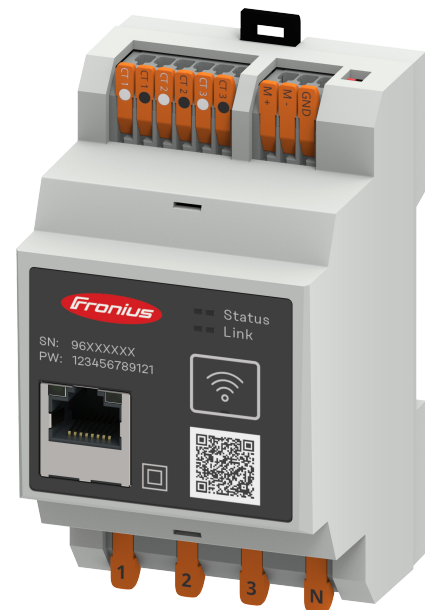


# Operating Instructions

## Fronius Smart Meter IP



EN | Operating Instructions





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# **Safety rules**



# Safety rules

## Explanation of safety notices

### **DANGER!**

**Indicates immediate danger.**

- ▶ If not avoided, death or serious injury will result.

### **WARNING!**

**Indicates a potentially hazardous situation.**

- ▶ If not avoided, death or serious injury may result.

### **CAUTION!**

**Indicates a situation where damage or injury could occur.**

- ▶ If not avoided, minor injury and/or damage to property may result.

### **NOTE!**

**Indicates a risk of flawed results and possible damage to the equipment.**

## General

The device has been manufactured in line with the state of the art and according to recognized safety standards. If used incorrectly or misused, however, it can cause:

- Injury or death to the operator or a third party
- Damage to the device and other material assets belonging to the operating company.

All personnel involved in commissioning, maintenance, and servicing of the device must:

- Be suitably qualified
- Have knowledge of and experience in dealing with electrical installations and
- Have fully read and precisely followed these Operating Instructions

The Operating Instructions must always be at hand wherever the device is being used. In addition to the Operating Instructions, attention must also be paid to any generally applicable and local regulations regarding accident prevention and environmental protection.

All safety and danger notices on the device:

- Must be kept in a legible state
- Must not be damaged
- Must not be removed
- Must not be covered, pasted or painted over

The terminals can reach high temperatures.

Only operate the device when all protection devices are fully functional. If the protection devices are not fully functional, there is a danger of:

- Injury or death to the operator or a third party
- Damage to the device and other material assets belonging to the operating company

Any safety devices that are not fully functional must be repaired by an authorised specialist before the device is switched on.

---

Never bypass or disable protection devices.

---

For the location of the safety and danger notices on the device, refer to the section headed "General remarks" in the Operating Instructions for the device.

---

Any equipment malfunctions which might impair safety must be remedied before the device is turned on.

---

**This is for your personal safety!**

---

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**Environmental conditions**

Operation or storage of the device outside the stipulated area will be deemed as not in accordance with the intended purpose. The manufacturer accepts no liability for any damage resulting from improper use.

---

**Qualified personnel**

The servicing information contained in these operating instructions is intended only for the use of qualified service engineers. An electric shock can be fatal. Do not carry out any actions other than those described in the documentation. This also applies to qualified personnel.

---

All cables and leads must be secured, undamaged, insulated and adequately dimensioned. Loose connections, scorched, damaged or inadequately dimensioned cables and leads must be immediately repaired by authorised personnel.

---

Maintenance and repair work must only be carried out by an authorised specialist.

---

It is impossible to guarantee that bought-in parts are designed and manufactured to meet the demands made on them, or that they satisfy safety requirements. Use only original spare parts (also applies to standard parts).

---

Do not carry out any alterations, installations, or modifications to the device without first obtaining the manufacturer's permission.

---

Components that are not in perfect condition must be changed immediately.

---

**Copyright**

Copyright of these operating instructions remains with the manufacturer.

---

The text and illustrations are all technically correct at the time of printing. We reserve the right to make changes. The contents of the operating instructions shall not provide the basis for any claims whatsoever on the part of the purchaser. If you have any suggestions for improvement, or can point out any mistakes that you have found in the instructions, we will be most grateful for your comments.

---

**Data protection**

The user is responsible for the safekeeping of any changes made to the factory settings. The manufacturer accepts no liability for any deleted personal settings.

---



# **General information**



# Fronius Smart Meter IP

## Device description

The Fronius Smart Meter IP is a bidirectional electricity meter which optimises self-consumption and records the household's load curve. In conjunction with the Fronius inverter, Fronius Datamanager and Fronius data interface, the Fronius Smart Meter IP provides a clear overview of a user's own power consumption.

The meter measures the power flow to the loads or to the grid and forwards the information via the Modbus RTU/RS485- or TCP (LAN/WLAN) communication to the Fronius inverter and the Fronius Datamanager.

### CAUTION!

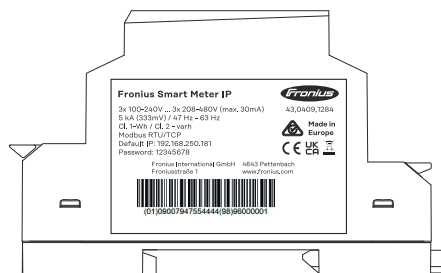
#### Observe and follow safety instructions!

Failure to observe the safety instructions will result in damage to personnel and equipment.

- ▶ Switch off the power supply before establishing a mains connection.
- ▶ Observe the safety instructions.

## Information on the device

Technical data, markings and safety symbols are located on the Fronius Smart Meter IP. These must NOT be removed or painted over. They warn against incorrect operation which can lead to serious injury and damage.



### Symbols on the rating plate:



CE mark – confirms compliance with applicable EU directives and regulations. The product has been tested by a specific notified body.



WEEE mark – waste electrical and electronic equipment must be collected separately and recycled in an environmentally sound manner in accordance with the European Directive and national law.



UKCA mark – confirms compliance with applicable UK directives and regulations.



RCM mark – tested in accordance with the requirements of Australia and New Zealand.

## Intended use

The Fronius Smart Meter IP is a fixed piece of equipment for public grids of TN/TT systems and records self-consumption and/or individual loads in the sys-

tem.

The Fronius Smart Meter IP is required for systems with a battery storage system and/or a Fronius Ohmpilot installed for communication between the individual components.

The installation is carried out on an indoor DIN rail with corresponding back-up fuses, which are adapted to the cable cross-sections of the copper conductors and to the maximum current of the meter. The Fronius Smart Meter IP must only be operated in accordance with the specifications in the enclosed documentation and in accordance with local laws, regulations, provisions, standards and within the limits of technical possibilities. Any use of the product other than as described in the intended use shall be deemed to be not in accordance with the intended purpose.

The available documentation forms part of the product and must be read, observed and kept in good condition. It must also be accessible at all times at the place of installation. The available documents do not replace regional, state, provincial or national laws, or regulations or standards that apply to the installation, electrical safety and use of the product. Fronius International GmbH assumes no responsibility for compliance with or non-compliance with these laws or regulations in connection with the installation of the product.

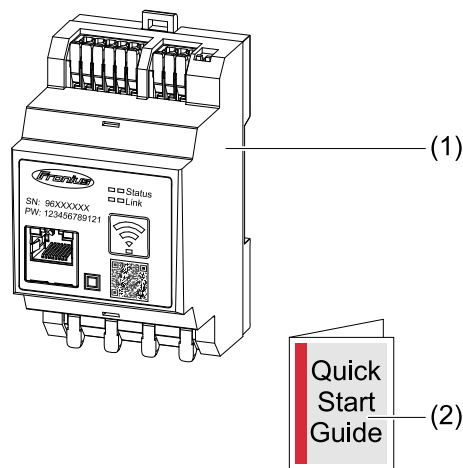
Interventions on the Fronius Smart Meter IP, e.g. modifications and alterations, are not permitted. Unauthorised interventions will void the warranty and warranty claims and, as a rule, void the user's authority to operate the equipment. The manufacturer shall not be liable for any damage resulting from such use.

Reasonably foreseeable misuse:

The Fronius Smart Meter IP is not suitable for the supply of life-sustaining medical devices or for the billing of subtenants.

