

# Operating Instructions

## Fronius Symo Advanced

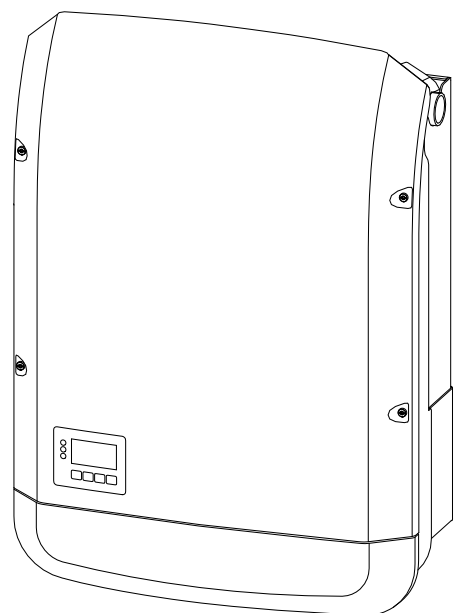
10.0-3-M

12.5-3-M

15.0-3-M

17.5-3-M

20.0-3-M



**EN** | Operating Instructions





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# **Safety rules**





# Safety rules

## Explanation of safety notices

### **DANGER!**

**Indicates immediate danger.**

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

### **WARNING!**

**Indicates a potentially hazardous situation.**

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

### **CAUTION!**

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

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

### **NOTE!**

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

## General

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

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

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

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

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

All safety and danger notices on the device:

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

The terminals can reach high temperatures.

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

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

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

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Never bypass or disable protection devices.

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

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

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**This is for your personal safety!**

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**Environmental conditions**

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

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**Qualified personnel**

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

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

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

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

---

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

---

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

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**Noise emission values**

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

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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.

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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.

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**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 equipment that is susceptible to interference 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 action to rectify the situation.

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**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.

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**Copyright** Copyright of these operating instructions remains with the manufacturer.

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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.

---

**System component compatibility** All installed components in the photovoltaic system must be compatible and have the necessary configuration options. The installed components must not restrict or negatively influence the functioning of the photovoltaic system.

**NOTE!**

**Risk due to components in the photovoltaic system that are not compatible and/or have limited compatibility.**

Incompatible components may limit and/or negatively affect the operation and/or functioning of the photovoltaic system.

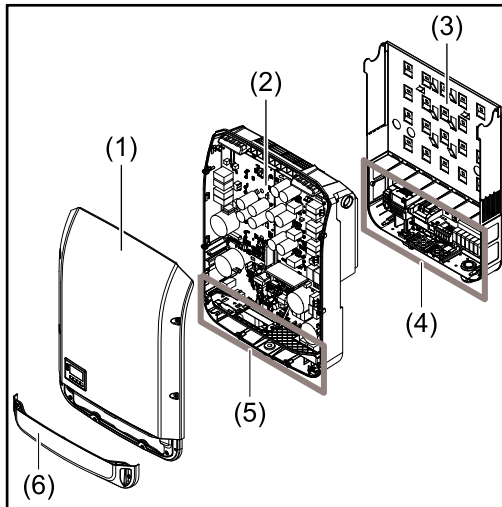
- ▶ Only install components recommended by the manufacturer in the photovoltaic system.
  - ▶ Before installation, check the compatibility of components not expressly recommended with the manufacturer.
-



# **General information**



## Device concept



### Device design:

- (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 current. This alternating current is fed into the public grid synchronously with the grid voltage.

The inverter has been developed exclusively for use in grid-connected photovoltaic systems; it is impossible to generate energy independently of the public grid.

Thanks to its design and the way it works, the inverter is extremely safe both to install and to operate.

The inverter automatically monitors the public grid. Whenever conditions in the electric grid are inconsistent with standard conditions (for example, grid switch-off, interruption, etc.), the inverter will immediately stop producing power and interrupt the supply of power into the grid.

The grid is monitored by monitoring the voltage, frequency and islanding conditions.

The inverter operates fully automatically. As soon after sunrise as there is sufficient energy available from the solar modules, the inverter starts monitoring the grid. When insolation has reached a sufficient level, the inverter starts feeding energy into the grid.

The inverter operates in such a way that the maximum possible amount of power is obtained from the solar modules.

As soon as the power available has fallen below the level at which energy can be fed into the grid, the inverter disconnects the power electronics completely from the grid and stops running. It retains all its settings and stored data.

If the inverter becomes too hot, it automatically reduces the current output 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).

## Proper use/ intended purpose

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

Utilisation not in accordance with the intended purpose comprises:

- Any use above and beyond this purpose
- Making any modifications to the inverter that have not been expressly approved by Fronius
- the installation of components that are not distributed or expressly 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 reading and obeying all the instructions and all the safety and danger notices in the Operating Instructions and Installation Instructions
- Performing all stipulated maintenance work
- Installation as specified in the Installation Instructions

When designing the photovoltaic system, ensure that all 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.

Obey the regulations of the power supply company regarding connection methods and energy fed into the grid.

## 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 incorrect operation, as this may result in serious injury and damage.



### Safety symbols:



Danger 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.





To comply with European Directive 2012/19/EU on Waste Electrical and Electronic Equipment and its implementation as national law, electrical equipment that has reached the end of its life must be collected separately and returned to an approved recycling facility. Any device that you no longer require must be returned to your distributor or disposed of at an approved collection and recycling facility in your area. Ignoring this European Directive may have potentially adverse effects on the environment and your health!

#### Text of the warning notices:

#### WARNING!

An electric shock can be fatal. Before opening the device, it must be disconnected at the input and output. Wait for the capacitors to discharge (the discharge time is indicated on the device).

#### Symbols on the rating plate:



CE mark – confirms compliance with applicable EU directives and regulations.



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



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



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



ICASA mark – tested in accordance with the requirements of the Independent Communications Authority of South Africa.



CMIM mark – tested in accordance with IMANOR requirements for import regulations and compliance with Moroccan standards.

#### AFCI - Arc Fault Circuit Interrupter (Arc Guard)

AFCI (Arc Fault Circuit Interrupter) protects against arcing faults and in the narrower sense is a protection device against contact faults. The AFCI evaluates any DC-side faults that occur in the current and voltage curve with an electronic circuit and switches off the circuit when a contact fault is detected. This prevents overheating on poor contacts and ideally possible fires.



#### CAUTION!

#### Danger due to incorrect or unprofessional DC installation.

The result is risk of damage and in turn, risk of fire to the PV system due to inadmissible thermal loads that arise with an arc.

- ▶ Check plug connections are in good condition.
- ▶ Repair incorrect insulation as appropriate.
- ▶ Complete connections as per the specifications.

#### IMPORTANT!

Fronius will not accept any costs associated with production downtimes, installer costs, etc., that may arise as the result of a detected arc and its consequences. Fronius accepts no liability for damage that can occur despite the presence of the integrated Arc Fault Circuit Interrupter/extinguishing system ( e.g. caused by a parallel arc).

**IMPORTANT!**

Active PV module electronics (e.g., power optimiser) can impair the function of the Arc Fault Circuit Interrupter. Fronius does not guarantee that the Arc Fault Circuit Interrupter will work correctly in combination with active PV module electronics.

**Reconnection behaviour**

After detection of an arc, feeding energy into the grid is interrupted for at least 5 minutes. Depending on the configuration, feeding energy into the grid is then automatically resumed. If several arcs are detected within a period of 24 hours, feeding energy into the grid can also be permanently interrupted until a manual reconnection has taken place."

# Data communication and Fronius Solar Net

## Fronius Solar Net and data interface

Fronius Solar Net was developed to make system add-ons flexible to use in a variety of different applications. Fronius Solar Net is a data network that enables multiple inverters to be linked up using system add-ons.

It is a bus system that uses a ring topology. One suitable cable is sufficient for communication between one or several inverters that are connected on the Fronius Solar Net using a system add-on.

Similarly, every inverter on the Fronius Solar Net must be assigned a unique number.

For instructions on how to assign a unique number, refer to the section **SETUP menu item**.

Fronius Solar Net automatically recognises a wide variety of system add-ons.

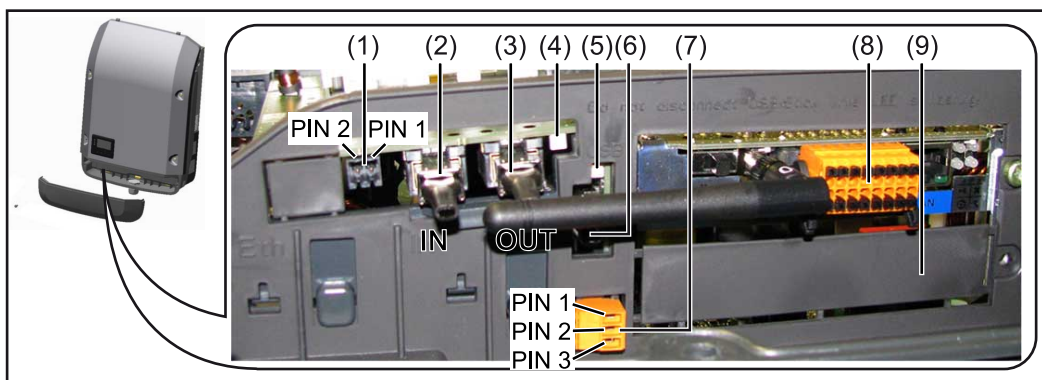
In order to distinguish between several identical system extensions, each one of them must be assigned a unique number.

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



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

## Data communication area



Depending on the model, the inverter may be equipped with the Fronius Datamanager plug-in card (8).

Item	Description
(1)	<p>Switchable multifunction current interface. For a more detailed explanation, see the following section <a href="#">Explanation of the multifunction current interface</a>.</p> <p>Use the 2-pin mating connector supplied with the inverter to connect to the multifunction current interface.</p>
(2) / (3)	<p>IN Fronius Solar Net connection / interface protocol OUT Fronius Solar Net connection / interface protocol "Fronius Solar Net" / interface protocol input and output for connecting to other DATCOM components (e.g. inverter, Fronius sensor box, etc.)</p> <p>If several DATCOM components are linked together, a terminating plug must be connected to every free IN or OUT connection on a DATCOM component. For inverters with a Fronius Datamanager plug-in card, two terminating plugs are supplied with the inverter.</p>
(4)	<p>The "Fronius Solar Net" LED indicates whether the Fronius Solar Net power supply is available.</p>
(5)	<p>The "Data transfer" LED flashes while the USB flash drive is being accessed. The USB flash drive must not be removed while recording is in progress.</p>
(6)	<p>USB A socket for connecting a USB flash drive with maximum dimensions of 65 x 30 mm (2.6 x 2.1 in.)</p> <p>The USB flash drive can function as a datalogger for any inverter that it is connected to. The USB flash drive is not included in the scope of supply of the inverter.</p>
(7)	<p>Floating switch contact (relay) with mating connector</p> <p>max. 250 V AC / 4 A AC max. 30 V DC / 1 A DC max. 1.5 mm<sup>2</sup> (AWG 16) cable cross-section</p> <p>Pin 1 = NO contact (normally open) Pin 2 = C (common) Pin 3 = NC contact (normally closed)</p> <p>For a more detailed explanation, please see section <a href="#">Relay (floating contact switch)</a>. Use the mating connector supplied with the inverter to connect to the floating switch contact.</p>
(8)	<p>Fronius Datamanager 2.0 with WLAN antenna or cover for option card compartment</p> <p>Note: Fronius Datamanager 2.0 is only available as an option.</p>
(9)	<p>Cover for option card compartment</p>

**Description of the "Fronius Solar Net" LED**

**The "Fronius Solar Net" LED is on:**  
the power supply for data communication within the Fronius Solar Net / interface protocol is OK

### The "Fronius Solar Net" LED flashes briefly every 5 seconds:

data communication error in the Fronius Solar Net

- Overcurrent (current flow  $> 3$  A, e.g. resulting from a short circuit in the Fronius Solar Net ring)
- Undervoltage (not a short circuit, voltage in Fronius Solar Net  $< 6.5$  V, e.g. if there are too many DATCOM components on the Fronius Solar Net and not enough electrical power is available)

In this case, power for the Fronius DATCOM components must be supplied by connecting an additional power supply (43,0001,1194) to one of the Fronius DATCOM components.

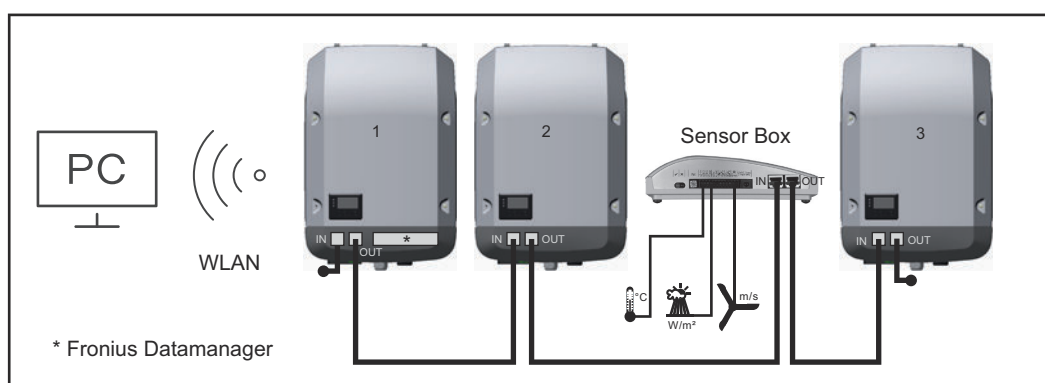
To detect the presence of an undervoltage, check some of the other Fronius DATCOM components for faults as required.

After cutting out because of overcurrent or undervoltage, the inverter attempts to restore the power supply in the Fronius Solar Net every 5 seconds while the fault is still present.

Once the fault is rectified, power to the Fronius Solar Net will be restored within 5 seconds.

### Example

Recording and archiving data from the inverter and sensor using a Fronius Datamanager and a Fronius Sensor Box:



Data network with 3 inverters and a Fronius Sensor Box:

- Inverter 1 with Fronius Datamanager 2.0
- Inverters 2 and 3 without Fronius Datamanager 2.0!

● = Terminating plug

The external communication (Fronius Solar Net) takes place on the inverter via the data communication area. The data communication area contains two RS 422 interfaces as inputs and outputs. RJ45 plug connectors are used to make the connection.

**IMPORTANT!** Since the Fronius Datamanager 2.0 functions as a Datalogger, the Fronius Solar Net ring must not include any other Dataloggers / Datamanagers. As such, only one Fronius Datamanager / Dataloggers is permitted per Fronius Solar Net ring!

Any other Fronius Datamanagers / Dataloggers must be removed and the unoccupied option card compartment sealed off by replacing the cover (item number - 42,0405,2094); alternatively, use an inverter without Fronius Datamanager (light version).

## Explanation of the multifunction current interface

Various wiring variants can be connected to the multifunction current interface. However, these cannot be operated simultaneously. For example, if an SO meter is connected to the multifunction current interface, it is not possible to connect a signal contact for the surge protective device (or vice versa).

Pin 1 = measurement input: max. 20 mA, 100 Ohm measurement resistor (load impedance)

Pin 2 = max. short circuit current 15 mA, max. open-circuit voltage 16 V DC or GND

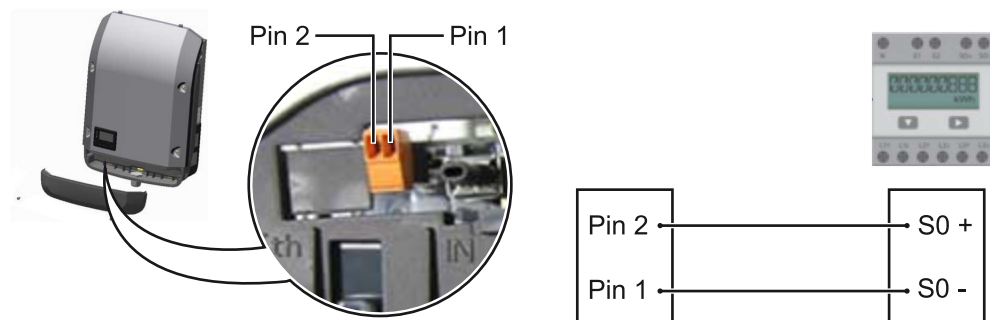
### Wiring diagram variant 1: Signal contact for surge protective device

Depending on the setting in the Basic menu (Signal Input submenu), the DC SPD option (surge protective device) either outputs a warning or an error on the display. Further information on the DC SPD option can be found in the Installation Instructions.

### Wiring diagram variant 2: SO meter

A meter for recording the self-consumption of each SO can be connected directly to the inverter. This SO meter can be positioned directly at the feed-in point or in the consumption branch.

**IMPORTANT!** In order to connect an SO meter to the inverter, it may be necessary to update the inverter firmware.



The SO meter must comply with the IEC62053-31 Class B standard

#### Recommended max. pulse rate of the SO meter:

PV output kWp [kW]	Max. pulse rate per kWp
30	1000
20	2000
10	5000
≤ 5.5	10000

With this meter, dynamic power reduction can be performed in two ways:

- **Dynamic power reduction by means of inverter**  
For more information see chapter [Dynamic power reduction by means of inverter](#) on page 23
- **Dynamic power reduction by means of the Fronius Datamanager 2.0**  
for more info see: [manuals.fronius.com/html/4204260191/#0\\_m\\_0000017472](https://manuals.fronius.com/html/4204260191/#0_m_0000017472)

### Dynamic power reduction by means of inverter

Energy companies or grid operators may impose feed-in limits on an inverter. Dynamic power reduction takes account of self-consumption by the household before the power of an inverter is reduced:

A counter for determining self-consumption of the SO can be connected directly to the inverter – see chapter [Explanation of the multifunction current interface](#) on page [22](#)

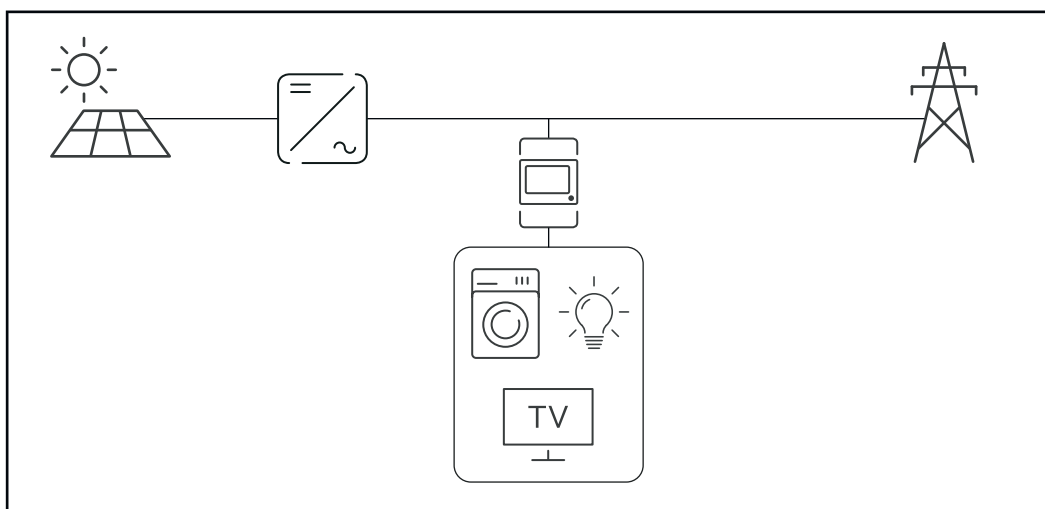
A feed-in limit can be set in the Basic menu under Signal input – SO meter – see chapter [Menu items in the Basic menu](#) on page [98](#).

Setting options for SO meter:

- **Grid feed-in limit**  
Field for entering the maximum grid feed-in power in W. If this value is exceeded, the inverter regulates down to the set value within the time required by national standards and regulations.
- **Pulses per kWh**  
Field for entering the pulses per kWh of the SO meter.

Zero feed-in is possible with this configuration.

When using the SO meter and power reduction by means of an inverter, the SO meter must be installed in the consumption branch.



*SO meter in the consumption branch*

If dynamic power reduction is subsequently configured using the Fronius Datamanager 2.0 (Inverter user interface - UC Editor menu - Dynamic power reduction), dynamic power reduction must be deactivated using the inverter (Inverter display - Basic menu - Signal input - SO meter).

### Fail-Safe

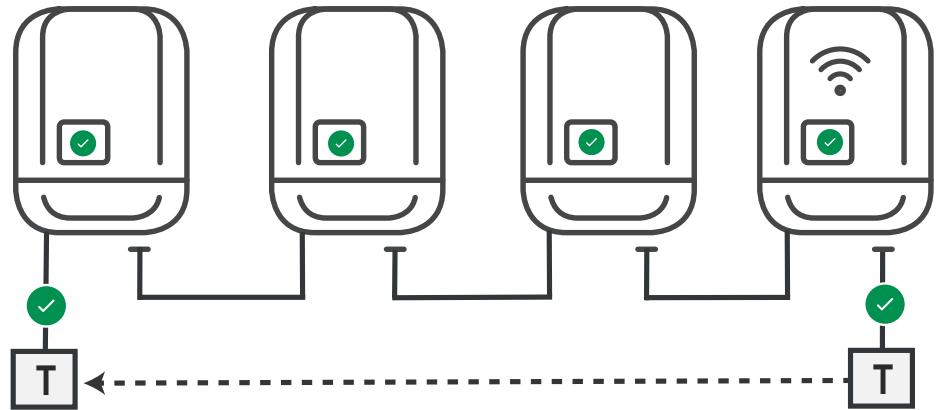
In the Fronius Solar Net ring (a combination of several inverters), the Fail-Safe function prevents inadmissible feeding of the connected inverters in the start-up phase or during operation. For this purpose, a signal is transmitted from the primary inverter with built-in data manager to the secondary inverters (Lite devices).

The function is activated as soon as the data manager fails or the Solar Net connection is interrupted. In this case, the signal is not transmitted to the secondary inverters. All devices switch off with status 710.

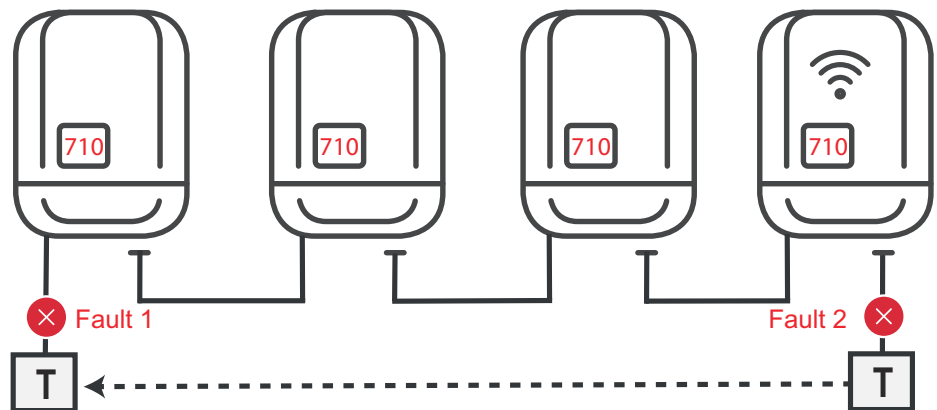
The following requirements must be met to enable the Fail-Safe to function correctly:

- For all inverters in the Solar Net ring, **Fail-Safe Mode** must be set to **Permanent** and **Fail-Safe Behaviour** to **Disconnect**.
- The inverter with data manager must be located in the last position of the ring line.

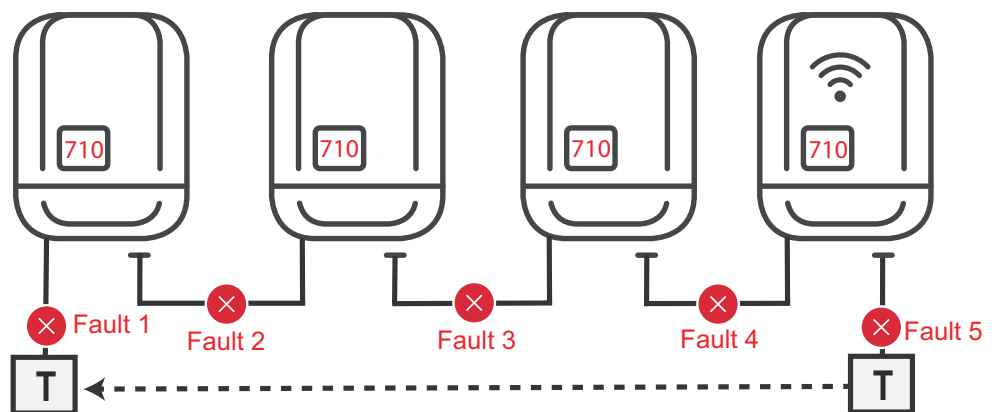
### Correct wiring



### Function in the event of a fault



Faults occur at the beginning and end of the Solar Net ring – the primary inverter stops sending the signal, and secondary inverters switch off with status 710.

