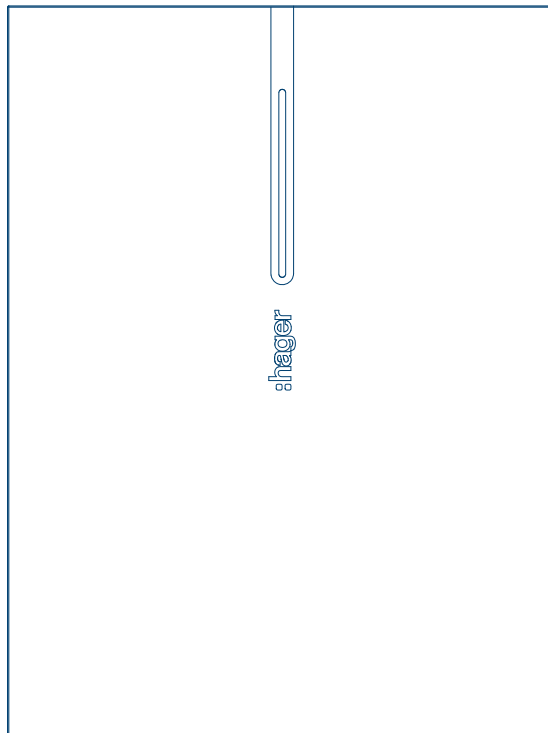


Energy management

flow R3

inverter



flow R3 hybrid inverter for solar and
battery-supported energy systems

XEM1200



Legal information

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Internal reproduction, intended for the evaluation of the product or for correct use, is permitted and does not require approval.

Manufacturer's guarantee

The extended system guarantee is 10 years. This applies to the battery modules only if at least 80% of the battery capacity is retained. To obtain the extended 10-year system guarantee, the guarantee declaration must be downloaded and completed at flow.hager.com/documents (see [Guarantee declaration online in the customer portal](#)). For further information, please contact HagerEnergy GmbH.

The device was developed, produced and tested with special care and using state-of-the-art technology.

HagerEnergy GmbH fulfils the requirements of DIN EN ISO 9001 and proves this through a certified quality management system.

Please obtain the current version of these instructions from the customer portal. Carefully read the instructions. Illustrations in this manual may differ from the actual version of the device.

If you have questions, feel free to contact us.

You can find more information on the product and HagerEnergy GmbH on the company website.

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The manual is optimised for double-sided printing (duplex printing).

This manual applies to the following device:

Device:	flow R3 inverter
Device serial number:	from E3EBZxxx onwards
Date and version of these instructions	2026-04 Version: A



The manuals issued by HagerEnergy GmbH are continuously updated. The current version of this manual and further information on the use of this product can be downloaded via the customer portal using the QR code shown (login required).



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1 About these instructions

This manual describes the safe and proper assembly, installation and commissioning of the flow R3 inverter. These instructions are part of the device. Keep this manual accessible at all times throughout the entire service life of the device and pass it on if required.

The assembly and electrical installation work described relates to the intended standard installation of the device. In particular, the safety instructions and warnings must be observed.

The illustrations in this manual are provided for explanatory purposes and may differ from the actual version of the device and its components.

1.1 Scope of validity

This document applies to the flow R3 inverter device type. HagerEnergy GmbH expressly reserves the right to make technical modifications.

In this document, this inverter is also referred to as the **electrical functional unit** or simply as the **device**. The term **energy management system**, or simply **system**, is used when referring collectively to the electrical functional unit (inverter), battery system and energy management controller.

1.2 Symbols used

Symbol	Description			
●	Instruction consisting of a single step or multiple steps in any order.			
①	Instruction for multiple step actions. The order must be followed.			
①	Identification and description of device components			
-	List			
▶	Reference to documents / additional information			
	Scope of delivery		Safety instructions	 Required tools
	Dimensions		Installation	 Installation
	Final installation		Device overview	 Settings
	Optional accessories		Wireless device connection (pairing)	 Earth before use
	Installed by an electrician		Applicable in all Europe and in Switzerland	 Note on disposal of waste electrical and electronic equipment (WEEE)

Danger levels of warnings

Symbol	Signal word	Consequences in the event of non-compliance
	Danger	Causes serious injury or death.
	Warning	May cause serious injuries or death.
	Caution	May cause minor injury.
	Caution	May cause severe damage to the device.
	Note	May cause damage to the device.

Symbol	Description
	Risk of electric shock.
	Risk of damage due to mechanical stress.
	Risk of damage to the device caused by electricity. Risk of electric shock.
	Risk of fire damage.
	Risk of damage due to explosion or explosive substances.
	Risk of damage due to data misuse. Risk of damage due to cyber attacks.

Symbol	Definition
	Indicates important information that must be observed.
	Indicates useful information.
	For further information on the use of the product, see ...



Formatting in the text

Markings on the product or on control elements, as well as displays shown in a display or app, are highlighted in **bold**.

1.3 Target groups

This document is intended for qualified electricians employed by partner companies. The activities described may only be carried out by personnel with the appropriate qualifications authorised by Hager (see [Qualifications of the installing electrician](#)).

Qualified electricians must meet the following requirements:

- Training in the installation and commissioning of electrical devices and systems
- Trained in handling hazards and risks associated with the installation, configuration, operation and maintenance of electrical devices, batteries and systems
- Knowledge of the relevant laws, standards and directives
- Knowledge and observance of this document, including the safety instructions
- Knowledge of the function and operation of an inverter
- Knowledge of the function and safe operation of batteries
- Knowledge and observance of the battery manufacturer's documentation, including the safety instructions

Persons who, due to their physical, sensory or mental capabilities, lack of experience or lack of knowledge, are unable to operate the device safely must not use the device without supervision or instruction from a responsible person.

Knowledge of network technology is required for commissioning.

1.4 Qualifications of the installing electrician



Assembly, installation and configuration of electrical and electronic devices may only be carried out by a technically trained and certified electrician in accordance with the applicable national installation standards. The accident prevention regulations valid in the appropriate countries must be complied with.

The qualified electrician must have carefully read and understood this manual and be familiar with the necessary safety precautions.

These requirements are generally considered fulfilled if the qualified electrician has relevant professional training and is familiar with the applicable standards and regulations.



To ensure smooth installation of the flow R3 energy management system, Hager recommends prior participation in a specialist training course. This training course can be attended either remotely or on site at one of our regional TSCs.

Further information on the professional development and training programme can be found at hager.com/de/wissen/weiterbildung.

If additional work by other specialists is required for assembly, it may only be carried out by suitably qualified personnel.

2 Safety



Installation and assembly of electrical devices may only be carried out by a qualified electrician in accordance with the applicable national installation standards, directives, regulations, safety requirements and accident prevention regulations.

This also applies to decommissioning of the device.

National regulations and safety provisions must be observed. See also IEC 60364-7-712:2017 (DIN VDE 0100-712:2016-10).

Please read this manual before assembling, installing and commissioning the device in order to avoid possible injury and/or property damage. All users must always observe the safety instructions and warnings.

If the device is sold, loaned or otherwise transferred to another party, this manual must also be provided.

2.1 Intended use

This device is a PV inverter designed to operate as part of a complete Hager solution together with lithium-ion battery modules, battery converters and an energy management controller (EMC) as an energy management system.

This system is used in conjunction with photovoltaic and/or combined heat and power (CHP) systems to generate, store and consume electricity.

The device described in this manual is the electrical functional unit (inverter, XEM1200), which is also available together with a battery module as an energy storage system (XEM4x0x).

- Operation is possible in DC, AC or hybrid mode.
- The electrical functional unit and the battery system are installed separately from one another.
- Loads connected to the device must have a valid CE marking.
- The optional ATS box (XEMA250, automatic transfer switch box for automatic switchover between mains and emergency power supply) enables implementation of a backup power function.



Additional inverter

The device can be operated as an additional inverter (without batteries) within a Hager energy management system in a **farming configuration**. A farming energy meter may also be required for this purpose.



Detailed visualisations of possible device connection variants and operating modes are available as block diagrams in the download area of the customer portal at:

flow.hager.com/documents (login required)

2.2 Installation location



Danger

Danger to life due to fire and explosion!

A fire can occur on electrical devices.

- Do not mount the device in an area at risk of explosions (Ex zone) or in the immediate vicinity of a potential explosion source, such as a gas pipe or gas tank (Ex zone 0 for gases and vapour, Ex zone 20 for cloud).
- Avoid rooms requiring compliance with special fire protection regulations or areas containing highly flammable substances.
- Do not install the device in areas at risk of flooding.

The following must be taken into account when selecting an appropriate location for installation:

- The functional unit and the stackable battery system are suitable for indoor use, but may also be used in weather-protected outdoor areas (protection class IP65). Operation in a garage, under a carport or beneath an outdoor canopy is possible, provided that the devices are not exposed to powerful jets of water.
- At the inverter installation location, operation within the permissible ambient temperature range of -25°C to +60°C must be ensured throughout the year (see [Temperature range and environmental conditions](#)). Direct sunlight and strong temperature fluctuations must be avoided. Operation outside this temperature range will cause the device to overheat and may result in a function loss and loss of legal warranty.
- Install the devices away from heat sources and ensure adequate air circulation during operation.
- The devices may only be operated as permanently installed electrical equipment.

2.3 Unintended use



Warning

Danger to life due to unauthorised modifications to the device!

Unauthorised modifications to the device may result in serious safety issues and danger to life.

Do not carry out any unauthorised modifications of any kind to the device or the external wiring.

HagerEnergy GmbH accepts no liability for damage or accidents resulting from improper or unintended use of the device. Any unauthorised modifications to the device will invalidate the manufacturer's guarantee.

Examples of improper use of the device and system components include, but are not limited to:

- Electrical connection and opening of the device by unqualified persons
- Installation and operation of the device in potentially explosive atmospheres
- Installation and operation of the device in areas containing highly flammable substances
- Short-circuiting the batteries
- Operating the device to supply life-support medical equipment
- Operating the device at ambient temperatures outside the permissible temperature range
- Failure to observe this manual

2.4 Consequences of failure to observe this manual

HagerEnergy GmbH accepts no liability for damage resulting from failure to observe this manual and its safety instructions and warnings.

Any use of the device other than that described in this manual is considered improper use.



Warning

Risk of damage resulting from failure to observe this manual!

Failure to observe the warnings and safety instructions in this manual may result in property damage and serious personal injury.

- Do not use the device for any purpose other than that described in this manual.
- Carry out all installations as described in this manual.
- Use the device only in accordance with the specifications in this manual.
- The manual belonging to this device forms part of the product and must be made available to qualified personnel at all times.

2.5 Safety instructions



Installation and assembly of electrical devices may only be carried out by a qualified electrician in accordance with the applicable national installation standards, directives, regulations, safety requirements and accident prevention regulations.

Proper and safe operation of the device requires correct and professional transport, storage, assembly and installation, as well as careful operation and maintenance of the device.

This chapter lists safety instructions and warnings that must be read thoroughly before carrying out any work on or with the device and must be observed without exception. If any information is not fully understood in terms of content or language, contact and inform the supplier.



Danger

Danger to life due to electrical voltage!

Energised parts can cause serious injuries.

- Before starting work, disconnect the power supply and verify that no voltage is present. This also applies to any subsequent service work.
- The fuse integrated in the device is intended to protect the device and must be used for this device only.
- All prescribed safety regulations, the technical connection conditions (TAB) of the responsible energy supply company and the VDE regulations must be complied with during installation and operation of the device.
- The installer must dimension and provide the necessary cable protection and personal protection accordingly.



Danger

Danger to life due to fire or explosion!

A fire can occur on electrical devices.

- Do not install the device in areas containing highly flammable substances.
- Do not install the device in potentially explosive atmospheres.



Caution

Risk of burns due to hot surfaces!

During operation, the housing may reach elevated surface temperatures.

Avoid prolonged contact with the housing outside the control elements during operation.



Caution

Potential health risks due to exposure to electromagnetic emissions!

Special precautions are required for users of medical devices and implants.

Observe the instructions provided by the respective manufacturers.



Caution

Risk of injury to children!

Children may injure themselves when playing with the device or its packaging.

Keep children away from the device, packaging and accessories.



Warning

Risk of damage to the device and battery system due to failure to observe the permissible environmental conditions!

Failure to observe the permissible environmental conditions may result in damage to the device and the battery system. Operation outside these environmental conditions may invalidate the guarantee.

The permissible environmental conditions for the inverter and the various battery types must always be observed, including:

- permissible and recommended ambient temperature
- relative humidity
- adequate air ventilation and cooling
- maximum installation altitude

The applicable values can be found in the data sheet for the respective device.

2.6 Symbols on the type label

Symbol	Meaning	Explanation
	CE marking	The device complies with the requirements of the applicable EU directives and standards.
	Warning: hot surfaces	–
	Warning: hazard	–
	Observe the documentation	–
	Manufacturer information in accordance with Section 18(4) of the German Electrical and Electronic Equipment Act (ElektroG)	The symbol regularly shown on electrical and electronic equipment indicates that, at the end of its service life, the device must be disposed of separately from unsorted household waste (see Disposal).
	Warning: failure to observe the discharge time.	Danger to life due to high electrical voltages in the inverter Even after disconnecting the device from external voltage sources, voltage may still be present in the device. Always observe the capacitor discharge time.
	Caution! The device is supplied by multiple voltage sources: – PV generator – Battery – AC mains	Disconnecting only individual voltage sources may not fully de-energise the entire system.
	Before opening the device, disconnect it from all voltage sources.	–

Table 1: Symbols on the type label

3 Design and layout of the device

3.1 The electrical functional unit

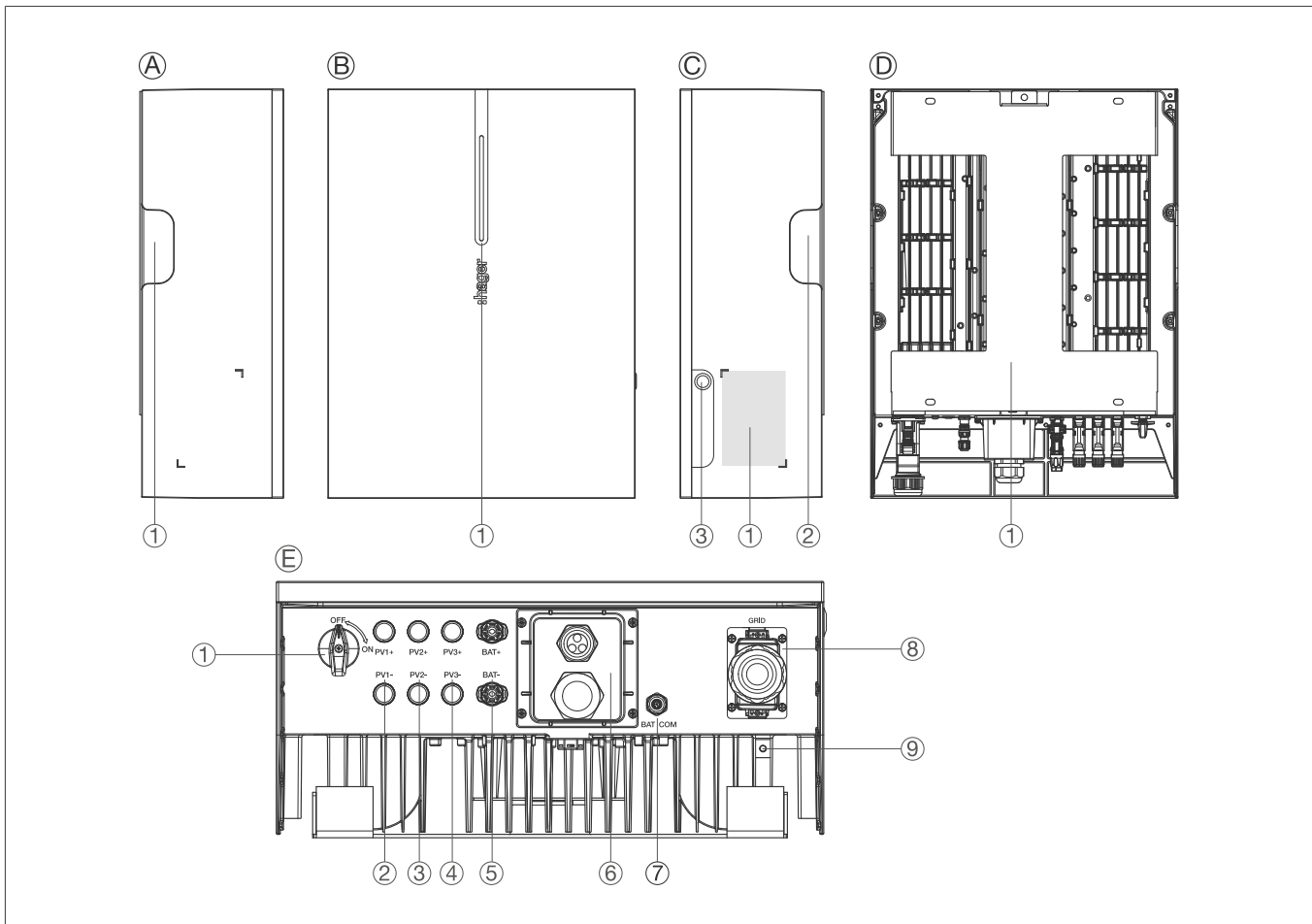


Fig. 1: Structure of the electrical functional unit

- (A) **Left side view**
- (1) Left recessed grip
- (B) **Front view**
- (1) LED strip for status indication
- (C) **Right side view**
- (1) Type label
- (2) Right recessed grip
- (3) Push button for manually triggered functions
- (D) **Rear view**
- (1) Wall bracket
- (E) **Bottom view**
- (1) DC disconnect switch
- (2) PV string 1 (positive and negative)
- (3) PV string 2 (positive and negative)
- (4) PV string 3 (positive and negative)
- (5) Battery connection 1 (positive and negative)
- (6) Cover for communication connection
- (7) BAT/COM connection

- ⑧ AC port
- ⑨ Equipotential bonding

3.2 Identification by means of the type label

The type label with the exact device designation clearly identifies the device. It is located on the right-hand side of the housing. The information on the type label is important for the safe use of the device and for any enquiries to Technical Support. The type label must remain permanently attached to the device.



Fig. 2: Type label (example)

3.3 The stackable battery system

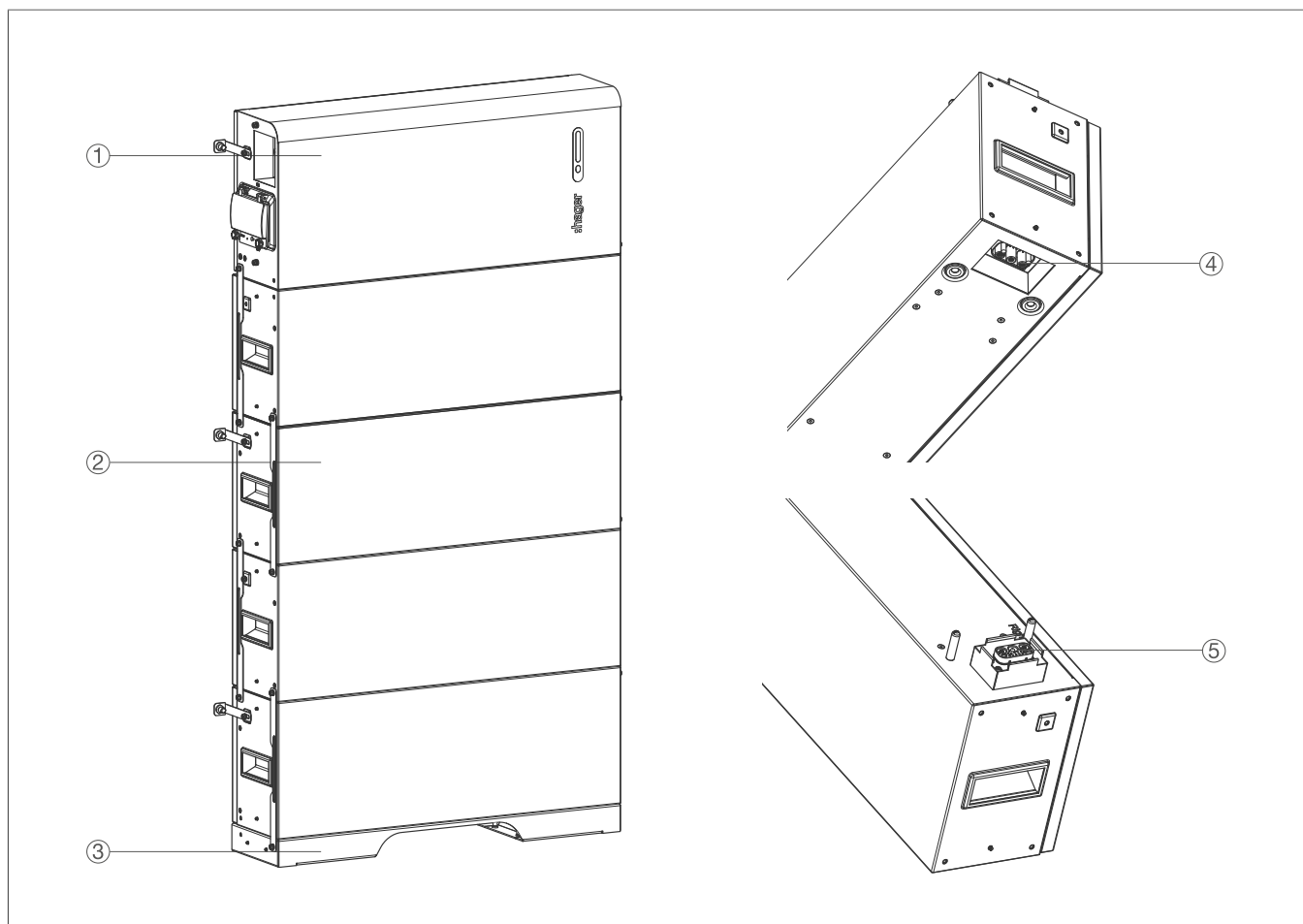


Fig. 3: Structure of the stackable battery system

- ① Battery management system (BMS)
- ② Battery module
- ③ Base plate
- ④ Battery/BMS input connection
- ⑤ Battery module output connection

3.4 The ATS box

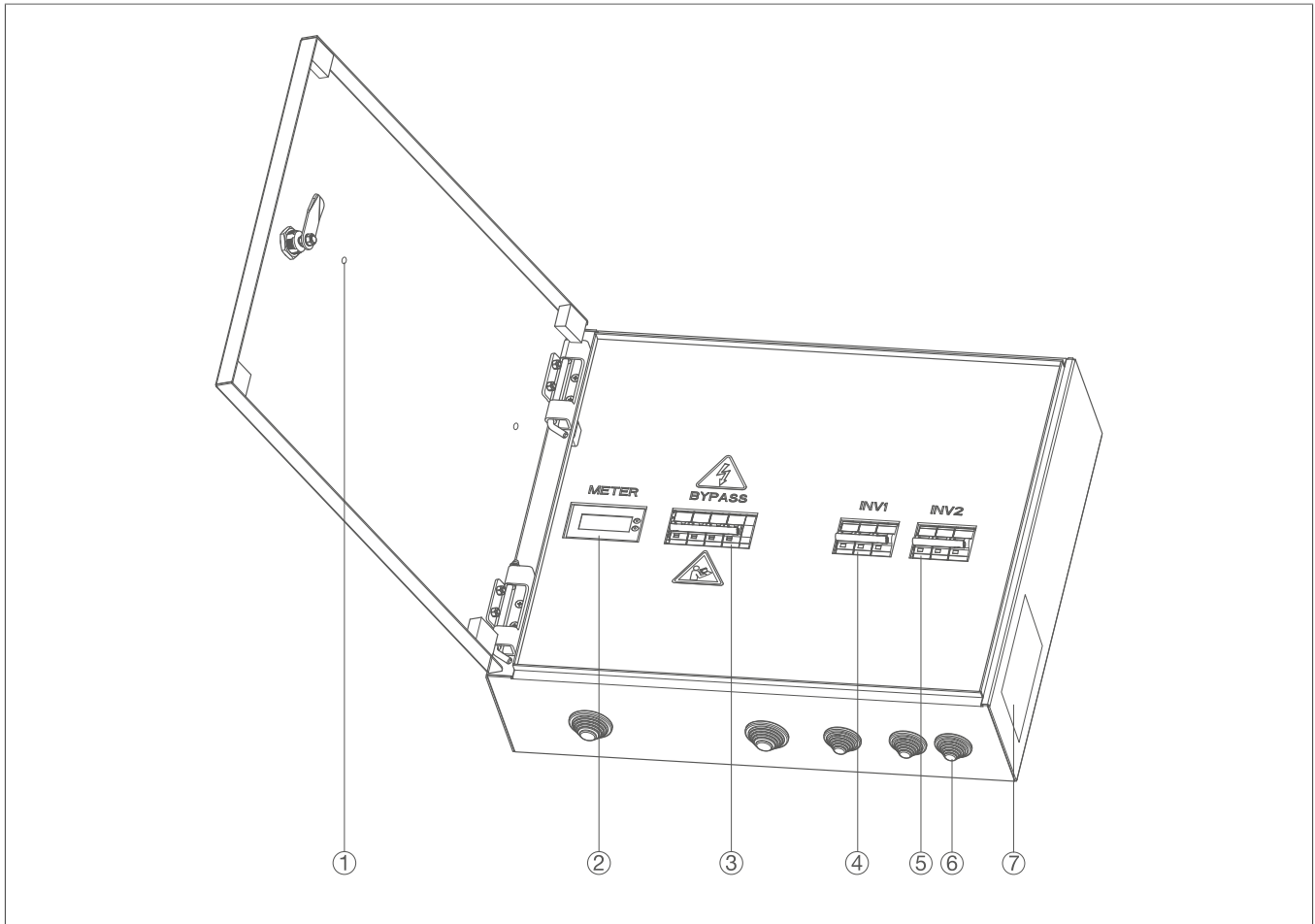


Fig. 4: Structure of the ATS box

- ① Sealing cover
- ② Energy meter
- ③ Bypass switch
- ④ Circuit breaker 1
- ⑤ Circuit breaker 2
- ⑥ Cable entries
- ⑦ Type label

3.5 Black start capability of the device

The term **black start** originally comes from conventional power generation. It refers to the ability of an energy storage system or generating unit to start up from a shutdown state and generate electricity independently of the power grid. This energy management system has a comparable capability. It requires only solar energy, not mains power, to resume operation after shutdown.

For the system, shutdown is an exceptional situation that only occurs if no power from the PV system is available over an extended period. Before the battery becomes excessively discharged, the system shuts down automatically. This also applies during prolonged power failures if the usable battery capacity is exhausted and recharging is not possible due to a lack of solar power.

However, sufficient solar energy will eventually become available again. The black start capability guaranteed by Hager means that the energy management system resumes operation solely using energy

from the PV system, recharges the batteries and supplies energy for self-consumption or backup power.

- As soon as the PV system starts generating current again, the main switch of the battery management system must be operated.

The device then automatically resumes operation without mains supply, even if the grid outage continues. However, this process requires a certain residual amount of energy in the battery modules. A minimum battery voltage must be present to trigger the black start via the battery switch.

3.6 Charging the batteries from the mains

3.6.1 Technical reasons

- A minimum energy reserve is maintained in the batteries to protect them. If the battery level temporarily falls below this minimum reserve, it may be necessary to recharge it from the mains (trickle charge).



Note

Recharging the batteries using solar production is always prioritised over recharging from the mains.

- The minimum energy reserve in the batteries may temporarily fall below the minimum required level if solar energy generation and stored energy are insufficient to cover self-consumption. In such cases, charging takes place from the mains.
- The self-consumption of the BMS (battery management system) and, where applicable, the energy management system is not supplied from battery power.
- A backup power reserve defined by the user is maintained by charging from the mains when no solar power is available.

