that the suction lip touches the floor and vacuum cleaning is performed correctly.

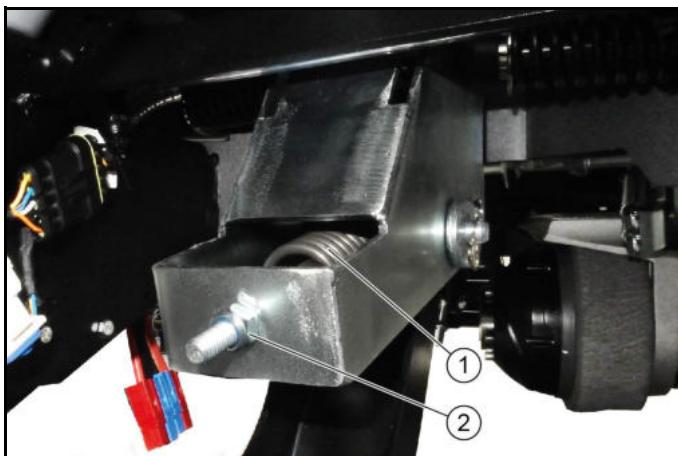
11.4.8 Removing/installing the suction bar suspension

- 11.4.6 Removing/installing the suction bar



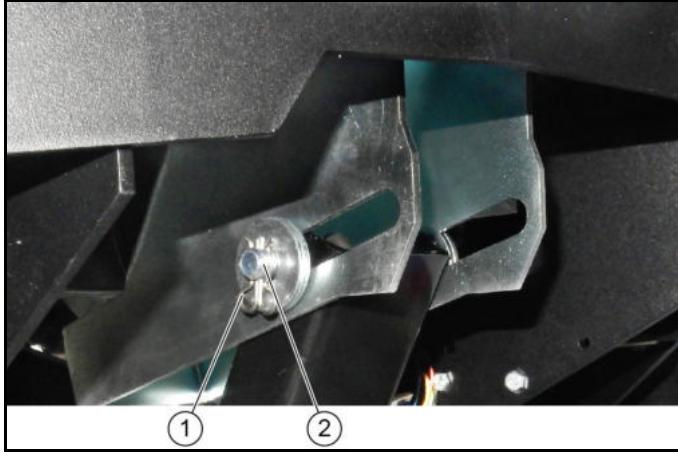
- ① Lifting motor
- ② Screw

1. Extend the lifting motor.
2. Unscrew the screw and lock nut.



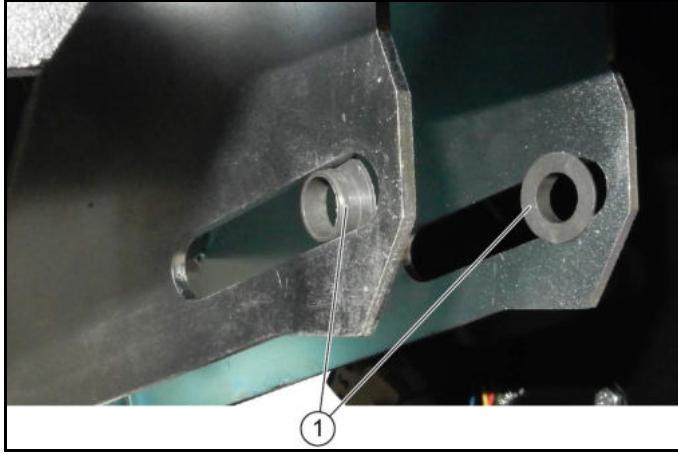
- ① Spring
- ② Nut

3. Counter-hold the spring.
4. Unscrew the nut.



- ① Locking pin
- ② Bolt

5. Remove the locking pin.
6. Pull out the bolt.



- ① Bearing bushes

7. Remove the bearing bushes.



Adjusting the suction bar

① Adjustment screw

② Lock nut

8. Loosen the counternut.

9. Adjust the suction bar using the adjusting nut.

10. Tighten the counternut.

See 11.5.1 Suction bar standard setting.

Installation information

Grease the thread of the adjusting screw.

11.4.9 Removing/installing the suction bar lifting motor

- 11.4.6 Removing/installing the suction bar

① Lifting motor

② Screw

1. Extend the lifting motor.

2. Unscrew the screw and lock nut.

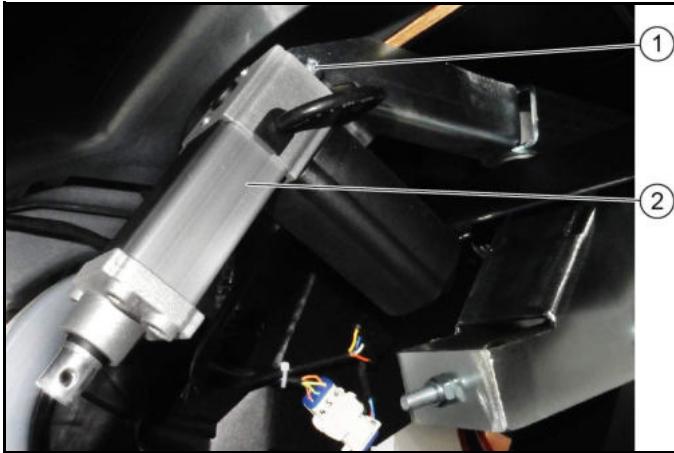


① Screw

② Lifting motor

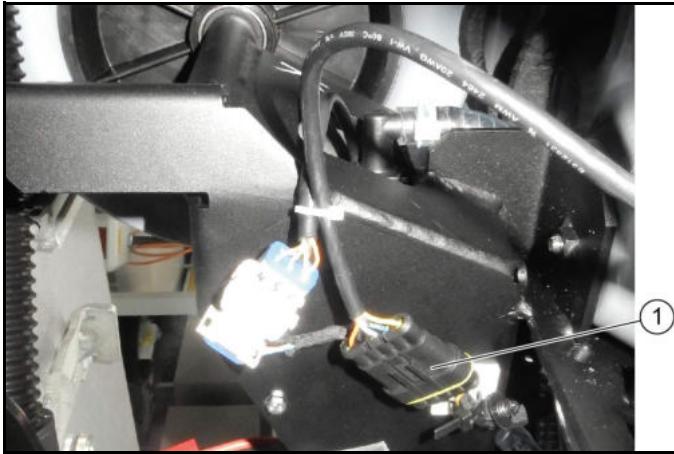
3. Unscrew the screw and lock nut.

4. Remove the lifting motor.



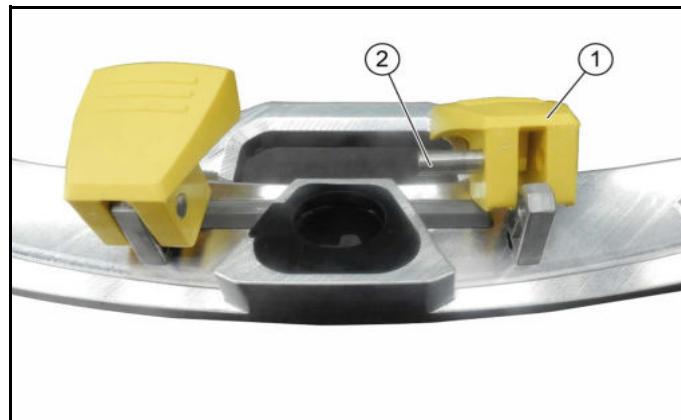
① Electrical connector

5. Disconnect the electrical connector.



11.4.10 Removing/installing the suction bar clamps

- 11.4.6 Removing/installing the suction bar



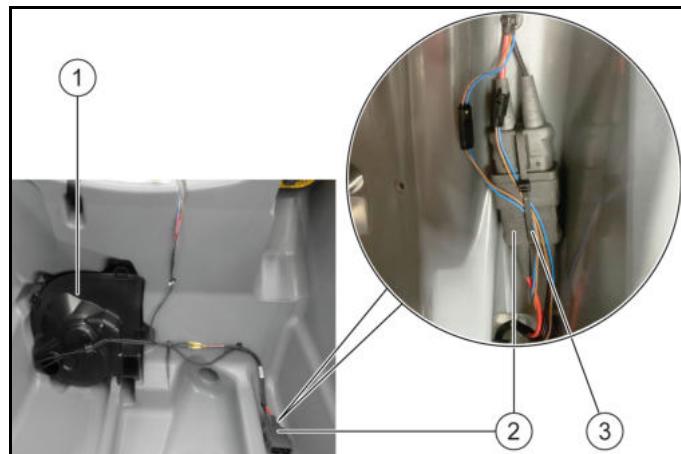
① Clamp

② Bolt

1. Knock out the bolt.
2. Remove the clamp.

11.4.11 Removing/installing the suction turbine

- 17.4.1 Disconnecting/connecting the power supply
- Drain and pivot up the waste water tank



① Suction turbine

② Electrical connector

③ Cable ties

Note

If the suction turbine is defective, always check the float functionality.

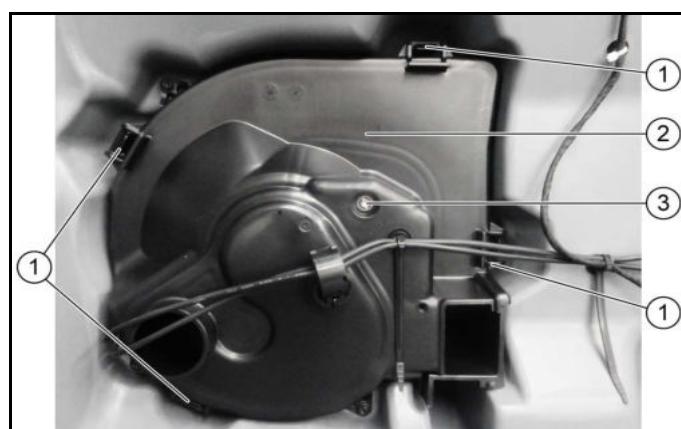
1. Disconnect the electrical connector.

Note

Release the necessary cable ties.

Installation information

Secure the connector with a cable tie as shown. Otherwise the connector could vibrate apart.



① Latching hooks

② Suction duct cover

③ Screw

2. Unscrew the screw.

(Tightening torque: 1.8 Nm)

3. Unclip the locking hook.

4. Remove the suction duct cover.

Installation information

Ensure that the cover seal and electrical cables are seated correctly.



① Screws

② Casing

5. Remove the casing with the suction turbine.

Installation information

Pay attention to the length of the screws when installing in order not to damage the waste water tank.

Note

If the suction turbine bearing is damaged, check the function of both floats in the waste water tank.



① Suction turbine

② Anti-turn lock

6. Carefully release the suction turbine from its seat and remove it.

Note

The suction turbine is very tightly seated!

Installation information

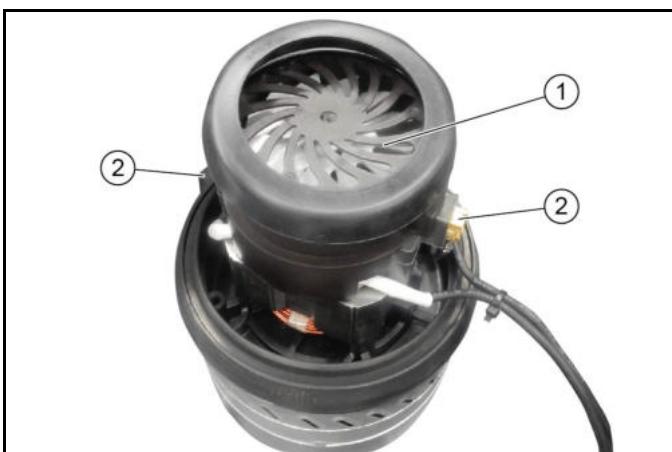
Take care to ensure the correct alignment of the anti-turn lock.

11.4.12 Removing/installing the suction turbine sliding contacts

- 11.4.11 Removing/installing the suction turbine

Note

Only release the suction turbine and do not disconnect the suction turbine electrical cables.



① Suction turbine

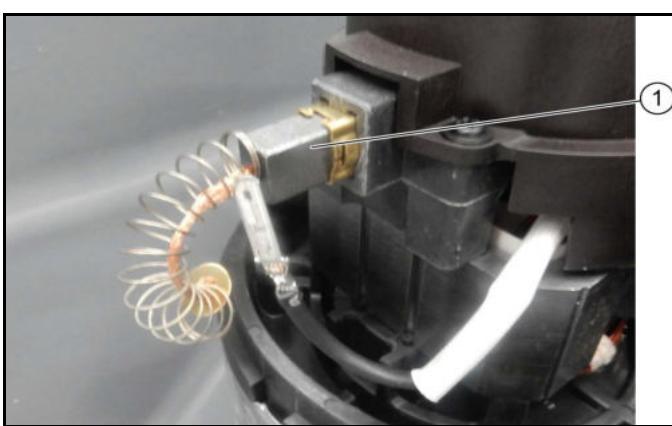
② Sliding contacts

1. Expose the suction turbine until both sliding contacts are accessible.



① Retaining contact

2. Unlock and pull out the retaining contact.



① Sliding contact

3. Pull out the sliding contact.

Note

Check slip rings for deposits on the sliding contacts and clean if necessary.

Note

Always renew all sliding contacts (length 28 mm).

11.4.13 Removing/installing the dirt sieve



- (1) Suction turbine dirt sieve
- (2) Waste water tank dirt sieve

ATTENTION

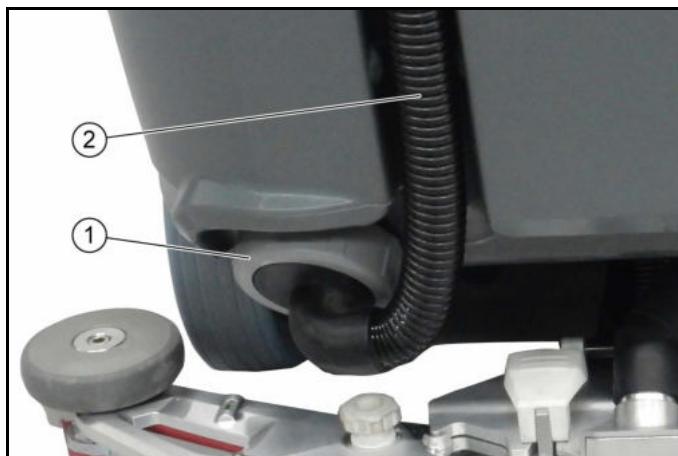
Damage to the suction turbine

Water can damage the suction turbine.

Do not pour water into the opening of the dirt sieve.

1. Open the waste water tank cover.
2. Remove the dirt sieve from the support and clean it, replace if damaged.

11.4.14 Removing/installing the waste water drain hose



- Empty the waste water tank

- (1) Waste water tank cap

- (2) Drain hose

1. Open and remove the waste water tank cap.
2. Remove the waste water hose from the screw ring and replace it.

Note

The waste water drain hose is also a sealing ring.

If the screw connection leaks, replace the waste water drain hose.

11.4.15 Removing/installing the suction hose



- (1) Suction hose

- (2) Suction hose branch

- (3) Suction bar

1. Pull off the suction hose branch at the suction mouth of the suction bar.

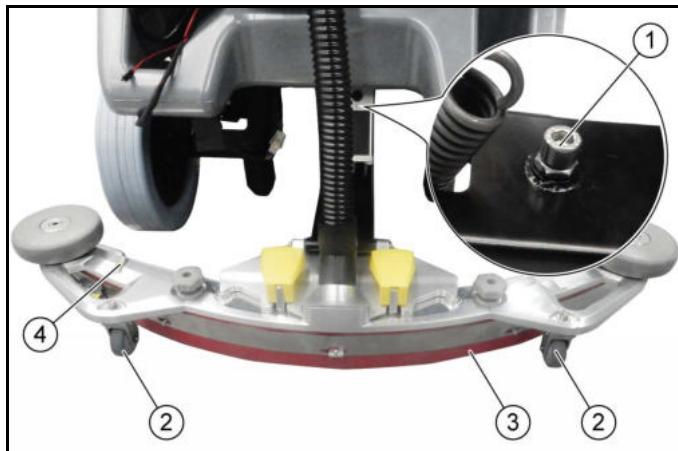
2. Pull off the suction hose at the top of the device.

Installation information

Make sure that the suction hose is routed diagonally to the front right so that it does not rub against the tank.

11.5 050 Service and inspection

11.5.1 Suction bar standard setting



① Suction bar inclination adjustment

② Support rollers

③ Rear suction lip

④ Spirit level (bubble level)

1. The front and rear suction lips must be installed correctly.

2. Lower the suction bar onto the floor.

3. Turn the adjusting screw of the inclination adjustment until the suction bar is centred via the attached spirit level (bubble level).

Note

The suction bar needs to be adjusted so that the rear suction lip bends slightly to the rear when driving forwards.

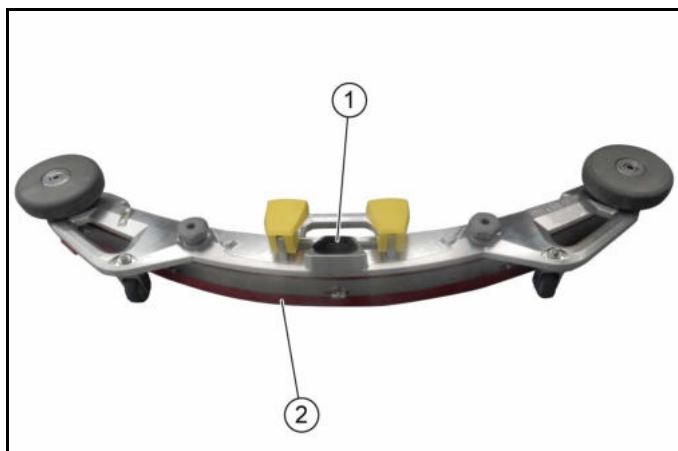
4. Adjust the support rollers so that they roll slightly when driving forwards and the rear suction lips are slightly bent.

Note

The suction bar must be adjusted parallel to the floor in order to achieve the best suction result.

5. Check the suction result with a test run of the device, re-adjust if necessary.

11.5.2 Cleaning the suction bar



① Suction hose port

② Rear suction lip

1. Clean the suction hose port.

2. Clean the front and rear suction lips.

11.6 060 Fault diagnosis

This service group does not have fault diagnosis.

11.7 070 Special features / other

This service group does not have any special features.

12 Steering service group

12.1 010 Safety instructions

Note

Service and maintenance work may only be performed by suitably qualified and specially trained personnel.

Observe the safety instructions in the chapters!

⚠ DANGER

Risk of injury due to the device starting and due to rotating parts

A risk of injury exists due to the device starting unexpectedly and from rotating parts such as motors, suction turbine, drive wheels and brushes.

Turn the program selection switch to the "Off" position and remove the Intelligent Key before performing any work on the device. Disconnect the battery connector and disconnect the minus terminal before working on electrical or electronic components.

⚠ CAUTION

Risk of burns from hot surfaces.

Allow the device to cool down prior to all work.

12.2 020 Overview



- ① 12.4.1 Removing/installing the steering wheel
- ② 12.4.2 Removing/installing the steering column
- ③ 12.4.3 Removing/installing the steering ring gear

12.3 030 Function

No special functional features.

12.4 040 Service activities

Note

Unless otherwise described, installation is performed in reverse order.

12.4.1 Removing/installing the steering wheel

Note

A special pulling tool is required to remove the steering wheel.



① Bar cover

1. Remove the cover with a screwdriver.



① Nut

② Washer

2. Unscrew the nut.
3. Remove the nut and washer.



① Pulling tool

② Screw

③ Screws

4. Apply the pulling tool.
5. Screw in the screws.
6. Remove the steering wheel by tightening the screw.

Installation information

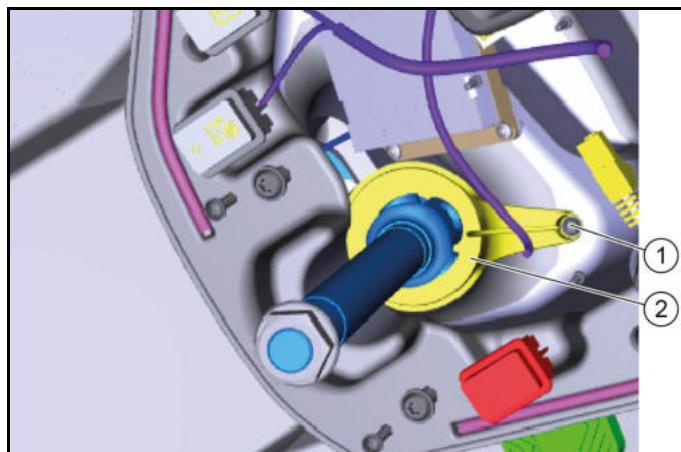
Ensure the correct mounting position on re-installation.

12.4.2 Removing/installing the steering column

- 12.4.1 Removing/installing the steering wheel
- 8.4.1 Removing/installing the control panel



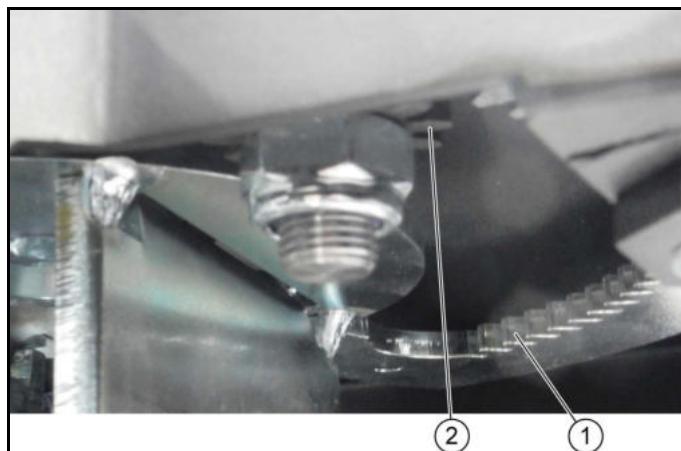
- ① Steering column
 - ② Bar cover
 - ③ Screws
1. Unscrew the screws.
 2. Remove the cover.



- ① Screw
 - ② Steering bearing
3. Unscrew the screw.
 4. Remove the steering bearing.



- ① Steering column
 - ② Screws
5. Loosen and lift the fresh water tank, see 9.4.5 Removing/installing the fresh water tank.
 6. Unscrew four screws from the steering column bracket.
 7. Pull off the steering column and remove it from the unit with the cover.



- ① Steering column pinion
 - ② Ring gear
8. When installing the steering column, fit the pinion in the ring gear and fasten it.

Installation information

*Ensure the correct mounting position on reinstallation.
Lightly grease the pinion and ring gear.*

12.4.3 Removing/installing the steering ring gear

- 12.4.2 Removing/installing the steering column
- 13.4.4 Removing/installing the driving motor



- ① Locking tab
 - ② Slotted nut
1. Bend the locking tab downwards.
 2. Unscrew the slotted nut with the special tool.



- ① Retaining ring
 - ② Washer
3. Remove the retaining ring and washer.



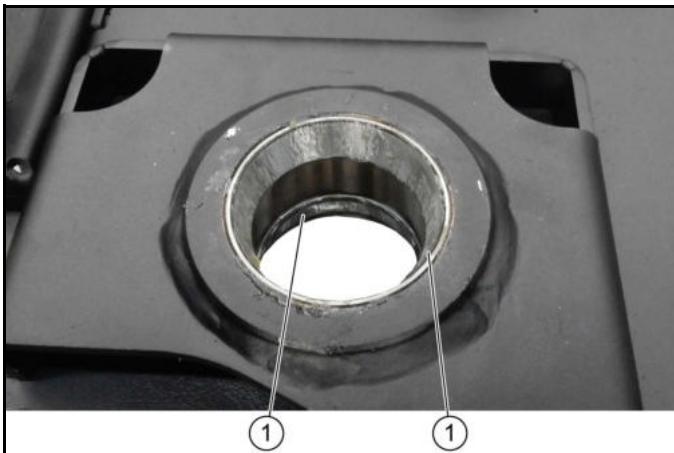
- ① Slip ring
4. Remove the slip ring.



- ① Tapered roller bearing
5. Remove the tapered roller bearing.



- ① Steering ring gear
6. Remove the steering ring gear from the unit downwards.



- ① Bearing rings
7. Knock the bearing rings out of the holder on both sides.
Note
*The bearing rings are destroyed when they are removed.
Use new tapered roller bearings when installing.*



- ① Rubber mallet
② Driving mandrel
8. Drive in the bearing ring with a rubber mallet and a driving mandrel.
Use an old bearing ring as a driving mandrel if necessary.
Installation information
Lightly grease the holder.

12.5 050 Service and inspection

Service group does not contain any maintenance and inspection points.

12.6 060 Fault diagnosis

This service group does not have fault diagnosis.

12.7 070 Special features / other

This service group does not have any special features.

13 Chassis and suspension service group

13.1 010 Safety instructions

Note

Service and maintenance work may only be performed by suitably qualified and specially trained personnel.

Observe the safety instructions in the chapters!

⚠ DANGER

Risk of injury due to the device starting and due to rotating parts

A risk of injury exists due to the device starting unexpectedly and from rotating parts such as motors, suction turbine, drive wheels and brushes.

Turn the program selection switch to the "Off" position and remove the Intelligent Key before performing any work on the device. Disconnect the battery connector and disconnect the minus terminal before working on electrical or electronic components.

⚠ CAUTION

Risk of burns from hot surfaces.

Allow the device to cool down prior to all work.

13.2 020 Overview



- ① 13.4.4 Removing/installing the driving motor
- ② 13.4.5 Removing/installing the driving motor sliding contacts
- ③ 13.4.7 Removing/installing the driving motor tyres
- ④ 13.4.6 Removing/installing the driving motor brake
- ⑤ 13.4.2 Removing/installing the accelerator pedal potentiometer
- ⑥ 13.4.1 Removing/installing the accelerator pedal
- ⑦ 13.4.3 Removing/installing the rear wheel

13.3 030 Function

13.3.1 Driving motor and parking brake



① Parking brake

② Driving motor

Driving motor

The driving motor works as a pure drive motor. The controller regulates the speed via pulse width modulation. The duty cycle depends on the position of the accelerator pedal.

When the accelerator pedal is fully depressed, the drive motor is activated with the maximum pulse duration.

When driving downhill or when braking, the energy generated by the driving motor is used for braking.

Parking brake

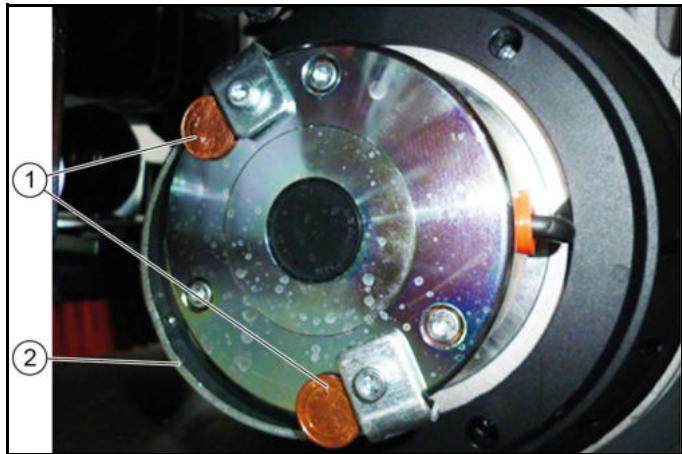
The electromagnetic brake is a maintenance-free parking brake that is activated shortly before the vehicle comes to a standstill. A clearly audible clicking sound can be heard when the brake is switched on/off. The parking brake is fully open while driving. The parking brake is not used to regulate the travel speed. When the accelerator pedal is released, the driving motor brakes the vehicle.

The brake is opened via the brake coil if the following conditions are met:

- Seat switch must be actuated.
- An operating program must be selected with the program selection switch.
- Throttle pedal must be pressed down.

The brake closes if one of the above conditions is not met. The brake can be opened mechanically in order to move the vehicle without a functioning driving motor. The brake is fully enclosed, no dirt can get into the brake from the outside.

13.3.2 Opening the brake mechanically



Note

The brake may only be opened mechanically if:

- The unit must be pushed out of the danger zone in the event of a defect.
- No batteries are connected and the unit needs to be moved.

① 1 cent coins

② Brake lever

1. Lift the brake lever and block it with two 1-cent coins. The brake is open and the unit can be moved from the position.

⚠ CAUTION

The cent coins must be removed again immediately, otherwise the electric brake will be disabled.

13.4 040 Service activities

Note

Unless otherwise described, installation is performed in reverse order.

13.4.1 Removing/installing the accelerator pedal



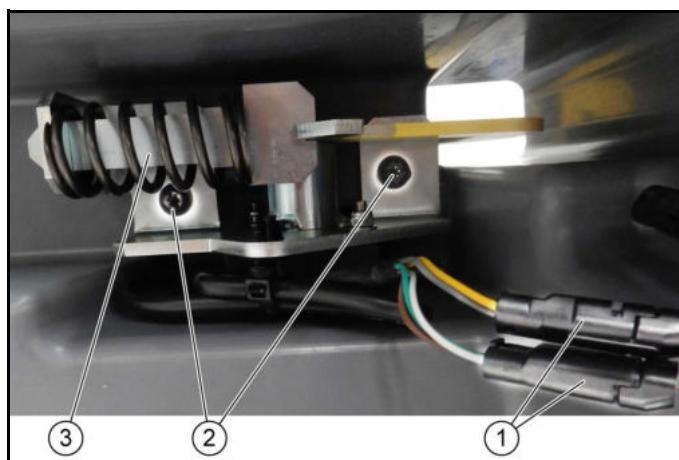
Note

The tread can vary depending on the vehicle version.

① Screws

② Tread

1. Unscrew the screws.
(Tightening torque: 2.5 Nm)
2. Remove the tread.



① Electrical socket plug connections

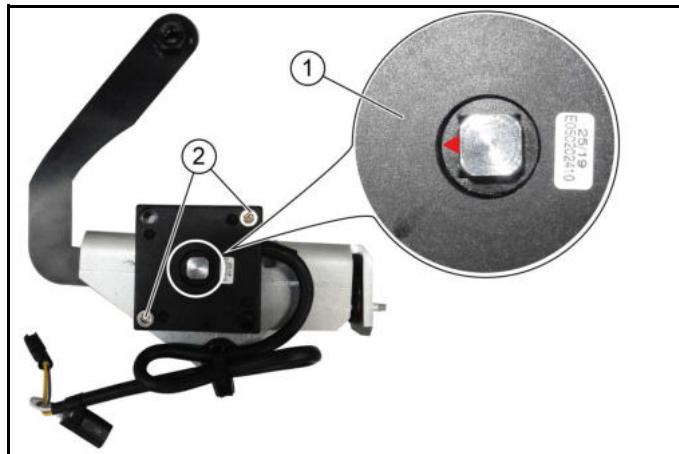
② Screws

③ Accelerator pedal

3. Disconnect the electrical socket plug connections.
4. Unscrew the screws.
(Tightening torque: 2.5 Nm)
5. Remove the accelerator pedal downwards.

13.4.2 Removing/installing the accelerator pedal potentiometer

- 13.4.1 Removing/installing the accelerator pedal



① Potentiometers

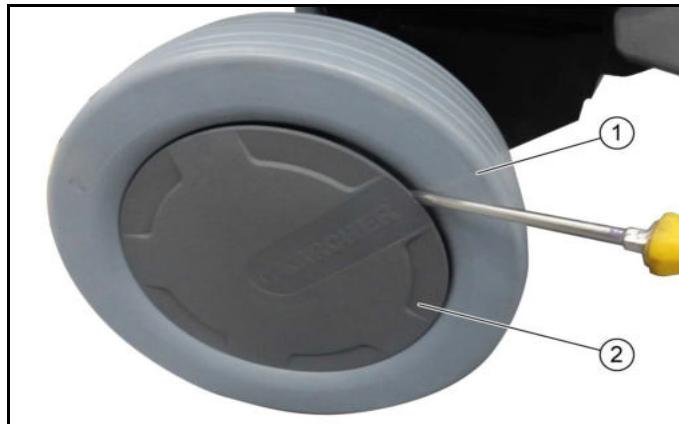
② Screws

1. Unscrew the screws.
(Tightening torque: 1.8 Nm)
2. Remove the potentiometer.

Installation information

The notch on the potentiometer must point in the travel direction.

13.4.3 Removing/installing the rear wheel



① Rear wheel

② Hubcap

1. Jack up the vehicle at the rear.
2. Lever out the wheel cap with a screwdriver.



① Retaining ring

② Wheel shaft

③ Washer

3. Remove the retaining ring.
4. Remove the pulley.
5. Remove the wheel.

Installation information

Lightly grease the wheel shaft when installing.

13.4.4 Removing/installing the driving motor

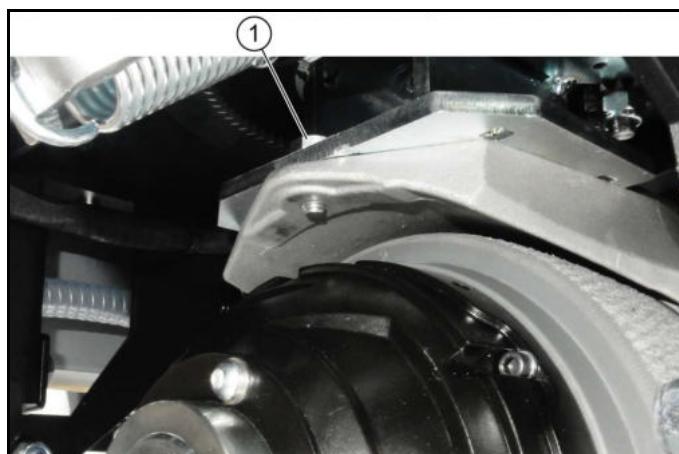
- 17.4.1 Disconnecting/connecting the power supply



① Electrical socket plug connections

② Nuts

1. Jack up the vehicle and support it so that the drive wheel is 3-4 cm in the air.
2. Disconnect the electrical socket plug connections.
3. Unscrew the nuts of the connection cables.



① Screw

Note

The driving motor is fastened from above with 4 screws.

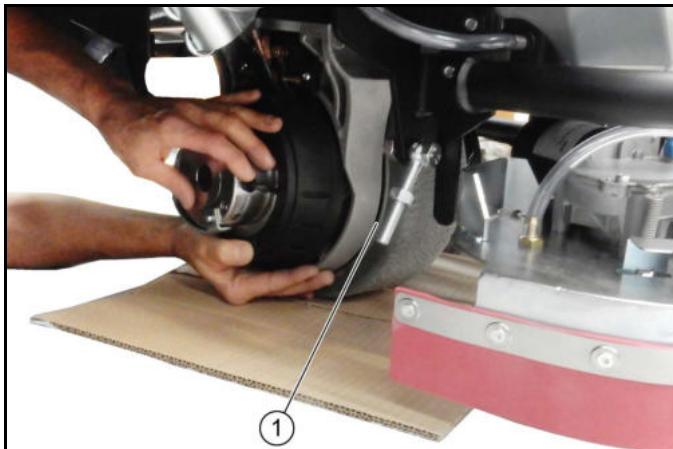
4. Unscrew the screw.
5. Turn the driving motor and remove the other 3 screws.

6. Remove the driving motor and set it down.



① Driving motor

7. To install the driving motor, place it on a surface such as cardboard so that it can be turned.

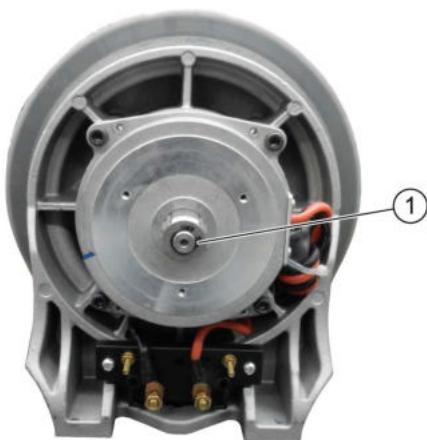


13.4.5 Removing/installing the driving motor sliding contacts

- 13.4.4 Removing/installing the driving motor
- 13.4.6 Removing/installing the driving motor brake

① Retaining ring

1. Remove the retaining ring.



① Pinion

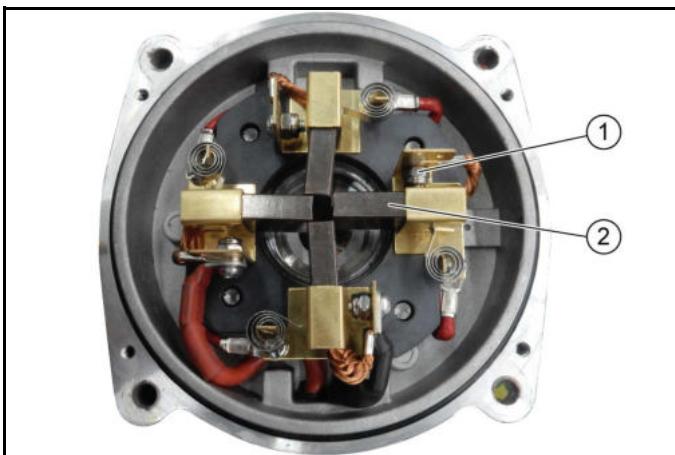
② Puller

2. Apply the puller and release the pinion from the shaft.

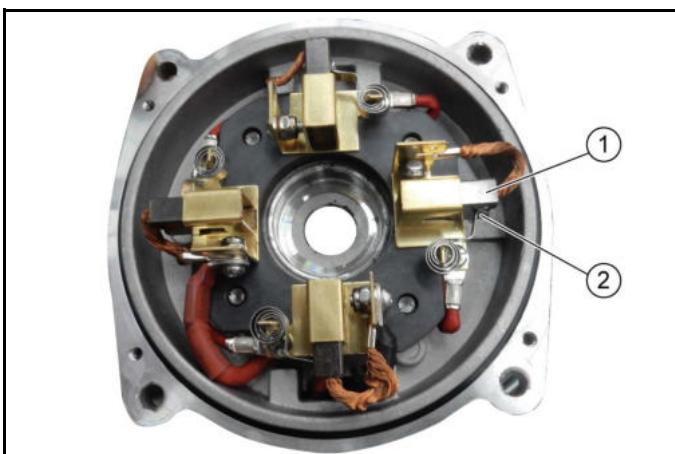




- ① Screws
 - ② Cover
3. Unscrew the screws.
4. Remove the cover.



- ① Nut
 - ② Sliding contact
5. Unscrew the nut.
6. Pull out the sliding contact.



- ① Sliding contact
 - ② Retaining spring
7. For installation, push the sliding contacts back and secure with the retaining spring.

Note

Check slip rings for deposits on the sliding contacts and clean if necessary.

Note

Always renew all sliding contacts (length 20.5 mm).



- ① Cover
 - ② Screwdriver
8. Fit the cover and use a screwdriver to push the sliding contacts inwards.
9. Fit the cover when all sliding contacts have been released.

13.4.6 Removing/installing the driving motor brake

Note

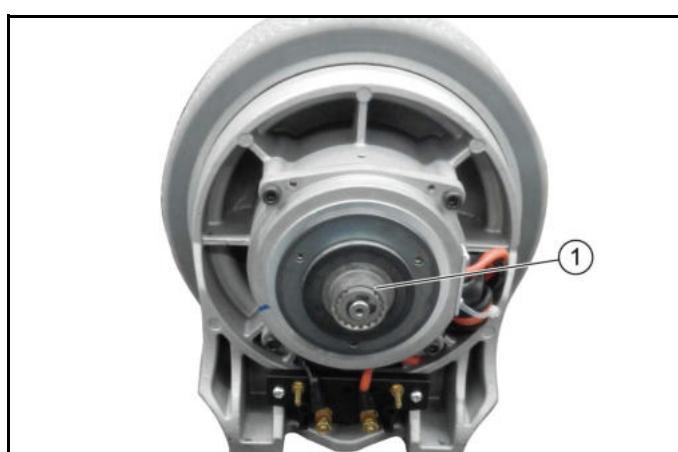
The brake can also be replaced with the driving motor installed.



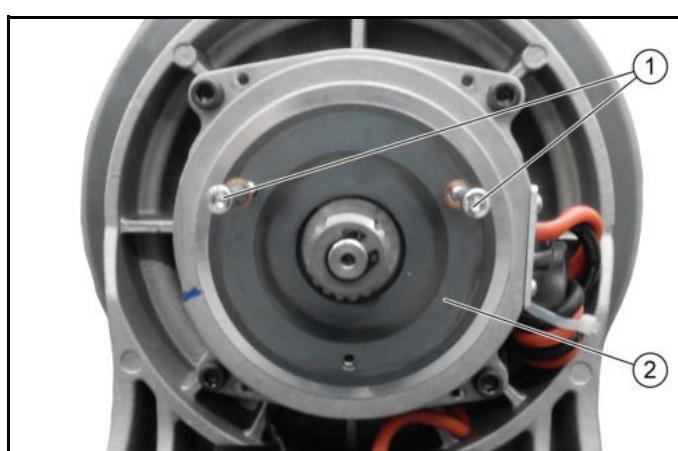
- ① Screws
 - ② Cover
1. Unscrew the screws.
 2. Remove the cover.



- ① Magnet coil
 - ② Screws
3. Mark the position of the brake on the housing.
 4. Unscrew the screws.
 5. Remove the magnet coil and set it down.



- ① Brake disc
6. Remove the brake disc and set it down.



- ① Screws
 - ② Pressure disc
7. Position the screws and remove the pressure disc with the screws and set them down.



- ① Magnet coil
- ② Brake disc
- ③ Pressure disc
- ④ O-ring
- ⑤ O-ring

8. Check the O-rings of the magnet coil and pressure disc and replace if necessary.

Installation information

The brake is delivered adjusted as a spare part, no adjustments are necessary.

13.4.7 Removing/installing the driving motor tyres

- 13.4.4 Removing/installing the driving motor



- ① 5 screws
- ② 6 screws

1. Unscrew the 6 screws.
2. Unscrew the 5 screws.

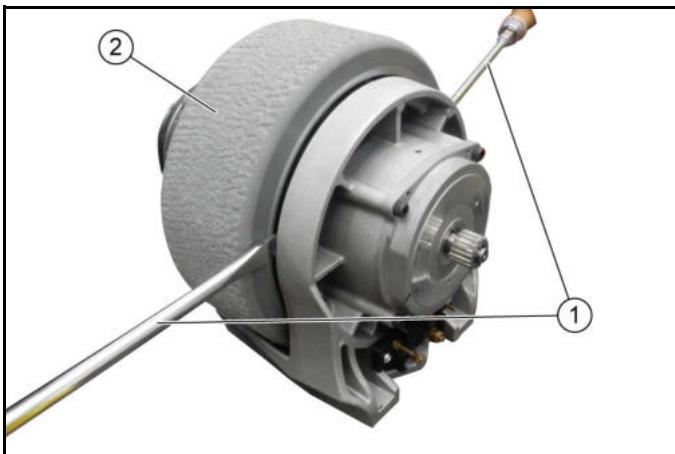
Note

Glue screws in place with Loctite during installation.



- ① Casing

3. Mark the position of the casing in relation to the tyre.
4. Remove the casing.



- ① Screwdriver
- ② Tyre

5. Lever the tyre off the shaft using 2 screwdrivers.
6. Grease the contact surface of the wheel hub with copper paste before installing the new tyre.



7. Before installation, grease the contact surface of the wheel hub with copper paste before installing the new tire.



① Tyre
② Casing

8. Push the new tyre onto the wheel hub.
9. Attach the housing.
10. Push the tyre onto the wheel hub with 2 screws 8x35 until the original screws can be attached.



① 5 screws
② 6 screws
11. Fit 6 screws and tighten crosswise until the wheel is completely pressed onto the wheel hub.
12. Fit 5 screws and tighten crosswise.

13.5 050 Service and inspection

Service group does not contain any maintenance and inspection points.

13.6 060 Fault diagnosis

This service group does not have fault diagnosis.

13.7 070 Special features / other

This service group does not have any special features.

14 R cleaning head service group

14.1 010 Safety instructions

Note

Service and maintenance work may only be performed by suitably qualified and specially trained personnel.

