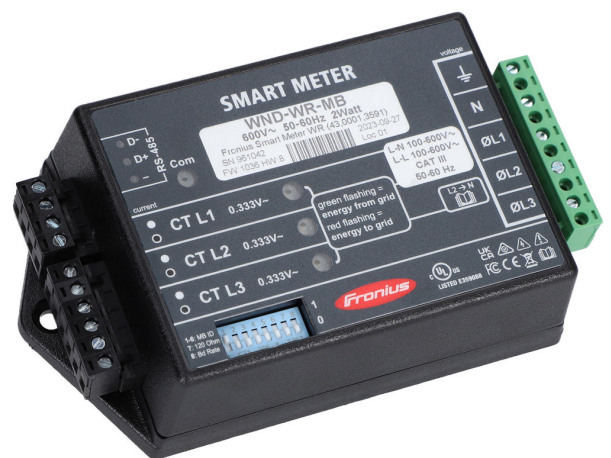


Operating Instructions

Fronius Smart Meter WR



EN | Operating Instructions



42,0426,0455,EA

012-02062026

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General information

Safety information

Explanation of warnings and safety instructions

Warnings are intended to warn people of possible injuries and to avoid personal injury and damage to the product. They relate to individual actions with and on the product.



DANGER!

Indicates an immediately dangerous situation.

Serious injury or death will result if the danger is not avoided.

- Action step to escape the situation.



WARNING!

Indicates a potentially dangerous situation.

Serious injury or death may result if the danger is not avoided.

- Action step to escape the situation.



CAUTION!

Indicates a potentially dangerous situation.

Minor or moderate injury may result if the danger is not avoided.

- Action step to escape the situation.

NOTE!

Indicates a situation that may result in property damage.

If the situation is not avoided, impaired work results, material damage to the product or other property are the possible consequences.

- Action step to avoid the situation.

Safety instructions are designed to ensure safe product use. They are preventive and help to inform users about the fundamental risks involved when dealing with the product. They do not refer specifically to individual actions with and on the product.

Safety instructions and important information

The device has been manufactured in line with the state of the art and according to recognized safety standards.



WARNING!

Incorrect operation or misuse

Serious to fatal injuries to the operator or third parties as well as damage to the device and other property of the operator may result.

- All persons involved in the commissioning, maintenance, and servicing of the device must be appropriately qualified and have knowledge of working with electrical installations.
- Read these operating instructions in full and follow them carefully and precisely.
- The operating instructions must always be kept to hand wherever the device is being used.

IMPORTANT!

In addition to the operating instructions, observe the following general and local rules:

- Accident prevention
- Fire protection
- Environmental protection

IMPORTANT!

Labels, warning notices, and safety symbols are located on the device. A description can be found in these operating instructions.

IMPORTANT!

All safety and danger notices on the device:

- Must be kept in a legible state
- Must not be damaged/marked
- Must not be removed
- Must not be covered, have anything stuck on them, or painted over

**WARNING!****Tampered-with and non-functioning protection devices**

Serious to fatal injuries as well as damage to the device and other property of the operator may result.

- ▶ Never bypass or disable protection devices.
- ▶ Any protection devices that are not fully functional must be repaired by an authorized specialist before the device is switched on.

**WARNING!****Loose, damaged, or under-dimensioned cables**

An electric shock can be fatal.

- ▶ Use undamaged, insulated, and adequately dimensioned cables.
- ▶ Fasten the cables according to the specifications in the operating instructions.
- ▶ Loose, damaged, or under-dimensioned cables must be repaired or replaced immediately by an authorized specialist.

NOTE!**Installations or modifications to the device**

The device may be damaged

- ▶ Do not carry out any alterations, installations, or modifications to the device without first obtaining the manufacturer's permission.
- ▶ Damaged components must be replaced.
- ▶ Only use original spare parts.

General

The device has been manufactured using state-of-the-art technology and according to recognized safety standards. If used incorrectly or misused, however, it can cause

- serious or fatal injury to the operator or a third party,
 - and damage to the device and other material assets belonging to the operating company.
-

All persons involved in start-up operation, 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 kept on hand wherever the device is being used. In addition to the Operating Instructions, all applicable local rules and regulations regarding accident prevention and environmental protection must also be followed.

All safety and danger notices on the device

- must be kept in a legible state
- must not be damaged/marked
- 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 risk of

- serious or fatal injury to the operator or a third party,
- and damage to the device and other material assets belonging to the operating company.

Any safety devices that are not functioning properly must be repaired by an authorized 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" in the Operating Instructions for the device.

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

Your personal safety is at stake!

Environmental conditions

Operation or storage of the machine outside the stipulated area will be deemed as not in accordance with the intended purpose.

For exact information on permitted environmental conditions, please refer to the technical data.

General

Information on the device

Safety symbols:



To avoid electric shocks:

- Do not dismantle or modify the device
- Do not allow any water to enter the device
- Do not allow any foreign substances or material to enter the device
- Do not touch any connections directly



RCM Symbol - The product complies with the Australian laws.

How information is presented in the document

The conventions regarding how information is presented in the document, which are set out below, have been defined in order to increase the readability and comprehensibility of the document.

Application notes

IMPORTANT! Indicates application notes and other useful information. It does not indicate a harmful or dangerous situation.

Software

Software functions and elements of a graphical user interface (e.g., buttons, menu items) are highlighted in the text with this **mark up**.

Example: Click **Save**.

Instructions for action

1 Action steps are displayed with consecutive numbering.

- ✓ *This symbol indicates the result of the action step or the entire instruction.*

Target group

This document provides detailed information and instructions to ensure that people can use the machine safely and efficiently.

The information is intended for the following groups of people:

- **Technical specialists:** People with appropriate qualifications and fundamental knowledge of electronics and mechanics. The activities of a technical specialist include installation, operation, maintenance, and service work.
- **User:** People that use the machine in daily operation and want to understand its basic functions.

Regardless of any qualifications, only perform the activities listed in this document.

The definition of professional qualifications and their applicability are subject to national law.

Data security

With regard to data security, the user is responsible for:

- Backing up any changes made to the factory settings
- Saving and storing personal settings

NOTE!

Data security for network and Internet connection

Unsecured networks and a lack of safeguards can result in data loss and unauthorized access. Observe the following points for safe operation:

- ▶ Operate inverters and system components on a private, secure network. A WiFi network is considered secure if security standard WPA 2 is satisfied as a minimum.
- ▶ Keep the network devices (e.g., WiFi routers) up to date with the latest technology.
- ▶ Keep the software and/or firmware updated.
- ▶ Use a wired network to ensure a stable data connection.
- ▶ For security reasons, do not make inverters and system components accessible from the Internet via port forwarding or Port Address Translation (PAT).
- ▶ Use the solutions provided by Fronius for monitoring and remote configuration.
- ▶ The optional communication protocol Modbus TCP/IP¹⁾ is an unsecured interface. Only use Modbus TCP/IP if no other secured data communication protocol (MQTT²⁾) is possible (e.g., compatibility with older Smart Meters).

¹⁾ TCP/IP - Transmission Control Protocol/Internet Protocol

²⁾ MQTT - Message Queuing Telemetry Protocol

Privacy policy

When you connect your device (and any associated devices) to the internet, the following device and operating data (device ID/identifier, device IP address, device time, configuration settings, hardware and software information, device status log files, serial number) is sent automatically to

Fronius International GmbH, Froniusstraße 1, 4643 Pettenbach, Austria, telephone +43(0) 7242241-0, email: contact@fronius.com (controller)

and stored.

The processing of this device and operating data is carried out for the purpose of ensuring the operational safety of the device (time synchronization, provision of updates). This processing is therefore necessary for the functionality of the device and thus for the fulfillment of the contract (Art. 6 (1) (b) GDPR).

If you do not wish to have such data processed, you must manually disable the device's internet connection.

In addition, the device and operating data is also processed for the purpose of providing services as part of a supplementary digital service for your device (such as solar.web or similar) as soon as you have registered your device with such a digital service (identification). This data is processed to provide the requested digital services and is therefore necessary for the fulfillment of the contract (Art. 6 (1) (b) GDPR).

Furthermore, this data processing is also carried out for maintenance and support purposes and for handling customer concerns as well as in warranty and

guarantee cases (only in individual cases and given connection between device and internet). In this context, the device and operating data may also be passed on to our cooperation partners (third-party providers and suppliers). The processing of this data is necessary for maintenance and support purposes or for processing warranty and guarantee cases and thus for the fulfillment of the contract (Art. 6 (1) (b) GDPR).

Device and operating data are also processed for analysis and diagnostic purposes in order to gain insights into the functionality of the devices and improve them accordingly. This data processing is based on our legitimate interest (Art. 6 (1) (f) GDPR).