3.6.2 Use of dynamic electricity tariffs

The batteries can be charged from the mains using dynamic electricity tariffs.

Use of this function requires a dynamic electricity tariff contract with a suitable electricity supplier.

3.7 Grid-oriented control of load devices (Section 14a of the German Energy Industry Act (EnWG))

Systems with controllable load devices commissioned from 01/01/2024 on must comply with Section 14a EnWG.

Selected loads are required to be controllable when all of the following criteria are met: maximum power above 4.2 kW, classification as a controllable load device under EnWG, and connection to the low-voltage grid.

Controllable load devices in accordance with Section 14a EnWG include the following categories:

- Charging points that are not publicly accessible
- Heat pump heating systems including auxiliary heating devices
- Space cooling systems
- Systems for storing electrical energy (battery storage systems)

Normal **household electricity consumption** and all other devices are **not affected** by any temporary power limitations.

HagerEnergy GmbH energy storage systems support communication with a Smart Meter Gateway (SMGW) via the EEBus communication interface and can therefore comply with the regulation introduced by law.

HagerEnergy GmbH vehicle chargers operated in conjunction with an HagerEnergy GmbH energy storage system also support this regulation.

The function is available with all energy storage systems from software version **xxx_2023_06** or later and therefore fully meets the requirements of Section 14a EnWG.

4 Scope of delivery and transport inspection

4.1 Included on the pallet



The flow R3 energy storage systems (XEM4x0x) generally include one battery module in addition to the inverter. For the battery module, please refer to the separate installation manual supplied with the product in printed form or available for download at:
hgr.io/d/XEM4100/ProductInstallationManual



Designation	Details
flow R3 inverter	Consisting of: – Electrical functional unit – Wall bracket
Battery module(s) ^[1] : Varies depending on the battery type	Structure of the stackable batteries
Battery kit ^[1]	Battery and communication cables for connecting the inverter to the BMS
Accessory box XEMA301 (BE-B1443, in the device): Varies depending on the battery type	Contains various materials for electrical installation of the device.
Quick guide for installing the inverter	1 unit
Quick guide for installing the ATS box	1 unit
Battery module installation manual ^[1]	1 unit

^[1] Included only in the scope of delivery of an XEM4x0x energy storage system.

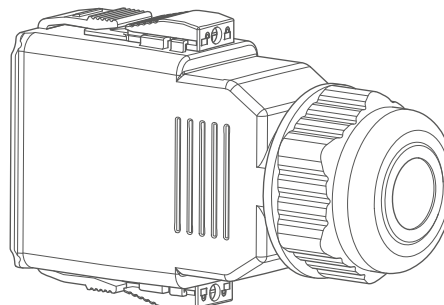
4.2 Connectors included in the accessory box

Designation

Figure

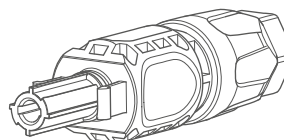
AC connector

Quantity: 1



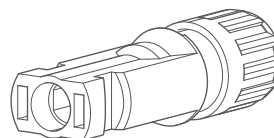
PV connector (positive)

Quantity: 3



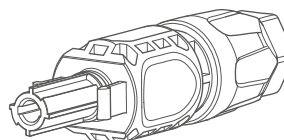
PV connector (negative)

Quantity: 3



Battery connector (positive)^[1]

Quantity: 1



Battery connector (negative)^[1]

Quantity: 1

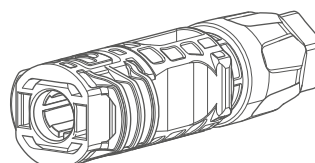


Table 2: Connectors included in the scope of delivery (illustrations for reference only)

^[1] Included only in the scope of delivery of an XEM4x0x energy storage system.



Battery accessory pack

For the respective scope of delivery, refer to the installation manual for the corresponding battery type.

4.3 Transport

Please inspect the delivered goods thoroughly. If the packaging shows signs of damage that may indicate damage to the device, or if the device itself is visibly damaged, refuse delivery and report the damage within 24 hours.

- ❶ To protect the device from damage, transport it to the installation location in its packaging and unpack it there.
- ❷ If battery modules are included in the scope of delivery, they should also only be unpacked at the installation location.
- ❸ Retain the original battery packaging. In the event of battery replacement, this ensures that the battery can be transported safely and in accordance with UN38.3 hazardous goods class 9. This also applies to subsequent disposal of the batteries.
- ❹ After unpacking the device, check the scope of delivery for completeness and inspect the parts for damage.
- ❺ Please report any damaged or missing parts immediately to flow.hager.com/contacts (login required).
- ❻ Transport damage claims are submitted to the relevant transport company.

5 Installation



Installation and assembly of electrical devices may only be carried out by a qualified electrician in accordance with the applicable national installation standards, directives, regulations, safety requirements and accident prevention regulations.



Danger

Danger to life due to fire or explosion!
A fire can occur on electrical devices.

- Do not install the device in areas containing highly flammable substances.
- Do not install the device in potentially explosive atmospheres.



Caution

Crushing due to high weight!
Careless placement of the device may result in foot injuries.
Wear safety shoes.



Caution

Risk of injury due to sharp edges!
Sharp edges may cause hand injuries.
Wear gloves when assembling the device and when positioning and installing the battery modules.

5.1 Dimensions and weights

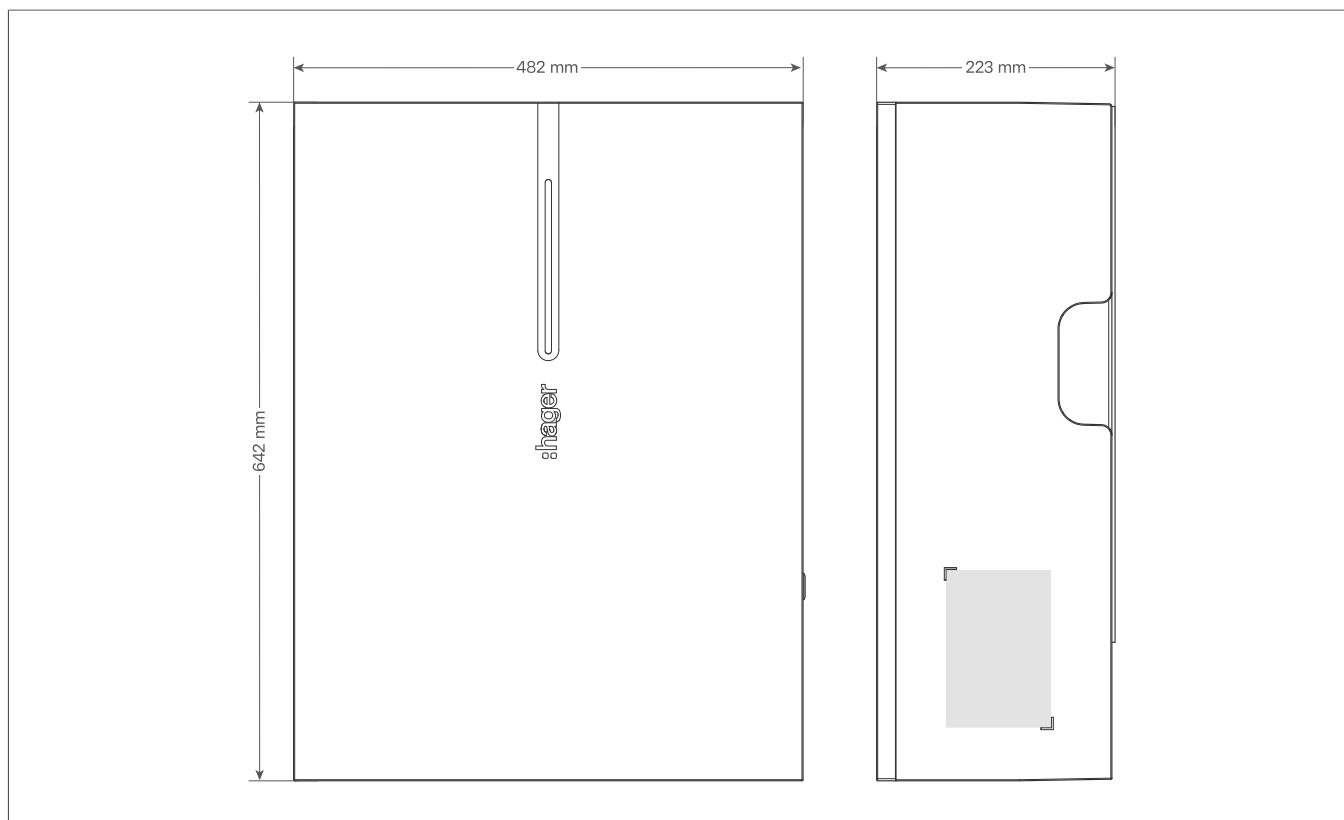


Fig. 5: Inverter dimensions

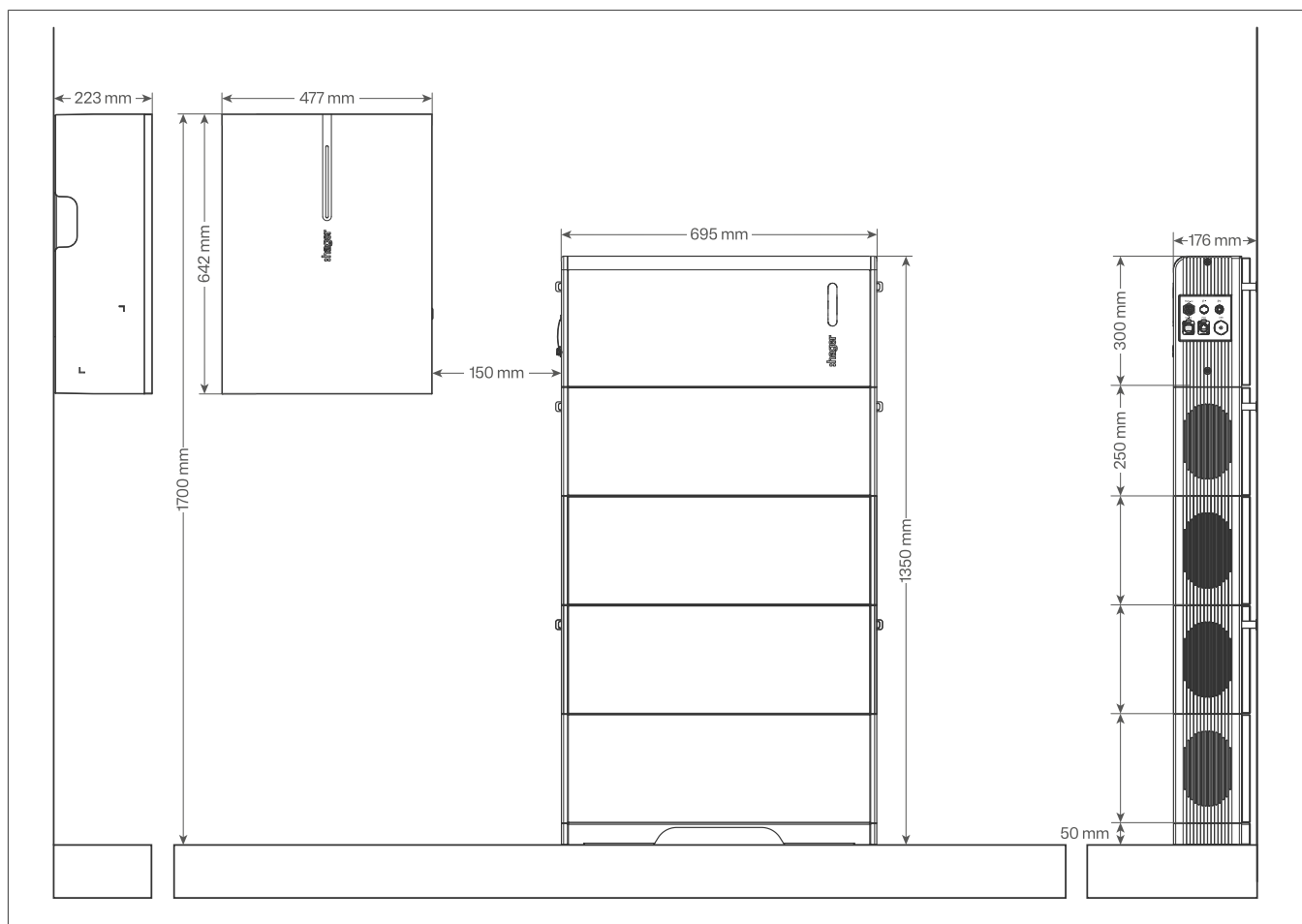


Fig. 6: Inverter dimensions with stackable battery system

Weight without packaging

Components	Weight
Inverter	approx. 40 kg
Batteries	The weight of the batteries depends on the manufacturer.

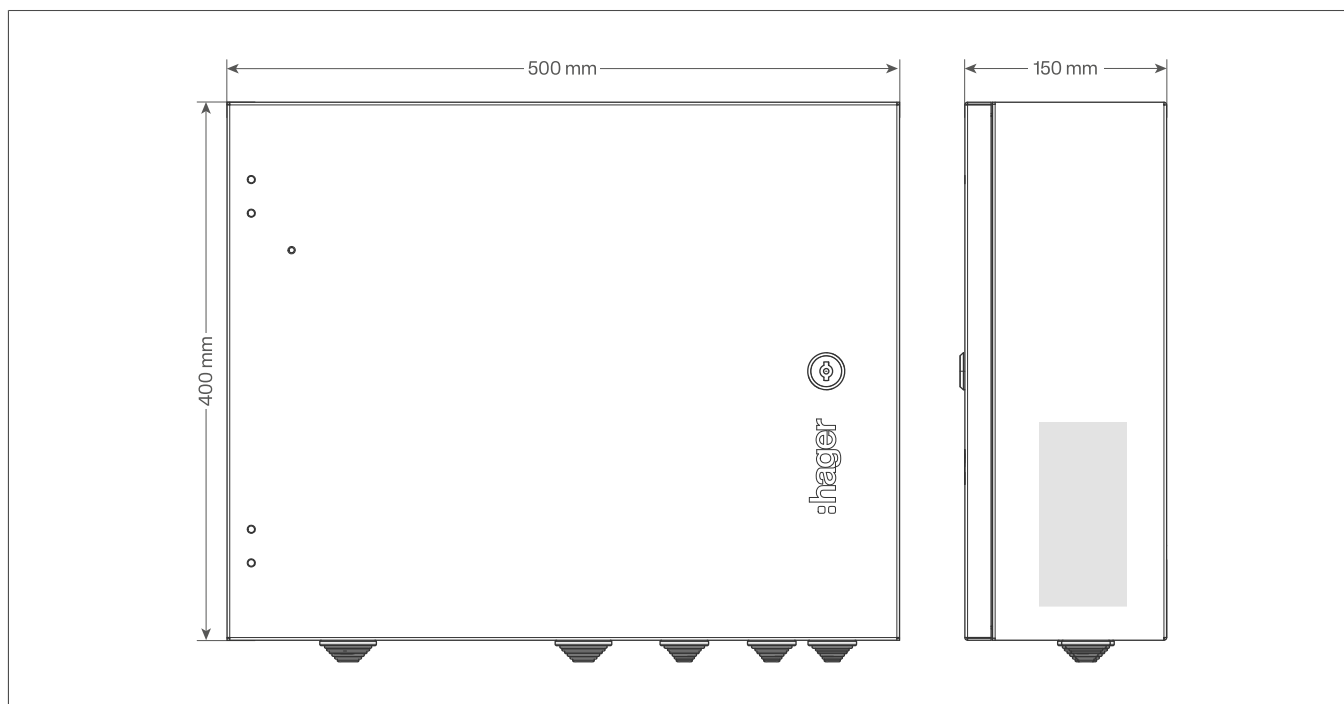


Fig. 7: ATS box dimensions

5.2 Assembly tools

The following tools must be available for assembly and installation of the device:

- Screwdriver set (including Torx)
- Hex key set
- Open-ended spanner set
- Torque wrench
- Drill
- Cable stripping tool
- Crimping pliers
- Utility knife
- Side cutters
- Combination pliers
- Spirit level
- Multimeter
- Rotating field indicator

5.3 Requirements for the installation location



Danger

Danger to life due to fire and explosion!

A fire can occur on electrical devices.

- Do not mount the device in an area at risk of explosions (Ex zone) or in the immediate vicinity of a potential explosion source, such as a gas pipe or gas tank (Ex zone 0 for gases and vapour, Ex zone 20 for cloud).
- Avoid rooms requiring compliance with special fire protection regulations or areas containing highly flammable substances.
- Do not install the device in areas at risk of flooding.



Danger

Fire hazard due to high temperatures!

If the battery module is exposed to high temperatures, battery fluid may leak and ignite.

- Do not expose the battery module to pressure or temperatures above 55°C.
- Do not place the battery module near a heat source such as a fireplace.
- Do not expose the battery module to direct sunlight.



Danger

Danger to life due to obstructed escape routes!

Blocked or obstructed escape routes may result in death or serious injury in hazardous situations.

- Keep walkways and escape routes clear at all times.
- Do not install the device in walkways or escape routes.
- Do not place or store objects in escape routes.
- Avoid tripping hazards such as loose cables.

The qualified installer is required to explain the installation and assembly conditions sufficiently to the customer so that the customer is aware that these conditions must be observed at all times.

If the installation and assembly conditions are not observed at all times, there is no entitlement under the guarantee and HagerEnergy GmbH reserves the right to assess any guarantee claim.

The installation and assembly conditions are available to the customer at any time in the operating manual.

5.3.1 Installation location for the electrical functional unit

- The electrical functional unit must not be installed in living rooms or bedrooms.
- When installing the device near living areas, note that operating noises from the device may be disruptive.
- **Do not** install the electrical function unit on the floor.

Wall installation

- Ensure that the wall structure is suitable.
- Installation must be carried out on a flat, solid, non-combustible wall:
 - No installation on plasterboard walls.
The wall must be able to support a significant weight. Walls made of plasterboard or similar material are therefore unsuitable.
 - For wooden walls, install the wall bracket on non-combustible material.
Calcium silicate building boards, for example, are suitable.
The applicable fire protection requirements must be observed.

Installation height

- The electrical functional unit must be installed so that the top edge of the device is no more than 2 metres above the floor, allowing any service work to be carried out safely and easily.
- An installation height of approx. 1.7 metres is recommended. The LED strip for status indication should be clearly visible.
- No heaters, tumble dryers or similar heat sources may be located directly below the device.
- Ensure adequate air circulation.
- Service work on the device must be easy to carry out.
- There must be sufficient space below the device so that, for example, a PV connector can be disconnected without difficulty.
- Control elements below the device (connection panel) and on the right-hand side must be fully accessible and operable.
- Labels must be fully legible.
- The environmental conditions must be observed at all times (see [Temperature range and environmental conditions](#)). In particular, no heaters or similar heat sources may be operated in the immediate vicinity of the device.

5.3.2 Installation location for the electrical functional unit and stackable battery system

- The electrical functional unit and the stackable battery system are installed separately.
- They must not be installed in living rooms or bedrooms.
- The installation location must be selected in accordance with the IP degree of protection.
- The electrical functional unit is suitable for indoor use or use in weather-protected outdoor areas (IP degree of protection IP65).
- The stackable battery system is suitable for indoor use and use in weather-protected outdoor areas (IP degree of protection IP65).

Suitable: Ideal installation locations include meter rooms, utility rooms, garages or carports.

Unsuitable: Do not install in the attic. Do not install in rooms subject to increased fire protection requirements (e.g. oil tank rooms).

- The stackable battery system must be installed on a solid and level floor.
- The stackable battery system is secured to the wall using anti-tip brackets.
 - No installation on plasterboard walls.
Walls made of plasterboard or similar materials are unsuitable.
 - For wooden walls, install the anti-tip bracket on non-combustible material.
Suitable materials include, for example, calcium silicate building boards.
The applicable fire protection regulations must be observed at all times.

- The environmental conditions must be observed at all times (see [Temperature range and environmental conditions](#)). In particular, no heaters or similar heat sources may be operated in the immediate vicinity of the device.

5.3.3 Installation location for ATS box (accessory, XEMA250)

- The ATS box must not be installed in living rooms or bedrooms.
- Installation in a dry location is mandatory.
- The ATS box is suitable for indoor use (IP degree of protection IP20).
Suitable: Ideal installation locations include basements, meter rooms, utility rooms and garages.
Unsuitable: Rooms subject to increased fire protection requirements (e.g. oil tank rooms). Do not install the device outdoors.
- When installing the device near living areas, note that operating noises from the device may be disruptive.
- **Do not** install the ATS box on the floor.

Wall installation

- Ensure that the wall structure is suitable.
- Installation must be carried out on a flat, solid, non-combustible wall:
 - No installation on plasterboard walls.
Walls made of plasterboard or similar materials are unsuitable.
 - For wooden walls, install the anti-tip bracket on non-combustible material.
Calcium silicate building boards, for example, are suitable.
The applicable fire protection requirements must be observed.

Installation height

- The ATS box must be installed so that the top edge of the device is no more than 2.00 metres above the floor, allowing any service work to be carried out safely and easily.
- No heaters, tumble dryers or similar heat sources may be located directly below the device.
- Ensure adequate air circulation.
- Service work on the device must be easy to carry out.
- Control elements below the device (connection panel) and on the right-hand side must be fully accessible and operable.
- Labels must be fully legible.
- The environmental conditions must be observed at all times (see [Temperature range and environmental conditions](#)). In particular, no heaters or similar heat sources may be operated in the immediate vicinity of the device.

5.3.4 Temperature range and environmental conditions

Permissible ambient temperature at the installation locations:

- Electrical functional unit: -25°C to +60°C
- Battery system: -20°C to +55°C
- ATS box: 0°C to +40°C

Recommended ambient temperature at the installation locations:

- Electrical functional unit: 0°C to +20°C
- Battery system: +15°C to +30°C
- ATS box: 5°C to +35°C

Operation outside this temperature range may result in malfunction and loss of guarantee coverage.

- Ensure adequate cooling of the power electronics. The heat sink may reach temperatures exceeding 80°C.
 - At the installation location, a minimum clearance of 400 mm must be maintained between the top edge of the device and the ceiling to ensure cooling of the power electronics.
 - Air circulation must not be obstructed. Adequate heat dissipation is ensured via the side air outlets.
 - No heaters or similar heat sources may be operated in the immediate vicinity of the installation location.
- The maximum installation altitude is 2,000 m above sea level. Installations at greater altitudes are possible only on request and may require derating factors to be taken into account.

