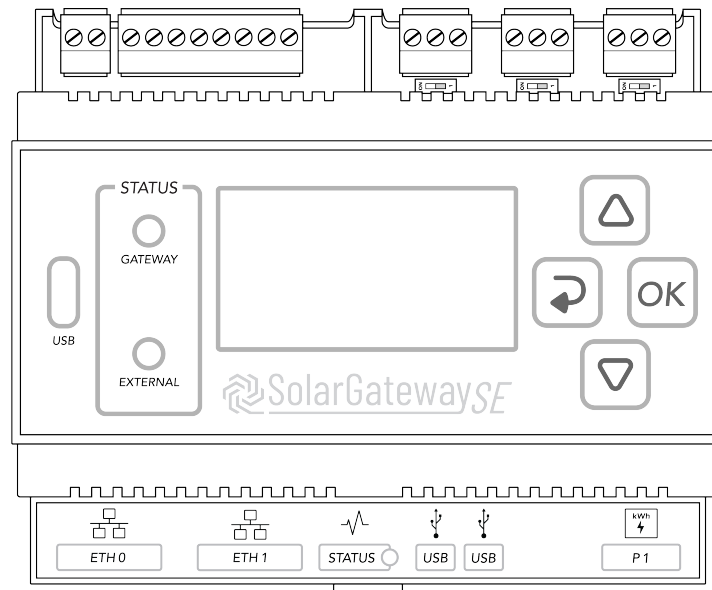


SolarGatewaySE

User Manual

v2.0.0



emi**bion**

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SolarGatewaySE User Manual

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1 About this document

1.1 Purpose


This document introduces the SolarGatewaySE (GSE) in terms of installation, electrical connections, system operation and maintenance and troubleshooting. Understand the SolarGatewaySE features, functions and safety precautions provided in this document before installing and operating the SolarGatewaySE.

1.2 Intended Audience


This document is intended for operating personnel, system engineers adopting the SolarGatewaySE in their system design.

1.3 Symbol conventions


The symbols that may be found in this document are defined as follows:

 Note

Used for general notes in this documentation

 Warning

Used for expressing warnings in this documentation

 Important

Used for important notes in this documentation

 Tip

Used for general tips in this documentation

 Caution

Used for caution notes in this documentation

1.4 Change history

V2.0.0 - First release of the user manual 03/10/2023

2 Safety information

2.1 General Safety

2.1.1 Statement

Before installing, operating or maintaining the equipment, read this document and observe all safety instructions on the equipment and in this document.

The “Warning”, and “Caution” statements in this document do not cover all the safety instructions. They are only supplements to the safety instructions. Embion will not be liable for any consequence caused by the violation of general safety requirements.


Ensure that the equipment is used in environments that meet its design specifications. Otherwise, the equipment may become faulty, the resulting equipment malfunction, component damage, personal injuries, or property damage are not covered under the product warranty.

Follow local laws and regulations when installing, operating, or maintaining the equipment. The safety instructions in this document are only supplements to local laws and regulations.

Embion will not be liable for any consequences of the following circumstances:

- Operation beyond the conditions specified in this document
- Installation or use in environments which are not specified in relevant international or national standards
- Unauthorized modifications to the product, software or removal of the product warranty sticker
- Failure to follow the operation instructions and safety precautions on the product and in this document
- Equipment damage due to force majeure, such as earthquakes, fire, and storms
- Damage caused during transportation by the customer
- Storage conditions that do not meet the requirements specified in this document

2.1.2 General requirements

 Warning

Do not work with system power turned-on during installation

- After installing the equipment, remove idle packing materials such as cartons, foam, plastics, and cable ties from the equipment area
- In the case of a fire, immediately leave the building or the equipment area, and turn on the fire alarm bell or make an emergency call. Do not enter the building on fire in any case
- Do not scrawl, damage, or block any warning label on the equipment
- Tighten the screws using the correct tools when installing the equipment
- Understand the components and functioning of the system, the SolargatewaySE and relevant local standards
- You shall not to reverse engineer, decompile, disassemble, adapt, add code to, or alter in any other way, the device software; research the internal implementation of the device; obtain the device software source code; infringe on Embion's intellectual property; or disclose any performance test results related to the device software.

2.1.3 Personal safety

- If there is a probability of personal injury or equipment damage during operations on the equipment, immediately stop the operations, report the case to the supervisor, and take feasible protective measures.
- Use tools correctly to avoid hurting people or damaging the equipment

2.2 Personnel requirements

- Personnel who plan to install or maintain Embion equipment must receive thorough training, understand all necessary safety precautions, and be able to correctly perform all operations
- Only qualified professionals or trained personnel are allowed to install, operate, and maintain the equipment
- Only qualified professionals are allowed to remove or acknowledge any safety lock or notification on the device

- Only professionals or authorized personnel are allowed to replace the equipment or components

i Note

- Professionals: personnel who are trained or experienced in equipment operations and are clear of the sources and degree of various potential hazards in equipment installation, operation, and maintenance. It is task of a professional to understand the working concept of the complete system. This is required to correctly configure the SolargatewaySE
- Trained personnel: personnel who are technically trained, have required experience, are aware of possible hazards on themselves in certain operations, and are able to take protective measures to minimize the hazards on themselves and other people
- Operators: operation personnel who may come in contact with the equipment, except trained personnel and professionals

2.3 Electrical Safety

2.3.1 General

⚠ Warning

Before connecting cables, ensure that the equipment is intact. Otherwise, electric shocks or fire may occur.

- Ensure that all electrical connections comply with local electrical standards.
- Ensure that the cables you prepared meet local regulations.

2.3.2 Product power supply

⚠ Warning

Do not connect or disconnect power cables with power on.

- Before making electrical connections, switch off the disconnecter on the upstream,

- Before connecting a power cable, check that the label on the power cable is correct.
- If the equipment has multiple energized inputs, disconnect all the energized inputs before operating the equipment.

2.4 Installation environment requirements

- Ensure that the equipment is installed in a well ventilated environment.
- Ensure the environment temperature does not exceed the maximum allowed environment temperature.
- Do not expose the equipment to flammable or explosive gas or smoke. Do not perform any operation on the equipment in such environments.

2.5 Commissioning

When the equipment is powered on for the first time, ensure that professional personnel set parameters correctly. Incorrect settings may result in damage to subsystems connected to the SolargatewaySE.

2.6 Maintenance and replacement

- Maintain the equipment with sufficient knowledge of this document and using proper tools and testing equipment.
- If the equipment is faulty, contact your dealer.
- The equipment can be powered on only after all faults are rectified. Failing to do so may escalate faults or damage the equipment.

3 Product overview

3.1 Model description

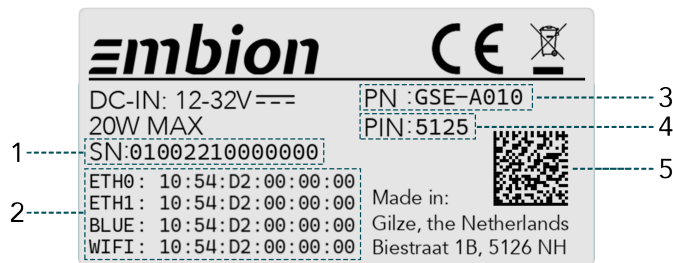
This document covers the following SolarGatewaySE models:

- GSE-A010
- GSE-A010-POE

3.2 Model identification

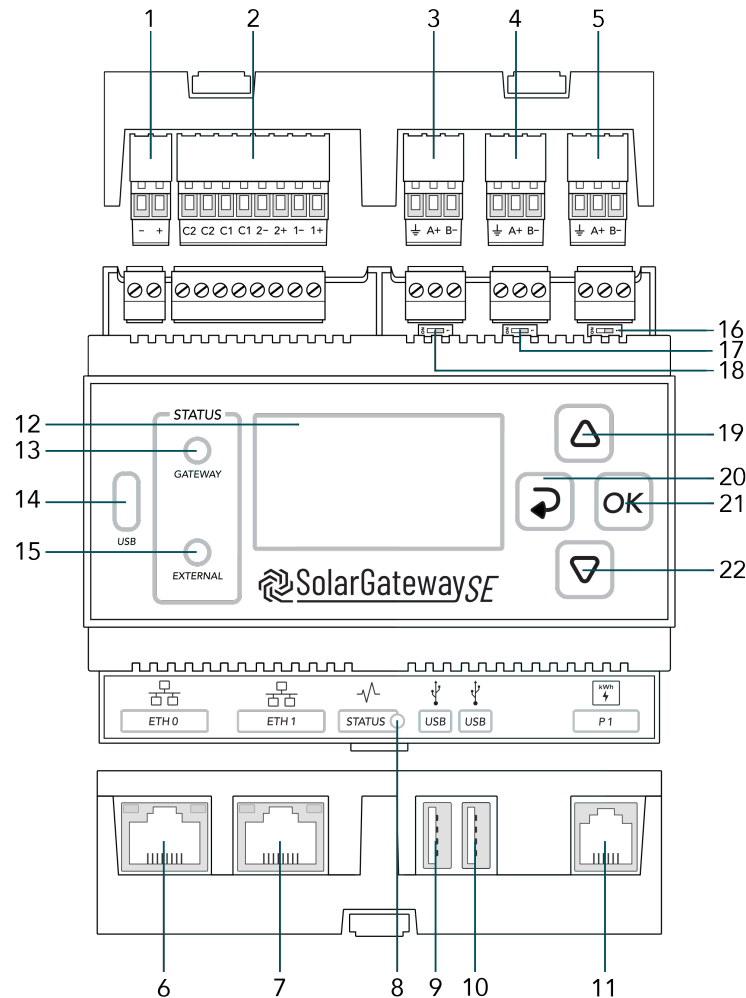
The model number of the SolarGatewaySE can be found on the label on the side of the device. The model number is listed on the label under PN (Product Name).

3.3 Label appearance



1. Serial Number
2. MAC Adresses
3. Product Name
4. PIN Code
5. Datamatrix

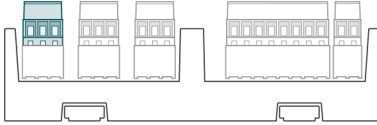
3.4 Product appearance




- | | | |
|----------------------|----------------------------|----------------------------|
| 1. X14 DC Input Port | 9. USB Port 0 | 17. X11 termination switch |
| 2. X13 GPIO Port | 10. USB Port 1 | 18. X12 termination switch |
| 3. X12 RS485 Port C | 11. P1 Port | 19. Arrow up button |
| 4. X11 RS485 Port B | 12. LCD Screen | 20. Back button |
| 5. X10 RS485 Port A | 13. Gateway status LED | 21. OK button |
| 6. ETH Port 0 / POE | 14. USB-C Port | 22. Arrow down button |
| 7. ETH Port 1 | 15. Service status LED | |
| 8. Status LED | 16. X10 termination switch | |



3.5 Communication ports

3.5.1 X10 RS485 Default inverter port



The X10 RS485 connector is the default inverter port. It is possible to deviate from the default and use the port for something else as inverters.

X10 RS485 Connector		
Appearance	Pin Name	Description
	1 B-	RS485 Negative signal
	2 A+	RS485 Positive signal
	3 \perp	RS485 SHIELD (ISOGND)

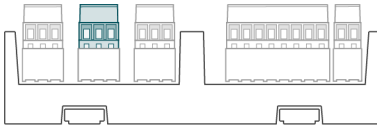
X10 120 ohm termination switch	
Position	Description
	Termination ON
	Termination OFF

The X10 120 ohm termination switch is used to terminate the the X10 RS485 bus.


! Important



The protocol and port settings (baudrate, parity databits and stopbits) need to be identical for all devices connected to the X10 port. Every (Modbus) slave address should be unique per port.

3.5.2 X11 RS485 Default meter port



The X11 RS485 connector is the default meter port. It is possible to deviate from the default and use the port for something else as meters.

X11 RS485 Connector		
Appearance	Pin Name	Description
	1 B-	RS485 Negative signal
	2 A+	RS485 Positive signal
	3 \perp	RS485 SHIELD (ISOGND)

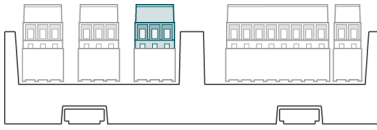
X11 120 ohm termination switch	
Position	Description
	Termination ON
	Termination OFF

The X11 120 ohm termination switch is used to terminate the the X11 port.


! Important



The protocol and port settings (baudrate, parity databits and stopbits) need to be identical for all devices connected to the X11 port. Every (Modbus) slave address should be unique per port.

3.5.3 X12 RS485 Default Auxiliaries port



The X12 RS485 connector is the default auxiliary devices port. It is possible to deviate from the default and use the port for something else as auxiliary devices.

X12 RS485 Connector			
Appearance	Pin Name		Description
	1	B-	RS485 Negative signal
	2	A+	RS485 Positive signal
	3	⊥	RS485 SHIELD (ISOGND)

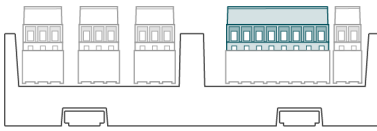
X12 120 ohm termination switch	
Position	Description
	Termination ON
	Termination OFF

The X12 120 ohm termination switch is used to terminate the the X12 port.

! Important

The protocol and port settings (baudrate, parity databits and stopbits) need to be identical for all devices connected to the X12 port. Every (Modbus) slave address should be unique per port.

3.5.4 X13 GPIO Port

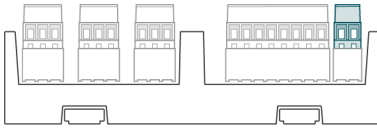



The X13 GPIO connector can be used for general input/output control.

X13 GPIO Port		
Appearance	Pin Name	Description
	1 1+	Potential free input #1 (+)
	2 1-	Potential free input #1 (-)
	3 2+	Potential free input #2 (+)
	4 2-	Potential free input #2 (-)
	5 C1	Potential free output contact #1
	6 C1	Potential free output contact #1
	7 C2	Potential free output contact #2
	8 C2	Potential free output contact #2

GPIO electrical specifications			
Item	Min	Max	Unit
Input 'false' voltage	-32.0	2.0	V
Input 'true' voltage	5.0	32.0	V
Input forward current	1.0	6.0	mA
Contact (C) switch voltage	-	32.0	V
Contact (C) switch current	-	2.0	A
GPIO isolation voltage	-	48.0	V

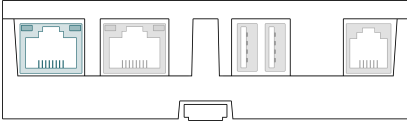
3.5.5 X14 DC Input Port



X14 DC Port			
Appear	Pin	Name	Description
	1	+	External DC power supply (+)
	2	-	External DC power supply (-)

DC input supply specifications			
Item	Min	Max	Unit
DC input voltage	12.0	32.0	V
DC input current	-	2.0	A
DC input power	-	20.0	W

3.5.6 ETH0 Port / POE



The ETH0 port can be used as normal Ethernet port and for powering the SolarGatewaySE with Power over Ethernet (POE) (only for the POE variants)).

3.5.6.1 Port specifications

- 10/100/1000 Mbps

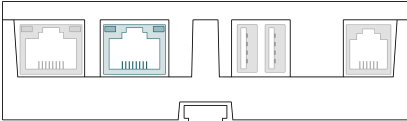
For the POE variants:

- IEEE 802.3af PoE support (not recommended due to the power limit), device may reduce performance
- IEEE 802.3at PoE+ support
- Redundant power source possible, automatically switches between PoE and DC input. If both are present, PoE is preferred.

ETH0 Pinning	
Appearance	Pin Description
	1 BI_DA+
	2 BI_DA-
	3 BI_DB+
	4 BI_DC+
	5 BI_DC-
	6 BI_DB-
	7 BI_DD+
	8 BI_DD-

ETH0 Indicators	
Indicator	Description
Green	Blinks when data is transmitted/received
Yellow	On when POE+ source is connected

3.5.7 ETH1 Port



The ETH1 port can be used for ethernet connections on the SolarGatewaySE

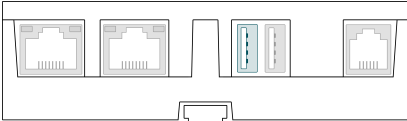
3.5.7.1 Port specifications

- 10/100 Mbps

ETH1 Pinning	
Appearance	Pin Description
	1 TX+
	2 TX-
	3 RX+
	4 NC
	5 NC
	6 RX-
	7 NC
	8 NC

ETH1 Indicators	
Indicator	Description
Green	Blinks when data is transmitted/received
Yellow	Reserved

3.5.8 USB0 Port



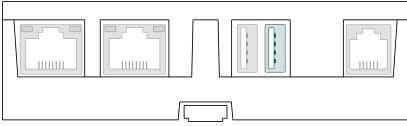
The USB0 port can be used to insert external storage devices into the SolarGatewaySE.