We store this data for as long as it is necessary to fulfill the existing contract with you. Any storage beyond this is carried out for legal reasons or if we have a legitimate interest in doing so. For more information on data processing for the solar.web-digital service, as well as our general privacy policy and your rights as a data subject, please visit <https://www.fronius.com>.

Copyright

Fronius International GmbH retains the copyrights of these operating instructions.

Text, illustrations, and other media correspond to the technical state of the art at the time of publication. Fronius reserves the right to make changes. If you have any suggestions for improvement or have found a mistake in this document, we would be most grateful for your comments.

FCC / RSS Compliance

FCC

This device corresponds to the limit values for a digital device of class B in accordance with Part 15 of the FCC regulations. The limit values should provide adequate protection against harmful interference in homes. This device creates and uses high frequency energy and can interfere with radio communications when not used in accordance with the instructions. However, there is no guarantee against interference occurring in a particular installation.

If this device interferes with radio or television reception when turning the device on and off, it is recommended that the user solve this with one or more of the following measures:

- adjust or reposition the receiving antenna
- increase the distance between the affected device and the receiver
- connect the device to another circuit, which does not include the receiver
- for further support, please contact the retailer or an experienced radio/TV technician.

Industry Canada RSS

The device corresponds to the license-free Industry Canada RSS standards. Operation is subject to the following conditions:

- (1) The device may not cause harmful interference
- (2) The device must accept any interference received, including interference that may cause undesired operation.

Territorial Limitations

This product is intended for use and sale outside the Province of Québec. It does not meet the French language documentation and labeling requirements of Québec's Charter of the French Language. Accordingly, Fronius International GmbH does not offer this product for sale to, or for delivery to, any address within the Province of Québec.

By placing an order, the customer represents and warrants that they are not purchasing the product for use or resale within Québec. Fronius International GmbH disclaims all liability and warranty obligations for any products operated in Québec in violation of these restrictions.

Disposal

In accordance with the EU Directive and national law, the following products must be disposed of separately and recycled:

- Waste electrical and electronic equipment
- Used batteries (portable batteries, industrial batteries)

Used equipment and batteries must be returned to the distributor or an authorized local collection system. Do not dispose of batteries with domestic waste. Protect batteries from high temperatures, direct sunlight, moisture and corrosive environments.

Arrange for the safe collection and proper disposal of damaged, leaking or used batteries by a battery recycling company or the Fronius Service Partner.

In addition, it should be noted that batteries contain substances that, if disposed of improperly, can have a significant negative impact on the environment as well as on human health and the safety of persons, in particular due to the leakage of hazardous substances such as heavy metals or electrolytes, which can contaminate soil, water and air.

This ensures environmental protection and the sustainable use of natural resources.

Packaging materials

- Collect separately
- Observe local regulations
- Compress the cardboard box to reduce volume

Fronius Smart Meter WR

Device description

The Fronius Smart Meter is a bidirectional electricity meter for optimizing self-consumption and recording a household's load characteristic curve. Together with a Fronius inverter or Fronius Datamanager 2.0 and a Fronius data interface, the Fronius Smart Meter allows you to view your own power consumption. The meter measures the energy flow to the loads or to the public grid and forwards the information to the Fronius inverter or Fronius Datamanager 2.0 via the Modbus RTU/RS485 interface.



CAUTION!

Danger due to non-compliance with the safety instructions

Risk of injury and damage to the device as a result.

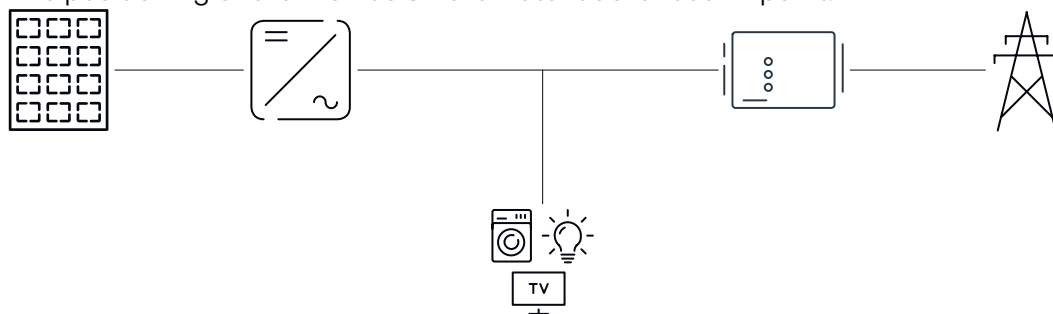
- ▶ Follow all safety instructions.
- ▶ Switch off the power supply before establishing the mains connection.

Positioning

The Fronius Smart Meter can be installed at two possible locations in the system, at the feed-in point and at the consumption point.

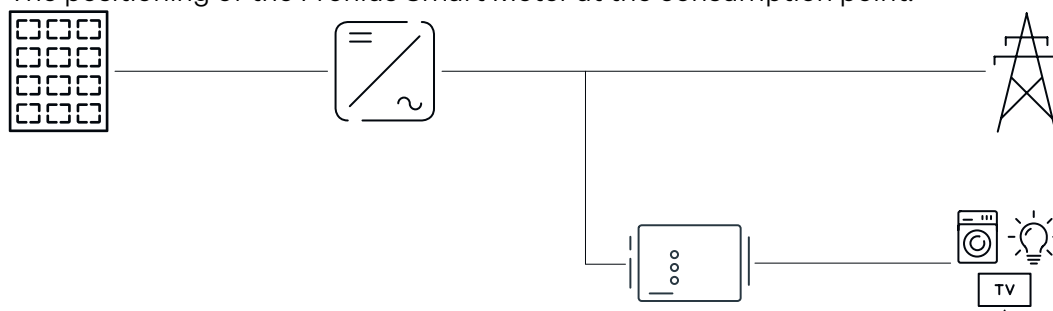
Positioning at the feed-in point

The positioning of the Fronius Smart Meter at the feed-in point.

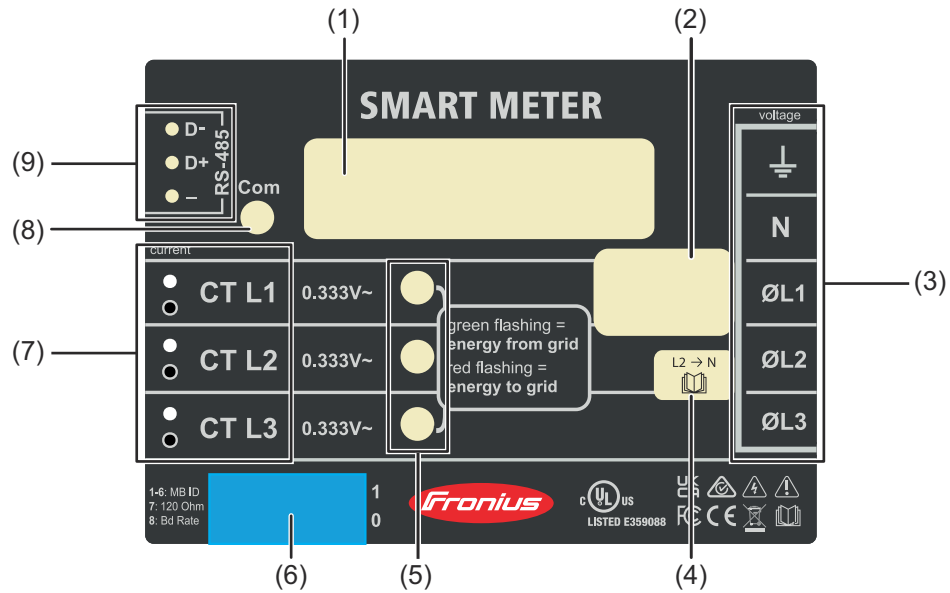


Positioning at the consumption point

The positioning of the Fronius Smart Meter at the consumption point.