Observe the safety instructions in the chapters!

⚠ DANGER

Risk of injury due to the device starting and due to rotating parts

A risk of injury exists due to the device starting unexpectedly and from rotating parts such as motors, suction turbine, drive wheels and brushes.

Turn the program selection switch to the "Off" position and remove the Intelligent Key before performing any work on the device. Disconnect the battery connector and disconnect the minus terminal before working on electrical or electronic components.

ATTENTION

Risk of damage due to electrostatic discharge (ESD)!

Take suitable measure to discharge the electrostatic charge before all work on the unit electronics.

Wear ESD shoes.

Touch one battery pole with your hand for potential equalisation.

Do not remove the electronics from the packaging until immediately before installation.

Do not damage the insulation of the conductors or the coating on the circuit boards when performing measurements on electronic components.

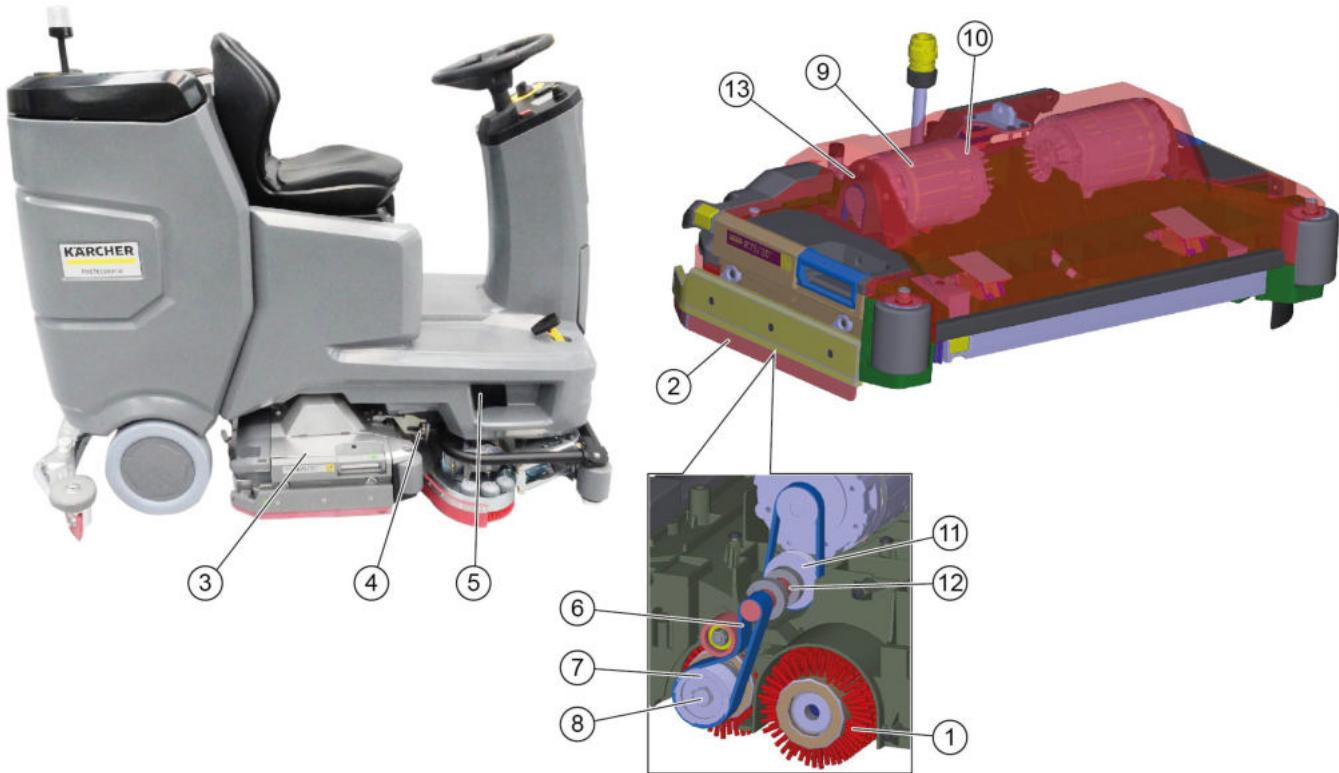
ATTENTION

Risk of damage due to sharp-edged objects and soiling!

Sharp-edged or dirty objects can cause damage such as scratches, notches and deformation when coming into contact with device components. Dirty tools, cloths and work surfaces can cause irreversible soiling and discolouration.

Use only suitable, undamaged and clean tools and auxiliary materials and exercise care when working. Place components and devices only on clean, padded surfaces.

14.2 020 Overview

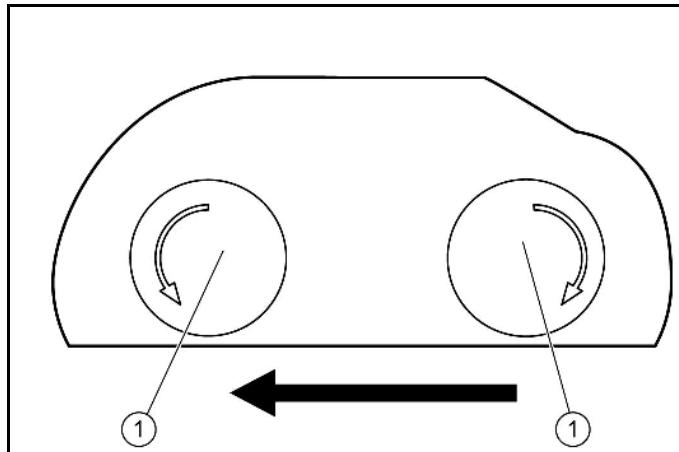


- ① 14.4.1 Removing/installing the roller brushes
- ② 14.4.2 Removing/installing the squeegee blade
- ③ 14.4.3 Removing/installing the cleaning head
- ④ 14.4.4 Removing/installing the cleaning head lifting linkage
- ⑤ 14.4.5 Removing/installing the cleaning head lifting motor
- ⑥ 14.4.6 Removing/installing the roller brushes drive belts

- ⑦ 14.4.7 Removing/installing the transmission belt pulley
- ⑧ 14.4.9 Removing/installing the brush holder axle
- ⑨ 14.4.10 Removing/installing the brush motor
- ⑩ 14.4.11 Removing/installing the brush motor sliding contacts
- ⑪ 14.4.8 Removing/installing the roller brush drive pulley
- ⑫ 14.4.12 Removing/installing the roller brush drive axle
- ⑬ 14.4.13 Removing/installing the gearbox housing

14.3 030 Function

14.3.1R cleaning head



① Roller brushes

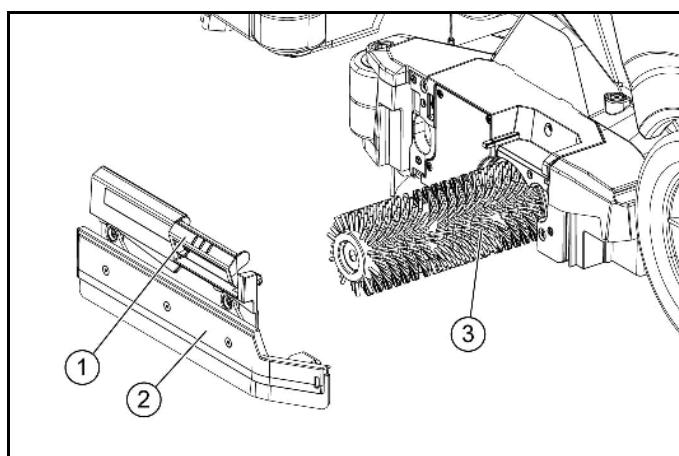
- The two roller brushes have the same speed and opposite directions of rotation.
- Each roller brush is driven by a separate motor and toothed belt.
- If the brush motors are overloaded, e.g. due to excessive contact pressure or blockage of the cleaning brushes, they are automatically switched off (overload protection).
- A light is fitted to the right side of the cleaning head. The sidelight illuminates the cleaning head during operation.
- The brush motors are started with a soft start.

14.4 040 Service activities

Note

Unless otherwise described, installation is performed in reverse order.

14.4.1 Removing/installing the roller brushes



Note

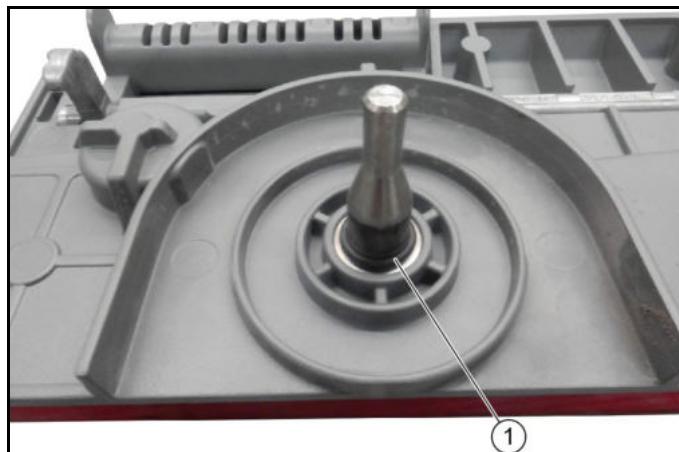
Replace the roller brushes when the bristle length has reached 10 mm.

- ① Brush replacement handle
- ② Bearing cover with squeegee blade
- ③ Roller brush

1. Raise the cleaning head.
2. Pull out the brush replacement handle.
3. Remove the side skirt with the squeegee blade.
4. Pull out the roller brush.
5. Fit the new roller brush and centre it on the driver.
6. Attach the side skirt with the squeegee blade.
7. Pivot the brush replacement handle upwards and latch it into place.
8. Repeat the entire procedure on the opposite side.

① O-ring

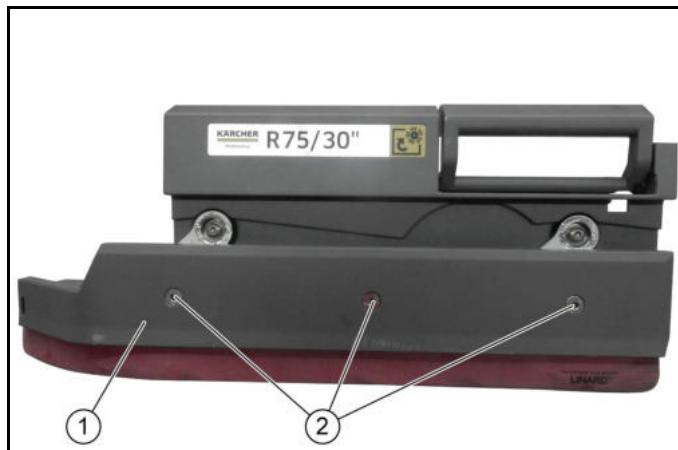
9. Check the O-ring on the roller brush counter bearing for damage and replace if necessary.



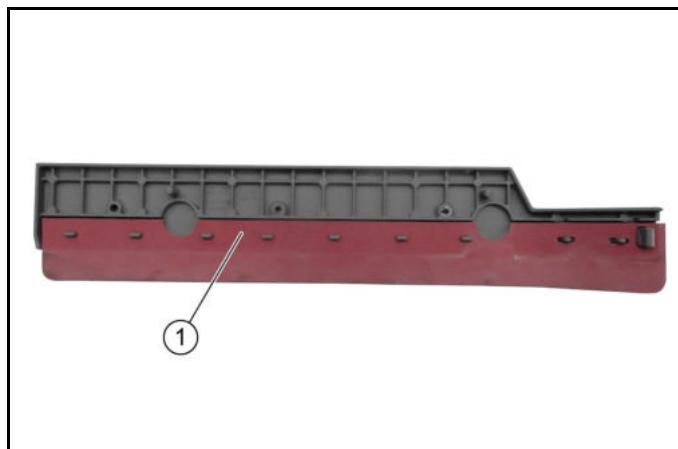
14.4.2 Removing/installing the squeegee blade



- ① Brush replacement handle
- ② Bearing cover with side skirt
- 1. Pull out the brush replacement handle.
- 2. Remove the side skirt with the squeegee blade.



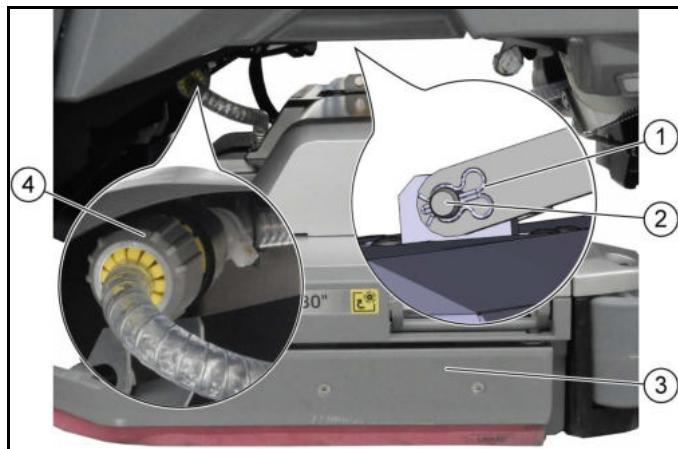
- ① Side skirt
- ② Screws
- 3. Unscrew the screws.
- 4. Remove the side skirt.



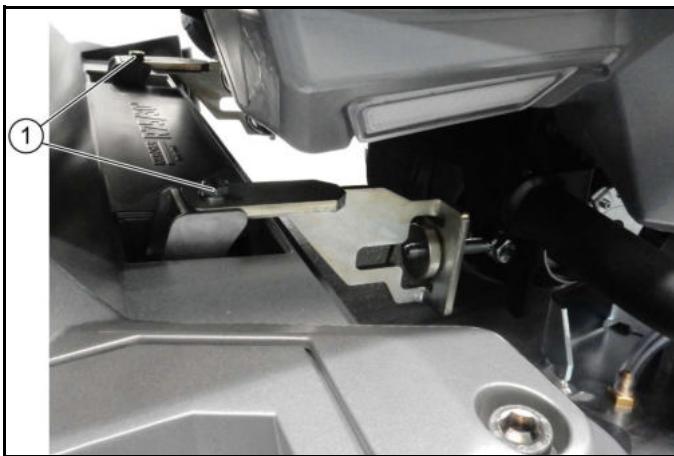
- ① Squeegee blade
- 5. Remove the squeegee blade.

14.4.3 Removing/installing the cleaning head

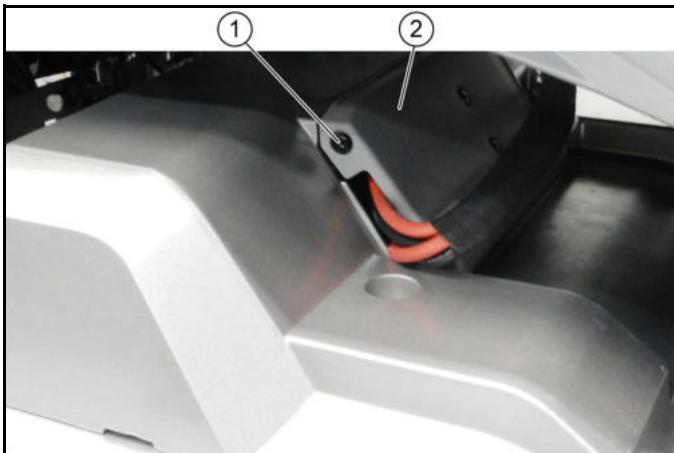
- 17.4.1 Disconnecting/connecting the power supply



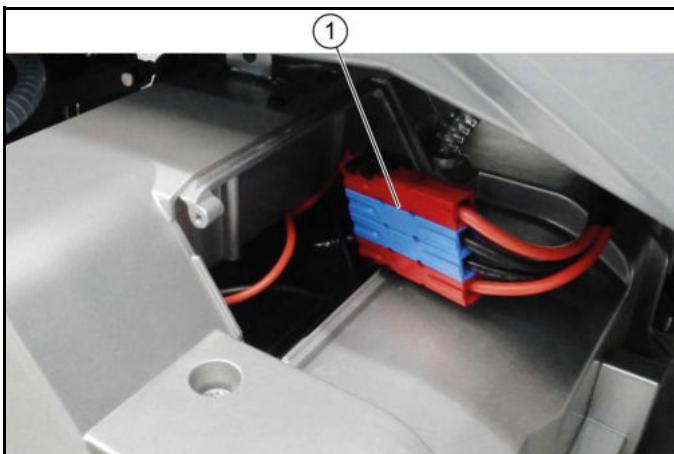
- ① Retaining spring
- ② Bolt
- ③ Cleaning head
- ④ Water connection
- 1. Lower the cleaning head.
- 2. Remove the retaining spring.
- 3. Pull out the bolt.
- 4. Disconnect the water connection.



- ① Screws
5. Unscrew the screws.



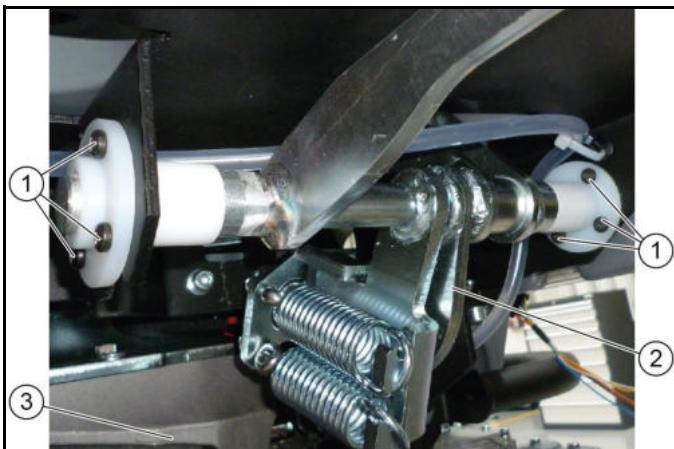
- ① Screw
② Bar cover
6. Push the cleaning head out approx. 5 cm to the left.
7. Unscrew the screw.
8. Remove the cover.



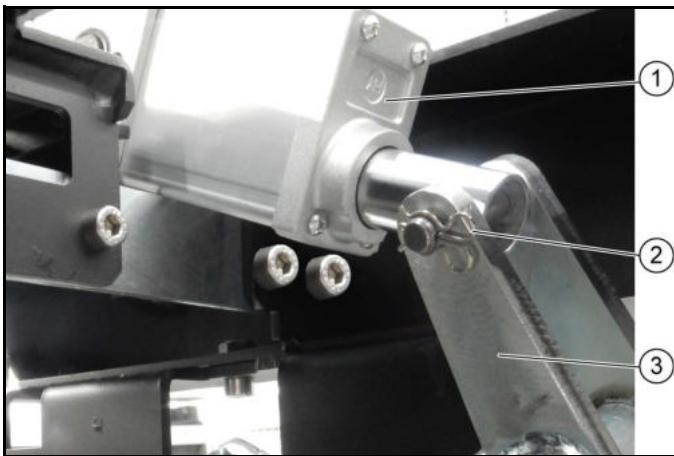
- ① Electrical connector
9. Disconnect the electrical socket plug connections.
10. Push the cleaning head completely out.

14.4.4 Removing/installing the cleaning head lifting linkage

- 14.4.3 Removing/installing the cleaning head



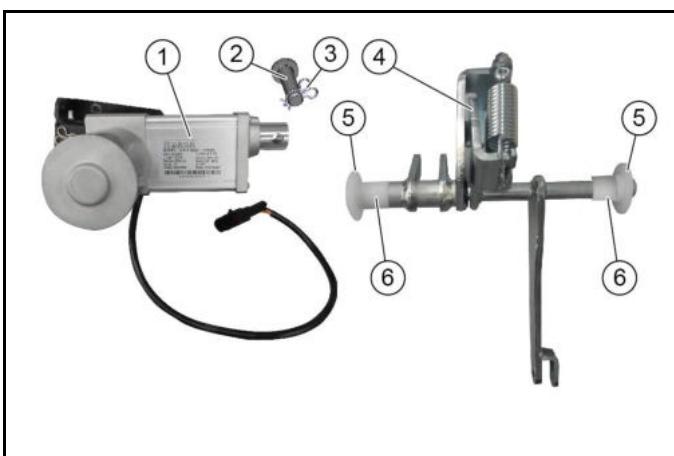
- ① Screws
② Lifting linkage
③ Drive wheel
1. Turn the drive wheel 90 ° to the left to the travel direction.
2. Unscrew the screws.
3. Pull the lifting linkage down.



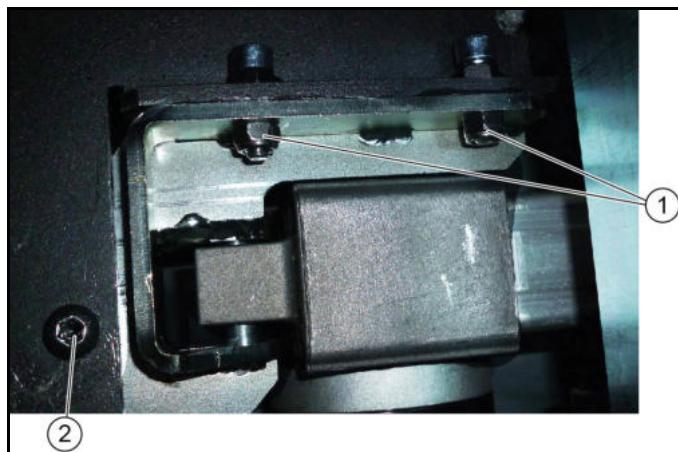
- ① Lifting motor
 ② Locking pin
 ③ Lifting linkage
 4. Pull out the locking pin.
 5. Pull out the bolt.
 6. Remove the lifting linkage.

14.4.5 Removing/installing the cleaning head lifting motor

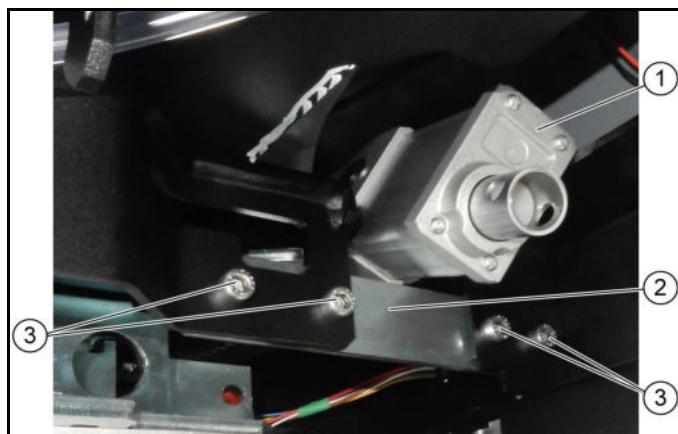
- 14.4.3 Removing/installing the cleaning head
- 14.4.4 Removing/installing the cleaning head lifting linkage



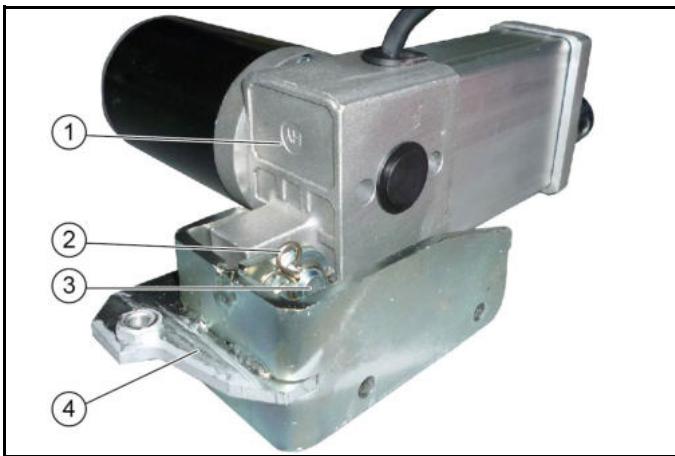
- ① Lifting motor
 ② Bolt
 ③ Locking pin
 ④ Lifting linkage
 ⑤ Axle attachment/bearing
 ⑥ Sleeve



- ① Nuts
 ② Screw
 1. Unscrew the nuts.
 2. Unscrew the screw.



- ① Lifting motor
 ② Stiffening plate
 ③ Screws
 3. Unscrew the screws.
 4. Remove the stiffening plate.
 5. Disconnect the electrical connector.
 6. Remove the lifting motor with the mounting plate.



- ① Lifting motor
- ② Locking pin
- ③ Bolt
- ④ Fastening plate
- 7. Pull out the locking pin.
- 8. Pull out the bolt.
- 9. Remove the lifting motor.

Installation information

Extend the lifting motor approx. 4 cm or unscrew the spindle by hand.

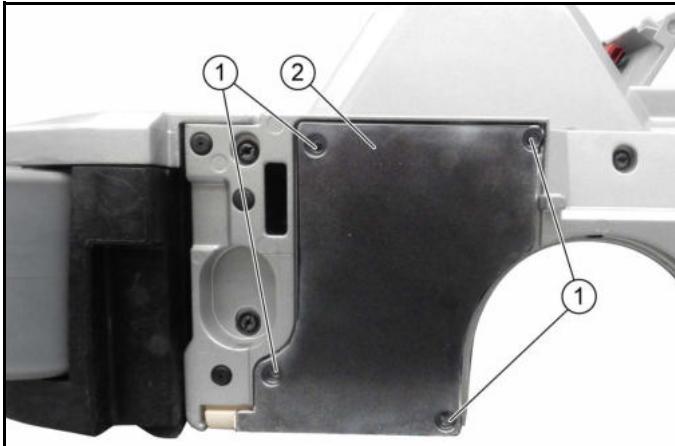
Pull the cable of the electrical connector upwards.

14.4.6 Removing/installing the roller brushes drive belts

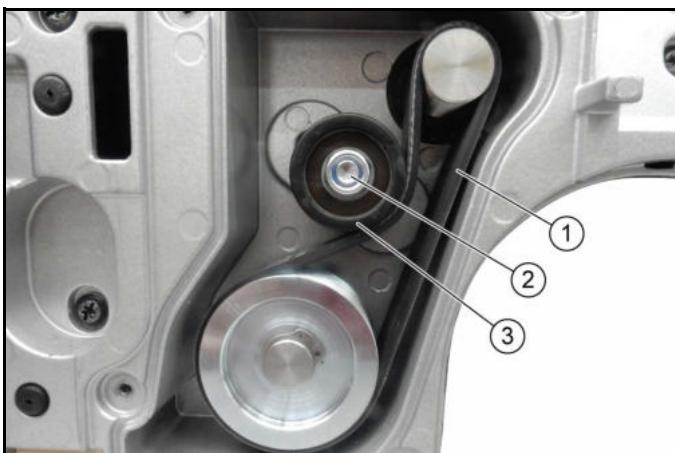
- 14.4.3 Removing/installing the cleaning head



- ① Brush replacement handle
- ② Side skirt with squeegee blade
- 1. Pull out the brush replacement handle.
- 2. Remove the side skirt with the squeegee blade.



- ① Screws
- ② Bar cover
- 3. Unscrew the screws.
- 4. Remove the cover.



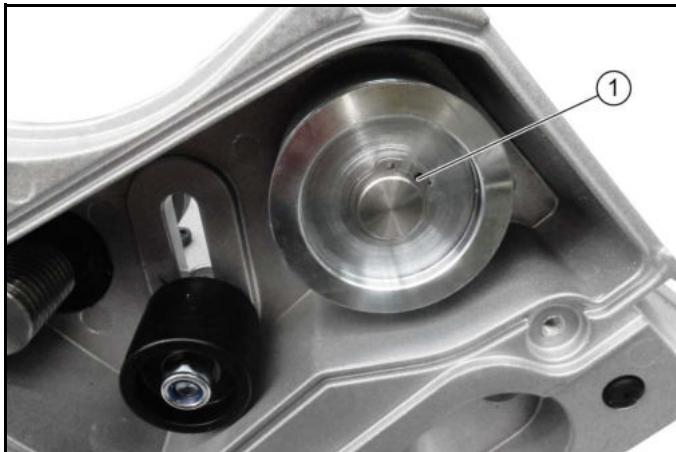
- ① Drive belt
- ② Nut
- ③ Tension pulley
- 5. Unscrew the nut.
- 6. Move the tension pulley.
- 7. Remove the drive belt.

Installation information

Tension the drive belt taut.

14.4.7 Removing/installing the transmission belt pulley

- 14.4.6 Removing/installing the roller brushes drive belts



① Retaining ring

1. Remove the retaining ring.



① Pulley

② Puller

2. Apply the puller and release the belt pulley from the shaft.

14.4.8 Removing/installing the roller brush drive pulley

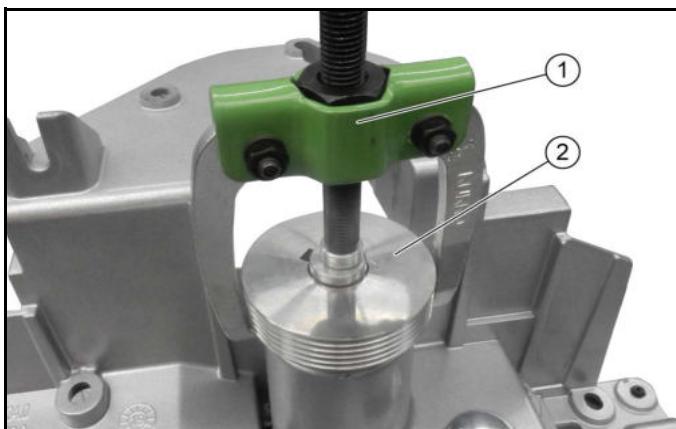
- 14.4.10 Removing/installing the brush motor



① Pulley

② Retaining ring

1. Remove the retaining ring.



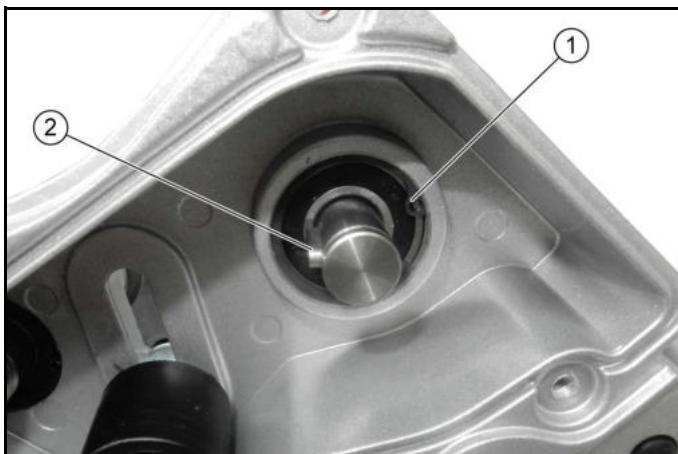
① Puller

② Pulley

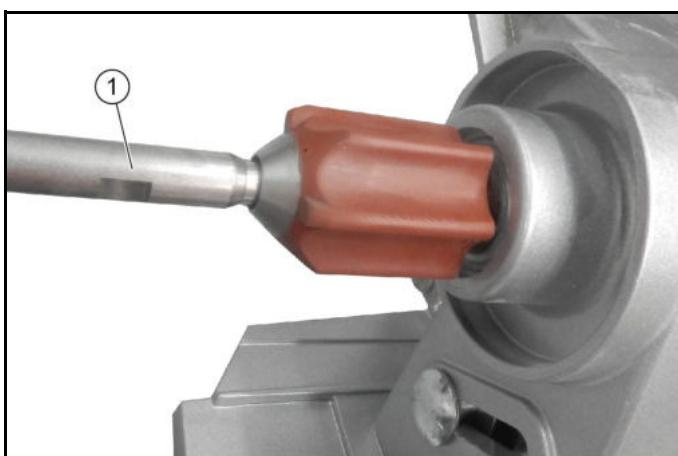
2. Apply the puller and release the belt pulley from the shaft.

14.4.9 Removing/installing the brush holder axle

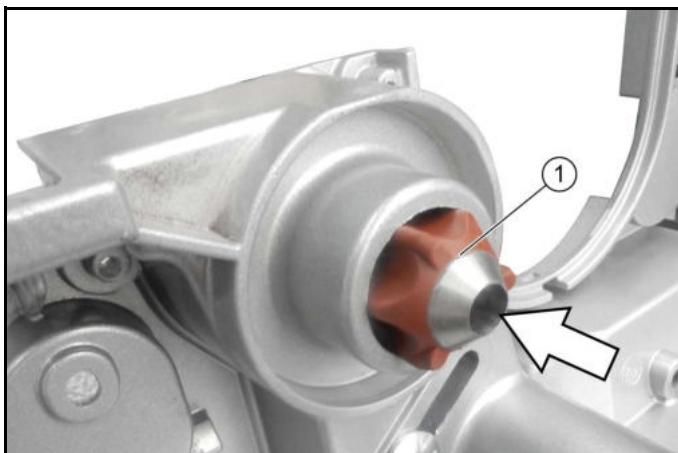
- 14.4.7 Removing/installing the transmission belt pulley



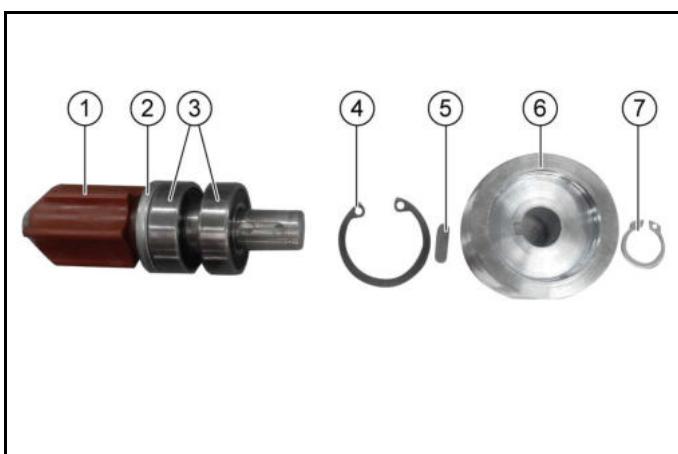
- ① Retaining ring
 - ② Woodruff key
1. Remove the Woodruff key.
 2. Remove the retaining ring.



- ① Assembly aid for roller brush holder
3. Unscrew the assembly aid.



- ① Axle with roller brush holder
4. Drive the axle out of the casing with light blows using a rubber mallet.



- ① Axle with roller brush holder
- ② Sealing ring
- ③ Ball bearing
- ④ Retaining ring
- ⑤ Woodruff key
- ⑥ Pulley
- ⑦ Retaining ring

Note

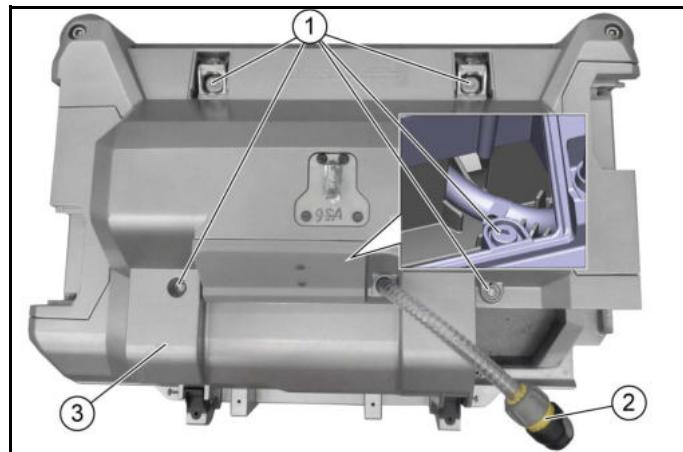
The ball bearing has a sealing ring that prevents moisture from penetrating the ball bearing.

Installation information

Check the components for wear/damage and replace if necessary.

14.4.10 Removing/installing the brush motor

- 14.4.3 Removing/installing the cleaning head

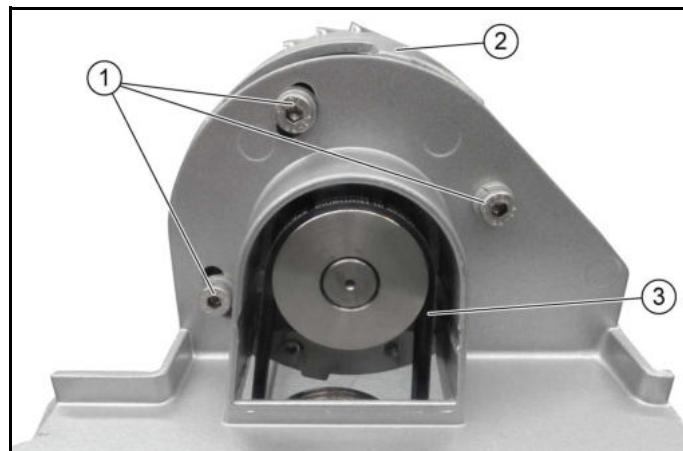


① Screws

② Water connection

③ Cover

1. Place the cleaning head on a clean, padded surface.
2. Unscrew the screws.
3. Release the coupling on the water connection.
4. Remove the cover.



① Screws

② Brush motor

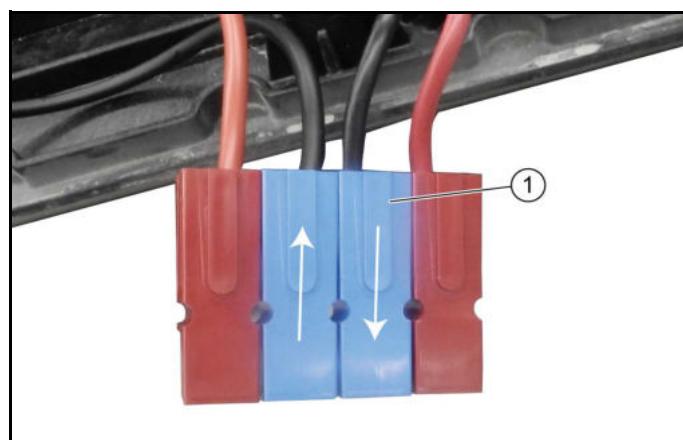
③ Drive belt

5. Unscrew the screws.
(Tightening torque: 3 Nm)
6. Remove the drive belt.

7. Remove the brush motor.

Installation information

Use a screwdriver to push the motor up at the screw and tighten the drive belt.



① Electrical socket plug connections

8. Disconnect the electrical socket plug connections.

14.4.11 Removing/installing the brush motor sliding contacts

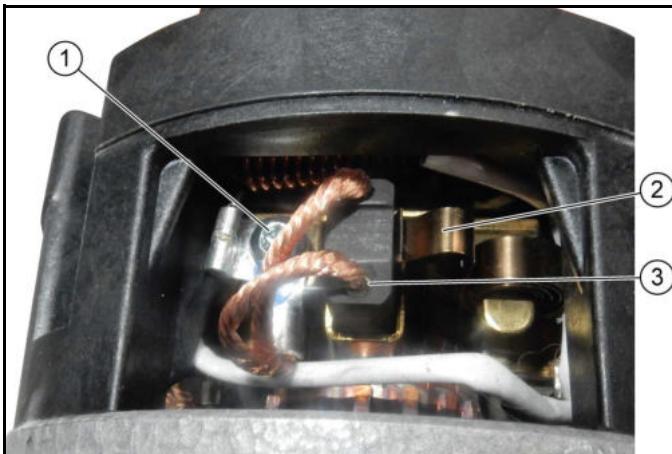
- 14.4.10 Removing/installing the brush motor

① Screw

② Bar cover

1. Unscrew the screw.
2. Removing the cover





- ① Screw
 - ② Spring bar
 - ③ Sliding contact
3. Disengage the spring bar to the side.
4. Pull out the sliding contact.

Note

Check slip rings for deposits on the sliding contacts and clean if necessary.

Note

Always renew all sliding contacts (23.5mm).

14.4.12 Removing/installing the roller brush drive axle

- 14.4.8 Removing/installing the roller brush drive pulley

① Retaining ring

② Axle

1. Remove the retaining ring.

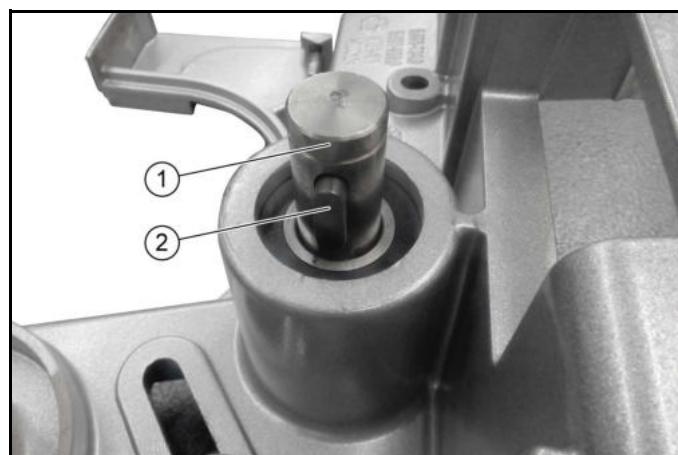


① Axle

② Woodruff key

2. Remove the Woodruff key.

3. Drive the axle out of the casing with light blows using a rubber mallet.



① Retaining ring

② Pulley

③ Woodruff key

④ Retaining ring

⑤ Axle

⑥ Ball bearing

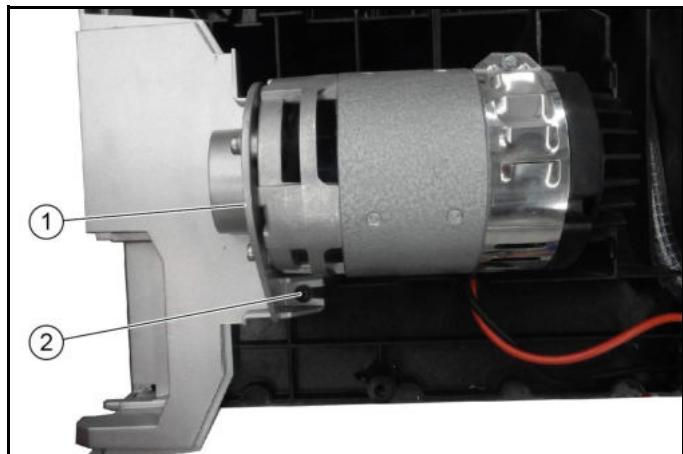
Installation information

Check the components for wear/damage and replace if necessary.



14.4.13 Removing/installing the gearbox housing

- 14.4.3 Removing/installing the cleaning head



① Gearbox casing

② Screws

1. Unscrew four screws.

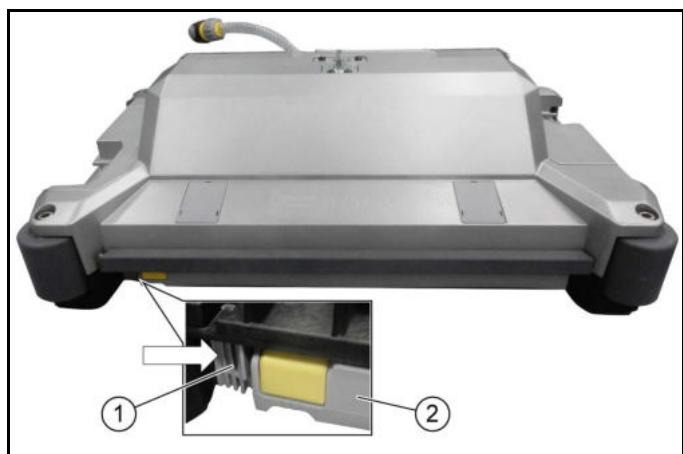
Installation information

Tightening torque: 2.5 Nm

2. Remove the gearbox housing.

14.5 050 Service and inspection

14.5.1 Cleaning the water distribution strip



① Unlocking button

② Water distribution strip

1. Press the release mechanism in the direction of the arrow and hold it there.
2. Pivot the water distribution strip forward.
3. Pull out the water distribution strip lengthways.
4. Clean the water distribution strip.
5. Fit the water distribution strip back into the cleaning head and snap the lock into place.

