/ Perfect Charging / Perfect Welding / **Solar Energy**

SHIFTING THE LIMITS

Fronius CL
36.0 / 48.0 / 60.0

EN-US

Operating Instructions

Inverter for grid-connected photo-voltaic systems



42,0426,0077,EA 010-31032015

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 rules

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.

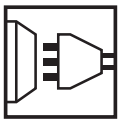
EMC device classification as per the rating plate or technical data.

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 affects 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.

General Information

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.

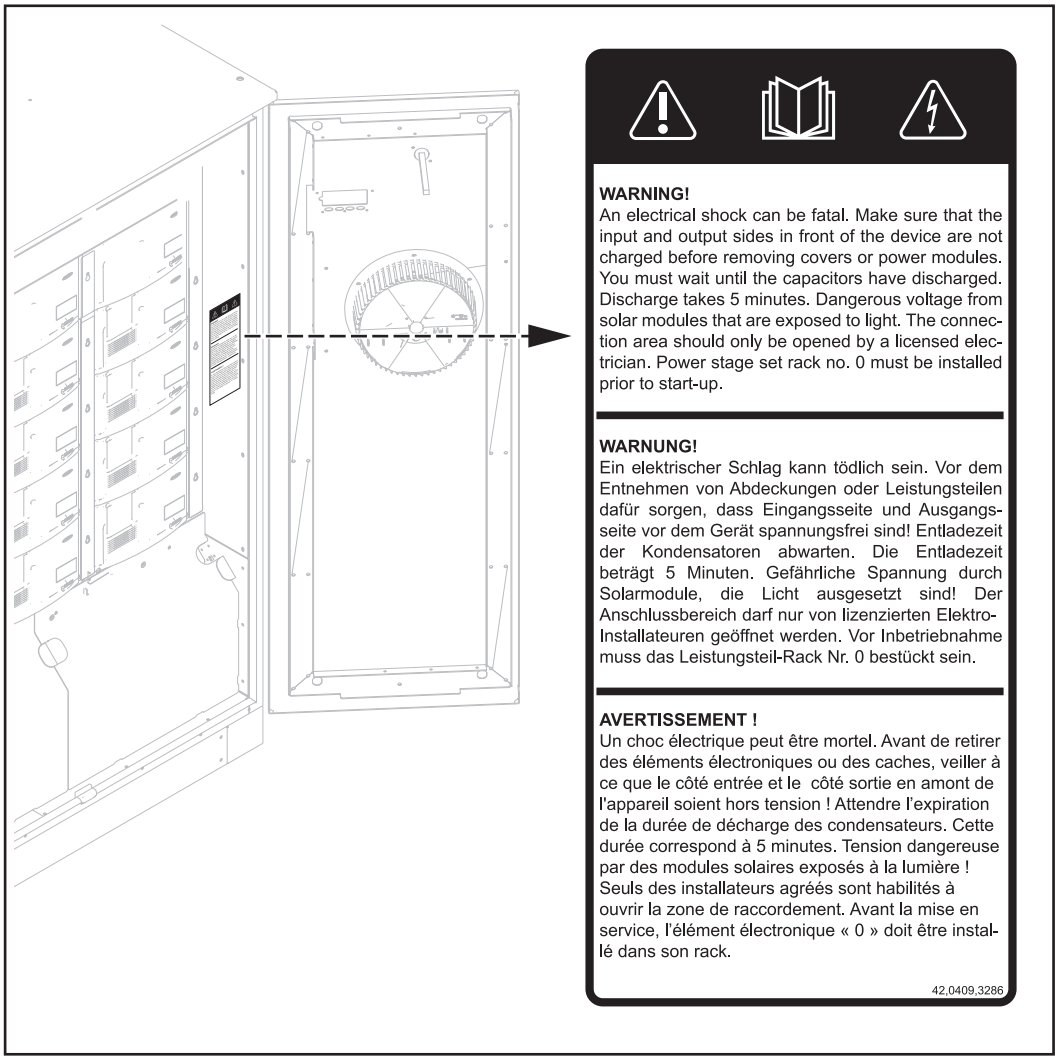
Monitoring the grid

Whenever conditions in the electric grid are inconsistent with standard conditions (e.g., grid switch-off, interruption), your inverter will immediately stop operating and interrupt the supply of power into the grid in accordance with national standards and guidelines.

Grid monitoring is carried out using:
- voltage monitoring
- frequency monitoring
- over-/under-voltage relay (option, depending on the country setup)
- monitoring of islanding conditions

Warning notices affixed to the device

The interior of 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.



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!
An electrical shock can be fatal.
Make sure that the input and output sides in front of the device are not charged before removing covers or power stage sets.
You must wait until the capacitors have discharged. Discharge takes 5 minutes.
Dangerous voltage from solar modules that are exposed to light.
The connection area should only be opened by a licensed electrician.
Power stage set rack no. 0 must be installed prior to start-up.

Utilization in accordance with "intended purpose"

Utilization in accordance with "intended purpose"

The Fronius CL solar inverter is designed exclusively to convert direct current from solar modules into alternating current and feed this power into the pubic grid.
The following are deemed not in accordance with the intended purpose:
- Utilization for any other purpose, or in any other manner
- Alternations to the Fronius CL that are not expressly recommended by Fronius
- Installation of parts that are not expressly recommended or sold by Fronius

The manufacturer is not responsible for any damages resulting from unintended use.
In addition, no warranty claims will be entertained.

Utilization in accordance with the "intended purpose" also includes
- following all the instructions in these operating instructions
- carrying out all the specified inspection and servicing work

Field of application

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

Photovoltaic system stipulations

The inverter is designed exclusively to be connected and used with solar modules.
Use with other DC generators (e.g., wind generators) is not permitted.

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

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

Functional principle

Functional principle

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

The MIX^{TM} concept

MIX = **M**aster **I**nverter **X**-change

In the MIX concept, several smaller power stage sets operate instead of one large power stage set. Depending on the irradiance, the inverter turns the power stage sets on or off according to country-specific standards, e.g.:

- When irradiance is low, initially only 1 power stage sets turn on in the inverter.
- As irradiance increases, a 2nd and then a 3rd power stage set turns on.
- When irradiance is high, the other power stage sets switch on in sets of 3.
- In this way, the power stage sets operate in a higher partial-load range than a large power stage set.
- The energy can then be converted more efficiently, thus significantly increasing the efficiency.
- The control software alternately assigns the "master power stage set" function to all the power stage sets.
- A "master power stage set" coordinates and controls the operation of the other power stage sets.
- Operating hours per power stage set are decreased, and the service life of the power stage sets is increased along with the yield for partial-load operation.

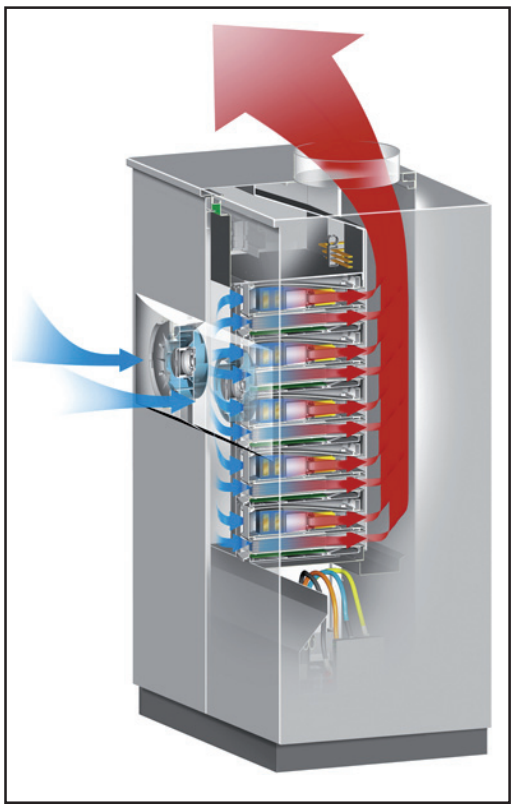
Reliability

The MIX concept ensures a high degree of reliability due to the number of independent power stage sets:
if one power stage set fails, the remaining power stage sets take over for it. Thus energy losses are limited and only occur when irradiance is high.

Forced ventilation

The inverter is cooled through forced ventilation via 2 temperature-controlled fans mounted in the doors. The air drawn in at the front flows into a closed channel through the individual racks containing the power stage sets and then is discharged out the top.
The closed air channel ensures that the power stage sets do not come into contact with the outside air. This helps to prevent power stage sets from getting dirty.
The fan speed and the temperature of the supply air are monitored.

The self-contained power stage sets have their own fans for circulating the air in the power stage set racks.



The inverter's speed-controlled fans with ball bearing support ensure:
- optimal inverter cooling
- higher efficiency
- cooler parts, thus improving service life
- lowest possible energy consumption and noise level

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 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.

Solar module ground

The inverter connection area has a PC board with 2 fuse holders for inserting fuses when a solar module ground is required.

The Fronius CL 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.

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 upgrades

System upgrades

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

- Fronius Com Card
- Fronius Datalogger Card / Box
- Fronius Public Display
- Fronius Public Display Card / Box
- Fronius Interface Card / Box
- Fronius String Control 250/25

System upgrades are available as plug-in cards or versions with an external housing. The inverter can accommodate 2 option cards in addition to the standard Fronius Com Card.

Fronius Com Card

The Fronius Com Card enables the inverter to communicate with external system upgrades as well as with other inverters.
The Fronius Com Card comes standard with the inverter.

Fronius Datalogger Card

Datalogger (when using a PC to record and manage data from your photovoltaic system), includes Datalogger and a modem interface
Fronius Solar.access software is required for data analysis.

Fronius Public Display

Various large-format displays

Fronius Interface Card

The Fronius Interface Card is an RS 232 interface for transmitting various kinds of system data in a freely accessible format.

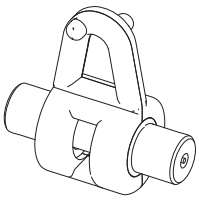
Fronius String Control 250/25

The Fronius String Control 250/25 is used to combine and monitor solar module strings.

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

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.

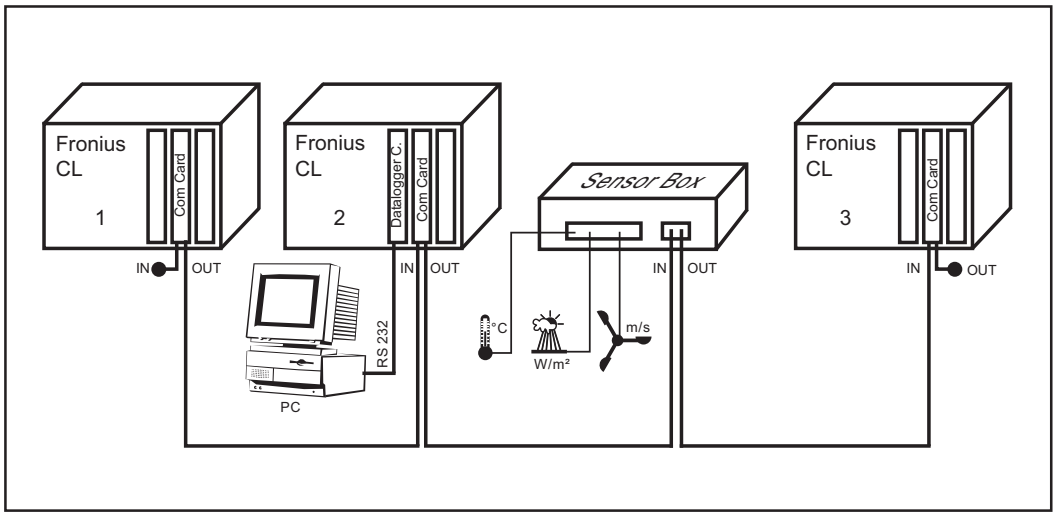
In order to distinguish between several identical system upgrades, each one must be assigned a unique number.

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:



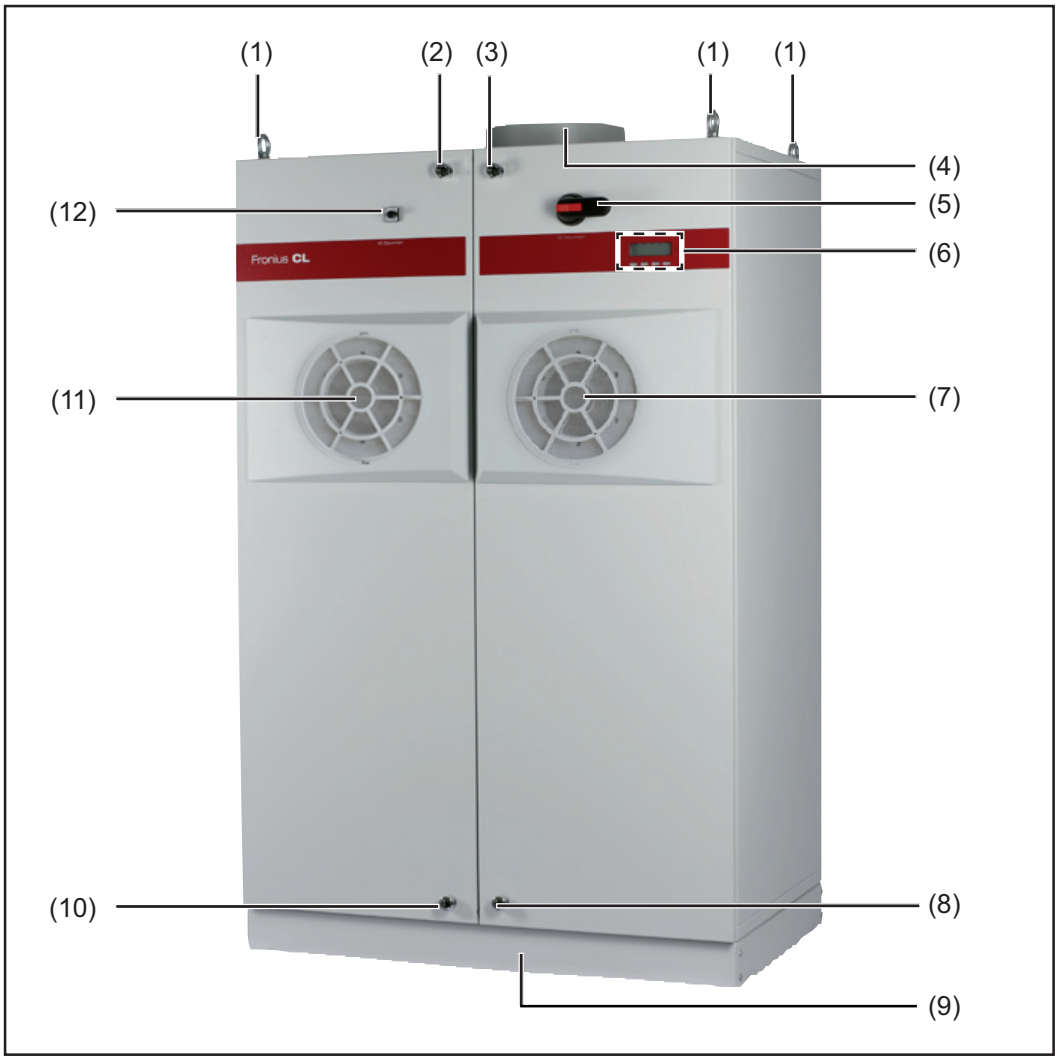
= Terminating plug

Illustration explanation: Data network with 3 Fronius CL units and one Fronius Sensor Box:
- all Fronius CL units have one 'Fronius COM Card'
- one Fronius CL has a 'Fronius Datalogger Card' (no. 2)
- Fronius Datalogger has two RS232 interfaces for connecting to a PC and a modem

Option cards communicate within the inverter 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.

Inverter product description

Closed inverter product description



Item	Designation
(1)	Ring bolt for transporting by crane (4 x)
(2)	Door latch top left
(3)	Door latch top right (can be locked)
(4)	Air discharge opening diameter 315 mm
(5)	DC main switch, can be locked when turned off **IMPORTANT** The doors cannot be opened when the DC main switch is turned on.
(6)	Control units (display, keys, Operating Status LED)
(7)	Right fan
(8)	Door latch bottom right (can be locked)
(9)	Optional mounting base with removable side parts, height 100 mm (not included in the scope of supply of the inverter)
(10)	Door latch bottom left

Item	Designation
(11)	Left fan
(12)	AC main switch

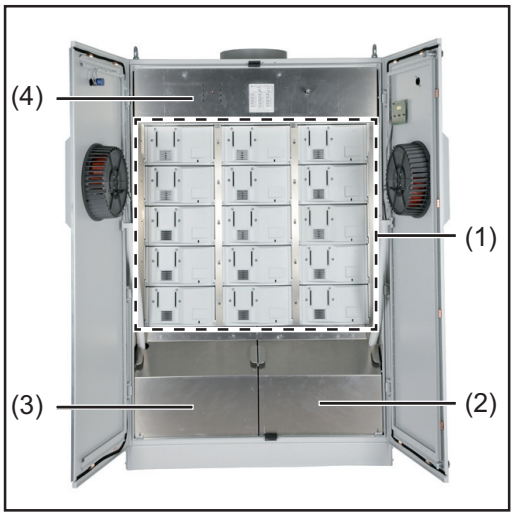
The 'AC main switch' is equipped as an AC disconnect for BDEW devices with the 'DE-MS' setup.



The AC main switch (AC disconnect) can be locked when turned off.

IMPORTANT The doors cannot be opened when the AC main switch is turned on.

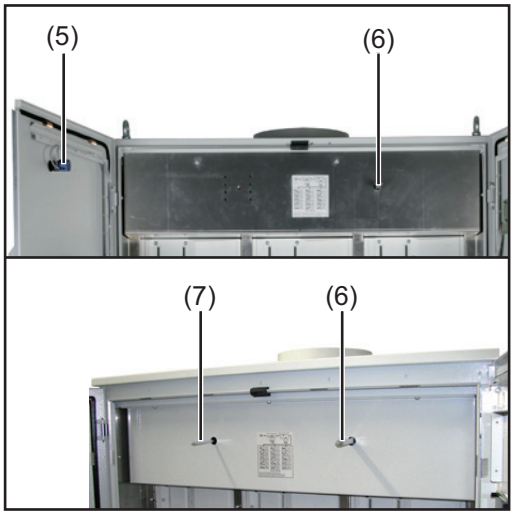
Open inverter product description



Item	Designation
(1)	Power stage set racks (max. 15)
(2)	Cover right
(3)	Cover left
(4)	Cover top

The connection area is located under the left and right covers.