Displays and connections



- (1) Product name
- (2) Nominal voltage, operating frequencies, measurement category
- (3) AC connection area
- (4) Note single-phase grids
- (5) Power status LED
 - green, flashing: Import of energy from public grid
 - red, flashing: Export of energy to the public grid
 - For further display options, see [Power Status LEDs](#)
- (6) DIP-switch:
 - set modbus address, see [Set the address of the Fronius Smart Meter](#)
 - set terminating resistor, see [Terminating Resistors](#)
 - set Baud Rate, see [Set Baud Rate](#)
- (7) CT connection area
- (8) Data communication LED
- (9) Data communication connection area

Installation

Installation Checklist

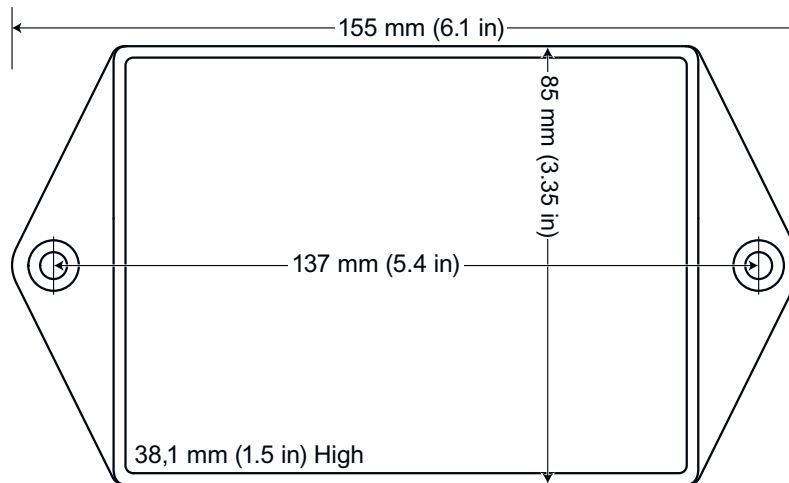
See the sections referenced below for installation details.

- 1** Turn off power before making line voltage connections.
- 2** Mount the Fronius Smart Meter (see [Mounting](#) on page 16).
- 3** Connect circuit breakers or fuses and disconnects (see [Circuit Protection](#) on page 17).
- 4** Connect the line voltage wires to the meter's terminal block (see [Line Wiring](#) on page 17).
- 5** Mount the Current Transformers (CTs) around the line conductors. Make sure the CTs face the correct direction. An arrow might indicate either the load or the source (public grid) (see [Connect Current Transformers](#) on page 20).
- 6** Connect the twisted white and black wires from the CTs to the terminal block on the meter, matching the wire colors to the white and black dots on the meter label (see [CT Wiring](#) on page 21).
- 7** Check that the CT phases match the line voltage phases (see [Connect Current Transformers](#) on page 20).
- 8** Record the CT rated current for each meter, because it will be required during setup.
- 9** Connect the output terminals of the Fronius Smart Meter to the monitoring equipment (see [Connecting data communication cables to inverters](#) on page 21).
- 10** If necessary set terminating resistors (see [Terminating Resistors](#) on page 23).
- 11** Check that all the wires and plugs are securely installed in the terminal blocks by tugging on each wire.
- 12** Turn on the power to the Smart Meter.
- 13** Verify that the LEDs indicate correct operation. If there is a consumption of power and all generated power sources are turned off, then the LEDs from the used phases should flash green (see [Power Status LEDs](#) on page 36).
- 14** Check your Fronius System monitoring software. In order to ensure compatibility between the inverter and the Smart Meter, software must always be kept up-to-date. The update can be started via the inverter website or via Solar.web.
- 15** Set CT-Ratio and Grid Type on the web interface of the Fronius Dataman-ager in Settings - Meter - Settings (see [Commissioning](#) on page 29).

Mounting

The Fronius Smart meter has two mounting holes spaced 5.4 in. (137 mm) apart (center-to-center). These mounting holes are normally obscured by the detachable screw terminals. Remove the screw terminals to mark the hole positions and mount the meter.

Self-tapping sheet metal screws are included. Do not over-tighten the screws, as long-term stress on the case can cause cracking.



Circuit Protection

The Fronius Smart Meter is considered "permanently connected equipment" and requires a disconnect means (circuit breaker, switch or disconnect) and overcurrent protection (fuse or circuit breaker).

The Fronius Smart Meter only draws 10-30 mA, so the rating of any switches, disconnects, fuses and / or circuit breakers is determined by the wire gauge, the mains voltage and the current interrupting rating required.

- The switch, disconnect or circuit breaker must be within sight and as close as practicable to the Fronius Smart Meter and must be easy to operate.
- Use circuit breakers or fuses rated for 20 amps or less.
- Use ganged circuit breakers when monitoring more than one line voltage.
- The circuit breakers or fuses must protect the mains terminals labeled L1, L2 and L3. In the rare cases where neutral has overcurrent protection, the overcurrent protection device must interrupt both neutral and ungrounded conductors simultaneously.
- The circuit protection / disconnect system must meet IEC 60947-1 and IEC 60947-3, as well as all national and local electrical codes.

Line Wiring

- Always turn off power before connecting the line voltage inputs to the Fronius Smart Meter.
- For the line voltage wires, 16 to 12 AWG stranded wire, type THHN, MTW or THWN, 600 V are recommended.
- Do not place more than one wire per screw terminal; use separate wire nuts or terminal blocks if needed.
- Verify that the line voltages match the line-to-line and line-to-neutral values printed in the white box on the front label.

Connect each conductor to the appropriate phase; also connect ground and neutral (if applicable). The neutral connection "N" is not required on delta models but we recommend connecting it to ground if neutral is not present.

The screw terminal can handle wire up to 12 AWG. Connect each voltage line to the green terminal block as shown in the following figures. After the voltage lines have been connected, make sure both terminal blocks are fully seated in the Fronius Smart Meter.

When power is first applied, check that the LEDs behave normally. If you see LEDs flashing red-green-red-green, the voltage is too high for this model, so disconnect the power switch immediately!

The diagram illustrates a three-phase metering system. A **Fronius Inverter** is connected to a **Fronius Smart Meter**. The inverter's output is connected to the meter's **D-**, **D+**, and **-** terminals. The meter's **CT L1**, **CT L2**, and **CT L3** terminals are connected to the **WHITE** and **BLACK** lines of the three-phase system. A **Shorting Jumper** is connected between the **WHITE** and **BLACK** lines. The meter's **N** terminal is connected to the **Neutral** line. The meter's **L1**, **L2**, and **L3** terminals are connected to the **Phase L1**, **Neutral**, and **Phase L2** lines. The meter is also connected to **Ground**. The three-phase system is labeled **LOAD** and **LINE**. The voltage levels are specified as **e.g. 120 Vac (US) / 240 Vac (US)** for Phase L1 to Neutral, and **e.g. 240 Vac (US) / 400 / 480 Vac (US)** for Phase L2 to Phase L1.

The diagram illustrates the correct wiring for a three-phase load using a Fronius Smart Meter and current transformers (CTs). The load is represented by two circular components with 'Load Faces' and 'Source Faces'. The 'LOAD' is connected to the 'Source Faces' of the CTs. The 'Fronius Inverter' is connected to the 'Load Faces' of the CTs. The 'Fronius Smart Meter' is connected to the 'Source Faces' of the CTs. The meter's output is connected to the 'LINE' (Phase L1 and Phase L2) through 'Fuses or Breaker ≤ 20 A'. The meter's input is connected to the 'LOAD' through 'Fuses or Breaker ≤ 20 A'. The meter's output is also connected to 'Ground' and 'N'.

The diagram illustrates the wiring for a Fronius Smart Meter. The meter is connected to a Fronius Inverter via D-, D+, and a ground connection. It also features three current transformers (CT L1, CT L2, CT L3) with shorting jumpers. The meter's output terminals include Ground, N (Neutral), L1, L2, and L3. These are connected to a Load Transformer, which is also connected to a Phase L1 line and a Neutral line. The Load Transformer has a 'Load Face' and a 'Source Face'. The Phase L1 line is labeled 'LINE' and the Neutral line is labeled 'Neutral'. A note indicates 'Fuses or Breaker ≤ 20 A' should be installed on the Phase L1 line.

The diagram illustrates the wiring for a three-phase system. A **Fronius Inverter** is connected to a **Fronius Smart Meter**. The inverter's output terminals (D-, D+, and Ground) are connected to the meter's corresponding terminals. The meter's CT L1, CT L2, and CT L3 terminals are connected to the load via current transformers. The meter's L1, L2, and L3 terminals are connected to the line via fuses or breakers. The meter's N terminal is connected to the neutral line. The meter's Ground terminal is connected to the ground. The load is connected to the meter via current transformers. The line is connected to the meter via fuses or breakers. The meter is connected to the load via current transformers. The meter is connected to the line via fuses or breakers. The meter is connected to the load via current transformers.

