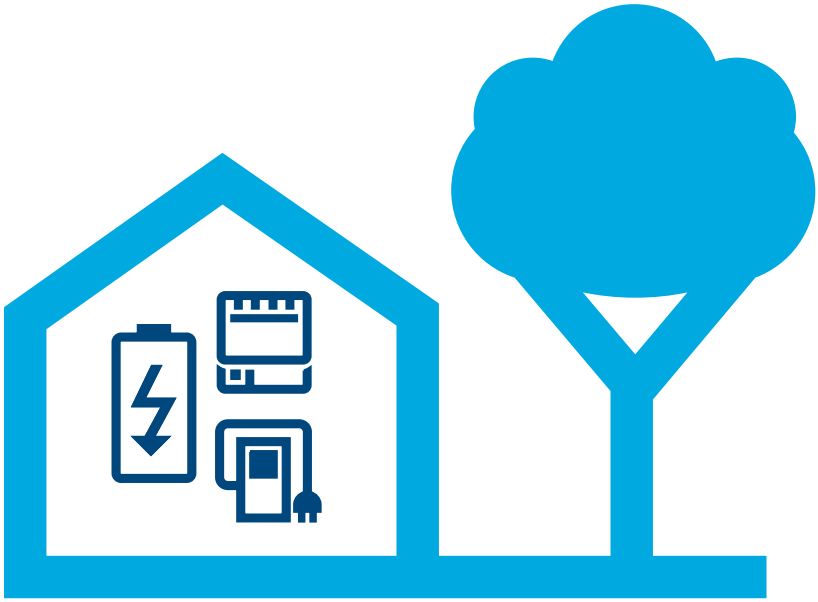
System Configuration Guide

# Energy management system flow R3



Energy management controller
**XEM470**

hager

EN

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# 1 Introduction and system overview

The **flow energy management system** manages the flow of electrical power in single-family homes. To get started, you need the **Energy Management Controller (abbreviated to: EMC)**. It is the central control unit and controls the photovoltaic power generated to ensure that the ratio of self-consumption is as high as possible. Additional components, such as an power storage system, electric charging station(s) and additional measuring and control devices, increase the self-sufficiency level of the house. You can create custom concepts that suit your individual circumstances perfectly.

## 1.1 Target group

This document is intended for installers of the Hager flow house energy management system.

Installation must only be carried out by qualified electricians who have successfully completed the relevant professional training and are familiar with all the relevant standards and regulations required for installation and other construction phases. The required tasks must only be performed by trained specialists. Hager recommends attending a training seminar about the Hager flow energy management system.

## 1.2 Document content

This document provides information on how to configure and commission the flow home energy management system and how to hand it over to the customer. It also provides tips and tricks on how to use the application software. It does not cover the assembling and installation of the devices used, nor does it contain all the information about its features, as it is an intuitive software.



Note

Read the separate installation instructions for information on the assembly and installation of the system components in question.

The illustrations and descriptions in this manual are for clarification purposes only and may differ from the actual state of the software due to regular improvements being made.

For general information on energy management using flow system

- See website https://hager.de/flow

# 1.3 Energy management with Hager flow

## 1.3.1 Applications

### Installation with EMC XEM470 and external inverter

Some of the use cases described below include devices that are not available in all countries. Accordingly, the examples shown may be implemented differently depending on the country.

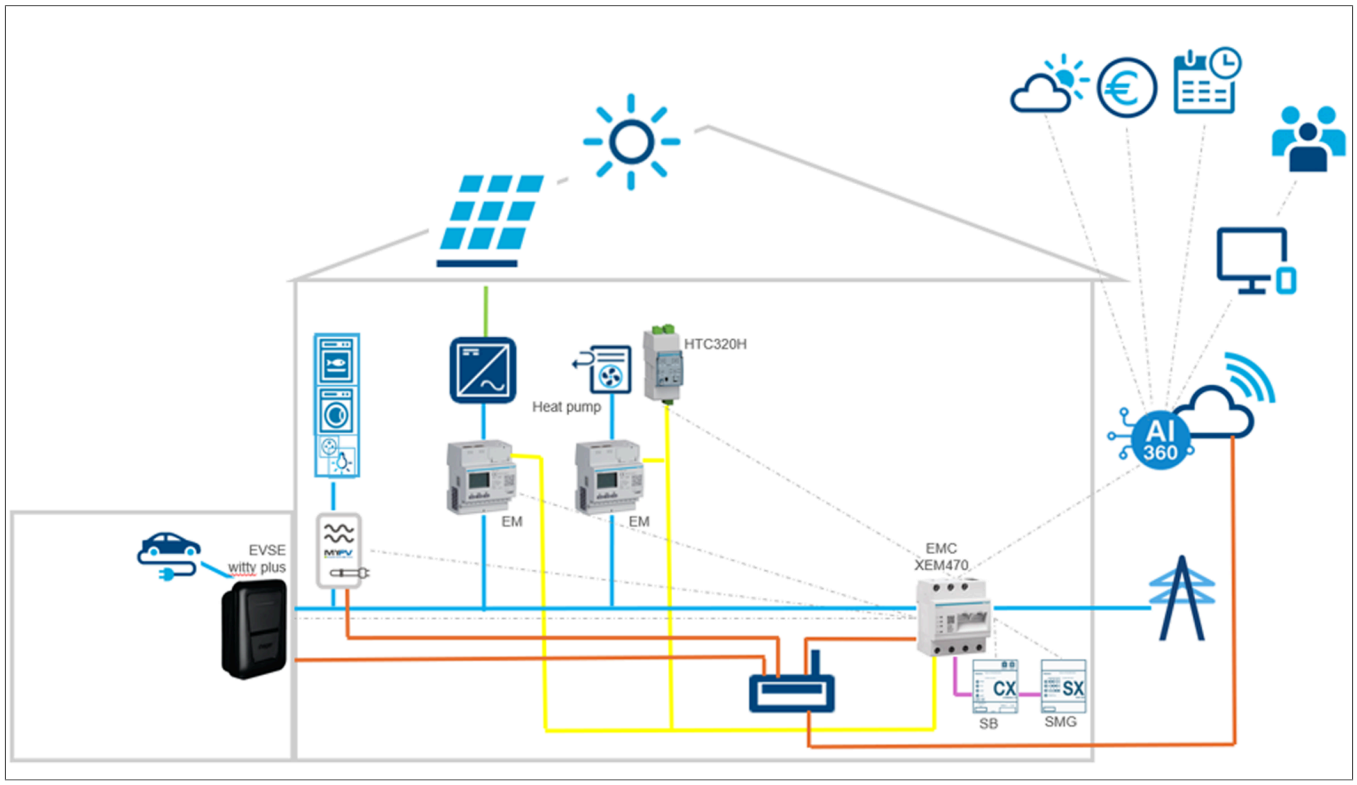



Fig. 1: Use case with EMC XEM470 and external inverter

| | | | |
|---|---|---|---|
| ——— | AC power supply | – – – – – | AC-secured network, backup |
| ——— | Power supply DC/ (PV system) | ——— | Modbus RTU |
| ——— | Network, Internet | ——— | EEBus |

Table 1: Colours and descriptions used

### Installation with EMC XEM470 and XEM1200 inverter

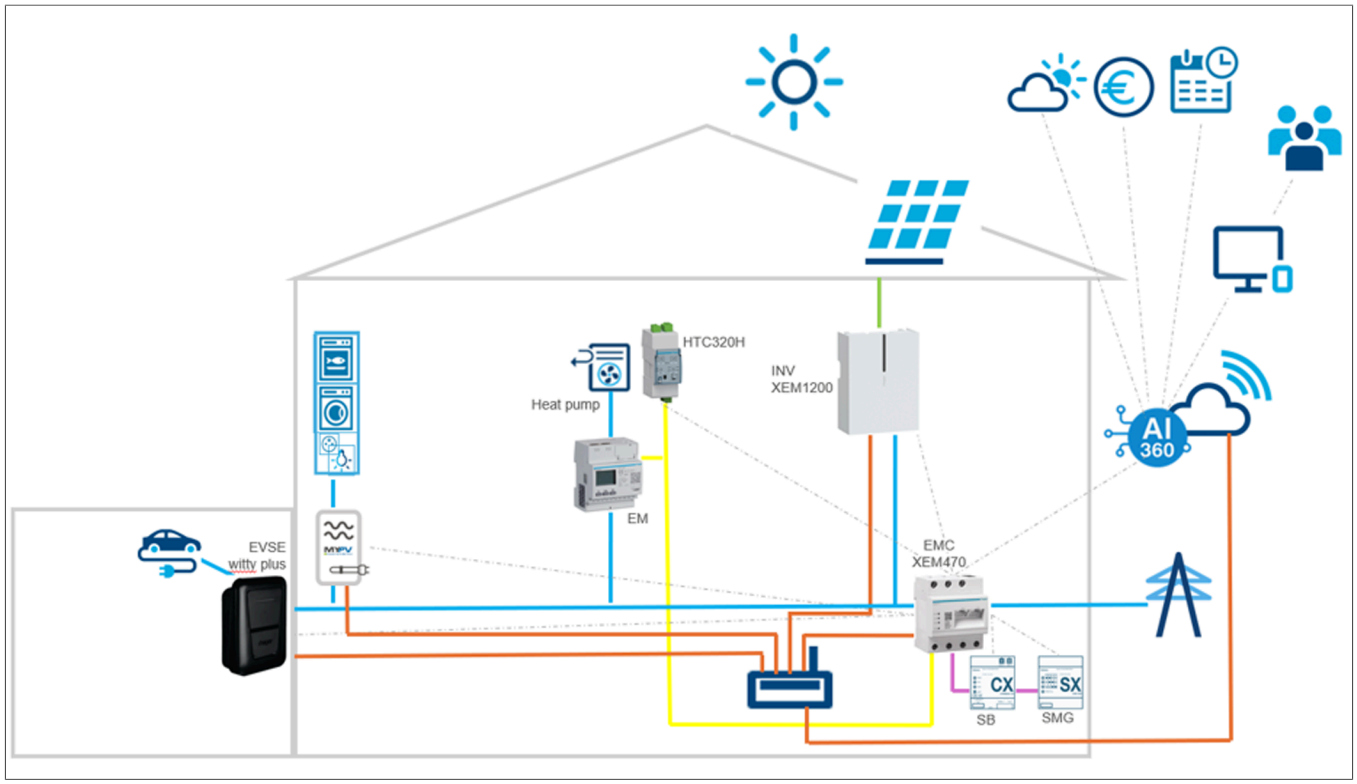



Fig. 2: Use case with EMC XEM470 and XEM1200 inverter

| | | | |
|---|---|---|---|
| ——— | AC power supply | - - - - - | AC-secured network, backup |
| ——— | Power supply DC/ (PV system) | ——— | Modbus RTU |
| ——— | Network, Internet | ——— | EEBus |

Table 2: Colours and descriptions used

### Installation with EMC XEM470, XEM1200 inverter and XEM4001 power storage (retrofit)

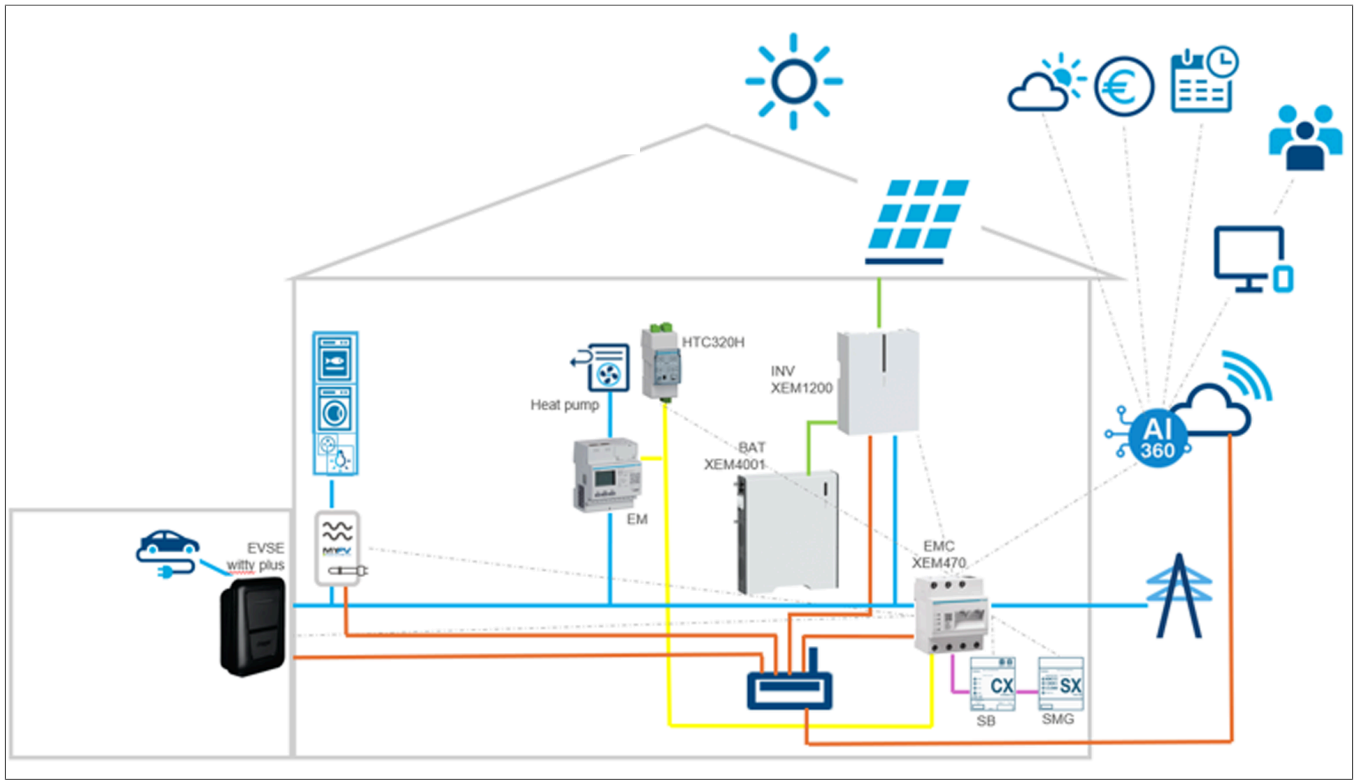



Fig. 3: Use case with EMC XEM470, XEM1200 inverter and XEM4001 power storage

| | | | |
|---|---|---|---|
| ——— | AC power supply | - - - - - | AC-secured network, backup |
| ——— | Power supply DC/ (PV system) | ——— | Modbus RTU |
| ——— | Network, Internet | ——— | EEBus |

Table 3: Colours and descriptions used

### Installation with EMC XEM470, XEM1200 inverter, XEM4001 power storage (retrofit) and ATS box XEMA250

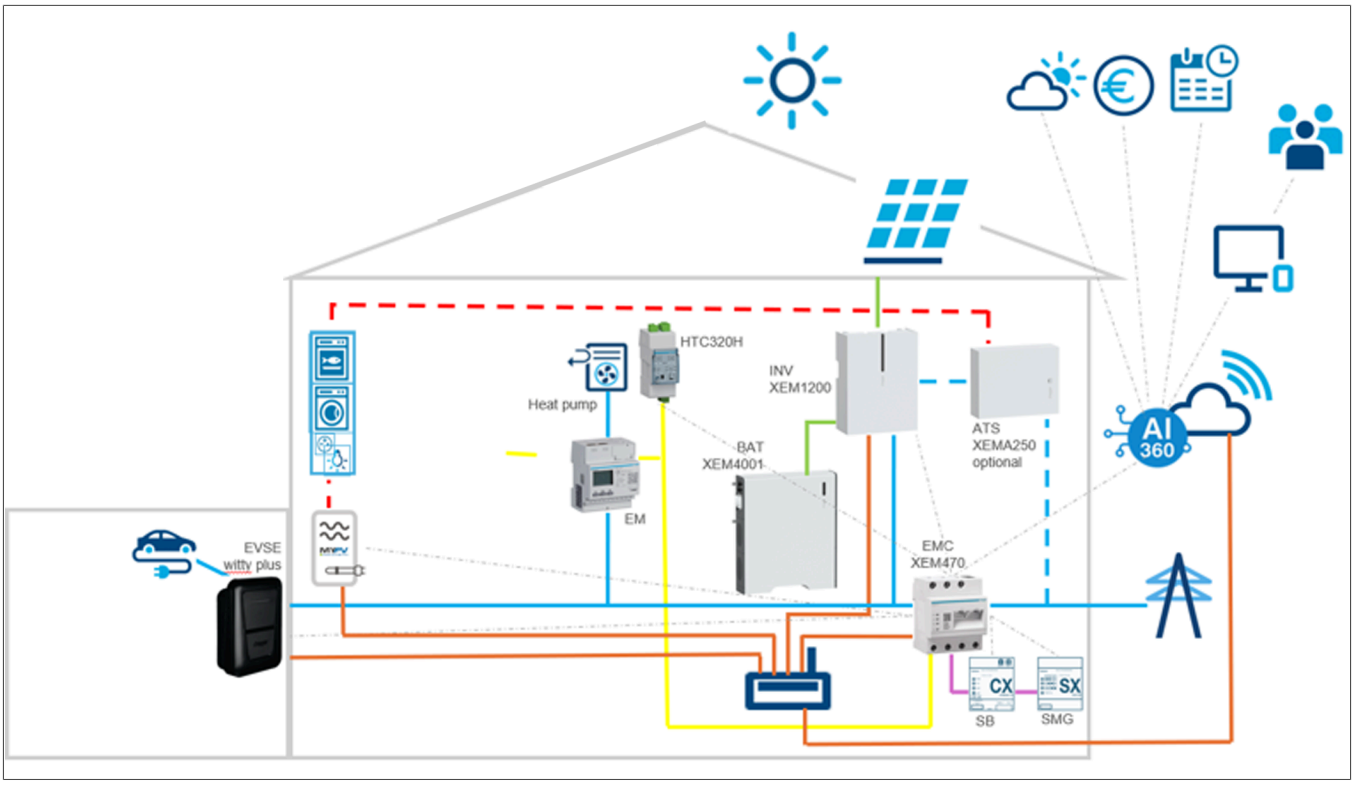



Fig. 4: Use case with EMC XEM470, XEM1200 inverter, XEM4001 energy storage and ATS-Box XEMA250

| | | | |
|---|---|---|---|
| ——— | AC power supply | – – – – – | AC-secured network, backup |
| ——— | Power supply DC/ (PV system) | ——— | Modbus RTU |
| ——— | Network, Internet | ——— | EEBus |

Table 4: Colours and descriptions used

| Abbreviation | Terms | Abbreviation | Terms |
|---|---|---|---|
| EMC | Energy management controller | EVCS | Electric vehicle charging station |
| INV | Inverter | V2H | Vehicle to Home |
| BA | Battery module(s): | SB | Control box |
| ATS | Automatic Transfer Switch | SMGW | Smart Meter Gateway |
| EM | Energy meter | HTC320H | I/O Box (SG Ready) |

Table 5: Abbreviations and terms used ( Fig. 1 to Fig. 4 )

## 1.3.2 Advantages

flow provides an intuitive software interface, which can be expanded in different stages. The modular expansion options let the home's level of self-sufficiency be continuously increased. This makes it possible to create an individual system for each customer.



The basic package consists of an EMC, an energy meter for PV power measurement (for external PV systems) and a network router connected to the Hager Cloud. The power generated by the PV system can be calculated and distributed to the electrical loads in the house with these components alone.

The range of functions provided by flow can be flexibly expanded by adding additional devices:




The individual consumption of various connected loads can be determined using additional **energy meters**. This improves transparency regarding power consumption and makes it easier to control costs.




The **I/O interface** enable HVAC devices, such as a heat pump, to be connected.



flow comes with permanently active **blackout protection** for **charging stations**. This prevents the house installations from being overloaded when charging electric vehicles. End customers can also set a charge planning function individually using the flow software. The flow system controls when an electric vehicle is charged, which vehicle should be charged first and whether it is more economical to charge vehicles with self-generated power or power from the grid.



The system achieves the highest level of self-sufficiency if an **energy storage unit** is integrated in the installation. This increases the self-consumption of PV power and stores the excess energy during solar power production.

The **isolator switch** integrated into the energy storage unit prevents excess self-generated power from being fed back unnecessarily into the grid. flow gathers the information needed to distribute this power efficiently among the loads in the house.

# 2 Safety instructions

## 2.1 General safety instructions



**Warning**

Risk of house connection overload!

If the total load on the building connection, including connected loads, equipment and charging station(s), exceeds the maximum permissible value agreed with the energy supplier, taking into account the respective operating mode, malfunctions, damage to the system, fire or other hazards may occur.

- Ensure that the customer's electrical installation and protective measures are adequately dimensioned and implemented in accordance with relevant standards.
- If necessary, retrofit the installation in accordance with the applicable regulations.
- Only devices compatible with the system may be used in the flow installation.

## 2.2 Network requirements and password protection



**Attention**

Installation malfunctions due to unstable DSL Internet connection.

Connection breakdowns or frequent disruptions can impair system functions and stability.

- Provide a local network router to commission and operate flow.
- Configure the network router as a DHCP server.
- Appropriate cyber security measures must also be put in place to protect the local network against unauthorised access.



**Attention**

Failure to secure access accounts through adequate security measures jeopardises data security.

Data loss or data theft; in the worst-case scenario, it is even possible for the system to be taken over by an external party.

- All myHager access accounts must be protected with secure passwords.
- Passwords must be kept safe and protected against unauthorised access

If the connection to a device in the installation has not been established, reset the appropriate network configuration. This may be necessary, for example, if several networks are set up in the building and the device without an internet connection 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. Restart the device to get a new IP address from the DHCP router.
3. Then wait until the device shows no issues on the relevant status display.
4. If this does not happen, repeat the restart process or check the internet connection and the router connections and DHCP settings.

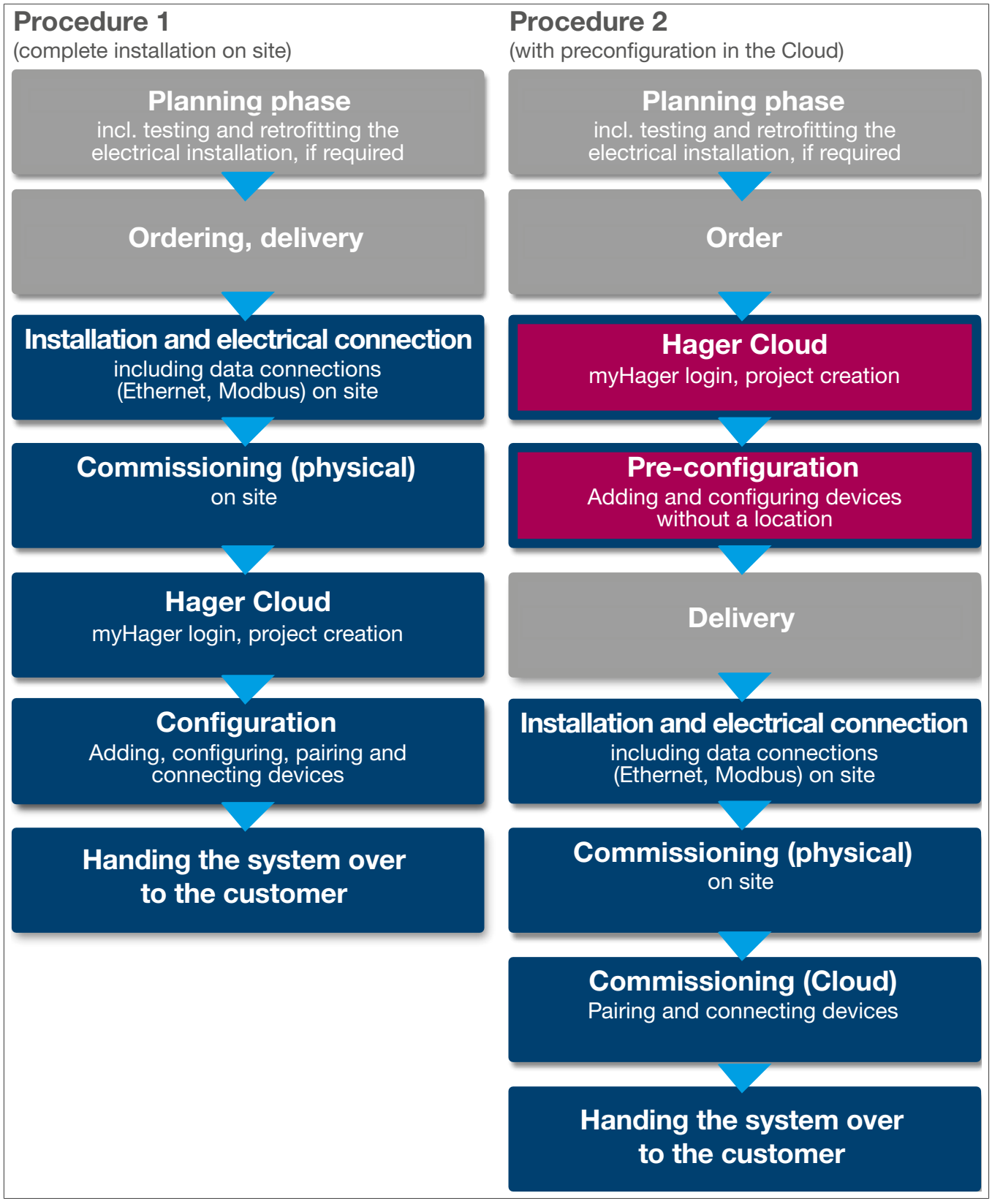
**Hager privacy policy**

Please also consider our data protection regulations at
https://hager.com/_de/privacy/products-services/flow

# 3 How to proceed

## 3.1 Do everything on site or plan the installation virtually?

You can choose from two procedures.



# 4 Logging in to myHager

## 4.1 System requirements for mobile devices

The system is configured via the Hager Cloud. The software is to be run with a mobile device (laptop, tablet, smartphone) with stable Internet connection, as well as a compatible browser.

| Mobile device | Browser |
|---|---|
|  | Google Chrome<br>Mozilla Firefox<br>Microsoft Edge<br>Safari/Safari mobile |

Table 6: Compatible browser

## 4.2 Connecting to Hager Cloud

Access to the system is available exclusively via the Hager Cloud. The portal's website can be accessed via a browser on a mobile device. If you are a specialist installer, all customer installations must be managed through the myHager business account. The customers receives the access details to their private myHager account after handover.

**Note**

If there is no existing myHager account, a new myHager account must first be created.

- Click **Register Now**.
- Follow the instructions on the website.
- Select the account type **business**.

1. Open the browser and access the link **flow.hager.com**.

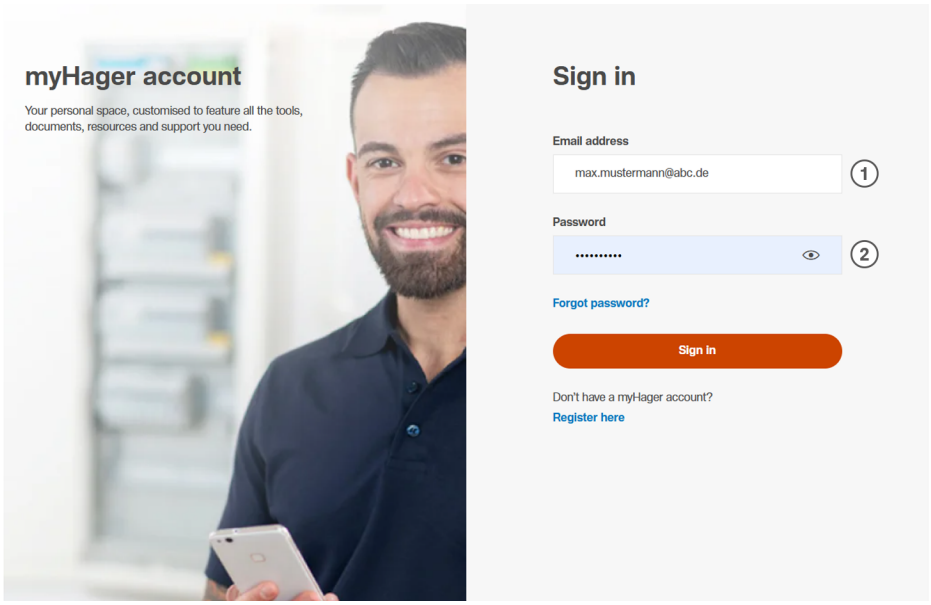



Fig. 5: myHager login – browser view

1 Email address
2 Password

2. Select the **Login** button.
   The login window opens.
3. As the installing specialist installer, enter the email address (1) and the password (2) for the myHager account.
4. Submit the login details using the coloured button.
   The application **overview** page opens (Fig. 7).

Google maps

If an address is to be checked via the portal, Google cookies must be accepted (Fig. 6) so that map data from Google Maps can be used.

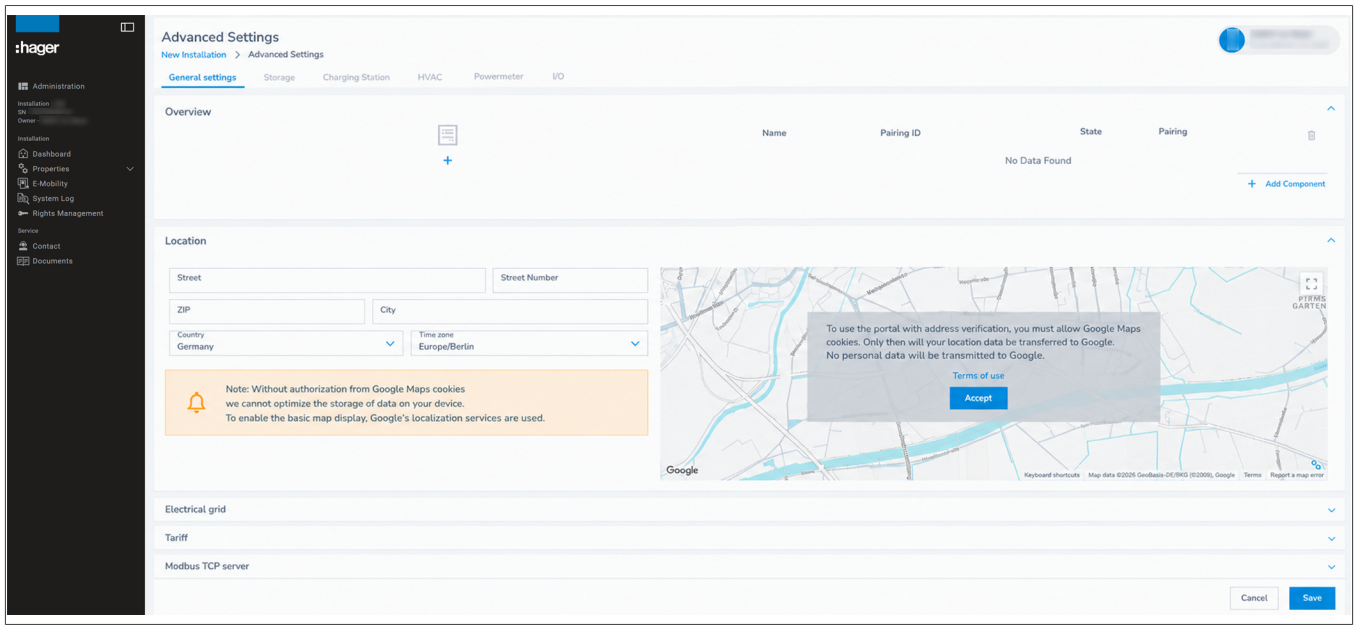



Fig. 6: Check the address via map data from Google Maps

# 5 Managing flow systems

## 5.1 Homepage

All systems are listed on the overview page. All ongoing projects must be reviewed in a clear and convenient manner. If necessary, control can be taken, provided that the customer has granted the specialist installer the required access and permissions.". Access is possible from anywhere, regardless of location.

