

Wallbox Energy Control, eng

Instruction manual

00.999.3099/

HEIDELBERG

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A Checklist

Checklist A.1.1

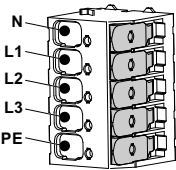
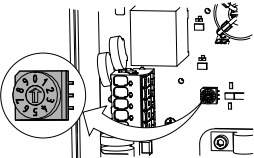
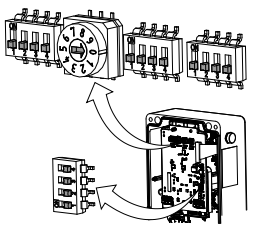
1 Checklist for Installation of Wallbox Energy Control A.1.1

1.1 Checklist A.1.1

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1 Checklist for Installation of Wallbox Energy Control

1.1 Checklist

	Yes	No
Individual operation - no load management?	<input type="radio"/>	<input type="radio"/>
Local load management?	<input type="radio"/>	<input type="radio"/>
External load management?	<input type="radio"/>	<input type="radio"/>
Instruction manual read?	<input type="radio"/>	<input type="radio"/>
Safety instructions read?	<input type="radio"/>	<input type="radio"/>
Terminal sequence observed? 	<input type="radio"/>	<input type="radio"/>
Maximum charging current set in accordance with the building line protection? 	<input type="radio"/>	<input type="radio"/>
Setting of the microswitches configured in accordance with the purpose? 	<input type="radio"/>	<input type="radio"/>
Option: External enabling/disabling of the wallbox installed?	<input type="radio"/>	<input type="radio"/>
Safety tests conducted?	<input type="radio"/>	<input type="radio"/>
Commissioning successful?	<input type="radio"/>	<input type="radio"/>

Tab. 1

B Safety instructions

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1 Wallbox Energy Control safety instructions

1.1 Note to the owner and operator of the charging system

- Read the operating manual before starting up the charging system.
- Ensure that all persons working on or using this charging system
 - have read the operating manual,
 - follow the regulations and instructions for working without risk.
- Keep the equipment documentation at a location where it is always accessible to the operators of the charging system.
- Ensure that no unauthorized persons can access the charging system.

1.2 Intended use

The charging system is intended for use in private and semiprivate areas, e.g. private properties, corporate parking areas, or depots.

Do not use the charging system where explosive or combustible substances (e.g. gases, liquids, or dusts) are stored or are present.

The charging system is intended exclusively for charging electric vehicles.

- Charging in accordance with type 3 of IEC 61851-1
- Plug-and-socket connectors in accordance with IEC 62196
- The charging system is intended for use only in TT, TN-C, and TN-C-S networks. The charging system must not be operated in IT networks.

The charging system is not suitable for charging vehicles with outgassing batteries (e.g. lead-acid batteries).

The charging system is intended exclusively for stationary installation.

The charging system may only be operated and used by persons who have read the operating manual.

The electrical installation, start-up, and maintenance of the charging system may only be performed by qualified electricians who have been correspondingly authorized by the operator.

The qualified electricians must have read and understood the equipment documentation and must comply with its instructions.

Requirements regarding the qualification of electricians

Knowledge of and compliance with the 5 safety rules for working with electrical installations:

- isolate.
- secure against reactivation.
- check absence of voltage.
- ground and short-circuit.
- cover or block off live parts in the vicinity.

Reactivation is carried out in reverse order.

- Knowledge of the general and special safety regulations and accident prevention regulations.
- Knowledge of the relevant electrotechnical regulations e.g. checks associated with commissioning and the requirements for operating facilities, rooms, and special types of equipment - power supply for electric vehicles.
- Ability to recognize risks and to avoid potential hazards.

When installing and handling the charging system, the user, the operator, and the electrician must comply with the national regulations on safety and accident prevention.

Improper use and non-compliance with the operating manual may jeopardize:

- your life
- your health
- charging system and vehicle.

Safety devices on the charging system

- must not be removed,
- must not be manipulated,
- must not be bypassed,
- before each use, it must be checked that the equipment (e.g. housing, connecting line, charging coupler) is undamaged,
- must be repaired or replaced as necessary, in order to preserve the functional properties.

Ensure that:

- safety identifications, e.g. yellow-colored marks,
- danger signs and
- safety lights

remain easily visible and retain their effectiveness.

- When operating the charging system, do not use any extension cables, cable reels, multisocket power strips, or travel adapters.
- Do not insert any objects into the charging coupler of the charging system.
- Protect the socket-outlets and plug-in connections against moisture and water or other liquids.
- Never immerse the charging system or the charging coupler in water or other liquids.
- Do not disconnect the charging coupler from the vehicle during charging.

Heidelberg takes responsibility only of the charging system in its delivered condition and for any work performed by skilled Heidelberg personnel.

1.3 Notes for people with a pacemaker (PM) or implantable cardioverter defibrillator (ICD)

Charging systems from Heidelberg that are operated as intended, comply with the European guideline on electromagnetic compatibility regarding radiated interference.

Should people with a pacemaker (PM) or implantable cardioverter defibrillator (ICD) wish to conduct activities on charging systems and their devices in the intended manner, Heidelberg is not in a position to make any statement regarding the suitability of such medical devices. Heidelberg is not able to assess the pacemakers or concerned implantable cardioverter defibrillators with regard to their susceptibility to electromagnetic radiation. This is something that only the manufacturers of the pacemaker or implantable cardioverter defibrillator can do.

Heidelberg therefore recommends only allowing the people in question to work on its charging systems after consultation with the manufacturer of the pacemaker/defibrillator and the relevant insurance company. Ensure at all times that no health or safety risks are involved.



Note

People with a pacemaker or defibrillator may not work on or stand near the charging systems and their devices, e.g. to perform maintenance operations or rectify any faults.

1.4 Working on the charging system without risk

Before plugging the charging coupler into the vehicle

- The connecting line of the charging system must be completely unwound.
- Check whether the housing of the charging system, the connecting line, the charging coupler, and the connectors are undamaged.
- Take hold of the plug-in connection of the charging system only on the charging coupler and not on the charging cable.
- Ensure that no-one can trip e.g. over the charging cable.

During the charging process

- Keep unauthorized persons away from the charging system.
- When the charging system is connected, you must not clean or wash the vehicle with a high-

pressure cleaner because the plug-in connection is not sealed against pressurized water.

In case of malfunctions or failure of the charging system

- Disconnect the charging system from the power supply by switching off the respective circuit breaker in the building. Leave a sign with the name of the person authorized to switch on the circuit breaker.
- Call in a qualified electrician immediately.

Electrical devices

- The housing of the charging system must always be kept closed.

1.5 Installation and tests

Information for selecting protective devices for basic and fault protection against touching directly or indirectly

- **Electrical circuit breakers**

The charging system must be protected with circuit breakers in compliance with the respective national regulations. This depends, for example, on the required tripping time, internal network resistance, conductor cross-section, conductor lengths, and the preset rating of the charging system.

The short-circuit protection of the conductor must have a characteristic that permits 8-10-fold of the I_{nom} value and must not exceed a maximum nominal current of 16 A, depending on the preset rating of the charging system.

- **Residual-current circuit breaker**

For reasons of personal safety, national regulations may stipulate an upstream RCD with an $I_{\Delta N}$ of 30 mA AC. Choose a suitable RCD that complies with the national regulations. Heed also the notes from the section *DC residual current detection*.

- **DC residual-current detection**

The charging system is equipped with 6 mA DC residual-current detection. The charging system switches itself off if there is a residual current that is greater than or equal to 6 mA DC. Details of this are given in the *Diagnostics* section.

Information on initial inspections after installation and repeat inspections

National regulations may stipulate inspections of the charging system before start-up and at regular intervals. Perform these inspections in accordance with the

respective rules and regulations. Information is given below on how these inspections can be performed.

- **PE conductor test**

After the installation and before switching on for the first time, test the continuity of the PE conductor. For this, connect the charging coupler to a test adapter for vehicle simulation in accordance with EN 61581-1. Measure the resistance of the PE conductor between the PE conductor socket of the adapter and the connection point of the PE conductor in the building's electrical cabinet. The value of the PE conductor for a total conductor length (connecting line to the charging system and the vehicle charging cable) of up to 5 m must not exceed 300 mΩ. For longer cables, the value can be increased in accordance with the applicable national regulations. In any case, the resistance must not exceed a value of 1 Ω.

- **Insulation test**

Two insulation measurements are required because the charging system is equipped with a disconnecting relay. The charging system must be disconnected from the power supply for this. Therefore, before the measurement, switch off the supply voltage using the circuit breaker in the building's electrical cabinet.

1. Measurement of the primary side of the charging system.

Measure the insulation resistance on the primary side of the charging system at the connection point of the power supply line to the charging system in the building's electrical cabinet. The value must not exceed 1 MΩ.



Note

The Wallbox has a surge protector. This may be considered in the course of making measurements.

2. Measurement of the secondary side of the charging system.

For this, connect the charging coupler to a test adapter for vehicle simulation in accordance with EN 61581-1. Measure the insulation via the measuring sockets on the test adapter. The value must not exceed 1 MΩ.

Alternatively, the differential current method can be used in conjunction with measurement of the PE conductor current. In both cases, the value must not exceed 3.5 mA. For these measurements, connect the charging coupler to a test adapter for vehicle simulation in accordance with EN 61581-1. The measurements must be carried out with the adapter in the C mode. Measure the differential current at the connection point of the power supply line to the charging system in the building's electrical cabinet.

- **Test of the power-off condition in case of a short-circuit (Z_{L-N})**

For these measurements, connect the charging coupler to a test adapter for vehicle simulation in accordance with EN 61581-1. The measurements must be carried out with the adapter in the C mode. Carry out the measurements on the measuring sockets of the test adapter. The values must comply with those of the selected circuit breaker.

- **Test of the power-off condition in case of a fault (Z_{L-PE})**

For these measurements, connect the charging coupler to a test adapter for vehicle simulation in accordance with EN 61581-1. The measurements must be carried out with the adapter in the C mode. Carry out the measurements on the measuring sockets of the test adapter with a suitable instrument. The values must comply with those of the selected circuit breaker.

- **Test of the integrated DC residual-current detection**

For these measurements, connect the charging coupler to a test adapter for vehicle simulation in accordance with EN 61581-1. The measurements must be carried out with the adapter in the C mode. Carry out the measurements on the measuring sockets of the test adapter with a suitable instrument. If the residual current is greater than 6 mA DC, the charging system must disconnect the charging coupler from the power supply. The fault indicator on the charging system must be activated.

- **Test of the upstream RCD**

The upstream RCD has to be checked at the connection point of the charging system supply in the building's electrical cabinet. The RCD must trip in accordance with the national regulations.

1.6 Specifications

Designation	Technical specifications
Regulations	IEC 61851-1; IEC61439-7
Charging capacity type 3	up to 11 kW
Nominal voltage	230 V / 400 V / 1/3 AC
Nominal current	up to 16 A adjustable from 6 A to 16 A in 2 A increments
Nominal frequency	50 Hz
Data interface	RS485
Charging connection/charging coupler	Type 2
Length of charging cable	5 m or 7.5 m
Status information	Front illumination

Designation	Technical specifications
Protection rating	IP54
Residual current detection	DC 6 mA
Ambient temperature	-25 °C to +40 °C
Ventilation	No ventilation required
Protection class	I
Overvoltage category	III
Dimensions	(HxWxDx) 386 mm x 295 mm x 112 mm
Weight	approx. 8 kg

Tab. 1

1.7 Protective devices



The following components are protective devices:

- 1 Housing
- 2 Charging cable
- 3 Protective cover
- 4 Charging coupler

Checking the protective devices

1. Before every charging process, make a visual inspection of the protective devices for damage.
2. Have a qualified electrician make regular electrical function tests in accordance with the national regulations.

Fig. 1 Charging system

1.8 Front illumination and blocking device

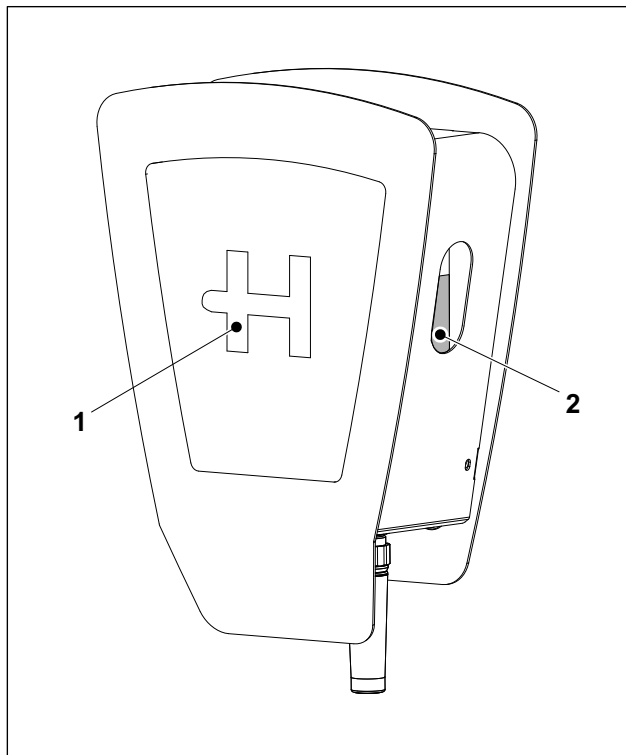


Fig. 2 Heidelberg Wallbox Energy Control

1 Front illumination

2 Nameplate

Front illumination

The front illumination indicates the operating state of the charging system. Detailed information on the operating states is given in the operating manual.

Optional external blocking device

If an external blocking device (e.g. key switch) is connected, the charging process is only started when the Wallbox has been enabled by the external blocking device.

C Installation instructions

Installation instructions C.1.1

1 Wallbox Energy Control assembly instructions C.1.1

1.1 Safety C.1.1

1.2 Prerequisites C.1.1

1.3 Checklist C.1.1

1.4 Scope of supply/accessories in the separate parts set C.1.1

1.5 Mounting on the wall C.1.2

1.6 Mounting on a column C.1.5

1.7 Electrical connection C.1.5

1.8 Commissioning C.1.9

1.9 Contact address/Customer Sales Representative C.1.10

1.10 Environment C.1.10

1 Wallbox Energy Control assembly instructions

1.1 Safety

Before installing and starting up the Wallbox, please carefully read the enclosed safety instructions.

