



SHIFTING THE LIMITS

Fronius Primo 208-240
3.8-1 / 5.0-1 / 6.0-1
7.6-1 / 8.2-1

EN-US

Operating Instructions

Inverter for grid-connected photo-voltaic systems

FR

Instructions de service

Onduleur pour installations photo-voltaïques connectées au réseau

ES

Manual de instrucciones

Inversores para instalaciones foto-voltaicas acopladas a la red



**USA FRONIUS Technical support contact information:
Mon. – Fri. 8:00 am – 7:00 pm CST (excluding holidays)
(219) 734-5500 or Toll Free 1-877-FRONIUS**

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 familiarize 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 Instructions



DANGER! Indicates an immediate danger. Death or serious injury may result if appropriate precautions are not taken.



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



CAUTION! Indicates a situation where damage or injury could occur. Minor injury or damage to property may result if appropriate precautions are not taken.



NOTE! Indicates the possibility of flawed results and 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," special care is required.

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Safety rules

General



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

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

All persons involved in start-up operation, maintenance and servicing for the device must

- be suitably qualified
- have knowledge of and experience in dealing with electrical installations and
- have completely read and followed these operating instructions.

The operating instructions must always be at hand wherever the device is being used. In addition to the operating instructions, all applicable local rules and regulations regarding accident prevention and environmental protection must also be followed.

All safety and danger notices on the device

- must be kept in a legible state
- must not be damaged/marked
- must not be removed
- must not be covered, pasted or painted over.



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 operating company
- inefficient operation of the device.

Safety equipment that is not fully functional must be repaired by an authorized specialist before the device is turned on.

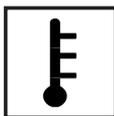
Never bypass or disable protection devices.

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

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

Your personal safety is at stake!

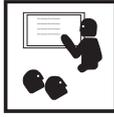
Environmental Conditions



Operation or storage of the device outside the stipulated area will be deemed as "not in accordance with the intended purpose." The manufacturer is not responsible for any damages resulting from unintended use.

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

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 also applies to those who may be qualified.



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



Maintenance and repair work must only be carried out by authorized personnel.

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

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

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

Data Regarding Noise Emission Values



The inverter generates a maximum sound power level of <math>< 65 \text{ dB(A)}</math> (ref. 1 pW) when operating under full load in accordance with IEC 62109-1:2010.

The device is cooled as quietly as possible with the aid of an electronic temperature control system, and 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.

Safety symbols



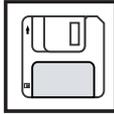
Devices marked with the CSA test mark satisfy the requirements of the relevant standards for Canada and the USA.

Disposal



Dispose of in accordance with the applicable national and local regulations.

Backup



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

Copyright

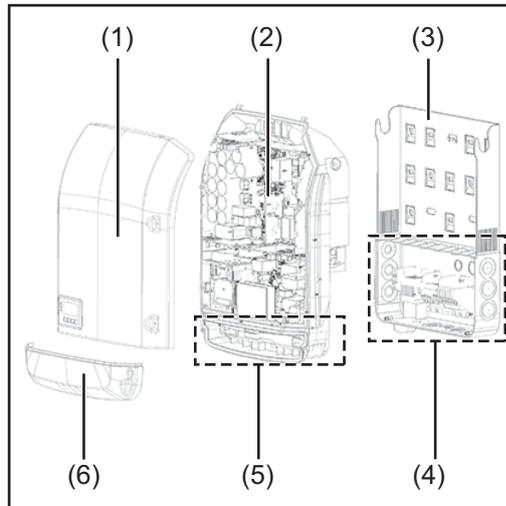


Copyright of these operating instructions remains with the manufacturer.

Text and illustrations are technically correct at the time of going to print. The right to make modifications is reserved. 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 operating instructions, we will be most grateful for your comments.

General

Device concept



Device construction:

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

The inverter transforms the direct current generated by the solar modules into alternating AC current. This alternating current is fed into your home system or into the public grid and synchronized with the voltage that is used there.

The inverter has been designed exclusively for use in grid-connected photovoltaic systems. It cannot generate electric power independently of the grid.

The design and function of the inverter provide a maximum level of safety during both installation and operation.

The inverter automatically monitors the public grid. Whenever conditions in the electric grid are inconsistent with standard conditions (for example, grid switch-off, interruption), the inverter will immediately stop operating and interrupt the supply of power into the grid. Grid monitoring is carried out using voltage monitoring, frequency monitoring and monitoring islanding conditions.

The inverter is fully automatic. Starting at sunrise, as soon as the solar modules generate enough energy, the inverter starts monitoring grid voltage and frequency. As soon as there is a sufficient level of irradiance, the solar inverter starts feeding energy into the grid. The inverter ensures that the maximum possible power output is drawn from the solar modules at all times.

As there is no longer sufficient energy available to feed power into the grid, the inverter shuts down the grid connection completely and stops operating. All settings and recorded data are saved.

If the inverter temperature exceeds a certain value, the inverter derates automatically the actual output power for self protection.

The cause for a too high inverter temperature can be found in a high ambient temperature or an inadequate heat transfer away (eg for installation in control cabinets without proper heat dissipation).

Intended Use

The inverter is designed exclusively to be connected and used with nongrounded solar modules. The solar modules cannot be grounded at either the positive or negative pole.

The solar inverter is designed exclusively to convert direct current from solar modules into alternating current and feed this power into the public grid.

The following are deemed not to be in conformity with its intended purpose:

- utilization for any other purpose, or in any other manner
- alterations to the inverter that are not expressly recommended by Fronius
- installation of components that are not expressly recommended or sold by Fronius.

The manufacturer is not responsible for any damage resulting from improper use.

All warranty claims are considered void in such cases.

Proper use also means

- carefully reading and obeying all the instructions and safety and danger notices in the operating instructions
- carrying out all the specified inspection and servicing work
- installation as per operating instructions.

When configuring the photovoltaic system, make sure that all photovoltaic system components are operating completely within their permitted operating range.

All measures recommended by the solar module manufacturer for maintaining solar module properties must be followed.

Utility company regulations regarding grid power feed must be followed.

**Information on
"Field Adjustable
Trip Points" and
"Advanced Grid
Features"**

The inverter is equipped with field adjustable trip points and advanced grid features. For further information, please contact Fronius technical support at the following e-mail address: pv-us-support@fronius.com.

FCC / RSS Compliance



FCC

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

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

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

Industry Canada RSS

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

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

Insulation Monitoring

The inverter is fitted with the following safety function as required by UL 1741 and the National Electrical Code:

Insulation monitoring

In photovoltaic systems with ungrounded solar modules, the inverter checks the resistance between the photovoltaic system's positive or negative pole and the ground potential. In the case of a short circuit between the DC+ or DC- cable and the ground (e.g., due to poorly insulated DC cables or faulty solar modules) the inverter disconnects from the grid.

Arc Detector / Interrupter

The inverter has an integrated arc detector / interrupter, which detects and deletes serial arcs.

A serial arc may occur after the following example errors or situations:

- poorly connected DC plug
- defective solar module connection sockets
- high resistance solder connections between the cells of a solar module
- incorrect cable connected to the input terminal of an inverter
- defective DC cables that allow a connection to the ground.

If an arc is detected, the power is shut down and the grid power feed operation is interrupted. A status code appears on the display.

The status code on the display must be reset manually before the grid power feed operation can be resumed.

The power shut down also deletes the serial arc.

NOTE! Power optimizers for solar modules or data transfer via DC cables (PLC – Power Line Communication) in the PV system can compromise the correct function of the arc detector / interrupter.
 When using such components, it is the responsibility of the system installer to ensure that the arc detector / interrupter functions correctly. Contact Fronius Technical Support for further information.

Warning Notices Affixed to the Device

The inverter contains and displays warning notices and safety symbols. These warning notices and safety symbols must NOT be removed or painted over. The notices and symbols warn against operating the equipment incorrectly, as this may result in serious injury and damage.



Safety Symbols:



Danger of serious injury or damage due to incorrect operation



Do not use the functions described until you have thoroughly read and understood the following documents:

- these operating instructions
- all operating instructions for system components of the photovoltaic system, especially the safety rules



Dangerous electrical voltages



You must wait until the capacitors have discharged

Text of Warning Notices:

**WARNING!
 Danger of electric shock
 Non-Isolated Inverter**

Do not remove cover. No user serviceable parts inside. Refer servicing to qualified service personnel.

Both AC and DC voltage sources are terminated inside this equipment. Each circuit must be individually disconnected before servicing.

When the photovoltaic array is exposed to light, it supplies DC voltage to this equipment. Risk of electric shock from energy stored in capacitor. After disconnecting all sources of supply, wait 5 minutes before removing cover.