3.5.8.1 Port specifications

- Up to 500mA current delivery

USB0 Pinning		
Appearance	Pin	Description
	1	+5V
	2	D-
	3	D+
	4	GND


3.5.9 USB1 Port



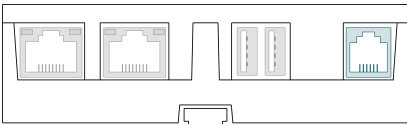
The USB1 port can be used to insert external storage devices into the SolarGatewaySE.

3.5.9.1 Port specifications

- Up to 500mA current delivery

USB1 Pinning		
Appearance	Pin	Description
	1	+5V
	2	D-
	3	D+
	4	GND


3.5.10 P1 Port



The P1 port is used to directly connect to a compatible smart meter.


3.5.10.1 Port specifications

- Reads meter directly from P1 connection on smart meter
- Fixed baudrate of 115200 Baud
- Only usable for unencrypted meter data


P1 Pinning		
Appearance	Pin	Description
	1	NC
	2	Data request
	3	ISOGND
	4	NC
	5	Data
	6	ISOGND

3.6 Status indicators


3.6.1 Status LED

Status LED		
LED	LED Status	Description
	Green	Device operational
	Red	System busy
	Blue	Reserved

3.6.2 Gateway LED


Gateway LED		
LED	LED Status	Description
	Green	SolarGatewaySE services are running
	Yellow	Problem with a service
	Red	SolarGatewaySE is not operating

3.6.3 External LED


External LED		
LED	LED Status	Description
	Green	External devices are ok
	Yellow	Communication problem
	Red	Problem with at least one of the external devices

3.7 Buttons


3.7.1 UP Button

Button UP		
Appearance	Press	Action
	Short press	Short press action
	Long press	Long press action


3.7.2 DOWN Button

Button DOWN		
Appearance	Press	Action
	Short press	Short press action
	Long press	Long press action

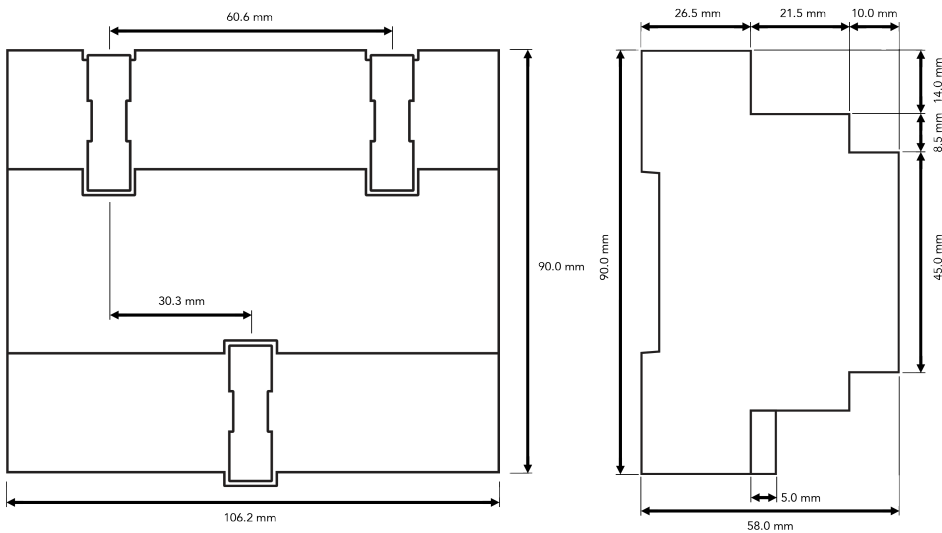
3.7.3 BACK Button

Button BACK		
Appearance	Press	Action
	Short press	Short press action
	Long press	Long press action

3.7.4 OK Button

Button OK		
Appearance	Press	Action
	Short press	Short press action
	Long press	Long press action

3.8 Dimensions



3.9 Weight

PN	Weight	Unit
A010	335	gram
A010-POE	355	gram

4 Device installation

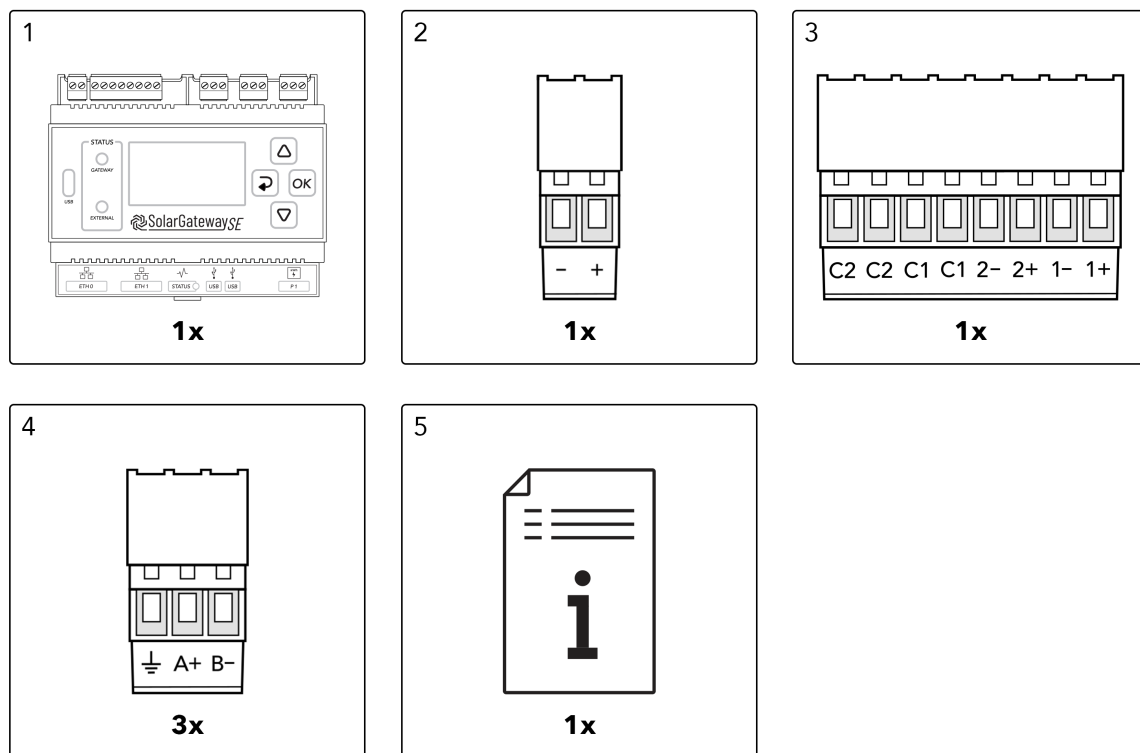
4.1 Box check

4.1.1 Outer packaging

Check if outer packaging is undamaged before opening it. If there are any signs of damage or abnormality, do not open the package and contact your dealer immediately.

4.1.2 Deliverables

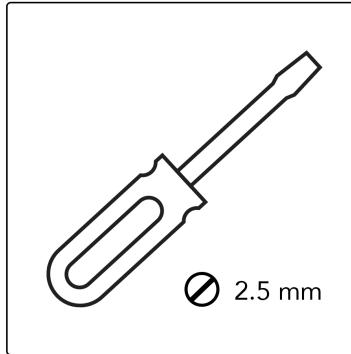
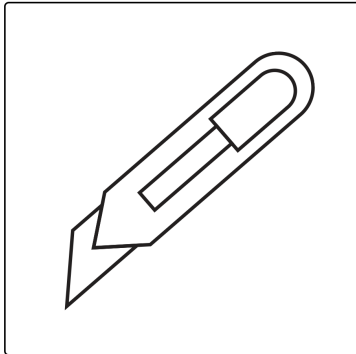
Check if the quantity against packing list is in the packing case. If any component is missing or damaged, contact your dealer.



i Note

All provided connectors are already plugged into the device

4.2 Required tools



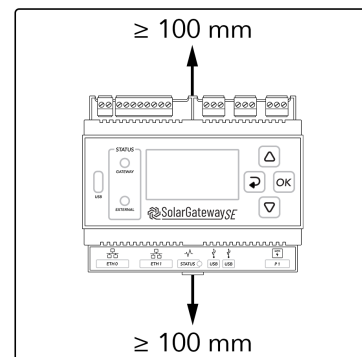
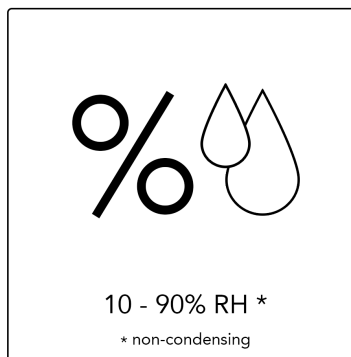
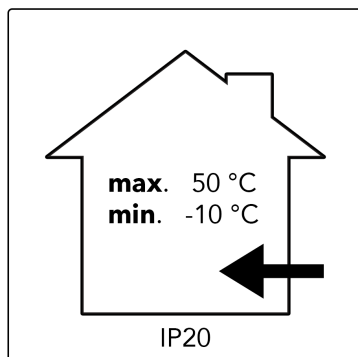
i Note

Dependent on the specific type of installation and type of environment, extra tools may be required.