5.3.5 Minimum distances

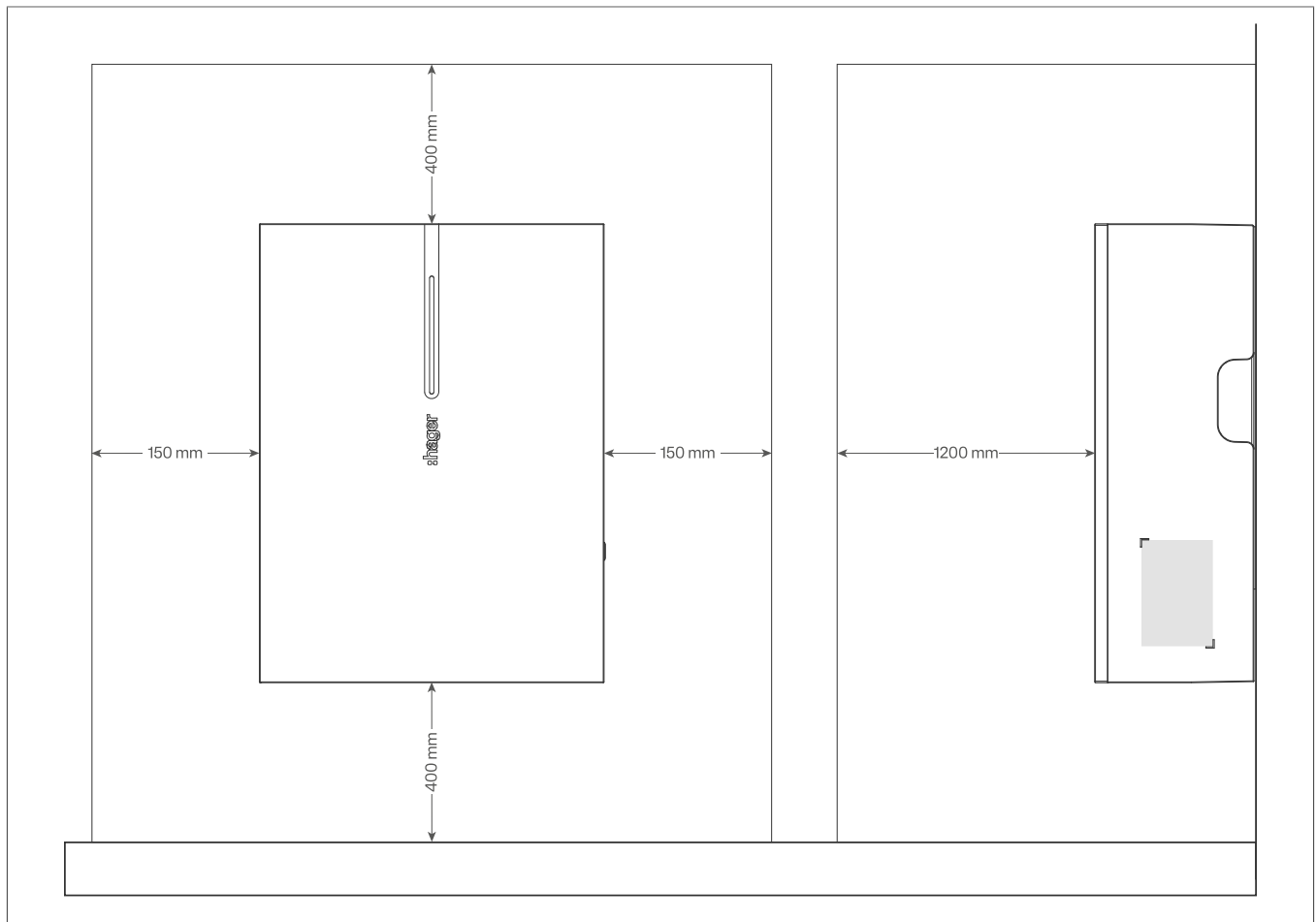


Fig. 8: Minimum clearances for inverter

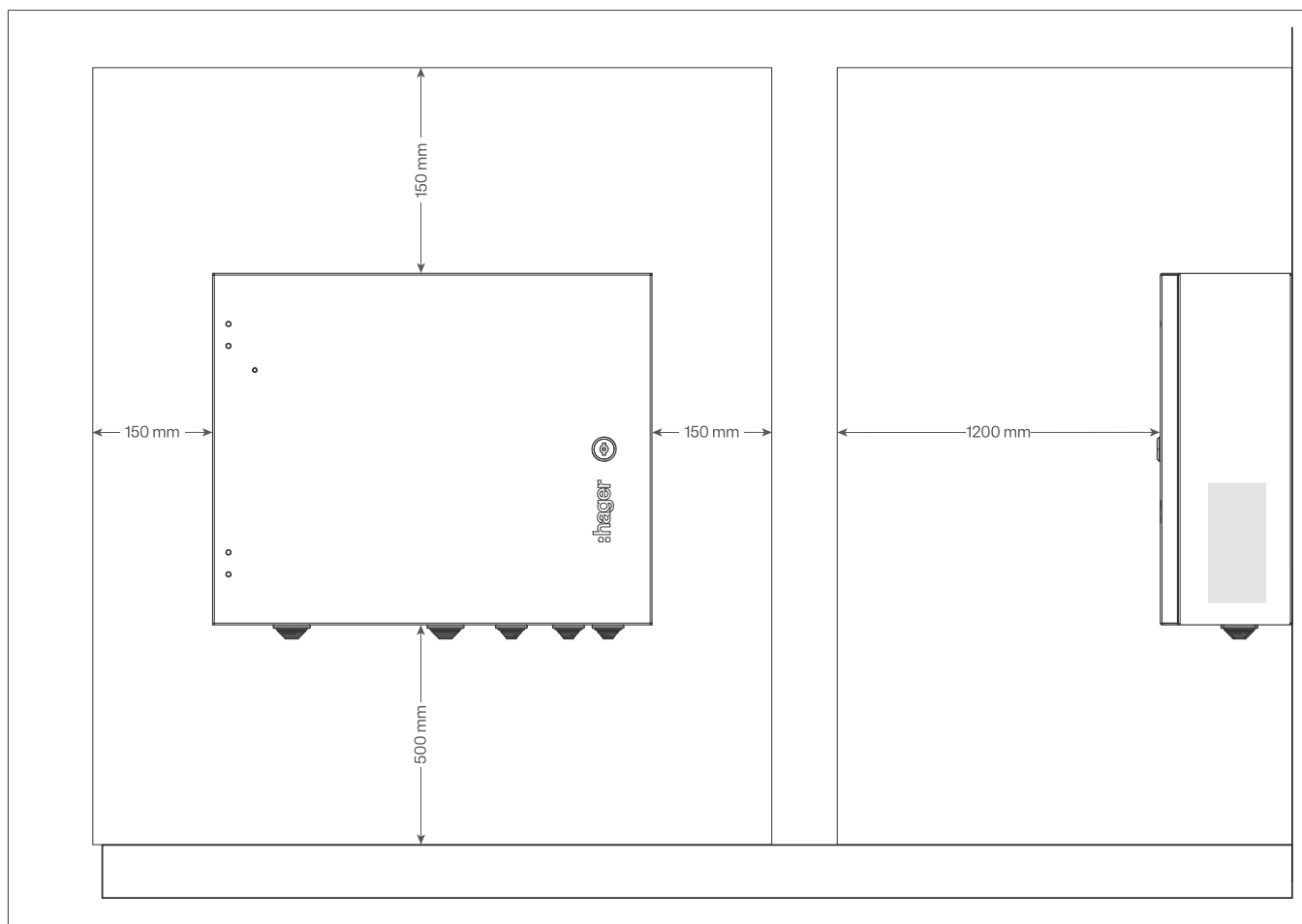


Fig. 9: Minimum clearances for ATS box

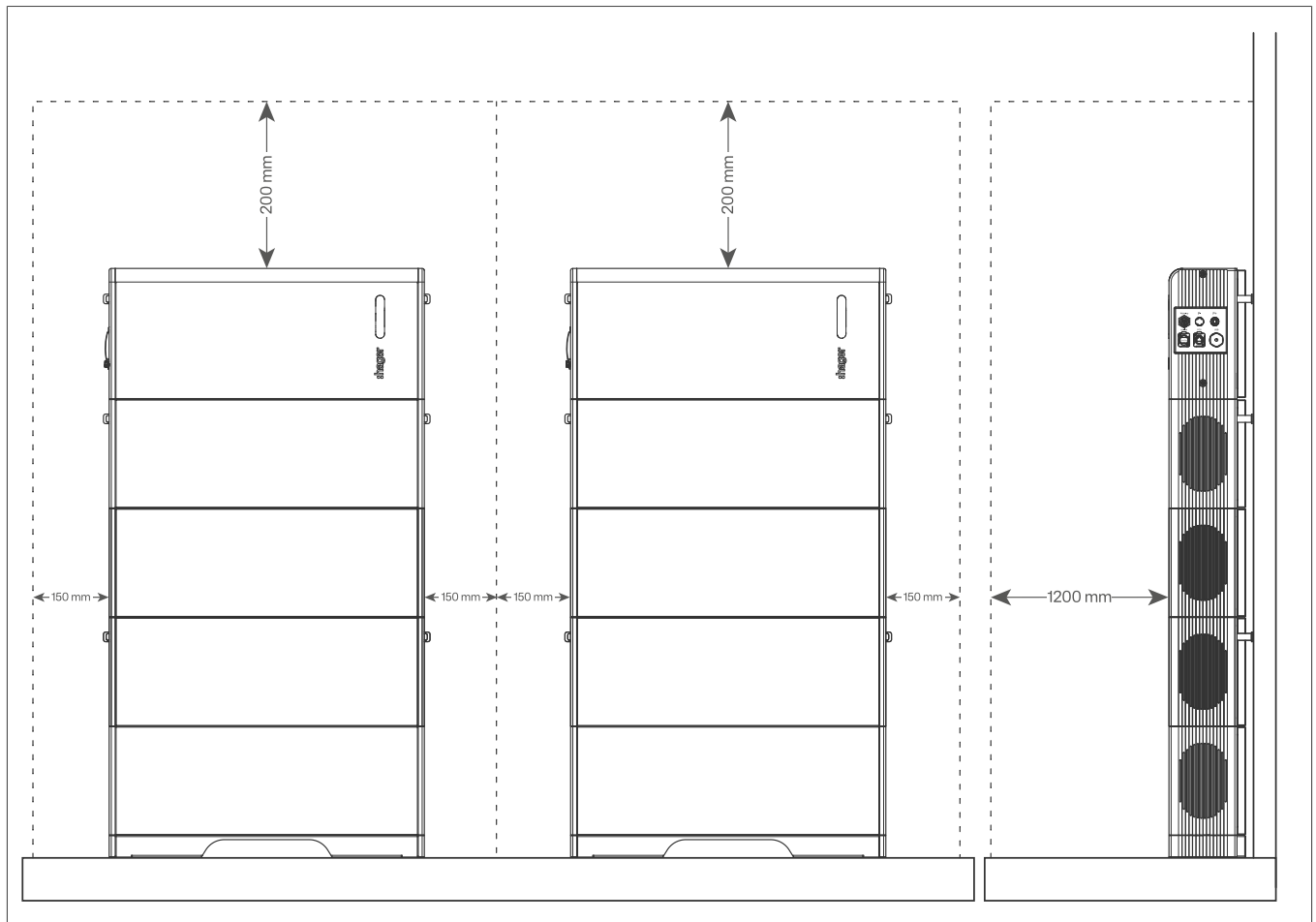


Fig. 10: Minimum clear distances between the stackable battery system

5.4 System assembly



Warning

Risk of injury due to unsuitable mounting wall!

Installation on an unsuitable wall may result in injury if the device falls.

- Install the device only on walls with suitable properties.
- Before installation, ensure that the mounting wall and fixing material have the required load-bearing capacity to support the weight of the device.
- Observe the instructions at [Requirements for the installation location](#).



Attention

Risk of damage to the device due to careless installation!

Careless installation may damage or scratch the device.

Carry out the installation with great care to avoid damage to the device, the paint finish and the electronic components.



Information on installation of the stackable battery system can be found in the corresponding DCB-SAHoc manual for flow R3 energy management systems in the download section of the customer portal at flow.hager.com/documents (login required).

5.4.1 Wall mounting of the electrical functional unit

Securing the wall bracket

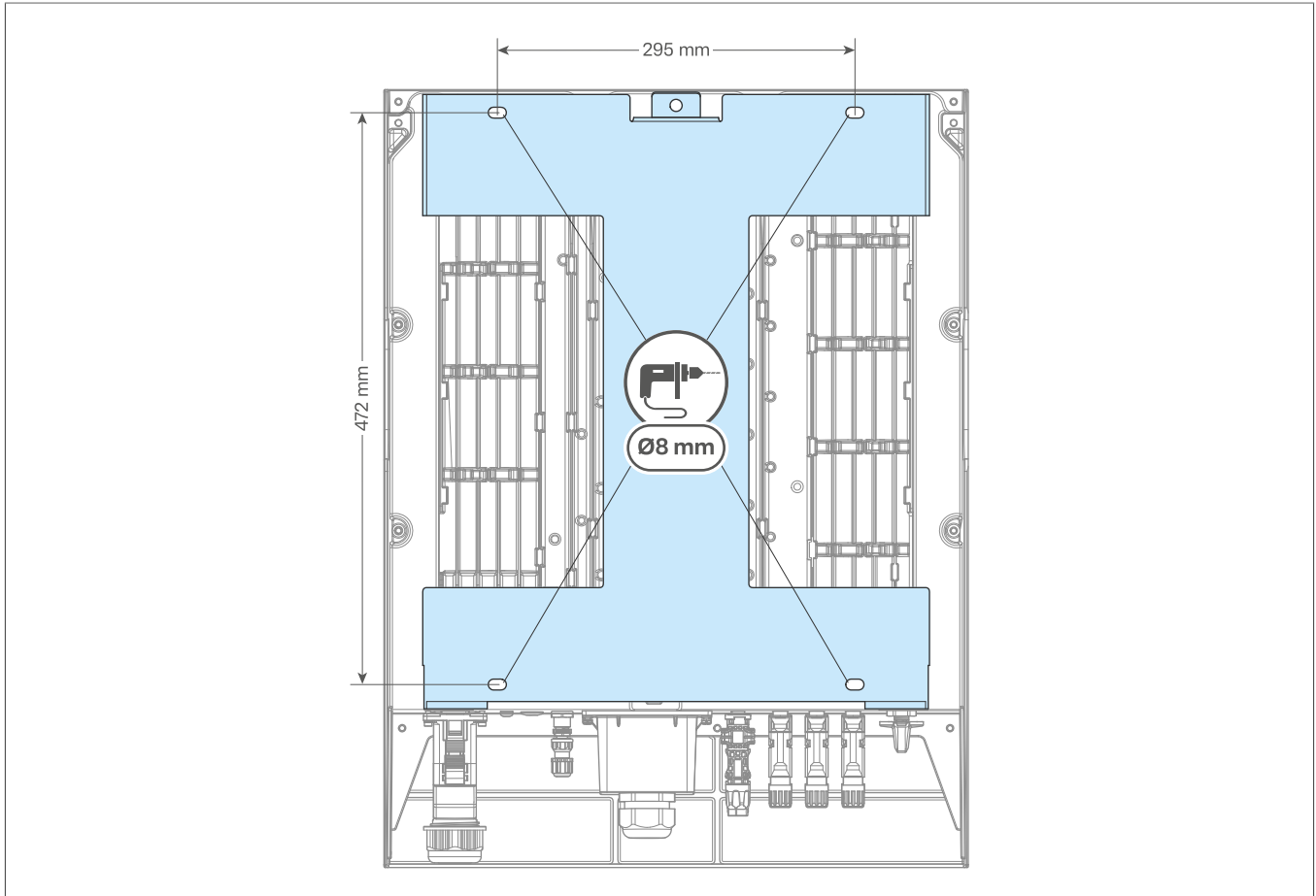


Fig. 11: Drilling template for wall bracket



Note

When installing the wall bracket, the recommended installation height of 1.7 m must be observed (see [Requirements for the installation location](#)).

- 1 Position the wall bracket horizontally on the mounting wall using a spirit level.
- 2 Mark the drill holes (4x) at the corresponding positions on the mounting wall.
- 3 Drill 4 holes with a diameter of 8 mm in the mounting wall.
- 4 Insert the supplied heavy-duty wall plugs into the drilled holes.
- 5 Place the wall bracket on the heavy-duty wall plugs.
- 6 Fit the washers and hex nuts onto the heavy-duty wall plugs.
- 7 Tighten the hex nuts with a tightening torque of 20 Nm.

Hanging the electrical functional unit on the wall bracket

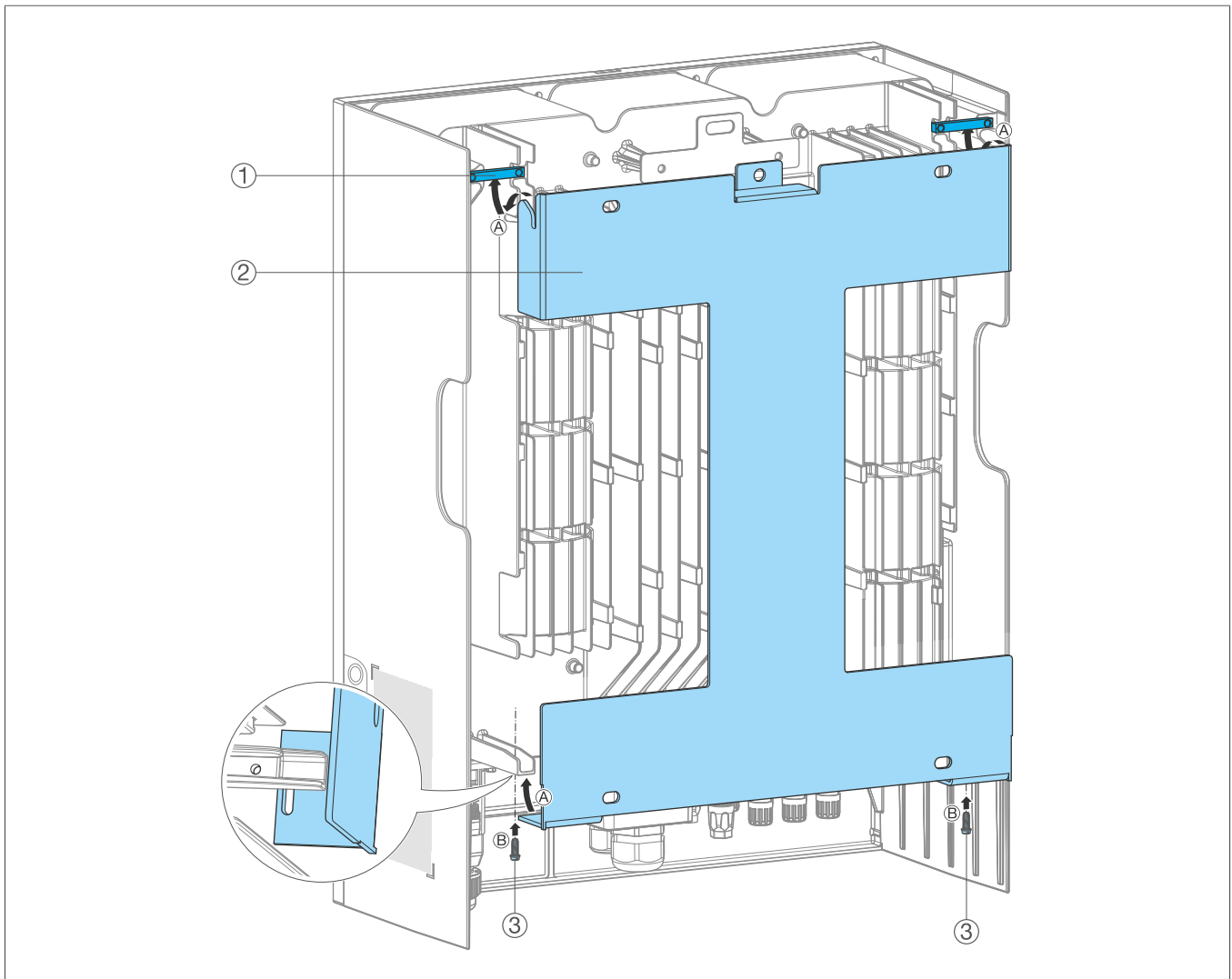


Fig. 12: Wall bracket

- ① Retaining bolts
- ② Wall bracket
- ③ Fastening screws

- ① Hang the electrical functional unit on the wall bracket (2) using the two upper retaining bolts (1) as shown.
- ② Insert the two fixing screws (3) from below through the wall bracket and screw them into the device.

Earthing the electrical functional unit

An earthing conductor must be attached to the underside of the electrical functional unit for earthing purposes.



Note

The cross-section of the earthing conductor must be at least 10 mm².

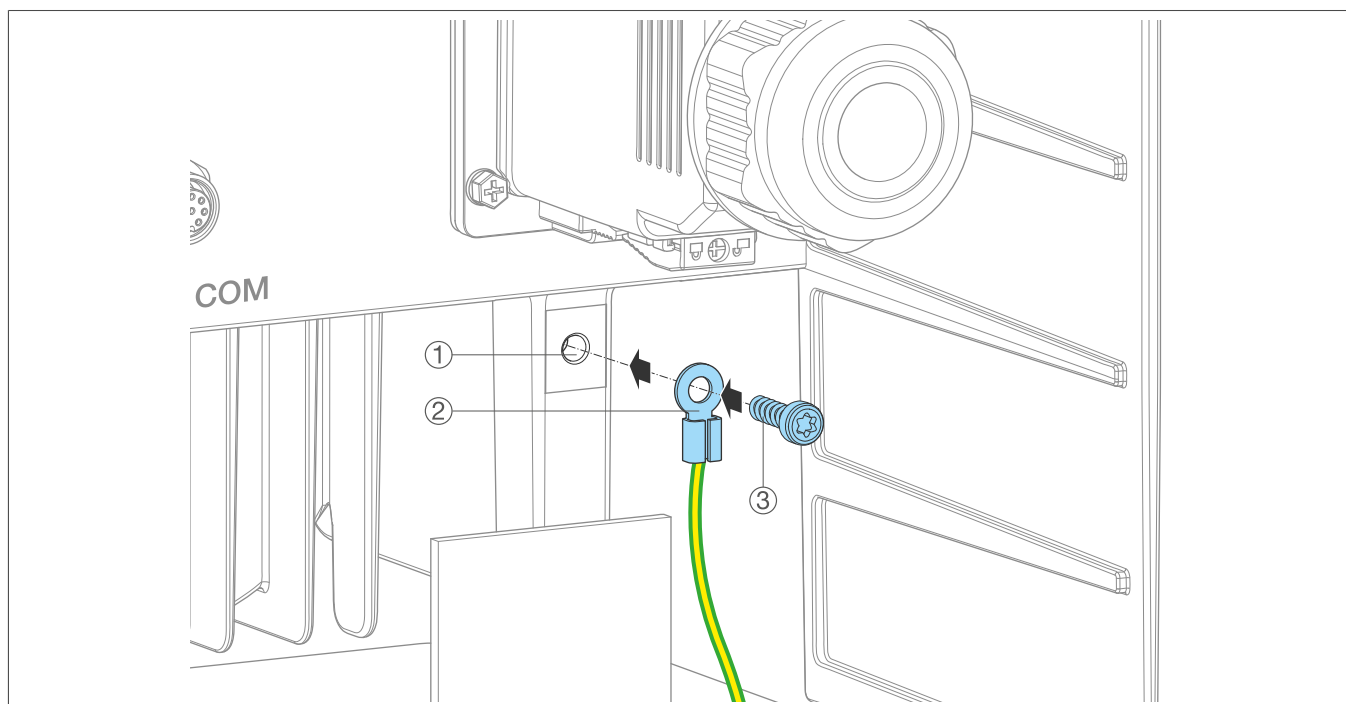


Fig. 13: Earthing conductor for the electrical functional unit

- ① Threaded hole
 - ② Ring terminal of the earthing conductor (to be provided on site)
 - ③ Fastening screw
- Insert the fixing screw (3) through the ring terminal of the earthing conductor (2) and tighten it in the threaded hole (1) on the underside of the device with a tightening torque of 3.0 Nm.

Removing the cover cap

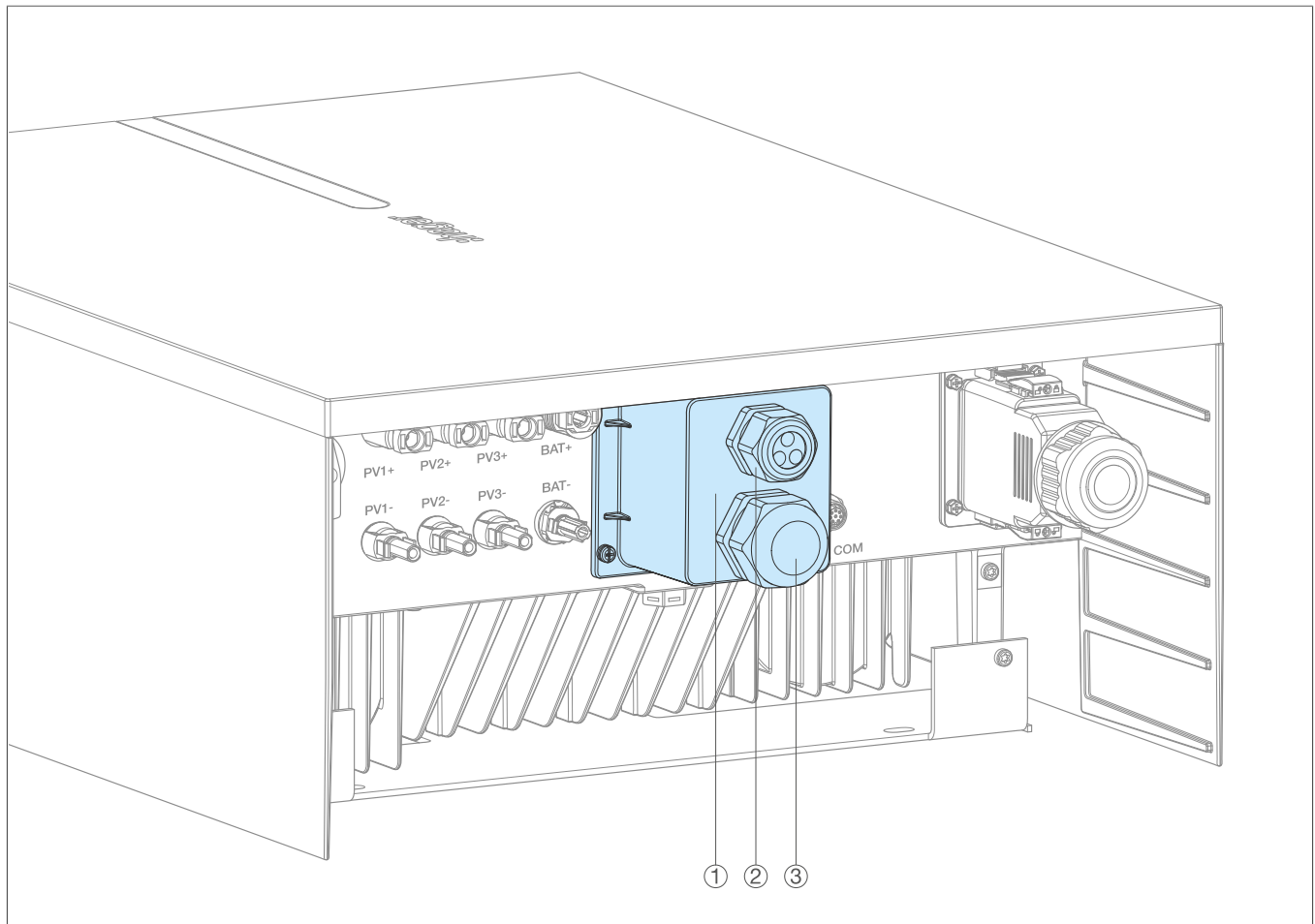


Fig. 14: Removing the cover cap

- ① Sealing cover
- ② Upper cable gland
- ③ Lower cable gland

- ① Loosen the 4 screws on the cover cap (1) and remove the cover cap.
- ② Loosen both cable glands (2) and (3).
- ③ Route all cables for the backup power function (see [Backup power function \(option\)](#)) and power measurement (see [Externe Leistungsmessung über CAN-Bus](#)) through the cable glands and the cover cap.
- ④ Tighten the cable glands finger-tight only so that the cables can still be positioned during installation.

5.4.2 Wall mounting of the ATS box

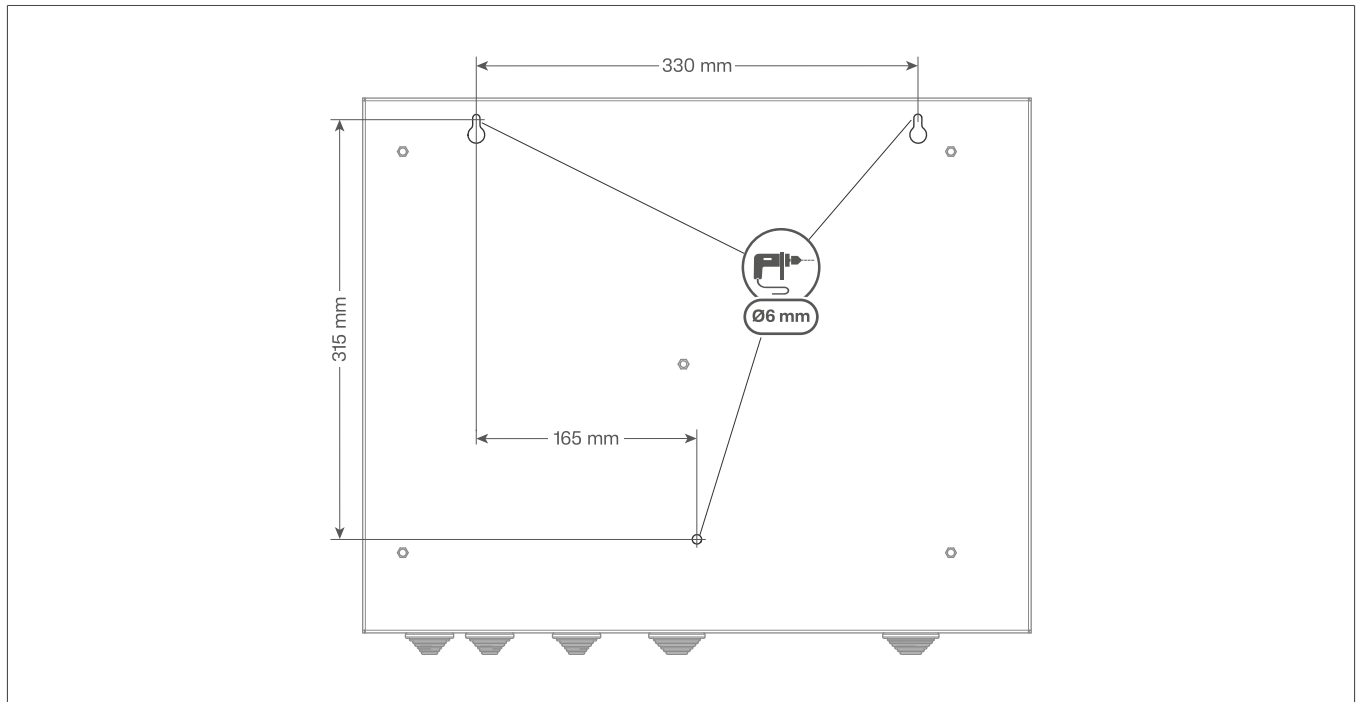


Fig. 15: Drilling template for ATS box

6 Electrical connection



Installation and assembly of electrical devices may only be carried out by a qualified electrician in accordance with the applicable national installation standards, directives, regulations, safety requirements and accident prevention regulations.

This also applies to decommissioning of the device.

National regulations and safety provisions must be observed. See also IEC 60364-7-712:2017 (DIN VDE 0100-712:2016-10).

6.1 Safety instructions



Danger

Electric shock when live parts are touched!

An electric shock can lead to death!

- Before carrying out work on the device, disconnect the connecting cables, secure them against being switched on again, verify that no voltage is present, earth and short-circuit them and cover any live parts nearby.
- Prevent or switch off backup power operation.
- Before opening the device, set the DC isolator and the main switch of the battery management system (BMS) to **OFF**. Be sure to remove the DC plugs.
- Do not switch off the DC voltage by disconnecting the DC plugs only. Otherwise, there is a risk of arcing.
- Comply with all prescribed safety regulations, the technical connection conditions (TAB) of the responsible energy supply company and the VDE regulations during installation and operation of the device.
- Dimension and provide the necessary cable protection and personal protection accordingly.



Danger

Danger to life due to high voltages in the inverter!

Even after disconnecting the device from external voltages, voltage may still be present in the device.