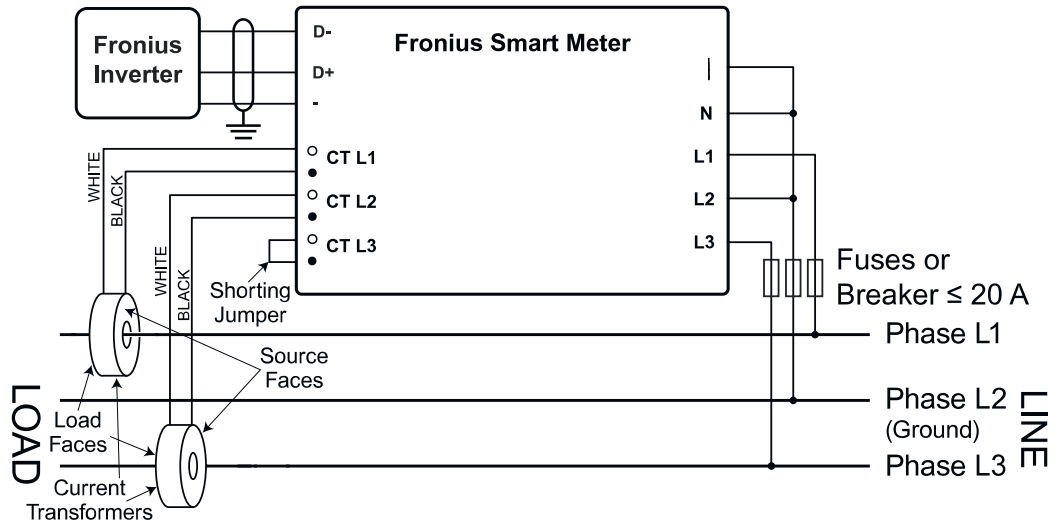
Diagram illustrating a three-phase metering system configuration using a Fronius Smart Meter and a Fronius Inverter.

The system includes the following components and connections:

- Fronius Inverter:** Connected to the meter's D- and D+ terminals.
- Fronius Smart Meter:** The central metering unit, featuring terminals for D-, D+, Ground, N, L1, L2, L3, and CT L1, CT L2, CT L3.
- Grounding:** The meter is grounded to the system ground (N).
- Phase Connections:** The meter is connected to three phases (L1, L2, L3) via fuses or a breaker (≤ 20 A).
- Current Transformers (CTs):** CT L1, CT L2, and CT L3 are used for current measurement, connected to the meter's CT terminals.
- Load Faces:** The meter's load faces are connected to the three phases (L1, L2, L3) via fuses or a breaker (≤ 20 A).
- Source Faces:** The meter's source faces are connected to the three phases (L1, L2, L3) via fuses or a breaker (≤ 20 A).
- Current Transformers (CTs):** CT L1, CT L2, and CT L3 are used for current measurement, connected to the meter's CT terminals.

[illegible]

Three-Phase Two-Wire Corner Grounded Delta



Connect Current Transformers

The current transformer must generate 333.33 millivolts AC at rated current. See the current transformer data sheets for CT ratings (Fronius CT, 41,0010,0104 / 41,0010,0105 / 41,0010,0232).

- Do not use ratio or current output such as 1 amp or 5 amp output models!
- See the CT data sheets for the maximum input current ratings.
- Be careful to match the CTs with the voltage phases. Make sure the CT L1 is measuring the current on the same phase being monitored by the L1 voltage input and the same for phases L2 and L3. Use the supplied colored labels or colored tape to identify the CT leads.
- To minimize current measurement noise, avoid extending the CT wires, especially in noisy environments. If it is necessary to extend the wires, use twisted pair cable 22 to 14 AWG, rated for 300 V or 600 V (not less than the service voltage) and shielded if possible
- Make sure the CTs face the correct direction. An arrow might indicate either the load or the source (public grid)
- If you see strange readings on unused phases, jumper the unused CT inputs: for each unused CT, connect a short cable from the terminal marked with a white dot to the terminal marked with a black dot.

Install the CTs around the conductor to be measured and connect the CT leads to the Fronius Smart Meter. Always turn off power before disconnecting any live conductors. Put the line conductors through the CTs as shown in the previous section.

CTs are directional. If they are mounted backwards or with their white and black wires swapped the measured power will be negative. The status LEDs indicate negative measured power by flashing red.

Split-core CTs can be opened for installation around the conductor. A nylon cable tie may be secured around the CT to prevent inadvertent opening.

Power control systems (USA, Canada, Mexico)

The device can be used for power control systems in accordance with the UL 3141 standard. The additionally required current transformers must comply with the specifications of the UL 2808 standard.

NOTE!**Power Control Systems**

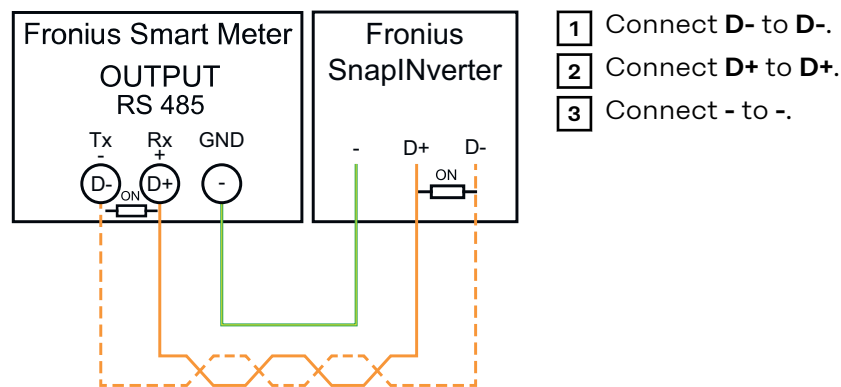
Power Control Systems according to UL 3141 are only available for installations in the USA, Canada and Mexico.

CT Wiring

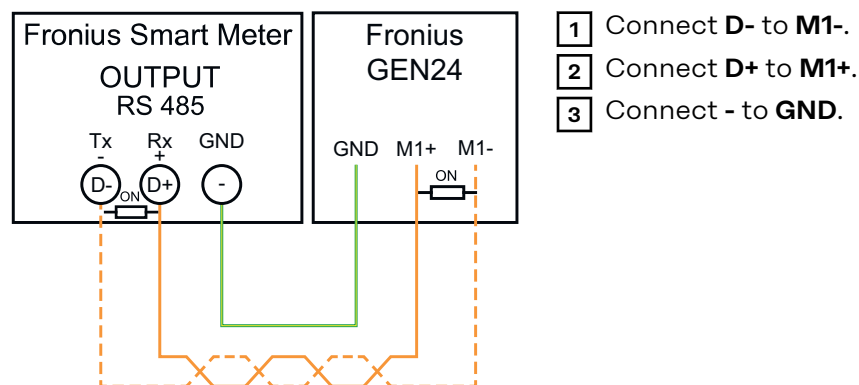
The current transformers connect to the six position black screw terminal block. Connect the white and black CT wires to the Fronius Smart Meter terminals marked CT L1, CT L2 and CT L3. Excess length may be trimmed from the wires if desired. Connect each CT with the white wire aligned with the white dot on the label and the black wire aligned with the black dot. Note the order in which the phases are connected, as the line voltage phases must match the current phases for accurate power measurement.

Connecting data communication cables to inverters**Fronius SnapINverter:**

Connect the data communication ports of the Fronius Smart Meter to the Fronius system monitoring in the inverter. Several Smart Meters can be installed in the system, see chapter [Multi meter system – Fronius SnapINverter](#) on page 27

**Fronius GEN24 inverter:**

Connect the data communication ports of the Fronius Smart Meter to the Modbus interface of the Fronius GEN24 inverter. Several Smart Meters can be installed in the system, see chapter [Multi meter system – Fronius GEN24 inverter](#) on page 27



IMPORTANT! Further information on successful start-up.

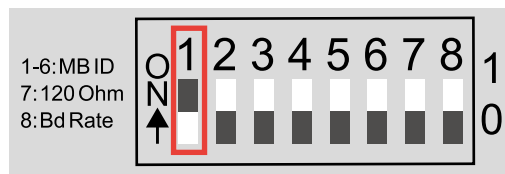
Observe the following information on connecting the data communication line to the inverter.

- Use a CAT5 type cable or higher.
- For data lines belonging together (D+, D- and M1+, M1-) use a twisted pair of cables.
- If the output cables are close to the mains wiring, use wires or cables rated at 300 V to 600 V (never less than the operating voltage).
- Use double insulated or sheathed output cables when near bare conductors.
- Use shielded twisted pair cables to avoid interference.
- The outputs of the Fronius Smart Meter are galvanically isolated from dangerous voltages.

Set the address of the Fronius Smart Meter

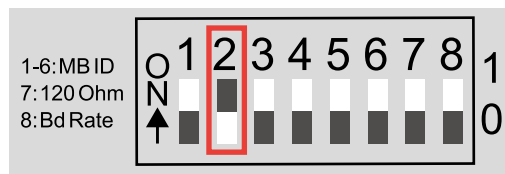
The Fronius Smart Meter must be connected to the Fronius Datamanager. If only one Fronius Smart Meter is installed, the Modbus Address is 1.

