Operating manual

SUNNY HOME MANAGER 2.0
in Sunny Portal powered by ennexOS

ENGLISH

HM-20-ennexOS-BE-en-18 | Version 1.8

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The software licenses for the installed software modules (Open Source) are contained in the Sunny Home Manager software. Upon connecting the Sunny Home Manager with a web browser, you will find the licenses at the following address: http://###/legal_notices.txt, for example http://192.168.22.11/legal_notices.txt. The IP address (in this example, 192.168.22.11) will be assigned by your router for the Sunny Home Manager. You will find further information on determining the IP address in your router documentation.

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1 Information on this Document

1.1 Validity

This document is valid for:

- Sunny Home Manager 2.0 in Sunny Portal powered by ennexOS

1.2 Target Group

This document is intended for qualified persons and end users. Only qualified persons are allowed to perform the activities marked in this document with a warning symbol and the caption "Qualified person". Tasks that do not require any particular qualification are not marked and can also be performed by end users. Qualified persons must have the following skills:

- Training in how to deal with the dangers and risks associated with installing, repairing and using electrical devices and installations
- Knowledge of all applicable laws, regulations, standards, and directives
- Knowledge of and compliance with this document and all safety information

1.3 Levels of Warning Messages

The following levels of warning messages may occur when handling the product.

⚠ DANGER
Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING
Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION
Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE
Indicates a situation which, if not avoided, can result in property damage.

1.4 Symbols in the Document

Symbol	Explanation
	Information that is important for a specific topic or goal, but is not safety-relevant
☐	Indicates a requirement for meeting a specific goal
☑	Required result
✖	A problem that might occur.
	Example
⚠ QUALIFIED PERSON	Sections describing activities to be performed by qualified persons only

1.5 Typographies in the document

Typography	Use	Example
bold	• Messages • Terminals • Elements on a user interface • Elements to be selected • Elements to be entered	• Connect the insulated conductors to the terminals **X703:1** to **X703:6**. • Enter **10** in the field **Minutes**.
>	• Connects several elements to be selected	• Go to Settings > Date.
[**Button**] [**Key**]	• Button or key to be selected or pressed	• Select [**Enter**].
#	• Placeholder for variable components (e.g., parameter names)	• Parameter **WCtlHz.Hz#**

1.6 Designations in the Document

Complete designation	Designation in this document
Sunny Home Manager 2.0	Sunny Home Manager, product

1.7 Additional Information

For more information, please go to www.SMA-Solar.com.

Title and information content	Type of information
SMA SMART HOME - Compatibility list for the Sunny Home Manager 2.0	Technical Information
"SMA SMART HOME Load Control Using Relays or Contactors - Example: Heating Rod"	Technical Information
SMA FLEXIBLE STORAGE SYSTEM Increased Self-Consumption with Sunny Island and Sunny Home Manager	System description
"SUNNY PORTAL powered by ennexOS"	User Manual
"PUBLIC CYBER SECURITY - Guidelines for a Secure PV System Communication"	Technical Information
User information on the operation and features of the product	User information on the Sunny Portal user interface
Answers to frequently asked questions	FAQs in Sunny Portal and at Online Service Center

2 Safety

2.1 Intended Use

The Sunny Home Manager is the central product responsible for energy management in households with a photovoltaics (PV) system and battery-storage system for self-consumption. The Sunny Home Manager continuously records the solar power generated by the PV system and, if desired, ensures optimal use of the solar power by combining all suitable energy flows in the household to create an intelligent system and, upon request, control it automatically. Sunny Portal powered by ennexOS is used to operate and configure the Sunny Home Manager. The user can make all the required and desired settings here.

The Sunny Home Manager is not an energy meter for power consumption in the sense of the EU directive 2004/22/EG (MID). The Sunny Home Manager may not be used for billing purposes. The data collected by the Sunny Home Manager relating to the power generated by your PV system may deviate from the data of the main energy meter, which is used for billing purposes.

The Sunny Home Manager supports up to 26 devices and can actively control a maximum of 12 devices.
The Sunny Home Manager is not suitable for controlling life-sustaining medical devices. A power outage must not lead to personal injury. Loads connected to the Sunny Home Manager must have an CE, UKCA, RCM or UL identification label.

The Sunny Home Manager is approved for use in all EU member states, Great Britain, and Australia.

The type label must remain permanently attached to the product.

Environment

The product is designed for indoor use only.

The Sunny Home Manager may only be connected to the subdistribution of the household on the load side behind the energy meter of the electric utility company. The Sunny Home Manager must be installed in a switch cabinet or in a residential installation cabinet in the area of the additional applications intended for this as per VDE-AR-N 4100:2019-04 or the locally applicable installation regulations.

It is possible to use the Sunny Home Manager in delta IT grids. When using the Sunny Home Manager in delta IT grids, the cumulative power values are correctly measured. Due to the measuring principle of the Sunny Home Manager, other measured values may be incorrect.

Statutory warranty

The products by SMA Solar Technology AG are not suitable for use in

- Medical devices, in particular products for supplying life-support systems and machines,
- Aircraft, the operation of aircraft, the supply of critical airport infrastructure and airport systems,
- Rail vehicles, the operation and supply of rail vehicles and their critical infrastructure.

The above list is not exhaustive. Contact us if you are unsure whether products by SMA Solar Technology AG are suitable for your application.

Use SMA products only in accordance with the information provided in the enclosed documentation and with the locally applicable laws, regulations, standards and directives. Any other application may cause personal injury or property damage.

The documentation must be strictly followed. Deviations from the described actions and the use of materials, tools, and aids other than those specified by SMA Solar Technology AG are expressly forbidden.

Any use of the product other than that described in the Intended Use section does not qualify as appropriate.

The documentation supplied is an integral part of SMA products. Keep the documentation in a convenient, dry place for future reference and observe all instructions contained therein.

This document does not replace any regional, state, provincial, federal or national laws, regulations or standards that apply to the installation, electrical safety and use of the product. SMA Solar Technology AG assumes no responsibility for the compliance or non-compliance with such laws or codes in connection with the installation of the product.

2.2 IMPORTANT SAFETY INFORMATION

Keep the manual for future reference.

This section contains safety information that must be observed at all times when working.

The product has been designed and tested in accordance with international safety requirements. As with all electrical or electronical devices, some residual risks remain despite careful construction. To prevent personal injury and property damage and to ensure long-term operation of the product, read this section carefully and observe all safety information at all times.

⚠ DANGER

Danger to life due to electric shock when live components or cables are touched

High voltages are present in the conductive components or cables of the product. Touching live parts and cables results in death or lethal injuries due to electric shock.

- Disconnect the product from voltage sources and make sure it cannot be reconnected before carrying out any work on the product.
- Before carrying out any work on the product, disconnect the grid side from all voltage sources using the installed disconnect switch.
- Ensure that the conductors to be connected are de-energized.
- Clean the product with a dry cloth only.
- Only use the product in a dry environment and keep it away from moisture.
- Install the product in the switch cabinet only and ensure that the connection areas for the line conductors and the neutral conductor are behind a cover or have contact protection.
- Observe the prescribed minimum clearance between the network cable and live installation components, or use suitable insulation.

⚠ DANGER

Danger to life due to electric shock if external disconnect switch is missing

High voltages are present in the conductive components. Touching live parts results in death or lethal injuries due to electric shock.

- Install an external disconnect switch between the product and the grid-connection point. The external disconnector must be close to the product and easily accessible.
- Before carrying out any work on the product, disconnect the grid side from all voltage sources using the installed disconnect switch.

⚠ DANGER

Danger to life due to electric shock in case of overvoltages and if surge protection is missing

Overvoltages (e.g., in the event of a flash of lightning) can be further conducted into the building and to other connected devices in the same network via the network cables or other data cables if there is no surge protection. Touching live parts and cables results in death or lethal injuries due to electric shock.

- Ensure that all devices in the same network are integrated in the existing overvoltage protection.

⚠ WARNING

Danger of fire due to missing or incorrect fuse

If a fuse is missing or incorrect and a fault occurs, a fire may be caused. This can result in death or serious injury.

- Protect the line conductors of the product with a fuse or a selective circuit breaker with max. 63 A.

DHCP Server is recommended

The DCHP server automatically assigns the appropriate network settings to your nodes in the local network. A manual network configuration is therefore not necessary. In a local network, the Internet router is usually the DHCP server. If the IP addresses in the local network are to be assigned dynamically, DHCP must be activated in the Internet router (see the Internet router manual). In order to receive the same IP address by the internet router after a restart, set the MAC address binding.

In networks where no DHCP server is active, proper IP addresses must be assigned from the free address pool of the network segment to all network participants to be integrated during commissioning.

2.3 Cyber Security

Most operating activities such as monitoring and control of systems can be done locally by the PV system operator or service personnel without the need for data communication via public Internet infrastructure. These operating activities, including data communication between PV system operator/service personnel and data logger, inverter or additional equipment, can be accessed by using local displays, keypads or using local access of the webserver of a device in the LAN of the PV system or of the building.

In other use cases of systems, the PV systems are also part of the global communication system, which is based on Internet infrastructures.

The data communication via Internet is an up-to-date, economically viable and customer-friendly approach in order to enable easy access for the following modern applications such as:

- Cloud platforms (e.g., Sunny Portal powered by ennexOS)
- Smartphones or other mobile devices (iOS or Android apps)
- SCADA systems, which are remotely connected
- Utility interfaces for grid management services

Alternatively, selected and secured communication interfaces may be used. These solutions are no longer state of the art and are very expensive to use (special communication interfaces, separate wide area networks and more).

When using the Internet infrastructure, the systems connected to the Internet are entering a basically unsecure area. Potential attackers constantly seek vulnerable systems. Usually, they are criminally motivated, have a terrorist background or aim to disrupt business operations. Without taking any measures to protect systems and other systems from such misuse, a data communication system should not be connected to the Internet.

Communication between the SMA internet platform Sunny Portal powered by ennexOS and the Sunny Home Manager takes place via the Webconnect process as well as the HTTPS protocol, i.e., an authenticated and encrypted connection, and thus enables secure communication via the internet.

You can find the current recommendations of SMA Solar Technology AG on the topic of cyber security in the technical information "PUBLIC CYBER SECURITY - Guidelines for a Secure PV System Communication" at www.SMA-Solar.com.

3 Applications

3.1 Sunny Home Manager as energy meter

The Sunny Home Manager detects energy flows in both directions and can be used as the following applications:

- As a consumption meter
- As an energy meter for energy generators through, for example, continuous recording of the energy generated by the PV system
- As an energy meter to capture the grid-supplied power and export via bidirectional measurement at the point of interconnection

SMA offers the option to use the protocol interface SEMP at https://www.sma.de/produkte/sma-developer.html.

3.2 Sunny Home Manager in systems without self-consumption

3.2.1 Monitoring System of the Sunny Home Manager in Systems without Self-Consumption

The basic PV system status monitoring to confirm correct system performance analyzes all energy flows and indicates, or evaluates, these. Disturbances are communicated at an early stage via message. In this way, the product supports maximizing the power and profitability of PV systems, extending the service life of the system, and minimizing downtimes.

3.2.2 Limiting of the Active Power Feed-In in Systems without Self-Consumption

Local legal regulations, for example the Renewable Energy Sources Act (EEG) in Germany, can call for permanent limiting of the active power feed-in for your PV system. This means limiting the active power fed into the utility grid to a fixed value or a percentage of the installed nominal system power.

The Sunny Home Manager monitors the active power that is fed into the utility grid. If the active power feed-in exceeds the prescribed threshold, the Sunny Home Manager will limit the PV generation of the PV and hybrid inverters.

3.3 Sunny Home Manager in systems with self-consumption

3.3.1 Information about Self-Consumption

Self-consumption means that the energy produced by your PV system is consumed at the site where it is generated. Self-consumption reduces the amount of energy that you feed into the utility grid, but also the amount of energy that you purchase from your grid operator.

3.3.2 Monitoring and prognosis

The energy management system can create a PV generation forecast based on the location-based weather forecast. Furthermore, it is possible to create a load profile based on individual analysis of time-dependent energy consumption: The Sunny Home Manager makes recommendations for the judicious use of electrical energy. This enables the switching on and off of household loads (e.g., home appliances, heating, heat pumps, charging stations) in a targeted manner (see Section 11 "Load Control", page 54).
To learn the load profile, the consumption data should be available over a period of at least 2 weeks.

The forecast generated by the Sunny Home Manager is calculated from the estimated energy balance from generation and consumption for the next 48 hours.

3.3.3 Optimized self-consumption through load control

The Sunny Home Manager measures the power consumption of all connected loads and records both the power consumption and the usage time of a load. The Sunny Home Manager uses this individual load profile combined with the location-based weather forecast to support your increased self-consumption:

To control loads, there are the following options:

- Control of loads that do not communicate directly via switching devices such as radio-controlled sockets or relays, e.g. Modbus devices that control the SG Ready interface of loads. Indirectly communicating loads can be controlled via the device dashboard (or the Energy App).
- Control of directly communicating loads via the standard protocol interfaces EEBus or SEMP

The Sunny Home Manager automatically switches on home appliances that can be operated flexibly when PV energy is available.

3.3.4 Optimized self-consumption through dynamic active power limitation

Through forecast-based load control, the Sunny Home Manager ensures that even on sunny days, surplus energy that had to be curtailed due to limiting of the active power is rarely lost.

When using SMA battery inverters, the Sunny Home Manager prevents derating losses that can be caused by limiting the active power feed-in. Taking the PV generation forecast and the consumption forecast into account, the time and duration of battery charging are chosen so that the battery is charged when PV energy is available.

3.3.5 Increased self-consumption through forecast-based battery charging

The Sunny Home Manager increases the efficiency of your PV system by storing the excess energy generated during the midday peak, which is not allowed to be fed into the utility grid due to the active power limitation, in batteries. By means of the location-based weather forecast, the Sunny Home Manager can predict the solar irradiation for some hours to days and check whether derating losses due to the limitation of PV grid feed-in are to be expected for the current or following day. This means that in the afternoon of the current day only as much PV energy is charged to the battery as to ensure that, with the remaining battery charge, grid-supplied power at night and on the morning of the next day can be avoided. Any derating losses forecast for the following day are avoided by the free storage capacity of the more heavily discharged battery.

3.3.6 Increased Self-Consumption and Peak Load Shaving

In systems with SMA battery or hybrid inverters, the self-consumption portion can be additionally increased and more electricity costs saved by virtually distributing the total storage capacity of the battery between increased self-consumption and peak load shaving (multi-use).

- Increased self-consumption - through flexible use of the self-generated solar power stored in the battery at times when insufficient or no solar power is produced
- Peak load shaving - limitation of power consumption from the utility grid; any increased energy demand at certain times is drawn from the battery

4 Scope of delivery

Check the scope of delivery for completeness and any externally visible damage. Contact your distributor if the scope of delivery is incomplete or damaged.

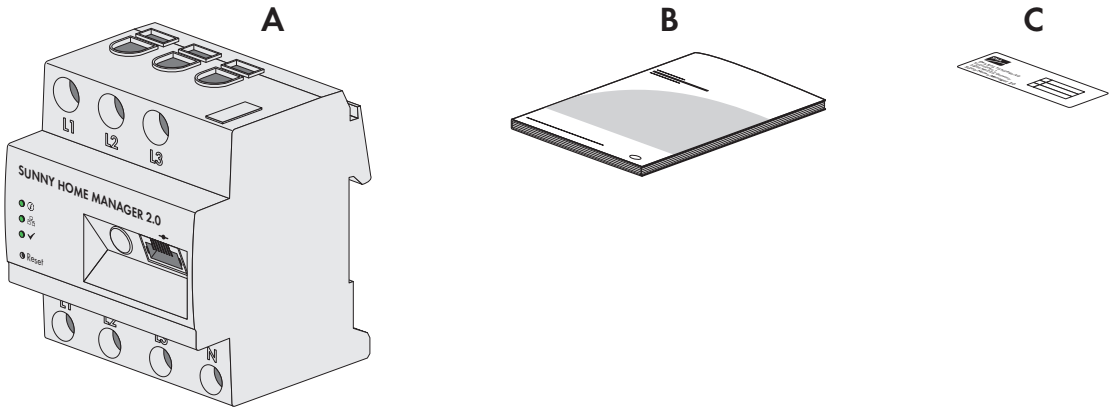


Figure 1: Components included in scope of delivery

Position	Quantity	Designation
A	1	Sunny Home Manager
B	1	Quick reference guide for commissioning
C	1	Label with serial number (SN), registration ID (RID) and identification key (PIC) for registration of the device by means of the setup assistant in the Sunny Portal

5 Product overview

5.1 Product Description

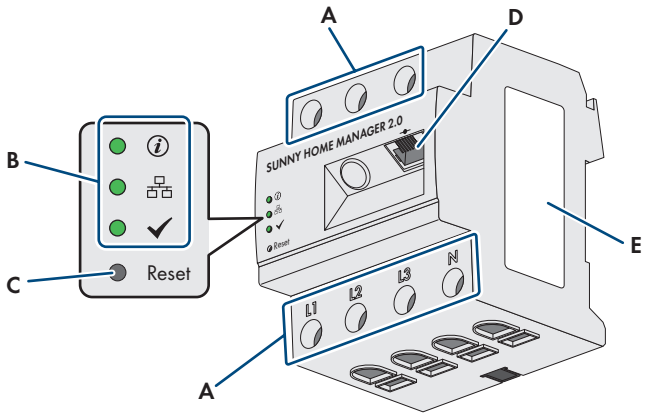


Figure 2: Sunny Home Manager 2.0

Position	Designation
A	Connection area for line conductors and neutral conductor
B	Light-emitting diodes
C	Reset button
D	Network terminal (Speedwire/Ethernet)
E	Type label The type label clearly identifies the product. The type label must remain permanently attached to the product. You will find the following information on the type label: • Assembly name • Hardware version (Version) • Serial number (SN) • Registration ID (RID) • Identification key (PIC) • MAC address (MAC)

5.2 Light-Emitting Diodes (LEDs)

The LEDs indicate the operating state of the product.

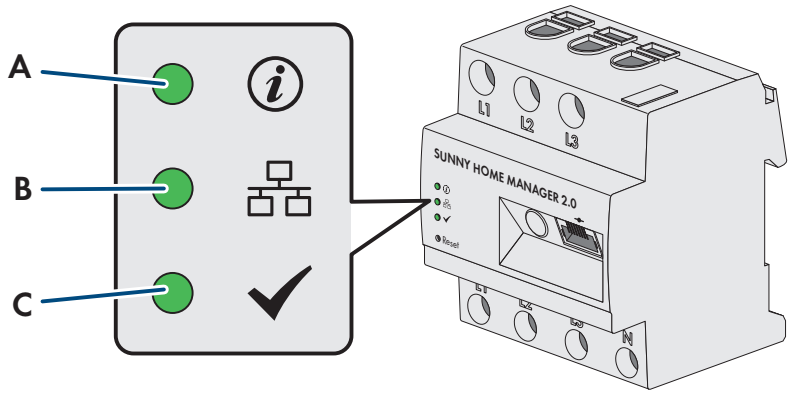


Figure 3: LEDs of the Sunny Home Manager

Position	LED symbol	Designation	Explanation
A		Status LED	Displays the operating state of the Sunny Home Manager (operation, startup process, error status)
B		COM LED	Displays the status of the Ethernet connection to the router
C		Performance LED	Displays the operating state, energy management, portal connection and error status.

5.3 Type Label

The type label clearly identifies the product. The type label is located on the side of the product and must remain permanently attached to the product. You will find the following information on the type label:

- Assembly name
- Hardware version (Version)
- Serial number (SN)
- Registration ID (RID)
- Identification key (PIC)
- MAC address (MAC)

You will require the information on the type label to use the product safely and when seeking customer support from Service Contact.