- Always observe the capacitor discharge time stated on the type label.



Caution

Risk of property damage or personal injury!

Failure to observe this manual may result in injury or damage to the device.

- The electrical connection of the inverter and the connection of the AC and DC voltages must be carried out in the sequence described here.



Attention

Risk of destruction of or damage to the device due to connection to other DC voltage sources!

The DC connection is designed exclusively for operation with photovoltaic systems.

- Connect the DC side of the device only to photovoltaic systems.
- Do not connect the device to other DC voltage sources.

6.2 Integration of the device into the existing home installation

6.2.1 System circuit diagram

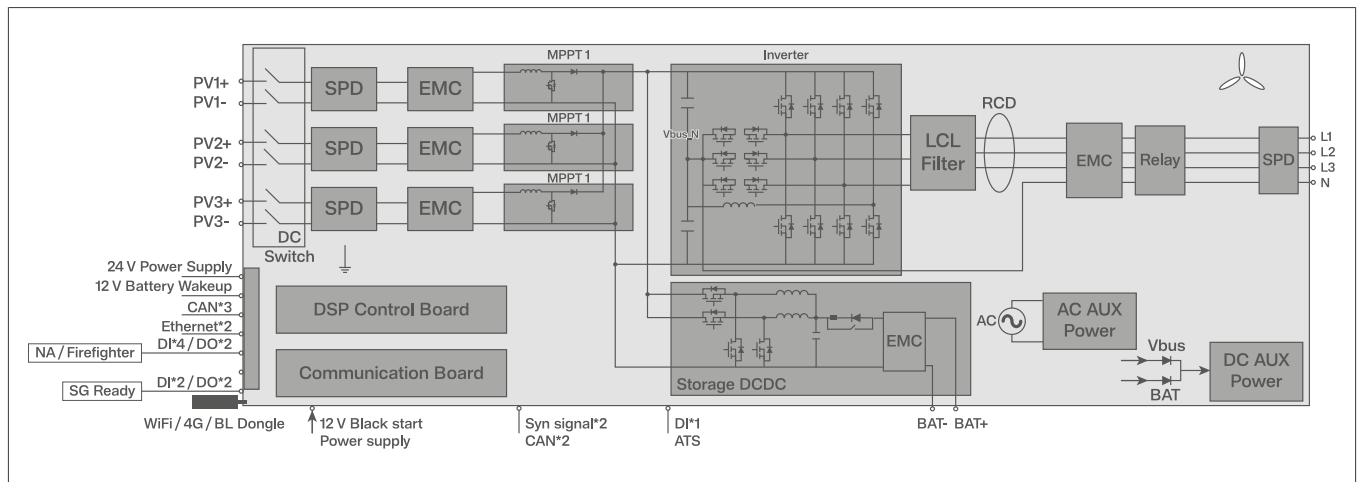


Fig. 16: System circuit diagram^[1]

^[1] The circuit diagram in the Info Centre on the website is definitive (with backup power option).



Connection variants – block diagrams

Detailed visualisations of possible device connection variants and operating modes are available as block diagrams in the download area of the customer portal at:

flow.hager.com/documents (login required)

6.2.2 Power measurement

Power measurement is performed externally.

The EMC (XEM470) required for the energy management system has an integrated function for measuring energy flows. For this purpose, the current transformers must be installed directly downstream of the electricity meter in the building. The EMC must be installed downstream of the ATS box to ensure an uninterruptible power supply for the EMC. In the event of backup/emergency power supply, the ATS box uses the integrated energy meter to measure the energy flows and manage the system.

6.3 Dimensioning the connecting cables



Danger

Risk of increased grid impedance due to insufficient cable cross-sections!

Insufficiently dimensioned cable cross-sections between the building distribution board and the device may lead to a significant increase in grid impedance (internal resistance of the electrical supply network).

- Use only sufficiently large cable cross-sections.

For planning and preparation of the installation, the following is strongly recommended:

- use flexible cables, 5-core design and protected with 32 A
Recommendation: LAPP Ölflex Classic 100 **5 G 6**
- route the cables in a cable duct
- route a spur line from the building distribution board or from the ATS box to the inverter

The inverter connections are located on the connection panel on the underside of the device. The AC connection must be established using a **plug-in connector**. A DC solar plug-in connector (MC4 connector) must be provided for the DC connection of the PV generator.

6.4 AC port

6.4.1 Electrical installation diagram

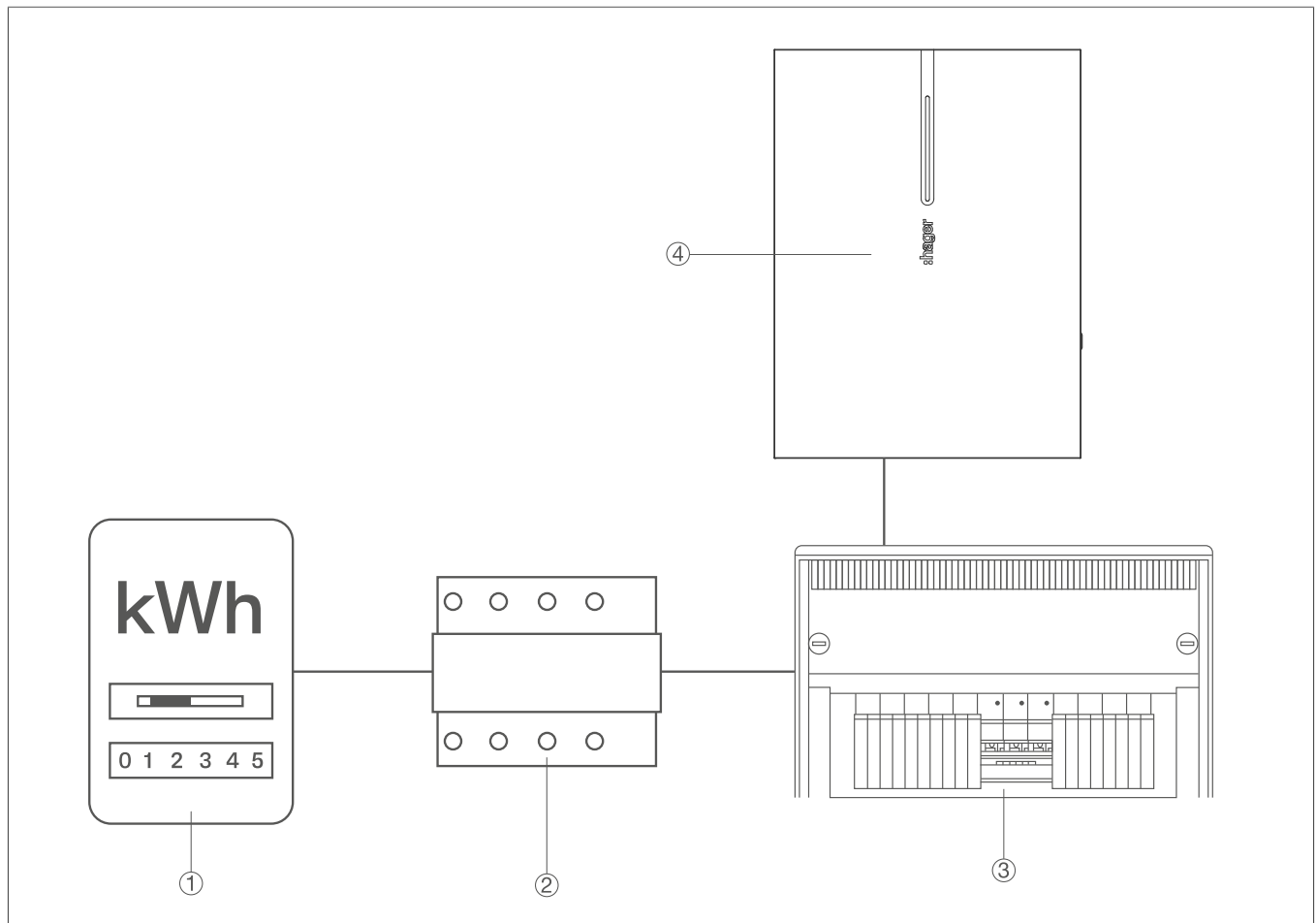


Fig. 17: Inverter grid connection (diagram)

- ① Electricity meter
- ② flow energy management controller
- ③ Building distribution board
- ④ flow R3 inverter

6.4.2 Connecting the inverter to the mains

The inverter is connected as a 3-phase system (5-core). The AC connection of the inverter is established on the underside of the electrical functional unit (connection panel) using the AC connector supplied.



Danger

Electric shock when live parts are touched!

An electric shock can lead to death!

- Never plug in or disconnect plug-in connectors under load. The plug-in connectors are not suitable for interrupting current.

Preparing the connections

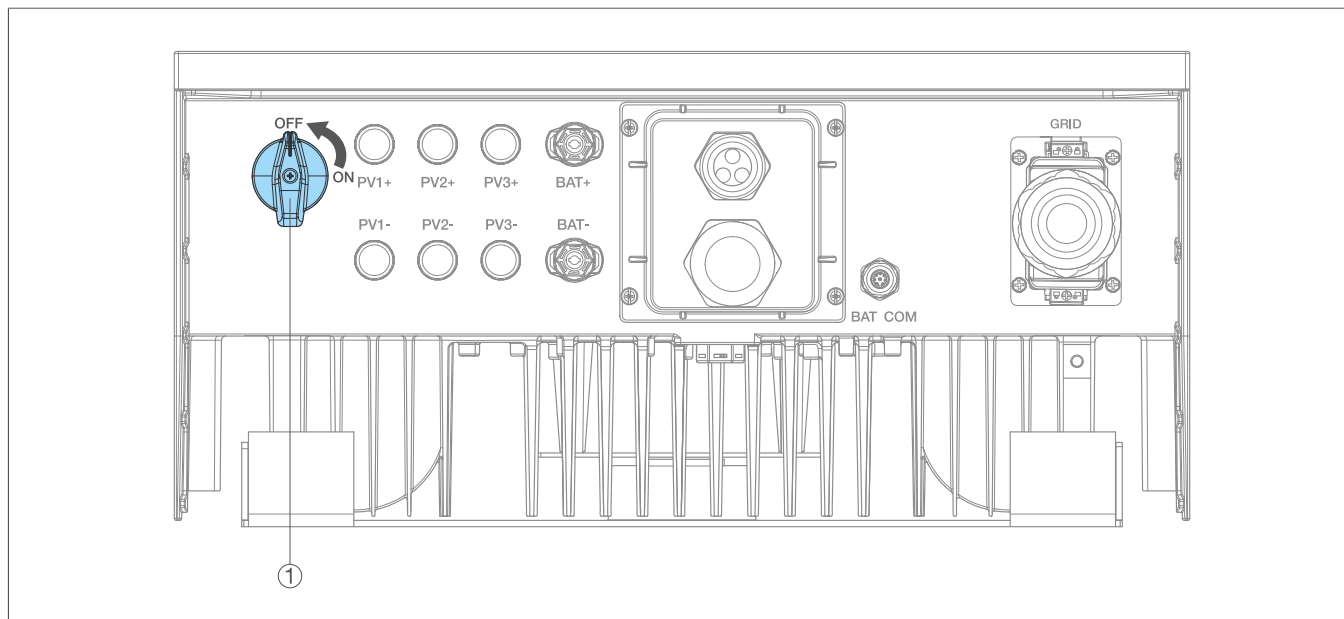


Fig. 18: Underside of the electrical functional unit

- ① DC disconnect switch
- ➊ Route the AC connecting cable (5-core) from the building distribution board or the ATS box to the device. Observe the recommended cable type and cross-section (see [Dimensioning the connecting cables](#)).
- ➋ Switch off the miniature circuit breaker for the 3-phase AC connection.
- ➌ Turn the DC isolator (1) on the underside of the electrical functional unit to the **OFF** position.

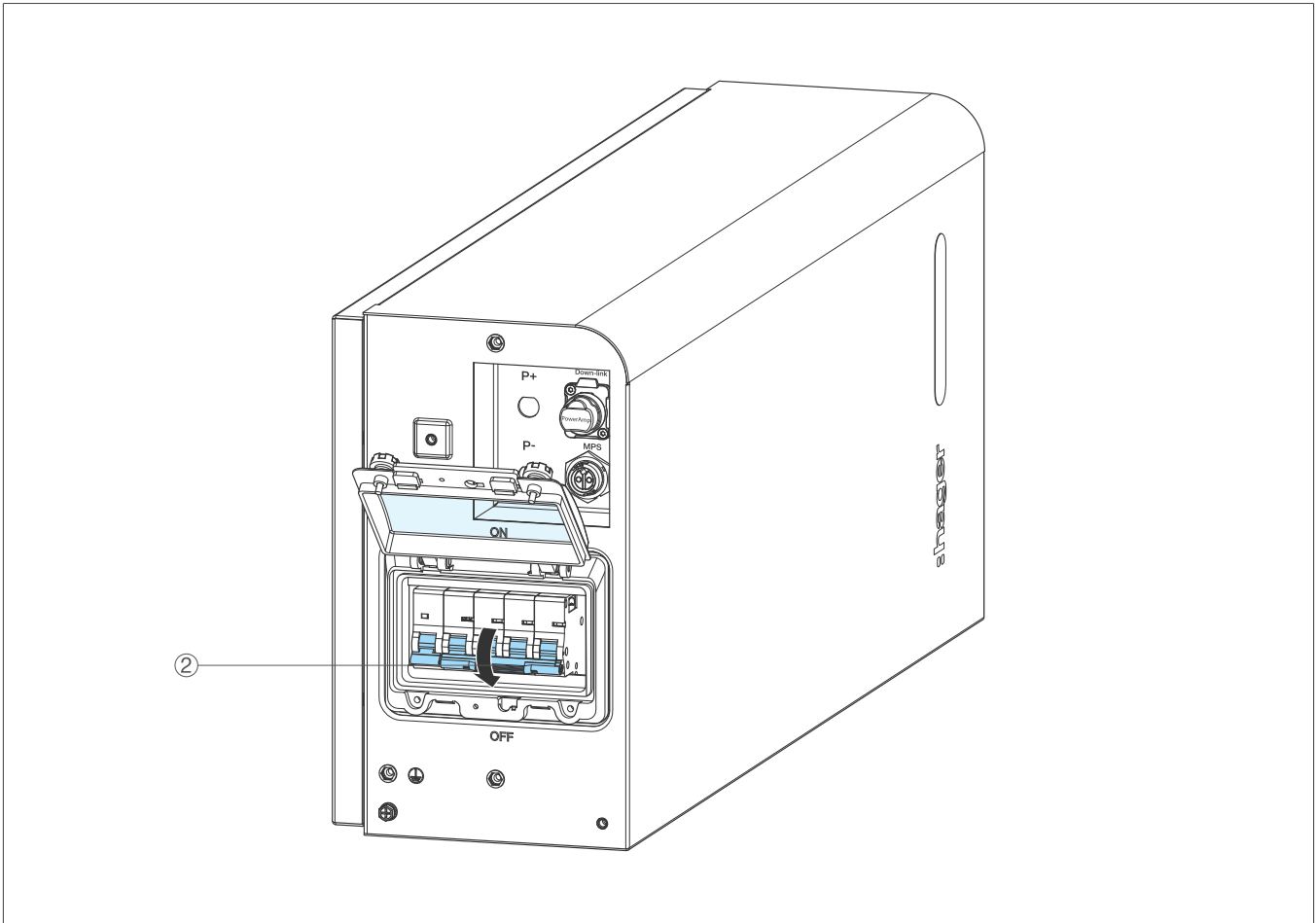


Fig. 19: Switching off the BMS

② Main switch BMS

④ If batteries are already connected, also set the main switch of the BMS (2) to the **OFF** position.

Connecting the AC cable to the AC connector



The specified stripping lengths and tightening torques are based on the recommended AC cable.

When connecting the AC cable to the device, ensure that sufficient cable slack is provided.



Warning

Electric shock when live parts are touched!

An electric shock can lead to death!

- Connection of the cable to the plug-in connector may only be carried out by a person who has received at least electrical safety instruction.
- Observe the plug-in connector manufacturer's instructions.

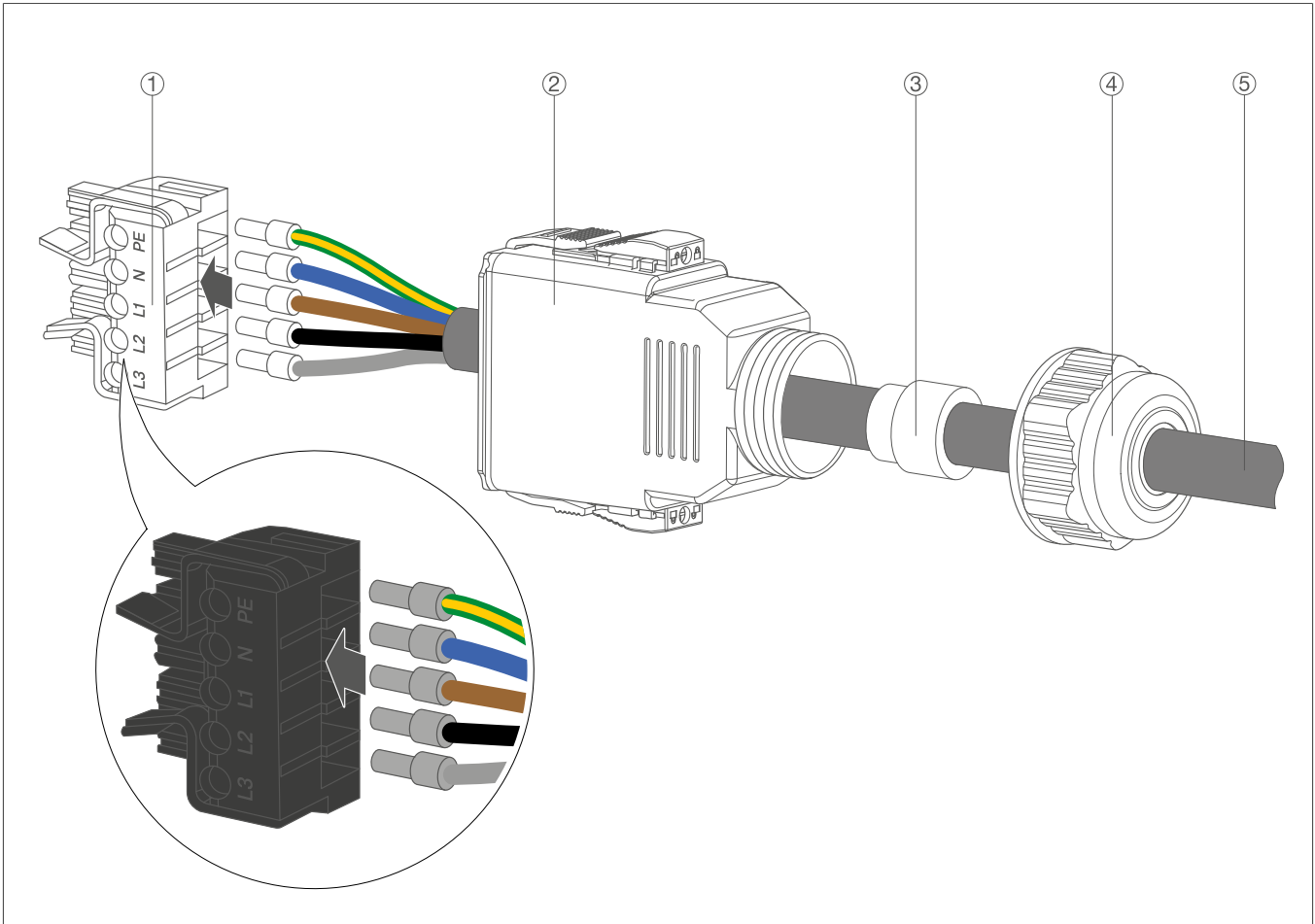


Fig. 20: Structure of the AC plug-in connector

- ① Terminal block
- ② Housing
- ③ Sealing
- ④ Union nut
- ⑤ AC cable

- ① Unscrew the AC plug-in connector and have the individual parts ready for assembly.
- ② Slide the union nut (4), seal (3) and housing (2) onto the cable (5).
- ③ Strip the outer sheath from the cable and strip the individual cores (see Fig. 21).

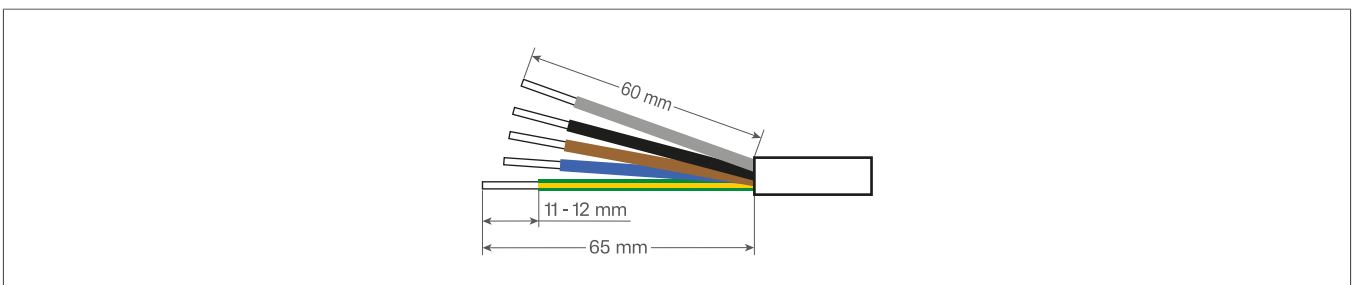


Fig. 21: Stripping the cable

- ④ Fit suitable ferrules onto the flexible cores and crimp them using suitable approved tools.
- ⑤ Connect the cores in accordance with the markings on the terminal block (1) and tighten them to 1.3 Nm.
- ⑥ Push the terminal block into the housing (2) until it audibly clicks into place.

- ⑦ Insert the seal (3) into the housing.
 - ⑧ Screw the union nut (4) onto the housing and tighten it to 6.8 Nm.
- The AC plug-in connector is now fully connected.

Inserting the AC connector into the GRID socket

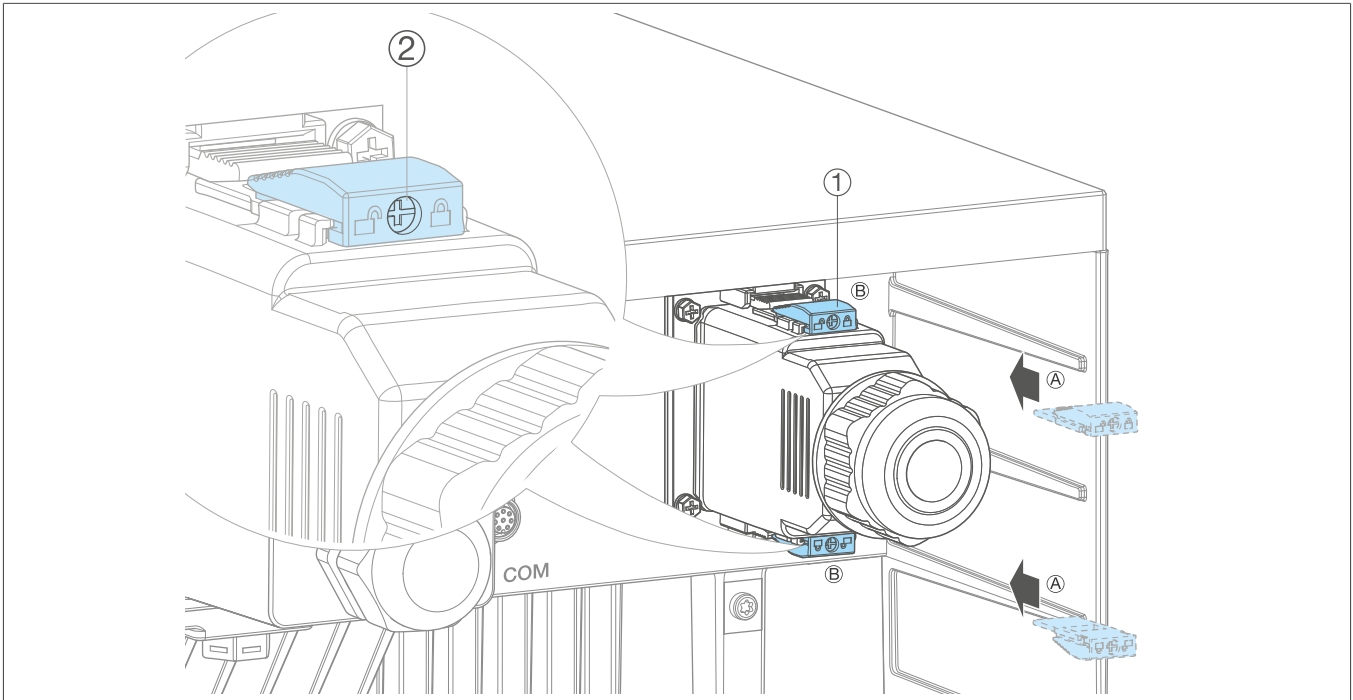


Fig. 22: Underside of the electrical functional unit, GRID connection socket

- ① Locking tabs
 - ② Locking screw
- ① Insert the AC connector into the **GRID** socket of the electrical functional unit.
 - ② Slide the locking tabs (1) at the top and bottom in the direction of the arrows until they engage several times.
 - ③ Tighten the locking screws (2) on the AC connector to 0.6 Nm.
 - ④ Finally, check the connection and switch the miniature circuit breaker for the AC connection back on.

6.5 Backup power function (option)

The device features an optional 3-phase backup power function implemented using a transfer switch box (ATS box). Backup power operation is not possible without this transfer switch box.

A prerequisite for backup power operation is sufficient battery or PV power being available.



Note

Backup power operation supplied from the battery is possible only if the battery charge is sufficient. This can be remedied by setting a **backup power reserve** in the device app.

Before performing a **backup power test** via the device app, switch off all high-power loads, such as electric cookers and computers, to avoid high loads or overloads. If necessary, switch off additional loads, for example if there is not enough energy available for lighting.

6.5.1 Requirements and recommendations

- Device serial number (with backup power):
 - from E3EBZxxx onwards (applies to all XEM4xxx products in conjunction with the ATS box (XE-MA250))
- Cable recommendations:
 - AC cable cross-section for transfer switch box (ATS box): max. 35 mm²
 - Communication cable between transfer switch box and inverter, for example LiYY (TP) 4 x 2 x 0.25 mm² or higher quality.
The length depends on the installation location, but should not exceed 30 m.
- Install the transfer switch box upstream of the spur connection to the inverter.
- High-power loads that are not supplied with backup power can be connected directly upstream of the transfer switch box with appropriate protection (see the relevant block diagrams).



The current version of this manual can be downloaded from the download area of the customer portal at flow.hager.com/documents (login required).

6.5.2 Connecting the energy meter in the ATS box

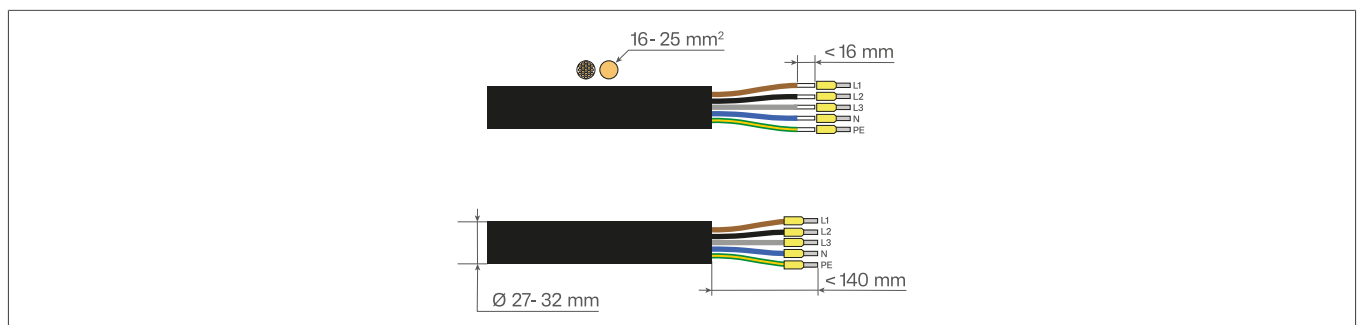


Fig. 24: Energy meter cable

- 1 Strip the sheath and cores of the cable, flexible or rigid (see Fig. 24).
- 2 When using flexible cables, fit suitable ferrules onto the cores and crimp them using a suitable tool.