The DC conductors of this photovoltaic system are normally ungrounded but will become intermittently grounded without indication when the inverter measures the PV array isolation.

Ungrounded System: The DC lines of this PV system are not grounded and may be energized.

Data Communication and Solar Net

Fronius Solar Net and Data Interface

Fronius developed Solar Net to make these system add-ons flexible and capable of being used in a wide variety of different applications. Fronius Solar Net is a data network that enables several inverters to be linked to the system add-ons.

Fronius Solar Net is a bus system with ring topology. Just one suitable cable is enough to provide communication between one or more inverter connected to Fronius Solar Net and a system add-on.

Different system add-ons are automatically recognized by Fronius Solar Net.

In order to distinguish between several identical system add-ons, each one must be assigned a unique number.

In order to clearly define each inverter in Fronius Solar Net, each inverter must also be assigned an individual number.

You can assign individual numbers as per the "SETUP Menu" section in this manual.

More detailed information on individual system upgrades can be found in the relevant operating instructions or on the internet at <http://www.fronius.com>

More detailed information on cabling DATCOM components can be found at



→ <http://www.fronius.com/QR-link/4204101938>

Installing Option Cards in Inverters

Information on installing option cards in the inverters and for connecting data communication cables can be found in the installation instructions.

System monitoring

General

If no device special version is present, the inverter is equipped with Wi-Fi enabled system monitoring Fronius Data Manager 2.0.

The monitoring system includes inter alia the following functions:

- own website with display of actual data and a wide variety of settings
- direct connection-possibility to Fronius Solar.web
- automatic sending of service messages via SMS or e-mail in case of errors
- Internet connection via WiFi or LAN
- Possibility to control the inverter by setting of power limits, minimum or maximum operational times or target operational times
- Controlling the inverter via Modbus (tcp / rtu)
- Allocation of control priorities
- Controlling the inverter by connected meters (Fronius Smart Meter or S0 meter)
- Controlling the inverter via a ripple control signal receiver (eg reactive power setting or power setting)
- dynamic power reduction considering the own consumption

Further information about the Fronius Data Manager 2.0 can be found online in the Fronius Data Manager 2.0 operating instructions.

Starting for the First Time via the Fronius Solar.web App



NOTE! The Fronius Solar.web App makes starting Fronius Datamanager 2.0 for the first time significantly easier.

The Fronius Solar.web App is available in the relevant app store.



To start Fronius Datamanager 2.0 for the first time,

- the Fronius Datamanager 2.0 plug-in card must be installed in the inverter, or
- there must be a Fronius Datamanager Box 2.0 in the Fronius Solar Net ring.

IMPORTANT! To establish a connection to Fronius Datamanager 2.0, the end device in question (e.g., laptop, tablet) must be configured as follows:

- "Obtain an IP address automatically (DHCP)" must be activated



WARNING! An electric shock can be fatal. Danger from grid voltage and DC voltage from solar modules.

Before opening the inverter:

- You must wait until the capacitors have discharged.
- Follow the operating instructions when opening the inverter.
- Observe the safety rules and safety instructions contained in the inverter's operating instructions.

- 1 Connect the inverters with Fronius Datamanager 2.0 or Fronius Datamanager Box 2.0 in Fronius Solar Net

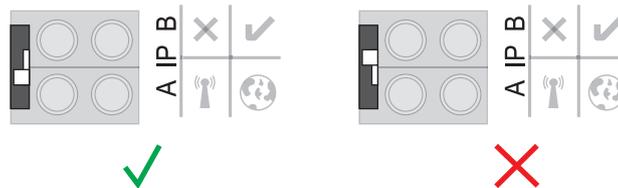
IMPORTANT! Inverters Fronius IG, Fronius IG Plus, Fronius IG Plus V, Fronius IG Plus A, Fronius CL, Fronius CL USA, and Fronius IG 300–500 must always be located at the beginning or end of the Fronius Solar Net ring.

- 2** For Fronius Galvo/Fronius Symo/Fronius Primo only and when linking multiple inverters in Fronius Solar Net:
Set the Fronius Solar Net master/slave switch on the Fronius Datamanager 2.0 plug-in card as required
- One inverter with Fronius Datamanager 2.0 = master
 - All other inverters with Fronius Datamanager 2.0 = slave (the LEDs on the Fronius Datamanager 2.0 plug-in cards are off)

3 Switch the device to service mode

Inverter with Fronius Datamanager 2.0 plug-in card:

- Switch the IP switch on the Fronius Datamanager 2.0 plug-in card to position A



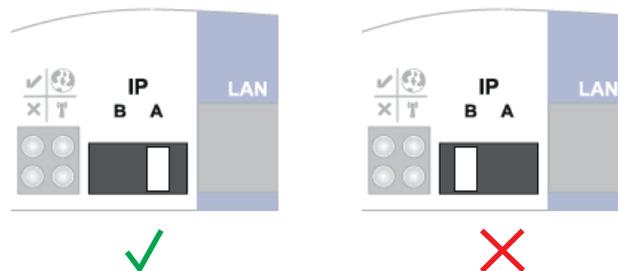
or

- Activate the WIFI Access Point via the Setup menu of the inverter (the performance of this function depends on the inverter software)



Fronius Datamanager Box 2.0:

- Switch the IP switch on the Fronius Datamanager Box 2.0 to position A



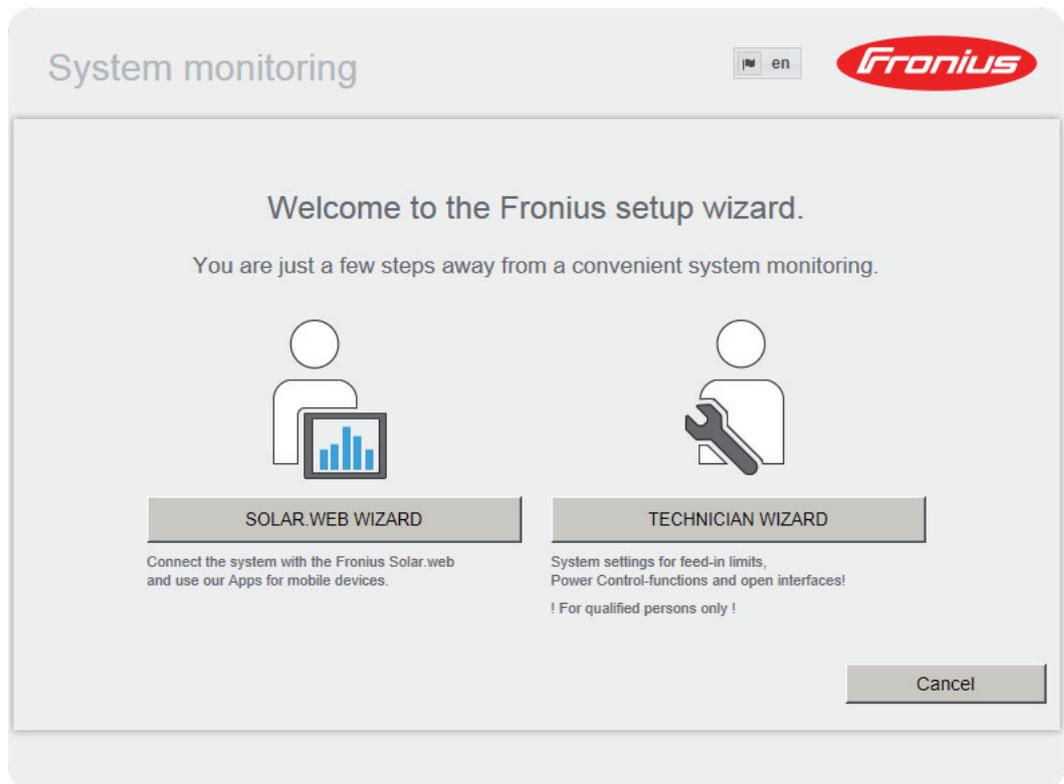
The inverter/Fronius Datamanager Box 2.0 establishes the WLAN Access Point. The WLAN Access Point stays open for one hour.

4 Download Fronius Solar.web App



5 Run Fronius Solar.web App

The start page of the Commissioning Wizard appears.



The Technician Wizard is designed for the installer and includes standard-specific settings. Running the Technician Wizard is optional. If the Technician Wizard is run, it is essential to note down the assigned service password. This service password is required to configure the UC Editor and Counter menu items. If the Technician Wizard is not run, no specifications for power reduction are set.

The Solar Web Wizard must be run.

6 If necessary, run the Technician Wizard and follow the instructions

7 Run the Solar Web Wizard and follow the instructions

The Fronius Solar.web start page appears.

or

The Fronius Datamanager 2.0 website opens.