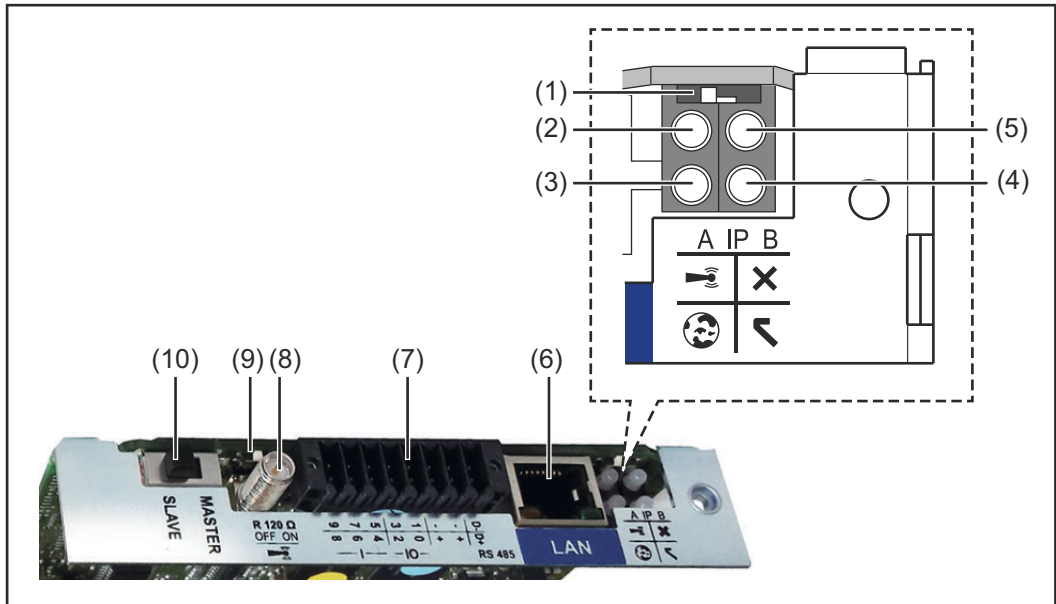


Faults occur at the beginning and end of the Solar Net ring or between the connected inverters – the primary inverter stops sending the signal, and secondary inverters switch off with status 710.



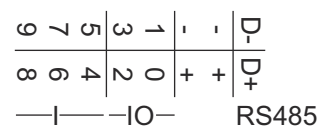
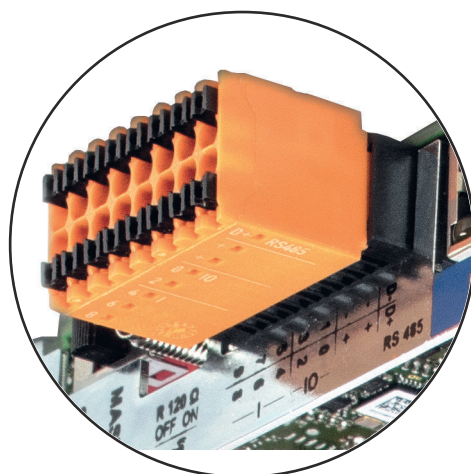
# Fronius Datamanager 2.0

Controls, connections and displays on the Fronius Datamanager 2.0



No.	Function
(1)	<p><b>IP switch</b> For switching the IP address:</p> <hr/> <p>Switch position <b>A</b> Default IP address with opening of the WLAN access point</p> <p>Fronius Datamanager 2.0 uses the set IP address 169.254.0.180 to establish a direct connection to a PC via LAN.</p> <p>Setting the IP switch to position A also opens an access point to enable a direct WLAN connection to the Fronius Datamanager 2.0.</p> <p>Access data for this access point: Network name: FRONIUS_240.XXXXXX Code: 12345678</p> <p>Access to the Fronius Datamanager 2.0 is possible:</p> <ul style="list-style-type: none"> <li>- Using the DNS name "http://datamanager"</li> <li>- Using the IP address 169.254.0.180 for the LAN interface</li> <li>- Using the IP address 192.168.250.181 for the WLAN access point</li> </ul> <hr/> <p>Switch position <b>B</b> Assigned IP address</p> <p>The Fronius Datamanager 2.0 uses an assigned IP address (factory setting dynamic (DHCP)) The IP address can be set on the Fronius Datamanager 2.0 website.</p>

No.	Function
(2)	<p><b>WLAN LED</b></p> <ul style="list-style-type: none"> <li>- Flashing green: Fronius Datamanager 2.0 is in Service mode (IP switch on the Fronius Datamanager 2.0 plug-in card is in position A or Service mode has been activated via the inverter display, the WLAN access point is open)</li> <li>- Lights up green: WLAN connection established</li> <li>- Flashing green/red (alternately): WLAN access point has timed out following activation (1 hour)</li> <li>- Lights up red: no WLAN connection</li> <li>- Flashing red: faulty WLAN connection</li> <li>- Does not light up: Fronius Datamanager 2.0 is in Slave mode</li> </ul>
(3)	<p><b>Solar.web connection LED</b></p> <ul style="list-style-type: none"> <li>- Lights up green: Fronius Solar.web connection established</li> <li>- Lights up red: Fronius Solar.web connection is required but has not been established</li> <li>- Does not light up: no connection to Fronius Solar.web is required</li> </ul>
(4)	<p><b>Supply LED</b></p> <ul style="list-style-type: none"> <li>- Lights up green: Fronius Solar Net is providing an adequate power supply; Fronius Datamanager 2.0 is ready for use.</li> <li>- Does not light up: insufficient or no power supply from Fronius Solar Net - an external power supply is required or the Fronius Datamanager 2.0 is in Slave mode</li> <li>- Flashing red: update in progress</li> </ul> <p><b>IMPORTANT!</b> Never interrupt the power supply while an update is in progress.</p> <ul style="list-style-type: none"> <li>- Lights up red: update failed</li> </ul>
(5)	<p><b>Connection LED</b></p> <ul style="list-style-type: none"> <li>- Lights up green: connection established within Fronius Solar Net</li> <li>- Lights up red: connection within Fronius Solar Net interrupted</li> <li>- Does not light up: Fronius Datamanager 2.0 is in Slave mode</li> </ul>
(6)	<p><b>LAN connection</b> Ethernet interface, colour-coded blue, for connecting the Ethernet cable</p>
(7)	<p><b>I/Os</b> Digital inputs and outputs</p>



No.	Function
-----	----------

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

D- Modbus data -  
D+ Modbus data +

**Int./ext. Power 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 kOhm

**Digital outputs:** 0 - 3

Switching capacity when power is supplied by the Fronius Datamanager 2.0 plug-in card: 3.2 W in total for all 4 digital outputs

Switching capacity when power is supplied by an external power supply delivering min. 12.8 - max. 24 V DC (+ 20%), connected to  $U_{int} / U_{ext}$  and GND: 1 A, 12.8 - 24 V DC (depending on external power supply) for each digital output

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The connection to the I/Os is established via the mating connector supplied.

**(8) Antenna socket**

This is where the WLAN antenna is connected

**(9) Modbus termination switch (for Modbus RTU)**

Internal bus terminator with 120 ohm resistor (yes/no)

Switch in "ON" position: 120 ohm terminating resistor active  
Switch in "off" position: no terminating resistor active



**IMPORTANT!** On an RS485 bus, the terminating resistor on the first and last device must be active.

**(10) Fronius Solar Net Master / Slave switch**

To switch from master to slave mode within a Fronius Solar Net ring

**IMPORTANT!** In slave mode, all the LEDs on the Fronius Datamanager 2.0 plug-in card are off.

---

**Fronius Datamanager 2.0 during the night or when the available DC voltage is insufficient**

The Night Mode parameter under "Display Settings" in the Setup menu is preset to OFF in the factory.

For this reason the Fronius Datamanager 2.0 cannot be accessed during the night or when the available DC voltage is insufficient.

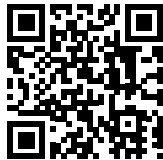
To nevertheless activate the Fronius Datamanager 2.0, switch the inverter off and on again at the mains and press any function button on the inverter display within 90 seconds.

See also the chapters on "Menu items in the Setup menu", "Display settings" (Night Mode).

---

**Starting for the first time**

Starting the Fronius Datamanager 2.0 for the first time is made considerably easier with the Fronius Solar.start app. The Fronius Solar.start app is available in the respective app stores.



When starting the 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!** In order to establish a connection to Fronius Datamanager 2.0, "Obtain IP address automatically (DCHP)" must be activated on the end device in question (e.g. laptop, tablet).

**NOTE!**

**If the photovoltaic system has only one inverter, steps 1 and 2 below can be skipped.**

In this case, starting for the first time will commence with step 3.

---

- 1** Connect inverter with Fronius Datamanager 2.0 or Fronius Datamanager Box 2.0 to the Fronius Solar Net
- 2** When networking several inverters in Fronius Solar Net:  
Set the Fronius Solar Net master / slave switch on the Fronius Datamanager 2.0 plug-in card correctly
  - 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 and boxes are not illuminated)
- 3** Switch the device to Service mode
  - Activate the WLAN Access Point via the Setup menu on the inverter



The inverter establishes the WLAN access point. The WLAN access point remains open for 1 hour. The protection switch on the Fronius Datamanager 2.0 can remain in switch position A due to the activation of the WLAN Access Point.

### Installation using the Solar.start app

- 4 Download Fronius Solar.start



- 5 Run the Fronius Solar.start app

### Installation using a web browser

- 4 Connect the end device to the WLAN access point

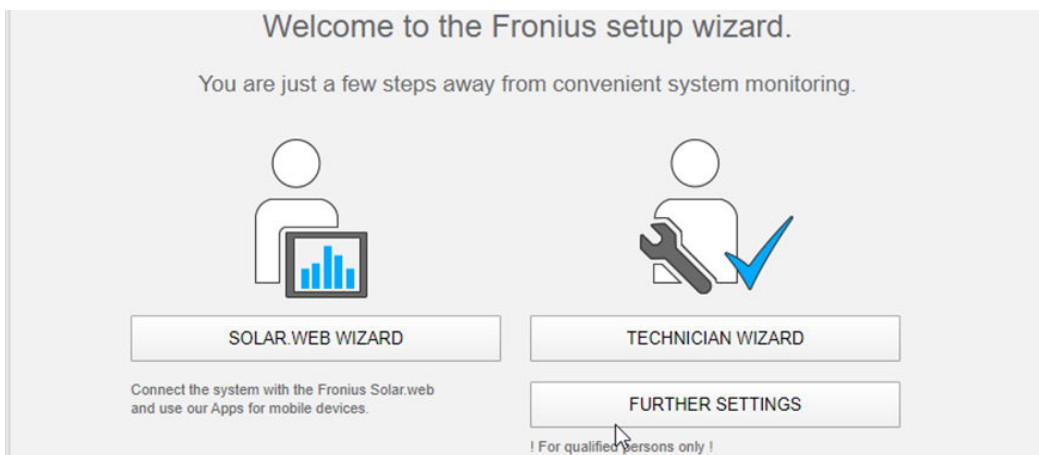
SSID = FRONIUS\_240.xxxxx (5-8 digits)

- Search for a network with the name "FRONIUS\_240.xxxxx"
- Establish a connection to this network
- Enter password from the inverter display

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

- 5 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.



The technician wizard is intended for the installer and contains standard-specific settings. Running the technician wizard is optional.

If the technician wizard is run, it is vital to note the service password that is issued. This service password is necessary for setting the "DNO Editor" menu item. If the technician wizard is not run, no specifications regarding power reduction are set.

Running the Fronius Solar.web wizards is mandatory.

**6** Run the Fronius Solar.web wizards and follow the instructions

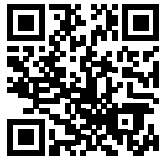
The Fronius Solar.web homepage is displayed,  
or  
the Fronius Datamanager 2.0 web page is displayed.

**7** Where necessary, run the technician wizard and follow the instructions

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**Further information on Fronius Datamanager 2.0**

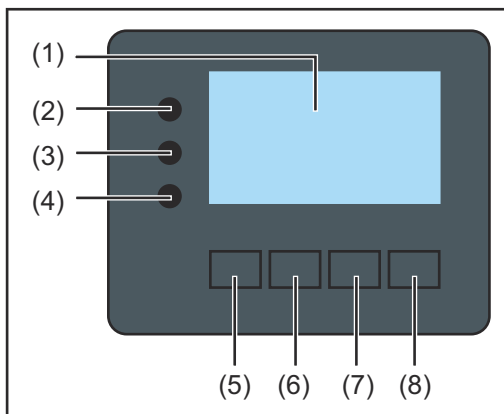
Further information on the Fronius Datamanager 2.0 and other start-up options can be found at:



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

# Controls and indicators

## Controls and displays



Item	Description
(1)	Display For displaying values, settings and menus
<b>Monitoring and status LEDs</b>	
(2)	Initialisation LED (red) lights up <ul style="list-style-type: none"><li>- During the initialisation phase when starting up the inverter</li><li>- If, when starting up the inverter in the initialisation phase, there is a continuous hardware fault</li></ul>
(3)	Status LED (orange) lights up <ul style="list-style-type: none"><li>- If, after the initialisation phase, the inverter is in its automatic startup or self-test phase (as soon as the solar modules are delivering sufficient power after sunrise)</li><li>- If status codes (STATE Codes) are shown on the inverter display</li><li>- If the inverter has been switched to Standby mode in the Setup menu (= feeding energy into the grid switched off manually)</li><li>- If the inverter software is being updated</li></ul>
(4)	Operating status LED (green) lights up <ul style="list-style-type: none"><li>- If the PV system is working correctly after the inverter's automatic startup phase</li><li>- all the time while energy is being fed into the grid</li></ul>
<b>Function keys - allocated different functions depending on the selection:</b>	
(5)	"Left/up" key For navigating to the left and up
(6)	"Down/right" key For navigating down and to the right
(7)	"Menu/Esc" key For switching to the menu level For quitting the Setup menu
(8)	"Enter" key For confirming a selection

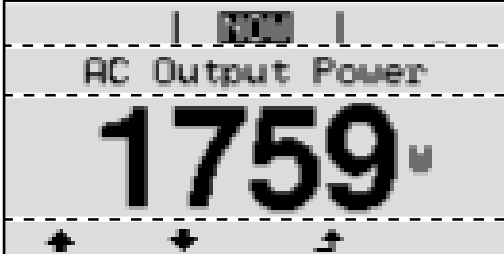
The keys operate capacitively. Exposure to water may impair their function. If necessary, wipe the keys dry with a cloth to ensure optimum functionality.

## Display

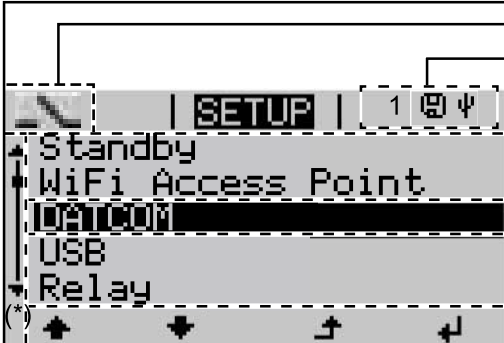
Power for the display comes from the mains voltage. Depending on the setting selected in the Setup menu, the display can be kept on all day. (For night mode, see section [Display settings](#))

### **IMPORTANT! The display of the inverter is not a calibrated measuring device.**

A slight deviation from the utility meter of the energy company is system-related. A calibrated meter will be needed to calculate the bills for the energy company.

	Menu item
AC Output Power	Parameter declaration
1759 W	Display of values, units and status codes
Navigation arrows	Function key functions

Display areas, display mode

	Energy-Manager (**) Inv. no.   Save symbol   USB conn.(***)
SETUP   1   Energy Manager icon   Save symbol   USB conn.	Menu item
Standby WiFi Access Point	Previous menu items
DATCOM	Currently selected menu item
USB Relay	Next menu items
Navigation arrows	Function key functions

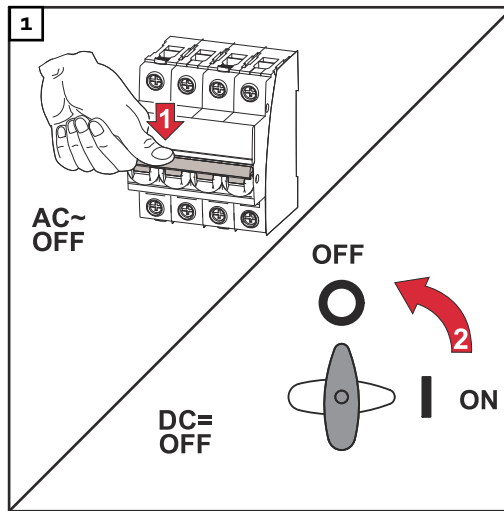
Display areas in Setup mode

- (\*) Scroll bar
- (\*\*) Energy Manager icon  
is displayed when the "Energy Manager" function is activated  
For more information, see section [Relay \(floating contact switch\)](#)
- (\*\*\*) Inv. no. = Inverter DATCOM number,  
Save symbol - appears briefly while set values are being saved,  
USB connection - appears if a USB flash drive has been connected



# Switching off current supply and restarting the inverter

## Switching off the power supply to the inverter



1. Turn off the automatic circuit breaker.
2. Turn the DC disconnect to the "OFF" switch position.

## Switching the inverter on again

1. Turn the DC disconnect to the "ON" switch position.
2. Switch on the automatic circuit breaker.



# Installation



# Installation location and position

## Explanation of safety notices



### **DANGER!**

**Indicates immediate danger.**

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



### **WARNING!**

**Indicates a potentially hazardous situation.**

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



### **CAUTION!**

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

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

### **NOTE!**

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

## Safety



### **WARNING!**

**Danger due to incorrect operation and incorrectly performed work.**

This can result in serious injury and damage to property.

- ▶ Only qualified personnel are authorised to commission your inverter and only within the scope of the respective technical regulations.
- ▶ Read the Installation and Operating Instructions before installing and commissioning the equipment.



### **WARNING!**

**Danger due to work that has been carried out incorrectly.**

This may result in serious injury and damage to property.

- ▶ Surge protective devices must only ever be installed and connected by a qualified electrical installation engineer!
- ▶ Follow the safety rules.
- ▶ Ensure that both the AC side and the DC side of the inverter are de-energised before carrying out any installation and connection work.

## Fire prevention

### CAUTION!

#### **Danger due to poor or unprofessional installation.**

This may result in damage to inverters and other live photovoltaic system components.

Poor or unprofessional installation can cause overheating of cables and terminal connections and result in arcs. These can cause heat damage, which in turn may lead to fires.

Observe the following when connecting AC and DC cables:

- ▶ Tighten all terminals to the torque specified in the Operating Instructions
  - ▶ Tighten all grounding terminals (PE / GND), including free ones, to the torque specified in the Operating Instructions
  - ▶ Do not overload cables
  - ▶ Check cables for damage and verify that they are laid correctly
  - ▶ Take note of the safety instructions, Operating Instructions and any local connection regulations
- 
- ▶ Using fastening screws, always screw the inverter firmly to the mounting bracket to the torque specified in the Operating Instructions.
  - ▶ Ensure that the fastening screws are tight before starting the inverter!

---

**IMPORTANT!** Fronius will not accept any costs associated with production downtimes, installer costs, etc., that may arise as the result of a detected arc and its consequences. Fronius accepts no liability for fires that can occur despite the presence of the integrated Arc Fault Circuit Interrupter / interruption system (e.g. fires caused by a parallel arc).

**IMPORTANT!** After an arc has been detected, the entire photovoltaic system must be checked for possible damage before resetting the inverter.

Observe the manufacturer's connection, Installation and Operating Instructions at all times. To reduce the hazard potential to a minimum, perform all installation and connection work carefully according to the instructions and regulations. Refer to the device Installation Instructions for the tightening torques to be used at the relevant terminal connections.

---

### **Proper use/ intended purpose**

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

Utilisation not in accordance with the intended purpose comprises:

- Any use above and beyond this purpose
- Making any modifications to the inverter that have not been expressly approved by Fronius
- the installation of components that are not distributed or expressly 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:

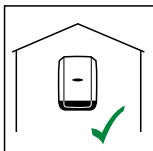
- Carefully reading and obeying all the instructions and all the safety and danger notices in the Operating Instructions and Installation Instructions
- Performing all stipulated maintenance work
- Installation as specified in the Installation Instructions

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

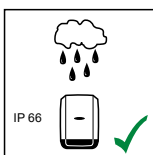
Observe all the measures recommended by the solar module manufacturer to ensure that the solar module retains its properties in the long term.

Obey the regulations of the power supply company regarding connection methods and energy fed into the grid.

## Choice of location

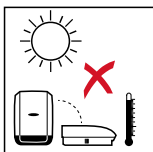


The inverter is suitable for indoor installation.

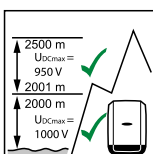
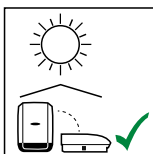


The inverter is suitable for outdoor installation.

Because of its IP 66 protection class, the inverter is resistant to water jets from any direction and can also be used in damp environments.

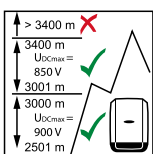


In order to minimise the heating up of the inverter, do not expose it to direct insolation. The inverter should be installed in a protected location, for example, e.g. in the area of the PV modules or under an overhanging roof.

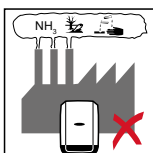


U<sub>DCmax</sub> at an altitude of:

0 to 2000 m = 1000 V  
 2001 to 2500 m = 950 V  
 2501 to 3000 m = 900 V  
 3001 to 3400 m = 850 V

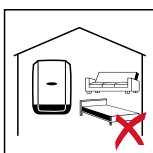


**IMPORTANT!** The inverter must not be installed or used at altitudes above 3400 m.

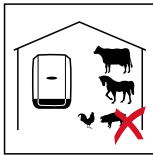


Do not install the inverter in:

- Areas where it may be exposed to ammonia, corrosive gases, acids or salts (e.g. fertiliser storage areas, vent openings for livestock stables, chemical plants, tanneries, etc.)

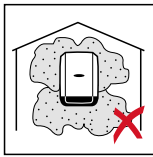


During certain operating phases the inverter may produce a slight noise. For this reason it should not be installed in an occupied living area.



Do not install the inverter in:

- Places where there is an increased risk of damage from farm animals (horses, cattle, sheep, pigs, etc.)
- Stables or adjoining areas
- Storage areas for hay, straw, chaff, animal feed, fertilisers, etc.



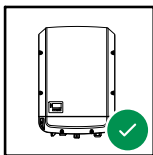
All inverters are designed to be dust-tight. However, in areas with a heavy build-up of dust, the thermal efficiency may still be impaired by dust forming on the cooling surfaces. Regular cleaning is necessary in such situations. We therefore recommend not installing the device in areas and environments with high dust accumulation.



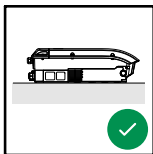
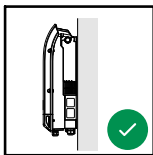
Do not install the inverter in:

- Greenhouses
- Storage or processing areas for fruit, vegetables or viticulture products
- Areas used in the preparation of grain, green fodder or animal feeds

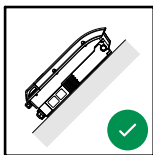
## Installation position



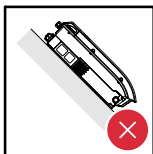
The inverter is suitable for vertical installation on a vertical wall or column.



The inverter is suitable for a horizontal installation position.



The inverter is suitable for installation on a sloping surface.

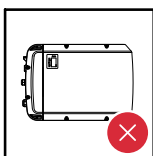


Do not install the inverter on a sloping surface with its connection sockets at the top.



Do not install the inverter at an angle on a vertical wall or column.

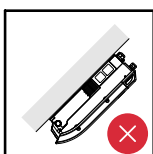
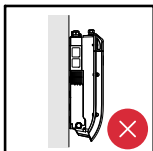




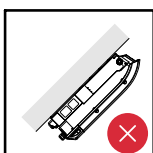
Do not install the inverter horizontally on a vertical wall or pillar.



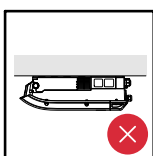
Do not install the inverter on a vertical wall or pillar with its connection sockets facing upwards.



Do not install the inverter overhanging with the connection sockets at the top.



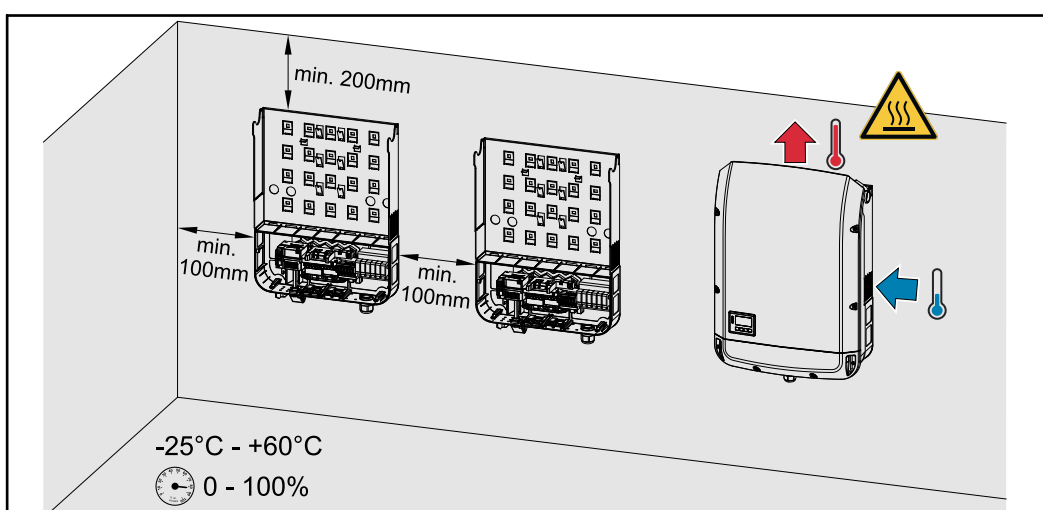
Do not install the inverter overhanging with the connection sockets at the bottom.