1.2 Prerequisites

- The Wallbox may only be operated when mounted vertically.
- If possible, the Wallbox should be mounted so that it is not directly exposed to rain e.g. to prevent icing, being damaged by hail or similar. Do not expose the Wallbox to direct sunlight because this can cause it to overheat.
- The individual phases of the supply voltage must each be protected with residual current devices and circuit breakers.
- Single wires are not permitted to supply power.
- The diameter of the supply line must be between 9 mm and 17 mm.
- The charging current of the Wallbox must be set in accordance with the building's circuit breakers. (The procedure is described in the "Electrical connection" section.)



Note

Please note that, depending on the local installation location of the Wallbox, a registration with the responsible network operator can be necessary.

1.3 Checklist

The points listed below are essential for trouble-free installation and start-up:

- Mechanical assembly,
- Electrical connection,
- Setting of the maximum charging current.

1.4 Scope of supply/accessories in the separate parts set

- Mounting plate with electronics housing,
- Wallbox housing cover,
- Safety instructions.

Bag 1:

- 4x fillister head screws M4x10 (to attach the housing cover of the Wallbox),
- Cable gland ESKV25 (cable entry for power supply),
- Gasket EADR25, for cable gland ESKV25.

Bag 2:

- Cable gland ESKV25 (cable entry for optional external blocking device and optional RS485 bus),
- Gasket EADR25, for cable gland ESKV25,
- Multigasket for cable gland ESKV25,
- 2 blind plugs BS7 for multigasket.

1.5 Mounting on the wall



Note

The following drilling plan is not to scale.
It may not be used as a drilling template.

Please use only the specified dimensions from the drilling plan.

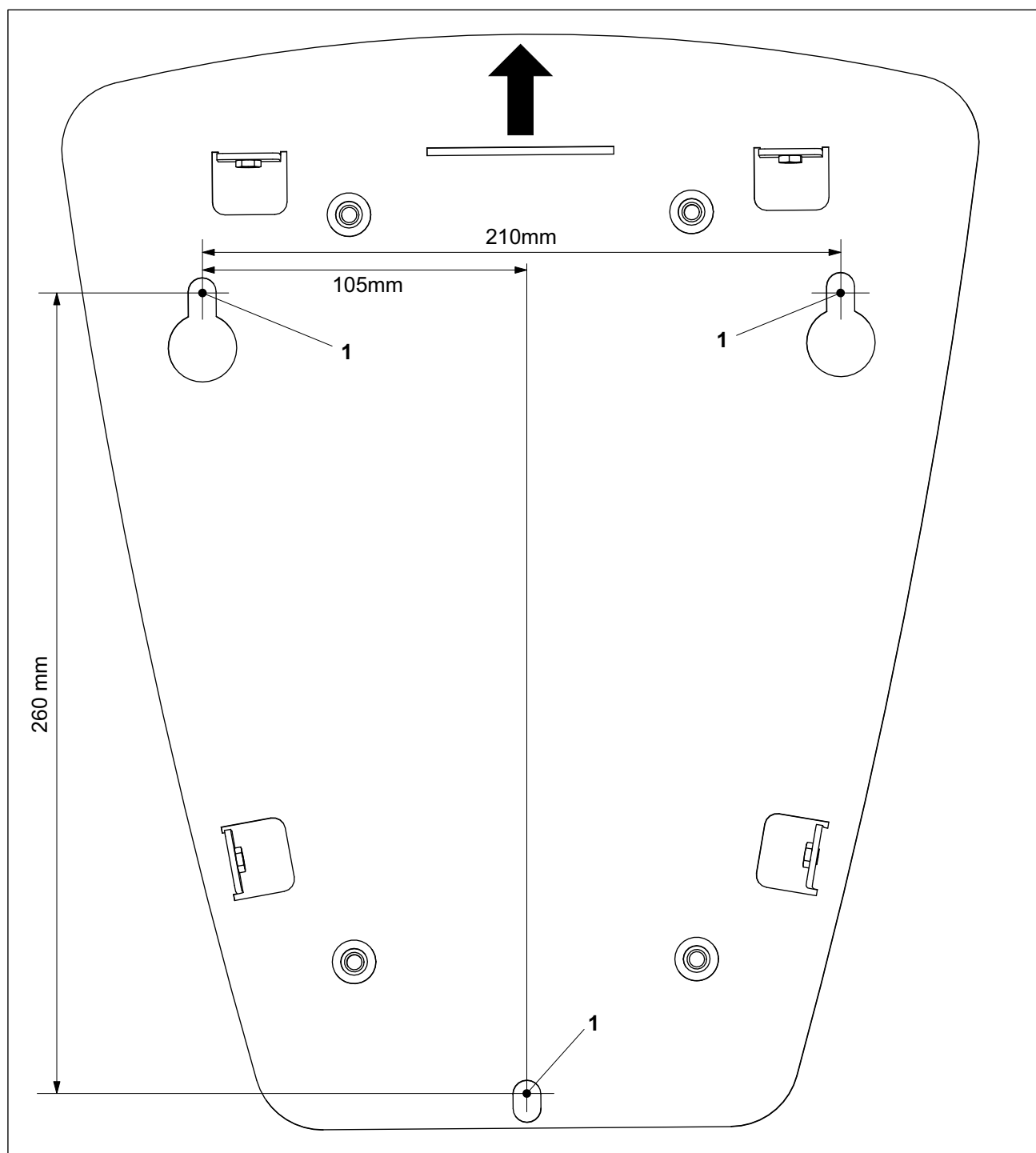


Fig. 1 Drilling plan for the Wallbox Energy Control

Prerequisites

Recommended mounting height above the floor is 1.00 m -1.10 m up to the lower hole.

The mounted Wallbox must be able to withstand a load of at least 16 kg.

Installation steps

1. Mark the three mounting holes (Fig. 1/1) as shown on the drilling plan.
2. Drill and prepare the mounting holes according to the type of mounting surface (e.g. dowels for masonry). The screw diameter must not exceed 8 mm.
3. Screw in the two top fastening screws.

► Note

The fastening screws are not included in the scope of delivery due to the different types of mounting surfaces.

4. Hang the mounting plate (Fig. 2/1) of the Wallbox on the two fastening screws (slotted holes, Fig. 2/2).
5. Screw the third fastening screw into the lower hole.
6. Tighten the three fastening screws (approx. 12 Nm).

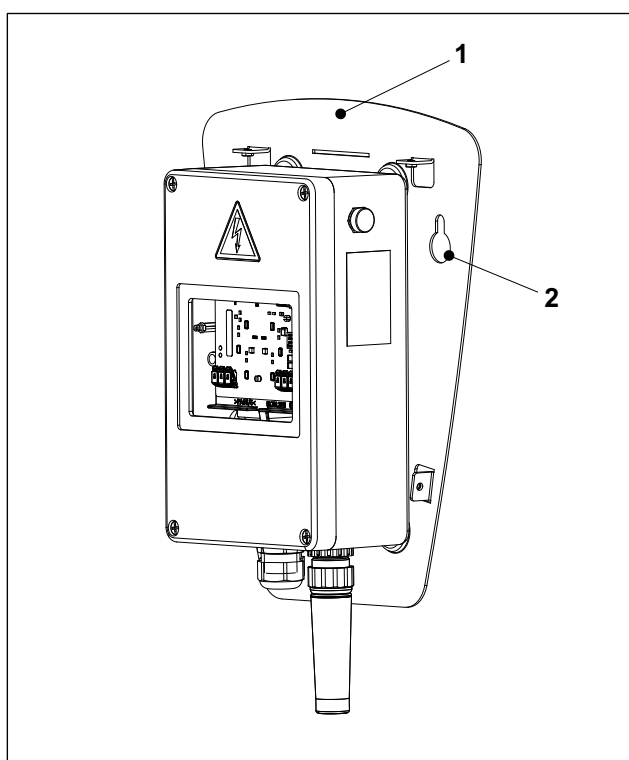


Fig. 2 Wallbox Energy Control, mounting plate

1.6 Mounting on a column

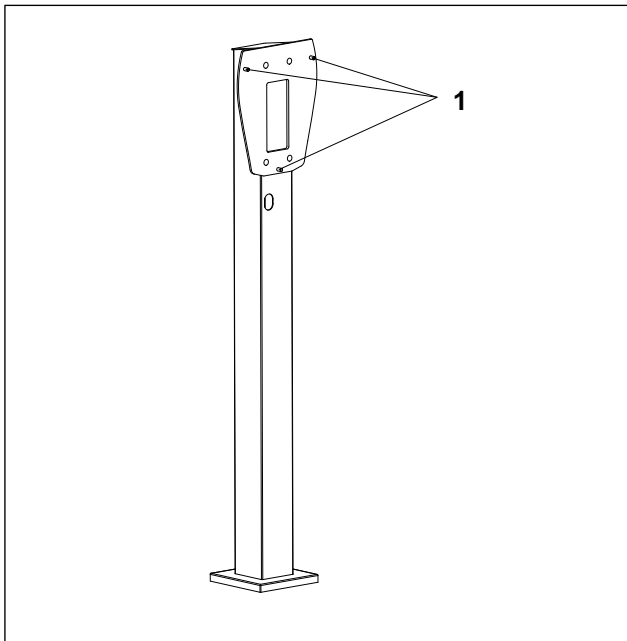


Fig. 3 Column with three attachment points

1.7 Electrical connection

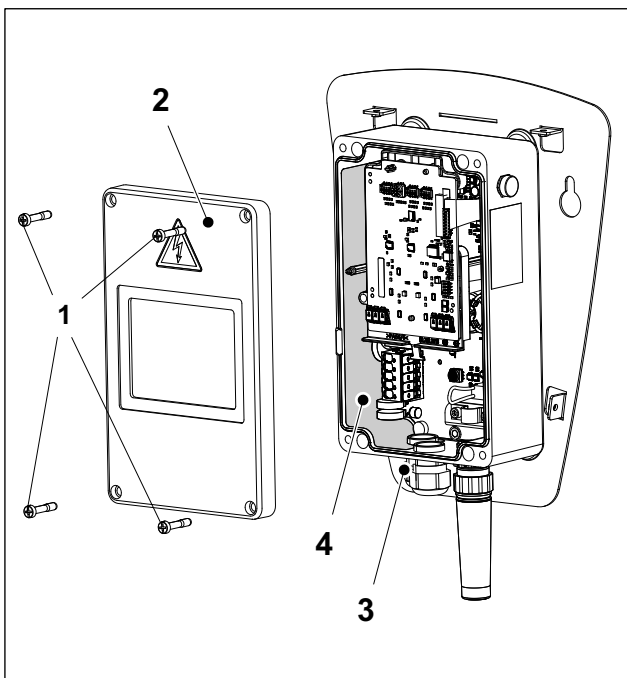


Fig. 4 Wallbox Energy Control, open electronics housing

1. Hang the mounting plate of the Wallbox (Fig. 1/1) on the three stud bolts of the column (Fig. 3/1).
2. Screw the three nuts (separate parts set for the column) on the stud bolts (Fig. 3/1) and tighten (approx. 12 Nm).

Prerequisites

The Wallbox can be connected with a single phase 1 AC 230 V or with three phases 3 AC 400 V.

1. Remove the four screws (Fig. 4/1) and take off the cover of the electronics housing (Fig. 4/2).
2. Screw the cable gland ESKV25 (enclosed accessories) with the respective gasket EADR25 (enclosed accessories) into the electronics housing (Fig. 4/3) and tighten (approx. 8 Nm).
3. Strip off maximum 13 cm jacket from the power supply cable.
4. Strip off approx. 11 to 13 mm insulation from the individual wires.
5. Follow the instructions on the sticker (Fig. 4/4) and then pierce the sticker on the cable entry.
6. Insert the connecting line into the cable gland.
7. Tighten the cap nut of the cable gland (approx. 4 Nm).

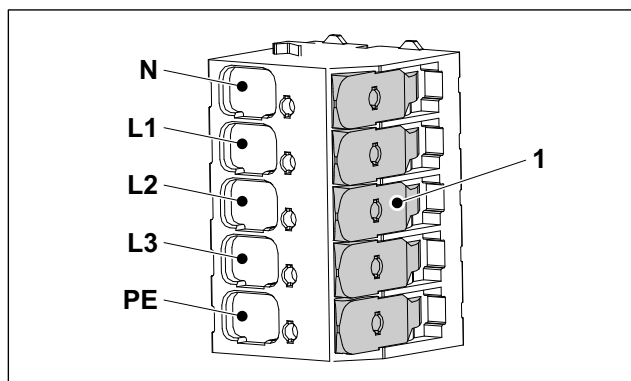


Fig. 5 Terminal clamps of the power supply unit

**Caution - Heed the terminal sequence.**

When clamping the connecting line, heed the sequence of the terminals. PE, L3, L2, L1, N.

Reverse polarity of the electrical connecting lines will destroy the electronics in the Wallbox!

**Caution - Single-sided phase load**

If in a system network of Wallboxes (with load management), several vehicles should be charged single-phased at the same time, this can generate an unfavorable current distribution between the phases.

Therefore, the Wallboxes must be connected with alternating phase sequence.

First Wallbox L1, L2, L3.

Second Wallbox L2, L3, L1.

Third Wallbox L3, L1, L2.

Fourth Wallbox again L1, L2, L3, etc.

8. Connect the individual wires of the power supply cable as shown in the diagram (Fig. 5). If a single-phase supply voltage is used, it must be connected to L1. Terminals L2 and L3 are not used for a single-phase connection.

**Note**

This is a tool-free terminal strip. Folding back the clamping lever (Fig. 5/1) opens the terminal so that the respective individual wire can be inserted. The respective clamping lever is then shut to secure the respective individual wire. Folding back more than one clamping lever at a time must be avoided.

