

sonnen

energy is yours

Manual | for Electricians and operators
sonnenKNX Module

IMPORTANT

- ▶ This entire document must be read carefully.
- ▶ This document must be kept for reference purposes.

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1 Information about this document

This document describes the installation and setup of the sonnenKNX module in connection with a sonnenBatterie eco 8.0 or sonnenBatterie hybrid 8.1 storage system or newer.

- Make sure you read this entire document carefully.
- Keep this document for reference purposes.

1.1 Target group of this document

This document is intended for operators and installers of the sonnenBatterie and sonnenKNX module.

Sections marked with the following note must only be carried out by individuals who belong to the target group specified therein (see Qualified experts [P. 7]).

NOTICE

Target group: authorised electricians

The actions described in this section must only be carried out by this target group.

NOTICE

Target group: trained KNX commissioning and operation experts

The actions described in this section must only be carried out by experts who have acquired detailed knowledge through KNX training.

1.2 Designations in this document

The following designations are used in this document:

Complete designation	Designation in this document
sonnenBatterie	Storage system
sonnenKNX Module	KNX module
Authorised electrician	Electrician performing the installation/Installer
Person who purchased the storage system and on whose premises the system is installed	Operator

1.3 Explanation of symbols

DANGER

Extremely dangerous situation leading to certain death or serious injury if the safety information is not observed.

WARNING

Dangerous situation leading to potential death or serious injury if the safety information is not observed.

CAUTION

Dangerous situation leading to potential injury if the safety information is not observed.

NOTICE

Indicates actions that may cause material damage.



Important information not associated with any risks to people or property.

Symbol	Meaning
►	Work step
1. 2. 3. ...	Work steps in a defined order
✓	Condition
•	List

2 Safety

2.1 Proper use

The sonnenKNX Module is an interface for providing data points of the storage system in a KNX environment. Within a KNX environment, devices are connected to each other in a network and their individual functions are defined. The data points of the storage system can be used for the following purposes:

- Visualising energy data.
- Displaying current operating mode and status of the storage system.
- Mapping special functions of the storage system.
- Individual energy management.

The data points of the KNX module are first provided to the KNX environment. The data points have to be individually programmed by a KNX expert in order to link them to other KNX subscribers. Detailed information about the data points and the programming environment can be found in the following sections.

The following points must be observed at all times in order to ensure **proper use**:

- The KNX module is a mounting rail module and must be mounted in an appropriate installation location as required by standard.
- The KNX module must be fully installed in accordance with the instructions.
- The KNX module must be electrically connected by an authorised electrician. Country-specific regulations concerning electrical installations must be observed at all times.
- The KNX module must be commissioned and programmed by a KNX expert.
- The interfaces of the KNX module must be connected in accordance with the specifications set out in the product documentation.
- The KNX module must only be used in its original condition in perfect technical order, with no unauthorised modifications.

Especially the following uses are not permissible:

- Operation of the KNX module in areas which do not meet the required ambient conditions (see Technical data [P. 12]).
- Operation in flammable environments or areas at risk of explosion.

Operating the KNX module

- The KNX module may only be operated as described in the product documentation.



Failure to comply with the conditions of the warranty and the information specified in this document invalidates any warranty claims.

2.2 Qualified experts

- The KNX module must be **installed** by authorised electricians only. An electrician is a person with suitable specialist training, knowledge and experience who can recognise the electrical hazards and avoid them. Installation by unqualified and/or unauthorised persons may cause injury and/or component damage.
- The KNX module must be **commissioned and configured** by a KNX expert who has acquired detailed knowledge through appropriate training and professional development.

2.3 Symbols on the product



CE mark. The product meets the requirements of the applicable EU directives.



WEEE mark. The product must not be disposed of in household waste; dispose of it through environmentally friendly collection centres.



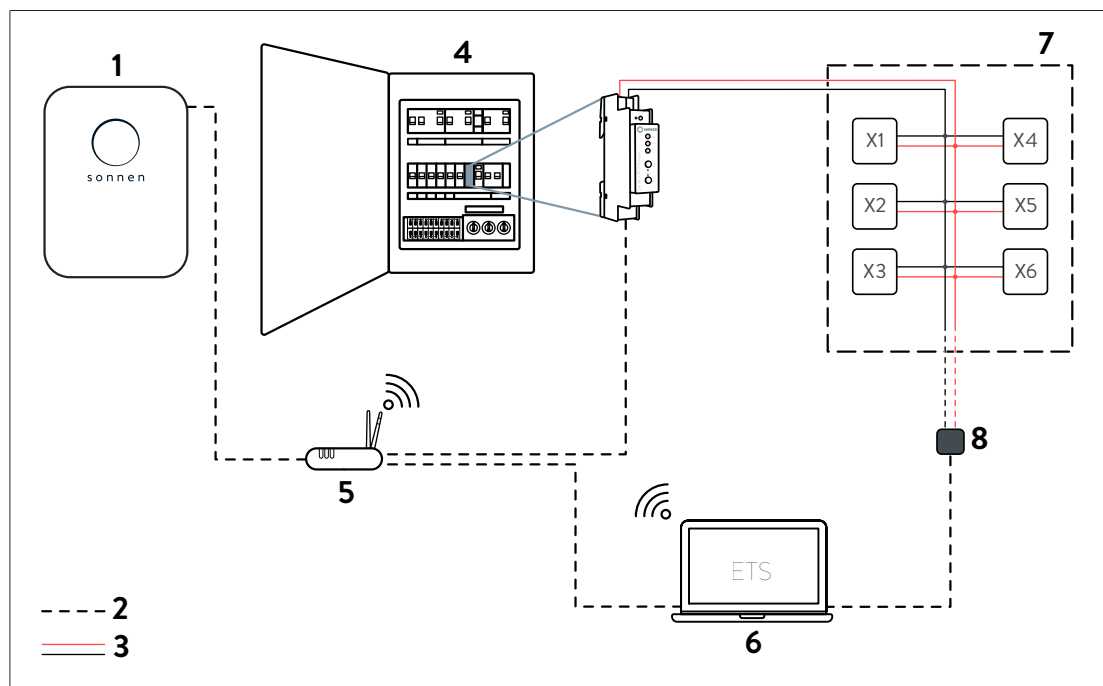
Observe the documentation. The documentation contains safety information.

3 Product description

The KNX module is a mounting rail module intended for standard-compliant mounting and electrical installation in a distribution board. The storage system and KNX module are connected to each other via Ethernet. Thanks to the Ethernet connection, the KNX module and storage system can be installed anywhere as long as they are located on the same home network. The KNX module integrates the storage system in a KNX infrastructure.