Do not install the inverter on the ceiling.

### General comments regarding choice of location

Please note the following criteria when choosing a location for the inverter:



Only install on a solid, non-flammable surface

Max. ambient temperatures: -25 °C / +60 °C

Relative humidity: 0-100%

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The airflow within the inverter is from the right to the top (cold air taken in from the right, hot air dissipated out of the top).  
The exhaust air can reach a temperature of 70 °C.

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

---

If the inverter is to be installed on the outer wall of a cattle shed, maintain a minimum all-round clearance of 2 m between the inverter and all ventilation and other openings in the building.  
The installation location must not be exposed to ammonia, corrosive vapours, salts or acids.

---

# Attaching the Mounting Bracket

## Safety

### **WARNING!**

#### **Danger of residual voltage from capacitors.**

This may result in an electric shock.

- ▶ Wait for the capacitors to discharge. The discharge time is indicated on the inverter.

### **CAUTION!**

#### **Danger due to dirt or water on the terminals and contacts of the inverter's connection area.**

This may result in damage to the inverter.

- ▶ When drilling, ensure that terminals and contacts in the connection area do not become dirty or wet.
- ▶ The mounting bracket without the power stage set does not correspond to the protection class of the entire inverter and must therefore not be exposed to external weather influences over a longer period of time without protection. The mounting bracket is protected when the inverter is suspended in the mounting bracket and firmly screwed to it.
- ▶ The mounting bracket should be protected from dirt and moisture during installation.

### **IMPORTANT!**

Degree of protection IP 66 is only applicable if

- the inverter is placed in the mounting bracket and permanently attached using screws,
- the cover for the data communication area is permanently attached to the inverter with screws.

Degree of protection IP 20 applies to the mounting bracket with no inverter.

## Selecting wall plugs and screws

**Important!** Different fixings may be required to fit the mounting bracket depending on the type of underlying surface. Fixings are therefore not included in the scope of supply of the inverter. The installer is responsible for selecting the right type of fixing.

## Recommended screws

To install the inverter, we recommend the use of steel or aluminium screws with a diameter of 6 - 8 mm.

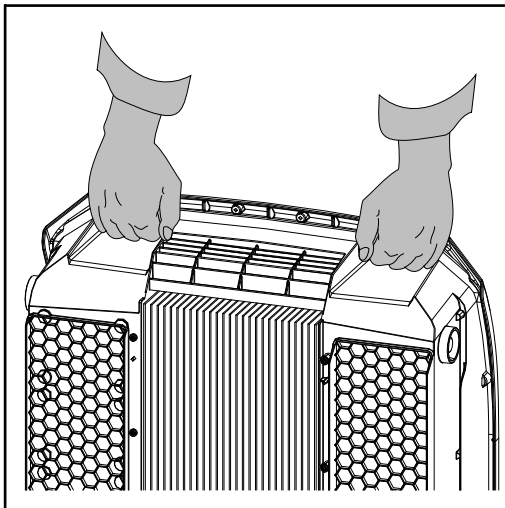
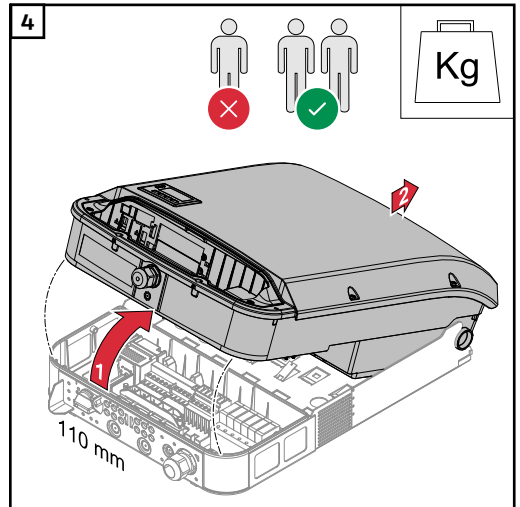
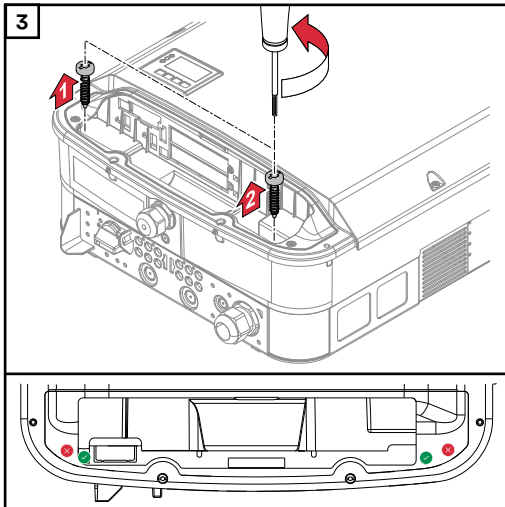
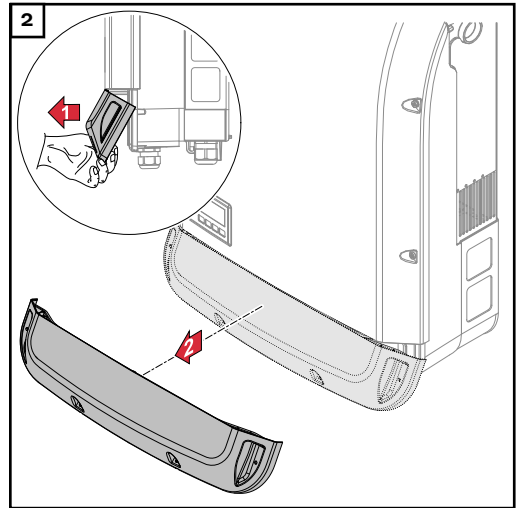
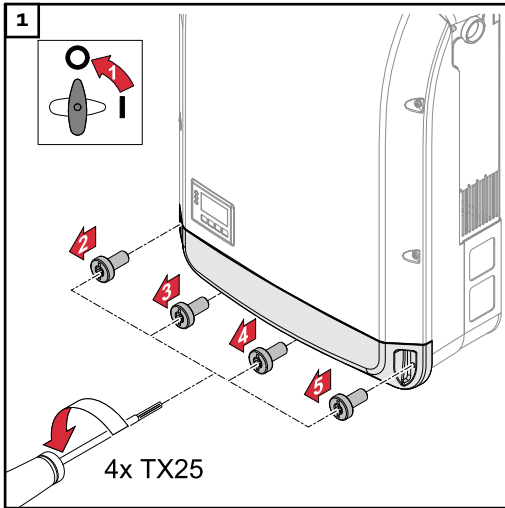
## Opening the inverter

### **WARNING!**

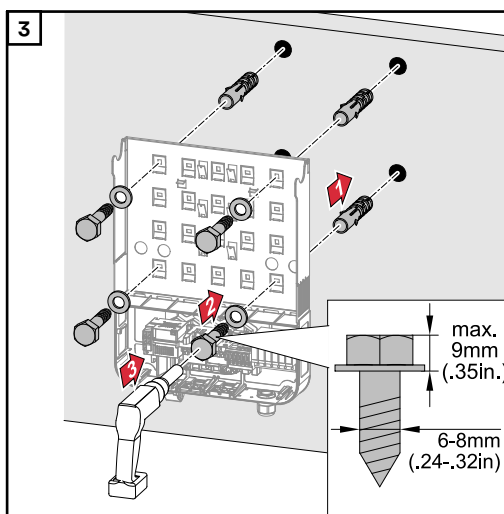
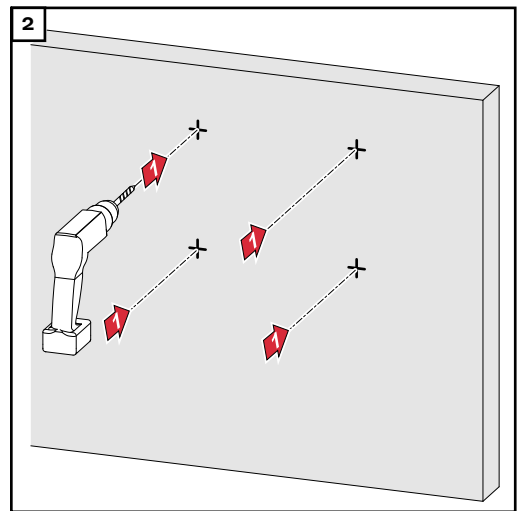
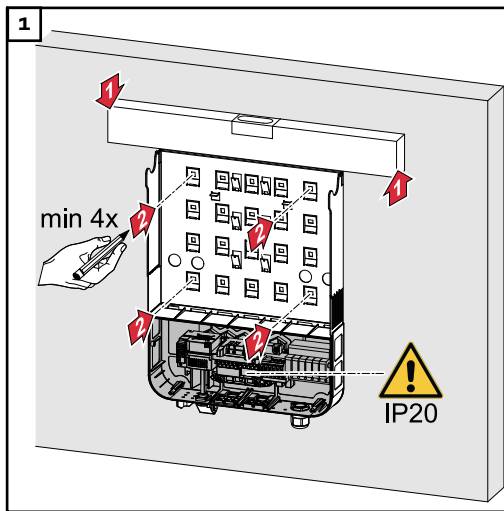
#### **Danger from inadequate ground conductor connection.**

This can result in serious injury and damage to property.

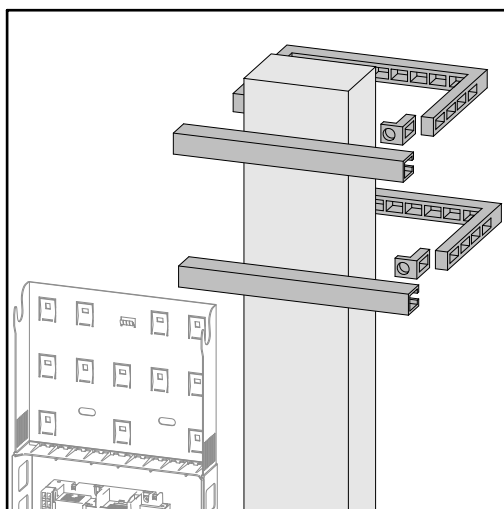
- ▶ The housing screws provide a suitable ground conductor connection for earthing the housing and must NOT be replaced by any other screws that do not provide a reliable ground conductor connection.



**Fitting the mounting bracket to a wall**



**Installing the mounting bracket on a mast or beam**



When installing the inverter on a mast or support, Fronius recommends the "Pole Clamp" kit from Rittal GmbH (order no. SZ 2584.000). This kit enables the inverter to be installed on round or rectangular masts with the following diameters:  $\bar{A}$  from 40 to 190 mm (round mast),  $\bar{y}$  from 50 to 150 mm (rectangular mast)

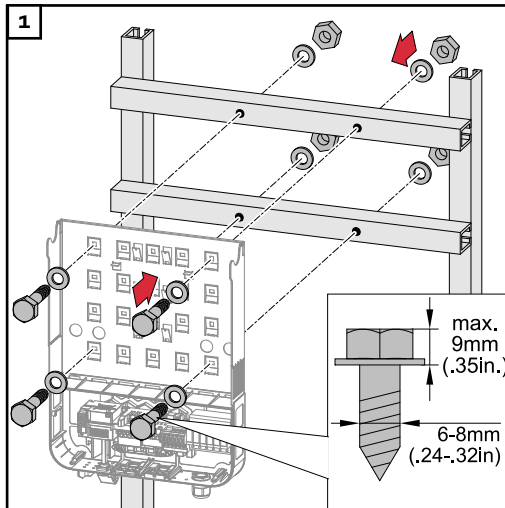
**Fitting the mounting bracket to metal supports**

**NOTE!**

**When mounted on metal supports, the inverter must not be exposed to rainwater or splashing water from the rear.**

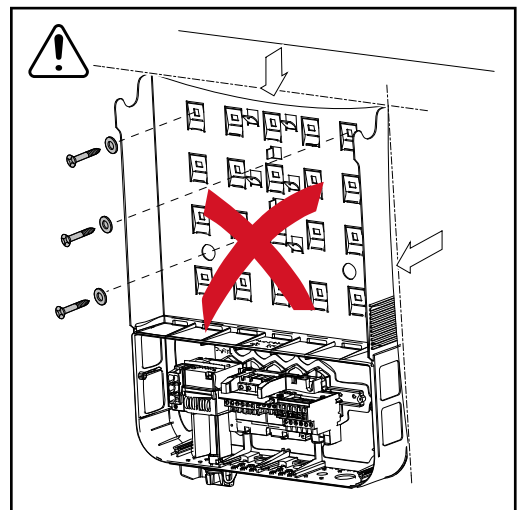
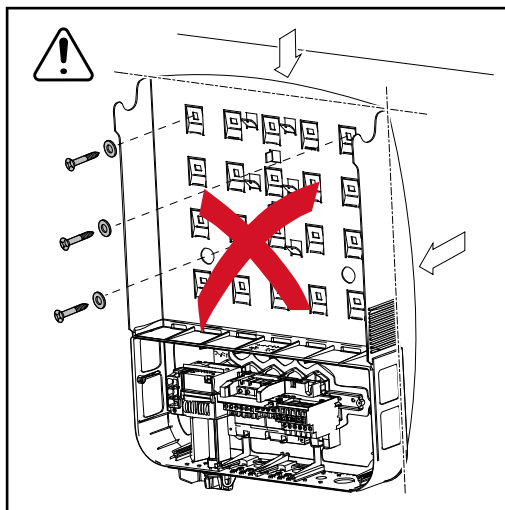
Provide suitable rainwater protection or splash water protection.

The mounting bracket must be securely screwed to at least four points.



**Do not warp or deform the mounting bracket**

**IMPORTANT!** When fitting the mounting bracket to the wall, ensure that the mounting bracket does not become warped or deformed.



# Connecting the inverter to the public grid (AC side)

## Safety

### **WARNING!**

#### **Danger due to incorrect operation and incorrectly performed work.**

This may result in serious injury and damage to property.

- ▶ Only qualified staff are authorised to commission your inverter and only within the scope of the respective technical regulations.
- ▶ Read the Installation and Operating Instructions before installing and commissioning the equipment.

### **WARNING!**

#### **Danger due to grid voltage and DC voltage from solar modules that are exposed to light.**

This may result in an electric shock.

- ▶ Ensure that both the AC side and the DC side of the inverter are de-energised before carrying out any connection work.
- ▶ Only an authorised electrical engineer is permitted to connect this equipment to the public grid.

### **CAUTION!**

#### **Danger due to incorrectly tightened terminals.**

This may result in heat damage to the inverter, which may lead to fire.

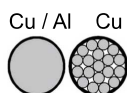
- ▶ When connecting AC and DC cables, ensure that all the terminals are tightened to the specified torque.

## Monitoring the grid

To provide the best possible grid monitoring, the resistance in the leads to the AC-side terminals should be as low as possible.

## Type of AC cable

The following types of AC cable can be connected to the AC terminals of the inverter:



- Copper or aluminium: solid round conductor
- Copper: fine-stranded round conductor

## Preparing the aluminium cables for connection

The AC-side terminals are suitable for connecting single-wire, round aluminium cables. Because of the formation of a non-conductive oxide layer due to the reaction of aluminium with air, the following points must be considered when connecting aluminium cables:

- the reduced rated currents for aluminium cables
- the connection conditions listed below

Always follow the cable manufacturer instructions when using aluminium cables.

When designing cable cross-sections, take local regulations into account.

### Connection conditions:

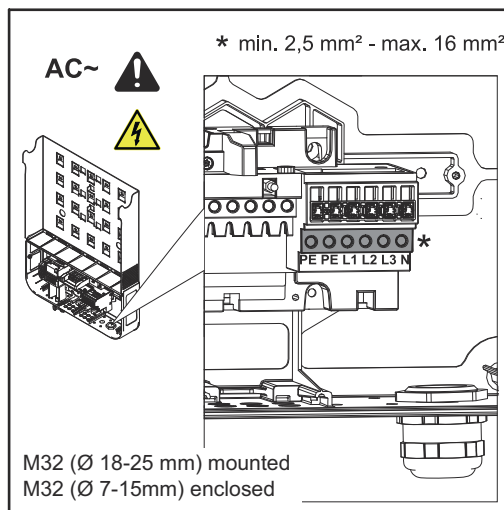
- 1 Carefully clean the oxide layer from the bare end of the cable by scraping it, e.g. with a knife

**IMPORTANT!** Do not use brushes, files or emery paper, as the aluminium particles get trapped and can be transferred to other conductors.

- 2 Once the oxide layer is removed, rub the end of the cable with a neutral grease, such as non-acidic and non-alkaline Vaseline
- 3 Immediately connect the cable end to the terminal

**IMPORTANT!** Repeat the procedure if the cable has been disconnected and is to be re-connected.

### AC terminals



Fronius Symo Advanced

PE Ground conductor / earthing  
L1-L3 Phase conductor  
N Neutral conductor

Max. cross-section of each conductor cable:  
16 mm<sup>2</sup>

Min. cross-section of each conductor cable:  
in accordance with the fuse rating on the AC side, but at least 2.5 mm<sup>2</sup>

The AC cables can be connected to the AC terminals without ferrules.

M32 (Ø 18-25 mm) mounted  
M32 (Ø 7-15 mm) enclosed

**IMPORTANT!** When using ferrules for AC cables with a cross-section of 16 mm<sup>2</sup>, the ferrules must be crimped with a right-angled cross-section.

The use of ferrules with insulating collars is only permitted up to a max. cable cross-section of 10 mm<sup>2</sup>.

For a power category of 15-17.5 kW, an M32 PG gland is fitted (Ø 18-25 mm) and an M32 PG gland (Ø 7-15 mm) supplied.

### Cross section of the AC cable

When using an M32 metric screw joint (reducer removed):

Cable diameter 11 - 21 mm

(with a cable diameter of 11 mm the strain-relief force is reduced from 100 N to a maximum of 80 N)

With cable diameters greater than 21 mm, the M32 screw joint must be replaced by an M32 screw joint with a larger clamping area - item number: 42,0407,0780 – strain-relief device M32x1.5 clamping area 18–25.



**Connecting the inverter to the public grid (AC)**

**IMPORTANT!**

- Form loops with the AC cables when connecting them to the AC terminals.
- When securing the AC cables using a metric screw joint, ensure that the loops do not protrude beyond the connection area.

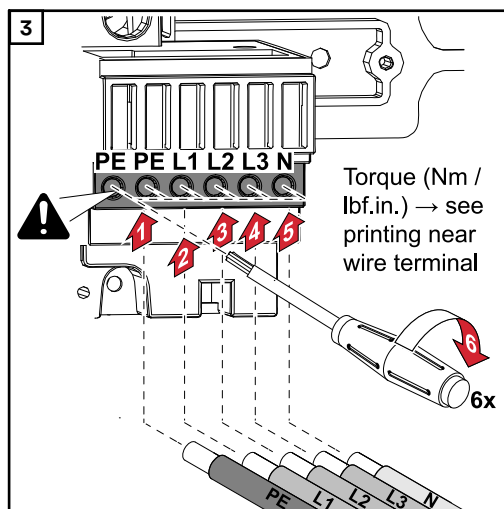
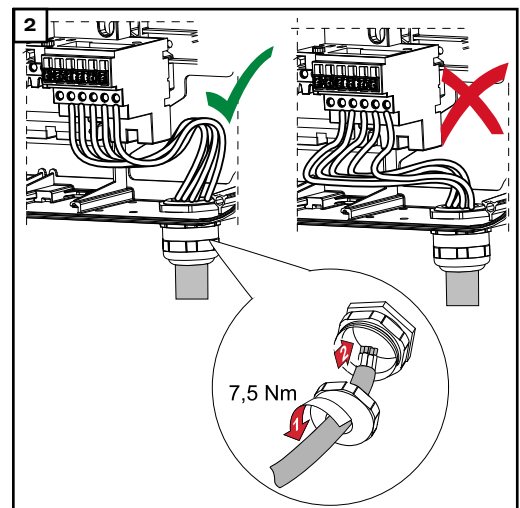
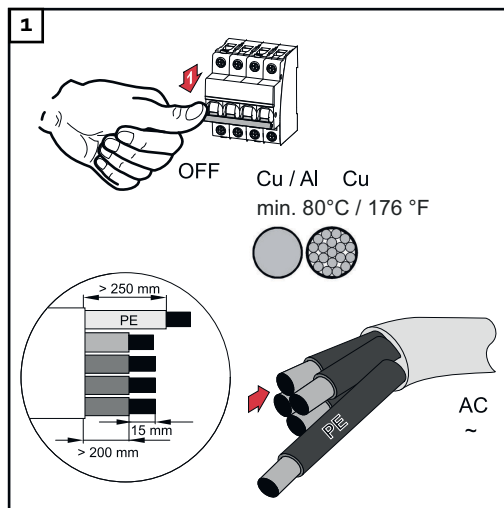
Otherwise, under certain circumstances it may no longer be possible to close the inverter.

**IMPORTANT!**

- Make sure that the grid's neutral conductor is grounded. This may not be the case for IT grids (insulated grids with no earthing); it will then not be possible to use the inverter.
- The neutral conductor must be connected in order to operate the inverter. A neutral conductor that is too small may adversely affect the inverter feeding energy into the grid. The neutral conductor must have an amperage of at least 1 A.

**IMPORTANT!** The PE ground conductor of the AC cable must be laid in such a way that it is the last to be disconnected in the event that the strain-relief device should fail.

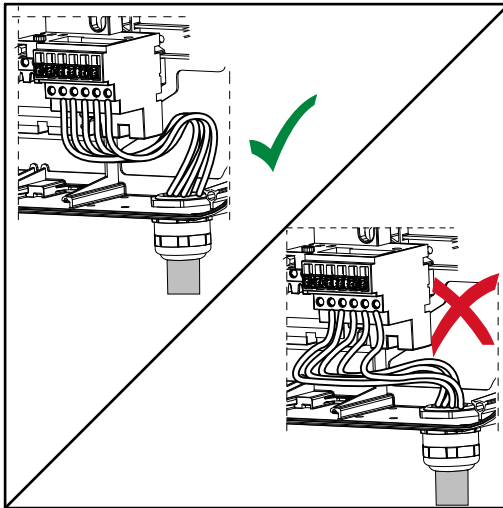
This can be ensured, for example, by making it somewhat longer and by laying it in a loop.



The fastening screw must also be tightened for an unassigned ground conductor (PE) connection.

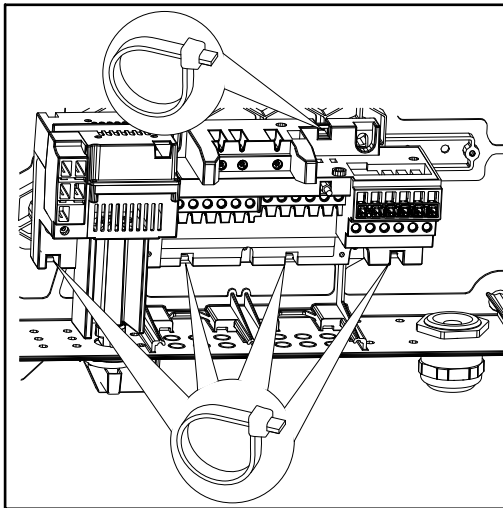
**IMPORTANT!** Observe the torque values marked on the side underneath the terminals.

Torque (Nm / lbf.in.) -> see information printed next to the terminal

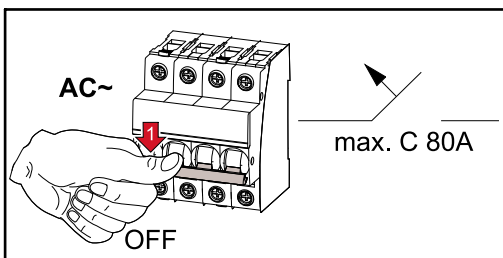


If AC cables are laid over the shaft of the DC main switch or across the connection block of the DC main switch, they may be damaged when the inverter is swung in or they may even prevent the inverter from being fully swung in. **IMPORTANT!** Do not lay the AC cable over the shaft of the DC main switch! Do not lay the AC cable across the DC main switch connection block or the AC connection block! AC cable must not protrude over the edge of the housing.

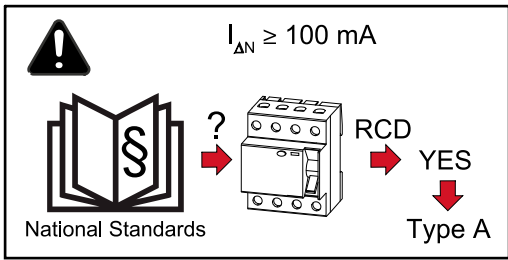
If overlength AC or DC cables are to be laid in loops in the connection area, attach the cables with cable ties to the eyelets provided on the top and bottom of the connection block.



**Maximum fuse rating on alternating current side**



Inverter	Phases	AC output	Maximum output overcurrent protection
Symo Advanced 10.0-3-M	3	10,000 W	C 80 A
Symo Advanced 12.5-3-M	3	12,500 W	C 80 A
Symo Advanced 15.0-3-M	3	15,000 W	C 80 A
Symo Advanced 17.5-3-M	3	17,500 W	C 80 A
Symo Advanced 20.0-3-M	3	20,000 W	C 80 A



**IMPORTANT!** Local regulations, the electricity retailer or other factors may require a residual-current protective device in the AC connection lead. A type A residual-current circuit breaker with a trip current of at least 100 mA is generally sufficient in this case. In particular cases, and depending on local factors, however, the type A residual-current circuit breaker may trip at the wrong time. For this reason, Fronius recommends that a residual-current circuit breaker that is suitable for frequency converters should be used.

