**Fronius**

SHIFTING THE LIMITS

42,0426,0222,EN 005-30092015

# Fronius Energy Package

EN

Operating Instructions

Grid-connected inverter

# Dear reader,

**Introduction**

Thank you for the trust you have placed in our company and congratulations on buying this high-quality Fronius product. These instructions will help you familiarise yourself with the product. Reading the instructions carefully will enable you to learn about the many different features it has to offer. This will allow you to make full use of its advantages.

Please also note the safety rules to ensure greater safety when using the product. Careful handling of the product will repay you with years of safe and reliable operation. These are essential prerequisites for excellent results.

**Explanation of safety symbols**

⚠️ **DANGER!** Indicates immediate and real danger. If it is not avoided, death or serious injury will result.

⚠️ **WARNING!** Indicates a potentially dangerous situation. Death or serious injury may result if appropriate precautions are not taken.

⚠️ **CAUTION!** Indicates a situation where damage or injury could occur. If it is not avoided, minor injury and/or damage to property may result.

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

**IMPORTANT!** Indicates tips for correct operation and other particularly useful information. It does not indicate a potentially damaging or dangerous situation.

If you see any of the symbols depicted in the "Safety rules" chapter, special care is required.

# Contents

# Safety rules

**General**

The device is manufactured using state-of-the-art technology and according to recognised 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 operator,
- inefficient operation of the device.

All persons involved in commissioning, maintaining and servicing the device must
- be suitably qualified,
- have knowledge of and experience in dealing with electrical installations and
- read and follow these operating instructions carefully.

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 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 risk of
- injury or death to the operator or a third party,
- damage to the device and other material assets belonging to the operator,
- inefficient operation of the device.

Any safety devices that are not functioning properly must be repaired by a suitably qualified engineer 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 "General" section in the operating instructions for the device.

Before switching on the device, rectify any faults that could compromise safety.

**This is for your personal safety!**

**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 shall not be held liable for any damage arising from such usage.

For exact information on permitted environmental conditions, please refer to the "Technical data" in the operating instructions.

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**Qualified service engineers**

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 perform any actions other than those described in the documentation. This applies even if you are qualified to do so.

All cables and leads must be secure, 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 authorised personnel.

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

Do not carry out any modifications, alterations, etc. to the device without the manufacturer's consent.

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

**Noise emission values**

The maximum sound power level of the inverter is specified in the Technical Data.

The device is cooled as quietly as possible with the aid of an electronic temperature control system; this depends on the amount of converted power, the ambient temperature, the level of soiling of the device, etc.

It is not possible to provide a workplace-related emission value for this device because the actual sound pressure level is heavily influenced by the installation situation, the power quality, the surrounding walls and the properties of the room in general.

**EMC measures**

In certain cases, even though a device complies with the standard limit values for emissions, it may affect the application area for which it was designed (e.g. when there is sensitive equipment at the same location, or if the site where the device is installed is close to either radio or television receivers). If this is the case, then the operator is obliged to take appropriate action to rectify the situation.

**Disposal**

To comply with the European Directive 2002/96/EC on Waste Electrical and Electronic Equipment and its implementation as national law, electrical equipment that has reached the end of its life and dead batteries must be sorted from general waste and returned to an approved recycling facility. Any device that you no longer require must either be returned to your dealer or given to one of the approved collection and recycling facilities in your area. Ignoring this European Directive may be harmful to the environment and your own health!

If you need to replace your battery at some point, Fronius will take back the old device and arrange for it to be recycled in an appropriate manner.

**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 Symo Hybrid

**Device concept**
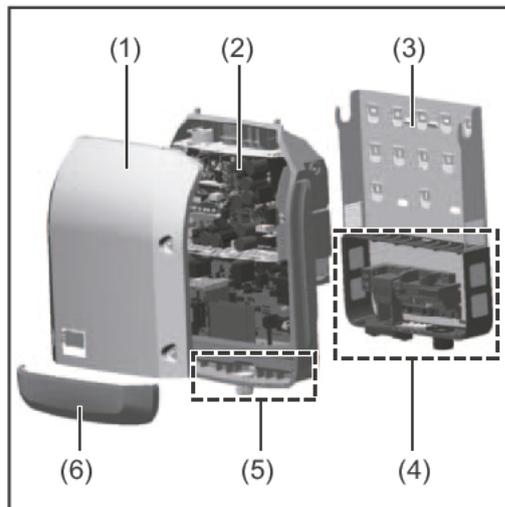


Device design:

| | |
|---|---|
| (1) | Housing lid |
| (2) | Inverter |
| (3) | Wall bracket |
| (4) | Connection area including DC main switch |
| (5) | Data communication area |
| (6) | Data communication cover |

The hybrid inverter converts the direct current generated by the solar modules into alternating current. This alternating current is fed into the public grid synchronously with the grid voltage. In addition, the solar energy can be stored in a connected Fronius Solar Battery for use later on.

This version of the hybrid inverter is only intended for use in grid connected photovoltaic systems. A device update is required from the manufacturer in order to generate power separately from the public grid. As well as providing functional enhancements for the hardware and software, this update also includes relevant user documentation.
The hybrid inverter is delivered ready for supplying emergency power.

Thanks to its design and the way it works, the inverter is extremely safe both to install and to operate.
The inverter monitors the public grid automatically. In the event of abnormal grid conditions, the inverter ceases operating immediately and stops feeding power into the grid (e.g. if the grid is switched off, if there is an interruption, etc.).
Grid monitoring involves voltage, frequency and islanding detection monitoring.

Operation of the inverter is fully automatic.
The inverter is designed to get as much power out of the solar modules as possible. Depending on the operating point, this power is either stored in the battery or it is fed into the grid.

As soon as the solar modules stop providing sufficient energy, the power from the Fronius Solar Battery is fed into the home network. Depending on the selected setting, power can also be drawn from the public grid for the purpose of charging the battery.

If no power is available from the solar modules and no power is being drawn from the batteries, the inverter disconnects the power electronics from the grid completely and ceases operating. It retains all its settings and stored data.

If the inverter becomes too hot, it automatically reduces the current output power or current charging power in order to protect itself.
Reasons for the inverter becoming too hot include the ambient temperature being too high or inadequate heat dissipation (e.g. if it is installed in a switch cabinet without suitable heat dissipation).

**IMPORTANT!** The Fronius Solar Battery is only to be switched on when the inverter is in Standby mode.

**Proper use**

The solar inverter is exclusively intended for charging a Fronius Solar Battery with direct current from solar modules or for converting this direct current into alternating current and feeding it into the public grid.
The following actions constitute improper use:
- Any use above and beyond this purpose
- Making any modifications to the inverter that have not been expressly approved by Fronius
- Installing components that are not distributed or expressly approved by Fronius
- Operating the device with a battery that has not been approved by Fronius
- Operating the equipment with an energy meter that has not been approved by Fronius

Fronius shall not be liable for any damage resulting from such action.
No warranty claims will be entertained.

Proper use also includes:
- Carefully studying and obeying the installation and operating instructions
- Performing all stipulated inspection and maintenance work

When designing the photovoltaic system, ensure that all of its components are operated within their permitted operating ranges at all times.

Observe all the measures recommended by the solar module manufacturer to ensure that the solar module retains its properties in the long term.

Observe the stipulations of the utility company concerning energy fed into the grid and the operation of storage systems.

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**Warning notices on the device**

There are warning notices and safety symbols on and in the inverter. These warning notices and safety symbols must not be removed or painted over. They warn against operating the device incorrectly, as this may result in serious injury and damage.



**Safety symbols:**

Risk of serious injury and damage due to incorrect operation

Do not use the functions described here until you have fully read and understood the following documents:
- These operating instructions
- All the operating instructions for the system components of the photovoltaic system, especially the safety rules

Dangerous electrical voltage

Wait for the capacitors to discharge.

**Text of the warning notices:**

**WARNING!**
An electric shock can be fatal. Make sure that both the input side and output side of the device are de-energised before opening the device. Wait for the capacitors to discharge (6 minutes).

# Fronius Solar Battery

**Device concept**
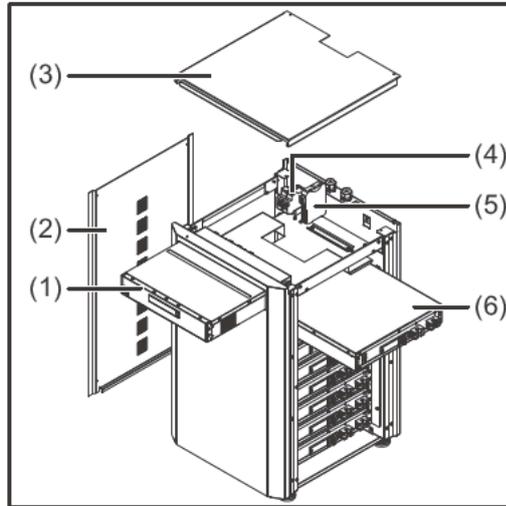


Device design:

(1) Battery management module
(2) Side panel
(3) Lid
(4) Fuses
(5) Data converter
(6) Battery module (1.2 kWh usable capacity)

With the market launch of its new Fronius Energy Package, Fronius is introducing an inverter that can be used to store energy. One of the key components is the Fronius Solar Battery, which contains a lithium-ion rechargeable cell. The Fronius Solar Battery supplements the Fronius Symo Hybrid by adding storage functionality as well. This means that the solar energy from the solar modules can be stored for use later on.
The storage system is only suitable for operation in conjunction with Fronius Symo Hybrid inverters.

Thanks to its design and the way it works, the storage system is extremely safe both to install and to operate. It relies on a high-power lithium-ion rechargeable cell, which is based on state-of-the-art iron phosphate (LiFePO4) technology and conforms to the highest safety standards.

When used in conjunction with the Fronius inverter, operation of the storage system is fully automatic.

**Proper use**

The Fronius Solar Battery is exclusively intended for taking direct current from a Fronius Symo Hybrid inverter and storing it so that it can be used later on.
The following actions constitute improper use:
- Any use above and beyond this purpose
- Making any modifications to the storage system that have not been expressly approved by Fronius
- Installing components that are not distributed or expressly approved by Fronius
- Operating the system with an inverter that has not been approved by Fronius
- Operating the equipment with an energy meter that has not been approved by Fronius

Fronius shall not be liable for any damage resulting from such action.
No warranty claims will be entertained.

Proper use also includes:
- Carefully studying and obeying the installation and operating instructions
- Performing all stipulated inspection and maintenance work

Observe the stipulations of the utility company concerning energy fed into the grid and the operation of storage systems.

**Warning notices on the device**

Warning notices and safety symbols are affixed to the battery. These warning notices and safety symbols must not be removed or painted over. They warn against operating the device incorrectly, as this may result in serious injury and damage.



**Safety symbols – Text of the warning notices:**

CAUTION!
Incorrect handling or failing to observe these notices and the operating instructions is extremely dangerous. It may give rise to thermal/electrical hazards or create a risk of fire, thereby resulting in serious injuries.

Please read the operating instructions carefully while also ensuring compliance with the safety instructions during use!

To avoid electric shocks:
- Do not dismantle or modify device
- Do not allow any water to enter device
- Do not allow any foreign substances or material to enter device
- Do not touch any connections directly

To avoid overheating, the risk of fire, electric shocks or injuries:
- Do not use any unspecified charging devices
- Do not use in room temperatures of 35 °C or above
- Do not use in unstable environments
- Do not expose to any strong vibrations

To avoid the risk of fire:
- Do not short-circuit individual connections
- Avoid overheating

What to do in an emergency:
a) Fire:
- Suitable extinguishing agents: CO2 or powder extinguisher; fire extinguishing equipment that involves the use of water can result in electric shocks.
- Notify fire brigade
- Notify anyone who is in danger
- Switch off main switch
- Open residual current-operated circuit breaker

b) Flooding:
- Switch off main switch
- Open residual current-operated circuit breaker
- Protect system from water, pump water away

c) Undefined operating status (see also section titled "Undefined operating statuses" on page External Link: "Page"):
- Ensure adequate ventilation.
- Switch off main switch
- Open residual current-operated circuit breaker

# The various operating modes

**Operating modes – Explanation of symbols**

**Solar module**
Generates direct current

**Inverter – Fronius Symo Hybrid**
Converts the direct current into alternating current and charges the battery. Thanks to the built-in system monitoring function, the inverter can be integrated into a network using WLAN technology.

**Battery – Fronius Solar Battery**
Connected to the inverter on the DC side and used to store electrical energy

**Photovoltaic system consumers**
The consumers connected to the PV system (single or three-phase)

**Meter – Fronius Smart Meter**
For optimum energy management. You can have the meter installed in a switch cabinet by your electrical installation engineer.

**Emergency power function**
The inverter is delivered ready for supplying emergency power. However, the electrical installation engineer must set up the emergency power function in the switch cabinet. In "Emergency power" mode, the PV system operates as a stand-alone island. The PV system can also be disconnected from the grid manually.

**Grid**

**Operating mode: Inverter**

The Fronius Symo Hybrid can be used purely as an inverter without a battery connected to it.

**Operating mode: Inverter plus battery**

To maximise self-consumption of the energy provided by your PV system, you can use a Fronius Solar Battery to act as a storage system. The Fronius Solar Battery is connected to the inverter on the DC side. As a result, there is no need for multiple current conversion processes, leading to greater efficiency.
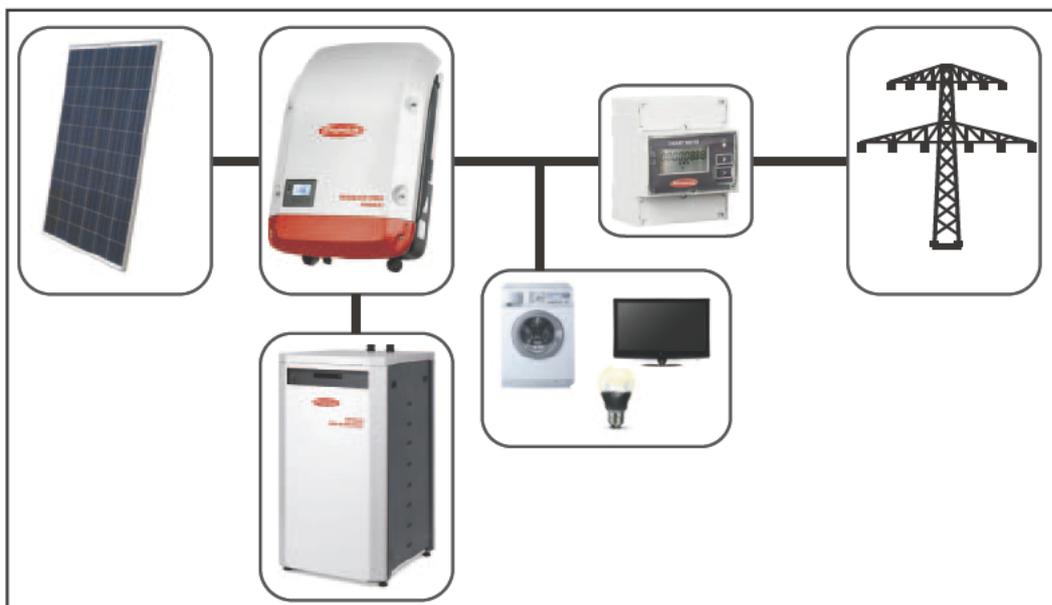


**Operating mode: Inverter plus battery and emergency power function**

When the hybrid PV system is equipped with all the available features, the inverter can:
- Feed energy into the grid
- Supply the devices that are connected to the PV system with power in the event of a power failure
- Use any excess energy to charge the Fronius Solar Battery
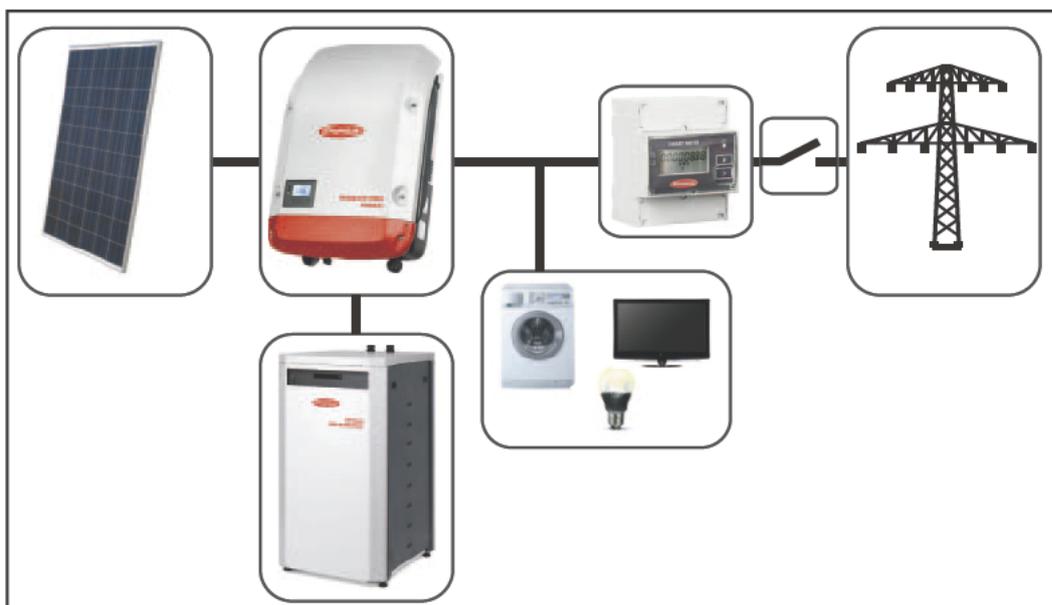


**Energy flow direction**

The hybrid inverter supports four different directions of energy flow:
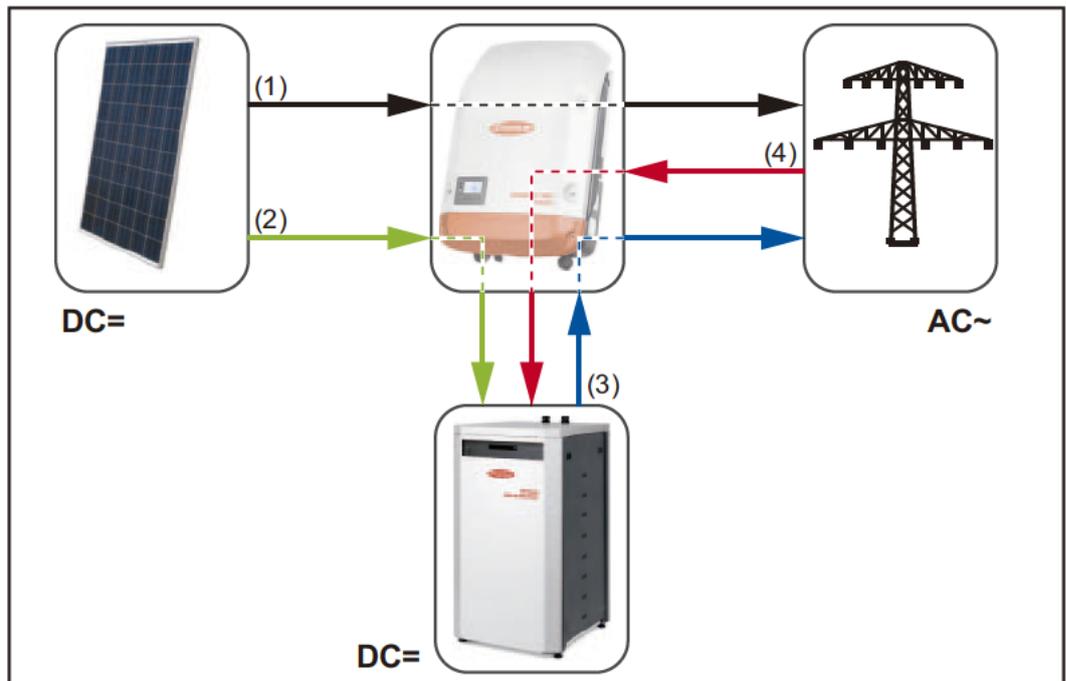
*Energy flow directions in the hybrid PV system*

(1)     Solar module - inverter - grid
(2)     Solar module - inverter - battery
(3)     Battery - inverter - grid
(4)     Grid - inverter - battery

# Operation

# Data communication

**Data communica-
tion area**



| Item | Name |
|------|------|
| (1) | Switchable multifunction current interface |
| | Use the 2-pin mating connector supplied with the inverter to connect to the multi-function current interface. |
| (2) | Floating switch contact with mating connector |
| | Max. 250 V AC / 4 A AC<br>Max. 30 V DC / 1 A DC<br>Max. 1.5 mm² (AWG 16) cable cross-section |
| | Pin 1 = NO contact (normally open)<br>Pin 2 = C (common)<br>Pin 3 = NC contact (normally closed) |
| | Use the mating connector supplied with the inverter to connect to the floating switch contact. |
| (3) | System monitoring with WLAN antenna |

