



SHIFTING THE LIMITS

Fronius IG Plus
25 V / 30 V / 35 V / 50 V / 55 V / 60 V
70 V / 80 V / 100 V / 120 V / 150 V

EN-US

Operating Instructions

Inverter for grid-connected photo-voltaic systems



Dear reader,

Introduction

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

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

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Safety Instructions

Explanation of Safety Instructions



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



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



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



NOTE! Indicates the possibility of flawed results and damage to the equipment.

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

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

General



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

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

All persons involved in commissioning, maintaining and servicing the device must

- be suitably qualified,
- have knowledge of and experience in dealing with electrical installations and
- read and follow these operating instructions carefully

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

All safety and danger notices on the device

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

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

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

Your personal safety is at stake!

Utilization in Accordance with "Intended Purpose"



The device is to be used exclusively for its intended purpose.

Utilization for any other purpose, or in any other manner, shall be deemed to be "not in accordance with the intended purpose." The manufacturer shall not be liable for any damage resulting from such improper use.

Utilization in accordance with the "intended purpose" also includes

- carefully reading and obeying all the instructions and all the safety and danger notices in the operating instructions
- performing all stipulated inspection and servicing work
- installation as specified in the operating instructions

The following guidelines should also be applied where relevant:

- Regulations of the utility regarding energy fed into the grid
 - Instructions from the solar module manufacturer
-

Environmental Conditions



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

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

Qualified Service Engineers



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



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



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

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

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

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

Safety Measures at the Installation Location

When installing devices with openings for cooling air, ensure that the cooling air can enter and exit unhindered through the vents. Only operate the device in accordance with the degree of protection shown on the rating plate.

Data Regarding Noise Emission Values



The inverter generates a maximum sound power level of < 80 dB(A) (ref. 1 pW) when operating under full load in accordance with IEC 62109-1:2010.

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

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

EMC Device Classifications



Devices in emission class A:

- Are only designed for use in industrial settings
- Can cause line-bound and radiated interference in other areas

Devices in emission class B:

- Satisfy the emissions criteria for residential and industrial areas. This is also true for residential areas in which the energy is supplied from the public low-voltage grid.

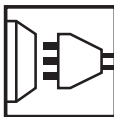
EMC device classification as per the rating plate or technical data.

EMC Measures



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

Grid Connection



High-performance devices (> 16 A) can affect the voltage quality of the grid because of a high output current in the main supply.

This may affect a number of types of device in terms of:

- connection restrictions
- criteria with regard to maximum permissible mains impedance *)
- criteria with regard to minimum short-circuit power requirement *)

*) at the interface with the public grid

see Technical Data

In this case, the operator or the person using the device should check whether or not the device is allowed to be connected, where appropriate through discussion with the power supply company.

Electrical Installations



Electrical installations must only be carried out according to relevant national and local standards and regulations.

Protective Measures against ESD



Danger of damage to electrical components from electrical discharge. Suitable measures should be taken to protect against ESD when replacing and installing components.

Safety measures in normal operation



Only operate the device when all safety devices are fully functional. If the safety devices are not fully functional, there is a risk of

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

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

Never bypass or disable safety devices.

Safety Symbols



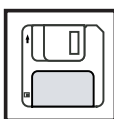
Devices with the CE marking satisfy the essential requirements of the low-voltage and electromagnetic compatibility directives. Further details can be found in the appendix or the chapter entitled "Technical data" in your documentation.

Disposal



Do not dispose of this device with normal domestic waste! To comply with the European Directive 2002/96/EC on Waste Electrical and Electronic Equipment and its implementation as national law, electrical equipment that has reached the end of its life must be collected separately and returned to an approved recycling facility. Any device that you no longer require must be returned to your dealer, or you must locate the approved collection and recycling facilities in your area. Ignoring this European Directive may have potentially adverse effects on the environment and your health!

Backup



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

Copyright



Copyright of these operating instructions remains with the manufacturer.

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

Protection of Persons and Equipment

Safety



WARNING! If the equipment is used or tasks are carried out incorrectly, serious injury or damage may result. Only qualified personnel are authorized to install your inverter and only within the scope of the respective technical regulations. It is essential that you read the "Safety regulations" chapter before commissioning the equipment or carrying out maintenance work.

Protection of Persons and Equipment

The design and function of the inverter offer a maximum level of safety, both during installation as well as operation.

The inverter provides operator and equipment protection through:

- a) galvanic isolation
 - b) monitoring the grid
-

Galvanic isolation

The inverter is equipped with a high frequency transformer that ensures galvanic isolation between the DC side and the grid, thus ensuring the highest possible safety.

Monitoring the Grid

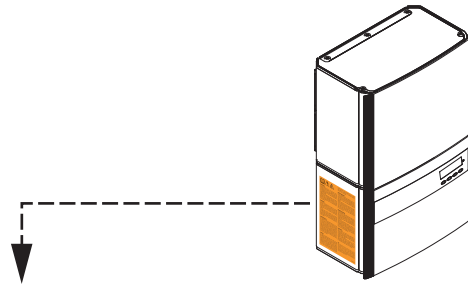
Whenever conditions in the electric grid are inconsistent with standard conditions (for example, grid switch-off, interruption), the inverter will immediately stop operating and interrupt the supply of power into the grid.

Grid monitoring is carried out using:

- Voltage monitoring
- Frequency monitoring
- Monitoring islanding conditions

Warning notices affixed to the device

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



WARNING!

Der Anschlussbereich darf nur von lizenzierten Elektro-Installateuren geöffnet werden. Der separate Bereich der Leistungsteile darf nur im spannungsfreien Zustand vom Anschlussbereich getrennt werden. Der separate Bereich der Leistungsteile darf nur durch geschultes Servicepersonal geöffnet werden.

Entladezeit der Kondensatoren abwarten. Die Entladezeit beträgt 5 Minuten. Der Neutralleiter des Netzes muss geerdet sein. Dem Licht ausgesetzte Solarmodule erzeugen gefährliche Spannung. Vor Arbeiten an den Solarmodulen den DC-Trenner betätigen und wenn vorhanden die Modulerdung aufheben.

WARNING!

The connection area should only be opened by a licensed electrician. The separate power module area should only be disconnected from the connection area after first being disconnected from the mains power. The separate power module area should only be opened by a trained service personnel.

You must wait until the capacitors have discharged. Discharge takes 5 minutes. The network neutral conductor must be grounded. Solar modules exposed to light create dangerous voltage. Activate the DC disconnect and disengage the module ground, if available, before working on the solar modules.

¡ADVERTENCIA!

Sólo instaladores eléctricos oficiales pueden abrir la zona de conexión. La zona separada de las partes de potencia sólo se puede separar de la zona de conexión cuando se encuentra en el estado sin tensión. Sólo el personal de servicio formado puede abrir la zona separada de las piezas conductoras. Esperar el tiempo de descarga de los condensadores. El tiempo de descarga es de 5 minutos. El conductor neutro de la red debe estar conectado a tierra. Los módulos solares expuestos a la luz generan una tensión peligrosa. Antes de realizar trabajos en los módulos solares, activar el seccionador DC y anular la puesta a tierra del módulo, si ésta existe.

AVVISO!

La scatola dei collegamenti deve essere aperta soltanto da installatori elettrici qualificati. La zona separata delle fonti d'energia può essere staccata dalla scatola dei collegamenti solo in assenza di tensione. La zona separata delle fonti d'energia può essere aperta solo da personale addestrato del servizio di assistenza. Attendere il tempo di scaricamento dei condensatori. Il tempo di scaricamento è di 5 minuti. Il conduttore neutro della rete deve essere messo a terra. I moduli solari esposti alla luce generano

tensione pericolosa. Prima di effettuare lavori sui moduli solari, azionare il separatore CC e annullare la messa a terra dei moduli, se presente.

AVERTISSEMENT !

Seuls des installateurs agréés sont habilités à ouvrir la zone de raccordement. Le bloc indépendant des étages de puissance ne doit être séparé de la zone de raccordement que si l'ensemble est hors tension. Seuls des installateurs formés sont habilités à ouvrir le bloc indépendant des étages de puissance.

Attendre l'expiration de la durée de décharge des condensateurs. Cette durée correspond à 5 minutes. Le conducteur neutre du secteur doit être mis à la terre. Les modules solaires exposés à la lumière produisent une tension dangereuse. Avant toute intervention sur les modules solaires, activer le sectionneur DC et, si elle existe, supprimer la mise à la terre de module.

WAARSCHUWING!

Het aansluitgedeelte mag uitsluitend worden geopend door elektromonteurs die hiertoe zijn bevoegd. Het afzonderlijke deel van het vermogensgedeelte mag alleen in spanningsvrije toestand worden gescheiden van het aansluitgedeelte. Het afzonderlijke deel van het vermogensgedeelte mag uitsluitend worden geopend door geschoolde onderhoudswerkers.

Wacht tot de condensatoren volledig zijn ontladen. De ontladijd bedraagt 5 minuten. De nulleiding van het net moet zijn geaard. Fotovoltaïsche modules die aan licht zijn blootgesteld, produceren een gevaarlijke spanning. Voordat u werkzaamheden verricht aan de fotovoltaïsche modules, moet u de DC-scheider bedienen en (indien aanwezig) de aarding van de module uitschakelen.

VAROVÁNÍ!

Prostor připojení smí otevřít pouze elektromontér s příslušnou licenci. Samostatnou oblast výkonového dílu lze od přípojné oblasti odpojit pouze, je-li odpojena od proudu. Samostatnou oblast výkonového dílu smí otevírat pouze vyškolený odborný personál.

Vyčkejte na vybití kondenzátorů. Doba vybití je 5 minut. Neutrální síťový vodič musí být uzemněn. Solární moduly vystavené světlu vytvářejí nebezpečné napětí. Před zahájením práce na solárních modulech aktivujte oddělovač DC a deaktivujte uzemnění modulu, je-li k dispozici.

경고!

연결 영역은 면허가 있는 전기 기사만 열 수 있습니다. 별도의 전력 모듈 영역은 주 전원으로부터 먼저 차단한 후에만 연결 영역으로부터 차단시킬 수 있습니다. 별도의 전력 모듈 영역은 교육을 받은 서비스 직원만 열 수 있습니다. 콘덴서가 방전될 때까지 기다려야 합니다. 방전은 5분이 소요됩니다. 네트워크 중성선은 접지되어야 합니다. 태양전지판이 빛에 노출되면 위험 전압이 발생합니다. 가능하면 DC를 차단하고 모듈 접지를 해제한 후에 태양전지판을 작동하십시오.

42,0409,3296

Safety symbols:



Risk of serious injury and damage due to incorrect operation



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

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



Dangerous electrical voltages

Text of warning notices:

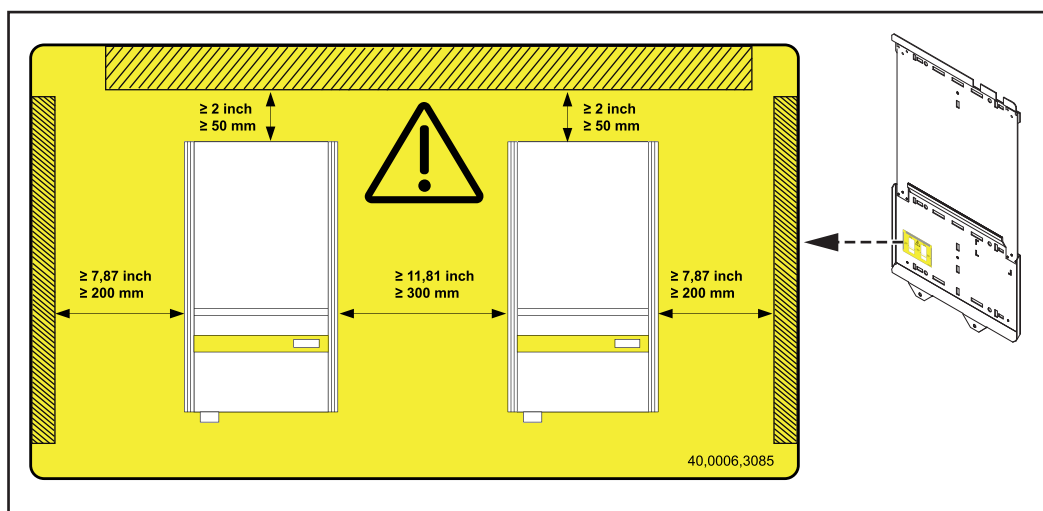
WARNING!

The connection area should only be opened by a licensed electrician. The separate power stage set area should only be disconnected from the connection area after first being disconnected from the grid power. The separate power stage set area should only be opened by trained service personnel.

You must wait until the capacitors have discharged. Discharge takes 5 minutes. The neutral conductor of the grid must be grounded. Solar modules exposed to light create dangerous voltage. Activate the DC disconnect and disengage the module ground, if available, before working on the solar modules.

Warning notice on the wall bracket

The wall bracket contains a warning notice regarding the installation of several inverters next to each other. This warning notice warns against incorrect installation and must not be removed or painted over. Incorrect installation voids the warranty, property damage can result.



The spacing information listed in the warning notice from the wall/ceiling to the inverter and from inverter to inverter must be observed when installing several inverters next to each other.

The Fronius IG Plus Unit in the PV System

General The solar inverter is the highly complex link between the solar modules and the public grid.

Tasks The main tasks of the inverter include:

- Converting DC to AC current
- Fully automatic operational management
- Display function and data communication

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

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

Fully automatic operation management The inverter is fully automatic. Starting at sunrise, as soon as the solar modules generate enough energy, the automatic control unit starts monitoring grid voltage and frequency. As soon as there is a sufficient level of irradiance, your solar inverter starts feeding energy into the grid.

The control system of the inverter ensures that the maximum possible power output is drawn from the solar modules at all times.

This function is called MPPT (Maximum Power Point Tracking).

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

Display function and data communication The display on the inverter is the interface between the inverter and the operator. The design of the display is geared towards simple operation and making system data available as long as the inverter operates.

The inverter is equipped with a basic logging function to monitor minimum and maximum data on a daily and a cumulative basis. These values are shown on the display.

A wide range of data communication products allows for many possibilities of recording and viewing data.

System Upgrade The inverter is designed for various system upgrades, e.g.:

- Upgrades that enable the inverter to communicate with external system upgrades as well as with other inverters
- Datalogger (when using a PC to record and manage data from your photovoltaic system), includes Datalogger and a modem interface
- Various large-format displays
- Fronius Personal Display
- Actuators (e.g.: relays, alarms)
- Interface cards

System upgrades are available as plug-in cards.

Forced Ventilation

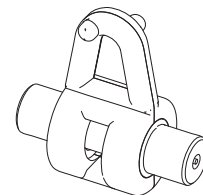
The inverter's temperature-controlled, variable-speed fan with ball-bearing support provides:

- optimal inverter cooling
- efficiency increases
- cooler components, thus improving service life
- least possible energy consumption and lowest possible noise level
- weight reduction due to a reduction of the cooling element surface

100 kohm Grounding Kit Option

Along with the solar module ground on the positive or negative pole, solar modules can also be grounded with high resistance on the positive or negative pole.

This requires the 100 kohm Grounding Kit option, which is inserted into the corresponding fuse holder similar to a regular fuse for the solar module ground.



Grounding Kit 100 kOhm

Power derating

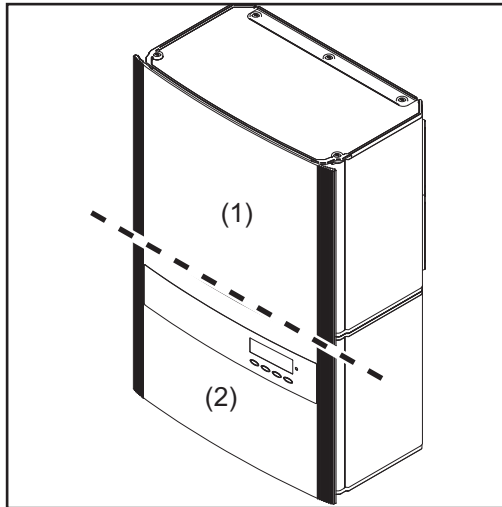
Should there be insufficient heat dissipation in spite of the fan operating at maximum speed (for example, inadequate heat transfer away from the heat sinks), the power will be derated to protect the inverter when the ambient temperature reaches approx. 40 °C and above.

Derating the power reduces the output of the inverter for a short period sufficient to ensure that the temperature will not exceed the permissible limit.

Your inverter will remain ready for operation as long as possible without any interruption.

Fronius IG Plus Installation and Connection

Inverter Construction



The power stage set and the connection area are separated from each other for delivery.

(1) Power stage set(s)

(2) Connection area

Overview

'Fronius IG Plus Installation and Connection' contains the following sections:

- Choosing the Location
- Fronius IG Plus Connection Options
- Knockouts on the Fronius IG Plus
- Fronius IG Plus Installation
- Connecting the Fronius IG Plus to the Public Grid (AC)
- Connecting Solar Module Strings to the Fronius IG Plus (DC)
- Closing Fronius IG Plus

Choosing the Location

Choosing the Location, General

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

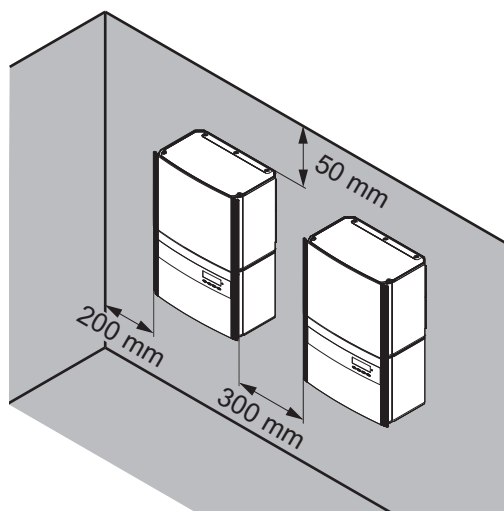
It should only be installed on a stable, vertical wall

Max. ambient temperatures: -20 °C / +55 °C

Relative humidity: 0 - 95 %

For use at altitudes above sea level: up to 2000 m

- There should be a 200 mm (7.8 in) clearance on both sides of the inverter for the cool air vents.
- Maintain a side distance of 300 mm (11.8 in) between individual inverters.



The air flow direction within the inverter is from right to left (cold air intake on right, hot air exit on left).

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

The inverter is designed for installation both indoors and outdoors.

Choosing a Location for Inside Installation

During certain operation 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:

- areas with large amounts of dust
 - areas with large amounts of conducting dust particles (e.g., iron filings)
 - areas with corrosive gases, acids or salts
 - areas where there is an increased risk of accidents, e.g., from farm animals (horses, cattle, sheep, pigs, etc.)
 - stables or adjoining areas
 - storage areas for hay, straw, chaff, animal feed, fertilizers, etc.
 - storage or processing areas for fruit, vegetables or winegrowing products
 - areas used in the preparation of grain, green fodder or animal feeds
 - greenhouses
-

Choosing a location for outdoor installation

Because of its degree of protection, the inverter is not susceptible to splash water from any direction.

However the manufacturer recommends, if possible, not to expose the inverter to direct weathering, in order to prevent water deposits caused by rain or snow.

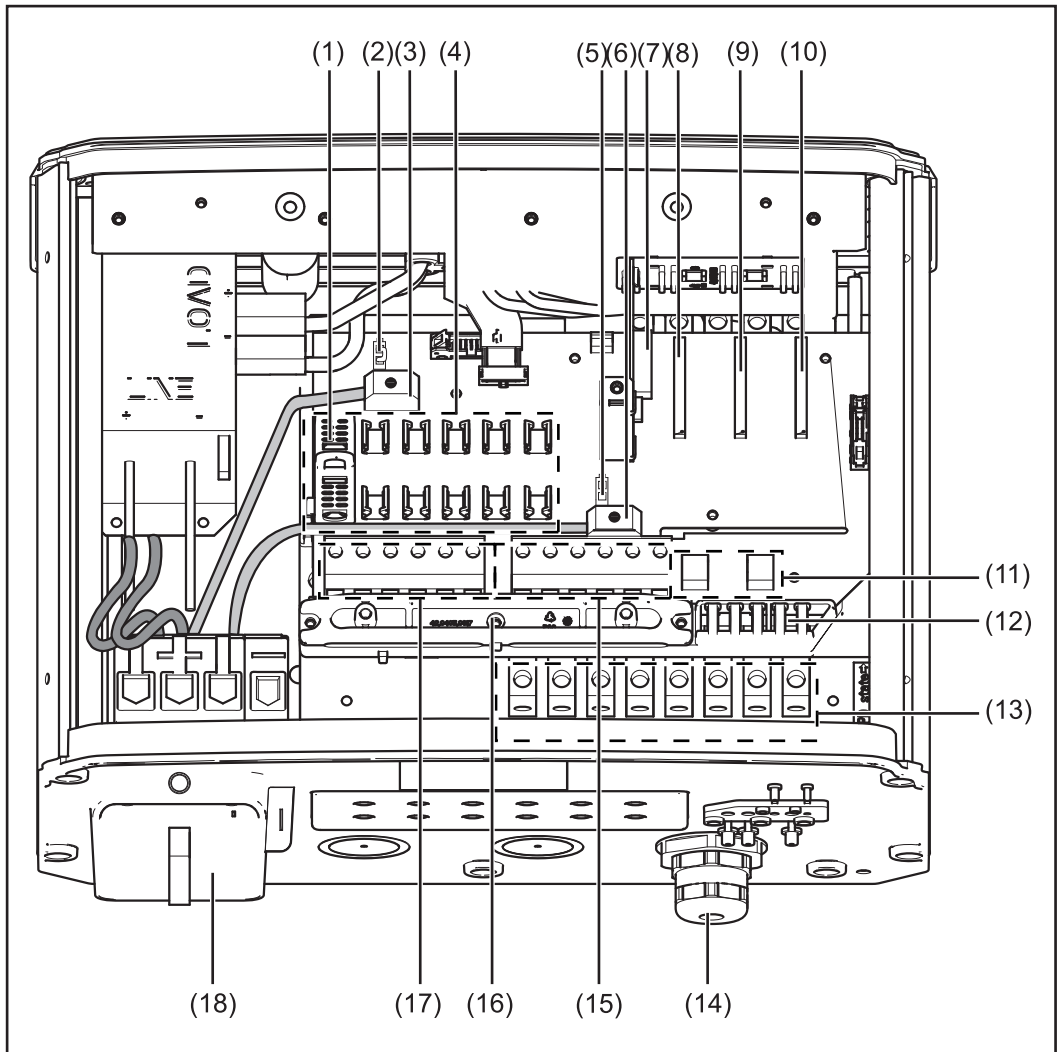
In order to protect the display, the inverter should not be exposed to direct sunlight. Ideally, the inverter should be installed in a protected location, e.g., near the solar modules or under a roof overhang.

Do not install the inverter:

- where it can be exposed to ammonia, corrosive gasses, acids or salts (e.g., fertilizer storage areas, vent openings of livestock stables, chemical plants, tanneries)
-

Fronius IG Plus Connection Options

Fronius IG Plus connection options



| Item | Description |
|------|---|
| (1) | Fuse cover (6 x for string fuses, 1 x for the solar module ground fuse) |
| (2) | Jumper slot SMON |
| (3) | DC+ main switch wire |
| (4) | 6 DC+ fuse holders |
| (5) | Jumper slot SMOFF |
| (6) | DC- main switch wire |
| (7) | Plug-in card for country setup (IG Brain) |
| (8) | Open card slot for an option card |
| (9) | Open card slot for a second option card |
| (10) | Open card slot for a third option card |
| (11) | Fuse holder for solar module ground |
| (12) | Strain relief for plug-in card cable |
| (13) | AC-side terminals |
| (14) | Metric screw joint M32 or M40 (AC connection) |
| (15) | 6 DC- terminals |
| (16) | Strain relief for solar module strings |

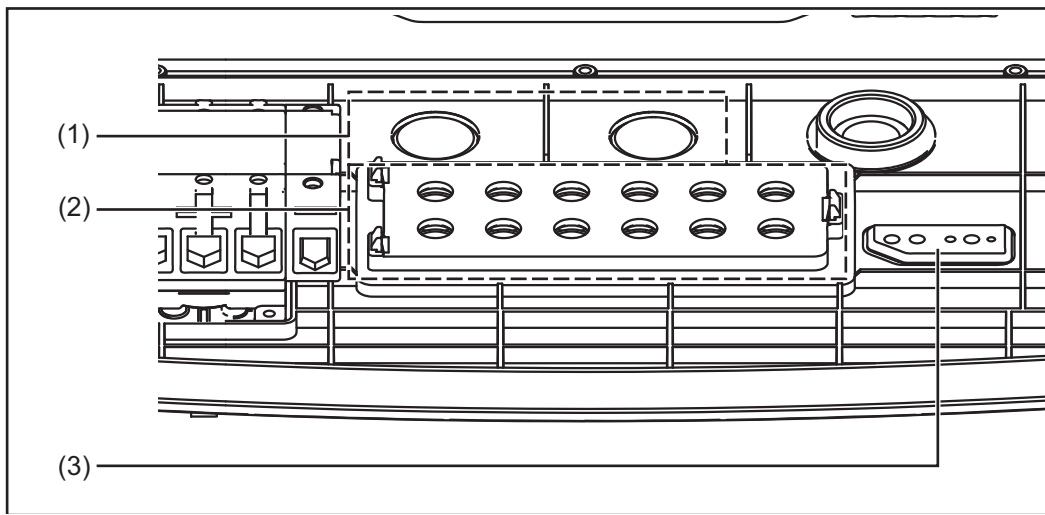
| Item | Description |
|-------------|--------------------|
| (17) | 6 DC+ terminals |
| (18) | DC main switch |

Knockouts on the Fronius IG Plus

General

The inverter contains several knockouts of different sizes. When knocked out, the openings are used for the inputs of various wires.

Knockouts on the Fronius IG Plus for wire inputs



| Item | Description |
|------|---|
| (1) | 2 cable inputs for M32 metric screw joint (for DC cables with a cross section > 16 mm ²) |
| (2) | 12 cables inputs for 6 solar module strings DC (for a cable diameter of 5 - 9.2 mm) |
| (3) | Sealing insert (cable input for plug-in card wire) |

Removing Knockouts

The knockouts made from plastic as well as the larger ones made from metal should only be removed from the outside in.

The smaller knockouts made from metal should be removed from the inside out.

You should only remove the number of knockouts required for the available cables (e.g., 6 openings for 3 module strings).

The plastic knockouts are also equipped with centering holes so that they can be drilled out if required.

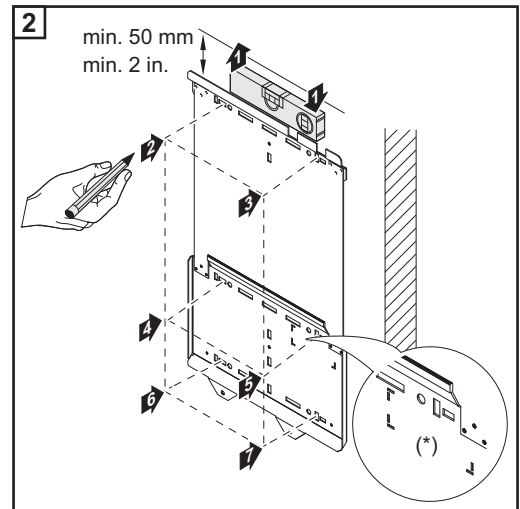
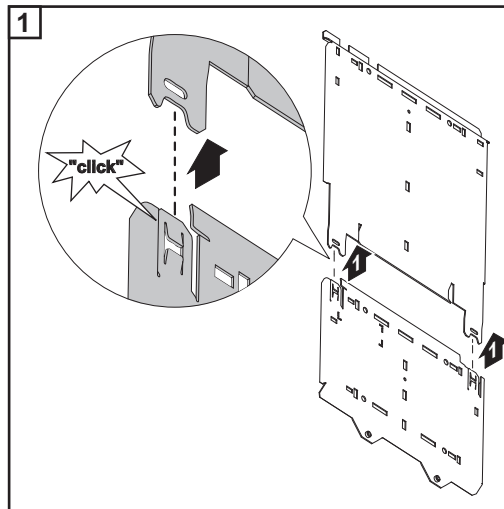
Fronius IG Plus Installation

Attaching the wall bracket

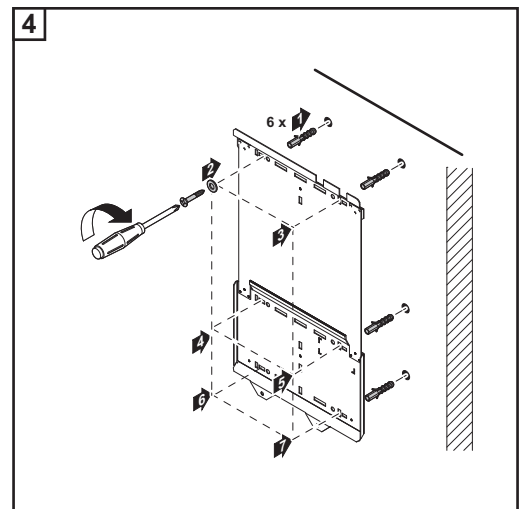
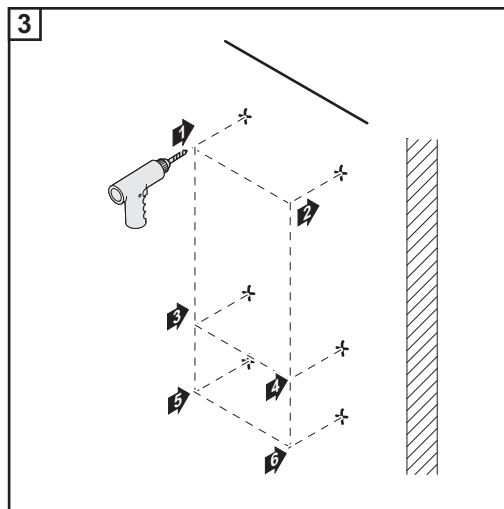
IMPORTANT! Depending on the surface, different dowels and screws may be required for installing the wall bracket. Therefore, these dowels and screws are not part of the scope of supply for the inverter. The system installer is responsible for selecting the proper dowels and screws.



NOTE! The Fronius IG Plus should only be installed upright on the wall.



IMPORTANT! Attach the wall bracket so that the display marking (*) on the wall bracket is at eye level.



Lifting the Fronius IG Plus

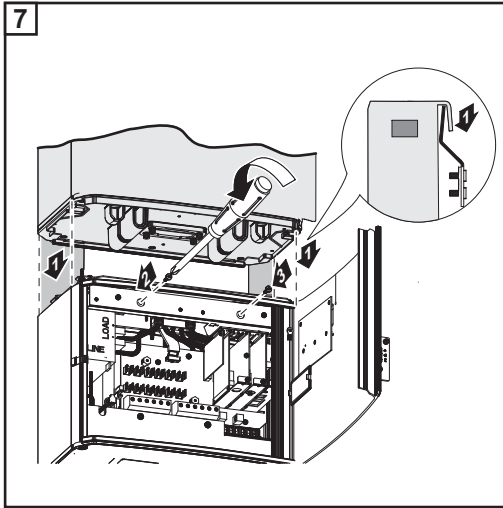
Fronius recommends using commercially available vacuum lifting pads for flat surfaces to lift the connection area and power stage set.

IMPORTANT!

- The vacuum lifting pads must be designed for the weight of the connection area and power stage set.
- Follow all safety instructions from the vacuum lifting pad manufacturer.
- Vacuum lifting pads are not part of the scope of delivery for the inverter.

Weight information for the connection area and power stage set:

| Inverter | Connection area | Power stage set |
|-------------------------|-----------------|-----------------|
| Fronius IG Plus 25 V-1 | 9.85 kg | 13.95 kg |
| Fronius IG Plus 30 V-1 | 9.85 kg | 13.95 kg |
| Fronius IG Plus 35 V-1 | 9.85 kg | 13.95 kg |
| Fronius IG Plus 50 V-1 | 9.85 kg | 13.95 kg |
| Fronius IG Plus 55 V-1 | 9.85 kg | 26.10 kg |
| Fronius IG Plus 55 V-2 | 9.85 kg | 26.10 kg |
| Fronius IG Plus 55 V-3 | 11.05 kg | 38.15 kg |
| Fronius IG Plus 60 V-1 | 9.85 kg | 26.10 kg |
| Fronius IG Plus 60 V-2 | 9.85 kg | 26.10 kg |
| Fronius IG Plus 60 V-3 | 11.05 kg | 38.15 kg |
| Fronius IG Plus 70 V-1 | 9.85 kg | 26.10 kg |
| Fronius IG Plus 70 V-2 | 9.85 kg | 26.10 kg |
| Fronius IG Plus 80 V-3 | 11.05 kg | 38.15 kg |
| Fronius IG Plus 100 V-1 | 10.80 kg | 26.10 kg |
| Fronius IG Plus 100 V-2 | 10.85 kg | 26.10 kg |
| Fronius IG Plus 100 V-3 | 11.05 kg | 38.15 kg |
| Fronius IG Plus 120 V-1 | 11.05 kg | 38.15 kg |
| Fronius IG Plus 120 V-3 | 11.05 kg | 38.15 kg |
| Fronius IG Plus 150 V-3 | 11.05 kg | 38.15 kg |



Use the screws in the bag attached to the wall bracket to secure the power stage set to the connection area.

Connecting the Fronius IG Plus to the Public Grid (AC)

Monitoring the Grid

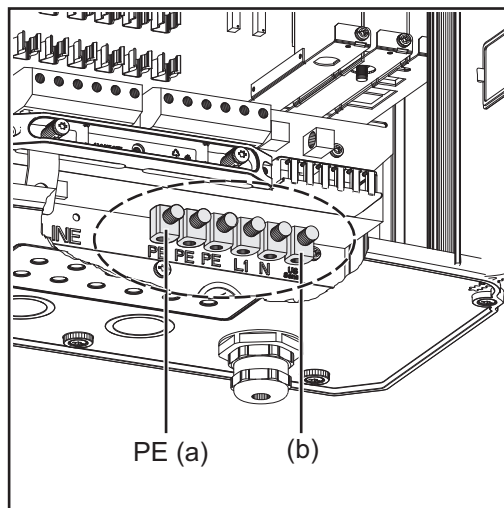
IMPORTANT! The resistance in the leads to the AC-side connection terminals must be as low as possible for optimal functioning of grid monitoring.

Installations with Several Inverters

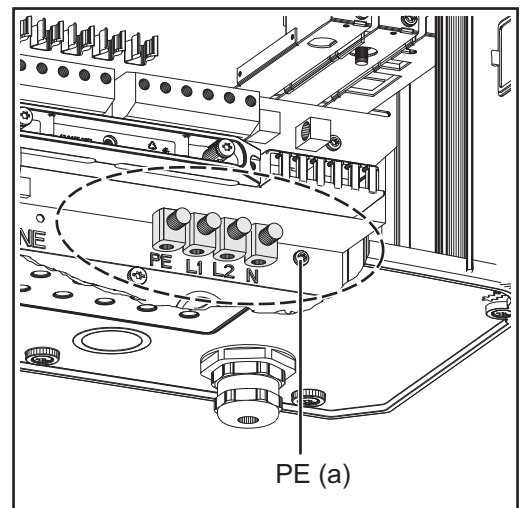
For larger photovoltaic systems, it is possible to connect several inverters in parallel without any problems. To ensure symmetrical feeding, connect the inverters uniformly to all 3 phases.

AC-side terminals

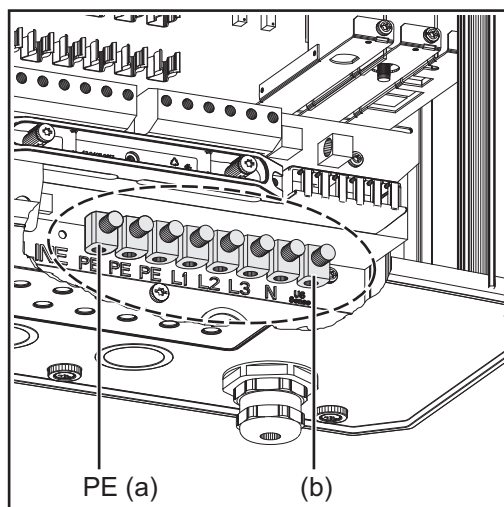
Single-phase inverter



Two-phase inverter



Three-phase inverter



Legend:

- L1 Phase conductor
- L2 Phase conductor
- L3 Phase conductor
- N Neutral conductor
- PE Ground conductor/grounding
- PE (a) Connection option for additional grounding
- (b) "US Sense" terminal (for USA)

Max. cable cross-section:
 25 mm² - for flexible cables
 35 mm² - for rigid cables

Mains Neutral Conductor



NOTE! Make sure that the grid neutral conductor is grounded.

The neutral conductor must be connected in order to operate the inverter.



NOTE! If the neutral conductor is too small it can adversely affect the inverter's feed-in of power to the mains. The neutral conductor must therefore be the same size as the other live conductors: L1, L2 and L3.

Connecting Aluminum Cables



NOTE! The AC side terminals are not designed for connecting aluminum cables.

Cross Section of AC Wires

For M32 metric screw joint:
Cable diameter 11 - 21 mm

For M40 metric screw joint:
Cable diameter 19 - 28 mm

If required, use reducers for smaller cable diameters.

Safety



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

- The connection area should only be opened by a licensed electrician.
- The separate power stage set area should only be disconnected from the connection area after first being disconnected from the grid power.
- The separate power stage set area should only be opened by Fronius-trained service personnel.

Never work with live wires! Prior to all connection work, make sure that the AC and DC wires are not charged.



CAUTION! Danger of damaging the inverter by overloading the grid neutral conductor.

- Do not connect 2-phase and 3-phase devices together to one phase
- Never operate multi-phase devices in one phase



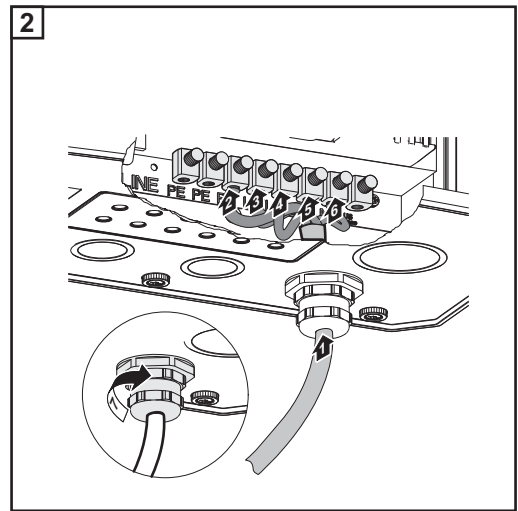
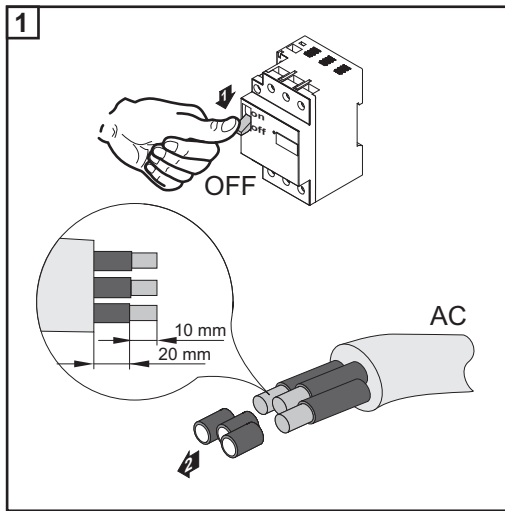
CAUTION! Danger of damaging the inverter from improperly connected terminals. Improperly connected terminals can cause thermal damage to the inverter and may cause a fire. When connecting the AC and DC cables, make sure that all terminals are tightened securely using the proper torque.

Connecting the Fronius IG Plus to the public grid (AC)

Only an authorized electrician is permitted to connect this inverter to the public grid.



NOTE! Finely stranded cables up to conductor class 5 can be connected to the AC-side terminals without wire end ferrules.



Terminal tightening torque: 2 Nm

Maximum alternating current fuse protection

| Inverter | Phases | Nominal output | Fuse protection |
|-------------------------|--------|----------------|-----------------|
| Fronius IG Plus 25 V-1 | 1 | 2.6 kW | 1 x C 25 A |
| Fronius IG Plus 30 V-1 | 1 | 3 kW | 1 x C 25 A |
| Fronius IG Plus 35 V-1 | 1 | 3.5 kW | 1 x C 25 A |
| Fronius IG Plus 50 V-1 | 1 | 4 kW | 1 x C 25 A |
| Fronius IG Plus 55 V-1 | 1 | 5 kW | 1 x C 50 A |
| Fronius IG Plus 55 V-2 | 2 | 5 kW | 2 x C 25 A |
| Fronius IG Plus 55 V-3 | 3 | 5 kW | 3 x C 25 A |
| Fronius IG Plus 60 V-1 | 1 | 6 kW | 1 x C 50 A |
| Fronius IG Plus 60 V-2 | 2 | 6 kW | 2 x C 25 A |
| Fronius IG Plus 60 V-3 | 3 | 6 kW | 3 x C 25 A |
| Fronius IG Plus 70 V-1 | 1 | 6.5 kW | 1 x C 50 A |
| Fronius IG Plus 70 V-2 | 2 | 6.5 kW | 2 x C 25 A |
| Fronius IG Plus 80 V-3 | 3 | 7 kW | 3 x C 25 A |
| Fronius IG Plus 100 V-1 | 1 | 8 kW | 1 x C 50 A |
| Fronius IG Plus 100 V-2 | 2 | 8 kW | 2 x C 25 A |
| Fronius IG Plus 100 V-3 | 3 | 8 kW | 3 x C 25 A |
| Fronius IG Plus 120 V-1 | 1 | 10 kW | 1 x C 63 A |
| Fronius IG Plus 120 V-3 | 3 | 10 kW | 3 x C 25 A |
| Fronius IG Plus 150 V-3 | 3 | 12 kW | 3 x C 25 A |

NOTE! A residual current circuit breaker for the AC connecting cable may be required depending on local regulations, the power supply company as well as other conditions. A type A residual current circuit breaker is generally sufficient in this case, however, false alarms can be triggered for the type A residual current circuit breaker in individual cases and depending on local conditions. For this reason, Fronius recommends that you use a residual current circuit breaker suitable for a frequency converter.

NOTE! Only for three-phase inverters: When using a residual current circuit breaker, the voltage difference between the PE ground conductor and the N neutral conductor must not be higher than 8 V.

Connecting Solar Module Strings to the Fronius IG Plus (DC)

General Information about Solar Modules

In order to select suitable solar modules and get the most efficient use out of the inverter, please note the following points:

- If irradiance is constant and the temperature is falling, the open circuit voltage of the solar modules will increase. Open circuit voltage may not exceed 600 V. Whenever the open circuit voltage of the solar modules exceeds 600 volts, the inverter may be damaged, and all warranty rights will become null and void.
- More exact values for dimensioning solar modules for the chosen installation location can be provided using suitable calculation programs like the Fronius Solar.configurator (available at <http://www.fronius.com>).



NOTE! Before connecting solar modules:

- make sure that the voltage specified by the manufacturer corresponds to the actual measured voltage
- determine whether or not a solar module ground is required

Safety



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

- The connection area should only be opened by a licensed electrician.
- The separate power stage set area should only be disconnected from the connection area after first being disconnected from the grid power.
- The separate power stage set area should only be opened by Fronius-trained service personnel.