4.3 Installation Requirements

i Note

The installation of the SolarGatewaySE must be done at a proper height for optimum operation and maintenance. Ensure that the minimum object distance, ambient temperature, and humidity requirements are met; otherwise the warranty will become void.



4.4 Installing the SolarGatewaySE

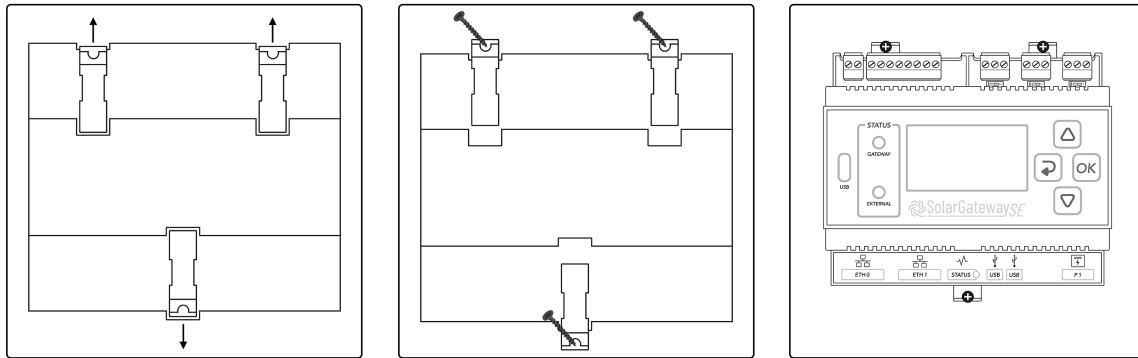
The SolarGatewaySE can be wall-mounted or DIN rail-mounted (preferred).

4.4.1 Wall-mounted installation

Warning

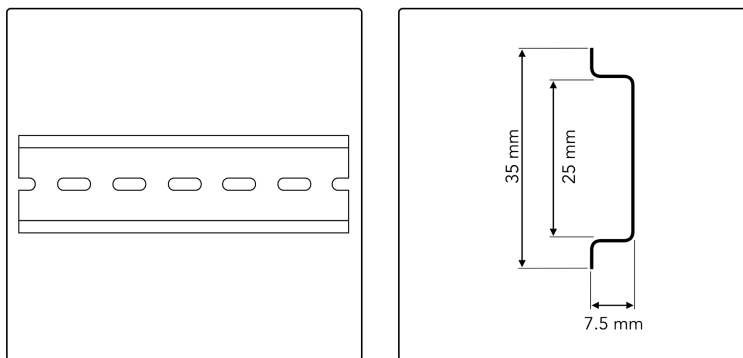
The SolarGatewaySE should be installed at a proper height to facilitate operation and maintenance

Install the SolarGatewaySE on a flat and secure wall



4.4.2 DIN rail mounted

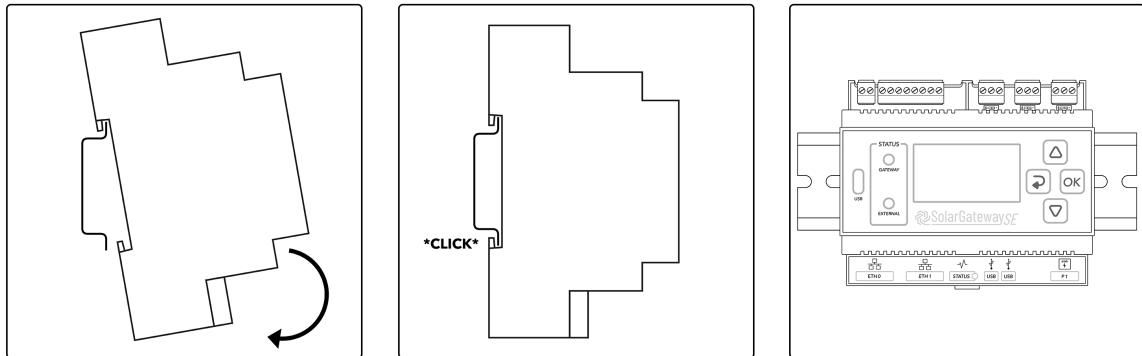
Prepare a 35mm standard DIN rail (not included). Ensure that the rail:



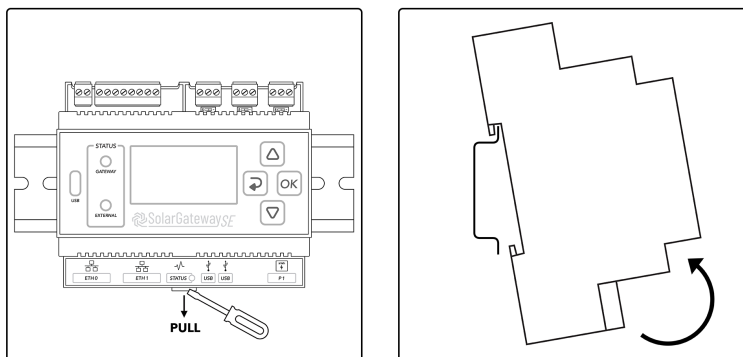
Ensure that the rail:

- Has sufficient length for securing the SolarGatewaySE. The recommended effective length is 120 mm or greater.
- Has been secured before you install the SolarGatewaySE.
- Is correctly terminated, so the SolarGatewaySE can't slide.

4.4.2.1 Attach to DIN rail



4.4.2.2 Remove from DIN rail



5 Device usage

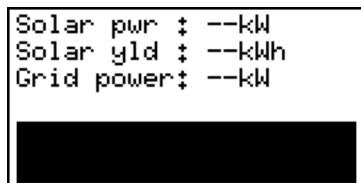
5.1 Menu usage

The SolarGatewaySE device menu is used to configure the device. Multiple inputs are required during these settings. To allow for a standard and generic input option a dedicated input menu is designed. This menu allows for free character input, but it is important to understand the way of working as described in this chapter.

5.1.1 Menu overview

The main page that is shown contains some general information about the installation. This page will automatically be shown when there is no more interaction between user and device. The items shown on this page may vary depending on the configuration. The dark bar shows actual system information.

```
Solar pwr : --kW
Solar yld : --kWh
Grid power: --kW
```



5.1.2 Menu settings

When a menu page contains an arrow in the right corner, it means that there is a settings menu for it. Press the OK button to open the settings for the selected menu page. The images below show an example of the menu page "Modbus" which contains a settings menu "Modbus settings".

```
Modbus ▶
RTU A   : --
RTU B   : --
RTU C   : Idle
TCP     : Idle
```

```
Modbus settings
● Setup RTU-A (X10)
  Setup RTU-B (X11)
  Setup RTU-C (X12)
```

5.1.3 Menu pages

An overview of all the SolarGatewaySE menu pages with the related settings menu page is shown below. When a settings page is present, a reference to the related information page is given.

5.1.4 Device information

```
Device info
-----
SN   :0100223301000P
PN   :GSE-A010
PIN  :5127
SFTWV:
PRODV:1.0.1
```

```
Device info
-----
MFGDT:20082022
```

This page shows product information which is identical to the information on the product label. Also current software version is visible in this menu.

5.1.5 Config

This page will show the active strategy. For example: General. By entering the menu, strategy settings can be changed.

```
Config ▶
-----
Strategy :General
```

```
Config settings
-----
●Apply settings
  Inverters
  Meters
  EV Chargers
  Auxiliaries
```

More information about the config settings can be found here: [Section 6](#)

5.1.6 Updates

This menu page shows the current update settings for the device. By entering the menu new device software can directly be installed if available.

```

Config ▶
-----
Strategy ;General

```

```

Config settings
-----
●Apply settings
  Inverters
  Meters
  EV Chargers
  Auxiliaries

```

More information about the update settings can be found here: [Section 7.6](#)

5.1.7 System status

This menu page shows system status information. Internet connection, HUB setup and support information can directly be read from this page.

```

Config ▶
-----
Strategy ;General

```

```

Config settings
-----
●Apply settings
  Inverters
  Meters
  EV Chargers
  Auxiliaries

```

More information about the system status settings can be found here: [Section 7.5](#)

5.1.8 Inverters

If any inverters are configured, this menu page(s) show the current status for all inverter(s) combined. The AC power per inverter is also listed. Dependend on the number of inverters configured, multiple pages are used.

```

Inverters
-----
Solar pwr  ‡ --kW
Solar yld  ‡ --kWh
INV RUN    ‡ --
INV WARN   ‡ --
INV ERROR  ‡ --

```

This menu page(s) displays the current status for each inverter. The displayed name of the inverter is the name of the group where it's in, combined with the inverter address. For

example the inverter "New 1.10" is a inverter from the inverter group "New 1" with the inverter address "10".