DIP Switch	1	2	3	4	5	6	7	8
Up (1) value	1	2	4	8	16	32	R 120 Ohm	Baud Rate

Examples

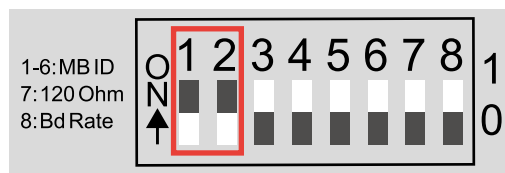
Modbus Adress 1

DIP Switch	1	2	3	4	5	6
Position	1	0	0	0	0	0



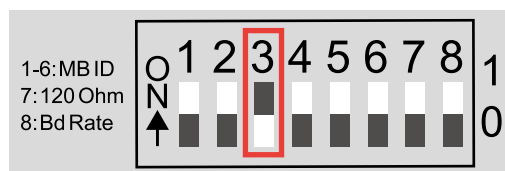
Modbus Adress 2

DIP Switch	1	2	3	4	5	6
Position	0	1	0	0	0	0



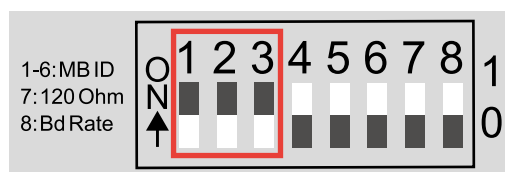
Modbus Adress 3 (value 1 + 2 = 3)

DIP Switch	1	2	3	4	5	6
Position	1	1	0	0	0	0



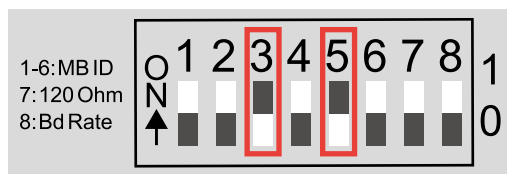
Modbus Adress 4

DIP Switch	1	2	3	4	5	6
Position	0	0	1	0	0	0



Modbus Adress 7 (value 1 + 2 + 4 = 7)

DIP Switch	1	2	3	4	5	6
Position	1	1	1	0	0	0



Modbus Adress 20 (value 4 + 16 = 20)

DIP Switch	1	2	3	4	5	6
Position	0	0	1	0	1	0

Terminating resistors - explanation of symbols



Inverter in the system

e.g. Fronius Primo GEN24 208-240



Meter - Fronius Smart Meter WR

Terminating resistor is integrated in the meter.



Fronius or third-party device, connection via Modbus RTU

e.g. Fronius Ohmpilot, battery, etc.

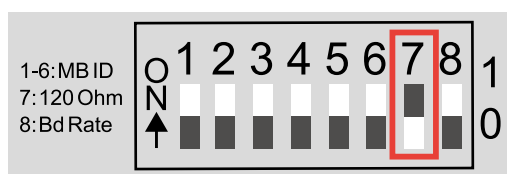


Termination resistance

R 120 Ohm

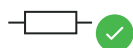
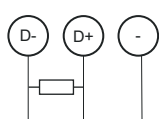
Terminating Resistors

The system might work without terminating resistors. Due to interferences, the use of terminating resistors according to the following schemes are recommended.



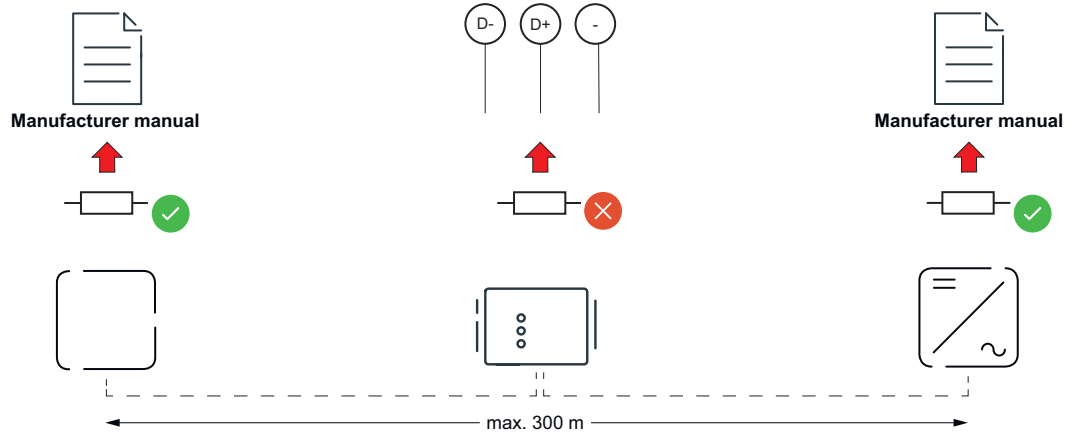
Activate the Fronius Smart Meter terminating resistor (R 120 Ohm) by switching pin 7 to ON (1).

OPTION 1

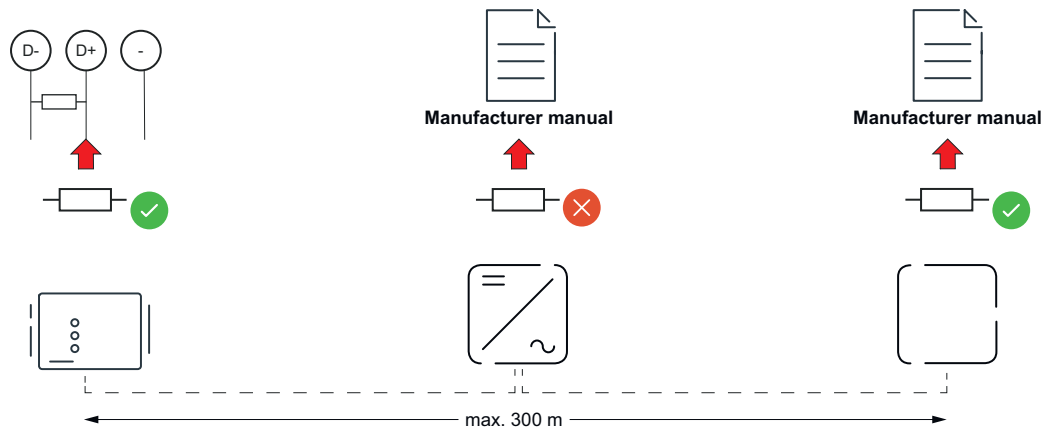


max. 300 m

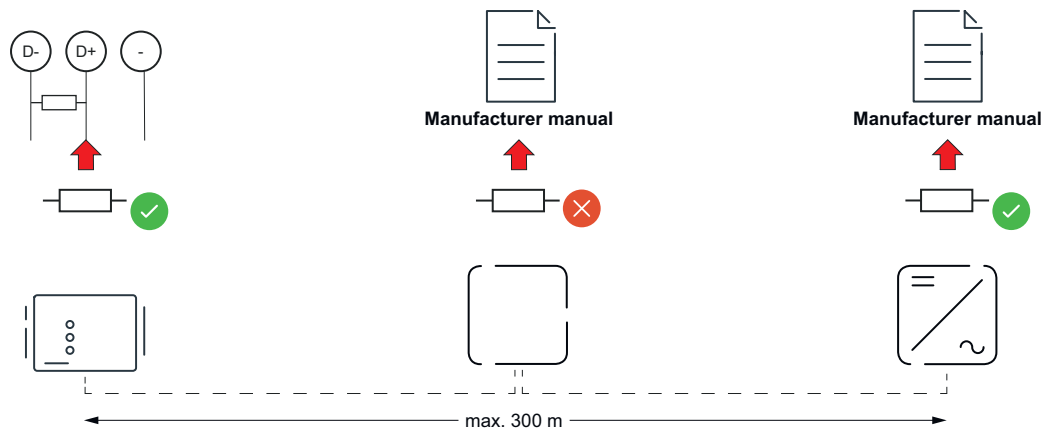
OPTION 2



OPTION 3

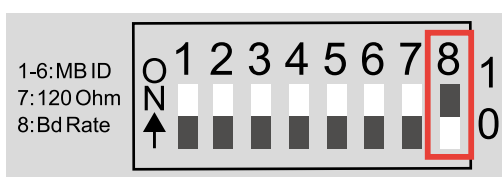


OPTION 4



Set Baud Rate

Select the baud rate by setting DIP switch position 8 (see below). The change will take effect immediately.



Baud Rate	DIP Switch 8
9600 (default)	0 (OFF)
38400	1 (ON)

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 metering data relevant for the billing of electricity quantities (primarily the kilowatt hours of grid purchases and grid power feed). On the basis of the data relevant for billing, the electricity retailer invoices a grid purchase and the purchaser of the surplus pays for the grid power feed.



Primary meter

Records the load curve of the system and makes the measured data available for energy profiling in Fronius Solar.web. The primary meter also regulates the dynamic feed-in control.



Secondary meter

Records the load curve of individual loads and producers (e.g. washing machine, lights, television, heat pump, etc.) in the consumption branch and makes the measured data available for energy profiling in Fronius Solar.web.