14.5.2 Checking/adjusting the brush pattern

Note

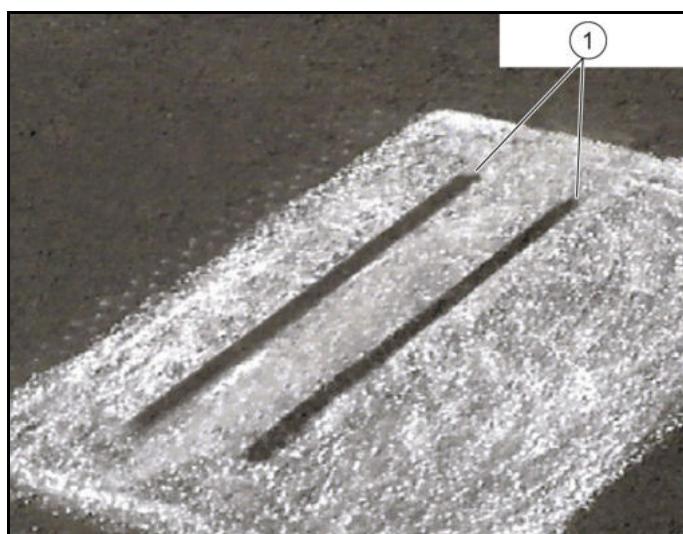
The cleaning head can be lowered and raised in the transport travel position in the "Brush head" menu. The grey or red KIK key is required for this.

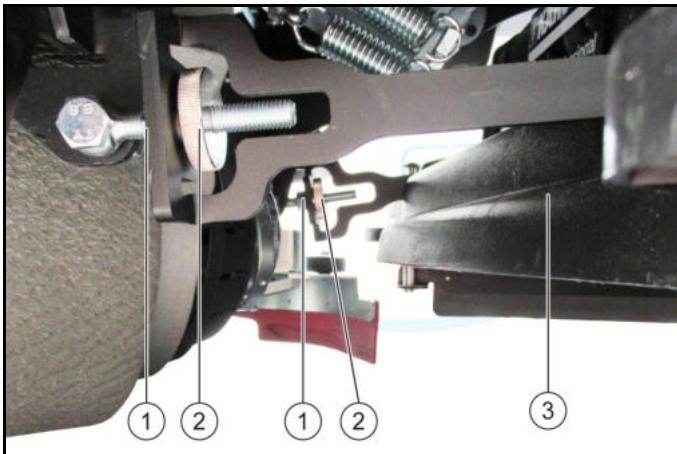
The sweeping pattern must be set on a flat, insensitive surface with new roller brushes.

The suspension of the cleaning head must not be bent or damaged.

① Sweeping pattern

1. Wet a correspondingly large floor area with chalk and run the cleaning head over it.
2. Switch on the cleaning head, lower it and briefly brush on the chalk surface.
3. Lift the cleaning head and remove it from the chalk surface.
4. Check the sweeping pattern for evenness and parallelism, adjust if necessary.





- ① Lock nut
- ② Lock nut
- ③ Cleaning head

5. Release the lock nuts.
6. Adjust the sweeping pattern by turning the knurled nuts.

Note

When the knurled nut is turned back, the cleaning head lifts up at the rear.

When the knurled nut is turned forward, the cleaning head lifts up at the front.

7. Check the sweeping pattern again, adjust again if necessary.

8. When the sweeping pattern has been set correctly, tighten the lock nuts.

14.6 060 Fault diagnosis

This service group does not have fault diagnosis.

14.7 070 Special features / other

This service group does not have any special features.

15 D cleaning head service group

15.1 010 Safety instructions

Note

Service and maintenance work may only be performed by suitably qualified and specially trained personnel.

Observe the safety instructions in the chapters!

⚠ DANGER

Risk of injury due to the device starting and due to rotating parts

A risk of injury exists due to the device starting unexpectedly and from rotating parts such as motors, suction turbine, drive wheels and brushes.

Turn the program selection switch to the "Off" position and remove the Intelligent Key before performing any work on the device. Disconnect the battery connector and disconnect the minus terminal before working on electrical or electronic components.

ATTENTION

Risk of damage due to electrostatic discharge (ESD)!

Take suitable measure to discharge the electrostatic charge before all work on the unit electronics.

Wear ESD shoes.

Touch one battery pole with your hand for potential equalisation.

Do not remove the electronics from the packaging until immediately before installation.

Do not damage the insulation of the conductors or the coating on the circuit boards when performing measurements on electronic components.

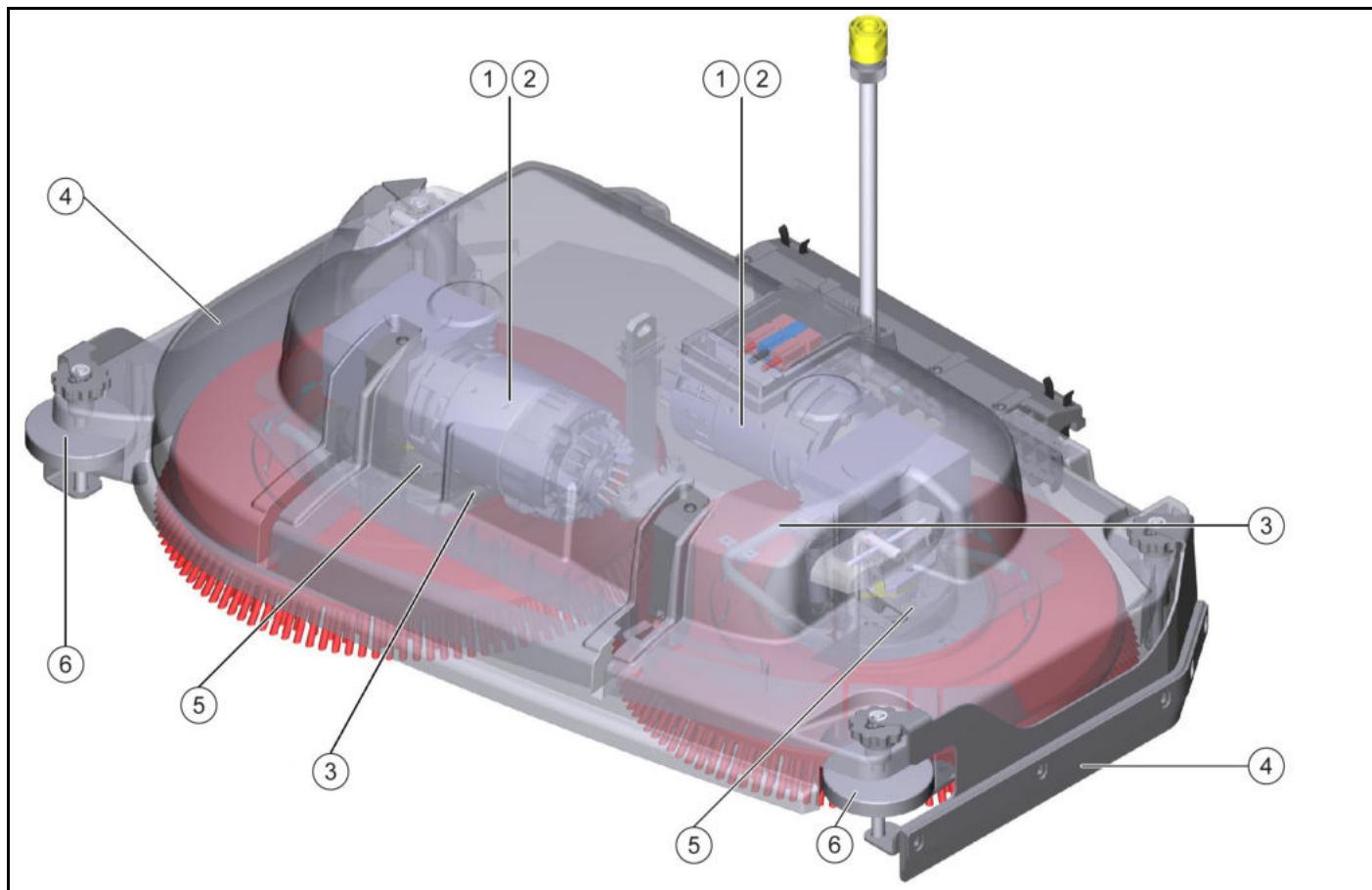
ATTENTION

Risk of damage due to sharp-edged objects and soiling!

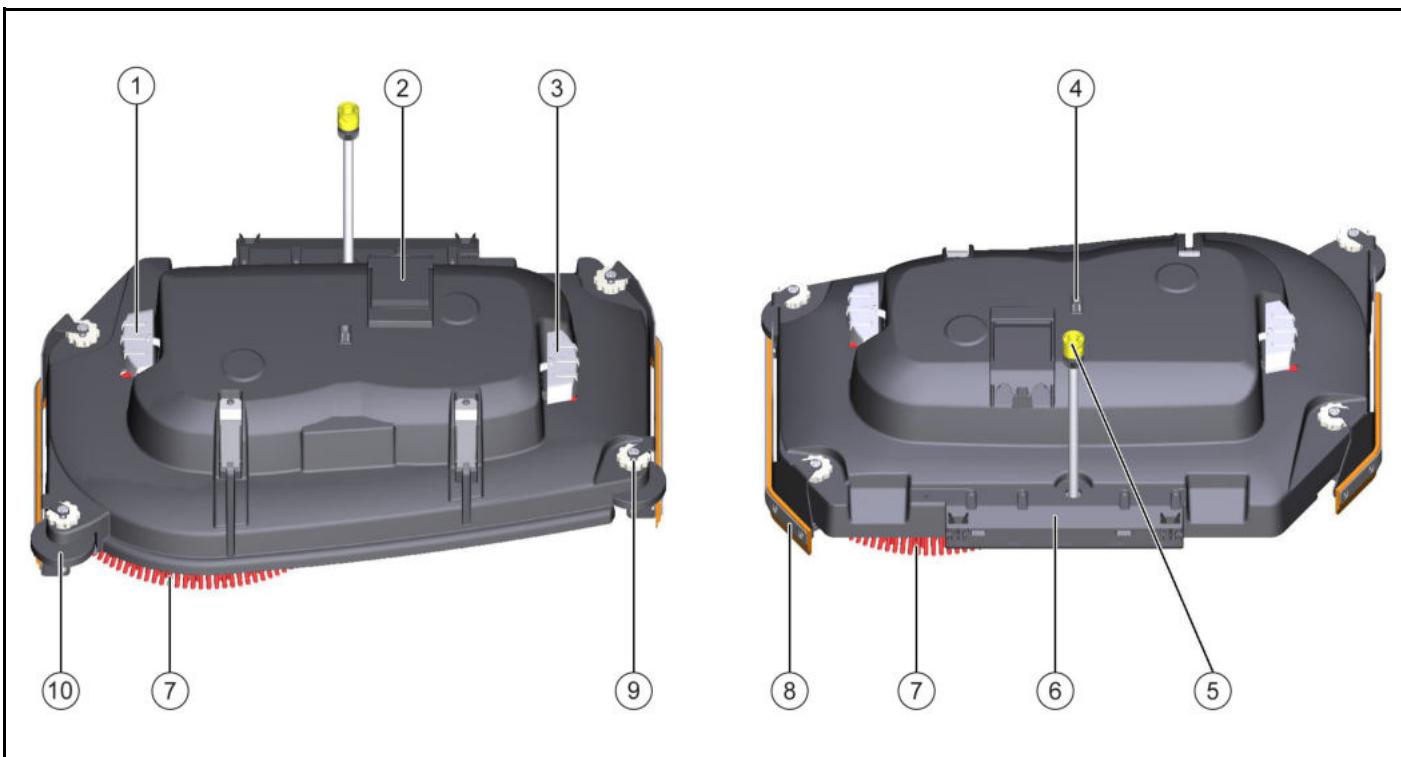
Sharp-edged or dirty objects can cause damage such as scratches, notches and deformation when coming into contact with device components. Dirty tools, cloths and work surfaces can cause irreversible soiling and discolouration.

Use only suitable, undamaged and clean tools and auxiliary materials and exercise care when working. Place components and devices only on clean, padded surfaces.

15.2 020 Overview

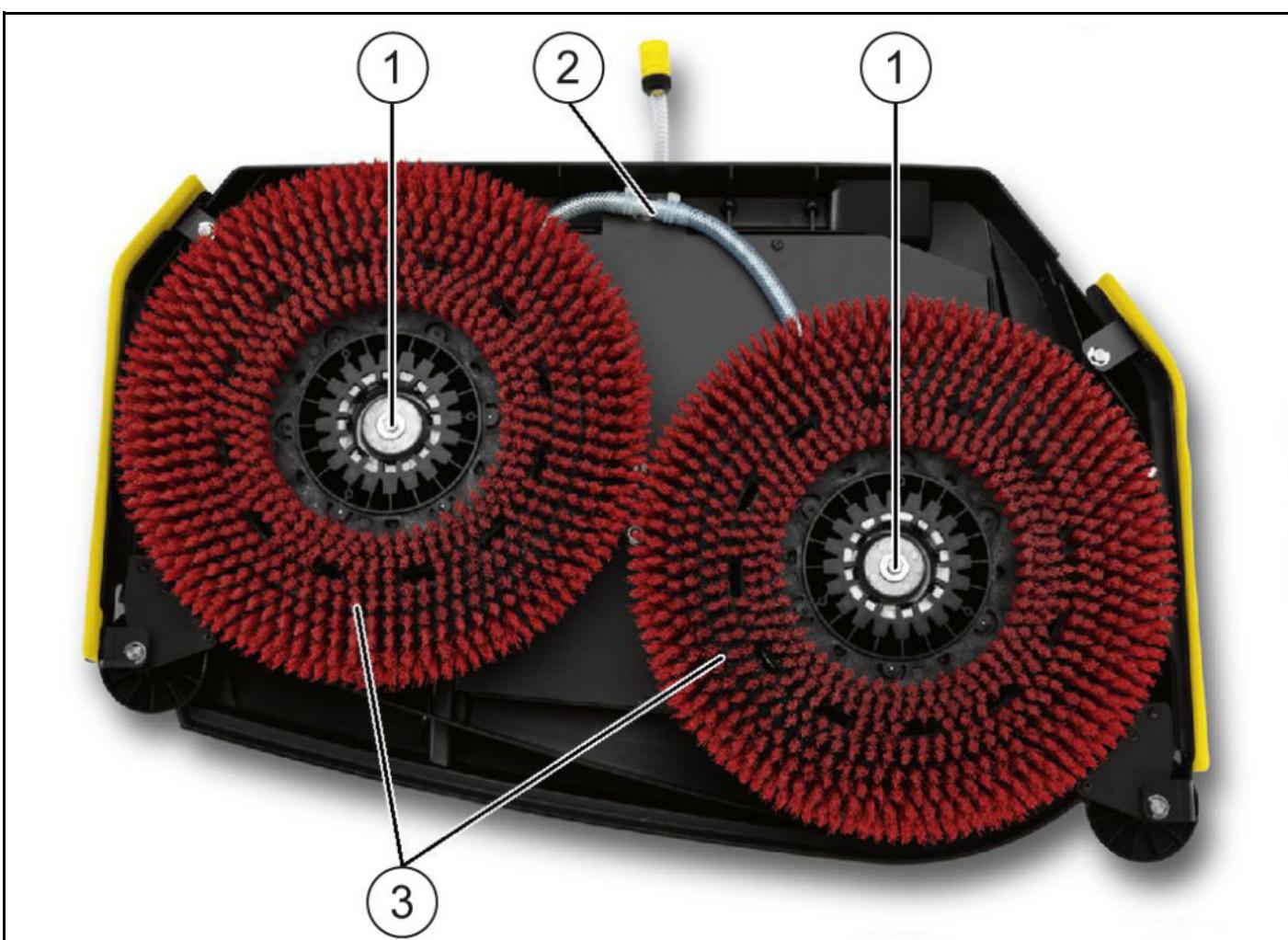


- ① 15.4.3 Removing/installing the brush motor with transmission
- ② 15.4.4 Removing/installing the brush motor sliding contacts
- ③ 15.4.2 Removing/installing the disc brush replacement bracket
- ④ 15.4.5 Removing/installing the squeegee blade
- ⑤ 15.4.1 Removing/installing the disc brush holder
- ⑥ 15.4.6 Removing/installing the deflection roller



- ① Brush replacement pedal
- ② Lid, power connection plug
- ③ Brush replacement pedal
- ④ Cleaning head holder
- ⑤ Water connection

- ⑥ Push rod holder
- ⑦ Disc brush
- ⑧ Squeegee blade
- ⑨ Squeegee blade adjustment wheel
- ⑩ Scraper roll

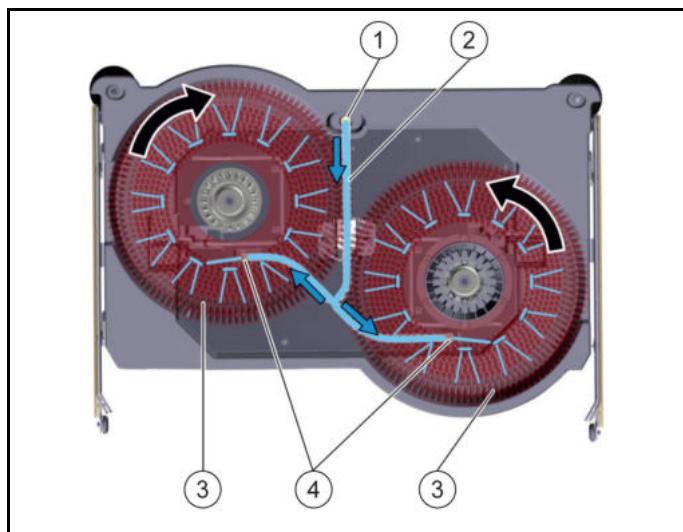


- ① Transmission/disc brush holder
- ② Water inlet

- ③ Disc brush

15.3 030 Function

15.3.1D cleaning head



① Hose coupling

② Water inlet

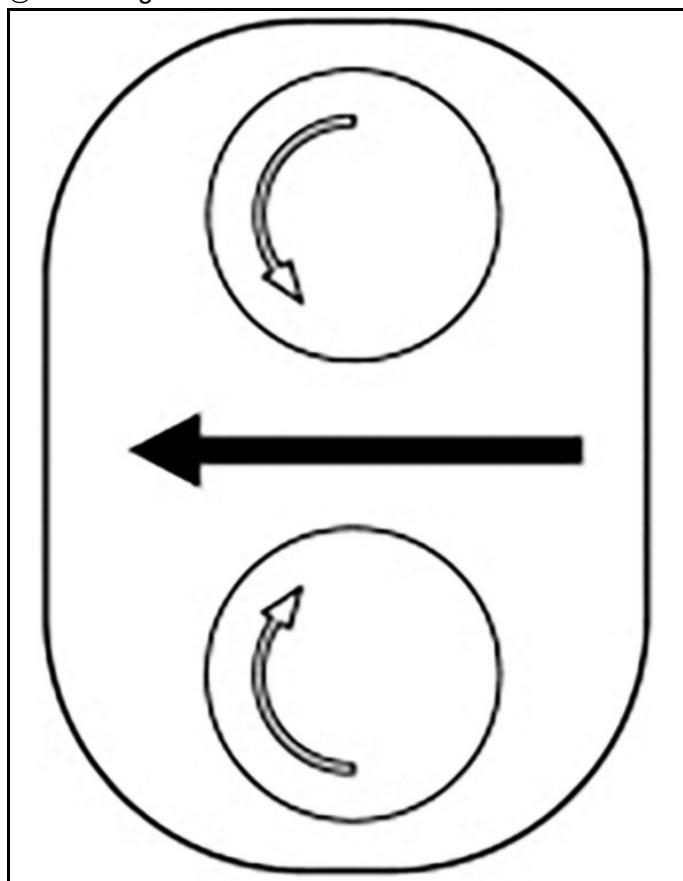
③ Disc brush

④ Reducing sleeve

① Cleaning head

② Tie rods

The D cleaning head has different tie rods than the R cleaning head.



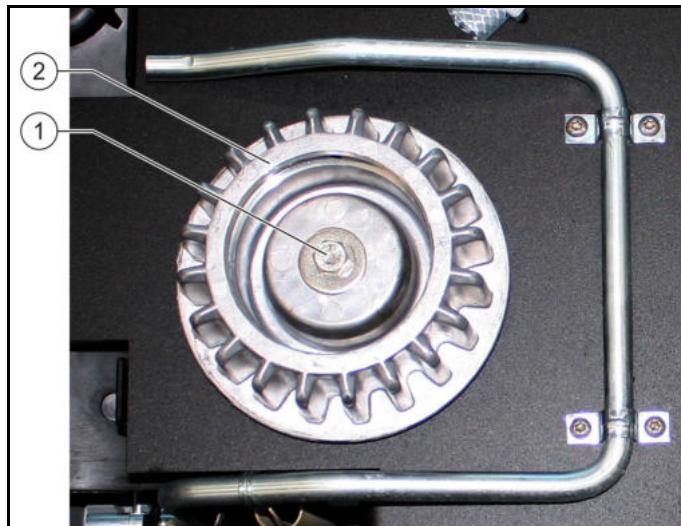
- The two disc brushes have the same speed but opposite rotation directions and are powered by two motors with a transmission.
- If the brush motors are overloaded, e.g. due to excessive contact pressure or blockage of the cleaning brushes, they are automatically switched off (overload protection).
- The brush motors are started with a soft start.

15.4 040 Service activities

Note

Unless otherwise described, installation is performed in reverse order.

15.4.1 Removing/installing the disc brush holder



① Screw

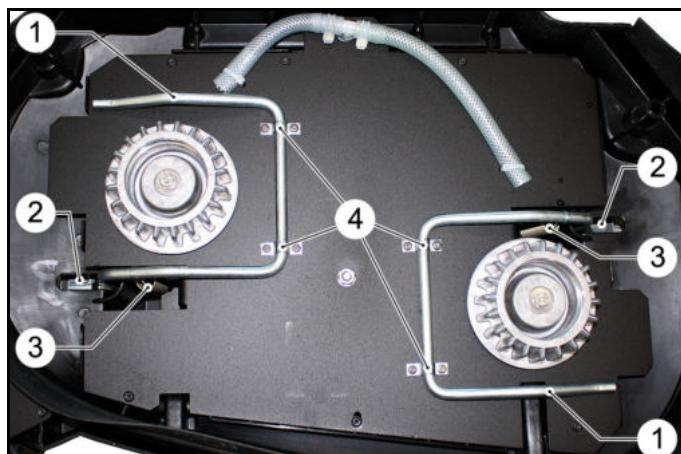
② Disc brush holder

1. Remove the disc brush.

2. Unscrew the screw.

3. Remove the disc brush holder or pull it off with the appropriate puller.

15.4.2 Removing/installing the disc brush replacement bracket



① Bar

② Bracket opening

③ Spring

④ Bracket holder

1. Remove the disc brush.

2. Unscrew the screws at the holders.

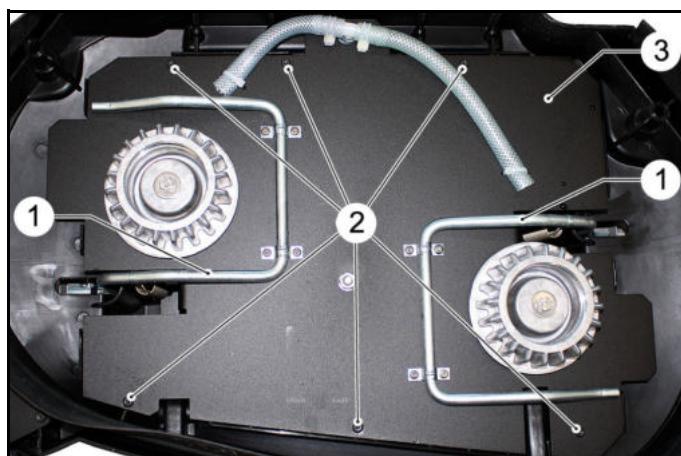
3. Remove the holder.

4. Unhook the springs.

5. Remove the bracket through the openings.

15.4.3 Removing/installing the brush motor with transmission

- 15.4.1 Removing/installing the disc brush holder



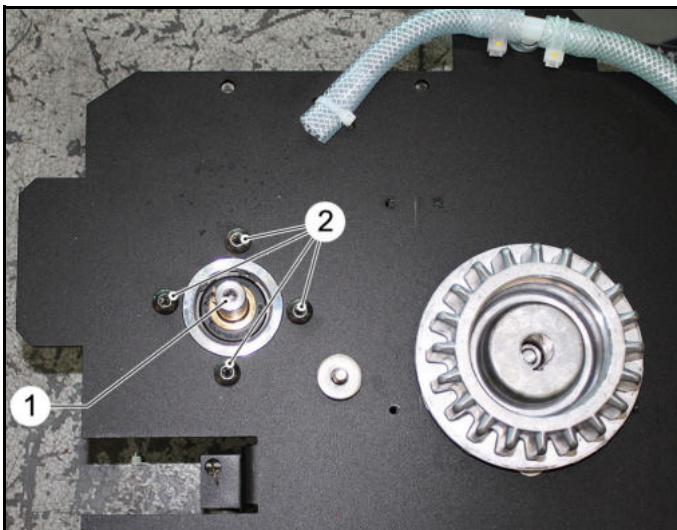
① Bar

② Screws

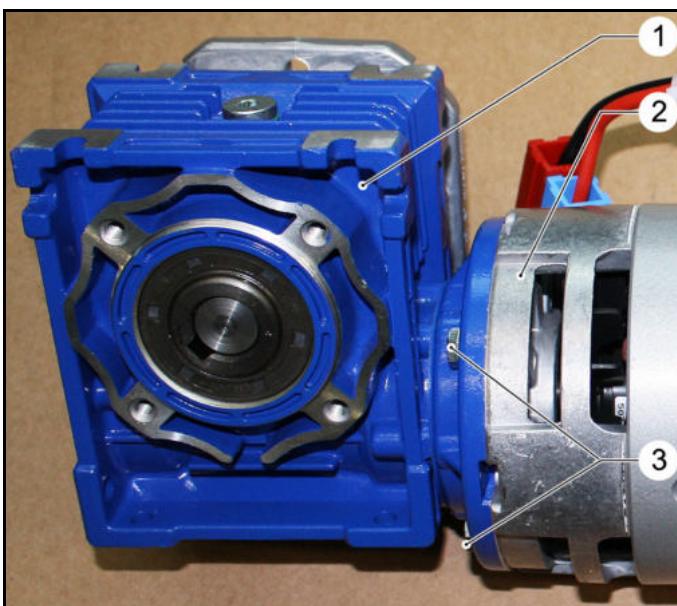
③ Floor plate

1. Unscrew the screws.

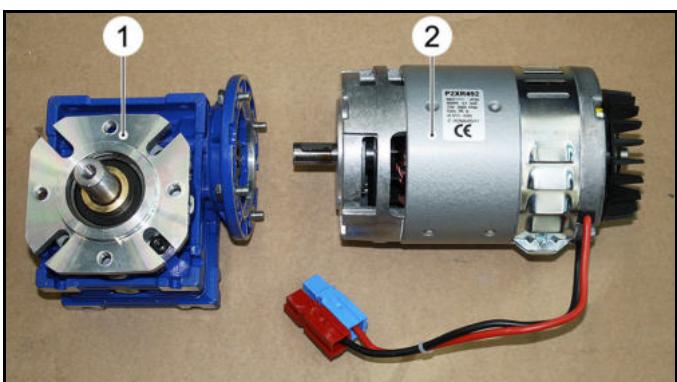
2. Remove the base plate.



- ① Gearbox axle
② Screws
3. Unscrew the screws.
4. Remove transmission with motor.



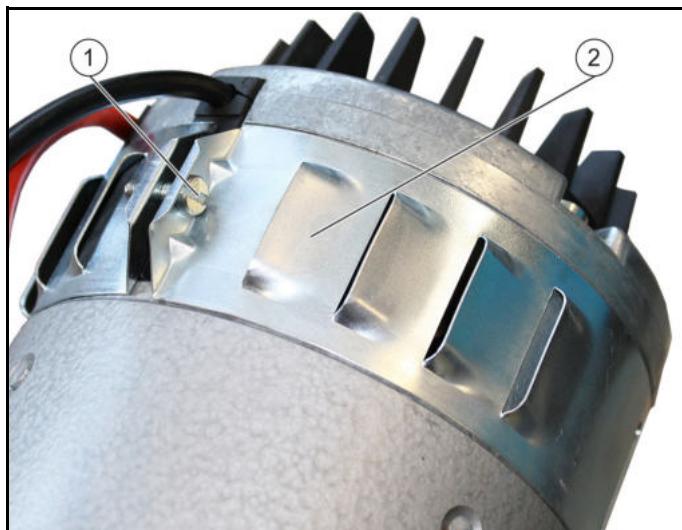
- ① Transmission
② Motor
③ Screws
5. Unscrew the screws.



- ① Transmission
② Motor

15.4.4 Removing/installing the brush motor sliding contacts

- 15.4.3 Removing/installing the brush motor with transmission

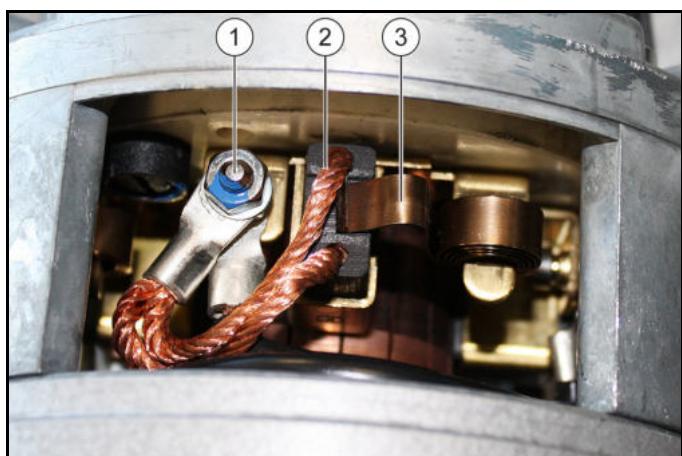


- ① Screw
- ② Sliding contacts cover

1. Unscrew the screw.
2. Remove the sliding contacts cover.

Note

Note the installation position of the cover, if necessary make a mark.



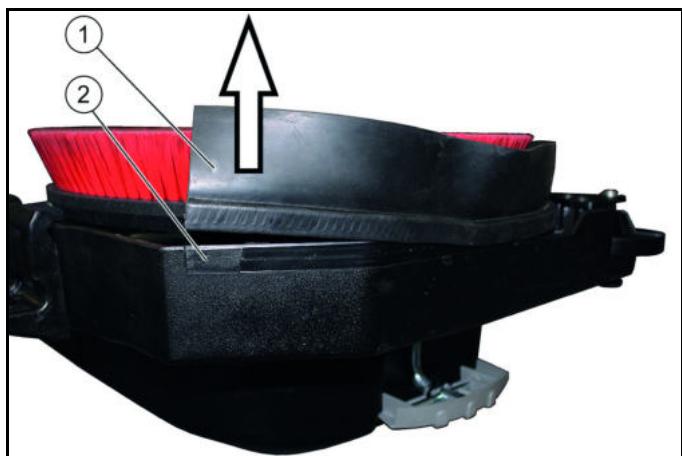
- ① Sliding contact nut
- ② Sliding contact
- ③ Pressure spring

3. Unscrew the nut
4. Lift the pressure spring and pull the sliding contact out of the shaft.

Note

Always replace all four sliding contacts.

15.4.5 Removing/installing the squeegee blade

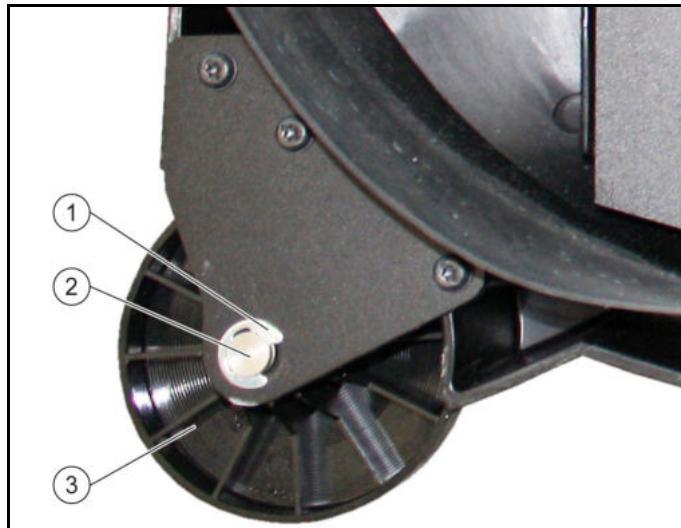


- ① Squeegee blade

- ② Bar

1. Pull the squeegee blade off the bar.

15.4.6 Removing/installing the deflection roller



① Retaining ring

② Axle bolt

③ Scraper roll

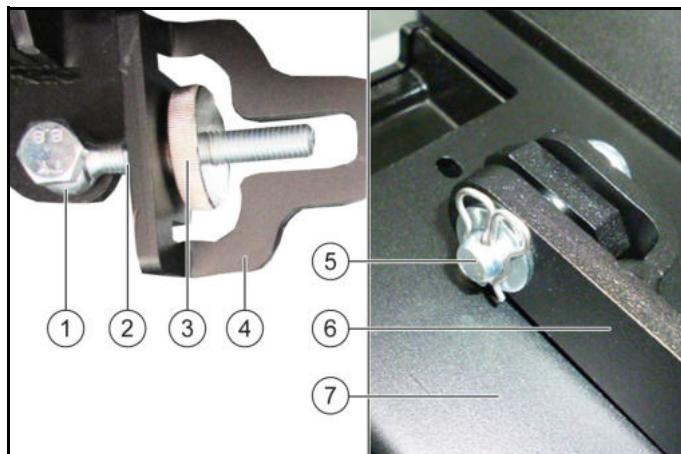
1. Remove the retaining ring.

2. Pull out the axle pin and remove the deflection roller.

15.4.7 Adjusting the D cleaning head

Note

Use the grey or red KIK key in the "Brush Head - Brush Head Control" menu to lower the cleaning head until the disc brushes lie lightly on the floor.



The suspension of the cleaning head must not be bent or damaged.

① Eyebolt

② Lock nut

③ Lock nut

④ Tie rod

⑤ Bolt

⑥ Cleaning head holder

⑦ Cleaning head

1. Loosen the counternut.

2. Adjust the tie rod on the eyebolt using the knurled nut so that the bolt can move freely in the cleaning head holder.

3. Tighten the counternut against the knurled nut.

15.5 050 Service and inspection

Service group does not contain any maintenance and inspection points.

15.6 060 Fault diagnosis

This service group does not have fault diagnosis.

15.7 070 Special features / other

This service group does not have any special features.

16 Side scrubbing deck service group

16.1 010 Safety instructions

Note

Service and maintenance work may only be performed by suitably qualified and specially trained personnel.

Observe the safety instructions in the chapters!

⚠ DANGER

Risk of injury due to the device starting and due to rotating parts

A risk of injury exists due to the device starting unexpectedly and from rotating parts such as motors, suction turbine, drive wheels and brushes.

Turn the program selection switch to the "Off" position and remove the Intelligent Key before performing any work on the device. Disconnect the battery connector and disconnect the minus terminal before working on electrical or electronic components.

⚠ CAUTION

Risk of burns from hot surfaces.

Allow the device to cool down prior to all work.

16.2 020 Overview



- ① 16.4.1 Removing/installing the side scrubbing deck
- ② 16.4.2 Removing/installing the side scrubbing deck water pump
- ③ 16.4.3 Venting the side scrubbing deck
- ④ 16.4.7 Removing/installing the side scrubbing deck motor
- ⑤ 16.4.9 Adjusting the swivel range of the side scrubbing deck
- ⑥ 16.4.4 Removing/installing the side scrubbing deck brush
- ⑦ 16.4.8 Removing/installing the skid
- ⑧ 16.4.6 Removing/installing side scrubbing deck drive chain
- ⑨ 16.4.5 Removing/installing side scrubbing deck lifting motor

16.3 030 Function

16.3.1 Side scrubbing deck

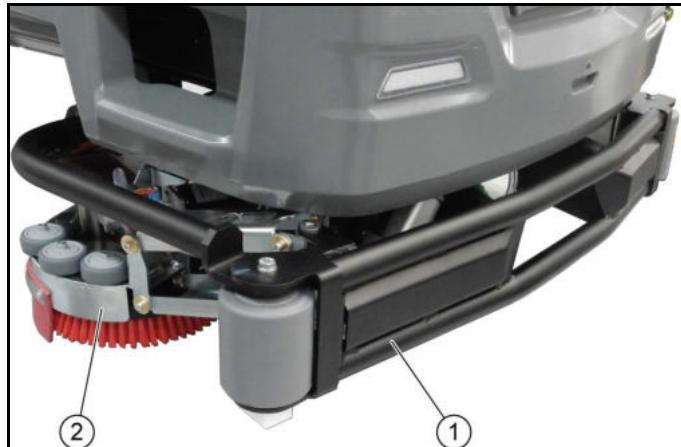
The side scrubbing deck is not active in the polish and vacuum cleaning programs.

16.4 040 Service activities

Note

Unless otherwise described, installation is performed in reverse order.

16.4.1 Removing/installing the side scrubbing deck



① Collision guard

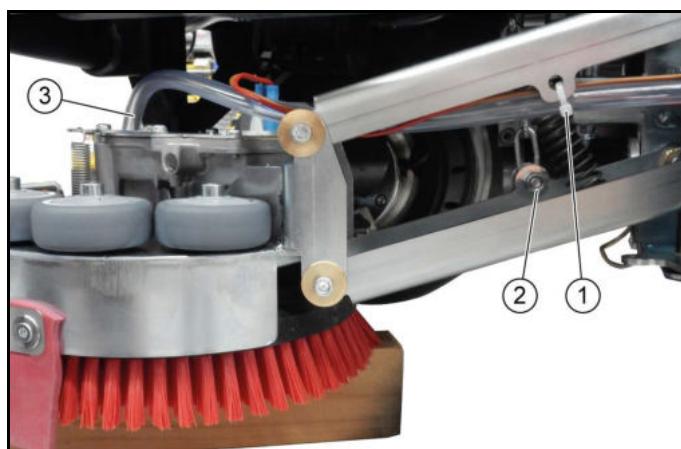
② Side scrubbing deck

1. Raise the front of the machine and support it under the impact protection.
2. Support the side scrubbing deck underneath to prevent it from falling down.



① Nut

3. Unscrew the nut while holding the spring.

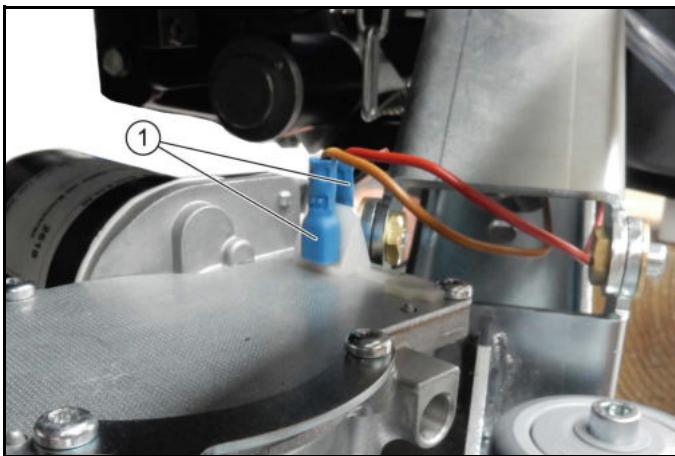


① Cable ties

② Nut

③ Water connection

4. Cut the cable ties.
5. Unscrew the nut.
6. Disconnect the water connection.



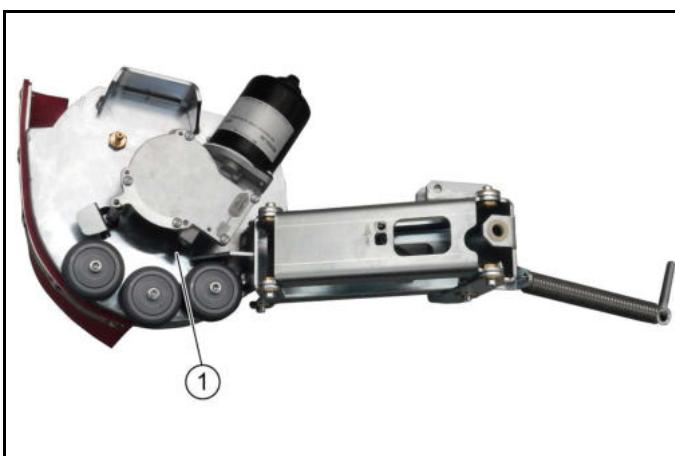
- ① Electrical socket plug connections
7. Disconnect the electrical socket plug connections.



- ① Spring
8. Unhook the springs.

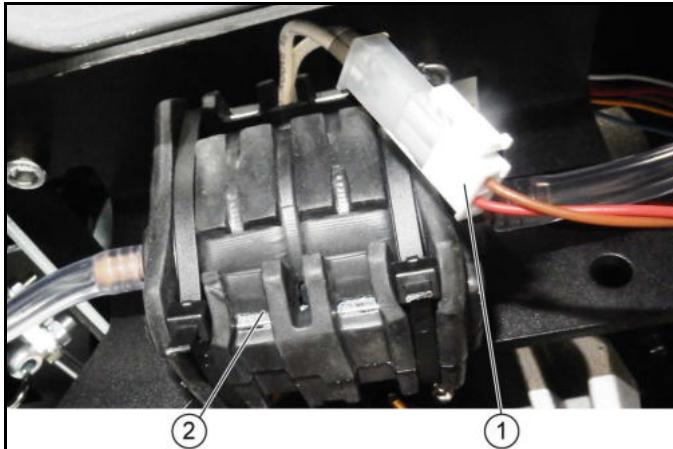


- ① Retaining ring
② Bolt
9. Remove the retaining ring.
10. Remove the bolt downwards.



- ① Side scrubbing deck
11. Remove the side scrubbing deck.

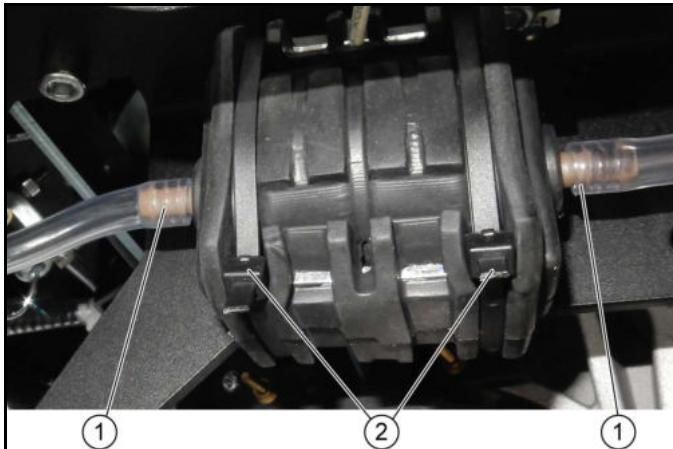
16.4.2 Removing/installing the side scrubbing deck water pump



① Electrical connector

② Water pump

1. Disconnect the electrical connector.



① Water connections

② Cable ties

2. Disconnect the water connections.
3. Cut the cable ties.
4. Remove the water pump.

16.4.3 Venting the side scrubbing deck

1. Plug in the KIK on the control panel.
2. Press the safety switch into position "I".
3. Turn the program switch to the position "Scouring/pre-cleaning without vacuum cleaning" (see operating instructions).
4. Switch on the side scrubbing deck.
5. Drive until the 960 mm hose with check valve is vented and fresh water emerges from the side scrubbing deck.

Note

If no fresh water is emitted despite a longer journey, proceed as follows:



9. Attach the hose to the check valve.

10. Attach hose clip.

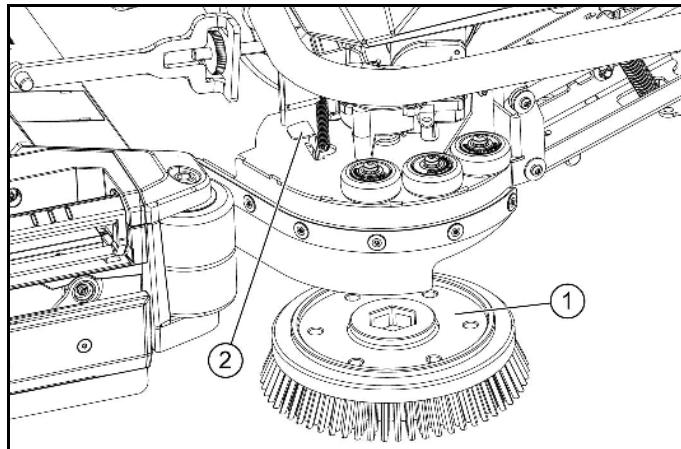
① Check valve

② Hose clamp

③ Hose

6. Release the hose clip.
7. Pull off the hose at the check valve.
8. Drive until the hose is vented and fresh water emerges.