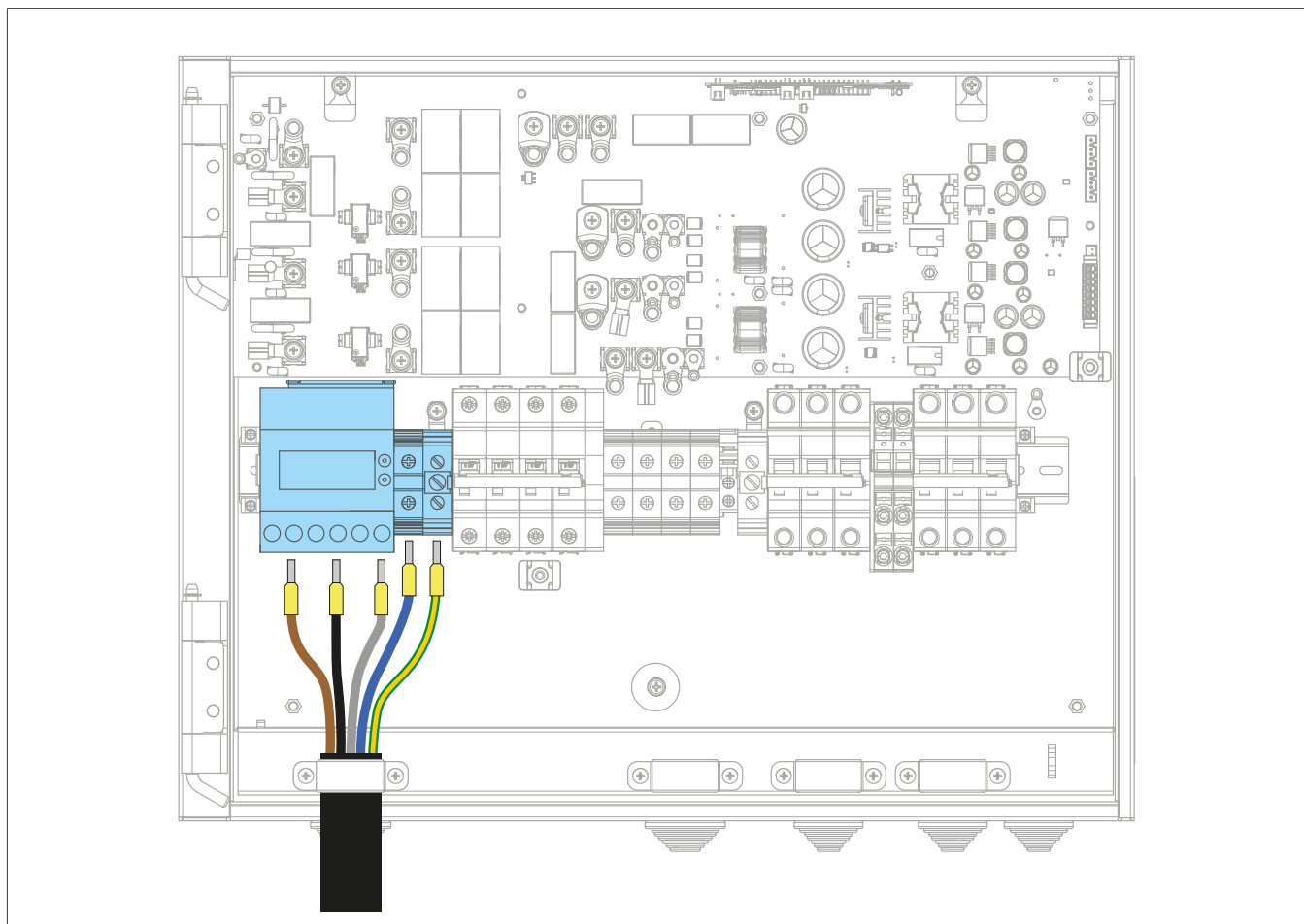


Fig. 25: Connecting the energy meter

- 3 Route the cable through the cable entries on the underside of the housing and through the strain relief in the housing.
- 4 Tighten the screws on the strain relief with a tightening torque of 1.8 Nm.
- 5 Connect the cores (see Fig. 25).
- 6 Tighten the cores with a tightening torque of 2.8 Nm.

6.5.3 Connection cable to the building distribution board

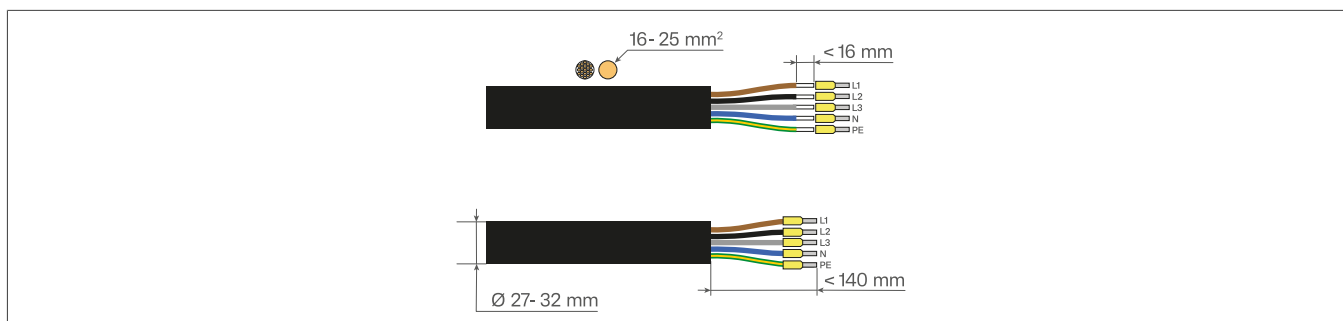


Fig. 26: Cable to the building distribution box

- 1 Strip the sheath and cores of the cable, flexible or rigid (see Fig. 26).
- 2 Fit suitable ferrules onto the cores and crimp them using a suitable tool.

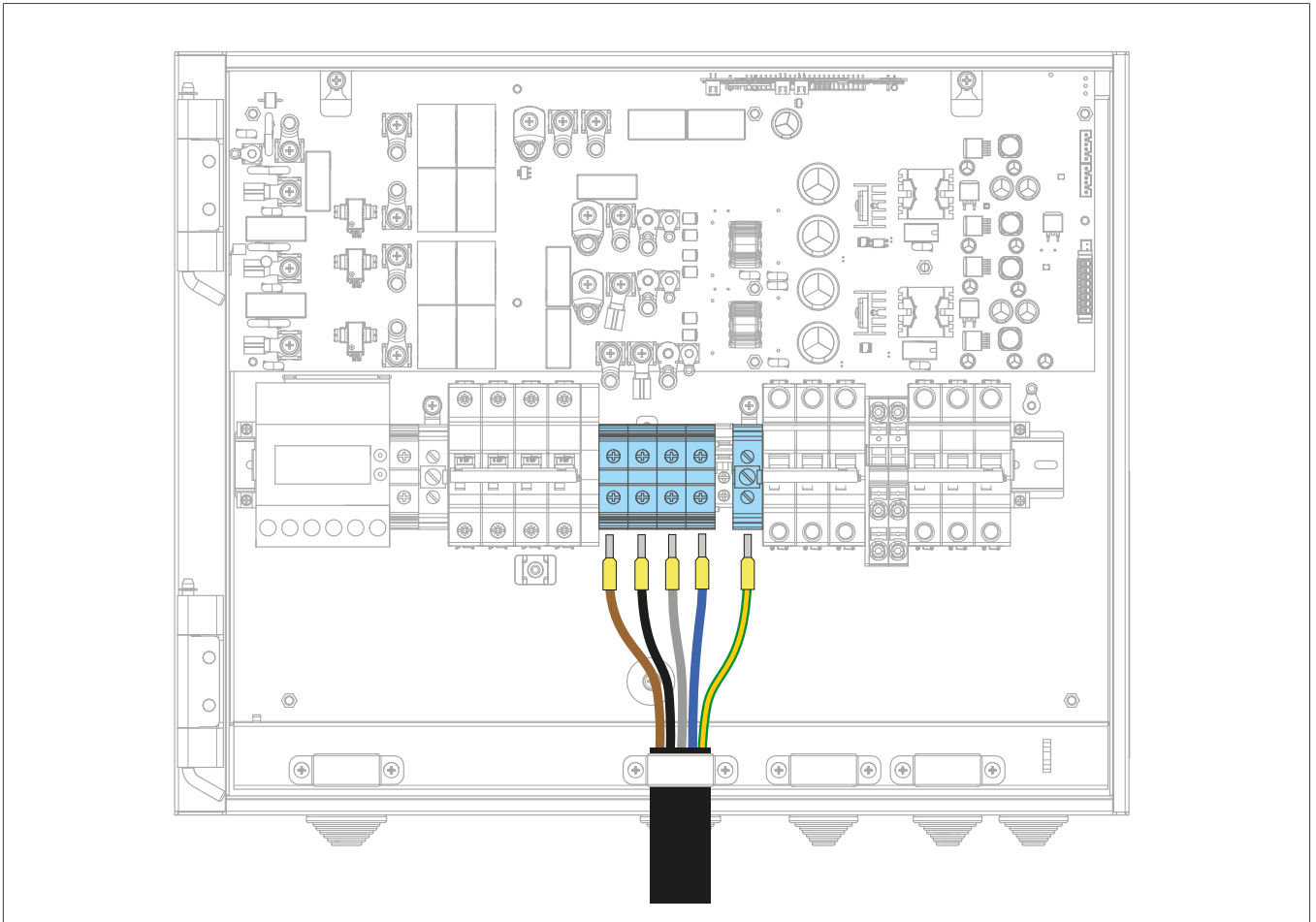


Fig. 27: Connecting the building distribution board

- 3 Route the cable through the cable entries on the underside of the housing and through the strain relief in the housing.
- 4 Tighten the screws on the strain relief with a tightening torque of 1.8 Nm.
- 5 Connect the cores (see Fig. 27).
- 6 Tighten the cores with a tightening torque of 2.8 Nm.

6.5.4 Connection cable to the inverter

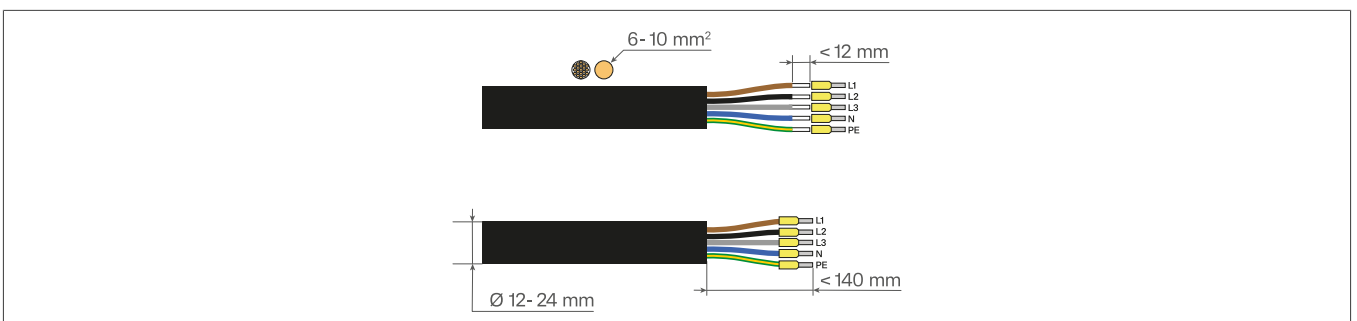


Fig. 28: Cable to the inverter

- 1 Strip the sheath and cores of the cable, flexible or rigid (see Fig. 28).
- 2 When using a flexible cable, fit suitable ferrules onto the cores and crimp them using a suitable tool.

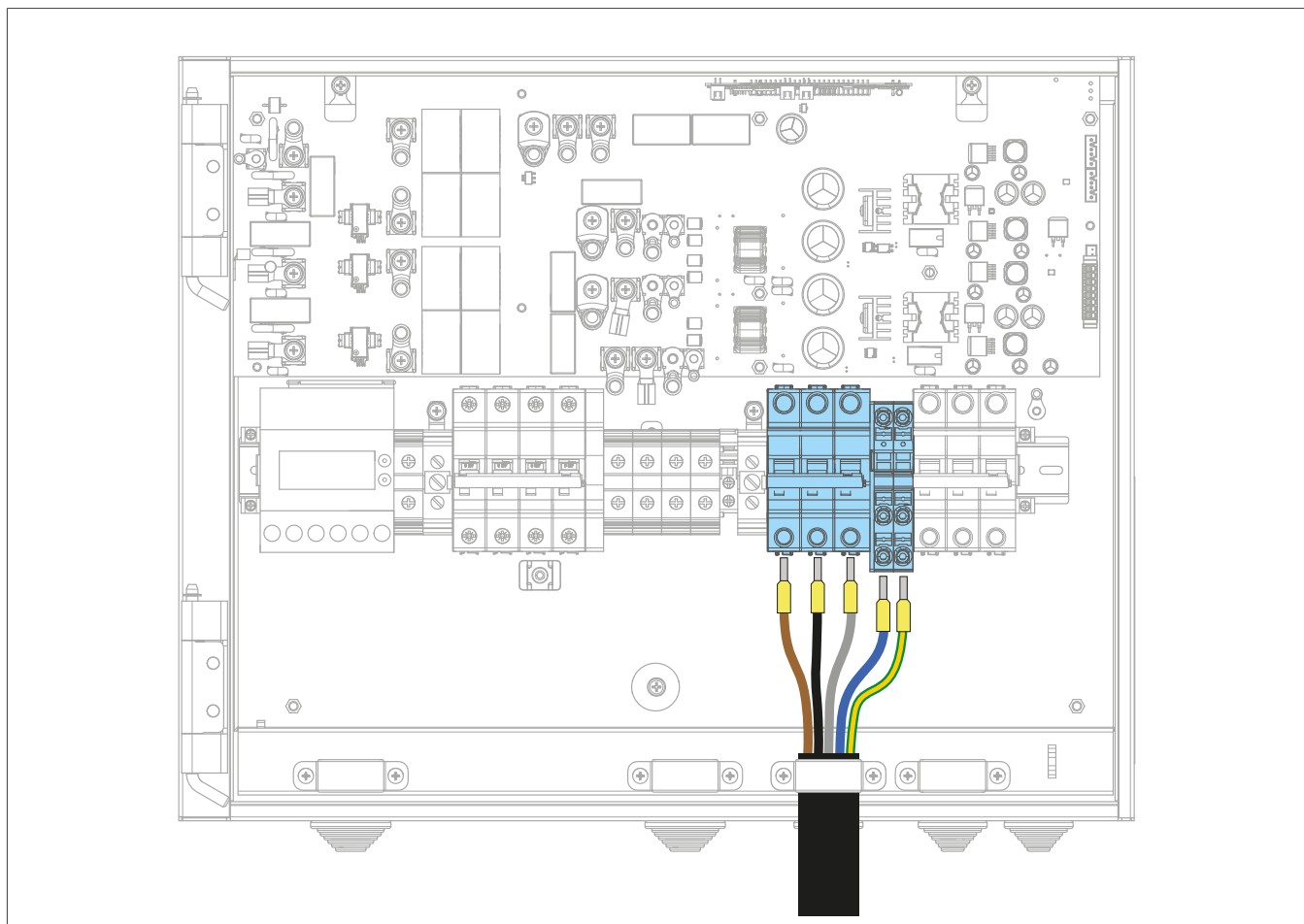


Fig. 29: Connecting the inverter

- ③ Route the cable through the cable entry on the underside of the housing and through the strain relief in the housing.
- ④ Tighten the screws on the strain relief with a tightening torque of 1.8 Nm.
- ⑤ Connect the cores (see [Fig. 29](#)).
- ⑥ Tighten the cores with a tightening torque of 2.8 Nm.

6.5.5 Communication with the ATS box

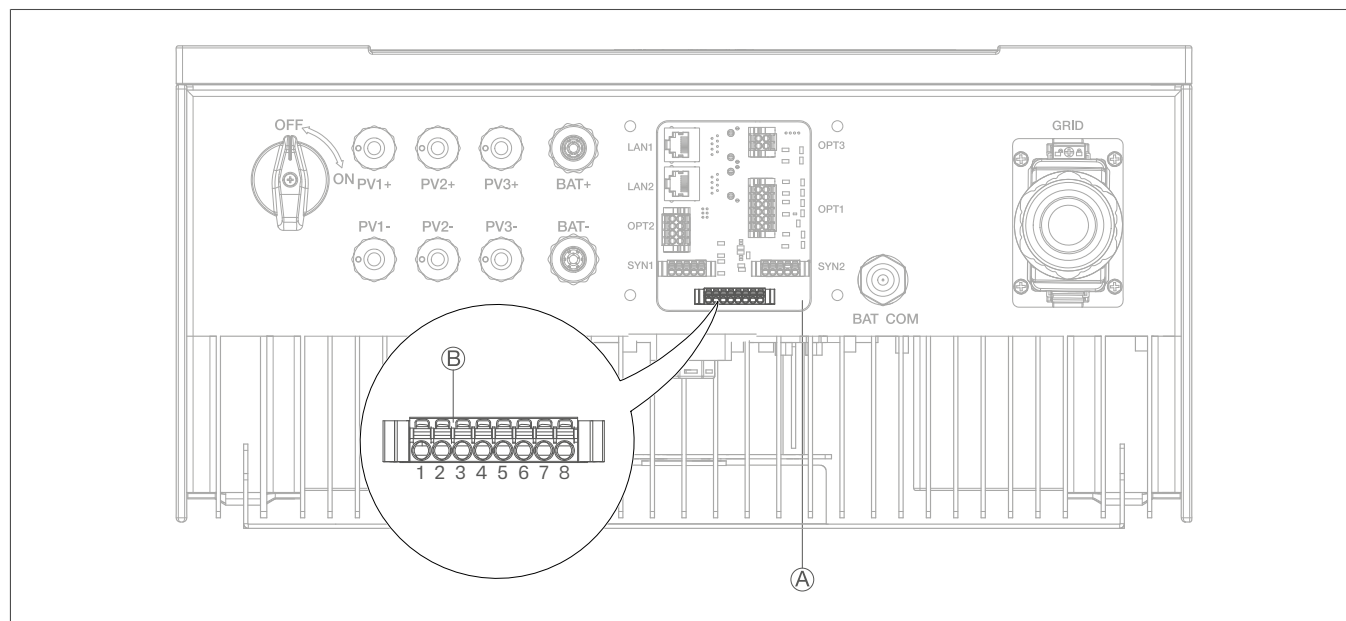


Fig. 30: Underside of the electrical functional unit, connection for emergency power supply

- (A) Communication board
- (B) Connector for connection to ATS box

PIN no.	Designation	Colour	
1	CG		Grey
2	AL		White
3	AH		Brown
4	CG		Pink
5	G		Blue
6	ML		Green
7	MH		Yellow
8	24 V		Red

Table 3: PIN assignment

Recommended cable: Lapp Kabel LiYY (TP) 4 x 2 x 0.25 mm²



Fig. 31: ATS box, communication connection

Ⓒ Connector for communication cable

- ➊ Remove the connector (B) from the communication board(A).
- ➋ Remove the connector (C) from the PCB of the opened ATS box.
- ➌ Strip the cores of the communication cable by 8 mm.
- ➍ Connect the cores to both connectors (see Tab. 3).
- ➎ Refit and lock the connectors.



Note

If no ATS box is installed, the cover cap can be screwed onto the electrical functional unit (see [Verschlussdeckel entfernen](#)).

6.6 Connection to the PV generator (DC connection)

6.6.1 Safety instructions



Danger

Danger to life due to high voltages on the PV module cables!

Due to the design, a DC voltage of up to 1,000 volts may be present between the cables (+ and -) to the PV modules. PV modules generate dangerous voltages even in low light. Touching the two live cables may result in death.

Do not touch live cables.



Danger

Danger to life due to electric shock!

For technical reasons, there is no galvanic isolation between the grid side and the PV side.

- Use only PV modules that comply with IEC 61730 (application class A).
- Include the PV module frames in the equipotential bonding.



Warning

Risk of burns when working on the inverter!

Disconnecting the PV generator from the inverter under load by pulling out the plug connection may cause burns.

- Never disconnect the PV generator from the inverter under load by pulling out the plug connection while the inverter is feeding in power.
- Disconnect the mains supply before disconnecting the PV generator from the inverter.
- Before working on the inverter or the PV plug connections, turn the DC isolator to position 0.



Caution

Risk of electric shock when working on the PV system!

Dangerous touch voltages may occur during installation of PV systems and connection of the PV generator to the inverter.

- Keep the positive and negative cables strictly separated electrically from earth potential (PE).
- Carry out an insulation test before connecting the PV generator.



Attention

Risk of destruction of the inverter due to exceeding the maximum DC input voltage!
The maximum DC input voltage of the device is 1,000 volts. Exceeding this voltage will destroy the inverter.

- Do not exceed the maximum DC input voltage.
- The temperature coefficients of the PV modules must be taken into account.
- Ensure compliance with the voltage limits down to -20°C.



Attention

Risk of destruction of the PV modules due to incorrect connection of the strings!
Incorrect connection of the strings may destroy the PV modules.

Only strings consisting of PV modules of the same type and with the same number of cells connected in series may be connected to each DC input.



Attention

Risk of destruction of the inverter due to impermissible earthing of the PV modules!
Earthing the PV modules may destroy the inverter.

Do not earth the PV generator connections.

6.6.2 Checks before connection

Correctly dimensioning the PV system



Attention

Risk of destruction of the inverter due to incorrect dimensioning of the PV system!
Incorrect dimensioning of the PV system is a design error and may destroy the device.
Dimension the PV system correctly.

The maximum open-circuit voltage of a PV generator is reached at full solar irradiance and minimum module temperature. This must be taken into account when dimensioning the PV system.

Checking the PV system

- 1 Carry out a PV insulation test before commissioning and subsequently at regular intervals.
- 2 Connect only correctly dimensioned strings to the inverter.
- 3 Measure the insulation resistance between protective earth (**PE**) and the positive cable, and between protective earth (**PE**) and the negative cable of the PV generator. The measured insulation resistance must be within the specified limit values.



Note

Any faults that occur must be rectified before continuing the installation.

6.6.3 Internal string configuration of the MPP trackers – diagram

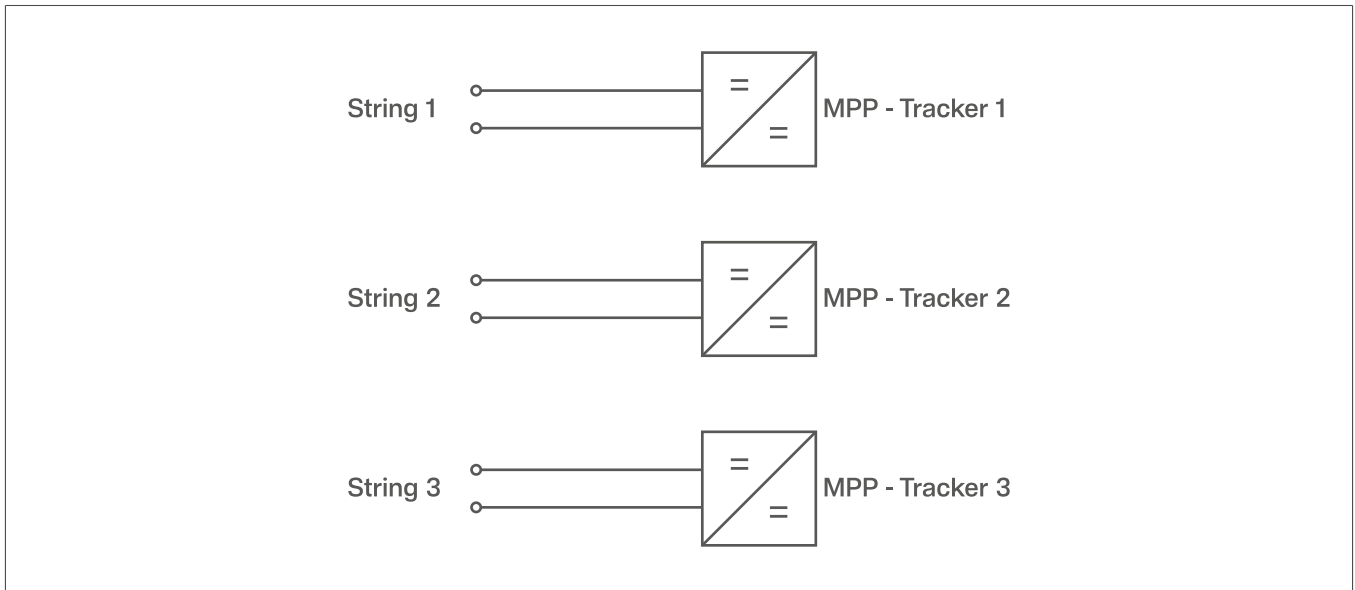


Fig. 32: Diagram of the internal string configuration of the MPP trackers

6.6.4 Connecting the PV strings



Danger

Risk of destruction of the inverter due to reversed polarity!

Reversed polarity is an installation error and may destroy the inverter.

- Ensure correct polarity of the supply cables.
- Check whether the positive and negative cables belong to the same string.

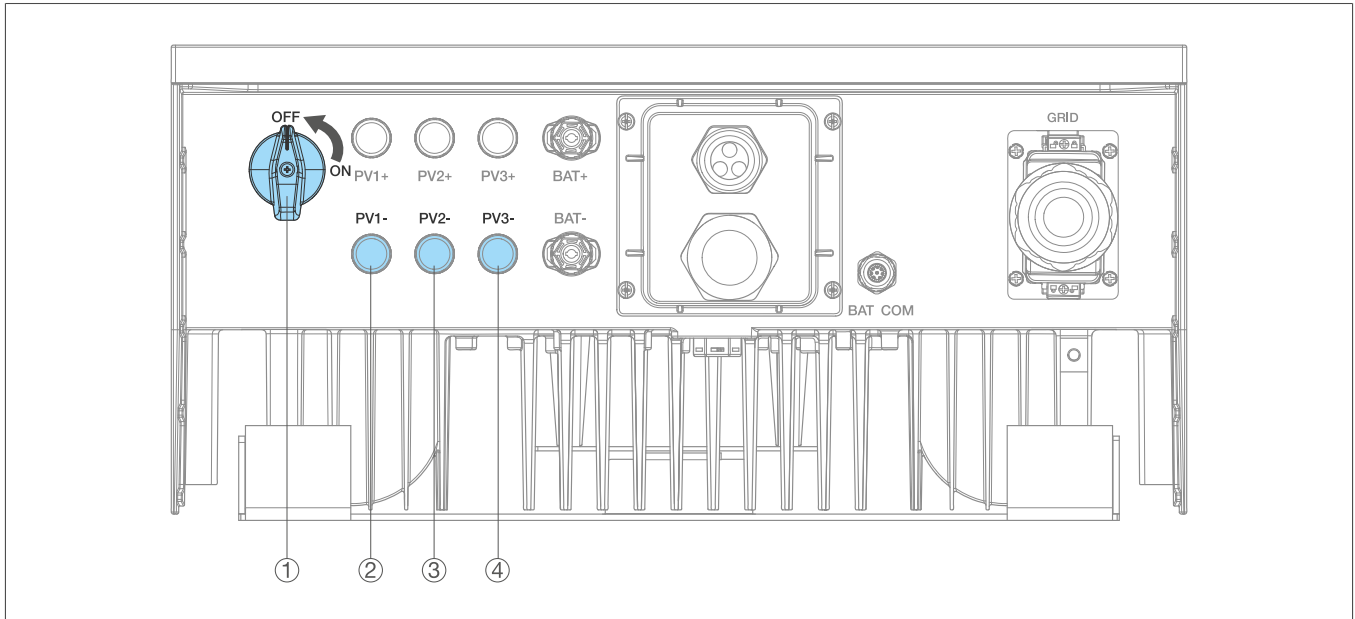


Fig. 33: Underside of the electrical functional unit, DC isolator and PV strings

- ① DC disconnect switch
- ② PV string 1
- ③ PV string 2
- ④ PV string 3

- ➊ Turn the DC isolator (1) to the **OFF** position.
- ➋ Insert the PV strings into sockets (2) to (4) on the inverter using the supplied PV plug-in connectors. The connectors must audibly click into place.