# Connection variants on multi-MPP tracker inverters

## General

In the case of inverters with multiple MPP trackers like the Fronius Symo Advanced –M, there are 2 independent DC inputs (MPP trackers) available. These two MPP trackers can be wired with a different number of modules.

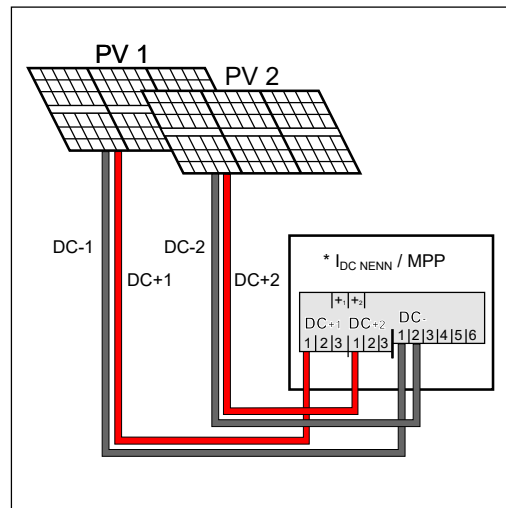
**IMPORTANT!** The number of PV modules per MPP tracker per string connection should be the same.

There are 3 terminals for DC+ per MPP tracker. In total there are six terminals for DC-.

In the case of inverters with single MPP trackers like the Fronius Eco, there is 1 DC input (MPP tracker) available. The number of PV modules per string connection should be the same. For the MPP tracker, there are 6 terminals for DC+ and 6 terminals for DC-.

## Multi MPP Tracker

### Multi MPP tracker mode on both MPP tracker inputs:



Connecting two solar module fields to an inverter with multiple MPP trackers

MPP tracker	Input current	
DC input	Symo Advanced ROW 10-12	Symo Advanced ROW 15-20
<b>If an AFCI (AFPE) according to IEC63027 is prescribed in your installation, an input current per string of maximum 12 A is permitted.</b>		
MPP1	27 A ( $I_{DC\ NOMINAL}$ )	33 A ( $I_{DC\ NOMINAL}$ )
DC+1		
MPP2	16.5 A ( $I_{DC\ NOMINAL}$ )	27 A ( $I_{DC\ NOMINAL}$ )
DC+2		
	14 A ( $I_{DC\ NOMINAL}$ ) if $< 420\ V_{DC}$	

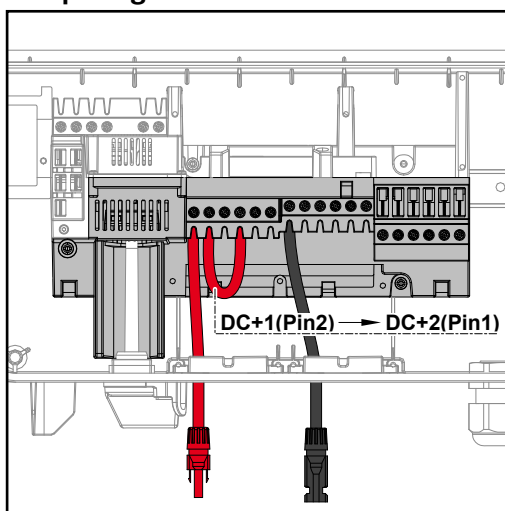
Divide the solar module strings between the two MPP tracker inputs (DC+1 and DC+2). The DC- terminals can be used however you wish, as they are internally

connected. A clearly numbered connection, but also at the DC terminal, makes it easier to find the correct string, e.g. during an inspection. Set the MPP tracker 2 to the "On" during initial commissioning. The user can of course also do this later in the Basic menu of the inverter.

### Single MPP tracker mode on both MPP tracker inputs:

If the solar module strings are connected to a string combiner box (GAK - generator junction box) and the distance to the inverter is bridged by means of a DC string, this DC string can be connected to the inverter as follows.

#### Jumpering



With jumpering, the MPP tracker 1 and MPP tracker 2 can be jumpered together. This takes place as shown in the image via the connection DC+1 (Pin2) to DC+2 (Pin1).

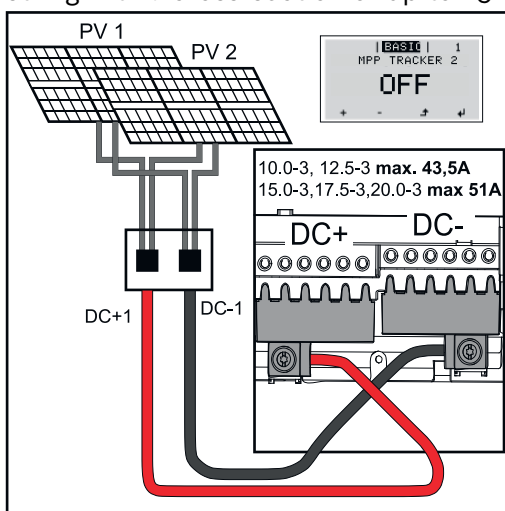
**IMPORTANT!** The MPP tracker 2 must be set to OFF. This can be checked in the Basic menu of the inverter.

**IMPORTANT!** The cable diameter of the DC connection cable and the jumpering must be the same. Jumpering of the DC- terminal is not necessary because it is jumpered internally.

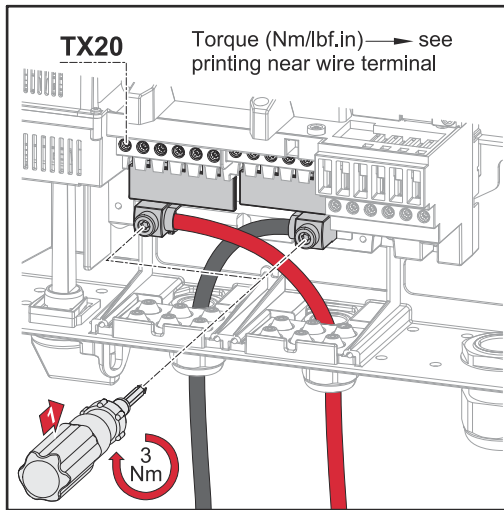
#### DC Con Kit 25

If your installation requires an AFCI (AFPE) according to IEC63027, do not use a DC Con Kit.

The Fronius DC Con Kit 25 (4,251,015) can be used to connect a solar module string with a cross-section of up to 25 mm<sup>2</sup> to the inverter.



Set the MPP tracker 2 to "OFF" during initial commissioning. This can also be done later in the Basic menu of the inverter. By using the DC Con Kit 25, the DC strings of the connected DC lines are divided equally between both inputs.

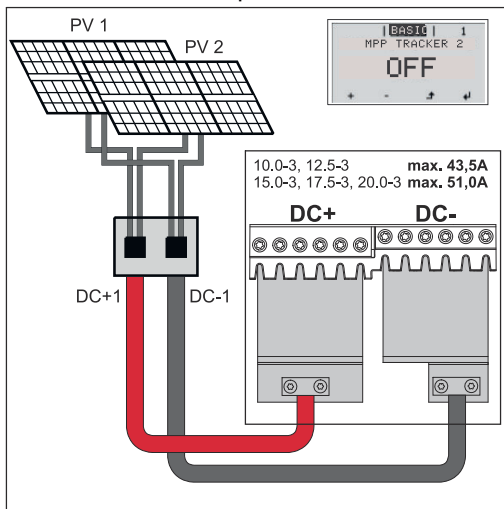


PV cable connection torque DC Con Kit 25: 5.5 Nm / 50 lb-in

### DC Con Kit 35

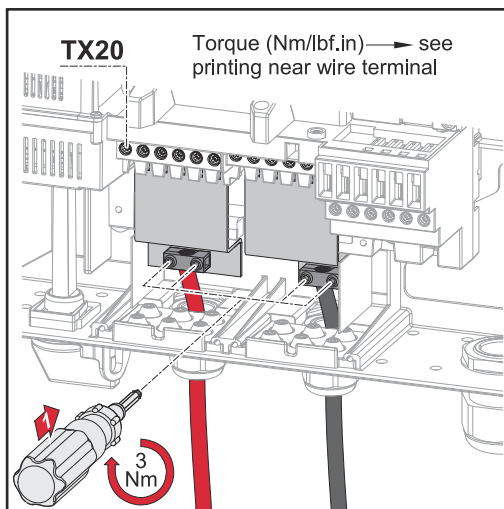
If your installation requires an AFCI (AFPE) according to IEC63027, do not use a DC Con Kit.

The Fronius DC Con Kit 35 (4,251,029) can be used to connect a PV string with a cross-section of up to 35 mm<sup>2</sup> to the inverter.



Set the MPP tracker 2 to "OFF" during initial commissioning. This can also be done subsequently in the Basic menu of the inverter.

By using the DC Con Kit 35, the DC strings of the connected DC lines are divided equally between the two inputs.



PV cable connection torque DC Con Kit 35: 3 Nm

# Connecting solar module strings to the inverter

## Safety

### **WARNING!**

#### **Danger due to incorrect operation and incorrectly performed work.**

This can result in serious injury and damage to property.

- ▶ Only qualified personnel are authorised to commission your inverter and only within the scope of the respective technical regulations.
- ▶ Read the Installation and Operating Instructions before installing and commissioning the equipment.

### **WARNING!**

#### **Danger due to grid voltage and DC voltage from solar modules that are exposed to light.**

This may result in an electric shock.

- ▶ Prior to any connection work, disconnect the inverter on the AC side and the DC side.
- ▶ Only an authorised electrical engineer is permitted to connect this equipment to the public grid.

### **WARNING!**

#### **Danger from grid voltage and DC voltage from solar modules.**

This may result in an electric shock.

- ▶ The DC main switch is only to be used to de-energise the power stage set. The connection area is still live when the DC main switch is switched off.
- ▶ Ensure that the power stage set and connection area are disconnected from one another before carrying out any maintenance or service tasks.
- ▶ The power stage set, which is enclosed in a separate housing, must only be disconnected from the connection area when in a de-energized state.
- ▶ Maintenance and servicing in the power stage set of the inverter must only be carried out by Fronius-trained service technicians.

### **CAUTION!**

#### **Danger due to incorrectly tightened terminals.**

This may result in heat damage to the inverter, which may lead to fire.

- ▶ When connecting AC and DC cables, ensure that all the terminals are tightened to the specified torque.

### **CAUTION!**

#### **Danger due to overloading.**

This may result in damage to the inverter.

- ▶ The maximum amperage when connecting to a single DC terminal is 33 A.
- ▶ Connect the DC+ and DC- cables to the DC+ and DC- terminals on the inverter, taking care to ensure that the polarity is correct.
- ▶ Observe the maximum DC input voltage.

**IMPORTANT!** The solar modules connected to the inverter must comply with the IEC 61730 Class A standard.

**IMPORTANT!** When photovoltaic modules are exposed to light, they supply current to the inverter.

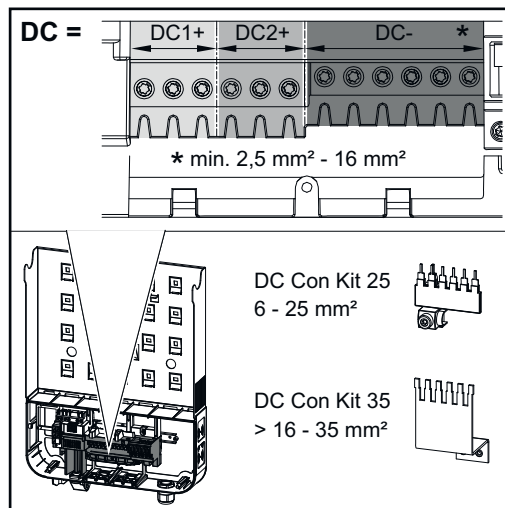
**General comments regarding PV modules**

To enable suitable PV modules to be chosen and to use the inverter as efficiently as possible, it is important to bear the following points in mind:

- If insolation is constant and the temperature is falling, the open-circuit voltage of the PV modules will increase. The open-circuit voltage must not exceed the maximum permissible system voltage. If the open-circuit voltage exceeds the specified values, the inverter will be destroyed and all warranty claims will be forfeited.
- The temperature coefficients on the data sheet of the PV modules must be observed.
- Exact values for sizing the solar modules can be obtained using suitable calculation tools, such as the Fronius Solar.creator ([creator.fronius.com](http://creator.fronius.com)).

**IMPORTANT!** Before connecting up the solar modules, check that the voltage for the solar modules specified by the manufacturer corresponds to the actual measured voltage.

**DC terminals**

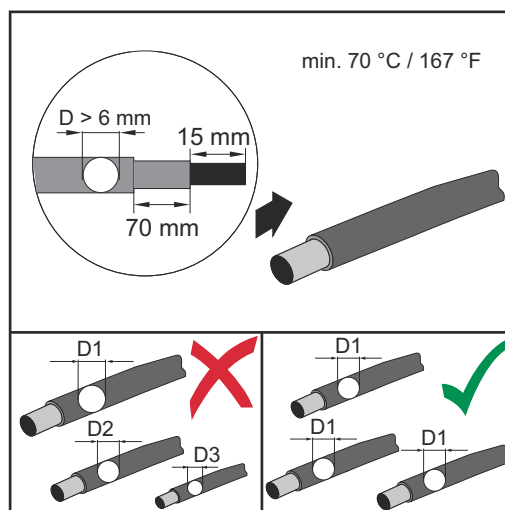


Max. cross-section of each DC cable: 16 mm<sup>2</sup>

Min. cross-section of each DC cable: 2.5 mm<sup>2</sup>

The DC cables can be connected to the DC terminals without ferrules.

**IMPORTANT!** When using ferrules for DC cables with a cross-section of 16 mm<sup>2</sup>, the ferrules must be crimped with a right-angled cross-section. The use of ferrules with insulating collars is only permitted up to a max. cable cross-section of 10 mm<sup>2</sup>.



For double insulated DC connection leads with a cable diameter greater than 6 mm, 70 mm of the outer jacket must be stripped in order to connect the cable to the DC terminal.

**IMPORTANT!** To ensure effective strain relief of the solar module strings, only use cables with identical cross-sections.

**Connecting aluminium cables**

The DC-side terminals are suitable for connecting single-wire, round aluminium cables. Because of the formation of a non-conductive oxide layer due to the re-



action of aluminium with air, the following points must be considered when connecting aluminium cables:

- the reduced rated currents for aluminium cables
- the connection conditions listed below

**IMPORTANT!** Always follow the cable manufacturer instructions when using aluminium cables.

**IMPORTANT!** When designing cable cross-sections, take local regulations into account.

#### Connection conditions:

- 1 Carefully clean the oxide layer from the bare end of the cable by scraping it, e.g. with a knife

**IMPORTANT!** Do not use brushes, files or emery paper, as the aluminium particles get trapped and can be transferred to other conductors.

- 2 Once the oxide layer is removed, rub the end of the cable with a neutral grease, such as non-acidic and non-alkaline Vaseline
- 3 Immediately connect the cable end to the terminal

**IMPORTANT!** Repeat the procedure if the cable has been disconnected and is to be re-connected.

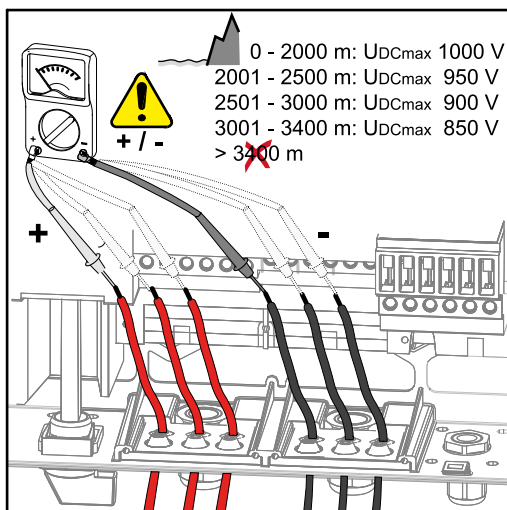
#### Solar module strings - checking the polarity and voltage

#### CAUTION!

#### Danger due to incorrect polarity and voltage.

This may result in damage to the inverter.

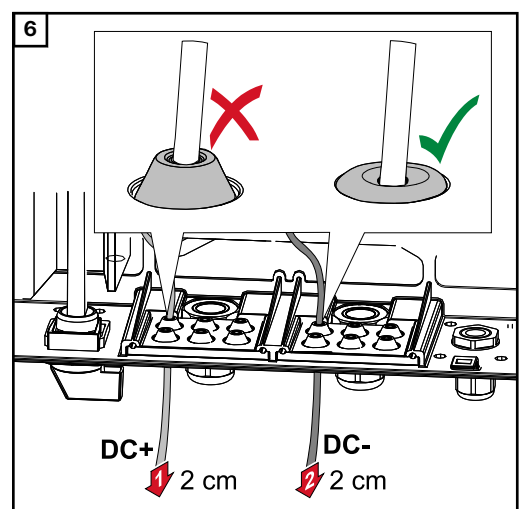
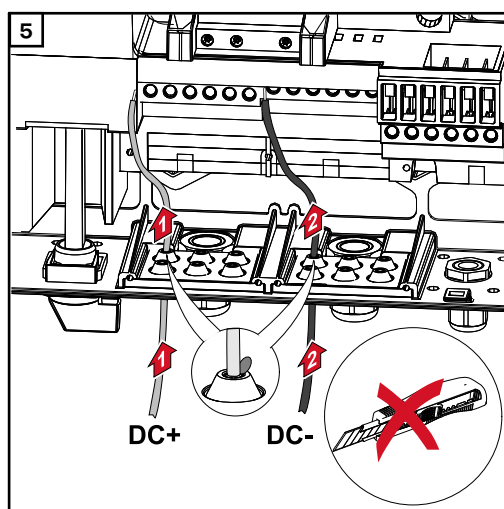
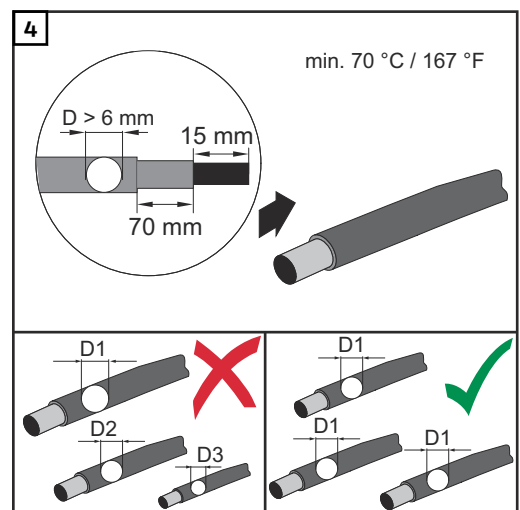
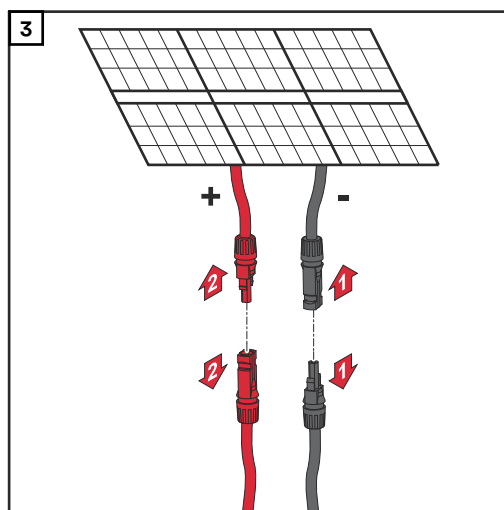
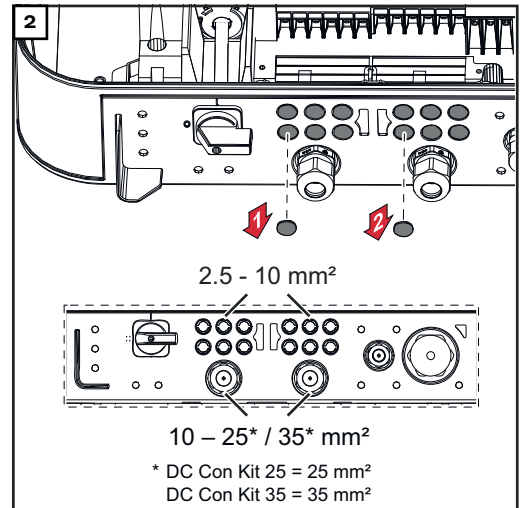
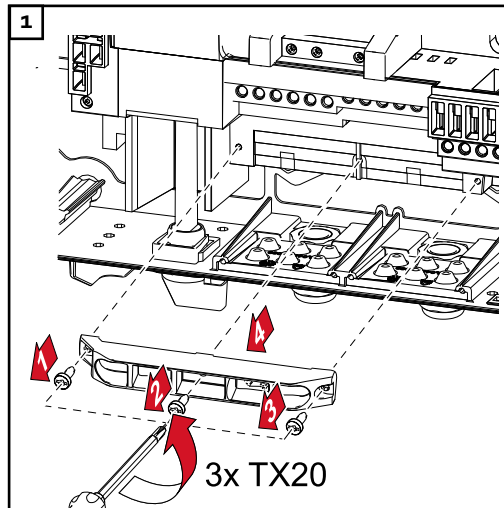
- ▶ Check the polarity and voltage of the solar module strings before making the connection. The voltage must not exceed the following values:
- ▶ When installed between 0 and 2000 m above sea level: 1000 V
- ▶ When installed between 2001 and 2500 m above sea level: 950 V
- ▶ When installed between 2501 and 3000 m above sea level: 900 V
- ▶ When installed between 3001 and 3400 m above sea level: 850 V
- ▶ the Fronius Symo Advanced must not be installed at an altitude exceeding 3400 m above sea level

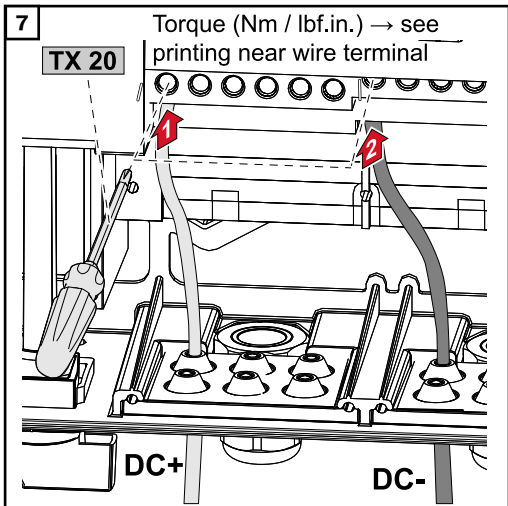


**Connecting the solar module strings to the inverter**

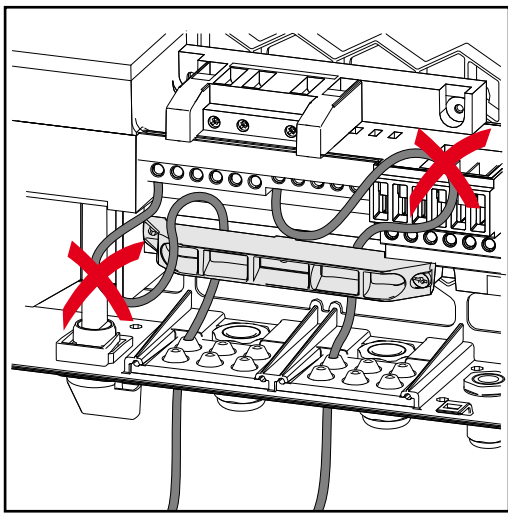
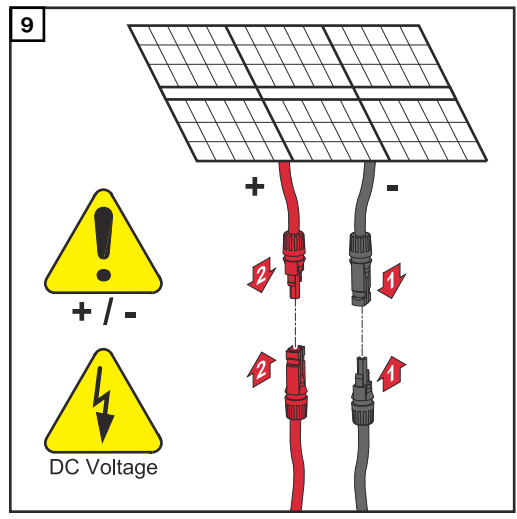
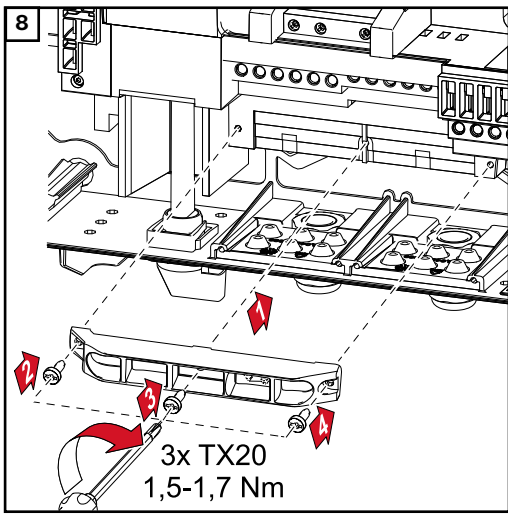
**IMPORTANT!** Only break out as many target break points as the number of cables that are provided (e.g. if there are 2 DC cables, then break out 2 recesses).