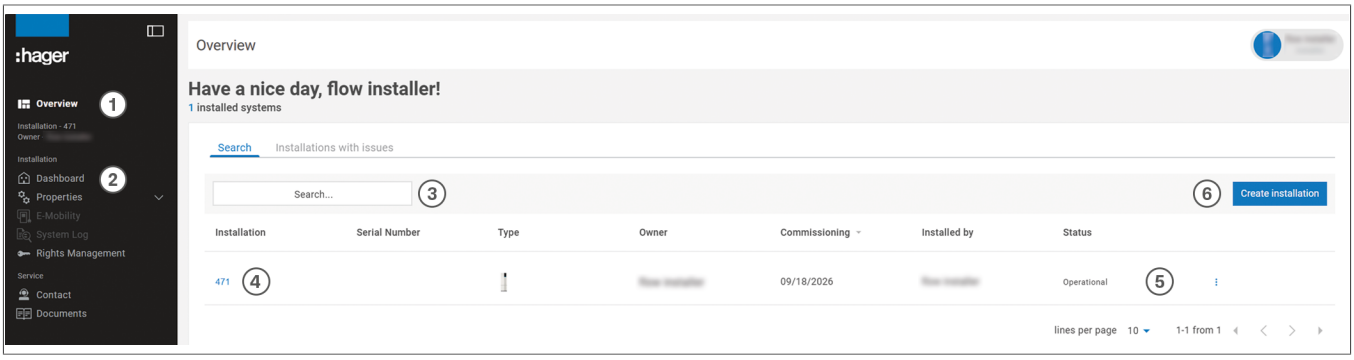



Fig. 7: Home page – Overview of customer installations

1. **Overview** as a list of all customer installations
2. **Dashboard** menu for visualising a customer installation
3. Search field
4. Customer installation (example)
5. System-specific menu selection
6. **Create an installation** button

**Note**

Each system is defined and identified by the owner/installer name, a system name and a serial number.

## 5.2 Creating a new project

### Adding an installation

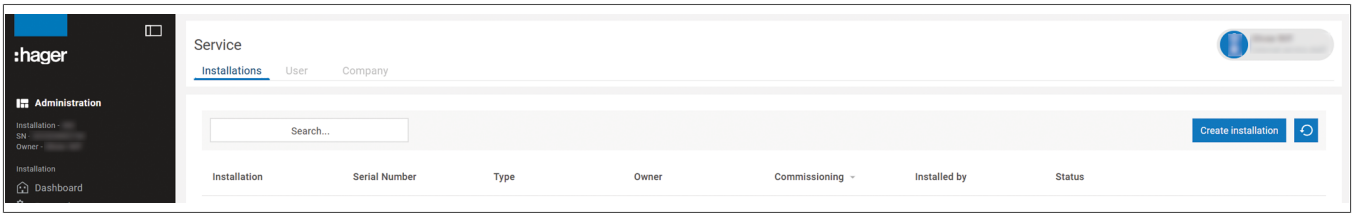



Fig. 8: Creation of a new project (installation)

1. Click **Create an installation**.

   The **Advanced settings** page opens.

**Note**

The project ID is assigned automatically and therefore cannot be changed.

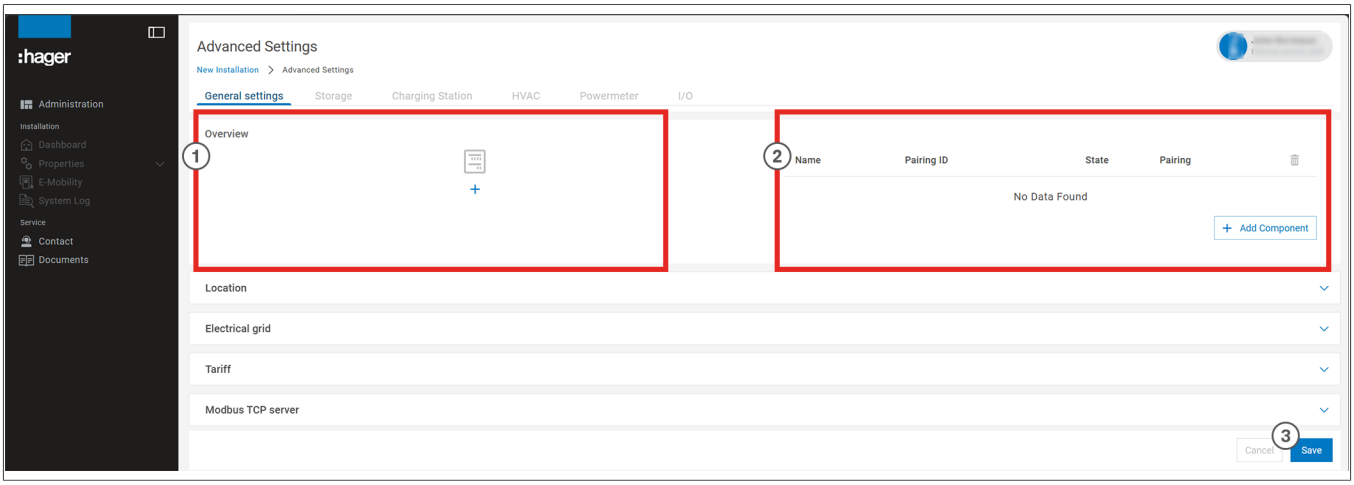



Fig. 9: Creation of a new project

1. Overview of devices (see Managing devices )
2. Area for devices with status indicator (see Managing devices )
3. **Save** and **Cancel** button

At this point, the best option is togo back to the **overview** of installations.

2. Then find the newly created project, click ⋮ at the end of the row and select Rename.
   A new window opens.

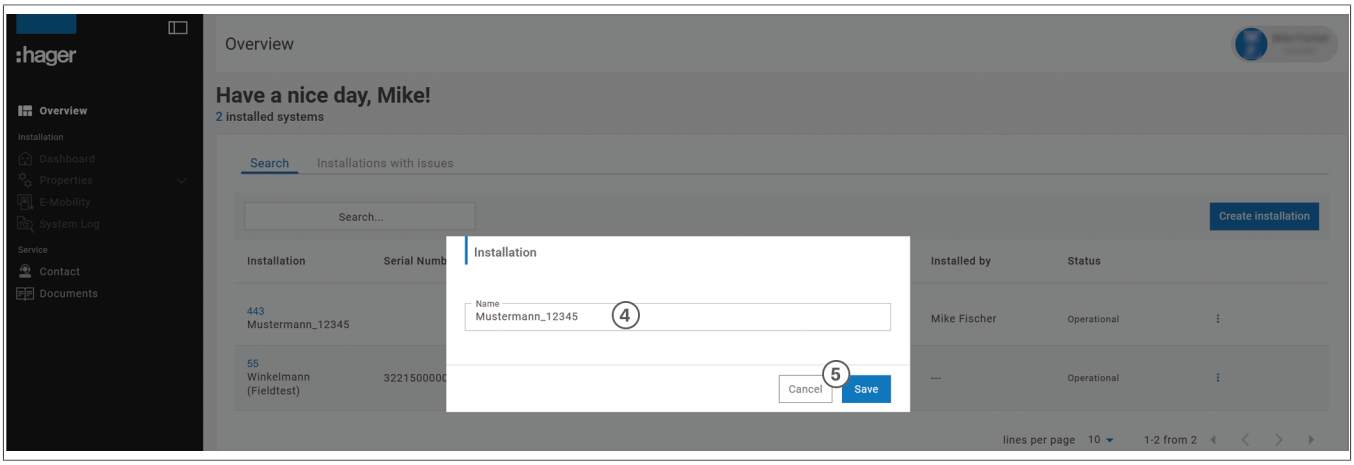



Fig. 10: Rename the system

4. Input field for the name of the installation (project name)
5. **Save** and **Cancel** button

3. Enter a unique project name, for example: Surname_customer-number
4. Confirm the entry with **Save** or discard it with **Cancel**.

**Note**

The project must be saved each time new devices are added (4). Only then can pairing begin.

## 5.3 Managing devices

After the system has been created, paired, and the required components have been configured, the overview displays a screen similar to the one shown below." Here, devices can be edited via ☑ or removed via 🗑 and ✎. New ones can be added via+.

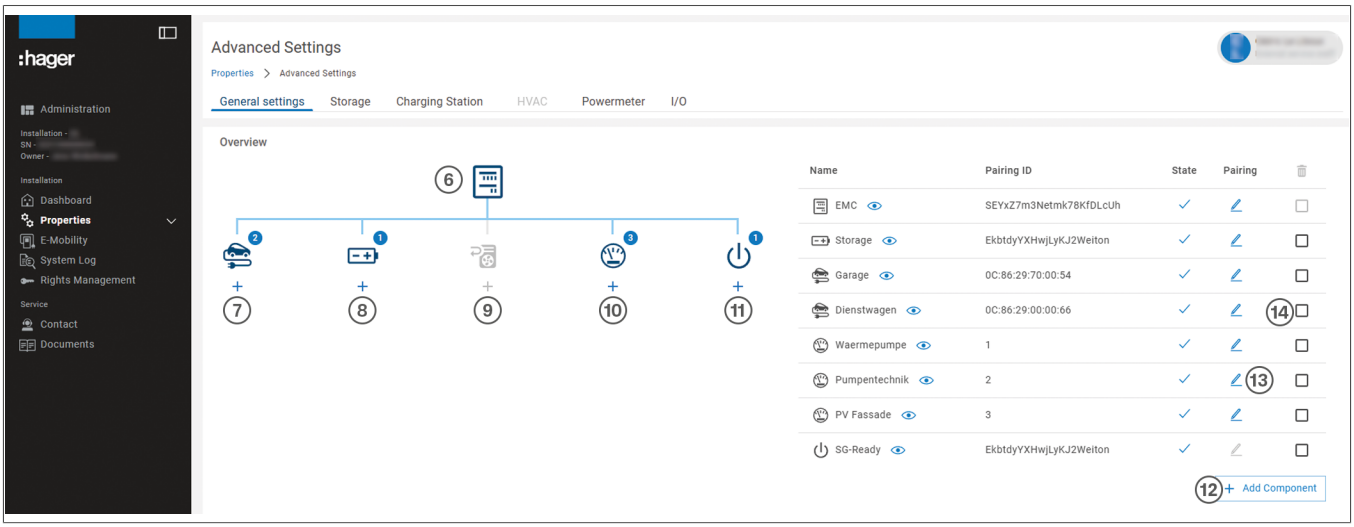



Fig. 11: Device management (example)

6. Energy management controller (EMC)
7. Charging station(s)
8. Energy storage system (ESS)
9. Heat pump
10. Energy meter
11. I/O interface
12. **+ Add component** button
13. Edit device button
14. Checkbox for removing a device

# 6 Configuration and commissioning

## 6.1 Calling up configuration

**Note**

When a new project is created, the **configuration** opens automatically.

Starting from the home page with an overview of all projects (installations), the **Configuration** page for a specific installation can be accessed in several ways.

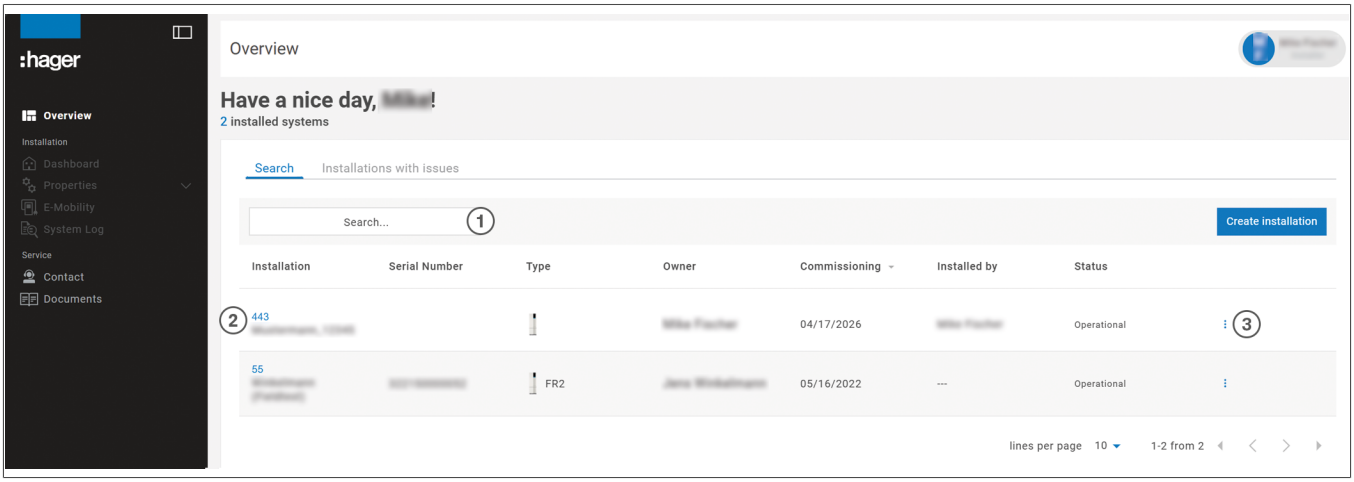



Fig. 12: Overview of systems

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

- If necessary, quickly find the installation you are looking for by entering it in the search field (1) within a longer list.

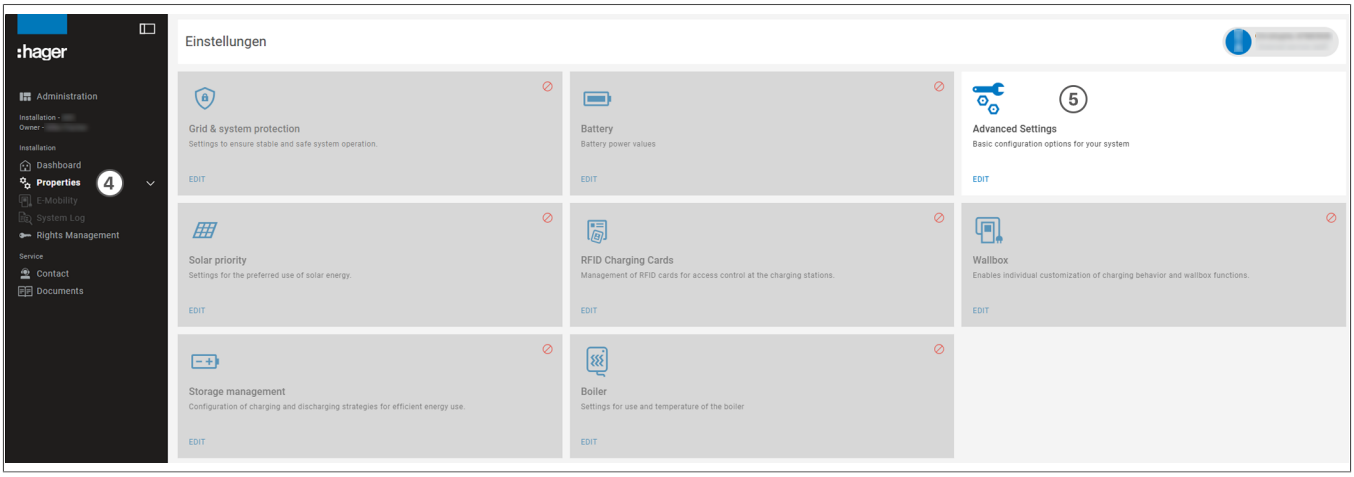



Fig. 13: Properties menu

(4) **Properties** menu
(5) **Advanced settings** tab
(6) **Advanced settings** submenu

- When configuring the installation, simply click on the installation number.

Or:

- If the system is already shown on the left, go to **Properties** (4) in the left-hand menu bar and select **Configuration** (6) directly.

Or:

- In the area on the right, select the **Configuration** (5) tab.

  The **Advanced settings** page opens.

## 6.2 Energy Manager XEM470 (EMC)

The energy management controller XEM470 (short: energy manager or EMC) is always created as the first device as it is the central control unit of an installation. Other devices can only be assigned to an installation that has already been created and in which the EMC has previously been added and, ideally, fully configured.

### Adding the EMC

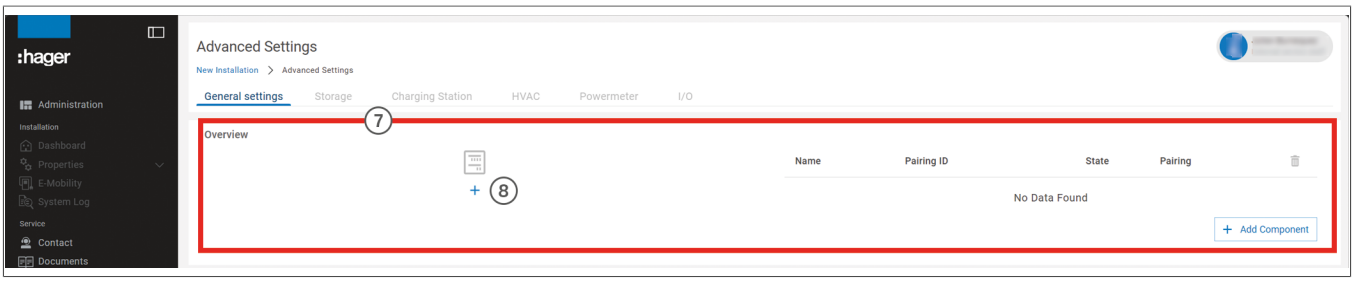



Fig. 14: Appendix EMC

(7) Button for creating the EMC
(8) Button for adding a new component (device)

1. Click the **+** below the EMC icon (7) in the overview or click the **Add + component** (8) button.

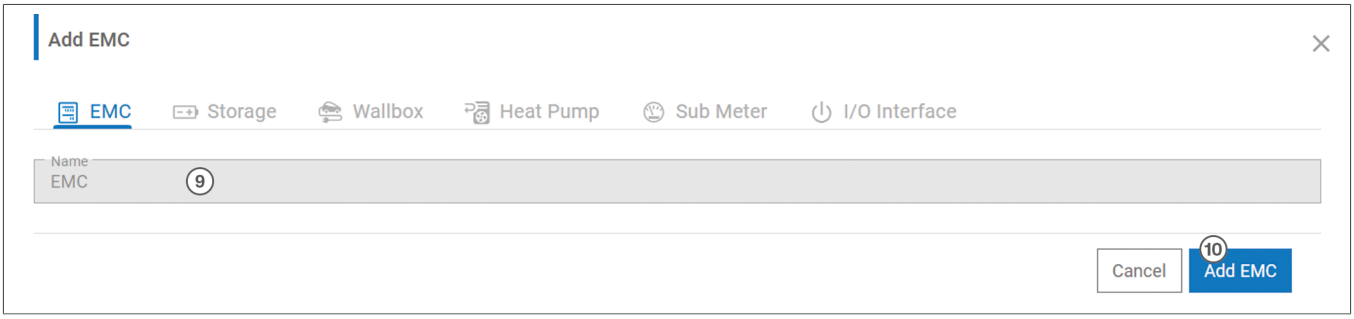



Fig. 15: Appendix EMC

(9) Default EMC device name (can only be edited in the **Overview** after pairing)
(10) Button for EMC system

2. In the window that opens, confirm the EMC system with the blue button in the lower-right corner. The EMC is displayed in the device list (Fig. 16).

### Connecting the EMC to the Cloud

☑ EMC is installed and operational (see XEM470 Installation Guide).
☑ EMC is integrated into the customer's home network (LAN). The home network is connected to the Internet.

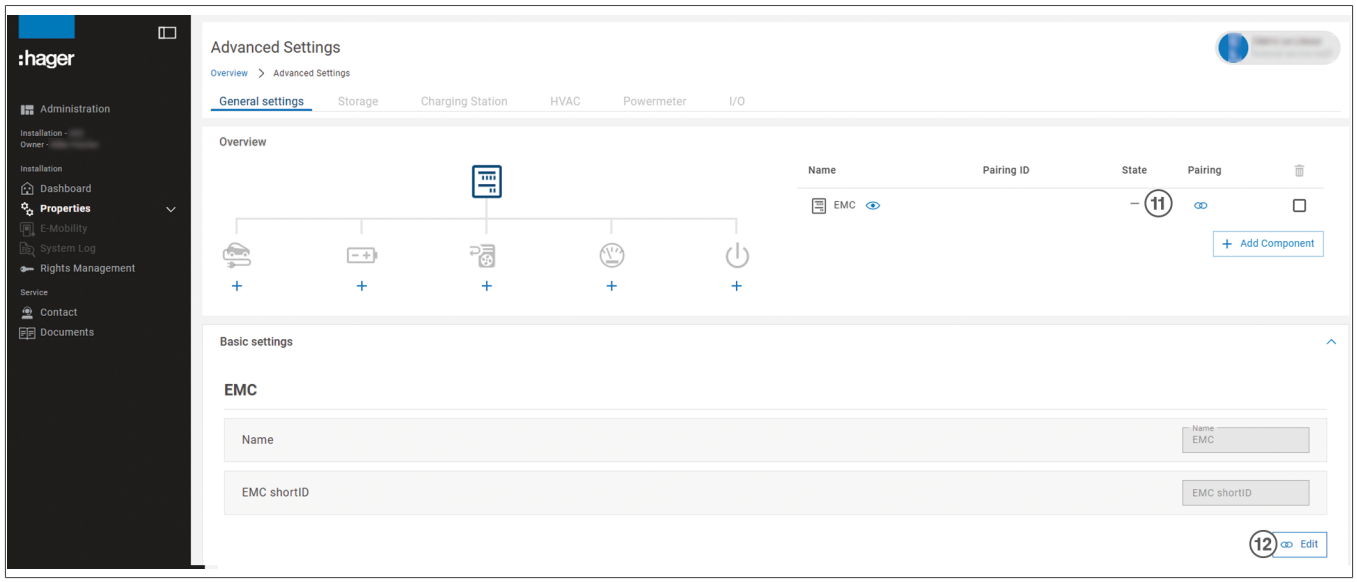



Fig. 16: Start the EMC coupling

(11) Icon for pairing
(12) Button to pair the EMC

1. Remain in the **Overview** tab of **Configuration** and call up the coupling mode via (11) or the appropriate button (12).

   A window opens.

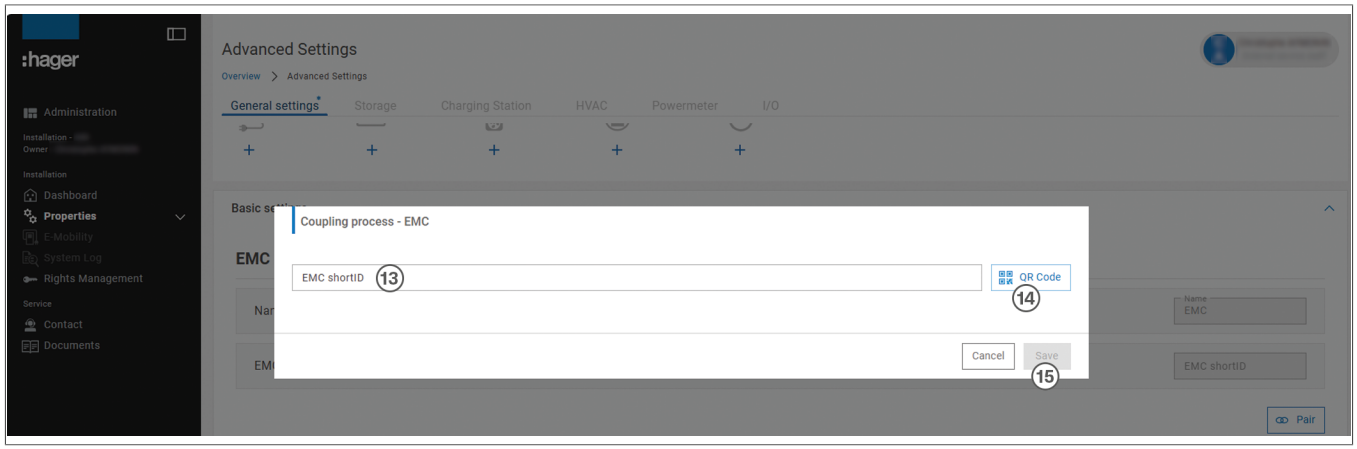



Fig. 17: EMC pairing mode

(13) EMC **Short ID**
(14) Button for scanning the QR code on the device
(15) Save and Cancel button

There are several options for starting pairing mode.

2. Enter the EMC ID in the input field (13).

   Or:
   When configuring in the browser on a mobile end device or in the app, open the camera using the **QR Code** (14) button and scan the code shown there.
   The device ID is displayed in the input field.

3 Complete pairing using the **Pair and save** (15) button, or discard with **Cancel**.
The paired device is marked with ✓ on the status displayFig. 18.

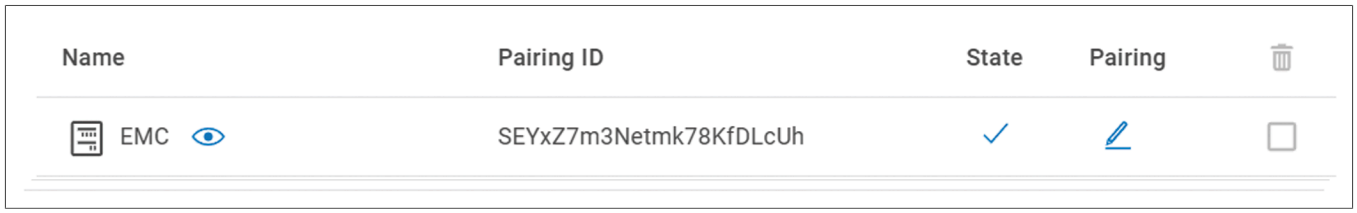



Fig. 18: Status of EMC in the portal/APP

Once pairing is complete, the EMC connects to the cloud automatically. The **pairing ID** and connection status (**status**) are displayed.

All three status LEDs on the EMC are green.

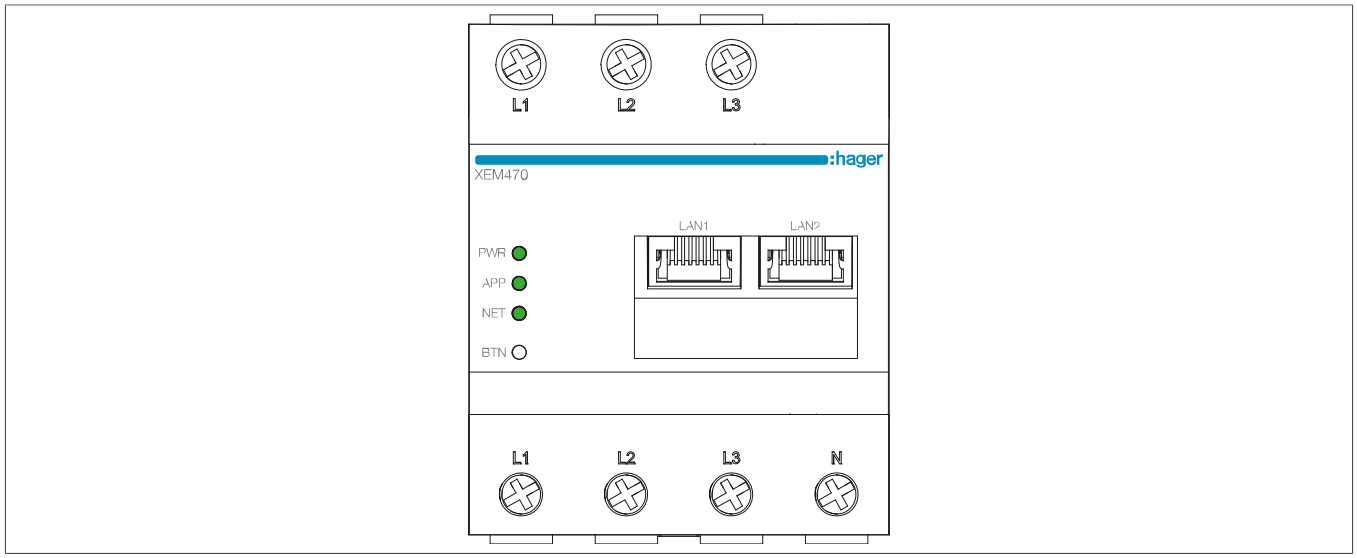



Fig. 19: LED status indicator of the EMC

► If there are any deviations in the status LED display, refer to the XEM470 installation instructions.

### 6.2.1 Smart Meter Gateway

**Connecting the Smart Meter Gateway**

A Smart Meter Gateway (SMGW) can retrieve information from the energy provider, such as dynamic/flexible tariffs or feed-in/consumption restrictions and transmit the corresponding measured values to the energy provider.

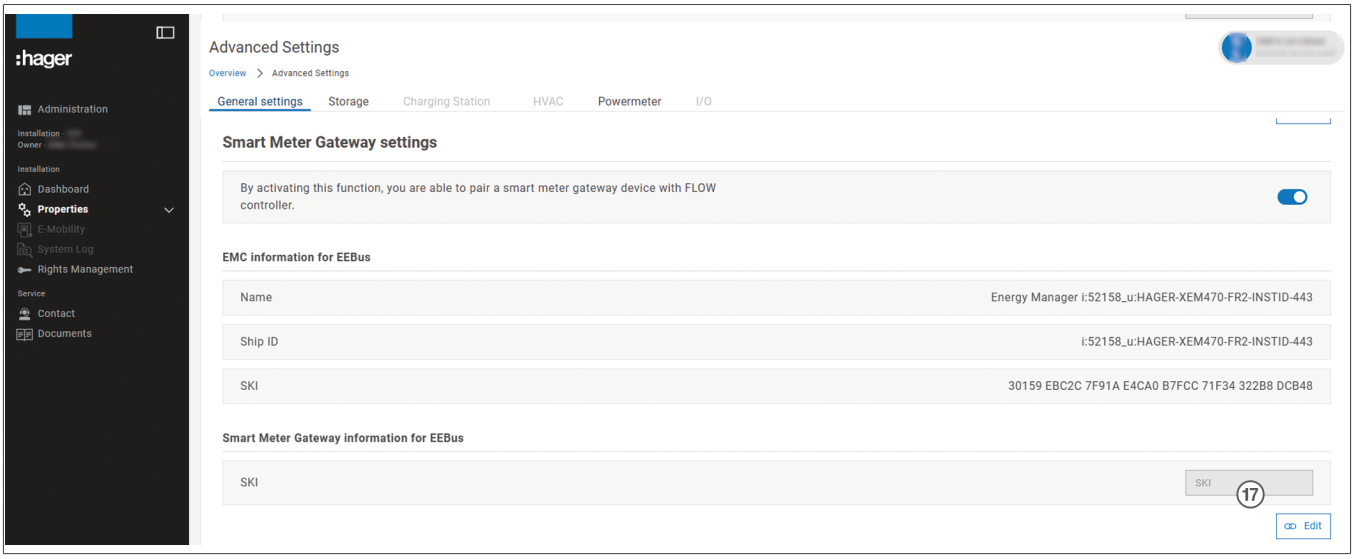



Fig. 20: SMGW settings

17 SMGW edit button

1. The Smart Meter Gateway (SMGW) must be activated with the flow EMC via the (17) button.




Fig. 21: SMGW pairing process

18 Entry field for the **SKI**
19 Button for scanning the network
20 Button for scanning the QR code on the device
21 Button for **pairing and saving**

There are several options for pairing the two devices:

2. Enter the **SKI** of the SMGW in the input field(18).

   Or:

   Browse the network for devices to pair using the **Network Scan** (19) button.