16.4.4 Removing/installing the side scrubbing deck brush



Note

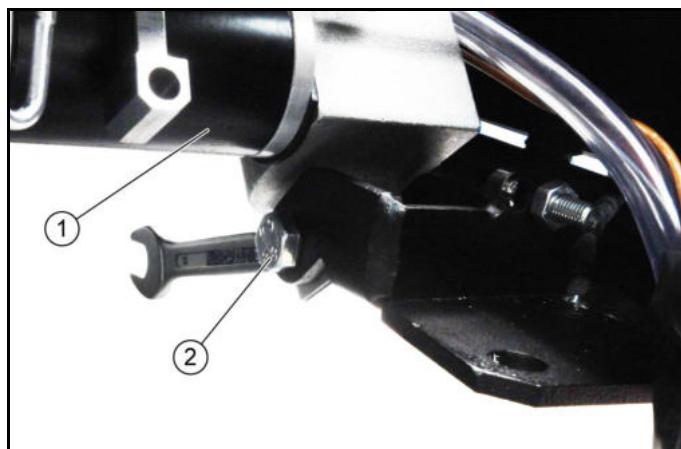
Replace the brush when the bristle length has reached 10 mm.

- ① Side scrubbing deck brushes
- ② Brush replacement lever

1. Press the brush replacement lever downwards.
The brush is released.
2. Remove the brush.

16.4.5 Removing/installing side scrubbing deck lifting motor

- 16.4.1 Removing/installing the side scrubbing deck



- ① Lifting motor
- ② Screw

1. Counter-hold the screw and unscrew it.



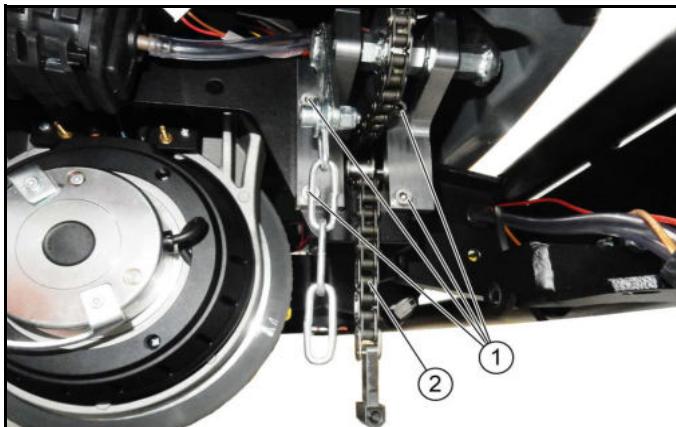
- ① Screw
 - ② Lifting motor
2. Counter-hold the screw and unscrew it.
 3. Remove the lifting motor.



- ① Electrical connector
4. Disconnect the electrical connector.

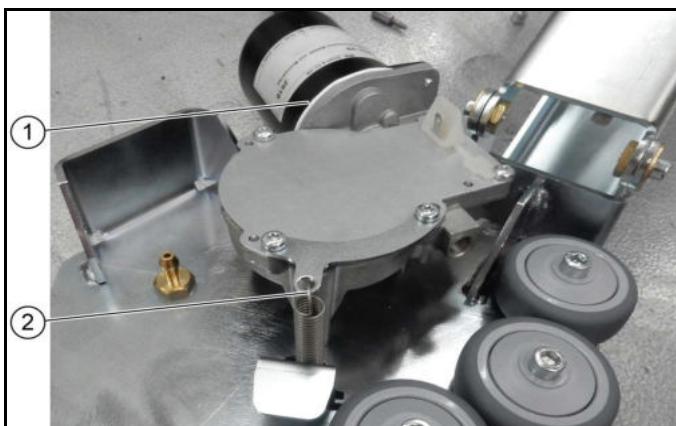
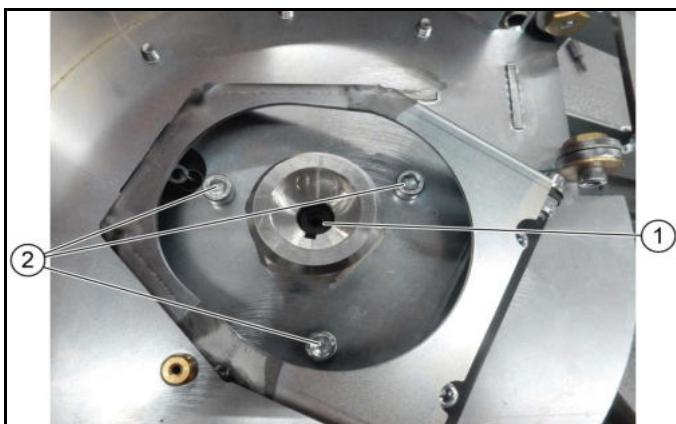
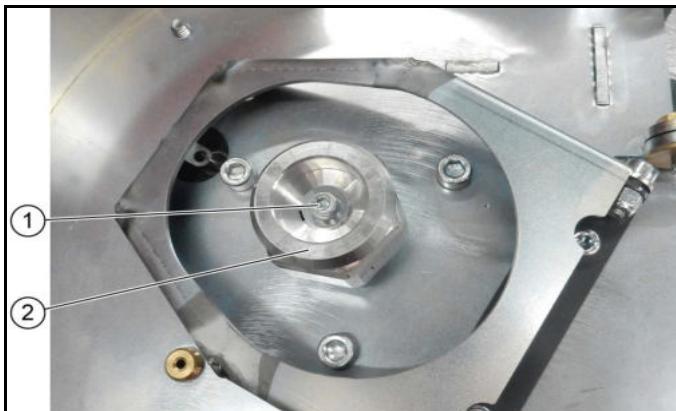
16.4.6 Removing/installing side scrubbing deck drive chain

- 16.4.5 Removing/installing side scrubbing deck lifting motor



16.4.7 Removing/installing the side scrubbing deck motor

- 16.4.1 Removing/installing the side scrubbing deck
- 16.4.4 Removing/installing the side scrubbing deck brush



- ① Screw
 - ② Feather nut
1. Remove the side brush.
 2. Unscrew the screw.
 3. Remove feather nut.

- ① Drive shaft
 - ② Screws
4. Unscrew the screws.

- ① Motor
 - ② Spring
5. Release the spring.
 6. Remove the entire motor.
 7. Remove the Woodruff key on the drive shaft.

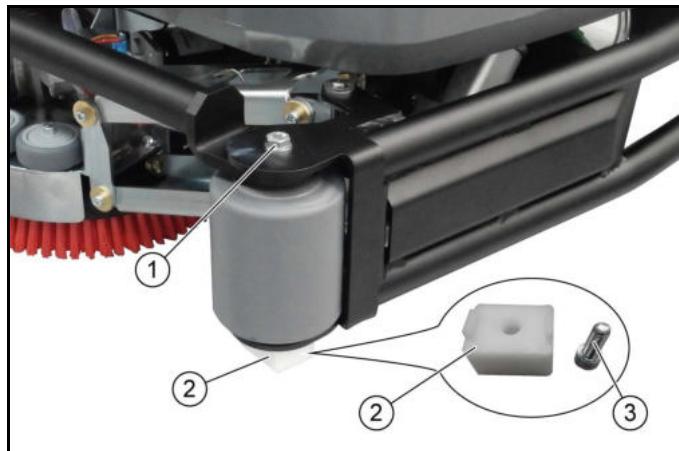
Note

The Woodruff key is not included in the scope of delivery of spare parts.

Installation information

Lightly grease the drive shaft.

16.4.8 Removing/installing the skid

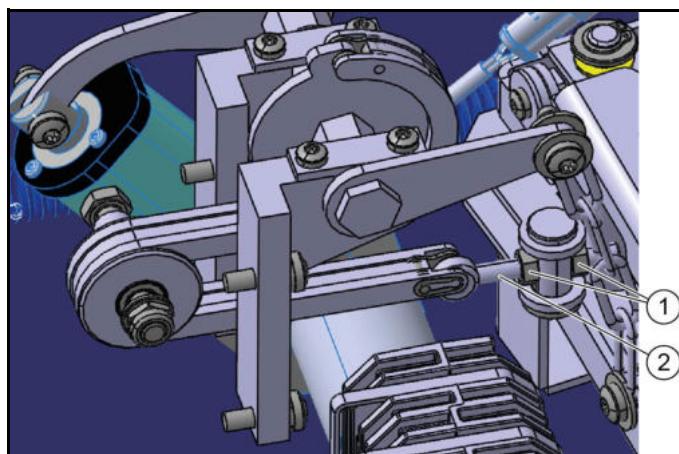


- ① Screw
 - ② Skid
 - ③ Hexagon socket screw
1. Counter-hold the screw.
 2. Unscrew the hexagon socket screw.
 3. Remove the skid.

Note

The skid prevents damage to the floor. Check the skid regularly for wear.

16.4.9 Adjusting the swivel range of the side scrubbing deck



- ① Nuts
 - ② Adjustment screw
1. Release the nuts.
 2. Adjust the lifting range using the adjustment screw.

Note

Adjust the swivel range so that the side scrubbing deck does not touch the brake.

3. Tighten the nuts.

16.5 Adjusting the side scrubbing deck

Note

The side scrubbing deck has three possible adjustment screws for:

- Extending the side scrubbing deck
- Retracting the side scrubbing deck
- Lowering the side scrubbing deck

Extending the side scrubbing deck (SSD)



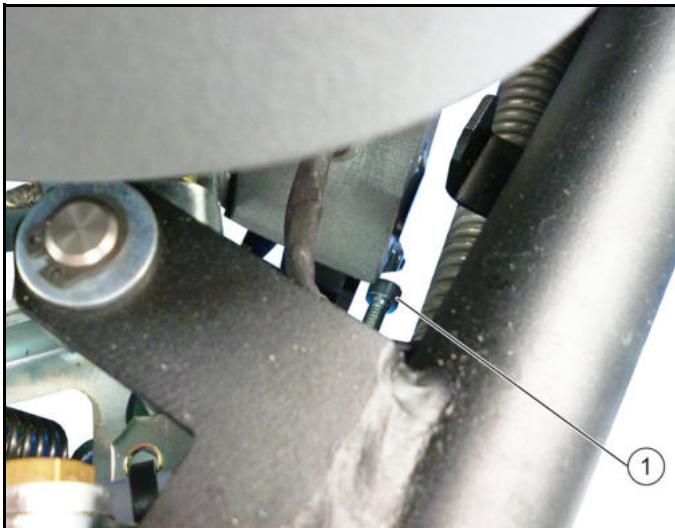
Note

This setting is made at the factory. It is not intended to change this setting later. The adjustment screw limits the extension of the side scrubbing deck.

- ① Collision guard
- ② Brass bearing

Test:

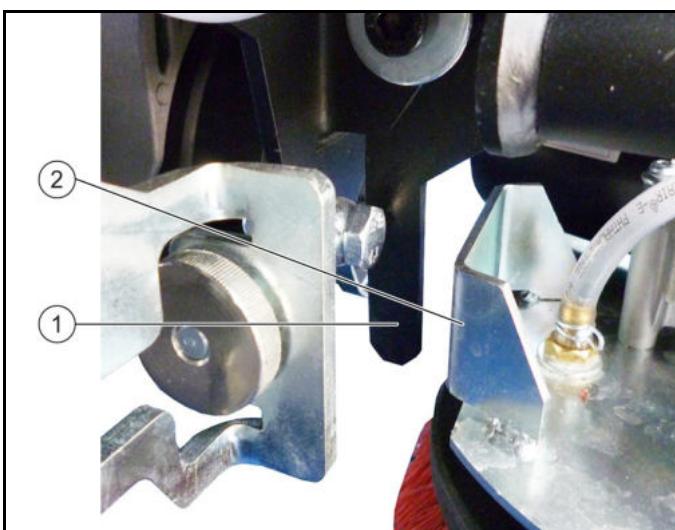
1. The brass bearing must not touch the impact protection when the side scrubbing deck is extended.



① Adjustment screw

2. The adjustment screw is located under the side scrubbing deck near the lifting motor.

Retracting the side scrubbing deck (SSD)



Note

This setting must be corrected after a repair.

- ① Device frame
- ② Side scrubbing deck

Test:

3. The side scrubbing deck should retract so that there is a gap of approx. 5 mm between the unit frame and the side scrubbing deck.

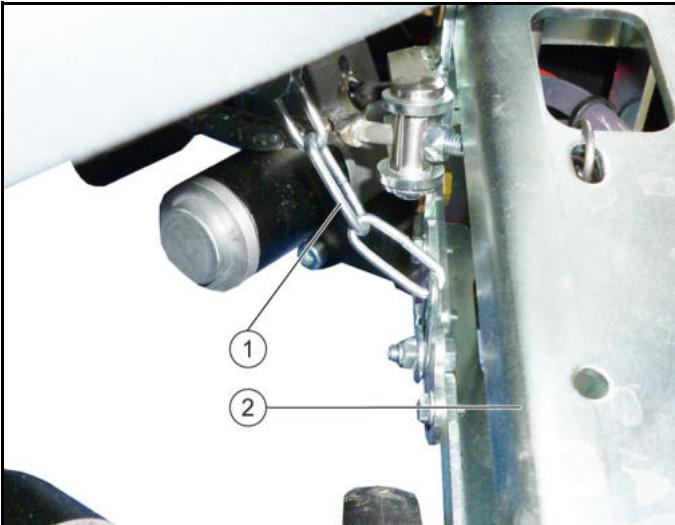


① Adjustment screw

② Brass bearing

4. The adjustment screw is located next to the brass bearing.

Lowering the side scrubbing deck (SSD)



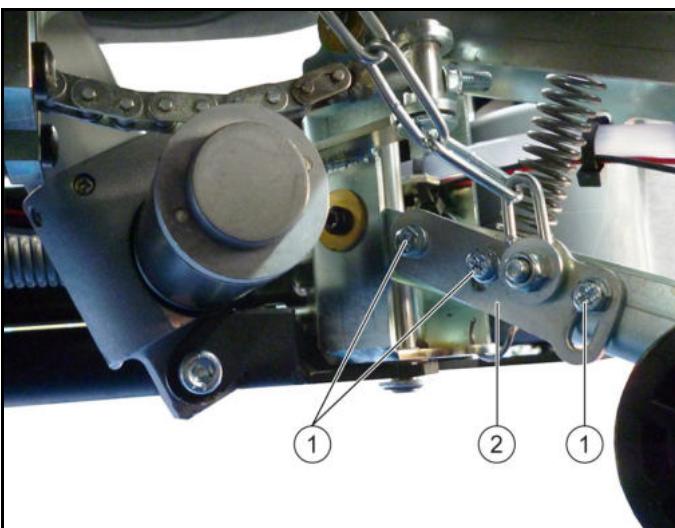
- ① Chain
- ② Side scrubbing deck

Test:

5. Extend the side scrubbing deck completely.
6. The chain should sag a little as shown in the illustration.

Note

This setting ensures complete wear of the disc brush when the side scrubbing deck is extended and also sufficient ground clearance when the side scrubbing deck is retracted.



- ① Screws
- ② Adjusting plate

7. Loosen the screws and align the adjustment plate accordingly.

16.6 060 Fault diagnosis

This service group does not have fault diagnosis.

16.7 070 Special features / other

This service group does not have any special features.

17 Electrical system service group

17.1 010 Safety instructions

Note

Service and maintenance work may only be performed by suitably qualified and specially trained personnel.

Observe the safety instructions in the chapters!

⚠ DANGER

Risk of injury due to the device starting and due to rotating parts

A risk of injury exists due to the device starting unexpectedly and from rotating parts such as motors, suction turbine, drive wheels and brushes.

Turn the program selection switch to the "Off" position and remove the Intelligent Key before performing any work on the device. Disconnect the battery connector and disconnect the minus terminal before working on electrical or electronic components.

ATTENTION

Risk of damage due to electrostatic discharge (ESD)!

Take suitable measure to discharge the electrostatic charge before all work on the unit electronics.

Wear ESD shoes.

Touch one battery pole with your hand for potential equalisation.

Do not remove the electronics from the packaging until immediately before installation.

Do not damage the insulation of the conductors or the coating on the circuit boards when performing measurements on electronic components.

ATTENTION

Risk of damage due to sharp-edged objects and soiling!

Sharp-edged or dirty objects can cause damage such as scratches, notches and deformation when coming into contact with device components. Dirty tools, cloths and work surfaces can cause irreversible soiling and discolouration.

Use only suitable, undamaged and clean tools and auxiliary materials and exercise care when working. Place components and devices only on clean, padded surfaces.

17.2 020 Overview



① 17.4.1 Disconnecting/connecting the power supply

② 17.4.4 Removing/installing the Telematic Control Unit (TCU)

③ 17.4.6 Removing/installing the controller

④ 17.4.5 Removing/installing the controller fan

⑤ 17.4.9 Removing/installing the driving lights and sidelights

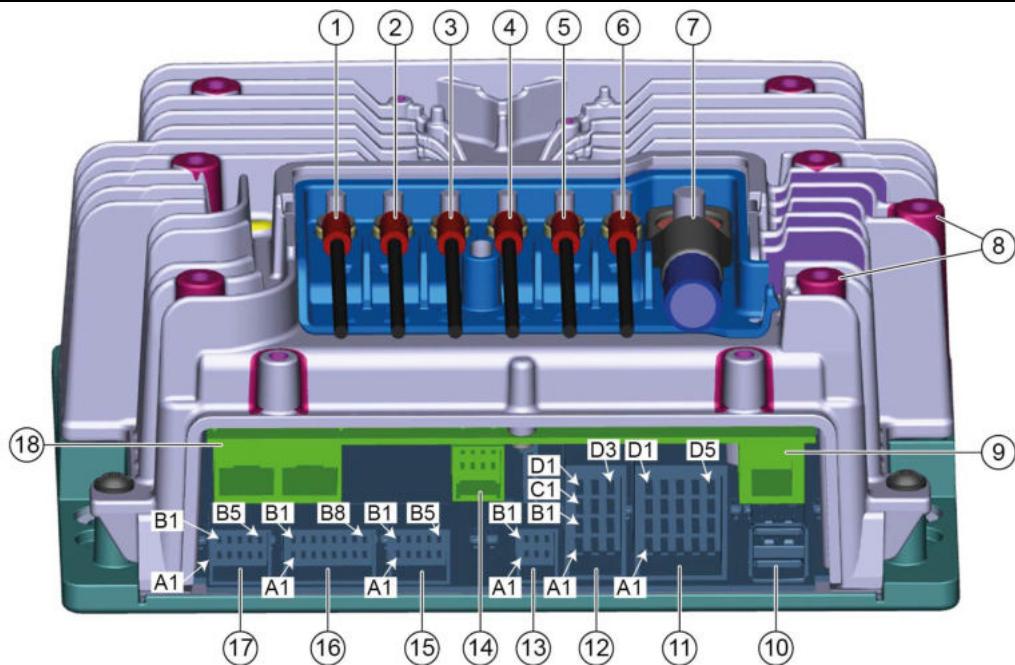
⑥ 17.4.2 Removing/installing the batteries

⑦ 17.4.3 Removing/installing the battery terminal fuse

⑧ 17.4.7 Removing/installing the charger

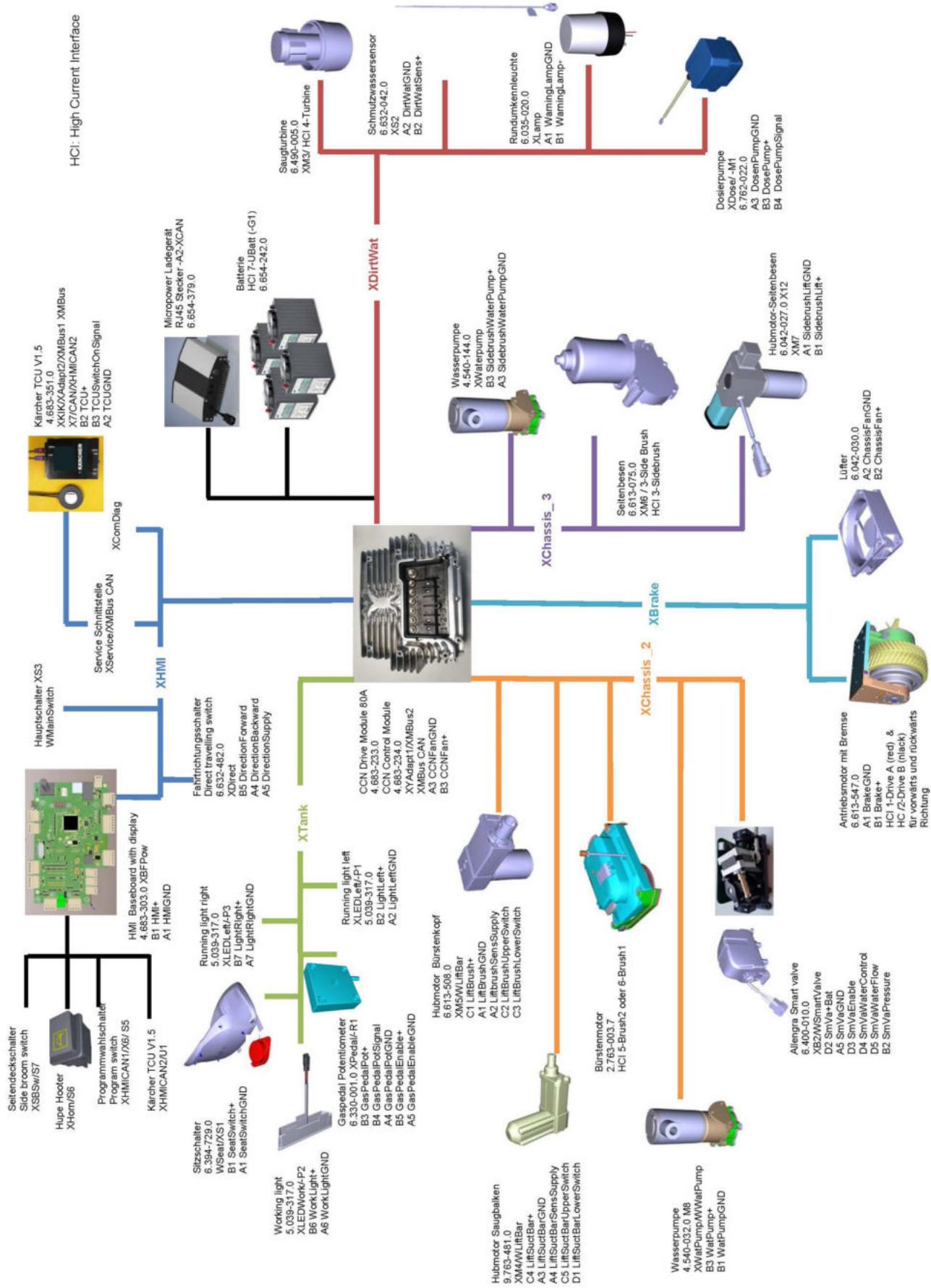
17.3 030 Function

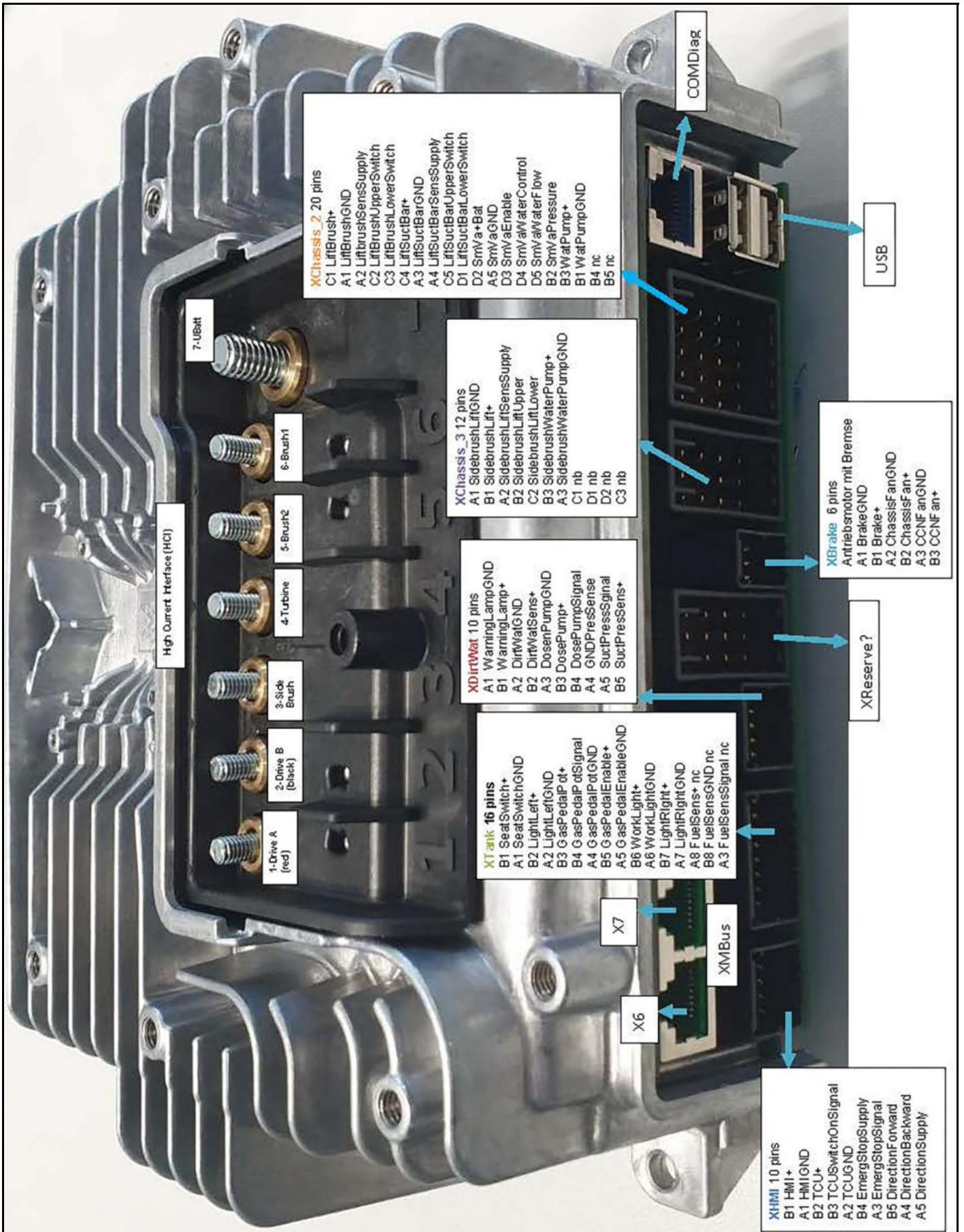
17.3.1 Control unit connections



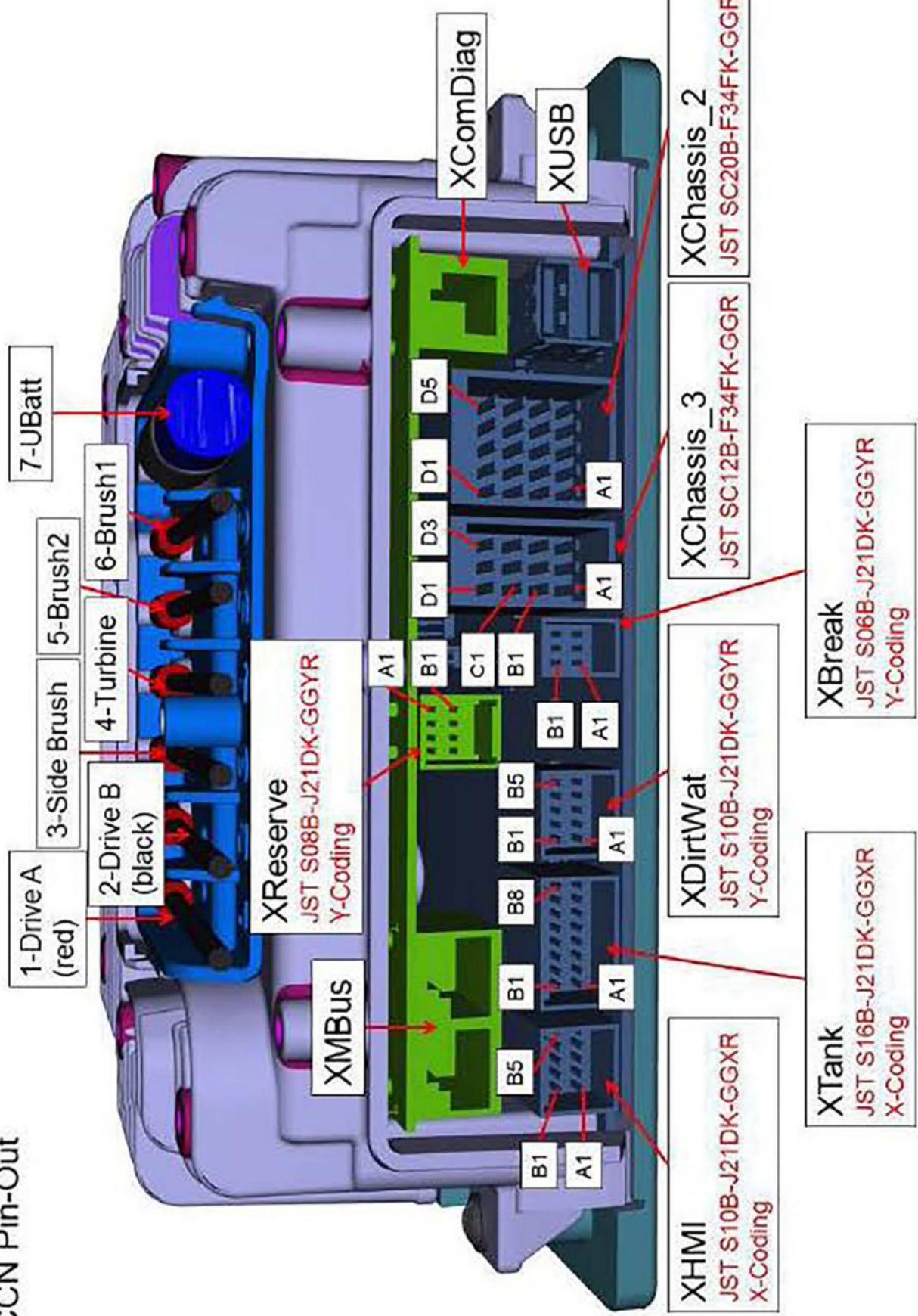
- ① Drive A (red)
- ② Drive B (black)
- ③ Side brush
- ④ Turbine
- ⑤ Brush 2
- ⑥ Brush 1
- ⑦ Vbatt
- ⑧ Negative connection
- ⑨ ComDiag
- ⑩ USB
- ⑪ Chassis 2
- ⑫ Chassis 3
- ⑬ Break
- ⑭ Reserve
- ⑮ DirtWat
- ⑯ Tank
- ⑰ HMI
- ⑱ MBus

17.3.2 Controller overview





B110R CCN Pin-Out



17.3.3 Terminating resistor/bus systems

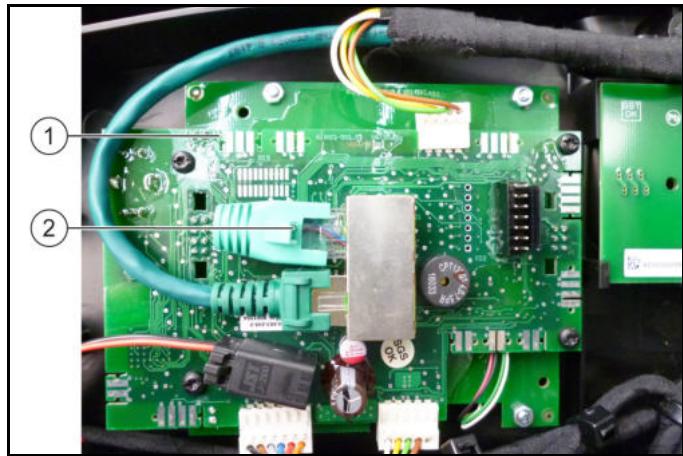
The machine has two different bus systems to be aware of.

Machine bus

Depending on the configuration, the controller and the control panel board can be equipped with a terminating resistor (120 Ohm).

If the unit has a charger installed, a terminating resistor is only present in the control panel circuit board. If a charger is not installed, a further terminating resistor (120 ohms) must be installed in the controller instead of the charger bus cable to prevent malfunctions. The terminating resistor plug has a green rubber cover.

The terminating resistor is connected to pin 1 and pin 2.



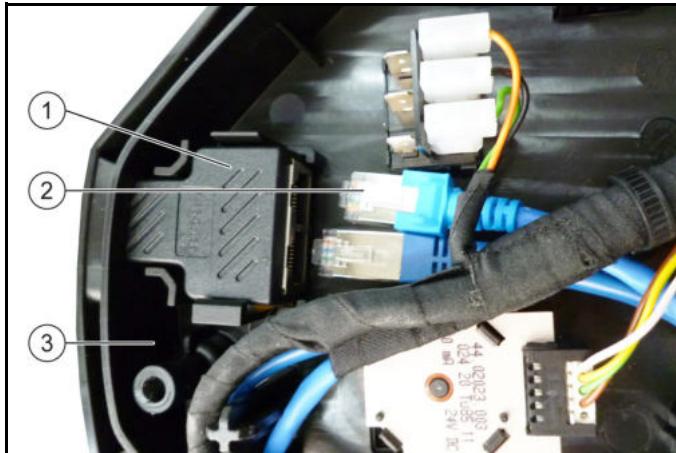
① Control panel circuit board

② Terminating resistor

- ① Controller
- ② Terminating resistor

TCU bus

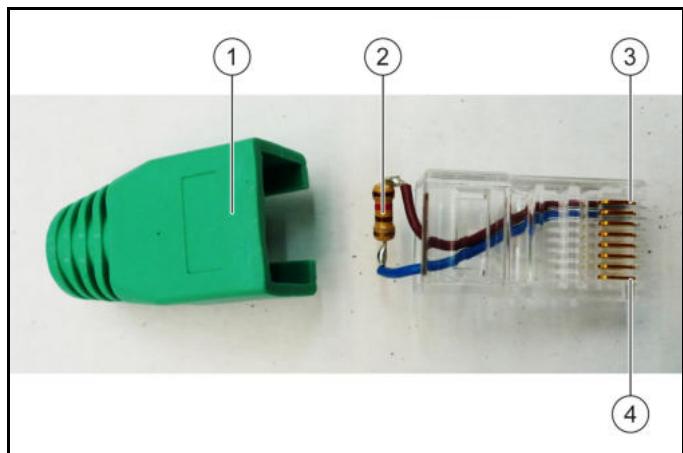
If the unit is configured without a TCU, a terminating resistor (120 Ohm) must be installed in the RJ45 distributor instead of the TCU bus cable. The terminating resistor has a grey rubber cover and is connected to pins 7 and 8.



① RJ45 distributor

② TCU bus cable

③ Control panel



① Rubber cover

② Machine bus terminating resistor

③ PIN 1

④ Pin 8



17.3.4 Battery indicator

The unit has two battery indication modes.

Voltage mode:

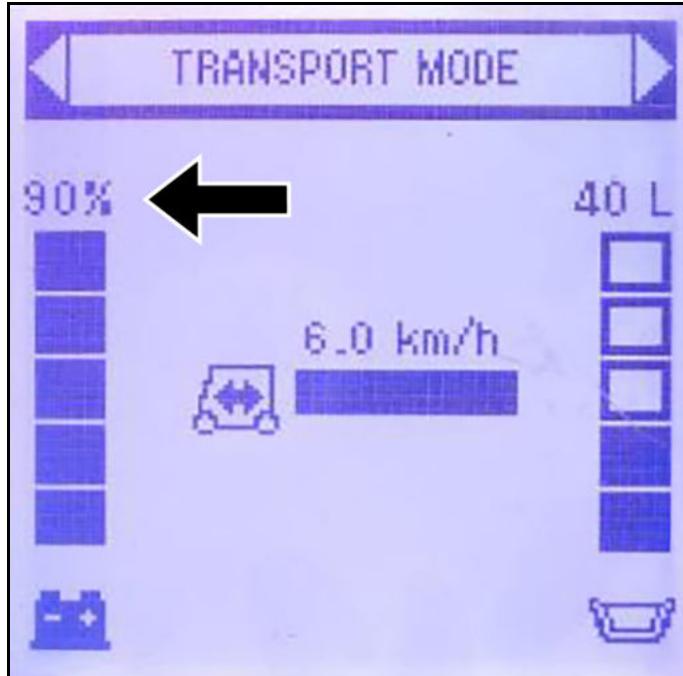
The voltage mode is active when a new controller is installed or after a battery has been selected in the battery menu.

Capacity mode:

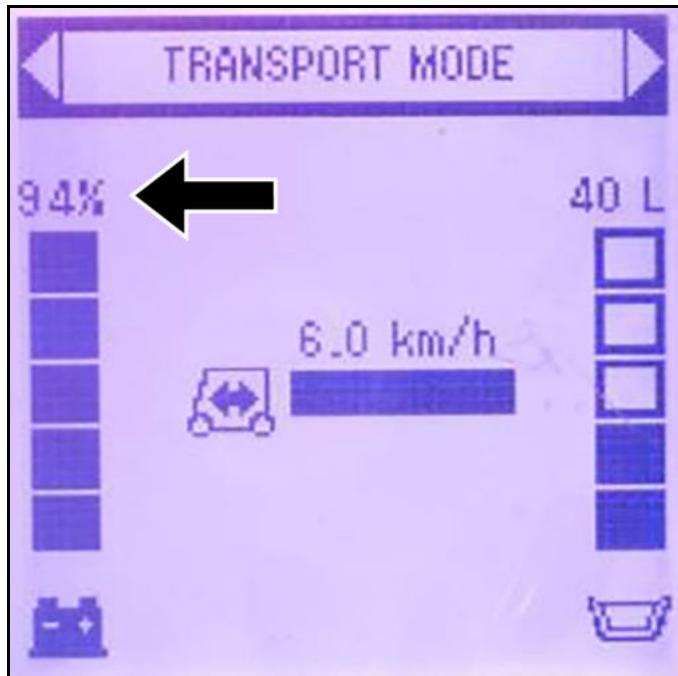
The capacity mode is active after the battery has been fully charged without interruption with the onboard charger, regardless of the remaining battery capacity.

The voltage mode can be recognized when the battery indicator is displayed in 10% steps, otherwise the unit is in capacity mode.

Voltage mode:



Capacity mode:



Note

If the onboard charger is replaced by an external charger, it must be switched to voltage mode so that the battery indicator shows correctly.

17.3.5 Taking batteries out of service

If batteries are not used for a period of time, the following must be observed when storing them:

- Disconnect the negative terminal connection on the battery and store the cable in such a way that it cannot be accidentally connected to the negative terminal of the battery.
- Store batteries only in a charged state. A cool storage ensures less self-discharge.

Maintenance-free batteries:

Recharge as soon as the battery capacity has fallen below 60%.

Low-maintenance batteries:

- Monthly check of the acid density.
- Recharge as soon as the acid density has dropped below 1.23 kg/l.

17.4 040 Service activities

Note

Unless otherwise described, installation is performed in reverse order.

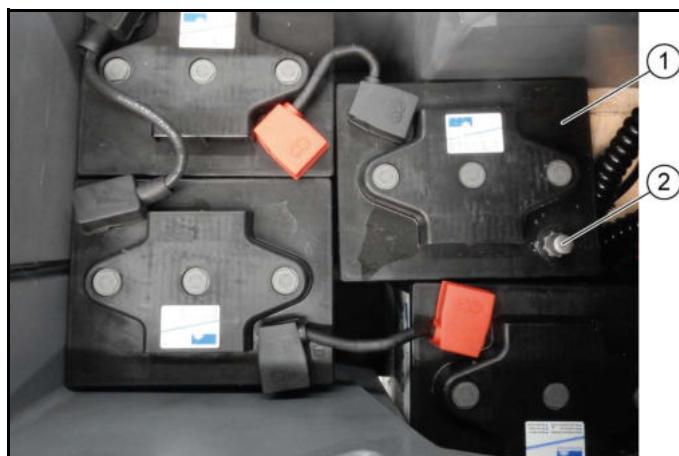
17.4.1 Disconnecting/connecting the power supply



① RFID reader

② Program selection switch

1. Turn the program selection switch to the "Off" position.
2. Remove the Intelligent Key from the RFID reader.



① Batteries

② Connection to the device

3. Disconnect the battery connection to the device.

Note

Do not connect a battery charger for performing maintenance and repair work.

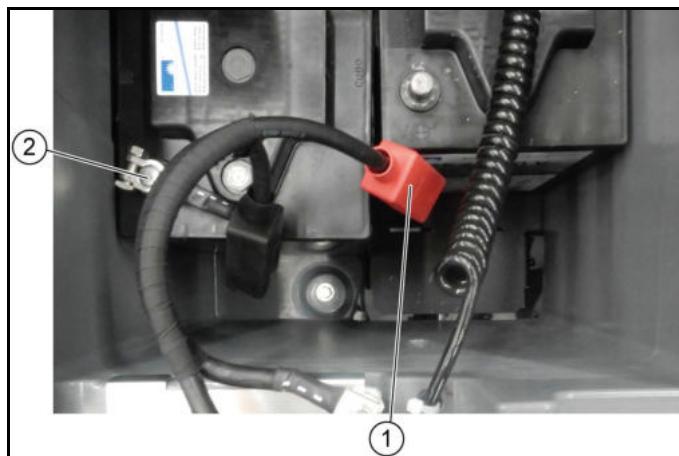
17.4.2 Removing/installing the batteries

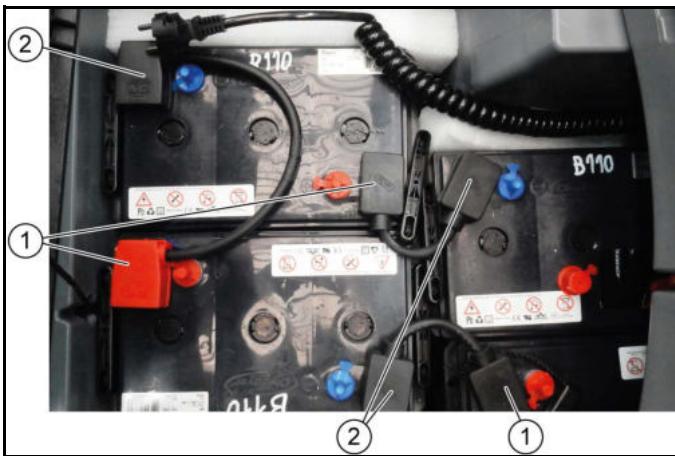
- 17.4.1 Disconnecting/connecting the power supply
- Drain and pivot up the waste water tank

① Plus terminal connection

② Minus terminal connection

1. Remove the cover and detach the minus terminal connection at the battery.
2. Detach the plus terminal connection at the battery.





- ① Plus terminal connection
- ② Minus terminal connection
- 3. Detach the minus terminal connection at the battery.
- 4. Detach the plus terminal connection at the battery.
- 5. Lift the batteries out using the carrying straps.