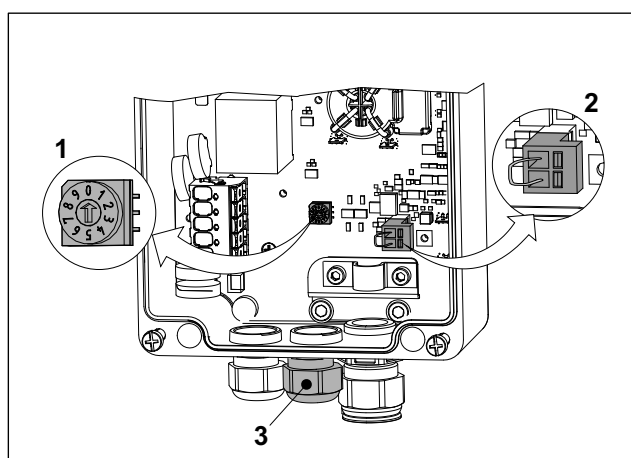


Fig. 6 Opened electronics housing

Setting the charging current

The charging current of the Wallbox must be set in accordance with the building's circuit breakers. Under no circumstances may the charging current be set higher than the respective circuit breaker.

The rotary switch (Fig. 6/1) is used to set the charging current from 6 to 16 A.

0	6 A (default setting, delivery state)
1	8 A
2	10 A
3	12 A
4	14 A
5 ... 9	16 A

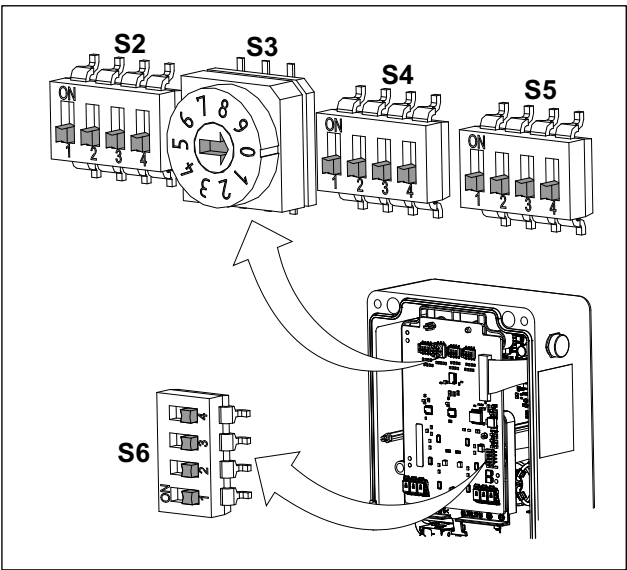


Fig. 7 Basic position of the microswitches

External enabling/disabling of the Wallbox

The Wallbox can be optionally disabled or enabled by means of external switching elements (e.g. key switch). For this, the plug (Fig. 6/2) in the electronics housing must be pulled out and the wire jumper removed. The now vacant contacts of the plug must then be connected to a two-pole lead that exits through the multigasket of the cable entry (Fig. 6/3) to the corresponding switching element.

The contacts of the switching element must be dimensioned so that they can switch zero-potential currents of approx. 30 mA/12 V.

Basic position of the microswitches

The basic positions of the microswitches must **not** be changed for Wallboxes in individual operation. The microswitches are only configured for use in load/energy management.

In the figure, you can see the basic position of the microswitches.

Exception: S5/1, setting of the front illumination

The front illumination setting is made with the S5/1 microswitch (Fig. 7).

The illumination behavior only affects status messages.

Error messages always light up steadily.

This setting is only effective if a vehicle is connected.

S5/1	
ON	Front illumination lights up steadily
OFF	Front illumination goes out after 5 min.

Tab. 1

► **Note**

If an external switching element and/or the load/energy management is used, the blind plugs on the electronics housing must be removed and the cable gland with gasket installed, as well as the multigasket (enclosed accessories) (Fig. 6/3).

All remaining openings in the multigasket of the cable entry (Fig. 6/3) must be sealed with the included blind plugs.

After inserting and connecting the appropriate lines, the cap nut of the cable gland must be tightened (4 Nm).

Load/energy management (optional)

The Wallbox "Energy Control" can be operated with load/energy management. This way, the Wallbox can be operated in various configurations, e.g.:

- Operation of several Wallboxes in a network with monitoring of the power distribution (load management),
- Operation of one or more Wallboxes with different types of energy supply, e.g. solar energy, normal power network, ...

For additional information, read the online instructions "Wallbox Energy Control, Local Load Management and External Load Management":

<https://wallbox.heidelberg.com/>

If the Wallbox is operated in load/energy management, the communication lines (RS485 bus) must also be laid through the multigasket of the cable gland (Fig. 6/3).

9. Replace the lid of the electronics housing (Fig. 4/2) and tighten the four screws (2.5 Nm).
10. Replace the cover, fasten it with the four screws M4x10 (Fig. 8/1) and tighten them (1.8 Nm). The four screws are included in the enclosed accessories.

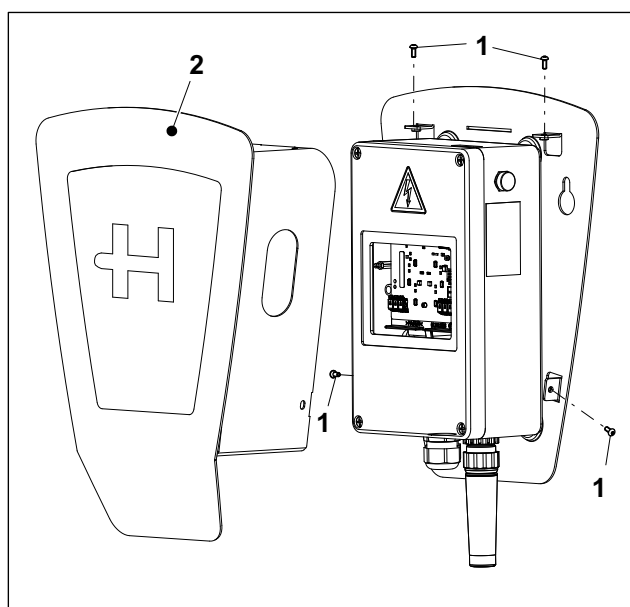


Fig. 8 Wallbox Energy Control with cover

1.8 Commissioning

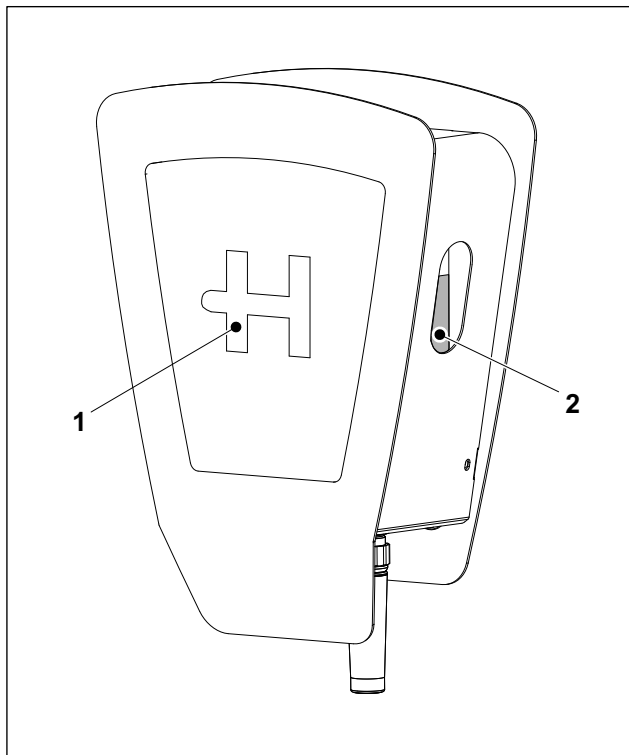


Fig. 9 Wallbox Energy Control

- 1 Front illumination
- 2 Nameplate

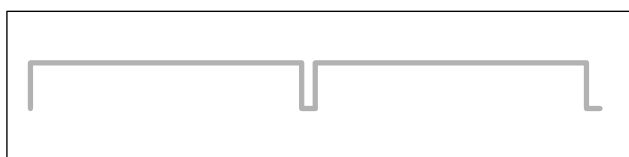


Fig. 10 Status display "external block"

1. Establish the power supply to the Wallbox.

As soon as the Wallbox is connected to the power supply, the front illumination lights up for 5 minutes and then goes out.

2. Connect the charging cable to the vehicle.

As soon as the charging cable is plugged into the vehicle, the Wallbox switches automatically to ready to run state. The front illumination lights up.

If the vehicle requests the charging process, the Wallbox enables the charging process and the front illumination pulses.

External block

If an external blocking device is used, when the vehicle is connected, it checks whether there is an external block (e.g. by means of a key switch or similar). As long the external device has not enabled the Wallbox, the front illumination lights up white with brief interruptions (95% on, 5% off) and no charging takes place. After the external device has enabled the Wallbox, the front illumination lights up steady white until the vehicle requests the charging process.

► Note

The procedure for fixing a malfunction (various flashing sequences of the front illumination) is described in the Wallbox operating manual.

1.9 Contact address/Customer Sales Representative

Hotline: +49 6222 82-2266

E-mail: Wallbox@heidelberg.com

Contact language: German and English.

Website: <https://wallbox.heidelberg.com/>

1.10 Environment

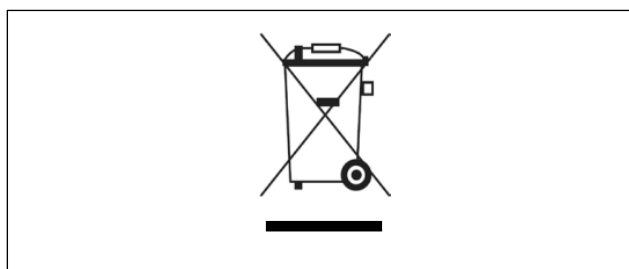


Fig. 11

This device is used for charging electrically powered vehicles and is regulated by the corresponding EU Directive 2012/19/EU on waste electrical and electronic equipment (WEEE).

Its disposal must comply with the national and regional regulations for electrical and electronic equipment.

Waste equipment and batteries must not be disposed of by putting them in household or bulky waste. The device should be made inoperative before disposal.

Please dispose of the packaging material in the usual collection containers for cardboard, paper, and plastics for your region.

D Operating manual

Operating manual	D.1.1
1 Operating manual for Wallbox Energy Control	D.1.1
1.1 Safety	D.1.1
1.2 Cleaning the Wallbox	D.1.1
1.3 Load management (optional)	D.1.1
1.4 Operation	D.1.2
1.5 Diagnosis possibilities via front illumination	D.1.3
1.6 Contact address/Customer Sales Representative	D.1.6
1.7 Environment	D.1.6

Before installing and starting up the Wallbox, please carefully read the enclosed safety instructions.

Do not use any aggressive cleaners (e.g. benzine solvents, acetone, ethanol, spirit glass cleaner) to clean the Wallbox and especially the plastic disc. These can attack/damage the surface.

1.3 Load management (optional)

The Wallbox "Energy Control" can be operated with load management. This way, the Wallbox can be operated with various strategies, e.g.:

- Operation of several Wallboxes in a network with monitoring of the power distribution (load management),
- Operation of the Wallbox with different types of energy supply, e.g. solar energy, normal power network, ...

For additional information, see the online instructions "Wallbox Energy Control, Local Load Management and External Load Management":

<https://wallbox.heidelberg.com/>

1.4 Operation

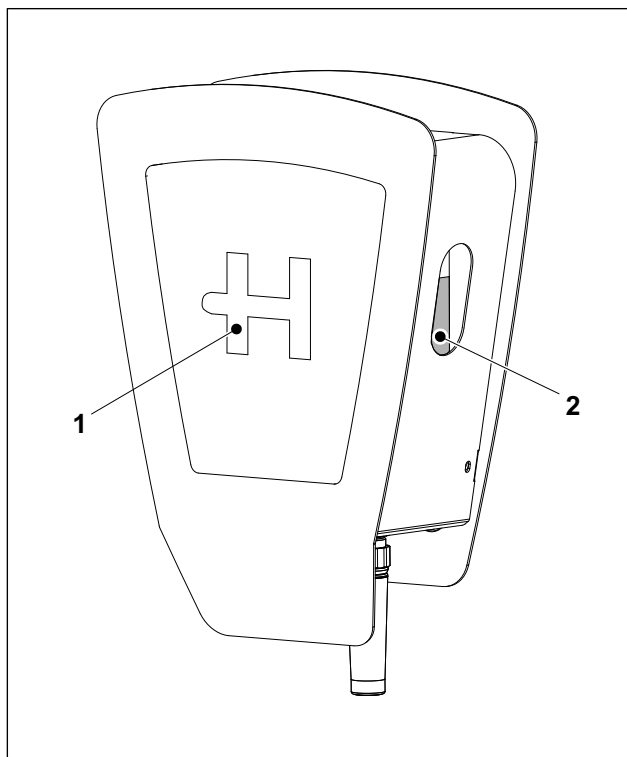


Fig. 1 Heidelberg Wallbox Energy Control

- 1 Front illumination
- 2 Nameplate

1. Completely unwind the charging cable from the Wallbox.
2. Remove the cover from the coupler of the charging cable.
3. Plug the charging cable into the vehicle.

Charging process

As soon as you have plugged the charging cable into the vehicle, the Wallbox switches to "ready" and the front illumination lights up white. If the vehicle has requested the charging process, the front illumination pulses and it is charged.

When the vehicle has stopped charging, the Wallbox terminates the charging process. The front illumination lights up white.

These two operating statuses may be repeated a number of times during a complete charging cycle.

► **Note**

If an external blocking device is used, when the vehicle is connected, it checks whether there is an external block (e.g. by means of a key switch or similar). As long the external device has not enabled the Wallbox, the front illumination lights up white with brief interruptions (95% on / 5% off) and no charging takes place. After the external device has enabled the Wallbox, the front illumination lights up steady white until the vehicle requests the charging process.

End of charging

When the charging process is finished, you must unplug the charging cable from the vehicle and close the cover on the cable. You must then wind up the charging cable onto the Wallbox.

After 12 minutes, the Wallbox goes into Standby to save energy.

► **Note**

If the charging cable is not wound up and lies loosely on the ground, someone may trip over it. When winding the cable, make sure you do not pull it too hard or wind it too tightly. Repeatedly pulling too hard or winding too tightly can lead to cable breakages.