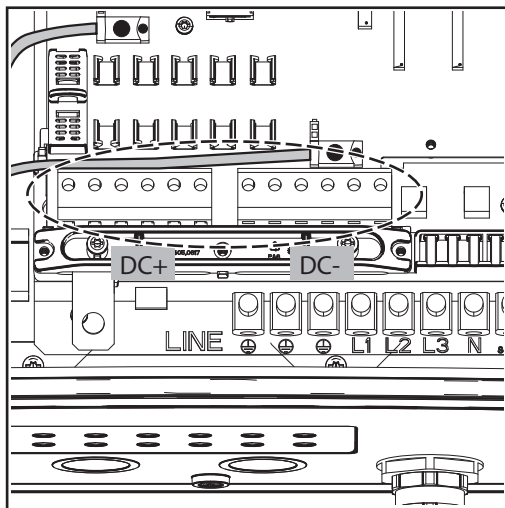
Never work with live wires! Prior to all connection work, make sure that the AC and DC wires are not charged.

The DC main switch is only used to switch off power to the power stage set. When the DC main switch is turned off, the connection area is still energized.



CAUTION! Danger of damaging the inverter from improperly connected terminals. Improperly connected terminals can cause thermal damage to the inverter and may cause a fire. When connecting the AC and DC cables, make sure that all terminals are tightened securely using the proper torque.

DC-Side Terminals



Connecting aluminum cables (DC)

The DC-side terminals are designed for connecting single-wire, round aluminum cables. The following points must be taken into account when connecting aluminum cables due to the non-conducting oxide layer of aluminum:

- The reduced rated currents for aluminum cables
- The connection requirements listed below

Reduced rated currents for aluminum cables:

| Rated cross section | Reduced rated current |
|---------------------|-----------------------|
| 2.5 mm ² | 20 A |
| 4 mm ² | 27 A |
| 6 mm ² | 35 A |
| 10 mm ² | 48 A |
| 16 mm ² | 64 A |



NOTE! Take into account local specifications when configuring cable cross sections.

Connection requirements:

- 1 Carefully clean off the oxide layer of the stripped cable end, e.g., using a knife.

IMPORTANT! Do not use brushes, files or sandpaper. Aluminum particles may get stuck and can transfer to other cables.

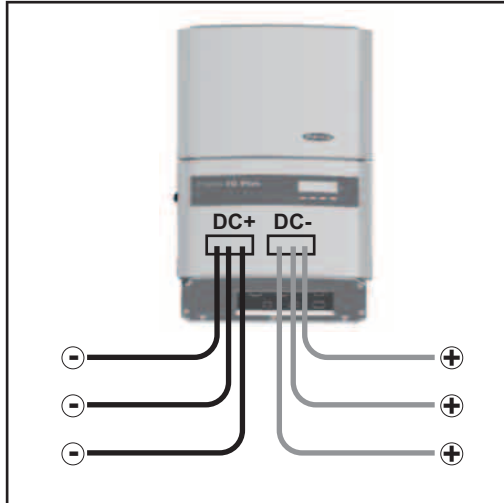
- 2 After removing the oxide layer of the cable end, rub in a neutral grease, e.g., acid- and alkali-free Vaseline.
- 3 Then immediately connect to the terminal.

Repeat the steps above whenever the cable is disconnected and then reconnected.

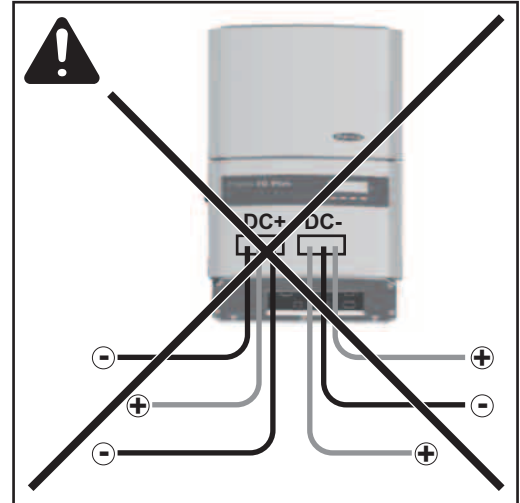
Polarity Reversal of Solar Module Strings

CAUTION! Risk of damage and fire to inverter due to reverse polarity of single solar module strings.
 Reverse polarity of even one single solar module string can cause an unacceptable thermal load, which can lead to an inverter fire.
 Confirm string polarity and voltage before connecting DC wires to the inverter!

Connecting all solar module strings with reverse polarity will not cause any damage to the inverter.



All solar module strings connected with reverse polarity - no damage to the inverter



One single solar module string connected with reverse polarity - risk of damage, risk of fire !

Overview

'Connecting Solar Module Strings to the Fronius IG Plus (DC)' includes the following sections:

- Ungrounded System: Connecting Solar Module Strings
- Ungrounded System: Connecting Solar Module Strings with a Cable Cross Section > 16 mm²
- Solar Module Ground at Negative Pole: Connecting Solar Module Strings
- Solar Module Ground at Negative Pole: Connecting Solar Module Strings with a Cable Cross Section > 16 mm²
- Solar Module Ground at Negative Pole for Fronius IG Plus
- Solar Module Ground at Positive Pole: Connecting Solar Module Strings
- Solar Module Ground at Positive Pole: Connecting Solar Module Strings with a Cable Cross Section > 16 mm²
- Solar Module Ground at Positive Pole for Fronius IG Plus
- Criteria for the Proper Selection of String Fuses

Ungrounded System: Connecting Solar Module Strings

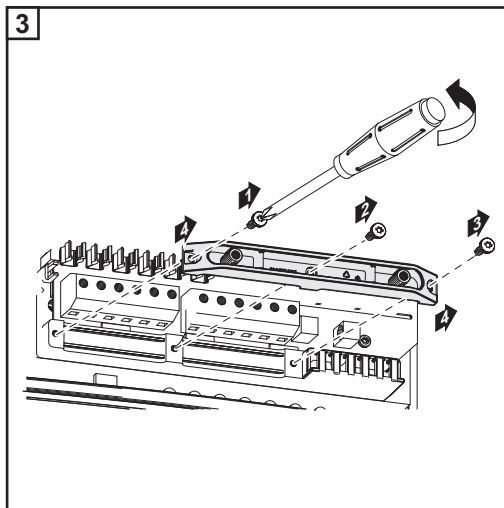
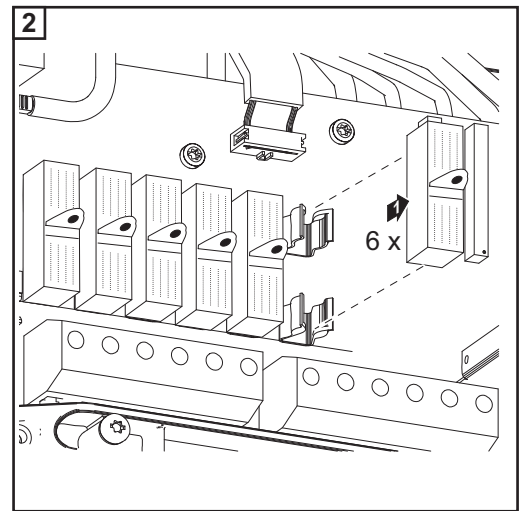
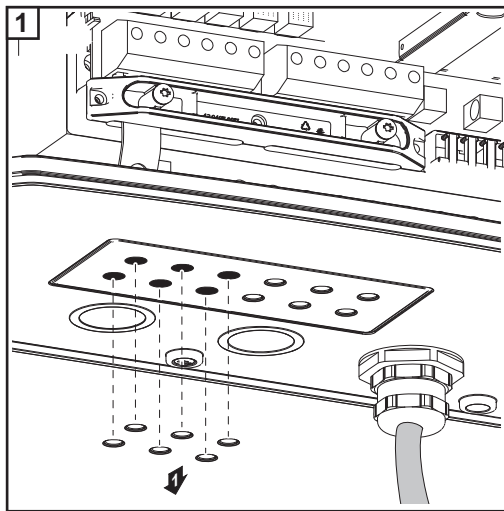
Wire Cross Section of Solar Module Strings

The cable cross section for solar module strings should be a maximum of 16 mm² per cable.

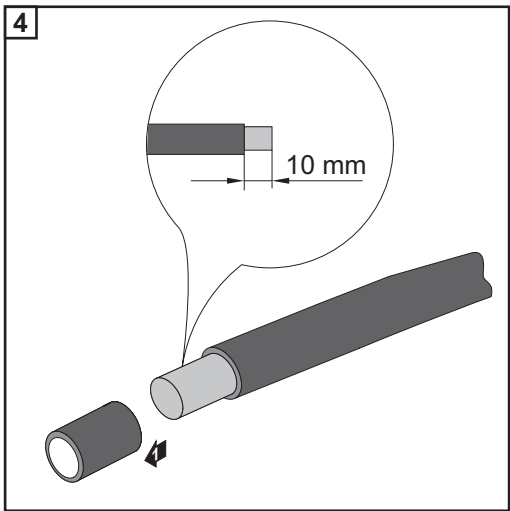


NOTE! To ensure an effective strain relief device for solar module strings, only use cable cross sections of the same size.

Ungrounded system: Connecting solar module strings

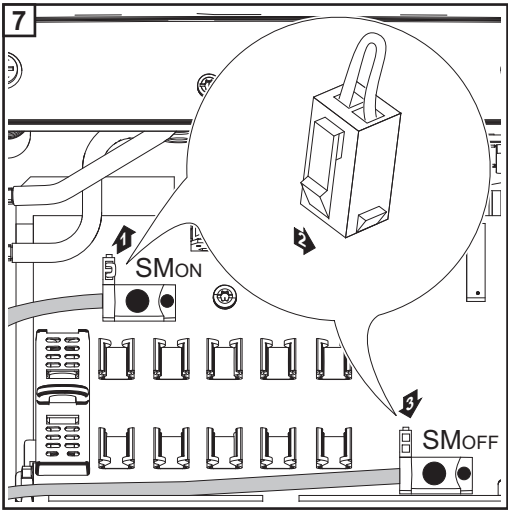
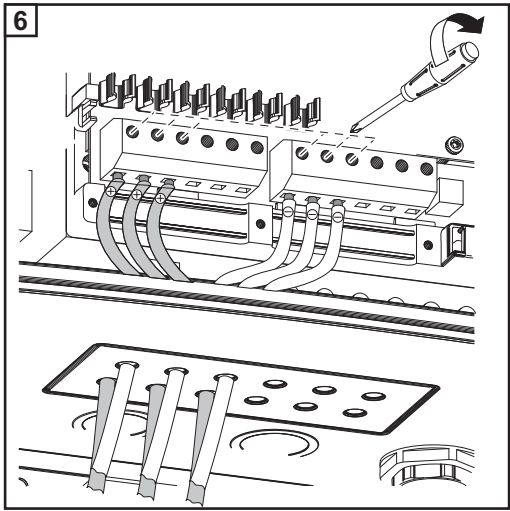


NOTE! Finely stranded cables up to conductor class 5 can be connected to the DC-side terminals without wire end ferrules.



CAUTION! Danger of damaging the inverter by overload.

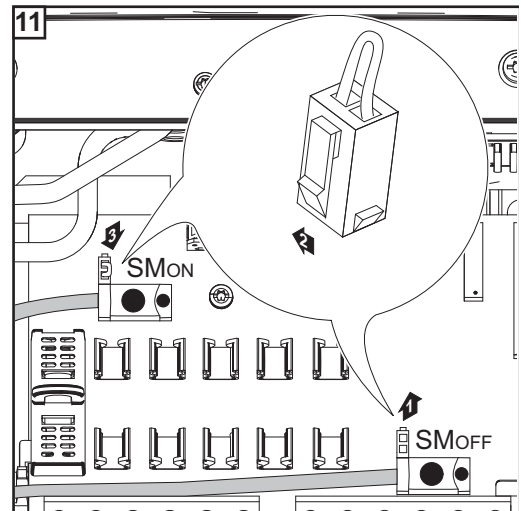
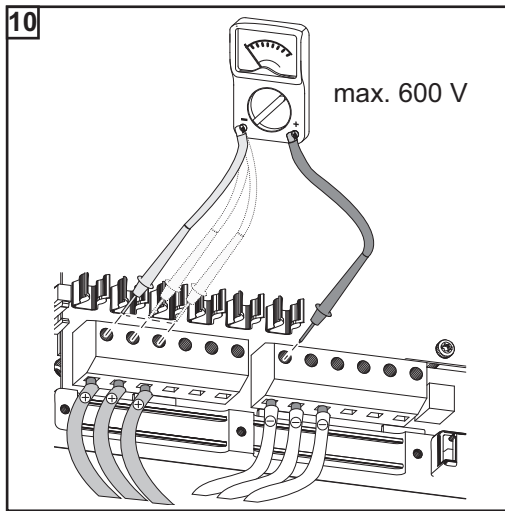
- Only connect a maximum of 20 A to an individual DC terminal.
- Connect the DC+ and DC- cables to the correct DC+ and DC- terminals on the inverter.



Tightening torque of terminals:
1.2 - 1.5 Nm

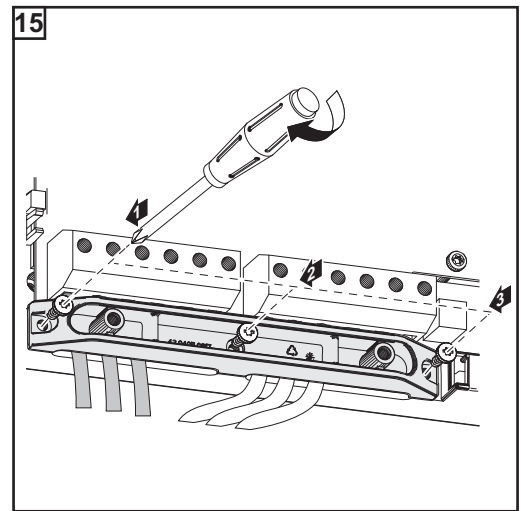
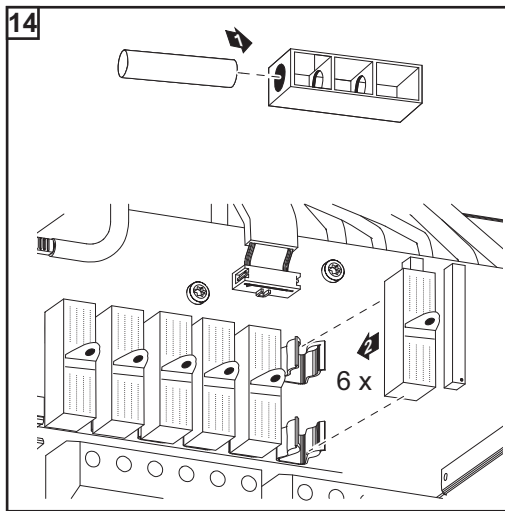
IMPORTANT!

- Set the jumper from the 'SM_{ON}' position to the 'SM_{OFF}' position for correct measurement results
- Check the polarity and voltage of the solar module strings: the voltage should be a max. of 600 V, the difference between the individual solar module strings should be a max. of 10 V.



IMPORTANT!

- When connecting solar module strings, you should use metal bolts or string fuses with fuse covers in the fuse holders depending on the solar module manufacturer's instructions.
The metal bolts are included in the inverter scope of delivery.
- Place metal bolts with fuse covers in the fuse holders for unoccupied DC+ terminals.



For more information on string fuses, see the section "Criteria for the proper selection of string fuses."

Selecting String Fuses

- If the solar module manufacturer requires the use of string fuses for operation:
- Select string fuses according to the information from the solar module manufacturer or according to "Criteria for the Proper Selection of String Fuses" (max. 20 A per solar module string, max. 6 solar module strings)

IMPORTANT!

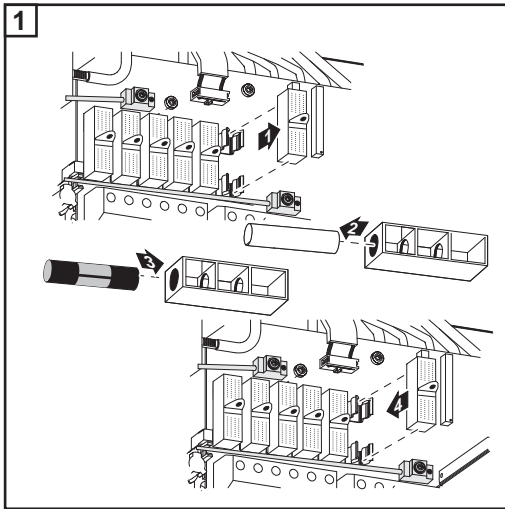
- Please follow solar module safety instructions
- Follow all solar module manufacturer requirements

Inserting String Fuses



NOTE! If the solar module manufacturer requires the use of string fuses:

- Insert fuses with a fuse cover in the respective fuse holder
- Do not operate the inverter without fuse covers



WARNING! An electric shock can be fatal. Danger from DC voltage from solar modules. Fuse covers are for installation purposes only. They offer no protection against contact.

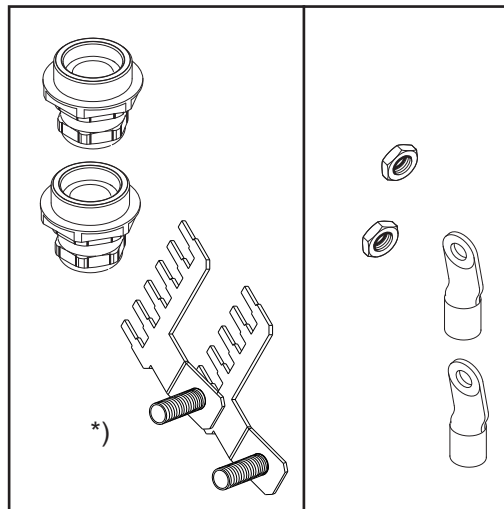
Ungrounded System: Connecting Solar Module Strings with a Cable Cross Section $> 16 \text{ mm}^2$

General

As an option, you can also connect DC cables to the inverter with a cross section $> 16 \text{ mm}^2$, e.g., when the DC cables from the solar modules are combined outside of the inverter into a large string.

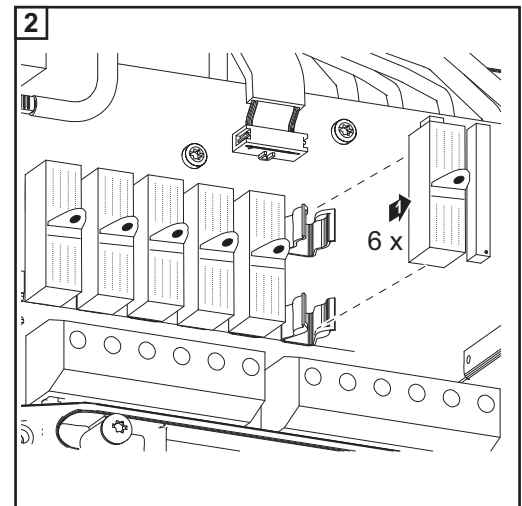
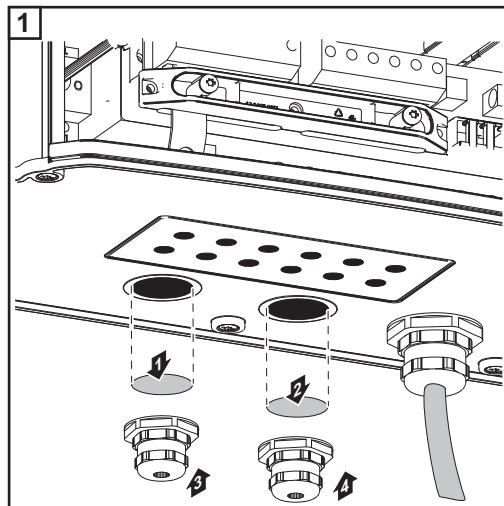
Additional components required

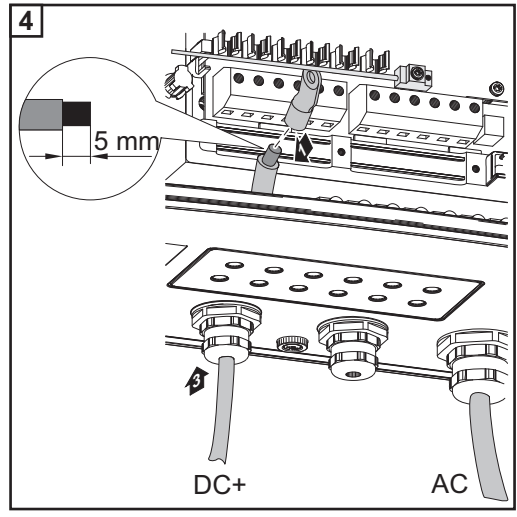
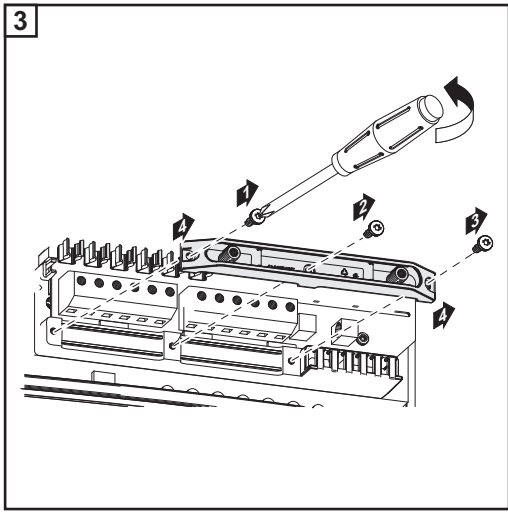
The following additional components are required for connecting DC cables with a cross section $> 16 \text{ mm}^2$:



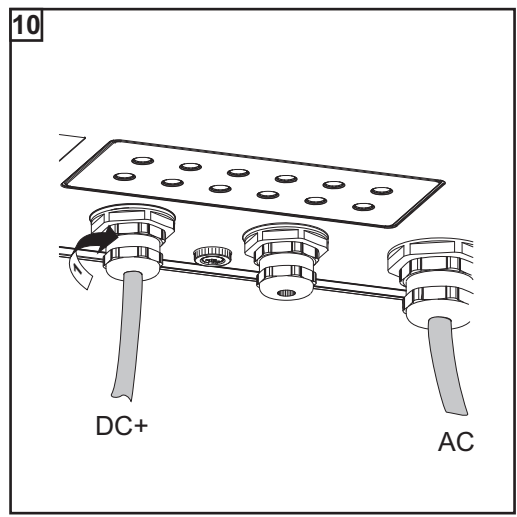
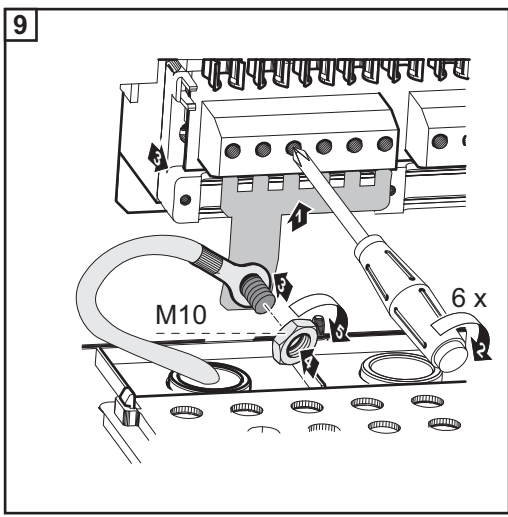
- 2 M32 metric screw joints (degree of protection min. IP45)
- 2 connection distributors
- *) Metric screw joints and connection distributors are available from Fronius as an option.
- 2 M10 cable lugs
- Select cable lugs that match the available DC cables
- 2 M10 hexagon nuts

Ungrounded system: Connecting solar module strings with a cable cross section $> 16 \text{ mm}^2$

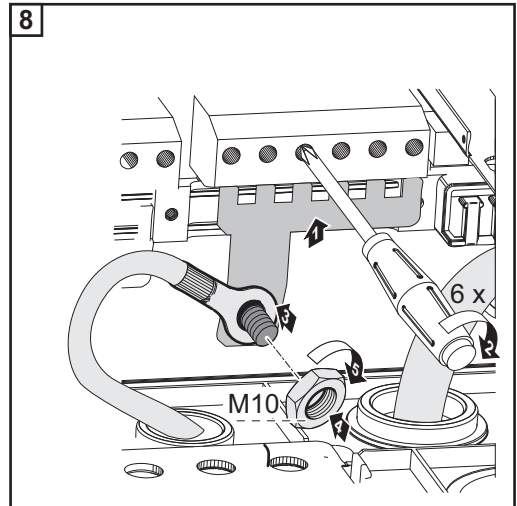
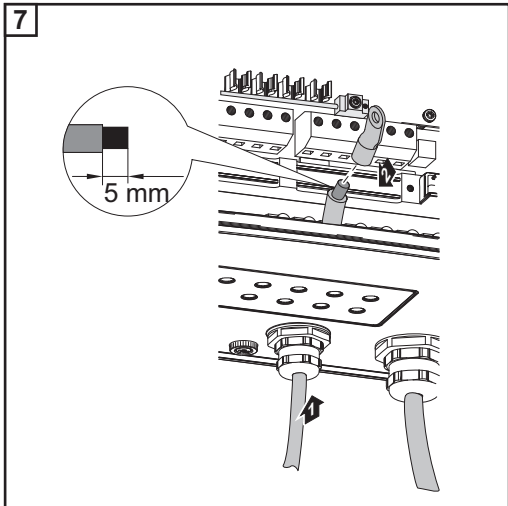




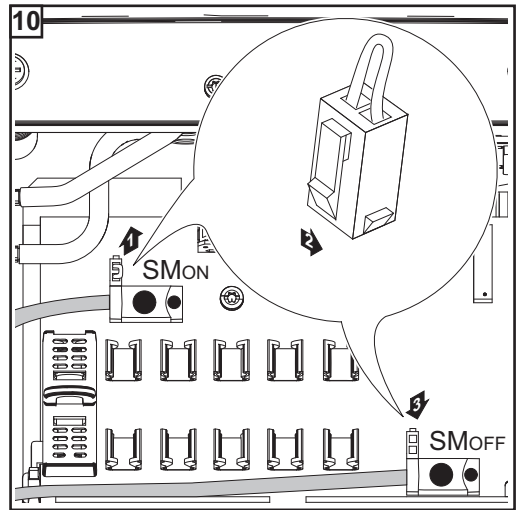
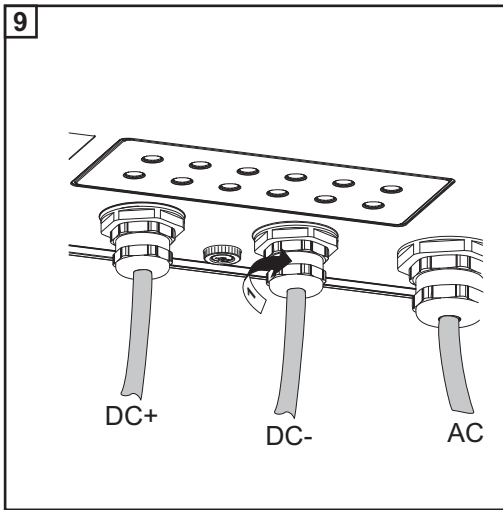
CAUTION! Danger of damaging the inverter by overload. Connect the DC+ and DC- cables to the correct DC+ and DC- terminals on the inverter.



Tightening torque of terminals:
1.2 - 1.5 Nm
Tightening torque of hexagon nut on the
connection distributor:
max. 15 Nm

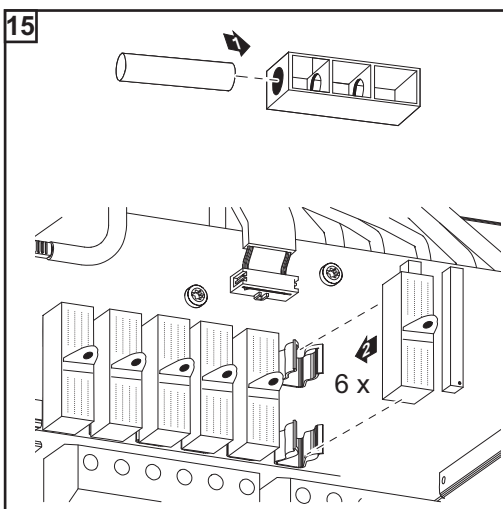
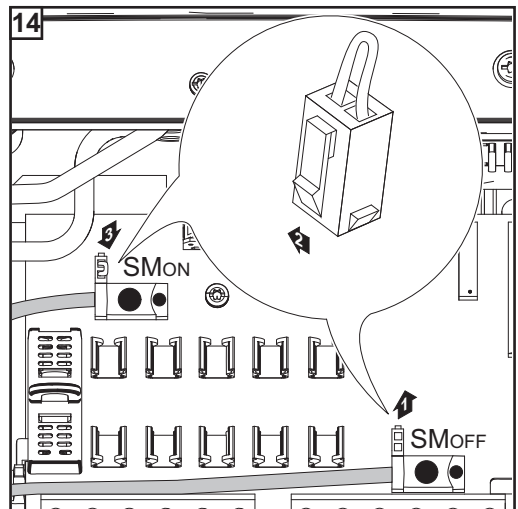
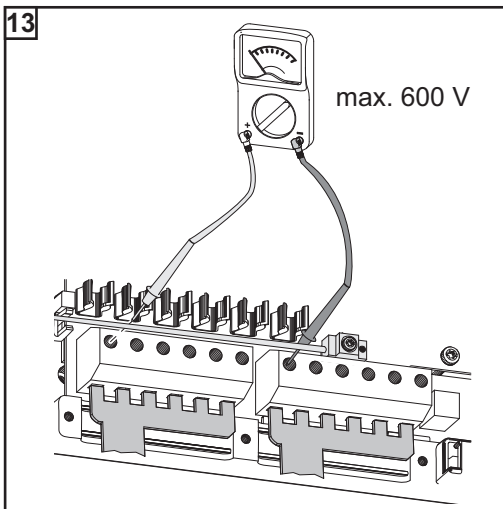


Tightening torque of terminals:
1.2 - 1.5 Nm
Tightening torque of hexagon nut on the
connection distributor: max. 15 Nm



IMPORTANT!

- Set the jumper from the 'SM_{ON}' position to the 'SM_{OFF}' position for correct measurement results
- Check the polarity and voltage of the DC cables strings: The voltage should be a max. of 600 V.




IMPORTANT When using connection distributors, insert 6 metal bolts with fuse covers in the fuse holders. The metal bolts are included in the inverter scope of delivery.

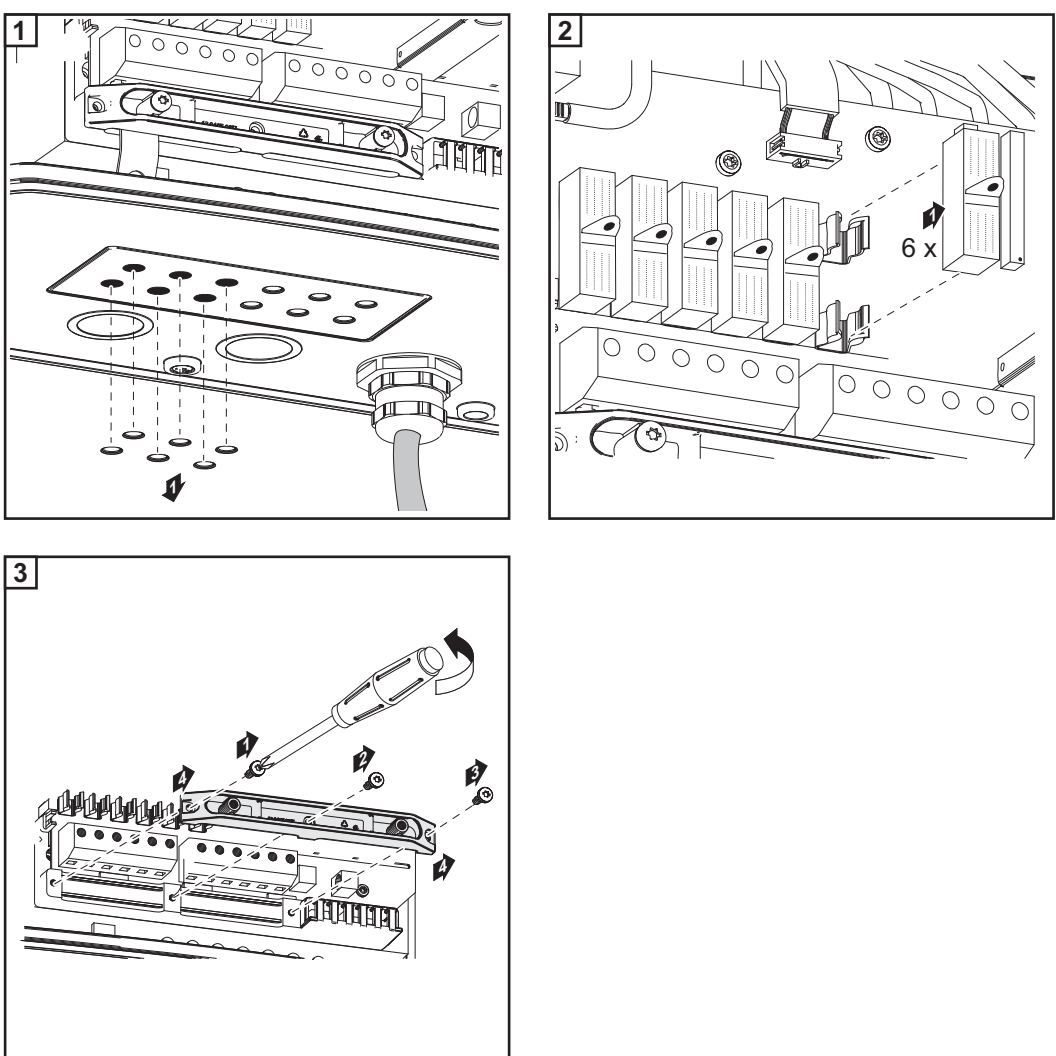
Solar Module Ground at Negative Pole: Connecting Solar Module Strings


General The following steps are only necessary when the solar module manufacturer requires a solar module ground at the negative pole.

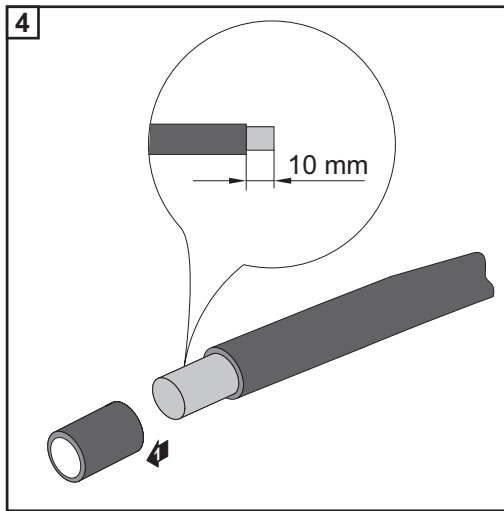
Wire Cross Section of Solar Module Strings The cable cross section for solar module strings should be a maximum of 16 mm² per cable.

 **NOTE!** To ensure an effective strain relief device for solar module strings, only use cable cross sections of the same size.

Solar module ground at negative pole: Connecting solar module strings

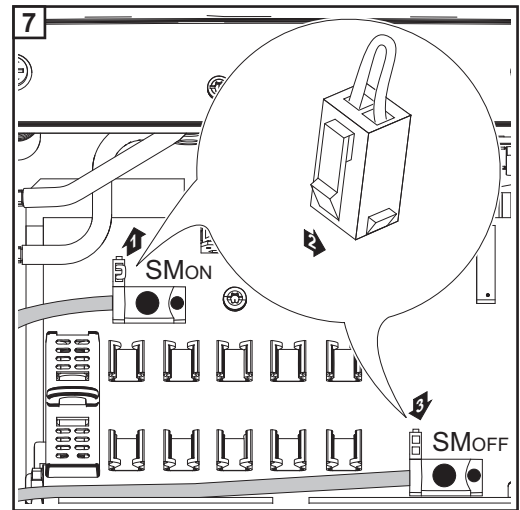
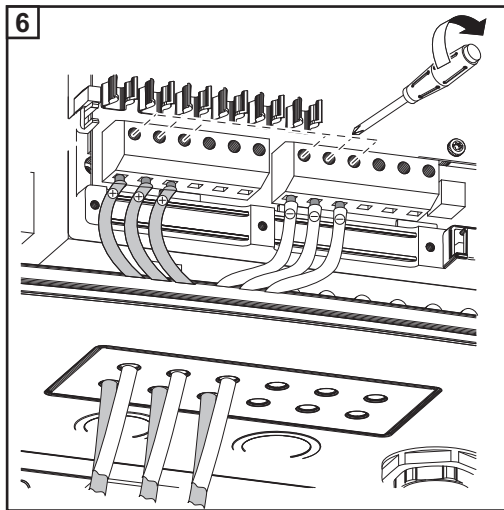


 **NOTE!** Finely stranded cables up to conductor class 5 can be connected to the DC-side terminals without wire end ferrules.



CAUTION! Danger of damaging the inverter by overload.

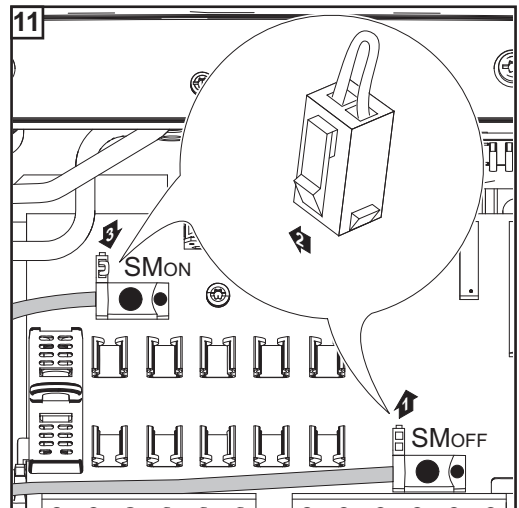
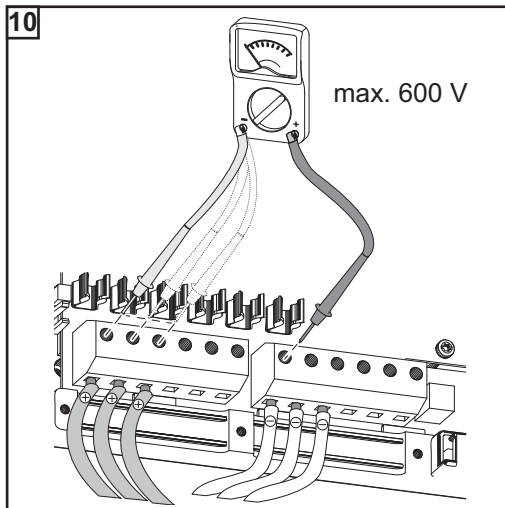
- Only connect a maximum of 20 A to an individual DC terminal.
- Connect the DC+ and DC- cables to the correct DC+ and DC- terminals on the inverter.



Tightening torque of terminals:
1.2 - 1.5 Nm

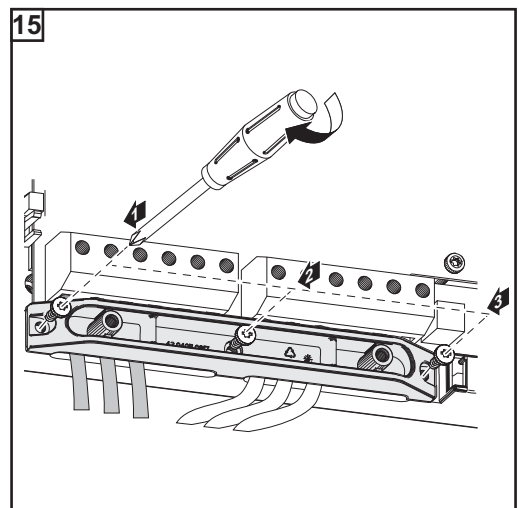
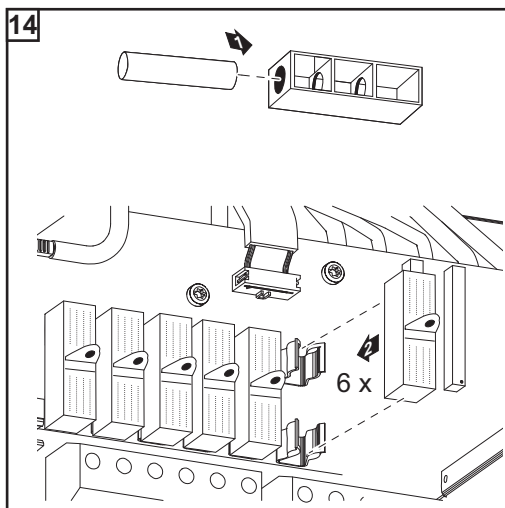
IMPORTANT!

- Set the jumper from the 'SM_{ON}' position to the 'SM_{OFF}' position for correct measurement results
- Check the polarity and voltage of the solar module strings: the voltage should be a max. of 600 V, the difference between the individual solar module strings should be a max. of 10 V.



IMPORTANT!

- When connecting solar module strings, you should use metal bolts or string fuses with fuse covers in the fuse holders depending on the solar module manufacturer's instructions. The metal bolts are included in the inverter scope of delivery.
- Place metal bolts with fuse covers in the fuse holders for unoccupied DC+ terminals.



For more information on string fuses, see the section "Criteria for the proper selection of string fuses."

Selecting String Fuses

- If the solar module manufacturer requires the use of string fuses for operation:
- Select string fuses according to the information from the solar module manufacturer or according to "Criteria for the Proper Selection of String Fuses" (max. 20 A per solar module string, max. 6 solar module strings)

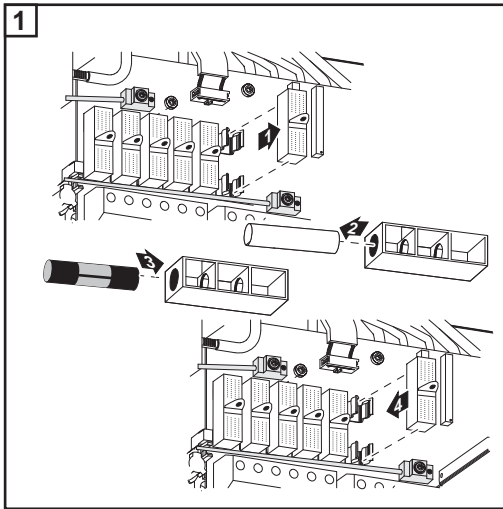
IMPORTANT!

- Please follow solar module safety instructions
- Follow all solar module manufacturer requirements

Inserting String Fuses



- NOTE!** If the solar module manufacturer requires the use of string fuses:
- Insert fuses with a fuse cover in the respective fuse holder
 - Do not operate the inverter without fuse covers



WARNING! An electric shock can be fatal. Danger from DC voltage from solar modules. Fuse covers are for installation purposes only. They offer no protection against contact.