Inverters	
New 1.10	: --kW
New 1.11	: --kW
New 1.12	: --kW
New 1.13	: --kW
New 1.14	: --kW

Inverters	
New 1.15	: --kW
New 1.16	: --kW
New 1.17	: --kW
New 1.18	: --kW
New 1.19	: --kW

Inverters can be configured in the config settings for inverters explained on page: Section [6.3](#)

5.1.9 Meters

If any meters configured, this menu pages(s) displays the current grid power and current status for each meter. The displayed name of the meter is the name of the group where it's in, combined with the meter address. For example the meter "New 1.10" is a meter from the meter group "New 1" with the meter address "10".

Meters	
New 1.10	: --kW
New 1.11	: --kW
New 1.12	: --kW
New 1.13	: --kW
New 1.14	: --kW

Meters	
New 1.15	: --kW
New 1.16	: --kW
New 1.17	: --kW
New 1.18	: --kW
New 1.19	: --kW

Meters can be configured in the config settings for meters explained on page: Section [6.4](#)

5.1.10 P1 Smart meter

This menu page displays the P1 smart meter status. No metering values are shown here, only connection related information.

P1 smart meter	
CONN:	--
ERRS:	--
ID :	--
VERS:	--
CLTS:	--

P1 can be configured in the config settings for meters explained on page: Section [6.4.2.1](#)

5.1.11 Modbus

This menu page displays the current modbus status for all the RTU and TCP ports. The individual RTU ports can be configured through this menu.

```

Modbus
-----
RTU A   : --
RTU B   : --
RTU C   : Idle
TCP     : Idle

```

More information about the Modbus settings can be found here: [Section 7.3](#)

5.1.12 Network ETH0

This menu displays the current ethernet status for the ETH0 connection.

```

Config
-----
Strategy :General

```

```

Config settings
-----
●Apply settings
  Inverters
  Meters
  EV Chargers
  Auxiliaries

```

More information about the ETH0 settings can be found on page: [Section 7.1](#)

5.1.13 Network ETH1

This menu displays the current ethernet status for the ETH1 connection.

```

Network ETH0
-----
IP   :192.168.0.126
NET:255.255.255.0
GW   :192.168.0.1
DNS:192.168.0.1
TYP:DHCP

```

```

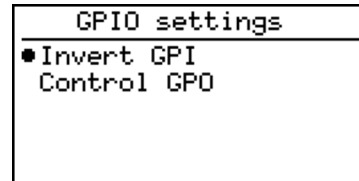
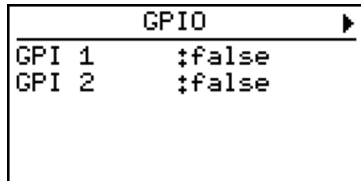
Network ETH1
-----
IP   :
NET:
GW   :
DNS:
TYP:no link

```

More information about the ETH1 settings can be found on page: [Section 7.2](#)

5.1.14 GPIO

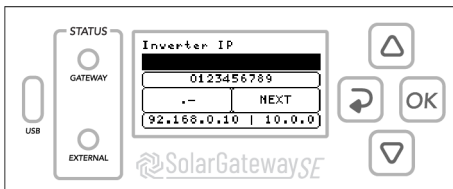
This menu page displays the GPIO status.



More information about the GPIO settings can be found on page: Section [7.4](#)

5.2 Input description

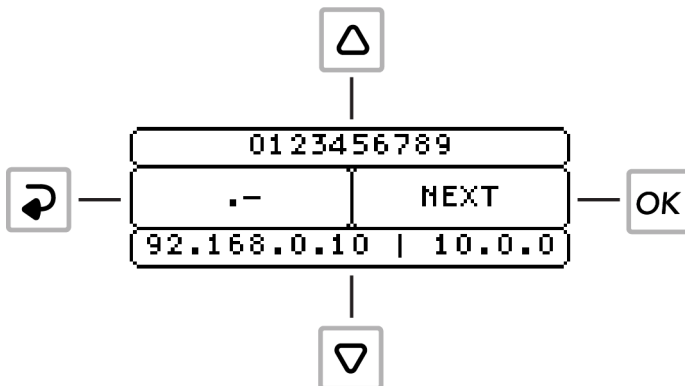
On the SolarGatewaySE there are multiple inputs required like IP addresses, IP address ranges and names. The steps below will explain how to use the buttons to insert characters.



5.2.1 Input options

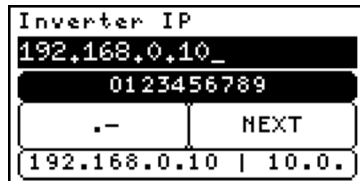
Use the buttons on the SolarGatewaySE to select one of the four input options related to the position of the pressed button.

For example: the UP button selects and highlights the numeric input.



5.2.2 Select characters

When an input option is selected, use the UP and DOWN buttons to navigate and select a character or pre-defined value like and IP-adress. Press the OK button or wait 3 seconds to confirm the selected character or value. Characters now appear in the input field as shown below.



5.2.3 Remove characters

While one of the input option is selected, press the BACK button to remove the last character or hold the OK button to clear all input.

5.2.4 Uppercase

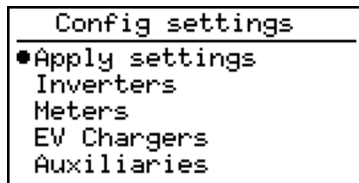
It is possible to use uppercase characters. Hold the UP button to activate uppercase characters, and hold it again to switch back.



6 Configuration settings

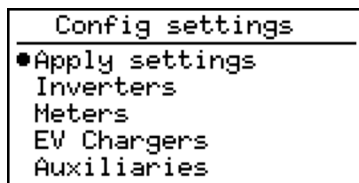
On the "Config settings" page the basic system settings are done. The following configuration items are found:

- Apply settings
- Inverters
- Meters
- EV Chargers
- Auxiliaries
- Grid settings
- Setup RTU-A (X10)
- Setup RTU-B (X11)
- Setup RTU-C (X12)
- System setup



6.1 Apply settings

All settings in the config menu can be changed without directly affecting the current function of the SolarGatewaySE. When settings are changed, the changes must be applied using this menu. Applying the settings can be done selecting one of multiple strategies. Each strategy has predefined controllers and certain required settings to be set. After applying a new strategy the system will check all requirements and only if all requirements for the strategy are met, the new strategy is applied.

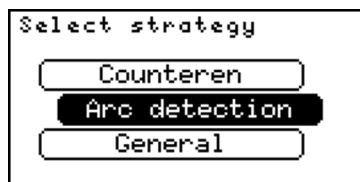


6.2 Activate config

This configuration will activate all settings, a strategy must be selected. Changed settings are stored, but not applied until the wanted strategy is selected and correctly applied. If a faulty configuration is found, the selected strategy returns an error, and the system function is not changed. Only if the selected strategy is correctly configured, the new configuration is applied and the old configured strategie is replaced by the new one.

6.2.1 Select strategy

To activate all settings, a strategy needs to be selected. The current implented strategies are:



6.2.1.1 Counteren

Counteren will provide the stand-alone counter controller using a grid meter, inverters and a pyrano sensor.

6.2.1.2 Arc detection

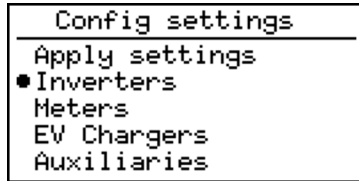
Arc detection will only provide the arc detection functionality using an external arc detection. This strategy will not implement any export or import limiter. This allows for easy and fast arc detection integration in existing systems.

6.2.1.3 General

General will provide all required controllers, except for the countering controller. This strategy uses the entered solar power per group and grid export limits to create (if required) an export controller. At least one grid meter is required to do so.