Modbus RTU, Third-party device

e.g. Fronius Ohmpilot, 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

Modbus participant - Fronius SnapINverter

A maximum of 4 Modbus stations can be connected to the Modbus connection 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 subscribers.

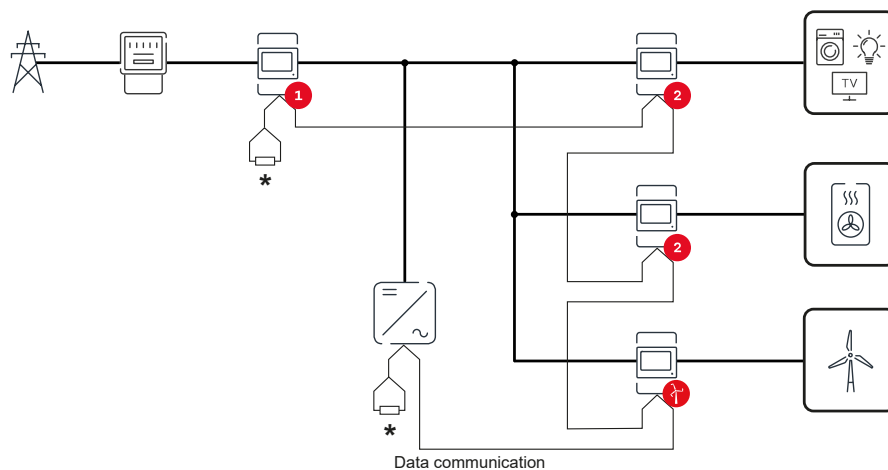
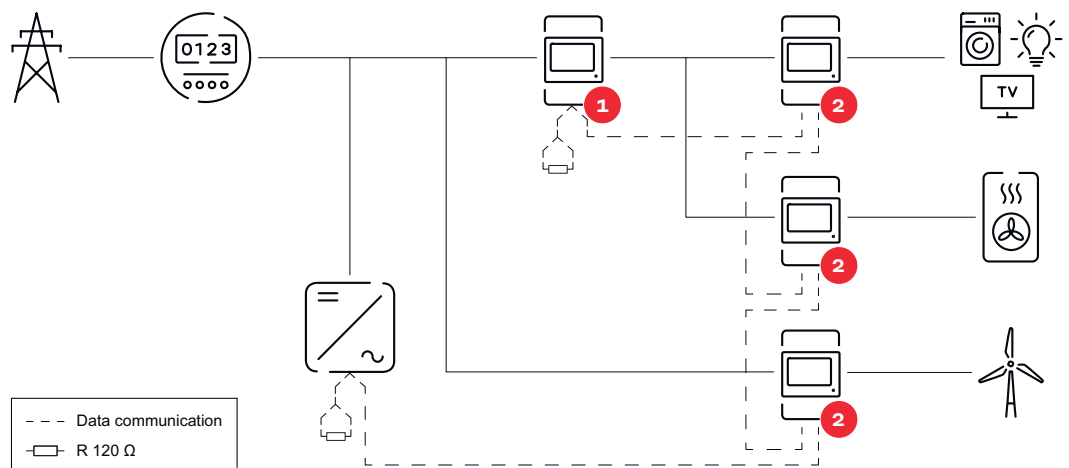
Example:

Input	Battery	Fronius Ohmpilot	Number of primary meters	Number of secondary meters
Modbus	✓	✓	1	0
	✓	✗	1	1
	✗	✓	1	2
	✗	✗	1	3

Multi meter system - Fronius SnapINverter

If several Fronius Smart Meters are installed, set a separate address for each Smart Meter. The primary meter always receives the address 1. Number all other meters consecutively in the address range from 2 to 14. Different Fronius Smart Meter power categories can be used together.

IMPORTANT! Use a maximum of three secondary meters in a system. To avoid interference, install the terminating resistors as described in chapter [Terminating Resistors](#).



Observe the following in a multi meter system:

- Each Modbus address is assigned only once.
- Place the terminating resistors individually for each channel.

Modbus participant - Fronius GEN24

The inputs M0 and M1 can be freely selected. A maximum of 4 Modbus participants can be connected to the Modbus terminal on the inputs M0 and M1.

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 subscribers.

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

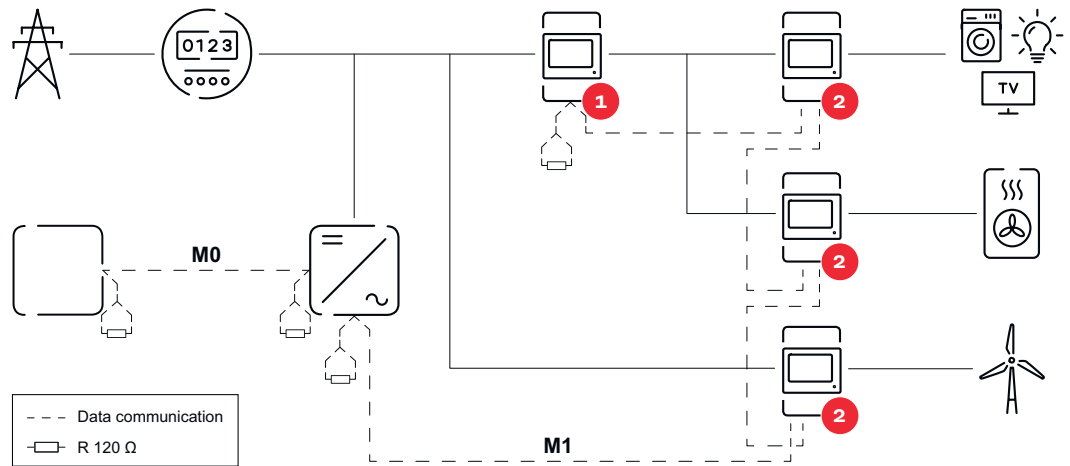
Multi meter system - Fronius GEN24 inverter

If several Fronius Smart Meters are installed, a separate address must be set for each one (see [Set the address of the Fronius Smart Meter](#) on page 22). The primary meter always receives the address 1. All other meters are numbered consecutively in the address range from 2 to 14. Different Fronius Smart Meter power categories can be used together.

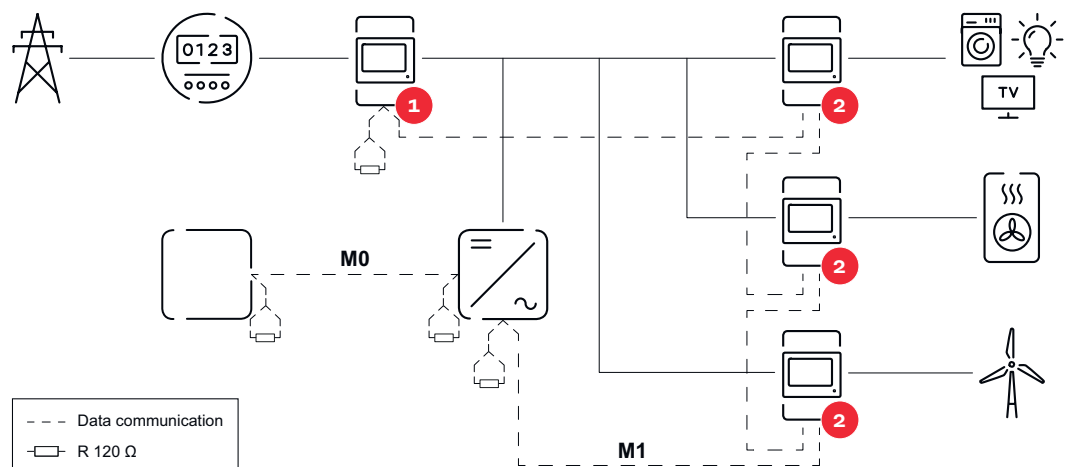
IMPORTANT!

Use no more than Use 7 secondary meters in the system. To avoid interference,

it is recommended to install the terminating resistors according to the chapter [Terminating Resistors](#) on page 23.



Position of the primary meter in the consumption branch. *Termination resistance R 120 Ohm



Position of the primary meter at the feed-in point. *Termination resistance R 120 Ohm

The following must be observed in a multi meter system:

- Connect the primary meter and the battery to different channels (recommended).
- Distribute the remaining Modbus participants evenly.
- Each Modbus address is assigned only once.
- Place the terminating resistors individually for each channel.

Commissioning

Fronius SnapInverter

General

IMPORTANT! Settings in the "Meter" menu item may only be entered by staff trained to do so!

The service password must be entered for the "Meter" menu item.

Three-phase or one-phase Fronius Smart Meters may be used. In both cases, selection is made via the "Fronius Smart Meter" item. The Fronius Datamanager automatically detects the meter type.