**General remarks**

As standard, the inverter features the WLAN-enabled system monitoring and energy management unit (Fronius Hybrid Manager).
Various functions are included in system monitoring, such as:
- Dedicated web page displaying current data and a wide range of different setting options
- Option of connecting directly to Fronius Solar.web
- Automatic sending of service messages by SMS or e-mail in the event of a fault
- Internet connection via WLAN or LAN
- Ability to control the inverter load by specifying power limit values, minimum or maximum running times or target running times (called "durations" in the software)
- Ability to control the inverter via Modbus (TCP)
- Ability to assign control priorities
- Ability to control the inverter by means of connected meters (Fronius Smart Meter)
- Ability to control the inverter via a ripple control signal receiver (e.g. by specifying the reactive power or effective power)
- Dynamic power reduction, taking self-consumption into account
- Ability to control battery charging in line with the control targets set

**Controls, connections and indicators on the system monitoring unit**
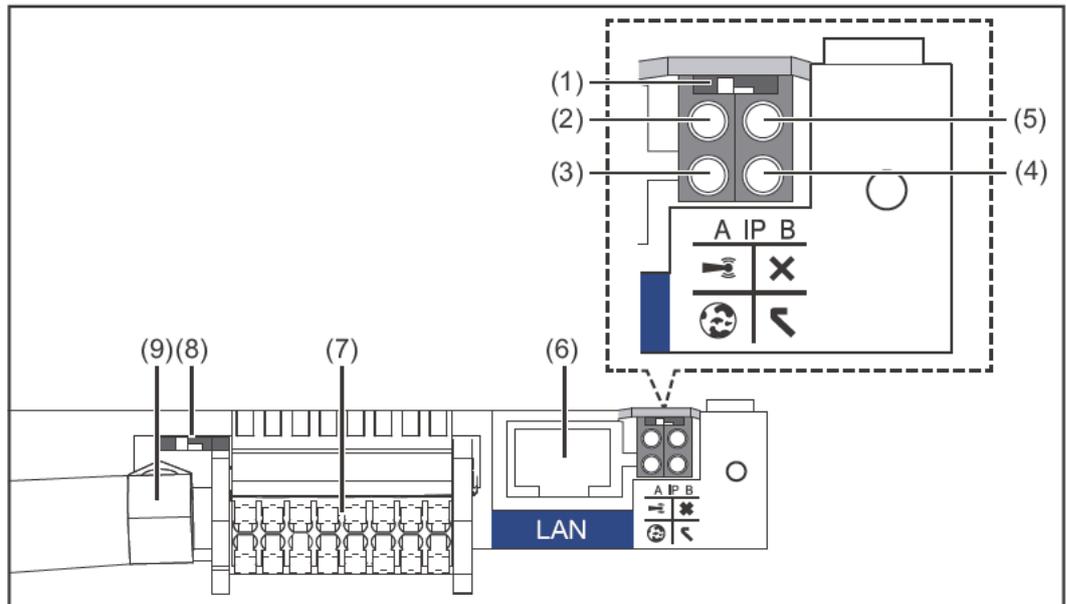


| No. | Function |
|---|---|
| **(1)** | **IP switch**<br>For switching the IP address: |
| | Switch position **A**<br>Default IP address with opening of the WLAN access point<br><br>System monitoring uses the set IP address 169.254.0.180 to establish a direct connection to a PC via LAN.<br><br>Setting the IP switch to position A also opens an access point to enable a direct WLAN connection to the system monitoring datalogger.<br><br>Access data for this access point:<br>Network name: FRONIUS_239.XXXXXX<br>Code: 12345678<br><br>System monitoring can be accessed by:<br>- Using the DNS name "http://datamanager"<br>- Using the IP address 169.254.0.180 for the LAN interface<br>- Using the IP address 192.168.250.181 for the WLAN access point |
| | Switch position **B**<br>Assigned IP address<br><br>System monitoring uses an assigned IP address (factory setting: dynamic (DHCP))<br>The IP address can be set on the system monitoring web page. |
| **(2)** | **WLAN LED**<br>- Flashing green: System monitoring is in Service mode<br>  (IP switch on the system monitoring plug-in card is in position A or Service mode has been activated via the inverter display, the WLAN access point is open)<br>- Steady green: WLAN connection established<br>- Flashing alternately green/red: WLAN access point has timed out following activation (1 hour)<br>- Steady red: No WLAN connection<br>- Flashing red: Faulty WLAN connection |

| No. | Function |
|---|---|
| (3) | **Solar.web connection LED** |

(3) **Solar.web connection LED**
- Steady green: Fronius Solar.web connection established
- Steady red: Fronius Solar.web connection is required but has not been established
- Not lit: No Fronius Solar.web connection is required or the option for sending data to Fronius Solar.web has been deactivated

(4) **Supply LED**
- Steady green: Internal communication system is providing an adequate power supply; system monitoring is ready for use
- Not lit: No power is being supplied by the internal communication system
- Flashing red: Update in progress

  **IMPORTANT!** Never interrupt the power supply while an update is in progress.
- Steady red: Update failed

(5) **Connection LED**
- Steady green: Good connection within the internal communication system
- Steady red: Connection within the internal communication system has been interrupted

(6) **LAN connection**
Ethernet interface, colour-coded blue, for connecting the Ethernet cable

(7) **I/Os**
Digital inputs and outputs



**Modbus RTU 2-wire (RS485):**

D-    Modbus data -
D+    Modbus data +

**Int./ext. supply**

-    GND
+    $U_{int}$ / $U_{ext}$
     Internal voltage output 12.8 V
     or
     input for an external supply voltage
     >12.8 - 24 V DC (+ 20%)

**Digital inputs:** 0 - 3, 4 - 9
Voltage level: Low = min. 0 V - max. 1.8 V; high = min. 3 V - max. 24 V DC (+ 20%)
Input currents: Dependent on input voltage; input resistance = 46 kohms

| No. | Function |
| --- | --- |
| | **Digital outputs: 0 - 3**<br>Switching capacity when power is supplied by the system monitoring plug-in card: 3.2 W in total for all 4 digital outputs<br><br>Switching capacity when power is supplied by an external power supply delivering min. 12.8 - max. 24 V DC (+ 20%), connected to Uint / Uext and GND: 1 A, 12.8 - 24 V DC (depending on external power supply) for each digital output<br><br>The connection to the I/Os is established via the mating connector supplied. |
| (8) | **Antenna socket**<br>This is where the WLAN antenna is connected. |
| (9) | **Modbus termination switch (for Modbus RTU)**<br>Internal bus terminator with 120 ohm resistor (yes/no)<br><br>Switch in "on" position: 120 ohm terminating resistor active<br>Switch in "off" position: No terminating resistor active<br><br><br><br>**IMPORTANT!** On an RS485 bus, the terminating resistor on the first and last devices must be active. For a detailed description, see the installation instructions. |

**Schematic connection diagrams for I/Os**

**Power supplied by the system monitoring plug-in card:**
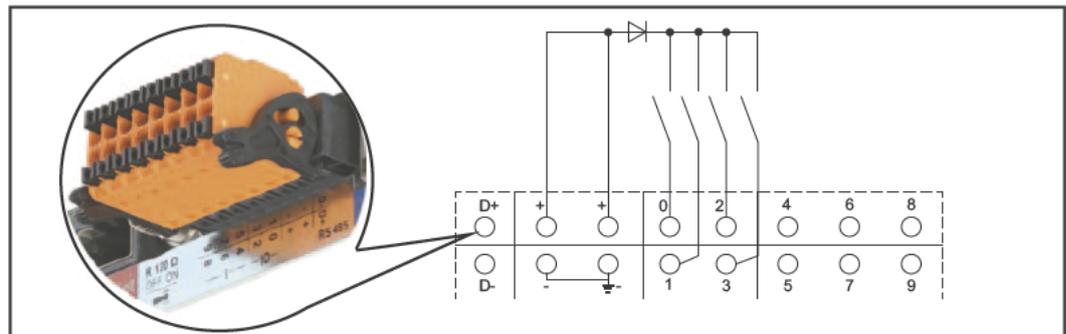


**Power supplied by an external power supply:**

12,8 - 24 V DC
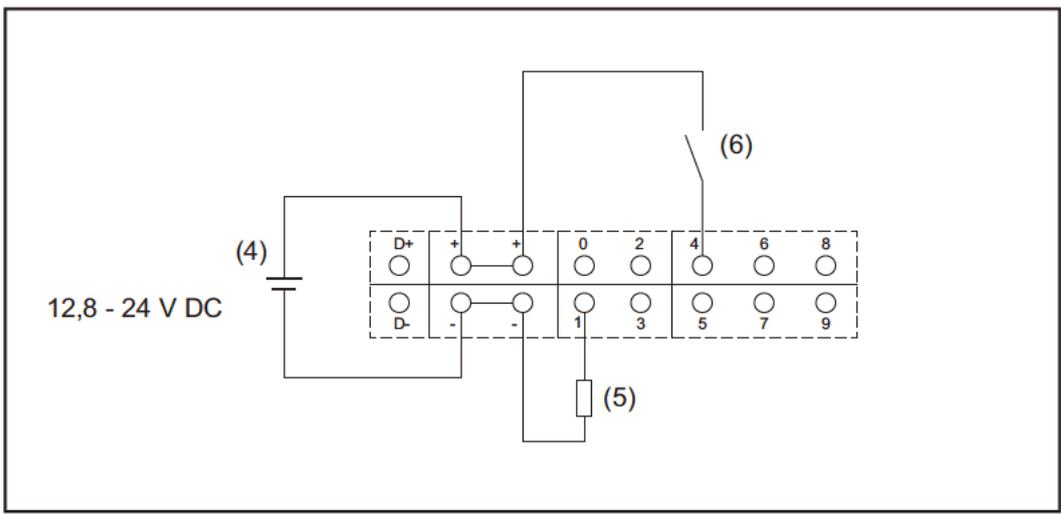
(5)     External power supply
(6)     Load
(7)     Switch

**NOTE!** If an external power supply is used, it must be electrically isolated.

# Fronius Symo Hybrid

**Controls and indicators**
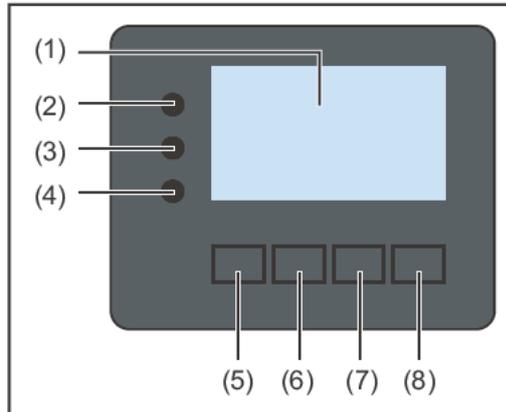


| Item | Description |
|------|-------------|
| (1) | Display<br>For displaying values, settings and menus |

**Monitoring and status LEDs**

| Item | Description |
|------|-------------|
| (2) | General status LED<br>Lights up steady:<br>- If a status code is being displayed on the monitor (red for error, orange for warning)<br>- If the process of feeding energy into the grid is interrupted<br>- During error handling (the inverter waits for an acknowledgement or for an error to be rectified) |
| (3) | Startup LED (orange)<br>Lights up steady:<br>- If the inverter is in its automatic startup or self-test phase (as soon after sunrise as the solar modules are delivering sufficient power)<br>- If the inverter has been switched to Standby mode in the Setup menu (= feeding energy into the grid switched off manually)<br>- If the inverter software is being updated |
| (4) | Operating status LED (green)<br>Lights up steady:<br>- If the PV system is working correctly after the inverter's automatic startup phase<br>- When system is feeding energy into the grid or is in Storage mode |

**Function keys – Allocated different functions depending on what has been selected:**

| Item | Description |
|------|-------------|
| (5) | "Left/up" key<br>For navigating to the left and up |
| (6) | "Down/right" key<br>For navigating down and to the right |
| (7) | "Menu/Esc" key<br>For switching to the menu level<br>For quitting the Setup menu |
| (8) | "Enter" key<br>For confirming a selection |

The keys operate capacitively. Exposure to water may impair their function. If necessary, wipe the keys dry with a cloth to ensure optimum functionality.

**Display**

The display is supplied with power via the AC grid voltage and via the PV and battery side. Depending on the setting selected in the Setup menu, the display can be kept on all day.

**IMPORTANT!** The display on the inverter is not a calibrated measuring device. A slight inaccuracy in comparison with the energy meter used by the utility company is intrinsic to the system. A calibrated meter will be needed to calculate the bills for the utility company.

| | |
|---|---|
| NOW | Menu item |
| AC Output Power | Parameter declaration |
| 1759 W | Display of values, units and status codes |
| ↑  ↓  ↱ | Function key functions |

*Display areas in Display mode*

| | |
|---|---|
| SETUP 💾 | Save symbol |
| Standby | Previous menu items |
| Relay | |
| Clock | Currently selected menu item |
| Display Setting | Next menu items |
| Energy Yield | |
| (*) ↑  ↓  ↱  ↵ | Function key functions |

(*)    Scroll bar

Save symbol – Appears briefly while the set values are being saved

# Fronius Solar Battery

**Battery manage-
ment module**
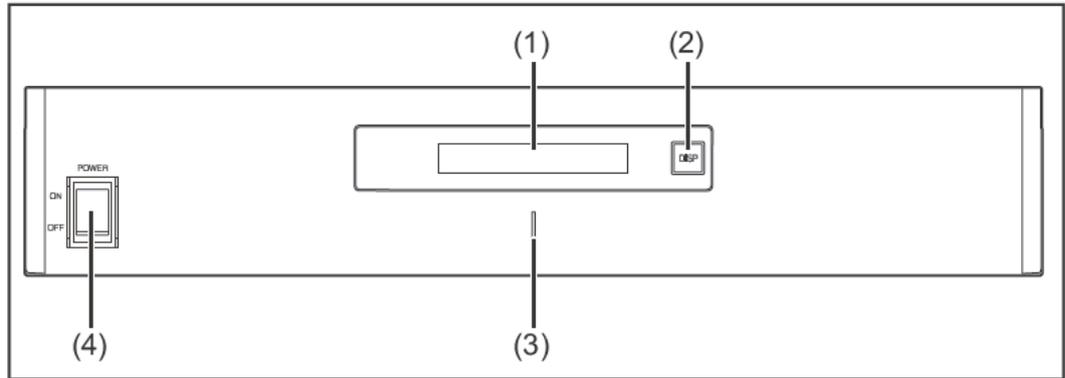


| (1) | **LCD display** |
| --- | --- |
| | Provides information about the status of a module (charging/discharging, total volt-age, total current strength, total remaining capacity, number of connected modules, remaining capacity of each module, voltage/temperature etc. of the cell block) |

| (2) | **DISP switch** |
| --- | --- |
| | Changes the information shown on the display |

| (3) | **Indicator LED** |
| --- | --- |
| | Normal status: Green |
| | Error: Flashing red |

| (4) | **POWER ON/OFF switch** |
| --- | --- |
| | POWER ON: Switches on battery modules and battery management module (operation) |
| | POWER OFF: Switches off battery modules and battery management module (power supply interrupted) |

**Battery module**
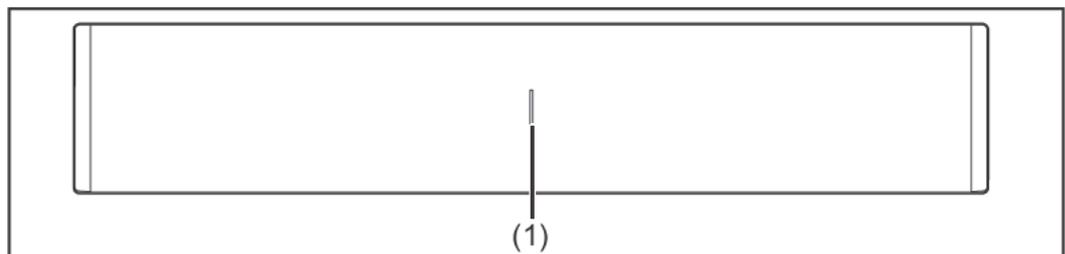


| (1) | **Indicator LED** |
| --- | --- |
| | Normal status: Green |
| | Error: Flashing red |

**Display**          Press the DISP key to display information.

Display switching diagram

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Display overall status of system

Display status of individual modules
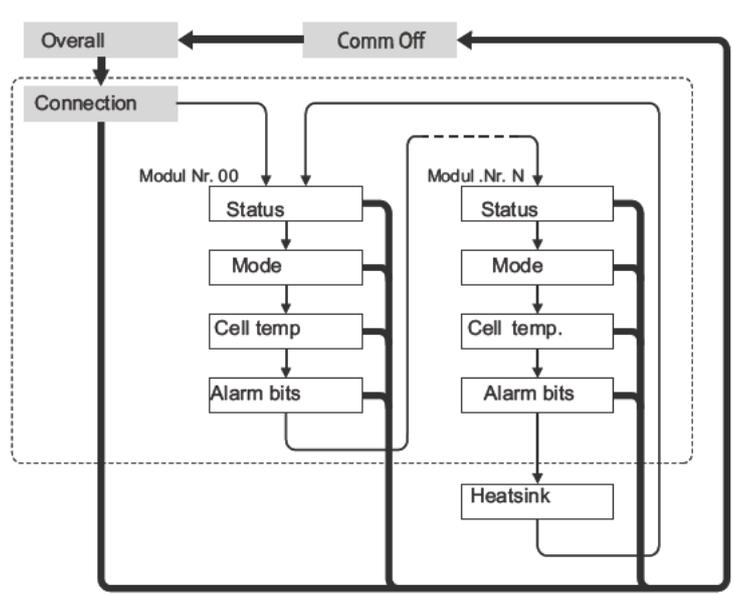


➡ Press and hold DISP key

→ Press DISP key

Nr.N. Means the nth storage module

Tips:
- Hold down DISP key for longer than 3 seconds
- Pressing the DISP key on the "Connection" display takes you back to the "Overall" display.
- "Comm Off Mode" is used for maintenance purposes.

**Display types**

**"Overall" display**
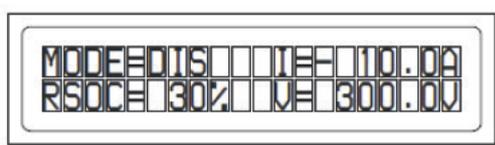


| Indicator | Details | Display |
|---|---|---|
| MODE | Charging/discharging and stop status | DIS: Discharging<br>CHG: Charging |
| RSOC | Remaining system capacity | 0% - 100% |
| I | Total system current strength | -999.9 A to +999.9 A |
| V | Total system voltage | 0.0 V to +999.9 V |

**"Connection" display**



| Indicator | Details | Display |
|---|---|---|
| UNIT | Number of connected modules | 1 - 16 |
| VER | Version | XXXX |

| | | |
|---|---|---|
| CON | Status of connected modules | In the above example, there are 6 connected modules (no. 00 - no. 05). |

**"Status" display**

```
M_NO=01
STAT=32[Normal Chg ]
```

| Indicator | Details | Display |
|---|---|---|
| M_NO | Number of modules displayed | 00 - 15 |
| STAT | Module status | YX (Y: Current status, X: Previous status)<br>1X [Pre Charge]: Pre-charging<br>2X [Initial]: Status at beginning<br>3X [Normal Chg]: Normal charging<br>4X [Terminate]: End charging<br>5X [Normal Dis]: Normal discharging<br>6X [Over Volt]: Overvoltage<br>7X [Over Dis]: Deep discharge<br>8X<br>9X [Over Temp C]: Overtemperature charging<br><br>AX [Over Curr C]: Overcurrent charging<br>BX [Over Temp D]: Overtemperature discharging<br>CX [Over Curr D]: Overcurrent discharging<br>DX [Unbalance]: Cell imbalance<br>EX [Chg Suspend]: Charging suspended<br>FX |

**"Mode, Current, SOC, Voltage" display**

```
M_NO=01      I=+ 10.0A
RSOC= 30%    V=  51.2V
```
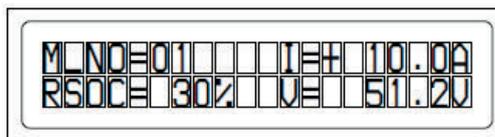
| Indicator | Details | Display |
|---|---|---|
| M_NO | Number of modules displayed | 00 - 15 |
| RSOC | Remaining module capacity | 0% - 100% |
| I | System module current strength | -999.9 A to +999.9 A |
| V | System module voltage | 0.0 V to +999.9 V |

**"Cell Temp., Cycle Count" display**

```
M_NO=01
CYCL=0001   T=+ 23.0C
```
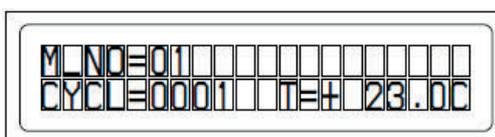
| Indicator | Details | Display |
|---|---|---|

| M_NO | Number of modules displayed | 00 - 15 |
| CYCL | Number of cycles | 0000 - 9999 |
| T | Average temperature of all cells | -99.9 °C to +99.9 °C |