5.4 Symbols on the type label

Symbol	Explanation
	WEEE designation Do not dispose of the product together with the household waste but in accordance with the disposal regulations for electronic waste applicable at the installation site.
	Protection class II The product has a reinforced or double insulation between grid current circuit and output voltage.

Symbol	Explanation
	Qualified person The product may only be installed by a qualified person.
	CE marking The product complies with the requirements of the applicable EU directives.
	RCM (Regulatory Compliance Mark) The product complies with the requirements of the applicable Australian standards.
	Data matrix code 2D code for device-specific characteristics

5.5 Sunny Home Manager operating states

The operating states can be read out via the LEDs on the device (see Section 5.2 "Light-Emitting Diodes (LEDs)", page 17). The following statuses can be displayed:

LED	Status	Explanation
Status LED	Off	The Sunny Home Manager is switched off.
	glowing green	Sunny Home Manager is switched on.
	flashing green	The firmware is being updated.
	glowing red	Sunny Home Manager is starting.
	flashing red	No connection to Sunny Portal powered by ennexOS.
COM LED	Off	No Ethernet connection.
	glowing green	Ethernet connection is established.
	flashing green	Sunny Home Manager is sending or receiving data.
Performance LED	Off	Sunny Home Manager is not registered in Sunny Portal powered by ennexOS.
	glowing green	Energy management in Sunny Home Manager is running smoothly.
	flashing green	An error has occurred. The error was already reported to Sunny Portal powered by ennexOS.
	glowing red	An error has occurred. The error was not yet reported to Sunny Portal powered by ennexOS.
	flashing red	No connection to Sunny Portal powered by ennexOS.

More than one LED can be illuminated. The following statuses can be displayed:

LED	Status	Explanation
Status LED	glowing green	There is a connection to Sunny Portal powered by ennexOS, and the registration in the Portal has already been executed.
Performance LED	glowing green	

LED	Status	Explanation
Status LED	glowing green	There is a connection to Sunny Portal powered by ennexOS, but the Sunny Home Manager must still be registered in the Portal.
Performance LED	Off	
Status LED	flashing red	The Sunny Home Manager cannot establish the connection to Sunny Portal powered by ennexOS automatically.
Performance LED	flashing red	

5.6 Components for Systems with Sunny Home Manager

5.6.1 Requirements for Operating the Sunny Home Manager

The following components are required for operating the Sunny Home Manager:

☐ Internet access via router

☐ PC with web browser

☐ Sunny Portal powered by ennexOS account

5.6.2 Operation of a PV system with SMA inverters

The Sunny Home Manager organizes the electricity generated by the PV system and provided by inverters within the loads in the household. The Sunny Home Manager regulates the feed-in of the residual current into the utility grid at the point of interconnection.

Inverters can communicate in two different ways with the Sunny Home Manager:

- Wired via SMA Speedwire/Ethernet

  The inverter must be connected to the local network via a network cable (e.g., via a router).

- Wireless via SMA Speedwire/Wi-Fi

  The Sunny Home Manager does not have its own a Wi-Fi connection, however it can communicate with all devices connected to the same router.

The Sunny Home Manager supports all inverters with integrated or retrofitted Speedwire interface of SMA Solar Technology AG. The inverters must have the current firmware version in each case (see the inverter product page at www.SMA-Solar.com).

5.6.3 Components for the control of loads

At least one of the following compatible components must be present to control loads:

☐ Indirectly communicating load (switching device)

☐ Intelligent, directly communicating load

Component:

Component for control	Explanation
Indirectly communicating load (e.g. radio-controlled socket, relay or Modbus device)	Devices without a communicating data connection can be integrated into the energy management system via a switching device and controlled by the Sunny Home Manager. Load planning can be configured and monitored via Sunny Portal powered by ennexOS.
Intelligent, directly communicating load	To control a load that communicates directly, this load must have an EEBus or SEMP interface that is compatible with the Sunny Home Manager.

SMA offers the option to use the protocol interface SEMP at https://www.sma.de/produkte/sma-developer.html.

6 System Structure

6.1 System Requirements

- ☐ SMA recommends a permanent internet connection (flat rate) and the use of a router that supports the dynamic assignment of IP addresses (DHCP – dynamic host configuration protocol).
- ☐ All network components used must support the IGMP protocol, minimum version 3 (IGMPv3).
- ☐ If Ethernet network switches are used in the system, make sure that they do not perform IGMP snooping and cause deactivation.
- ☐ Using media couplers such as powerline adaptors can cause transmission problems. These can usually be activated for multicast operation via a firmware update from the manufacturer.

6.2 System Topology

The Sunny Home Manager must be installed behind the meter and the input fuse of the grid operator and in front of the first distributor in the house. SMA recommends using the Sunny Home Manager for measuring at the point of interconnection. As a bidirectional device, the Sunny Home Manager measures both the grid-supplied power and the grid feed-in at the point of interconnection.

The Sunny Home Manager receives the measured data for PV generation, grid feed-in, and grid-supplied power via the integrated measuring device directly from the connected SMA inverters or a separate, optionally connected SMA Energy Meter.

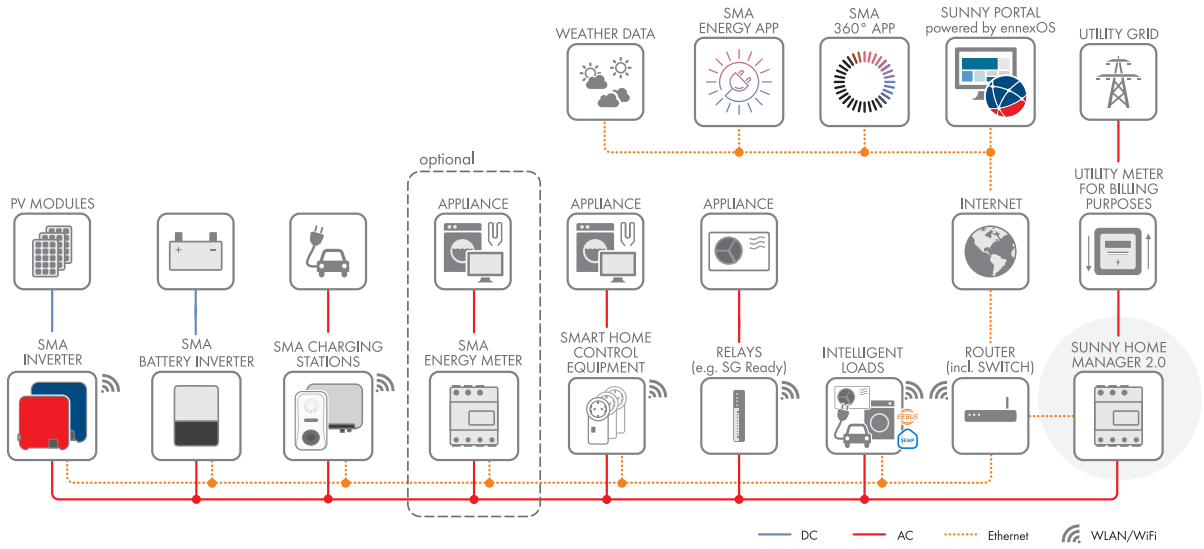

WEATHER DATA
SMA ENERGY APP
SMA 360° APP
SUNNY PORTAL powered by ennexOS
UTILITY GRID
optional
PV MODULES
APPLIANCE
APPLIANCE
APPLIANCE
INTERNET
UTILITY METER FOR BILLING PURPOSES
SMA INVERTER
SMA BATTERY INVERTER
SMA CHARGING STATIONS
SMA ENERGY METER
SMART HOME CONTROL EQUIPMENT
RELAYS (e.g. SG Ready)
INTELLIGENT LOADS
ROUTER (incl. SWITCH)
SUNNY HOME MANAGER 2.0
DC
AC
Ethernet
WLAN/WiFi

Figure 4: Operation of the PV system with SMA inverters

7 Mounting

7.1 Requirements for mounting

- ☐ The mounting location must be indoors.
- ☐ The Sunny Home Manager must be installed in a switch cabinet.
  The short-circuit current (circuit distributor or subdistributor) must not exceed 6 kA.
- ☐ The installation site must be protected against dust, moisture, and hazardous substances.
- ☐ The cable route from the mounting location to the router must not exceed a maximum length of 100 m.
- ☐ A minimum distance of 1 m must be maintained from devices using the 2.4 GHz radio spectrum (e.g. WLAN devices, microwave ovens). This will prevent reduced connection quality and data transmission speed.
- ☐ The ambient conditions at the mounting location must be suitable for the operation of the Sunny Home Manager (see Section 16 "Technical Data", page 85).

7.2 Mounting the Sunny Home Manager on the Top-Hat Rail

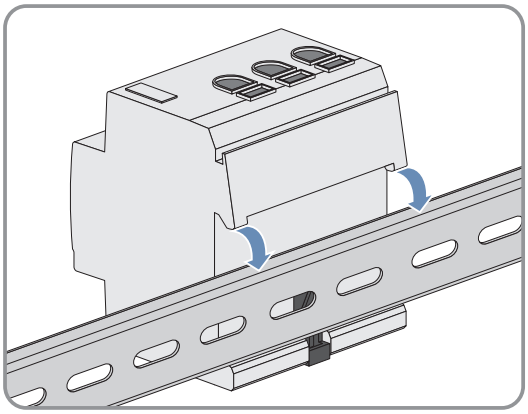
⚠ QUALIFIED PERSON

Requirement:

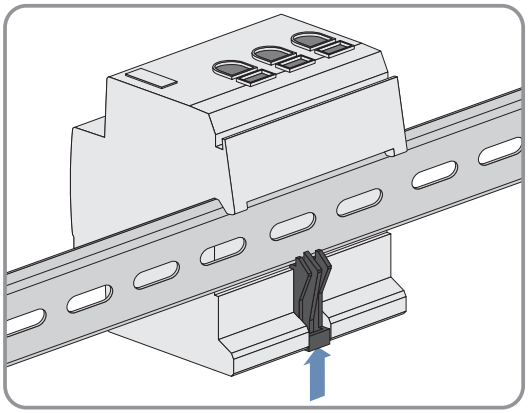
- ☐ The top-hat rail must be securely mounted in the switch cabinet.

Procedure:

1. Press the Sunny Home Manager with the upper retainers into the upper edge of the top-hat rail.



2. Hook the lower retainers into the lower edge of the top-hat rail.



8 Connection

8.1 Safety during Electrical Connection

⚠ WARNING

Risk of fire due to dirty or oxidized contact surfaces of live aluminum conductors

Connecting dirty or oxidized contact surfaces with aluminum conductors reduces the ampacity of the live terminals, thereby increasing the transition resistances. This can cause components to overheat and catch fire.

- The contact surfaces are to be cleaned, brushed, and treated with acidic and alkaline substances (e.g. petroleum jelly or special thermal grease).

8.2 Connecting the Voltage Supply

8.2.1 Requirements for connecting the voltage supply

Requirements:

☐ The setpoints of the electric utility company must be observed.

☐ The product can be operated single-phase or three-phase (see Section 8.2.3 "Connecting the Voltage Supply up to 63 A", page 25).

☐ When using fine stranded conductors, bootlace ferrules must be used.

8.2.2 Requirements for the Cable of the Voltage Supply

☐ Conductor cross-section for measurements up to 63 A: 10 mm² to 25 mm²

☐ Conductor cross-section with current transformer: at least 1.5 mm², for more information see recommendations of the current transformer manufacturer

8.2.3 Connecting the Voltage Supply up to 63 A

8.2.3.1 Connecting the Voltage Supply

1. Disconnect the connection point from voltage sources and make sure it cannot be reconnected.
2. In three-phase utility grids: Connect the line conductors L1, L2, L3 and the neutral conductor N to the screw terminals at the inlet of the Sunny Home Manager (see Section 8.2.3.2 "Connecting the Voltage Supply up to 63 A in Three-Phase Utility Grids", page 26).
3. In single-phase utility grids: Connect the line conductor L1 and the neutral conductor N to the screw terminals at the inlet of the Sunny Home Manager (see Section 8.2.3.3 "Connecting the Voltage Supply up to 63 A in Single-Phase Utility Grids", page 27).
4. In delta IT utility grids: Connect the line conductors L1, L2, and L3 to the screw terminals at the inlet of the Sunny Home Manager. Also connect the line conductor L3 to the neutral conductor N (see Section 8.2.3.4 "Connecting the Voltage Supply up to 63 A in Delta IT Utility Grids", page 27).
5. In split-phase utility grids: Connect the line conductors L1 and L2 and the neutral conductor N to the screw terminals at the inlet of the Sunny Home Manager.
   Open each screw terminal using a cross-head screwdriver, insert the conductor into the contact terminal and tighten the screw (torque: 2.0 Nm).

8.2.3.2 Connecting the Voltage Supply up to 63 A in Three-Phase Utility Grids

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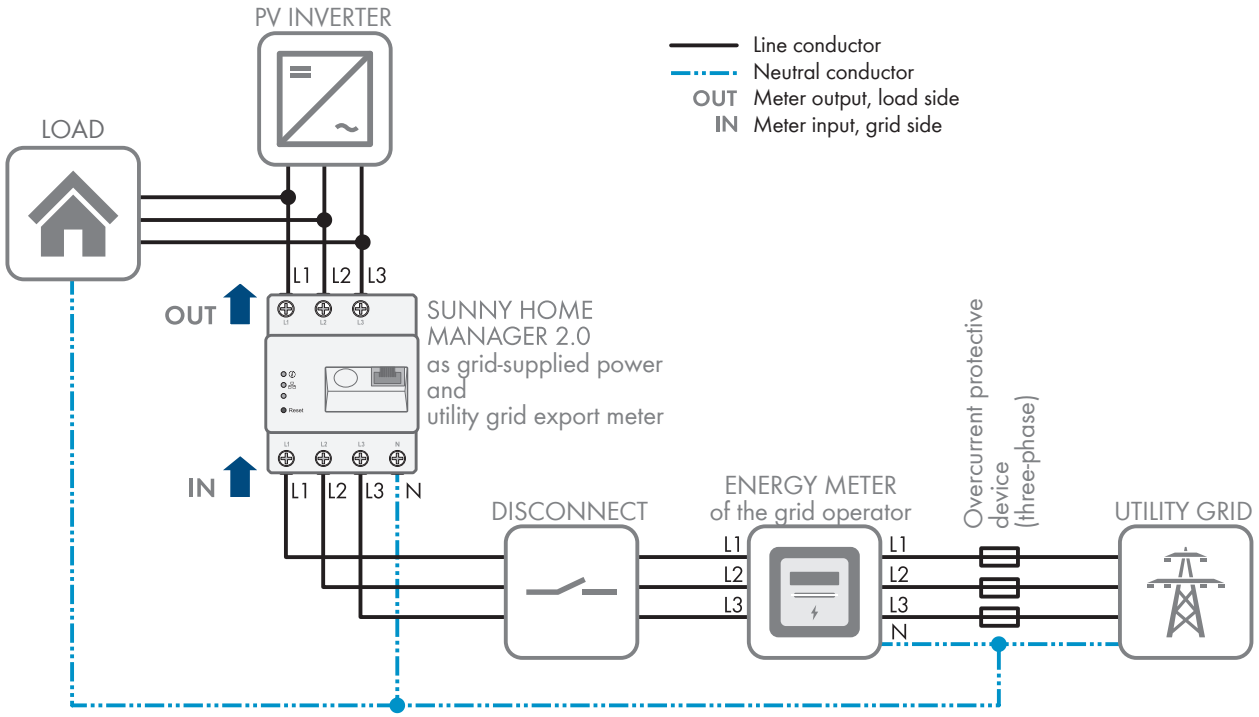

Figure 5: Connection example in three-phase TN and TT utility grids in the case of installation at the point of interconnection when using the integrated measuring unit.

8.2.3.3 Connecting the Voltage Supply up to 63 A in Single-Phase Utility Grids

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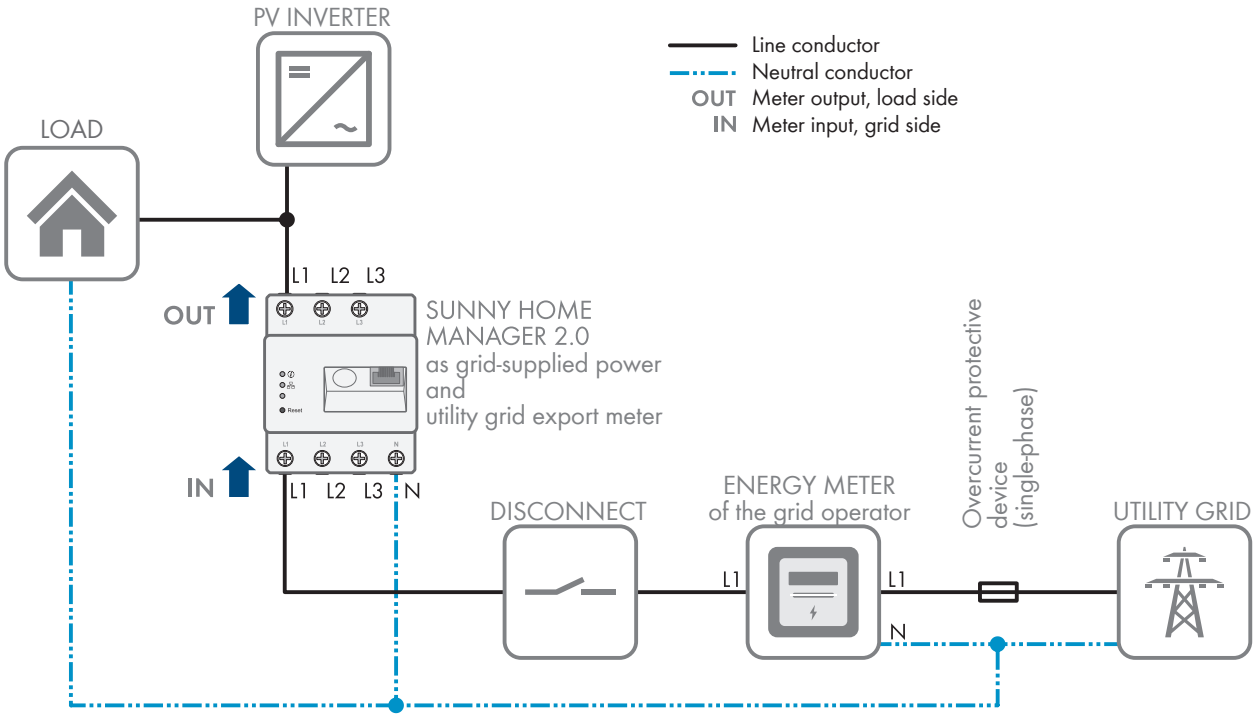

Figure 6: Connection example in single-phase TN and TT utility grids in the case of installation at the point of interconnection when using the integrated measuring unit.