One primary meter and several secondary meters can be selected. The primary meter must be configured before a secondary meter can be chosen.

Connect to Fronius Datamanager 2.0

Access Point:

Activate the WiFi access point of the inverter:

- 1** Select the **Setup** menu on the inverter display.
- 2** Navigate to **WiFi Access Point**.
 - ✓ *Network (SS) and password (PW) are displayed.*
- 3** Activate the **WiFi Access Point** with the Enter ↵ key.

Establish the connection from the inverter's WiFi access point to the PC:

- 1** Establish the connection to the inverter in the network settings (the inverter is displayed with the name "Fronius_240.XXXXXX").
 - 2** Enter and confirm the password from the inverter display.
 - 3** In the browser's address bar, enter the IP address <http://192.168.250.181> and confirm.
- ✓ *The Fronius Datamanager 2.0 start page is displayed.*
-

LAN:

- 1** Connect the Fronius Datamanager and computer with a LAN cable.
 - 2** Place the Fronius Datamanager 2.0 IP switch in the "A" position.
 - 3** In the browser's address bar, enter the IP address <http://169.254.0.180> and confirm.
-

Configure Fronius Smart Meter as primary meter

- 1** Call up the Fronius Datamanager 2.0 website.
 - Open web browser.
 - In the browser's address bar, enter the IP address (IP address for WLAN: 192.168.250.181, IP address for LAN: 169.254.0.180) or enter and confirm the host and domain name of the Fronius Datamanager 2.0.
 - The Fronius Datamanager 2.0 website appears.
- 2** Click on the **Settings** button.
- 3** Log in to the login area with user **Service** and the service password.
- 4** Call up the **Meter** menu area.
- 5** Select the primary meter from the drop-down list.
- 6** Click on the **Settings** button.

- 7** Set the meter position of the meter (feed-in point or consumption point) in the pop-up window. For more information on the position of the Fronius Smart Meter, see [Positioning](#) on page 14.
- 8** Set the converter ratio and the network type.
- 9** Click the **OK** button when the status OK is displayed. If the *timeout* status is displayed, repeat the operation.
- 10** Click on the button ☐ ✓ to save the settings.

The Fronius Smart Meter is configured as a primary meter.

In the menu area **Current Total View**, the power of the PV modules, the self-consumption, the grid power feed and battery charging (if available) are displayed.

Configure Fronius Smart Meter as a secondary meter

- 1** Call up the Fronius Datamanager 2.0 website.
 - Open web browser.
 - In the browser's address bar, enter the IP address (IP address for WLAN: 192.168.250.181, IP address for LAN: 169.254.0.180) or enter and confirm the host and domain name of the Fronius Datamanager 2.0.
 - The Fronius Datamanager 2.0 website appears.
- 2** Click on the **Settings** button.
- 3** Log in to the login area with user **Service** and the service password.
- 4** Call up the **Meter** menu area.
- 5** Select the secondary meter from the drop-down list.
- 6** Click on the **Add** button.
- 7** Enter the name of the secondary meter in the **Name** input field.
- 8** Enter the previously assigned address in the **Modbus address** input field.
- 9** Set the converter ratio and the network type.
- 10** Complete the description of the meter.
- 11** Click on the button ☐ ✓ to save the settings.

The Fronius Smart Meter is configured as a secondary meter.

Fronius GEN24 inverter

General

IMPORTANT! Settings in the "Device configuration" menu item may only be entered by staff trained to do so!

The service password must be entered for the "Device configuration" menu item.

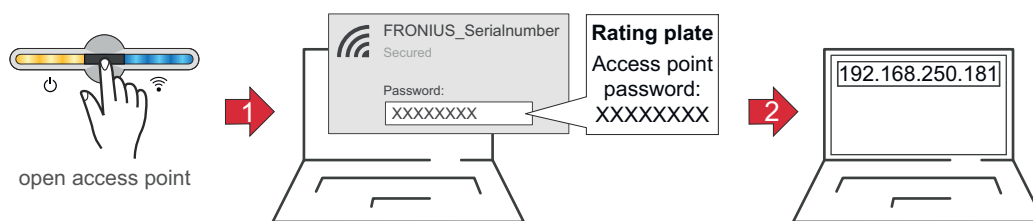
Three-phase or one-phase Fronius Smart Meters may be used. In both cases, selection is made via the "Components" menu area. The meter type is determined automatically.

One primary meter and several secondary meters can be selected. The primary meter must be configured before a secondary meter can be chosen.

Installation with the browser

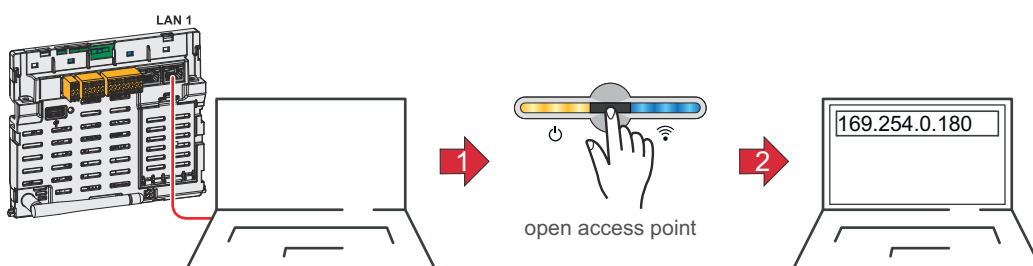
The network wizard and product setup can be performed independently. A network connection is required for the Fronius Solar.web installation wizard.

WiFi:



- 1 Open the access point by touching the sensor .
✓ *Communication LED flashes blue.*
- 2 Establish the connection to the inverter in the network settings (the inverter is displayed with the name "FRONIUS_" and the serial number of the device).
- 3 Enter the password from the rating plate and confirm.
IMPORTANT!
To enter the password, first select the **Connect using a security key instead** link in order to establish the connection with the password.
- 4 Enter the IP address 192.168.250.181 in the address bar of the browser and confirm. The installation wizard opens.
- 5 Follow the installation wizard and complete the installation in the individual areas.
- 6 Add the system components in Fronius Solar.web and commission the PV system.

Ethernet:



- 1 Establish a connection to the inverter (LAN1) using a network cable (min. CAT5 STP).
- 2 Open the access point by touching the sensor once .
✓ *Communication LED flashes blue.*
- 3 Enter the IP address 169.254.0.180 in the address bar of the browser and confirm. The installation wizard opens.
- 4 Follow the installation wizard and complete the installation in the individual areas.
- 5 Add the system components in Fronius Solar.web and commission the PV system.

Configure Fronius Smart Meter as primary meter

- 1 Call up the website of the inverter.
 - Open web browser.
 - In the browser's address bar, enter the IP address (IP address for WLAN: 192.168.250.181, IP address for LAN: 169.254.0.180) or enter and confirm the host and domain name of the inverter.
 - The website of the inverter is displayed.
- 2 Click on the **Device configuration** button.
- 3 Log in to the login area with user **Technician** and the technician password.
- 4 Call up the **Components** menu area.
- 5 Click on the **Add components** button.
- 6 Set the position of the meter (feed-in point or consumption point) in the **Position** drop-down list. For more information on the position of the Fronius Smart Meter, see [Positioning](#) on page 14.
- 7 Set the converter ratio and the network type.
- 8 Click on the **Add** button.
- 9 Click the **Save** button to save the settings.

The Fronius Smart Meter is configured as a primary meter.

Configure Fronius Smart Meter as a secondary meter

- 1 Call up the website of the inverter.
 - Open web browser.
 - In the browser's address bar, enter the IP address (IP address for WLAN: 192.168.250.181, IP address for LAN: 169.254.0.180) or enter and confirm the host and domain name of the inverter.
 - The website of the inverter is displayed.
- 2 Click on the **Device configuration** button.
- 3 Log in to the login area with user **Technician** and the technician password.
- 4 Call up the **Components** menu area.
- 5 Click on the **Add components** button.
- 6 Select the meter type (generator meter/load meter) in the **Position** drop-down list.
- 7 Enter the previously assigned address in the **Modbus address** input field.
- 8 Enter the name of the meter in the **Name** input field.
- 9 Set the converter ratio and the network type.
- 10 Select the category (generator or load) in the **Category** drop-down list.
- 11 Click on the **Add** button.
- 12 Click the **Save** button to save the settings.

The Fronius Smart Meter is configured as a secondary meter.

Operation

Power Status LEDs

The three status LEDs on the front of the Fronius Smart Meter can help indicate correct measurements and operation. The "L1", "L2", and "L3" on the diagrams indicate the three phases:

Normal Startup

The Fronius Smart Meter displays the following startup sequence whenever power is first applied.