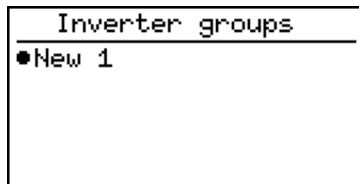
6.3 Inverter configuration

This configuration allows the user to configure the connected inverters (if any). Multiple groups can be made, where each group connects to the same type of meters, through the same physical interface.



6.3.1 Inverter groups

The "Inverter groups" page will show all existing inverter groups. There is one pre-set group called "New 1" that isn't configured yet, this group is automatically added by removing your last existing group.



It is possible to add more groups, rename the existing groups, duplicate a specific group or delete one group. Select a group and hold the OK button to trigger this options.



i Note

To add more than 15 inverters, a licence is needed, inverter ranges in different groups will be counted together as single inverters.

6.3.2 Configure inverter group

The following inputs are required to configure a group of inverter(s).

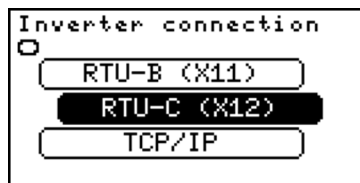
- Inverter connection
- Adress range
- Inverter type
- Inverter IP adress
- Inverter TCP port
- Strings per inverter
- Total number of solar panels
- Peak power per panel

i Note

Inverter IP and TCP port will only be asked when the selected connection type of the inverter is TCP/IP.

6.3.2.1 Inverter connection

Select the connection type of the to be configured inverter(s)



The following connection types can be selected:

- RTU-A (X10)
- RTU-B (X11)
- RTU-C (X12)
- TCP/IP

6.3.2.2 Inverter address range

Insert the address range of the to be configured inverter(s). It is possible to separate addresses with the use of "," or to define a range with the use of "-". For example: The input "1,2,4-10" will set a address range from 1 to 10 except 3.

address range			
1,2,4-10			
0123456789			
-,		NEXT	
1-2	1-3	1-4	1,

i Note

An adress may only occures once per RTU port. Meters and inverters could be connected to the same RTU port, as long as baudrate settings are identical and each connected slave has a unique adress.

6.3.2.3 Inverter type

Select here the type or brand of the to be configured inverter, in the image below 'Goodwe' is selected.

Inverter type	
OO	
Growatt-V2	
Goodwe	
Huawei V2	
OOOOOO	

The following types can be selected:

- INVT
- Growatt-V1
- Growatt-V2
- Huawei V3
- SMA tripower
- SMA core2
- SolarEdge
- Solax

6.3.2.4 Inverter IP

Insert the IP address of the to be configured inverter(s). For example: "192.168.0.125"

Inverter IP	
192.168.0.125	
0123456789	
.	NEXT
192.168.0.10 10.0.	

i Note

Inverter IP will only be asked when the inverter connection type is TCP/IP.

6.3.2.5 Inverter TCP port

Insert the TCP port of the to be configured inverter(s). For example: "502"

Inverter TCP port	
0123456789	
BACKSPACE	NEXT
502	

i Note

Inverter port will only be asked when the inverter connection type is TCP/IP.

6.3.2.6 Strings per inverter

Insert the number of individual string data which should be read for every inverter connected to the group. Basically the number of individually monitored strings or MPPTs per inverter is entered here.

Strings per inverter				
4				
0123456789				
BACKSPACE		NEXT		
1	2	4	6	10

6.3.2.7 Installed solar panels

Enter the total number of solar panels installed for this group of inverter(s).

Total number of panel:			
32			
0123456789			
BACKSPACE		NEXT	
10	50	100	500

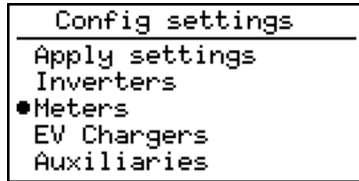
6.3.2.8 Peak power per panel

Enter the peak power per panel for the installed solar panels. The total solar power (Installed solar panels * Peak power per panel) is used to calculate the required export limit controllers. If different panels are used, make sure the total entered power (Installed solar panels * Peak power per panel) is correct.

Peak power per panel			
200 Wp			
0123456789			
BACKSPACE		NEXT	
200	300	400	45

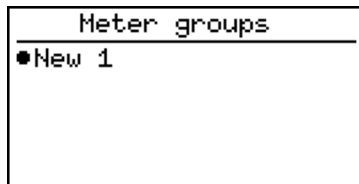
6.4 Meter configuration

This configuration allows the user to configure the connected meters (if any). Multiple groups can be made, where each group connects to the same type of meters, through the same physical interface.



6.4.1 Meter groups

The "Meter groups" page will show all existing meter groups. There is one pre-set group called "New 1" that isn't configured yet, this group is automatically added by removing your last existing group.



It is possible to add more groups, rename the existing groups, duplicate a specific group or delete one group. Select a group and hold the OK button to trigger this options.



i Note

To add more than 15 meters, a licence is needed, meter ranges in different groups will be counted together as single meters.

6.4.2 Configure meter group

The following inputs are required to configure a group of meter(s).

- Meter connection
- Adress range
- Meter type
- Meter location
- Meter IP address
- Meter TCP port

i Note

Adress range will only be asked when the selected connection type of the meter(s) is RTU or TCP/IP.

i Note

Meter IP address and TCP port will only be asked when the selected connection type of the meter(s) is TCP/IP.

6.4.2.1 Meter connection

Select the connection type of the to be configured meter(s) the options are:

- RTU-A (X10)
- RTU-B (X11)
- RTU-C (X12)
- P1
- TCP/IP



i Note

When meter(s) connection is P1, the only extra setting needed to complete meter configuration is 5.3.1.5 Meter location.

6.4.2.2 Adress range

Insert the address range of the to be configured meter(s). It is possible to seperate addresses with the use of "," or to define a range with the use of "-". For example: The input "1,2,4-10" will set a address range from 1 to 10 except 3.

address range			
1,2,4-10			
0123456789			
-,	NEXT		
1-2	1-3	1-4	1,

i Note

An adress may only occures once per RTU port. Meters and inverters could be connected to the same RTU port, as long as baudrate settings are identical and each connected slave has a unique adress.

6.4.2.3 Meter type

Select here the type or brand of the to be configured inverter, in the image below 'Goodwe' is selected. The following type or brands are available to select:

- Eastron
- Socomec Diris
- Janitza
- Hager 3000

meter type	
Eastron	
Socomec Diris	
Janitza	
OO	

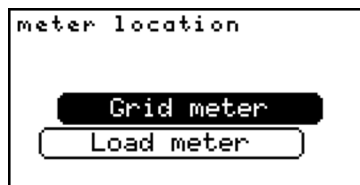
6.4.2.4 Meter location

Select here the meter(s) location of the to be configured meter(s), options are:

- Grid meter
- Load meter

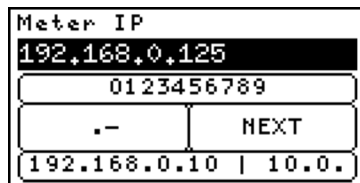
i Note

All meters configured as Grid meter should measure the same power. Multiple meters configured as Grid meter can be used as redundant measurement. If the measurement in one of the Grid meters is not corresponding with the measurements of the other, an error is raised and inverters are safely reduced to their safe power. This to prevent the export limit to exceed the configured limit.



6.4.2.5 Meter IP

Insert the IP address of the to be configured meter(s). For example: "192.168.0.125"



i Note

Meter(s) IP will only be asked when the meter(s) connection type is TCP/IP.

6.4.2.6 Meter port

Insert the port of the to be configured meter(s). For example: "502"

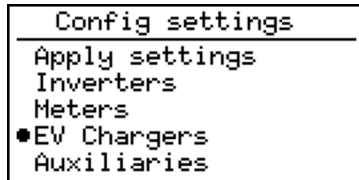
Meter TCP port	
[REDACTED]	
0123456789	
BACKSPACE	NEXT
502	

i Note

Meter(s) port will only be asked when the meter(s) connection type is TCP/IP.

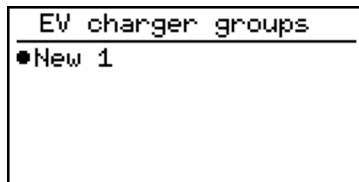
6.5 EV Chargers

This configuration will define all EV Charger(s) settings. (INTRO ABOUT EV CHARGERS)



6.5.1 EV Charger groups

The 'EV Charger groups' page will show all existing EV Charger groups. There is one pre-set group called 'New group' that isn't configured yet, this group is automatically added by removing your last existing group.



It is possible to add more groups, rename the existing groups, duplicate a specific group or delete one group. Select a group and hold the OK button to trigger this options.



i Note

To add more than 5 EV Chargers, a licence is needed. EV Charger ranges in different groups will be counted together as single EV Chargers.