Stopping the charging process

There are three ways of stopping the charging process:

- Stop the charging process with the vehicle's controls.
- Disconnect the Wallbox from the power supply by switching off the building's miniature circuit breakers.
- If the Wallbox has an external blocking device, you can use it to stop the charging process.

1.5 Diagnosis possibilities via front illumination

During initial installation, the illumination behavior can be specified.

- The front illumination goes out after 5 min.
- The front illumination is always active.

The illumination behavior only affects status messages.

Error messages always light up steadily.

The procedure for the selection of the illumination behavior is described in the installation instructions.

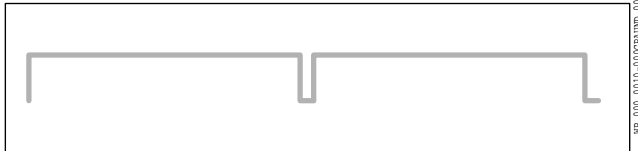


Fig. 2

Front illumination off

No vehicle connected.

- Plug the charging cable into the vehicle.

The front illumination lights up white. The vehicle can request the charging process.

If, after plugging the charging cable in, the Wallbox does not react, please check the building's power supply (miniature circuit breakers, residual current circuit breaker).

Lights up white with brief interruptions (95% on, 5% off)

External device has not yet enabled the Wallbox. There is no charging.

- Switch off the external blocking device.

After the external device has enabled the Wallbox, the front illumination lights up steady white. The vehicle can request the charging process.

Permanently lit white

Vehicle connected. Charging process not yet requested by the vehicle.

- The vehicle must request the charging process.

The vehicle is charged, the front illumination pulses white.

Pulsing white (quickly increasing from 0 to 100 %, then slowly decreasing from 100 % to 0 %)

The vehicle is charged.

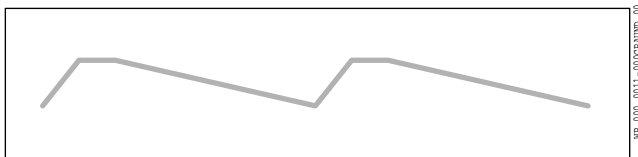


Fig. 3 Charging process display

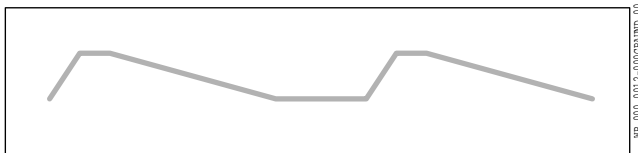


Fig. 4 Charging process display, reduced power

Pulsing white with pause (quickly increasing from 0 to 100 %, then slowly decreasing from 100 % to 0 %, then pause)

The vehicle is charged with reduced charging power.

This display version is only shown when the optional load management is used (operation of several Wallboxes in a network).

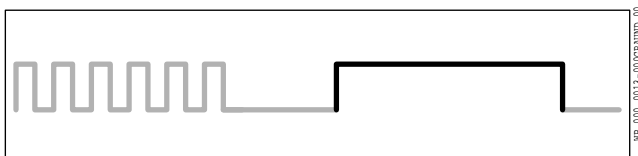


Fig. 5 Residual current display

Flashes six times white, pause, lights up blue (3 s), pause

Residual current circuit breaker in the Wallbox has been triggered.

- Make a visual inspection of the Wallbox, the charging cable, and the vehicle.
- To reset the residual current circuit breaker, you have to disconnect the charging cable from the vehicle for approx. 4 s.

After you have reconnected the charging cable to the vehicle, the charging process can be requested by the vehicle.

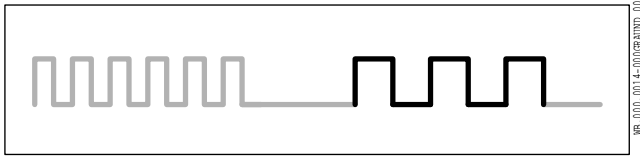


Fig. 6 Fault display

Six times flashing white, pause, three times flashing blue (50% on, 50% off), pause

Possible cause of the fault: overheating.

- You do not need to intervene.

After a self-test and elimination of the malfunction, the front illumination lights up white. The vehicle can request the charging process.

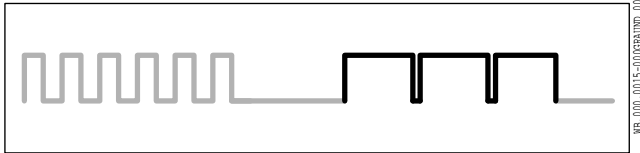


Fig. 7 Fault display

Six times flashing white, pause, three times flashing blue (90% on, 10% off), pause

Possible cause of the fault: supply voltage is too high or too low.

During operation with load management, this flashing sequence means that there is a communication error between the external control system and the Wallbox or between the leader Wallbox and the Wallbox.

- You do not need to intervene in case of over- or undervoltage.
- In case of communication errors, the installer has to check the correct installation of the communication line.

After a self-test and elimination of the malfunction, the front illumination lights up white. The vehicle can request the charging process.

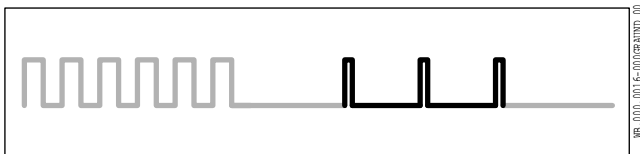


Fig. 8 Fault display

Six times flashing white, pause, three times flashing blue (10% on, 90% off), pause

Faulty communication with the vehicle or the maximum preset current has been exceeded.

- Check that the charging cable is correctly plugged into the vehicle.

After a self-test and elimination of the malfunction, the front illumination lights up white. The vehicle can request the charging process.

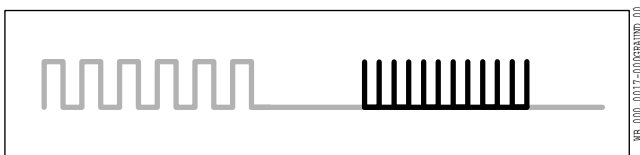


Fig. 9 Wallbox malfunction

Six times flashing white, pause, twelve times flashing blue, pause

Internal malfunction of the Wallbox.

- Disconnect the charging cable from the vehicle.
- Disconnect the Wallbox from the power supply by switching off the respective miniature circuit breakers of the building. Wait approx. 1 minute and then re-engage the miniature circuit breakers.
- Reconnect the charging cable to the vehicle.

After a self-test and elimination of the malfunction, the front illumination lights up white. The vehicle can request the charging process.

Troubleshooting

If the above malfunctions continue, please contact our hotline.

1.6 Contact address/Customer Sales Representative

Hotline: +496222 82 2266

E-mail: Wallbox@heidelberg.com

Contact language: German and English.

Website: <https://wallbox.heidelberg.com/>

1.7 Environment

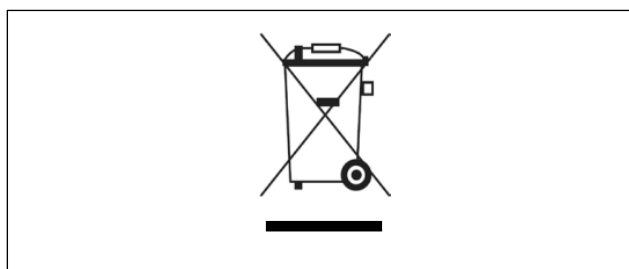


Fig. 10

This device is used for charging electrically powered vehicles and is regulated by the corresponding EU Directive 2012/19/EU on waste electrical and electronic equipment (WEEE).

Its disposal must comply with the national and regional regulations for electrical and electronic equipment.

Waste equipment and batteries must not be disposed of by putting them in household or bulky waste. The device should be made inoperative before disposal.

Please dispose of the packaging material in the usual collection containers for cardboard, paper, and plastics for your region.

E Local Load Management

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1 Local Load Management

1.1 Introduction

The "Energy Control" wallbox charging station is used for charging plug-In-hybrid or electric vehicles. Several "Energy Control" wallboxes can be operated on the system network. This enables the monitoring of power distribution of up to 16 wallboxes.

In the following documentation, these "Energy Control wallboxes" are only called wallboxes.

For local load management, several wallboxes are networked with one another via a RS485 bus. These wallboxes divide the available total current equally. An external control system is not necessary here. For this local load management, the person putting it into service must not worry about the communication between the wallboxes. Only the notes about the configuration and installation of the wallboxes must be heeded.

1.2 Checklist

All of the points listed below are necessary for a trouble-free installation and start-up:

- Selection of leader wallbox,
- Setting of the number of follower wallboxes (in the leader wallbox),
- Setting of the maximum system current (in the leader wallbox),
- Configuration of the lock function (in the leader wallbox),
- Selection of the number of follower wallboxes (in the leader wallbox),
- Setting of the bus ID (in each follower wallbox),
- Setting of the maximum and minimum charging current (in each wallbox),
- Wiring of the power supply and bus system, Avoid single-sided phase loading!
- Activation of the bus termination (in the first and last wallbox).

1.3 Prerequisites

In order to establish a system with local load management, at least two wallboxes are required. A maximum of 16 wallboxes can be networked. A hybrid or electric vehicle can be charged on each of these wallboxes. To have a reliable power supply, the overall output of the system must be configured such that at least 6 A is available for each wallbox. Otherwise, load requests, in the event of an overload for a requested output, will be delayed until the current charging process has completed, and free capacity is available.

► **Note**

The documentation "Safety instructions," "Installation instructions," and "Operating manual" for the "Energy Control" wallbox must be read carefully and heeded.

These documents are available online:
<https://wallbox.heidelberg.com/>



Caution - Single-sided phase load

If in a system network of wallboxes (with load management), several vehicles should be charged single-phased at the same time, this can generate an unfavorable current distribution between the phases.

Therefore, the wallboxes must be connected with alternating phase sequence.

First wallbox L1, L2, L3.

Second wallbox L2, L3, L1.

Third wallbox L3, L1, L2.

Fourth wallbox again L1, L2, L3, etc.

1.4 Bus topology

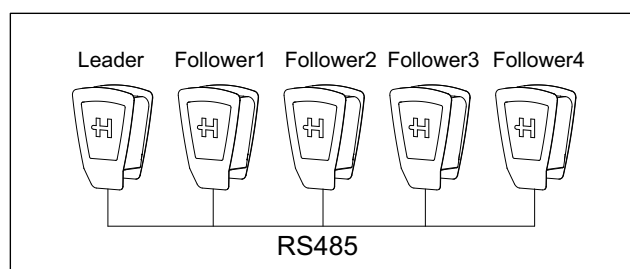


Fig. 1 Example: bus system with 5 participants

The bus system used to connect the wallboxes is a RS485 field bus. Modbus-RTU is used as the protocol. The system consists of a wallbox that is configured as leader and at least one wallbox that is configured as follower. Up to 15 wallboxes configured as follower can communicate with the leader wallbox.

The physical position of the leader wallbox can be selected at will.

The total current available is distributed by the leader across the whole system. A minimum charge current (default 6 A) and a maximum charge current (default 6 A) is preconfigured for each wallbox.

The follower wallboxes switch into standby status when they are not used. The wallbox configured as leader does not switch into standby status.

If communication between the follower wallbox and the leader wallbox is aborted it or cannot be established, the charging process will not be started or it will be aborted.

1.5 Examples of the distribution of the load power

The following examples depict the distribution strategy of the power supply. In a system network of 5 wallboxes, a maximum of 32 A is available through the power supply. The wallboxes are pre-set with I_{\max} 16 A and I_{\min} 6 A. The total charging current (32 A) is distributed equally. A vehicle that has finished the charg-

ing process, but remains connected to the wallbox still has 6 A made available to it (e.g. for auxiliary heating).

1.5.1 Example 1

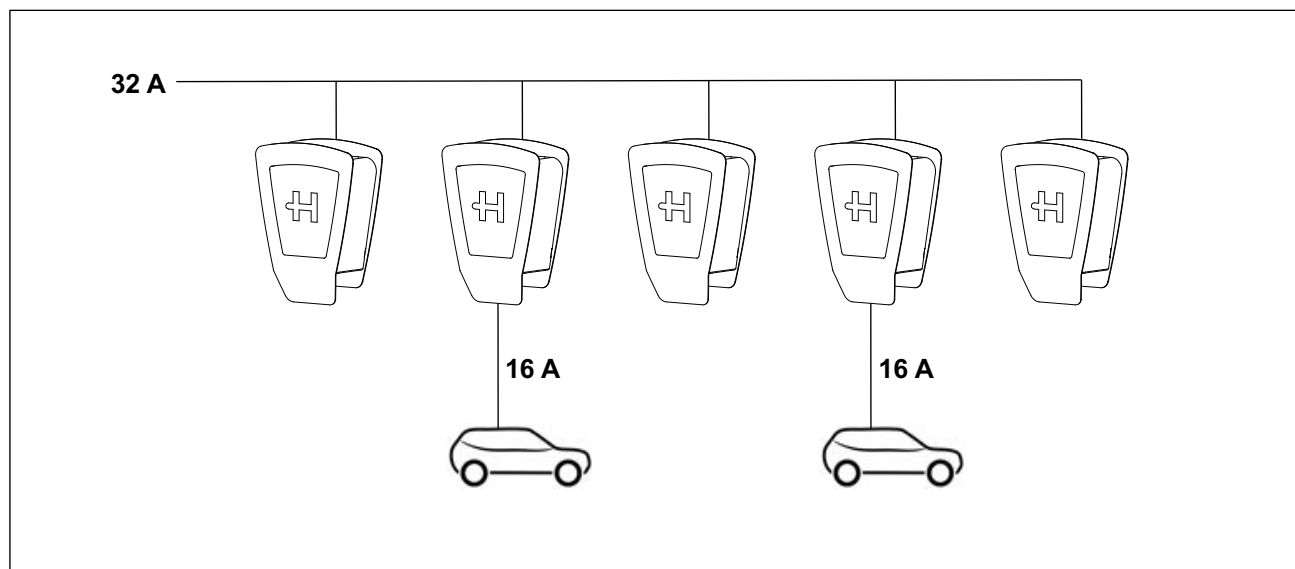


Fig. 2 Both vehicles are charged with 16 A apiece.