A	Red	Yellow	Green
B	Red	Yellow	Green
C	Red	Yellow	Green
	1.0sec	1.0sec	1.0sec

Consuming Power

Any phase with the LEDs flashing green is indicating normal positive power (Import of energy from public grid).

If the inverter or any other power source is not producing power and some minimal power is being used, the LEDs should be flashing green. This is normal, when the inverter is in its 5 minute startup cycle.

Green	Off	Green	Off	Green	Off
-------	-----	-------	-----	-------	-----

No Power

Any phase with a solid green LED indicates no power, but line voltage is present.

Green

No Voltage

Any phase LED that is off indicates no voltage on that phase.

Off

Generating Power

Red flashing indicates negative power for that phase. This is a normal behavior if more power is produced (by the inverter or any other power source) than consumed (Export of energy to the public grid). If no power is produced at all, this might indicate either reversed CT's, swapped CT wires or CT's are not matched with the correct line voltage phase.

Red	Off	Red	Off	Red	Off
-----	-----	-----	-----	-----	-----

Overvoltage Warning

The following indicates that the line voltage is too high for this model. Disconnect power immediately! Check the line voltages and the meter ratings (in the white box on the label).

A	R	G	R	G	R	G	R	G	R	G	R	G
B	R	G	R	G	R	G	R	G	R	G	R	G
C	R	G	R	G	R	G	R	G	R	G	R	G
	1.0sec											

Meter Not Operating

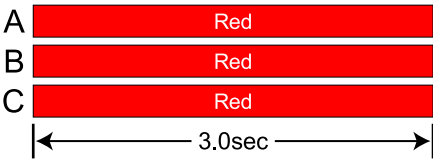
If none of the LEDs are illuminated, check that the correct line voltages are ap-

plied to the meter. If the voltages are correct, call customer service for assistance.

A	Off
B	Off
C	Off

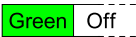
Error

If the meter experiences an internal error, all LEDs will light up red for 3 or more seconds. If you see this happen repeatedly, call customer service for assistance.

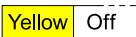


Modbus Communication LEDs

Near the upper left corner, there is a diagnostic Com (communication) LED that can indicate the following:



A short green flash indicates a valid packet addressed to this device.



Short yellow flashes or rapid flashing indicate valid packets addressed to different devices.



A one-second red flash indicates an invalid packet: bad baud rate, bad CRC, noise, bad parity, etc.



Rapid red/yellow flashing indicates a possible address conflict (two devices with the same DIP switch address).



Solid red indicates the address is set to zero: an invalid choice.

Technical data

Accuracy

Normal Operation

Line voltage: 90 - 347 Vac (Line to Neutral), 120 - 600 Vac (Line to Line)

Power factor: 1.0

Frequency: 45 - 65 Hz

Ambient Temperature: 23° C ± 5° C

CT Current: 5% - 100% of rated current

Accuracy: ± 0.5% of reading

Measurement

Update Rate: 0.1 second. Internally, all measurements are performed at this rate.

Startup Time: ~1.0 second. The Fronius Smart Meter starts communicating this long after AC voltage is applied. Energy measurement starts 50-100 milliseconds after AC is applied.

Default CT Phase Angle Correction: 0.0 degrees.

Models and Electrical

Meter Service Type	Nominal Vac Line-to-Neutral	Nominal Vac Line-to-Line	Phases	Wires
WR	90-347	120-600	1 - 3	2 - 4

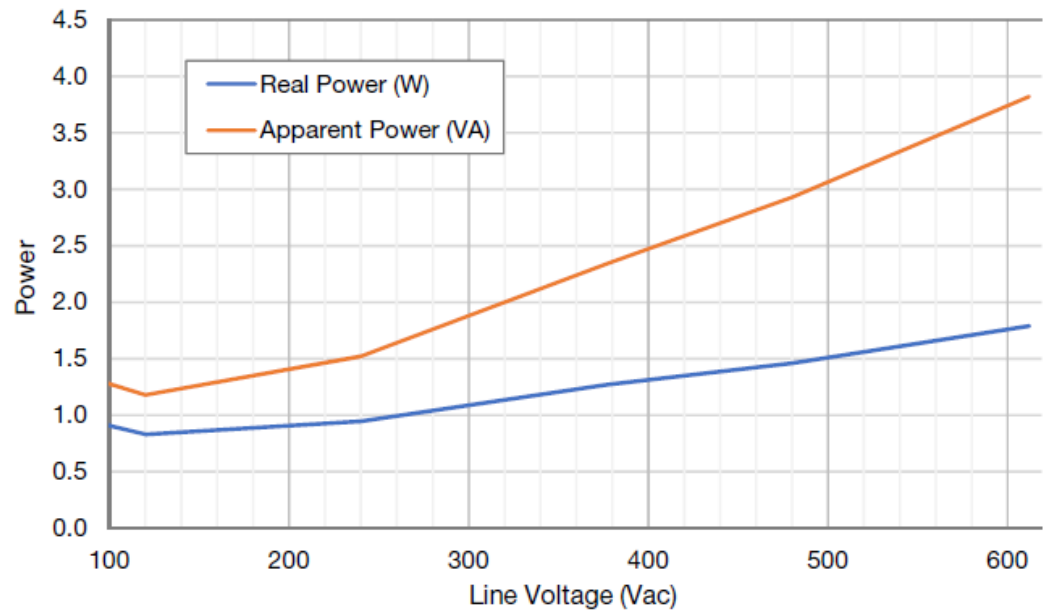
The Fronius Smart Meter has an optional neutral connection that may be used for measuring wye circuits. In the absence of neutral, voltages are measured with respect to ground. The Fronius Smart Meter uses the phase L1 (øA) and phase L2 (øB) connections for power.

Over-Voltage Limit: 125% of nominal Vac. Extended over-voltage operation can damage the Fronius Smart Meter and void the warranty.

Over-Current Limit: 120% of rated current. Exceeding 120% of rated current will not harm the Fronius Smart Meter but the current and power will not be measured accurately.

Maximum Surge: 4 kV according to EN 61000-4-5

Power Consumption:



Operating Frequencies: 50 / 60 Hz

Measurement Category: CAT III

Measurement category III is for measurements performed in the building installation. Examples are measurements on distribution boards, circuit breakers, wiring, including cables, bus bars, junction boxes, switches, socket outlets in the fixed installation, and equipment for industrial use and some other equipment, for example, stationary motors with permanent connection to the fixed installation.

The line voltage measurement terminals on the meter are rated for the following CAT III voltages (these ratings appear on the front label):

Meter Service Type	CAT III Voltage Rating
WR	600

Current Transformer Inputs:

Nominal Input Voltage (At CT Rated Current): 0.33333 Vac RMS

Absolute Maximum Input Voltage: 5.0 Vac RMS

Input Impedance at 50/60 Hz: 23 kOhm

Certifications

EMC

- EN55011:2007, CISPR 11:2009- Class B
- FCC Part 15 - Class B
- EN 61326-1:2012, includes:
 - **Harmonics:** IEC 61000-3-2
 - **Flicker:** IEC 61000-3-3
 - **Electrostatic Discharge:** IEC 61000-4-2
 - **Radiated RF Immunity:** IEC 61000-4-3
 - **Electrical Fast Transient / Burst:** IEC 61000-4-4
 - **Surge Immunity:** IEC 61000-4-5
 - **Conducted RF Immunity:** IEC 61000-4-6
 - **Power Frequency H-Field:** IEC 61000-4-8
 - **Voltage Dips, Interrupts:** IEC 61000-4-11

Safety

- UL 61010-1
 - CAN/CSA-C22.2 No. 61010-1-12
 - IEC 61010-2
-

Environmental

Operating Temperature: -40° C to +80° C (-40° F to 176° F)

Altitude: Up to 3000 m (9842 ft)

Operating Humidity: non-condensing, 5 to 90% relative humidity (RH) up to 40°C, decreasing linearly to 50% RH at 55°C

Pollution: POLLUTION DEGREE 2 - Normally only non-conductive pollution; occasionally, a temporary conductivity caused by condensation must be expected.

Indoor Use: Suitable for indoor use

Outdoor Use: Suitable for outdoor use if mounted inside an electrical enclosure (Hammond Mfg., Type EJ Series) rated NEMA 3R or 4 (IP 66).

Warranty

Detailed warranty conditions specific to your country can be found at <https://www.fronius.com/en/download-center?searchword=Warranty+conditions>.

If there is a warranty for the relevant product, register the product at <https://warranty.fronius.com/> and activate or extend the warranty.



fronius.com/en/solar-energy/installers-partners/products-solutions/monitoring-digital-tools

MONITORING &
DIGITAL TOOLS

Fronius International GmbH

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At www.fronius.com/contact you will find the contact details of all Fronius subsidiaries and Sales & Service Partners.