The specific data points of the storage system are individually configured using the **Engineering Tool Software (ETS)**. The buttons on the KNX module are used for programming and troubleshooting. The LEDs indicate operating statuses and communication errors on the bus.

3.1 Connection concept



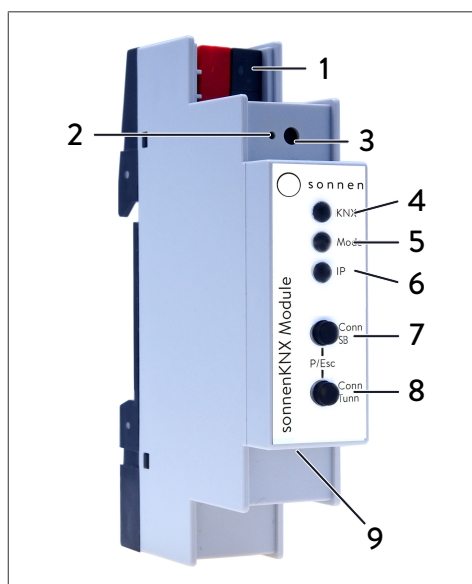
- | | |
|---|-------------------------------|
| 1 | sonnenBatterie |
| 2 | Communication line (Ethernet) |
| 3 | KNX bus (TP) |
| 4 | Distribution board |
| 5 | Internet-Router |
| 6 | ETS |
| 7 | KNX-Installation |
| 8 | Adapter |
| X | Client |

The KNX module is installed in the distribution board and connected to the KNX bus and therefore the rest of the KNX installation via the KNX control line (twisted pair cable). The voltage supply to the KNX module is also provided by the KNX bus.

The storage system is connected to the internet router and KNX module via Ethernet. Both devices must be located in the same local home network.

The individual KNX clients (including KNX module) of the KNX installation can be accessed via the *ETS* on the computer. The connection to the KNX clients is established using a programming adapter, an LAN connection or using a WLAN connection.

3.2 Device overview



- 1 KNX bus port
- 2 Programming mode LED
- 3 Programming mode button
- 4 KNX LED (multicoloured)
- 5 Mode LED (multicoloured)
- 6 IP LED (multicoloured)
- 7 Conn SB button
- 8 Conn Tunn button
- 9 LAN port

3.3 Function of the buttons and LEDs

Programming mode LED

When programming mode is active the programming mode LED (2) lights up red.

Programming mode button

Programming mode can be activated or deactivated using the button (3) or by pressing the Conn SB (7) and Conn Tunn (8) buttons at the same time.

KNX LED

The following KNX module operating statuses are indicated using the KNX LED (4):

KNX LED	Operating status
lights up green	KNX bus voltage is present.
flashes red	Telegram traffic on the KNX bus.
lights up red	Communication error on the KNX bus.

Mode LED, Conn SB button and Conn Tunn button

The mode LED (5) indicates the connection to the storage system or the connection to KNXnet/IP tunnelling.

Mode LED	Operating status
lights up green	The KNX module is running in normal operating mode.
lights up red	Programming mode is active.
flashes red	Programming mode is not active. The connection indicator is not active. The KNX module has not loaded correctly, e.g. after a download was cancelled.

The Conn SB (7) and Conn Tunn (8) buttons can be used to select the connection number for connecting to the storage system (SB) or to KNXnet/IP tunnelling (Tunn). The connection number only has to be changed if the KNX module is to be connected to multiple storage systems or multiple devices. The default setup does not envisage this usage, so none of the connection numbers need to be changed for standard use.

IP LED

The following KNX module operating statuses are indicated using the IP LED (6):

IP LED	Operating status
lights up green	The KNX module has an active Ethernet connection and valid IP settings (IP address, subnet and gateway).
lights up red	The KNX module has an active Ethernet connection and invalid IP settings (IP address, subnet and gateway) or has not yet received any IP settings from the <i>DHCP</i> server.
flashes green	IP telegram traffic.

3.4 Programming methods

There are several ways to program the KNX module using the *ETS*:

Via the KNX bus

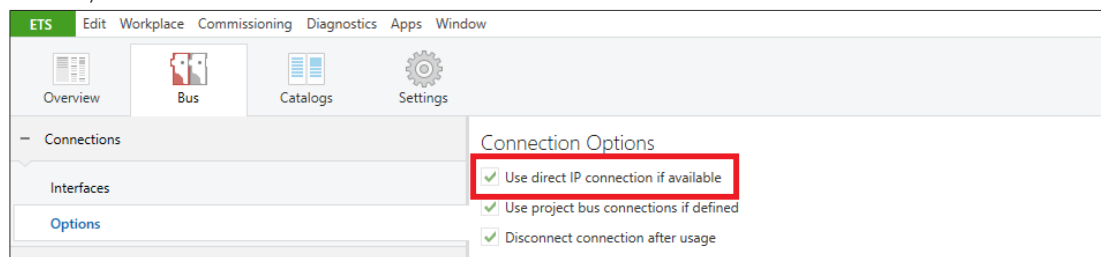
The device only needs to be connected to the KNX bus for this. The *ETS* needs an additional interface (e.g. *USB*) to the KNX bus. Both the individual address and the entire application including IP configuration can be programmed using this method. Programming via the KNX bus is recommended if no IP connection can be established.

Via KNXnet/IP tunnelling

No additional interface is required with this method. Programming via KNXnet/IP tunnelling is possible if the device already has a valid IP configuration (e.g. via *DHCP*). In this case the device is displayed on the interfaces in the *ETS* and must be selected. The download takes place from the *ETS* project.

Via direct IP connection

While KNXnet/IP tunnelling is limited to the speed of the KNX bus, a higher speed can be achieved if the download is carried out via a direct IP connection. A direct IP connection is possible if the device already has both a valid IP configuration and an individual address. To use this method, go to Bus section of the *ETS* menu, navigate to Connections > Options, and then select **Use direct IP connection if available**. The download can then be carried out directly on the KNX module.



Due to the significantly shorter transmission times it is recommended to perform downloads via direct IP connection.

3.5 Scope of delivery and additional parts

Included in scope of delivery

- sonnenKNX Module
- Data sheet

The following files can be downloaded from the sonnen Partner Portal and the landing page

- Detailed instructions (this document)
- ETS product database for the KNX module

Not included in scope of delivery

- KNX programming adapter
- Engineering Tool Software (ETS)

3.6 Factory settings

The following configuration is set at the factory:

- Individual address of the device: 15.15.255
- Configured KNXnet/IP tunnelling connection: 1
- Individual address of the tunnelling connection: 15.15.250
- IP address assignment: DHCP

NOTICE

Target group: authorised electricians

The actions described in this section must only be carried out by this target group.