Solar Module Ground at Negative Pole: Connecting Solar Module Strings with a Cable Cross Section > 16 mm²

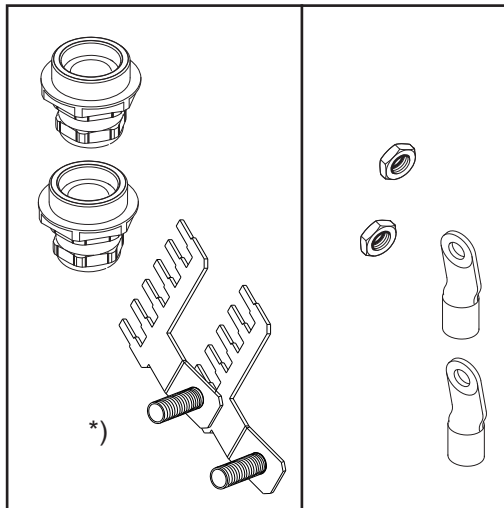
General

The following steps are only necessary when the solar module manufacturer requires a solar module ground at the negative pole.

As an option, you can also connect DC cables to the inverter with a cross section > 16 mm², e.g., when the DC cables from the solar modules are combined outside of the inverter into a large string.

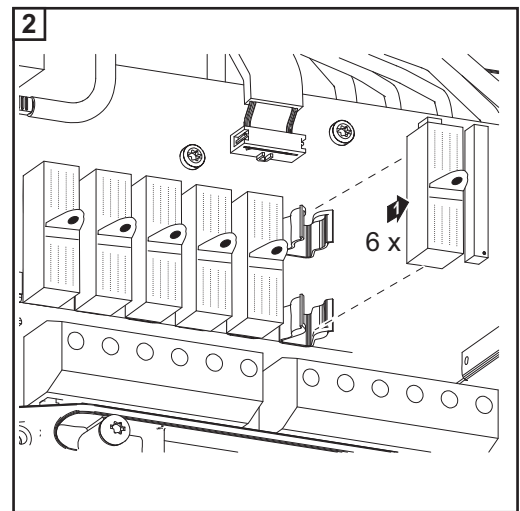
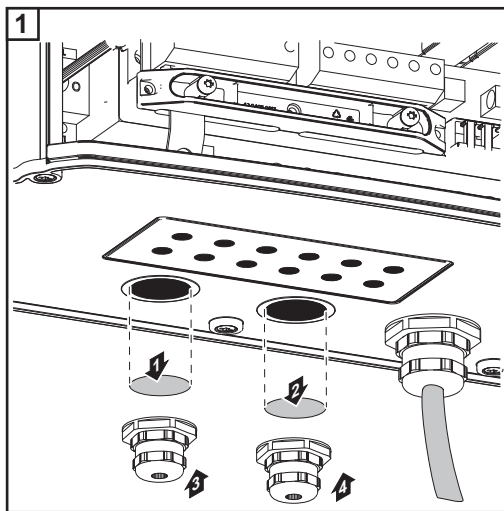
Additional components required

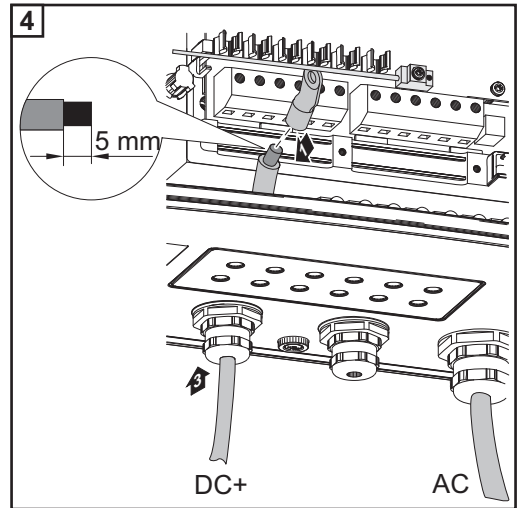
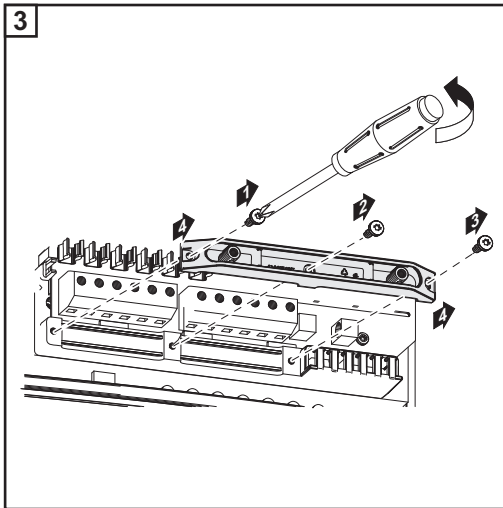
The following additional components are required for connecting DC cables with a cross section > 16 mm²:



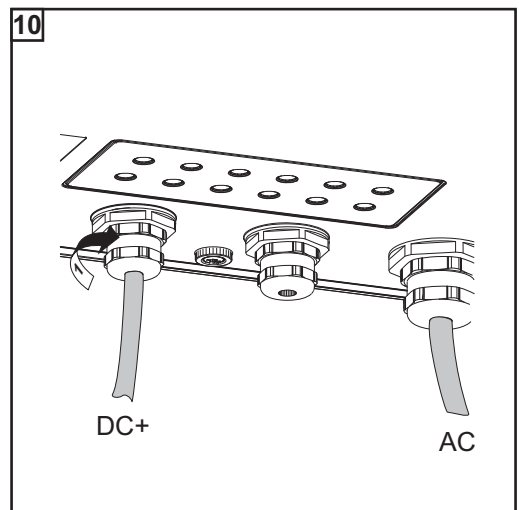
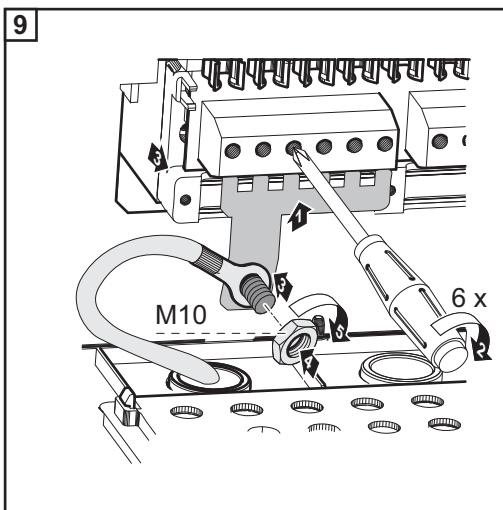
- 2 M32 metric screw joints (degree of protection min. IP45)
 - 2 connection distributors
 - *) Metric screw joints and connection distributors are available from Fronius as an option.
 - 2 M10 cable lugs
 - 2 M10 hexagon nuts
- Select cable lugs that match the available DC cables

Solar module ground at negative pole: Connecting solar module strings with a cable cross section > 16 mm²

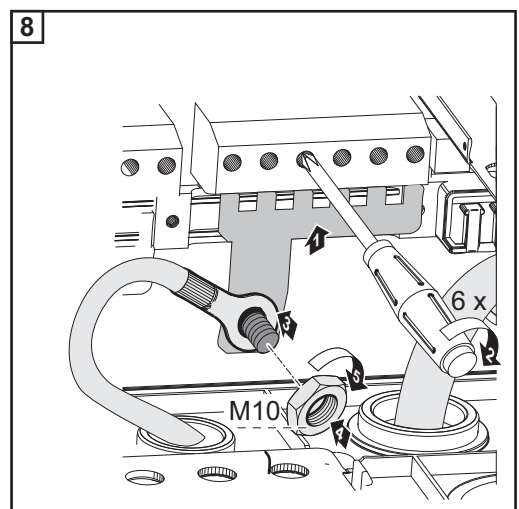
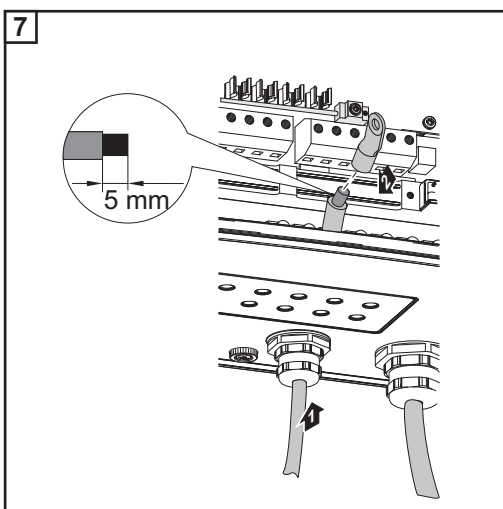




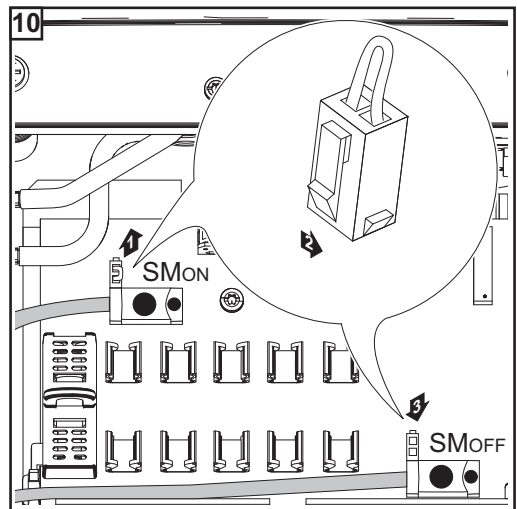
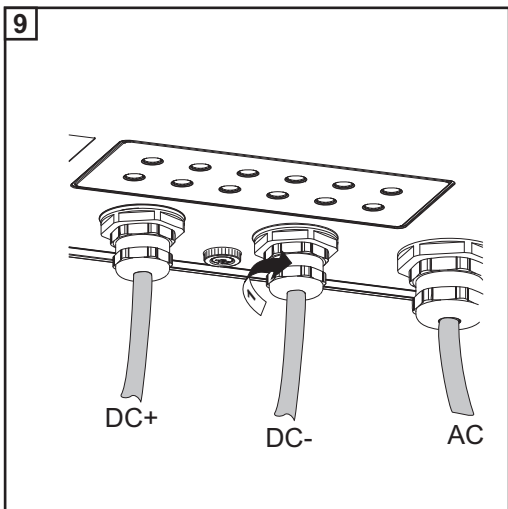
CAUTION! Danger of damaging the inverter by overload. Connect the DC+ and DC- cables to the correct DC+ and DC- terminals on the inverter.



Tightening torque of terminals:
1.2 - 1.5 Nm
Tightening torque of hexagon nut on the
connection distributor:
max. 15 Nm

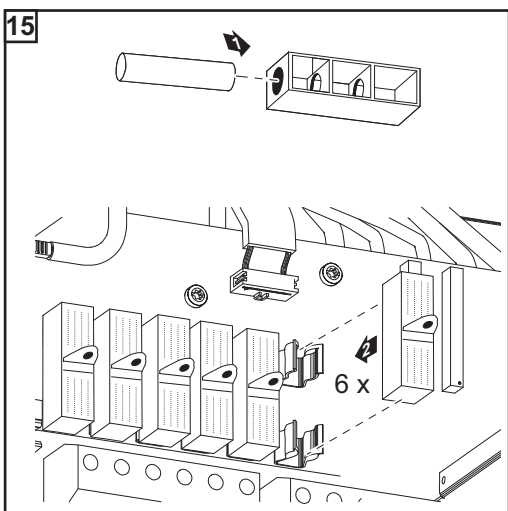
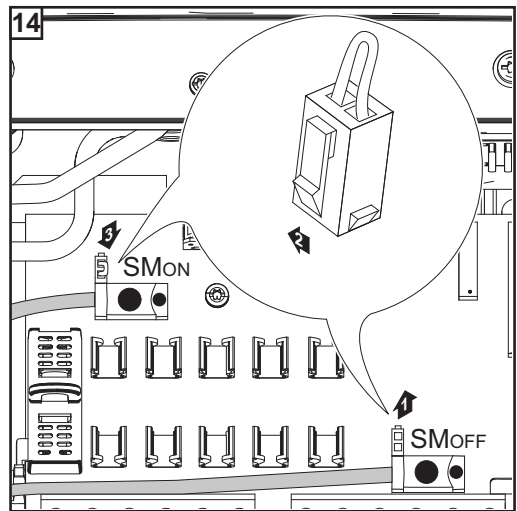
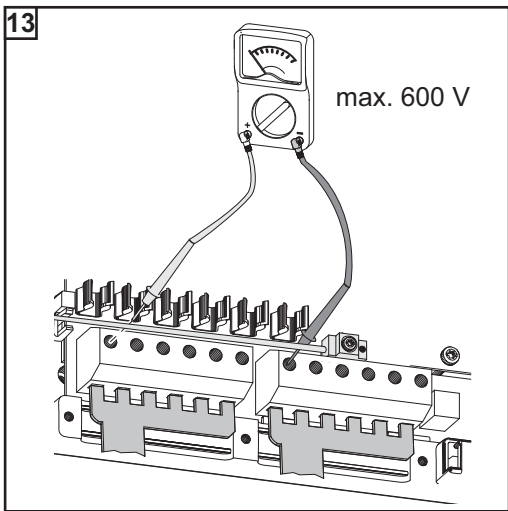


Tightening torque of terminals:
1.2 - 1.5 Nm
Tightening torque of hexagon nut on the
connection distributor: max. 15 Nm



IMPORTANT!

- Set the jumper from the 'SM_{ON}' position to the 'SM_{OFF}' position for correct measurement results
- Check the polarity and voltage of the DC cables strings: The voltage should be a max. of 600 V.



IMPORTANT When using connection distributors, insert 6 metal bolts with fuse covers in the fuse holders. The metal bolts are included in the inverter scope of delivery.

Solar Module Ground at Negative Pole for Fronius IG Plus

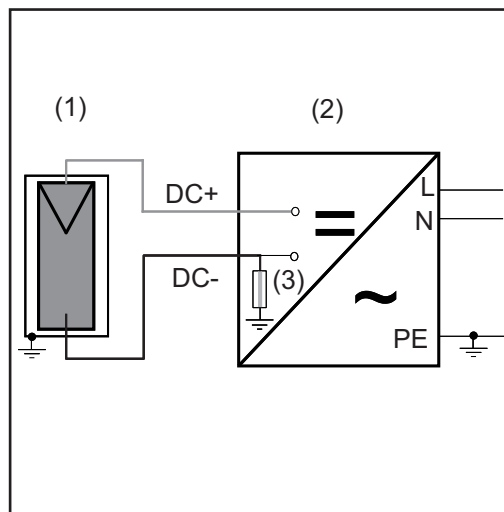
General

Some manufacturers of solar modules stipulate that the module must be grounded.

IMPORTANT: Take into account the following points if a solar module ground is required:

- Specifications of the solar module manufacturer regarding polarity and required type of solar module ground
- National provisions

Solar Module Ground at Negative Pole



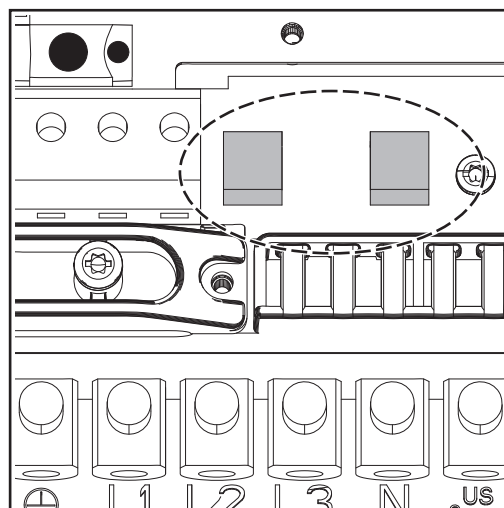
Example:

Solar module ground at negative pole with fuse or high ohm resistor

- (1) Solar module
- (2) Inverter
- (3) Fuse / High ohm resistor

Solar Module Grounding at Negative Pole for Fronius IG Plus

You can ground solar modules in the Fronius IG Plus using a fuse or a high ohm resistor.



Fuse Holder on the Fronius IG Plus for Solar Module Grounding

Fronius recommends a 1A fuse, size 10 x 38 mm for solar module grounding.


For solar module grounding using a high ohm resistor, Fronius recommends the "100 kOhm Grounding Kit" option only.



WARNING! An electric shock can be fatal. Incorrect or insufficient solar module grounding may result in an electric shock.

If the solar module manufacturer requires solar module grounding in the inverter, this may only be provided via the specified fuse or the high ohm resistor "Grounding Kit 100 kohm" in compliance with IEC 62109-2.

Safety

 **WARNING!** An electric shock can be fatal. Danger presented by DC voltage from solar modules that are exposed to light. When solar modules are grounded, the inverter's insulation monitoring is deactivated.

- Ensure that grounded solar modules are designed so that they are double insulated according to protection class II.
- Place the relevant safety labels in a clearly visible place on the photovoltaic system.
- Set the inverter so that a warning message is displayed if the fuse trips.




Safety label for the solar module ground


IMPORTANT! The safety labels and fuse for the solar module ground are not part of the scope of delivery for the inverter and must be obtained separately.

Setting inverters for grounded solar modules

When solar modules are grounded, the inverter's insulation monitoring must be deactivated. For this reason, the inverter must be configured in the second level of the Setup menu so that an error message is displayed or the inverter turns off when the ground fuse is blown (depending on the country setup). The access code 22742 must be entered in order to access the second level of the Setup menu.

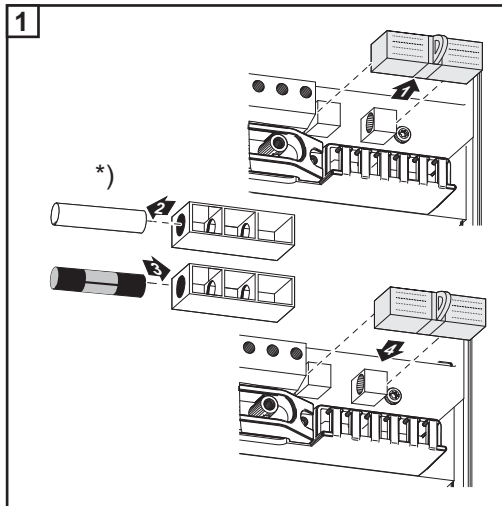
Solar Module Ground: Inserting Fuse or "100 kohm Grounding Kit" Option

-  **NOTE!** If the solar module manufacturer requires a ground for solar modules at the negative pole:
- Insert the "100 kohm Grounding Kit" option into the fuse holder completely with the plastic jacket
 - Do not operate the inverter without the plastic jacket when using the "100 kohm Grounding Kit" option
- or
- Insert the fuse with a fuse cover in the fuse holder
 - Do not operate the inverter without a fuse cover

 **WARNING!** An electric shock can be fatal. Danger from DC voltage from solar modules. Fuse covers are for installation purposes only. They offer no protection against contact.

The DC main switch is only used to switch off power to the power stage set. When the DC main switch is turned off, the solar module ground at the negative pole remains unaffected. Never touch the DC+ and DC-.

Inserting a fuse:

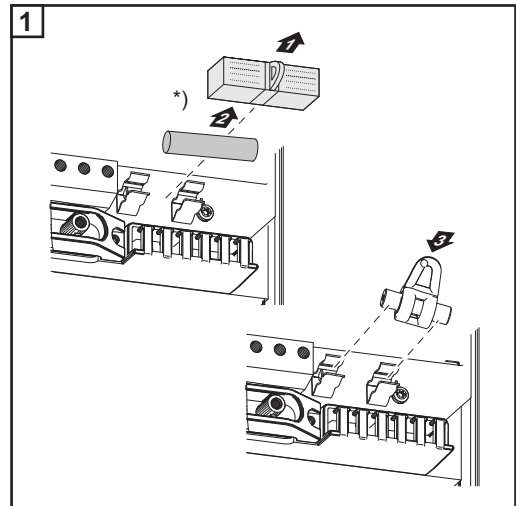


*) The plastic bolts are included in the inverter scope of delivery

Fronius recommends a fuse with 1 A and a dimension of 10 x 38 mm for solar module grounding.

Inserting the fuse will ground the solar module at the negative pole.

Inserting the "100 kohm Grounding Kit" option:



*) Remove standard fuse holder with plastic bolt

Insert the "100 kohm Grounding Kit" option into the fuse holder completely with the plastic jacket

Inserting the "100 kohm Grounding Kit" option grounds the solar module at the negative pole via a high ohm resistor.

Opening Fronius IG Plus for Service/Maintenance

Procedure for opening the inverter for service or maintenance:

- 1 Disconnect AC and DC supply from the inverter
- 2 Open the connection area
- 3 Turn off DC main switch
- 4 Allow the capacitors to discharge (5 minutes)
- 5 Remove metal covers
- 6 If present, remove the fuse for the solar module ground
- 7 If present, remove string fuses
- 8 Disconnect DC wire
- 9 Disconnect AC wire

Solar Module Ground at Positive Pole: Connecting Solar Module Strings

General

The following steps are necessary when the solar module manufacturer requires a solar module ground at the positive pole.

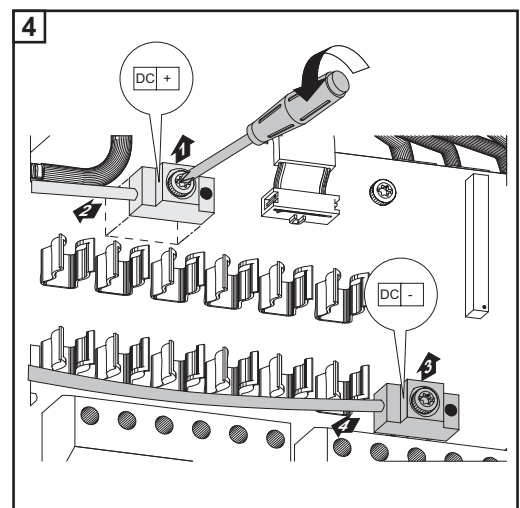
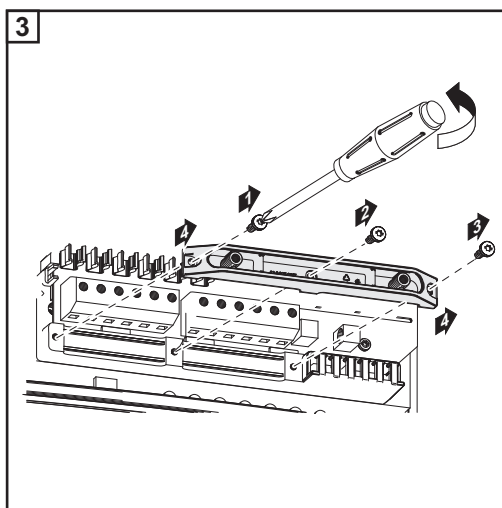
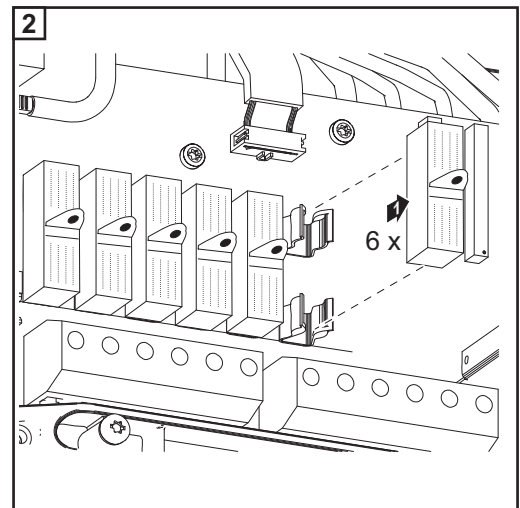
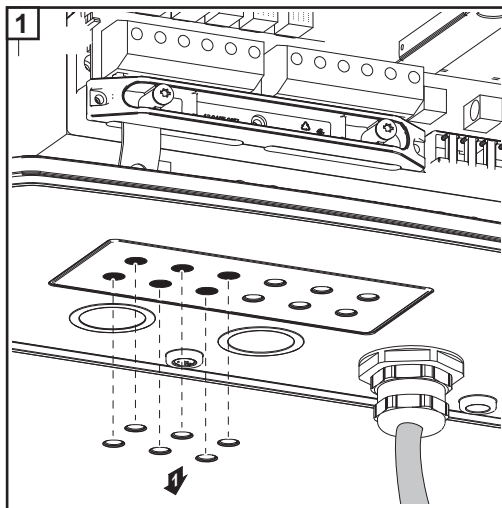
Wire Cross Section of Solar Module Strings

The cable cross section for solar module strings should be a maximum of 16 mm² per cable.



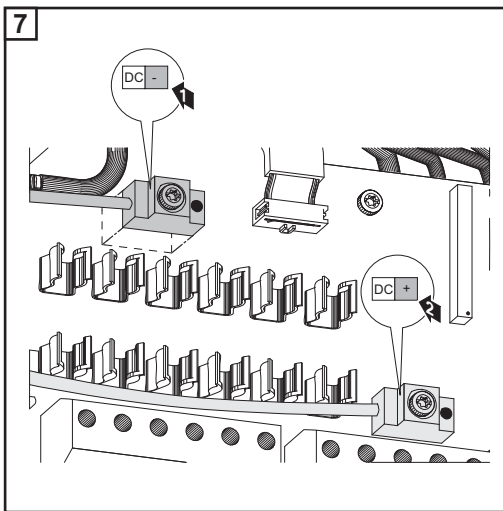
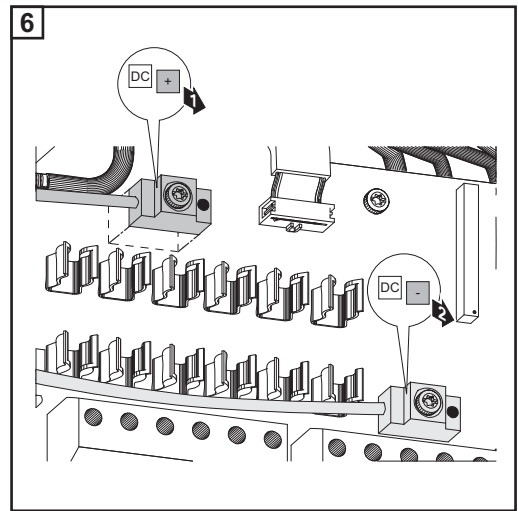
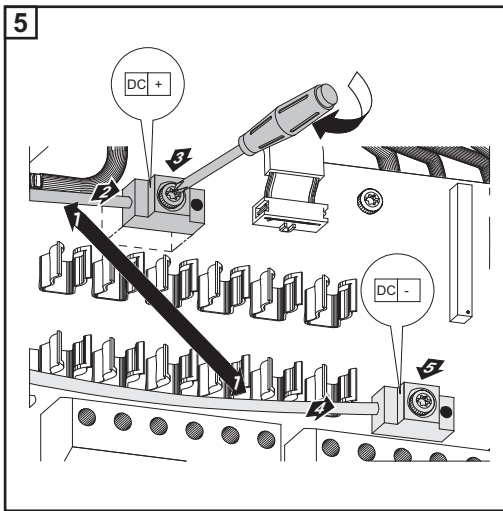
NOTE! To ensure an effective strain relief device for solar module strings, only use cable cross sections of the same size.

Solar module ground at positive pole: Connecting solar module strings

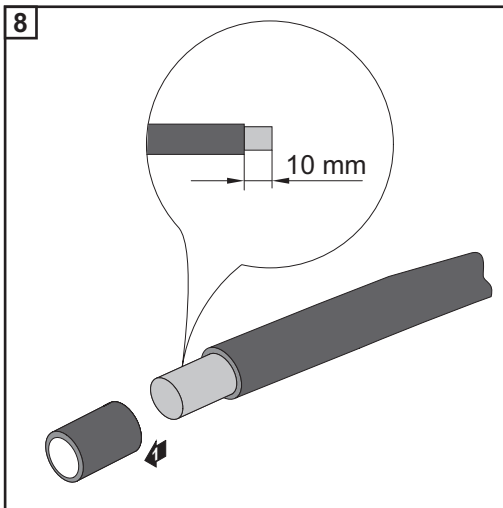


After disconnecting the DC main switch cable:

- Connect the DC+ cable to the DC- connection as per step 5
- Connect the DC- cable to the DC+ connection as per step 5
- Identify the reversed polarity with (+) and (-) according to steps 6 and 7

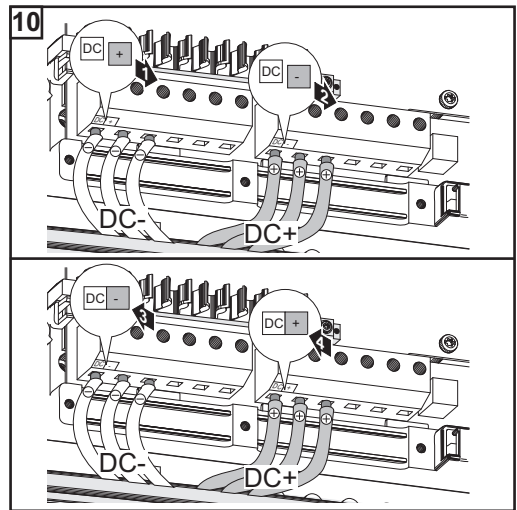
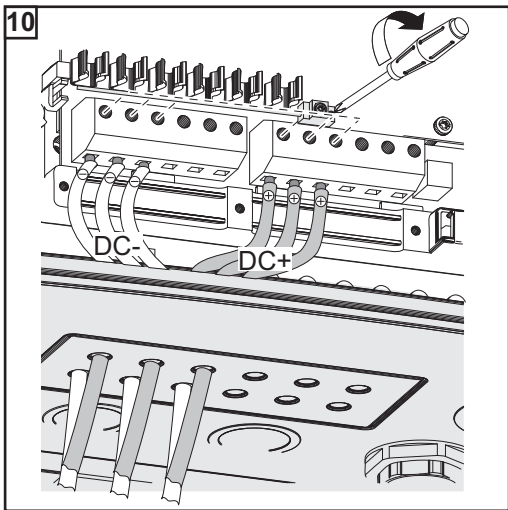


NOTE! Finely stranded cables up to conductor class 5 can be connected to the DC-side terminals without wire end ferrules.



CAUTION! Danger of damaging the inverter by overload.

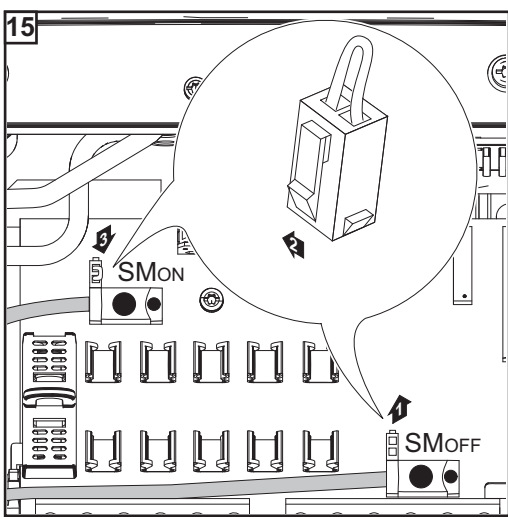
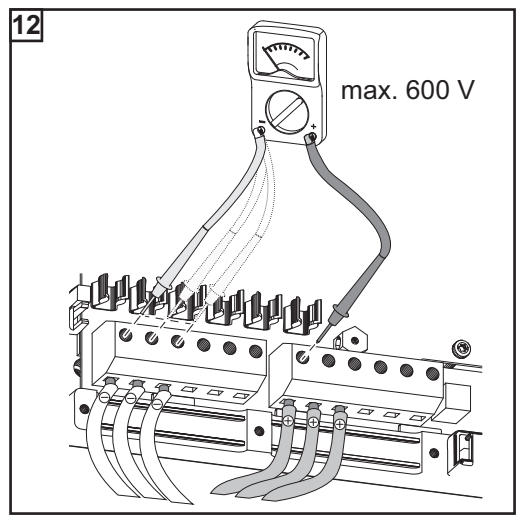
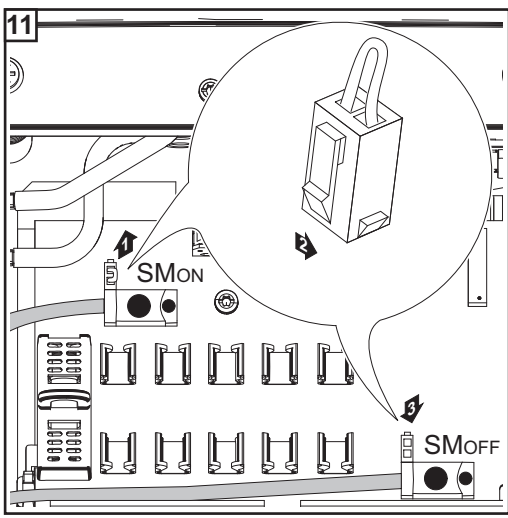
- Only connect a maximum of 20 A to an individual DC terminal.
- Connect the DC+ cable to the right connection block of the inverter's DC terminals.
- Connect the DC- cable to the left connection block of the inverter's DC terminals.
- Identify the reversed polarity with (+) and (-) according to step 10



Tightening torque of terminals:
1.2 - 1.5 Nm

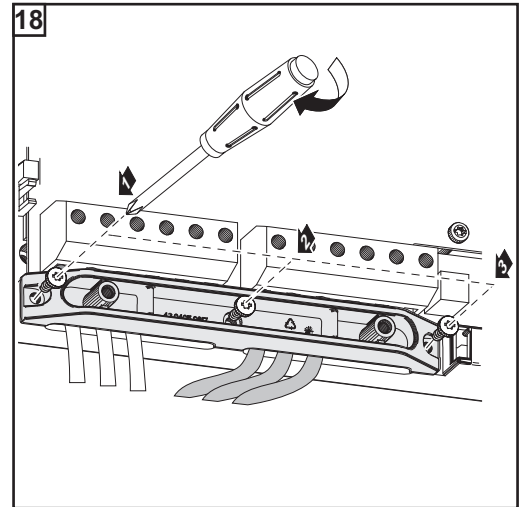
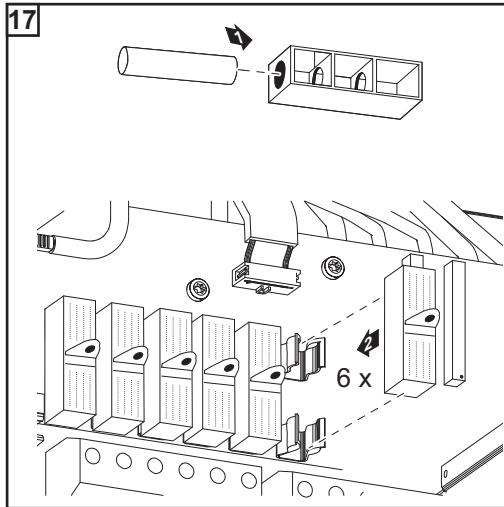
IMPORTANT!

- Set the jumper from the 'SM_{ON}' position to the 'SM_{OFF}' position for correct measurement results
- Check the polarity and voltage of the solar module strings: the voltage should be a max. of 600 V, the difference between the individual solar module strings should be a max. of 10 V.



IMPORTANT!

- When connecting solar module strings, you should use metal bolts with fuse covers in the fuse holders depending on the solar module manufacturer's instructions. The metal bolts are included in the inverter scope of delivery.
- Place metal bolts with fuse covers in the fuse holders for unoccupied DC+ terminals.



Selecting String Fuses

If the solar module manufacturer requires the use of string fuses for operation:

- Select string fuses according to the information from the solar module manufacturer or according to "Criteria for the Proper Selection of String Fuses" (max. 20 A per solar module string, max. 6 solar module strings)

IMPORTANT!

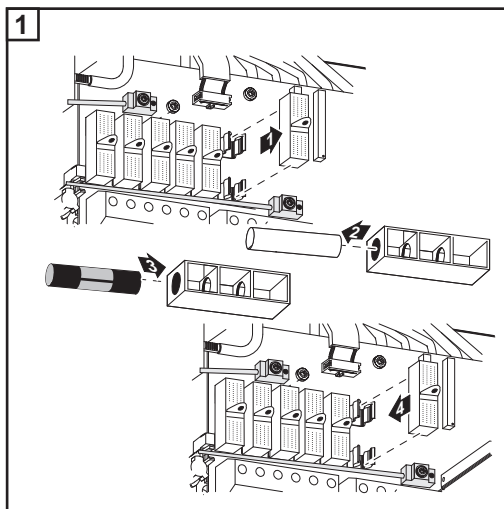
- Please follow solar module safety instructions
- Follow all solar module manufacturer requirements

Inserting String Fuses



NOTE! If the solar module manufacturer requires the use of string fuses:

- Insert fuses with a fuse cover in the respective fuse holder
- Do not operate the inverter without fuse covers



WARNING! An electric shock can be fatal. Danger from DC voltage from solar modules. Fuse covers are for installation purposes only. They offer no protection against contact.

Solar Module Ground at Positive Pole: Connecting Solar Module Strings with a Cable Cross Section > 16 mm²

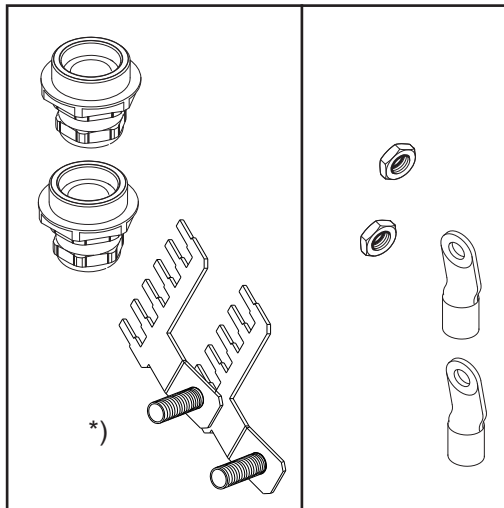
General

The following steps are only necessary when the solar module manufacturer requires a solar module ground at the negative pole.

As an option, you can also connect DC cables to the inverter with a cross section > 16 mm², e.g., when the DC cables from the solar modules are combined outside of the inverter into a large string.

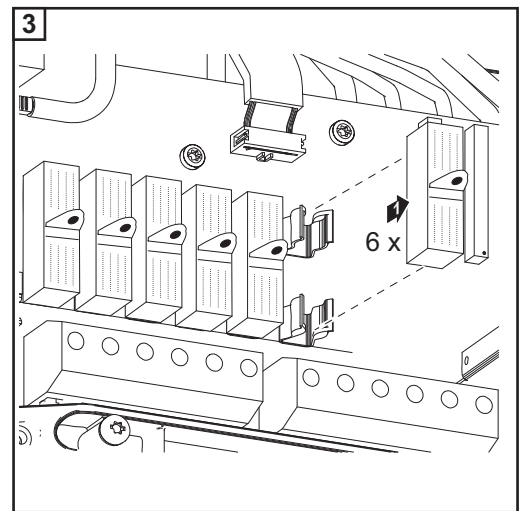
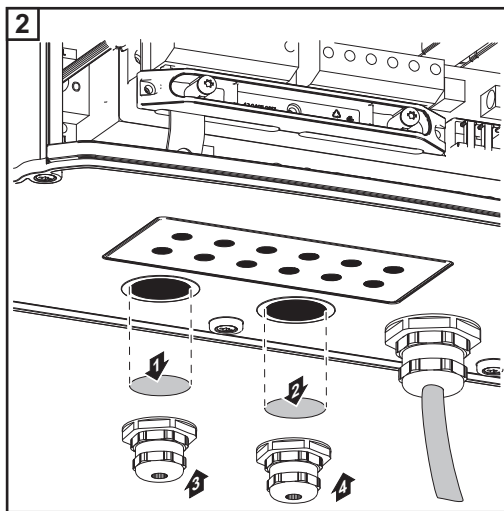
Additional components required

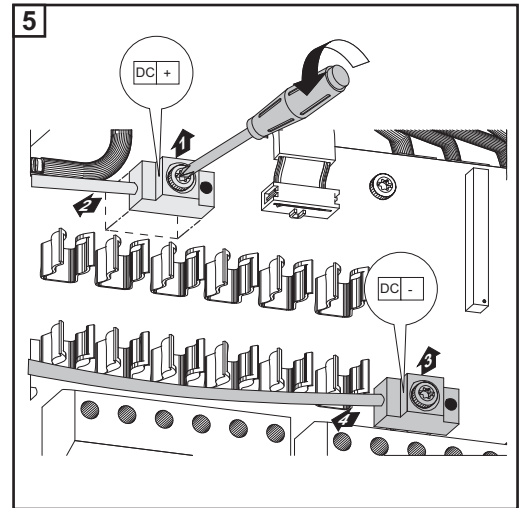
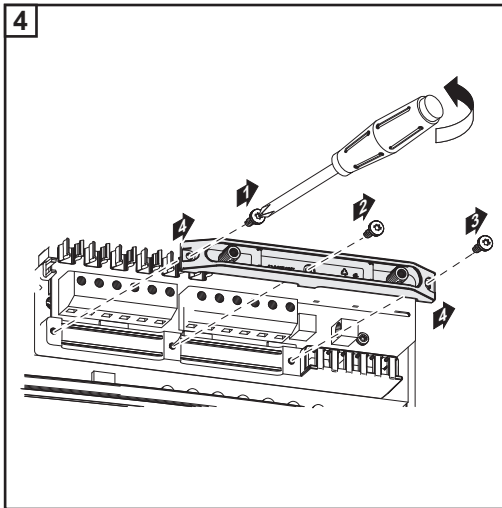
The following additional components are required for connecting DC cables with a cross section > 16 mm²:



- 2 M32 metric screw joints (degree of protection min. IP45)
- 2 connection distributors
- *) Metric screw joints and connection distributors are available from Fronius as an option.
- 2 M10 cable lugs
- Select cable lugs that match the available DC cables
- 2 M10 hexagon nuts

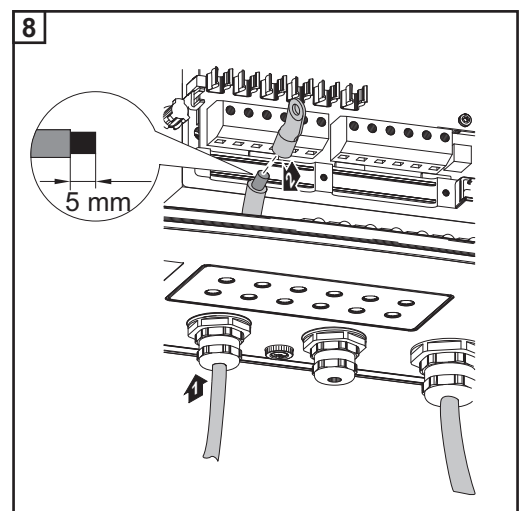
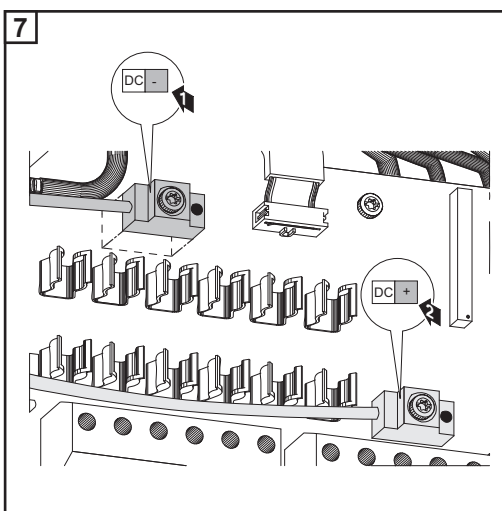
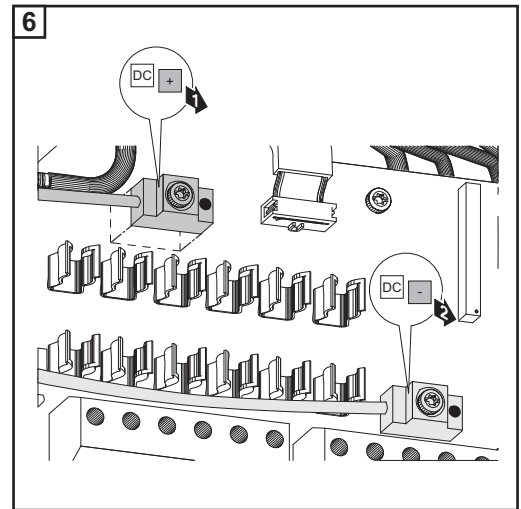
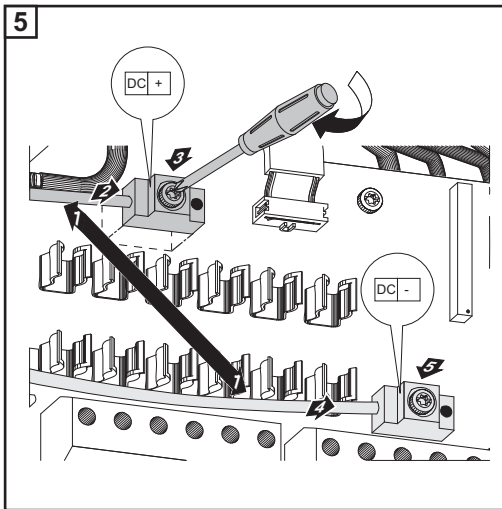
Solar module ground at positive pole: Connecting solar module strings with a cable cross section > 16 mm²





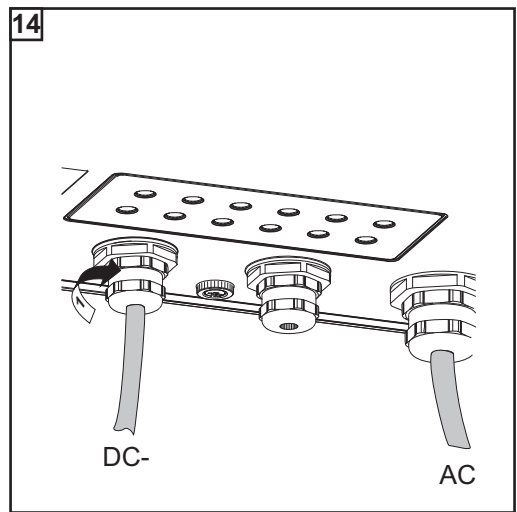
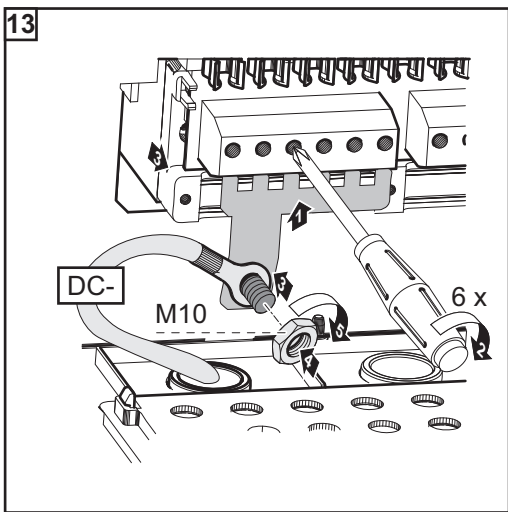
After disconnecting the DC main switch cables:

- Connect the DC+ cable to the DC- connection as per step 5
- Connect the DC- cable to the DC+ connection as per step 5
- Identify the reversed polarity with (+) and (-) according to steps 6 and 7

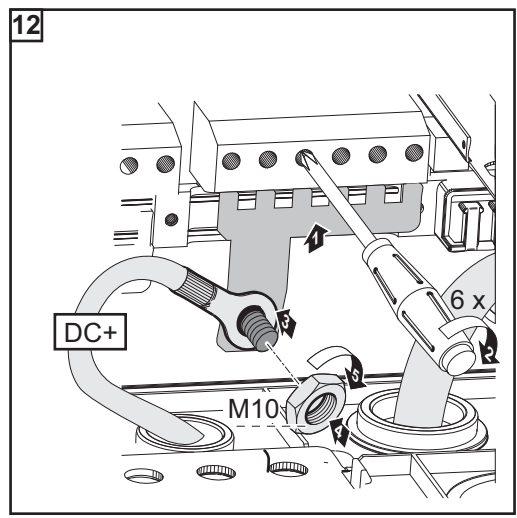
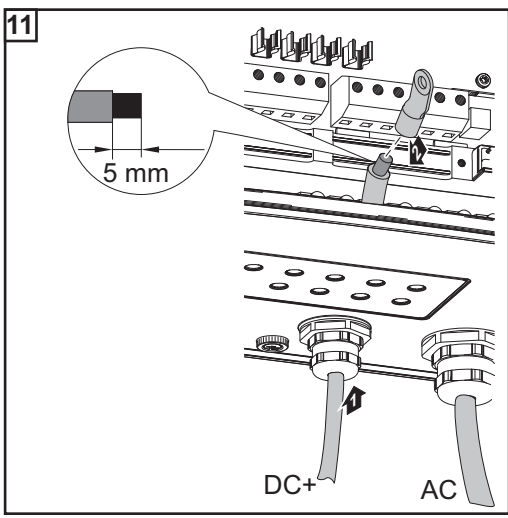


CAUTION! Danger of damaging the inverter by overload.