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

   Or:

   When using a mobile device to configure the system via a browser or the app, open the camera using the **QR code** (20) button and scan the code shown on the device type label.

The device **SKI** is displayed in the input field.

3. Complete pairing using the **Pair and save** (21) button, or discard with **Cancel**.
   The paired device is marked with ✓ on the status display.

### 6.2.2 Customer installation information

On the Configuration page, enter some additional information about the customer installation and the environmental and connection conditions.

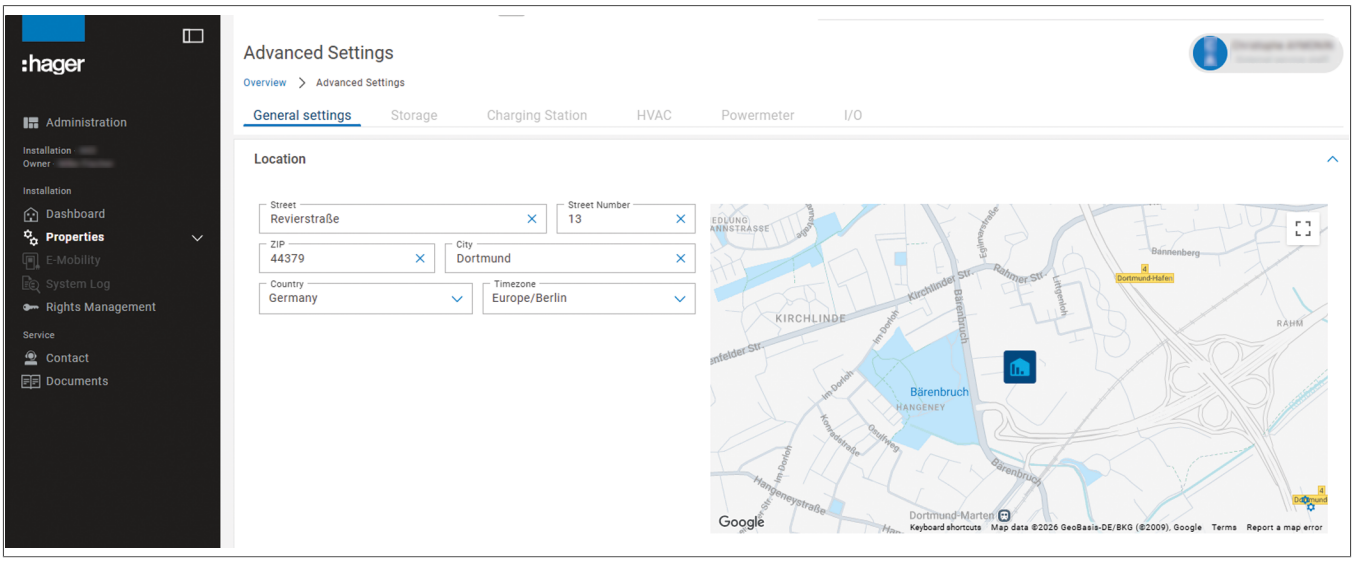



Fig. 22: Location of the installation

The location is used to monitor local weather conditions and get weather forecasts via an online service. The flow system uses the weather data to calculate the expected amount of PV power.

1. Complete the location information for the customer installation (Fig. 22).

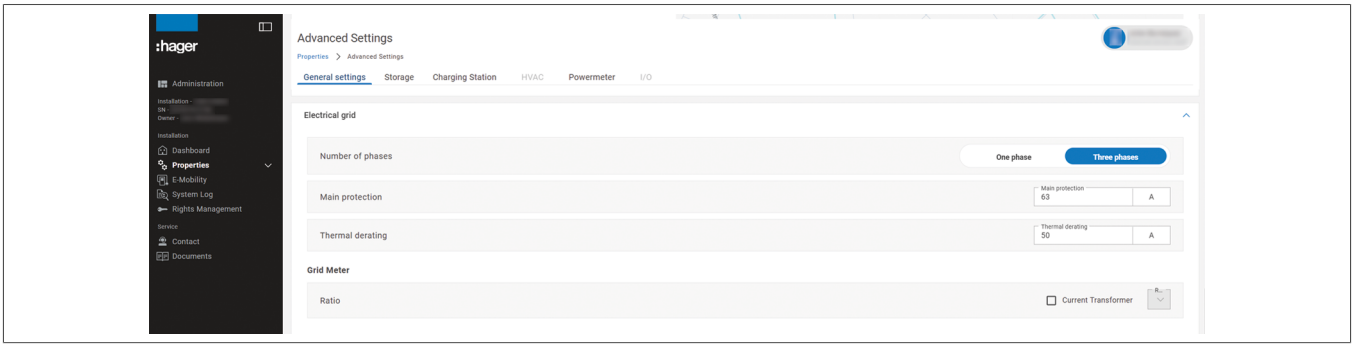



Fig. 23: Information about the power grid

Please provide the following key details regarding the power grid to which the domestic system is connected:

- **Number of phases** of the house connection (single-phase or three-phase)
- Rated current of the **main protection** (unit: A
- **Thermal reduction** (unit: A

**Thermal reduction**

It is recommended to limit the **maximum effective current for flow to 80% of the rated value of the** main fuse. The **thermal reduction** value is preset accordingly. This reserve prevents the customer's electrical installation from being continuously operated at its thermal load limit, e.g. when charging electric vehicles. The responsible specialist installer can adjust this value if the design of the electrical system permits.

Note application rule**VDE-AR-N 4100 2026-04**!

2. If an external **power meter** is used, enter the **ratio** given by the current transformers used.

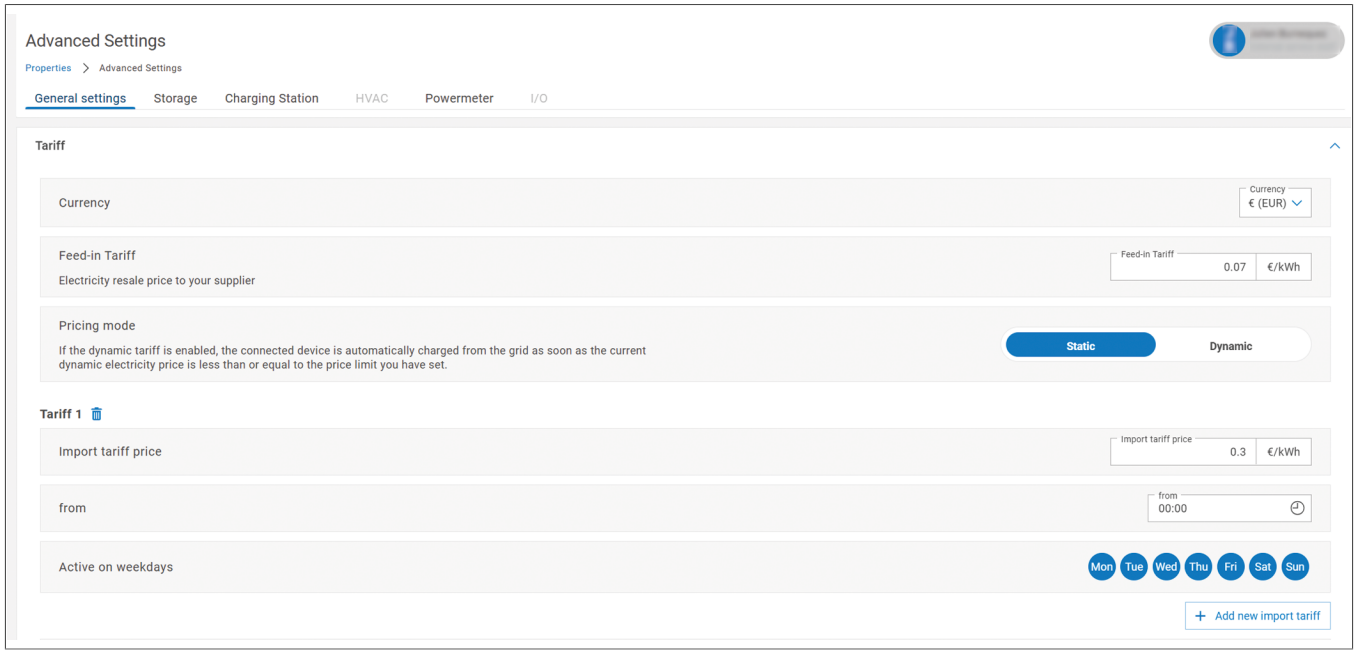



Fig. 24: Information on the electricity tariff

3. The following information must be entered in the tariff section.
   - **Power export**: The current **feed-in tariff** for the surplus PV power in €/kWh.
   - **Pricing**: If you select **dynamic**, do not enter any further information; if you select **static**, enter the current electricity price in €/kWh that applies to this electricity purchase. The tariff can still be differentiated by time and day of the week if the customer's current contract contains such a provision. If necessary, additional tariffs can be added via the **+ Add new import tariff** button.

4. Confirm all details by pressing the **Save** button or delete with **Cancel**.

## 6.3 XEM4xxx energy storage system



A flow energy storage system from Hager consists of an inverter, battery modules and the battery management system (BMS). The hybrid inverter is also available as a stand-alone unit (XEM1200) to supplement the system or as a replacement.

## Configure energy storage

**Note**

Only qualified electricians are permitted to commission and pair the flow energy storage system.

System **configuration** can be flexibly adapted by the customer's administrator at a later date (exceptions: Pairing process and distribution network operator specifications).

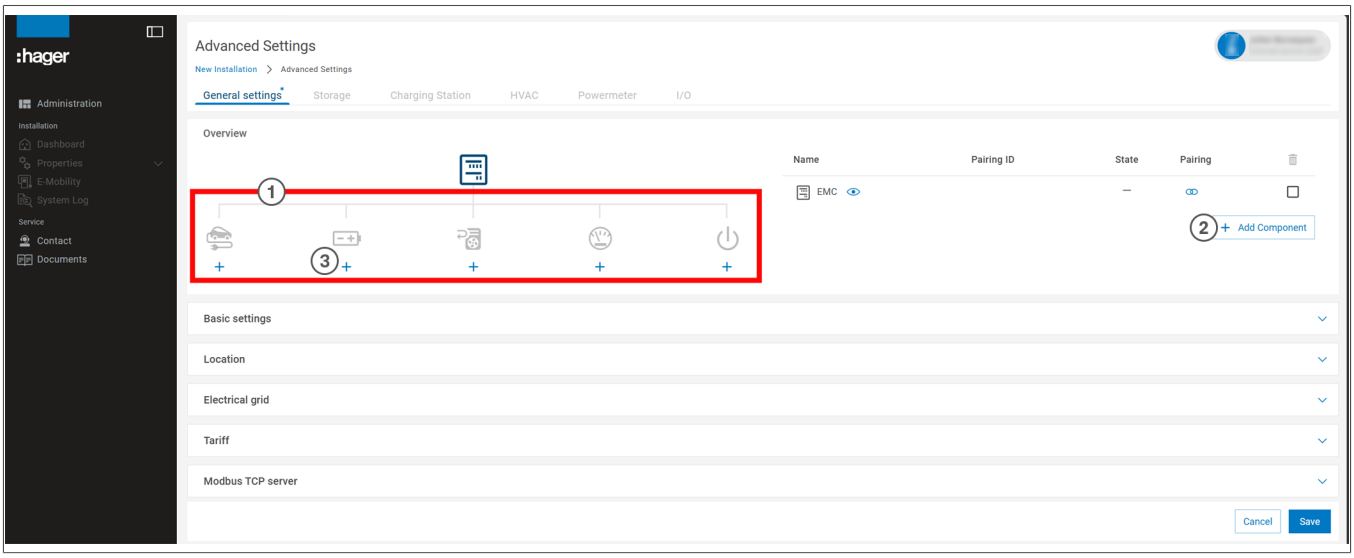



Fig. 25: Adding components (example of a newly created system)

1. Components that can be paired in the energy management system
2. Button for adding a new component
3. Add new storage system directly

1. Select the **+ Add component** (2) button.
   Or:
   Select the + under the battery icon (3) 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.

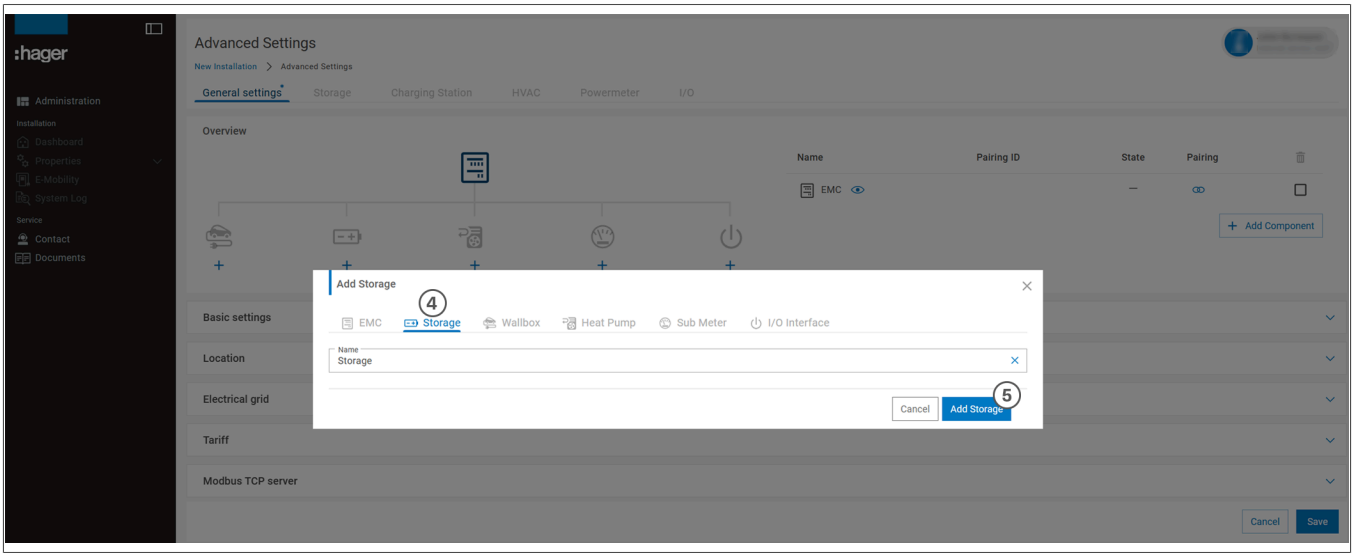



Fig. 26: Creating the storage system including inverter

4 Storage system device type
5 Button for **saving** the new component

2 Enter a name for the battery with inverter (new component) and save it using the blue button (5), or discard it by selecting **Cancel**.

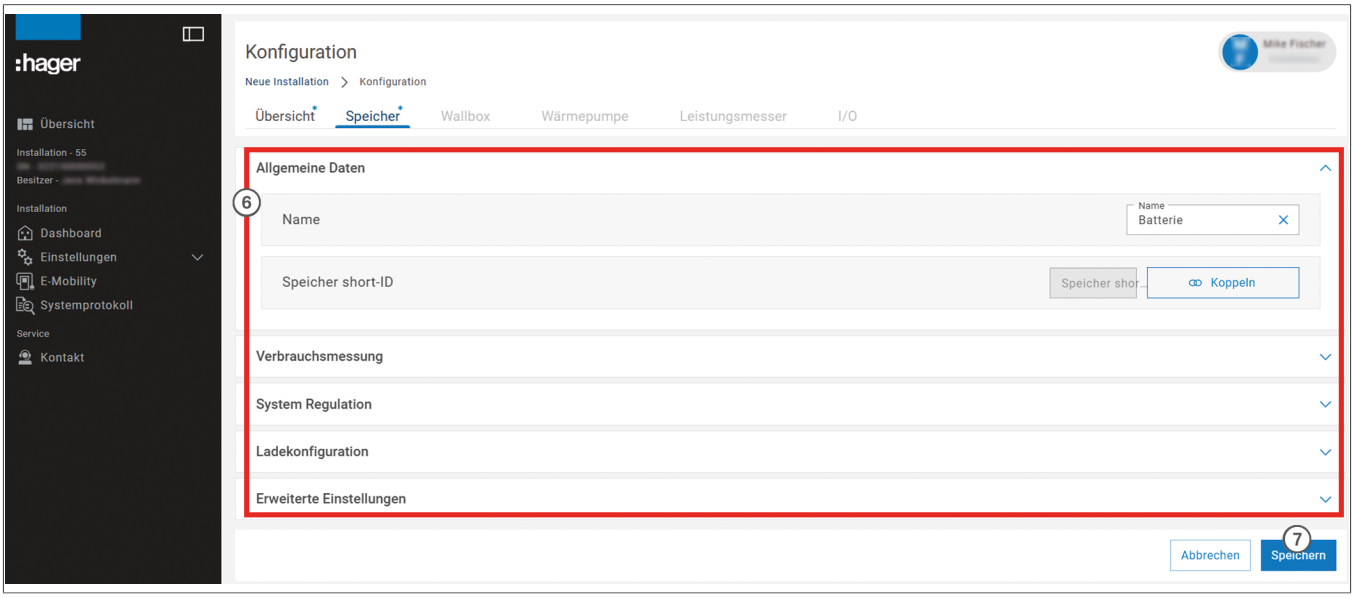



Fig. 27: Required storage system/inverter settings

6 Required settings
7 Button for **saving** the settings

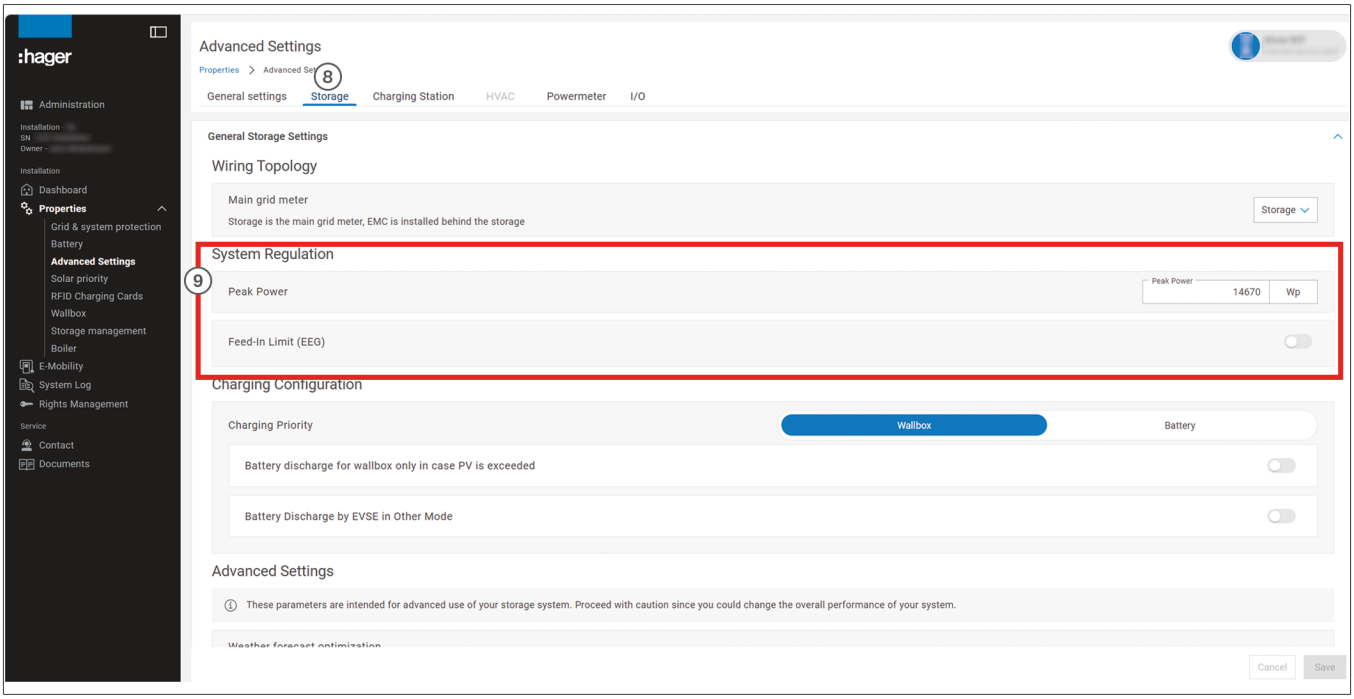



Fig. 28: Storage — basic settings

(8) **Storage** settings tab
(9) Settings for **system regulation**

3. On the **Configuration** page, under the **Storage** (8) tab, enter the information listed in the **System regulation** (9) section as the basic settings for the energy storage device. The parameters and values depend on the customer installation.

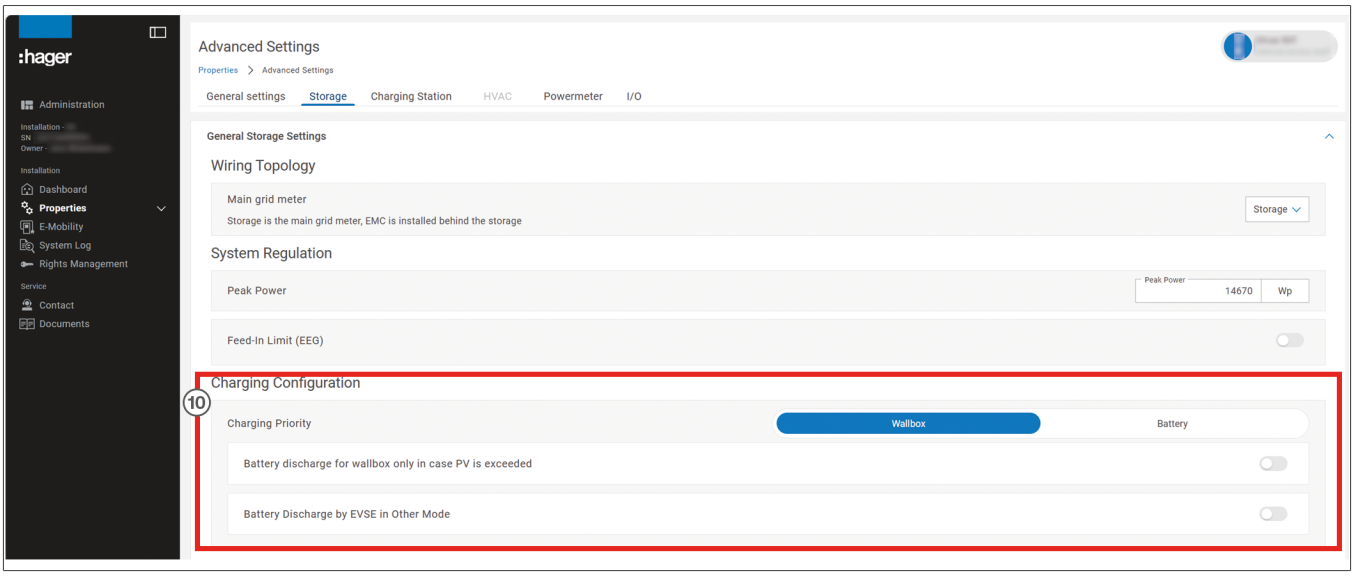



Fig. 29: Storage — charging configuration

(10) **Charging configuration** settings

The **Charging configuration** (10) section contains settings that define the usage and behaviour of the energy storage system during charging.

- Select the **charge prioritisation** depending on the customer's requirements:
  - Use the **Charging station** setting to prioritise the charging of electric vehicles. For more information on the **PV surplus charging** and **boost mode** options, see the documentation for compatible charging stations.
  - When the **Battery** setting is activated, the energy storage unit is charged as a priority. These settings can also be changed at any time by the customer with administrator rights.

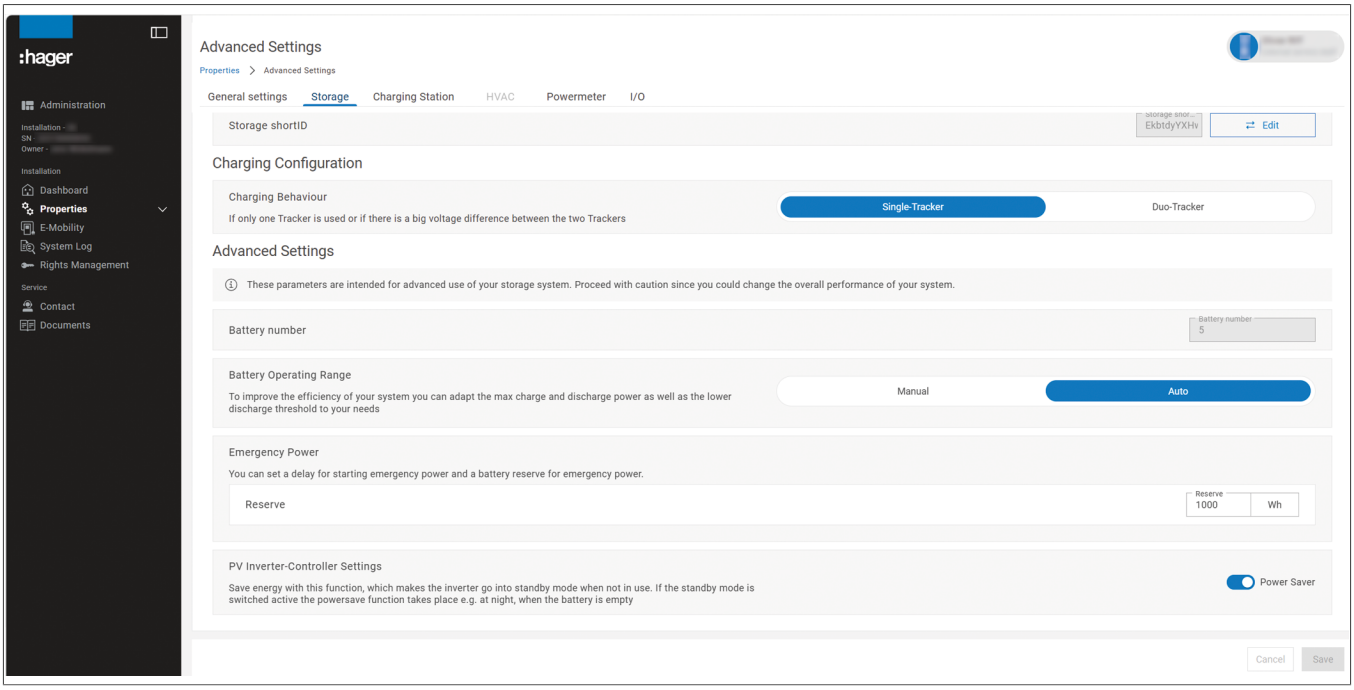



Fig. 30: Storage – Advanced settings

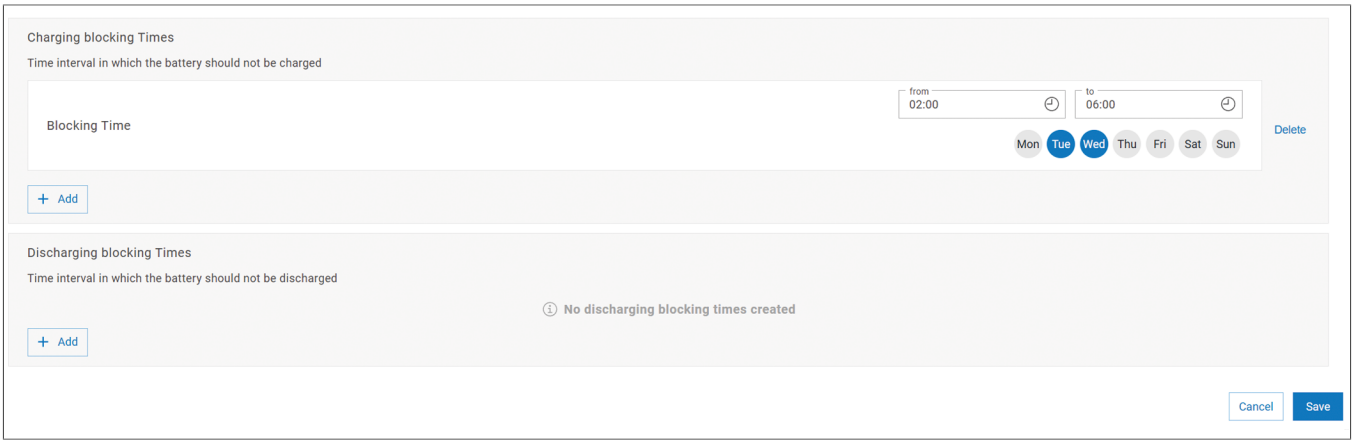



Fig. 31: Storage – Advanced settings for blocking times

2. If required, under **Advanced settings**, activate special functions that optimise energy storage and enhance the safety of power supply setup from the energy management system.

Please note the appropriate explanations in the user interface.

3. Confirm all details by pressing the **Save** button or delete with **Cancel**.

### Connecting energy storage system with flow

- ☑ The energy storage system consisting of the inverter (XEM1200) and battery module(s) (XEM4x0x) is installed and ready for operation (see the installation instructions for the XEM1200 , XEM4x0x).
- ☑ The energy storage system is integrated into the customer's home network (LAN), in the same sub-net as the EMC. The home network is connected to the Internet.
- ☑ The energy storage system is now visible in the system overview as a storage system with a battery symbol (shown in colour) (11).

The pairing process is initiated via the cloud and controlled by the EMC. The energy storage system receives appropriate pairing data from the EMC over the LAN and automatically connects to flow after successful pairing.

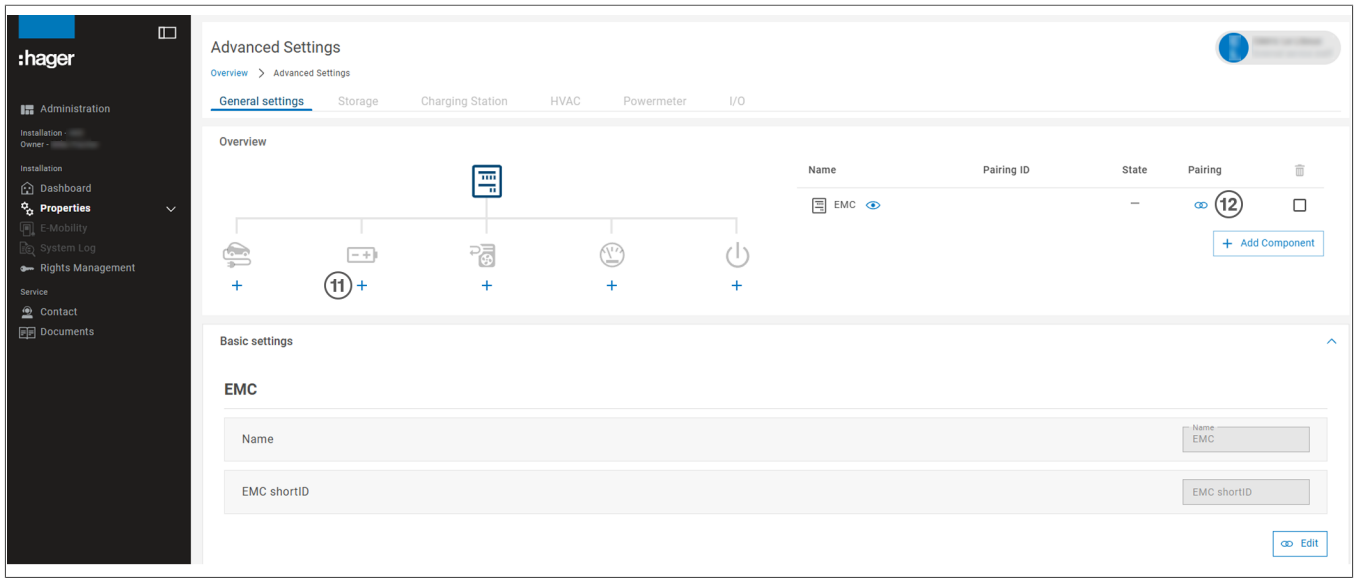



Fig. 32: Storage system

(11) Created inverter with battery
(12) Device pairing

1. In the overview, call up pairing mode via (12).

   Or:

   Under the **Storage** tab, select the **Pair** button.