**IMPORTANT!** Fronius Eco: check the string fuses used (type and rating) before connecting the solar module strings to the inverter.





**IMPORTANT!** Observe the torque values marked on the side underneath the terminals.

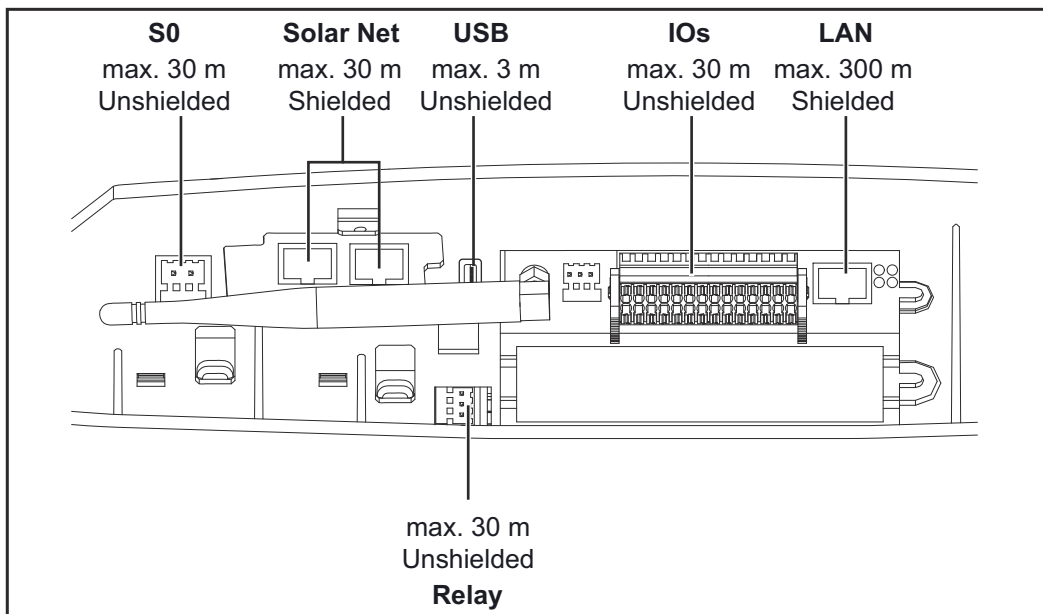


If DC cables are laid over the shaft of the DC main switch or across the connection block of the DC main switch, they may be damaged when the inverter is swung in or they may even prevent the inverter from being swung in.

**IMPORTANT!**  
Do not lay DC cables over the shaft of the DC main switch or across the AC connection block or the DC main switch connection block. DC cable must not protrude beyond the edge of the housing!

# Data communication

## Permitted cables for the data communication area



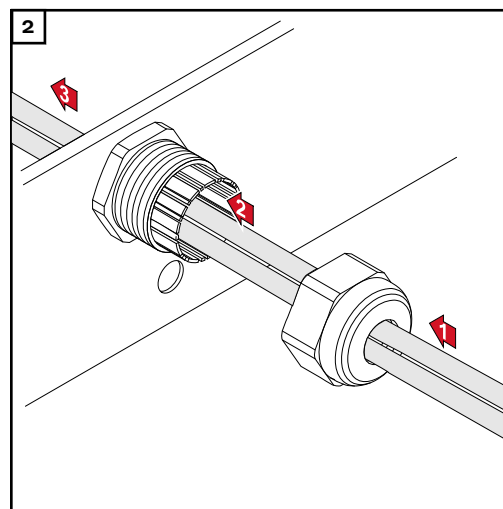
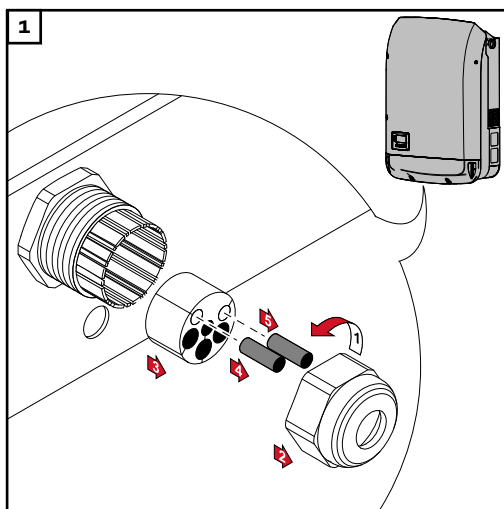
## Routing data communication cables

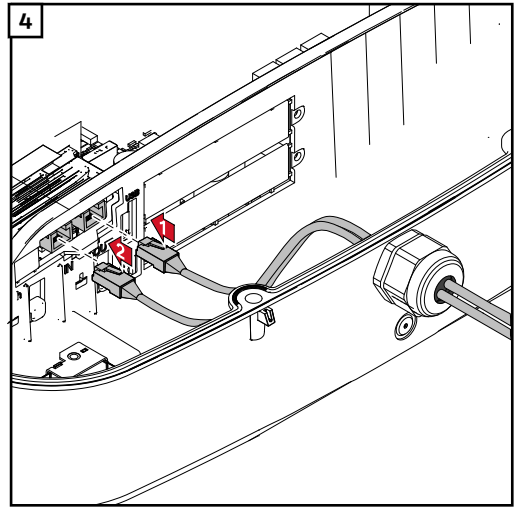
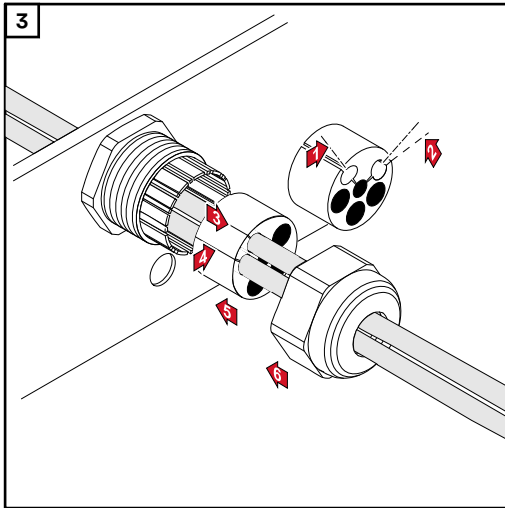
**IMPORTANT!** Operating the inverter with one option card and two broken-out option card slots is not permitted.

To cater for this eventuality, a suitable blanking cover (item number 42,0405,2094) is available from Fronius as an option.

**IMPORTANT!** If data communication cables are wired into the inverter, observe the following points:

- Depending on the number and cross-section of the data communication cables that are being introduced, take the relevant blanking plugs out of the sealing insert and insert the data communication cables.
- The relevant blanking plugs must be inserted into the free openings on the sealing insert.





**Installing the Datamanager in the inverter**

**⚠ WARNING!**

**Danger of residual voltage from capacitors.**

This may result in an electric shock.

- ▶ Wait for the capacitors to discharge. The discharge time is five minutes.

**⚠ WARNING!**

**Danger from inadequate ground conductor connection.**

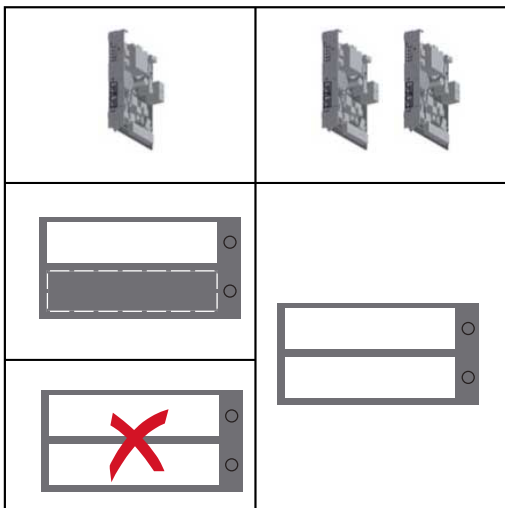
This can result in serious injury and damage to property.

- ▶ The housing screws provide a suitable ground conductor connection for earthing the housing and must NOT be replaced by any other screws that do not provide a reliable ground conductor connection.

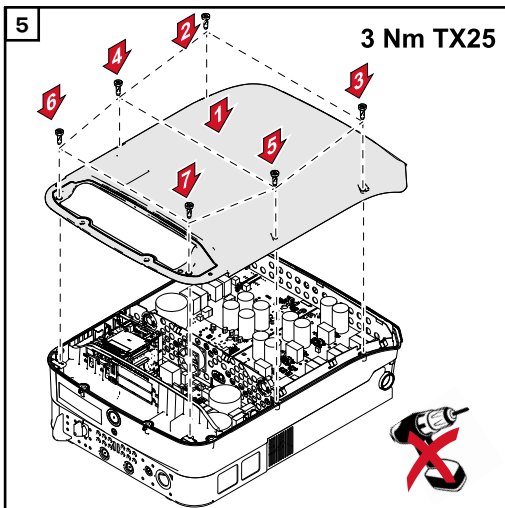
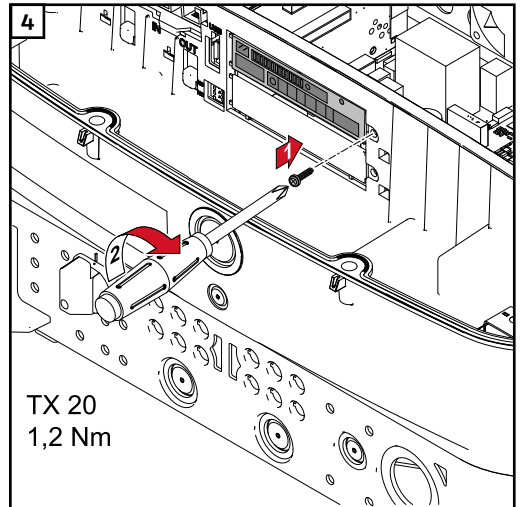
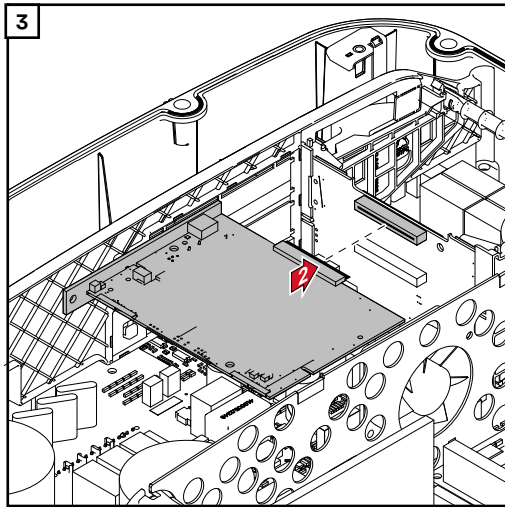
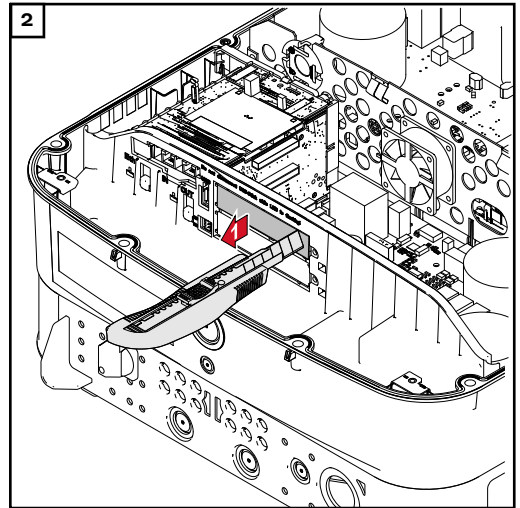
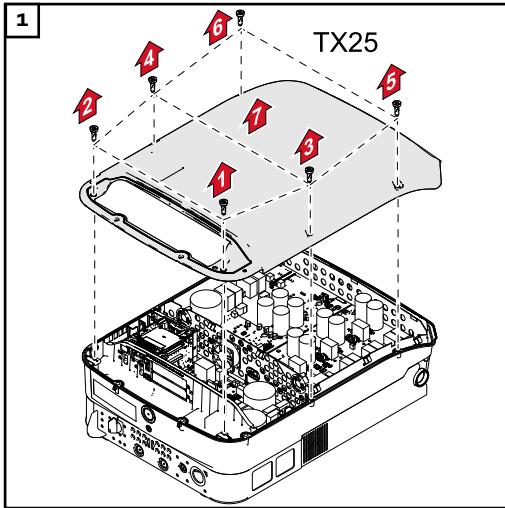
**IMPORTANT!** Observe the ESD guidelines when handling option cards.

**IMPORTANT!** Only one Fronius Datamanager in master mode is permitted per Fronius Solar Net ring. Switch any other Fronius Datamanagers to slave mode or remove them.

Seal off the unoccupied option card slot by replacing the cover (item number 42,0405,2094); alternatively, use an inverter without a Fronius Datamanager (light version).



**IMPORTANT!** Only break out one opening for the PC board when installing a Datamanager in the inverter.



# Attaching the inverter to the mounting bracket

## Attaching the inverter to the mounting bracket

### **WARNING!**

#### **Danger from inadequate ground conductor connection.**

This can result in serious injury and damage to property.

- ▶ The housing screws provide a suitable ground conductor connection for earthing the housing and must NOT be replaced by any other screws that do not provide a reliable ground conductor connection.

Two people are required to attach the inverter to the mounting bracket, as it is extremely heavy.

**IMPORTANT!** For safety reasons, the inverter is fitted with a latch that prevents the inverter from being swung into the mounting bracket unless the DC main switch is switched off.

- Never attach the inverter to the mounting bracket or swing it in unless the DC main switch is switched off.
- Never use force to attach the inverter or swing it in.

The fastening screws in the data communication area of the inverter are used for securing the inverter to the mounting bracket. Correctly tightened fastening screws are a prerequisite if proper contact is to be established between the inverter and mounting bracket.

### **CAUTION!**

#### **Danger due to incorrectly tightened fastening screws.**

This may result in arcs occurring when the inverter is in operation, which may lead to fire.

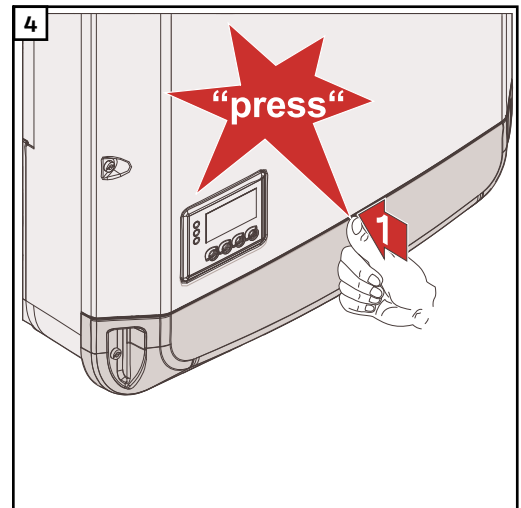
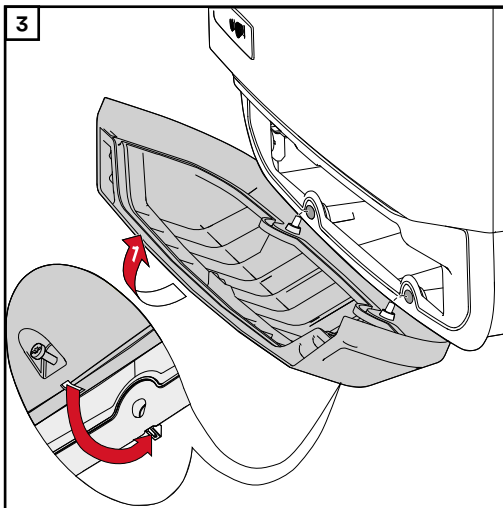
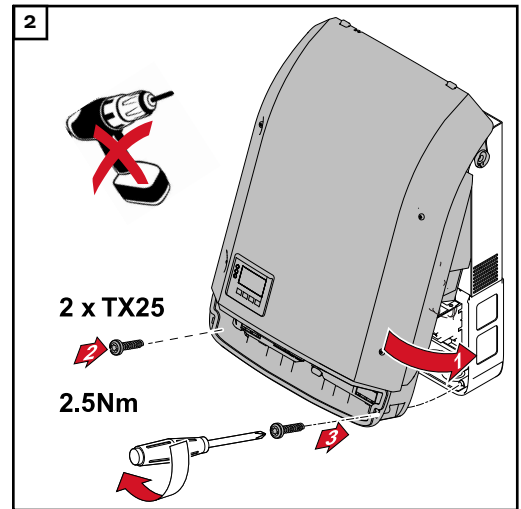
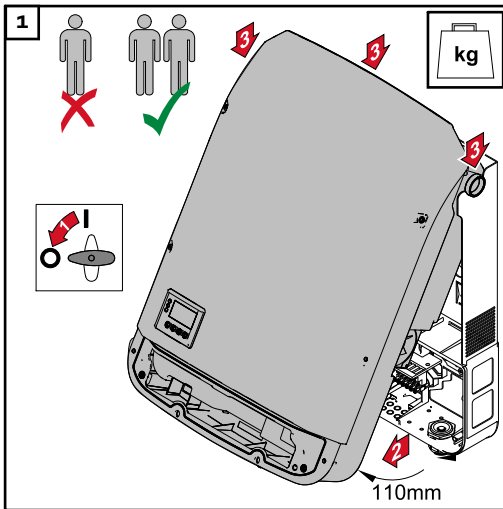
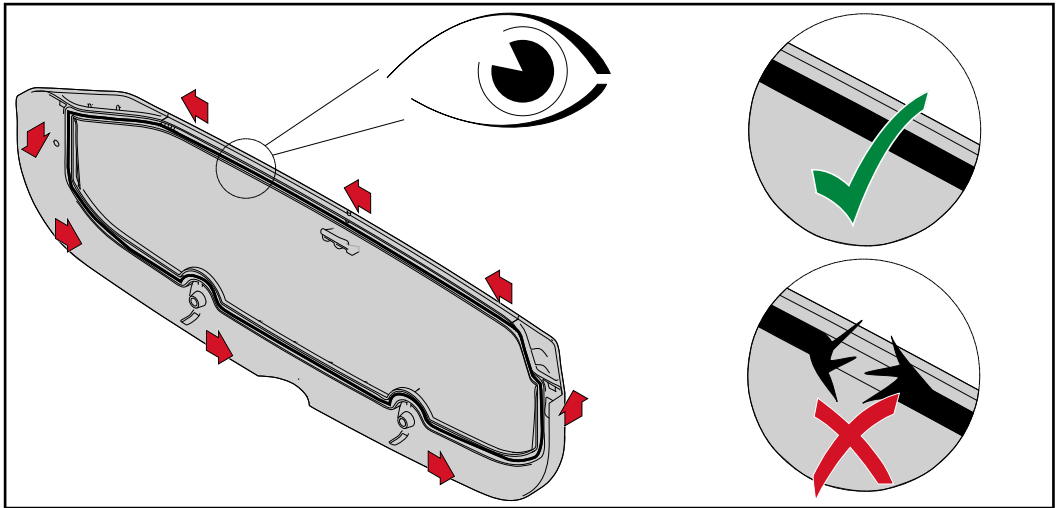
- ▶ Always use the specified torque when tightening the fastening screws.



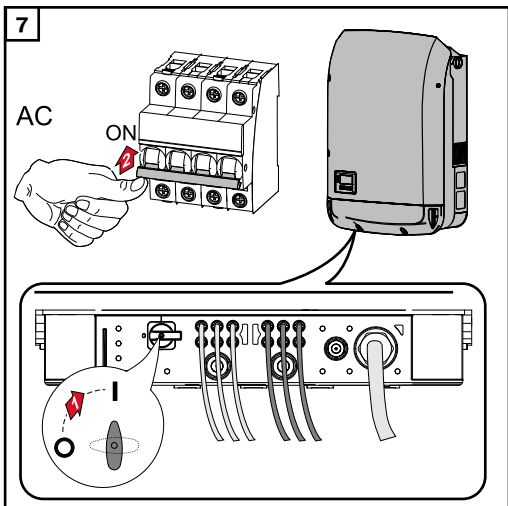
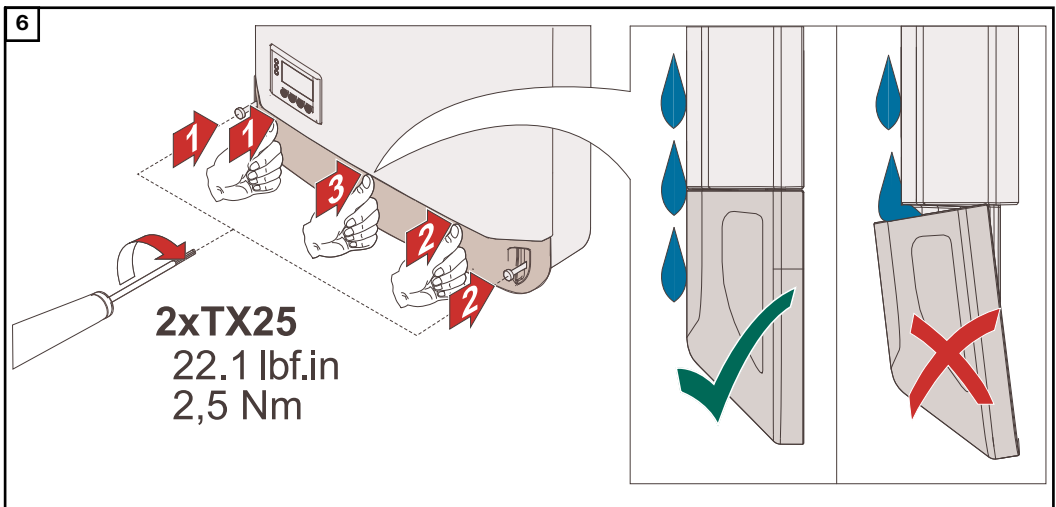
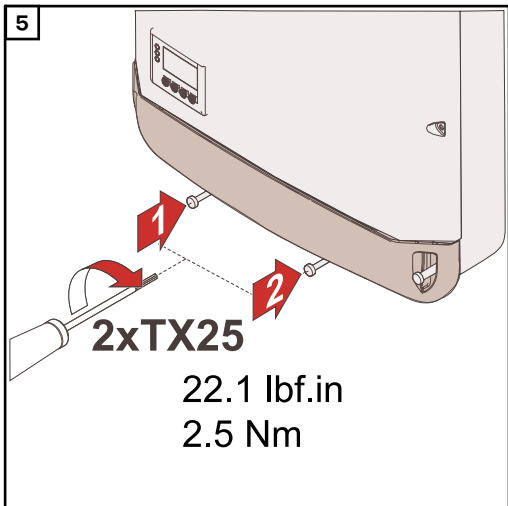
**Over torquing with an electric drill will void the warranty**

Warranty claims will be void if the screws are tightened using an incorrect torque.

Carry out a visual inspection of the seal on the DATCOM mounting bracket cover and check for any damage. A damaged or faulty DATCOM cover must not be fitted to the device.







# Starting for the first time

## Starting the inverter for the first time

**⚠ WARNING!**

**Danger due to incorrect operation and incorrectly performed work.**

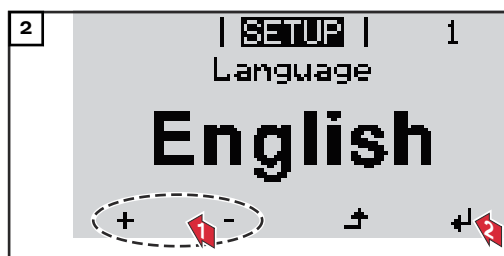
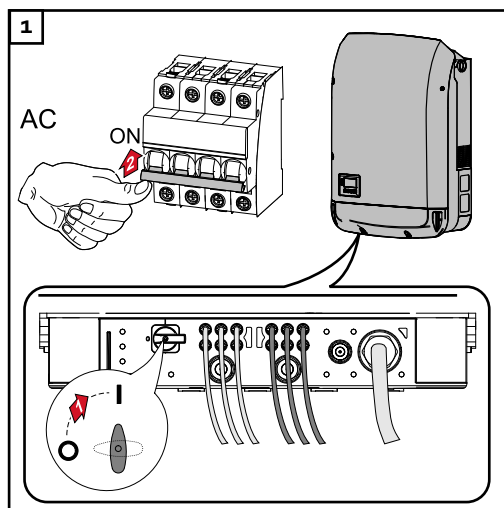
This can result in serious injury and damage to property.

- ▶ Only qualified personnel are authorised to commission your inverter and only within the scope of the respective technical regulations.
- ▶ Read the Installation and Operating Instructions before installing and commissioning the equipment.

When starting the inverter for the first time, it is necessary to select various setup settings.

If setup is interrupted before it is complete, it can be restarted by means of an AC reset. An AC reset can be carried out by switching the automatic circuit breaker off and on again.

The country setup can only be set when using the inverter for the first time. If the country setup needs to be changed at a later date, please contact your Technical Support team.