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### Scope of supply

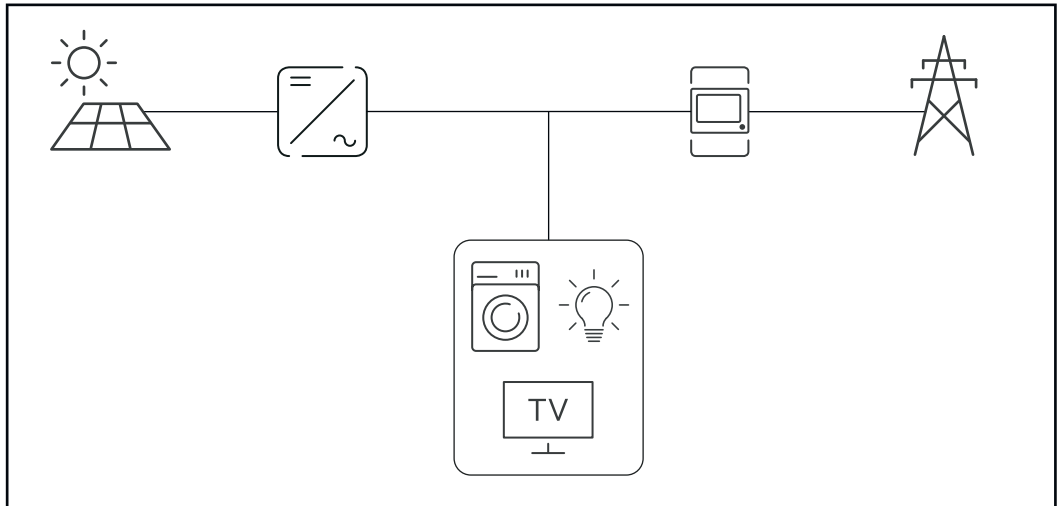
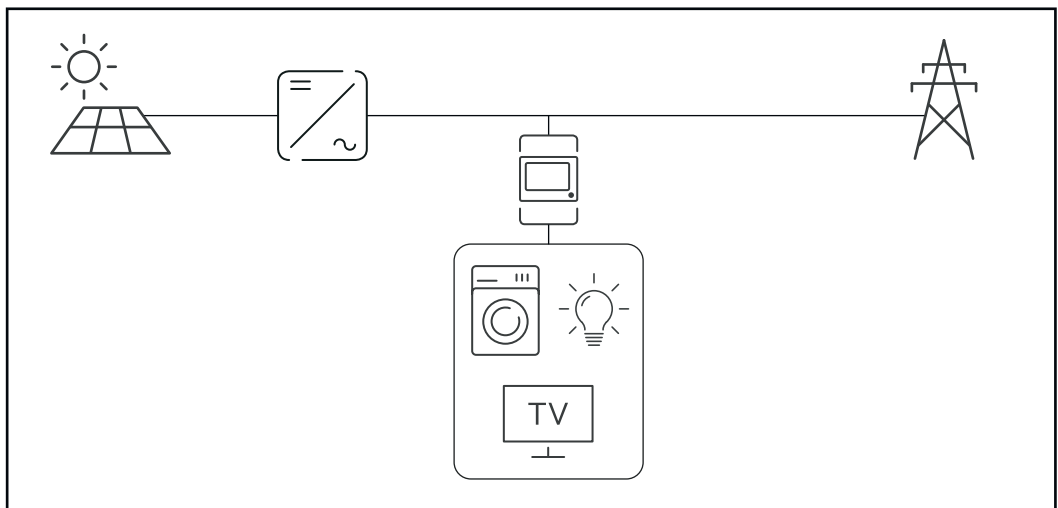


- (1) Fronius Smart Meter IP
- (2) Quick Start guide

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### Positioning

The Smart Meter can be installed in the following positions in the system:

**Positioning at the feed-in point:****Positioning at consumption point:****Measuring accuracy**

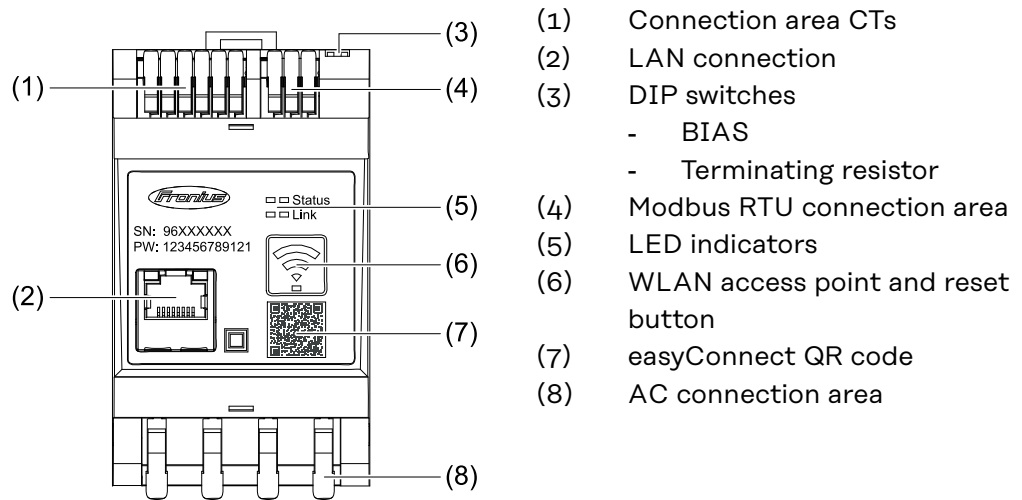
The Fronius Smart Meter IP has accuracy class 1 when measuring active energy (EN IEC 62053-21) in the voltage ranges 208 - 480 VLL and 100 -240 VLN. For further details see [Technical data](#) on page 50.

**Backup power mode**

The Fronius Smart Meter IP is backup power capable with Modbus RTU / TCP data cabling. When connecting via Modbus TCP, make sure that the grid reset time is increased by starting the network. Fronius recommends a Modbus RTU connection

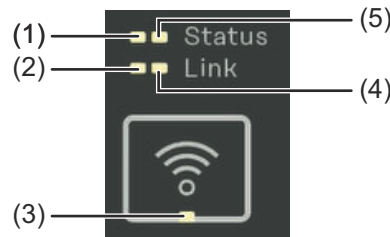
# Control elements, connections and displays

## Product overview



## LED status indicator

The LED status indicator shows the operating status and data connection of the Fronius Smart Meter IP.



- (1) **Status 1 LED**  
Lights up green: Ready
- (2) **Link 1 LED**  
Lights up green: Data connection established with the network.

- (3) **WLAN LED**  
Flashing green: WLAN connection is being established.  
Lights up green: WLAN connection successfully established.
- (4) **Link 2 LED**  
Lights up red: No data connection  
Flashing red: Open WLAN access point
- (5) **Status 2 LED**  
Lights up: Booting

# Installation





# Preparations

## Selecting the Smart Meter location

Please note the following criteria when choosing a location for the Smart Meter:

Only install on a solid, non-flammable surface.

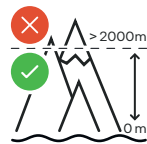
Max. ambient temperatures:  $-25\text{ }^{\circ}\text{C}$  –  $+55\text{ }^{\circ}\text{C}$

Relative humidity: max. 93%

When installing the Smart Meter in a switch cabinet or similar closed environment, it is necessary to make sure that the hot air that develops will be dissipated by forced-air ventilation.



The Smart Meter is suitable for indoor installation.



The Smart Meter must not be installed or used at altitudes above 2 000 m.

# Installation

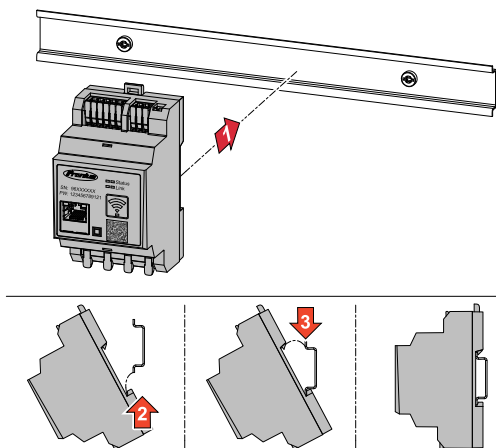
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## Checklist for installation

For installation information, see the following chapters:

- 1 Switch off the power supply before establishing a mains connection.
- 2 Mount the Fronius Smart Meter IP (see [Installation](#) on page 19).
- 3 Connect automatic circuit breakers or automatic circuit breakers and disconnectors (see [Protective circuit](#) on page 19).
- 4 Connect the mains cable to the Fronius Smart Meter IP (see [Cabling](#) on page 19).
- 5 Note down the nominal current of the current transformer for each meter. These values will be required during setup.
- 6 Connect the current transformer and Fronius Smart Meter IP (see [Current transformer connection requirements](#) on page 20).
- 7 Mount the current transformers on the conductors. Make sure that the current transformers are pointing in the correct direction. An arrow either points to the load or the source (public grid) (see [Connecting the current transformers](#) on page 21 and electricity trader user information).
- 8 Make sure that the current transformer phases match the mains voltage phases (see [Connecting the current transformers](#) on page 21).
- 9 Establish the data connection of the Fronius Smart Meter IP. The data connection can be established in three different ways:
  - Modbus RTU (recommended if backup power operation is used), see [22](#), on page 22.
  - LAN, see [Connecting the LAN](#) on page 22.
  - WLAN, see [WLAN configuration](#) on page 22.
- 10 With Modbus RTU connection: If necessary, set terminating resistors (see [Setting the Modbus RTU terminating resistor](#) on page 24).
- 11 With Modbus RTU connection: If necessary, set the BIAS switch (see [Setting the Modbus RTU BIAS](#) on page 25).
- 12 Tug on each wire and plug to make sure that they are securely connected to the terminal blocks.
- 13 Switch on the power supply to the Fronius Smart Meter IP.
- 14 Check the firmware version of the Fronius system monitoring (see "[Technical data](#)"). To ensure compatibility between the inverter and the Fronius Smart Meter IP, the software must always be kept up to date. The update can be started via the inverter web page or using Fronius Solar.web. (see "[Advanced settings](#)").
- 15 Configure the Fronius Smart Meter IP and put it into operation (see [Start-up](#) on page 27).

## Installation



The Fronius Smart Meter IP can be mounted on a 35 mm DIN rail. The housing comprises 3 modules according to DIN 43880.

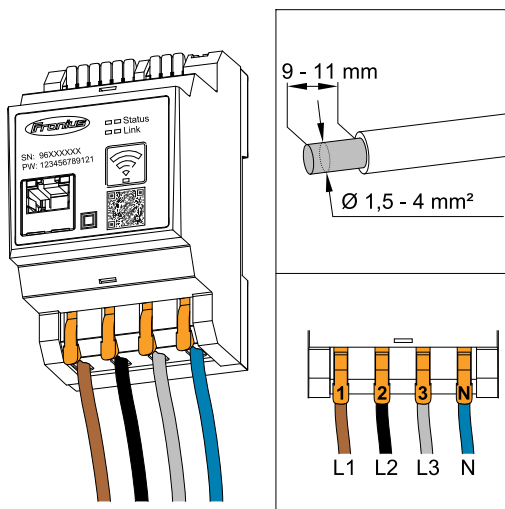
## Protective circuit

The Fronius Smart Meter IP is a hard-wired device and requires a disconnecting device (circuit breaker, switch or disconnecter) and overcurrent protection (automatic circuit breaker).

The Fronius Smart Meter IP consumes 30 mA, the nominal capacity of the disconnecting devices and the overcurrent protection is determined by the wire thickness, the mains voltage and the required breaking capacity.