Resetting to factory settings

- ▶ Disconnect the KNX bus port from the device.
 - ▶ Press the programming mode button and hold it down while reconnecting the KNX bus port.
 - ▶ Hold down the programming mode button for at least another six seconds.
- ⇒ All LEDs will flash briefly to indicate that the reset was successful.

3.7 Technical data

	sonnenKNX Module		
Ambient conditions	Housing	Plastic (PC)	
	Installation	DIN mounting rail installation using 1 MW (18 mm)	
	Weight	approx. 40 g	
	Control and display elements	2 keys and 3 LEDs (multicoloured), KNX programming key with LED (red)	
	Degree of protection (as per EN 60529)	IP20	
	Relative humidity (non-condensing)	5% ... 93%	
	Ambient temperature during operation	-5°C ... +45°C	
	Storage temperature	-25°C ... +70°C	
Ethernet	Transfer rate	10BaseT (10 Mbit/s)	
	Internet protocols	ARP, ICMP, IGMP, UDP/IP, TCP/IP, DHCP and Auto IP	
	Connections	up to 5 KNXnet/IP Tunnelling connections simultaneously	
KNX	Transmission medium	Twisted Pair (TP)	
	Interface protocol	cEMI	
	Max. APDU length	55	
	Device model	System B	
Connection	Voltage supply	KNX bus	
	Current consumption	approx. 15 mA	
	KNX port	Bus terminal for KNX (red/black)	
LAN socket		RJ-45	
	Conformity	CE mark as per	<ul style="list-style-type: none">• EMC Directive 2014/30/EU• RoHS Directive 2011/65/EU• EN 63044-3: 2018• EN 63044-5-1: 2019• EN 63044-5-2: 2019• EN 63044-5-3: 2019• EN 61000-6-2: 2019• EN 61000-6-3: 2021• EN 63000: 2018

4 Commissioning the KNX module

DANGER

Work on the electrical distributor

Danger to life due to electrocution!

- ▶ Disconnect the relevant electrical circuits.
- ▶ Secure against anyone switching on the device again.
- ▶ Check that the device is disconnected from the power supply.
- ▶ Only authorized electricians are permitted to carry out electrical work.

NOTICE

Target group: authorised electricians

The actions described in this section must only be carried out by this target group.

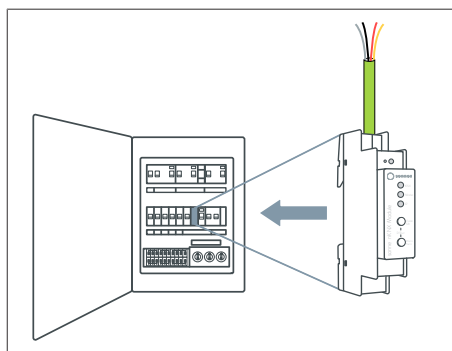
NOTICE

Target group: trained KNX commissioning and operation experts

The actions described in this section must only be carried out by experts who have acquired detailed knowledge through KNX training.

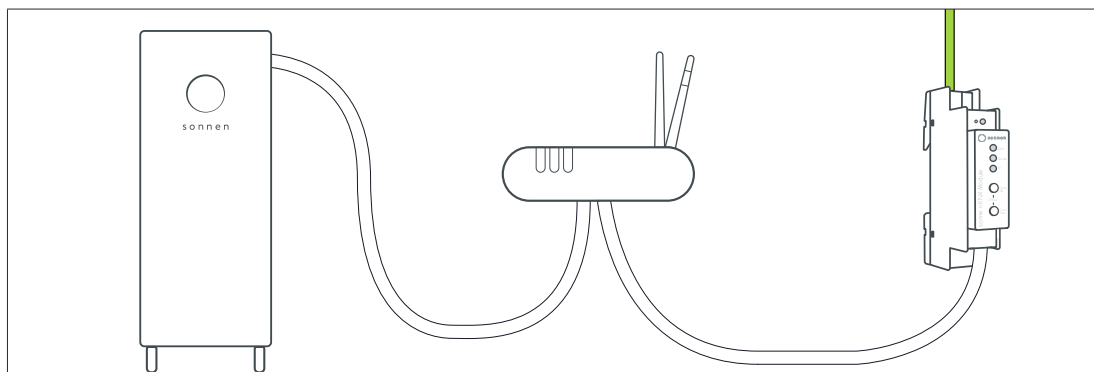
1. Install the KNX module in the distribution board

- The KNX module has a space requirement of 1 MW on a mounting rail.
- An external supply voltage does not need to be connected because the KNX module draws its power from the KNX bus. The KNX module does not work if there is no bus voltage.



- ▶ Place the KNX module on a mounting rail in the electrical distribution board.
- ▶ Wire the KNX module to the existing KNX installation.

2. Connect the KNX module to the local home network

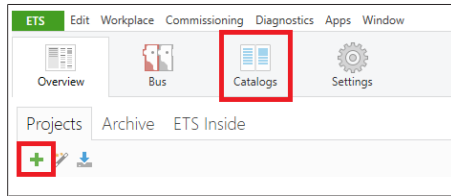


- ▶ Connect the KNX module via Ethernet line to the router of the home network.
- ▶ Ensure that the storage system is also connected to the home network router.

- Check the IP LED of the KNX module. This LED should illuminate green after a brief initialisation phase.

3. Configure data points via the ETS

- Open the *ETS*. The KNX module should now be detected automatically. If not, check whether the KNX module is being supplied with electricity via the KNX bus.



- Create a new project or open an existing KNX installation project.
- Download the sonnen product database from the manufacturer's catalogue (in the manufacturer search in the Catalogues tab) or from the

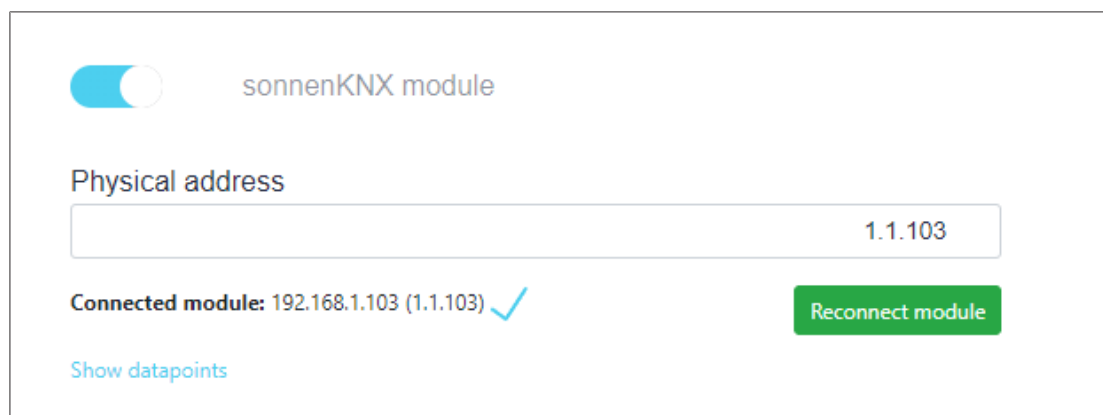
service portal (documents section).