**"Alarm bits" display**

```
M_NO=01
ALRM=0000[           ]
```

| Indicator | Details | Display |
|-----------|---------|---------|
| M_NO | Number of modules displayed | 00 - 15 |
| ALRM | Module status | 8000 [Over Volt]: Overvoltage<br>4000 [Terminate]: End charging<br>2000 [Under Volt]: Undervoltage<br>1000 [Over Curr]: Overcurrent<br>0800 [Over Temp]: Overtemperature<br>0400 [0]:<br>0200 [Resistor]: Resistor alarm<br>0100 [Unbalance]: Cell imbalance<br>**Details displayed if multiple alarms are triggered**<br>Example: If both "Over Current" and "Over Temp" are detected, the following message is displayed. A higher bit level takes priority over messages in brackets: "ALRM=1800 [Over Curr]" |

**"Heatsink Temp" display**

```
HEATSINK_TMP=+ 23C
```

| Indicator | Details | Display |
|-----------|---------|---------|
| HEAT-SINK_T-MP | Temperature of the heat sink | -40 °C to +119 °C |

**Data converter connections**
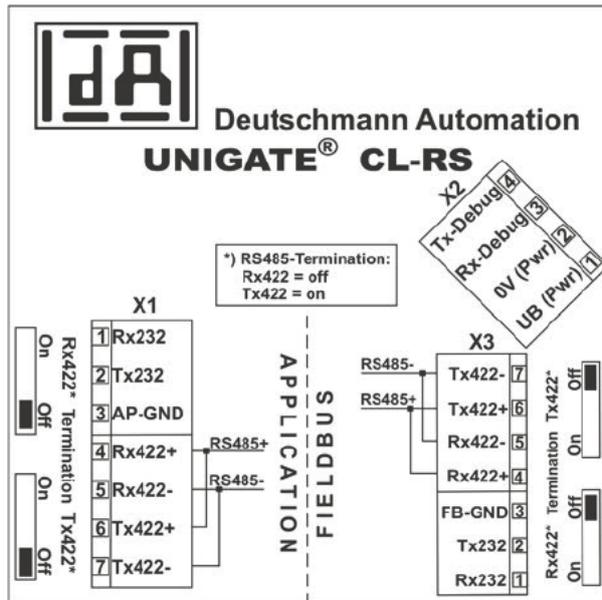


**Data converter controls and indicators**

Connection to Fronius Solar Battery    Connection to Fronius Symo Hybrid
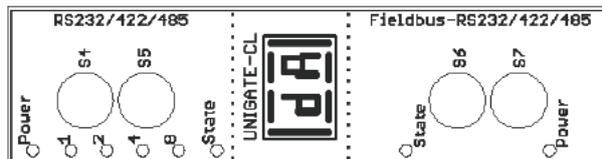


Factory settings:
S4 = 0x0 (hex) = 0000 (binary)
S5 = 0x0 (hex) = 0000 (binary)
S6 = 0x1 (hex) = 0001 (binary)
S7 = 0x4 (hex) = 0100 (binary)
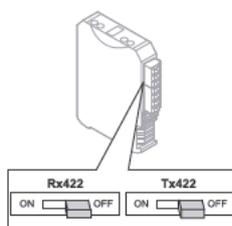


RS485 terminal
Rx422 = off
Tx422 = off

**Data converter LED displays**

The data converter features 8 LEDs, the meaning of which is explained below:

| Fronius Solar Battery RS232/422/485 | Fronius Symo Hybrid Fieldbus RS232/422/ 485 | | |
|---|---|---|---|
| Power LED | | Green | Supply voltage on storage side |
| LED 1/2/4/8 (Error No / Selected ID) | | Green | General gateway error |

| State LED | | | Red/green | General gateway error |
|-----------|-----------|-----------|-----------|-----------------------|
| | State LED | | Red/green | Inverter interface state |
| | Power LED | | Green | Inverter supply voltage |

**"Power" LED** (Fronius Solar Battery)
This LED is connected directly to the supply voltage of the 1st serial interface (electrical isolation is optionally available for this supply).

**"1/2/4/8 (Error No / Selected ID)" LED**
If these 4 LEDs and the "State" LED all light up steady red at the same time, the error number is indicated in binary format in accordance with the table in the "Troubleshooting" section.

**"State" LED** (Fronius Solar Battery)

| Steady green | Status OK |
|--------------|-----------|
| Flashing green | Status OK |
| Flashing green/red | Status OK |
| Steady red | General gateway error (see "Error No." LEDs) |
| Flashing red | Data converter is in Configuration/Test mode |

**"State" LED** (Fronius Symo Hybrid)

| Steady green | Initialised and started |
|--------------|-------------------------|
| Flashing green | Initialised |
| Flashing green/red | - |
| Steady red | General bus error (system error 10) |
| Flashing red | Starts to flash straight after "BusStart" -> Initialisation failed |
| | Starts to flash during actual operation -> Data error |

**"Power" LED (Fronius Symo Hybrid)**
This LED is connected directly to the supply voltage of the interface.

# Navigation at the menu level

**Activate display backlighting**

[1] Press any key

The display backlighting is activated.

There is an option under 'Display Settings' in the SETUP menu to set the display backlighting so that it is on all the time or off all the time.

**Automatic deactivation of display backlighting / choose 'NOW' menu item**

If no key is pressed for 2 minutes,
- the display backlighting switches off automatically and the inverter goes to the 'NOW' menu item (assuming the display backlighting is set to automatic).
- The selection of the 'NOW' menu item can happen from any position on the menu level with the exception of the item 'Standby' on the Setup menu.
- The amount of energy currently fed in is displayed.

**Open menu level**
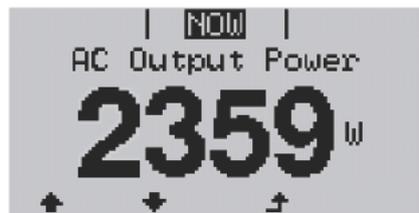


[1] Press the 'Menu' key
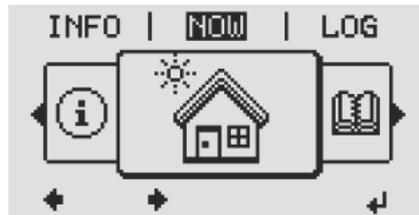
The display switches to the menu level.

[2] Use the 'Left' or 'Right' keys to select the desired menu item

[3] Press the 'Enter' key to select the desired menu item

The menu items
- **NOW** displays real-time values
- **LOG** data recorded today, during the current calendar year and since the inverter was first commissioned
- **GRAPH** Day characteristic displays a plot showing the power output during the day. The time axis is scaled automatically. Press the 'Back' key to close the display
- **SETUP** Setup menu
- **INFO** Information about the device and the software

**Values displayed under the NOW menu item**

| | |
|---|---|
| **Output power** (W) – Output power is displayed | |
| **AC reactive power** (VAr) | |
| **Grid voltage** (V) | |
| **Output current** (A) | |
| **Grid frequency** (Hz) | |
| **Solar voltage** (V) – Of U PV | |
| **Solar current** (A) – Of I PV | |
| **Time Date** – Time and date on inverter | |

**Values displayed under the LOG menu item**

**Energy fed in** (kWh / MWh)
Energy delivered by the inverter over the period in question

There may be discrepancies compared with values displayed on other measuring instruments because of differences in measuring methods. As far as the billing of the energy fed in is concerned, the only binding display values are those produced by the calibrated measuring instrument provided by the utility company.

**Max. output power** (W)
Largest amount of energy delivered by the inverter during the period in question

**Yield**
Amount of money earned during the period in question (currency and conversion factor can be selected in the Setup menu)

Like the "Energy fed in" figure, the yield figure may also exhibit discrepancies compared with other measured values.

The "Setup menu" section explains how to select a currency and charge rate.
The factory setting depends on the respective country setup.

**Max. AC Grid Voltage** (V)
Highest AC grid voltage measured during the period in question

**Maximum Solar Voltage** (V)
Highest solar module voltage measured during the period in question

**Operating Hours**
Length of time the inverter has been working (HH:MM)

**IMPORTANT!** In order for the day and year values to be displayed correctly, the time must be set accurately.

# Menu items in the Set-up menu

**Standby**        Manual activation / deactivation of Standby mode

- No energy is fed into the grid.
- The Startup LED will show steady orange.
- In Standby mode, no other menu item at menu level can be accessed or adjusted.
- The automatic switchover into the 'NOW' display mode after 2 minutes of keyboard in-activity does not occur.
- Standby mode can only be terminated manually by pressing the 'Enter' key.
- Feeding energy into the grid can be resumed at any time (deactivate 'Standby').

**Switching off Standby mode (manually switching off feeding energy into the grid):**

| 1 | Select the 'Standby' item
| 2 | Press the 'Enter' key

'STANDBY' and 'ENTER' appear alternately on the display.
Standby mode is now active.
The Startup LED shows steady orange.

**Resuming feeding energy into the grid:**

'STANDBY' and 'ENTER' appear alternately on the display when in Standby mode.

| 1 | Press the 'Enter' key to resume feeding energy into the grid

The 'Standby' menu item is displayed.
At the same time, the inverter enters the startup phase.
The operating state LED shows steady green when feeding energy into the grid has been resumed.

---

**Relay**        Activate relay, relay settings, relay test

    Setting range        Relay mode / Relay test / Switch-on point* / Switch-off point*

\* these are only shown if the 'E-Manager' function has been activated under 'Relay mode'.

**Relay mode**
for selecting the different functions of the floating switch contact in the data communication area:
- Alarm function
- Active output
- Energy-Manager

    Setting range        ALL / Permanent / OFF / ON / E-Manager
    Factory setting     ALL

    **Alarm function:**

| Permanent / ALL: | Switch the floating switch contact for permanent and temporary service codes (e.g. brief interruption to energy being fed into the grid, a service code occurs a certain number of times a day - can be adjusted in 'BASIC' menu) |

    **Active output:**

ON: The floating NO contact is on all the time the inverter is in operation (as long as the display is not dark and is displaying something).

OFF: The floating NO contact is off.

**Energy-Manager:**

E-Manager: Further details on the 'Energy-Manager' function may be found in the "Energy-Manager" section.

**Relay test**
Function test to determine whether the floating switch contact switches

**Switch-on point** (only if 'Energy-Manager' function is activated)
for setting the effective power limit beyond which the floating switch contact is switched on

| | |
|---|---|
| Factory setting | 1000 W |
| Setting range | Switch-off point - max. nominal output of inverter / W / kW |

**Switch-off point** (only if 'Energy-Manager' function is activated)
for setting the effective power limit beyond which the floating switch contact is switched off

| | |
|---|---|
| Factory setting | 500 |
| Setting range | 0 - Switch-on point / W / kW |

---

**Energy Manager (under Relay menu item)**

The "Energy Manager" function can be used to activate the floating switch contact in such a way that it functions as an actuator.
Thus, a consumer that is connected to the floating switch contact can be controlled by specifying a switch-on or switch-off point that depends on the feed-in power.

The floating switch contact is automatically switched off:
- If the inverter is not feeding any power into the grid
- If the inverter is manually switched to Standby mode
- If the effective power is set to < 10% of the nominal output

To activate the "Energy Manager" function, select "E-Manager" and press the "Enter" key. When the "Energy Manager" function is running, the "Energy Manager" symbol will appear in the top left corner of the display:

When the floating NO contact is off (open contact)

When the floating NO contact is on (closed contact)

To deactivate the "Energy Manager" function, select a different function and press the "Enter" key.

**Notes on setting up the switch-on and switch-off points**
The interface of the energy management relay always uses the output power of the inverter as a reference point, although this will not necessarily match what is generated by the PV system in the case of the hybrid system.
If the difference between the switch-on and switch-off points is too small, or if there are fluctuations in effective power, the result may be multiple switching cycles
To avoid frequent switching on and off, the difference between the switch-on and switch-off points should be at least 100 - 200 W.

When choosing the switch-off point, the power consumption of the connected consumer should be taken into account.

When choosing the switch-on point, the weather conditions and anticipated insolation should also be taken into account.

**Application example**
Switch-on point = 2000 W, switch-off point = 1800 W

If the inverter is outputting 2000 W or above, then the floating switch contact on the inverter is switched on.
If the inverter output falls to below 1800 W, the floating switch contact is switched off.

Possible applications:
Operating a heat pump or an air-conditioning system using as much self-generated power as possible

---

**Time / Date**     Set the time, date and automatic changeover between summer and winter time

| | |
|---|---|
| Setting range | Set time / Set date / Time display format / Date display format / Summer/winter time |

**Set time**
Set the time (hh:mm:ss or hh:mm am/pm – depending on the setting for the time display format)

**Set date**
Set the date (dd.mm.yyyy or mm/dd/yyyy - depending on the setting for the date display format)

**Time display format**
For specifying the time display format

| | |
|---|---|
| Setting range | 12hrs / 24hrs |
| Factory setting | Depends on country setup |

**Date display format**
For specifying the date display format

| | |
|---|---|
| Setting range | mm/dd/yyyy / dd.mm.yy |
| Factory setting | Depends on country setup |

**Summer/winter time**
Activate/deactivate automatic changeover between summer and winter time

| | |
|---|---|
| Setting range | on / off |
| Factory setting | on |

**IMPORTANT!** The time and date must be set accurately in order for the day and year values and for the day characteristic to be displayed correctly.

---

**Display settings**

| | |
|---|---|
| Setting range | Language / Night mode / Contrast / Illumination |

**Language**
Set language for display

Setting range                 German, English, French, Dutch, Italian, Spanish, Czech, Slo-
                              vak, etc.

**Night mode**
DATCOM night mode; controls DATCOM and display operation during the night or when
the DC voltage is insufficient

Setting range           AUTO / ON / OFF
Factory setting         OFF

AUTO:    DATCOM mode is always in effect whenever Fronius system monitoring is
         active.
         The display remains dark during the night, but can be activated by pressing
         any key.

ON:      DATCOM mode is always in effect. The inverter supplies 12 V continuously
         to power the Fronius Solar Net. The display is always active.

         **IMPORTANT!** If DATCOM night mode is set to ON or AUTO when there are
         Fronius Solar Net components connected, then the inverter's current con-
         sumption during the night will increase to around 7 W.

OFF:     **IMPORTANT!** If a battery has been connected to the system and activated,
         Night mode must not be set to OFF.

         DATCOM will not run at night, the inverter will not need any AC current in
         order to supply power to the internal communication system.
         The display is switched off during the night and the Fronius system monitor-
         ing datalogger is not available.

**Contrast**
Set the contrast on the display

Setting range           0 - 10
Factory setting         5

Since the contrast is temperature-dependent, it may be necessary to adjust the setting un-
der the "Contrast" menu item when the environmental conditions change.

**Illumination**
Initial setting for display illumination

The "Illumination" menu item only relates to the display backlighting.

Setting range           AUTO / ON / OFF
Factory setting         AUTO

AUTO:    The display backlighting is activated by pressing any key. If no key is
         pressed for 2 minutes, the display backlighting will go off again.
ON:      The display backlighting remains permanently on when the inverter is active.
OFF:     The display backlighting is permanently switched off.

**Energy yield**

Setting
- of an OFFSET value for the total energy display
- of a measuring offset factor for the day, year and total energy display
- of the currency
- of the feed-in tariff

| | |
|---|---|
| Setting range | Meter deviation / Meter calibration / Currency / Feed-in tariff |

**Meter deviation**
Input of a value for the fed-in energy that will be added to the energy currently fed in (e.g. carry-over value when replacing an inverter)

| | |
|---|---|
| Unit | Wh / kWh / MWh |
| Setting range | Five digits |
| Factory setting | 0 |

**Meter calibration**
Input of a correction value to ensure that the value shown on the inverter display corresponds with the calibrated display on the electricity meter

| | |
|---|---|
| Unit | % |
| Setting range | -5.0 - +5.0 |
| Factory setting | 0 |

**Currency**
Set the currency

| | |
|---|---|
| Setting range | 3 characters, A-Z |

**Feed-in tariff**
Set the remuneration rate for energy fed into the grid

| | |
|---|---|
| Setting range | 2 digits, 3 decimal places |
| Factory setting | (depends on country setup) |

---

**Fan**

To check that the fan is working correctly

| | |
|---|---|
| Setting range | Test fan #1 / Test fan #2 (depending on the device) |

- Use the 'Up' and 'Down' keys to select the desired fan
- Testing of the selected fan is initiated by clicking 'Enter'.
- The fan will continue to run until the operator exits the menu by pressing 'Esc'.

# SETUP menu item

| **Initial setting** | The inverter is pre-configured and ready to use. There is no need to enter any initial settings before using it to feed energy into the grid, as this is a fully-automated process. |
|---|---|
| | The SETUP menu item allows the initial settings of the inverter to be changed easily to bring it in line, as closely as possible, with the preferences and requirements of the user. |

| **Software updates** | **NOTE!** As a result of software updates, you may find that your device has certain functions that are not described in these operating instructions, or vice versa. Certain illustrations may also differ slightly from the actual controls on your device, but these controls function in exactly the same way. |
|---|---|

**Navigating the SETUP menu item**

**Entering the SETUP menu item**



◄ ► [1] At the menu level, use the 'Left' or 'Right' keys to select the 'SETUP' menu item

↵ [2] Press the 'Enter' key



The first entry under the SETUP menu item is displayed: 'Standby'

**Scrolling between the entries**
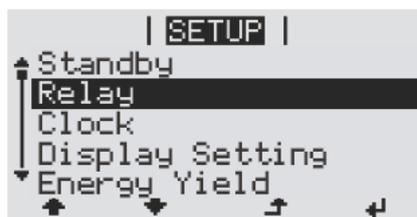


▲ ▼ [3] Use the 'UP' and 'Down' keys to move between the available entries

**Exiting an entry**
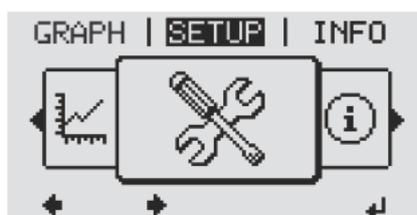


▲ [4] To exit a menu entry, press the 'Back' key

The menu level appears.

If no key is pressed for 2 minutes:
- The inverter switches from wherever it is on the menu level back to the 'NOW' display mode (exeption: 'Standby' Setup menu item).
- The display backlighting goes out.
- The amount of energy currently being fed in is displayed.

**Setting entries on the Setup menu, general**

1 Enter the SETUP menu item

2 Use the 'Up' or 'Down' keys to select the desired menu item
▲ ▼

3 Press 'Enter'
↵

**The first digit of a value to be set flashes:**

4 Use the 'Up' or 'Down' keys to select a value for the first digit
▲ ▼

5 Press 'Enter'
↵

The second digit of the value flashes.

6 Repeat steps 4 and 5 until ...

the whole value to be set flashes.

7 Press 'Enter'
↵

8 Repeat steps 4 - 6 as required for units or other values that are to be set until the appropriate unit or the value flashes.

9 Press the 'Enter' key to save and apply the changes.
↵

To discard the changes, press the 'Esc' key.
↰

The currently selected menu item is displayed.

**The available settings are displayed:**

4 Use the 'Up' or 'Down' keys to select the desired setting
▲ ▼

5 Press the 'Enter' key to save and apply the setting.
↵

To discard the setting, press the 'Esc' key.
↰

The currently selected menu item is displayed.

**Application example: Setting the time**

| SETUP |
▲ Standby
  Relay
  **Clock**
  Display Setting
▼ Energy Yield
  ▲   ▼   ↰   ↵

▲ ▼   1 Select "Time / Date" from the Setup menu.

↵   2 Press the "Enter" key.

An overview of the values that can be changed is displayed.

⬆ ⬇ ③ Use the "Up" or "Down" keys to select "Set time".

↵ ④ Press the "Enter" key.

The current time appears.
(HH:MM:SS, 24-hour clock),
the "tens" digit for the hour will flash.

+ − ⑤ Use the "Up" and "Down" keys to select a value for the "tens" digit of the hour.

↵ ⑥ Press the "Enter" key.

The "units" digit for the hour will flash.

⑦ Repeat steps 5 and 6 to set the "units" digit for the hour, for the minutes and for the seconds until...

the set time starts flashing.

↵ ⑧ Press the "Enter" key.

The time is applied and the overview of values that can be changed is displayed.

⬆ ④ Press the "Esc" key.
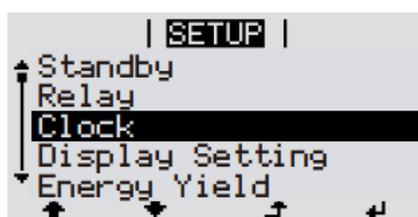
The "Time / Date" item on the Setup menu appears.

# The INFO menu item

**Measured values**

**PV ins.**
Insulation resistance of the photovoltaic system and the storage system

**Ext. lim.**
External power reduction in per cent e.g. specified by grid operator

**U PV**
Current PV voltage on the terminals even if the inverter is feeding in no power whatsoever

**GVDPR**
Grid voltage-dependent power reduction

**Fan #1**
Percentage of target output for fan

**PSS status**

The status of the most recent inverter fault can be displayed.

**IMPORTANT!** Due to the low level of insolation early in the morning and in the evening, the status codes 306 (Power low) and 307 (DC low) are displayed routinely at these times of day. These status codes do not indicate any kind of fault.