- Disconnecting devices must be mounted within sight and as close as possible to the Fronius Smart Meter IP; they must also be easy to use.
- The disconnecting devices must satisfy the requirements of IEC 60947-1 and IEC 60947-3, as well as all national and local regulations for electrical systems.
- To monitor more than one mains voltage, use connected automatic circuit breakers.
- The overcurrent-protection must protect the mains terminals with the designations L1, L2 and L3. In rare cases, the neutral conductor has an overcurrent-protection, which must interrupt both neutral and non-earthed cables concurrently.

## Cabling



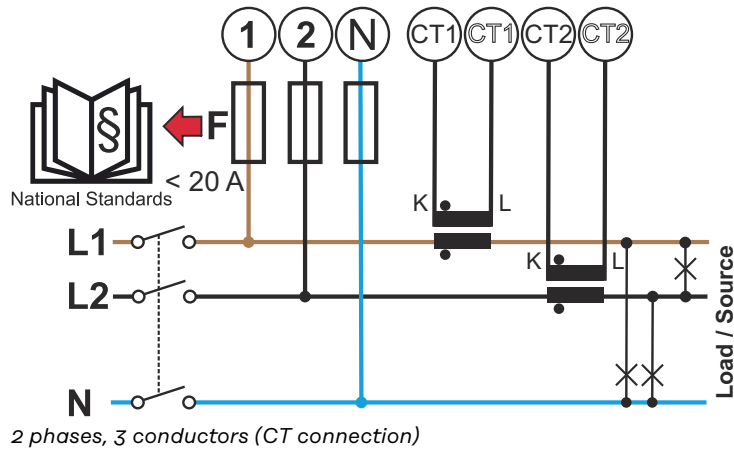
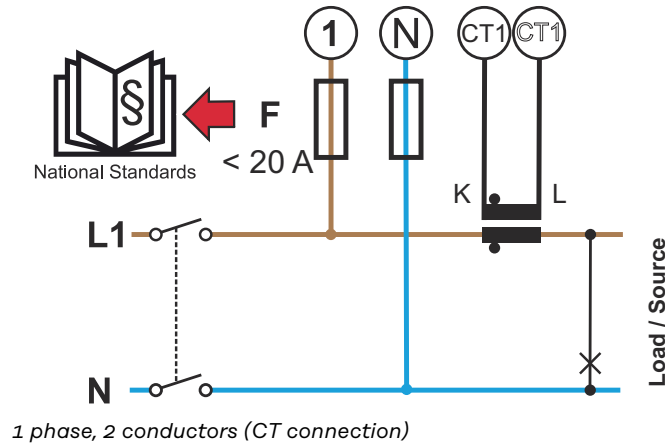
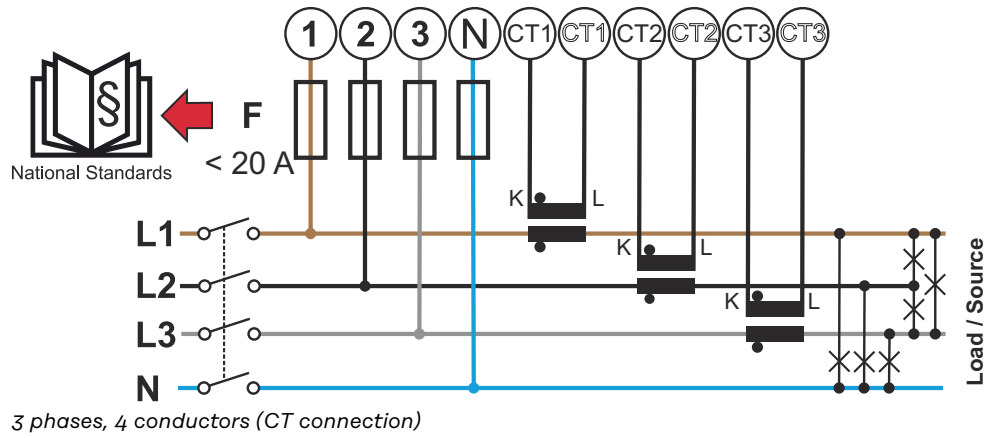
### IMPORTANT!

Always switch off the power supply before connecting the mains voltage inputs to the Fronius Smart Meter IP.

Recommended thickness of conductors of mains voltage cables for the connection terminals:

- Wire: 1.5 - 4 mm<sup>2</sup>

Connect each voltage cable to the terminal strip as shown in the graphics below.



**Current transformer connection requirements**

The current transformer must generate 333 mV at nominal current. The nominal currents of the current transformers are listed in the current transformer data sheets (Fronius CT, 41,0010,0104 / 41,0010,0105 / 41,0010,0232).

- Do not use models with 1 ampere or 5 ampere output current!
- The maximum input currents are listed in the data sheets of the current transformers.
- Make sure that the current transformers match the voltage phases. Make sure that current transformer L1 measures the current on the phase that is monitored by voltage input L1. The same applies for phases L2 and L3 respectively. Use the coloured labels or coloured adhesive tape supplied to mark the current transformer cables.
- To maintain accuracies, the current transformer wires should not be extended. If a line extension is necessary, use a 0.34 bis 1.5 mm<sup>2</sup> (22 to 16 AWG) twisted pair cable rated for 300 V or 600 V (not less than the operating voltage) and shielded if possible.
- Make sure that the current transformers are pointing in the correct direction. An arrow can indicate either the load or the source (public grid).
- If unusual measured values occur on unused phases, bypass the unused current transformer inputs: for each unused current transformer, connect the terminal marked with a white dot to the terminal marked with a black dot using a short cable.

Attach the current transformers to the conductors to be measured and connect the current transformer cables to the Fronius Smart Meter. Switch off the current before disconnecting the live conductor. Route the mains conductors through the current transformers as described in the previous section.

Current transformers are direction-dependent. If they are fitted the wrong way round or the white and black cables are reversed, the measured power will be negative.

Current transformers with a split core can be opened for installation on the conductor. A nylon cable tie can be fastened around the current transformer to prevent accidental opening.

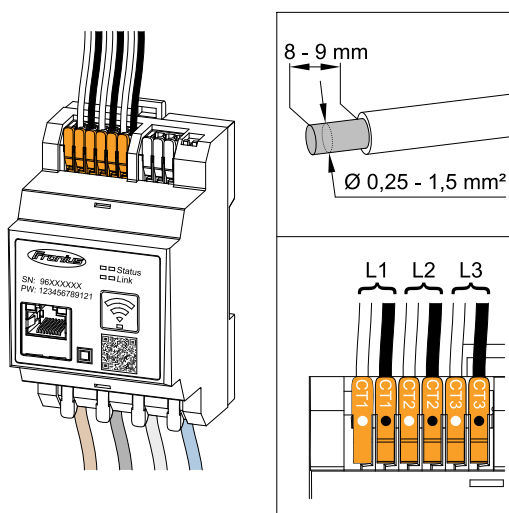
### Mounting

Rigid or hinged.

"Rigid" is usually cheaper with better power and accuracy values.

Hinged current transformers can be opened for attachment to the conductor. To prevent it being opened inadvertently, a plastic cable tie can be secured to the current transformer. Hinged current transformers can be installed in a system without interrupting the voltage.

### Connecting the current transformers



- 1 Make sure that the current transformers match the voltage phases. Make sure that current transformer L1 measures the current on the same phase that is monitored by voltage input L1. The same applies for phases L2 and L3.
- 2 Make sure that the current transformers are pointing in the correct direction. Observe the data sheet for the current transformer.

- 3 Note down the nominal current of the current transformer for each meter. These values will be required for setup.

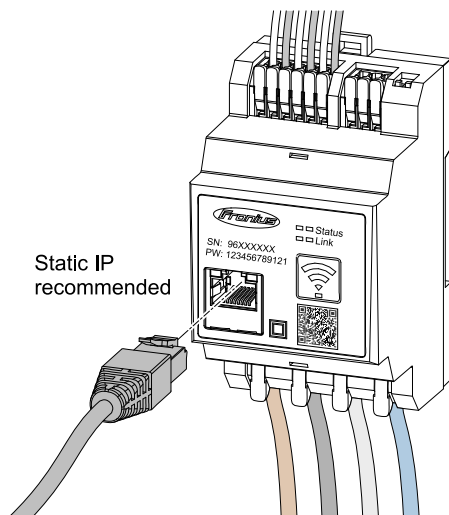
- 4 Attach the current transformers to the conductor to be measured and connect the cables of the current transformer to the Fronius Smart Meter IP.

**IMPORTANT!**

Always switch off the power supply before disconnecting live conductors.

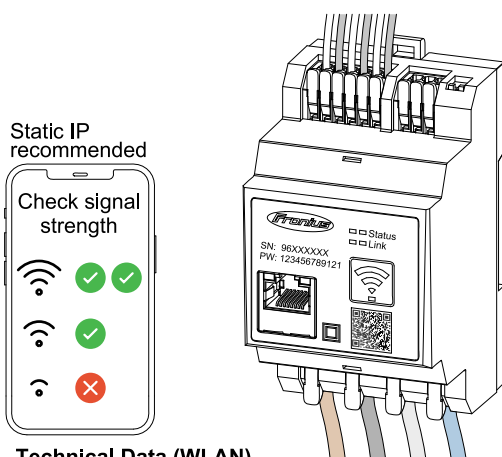
- 5 The current transformers are connected to the terminals CT1 (white / black), CT2 and CT3. If necessary, excessively long cables can be shortened accordingly. Observe the sequence in which the phases are connected. Accurate power measurement is only ensured if the mains voltage phases match the current phases.

**Connecting the LAN**



- Observe the following instructions:
- Use network cables of type CAT5 or higher.
  - If the data lines are close to the mains cabling, use wires or cables that are designed for 300 to 600 V (never less than the operating voltage).
  - Use double-insulated or sheathed data lines when they are close to bare conductors.
  - Use shielded twisted pair cables to avoid faults.