- Assign a individual address for the KNX module.
- Select the KNX module and select the Parameters tab.
- Configure the relevant send parameters.
- ⇒ Activated data points can be seen in the Communication objects tab and addressed.
- Allocate suitable group addresses in order to integrate the KNX module in the KNX installation.
- Use functions of other KNX subscribers to establish individual circuits by connecting data points to each other.
- Click on **Program** to import the resulting application program to the KNX installation.

4. Set up the KNX module

The KNX module can be activated in the commissioning assistant or via the web interface of the storage system.

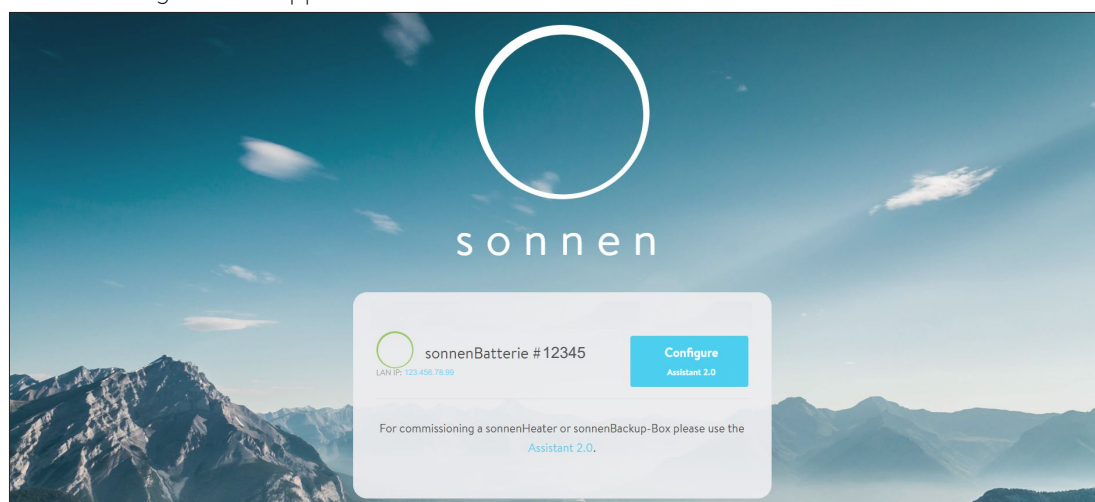
- **If storage system is being commissioned for the first time using the commissioning assistant (installer access required)**
 - Navigate to the commissioning assistant as described in the installation instructions for the storage system in question (section 'Commissioning' or 'Initial commissioning').
 - Activate the KNX module at the appropriate point in the commissioning assistant under Software integration.
 - Enter the previously defined physical address.



- Then click on **Reconnect module**.
- ⇒ If the KNX installation is successful, the IP address of the connected KNX module is displayed. The storage system has now been successfully integrated into the KNX installation with the KNX module and can be used.

- ▶ To check the configured data points of the KNX module, click on **Show datapoints**
- ▶ Each time the parameters are changed via the ETS, the module must then be reconnected so that the changed settings and parameters are adopted by the storage system.
- **If KNX module is being installed after initial commissioning, using the web interface of the storage system**
- ✓ The storage system has been set up by the electrician performing the installation using the commissioning assistant.
- ▶ Enter the following address into an internet browser:
<https://find-my.sonnen-batterie.com>

The following window appears:



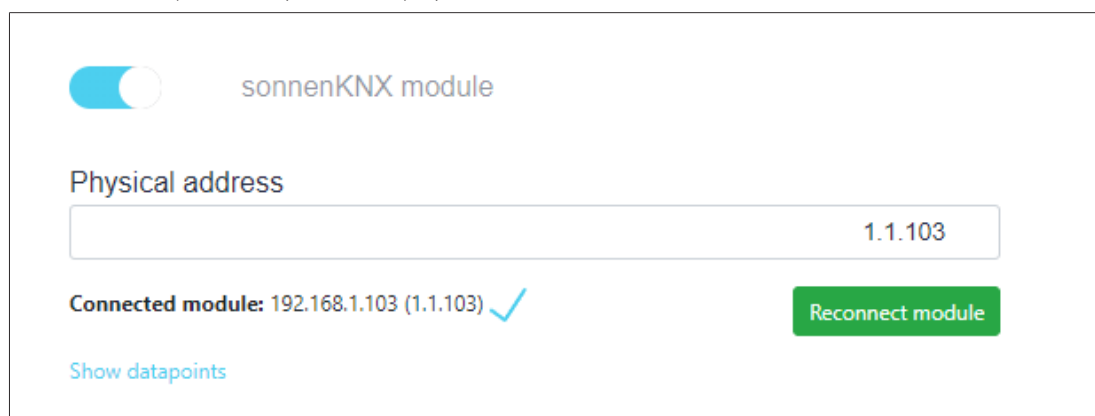
- ▶ Click on the blue LAN IP number.

The login page appears.

- ▶ Log in (as the installer or user).

The dashboard appears.

- ▶ Switch to the Software-Integration page.
- ▶ Activate the sonnenKNX module.
- ▶ Enter the previously defined physical address.



- ▶ Click on **Reconnect module**.
- ⇒ If the KNX installation is successful, the IP address of the connected KNX module is displayed. The storage system has now been successfully integrated into the KNX installation with the KNX module and can be used.

- ▶ To check the configured data points of the KNX module, click on **Show datapoints**
- ▶ Each time the parameters are changed via the ETS, the module must then be reconnected so that the changed settings and parameters are adopted by the storage system.

5 Configuring the ETS

DANGER

Work on the electrical distributor

Danger to life due to electrocution!

- ▶ Disconnect the relevant electrical circuits.
- ▶ Secure against anyone switching on the device again.
- ▶ Check that the device is disconnected from the power supply.
- ▶ Only authorized electricians are permitted to carry out electrical work.

NOTICE

Target group: authorised electricians

The actions described in this section must only be carried out by this target group.

NOTICE

Target group: trained KNX commissioning and operation experts

The actions described in this section must only be carried out by experts who have acquired detailed knowledge through KNX training.