More Information on Fronius Data-manager 2.0

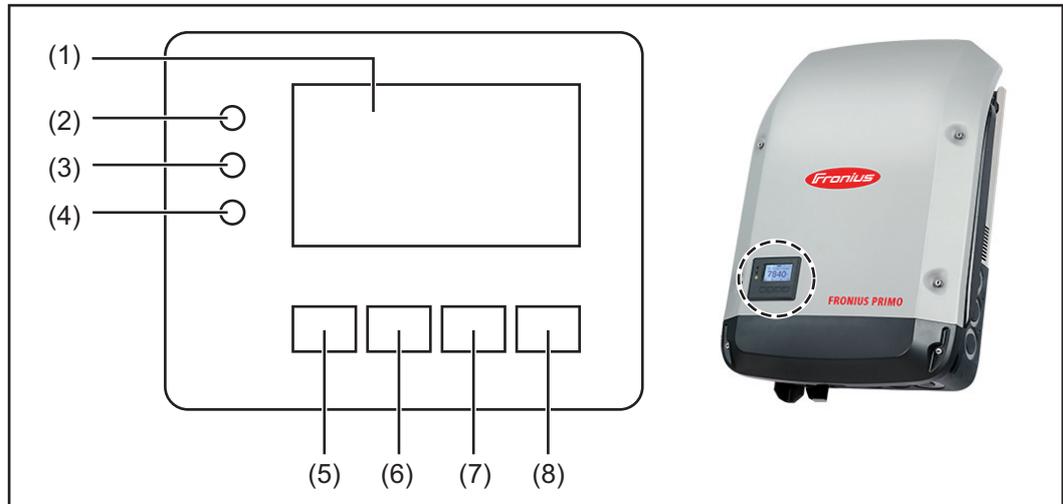
Detailed information on Fronius Datamanager 2.0 can be found at:



→ <http://www.fronius.com/QR-link/4204260191EA>

Keys and symbols

Keys and Symbols



Item	Description
(1)	Display for displaying values, settings, and menus
Control and Status LEDs	
(2)	General Status LED (red) indicates <ul style="list-style-type: none"> - when a status code is shown on the display - interruption of grid power feed operation - during troubleshooting (the inverter is waiting to be reset or for an error to be corrected).
(3)	Startup LED (orange) indicates <ul style="list-style-type: none"> - if the inverter will enter the automatic startup or self test phase (as soon as the solar modules yield sufficient power output after sunrise) - if the inverter has been set to standby operation in the Setup menu (= manual shutoff of operation) - when the inverter software is being updated.
(4)	Operating Status LED (green) indicates <ul style="list-style-type: none"> - if the photovoltaic system is working fault-free following the automatic start-up phase of the inverter - when the grid power feed operation is taking place.
Function keys – each has a different function depending on the selection:	
(5)	"Left/Up" key for navigating left and up
(6)	"Down/Right" key for navigating down and right
(7)	"Menu/Esc" key for switching to the menu level to exit the Setup menu
(8)	"Enter" key for confirming a selection

The keys are capacitive keys; if they become wet their function may be compromised. Wipe the keys dry with a cloth if necessary to ensure optimal function.

Display

Power for the display comes from the AC grid voltage. The display can be available all day long depending on the setting in the Setup menu.

IMPORTANT! The inverter display is not a calibrated measuring instrument. Slight deviation from the utility company meter is intrinsic to the system. A calibrated meter is required to make calculations 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 area, display mode

SETUP 1 [E] [ψ]	Energy-Manager (**) Inv. no. Save symbol USB conn.(***)
Standby	Menu item
WiFi Access Point	Previous menu items
DATCOM	Currently selected menu item
USB	Next menu items
Relay	Function key functions
(*) ↑ ↓ ↵ ↶ ↷	

Display area, setup mode

- (*) Scroll bars
- (**) The Energy Manager symbol is displayed if the Energy Manager function has been activated
- (***) WR no. = Inverter DATCOM number,
Store icon – appears briefly when set values are stored,
USB connection – appears if a USB stick has been inserted

Menu level

Activating Display Illumination

- 1 Press any key.

The display illumination is activated.

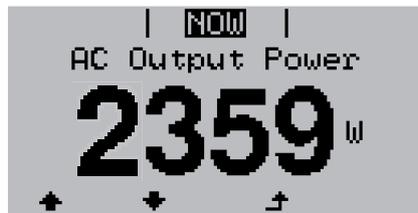
The SETUP menu item offers the choice between a permanently lit or permanently dark display under "Display Settings."

Automatic Deactivation of Display Illumination / Switching to the "NOW" Display Mode

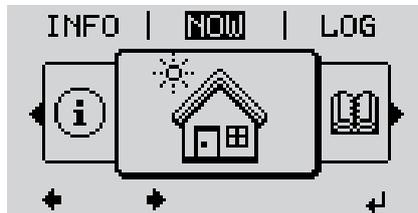
If no key is pressed for 2 minutes:

- the display illumination turns off automatically and the inverter switches to the "NOW" display mode (if the display illumination is set to automatic)
 - the inverter can be switched to the "NOW" display mode from any menu level, except for the "Standby" menu item
 - the current output power is displayed.
-

Accessing the Menu Level



- 1 Press the "Menu" key

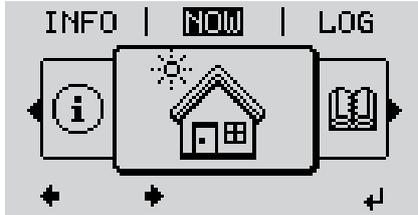


The display switches to the menu level

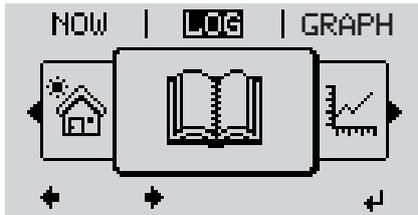
- 2 Select the desired menu item using the "Left" or "Right" key
- 3 Access the desired menu item by pressing the "Enter" key

Menu items NOW, LOG, and GRAPH

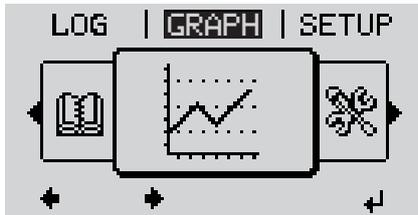
NOW
LOG
GRAPH



NOW
(displays real-time values)



LOG
(data logged on the current day, from the current calendar year, and since using the inverter for the first time)



GRAPH
graphically represents the course of the output power during the day. The time axis is automatically scaled

Press the "Back" key to close the display

Values Displayed in the Menu Items NOW and LOG

Data displayed in menu item NOW:

Output power (W)
Grid voltage (V)
Output current (A)
Grid frequency (Hz)
Solar voltage (V)
Solar current (A)
Time
Time on the inverter or Fronius Solar Net ring
Date
Date on the inverter or Fronius Solar Net ring

Data displayed in menu item LOG:

(for the current day, the current calendar year, and since using the inverter for the first time)

Output energy (kWh / MWh)
energy fed into the grid during the monitored period

Due to the variety of different monitoring systems, there can be deviations between the readings of other metering instruments and the readings from the inverter. For determining the energy supplied to the grid, only the readings of the calibrated meter supplied by the electric utility company are relevant.

Maximum output power (W)
highest power feeding in during the monitored period

Yield
amount of money earned during the monitored period (currency can be selected in the Setup menu)

As was the case for the output energy, readings may differ from those of other instruments.

"The Setup Menu" section describes how to set the currency and rate for the energy supplied.
The factory setting depends on the respective country-specific setup.

Maximum grid voltage (V)
highest reading of grid voltage during monitored period

Maximum solar voltage (V)
highest reading of solar module voltage during monitored period

Operating hours
indicates how long the inverter has been operating (HH:MM)

IMPORTANT! The time must be set correctly for day and year values to be displayed properly.

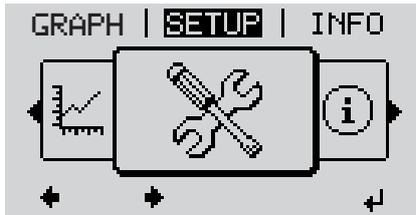
The SETUP menu item

Presetting

Following commissioning, the inverter is preconfigured according to the country setup.

The SETUP menu item enables you to easily customize the inverter's preset parameters to your needs.

SETUP



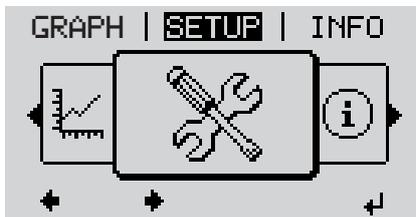
SETUP
(Setup menu)



NOTE! Because of software updates, certain functions may be available for your device but not described in these operating instructions or vice versa. In addition, individual figures may also differ slightly from the operating elements of your device. However, the function of these operating elements is identical.