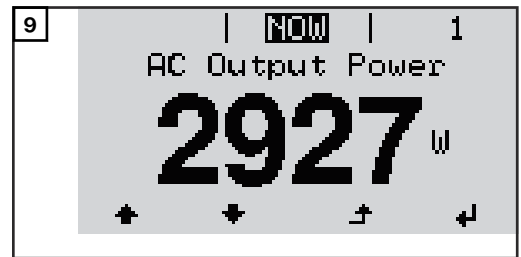
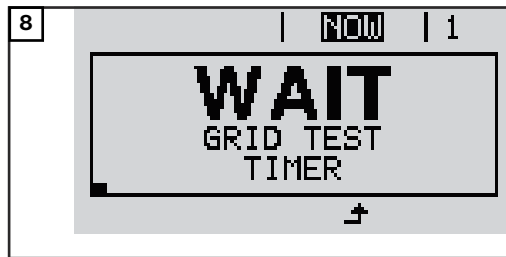
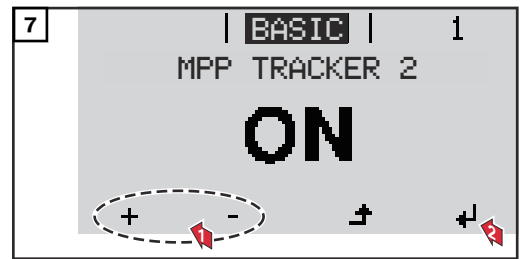
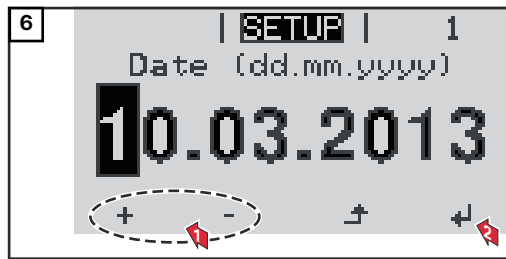


### \* Country setup examples

The available country setups may change during a software update. Therefore, the following list may not exactly match the display on the inverter.

50Hz International 50 Hz	DE2P Deutschland (> 4,6 kVA)	IT6 Italia ≤ 11,08 kVA 2019
60Hz International 60 Hz	- cosPhi(P) 0,9	IT7 Italia > 11,08 kVA 2019
AT1E Österreich cosphi = 1	DE2U Deutschland (> 4,6 kVA)	ITM1 Italia IT - MT 2019
AT2E Österreich cosphi P 0,9	- Q(U)	JO98 Jordan G98
AT3E Österreich: Q(U)	DEM2 Deutschland DE MS ext.	JO99 Jordan G99
AUS1 Australia AUS1 - AS/ NZS4777.2	NA-S	KR Republic of Korea
AUS2 Australia AUS2 - VIC	DK B Danmark 50kW-1.5MW	LK Sri Lanka
AUS3 Australia AUS3 - NSW Ausgrid	DKA1 West Denmark - 125kW	MG50 Microgrid 50 Hz
AUS4 Australia AUS4 - QLD	DKA2 East Denmark - 125kW	MG60 Microgrid 60 Hz
AUS5 Australia AUS5 - SA	DU1 Dubai < 10 kW	NI98 Northern Ireland G98
AUS6 Australia AUS6 - WA - WP	DU2 Dubai 10 kW - 400 kW	NI99 Northern Ireland G99
AUS7 Australia AUS7 - WA - HP	DU3 Dubai > 400 kW	NIE1 Northern Ireland < 16 A
AUA Australia Region A 2020	EE Estonia	NIE2 Northern Ireland > 16 A
AUB Australia Region B 2020	ES España	NL Nederland
AUC Australia Region C 2020	ESOS Territorios españoles en el extranjero (Spanish Oversea Islands)	NO Norge
BE Belgique / België	EULV EU - low voltage	NZ New Zealand
BR2 Brasil: ≤ 6 kVA	EUMV EU - medium voltage	PF1 Polynésie française (French Polynesia)
BR3 Brasil: > 6 kVA	FI Finland	PL Poland
CH Schweiz / Suisse / Svizzera / Svizra	FR France	PT Portugal
CL Chile	FRMV France MV	RO România
CY Κύπρος / Kıbrıs / Cyprus	FROS Territoire d'Outre-Mer (French Oversea Is- lands)	SA Saudi Arabia
CZ Česko	G98 Great Britain GB - G98	SE Sverige
CZMV Ceske Vysoke Napeti	G99 Great Britain GB - G99	SI Slovenija
DE1F Deutschland (≤ 4,6 kVA) - konst. cosPhi(1)	GB Great Britain	SK Slovensko
DE1P Deutschland (≤ 4,6 kVA) - cosPhi(P) 0,95	GR Ελλάδα	TH M Thailand MEA
DE2F Deutschland (> 4,6 kVA) - konst. cosPhi(1)	HR Hrvatska	TH P Thailand PEA
	HU Magyarország	TR Türkiye
	IE Éire / Ireland	TRMV Türkiye orta g.
	IL ישראל / إسرائيل / Israel	UA Україна
	IN India	ZA South Africa < 100kVA
		ZA South Africa < 1 MVA





# Notes regarding maintenance

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## Maintenance

**IMPORTANT!** When installed outdoors in a horizontal position: once a year, check that all screw joints are tight!

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

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## Cleaning

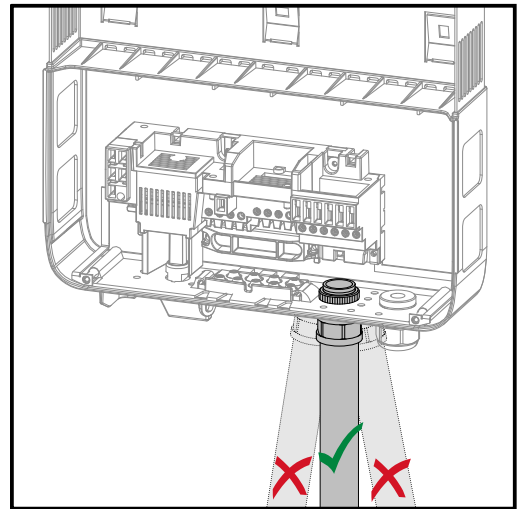
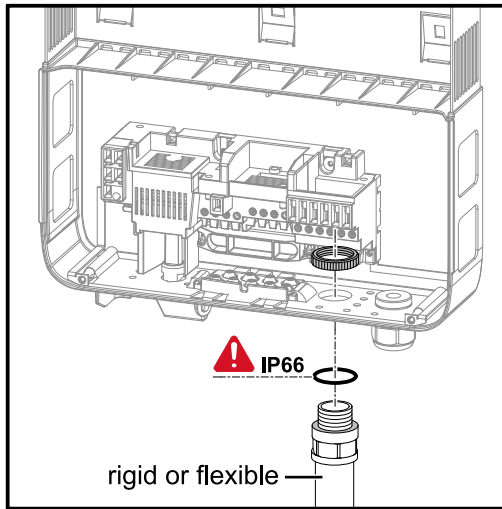
Clean the inverter as required with a damp cloth.

Do not use cleaning agents, abrasives solvents or similar to clean the inverter.

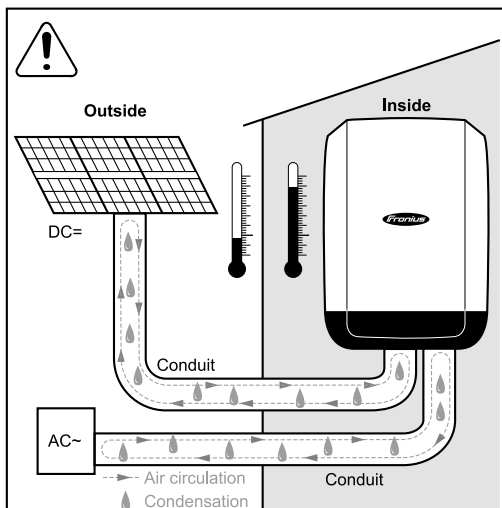
# Australian Conduits

## Tightly sealing the conduits

Ensure that the conduits are tightly sealed.



## Seal conduits

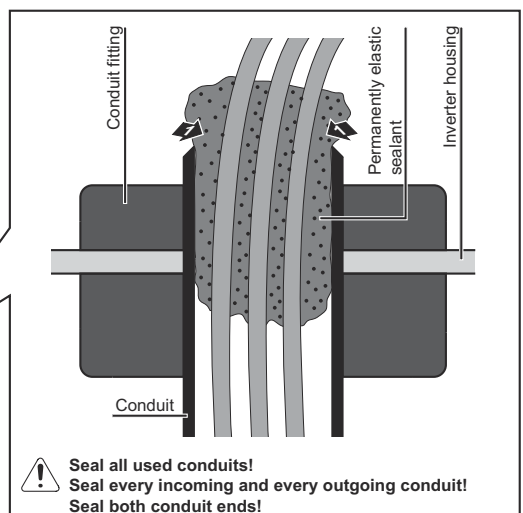
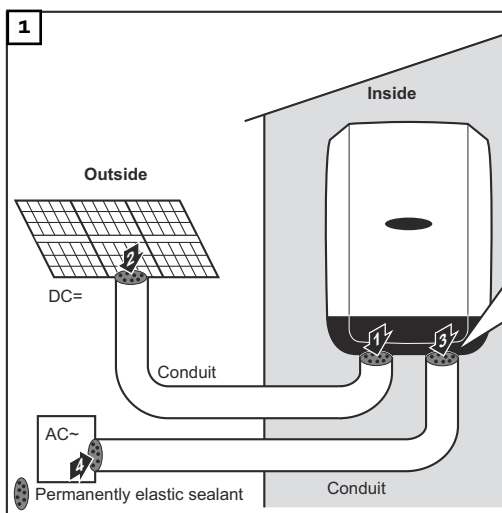


### NOTE!

**Condensation within the conduits can damage the inverter or components of the photovoltaic systems.**

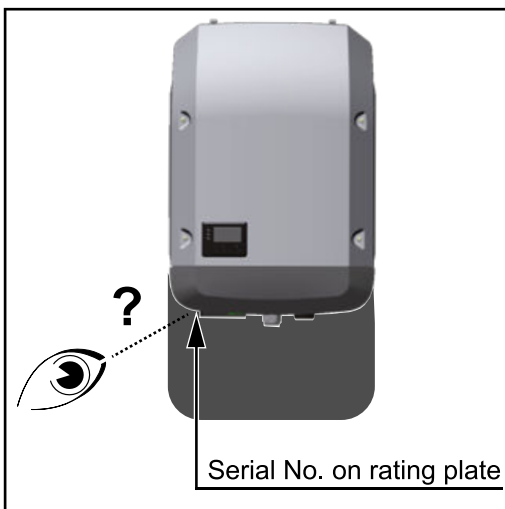
To avoid undesirable air circulation and condensation in the conduits:

- ▶ Seal all conduits being used with a permanently elastic sealant
- ▶ Seal every incoming and outgoing conduit
- ▶ Seal both conduit ends.

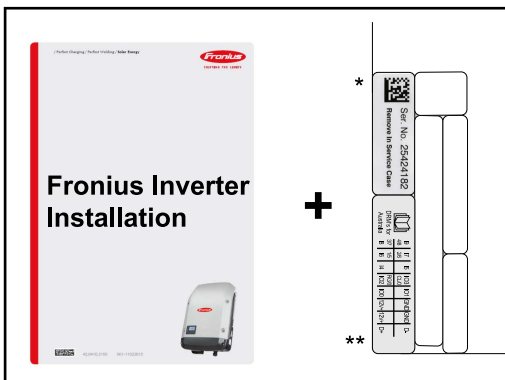


# Serial Number Sticker for Customer Use

## Serial number sticker for customer use



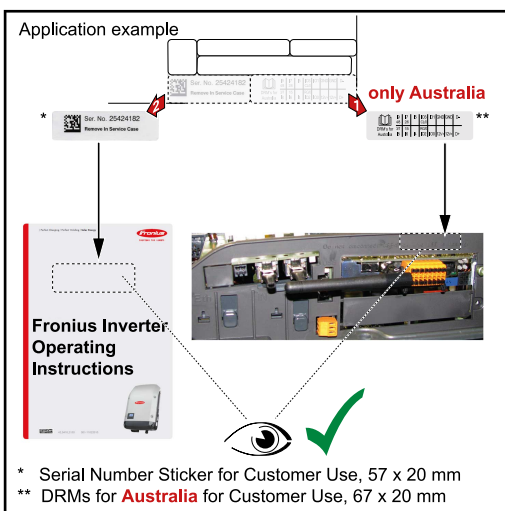
The serial number of the inverter is located on the rating plate on the bottom of the inverter. Depending on the installation position of the inverter, the serial number can be difficult to access or read, e.g. if the inverter has been installed in a dark or shaded area.



Two serial number stickers are enclosed with the inverter's installation instructions:

- \* 57 x 20 mm
- \*\* 67 x 20 mm

These can be affixed by the customer in a visible location of their choosing, e.g. on the front of the inverter or on the Operating Instructions.



Application example: Serial number sticker on the Operating Instructions or on the front of the inverter

For Australia only: Affix the DRM Australia sticker in the Datamanager area.





# Settings



# Navigation at the menu level

## Activating display backlighting

- 1 Press any key

The display backlighting is activated.

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

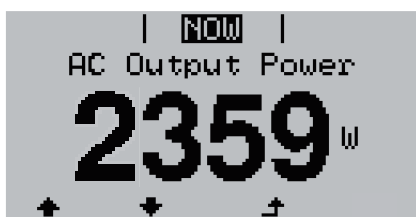
## Automatic deactivation of display backlighting / changing to the "NOW" menu item

If two minutes pass without any button being pressed, the display backlighting switches off automatically and the inverter goes to the "NOW" menu item (assuming the display backlighting is set to AUTO).

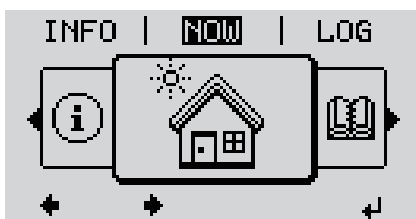
The automatic selection of the "NOW" menu item can happen from any position on the menu level, unless the inverter was manually switched into the "Standby" operating mode.

After automatically selecting the "NOW" menu item, the current power of feeding in is displayed.

## Opening the menu level



- 1 Press "ESC" ↵



The display switches to the menu level.

- 2 Using the "Left" or "Right" keys ←→ 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 started for the first time
- **GRAPH**  
Day characteristic displays a plot showing the output power 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)** - depending on the device type (MultiString), when the Enter key is pressed, ↵ the individual output powers for MPP Tracker 1 and MPP Tracker 2 (MPPT1 / MPPT2) are displayed

---

**AC reactive power (VAr)**

---

**Grid voltage (V)**

---

**Output current (A)**

---

**Grid frequency (Hz)**

---

**Solar voltage (V)** - U PV1 from MPP Tracker 1 and U PV2 from MPP Tracker 2 (MPPT1 / MPPT2), if MPP Tracker 2 is activated (see "The Basic menu" - "Menu items in the Basic menu")

---

**Solar power (A)** - I PV1 from MPP Tracker 1 and I PV2 from MPP Tracker 2 (MPPT1 / MPPT2), if MPP Tracker 2 is activated (see "The Basic menu" - "Menu items in the Basic menu")

---

Fronius Eco: The total current from both measuring channels is displayed. Both channels are shown separately in SolarWeb.

---

**Time date** - Time and date on the inverter or in the Fronius Solar Net ring

---

---

**Values displayed under the LOG menu item**

---

**Energy fed in (kWh / MWh)**

Energy fed into the grid during the period in question.

When the Enter key is pressed, ↵ the individual output powers for MPP Tracker 1 and MPP Tracker 2 (MPPT1 / MPPT2) are displayed, if MPP Tracker 2 is activated (see "The Basic menu" - "Menu items in the Basic menu")

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 fed into the grid during the period in question.

When the Enter key is pressed, ↵ the individual output powers for MPP Tracker 1 and MPP Tracker 2 (MPPT1 / MPPT2) are displayed, if MPP Tracker 2 is activated (see "The Basic menu" - "Menu items in the Basic menu")

---

**Yield**

Amount of money earned during the period in question

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

The subitem "Energy yield" in the "Menu items in the Set-up menu" section explains how to select a currency and charge rate.

The factory setting depends on the respective country setup.

---

**CO2 savings**

CO2 emissions saved during the period in question

The subitem "CO2 factor" in the "Menu items in the Set-up menu" section explains how to set the CO2 factor.

---

---

**Maximum grid voltage (V)** [phase indicator - neutral or phase - phase]

Highest grid voltage measured during the period in question

When the Enter key is pressed, ↵ the individual grid voltages are listed

---

**Maximum solar voltage (V)**

Highest solar module voltage measured during the period in question

When the Enter key is pressed, ↵ the voltage values for MPP Tracker 1 and MPP Tracker 2 (MPPT1 / MPPT2) are displayed, if MPP Tracker 2 is activated (see "The Basic menu" - "Menu items in the Basic menu")

---

**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.

---

# SETUP menu item

## Initial setting

The inverter is pre-configured after commissioning has been completely carried out (e.g. using the Installation Wizard) according to the country setup.

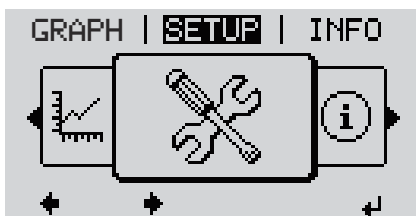
The SETUP menu item allows the initial settings of the inverter to be changed easily to bring it in line, as closely as possible, with the preferences and requirements of the user.

## Software updates

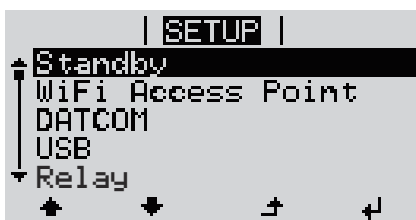
**IMPORTANT!** As a result of software updates, you may find that your device has certain functions that are not described in these Operating Instructions, or vice versa. Certain illustrations may also differ slightly from the actual controls on your device, but these controls function in exactly the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

## Navigating the SETUP menu item

### Entering the SETUP menu item



- 1 At the menu level, use the "Left" or "Right" keys  $\leftarrow \rightarrow$  to select the "SETUP" menu item
- 2 Press the "Enter" key  $\rightarrow$



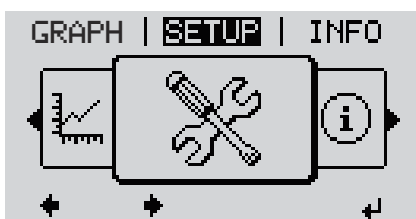
The first entry under the **SETUP** menu item is displayed: "Standby"

### Scrolling between the entries



- 3 Use the "Up" and "Down" keys  $\uparrow \downarrow$  to scroll between the available entries

### Exiting an entry



- 4 To exit a menu entry, press the "Back" key  $\leftarrow$

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 (exception: "Standby" Setup menu item).
- The display backlighting goes out unless it has been set to ON in Display Setting - Backlighting (see Display Setting - Backlighting).
- The power currently being fed in is displayed or the currently active state code is displayed.

**Setting menu entries, general**

- 1 Open the desired menu
- 2 Use the 'Up' or 'Down' keys to select the desired menu item  $\uparrow \downarrow$
- 3 Press "Enter"  $\leftarrow$

**The available settings are displayed:**

- 4 Use the 'Up' or 'Down' buttons to select the desired setting  $\uparrow \downarrow$
- 5 Press the 'Enter' key to save and apply the setting.  $\leftarrow$

To discard the setting, press the 'Esc' key.  $\uparrow$

The currently selected menu item is displayed.

**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  $\uparrow \downarrow$
- 5 Press "Enter"  $\leftarrow$

The second digit of the value flashes.

- 6 Repeat steps 4 and 5 until ...  
the whole value to be set flashes.
- 7 Press "Enter"  $\leftarrow$
- 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.  $\leftarrow$

To discard the changes, press the 'Esc' key.  $\uparrow$

The currently selected menu item is displayed.

**Application example: Setting the time**



- 1 Select "Clock" from the Setup menu  $\uparrow \downarrow$ .
- 2 Press the "Enter"  $\leftarrow$  key



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

3 Use the "Up" and "Down" keys  $\uparrow$   $\downarrow$  Select "Set time"

4 Press the "Enter"  $\leftarrow$  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 first digit of the code

6 Press the "Enter"  $\leftarrow$  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"  $\leftarrow$  key



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

4 Press the "Esc"  $\uparrow$  key



The "Clock" item on the Setup menu appears.



# 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 the display, STANDBY / ENTER are alternately displayed
- 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 inactivity does not occur.
- Standby mode can only be terminated manually by pressing the "Enter" key.
- Pressing "Enter" at any time will cause energy to resume feeding into the grid, as long as there is no error (state code)

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

- 1 Select the "Standby" item
- 2 Press "Enter" function  $\leftarrow$  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:

In standby mode, the display alternates between 'STANDBY' and 'ENTER'.

- 1 Press the "Enter" function key to resume feeding energy into the  $\leftarrow$  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.

## DATCOM

Checking data communications, entering the inverter number, protocol settings

Setting range	Status / inverter number / protocol type
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### Status

Indicates data communication is taking place via Fronius Solar Net or that a data communications error has occurred

### Inverter number

Sets the number (= address) of the inverter in a system with several inverters

Setting range	00 - 99 (00 = inverter address 100)
Factory setting	01

**IMPORTANT!** If a number of inverters are linked together in a data communications system, assign a unique address to each one.

### Protocol type

Specifies the communications protocol to be used to transfer the data:

Setting range	Solar Net / Interface *
Factory setting	Fronius Solar Net

\* The protocol type "Interface" only functions when there is no Datamanager card in the inverter. All Fronius Datamanager cards should be removed from the inverter.

## USB

Running firmware updates or saving detailed information from the inverter to the USB flash drive

Setting range	Safely remove hardware / Software update / Logging interval
---------------	---

### Safely remove hardware

To remove a USB flash drive from the USB A socket on the plug-in data communications card without losing any data.

The USB flash drive can be removed:

- If the OK message appears
- when the "Data transfer" LED stops flashing or comes on steady

### Software update

To update the inverter firmware using a USB flash drive.

Procedure:

- 1 Download the relevant firmware update file "froxxxxx.upd" (under <http://www.fronius.com>; xxxxx stands for the version number)

### NOTE!

**To successfully update the inverter software, the USB flash drive provided for the purpose must not have a hidden partition or any encryption (see chapter "Suitable USB flash drives").**

- 2 Save the firmware update file to the highest data level of the USB flash drive
- 3 Open the lid of the data communication area on the inverter
- 4 Plug the USB flash drive containing the firmware update file into the USB socket in the inverter's data communication area
- 5 Select "USB" from the Setup menu, followed by "Software update"
- 6 Press the "Enter" key
- 7 Wait until the version currently installed on the inverter and the new firmware version are displayed for comparison:
  - 1st page: Recerbo software (LCD), key controller software (KEY), country setup version (Set)
  - 2nd page: Power stage set software (PS1/PS2)
- 8 Press the "Enter" function button after each page

The inverter starts copying the data.

"BOOT" and the progress of storing the individual tests expressed in % are displayed until all the data for all the electronic modules has been copied.

Once copying is complete, the inverter updates the electronic modules as required in sequence.

"BOOT", the affected modules and the update progress in % are displayed.

The final step is for the inverter to update the display. The display remains dark for approx. 1 minute while the monitoring and status LEDs flash.

Once the firmware update is complete, the inverter enters its start-up phase before going on to start feeding energy into the grid. Unplug the USB flash drive using the "Safely remove hardware" function.

When the inverter firmware is updated, any custom settings that were configured in the Setup menu are retained.

**Logging interval**

Activate / deactivate the USB logging function and specify a 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; every 30 minutes new logging data will be saved to the USB flash drive.
---------	---

20 min.	↓
15 min.	
10 min.	

5 min.	The logging interval is 5 minutes; every 5 minutes new logging data will be saved to the USB flash drive.
--------	---

No log	No data is saved
--------	------------------

**IMPORTANT!** In order for the USB logging function to work correctly the time must be set correctly. Setting the time is discussed in the section "Menu items in the Setup menu" - "Clock".

**Relay (floating contact switch)**

Status codes (state codes), the status of the inverter (e.g. feeding energy into the grid) or Energy Manager functions can be displayed using the floating switch contact (relay).

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**

The following functions can be shown using relay mode:

- Alarm function (Permanent / ALL / GAF)
- Active output (ON / OFF)
- Energy Manager (E-Manager)

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

### Alarm function:

ALL / Permanent: Switching 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 the "BASIC" menu)

GAF As soon as GAF mode is selected, the relay is switched on. The relay opens as soon as the power stage set registers an error and goes from normally feeding energy into the grid to being in an error state. This means that the relay can be used for fail-safe functions.

### Application example

It may be necessary to perform phase compensation when using a single-phase inverter at a multiphase site. If an error occurs on one or several inverters and the connection to the grid is broken, the other inverters must also be disconnected to maintain the phase balance. The "GAF" relay function can be used in conjunction with the Datamanager or an external protection device to recognise or signal that an inverter is not feeding in or is disconnected from the grid and to then disconnect the remaining inverters from the grid using a telecontrol command.

### 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 or 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 Set switch-off point up to the maximum nominal output of the inverter (W or 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 to the set switch-on point of the inverter (W or kW)

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---

### Energy Manager (under Relay menu item)


The "Energy Manager" (E-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 (effective 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 of the inverter.

To activate the Energy Manager function, select the "E-Manager" item 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 NC contact is on (closed contact)

To deactivate the Energy Manager function, select a different function (ALL / Permanent / OFF / ON) and press the "Enter" key.