8.2.3.4 Connecting the Voltage Supply up to 63 A in Delta IT Utility Grids

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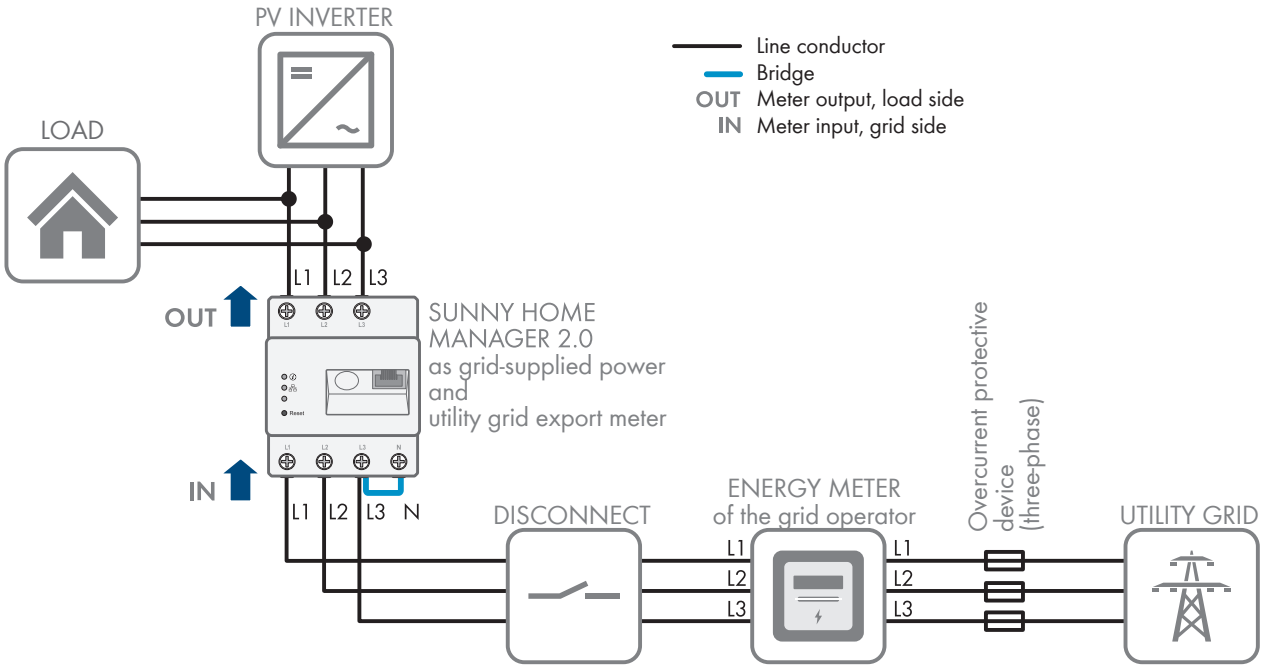

Figure 7: Connection example in delta IT, TN and TT utility grids in the case of installation at the point of interconnection when using the integrated measuring unit.

8.2.3.5 Connecting the Voltage Supply up to 63 A in Split-Phase Utility Grids

⚠ QUALIFIED PERSON

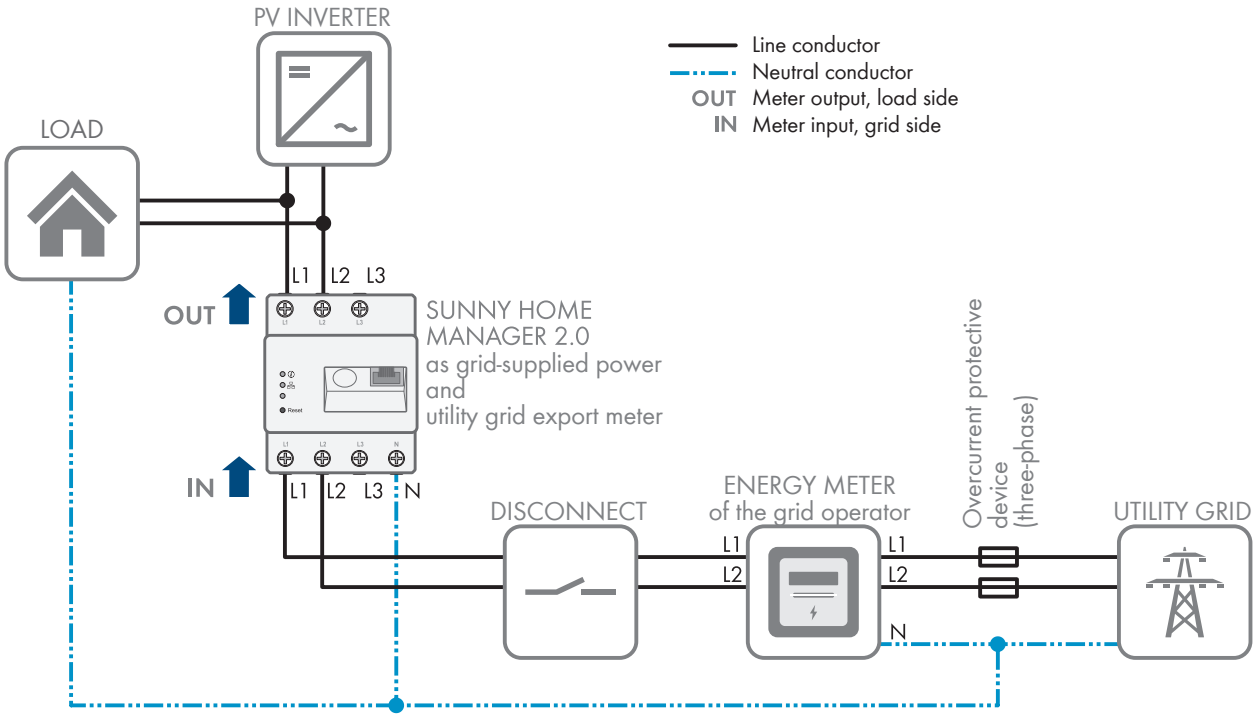

Figure 8: Connection example in split-phase (single-phase three-wire system) TN and TT utility grids in the case of installation at the point of interconnection when using the integrated measuring unit.

8.2.4 Connecting the Voltage Supply greater than 63 A

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Current transformers must be installed for a voltage supply > 63 A.

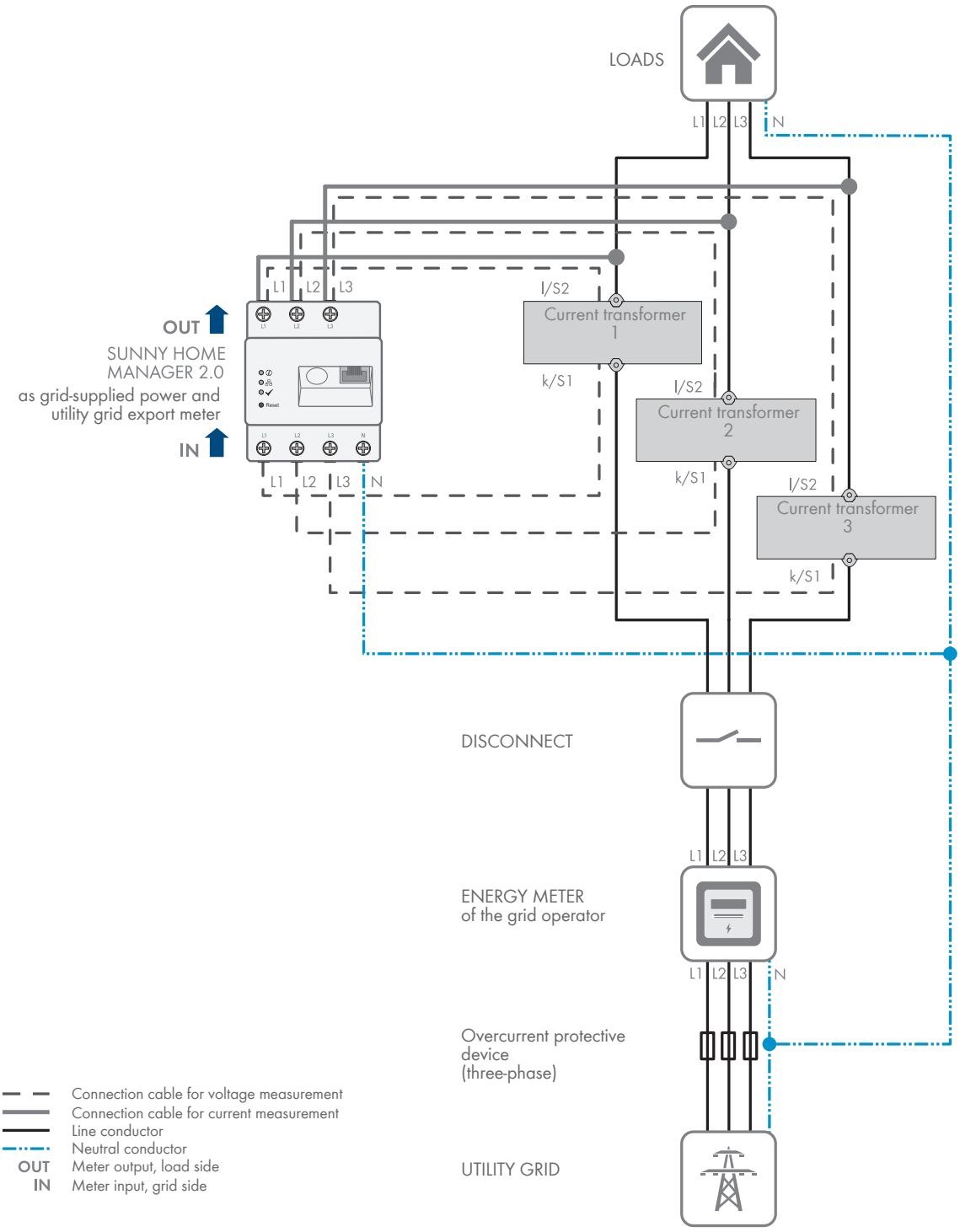

Figure 9: The following figure shows a connection example in three-phase TN and TT utility grids in the case of installation at the point of interconnection.

Additionally required material (not included in the scope of delivery):

☐ 3 x current transformers (recommendation: 5 A secondary current, accuracy class at least 1). Current transformers must be installed for a voltage supply > 63 A.

☐ Connection cables for current transformers (per datasheet of current transformer).

Procedure:

1. Disconnect the connection point from voltage sources and make sure it cannot be reconnected.
2. Connect one current transformer to each line conductor L1, L2 and L3.
3. On each current transformer, connect 1 connection cable for secondary current measurement to terminals k/S1 and l/S2.
4. Connect the connection cables for current measurement to the screw terminals L1, L2, and L3 of the Sunny Home Manager. To do this, open each screw terminal using a cross-head screwdriver, insert the conductor into the contact terminal and tighten the screw using a cross-head screwdriver (torque: 2.0 Nm).
5. Connect the connection cables for voltage measurement to the screw terminals L1, L2 and L3 at the output of the Sunny Home Manager. To do this, open each screw terminal using a cross-head screwdriver, insert the conductor into the contact terminal and tighten the screw using a cross-head screwdriver (torque: 2.0 Nm).
6. Connect the connection cables for voltage measurement L1, L2 and L3 (solid gray line) to the corresponding line conductors L1, L2 and L3.

8.3 Connection for Unidirectional Use

⚠ QUALIFIED PERSON

If you do not want to use the Sunny Home Manager as a bidirectional device, which is the standard mode of operation, but rather will choose only one of its two functions, the connection must be selected accordingly. You have the following options here:

- Connection exclusively for measurement of PV generation power.
- Connection exclusively for measurement of grid exchange capacity (see Section 8.3.1 "Connection for Measurement of Grid Exchange Capacity", page 30).

8.3.1 Connection for Measurement of Grid Exchange Capacity

If the product will be connected exclusively for measurement of grid exchange capacity:

1. Open the screw terminals at the inlet of the Sunny Home Manager.
2. Connect the line conductor L1 and the neutral conductor to the screw terminals with a cross-head screwdriver, 2.0 Nm.

8.4 Connecting Modbus Device Moxa E1214

The Modbus device Moxa E1214 can fulfill 2 functions:

- Limit the feed-in power via ripple control receivers (see Section 9.4.2 "Activating or Deactivating the Specifications of the Grid Operator via Local Interfaces", page 36).
- Control SG-ready devices such as heat pumps.

Procedure:

1. Prior to the installation, perform a factory reset of the Moxa E1214 (see manufacturer manual).
2. Disconnect the connection point from voltage sources and make sure it cannot be reconnected.

3. Connect devices to Moxa E1214. To do this, refer to the table below and to the device documentation.
4. Set the appropriate Modbus profile for the Modbus device in Sunny Portal powered by ennexOS.

Component	Use	Connection to Moxa E1214	Modbus profile
Ripple control receiver Only 1 terminal may be active.	Limitation 0%	DI0 + GND	MOXA1214_PLimit
	Limitation 30%	DI1 + GND	MOXA1214_PLimit
	Limitation 60%	DI2 + GND	MOXA1214_PLimit
	Limitation 100%	DI3 + GND	MOXA1214_PLimit
SG-ready device	Open-loop control	R0_NO + R0_C	MOXA1214 or MOXA1214_PLimit

8.5 Establishing Communication to Sunny Portal Powered by ennexOS

8.5.1 Preparing the Speedwire Communication

8.5.1.1 Requirements for Speedwire Communication

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Inverter with Webconnect function

If an inverter is already registered in Sunny Portal powered by ennexOS with the Webconnect function, the inverter cannot be added to the Sunny Home Manager system in Sunny Portal powered by ennexOS.

- In order to be able to add the inverter to the Sunny Home Manager system in Sunny Portal powered by ennexOS, delete the inverter with Webconnect function from the Webconnect system in Sunny Portal powered by ennexOS, or deactivate data reception for the inverter in the Webconnect system in Sunny Portal.

- If the Sunny Home Manager is to communicate with other SMA devices via SMA Speedwire (Ethernet), the Sunny Home Manager and the Speedwire devices must be in the same local network.
- Only one system with Sunny Home Manager may be installed in the local network. If there are several systems with SMA devices, these must be separated from each other in the network, for example by using sub-networks.
- DHCP must be active on the router (see router documentation).
- It must be possible for the outgoing router connections to reach all Internet destinations (target IP, target port). If there is a firewall installed on the router, you might have to adjust the firewall settings.
- On the router with Network Address Translation), no port forwarding must be entered. Potential communication problems can thus be prevented.
- There must be no packet filtering or manipulation for SIP packets installed on the router.
- The routers and network switches with router function must forward the Multicast telegrams (telegrams with destination address 239.0.0.0 to 239.255.255.255) required for the Speedwire connection to all nodes of the Speedwire network.
- All network components used must support the IGMP protocol, minimum version 3 (IGMPv3) (see network component documentation).

8.5.1.2 Establishing Speedwire Communication

⚠ QUALIFIED PERSON

- Connect the Speedwire devices to the router (see Speedwire device documentation).

8.5.2 Network cable requirements

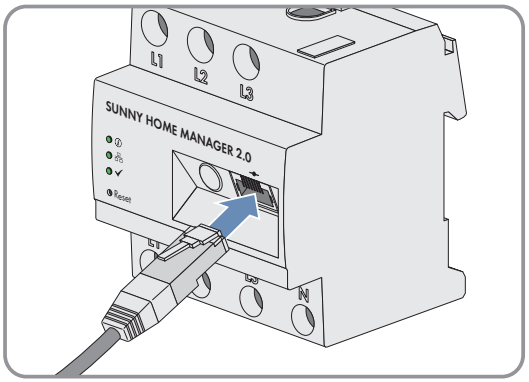
To be able to connect the Sunny Home Manager to the router, you also need **1 network cable** that meets the following requirements:

- ☐ Cable type: 100BaseTx
- ☐ Cable category: minimum CAT5e
- ☐ Plug type: RJ45 of Cat5, Cat5e or higher
- ☐ Shielding: S/UTP, F/UTP or higher
- ☐ Number of insulated conductor pairs and insulated conductor cross-section: at least 2 x 2 x 0.22 mm^2
- ☐ Maximum cable length between 2 nodes when using patch cables: 50 m
- ☐ Maximum cable length between 2 nodes when using installation cables: 100 m
- ☐ UV-resistant if installed outdoors

8.5.3 Connecting the Sunny Home Manager to the Router

⚠ QUALIFIED PERSON

1. Connect the network cable to the network terminal of the product.
2. Connect the other end of the network cable to the router.



9 Creating a Sunny Home Manager System in Sunny Portal Powered by ennexOS

9.1 Requirements for Establishing Connection

The Sunny Home Manager automatically establishes a connection to Sunny Portal powered by ennexOS and indicates this via the status display of the LEDs (see Section 5.5 "Sunny Home Manager operating states", page 18).

Requirements:

- ☐ The Sunny Home Manager must be supplied with voltage.
- ☐ The Sunny Home Manager must be connected to the router.
- ☐ DHCP must be active for the router (see router manual). If your router does not support DHCP, you can configure the static network settings on the Sunny Home Manager using the Sunny Home Manager Assistant.

9.2 Requirements for creating a Sunny Home Manager system in Sunny Portal powered by ennexOS

Even if you already have a PV system in which you want to integrate a Sunny Home Manager, you have to create a new system.

Only after the Sunny Home Manager has been registered, can other devices in the system be detected or further devices integrated.

In order to be able to transfer the devices of the previous system to the new Sunny Home Manager system, you must first deactivate these devices (usually at least 1 inverter) in the old system. Then you can add the devices to the new system.

If you already have a Webconnect system in Sunny Portal Classic, you have to create a new system in Sunny Portal ennexOS.

The devices can be accepted in Sunny Portal powered by ennexOS, and a Sunny Home Manager can also be added to this system.

Service access and assistance with problems

To ensure a better quality of service, activate the switch for service access during registration. Indicate which role you have in the system. With this information, we will be able to offer you additional services such as SMA Smart Connected, and contact the correct persons in the event of problems.

If you have already registered or re-entered the Sunny Home Manager in Sunny Portal Classic, the product can no longer be registered in Sunny Portal powered by ennexOS.

- ☐ Registration as a new user in Sunny Portal powered by ennexOS is complete (see operating manual of Sunny Portal powered by ennexOS).
- ☐ You must have the user role **Installer** or **System Administrator** in Sunny Portal powered by ennexOS.
- ☐ The registration ID (RID) and the identification key (PIC) of the type label of the Sunny Home Manager or of other provided labels must be available.
- ☐ All devices in the local network must be in operation and connected to the Sunny Portal via an Internet router.
- ☐ The status LED must glow green and the performance LED must be off on the Sunny Home Manager.
- ☐ The inverters in your system must have been commissioned as subordinate devices.

9.3 Creating a Sunny Home Manager System in Sunny Portal Powered by ennexOS

1. Select the [**Create System**] menu item under **Configuration**.
2. Depending on the application, select [**Create System**], [**Sunny Design Project**], or [**Data transfer from an existing Sunny Portal system**].
3. Select [**Continue**] to confirm.
   ☑ The system setup assistant opens and guides you through all the steps.

9.4 Special Notes Regarding Configuration of a Sunny Home Manager System in Sunny Portal Powered by ennexOS

9.4.1 Configuring Limitation of Active Power Feed-In

9.4.1.1 Information Regarding Limiting of the Active Power Feed-In

The parameter **Operating mode active power setting** must be set to **Active power limitation P via system control** or to **External specification via communication** for the inverters.

When using a Moxa device with ripple control receiver, in the Modbus configuration, the profile **MOXA1214_PLimit** must be selected.

NOTICE

Responsibility of the system operator for limitation of active power feed-in

The system operator is responsible for the accuracy of the information on limiting the active power feed-in and the nominal system power.

- Ask your grid operator beforehand whether you are permitted to use the Sunny Home Manager to limit active power feed-in (Manufacturer's Declaration "Feed-In Management in Accordance with the Renewable Energy Sources Act (EEG) 2012 with Sunny Home Manager (SHM) from SMA" available at www.SMA-Solar.com).
- Set the limitation of active power feed-in required by the grid operator. If you are not sure about this, contact your grid operator.
- Ensure you have correct information on the nominal PV system power. If you extend the system, adjust the value for the nominal PV system power accordingly.

ⓘ Ensure that your feed-in meter complies with the requirements.

If your grid operator only allows a certain active power feed-in into the utility grid, the Sunny Home Manager can monitor and fulfill this requirement by reducing the PV generation of the inverters when the specified limit is exceeded. This takes into account that in times when your PV system generates a lot of PV power, which is also used directly by loads - household appliances or a battery that is being charged - a PV power higher than the feed-in limitation is allowed regardless (dynamic active power limitation).