Navigation in the SETUP Menu Item

Accessing the SETUP menu item



"SETUP" menu level selected

- 1 Select the "Setup" menu item at menu level using the "Left" or "Right" key
- 2 Press the "Enter" key



"Standby" item

The first SETUP menu item is displayed: "Standby"

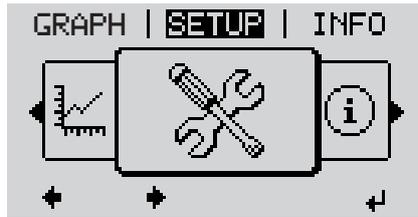
Scrolling through the items



Example: "WiFi Access Point" menu item

- 3 Scroll through the available menu items using the "Up" and "Down" keys

Exiting a menu item



- ▲ [4] To exit a menu item, press the "Back" key

The menu level is displayed

If no key is pressed for 2 minutes

- the inverter switches to the "NOW" menu item from anywhere within the menu level (exception: Setup menu item "Standby")
- the display illumination turns off
- the current power of feeding in is displayed.

General Setup Menu Item Settings

- [1] Accessing the SETUP menu item
- [2] Use the "Up" and "Down" keys to select the desired menu item
▲ ▼
- [3] Press the "Enter" key
↵

The first digit of a value to be set flashes:

- [4] Use the "Up" and "Down" keys to select a value for the first digit
▲ ▼
- [5] Press the "Enter" key
↵

The second digit of the value flashes.

- [6] Repeat steps 4 and 5 until...

the entire value flashes.

- [7] Press the "Enter" key
↵
- [8] Repeat steps 4–6 for units or other values to be set until the unit or value to be set flashes.
- [9] Press the "Enter" key to save and apply the changes.
↵

Press the "Esc" key to discard the changes.



The currently selected item is displayed.

The available settings are displayed:

- [4] Use the "Up" and "Down" keys to select the desired setting.
▲ ▼
- [5] Press the "Enter" key to save and apply the selection.
↵

Press the "Esc" key to discard the selection.



The currently selected item is displayed.

Application Example: Setting the Feed-In Tariff



↑ ↓ **1** Select the Setup menu item "Energy yield"

↵ **2** Press the "Enter" key



The overview of values that can be selected is displayed.

↑ ↓ **3** Use the "Up" or "Down" keys to select "Energy yield"

↵ **4** Press the "Enter" key



The feed-in tariff is displayed. The tens digit flashes.

+ - **5** Use the "Up" and "Down" keys to select a value for the tens digit.

↵ **6** Press the "Enter" key



The units digit flashes.

7 Repeat steps 5 and 6 for the units digit and for the three digits after the decimal point until ...



the set feed-in tariff flashes.

↵ **8** Press the "Enter" key



The feed-in tariff is applied; the overview of the values that can be set is displayed.

↑ **9** Press the "Esc" key



The Setup menu item "Energy yield" is shown.

The Setup menu item

Standby

Manual activation/deactivation of the standby mode

- No power is fed into the grid.
- The Startup LED lights up orange.
- In standby mode, no other menu item can be accessed or set in the menu level.
- The automatic switching to the "NOW" menu item after 2 minutes if no key is pressed is not activated.
- The Standby mode can only be deactivated manually by pressing the "Enter" key.
- Grid supply operation can be resumed at any time (deactivate "Standby").

Setting standby mode (manual shutoff for feeding energy into the grid):

1 Select the "Standby" item

2 Press the "Enter" key

The display alternates between "STANDBY" and "ENTER."

The Standby mode is now activated.

The Startup LED lights up orange.

Restoring the grid feed:

In Standby mode, the display alternates between "STANDBY" and "ENTER."

1 Press "Enter" to restore the grid power feed operation

The "Standby" item is displayed.

The inverter also switches to the Startup phase.

After the grid power feed operation is restored, the Operation Status LED lights up green.

WiFi Access Point

For activating / deactivating of the WiFi Access Point (e.g. to set a system monitoring)

Adjustment range

WiFi Access Point
[stopped]

Activate WiFi ?

↵ To activate the WiFi Access Point press the Enter key.

WiFi Access Point
[active]

The SS-ID (SS) and the password (PW) are displayed.

Deactivate WiFi AP ?

↵ To deactivate the WiFi Access Point press the Enter key.

WiFi Access Point
[not available]

Is displayed, when no system monitoring is present at the inverter.

DATCOM

Check of a data communication, entry of the inverter number, DATCOM night mode, protocol settings

Setting range Status / Inverter number / Protocol type

Status

Displays data communication available via Solar Net or an error that occurred in data communication

Inverter Number

Number setting (address) of the inverter in a setup where multiple solar inverters are linked together

Setting range 00 – 99 (00 = 100 inverter)

Factory setting 01

IMPORTANT! Each inverter must be assigned its own address when using multiple inverters in a data communications system.

Protocol type

Defines the communication protocol used to transmit data:

Setting range Solar Net / Interface Protocol *

Factory setting Solar Net

* The protocol type Interface Protocol only works without the Datamanager card. Available Datamanager cards must be removed from the inverter.

USB

Value settings when using a USB stick

Setting range Safely remove hardware / software update / logging interval

Safely remove hardware

To remove a USB stick from the USB A socket on the data communication rack without losing data.

The USB stick can be removed:

- when OK is displayed
- when the "Data Transfer" LED is no longer flashing or illuminated

Software update

For updating inverter software using a USB stick.

IMPORTANT! Firmware may only be updated by Fronius Service Technicians or Fronius Service Partners.

Procedure:

- 1 Download the "froxxxxx.upd" update file (e.g., at <http://www.fronius-usa.com>; xxxxx stands for the respective version number)



NOTE! To ensure problem-free updates of inverter software, the USB stick should have no hidden partitions and no encryption (see section "Suitable USB Sticks").

- 2 Save the update file to the highest data level of the USB stick
- 3 Open the data communication area
- 4 Insert the USB stick with the update file into the USB socket in the data communication area
- 5 In the Setup menu, select the menu item "USB" and then "Update Software"
- 6 Press the "Enter" key
- 7 Wait until a comparison of the current software version on the inverter and the new software version is displayed:
 - Page 1: Recerbo software (LCD), key controller software (KEY), country-setup version (SET)
 - Page 2: Power stage set software
- 8 Press the "Enter" key after every page

The inverter begins copying the data. "UPDATE" and the saving progress of the individual tests is displayed in % until the data for all electronic assemblies is copied.

After the copying is complete the inverter updates the required electronic assemblies one after the other. "UPDATE", the relevant assembly, and the update progress are displayed in %.

The inverter updates the display in the last step. The display remains dark for approx. 1 minute, the control and status LEDs flash.

When the software update is complete, the inverter switches to the startup phase and then to grid power feed operation. The USB stick can be removed.

Individual settings in the Setup menu are retained when the inverter software is updated.

Logging Interval

Activating / deactivating the logging function, as well as setting the logging interval

Unit	Minutes
Setting range	30 Min. / 20 Min. / 15 Min. / 10 Min. / 5 Min. / No Log
Factory setting	30 Min.
30 Min.	The logging interval is 30 minutes; new logging data are saved to the USB stick every 30 minutes.
20 Min.	
15 Min.	
10 Min.	
5 Min.	
No Log	No data are saved

IMPORTANT! The time must be set correctly in order for the logging function to work properly.

Relay

Activate Relay, Relay Settings, Relay Test

Setting range Relay Mode / Relay Test / Switch on Point* / Switch off Point*

* only shown if the 'E-manager' function has been activated under "Relay Mode."

Relay Mode

For selection of the various functions of the potential-free switching contact in the data communications area:

- Alarm function
- Active output
- Energy manager

Setting range ALL / Permanent / OFF / ON / E-manager

Factory setting ALL

Alarm function:

Permanent / Switches the potential-free switching contacts for continual and temporary service codes (e.g., brief interruption of grid power feed operation, a service code occurs a set number of times per day – can be set in the "BASIC" menu)

Active output:

ON: The potential-free switching contact NO is switched on at all times while the inverter is operating (as long as the display lights up or appears)

OFF: The potential-free switching contact NO is switched off

Energy manager:

E-manager: You can find additional information on the "Energy manager" function in the "Energy Manager" section below

Relay test

Functional test to check if the potential-free switching contact works

Switch on point (only if "Energy manager" function is activated)

for setting the effective power limit from which the potential-free switching contact will be switched on

Factory setting 1000 W

Setting range Switch off point – max. power rating of the inverter / W / kW

Switch off point (only if the "Energy manager" function is activated)

for setting the effective power limit from which the potential-free switching contact will be switched off

Factory setting 500

Setting range 0 – switch on point / W / kW

Time / Date

Setting of the time, the date, and the automatic daylight saving time adjustment

Setting range Set time / Set date / Time display format / Date display format / Daylight saving time

Set time

Set the time (hh:mm:ss or hh:mm AM/PM – depends on the Time display format settings)

Set date

Set the date (dd/mm/yyyy or mm/dd/yyyy – depends on the Date display format settings)

Time display format

For setting the format in which the time is displayed

Setting range 12 / 24 hour clock

Factory setting Depends on the country setup

Date display format

For setting the format in which the date is displayed

Setting range mm/dd/yyyy / dd.mm.yy

Factory setting Depends on the country setup

Daylight saving time

Activate / deactivate automatic daylight saving time adjustment



NOTE! Only use the function for automatic daylight saving time adjustment when there are no LAN or WLAN-compatible system components in a Fronius Solar Net ring (e.g., Fronius Datalogger Web, Fronius Datamanager).
If LAN or WLAN-compatible system components are found, adjust this setting on the system component web interface.