**WLAN configuration**



**Technical Data (WLAN)**  
Frequency band: channel 1-14 (2412-2472 MHz)  
Radio-frequency power: <100 mW (<20 dBm)

If the Smart Meter is integrated into the network via WLAN, ensure sufficient WLAN signal strength at the installation site!

If the signal strength is low, a WLAN repeater must be installed, for example.

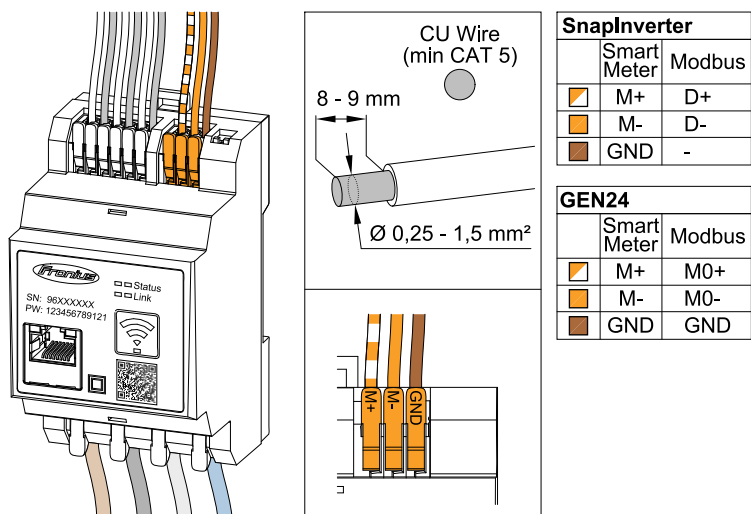
**Connecting the Modbus RTU**

Connect the data communication connections of the Fronius Smart Meter IP to the Modbus interface of the Fronius inverter using a network cable (type CAT5 or higher).

The Fronius Smart Meter IP can also be connected to the network (LAN / WLAN). This enables software updates to be carried out.

Standard Modbus address & TCP port:

- Address: 1
- TCP port: 502



To avoid interference, the terminating resistor must be used (see chapter [Setting the Modbus RTU terminating resistor](#) on page 24).

If a battery is installed in the system, the BIAS switch must be set (see chapter [Setting the Modbus RTU BIAS](#) on page 25).

Further configurations are necessary on the web interface of the inverter and the Smart Meter.

**Further information for successful commissioning.**

Observe the following information on connecting the data communication cable to the inverter.

- Use network cables of type CAT5 or higher.
- Use a mutual twisted cable pair for corresponding data lines (D+/D-, M1+/M1-).
- If the data lines are close to the mains cabling, use wires or cables that are designed for 300 to 600 V (never less than the operating voltage).
- Use double-insulated or sheathed data lines when they are close to bare conductors.
- Use shielded twisted pair cables to avoid faults.
- Two wires can be installed in each terminal; the wires are twisted first, inserted into the terminal and tightened.

**Note:** A loose wire can disable an entire area of the network.

- The data communication connections of the Fronius Smart Meter IP are electrically isolated from hazardous voltages.

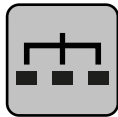
**Terminating resistors - Explanation of symbols**



**Inverter in the system**  
e. g. Fronius Symo



**Meter - Fronius Smart Meter IP**  
Terminating resistor is set to ON with the DIP switch (Term).



### Modbus RTU slave

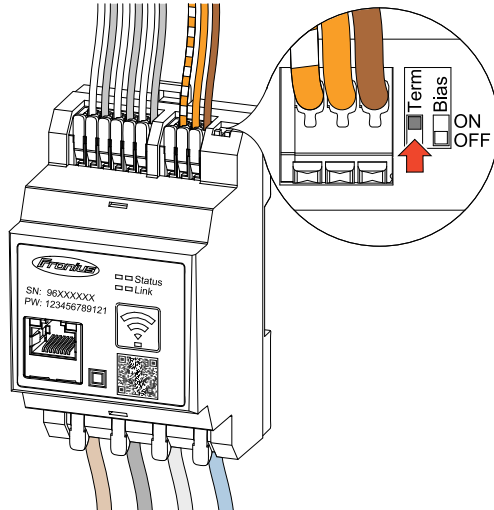
e. g. Fronius Ohmpilot, Fronius Solar Battery, etc.



### Terminating resistor

R 120 Ohm

## Setting the Modbus RTU terminating resistor

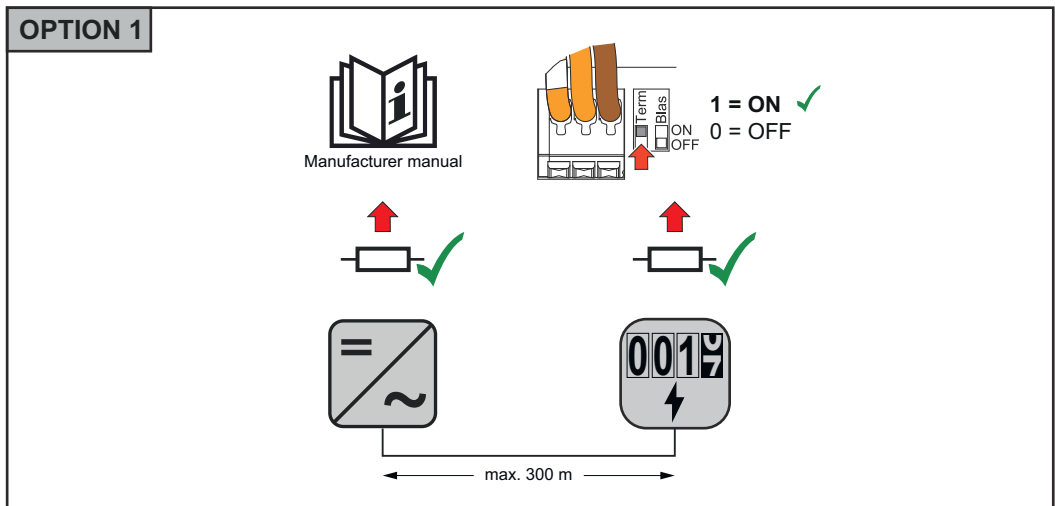


The terminating resistor is integrated in the Fronius Smart Meter IP and is set by a switch.

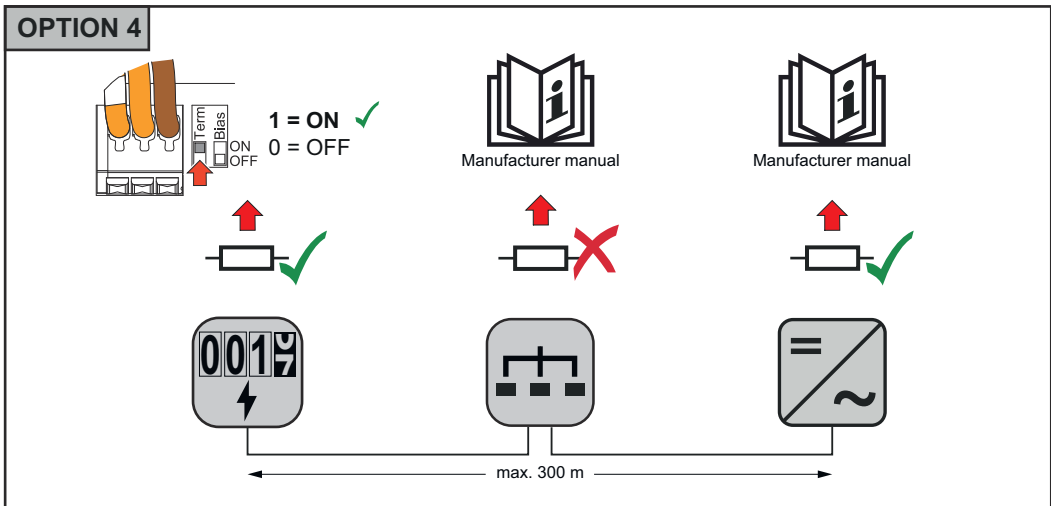
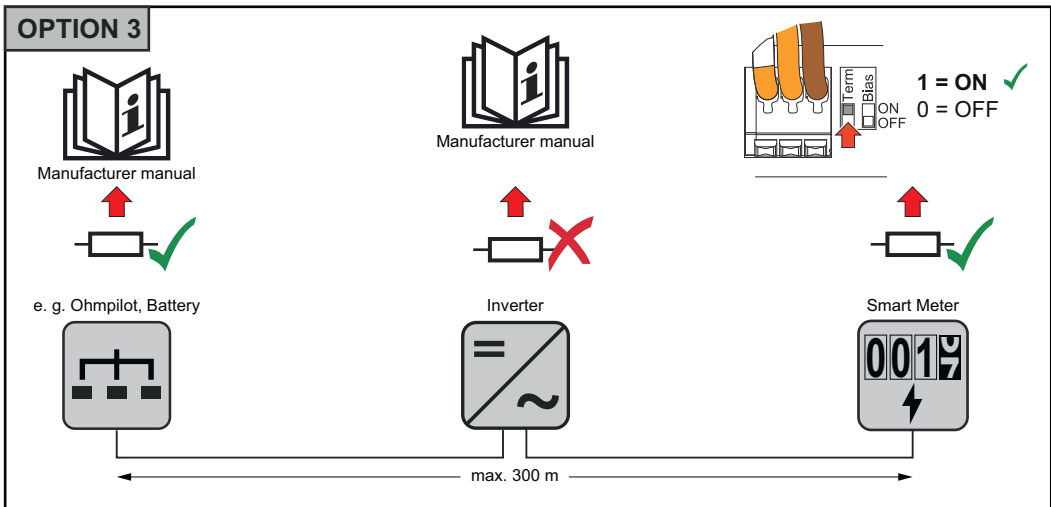
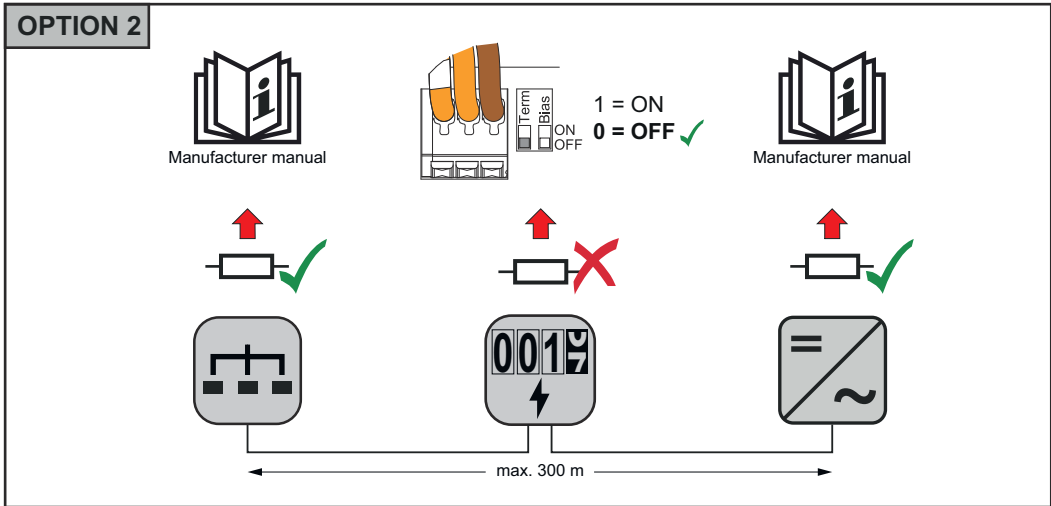
For information on whether the terminating resistor must be set or not, see chapter [Terminating resistors](#) on page 24.