   A new window opens.

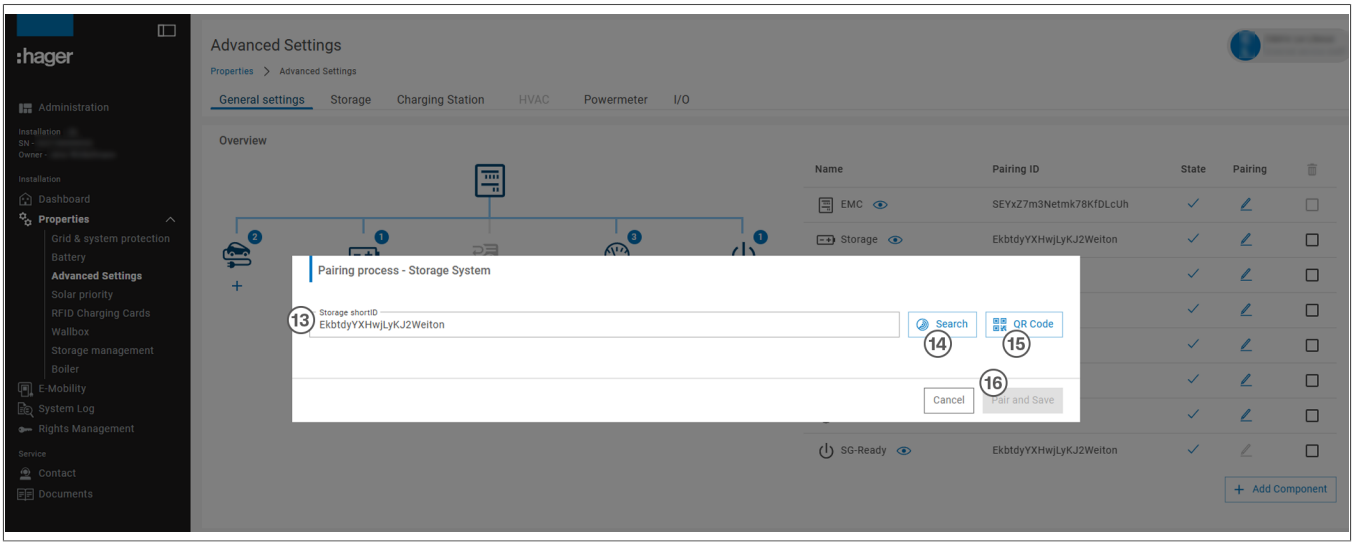



Fig. 33: Storage — pairing

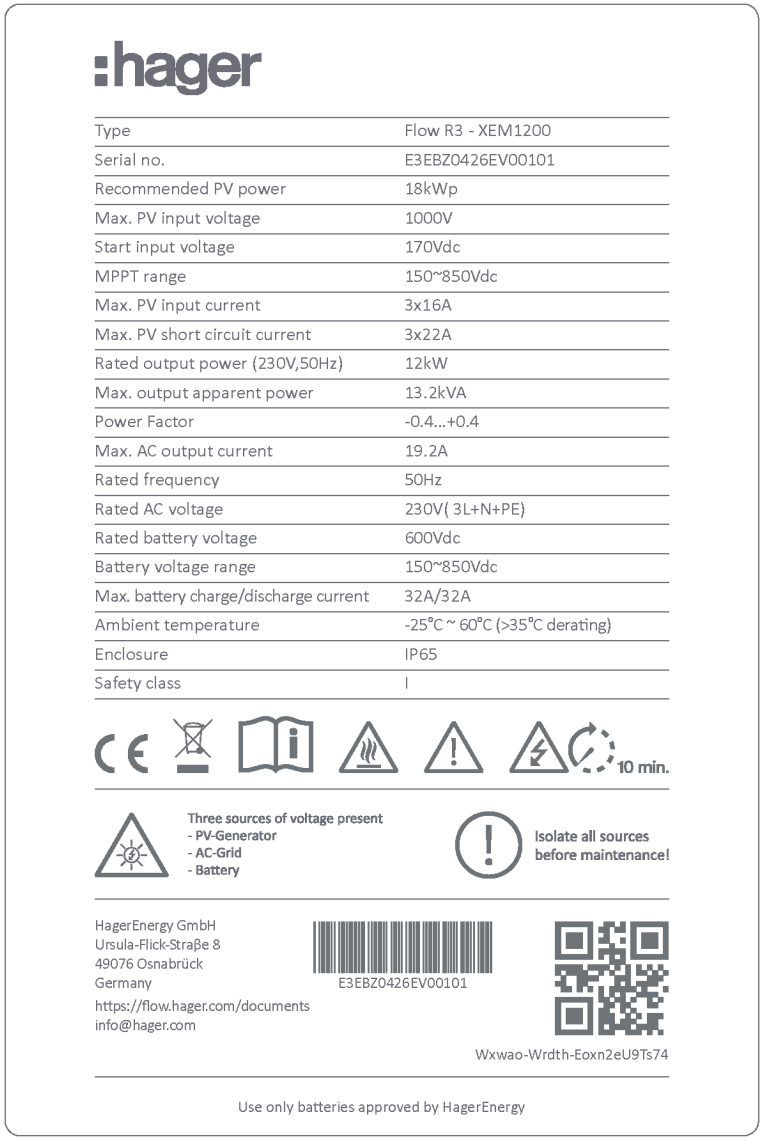
13 Storage **short ID**
14 Button for **searching** the network
15 Button for scanning in the **QR code** on the device
16 Button for **pairing and saving**

There are several options for starting pairing mode.

2. Enter the storage system ID in the input field (13).
   Or:
   Scan the network for devices to be paired using the **Search** (14) button.

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

   Or:
   When configuring using the browser on a mobile device or the app, open the camera using the **QR code** (15) button and scan the code shown on the inverter type label (Fig. 34/15) .
   The device ID is displayed in the input field.
3. Complete pairing using the **Pair and save** (16) button, or discard with **Cancel**.
   The paired device is marked with ✓ on the status display.



| | |
|---|---|
| Type | Flow R3 - XEM1200 |
| Serial no. | E3EBZ0426EV00101 |
| Recommended PV power | 18kWp |
| Max. PV input voltage | 1000V |
| Start input voltage | 170Vdc |
| MPPT range | 150~850Vdc |
| Max. PV input current | 3x16A |
| Max. PV short circuit current | 3x22A |
| Rated output power (230V,50Hz) | 12kW |
| Max. output apparent power | 13.2kVA |
| Power Factor | -0.4...+0.4 |
| Max. AC output current | 19.2A |
| Rated frequency | 50Hz |
| Rated AC voltage | 230V( 3L+N+PE) |
| Rated battery voltage | 600Vdc |
| Battery voltage range | 150~850Vdc |
| Max. battery charge/discharge current | 32A/32A |
| Ambient temperature | -25°C ~ 60°C (>35°C derating) |
| Enclosure | IP65 |
| Safety class | I |



Fig. 34: XEM1200 type label

After successful pairing, the energy storage system automatically connects to flow. **Pairing ID**, **Pairing/connection status (status)** are displayed in the portal.

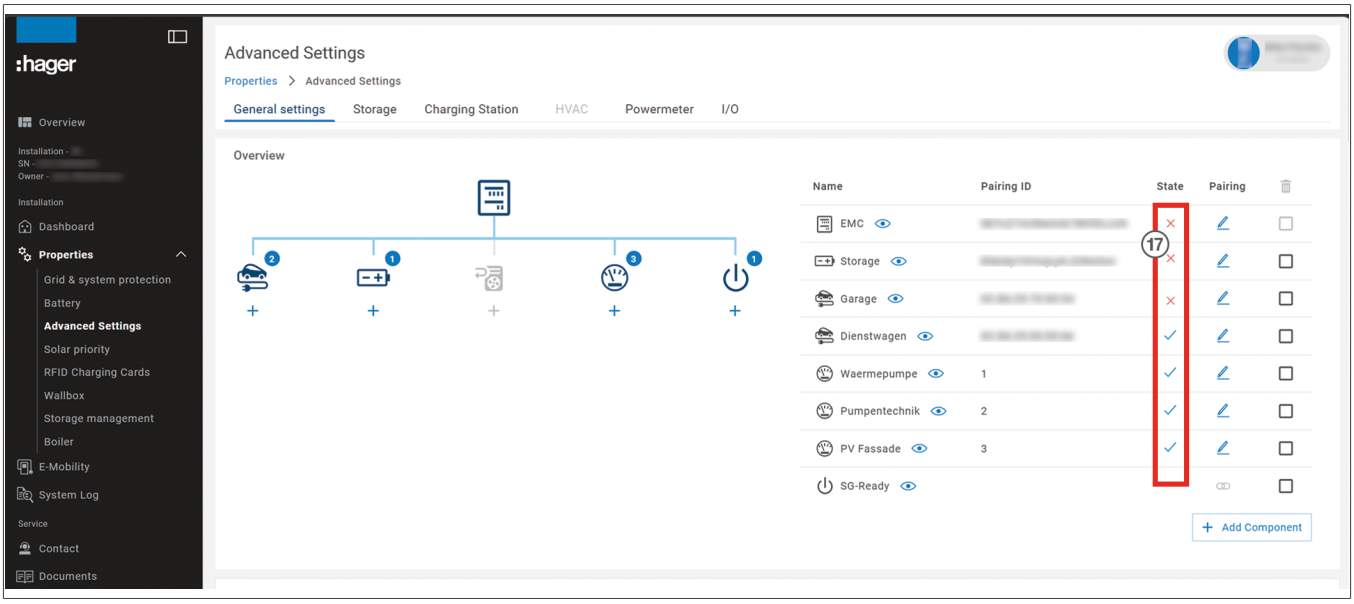



Fig. 35: Status display

(17) Status display for all components

If a fault is identified in the energy management system, the LED bargraph 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. 36).

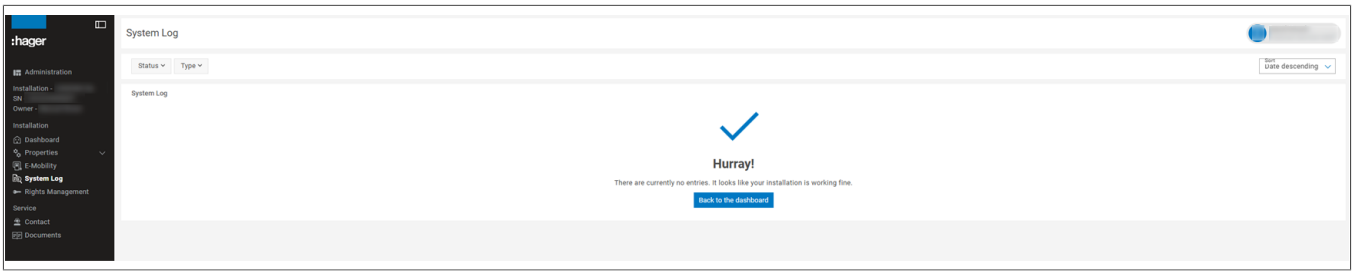



Fig. 36: Example of a system log with faults in the system

## 6.4 Backup power operation (optional with XEMA250)

This function is used to monitor and control situations in which the house installation, including the energy management system, operates in real stand-alone mode (backup power supply) or in emergency power test mode. In addition, network faults are displayed in a traceable manner by displaying failed phase(s).



**Attention**

Overload in backup power mode or during emergency power test!

Large loads can cause an overload of the backup power grid. If you are using a router, you may also lose the Internet connection.

- Before performing an emergency power test, switch off all loads that cause high current, such as an electric stove, oven or computer, to avoid heavy loads or overloads.
- If necessary, switch off additional electrical loads. This is necessary when the self-generated and stored energy is no longer sufficient to operate small loads such as the Internet router and lighting.
- If you are using the flow R3 system, implement backup power operation using the optionally available Automated Transfer Switch box (ATS box).

A prerequisite for backup power operation, which in principle ensures an uninterrupted power supply to the loads in the house network, is that there be sufficient battery charge and/or PV power available. To ensure that critical loads such as routers, refrigerators, and similar devices remain supplied even when the battery charge is too low, configure an emergency power reserve via the portal. Devices that do not have an emergency power function cannot switch to emergency power mode.

**Emergency power mode in normal cases — flow R3 running in parallel with the grid**

Normally, flow R3 must be run in parallel with the grid. The system has access to the public power grid of the energy provider in question and is also connected to the PV system.

This means that the system operator of the flow R3 has three power sources at their disposal:

- Their own PV system,
- The system battery(/ies) and
- The public power grid.

The power produced by the PV system is either used directly, stored temporarily in the battery(/ies) or fed into the grid. The flow R3 energy management system controls and regulates the energy flows. No power from the grid is used to charge to the battery(/ies).

**Behaviour in the event of a power failure**

In the event of a power failure, the flow R3 switches to standby power mode within 20 ms. The power supply to the house is now provided solely by the PV system connected to the flow R3 and by the battery(/ies).

This operating mode of the flow R3 is indicated on the LED bargraph of the inverter by means of a blue flashing signal along the complete height of the bargraph (100%).

**True 3-phase backup power operation**

In the event of a power failure, the device disconnects from the public grid and, almost without interruption, establishes its own internal 3-phase domestic grid within a fraction of a second. This is known as

an island grid and is isolated from the public grid. For this purpose, the device is disconnected from the grid on all poles (L1, L2, L3 and N).

The power supply in the building continues as usual. All loads can continue to be operated as usual. However, current is no longer drawn from the grid, but exclusively from the PV system's own power generation and the current already stored in the battery(/ies).

If the PV system generates power and household consumption is lower than the PV power output (surplus production), the batteries continue to be charged.

### Configuring the backup power supply

- To make the necessary settings, expand the **Advanced settings** section on the **Configuration page** in the **Storage** tab.
- If necessary, activate the **Emergency power supply start** in the event of a phase failure setting.
- Setting a delay time may be useful in the event of very short-term grid fluctuations, so that the device does not switch to emergency power operation unnecessarily. The **delay time** can be set to between 0 and 60 seconds.
- When the adjustable emergency power reserve is used, a defined minimum battery capacity is available for emergency power operation in the event of a power failure. Ideally, the power required for the **emergency power reserve** is generated by photovoltaic production and replenished with grid support. The **reserve** can be set between 0 and 20,000 Wh.

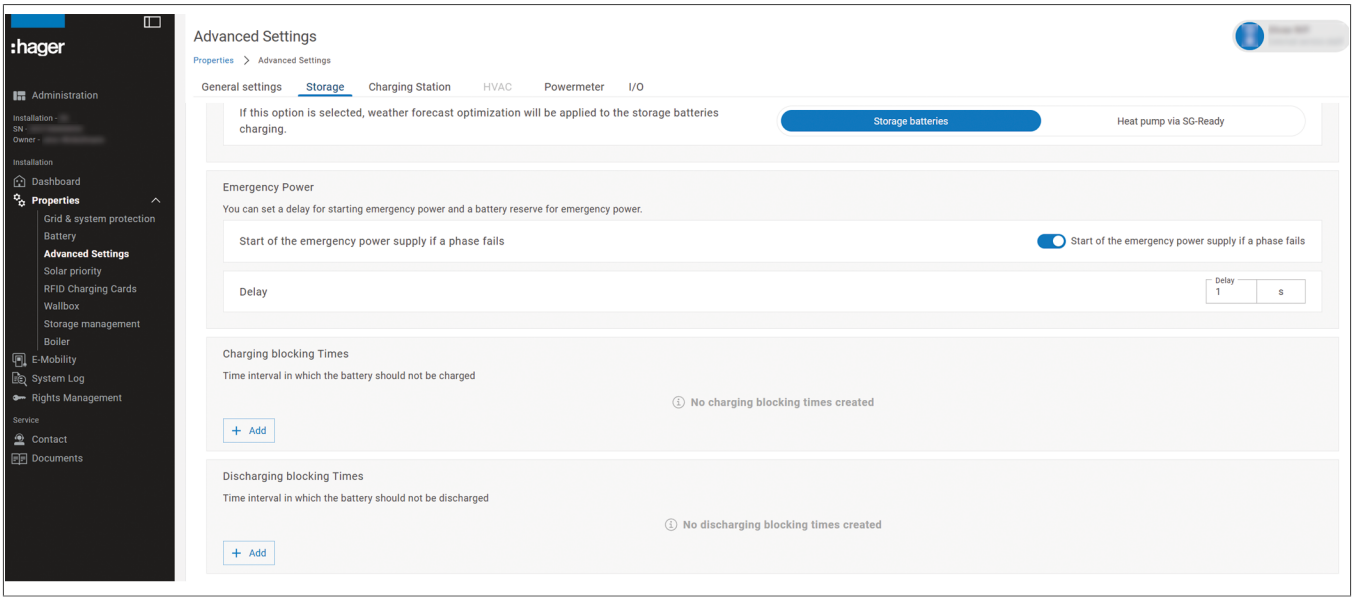



Fig. 37: Emergency power

#### Use of one/two battery circuits

With only one battery circuit, the backup power reserve can be between 0 and the total available battery capacity. This **reserve** is not used for backup power operation.

For two battery circuits, the maximum possible backup power reserve is the battery capacity of the lower-capacity battery circuit.

It is important to know that the set **reserve** is not available for normal operation

**Switch on backup power operation/emergency power test mode**

1. Switch off all unnecessary electrical loads to avoid heavy loads or overloads.
2. Press and hold the push button on the right-hand side of the device for < 5 s.
3. If necessary, restart the backup power operation or emergency power test operation, even if the three attempts have already failed.

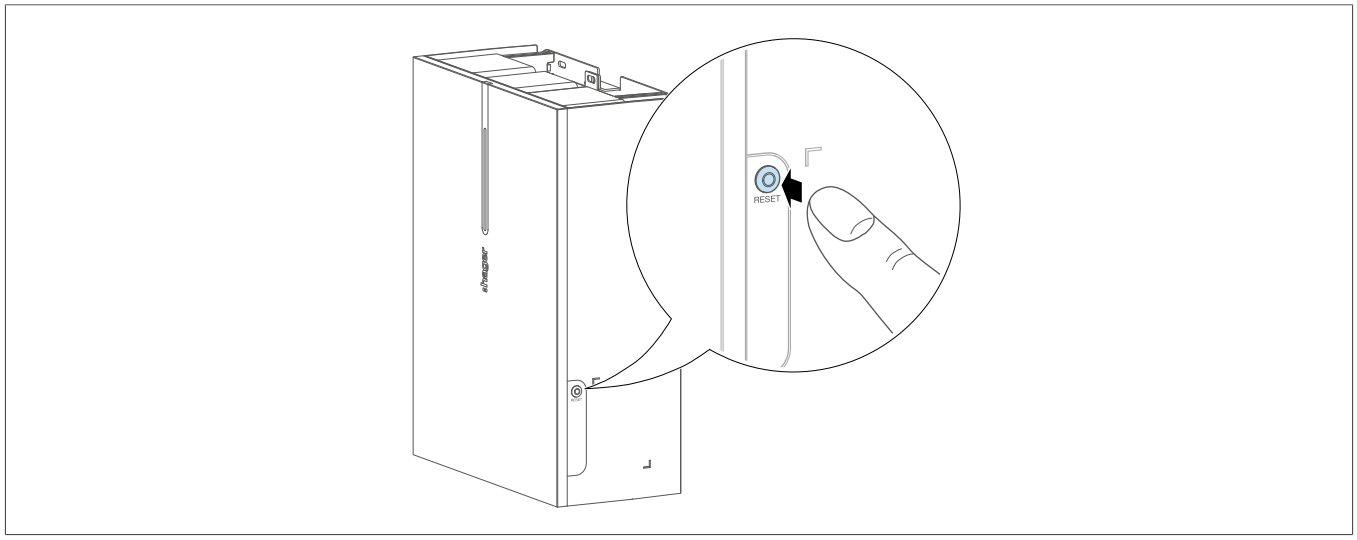



Fig. 38: Switching on the backup power circuit

In the application case shown (Fig. 29), too many loads are connected so that it is not possible to switch completely to backup power operation. The system will attempt to re-establish a back-up grid every 90 seconds, a total of three times.

During the entire time required for the tests, the LED strip on the inverter flashes orange along the complete height of the strip (100%). If the overload persists, the LED strip flashes orange along its full height (100%).

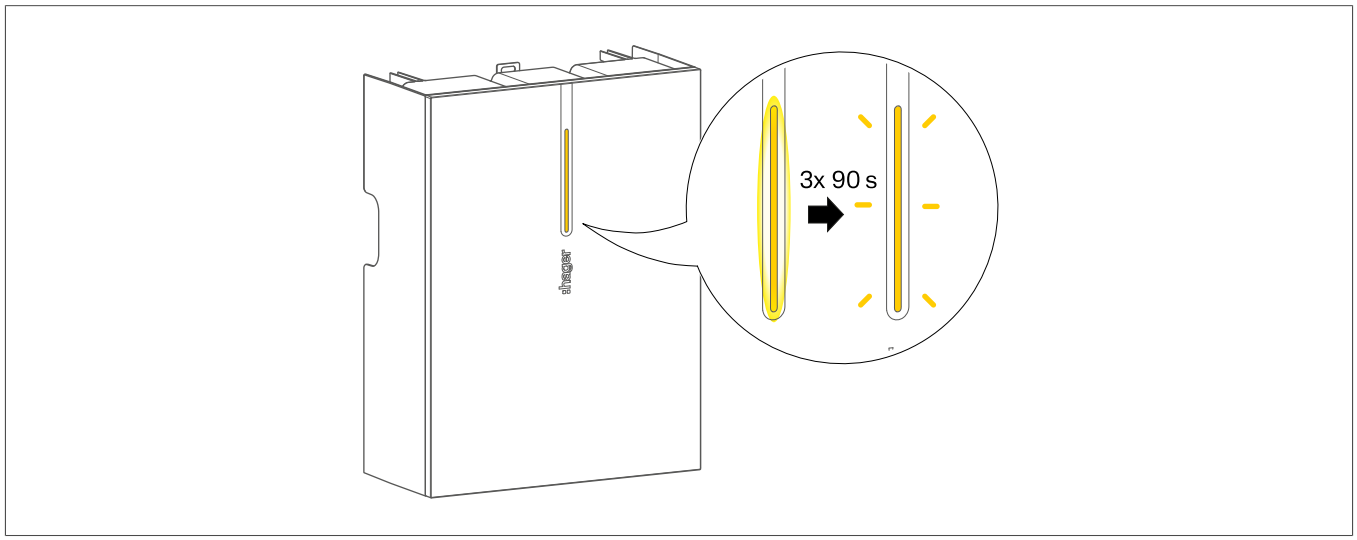



Fig. 39: Setting up backup power operation

## 6.5 Grid and system protection

When selecting the country in which the installation is located, the electrician must record important values for grid and system protection. These values may vary depending on the device type and country setting.

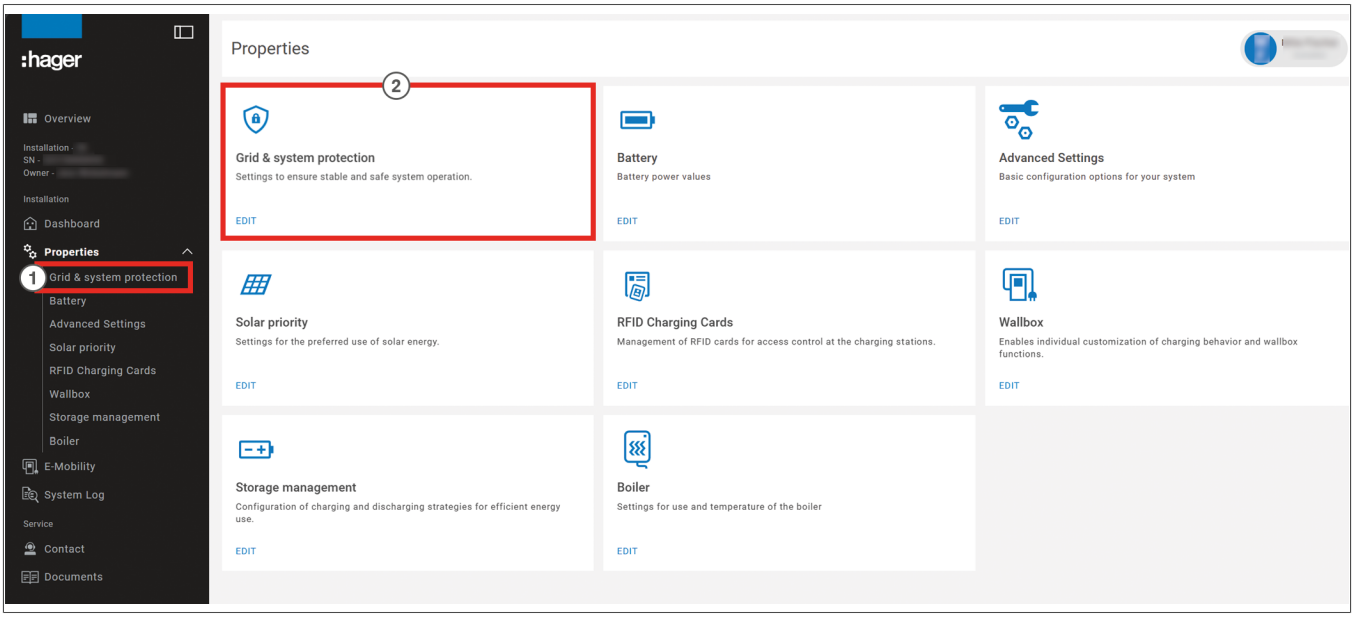



Fig. 40: Grid and system protection

(1) **Grid and system protection** menu
(2) **Grid and system protection** tab

1. Under **Settings**, open the **Grid and system protection** (1) submenu or select the tab with the same name(2).
2. The following technical specifications must be defined successively:
   - Frequency monitoring, (Fig. 41)
   - Behaviour for island grid detection
   - Active power reduction at overfrequency (LSFM-O), (Fig. 42)
   - Active power reduction at underfrequency (LSFM-U), (Fig. 43)
   - Mains voltage limits, (Fig. 44)
   - Switch-on conditions, (Fig. 45)
   - Dynamic grid support (LVRT), (Fig. 46)
   - Deadband threshold, (Fig. 47)
   - Reactive power settings, (Fig. 48)
   - Active power settings, (Fig. 49)
   - List of mains conductors, (Fig. 50)
3. At the end of each section, save the settings or discard them using Reset.