5.1 Interface settings

In the *ETS*, interfaces can be selected and configured via the ETS menu Bus interfaces. The *ETS* can access a configured KNX module even without a database entry. If the configuration of a KNX module does not match the circumstances of the KNX installation, the following settings can be adapted:

- Device name and individual addresses
- Additional individual addresses
- IP settings

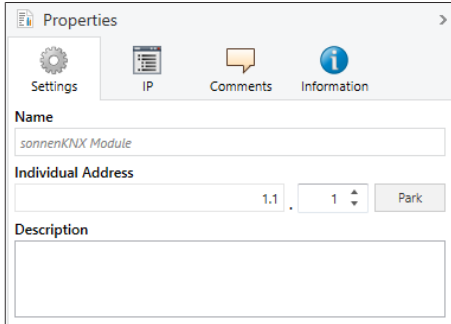
Once the KNX module has been connected to the LAN and the KNX bus, it is automatically detected by the *ETS* and displayed in the Bus menu under Found interfaces.

- ▶ Click on the found interface to select it as the current interface.

Depending on the version of the ETS, connection-specific information and options are displayed at the edge of the screen.

5.2 Device name and individual address

The displayed device name and the individual address of the device can be changed within the ETS project.



The screenshot shows the 'Properties' dialog box in the ETS software. It has four tabs: 'Settings' (selected), 'IP', 'Comments', and 'Information'. Under the 'Settings' tab, there are three main sections: 'Name' with a text field containing 'sonnenKNX Module', 'Individual Address' with a numeric field set to '1.1' and a 'Park' button, and 'Description' with an empty text area.

- ▶ Select the sonnenKNX module in the topology view within the ETS project.
- ▶ Select the Properties tab.
- ▶ Enter a new name in the Name field.

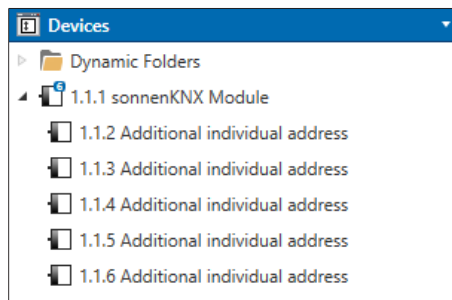
Like all programmable KNX devices, the KNX module has an individual address which can be used to address the device. This address is used by the *ETS*, for example, when downloading the KNX module via the KNX bus.

- Enter the desired address in the Individual address field. If the text field box is red, this means that the entered address is already in use.

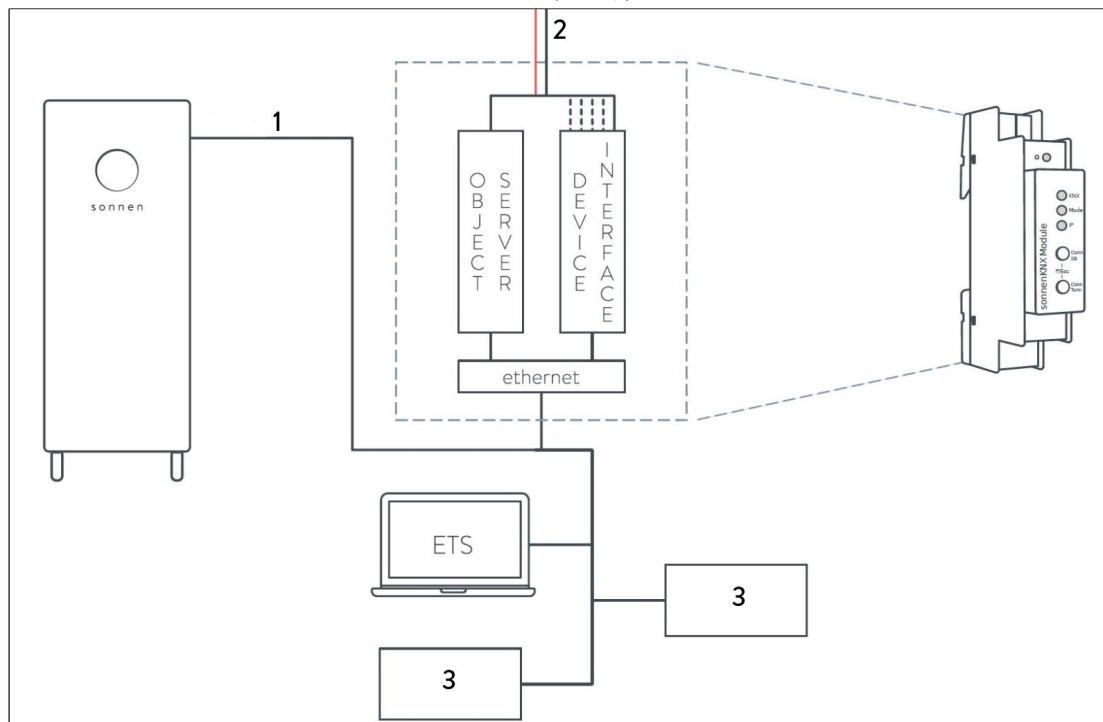


Changes carried out in the Properties menu only take effect after an application download has been completed.

5.3 Additional individual addresses



In addition to operating as an object server for transmitting data points, the KNX module also offers KNXnet/IP tunnelling, also known as the interface function. The device uses additional individual addresses for the interface function, which can be set in the *ETS* (ETS4.2 or higher). In ETS5 or higher, the additional individual addresses are displayed in the topology view.



- 1 Data points
- 2 KNX bus (TP)
- 3 MISC Devices

If a client (e.g. ETS) uses the KNX module to send telegrams to the KNX bus, it is given one of the additional individual addresses as the send address. Each additional individual address is assigned to a connection. This way response telegrams can be forwarded to the relevant client only.

The additional individual addresses must be from the address range of the bus line on which the KNX module is located and must not be used by any other device.

Example:

Device address 1.1.1 (device address in the topology)

Connection 1	1.1.250	(1st additional address)
Connection 2	1.1.251	(2nd additional address)
Connection 3	1.1.252	(3rd additional address)
Connection 4	1.1.253	(4th additional address)
Connection 5	1.1.254	(5th additional address)

Section Device name and individual address [P. 17] describes how the individual KNX address can be changed for the KNXnet/IP tunnelling connection currently in use.