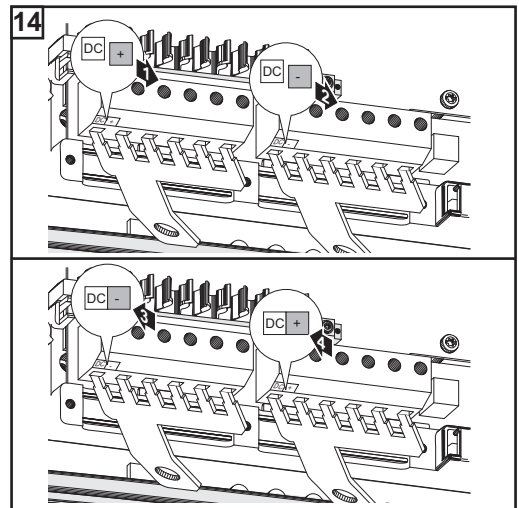
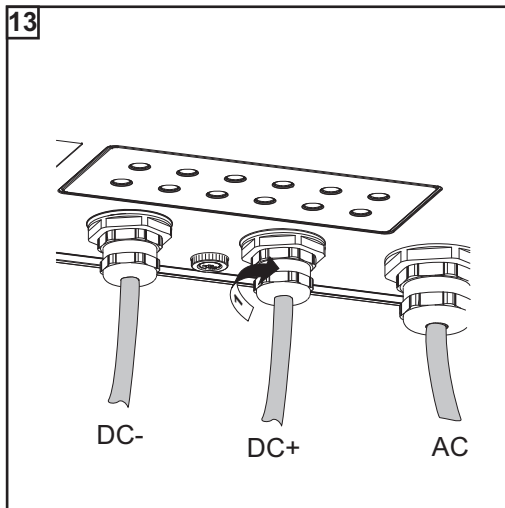
- Connect the DC+ cable to the right connection block of the inverter's DC terminals.
- Connect the DC- cable to the left connection block of the inverter's DC terminals.
- Identify the reversed polarity with (+) and (-) according to step 14



Tightening torque of terminals:
1.2 - 1.5 Nm
Tightening torque of hexagon nut on the
connection distributor:
max. 15 Nm

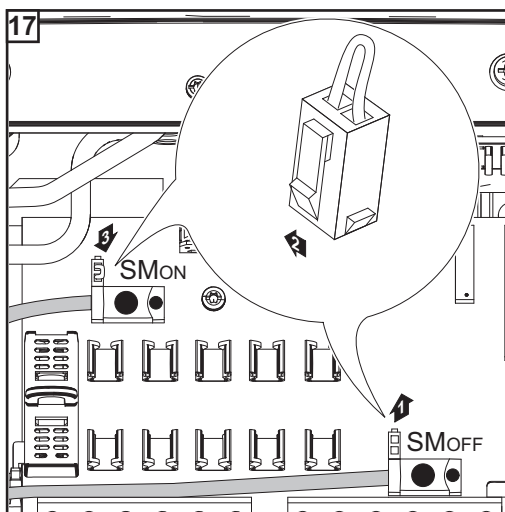
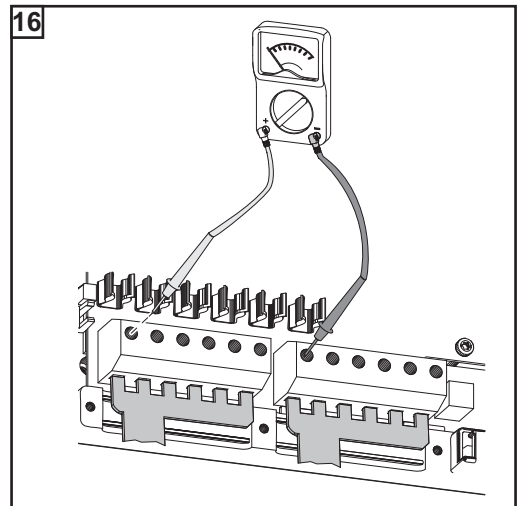
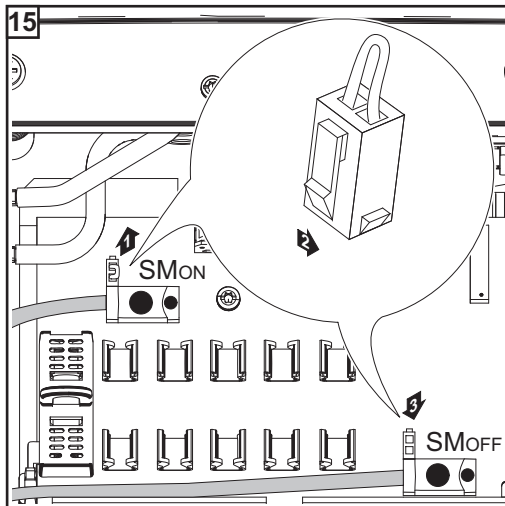


Tightening torque of terminals:
1.2 - 1.5 Nm
Tightening torque of hexagon nut on the
connection distributor:
max. 15 Nm

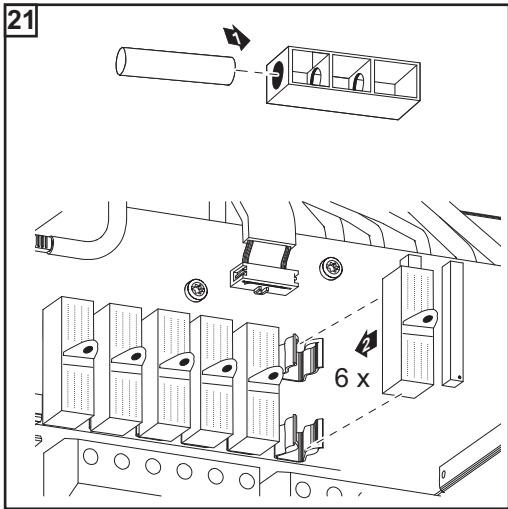


IMPORTANT!

- Set the jumper from the 'SM_{ON}' position to the 'SM_{OFF}' position for correct measurement results
- Check the polarity and voltage of the DC cables strings: The voltage should be a max. of 600 V.



IMPORTANT! When using connection distributors, insert 6 metal bolts with fuse covers in the fuse holders. The metal bolts are included in the Fronius IG Plus scope of delivery.



Solar Module Ground at Positive Pole for Fronius IG Plus

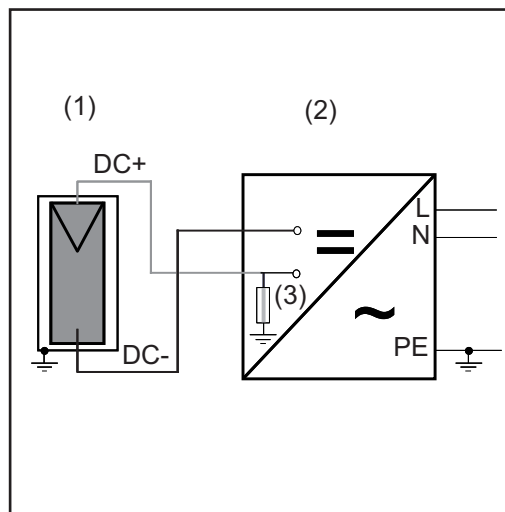
General

Some manufacturers of solar modules stipulate that the module must be grounded.

IMPORTANT: Take into account the following points if a solar module ground is required:

- Specifications of the solar module manufacturer regarding polarity and required type of solar module ground
- National provisions

Solar Module Ground at Positive Pole



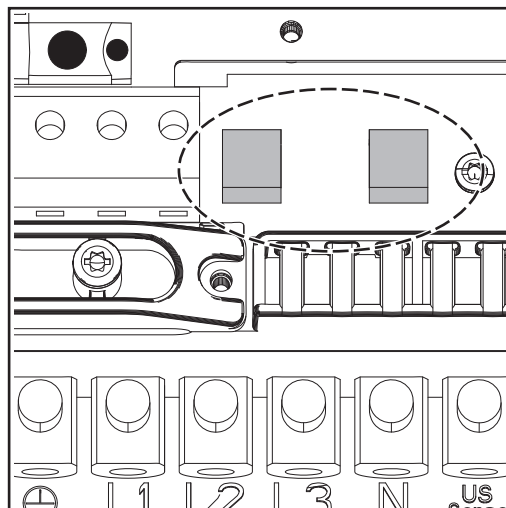
Example:

Solar module ground at positive pole with fuse or high ohm resistor

- (1) Solar module
- (2) Inverter
- (3) Fuse / High ohm resistor

Solar Module Grounding at Positive Pole for Fronius IG Plus

You can ground solar modules in the Fronius IG Plus using a fuse or a high ohm resistor.



Fuse Holder on the Fronius IG Plus for Solar Module Grounding

Fronius recommends a 1A fuse, size 10 x 38 mm for solar module grounding.


For solar module grounding using a high ohm resistor, Fronius recommends the "100 kOhm Grounding Kit" option only.



WARNING! An electric shock can be fatal. Incorrect or insufficient solar module grounding may result in an electric shock.

If the solar module manufacturer requires solar module grounding in the inverter, this may only be provided via the specified fuse or the high ohm resistor "Grounding Kit 100 kohm" in compliance with IEC 62109-2.

Safety

 **WARNING!** An electric shock can be fatal. Danger presented by DC voltage from solar modules that are exposed to light. When solar modules are grounded, the inverter's insulation monitoring is deactivated.

- Ensure that grounded solar modules are designed so that they are double insulated according to protection class II.
- Place the relevant safety labels in a clearly visible place on the photovoltaic system.
- Set the inverter so that a warning message is displayed if the fuse trips.




Safety label for the solar module ground


IMPORTANT! The safety labels and fuse for the solar module ground are not part of the scope of delivery for the inverter and must be obtained separately.

Setting inverters for grounded solar modules

When solar modules are grounded, the inverter's insulation monitoring must be deactivated. For this reason, the inverter must be configured in the second level of the Setup menu so that an error message is displayed or the inverter turns off when the ground fuse is blown (depending on the country setup). The access code 22742 must be entered in order to access the second level of the Setup menu.

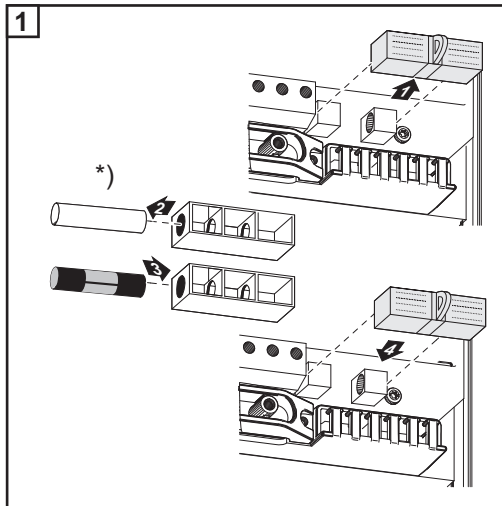
Solar Module Ground: Inserting Fuse or "100 kohm Grounding Kit" Option

-  **NOTE!** If the solar module manufacturer requires a ground for solar modules at the positive pole:
- Insert the "100 kohm Grounding Kit" option into the fuse holder completely with the plastic jacket
 - Do not operate the inverter without the plastic jacket when using the "100 kohm Grounding Kit" option
- or
- Insert the fuse with a fuse cover in the fuse holder
 - Do not operate the inverter without a fuse cover

 **WARNING!** An electric shock can be fatal. Danger from DC voltage from solar modules. Fuse covers are for installation purposes only. They offer no protection against contact.

The DC main switch is only used to switch off power to the power stage set. When the DC main switch is turned off, the solar module ground at the negative pole remains unaffected. Never touch the DC+ and DC-.

Inserting a fuse:

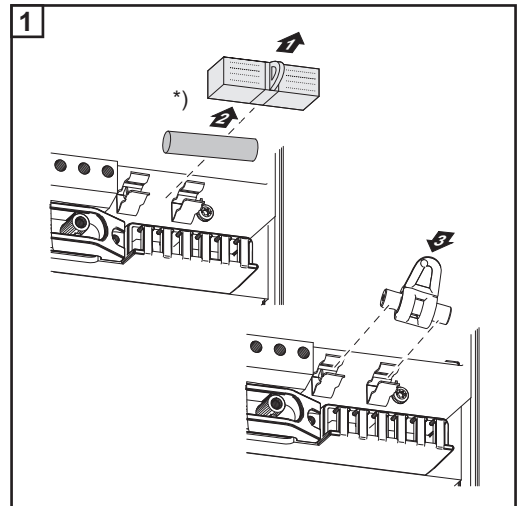


*) The plastic bolts are included in the inverter scope of delivery

Fronius recommends a fuse with 1 A and a dimension of 10 x 38 mm for solar module grounding.

Inserting the fuse will ground the solar module at the positive pole.

Inserting the "100 kohm Grounding Kit" option:



*) Remove standard fuse holder with plastic bolt

Insert the "100 kohm Grounding Kit" option into the fuse holder completely with the plastic jacket

Inserting the "100 kohm Grounding Kit" option grounds the solar module at the positive pole via a high ohm resistor.

Opening Fronius IG Plus for Service/Maintenance

Procedure for opening the inverter for service or maintenance:

- 1 Disconnect AC and DC supply from the inverter
- 2 Open the connection area
- 3 Turn off DC main switch
- 4 Allow the capacitors to discharge (5 minutes)
- 5 Remove metal covers
- 6 If present, remove the fuse for the solar module ground
- 7 If present, remove string fuses
- 8 Disconnect DC wire
- 9 Disconnect AC wire

Criteria for the Proper Selection of String Fuses


General The use of string fuses in the inverter also adds fuse protection to the solar modules. A crucial factor for the fuse protection of solar modules is the maximum short circuit current I_{SC} of the respective solar module.

Criteria for the Proper Selection of String Fuses The following criteria must be fulfilled for each solar module string when using fuse protection:

- $I_N > 1.5 \times I_{SC}$
- $I_N < 2.0 \times I_{SC}$
- $V_N \geq 600 \text{ V DC}$
- Fuse dimensions: Diameter 10.3 x 35 - 38 mm

I_N Nominal current rating of fuse
 I_{SC} Short circuit current for standard test conditions (STC) according to solar module data sheet
 V_N Nominal voltage rating of fuse

Effects of Using Underrated Fuses With underrated fuses, the nominal current value may be less than the short circuit current of the solar module.
 Effect:
 The fuse may trip in intensive lighting conditions.

Fuse Recommendations  **NOTE!** Only select fuses suitable for a voltage of 600 V DC.

You should only use the following fuses, which have been tested by Fronius, to ensure problem-free fuse protection:

- Littelfuse KLKD fuses
- Cooper Bussmann PV fuses

Fronius shall not be liable for any damage or other incidents resulting from the use of other fuses. In addition, all warranty claims are forfeited.

Application Example e.g.: Maximum short circuit current (I_{SC}) of the solar module = 5.75 A

According to the criteria for selecting the correct fuse, the fuse must have a nominal current greater than 1.5 times the short circuit current:
 $5.75 \text{ A} \times 1.5 = 8.625 \text{ A}$

The fuse that should be selected according to the "Fuses" table:
 KLK D 9 with 9.0 A and 600 V AC / DC

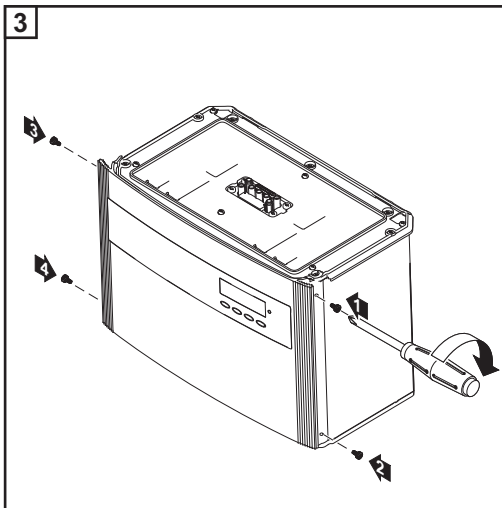
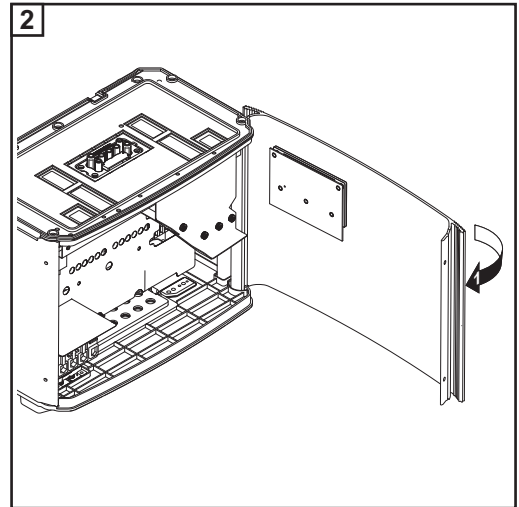
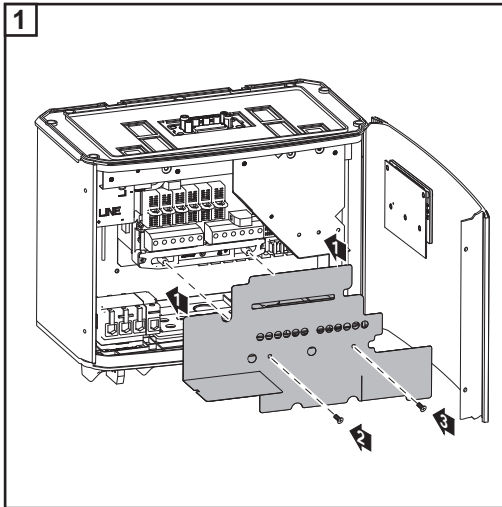
| Fuses | Nominal current | Fuse | Nominal current | Fuse |
|-------|-----------------|---------|-----------------|----------|
| | | 4.0 A | KLK D 4 | 9.0 A |
| | 5.0 A | KLK D 5 | 10.0 A | KLK D 10 |

| Nominal current | Fuse | Nominal current | Fuse |
|------------------------|-------------|------------------------|-------------|
| 6.0 A | KLK D 6 | 12.0 A | KLK D 12 |
| 7.0 A | KLK D 7 | 15.0 A | KLK D 15 |
| 8.0 A | KLK D 8 | 20.0 A | KLK D 20 |

'Fuses' table: Extract of suitable fuses, e.g. Littelfuse fuses

Closing Fronius IG Plus

Closing Fronius IG Plus



Inserting Option Cards

Suitable Option Cards

There are several options and system upgrades available for the inverter, e.g.:

- Datalogger and modem interfaces (for using a PC to record and manage data from your photovoltaic system)
- Various large displays (public display)
- Actuators / relays / alarms (signal card)

System upgrades come in the form of plug-in cards. The inverter can be equipped with three option cards.

Safety



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

- The connection area should only be opened by a licensed electrician.
- Never work with live wires! Prior to all connection work, make sure that the AC and DC wires are not charged.



WARNING! An electric shock can be fatal. Danger from residual voltage from capacitors.

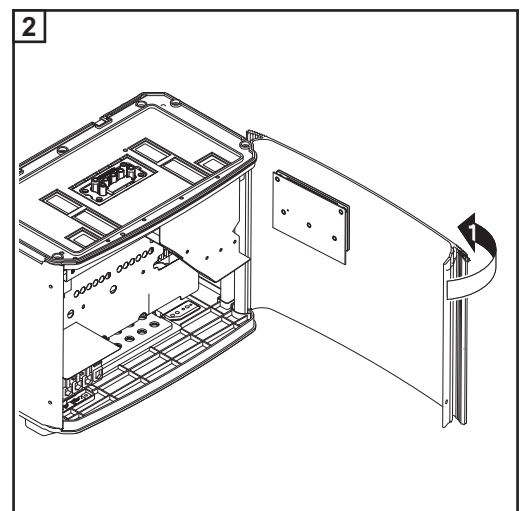
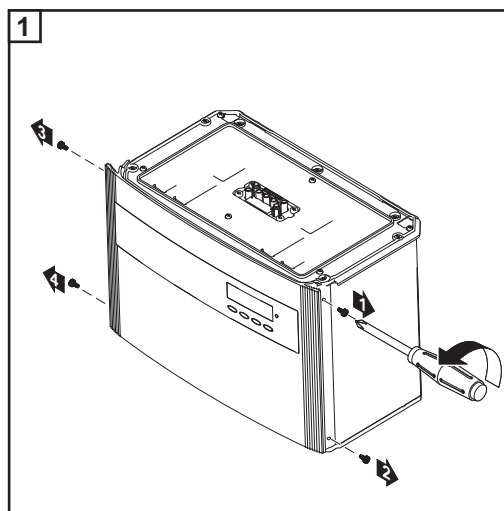
You must wait until the capacitors have discharged. Discharge takes 5 minutes.



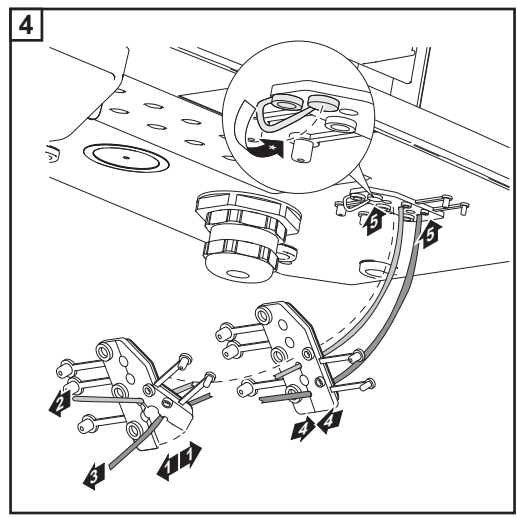
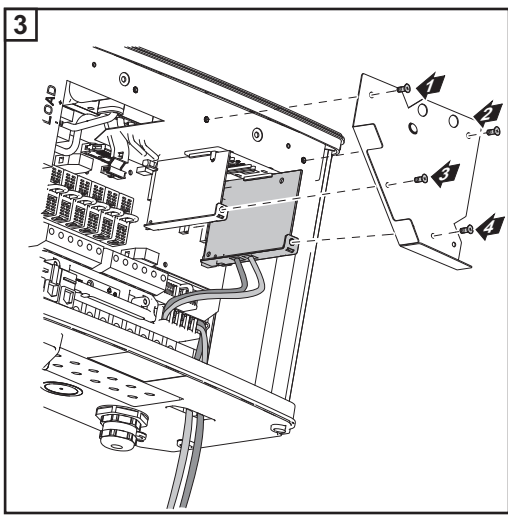
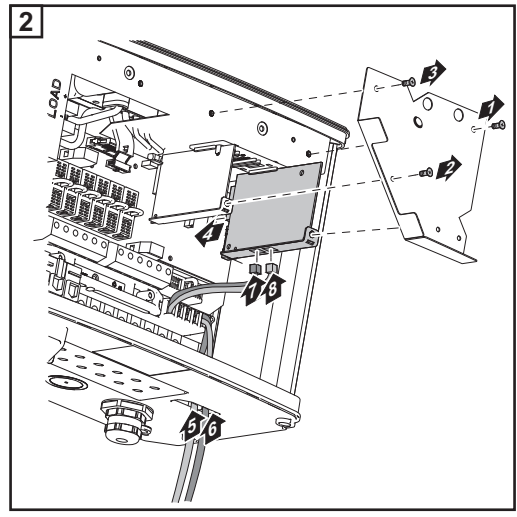
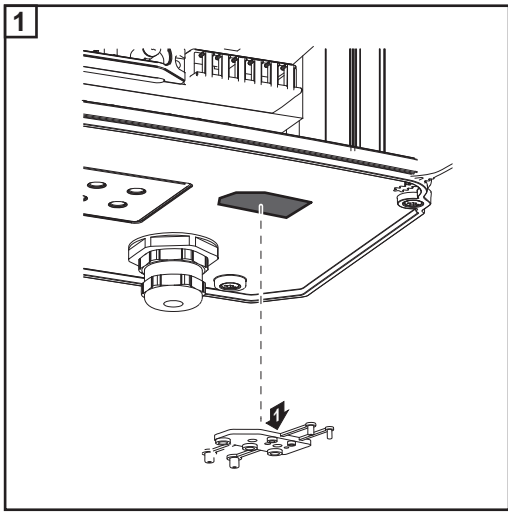
NOTE! Follow general ESD precautions when handling option cards.

Opening Fronius IG Plus

When adding option cards to the inverter, please follow all inverter safety instructions and information.



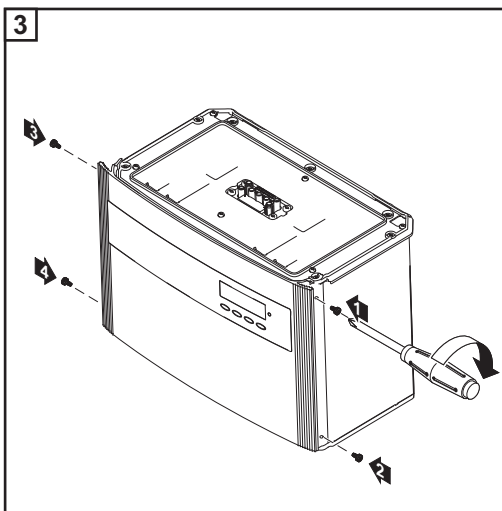
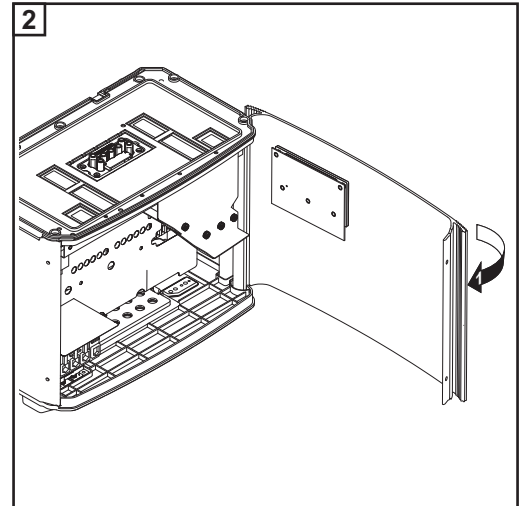
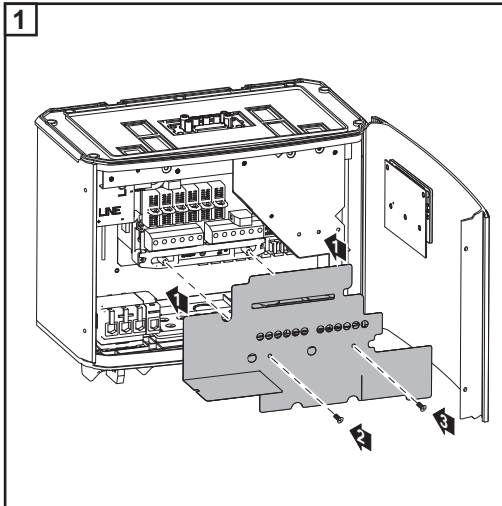
Inserting option cards into the Fronius IG Plus



IMPORTANT! When networking several DATCOM components, a termination plug must be placed on each free IN and/or OUT connection of a DATCOM component.

IMPORTANT! Close any unused openings at the sealing insert using corresponding blanking plugs.

Closing Fronius
IG Plus



Data Communication and Solar Net

Solar Net and Data Interface

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

Solar Net is a bus system. A single cable is all that is required for one or more inverters to communicate with all system upgrade components.

The core of the Solar Net is the Fronius Datalogger. It coordinates the data traffic and makes sure that even large volumes of data are distributed quickly and reliably.

The 'Fronius COM Card' option is required to integrate an inverter into Solar Net.

Important Every inverter that is to be monitored using a Datalogger requires a 'Fronius COM Card.' In this case, the 'Fronius Com Card' serves as a link between the internal network of the inverter and the Solar Net interface of the Fronius Datalogger.

Important Each inverter can only have one 'Fronius Com Card.' A network may only contain one Fronius Datalogger.

The first inverter with a 'Fronius COM card' can be up to 1000 m (3280 ft) away from the last inverter with a 'Fronius COM card.'

Different system upgrades are detected automatically by Solar Net.

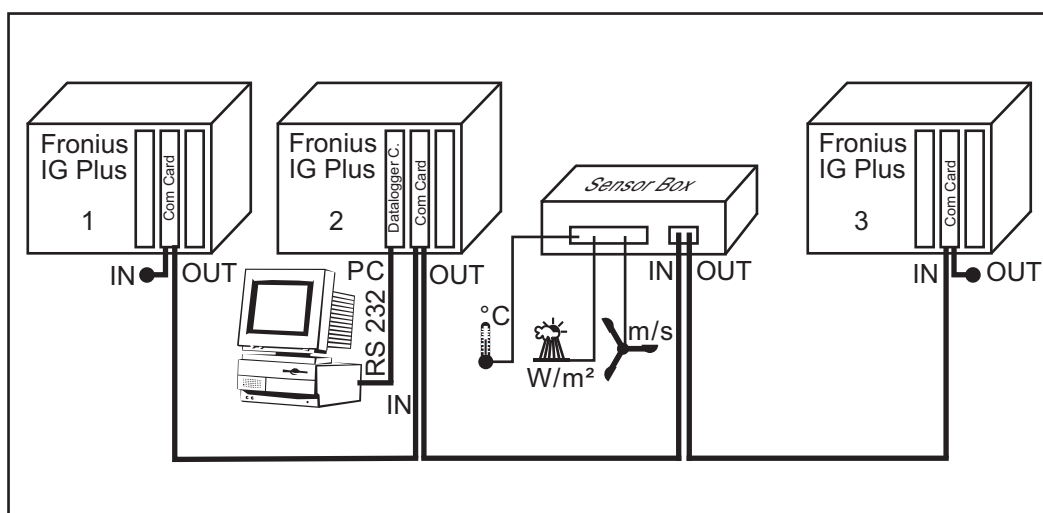
In order to distinguish between several identical system upgrades, each one must be assigned a unique number.

In order to uniquely identify each inverter in Solar Net, each inverter must also be assigned an individual number. You can assign individual numbers as per 'The Setup Menu' section in this manual.

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

Example

Logging and archiving inverter and sensor data using a Fronius Datalogger and Fronius Sensor Box:



● = Terminating plug

Illustration explanation: Data network with 3 Fronius IG Plus units and one Fronius Sensor Box:

- all Fronius IG Plus units have one 'Fronius COM Card'
- one Fronius IG Plus has a 'Fronius Datalogger Card' (no. 2)
- Fronius Datalogger has a USB-interface and two RS-232 interfaces for connecting to a PC and a modem

Option cards communicate within the Fronius IG Plus via its internal network. External communication (Solar Net) takes place via the 'Fronius Com Cards.' Each 'Fronius Com Card' is equipped with two RS485 interfaces - an input and an output. RJ45 plug connectors are used to connect to these cards.

Commissioning

Factory Configuration

The inverter has been pre-configured in the factory and is ready for operation.

To change your inverter settings, please see "The Setup Menu" section in these instructions.

Start-up operation

Once the inverter has been connected to the solar modules (DC) and the public grid (AC), turn the main switch to position - 1 -.

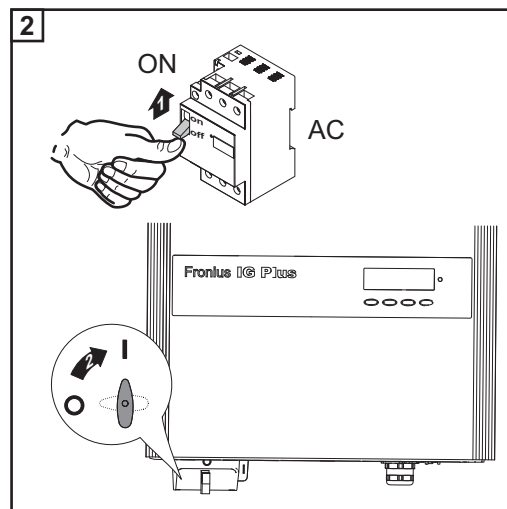
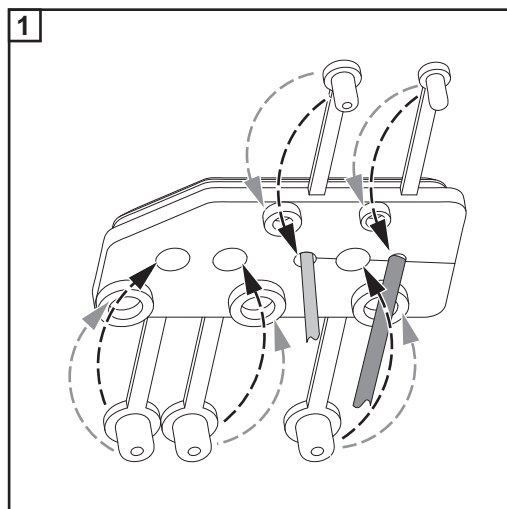


NOTE! Regardless of whether bolts or fuses are used, do not operate the inverter without fuse covers.



NOTE! To ensure the degree of protection at the inverter:

- Insert blanking plugs into all openings at the sealing insert in which there are no cables
- If cables are run through the sealing insert, insert the remaining blanking plugs in the recesses located on the outside



- As soon as the photovoltaic modules produce sufficient power, the Operating Status LED lights up orange. The screen displays the startup phase. The orange LED indicates that the feed-in mode of the inverter will begin shortly.
- After the automatic inverter start, the Operating Status LED lights up green.
- Provided that power continues to feed into the grid, the Operating Status LED will remain green to confirm that the inverter is functioning correctly.

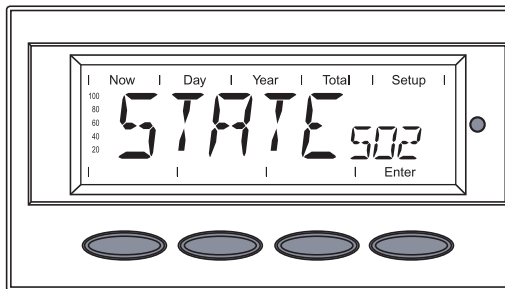
Setting Inverters for Available Solar Module Ground



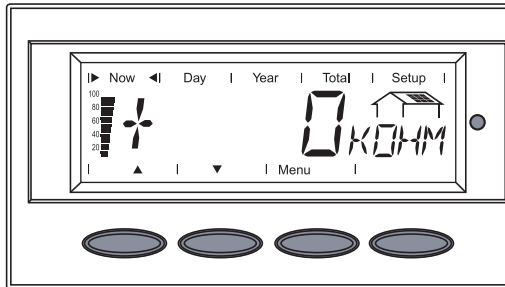
NOTE! If a solar module ground is used, the corresponding grounding mode must be set in the 'Basic Service Menu' after the inverter is turned on.

A 5-character access code is required to access the 'Basic Service Menu.' This access code will be provided by Fronius upon request.

If a solar module ground is being used, the status message 502 "Insulation value too low" will be displayed after the inverter is turned on and upon completion of the startup phase.

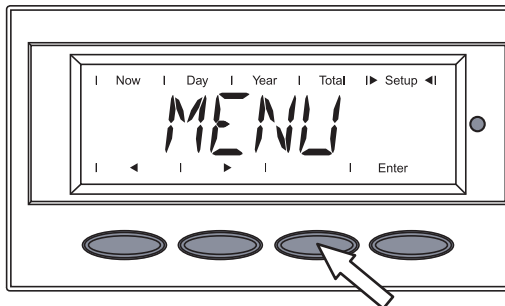


- 1 Confirm the status message by pressing the "Enter" key



The current insulation value is displayed.

- 2 Press the "Menu" key

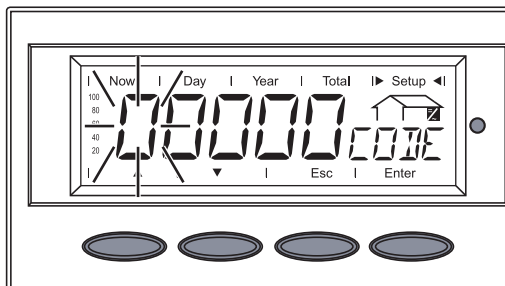


The "menu" is displayed.

- 3 Select the "Setup" mode using the "Left" or "Right" keys



- 4 Press the unassigned "Esc" key 5 x

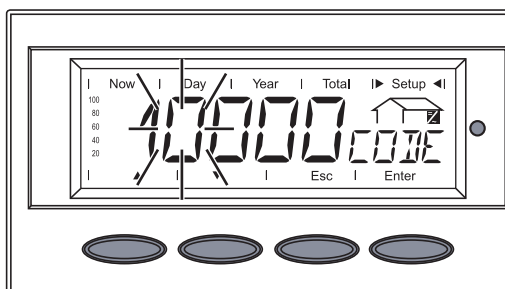


"CODE" is displayed, the first digit flashes.

- 5 Use the "Up" and "Down" keys to select the value for the first digit of the access code



- 6 Press the "Enter" key

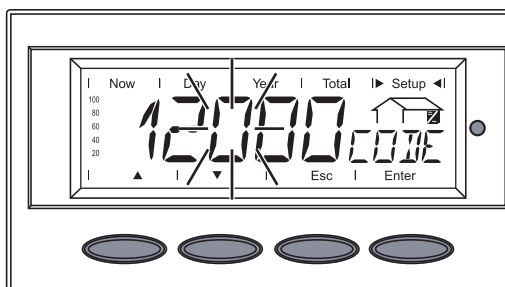


The second digit flashes.

- 7 Use the "Up" and "Down" keys to select a value for the second digit of the access code



- 8 Press the "Enter" key

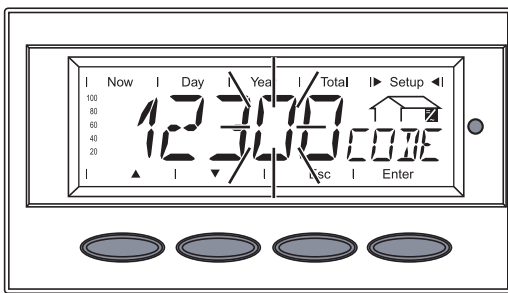


The third digit flashes.