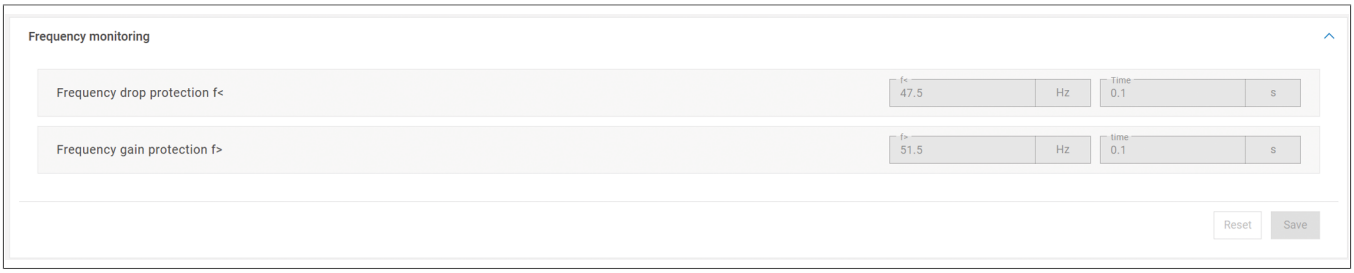



Fig. 41: Frequency monitoring




Fig. 42: Active power reduction at overfrequency (LFSM-O)




Fig. 43: Active power reduction at underfrequency (LFSM-U)




Fig. 44: Mains voltage limits

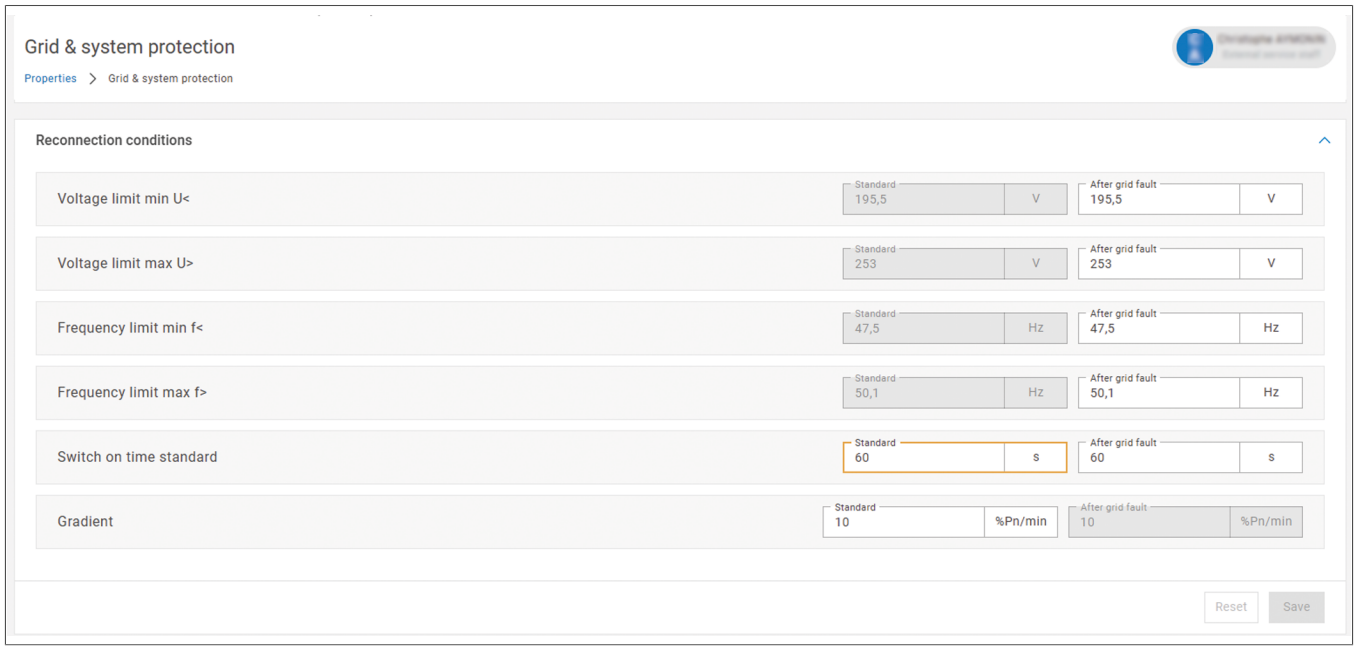



Fig. 45: Switch-on conditions




Fig. 46: Dynamic grid support (LVRT)

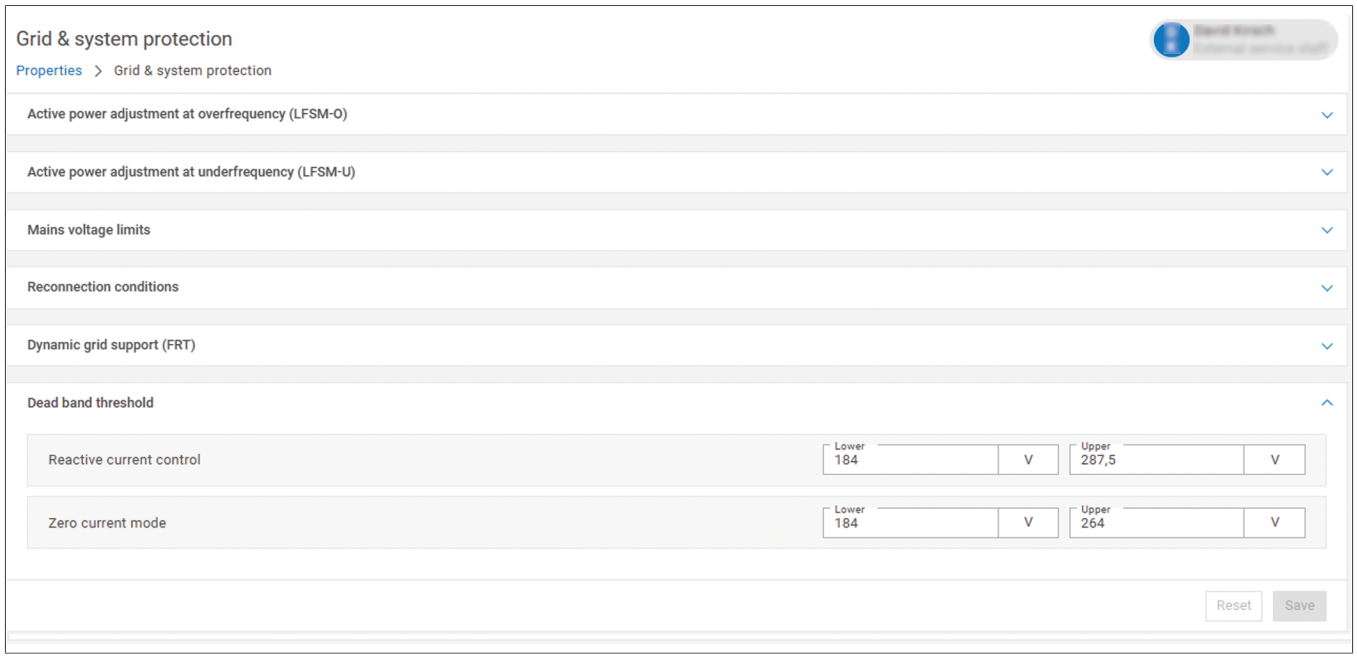



Fig. 47: Deadband threshold

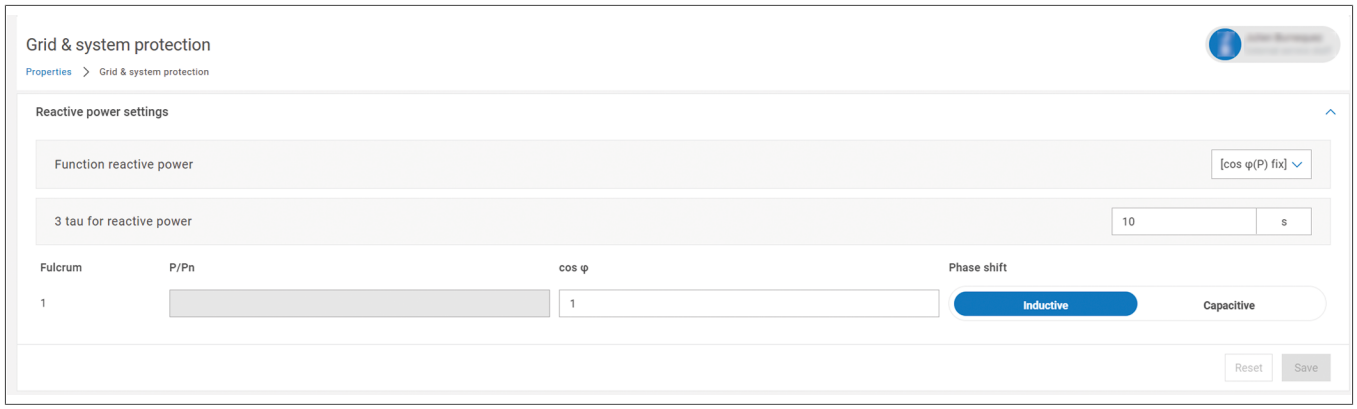



Fig. 48: Reactive power settings

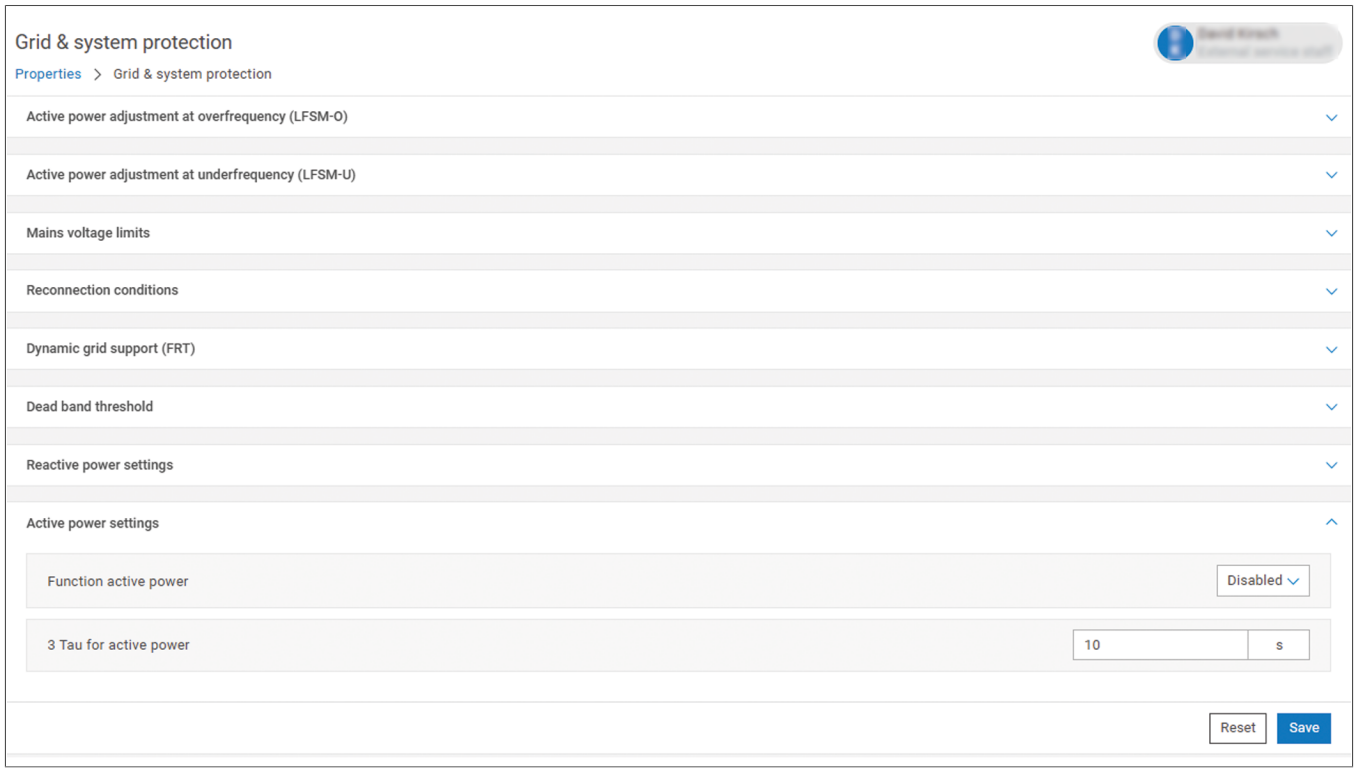



Fig. 49: Active power settings

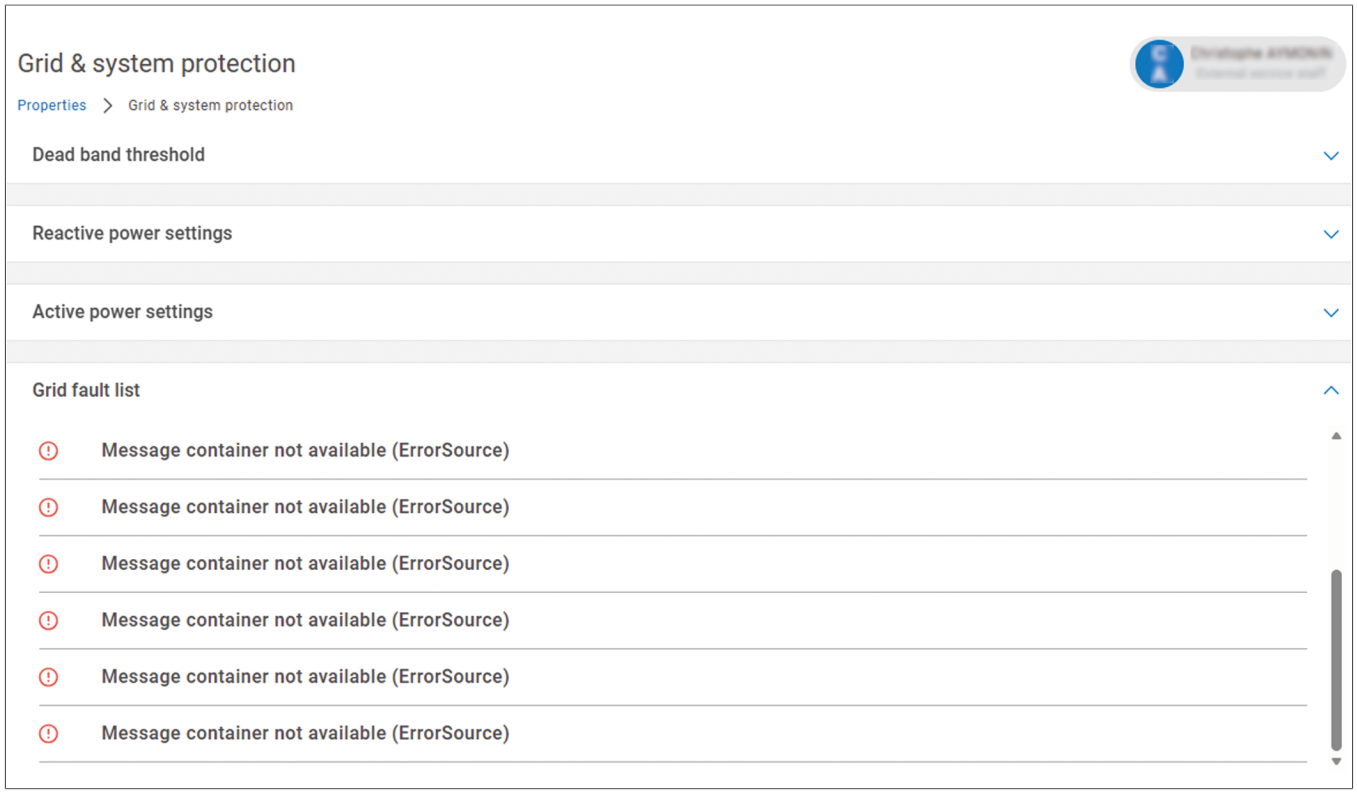



Fig. 50: List of grid faults

## 6.6 Charging stations

### Compatible charging stations

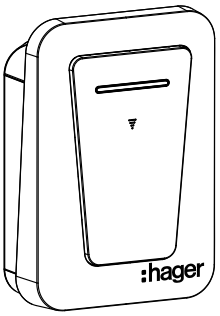
| Charging station | Order no. | Description | Note |
|---|---|---|---|
|  | XVL122C<br>XVL122S | witty plus 22-kW charging station | with pre-assembled charging cable<br>with socket outlet for charging cable |
| [As at: 2026-09] | | | |

Table 7: Compatible charging stations

### Configuring charging station

The energy manager works with up to eight charging stations (seeTab. 7).

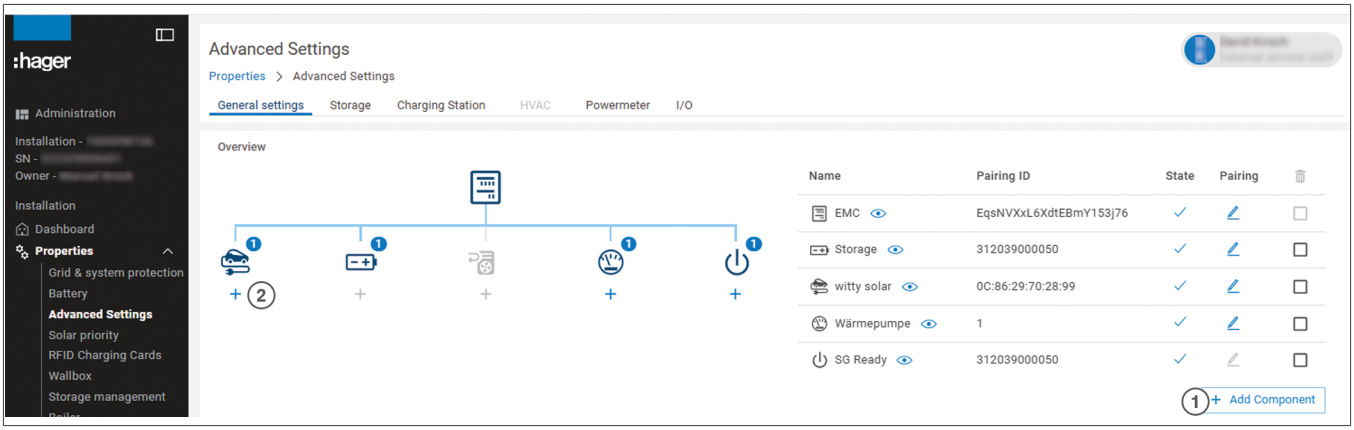



Fig. 51: Adding a charging station

(1) Button for adding a new component
(2) Adding a charging station directly

1. Select the **+ Add Component** (1) button.

   Or:

   Select the **+** under the electric car icon (2) in the system overview.

   A new window opens in which, after selecting the device type **charging station**, a device name must be entered.

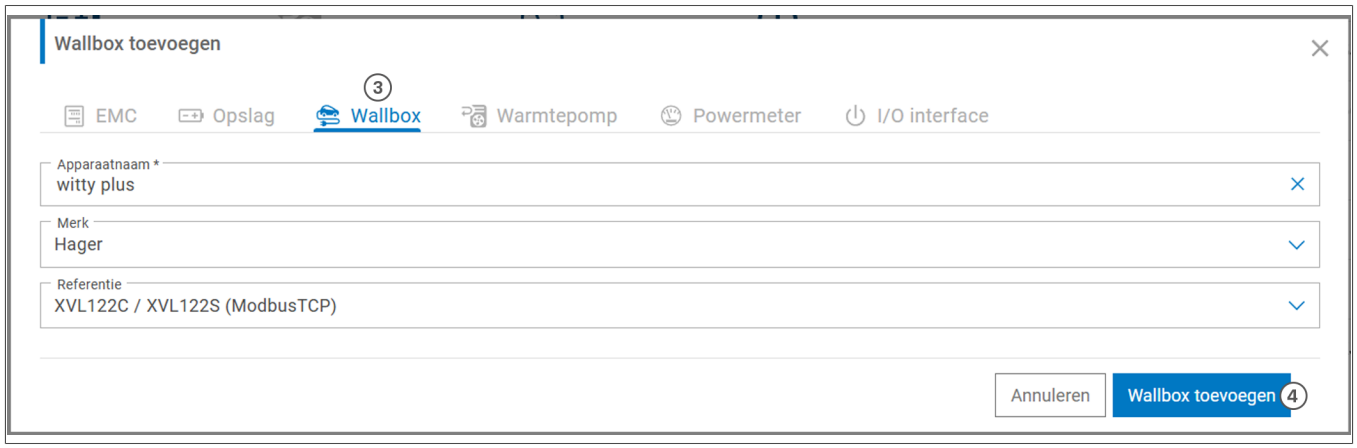
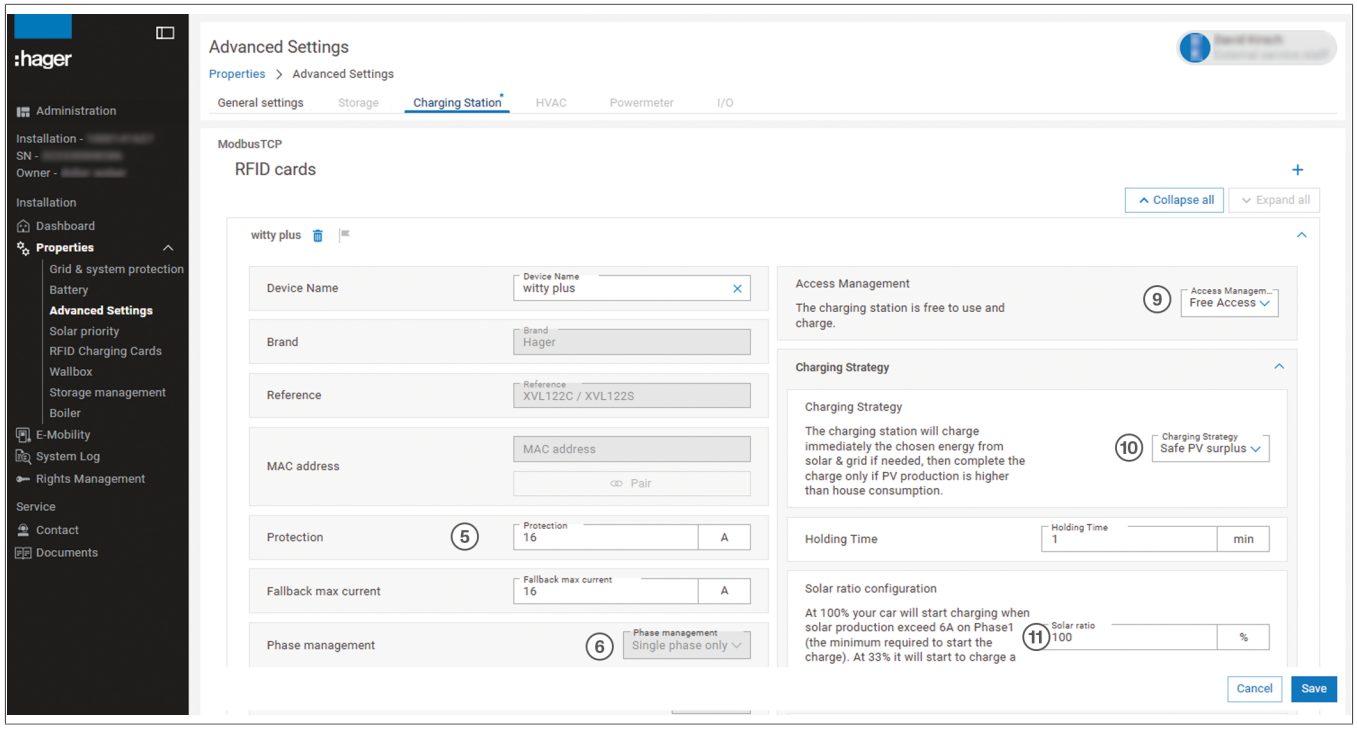



Fig. 52: Adding a charging station

(3) Device type charging station
(4) Button for saving the charging station

2. Enter a name for the charging station (new component) and save it using the blue button (4), or discard it by selecting **Cancel**.

   The configuration changes back to the **Overview** and opens the **Charging station** tab automatically.



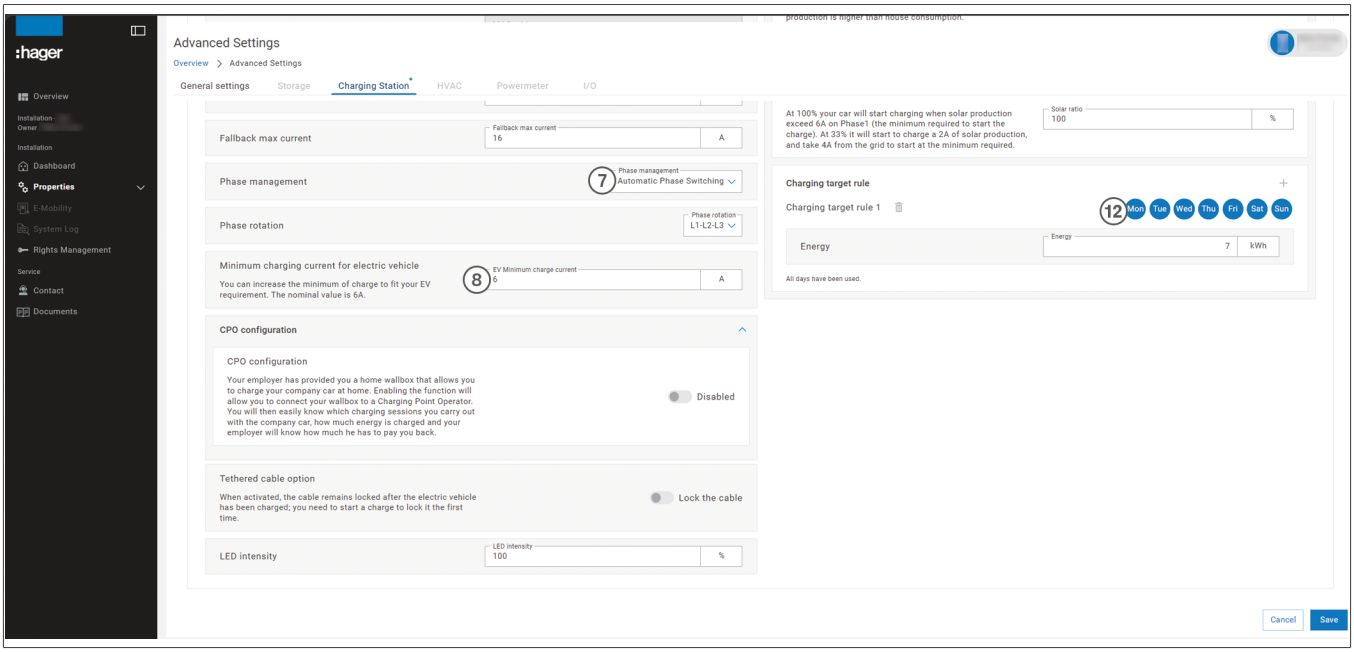



Fig. 53: Configuration of charging station (example)

(5) Input field for the nominal current of the **back-up fuse**
(6) Selects the **phase setting**
(7) Sets the installed **phase sequence**
(8) Input field for the **minimum charging current**
(9) Selects the type of access to the charging station
(10) Selects the **charging strategy**
(11) Input field for the **solar component**
(12) **Targets for charging**

- Enter the rated current of the **backup fuse** (5) installed for this charging station and the **maximum fallback charging current**. The default settings are **16 A** in each case.
- Depending on how the electric vehicle is to be charged, three-phase or single-phase charging can be selected under **Phase settings** (6). If multiple vehicles, and different types of vehicle, are to be charged, it is recommended that the factory setting of **Automatic phase change-over** be retained.
- The **phase sequence** (7) documents the sequence in which the three phases L1, L2 and L3 are connected to the connection terminals of the charging station. Deviation from the **L1-L2-L3** standard should be made when multiple charging stations are installed within an energy management system. This improves the measurement accuracy of the connected energy meters.
- The **minimum charging current** (8) for electric vehicles is 6 A and is preset. If required by the electric vehicle, this value must be increased accordingly. In combination with the solar contribution**solar component** (11), the minimum charging current defines the minimum power at which the electric vehicle can be charged from PV production. This parameter can only be set for charging strategies that also manage PV power.
- Select a **charging strategy** (10) (see Tab. 8). This setting can also be changed by the customer (admin) at any time later on.

| Charging mode | Meaning | Other specifications |
|---|---|---|
| **Boost mode** | – Blackout protection only<br>– No charging optimisation<br>– **Depending on availability**, electric vehicles are charged using PV power or mains power. | Hold time [min] [1]<br>Recommendation: 5 min |
| **PV surplus charging (only)** | – Electric vehicles are charged **exclusively** using surplus PV power.<br>– This optimises the self-consumption of self-generated PV power. | Hold time [min] [1]<br>Recommendation: 5 min<br>Solar share [%] |
| **Budget charging** | – Electric vehicles are primarily charged with self-generated power from the PV system.<br>– This optimises the self-consumption of self-generated PV power.<br>– The power values for charging can be freely defined. | Hold time [min] [1]<br>Recommendation: 5 min<br>Solar power ratio [%],<br>Energy amount [kWh] |
| **Time-dependent budget charging** | – Electric vehicles are primarily charged with self-generated power from the PV system.<br>– This optimises the self-consumption of self-generated PV power.<br>– The energy values for charging can be freely defined.<br>– Charging days and times can be freely defined. | Hold time [min] [1]<br>Recommendation: 5 min<br>Solar power ratio [%],<br>Energy amount [kWh],<br>Day of the week and target time [hh:mm] |

Table 8: Charging strategies

[1] The hold time is the maximum period during which the charging station continues charging the electric vehicle according to the configured settings, even if PV power production temporarily decreases, for example due to cloud cover. 1 min is preset. This avoids frequent stopping and starting of the charging operation.

- Depending on the charging mode, apply the other settings (see Tab. 8).

**Charging prioritisation**

Available PV power can be prioritised either for charging the energy storage unit or for charging electric vehicles. The desired prioritisation must be defined in the **Overview** menu under the **Storage** tab under **Charging prioritisation**. The default setting is **charging station** (both options enabled). If the **battery**option is selected, the energy storage unit is always fully charged before electric vehicles can be charged.

**Charging planning**

Desired charging times and charging levels should not be set additionally in a vehicle app. flow always prioritises the charge planning settings configured in the Hager Cloud. Please bring this to the attention of customers.

- If necessary, set RFID card **authentication** (9) to lock the charging station from free access.
- If necessary, the following can be activated:
  - **Company car at home** function when a personal charging station is used to charge a company car and these charging operations are to be documented separately (if reimbursed by the employer),
  - **Locking the charging cable** if required for safety reasons or long-term absence, for example. The brightness of the LED on the charging station can also be reduced. When delivered, it is set to 100%.
- Finally, **save** or **cancel** the settings.

### Connecting a charging station with flow

☑ The charging station is installed and ready for use (see the charging station installation instructions).
☑ The charging station is integrated in the customer's home network (LAN) (same subnet as the EMC).

1. Open the **Charging station** tab in the configuration overview.

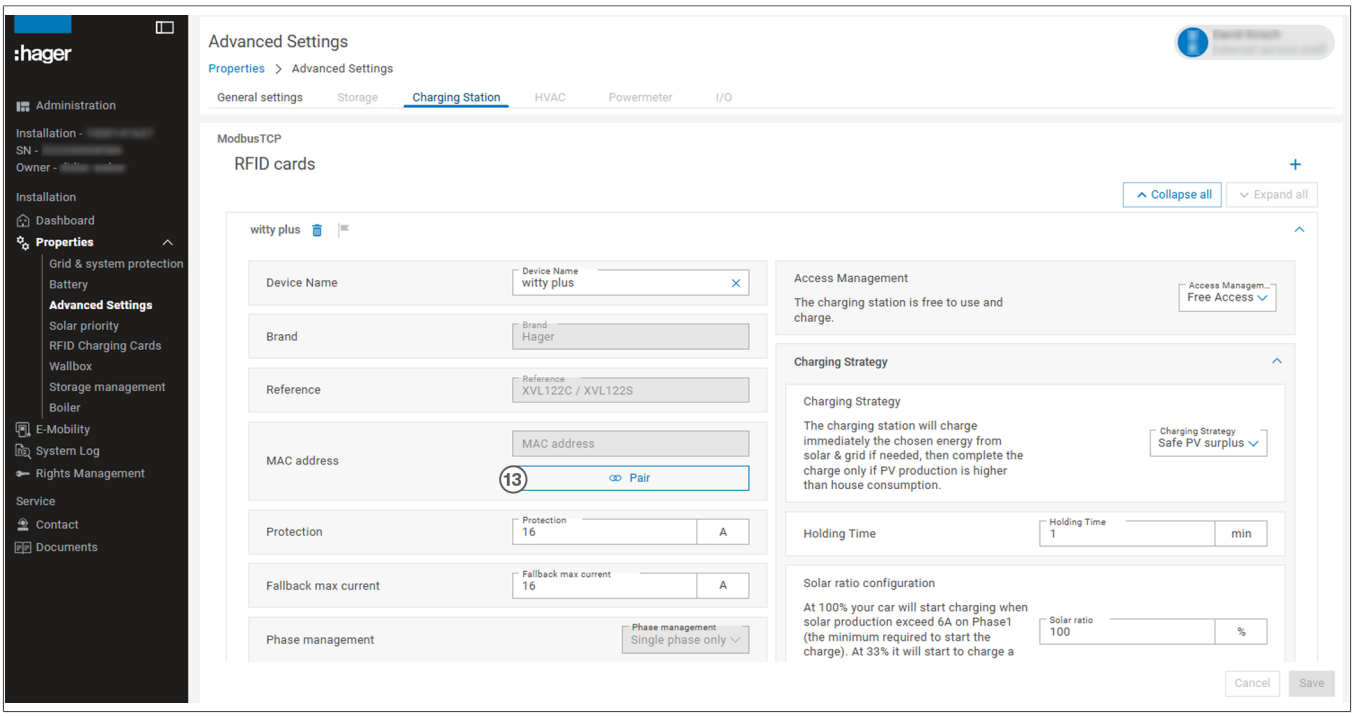



Fig. 54: Pairing the charging station

13 Pairing button

2. Click the active **Pair** (13) button.
   A new window opens.

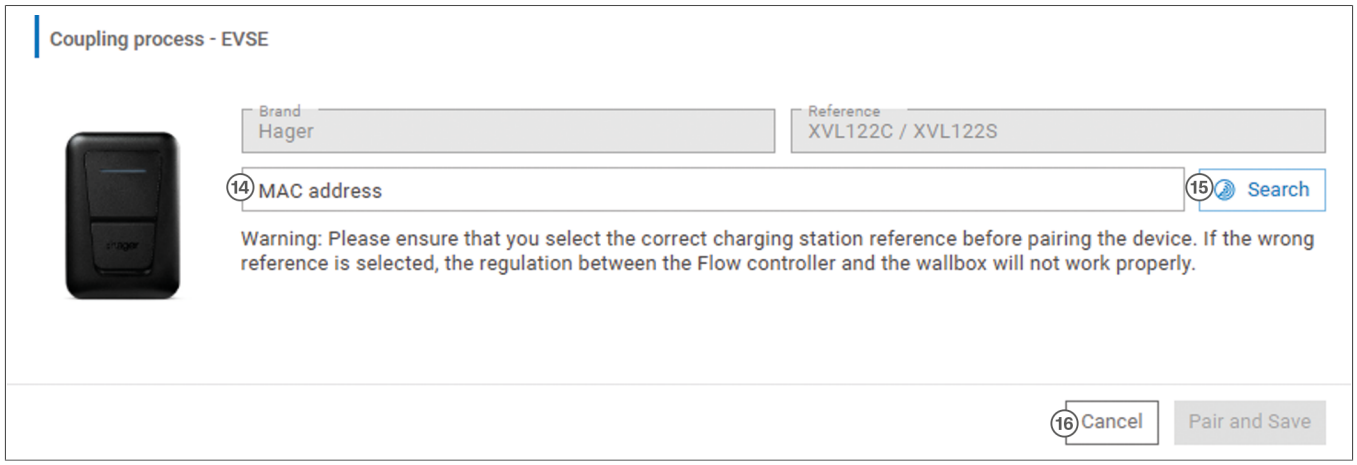



Fig. 55: Charging station pairing process

(14) **MAC address** input field
(15) Button for scanning the network
(16) Button for **pairing and saving**

3. Enter the **MAC address of the charging station** in the input field (14).
   Or:
   Scan the network for devices to be paired using the **Search** (15) button.