Setting range on / off

Factory setting on

IMPORTANT! The time and date must be correct to ensure that the daily and yearly values and the daily characteristics are displayed correctly.

Display Settings

Setting range Language / Night mode / Contrast / Illumination

Language

Setting the display language

Setting range German, English, French, Dutch, Italian, Spanish, Czech, Slovak, etc.

Night Mode

DATCOM night mode; controls DATCOM and display operation at night or when there is insufficient DC voltage available

Setting range	AUTO / ON / OFF
Factory setting	OFF

AUTO: DATCOM operation is constant as long as a Datalogger is connected to an active, uninterrupted Solar Net.
The display is dark during the night and can be activated by pressing any key.

ON: DATCOM operation is constant. The inverter provides 12 V constantly to supply Solar Net with power. The display is always active.

IMPORTANT! The power consumption of the inverter is increased at night to approximately 7 W when the DATCOM night mode is ON or on AUTO and Solar Net components are connected.

OFF: No DATCOM operation at night, the inverter requires no AC power to supply Solar Net.
The display is deactivated at night; the Fronius Datamanager is not available.

Contrast

set contrast on the display

Setting range	0–10
Factory setting	5

Since contrast depends on temperature, it may be necessary to adjust the "Contrast" menu item when environmental conditions change.

Illumination

Initial setting for display illumination

The "Illumination" menu item only applies to the display background illumination.

Setting range	AUTO / ON / OFF
Factory setting	AUTO

AUTO: The display illumination is activated by pressing any key. If no key is pressed for 2 minutes, the display backlight goes out.

ON: The display illumination will be permanently on when the inverter is active.

OFF: The display illumination will be permanently off.

Energy Yield

Setting

- an OFFSET value for the Total energy display
- a measurement correction value for the day, year and total energy display
- the currency
- the feed-in tariff

Setting range

E-meter offset/E-meter calibration/Currency/Feed-in tariff

E-meter offset

Specification of a value for the energy supplied that is added to the currently supplied energy (e.g., the transfer value when an inverter is replaced)

Unit

Wh/kWh/MWh

Setting range

5-digit

Factory setting

0

E-meter calibration

Specification of a correction value so that the data shown on the inverter display correspond to the calibrated data shown on the electric meter

Unit

%

Setting range

-5.0 to +5.0

Factory setting

0

Currency

Currency setting

Setting range

3-digit, A-Z

Feed-in tariff

Charge rate setting for the energy fed into the grid

Setting range

2-digit, 3 decimal places

Factory setting

(depends on the country setup)

Fan

for checking the fan functionality

Setting range

Test fan #1 / Test fan #2

- Use the "Up" and "Down" keys to select Test fan #1
- Press the "Enter" key to start testing of the fans
- The fans run until the menu is exited by pressing the "Esc" key

Arc Detection for checking arc detection/interruption

Setting range ArcDetector Status/Start Self-test

Arc.det. Status

displays the current status of arc detection/interruption

Start Self-test

self-test to check whether the inverter interrupts grid power feed operation when an arc is detected.

Test procedure:

- 1 Select "Arc Detection" in the Setup menu
- 2 Press the "Enter" key
- 3 Use the up and down keys to select "Start Self-test"
- 4 Press the "Enter" key

The self-test starts. The arc detection/interruption function simulates an arc and sends the corresponding signal to the inverter.

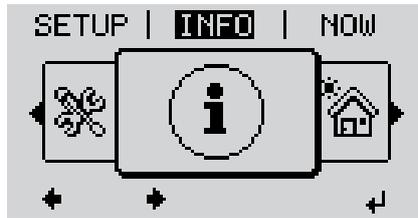
If the test is successful, the inverter disconnects from the grid and stops grid power feed operation.

The message "Self-test completed and Start AFCI" is shown on the display.

- 5 Confirm the indication by pressing the "Enter" key

The INFO menu item

INFO



INFO

(information on device and software)

Measured values LT status Grid status

Measured values	Display range:	PV Iso. / U PV1 / U PV2 / GVDPR / Fan #1
	<p>PV Iso. Insulation resistance of the PV system (for ungrounded solar modules and for solar modules grounded at the negative pole)</p> <p>U PV1 Current DC voltage at the terminal, also if the inverter is not feeding in at all (from the first MPP Tracker)</p> <p>U PV 2 Current DC voltage at the terminal, also if the inverter is not feeding in at all (from the second MPP Tracker)</p> <p>GVDPR Grid voltage-dependent power reduction</p> <p>Fan #1 Percentage value of the fan's target power</p>	
LT status	<p>The status display of the last error that occurred in the inverter can be shown.</p> <p>IMPORTANT! Status codes 306 (Power low) and 307 (DC low) appear naturally every morning and evening due to low solar irradiance. These status codes are not the result of a fault.</p> <ul style="list-style-type: none"> - After pressing the "Enter" key, the power stage set status and the last error that occurred are displayed - Use the "Up" and "Down" keys to scroll through the list - Press the "Back" key to exit the status and error list 	
Grid status	<p>The last 5 grid errors that occurred can be displayed:</p> <ul style="list-style-type: none"> - After pressing the "Enter" key, the last 5 grid errors that occurred are displayed - Use the "Up" and "Down" keys to scroll through the list - Press the "Back" key to exit the grid error display 	

Device Information

Used to display settings relevant to a power supply company. The displayed values depend on the respective country setup or device-specific inverter settings.

Display range	General/Country-specific setting/MPP tracker/Grid monitoring/ Grid voltage limits/Grid frequency limits/Q-mode/AC output limit/AC voltage derating
General:	Device type Fam.
Country-specific setting:	Setup Country setup used Version Country setup version Group Inverter software update group
MPP Tracker:	Tracker 1 (status, voltage) Tracker 2 (status, voltage)
Grid monitoring:	GMTi Startup time of the inverter in s GMTr Restart time in s after a grid error ULL Grid voltage average value over 10 minutes in V. LLTrip Detection time for long-term voltage monitoring
Grid voltage limits:	UILmax Upper inner grid voltage value in V UILmin Lower inner grid voltage value in V UOLmax Upper outer grid voltage value in V UOLmin Lower outer grid voltage value in V
Grid frequency limits:	FILmax Upper inner grid frequency value in Hz FILmin Lower inner grid frequency value in Hz FOLmax Upper outer grid frequency value in Hz FOLmin Lower outer grid frequency value in Hz

Q-mode:	Currently set power factor (cos phi) (e.g., Constant Cos(phi)/Constant Q/Q(U) characteristic/etc.)
AC output limit:	Max. P AC Manual power reduction
AC voltage derating:	Status ON/OFF voltage-dependent power reduction GVDPR _e Threshold from which the voltage-dependent power reduction begins GVDPR _v Reduction gradient used to reduce the power. Example: 10% per volt exceeding the GVDPR _e threshold. Message Allows info messages to be sent via Fronius Solar Net

Version

Display of version number and serial number of the PC boards installed in the inverter (e.g., for service purposes)

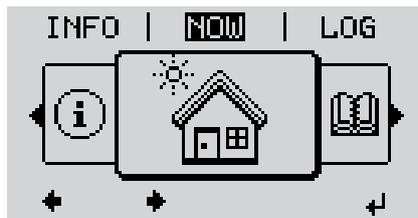
Display range Display/Display software/SW checksum/Memory data/Data memory #1/Power stage set/SW power stage set/EMC filter/Power stage #3/Power stage #4

Switching the key lock on and off

General

The inverter comes equipped with a 'Key lock' function. When the 'Keylock' function is active, the Setup menu cannot be accessed, e.g., to protect against setup data being changed by accident. You must enter code 12321 to activate / deactivate the 'Key lock' function.

Switching the Key Lock On and Off



- **1** Press the "Menu" key.

The menu level is displayed.

- 2** Press the unassigned "Menu / Esc" key 5 x.



In the "CODE" menu, the "Access Code" is displayed; the first digit flashes.