Installation of Hoppecke battery



Note

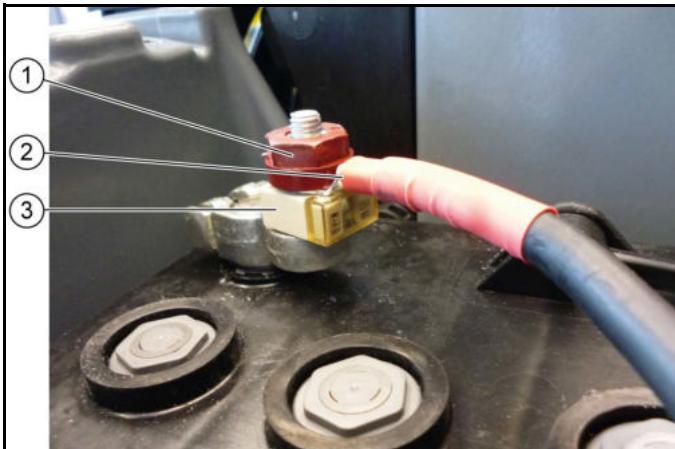
The standard minus battery terminal cover does not fit the Hoppecke battery. For this reason, the minus cable coming from the unit is attached using a pole screw with an insulating head. The connection cable between the batteries are not affected. The ring eyelet of the minus cable is screwed directly onto the minus terminal. A washer must be inserted between the eyelet and the pole screw.

- ① Ring eyelet
- ② Terminal bolt
- ③ Washer

| | | |
|---------------|---------|-------------|
| Terminal bolt | M8 x 22 | 6.654-405.0 |
| Washer | B8 | 7.312-004.0 |

17.4.3 Removing/installing the battery terminal fuse

- 17.4.1 Disconnecting/connecting the power supply
- Drain and pivot up the waste water tank

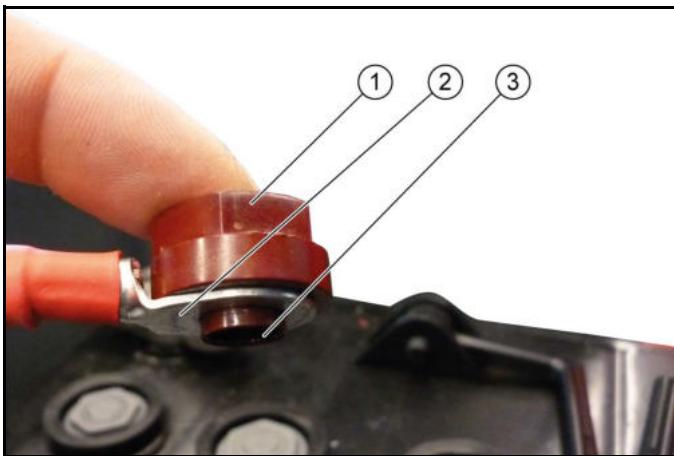


- ① Screw connection
- ② Power cable
- ③ Fuse

Note

A 125 A fuse is installed under the red positive terminal cover.

1. Remove the covering cap above the positive pole.
2. Open the screw connection.
3. Remove the power cable



- ① Screw connection
 - ② Cable lug for power cable
 - ③ Guide
4. Put the fuse on the thread of the battery terminal.
 5. Insert the guide for the screw connection through the cable lug.

Note

The guide must not get damaged.

6. As one unit, screw it tightly onto the thread on the battery terminal.



Installation information

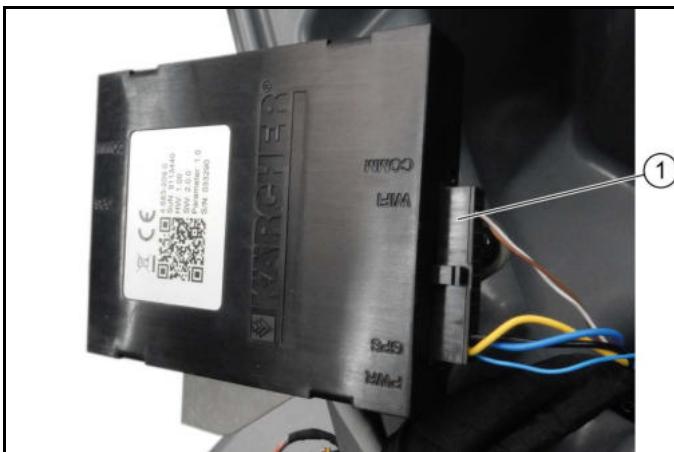
Carry out a continuity check between the battery terminal and cable lug for power cable.

17.4.4 Removing/installing the Telematic Control Unit (TCU)

- 8.4.1 Removing/installing the control panel



- ① TCU
 - ② Screws
1. Unscrew the screws.
 2. Remove the TCU with the support and put it down.



- ① Electrical connector
3. Disconnect the electrical connector.



① TCU

② Screws

4. Unscrew the screws.

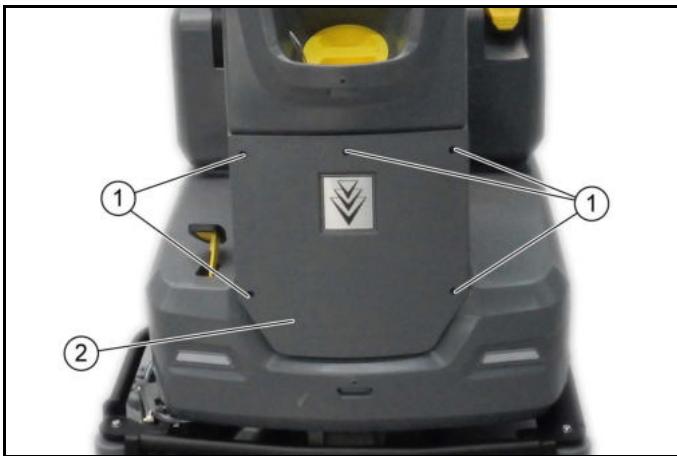
5. Remove the TCU from the support.

Installation information

Check for correction function.

17.4.5 Removing/installing the controller fan

- 17.4.1 Disconnecting/connecting the power supply



① Screws

② Bar cover

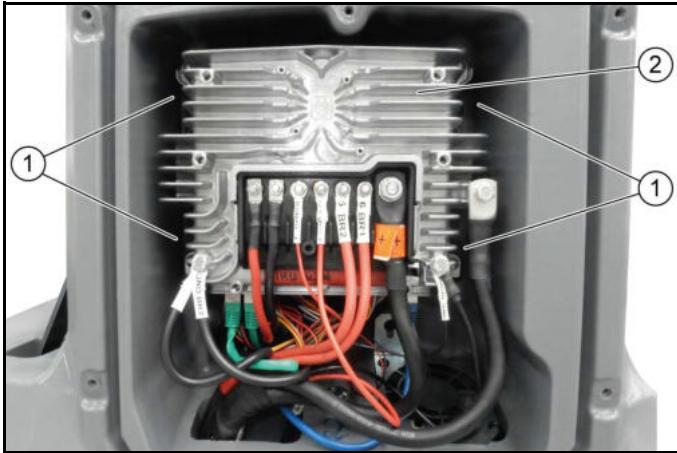
1. Unscrew the screws.

(Tightening torque: 1.8 Nm)

2. Remove the cover.

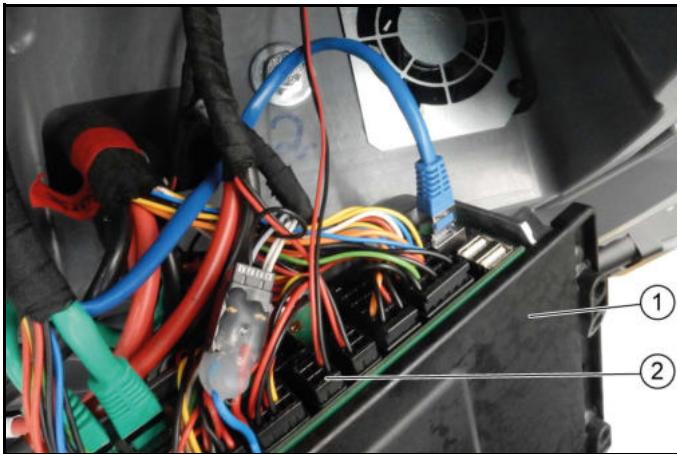
Installation information

When assembling, be sure to use the correct screw length of 5 x 20 mm. Using longer screws can cause leaks in the tank.



① Screws

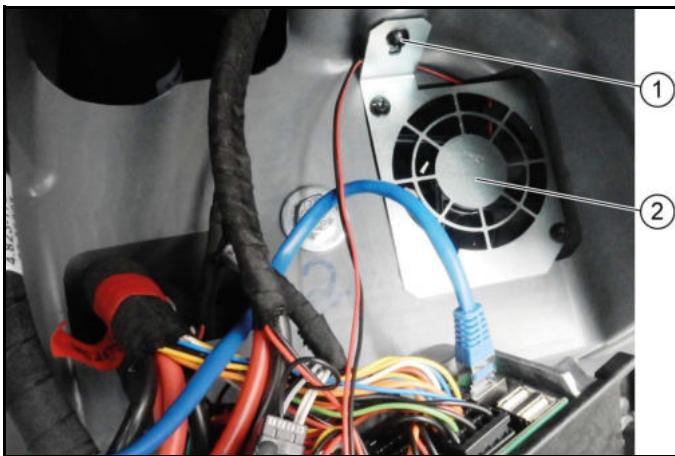
3. Unscrew the screws and carefully tip the controller forwards.



① Controller

② Fan electrical connector

4. Disconnect the fan electrical connector.



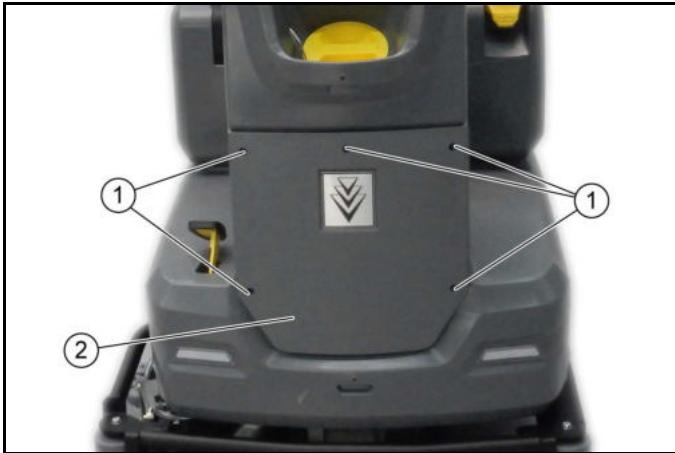
- ① Screw
 - ② Fan
5. Unscrew the screw.
 6. Remove the fan.

Note

The fan only switches on when the controller or drive circuit board has reached a temperature of 40 ° C. The temperature sensor is located on the circuit boards.

17.4.6 Removing/installing the controller

- 17.4.1 Disconnecting/connecting the power supply

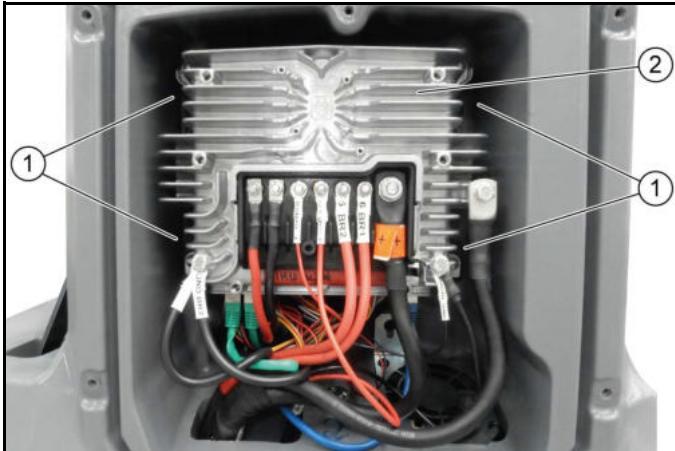


- ① Screws
- ② Bar cover

1. Unscrew the screws.
(Tightening torque: 1.8 Nm)
2. Remove the cover.

Installation information

When assembling, be sure to use the correct screw length of 5 x 20 mm. Using longer screws can cause leaks in the tank.



- ① Screws
- ② Control unit

Note

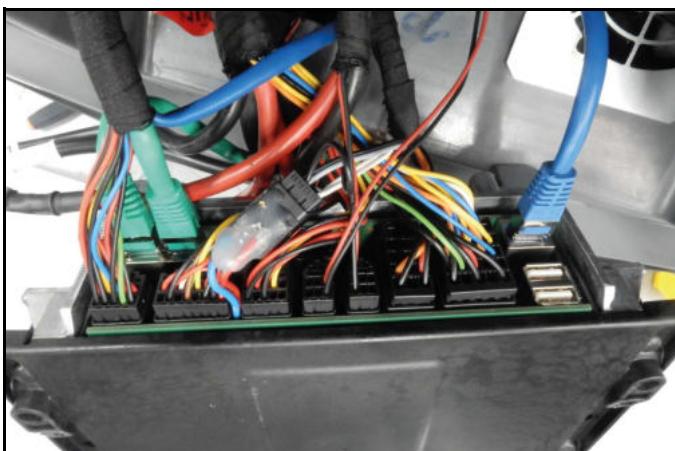
The aluminium casing is the negative pole for the units.

3. Disconnect all connections on the control unit.
4. Unscrew the screws and carefully tip the control unit forward.
(Tightening torque M5: 6.3 - 6.5 Nm)
(Tightening torque M8: 8.5 - 8.7 Nm)
(Tightening torque M6: 4.0 Nm minus aluminium housing)

5. Disconnect all electrical socket plug connections and LAN cables on the control unit.

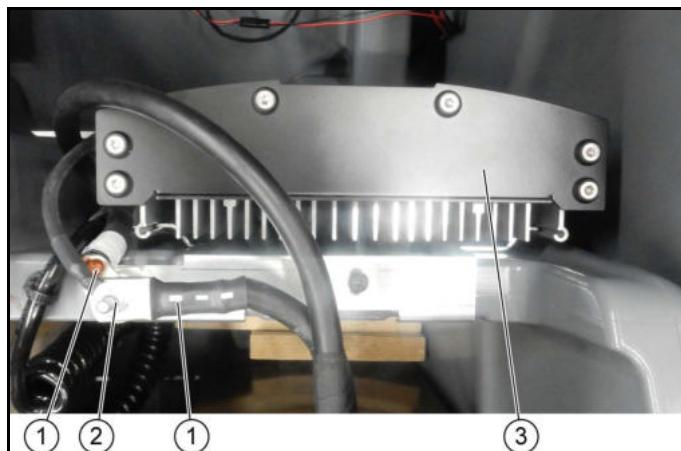
Installation information

For connections on the control unit, see 17.3.1 Control unit connections.



17.4.7 Removing/installing the charger

- 17.4.1 Disconnecting/connecting the power supply
- 9.4.1 Bringing the waste water tank into the servicing position



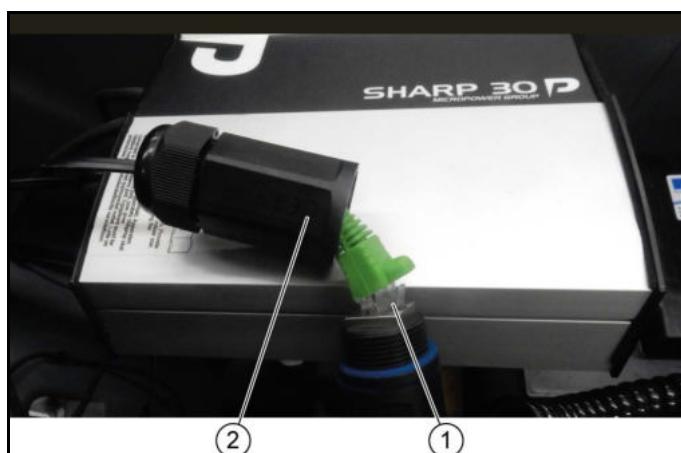
- ① Negative pole connection cables
 - ② Nut
 - ③ Charger
1. Unscrew the nut.
 2. Remove the power cables.
(Tightening torque for charger mounting plate: 1.8 Nm)



- ① Positive pole connection cables
 - ② Nut
3. Unscrew the nut.
 4. Remove the power cables.
 5. Remove the charger from the support.



- ① Electrical connector
6. Disconnect the electrical connector.



- ① LAN cable
 - ② socket
7. Screw the socket open.
 8. Disconnect the LAN cable.
- Installation information**
Ensure correct routing of the cables.

17.4.8 Checking the charger

Note

The charger is connected to the batteries. When the charger is active, an electronic immobilizer prevents the unit from being used. The controller communicates continuously with the charger via a bus cable. The configured charging characteristic is processed by the controller and defines the charging mode for the charger.

Note

Check cable connections and fuses before replacing components!

- 9.4.1 Bringing the waste water tank into the servicing position



① Negative pole connection cables

② Nut

③ Charger

1. Connect the charger to the batteries.
2. Connect the voltmeter and clamp ammeter to the battery cables.
3. Plug in the charger's mains plug.
4. Measure and record current and voltage values approx. 10 minutes after switching on the charger.

Note

The measurement results of the I constant phase in the main charging process must almost correspond to the manufacturer information for the charger.

See charger type plate

17.4.9 Removing/installing the driving lights and sidelights

- 17.4.1 Disconnecting/connecting the power supply

① Screwdriver

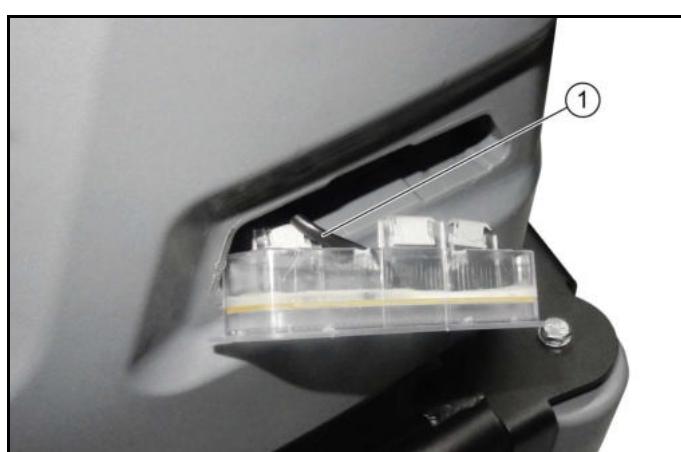
② Driving lights and sidelights

1. Lever out the driving lights and sidelights with a screwdriver.



① Electrical connector

2. Disconnect the electrical connector.



17.5 050 Service and inspection

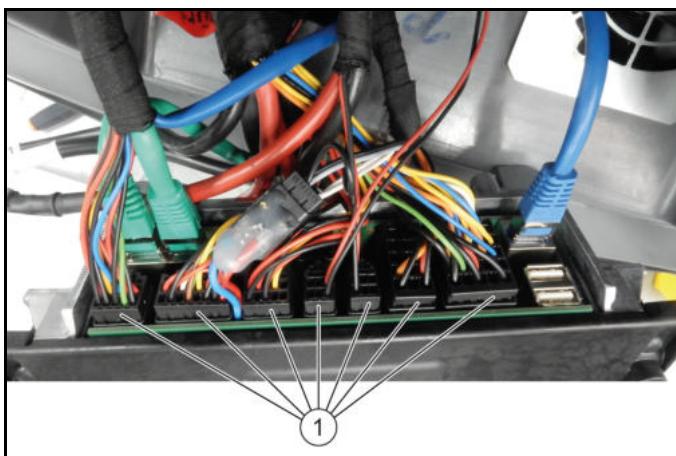
Service group does not contain any maintenance and inspection points.

17.5.1 Test cable set for CCN controller

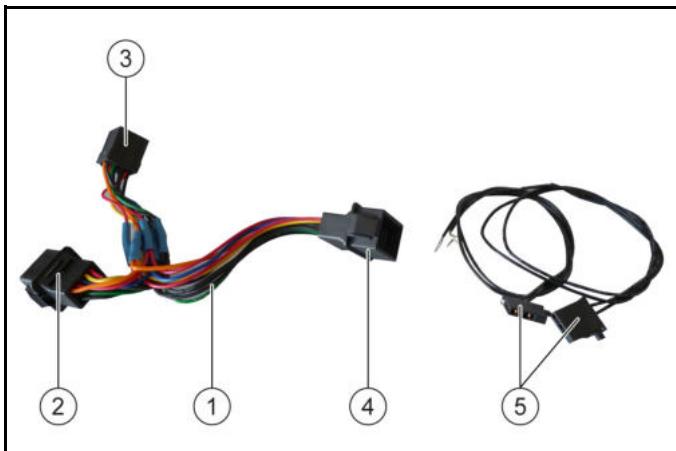
Note

It is not possible to take measurements directly on the JST plug. For this reason, test cables have been developed for

all JST plugs, which will be available in a set from the beginning of 2021.



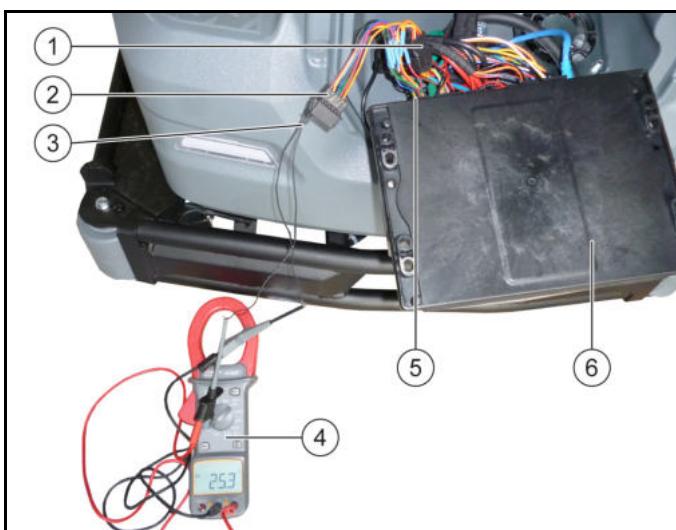
① JST plug



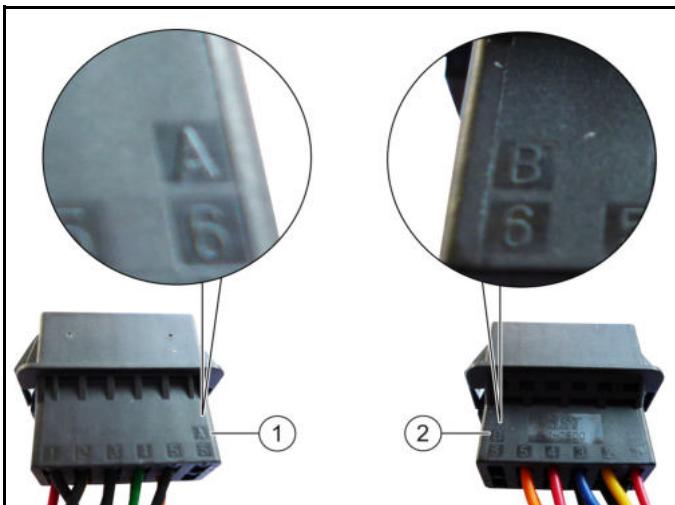
- ① Test leads
- ② Controller plug
- ③ Wiring harness plug
- ④ Measuring plug
- ⑤ Measuring cable

Note

The outputs on the controller can be checked with the test cable set. The test cable is plugged in between the controller and the cable harness. There is a measuring plug on the test cable at which the measurements are made. The test cable set also contains additional two-core measuring cables that can optionally be plugged into the measuring plug. The measurements can be carried out at these line ends.



- ① Wiring harness plug
- ② Measuring plug
- ③ Measuring cable
- ④ Measuring device
- ⑤ Controller plug
- ⑥ Controller



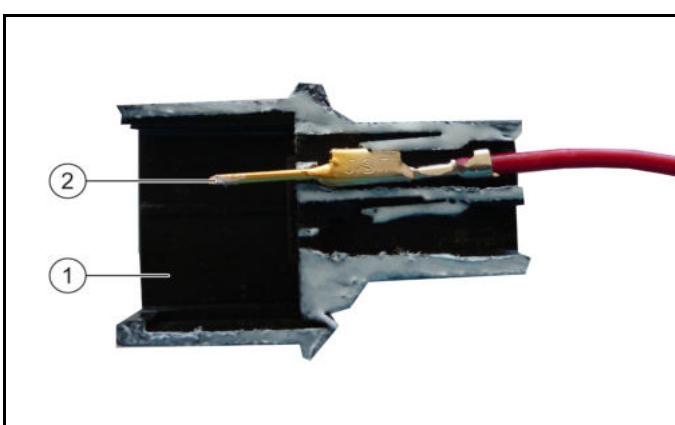
- ① A side
- ② B side

Note

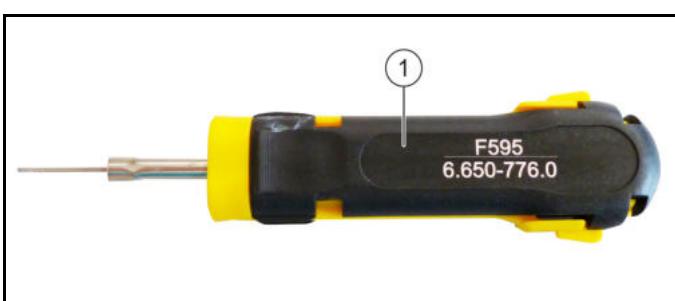
Each JST connector shell has an "A" and "B" side. The contacts are numbered. Consult the circuit diagram to determine which contacts are to be measured.

17.5.2 Unpin the JST plug

If a pin is to be removed from the connector housing, the procedure is as follows:

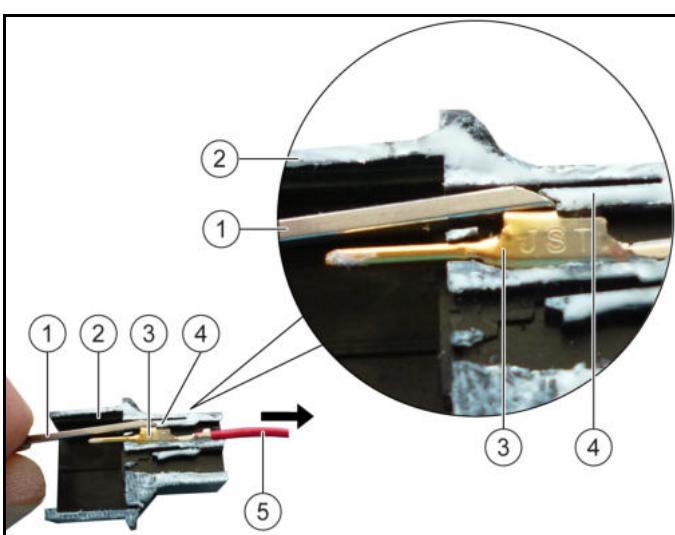


- ① Connector housing
- ② Pin



- ① Unpinning tool

Unpinning tool 6.650-776.0 required. The unpinning tool is included in the 6.650-788.0 case



- ① Unpinning tool
- ② Connector housing
- ③ Pin
- ④ Barbed hooks
- ⑤ Cable

1. Insert the unpinning tool into the connector housing.
2. Unlock the barb upwards with the unpinning tool.
3. Pull the pin with the cable out of the connector housing.

17.6 070 Special features / other

This service group does not have any special features.

18 Diagnostics/Software

18.1 KÄRCHER Diagnostics

KÄRCHER Diagnostics is a diagnostic system allowing you to perform the following tasks on this machine:

- Software updates for all control units
- Software update for TCU (Telematics Control Unit)
- Fleet pairing
- Reading out the operating hours and charging cycle counters
- Adaptation of cleaning programs
- Battery selection with on-site adjustable battery characteristics
- Resetting of service counters
- Manual activation of the actuators (except travel drive)
- Display of the measured values (current/voltage) of the outputs/actuators
- Display of all inputs
- Reading out the fault memory

For this, you require installed with the Windows 7 or higher operating system and an installation of the KÄRCHER Diagnostics software.

Fleet devices are fitted with a transmission unit (Telematic Control Unit - TCU) allowing them to establish a wireless connection to a WLAN-capable computer.

Devices without the fleet option and fleet devices with a faulty TCU are connected to the computer via the Diagnostics Module.

The following parts are required:

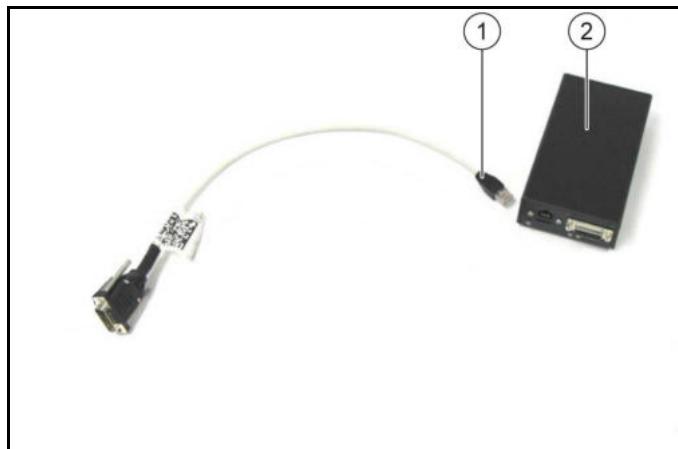
- 1x Kärcher Diagnostics Module 2.643-615.0
- 1x cable CAN 4.822-999.0

Note

The diagnostics tool is absolutely necessary for this device.

The diagnostic tool is required for the software installation of new controllers from the spare parts store.

New controllers do not have any software pre-installed and can only be made functional using the diagnostic tool. This has the advantage that the latest software is always transferred to the controllers.



① CAN cable
② Kärcher Diagnostics Module



• Kärcher Diagnostics Module with WLAN connection



• Kärcher Diagnostics Module with LAN connection

18.2 Install the KÄRCHER Diagnostics software

The current "KaercherDiag" software is always available on the following Smartbox page. The software must be installed on the computer. Administrator rights are usually required for the installation. The installation is simple and self-explanatory.

<https://smartbox.kaercher.com/x/QmQSEg>

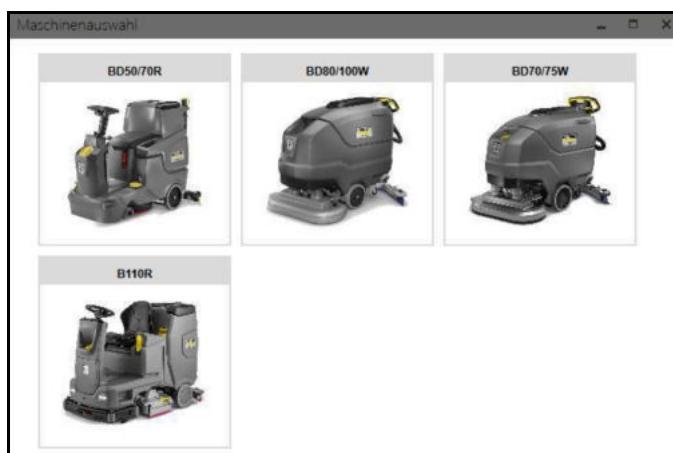
18.3 Diagnostics software



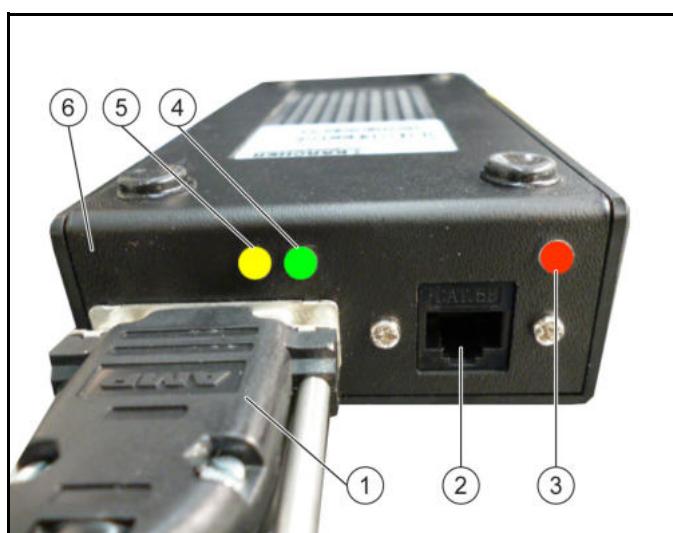
1. Start the KaercherDiag software on the computer.



2. Select the machine and connect it to a LAN or WLAN connection.



3. If the unit is not detected, select the corresponding unit in the unit selection field.

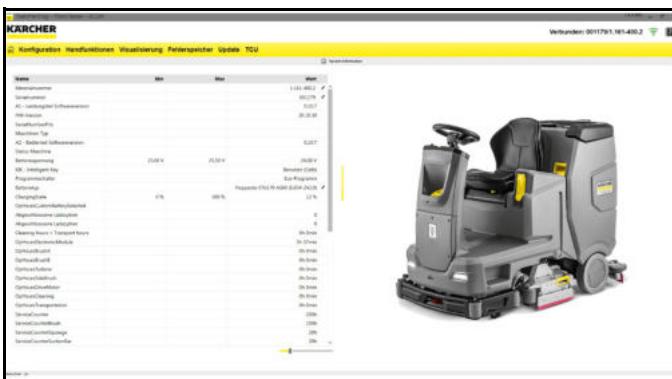


- ① CAN cable (connection to the machine)
- ② Patch cable connection (LAN connection to the computer)
- ③ Power On LED
- ④ WLAN LED
- ⑤ Communication LED
- ⑥ Diagnostics module

4. Establish a WLAN or LAN connection.

Note

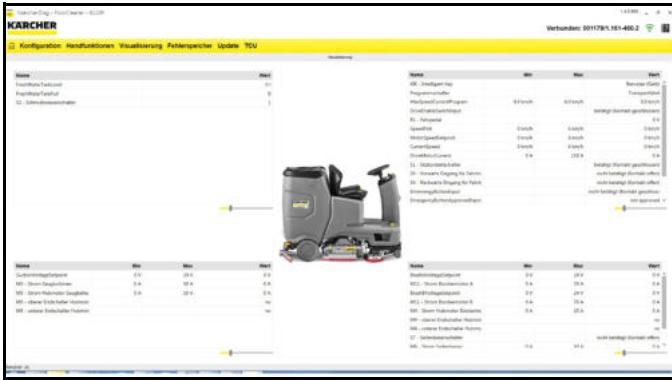
- A LAN connection can be established if a WLAN connection is not possible.
- When the WLAN connection is activated, the Power On LED lights up red, the WLAN slowly flashes green and the Communication LED quickly flashes yellow.



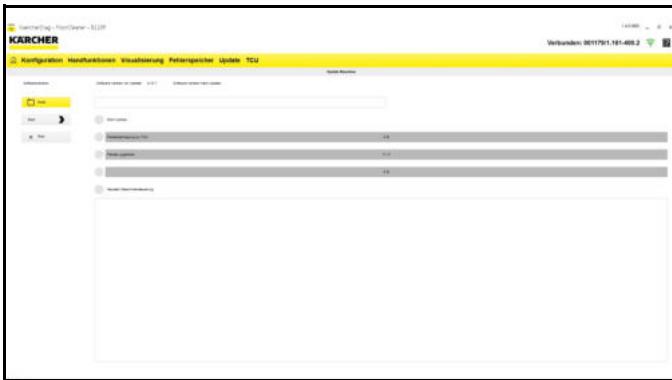
5. Start the Diagnostics software to see the start screen with system information.



6. Select the "Configuration" menu to adjust the unit settings.



7. The "Visualization" menu shows information on switch positions, sensors, unit parameters, electrical voltage and voltage supply.



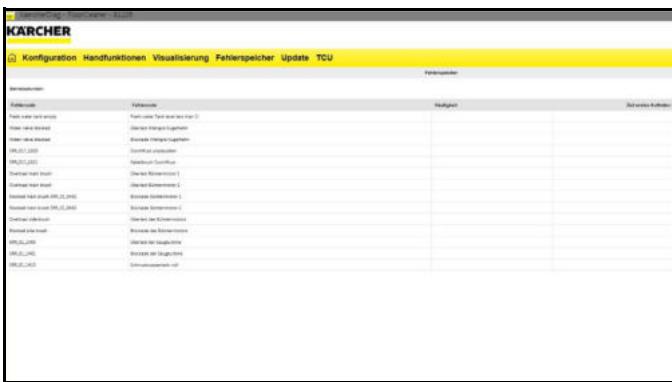
8. The "Update" menu contains software updates for all control units in one package.



9. "TCU" menu for changing the TCU settings and updating the software.



10."Fleet pairing" indicates whether the TCU is linked to a machine in the cloud.



11.Select the "Error buffer" menu for displaying error codes, error descriptions and troubleshooting information.

19 Troubleshooting guide

19.1 Malfunctions without information shown on the display

| Malfunction | Remedy |
|--|--|
| Brush motors do not run | <ol style="list-style-type: none"> Check electrical connector on the cleaning head. Check the brush motors using test mode. Check the program selection switch. Check cable connections/eliminate defect. Check the control electronics. |
| Diagnostic tool can only be used to a limited extent. | <ol style="list-style-type: none"> Use the red Intelligent Key. If no connection can be established with the built-in TCU, the diagnostic modules can be used. |
| Device cannot be started | <ol style="list-style-type: none"> Check the safety switch Check the program selection switch. Check the fuse. Check/charge the battery. Check the main relay. Test the Intelligent Key. <p>Note The controller may malfunction if two Intelligent Keys are used lying on top of each other.</p> <ol style="list-style-type: none"> Check the accelerator pedal sensor/perform calibration. Check the travel direction switch. Check the seat switch. Check the driving motor. Check circuit board with display. Check the control electronics. |
| Noises in the area of the wheel hub motor | <ol style="list-style-type: none"> Adjust the steering bearing fastening nut. Check the steering bearing. Check the brake. Check the attachment of the tire (driving motor). Check the carbon brushes in the driving motor. |

| Malfunction | Remedy |
|---|---|
| No water supply or insufficient water supply | <ol style="list-style-type: none"> Air in the water system. Fill the tank completely with water Checking/cleaning the water filter in the fresh water tank Check the water hose to the cleaning head/eliminate blockage/eliminate kink. Check/clean the water distribution strip. Check the program selection switch. Check the dosing valve using the Test mode. Check the water pump using the Test mode. Check cable connections/eliminate defect. Check the control electronics. |
| The cleaning head cannot be raised/lowered | <ol style="list-style-type: none"> Lifting mechanism blocked. Check the lifting motor using the Test mode. Check the program selection switch. Check control electronics using the Test mode. |
| The cleaning head vibrates strongly | <ol style="list-style-type: none"> Check the brush pattern/adjust if necessary. Roller brushes are out of balance. Replace the roller brushes. Roller brushes have axial play. O-ring on the brush roller counter bearing is defective or missing. Brush speed too high for the floor covering. Reduce speed. Contact pressure not suitable for the floor covering. Change contact pressure. Roller brush too hard for the floor covering. Use a softer roller brush. |
| The suction bar cannot be raised/lowered | <ol style="list-style-type: none"> Lifting mechanism blocked. Check the lifting motor using the Test mode. Check the program selection switch using the test mode. Check cable connections/eliminate defect. Check the control electronics. |
| Suction performance too low | <ol style="list-style-type: none"> Check if the suction performance is set to "WHISPER". Fluff filter on the air intake (waste water tank) clogged/clean. There is no seal in the cover of the waste water flushing system that seals against the coupling. Waste water tank flushing system lid not closed. Drain hose lid not closed. Check inclination setting and setting of the suction bar Check the suction lips. Transfer standard parameters to the controller circuit board. |
| Suction turbine does not start up | <ol style="list-style-type: none"> Waste water tank is full. Check the waste water tank float switch. Float switch blocked/defective (is only fully active for the waste water tank). Check the program selection switch. Check suction turbine. Check cable connections/eliminate defect. Check the controller circuit board. |
| The suction turbine does not switch off after the after-running time | <ol style="list-style-type: none"> Float switch blocked/defective (is only fully active for the waste water tank). Check the lifting motor using the Test mode. Check the controller circuit board. |
| Poor braking effect | <ol style="list-style-type: none"> Brake mechanically vented. Check the electromagnetic brake. Check the cable connection to the brake. Check the control electronics. |
| Poor cleaning result | <ol style="list-style-type: none"> Check roller brushes for suitability, wear and foreign matter. Brush length must be at least 10 mm. Check/adjust the contact pressure of the roller brushes. Suction performance too low. No water supply or insufficient water supply. No detergent supply or insufficient detergent supply. Check brush direction of rotation and speed (FACT). |
| Waste water tank overflows | <ol style="list-style-type: none"> Check the waste water tank float switch. Check cable connections/eliminate defect. Check the controller circuit board. |

| Malfunction | Remedy |
|--|---|
| No detergent supply or insufficient detergent supply | <ol style="list-style-type: none"> Check detergent dosing pump using Test mode. Check the pump hose of the detergent dosing pump. Check the detergent hose from the detergent container to the cleaning head/eliminate blockage/eliminate kink. Detergent dosage set? Check the program selection switch. Check the water valve. Check cable connections/eliminate defect. Check the control electronics. |
| Cleaning speed cannot be adjusted to the max. speed (6 km/h) | <ol style="list-style-type: none"> In transport mode first adjust the max. speed. |
| The battery indicator shows the wrong value | <ol style="list-style-type: none"> Set the currently installed battery type in the battery menu. |

19.2 Measurement results of electrical components

The specified values are reference values with factory settings

27.1 volt battery voltage

| | | |
|----------------------|-----------------|----------------------|
| Software version CCN | Version 0.13.00 | HMI version 01.01.00 |
| Hardware version CCN | Version 0.13.00 | |

| Description | Component | Measured between: | Result | Module |
|-------------|---------------------------------|--|--|------------|
| G1 | Battery | + : - | 27.1 VDC = BAT | Battery |
| | UBAT | UBAT: GND | UBAT | CCN |
| | Control panel electronics | B1 HMI+: A1 HMIGND- | 25.7 VDC | XHMI |
| A1 | TCU | B2 TCU+: A2 TCUGND- | 25.65 VDC | XHMI |
| | TCU standby power in Sleep mode | | 50 mA | |
| A2 | Charger | L: N X2+: X2- | 230 VAC 28.7 VDC; 25 A (Battery was fully charged) | |
| A3 | Driving motor | DM_A: DM_B Jacked up Vmax | 23.4 VCD; 7.5 A | CCN_HCI |
| A3 | Magnetic brake | B1 Break +: A1 BreakGND- | First 24 VDC then 11.6 VDC; 0.65 A Magnet coil 24.2 Ω | XBreak |
| B2 | Allengra Smart Valve | D2 SmVa + Bat: A5 SmVaGND A5 SMVaGND: D3 SmVaEnable | UBAT 25.1 VDC when the accelerator pedal is depressed (regardless of the depressed position) | Chassis 2 |
| H1 | Flashing beacon | B1 WarningLamp +: A1 WarningLamp-GND- | UBAT | XDirtwat |
| M1 | RM dosing pump | B3 DosePump +: A3 DosePumpGND- | 24 VDC | XDirtwat |
| M3 | Suction turbine | VAC: VACGND | 23 VDC; 26.5 A | CCN_HCI |
| M4 | Cleaning head lifting motor | C1 LiftBrush +: A1 LiftBrushGND- Cleaning head up: C2LiftBrushUpperSwitch: A2 Lift-BrushSensSupply C3 LiftBrushLowerSwitch: A2 Lift-BrushSensSupply Cleaning head down: C2LiftBrushUpperSwitch: A2 Lift-BrushSensSupply C3 LiftBrushLowerSwitch: A2 Lift-BrushSensSupply Cleaning head in middle position | 26.7 VDC; 1.5 A when lowering; 2.5 A when lifting Motor winding 1.8 Ω Contact closed Contact open Contact open Contact closed Contact closed | XChassis_2 |

| | | | | |
|-----|--|--|---|------------|
| M5 | Suction bar lifting motor | C4 LiftSuctBar +: A3 LiftSuctBarGND- Upper suction bar: C5 LiftSuctBarUpperSwitch: A4 LiftSuctBarSensSupply D1 LiftSuctBarLowerSwitch: A4 LiftSuctBar SensSupply Lower suction bar: C5 LiftSuctBarUpperSwitch: A4 LiftSuctBarSensSupply D1 LiftSuctBarLowerSwitch: A4 LiftSuctBar SensSupply Suction bar in middle position | 26.7 VDC; 1.5 A Motor winding 1.65 Ω Contact closed Contact open Contact open Contact closed Contact closed | XChassis_2 |
| M6 | Side scrubbing deck (SSD) side brush motor | SB +: SB_GND- | 24 VDC; 1.5 A Motor winding 0.75 Ω | CCN_HCI |
| M7 | Side scrubbing deck (SSD) lifting motor | B1 SideBrushLift +: A1 SideBrush-GND- | 24.5 VDC; 1.5 A when lowering; 3.3A when lifting | XChassis_3 |
| M8 | Water pump | B3 WatPump +: B1 WatPumpGND- | 23.8 VDC; 1.25 A Motor winding 1, 25Ω | XChassis_2 |
| M9 | Side scrubbing deck SSD water pump | B3 SideBrushWaterPump +: A3 Side-BrushWaterPumpGND | The pump is clocked Magnet coil 3.2 Ω | XChassis_3 |
| M11 | Cleaning head brush motor | BR1 Brush +: BR1_GND BR2 Brush +: BR2_GND | 23.4 VDC; 6 A Motor winding 0.15 - 0.2 Ω 23.4 VDC; 7.2 A Motor winding 0.15 - 0.2 Ω | CCN_HCI |
| P1 | Daytime running light on the left | B2 LightLeft +: A2 LightLeftGND- | 24.5 VDC | XTank |
| P2 | Work light | B6 WorkLight +: A6 WorkLightGND- | 24.5 VDC | XTank |
| P3 | Daytime running light on the right | B7 LightRight +: A7 LightRightGND- | 24.5 VDC | XTank |
| R1 | Shaft sensor potentiometer (accelerator pedal) | B3 GasPedalPot +: B4 GasPedalPot-Signal B5 GasPedalEnable: A5 GasPedalEnableGND | 1.6 VDC pulsed signal Accelerator pedal released 4.9 kΩ Accelerator pedal fully depressed 3.2 kΩ 1.6 VDC pulsed signal | XTank |
| S1 | Seat switch | B1 SeatSwitch +: A1 SeatSwitchGND- Seat loaded Seat unloaded | 1.6 VDC pulsed signal Contact closed Contact open | XTank |
| S2 | Waste water sensor | B2 DirtWatSens +: A2 DirtWatGND- Waste water tank empty Waste water tank full | Contact closed Contact open | XDirtWater |
| S3 | Main switch | B4 EmergStopSupply: A3 EmergStopSignal Safety switch switched off Safety switch switched on | 1.6 VDC pulsed signal when switch is off Contact open Contact closed | XHMI |
| S4 | Travel direction switch | Forward travel: B5 DirectionForward: A5 DirectionSupply A4 DirectionBackward: A5 Direction-Supply | 0 VDC 1.6 V pulsed signal | XHMI |

| | | | |
|----|---|--|---|
| | B5 DirectionForward: A5 DirectionSupply A4 DirectionBackward: A5 DirectionSupply Reverse travel: B5 DirectionForward: A5 DirectionSupply A4 DirectionBackward: A5 DirectionSupply B5 DirectionForward: A5 DirectionSupply A4 DirectionBackward: A5 DirectionSupply | Contact closed Contact open 0 VDC 1.6 V pulsed signal Contact open Contact closed | |
| S5 | Program selection switch | See Removing/installing the program selection switch | HMI |
| S6 | Horn | Horn button pressed Horn button not pressed | Contact closed Contact open |
| S7 | Side brushes SSD | Side brushes switch on Side brushes switch off | Contact closed Contact open |
| | Fan | B2 ChassisFan +: A2 ChassisFanG-ND- | The fan only switches on when the controller or drive circuit board has reached a temperature of 40 ° C. The temperature sensor is located on the circuit boards. |

20 Software diagrams and parameter overview

20.1 Control elements

| | | | |
|--|--|---|--|
|  | The individual modes are selected by turning the program selection switch. |  | Turn the info button to select the parameter |
|  | The menu is navigated using the Info button. Note <i>The menus are displayed depending on the selected mode. Not all menus are available in every mode.</i> |  | Press the Info button to confirm the selection If no change or selection is made in the submenu for 10 seconds, the program changes to the respective standard setting. |

20.2 Factory setting

The factory settings can be restored in the menu of the grey and red Intelligent Key.