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

   The **MAC address of the charging station** is displayed in the input field.
4. Complete pairing using the **Pair and save** (16) button, or discard with **Cancel**.
   The paired device is marked with ✓ on the status display(17).

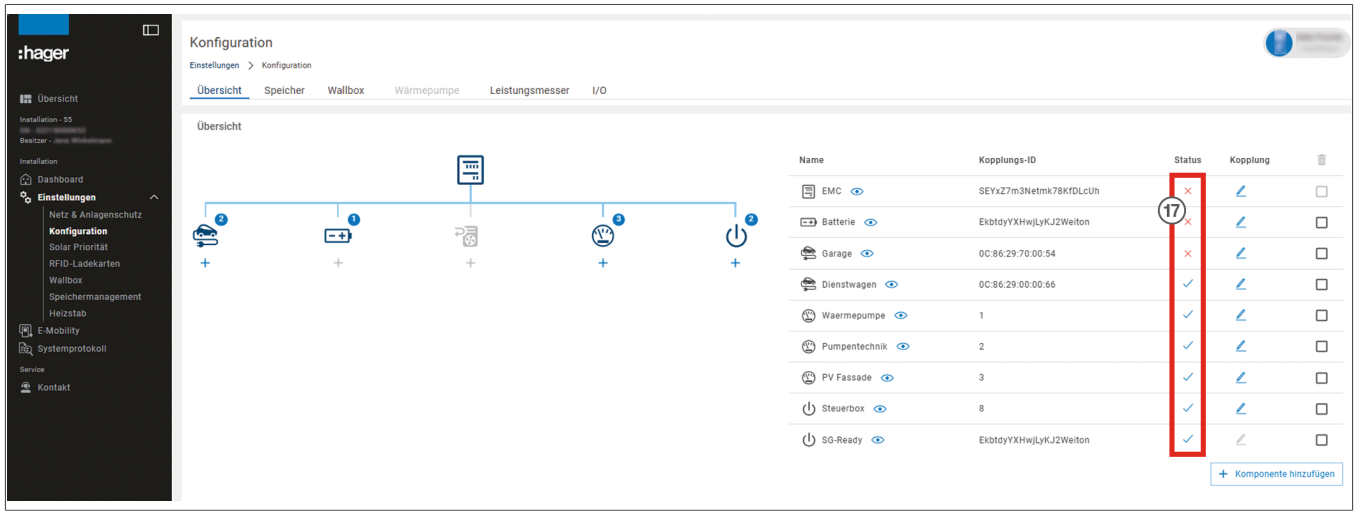



Fig. 56: Status of the charging station

(17) Paired charging station with **status** indicator

5. If the LED status indicator does not flash or light up green or blue, please see the installation instructions for the charging station.

## 6.7 Energy meter




**Notes on total energy measurement**

For customer installations with storage and ATS-box, the energy meter in the ATS- box measures the current total power consumption per line conductor. The power consumption from the grid, the house consumption, as well as the currents at the charging input and output of the energy storage system are recorded. The EMC receives the measurement data from the energy storage system via the LAN (Modbus® TCP).

► See the **Application with an energy storage unit, ATS-Box** (Fig. 4).

For customer installations without energy storage, the EMC meter manages the total current measurement.

► See the **Application without an energy storage unit**(Fig. 1, Fig. 2,Fig. 3).




**Notes on PV power measurement:**

In **customer installations with an energy storage unit**, the energy storage system records the current PV power output**of PV systems connected directly to the energy storage unit** and the amount of energy fed into the grid. The EMC receives the measurement data from the energy storage system via the LAN (Modbus® TCP).

► See the Application with energy storage unit (Fig. 2).

In **customer installations with an external PV inverter**, an additional energy meter is required. The EMC receives the measurement data from the energy meter via Modbus® RTU.

► See (Adding energy meters).



### Measuring further individual power loads:

Adding additional energy meters allows the energy needs of individual (high-demand) loads in the house to be recorded and displayed in a more differentiated manner. Every additional energy meter improves transparency for the customer and lets them monitor their costs more specifically. The EMC receives the measurement data from the energy meters via Modbus® RTU.

Example of **heat pump**:

If a heat pump is integrated into the flow system, we recommend recording the power consumption of the heat pump separately with an energy meter.

### Compatible energy meters

All Modbus® energy meters in our **ECRxx** and **ECAxx** series are compatible with flow.

► You can find compatible meters for any customer installation in our online catalogue at **hager.de**. Our range includes meters with a wide range of properties, such as different measuring methods (direct or indirect with current transformers), rated currents and number of phases.

### Adding energy meters

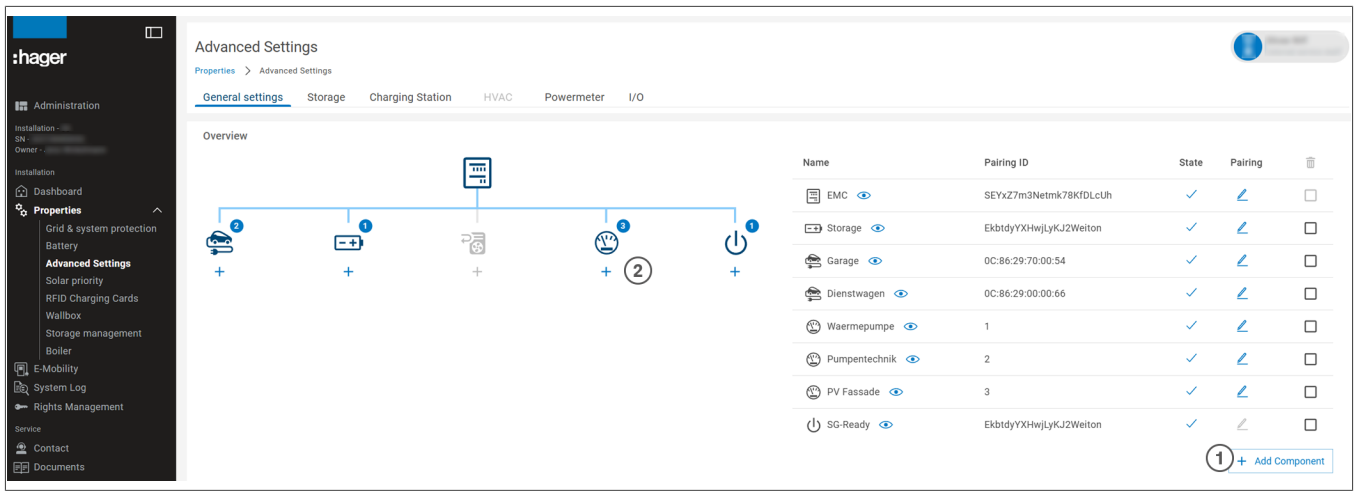



Fig. 57: Adding energy meters

(1) **+ Add component** button
(2) **+** icon below the energy meter

1. Select the **+ Add Component** (1) button.

   Or:

   Select the **+** below the energy meter icon (2) in the system overview.

   A new window opens.

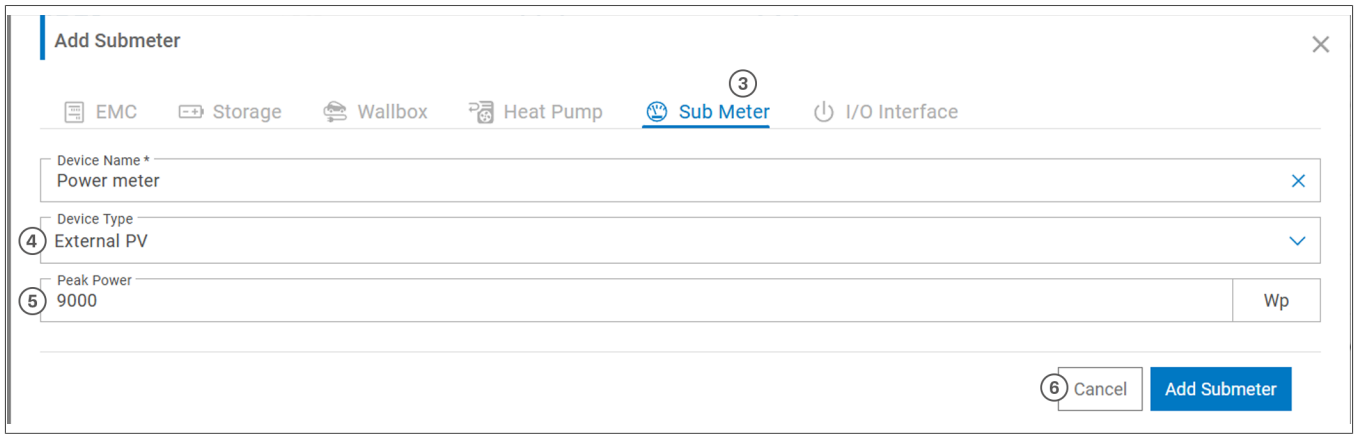



Fig. 58: Installation of an energy meter

3 Device type **Power meter** (energy meter)
4 Selection field for the device type of the load to be measured
5 Maximum power [$W_P$]
6 Button for saving the new component

2. If the **power meter** (3) device type is selected or already activated, enter a unique name.
3. Select the appropriate device type (4)for which the additional energy meter is to be used, e.g. **air conditioning system** or **additional PV**.
4. For a PV energy meter, enter the maximum power [Wp] of the external PV system(5).
5. Save the entries using the blue button (6)or discard them using **Cancel**.

### Connecting energy meters with flow

☑ Energy meter is installed and ready for use (see meter installation instructions).

**Metering direction of PV energy meters**

The external PV inverter must be connected to the outgoing terminals of the PV energy meter. The direction of the arrow must point from the distributor to the inverter, not vice versa.

☑ The energy meter is connected to the EMC via the Modbus® interface.
☑ The energy meter is addressed and configured for flow.

**Addressing and configuring the energy meters**

All compatible Hager **ECRxx, ECAxx** energy meters have factory settings for use with flow. Only the applicable **Modbus® address** must be set on the devices.

Recommendation:

- Energy meter for heat pump: Modbus® address **‘1’**
- Energy meter for external PV system: Modbus® address **‘10’**

- Open the **Power meter** tab.

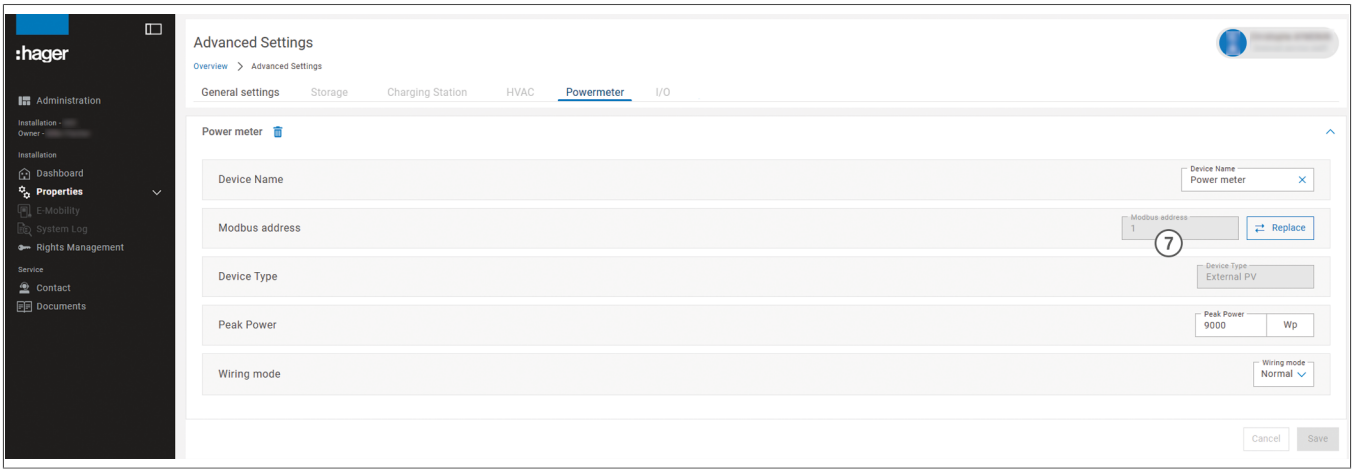



Fig. 59: Connection to energy meter (example)

⑦ Button for **editing** the **Modbus® address**

- Activate the **Edit** (7) button.
- Enter the **Modbus® address** of the meter. This address must match the address programmed on the meter.
- Confirm the entry with **Save**.

  The connection is established automatically.

## 6.8 I/O interface

I/O

Whenever the power grid is overloaded, for example on sunny days with high power production but low power consumption, the utility company sends control signals to limit the feed-in power of all connected systems within a grid section (as regulated by Section 9 of the German Renewable Energy Sources Act (EEG)). Conversely, grid congestion and excessive consumption can lead to the power consumption of households being reduced by x percent by the utility (regulated in Section 14a of the German Energy Industry Act (EnWG)). Depending on the country/region, the utilities may install a ripple control receiver behind each house connection; this receiver is installed in the distribution board. Alternatively, the utility may use a control box in conjunction with a control signal terminal strip (according to Section 14a of the EnWG) in what is referred to as the connection-side connection compartment. The binary control signals, which can then be activatedd remotely by the utility, must be sent to the inverter within the house installation.

The I/O interface converts the binary control signals received via a control line from the ripple control receiver or from the connection-side connection compartment into commands that can be used by the inverter of the energy management system (Fig. 60).

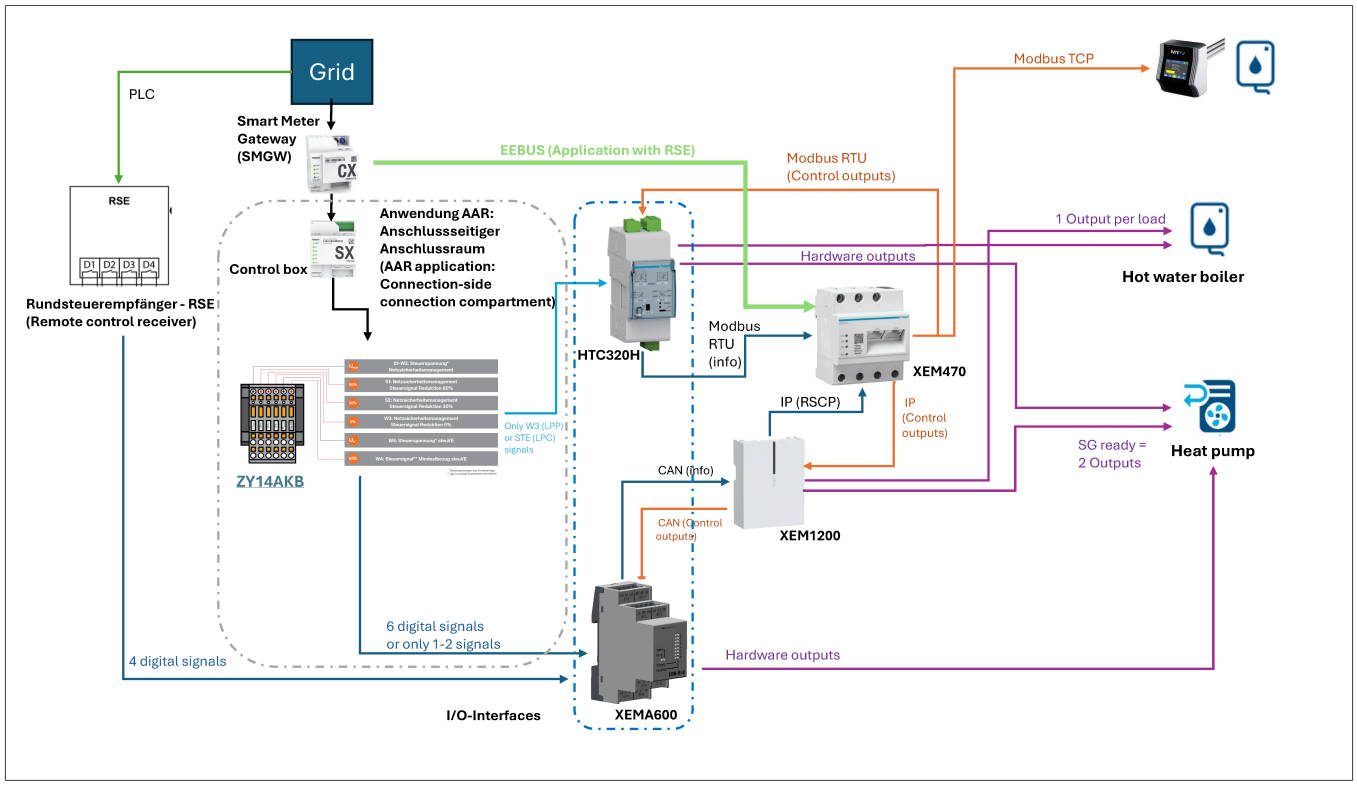



Fig. 60: I/O interfaces in the energy management system

The inverter, in turn, can use the energy management controller internally to optimise self-consumption by means of the following functions:

- Control the heat pump directly via its own relay contacts (**SG Ready**) (application with I/O box, XE-MA600).
- Control the **HTC320H** communication module, which can be used to control large loads in the installation, or
- Using additional **myPV** hardware, further optimise self-consumption.

### Activation of large loads

The **I/O interface** enables active control of external loads via digital inputs and outputs. Communication with EMC is via Modbus® RTU (HTC320H communication module). Possible applications include:

- Flow heater
- Washing machine
- Tumble dryer
- Pump
- Heat pump

An I/O interface can be used to implement other functions for optimising the system, such as:

- Demand-based time control
- Protection against overload due to high inrush currents (heat pump)
- Helps to achieve desired charging targets of the energy storage unit and charging station(s)

### Adding an I/O interface

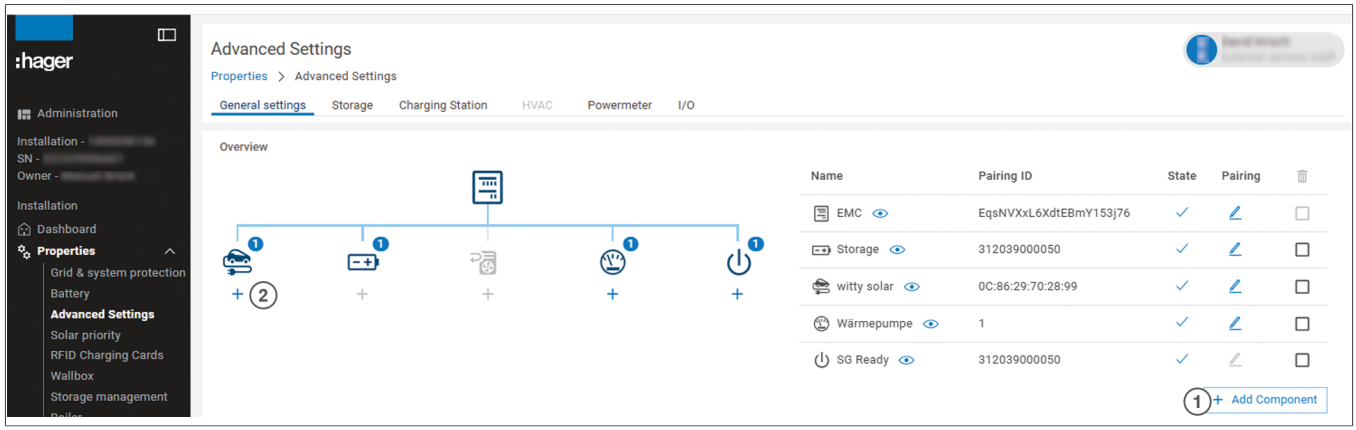



Fig. 61: Adding an I/O interface

(1) Button for adding a new component
(2) Adding a charging station directly

- Select the **+ Add component**(1) button.

  Or:

  Select the **+** below the I/O interface icon (2)in the system overview.

  A new window opens.

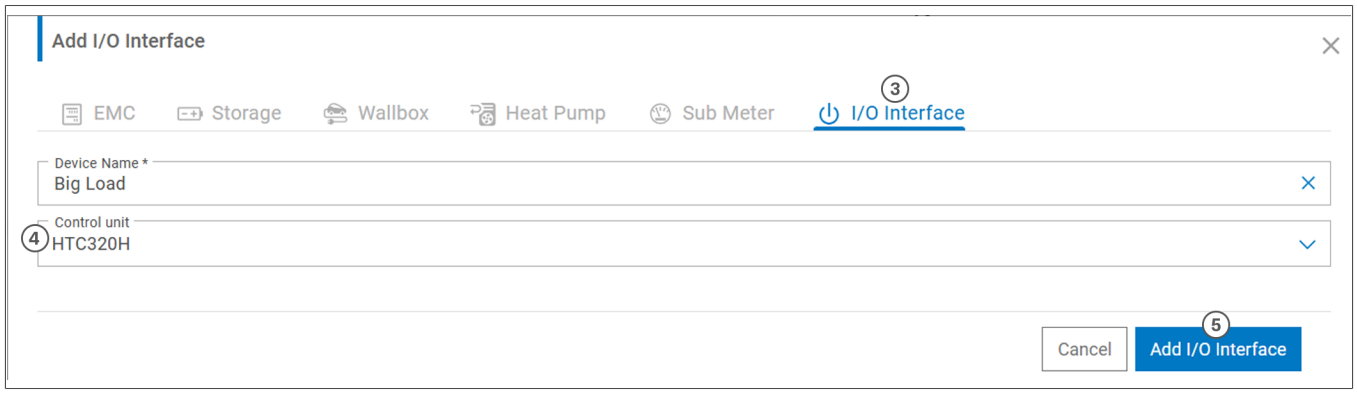



Fig. 62: Creating an I/O interface for large loads

3 **I/O interface** device type
4 Selection field for the **control unit**
5 Button for **saving** the new component

- If the **I/O interface** (3) device type is selected or already activated, enter a unique name.
- Select the appropriate **control unit** (4) via which the I/O interface is to be implemented, e.g. **HTC320H** (accessories), **storage** or **my PV**.
- Save the entries using the blue button (5)or discard them using **Cancel**.

### Adding I/O interface for SG Ready

**Heat pumps via SG Ready**

The PV inverter already has an integrated SG Ready interface, with which the self-consumption of the self-produced PV current can be optimised for heat pump operation (see installation instructions for the inverter).

- The procedure is the same as described above. Select **storage** (4) as the control unit.

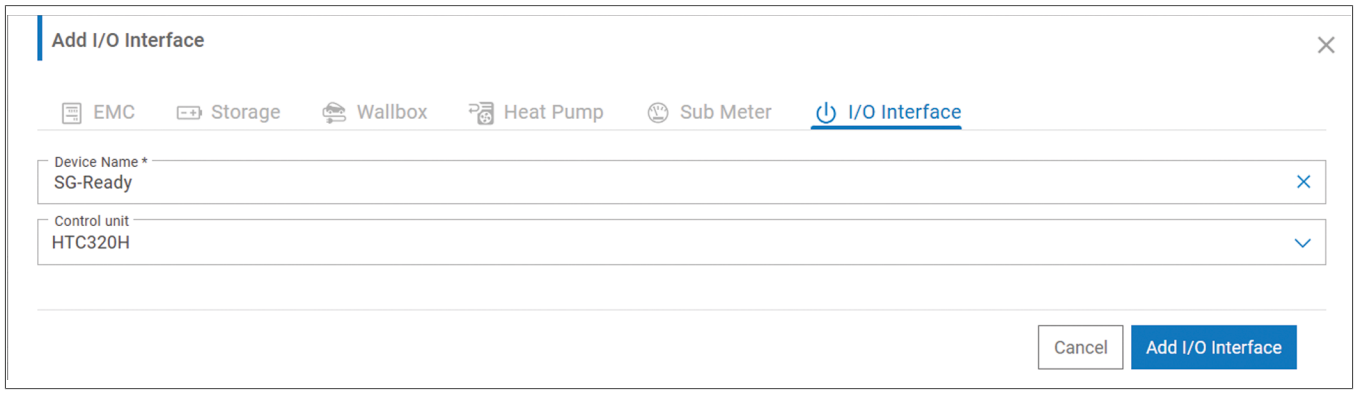



Fig. 63: Creating an I/O interface for SG Ready (heat pump)

## Configuring an I/O interface

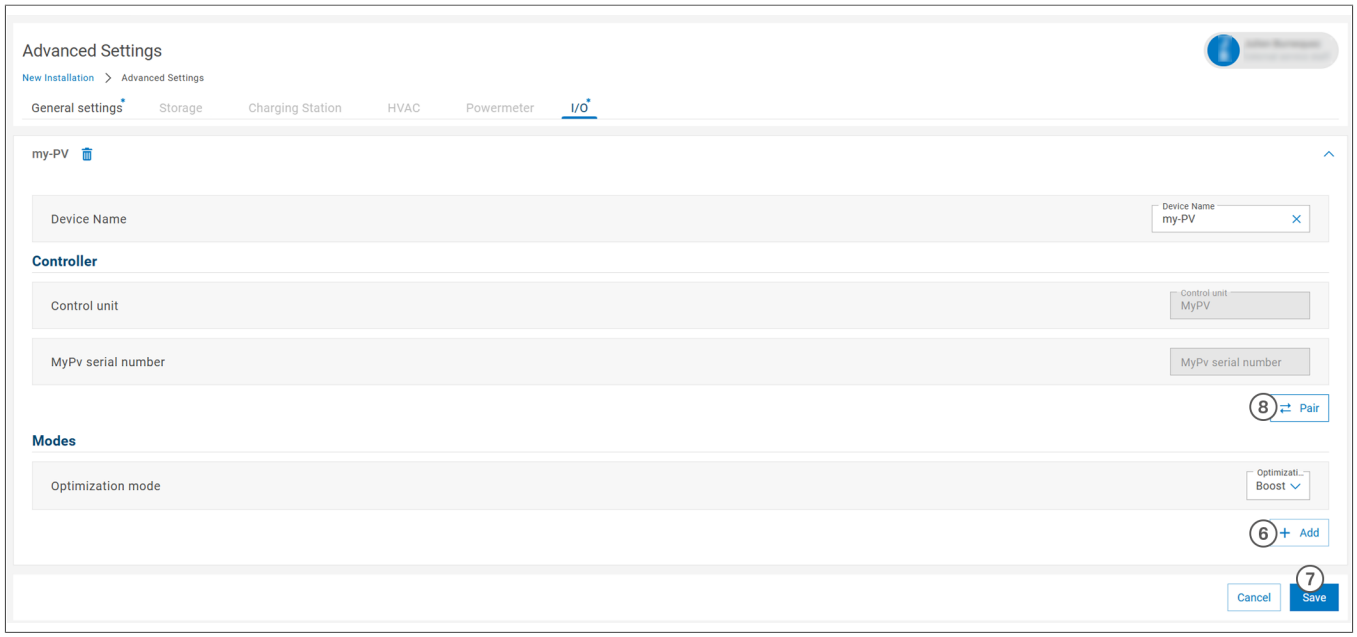



Fig. 64: Configuration of I/O interface (example: **MyPV**)

6 Selection field for the **optimisation mode**
7 **Save** button
8 **Pair** button

In the example (Fig. 64), **myPV** is used to determine that any PV surplus is to be used primarily to heat water. Selecting **myPV** implements a special application case with an additional device that can be controlled via Modbus® TCP.

This application aims to use as much self-produced power as possible from the PV system for providing of hot water and heating water. This is comparable to a solar thermal system, in which the solar power is used directly to heat the water. With **myPV**, the self-generated power is used to heat the water up to a defined, maximum temperature.

1. Select **Optimisation mode** (6). The following modes are available:
   - **Boost mode**,
   - **PV surplus only**,
   - **PV surplus with priority** and
   - **Safety temperature**
2. Confirm the entry with **Save** (7).
3. Start establishing a connection using the **Pair** (8) button.

### Connecting an I/O interface to flow (HTC320H)

The following assumes that the control signal of the utility comes via the connection-side connection compartment and that instead of an I/O box, the HTC320H communication module (optional accessory) is to be used to control large loads.

**Note**

For customer installations with an I/O box and a directly connected heat pump to the SG Ready interface of the inverter, the following steps are not necessary.

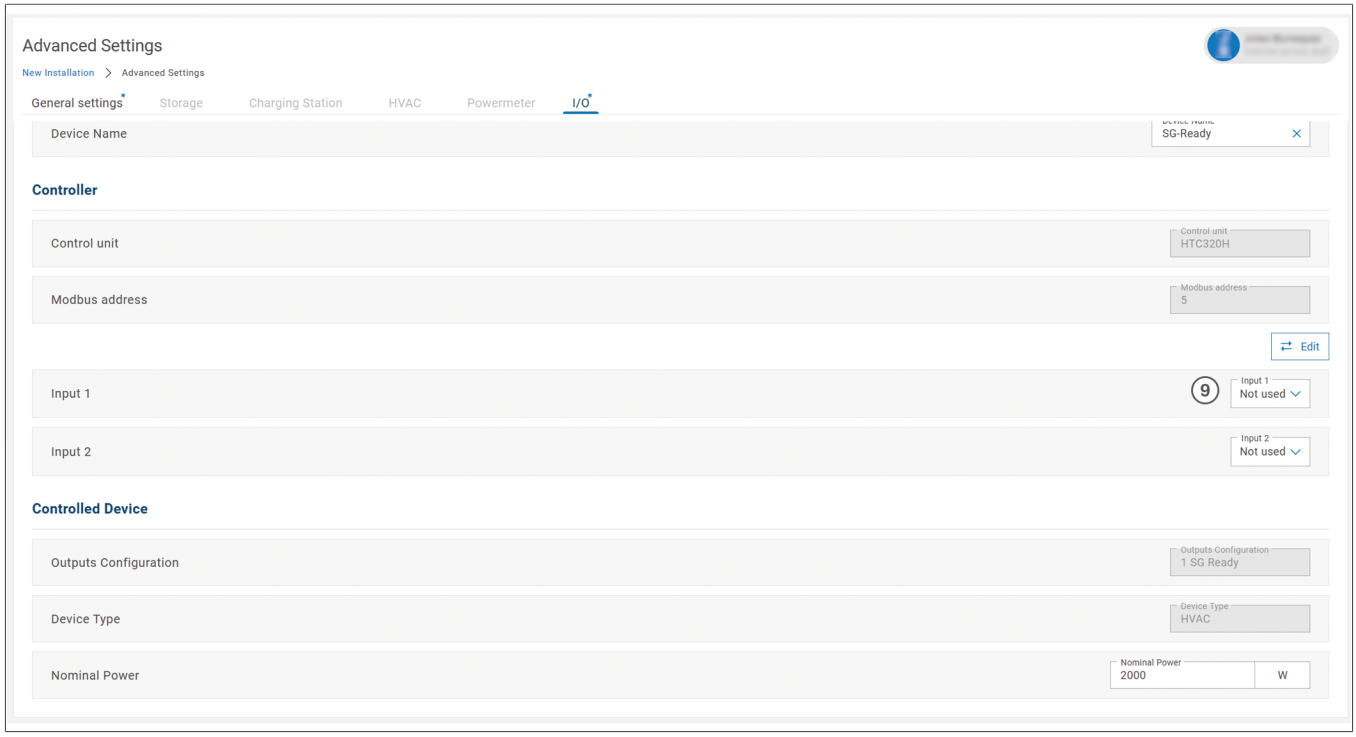



Fig. 65: Modbus® address for I/O interface (example)

(9) Button for **editing** the **Modbus® address**

☑ I/O interface HTC320H is installed and ready for use (see I/O interface installation instructions).
☑ I/O interface HTC320H is connected to the EMC via the Modbus® interface.
☑ HTC320H I/O interface is configured.