### NOTE!

#### Notes on setting up the switch-on and switch-off points

**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 switching on and off frequently, 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 insulation should 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.

This allows useful applications, such as operating a heat pump or an air-conditioning system using as much self-generated power as possible, to be implemented quickly

## Time / Date

Set the time, date, the display format 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 or dd.mm.yy
Factory setting	Depends on country setup

---

**Summer/winter time**

Activate/deactivate automatic changeover between summer and winter time

**IMPORTANT!** Only use the automatic summer/winter time changeover function if the Fronius Solar Net ring does not include any LAN- or WLAN-compatible system components (e.g. Fronius Datalogger Web, Fronius Datamanager or Fronius Hybridmanager).

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.

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**Display settings**

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

**Language**

Set language for display

Setting range	English, German, French, Spanish, Italian, Dutch, Czech, Slovakian, Hungarian, Polish, Turkish, Portuguese, Romanian
---------------	--

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**Night mode**

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

Setting range	AUTO / ON / OFF
Factory setting	OFF

AUTO: Fronius DATCOM mode is always in effect as long as there is a Fronius Datamanager connected in an active and uninterrupted Fronius Solar Net.  
The inverter display remains dark during the night, but can be activated by pressing any function button.

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

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

**OFF:** Fronius DATCOM will not run at night, the inverter therefore does not require any power during the night to supply the Fronius Solar Net with energy.  
The inverter display is switched off during the night and the Fronius Datamanager is not available. To nevertheless activate the Fronius Datamanager, switch the inverter off and on again at the mains and press any function button on the inverter display within 90 seconds.

---

### Contrast

Set the contrast on the inverter display

Setting range            0 - 10

Factory setting         5

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

---

### Illumination

Initial setting for inverter display illumination

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

Setting range            AUTO / ON / OFF

Factory setting         AUTO

**AUTO:** The inverter 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 inverter display backlighting remains permanently on when the inverter is active.

**OFF:** The inverter display backlighting is permanently switched off.

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## ENERGY YIELD

The following settings can be changed/set here:

- Counter deviation / Calibration
- Currency
- Feed-in tariff
- CO2 factor

Setting range            Currency / Feed-in tariff

---

**Counter deviation / calibration**

Calibrating the counter

---

**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)

---

**CO2 factor**

Setting the CO2 factor of the energy fed into the grid

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**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".

**IMPORTANT!** Nothing will show on the inverter display if the fan is working. The only way to check how the fan is working is by listening and feeling.



# The INFO menu item

**Measured values**

**PV Ins.**- Insulation resistance of the PV system  
**Ext. Lim.** - external Limitation  
**U PV 1 / U PV 2\*** (U PV 2 is not available on the Fronius Symo 15.0-3 208)  
 Current DC voltage at the DC input terminals, even if the inverter is feeding no power into the grid whatsoever (from the 1st or 2nd MPP Tracker)  
 \* MPP Tracker 2 must be switched to ON via the Basic menu  
**GVDPR** - Grid voltage-dependent power reduction  
**Fan #1** - Percentage of target output for fan

**PSS status**

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

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

- 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 power supply 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 / AC voltage derating / Fault Ride Through
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General:	Device type - the exact name of the inverter fam. - inverter family of the inverter serial number - serial number of the inverter
----------	---

Country-specific setting:	<p>Setup - specified country setup</p> <p>Version - version of country setup</p> <p>Origin activated - indicates that the normal country-specific setup is activated.</p> <p>Alternat. activated - indicates that the alternative country-specific setup is activated (for Fronius Symo Hybrid only)</p> <p>Group - group for updating the inverter software</p>
MPP Tracker:	<p>Tracker 1 - indicates the set tracking behaviour (MPP AUTO / MPP USER / FIX)</p> <p>Tracker 2 - indicates the set tracking behaviour (MPP AUTO / MPP USER / FIX)</p>
Grid monitoring:	<p>GMTi - Grid Monitoring Time - start-up time of the inverter in sec (seconds)</p> <p>GMTr - Grid Monitoring Time reconnect - reconnection time in sec (seconds) after a grid fault</p> <p>ULL - U (voltage) Longtime Limit - voltage limit value in V (volts) for the 10-minute average voltage value</p> <p>LLTrip - Longtime Limit Trip - trip time for ULL monitoring, how fast the inverter should switch off</p>
Grid voltage limits inner limit value:	<p>UImax - upper inner grid voltage in V (volts)</p> <p>TTMax - Trip Time Max - trip time for exceeding the upper inner grid voltage limit value in cyl*</p> <p>UMin - lower inner grid voltage in V (volts)</p> <p>TTMin - Trip Time Min - trip time for falling below the lower inner grid voltage limit value in cyl*</p> <p>*cyl = grid periods (cycles); 1 cyl corresponds to 20 ms at 50 Hz or 16.66 ms at 60 Hz</p>
Grid voltage limits outer limit value	<p>UMax - upper outer grid voltage in V (volts)</p> <p>TTMax - Trip Time Max - trip time for exceeding the upper outer grid voltage limit value in cyl*</p> <p>UMin - lower outer grid voltage in V (volts)</p> <p>TTMin - Trip Time Min - trip time for falling below the lower outer grid voltage limit value in cyl*</p> <p>*cyl = grid periods (cycles); 1 cyl corresponds to 20 ms at 50 Hz or 16.66 ms at 60 Hz</p>

Grid frequency limits:	FILmax - upper inner grid frequency in Hz (Hertz)
	FILmin - lower inner grid frequency in Hz (Hertz)
	FOLmax - upper outer grid frequency in Hz (Hertz)
	FOLmin - lower outer grid frequency in Hz (Hertz)
Q-mode:	Indicates which reactive power setting is currently active on the inverter (e.g. OFF, Q / P, etc.)
AC power limit including SoftStart indicator and/or AC grid frequency derating:	Max P AC - maximum output power, which can be changed using the "Manual Power Reduction" function
	GPIS - Gradual Power Incrementation at Startup - indicates (%/sec) whether the SoftStart function is active on the inverter
	GFDPRe - Grid Frequency Dependent Power Reduction enable limit - indicates the set grid frequency in Hz (Hertz) from when power derating takes place
AC voltage derating:	GFDPRe - Grid Frequency Dependent Power Reduction derating gradient - indicates the set grid frequency in %/Hz, how strong power derating is
	GVDPRe - Grid Voltage Depending Power Reduction enable limit - threshold value in V from which voltage-dependent power derating starts
	GVDPRe - Grid Voltage Depending Power Reduction derating gradient - derating gradient %/V with which the power is reduced
	Message - indicates whether the dispatch of an info message via Fronius Solar Net is active

## 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

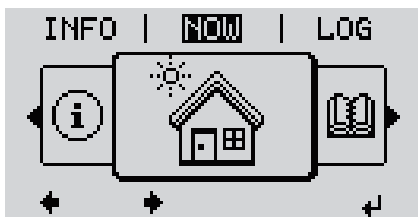
## General

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



- 1 Press the "Menu" key  $\uparrow$

The menu level appears.

- 2 Press the unassigned "Menu / Esc" key 5 times  $\square \square \square \square \square$



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

- 3 Enter the code 12321: Use the "Plus" and "Minus" keys  $+ -$  to select a value for the first digit of the code

- 4 Press the "Enter" key  $\leftarrow$

The second digit flashes.

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



the selected code starts flashing.

- 6 Press the "Enter" key  $\leftarrow$

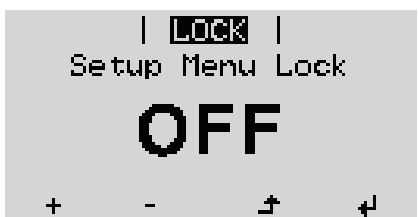
"Setup Menu Lock" is displayed in the "LOCK" menu.

- 7 Use the "Plus" and "Minus" 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  $\leftarrow$



# USB Stick as a Data Logger and for Updating Inverter Software

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## USB flash drive as a datalogger

If a USB flash drive is connected to the USB A socket it can function as a data-logger for an inverter.

At any time, the logging data stored on the USB flash drive can be

- imported into the Fronius Solar.access software using the FLD file that was logged at the same time,
- viewed directly in third-party programs (e.g. Microsoft® Excel) using the CSV file logged at the same time.

Older versions (before Excel 2007) are limited to a maximum of 65,536 rows.

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



→ <https://manuals.fronius.com/html/4204260426>

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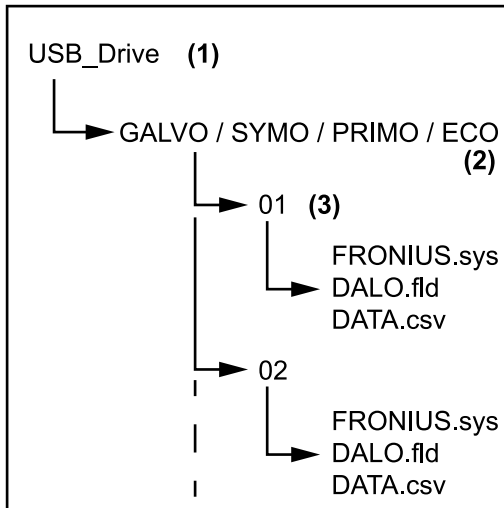
## Data on the USB flash drive

If the USB flash drive is being used as a data logger, three files will be created automatically:

- FRONIUS.sys system file:  
This file stores information from the inverter that is irrelevant to the customer. The file must not be deleted separately. Only delete all of the files (sys, fld, csv) at one time.
- DALO.fld log file:  
A log file for reading the data in the Fronius Solar.access software.

Further details on the Fronius Solar.access software can be found in the "DATCOM Details" operating instructions at <http://www.fronius.com>

- DATA.csv log file:  
A log file for reading the data in a spreadsheet program (e.g.: Microsoft® Excel)



- (1) USB root directory
- (2) Fronius inverters (Fronius Galvo, Fronius Symo, Fronius Primo or Fronius Eco)
- (3) Inverter number - can be set in the Setup menu under DAT-COM

If there are several inverters with the same inverter number, the three files will be saved in the same folder. A digit is added to the file name as a suffix (e.g.: DALO\_02.fld)

Data structure on the USB flash drive

Structure of the CSV file:

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	
	A	B	C	D	E	F	G	H
1	SerialNr.:123456789987456321'							
2	Date	Time	Inverter No.	Device Type	Periode [s]	Energy [Ws]	Energy L[Var]	Energy C[Var]
3	30.03.2013	17:15:19	1	247				
4	30.03.2013	17:15:19	1	247				
5	30.03.2013	17:15:19	1	247				
6	30.03.2013	17:15:20	1	247				

	(8)	(9)									
	I	J	K	L	M	N	O	P	Q	R	S
	Uac L1 [V]	Uac L2 [V]	Uac L3 [V]	Iac L1 [A]	Iac L2 [A]	Iac L3 [A]	Udc S1[V]	Idc S1[A]	Description		
									Display Information		
									V0.1.5 Build 0		
									28.03.2013 23:59:49 Info 017, Counter 0092		
									Logging Start		

- (1) ID
- (2) Inverter no.
- (3) Inverter type (DATCOM code)
- (4) Logging interval in seconds
- (5) Energy in watts per second, relative to the logging interval
- (6) Inductive reactive power
- (7) Capacitive reactive power
- (8) Average values during the logging interval (AC voltage, AC current, DC voltage, DC current)
- (9) Additional information

### Data volume and storage capacity

A USB flash drive with a storage capacity of 1 GB can record logging data for roughly seven years at a logging interval of five minutes.

### CSV file

CSV files can only store 65,535 lines (data records) (up to Microsoft® Excel 2007; there is no restriction from this version onwards).

At a five-minute logging interval, the 65,535 lines will be written within approximately seven months (CSV data size of approx. 8 MB).

In order to avoid data loss, the CSV file should be backed up to a PC and deleted from the USB flash drive within this seven-month period. If the logging interval is set to a longer period, this time frame will be increased accordingly.

#### **FLD file**

The FLD file should not be larger than 16 MB. This will provide enough storage capacity for approximately six years at a logging interval of five minutes. If the file exceeds the 16 MB limit, it should be backed up to a PC and all of the data on the USB flash drive should be deleted.

After backing up and removing the data, the USB flash drive can be reconnected immediately to resume recording the logging data without any further steps being required.

**IMPORTANT!** Using a full USB flash drive can lead to data loss or data being overwritten. When using USB flash drives, always ensure that there is sufficient storage capacity on the flash drive.

#### **NOTE!**

##### **Risk of USB flash drive becoming full.**

This may result in data being lost or overwritten.

- ▶ When using USB flash drives, always ensure that there is sufficient storage capacity on the flash drive.

#### **Buffer memory**

If the USB stick is unplugged (e.g. for data backup purposes), the logging data is written to a buffer memory in the inverter.

As soon as the USB stick is plugged in again, the data is copied automatically from the buffer memory to the stick.

The buffer memory can store a maximum of six logging points. Data is only logged while the inverter is running (output greater than 0 W). The logging interval is permanently set at 30 minutes. Data can be recorded on the buffer memory for a three-hour time period as a result.

When the buffer memory is full, the oldest data in the memory will be overwritten by the next batch of data.

**IMPORTANT!** The buffer memory requires a permanent power supply.

If there is a power failure while the inverter is in operation, all the data in the buffer memory will be lost. To avoid losing data during the night, the automatic night switch-off facility must be deactivated (switch the "Night Mode" setup parameter to ON - see the Datamanager 2.0 Operating Instructions, section "Setting and displaying the menu items", "Viewing and adjusting parameters in the DATCOM menu item").

On the Fronius Eco or Fronius Symo 15.0-3 208, the buffer memory also functions with just a DC supply.

#### **Suitable USB flash drives**

Due to the variety of USB flash drives available on the market, it cannot be guaranteed that every USB flash drive will be detected by the inverter.

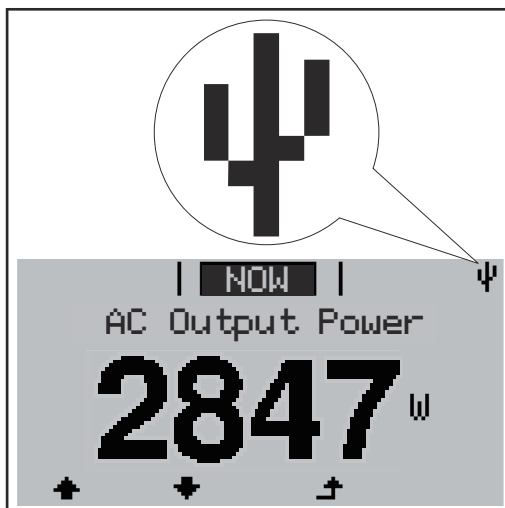
Fronius recommends that only certified, industry-grade USB flash drives are used (look out for the USB-IF logo).

The inverter supports USB flash drives with the following file systems:

- FAT12
- FAT16
- FAT32

Fronius recommends that the USB flash drive employed should only be used for recording logging data or updating the inverter software. The USB flash drives should not contain any other data.

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

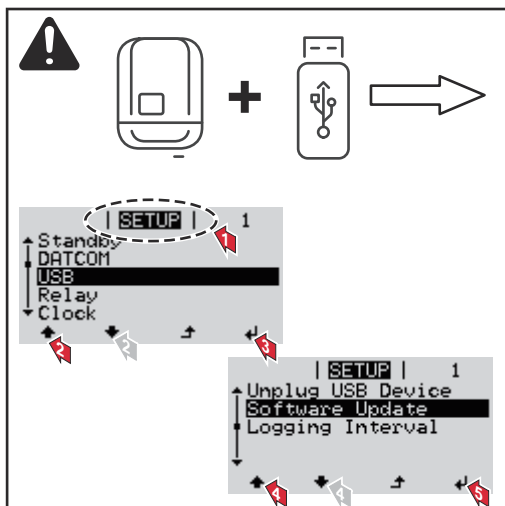


If the inverter detects a USB flash drive, the USB symbol will appear in the top right corner of the display.

When inserting a USB flash drive, check whether the USB symbol is displayed (it may also flash).

**IMPORTANT!** Please note for outdoor applications that conventional USB flash drives are often only guaranteed to work within a restricted temperature range. For outdoor applications ensure that the USB flash drive also functions, for example, at low temperatures.

### USB flash drive for updating the inverter software

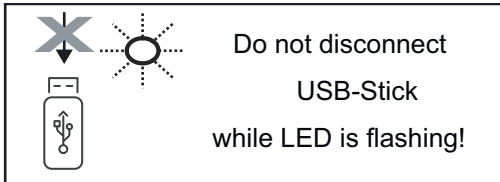


With the help of the USB flash drive, end customers can also update the inverter software via the SETUP menu: the update file is first saved to the USB flash drive, from where it is then transferred to the inverter.

### Removing the USB flash drive

Safety instruction concerning the removal of a USB flash drive:



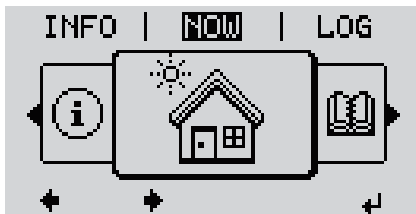


**IMPORTANT!** To avoid any loss of data, a USB flash drive may only be removed if the following conditions are met:

- Only remove a USB flash drive via the 'Safely remove USB / HW' item on the SETUP menu
- The 'Data transmission' LED has stopped flashing or comes on steady.

# The Basic menu

## Access the Basic menu



- 1 Press the "Menu"  $\uparrow$  button

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 "Plus" and "Minus" keys  $+ -$  to select a value for the first digit of the code

- 4 Press the "Enter"  $\leftarrow$  button

The second digit flashes.

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

the selected code starts flashing.

- 6 Press the "Enter"  $\leftarrow$  button



The Basic menu appears.

- 7 Use the "Plus" and "Minus" keys  $+ -$  to select the desired entry
- 8 Edit the desired menu item by pressing the "Enter"  $\leftarrow$  button
- 9 Press the "Esc" key to exit the Basic menu  $\uparrow$

## Menu items in 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 / MPP Tracker 2

- MPP Tracker 2: ON / OFF
- 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 the fixed voltage
- MPPT start-up input voltage: for entering the start-up input voltage

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### USB log book

Activates or deactivates the function for saving all error messages to a USB flash drive AUTO / OFF / ON

- ON: All error messages are automatically saved to a connected USB flash drive.
- 

### Input signal

- How it works: Ext Sig. / SO-Meter / OFF operating mode Ext Sig.:
  - **Triggering method:** Warning (warning shown on display) / Ext. Stop (inverter switches off)
  - **Connection type:** N/C (normally closed contact) / N/O (normally open contact)

SO meter operating mode – see chapter [Dynamic power reduction by means of inverter](#) on page 23.

- **Grid feed-in limit**  
Field for entering the maximum grid feed-in power in W. If this value is exceeded, the inverter regulates down to the set value within the time required by national standards and regulations.
  - **Pulses per kWh**  
Field for entering the pulses per kWh of the SO meter.
- 

### SMS / relay

- Event delay:  
for entering the time delay after which an SMS is sent or the relay is to switch  
900–86,400 seconds
  - Event counter:  
for entering the number of events that lead to signalling:  
10 - 255
- 

### Isolation setting

- Isolation warning: ON / OFF
  - Threshold warning: for entering a threshold that leads to a warning
  - Threshold fault: for entering a threshold that leads to a fault (not available in all countries)
- 

### 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

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### Settings if the "DC SPD" option is installed

If the option: DC SPD (surge protection) has been fitted in the inverter, the following menu items will be set by default:

**Signal input:** Ext Sig.  
**Triggering method:** Warning  
**Connection type:** N/C



# Appendix



# Status diagnostics and troubleshooting

**Status code display** 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 or 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** If the display fails to come on some time after sunrise:

- 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 %).


**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 fitter
106	AC frequency too low		
107	No AC grid		
108	Stand-alone operation detected		
112	RCMU error		

**Class 2 status codes**

Code	Description	Behaviour	Remedy
240	ArcContinuousFault An arc was detected on the PV system and the maximum number of automatic switch-ons within 24 hours was reached.	The status code 240 is displayed for roughly 4 seconds.	<div style="background-color: yellow; padding: 5px; display: inline-block;">  <b>CAUTION!</b> </div> <p><b>Danger from damaged components of the photovoltaic system</b></p> <p>This can result in severe personal injury/damage to property.</p> <ul style="list-style-type: none"> <li>▶ Before the status "240 - ArcContinuousFault" is confirmed, the entire photovoltaic system in question must be checked for possible damage.</li> <li>▶ Have damaged components repaired by qualified personnel.</li> </ul>
241	ArcContinuousFault An arc was detected on the PV system.	The status code 241 is displayed directly after 240, the inverter disconnects from the grid for safety reasons.	<p>Before resetting the inverter after a detected arc, check the entire photovoltaic system in question for any damage!</p> <p>Reset the status code by pressing the Enter key.</p>
242	ArcContinuousFault An arc was detected on the PV system.	The status code 242 is displayed after resetting the status code 241.	<p>Reset the status code by pressing the Enter key.</p> <p>The inverter resumes feeding energy into the grid. **)</p>
244	ArcDetected An arc was detected on the PV system.	The status code 244 is displayed.	<p>No action required. Feed-in mode is started again automatically after 10 minutes.</p>
245	Arc Detector self-test failed	The inverter disconnects itself from the grid.	<p>Perform AC reset; the test is repeated. *)</p>

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

\*\*) Fault is rectified automatically. If this status code is displayed all the time, contact your system fitter

**Class 3 status codes**

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 resumes its start-up routine.	*)
302	Overcurrent (DC)		
303	DC module overtemperature	Short-term interruption while feeding energy into the grid. The inverter resumes with its startup routine.	Purge cooling air openings and heat sink; **)
304	AC module overtemperature		
305	No power being fed in, despite closed relay	Short-term interruption while feeding energy into the grid. The inverter resumes with its startup routine.	**)
306	PV output too low for feeding energy into the grid	Short-term interruption while feeding energy into the grid The inverter resumes its startup routine.	wait for sufficient level of insolation; **)
307	DC low DC input voltage too low for feeding energy into the grid		
<b>IMPORTANT!</b> 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.			
308	Intermediate circuit voltage too high	Short-term interruption while feeding energy into the grid The inverter resumes its startup routine.	**)
309	DC input voltage MPPT 1 too high		
311	Polarity of DC strings reversed		
313	DC input voltage MPPT2 too high		
314	Current sensor calibration timeout	Short-term interruption while feeding energy into the grid. The inverter resumes with its startup routine.	*)
315	AC current sensor error		
316	InterruptCheck fail		
325	Overtemperature in the connection area		
326	Fan 1 error		
327	Fan 2 error		

\*) 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 technician.