Cover top:



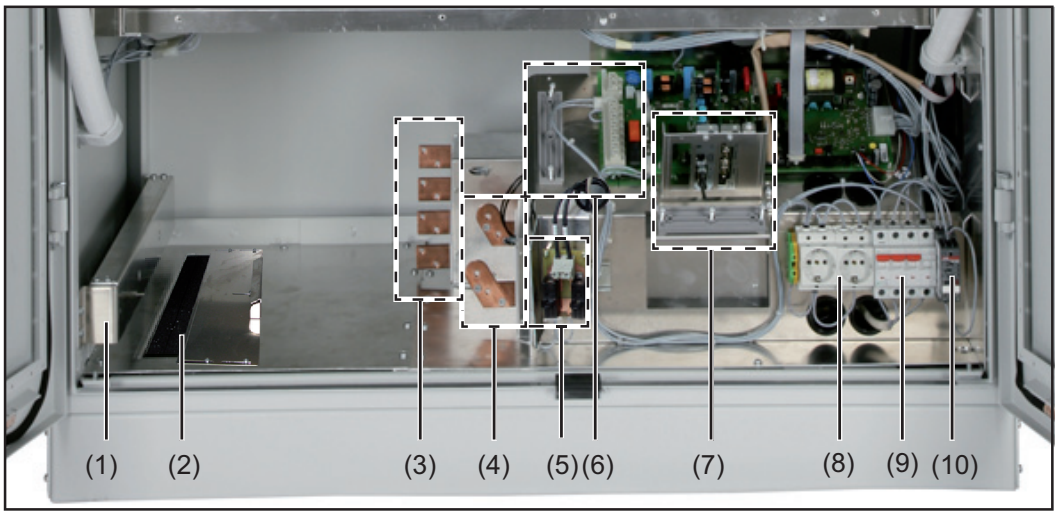
BDEW device

Item	Designation
(5)	AC main switch back (depending on country setup)
(6)	Shaft for DC main switch
(7)	Only for BDEW devices with the 'DE-MS' setup: Shaft for AC main switch (AC disconnect)

The grid voltage contactor is located under the top cover on the left (except for BDEW devices with the 'DE-MS' setup).

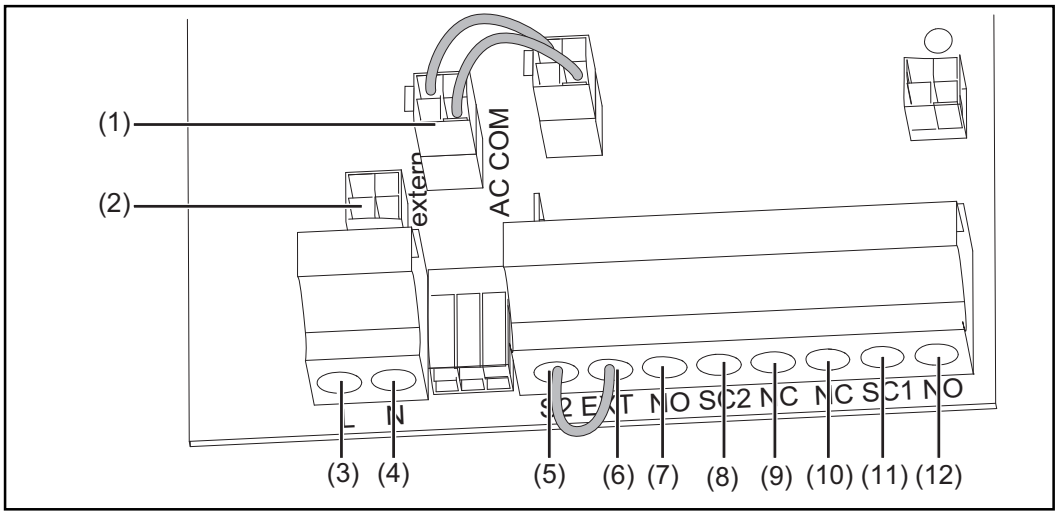
Connection area product description

Connection area product description



Item	Designation
(1)	Rail with strain relief device clamps for AC and DC wires (included in the scope of supply for the inverter)
(2)	Cable input opening with slide cover
(3)	AC connections M10 (L1, L2, L3, N) and ground clamp (PE, solar module frame ground, etc.)
(4)	DC connections M10
(5)	Fuse holders for grounding solar modules: DC+ to PE or DC- to PE
(6)	2 potential-free relays, e.g., for connecting and controlling external ventilation - with terminals - with a strain-relief device
(7)	Option area - with standard Fronius Com Card for data communication via Solar Net - with 2 free slots for option cards - with a strain-relief device The number of free slots and available option cards can vary depending on the country setup.
(8)	230 V AC sockets, e.g., for supplying power to DATCOM components, a modem, notebook, etc.
(9)	4-pin power circuit breaker (depending on the country setup) For interrupting the power supply to the following: - "Snowball" PC board (fan control) - Both sockets - Measurement and monitoring relay
(10)	Measurement and monitoring relay (depending on the country setup) Three-phase monitoring of phase sequence, phase failure, overvoltage, undervoltage and asymmetry, neutral conductor monitoring

Terminals in the area of the potential-free relays



Item	Description
(1)	Jumper slot 'AC COM'
(2)	Jumper slot 'external'
(3) (4)	L + N = connection for external AC supply (e.g., for fans, DATCOM, sockets, etc.) 230 V, connection of phase and neutral conductor alternating current fuse: 230 V AC / 10 A **IMPORTANT** When connecting an external AC power supply, set the jumper at the 'external' and 'AC COM' jumper slots.
(5) (6)	S2 + EXT = connection for an external switch for external control of the grid voltage contactor (e.g., to enable the inverter to operate off the grid if required) Switch: normally open contact with min. 230 V / 1 A **IMPORTANT** The external switch can only be connected to devices with a grid voltage contactor. When connecting an external switch, remove the shorting bar connected in series.
(7)	NO = normally open contact for relay contact 2
(8)	SC2 = relay contact 2
(9)	NC = break contact for relay contact 2
(10)	NC = break contact for relay contact 1
(11)	SC1 = relay contact 1
(12)	NO = normally open contact for relay contact 1

Cable cross-section: 1–16 mm²
Terminal tightening torque: 1.2–1.5 Nm
max. Current per relay output: AC max. 277 V / 10 A, DC max. 24 V / 10 A

The relay contacts can have different functions assigned in the "Basic Service" menu. To access the "Basic Service" menu, you need to enter the code 22742:

- Press the "Menu" key
- Select the 'Setup' mode
- Press the unassigned "Esc" key five times
- Enter access code 22742
- Select the 'GPSC CFG' parameter
- Set the desired functions for the relay contacts

Possible functions of relay contacts

Function number	Activation criterion[1] for the switch contact	Deactivation criterion[2] for the switch contact	Description
1	AC contactor is open	AC contactor is closed	Error signal of contactor or no AC grid
2	Power feed-in possible on DC side	Power feed-in not possible on DC side	Shut-down of external components over night (e.g., 50 Hz transformer)
3	Cabinet fan in operation	Cabinet fan not in operation	External ventilation / air conditioning can be activated
4	Max. interior temperature >/= 40	Max. interior temperature </= 30	
5	Max. interior temperature >/= 50	Max. interior temperature </= 40	
6	Triggering of continual[3] and temporary[4] service codes	Error confirmation per key press / per Solar Net command	Status display / Relay contact trips
7	Triggering of continual[3] service codes		
8	Inverter in feed-in mode	Inverter not in feed-in mode	Control of motorized stop valve
9	The switch-on point for the effective power limit has been reached.	The switch-off point for the effective power limit has been reached.	Energy Management function[5]

1) Activation = the break contact for the relay contact opens, the normally open contact closes

2) Deactivation = the break contact for the relay contact closes, the normally open contact opens

3) Continual service codes (e.g., inverter malfunction or shutdown, when the service code is displayed longer than 4 h 15 min.)

4) Temporary service codes (e.g., brief interruption of feed-in operation, a service code is triggered more than 50 x per day)

5) The Energy Management function is automatically activated as soon as one of the two relay contacts is assigned function number 9,
- either with the values from the factory settings, if the Energy Management function has never been used,
  or
- with the values last set by the user.

Installation and Startup

Choosing the Location

Choosing the location in general

Due to its IP 20 degree of protection, the inverter is designed exclusively for installation in closed spaces or containers.

The inverter must be completely covered by a building or structure to protect against rain, sun, wind-blown dust, fungal infestation, radiation to the cold night sky, etc.
Buildings or structures must fulfill all requirements regarding temperature, humidity and air filtration. Condensation is not expected.

Criteria for location selection

Only set up on a firm, flat, level and fireproof surface.
Max. ambient temperatures: -20 °C / +50 °C
For use at altitudes above sea level: up to 2000 m
Keep a min. side distance of 350 mm between the inverter and a wall.
The distance between the upper edge of the inverter and the ceiling must be at least 450 mm to prevent trapped air.
The air flow direction within the inverter is from front to top (cold air intake front, hot air exit top).
When installing the inverter in a closed space, it is necessary to ensure that the hot air that develops will be discharged by forced ventilation.

Unsuitable locations

Do not install the inverter:
- in proximity to a living area
- in areas where the device is exposed to water
- in areas with large amounts of dust
- in areas with a large amount of conducting dust particles (e.g., iron filings)
- in areas with corrosive gases, acids or salts
- in areas where there is an increased risk of accidents caused by farm animals (horses, cattle, sheep, pigs, etc.)
- in stables or adjoining areas
- in storage areas for hay, straw, chaff, animal feed, fertilizers, etc.
- in storage or processing areas for fruit, vegetables or winegrowing products
- in areas used in the preparation of grain, green fodder or animal feeds
- in greenhouses

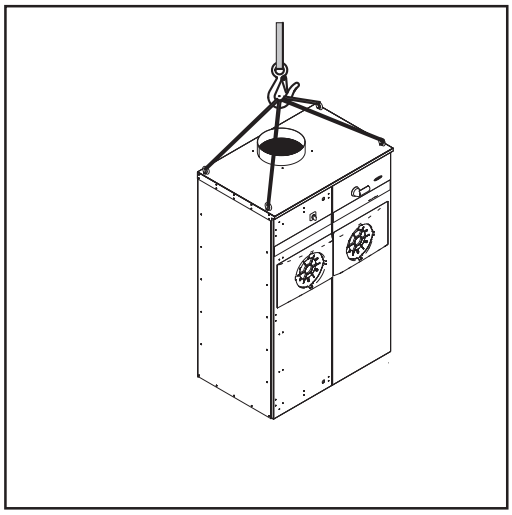
Transport

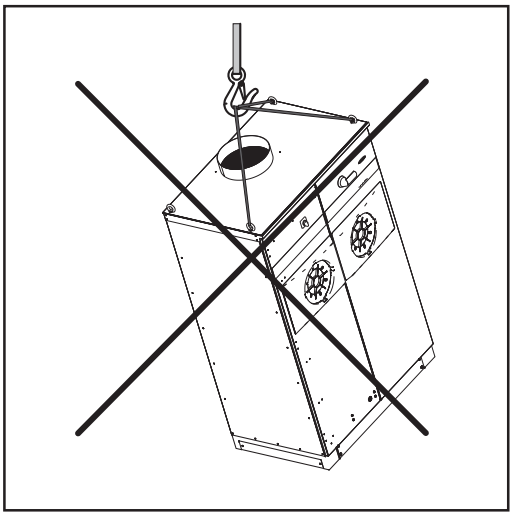
Transport

The inverter can be transported as follows:
- Using a crane
- On a palette using a forklift or lift truck
- manually

Crane transport

WARNING! Falling devices can be deadly. Use all 4 ring bolts when transporting the inverter by crane.





Transport using a forklift or lift truck

WARNING! Falling or toppling devices can be deadly.
- When transporting the inverter by forklift or lift truck secure the inverter from falling.
- Do not turn, brake, or accelerate in a sudden, jerking manner

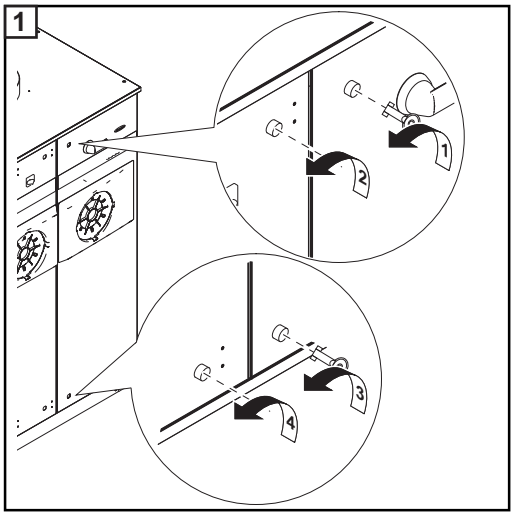
Manual transport

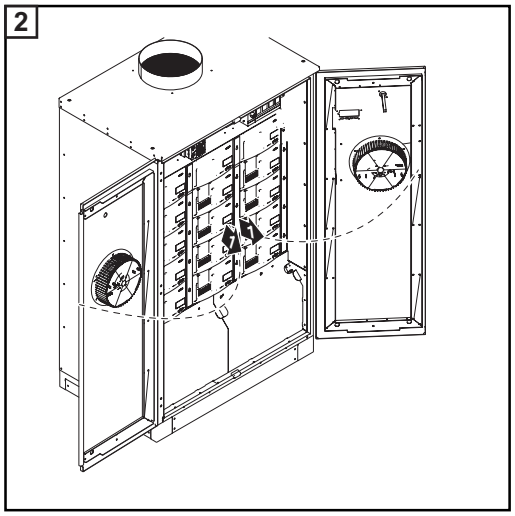
The inverter can also be transported manually if a crane, forklift or lift truck cannot be used.

NOTE! At least 4 adults are required to manually transport the inverter.
The manufacturer recommends that you remove the power stage sets from the inverter to reduce its weight for manual transport.

Removing power stage sets

Opening the Fronius CL

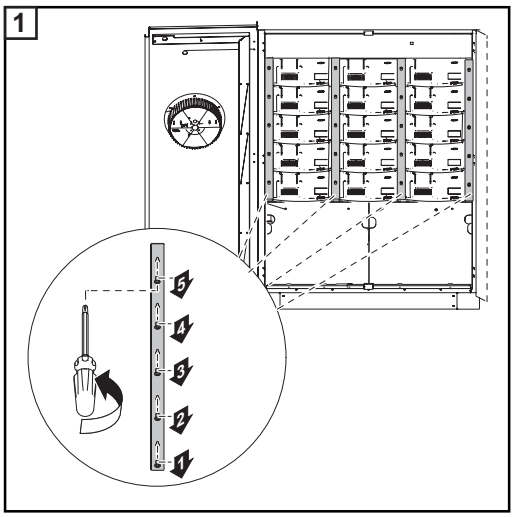




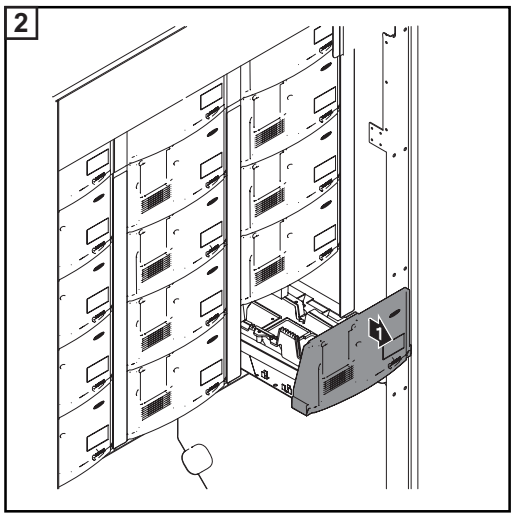
Removing power stage sets

WARNING! An electrical shock can be fatal. Danger from grid voltage and DC voltage from solar modules.
Do not remove power stage sets under load. Before removing power stage sets, make sure that the AC and DC main switches are turned off in the device interior.

WARNING! An electrical shock can be fatal. Danger from residual voltage from capacitors.
You must wait until the capacitors have discharged. Discharge takes 5 minutes.



- Remove the screws at the 4 rails (4 x 5 screws)
- Remove the 4 rails



- Remove the power stage sets

Setting up the Fronius CL

Requirements

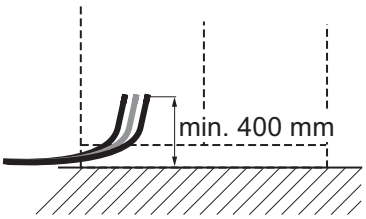
WARNING! Toppling or falling devices can be deadly. Install the inverter on a level and stable surface.

A mounting base is required for inverter setup and operation.
The mounting base is available at a height of 100 mm.

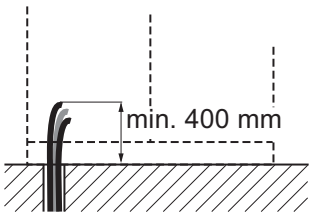
The cabling into the inverter can be done from the bottom or side through the mounting base.

For bottom cabling
- All AC and DC cables to be connected must protrude out of the base at least 400 mm before inverter setup.
- If possible, data communications cables for connecting option cards should also protrude out of the base.
- The cables must be positioned so that there is at least 1.2 m of free space to the right of the cables to position the inverter.