In addition to the dynamic limitation of PV generation, the Sunny Home Manager can also use intelligent energy management to ensure that loads in the household are switched on at precisely those times when so much PV energy is available that the feed-in limit will be reached. If switching on a load means that more power is consumed directly in the household, the PV generation must not be reduced by as much or must not be reduced at all.

For the function **Limiting of the active power feed-in**, at least one measurement at the point of interconnection is required.

If there are several external specifications, the smallest value is used.

9.4.1.2 Example of Limiting of the Active Power Feed-In to 70%

Limitation of the active power feed-in to 70% of the nominal PV system power

Due to high levels of solar irradiation, the system (system size: 10 kWp / feed-in limit: 7 kW) can currently produce 90% of the nominal PV system power.

- 20% of the nominal PV system power is currently being consumed by loads in the household. The remaining amount of 70% of the nominal PV system power is being fed into the utility grid.
  No limitation of PV generation is required.
- A load is switched off and only 10% of the nominal PV system power is consumed in the household. As a result, 80% of the nominal system power is available for feed-in to the utility grid – more than allowed.
  The Sunny Home Manager reduces PV generation from the theoretically possible 90% of nominal PV system power to 80%. 70% of the nominal PV system power continues to be fed into the utility grid.

A **Limiting of the active power feed-in** can be entered as follows:

- Limitation to a fixed value of the nominal system power in kW (setting range: 0 kW to 0.99 x nominal system power kW)
  If there is also a limit due to external setpoints in addition to this setting, the limit is set to the smallest value.
- Limitation to a percentage of the nominal system power (setting range: 0% to 99%)
  If there is also a limit due to external setpoints in addition to this setting, the limit is set to the smallest value.
- Zero export – blocks grid feed-in into the utility grid (setting: 0% or 0.000 kW of the nominal system power). Due to control cycle times, an inevitable remaining quantity of energy might nevertheless be fed into the utility grid.

If a battery or hybrid inverter is part of your system, after a defined limit of the nominal system power (< 10 % of or the corresponding kW value of the system power) is set, you can include the battery or hybrid inverter in the energy management and use the surplus energy to charge the battery-storage system.

You can use a function test to check the limitation of the active power feed-in:

- In the **Limitation of active power feed-in** section, click on the option button **max. xx kW** and enter the value **0**. Thus, the Sunny Home Manager immediately limits the active power when the inverters starts feeding into the utility grid.

Supported inverters for the limitation of the active power feed-in to 0%

The limitation of the active power feed-in to 0% is only supported by inverters that support the fallback function. In the event of a communication failure between the Sunny Home Manager and the inverter, the inverter reverts to an output power of 0 watts. For more information see the inverter manual at www.SMA-Solar.com.

Monitoring of the PV system and the dynamic limitation of the active power fed into the utility grid are not possible with inverters from other manufacturers. In this case, verify whether operation of the PV system without dynamic active power limitation is permitted in the given country, or whether dynamic active power limitation can be performed independently by the inverter itself.

9.4.1.3 Configuring Limitation of Active Power Feed-In

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1. Select the menu item **Grid management services** under **Configuration** and go to **User-defined limitation of the active power**.
2. Configure the settings from the table (see Section 9.4.1.4 "Requirements for Limiting of the Active Power Feed-In", page 36) based on requirements.
3. [**Save**] the settings.

The data is being transferred. This can take up to 5 minutes. In the page and menu selection **Energy balance > Day**, the specified limitation of active power feed-in is displayed as a dotted red line in the diagram **Generation**.

9.4.1.4 Requirements for Limiting of the Active Power Feed-In

Observe the following requirements for the configuration of the limiting of the active power feed-in (see Section 9.4.1.3 "Configuring Limitation of Active Power Feed-In", page 35):

Requirements	Setting
The grid operator requires a limitation to a percentage of the nominal system power.	Select **% of PV array power** and enter the required percentage.
The grid operator requires a limitation to a maximum active power in kW.	Select **max. xx kW** and enter the maximum permitted active power in kW.
The grid operator requires limiting of the active power feed-in to 0% or 0 kW ("zero export").	Select the option button **Zero Export**.

If you have activated the zero export function, also observe:

Requirements	Setting
If your system has a battery or hybrid inverter, and you have set the nominal system power to a correspondingly low value, you can use the surplus energy to charge the battery-storage system.	Activate **Including the battery inverter**.

9.4.2 Activating or Deactivating the Specifications of the Grid Operator via Local Interfaces

⚠ QUALIFIED PERSON

As part of grid management services, it may be necessary to implement grid operator specifications for active power limitation and for reactive power feed-in in your PV system. The Sunny Home Manager can receive these specifications via Ethernet-based communication. The grid operator can set up this link. The specifications of the grid operator must be activated via local interfaces in the Sunny Home Manager to do so.

Procedure:

1. Open the menu item **Grid management services** under **Configuration** and go to **Specifications of the grid operator via local interfaces**.
2. Configure the settings from the table based on requirements.

Requirement	Setting
The Sunny Home Manager does not have to implement specifications via Modbus.	**Off** (default setting)
The Sunny Home Manager has to implement specifications via Modbus.	**Active** (the factory-set Port **502** can normally remain set)

If you need to change a port and there are several Modbus devices in the network, or if the grid operator specifications are to be transmitted via a certain port, manually enter the corresponding value.

If you change this port, you must also change the port in your VPN router and inform the grid operator of this change.

9.4.3 Load control as per §14a EnWG (German Energy Act)

As required by your grid operator, the system can ensure that the requirements for load control in accordance with §14a of the German Energy Act (Energiewirtschaftsgesetz – EnWG) are implemented in your PV system. This applies to controllable consumption units with a grid connection capacity of more than 4.2 kW. Control is achieved via an FNN control box.

Procedure:

1. Open the menu item **Grid management services** under **Configuration** and go to **Load control in accordance with §14a German Energy Act (EnWG)**.
2. Configure the settings based on requirements (Default setting **Off**).

9.4.4 Export limitation in accordance with §9 Renewable Energy Sources Act (EEG)

As required by your grid operator, the system can ensure that the export limitation requirements in accordance with §9 of the Renewable Energy Sources Act (EEG) are implemented in your PV system. This applies to controllable generating units with an installed power of 25 to 100 kWp. Control is achieved via an FNN control box.

Procedure:

1. Open the menu item **Grid management services** under **Configuration** and go to **Export limitation in accordance with §9 Renewable Energy Sources Act (EEG)**.
2. Configure the settings based on requirements (Default setting **Off**).

10 Device Administration

10.1 Maximum Number of Supported Devices

The Sunny Home Manager supports a maximum of 26 devices, which are monitored and visualized. 12 of these 26 devices can be actively controlled from Home Manager, which means that the Home Manager not only displays the energy consumption of the device of a direct load or of a load connected via a switching device, but also actively switches these devices.

All components that exchange data with the Sunny Home Manager are considered devices. Only a certain number of the following devices can be added to the system:

- 1 SMA battery/hybrid inverter
- 3 SMA eCharger / SMA EV Charger
- 5 SMA Energy Meter

Also see:

- Example of a Fully Equipped Energy Management System ⇒ page 38

10.2 Example of a Fully Equipped Energy Management System

A fully equipped energy management system consists of 26 devices, 12 of which are controllable and can consist, for example, of the following components:

Measuring and controlling	2 x SMA PV inverters
	1 x SMA battery inverter
	3 x SMA eCharger (SEMP)
	1 x heat pump (EEBus)
	1 x washing machine (via radio-controlled socket)
	1 x clothes dryer (via radio-controlled socket)
	3 x radio-controlled sockets
Measuring only	1 x dishwasher (via radio-controlled socket)
	1 x freezer (via radio-controlled socket)
	12 x radio-controlled sockets

Also see:

- Maximum Number of Supported Devices ⇒ page 38

10.3 Configuring the Sunny Home Manager

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10.3.1 Dashboard overview in Sunny Portal powered by ennexOS

Figure 10: Sunny Home Manager system overview in the dashboard

Position	Designation	Description
A	Focus navigation	Enables the navigation between the following levels: • System portfolio • System group • System section • System • Device

Position	Designation	Description
B	Content area	Displays the dashboard or content of the selected menu and the following information: • System information • System components and their states • Energy flow • Energy balance • Battery history • Battery • Overview of PV power and energy • Weather forecasts • CO_2 avoided • Feed-in tariff • Overall system status
C	Home	Opens the user interface home page
D	Dashboard	Displays information and instantaneous values of the device or system currently selected.
E	Monitoring	Depending on the system level, the following information of the Sunny Home Manager can be found: • Status list • Event monitor • Energy balance • Load balance • Energy and power
F	Analysis	Depending on the system level, detailed information on measured values of the system and of connected devices can be found. The following functions are available for this purpose: • Analysis Pro (Measured values of individual devices with each other, with the overall system or with systems of the entire portfolio) • PV inverter comparison (compare performance of individual PV inverters with each other) • Annual comparison (Compare yield and energy balance of individual months over the entire system period)
G	Configuration	Offers different configuration options, depending on the scope of the connected devices and the selected level.
H	Dashboard context menu	Lets you customize the view as needed and show or hide information in the content area.

10.3.2 Requirements for the configuration

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☐ You must have the user role **Installer** or **PV System Administrator** .

10.3.3 Setting Automatic Updates

⚠ QUALIFIED PERSON

By default, the automatic software update is activated for the Sunny Home Manager and the devices in the PV system. SMA recommends keeping the defaults.

Procedure:

1. Go to **System properties** via the side menu **Configuration**.
2. Click the button ✎ beside **Automatic updates**. A new window opens.
3. **Activate/deactivate** the automatic security and function updates via the button.
4. **Activate/deactivate** the automatic updates for all SMA products via the button.

10.3.4 Configuring Speedwire Encryption

⚠ QUALIFIED PERSON

The Speedwire encryption lets you safely encrypt the local SMA system network with SEC (Speedwire Encrypted Communication) and protect from unauthorized access.

ⓘ The Speedwire encryption can only be enabled if all devices in the system support SEC (Speedwire Encrypted Communication) and the devices can be accessed by the Sunny Home Manager.

ⓘ If a new device is integrated into the system, this device must support encryption so that the encryption of the system can be maintained. Speedwire encryption must be temporarily deactivated if a new encryption-capable device is not displayed. Once the new device has been added to the system, encryption can be re-enabled.

ⓘ If the Sunny Home Manager is reset when Speedwire encryption is activated, the encryption is deleted. Therefore, deactivate Speedwire encryption before resetting the Sunny Home Manager.

Procedure:

1. Go to **System properties** via the side menu **Configuration**.
2. Click the button ✎ beside **Speedwire encryption**. A new window opens.
3. **Activate/deactivate** Speedwire encryption via the button.

10.3.5 Configuring Edimax Smart Plug

⚠ QUALIFIED PERSON

1. Go to **Communication options** via the side menu **Configuration**.
2. Go to the field **Edimax Smart Plug**.
3. **Activate/deactivate** the control via the slider.
4. If you have stored a password for your Wi-Fi sockets in the Edimax app, click on the button ✎. A new window opens.
5. Enter the password of the Wi-Fi sockets.
6. Confirm with **[Save]**.

10.3.6 Configuring AVM FRITZ!Box Smart Home Control

⚠ QUALIFIED PERSON

The Sunny Home Manager communicates with FRITZ!DECT products such as radio-controlled sockets or thermostats only indirectly via the FRITZ!Box.

Requirements:

- ☐ You must have a FRITZ!Box with Smart Home software support.
- ☐ The FRITZ!Box must be equipped with the DECT function.
- ☐ The FRITZ!DECT products connected to the FRITZ!Box must have been correctly connected and commissioned (see manufacturer's manual).
- ☐ The radio-controlled sockets connected to the FRITZ!Box must be able to measure the energy consumption.
- ☐ You must be logged in to your FRITZ!Box with a user name and password. You should have this data ready, as the settings for the FRITZ!Box login must be the same in the home network and in the Sunny Home Manager.

Procedure:

1. Go to **Communication options** via the side menu **Configuration**.
2. Go to the field **AVM FRITZ!Box Smart Home control**.
3. **Activate/deactivate** the AVM FRITZ!Box Smart Home control via the slider.
4. To configure the AVM FRITZ!Box Smart Home controller, click on the pencil icon .
5. Select the type of the required login in the home network of the FRITZ!box. SMA recommends **FRITZ!Box user and password**.
6. Enter FRITZ!Box address and login credentials.
7. Confirm with **[Save]**.

10.3.7 Configuring Shelly Smart Home Control

⚠ QUALIFIED PERSON

1. Go to **Communication options** via the side menu **Configuration**.
2. Go to the field **Shelly Smart Home control**.
3. **Activate/deactivate** the control via the slider.
4. If you have stored a password for your Shelly devices in the Shelly app, click on the button . A new window opens.
5. Enter the password for the Shelly devices.
6. Confirm with **[Save]**.

i Password information

Use the same password for all Shelly devices. Shelly devices with configurable user name have to use "admin". The following special characters should not be used: a space, colon and the at sign @

10.3.8 Configuring the display of the current status

⚠ QUALIFIED PERSON

The current status of the grid supply and the grid feed-in can be displayed via an LED lamp and thus support you in your load control:

- When the LED light is **green**, "surplus" PV energy is available, which the Sunny Home Manager could use to operate additional loads.
  You can increase your self-consumption quota by having additional loads managed by the Sunny Home Manager.
- When the LED light is **red**, the household is consuming more energy than is generated via PV. This additional demand is met by purchasing energy from the utility grid for a fee.

The LED lamp is not one of the maximum number of devices that can be controlled by the Sunny Home Manager, so it does not reduce its number.

The Sunny Home Manager exclusively controls the color change of the LED lamp. The Sunny Home Manager does not perform on/off switching or dimming of the LED lamp or power measurement.

Requirements:

☐ For the AVM FRITZ!DECT 500 LED lamp, you need to use a FRITZ!Box with DECT as well as FRITZ!OS version 7.20. How to establish a DECT connection and set up the LED lamp can be found on the manufacturer's website at https://avm.de/service/wissensdatenbank/dok/FRITZ-DECT-500/3541_FRITZ-DECT-500-im-FRITZ-Box-Heimnetz-einsetzen/

Procedure:

1. Go to **Communication options** via the side menu **Configuration**.
2. Go to the field **AVM FRITZ!Box Smart Home control**.
3. To configure the AVM FRITZ!Box Smart Home controller, click on the pencil icon .
4. In the **Status display of** line, select the previously commissioned LED lamp from the drop-down list.
5. Confirm with **[Save]**.

10.3.9 Configuring Modbus Interfaces

⚠ QUALIFIED PERSON

Each device that is to communicate with the Sunny Home Manager via a Modbus communication protocol must be uniquely addressed. Note that you can integrate a maximum of 4 Modbus devices into your system.

Procedure:

1. Go to [**Communication options**] via the side menu **Configuration**.
2. Go to the section **Modbus devices**.
3. If no Modbus device is installed, click the field **[Initial configuration of interface].**
4. When you add, change, or delete a Modbus device, click the edit pencil beside **Modbus devices**.
5. A new window opens in which all the necessary settings can be made.
6. Add and configure a new Modbus device via + **Add configuration**.
7. In the **Modbus Profile** column, select the required predefined Modbus device from the drop-down menu. If a Moxa device is used with an SG-ready device, for example, set up a Modbus configuration with profile **MOXA1214**. If a ripple control receiver is connected to the Moxa device for external limitation of the active power feed-in, use the profile **MOXA1214_PLimit**.
8. Enter the data of the selected device in the fields **IP address**, **Port** and **Unit ID**. If the Modbus device is a Moxa device, it is recommended to set the Moxa device in the router with an IP address/MAC address binding or to subsequently set to a fixed IP address from the free range of the router not used for DHCP. Port (default 502) and Unit ID (default 1 or 2) do not need to be changed. Existing entries can be changed by overwriting. To delete a configuration, click on the recycle bin symbol in the corresponding line.
9. Confirm with **[Save]**.

10.3.10 Configuring the External Current Transformer

⚠ QUALIFIED PERSON

If the integrated measuring unit of the Sunny Home Manager is connected directly, it can measure a maximum current of 63 A per phase. Current transformers must be used to measure currents > 63 A per phase.

Procedure:

1. Go to **Device management** via the side menu **Configuration**.
2. Open the context menu of the Sunny Home Manager via the button •••.
3. Select **Display device properties**.
4. Start the edit via the button ✎ in the **Advanced configurations** area.
5. Make the settings in the **External current transformer** area.
6. Check the **Use external current transformer?** item.
7. Enter the specified values of the current transformer (default setting: 1 each) in the fields **Primary current:** and **Secondary current**.
8. Confirm with [**Save**].

10.3.11 Information about Self-Consumption

If you want to use the self-generated PV energy in your household, the Sunny Home Manager system must be configured accordingly. The feed-in tariff and electricity tariff must be configured as well.

If you already answered **Yes** to the question about self-consumption when you created the system in Sunny Portal powered by ennexOS, no further settings are required. However, the settings can still be made or changed later (see Section 10.3.12 "Activating the Self-Consumption Function", page 44).

10.3.12 Activating the Self-Consumption Function

⚠ QUALIFIED PERSON

1. Go to **System properties** via the side menu **Configuration**.
2. Start the edit via the button ✎ in the area **System data**.
3. Select **Yes/no** based on requirements in the section **System with self-consumption**.
4. Confirm with **[Save]**.

10.3.13 Activating Prioritized Battery Charging

1. Go to **Energy management** via the side menu **Configuration**.
2. Start the edit via the button ✎ in the area **Battery**.
3. **Activate/deactivate** prioritized battery charging via the slider.
4. Confirm with [**Save**].

ⓘ Devices not supported: SB 3600SE-10, SB5000SE-10

10.3.14 Changing the extended configuration

⚠ QUALIFIED PERSON

1. Go to **Device management** via the side menu **Configuration**.
2. Open the context menu of the Sunny Home Manager via the button •••.
3. Select **Display device properties**.

4. Start the edit via the button in the area **Advanced configurations**.
5. Configure the settings in the area **Direct meter communication**.
6. Make the settings in the **Measuring interval** area.
7. Confirm with [**Save**].

10.3.15 Configure energy management

10.3.15.1 Settings for the optimization target

The optimization target indicates whether the Sunny Home Manager should prioritize ecological or economical factors for load management.

Setting	Explanation
ecological (highest possible self-consumption)	Greater self-consumption conserves the environment because there is no energy loss caused by the transport of current through the utility grid.
balanced	Equal distribution of the setting ecologically and economically.
economical (highest possible cost savings)	The Sunny Home Manager calculates the most financially rewarding control of the loads, taking into consideration the electricity tariff. In certain cases, it may be more economical to feed the PV energy into the utility grid and to operate the individual loads at night using electricity purchased from the grid.

10.3.15.2 Configuring the optimization target

Requirements:

☐ The feed-in tariff and the electricity tariff must be configured.

Procedure:

1. Go to **Energy management** via the side menu **Configuration**.
2. Start the edit via the button in the area **Optimization target**.
3. From the dropdown menu select from **ecological**, **balanced** and **economical**.
4. Confirm with [**Save**].

10.3.16 Configuring the energy management of battery systems

10.3.16.1 Requirements for the energy management of battery systems

☐ At least 1 battery inverter or hybrid inverter is configured in the system.

10.3.16.2 Settings for forecast-based battery charging

Forecast-based battery charging is based on the production and consumption forecast of your smart home. The settings for charging a battery are only displayed for systems with a battery.