6.5.2 configure EV Charger group

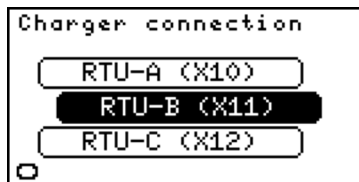
The following inputs are required to configure a group of EV Charger(s).

- EV Charger connection
- EV Charger slaves
- EV Charger type
- EV Charger IP

6.5.2.1 EV Charger connection

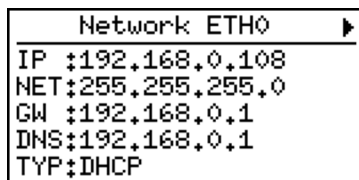
Select the connection type of the to be configured EV Charger(s) the options are:

- RTU-A (X10)
- RTU-B (X11)
- RTU-C (X12)
- TCP/IP



6.5.2.2 Adress range

Insert the address range of the to be configured EV Charger(s). It is possible to separate addresses with the use of "," or to define a range with the use of "-". For example: The input "1,2,4-10" will set a address range from 1 to 10 except 3.



i Note

An adress may only occurs once per RTU port. Slaves of diffrent types could be connected to the same RTU port, as long as baudrate settings are identical and each connected slave has a unique adress.

6.5.2.3 EV Charger slaves

Enter the slaves for the EV Charger(s). It is possible to separate slaves with the use of "," or to define a range with the use of "-". For example: The input "1,2,4-10" will set a the slaves 1 to 10 except 3.

Charger slaves
1,2,4-10
0123456789
-, NEXT
1-2 1-3 1-4 1,

6.5.2.4 EV Charger type

Select here the type or brand of the to be configured EV Charger(s). The following type or brands are available to select:

- Orbis

Charger type
Orbis

6.5.2.5 EV Charger IP

Insert the IP adress of the to be configured EV Charger(s). For example: "192.168.0.125"

EV IP
192,168,0,125
0123456789
.- NEXT
192.168.0.10 10.0.

i Note

EV Charger(s) IP will only be asked when the EV Charger(s) connection type is TCP/IP.

6.5.2.6 EV Charger port

Insert the port of the to be configured EV Charger(s). For example: "502"

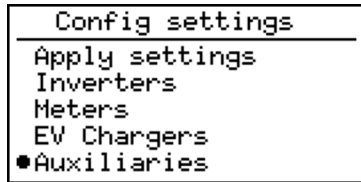
Charger TCP port	
[REDACTED]	
0123456789	
BACKSPACE	NEXT
502	

i Note

EV Charger(s) port will only be asked when the EV Charger(s) connection type is TCP/IP.

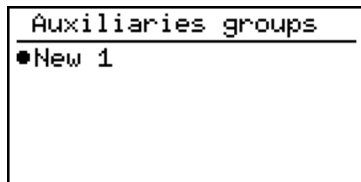
6.6 Auxiliaries

This configuration will define all Auxiliaries settings. (INTRO)



6.6.1 Auxiliaries groups

The 'Auxiliaries groups' page will show all existing Auxiliaries groups. There is one pre-set group called 'New group' that isn't configured yet, this group is automatically added by removing your last existing group.



It is possible to add more groups, rename the existing groups, duplicate a specific group or delete one group. Select a group and hold the OK button to trigger this options.



i Note

To add more than 15 Auxiliaries, a licence is needed. Auxiliaries ranges in different groups will be counted together as single Auxiliaries.

6.6.2 configure Auxiliaries group

The following inputs are required to configure a group of Auxiliaries:

- Auxiliaries connection
- Auxiliaries slaves
- Auxiliaries type
- Auxiliaries IP

6.6.2.1 Auxiliaries connection

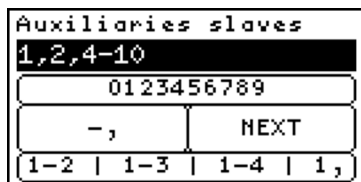
Select the connection type of the to be configured Auxiliaries the options are:

- RTU-A (X10)
- RTU-B (X11)
- RTU-C (X12)
- TCP/IP



6.6.2.2 Auxiliaries adres range

Enter the slaves for the Auxiliaries. It is possible to separate slaves with the use of "," or to define a range with the use of "-". For example: The input "1,2,4-10" will set the slaves 1 to 10 except 3.



i Note

An address may only occur once per RTU port. Slaves of different types could be connected to the same RTU port, as long as baudrate settings are identical and each connected slave has a unique address.

6.6.2.3 Auxiliaries type

Select the connection type of the to be configured Auxiliaries the options are:

- IO TM-P4A4 (Modbus GPIO module)
- Kipp&Zonen SMP3-A (Pyrano sensor)

```

Auxiliaries type
  IO TM-P4A4
  Kipp&Zonen SMP3-
  
```

6.6.2.4 Auxiliaries IP

Insert the IP adress of the to be configured Auxiliaries. For example: "192.168.0.125"

```

Auxiliaries IP
192.168.0.125
0123456789
.-      NEXT
192.168.0.10 | 10.0.
  
```

i Note

Auxiliaries IP will only be asked when the Auxiliaries connection type is TCP/IP.

6.6.2.5 Auxiliaries port

Insert the port of the to be configured Auxiliaries. For example: "502"

```

Auxiliaries TCP port
0123456789
BACKSPACE  NEXT
502
  
```

i Note

Auxiliaries port will only be asked when the Auxiliaries connection type is TCP/IP.

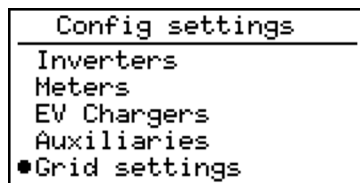
6.7 Grid settings

In this configuration power and current limits for the plant can be defined.

6.7.1 Grid settings configuration

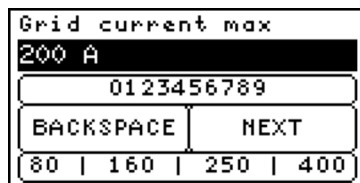
The following inputs are required to configure the grid settings:

- Grid current max
- Grid + power max
- Grid - power max



6.7.1.1 Grid current max

Enter the maximum allowed grid current for this plant. For example: 200 A.



💡 Tip

This is typically the value of the main fuse.

6.7.1.2 Grid + power max

Enter the maximum active power which might be consumed from the grid. For example: 50 kW.

Grid + power max			
50 kW			
0123456789			
BACKSPACE		NEXT	
50	100	200	50

6.7.1.3 Grid - power max

Enter the maximum active power which might be exported to the grid. For example: 100 kW. The SolarGatewaySE will implement export limitation controllers for configured solar inverters if the configured solar power exceeds the configured limit.

Grid - power max			
100 kW			
0123456789			
BACKSPACE		NEXT	
50	100	200	50

6.8 Arc detection

This configuration will define the external arc detection settings. By default external arc detection is disabled. Keep in mind, any GPIO used to connect to the external arc detection should be true when no arc is detected!

6.8.1 Arc detection configuration

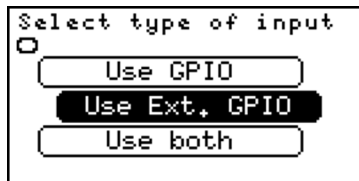
The following inputs are required to complete Arc detection configuration:

- Input type
- Minimum PAC
- Inverter adress

6.8.1.1 Input type

Select the input type for Arc detection, options are:

- Deactivate
- GPIO (use onboard GPIO for max 2 inverters)
- Ext. GPIO (use modbus GPIO modules for multiple external arc detections)
- Both (Use as well the internal GPIO as external GPIO modules)



💡 Tip

The deactivate option will deactivate arc detection, even if the Arc detection strategy is selected. Arc detection is deactivated by default.

6.8.2 Minimum PAC

Enter the minimum PAC (Inverter AC power) required per inverter for an arc detection. If the AC power of the inverter is not at least as high as Minimum PAC, while a detection is done, the detection is neglected.