The inverter is now successfully connected to the PV generators.

6.7 SG Ready connection

SG Ready (**S**Mart **G**rid **R**eady) is a standard for heat pumps. It enables the heat pump to respond to signals from an intelligent power grid or energy management system to increase self-consumption of solar power and/or relieve the load on the power grid.

This standardised interface, usually consisting of two relay contacts, supports four operating states:

- State 1 (blocking period/utility blocking): If the grid is overloaded, the utility company can temporarily disconnect the heat pump from the grid.
- State 2 (normal operation): The heat pump operates energy efficiently and charges the domestic hot water cylinder.
- State 3 (temporarily increased comfort): If sufficient surplus in photovoltaic power is available, the heat pump operates more intensively even though there is currently no demand.
- State 4 (maximum operation): The heat pump is actively controlled to store as much surplus energy as possible as heat in the buffer storage tank for later use.

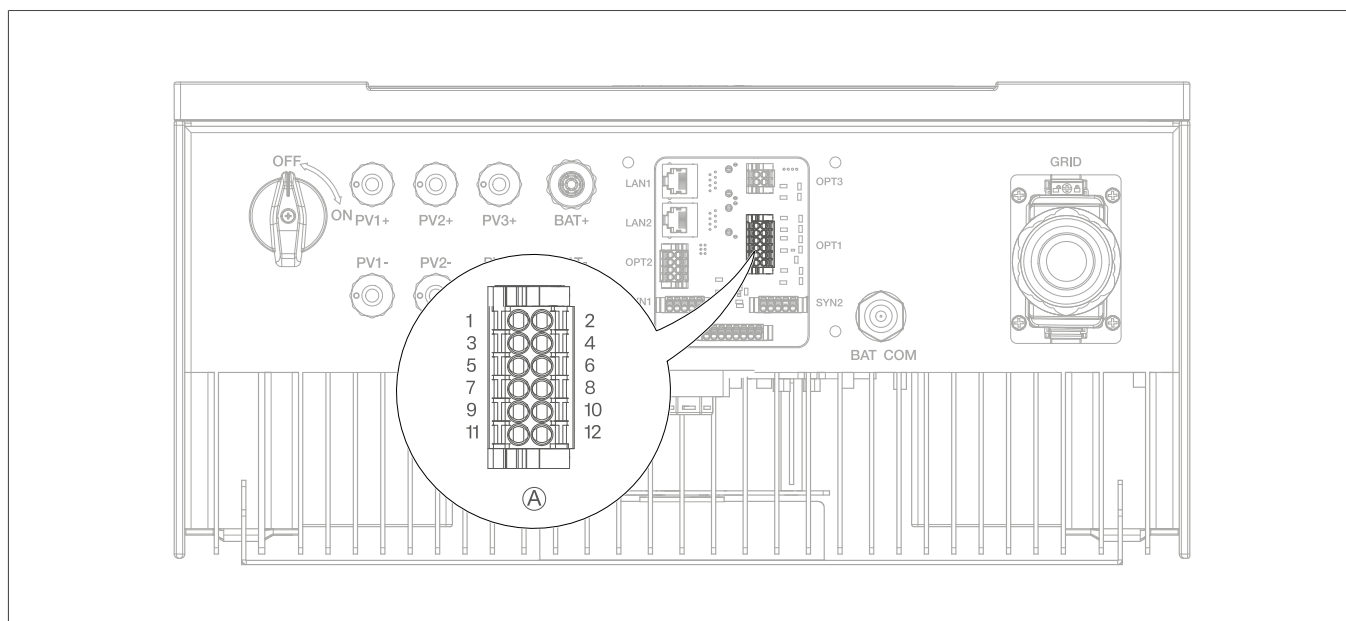


Fig. 34: Installation for use with SG Ready

Ⓐ PCB connector

PIN no.	Designation	Colour
9	NO A	White
10	COM A	Brown
11	NO B	Green
12	COM B	Yellow

Recommended cable: UNITRONIC® LiYY 4 x 2 x 0.25 mm²



Note

Only a 24 V safety extra-low voltage (SELV) may be used.

6.8 Internet connection



Note

It is not possible to commission the device without an internet connection.

The LAN cable length must not exceed 30 metres.

Notes on the internet connection

A permanent internet connection between the device and the Hager server is recommended for safe and trouble-free operation of the inverter.

Updates may involve larger data volumes, therefore a high-performance internet connection is advantageous.

Recommendation:

- If possible, use a DSL connection.
- Other connection types are possible using appropriate adapters (Wi-Fi, PowerLAN, UMTS, GPRS, LTE, etc.), but are not explicitly supported.

Protective measures

- The device should be connected to the internet via a router that supports at least NAT.
- **Operating the device in a DMZ**
Additional measures may be required for installation of the device in a computer network with security-controlled access to connected servers (DMZ).

Establishing an internet connection

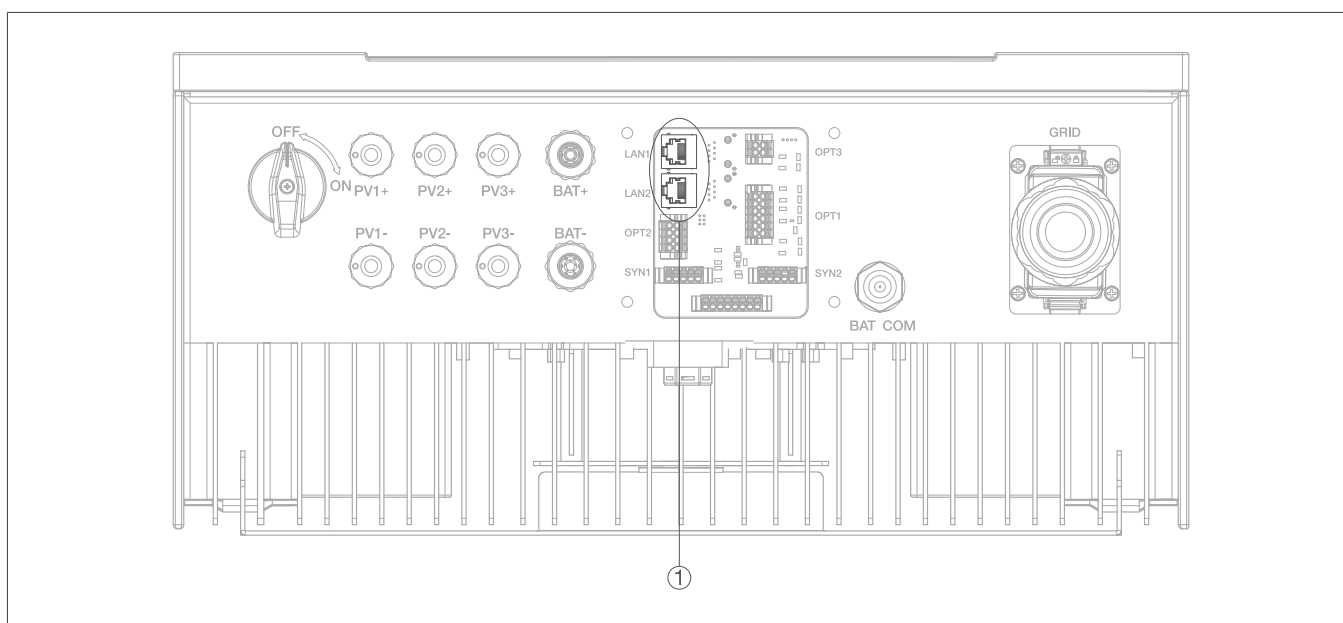


Fig. 35: Underside of the electrical functional unit, RJ45 **LAN** socket

① Ethernet/LAN connection for internet (RJ45 socket)

- ① Insert the Ethernet/LAN cable connector into **LAN1** or **LAN2**.
- ② Connect the RJ45 socket on the underside of the device (see Fig. 35) to a suitable router using a LAN cable. Special settings are usually not required.

7 Battery assembly and installation



Instructions for battery installation

Various battery types are used in the Hager flow R3 system. Descriptions of battery assembly and installation are provided in battery-specific installation manuals, which can be downloaded from the customer portal download area at flow.hager.com (login required).

These manuals must be observed during battery assembly and installation.

8 Final work

8.1 AC-side insulation measurement



Installation and assembly of electrical devices may only be carried out by a qualified electrician in accordance with the applicable national installation standards, directives, regulations, safety requirements and accident prevention regulations.

National regulations and safety provisions must be observed. See also IEC 60364-7-712:2017 (DIN VDE 0100-712:2016-10).

An insulation measurement is a measurement of insulation resistance or a test of the insulation in order to identify its safety or detect faults. The correct procedure is described in the standards listed below.

- Germany:
Carry out the insulation measurement in accordance with DIN VDE 0100-600:2017-06
- Switzerland:
Carry out the insulation measurement in accordance with the Low-Voltage Installation Standard SN 411000 (NIN)

8.2 Loop impedance measurement before commissioning

After integrating an inverter into an existing installation, an initial verification of the newly installed part of the electrical installation is required in accordance with DIN VDE 0100-600:2017-06. The test includes a measurement to ensure protection by automatic disconnection of the power supply and must be carried out as a loop impedance measurement. This determines the loop resistance and short-circuit current. The loop resistance is a key factor in determining the short-circuit current that flows in the event of a fault.

The short-circuit current must be sufficiently high to cause the protective device, fuse or RCCB, to disconnect within a specified time in the event of a fault.

The values determined provide information about the integrity of all screw and terminal connections in the new installation.

After installation of the inverter, the test must be carried out in the distribution box at the connection point of the outgoing cable from the device, referred to as **household consumption** in Hager block diagrams.

8.3 Residual current circuit breaker

Due to its design, this device cannot cause a DC residual current >6 mA. If residual current circuit breakers (RCCBs) and residual current monitors (RCMs) are used for protection against direct or indirect contact, type A RCCBs or RCMs are permitted on the supply side of this device.

The device is equipped with an integrated universal-current-sensitive residual current monitoring unit. If an external RCCB is mandatory, a device must be used that trips at a residual current of 300 mA or higher.

9 Commissioning



Installation and assembly of electrical devices may only be carried out by a qualified electrician in accordance with the applicable national installation standards, directives, regulations, safety requirements and accident prevention regulations.

National regulations and safety provisions must be observed. See also IEC 60364-7-712:2017 (DIN VDE 0100-712:2016-10).



Note

Before commissioning the device, ensure that the installation work has been carried out correctly and without faults and that all internal and external safety measures, such as earthing and fuse protection, have been implemented correctly.



Note

An installation must already have been created in the database before the inverter can be commissioned. This is done during registration and setup of the mandatory energy management controller (EMC).

9.1 Switching on for the first time



Note

The inverter must be connected to the internet for automatic software updates and for registration in the customer portal via web browser or in the app on a mobile end device. The inverter automatically updates the software once the internet connection has been established.

- ① Switch on the circuit breakers and, where applicable, the RCCB.

Establishing a network connection

The inverter only needs to be connected to a DHCP router with **DHCP** enabled so that the inverter obtains its IP address automatically from the router. If the connection is not established, the network configuration can be reset. This may be necessary, for example, if several networks are set up in the building and the inverter has received its IP address from a different network to which the other energy management system devices are not assigned. All system devices must communicate with one another in the same network address range.

- ① Check the network connection of the device and, if necessary, plug it into a different port on the switch or router.
- ② Press and hold the push button (Fig. 53) on the right-hand side of the device for >30 s (see [Function of the button](#)).

The inverter restarts and receives a new IP address.

If there is still no internet connection or the device is not yet ready, this is indicated by the LED strip flashing white.

- ③ Then wait briefly until the status display changes and lights up blue.
- ④ If this does not happen, repeat the restart or check the internet connection and the router connection and DHCP settings.

9.2 Login to the customer portal

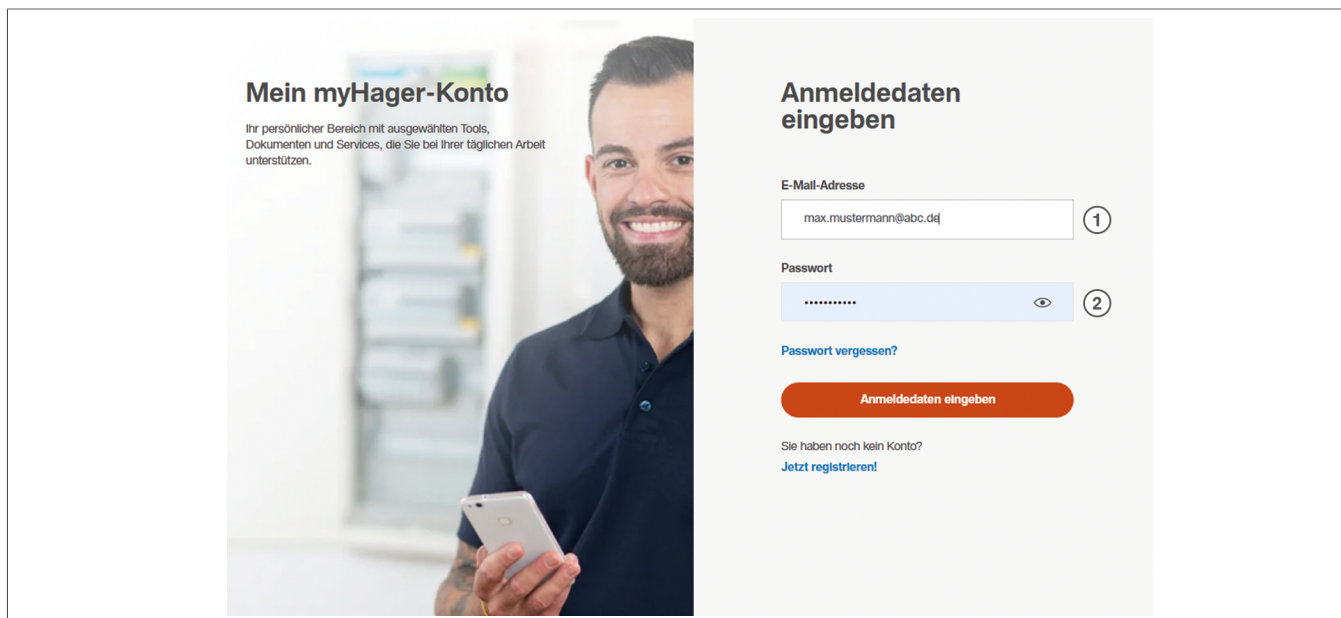


Fig. 36: Login in the app

- ① Email address
- ② Password

☑ The inverter is connected to the internet.

- ① Select the **Login** button under flow.hager.com.
The login window opens.
- ② As the installing electrician, enter the **email address** (1) and **password** (2) for the myHager account in the login window. If no myHager account exists yet, click **Register**, enter the required login details and confirm.
- ③ Submit the login details using the coloured button.
The application **overview** page opens (Fig. 37).

9.3 Configuration

All systems are listed on the overview page.



Note

Each system is defined and identified by the owner/installer name, a system name and a serial number. The inverter can therefore only be assigned to a system that has already been created and in which at least the EMC has already been created or, ideally, set up.

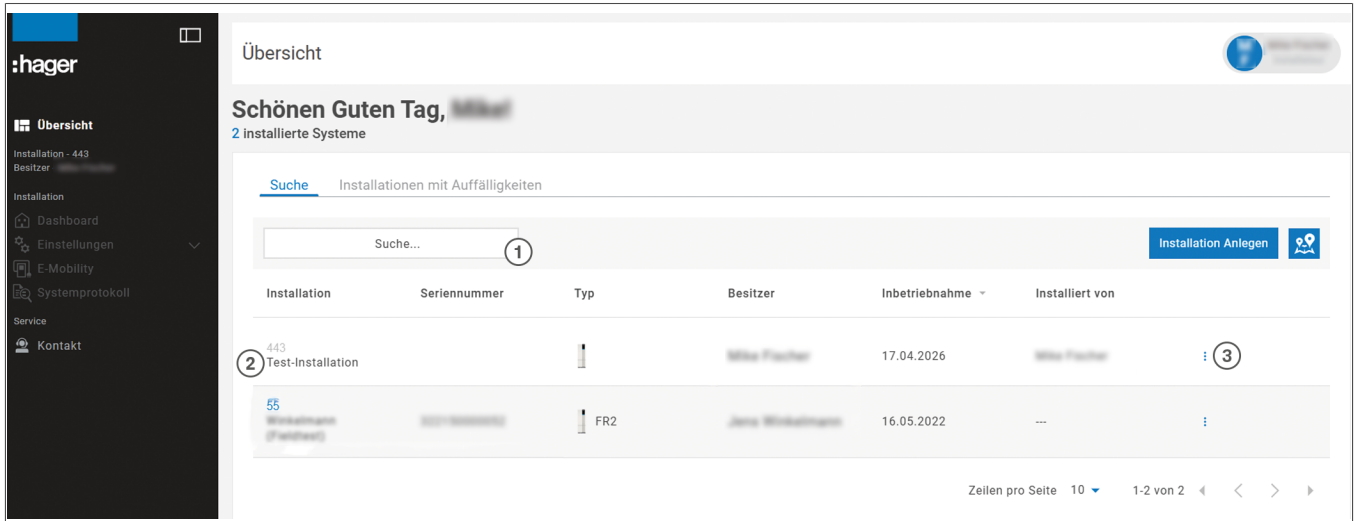


Fig. 37: Overview of systems

- 1** Search field
- 2** Overview of systems
- 3** System-specific menu selection

1 Search for the system to be set up using the search field **(1)** or select it directly in the overview **(2)**.

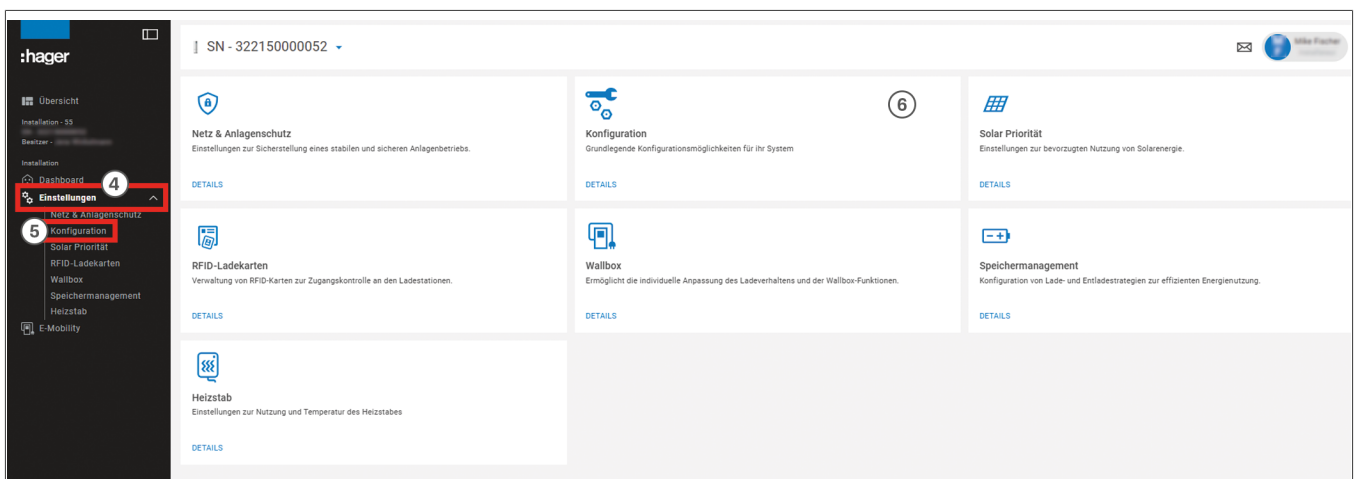


Fig. 38: Properties menu

- 4** Properties menu
- 5** Advanced settings submenu
- 6** Advanced settings tile

2 Go to **(3)** at the end of the system to be set up and select the **Go to properties** button (Fig. 37).
Or:

If the system is already shown on the left, go to **Properties (4)** in the left-hand menu bar and select **Advanced settings (5)** directly.

Or:

Select the **Advanced settings (6)** tile in the right-hand area.

The **Advanced settings** page opens.

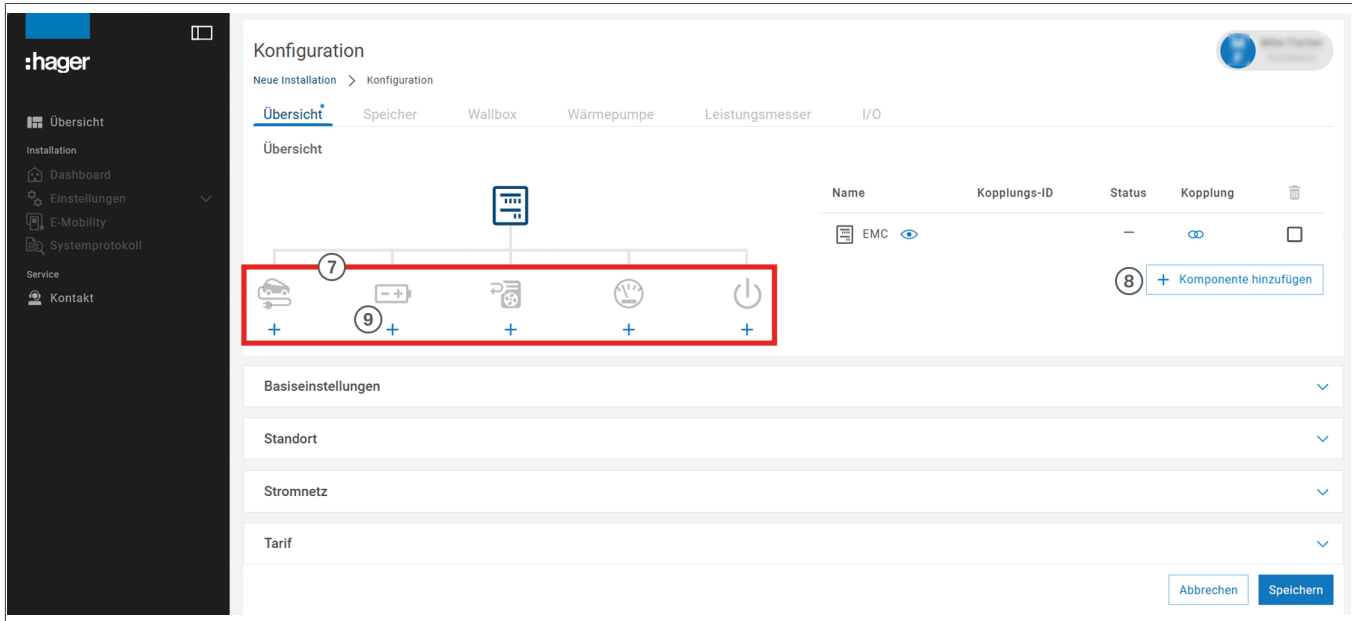


Fig. 39: Adding components (example of a newly created system)

- ⑦ Components that can be paired in the energy management system
- ⑧ Button for adding a new component
- ⑨ Add new storage system directly

③ Select the **+ Add Component (8)** button.

Or:

Select **+** below the battery symbol in the system overview.

A new window opens in which, after selecting the device type, a device name must be entered. The inverter must be created as one unit together with the battery/batteries and set up as the **storage system** device type.



The settings for the energy management system are usually already defined when the EMC is paired and only need to be checked for the inverter if required.

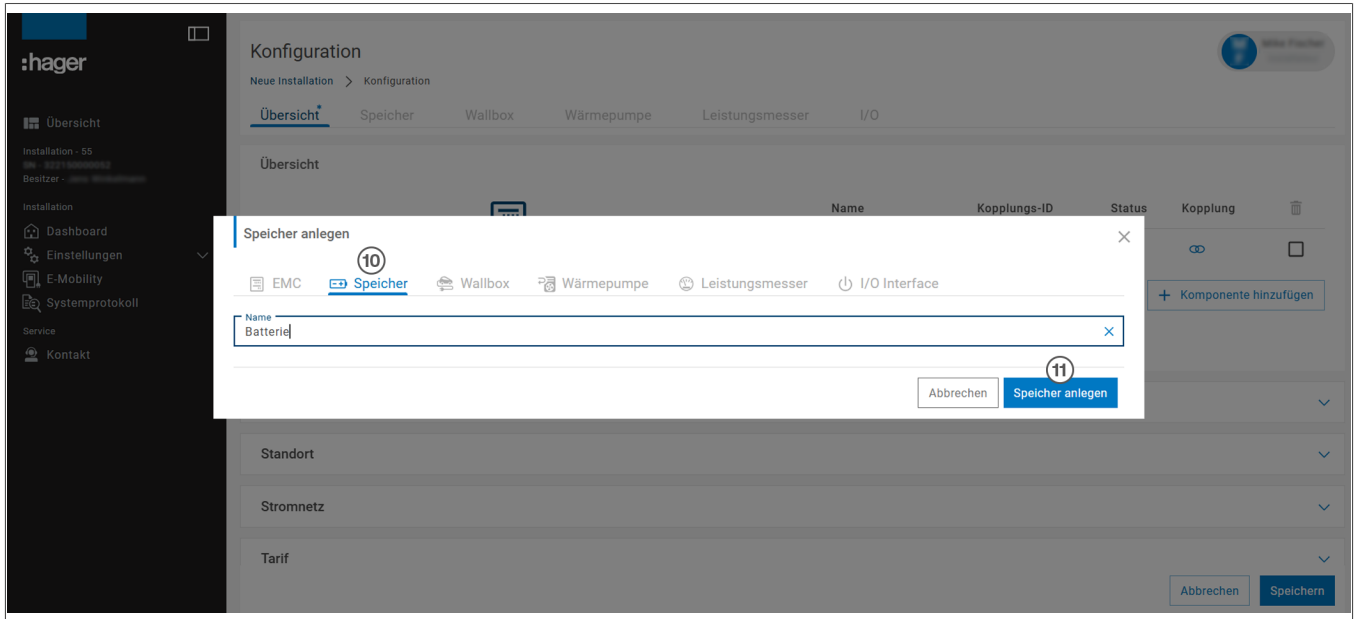


Fig. 40: Creating the storage system including inverter

- ⑩ Storage system device type
- ⑪ Button for **saving** the new component
- ④ Enter a name for the battery with inverter (new component) and save it using the blue button (⑪), or discard it by selecting **Cancel**.