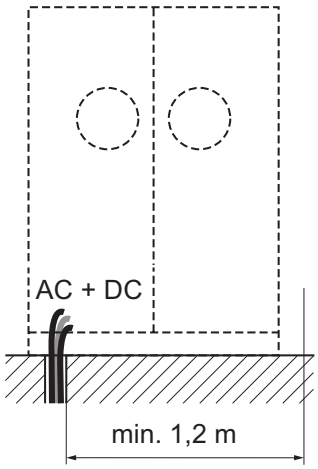
Side cabling:



Bottom cabling



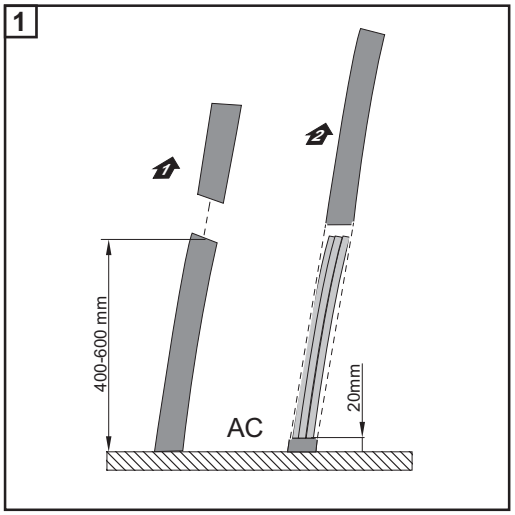
Space requirement:



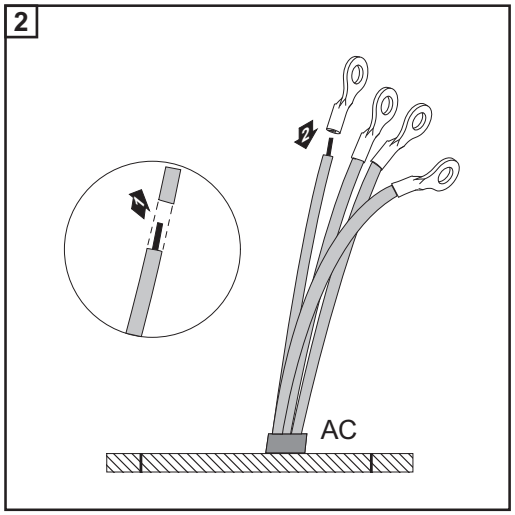
Recommendation for max. wire cross section

Maximum cross section of AC wires:	70 mm²
Maximum cross section of DC wires:	120 mm²

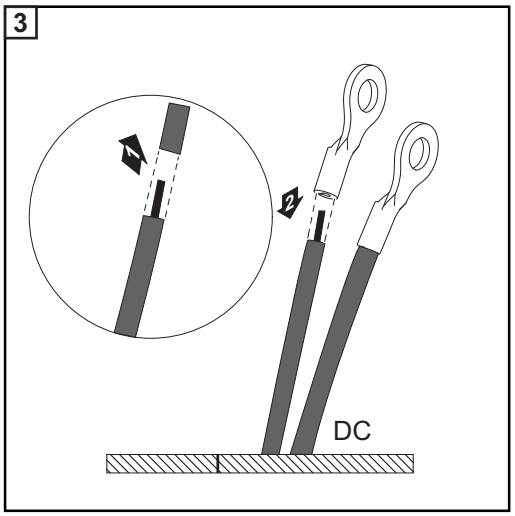
Preparing AC and DC wires



- Cut the AC and DC wires so that 400 - 600 mm protrudes from the base
- Strip the AC wire so that approx. 20 mm of the insulation remains



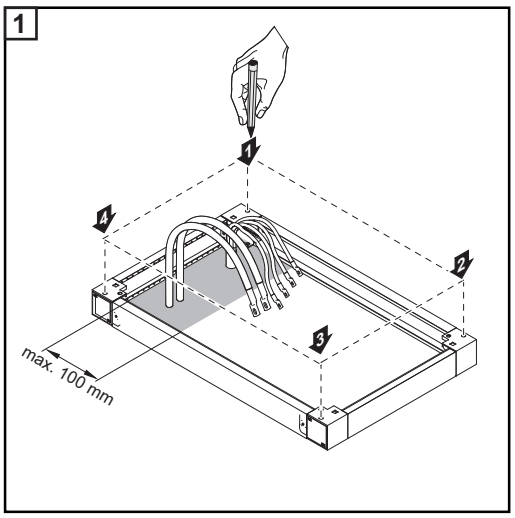
- Strip the AC wires
- Attach the cable lugs

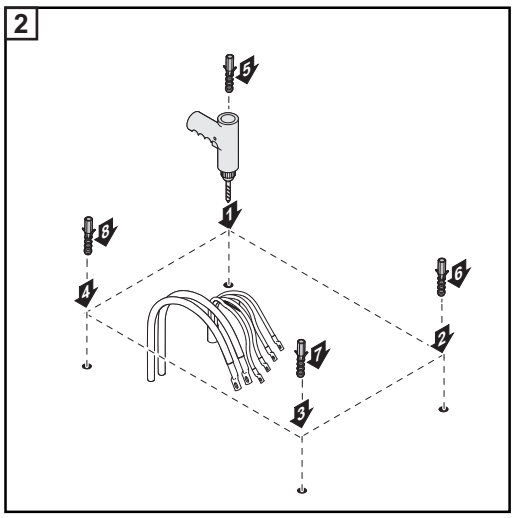


- Strip the DC wires
- Attach the cable lugs

Installing the mounting base

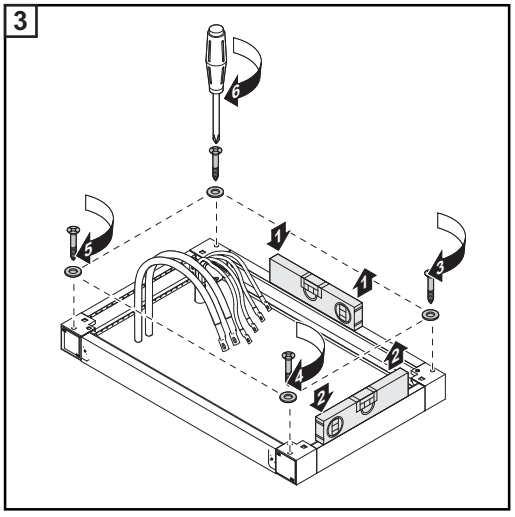
NOTE! When positioning the mounting base, make sure that the AC and DC wires on the left are located up to a max. of 100 mm from the inside edge of the mounting base.





Different dowels and screws are required for installation of the mounting base depending on the surface used. Therefore, 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.

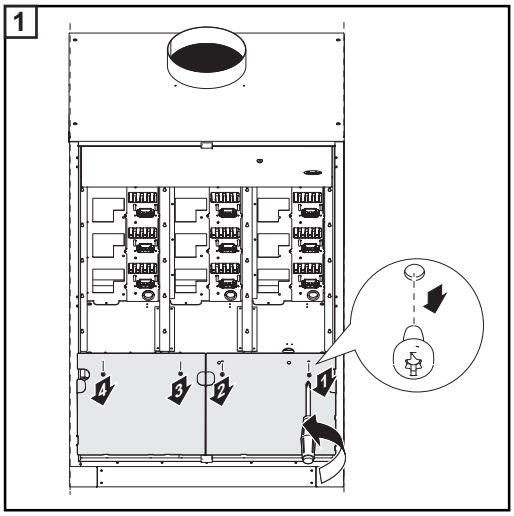
NOTE! To avoid warping of inverter doors, the mounting base should only be attached in a 100% level position.



Preparing the Fronius CL

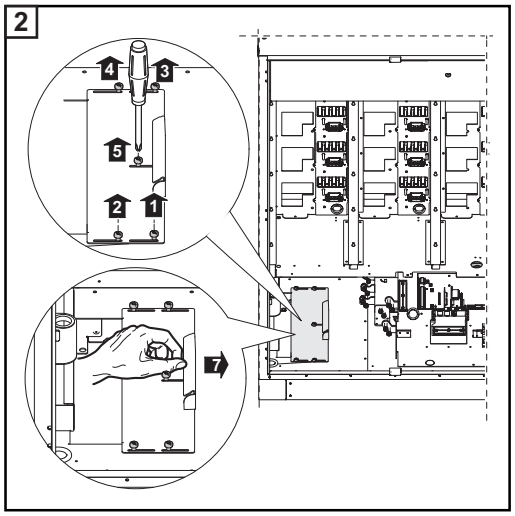
CAUTION! An inadequate grounding conductor connection can cause serious injuries to persons and damage to (or loss of) property.
The screws on the covers provide an adequate grounding conductor connection for the housing ground and should not under any circumstances be replaced by other screws that do not provide a proper grounding conductor connection.

1



- Open the inverter
- Remove 2 x 2 screws
- Remove 2 covers

2



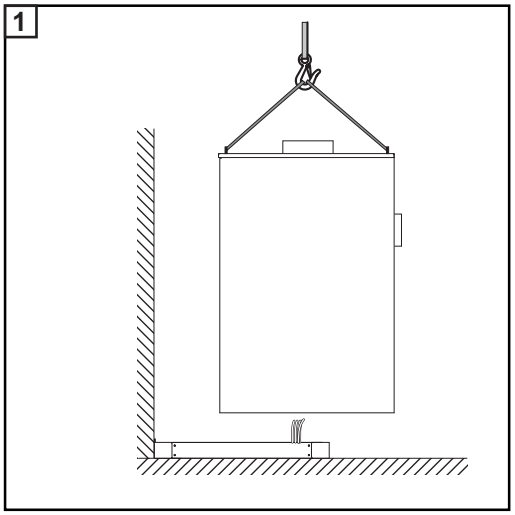
- Loosen 5 screws
- Open the slide cover as far as possible

Safety

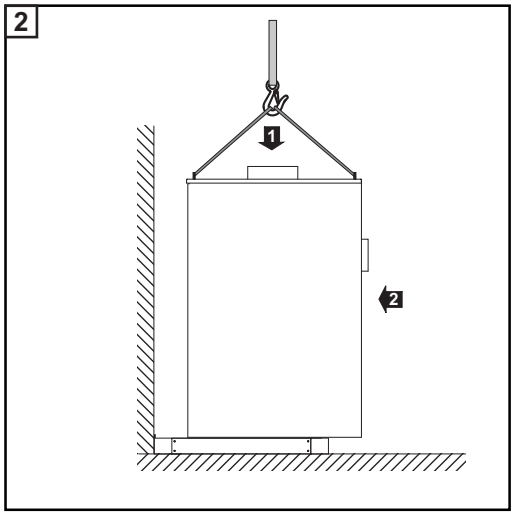
WARNING! Toppling or falling devices can be deadly. When sliding the inverter back on the mounting base, make sure that the inverter does not slip off the mounting base sideways.

NOTE! When setting the inverter onto the mounting base make sure that the AC and DC wires are not broken, kinked, crushed or otherwise damaged in any way.

Positioning the Fronius CL on the mounting base using a crane

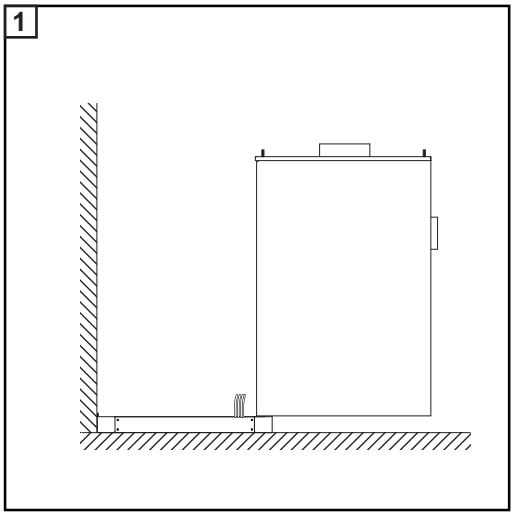


- Position the inverter over the mounting base using a crane
- Insert AC and DC wires into the cable input opening on the inverter

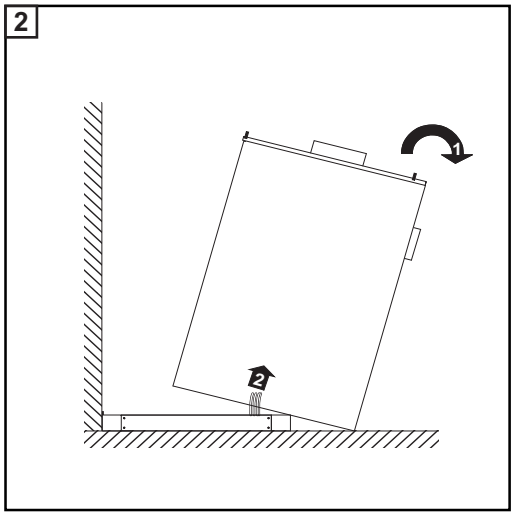


- Lower the inverter onto the mounting base
- Slide the inverter backwards until it engages at the stop

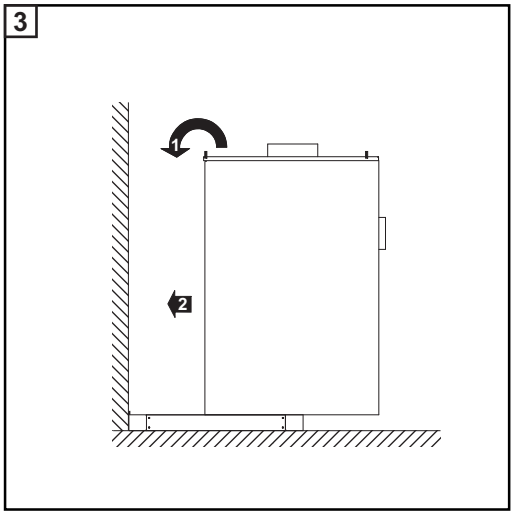
Manually positioning the Fronius CL on the mounting base



- Position the inverter on the mounting base so that the back edge of the inverter lies on the front edge of the mounting base

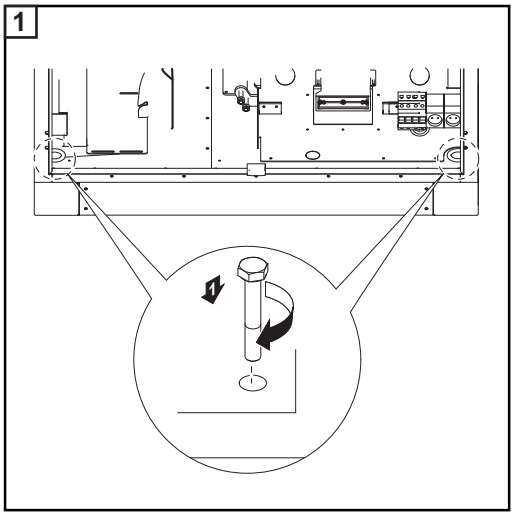


- Carefully tip the inverter backward
- Insert AC and DC wires into the cable input opening on the inverter

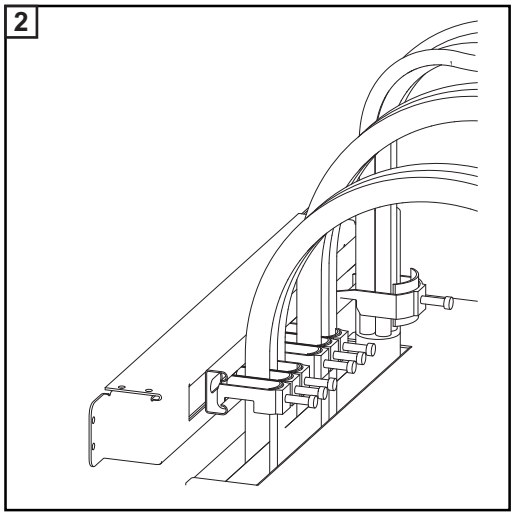


- Lower the inverter onto the mounting base
- Slide the inverter backwards until it engages at the stop

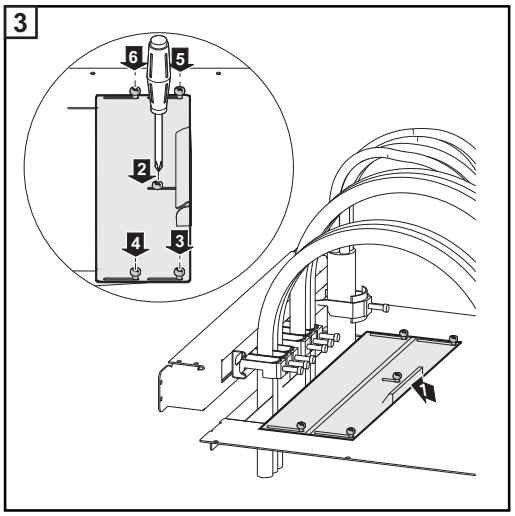
Securing the Fronius CL to the mounting base



Tightening torque: 9 Nm



- Attach the AC and DC wires on the side to the strain-relief device



Tightening torque: 3 Nm

- Close the slide cover as far as possible
- Attach 5 screws

Information regarding air supply and connection of an exhaust pipe

The air supply to the inverter must be at least 1300 m³/h of air (approx. 21 m³/min).

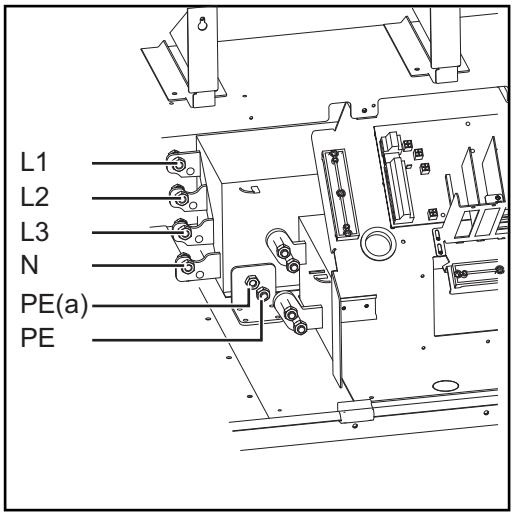
When connecting an exhaust pipe, the counter-pressure created by the pipe must not exceed a maximum value of 150 Pa.
This results in a flow rate of approx. 13 m³/min.

Connecting the Fronius CL 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.

AC connections



Legend:

L1	Phase conductor
L2	Phase conductor
L3	Phase conductor
N	Neutral conductor
PE	Grounding conductor / Ground
PE(a)	Grounding conductor / Ground

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

Connecting aluminum cables

Aluminum cables can also be connected to the AC connections.

NOTE! When connecting aluminum cables:
- Follow all national and international guidelines regarding the connection of aluminum cables
- Follow the instructions of the cable manufacturer
- Use suitable cable lugs: the cable lugs must be suitable for the connection material (Cu) and the cable material (Al).

Cross section of AC wires

The optimal bending radius in the inverter can be achieved using wires with a cross section of 70 mm². However, AC wires with a larger cable cross section can be connected to the AC connections of the inverter.

Safety

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

- Never work with live wires! Prior to all connection work, make sure that the AC and DC wires are not charged.
- Only an authorized electrician is permitted to connect this inverter to the public grid.
- Power stage sets should only be opened by Fronius-trained service personnel.

CAUTION! Danger of damaging the inverter due to an overload of the grid neutral conductor.

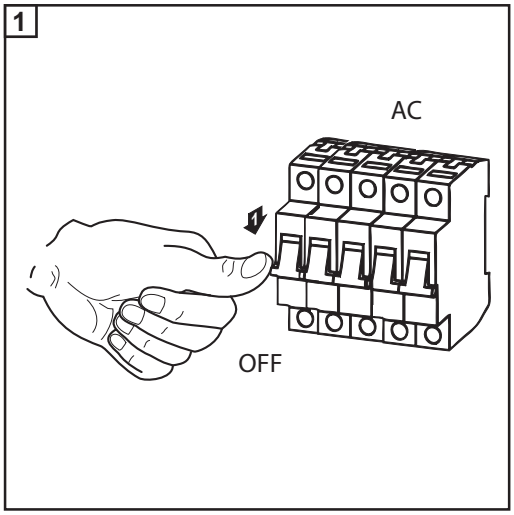
- Do not connect 3-phase devices to one phase
- Never operate multiphase devices in one phase

CAUTION! Danger of damaging the inverter due to improperly connected wires. Improperly connected wires can cause thermal damage to the inverter and may cause a fire. When connecting AC and DC wires, make sure that all cables are secured to the inverter connections using the correct torque.

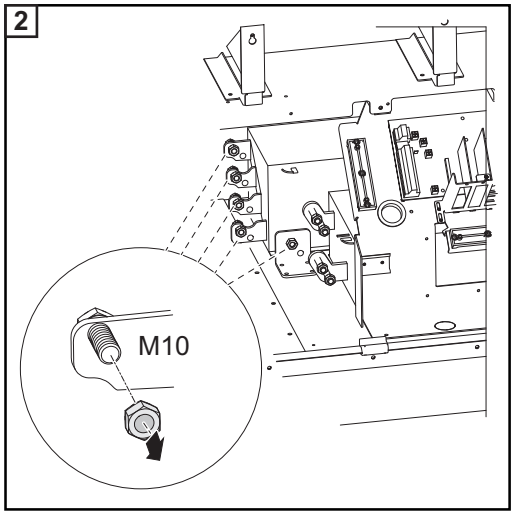
Connecting the Fronius CL to the public grid

NOTE! The phases should be connected in the proper order: L1, L2, L3, N and PE.