- + - **3** Enter 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 flashes.



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

...the set code flashes.

- ↵ **6** Press the "Enter" key.

In the "LOCK" menu, the "Key lock" function is displayed.



- + - **7** Use the "Up" and "Down" keys to switch the key lock on or off:

ON = the key lock function is activated (the SETUP menu item cannot be accessed)

OFF = the key lock function is deactivated (the SETUP menu item can be accessed).

- ↵ **8** Press the "Enter" key.

USB Stick as a Data Logger and for Updating Inverter Software

USB Stick as a Data Logger

A USB stick connected to the USB A socket can act as a data logger for an inverter.

Logging data saved to the USB stick can at any time

- be imported into the Fronius Solar.access software via the included FLD file
- be viewed directly in third-party applications (e.g., Microsoft® Excel) via the included CSV file.

Older versions (up to Excel 2007) have a row limit of 65536.

Further information on "Data on a USB stick", "Data volume and storage capacity" as well as "Buffer memory" can be found at:



→ <http://www.fronius.com/QR-link/4204260171EN>

Suitable USB Sticks

Due to the number of USB sticks on the market, we cannot guarantee that every USB stick will be recognized by the inverter.

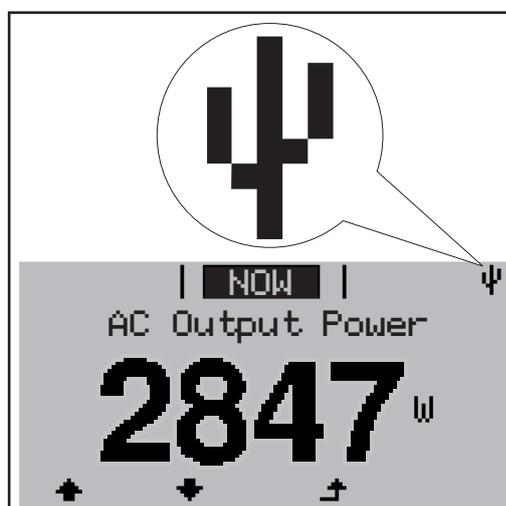
Fronius recommends using only certified, industrial USB sticks (look for the USB-IF logo).

The inverter supports USB sticks using the following file systems:

- FAT12
- FAT16
- FAT32

Fronius recommends that the USB stick only be used for recording logging data or for updating the inverter software. USB sticks should not contain any other data.

USB symbol on the inverter display, e.g., in the "NOW" display mode:



When the inverter recognizes a USB stick, the USB symbol will appear at the top right of the display.

When inserting the USB stick, make sure that the USB symbol is displayed (it may also be flashing).



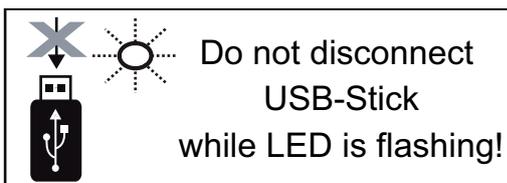
NOTE! Please be aware that in outdoor applications the USB stick may only function in a limited temperature range. Make sure, for example, that the USB stick will also function at low temperatures for outdoor applications.

USB Stick for Updating Inverter Software

The USB stick can be used to help end customers update inverter software via the USB menu item in the SETUP menu item: the update file is first saved on the USB stick and then transferred to the inverter. The update file must be saved in the USB stick root directory.

Removing the USB Stick

Safety information for removing a USB stick



IMPORTANT! To prevent a loss of data, the connected USB stick should only be removed under the following conditions:

- via the SETUP and "Safely remove USB / hardware" menu items
- when the "Data Transfer" LED is no longer flashing or illuminated.

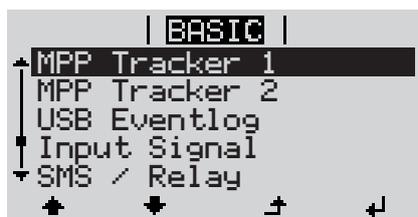
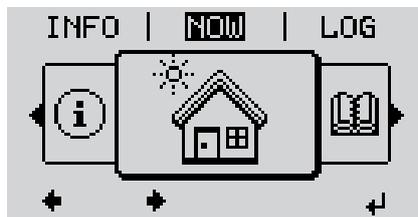
The Basic menu

General

The following important parameters are set in the Basic menu for the installation and operation of the inverter:

- DC operating mode
- Fixed voltage
- MPPT1 / MPPT2 initial voltage
- USB logbook
- Insulation settings
- Temperature warning
- TOTAL reset
- Event meter

Accessing the Basic menu



- ↑ **1** Press the "Menu" key.

The menu level is displayed.

- 2** Press the unassigned "Menu / Esc" key 5 x.



In the "CODE" menu, the "Access Code" is displayed; the first digit flashes.

- + - **3** Enter code 22742: 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 flashes.

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

...the set code flashes.

- ↵ **6** Press the "Enter" key.

The Basic menu is shown.

- + - **7** Use the "Up" and "Down" keys to select the desired item.

- ↵ **8** Edit the selected item by pressing the "Enter" key.

- ↑ **9** Press "Esc" to exit the Basic menu.

Items in the Basic Menu

The Basic menu contains the following items:

MPP Tracker 1

- DC Tracking Mode:
MPP AUTO
FIX
MPP USER
 - Dyn. Peak Manager:
ON / OFF
 - Fix PV Voltage:
For entering the fixed voltage, 150 - 800 V
 - MPPT1 Start Voltage:
For entering the MPPT1 initial voltage, 150 - 800 V
-

MPP Tracker 2

- MPP Tracker 2:
ON / OFF
 - DC operating mode:
MPP AUTO
FIX
MPP USER
 - Dyn. Peak Manager:
ON / OFF
 - Fix PV Voltage:
For entering the fixed voltage, 150 - 800 V
 - MPPT2 Start Voltage:
For entering the MPPT2 initial voltage, 150 - 800 V
-

USB Eventlog

Activating or deactivating the function to save all error messages to a USB stick
AUTO / OFF / ON

Input Signal

- Mode of operation:
Ext Sig. / S0-Meter / OFF
 - Trigger response (at Mode of operation „Ext. Sig.“):
Warning / Ext. Stop
 - Connection type (at Mode of operation „Ext. Sig.“):
N/C / N/O
-

SMS / Relay

- Event Delay:
For entering the delay time from when an SMS is sent or from when the relay should switch
900–86400 seconds
- Event Counter:
For entering the number of errors following which an SMS is sent or the relay should switch:
10–255

Insulation settings

- Insulation warning:
to activate and deactivate the insulation monitoring with display of a warning without interrupting feed-in in the event of an insulation error
ON / OFF (depends on the country setup)
- Threshold warning:
to set an insulation threshold below which the inverter displays a warning (without interrupting feed-in)
depends on the country setup set
- Threshold error:
to set an insulation threshold under which the inverter displays an error message and interrupts feed-in
depends on the country setup

Temperature warning

to activate / deactivate the overtemperature warning for an event;
the overtemperature warning is sent and shown on the display.
ON / OFF

TOTAL Reset

resets the max. and min. voltage values and the max. power of feeding in in the LOG menu item to zero.
Once you have reset the values, this cannot be undone.

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

Status Diagnosis and Troubleshooting

Displaying Status Codes

Your inverter is equipped with a self diagnostic system that automatically identifies a large number of possible operation issues by itself and displays them on the screen. This enables you to know immediately if there are any malfunctions in the inverter, the photovoltaic system or any installation or operating errors.

Whenever the self diagnostic system has identified a particular issue, the respective status code is shown on the screen.

IMPORTANT! Status codes may sometimes appear briefly as a result of the control response from the inverter. If it subsequently continues to operate normally, there has not been a system error.

Total Failure of the Display

If the display remains dark for a long time after sunrise:
- check the AC voltage at the inverter's connections:
the AC voltage must be 208–240 V (+10% / -12%) according to the grid.

Class 1 Status Codes

Status codes in class 1 are typically temporary. Their cause lies in the grid.

The grid frequency is too high and the inverter is not permitted to feed energy into the grid because this would not comply with a standard. No device fault has occurred. The inverter will first respond by disconnecting from the grid. Then, the grid will be checked for the duration of the observation period stipulated. If, after the end of this period, no further defect is identified, your inverter resumes operating and feeding energy into the grid.

The GPIS soft start function is activated depending on the country setup: according to national guidelines, the output of the inverter increases continuously after a shutdown due to an AC error.