- Press the 'Enter' key to see the status of the power stage set and the most recent fault
- Use the 'Up' and 'Down' keys to scroll through the list
- Press the 'Back' key to close the status and fault list

**Grid status**

The five most recent grid faults can be displayed:
- Press the 'Enter' key to see the five most recent grid faults
- Use the 'Up' and 'Down' keys to scroll through the list
- Press the 'Back' key to close the grid fault display

**Device information**

For displaying the settings that will be of relevance to a utility company. The values shown will depend on the country setup or the device-specific settings of the inverter.

| | |
|---|---|
| Display area | General / Country-specific setting / MPP Tracker / Grid monitoring / Grid voltage limits / Grid frequency limits / Q-mode / AC power limit |
| General: | Device type<br>Fam. |
| Country-specific setting: | Setup<br>Specified country setup<br><br>Version<br>Version of country setup<br><br>Group<br>Group for updating the inverter software |
| MPP Tracker: | PV Tracker |

| | |
|---|---|
| Grid monitoring: | **GMTi**<br>Start-up time of inverter in s<br><br>**GMTr**<br>Reconnection time in s following a grid fault<br><br>**ULL**<br>Mean grid voltage over 10 minutes in V<br><br>**LLTrip**<br>Trip time for long-term voltage monitoring |
| Grid voltage limits: | **UILmax**<br>Upper inner grid voltage in V<br><br>**UILmin**<br>Lower inner grid voltage in V |
| Grid frequency limits: | **FILmax**<br>Upper inner grid frequency in Hz<br><br>**FILmin**<br>Lower inner grid frequency in Hz |
| Q-mode: | Current cos phi power factor setting<br>(e.g. Constant Cos(phi) / Constant Q / Q(U) characteristic / etc.) |
| AC power limit: | Max. P AC<br>Manual power reduction |
| AC voltage derating: | **Status**<br>ON / OFF – Voltage-dependent power reduction<br><br>**GVDPRe**<br>Threshold at which the voltage-dependent power reduction begins<br><br>**GVDPRv**<br>Reduction gradient used to reduce the power, e.g.: 10% per volt above the GVDPRe threshold<br><br>**Message**<br>Activates the sending of an info message via Fronius Solar Net |
| Fault Ride Through: | Status – default setting: OFF<br>If the function is activated, the inverter does not switch off immediately in the event of a short-term AC voltage dip (outside of the limits specified by the grid supplier), but instead continues to feed in power for a defined period.<br><br>DB min – Default setting: 90%<br>"Dead Band Minimum" setting in per cent<br><br>DB max – Default setting: 120%<br>"Dead Band Maximum" setting in per cent<br><br>k-Fac. – Default setting: 0 |

**Version** — Displays the version and serial numbers of the PC boards in the inverter (e.g. for service purposes)

| Display area | Display / Display Software / Integrity Checksum / Memory Card / Memory Card #1 / Power Stage / Power Stage Software / EMI Filter / Power Stage #3 / Power Stage #4 |
|---|---|

# Switching the key lock on and off

**General**

The inverter has a key lock function.
When the key lock is active, the Setup menu is not accessible, i.e. the setup data cannot be changed accidentally (or maliciously).
The code 12321 has to be entered in order to activate / deactivate the key lock.

**Switching the key lock on and off**

INFO | NOW | LOG

1. Press the 'Menu' key

The menu level appears.

2. Press the unassigned 'Menu / Esc' key
5 times

"Access Code" is displayed in the "CODE" menu; the first digit starts flashing.

| CODE |
Access Code
0000

3. Enter the code 12321: use the 'Up' and 'Down' keys to select a value for the first digit of the code.

4. Press the 'Enter' key

The second digit starts flashing.

| CODE |
Acess Gode
12321

5. Repeat steps 3 and 4 for the second, third, fourth and fifth digit of the access code until ...

the selected code starts flashing.

6. Press the 'Enter' key

'Key Lock' is displayed in the 'LOCK' menu.

| LOCK |
Setup Menu Lock
OFF

7. Use the 'Up' and 'Down' keys to turn the key lock on or off:

ON = key lock is on (the Setup menu is not accessible)

OFF = key lock is off (the Setup menu is accessible)

8. Press the 'Enter' key

# The Basic menu

**Access the Basic menu**
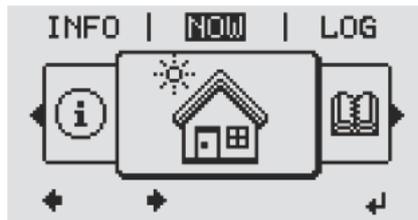


☝ **1** Press the "Menu" key

The menu level appears.

**2** Press the unassigned 'Menu / Esc' key
5 times

'Access Code' is displayed in the 'CODE' menu; the first digit starts flashing.



+ − **3** Enter the code 22742: Use the 'Up' and 'Down' keys to select a value for the first digit of the code

↵ **4** Press 'Enter'

The second digit flashes.



**5** Repeat steps 3 and 4 for the second, third, fourth and fifth digit of the access code until...

the selected code starts flashing.

↵ **6** Press 'Enter'

The Basic menu appears.

+ − **7** Use the 'Up' or 'Down' keys to select the desired menu item

↵ **8** Press the 'Enter' key to open the desired menu item

☝ **9** Press the 'Esc' key to exit the Basic menu

**Items on the Basic menu**

The Basic menu is used to set the following parameters, which are important for installing and operating the inverter:

**MPP Tracker 1**
- DC operating mode: MPP AUTO / FIX / MPP USER
    - MPP AUTO: Normal operating status; the inverter automatically searches for the ideal operating point
    - FIX: For entering a fixed DC voltage at which the inverter will operate
    - MPP USER: For entering a lower MP voltage above which the inverter will search for its ideal operating point
- Dynamic Peak Manager: ON / OFF
- Fixed voltage: For entering a fixed voltage (150 - 800 V)
- MPPT start voltage: For entering the start voltage (150 - 800 V)

**Input signal**
- How it works: Ext Sig. / S0-Meter / OFF
  only with the Ext Sig function selected :
  - Triggering method: Warning (Warning shown on display) / Ext. Stop (inverter switches off)
  - Connection type: N/C (normally closed contact / N/O (normally open contact)

**SMS / relay**
- Event delay
  For entering the time delay after which an SMS is sent or the relay is to switch
  900 - 86400 seconds
- For entering the number of events that lead to signalling:
  10 - 255

**Insulating warning**
- Insulating warning ON / OFF
- Threshold warning: For entering a threshold that leads to a warning
- Both the PV system and the Fronius Solar Battery are monitored.

**Temperature warning**
For activating/deactivating the overtemperature warning for each event
ON / OFF

**TOTAL Reset**
Under the LOG menu item, this setting resets the max. and min. voltage values and the max. power of feeding in to zero.
Once the values have been reset, this action cannot be undone.

To reset the values to zero, press the "Enter" key.
„CONFIRM" is displayed.
Press 'Enter' again.
The values are reset and the menu is displayed.

# Fronius system monitoring

# General

**General remarks**

The Fronius system monitoring feature is a networked datalogger that manages to combine the functions of the Fronius Com Card, the Fronius Datalogger Web, the Fronius Power Control Card and the Fronius Modbus Card on a single plug-in card.
The Fronius system monitoring web page offers a rapid overview of the photovoltaic system.
It can be accessed via a web browser when there is a direct connection or – if configured to support an indirect connection – over the Internet.
Fronius system monitoring is easy to configure and provides automatic alerts. Alerts can be sent via SMS or e-mail.

If the feature is used in conjunction with Fronius Solar.web, current data and archive data can be accessed for a particular photovoltaic system via the Internet or the Fronius Solar.web App without the need for any laborious configuration work. Fronius system monitoring automatically sends the data to Fronius Solar.web.

**Prerequisites for operation**

So that data can be exchanged smoothly over the Internet, you must have a suitable Internet connection:
- For wired Internet solutions, Fronius recommends a download speed of at least 512 kbit/s and a minimum upload speed of 256 kbit/s.
- For solutions that rely on mobile Internet services, Fronius recommends 3G transmission as a minimum, plus a reliable signal.

Even if these specifications are adhered to, there is still no guarantee that everything will run smoothly.
High error rates during transmission, variable reception conditions or transmission dropouts can all have a detrimental effect on the online functionality of Fronius system monitoring.
Fronius recommends testing any connections that meet the minimum requirements locally.

# General information for the network administrator

**Prerequisites**

👉 **NOTE!** Knowledge of networking systems is required in order to configure Fronius system monitoring for the network.

If you are integrating Fronius system monitoring into an existing network, you must adapt the address settings in line with the network.

For example: Network address space = 192.168.1.x, subnet mask = 255.255.255.0

- An IP address of between 192.168.1.1 and 192.168.1.254 must be assigned to Fronius system monitoring.
- The selected IP address must not be in use on the network already.
- The subnet mask must match that of the existing network (e.g. 255.255.255.0).

If you want Fronius system monitoring to send service messages or to transmit data to Fronius Solar.web, you must enter a gateway address and a DNS server address. Fronius system monitoring uses the gateway address for the purpose of establishing an Internet connection. An example of a suitable gateway address would be the IP address of the DSL router.

**IMPORTANT!**
- Fronius system monitoring must never be assigned the same IP address as the PC/ laptop itself!
- Fronius system monitoring is not capable of connecting to the Internet on its own. In the case of a DSL connection, a router has to establish the Internet connection.

**General firewall settings**

So that the various functions offered by Fronius system monitoring can be performed, you must make the following firewall settings:

|  | 49049/UDP output | 15015/TCP input | 80/TCP input |
|---|---|---|---|
| Sending of service messages | x | - | - |
| Connection to Fronius system monitoring established via Fronius Solar.web | x | - | - |
| Connection to Fronius system monitoring established via Fronius Solar.access | - | x | x |
| Ability to access the Fronius system monitoring web page | - | - | x |

Service messages are sent via Fronius Solar.web.

Configure the firewall so that data can be sent from the Fronius system monitoring IP address to port 49049/UDP of "fdmp.solarweb.com".

DSL routers usually allow data to be sent to the Internet anyway and so do not normally have to be configured for this purpose.

To enable access to the web interface of Fronius system monitoring from outside the LAN:
- Configure the network router so that requests on port 80/TCP are forwarded to Fronius system monitoring.

**Using Fronius So-
lar.web and send-
ing service
messages**

An Internet connection is required if you want to use Fronius Solar.web or to send service
messages.

Fronius system monitoring is not capable of connecting to the Internet on its own. In the
case of a DSL connection, a router has to establish the Internet connection.

# Installing Fronius system monitoring – Overview

**Safety**

⚠️ **WARNING!** Operating the equipment incorrectly can cause serious injury and damage. Do not use the functions described until you have thoroughly read and understood the following documents:
- these operating instructions
- all the operating instructions for the system components, especially the safety rules

👉 **NOTE!** Knowledge of networking systems is required in order to install Fronius system monitoring.

**Using for the first time**

👉 **NOTE!** The Fronius Solar.web App makes it much easier to set up Fronius system monitoring when using it for the first time.
The Fronius Solar.web App is available in the relevant App store.

GET IT ON Google play    Download on the App Store

Alternatively,

„https://wizard.solarweb.comvisit "https://wizard.solarweb.com".

**IMPORTANT!** In order to establish a connection to Fronius system monitoring, the end device in question (e.g. laptop, tablet, etc.) must be set up as follows:
- "Obtain IP address automatically (DHCP)" must be activated.

**1** Switch the device to Service mode.
- Activate the WIFI access point via the Setup menu on the inverter.

| SETUP |
Standby
WiFi Access Point
Relay
Clock
Display Setting
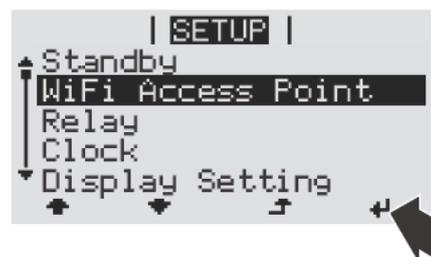
The inverter establishes the WLAN access point. The WLAN access point remains open for 1 hour.

**Installation using the Solar.web App**

2 | Download the Fronius Solar.web App.



3 | Run the Fronius Solar.web App.

**Installation using a web browser**

2 | Connect the end device to the WLAN access point.

SSID = FRONIUS_239.xxxxx (4 - 8 digits)
- Search for a network with the name "FRONIUS_239.xxxxx".
- Establish a connection to this network.
- Enter the password 12345678.

(Alternatively, connect the end device and inverter using an Ethernet cable.)

3 | Enter the following in the browser: http://datamanager
or
192.168.250.181 (IP address for WLAN connection)
or
169.254.0.180 (IP address for LAN connection).

The Setup wizard start page is displayed.
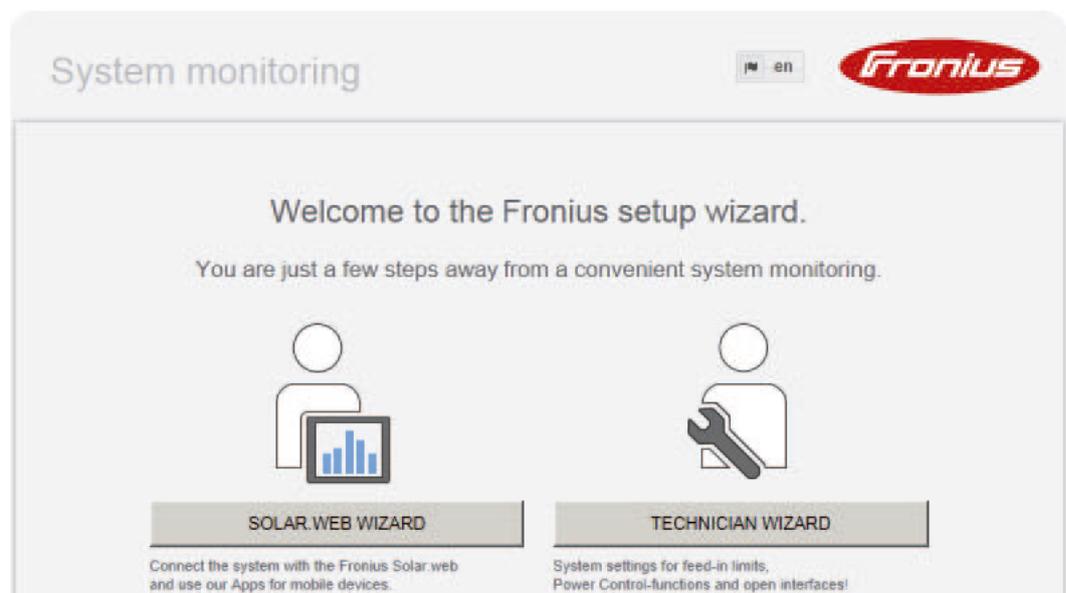


If you run the technician wizard, always remember to make a note of the assigned service password. This service password is necessary for making settings in the "System overview" and "EVU Editor" [UC Editor] menus as well as for advanced battery settings.
If the technician wizard is not run, no specifications regarding power reduction are set and hybrid mode is not possible (charging and discharging of the Fronius Solar Battery).

4 | Run the technician wizard and follow the instructions.

5 | Run the Solar Web wizard and follow the instructions.

The Fronius Solar.web homepage
or
the Fronius system monitoring web page is displayed.

**Information to help you work through the Solar Web wizard**



**(1)  PV power:**

If there is no solar module connected to the Fronius Symo Hybrid, the PV power option must be deactivated. The connected PV power must be entered in the field underneath.

**(2)  Battery:**

If a Fronius Solar Battery is connected to the Fronius Symo Hybrid, it must be activated here.

This setting can only be made when there is an active connection to the Fronius Solar Battery. If you are unable to make this setting, check whether the Fronius Solar Battery is switched on and whether the data connection has actually been established.
If there is a connection, the current state of charge of the Fronius Solar Battery will be indicated underneath the battery symbol.

**(3)  battery charging from UC grid:**

If you want the Fronius Solar Battery to be charged from the public grid, you can activate this here. Depending on what is required by standards or the feed-in tariff rules, it may be necessary to disable the setting.
This setting does not affect the charging of the Fronius Solar Battery by other producers within the home. It merely relates to the process of drawing charging energy from the public grid.
**Important!** Regardless of this setting, any charging from the public grid that is required for service reasons (e.g. to protect against deep discharge) is still performed.

**(4)** **battery charge from producers in the home network:**

If further decentralised producers are installed in the household and have been integrated into the self-consumption rule for the Fronius Symo Hybrid, you must activate this setting. This means that energy can be drawn from the home network and fed into the Fronius Solar Battery via the Fronius Symo Hybrid for the purpose of charging it.

You can restrict how much power is consumed by the Fronius Symo Hybrid by specifying a maximum AC power value (AC max.). The maximum power consumption is limited to the AC nominal output of the Fronius Symo Hybrid.

**(5)** **Meter:**

To ensure smooth operation in conjunction with other energy producers, it is important to install the Fronius Smart Meter at the feed-in point. The Fronius Symo Hybrid and other producers must be connected to the public grid via the Fronius Smart Meter.

This setting also affects how the Fronius Symo Hybrid behaves overnight. If the function is deactivated, the inverter switches to Standby mode as soon as there is no more PV power available, provided that no energy management command is sent to the battery (e.g. minimum state of charge reached). The message "Power low" is displayed. The inverter restarts as soon as an energy management command is sent or there is sufficient PV power available.

If the function is activated, the inverter remains permanently connected to the grid so that energy can be drawn from other producers at any time.

Once you have worked your way through the Solar Web wizard, an automatic process is triggered to calibrate all the components. This involves charging the Fronius Solar Battery fully. After that, the system automatically starts in the set operating mode.
This calibration charging process is also performed automatically during actual operation after a number of charging and discharging cycles.

If the "battery charging from UC grid" setting is deactivated, this calibration charging process relies exclusively on energy from the photovoltaic system. Depending on the insolation conditions and size of the systems concerned, the charging process can take a very long time.
If the "battery charging from UC grid" setting is activated, the calibration charging process is performed by drawing a constant current from the photovoltaic system and utility company grid.

**Important!** The automatic process for fully charging the battery may result in energy being drawn from the utility company grid. The process can take several hours and cannot be aborted.

# Connecting to Fronius system monitoring via a web browser

**General remarks**

A connection to Fronius system monitoring via a web browser is the ideal choice if there are lots of PC users who need to access the latest system values over the same LAN (e.g. company networks, schools, etc.).

The Fronius system monitoring web page shows the current power flow in the hybrid system.

**Prerequisites**

- LAN or WLAN connection as a minimum
- Web browser (e.g. Microsoft Internet Explorer IE >/= 9.0, Firefox 4, Google Chrome 27.0, etc.)
- PC/laptop on the same network segment as Fronius system monitoring

**Establishing a connection to Fronius system monitoring via a web browser**

1 Open the web browser.

2 In the address field, enter the IP address or the host name and domain name of the Fronius system monitoring datalogger.

The Fronius system monitoring web page appears.
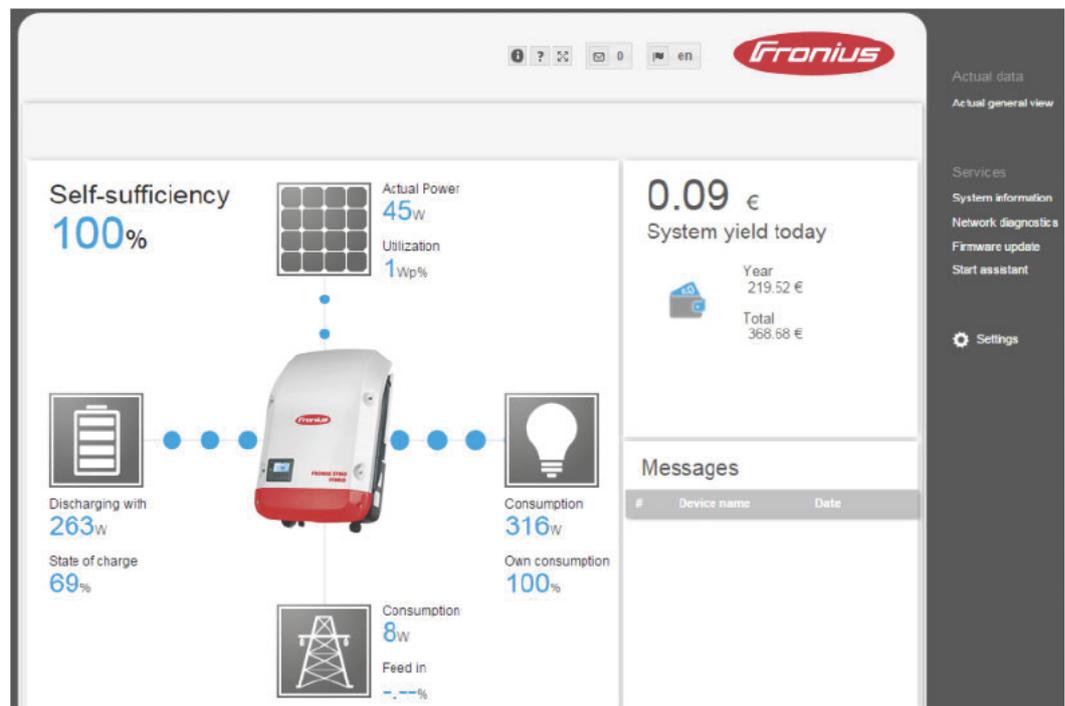
# Connecting to Fronius system monitoring established via the Internet and Fronius Solar.web

**General remarks**

Archive and current data for a photovoltaic system can be accessed from anywhere in the world (provided that you have Internet access) by setting up a connection to Fronius system monitoring via the Internet and Fronius Solar.web.