1.5.2 Example 2

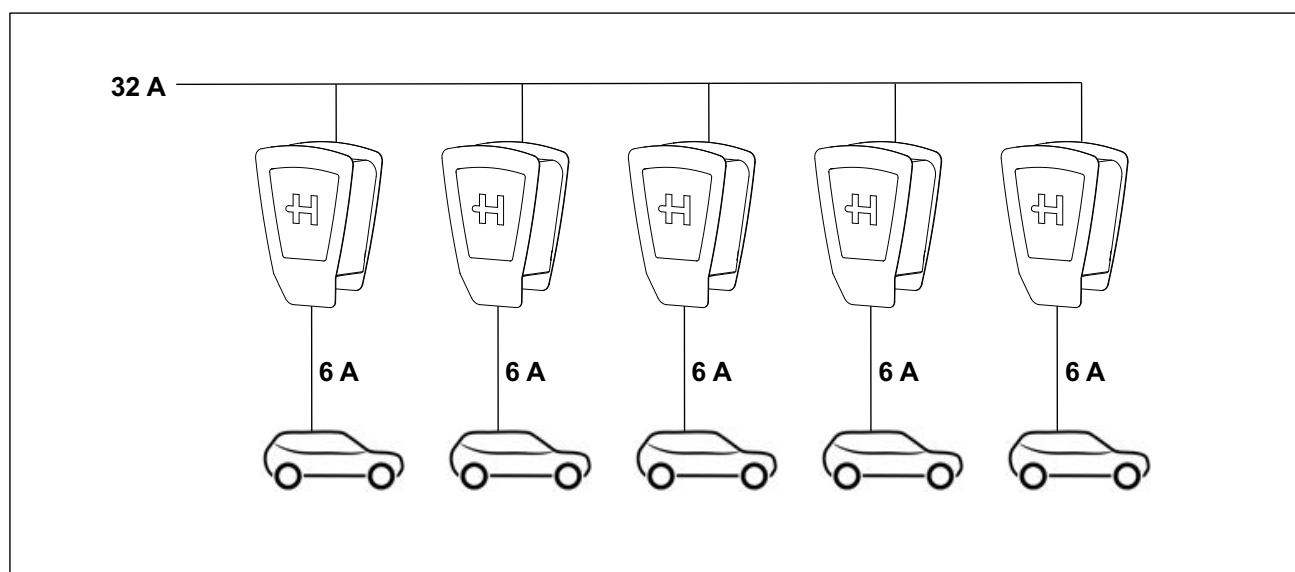


Fig. 3 All five vehicles are charged with 6 A apiece.

1.5.3 Example 3

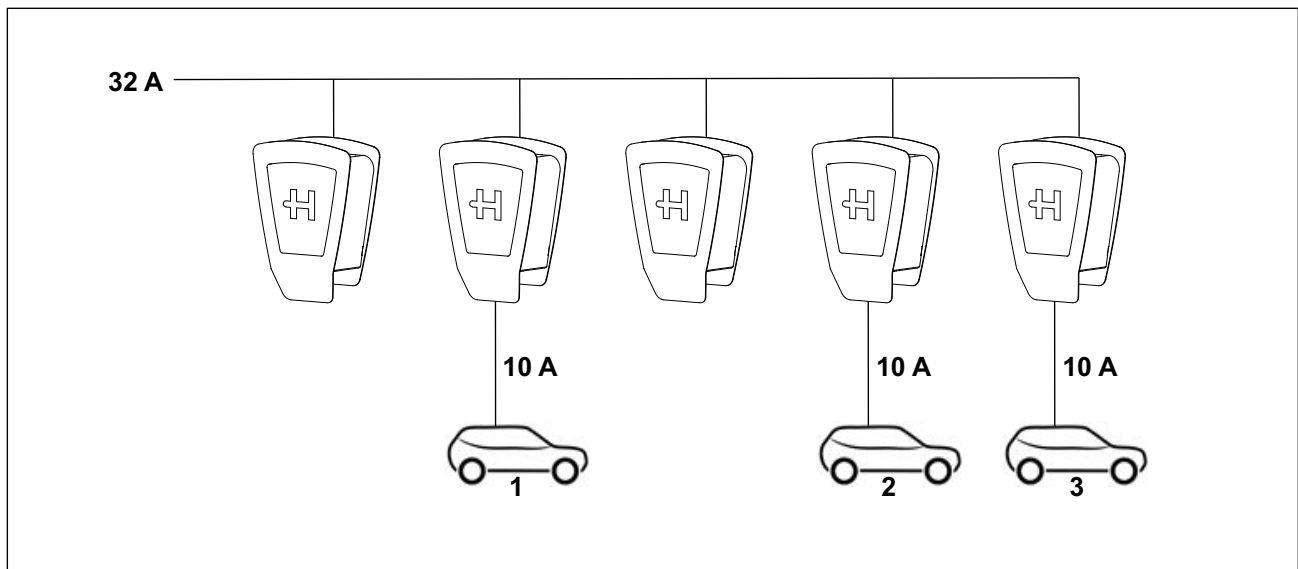


Fig. 4 The three vehicles are charged with 10 A apiece.

1.5.4 Example 4

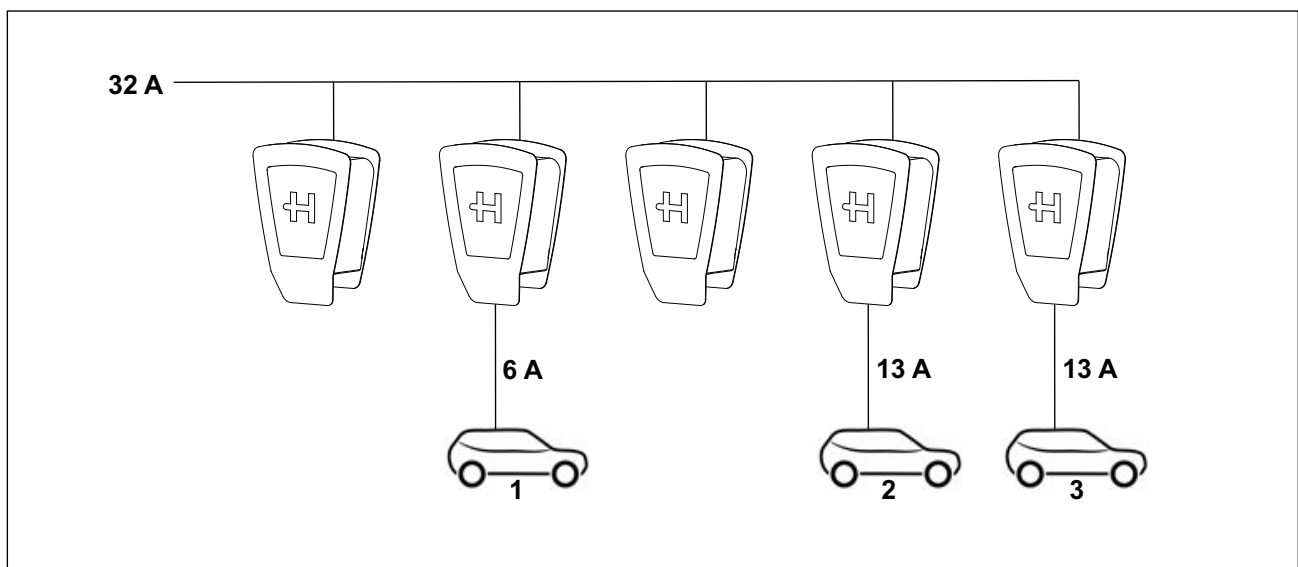


Fig. 5 Vehicle 1 has completed the charging process, but 6 A is still available to it in order to cover any possible need (e.g. auxiliary heating/cooling). Vehicles 2 and 3 are now charged with 13 A.

1.5.5 Example 5

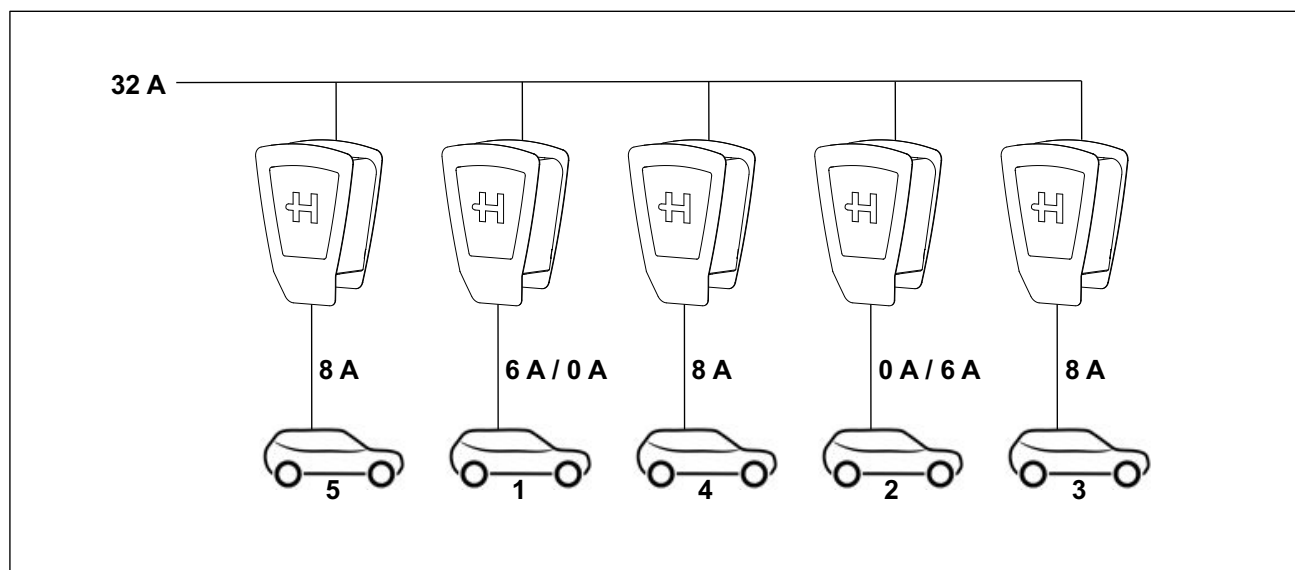
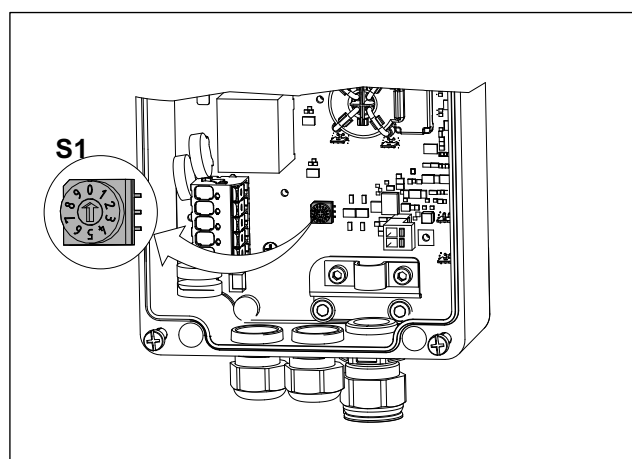


Fig. 6 Vehicles 1 and 2 have completed the charging process and receive alternately (every 12 min) 6 A in order to cover any possible need (e.g. auxiliary heating/cooling). Vehicles 4 and 5 are added to this. The charging current for the vehicles 3, 4 and 5 is now 8 A apiece.

1.6 Configuration of the wallboxes

In order to operate the system network of wallboxes, the individual wallboxes must be preconfigured. This configuration is done with various rotary and microswitches.

1.6.1 Configuration of maximum charging current (per wallbox)



The rotary switch S1 is used to set the maximum charging current from 6 to 16 A.

0	6 A (default setting, delivery state)
1	8 A
2	10 A
3	12 A
4	14 A
5 ... 9	16 A

Fig. 7 Rotary switch S1

1.6.2 Overview of the rotary and microswitches

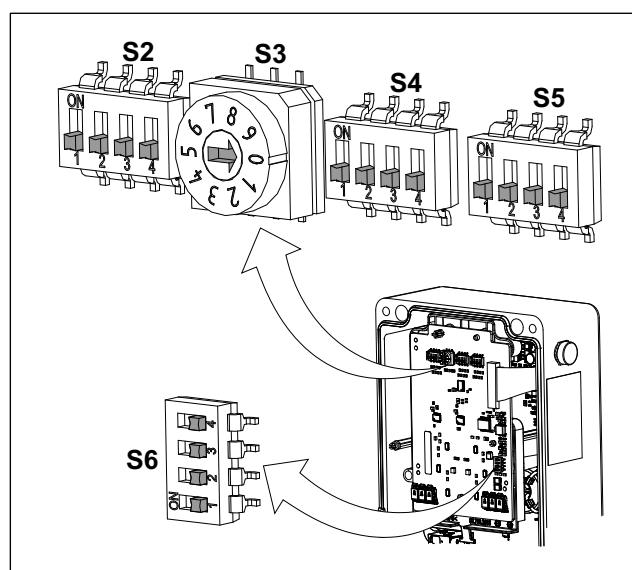


Fig. 8 All rotary and microswitches in OFF position

- S2** Setting for maximum system current (in leader wallbox only)
- S3** Setting for minimum charging current
- S4** In leader wallbox: Setting for number of followers
- S4** In follower wallbox: Setting for each bus ID
- S5** Setting for leader or follower, front illumination, lock
- S6** Bus termination ON/OFF

1.6.3 S3, configuration of minimum charging current (per wallbox)

With the rotary switch S3 (Fig. 8), you can set the minimum charging current from 6 to 16 A.

0	6 A (default setting, delivery state)
1	8 A
2	10 A
3	12 A
4	14 A
5 ... 9	16 A

If there is less than the set current available for the wallbox in question, no charging will take place.

1.6.4 S5/4, configuration as leader wallbox

The leader setting is made using the S5/4 microswitch (Fig. 8).

S5/4	
ON	Leader
OFF	Follower

Tab. 1

1.6.5 S4, configuration of the number of follower wallboxes (in leader wallbox)

The number of follower wallboxes is specified through the setting of the microswitches S4/1 to S4/4 (Fig. 8).