Code	Description	Behavior	Remedy
102	AC voltage too high		
103	AC voltage too low		
105	AC frequency too high	Grid conditions are being tested and as soon as they are again within the permissible range, the inverter will resume feeding power into the grid.	Check grid connections. If this status code keeps recurring, contact your system installer.
106	AC frequency too low		
107	No AC grid detected		
108	Stand alone operation detected		
112	RCMU error		

Class 2 status codes

Code	Description	Details	Rectification
212	Undervoltage at L1	Grid conditions are being tested and as soon as they are back within the permissible range, the inverter will resume grid power feed operation.	Check grid connections. If this status code keeps recurring, contact your system installer.
213	Undervoltage at L1		
222	Undervoltage at L2		
223	Overvoltage at L2		

Code	Description	Details	Rectification
240	Arc detected	The status code is displayed for approx. 4 seconds.	-
241	Arc detected	The status code 241 is displayed directly after 240; the inverter disconnects from the grid for safety reasons.	If an arc has been detected, check the entire affected PV system for damage before resetting the inverter. Reset status code by pressing the "Enter" key.
242	Arc detected	Status code 242 is displayed after resetting status code 241.	Reset the status code by pressing the "Enter" key. The inverter resumes grid power feed operation. If the status code keeps recurring, contact your system installer.
245	Arc detector self test failed	The inverter disconnects from the grid.	Reset AC. The test is repeated. If the status code persists: contact a Fronius-trained service technician.
247	Arc detector current sensor defective	The inverter disconnects from the grid.	If status code persists: contact a Fronius-trained service technician.
249	Arc detector defective		

Class 3 Status Codes

Class 3 includes status codes that may appear during grid power feed operation and do not cause permanent interruption of the grid power feed operation.

After automatic disconnection from the grid and waiting for its conditions to return to those stipulated, your inverter will try to resume grid power feed operation.

Code	Description	Details	Rectification
301	Over-current (AC)	Brief interruption of grid power feed operation due to overcurrent in the inverter.	Error is automatically rectified; if status code persists: contact a Fronius-trained service technician.
302	Over-current (DC)	The inverter returns to the startup phase.	
303	Power stage set over temperature	Brief interruption of grid power feed operation due to over temperature.	If required, clean cool air vents and cooling elements with compressed air. The fault is rectified automatically. If this status code keeps recurring, contact your system installer.
304	Interior temperature too high	The inverter returns to the startup phase.	

Code	Description	Details	Rectification
306	LOW PV POWER Intermediate circuit voltage has dropped below permissible threshold value for grid power feed operation.	Brief interruption of grid power feed operation.	The fault is rectified automatically.
307	LOW PV VOLTAGE DC input voltage has dropped below permissible threshold value for grid power feed operation.	The inverter returns to the Startup phase.	If this status code keeps recurring with sufficient solar irradiance, contact your system installer.

IMPORTANT! Status codes 306 (LOW PV POWER) and 307 (LOW PV VOLTAGE) appear naturally every morning and evening due to low solar irradiance. These status codes are not the result of a fault.

308	Intermediate circuit overvoltage	Brief interruption of grid power feed operation.	Error is automatically rectified;
309	DC input voltage for MPPT 1 too high	The inverter returns to the Startup phase.	if status code persists: contact a Fronius-trained service technician.
313	DC input voltage for MPPT 2 too high		

Class 4 Status Codes Class 4 status codes may require the intervention of a trained Fronius service technician.

Code	Description	Details	Rectification
401	No internal communication with power stage set.		
406	Power stage set temperature sensor defective	The inverter will automatically attempt to connect again and, if possible, resume grid power feed operation.	If status code persists: contact a Fronius-trained service technician.
407	Internal temperature sensor defective		
408	DC feed-in detected		
412	The "fixed voltage" setting has been selected instead of MPP voltage operation and the voltage is set to a value that is too low or too high.	-	If this status code keeps recurring, contact your system installer.
415	Safety cut-out has been triggered by option card or RECERBO	Inverter does not feed energy into the grid.	
416	No communication between power stage set and control unit		
417	ID problem with hardware	The inverter will automatically attempt to connect again and, if possible, resume grid power feed operation.	If status code persists: contact a Fronius-trained service technician.
419	Unique ID conflict		
421	HID range error		
425	Communication with the power stage set is not possible		
426 - 428	Possible hardware defect		

Code	Description	Details	Rectification
431	Software problem	Inverter does not feed energy into the grid.	Carry out AC reset (switch automatic circuit breaker off and on); update inverter firmware; If status code persists: contact a Fronius-trained service technician.
436	Function incompatibility (one or more PC boards in the inverter are not compatible with each other, e.g., after PC board replacement)	The inverter will automatically attempt to connect again and, if possible, resume feeding energy into the grid	Update inverter firmware; If status code persists: contact a Fronius-trained service technician.
437	Power module problem		
438	Function incompatibility (one or more PC boards in the inverter are not compatible with each other, e.g., after PC board replacement)	The inverter will automatically attempt to connect again and, if possible, resume feeding energy into the grid	Update inverter firmware; If status code persists: contact a Fronius-trained service technician.
443	Intermediate circuit voltage too low or unsymmetrical	Inverter does not feed energy into the grid.	If status code persists: contact a Fronius-trained service technician.
445	Limit value setting not permitted		Update the inverter firmware. If status code persists: contact a Fronius-trained service technician.
447	Insulation fault	Inverter does not feed energy into the grid for safety reasons.	
448	Neutral conductor not connected		If this status code keeps recurring, contact your system installer.
450	No guard found		
451	Memory error detected		
452	Communication problem between processors	The inverter will automatically attempt to connect again and, if possible, resume grid power feed operation.	If status code persists: contact a Fronius-trained service technician.
453	Brief grid voltage error		
454	Brief grid frequency error		
456	Anti-islanding function has stopped running properly		
457	Grid relay stuck		
459	Error receiving measuring signal for the insulation test		
460	Reference power source for the digital signal processor (DSP) is operating outside of tolerances	Inverter does not feed energy into the grid.	If status code persists: contact a Fronius-trained service technician.
461	Error in DSP data memory		
462	Error in DC feed-in monitoring routine		
463	AC polarity reversed, AC connector plugged in incorrectly		

Code	Description	Details	Rectification
474	RCMU sensor faulty		
475	Solar module ground, insulation error (connection between solar module and ground)	Inverter does not feed energy into the grid.	If this status code keeps recurring, contact your system installer.
476	Supply voltage for driver too low		
480, 481	Function incompatibility (one or more PC boards in the inverter are not compatible with each other, e.g., after PC board replacement)	Inverter does not feed energy into the grid.	Update inverter firmware; *)
482	Commissioning is not complete	Inverter does not feed energy into the grid.	Reset AC (switch automatic circuit breaker on and off), carry out full commissioning.
483	Voltage U_{DCfix} for MPP2 string is outside of valid range	Inverter does not feed energy into the grid.	Check MPP settings; If status code persists: contact a Fronius-trained service technician.
485	CAN transmission buffer is full	Inverter does not feed energy into the grid.	Carry out AC reset (switch automatic circuit breaker off and on); If status code persists: contact a Fronius-trained service technician.

Class 5 Status Codes

Class 5 status codes generally do not impair grid power feed operation, but can lead to limitations in grid power feed operation. They will be displayed until the status code is acknowledged by pressing a key (the inverter, however, continues working normally in the background).

Code	Description	Details	Rectification
502	Insulation error on the solar modules	Warning message is shown on the display.	If this status code keeps recurring, contact your system installer.
509	No feed-in within the last 24 hours	Warning message is shown on the display.	Acknowledge status code; check if all conditions for fault-free grid power feed operation are fulfilled (e.g., if the solar modules are covered with snow). If the status code persists: observe further status codes.
515	No internal communication with filter	Warning message on the display	If status code persists: Contact a Fronius-trained service technician
516	Communication with memory unit not possible	Warning message of memory unit	

Code	Description	Details	Rectification
517	Power derating due to excessive temperature	If a power derating occurs, a warning message is shown on the display.	If required, clean cool air vents and cooling elements with compressed air. The fault is rectified automatically. If this status code keeps recurring, contact your system installer.
558	Function incompatibility (one or more PC boards in the inverter are not compatible with each other, e.g., after PC board replacement)	Possible error displays or malfunctions in the inverter.	If this status code keeps recurring, contact your system installer.
560	Power derating due to over-frequency	The status code is displayed with excessive grid frequency. The inverter reduces the power. The status indicator is displayed until the inverter resumes normal operation.	As soon as the grid frequency returns to the permissible range and the inverter resumes normal operation, the error is rectified automatically. If the status code persists, contact your system installer.
566	Arc detector switched off (e.g., with external arc monitoring)	The status code is displayed every day until the arc detector is activated again.	No error! Confirm status code displayed by pressing the "Enter" key.

Class 7 Status Codes Class 7 status codes concern the inverter control unit, configuration and data recording, and can directly or indirectly affect grid feed operation.