## Terminating resistors

Due to interference, it is recommended that terminating resistors are used as illustrated below to ensure proper functioning.

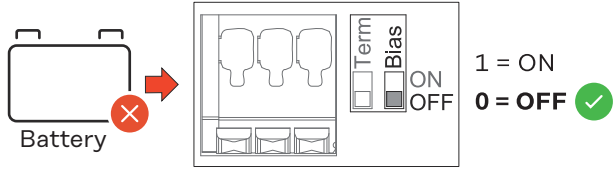
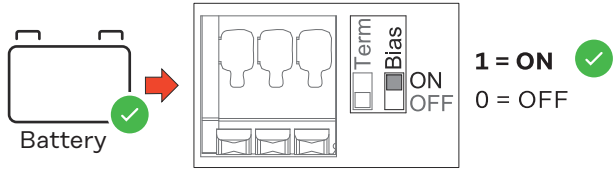






**Setting the Modbus RTU BIAS**

If the Smart Meter is connected to the same Modbus interface (MBO or MB1) as the battery, the BIAS switch must be set to ON.

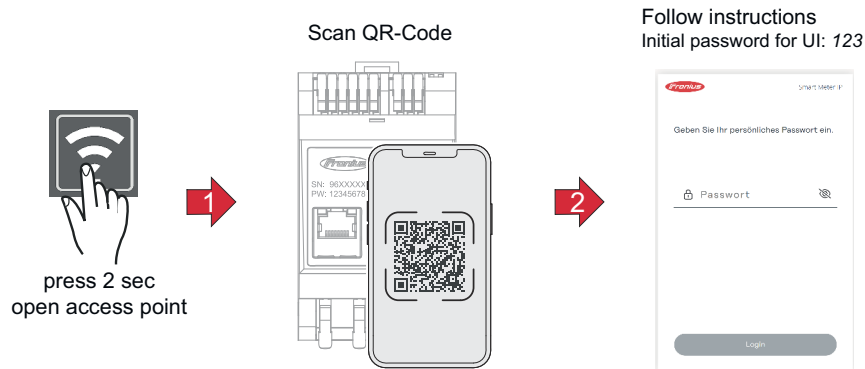


# Start-up



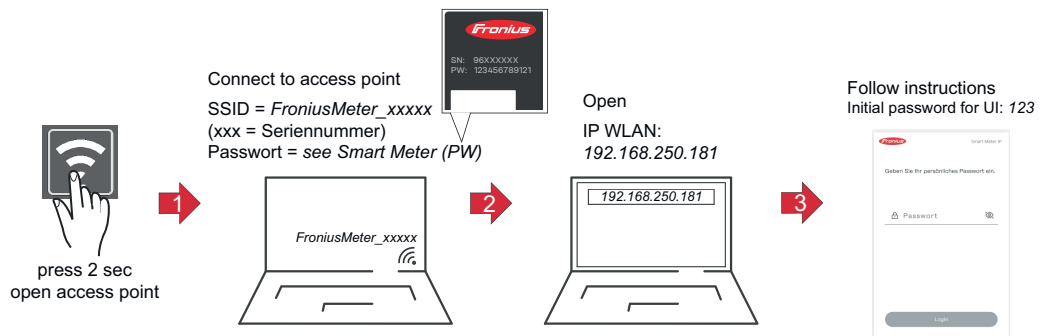
# Commissioning the Fronius Smart Meter IP

## Commissioning the Fronius Smart Meter IP with smartphone or tablet



- 1 Open the access point by touching the button for two seconds → right link LED flashes red.
- 2 Scan the QR code on the front of the device with a smartphone or tablet
- 3 In the browser address bar, enter and confirm the IP address 192.168.250.181. The installation wizard is opened.
- 4 Follow the installation wizard in the individual sections and complete the installation.
- 5 Add the Smart Meter IP in the inverter UI (see Commissioning GEN24 / SnapINverter)

## Commissioning the Fronius Smart Meter IP with PC



- 1 Open the access point by touching the button for two seconds → right link LED flashes red.
- 2 Establish a connection from the PC to the access point  
SSID = *FroniusMeter\_xxxxx* (xxxx = serial number)  
Password = see Smart Meter (PW)
- 3 In the browser address bar, enter and confirm the IP address 192.168.250.181. The installation wizard is opened.
- 4 Follow the installation wizard in the individual sections and complete the installation.
- 5 Add the Smart Meter IP in the inverter UI (see Commissioning GEN24 / SnapINverter)

# Fronius SnapINverter

---

## General

**IMPORTANT!** Settings under the "Meter" menu item are only to be made by trained and qualified personnel!

The service password must be entered in order to access the "Meter" menu item.

The meter is selected via Fronius Smart Meter. The Fronius Datamanager automatically identifies the meter type.

A primary meter and several secondary meters can be selected. The primary meter needs to be configured first before a secondary meter can be selected.

The Fronius Smart Meter IP can only communicate with Fronius SnapINverter inverters via Modbus RTU. The Fronius Smart Meter IP can also be connected to the network (LAN / WLAN). This enables software updates to be carried out.

---

## Connecting to the Fronius Datamanager

### Access point:

- 1 Select the **"Setup"** menu on the inverter display and enable the **"Wi-Fi Access Point"**.
- 2 Establish the connection to the inverter in the network settings (the inverter is displayed with the name "Fronius\_240.XXXXXX").
- 3 Password: Enter 12345678 and confirm.
- 4 In the browser address bar, enter and confirm the IP address <http://192.168.250.181> and confirm.

The Fronius Datamanager start page is displayed.

---

### LAN:

- 1 Connect the Fronius Datamanager and computer to a LAN cable.
  - 2 Place the Fronius Datamanager IP switch in the 'A' position.
  - 3 In the browser address bar, enter and confirm the IP address <http://169.254.0.180> and confirm.
- 

## Configuring the Fronius Smart Meter IP as the primary meter

- 1 Go to the Fronius Datamanager website.
  - Open the web browser.
  - In the address bar of the browser, enter the IP address (IP address for WLAN: 192.168.250.181, IP address for LAN: 169.254.0.180) or the host and domain name of the Fronius Datamanager and confirm.
  - The Fronius Datamanager website will be displayed.
- 2 Click the **Settings** button.
- 3 Log in to the login area with the **service** user and the service password.
- 4 Call up the **Meter** menu area.
- 5 Select the primary meter from the drop-down list.
- 6 Click the **Settings** button.
- 7 In the pop-up window, set the position of the meter (feed-in point or consumption point). For more information on the position of the Fronius Smart Meter IP, see [Positioning](#) on page 12.

- 8 Click the **Ok** button when the OK status is displayed. If the *Timeout* status is displayed, try again.
- 9 Click the  **✓** button to save the settings.

The Fronius Smart Meter IP is configured as a primary meter.

The **Current general view** menu area displays the power of the PV modules, self-consumption, the energy fed into the grid and the battery charge (if available).

### Configuring the Fronius Smart Meter IP as a secondary meter

- 1 Log in to the Smart Meter IP (IP WLAN: 192.168.250.181) and change the Modbus address accordingly under **Advanced Settings > Data Interface > Modbus Address** (1 = primary meter)
- 2 Go to the Fronius Datamanager website.
  - Open the web browser.
  - In the address bar of the browser, enter the IP address (IP address for WLAN: 192.168.250.181, IP address for LAN: 169.254.0.180) or the host and domain name of the Fronius Datamanager and confirm.
  - The Fronius Datamanager website will be displayed.
- 3 Click the **Settings** button.
- 4 Log in to the login area with the **service** user and the service password.
- 5 Call up the **Meter** menu area.
- 6 Select the secondary meter from the drop-down list.
- 7 Click the **Add** button.
- 8 Enter the name of the secondary meter in the **Name** input field.
- 9 Enter the previously assigned address in the **Modbus address** input field. The secondary meter address must match the Modbus address set on the Smart Meter IP.
- 10 Add meter description.
- 11 Click the  **✓** button to save the settings.

The Fronius Smart Meter IP is configured as a secondary meter.

### Modbus RTU participants - Fronius SnapIN-inverter

A maximum of 4 Modbus participants can be connected to the Modbus terminal.