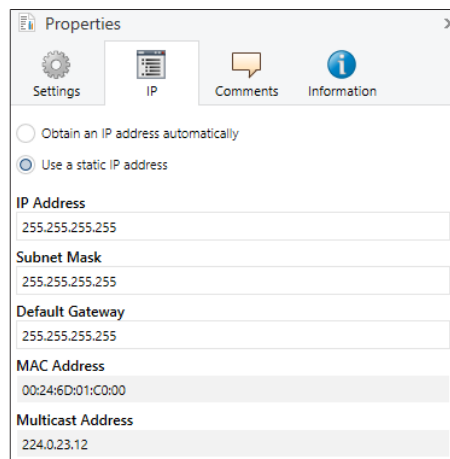
- Click on the **Check if available** button to check whether the desired individual address already exists in the KNX installation.

The individual KNX device address and the individual KNX addresses for the additional tunnelling connections can be changed within the ETS project once the device has been added to the project.

5.4 IP settings

In its condition on delivery, the KNX module is automatically assigned an IP address via *DHCP*, meaning that no further settings are required. To use this function, a DHCP server must be located on the LAN (many DSL routers have an integrated DHCP server). It is also possible to assign a fixed IP address.

Fixed IP address



The screenshot shows the 'Properties' dialog box with the 'IP' tab selected. The 'Settings' icon is active. Under 'Obtain an IP address automatically' (unselected) and 'Use a static IP address' (selected), there are input fields for 'IP Address', 'Subnet Mask', and 'Default Gateway', all containing '255.255.255.255'. Below these are 'MAC Address' (00:24:6D:01:C0:00) and 'Multicast Address' (224.0.23.12).

- Select the KNX module in the topology view.
- Select the IP tab.
- Choose **Use fixed IP address** to freely select the IP address, subnet mask and default gateway.

IP address: Enter the IP address of the KNX module here. This address is used to address the device via the IP network (LAN). IP addressing should be approved by the network administrator.

Subnet mask: This mask is used to define whether the device has a communication partner on the local network. If a partner is not on the local network, the device does not send the telegrams directly to the partner but rather to the gateway, which forwards the telegrams.

Default gateway: Specify the IP address of the gateway here, e.g. the IP address of the internet router for the local home network.

Example of assigning IP addresses for the KNX module:

A PC will be used to access the KNX module.

- PC IP address: 192.168.1.30
- PC subnet: 225.225.225.0

The KNX module is located on the same local home network, meaning that it uses the same subnet. The subnet limits IP address assignment. In this example, the IP address of the IP router has to be 192.168.1.xx. The placeholder xx can be a number from 1 to 254 (except 30, which has already been used). Note that addresses must be unique and cannot be assigned to two devices at the same time.

- KNX module IP address: 192.168.1.31
- KNX module subnet: 225.225.225.0

6 Configuring the data points


Once the KNX module has been found on the local home network, the pages Description, General settings and sonnen settings are displayed when the device name is selected.

Description

A device description and the associated wiring diagram is displayed on this page.

1.1.1 sonnenKNX Module > Description

Description
General settings
sonnen settings



sonnenKNX Module

Compact interface between sonnenBatterie and the KNX bus


The sonnenKNX module integrates the sonnenBatterie into a KNX infrastructure. The communication to the sonnenBatterie is based on Ethernet.

The individual parameterisation of the specific solar battery data points is carried out with the common Engineering Tool Software (ETS).

Individual configurations can be defined for the parameters of the solar battery. A detailed list of all options can be found in the product documentation.

The buttons of the device are used for programming and diagnosis. The LEDs indicate operating states and communication errors on the bus. Power is supplied via the KNX bus.

Wiring diagram:



Please refer to the data sheet and product documentation for further information.

6.1 General settings

1.1.1 sonnenKNX Module > General settings

Description
General settings
sonnen settings

Note: For device name and IP settings see dialog "Properties"

Prog. mode on device front
☐ Disabled ☒ Enabled

Manual operation on device
Enabled without time limit

Prog. mode on device front: When this function is activated, the programming mode can additionally be activated and deactivated for the programming key by pressing the two buttons Conn SB and Conn Tunn at the same time. The control panel cover in the distribution board does not have to be opened for this, in order to activate the programming mode. The programming mode button is not affected by this setting; it is always active.

Manual operation on device: The duration of the manual operating mode is set using this function. Once manual operation ends, the KNX module automatically returns to the normal operating mode.

6.2 sonnen settings

This page shows the sonnen specific data points that are listed under the Parameter tab. Depending on the version of the ETS, the tab contains the specific data points that can be activated and configured via the ETS

Communication objects 0		Parameter
Description	Interval for cyclic sending 15 min	
General settings	sonnenBatterie	
sonnen settings	State of charge	Disabled
	Independent	Disabled
	Measurement Data	
	Timestamp	Disabled
	Power of battery	Disabled
	Consumption	Disabled
	Production	Disabled
	Grid Feed In	Disabled
	Surplus	Disabled
	Surplus guaranteed	Disabled
	Operation mode	
	Operation mode	Disabled
	Manual mode	Disabled
	Automatic mode	Disabled
	Time-dependent charging mode	Disabled
Full charge mode	Disabled	
Alarm		
Alarm state	Disabled	
Alarm text	Disabled	
Alarm critical error	Disabled	
Alarm Internet connection	Disabled	
Alarm Offgrid overload	Disabled	
Special functions		
Backup operation mode active	Disabled	
Backup buffer	Disabled	
State of Self Consumption Relay	Disabled	
Status of CHP	Disabled	
HEMS		
HEMS-Funcionality <input checked="" type="radio"/> Deactivated <input type="radio"/> Activated		

- The default setting is for all data points to be deactivated. Different send parameters become available when a data point is activated. These parameters define how the data point is sent to the KNX bus. Only certain options are available for selection for each data point here.
- If the send parameter for a data point is selected, it can be seen in the Group objects tab and can be used within a KNX installation.

Possible send parameters

Deactivated (D): The data point is deactivated and not visible and is not sent to the KNX bus.

Read only (R): The data point can be read by a KNX participant if required.

Write only (W): The data point can be written by a KNX participant (write only).

Cyclical (C): Cyclical refers to the parameter 'interval for cyclical sending'. If a data point has been activated as 'Cyclical', it is sent to the KNX bus at the selected interval.

Cyclical (C-15): The value of a data point is sent to the KNX bus when it changes and additionally every 15 minutes.

If changed (CH): The value of a data point is sent to the KNX bus when it changes.

6.2.1 sonnenBatterie status

The internal status of the sonnenBatterie is indicated by the charging status and the current self-sufficiency status. Self-sufficiency is defined as follows: if 80% of consumption in the last five minutes was covered by the PV system or the sonnenBatterie, the system is considered self-sufficient.