- 9 Use the "Up" and "Down" keys to select a value for the third digit of the access code



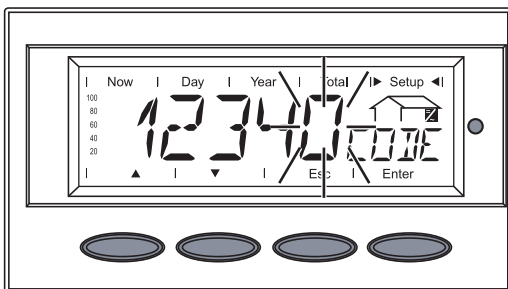
- 10 Press the "Enter" key



The fourth digit flashes.

11 Use the "Up" and "Down" keys to select a value for the fourth digit of the access code
▲ ▼

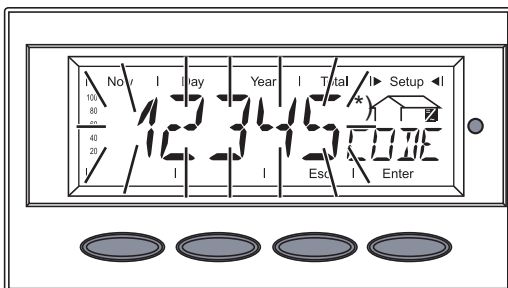
12 Press the "Enter" key



The fifth digit flashes.

13 Use the "Up" and "Down" keys to select a value for the fifth digit of the access code
▲ ▼

14 Press the "Enter" key



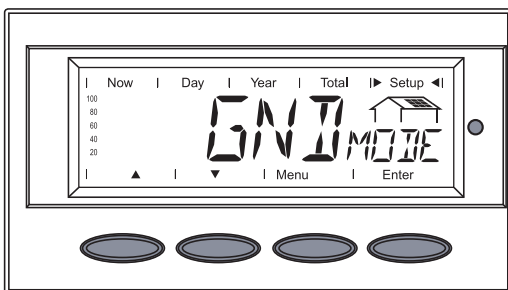
The access code flashes.

*) ... Code example

15 Press the "Enter" key

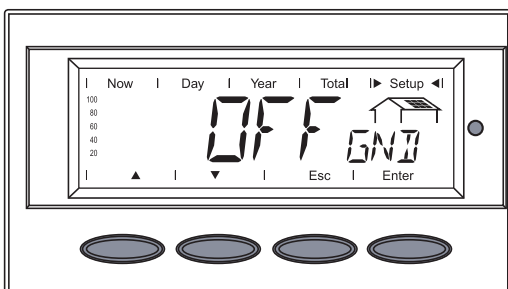
The inverter is now in the Basic Service menu, the first parameter is displayed:

- 'MIXMODE' for multiphase inverters
- 'DCMODE' for one-phase inverters



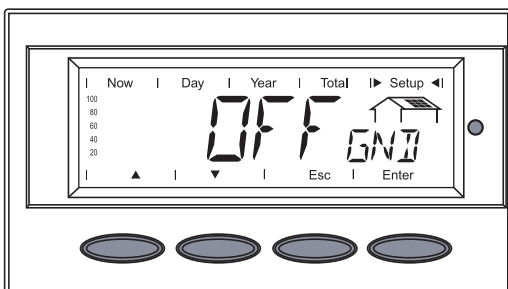
16 Use the "Up" or "Down" keys to select the 'GNDMODE' parameter
▲ ▼

17 Press the "Enter" key

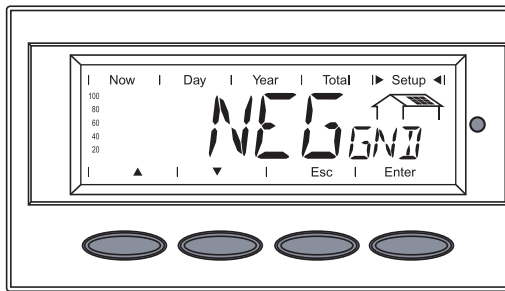


The grounding mode is displayed.

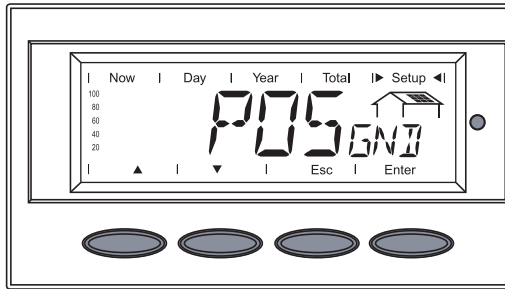
18 Use the "Up" and "Down" keys to select the grounding mode:
▲ ▼



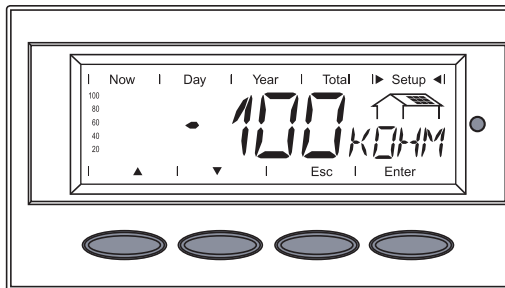
OFF = no solar module ground (factory setting)



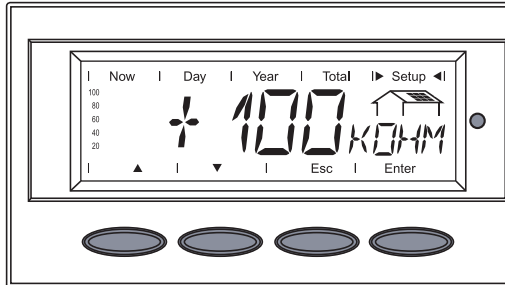
NEG = solar module ground at negative pole



POS = solar module ground at positive pole



-100 kohm = solar module ground at negative pole using high ohm resistor



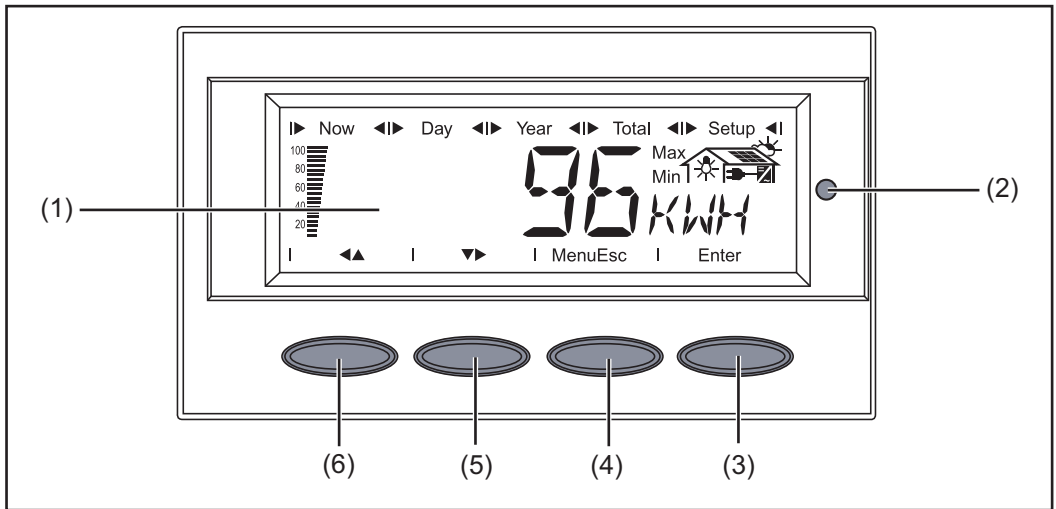
+100 kohm = Solar module ground at positive pole using high ohm resistor

19 Press the "Enter" key to apply the required grounding mode

20 Press the "Esc" key to exit the Basic Service menu

Product Description Fronius IG Plus

Controls and Indicators

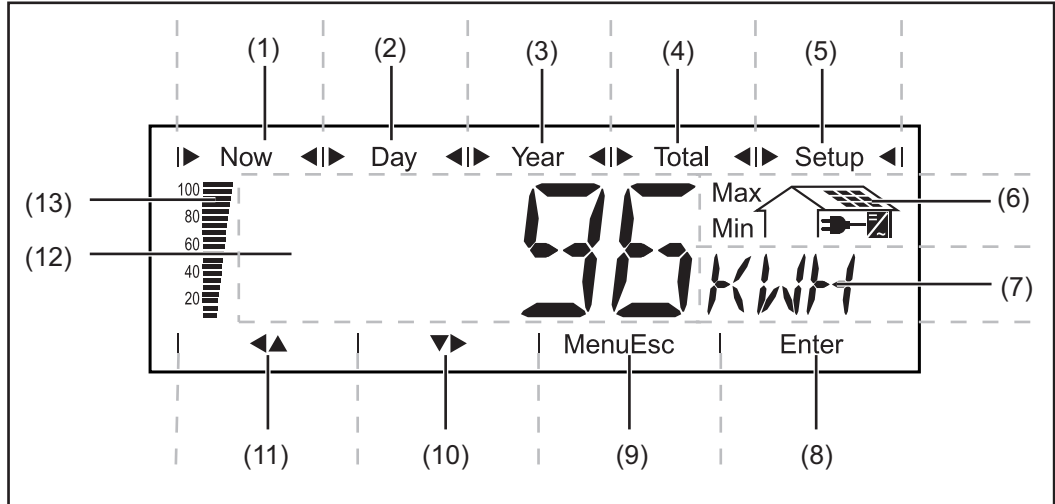


| Item | Function |
|------|--|
| (1) | Display for displaying values, settings and menus |
| (2) | Operating Status LED for displaying the operating status |
| (3) | "Enter" key for confirming a selection |
| (4) | "Menu / Esc" key for scrolling through menu options for exiting the Setup menu |
| (5) | "Down/Right" key depending on the selection: for navigating down for navigating right |
| (6) | "Left/Up" key depending on the selection: for navigating left for navigating up |

Display

The display unit's power is supplied via the safety-low voltage of the solar modules, which means that the display unit can be used only in the daytime.

IMPORTANT! The inverter display is not a calibrated measuring instrument. A slight inaccuracy of a few percent is intrinsic to the system. A calibrated meter will be needed to make calculations for the power supply company.



| Item | Function |
|------|------------------------------------|
| (1) | Icons for the "Now" display mode |
| (2) | Icons for the "Day" display mode |
| (3) | Icons for the "Year" display mode |
| (4) | Icons for the "Total" display mode |
| (5) | Icons for the "Setup" display mode |
| (6) | Icons for operating conditions |

Max The value shown represents the maximum value within the period of observation (depending on which display mode is selected).

Min The value shown represents the minimum value within the period of observation (depending on which display mode is selected).

Important The minimum and maximum values displayed do not represent the absolute extreme values, because data are recorded only at two-second intervals.



... appears when values are displayed which are directly associated with the solar modules



... appears when values are displayed which are directly associated with the public grid

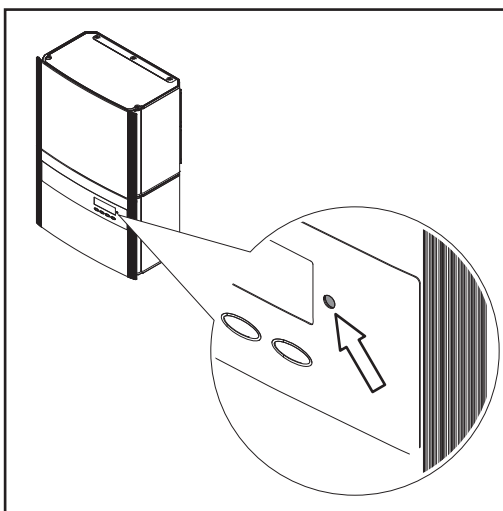


... appears with data readings that are directly related to the inverter

| | |
|-----|---|
| (7) | Range for display unit for displaying the applicable measuring unit |
| (8) | Icon for the "Enter" key |

| Item | Function |
|------|---|
| (9) | Icons for the "Menu/Esc" key |
| (10) | Icons for the "Down/Right" key |
| (11) | Icons for the "Left/Up" key |
| (12) | Range for display value for displaying the value |
| (13) | Output bar (not active during setup) indicates the output power fed into the grid at a given moment - regardless of the display mode chosen. The screen displays % of the maximum possible output power of your solar inverter |

Operating Status LED



Position of Operating Status LED on the inverter

Depending on the operating status, the Operating Status LED assumes different colors:

| Operating Status LED | Explanation |
|----------------------|--|
| Steady green | The LED stays lit after the automatic startup phase of the inverter as long as power is being fed into the grid. It indicates problem-free operation of the photovoltaic system. |
| Flashing green | The photovoltaic system is working correctly, a status code is on the display. When a status code is shown, rectify the relevant condition by going to the "Maintenance and Service" chapter, "Status Diagnosis and Troubleshooting" section. The status code can be acknowledged by pressing the "Enter" key. |
| Steady orange | The inverter enters an automatic startup phase as soon as the solar modules are delivering sufficient power after sunrise. |
| Flashes orange | A warning is shown on the display or the inverter has been set to standby operation in the Setup menu (= manual shutoff of operation). The next day, operation will resume automatically. During the time the LED flashes orange, operation can be resumed manually at any time (see section "The Setup Menu") |
| Steady red | General status: the respective status code is shown on the screen |
| Remains dark | There is no connection to the solar modules, no solar module power due to darkness. |

A list of most status codes, the corresponding status information, their status causes and repair measures can be found in the chapter "Troubleshooting and Maintenance," section "Status Diagnosis and Troubleshooting."

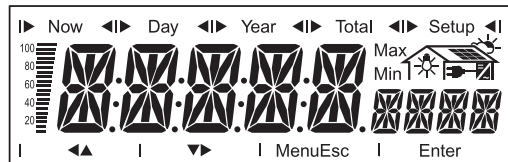
Startup Phase and Grid Feed-in Mode

Startup phase

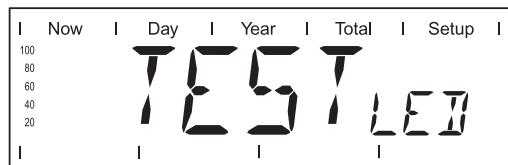
The inverter carries out a self test after being turned on automatically. Then a test of the public grid is carried out. This test can take from several seconds up to several minutes depending on local regulations. During the startup sequence the illumination of the Operating Status LED is orange.

Test Procedure

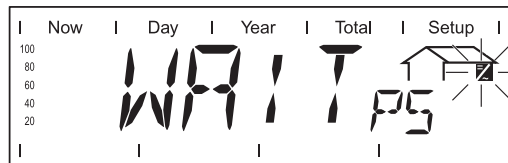
1. Segment test
All display elements light up for about one second



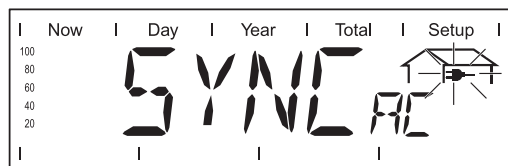
2. Self test of important inverter components
 - The inverter goes through a master check list for several seconds
 - The display will show "TEST" as well as the component currently being tested (e.g., "LED")



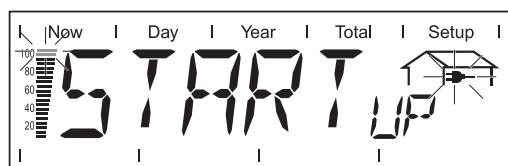
3. Synchronization with grid:
 - "WAIT PS" is displayed, the inverter icon flashes: The inverter waits for all power stage sets on the grid to be operational. This procedure is dependent on the DC voltage.



- Next, the display shows "SYNC AC," the grid icon flashes



4. Startup test
 - Before the inverter begins feeding power into the grid, grid conditions are tested according to local regulations.
 - The display shows "START UP"



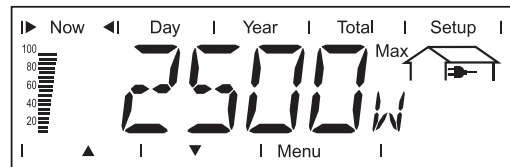
The startup test can take anything from just a few seconds up to several minutes de-

pending on national regulations. The time elapsed is indicated by a bar shrinking from the top down.

Whenever two scale divisions stop flashing and disappear, 1/10 of the total duration of the test is over.

Operation of Feeding Energy into the Grid

- Once the tests have been completed, the inverter starts feeding power into the grid.
- The display shows the present power feeding into the grid.
- The Operating Status LED lights up green, and the inverter starts operating.



Navigation in the Menu Level

Activating display illumination

- 1 Press any key

The display illumination is activated.

If no key is pressed for 30 seconds, the display backlight goes out (provided that the display illumination is set to automatic in the Setup menu).

The Setup menu also offers a choice between a permanently lit or permanently dark display.

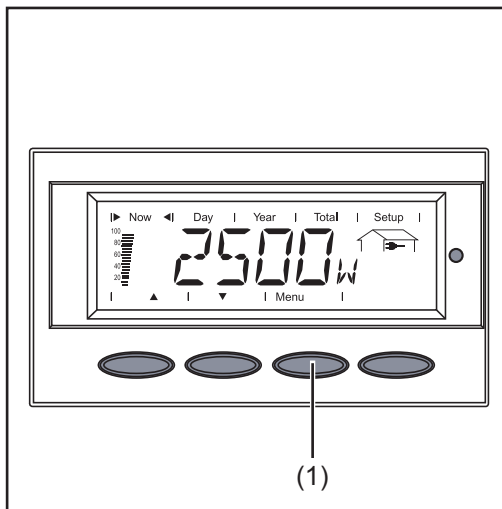
Automatic switch to the "Now" display mode or the startup phase

If no key is pressed for 2 minutes:

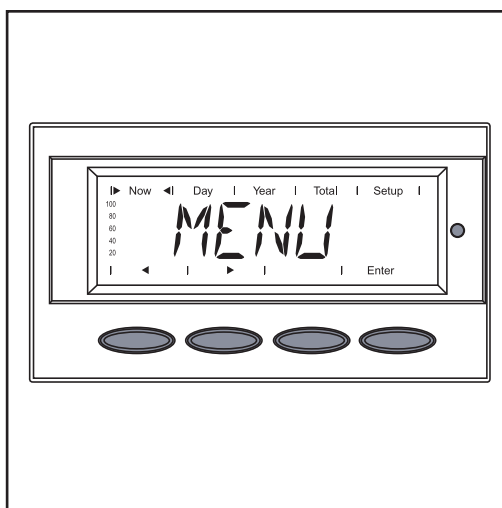
- While power is being fed into the grid, the inverter automatically switches to the "Now" display mode and the present output power is displayed.
- If the inverter is not feeding power into the grid, the inverter automatically switches to the startup phase for synchronization with the grid.

The inverter switches to the "Now" display mode or startup phase from anywhere within the display modes or the Setup menu.

Accessing the Menu Level



- 1 Press the "Menu" key (1)



"Menu" will appear on the display

The inverter is now in the menu level.

From the menu level you can

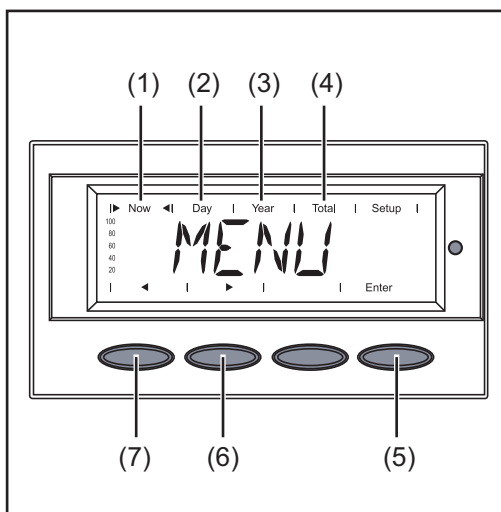
- set the desired display mode
- access the Setup menu

The Display Modes

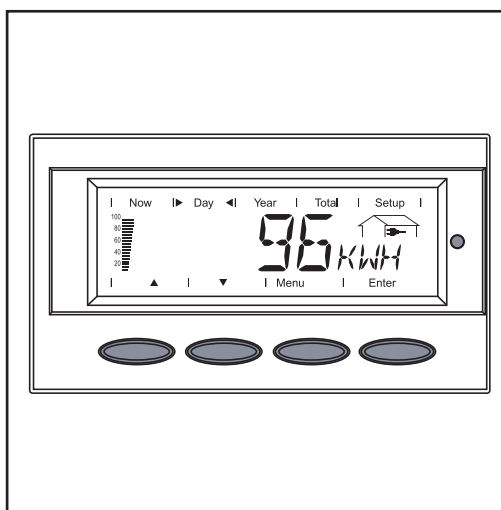
The Display Modes

| | | |
|----------------------|-------|--|
| "Now" display mode | | Displays real-time values |
| "Day" display mode | | Displays values for power fed into the grid during that day |
| "Year" display mode | | Displays values for the present calendar year - only available in combination with optional Fronius Datalogger |
| "Total" display mode | | Displays values for power fed into the grid since the inverter was started for the first time |

Selecting a Display Mode


















- 1 Accessing the menu level
 - 2 Use the "left" (7) or "right" (6) keys to select your preferred display mode (1) - (4)
- ◀ ▶
- 3 Press "Enter" (5)



The selected display mode is shown, e.g., "Day" display mode.

IMPORTANT! The "Year" menu option is supported only when the optional Fronius Datalogger is connected. This system upgrade includes a real-time clock.

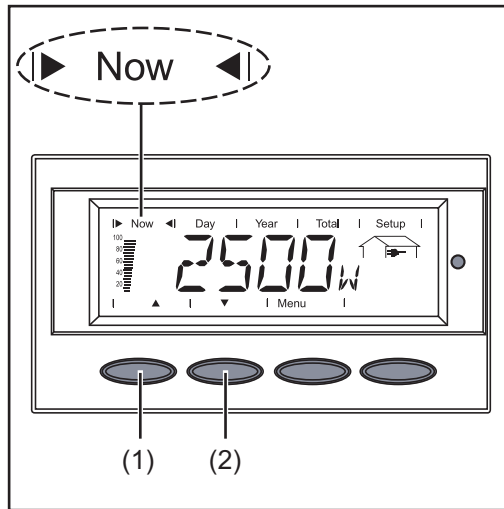
Overview of Display Values

| Display mode | Symbol | Unit | Optional | Display value |
|--------------|---|-----------|----------|---|
| "Now" |  | W | - | Output power |
| |  | V | - | Grid voltage |
| |  | A | - | Output current |
| |  | Hz | - | Grid frequency |
| |  | V | - | Solar module voltage |
| |  | A | - | Solar module current |
| |  | Mohm | - | Insulation resistance |
| | | HH:MM | x | Time |
| "Day" |  | kWh / MWh | - | Energy fed into the grid |
| "Year" |  | Currency | - | Return |
| "Total" |  | kg / T | - | CO ₂ reduction |
| |  | W | - | Max. output power |
| |  | V | - | Maximum grid voltage |
| |  | V | - | Minimum grid voltage |
| |  | V | - | Maximum array voltage |
| |  | HH:MM | - | Service hours completed by the inverter |

x Optional
 If the DatCom component for the required options is not available, the message "N.A." (not available) is shown.

Display Values in "Now" Display Mode

Selecting the "Now" Display Mode



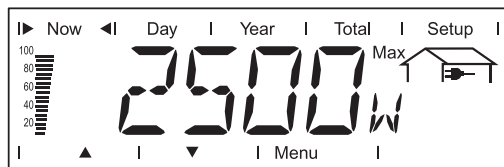
- 1 Select the "Now" display mode

The first display value in the "Now" display mode appears

- 2 Use the "Down" (2) key to scroll to the next display value

Scroll back using the "Up" key (1)

Display values in the "Now" display mode



Output power

Power (in watts) currently being fed into the grid

The "Enter" key is active for the output power display if at least one of the following functions is available on the inverter:

- Reactive power mode
- Remote-controlled effective power reduction
- GVPR (**G**rid **V**oltage-dependent **P**ower **R**eduction)

The availability of a function depends on the country setup, device-specific settings and the software version of electronic assemblies.

Reactive power mode:

- The current apparent power for the device is displayed in VA by pressing the "Enter" key.
- The current operating mode can be displayed by pressing the "Up" and "Down" keys.

Remote-controlled effective power reduction (if there is a Fronius Power Control Box/ Card in the Solar Net and a power reduction has been triggered by the utility company):

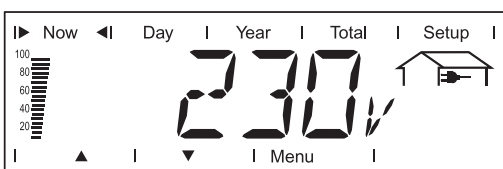
- Pressing the "Enter" key will display the power reduction as a percentage.
- You can display how long the power reduction has been in effect by pressing the "Up" and "Down" keys.

GVPR:

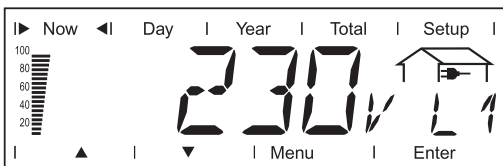
- Pressing the "Enter" key will display the activation time in SEC/GVPR (alternating).

You can use the "Up" and "Down" keys after pressing the "Enter" key to scroll through the existing parameters.

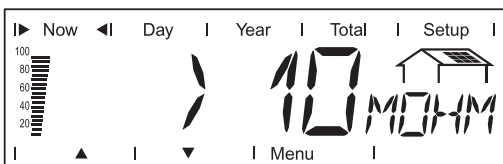
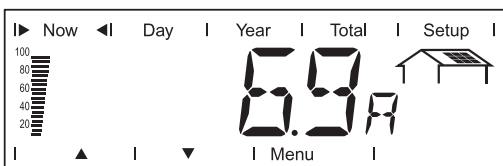
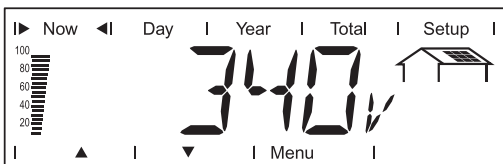
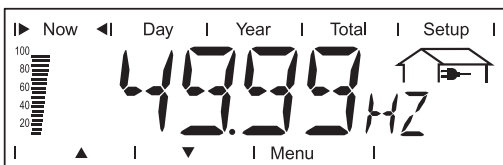
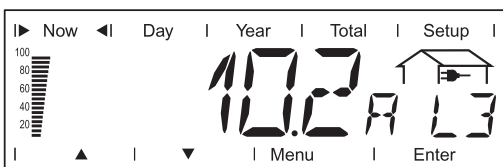
- You can return to the menu level by pressing the "Menu" key.



For example, phase voltage for phase L1:



For example, phase current for phase L3:



Grid voltage

External conductor voltage (volts)

The "Enter" key is active for multi-phase inverters.

- The phase voltage can be displayed by pressing the "Enter" key.
- The phase voltage of the other phases can be displayed by pressing the "Up" and "Down" keys.
- You can return to the menu level by pressing the "Menu" key.

Output current

Current (in amperes) supplied to the grid at any particular moment

The "Enter" key is active for multi-phase inverters.

- The phase current can be displayed by pressing the "Enter" key.
- The phase current of the other phases can be displayed by pressing the "Up" and "Down" keys.
- You can return to the menu level by pressing the "Menu" key.

Grid frequency

(hertz)

Solar module voltage

Voltage of the solar modules at the moment of data display (volts)

Solar module current

Current supplied by solar modules at the moment of data display (amperes)

Insulation resistance of photovoltaic system

(MOhm)

For ungrounded solar modules



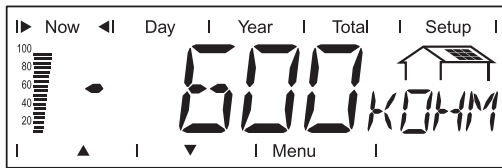
WARNING! An electric shock can be fatal. The positive and negative poles of the photovoltaic system should never be touched if the insulation resistance is less than 600 kOhm. An insulation resistance of < 600 kOhm may be due to an inadequately insulated DC lead or defective solar modules. In the event that the insulation resistance is too low, you must contact your Fronius service partner.

The insulation resistance is the resistance between the positive or negative pole of the photovoltaic system and the earth potential. If an insulation resistance of > 600 kOhm is shown, this means that the photovoltaic system is adequately insulated.

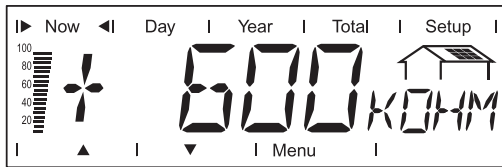
An insulation resistance of less than 600 kOhm indicates an error.

When the insulation resistance is less than 10 MOhm, the display differentiates between:

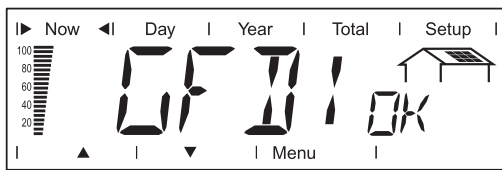
- negative potential of the ground (polarity sign '-')
- positive potential of the ground (polarity sign '+')



Display example of a negative potential (polarity sign '-')
Short circuit between DC- lead and ground

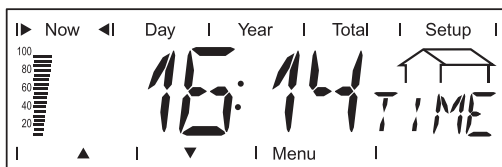


Display example of a positive potential (polarity sign '+')
Short circuit between DC+ lead and ground



GFDI status
for grounded solar modules
'GFDI OK' is displayed if there is no ground fault in the system

GFDI = Ground Fault Detector Interruptor



Time (datalogger option)
When the time on the inverter or a system add-on is changed, this changes the time on all devices connected via Solar Net.

Options

If the DatCom component for the required options is not available, the message "N.A." (not available) is shown.

Display Values in "Day / Year / Total" Display Modes

General

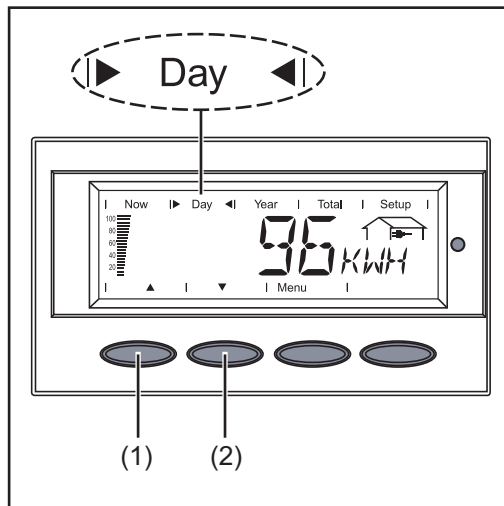
For the inverter, the day begins when it switches on. If the DC supply line is disconnected, the following parameters within the "Day" display mode will be reset after repeating the startup:

- Return (currency can be selected)
- CO₂ reduction (kg)
- Maximum output power (watts)
- Maximum grid voltage (volts)
- Minimum grid voltage (volts)
- Service hours completed by the inverter

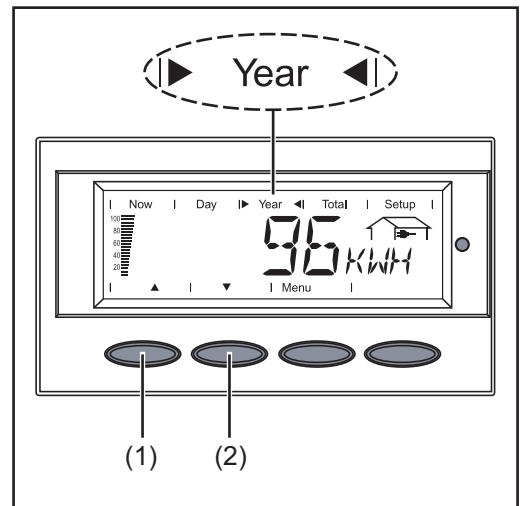
If an optional Fronius Datalogger is available, the display values listed always apply to the whole day.

Selecting "Day / Year / Total" Display Mode

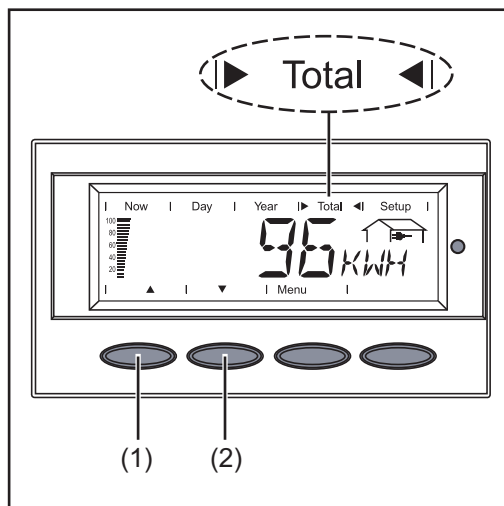
First Display Value in the "Day" Display Mode:



First Display Value in the "Year" Display Mode:



First Display Value in the "Total" Display Mode:



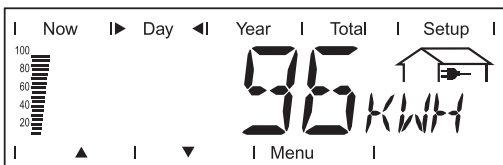
- 1 Select the "Day" or "Year" or "Total" display mode

The first display value in the selected display mode appears.

- 2 Use the "Down" (2) key to scroll to the next display value

Scroll back using the "Up" key (1)

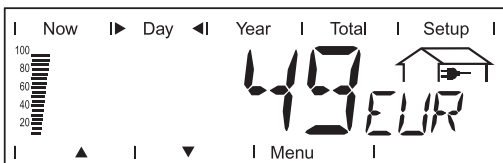
Display values in the 'Day / Year / Total' display modes



Output energy

Energy fed into the grid over the period of time in question (kWh / MWh)

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

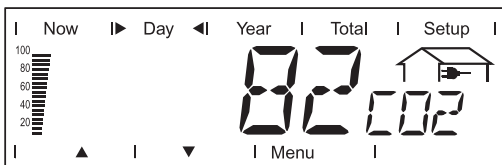
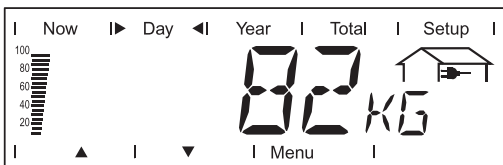


Yield

Amount of money earned during the period of time in question (currency can be selected in the Setup menu)

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

'The Setup menu' section describes how to set the currency and rate for the output energy. The factory setting depends on the respective country-specific setting.



CO2 reduction

CO2 emissions saved during the monitored period (kg / T; T = tons)

The area for unit display switches between 'kg' or 'T' and 'CO2.'

The CO2 meter gives an indication of CO2 emissions that would be released during the generation of the same amount of electricity in a combustion power plant.

The factory setting is 0.59 kg / kWh (source: DGS - the German Society for Solar Energy).



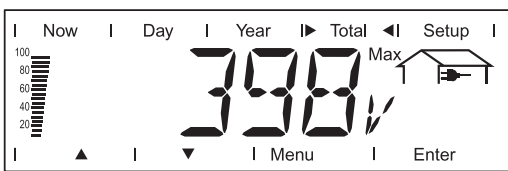
Maximum output power

Highest output power of the inverter during observation period (watts)

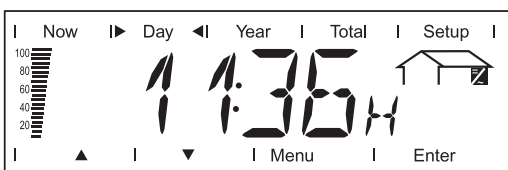
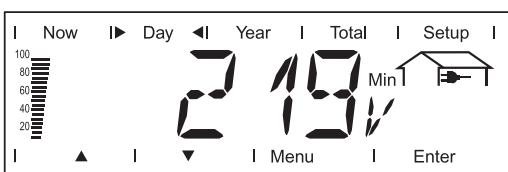
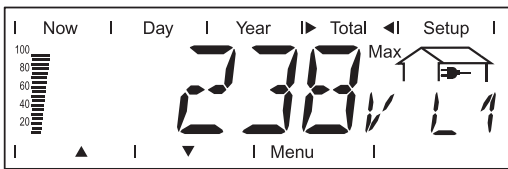


Maximum grid voltage

Highest reading of grid voltage (V) during observation period



For example, maximum phase voltage for phase L1:



The 'Enter' key is active in the 'Total' display mode depending on the country set-up or the device-specific settings.

- The maximum phase voltage measured during the time in question can be displayed by pressing the 'Enter' key.
- The maximum phase voltage of the other phases measured during the time in question can be displayed by pressing the 'Up' and 'Down' keys.
- You can return to the menu level by pressing the 'Menu' key.

Minimum grid voltage

Lowest reading of grid voltage (V) during observation period

Maximum solar module voltage

Highest reading of solar module voltage (V) during observation period

Operating hours

Indicates how long the inverter has been operating (HH:MM)

Duration of operation is shown in hours and minutes up to 999 h and 59 min (display: '999:59'). After that only full hours are displayed.

Although the inverter does not operate during the night, all sensor data are recorded around the clock.

Options

If the DatCom component for the required options is not available, the message "N.A." (not available) is shown.

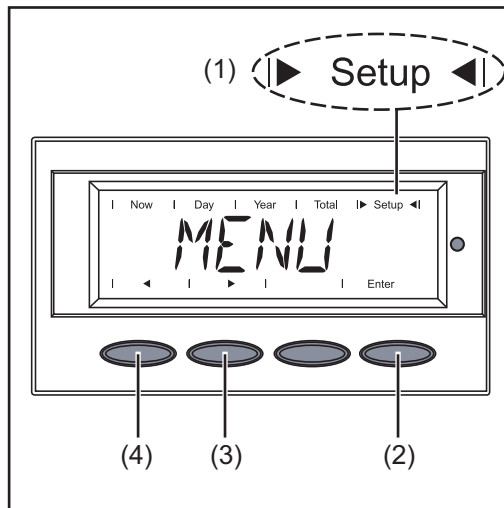
The Setup Menu

Presetting

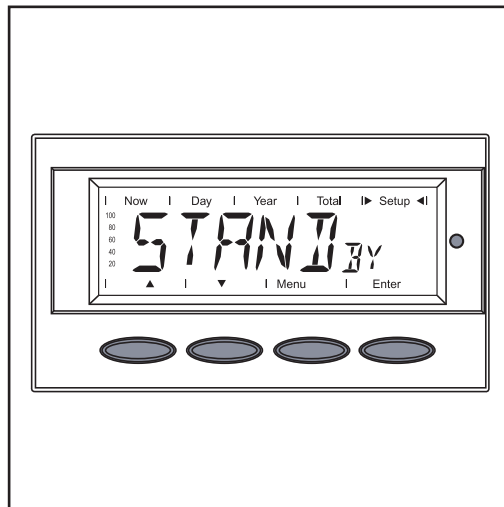
Following commissioning, the inverter is preconfigured according to the country setup.

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

Accessing the Setup Menu



- 1 Switch to the menu level (press the "Menu" key)
- 2 Select the "Setup" (1) mode using the "Left" (4) or "Right" (3) keys
- 3 Press "Enter" (2)

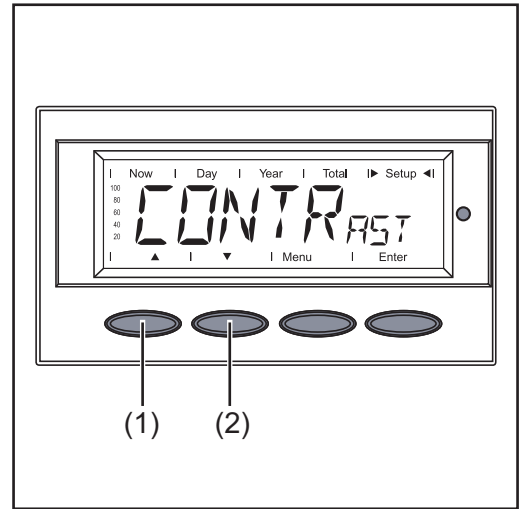
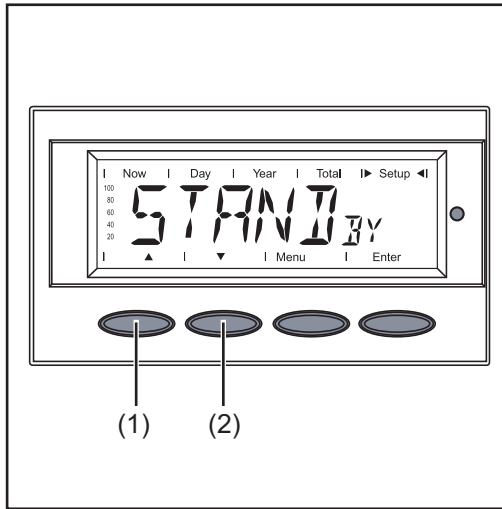


The Setup Menu's first menu item "STANDBY" is shown.

Scrolling through Menu Items

Example: "STANDBY" menu item

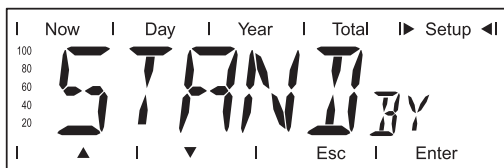
Example: "CONTRAST" menu item



- 1** Access the Setup menu
- 2** Scroll through the available menu items using the "Up" (1) and "Down" (2) keys

Menu Items in the Setup Menu

STANDBY

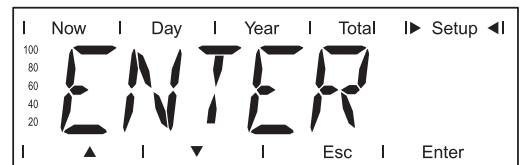
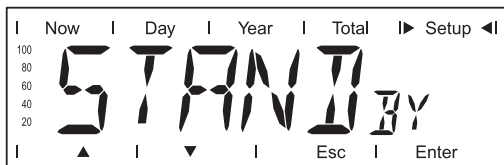


Manual activation / deactivation of Standby operation using the "Enter" key

| | |
|-----------------|---|
| Unit | - |
| Setting range | Enter |
| Factory setting | Automatic operation of feeding energy into the grid (Standby deactivated) |

- The power electronics are switched off in standby mode. No power is fed into the grid.
- The Operating Status LED flashes orange.
- The orange flashing Operating Status LED stops at dusk.
- After the subsequent sunrise, the power supply operation into the grid is resumed automatically (after completion of the startup phase the LED is illuminated green).
- Grid supply operation can be resumed at any time whenever the LED is flashing orange (deactivate "STANDBY").

If the Standby mode is activated by pressing the "Enter" key, the display alternates between "STANDBY" and "Enter:"



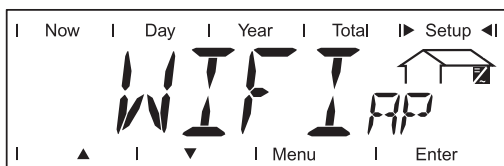
To maintain Standby operation:

- Press the "Esc" key

To end Standby operation:

- Press the "Enter" key

WLAN AP



To activate/deactivate the Fronius Datamanager 2.0 WLAN access point (e.g., to set up system monitoring)

| | |
|---------------|---------------|
| Setting range | MODE/SSID/KEY |
|---------------|---------------|

| | |
|------|--|
| MODE | To activate/deactivate the WLAN access point |
| | ON The WLAN access point is activated. |
| | OFF The WLAN access point is deactivated. |

| | |
|-------|---|
| SSID* | To display the Fronius network ID: FRONIUS_240.xxxxx (5–8 digits) (scrolls through) |
|-------|---|

KEY* To display the network password (8 digits)

* "SSID" and "KEY" values are only displayed when "MODE" is set to "ON". If "MODE" is set to "OFF", "---" will be displayed.