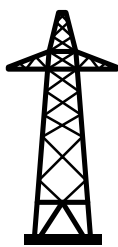
#### **IMPORTANT!**

Only one primary meter, one battery and one Ohmpilot can be connected per inverter. Due to the high data transfer of the battery, the battery occupies 2 participants.

**Example:**

| Input  | Battery | Fronius Ohmpilot | Quantity Primary meter | Quantity Secondary meter |
|--------|---------|------------------|------------------------|--------------------------|
| Modbus | ✓       | ✓                | 1                      | 0                        |
|        | ✓       | ✗                | 1                      | 1                        |
|        | ✗       | ✓                | 1                      | 2                        |
|        | ✗       | ✗                | 1                      | 3                        |

**Multi-meter system - Explanation of symbols**



**Grid**

supplies the loads in the system if insufficient power is being generated by the PV modules or supplied by the battery.



**Inverter in the system**

e. g. Fronius Primo, Fronius Symo, etc.



**Utility meter**

Measures the measurement data relevant for billing amounts of energy (in particular kilowatt hours of energy sourced from the grid and energy fed into the grid). Based on the relevant billing data, the electricity retailer will invoice the energy sourced from the grid and the purchaser of the surplus energy will reimburse the energy fed into the grid.



**Primary meter**

Records the system's load curve and provides measurement data for energy profiling in Fronius Solar.web. The primary meter also controls the dynamic feed-in control.



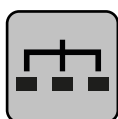
**Secondary meter**

Records the load curve of individual loads (e.g. washing machine, lamps, TV, heat pump, etc.) in the consumption branch and provides measurement data for energy profiling in Fronius Solar.web.



**Producer meter**

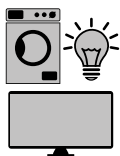
Records the load curve of individual producers (e.g. wind power plant) in the consumption branch and provides measurement data for energy profiling in Fronius Solar.web.



**Modbus RTU slave**

e. g. Fronius Ohmpilot, Fronius Solar Battery, etc.





**Loads in the system**  
e. g. washing machine, lamps, TV, etc.



**Additional loads in the system**  
e. g. heat pump



**Additional producers in the system**  
e. g. wind power plant



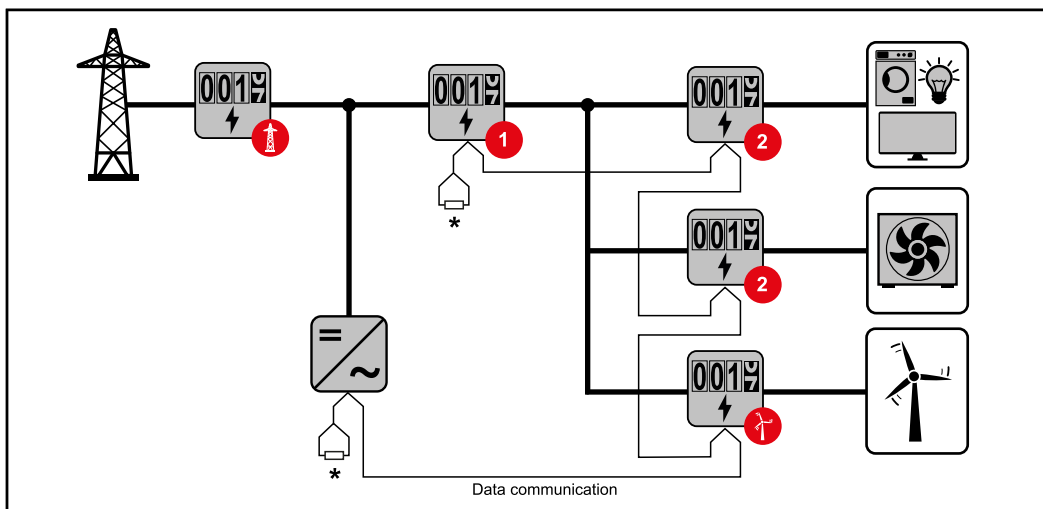
**Terminating resistor**  
R 120 Ohm

**Multi-meter system - Fronius SnapINverter**

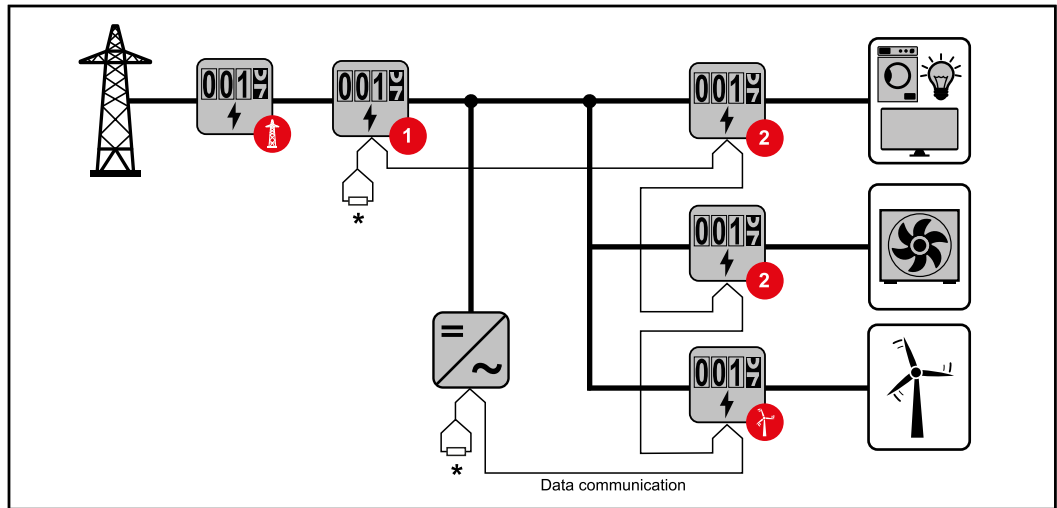
If several Fronius Smart Meters are installed, a separate address must be set for each one (see **Advanced settings** on page 44). The primary meter is always assigned address 1. All the other meters are numbered consecutively with the address range from 2 to 14. Different Fronius Smart Meter power categories can be used in combination.

**IMPORTANT!**

Use max. 3 secondary meters in the system. To avoid interference, it is recommended to install the terminating resistors according to chapter **Terminating resistors** on page 24.



Location of the primary meter in the consumption branch. \*Terminating resistor R 120 Ohm



Location of the primary meter at the feed-in point. \*Terminating resistor R 120 Ohm

**The following must be observed in a multi-meter system:**

- Only assign each Modbus address once.
- Terminating resistors must be positioned individually for each channel.

# Fronius GEN24 inverter

## General

**IMPORTANT!** Settings under the **Device configuration** menu item are only to be made by trained and qualified personnel!

The service password must be entered in order to access the **Device configuration** menu item.

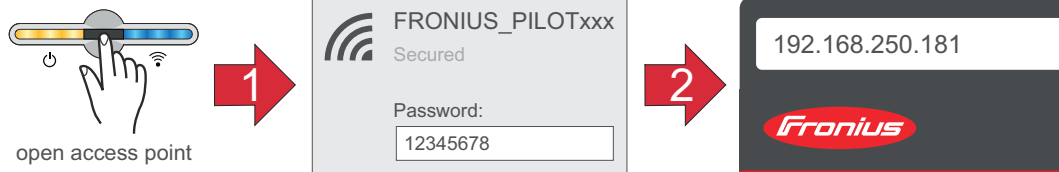
Three-phase or single-phase Fronius Smart Meter IP can be used. In both cases, the selection is made under the **Components** menu area. The meter type is determined automatically.

A primary meter and several secondary meters can be selected. The primary meter needs to be configured first before a secondary meter can be selected.

The Fronius Smart Meter IP can be connected with Modbus TCP or Modbus RTU.

## Installation using the web browser

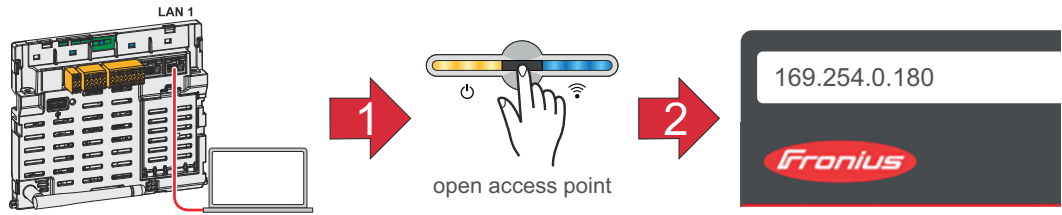
### WLAN:




- 1 Open the access point by touching the sensor once → Communication LED: flashes blue.
- 2 Establish the connection to the inverter in the network settings (the inverter is displayed with the name "FRONIUS\_PILOT" and the serial number of the device).
- 3 Password: enter 12345678 and confirm.  
**IMPORTANT!**  
To enter the password on a Windows 10 operating system, the link "Connect using a security key instead" must first be activated to establish a connection with the password: 12345678.
- 4 In the browser address bar, enter and confirm the IP address 192.168.250.181. The installation wizard is opened.
- 5 Follow the installation wizard in the individual sections and complete the installation.
- 6 Add system components in Solar.web and start up the PV system.

The network wizard and the product setup can be carried out independently of each other. A network connection is required for the Solar.web installation wizard.

## Ethernet:



- 1 Establish a connection to the inverter (LAN1) with a network cable (CAT5 STP or higher).
- 2 Open the access point by touching the sensor once  → Communication LED: flashes blue.
- 3 In the browser address bar, enter and confirm IP address 169.254.0.180. The installation wizard is opened.
- 4 Follow the installation wizard in the individual sections and complete the installation.
- 5 Add system components in Solar.web and start up the PV system.

The network wizard and the product setup can be carried out independently of each other. A network connection is required for the Solar.web installation wizard.