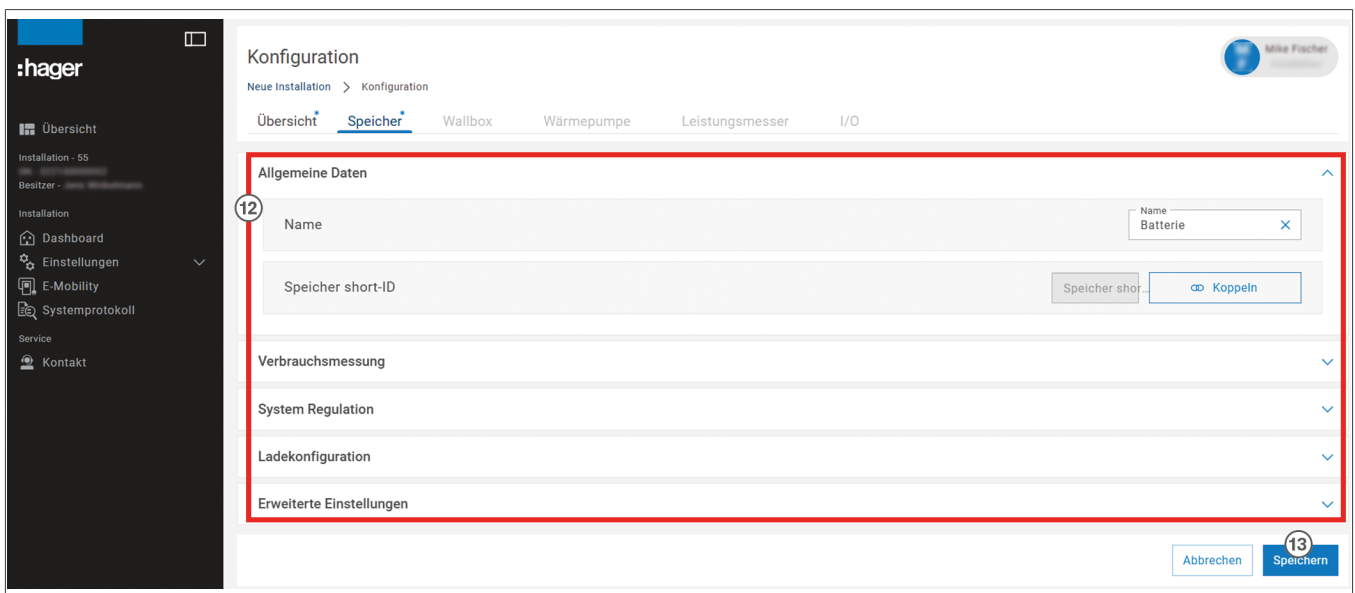


Fig. 41: Required storage system/inverter settings

- ⑫ Required settings
- ⑬ Button for **saving** the settings

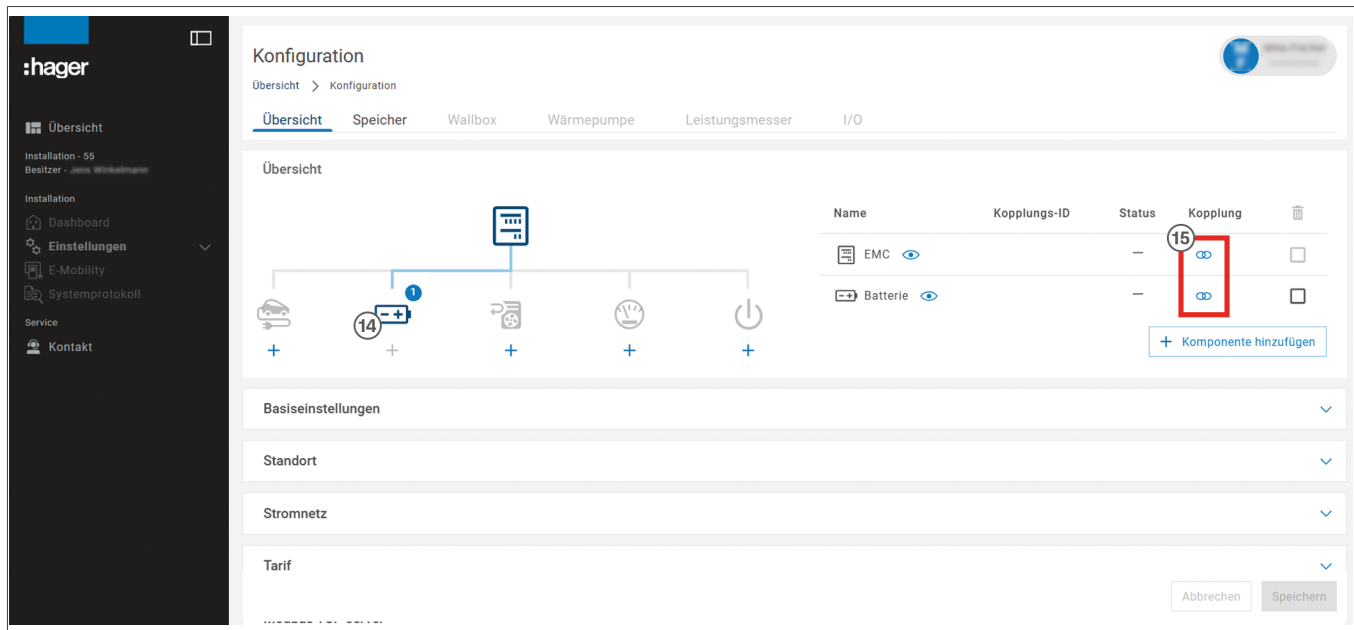


Fig. 42: Storage system/inverter created

- 14 Created inverter with battery
- 15 Device pairings
- 5 Make the minimum required settings for the storage system/inverter (Fig. 41) and confirm with the **Save (13)** button, or discard with **Cancel**.
The inverter is now visible in the system overview as a storage system with a battery symbol (shown in colour (14)).
- 6 Open pairing mode via .
A new window opens.

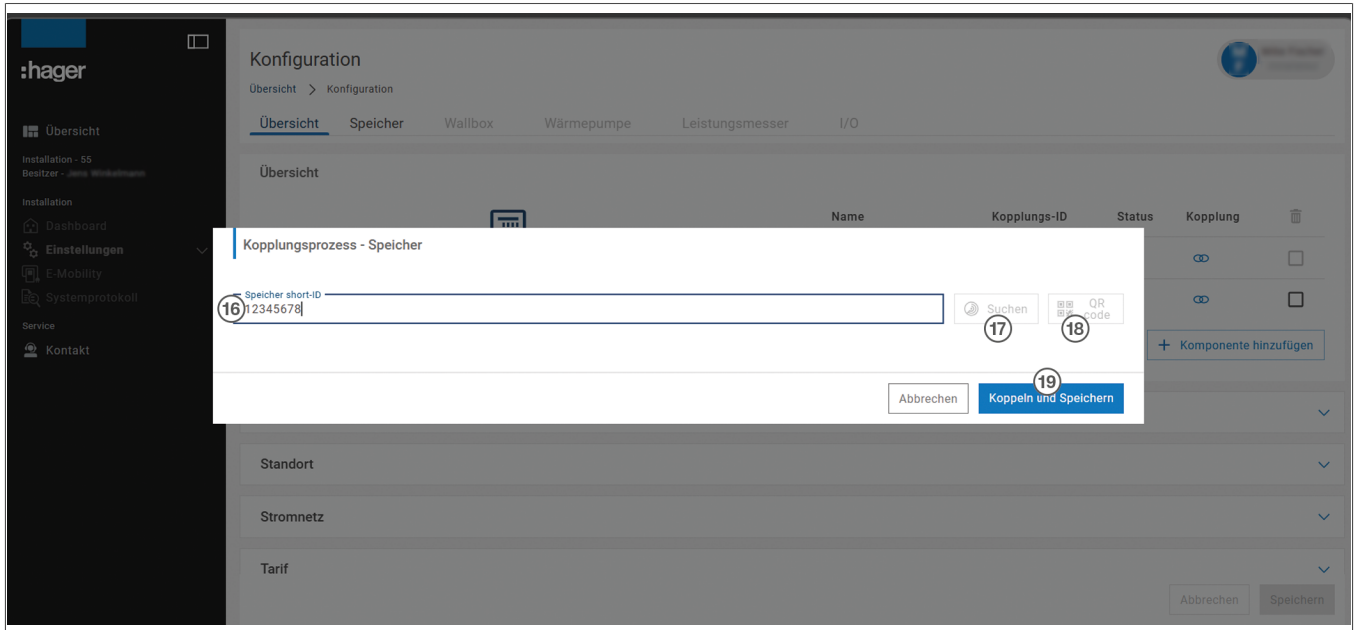


Fig. 43: Pairing storage system/inverter

- (16) Storage **short ID**
- (17) Button for scanning the network
- (18) Button for scanning the QR code on the device
- (19) Button for **pairing and saving**

There are several options for starting pairing mode.

- 7 Enter the storage system ID in the input field (16).

Or:

Scan the network for devices to be paired using the **Search** (17) button.

i

To search the local network, the EMC of the system must be connected to the internet.

Or:

When configuring in the browser on a mobile end device or in the app, open the camera using the **QR Code** (18) button and scan the code shown on the inverter type label.

The device ID is displayed in the input field.

- 8 Complete pairing using the **Pair and save** (19) button, or discard with **Cancel**.
The paired device is marked with ✓ on the status display(20).

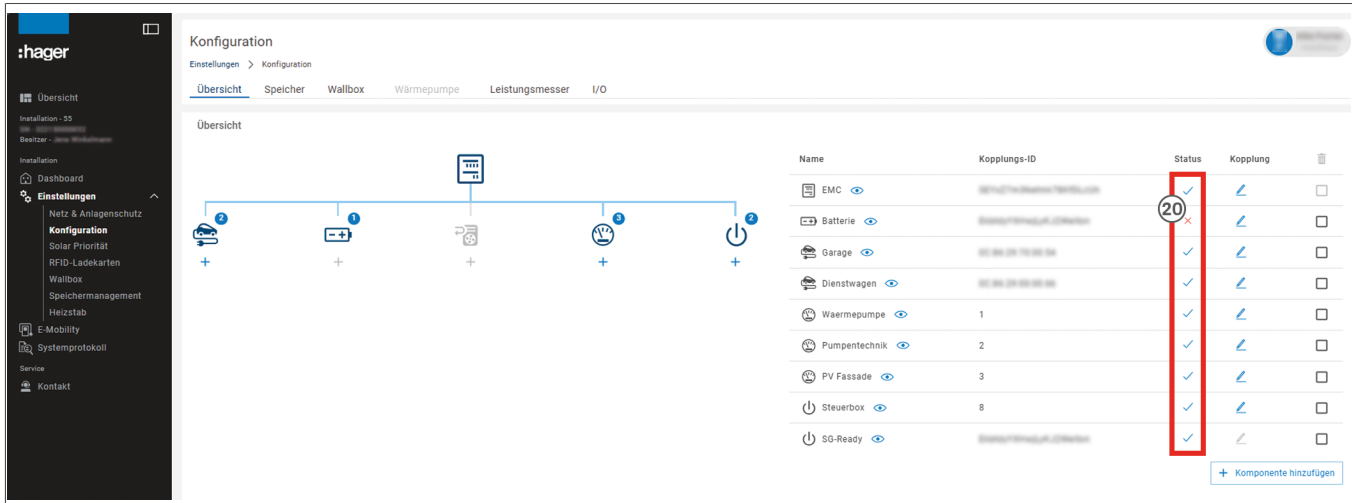


Fig. 44: System overview with storage system/inverter (example of an extensive system)

20 Status display for all components

If a fault is identified in the energy management system, the LED strip on the inverter indicates the corresponding fault type and the fault is shown in the portal/app overview with ✗. Detailed information on the fault that has occurred can be viewed under **System log** in the left-hand menu bar (Fig. 45).

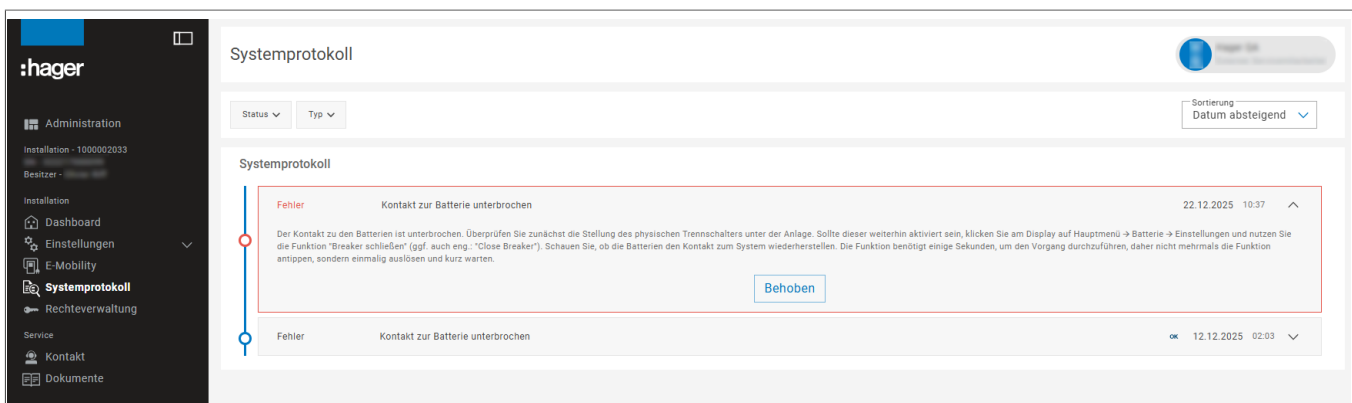


Fig. 45: Example of a system log with faults in the system

9.4 Commissioning the inverter



Attention

Risk of destruction of the inverter if an error message is present!

If the device indicates a fault via the LED strip before commissioning, it may be damaged when switched on or later because it cannot be ensured that the internal protection mechanism for any increased voltages that may occur is activated.

- Before switching on the device, ensure that no error message is displayed on the device or in the app under **Properties > Advanced settings** (Fig. 39) (see Configuration).
- If a fault is indicated, check the device connection again and eliminate the cause of the fault.

Switching on the inverter

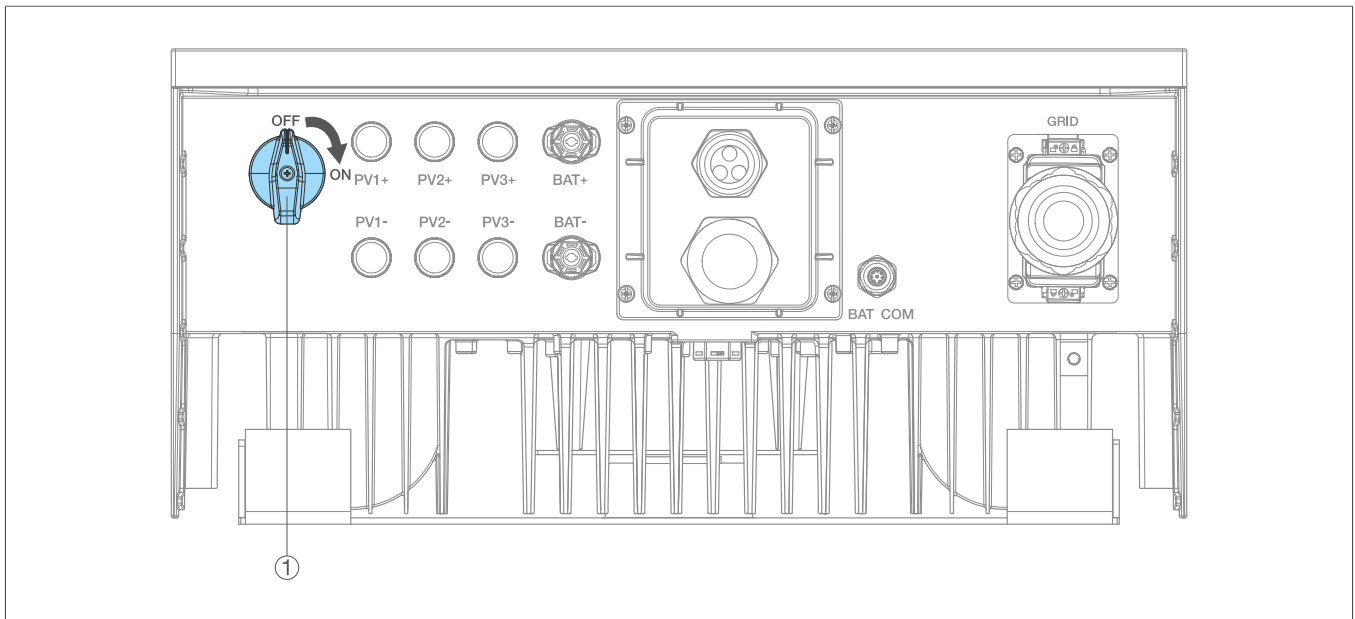


Fig. 46: Underside of the electrical functional unit

① DC disconnect switch

① Switch on the inverter by turning the DC isolator (1) to **ON**.

If sufficient voltage from the PV generator is available, the inverter will then start operating.

Switching on the battery



Note

Do not switch on the BMS if there is a prolonged period between installation and commissioning, to prevent unintentional discharge of the battery modules.

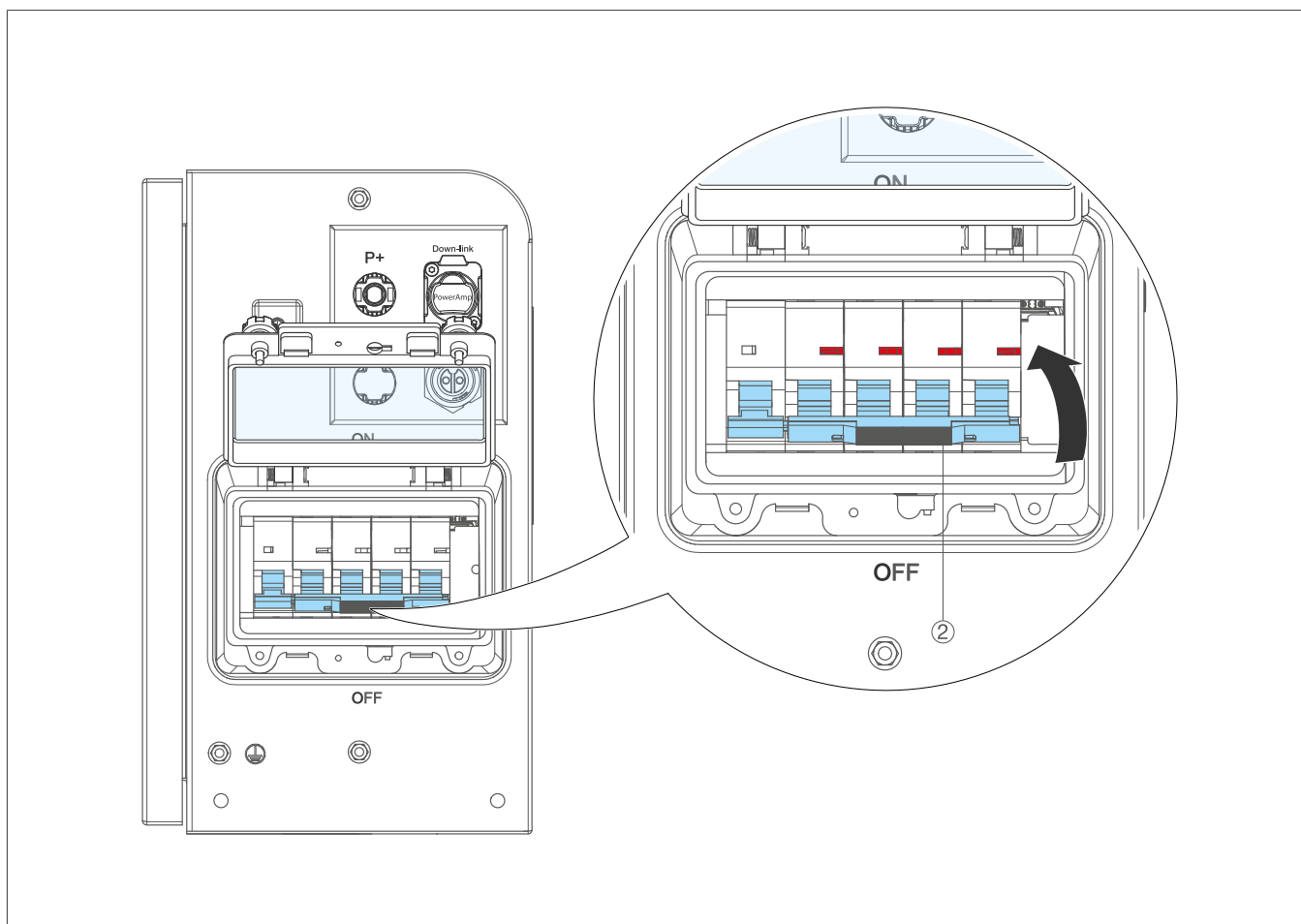


Fig. 47: Switching on the battery module(s) on the BMS

② Main switch on the BMS

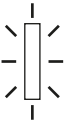
② Set the battery modules to the (2) **ON** position using the on/off switch on the BMS.

All connected battery modules are switched on and started. The status of the battery modules is indicated by LEDs.

Checking the system components



Once all new system components have started up, check again in the portal/app whether the status (Fig. 44) (20) of all system components is marked as OK with a *blue check symbol*. If necessary, obtain further information under **System log** (Fig. 45) or check the signals of the LED strip for status indication on the inverter.

Indication	Meaning	Action
In the portal/app:		
	System component functioning correctly.	
	Component faulty.	View details under System Log .
On the inverter LED strip:		
	Device is busy performing automatic checks or installing a new software version.	none
	Connection to the cloud server interrupted.	Check the internet connection and the connection to the inverter. Restart the router if necessary.
	No connection to the EMC although already configured. At least one device fault is present (BMS, EMC, ATS box).	Follow the additional information and instructions in the portal/app.

If all system components are functioning correctly, all energy flows in the household electrical system are clearly displayed in the dashboard (Fig. 48).

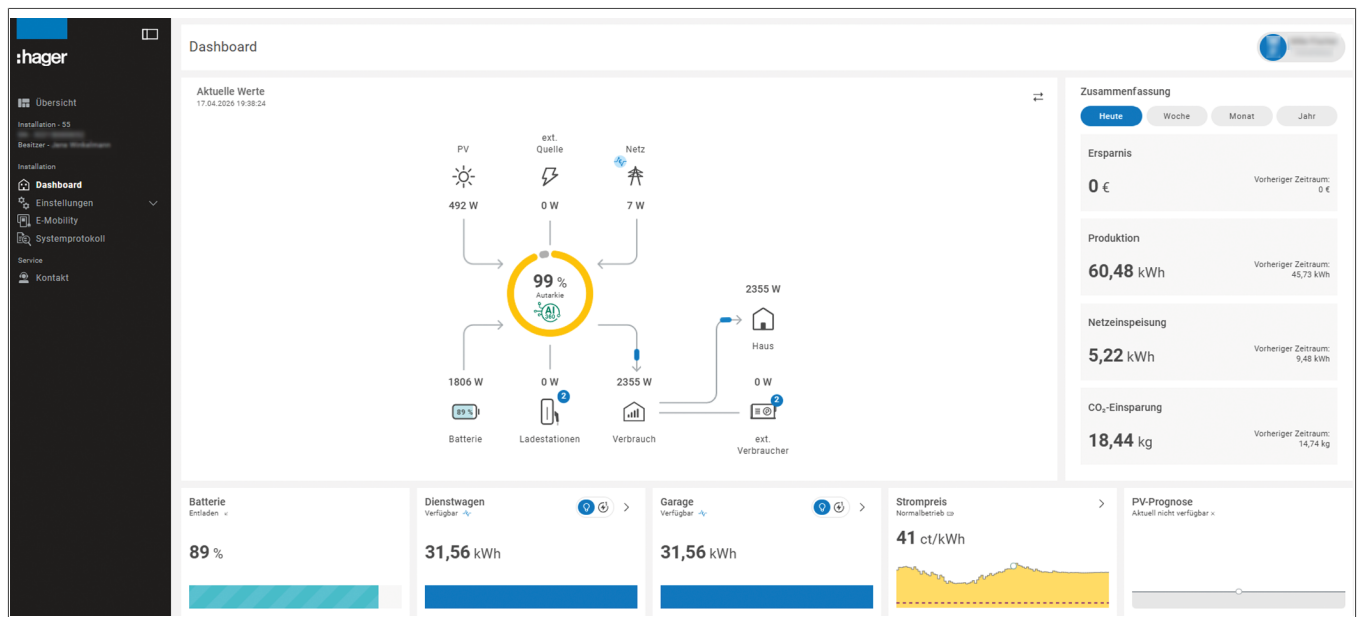


Fig. 48: Dashboard with current information

9.5 Handover of the project to the customer

Entering customer details

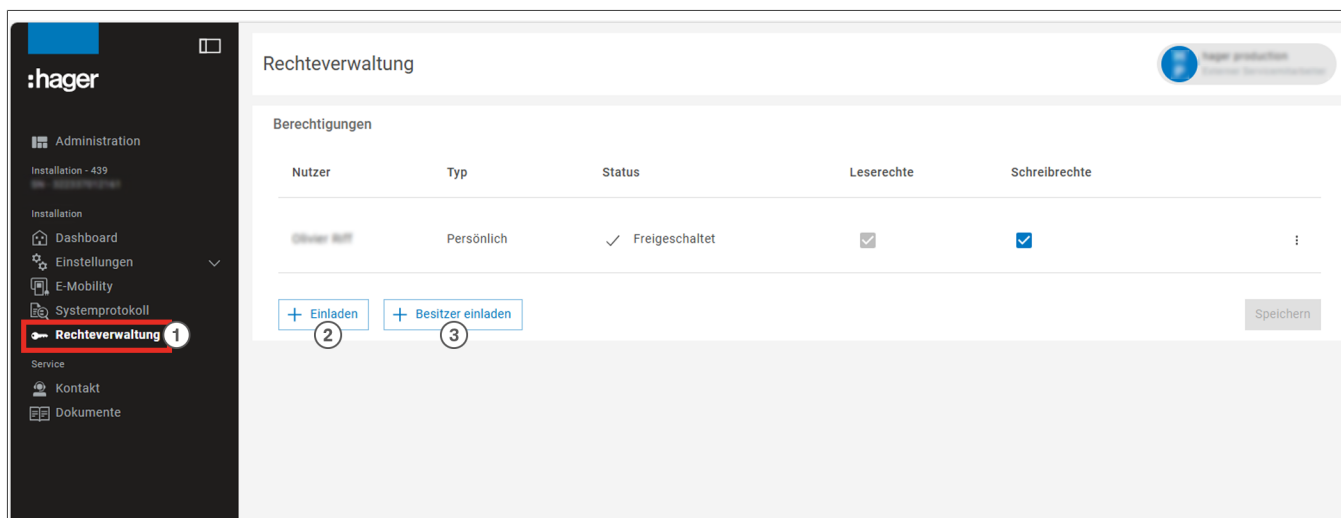


Fig. 49: Inviting the owner (customer)

- ① Rights management
- ② + Invite button
- ③ + Invite owner button

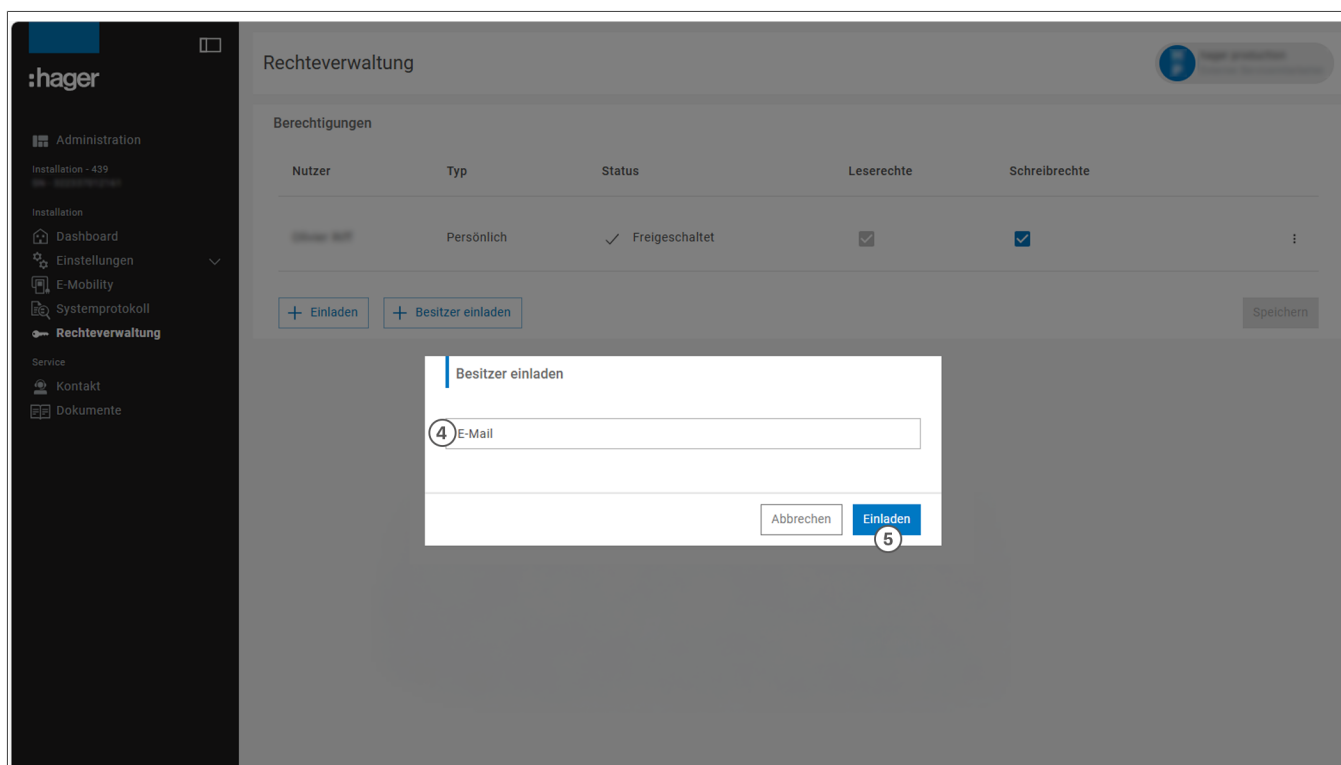


Fig. 50: Owner (customer) email address

- ④ Input field for owner email address
- ⑤ Invite button

- ☑ The system has been commissioned and all required settings have been completed by the installer.
- ① For handover to the customer, the customer must be invited in the app/portal **as the owner**. To do this, open **Rights management** (1) in the left-hand menu bar.
All previously invited users are displayed in the rights management section. Before inviting the owner, normally only the installer is listed here.