Activating the WLAN access point

Requirement:

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

- 1 Select the "WLAN AP" menu item
- 2 Press the "Enter" key

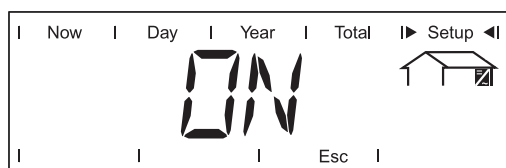
"MODE" is displayed.

- 3 Press the "Enter" key

The current WLAN access point status is displayed:

ON The WLAN access point is activated.

If the IP switch of the Fronius Datamanager 2.0 plug-in card or Fronius Datamanager Box 2.0 is activated, then arrows and "Enter" are hidden:



Settings cannot be changed.

OFF The WLAN access point is deactivated.

- 4 To activate the WLAN access point, select "ON" using the "Up" or "Down" keys
- 5 Press the "Enter" key

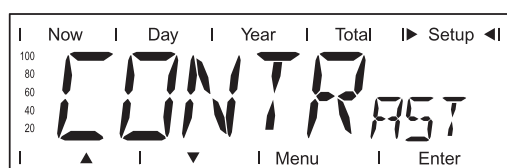
The WLAN access point is activated and stays open for one hour.

- 6 Press the "Esc" key to exit the menu

"MODE" is displayed.

To select the "SSID" and "KEY" points, use the "Up" or "Down" keys and press the "Enter" key to display them.

CONTRAST

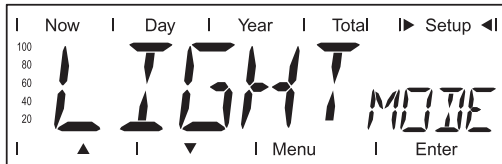


Contrast setting on LCD display

| | |
|-----------------|-------|
| Unit | - |
| Setting range | 0 - 7 |
| Factory setting | 7 |

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

LIGHT MODE



Initial setting for display illumination.

| | |
|-----------------|-----------------|
| Unit | - |
| Setting range | AUTO / ON / OFF |
| Factory setting | AUTO |

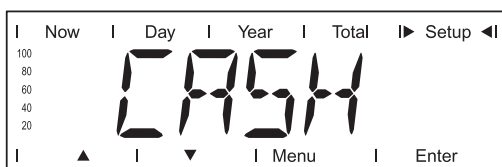
AUTO: The display illumination will stop 30 seconds after the last time a key has been pressed.

ON: The display will remain illuminated whenever power is supplied to the grid.

OFF: The display illumination will be permanently off.

IMPORTANT! The "LIGHT MODE" setting only relates to the display's background illumination. The LCD display will still remain on during operation. Its energy consumption is less than one mW (1/1000 W).

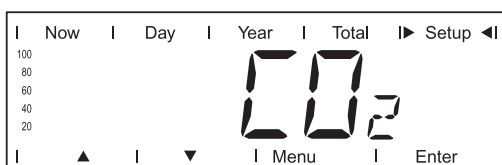
CASH



Sets the currency and charge rate for the output energy to the grid

| | |
|-----------------|----------------------------------|
| Unit | - |
| Display area | Currency / Charge rate / kWh |
| Factory setting | (depends on the country setting) |

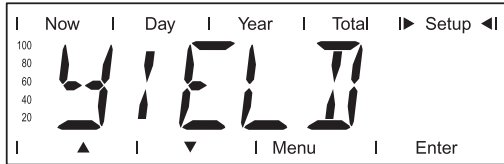
CO2



Setting of CO2 reduction factor

| | |
|-----------------|---------------|
| Unit | kg/kWh, T/kWh |
| Setting range | 00,01 - 99,99 |
| Factory setting | 0.59 kg/kWh |

YIELD



Setting

- an OFFSET value for the total energy display
- a measurement correction value for the Day, Year and Total energy display

Setting range OFF SET / CALI.

OFF SET

Offset is an amount of energy (in Wh, kWh, or MWh) that can be added to the lifetime total energy output of the inverter to give it a 'head start.'

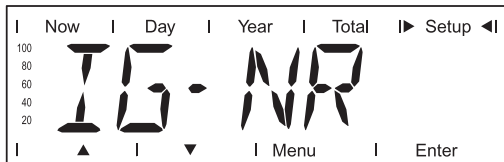
Unit Wh / kWh / MWh
 Setting range 5-digit + k... / M...
 1 kWh = 1000 Wh
 1 MWh = 1000000 Wh
 Factory setting 0

CALI.

Preset correction value, so that the data shown on the inverter display corresponds to the calibrated data shown on the electric meter

Unit %
 Setting range -5.0 - +5.0 in increments of 0.1
 Factory setting 0

IG no.

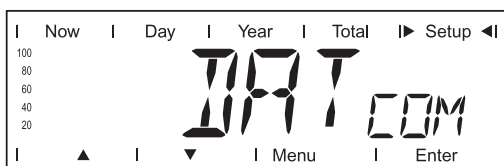


Number setting (address) of the inverter in a setup comprising multiple solar inverters linked together

Unit -
 Setting range 01 - 99 (100th inverter = 00)
 Factory setting 1

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

DAT COM



Indicates status of data transmission, function test or activates and resets various option (e.g., Fronius Signal Card, Fronius Personal Display Card, Fronius Interface Card, Fronius TAC Card, etc.)

Setting range Displays OK COM or ERROR COM;
 SIGCD TEST / PDCD RST / IFCD RST / TAC TEST

OK COM / ERROR COM

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

Examples of options:

SIGCD TEST

Function test for the Fronius Signal Card option

When the "Energy Management" function is activated, the function test for the Fronius Signal Card cannot be carried out.

PDCD RST

Resets the Fronius Personal Display Card option

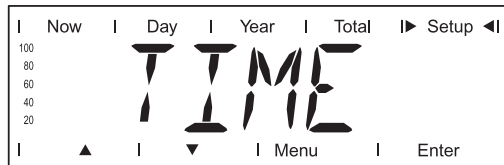
IFCD RST

Resets the Fronius Interface Card option

TAC TEST

Function test for the Fronius Power Relay Card (TAC) option

TIME

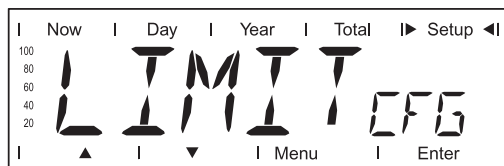


Date and time setting

| | |
|-----------------|-----------------|
| Unit | DDMMYYYY, HH:MM |
| Setting range | Date / Time |
| Factory setting | - |

IMPORTANT! The "TIME" menu item is only supported when the Fronius Datalogger option is installed.

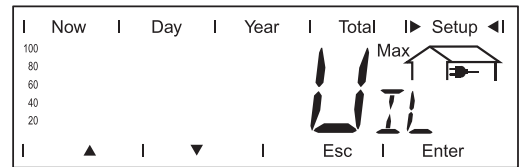
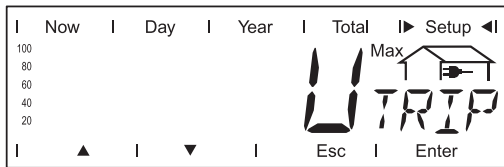
LIMIT CFG



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

| | |
|---------------|---|
| Display range | U IL Max / U IL/TRIP* Max / U IL Min / U IL/TRIP* Min / U OL Max / U OL/TRIP* Max / U OL Min / U OL/TRIP* Min / U RC Max / U RC Min / U LL FREQ IL Max / FREQ IL/TRIP* Max / FREQ IL Min / FREQ IL/TRIP* Min / FREQ OL Max / FREQ OL/TRIP* Max / FREQ OL Min / FREQ OL/TRIP* Min / FREQ RE Max / FREQ RE Min START TIME/INIT* / START TIME/RCON* AGF / EMI COMP / POWER LIM / MIX MODE |
|---------------|---|

* Alternating display, e.g.:



IL "Inner Limit"
 OL "Outer Limit"

Different clearing times can be assigned to the inner limit IL and the outer limit OL depending on the country setup or device-specific settings.

E.g.:

- Short clearing time for a deviation from the outer limit
- Longer clearing time for a deviation from the inner limit

U IL Max

Upper inner grid voltage limit in V

U IL/TRIP Max

Clearing time for exceeding the upper inner grid voltage limit in P**

U IL Min

Lower inner grid voltage limit in V

U IL/TRIP Min

Clearing time for falling below the lower inner grid voltage limit in P**

U OL Max

Upper outer grid voltage limit in V

U OL/TRIP Max

Clearing time for exceeding the upper outer grid voltage limit in P**

U OL Min

Lower outer grid voltage limit in V

U OL/TRIP Min

Clearing time for falling below the lower outer grid voltage limit in P**

U RC Max

"Reconnection"

Upper voltage limit for reconnection to the public grid after disconnection due to an unacceptable parameter deviation

U RC Min

"Reconnection"

Lower voltage limit for reconnection to the public grid after disconnection due to an unacceptable parameter deviation

U LL

"Longtime Limit"

Voltage limit in V for the voltage average determined over a longer time period

FREQ IL Max

Upper inner grid frequency limit in Hz

FREQ IL/TRIP Max

Clearing time for exceeding the upper inner grid frequency limit in P**

FREQ IL Min

Lower inner grid frequency limit in Hz

FREQ IL/TRIP Min

Clearing time for falling below the lower inner grid frequency limit in P**

FREQ OL Max

Upper outer grid frequency limit in Hz

FREQ OL/TRIP Max

Clearing time for exceeding the upper outer grid frequency limit in P**

FREQ OL Min

Lower outer grid frequency limit in Hz

FREQ OL/TRIP Min

Clearing time for falling below the lower outer grid frequency limit in P**

** P = grid periods; 1 P corresponds to 20 ms at 50 Hz and 16.66 ms at 60 Hz

FREQ RC Max

"Reconnection"

Upper grid frequency limit for reconnection to the public grid after disconnection due to an unacceptable parameter deviation

FREQ RC Min

"Reconnection"

Lower grid frequency limit for reconnection to the public grid after disconnection due to an unacceptable parameter deviation

START TIME/INIT

Startup time of the inverter in s

START TIME/RCON

Reconnection time in s after a grid error

AGF

"Advanced Grid Features"

Display range

Q MODE / GPIS / GFPR / FULL/LVRT

| | |
|----------------|---|
| Q MODE | <p>Mode for reactive power specification</p> <ul style="list-style-type: none"> - CONST / COSP*** Constant cos phi specification - CONST / Q REL *** Constant specification of the relative reactive power in % - CONST / Q ABS*** Constant specification of an absolute reactive power in var - COSP (P) cos phi specification depending on the effective power - Q (U) Relative reactive power specification regarding the current grid voltage - Q (P) Relative reactive power specification depending on the effective power - OFF The inverter is operating in the pure effective power range (cos phi = 1) |
| GPIS | <p>"Gradual Power Increment at Startup" SoftStart function regarding how fast the inverter should increase the power</p> <p>ON / OFF / N.A.</p> |
| GFPR | <p>"Grid Frequency Depending Power Reduction" Power reduction depending on the grid frequency</p> <p>ON / OFF / N.A.</p> |
| FULL / LVRT*** | <p>"Low Voltage Ride Through" Function for bridging a grid voltage gap that was caused by grid voltage parameters outside of the limits</p> <p>ON / OFF / N.A.</p> |

EMI COMP

Compensation of the EMC filter during operation

ON / OFF / N.A.

POWER LIM

Constant apparent power limiting

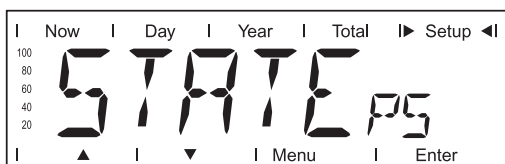
MIX MODE

DC operating type

*** alternating display

N.A. not available

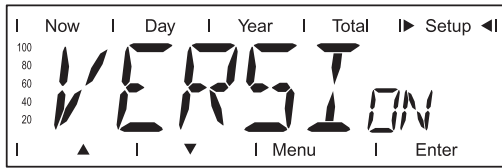
- Press the "Enter" key to display the respective value
- Press "Esc" to exit the displayed value

STATE PS

Status display of power stage sets; the last error that has occurred can be displayed

IMPORTANT! Due to the low level of irradiance 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 messages do not indicate any kind of fault.

VERSION



Displays the version number and serial number of electronic components (e.g., IG Brain, power stage sets, display, country setup)

| | |
|-----------------|---|
| Unit | - |
| Display area | MAIN CTRL / LCD / PS (PS00, PS01, PS02) / SETUP |
| Factory setting | - |

| | |
|----------|---|
| MAINCTRL | Version data of IG Brain unit (inverter control) |
| LCD | Display version data |
| PS | Power stage set version data (PS00 - max. PS02) |
| SETUP | Display of current country setup The current country setup is displayed (2-3 letters) by pressing the "Enter" key, e.g., "DE" for Germany country setup; Exit the Country Setup display by pressing the "Esc" key |

Setting and Displaying Menu Items

Setting Menu Items - General

- 1 Access the Setup menu
- 2 Use the "Up" or "Down" keys to select the desired menu item
▲ ▼
- 3 Press the "Enter" key

The first digit of a value to be set flashes:

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

The second digit of the value flashes.

- 6 Repeat steps 4 and 5 until ...

the entire value flashes.

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

Press the "Esc" key to not save the changes.

The currently selected menu item is displayed.

The available settings are displayed:

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

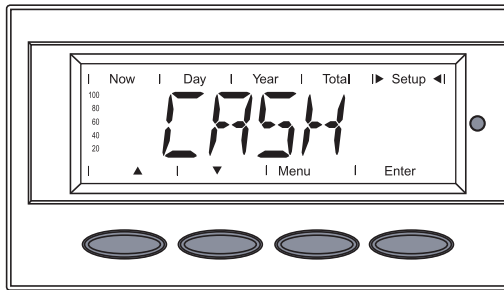
Press the "Esc" key to not save the selection.

The currently selected menu item is displayed.

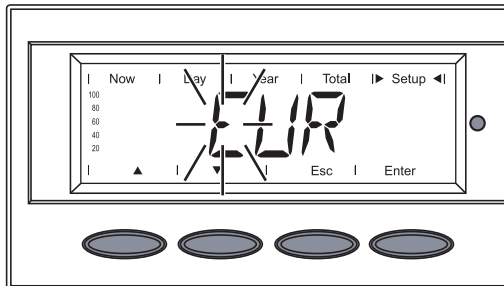
Examples of Setting and Displaying Menu Items

- The following examples describe how to set and display menu items:
- Setting the Currency and Charge Rate
 - Displaying and Setting Parameters in the "DATCOM" Menu Item
 - Setting Time and Date

Setting the Currency and Charge Rate

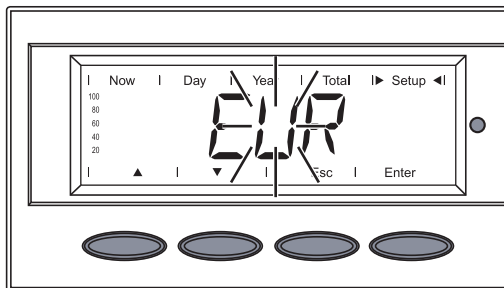


- 1 Select the "CASH" menu item
- 2 Press the "Enter" key



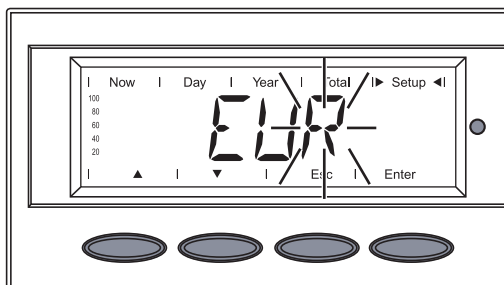
The currency is displayed, factory setting = "EUR";
The first character flashes.

- 3 Use the "Up" and "Down" keys to select a letter for the first character
▲ ▼
- 4 Press the "Enter" key



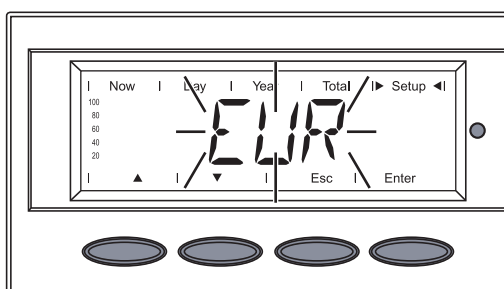
The second character flashes.

- 5 Use the "Up" and "Down" keys to select a letter for the second character
▲ ▼
- 6 Press the "Enter" key



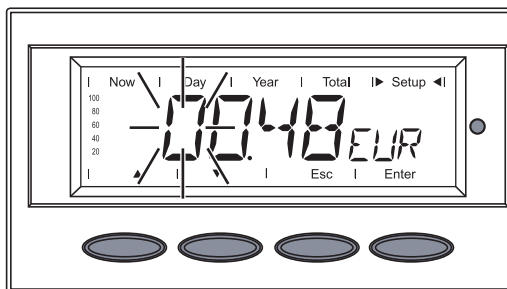
The third character flashes.

- 7 Use the "Up" and "Down" keys to select a letter for the third character
▲ ▼
- 8 Press the "Enter" key



The set currency flashes.

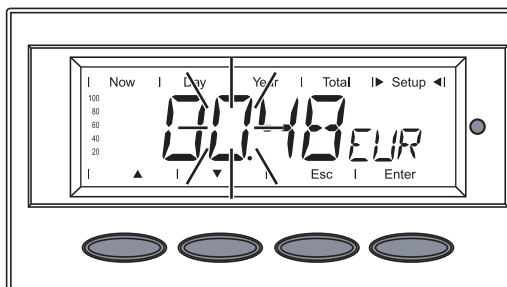
- 9 Press the "Enter" key



The charge rate in kWh/currency is displayed, factory setting = EUR 0.48 / kWh
The first digit flashes.

- 10** Use the "Up" and "Down" keys to select a value for the first digit (e.g., 0)
▲ ▼

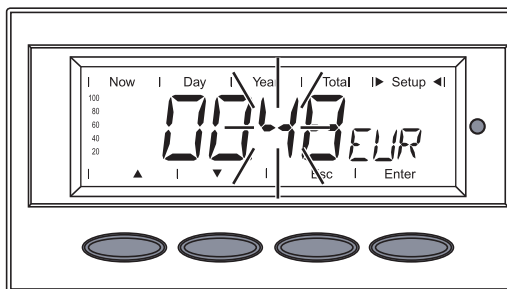
- 11** Press the "Enter" key



The second digit flashes.

- 12** Use the "Up" and "Down" keys to select a value for the second digit (e.g., 0)
▲ ▼

- 13** Press the "Enter" key



The first digit after the decimal point flashes.

- 14** Use the "Up" and "Down" keys to select a value for the first digit after the decimal point (e.g., 4)
▲ ▼

- 15** Press the "Enter" key

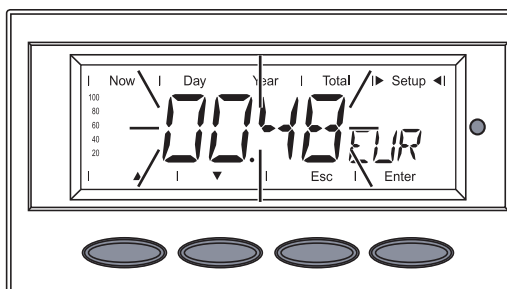


The second digit after the decimal point flashes.

- 16** Use the "Up" and "Down" keys to select a value for the second digit after the decimal point (e.g., 8)
▲ ▼

The values that can be set range from 00.01 to 99.99.

- 17** Press the "Enter" key



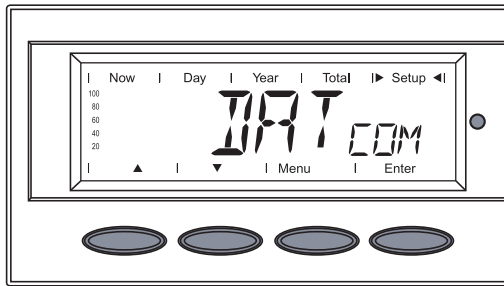
The set charge rate flashes.

- 18** Press the "Enter" key

The currency and the charge rate are applied.

- 19** Press the "Esc" key to exit the "CASH" menu item

Displaying and Setting Parameters in the "DAT-COM" Menu Item

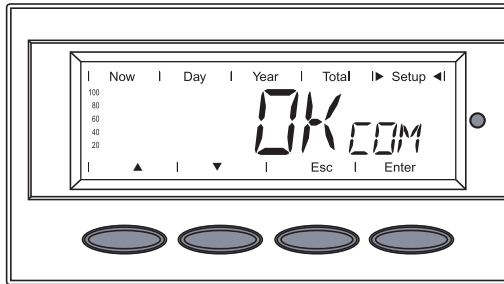


- 1 Select the "DATCOM" menu item
- 2 Press the "Enter" key

The following displays depend on whether

- a data connection has been established
- a data connection is faulty or an option is not installed

Available data connection

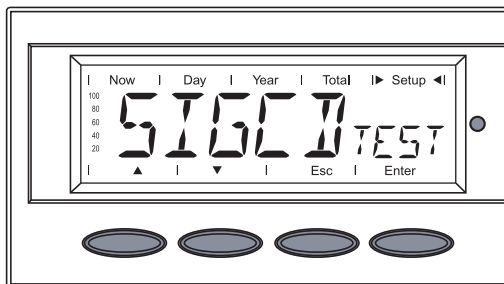


If there is a data connection available, "OK-COM" is shown.

- 3 Use the "Down" key to access the "signal card test"

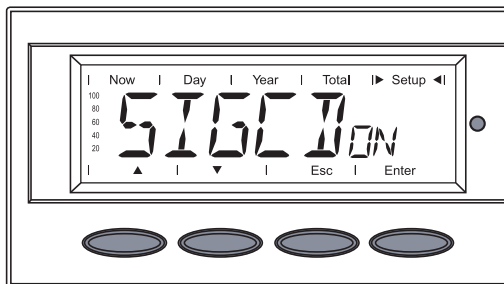


"SIGCDTEST" is displayed



- 4 Press the "Enter" key

The "Signal Card Test" starts, "SIGCD ON" appears on the display.

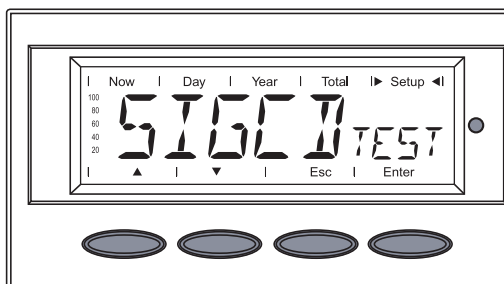


If the "signal card" is active, it will emit an acoustic signal in confirmation.

IMPORTANT! If no acoustic signal is heard, the signal lines should be checked.

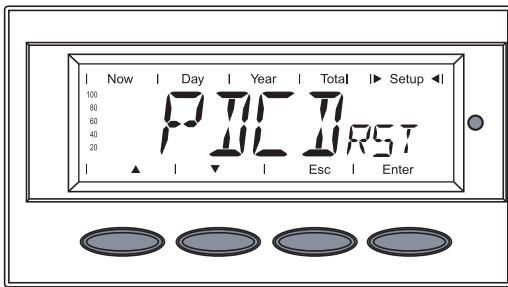
- 5 Press the "Esc" key to exit the "Signal Card Test"

"SIGCD TEST" is displayed

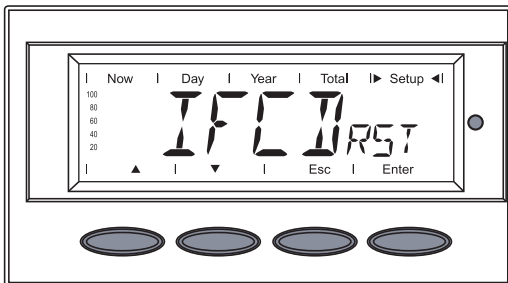


- 6 Use the "Down" key to select additional options:



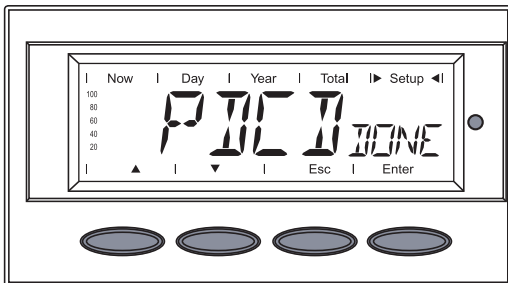


e.g., Reset Personal Display Card ("PDCD RST") ...



...or reset Interface Card ("IFCD RST")

7 Press the "Enter" key



"PDCD DONE"...

...Or...

"IFCD DONE" is displayed

8 Press the "Esc" key to exit the current option

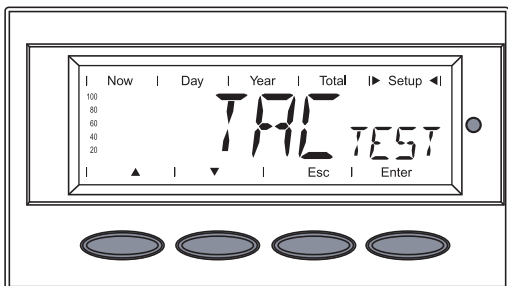
9 Use the "Down" key to select additional options:



"TAC ON" is displayed



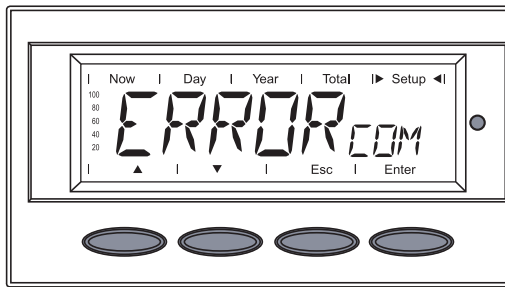
10 To test the function of the Fronius Power Relay Card option, press the "Enter" key



"TAC TEST" is displayed, the AC relay switches off and the AC connection to the inverter is interrupted (no grid feed).

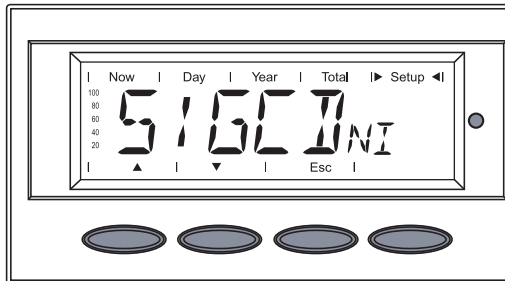
11 Press the "Esc" key 2x to exit the "DATCOM" menu item

Data connection faulty or DATCOM is not installed



If there is a faulty data connection or options are not installed, "ERROR COM" is displayed.

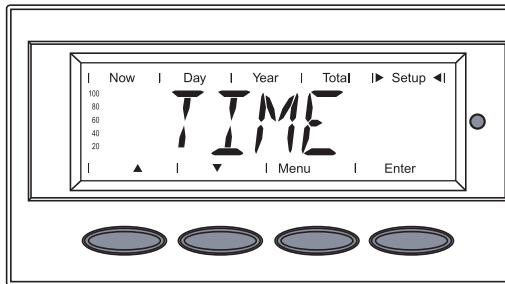
- 3 Select the respective option using the "Down" key



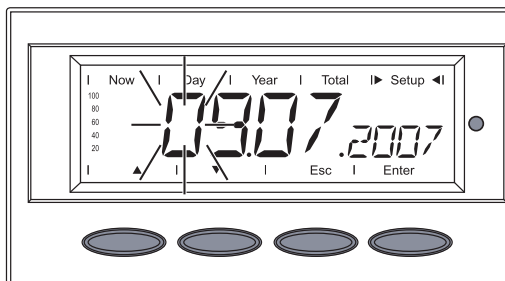
"SIGCD NI" (Signal Card not installed) or "PDCD NI" (Personal Display Card not installed) or "IFCD NI" (Interface Card not installed) or "TAC NI" (TAC Card not installed) is displayed.

- 4 Press the "Esc" key to exit the "DATCOM" menu item

Setting Time and Date



- 1 Select the "TIME" menu item
- 2 Press the "Enter" key

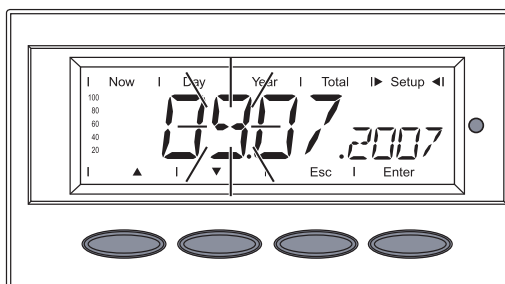


The **date** is displayed (DD.MM.YYYY), the first digit for the day flashes.

- 3 Use the "Up" and "Down" keys to select a value for the first day digit



- 4 Press the "Enter" key

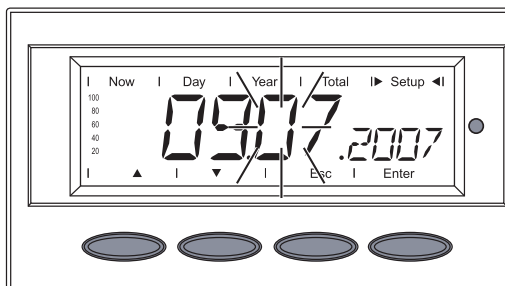


The second digit for the day flashes.

- 5 Use the "Up" and "Down" keys to select a value for the second day digit

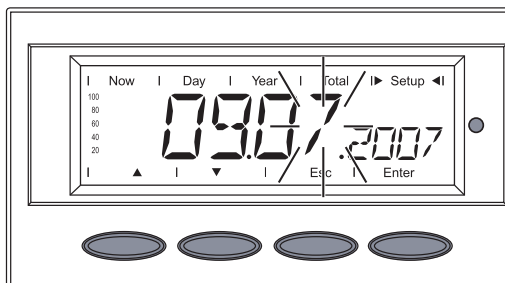


- 6 Press the "Enter" key



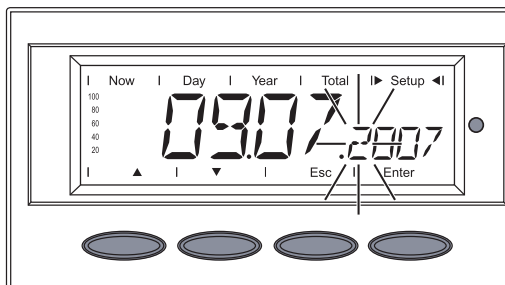
The first digit for the month flashes.

- 7** Use the "Up" and "Down" keys to select a value for the first month digit
▲ ▼
- 8** Press the "Enter" key



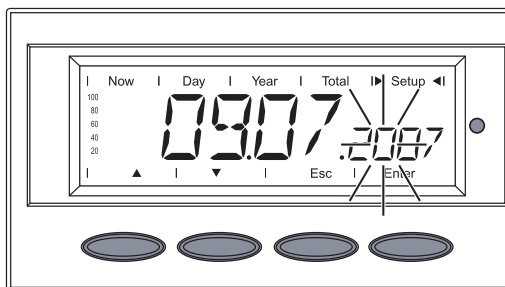
The second digit for the month flashes.

- 9** Use the "Up" and "Down" keys to select a value for the second month digit
▲ ▼
- 10** Press the "Enter" key



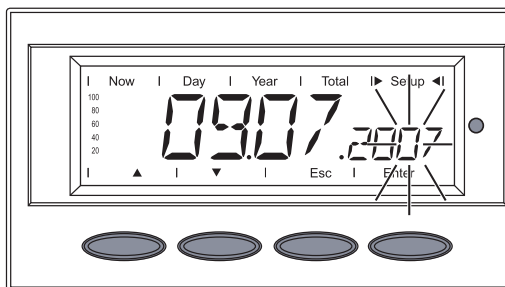
The first digit for the year flashes.

- 11** Use the "Up" and "Down" keys to select a value for the first year digit
▲ ▼
- 12** Press the "Enter" key



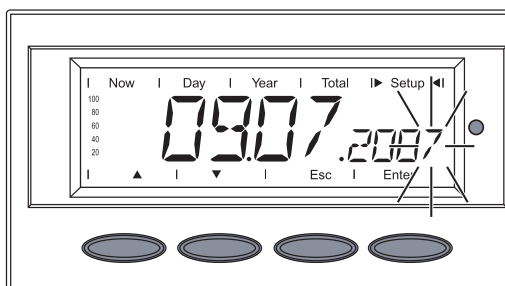
The second digit for the year flashes.

- 13** Use the "Up" and "Down" keys to select a value for the second year digit
▲ ▼
- 14** Press the "Enter" key



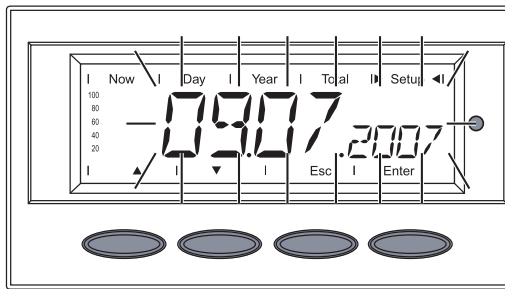
The third digit for the year flashes.

- 15** Use the "Up" and "Down" keys to select a value for the third year digit
▲ ▼
- 16** Press the "Enter" key



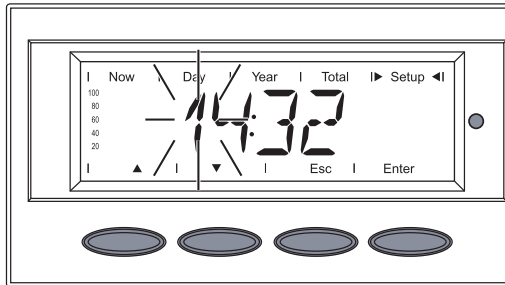
The fourth digit for the year flashes.

- 17** Use the "Up" and "Down" keys to select a value for the fourth year digit
▲ ▼
- 18** Press the "Enter" key



The set date then flashes.

- 19** Press the "Enter" key

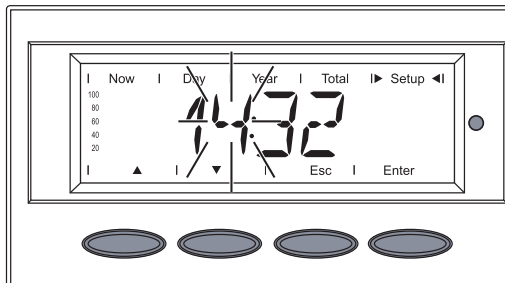


The **time** is displayed (HH:MM), the first digit for the hour flashes.

- 20** Use the "Up" and "Down" keys to select a value for the first hour digit



- 21** Press the "Enter" key

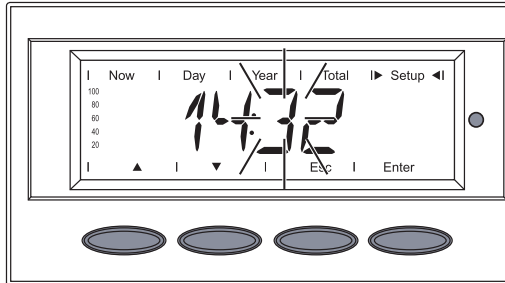


The second digit for the hour flashes.

- 22** Use the "Up" and "Down" keys to select a value for the second hour digit



- 23** Press the "Enter" key

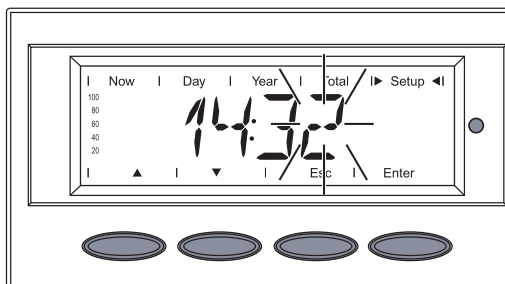


The first digit for the minutes flashes.

- 24** Use the "Up" and "Down" keys to select a value for the first minutes digit



- 25** Press the "Enter" key

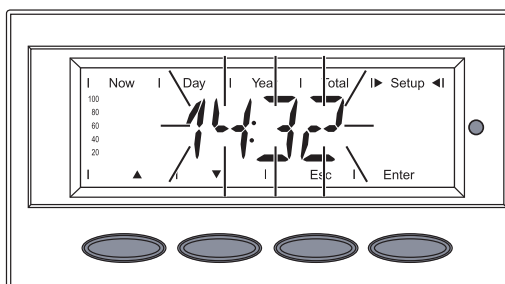


The second digit for the minutes flashes.

- 26** Use the "Up" and "Down" keys to select a value for the second minutes digit



- 27** Press the "Enter" key



The set time flashes.

- 28** Press the "Enter" key to apply the time

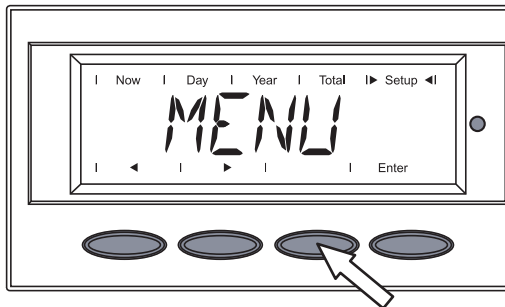
- 29** Press the "Esc" key to exit the "TIME" menu item

Setup Lock function

General

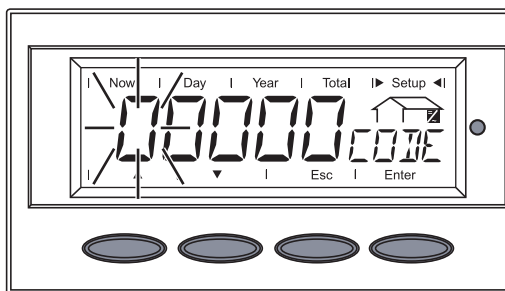
The inverter comes equipped with the "Setup Lock" function. When the "Setup Lock" function is active, the Setup menu cannot be accessed, e.g., to protect against setup data being changed by accident. You must enter code 12321 to activate / deactivate the "Setup Lock" function.

Activating/deactivating the "Setup Lock" function



- 1 Press the "Menu" key

"Menu" is shown.



- 2 Select the "Setup" mode using the "Left" or "Right" keys



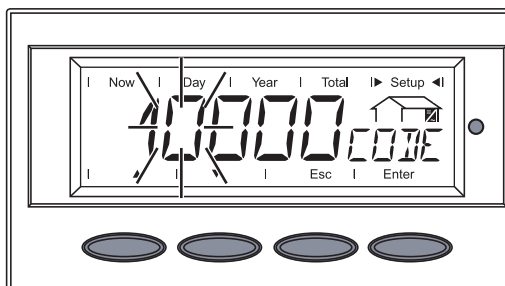
- 3 Press the unoccupied "Esc" key 5 x

"CODE" is displayed, the first digit flashes.

- 4 Enter the access code 12321: Use the "Up" and "Down" keys to select a value for the first digit of the access code

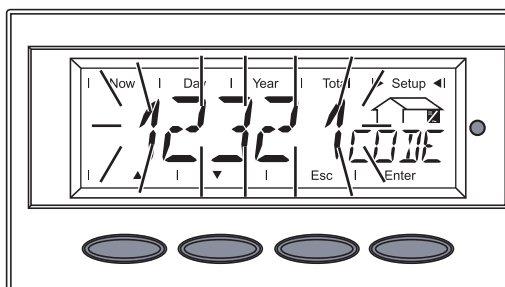


- 5 Press the "Enter" key



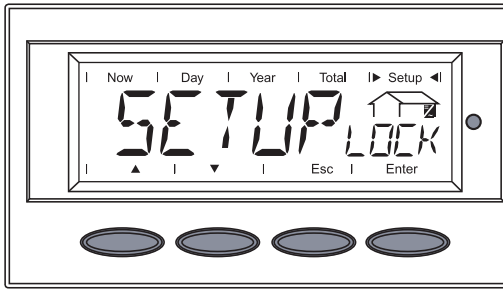
The second digit flashes.

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



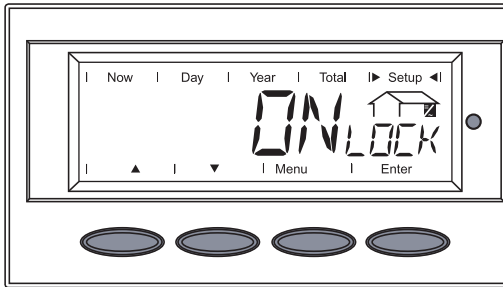
... the access code flashes.

- 7 Press the "Enter" key



"SETUP LOCK" is displayed.

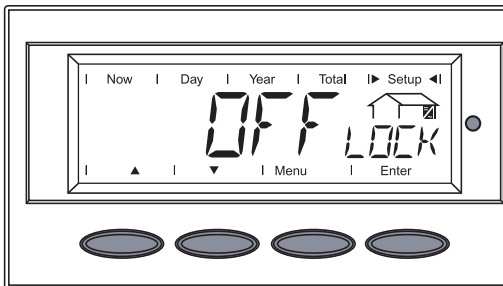
8 Press the "Enter" key



"ON LOCK" is displayed.

9 Use the "Up" and "Down" keys to select the desired function
▲ ▼

ON LOCK = "Setup Lock" function is activated (the Setup menu cannot be accessed)



OFF LOCK = "Setup Lock" function is deactivated (the Setup menu can be accessed)

10 Press the "Enter" key to apply the function

Select Log Entry function

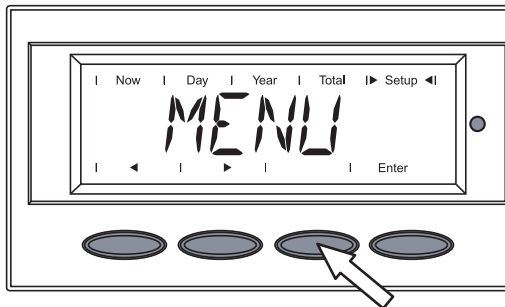
General

The inverter is equipped with a simple logging function that can record up to 5 grid errors. The 5 most recent grid errors are saved together with the time the error occurred according to the total operating hours counter. When there are more than 5 errors, the oldest error is deleted.

A grid error is saved when it is different than the most recent error.

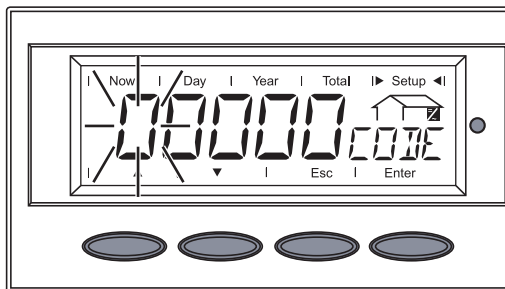
Code 22564 must be entered to access saved grid errors.

'Select Log Entry' function - access saved grid errors



- 1 Press the "Menu" key

"Menu" is shown.



- 2 Select the "Setup" mode using the "Left" or "Right" keys



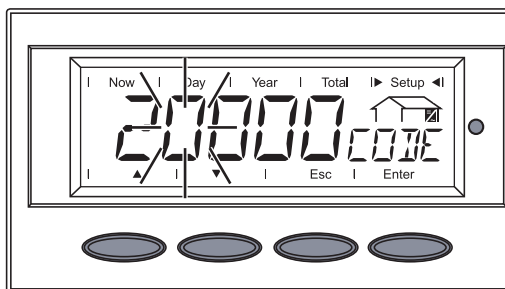
- 3 Press the unassigned "Esc" key five times

"CODE" is displayed, the first digit flashes.