Setting	Explanation
Forecast-based battery charging	To create a battery-charging forecast for the next 48 hours, the Sunny Home Manager uses the current day and the two following days by default.(see Section 10.3.16.3 "Configuring the forecast-based battery charging", page 46)

Setting	Explanation
Required battery state of charge (SOC) in terms of forecast-based charging	Disables the forecast-based charging until the battery is charged to the specified % value (SoC = State of Charge). If this value is reached, the Sunny Home Manager enables forecast-based battery charging function. **This configuration may lead to derating losses.** The electricity generation and consumption forecast is not taken into account up to the entered value. The energy may be reduced if the battery does not have sufficient free capacity for storage.
Prioritized battery charging	If you activate this function, the battery charge is prioritized over an optional load that you have defined (see Section 10.3.13 "Activating Prioritized Battery Charging", page 44).
Shortened forecast period	Shortens the default forecast period from a maximum of 48 hours to the current day. This allows more PV energy to be loaded into the battery on the current day. **This configuration may lead to derating losses.** PV energy may have to be derated on the following days due to insufficient free battery capacity.

Two cases can be distinguished for forecast-based battery charging:

Case 1: System with PV inverter and battery inverter or PV inverter and hybrid inverter

The forecast-based battery charging function ensures that the otherwise curtailed PV energy is stored in batteries when effective active power limitation is configured in the system.

Case 2: System with 1 hybrid inverter and overdimensioning of the PV system

When using a hybrid inverter, the PV system can be overdimensioned. The installed nominal DC power of the PV modules is greater than the nominal AC power of the inverter. The forecast-based battery charging function ensures that the battery is preferentially charged when the highest PV power is expected, for example at midday. This allows the total output of the PV system to be optimally utilized.

A maximum of 1 hybrid inverter may be installed to use the forecast-based battery charging function for DC oversizing. No other PV inverters may be installed.

10.3.16.3 Configuring the forecast-based battery charging

1. Go to **Energy management** via the side menu **Configuration**.
2. Start the edit via the button in the area **Battery**.
3. **Activate/deactivate** the forecast-based battery charging via the slider.
4. Define the required battery state of charge depending on the requirements.
5. **Activate** the shortened forecast period via the checkbox.
6. Confirm with [**Save**].

Also see:

- Settings for forecast-based battery charging ⇒ page 45

10.3.16.4 Settings for peak load shaving

Additional electricity costs can be saved if you reduce your power consumption from the utility grid by intelligently adjusting your battery storage system. An increased energy demand at certain times of day (e.g. in the morning or in the evening) leads to so-called load peaks, which can have you classified into a higher tariff category. Thus, the battery-storage system allows you to capture, i.e. "shave" these load peaks with stored electric current. Adhere to the following information for the configuration in the process:

Setting	Explanation
Peak load shaving	By activating the operating mode "Peak load shaving", you can specify the maximum power supply from the utility grid as well as a limiting value for the portion of the total storage capacity of the battery system for the peak load shaving.
Limiting value for peak shaving	The threshold specifies the maximum power that may be drawn from the utility grid. When this power is exceeded, the energy required is drawn from the battery. As soon as the battery is discharged, the corresponding load can no longer be operated. In order to be able to operate a load despite the battery's insufficient state of charge, the purchased energy limit can be increased temporarily; see 'Increase threshold adaptively'. In this case, the load is operated with electric current additionally drawn from the utility grid, which needs to be compensated for as well.
Threshold for switching operating modes (multiuse)	By entering a SOC (state of charge of the battery) limit, the total storage capacity of the battery system can be divided. • Below the limit: used for peak load shaving • Above the limit: used for increased self-consumption
Adaptively increase threshold	When activated, the threshold is automatically adjusted to the new maximum value if the grid-supply limit could not be met, e.g. due to insufficient battery charge.

Also see:

- Configure peak load shaving ⇒ page 47

10.3.16.5 Configure peak load shaving

1. Go to **Energy management** via the side menu **Configuration**.
2. Start the edit via the button in the area **Peak load shaving**.
3. **Activate/deactivate** the peak load shaving via the slider.
4. Enter the value as required under **Threshold for peak load shaving**.
5. In the area **Threshold for switching operating modes (multiuse)**, use the slider to set the percentage of the operating mode that should be switched from increased self-consumption to peak load shaving.
6. Activate the checkbox in the area **Automatic threshold adjustment**.
7. Confirm with [**Save**].

Also see:

- Settings for peak load shaving ⇒ page 47

10.3.17 Configuration of virtual PV generators

⚠ QUALIFIED PERSON

A virtual generator uses the energy and power values of an energy meter. For this purpose, an energy meter that has not yet been assigned must be assigned to the virtual generator.

Requirements:

- A measuring/switching device (e.g., energy meter) must be configured.
- All devices in the local network must be in operation and connected to the Sunny Portal via an Internet router.

Procedure:

1. Select the menu **Configuration**.
2. Select [**Device management**] in the context menu.
3. Open the context menu of the measuring/switching device via the button •••.
4. Select **[Configure as generator]**.
5. Select **PV inverter** as energy generator and confirm with **[Next]**.
6. Enter the PV inverter data.
7. Select **[Next]**.
8. Enter system power and click on **[Save]**.
   ☑ The configuration is now complete.

Also see:

- Adding a Radio-Controlled Socket ⇒ page 49

10.3.18 Configure tariffs

10.3.18.1 Tariffs

Configure the currency, electricity feed-in tariff and electricity tariff to optimize your energy management and display your savings in a clear way.

10.3.18.2 Settings for the feed-in tariffs and electricity prices

You can either use the electric current generated by your PV system for self-consumption or sell it , i.e., feed it into the utility grid. The Sunny Home Manager uses this information for cost saving and takes the entered values into account during load control to optimize self-consumption.

The entered values affect:

- Recommended actions for manually switching on loads
- Load control via the Sunny Home Manager (either directly via the local network or via switching devices such as a radio-controlled sockets or a relays)

Setting	Explanation
Tariff type: "Fixed"	Electricity tariff that does not vary in terms of time. This setting is activated by default.

10.3.18.3 Configuring the electricity tariff and feed-in tariff

The electricity tariff is set to 0 regardless of currency.
Enter the relevant electricity tariff.

You require an active electricity tariff and a feed-in tariff at all times to optimize your energy management and ensure a clear display of your savings.

1. Go to **Tariffs** via the **Configuration** side menu.
2. In the **Currency** section, click the button and select the applicable currency from the dropdown menu.

3. In the **Tariff Overview** section, the electricity tariff and feed-in tariff can be configured manually. As long as one of the two tariffs is not configured, a notification (Configure manual tariffs) will be displayed.
   Information: If no feed-in tariff is received, enter a value of **0**.
4. Click the button to set the electricity tariff.
5. Enter the name for the manual tariff under **Name**.
6. In the **Electricity tariff** area, select the **Tariff type** from the dropdown menu.
7. If you select **Fixed**, enter the electricity price in the **Electricity price** field.
8. If **Dynamic** is selected, both additional segments **Electricity market** and **Markup** become visible.
9. With a dynamic tariff, the electricity price is determined by the power exchange market. The region is automatically selected based on the system's location.
   Information: It may happen that the region cannot be detected automatically. In this case, select the region.
10. In the **Electricity market** area, the region can be adjusted using the button . Currently, the regions DE-LU, BE and NL are available.
11. In the **Markup** area, you can choose between **Simplified** and **Detailed**.
12. When purchasing energy, you generally do not pay the exact power exchange price, but rather a higher price that covers costs such as grid fees and taxes, etc. The markup is calculated per kWh, with no annual fees.
13. Under **Simplified**, a fixed markup in currency/kWh must be entered. An exemplary market price is supplemented with the markup and displayed as an exemplary electricity rate.
14. Under **Detailed**, the information from the electricity provider can be entered if they provide it.
15. If **Time-based** is selected, configure the base tariff and additional segments. Use **+ Add tariff section** to add further tariff sections as required.
16. Confirm with [**Save**].
    - ☑ Configured tariffs appear in the dropdown menu.
    - ☑ Tariffs from the external partner Lichtblick SE are displayed above the manually configured tariffs.
    - ☑ The currently valid tariff is marked as "active." Other configured tariffs are displayed as "inactive" or "scheduled."

10.3.18.4 Take negative electricity rate into account

Information: This function is only available for PV systems in Germany and when a fixed feed-in tariff is configured.

The EEG (Renewable Energy Sources Act) feed-in tariff ceases to apply as soon as the electricity market price turns negative - effective from the first 15 minutes with a negative electricity rate. Such phases typically occur when a particularly large amount of solar power is fed into the utility grid - while demand is simultaneously low.
This rule applies to all new PV systems between 2 and 100 kW that go into operation on or after February 25, 2025, regardless of whether a control device is present, provided the system is not participating in direct selling.

When the electricity prices are negative, the feed-in tariff is set to 0 €/kWh. Activating this function has no impact on energy management or load planning, but it serves to calculate compensation more accurately.

10.4 Adding a Switching Device

⚠ QUALIFIED PERSON

10.4.1 Adding a Radio-Controlled Socket

⚠ QUALIFIED PERSON

Requirements:

☐ The new radio-controlled socket must be set up in the home network.

Procedure:

1. Go to **[Device management]** via the side menu **Configuration**.
2. Open the dialog **Add devices** via ⊕.
3. Select **SMA device or load** to add radio-controlled sockets.
4. Select **[Next]**.
5. Select the radio-controlled socket in the drop-down menu.
6. Confirm the selection via **[Save]**.

10.4.2 Adding Modbus Device

⚠ QUALIFIED PERSON

Requirements:

☐ The new device must have been installed in the system and commissioned in accordance with the manufacturer specifications.

☐ The **Modbus configuration** must have been performed under **Communication options > Modbus devices** on the Sunny Home Manager.

Procedure:

1. Go to **[Device management]** via the side menu **Configuration**.
2. Open the dialog **Add devices** via ⊕.
3. Select **SMA device or load** to add Modbus devices.
4. Select **[Next]**.
5. Select the device in the drop-down menu.
6. Confirm the selection via **[Save]**.

10.5 Adding direct communicating loads

10.5.1 Pairing Loads via an EEBus Interface

ℹ A time window of 2 minutes is available for pairing the devices.

Requirements:

☐ The new device must be in operation.

☐ The Sunny Home Manager and the new consuming devices must be connected to each other via a router in the same local network.

Procedure:

1. Go to **[Device management]** via the side menu **Configuration**.
2. Add a new device via the button ⊕.
3. Select **Device via EEBUS**.
4. Click on [**Next**].
   ☑ The device pairing will be prepared.
5. Click on [**Next**].
6. After connection of the preparation of the device pairing, select [**Continue**].
7. Select the device to be paired via the button.
8. Click on [**Next**].
   ☑ The device is paired via the EEbus interface.

10.5.2 Adding SMA devices or loads

Requirements:

☐ The new device must be in operation.

Procedure:

1. Go to **[Device management]** via the side menu **Configuration**.
2. Add a new device via the button ⊕.
3. Select **SMA device or load**.
4. Click on [**Next**].
5. Select the device via the button. In doing so, observe the information in Sunny Portal powered by ennexOS.
6. Click on [**Next**].
7. Define the **Nominal system power** when selecting PV inverters.
8. Click [**Continue**] to confirm.
   ☑ The device is added to the Sunny Home Manager system.

10.6 Replacing a Sunny Home Manager

10.6.1 Requirements for Replacing a Sunny Home Manager

☐ You must have the user role **Installer** or **PV System Administrator** .

☐ The Sunny Home Manager to be replaced must have been decommissioned.

☐ The new Sunny Home Manager must be reset prior to the replacement:

- Ex works (new device)
- Manually (already used device)

☐ The new Sunny Home Manager must have been commissioned:

- The new Sunny Home Manager must be connected to the router.
- The new Sunny Home Manager must be supplied with voltage.

☐ The serial number and the registration ID of the new Sunny Home Manager are available. These data can be found on the type label attached on the side of the device or on the label provided.

10.6.2 Replacing the Sunny Home Manager

1. Go to **Device management** via the side menu **Configuration**.
2. Open the context menu in the row of the Sunny Home Manager to be replaced via the button •••.
3. Select **[Replace device]**.
4. Enter the PIC and RID of the new device and select **[Identify]**.
5. Click **[Replace]** to confirm.

i After replacing the Sunny Home Manager, it may be necessary to manually adjust the meter configuration in the user interface of subordinate devices (e.g., in the SMA eCharger).

10.7 Resetting the Sunny Home Manager

A Sunny Home Manager must only be reset if it had been installed in another system previously.

Loss of data due to replacement or due to resetting to default settings

If the Sunny Home Manager is reset to the default settings, all data saved in the Sunny Home Manager will be deleted. The data saved in Sunny Portal can be transmitted to the Sunny Home Manager after calling up the PV system again in Sunny Portal. In this case, the PV generation data remains in the Sunny Portal system. Devices that were paired to the Sunny Home Manager via EEBus have to be paired again. The interface for grid management services of the Sunny Home Manager must be deactivated prior to resetting. After resetting the Sunny Home Manager, the interface for grid management services must be activated again. This will assign new, valid Unit IDs to the Modbus devices. Stored Modbus configurations are deleted by resetting the Sunny Home Manager and must be stored again.

Procedure:

1. Hold down the reset button with a pointed object until the LEDs flash red. This can take up to 6 seconds.
   ☑ The LEDs flash first green and then red.
2. When the LEDs start flashing red, release the reset button.
   ☑ All data stored is deleted and the Sunny Home Manager restarts.
3. Assign the Sunny Home Manager to the system in Sunny Portal powered by ennexOS again (see Section 10.9 "Reassigning the Sunny Home Manager after resetting the system", page 52).

10.8 Restarting the Sunny Home Manager via Sunny Portal powered by ennexOS

1. Go to **Device management** via the side menu **Configuration**.
2. Open the context menu in the row of the Sunny Home Manager via the button •••.
3. Select [**Carry out restart**] in the section **Device function**. This process may take a few minutes.
   ☑ If the restart was successfully started, a green notification is displayed in the portal.
   ☑ If the restart was not successfully started, a red notification is displayed in the portal.

☑ The restart was successful if the button [**Carry out restart**] is active again.

10.9 Reassigning the Sunny Home Manager after resetting the system

After resetting the Sunny Home Manager, the device must be assigned to the system in Sunny Portal powered by ennexOS again. Otherwise, data will not be transferred to the Sunny Home Manager.

Procedure:

1. Log into Sunny Portal powered by ennexOS at https://ennexos.sunnyportal.com/.
2. As soon as the device is back online, this is indicated in the notifications 🔔. The device can be added again here.

10.10 Deleting Sunny Home Manager from Sunny Portal Powered by ennexOS

Device data is irretrievably deleted

If you delete a device, all the data of that device is irretrievably deleted.

Subordinate devices will be deactivated upon deletion

If you delete a device that has subordinate devices, these devices are deactivated and the device links removed.

- Check whether the devices can be removed from this structure in advance and reconfigured if they need to remain active.

Requirements:

- You must have the user role **System Administrator** or **Installer**.

Procedure:

1. Go to **Device management** via **Configuration**.
2. Select **[Delete device]** in the context menu •••.

11 Load Control

11.1 Background Information

11.1.1 Types of Loads

A load is a device in a household that is operated with electrical energy.

The goal of the open-loop control is to have the Sunny Home Manager switch the load so that PV energy is mostly used, if possible, and thereby, or by selecting a suitable time window, minimize the energy costs for operating the load.

Loads suitable for control by the Sunny Home Manager are those that are to be switched on and operated for a defined period of time (e.g. washing machine) or have a flexible time of use (e.g. heat pump, charging station for electric vehicles).

Loads that are only switched on when they are needed immediately afterwards (e.g. television, toaster, lamp, or vacuum cleaner) are not suited for being controlled by the Sunny Home Manager. These must be configured via a switching device (e.g., radio-controlled socket).

A distinction is made between the following types of loads that are suited for being controlled by the Sunny Home Manager:

The following energy loads can be configured:

- Washing machine
- Heat pumps
- Dishwasher
- Clothes dryer
- Heating element
- Other

Depending on the type of energy load, the load type may already be set in the subsequent configuration. During configuration, the load type can still be changed or further defined. The following list summarizes the load types:

- Light
- Home appliance
- Heating element and hot water
- Cooling
- Air-conditioning
- E-mobility
- Industrial load
- Other

11.1.2 Program-controlled loads

A program-controlled load runs through a preset program during operation. The program is typically selected by the user prior to operation and started by pressing the start button on the load. Once the program has started, the load should no longer be switched off.

Sunny Home Manager can only control a program-controlled load if, after an interruption in the power supply, the load's program picks up at the point where the power supply was interrupted.

Examples of program-controlled loads:

- Washing machine
- Dishwasher
- Clothes dryer

11.1.3 Non-program-controlled loads

A non-program-controlled load must be able to switch on and off as needed and have a flexible switch-on time. The Sunny Home Manager 2.0 can select one or more periods within the user-defined time frame in which it can switch the load on or off (see Section 11.1.6.2 "Controlling Loads via a Time Period", page 56).

Examples of non-program-controlled loads:

- Heat pump
- Heating element

11.1.4 Communicating with Loads

To have loads captured and controlled by the Sunny Home Manager, you must establish a connection between the load and Sunny Home Manager:

- Via radio-controlled sockets/relays as intermediate switches (indirectly communicating loads)
  - Capturing the energy consumption of individual home appliances: measuring function of the assigned radio-controlled socket
  - Controlling household appliances: on/off function of the assigned device
- Via the standard protocol interfaces (directly communicating loads)

11.1.5 Intelligent, Directly Communicating Loads

Intelligent, directly communicating loads exchange their data directly with the Sunny Home Manager via an SEMP or EEBus interface. The exchanged data can change several times a day depending on the needs of the load. In contrast to a self-configured indirectly communicating load with an intermediate measuring/switching device, directly communicating loads offer you better system efficiency and a higher potential for savings.

The load connected via Ethernet or Wi-Fi sends the Sunny Home Manager information about the load type, the planned energy requirement, and the preferred operating time period. The Sunny Home Manager factors this information into its load planning, takes the configured optimization targets for the load control into account, and sends the appropriate start and stop signals to the load.

As soon as this load has been added to your Sunny Home Manager system and configured once, you do not need to make any further settings.

11.1.6 Indirectly Communicating Loads

Indirectly communicating loads are not suitable for being controlled by the Sunny Home Manager. These must be configured via a switching device (e.g., radio-controlled socket) (see Section 11.1.1 "Types of Loads", page 54).

11.1.6.1 Measuring and switching

If a consuming device is connected to the Sunny Home Manager via a switching device with a measuring function, e.g., a radio-controlled socket, this can measure the energy consumption of the connected load and transmit it to the Sunny Home Manager. For this purpose, the switching device must be added as a **device** in the Sunny Home Manager system (see Section 10.4 "Adding a Switching Device", page 49).

A radio-controlled socket cannot be used to measure the load's power consumption if it is controlled using a relay or contactor.

The Sunny Home Manager system can switch loads connected to the switching device on and off. To this end, the consuming device mode must be set to **Automatic**. The consuming device mode can be configured via the respective device dashboard in the widget **Consuming device mode** or via the Energy App.

If a load is not assigned to a switching device, the Sunny Home Manager does not receive consumption data from this load, and it cannot control this load.

A load can either be permanently connected to the same switching device or to alternate switching devices. For each change, the load must be assigned to the new switching device.

Since the Sunny Home Manager does not receive any detailed data on loads if they are controlled via switching devices, you will need to make additional settings in the load profiles depending on the respective load type. Thus, the Sunny Home Manager can effectively schedule the loads and help save energy and costs.

11.1.6.2 Controlling Loads via a Time Period

You can configure time periods for loads that communicate with the Sunny Home Manager via a switching device. Within these time periods, the Sunny Home Manager automatically switches loads on and off. You cannot make any settings in Sunny Portal for loads that communicate directly. All necessary information can be exchanged directly if the directly communicating load has been configured according to the manufacturer's specifications.

The configuration differentiates between the following types of time periods:

- Load MUST be switched on
- Load CAN be switched on

Load MUST be switched on

The load must have a defined operating time.

Sunny Home Manager switches the load on and off within the configured time period.

You should select this option if the load should be operated in any case, for example on a specific day.