Position	Datapoint title	Data type			Direction	Description
		Numerical	Unit	KNX		
SONNENBATTERIE						
1	State of charge	Percent	%	5.001	R, CH	State of charge of the sonnenBatterie
2	Self-sufficient	Boolesch	True/False	1.002	R, CH	Status, if currently self-sufficient • self-sufficient: 1 • not self-sufficient: 0

6.2.2 Measurement data

The measurement data include energy flows and their specific timestamps.

Position	Datapoint title	Data type			Direction	Description
		Numerical	Unit	KNX		
MEASUREMENT DATA						
3	Timestamp	Date/Time	-	19.001	R, C	Date-/timestamp of measurement
4	Power of battery	Power	kW	9.024	R, C	sonnenBatterie power • negative: Charge • positive: Discharge
5	Power of battery	Power	W	14.056	R, C	sonnenBatterie power • negative: Charge • positive: Discharge
6	Consumption	Power	kW	9.024	R, C	Household demand
7	Consumption	Power	W	14.056	R, C	Household demand
8	Production	Power	kW	9.024	R, C	PV production
9	Production	Power	W	14.056	R, C	PV production
10	Grid usage	Power	kW	9.024	R, C	Grid power • negative: Grid demand • positive: Feed in
11	Grid usage	Power	W	14.056	R, C	Grid power • negative: Grid demand • positive: Feed in
12	Surplus	Power	kW	9.024	R, C	PV surplus
13	Surplus	Power	W	14.056	R, C	PV surplus
14	Surplus guaranteed	Power	kW	9.024	R, C	PV surplus calculated with maximal battery power to calculate flexible demand potential
15	Surplus guaranteed	Power	W	14.056	R, C	PV surplus calculated with maximal battery power to calculate flexible demand potential

6.2.3 Operating mode

The different operating modes of the storage system can be output as text. They can also be read out individually using a true/false query.

Position	Datapoint title	Data type			Direction	Description
		Numerical	Unit	KNX		
OPERATION MODE						
16	Operation Mode	Character	ISO-8859-1	16.001	R, CH	'manual' 'automatic' 'service' 'time of use' 'full charge'
17	Manual mode	Boolesch	True/False	1.002	R, CH	• Manual: 1 • Not manual: 0
18	Automatic mode	Boolesch	True/False	1.002	R, CH	• Automatic: 1 • Not automatic: 0
19	Time-dependent charging mode	Boolesch	True/False	1.002	R, CH	• Time dependent charging active: 1 • Time dependent charging not active: 0
20	Full charge mode	Boolesch	True/False	1.002	R, CH	• Full charge active: 1 • Full charge not active: 0

6.2.4 Alarm

The alarm status differentiates between the normal operation and faulty operation of the storage system. Cascading is possible. The different error modes of the storage system can be output as text. They can also be read out individually using a true/false query.

Position	Datapoint title	Data type			Direction	Description
		Numerical	Unit	KNX		
ALARM						
21	Alarm state	Boolesch	True/False	1.002	R, CH	Status sonnenBatterie alarm • Alarm: 1 • No alarm: 0
22	Alarm text	Character	ISO-8859-1	16.001	R, CH	'No Error' 'Critical Error' 'Lost Internet' 'Overload in Offgrid'
23	Alarm critical error	Boolesch	True/False	1.002	R, CH	• Critical error: 1 • No critical error: 0
24	Alarm internet connection	Boolesch	True/False	1.002	R, CH	• Internet connection: 1 • No internet connection: 0
25	Alarm offgrid overload	Boolesch	True/False	1.002	R, CH	• Overload in offgrid: 1 • No overload in offgrid: 0

6.2.5 Special functions

The send parameters for the special functions (backup power, self-consumption relay and *CHP*) can be used to indicate what the current status of the function/device is.

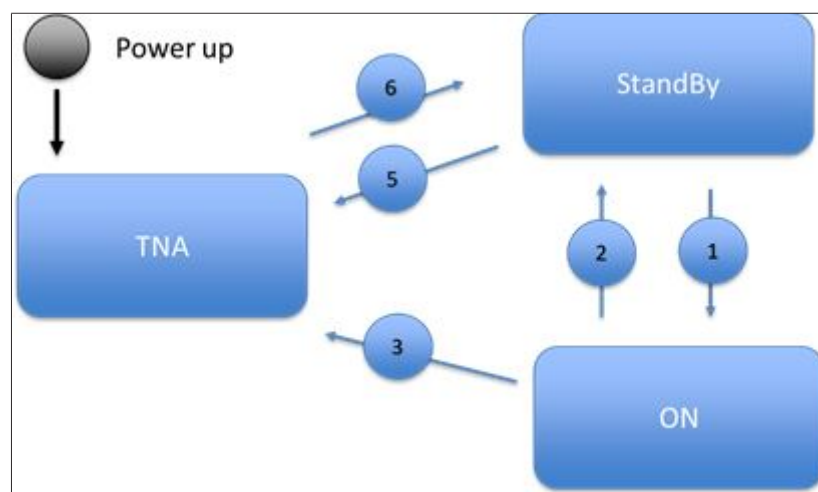
Position	Datapoint title	Data type			Direction	Description
		Numerical	Unit	KNX		
SPECIAL FUNCTIONS						
26	Backup operation mode active	Boolesch	True/False	1.002	R, CH	Status if backup operation is active • Backup operation active: 1 • Normal operation: 0 • Empty sonnenBattery: 0
27	Backup buffer	Percent	%	5.001	R, CH	Minimal rest-capacity for backup operation
28	State of Self Consumption Relay	Boolesch	True/False	1.002	R, CH	Status of Self Consumption Relay • PV-Surplus: 1 • No PV-Surplus: 0
29	Status of CHP	Boolesch	True/False	1.002	R, CH	Status of CHP • CHP active: 1 • CHP not active: 0

6.2.6 Home Energy Management System – HEMS

The HEMS data points are used to control the storage system and retrieve information about the status of the storage system. The HEMS functionality is only available from the combination of sonnenBattery SW version 1.9.4 and sonnenKNX module application program version 2.0.

Position	Datapoint title	Data type			Direction	Description
		Numerical	Unit	KNX		
HEMS						
30	HEMS Power Setpoint	Power	W, kW	14.056	W	Desired charging or discharging power ▪ negative: charging ▪ positive: discharging
31	HEMS Setpoint Status	-	-	5.010	W	Desired HEMS Status ▪ HEMS ON: 1 (sonnenBatterie can be controlled via KNX) ▪ HEMS Standby: 0 (no control via KNX possible)
32	sonnenBatterie Status	-	-	5.010	L, CH, C-15	Feedback HEMS status ▪ HEMS TNA: 2 (no control via KNX possible) ▪ HEMS ON: 1 (sonnenBatterie can be controlled via KNX) ▪ HEMS Standby: 0 (no control via KNX possible)
33	sonnenBatterie Residual Capacity	Watt-hour	Wh	13.010	L, CH, C-15	State of charge of the sonnenBatterie in %
34	HEMS Heartbeat	Date/Time	-	19.001	W	Current time in UTC format must be written cyclically in order to use the HEMS functionality. The timeout is 10 minutes, i.e. if the last written UTC time stamp is older than 10 minutes, the sonnenBatterie cannot be controlled via KNX.