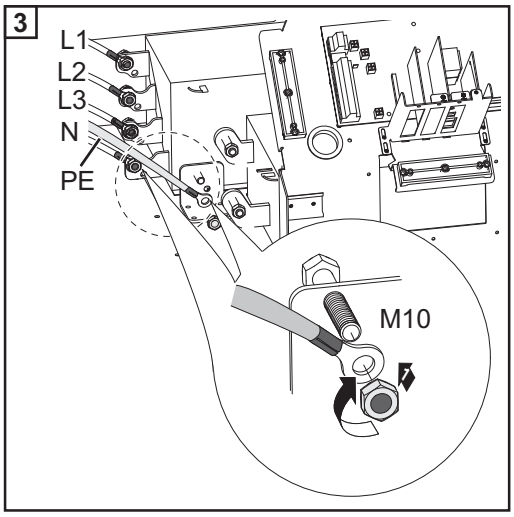
1



2



3



Tightening torque: 30 Nm

Maximum AC-side overcurrent protection

Inverter	Number of phases	Nominal output	Fuse protection
Fronius CL 36.0	3	36 kW	3 x C 80 A
Fronius CL 48.0	3	48 kW	3 x C 100 A
Fronius CL 60.0	3	60 kW	3 x C 125 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 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! When using a residual current circuit breaker, the voltage difference between the PE grounding conductor and the N neutral conductor cannot be higher than 8 V.

Connecting DC wires to the Fronius CL

General Information about Solar Modules

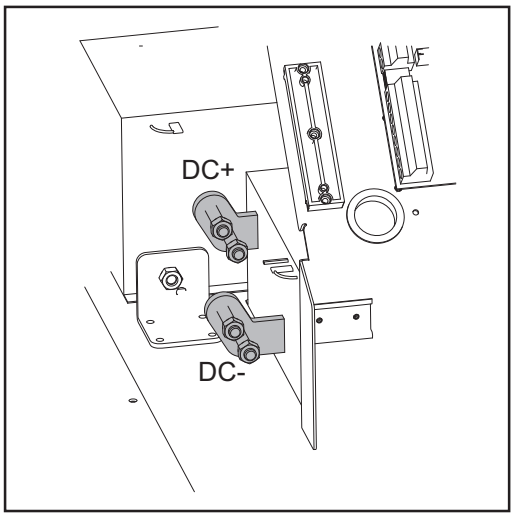
In order to select suitable solar modules and get the most efficient use out of the inverter, please note the following points:

- 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

DC connections



Connecting aluminum cables

Aluminum cables can also be connected to the DC connections.

NOTE! When connecting aluminum cables:

- Follow all national and international guidelines regarding the connection of aluminum cables
- Follow the instructions of the cable manufacturer
- Use suitable cable lugs: the cable lugs must be suitable for the connection material (Cu) and the cable material (Al).

Max. cross section of DC wires

A max. of 3 DC wires per pole with a max. cross section of 120 mm² can be connected to the inverter DC connections.

Safety

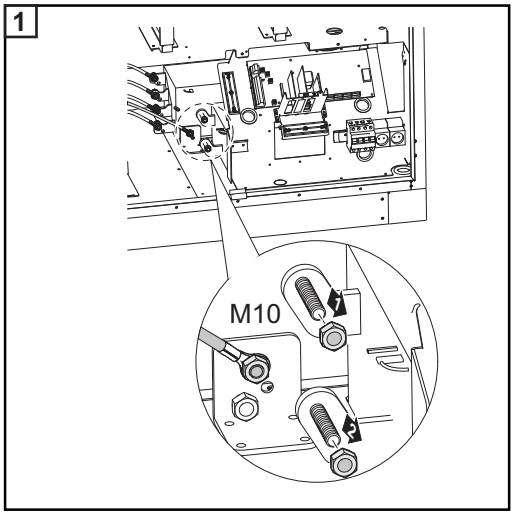
WARNING! An electrical shock can be fatal. Danger from grid voltage and DC voltage from solar modules.

- Never work with live wires! Prior to all connection work, make sure that the AC and DC wires are not charged.
- Only an authorized electrician is permitted to connect this inverter to the public grid.
- The separate power stage set area should only be disconnected from the connection area after first being disconnected from the grid power.
- Power stage sets should only be opened by Fronius-trained service personnel.

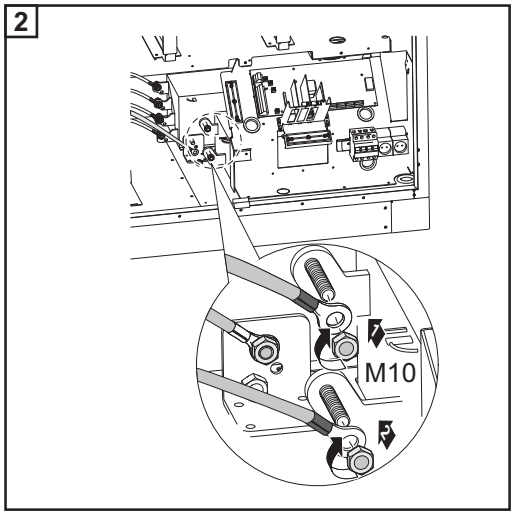
CAUTION! Danger of damaging the inverter from improperly connected terminals. Improperly connected terminals can cause thermal damage to the inverter and may cause a fire. When connecting the AC and DC cables, make sure that all terminals are tightened securely using the proper torque.

Connecting DC wires

1



2

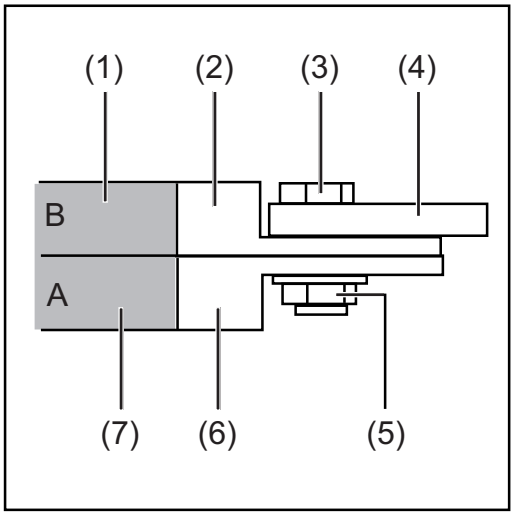


Tightening torque: 30 Nm

Connecting several DC wires

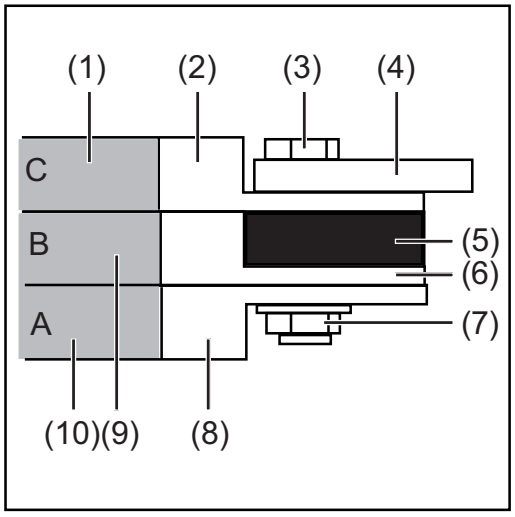
You can connect 2 - 3 DC wires per DC connection on the inverter.
A spacer is required to connect 3 wires.

Connecting 2 DC wires:



(1) Cable B
(2) Cable lug B
(3) Screw
(4) DC connection on inverter
(5) Hex nut
(6) Cable lug A
(7) Cable A

Connecting 3 DC wires:

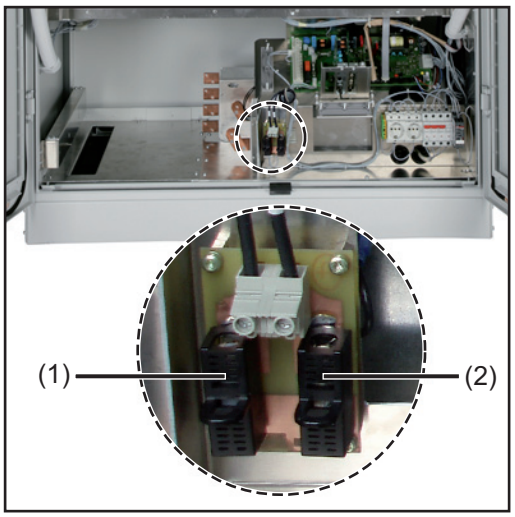


(1) Cable C
(2) Cable lug C
(3) Screw
(4) DC connection on inverter
(5) Spacer
(6) Cable lug B
(7) Hex nut
(8) Cable lug A
(9) Cable B
(10) Cable A

Fronius CL solar module ground

General

Some solar module manufacturers require that the solar modules be grounded.



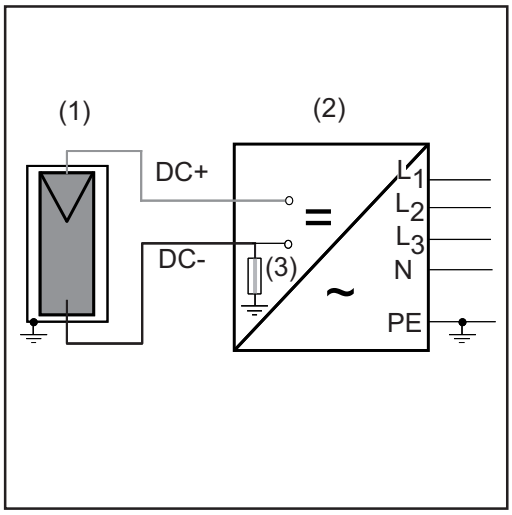
The inverter allows you to ground solar modules via a fuse or a high ohm resistor in the connection area either at the negative pole or the positive pole.

(1) Fuse holder for solar module ground at the positive pole

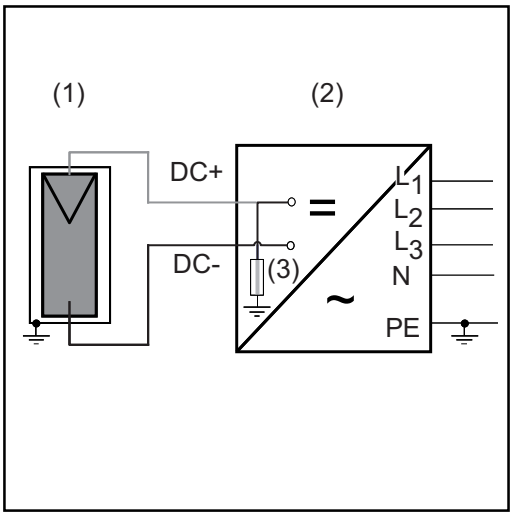
(2) Fuse holder for solar module ground at the negative pole

Solar module ground via fuse or high ohm resistor

Solar module ground at negative pole via fuse or high ohm resistor:



Solar module ground at positive pole via fuse or high ohm resistor:



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

Depending on the inverter output, Fronius recommends fuses with the following nominal current values for the solar module ground:
- Fronius CL 36.0: 2 A
- Fronius CL 48.0: 2 A
- Fronius CL 60.0: 3 A

Fuse dimensions: 10 x 38 mm

IMPORTANT! Fuses for the solar module ground are not included with the inverter. If the solar module manufacturer requires a ground for solar modules, a suitable fuse must be ordered separately.

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. Danger of an electrical shock due to incorrect or insufficient solar module grounding.
If the solar module manufacturer requires a solar module ground in the inverter, this may be provided only via the specified fuse or the high ohm resistor "Grounding Kit 100 kOhm" in order to comply 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.

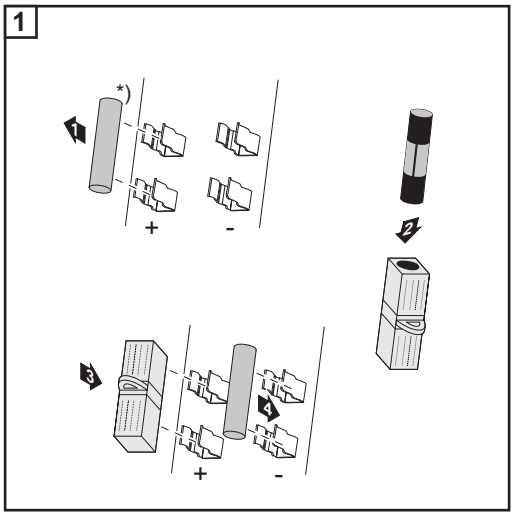
Setting inverters for grounded solar modules

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 at positive pole: Inserting fuse or "100 kohm Grounding Kit" option

WARNING! An electrical shock can be fatal. Danger from DC voltage from solar modules.
The DC main switch is only used to switch off power to the power stage sets. When the DC main switch is turned off, the solar module ground at the positive pole remains unaffected. Never touch the DC+ and DC-.

Inserting a fuse:

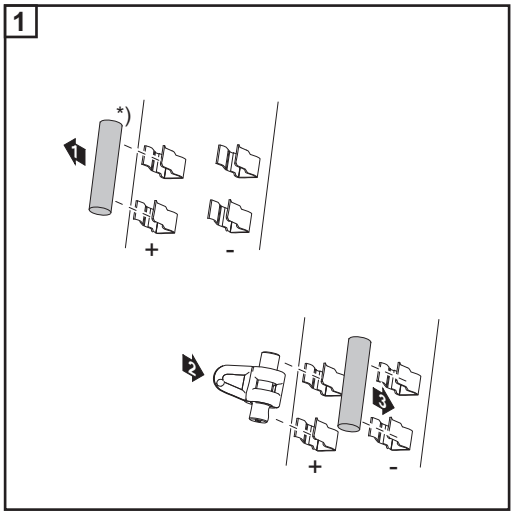


- Remove the plastic bolts from the fuse holder (included in the inverter scope of delivery)
- Insert the fuse into the fuse cover (included in the inverter scope of delivery)
- Insert the fuse with a fuse cover into the left fuse holder
- Insert the plastic bolt into the empty fuse holder

IMPORTANT The right fuse holder for the solar module ground at the negative pole must have a plastic bolt inserted.

Inserting the fuse at the positive pole grounds the solar module.

Inserting the "100 kohm Grounding Kit" option:



- Remove the plastic bolts from the fuse holder (included in the inverter scope of delivery)
- Insert the "100 kohm Grounding Kit" option into the left fuse holder completely with the plastic jacket
- Insert the plastic bolt into the empty fuse holder

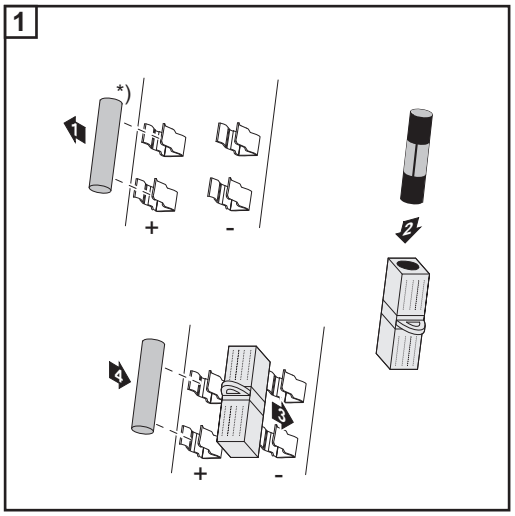
IMPORTANT The right fuse holder for the solar module ground at the negative pole must have a plastic bolt inserted.

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

Solar module ground at negative pole: Inserting fuse or "100 kohm Grounding Kit" option

WARNING! An electrical shock can be fatal. Danger from DC voltage from solar modules.
The DC main switch is only used to switch off power to the power stage sets. 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:

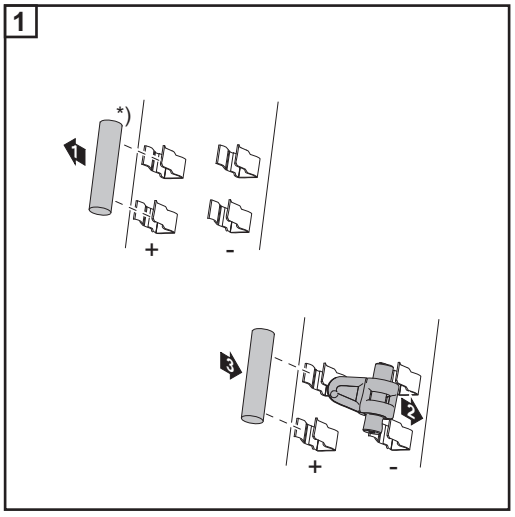


- Remove the plastic bolts from the fuse holder (included in the inverter scope of delivery)
- Insert the fuse into the fuse cover (included in the inverter scope of delivery)
- Insert the fuse with a fuse cover into the right fuse holder
- Insert the plastic bolt into the empty fuse holder

IMPORTANT The left fuse holder for the solar module ground at the positive pole must have a plastic bolt inserted.

Inserting the fuse at the negative pole grounds the solar module.

Inserting the "100 kohm Grounding Kit" option:



- Remove the plastic bolts from the fuse holder (included in the inverter scope of delivery)
- Insert the "100 kohm Grounding Kit" option into the right fuse holder completely with the plastic jacket
- Insert the plastic bolt into the empty fuse holder

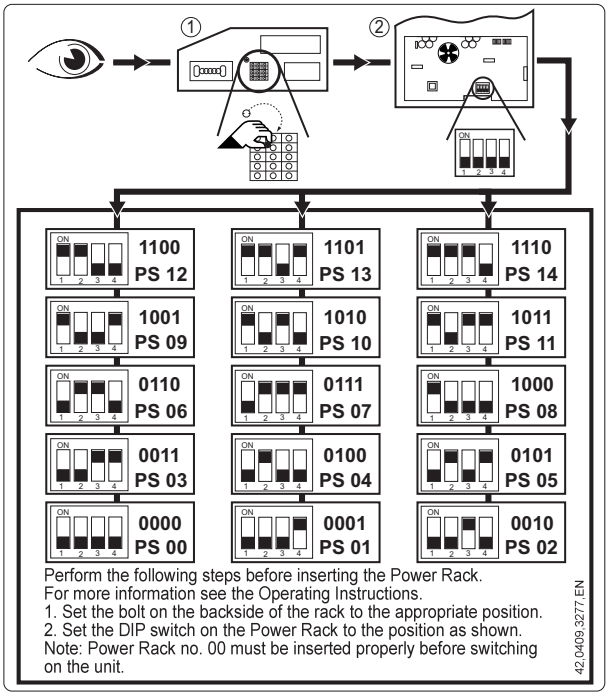
IMPORTANT The left fuse holder for the solar module ground at the positive pole must have a plastic bolt inserted.