With this setup, you can also invite other users to view the photovoltaic system data as guests and you can compare several systems with one another.

**Functional description**

Fronius system monitoring is connected to the Internet (e.g. via a DSL router). Fronius system monitoring logs into Fronius Solar.web at regular intervals and sends the saved data on a daily basis.

Fronius Solar.web can actively make contact with Fronius system monitoring, e.g. for the purpose of displaying up-to-date data.

**Prerequisites**

- Internet access
- Web browser

    **IMPORTANT!** Fronius system monitoring is not capable of connecting to the Internet on its own. In the case of a DSL connection, a router has to establish the Internet connection.

- The photovoltaic system must be registered with Fronius Solar.web.

- Current data can only be accessed in Fronius Solar.web if "Send actual data to Fronius Solar.web" is set to "Yes" under "Fronius Solar.web" in the settings for Fronius system monitoring.

- In order for archive data to be accessed in Fronius Solar.web, "Send archive data to Fronius Solar.web" must be set to "daily" or "hourly" for Fronius system monitoring.

**Accessing Fronius system monitoring data via the Internet and Fronius Solar.web**

To use Fronius Solar.web for the purpose of accessing current data and archive data recorded by Fronius system monitoring, proceed as follows:

1   Start Fronius Solar.web: http://www.solarweb.com

For detailed information on Fronius Solar.web, see the online help system.

# Current data, services and settings offered by Fronius system monitoring

# The Fronius system monitoring web page

**Fronius system monitoring web page – Overview**

The Fronius system monitoring web page shows the following data:

(1)   Additional setting options

(2)   System overview: Indication of current power flow on hybrid system

(3)   System yield overview

(4)   Overview of recent status codes

(5)   System information, network diagnostics, firmware update

(6)   The Settings menu
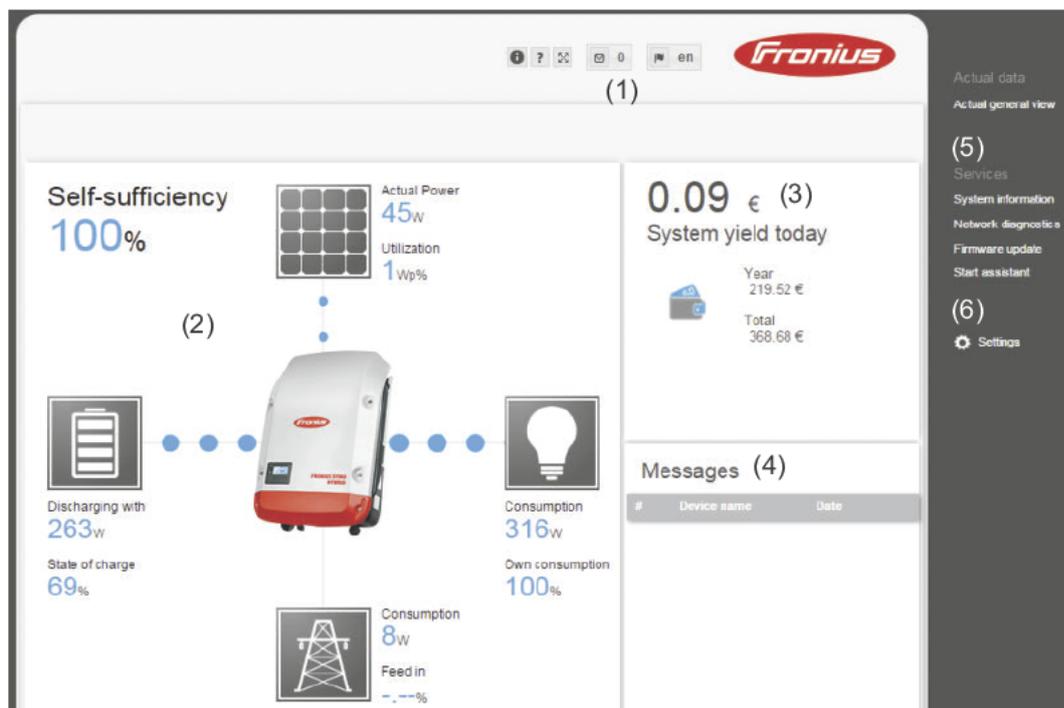


**The Settings menu**

When you click "Settings", the Settings menu appears on the Fronius **system monitoring web page.**
The "Settings" menu is where you configure Fronius system monitoring.

## Setting and viewing "General" menu items

GENERAL *

| PASSWORDS |
| NETWORK |
| FRONIUS SOLAR.WEB |
| SERVICE MESSAGES |
| IO MAPPING |
| ENERGY MANAGER |
| PUSH SERVICE |
| MODBUS |
| BATTERY MANAGEMENT |
| SYSTEM OVERVIEW ** |
| DNO EDITOR ** |
| BATTERY ** |

**1** Establish a connection to Fronius system monitoring.

**2** Click "Settings".

**3** Click the required menu item.

The relevant menu item opens.

**4** View the menu item or edit it as required.

**5** If applicable, click the button for implementing the setting (e.g. Save, Synchronise, etc.)

The edited data is applied.

\*     Selected menu item

\*\*    These menu items are protected by the service password. Settings within these menus may affect the functionality of the inverter.

---

**Additional setting options**

On the Fronius system monitoring web page, the following additional setting options are available on the top right-hand side:

| | |
|---|---|
| **ℹ** | System information: Datalogger ID, software version, hardware version, Fronius Solar.web connection |
| **?** | Help: <br> - Commissioning the LAN <br> - Commissioning the WLAN <br> - Software operating instructions <br> - Fronius Solar channel |
| **⤢** | Expand contents: Hides the area containing the Actual data/Settings menus |
| **✉ 0** | Display messages |
| **⚑ de** | Language: For setting the language |

The Fronius system monitoring web page is either displayed in the same language as the current browser or in the language that was last selected.

# Services – System information

**System informa-**
**tion**

——————— System information ———————

| | |
|---|---|
| Datalogger ID | 239.xxxxx |
| Circuit board version | 2.4D |
| Software version | 3.3.5-22 |
| System time | Oct 21 2014, 12:06:29 CEST |
| Uptime | 3 d, 23 h, 48 min, 34 sec. |
| User agent | Mozilla/5.0 (compatible; MSIE 9.0; Windows NT 6.1; WOW64; Trident/5.0; SLCC2; .NET CLR 2.0.50727; .NET CLR 3.5.30729; .NET CLR 3.0.30729; Media Center PC 6.0; .NET4.0C; .NET4.0E) |
| Gateway | |
| DNS server | |
| LED states | ✔ ✘ 🌐 📡 |

| **LAN interface** | |
|---|---|
| IP address | |
| Subnet mask | 255.255.255.0 |
| MAC address | 00:03:AC:01:BF:49 |

| **WLAN interface** | |
|---|---|
| IP address | |
| Subnet mask | |
| MAC address | 00:06:C6:41:27:D3 |

| **GPIO** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| IO-Name | I/O0 | I/O1 | I/O2 | I/O3 | I4 | I5 | I6 | I7 | I8 | I9 |
| IO-Direction | OUT | OUT | IN | IN | IN | IN | IN | IN | IN | IN |
| IO-State | off | off | off | off | off | off | off | off | off | off |

Note: This device contains open source software.
For detailed information about the software being used and the requirements of the corresponding source code, please contact Fronius Tech Support.

| Datalogger restart | (1) | Reset to factory settings | (2) |
|---|---|---|---|

◉ All settings except for the network (3)
○ All settings (4)

(1)     "Datalogger restart" button
        For restarting Fronius system monitoring

(2)     "Reset to factory settings" button

(3)     "All settings except for the network" option
        For resetting Fronius system monitoring to the factory settings.
        The network settings and all the items protected by the service user (EVU Editor, meter settings and the service password) are retained.

(4)     "All settings" option
        For resetting Fronius system monitoring and the network settings to the factory settings.
        All the items protected by the service user (EVU Editor, meter settings and the service password) are retained.

**IMPORTANT!** If Fronius system monitoring is reset to the factory settings, it is essential to check the time and date settings.

# Services – Network diagnostics

**Network diagnos-tics**

Under Services / Network diagnostics, you will find various functions that are useful for diagnosing and resolving network problems. You can execute ping and traceroute commands.
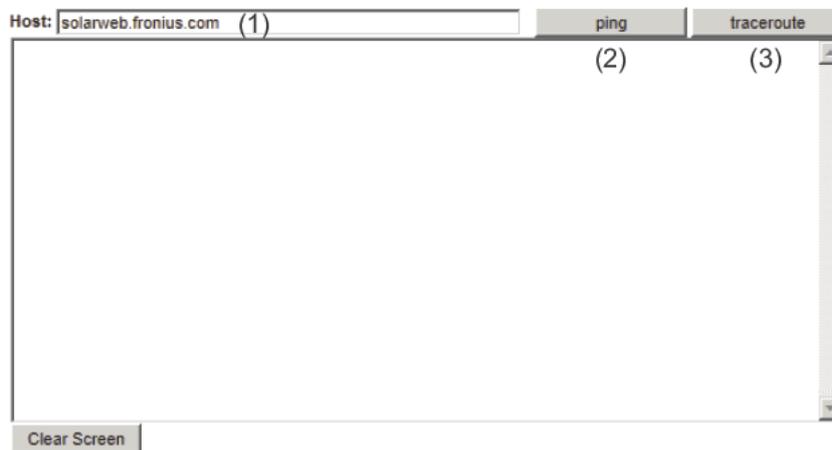


**Ping command**

A ping command allows you to check whether a host can be reached and how long the data transfer process takes.

Sending a ping command:

**1** Enter a host name or an IP address in the "Host:☐" field (1).

**2** Click the "ping" button (2).

- The ping command is sent.
- The identified data is displayed.

**Traceroute command**

You can use a traceroute command to determine which intermediate stations the data passes through on its way to the host.

Sending a traceroute command:

**1** Enter a host name or an IP address in the "Host:☐" field (1).

**2** Click the "traceroute" button (3).

- The traceroute command is sent.
- The identified data is displayed.

# Services – Firmware update

**General remarks**  The firmware of the Fronius system monitoring datalogger can be updated under Services / Firmware update. A firmware update can be performed via a LAN or over the Web.

**Configuration**

(1) ☑ Automatic update search  [ check now ]  (2)
(3) ☑ allow installing Updates automatically
     daily at  [ 15 ]  :  [ 00 ]

(4) ☐ Use proxy server for Web update

**Update**
            (6)
(5) ◉ Update via Web   ○ Update via LAN

[ Run update ]  (7)

(1)     Automatic update search
(2)     "check now" button (search manually for updates)
(3)     allow installing Updates automatically daily at
(4)     Use proxy server for Web update

(3) ☑ Use proxy server for Web update
(3a) Proxy server:  [ http:// ]
(3b) Port:          [ 8080 ]
(3c) User:          [          ]
(3d) Password:      [          ]

(3a)     Field for entering the proxy server
(3b)     Field for entering the port
(3c)     Field for entering the user
(3d)     Field for entering the password

(5)     Update via Web
(6)     Update via LAN

        ○ Update via Web   ◉ Update via LAN
                        (5)

(5a)   IP address of your computer:  [   ] . [   ] . [   ] . [   ]

(5a)     Field for entering the IP address

(7)     "Run update" button
        For starting the update process

**Searching for updates automatically**  **IMPORTANT!** An Internet connection is required to use the "Automatic update search" function.

If the "Automatic update search" (1) option is activated, Fronius system monitoring automatically searches for updates once a day. If new updates are available, a corresponding message is displayed alongside the additional setting options on the Fronius system monitoring web page.

## Firmware Update

Configuration

(1)  ☑ Automatic update search    [check now]

---

**Searching for updates manually**

If the "Automatic update search" option is deactivated, the system does not search for updates automatically.

[1] To search for updates manually, press the "check now" button (2).

## Firmware Update

Configuration

☐ Automatic update search    [check now]    (2)

---

**Updating the firmware via the Web**

[1] Use your web browser to open the Fronius system monitoring web page.
[2] Open "Firmware update" under "Services".
[3] Select "Update via Web".
[4] Click the "Run update" button.

A confirmation prompt for the update is displayed.

[5] Click the "Yes" button.

The update is performed and progress is indicated in the form of a bar and as a percentage.

[6] Once the update has been successfully completed, click the "Apply/Save" button.

If the connection to the server fails:
- Deactivate the firewall for the amount of time required to complete the update.
- Try again.

**IMPORTANT!** If a proxy server is being used to establish the Internet connection:
- You must activate the "Use proxy server for Web update" option.
- You must enter the data required.

---

**Updating the firmware via a LAN**

[1] Establish the LAN connection between the PC/laptop and Fronius system monitoring.
[2] Download the latest firmware from the Fronius homepage.
[3] Once it has been downloaded, run the update file on the PC/laptop.

This starts a web server so that Fronius system monitoring can download the necessary files from it.

[4] Use your web browser to open the Fronius system monitoring web page.
[5] Open "Firmware update" under "Services".
[6] Select "Update via LAN".
[7] Enter the IP address of the PC/laptop.

8   Click the "Run update" button.

A confirmation prompt for the update is displayed.

9   Click the "Yes" button.

The update is performed and progress is indicated in the form of a bar and as a percentage.

10   Once the update has been successfully completed, click the "Apply/Save" button.

The "Supply LED" lights up steady green again to indicate that the update process is complete.

If the connection to the server fails:
-   Deactivate the firewall for the amount of time required to complete the update.
-   Try again.

# Services – Starting the wizard

**Starting the wizard**

You can access and run the wizard again by selecting "Start assistant".
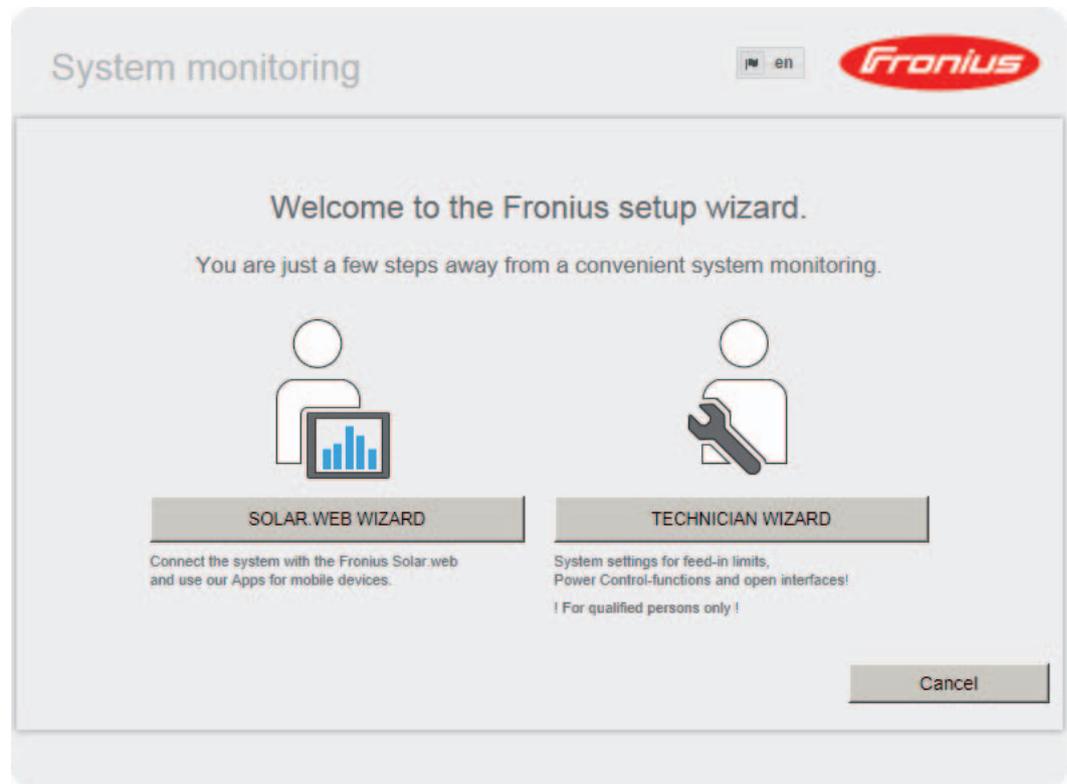
# Settings – General

**General**

General



You can enter the name of the system under "System name" (1). Under "Yield", you can enter the charge rate per kWh ("Feed-in tariff") (2), the currency (3) and the procurement costs per kWh ("Grid supply tariff") (4) for calculating the yield. The yield figure is displayed in the current general view.

Under "System time", you can enter the date (5), hour (6) and minutes (7).
Click the "synchronisation" button (8) to align the time that is displayed in the input fields of the Fronius system monitoring web page with the time of the computer operating system. To apply the time, click the "Apply/Save" button (11).

Under "Time zone settings", you can set the region (9) and the town/city (10) for the time zone.

(11)    "Apply/Save" button
(12)    "Cancel/Discard entry" button

*      Fields marked with an asterisk * are mandatory.

# Settings – Passwords

**General remarks**    Access to Fronius system monitoring is controlled by assigning passwords.
There are 3 different types of password available for this purpose:
- The administrator password
- The service password
- The user password

**Passwords**

Passwords



(1) Administrator password, user name = admin

The administrator password is set during the commissioning process and grants the user read permissions and setting permissions for Fronius system monitoring. The user can open the Settings menu and make all the settings apart from the ones for "System overview", "EVU Editor" and "Advanced battery settings".

If an administrator password has been set, the user must enter the user name and password for Fronius system monitoring in order to open the Settings menu.

(2) Service password, user name = service

The service password is usually assigned by the service engineer or system installer when running the Setup wizard and it provides access to system-specific parameters. The service password is required to alter meter and EVU Editor settings. The "System overview", "EVU Editor" and "Advanced battery settings" menu items cannot be accessed unless a service password has been assigned.

(3) As soon as the selection box is activated, the user password is displayed, user name = user.

☑ Protect your system monitoring from unauthorized read access.

(3)

✓  (4)

| User name | user |
| Password * | |
| Repeat password * | |

If a user password has been assigned, the user only has read permissions for Fronius system monitoring. The user is not able to open the "Settings" menu.

If a user password is assigned, the user is required to enter the user name and password whenever they want to establish a connection to Fronius system monitoring.

(4)    "Apply/Save" button

# Settings – Network

**General remarks**    The Network menu item is used to define whether the Internet connection is to be established via LAN or via WLAN.

**IMPORTANT!** If the IP address is obtained statically, a gateway and a DNS server must be entered for the selected network interface.

**Network**

Network interfaces
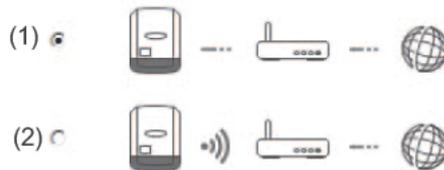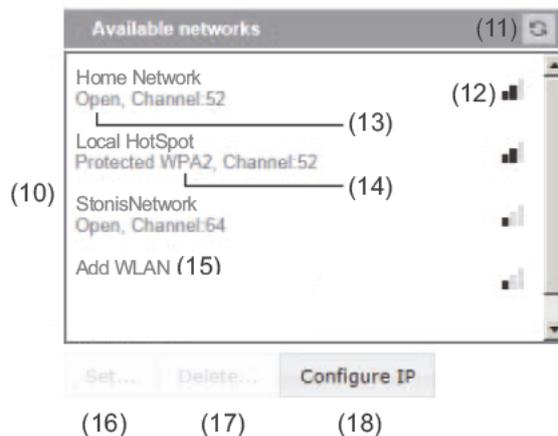


(1)    Internet connection via LAN
(2)    Internet connection via WLAN

**LAN**
(3)    Obtain IP address statically
       The user enters a fixed IP address for Fronius system monitoring and also defines the subnet mask, the gateway address and the DNS server address (from the provider) manually.

(4)     Obtain IP address dynamically
        Fronius system monitoring fetches the IP address from a DHCP server (DHCP =
        Dynamic Host Configuration Protocol).
        The DHCP server must be configured so that the same IP address is always as-
        signed to Fronius system monitoring. This means that you always know which IP
        address can be used to reach the Fronius system monitoring datalogger.
        If the DHCP server supports the DNS dynamic updates function, a name can be
        assigned to Fronius system monitoring in the "Host name" field. As a result, the
        connection to Fronius system monitoring can be established using the name in-
        stead of the IP address.
        For example: Host name = sample_system, domain name = fronius.com
        Fronius system monitoring can be reached via the address "sample_system.froni-
        us.com".

(5)     Field for entering a host name when the IP address is obtained dynamically

(6)     Field for entering the IP address in the case of a static IP address

(7)     Field for entering the subnet mask in the case of a static IP address

(8)     Field for entering the gateway in the case of a static IP address

(9)     Field for entering the DNS server in the case of a static IP address


        **WLAN**

(10)    Display showing which WLAN networks have been found

(11)    "Refresh" button
        For starting a new search to find available WLAN networks

(12)    Signal quality indicator
        One bar = weak signal
        Three bars = strong signal

(13)    Network status
        Open / Secure / Saved (once you have pressed the "Einrichten" [Set up] button
        (16))

(14)    Encryption indicator
        WPA / WPA2 / WEP

(15)    WLAN hinzufügen [Add WLAN]
        For displaying hidden networks
        As soon as you click this, the "WLAN connection" window opens.