The storage system has three statuses that are relevant for control via KNX.



STANDBY

- The storage system follows the internal energy management and operates in self-consumption mode, for example.
- The storage system is not controlled via the KNX bus and via an external HEMS.

ON

- The storage system is controlled by an external HEMS via the KNX bus.
- The storage system executes the last setpoint requested by the HEMS until a new setpoint is sent via the KNX bus.

TNA (Temporarily not available)

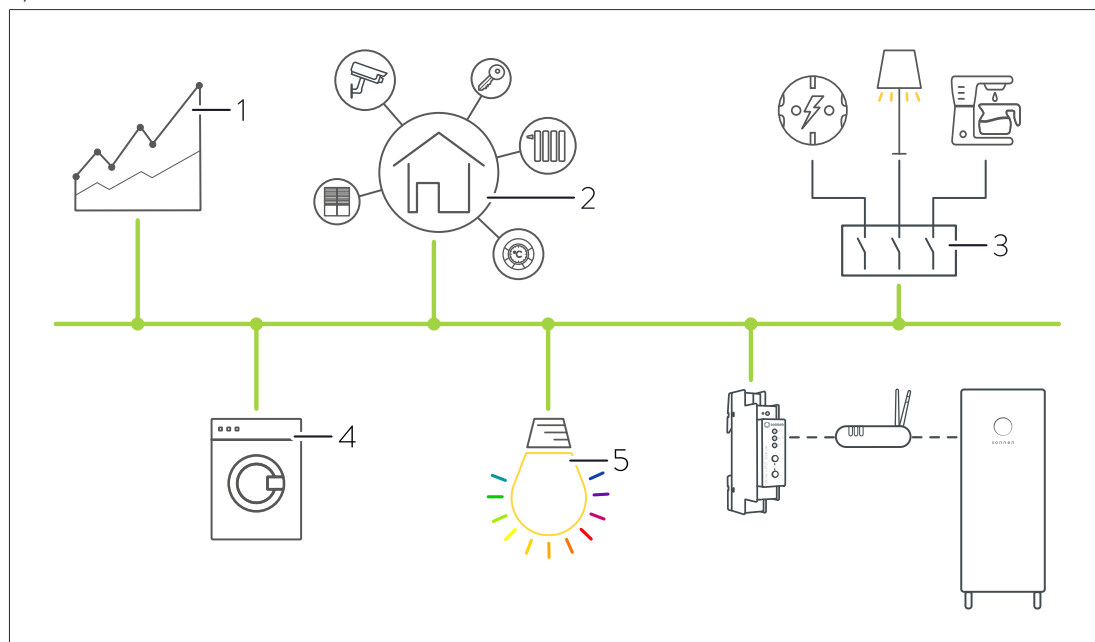
- The storage system works autonomously and only reacts to internal battery setpoints/actions; the storage system carries out specific service work:
 - Trickle charging
 - Full charge
 - VPP operation
- The storage system cannot currently be controlled via the KNX bus.

Transition	Description
Action 1	<p>A current UTC timestamp was sent from the HEMS to the data point HEMS Heartbeat of the storage system</p> <p>and</p> <p>ON was sent from the HEMS to the data point HEMS Setpoint Status of the storage system.</p>
Action 2	<p>STANDBY was sent from the HEMS to the data point HEMS Setpoint Status of the storage system</p> <p>or</p> <p>the timeout for the HEMS Heartbeat has expired, the UTC timestamp is older than 10 minutes. The status of the storage system changes to standby.</p>
Action 3 / 5	<p>The storage system is in an operating state in which an external setpoint request or a state change request - triggered by the HEMS - cannot be accepted. This does not necessarily have to be an error or a specific problem of the storage system.</p> <ul style="list-style-type: none"> • The storage system automatically switches to the TNA status. • The TNA status (sent by the storage system or read by the HEMS) allows the HEMS to recognize such a status that prevents the HEMS from sending an (unsuccessful) request to the storage system, regardless of the underlying reason.
Action 6	<p>The operating state that caused the TNA status is terminated and the storage system automatically switches to STANDBY status.</p>

7 KNX installation example

The storage system can be integrated in a KNX installation via the data points. Thanks to a large variety of KNX products, there are many application areas for customising the functions.

Several basic applications are shown in the following figure in connection with the storage system.



Possible applications:

- Visualising energy flows (1).
- Visualising operating and alarm statuses (1).
- Energy and building management (2).
- Indirectly switching plug outlets, electrical consumers (e.g. lights) or electronics, using KNX switch actuators, for example (3).
- Integrating KNX domestic appliances (4).
- Indicating storage system statuses via coloured light (5).
- Indicating operating and alarm statuses via coloured light (5).



Information on the complete range of KNX products can be found at www.knx.org.

8 Decommissioning and Disposal

DANGER

Improper uninstallation

Danger to life due to electrocution!

- The sonnenKNX module must only be uninstalled by authorised electricians.

The KNX module must **not** be disposed of as domestic waste!

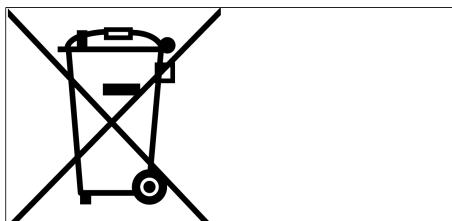


Illustration 1: WEEE symbol

- Dispose of the KNX module in an environmentally friendly way through suitable collection systems.

List of abbreviations

CHP

Combined heat and power station

DHCP

Dynamic Host Configuration Protocol - communication protocol for assigning the network configuration

ETS

Engineering Tool Software - programming software for planning and configuring intelligent home and building system technology using the KNX system

HEMS

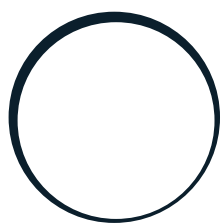
Home Energy Management System

MW

Module width. A unit of measurement used to describe the width of components in the electrical installation. One module width is equal to 18 mm.

USB

Universal serial bus



sonnen

energy is yours

sonnen GmbH

Am Riedbach 1

D-87499 Wildpoldsried