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

Inserting power stage sets

Overview

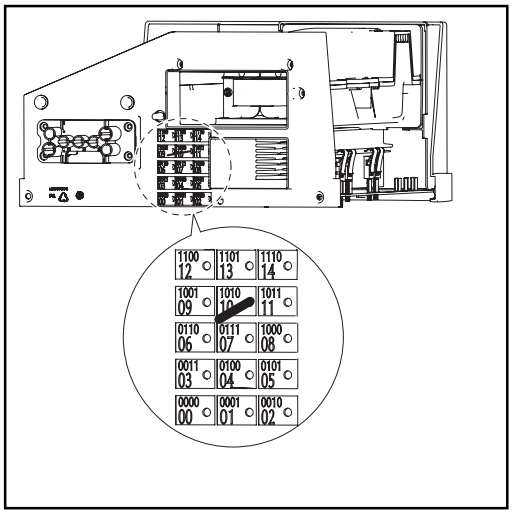
A sticker is located in the inverter on the top cover. The sticker provides an overview of the steps required for inserting power stage sets. A detailed description of the sticker can be found in 'Troubleshooting and maintenance' in the 'Replacing power stage sets' section.



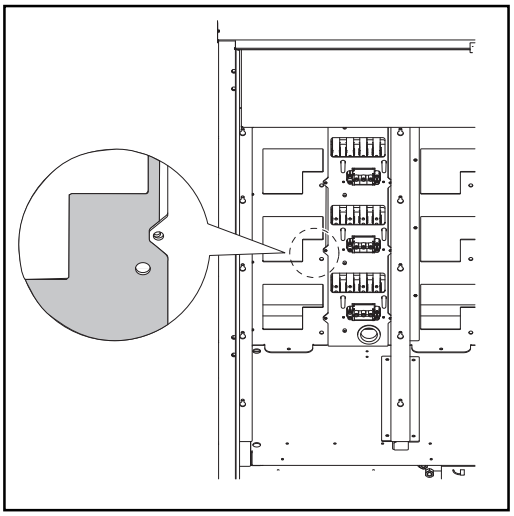
General

One slot in the inverter is assigned to each power stage set rack. In order to avoid mixing up the slots, positioning bolts are used on the back of the power stage set racks and a corresponding recess is available for the slot.

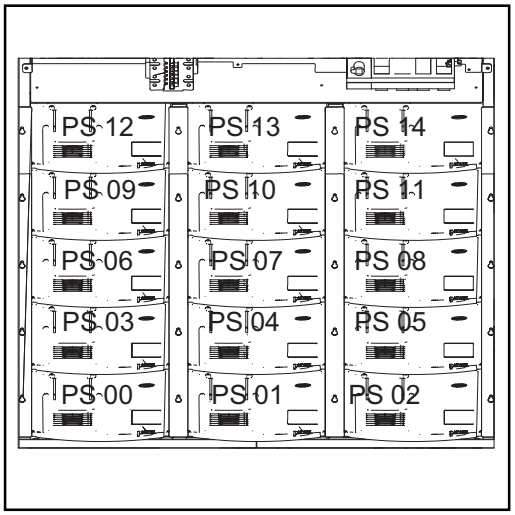
Positioning bolt on the back of the power stage set:



Opening for the slot



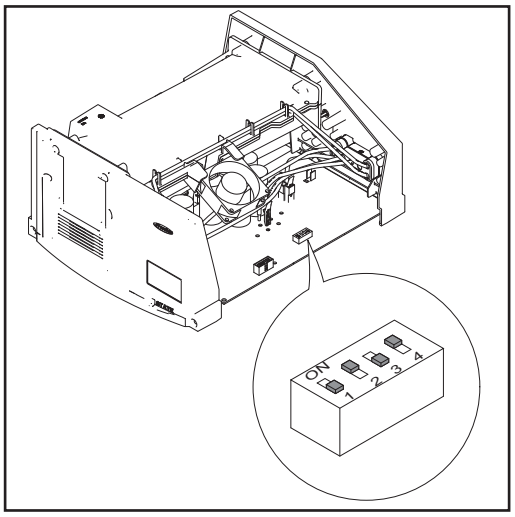
Slot arrangement



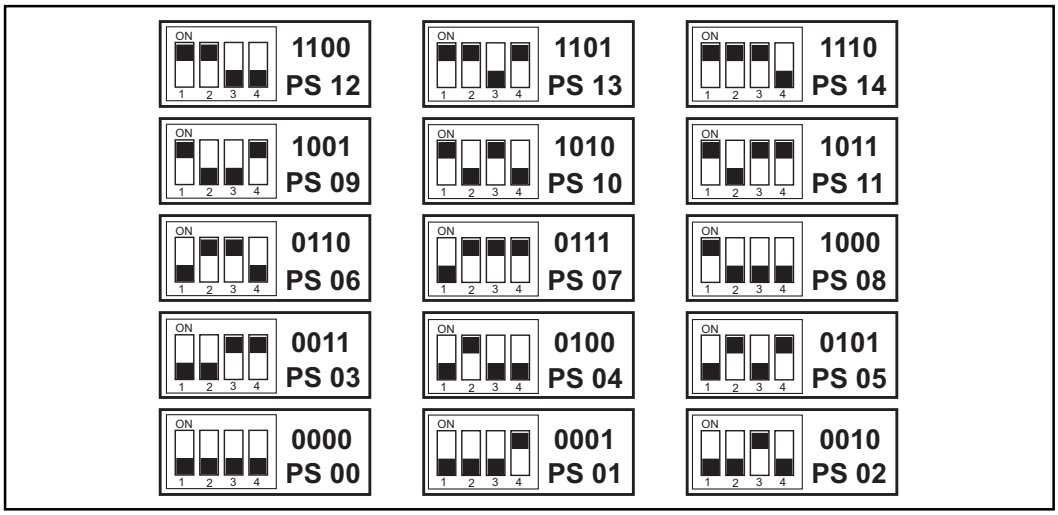
Dip switches for identifying power stage set racks

A dip switch on the front of the power stage set is used to identify each individual power stage set in the inverter. The dip switch must be set exactly for each individual slot.

Dip switches on the front of the power stage set:



Dip switch settings for each slot

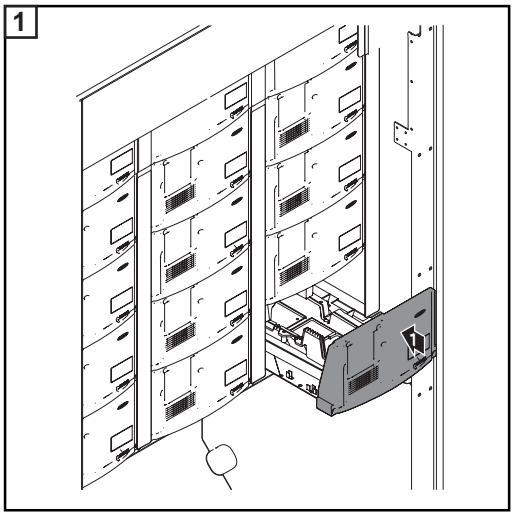


Inserting power stage sets

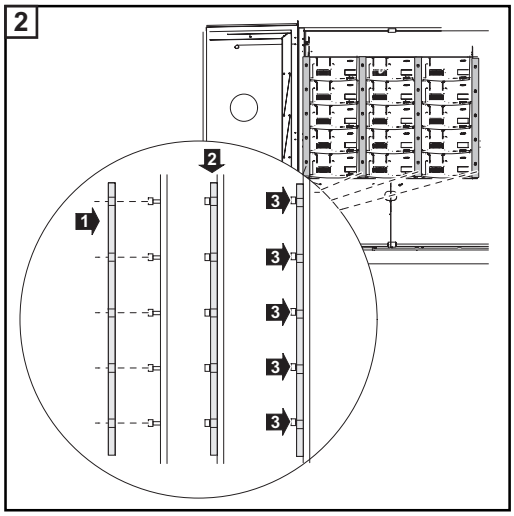
NOTE! Check the following before inserting power stage sets into the inverter:
- The location of the positioning bolt
- Whether or not the dip switch is set for the slot

IMPORTANT When inserting power stage sets, the plastic front of the power stage set must be inserted flat against the side metal supports.
If a power stage set cannot be inserted completely into the inverter, then the power stage set has been inserted into the wrong slot.

1



2



Tightening torque: 3.5 Nm

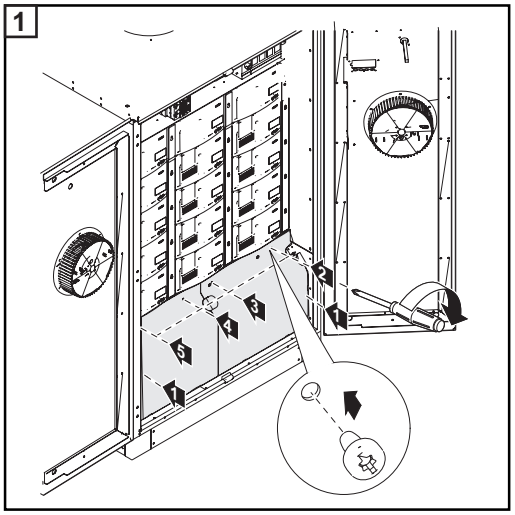
- Insert 4 rails
- Secure rails using 4 x 5 screws

Closing the Fronius CL

Closing the Fronius CL

CAUTION! An inadequate grounding conductor connection can cause serious injuries to persons and damage to (or loss of) property.
The screws on the covers provide an adequate grounding conductor connection for the housing ground and should not under any circumstances be replaced by other screws that do not provide a proper grounding conductor connection.

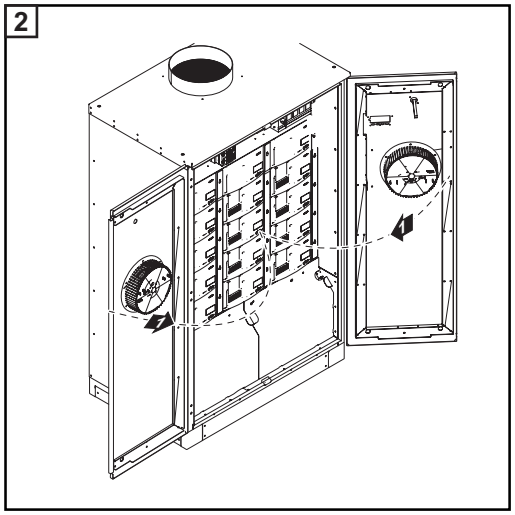
1



Tightening torque: 2.5 Nm

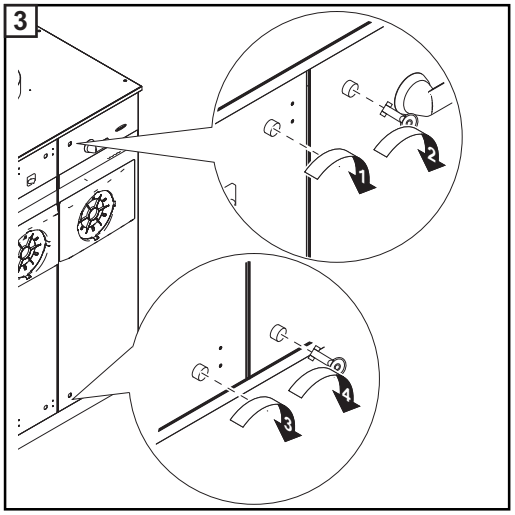
- Replace covers
- Secure with screws

2



- Close doors

3



- Close door latches

Inserting Option Cards

Safety

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

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

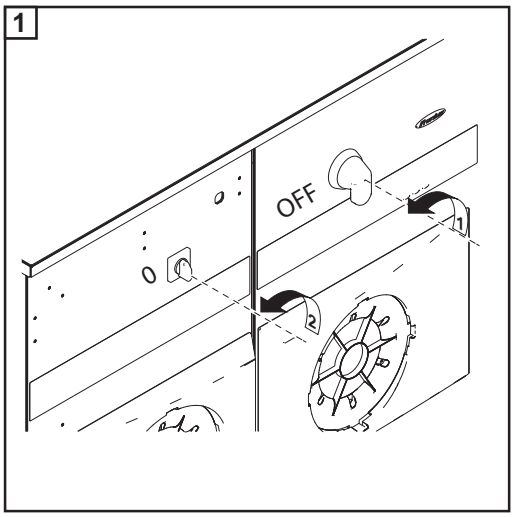
WARNING! An electric shock can be fatal. Danger from residual voltage from capacitors.

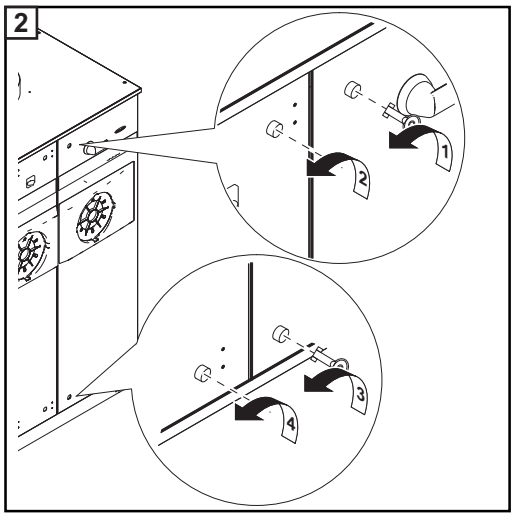
You must wait until the capacitors have discharged. Discharge takes 5 minutes.

NOTE! Follow general ESD precautions when handling option cards.

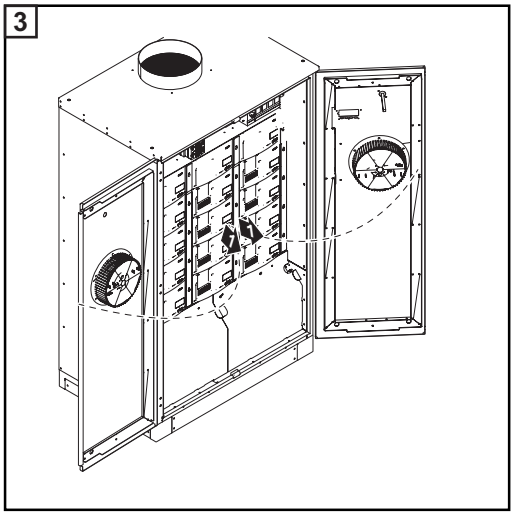
Opening the Fronius CL

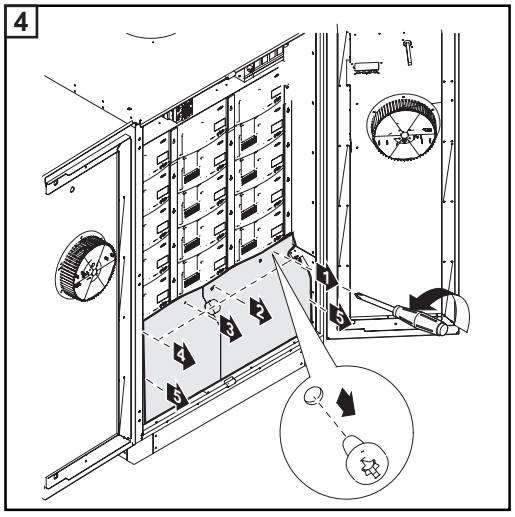
When adding option cards to the inverter, please follow all inverter safety instructions and information before opening the inverter.



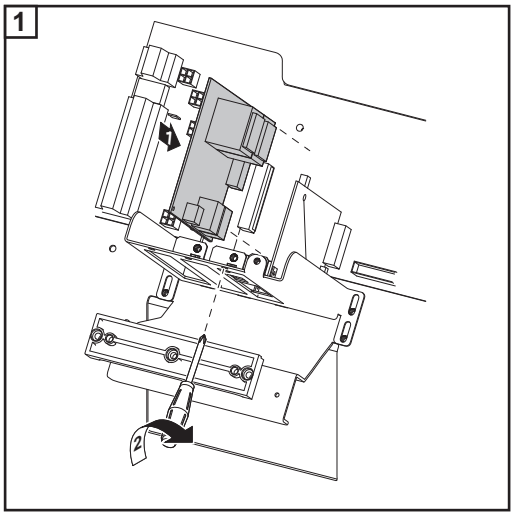


CAUTION! An inadequate grounding conductor connection can cause serious injuries to persons and damage to (or loss of) property.
The screws on the covers provide an adequate grounding conductor connection for the housing ground and should not under any circumstances be replaced by other screws that do not provide a proper grounding conductor connection.





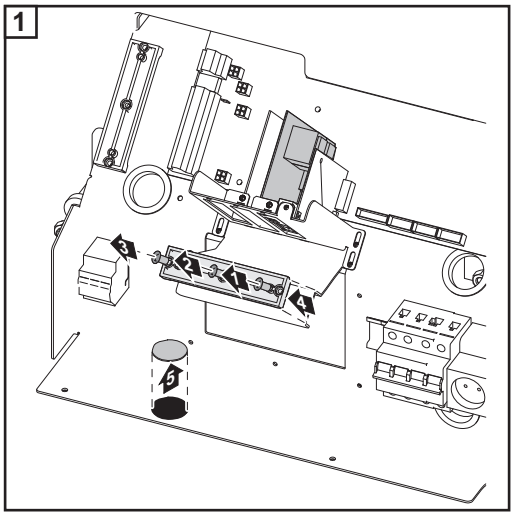
Inserting option cards



- Insert option cards into free slots and secure.

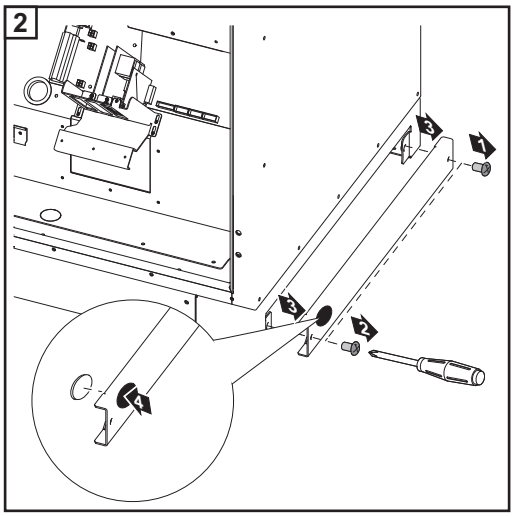
Connecting option cards, laying data communication wires

CAUTION! Danger of short circuit by loose metal parts from knockouts. Loose metal parts in the inverter may cause short circuits when the inverter is powered up. When removing knockouts, make sure that
- no loose metal parts fall into the inverter
- any metal pieces that do fall into the inverter are removed immediately



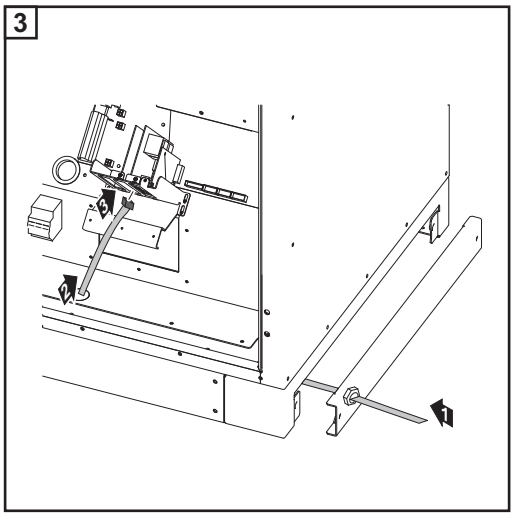
- Remove the knockouts
- Remove strain-relief device

Only when data communication cables are not run out the base like the AC and DC wires, but rather run into the inverter from the side:

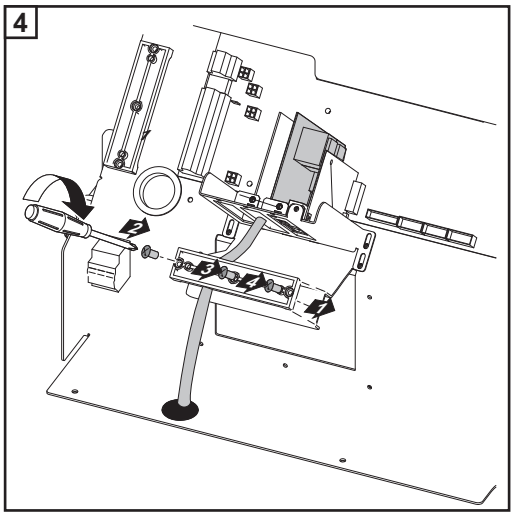


- Remove right side panel of the mounting base
- Drill a hole for inserting the data communication cable on the side panel of the mounting base. Attach a metric screw joint if required.