The load is also switched on if there is not sufficient self-generated PV energy available, i.e. energy required for the load to operate may be drawn from the utility grid.

Load CAN be switched on

You can only select this option if you have a self-consumption system and use the self-generated PV energy in your own household.

Optional loads cannot be used with zero export.

The load must have a flexible switch-on time. The Sunny Home Manager switches on the load within the time period you have configured. However, the configured conditions must be met. You choose among the following conditions for configuration:

Proportion of the PV energy

You can set the load to be switched on only when a certain minimum amount of PV energy is available for its operation or is expected for a certain period of time (ecological optimization).

If the set proportion of PV energy is not attained or the set maximum permissible energy costs are exceeded, it is possible that the load will not receive any energy and that the load will not be switched on at all in the defined time period.

- **100% PV energy not fed into the grid**

  If limiting of the active power feed-in is activated, you can also set the proportion of PV energy not fed into the grid that would otherwise be curtailed.

  If your system has active power limitation, active power can only be fed into the utility grid up to a predefined threshold (e.g. 70% regulation in Germany). If this value is exceeded, the PV and hybrid inverters will be regulated down. As a result, any PV energy generated above this threshold is lost as "PV energy not fed into the grid". PV energy not fed into the grid, however, can be used effectively if it is available when a load happens to be switched on. The PV energy not fed into the grid is free (0 ct/kWh) since it would not have been fed into the utility grid anyway due to the active power limitation requirements.

  Sunny Home Manager also considers PV energy not fed into the grid in its PV power generation forecast. If 100% PV energy not fed into the grid is set, the load will only be switched on if the forecasted PV energy not fed into the grid can cover the total power consumption for the configured minimum switch-on time.

- **Maximum permitted energy costs**

  You can specify that the load should only be operated if the energy costs to operate the load are below a predefined cost limit (economic optimization).

  The energy costs are calculated from the grid electricity price and the feed-in tariff. The calculation of energy costs is based on the combination and proportions of both factors. A mains current that exceeds the maximum permitted energy costs can also be used. The combination of grid electricity and self-generated PV electricity means that the costs are still lower than the grid electricity price, provided that the feed-in tariff does not exceed the grid electricity price.

  – In the case of **exclusive use of energy from the utility grid**, the costs correspond to the electricity tariff in Euro/kWh for the grid-supplied electricity that was set in the system properties.

    Since grid energy is always available, the load can be operated within the time period without any restrictions.

  – In the case of **exclusive use of self-generated PV energy**, the costs correspond to the feed-in tariff in Euro/kWh that was set in the system properties.

    You do not receive a feed-in tariff for PV energy if it is consumed by a load in your home instead of being fed into the utility grid. Put another way, the PV energy that could otherwise have been fed into the grid "costs" as much as the feed-in tariff.

11.1.7 Direct communication of devices using data exchange protocols

This connection option is only possible for smart appliances that communicate with the Sunny Home Manager via a data exchange protocol such as EEBus or SEMP.

Since the load transmits all information about its energy demand and consumption directly to the Sunny Home Manager and exchanges this information with it automatically, you cannot configure a directly communicating load yourself.

An exception are loads that are able to absorb optional energy. With these, the priority and rules for switching on when optional power is actually requested can be set (see Section 10.5 "Adding direct communicating loads", page 50).

11.1.8 Prioritizing Loads

In the case of loads that can be operated flexibly in terms of time, you can specify a sequence that the Sunny Home Manager will use to schedule these loads in its energy management. This prioritization can save you energy costs. The following prioritizations can be configured here:

Prioritizations
High
Higher
Medium
Lower
Low

The prioritization will only be considered for the following loads:

- Loads connected to switching devices for which you have set time periods of type **Load can be switched on**.

  Batteries, if **Prioritized battery charging** is configured in the Sunny Home Manager.

- Smart appliances with optional energy absorption. You will have already set the priority of these devices when adding them to your Sunny Home Manager system via the configuration wizard.

11.1.8.1 Effects of Prioritization of Loads

The following effects will be caused by a prioritization of loads:

- If there are several loads with CAN time periods, the lowest-cost energy will be allocated to the load which you have given the highest priority using the slider.
- If there is not enough low-cost PV energy for all loads with CAN time periods, lower-priority loads may not be switched on at all. For this reason, the priority of appliances with low power, such as washing machines and dishwashers, should be lower than the priority of charging devices such as the SMA eCharger, for example.
- Basically, the Sunny Home Manager schedules optional loads only if it can ensure that the planning target is met.

In the case of the time period type **Load must be switched on**, the priority of the load does not have any effect, as the load is switched on in any event, possibly also with grid-supplied power.

11.1.8.2 Editing Prioritizations

Procedure:

1. Go to **Device management** via **Configuration**.
2. Open **Display device properties** via the context menu •••.
3. Activate the edit via the button ✎ in the area **Device control**.
4. Set the prioritization via the drop-down menu.
5. Confirm with [**Save**].

11.2 Configuring Switching Devices

11.2.1 Safety when Configuring Switching Devices

⚠ WARNING

Danger to life by switching medical devices

Unintentional switching of medical devices can result in life-threatening situations.

- Do not connect any medical devices to the switching device (e.g. radio-controlled socket/relay).

⚠ WARNING

Risk of injury and fire due to unintentional and unattended switching on of loads

Loads that are switched on via a radio-controlled socket or a relay unintentionally and while unattended can cause injuries and fires (e.g. an iron).

- Do not connect any loads to the switching device that could endanger persons or cause damage if unintentionally switched on.

NOTICE

Damage to loads due through frequent switching

Frequently switching a load on and off can damage it.

- Ask the load manufacturer whether the load is suitable for control via a radio-controlled socket or relay, for example.
- Configure the switching device so that the load connected is not switched on or off more frequently than specified by the load manufacturer.
- Do not connect any loads to a switching device if they require a continuous current supply.

11.2.2 Activating Start-Up Detection for Radio-Controlled Sockets

Requirements:

☐ The switching device must have been commissioned and registered in Sunny Portal powered by ennexOS (see Section 10.4 "Adding a Switching Device", page 49).

Procedure:

1. Go to **Device management** via **Configuration**.
2. In the context menu ••• of the measuring/switching device that was linked with a radio-controlled socket of the load, select **Display device properties**.
3. Activate editing mode via ✎ in the section **Device control**.
4. Configure the settings as needed.
5. Confirm with **[Save]**.

11.3 Configuring Load Characteristics

11.3.1 Configuring indirectly communicating loads

⚠ QUALIFIED PERSON

All settings for configuration of a load are made via Sunny Portal powered by ennexOS.

Procedure:

1. Go to **Device management** via **Configuration**.
2. In the context menu ••• of the measuring/switching device, select **Configure as load**.
3. Select the **energy load** as needed (see Section 11.1.1 "Types of Loads", page 54).
4. In the section **Integration into the energy management**, select the type of integration as needed. To change these settings later, you must first delete the load from the system and then reconfigure it.
5. Select [**Continue**] to confirm.
6. Give the load a designation in the field **Device name**.
7. If the **load type** was not defined by the **energy load**, select the **load type** via the drop-down menu.
8. Select the **maximum power consumption** (see Section 11.3.3 "Power consumption of loads", page 60).
9. Set the **Priority** of the load (see Section 11.1.8 "Prioritizing Loads", page 57).
10. Configure the program controllability (see Section 11.3.4 "Selecting Program Controllability of Directly Communicating Loads", page 60).
11. If the load is program-controlled, enter the **maximum program runtime** (see Section 11.3.5 "Maximum Program Runtime of Directly Communicating Loads", page 61).
12. If the load is not program-controlled, enter the **minimum switch-on/off time** (see Section 11.3.6 "Minimum Switch-On and Switch-Off Times", page 61).
13. As needed, activate automatic switching for the non-program-controlled load or heating rod via the button and then define the limit value and the detection time for disconnection (see Section 11.3.7 "Load with Automatic Switching", page 62).
14. Select **[Continue]** to confirm.
15. Configure the time period (see Section 11.3.10 "Information about the configuration of time periods", page 63).
16. Make the optional settings.

Also see:

- Program-controlled loads ⇒ page 54

- Non-program-controlled loads ⇒ page 55

11.3.2 Configuring directly communicating loads

⚠ QUALIFIED PERSON

All settings for configuration of a directly communicating load (SEMP/EEBus) are made via Sunny Portal powered by ennexOS.

Procedure:

1. Add the device to the system (see Section 10.5 "Adding direct communicating loads", page 50).
2. Go to **Device management** via **Configuration**.
3. Open the dialog **Display device properties** via the context menu ••• of the device or load.
4. Activate editing mode via ✎ in the section **Device details**.
5. Enter the device details.
6. Confirm with **[Save]**.
7. Activate editing mode via ✎ in the section **Device control**.
8. Configure the priority of the load.
9. Configure the min. PV share or max. energy costs in the section **Optional energy demand**.
10. Confirm with **[Save]**.

11.3.3 Power consumption of loads

The power consumption is the power typically required by a load for its operation (see type label or manual of the load).

The Sunny Home Manager takes account of this value in the initial calculation of the required energy.

Once the load provides measured values of its actual consumption during operation, the Sunny Home Manager can determine a more precise power value after a learning phase. This way, the Sunny Home Manager improves its load planning and increases energy and cost savings.

i Loads with low power consumption

Sunny Home Manager may not detect when controlled loads with low power consumption (e.g., < 250 W) are switched on with a delay or are switched off automatically after reaching an end point. If either of these things occurs, Sunny Home Manager will be unable to allocate freed-up energy to other loads.

i If the assigned switching device is set to **Only switching**, the power consumption set here is used instead of the measured power as long as the device is switched on. This is necessary, for example, when controlling via a relay or contactor, since the actual power consumption of the load is not measured via the switching device.

Also see:

- Configuring indirectly communicating loads ⇒ page 59

11.3.4 Selecting Program Controllability of Directly Communicating Loads

⚠ QUALIFIED PERSON

1. Select the load type "Other."
2. Select **Integration into the energy management** as needed.
3. Select **[Continue]** to confirm.
4. Define the **Device information**. In doing so, observe the information in Sunny Portal powered by ennexOS.
5. In the section **Load is program-controlled?**, select **[Yes]** or **[No]** based on the load.
6. Define the switch-on and switch-off times as needed.

7. Select **[Continue]** to confirm.
8. Configure the further settings as needed.

Also see:

- Configuring indirectly communicating loads ⇒ page 59
- Program-controlled loads ⇒ page 54
- Non-program-controlled loads ⇒ page 55

11.3.5 Maximum Program Runtime of Directly Communicating Loads

☐ This option can only be set for **program-controlled** loads.

The maximum program operating time is the time that a program-controlled load requires for its longest program. The maximum program operating time defines the latest time at which a load must be switched on so that its longest program can be completed within the specified time limits.

Maximum program operating time for a washing machine

You have defined a time slot from 10:00 a.m. to 6:00 p.m. for your washing machine; i.e., your washing machine's washing cycle must be completed by 6:00 p.m.

The longest washing cycle of your washing machine lasts 3 hours. Therefore, enter at least 3 hours as the maximum program runtime when configuring the switching device. In this case, the washing machine will start at 3:00 p.m. at the latest so that the longest washing cycle can be completed. If the selected washing cycle is of shorter duration, the Sunny Home Manager still adheres to the maximum program runtime.

11.3.6 Minimum Switch-On and Switch-Off Times

☐ This option can only be set for **non-program-controlled** loads.

Information about configuring switch-on and switch-off times

Loads are not designed to be switched on and off an infinite number of times during their service life. Internal components such as relays can fail after several thousand switching cycles due to material fatigue. In fickle weather conditions with highly variable PV power generation, the load may be switched on and off every few minutes because there is only enough surplus PV energy for brief periods.

You can set minimum switch-on and switch-off times when configuring the load characteristics in order to prevent loads from being switched on and off too frequently and experiencing too many switching cycles. If this is done, however, power may be drawn from the utility grid to operate the load if PV power generation drops briefly. Conversely, surplus PV energy may be "lost" during switch-off times.

If you select a long minimum switch-on time, by contrast, the load may not be switched on very often since there are very few adequately long periods in the PV power generation forecast with enough power to operate the load during the overall minimum switch-on time.

It is worth trying out different time settings in order to gradually find the best values for each load.

Setting	Explanation
Minimum switch-on time	The minimum switch-on time is the minimum time that the load connected must remain switched on, for example, to complete its starting sequence or complete a work sequence. **Delayed activation possible:** Some loads may not start to operate immediately after switching on the assigned switching device, e.g. heat pumps for water storage tanks. Immediate activation can only be ensured for the switching device, not for the connected loads. • Enter the minimum switch-on time in the **Minimum switch-on time** text field. Take into consideration any possible delays in starting the connected load.
Minimum switch-off time	The minimum switch-off time is the minimum time the connected load must remain switched off, for example, to prevent overheating or enable restarting. • Enter the minimum switch-off time in the **Minimum switch-off time** text field.

11.3.7 Load with Automatic Switching

☐ The load must be **non-program-controlled**.

Devices such as heating elements or fan heaters have their own automatic switch-off. An integrated thermocouple ensures that the device automatically switches off upon reaching a configurable temperature threshold. The Sunny Home Manager registers this disconnection via the switching device connected to the load and also switches off the switching device for safety reasons. However, the switching device must first be able to detect whether the load is in operation or in standby mode. You have to enter this detection value. With these settings, you also avoid a premature disconnection of the load, so that it can also run for longer than the configured time period if necessary.

Heating element with automatic switch-off

When controlled via a switching device, the heating element is switched on and off depending on the availability of PV energy within the time period defined. If the automatic switch-off is activated and the water has not yet reached the set temperature at the end of the time period, the heating element can continue to draw electric current from the switching device even though the time period has expired, until the target temperature is reached and the heating element has switched to standby mode on its own. The Sunny Home Manager recognizes the standby mode of the heating element and switches the switching device off.

11.3.8 Editing Load Properties of Indirectly Communicating Loads

⚠ QUALIFIED PERSON

1. Go to **Device management** via **Configuration**.
2. In the context menu ••• of the measuring/switching device, select **Display device properties**.
3. Activate editing mode via ✎ in the section **Device details** or **Device control**.
4. Configure the settings as needed.

11.3.9 Changing Device Names

⚠ QUALIFIED PERSON

1. Go to **Device management** via **Configuration**.
2. In the context menu ••• of the measuring/switching device, select **Display device properties**.
3. Activate editing mode via ✎ in the section **Device details**.

4. Assign the device names.
5. Confirm with **[Save]**.

11.3.10 Information about the configuration of time periods

You can define one or more time periods for a load in which the Sunny Home Manager can or must switch on this load.

Length of time period

The time period in which the load should be operated must be much longer than the actual operating time so that Sunny Home Manager has enough flexibility within the time period to identify the time when energy is the cheapest.

Shorter service life of switching devices through frequent switching of loads

When setting time periods and device operating times, make sure that the load does not have to switch loads on and off unnecessarily often.

11.3.11 Setting or changing the time windows

1. Go to **Device management** via **Configuration**.
2. In the context menu ••• of the measuring/switching device, select **Device information**.
3. Activate editing mode via ✎ in the section **Device control**.
4. Set the time period as needed in the section **Setting the time period** via **[+ Add time period]**. In doing so, observe the information in Controlling Loads via a Time Period (see Section 11.1.6.2 "Controlling Loads via a Time Period", page 56).
5. When the settings are complete, confirm with **[Save]**.

11.3.12 Deleting a Time Period

Number of time periods

Time periods can be deleted if you have configured more than one time period for a load.

1. Go to **Device management** via **Configuration**.
2. In the context menu ••• of the measuring/switching device, select **Device information**.
3. Activate editing mode via ✎ in the section **Device control**.
4. In the context menu ••• of the time period to be deleted, select **[Delete time period]**.
5. Confirm with **[Save]**.

11.4 Integrating heat pumps as loads

11.4.1 Requirements for integrating heat pumps

☐ The compatible relay must have been installed in the system and commissioned in accordance with the manufacturer specifications.

☐ The separate relay must accept a 230 V_{AC} input signal.

☐ The heat pump must have been installed in the system and commissioned in accordance with the manufacturer specifications.

11.4.2 The goal of integration into energy management

The SG Ready label, which was introduced in 2012 by the Bundesverband für Wärmepumpen (BWP) e.V. (German Heat Pump Association), certifies heat pumps that can communicate with the utility grid due to an interface-compatible system component - the Smart Grid Ready interface.

In combination with a PV system and control via the Sunny Home Manager, heat pumps can make a major contribution to increasing self-consumption, as they are well suited to "shifting" loads.

Heat pumps as so-called load-variable loads can be

- switched on in a targeted manner in order to store solar power, which is not to be fed into the local grid, in the form of thermal energy and use it to cover heating requirements.
- switched off in a targeted manner in order to reduce consumption peaks or avoid them altogether.

11.4.3 Functions of SG Ready heat pumps

This SG Ready interface enables high grid efficiency and efficient load control.

- Grid operators can access this interface.
  In the event of power peaks or shortages, the grid operator can issue "instructions" to SG Ready heat pumps: For example, he can temporarily shut them down or ramp up their operation.

Regardless of the current demand, SG Ready heat pumps can:

- convert surplus electricity into thermal energy
- temporarily store energy in a hot water or buffer storage tank, for example, in order to temporarily relieve the utility grid on the one hand, and on the other hand to be able to retrieve this temporarily stored energy for own use as needed.

Supported by selected devices only

Only selected devices support the connection to the Sunny Home Manager (see technical information "SMA SMART HOME - Compatibility list for the Sunny Home Manager 2.0").

11.4.4 Integration of heat pump into the system

11.4.4.1 Connection via compatible radio-controlled socket and separate relay

The radio-controlled socket can switch a relay with potential-free output, which can be controlled on the input side via 230 V_{AC}. The actual load, in this case the heat pump, is put into operation by the output of the relay. If 230 V_{AC} is applied to the relay via the radio-controlled socket, the SG Ready control input is active and the heat pump starts or is set to the programmed operating mode, e.g. to preferentially consume excess PV energy.

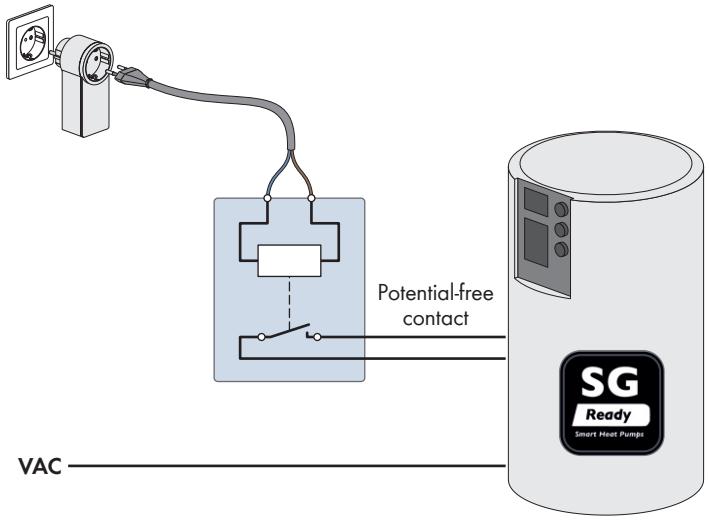


Figure 11: Connection of a heat pump via compatible radio-controlled socket and separate relay

11.4.4.2 Connection via compatible relay

The SG Ready control input is connected directly via a compatible relay.