---

### Configuring the Fronius Smart Meter IP as the primary meter

- 1 Call up the user interface of the inverter.
  - Open the web browser.
  - In the address bar of the browser, enter the IP address (IP address for WLAN: 192.168.250.181, IP address for LAN: 169.254.0.180) or the host and domain name of the inverter and confirm.
  - The user interface of the inverter is displayed.
- 2 Click the **Device configuration** button.
- 3 Log in to the login area with the **Technician** user and the technician password.
- 4 Access the **Components** menu area.
- 5 Click the **Add component** button.
- 6 Select connection type (**Fronius Smart Meter (RTU)** or **Fronius Smart Meter (TCP)**).
- 7 In the **Position** drop-down list, set the position of the meter (**feed-in point** or **consumption point**). For more information on the position of the Fronius Smart Meter IP, see [Positioning](#) on page 12.
- 8 If using **Fronius Smart Meter (TCP)**, enter the IP address of the Fronius Smart Meter IP. A static IP address is recommended for the Fronius Smart Meter.
- 9 Click the **Add** button.
- 10 Click the **Save** button to save the settings.

The Fronius Smart Meter IP is configured as a primary meter.

---

### Configuring the Fronius Smart Meter IP as a secondary meter

- 1 Log in to the Smart Meter IP (IP WLAN: 192.168.250.181) and change the **Modbus Address** accordingly under **Advanced Settings > Data Interface > (1 = primary meter)**  
This setting is necessary when using Modbus TCP and RTU.

- 2 Call up the user interface of the inverter.
  - Open the web browser.
  - In the address bar of the browser, enter the IP address (IP address for WLAN: 192.168.250.181, IP address for LAN: 169.254.0.180) or the host and domain name of the inverter and confirm.
  - The user interface of the inverter is displayed.
- 3 Click the **Device configuration** button.
- 4 Log in to the login area with the **Technician** user and the technician password.
- 5 Access the **Components** menu area.
- 6 Click the **Add component** button.
- 7 Select connection type (**Fronius Smart Meter (RTU)** or **Fronius Smart Meter (TCP)**).
- 8 In the **Position** drop-down list, select the meter type (producer/load meter).
- 9 Enter the previously assigned address in the **Modbus address** input field. The secondary meter address must match the Modbus address set on the Smart Meter IP.
- 10 Enter the name of the meter in the **Name** input field.
- 11 In the **Category** drop-down list, select the category (**producer** or **load**).
- 12 If using **Fronius Smart Meter (TCP)**, enter the IP address of the Fronius Smart Meter IP under **IP Address**. A static IP address is recommended
- 13 Click the **Add** button.
- 14 Click the **Save** button to save the settings.

The Fronius Smart Meter IP is configured as a secondary meter.

### Modbus participants - Fronius GEN24

**Modbus RTU:** The inputs M0 and M1 can be selected for this purpose. A maximum of 4 Modbus participants each can be connected to the Modbus terminal at inputs M0 and M1.

**Modbus TCP:** A maximum of 7 secondary meters can be used in the system.

#### IMPORTANT!

Only one primary meter, one battery and one Ohmpilot can be connected per inverter. Due to the high data transfer of the battery, the battery occupies 2 participants.

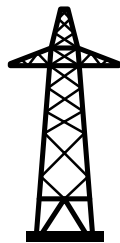
#### Example 1:

| Input         | Battery | Fronius Ohmpilot | Number of primary meters | Number of secondary meters |
|---------------|---------|------------------|--------------------------|----------------------------|
| Modbus 0 (M0) | ✗       | ✗                | 0                        | 4                          |
|               | ✓       | ✗                | 0                        | 2                          |
|               | ✓       | ✓                | 0                        | 1                          |
| Modbus 1 (M1) | ✗       | ✗                | 1                        | 3                          |

**Example 2:**

| Input         | Battery | Fronius Ohmpilot | Number of primary meters | Number of secondary meters |
|---------------|---------|------------------|--------------------------|----------------------------|
| Modbus 0 (M0) | ✘       | ✘                | 1                        | 3                          |
| Modbus 1 (M1) | ✘       | ✘                | 0                        | 4                          |
|               | ✔       | ✘                | 0                        | 2                          |
|               | ✔       | ✔                | 0                        | 1                          |

**Multi-meter system - Explanation of symbols**



**Grid**

supplies the loads in the system if insufficient power is being generated by the PV modules or supplied by the battery.



**Inverter in the system**

e. g. Fronius Primo, Fronius Symo, etc.



**Utility meter**

Measures the measurement data relevant for billing amounts of energy (in particular kilowatt hours of energy sourced from the grid and energy fed into the grid). Based on the relevant billing data, the electricity retailer will invoice the energy sourced from the grid and the purchaser of the surplus energy will reimburse the energy fed into the grid.



**Primary meter**

Records the system's load curve and provides measurement data for energy profiling in Fronius Solar.web. The primary meter also controls the dynamic feed-in control.



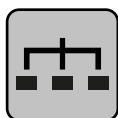
**Secondary meter**

Records the load curve of individual loads (e.g. washing machine, lamps, TV, heat pump, etc.) in the consumption branch and provides measurement data for energy profiling in Fronius Solar.web.



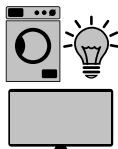
**Producer meter**

Records the load curve of individual producers (e.g. wind power plant) in the consumption branch and provides measurement data for energy profiling in Fronius Solar.web.



**Modbus RTU slave**

e. g. Fronius Ohmpilot, Fronius Solar Battery, etc.



**Loads in the system**

e. g. washing machine, lamps, TV, etc.



**Additional loads in the system**

e. g. heat pump



**Additional producers in the system**

e. g. wind power plant



**Terminating resistor**

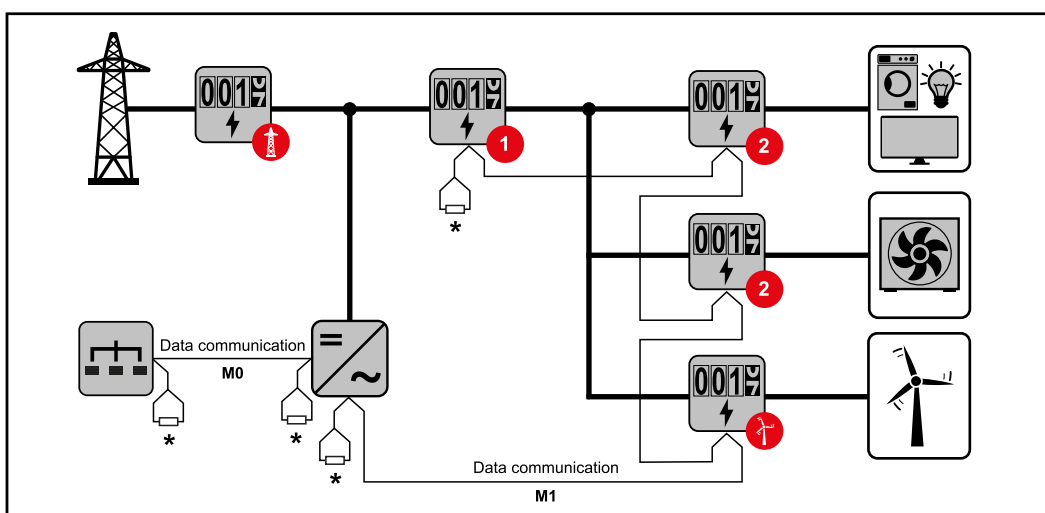
R 120 Ohm

**Multi-meter system - Fronius GEN24 inverter**

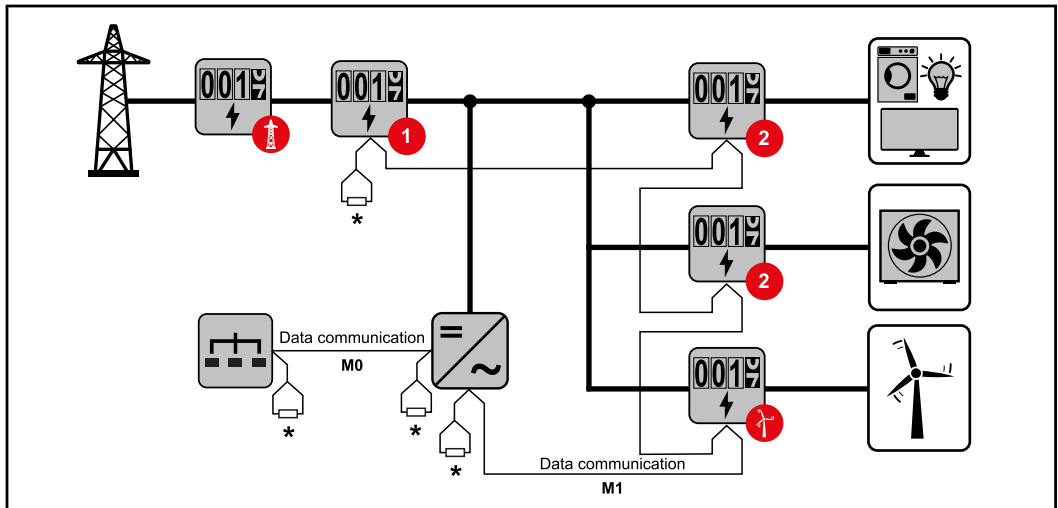
If several Fronius Smart Meters are installed, a separate address must be set for each one (see [Advanced settings](#) on page 44). The primary meter is always assigned address 1. All the other meters are numbered consecutively with the address range from 2 to 14. Different Fronius Smart Meter power categories can be used in combination.

**IMPORTANT!**

Max. 7 secondary meters may be used in the system. A data connection via RTU as well as TCP is possible. To avoid interference, it is recommended to install the terminating resistors according to chapter [Setting the Modbus RTU terminating resistor](#) on page 23.