(15a)   Name of the hidden WLAN network

(15b)   Selection box for choosing the type of encryption for the hidden WLAN network

(15c)   Field for entering the password for the hidden WLAN network

(15d)   Selection box for specifying whether the password should be displayed

(15e)   "Save" button

(15f)   "Cancel" button

(16)    "Einrichten" ("Set up") button
        For saving a selected WLAN network
        Clicking the button opens the "WLAN connection" window.

**WLAN Connection**

| | | |
|---|---|---|
| Network: | Home Network | (16a) |
| Signal quality: | good | (16b) |
| Security: | WPA2 | (16c) |
| Enter password: | •••••••• | (16d) |
| Show password: | ☐ | (16e) |

(16f) Save    Cancel
(16g)

(16a)   Name of the selected WLAN network
(16b)   Signal strength of the selected WLAN network
(16c)   Encryption method used for the selected WLAN network
(16d)   Field for entering the password for the WLAN network
(16e)   Selection box for specifying whether the password should be displayed
(16f)   "Save" button
(16 g)  "Cancel" button

(17)    "Entfernen" [Remove] button
        For deleting a saved WLAN network
(18)    "Configure IP" button
        Clicking this button opens the "Configure IP" window.



**Configure IP**

| | (3)          (4) | |
|---|---|---|
| Get address | ☐ static ◉ dynamic | |
| Host name | meineanlage | (5) |
| IP-Address | | (6) |
| Subnet-mask | 255.255.255.0 | (7) |
| Gateway | | (8) |
| DNS-Server | | (9) |

(19) OK    Cancel
(20)

(19)    "OK" button
(20)    "Cancel" button
(21)    "Apply/Save" button
(22)    "Cancel/Discard entry" button

80

# Settings – Fronius Solar.web

**Fronius So-
lar.web**

You can use the Fronius Solar.web menu item to establish a direct connection between Fronius system monitoring and Fronius Solar.web.

Fronius Solar.web

|  | ✓ | ✗ |
|---|---|---|
|  | (9) | (10) |

Datalogging settings

Query cycle inverter          [5 Minutes  ▾]   (1)

logged delete logged data ...
                    (2)

Send actual data to Fronius Solar.web

○ No  ● Yes
         (3)

Send archive data to Fronius Solar.web

● never  ○ daily  ○ hourly
(4)       (5)        (6)

register at Solar.web ...
                (7)

**Datalogging settings**

(1)     Select the query cycle for the inverter:
        Data can be queried every 5 / 10 / 15 / 20 / 30 minutes.

(2)     "delete logged data" button
        When you click the "delete logged data" button, a confirmation prompts appears to check that you really do want to delete the logged data.

(3)     Here you can select whether archive data should be sent to Fronius Solar.web

        **Send archive data to Fronius Solar.web**

(4)     never

(5)     daily
        When you check this selection box, the associated setting options are displayed:

○ never    ● daily    ○ hourly
                (6)
at [07:00 ▾]  (6a)
on ☑ Monday ☑ Tuesday ☑ Wednesday ☑ Thursday    ☑ Friday  ☑ Satturday ☑ Sunday
                        (6b)

(6a)    Field for entering the time (hour)
(6b)    Fields for selecting the days of the week

○ never  ○ daily  ⦿ hourly

(7)

□ 00:00 □ 01:00 □ 02:00 □ 03:00 □ 04:00 □ 05:00 ☑ 06:00 ☑ 07:00

(7a) ☑ 08:00 ☑ 09:00 ☑ 10:00 ☑ 11:00 ☑ 12:00 ☑ 13:00 ☑ 14:00 ☑ 15:00

☑ 16:00 ☑ 17:00 ☑ 18:00 ☑ 19:00 ☑ 20:00 ☑ 21:00 □ 22:00 □ 23:00

(7)     hourly
        When you check this selection box, the associated setting options are displayed:

(7a)    Fields for selecting the time (hour)

(8)     "register at Solar.web" button
        Clicking this button opens the Fronius Solar.web homepage and any data of relevance to Fronius Solar.web is sent automatically at the same time.

(9)     "Apply/Save" button

(10)    "Cancel/Discard entry" button

# Settings – Service messages

**General remarks**    Service messages or inverter errors are sent to Fronius system monitoring and saved. Use the "Service messages" option to define what method of external communication should be used for service messages. Communication can take place via:
- E-mail
- SMS

It is also possible to evaluate the service messages using Fronius Solar.web as well.

**Service messages**



(1)    Activate "Meldung an E-Mail-Empfänger" [Send message to e-mail recipient] if you want service messages to be sent to one or more e-mail addresses.

(2)    Field for entering up to 10 e-mail addresses
       If entering multiple e-mail addresses, use the " ; " character as a separator.

(3)    Selection box for specifying whether the service message should be sent by e-mail immediately or at a particular time
       If you select "daily at", the time (hour) option is displayed as well.

(4)    "Testmail schicken" [Send test e-mail] button
       It can take several minutes to send a test e-mail.

(5)    Activate "Meldung an SMS-Empfänger" [Send message to SMS recipient]
       if you want service messages to be sent to a telephone number in the form of an SMS text message.

(6)    Field for entering the country prefix
       For example: +43 = country prefix for Austria

(7)    Field for entering the local dialling code

(8)    Field for entering the telephone number

(9)    Field for daily sending

(10)   Box for selecting the time (hour) if service messages are to be sent via SMS

(11)    "Schaltfläche Test-SMS" [Send test SMS] button
        It can take several minutes to send a test SMS.

(12)    Box for selecting the language in which the service message is to be sent

(13)    "Apply/Save" button

(14)    "Cancel/Discard entry" button

# Settings – IO mapping

**General remarks**

IO allocation

| | | | | |
|---|---|---|---|---|
| | RS485 | D- | D+ | RS485 |
| | | - | + | |
| | | - | + | |
| Load management 1 ⌄ | | 1 | 0 | IO control feedback 1 ⌄ |
| IO control 2 ⌄ | | 3 | 2 | IO control 1 ⌄ |
| IO control 4 ⌄ | | 5 | 4 | IO control 3 ⌄ |
| IO control 6 ⌄ | | 7 | 6 | IO control 5 ⌄ |
| IO control 8 ⌄ | | 9 | 8 | IO control 7 ⌄ |

⬛ can be used as an input or output
⬜ can be used as an input
NOTE: You are not authorised to apply all settings.

This menu allows you to configure the properties of the inverter's individual inputs and outputs (I/O). You can only select those settings that are supported by the system concerned (which are determined by the functionality of the system and how it has been configured).

# Settings – Energy Manager

**General remarks**
The Fronius Symo Hybrid always controls the system by adjusting it in line with the target value set at the metering point. In "Automatic" operating mode (factory setting), the system is adjusted so that 0 W is achieved at the feed-in point (maximum self-consumption).

The target value still applies even if another source feeds energy in at this metering point. However, in this case:
- The Fronius Smart Meter must be installed at the feed-in point
- The option that allows the battery to be charged by another producer must be activated (see External Link: "Text" section on page External Link: "Page").

**Energy management**

(1)

Own consumption optimisation: ● automatic ○ manual
Target values at the metering point: [ 0 ] W   [ Feed in ▾ ]
(2)                (3)

(1)     Option for selecting automatic or manual optimisation of self-consumption
(2)     If you opt for "manual" under "Own consumption optimisation", you can select the target value at the metering point (2) and choose between "Bezug" [Consume] and "Feed in" (3) here.

**Energy Manager examples**
These examples illustrate possible energy flows. Efficiency values have not been taken into account.

**Example involving Fronius Energy Package**

| | |
|---|---|
| PV system connected to Fronius Symo Hybrid: | 1000 W |
| Household consumption: | 500 W |
| Target value set at feed-in point: | 0 W |
| | |
| Energy fed into Fronius Solar Battery: | 500 W |
| Power output (AC) by inverter: | 500 W |
| Energy fed into the public grid: | 0 W |

**Example involving Fronius Energy Package plus a second producer within the home**

| | |
|---|---|
| PV system connected to Fronius Symo Hybrid: | 1000 W |
| Second producer on home network: | 2000 W |
| Household consumption: | 500 W |
| Target value set at feed-in point: | 0 W |
| | |
| Energy fed into Fronius Solar Battery: | 2500 W |
| Power consumed (AC) by inverter: | 1500 W |
| Energy fed into the public grid: | 0 W |

**Example involving Fronius Energy Package without photovoltaics but with a second producer within the home**

| | |
|---|---|
| Second producer on home network: | 2000 W |
| Household consumption: | 500 W |
| Target value set at feed-in point: | 0 W |

| | |
|---|---|
| Energy fed into Fronius Solar Battery: | 1500 W |
| Power consumed (AC) by inverter: | 1500 W |
| Energy fed into the public grid: | 0 W |

**Example involving Fronius Energy Package plus a second producer within the home (with AC max. limiting)**

| | |
|---|---|
| PV system connected to Fronius Symo Hybrid: | 1000 W |
| Second producer on home network: | 2000 W |
| Household consumption: | 500 W |
| Target value set at feed-in point: | 0 W |
| Max. AC power consumption limited to: | 1000 W |

| | |
|---|---|
| Energy fed into Fronius Solar Battery: | 2000 W |
| Power consumed (AC) by inverter: | 1000 W |
| Energy fed into the public grid: | 500 W |

---

**Load management**

## Load management



(1) **Status**

(2) **Controlling**

- Control via Energy Manager deactivated.

- Control via Energy Manager is based on the power produced.

- Control via Energy Manager is based on surplus power (with feed-in limits). This option can only be selected if a meter has been connected. Control via Energy Manger is based on the amount of energy actually fed into the grid.

(3) **Thresholds**

- on: For entering an effective power limit as of which output I/O 1 is to be activated.

- off: For entering an effective power limit as of which output I/O 1 is to be deactivated.

(4)     **Duration**
- Field for activating the minimum running time per switch-on operation
- Field for specifying the minimum amount of time that output I/O 1 should remain activated for per switch-on operation.
- Field for activating the maximum running time per day
- Field for specifying the maximum total amount of time that output I/O 1 should be activated for per day (allowing for several switch-on operations).

(5)     **Desired duration**
- Field for activating a desired running time

# Settings – Push Service

**Push Service**    This function allows you to export current and log data to an external server in different formats or using different protocols.

Push Service



(1)    "Apply/Save" button

(2)    "Cancel/Discard entry" button

(3)    "Add" button
       Click this button to add a new push service job. The new job is saved by clicking the "Apply/Save" button (1).

(4)    State
       Displays the current status of the respective push service job

(5)    Name displayed for the push service job

(6)    Area for entering general data:
       Name (name of the push service job)
       Data format
       Protocol type (FTP upload/HTTP POST)
       Interval
       Activation status

(7)    Area for entering destination data:
       Server port
       Upload file name
       Login (user/password)

(8) Area for entering proxy data:
Server port
User
Password

(9) "Delete" button
Click this button to delete the selected push service job.

**Further information about the push service function**

For further information about the push service function, please see the following operating instructions:

http://www.fronius.com/QR-link/4204102152

42,0410,2152
Fronius Push Service

# Settings – Modbus

**General remarks**

With a web browser, you can use the Fronius system monitoring web page to make settings for the Modbus connection that are not accessible via the Modbus protocol.

**Further information about the Modbus function**

For further information about the Modbus function, please see the following operating instructions:

http://www.fronius.com/QR-link/4204101885

42,0410,1885
Fronius Modbus Card Register Tables

http://www.fronius.com/QR-link/4204102049

42,0410,2049
Fronius Datamanager Modbus TCP & RTU

http://www.fronius.com/QR-link/4204102108

42,0410,2108
Fronius Datamanager 2.0 Modbus RTU Quickstart Guide

**Exporting data via Modbus**

Modbus

(1) (2)

Data export via Modbus ⦿ off ○ tcp

(4)  (5)

Control priorities overview

|  | 1 | 2 | 3 |
|---|---|---|---|
| Ripple control signal receiver | ⦿ | ○ | ○ |
| Dynamic power reduction | ○ | ⦿ | ○ | (3) |
| Controlling via Modbus | ○ | ○ | ⦿ |

**Data export via Modbus**
Here you can activate the Modbus service and select the transmission protocol.
If the Modbus service is activated, additional input fields are made available.

The Modbus RTU transmission protocol is only available with Fronius system monitoring.

(1)    **off**
No data exported via Modbus

(2)    **tcp**
Data exported via Modbus TCP



| | (2) |
|---|---|
| Data export via Modbus | off ● tcp |
| Modbus port | 502 (2a) |
| Demo mode | ☐ (2b) |
| Inverter control via Modbus | ☐ (2c) |

(2a)    **Modbus port**
Number of the TCP port that is to be used for Modbus communication.

(2b)    **Demo mode**
Demo mode is used to implement or validate a Modbus master. It enables inverter and string control data to be read out, even if no device is actually connected or active. The same data is always returned for all registers.

(2c)    **Inverter control via Modbus**
If this option is activated, the inverters can be controlled via Modbus.
The "Steuerung einschränken" [Restrict control] selection box is displayed.
Inverter control includes the following functions:
- On/Off
- Power reduction
- Specification of a constant cos phi power factor
- Specification of a constant reactive power value

(3)    **Control priorities**
The control priorities define which service takes priority during inverter control.

1 = highest priority, 3 = lowest priority

The control priorities can only be changed under the **EVU EDITOR** menu item.

(4)    **"Apply/Save" button**

(5)    **"Cancel/Discard entry" button**

---

**Restricting control**

The "Steuerung einschränken" [Restrict control] option is only available with TCP transmission protocols.
It prevents unauthorised persons from issuing inverter control commands by only allowing certain devices to perform control functions.

| | | |
|---|---|---|
| Inverter control via Modbus | ☑ | |
| Restrict the control | ☑ | (1) |
| IP adress | 10.5.34.1 ✕ | (2) |

(1)  **Steuerung einschränken [Restrict control]**
If this option is activated, only certain devices are allowed to send control commands.

(2)  **IP address**
If inverter control is to be limited to one or more devices, use this field to enter the IP addresses of the one(s) that is/are allowed to send commands to Fronius system monitoring. Use commas to separate multiple entries.

Examples:
-  One IP address: *98.7.65.4*
   -  Inverter may only be controlled by IP address *98.7.65.4*

-  Multiple IP addresses: *98.7.65.4,222.44.33.1*
   -  Inverter may only be controlled by IP addresses *98.7.65.4 and 222.44.33.1*

-  IP address space could (for example) be specified as a range from 98.7.65.1 to 98.7.65.254 (CIDR notation) as follows: *98.7.65.0/24*
   -  Inverter may only be controlled by IP addresses *98.7.65.1 to 98.7.65.254*

**Saving or discarding changes**

| ✓ | Saves the settings and displays a message to indicate that the save operation was successful<br>If you exit the "Modbus" menu item without saving, all the changes you have made will be discarded. |
| ✕ | Triggers a confirmation prompt to check that you really do want to discard the changes that have been made and then restores the last set of saved values. |

# Settings – Battery management

**Battery management**

battery management

reserve battery capacity ☐ (1)

battery charge from producers in the home network (2)
deactivated ▾

Calibration charge (3)
The Fronius Energy Package will periodically run an automatic full charge of the Fronius Solar Battery to calibrate all components.
This process can be started manually here.

start calibration charge
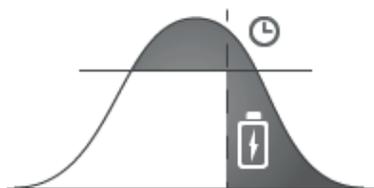
**(1) reserve battery capacity:**

This function is required to prevent available energy from going to waste if the photovoltaic system is over-dimensioned or in the case of dynamic power reduction. Up until a certain time of day, energy is only fed into the Fronius Solar Battery if dynamic power reduction is active or if the amount of PV power available on the Fronius Symo Hybrid exceeds what can be delivered on the AC side (overdimensioning).

Consequently, storage space is "reserved" in the Fronius Solar Battery to accommodate this operating scenario. Standard energy management (self-consumption optimisation) only resumes once the set time is reached.

**(2) battery charge from producers in the home network:**

If further decentralised producers are installed in the household and have been integrated into the self-consumption rule for the Fronius Symo Hybrid, you must activate this setting. This means that energy can be drawn from the home network and fed into the Fronius Solar Battery for charging purposes via the Fronius Symo Hybrid.

You can restrict how much power is consumed by the Fronius Symo Hybrid by specifying the maximum AC power. The maximum power consumption is limited to the AC nominal output of the Fronius Symo Hybrid.

To ensure smooth operation in conjunction with other energy producers, it is important to install the Fronius Smart Meter at the feed-in point. The Fronius Symo Hybrid and other energy producers must be connected to the public grid via the Fronius Smart Meter.

**(3) Calibration charge:**

At regular intervals, the Fronius Symo Hybrid automatically charges the Fronius Solar Battery until it is full for the purpose of calibrating all the components. This process can be started manually here.

**Important!** When calibration charging is activated, normal operation is interrupted and the system may draw energy from the utility company grid. The process can take several hours and cannot be aborted.

Once calibration is complete, the system automatically reverts to the operating mode that was set originally.

This calibration charging process is also performed automatically during actual operation after a number of charging and discharging cycles.

If the "battery charging from UC grid" setting is deactivated, this calibration charging process relies exclusively on energy from the photovoltaic system. Depending on the insolation conditions and size of the systems concerned, the charging process can take a very long time.

If the "battery charging from UC grid" setting is activated, the calibration charging process is performed by drawing a constant current from the photovoltaic system and utility company grid.

# Settings – System overview

**(1)    PV power:**

If there is no solar module connected to the Fronius Symo Hybrid, the PV power option must be deactivated. The connected PV power must be entered in the field underneath.

**(2)    Battery:**

If a Fronius Solar Battery is connected to the Fronius Symo Hybrid, it must be activated here.

This setting can only be made when there is an active connection to the Fronius Solar Battery. If you are unable to make this setting, check whether the Fronius Solar Battery is switched on and whether the data connection has actually been established.

If there is a connection, the current state of charge of the Fronius Solar Battery will be indicated underneath the battery symbol.

**(3)    Permit battery charging from UC grid:**

If you want the Fronius Solar Battery to be charged from the public grid, you can activate this here. Depending on what is required by standards or the feed-in tariff rules, it may be necessary to deactivate the setting.

This setting does not affect the charging of the Fronius Solar Battery by other producers within the home. It merely relates to the process of drawing charging energy from the public grid.

Regardless of this setting, any charging from the public grid that is required for service reasons (e.g. to protect against deep discharge) is still performed.

**(4)      battery charge from producers in the home network:**

If further decentralised producers are installed in the household and have been integrated into the self-consumption rule for the Fronius Symo Hybrid, you must activate this setting. This means that energy can be drawn from the home network and fed into the Fronius Solar Battery via the Fronius Symo Hybrid for the purpose of charging it.

You can restrict how much power is consumed by the Fronius Symo Hybrid by specifying a maximum AC power value (AC max.). The maximum power consumption is limited to the AC nominal output of the Fronius Symo Hybrid.

**(5)      Meter:**

To ensure smooth operation in conjunction with other energy producers, it is important to install the Fronius Smart Meter at the feed-in point. The Fronius Symo Hybrid and other producers must be connected to the public grid via the Fronius Smart Meter.

This setting also affects how the Fronius Symo Hybrid behaves overnight. If the function is deactivated, the inverter switches to Standby mode as soon as there is no more PV power available, provided that no energy management command is sent to the battery (e.g. minimum state of charge reached). The message "Power low" is displayed. The inverter restarts as soon as an energy management command is sent or there is sufficient PV power available.

If the function is activated, the inverter remains permanently connected to the grid so that energy can be drawn from other producers at any time.

---

**Fronius Smart Meter**

Recording self-consumption via a Fronius Smart Meter

Meter: [Fronius Smart Meter ▾]  (1)
Location of the meter:  ⦿ Feed-in point  ○ Consumption path
                              (1a)                (1b)
Click here for circuit diagrams of the meter installation
    (2)
**Notification:** When using the Fronius Smart Meter, the query of system data via Modbus RTU is not possible anymore.

**(1a)      Meter positioned at feed-in point**
The meter measures the amount of power and energy fed in. Consumption is determined on the basis of these values and the system data.

**(1b)      Meter positioned at consumption branch**
The meter directly measures the amount of power and energy consumed. These values and the system data are used to determine the amount of power and energy fed in.

How to connect the Fronius Smart Meter to Fronius system monitoring:

# Settings – EVU Editor

**General remarks**  Use the "EVU Editor" menu item to make the settings that are of relevance to a utility company.
You can set an effective power limit in % and/or a power factor limit.

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

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

**EVU Editor – Ripple control signal receiver**



EVU Editor – The factory settings for effective power are 100%, 60%, 30% and 0%.
The settings can be changed at any time.