- Open the **I/O** tab in the configuration.
- Click the button to **edit** the **Modbus® address** (9).

  A separate window opens.
- Enter the **Modbus® address** of the I/O interface in the input field. The address entered must match the address programmed on the HTC320H.
- Connect with **Pair**.

## 6.9 Status indicators in the portal

Check the status of all devices at the end of the commissioning process. The number and type of devices vary depending on the customer installation.

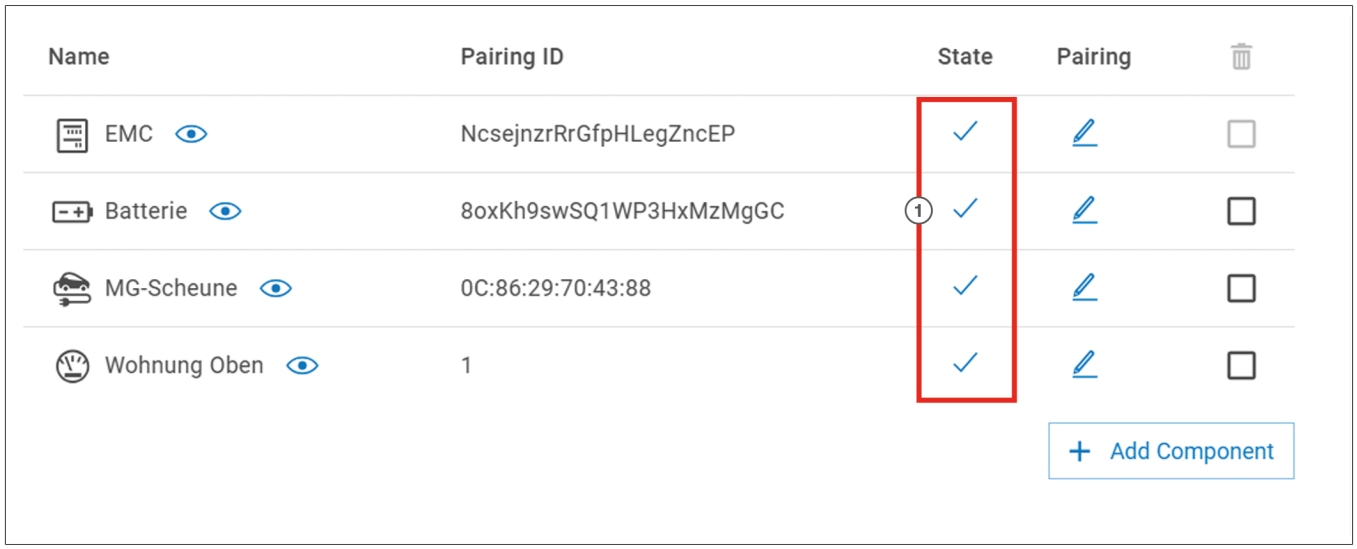



Fig. 66: Status indicators after commissioning (example)

1 **Status indicator** for each component of the system

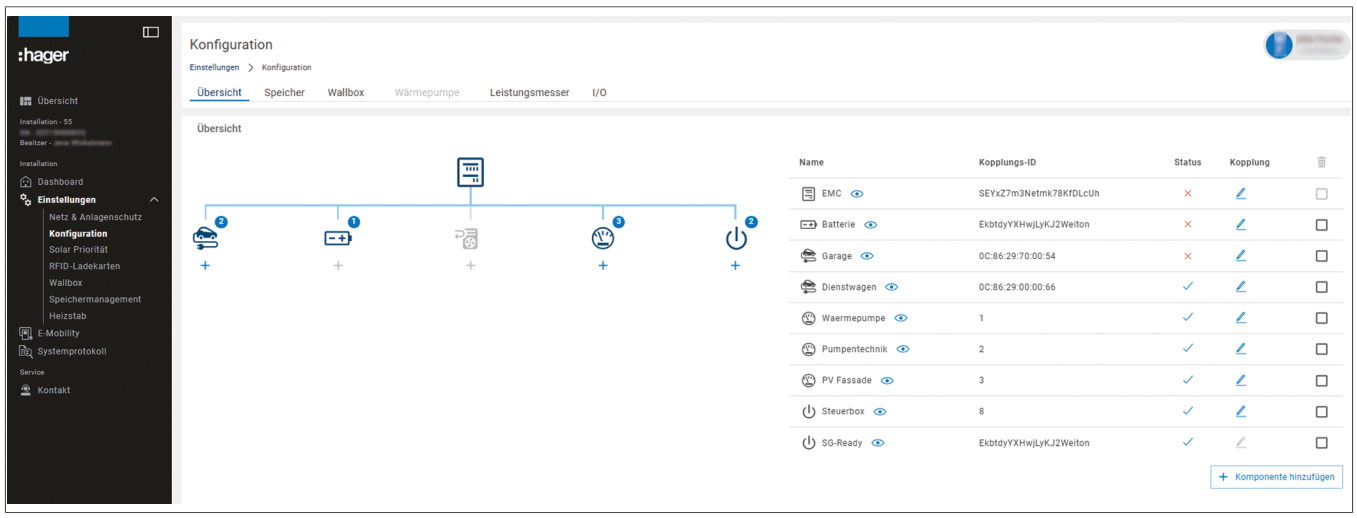



Fig. 67: Status indicator with error message (example)

If a fault is identified in the energy management system, the fault is also reported in the overview of the portal by means of ✖. Detailed information on the fault that has occurred can be viewed under **System log** in the left-hand menu bar (Fig. 67).

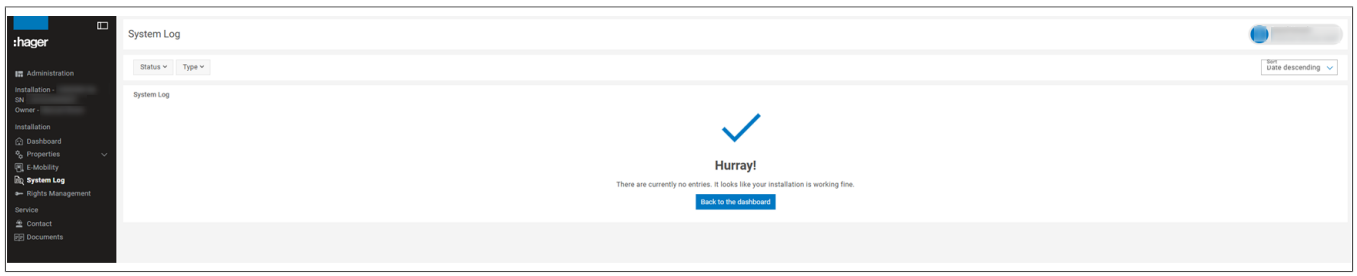



Fig. 68: Example of a system log with faults in the installation

# 7 Handover of the project to the customer



After successful commissioning, the flow installation with the associated administrator rights must be handed over to the customer (end-user). The installer will continue to have service access to the customer installation through the myHager business account (see**Managing customer flow installations**). The customer must create their own personal myHager account to access flow.

### Entering customer details

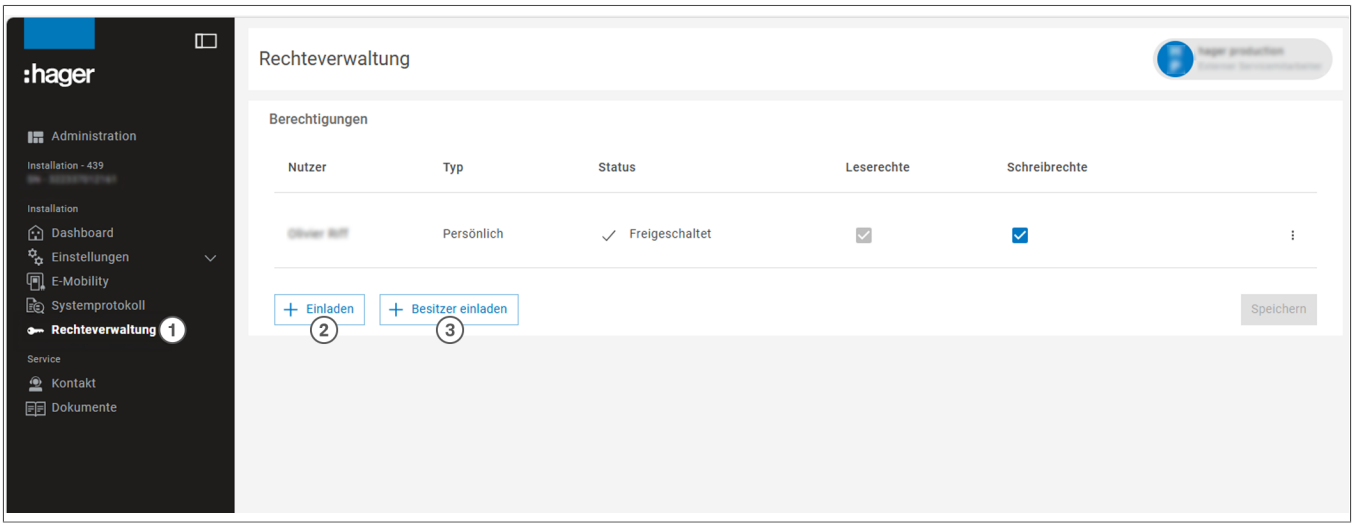



Fig. 69: Inviting the owner (customer)

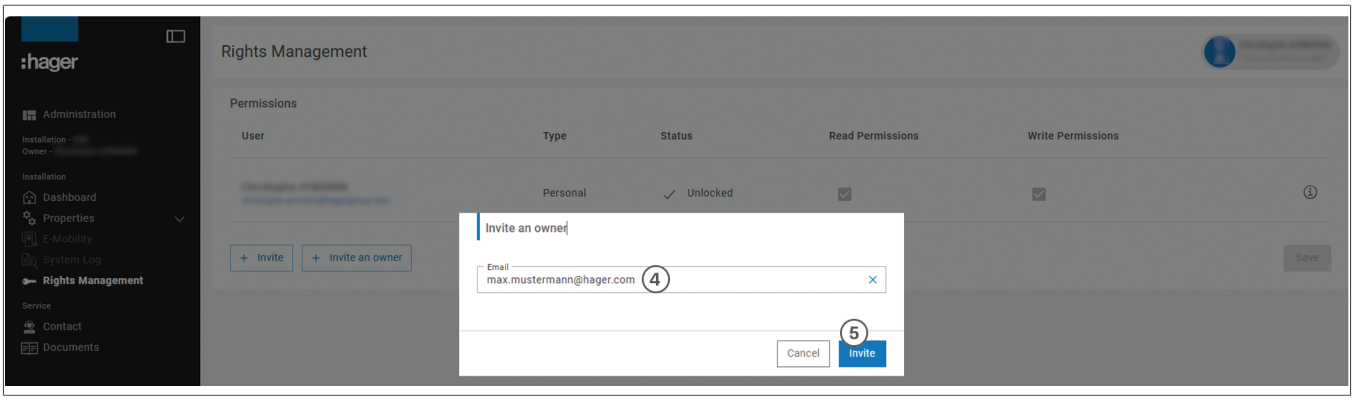



Fig. 70: Owner (customer) email address

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.

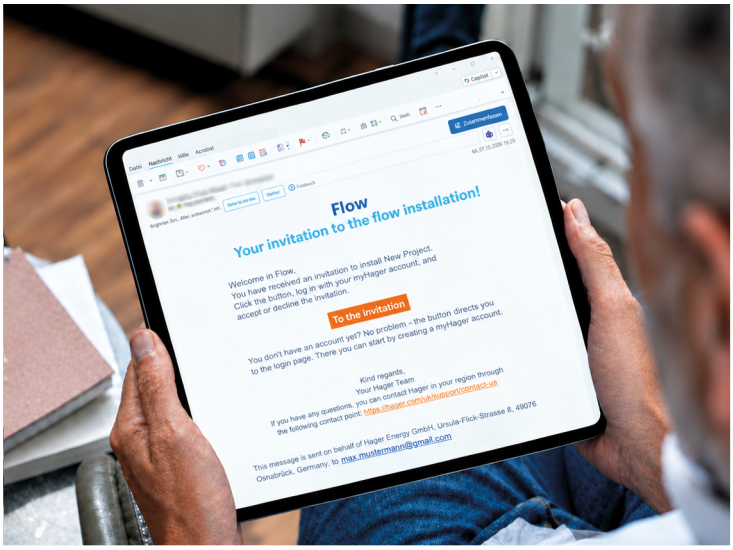
   An input field for the owner's email address (4) opens.

3. Enter the owner's **email address** (Fig. 70) and send it using **Invite** (5), 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.




**Flow**

**Your invitation to the flow installation!**

Welcome in Flow,
You have received an invitation to install New Project.
Click the button, log in with your myHager account, and
accept or decline the invitation.

**To the invitation**

You don't have an account yet? No problem - the button directs you
to the login page. There you can start by creating a myHager account.

Kind regards,
Your Hager Team
If you have any questions, you can contact Hager in your region through
the following contact point: https://hager.com/uk/support/contact-us

This message is sent on behalf of Hager Energy GmbH, Ursula-Flick-Strasse 8, 49076
Osnabrück, Germany, to max.mustermann@gmail.com.

Fig. 71: Handover email

5. Accept the invitation using the link in the email (Fig. 71).

   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.

**myHager**

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 ((5)). 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.

**Important information for the new owner (customer)**

We recommend a brief informal exchange with the customer. This should include:

- Brief demonstration and explanation of **flow overview** (dashboard, diagrams, settings etc.),
- Overview of **flow system expansion options and related services** provided by the company's in-house electrical specialists.
- Mention the required **network security and password protection measures (see Security information**).
- Share a **link to Hager's flow website** for more information: https://hager.de/flow

# 8 AI settings

- Open the **Overview** tab in the configuration.

  In the **Tariff** section, **settings** for **price-based charging** of electric vehicles and energy storage systems can be used with the AI 360° based on dynamic electricity prices.

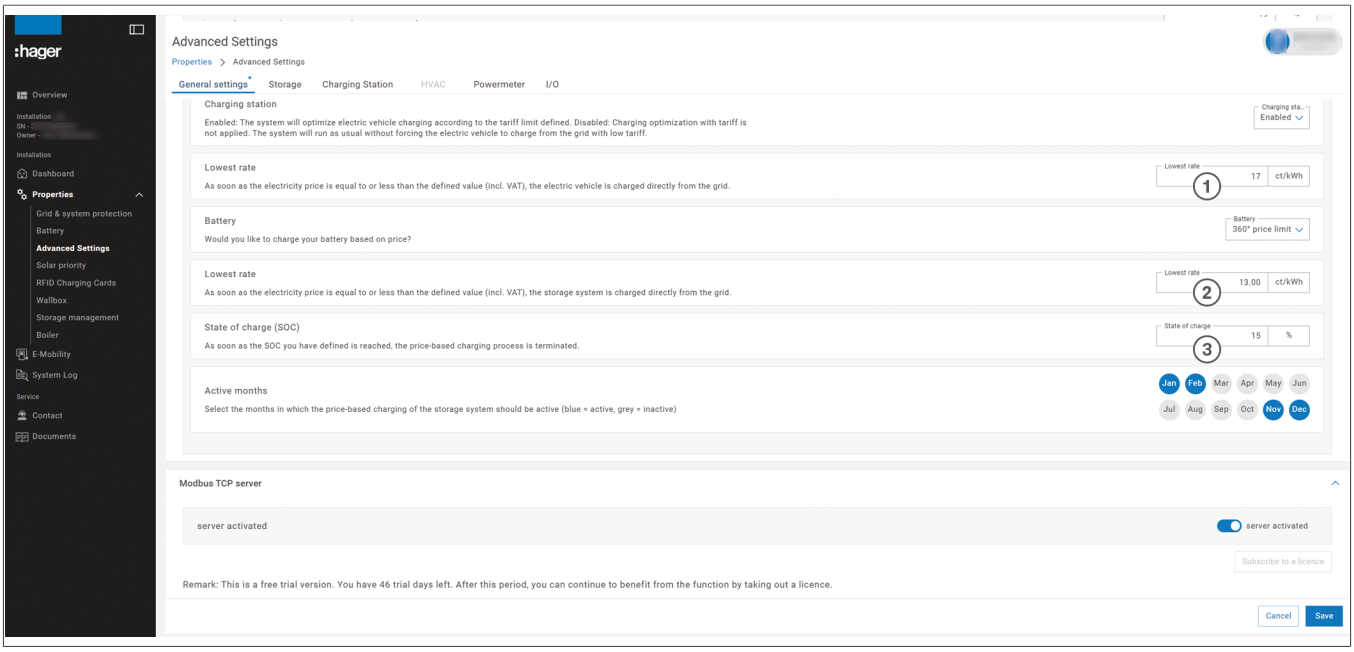



Fig. 72: AI settings — 360° price threshold

(1) Input field for the lower limit (charging station/energy storage)
(2) Input field for the maximum charge conditions
(3) Active months for charging the energy storage device

- Use the **lower limit to** (1) specify the electricity price from which charging is enabled from the grid.
- For energy storage, also define **Active months** (3) and a maximum **condition of charge** (2) (**SOC**). In this way, charging is deliberately scheduled for cost-effective time slots while protecting the battery.
- If required, specify a **reference price** further up as a benchmark, along with the relevant surcharges, to calculate and visualise the savings compared with a fixed electricity tariff.

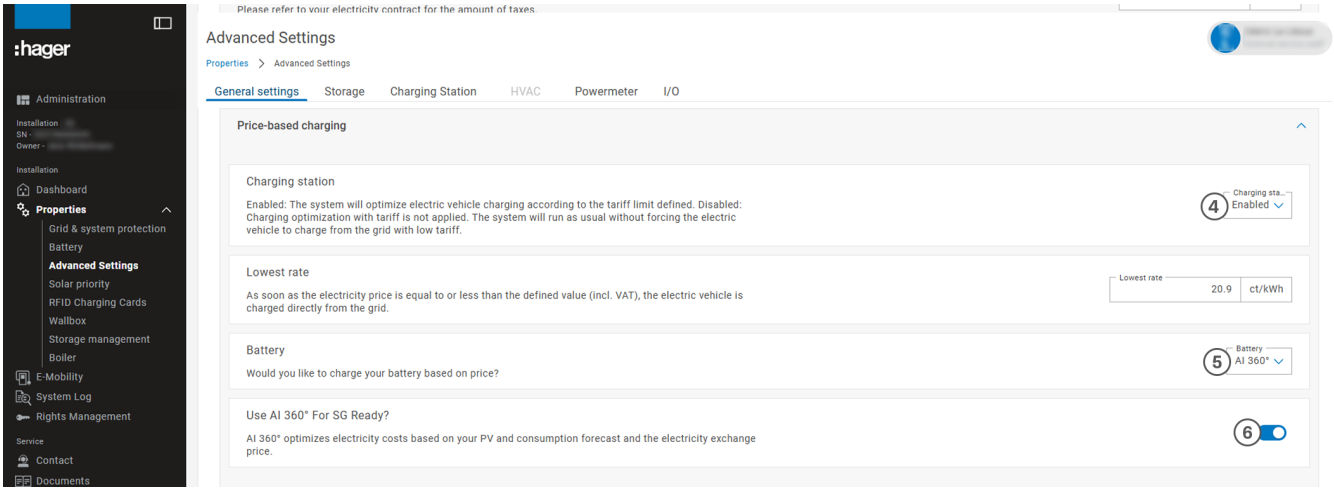



Fig. 73: AI settings — AI 360°

④ Selection field for charging from the grid (charging station)
⑤ Selection field for **price-based charging** of the energy storage with **AI 360°**
⑥ Activating **AI 360°** for the heat pump

This view (Fig. 73) shows the basic charging settings of **AI 360°** for electric vehicle and energy storage.

- Activate/deactivate **price-based charging** from the grid (4) for the electric vehicle as desired.
- For the energy storage unit, set the optimisation of price-based charging explicitly to **AI 360°** (5).
- As an option, you can activate the **SG-Ready** control (6)so that **AI 360°** also takes the heat pump and other loads into account.
- If required, specify a **reference price** as a benchmark, along with the applicable surcharges, to calculate and visualise the savings compared with a fixed electricity tariff.

The optimisation is based on PV production and consumption forecasts as well as stock market electricity prices.

If price-based optimisation is not activated for the heat pump(5), no energy is stored in the form of heated water in the heat pump from the grid when electricity prices are low. The heat pump therefore only operates in normal operation within the energy management system. The price-based charging of the electric vehicle can be switched on/off independently of this.

# 9 Customer settings

## 9.1 Solar priority

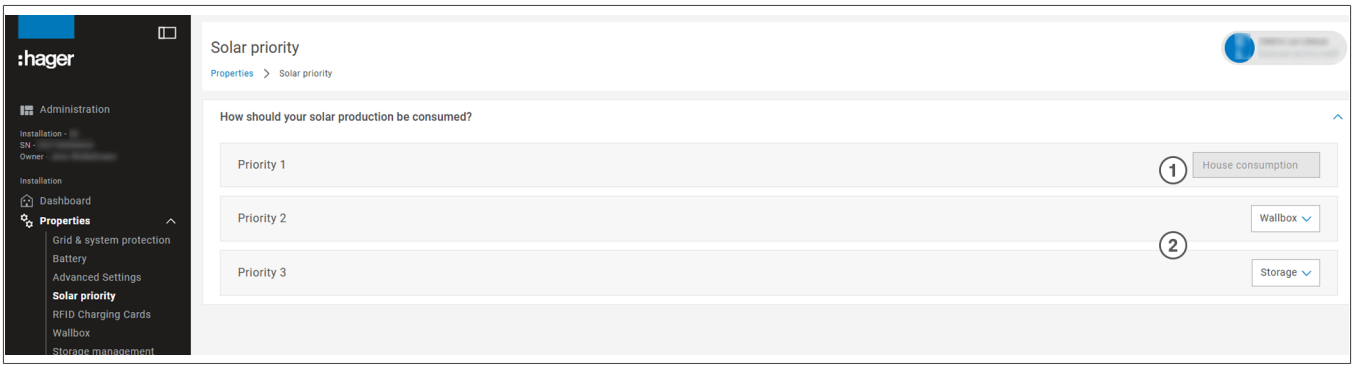



Fig. 74: Solar priority

1 **Priority 1** is set by default to **house consumption**
2 Priority 2 and 3 selection fields

- Under **Configuration**, open the **Settings — Solar priority** menu or directly select the tab with the same name.
- If necessary, in the **Solar priority** view, specify in which order the generated solar power is to be used in the system.

  The **house consumption** is fixed and is always supplied with **priority 1**.
- For priorities 2 and 3, specify whether the solar power should first be fed to the **charging station** or directly to the **energy storage**.

  The available photovoltaic power is distributed successively according to this prioritisation. This setting allows the solar power usage to be directed to the individual needs of the system owner.

## 9.2 RFID charging cards

The user can create an RFID charging card in flow management to authenticate themselves at the charging station and to activate the charging station for charging.

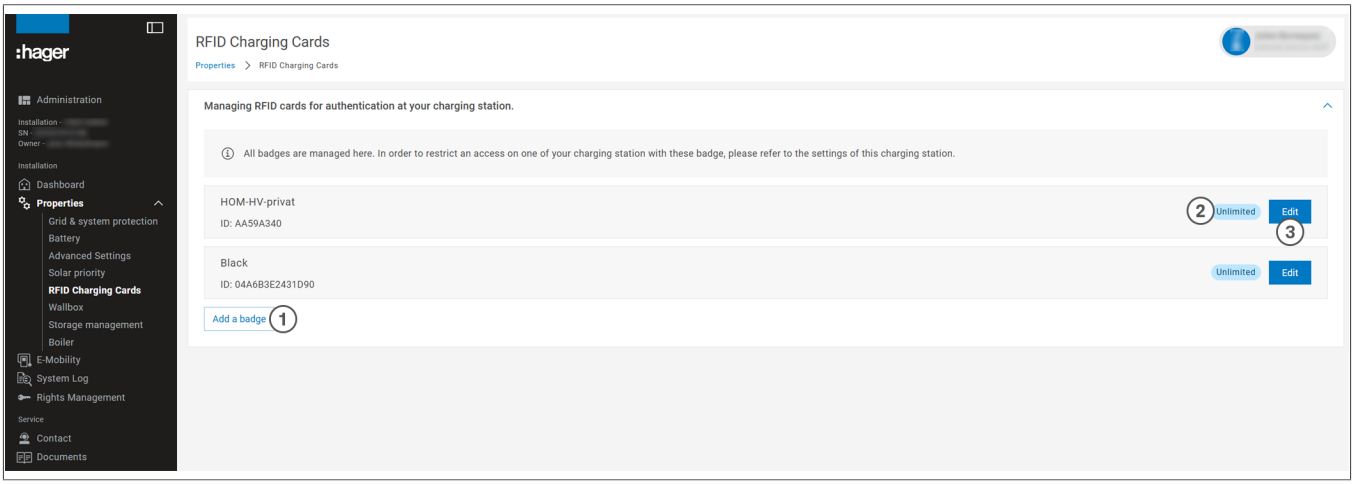



Fig. 75: Created RFID cards

① Button for adding an RFID card
② Activation status
③ **Edit** button

1. Under **Configuration**, open the **Settings — RFID charging cards** menu or directly select the tab with the same name.
   All registered cards and their activation status are displayed.
2. Edit, deactivate or delete the existing releases, or **add RFID cards** if additional cards are necessary.

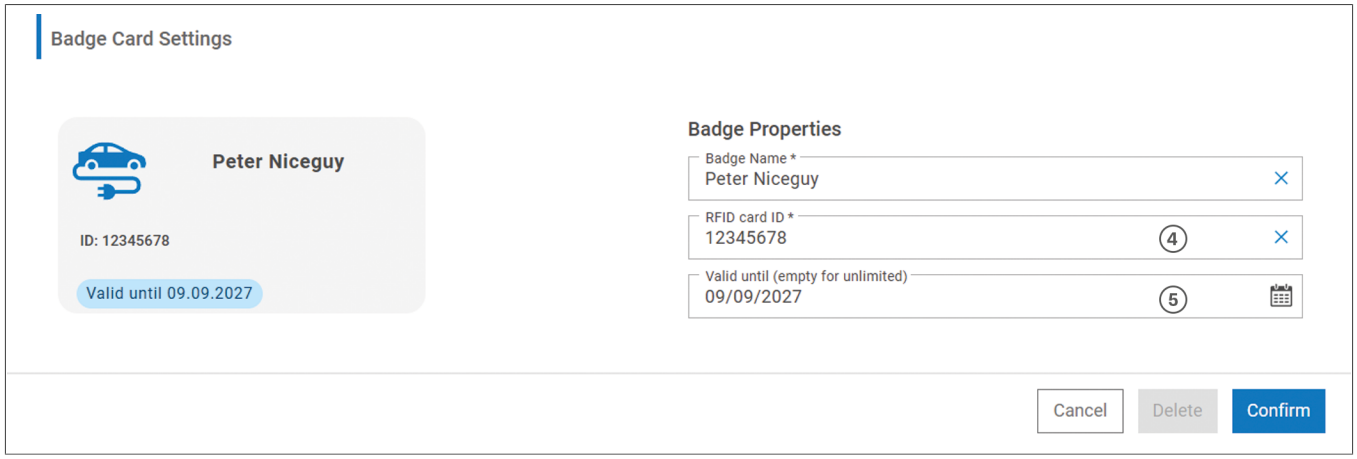



Fig. 76: Badge card settings

④ Input field for the RFID card ID
⑤ Selection field for an expiry date
⑥ **Accept**, **Delete** or **Cancel** button

3. Create a new RFID badge for charging authentication with a unique name, card ID (4) and expiry date in the open **Badge card settings** window. The **expiry date** (5) limits the validity of the badge.
4. Confirm or cancel the process or delete the card using the appropriate button(6). The settings made here determine access rights to charging operations.

## 9.3 Charging station

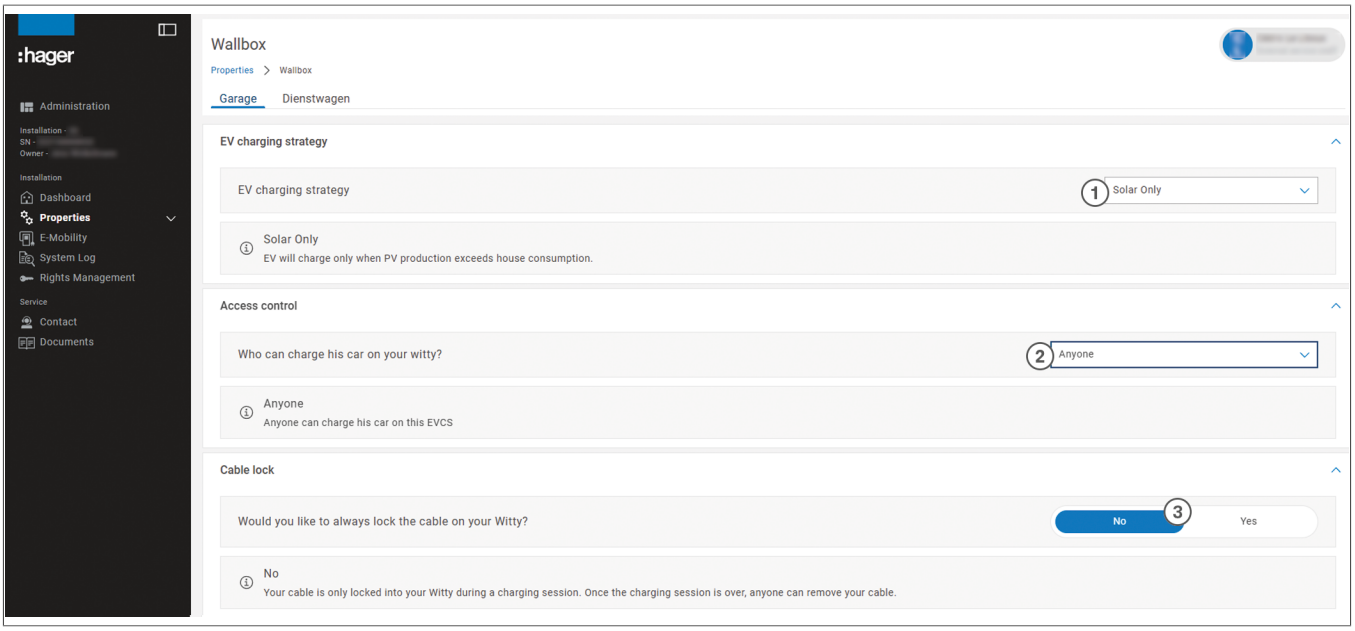



Fig. 77: Charging station settings

1. Charging strategy selection field
2. Selection field for the **authentication** mode
3. Activate/deactivate the **charging cable locking system**

1. Under **Configuration**, open the **Settings — Charging station** menu or directly select the tab with the same name.

   Charging parameters for the charging station and the electric vehicle can be set.
2. Select the **charging strategy** of the **charging station** (1) as required. The meaning of the setting is briefly explained in each case. The setting can be changed again at any time.