Minimum PAC for arc	
100 W	
0123456789	
BACKSPACE	NEXT
50 100 200 300	

6.8.3 Inverter adress

This menu is only visible if the "Both" option is selected. It allows the user to select the one or two inverter addresses controlled by the internal GPIO. The other addresses will be logically (from low to high) mapped to the external GPIO modules. For example, if 5 inverters are configured, 1,2,3,4,5 and only 2 external GPIO modules are configured and "Inverter address" is set to 3,4: The first GPIO modules is connected to inverter 1, the second GPIO module to inverter 2 and GPI1 is connected to inverter 3, GPI2 to 4. Inverter 5 has no arc detection connected. Setting the "Inverter adress" to 1 in this situation connects inverter 1 to GPI1 and inverter 2 to external GPIO 1 and inverter 3 to external GPIO 2.

inv addr for GPIO	
10	
0123456789	
-,	NEXT
1-2 1-3 1-4 1,	

6.8.3.1 Connecting the external arc detection

When connecting the external arc detection please check the following items:

- Make sure the arc detection is not latched on detection.
- Make sure the GPIO of the SolarGatewaySE or input on the external GPIO are HIGH when no detection is done and LOW when a detection is done.
- Check the functionality of the external arc detection
- Check the functionality of the configured SolarGatewaySE, check if the correct inverter is turned-off when a detection is done.

7 Device settings

This part of the manual will describe all device settings and configurations.

7.1 ETH0 settings

Shows the actual status of the ETH0 port, and allows user to change port IP configuration.

```
Network ETH0 ▶
IP :192.168.0.108
NET:255.255.255.0
GW :192.168.0.1
DNS:192.168.0.1
TYP:DHCP
```

```
Network ETH0 setti
●ETH0 Setup
```

7.1.1 ETH0 Setup

7.1.1.1 ETH0 Type

Select the type of ETH0 connection, options are:

- DHCP
- STATIC

```
Static / DHCP
  DHCP
  STATIC
```

i Note

When DHCP is selected as network type for ETH0, no other settings are needed for configuration. If Static is selected as ETH0 network type, other settings below are needed.

7.1.1.2 ETH0 IP Address

Enter the IP address of the ETH0 network, for example: "192.168.0.10"

ETH0 IP address	
192.168.0.10	
0123456789	
.	NEXT
192.168.0.10	10.0.

7.1.1.3 ETH0 Gateway IP address

Enter the IP address of the network gateway, for example: "192.168.0.1".

ETH0 Gateway address	
192.168.0.1	
0123456789	
.	NEXT
192.168.0.10	10.0.

7.1.1.4 ETH0 Netmask

Enter the network Netmask, for example: "255.255.255.0".

ETH0 Netmask	
255.255.255.0	
0123456789	
.	NEXT
255.255.255.0	

7.1.1.5 ETH0 DNS

Enter the DNS setting for ETH0, for example: "8.8.8.8".

ETH0 DNS	
8.8.8.8	
0123456789	
.	NEXT
8.8.8.8	4.4.4.4

7.2 ETH1 settings

Shows the actual status of the ETH1 port, and allows user to change port IP configuration.

```
Network ETH1 ▶
IP :192.168.0.126
NET:/24
GW :192.168.0.1
DNS:192.168.0.1
TYP:DHCP
```

7.2.1 ETH1 Setup

```
Network ETH1 setti
●ETH1 Setup
```

7.2.1.1 ETH1 Type

Select the type of ETH1 connection, options are:

- DHCP
- STATIC

```
Static / DHCP
  DHCP
  STATIC
```

i Note

When DHCP is selected as network type for ETH1, no other settings are needed for configuration. If Static is selected as ETH1 network type, other settings below are needed.

7.2.1.2 ETH1 IP Address

Enter the IP address of the ETH1 network, for example: "192.168.10.0"

ETH1 IP address	
192.168.0.10	
0123456789	
.	NEXT
192.168.0.10	10.0.

7.2.1.3 ETH1 Gateway IP address

Enter the IP address of the network gateway, for example: "192.168.0.1".

ETH1 Gateway address	
192.168.0.1	
0123456789	
.	NEXT
192.168.0.10	10.0.

7.2.1.4 ETH1 Netmask

Enter the ETH1 Netmask, for example: "255.255.255.0".

ETH1 Netmask	
255.255.255.0	
0123456789	
.	NEXT
255.255.255.0	

7.2.1.5 ETH1 DNS

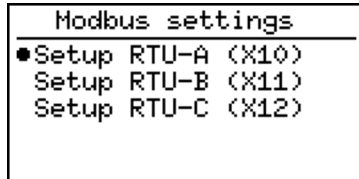
Enter the DNS setting for ETH0, for example: "8.8.8.8".

ETH1 DNS	
8.8.8.8	
0123456789	
.	NEXT
8.8.8.8	4.4.4.4

7.3 Modbus settings

This explains the RTU setup for:

- RTU-A (X10)
- RTU-B (X11)
- RTU-C (X12)



7.3.1 RTU configuration

The following inputs are required to complete RTU configuration:

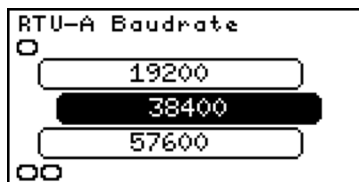
- Baudrate
- Parity
- Databits
- Stopbits

The default port configuration is 9600 8N1.

7.3.1.1 Baudrate

Select the baudrate for the RTU connector, options are:

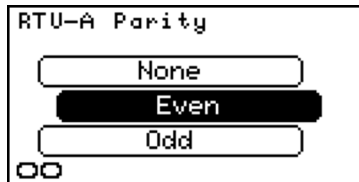
- 9600
- 19200
- 38400
- 57600
- 115200
- 230400



7.3.1.2 Parity

Select the parity for the RTU connector, options are:

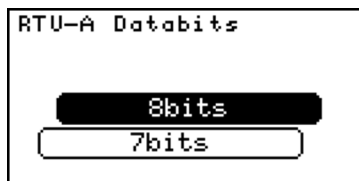
- None
- Even
- Odd



7.3.1.3 Databits

Select the databits for the RTU connector, options are:

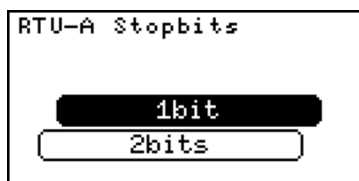
- 8 bits
- 7 bits



7.3.1.4 Stopbits

Select the stopbits for the RTU connector, options are:

- 1 bit
- 2 bits



7.4 GPIO settings

The GPIO page shows the actual status of the input ports. True is a high input, false is a low input.

```
GPIO
GPI 1  :false
GPI 2  :false
```

```
GPIO settings
●Control GPO
```

7.4.1 Control GPO

This menu allows the user to directly control the two output ports on the SolarGatewaySE.

```
Switch GPO
GPIO 1 
GPIO 2 
```

Warning

Forcing the GPO state can counteract the intended function!

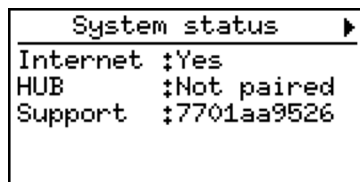
7.5 System settings

This page shows actual connection status of the SolarGatewaySE.

- Internet, yes if the device was able to ping to an external ip.
- HUB, paired if the user has already paired the device to the HUB.
- Support, shows the support ID when support is enabled.

System settings contains

- Display dim
- Display contrast

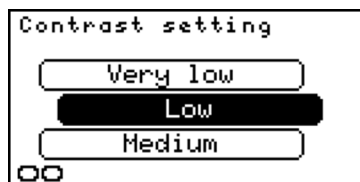


7.5.1 Display dim



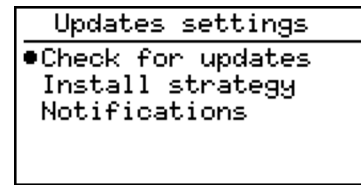
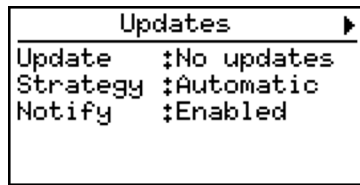
Select the low level of the backlight intensity. The SolarGatewaySE will reduce the backlight to the configured intensity when the buttons are not pressed for a while.

7.5.2 Display contrast



Selects the display's contrast.

7.6 Update settings



7.6.1 Check for updates

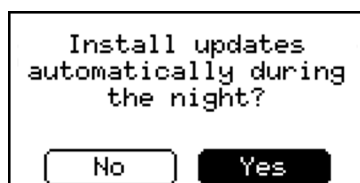
Manually checks if there are any software updates available. The SolarGatewaySE should be connected to the internet to check for new updates.



7.6.2 Install strategy

Selects the strategy to run updates. Two options are available:

- **Automatically:** SolarGatewaySE will automatically download and install available updates at night.
- **Manual:** If enabled a notification is shown when an update is available. The device will not automatically install updates.



7.6.3 Notifications

Turn on or turn off update notifications on the SolarGatewaySE.





All products described in this document are owned by **Embion B.V.**

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