Code	Description	Details	Rectification
705	Conflict between inverter numbers (e.g., number is assigned twice)	-	Correct inverter number in Setup menu
721	EEPROM was reinitialized or EEPROM is defective	Warning message is shown on the display.	Acknowledge status code. If status code persists: contact a Fronius-trained service technician.
731	Initialization error – USB stick is not supported	Warning message is shown on the display.	Check or replace the USB stick. Check the USB stick file system.
732	Overcurrent on the USB stick		If status code persists: contact a Fronius-trained service technician.
733	No USB stick inserted	Warning message is shown on the display.	Insert or check the USB stick. If status code persists: contact a Fronius-trained service technician.
734	Update file is not detected or is not available	Warning message is shown on the display.	Check the update file (e.g., for the proper file name). If status code persists: contact a Fronius-trained service technician.

Code	Description	Details	Rectification
735	Update file does not correspond to the device, update file is too old	Warning message is shown on the display; update process is canceled.	Check the update file. If necessary, download the correct update file for the device (e.g., at http://www.fronius.com). If status code persists: contact a Fronius-trained service technician.
736	Write or read error occurred	Warning message is shown on the display.	Check the USB stick and the files on the USB stick or replace the USB stick. Remove the USB stick only when the "Data Transfer" LED is no longer flashing or lit. If status code persists: contact a Fronius-trained service technician.
738	Log file could not be saved (e.g., USB stick is write-protected or full)	Warning message is shown on the display.	Free up memory. Remove write-protection. If necessary, check or replace the USB stick. If status code persists: contact a Fronius-trained service technician.
743	Error occurred during the update	Warning message is shown on the display.	Repeat the update process. Check the USB stick. If status code persists: contact a Fronius-trained service technician.
745	Update file is faulty	Warning message is shown on the display; update process is canceled.	Download the update file again. If status code persists: contact a Fronius-trained service technician.
751	Incorrect time		Reset the time and date on the inverter.
752	Communication error in the Real Time Clock module	Warning message is shown on the display.	If status code persists: contact a Fronius-trained service technician.
757	Hardware error in the Real Time Clock module	Error message is shown on the display; the inverter does not feed energy into the grid.	
758	Internal error: Real Time Clock module is in emergency mode	Incorrect timing; time may be set incorrectly (normal grid power feed operation).	If status code persists: contact a Fronius-trained service technician.
766	Emergency power limiter has been activated (max. 750 W)	Error message is shown on the display	

Customer Service

- IMPORTANT!** Please contact your Fronius dealer or a Fronius-trained service technician if
- an error appears frequently or for a long period of time
 - an error appears that is not listed in the tables

**Operation in
dusty environ-
ments**

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

Technical Data

Fronius Primo	3.8-1 208-240	5.0-1 208-240	6.0-1 208-240
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Input data

MPP voltage range	200 - 800 V	240 - 800 V	240 - 800 V
Initial voltage	150 V		
Max. input voltage at 1000 W/m ² / 57.2°F (14 °C) in an open circuit	1000 V		
Nominal input voltage	650 V	650 V	660 V
Nominal input current	6.1 A	7.9 A	9.4 A
Max. input current	12.0 A	12.0 A	18.0 A
Max. short circuit current of the solar modules	15.0 A	15.0 A	22.5 A

Output data

Nominal output power (P _{nom})	at 208 V	3800 W	5000 W	6000 W
	at 220 V	3800 W	5000 W	6000 W
	at 240 V	3800 W	5000 W	6000 W
P _{nom} at +131°F (55°C)	at 208 V	3800 W	5000 W	5300 W
	at 220 V	3800 W	5000 W	5450 W
	at 240 V	3800 W	5000 W	5550 W
Max. output power		3800 W	5000 W	6000 W
		3800 W	5000 W	6000 W
		3800 W	5000 W	6000 W
Nominal mains voltage	208 V / 220 V / 240 V			
Mains voltage tolerance	-12 % / +10 %			
Operating AC voltage range	at 208 V	183 - 229 V		
	at 220 V	194 - 242 V		
	at 240 V	211 - 264 V		
Grid voltage setting range	at 208 V	104 - 288 V		
	at 220 V	104 - 288 V		
	at 240 V	104 - 288 V		
Voltage limit accuracy	1% of nominal value			
Voltage limit clearing times setting range	0.016 - 21.0 s			
Nominal output current	at 208 V	18.3 A	24.0 A	28.8 A
	at 220 V	17.3 A	22.7 A	27.3 A
	at 240 V	15.8 A	20.8 A	25.0 A
Number of phases	1			
Maximum output fault current / duration	at 208 V	384 A / 146 ms		
	at 220 V	560 A / 172 ms		
	at 240 V	584 A / 154 ms		
Nominal output frequency	50 / 60 Hz			
Output frequency range	48,0 - 50,5 Hz / 59,3 - 60,5 Hz			
Setting range for grid frequency	45,0 - 55,0 Hz / 50,0 - 65,0 Hz			
Frequency limit accuracy	0.05 Hz			
Frequency clearing times setting range	0.016 - 600 s			
Total harmonic distortion	< 5 %			
Power factor (cos phi)	0.85 - 1 ind./cap.. ¹⁾			

Fronius Primo	3.8-1 208-240	5.0-1 208-240	6.0-1 208-240
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General data

Maximum efficiency		97.9 %		
CEC efficiency	at 208 V	96.0 %	96.5 %	96.5 %
	at 220 V	95.5 %	96.5 %	96.5 %
	at 240 V	95.5 %	96.5 %	96.5 %
Night self-consumption	at 208 V	0.4 W	0.4 W	0.4 W
	at 220 V	0.6 W	0.6 W	0.6 W
	at 240 V	0.6 W	0.6 W	0.6 W
Self-consumption during operation		10 W		
Cooling		Forced-air ventilation		
Degree of protection		NEMA4X		
Dimensions H x W x D		24.7 x 16.9 x 8.1 inch (628 x 428 x 205 mm)		
Weight		47.29 lbs. (21.45 kg)		
Shipping dimensions H x W x D		30.1 x 21.7 x 11.4 inch (770 x 550 x 290 mm)		
Shipping weight		57.56 lbs. (26.11 kg)		
Permissible ambient temperature (at 95% rel. humidity)		-40 F - +131 °F (-40 °C - +55°C)		
Permissible storage temperature (with 95% rel. humidity)		-40 F - +158 °F (-40 °C - +70°C)		

Protection devices

Insulation monitoring	Integrated
Stand alone operation protection	Integrated
Reverse polarity protection	Integrated
Arc Detector / Interrupter	Integrated
Overtemperature	Operating point offset / active cooling

1) Ind. = inductive cap. = capacitive

Fronius Primo	7.6-1 208-240	8.2-1 208-240
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Input data

MPP voltage range	250 - 800 V	270 - 800 V
Initial voltage	150 V	
Max. input voltage at 1000 W/m ² / 57.2°F (14 °C) in an open circuit	1000 V	
Nominal input voltage	660 V	
Nominal input current	12.3 A	13.3 A (12.6 A at 208 V)
Max. input current	18.0 A	18.0 A
Max. short circuit current of the solar modules	22.5 A	22.5 A

Output data

Nominal output power (P _{nom})	at 208 V at 220 V at 240 V	7600 W 7600 W 7600 W	7900 W 8200 W 8200 W
P _{nom} at +131°F (55°C)	at 208 V at 220 V at 240 V	5300 W 5450 W 5550 W	5300 W 5450 W 5550 W
Max. output power	at 208 V at 220 V at 240 V	7600 W 7600 W 7600 W	7900 W 8200 W 8200 W
Nominal mains voltage	208 V / 220 V / 240 V		
Mains voltage tolerance	-12 % / +10 %		
Operating AC voltage range	at 208 V at 220 V at 240 V	183 - 229 V 194 - 242 V 211 - 264 V	
Grid voltage setting range	at 208 V at 220 V at 240 V	104 - 288 V 104 - 288 V 104 - 288 V	
Voltage limit accuracy	1% of nominal value		
Voltage limit clearing times setting range	0.016 - 21.0 s		
Nominal output current	at 208 V at 220 V at 240 V	36.5 A 34.5 A 31.7 A	38.0 A 37.3 A 34.2 A
Number of phases	1		
Maximum output fault current / duration	at 208 V at 220 V at 240 V	384 A / 146 ms 560 A / 172 ms 584 A / 154 ms	
Nominal output frequency	50 / 60 Hz		
Output frequency range	48,0 - 50,5 Hz / 59,3 - 60,5 Hz		
Setting range for grid frequency	45,0 - 55,0 Hz / 50,0 - 65,0 Hz		
Frequency limit accuracy	0.05 Hz		
Frequency clearing times setting range	0.016 - 600 s		
Total harmonic distortion	-		
Power factor (cos phi)	0.85 - 1 ind./cap.. ¹⁾		

General data

Maximum efficiency	97.9 %
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