(1)  Rule activation

(2)  Input pattern (assignment of individual I/Os)
     1 click = white
     2 clicks = blue
     3 x clicks = grey

(3)  Effective power
     Activate it first and then enter the required effective power value in %.

(4) cos phi power factor
Activate it first, enter the required power factor and then complete the process by selecting "ind" or "cap".

ind = inductive
cap = capacitive

(5) Utility company output (feedback output)
When the rule is enabled, input I/O 0 is activated (e.g. for operating a signalling device).

(6) ausgeschlossene Wechselrichter [excluded inverters]
Enter the numbers of the inverters that are to be excluded from the rule. If entering multiple inverters, use commas to separate them.

(7) Deleting/adding a rule
+ = add a new rule
- = delete the currently selected rule

(8) Key to colours

(9) "Import" button
Click this to import rules in *.fpc format.

The "Import" button only works with certain browsers, e.g. it is supported by Firefox and Google Chrome.

(10) "Export" button
Click this to save the rules separately in *.fpc format.

(11) "Apply/Save" button

(12) "Cancel/Discard entry" button

👉 **NOTE!** You can use the web browser's print function to create a PDF record of the settings that you have made under the "EVU Editor" menu item or to print these settings out (e.g. in the form of a commissioning record).

---

**Connection example**

(1) Ripple control signal receiver with 3 relays, for effective power limiting
(2) Ripple control signal receiver with 3 relays, for power factor limiting
(3) Fronius system monitoring I/Os
(4) Consumers (e.g. signal lamp, signal relay)
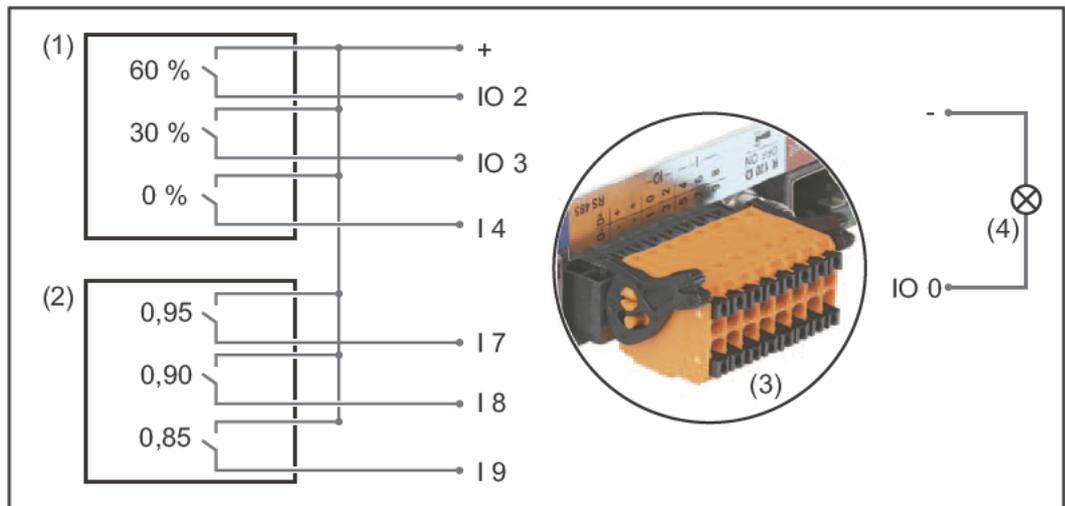
The ripple control signal receiver and the Fronius system monitoring connector are connected to one another by means of a four-pin cable in accordance with the connection diagram.

If the distance between the Fronius system monitoring datalogger and the ripple control signal receiver exceeds 10 m, a shielded cable is recommended.

EVU Editor settings:



| Approved | Input pattern | | | | | | | | | | Effective power | | Power factor cosφ | | | | PSC output | Excluded inverters | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | I/O 0 | I/O 1 | I/O 2 | I/O 3 | I 4 | I 5 | I 6 | I 7 | I 8 | I 9 | | | | | | | I/O 0 | | |
| ☑ | ■ | ■ | ■ | □ | □ | ▨ | ▨ | ▨ | ▨ | ▨ | ☑ | 60 % | □ 1 | ○ ind | ⦿ cap | | ☑ | | ⊖ |
| (1) ☑ | ■ | ■ | □ | ■ | □ | ▨ | ▨ | ▨ | ▨ | ▨ | ☑ | 30 % | □ 1 | ○ ind | ⦿ cap | | ☑ | | ⊖ |
| ☑ | ■ | ■ | □ | □ | ■ | ▨ | ▨ | ▨ | ▨ | ▨ | ☑ | 0 % | □ 1 | ○ ind | ⦿ cap | | ☑ | | ⊖ |
| ☑ | ■ | ■ | ▨ | ▨ | ▨ | ▨ | ▨ | ■ | □ | □ | □ | 100 % | ☑ 0.95 | ○ ind | ⦿ cap | | ☑ | | ⊖ |
| (2) ☑ | ■ | ■ | ▨ | ▨ | ▨ | ▨ | ▨ | □ | ■ | □ | □ | 100 % | ☑ 0.9 | ○ ind | ⦿ cap | | ☑ | | ⊖ |
| ☑ | ■ | ■ | ▨ | ▨ | ▨ | ▨ | ▨ | □ | □ | ■ | □ | 100 % | ☑ 0.85 | ○ ind | ⦿ cap | | ☑ | | ⊖ |
| □ | ■ | ■ | □ | □ | □ | ▨ | ▨ | ▨ | ▨ | ▨ | □ | % | □ | ○ ind | ⦿ cap | | □ | | ⊕ |

■ ... not usable   ▨ ... not considered   □ ... contact open   ▣ ... contact closed

**EVU Editor – Dynamic power reduction**

Utility companies or grid operators may stipulate feed-in limitations for an inverter (e.g. max. 70% of kWp or max. 5 kW).
Dynamic power reduction takes account of self-consumption by the household before the power of an inverter is reduced:
- A custom limit can be set.
- A Fronius Smart Meter can be connected to the D- / D+ connection sockets for Modbus data on the system monitoring datalogger.

With the Fronius Symo Hybrid, any PV power that is not allowed to be fed into the grid is used to charge the Fronius Solar Battery instead so that it does not go to waste. Dynamic power reduction is only activated if the battery is full or cannot be charged for some other reason.

## Dynamic power reduction

```
                    (1)         (2)
Power limit:    ○ No limit  ● limit for entire system
total DC power of the system: 1000    Wp  (3)
max. production power of entire system: 20   [ % ▼ ]
                              (4)       (5)
```

Leistungslimit [Power limit]
This allows you to define the maximum output power of the photovoltaic system.

(1)　　No limit
　　　　The photovoltaic system converts all the available PV energy.

(2)　　Dynamic power reduction limit for entire system
　　　　The entire photovoltaic system is limited in accordance with a set power limit.

(3)　　Field for entering the total DC system power in Wp
　　　　This value serves as a reference for the rule and also for failures (e.g. a meter failure).

(4)　　Field for entering the max. power in W or %

　　　　If no meter has been selected under the "Meter" menu item:
　　　　Max. power produced by the entire system

　　　　If "Fronius Smart Meter" has been selected under the "Meter" menu item:
　　　　Max. grid power feed

(5)　　Box for selecting % or W

(6)　　"Apply/Save" button

(7)　　"Cancel/Discard entry" button


**Example: Dynamic power reduction**
(efficiency values have not been taken into account)

| | |
|---|---|
| PV system connected to Fronius Symo Hybrid: | 5000 W |
| Household consumption: | 1000 W |
| Max. grid power feed: | 60% = 3000 W |
| | |
| Power at grid feed-in point: | 3000 W |
| Power at inverter output: | 4000 W |
| Energy fed into Fronius Solar Battery: | 1000 W |

In this example, no more than 3000 W may be fed into the grid at the grid feed-in point. However, any loads that are located between the inverter and the grid feed-in point can be supplied by additional power from the inverter. These loads are also compensated as required.

## EVU Editor – Control priorities



**Controlling priority**

| | 1 | 2 | 3 | |
|---|---|---|---|---|
| Ripple control signal receiver | ● | ○ | ○ | (1) |
| Dynamic power reduction | ○ | ● | ○ | (2) |
| Controlling via Modbus | ○ | ○ | ● | (3) |

1 = highest priority, 3 = lowest priority

(1)     For setting the control priorities for the ripple control signal receiver

(2)     For setting the control priorities for dynamic power reduction

(3)     For setting the control priorities for control via Modbus

(4)     "Apply/Save" button

(5)     "Cancel/Discard entry" button

---

**EVU Editor – Batterie Ladung [Battery charging]**

If you want the Fronius Solar Battery to be charged from the public grid, you can activate this here. Depending on what is required by standards or the feed-in tariff rules, it may be necessary to deactivate the setting.

This setting does not affect the charging of the Fronius Solar Battery by other producers within the home. It merely relates to the process of drawing charging energy from the public grid.

Regardless of this setting, any charging from the public grid that is required for service reasons (e.g. to protect against deep discharge) is still performed.

# Settings – Battery

**Battery**

## Advanced battery settings

| | | |
|---|---|---|
| ✔ | ✕ | |

| Maximum SOC in operation | 100 | % | (1) |
| Minimum SOC in operation | 7 | % | (2) |
| Maximum charging current | 16 | A | (3) |
| Maximum discharge current | 16 | A | (4) |

| | | |
|---|---|---|
| ✔ | ✕ | |

Service: Battery module replacement   (5)

Start Service mode   ☐

(1)   **Maximum SOC in operation:**
Maximum state of charge (SOC) of the Fronius Solar Battery that is not to be exceeded during normal operation.
Once the set value has been reached, the Fronius Symo Hybrid stops feeding energy into the Fronius Solar Battery.
Regardless of this setting, the Fronius Symo Hybrid still performs an automatic process at regular intervals, which charges the Fronius Solar Battery up fully (100% SOC) for the purpose of calibrating all the components.

(2)   **Minimum SOC in operation:**
Minimum state of charge (SOC) of the Fronius Solar Battery that is not to be undershot during normal operation.
Once the set value has been reached, the Fronius Symo Hybrid stops drawing energy from the Fronius Solar Battery.
This state of charge may be temporarily undershot as a result of battery self discharge.

(3)   **Maximum charging current:**
Maximum charging current of the Fronius Solar Battery.

(4)   **Maximum discharge current:**
Maximum discharge current of the Fronius Solar Battery.

(5)   **Service: Battery module replacement**
Service mode allows you to replace and extend the battery modules and is also intended for test purposes.
When this mode is activated, the Fronius Solar Battery is charged or discharged by means of a 10 A current or with the maximum inverter power, regardless of any other parameter settings. The charging or discharging process continues until the state of charge stands at 53% (the SOC of new battery modules on delivery). The process can be aborted at any time.
Once this SOC has been reached, the system maintains it until Service mode is deactivated again.

**Batterie Lizenzi-erung**

Falls einzelne Batteriemodule getauscht oder erweitert werden, beachten Sie die dem Pro-dukt beiliegende Installationsanleitung.

**Batterie licensing**

Module overview (1)

| No | Serial number | | State |
| --- | --- | --- | --- |
| | Old | New | |
| 1 | S01-11863- | S01-11863- | OK |
| 2 | S01-11861- | S01-11861- | OK |
| 3 | S01-11865- | S01-11865- | OK |
| 4 | S01-11877- | S01-11877- | OK |
| 5 | S01-11878- | S01-11878- | OK |
| 6 | S01-11872- | S01-11872- | OK |
| 7 | S01-11875- | S01-11875- | OK |
| 8 | S01-11871- | S01-11871- | OK |

Enter activation key (2)

[ ][ ][ ][ ][ ]  Apply

(1)     **Module overview:**
        Die bereits eingetragenen Batteriemodule und deren Status werden angezeigt.

(2)     **Enter activation key:**
        Hier kann der Aktivierungsschlüssel von neuen Batteriemodulen hinzugefügt werden.

# Troubleshooting and maintenance

# Fronius Symo Hybrid

**Displaying status codes**

The inverter performs a system self diagnosis that automatically detects many faults that may occur and shows them on the display. This means you are promptly made aware of malfunctions in the inverter and the photovoltaic system, or of any installation or operating faults.

If the system self diagnosis has detected a specific fault, the associated status code will be shown on the display.

**IMPORTANT!** Status codes may sometimes appear briefly as a result of the inverter's control response. If the inverter then continues working with no sign of any problem, this means that there was no fault.

**Total failure of the display**

The display can be supplied with power in three different ways. The display will only remain dark if all three methods fail. In this case:
- Check the AC voltage on the inverter connection sockets:
  The AC voltage must be 220/230 V (+10% / -5%) or 380/400 V (+10% / -5%).
- Check the DC voltage of the solar modules on the connection sockets of the inverter:
  The DC voltage must exceed 180 V.
- Check the DC voltage of the battery on the connection sockets of the inverter: The DC voltage must exceed 120 V.

**Class 1 status codes**

Class 1 status codes generally only arise momentarily and are caused by the public grid.

Example: The grid frequency is too high and the inverter may not feed any energy into the grid owing to a standard. There is nothing wrong with the device.
The initial response of the inverter is to disconnect itself from the grid. The grid is subsequently checked during the stipulated monitoring period. If no further problem has been detected by the end of this period, then the inverter will resume feeding energy into the grid.

The GPIS SoftStart function is activated according to the country setup:
After cutting out due to an AC error, the output power of the inverter is continuously increased in line with the national guidelines.

| Code | Description | Behaviour | Remedy |
|------|-------------|-----------|--------|
| 102 | AC voltage too high | | |
| 103 | AC voltage too low | | |
| 105 | AC frequency too high | Following careful testing and when the grid conditions are within the permissible range again, the inverter will resume feeding energy into the grid. | Check grid connections; if this status code keeps recurring, contact your system engineer |
| 106 | AC frequency too low | | |
| 107 | No AC grid | | |
| 108 | Stand-alone operation detected | | |
| 112 | RCMU error | | |

**Status codes – Class 3**

Class 3 includes status codes that may occur while feeding energy into the grid, but generally do not cause the process to be interrupted for any length of time.

The inverter disconnects automatically from the grid, the grid is then monitored as specified and the inverter attempts to resume feeding energy into the grid.

| Code | Description | Behaviour | Remedy |
|---|---|---|---|
| 301 | Overcurrent (AC) | Short-term interruption while feeding energy into the grid. The inverter repeats its start-up routine. | *) |
| 302 | Overcurrent (DC) | | |
| 303 | DC module overtemperature (PV) | Short-term interruption while feeding energy into the grid. The inverter repeats its startup routine. | Purge cooling air openings and heat sink; **) |
| 304 | AC module overtemperature | | |
| 305 | No power being fed in, despite closed relays | Short-term interruption while feeding energy into the grid. The inverter repeats its startup routine. | **) |
| 306 | There is not enough PV power available for feeding energy into the grid and no power has been requested from the battery. | Short-term interruption while feeding energy into the grid. The inverter repeats its startup routine. | Wait for sufficient insolation; wait for an energy management command; **) |
| 307 | DC low DC input voltage too low for feeding energy into the grid | Short-term interruption while feeding energy into the grid. The inverter repeats its startup routine. | Wait for sufficient insolation; **) |

**IMPORTANT!** Due to the low level of insolation early in the morning and in the evening, the status codes 306 (Power low) and 307 (DC low) are displayed routinely at these times of day. These status codes do not indicate any kind of fault.

| Code | Description | Behaviour | Remedy |
|---|---|---|---|
| 308 | Intermediate circuit voltage too high | Short-term interruption while feeding energy into the grid. The inverter repeats its startup routine. | **) |
| 309 | PV input voltage too high | | |
| 313 | Battery input voltage too high. | Short-term interruption while feeding energy into the grid. The inverter repeats its startup routine. This service code may occur sporadically even though there is no actual fault. | Switch on, connect or check battery; *) |
| 314, 315 | Internal system error | Short-term interruption while feeding energy into the grid. The inverter repeats its startup routine. | *) |
| 324 | DC module overtemperature (battery) | Short-term interruption while feeding energy into the grid. The inverter repeats its startup routine. | Purge cooling air openings and heat sink; **) |

*) If the status code is displayed all the time: Notify a Fronius-trained service engineer.

**) Fault is rectified automatically. If this status code keeps recurring, contact your system engineer.

**Status codes – Class 4**  Some of the class 4 status codes necessitate intervention by a Fronius-trained service engineer.

| Code | Description | Behaviour | Remedy |
|------|-------------|-----------|--------|
| 401 | Unable to communicate with the power stage set | The inverter will automatically attempt to connect again and, if possible, will resume feeding energy into the grid. | *) |
| 406 | DC module temperature sensor faulty (PV) | | |
| 407 | AC module temperature sensor faulty | | |
| 408 | DC component measured in the grid too high | | |
| 412 | Fixed voltage mode has been selected instead of MPP voltage mode, and the fixed voltage has been set to too low or too high a value. | - | **) |
| 415 | Safety cut-out via option card or RECER-BO has triggered | The inverter is not feeding any energy into the grid. | *) |
| 416 | No communication possible between power stage set and control system. | The inverter will automatically attempt to connect again and, if possible, will resume feeding energy into the grid. | *) |
| 417 | Hardware ID problem | The inverter will automatically attempt to connect again and, if possible, will resume feeding energy into the grid. | Update inverter firmware; *) |
| 420 | Unable to communicate with system monitoring | | |
| 425 | Unable to communicate with the power stage set | | |
| 426 - 427 | Possible hardware fault | | |
| 431, 432 | Software problem | The inverter is not feeding any energy into the grid. | Perform AC reset (switch automatic circuit breaker off and on again); update inverter firmware; *) |
| 436 | Functional incompatibility (one or more PC boards in the inverter are not compatible with each other, e.g. after a PC board has been replaced) | The inverter will automatically attempt to connect again and, if possible, will resume feeding energy into the grid. | Update inverter firmware; *) |
| 437 | Power stage set problem | | |
| 438 | Functional incompatibility (one or more PC boards in the inverter are not compatible with each other, e.g. after a PC board has been replaced) | The inverter will automatically attempt to connect again and, if possible, will resume feeding energy into the grid. | Update inverter firmware; *) |
| 445 | - Compatibility error (e.g. due to replacement of a PC board)<br>- Invalid power stage set configuration | The inverter is not feeding any energy into the grid. | Update inverter firmware; *) |
| 447 | Insulation fault (PV or battery) | The inverter is not feeding any energy into the grid. | *) |
| 450 | Guard cannot be found | | |

| Code | Description | Behaviour | Remedy |
|------|-------------|-----------|--------|
| 451 | Memory error detected | The inverter will automatically attempt to connect again and, if possible, will resume feeding energy into the grid. | *) |
| 452 | Communication error between the processors | | |
| 453 | Grid voltage and power stage set are incompatible | | |
| 454 | Grid frequency and power stage set are incompatible | | |
| 456 | Anti-islanding function is no longer being implemented correctly | | |
| 457 | Grid relay is sticking or the neutral conductor ground voltage is too high | The inverter is not feeding any energy into the grid. | Check the grounding (the neutral conductor ground voltage must be less than 30 V); *) |
| 458 | Error when recording measuring signal | The inverter is not feeding any energy into the grid. | *) |
| 459 | Error when recording the measuring signal for the insulation test | | |
| 460 | Reference voltage source for the digital signal processor (DSP) is working out of tolerance | | |
| 461 | DSP data memory error | | |
| 462 | Error during DC feed monitoring routine | | |
| 463 | Reversed AC polarity, AC connector inserted incorrectly | | |
| 474 | RCMU sensor faulty | The inverter is not feeding any energy into the grid. | **) |
| 475 | Insulation fault (connection between solar module and ground) | | |
| 476 | Driver supply voltage too low | | |
| 480, 481 | Functional incompatibility (one or more PC boards in the inverter are not compatible with each other, e.g. after a PC board has been replaced) | The inverter is not feeding any energy into the grid. | Update inverter firmware; *) |
| 482 | Setup interrupted after initial start-up | The inverter is not feeding any energy into the grid. | Perform AC reset (switch automatic circuit breaker off and on again); update inverter firmware; *) |
| 484 - 489 | CAN transmit buffer is full | The inverter is not feeding any energy into the grid. | Perform AC reset (switch automatic circuit breaker off and on again); update inverter firmware; *) |

*) If the status code is displayed all the time: Notify a Fronius-trained service engineer.