Note

Many errors result from incorrect settings. Load factory settings to solve the problem!

After the factory settings have been loaded, switch off the program selection switch so that the new parameters can be adopted. The following parameters must then be set:

- Language

- Standard settings
- Check battery selection and charging curve
- Check the brush head selection

20.3 Intelligent Key functional overviews

Note

The menus are displayed depending on the selected mode. The diagram shows all available menus for the sake of clarity.

If there is no activity on the Info button for four seconds, the display automatically returns to the first screen display.

20.4 Function overview: Yellow Intelligent Key

| | | |
|---|--|---|
| Transport journey  | Working speed  |  |
| | Counter  |  |
| | Maintenance counter  |  |
| | Software version  |  |
| | Water dosage  |  |
| | Flashing beacon  |  |
| | Horn  |  |
| | Exit  |  |
| Eco-Mode Scour and vacuum Heavy scouring and vacuum cleaning  | MB Watr  |  |
| | SB Watr  |  |
| | Working speed  |  |
| | Detergent  |  |
| | MB Prss  |  |
| | SB Prss  |  |
| | Suction  |  |
| | Exit  |  |

| | | | |
|-----------|--|---|---|
| Scrub | MB Watr  |  |  |
| | SB Watr  |  | |
| | Working speed  |  | |
| | Detergent  |  | |
| | MB Prss  |  | |
| | SB Prss  |  | |
| | Exit  |  | |
| Vacuuming | Working speed  |  |  |
| | Suction  |  | |
| | Exit  |  | |
| Polishing | Working speed  |  |  |
| | MB Prss  |  | |
| | SB Prss  |  | |
| | Exit  |  | |

20.5 Function overview: Grey Intelligent Key

| | | |
|---|--|---|
| Transport journey  | Working speed  |  |
| | Counter |  |
| | Maintenance counter |  |
| | Software version |  |
| | Brush head  |  |
| | Water dosage  |  |
| | Spin down times |  |
| | Language  |  |
| | KIKs  |  |
| | Flashing beacon  |  |
| | Horn  |  |
| | Exit  |  |
| Eco-Mode Scour and vacuum Heavy scouring and vacuum cleaning  | MB Watr  |  |

| | | | |
|-----------|---------------|---|---|
| | SB Watr |  |  |
| | Working speed |  |  |
| | Detergent |  |  |
| | MB Prss |  |  |
| | SB Prss |  |  |
| | Suction |  |  |
| | Exit |  |   |
| Scrub | MB Watr |  |  |
| | SB Watr |  |  |
| | Working speed |  |  |
| | Detergent |  |  |
| | MB Prss |  |  |
| | SB Prss |  |  |
| | Exit |  |   |
| Vacuuming | Working speed |  |  |
| | Suction |  |  |
| | Exit |  |   |

| | | |
|---|---|--|
| Polishing | Working speed | |
|  |  |  |
| | MB Prss |  |
| | SB Prss |  |
| | Exit |  |

20.6 Function overview: Red Intelligent Key

| | | |
|---|---|---|
| Transport journey  | Working speed  |  |
| | Counter |  |
| | Maintenance counter |  |
| | Software version |  |
| | Brush head  |  |
| | Water dosage  |  |
| | Spin down times |  |
| | Battery  |  |
| | Language  |  |
| | KIKs  |  |
| | Flashing beacon  |  |
| | Horn  |  |
| | Test mode |  |
| | Factory settings  |  |
| | Exit  |  |
| Eco-Mode Scour and vacuum Heavy scouring and vacuum cleaning  | MB Water  |  |

| | | | |
|-----------|---------------|---|---|
| | SB Watr |  |  |
| | Working speed |  |  |
| | Detergent |  |  |
| | MB Prss |  |  |
| | SB Prss |  |  |
| | Suction |  |  |
| | Exit |  |   |
| Scrub | MB Watr |  |  |
| | SB Watr |  |  |
| | Working speed |  |  |
| | Detergent |  |  |
| | MB Prss |  |  |
| | SB Prss |  |  |
| | Exit |  |   |
| Vacuuming | Working speed |  |  |
| | Suction |  |  |
| | Exit |  |   |

| | | |
|-----------|---|--|
| Polishing | Working speed |  |
| |  |  |
| | MB Prss |  |
| | SB Prss |  |
| | Exit |  |

20.7 Overview of special functions and standard settings

Version CM V00.13.00, DM V00.13.00, HMI V01.01.00

| Program | Transport journey | | | Eco program | | | Scour and vacuum | | | Increased brush contact pressure | | |
|--|-------------------|------|-----|-------------|------|------|------------------|-------|-------|----------------------------------|-------|-------|
| | Key | | | Key | | | Key | | | Key | | |
| | Yellow | Grey | Red | Yellow | Grey | Red | Yellow | Grey | Red | Yellow | Grey | Red |
| Filling level overview | x | x | x | x | x | x | x | x | x | x | x | x |
| Max spd 0-6 km/h | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 4 | 4 | 4 |
| Counters yes/no | x | x | x | | | | | | | | | |
| Maintenance counters | x | x | x | | | | | | | | | |
| Software version CM/DM/HMI | x | x | x | | | | | | | | | |
| Brush head - Roll/Disc | | x | x | | | | | | | | | |
| Water dosage - depend on velocity on/off | | x | x | | | | | | | | | |
| Spin down times | | x | x | | | | | | | | | |
| Battery | | | x | | | | | | | | | |
| Language | | x | x | | | | | | | | | |
| KIKs - Edit/Clone KIK | | x | x | | | | | | | | | |
| Warning light - ON/OFF | x | x | x | | | | | | | | | |
| Horn | x | x | x | | | | | | | | | |
| Test mode | | | x | | | | | | | | | |
| Factory settings - reset | x | x | | | | | | | | | | |
| MB Water 0-100% | | | | 30 | 30 | 30 | 40 | 40 | 40 | 70 | 70 | 70 |
| SB Water 0-100% | | | | 30 | 30 | 30 | 40 | 40 | 40 | 70 | 70 | 70 |
| Dtrgnt 0-3% | | | | 0.25 | 0.25 | 0.25 | 0.5 | 0.5 | 0.5 | 3 | 3 | 3 |
| MB press 0-100% | | | | 50 | 50 | 50 | 70 | 70 | 70 | 100 | 100 | 100 |
| SB press 0-100% | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Suction Off/Eco Power | | | | Eco | Eco | Eco | Power | Power | Power | Power | Power | Power |
| Exit | x | x | x | x | x | x | x | x | x | | | |

| Program | Scrub | | | Vacuuming | | | Polishing | | |
|--|--------|------|-----|-----------|------|-----|-----------|------|-----|
| | Key | | | Key | | | Key | | |
| | Yellow | Grey | Red | Yellow | Grey | Red | Yellow | Grey | Red |
| Filling level overview | x | x | x | x | x | x | x | x | x |
| Max spd 0-6 km/h | 4 | 4 | 4 | 6 | 6 | 6 | 4 | 4 | 4 |
| Counters yes/no | x | x | x | | | | | | |
| Maintenance counters | x | x | x | | | | | | |
| Software version CM/DM/HMI | x | x | x | | | | | | |
| Brush head - Roll/Disc | | x | x | | | | | | |
| Water dosage - depend on velocity on/off | | x | x | | | | | | |
| Spin down times | | x | x | | | | | | |
| Battery | | | x | | | | | | |

| | | | | | | | | | |
|--------------------------|-----|-----|-----|-------|-------|-------|-----|-----|-----|
| Language | | x | x | | | | | | |
| KIKs - Edit/Clone KIK | | x | x | | | | | | |
| Warning light - ON/OFF | x | x | x | | | | | | |
| Horn | x | x | x | | | | | | |
| Test mode | | | x | | | | | | |
| Factory settings - reset | | | x | x | | | | | |
| MB Water 0-100% | 90 | 90 | 90 | | | | | | |
| SB Water 0-100% | 90 | 90 | 90 | | | | | | |
| Dtrgnt 0-3% | 3 | 3 | 3 | | | | | | |
| MB press 0-100% | 100 | 100 | 100 | | | | 100 | 100 | 100 |
| SB press 0-100% | 0 | 0 | 0 | | | | 0 | 0 | 0 |
| Suction Off/Eco Power | | | | Power | Power | Power | | | |
| Exit | x | x | x | x | x | x | x | x | x |

20.8 Submenus

Note

- After a parameter has been saved, the display automatically returns to the first screen display.
- If there is no activity on the Info button for four seconds, the display automatically returns to the first screen display.

- Parameters changed in a specific cleaning program are only valid for this cleaning program. If the new value applies to all cleaning programs, the change must also be made in the other cleaning programs.

Battery

| | | | |
|--|--|--|--|
| | Battery | | |
| | New battery <ul style="list-style-type: none"> Yes No <ul style="list-style-type: none"> Hoppec 6TB170 EXIDE GF06180V EXIDE GF06180W EXIDE GF06240V Discov EV 305 A-A Custom battery | | |
| | ✓ | | |
| | | | |

Cleaning head

| | | | |
|--|--|--|--|
| | Brush head | | |
| | New <ul style="list-style-type: none"> Roll Disc Note <i>When "Roll" is selected, the brush speed can also be adjusted.</i> Brush head control <ul style="list-style-type: none"> Up OFF Down Note <i>The lifting motor lowers or lifts the cleaning head as long as the Info button is pressed. If the Info button is no longer pressed, the lifting motor stops.</i> | | |
| | | | |

Detergent

| | | | |
|---|---|---|---|
|  | Dtrgnt |  | |
|  | <ul style="list-style-type: none"> • 0 - 5% roll <p>Note <i>The setting at the beginning in small steps, then in larger steps up to max = 5%.</i></p> |  |  |

Horn

| | | | |
|---|---|---|---|
|  | Horn |  | |
|  | <ul style="list-style-type: none"> • ON • OFF <p>Note <i>ON: Horn sounds when moving forward and backward. OFF: Horn on when driving backwards</i></p> |  |  |

KIK

Note

Select menu with grey or red KIK!

| | | | |
|---|---|---|---|
|  | KIKs |  | |
|  | <p>Edit KIK Configure yellow KIK</p> <p>Note <i>The following functions can be enabled for the yellow KIK.</i></p> <ul style="list-style-type: none"> • Max. Speed • Brush speed • Suction intensity • Brush pressure • Flow rate • Detergent dosage • Flash light • Horn <p>Exit</p> |  |  |

Language

| | | | |
|---|-----------------|---|--|
|  | Language |  | |
|---|-----------------|---|--|



- English
- English
- Français
- Español
- Italiano
- Português
- Nederlands
- Norsk
- Dansk
- Suomi
- Polski
- Magyar
- Româna
- Češky
- Türkçe
- Ελληνικά
- Русский
- Slovenčina

Exit



Counter

| | | | |
|--|--|--|--|
| | <p>Counters</p> <ul style="list-style-type: none">● Runtime● Service counter | | |
| | <p>Reset counters?</p> <ul style="list-style-type: none">● Yes● No <p>Note</p> <p><i>The operating hours counter runs as soon as a consumer (driving motor, suction motor, brush motor, ...) is switched on. It cannot be reset.</i></p> <p><i>If "Yes" is selected, the service counter is reset to 400 h.</i></p> | | |

Maintenance counter

| | | | |
|--|--|--|--|
| | <p>Maintenance counters</p> | | |
| | <p>Maintenance counters</p> <ul style="list-style-type: none">● Brush● Squeegee● Suction bar● Fresh water filter● Waste water filter <p>Note</p> <p><i>This shows when maintenance of the individual components is due.</i></p> <p>Reset counter?</p> <ul style="list-style-type: none">● Brush● Squeegee● Suction bar● Fresh water filter● Waste water filter● Exit <p>Note</p> <p><i>If the maintenance is shown in the display and the maintenance has been carried out, the maintenance counter can be reset.</i></p> | | |

Maximum speed

| | | | |
|--|--|--|--|
| | Max spd. | | |
| | Note Adjustable up to max. 6 km/h. | | |

Brush contact pressure

| | | | |
|--|--|--|--|
| | Brush pressure | | |
| | Note Adjustable from 0 - 100%. | | |

Brush speed

| | | | |
|--|--|--|--|
| | Brush speed Note Adjustment can only be made with the R cleaning head. | | |
| | <ul style="list-style-type: none"> • Fine • Whisper • Power | | |

Turbine speed

| | | | |
|--|---|--|--|
| | Turbine power | | |
| | <ul style="list-style-type: none"> • OFF • ECO • Power | | |

Water quantity

| | | | |
|--|--|--|--|
| | Water amount | | |
| | Note Adjustable from 0 - 100%. | | |

• 10 %
 • 20 %ECO
 • 30 %Power
 • x %

Side scrubbing deck water quantity

| | | | |
|--|--|--|--|
| | Water amount SSD | | |
| | Note Adjustable from 0 - 100%. | | |

• 10 %
 • 20 %ECO
 • 30 %Power
 • x %

| | |
|-------------|--|
| Exit | |
|-------------|--|

Shutdown time

| | | | |
|--|---|--|--|
| | <p>Delay times</p> <p>Note The time when the power units are to be switched off is set here.</p> | | |
| | <p>Main brush</p> <p>halt delay</p> <p>Note Roller brush after-running time. Setting range 0 - 10 sec.</p> <ul style="list-style-type: none"> ● 1 s ● 2 s ● 3 s ● x s | | |
| | <p>Main brush</p> <p>spin dry time</p> <p>Note Brush dry run as soon as the cleaning head is raised. Setting range 0 - 10 sec.</p> <ul style="list-style-type: none"> ● 1 s ● 2 s ● 3 s ● x s | | |
| | <p>Turbine delay</p> <p>Waste water tank full</p> <p>Note Suction turbine after-running time when the waste water tank is full. Setting range 0 - 30 sec.</p> <ul style="list-style-type: none"> ● 5 s ● 10 s ● 15 s ● xx s | | |
| | <p>Turbine delay</p> <p>Suction mode</p> <p>Note Suction turbine after-running time when the suction turbine is switched off. Setting range 0 - 30 sec.</p> <ul style="list-style-type: none"> ● 5 s ● 10 s ● 15 s ● xx s | | |
| | <p>Turbine delay</p> <p>Transport Mode</p> <p>Note After-running time of the suction turbine when switching to transport mode. Setting range 0 - 30 sec.</p> <ul style="list-style-type: none"> ● 5 s ● 10 s ● 15 s ● xx s | | |

| | | | |
|---|--|---|---|
|  | Turbine delay Cleaning modes |  | |
| | Note <i>Setting range 0 - 30 sec.</i> <ul style="list-style-type: none">● 5 s● 10 s● 15 s● xx s |    | |
|  | Side brush Elevation delay |  | |
| | Note <i>Lifting motor delay. Setting range 0 - 10 sec.</i> <ul style="list-style-type: none">● 1 s● 2 s● 3 s● x s |    | |
|  | Side brush Brush delay |  | |
| | Side brush Note <i>Setting range 0 - 10 sec.</i> <ul style="list-style-type: none">● 1 s● 2 s● 3 s● x s |   | |
| | Exit |  EXIT |  |

Test mode

| | | | |
|---|---|---|--|
| | Test mode Note <i>Here the individual motors can be switched on and off with the red KIK.</i> |   | |
|  | Brush speed |   | |
|  | Brush speed SSD |   | |
|  | Turbine power |   | |
|  | Detergent dosing |   | |
|  | Water amount |   | |
|  | Daytime light |   | |

| | | | |
|--|---------------|--|--|
| | Warning light | | |
| | Working light | | |
| | Exit | | |

Warning light

| | | | |
|--|---|--|--|
| | Warning light | | |
| | <ul style="list-style-type: none"> • OFF • ON | | |

Water dosage

| | | | |
|--|---|--|--|
| | Water dosage mode Speed dependent | | |
| | <ul style="list-style-type: none"> • ON • OFF <p>Note <i>Water dosage is calculated according to the travel speed and automatically adjusted according to the specified ml/m²</i></p> | | |

Factory settings

| | | | |
|--|---|--|--|
| | Factory settings | | |
| | <ul style="list-style-type: none"> • YES • NO <p>Note <i>Resets cleaning parameters only.</i></p> | | |

20.9 Event code

HMI = Human-Machine Interface = Control panel circuit

board

DM = Drive module = driving module

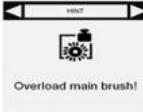
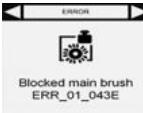
CM = Clean module = cleaning module

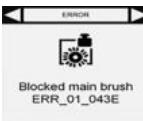
HW = hardware

ZWK = Intermediate circuit

NMT = Network Management = administration/state machine of the CAN communication

| HMI display | HMI error code | Event ID | Description | Measure to be taken |
|--------------------|---------------------------------|---------------|---|--|
| Fresh water | | | | |
| | POPUP_-FRESH_WA-TER_EMPTY_DESC | 2108303 12 | Fresh water tank empty | <p>Check fresh water level, top up tank if necessary.</p> <p>The filling level is monitored by the pressure sensor of the Allengra valve.</p> <p>Check the hoses for clogging, clean if necessary</p> <p>Check the fresh water filter, clean if necessary</p> <p>Check the wiring to the Allengra valve for damage</p> <p>Allengra valve defective</p> |
| | POPUP_WA-TER_PUMP_-BLOCKED_DESC | 2108303 23 | Blockage of Allengra ball tap, the Allengra signals a blockage by outputting a frequency of 2 kHz. The valve has detected a blockage due to overcurrent and standstill of the motor shaft. The valve tries to remove the blockage independently by means of 3 attempts. If this is not successful, an error message is output to the controller. | <p>Unplug the Allengra valve and plug it in again (reset)</p> <p>Check the hoses for clogging, clean if necessary</p> <p>Check the fresh water filter, clean if necessary</p> <p>Check the wiring to the Allengra valve for damage</p> <p>Allengra valve defective</p> |
| | ERR_01_1020 | 2108303 32 | Flow implausible, deviation between the target value and measured value at the flow sensor is too great. The controller specifies the flow rate for the valve that does not match the value measured by the controller. The valve records the flow volume with the integrated flow sensor. The measuring range of the sensor is between 0.03-15l/min. 4000 pulses per litre at the flow rate signal pin 5 on the valve. | <p>Unplug the Allengra valve and plug it in again (reset)</p> <p>Check the hoses for clogging, clean if necessary</p> <p>Check the fresh water filter, clean if necessary</p> <p>Check the wiring to the Allengra valve for damage</p> <p>Allengra valve defective</p> |
| | ERR_01_1021 | 2108303 33 | No flow signal, valve does not send a signal to the flow sensor. The controller does not detect a signal from the valve's internal flow sensor. | <p>Unplug the Allengra valve and plug it in again (reset)</p> <p>Check the hoses for clogging, clean if necessary</p> <p>Check the fresh water filter, clean if necessary</p> <p>Check the wiring to the Allengra valve for damage</p> <p>Allengra valve defective</p> |
| Brush head | | | | |

| | | | | |
|--|---------------------------------|---------------|--|---|
|  | POP-UP-_BRUSH_ONE_OVERLOAD_DESC | 2108305 12 | M11 Brush motor 1 overload, brush motor 1 current > 40A for > 30s | <p>Check brushes/brush head for damage and check (no suggestions)</p> <p>Check if the brushes are blocked by foreign bodies and remove the foreign bodies if necessary</p> <p>Measure the brush current in idle mode (brush removed) with a suitable clamp meter at CCN_HCI -Br1 (screw contact 6) during operation. Target value: ~5A. Actuate the brush motor using the manual functions in the "Kärcher Diag ServiceTool".</p> |
|  | POP-UP-_BRUSH_TWO_OVERLOAD_DESC | 2108305 13 | Overload M11 brush motor 2, current from brush motor 2 > 40A for > 30s | <p>Check brushes/brush head for damage</p> <p>Check if the brushes are blocked by foreign bodies and remove the foreign bodies if necessary</p> <p>Measure the brush current in idle mode (brush removed) with a suitable clamp meter at CCN_HCI -Br2 (screw contact 5) during operation. Target value: ~5A. Actuate the brush motor using the manual functions in the "Kärcher Diag ServiceTool".</p> |
|  | ERR_01_1202 | 2108305 14 | Blockage M11 brush motor 1, current > 40A, voltage < 1V for > 4s | <p>Check brush for blockage and sluggishness.</p> <p>Check if the brushes are blocked by foreign bodies and remove the foreign bodies if necessary</p> <p>Measure the resistance of brush motor 1. Disconnect the brush motor. Measure resistance between connection cable - Br1 and GND (CCN_Chassis). Target value: ~0,2 Ohm</p> <p>Measure the brush current in idle mode (brush removed) with a suitable clamp meter at CCN_HCI -Br1 (screw contact 6) during operation. Target value: ~5A. Actuate the brush motor using the manual functions in the "Kärcher Diag ServiceTool".</p> <p>Check the cabling for damage</p> <p>Measure voltage between -CCN_HCI -Br1 (screw contact 6) and GND - CCN_Chassis. Target value: 24V with setting in the "Kärcher Diag Servicetool" 100%</p> |

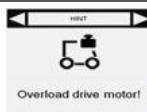
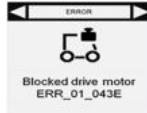
| | | | | |
|--|-------------|---------------|--|---|
|  Blocked main brush ERR_01_043E | ERR_01_1203 | 2108305 15 | Blockage M11 brush motor 2, current > 40A, voltage < 1V for > 4s | Check brush for blockage and sluggishness. |
| | | | | Check if the brushes are blocked by foreign bodies and remove the foreign bodies if necessary |
| | | | | Measure the resistance of brush motor 2. Measure resistance at CCN_HCI between -Br2 and GND (CCN_Chassis). Target value: 0.2 ohms |
| | | | | Measure the brush current in idle mode (brush removed) with a suitable clamp meter at CCN_HCI -Br2 (screw contact 5) during operation. Target value: ~5A. Actuate the brush motor using the manual functions in the "Kärcher Diag ServiceTool". |
| | | | | Check the cabling for damage |
| | | | | Measure voltage between -CCN_HCI -Br2 (screw contact 5) and GND -CCN_Chassis. Target value: 24V with setting in the "Kärcher Diag Servicetool" 100% |
| | ERR_01_0560 | 2108298 72 | Cable breakage M11 brush motor 1, current < 1A at 10V. When the machine is switched on, a "Start Up Check" is carried out. A voltage of 10V is applied to the motor for approx. 500ms, the resulting current must not be less than 1A. | Check cable connection to M11 brush motor 1 |
| | | | | Check the wiring to the brush motor 1 for damage. |
| | | | | Check screw connection at -CCN_HCI -Br1 (screw contact 6) |
| | ERR_01_0561 | 2108298 73 | Cable breakage M11 brush motor 2, current < 1A at 10V. A "Start Up Check" is carried out when the machine is switched on. A voltage of 10V is applied to the motor for approx. 500ms, the resulting current must not be less than 1A. | Check cable connection to M11 brush motor 2 |
| | | | | Check the wiring to the brush motor 2 for damage. |
| | | | | Check screw connection at -CCN_HCI -Br2 (screw contact 5) |
| | ERR_01_0600 | 2108299 12 | Short-circuit M11 brush motor 1, current > 7A at 5V. When the machine is switched on, a "Start Up Check" is carried out. A voltage of 5V is applied to the motor for approx. 500ms, the resulting current must not be greater than 7A. | Check brush motor 1 -M11 for short-circuit |
| | | | | Check the wiring to the brush motor 1 for damage. |
| | | | | Disconnect brush motor 1 -M11 and check for short-circuit including the connecting cable |
| | ERR_01_0601 | 2108299 13 | Short-circuit M11 brush motor 2, current > 7A at 5V. When the machine is switched on, a "Start Up Check" is carried out. A voltage of 5V is applied to the motor for approx. 500ms, the resulting current must not be greater than 7A. | Check brush motor 2 -M11 for short-circuit |
| | | | | Check the wiring to the brush motor 2 for damage. |
| | | | | Disconnect brush motor 2 -M11 and check for short-circuit including the connecting cable |
| | ERR_01_0580 | 2108298 92 | Cable breakage lifting motor M4, a "Start Up Check" is carried out when the machine is switched on. | Check the cable connection to the M4 lifting motor |
| | | | | Check the cabling to the M4 lifting motor |
| | ERR_01_0603 | 2108299 15 | Short-circuit lifting motor M4, current > 4A at 5V. When the machine is switched on, a "Start Up Check" is carried out. A voltage of 5V is applied to the motor for approx. 500ms, the resulting current must not be greater than 4A. | Disconnect the lifting motor and check for short-circuit incl. connecting cable |
| | | | | |

Side brushes

| | | | | |
|--|---------------------------------|---------------|--|--|
|  | POP-UP-SIDE_BRUSH_OVERLOAD-DESC | 2108306 12 | Overload brush motor -M6 side brush, current > 20A for > 30s | <p>Check brush for blockage and sluggishness.</p> <p>Measure brush current -M6 in idle mode (brush removed) with a suitable clamp meter on CCN_HCI -SB (screw contact 3) during operation. Target value: ~0.9A. Actuate the brush motor using the manual functions in the "Kärcher Diag Service-Tool". Setting 100%</p> <p>Disconnect brush motor -M6 including connection cable and check for damage.</p> |
|  | ERR_01_0165 | 2108306 13 | Brush motor -M6 blocked, current > 20A and voltage < 1V for > 4s | <p>Check brush for blockage and sluggishness.</p> <p>Check if the brushes are blocked by foreign bodies and remove the foreign bodies if necessary</p> <p>Measure brush current -M6 in idle mode (brush removed) with a suitable clamp meter on CCN_HCI -SB (screw contact 3) during operation. Target value: ~0.9A. Actuate the brush motor using the manual functions in the "Kärcher Diag Service-Tool". Setting 100%</p> <p>Measure resistance SB brush motor - M6. Disconnect the brush motor. Measure resistance between connection cable - SB and GND (CCN - Chassis). Target value: ~0.75 Ohm</p> <p>Disconnect brush motor -M6 including connection cable and check for damage.</p> |
| | ERR_01_0550 | 2108298 62 | Cable breakage side brushes rotary motor -M6, current < 1A at 20V. When the machine is switched on, a "Start Up Check" is carried out. A voltage of 20V is applied to the motor for approx. 500ms, the resulting current must not be less than 1A. | <p>Check cable connection to -M6 brush motor SB</p> <p>Check the configuration with Kärcher Diag. This error can also occur if the option is active but no side brushes are installed.</p> |
| | ERR_01_0590 | 2108299 16 | Lifting motor cable breakage | Disconnect the cable from the lifting motor -M7, measure the voltage directly at the plug. Target value: 24V |
| | ERR_01_0604 | 2108299 02 | Short-circuit in side brushes rotary motor -M6, current > 2A at 5V. When the machine is switched on, a "Start Up Check" is carried out. A voltage of 5V is applied to the motor for approx. 500ms, the resulting current must not be greater than 2A. | <p>Check side brushes rotary motor -M6 for short-circuit.</p> <p>Disconnect the rotary motor -M6 and check for short-circuit including the connecting cable</p> |
| | ERR_01_0607 | 2108299 19 | Short-circuit in side brushes lifting motor -M7, current > 2A at 5V. When the machine is switched on, a "Start Up Check" is carried out. A voltage of 5V is applied to the motor for approx. 500ms, the resulting current must not be greater than 2A. | Disconnect the lifting motor -M7 and check for short-circuit including the connecting cable |

Suction bar

| | | | | |
|--|-----------------------------------|---------------|---|---|
| | ERR_01_1400 | 2108307 12 | Overload of the suction turbine -M3, current > 30A for > 30s | <p>Check suction turbine -M3 for blockage and sluggishness</p> <p>Check the cabling for damage</p> <p>Actuate 100% of the suction turbine -M3 using the manual functions in the "Kärcher Diag Servicetool". Read the turbine current or measure with a suitable clamp meter at -CCN_HCI -VAC (screw contact 4): Should be about ~ 27A at 24V</p> |
| | ERR_01_1401 | 2108307 13 | Blockage of the suction turbine -M3, current > 30A for > 30s and voltage < 1V for > 4s | <p>Check suction turbine -M3 for blockage and sluggishness</p> <p>Check the cabling for damage</p> <p>Actuate 100% of the suction turbine -M3 using the manual functions in the "Kärcher Diag Servicetool". Read the turbine current or measure it with a suitable clamp meter at -CCN_HCI -VAC (screw contact 4): Should be about ~ 27A at 24V</p> |
| | POP-UP_WASTE_WATER_TANK_FULL_DESC | 2108307 22 | Waste water tank full | <p>Measure voltage between -CCN_HCI -VAC (screw contact 4) and GND -CCN_Chassis. Target value: 24V with setting in the "Kärcher Diag Servicetool" 100%</p> |
| | ERR_01_0570 | 2108298 82 | Cable breakage in suction turbine -M3, current < 1A at 5V. When the machine is switched on, a "Start Up Check" is carried out. A voltage of 5V is applied to the motor for approx. 500ms, the resulting current must not be less than 1A. | <p>Check tank filling level</p> <p>Check float switch S2. Tank full -> no continuity. Tank empty -> continuity. Measure -XDirtWat B2 DirtWatSens + to A2 DirtWatGND.</p> |
| | ERR_01_0568 | 2108299 14 | Cable breakage in lifting motor -M5 | <p>Check the cabling for damage</p> <p>Disconnect the cable at the suction turbine -M3, measure the voltage directly at the plug. Target value: 24V with setting in the "Kärcher Diag Servicetool" 100%</p> |
| | ERR_01_0602 | 2108298 80 | Short-circuit in suction turbine, current > 6A at 3V. When the machine is switched on, a "Start Up Check" is carried out. A voltage of 3V is applied to the motor for approx. 500ms, the resulting current must not be greater than 6A. | <p>Check the plug to the suction turbine</p> <p>Disconnect the cable from the lifting motor -M5, measure the voltage directly at the plug. Target value: 24V with setting in the "Kärcher Diag Servicetool" 100%</p> |
| | | | | Disconnect the suction turbine -M3 and check for short-circuit including the connecting cable |

| | | | | |
|--|---------------------------|---------------|--|--|
| | ERR_01_0605 | 2108299 17 | Short-circuit in lifting motor -M5, current> 4A at 5V. When the machine is switched on, a "Start Up Check" is carried out. A voltage of 5V is applied to the motor for approx. 500ms, the resulting current must not be greater than 4A. | Disconnect the lifting motor M5 and check for short-circuit including the connecting cable |
| Drive unit | | | | |
|  Overload drive motor! | POPUP_MOTOR_OVERLOAD_DESC | 2108963 48 | Driving motor overloaded -A3, current> 100A for 30s | Check driving motor -A3 for damage and check (no suggestions). Check mechanical parts according to the manual. |
| | | | | Check if foreign bodies are blocking the drive and remove the foreign bodies if necessary |
| | | | | Measure the idle mode current with a suitable clamp meter at the CCN_H-Cl -DM-A 1 Drive during operation. Target value at Vmax: ~7A |
|  Blocked drive motor ERR_01_043E | ERR_02_1501 | 2108963 49 | Driving motor blocked, current> 100A and voltage <15V for> 4s | Check driving motor -A3 for damage and check (no suggestions). Check mechanical parts according to the manual. |
| | | | | Check if foreign bodies are blocking the drive and remove the foreign bodies if necessary |
| | | | | Measure the idle mode current with a suitable clamp meter at the CCN_H-Cl -DM-A 1 Drive during operation. Target value at Vmax: ~7A |
| | ERR_02_0050 | 2108948 98 | Cable breakage in driving motor DM, the drive motor does not draw any current, current <1.5A at 5V. When the machine is switched on, a "Start Up Check" is carried out. A voltage of 5V is applied to the motor for approx. 500ms, the resulting current must not be less than 1.5A. | Disconnect the cable from the driving motor, measure the voltage directly at the plug. Target value at Vmax: 24V |
| | ERR_02_0040 | 2108948 88 | Short-circuit in parking brake breaker, conductor short-circuit of the parking brake against external voltage. Current > 0.35A at 16V. When the machine is switched on, a "Start Up Check" is carried out. A voltage of 16V is applied to the motor for approx. 500ms, the resulting current must not be greater than 0.35A. | Measure resistance at -Xbreak between B1 Break + and A2 Break GND. Target value: ~24Ohm. Current in normal operation: Target value: 0.65 A |
| | | | | Measure voltage at -Xbreak between B1 Break + and A2 Break GND. Target value: First 24 VDC then 11.6 |
| | | | | Disconnect the driving motor -A1 and check for short-circuit including the connecting cable |
| | ERR_02_0041 | 2108948 89 | Parking brake cable breakage, the parking brake does not draw any current. Current <0.15A at 16V. When the machine is switched on, a "Start Up Check" is carried out. A voltage of 16V is applied to the motor for approx. 500ms, the resulting current must not be less than 0.15A. | Measure voltage at -Xbreak between B1 Break + and A2 Break GND. Target value: First 24 VDC then 11.6 |
| | | | | Check the cabling for damage |

| | | | | |
|---|---------------------------------|------------|---|--|
|  | POPUP_RELEASE_SEAT_CONTACT_DESC | 2108949 08 | <p>Seat contact must be opened. Check that the seat contact opens. The seat contact was pressed when the machine was started, so the seat contact must be opened again during a journey > 90 min. The seat contact switch must be opened 1x within 90 minutes to check. Dead man surveillance.</p> | Check seat contact |
| | | | | Check whether seat contact has been bridged. |
| | | | | Seat contact defective |
| | POPUP_CLOSE_SEAT_CONTACT_TITLE | 2108949 09 | Seat contact must be closed. The seat contact was open when the accelerator pedal was pressed. | <p>Measure the voltage directly at the seat contact between 13 and 14. Target value: 1,6V. Measure voltage at CCN at plug -Xtank between B1 Seat + and A1 SeatSwitch GND. Target value: ~1.6V</p> <p>Seat contact defective</p> |
| | ERR_02_0070 | 2108949 18 | Seat contact -S1 signal invalid. The seat contact signal was consistently high. The signal from the seat contact is a square-wave signal that is output by the controller. If this signal is "faulty", this error occurs. | <p>Check the cabling for damage</p> <p>Check seat contact</p> <p>Measure the voltage directly at the seat contact between 13 and 14. Target value: 1,6V. Measure voltage at CCN at plug -Xtank between B1 Seat + and A1 SeatSwitch GND. Target value: ~1.6V</p> <p>Seat contact defective</p> |
| | ERR_02_0071 | 2108949 19 | Seat contact signal short-circuit. Conductor short-circuit of the seat contact signal against external voltage. Internal square wave signal has a short-circuit. Error occurs together with ERR_02_0070. Attention, this error can be caused by a defective CCN | <p>Check the cabling for damage</p> <p>Check seat contact</p> <p>Seat contact defective</p> |
| | ERR_02_0080 | 2108949 28 | Operating stop -S3 signal invalid. The operating stop signal was permanently high. The signal from the operating stop is a square-wave signal that is output by the controller. If this signal is "incorrect", this error occurs. | <p>Check switch -S3.</p> <p>When the switch is in position 0, there must be a voltage of 1.6V between contacts 11 and 12 of switch - S3. Measure voltage at -CCN at plug -XHMI between B4 EmergStopSupply and A3 EmergStopSignal. Target value: ~1.6V</p> <p>Check the cabling for damage</p> |
| | ERR_02_0081 | 2108949 29 | Operating stop -S3 signal short-circuit. Conductor short-circuit of the operating stop signal against external voltage. Internal square wave signal has a short-circuit. Error occurs together with ERR_02_0080. Attention, this error can be caused by a defective CCN | <p>Check switch -S3.</p> <p>When the switch is in position 0, there must be a voltage of 1.6V between contacts 11 and 12 of switch - S3. Measure the voltage at the CCN at plug -XHMI between B4 EmergStopSupply and A3 EmergStopSignal. Target value: ~1.6V</p> <p>Check the cabling for damage</p> |

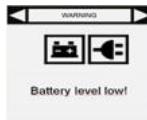
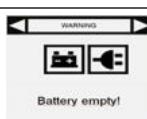
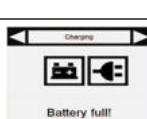
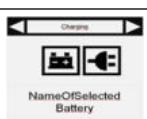
| | | | | |
|---|-----------------------------|---------------|---|--|
|   | POP-UP-_SWITCH_ON_DESC | 2108949 38 | Operating stop pressed | Close the switch again (switch position 1) and restart the machine. If there is no improvement, check the switch. When the switch is in position 0, there must be a voltage of 1.6V between contacts 11 and 12 of switch -S3. Measure the voltage at the CCN at plug -XHMI between B4 Emerg-StopSupply and A3 EmergStopSignal. Target value: ~1.6V |
| | | | | Check the cabling for damage |
|  | ERR_02_0100 | 2108949 48 | Signal short-circuit in the drive release switch -R1 in the accelerator pedal, wire short-circuit in drive release switch signal against external voltage. Internal square wave signal has a short-circuit. | Check the cabling for damage |
| | | | | With switch position 0 -> accelerator pedal in basic position, a voltage of 1.6V must be present between contacts 1 and 2 of switch -R1. Measure voltage at -CCN at plug -Xtank between B5 GasPedalEnable + and A5 GasPedalEnableGND. Target value: 1.6V |
| | | | | Defective accelerator pedal |
|  | ERR_02_0101 | 2108949 49 | Invalid signal from drive release switch -R1 in accelerator pedal . Drive enable switch signal was permanently high. The signal from the drive release switch (accelerator pedal) is a square-wave signal that is output by the controller. If this signal is "faulty", this error occurs | Check the cabling for damage |
| | | | | With switch position 0 -> accelerator pedal in basic position, a voltage of 1.6V must be present between contacts 1 and 2 of switch -R1. Measure voltage at -CCN at plug -Xtank between B5 GasPedalEnable + and A5 GasPedalEnableGND. Target value: 1.6V |
| | | | | Defective accelerator pedal |
|  | POPUP_RELEASE_THROTTLE_DESC | 2108949 58 | The drive release switch must be open. The drive release switch must initially not be activated before the start of the journey. The accelerator pedal was depressed while the machine was starting. | Restart the machine, making sure that the accelerator pedal is not depressed. If the error occurs again, check the accelerator pedal and replace if necessary. |