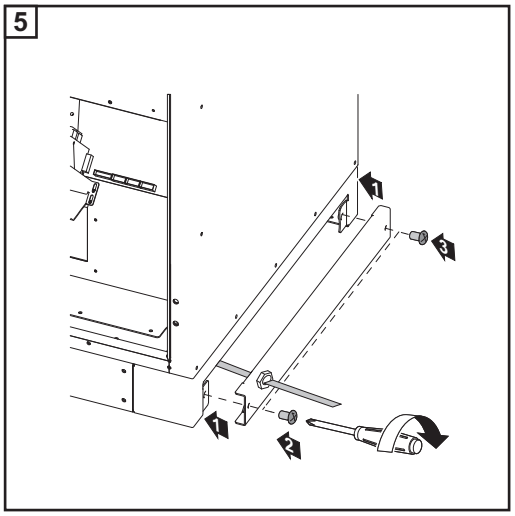
NOTE! To prevent damage to the data communication cables from the rough edges of wire input openings, install a suitable edge guard in the knockout and drilling on the side of the mounting base (e.g., a rubber bushing).



- Run data communication cable through the open side of the mounting base and through the knockout into the inverter
- Connect the data communication cable to the option card



- Secure data communication cable with strain-relief device and screws



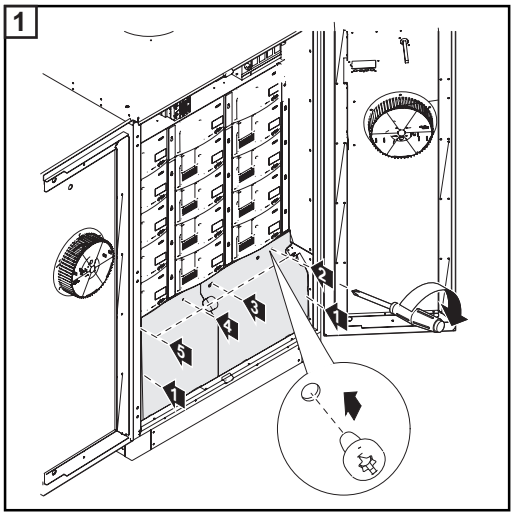
- Attach side panel to mounting base

Tightening torque: 2 Nm

Closing the Fronius CL

CAUTION! An inadequate grounding conductor connection can cause serious injuries to persons and damage to (or loss of) property.
The screws on the covers provide an adequate grounding conductor connection for the housing ground and should not under any circumstances be replaced by other screws that do not provide a proper grounding conductor connection.

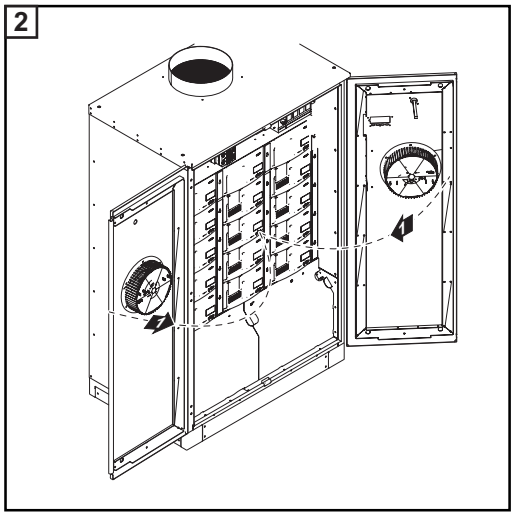
1



Tightening torque: 2.5 Nm

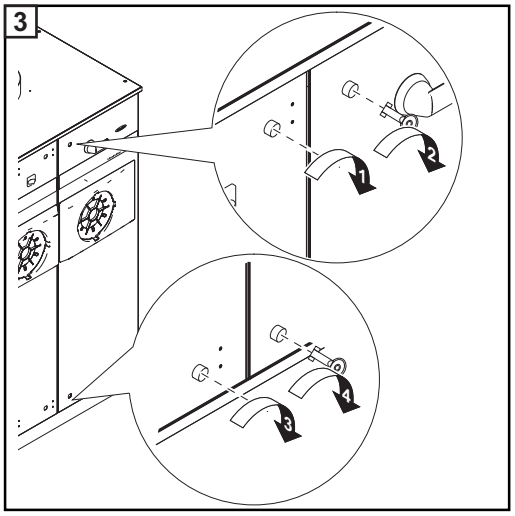
- Replace covers
- Secure with screws

2



- Close doors

3



- Close door latches

Commissioning

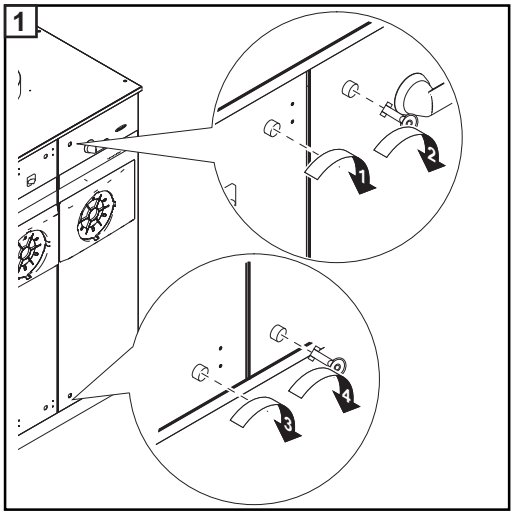
Factory Configuration

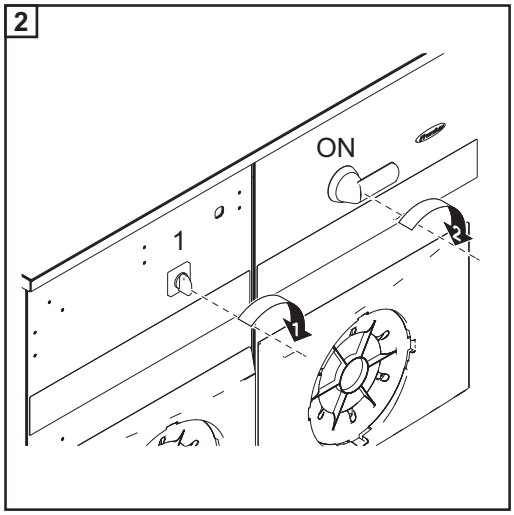
The inverter has been pre-configured in the factory and is ready for operation.

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

Start-up operation

After connecting the inverter to the solar modules (DC) and public grid (AC):
- Attach all covers
- Close and lock doors
- Flip AC main switch to position - 1 -
- Flip DC main switch to "ON" position





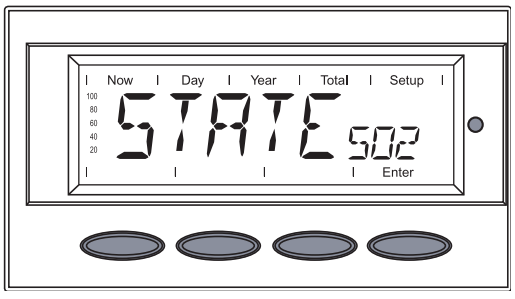
- As soon as the solar modules produce sufficient power, the Operating Status LED lights up orange. The screen displays the startup phase. The orange LED indicates that the feed-in mode of the inverter will begin shortly.
- After the automatic inverter start, the Operating Status LED lights up green.
- 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

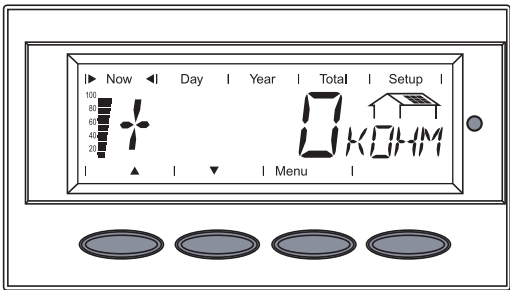
NOTE! If a solar module ground is used, the corresponding grounding mode must be set in the 'Basic Service Menu' after the inverter is turned on.

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.

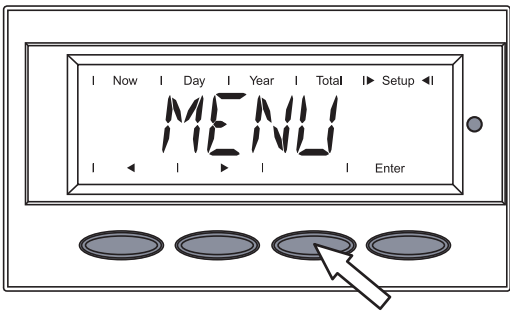


1 Confirm the status message by pressing the "Enter" key



The current insulation value is displayed.

2 Press the "Menu" key

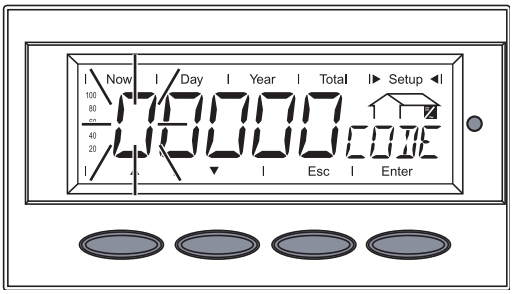


The "menu" is displayed.

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

◀ ▶

4 Press the unassigned "Esc" key 5 x

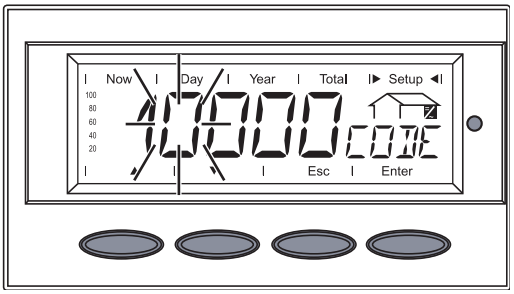


"CODE" is displayed, the first digit flashes.

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

▲ ▼

6 Press the "Enter" key

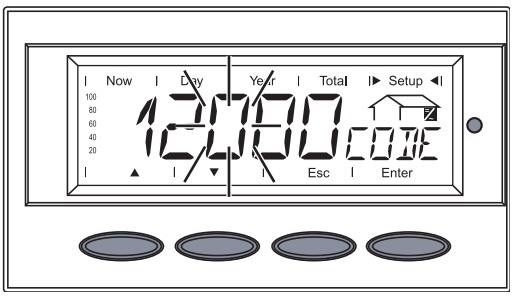


The second digit flashes.

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

▲ ▼

8 Press the "Enter" key

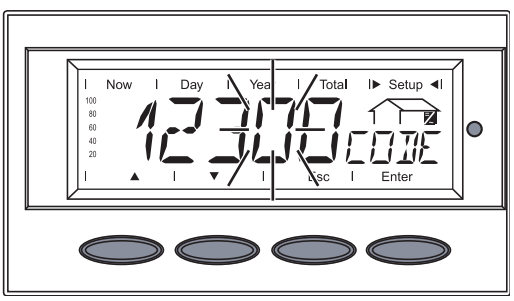


The third digit flashes.

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

▲ ▼

10 Press the "Enter" key

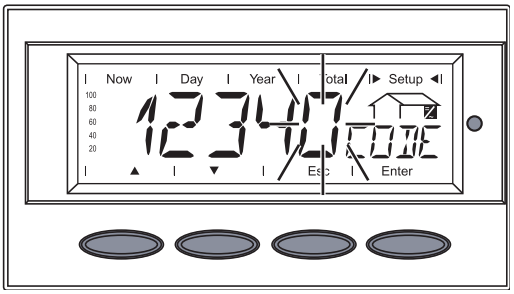


The fourth digit flashes.

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

▲ ▼

12 Press the "Enter" key

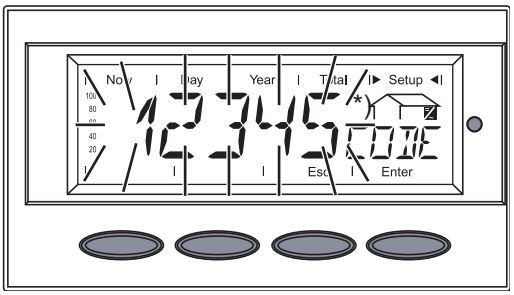


The fifth digit flashes.

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

▲ ▼

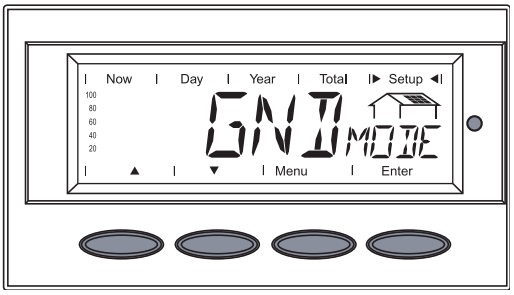
14 Press the "Enter" key



The access code flashes.
*) ... Code example

15 Press the "Enter" key

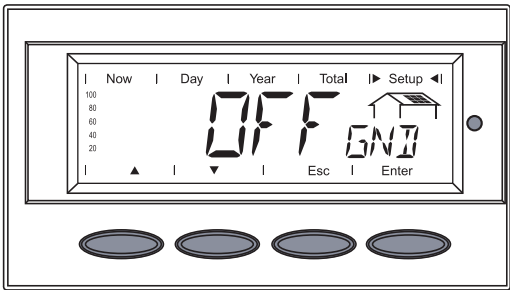
The inverter is now in the Basic Service menu, the first parameter is displayed:
- 'MIXMODE' for multiphase inverters
- 'DCMODE' for one-phase inverters



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

▲ ▼

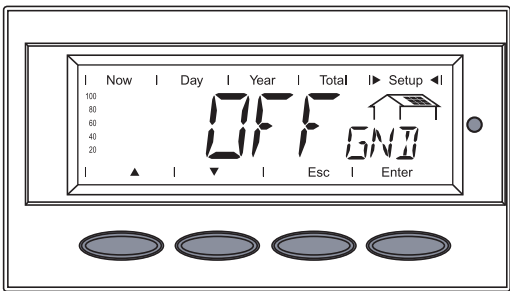
17 Press the "Enter" key



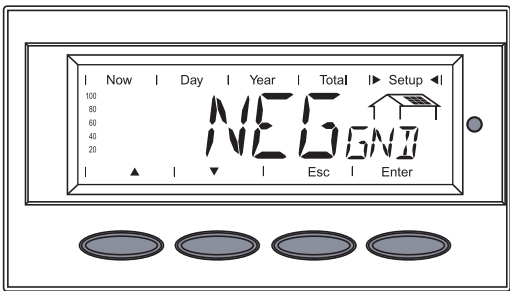
The grounding mode is displayed.

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

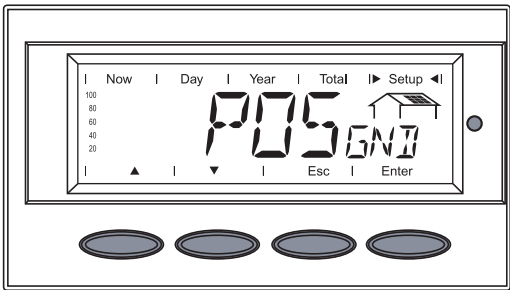
▲ ▼



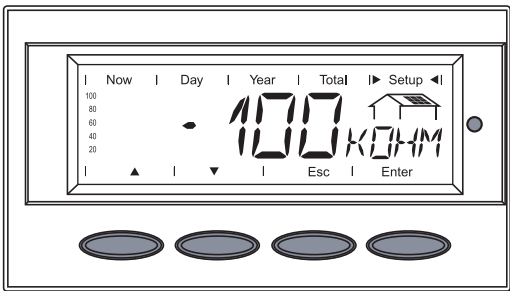
OFF = no solar module ground (factory setting)



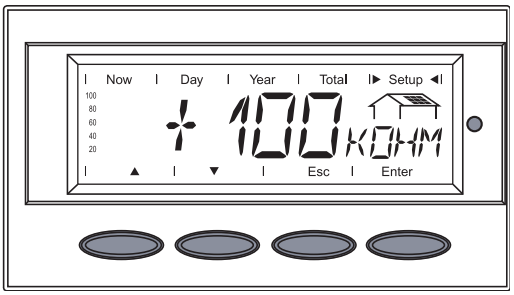
NEG = solar module ground at negative pole



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

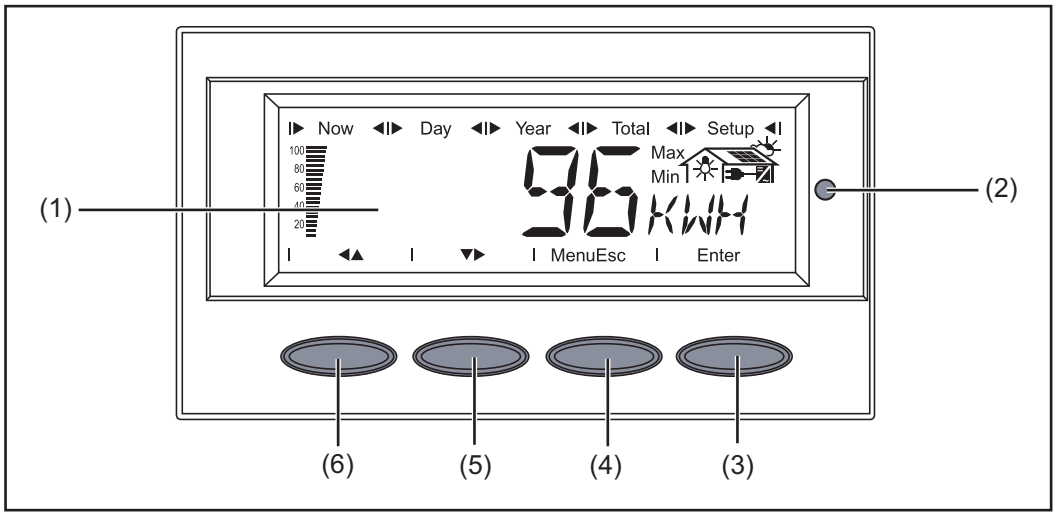
19 Press the "Enter" key to apply the required grounding mode

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

Operation

Keys and symbols

Controls and Indicators

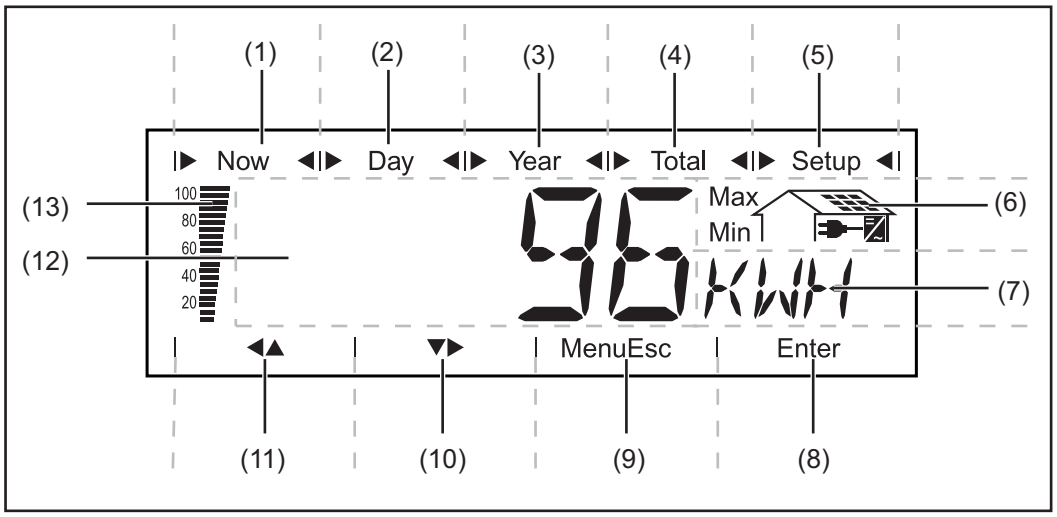


Item	Function
(1)	Display for displaying values, settings and menus
(2)	Operating Status LED for displaying the operating status
(3)	"Enter" key for confirming a selection
(4)	"Menu / Esc" key for scrolling through menu options for exiting the Setup menu
(5)	"Down/Right" key depending on the selection: 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	A green light starts as soon as the inverter has completed the startup phase, and stays green as long as the operation of feeding power into the grid continues. It indicates problem-free operation of the photovoltaic system.
flashes 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.
lights up 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")

Operating Status LED	Explanation
lights up 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."