Location of the primary meter in the consumption branch. \*Terminating resistor R 120 Ohm



Location of the primary meter at the feed-in point. \*Terminating resistor R 120 Ohm

**The following must be observed in a multi-meter system:**

- Connect the primary meter and the battery to different channels (recommended).
- The remaining Modbus participants must be distributed evenly.
- Only assign each Modbus address once.
- Terminating resistors must be positioned individually for each channel.



# **Fronius Smart Meter IP - website**



## Overview



### Measurement data and connection



### Language

The desired language can be set here via the drop-down menu.



### Change password

A new password can be set here.

#### Password guidelines

- At least 6 characters
- At least 3 of the following 4 properties: Upper case letters, lower case letters, numbers, special characters

If the password has been forgotten, the Smart Meter must be reset (see chapter [Performing a factory reset](#) on page [45](#)).



### Advanced settings

For more information on the settings, see chapter [Advanced settings](#) on page [44](#).



### Info

Various information about the Fronius Smart IP is displayed here. This information can be helpful in support cases.



### Logout

Clicking on the button logs out the current user.

# Settings

---

## Advanced settings

---

### Network

The WLAN or LAN connection can be configured here. The use of a static IP address is recommended.

---

### Meter values

Here all values can be set to 0 or meter values can be corrected manually.

The input current of the current transformers can be changed, see [Changing the input current of the current transformers](#) on page 45.

---

### Software update

Software update settings can be made here. It is possible to configure an automatic update. Observe the Terms and Conditions!

---

### Data interfaces

Several data interfaces can be used simultaneously

**Detailed views** - Entering the UI login data is required.

- **Expert view:** All available measured values of the Fronius Smart Meter IP are displayed.
- **REST/JSON:** The current measured data is displayed.
- **REST/XML:** Only visible if the **REST/XML** interface is enabled under data interfaces. The current measured data is displayed.

### Data interfaces

- **REST/XML:** To enable the REST/XML interface.
  - **Fronius Backend:** A connection to an MQTT broker can be set up via the Fronius backend. This setting is required for Fronius EMIL, for example. For further information, please contact your Fronius system partner.
  - **Modbus (TCP and RTU):**
    - **Modbus Address:** Must be changed accordingly when multiple meters are in operation (1 = primary meter)
    - **Modbus TCP Port:** This value must match the setting on the inverter (standard port: 502).
- 

### Single-phase/multiphase

The connection type of the Fronius Smart Meter IP can be selected here.

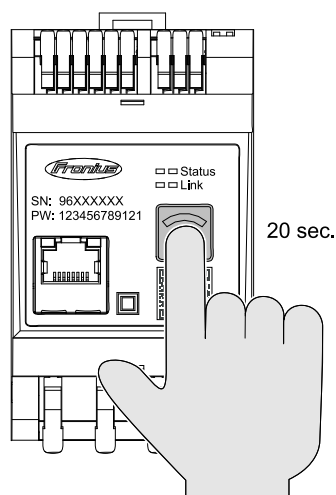
---

### Restart device

Click on **Restart device** to restart the Fronius Smart Meter IP.

---

## Performing a factory reset



If the **WLAN Access Point and Reset** button is pressed for 20 seconds, a factory reset of the Fronius Smart Meter IP is performed.

All LEDs on the Fronius Smart Meter IP go out and the device reboots (may take a few minutes).

All values are set to 0 and the configuration is reset. After a factory reset, the device must be reconfigured.

## Changing the input current of the current transformers

The input current of the current transformers can be changed after commissioning:

- 1 Open the menu **Advanced settings > Meter values**.
- 2 Click the **Current transformer** button.
- 3 Enter the input current of the connected current transformers in amperes and click **Next**.  
The input current value is printed on the current transformer or can be found in an accompanying document.
- 4 Confirm the change of the value by clicking on **Save**.



# Appendix





# Care, maintenance and disposal

---

**Maintenance** Maintenance and servicing may only be carried out by Fronius-trained service technicians.

---

**Cleaning** Clean the Fronius Smart Meter as required with a damp cloth. Do not use cleaning agents, abrasives solvents or similar to clean the Smart Meter.

---

**Disposal** Waste electrical and electronic equipment must be collected separately and recycled in an environmentally responsible manner in accordance with the EU Directive and national law. Used equipment must be returned to the distributor or through a local, authorised collection and disposal system. Proper disposal of the old device promotes sustainable recycling of material resources. Ignoring this may lead to potential health/environmental impacts.

**Packaging materials**

Collected separately. Check your municipality's regulations. Reduce the volume of the box.

# Technical data

## Technical data

**Modbus transmission speed:** 9600 baud

**Parity bit:** none

**Software version:**

- Fronius GEN24 & Tauro: Full compatibility (from version 1.24.1)
- Fronius Datamanager 2.0: Modbus RTU (from version 3.25.1)
- Fronius Symo Hybrid: Modbus RTU (from version 1.25.1)

| <b>Measuring input</b>  |   |
|---|---|
| Nominal voltage (3-phase) including tolerance                         | 208 - 480 V   |
| Nominal voltage (1-phase) including tolerance                         | 100 - 240 V   |
| Self-consumption  | 30 mA   |
| Nominal frequency<br>Tolerance  | 50 - 60 Hz<br>47 - 63 Hz  |
| Maximum current, $I_{max}$  | 5000 A  |
| <b>Current transformer (kCT)</b>                                      | 1 - 5000<br>e. g. CT 800/333mV  |
| Short-time overload<br>(EN IEC 62053-21, EN IEC 62053-23)             | $3 \times I_{max} / 20 \text{ s}$   |
| Self-consumption (max. current)                                       | max. 5 W  |
| Current distortion factor   | in acc. with EN IEC 62053-21  |
| Power factor<br>Operating range<br>(EN IEC 62053-21, EN IEC 62053-23) | active $\cos\phi$ 0.5 ind - 0.8 cap,<br>reactive $\sin\phi$ 0.5 ind - 0.5 cap |

| <b>Energy</b>  |         |
|--|---------|
| Active energy accuracy<br>(EN IEC 62053-21) / Class B (EN IEC 50470-3) | Class 1 |
| Reactive energy accuracy<br>(EN IEC 62053-23)                          | Class 2 |
| Response time after switch-on<br>(EN IEC 62053-21, EN IEC 62053-23)    | < 5 s   |

| <b>Output</b>  |                      |
|--|----------------------|
| <b>RS485 communication</b><br>Electrically isolated from input and auxiliary voltage |                      |
| Standard   | RS485 - 3 conductors |
| Transmission   | Serial, asynchronous |
| Protocol   | Modbus RTU           |
| <b>Addresses</b>   | 1–255                |
| Number of bits   | 8                    |

| <b>Output</b>     |                   |
|-------------------|-------------------|
| Stop bit          | 1                 |
| <b>Parity bit</b> | None - even - odd |
| <b>Baud rate</b>  | 9600 bit/s        |
| Response time     | ≤ 200 ms          |

| <b>WLAN</b>           |   |
|-----------------------|---|
| Frequency range       | 2412 - 2472 MHz   |
| Channels / power used | Channel: 1-13 b,g,n HT20<br>Channel: 3-9 HT40<br><18 dBm  |
| Modulation            | 802.11b: DSSS (1 Mbps DBPSK, 2 Mbps DQPSK, 5.5/11 Mbps CCK)<br>802.11g: OFDM (6/9Mbps BPSK, 12/18Mbps QPSK, 24/36Mbps 16-QAM, 48/54Mbps 64-QAM)<br>802.11n: OFDM (6.5 BPSK, QPSK, 16-QAM, 64-QAM) |

| <b>Insulation (EN IEC 62052-11, EN IEC 62053-21)</b> |  |
|--|--|
| Installation category                                | II   |
| Pollution degree                                     | PD2  |
| Insulation voltage                                   | 4 kV RMS   |
| Impulse withstand voltage<br>Test circuit            | 4 kV 1.2/60 μs<br>Voltage input, current transformer input, communication          |
| Test voltage<br>Test circuit                         | 2.5 kV RMS. 50 Hz/1 min<br>Voltage input, current transformer input, communication |
| Test voltage<br>Test circuit                         | 4 kV RMS. 50 Hz/1 min<br>All circuits and earth                                    |

| <b>Electromagnetic compatibility</b> |  |
|--------------------------------------|--|
| Test in acc. with EN IEC 62052-11    |  |

| <b>Operating conditions</b>                                      |                |
|--|----------------|
| Reference temperature  | 25 °C (± 5 °C) |
| Operating range  | -25 bis +55 °C |
| Temperature limit for storage and transport                      | -30 to +80 °C  |
| Max. humidity  | 93%            |
| Max. power loss (for thermal dimensioning of the switch cabinet) | ≤ 6 W          |
| Overvoltage category   | OVI            |

| <b>Housing</b>                  |                                    |
|---------------------------------|------------------------------------|
| Housing                         | 3 modules according to DIN 43880   |
| Connection                      | Spring-loaded terminals            |
| Mounting                        | Can be snapped onto 35 mm DIN rail |
| Housing material                | PA-765 UL                          |
| Degree of protection (EN 60529) | IP20 housing, IP30 connections     |
| Weight                          | 132 grams                          |

| <b>Terminals</b>                                 |  |
|--|--|
| <b>Voltage input</b>                             |  |
| Wire   | min. 1.5 mm <sup>2</sup> / max. 4 mm <sup>2</sup>    |
| <b>Data output and current transformer input</b> |  |
| Wire   | min. 0.25 mm <sup>2</sup> / max. 2.5 mm <sup>2</sup> |

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**Fronius manufacturer's warranty**

Detailed, country-specific warranty terms are available on the internet: [www.fronius.com/solar/warranty](http://www.fronius.com/solar/warranty)

To obtain the full warranty period for your newly installed Fronius inverter or storage system, please register at: [www.solarweb.com](http://www.solarweb.com).









[fronius.com/en/solar-energy/installers-partners/products-solutions/monitoring-digital-tools](https://fronius.com/en/solar-energy/installers-partners/products-solutions/monitoring-digital-tools)

**MONITORING &  
DIGITAL TOOLS**

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