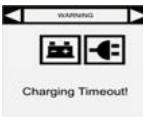
| | | | | |
|--|-------------|---------------|--|---|
| | ERR_02_0120 | 2108949 68 | Accelerator pedal signal short-circuit. Wire short-circuit of the accelerator pedal signal against external voltage. Internal square wave signal has a short-circuit. | Check accelerator pedal potentiometer. Disconnect the accelerator pedal and measure the resistance at - Xtank between B4 GasPedalPotSignal and B3 GasPedalPot +. min: max .. Measure between GasPedalPot + and GasPedalPotGND. Target value: Check the plug to the accelerator pedal potentiometer |
| | ERR_02_0121 | 2108949 69 | Accelerator pedal signal invalid. The accelerator pedal signal was permanently high. The signal from the accelerator pedal potentiometer is a square wave signal that is output by the controller. If this signal is "false", this error is displayed. | Check accelerator pedal potentiometer. Disconnect the accelerator pedal and measure the resistance at - Xtank between B4 GasPedalPotSignal and B3 GasPedalPot +. min: 3.2 kOhm max .. 4.9 kOhm. Check the plug on the potentiometer |
| | ERR_02_0122 | 2108949 70 | Accelerator pedal target value invalid. Conductor short-circuit of the gas target value encoder signal against external voltage. | Check accelerator pedal potentiometer. Disconnect the accelerator pedal and measure the resistance at - Xtank between B4 GasPedalPotSignal and B3 GasPedalPot +. min: 3.2 kOhm max .. 4.9 kOhm. |
| | ERR_02_0123 | 2108949 71 | Accelerator pedal target value plausible. The gas target value signal is outside the permissible limits. | Check accelerator pedal potentiometer. Disconnect the accelerator pedal and measure the resistance at - Xtank between B4 GasPedalPotSignal and B3 GasPedalPot +. min: 3.2 kOhm max .. 4.9 kOhm. |
| | ERR_02_0130 | 2108949 78 | Forward travel direction switch signal invalid. The forward travel direction switch signal was permanently high. The signal from the forward travel direction switch signal is a square-wave signal that is output by the controller. If this signal is "faulty", this error occurs. | |
| | ERR_02_0131 | 2108949 79 | Forward travel direction switch signal short-circuit. Conductor short-circuit of the forward travel direction switch signal against external voltage. Internal square wave signal has a short-circuit. | Measure at CCN: Forward travel direction. Measure resistance at -XHMI between B5 DirectionForward and A5 DirectionSupply Target value: 0 ohms A4 DirectionBackward and A5 DirectionSupply Target value: infinite ohms Measure at CCN: Reverse travel direction. Measure resistance at -XHMI between B5 DirectionForward and A5 DirectionSupply Target value: infinite Ohm A4 DirectionBackward and A5 DirectionSupply Target value: 0 ohms Measure directly at the travel direction switch, wire colours orange/black/green Forward travel direction: black: green Target value: 1.6V Reverse travel direction: black: orange Target value: 1.6V Should between green: orange always 1.6V |

| | | | | |
|--|-------------|---------------|--|---|
| | ERR_02_0132 | 2108949 80 | Reverse travel direction switch signal invalid. The reverse travel direction switch signal was permanently high. The signal from the reverse travel direction switch signal is a square-wave signal that is output by the controller. If this signal is "faulty", this error occurs. | Measure at CCN: Forward travel direction. Measure resistance at -XHMI between B5 DirectionForward and A5 DirectionSupply Target value: 0 ohms A4 DirectionBackward and A5 DirectionSupply Target value: infinite ohms Measure at CCN: Reverse travel direction. Measure resistance at -XHMI between B5 DirectionForward and A5 DirectionSupply Target value: infinite Ohm A4 DirectionBackward and A5 DirectionSupply Target value: 0 ohms Measure directly at the travel direction switch, wire colours orange/black/green Forward travel direction: black: green Target value: 1.6V Reverse travel direction: black: orange Target value: 1.6V Should between green: orange always 1.6V |
| | ERR_02_0133 | 2108949 81 | Reverse travel direction switch signal short-circuit. Conductor short-circuit of the reverse travel direction switch signal against external voltage. Internal square wave signal has a short-circuit. | Measure at CCN: Forward travel direction. Measure resistance at -XHMI between B5 DirectionForward and A5 DirectionSupply Target value: 0 ohms A4 DirectionBackward and A5 DirectionSupply Target value: infinite ohms Measure at CCN: Reverse travel direction. Measure resistance at -XHMI between B5 DirectionForward and A5 DirectionSupply Target value: infinite Ohm A4 DirectionBackward and A5 DirectionSupply Target value: 0 ohms Measure directly at the travel direction switch, wire colours orange/black/green Forward travel direction: black: green Target value: 1.6V Reverse travel direction: black: orange Target value: 1.6V Should between green: orange always 1.6V |

| | | | | |
|--|-------------|---------------|--|---|
| | ERR_02_0141 | 2108949 89 | Travel direction switch signal implausible. The travel direction switch signals contradict each other. | Measure at CCN: Forward travel direction. Measure resistance at -XHMI between B5 DirectionForward and A5 DirectionSupply Target value: 0 ohms A4 DirectionBackward and A5 DirectionSupply Target value: infinite ohms Measure at CCN: Reverse travel direction. Measure resistance at -XHMI between B5 DirectionForward and A5 DirectionSupply Target value: infinite Ohm A4 DirectionBackward and A5 DirectionSupply Target value: 0 ohms Measure directly at the travel direction switch, wire colours orange/black/green Forward travel direction: black: green Target value: 1.6V Reverse travel direction: black: orange Target value: 1.6V Target value between green: orange always 1.6V |
|--|-------------|---------------|--|---|

Energy unit

| | | | | |
|--|--------------------------|---------------|-----------------------------|---|
|  | POPUP_BATTERY_LOW_DESC | 2108309 12 | Battery voltage is low <10% | Charge battery, check battery voltage Target value: >22V. The message only disappears when the machine has been connected to the charger. |
|  | POPUP_BATTERY_EMPTY_DESC | 2108309 13 | Battery is flat =<5% | Charge battery, check battery voltage Target value: >22V. The message only disappears when the machine has been connected to the charger. |
|  | POPUP_BATTERY_FULL_DESC | 2108309 14 | Battery is fully charged | Charging process completed, disconnect the charger from the mains |
|  | | 2108309 15 | Battery being charged | Charging process active |

| | | | | |
|--|-----------------------------|---------------|---|---|
|  | POPUP_CHARGING_TIMEOUT_DESC | 2108309 | Charging process could not be completed successfully | The maximum charging time has been exceeded, disconnect the charger and reconnect it, measure the charging current with a suitable clamp meter on the charger. Target value: ~25A |
| | | | | Maximum charging time has been exceeded, disconnect the charger and reconnect, if the error continues to occur, replace the battery. |
|  | POPUP_CHARGING_TIMEOUT_DESC | 2108309 | Charging process could not be completed successfully | The maximum charging time has been exceeded, disconnect the charger and reconnect it, measure the charging current with a suitable clamp meter on the charger. Target value: ~25A |
| | | | | Check the settings in the battery menu, has the appropriate battery type been configured? |
| | | | | Maximum charging time has been exceeded, disconnect the charger and reconnect, if the error continues to occur, replace the battery. |
| HMI | | | | |
| | ERR_03_1001 | 2109613 85 | Battery voltage too low HMI, voltage <18 V, The voltage U_Bat, measured on the HMI, is below the permissible limit. | Measure voltage at -XHMI between B1 HMI + and A1 HMIGND. Target value: U_Bat 27 V |
| | ERR_03_1002 | 2109613 86 | Battery voltage too high HMI, voltage > 48 V, The voltage U_Bat, measured on the HMI, is above the permissible limit. | Measure voltage at -XHMI between B1 HMI + and A1 HMIGND. Target value: U_Bat 27 V |
| | ERR_03_1003 | 2109613 87 | Supply voltage 5V HMI, voltage <4.5 volts. The 5V voltage, measured on the HMI, is below the permissible limit. | HMI board defective |
| | ERR_03_1006 | 2109613 90 | Supply voltage 5V HMI, the voltage 5V, measured on the HMI, is above the permissible limit. | HMI board defective |
| | ERR_03_1004 | 2109613 88 | Supply voltage 3V3 HMI, voltage <3.0 volts, the voltage 3.3V, measured on the HMI, is below the permissible limit. | HMI board defective |
| | ERR_03_1007 | 2109613 91 | Supply voltage 3V3 HMI, the voltage 3.3V, measured on the HMI, is above the permissible limit. | HMI board defective |
| | ERR_03_1005 | 2109613 89 | RFID communication error. No communication with RFID reader possible | Check the socket plug connection between the HMI and the RFID reader. Check the cabling between the HMI and the RFID reader RFID reader defective |
| General safety | | | | |
| | ERR_01_0500 | 2108298 12 | Temperature error CM, the max. permissible temperature at the measuring point of the Control Module was exceeded. Board temperature is above 90°C for > = 10s | Allow the CCN to cool down. Check the fan below the CCN for blockage. Check the fan for correct functionality. |

| | | | | |
|--|-------------|---------------|--|--|
| | ERR_02_0501 | 2108953 49 | Temperature error DM, the max. permissible temperature at the measuring point of the Drive Module was exceeded. Board temperature is above 90°C for > = 10s | Allow the CCN to cool down. Check the fan below the CCN for blockage. Check the fan for correct functionality. |
| | | 2108298 14 | Temperature warning CM. The temperature warning threshold at the measuring point of the Control Module has been exceeded. Board temperature is above 75°C for > = 10s | Allow the CCN to cool down. Check the fan below the CCN for blockage. Check the fan for correct functionality. |
| | | 2108953 51 | Temperature warning DM. The temperature warning threshold at the measuring point of the Drive Module has been exceeded. Board temperature is above 75°C for > = 10s | Allow the CCN to cool down. Check the fan below the CCN for blockage. Check the fan for correct functionality. |
| | | 2108298 16 | CM Temperature OK. The temperature is fine again after a warning | Purely information |
| | | 2108953 53 | DM Temperature OK. The temperature is fine again after a warning | Purely information |
| | ERR_01_0510 | 2108298 22 | Supply voltage battery CM. Supply voltage battery CM, the voltage U_Bat, measured on the control module, is outside the permissible limits. Battery voltage <19V or> 35V | Measure U_Batt directly at the battery. Target value with a full battery: 27 V |
| | ERR_01_0511 | 2108298 23 | Supply voltage 5V CM, the voltage 5V, measured on the Control Module, is outside the permissible limits. 5V voltage < 4.8V or > 5.2V | Internal 5V signal from the control module is faulty. Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0512 | 2108298 24 | Supply voltage 12V CM, the voltage 12V, measured on the Control Module, is outside the permissible limits. 12V voltage < 10.8V or > 13.2V | Internal 12V signal from the control module is faulty. Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0521 | 2108298 33 | Safety Line CM. SafetyLine cannot be opened | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0522 | 2108298 34 | Safety Line CM. SafetyLine cannot be closed. | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0523 | 2108298 35 | Safety Line CM. SafetyLine input voltage too low | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_02_0530 | 2108953 78 | Safety Line DM. SafetyLine cannot be opened. | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_02_0531 | 2108953 79 | Safety Line DM. SafetyLine cannot be closed. | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |

| | | | | |
|--|-------------|---------------|---|--|
| | ERR_02_0532 | 2108953 80 | Safety Line DM. SafetyLine input voltage too low. | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0540 | 2108298 52 | Internal (CCN) general contactor CM. Error when testing the general contactor. FET transistor does not open/close, Safety Line does not close, or PreCharge short-circuited | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0541 | 2108298 53 | General contactor CM. An open Safetyline was recognized during operation | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0542 | 2108298 54 | CM CAN bus bus off. Accumulation of data transmission errors | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0543 | 2108298 55 | CM CAN Bus Error-Passive, accumulation of data transmission errors | Check terminating resistors and cabling. Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0545 | 2108298 57 | CM CAN Bus Node Aliveness, One or more bus participants did not send a life signal, at least at times. | Check terminating resistors and cabling. Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0650 | 2108299 62 | CM CAN bus DM heartbeat error | Check voltage supply CM. Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0651 | 2108299 63 | CM CAN Bus HMI Heartbeat Error, the HMI does not send a life signal | Check the HMI voltage supply, restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0669 | 2108299 81 | CM CAN bus master. Master could not send a command word. | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0670 | 2108299 82 | CM CAN bus master. Master could not change the NMT node status | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0671 | 2108299 83 | CM CAN bus master. Master could not detect the presence of all slaves | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0672 | 2108299 84 | CM CAN bus master. Master could not write the startup configuration or send self-test commands. | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |

| | | | | |
|--|-------------|---------------|---|---|
| | ERR_01_0673 | 2108299 85 | CM CAN bus master. Master could not prepare SafetyLine | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0674 | 2108299 86 | CM CAN bus master. Master could not complete the distributed SafetyLine test. | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0675 | 2108299 87 | CM CAN bus master. Initialization of the master interface failed | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0676 | 2108299 88 | CM CAN bus master. Master could not bring all slaves to the STARTUP state. | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0677 | 2108299 89 | CM CAN bus node. Node interface initialization failed | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0678 | 2108299 90 | CM CAN bus node. Node could not initiate a reboot | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0679 | 2108299 91 | CM CAN bus node. Node could not prepare SHUTDOWN state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0680 | 2108299 92 | CM CAN bus node. Node could not prepare OFF state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0681 | 2108299 93 | CM CAN bus node. Node could not prepare RESTART state. | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0682 | 2108299 94 | CM CAN bus node. Node could not prepare DIAGNOSTIC_MODE state. | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0683 | 2108299 95 | CM CAN bus node. Node could not prepare UPDATE state. | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0684 | 2108299 96 | CM CAN bus node. Node could not prepare INITIALIZATION state. | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |

| | | | | |
|--|-------------|---------------|---|---|
| | ERR_01_0685 | 2108299 97 | CM CAN bus node. Node could not prepare PREPARE_DIAGNOSTIC state. | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0686 | 2108299 98 | CM CAN bus node. Node could not prepare STARTUP state. | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0687 | 2108299 99 | CM CAN bus node. Node could not prepare SELF_TEST state. | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0688 | 2108300 00 | CM CAN bus node. Node could not prepare SAFETY_LINE_TEST state. | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0689 | 2108300 01 | CM CAN bus node. Node could not prepare PRE_RUN state. | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0690 | 2108300 02 | CM CAN bus node. Node could not prepare RUN state. | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0691 | 2108300 03 | CM CAN bus node. Node could not prepare CHARGING state. | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0692 | 2108300 04 | CM CAN bus node. Node could not prepare SERVICE_MODE state. | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0693 | 2108300 05 | CM CAN bus node. Node could not prepare MANUAL_MODE state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0694 | 2108300 06 | CM CAN bus node. Node could not execute DIAGNOSTIC_MODE state. | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0695 | 2108300 07 | CM CAN bus node. Node could not execute PREPARE_DIAGNOSTIC state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0696 | 2108300 08 | CM CAN bus node. The node could not execute its functions in the UPDATE state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |

| | | | | |
|--|-------------|---------------|--|---|
| | ERR_01_0697 | 2108300 09 | CM CAN bus node. Node could not execute its functions in the SLAVE_STARTUP state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0698 | 2108300 10 | CM CAN bus node. Node could not execute its functions in the SERVICE_MODE state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0699 | 2108300 11 | CM CAN bus node. Node could not execute its functions in the SELF_TEST state. | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0700 | 2108300 12 | CM CAN bus node. Node could not execute its functions in the FINISH_SELF_TEST_ROUTINE state. Emergency stop pressed at machine start or PCB temperature at machine stop > 94°C | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0701 | 2108300 13 | CM CAN bus node. Node could not execute its functions in the RUN state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0702 | 2108300 14 | CM CAN bus node. Node could not execute its functions in the PRE_RUN state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0703 | 2108300 15 | CM CAN bus node. Node could not execute its functions in the MANUAL_MODE state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0704 | 2108300 16 | CM CAN bus node. Node could not execute its functions in the CHARGING state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0705 | 2108300 17 | CM CAN bus node. Node could not execute its functions when exiting the CHARGING state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0706 | 2108300 18 | CM CAN bus state machine. CAN-open state machine recognized an error | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0708 | 2108300 20 | CM CAN bus state machine. CAN-open state machine signalled an application error | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0709 | 2108300 21 | CM CAN bus state machine. CAN-open state machine signalled an invalid NMT state change | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |

| | | | | |
|--|-------------|---------------|---|---|
| | ERR_01_0710 | 2108300 22 | CM CAN bus state machine. CAN-open state machine signalled the input in DIAGNOSTIC_MODE | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0711 | 2108300 23 | CM CAN bus state machine. CAN-open state machine signalled a remote object access error from the master | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0712 | 2108300 24 | CM CAN bus state machine. CAN-open state machine signalled the loss of the SafetyLine input voltage | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0713 | 2108300 25 | CM CAN bus state machine. CAN-open state machine signalled the intentional opening of the SafetyLine | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0714 | 2108300 26 | CM CAN bus NMT. CANopen NMT state could not be set | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0715 | 2108300 27 | CM CAN bus stack. CANopen stack could not be initialized | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0716 | 2108300 28 | CM CAN MachineBusMasterControl. Timeout in MachineBusMasterControl before all nodes reached the STARTUP state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0717 | 2108300 29 | CM CAN MachineBusMasterControl. Timeout in MachineBusMasterControl before all nodes reached the SELF_TEST state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0718 | 2108300 30 | CM CAN MachineBusMasterControl. Timeout in MachineBusMasterControl before all nodes reached the SAFETY_LINE_TESTS state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0719 | 2108300 31 | CM CAN MachineBusMasterControl. Timeout in MachineBusMasterControl before all nodes reached the PRE_RUN state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0720 | 2108300 32 | CM CAN MachineBusMasterControl. Timeout in MachineBusMasterControl before all nodes reached the RUN state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_01_0721 | 2108300 33 | CM CAN MachineBusMasterControl. Timeout in MachineBusMasterControl before all nodes reached a certain state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |

| | | | | |
|--|-------------|---------------|---|---|
| | ERR_02_0546 | 2108953 94 | DM CAN bus bus off. Accumulation of data transmission errors. Many errors have been detected on the CAN bus | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_02_0547 | 2108953 95 | DM CAN bus error passive. Accumulation of data transmission errors. Many errors have been detected on the CAN bus | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_02_0549 | 2108953 97 | DM CAN bus node aliveness. One or more bus participants did not send a life signal, at least at certain times. Heartbeat of the CM is not sent or does not arrive | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_02_0777 | 2108956 25 | DM CAN bus node. Node interface initialization failed | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_02_0778 | 2108956 26 | DM CAN bus node. Node could not initiate a reboot | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_02_0779 | 2108956 27 | DM CAN bus node. Node could not prepare SHUTDOWN state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_02_0780 | 2108956 28 | DM CAN bus node. Node could not prepare OFF state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_02_0781 | 2108956 29 | DM CAN bus node. Node could not prepare RESTART state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_02_0782 | 2108956 30 | DM CAN bus node. Node could not prepare DIAGNOSTIC_MODE state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_02_0783 | 2108956 31 | DM CAN bus node. Node could not prepare UPDATE state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_02_0784 | 2108956 32 | DM CAN bus node. Node could not prepare INITIALIZATION state. | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_02_0785 | 2108956 33 | DM CAN bus node. Node could not prepare PREPARE_DIAGNOSTIC state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |

| | | | | |
|--|-------------|---------------|--|---|
| | ERR_02_0786 | 2108956 34 | DM CAN bus node. Node could not prepare STARTUP state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_02_0787 | 2108956 35 | DM CAN bus node. Node could not prepare SELF_TEST state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_02_0788 | 2108956 36 | DM CAN bus node. Node could not prepare SAFETY_LINE_TEST state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_02_0789 | 2108956 37 | DM CAN bus node. Node could not prepare PRE_RUN state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_02_0790 | 2108956 38 | DM CAN bus node. Node could not prepare RUN state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_02_0791 | 2108956 39 | DM CAN bus node. Node could not prepare CHARGING state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_02_0792 | 2108956 40 | DM CAN bus node. Node could not prepare SERVICE_MODE state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_02_0793 | 2108956 41 | DM CAN bus node. Node could not prepare MANUAL_MODE state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_02_0794 | 2108956 42 | DM CAN bus node. Node could not execute DIAGNOSTIC_MODE state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_02_0795 | 2108956 43 | DM CAN bus node. Node could not execute PREPARE_DIAGNOSTIC state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_02_0796 | 2108956 44 | DM CAN bus node. The node could not execute its functions in the UPDATE state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_02_0797 | 2108956 45 | DM CAN bus node. Node could not execute its functions in the SLAVE_STARTUP state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |

| | | | | |
|--|-------------|---------------|---|---|
| | ERR_02_0798 | 2108956 46 | DM CAN bus node. Node could not execute its functions in the SERVICE_MODE state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_02_0799 | 2108956 47 | DM CAN bus node. Node could not execute its functions in the SELF_TEST state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_02_0800 | 2108956 48 | DM CAN bus node. Node could not execute its functions in the FINISH_SELF_TEST_ROUTINE state. Temperature when starting the machine > 94°C/Main contactor cannot be closed | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_02_0801 | 2108956 49 | DM CAN bus node. Node could not execute its functions in the RUN state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_02_0802 | 2108956 50 | DM CAN bus node. Node could not execute its functions in the PRE_RUN state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_02_0803 | 2108956 51 | DM CAN bus node. Node could not execute its functions in the MANUAL_MODE state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_02_0804 | 2108956 52 | DM CAN bus node. Node could not execute its functions in the CHARGING state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_02_0805 | 2108956 53 | DM CAN bus node. Node could not execute its functions when exiting the CHARGING state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_02_0806 | 2108956 54 | DM CAN bus state machine. CAN-open state machine recognized an error | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_02_0807 | 2108956 55 | DM CAN bus state machine. CAN-open state machine refused master command | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_02_0808 | 2108956 56 | DM CAN bus state machine. CAN-open state machine signalled an application error | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_02_0809 | 2108956 57 | DM CAN bus state machine. CAN-open state machine signalled an invalid NMT state change | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |

| | | | | |
|--|-------------|---------------|---|---|
| | ERR_02_0810 | 2108956 58 | DM CAN bus state machine. CAN-open state machine signalled the input in DIAGNOSTIC_MODE | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_02_0811 | 2108956 59 | DM CAN bus state machine. CAN-open state machine signalled a remote object access error from the master | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_02_0812 | 2108956 60 | DM CAN bus state machine. CAN-open state machine signalled the loss of the SafetyLine input voltage | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_02_0813 | 2108956 61 | DM CAN bus state machine. CAN-open state machine signalled the intentional opening of the SafetyLine | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_02_0814 | 2108956 62 | DM CAN bus NMT. CANopen NMT state could not be set | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_02_0815 | 2108956 63 | DM CAN bus stack. CANopen stack could not be initialized | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_03_0860 | 2109612 44 | HMI CAN bus node. Node interface initialization failed | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_03_0861 | 2109612 45 | HMI CAN bus node. Node could not initiate a reboot | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_03_0862 | 2109612 46 | HMI CAN bus node. Node could not prepare SHUTDOWN state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_03_0863 | 2109612 47 | HMI CAN bus node. Node could not prepare OFF state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_03_0864 | 2109612 48 | HMI CAN bus node. Node could not prepare RESTART state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_03_0865 | 2109612 49 | HMI CAN bus node. Node could not prepare DIAGNOSTIC_MODE state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |

| | | | | |
|--|-------------|---------------|---|---|
| | ERR_03_0866 | 2109612 50 | HMI CAN bus node. Node could not prepare UPDATE state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_03_0867 | 2109612 51 | HMI CAN bus node. Node could not prepare INITIALIZATION state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_03_0868 | 2109612 52 | HMI CAN bus node. Node could not prepare PREPARE_DIAGNOSTIC state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_03_0869 | 2109612 53 | HMI CAN bus node. Node could not prepare STARTUP state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_03_0870 | 2109612 54 | HMI CAN bus node. Node could not prepare SELF_TEST state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_03_0871 | 2109612 55 | HMI CAN bus node. Node could not prepare SAFETY_LINE_TEST state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_03_0872 | 2109612 56 | HMI CAN bus node. Node could not prepare PRE_RUN state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_03_0873 | 2109612 57 | HMI CAN bus node. Node could not prepare RUN state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_03_0874 | 2109612 58 | HMI CAN bus node. Node could not prepare CHARGING state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_03_0875 | 2109612 59 | HMI CAN bus node. Node could not prepare SERVICE_MODE state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_03_0876 | 2109612 60 | HMI CAN bus node. Node could not prepare MANUAL_MODE state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_03_0877 | 2109612 61 | HMI CAN bus node. Node could not execute DIAGNOSTIC_MODE state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |

| | | | | |
|--|-------------|---------------|--|---|
| | ERR_03_0878 | 2109612 62 | HMI CAN bus node. Node could not execute PREPARE_DIAGNOSTIC state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_03_0879 | 2109612 63 | HMI CAN bus node. The node could not execute its functions in the UPDATE state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_03_0880 | 2109612 64 | HMI CAN bus node. Node could not execute its functions in the SLAVE_STARTUP state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_03_0881 | 2109612 65 | HMI CAN bus node. Node could not execute its functions in the SERVICE_MODE state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_03_0882 | 2109612 66 | HMI CAN bus node. Node could not execute its functions in the SELF_TEST state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_03_0883 | 2109612 67 | HMI CAN bus node. Node could not execute its functions in the FINISH_SELF_TEST_ROUTINE state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_03_0884 | 2109612 68 | HMI CAN bus node. Node could not execute its functions in the RUN state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_03_0885 | 2109612 69 | HMI CAN bus node. Node could not execute its functions in the PRE_RUN state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_03_0886 | 2109612 70 | HMI CAN bus node. Node could not execute its functions in the MANUAL_MODE state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_03_0887 | 2109612 71 | HMI CAN bus node. Node could not execute its functions in the CHARGING state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_03_0888 | 2109612 72 | HMI CAN bus node. Node could not execute its functions when exiting the CHARGING state | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_03_0889 | 2109612 73 | HMI CAN bus state machine. CAN-open state machine recognized an error | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |

| | | | | |
|--|-------------|-----------|--|---|
| | ERR_03_0890 | 210961274 | HMI CAN bus state machine. CAN-open state machine refused master command | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_03_0891 | 210961275 | HMI CAN bus state machine. CAN-open state machine signalled an application error | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_03_0892 | 210961276 | HMI CAN bus state machine. CAN-open state machine signalled an invalid NMT state change | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_03_0893 | 210961277 | HMI CAN bus state machine. CAN-open state machine signalled the input in DIAGNOSTIC_MODE | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_03_0894 | 210961278 | HMI CAN bus state machine. CAN-open state machine signalled heartbeat timeout detection | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_03_0895 | 210961279 | HMI CAN bus state machine. CAN-open state machine signalled remote object access from the master | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_03_0896 | 210961280 | HMI CAN bus state machine. CAN-open state machine signalled CAN bus OFF error | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_03_0897 | 210961281 | HMI CAN bus state machine. CAN-open state machine signalled CAN bus PASSIVE error | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_03_0898 | 210961282 | HMI CAN bus NMT. CANopen NMT state could not be set | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_03_0899 | 210961283 | HMI CAN bus stack. CANopen stack could not be initialized | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_02_0620 | 210895468 | HW variant detection DM, an invalid HW variant coding was read. | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |

| | | | | |
|--|-------------|---------------|---|--|
| | ERR_01_0551 | 2108298 63 | Driver error side brush motor, driver error (temperature too high or extreme short-circuit) | <ul style="list-style-type: none"> - Check brush for blockage and sluggishness. - Measure brush current -M6 in idle mode (brush removed) with a suitable clamp meter at CCN_HCI -SB (screw contact 3) during operation. Target value: ~0.9A. Actuate the brush motor using the manual functions in the "Kärcher Diag ServiceTool". Setting 100%. - Disconnect brush motor -M6 including connection cable and check for damage. Check side brushes rotary motor -M6 for short-circuit. Disconnect the rotary motor -M6 and check for short-circuit including the connecting cable. |
| | ERR_01_0552 | 2108298 64 | Driver error brush motor 1, driver error (temperature too high or extreme short-circuit) | <ul style="list-style-type: none"> - Check the brush/brush head for damage and (no suggestions) - Check if the brushes are blocked by foreign bodies and remove the foreign bodies if necessary. - Measure the brush current in idle mode (brush removed) with a suitable clamp meter at CCN_HCI -Br1 (screw contact 6) during operation. Target value: ~5A. Actuate the brush motor using the manual functions in the "Kärcher Diag ServiceTool". - Check brush motor 1 -M11 for short-circuit. - Check the wiring to the brush motor 1 for damage. Disconnect brush motor 1 -M11 and check for short-circuit including the connecting cable. |
| | ERR_01_0553 | 2108298 65 | Driver error brush motor 2, driver error (temperature too high or extreme short-circuit) | <ul style="list-style-type: none"> - Check the brushes/brush head for damage. - Check if the brushes are blocked by foreign bodies and remove the foreign bodies if necessary. - Measure the brush current in idle mode (brush removed) with a suitable clamp meter at CCN_HCI -Br2 (screw contact 5) during operation. Target value: ~5A. Actuate the brush motor using the manual functions in the "Kärcher Diag ServiceTool". - Brush motor 2 -M11 for short-circuit . - Check the wiring to the brush motor 1 for damage. Disconnect brush motor 2 -M11 and check for short-circuit including the connecting cable |

| | | | | |
|--------------------------|-------------|---------------|--|--|
| | ERR_01_0554 | 2108298 66 | Driver error suction turbine, driver error (temperature too high or extreme short-circuit) | <ul style="list-style-type: none"> - Check suction turbine -M3 for blockage and sluggishness. - Check the cabling for damage. - Activate 100% of the suction turbine -M3 using the manual functions in the "Kärcher Diag Servicetool". Read the turbine current or measure with a suitable clamp meter at -CCN_HCI -VAC (screw contact 4): Should be about ~27A at 24V. - Measure voltage between -CCN_HCI -VAC (screw contact 4) and GND -CCN_Chassis. Target value: 24V with setting in the "Kärcher Diag ServiceTool" 100%. - Disconnect the suction turbine -M3 and check for short-circuit including the connecting cable |
| | ERR_01_0555 | 2108298 67 | Brush deck lifting motor driver error, driver error (temperature too high or extreme short-circuit) | <ul style="list-style-type: none"> - Disconnect lifting motor and check for short-circuit incl. connecting cable. |
| | ERR_01_0556 | 2108298 68 | Side brushes lifting motor driver error, driver error (temperature too high or extreme short-circuit) | <ul style="list-style-type: none"> - Disconnect lifting motor and check for short-circuit incl. connecting cable. |
| | ERR_01_0557 | 2108298 69 | Suction bar lifting motor driver error, driver error (temperature too high or extreme short-circuit) | <ul style="list-style-type: none"> - Disconnect lifting motor and check for short-circuit incl. connecting cable. |
| | ERR_01_0630 | 2108299 42 | The control module has detected a driver error during operation, the driver module is in error mode due to excess temperature or excess current. | <p>Group error for ERR_01_0551 - ERR_01_0557, please observe the measures to be taken for these errors.</p> |
| | ERR_02_0640 | 2108954 88 | The Drive Module has detected a driver error during operation, the driver module is in error mode due to overtemperature or overcurrent. | <ul style="list-style-type: none"> - Check driving motor -A3 for damage and check (no suggestions). - Check mechanical parts according to the manual. - Check if foreign bodies are blocking the drive and remove the foreign bodies if necessary. - Measure the idle mode current with a suitable clamp meter on the CCN_HCI -DM-A 1 Drive during operation. Target value at Vmax: ~7A. - Measure resistance at -Xbreak between B1 Break + and A2 Break GND. Target value: ~24Ohm. Current in normal operation: Target value: 0,65 A. - Measure voltage at -Xbreak between B1 Break + and A2 Break GND. Target value: First 24 VDC then 11.6. - Disconnect the driving motor -A1 and check for short-circuit including the connecting cable. |
| Functional safety | | | | |
| | ERR_02_0001 | 2108948 49 | Intermediate circuit voltage DM, The ZWK (intermediate circuit) voltage on the Drive Module has fallen below the critical limit. ZWK <19V for> 200ms | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |

| | | | | |
|--|-------------|---------------|---|---|
| | ERR_02_0002 | 2108948 50 | DC link voltage DM. The ZWK (intermediate circuit) voltage on the Drive Module has risen above the critical limit. ZWK > 35V for > 200ms can occur when driving downhill, the driving motor becomes a generator | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | | | Microcontroller Core DM, self-test error of the µC core of the Drive Module | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | | | Microcontroller stack DM. Stack overflow in the firmware of the Drive Module | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | | | Microcontroller ROM DM. The stored CRC of the application firmware does not match the calculated ROM CRC. Test takes place at run time. | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_02_0030 | 2108948 78 | General contactor DM. The general contactor cannot be opened. | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_02_0031 | 2108948 79 | General contactor DM. The general contactor cannot be closed. | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_02_0032 | 2108948 80 | General contactor DM. Timeout while waiting for the Safetyline to close in the Control Module. | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_02_0033 | 2108948 81 | General contactor DM. Error discovered in the ZWK. Rise time of ZWK (intermediate circuit) voltage is slower than 1mV/ms or faster than 100V/s. | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_02_0150 | 2108949 98 | Battery supply voltage DM. The voltage U_Bat, measured on the Drive Module, is outside the permissible limits. | Measure voltage > 35.0V or voltage < 19.0V. Measure the voltage directly on the battery. Target value with a full battery: 27 V |
| | ERR_02_0160 | 2108950 08 | Supply voltage 5V DM. The 5V voltage, measured on the Drive Module, is outside the permissible limits. | Internal voltage. Target value: between 4.8V and 5.2V. Restart the machine, reset the hardware (disconnect the battery for 15 seconds), if the error persists, the CCN is defective |
| | ERR_02_0180 | 2108950 28 | Internal multifunctional input, signal was above 2.0V for <100ms | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |
| | ERR_02_0181 | 2108950 29 | Internal multifunctional input, signal was above 2.0V for <100ms | Restart the machine, reset the hardware (disconnect the battery for 15 seconds), perform a software update, if the error still persists, the CCN is defective |

| | | | | |
|--|-------------------|---------|---|--|
| | ERR_02_0190 38 | 2108950 | Machine is not ready for operation, search for the cause of the critical error and note the error message. Is triggered for every error in which the machine goes into the safe state | Is triggered for every error in which the machine goes into the safe state. Look for original errors. |
|--|-------------------|---------|---|--|

21 Technical documentation

21.1 Technical data

| | | B 110 R 65 | B 110 D 65 | B 110 R 75 | B 110 D 75 |
|---|---|---------------------|---------------------|---------------------|---------------------|
| General | | | | | |
| Driving / cleaning speed | km/h | 6 | 6 | 6 | 6 |
| Transport speed | km/h | 6 | 6 | 6 | 6 |
| Travel speed, backwards | km/h | 4 | 4 | 4 | 4 |
| Theoretical surface performance | m ² /h | 3900 | 3900 | 4500 | 4500 |
| Theoretical surface performance with side scrubbing deck | m ² /h | - | - | 5100 | 5100 |
| Practical surface performance | m ² /h | 2730 | 2730 | 3150 | 3150 |
| Fresh water tank capacity | l | 110 | 110 | 110 | 110 |
| Waste water tank capacity | l | 110 | 110 | 110 | 110 |
| Coarse dirt container capacity | l | 1,6 | - | 1,8 | - |
| Volume of detergent tank ("Dose" option) | l | 5 | 5 | 5 | 5 |
| Detergent dosing | % | 0,25...5 | 0,25...5 | 0,25...5 | 0,25...5 |
| Water dosage | l/min | 0,132...9 | 0,132...9 | 0,132...9 | 0,132...9 |
| Load per unit area (with driver and full fresh water tank) | | | | | |
| Surface pressure | N/mm ² | 0,61 | 0,61 | 0,61 | 0,61 |
| Load per unit area (weight / parking area) | kg/m ² | 538 | 538 | 538 | 538 |
| Dimensions | | | | | |
| Length | mm | 1640 | 1640 | 1640 | 1640 |
| Width | mm | 740 | 740 | 740 | 740 |
| Wide suction bar | mm | 950 | 950 | 950 | 950 |
| Height | mm | 1310 | 1310 | 1310 | 1310 |
| Working width | mm | 650 | 650 | 750 | 750 |
| Working width with side scrubbing deck | mm | - | - | 850 | 850 |
| Packaging dimensions lwxh | mm | 1750x990x14 75 | 1750x990x14 75 | 1750x990x14 75 | 1750x990x14 75 |
| Turning circle | mm | 1750 | 1750 | 1750 | 1750 |
| Battery compartment dimensions lwxh | mm | 2x(315x386x3 75) | 2x(315x386x3 75) | 2x(315x386x3 75) | 2x(315x386x3 75) |
| Tyres | | | | | |
| Front wheel, width | mm | 90 | 90 | 90 | 90 |
| Front wheel, diameter | mm | 250 | 250 | 250 | 250 |
| Rear wheel, width | mm | 75 | 75 | 75 | 75 |
| Rear wheel, diameter | mm | 290 | 290 | 290 | 290 |
| Weight | | | | | |
| Approved total weight | kg | 650 | 650 | 650 | 650 |
| Net weight (transport weight) | kg | 480 | 480 | 480 | 480 |
| Typical operating weight | kg | 540 | 540 | 540 | 540 |
| Brush contact force, max. | N (kg) | 736 (75) | 736 (75) | 736 (75) | 736 (75) |
| Brush contact pressure, max. | N / m ² (g / cm ²) | 581 (570) | 51 (50) | 510 (500) | 41 (40) |
| Device performance data | | | | | |
| Nominal voltage | V | 24 | 24 | 24 | 24 |
| Battery capacity | Ah (5 h) | 170 / 285 | 170 / 285 | 170 / 285 | 170 / 285 |
| Mean power input | W | 2350 | 2350 | 2350 | 2350 |
| Nominal power | W | 2500 | 2500 | 2500 | 2500 |
| Driving motor power | W | 600 | 600 | 600 | 600 |
| Suction turbine power | W | 600 | 600 | 600 | 600 |
| Brush drive power | W | 2 x 600 | 2 x 600 | 2 x 600 | 2 x 600 |
| Degree of protection | | IPX3 | IPX3 | IPX3 | IPX3 |
| Vacuuming | | | | | |
| Suction performance, air quantity | l/s | ~25 | ~25 | ~25 | ~25 |

| | | B 110 R 65 | B 110 D 65 | B 110 R 75 | B 110 D 75 |
|--|---|-------------------|-------------------|-------------------|-------------------|
| Vacuum (max.) | kPa (mbar) | ~17 (~170) | ~17 (~170) | ~17 (~170) | ~17 (~170) |
| Vacuum (in operation) | kPa (mbar) | ~5 (~50) | ~5 (~50) | ~5 (~50) | ~5 (~50) |
| Cleaning brushes | | | | | |
| Brush diameter | mm | 100 | 355 | 100 | 385 |
| Brush length | mm | 605 | - | 705 | - |
| Brush speed | 1/min | 1200 | 180 | 1200 | 180 |
| Side scrubbing deck brush diameter | mm | - | - | 220 | 220 |
| Side scrubbing deck brush speed | 1/min | - | - | 220 | 220 |
| Internal charger | | | | | |
| Cable length | m | 5 | 5 | 5 | 5 |
| Nominal voltage | V | 100...240 | 100...240 | 100...240 | 100...240 |
| Frequency | Hz | 50-60 | 50-60 | 50-60 | 50-60 |
| Power input | W | 650 | 650 | 650 | 650 |
| Charging current | A | 28 | 28 | 28 | 28 |
| Degree of efficiency | % | 92 | 92 | 92 | 92 |
| Ambient conditions | | | | | |
| Permissible temperature range | °C | 5...40 | 5...40 | 5...40 | 5...40 |
| Water temperature max. | °C | 50 | 50 | 50 | 50 |
| Filling system water pressure (Option) | MPa (bar) | 1 (10) | 1 (10) | 1 (10) | 1 (10) |
| Waste water tank flushing system water pressure (option) | MPa (bar) | 1 (10) | 1 (10) | 1 (10) | 1 (10) |
| Relative humidity | % | 20...90 | 20...90 | 20...90 | 20...90 |
| Incline | | | | | |
| Max. working area slope | % | 10 | 10 | 10 | 10 |
| Short distance incline (max. 10 m) transport, loading | % | 22 | 22 | 22 | 22 |
| Determined values in acc. with EN 60335-2-72 | | | | | |
| Hand-arm vibration value | m/s ² | <2,5 | <2,5 | <2,5 | <2,5 |
| Seat vibration value | m/s ² | <2,5 | <2,5 | <2,5 | <2,5 |
| Uncertainty K | dB(A) | 0,2 | 0,2 | 0,2 | 0,2 |
| Sound level L _{pA} eco operation | dB(A) | 59,2 | 59,2 | 59,2 | 59,2 |
| Sound level L _{pA} normal operation | dB(A) | 63,6 | 63,6 | 63,6 | 63,6 |
| Uncertainty K _{pA} | dB(A) | 1,6 | 1,6 | 1,6 | 1,6 |
| Sound power level L _{WA} + Uncertainty K _{WA} eco operation | dB(A) | 74,1 | 74,1 | 74,1 | 74,1 |
| Sound power level L _{WA} + Uncertainty K _{WA} normal operation | dB(A) | 78,7 | 78,7 | 78,7 | 78,7 |
| Side scrubbing deck | | | | | |
| Power | W | - | - | 140 | 140 |
| Brush contact force, max. | N (kg) | - | - | 88 (9) | 88 (9) |
| Brush contact pressure, max. | N / m ² (g - / cm ²) | - | - | 30,6 (30) | 30,6 (30) |

Subject to technical modifications.

21.2 Special tools

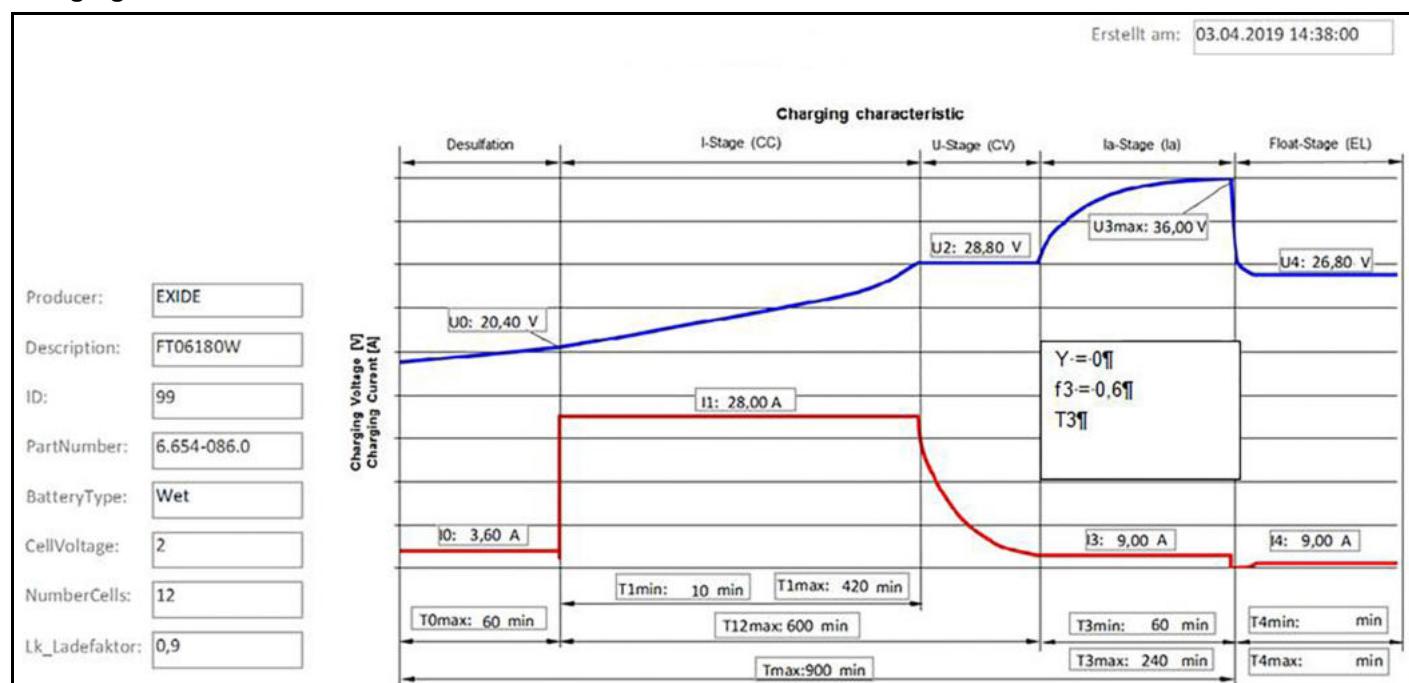
| | | |
|-------------------------------|-------------------------------------|-------------|
| Intelligent Key | Red | 5.035-337.0 |
| Voltage regulator | | 6.803-025.0 |
| Service cable harness | for unit electronics | 4.823-200.0 |
| Kärcher Diagnostics Module | | 2.643-615.0 |
| CAN cable | | 4.822-999.0 |
| Multimeter | | 6.803-022.0 |
| Battery acid hydrometer | for low-maintenance batteries | 6.803-015.0 |
| Pulling tool | Steering wheel | 2.860-166.0 |
| Magnetic field tester | | 6.803-003.0 |
| Torque wrench | 3/8 "drive, 2-25 Nm | 6.815-090.0 |
| Metratester electrical tester | | 6.803-034.0 |
| Socket wrench KM 6 | For steering tapered roller bearing | 6.035-045.0 |
| Grease | 400 g | 6.288-059.0 |
| Grease | 100 g | 6.288-134.0 |
| Copper paste | 100 g | 6.869-087.0 |

22 Circuit diagram

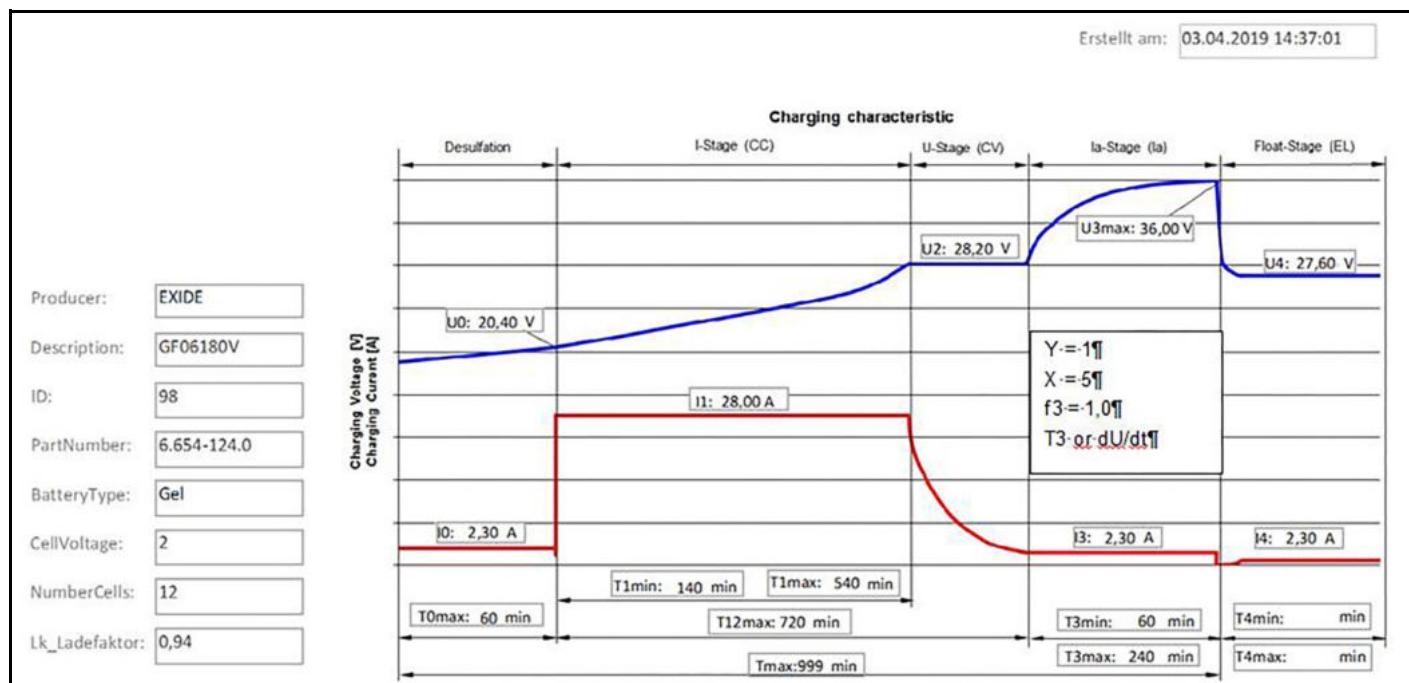
Always call up the current circuit diagram in DISIS when working on the device.