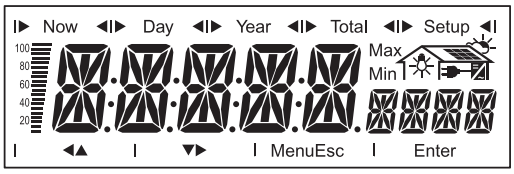
Startup Phase and Grid Feed-in Mode

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

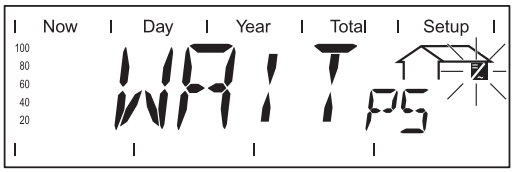
1. Segment test
   All display elements light up for about one second



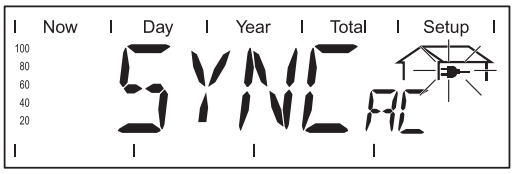
2. Self test of important inverter components
   - The inverter goes through a master check list for several seconds
   - The display will show "TEST" as well as the component currently being tested (e.g., "LED")



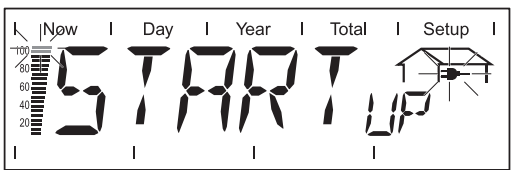
3. Synchronization with grid:
   - "WAIT PS" is displayed, the inverter icon flashes: The inverter waits for all power stage sets on the grid to be operational. This procedure is dependent on the DC voltage.



   - 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"



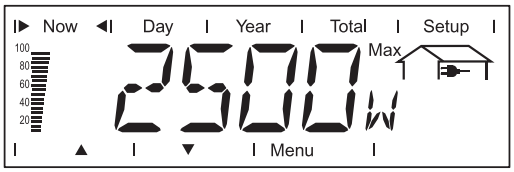
The startup test can take anything from just a few seconds up to several minutes de-

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.

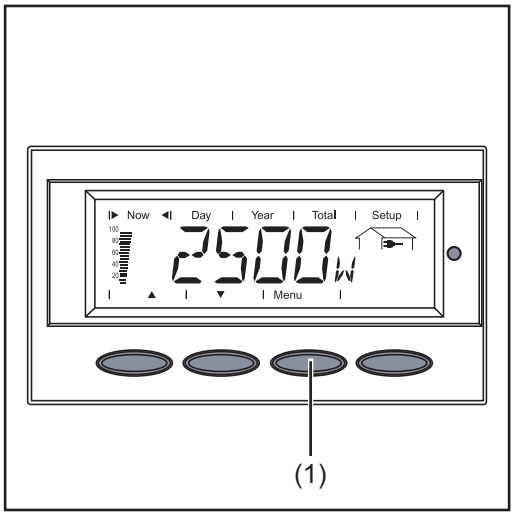
Automatic switch to the "Now" display mode or the startup phase

If no key is pressed for 2 minutes:

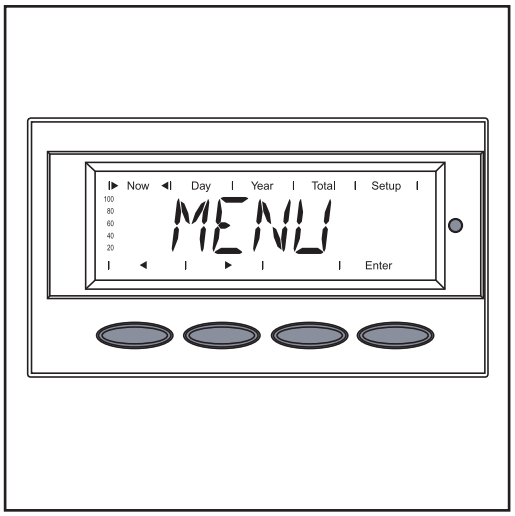
- While power is being fed into the grid, the inverter automatically switches to the "Now" display mode and the present output power is displayed.
- If the inverter is not feeding power into the grid, the inverter automatically switches to the startup phase for synchronization with the grid.

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

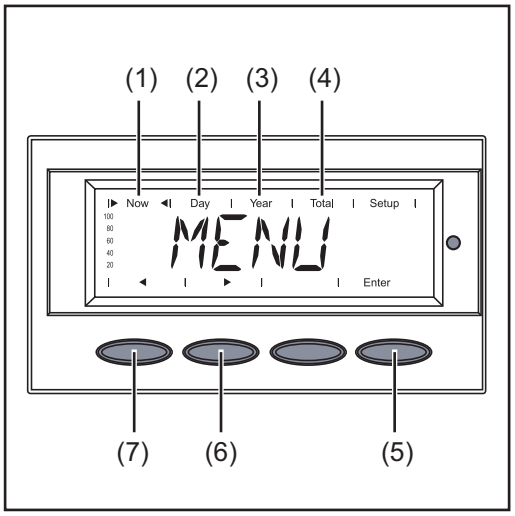
- set the desired display mode
- access the Setup menu

The Display Modes

The Display Modes

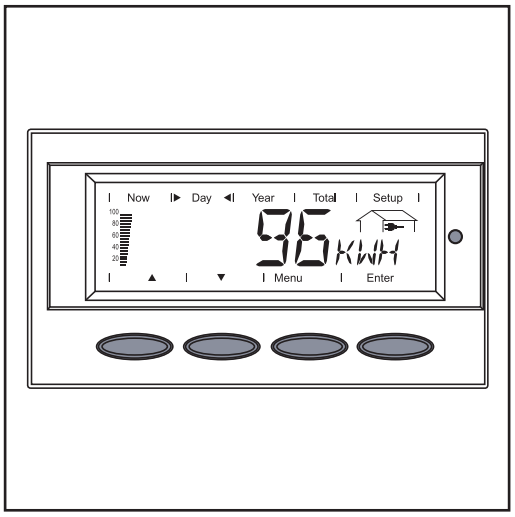
"Now" display mode	.....	Displays real-time values
"Day" display mode	.....	Displays values for power fed into the grid during that day
"Year" display mode	.....	Displays values for the present calendar year - only available in combination with optional Fronius Datalogger
"Total" display mode	.....	Displays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

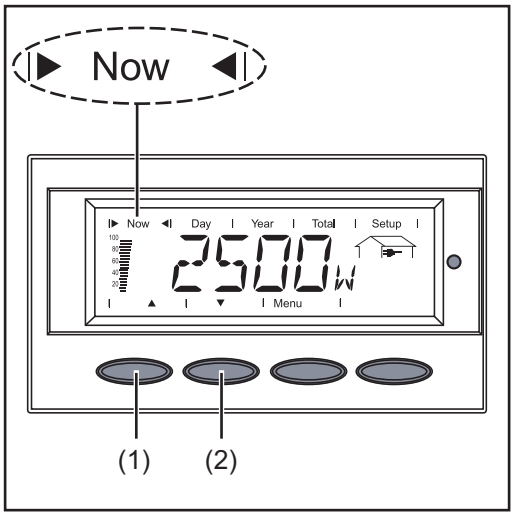
Overview of display values

Display mode	Icon	Unit	Optional	Display value
"Now"		W	-	Output power
		V	-	AC grid voltage
		A	-	Output current
		Hz	-	Grid frequency
		V	-	Solar module voltage
		A	-	Module current
		megaohms	-	Insulation resistance
		HH:MM	x	Time
		°C / °F	-	Supply air temperature
		rpm	-	Speed of left fan
		rpm	-	Speed of right fan
"Day"		kWh / MWh	-	Output energy
"Year"		Currency	-	Yield
"Total"		kg / T	-	CO_2 reduction
		W	-	Maximum output power
		V	-	Maximum grid voltage
		V	-	Minimum grid voltage
		V	-	Maximum solar module voltage
		HH:MM	-	Operating hours of the inverter

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

Display Values in "Now" Display Mode

Selecting the "Now" Display Mode



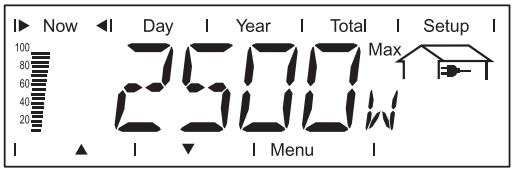
1 Select the "Now" display mode

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



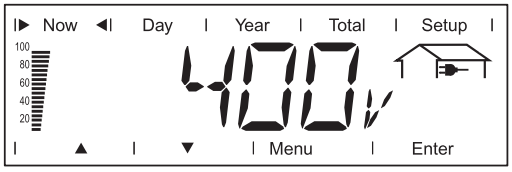
Output power
power (in watts) currently being fed into the grid

The "Enter" key is active for BDEW devices with the "DE-MS" setup.
- The apparent power can be displayed by pressing the "Enter" key.
- The present operating mode can be displayed by pressing the "Up" and "Down" keys.

The "Enter" key can also be active if a Fronius Power Control Box is located in Solar Net and power reduction has been triggered by the utility company.
- The power reduction is displayed as a % by pressing the "Enter" key.
- You can display how long the power reduction has been in effect by pressing the "Up" and "Down" keys.

In cases where both are occurring, you can display the apparent power by pressing the "Enter" key. Then you can scroll through the remaining parameters using the "Up" and "Down" keys.

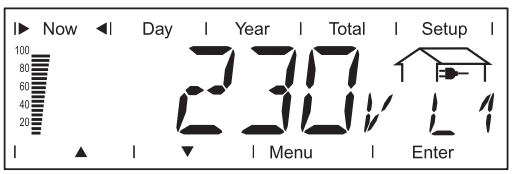
- You can return to the menu level by pressing the "Menu" key.

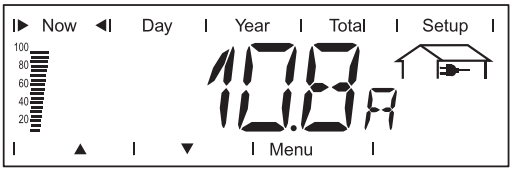


Grid voltage
External conductor voltage (volts)

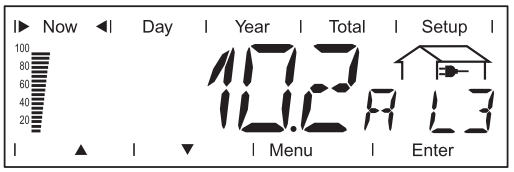
- The phase voltage can be displayed by pressing the "Enter" key.
- The phase voltage of the other phases can be displayed by pressing the "Up" and "Down" keys.
- You can return to the menu level by pressing the "Menu" key.

For example, phase voltage for phase L1:



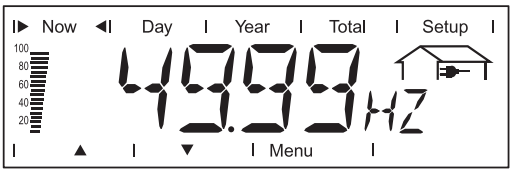


For example, phase current for phase L3:

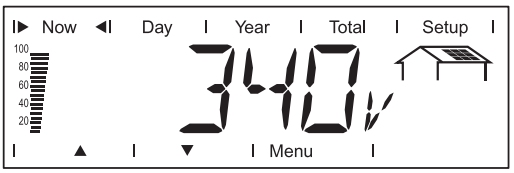


Output current
current supplied to the grid at the particular moment (amperes)

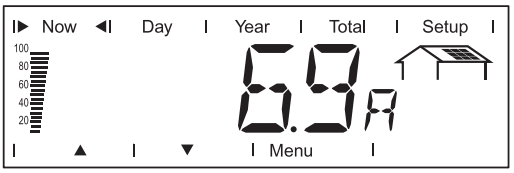
- The phase current can be displayed by pressing the "Enter" key.
- The phase current of the other phases can be displayed by pressing the "Up" and "Down" keys.
- You can return to the menu level by pressing the "Menu" key.



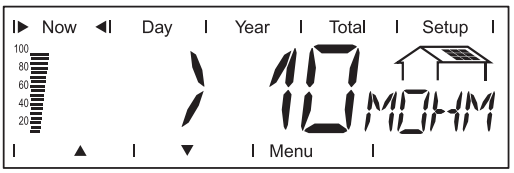
Grid frequency
(hertz)



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)

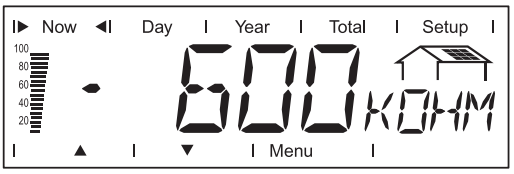


Insulation resistance of photovoltaic system
(megaohms)
for ungrounded solar modules

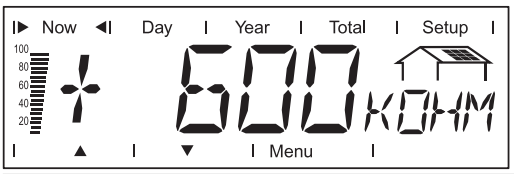
WARNING! An electric shock can be fatal. The positive and negative poles of the photovoltaic system should never be touched with an insulation resistance of < 600 kohm. An insulation resistance of < 600 kohm may be due to an inadequately insulated DC lead or defective solar modules. In the event that 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 ground potential. If an insulation resistance > 600 kilohms is shown, this means that the photovoltaic system is adequately insulated.
An insulation resistance of less than 600 kilohms indicates an error.

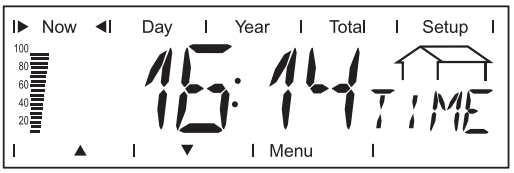
When the insulation resistance is less than 10 megaohms, the display differentiates between:
- negative potential of the ground (polarity sign '-')
- positive potential of the ground (polarity sign '+')



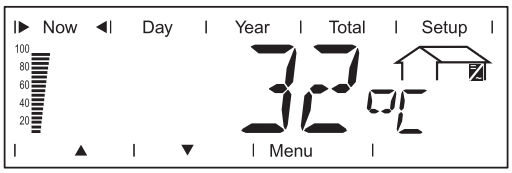
Display example of a negative potential (polarity sign "-")
Short circuit between DC- lead and ground



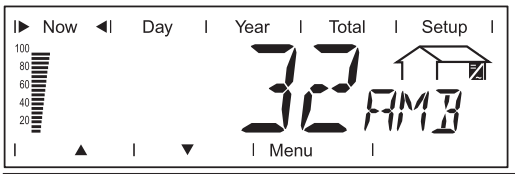
Display example of a positive potential (polarity sign '+')
Short circuit between DC+ lead and ground

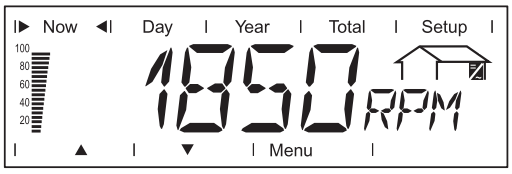


Time (optional datalogger)
When the time on the inverter or a system upgrade is changed, this changes the time on all devices connected via Solar Net.

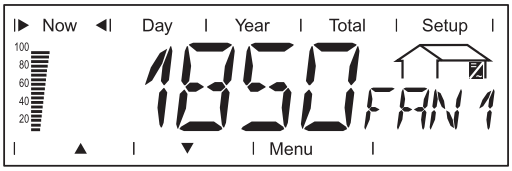


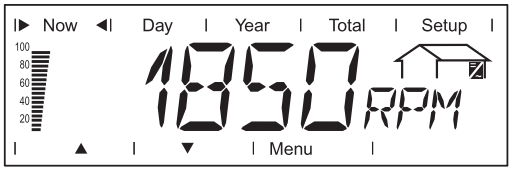
Supply air temperature
Temperature of the supply air used to cool the inverter
(° C)
The area for unit display switches between ‘°C’ and ‘AMB.’