Follower wallboxes	S4/1	S4/2	S4/3	S4/4
No follower	OFF	OFF	OFF	OFF
1	OFF	OFF	OFF	ON
2	OFF	OFF	ON	OFF
3	OFF	OFF	ON	ON
4	OFF	ON	OFF	OFF
5	OFF	ON	OFF	ON
6	OFF	ON	ON	OFF
7	OFF	ON	ON	ON
8	ON	OFF	OFF	OFF
9	ON	OFF	OFF	ON
10	ON	OFF	ON	OFF
11	ON	OFF	ON	ON
12	ON	ON	OFF	OFF
13	ON	ON	OFF	ON
14	ON	ON	ON	OFF
15	ON	ON	ON	ON

Tab. 2

1.6.6 S2, configuration of maximum system current (in leader wallbox)

The maximum current quantity in the system is specified via the setting of the microswitches S2/1 to S2/4 (Fig. 8).

Current	S2/1	S2/2	S2/3	S2/4
10 A	OFF	OFF	OFF	OFF
16 A	OFF	OFF	OFF	ON
20 A	OFF	OFF	ON	OFF
25 A	OFF	OFF	ON	ON
32 A	OFF	ON	OFF	OFF
35 A	OFF	ON	OFF	ON
40 A	OFF	ON	ON	OFF
50 A	OFF	ON	ON	ON
63 A	ON	OFF	OFF	OFF
80 A	ON	OFF	OFF	ON
100 A	ON	OFF	ON	OFF
125 A	ON	OFF	ON	ON
160 A	ON	ON	OFF	OFF
200 A	ON	ON	OFF	ON

Current	S2/1	S2/2	S2/3	S2/4
224 A	ON	ON	ON	OFF
250 A	ON	ON	ON	ON

Tab. 3

1.6.7 S5/1, setting of front illumination (all wallboxes)

The front illumination setting is made with the S5/1 microswitch (Fig. 8).

The illumination behavior only affects status messages.

Error messages always light up steadily.

This setting is only effective if a vehicle is connected.

S5/1	
ON	Front illumination lights up steadily
OFF	Front illumination goes out after 5 min.

Tab. 4

1.6.8 S5/3, configuration of locking function (in leader wallbox)

The wallbox has an input on which the wallbox can be locked with an external switching element (key switch or similar, see installation instructions). The switch S5/3 can be used to specify whether this lock influences only the leader wallbox or all wallboxes.

S5/3	
OFF	Only the leader wallbox is locked
ON	All wallboxes are locked

Tab. 5

The switch S5/2 is not required for the leader wallbox. The switch must be set to OFF.

1.6.9 S5/4, configuration as follower wallbox

The follower setting is made using the S5/4 microswitch (Fig. 8).

The switches S5/1, S5/2 and S5/3 are not required for all follower wallboxes. These switches must be on OFF.

S5/4	
OFF	Follower
ON	Leader

Tab. 6

The switch S5/2 is not required for the leader wallbox.
The switch must be set to OFF.

1.6.10 S4, configuration of bus ID for the individual follower wallboxes

The microswitches of S4 (Fig. 8) are used to assign the bus ID of the follower wallboxes from 1 to 15. To be observed:

- no duplicate bus IDs may be assigned,
- the bus ID must start with 1 for the first follower wallbox.

Bus-ID	S4/1	S4/2	S4/3	S4/4
Leader only	OFF	OFF	OFF	OFF
1	OFF	OFF	OFF	ON
2	OFF	OFF	ON	OFF
3	OFF	OFF	ON	ON
4	OFF	ON	OFF	OFF
5	OFF	ON	OFF	ON
6	OFF	ON	ON	OFF
7	OFF	ON	ON	ON
8	ON	OFF	OFF	OFF
9	ON	OFF	OFF	ON
10	ON	OFF	ON	OFF
11	ON	OFF	ON	ON
12	ON	ON	OFF	OFF
13	ON	ON	OFF	ON
14	ON	ON	ON	OFF
15	ON	ON	ON	ON

Tab. 7

1.7 Installation of the bus system

A screened bus line (e.g. CAT6a) must be used for the cabling of the bus system. The total length of the field bus may not exceed 500 m. It must be ensured that the shields of the bus lines are attached securely to the shield supports provided.

The bus system can be installed in two different ways:

1.7.1 Bus system in line wiring

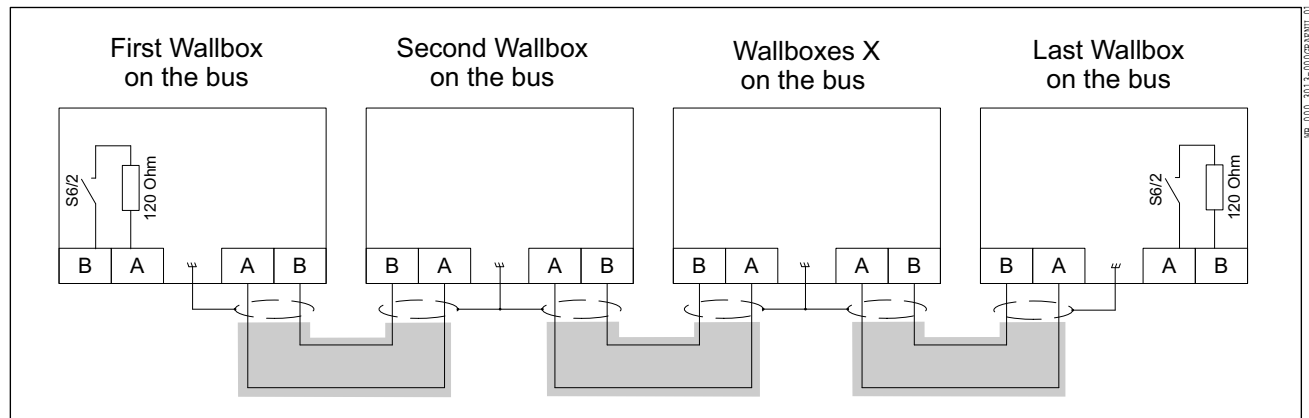


Fig. 9 Example of a line wiring

For the line wiring, the bus line is laid directly from one to the next wallbox. Only two wires are used for each bus line.

Only one bus line is connected to the first and last wallbox.

All other wallboxes have two bus lines routed to them (Fig. 10).

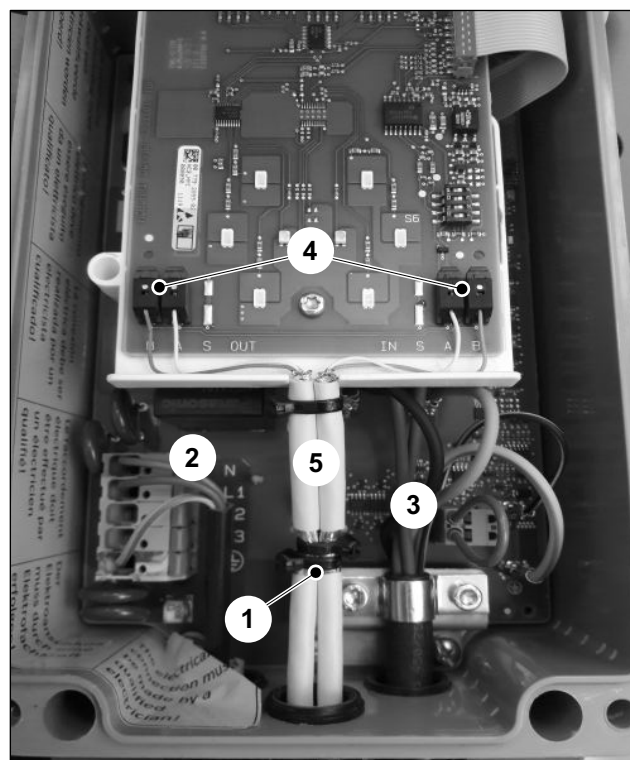


Fig. 10 Line routing for line wiring

- 1 Shield support for the bus lines
- 2 Connection of power supply
- 3 Wires of the charging cable
- 4 Terminals for bus wires
- 5 Bus jacketing

The individual wires of the power supply (Fig. 10/2) and of the charging cable (Fig. 10/3) should be laid at the greatest possible distance from the bus lines.

1. Strip approx. 7 cm insulation from the bus lines.
2. Expose the respective screen for the bus lines approx. 6 cm before the jacket end for approx. 15 mm.
3. Fasten the exposed shields to the shield support with one or two cable ties (Fig. 10/1).
4. Strip two individual wires approx. 8 mm and connect these to the appropriate terminals (Fig. 10/4).
5. Cut the single wires not used off at the jacket end.

The bus lines must be jacketed between the shield support and connection board (Fig. 10/5).

1.7.2 Bus system with central wiring in distributor

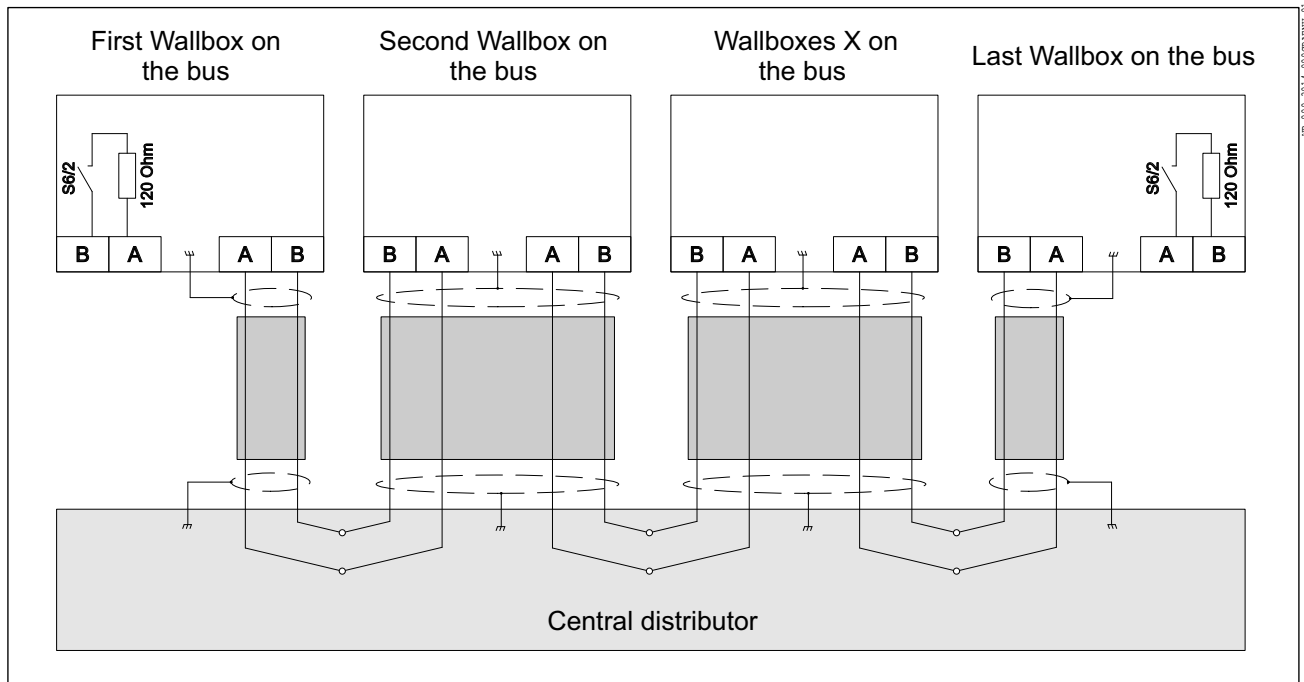


Fig. 11 Example of central wiring

With central wiring, one bus line is routed from each wallbox to a central distributor. There, the bus lines must be wired using terminal strips.

With central wiring, four wires are used for each bus line. Exception: first and last wallbox in the system network. There, only two wires are used.

The shields of the individual bus lines must be connected in the central distributor.

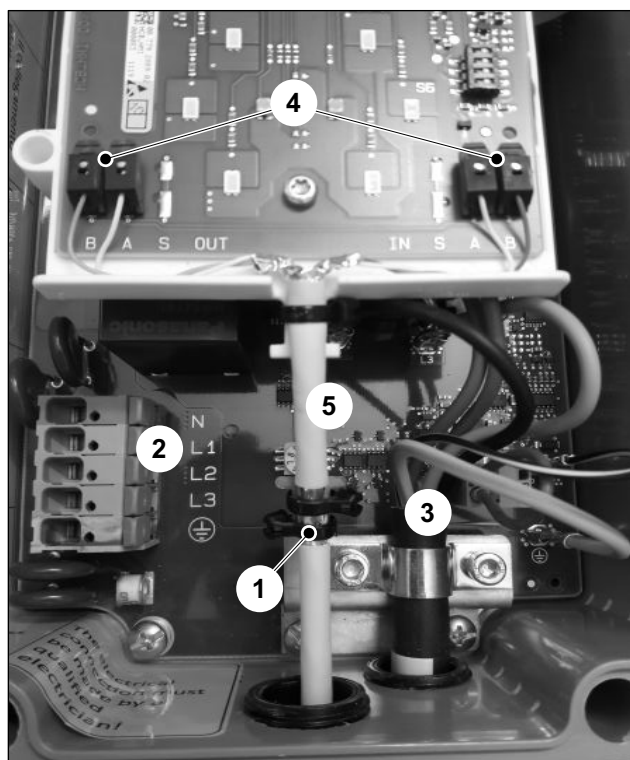


Fig. 12 Line routing for central wiring

- 1 Shield support for the bus line
- 2 Connection of power supply
- 3 Wires of the charging cable
- 4 Terminals for bus wires
- 5 Bus jacketing

The individual wires of the power supply (Fig. 12/2) and of the charging cable (Fig. 12/3) should be laid at the greatest possible distance from the bus lines.

1. Strip approx. 7 cm insulation from the bus line.
2. Expose the shield of the bus line approx. 6 cm before the jacket end for approx. 15 mm.
3. Fasten the exposed shield to the shield support with one or two cable ties (Fig. 12/1).
4. Strip two individual wires approx. 8 mm apiece and connect these to the appropriate terminals (Fig. 12/4).
5. Cut off the individual wires not used at the jacket end.