The charging strategy prioritises use of the available photovoltaic power for the charging operation.

Adjustable parameters are:

- **PV surplus charging**
  The electric vehicle is only charged if excess photovoltaic power is available.
  This operating mode maximises the self-consumption of solar power.
- **Budget charging**
  The charging operation continues until the specified amount of power is transferred. When this budget is reached, the charging operation will automatically stop.
- **Time-dependent budget charging**
  This charging strategy combines a defined charging budget with a specified time period. The charging operation is controlled accordingly based on time and power.
- **Boost**
  The charging operation starts immediately with the maximum available charging power, regardless of the current solar power production. This setting is used for fast charging of the electric vehicle.

The selected charging strategy influences the behaviour of the charging station during operation.

- **Authentication** (2) is used to select a strategy by which a charging operation is started and controlled. Depending on the setting selected, access to the charging station may be free or restricted.

Select one of the following parameters in the corresponding selection list.

– **Everyone**
  A charging operation can be started by any user. Authentication is not required and no RFID card is required.

– **RFID cards**
  The charging operation is only possible with registered RFID charging cards.
  Only owners of an authorised card are allowed to start a charging operation
  The cards are managed via the corresponding menu item (Fig. 75).

3. Activate the **Lock charging cable** (3) function with **Yes** to prevent disconnection of the charging cable on the charging station while charging is in progress.

   When the charging operation is complete, the locking system automatically unlocks.




Fig. 78: Additional settings for charging station

(4) Slider for the **LED brightness**
(5) Selection areas for the **behaviour in the event of a loss of connection**
(6) Input field for the **maximum charging current in the event of a loss of connection**

4. Use the slider (4) to adjust the brightness of the LED on the front panel continuously between OFF (0%) and 100%. In this way, the LED brightness can be easily adjusted to the environmental conditions.

   Changes take effect immediately.

5. If the charging station loses its connection to EMC, it can either **stop** or simply **continue** charging without EMC control, preventing any adjustments to changing conditions. Activate the Stop or Continue button (5).

6. To avoid possible negative effects when continuing charging without connection and EMC control, set the **maximum charging current** (6) at which charging should continue **if the connection is lost**.




Fig. 79: Advanced charging station settings

(7) Button for **editing** the **phase setting**
(8) Button for **editing** the **hold time**

The phase change-over must be set in the **advanced settings**. This function switches **automatically** depending on the requirements of the electric vehicle connected to the charging station or the amount of PV surplus. Alternatively, the setting can be set to **three-phase** if, for example, all electric vehicles to be charged can be charged in three-phase; t can also be set to **single-phase** if the electric vehicles only support single-phase charging. The aim is to optimise the **self-consumption** of the generated power.

❼ Use the **Edit** (7) button to open the setting options.

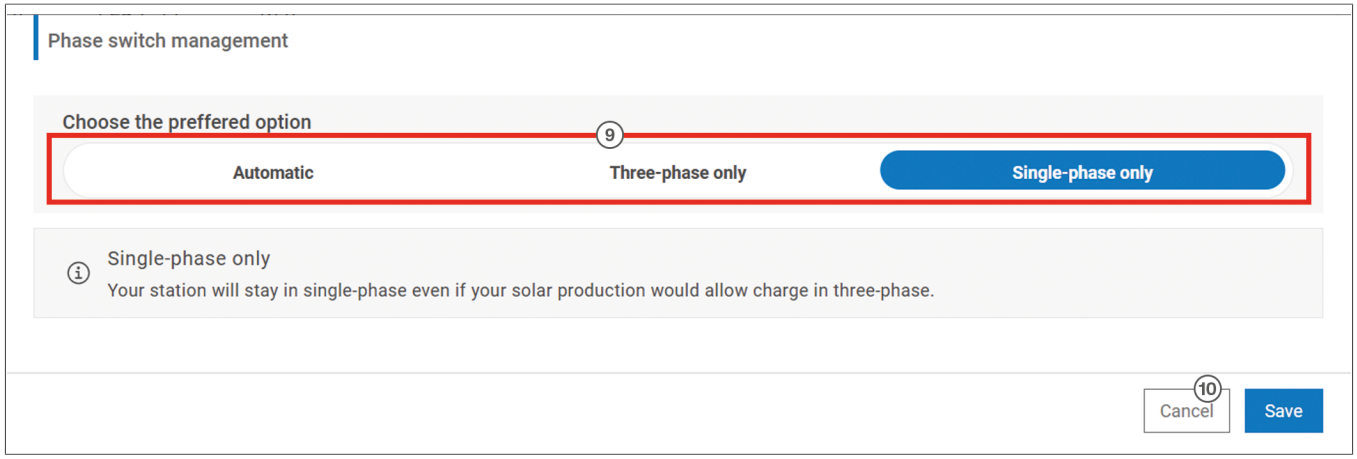



Fig. 80: Options for charging station phase switching

(9) Button for the phase change-over options
(10) **Save** or **Cancel** button

- Select one of the available options (9) to adjust the charging behaviour to the system configuration and/or the requirements of the electric vehicles to be charged. In addition to automatic phase change-over, single-phase and three-phase charging are also available.
- Confirm the selection with **Save** or discard with **Cancel** (10).

  The settings immediately affect the operation of the charging station.

**Note**

Some electric vehicles can only be charged using single-phase power. This must be taken into account when selecting options in the advanced settings. Follow the manufacturer's specifications for the electric vehicles to be charged!

❸ Use the **Edit** (8) button to open the window for setting the **hold time**.

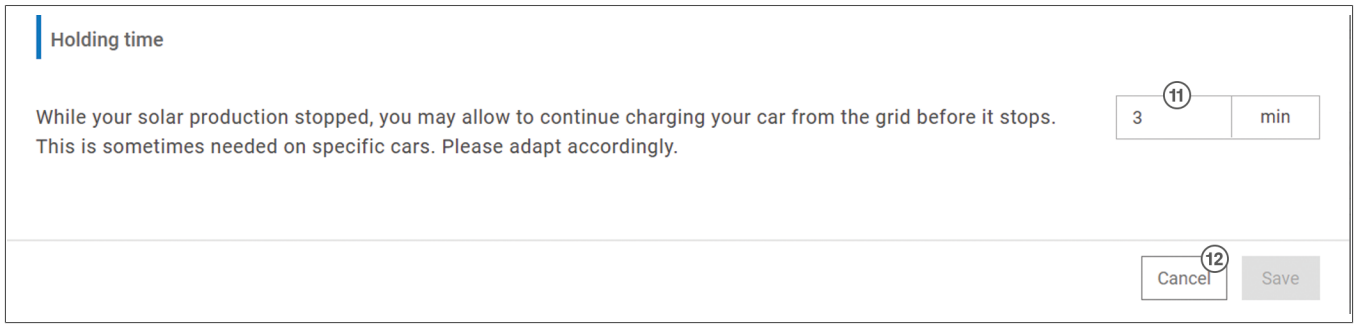



Fig. 81: Hold time for charging station

(11) Input field for the **hold time**
(12) **Save** or **Cancel** button

4. Enter the **hold time** (11) during which the photovoltaic power may fall below the required minimum value during the charging operation without stopping the charging operation. During this time, the charging operation continues with mains power.

   The duration shall be expressed in minutes and may be adapted to vehicle-specific requirements.

   It should also be noted that the hold time ensures that the charging operation is not constantly interrupted when the sky is overcast and there is insufficient PV surplus.

The settings made enable the charging station to be used in a controlled and on-demand manner.

## 9.4 Storage management

**Storage management** shall specify how the available energy in the storage system is to be used for an electric vehicle during a charging operation. The settings therefore determine the charging and discharging strategy of the energy storage device during charging.

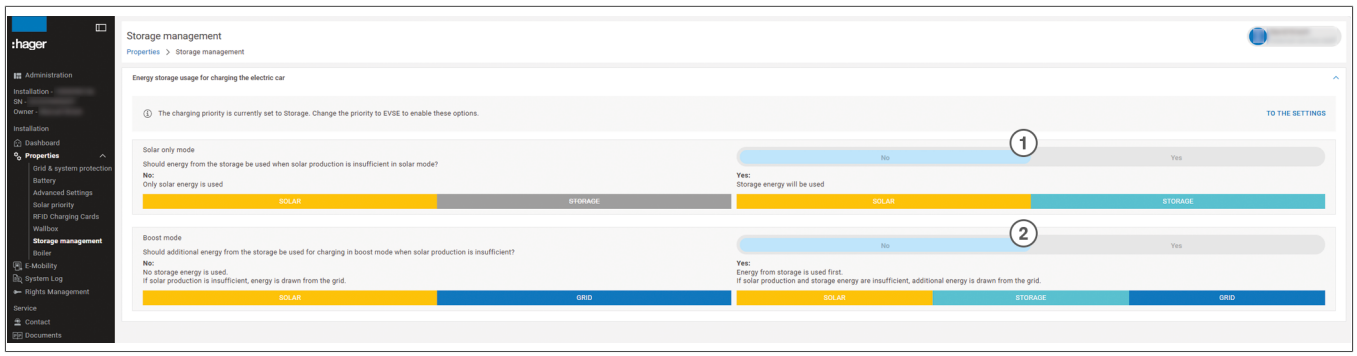



Fig. 82: Storage management

(1) Button for activating/deactivating **solar mode**
(2) Button for activating/deactivating **boost mode**

- Under **Configuration**, open the **Settings — storage Management** menu or directly select the tab with the same name.
- Activate **solar mode** via the **Yes** (1) button if, in addition to the excess power from the photovoltaic system, the energy remaining in the storage is also to be used to charge an electric vehicle.

  If power is no longer available for charging from either part of the system, the charging operation is interrupted.
- Set **Boost mode** to **Yes** (2)if you want to use energy from the storage system and, if necessary, from the grid in addition to surplus photovoltaic power.

This ensures that the electric vehicle is charged as planned without interruption.

- To disable **solar** or **boost mode**, select the appropriate **No** button.

## 9.5 E-mobility

For the analysis and traceability of charging behaviour, the **E-mobility** menu provides an overview of the daily power consumption associated with electric vehicle charging sessions (charging log) and includes additional statistical data.

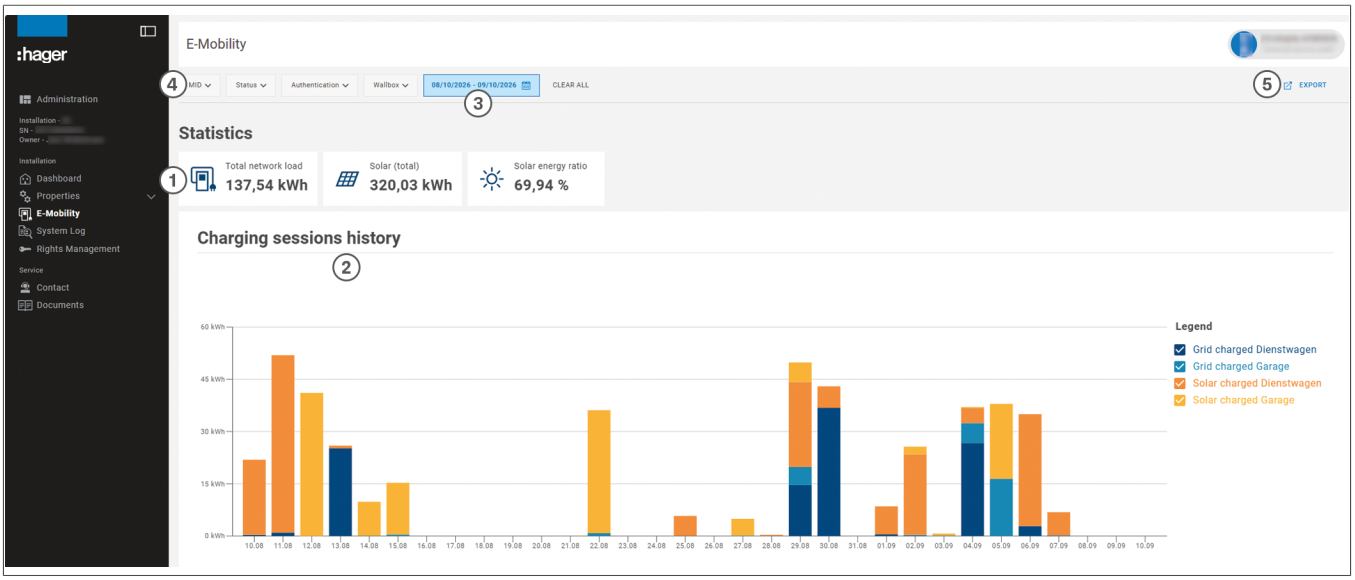



Fig. 83: E-mobility overview

1. Statistical data
2. **Overview of** charging log
3. Select the period for analysis
4. Filter criteria for displaying the results
5. Link for data export

- Go to the **E-mobility** menu under **Configuration**.

  The **Statistics** (1) section shows the energy consumption from the grid and from photovoltaic production and the share of photovoltaic output resulting from both values in the total consumption used to charge the electric vehicles.

  In the **overview** (2), all charging operations per day and electric vehicle are shown in coloured bar charts over a selected period(3). Filter options (4) allow the displayed data to be limited in time and content.

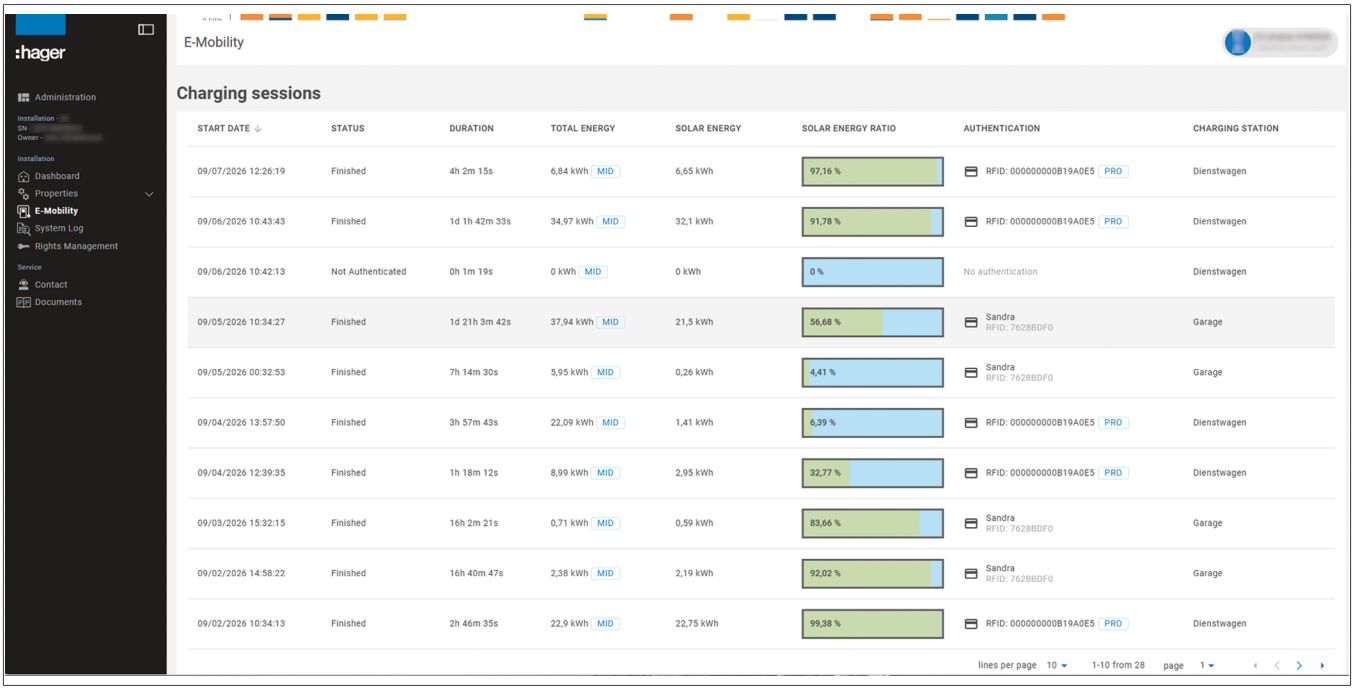



Fig. 84: Charging operations under **E-mobility**

Under **Charging operations**, all charging operations of the selected charging station completed in the selected time period are listed. For each charging operation:

- **Start date**
- **Status**
- **Charging duration**
- The total charged energy and the
- Ratio of solar power. This **solar ratio** is displayed as a percentage per charging operation and is highlighted in colour.
- In addition, there is information about **authentication** and the
- **charging station** that was used

- If necessary, export the filtered data (3) (4) via the link(5). The data must be downloaded in xlsx or csv format.

# 10 Visualisation for the customer

## 10.1 Dashboard

In the app/portal, the **dashboard** is the home page for the installation owner (customer) and provides an overview of the energy flows between the installation components, as well as status information and statistical values (see flow.hager.com)

### 10.1.1 flow animation

The flow animation shows the current energy flows in the house.

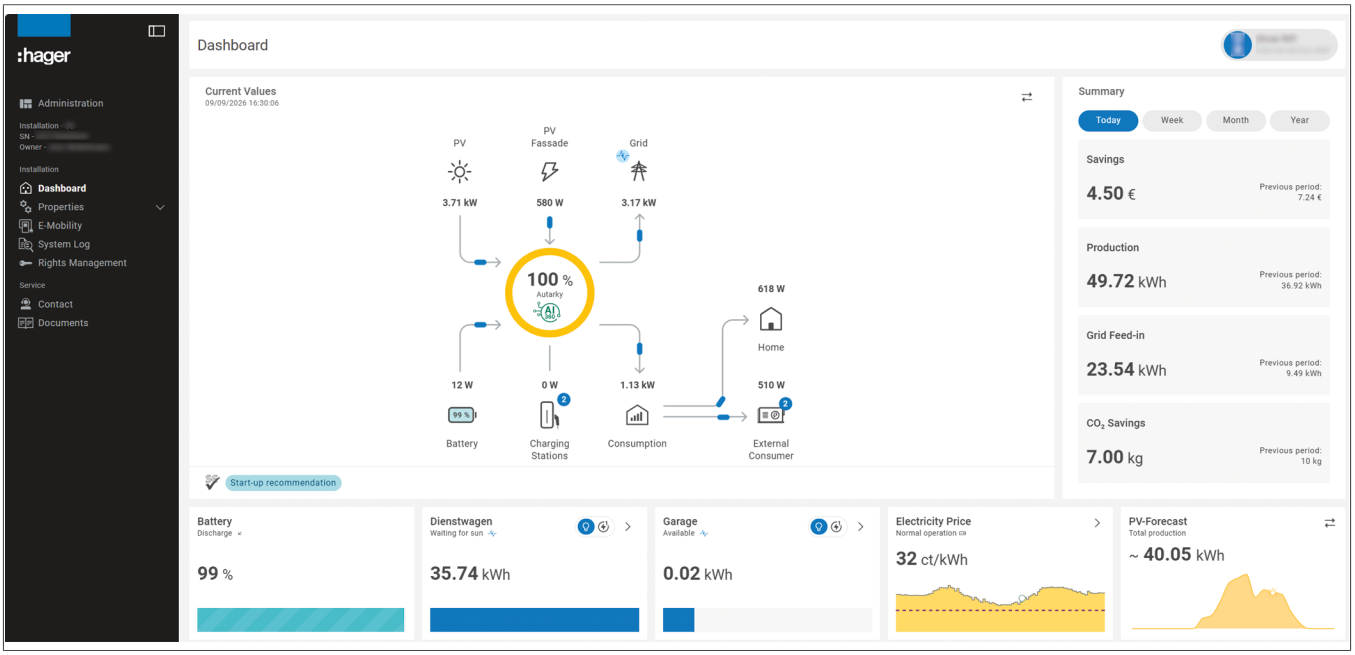



Fig. 85: Dashboard with flow animation

### 10.1.2 Widgets

**Widgets**

The widgets are located on the dashboard below Fig. 86 and to the right of the flow animation (Fig. 85). Widgets provide the operator with information, for example, on the **production** of PV power, the real-time **$CO_2$ saving** and the degree of self-sufficiency, as well as **electricity costs** (for supply from the grid) and electricity remuneration (for grid feed-in).

## 10.2 Energy diagrams



In addition to the widgets for the global overview, the dashboard also shows detailed statistics. By selecting a time interval, the user can review power logs and view forecasts.

## 10.2.1 Examples of statistics

For example, the user can view the following via statistical data:

- Power values (Fig. 86)
- Dynamic electricity tariffs (Fig. 87)

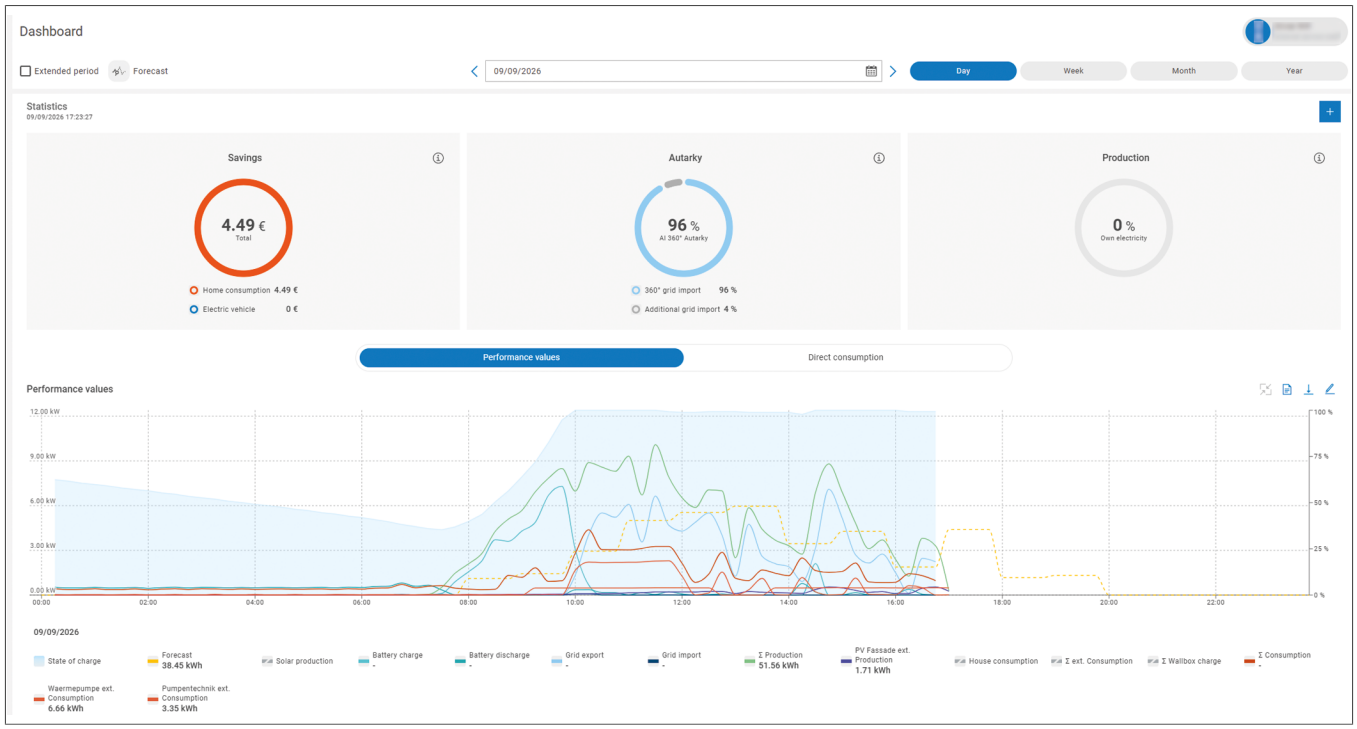



Fig. 86: Energy diagram — power values

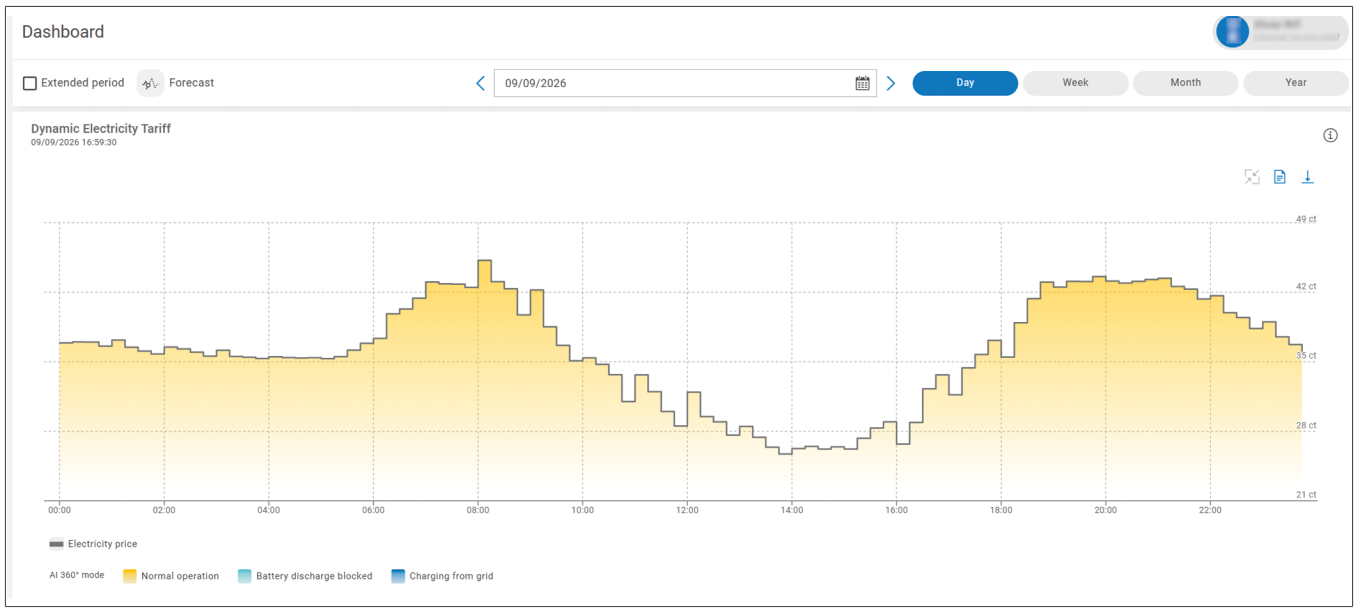



Fig. 87: Energy diagram — dynamic electricity tariffs

The owner of the installation can also create their own diagrams by individually compiling the data to be displayed from the available data points. This can be displayed as a line or bar chart.

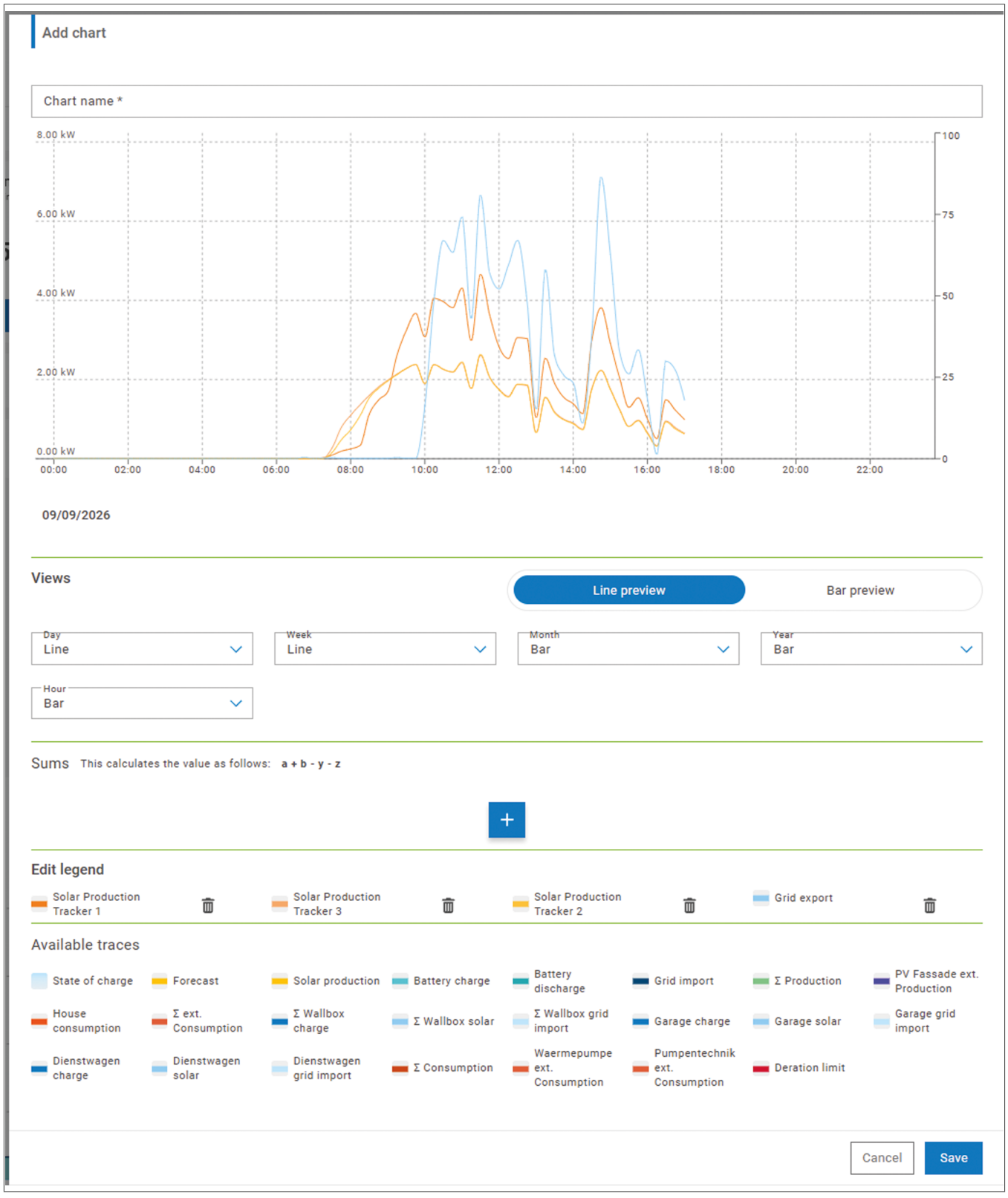



Fig. 88: Energy diagram — individual diagram creation

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2026-10

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