23 Charging characteristics/discharge characteristics

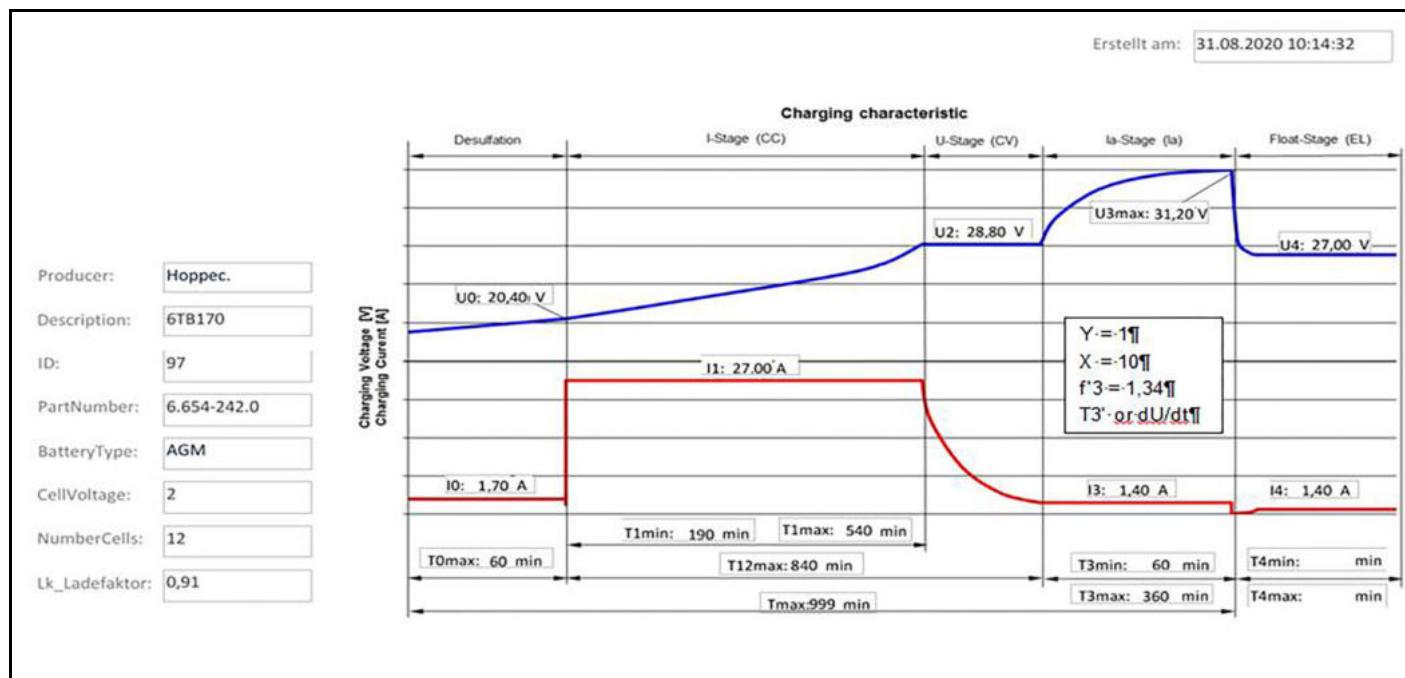
Charging curve for Exide FT06180W Wet - 6.654-086.0



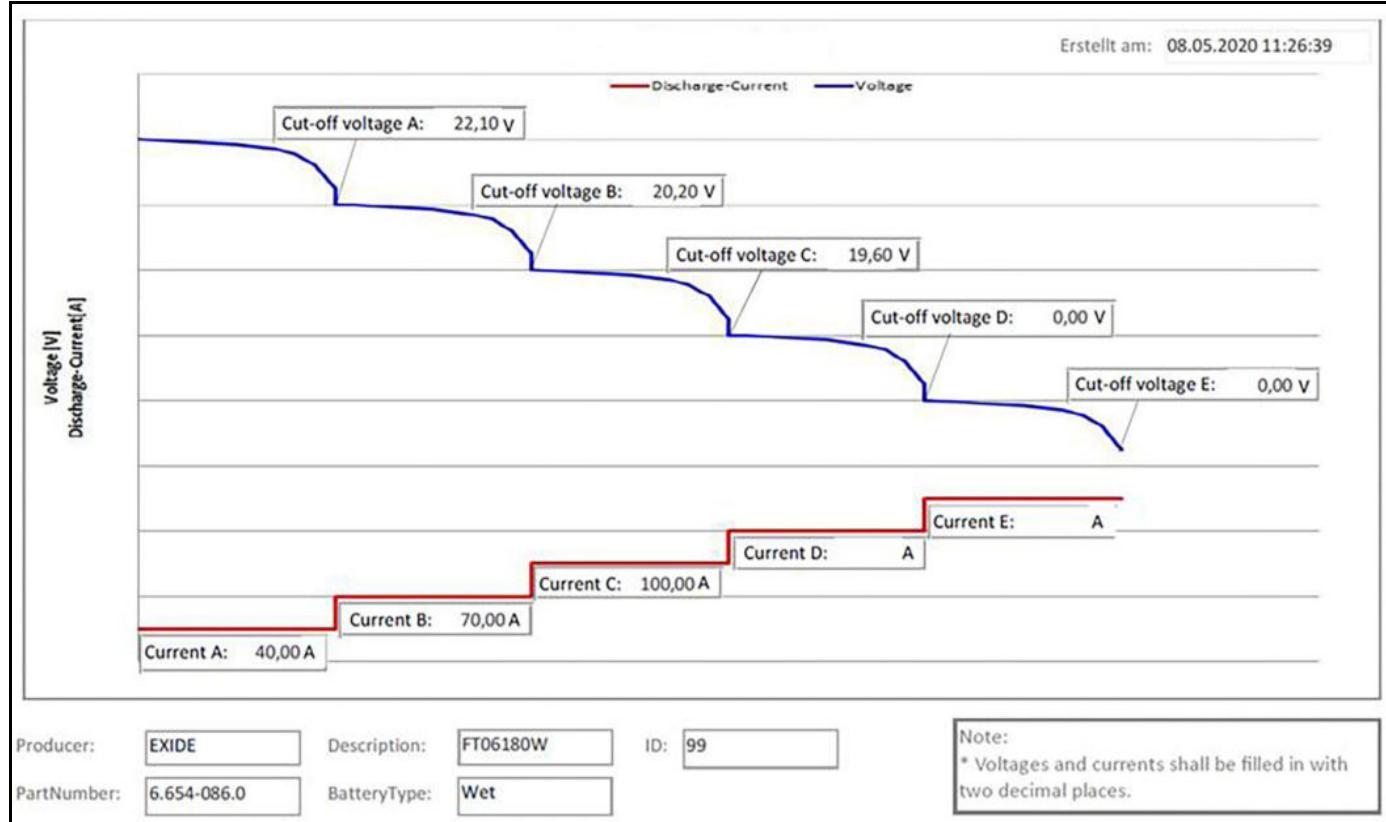
Charging curve for Exide GF06180V Gel - 6.654-124.0



Charging curve for Hoppecke 6TB170 AGM - 6.654-242.0

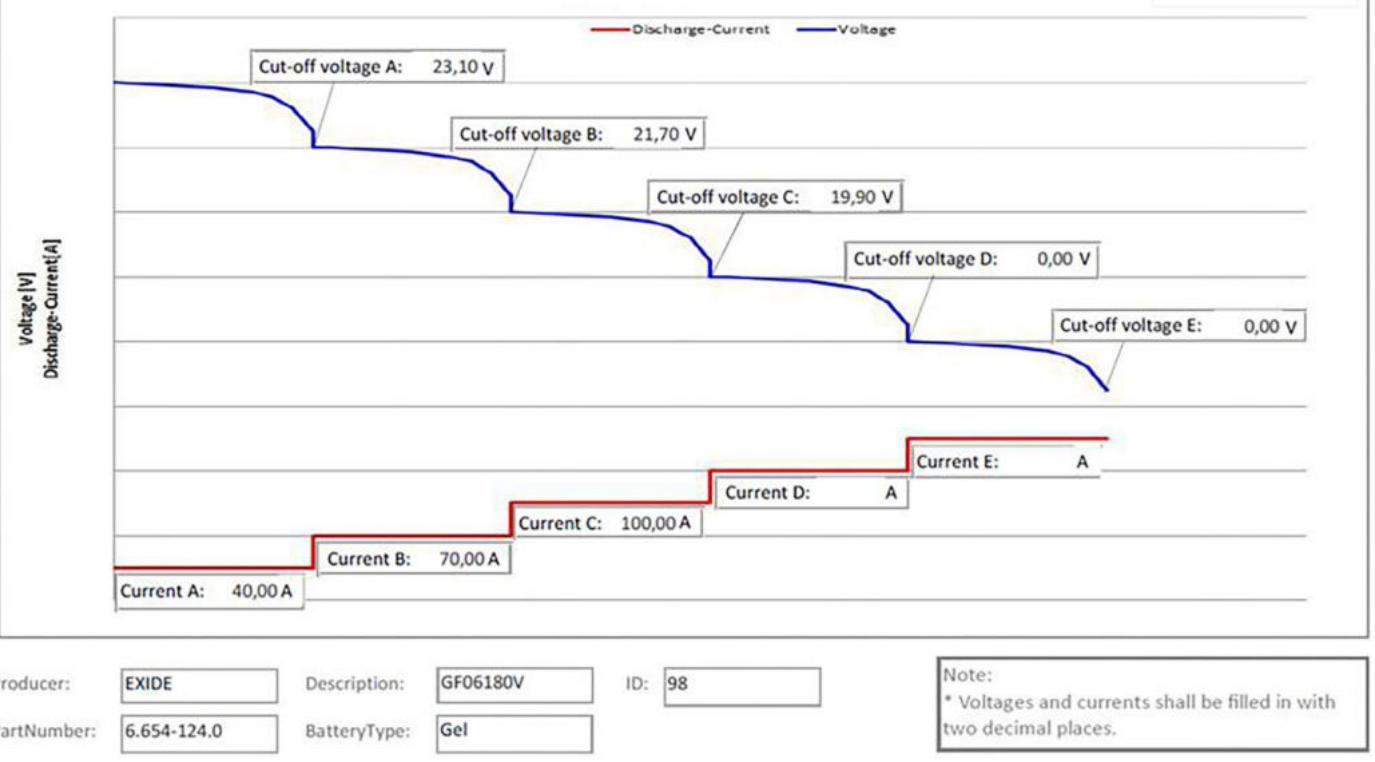


Discharge curve for Exide FT06180W Wet - 6.654-086.0



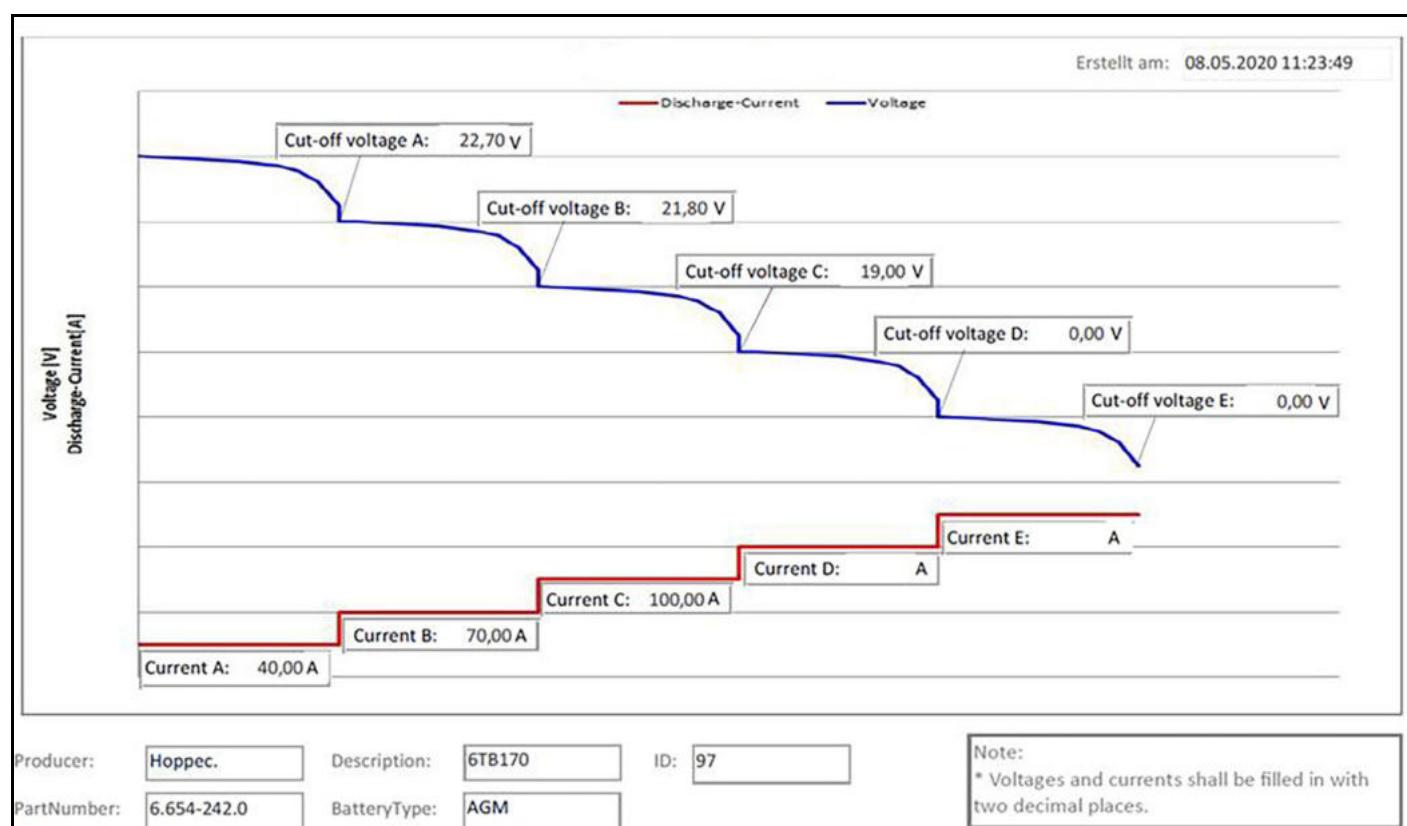
Discharge curve for Exide GF06180V Gel - 6.654-124.0

Erstellt am: 08.05.2020 11:25:26



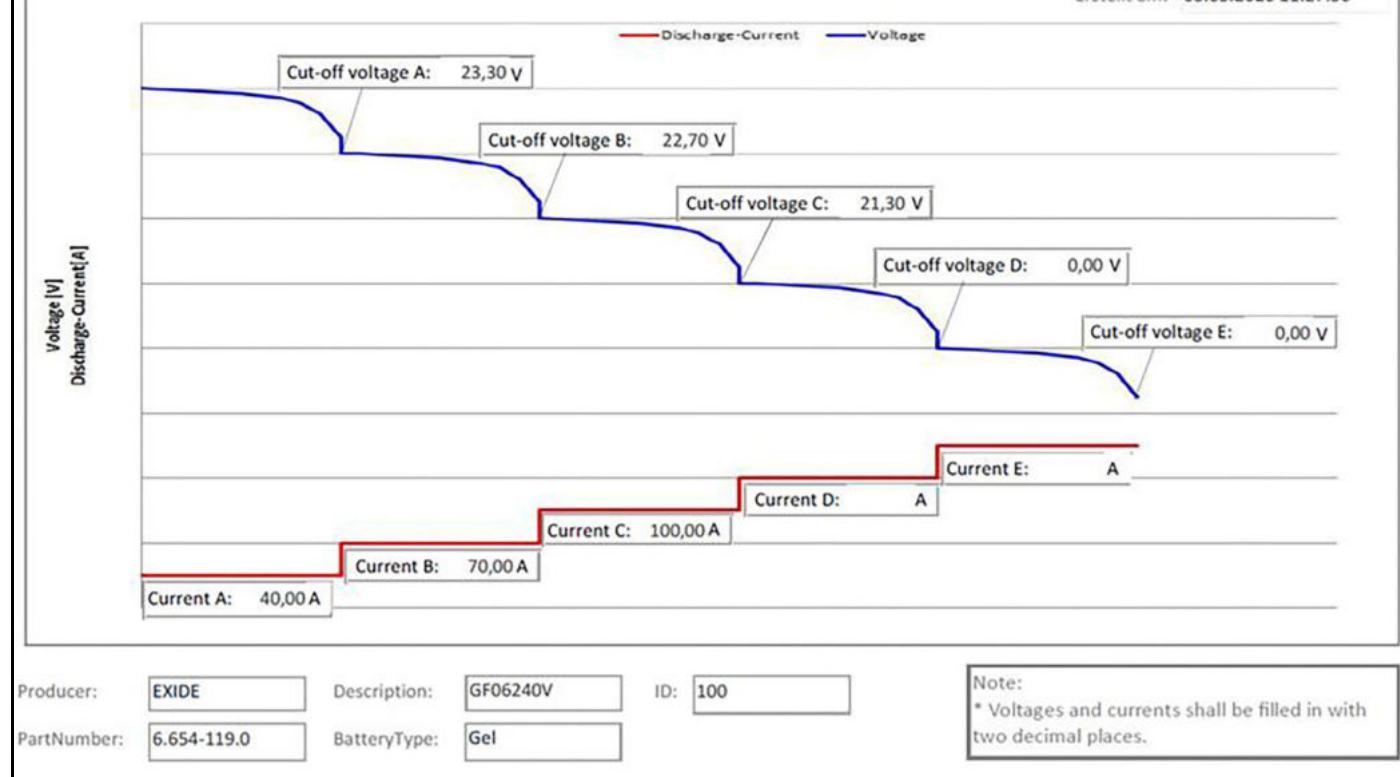
Discharge curve for Hoppecke 6TB170 AGM - 6.654-242.0

Erstellt am: 08.05.2020 11:23:49



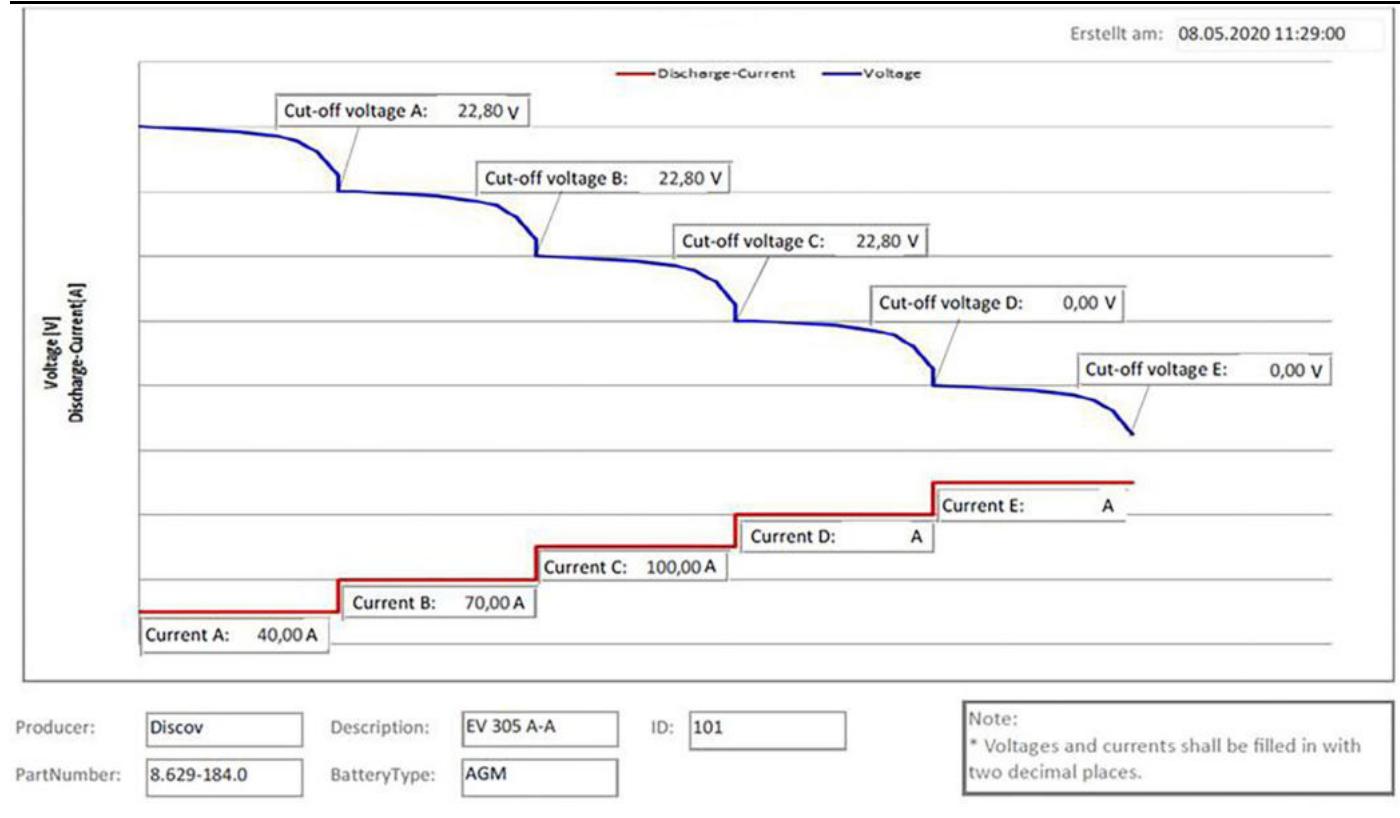
Discharge curve for Exide GF06240V Gel - 6.654-119.0

Erstellt am: 08.05.2020 11:27:56

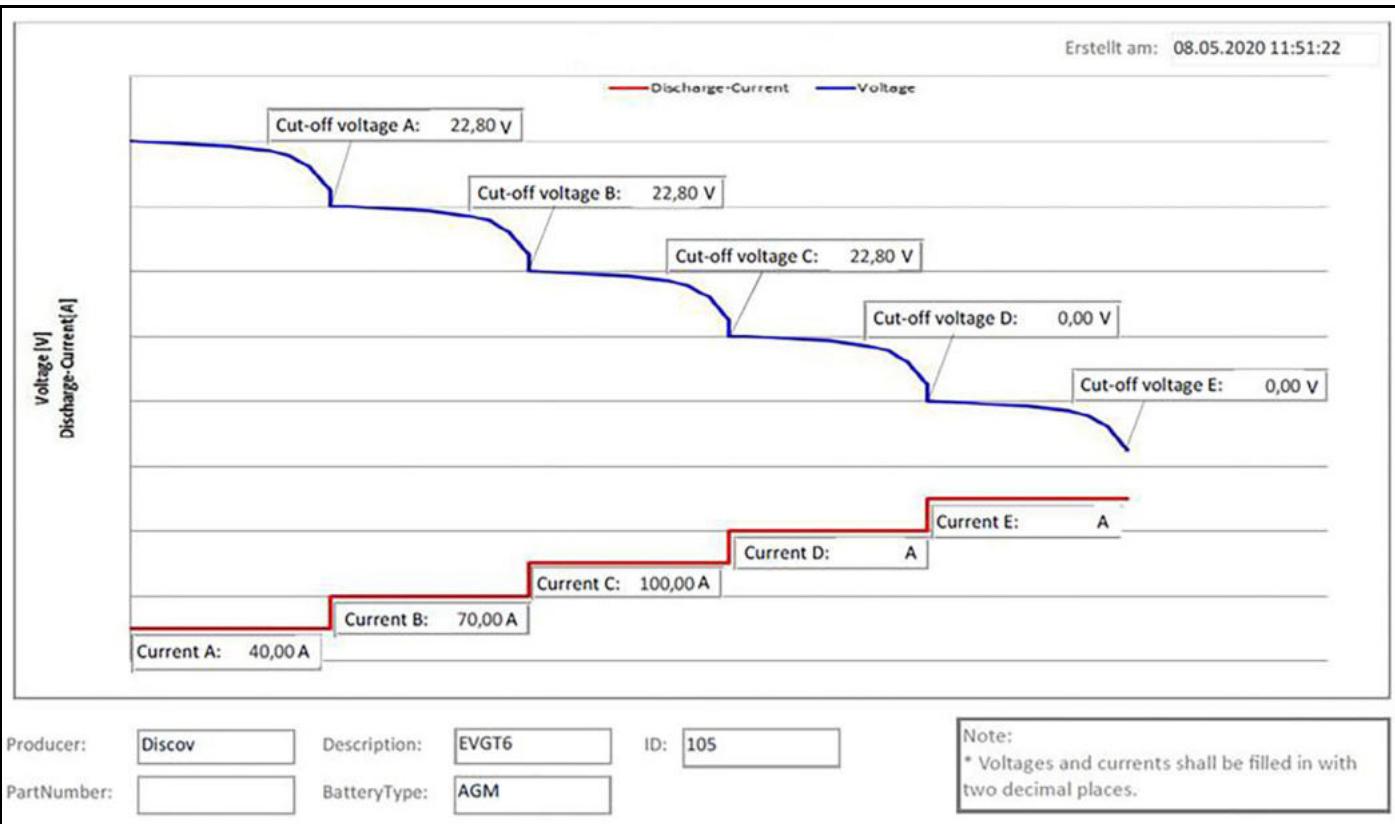


Discharge curve for Discover EV305 AA AGM - 8.629-184.0

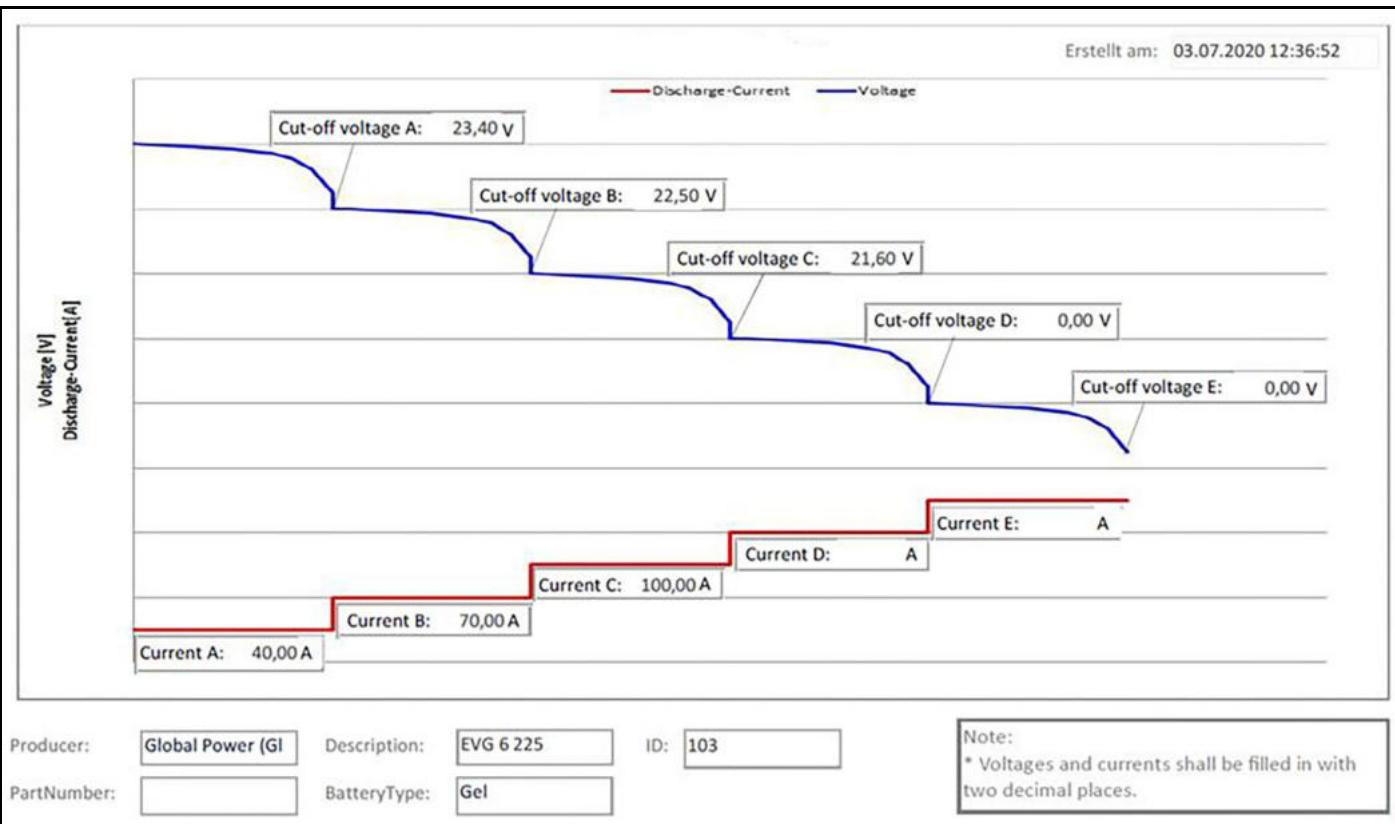
Erstellt am: 08.05.2020 11:29:00



Discharge curve for Discover EVGT6 AGM



Discharge curve for Global Power EVG 6225 Gel



DIAGNOSIS REPORT FOR BATTERY COMPLAINTS**Customer:**

Name _____

Address _____

Customer No. _____

Service Technician:

Name _____

Trade Partner _____

Date _____

Telephone number _____

(for questions)

1. Device

Appliance _____

type Device type no. _____

Facility no. _____

Purchase date: _____

visual impression _____

Most recent battery change _____

Software status _____

Updated Before After battery diagnosis

Charging cycles _____

Operating hours (if hourmeter is installed) _____ (There will be no warranty coverage for machines equipped with hourmeters if the operating hours are not indicated !)

2. Reason for complaint

Elapsed runtime _____ [min]

Current runtime _____ [min]

3. Device Use daily, how many hours _____ weekly, how many hours _____ When did the customer last use the machine _____**4. Battery**

Type: _____ Manufacturer: _____ Kärcher Part no.: _____

Stamped or engraved letter or number code _____

Hoppecke batteries have a round label (manufacturing date _____)

(If the manufacturing date, the letter code or the number code are not entered, no guarantee remuneration will be paid!)

Liquid condition (wet battery) sufficient too lowHave the pole shoes been tightened correctly? Yes NoIs there a voltage drop on the battery connection cable? No Yes _____ mV DC Current should be 20A to 50A _____ A

Which battery connection cable is used _____ ?

Was the battery connected and disconnected If yes, when? _____

Is there visible damage to the battery and connection elements: _____



makes a difference

5. Charger

Type: _____ Manufacturer: _____ Kärcher Part no.: _____

Facility-/Serial no: _____

Charge Characteristic: _____ Battery type: _____

Are the charging, battery and device plugs in order Yes No

Is there visible damage? _____

Charge: daily after each use weekly

Charger remains connected over the weekend

When was the last charge? _____

Is the function ("Battery fully charged") of the charger displayed? Yes No

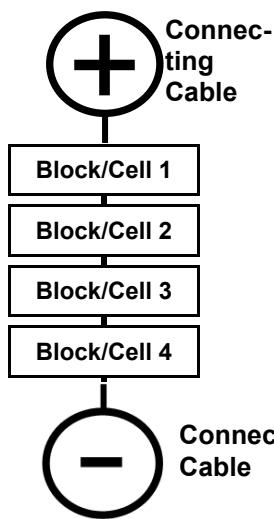
Currently measured charge power with

"Battery fully charged" display _____ Amps _____ Volt

(If this cannot be determined, please ask customer whether the "Battery fully charged" was displayed during the last/most recent charge)

6. Measuring Protocol

6.1 Battery



| 1. Measurement Idle voltage with charged battery without consumers and disconnected charger. 5 min. of waiting time. | 2. Measurement After about 5 min. with the suction turbine running. | 3. Measurement Shortly before switch-off via total discharge protection with the suction turbine running. | For wet batteries only <u>Acid density</u> <u>Temperature*)</u> | |
|--|--|--|--|----------|
| _____ Volts | _____ Volts | _____ Volts | _____ kg/l | _____ °C |
| _____ Volts | _____ Volts | _____ Volts | _____ kg/l | _____ °C |
| _____ Volts | _____ Volts | _____ Volts | _____ kg/l | _____ °C |
| _____ Volts | _____ Volts | _____ Volts | _____ kg/l | _____ °C |
| | A | A | Current pickup during measurement | |
| | min | min | Runtime | |

6.2 Charger

Performance values of the charger with the battery connected immediately after the start of the **charging process** (maximum, continuous current value):

Charge voltage _____ Volt Charge
current (constant current !) _____ Amps Performance
values of the charger with the battery connected
after approx. 10 minutes:
Charge voltage _____ Volt
Charging current _____ Amps

6.3 Battery monitoring with total discharge protection

The final discharge voltages can be found in the data sheets of the respective machines. Caution:
With some machines, the switch-off occurs only after a certain delay period.

Total discharge protection measured on the battery: _____ Volts

6.4 Design Changes to the Machine

Has the customer made modifications to the machine? Yes No

If YES, what were they? _____

6.5 Current Pickup of the Machine

| | | |
|---------------------------|-------|------|
| Brush motor 1 | _____ | Amps |
| Brush motor 2 | _____ | Amps |
| Suction turbine | _____ | Amps |
| Drive motor | _____ | Amps |
| Water pump | _____ | Amps |
| Side scrubbing deck motor | _____ | Amps |

Lifting motors:

| | | |
|--|-------|------|
| Raise/lower the brush head | _____ | Amps |
| Retract/extend the side scrubbing deck | _____ | Amps |
| Raise/lower the suction bar | _____ | Amps |
| Total Current Pickup | _____ | Amps |

for wet floors

for dry floors

The measuring values were determined under the following operating conditions.

for rough floors

for medium floors

for smooth floors

with soft brushes

standard brushes

with hard brushes

with soft pads

standard pads

with hard pads

with min. contact pressure

with medium contact pressure

with max. contact pressure

Miscellaneous: _____

7. Appendix:

7.1 Check the maintenance-free batteries

7.1.1 Idle voltage

Exide GEL batteries

| 12 volt battery block | 6 volt battery block | Charge approx. |
|-----------------------|----------------------|--------------------|
| ≥ 12.80 Volts | ≥ 6.42 Volts | 100 % |
| ≥ 12.55 Volts | ≥ 6.30 Volts | 75 % |
| ≥ 12.32 Volts | ≥ 6.20 Volts | 50 % |
| ≥ 12.18 Volts | ≥ 6.00 Volts | 25 % |
| ≤ 12.00 Volts | ≤ 6.00 Volts | totally discharged |

The idle voltage should reach at least the following limit values:

6 V Battery block 6.15 Volts

12 Volt battery block 12.30 Volts

Hoppecke AGM Fleece Batteries

| 12 volt battery block | 6 volt battery block | Charge approx. |
|-----------------------|----------------------|--------------------|
| ≥ 12.92 Volts | ≥ 6.46 Volts | 100 % |
| ≥ 12.61 Volts | ≥ 6.30 Volts | 75 % |
| ≥ 12.30 Volts | ≥ 6.15 Volts | 50 % |
| ≥ 12.00 Volts | ≥ 6.00 Volts | 25 % |
| ≤ 11.70 Volts | ≤ 5.85 Volts | totally discharged |

The idle voltage should reach at least the following limit values:

6 V Battery block 60.36 Volts

12 Volt battery block ... 12.72 Volts

If these values are not met, the battery must be charged first.

7.1.2 Measuring the battery under load.

With all measurements, the difference must not exceed the following voltages under load between the battery blocks:

Exide batteries between the 6 volt battery blocks 0.1 volts

 between the 12 volt battery blocks 0.2 volts

Hoppecke batteries between the 6 volt battery blocks 0.2 volts

 between the 12 volt battery blocks 0.4 volts

7.1.3 Replacing a battery due to old age

| Battery | Duration of use | Charging cycles |
|-----------------------|-----------------|-----------------|
| 6 volt battery block | 6 months | 100 |
| 12 volt battery block | - | - |

With 12 volt battery blocks, the complete battery set must be replaced in case of damage.

If the 6 volt battery blocks have reached the above mentioned use time or the number of loading cycles, replacing the battery block with a new one is no longer worth it. We recommend replacing the entire battery set.

7.2 Check the maintenance-free batteries

7.2.1 Measuring idle voltage (quick test)

| | | | | |
|----------------------------|--------------|-------|-------|----------------|
| 6 volt battery block | 6,36 – 6,45 | 6,18 | 5,91 | < 5,91 |
| 12 volt battery block | 12,72 – 12,9 | 12,36 | 11,82 | < 11,82 |
| Charging state approx. (%) | 100% | 50% | 20% | Deep discharge |

The idle voltage should reach at least the following limit values:

6 volt battery block Limit value 6.10 Volts

12 volt battery block Limit value 12.20 Volts

If these values are not met, the battery must be charged first.

7.2.2 Measuring the acid density with the battery acid meter (quick test)

| | | | | |
|----------------------------|------|------|------|----------------|
| Acid density (kg/l) | 1,29 | 1,21 | 1,13 | < 1,13 |
| Charging state approx. (%) | 100% | 50% | 20% | Deep discharge |

The difference between the battery blocks/battery cells should not exceed 0.04 kg/l. If a battery block / a battery cell is outside this tolerance, this battery block / battery cell must be replaced.

**Practice:**

The above mentioned values are guide values at 30 °C temperature.

In practice, the battery temperature influences the acid density and the voltage.

Rule of thumb:

1. 15 °C deviation from 30 °C changes the measuring value of the density by 0.01 kg/l.
2. Acid density + 0.84 ~ idle voltage of battery cell.

7.2.3 Measuring the battery under load.

With all measurements, the difference must not exceed the following voltage under load:

| | |
|------------------------|--|
| <u>Exide batteries</u> | between the 6 volt battery blocks 0.1 volts |
| | between the 12 volt battery blocks 0.2 volts |

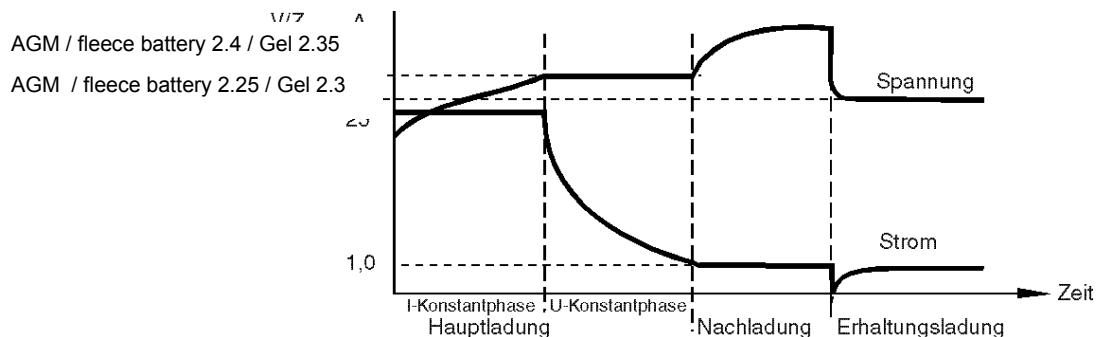
| | |
|---------------------------|--|
| <u>Hoppecke batteries</u> | between the 6 volt battery blocks 0.2 volts |
| | between the 12 volt battery blocks 0.4 volts |

If the difference between the battery blocks/battery cells is larger, the battery block/battery cell with the lowest voltage must be replaced.

7.3 Test the charger

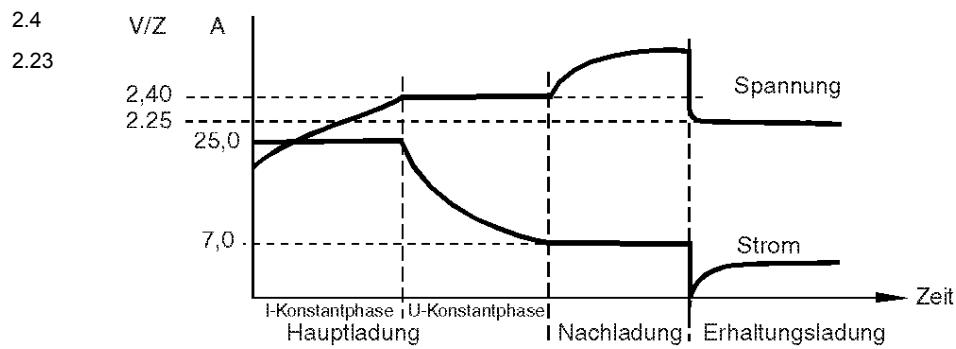
Regulated charge ID line IUI charger for maintenance-free batteries

Example:



Regulated charge ID line IUI charger for low-maintenance batteries

Example:



IUIa means:

I = constant current line

U = constant voltage line

I = constant current line recharging

a = automatic switch-off (transition to maintenance charge)