The bus line must be jacketed between the shield support and connection board (Fig. 12/5).

1.7.3 S6/2, configuration, bus termination

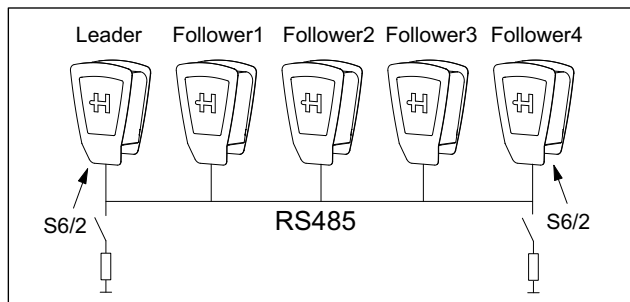


Fig. 13 Connecting the bus terminating resistors

The first and last wallbox on the RS485 bus must be connected with a terminating resistor. It is irrelevant here, if the wallbox is a leader or a follower wallbox.

This happens by connecting an installed terminating resistor via the microswitch S6/2 (Fig. 8) on the appropriate wallbox.

The switches S6/1, S6/3 and S6/4 are not used. These switches must be on OFF.

S6/2	
OFF	Bus termination inactive
ON	Bus termination active

Tab. 8

1.8 Checking load management

Once all the wallboxes have been electrically checked (see safety instructions, "Installation and checks"), properly configured and connected, the load management can then be put into operation.



Note

During checking of the load management, no vehicle must be connected to any of the wallboxes.

- Connect the power supply for the wallboxes, starting with the leader -wallbox.
- The front illumination of each wallbox lights up for 5 min and then goes out.
- The load management is now ready for operation.

1.8.1 Diagnosis of load management via front illumination

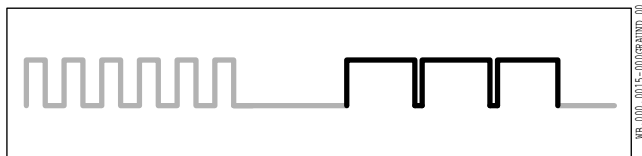


Fig. 14 Fault display

In the event of a fault, e.g. communication error between leader wallbox and the corresponding follower wallbox, the front illumination flashes.

Six times flashing white, pause, three times flashing blue (90% on, 10% off), pause

This flashing sequence means that there is a communication error between the leader wallbox and the corresponding follower wallbox.

- Check the correct execution of the bus installation.

After the fault has been eliminated and a self-test, the front illumination lights up white. The vehicle can request the charging process.

If the fault is still there, please contact the hotline.

1.8.2 Contact address/Customer Sales Representative

Hotline: +496222 82 2266

E-mail: wallbox@heidelberg.com

1.9 Table for checking configuration of leader wallbox

You can enter all relevant configuration/installation information in the following tables.

Distributor	F	L1	L2	L3	FI	Wallbox number	S1 I_{\max}	S2 I_{sysmax}	S3 I_{\min}	S4 Number of followers	S5/3 Lock	S5/4 Leader/Follower	S6/2 Bus termination
		L1	L2	L3								1	

Tab. 9

1.10 Table for checking configuration of follower wallboxes

Distributor	F	L1	L2	L3	FI	wallbox number	S1 I_{\max}	S2 I_{sysmax}	S3 I_{\min}	S4 Bus-ID	S5/3 Lock	S5/4 Leader/Follower	S6/2 Bus termination
		L2	L3	L1				0		1	0	0	
		L3	L1	L2				0		2	0	0	
		L1	L2	L3				0		3	0	0	
		L2	L3	L1				0		4	0	0	

Distribu- tor	F	L1	L2	L3	FI	wallbox number	S1 I_{\max}	S2 I_{sysmax}	S3 I_{\min}	S4 Bus-ID	S5/3 Lock	S5/4 Leader/ Follower	S6/2 Bus ter- mination
		L3	L1	L2				0		5	0	0	
		L1	L2	L3				0		6	0	0	
		L2	L3	L1				0		7	0	0	
		L3	L1	L2				0		8	0	0	
		L1	L2	L3				0		9	0	0	
		L2	L3	L1				0		10	0	0	
		L3	L1	L2				0		11	0	0	
		L1	L2	L3				0		12	0	0	
		L2	L3	L1				0		13	0	0	
		L3	L1	L2				0		14	0	0	
		L1	L2	L3				0		15	0	0	

Tab. 10

F External load/energy management

External load/energy management	F.1.1
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1 External load/energy management, e.g. with HEMS

1.1 Introduction

The "Energy Control" wallbox charging station is used for charging plug-In-hybrid or electric vehicles. Several "Energy Control" wallboxes can be operated on the system network. This enables the monitoring of power distribution of up to 16 wallboxes.

In the following documentation, these "Energy Control" wallboxes will simply be called wallboxes.

For external load/energy management, the wallboxes are networked with an external control system (e. g. HEMS) via a RS485 bus. The external control system takes over the management (leader) of this system and communicates with all connected wallboxes (follower). The external control system takes over the strategy for energy distribution.

This procedure enables, e.g., the incorporation of solar energy into the charging process of an electric vehicle.

HEMS Home Energy Management System

1.2 Checklist

All of the points listed below are necessary for a trouble-free installation and start-up:

- Configuration of the external control system (according to manufacturer's description),
- Specification as follower wallbox (in each wallbox),
- Setting of the bus ID (in each wallbox),
- Setting of the maximum and minimum charging current (in each wallbox),
- Wiring of the power supply and bus system, Avoid single-sided phase loading!
- Activating the bus termination (in external control system and last wallbox).

1.3 Prerequisites

In order to establish a system with external load/energy management, an external control system and at least one wallbox are required. A maximum of 16 wallboxes can be networked. The external control system is the leader and all wallboxes have to be configured as followers. A plug-in hybrid or electric vehicle can be charged on each of these wallboxes. To have a reliable power supply, the overall output of the system must be configured such that at least 6 A is available for each wallbox. Otherwise, load requests, in the event of an overload for a requested output, will be delayed until the current charging process has completed, and free capacity is available.

**Note**

The documentation "Safety instructions," "Installation instructions," and "Operating manual" for the "Energy Control" wallbox must be read carefully and heeded.

These documents are available online:
<https://Wallbox.heidelberg.com/>

**Caution - Single-sided phase load**

If in a system network of wallboxes (with load/energy management) several vehicles are charged single-phase at the same time, there can be an unfavorable current distribution among the phases.

Therefore, the wallboxes must be connected with alternating phase sequence.

First wallbox L1, L2, L3.

Second wallbox L2, L3, L1.

Third wallbox L3, L1, L2.

Fourth wallbox again L1, L2, L3, etc.

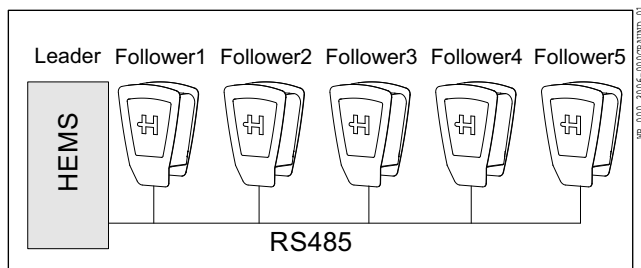
1.4 Bus topology

Fig. 1 Example: bus system with HEMS and 5 wallboxes.

The bus system used to connect the wallboxes is a RS485 field bus. Modbus-RTU is used as the protocol. The system consists of an external control system (e.g. HEMS), which is configured as leader, and at least one wallbox that is configured as a follower. Up to 16 wallboxes configured as followers can communicate with the external control system (leader).

The total current available is distributed by the leader across the whole system. A minimum charge current (default 6 A) and a maximum charge current (default 6 A) is preconfigured for each wallbox.

1.5 Configuration of the wallboxes

In order to operate the system network of wallboxes, the individual wallboxes must be preconfigured. This configuration is done with various rotary and microswitches.

1.5.1 S1, configuration of maximum charging current

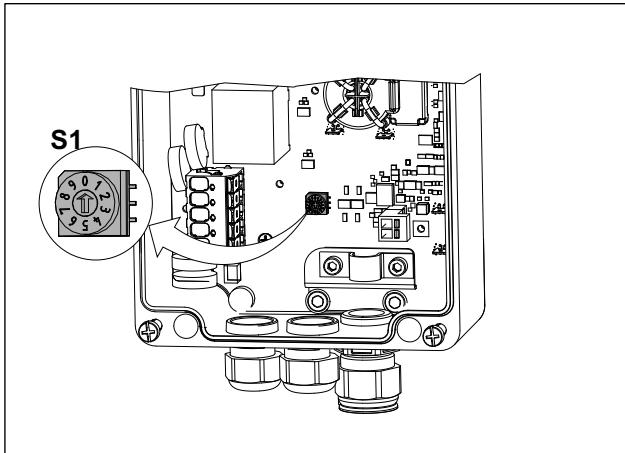


Fig. 2 Rotary switch S1

The rotary switch S1 is used to set the maximum charging current from 6 to 16 A.

0	6 A (default setting, delivery state)
1	8 A
2	10 A
3	12 A
4	14 A
5 ... 9	16 A

1.5.2 Overview of the rotary and microswitches

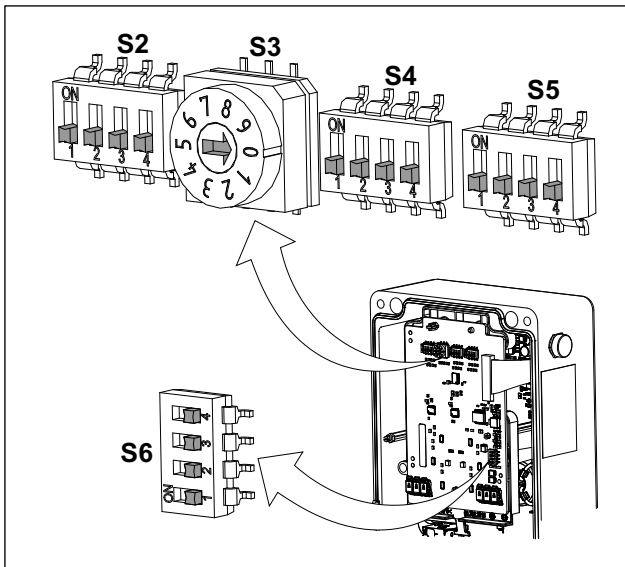


Fig. 3 All rotary and microswitches in OFF position

S2	Configuration of bus ID 16
S3	Setting for minimum charging current
S4	Configuration of bus ID 1 to 15
S5	Setting for leader or follower, front illumination
S6	Bus termination ON/OFF

1.5.3 S3, configuration of minimum charging current

With the rotary switch S3 (Fig. 3), you can set the minimum charging current from 6 to 16 A.

0	6 A (default setting, delivery state)
1	8 A
2	10 A
3	12 A
4	14 A
5 ... 9	16 A

If there is less than the set current available for the wallbox in question, no charging will take place.

1.5.4 S5, configuration as follower wallbox and setting for front illumination

The front illumination setting is made with the S5/1 microswitch (Fig. 3).

The illumination behavior only affects status messages.

Error messages always light up steadily.

This setting is only effective if a vehicle is connected.

S5/1	
ON	Front illumination lights up steadily
OFF	Front illumination goes out after 5 min.

Tab. 1

The setting as a follower wallbox is made using the S5/4 microswitch (Fig. 3).

S5/4	
ON	Leader
OFF	Follower

Tab. 2

The switches S5/2 and S5/3 are not required for all follower wallboxes. These switches must be on OFF.

1.5.5 S4, configuration of bus ID of follower wallboxes 1 to 15

The microswitches of S4 (Fig. 3) are used to assign the bus ID of the follower wallboxes from 1 to 15. To be observed:

- no duplicate bus IDs may be assigned,
- the bus ID "0" may not be used.

Bus-ID	S4/1	S4/2	S4/3	S4/4
0	OFF	OFF	OFF	OFF
1	OFF	OFF	OFF	ON
2	OFF	OFF	ON	OFF
3	OFF	OFF	ON	ON
4	OFF	ON	OFF	OFF
5	OFF	ON	OFF	ON
6	OFF	ON	ON	OFF
7	OFF	ON	ON	ON
8	ON	OFF	OFF	OFF
9	ON	OFF	OFF	ON
10	ON	OFF	ON	OFF
11	ON	OFF	ON	ON

Bus-ID	S4/1	S4/2	S4/3	S4/4
12	ON	ON	OFF	OFF
13	ON	ON	OFF	ON
14	ON	ON	ON	OFF
15	ON	ON	ON	ON

Tab. 3

1.5.6 S2, configuration of bus ID 16

Bus-ID	S2/1	S2/2	S2/3	S2/4
16	OFF	OFF	OFF	ON

Tab. 4

In the wallbox configured for bus ID 16, microswitch S4 is inoperative.

1.6 Installation of the bus system

For the cabling of the bus system, a shielded bus line (e.g. CAT6a) must be used. The total length of the field bus may not exceed 500 m. It must be ensured that the shields of the bus lines are attached securely to the shield supports provided.

The bus system can be installed in two different ways:

1.6.1 Bus system in line wiring

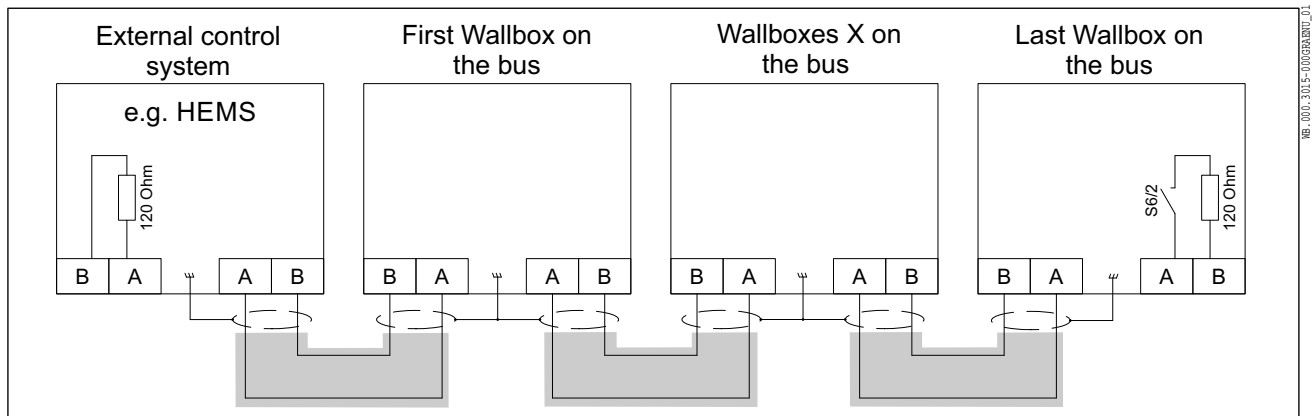


Fig. 4 Example of a line wiring

For the line wiring, the bus line is laid directly from the external control system to the first wallbox and then to the next wallbox. Only two wires are used for each bus line.