- 4 Enter the access code 22564: Use the "Up" and "Down" keys to select a value for the first digit of the access code

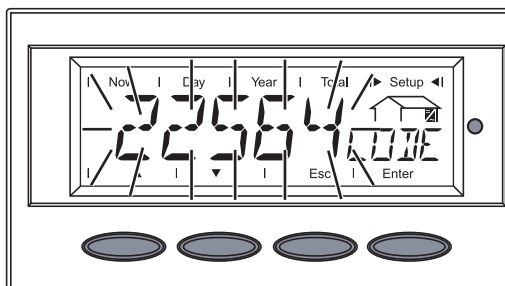


- 5 Press the "Enter" key



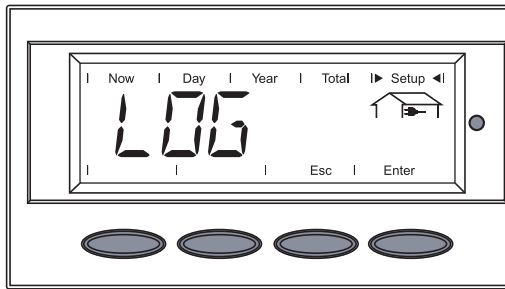
The second digit flashes.

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

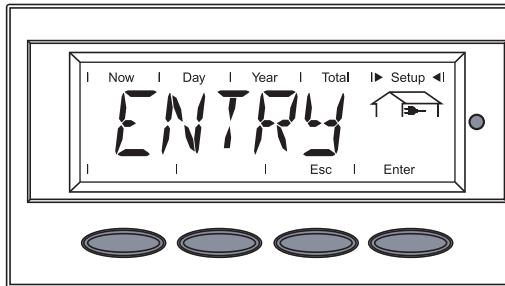


... the access code flashes.

- 7 Press the "Enter" key



"LOG" and ...



... "ENTRY" are displayed alternately.

8 Press the "Enter" key



The first saved grid error "LOG 1" is shown.

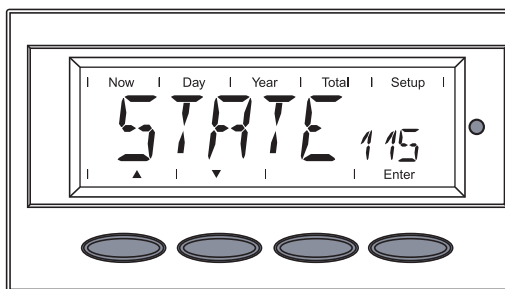
9 Use the "Up" and "Down" keys to select the desired grid error



LOG 1 ... contains the most recent grid error

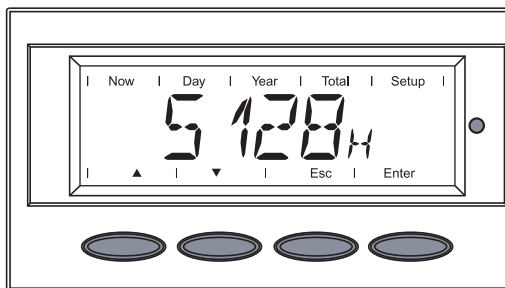
LOG 5 ... contains the oldest grid error

10 Press the "Enter" key to display the grid error



The corresponding status code is displayed (e.g. STATE 115 = AC frequency in phase 1 is too high)

11 Press the "Up" or "Down" key



The time when the grid error occurred (according to the total operating hours counter) is displayed.

12 Press "Esc" twice to exit the "Select Log Entry" function



NOTE! If the status code "STATE ----" and time "0:00 H" are displayed, then a save location was selected at which no AC error has yet been logged.

Energy Management function

General

The inverter is fitted with an "Energy Management" function. Via the "Energy Management" function, a potential-free switch contact can be triggered so that this functions as an actuator. A user connected to the switch contact can thus be controlled by assigning a power feed dependent switch-on or switch-off point.

The "Energy Management" function is only available if the "Fronius Signal Card" option is installed in the inverter.

When the "Energy Management" function is active,

- the basic function of the Fronius Signal Card is deactivated automatically and
- the potential-free switch contact of the Fronius Signal Card is triggered accordingly.



NOTE! The buzzer on the Fronius Signal Card can only be switched on or off by setting the "Buz." jumper on the Fronius Signal Card appropriately.

If the "Buz." jumper is in the "on" position, the acoustic signal sounds for as long as the potential-free contact of the Fronius Signal Card is switched on as a result of the "Energy Management" function.

For further information, refer to the Fronius Signal Card operating instructions.

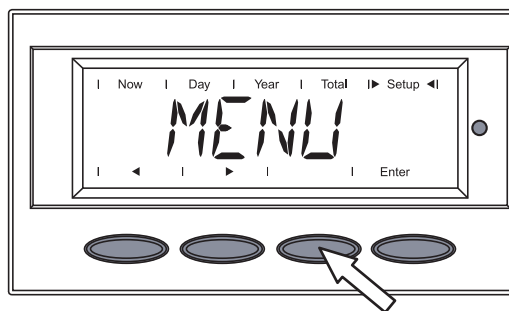
The switch contact is switched off

- when no current is being fed into the public mains supply by the inverter;
- when the inverter is switched manually to standby mode;
- if there is an effective power setting of <10% of the power rating (e.g. via the Fronius Power Control Card/Box);
- if there is insufficient solar irradiation (status codes "POWER LOW" and "DC LOW").

In the "Basic Service Menu" you can activate the "Energy Management" function and set a switch-on and switch-off point.

For access to the "Basic Service Menu," the code 22742 must be entered.

Activating the "Energy Management" function



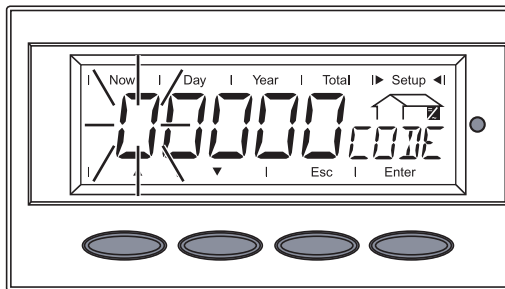
- 1 Press the "Menu" key

"Menu" is displayed.

- 2 Select the "Setup" mode using the "Left" or "Right" keys



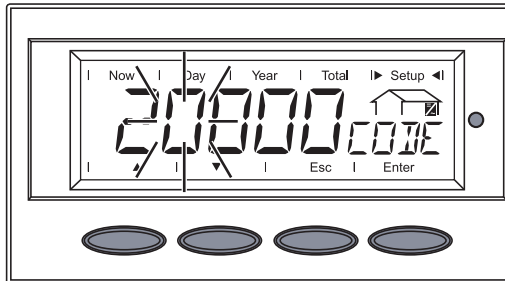
- 3 Press the unassigned "Esc" key five times



"CODE" is displayed, the first digit flashes.

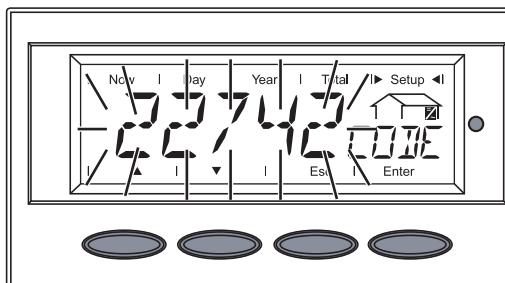
- 4 Enter the access code 22742: Use the "Up" and "Down" keys to select a value for the first digit of the access code
▲ ▼

- 5 Press the "Enter" key



The second digit flashes.

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

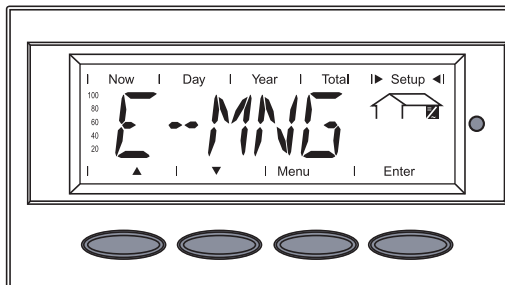


the access code flashes.

- 7 Press the "Enter" key

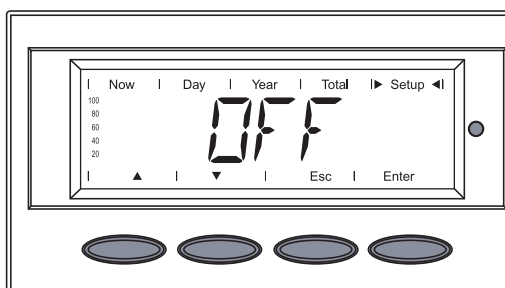
The inverter is now in the "Basic Service" menu, the first parameter is displayed:

- "MIXMODE" for multiphase inverters
- "DCMODE" for single-phase inverters



- 8 Use the "Up" or "Down" keys to select the "E-MNG" parameter
▲ ▼

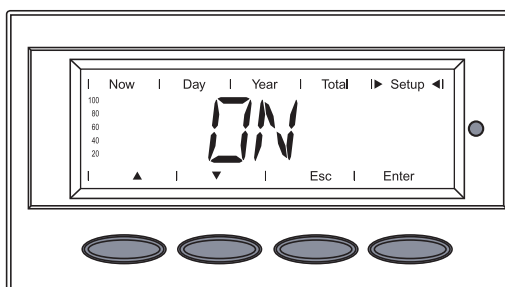
- 9 Press the "Enter" key



The current "Energy Management" status is displayed.

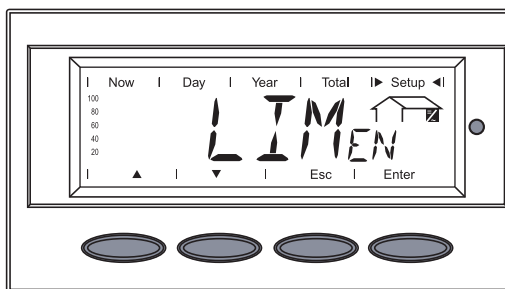
OFF The "Energy Management" function is deactivated (factory setting)

ON The "Energy Management" function is activated



- 10 To activate the Energy Management function, select "ON" using the "Up" or "Down" keys:
▲ ▼

- 11 Press the "Enter" key

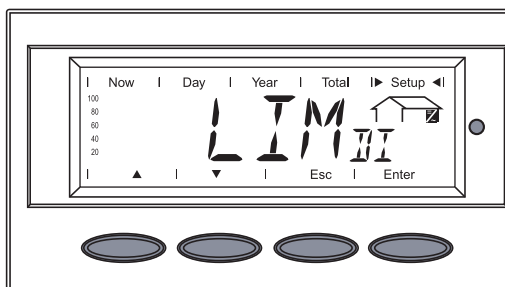


Effective power limits are displayed:

LIM EN = Limit engage (switch-on point)

Effective power limit, beyond which the switch contact is switched on

Factory setting: 20% of the power rating



LIM DI = Limit disengage (switch-off point)

Effective power limit, beyond which the switch contact is switched off

Factory setting: 0

12 Use the "Up" and "Down" keys to select the desired effective power limit:



13 Press the "Enter" key



The current switch-on or switch-off point is displayed in W

14 Altering the switch-on or switch-off point

To alter the switch-on or switch-off point:

a) Press the "Enter" key

The first digit of the value flashes.

b) Assign the appropriate value to a flashing digit using the "Up" or "Down" keys

c) Press the "Enter" key

d) Repeat the process for each digit until the whole value of the switch-on or switch-off point is flashing.

e) Press the "Enter" key

The value currently set for the switch-on or switch-off point is displayed.

f) Press the "Esc" key

The corresponding effective power limit is displayed.

Press the "Esc" key 3 times to exit the "Basic Service" menu.

Notes on configuring the switch-on and switch-off points

Pay attention to the following when configuring the switch-on and switch-off points:

Insufficient difference between the switch-on point and the switch-off point or power fluctuations can cause frequent switching cycles.

To avoid excessive switching on and off, the difference between the switch-on and switch-off points should be at least 100 - 200 W.

When selecting the switch-off point, consider the power consumption of the connected user.

When selecting the switch-on point also bear in mind the weather conditions and the expected solar radiation.

Example

Switch-on point 'LIM EN' = 2000 W

Switch off point 'LIM DI' = 1800 W

If the inverter supplies 2000 W or more, the potential free signal contact on the Fronius Signal Card is switched on.

If the inverter output sinks below 1800 W, the signal contact is switched off.

Possible applications:

Operation of a heat pump or an air-conditioning system, using as much self-produced power as possible.

Status Diagnosis and Troubleshooting

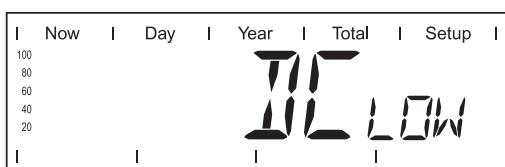
Displaying Status Codes

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

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

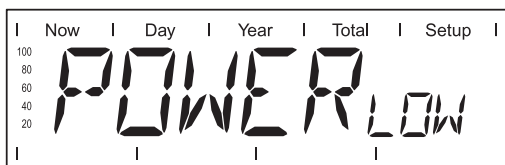
IMPORTANT! Status codes may sometimes appear briefly as a result of the control response from the inverter. If it subsequently continues to operate normally, there has not been a system error.

Normal Operation Status Codes



The open circuit voltage of the solar modules is too low.

As soon as the open circuit voltage exceeds 265 V, the inverter starts synchronizing with the grid (display shows "SYNC AC").



The total power output of the solar modules is insufficient.

After a short time the inverter resumes grid synchronization (display shows "SYNC AC").

Total Failure

If the display remains dark for a long time after sunrise:

- Check the open circuit voltage of the solar modules at the connections of the inverter:

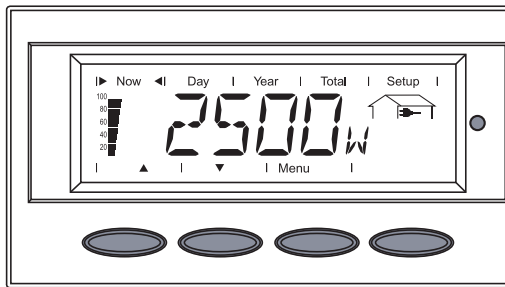
Open circuit voltage < 260 V ... error in the photovoltaic system

Open circuit voltage > 260 V ... may indicate a basic fault in the inverter. In this case, notify a Fronius-trained service engineer.

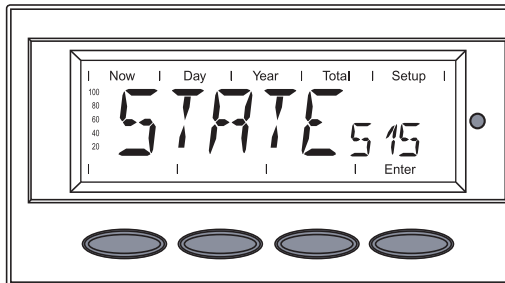
Status Codes on inverters with Several Power Stage Sets

A special status diagnostic is run if an error occurs in an inverter with several power stage sets.

It is also possible to call up status codes even if there is no actual error in existence. This form of status polling may be found in the section "The Setup Menu."

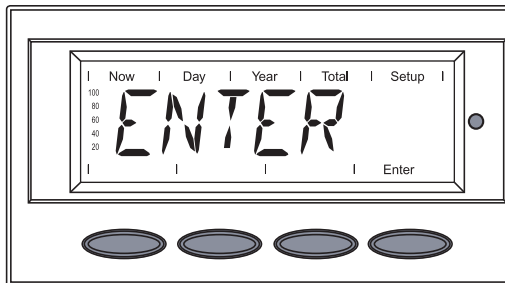


Display during normal operation



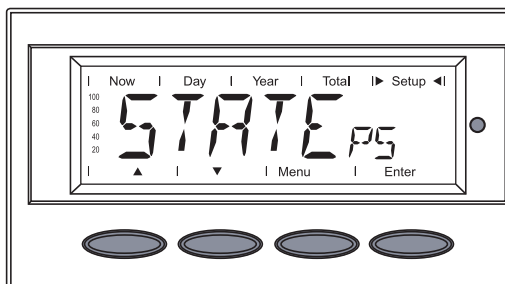
When there is an error in one of the power stage sets, the display flashes between "STATE" and the corresponding status code (e.g., "STATE 515")

and



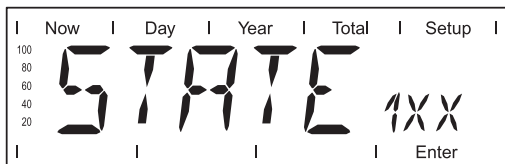
"ENTER"

- Press the "Enter" key twice



- The status display of the power stage sets "STATE PS" appears
- Press the "Enter" key

Class 1 Status Codes



Class 1 status codes are typically temporary. Their cause lies in the public grid.

The initial response of the inverter is to disconnect itself from the grid. The grid is subsequently checked for the stipulated monitoring period. If after the end of this period no further defect is identified, your inverter resumes operating and feeding power into the grid.

IMPORTANT! The 2nd position x defines the exact network point for the following status codes:

- 0 = several / all 3 phases
- 1 = L1
- 2 = L2
- 3 = L3

1x2

AC voltage too high

Behavior Grid conditions are thoroughly tested and as soon as they are again within the permissible range, the inverter will resume feeding power into the grid.

Remedy Check grid connections and fuses
Should the status code persist, you should contact your system installer

1x3

AC voltage too low

Behavior Grid conditions are thoroughly tested and as soon as they are again within the permissible range, the inverter will resume feeding power into the grid.

Remedy Check grid connections, breakers and disconnect
Should the status code persist, you should contact your system installer

1x5

AC frequency too high

Behavior Grid conditions are thoroughly tested and as soon as they are again within the permissible range, the inverter will resume feeding power into the grid.

Remedy Check grid connections and fuses
Should the status code persist, you should contact your system installer

1x6

AC frequency too low

Behavior Grid conditions are thoroughly tested and as soon as they are again within the permissible range, the inverter will resume feeding power into the grid.

Remedy Check grid connections and fuses
Should the status code persist, you should contact your system installer

1x7

No AC grid detected

Behavior Grid conditions are thoroughly tested and as soon as they are again within the permissible range, the inverter will resume feeding power into the grid.

Remedy Check grid connections and fuses
Should the status code persist, you should contact your system installer

108

Islanding detected

| | |
|----------|---|
| Behavior | Grid conditions are thoroughly tested and as soon as they are again within the permissible range, the inverter will resume feeding power into the grid. |
| Remedy | Should the status code persist, you should contact your system installer |

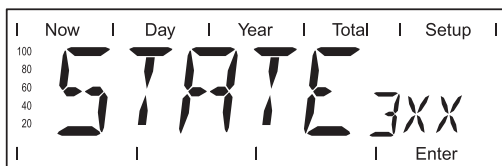
109

General grid error

This error is always displayed first for grid errors. After reviewing all power stage sets, the grid error is specified in more detail: 1x1 / 1x4 or the display remains at "109" (e.g., when 2 phases report "104" and one phase "101")

| | |
|----------|---|
| Behavior | Grid conditions are thoroughly tested and as soon as they are again within the permissible range, the inverter will resume feeding power into the grid. |
| Remedy | Check grid connections and fuses Should the status code persist, you should contact your system installer |

Class 3 status codes



Class 3 comprises status codes that may appear during feed-in operation and that do not cause a permanent interruption of the operation of feeding power into the grid.

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

301

Overcurrent (AC)

| | |
|-------------|---|
| Description | Short interruption of power feeding into the grid due to overcurrent. The inverter returns to the startup phase. |
| Remedy | Fault is rectified automatically If this status code keeps recurring, contact your system installer |

302

Overcurrent (DC)

| | |
|-------------|---|
| Description | Short interruption of power feeding into the grid due to overcurrent. The inverter returns to the startup phase. |
| Remedy | Fault is rectified automatically If this status code keeps recurring, contact your system installer |

303

Over-temperature buck converter

| | |
|-------------|--|
| Description | Short interruption of power feeding into the grid due to over-temperature. The inverter returns to the startup phase. |
| Remedy | Fault is rectified automatically If this status code keeps recurring, contact your system installer |

304

Over-temperature cooling element

| | |
|-------------|--|
| Description | Short interruption of power feeding into the grid due to over-temperature. The inverter returns to the startup phase. |
| Remedy | Fault is rectified automatically If this status code keeps recurring, contact your system installer |

305

No power transfer to grid possible

| | |
|-------------|--|
| Description | Continual interruption of grid feed operation |
| Remedy | Should the status code persist, you should contact your system installer |

'POWER LOW' (306)

Intermediate circuit voltage has dropped below permissible threshold value for feed in.
This error is shown on the inverter in plain text.

| | |
|-------------|--|
| Description | Short interruption of power feeding into the grid. The inverter returns to the startup phase. |
| Remedy | Fault is rectified automatically If this status code keeps recurring, contact your system installer |

'DC LOW' (307)

DC input voltage is too low for feed in.
This error is shown on the inverter in plain text.

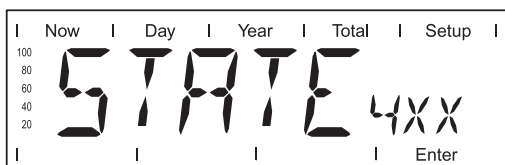
| | |
|-------------|--|
| Description | Short interruption of power feeding into the grid. The inverter returns to the startup phase. |
| Remedy | Fault is rectified automatically If this status code keeps recurring, contact your system installer |

308

Intermediate circuit voltage too high.

| | |
|-------------|--|
| Description | Short interruption of power feeding into the grid. The inverter returns to the startup phase. |
| Remedy | Fault is rectified automatically If this status code keeps recurring, contact your system installer |

Class 4 status codes



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

401

No internal communication with power stage set

Description The inverter will automatically attempt to connect again and, if possible, resume feeding power into the grid

Remedy Check grid connections and fuses
If status code persists: Contact a Fronius-trained service technician

402

Communication with EEPROM not possible

Description The inverter will automatically attempt to connect again and, if possible, resume feeding power into the grid.

Remedy If status code persists: Contact a Fronius-trained service technician

403

EEPROM faulty

Description The inverter will automatically attempt to connect again and, if possible, resume feeding power into the grid.

Remedy If status code persists: Contact a Fronius-trained service technician

406

One or both temperature sensors are defective

Description The inverter disconnects from the grid for safety reasons.

Remedy If status code persists: Contact a Fronius-trained service technician

407

Temperature sensor at cooling element defective

Description The inverter disconnects from the grid for safety reasons.

Remedy If status code persists: Contact a Fronius-trained service technician

408

Direct current feed in

Description The inverter disconnects from the grid for safety reasons.

| | |
|---|--|
| Remedy | If status code persists: Contact a Fronius-trained service technician |
| 412 | |
| The "fixed voltage" setting has been selected instead of MPP voltage operation and the voltage is set to too low a value, or DC voltage exceeds allowable limits. | |
| Description | Fixed voltage lower than the current MPP voltage. |
| Remedy | Remove excess solar modules so DC voltage fits within inverter limits If the status code persists: Contact a Fronius-trained service technician |
| 413 | |
| Control problems | |
| Description | The inverter briefly disconnects from the grid if AC voltage or frequency are out of range. |
| Remedy | If status code persists: Contact a Fronius-trained service technician |
| 414 | |
| EEPROM faulty | |
| Description | Memory deleted |
| Remedy | If status code persists: Contact a Fronius-trained service technician |
| 416 | |
| Communication with IG Brain not possible. | |
| Description | The Operating Status LED lights up orange, then the inverter attempts a restart. |
| Remedy | If status code persists: Contact a Fronius-trained service technician |
| 417 | |
| Two power stage sets have the same PC board number | |
| Description | The inverter stops feeding power into the grid, the display shows a critical error via a red Operating Status LED |
| Remedy | If status code persists: Contact a Fronius-trained service technician |
| 419 | |
| Two or more power stage sets with an identical software serial number detected. | |
| Description | The inverter stops feeding power into the grid, the display shows a critical error via a red Operating Status LED |
| Remedy | If status code persists: Contact a Fronius-trained service technician |

421

PC board number has been set incorrectly

Description The inverter stops feeding power into the grid, the display shows a critical error via a red Operating Status LED.

Remedy If status code persists: Contact a Fronius-trained service technician

425

Communication with the power stage set is not possible

Description The Operating Status LED lights up orange, then the inverter attempts a restart.

Remedy If status code persists: Contact a Fronius-trained service technician

431

All power stage sets are in boot mode

Description The inverter stops feeding power into the grid, the display shows a critical error via a red Operating Status LED.

Remedy Update firmware using Bootloader or Fronius Solar.update/IG Plus

Switches between SLAVE / DC LOW or SLAVE / POWER LOW (439)

The MPP master power stage set is switched off because of an error in a slave power stage set (in the balance mode).

Description The inverter stops feeding power into the grid, the display shows a critical error via a red Operating Status LED.

Remedy If status code persists: Contact a Fronius-trained service technician

Switches between SLAVE / DC LOW or SLAVE / POWER LOW (439)

The MPP master power stage set is switched off because of a faulty GFDI grounding fuse.

Description The inverter stops feeding power into the grid, the display shows a critical error via a red Operating Status LED.

Remedy Check the GFDI grounding fuse and replace it, if necessary. If status code persists: Contact a Fronius-trained service technician

442

No phase master for a phase

Description The inverter stops feeding power into the grid, the display shows a critical error via a red Operating Status LED.

Remedy If status code persists: Contact a Fronius-trained service technician

443

Energy transfer not possible

Description The inverter stops feeding power into the grid, the display shows a critical error via a red Operating Status LED.

Remedy If status code persists: Contact a Fronius-trained service technician

445

Invalid power stage set configuration

Description The inverter stops feeding power into the grid, the display shows a critical error via a red Operating Status LED.

Remedy If status code persists: Contact a Fronius-trained service technician

450

The monitoring of the power stage set main processor 'Guard' is active

Description The inverter stops feeding power into the grid, the display shows a critical error via a red Operating Status LED.

Remedy If status code persists: Contact a Fronius-trained service technician

451

The EEPROM Guard Control is defective

Description The inverter stops feeding power into the grid, the display shows a critical error via a red Operating Status LED.

Remedy If status code persists: Contact a Fronius-trained service technician

452

Communication between 'Guard' and the digital signal processor (DSP) has been interrupted

Description The inverter stops feeding power into the grid, the display shows a critical error via a red Operating Status LED.

Remedy If status code persists: Contact a Fronius-trained service technician

453

Error in grid voltage recording

Description The inverter stops feeding power into the grid, the display shows a critical error via a red Operating Status LED.

Remedy If status code persists: Contact a Fronius-trained service technician

454

Error in grid frequency recording

| | |
|-------------|--|
| Description | The inverter stops feeding power into the grid, the display shows a critical error via a red Operating Status LED. |
| Remedy | If status code persists: Contact a Fronius-trained service technician |

455

Reference power source for AC measurement is operating outside of tolerances

| | |
|-------------|--|
| Description | The inverter stops feeding power into the grid, the display shows a critical error via a red Operating Status LED. |
| Remedy | If status code persists: Contact a Fronius-trained service technician |

456

Error during anti-islanding test

| | |
|-------------|--|
| Description | The inverter stops feeding power into the grid, the display shows a critical error via a red Operating Status LED. |
| Remedy | If status code persists: Contact a Fronius-trained service technician |

457

Grid relay stuck

| | |
|-------------|--|
| Description | The inverter stops feeding power into the grid, the display shows a critical error via a red Operating Status LED. |
| Remedy | If status code persists: Contact a Fronius-trained service technician |

460

Reference power source for the digital signal processor (DSP) is operating outside of tolerances

| | |
|-------------|--|
| Description | The inverter stops feeding power into the grid, the display shows a critical error via a red Operating Status LED. |
| Remedy | If status code persists: Contact a Fronius-trained service technician |

461

Error in DSP data memory

| | |
|-------------|--|
| Description | The inverter stops feeding power into the grid, the display shows a critical error via a red Operating Status LED. |
| Remedy | If status code persists: Contact a Fronius-trained service technician |

464

Display error

The software and/or hardware versions of the display and IG Brain are not compatible.

| | |
|-------------|--|
| Description | The inverter stops feeding power into the grid, the display shows a critical error via a red Operating Status LED. |
|-------------|--|

| | |
|--------|--|
| Remedy | Update firmware using Bootloader or Fronius Solar.update/IG Plus |
|--------|--|

465

Display error

The UI command sent from the IG Brain is not recognized by the present display version.

| | |
|-------------|--|
| Description | The inverter stops feeding power into the grid, the display shows a critical error via a red Operating Status LED. |
|-------------|--|

| | |
|--------|---|
| Remedy | If status code persists: Contact a Fronius-trained service technician |
|--------|---|

466

Display error

The display was not detected.

| | |
|-------------|--|
| Description | The inverter stops feeding power into the grid, the display shows a critical error via a red Operating Status LED. |
|-------------|--|

| | |
|--------|---|
| Remedy | Check the display for damage, connect display, check ribbon wire for damage, check IG Brain for damage If status code persists: Contact a Fronius-trained service technician |
|--------|---|

467

The display has not received a start command from the IG Brain for longer than 6 s.

| | |
|-------------|--|
| Description | The inverter will automatically attempt to connect again and, if possible, resume feeding power into the grid. |
|-------------|--|

| | |
|--------|---|
| Remedy | If status code persists: Contact a Fronius-trained service technician |
|--------|---|

469

Output choke connected to wrong poles

| | |
|-------------|--|
| Description | The inverter stops feeding power into the grid, the display shows a critical error via a red Operating Status LED. |
|-------------|--|

| | |
|--------|--|
| Remedy | Properly connect output choke If status code persists: Contact a Fronius-trained service technician |
|--------|--|

470

The buck converter relay does not open at high DC voltage

| | |
|-------------|--|
| Description | The inverter stops feeding power into the grid, the display shows a critical error via a red Operating Status LED. |
|-------------|--|

| | |
|--------|---|
| Remedy | Check system configuration If status code persists: Contact a Fronius-trained service technician |
|--------|---|

471

Defective fuse for solar module ground has not yet been replaced.

This status code is displayed when the fuse for the solar module ground has not been replaced after a specific period of time after the status code 551 is displayed.

| | |
|-------------|--|
| Description | The inverter stops feeding power into the grid, the display shows a critical error via a red Operating Status LED. |
| Remedy | Insert new fuse for the solar module ground so that the solar modules are grounded at the negative or positive pole. Fault is rectified automatically If this status code keeps recurring, contact your system installer |

474

Short circuit between DC connection and ground (external insulation fault)
High ohm resistor for solar module ground is defective

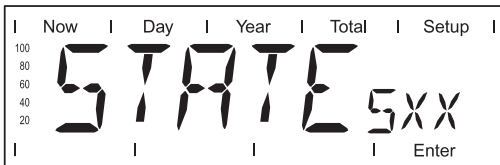
| | |
|-------------|---|
| Description | The inverter stops feeding power into the grid, the display shows a critical error via a red Operating Status LED. |
| Remedy | Insert new high ohm resistor for solar module ground. Remedy external insulation fault Fault is rectified automatically If this status code keeps recurring, contact your system installer |

475

DC insulation fault
The insulation value of the DC terminals to the protective earth (PE) is ≤ 500 kilohms

| | |
|-------------|---|
| Description | The inverter interrupts feed-in operation |
| Remedy | Correct insulation fault |

Class 5 status codes



Class 5 status codes generally do not impair the operation of feeding power into the grid. They will be displayed until the status code is acknowledged by pressing a key (the inverter, however, continues working normally in the background).

- press any key
- error message disappears

502

DC insulation fault

| | |
|-------------|--|
| Description | While automatically measuring the insulation, the inverter has detected an insulation fault to the ground. |
| Remedy | Check the insulation of your photovoltaic system The status code reappears: contact your system installer |

504

No Solar Net communication possible

| | |
|-------------|---|
| Description | Inverter address issued twice. |
| Remedy | Change inverter address (section: 'The Setup menu') |

| | |
|---|--|
| Description | The Solar Net components required are in the inverter: However, communication is still not currently possible. |
| Remedy | Status code will disappear after changing the inverter address |
| 505 | |
| EEPROM faulty | |
| Description | Data from the Setup menu are lost. |
| Remedy | Remedied automatically |
| 506 | |
| EEPROM faulty | |
| Description | Data from the 'Total' menu are lost. |
| Remedy | Remedied automatically |
| 507 | |
| EEPROM faulty | |
| Description | Data from the 'Day' / 'Year' menu are lost. |
| Remedy | Remedied automatically |
| 508 | |
| Inverter address incorrect | |
| Description | Address for data communication is no longer saved. |
| Remedy | Set address again |
| 509 | |
| 24h no feed in | |
| Description | Example: solar modules covered with snow |
| Remedy | Example: remove snow from solar modules |
| 510 | |
| EEPROM faulty | |
| Description | SMS settings were restored to default. |
| Remedy | If necessary, reconfigure SMS |
| 511 | |
| EEPROM faulty | |
| Description | Sensor card settings were restored to default |
| Remedy | If necessary, reconfigure measuring channels |
| 512 | |
| Too many power stage sets in the system | |

| | |
|-------------|---|
| Description | Too many power stage sets have been detected in the system. |
| Remedy | If status code persists: Contact a Fronius-trained service technician |

513

Power stage set in boot mode

| | |
|-------------|--|
| Description | One or more power stage sets cannot be activated, because they are in boot mode. |
| Remedy | Update power stage set firmware |

514

No communication with one of the power stage sets

| | |
|-------------|---|
| Description | Warning message from one of the power stage sets, second power stage set working normally |
| Remedy | If status code persists: Contact a Fronius-trained service technician |

515

Faulty plug connections

| | |
|-------------|---|
| Description | Temperature sensor on cooling element faulty or not connected properly. |
| Remedy | If status code persists: Contact a Fronius-trained service technician |

516

Status codes present for one of the power stage sets.

| | |
|-------------|---|
| Description | It is not possible to activate all power stage sets |
| Remedy | Carry out analysis. For more information, see the 'The setup menu' section. If status code persists: Contact a Fronius-trained service technician |

517

Change of master has taken place.

| | |
|-------------|---|
| Description | Transformer not connected / not plugged in Bridge short-circuit Detection of intermediate circuit voltage damaged |
| Remedy | Check possible errors referred to in 'Description.' If status code persists: Contact a Fronius-trained service technician |

550

String fuse defective.

| | |
|-------------|--|
| Description | One or more string fuses are defective. |
| Remedy | Test string fuses and replace any that are defective |

550

Jumper set incorrectly

Description The jumper on the C-Box PC board was not reset to the 'SMon' position after the solar module strings were checked

Remedy Set the jumper on the C-Box PC board to the 'SMon' position

551

Fuse for solar module ground is defective

Description The fuse for the solar module ground is defective, replace the fuse to protect the solar module.

Remedy Insert new fuse for the solar module ground so that the solar modules are grounded at the negative or positive pole.
Fault is rectified automatically
If this status code keeps recurring, contact your system installer

553

Phase master deactivated due to frequently occurring errors

Description A reintegration of the power stage set into the Mix network will be attempted at a later time.

Remedy If status code persists: Contact a Fronius-trained service technician

558

Feature deactivated (e.g., inverter control via the Fronius Power Control Box option)

Description A feature had to be deactivated (e.g., after component replacement).
The status code is no longer displayed after the next DC disconnect.

Remedy Confirm error, update firmware using Bootloader or Fronius Solar.update/IG Plus, if required
(The inverter will also operate problem-free without updating the firmware)

559

"Low Voltage Ride Through" event

Description Grid voltage parameters outside of the limits have caused a grid voltage gap. The inverter attempts to bridge the grid voltage gap.

Remedy Fault is corrected automatically when grid parameters return to normal
If this status code keeps recurring, contact your system installer

560

Power reduction due to over-frequency

Description The inverter reduces output power due to excessive grid frequency in order to stabilize the grid.

| | |
|--------|--|
| Remedy | Fault is corrected automatically when the grid frequency returns to normal If this status code keeps recurring, contact your system installer |
|--------|--|

561

Power reduction due to excessive power stage set temperature

| | |
|-------------|---|
| Description | The inverter reduces output power due to excessive ambient temperature. |
|-------------|---|

| | |
|--------|---|
| Remedy | Error is corrected automatically after cooling down |
|--------|---|

Customer Service

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

Maintenance

Safety

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

- The connection area should only be opened by a licensed electrician.
- The separate power stage set area should only be disconnected from the connection area after first being disconnected from the grid power.
- The separate power stage set area should only be opened by Fronius-trained service personnel.

Never work with live wires! Prior to all connection work, make sure that the AC and DC wires are not charged.

The DC main switch is only used to switch off power to the power stage set. When the DC main switch is turned off, the connection area is still energized.

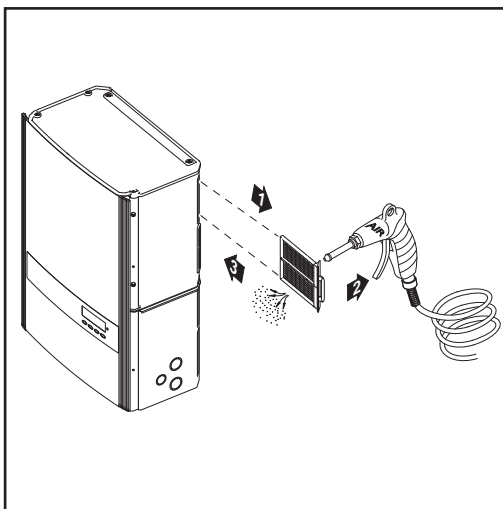
WARNING! An electric shock can be fatal. Danger from residual voltage from capacitors.

You must wait until the capacitors have discharged. Discharge takes 5 minutes.

General

The inverter is designed so that it does not require additional maintenance. However, there are a few points to keep in mind during operation to ensure that the inverter functions optimally.

Operation in Dusty Environments



When operating the inverter in extremely dusty environments:
Remove the fan cover and clean the integrated fly screen as required

Opening Fronius IG Plus for Service/Maintenance

Procedure for opening the inverter for service or maintenance:

- 1 Disconnect AC and DC supply from the inverter
- 2 Open the connection area
- 3 Turn off DC main switch
- 4 Allow the capacitors to discharge (5 minutes)

- 5 Remove metal covers
- 6 If present, remove the fuse for the solar module ground
- 7 If present, remove string fuses
- 8 Disconnect DC wire
- 9 Disconnect AC wire

Replacing String Fuses

Safety



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

- The connection area should only be opened by a licensed electrician.
- The separate power stage set area should only be disconnected from the connection area after first being disconnected from the grid power.
- The separate power stage set area should only be opened by Fronius-trained service personnel.

Never work with live wires! Prior to all connection work, make sure that the AC and DC wires are not charged.

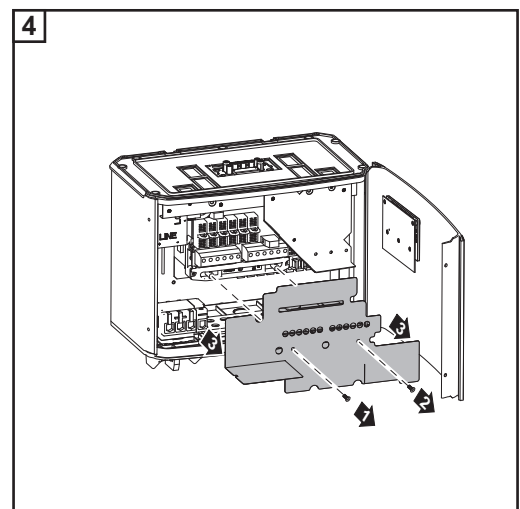
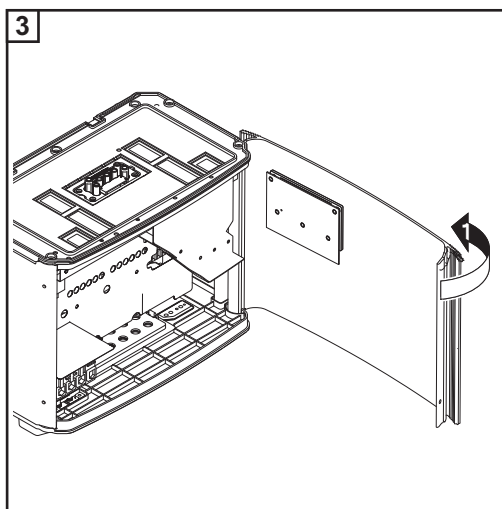
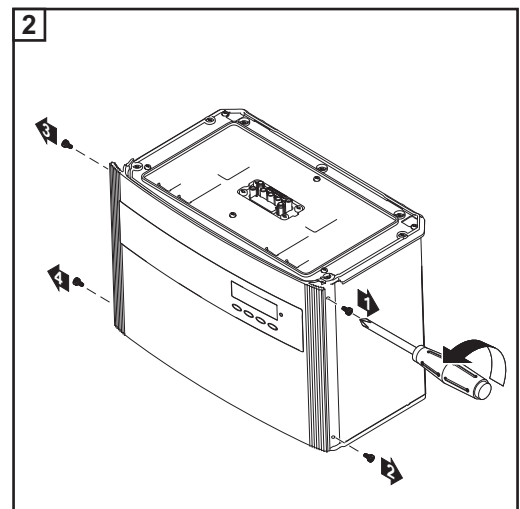
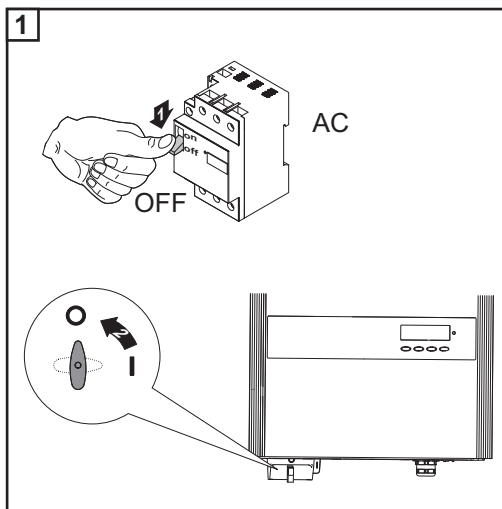
The DC main switch is only used to switch off power to the power stage set. When the DC main switch is turned off, the connection area is still energized.



WARNING! An electric shock can be fatal. Danger from residual voltage from capacitors.

You must wait until the capacitors have discharged. Discharge takes 5 minutes.