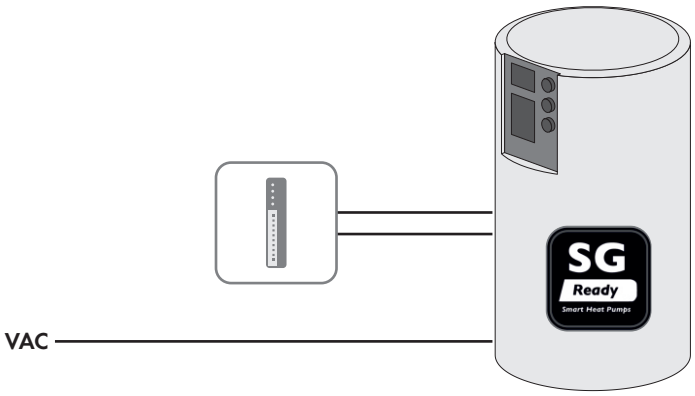


Figure 12: Connection of a heat pump via compatible relay

11.4.4.3 Switching of heat pump via compatible radio-controlled socket and separate relay

1. Include and add radio-controlled socket to the system (see Section 10.4.1 "Adding a Radio-Controlled Socket", page 49).
2. Connect the heat pump to the radio-controlled socket and define basic load characteristics, including, for example, the correct power consumption, the minimum running time and that the heat pump should only be switched (see Section 11.4.4.1 "Connection via compatible radio-controlled socket and separate relay", page 64).
3. Configure the time period (see Section 11.3.11 "Setting or changing the time windows", page 63).

11.4.4.4 Switching the heat pump directly via compatible relay

1. Adding a compatible relay to the system e.g. for a Modbus device: set up Modbus connection and include Modbus device in the system; add Modbus device (see Section 10.4.2 "Adding Modbus Device", page 50).
2. Connect the heat pump to the compatible relay and define basic load characteristics, including, for example, the correct power consumption, the minimum running time and that the heat pump should only be switched (see Section 11.4.4.2 "Connection via compatible relay", page 64).
3. Configure the time period (see Section 11.3.11 "Setting or changing the time windows", page 63).

11.4.5 Configuring a heat pump as directly communicating loads via the SEMP protocol

1. Go to **Device management** via **Configuration**.
2. Open the dialog **Add devices** via ⊕.
3. Activate the button **SMA device or load**.
4. Select the **Energy load** [**Heat pump**].
5. In the section **Integration into the energy management**, activate the button **Measuring and switching**.
6. Select [**Continue**] to confirm.
7. Give the load a designation in the field **Device name**.
8. If the **Type of load** was not defined by the **Energy load**, select the **Type of load** [**Heater & hot water**] via the drop-down menu.
9. Set the **Priority** of the load.
10. Select **[Continue]** to confirm.
11. Make the optional settings.

11.4.6 Configuring a heat pump as directly communicating loads via EEBus interface

1. Go to **Device management** via **Configuration**.
2. Open the dialog **Add devices** via ⊕.
3. Activate the button **Device via EEBus**.
4. Select [**Continue**] to confirm.
   ☑ Coupling is being started.
5. If several devices of the Sunny Home Manager 2.0 are found, select the device to be coupled.
6. Select [**Continue**] to confirm.
   ☑ The coupling is complete.

Also see:

- Configuring directly communicating loads ⇒ page 60

11.4.7 Configuring a heat pump as an indirectly communicating load

⚠ QUALIFIED PERSON

Requirement:

☐ A radio-controlled socket must have been configured (see Section 10.4.1 "Adding a Radio-Controlled Socket", page 49).

Procedure:

1. Go to **Device management** via **Configuration**.
2. In the context menu ●●● of the measuring/switching device, select **Configure as load**.
3. Select the **Energy load** [**Heat pump**].
4. In the section **Integration into the energy management**, activate the button **Switching only**.
5. Select [**Continue**] to confirm.
6. Give the load a designation in the field **Device name**.
7. If the **Type of load** was not defined by the **Energy load**, select the **Type of load** [**Heater & hot water**] via the drop-down menu.
8. Set the **Priority** of the load.
9. Select **[Continue]** to confirm.
10. Make the optional settings.

Also see:

- Configuring indirectly communicating loads ⇒ page 59

12 Visualization of the energy management

12.1 Energy balance overview

To access the energy balance, navigate on the side menu **Monitoring** to **Energy balance**.

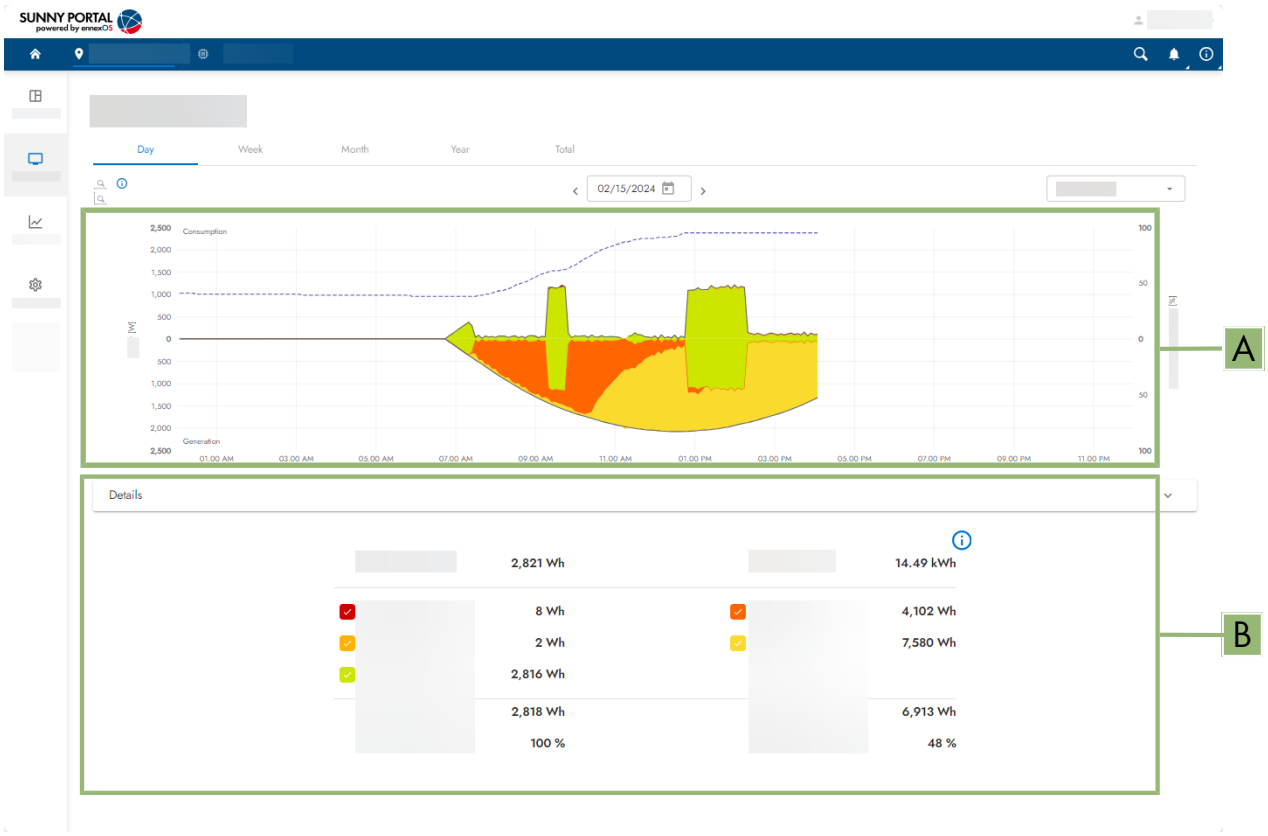


Figure 13: Energy balance overview of a Sunny Home Manager system

Position	Designation	Description
A	Energy balance	Shows the current values for grid-supplied power, grid feed-in, battery and direct consumption.
B	Details	Provides detailed information on • Total consumption • Internal power supply • Self-sufficiency quota • Total generation • Self-consumption • Self-consumption quota These values can be downloaded in the dropdown menu "Details".

12.2 Load balance overview

To access the load balance, navigate on the side menu **Monitoring** to **Consumer balance**.

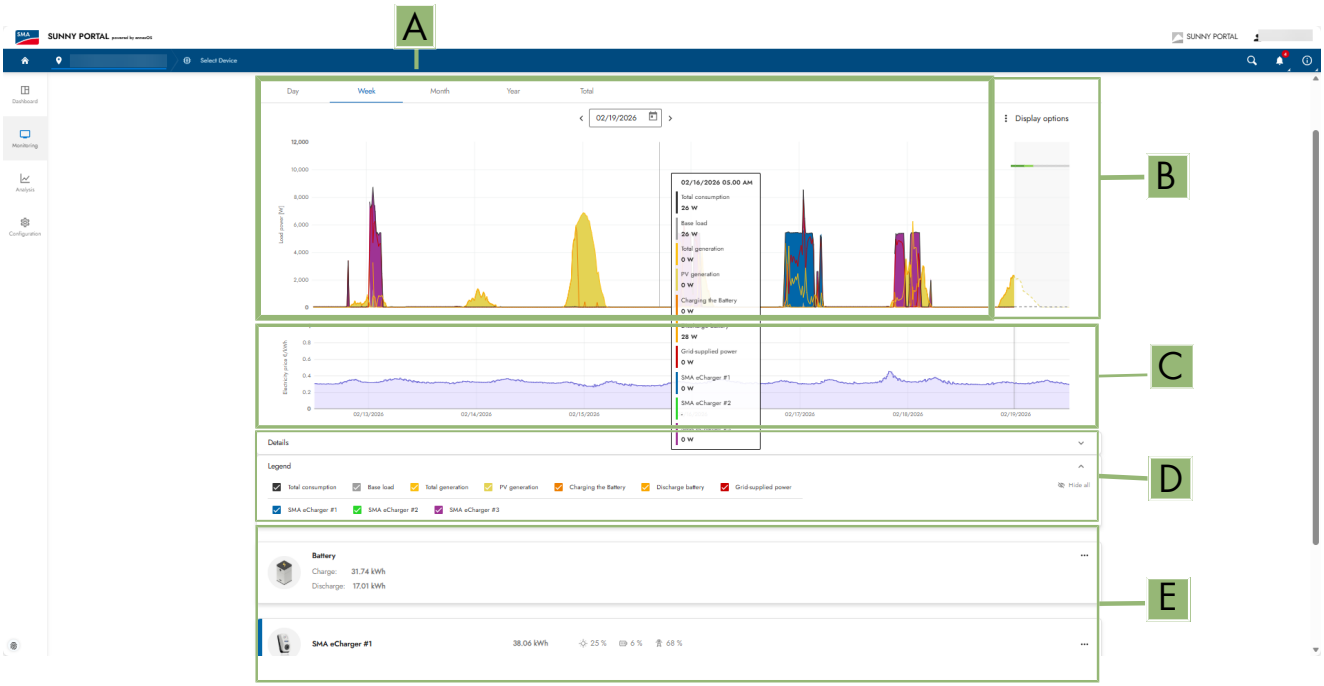


Figure 14: Load balance overview of a Sunny Home Manager system

Position	Designation	Description
A	Load balance	Shows the load balance relating to the system data.
B	Forecast	You can show and hide the forecast via the display options. 'Forecast' is selected by default. The forecast is generated based on current total consumption, base load, PV generation, battery charging, battery discharging, grid-supplied power and configured loads and includes the weather forecast. The gray dashed line indicates the consumption forecast.
C	Electricity price	The electricity rate can be shown via the display options. The electricity rate indicates when which load was active at which rates. The electricity rates configured by you are shown.

Position	Designation	Description
D	Details	Shows the detailed data including a download option.
	Legend	Provides information on the graphic representation and allows data to be shown or hidden.
E	Battery and load overview	Illustration of the battery and loads of the system (if present). Device properties and control can be edited or time periods configured, for example, via the context menu ••• of the loads. The device dashboard can also be opened via the context menu •••. A time bar shows the configured time windows, the running times of the consuming device and the scheduling by the Sunny Home Manager.

13 User Management

13.1 User Groups

If you have the user role **PV system administrator**, you can create further users in Sunny Portal so that they have access to your Sunny Portal system. You can assign various roles to users. The roles are differentiated by the rights they grant to users in your Sunny Portal system. The following roles are possible:

- Guest
- User
- Installer
- Administrator

For detailed information regarding user administration, see the operating manual of Sunny Portal powered by ennexOS.

13.2 User rights

The following rights can be assigned to the individual user groups (see Section 13.1 "User Groups", page 70):

Rights	Role			
	Guest	User	Installer	Administrator
Save diagram data	–	✓	✓	✓
View and change user information	–	✓	✓	✓
Change Sunny Portal password	–	✓	✓	✓
Change system password	–	–	✓	✓
View system properties	✓	✓	✓	✓
Change system properties	–	–	✓	✓
View report configuration	–	✓	✓	✓
Change report configuration	–	–	✓	✓
View and read out device properties	–	✓	✓	✓
Change device properties	–	–	✓	✓
Add and configure switching devices (radio-controlled sockets, Modbus devices) (only applies to Sunny Home Manager systems)	–	✓	✓	✓
Add and configure loads (EEBus/SEMP devices) (only applies to Sunny Home Manager systems)	–	✓	✓	✓
Replace Sunny Home Manager	–	–	✓	✓
Delete Sunny Home Manager	–	–	✓	✓
Reassign the Sunny Home Manager to the system	–	–	✓	✓
Delete the Sunny Home Manager system	–	–	–	✓

Rights	Role			
	Guest	User	Installer	Administrator
Add inverter (only applies to Sunny Home Manager systems)	–	–	✓	✓
Replace inverter (only applies to Sunny Home Manager systems)	–	–	✓	✓
Delete inverter (only applies to Sunny Home Manager systems)	–	–	✓	✓
Set inverter comparison	–	–	✓	✓
Set communication monitoring	–	–	✓	✓
Set the meter configuration	–	–	✓	✓
View event monitor	–	✓	✓	✓
Read off the software package version	–	✓	✓	✓
View user management	–	–	–	✓
Create and delete users and assign roles	–	–	–	✓
View energy management	–	✓	✓	✓
Set energy management	–	✓	✓	✓
Set tariffs	–	✓	✓	✓
View and configure grid management services	–	–	✓	✓

13.3 Add new user

Requirements:

☐ You are logged in as an **Administrator** in Sunny Portal powered by ennexOS.

Procedure:

1. Go to **User administration** via **Configuration**.
2. Open the settings options by clicking on ⊕ in the table.
3. Fill out the form.
4. Confirm with **[Save]**.

13.4 Changing User Rights or User Information

Requirements:

☐ You are a system **administrator**.

Procedure:

1. Go to **User administration** via **Configuration**.
2. Open the settings options via ✎ in the row for the user whose rights need to be changed.
3. Make the required changes.
4. Confirm with **[Save]**.

14 Troubleshooting

14.1 Error messages on the Sunny Home Manager

LED status	Cause and corrective measures
Status LED: off	The Sunny Home Manager is not supplied with voltage. **Corrective measures:** • Connect the Sunny Home Manager to the voltage supply .
Status LED: flashing red	The Sunny Home Manager cannot establish the connection to Sunny Portal automatically. **Corrective measures:** • Use the Sunny Home Manager Assistant.
Performance LED: off	The Sunny Home Manager has not been registered in Sunny Portal yet. **Corrective measures:** • Register the Sunny Home Manager in Sunny Portal (see Section 9.3 "Creating a Sunny Home Manager System in Sunny Portal Powered by ennexOS", page 34). If the Sunny Home Manager is used as an energy meter, it does not have to be registered - and the performance LED never glows.
Performance LED: glowing red	The Sunny Home Manager cannot establish the connection to Sunny Portal automatically. One or several of the devices in the system is/are in a fault state. This could not be reported yet to Sunny Portal due to the connection failure. **Corrective measures:** • Check connection and configuration of all devices in the system.
Performance LED: flashing red	The Sunny Home Manager cannot establish the connection to Sunny Portal automatically. **Corrective measures:** • Ensure that the Sunny Home Manager is correctly connected to the router (see Section 8.5.3 "Connecting the Sunny Home Manager to the Router", page 32). • Use the Sunny Home Manager Assistant.

Also see:

- Sunny Home Manager operating states ⇒ page 18
- Product Description ⇒ page 16

14.2 Problems during Registration with the System Setup Assistant

14.2.1 The Sunny Home Manager is Not Found with the Identification and Registration ID entered

The system setup assistant cannot find any Sunny Home Manager with the entered identification and registration ID.

Cause	Corrective measures
The registration procedure was previously initiated but not completed.	• Ensure that the entries are correct.

Cause	Corrective measures
The registration procedure was previously initiated but not completed.	• Perform a complete reset of the Sunny Home Manager Resetting the Sunny Home Manager.
The Sunny Home Manager is not correctly connected to the router.	• Ensure that the Sunny Home Manager is correctly connected to the router Connecting the Sunny Home Manager to the Router.
DHCP is not activated on your router or there is a proxy server in your network. For this reason, Sunny Home Manager cannot establish a connection to Sunny Portal.	• Establish the connection to Sunny Portal using the Sunny Home Manager Assistant Using the Sunny Home Manager Assistant.
The Sunny Home Manager has already been assigned to a system in Sunny Portal powered by ennexOS with your email address.	• Delete the Sunny Home Manager from the PV system Deleting devices from Sunny Portal.
The Sunny Home Manager is assigned to a different system in Sunny Portal powered by ennexOS, for instance, if you bought the Sunny Home Manager second-hand.	• If possible, contact the previous owners and ask them to delete the Sunny Home Manager system in Sunny Portal.

14.2.2 The Connection to the Sunny Home Manager is Not Established

The system setup assistant cannot establish a connection to the Sunny Home Manager.

Cause	Corrective measures
The Sunny Home Manager is not correctly connected to the router.	• Ensure that the Sunny Home Manager is correctly connected to the router Connecting the Sunny Home Manager to the Router.
The Sunny Home Manager is assigned to a system in Sunny Portal powered by ennexOS with your email address.	• Delete the Sunny Home Manager from the PV system Deleting devices from Sunny Portal.
The Sunny Home Manager is assigned to a different system in Sunny Portal, for instance, if you have bought the Sunny Home Manager second-hand.	• If possible, contact the previous owners and ask them to delete the Sunny Home Manager system in Sunny Portal.
The Sunny Home Manager is not correctly connected to the router.	• Ensure that the Sunny Home Manager is supplied with voltage. • If the Sunny Home Manager is correctly connected to the router and is supplied with voltage but all LEDs remain off, contact Service.
The Sunny Home Manager is not supplied with voltage. In this case, all LEDs on the Sunny Home Manager will be off.	• Ensure that the Sunny Home Manager is supplied with voltage. • If the Sunny Home Manager is correctly connected to the router and is supplied with voltage but all LEDs remain off, contact Service.
The SMA device is not correctly connected to the router or is not supplied with voltage.	• Ensure that the SMA device is correctly connected to the router and is supplied with voltage (see SMA device documentation).

Cause	Corrective measures
The SMA device is already registered in Sunny Portal via Webconnect.	• Delete the SMA device from the Webconnect system or deactivate the data reception of the device in the Webconnect system.
The SMA device is not located in the same local network as the Sunny Home Manager.	• Connect the SMA device to the same router/ network switch as the Sunny Home Manager.
The network cable that connects the SMA device to the router/network switch is not suitable for 100 MBit/s.	• Use a network cable suitable for Speedwire (for network cable requirements, see the Speedwire device documentation).
DHCP is not activated in your router.	• Activate DHCP in the router. • If your router does not support DHCP, configure the static network settings on the Speedwire device using SMA Connection Assist. You can obtain the SMA Connection Assist software free of charge from the download area at www.SMA-Solar.com.
The router/network switch used in the network deactivated the LAN ports due to apparent inactivity to save energy. As a result, it is not possible to establish any connection to the SMA device.	• Configure the router/network switch so that the LAN ports are not deactivated.

14.2.3 New Devices are Not Listed in the System Setup Assistant

The system setup assistant lists none or not all of the new SMA devices that are connected via Speedwire/Ethernet.