At this point, the installer does not create an account for the owner of the system. The owner is only invited to the system and later registers independently if they do not already have a myHager account.

- ② Select the **+ Invite owner** (3) button.
An input field for the owner's email address opens.
- ③ Enter the owner's **email address** (Fig. 50) and send it using **Invite**, or cancel the process.
The customer receives an invitation email containing a confirmation link.
- ④ Activate the link in the email.
A window opens in the app/portal asking the customer to accept or decline the invitation.
- ⑤ Accept the invitation.
The customer is now the owner of the system. They are therefore solely authorised to manage all users for the installation and to invite new users by email using the **+ Invite** (2) button, such as the installer for maintenance purposes, family members or occupants of the house.



If the customer has not previously logged in to their myHager account or does not yet have a myHager account, the link in the invitation email first leads to myHager login/registration (Fig. 36). After successful login, the invitation link in the email may need to be activated again to accept the invitation and take over the system as owner.



Further information can be found in the configuration manual in the Download Centre at:
hgr.io/d/XEM1200/ProductApplicationGuide



9.6 Guarantee declaration online in the customer portal

The guarantee declaration is completed online using a web form in the Hager customer portal at flow.hager.com (login required).

To preserve guarantee claims and obtain the extended 10-year system guarantee, the guarantee declaration must be **complete** and signed by the installer and the customer (system operator). Please then submit the guarantee declaration to Hager as described in the form.

The guarantee certificate is issued and returned **after** review by Hager.

9.7 Completion of commissioning

The device has been commissioned successfully. This completes all work relating to assembly, electrical installation and commissioning.

- Hand over the assembly and installation manual to the customer.

9.8 LED strip for status indications

The inverter has an LED strip for status indication, divided into 10 sections. The level at which the LED strip lights up may indicate a specific status (Tab. 5). In addition, the continuous rise of the LED scale may indicate that the inverter is currently processing an operation and that it is necessary to wait until the process has finished before starting a new action.



Important note

Whenever the status indication flashes, regardless of colour or extent on the LED strip, action is required by the system owner or installer.

Colour		Meaning
Blue		Normal operation; the inverter is operating correctly.
White		The device is missing at least one connection to another system unit or to the cloud server. It can also be busy (commissioning, software update).
Orange		Backup power operation
Red		Error

Table 4: Colour coding of the LED strip

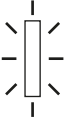
LED status indication	Meaning	Action/consequence
Before commissioning		
	Device checks all connections and the software version, which is updated if required.	none
	Device has started up but has not yet been commissioned.	Configure the required commissioning settings in the app.
Operational readiness		
	No solar energy production; connections to the EMC and internet are established.	none
	Solar energy is being produced.	none
Backup power operation (island mode)		
	Device in backup power operation	Connected loads are powered.
	Backup power operation is not possible. Overload, as the solar energy from the battery and PV panels is insufficient to supply the connected loads.	The device attempts to establish a backup power grid every 90 s.
	Overload remains permanently present.	The PV system owner must press and hold the push button on the inverter for 0.5 to 5 s so that the device attempts to establish a backup power grid again.
Error		
	Connection to the cloud server interrupted.	
	No connection to the EMC although already configured. At least one device fault is present (BMS, EMC, ATS box).	Follow the additional information and instructions in the app.

Table 5: LED status indications

9.9 Function of the button

There is an easily accessible push button on the outside of the inverter on the right-hand side (Fig. 53). This push button can be used to trigger important inverter actions manually and easily. These actions are possible from any inverter operating status. To trigger an action, press and hold the push button for a defined period of time (Tab. 6).

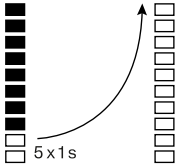
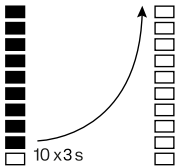
Push button action	LED strip	Inverter action
0.5 to 5 s		Checks whether the overload is no longer present. This is only possible when the device is in emergency power supply mode and an overload has previously occurred.
5 to 30 s		Device restart
> 30 s		Resets the network settings to the as-delivered state, then restarts the device.

Table 6: Push button functions

9.10 Technical support



Technical support for approved installers

Our staff will be happy to answer any questions and provide solutions. In the event of problems or faults, please have the following information ready:

- Installer name
- Serial number of the device in the Hager flow R3 energy management system
- Commissioning declaration (customer contact details)
- Description of the problem

10 Maintenance instructions

The device is maintenance-free.

In the event of a defect, please contact the specialist dealer or installer. They will then contact HagerEnergy GmbH.

All repairs must only be carried out by HagerEnergy GmbH or companies appointed by it.

Software updates are installed directly via the internet. A permanent internet connection is required to enable uninterrupted data recording.

With the privacy policy provided with the device, HagerEnergy GmbH confirms that the data recordings are used exclusively to optimise the service life of the batteries.

11 Decommissioning and disposal



Installation and assembly of electrical devices may only be carried out by a qualified electrician in accordance with the applicable national installation standards, directives, regulations, safety requirements and accident prevention regulations.

This also applies to decommissioning of the device.

National regulations and safety provisions must be observed. See also IEC 60364-7-712:2017 (DIN VDE 0100-712:2016-10).

11.1 Decommissioning

The system devices must be switched off before installation work can be carried out. To do this, switch off all devices in the system.

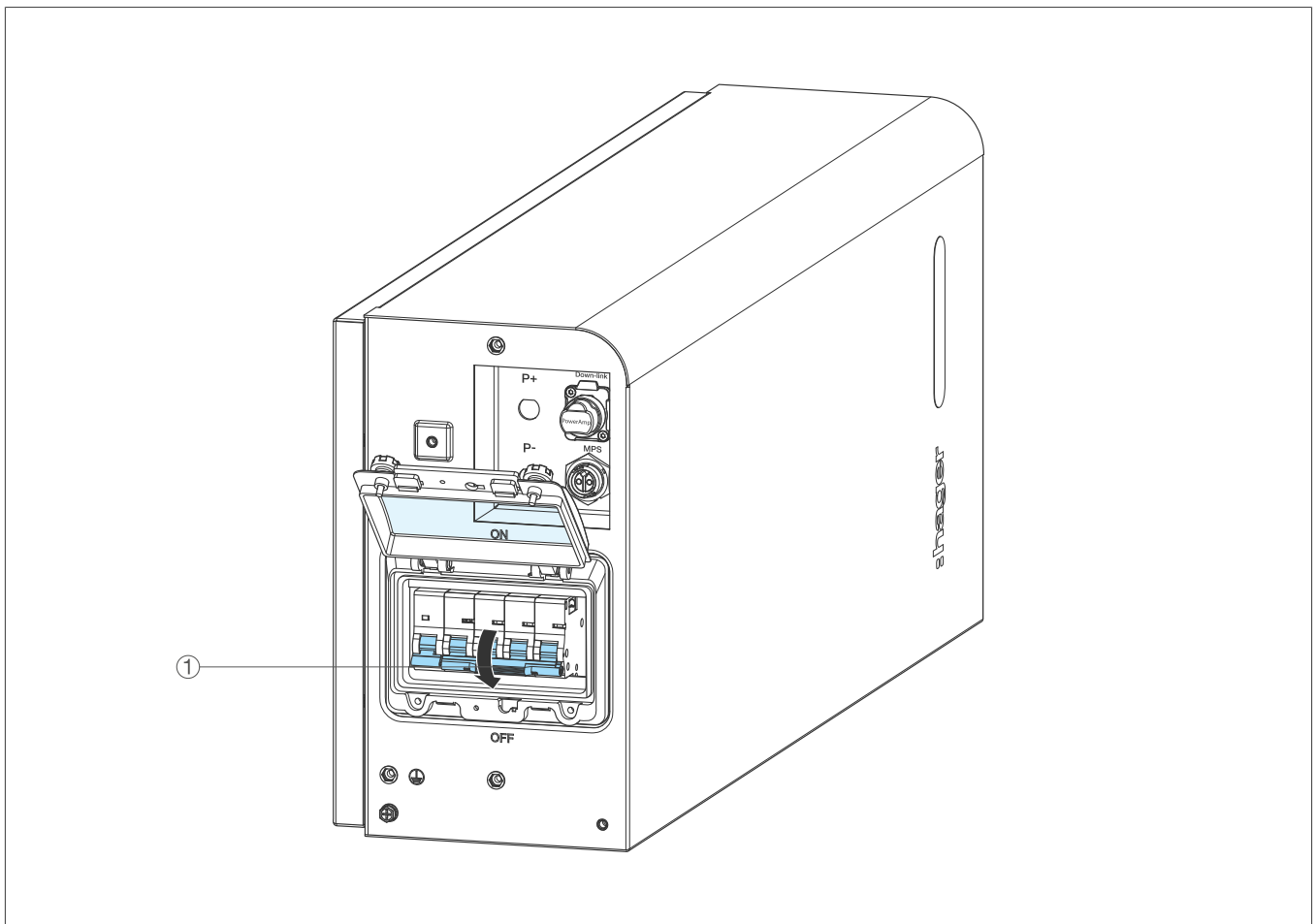


Fig. 51: Main switch on the BMS

① Main switch on the BMS

① Set the main switch (1) of the battery management system (BMS) to the **OFF** position.

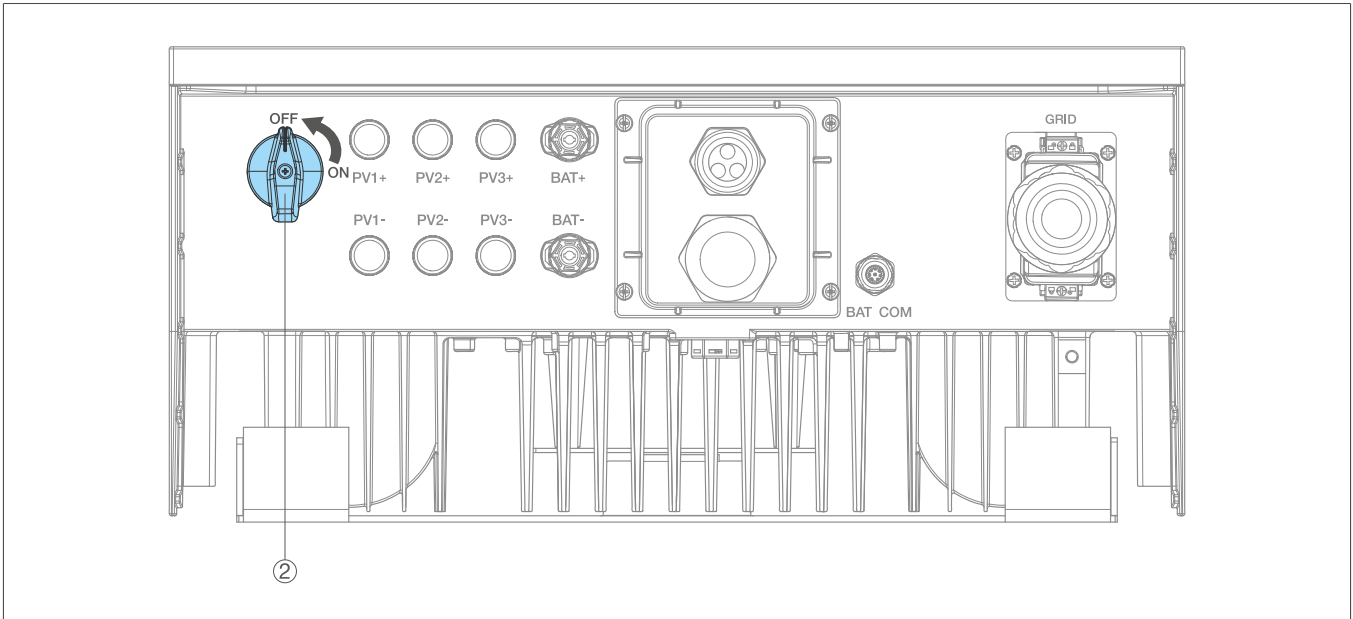


Fig. 52: Underside of the electrical functional unit

② DC disconnect switch

- ② Set the DC isolator (2) to **OFF** to switch off the inverter.
- ③ Switch off the circuit breakers and residual current circuit breakers in the distribution board.
- ④ Wait at least 2 minutes before switching the system on again.



Attention

Risk of deep discharge of the batteries!

If the main switch of the BMS remains in the **ON** position, the batteries may become deeply discharged.

- Always set the main switch of the BMS to **OFF** if the system is switched off for an extended period.

Deep discharge:

After the inverter has been switched off, the batteries remain in standby mode. The battery management system is then supplied exclusively with power from the batteries, although only to a very small extent. Under unfavourable circumstances, this may result in deep discharge of the batteries. In this case, the batteries cannot restart automatically and must be reactivated manually.

11.2 Disposal

In the EU, the handling of waste electrical and electronic equipment is regulated by the WEEE Directive, which is implemented in Germany by the Electrical and Electronic Equipment Act (ElektroG).

The device must not be disposed of with household waste, but must be sent to a specialist company for recycling.

11.2.1 Manufacturer information in accordance with Section 18 ElektroG

ElektroG contains a wide range of requirements that must be observed when handling electrical and electronic equipment, including:

Separate collection of waste equipment

Electrical and electronic equipment that has become waste is referred to as waste equipment. Owners of waste equipment must ensure that it is collected separately from unsorted municipal waste. In particular, waste equipment must not be disposed of with household waste, but must be taken to special collection and return systems.

Batteries, rechargeable batteries and lamps

Owners of waste equipment must generally remove waste batteries and accumulators that are not enclosed within the waste equipment, as well as lamps that can be removed from the waste equipment without being destroyed, before handing the equipment over to a collection point. This does not apply if waste equipment is prepared for reuse with the involvement of a public waste management authority.

Return options for waste equipment



Correct disposal of this product (electrical waste).

(Applicable in the European Union and other European countries with separate collection systems)

This marking shown on the product or its documentation indicates that it should not be disposed of with other household waste at the end of its working life. To prevent possible harm to the environment or human health from uncontrolled waste disposal, please separate this device from other types of waste. Recycle the device responsibly to promote the sustainable reuse of material resources.

Household users should contact either the dealer where they purchased this product, or their local government office, for details of where and how they can take this device for environmentally safe disposal.

Commercial users should contact their supplier and check the terms and conditions of the purchase contract. This product should not be mixed with other commercial waste for disposal.

Data protection notice

Waste equipment may contain sensitive personal data. This applies in particular to information and telecommunications technology devices such as computers and smartphones. Please note, in your own interest, that each end user is responsible for deleting data from the waste equipment to be disposed of.

Meaning of the symbol



The crossed-out wheeled bin symbol regularly shown on electrical and electronic equipment indicates that the respective device must be disposed of separately from unsorted municipal waste at the end of its service life.

In the EU, the handling of waste electrical and electronic equipment is regulated by the WEEE Directive, which is implemented in Germany by the Electrical and Electronic Equipment Act (ElektroG).

11.2.2 Disposal of batteries

Always retain all battery packaging so that it can be reused for future transport.

For end customers, HagerEnergy GmbH undertakes to take back the batteries used in the device free of charge.

The batteries must be transported safely and in accordance with UN38.3 dangerous goods class 9 in the original packaging.



For more information on safe transport and use, refer to the appropriate safety documents. These documents can be found in the Hager customer portal at flow.hager.com (login required).

12 Troubleshooting

12.1 Restarting the inverter

The function is only required in exceptional cases. Technical Support will usually ask you to restart the device.

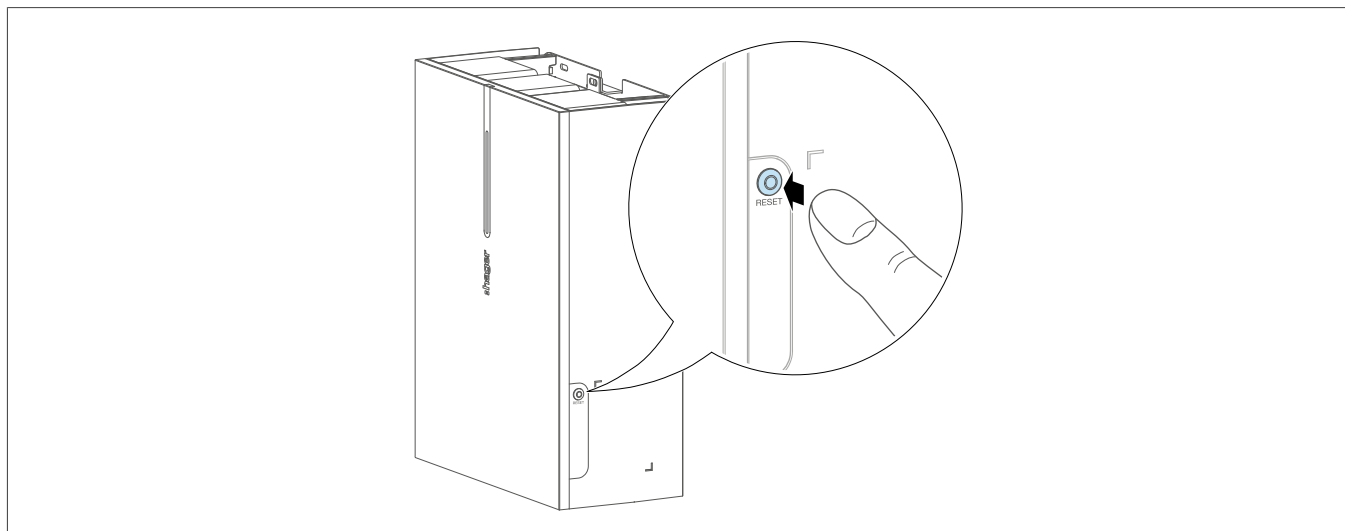


Fig. 53: Restart

① Push button

- Press and hold the push button (1) on the right-hand side of the device for 5 to 30 s.
The LED strip lights up white. It starts at 10% and rises every second up to 100%. If the push button is released during this period, the device restarts.

To check the system in the event of a fault, the system devices must be completely switched off. To do this, switch off all devices in the system (see [Decommissioning](#)).



Note

All safety and warning instructions in the installation manuals must be read and observed before carrying out installation work on the system.

If the device is to remain out of operation for an extended period, it should be completely switched off.

12.2 LED status indication (error messages)

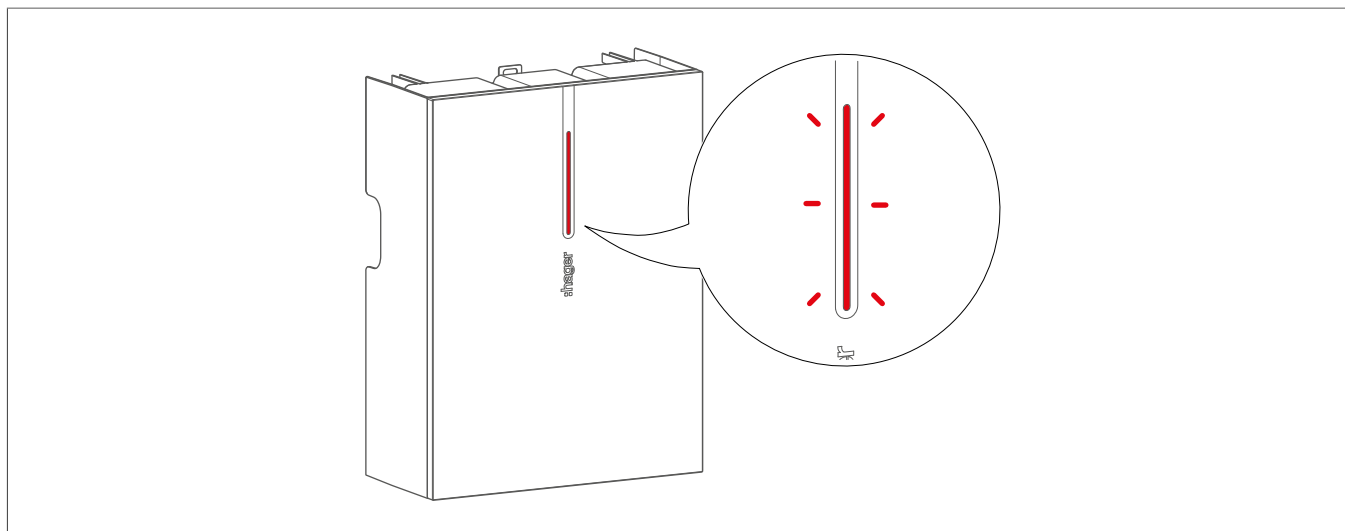
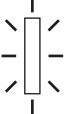


Fig. 54: LED status strip

The LED status indication shows whether the inverter is operating correctly or whether the system auto-diagnostic has detected a component failure.

Indication	Possible fault	Corrective actions
	No internet connection	- Check that the network cable between the device and the router is connected correctly. To do this, briefly disconnect the network cable from the connection socket on the router, reconnect it and restart the system (see Restarting the inverter). - Check that the router is functioning correctly.
	Solar inverter not communicating	If no solar power is generated and the battery is depleted, this is normal inverter operation and does not indicate a fault. As soon as solar power becomes available again, the inverter returns to normal operation. - If there is obvious solar energy or remaining battery capacity >0% and household consumption exceeds 60 W, check the DC isolator and the circuit breaker in the distribution board. - Ensure that both switches are switched on. If the fault indication continues to be displayed, restart the device (see Restarting the inverter). - If the error message is still displayed after restarting, contact Technical Support.
	Battery not active	- First restart the system (see Restarting the inverter). - If the fault indication persists, check whether the BMS has tripped. The main switch will then be in the OFF position. Contact Technical Support. The main switch in the BMS may only be switched ON again in consultation with Technical Support.
	Energy meter not active (only visible in the portal/app)	- First restart the system (see Restarting the inverter). - If the error message remains in the portal/app, contact Technical Support.

Indication	Possible fault	Corrective actions
	System software not active	1 First restart the system (see Restarting the inverter). 2 If the error message remains in the portal/app, contact Technical Support.

13 Technical data (excerpt)



Note

The complete and up-to-date technical data sheet is available for download from the Info Centre at flow.hager.com.

13.1 Technical data – generation

Input

Max. recommended DC rated power	18,000 Wp
Start input voltage	170 V
Min. MPP voltage	150 V
Max. MPP voltage	850 V
Max. DC input voltage	1000 V
Max. DC current per MPP tracker (MPPT)	16 A
Max. PV short-circuit current per MPPT	22 A
Independent MPP trackers	3

Output

Max. AC rated power (230 V, 50 Hz)	12,000 W ^[2]
AC rated voltage L/N/PE	3 x 230 V
AC rated frequencies	50 Hz
Max. output current (per phase)	19.2 A
Feed-in phases/connection phases	3/3
Technology	transformerless
cos (φ)	-0.4 ... +0.4

^[2] The actual power depends on the system status and temperature. Depending on the available PV power, the prevailing weather and grid conditions, it may be lower.

General data

PV inverter efficiency (EU)	>98%
Max. system efficiency incl. battery	>95%
AC short-circuit resistance/earth fault monitoring	yes/yes
Permissible ambient temperature inverter	-25 ... +60°C
Recommended ambient temperature inverter	0 ... +20°C
Degree of protection	IP65
Dimensions W × H × D	482 x 642 x 223 mm
Weight of hybrid inverter	approx. 40 kg
Degree of contamination	3
Overvoltage category	III for AC II for PV
RCD	Type A
Trip current	> 100 mA
Short-circuit current	3 x 11.6 A _{rms}
Backfeed current	0 A
Switch on current	11.6 A AC, 10 ms
Output short-circuit current	12.86 A
Protection class	1

14 Accessories



Note

An additional energy meter can be used with the flow R3 inverter.

Item number	Designation
Controller	
XEM470	flow energy management controller
Power supply and cable sets	
XEMA250	ATS box for mains and emergency power supply
XEMA310	Connecting cable set for solar systems, 10 m.
XEMA330	Connecting cable set for solar systems, 30 m.
Energy storage	
XEM4001	Basic energy storage system for retrofitting and capacity expansion
XEMA400	Additional energy storage system for expansion of existing systems
XEMA450	BMS module for parallel energy storage management
Energy meter	
XVA630	Three-phase energy meter for measuring the photovoltaic surplus for charging stations
XVA610	Three-phase energy meter for measuring the photovoltaic surplus for charging stations
ECR382D	3-phase energy meter, direct 80 A, 4 M, MODBUS, MID
ECR140D	1-phase energy meter, direct 40 A, 1 M, MODBUS, MID
ECR180D	1-phase energy meter, direct 80 A, 2 M, MODBUS, MID
ECR302C	3-phase energy meter for transformer ratio 1 A or 5 A, 4 M, MODBUS, MID
Transformers	
SRR02505A	Split-core current transformer SC1, 18 mm, 250/5 A, 0.6 VA, class 1
ZY2505LM	Equipment package for LM applications, 250/5 A transformer, 3-pole MCB, B 10 A, transformer class
I/O module	
XEMA600	Digital/analogue I/O gateway, 8 digital inputs and 8 digital outputs, 1 analogue input 0 to 20 mA/1 analogue output 0 to 20 mA



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