**) If this status code keeps recurring, contact your system engineer.

**Status codes – Class 5**

Class 5 status codes do not generally interfere with feeding energy into the grid, but can cause restrictions. These status codes are displayed until they are acknowledged by pressing a key (however, the inverter continues to operate normally in the background).

| Code | Description | Behaviour | Remedy |
|------|-------------|-----------|--------|
| 502 | Insulation fault on solar modules or on Fronius Solar Battery | Warning message is shown on the display | **) |
| 509 | No energy fed into the grid in the past 24 hours | Warning message is shown on the display | Acknowledge status code; check whether all the conditions for the problem-free feeding of energy into the grid have been met (e.g. are the solar modules covered with snow?); **) |
| 515 | Unable to communicate with filter | Warning message on the display | *) |
| 516 | Unable to communicate with the data storage unit | Data storage unit warning message | *) |
| 517 | Power derating caused by excessively high temperatures | When power derating occurs, a warning message is shown on the display. | If necessary, purge cooling air openings and heat sink; fault is rectified automatically; **) |
| 519 | Unable to communicate with the data storage unit | Data storage unit warning message | *) |
| 520 | No energy fed into the grid by the PV in the past 24 hours | Warning message is shown on the display | Acknowledge status code; check whether all the conditions for the problem-free feeding of energy into the grid have been met (e.g. are the solar modules covered with snow?); *) |
| 522 | DC low (PV). No PV voltage available. | Warning message on the display | In the case of hybrid systems, this message appears overnight or if no photovoltaics are connected to the Fronius Symo Hybrid; *) |
| 523 | DC low (battery). The battery has been activated but is either not connected or is not switched on. | Warning message on the display | Switch on, connect or check battery; *) |
| 558, 559 | Functional incompatibility (one or more PC boards in the inverter are not compatible with each other, e.g. after a PC board has been replaced) | Warning message on the display | Update inverter firmware; *) |
| 560 | Power derating caused by overfrequency | Displayed when grid frequency becomes excessively high. The power is reduced. | As soon as the grid frequency is back within the permissible range and the inverter has returned to normal operation, the fault is rectified automatically; **) |
| 567 | Power derating caused by overvoltage | Displayed when grid voltage becomes excessively high. The power is reduced. | As soon as the grid voltage is back within the permissible range and the inverter has returned to normal operation, the fault is rectified automatically; **) |
| 573 | Power derating caused by excessively low temperatures | When power derating occurs, a warning message is shown on the display. | Fault rectified automatically; **) |

*) If the status code is displayed all the time: Notify a Fronius-trained service engineer.

**) If this status code keeps recurring, contact your system engineer.

---

| | |
|---|---|
| **Status codes –**<br>**Class 6** | Some of the class 6 status codes necessitate intervention by a Fronius-trained service engineer. |

| Code | Description | Behaviour | Remedy |
|---|---|---|---|
| 601 | CAN bus is full | The inverter is not feeding any energy into the grid. | Update inverter firmware; *) |
| 603 | DC module temperature sensor faulty | The inverter will automatically attempt to connect again and, if possible, will resume feeding energy into the grid. | *) |
| 608 | Functional incompatibility (one or more PC boards in the inverter are not compatible with each other, e.g. after a PC board has been replaced) | The inverter is not feeding any energy into the grid. | Update inverter firmware; *) |

*) If the status code is displayed all the time: Notify a Fronius-trained service engineer.

**) Fault is rectified automatically. If this status code keeps recurring, contact your system engineer.

---

| | |
|---|---|
| **Status codes –**<br>**Class 7** | Class 7 status codes relate to the control system, the configuration and inverter data recording, and may directly or indirectly affect the process of feeding energy into the grid. |

| Code | Description | Behaviour | Remedy |
|---|---|---|---|
| 701 - 715 | Provides information about the internal processor status | Warning message on the display | *) |
| 721 | EEPROM has been re-initialised | Warning message on the display | Acknowledge status code; *) |
| 722 - 730 | Provides information about the internal processor status | Warning message on the display | *) |
| 746 | Error occurred during update process | Warning message on the display, update process is interrupted | Wait for 2 minutes, then start the update again; *) |
| 751 | Time lost | Warning message on the display | Reset time and date on the inverter; *) |
| 752 | Real Time Clock module communication error | | |
| 753 | Internal error: Real Time Clock module is in emergency mode | Time may be inaccurate or lost (feeding energy into the grid normal) | Reset time and date on the inverter |
| 754 - 755 | Provides information about the internal processor status | Warning message on the display | *) |
| 757 | Hardware error in the Real Time Clock module | Error message on the display; the inverter is not feeding any energy into the grid | *) |
| 758 | Internal error: Real Time Clock module is in emergency mode | Time may be inaccurate or lost (feeding energy into the grid normal) | Reset time and date on the inverter |
| 760 | Internal hardware error | Error message on the display | *) |

| Code | Description | Behaviour | Remedy |
|------|-------------|-----------|--------|
| 761 - 765 | Provides information about the internal processor status | Warning message on the display | *) |
| 766 | Emergency power limitation has been activated (max. 750 W) | Error message on the display | *) |
| 767 | Provides information about the internal processor status | Warning message on the display | *) |
| 768 | Different power limitation in the hardware modules | Warning message on the display | *) |
| 772 | Data storage unit not available | Warning message on the display | *) |
| 773 | Software update group 0 (invalid country setup) | Warning message on the display | *) |
| 775 | PMC power stage set not available | Warning message on the display | Press "Enter" key to acknowledge error; *) |
| 776 | Invalid device type | Warning message on the display | Press "Enter" key to acknowledge error; *) |
| 781 - 794 | Provides information about the internal processor status | Warning message on the display | *) |

*) If the status code is displayed all the time: Notify a Fronius-trained service engineer.

**Status codes – Class 9**

Class 9 status codes are only displayed on the system monitoring page and are not shown on the inverter display.

| Code | Description | Behaviour | Remedy |
|------|-------------|-----------|--------|
| 975 | Software on device is inconsistent | The inverter is not feeding any energy into the grid. | Update inverter firmware; *) |
| 976 | Unregistered battery module detected | Battery operation not possible, feed-in resumes | Enter activation key for battery module; *) |
| 977 | Incorrect number of battery modules connected to Fronius Solar Battery | Too many modules detected: Battery operation not possible<br>Too few modules detected: Error message output, operation resumes | Enter activation key for battery module; *) |
| 978 | Communication error between Fronius Symo Hybrid and Fronius Solar Battery | Battery operation not possible, feed-in resumes | Check wiring; **) |
| 979, 980 | No communication between Fronius Symo Hybrid and Fronius Solar Battery | Battery operation not possible, feed-in resumes | Switch on Fronius Solar Battery; check wiring; **) |
| 981 | Software version of Fronius Solar Battery is inconsistent | Battery operation not possible, feed-in resumes | *) |
| 983 | Communication error between battery controller and battery modules | Battery operation not possible, feed-in resumes | Check wiring in Fronius Solar Battery; check numbers of individual battery modules; check termination plug |
| 984 | Battery controller has stopped Charge mode | Battery operation not possible, feed-in resumes | Check error message on Fronius Solar Battery display; *) |

| Code | Description | Behaviour | Remedy |
|------|-------------|-----------|--------|
| 985 | Undervoltage at Fronius Solar Battery | Fronius Solar Battery has tripped due to undervoltage. Battery operation not possible, feed-in resumes | *) |
| 986 | Overtemperature at Fronius Solar Battery | Fronius Solar Battery has tripped due to overtemperature. Battery operation not possible, feed-in resumes | Reduce ambient temperature; switch off Fronius Solar Battery and activate it again after waiting an appropriate amount of time; *) |
| 987 | Undertemperature at Fronius Solar Battery | Fronius Solar Battery has tripped due to undertemperature. Battery operation not possible, feed-in resumes | Increase ambient temperature; switch off Fronius Solar Battery and activate it again after waiting an appropriate amount of time; *) |
| 988 | Communication error between Fronius Symo Hybrid and Fronius Smart Meter | No meter data available Battery operation not possible, feed-in resumes | Check wiring; **) |
| 989 | No communication between Fronius Symo Hybrid and Fronius Smart Meter | No meter data available Battery operation not possible, feed-in resumes | Check wiring; check Fronius Smart Meter power supply; **) |

*) If the status code is displayed all the time: Notify a Fronius-trained service engineer.

**) If this status code keeps recurring, contact your system engineer.

**Class 10 - 12 status codes**

| **1000 - 1299**- Provide information on the status of the internal processor program | |
|---|---|
| Description | Is of no concern when the inverter is working properly and only appears in the "Status PS" setup parameter. In the event of an actual error, this status code assists Fronius Technical Support during the error analysis. |

**Customer service**

**IMPORTANT!** Contact your Fronius dealer or a Fronius-trained service technician if
- an error appears frequently or all the time
- an error appears that is not listed in the tables

**Operation in dusty environments**

When operating the inverter in extremely dusty environments:
when necessary, clean the cooling elements and fan on the back of the inverter as well as the air intakes at the wall bracket using clean compressed air.

# Fronius Solar Battery

**Status code display**

The storage system performs a system self-diagnosis that automatically detects many faults that may occur. These are indicated on the display or via LEDs. This means you are promptly made aware of malfunctions in the storage system, or of any installation or operating faults.

If the system self-diagnosis has detected a specific fault, the associated status code will be shown on the display.

**Error messages – Battery management module**

| Indicator | Details | Solution |
|---|---|---|
| NO MODULE | No module | Connect modules |
| | If modules are connected | The message on the left appears even if modules are connected. Check whether they have been connected properly. |
| OV Error | Overvoltage | Discharge |
| DISCHARGE ERR | Deep discharge | Charge |
| COMM ERR or CON= ------------ -ooox | Error affecting communication with connected modules. The example on the left illustrates a scenario in which one module (no. 00) is affected by a communication error, 3 modules (nos. 01, 02 and 03) are connected and the other addresses are without a connection. | |
| COMM OFF MODE | For maintenance only | |
| No information displayed | Wiring error, storage module addressing error or system-critical error | Check wiring, check address settings for individual storage modules |

**Error message – Data converter**

If the data converter detects an error, the "State" LED lights up steady red to signal that an error has occurred. At the same time, the associated error messages are displayed via the "Error No" LEDs in accordance with table below. There are two different error categories: Serious errors (1 - 5): In this case, the data converter has to be switched off and then back on again. If the error recurs, the data converter must be replaced and sent away for repair. Warnings (6 - 15): These warnings are displayed for information only. They appear for 1 minute and are then reset automatically. If these warnings occur quite frequently, Customer Services should be notified accordingly.

These displays are not applicable in Configuration mode and are intended for internal purposes only.

| LED8 | LED4 | LED2 | LED1 | Error no. or ID | Display |
|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | Reserved |
| 0 | 0 | 0 | 1 | 1 | Hardware fault |
| 0 | 0 | 1 | 0 | 2 | EEROM fault |

| 0 | 0 | 1 | 1 | 3 | Internal memory error |
|---|---|---|---|---|---|
| 0 | 1 | 0 | 0 | 4 | Fieldbus hardware fault |
| 0 | 1 | 0 | 1 | 5 | Script error |
| 0 | 1 | 1 | 0 | 6 | Reserved |
| 0 | 1 | 1 | 1 | 7 | RS transmission buffer overflow |
| 1 | 0 | 0 | 0 | 8 | RS receiver buffer overflow |
| 1 | 0 | 0 | 1 | 9 | RS timeout |
| 1 | 0 | 1 | 0 | 10 | General fieldbus error |
| 1 | 0 | 1 | 1 | 11 | Parity error or stop bit error (frame check) |
| 1 | 1 | 0 | 0 | 12 | Reserved |
| 1 | 1 | 0 | 1 | 13 | Fieldbus configuration error |
| 1 | 1 | 1 | 0 | 14 | Fieldbus data buffer overflow |
| 1 | 1 | 1 | 1 | 15 | Reserved |

**Undefined operating statuses**

**Battery switches off during start-up procedure:**
Keep the battery switched off for at least 120 minutes and then switch it on again. If this does not resolve the error, notify Customer Services.

**Battery switched off with a SOC (state of charge) of 0%:**
Communication error – Disconnect the inverter on the DC side and isolate it from the grid on the AC side. Wait 5 minutes and then reconnect the inverter on both the DC and AC sides. If this does not resolve the error, notify Customer Services.

**Battery active, state of charge (SOC) is more than 90% and red LED is flashing:**
Battery charging error – Disconnect the inverter on the DC side and isolate it from the grid on the AC side. Wait 30 minutes and then reconnect the inverter on both the DC and AC sides. If this does not resolve the error, notify Customer Services.

**Battery not charging or discharging (SOC indicated on web interface does not match that of the battery):**
Check whether battery is switched on – If it is not, switch it on.
If it is, there is a communication error – Disconnect the inverter on the DC side and isolate it from the grid on the AC side. Wait 5 minutes and then reconnect the inverter on both the DC and AC sides. If this does not resolve the error, notify Customer Services.

**Battery no longer being displayed on web interface (triangular view instead of square view):**
Check whether battery is switched on – If it is not, switch it on.
If it is, there is a communication error – Disconnect the inverter on the DC side and isolate it from the grid on the AC side. Wait 5 minutes and then reconnect the inverter on both the DC and AC sides. If this does not resolve the error, notify Customer Services.

**Whenever an error message of any kind appears on the battery display:**
Disconnect the inverter on the DC side and isolate it from the grid on the AC side. Wait 5 minutes and then reconnect the inverter on both the DC and AC sides. If this does not resolve the error, notify Customer Services.

**Unusual increase in temperature or strange smells:**
Switch off the system (battery main switch, DC side of inverter), ventilate the room and inform Customer Services.

# Appendix

# Technical data

| Fronius Symo Hybrid | 3.0-3-S | 4.0-3-S | 5.0-3-S |
|---|---|---|---|
| **Input data** | | | |
| PV input power | 5 kW | 6.5 kW | 8 kW |
| MPP voltage range | 190 - 800 V DC | 250 - 800 V DC | 315 - 800 V DC |
| Max. input voltage (at 1000 W/m²/ -10 °C in an open circuit) | 1000 V DC | | |
| Feed-in start voltage | 200 V | | |
| Nominal input voltage | 595 V | | |
| Min. input voltage | 150 V DC | | |
| Max. input current | 1 x 16.0 A | | |
| Max. short circuit current of the solar modules ($I_{SC\ PV}$) | 24.0 A | | |
| Number of MPP trackers | 1 | | |
| Number of DC connections | 2 | | |
| **Battery input** | | | |
| Max. output power to battery | Dependent on connected Fronius Solar Battery | | |
| Max. input power from battery | Dependent on connected Fronius Solar Battery | | |
| **Output data** | | | |
| Nominal output power ($P_{nom}$) | 3000 W | 4000 W | 5000 W |
| Max. output power | 3000 VA | 4000 VA | 5000 VA |
| Nominal grid voltage | 3~ NPE 400/230 V3~ NPE 380/220 V (+20% / -30%) | | |
| Max. output current | 4.5 A | 6.0 A | 7.6 A |
| Frequency (frequency range) | 50 Hz / 60 Hz (45 - 65 Hz) | | |
| Total harmonic distortion | < 3% | | |
| cos phi power factor | 0.85 - 1 ind./cap.[2] | | |
| Power-up current pulse[6] and duration | 38 A / 2 ms | | |
| Max. overcurrent protection | 25 A | | |
| **General data** | | | |
| Max. efficiency (PV - grid) | 97.5% | 97.6 | |
| Max. efficiency (PV - battery - grid) | > 90% | > 90% | > 90% |
| Europ. efficiency (PV - grid) | 95.2% | 95.7% | 96% |
| Cooling | Controlled forced-air ventilation | | |
| Degree of protection | IP65 | | |
| Dimensions h x w x d | 645 x 431 x 204 mm | | |
| Weight | 22 kg | | |
| Permissible ambient temperature | -25 °C - +60 °C | | |
| Permitted humidity | 0 - 100% | | |
| EMC device class | B | | |
| Overvoltage category DC / AC | 3 / 2 | | |
| Pollution level | 2 | | |
| Noise emission | 59.5 dB(A) ref. 1pW | | |
| **Protection devices** | | | |
| DC insulation measurement | Integrated | | |
| Response to DC overload | Operating point shift, power limitation | | |

| Fronius Symo Hybrid | 3.0-3-S | 4.0-3-S | 5.0-3-S |
|---|---|---|---|
| DC disconnector | Integrated | | |
| RCMU | Integrated | | |

| Fronius Solar Battery | Battery 4.5 | Battery 6.0 | Battery 7.5 |
|---|---|---|---|
| **Electrical parameters** | | | |
| Nominal capacity | 4.5 kWh | 6 kWh | 7.5 kWh |
| Usable capacity | 3.6 kWh | 4.8 kWh | 6 kWh |
| Cycle stability | 8000 | | |
| Voltage range | 120 - 170 V | 160 - 230 V | 200 - 290 V |
| Nominal charging power | 2400 W | 3200 W | 4000 W |
| Nominal discharge power | 2400 W | 3200 W | 4000 W |
| Max. charging current (limited by inverter) | 16.0 A | | |
| Max. discharge current (limited by inverter) | 16.0 A | | |
| **General data** | | | |
| Battery technology | LiFePO4 | | |
| Dimensions h x w x d | 955 x 570 x 611 mm | | |
| Weight | 91 kg | 108 kg | 125 kg |
| Degree of protection | IP 20 | | |
| Protection class | 1 | | |
| Permissible ambient temperature | 5 °C - 35 °C | | |
| Permissible storage temperature | -40 °C - 65 °C | | |
| Permitted humidity | 0% - 95% (non-condensing) | | |
| **Interfaces** | | | |
| Connection to inverter | Modbus RTU (RS485) | | |

| Fronius Solar Battery | Battery 9.0 | Battery 10.5 | Battery 12.0 |
|---|---|---|---|
| **Electrical parameters** | | | |
| Nominal capacity | 9 kWh | 10.5 kWh | 12 kWh |
| Usable capacity | 7.2 kWh | 8.4 kWh | 9.6 kWh |
| Cycle stability | 8000 | | |
| Voltage range | 240 - 345 V | 280 - 400 V | 320 - 460 V |
| Nominal charging power | 4800 W | 5600 W | 6400 W |
| Nominal discharge power | 4800 W | 5600 W | 6400 W |
| Max. charging current (limited by inverter) | 16.0 A | | |
| Max. discharge current (limited by inverter) | 16.0 A | | |
| **General data** | | | |
| Battery technology | LiFePO4 | | |
| Dimensions h x w x d | 955 x 570 x 611 mm | | |
| Weight | 142 kg | 159 kg | 176 kg |
| Degree of protection | IP 20 | | |
| Protection class | 1 | | |
| Permissible ambient temperature | 5 °C - 35 °C | | |
| Permissible storage temperature | -40 °C - 65 °C | | |
| Permitted humidity | 0 - 95% | | |

| Fronius Solar Battery | Battery 9.0 | Battery 10.5 | Battery 12.0 |
|---|---|---|---|
| **Interfaces** | | | |
| Connection to inverter | Modbus RTU (RS485) | | |

**System monitoring**

| | |
|---|---|
| Supply voltage | 12 V DC |
| Energy consumption | < 2 W |
| Dimensions | 132 x 103 x 22 mm<br>5.2 x 4.1 x 0.9 in. |
| Ethernet (LAN) | RJ45, 100 Mbit |
| WLAN | IEEE 802.11b/g/n client |
| Ambient temperature | -20 - +65 °C<br>-4 - +149 °F |
| I/O connection specifications | |
| Voltage level of digital inputs | Low = min. 0 V - max. 1.8 V<br>High = min. 3 V - max. 24 V (+20%) |
| Input current values of digital inputs | Dependent on input voltage;<br>input resistance = 46 kohms |
| Switching capacity of digital outputs when supplied by Datamanager plug-in card | 3.2 W |
| | 12.8 V<br>in total for all 4 digital outputs |
| Max. switchable inductive loads at digital outputs | 76 mJ<br>(per output) |
| Modbus RTU | RS485 2-wire |
| Factory settings for RS485 interface:<br>Speed<br>Data frames | 9600 baud<br>1 start bit<br>8 Data bits<br>No parity<br>1 stop bit |

**Explanation of footnotes**

1) The values stated are defaults; the inverter is configured specifically to suit the requirements of the relevant country.
2) Depending on the country setup or device-specific settings (ind. = inductive; cap. = capacitive)
3) PCC = interface to the public grid
4) Maximum current from the inverter to the solar module when an error occurs in the inverter
5) Guaranteed by the electrical configuration of the inverter
6) Current peak when switching on the inverter

| **Applicable standards and guidelines** | **Fronius Symo Hybrid:** |
|---|---|

**CE mark**
The devices conform to all the requisite and relevant standards and guidelines that form part of the relevant EU directive, and are therefore permitted to display the CE mark.

**Emergency power operation**
This version of the hybrid inverter is only intended for use in grid connected photovoltaic systems. A device update is required from the manufacturer in order to generate power separately from the public grid. As well as providing functional enhancements for the hardware and software, this update also includes relevant user documentation.
The hybrid inverter is delivered ready for supplying emergency power.

**Grid failure**
The standard measurement and safety procedures integrated into the inverter ensure that the feed-in of energy is immediately interrupted in the event of a grid failure (e.g. switch-off by the energy supplier or damage to lines).

**Fronius Solar Battery:**
- IEC/EN 62133
- EN 50178 (1997)
- EN 61000-6-2:2005
- EN 61000-6-3:2007 + A1:2011
- EN 62208
- EN 62311:2008
- FCC Part 15 Subpart B:2012 Class B
- IEC 60730-1 (Fourth Edition) 2010 (H.7, H.11.12, H.27.1.2)
- UN 38.3
- 60730-1 2011 (H.7, H.11.12, H.27.1.2)

# Warranty terms and conditions, and disposal

**Fronius manufac-turer's warranty**

Detailed, country-specific warranty terms are available on the internet: 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.

**Disposal**

If you need to replace your inverter or your battery at some point, Fronius will take back the old device and arrange for it to be recycled in an appropriate manner.