Cause	Corrective measures
The IGMP snooping function is activated in the network switch used in the network. In this case this means that the connection to the SMA device is interrupted due to apparent inactivity, and cannot be subsequently restored.	• Deactivate the "IGMP snooping" function in the network switch if this is possible. Otherwise, replace the network switch.
The firewall or IP filter settings are not correct.	• Adjust the firewall or IP filter settings (see firewall- or router documentation).

14.2.4 All Devices are Shown in the System Setup Assistant with a Warning Symbol

After you have entered the system password and added devices, some devices are shown with a warning symbol in the system setup assistant.

Cause	Corrective measures
There is a different installer password configured in the devices with warning symbols.	1. Select [**Skip forward**] in the system setup assistant and finish registration without selecting the devices. 2. Set a uniform installer password for all devices via the inverter user interface. 3. If you do not know the password set on each device, apply for a personal unlocking key (PUK) for each device from Service. 4. Enable each device with the corresponding PUK. Then set a uniform installer password in all devices. 5. Log in to Sunny Portal and add the devices to the Sunny Home Manager system as new devices using the configuration wizard.

14.2.5 The Devices are Not Detected

While the system setup assistant is performing the device search, the status LED of the Sunny Home Manager first flashes red for 1 to 2 minutes. Subsequently, the status LED glows green again.

Cause	Corrective measures
Device detection takes a few minutes longer.	• No measures required.

14.3 Problems with Integration of Devices

14.3.1 The Sunny Home Manager Does Not Detect Any Devices

Cause	Corrective measures
The devices must be connected to the local router via Ethernet/Wi-Fi and also be able to communicate with the Sunny Home Manager:	• All Ethernet/Wi-Fi devices in your PV system must be in operation. • The Ethernet/Wi-Fi devices must be connected to the router/network switch correctly. • The network cable connecting the Ethernet devices with the router/network switch must be suitable for 100 MBit/s. • The Ethernet devices must be in the same local network as Sunny Home Manager. • DHCP must be activated on the router. • The router must have an Internet connection. • For Ethernet devices with integrated Bluetooth interface, the NetID of 0 must be set. In this way, Bluetooth is deactivated. • The LAN ports on the router / network switch may not be switched off in the event of apparent inactivity (see router / network switch manual). • The network switch may not use IGMP snooping (see network switch manual).

14.3.2 The Connection Attempt for New Devices Fails

When you **register a new device** with the configuration wizard, the error message **Connection failed** appears.

Cause	Corrective measures
A password other than the default password 1111 or the system password of the current system can be set for the new device.	• Temporarily change the system password of the current system to the password of the new SMA device.

14.3.3 Parameter Lists are Not Updated After Device Replacement

After a **Device replacement** using the commissioning wizard, the current parameters are not displayed in the parameter list.

Cause	Corrective measures
The new parameters have not yet been transferred to Sunny Portal powered by ennexOS.	• Call up the parameter list again later.

14.3.4 New Devices are Not Displayed after Pairing

After pairing, the new **EEBus device** is not displayed in Sunny Portal powered by ennexOS.

Cause	Corrective measures
Pairing exceeded the time window of 2 minutes.	• Repeat the pairing of the load and Sunny Home Manager.
Connect the Sunny Home Manager to another EEBus device.	• The new EEBus device can be identified by the serial number. Check the serial numbers of the devices connected to the Sunny Home Manager in **Device management** in Sunny Portal powered by ennexOS. • Repeat the pairing with the required load.

14.3.5 LEDs That Can Be Controlled Are Not Displayed

In the portal, not all **LED lamps** that can be controlled by the Sunny Home Manager are displayed in the drop-down list for the status display in the **AVM FRITZ!Box Smart Home control** area. I cannot select the LED lamp I want.

Cause	Corrective measures
The LED lamps are registered in the FRITZ!Box. There you can assign an individual name for each LED lamp. This is read out by the Sunny Home Manager and displayed together with the specific identification number in the portal in the AVM FRITZ!Box Smart Home control area. You may have entered too many characters when naming the individual LED lamps.	• Choose a short name for the naming of the LED lamps in the FRITZ!Box. Use as few special characters as possible.

14.3.6 The Current Status Display is Not Available

In the portal, the line **Current status display via:** is not displayed in the **AVM FRITZ!Box Smart Home control** area.

Cause	Corrective measures
The maximum specified character length was exceeded when registering the LED lamps.	• Choose a short name for the naming of the LED lamps in the FRITZ!Box. Use as few special characters as possible.

14.4 Problems with Data Update

14.4.1 The Automatic Firmware Update Is Not Working

The automatic firmware update is not working and there is a corresponding error message.

Cause	Corrective measures
The Sunny Home Manager cannot establish a connection to the SMA Update Portal because there is a proxy server in your network.	• Configure the settings of your network in such a way that the SMA Update Portal https://Update.SunnyPortal.de can be reached.

14.4.2 The New Firmware Is Not Updated

Cause	Corrective measures
The firmware update is always a 2-step process. First, it is downloaded and installed. At this point, the message "Update successful..." already appears. The update is only active after a reboot, which the Sunny Home Manager performs the night after the update.	• Check the update again later. • If necessary, perform a manual device reboot (as per the device manual).

14.4.3 Device Updates Are Not Being Loaded

Cause	Corrective measures
Some devices can only get their update directly since the update file is too large.	• Check the status or event messages of the affected device. If necessary, perform a manual device update (as per the device manual).

14.4.4 The Sunny Home Manager Does Not Restart

Cause	Corrective measures
The device is not available.	• Connect the device and perform the restart again (see Section 10.7 "Resetting the Sunny Home Manager", page 51). • In an emergency, you can also trigger the restart directly on the Sunny Home Manager: Press and hold the reset button on the device with a pointed object until the LEDs stop flashing red (at least 6 seconds).

14.5 Problems when Configuring and Controlling Radio-Controlled Sockets

14.5.1 The Time Period Cannot Be Set

When configuring the radio-controlled sockets, the time period cannot be set as desired.

Cause	Corrective measures
The time period must be at least as long as • the maximum program runtime **or** the sum of the minimum switch-on time and the minimum switch-off time and the sum of the device operating time and the minimum switch-off time set for the time period.	• When setting the time period, take into consideration the maximum program runtime or the minimum switch-on and switch-off time and the set device operating time.

14.5.2 The Sunny Home Manager does not switch the device

Cause	CORRECTIVE MEASURES
The Sunny Home Manager does not switch your device	• From the device dashboard in the menu under **Consuming device mode** the value [**Automatic**] must be selected.

14.5.3 The Sunny Home Manager Cannot Control the Edimax Smart Plug Switch

Cause	Corrective measures
The password of the Edimax smart plug switch is unknown to the Sunny Home Manager.	• Enter the password of the Edimax smart plug switch in the Sunny Home Manager properties (see Section 10.3.5 "Configuring Edimax Smart Plug", page 41).

14.5.4 The Sunny Home Manager Does Not Find the Edimax Smart Plug Switch

The Edimax smart plug switch registered in the local network is not found by the Sunny Home Manager.

Cause	Corrective measures
This might be a smart plug switch by Edimax, which is not supported by the Sunny Home Manager.	• Check whether the smart plug switch by Edimax is supported by the Sunny Home Manager.

14.5.5 The Sunny Home Manager is Not Communicating with the Fritz!Box

Cause	Corrective measures
The smart home settings in the Fritz!Box are not correct.	• If you selected the option **Login without password** for the Fritz!Box login when you set up the smart home control, in the Fritz!Box itself under the tab **Login for access from the home network** the option **Login with keystroke** must not be activated.

14.5.6 The Sunny Home Manager Cannot Switch the AVM Radio-Controlled Socket

Cause	Corrective measures
In the settings of the FRITZ!Box, it is specified that the radio-controlled socket can be switched via smart home devices.	• Check whether the settings in Sunny Portal match the settings for login of the FRITZ!Boz. • In the Fritz!Box settings, select the respective device under **Home network > Smart home > Smart home devices** and click on the button for editing the properties. Got to **Manual switching** and enable the **Permit manual switching by phone, app, user interface or other smart home device** checkbox.

14.5.7 The Sunny Home Manager Cannot Connect to the AVM Radio-Controlled Socket

Cause	Corrective measures
The TR-064 interface of the FRITZ!Box might be disabled.	• The interface TR-064 must be enabled in the FRITZ!Box under network settings: Select **Home network > Home network overview > Network settings** in the FRITZ!Box settings. Then enable the **Allow access for applications** option under Home network share (see manufacturer manual).

14.5.8 The Sunny Home Manager Does Not Switch the Configured AVM Radio-Controlled Socket

The Sunny Home Manager switches my AVM radio-controlled socket even though this is not configured in Sunny Portal powered by ennexOS.

Cause	Corrective measures
An automatic switching program is stored in the FRITZ!Box.	• Delete all automatic switching programs.
The radio-controlled socket might have assumed a predefined state due to a restart, for example.	• After a restart, configure the switching state of the AVM radio-controlled socket to "Last state".

14.6 Problems with the Network

14.6.1 Using the Sunny Home Manager Assistant in case of Network Problems

The Sunny Home Manager Assistant only has to be used in exceptional cases, such as when commissioning a system without DHCP function. The Sunny Home Manager Assistant then provides a permanent IP address for the Sunny Home Manager.
The Sunny Home Manager Assistant helps you configure the Sunny Home Manager for your network if the Sunny Home Manager does not automatically connect to Sunny Portal powered by ennexOS.

In addition, you can use the Sunny Home Manager Assistant to display the current connection status to Sunny Portal powered by ennexOS and the network settings, and save these as a log file. If servicing should be necessary, the Service can use this log file to analyze the problem.

The Home Manager Assistant was successfully tested on the operating systems listed here. Firewall releases may have to be confirmed upon first use. Proper functioning is not guaranteed on significantly newer operating systems.

- Microsoft Windows Version Vista
- Linux Kernel 2.6.12 with Java Runtime Environment version 6
- Apple macOS version 1.6 with Java Runtime Environment version 6

14.6.2 Using the Sunny Home Manager Assistant

Procedure:

1. Use a network cable to connect the computer to the same router to which the Sunny Home Manager is also connected.
2. In the download area at www.SMA-Solar.com, download the Sunny Home Manager Assistant for the operating system of your computer.
3. Start the Sunny Home Manager Assistant by double-clicking on the file name.
4. Follow the instructions given in the Sunny Home Manager Assistant.

14.7 Messages in the Event Monitor

14.7.1 Messages regarding active power limitation

14.7.1.1 Supplied Power Exceeded the Permitted Value Several Times

Cause	Corrective measures
Although the function **Limitation of active power feed-in** is activated, more than the maximum permitted active power has been fed into the utility grid.	• Ensure that the feed-in meter is configured correctly (see Section 10.3.14 "Changing the extended configuration", page 44). • Ensure that the parameter **Operating mode active power setting** must be set to **Active power limitation P via system control** or to **External specification** for the PV and hybrid inverters.

14.7.1.2 Active Power Limitation Deactivated due to Incorrect Configuration

Cause	Corrective measures
The function **Limiting of the active power feed-in** was deactivated by Sunny Home Manager because the system configuration in Sunny Portal was faulty.	• This message can appear while making changes to the Sunny Home Manager system, e.g. upon device replacement. In this case, no action is needed. • If the message appears over an extended time period, contact Service.

14.7.1.3 act. power limitation activated w/o regard to own consumption

Message in the system logbook: **Disturbance**

Cause	Corrective measures
The function **Limiting of the active power feed-in** is faulty because there is no data from the feed-in meter. Risk of yield loss because the self-consumption of the household cannot be taken into account.	• Ensure that the feed-in meter is working and correctly connected.

14.7.1.4 Inverter Fails to Respond to Active Power Limitation

Cause	Corrective measures
At least one inverter is not responding to limit the active power feed-in. In this case, the Sunny Home Manager initiates stronger active power limitation in the remaining inverters. Consequently, the maximum permitted active power feed-in is complied with. If the message **Fed-in power has repeatedly exceeded the permitted value** appears on the same day, an error is present.	• Ensure that the parameter **Operating mode active power setting** must be set to **Active power limitation P via system control** or to **External specification** for the PV and hybrid inverters.

14.7.2 Messages regarding communication via data exchange protocol

14.7.2.1 Information on the Messages Regarding Communication via Data Exchange Protocol

Devices having a specific interface for data exchange, e.g. SEMP or EEBus, can communicate directly with the Sunny Home Manager via a so-called EM (Energy Management) gateway.

The following placeholders are used:

- XXXX - is a placeholder for the used data exchange protocol SEMP or EEBus
- YYYY - is a placeholder for the respective 4-digit error number

14.7.2.2 EM Gateway Not Found

Message in the system logbook: **EM gateway was not found: XXXX, name:**

Cause	Corrective measures
The gateway is not connected to the local network.	• Check whether all network cable plugs are inserted and locked.
The voltage supply of the gateway is faulty.	• Check whether the power plug of the gateway is plugged into the outlet.
The gateway could not be found by the Sunny Home Manager.	• Restart the gateway (see manual of the gateway).
The Sunny Home Manager and the gateway are located in different local networks.	• Connect the gateway and the Sunny Home Manager to the same network switch/router.
The Sunny Home Manager and the gateway are configured for different IP subnets.	• If your router supports DHCP, configure the Sunny Home Manager (default setting) and the gateway to DHCP (see manual of the gateway). • If your router does not support DHCP, manually assign IP addresses in the same subnet for the Sunny Home Manager and the gateway (see manual of the respective device).

Cause	Corrective measures
The voltage supply of the device is faulty.	• Check whether the power plug of the device is plugged into the outlet.
The device is not connected to its gateway.	• Check whether the communication between the device and the gateway is working. The device might be outside the range of its gateway (e.g. with power-line communication).
The device could not be found by the Sunny Home Manager.	• Restart the device (see manual of the device).
One or more devices are not correctly configured in the gateway or for the smart grid.	• Configure the device for its gateway (see manual of the gateway). • Configure the device for the smart grid (see manual of the respective device).

14.7.2.3 Communication with the EM Gateway Disturbed

Message in the system logbook: **Communication with the EM gateway disturbed: XXXX, name:**

Cause	Corrective measures
The gateway is not connected to the local network.	• Check whether all network cable plugs are inserted and locked.
The gateway is not communicating correctly with the Sunny Home Manager.	• Restart the gateway (see manual of the gateway).
The device is not communicating correctly with its gateway.	• Check whether the communication between the device and the gateway is working. The device might be outside the range of its gateway (e.g. with power-line communication). • Restart the gateway (see manual of the gateway). • Restart the device (see manual of the device).

14.7.2.4 EM Gateway Has Incompatible Firmware

Message in the system logbook: **EM gateway has incompatible firmware: XXXX, name:**

Cause	Corrective measures
The supported firmware version is not installed on the gateway.	• Update the gateway to the supported firmware version (see manual of the gateway).

14.7.2.5 EM Communication Fault

Message in the system logbook:

EM communication:
An internal error has occurred (error number: YYYY**)**

Cause	Corrective measures
A software error has occurred on the Sunny Home Manager.	• Reset the Sunny Home Manager (see Section 10.7 "Resetting the Sunny Home Manager", page 51)

15 Decommissioning

15.1 Decommissioning the Sunny Home Manager

⚠ QUALIFIED PERSON

Procedure:

1. Disconnect the Sunny Home Manager from the voltage supply.
2. Remove the cables and dismount the Sunny Home Manager.
3. Disconnect the Sunny Home Manager from the voltage supply.

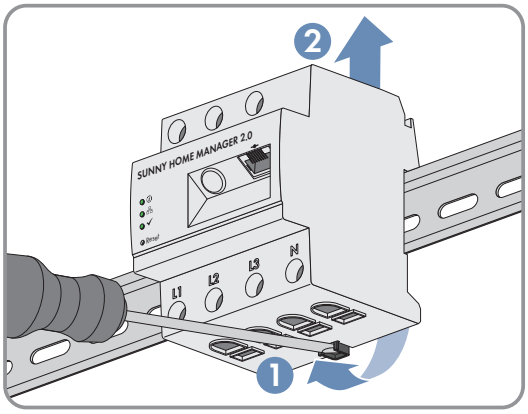
⚠ DANGER

Danger to life due to electric shock

Lethal voltages are present at the connection point of the utility grid.

- Disconnect the connection point from the utility grid via the disconnection device (e.g. in the distribution board).

4. Remove the cables and dismount the Sunny Home Manager.
5. Unplug the network cable from the network terminal of the Sunny Home Manager.
6. Unplug the other end of the network cable from the router.
7. Remove the Sunny Home Manager from the top-hat rail:
   Press the top-hat rail locking mechanism located underneath the Sunny Home Manager downwards using a screwdriver. Tilt the lower edge of the Sunny Home Manager forwards and remove upwards from the top-hat rail.



15.2 Disposing of the Product

⚠ QUALIFIED PERSON

- Dispose of the product in accordance with the locally applicable disposal regulations for electronic waste.

16 Technical Data

16.1 General Data

Width x height x depth	70 mm x 85 mm x 65 mm
Individual units DIN rail	4
Weight	0.3 kg
Mounting location	Switch or meter cabinet
Mounting type	Top-hat rail mounting
Status display	3 x LED
Self-consumption	< 3 W

16.2 Equipment

Operation and visualization	via Sunny Portal powered by ennexOS
Update function for the Sunny Home Manager and the connected SMA devices	automatically
Warranty	2 years
Certificates and approvals	www.SMA-Solar.com

16.3 Energy Manager

Connection to the local router	via Ethernet cable (10/100 Mbit/s, RJ45 plug)
Connecting SMA inverters	Ethernet or WLAN via local router
Connecting loads	1. Direct data connection (EEBus, SEMP) 2. Indirect data connection (compatible switchable devices)

16.4 Integrated measuring device

Measurement accuracy Accuracy class according to IEC 61557-12 Based on measured value	Energy Manager	Voltage: ±0.5% Current: ±0.5% Voltage: ±0.5% Active power: ±1.0% Reactive power: ±1.0% Power factor: ±1.0%
Based on IEC 62053-22 or -23 (typical)		Active Energy: class 1 Reactive energy: class 1
When using external current transformers, the respective measuring accuracy must be taken into account		
Interval	200 ms, 600 ms or 1000 ms	

16.5 Maximum Number of Connected Devices

Total number of devices in the system	up to 26
• of which devices as loads in active energy management	up to 12

16.6 Inlets (Voltage and Current)

Overvoltage category	300 V III
Measuring category	300 V CAT III
Nominal voltage	110 V_{AC} / 230 V_{AC} / 400 V_{AC}
Frequency	50 Hz / 60 Hz
Nominal current/limiting current per line conductor	5 A / 63 A
Short-circuit load carrying capacity	max. 6 kA
Connection cross-section	10 mm² to 25 mm² (for application up to 63 A)
Torque for screw terminals	2.0 Nm

16.7 Ambient Conditions in Operation

Ambient temperature	-20°C to +35°C
Storage temperature range	-20°C to +60°C
Pollution Degree	2
Protection class (as per IEC 62103)	II
Degree of protection (as per IEC 60529)	IP20
Maximum permissible value for the relative humidity (non-condensing)	5% to 90%
Altitude above MSL	0 m to 2000 m

17 Accessories

PV production meter when using third-party inverters	SMA Energy Meter

18 EU Declaration of Conformity

within the scope of the EU directives

- Electromagnetic compatibility 2014/30/EU (29.3.2014 L 96/79-106) (EMC)
- Low Voltage Directive 2014/35/EU (29.3.2014 L 96/357-374) (LVD)
- Restriction of the use of certain hazardous substances 2011/65/EU (L 174/88, June 8, 2011) and 2015/863/EU (L 137/10, March 31, 2015) (RoHS)

SMA Solar Technology AG confirms herewith that the products described in this document are in compliance with the fundamental requirements and other relevant provisions of the aforementioned directives. More information on the availability of the entire Declaration of Conformity can be found at https://www.sma.de/en/ce-ukca.

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