Code	Description	Behaviour	Remedy
401	Unable to communicate with the power stage set		
406	AC module temperature sensor faulty (L1)	The inverter will automatically attempt to connect again and, if possible, will resume feeding energy into the grid	*)
407	AC module temperature sensor faulty (L2)		
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 RECERBO 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		
419	Unique ID conflict		
420	No communication possible with the Fronius Datamanager	The inverter will automatically attempt to connect again and, if possible, will resume feeding energy into the grid	Update inverter firmware; *)
421	HID range error		
425	Unable to communicate with the power stage set		
426 - 428	Possible hardware fault		
431	Software problem		
431	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		

Code	Description	Behaviour	Remedy
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; *)
443	Intermediate circuit voltage too low or asymmetric	The inverter is not feeding any energy into the grid.	*)
445	- Compatibility error (e.g. due to replacement of a PC board) - Invalid power stage set configuration	The inverter is not feeding any energy into the grid.	Update inverter firmware; *)
447	Insulation fault	The inverter is not feeding any energy into the grid.	*)
448	Neutral conductor not connected		
450	Guard cannot be found		
451	Memory error detected		
452	Communication error between the processors	The inverter will automatically attempt to connect again and, if possible, will resume feeding energy into the grid	*)
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 voltage relay fault		
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		

Code	Description	Behaviour	Remedy
479	Intermediate circuit voltage relay is switched off	The inverter will automatically attempt to connect again and, if possible, will resume feeding energy into the grid	*)
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.	Restart Setup after an AC reset (switch automatic circuit breaker off and on again)
483	Voltage $U_{DC}$ fixed on MPP2 string out of limits	The inverter is not feeding any energy into the grid.	Check MPP settings; *)
485	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; *)
489	Permanent overvoltage on intermediate circuit capacitor (five 479 status codes in a row)	The inverter is not feeding any energy into the grid.	*)

\*) If the status code is displayed all the time: notify a Fronius-trained service technician

\*\*) 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 error on the solar modules	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	No communication possible with the storage unit	Storage unit warning message	*)

Code	Description	Behaviour	Remedy
517	Power derating caused by too high a temperature	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; **)
518	Internal DSP malfunction	Warning message on the display	*)
519	No communication possible with the storage unit	Storage unit warning message	*)
520	No energy fed into the grid by MPPT1 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 String 1	Warning message on the display	*)
523	DC low String 2		
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; **)
564	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; *)
566	Arc detector switched off (e.g. during external arc monitoring)	The status code is displayed every day until the arc detector is reactivated.	No error Confirm status code by pressing 'Enter'
568	Incorrect input signal on the multifunction current interface	The status code is displayed in the case of an incorrect input signal on the multifunction current interface and with the following setting: Basic menu / Input signal / Mode of operation = Ext. Signal, triggering method = Warning	Acknowledge status code; check the devices connected to the multifunction current interface; **)
572	Power limited by the power stage set	Power is being limited by the power stage set	*)

Code	Description	Behaviour	Remedy
573	Undertemperature warning	Warning message on the display	*)
581	"Special Purpose Utility-Interactive" (SPUI) setup activated	The inverter is no longer compliant with the IEEE1547 and IEEE1574.1 standards because the standalone function has been deactivated, a frequency-dependent power reduction has been activated and the frequency and voltage limits are being changed	No error Confirm status code by pressing 'Enter'

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

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

**Class 6 status codes** 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	AC module temperature sensor faulty (L3)	The inverter will automatically attempt to connect again and, if possible, will resume feeding energy into the grid	*)
604	DC module temperature sensor faulty		
607	RCMU error	The inverter is not feeding any energy into the grid.	Reset status code by pressing 'Enter'. The inverter resumes the feeding of energy into the grid; if the status code keeps appearing, check the complete photovoltaic system for damage; **)
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 – 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 - 704	Provides information about the internal processor status	Warning message on the display	*)
705	Conflict when setting the inverter number (e.g. number already assigned)	-	Correct inverter number in Setup menu
706 - 716	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	*)
731	Initialisation error - USB flash drive is not supported	Warning message on the display	Check or replace USB flash drive Check file system on USB flash drive; *)
732	Initialisation error - Overcurrent on USB flash drive		
733	No USB flash drive connected	Warning message on the display	Connect or check USB flash drive; *)
734	Update file not recognised or not present	Warning message on the display	Check update file (e.g. for correct file name) *)
735	Update file does not match the device, update file too old	Warning message on the display, update process is interrupted	Check update file and if necessary download an update file to match the device (e.g. at <a href="http://www.fronius.com">http://www.fronius.com</a> ); *)
736	Write or read error occurred	Warning message on the display	Check USB flash drive and the data contained on it or replace USB flash drive Never unplug a USB flash drive if the 'data transfer' LED is still flashing or lit; *)
737	File could not be opened	Warning message on the display	Remove and then reinsert USB flash drive; check or replace USB flash drive
738	Log file cannot be saved (e.g. USB flash drive is write-protected or full)	Warning message on the display	Create some storage space, remove write protection, if necessary check or replace USB flash drive; *)

Code	Description	Behaviour	Remedy
740	Initialisation error - error in file system on USB flash drive	Warning message on the display	Check USB flash drive; re-format on PC for FAT12, FAT16 or FAT32
741	Error during recording of logging data	Warning message on the display	Remove and then reinsert USB flash drive; check or replace USB flash drive
743	Error occurred during update process	Warning message on the display	Repeat update process, check USB flash drive; *)
745	Update file corrupt	Warning message on the display, update process is interrupted	Download update file again; check or replace USB flash drive; *)
746	Error occurred during update process	Warning message on the display, update process is interrupted	Wait for two 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	*)
761 - 765	Provides information about the internal processor status	Warning message on the display	*)
766	Emergency power limitation has been activated (max. 750 W)		
767	Provides information about the internal processor status	Warning message on the display	*)
768	Different power limitation in the hardware modules		
772	Storage unit not available	Warning message on the display	*)
773	Software update group 0 (invalid country setup)		
775	PMC power stage set not available	Warning message on the display	Press 'Enter' key to acknowledge error; *)
776	Invalid device type		



Code	Description	Behaviour	Remedy
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 technician

**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 mounting bracket using clean compressed air.

# Technical data

## Fronius Symo Advanced 10.0-3-M

Fronius Symo Advanced	10.0-3-M
<b>Input data</b>	
MPP voltage range	270–800 V DC
Max. input voltage (at 1000 W/m <sup>2</sup> / -10 °C in an open circuit)	1000 V DC
Min. input voltage	200 V DC
Max. input current (MPP1 / MPP2) (MPP1 + MPP2)	27.0 / 16.5 A (14 A for voltages < 420 V) 43.5 A
Max. input current per string with activated AFCI (AFPE)	12 A
Max. short circuit current of the solar modules (I <sub>SC PV</sub> ) (MPP1 / MPP2)	55.7 / 34 A
Max. inverter backfeed current to the array <sup>3)</sup>	40.5 / 24.8 A (RMS) <sup>4)</sup>
Max. capacity of the module array against earth	10,000 nF
Insulation resistance test limit value between module array and earth (on delivery) <sup>7)</sup>	100 kΩ
Adjustable range of insulation resistance test between module array and earth <sup>6)</sup>	100–10,000 kΩ
Limit value and tripping time of the sudden resid- ual current monitoring (on delivery)	30 / 300 mA / ms 60 / 150 mA / ms 90 / 40 mA / ms
Limit value and tripping time of the continuous re- sidual current monitoring (on delivery)	300 / 300 mA / ms
Adjustable range of continuous residual current monitoring <sup>6)</sup>	- mA
Cyclic repetition of the insulation resistance test (on delivery)	24 h
Adjustable range for the cyclic repetition of the insulation resistance test	-
<b>Output data</b>	
Nominal output power (P <sub>nom</sub> )	10,000 W
Max. output power	10,000 W
Rated apparent power	10,000 VA
Nominal mains voltage	3~ NPE 400 / 230 V or 3~ NPE 380 / 220
Min. grid voltage	150 V / 260 V
Max. grid voltage	280 V / 485 V
Nominal output current at 220 / 230 V	15.2 / 14.4 A
Max. output current	20 A

<b>Fronius Symo Advanced</b>	<b>10.0-3-M</b>
Nominal frequency	50 / 60 Hz <sup>1)</sup>
Initial short circuit alternating current / phase I <sub>K</sub>	20 A
Total harmonic distortion	< 1.75%
Current (inrush) <sup>5)</sup>	27.2 A peak / 5.18 A rms over 5.4 ms <sup>4)</sup>
Power factor (cos phi)	0–1 ind./cap. <sup>2)</sup>
Maximum output fault current / duration	64 A / 2.34 ms
<b>General data</b>	
Maximum efficiency	97.8%
European efficiency U <sub>DCmin</sub> / U <sub>DCnom</sub> / U <sub>DCmax</sub>	95.4 / 97.3 / 96.6%
Self-consumption at night	0.7 W & 117 VA
Cooling	Controlled forced-air ventilation
Protection class	IP 66
Dimensions h x w x d	725 x 510 x 225 mm
Weight	34.8 kg
Permitted ambient temperature	-25 °C - +60 °C
Permissible humidity	0-100%
EMC emission class	B
DC / AC overvoltage category	2 / 3
Pollution degree	2
Noise emission	65 dB(A) (ref. 1pW)
Inverter topology	Non-insulated transformerless
<b>Protection devices</b>	
DC isolation measurement	Integrated
DC overload performance	Operating point shift, power limiter
DC disconnecter	Integrated
RCMU	Integrated
Active anti-islanding method	Frequency conversion method
AFCI - Arc Fault Circuit Interrupter (Arc Guard)	Integrated
AFPE (AFCI) classification (according to IEC63027)	F-I-AFPE-1-6-1 Full coverage Integrated AFPE 1 monitored string per input port 6 input ports per channel (AFPE for MPP1 & MPP2: 6) 1 monitored channel

**Fronius Symo  
Advanced  
12.5-3-M**

<b>Fronius Symo Advanced</b>	<b>12.5-3-M</b>
<b>Input data</b>	
MPP voltage range	320–800 V DC
Max. input voltage (at 1000 W/m <sup>2</sup> / -10 °C in an open circuit)	1000 V DC
Min. input voltage	200 V DC
Max. input current (MPP1 / MPP2) (MPP1 + MPP2)	27.0 / 16.5 A (14 A for voltages < 420 V) 43.5 A
Max. input current per string with activated AFCI (AFPE)	12 A
Max. short circuit current of the solar modules (I <sub>SC PV</sub> ) (MPP1 / MPP2)	55.7 / 34 A
Max. inverter backfeed current to the array <sup>3)</sup>	40.5 / 24.8 A (RMS) <sup>4)</sup>
Insulation resistance test limit value between module array and earth (on delivery) <sup>7)</sup>	100 kΩ
Adjustable range of insulation resistance test between module array and earth <sup>6)</sup>	100–10,000 kΩ
Limit value and tripping time of the sudden resid- ual current monitoring (on delivery)	30 / 300 mA / ms 60 / 150 mA / ms 90 / 40 mA / ms
Limit value and tripping time of the continuous re- sidual current monitoring (on delivery)	300 / 300 mA / ms
Adjustable range of continuous residual current monitoring <sup>6)</sup>	- mA
Cyclic repetition of the insulation resistance test (on delivery)	24 h
Adjustable range for the cyclic repetition of the insulation resistance test	-
<b>Output data</b>	
Nominal output power (P <sub>nom</sub> )	12,500 W
Max. output power	12,500 W
Rated apparent power	12,500 VA
Nominal mains voltage	3~ NPE 400 / 230 V or 3~ NPE 380 / 220
Min. grid voltage	150 V / 260 V
Max. grid voltage	280 V / 485 V
Nominal output current at 220 / 230 V	18.9 / 18.1 A
Max. output current	20 A
Nominal frequency	50 / 60 Hz <sup>1)</sup>
Initial short circuit alternating current / phase I <sub>K</sub>	20 A
Total harmonic distortion	< 2%

<b>Fronius Symo Advanced</b>	<b>12.5-3-M</b>
Current (inrush) <sup>5)</sup>	27.2 A peak / 5.18 A rms over 5.4 ms <sup>4)</sup>
Power factor (cos phi)	0–1 ind./cap. <sup>2)</sup>
Maximum output fault current / duration	64 A / 2.34 ms
<b>General data</b>	
Maximum efficiency	97.8%
European efficiency $U_{DCmin} / U_{DCnom} / U_{DCmax}$	95.7 / 97.5 / 96.9%
Self-consumption at night	0.7 W & 117 VA
Cooling	Controlled forced-air ventilation
Protection class	IP 66
Dimensions h x w x d	725 x 510 x 225 mm
Weight	34.8 kg
Permitted ambient temperature	-25 °C - +60 °C
Permissible humidity	0-100%
EMC emission class	B
DC / AC overvoltage category	2 / 3
Pollution degree	2
Noise emission	65 dB(A) (ref. 1pW)
Inverter topology	Non-insulated trans- formerless
<b>Protection devices</b>	
DC isolation measurement	Integrated
DC overload performance	Operating point shift, power limiter
DC disconnect	Integrated
RCMU	Integrated
Active anti-islanding method	Frequency conversion method
AFCI - Arc Fault Circuit Interrupter (Arc Guard)	Integrated
AFPE (AFCI) classification (according to IEC63027)	F-I-AFPE-1-6-1 Full coverage Integrated AFPE 1 monitored string per in- put port 6 input ports per channel (AFPE for MPP1 & MPP2: 6) 1 monitored channel

**Fronius Symo  
Advanced  
15.0-3-M**

<b>Fronius Symo Advanced</b>	<b>15.0-3-M</b>
<b>Input data</b>	
MPP voltage range	320–800 V DC
Max. input voltage (at 1000 W/m <sup>2</sup> / -10 °C in an open circuit)	1000 V DC
Min. input voltage	200 V DC
Max. input current (MPP1 / MPP2) (MPP1 + MPP2)	33.0 / 27.0 A 51.0 A
Max. input current per string with activated AFCI (AFPE)	12 A
Max. short circuit current of the solar modules (I <sub>SC PV</sub> ) (MPP1 / MPP2)	68 / 55.7 A
Max. inverter backfeed current to the array <sup>3)</sup>	49.5 / 40.5 A
Insulation resistance test limit value between module array and earth (on delivery) <sup>7)</sup>	100 kΩ
Adjustable range of insulation resistance test between module array and earth <sup>6)</sup>	100–10,000 kΩ
Limit value and tripping time of the sudden residual current monitoring (on delivery)	30 / 300 mA / ms 60 / 150 mA / ms 90 / 40 mA / ms
Limit value and tripping time of the continuous residual current monitoring (on delivery)	300 / 300 mA / ms
Adjustable range of continuous residual current monitoring <sup>6)</sup>	- mA
Cyclic repetition of the insulation resistance test (on delivery)	24 h
Adjustable range for the cyclic repetition of the insulation resistance test	-
<b>Output data</b>	
Nominal output power (P <sub>nom</sub> )	15,000 W
Max. output power	15,000 W
Rated apparent power / S <sub>RATED</sub>	15,000 VA
Nominal mains voltage	3~ NPE 400 / 230 V or 3~ NPE 380 / 220
Min. grid voltage	150 V / 260 V
Max. grid voltage	280 V / 485 V
Nominal output current at 220 / 230 V	22.7 / 21.7 A
Max. output current	32 A
Nominal frequency	50 / 60 Hz <sup>1)</sup>
Initial short circuit alternating current / phase I <sub>K</sub>	32 A
Total harmonic distortion	< 1.5%

<b>Fronius Symo Advanced</b>	<b>15.0-3-M</b>
Current (inrush) <sup>5)</sup>	27.2 A peak / 5.18 A rms over 5.4 ms <sup>4)</sup>
Power factor (cos phi)	0–1 ind./cap. <sup>2)</sup>
Maximum output fault current / duration	64 A / 2.34 ms
<b>General data</b>	
Maximum efficiency	98%
European efficiency $U_{DCmin} / U_{DCnom} / U_{DCmax}$	96.2 / 97.6 / 97.1%
Self-consumption at night	0.7 W & 117 VA
Cooling	Controlled forced-air ventilation
Protection class	IP 66
Dimensions h x w x d	725 x 510 x 225 mm
Weight	43.4 kg / 43.2 kg
Permitted ambient temperature	-25 °C - +60 °C
Permissible humidity	0-100%
EMC emission class	B
DC / AC overvoltage category	2 / 3
Pollution degree	2
Noise emission	65 dB(A) (ref. 1pW)
Inverter topology	Non-insulated transformerless
<b>Protection devices</b>	
DC isolation measurement	Integrated
DC overload performance	Operating point shift, power limiter
DC disconnect	Integrated
RCMU	Integrated
Active anti-islanding method	Frequency conversion method
AFCI - Arc Fault Circuit Interrupter (Arc Guard)	Integrated
AFPE (AFCI) classification (according to IEC63027)	F-I-AFPE-1-6-1 Full coverage Integrated AFPE 1 monitored string per input port 6 input ports per channel (AFPE for MPP1 & MPP2: 6) 1 monitored channel

**Fronius Symo  
Advanced  
17.5-3-M**

<b>Fronius Symo Advanced</b>	<b>17.5-3-M</b>
<b>Input data</b>	
MPP voltage range	370–800 V DC
Max. input voltage (at 1000 W/m <sup>2</sup> / -10 °C in an open circuit)	1000 V DC
Min. input voltage	200 V DC
Max. input current (MPP1 / MPP2) (MPP1 + MPP2)	33.0 / 27.0 A 51.0 A
Max. input current per string with activated AFCI (AFPE)	12 A
Max. short circuit current of the solar modules (I <sub>SC PV</sub> ) (MPP1 / MPP2)	68 / 55.7 A
Max. inverter backfeed current to the array <sup>3)</sup>	49.5 / 40.5 A
Insulation resistance test limit value between module array and earth (on delivery) <sup>7)</sup>	100 kΩ
Adjustable range of insulation resistance test between module array and earth <sup>6)</sup>	100–10,000 kΩ
Limit value and tripping time of the sudden residual current monitoring (on delivery)	30 / 300 mA / ms 60 / 150 mA / ms 90 / 40 mA / ms
Limit value and tripping time of the continuous residual current monitoring (on delivery)	300 / 300 mA / ms
Adjustable range of continuous residual current monitoring <sup>6)</sup>	- mA
Cyclic repetition of the insulation resistance test (on delivery)	24 h
Adjustable range for the cyclic repetition of the insulation resistance test	-
<b>Output data</b>	
Nominal output power (P <sub>nom</sub> )	17,500 W
Max. output power	17,500 W
Rated apparent power / S <sub>RATED</sub>	17,500 VA
Nominal mains voltage	3~ NPE 400 / 230 V or 3~ NPE 380 / 220
Min. grid voltage	150 V / 260 V
Max. grid voltage	280 V / 485 V
Nominal output current at 220 / 230 V	26.5 / 25.4 A
Max. output current	32 A
Nominal frequency	50 / 60 Hz <sup>1)</sup>
Initial short circuit alternating current / phase I <sub>K</sub>	32 A
Total harmonic distortion	< 1.5%



<b>Fronius Symo Advanced</b>	<b>17.5-3-M</b>
Current (inrush) <sup>5)</sup>	27.2 A peak / 5.18 A rms over 5.4 ms <sup>4)</sup>
Power factor (cos phi)	0–1 ind./cap. <sup>2)</sup>
Maximum output fault current / duration	64 A / 2.34 ms
<b>General data</b>	
Maximum efficiency	98%
European efficiency $U_{DCmin} / U_{DCnom} / U_{DCmax}$	96.4 / 97.7 / 97.2%
Self-consumption at night	0.7 W & 117 VA
Cooling	Controlled forced-air ventilation
Protection class	IP 66
Dimensions h x w x d	725 x 510 x 225 mm
Weight	43.4 kg / 43.2 kg
Permitted ambient temperature	-25 °C - +60 °C
Permissible humidity	0-100%
EMC emission class	B
DC / AC overvoltage category	2 / 3
Pollution degree	2
Noise emission	65 dB(A) (ref. 1pW)
Inverter topology	Non-insulated transformerless
<b>Protection devices</b>	
DC isolation measurement	Integrated
DC overload performance	Operating point shift, power limiter
DC disconnect	Integrated
RCMU	Integrated
Active anti-islanding method	Frequency conversion method
AFCI - Arc Fault Circuit Interrupter (Arc Guard)	Integrated
AFPE (AFCI) classification (according to IEC63027)	F-I-AFPE-1-6-1 Full coverage Integrated AFPE 1 monitored string per input port 6 input ports per channel (AFPE for MPP1 & MPP2: 6) 1 monitored channel

**Fronius Symo  
Advanced  
20.0-3-M**

<b>Fronius Symo Advanced</b>	<b>20.0-3-M</b>
<b>Input data</b>	
MPP voltage range	420–800 V DC
Max. input voltage (at 1000 W/m <sup>2</sup> / -10 °C in an open circuit)	1000 V DC
Min. input voltage	200 V DC
Max. input current (MPP1 / MPP2) (MPP1 + MPP2)	33.0 / 27.0 A 51.0 A
Max. input current per string with activated AFCI (AFPE)	12 A
Max. short circuit current of the solar modules (I <sub>SC PV</sub> ) (MPP1 / MPP2)	68 / 55.7 A
Max. inverter backfeed current to the array <sup>3)</sup>	49.5 / 40.5 A
Insulation resistance test limit value between module array and earth (on delivery) <sup>7)</sup>	100 kΩ
Adjustable range of insulation resistance test between module array and earth <sup>6)</sup>	100–10,000 kΩ
Limit value and tripping time of the sudden residual current monitoring (on delivery)	30 / 300 mA / ms 60 / 150 mA / ms 90 / 40 mA / ms
Limit value and tripping time of the continuous residual current monitoring (on delivery)	300 / 300 mA / ms
Adjustable range of continuous residual current monitoring <sup>6)</sup>	- mA
Cyclic repetition of the insulation resistance test (on delivery)	24 h
Adjustable range for the cyclic repetition of the insulation resistance test	-
<b>Output data</b>	
Nominal output power (P <sub>nom</sub> )	20,000 W
Max. output power	20,000 W
Rated apparent power / S <sub>RATED</sub>	20,000 VA
Nominal mains voltage	3~ NPE 400 / 230 V or 3~ NPE 380 / 220
Min. grid voltage	150 V / 260 V
Max. grid voltage	280 V / 485 V
Nominal output current at 220 / 230 V	30.3 / 29 A
Max. output current	32 A
Nominal frequency	50 / 60 Hz <sup>1)</sup>
Initial short circuit alternating current / phase I <sub>K</sub>	32 A
Total harmonic distortion	< 1.25%

<b>Fronius Symo Advanced</b>	<b>20.0-3-M</b>
Current (inrush) <sup>5)</sup>	27.2 A peak / 5.18 A rms over 5.4 ms <sup>4)</sup>
Power factor (cos phi)	0–1 ind./cap. <sup>2)</sup>
Maximum output fault current / duration	64 A / 2.34 ms
<b>General data</b>	
Maximum efficiency	98%
European efficiency $U_{DCmin} / U_{DCnom} / U_{DCmax}$	96.5 / 97.8 / 97.3%
Self-consumption at night	0.7 W & 117 VA
Cooling	Controlled forced-air ventilation
Protection class	IP 66
Dimensions h x w x d	725 x 510 x 225 mm
Weight	43.4 kg / 43.2 kg
Permitted ambient temperature	-25 °C - +60 °C
Permissible humidity	0-100%
EMC emission class	B
DC / AC overvoltage category	2 / 3
Pollution degree	2
Noise emission	65 dB(A) (ref. 1pW)
Inverter topology	Non-insulated transformerless
<b>Protection devices</b>	
DC isolation measurement	Integrated
DC overload performance	Operating point shift, power limiter
DC disconnect	Integrated
RCMU	Integrated
Active anti-islanding method	Frequency conversion method
AFCI - Arc Fault Circuit Interrupter (Arc Guard)	Integrated
AFPE (AFCI) classification (according to IEC63027)	F-I-AFPE-1-6-1 Full coverage Integrated AFPE 1 monitored string per input port 6 input ports per channel (AFPE for MPP1 & MPP2: 6) 1 monitored channel

**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) Maximum current from a defective PV module to all other PV modules. From the inverter itself to the PV side of the inverter, it is 0 A.
- 4) Guaranteed by the electrical configuration of the inverter
- 5) Current peak when switching on the inverter
- 6) Specified values are standard values; depending on the requirement and PV power, these values must be adjusted accordingly.
- 7) Specified value is a max. value; exceeding the max. value may negatively affect the function.
- 8)  $I_{SC\ PV} = I_{SC\ max} \geq I_{SC\ (STC)} \times 1.25$  according to e.g.: IEC 60364-7-712, NEC 2020, AS/NZS 5033:2021

**WLAN**

WLAN	
Frequency range	2412–2462 MHz
Channels / power used	Channel: 1–11 b,g,n HT20 Channel: 3–9 HT40 <18 dBm
Modulation	802.11b: DSSS (1 Mbps DBPSK, 2 Mbps DQPSK, 5.5/11 Mbps CCK) 802.11g: OFDM (6/9 Mbps BPSK, 12/18 Mbps QPSK, 24/36 Mbps 16-QAM, 48/54 Mbps 64-QAM) 802.11n: OFDM (6.5 BPSK, QPSK, 16-QAM, 64-QAM)

**Integrated DC disconnector Fronius Symo Advanced 10.0-12.5**

Settings	
Product name	Benedict LS32 E 7857
Rated insulation voltage	1000 V <sub>DC</sub>
Rated impulse withstand voltage	8 kV
Suitability for insulation	Yes, DC only
Utilisation category and / or PV utilisation category	As per IEC/EN 60947-3 utilisation category DC-PV2
Rated short-time withstand current (I <sub>cw</sub> )	Rated short-time withstand current (I <sub>cw</sub> ): 1000 A for 2 poles; 1700 A for 2+2 poles
Rated short-circuit making capacity (I <sub>cm</sub> )	Rated short-time withstand current (I <sub>cm</sub> ): 1000 A for 2 poles; 1700 A for 2+2 poles

**Settings**

	Rated operating voltage (Ue) [V d.c.]	Rated operating current (Ie) [A]	I(make) / I(break) [A]	Rated operating current (Ie) [A]	I(make) / I(break) [A]
		2P	2P	2 + 2P	2 + 2P
Rated breaking capacity	≤ 500	32	128	50	200
	600	27	108	35	140
	700	22	88	22	88
	800	17	68	17	68
	900	12	48	12	48
	1000	6	24	6	24

**Integrated DC disconnector  
Fronius Symo  
Advanced 15.0 -  
20.0**
**Settings**

Product name	Benedict LS32 E 7858				
Rated insulation voltage	1000 V <sub>DC</sub>				
Rated impulse withstand voltage	8 kV				
Suitability for insulation	Yes, DC only				
Utilisation category and / or PV utilisation category	As per IEC/EN 60947-3 utilisation category DC-PV2				
Rated short-time withstand current (I <sub>cw</sub> )	Rated short-time withstand current (I <sub>cw</sub> ): 1400 A for 2 poles; 2400 A for 2+2 poles				
Rated short-circuit making capacity (I <sub>cm</sub> )	Rated short-time withstand current (I <sub>cm</sub> ): 1400 A for 2 poles; 2400 A for 2+2 poles				
	Rated operating voltage (Ue) [V d.c.]	Rated operating current (Ie) [A]	I(make) / I(break) [A]	Rated operating current (Ie) [A]	I(make) / I(break) [A]
		2P	2P	2 + 2P	2 + 2P
Rated breaking capacity	≤ 500	55	220	85	340
	600	55	220	75	300
	700	55	220	60	240
	800	49	196	49	196
	900	35	140	35	140
	1000	20	80	25	100

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**Applicable standards and guidelines**

**CE mark**

The devices comply with 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.

**Circuit to prevent stand alone operation**

The inverter has an approved circuit to prevent stand alone operation.

**Grid failure**

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

# Warranty terms and conditions, and disposal

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## **Fronius manufacturer's warranty**

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

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

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## **Disposal**

The manufacturer, Fronius International GmbH, will take back the old device and arrange for it to be recycled in an appropriate manner. Observe the national regulations for the disposal of electronic equipment.



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

**MONITORING &  
DIGITAL TOOLS**

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