Preparation



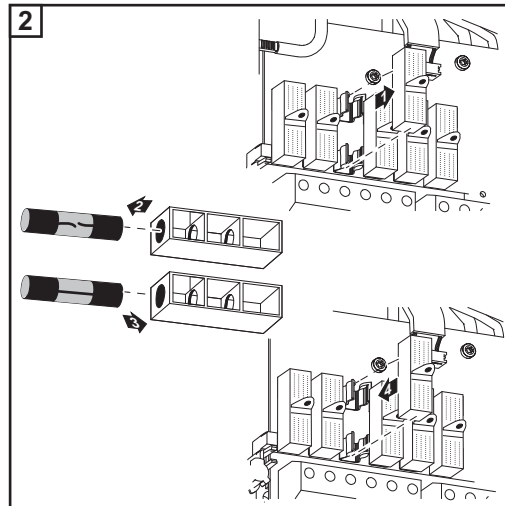
Replacing Fuses

- 1 Test the fuse holder at the terminal for continuity



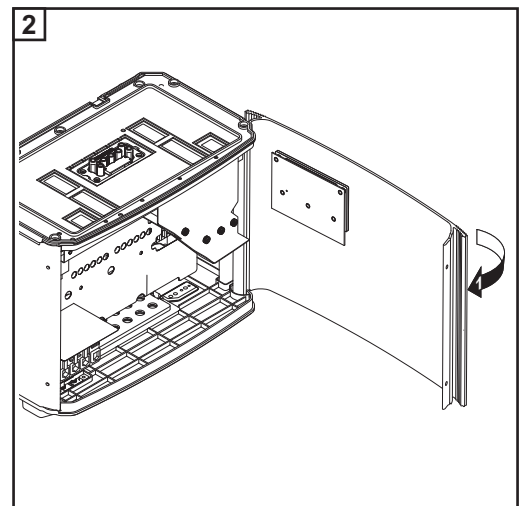
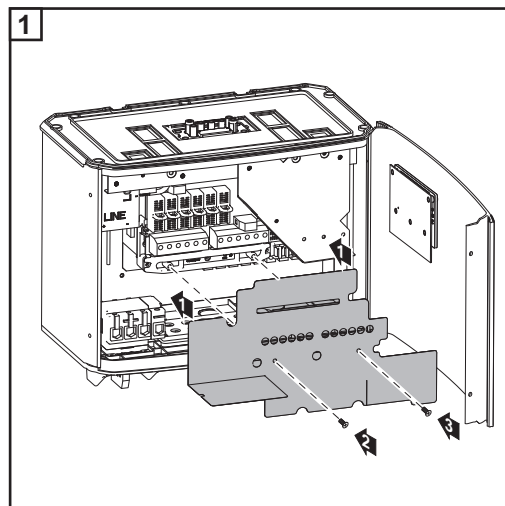
NOTE! Only use fuses for solar modules that meet the criteria for the proper selection of string fuses.

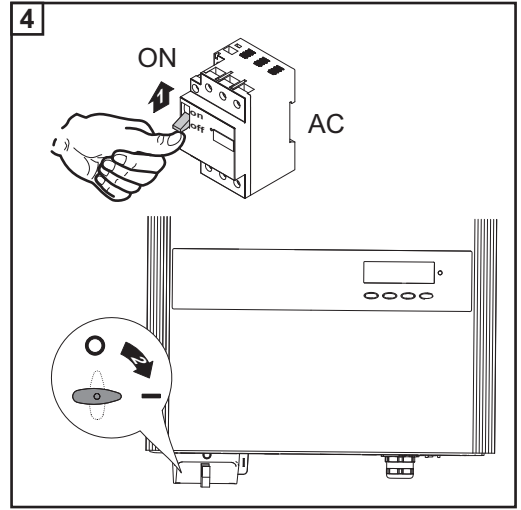
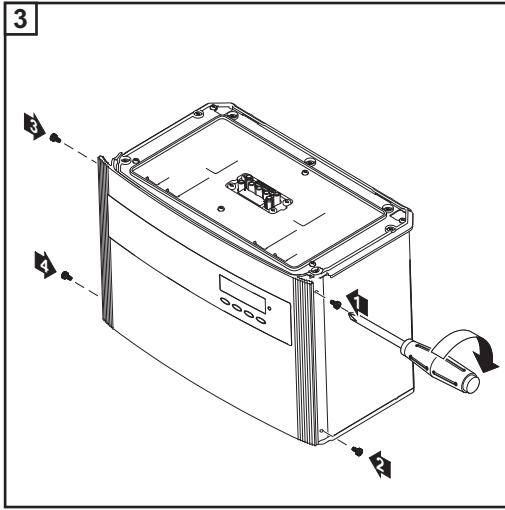
Fuse dimensions: Diameter 10.3 x 35 - 38 mm



- 3 After replacing the fuse:
 - Find out and correct the cause for the defective fuse

Finally...





Technical Data

Fronius IG Plus 25 V-1

Input data

| | |
|--|----------------|
| MPP voltage range | 230 - 500 V DC |
| Max. input voltage (at 1000 W/m ² / -10 °C in an open circuit) | 600 V DC |
| Max. input current | 11.9 A DC |
| Max. array short circuit current | 17.9 A |

Output data

| | |
|---|---------------------------------------|
| Nominal output power (P _{nom}) | 2.6 kW |
| Max output power | 2.6 kW |
| Nominal AC output voltage | 1 ~ NPE 230 V |
| Grid voltage tolerance | +10 / -15 % ¹⁾ |
| Nominal output current (single phase) | 11.3 A AC |
| Nominal frequency | 50 - 60 Hz ¹⁾ |
| Harmonic distortion | < 3,0 % |
| Power factor (cos phi) | 1 0.75 - 1 ind./cap. ²⁾ |
| Max. permitted grid impedance Z _{max} at PCC ³⁾ | None |
| Maximum continuous utility backfeed current ⁴⁾ | 0 A ⁵⁾ |
| Synchronization in-rush current ⁶⁾ | 0 A ⁵⁾ |
| Maximum output fault current / duration | 346 A / 3.24 μs |

General data

| | |
|---|-----------------------------------|
| Maximum efficiency | 95.7 % |
| Euro. efficiency | 94.6 % |
| Night consumption | 0.23 W |
| Cooling | Controlled forced-air ventilation |
| Degree of protection | IP 54 in Australia, IP 44 |
| Dimensions h x w x d | 673 x 434 x 250 mm |
| Weight | 23.8 kg |
| Permissible ambient temperature (with 95% rel. humidity) | - 20 °C - +55 °C |
| EMC emissions class | B |
| Over-voltage category (OVC) | AC 3 / DC 2 |

Safety equipment

| | |
|-------------------------------------|--|
| DC insulation measurement | Warning / Shutdown ⁷⁾ at R _{ISO} < 600 kilohms |
| DC over-voltage protection | integrated |
| Protection against reverse polarity | integrated |
| Manifestation of DC overload | Operating point shift |

**Fronius IG Plus
30 V-1**
Input data

| | |
|--|----------------|
| MPP voltage range | 230 - 500 V DC |
| Max. input voltage (at 1000 W/m ² / -10 °C in an open circuit) | 600 V DC |
| Max. input current | 13.8 A DC |
| Max. array short circuit current | 20.7 A |

Output data

| | |
|--|---------------------------------------|
| Nominal output power (P_{nom}) | 3.0 kW |
| Max output power | 3.0 kW |
| Nominal AC output voltage | 1 ~ NPE 230 V |
| Grid voltage tolerance | +10 / -15 % ¹⁾ |
| Nominal output current (single phase) | 13.0 A AC |
| Nominal frequency | 50 - 60 Hz ¹⁾ |
| Harmonic distortion | < 3,0 % |
| Power factor (cos phi) | 1 0.75 - 1 ind./cap. ²⁾ |
| Max. permitted grid impedance Z_{max} at PCC ³⁾ | None |
| Maximum continuous utility backfeed current ⁴⁾ | 0 A ⁵⁾ |
| Synchronization in-rush current ⁶⁾ | 0 A ⁵⁾ |
| Maximum output fault current / duration | 346 A / 3.24 μ s |

General data

| | |
|---|-----------------------------------|
| Maximum efficiency | 95,7 % |
| Euro. efficiency | 94,8 % |
| Night consumption | 0.23 W |
| Cooling | Controlled forced-air ventilation |
| Degree of protection | IP 54 in Australia, IP 44 |
| Dimensions h x w x d | 673 x 434 x 250 mm |
| Weight | 23.8 kg |
| Permissible ambient temperature (with 95% rel. humidity) | - 20 °C - +55 °C |
| EMC emissions class | B |
| Over-voltage category (OVC) | AC 3 / DC 2 |

Safety equipment

| | |
|-------------------------------------|---|
| DC insulation measurement | Warning / Shutdown ⁷⁾ at $R_{ISO} < 600$ kilohms |
| DC over-voltage protection | integrated |
| Protection against reverse polarity | integrated |
| Manifestation of DC overload | Operating point shift |

**Fronius IG Plus
35 V-1**

Input data

| | |
|--|----------------|
| MPP voltage range | 230 - 500 V DC |
| Max. input voltage (at 1000 W/m ² / -10 °C in an open circuit) | 600 V DC |
| Max. input current | 16.2 A DC |
| Max. array short circuit current | 24.3 A |

Output data

| | |
|---|---------------------------------------|
| Nominal output power (P _{nom}) | 3.5 kW |
| Max output power | 3.5 kW |
| Nominal AC output voltage | 1 ~ NPE 230 V |
| Grid voltage tolerance | +10 / -15 % ¹⁾ |
| Nominal output current (single phase) | 15.2 A AC |
| Nominal frequency | 50 - 60 Hz ¹⁾ |
| Harmonic distortion | < 3,0 % |
| Power factor (cos phi) | 1 0.75 - 1 ind./cap. ²⁾ |
| Max. permitted grid impedance Z _{max} at PCC ³⁾ | None |
| Maximum continuous utility backfeed current ⁴⁾ | 0 A ⁵⁾ |
| Synchronization in-rush current ⁶⁾ | 0 A ⁵⁾ |
| Maximum output fault current / duration | 346 A / 3.24 μs |

General data

| | |
|---|-----------------------------------|
| Maximum efficiency | 95,7 % |
| Euro. efficiency | 95,0 % |
| Night consumption | 0.23 W |
| Cooling | Controlled forced-air ventilation |
| Degree of protection | IP 54 in Australia, IP 44 |
| Dimensions h x w x d | 673 x 434 x 250 mm |
| Weight | 23.8 kg |
| Permissible ambient temperature (with 95% rel. humidity) | - 20 °C - +55 °C |
| EMC emissions class | B |
| Over-voltage category (OVC) | AC 3 / DC 2 |

Safety equipment

| | |
|-------------------------------------|--|
| DC insulation measurement | Warning / Shutdown ⁷⁾ at R _{ISO} < 600 kilohms |
| DC over-voltage protection | integrated |
| Protection against reverse polarity | integrated |
| Manifestation of DC overload | Operating point shift |

**Fronius IG Plus
50 V-1**
Input data

| | |
|--|----------------|
| MPP voltage range | 230 - 500 V DC |
| Max. input voltage (at 1000 W/m ² / -10 °C in an open circuit) | 600 V DC |
| Max. input current | 18.6 A DC |
| Max. array short circuit current | 27.9 A |

Output data

| | |
|--|---------------------------------------|
| Nominal output power (P_{nom}) | 4 kW |
| Max output power | 4 kW |
| Nominal AC output voltage | 1 ~ NPE 230 V |
| Grid voltage tolerance | +10 / -15 % ¹⁾ |
| Nominal output current (single phase) | 17.4 A AC |
| Nominal frequency | 50 - 60 Hz ¹⁾ |
| Harmonic distortion | < 3,0 % |
| Power factor (cos phi) | 1 0.75 - 1 ind./cap. ²⁾ |
| Max. permitted grid impedance Z_{max} at PCC ³⁾ | 261 megaohms |
| Maximum continuous utility backfeed current ⁴⁾ | 0 A ⁵⁾ |
| Synchronization in-rush current ⁶⁾ | 0 A ⁵⁾ |
| Maximum output fault current / duration | 346 A / 3.24 μ s |

General data

| | |
|---|-----------------------------------|
| Maximum efficiency | 95,7 % |
| Euro. efficiency | 95 % |
| Night consumption | 0.23 W |
| Cooling | Controlled forced-air ventilation |
| Degree of protection | IP 54 in Australia, IP 44 |
| Dimensions l x w x h | 673 x 434 x 250 mm |
| Weight | 23.8 kg |
| Permissible ambient temperature (with 95% rel. humidity) | - 20 °C - +55 °C |
| EMC emissions class | B |
| Over-voltage category (OVC) | AC 3 / DC 2 |

Safety equipment

| | |
|-------------------------------------|---|
| DC insulation measurement | Warning / Shutdown ⁷⁾ at $R_{ISO} < 600$ kilohms |
| DC over-voltage protection | integrated |
| Protection against reverse polarity | integrated |
| Manifestation of DC overload | Operating point shift |

**Fronius IG Plus
55 V-1,
Fronius IG Plus
55 V-2**

Input data

| | |
|--|--------------|
| MPP voltage range | 230–500 V DC |
| Max. input voltage (at 1000 W/m ² / -10 °C in an open circuit) | 600 V DC |
| Max. input current | 37.1 A DC |
| Max. short circuit current of the solar modules | 22.9 A |

Output data

| | |
|---|---|
| Nominal output power (P _{nom}) | 5 kW |
| Max. output power | 5 kW |
| Nominal mains voltage | 1 ~ NPE 230 V 2 ~ NPE 400 / 230 V |
| Mains voltage tolerance | +10 / -15% ¹⁾ |
| Nominal output current | single-phase 21.7 A AC two-phase 10.9 A AC |
| Nominal frequency | 50 - 60 Hz ¹⁾ |
| Distortion factor | < 3 % |
| Power factor (cos phi) | 1 0.75 - 1 ind./cap. ²⁾ |
| Max. permitted mains impedance Z _{max} at PCC ³⁾ | single-phase 207 mOhm two-phase none |
| Max. recovery current ⁴⁾ | 0 A ⁵⁾ |
| Switch-on current pulse ⁶⁾ | 0 A ⁵⁾ |
| Maximum output fault current / duration | 426 A / 125 µs |

General data

| | |
|---|---|
| Maximum efficiency | 95.7% |
| Europ. efficiency | 94.9 % |
| Night consumption | single-phase 0.36 W two-phase 0.50 W |
| Cooling | Controlled forced-air ventilation |
| Degree of protection | IP 54 in Australia, IP 44 |
| Dimensions h x w x d | 968 x 434 x 250 mm |
| Weight | 36.9 kg |
| Permissible ambient temperature (at 95% rel. humidity) | - 20 °C - +55 °C |
| EMC emission class | B |
| Overvoltage category (OVC) | AC 3 / DC 2 |

Safety equipment

| | |
|------------------------------|---|
| DC insulation measurement | Warning / Shutdown ⁷⁾ at R _{ISO} < 600 kOhm |
| DC overvoltage protection | integrated |
| Reverse polarity protection | integrated |
| Manifestation of DC overload | Operating point shift |

**Fronius IG Plus
55 V-3**
Input data

| | |
|--|----------------|
| MPP voltage range | 230 - 500 V DC |
| Max. input voltage (at 1000 W/m ² / -10 °C in an open circuit) | 600 V DC |
| Max. input current | 22.8 A DC |
| Max. array short circuit current | 34.2 A |

Output data

| | |
|---|---------------------------------------|
| Nominal output power (P _{nom}) | 5 kW |
| Max output power | 5 kW |
| Nominal AC output voltage | 3 ~ NPE 400 / 230 V |
| Grid voltage tolerance | +10 / -15 % ¹⁾ |
| Nominal output current (three-phase) | 7.3 A AC |
| Nominal frequency | 50 - 60 Hz ¹⁾ |
| Harmonic distortion | < 3.0 % |
| Power factor (cos phi) | 1 0.75 - 1 ind./cap. ²⁾ |
| Max. permitted grid impedance Z _{max} at PCC ³⁾ | None |
| Maximum continuous utility backfeed current ⁴⁾ | 0 A ⁵⁾ |
| Synchronization in-rush current ⁶⁾ | 0 A ⁵⁾ |
| Maximum output fault current / duration | 504 A / 30.26 ms |

General data

| | |
|---|-----------------------------------|
| Maximum efficiency | 95.9 % |
| Euro. efficiency | 94.9 % |
| Night consumption | 1.72 W |
| Cooling | Controlled forced-air ventilation |
| Degree of protection | IP 54 in Australia, IP 44 |
| Dimensions h x w x d | 1263 x 434 x 250 mm |
| Weight | 49.2 kg |
| Permissible ambient temperature (with 95% rel. humidity) | - 20 °C - +55 °C |
| EMC emissions class | B |
| Over-voltage category (OVC) | AC 3 / DC 2 |

Safety equipment

| | |
|-------------------------------------|--|
| DC insulation measurement | Warning / Shutdown ⁷⁾ at R _{ISO} < 600 kilohms |
| DC over-voltage protection | integrated |
| Protection against reverse polarity | integrated |
| Manifestation of DC overload | Operating point shift |

**Fronius IG Plus
60 V-1,
Fronius IG Plus
60 V-2**

Input data

| | |
|---|----------------|
| MPP voltage range | 230 - 500 V DC |
| Max. input voltage (at 1000 W/m ² / -10°C in an open circuit) | 600 V DC |
| Max. input current | 27.5 A DC |
| Max. short circuit current of the solar modules | 41.3 A |

Output data

| | |
|--|---|
| Nominal output power (P _{nom}) | 6 kW |
| Max output power | 6 kW |
| Nominal mains voltage | 1 ~ NPE 230 V 2 ~ NPE 400 / 230 V |
| Mains voltage tolerance | +10 / -15% ¹⁾ |
| Nominal output current | single-phase 26.1 A AC two-phase 13.0 A AC |
| Nominal frequency | 50 - 60 Hz ¹⁾ |
| Distortion factor | < 3.0% |
| Power factor (cos phi) | 1 0.75 - 1 ind./cap. ²⁾ |
| Max. permitted mains impedance Z _{max} at PCC ³⁾ | single-phase 173 mOhm two-phase none |
| Max. recovery current ⁴⁾ | 0 A ⁵⁾ |
| Switch-on current pulse ⁶⁾ | 0 A ⁵⁾ |
| Maximum output fault current / duration | 426 A / 125 µs |

General data

| | |
|---|---|
| Maximum efficiency | 95.7% |
| Europ. efficiency | 95.0% |
| Night consumption | single-phase 0.36 W two-phase 0.50 W |
| Cooling | Controlled forced-air ventilation |
| Degree of protection | IP 54 in Australia, IP 44 |
| Dimensions h x w x d | 968 x 434 x 250 mm |
| Weight | 36.9 kg |
| Permissible ambient temperature (at 95% rel. humidity) | - 20 °C - +55 °C |
| EMC emission class | B |
| Overvoltage category (OVC) | AC 3 / DC 2 |

Safety equipment

| | |
|------------------------------|---|
| DC insulation measurement | Warning / Shutdown ⁷⁾ at R _{ISO} < 600 kOHM |
| DC overvoltage protection | integrated |
| Reverse polarity protection | integrated |
| Manifestation of DC overload | Operating point shift |

**Fronius IG Plus
60 V-3**
Input data

| | |
|--|----------------|
| MPP voltage range | 230 - 500 V DC |
| Max. input voltage (at 1000 W/m ² / -10 °C in an open circuit) | 600 V DC |
| Max. input current | 27.5 A DC |
| Max. array short circuit current | 41.3 A |

Output data

| | |
|---|---------------------------------------|
| Nominal output power (P _{nom}) | 6 kW |
| Max output power | 6 kW |
| Nominal AC output voltage | 3 ~ NPE 400 / 230 V |
| Grid voltage tolerance | +10 / -15 % ¹⁾ |
| Nominal output current (three-phase) | 8.7 A AC |
| Nominal frequency | 50 - 60 Hz ¹⁾ |
| Harmonic distortion | < 3.0 % |
| Power factor (cos phi) | 1 0.75 - 1 ind./cap. ²⁾ |
| Max. permitted grid impedance Z _{max} at PCC ³⁾ | None |
| Maximum continuous utility backfeed current ⁴⁾ | 0 A ⁵⁾ |
| Synchronization in-rush current ⁶⁾ | 0 A ⁵⁾ |
| Maximum output fault current / duration | 504 A / 30.26 μs |

General data

| | |
|---|-----------------------------------|
| Maximum efficiency | 95.9 % |
| Euro. efficiency | 95.0 % |
| Night consumption | 1.72 W |
| Cooling | Controlled forced-air ventilation |
| Degree of protection | IP 54 in Australia, IP 44 |
| Dimensions h x w x d | 1263 x 434 x 250 mm |
| Weight | 49.2 kg |
| Permissible ambient temperature (with 95% rel. humidity) | - 20 °C - +55 °C |
| EMC emissions class | B |
| Over-voltage category (OVC) | AC 3 / DC 2 |

Safety equipment

| | |
|-------------------------------------|--|
| DC insulation measurement | Warning / Shutdown ⁷⁾ at R _{ISO} < 600 kilohms |
| DC over-voltage protection | integrated |
| Protection against reverse polarity | integrated |
| Manifestation of DC overload | Operating point shift |

**Fronius IG Plus
70 V-1,
Fronius IG Plus
70 V-2**

Input data

| | |
|--|----------------|
| MPP voltage range | 230 - 500 V DC |
| Max. input voltage (at 1000 W/m ² / -10 °C in an open circuit) | 600 V DC |
| Max. input current | 30 A DC |
| Max. array short circuit current | 45.0 A |

Output data

| | |
|---|---|
| Nominal output power (P _{nom}) | 6.5 kW |
| Max output power | 6.5 kW |
| Nominal AC output voltage | 1 ~ NPE 230 V 2 ~ NPE 400 / 230 V |
| Grid voltage tolerance | +10 / -15 % ¹⁾ |
| Nominal output current | single phase 28.3 A AC two-phase 14.1 A AC |
| Nominal frequency | 50 - 60 Hz ¹⁾ |
| Harmonic distortion | < 3.0 % |
| Power factor (cos phi) | 1 0.75 - 1 ind./cap. ²⁾ |
| Max. permitted grid impedance Z _{max} at PCC ³⁾ | single-phase 161 milliohms two-phase none |
| Maximum continuous utility backfeed current ⁴⁾ | 0 A ⁵⁾ |
| Synchronization in-rush current ⁶⁾ | 0 A ⁵⁾ |
| Maximum output fault current / duration | 426 A / 125 µs |

General data

| | |
|---|-----------------------------------|
| Maximum efficiency | 95.7 % |
| Euro. efficiency | 95.1 % |
| Night consumption | 0.36 W |
| Cooling | Controlled forced-air ventilation |
| Degree of protection | IP 54 in Australia, IP 44 |
| Dimensions h x w x d | 968 x 434 x 250 mm |
| Weight | 36.9 kg |
| Permissible ambient temperature (with 95% rel. humidity) | - 20 °C - +55 °C |
| EMC emissions class | B |
| Over-voltage category (OVC) | AC 3 / DC 2 |

Safety equipment

| | |
|-------------------------------------|--|
| DC insulation measurement | Warning / Shutdown ⁷⁾ at R _{ISO} < 600 kilohms |
| DC over-voltage protection | integrated |
| Protection against reverse polarity | integrated |
| Manifestation of DC overload | Operating point shift |

**Fronius IG Plus
80 V-3**
Input data

| | |
|--|----------------|
| MPP voltage range | 230 - 500 V DC |
| Max. input voltage (at 1000 W/m ² / -10 °C in an open circuit) | 600 V DC |
| Max. input current | 32.0 A DC |
| Max. array short circuit current | 48.0 A |

Output data

| | |
|---|---------------------------------------|
| Nominal output power (P _{nom}) | 7 kW |
| Max output power | 7 kW |
| Nominal AC output voltage | 3 ~ NPE 400 / 230 V |
| Grid voltage tolerance | +10 / -15 % ¹⁾ |
| Nominal output current (three-phase) | 10.2 A AC |
| Nominal frequency | 50 - 60 Hz ¹⁾ |
| Harmonic distortion | < 3.0 % |
| Power factor (cos phi) | 1 0.75 - 1 ind./cap. ²⁾ |
| Max. permitted grid impedance Z _{max} at PCC ³⁾ | None |
| Maximum continuous utility backfeed current ⁴⁾ | 0 A ⁵⁾ |
| Synchronization in-rush current ⁶⁾ | 0 A ⁵⁾ |
| Maximum output fault current / duration | 504 A / 30.26 μs |

General data

| | |
|---|-----------------------------------|
| Maximum efficiency | 95.9 % |
| Euro. efficiency | 95.1 % |
| Night consumption | 1.72 W |
| Cooling | Controlled forced-air ventilation |
| Degree of protection | IP 54 in Australia, IP 44 |
| Dimensions h x w x d | 1263 x 434 x 250 mm |
| Weight | 49.2 kg |
| Permissible ambient temperature (with 95% rel. humidity) | - 20 °C - +55 °C |
| EMC emissions class | B |
| Over-voltage category (OVC) | AC 3 / DC 2 |

Safety equipment

| | |
|-------------------------------------|--|
| DC insulation measurement | Warning / Shutdown ⁷⁾ at R _{ISO} < 600 kilohms |
| DC over-voltage protection | integrated |
| Protection against reverse polarity | integrated |
| Manifestation of DC overload | Operating point shift |

**Fronius IG Plus
100 V-1,
Fronius IG Plus
100 V-2**

Input data

| | |
|--|----------------|
| MPP voltage range | 230 - 500 V DC |
| Max. input voltage (at 1000 W/m ² / -10 °C in an open circuit) | 600 V DC |
| Max. input current | 37.1 A DC |
| Max. array short circuit current | 55.7 A |

Output data

| | |
|--|---|
| Nominal output power (P _{nom}) | 8 kW |
| Max output power | 8 kW |
| Nominal AC output voltage | 1 ~ NPE 230 V 2 ~ NPE 400 / 230 V |
| Grid voltage tolerance | +10 / -15 % ¹⁾ |
| Nominal output current | single-phase 34.8 A AC two-phase 17.4 A AC |
| Nominal frequency | 50 - 60 Hz ¹⁾ |
| Harmonic distortion | < 3 % |
| Power factor (cos phi) | 1 0.75 - 1 ind./cap. ²⁾ |
| Max. permitted grid impedance Z _{max} at PCC ³⁾ | single-phase 131 milliohms two-phase 262 milliohms |
| Maximum continuous utility backfeed current ⁴⁾ | 0 A ⁵⁾ |
| Synchronization in-rush current ⁶⁾ | 0 A ⁵⁾ |
| Maximum output fault current / duration | 426 A / 125 µs |

General data

| | |
|---|---|
| Maximum efficiency | 95.7 % |
| Euro. efficiency | 95.2 % |
| Night consumption | single-phase 0.36 W two-phase 0.50 W |
| Cooling | Controlled forced-air ventilation |
| Degree of protection | IP 54 in Australia IP 44 |
| Dimensions h x w x d | 968 x 434 x 250 mm |
| Weight | 36.9 kg |
| Permissible ambient temperature (with 95% rel. humidity) | - 20 °C - +55 °C |
| EMC emissions class | B |
| Over-voltage category (OVC) | AC 3 / DC 2 |

Safety equipment

| | |
|-------------------------------------|--|
| DC insulation measurement | Warning / Shutdown ⁷⁾ at R _{ISO} < 600 kilohms |
| DC over-voltage protection | integrated |
| Protection against reverse polarity | integrated |
| Manifestation of DC overload | Operating point shift |

**Fronius IG Plus
100 V-3**
Input data

| | | |
|--|-------------|----------------|
| MPP voltage range | | 230 - 500 V DC |
| Max. input voltage (at 1000 W/m ² / -10 °C in an open circuit) | | 600 V DC |
| Max. input current | three-phase | 36.7 A DC |
| Max. array short circuit current | three-phase | 55.1 A |

Output data

| | | |
|--|-------------|---------------------------------------|
| Nominal output power (P _{nom}) | | 8 kW |
| Max output power | | 8 kW |
| Nominal AC output voltage | | 3 ~ NPE 400 / 230 V |
| Grid voltage tolerance | | +10 / -15 % ¹⁾ |
| Nominal output current | three-phase | 11.6 A AC |
| Nominal frequency | | 50 - 60 Hz ¹⁾ |
| Harmonic distortion | | < 3 % |
| Power factor (cos phi) | | 1 0.75 - 1 ind./cap. ²⁾ |
| Max. permitted grid impedance Z _{max} at PCC ³⁾ | three-phase | none |
| Maximum continuous utility backfeed current ⁴⁾ | | 0 A ⁵⁾ |
| Synchronization in-rush current ⁶⁾ | | 0 A ⁵⁾ |
| Maximum output fault current / duration | three-phase | 504 A / 30.26 ms |

General data

| | | |
|---|-------------|-----------------------------------|
| Maximum efficiency | three-phase | 95.9 % |
| Euro. efficiency | three-phase | 95.3 % |
| Night consumption | three-phase | 1.72 W |
| Cooling | | Controlled forced-air ventilation |
| Degree of protection | | IP 54 in Australia IP 44 |
| Dimensions h x w x d | three-phase | 1263 x 434 x 250 mm |
| Weight | three-phase | 49.2 kg |
| Permissible ambient temperature (with 95% rel. humidity) | | - 20 °C - +55 °C |
| EMC emissions class | | B |
| Over-voltage category (OVC) | | AC 3 / DC 2 |

Safety equipment

| | |
|-------------------------------------|--|
| DC insulation measurement | Warning / Shutdown ⁷⁾ at R _{ISO} < 600 kilohms |
| DC over-voltage protection | integrated |
| Protection against reverse polarity | integrated |
| Manifestation of DC overload | Operating point shift |

**Fronius IG Plus
120 V-1**

Input Data

| | |
|--|--------------|
| MPP voltage range | 230–500 V DC |
| Max. input voltage (at 1000 W/m ² /-10°C in an open circuit) | 600 V DC |
| Max. input current | 46.2 A DC |
| Max. short circuit current of the solar modules | 69.3 A |

Output Data

| | |
|--|---------------------------------------|
| Nominal output power (P _{nom}) | 10 kW |
| Max. output power | 10 kW |
| Nominal mains voltage | 1 ~ NPE 230 V |
| Mains voltage tolerance | +10/-15% ¹⁾ |
| Nominal output current at 220 V | 45.5 A AC |
| at 230 V | 43.5 A AC |
| Nominal frequency | 16.7/50/60 Hz ¹⁾ |
| Total harmonic distortion | < 3.0% |
| Power factor (cos phi) | 1 0.75 – 1 ind./cap. ²⁾ |
| Max. permitted mains impedance Z _{max} at PCC ³⁾ | None |
| Max. recovery current ⁴⁾ | 0 A ⁵⁾ |
| Switch-on current pulse ⁶⁾ | 0 A ⁵⁾ |
| Max. output residual current per duration | 504 A/30.26 ms |

General Data

| | |
|---|-----------------------------------|
| Maximum efficiency | 95.9% |
| Europ. efficiency | 95.4% |
| Self-consumption at night | 0.36 W |
| Cooling | Controlled forced-air ventilation |
| Protection class | IP 54 in Australia, IP 44 |
| Dimensions h x w x d | 1263 x 434 x 250 mm |
| Weight | 49.2 kg |
| Permissible ambient temperature (at 95% rel. humidity) | -25°C–+55°C |
| EMC device class | B |
| Overvoltage category (OVC) | AC 3/DC 2 |

Protection Devices

| | |
|------------------------------|---|
| DC insulation measurement | Warning/shutdown ⁷⁾ at R _{ISO} < 600 kOhm |
| DC fuse | Integrated |
| Reverse polarity protection | Integrated |
| Manifestation of DC overload | Operating point shift |

**Fronius IG Plus
120 V-3**
Input data

| | |
|--|----------------|
| MPP voltage range | 230 - 500 V DC |
| Max. input voltage (at 1000 W/m ² / -10 °C in an open circuit) | 600 V DC |
| Max. input current | 46.2 A DC |
| Max. array short circuit current | 69.3 A |

Output data

| | |
|---|---------------------------------------|
| Nominal output power (P _{nom}) | 10 kW |
| Max output power | 10 kW |
| Nominal AC output voltage | 3 ~ NPE 400 / 230 V |
| Grid voltage tolerance | +10 / -15 % ¹⁾ |
| Nominal output current (three-phase) | 14.5 A AC |
| Nominal frequency | 50 - 60 Hz ¹⁾ |
| Harmonic distortion | < 3.0 % |
| Power factor (cos phi) | 1 0.75 - 1 ind./cap. ²⁾ |
| Max. permitted grid impedance Z _{max} at PCC ³⁾ | None |
| Maximum continuous utility backfeed current ⁴⁾ | 0 A ⁵⁾ |
| Synchronization in-rush current ⁶⁾ | 0 A ⁵⁾ |
| Maximum output fault current / duration | 504 A / 30.26 ms |

General data

| | |
|---|-----------------------------------|
| Maximum efficiency | 95.9 % |
| Euro. efficiency | 95.4 % |
| Night consumption | 1.72 W |
| Cooling | Controlled forced-air ventilation |
| Degree of protection | IP 54 in Australia, IP 44 |
| Dimensions h x w x d | 1263 x 434 x 250 mm |
| Weight | 49.2 kg |
| Permissible ambient temperature (with 95% rel. humidity) | - 20 °C - +55 °C |
| EMC emissions class | B |
| Over-voltage category (OVC) | AC 3 / DC 2 |

Safety equipment

| | |
|-------------------------------------|--|
| DC insulation measurement | Warning / Shutdown ⁷⁾ at R _{ISO} < 600 kilohms |
| DC over-voltage protection | integrated |
| Protection against reverse polarity | integrated |
| Manifestation of DC overload | Operating point shift |

**Fronius IG Plus
150 V-3**

Input data

| | |
|--|----------------|
| MPP voltage range | 230 - 500 V DC |
| Max. input voltage (at 1000 W/m ² / -10 °C in an open circuit) | 600 V DC |
| Max. input current | 55.6 A DC |
| Max. array short circuit current | 83.4 A |

Output data

| | |
|---|---------------------------------------|
| Nominal output power (P _{nom}) | 12 kW |
| Max output power | 12 kW |
| Nominal AC output voltage | 3 ~ NPE 400 / 230 V |
| Grid voltage tolerance | +10 / -15 % ¹⁾ |
| Nominal output current (three-phase) | 17.4 A AC |
| Nominal frequency | 50 - 60 Hz ¹⁾ |
| Harmonic distortion | < 3.0 % |
| Power factor (cos phi) | 1 0.75 - 1 ind./cap. ²⁾ |
| Max. permitted grid impedance Z _{max} at PCC ³⁾ | None |
| Maximum continuous utility backfeed current ⁴⁾ | 0 A ⁵⁾ |
| Synchronization in-rush current ⁶⁾ | 0 A ⁵⁾ |
| Maximum output fault current / duration | 504 A / 30.26 μs |

General data

| | |
|---|-----------------------------------|
| Maximum efficiency | 95.9 % |
| Euro. efficiency | 95.4 % |
| Night consumption | 1.72 W |
| Cooling | Controlled forced-air ventilation |
| Degree of protection | IP 54 in Australia, IP 44 |
| Dimensions h x w x d | 1263 x 434 x 250 mm |
| Weight | 49.2 kg |
| Permissible ambient temperature (with 95% rel. humidity) | - 20 °C - +55 °C |
| EMC emissions class | B |
| Over-voltage category (OVC) | AC 3 / DC 2 |

Safety equipment

| | |
|-------------------------------------|--|
| DC insulation measurement | Warning / Shutdown ⁷⁾ at R _{ISO} < 600 kilohms |
| DC over-voltage protection | integrated |
| Protection against reverse polarity | integrated |
| Manifestation of DC overload | Operating point shift |

Explanation of footnotes

- 1) The values provided are standard values. If required, the inverter can be customized for a specific country.
- 2) Depending on the country setup or device-specific settings (ind. = inductive; cap. = capacitive)
- 3) PCC = interface to the public grid
- 4) Max. current from the inverter to the solar module when there is an error in the inverter, or when the insulation between the AC and DC wires is defective.
- 5) Assured by electrical design of the inverter
- 6) Peak current when turning on the inverter
- 7) Depending on the country setup

Relevant Standards and Directives

CE Conformity Marking

The equipment complies with all the requisite and relevant standards and directives that form part of the relevant EU directive, and therefore is permitted to display the CE mark.

Parallel Operation of In-Plant Power Generation Systems

The inverter complies with the

- "Guidelines for connection and parallel operation of in-plant generation systems with the low-voltage grid" published by the German Electricity Industry Association (VDEW)
- "Technical guidelines for parallel operation of in-plant generation systems with distribution networks" published by the Association of Austrian Electricity Companies.

Circuit to Prevent Islanding

The inverter has a circuit for preventing islanding which is approved by the Professional Association for Precision Mechanics and Electronic Engineering in accordance with DIN VDE 0126-1-1.

Grid Failure

The standard measurement and safety procedures integrated into the inverter ensure that the power feed is immediately interrupted in the event of a grid failure (shut-off by the utility or damage to lines).

Terms and conditions of warranty and disposal

Fronius manufacturer's warranty

The detailed, country-specific warranty terms and conditions can be provided by the relevant system installer or can be found online at <http://www.fronius.com/Solar/Warranty>

Fronius therefore recommends that you print an up-to-date copy of the warranty terms and conditions after commissioning the inverter.

Disposal

Should your inverter be replaced at some future date, Fronius will accept the obsolete equipment back and provide for its proper recycling.



**EG-KONFORMITÄTSERKLÄRUNG 2012
EC-DECLARATION OF CONFORMITY 2012
DECLARATION DE CONFORMITE DE LA CE, 2012**

Wels-Thalheim, 2012-11-21

Die Firma

Manufacturer

La compagnie

FRONIUS INTERNATIONAL GMBH
Günter Fronius Straße 1, A-4600 Wels-Thalheim

erklärt in alleiniger Verantwortung,
dass folgendes Produkt:

Hereby certifies on its sole
responsibility that the following
product:

se déclare seule responsable du fait
que le produit suivant:

Fronius IG Plus 25V-1 / 30V-1
/ 35V-1 / 50V-1 / 55V-1 /
60V-1 / 55V-2 / 60V-2 / 70V-1
/ 70V-2 / 100V-1 / 100V-2 /
55V-3 / 60V-3 / 80V-3 /
100V-3 / 120V-3 / 150V-3
Solar-Wechselrichter

Fronius IG Plus 25V-1 / 30V-1
/ 35V-1 / 50V-1 / 55V-1 /
60V-1 / 55V-2 / 60V-2 / 70V-1
/ 70V-2 / 100V-1 / 100V-2 /
55V-3 / 60V-3 / 80V-3 /
100V-3 / 120V-3 / 150V-3
Photovoltaic inverter

Fronius IG Plus 25V-1 / 30V-1
/ 35V-1 / 50V-1 / 55V-1 /
60V-1 / 55V-2 / 60V-2 / 70V-1
/ 70V-2 / 100V-1 / 100V-2 /
55V-3 / 60V-3 / 80V-3 /
100V-3 / 120V-3 / 150V-3
Onduleur solaire

auf das sich diese Erklärung
bezieht, mit folgenden Richtlinien
bzw. Normen übereinstimmt:

which is explicitly referred to by this
Declaration meet the following
directives and standard(s):

qui est l'objet de la présente
déclaration correspondent aux
suivantes directives et normes:

Richtlinie 2006/95/EG
Elektrische Betriebsmittel
Niederspannungsrichtlinie

Richtlinie 2004/108/EG
Elektromag. Verträglichkeit

Directive 2006/95/EC
Electrical Apparatus
Low Voltage Directive

Directive 2004/108/EC
Electromag. compatibility

Directive 2006/95/CE
Outillages électriques
Directive de basse tension

Directive 2004/108/CE
Électromag. Compatibilité

Europäische Normen inklusive
zutreffende Änderungen
IEC 62109-1:2010
IEC 62109-2:2011
EN 50178:1997
EN 61000-3-2:2006
EN 61000-3-11:2000
EN 61000-3-12:2005
EN 61000-6-2:2005
EN 61000-6-3:2007
EN 62233:2008

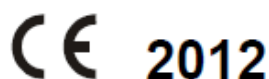
European Standards including
relevant amendments
IEC 62109-1:2010
IEC 62109-2:2011
EN 50178:1997
EN 61000-3-2:2006
EN 61000-3-11:2000
EN 61000-3-12:2005
EN 61000-6-2:2005
EN 61000-6-3:2007
EN 62233:2008

Normes européennes avec
amendements correspondants
IEC 62109-1:2010
IEC 62109-2:2011
EN 50178:1997
EN 61000-3-2:2006
EN 61000-3-11:2000
EN 61000-3-12:2005
EN 61000-6-2:2005
EN 61000-6-3:2007
EN 62233:2008

Die oben genannte Firma hält
Dokumentationen als Nachweis der
Erfüllung der Sicherheitsziele und
die wesentlichen Schutzanforder-
ungen zur Einsicht bereit.

Documentation evidencing
conformity with the requirements of
the Directives is kept available for
inspection at the above
Manufacturer.

En tant que preuve de la satisfaction
des demandes de sécurité la
documentation peut être consultée
chez la compagnie susmentionnée.



2012

ppa. Mag.Ing.H.Hackl

DE German

Deutsch

EN English

English

FR French

Française

Abgesandt...

10. NOV. 2009
WJ

Deutsche Gesetzliche
Unfallversicherung



Fachausschuss Elektrotechnik

Fachausschuss Elektrotechnik | Prof- und Zertifizierungsstelle
Gustav-Heinemann-Ufer 130 | 50958 Köln

FRONIUS International GmbH
Günter Fronius-Str. 1
4600 Wels-Thalheim
Austria

Ihr Zeichen:
Ihre Nachricht vom:
Unser Zeichen UB.010.17 Pl/wi
(bitte stets angeben):
Ansprechperson: Herr Pohl
E-Mail: pohl.wolfgang@bgete.d
Datum: 10.11.2009

☐ Herren Pohl
Vorgang + C.

Unbedenklichkeitsbescheinigung 09017 (Prüfschein)

| | |
|--|--|
| Erzeugnis: | Selbsttätig wirkende Schaltstelle |
| Typ: | IG Plus V |
| Bestimmungsgemäße Verwendung: | Selbsttätig wirkende, dem VNB unzugängliche Schaltstelle als Sicherheitsschnittstelle zwischen einer Eigenerzeugungsanlage und dem Niederspannungsnetz. Gleichwertiger Ersatz für eine jederzeit dem VNB zugängliche Schaltstelle mit Trennfunktion. Die Schaltstelle ist integrierter Bestandteil der PV-Wechselrichter Fronius IG Plus V |
| Prüfgrundlagen: DIN V VDE V 0126-1-1: 2006-02 | „Selbsttätige Schaltstelle zwischen einer netzparallelen Erzeugungsanlage und dem öffentlichen Niederspannungsnetz“ |

Das mit Prüfbericht 2.03.02013.1.0 vom 30.10.2009 arsenal research geprüfte Sicherheitskonzept des o. g. Erzeugnisses, entspricht den zum Zeitpunkt der Ausstellung dieser Bescheinigung geltenden sicherheitstechnischen Anforderungen für die aufgeführte bestimmungsgemäße Verwendung.

Die Unbedenklichkeitsbescheinigung gilt befristet bis:

31.12.2014

- Mehlem -
Leiter der Prüf- und
Zertifizierungsstelle

Document of Compliance 09017

- Product:** Automatic switching center
- Type:** IG Plus V
- Intended Use:** Automatic switching center inaccessible to the DSO as a safety interface between an in-plant generation system and the low-voltage grid. Also a backup for a switching center always accessible to the DSO with an isolation function. The switching center is an integral part of the PV inverter type: Fronius IG Plus V.
- Test specification:**
DIN V VDE V 0126-1-1: „Automatic switching center between a parallel net generation system and the public low-voltage grid“
2006-02

The safety concept of the above product tested with the report of 30.10.2009, ref. 2.03.02013.1.0 (arsenal research) corresponds to the safety requirements for the intended purpose valid at the time this certificate was issued.

This document of compliance is valid until:

31.12.2014

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