Only one bus line is connected to the external control system.

Only one bus line is connected to the last wallbox.

All other wallboxes have two bus lines routed to them (Fig. 5).

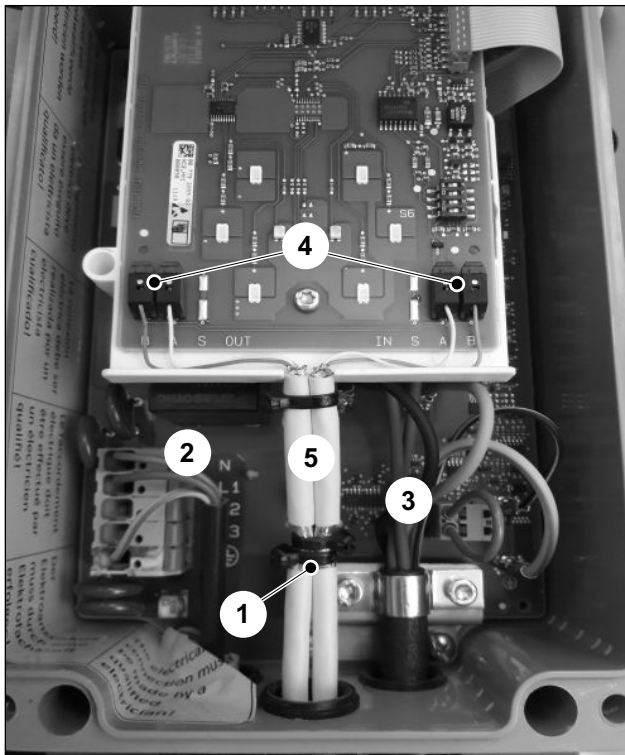


Fig. 5 Cable gland for line wiring

- 1 Shield support for the bus lines
- 2 Connection of power supply
- 3 Wires of the charging cable
- 4 Terminals for bus wires
- 5 Bus jacketing

The individual wires of the power supply unit (Fig. 5/2) and of the charging cable (Fig. 5/3) must be laid at the greatest possible distance from the bus lines.

1. Strip approx. 7 cm insulation from the bus lines.
2. Expose the respective screen for the bus lines approx. 6 cm before the jacket end for approx. 15 mm.
3. Fasten the exposed shields to the shield support with one or two cable ties (Fig. 5/1).
4. Strip two individual wires approx. 8 mm and connect these to the appropriate terminals (Fig. 5/4).
5. Cut the single wires not used off at the jacket end.

The bus lines must be jacketed between the shield support and connection board (Fig. 5/5).

1.6.2 Bus system with central wiring in distributor

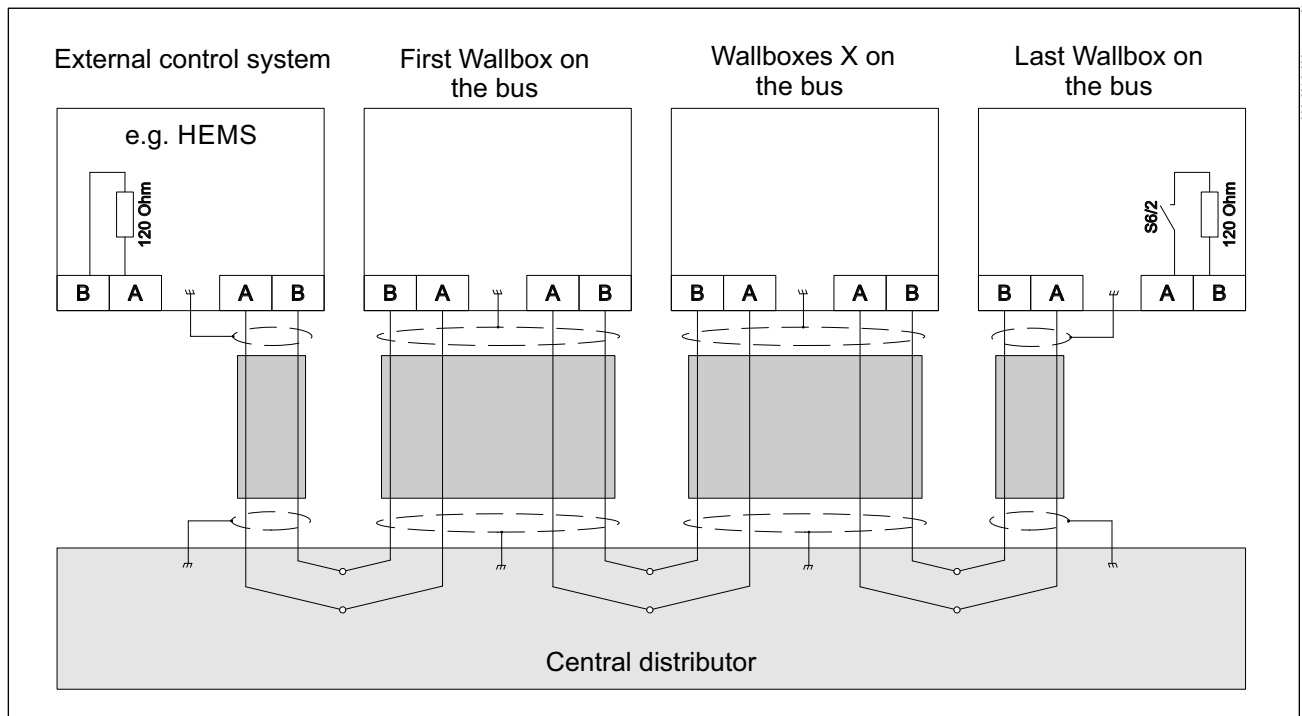


Fig. 6 Example of central wiring

For the central wiring, a bus line is routed from the external control system and each wallbox to a distributor. There, the bus lines must be wired using terminal strips.

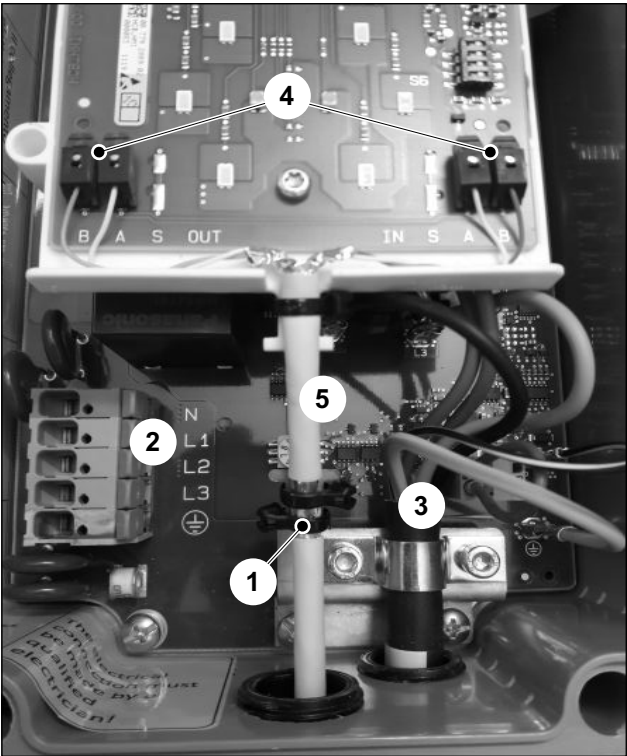


Fig. 7 Cable routings for central wiring

With central wiring, four wires are used for each bus line. Exception: external control system and last wall-box in the system network. There, only two wires are used.

The shields of the individual bus lines must be connected in the central distributor.

- 1 Shield support for the bus line
- 2 Connection of power supply
- 3 Wires of the charging cable
- 4 Terminals for bus wires
- 5 Bus jacketing

The individual wires of the power supply unit (Fig. 7/2) and of the charging cable (Fig. 7/3) must be laid at the greatest possible distance from the bus line.

- 1. Strip approx. 7 cm insulation from the bus line.
- 2. Expose the shield of the bus line approx. 6 cm before the jacket end for approx. 15 mm.
- 3. Fasten the exposed shield to the shield support with one or two cable ties (Fig. 7/1).
- 4. Strip four individual wires approx. 8 mm and connect these to the appropriate terminals (Fig. 7/4).
- 5. Cut the single wires not used off at the jacket end.

The bus line must be jacketed between the shield support and connection board (Fig. 7/5).

1.6.3 S6, configuration of bus termination

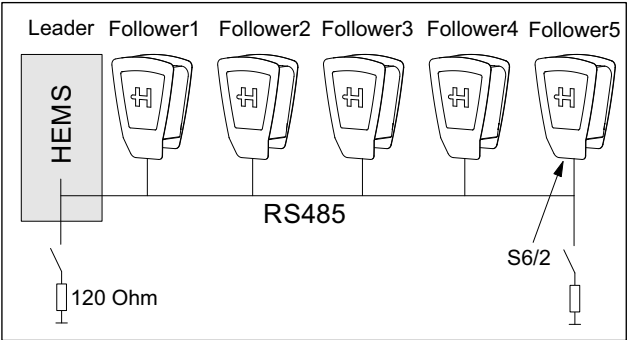


Fig. 8 Bus terminal resistors

The first and last members on the RS485 bus must have terminating resistors.

For the last follower wallbox, this is done by switching an installed terminating resistor through the microswitch S6/2 (Fig. 3).

Switches S6/1, S6/3 and S6/4 are not used. These switches must be on OFF.

When using an external control unit, the bus line must be terminated there with a 120 Ohm resistor. The manufacturer's specifications for the external control system must be heeded.

S6/2	
OFF	Bus termination inactive
ON	Bus termination active

Tab. 5

1.7 Checking load management

If all wallboxes are configured and connected properly, the load management can be started up.

► Note

In the process, no vehicle may be connected to any of the wallboxes.

- Establish the power supply for the external control electronics and the wallboxes beginning with the external control electronics.
- The front illumination of each wallbox then lights up for 5 min and goes out.
- The load management is now ready for operation.

1.7.1 Diagnosis of faulty communication through front illumination

In case of malfunction, e.g. faulty communication between the external control system and the follower wallbox in question, the front illumination flashes.

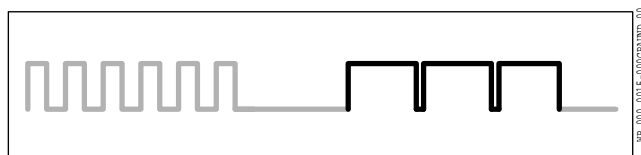


Fig. 9 Fault display

Six times flashing white, pause, three times flashing blue (90% on, 10% off), pause

This flash sequence indicates a communication error between the external control system and the follower wallbox in question.

- Check the correct execution of the bus installation.

After the fault has been eliminated and a self-test, the front illumination lights up white. The vehicle can request the charging process.

If the fault is still there, please contact the hotline.

1.7.2 Contact address/Customer Sales Representative

Hotline: +496222 82 2266

E-mail: Wallbox@heidelberg.com

1.8 Bus protocol

Communication between the external control system and the wallboxes uses the "ModBus-RTU" protocol.

10 seconds after "Power On," each individual wallbox is ready to accept a ModBus command. If the wallbox in question is in standby mode, it cannot be addressed via the ModBus.

1.8.1 ModBus connection

For the connection of the wallbox to an external control system, a RS485 bus in 2-wire design (half-duplex) is

used. The "Transmission Mode" is Modbus-RTU. The bus parameters used are:

- Baud 19200 Bit/sec,
- 8 data bits,
- 1 stop bit,
- 1 parity bit (even),
- Last significant bit sent first (LSN first).

As "Addressing Mode," only "Unicast Mode" is supported. "Broadcast Mode" is not supported.

1.8.2 Supported functions of the ModBus protocol

The wallboxes support only the following functions:

- 03 (0x03) Read Holding Register,
- 04 (0x04) Read Input Register,
- 06 (0x06) Write Holding Register,
- 16 (0x10) Write Multiple Register.

The sequence of the bytes is high byte before low byte (Motorola Format).

The sequence of the CRC check sum is low byte before high byte (Intel Format).

1.8.3 ModBus register

An overview of ModBus registers is available online at:
<https://Wallbox.heidelberg.com/>
 with more information.

1.9 Table for checking the configurations of the follower wallboxes

In the following table, you can enter all relevant configuration/installation information.

Distribu- tor	F	L1	L2	L3	FI	Wallbox number	S1 I_{\max}	S3 I_{\min}	Bus-ID	S5/3 Lock	S5/4 Leader/ Follower	S6/2 Bus ter- mination
		L1	L2	L3					1	0	0	
		L2	L3	L1					2	0	0	
		L3	L1	L2					3	0	0	
		L1	L2	L3					4	0	0	
		L2	L3	L1					5	0	0	
		L3	L1	L2					6	0	0	
		L1	L2	L3					7	0	0	
		L2	L3	L1					8	0	0	
		L3	L1	L2					9	0	0	
		L1	L2	L3					10	0	0	
		L2	L3	L1					11	0	0	

Distribu- tor	F	L1	L2	L3	FI	Wallbox number	S1 I_{\max}	S3 I_{\min}	Bus-ID	S5/3 Lock	S5/4 Leader/ Follower	S6/2 Bus ter- mination
		L3	L1	L2					12	0	0	
		L1	L2	L3					13	0	0	
		L2	L3	L1					14	0	0	
		L3	L1	L2					15	0	0	
		L1	L2	L3					16	0	0	

Tab. 6