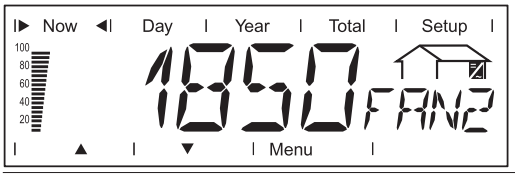


Speed of left fan - FAN 1
(rpm)
The area for unit display switches between ‘RPM’ and ‘FAN1.’





Speed of right fan - FAN 2
(rpm)
The area for unit display switches between ‘RPM’ and ‘FAN2.’



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

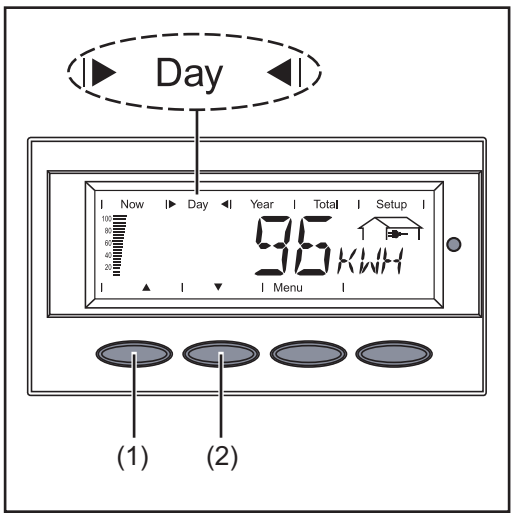
For the inverter, the day begins when it switches on. If the DC supply line is disconnected, the following parameters within the "Day" display mode will be reset after repeating the startup:

- Return (currency can be selected)
- CO_2 reduction (kg)
- Maximum output power (watts)
- Maximum grid voltage (volts)
- Minimum grid voltage (volts)
- Service hours completed by the inverter

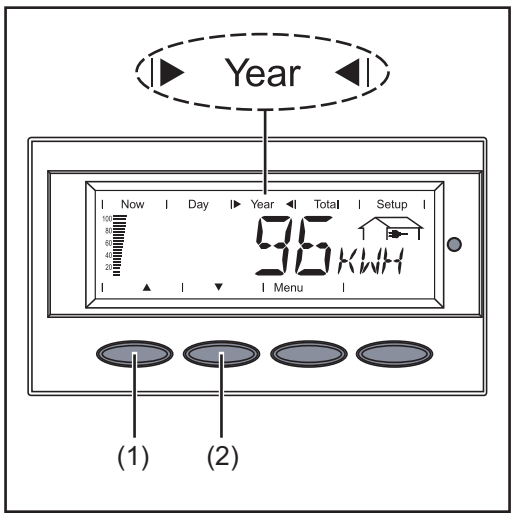
If an optional Fronius Datalogger is available, the display values listed always apply to the whole day.

Selecting "Day / Year / Total" Display Mode

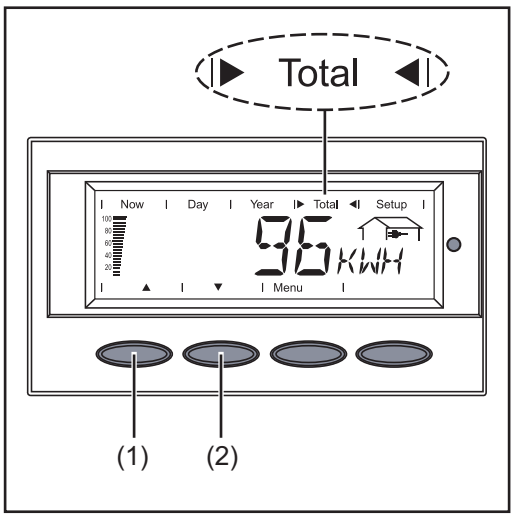
First Display Value in the "Day" Display Mode:



First Display Value in the "Year" Display Mode:



First Display Value in the "Total" Display Mode:



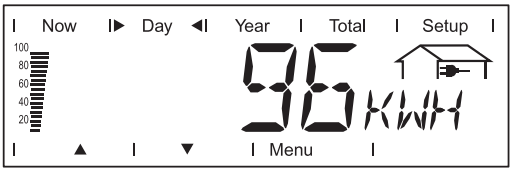
1 Select the "Day" or "Year" or "Total" display mode

The first display value in the selected display mode appears.

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

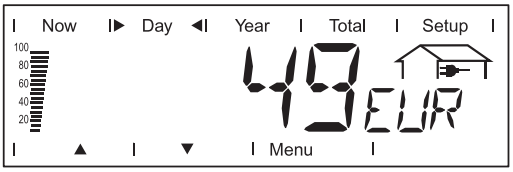
Scroll back using the "Up" key (1)

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)

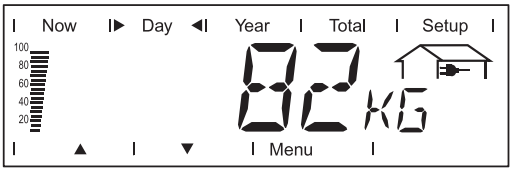
Due to the variety of different monitoring systems, there can be deviations between the readings of other metering instruments and the readings from the inverter. For determining the energy supplied to the grid, only the readings of the calibrated meter supplied by the electric utility company are relevant.

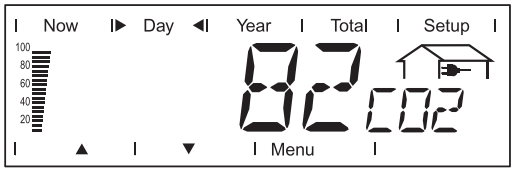


Yield
Amount of money earned during the period of time in question (currency can be selected in the Setup menu)

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

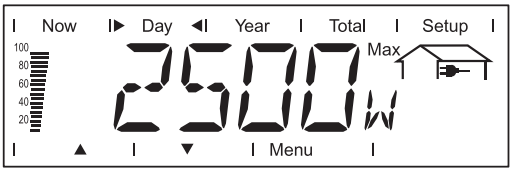
'The Setup menu' section describes how to set the currency and rate for the output energy. The factory setting depends on the respective country-specific setting.



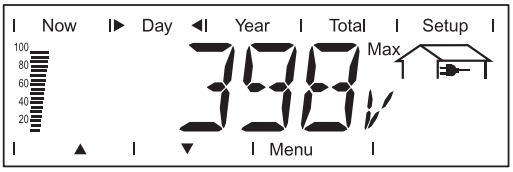


CO2 reduction
CO2 emissions saved during the monitored period
(kg / T; T = tons)
The area for unit display switches between ‘kg’ or ‘T’ and ‘CO2.’

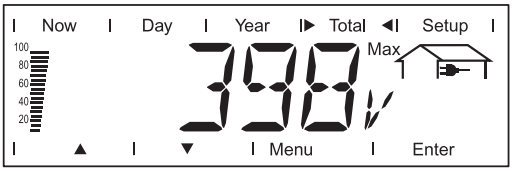
The CO2 meter gives an indication of CO2 emissions that would be released during the generation of the same amount of electricity in a combustion power plant.
The factory setting is 0.59 kg / kWh (source: DGS - the German Society for Solar Energy).



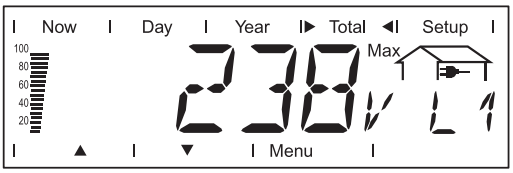
Maximum output power
Highest output power of the inverter during observation period (watts)



Maximum grid voltage
Highest reading of grid voltage (V) during observation period

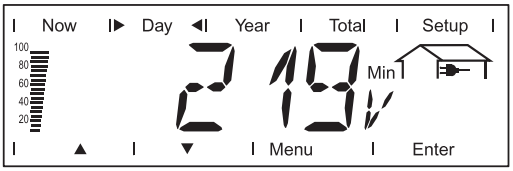


For example, maximum phase voltage for phase L1:

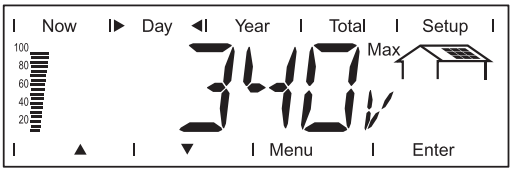


The 'Enter' key is active in the 'Total' display mode depending on the country set-up or the device-specific settings.

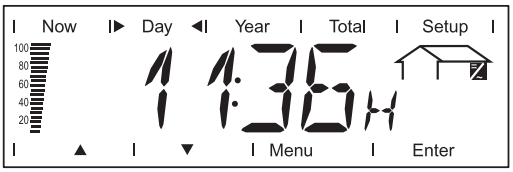
- The maximum phase voltage measured during the time in question can be displayed by pressing the 'Enter' key.
- The maximum phase voltage of the other phases measured during the time in question can be displayed by pressing the 'Up' and 'Down' keys.
- You can return to the menu level by pressing the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

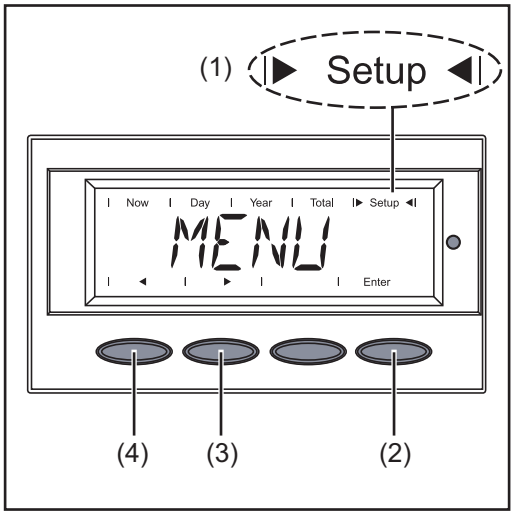
The Setup Menu

Presetting

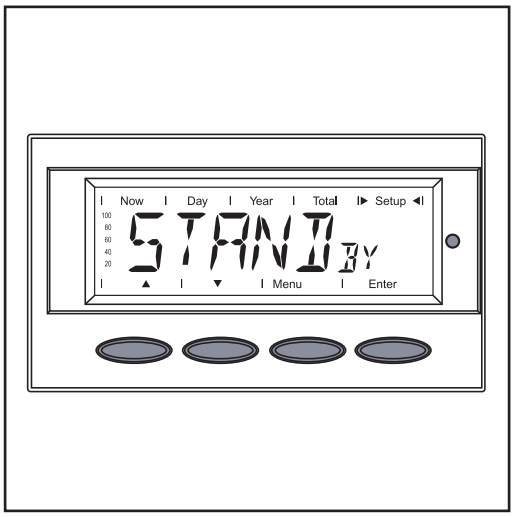
The inverter is pre-configured and ready to use. No manual control is necessary for feeding the power it generates into the grid.

The setup menu allows easy readjustment of the inverter's preset parameters to your needs.

Accessing the Setup Menu



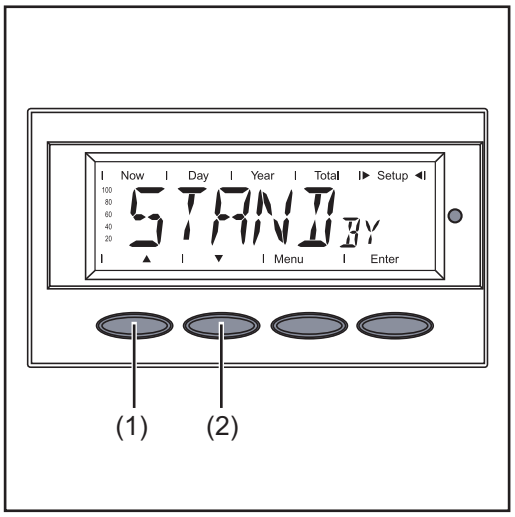
1. Switch to the menu level (press the "Menu" key)
2. Select the "Setup" (1) mode using the "Left" (4) or "Right" (3) keys
3. Press "Enter" (2)



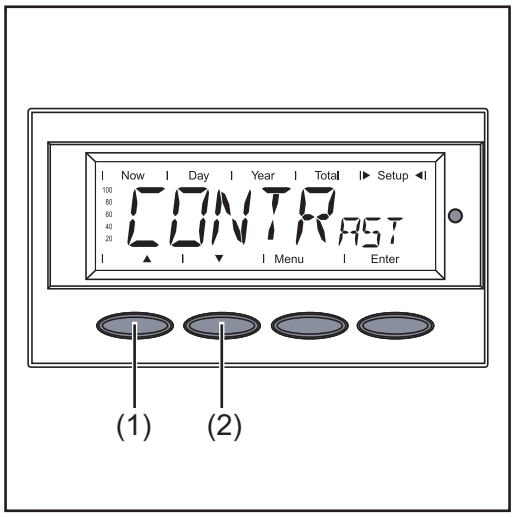
The Setup Menu’s first menu item "STAND-BY" is shown.

Scrolling through Menu Items

Example: "STANDBY" menu item



Example: "CONTRAST" menu item

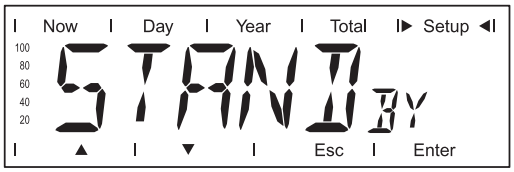


1 Access the Setup menu

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

Menu Items in the Setup Menu

STANDBY

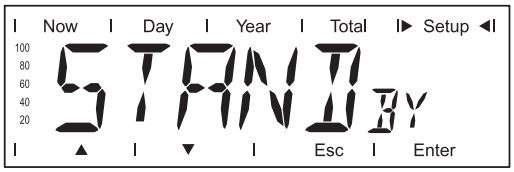


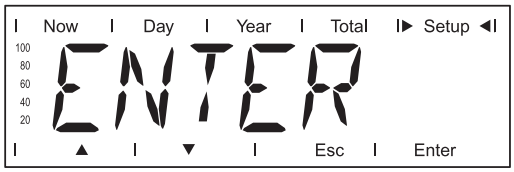
Manual activation / deactivation of Standby operation using the "Enter" key

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:"

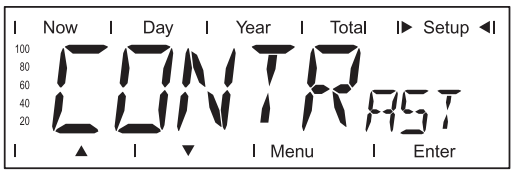




To maintain Standby operation:
- Press the "Esc" key

To end Standby operation:
- Press the "Enter" key

CONTRAST

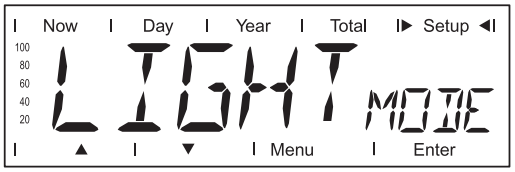


Contrast setting on LCD display

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



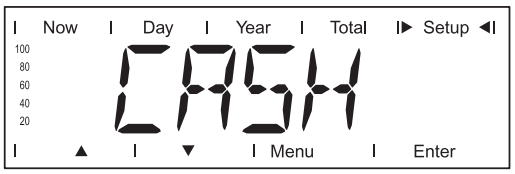
Initial setting for display illumination.

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).

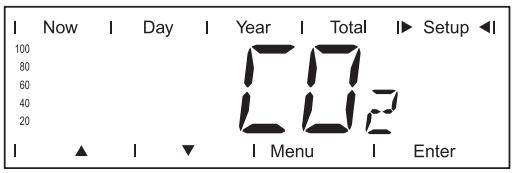
CASH



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)

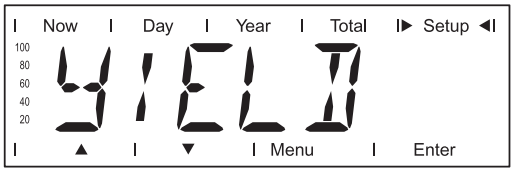
CO2



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.

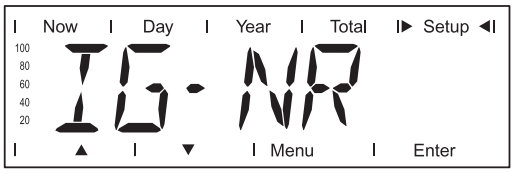
OFF SET
Offset is an amount of energy (in Wh, kWh, or MWh) that can be added to the lifetime total energy output of the inverter to give it a 'head start.'

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.

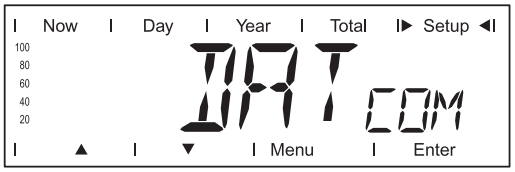


Number setting (address) of the inverter in a setup comprising multiple solar inverters linked together

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, 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 *)

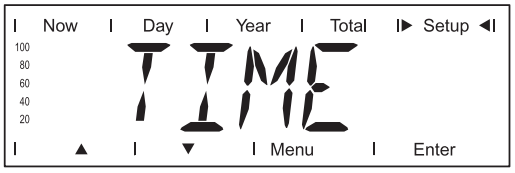
PDCD RST
Resets the Fronius Personal Display Card option

IFCD RST
Resets the Fronius Interface Card option

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

*) The Fronius Signal Card and Fronius Power Relay Card (TAC) options are not available for the Fronius CL.
These functions were implemented without additional option cards on the "Snowball" PC board (fan controller) via the potential-free relays.

TIME

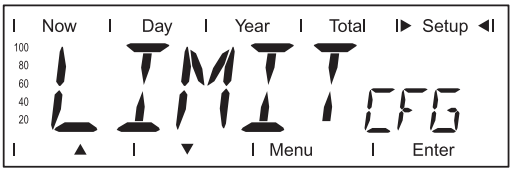


Date and time setting

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

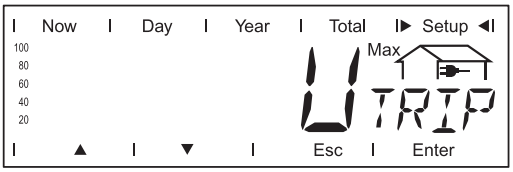


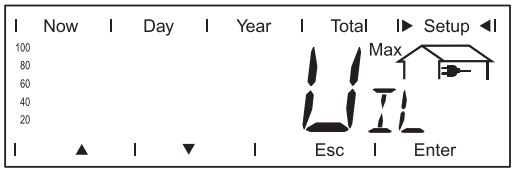
Used to display settings relevant to a power supply company. The displayed values depend on the respective country setup or device-specific inverter settings.

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	Mode for reactive power specification - 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	"Gradual Power Increment at Startup" SoftStart function regarding how fast the inverter should increase the power ON / OFF / N.A.
GFPR	"Grid Frequency Depending Power Reduction" Power reduction depending on the grid frequency ON / OFF / N.A.
FULL / LVRT***	"Low Voltage Ride Through" Function for bridging a grid voltage gap that was caused by grid voltage parameters outside of the limits ON / OFF / N.A.

EMI COMP
Compensation of the EMC filter during operation

ON / OFF / N.A.

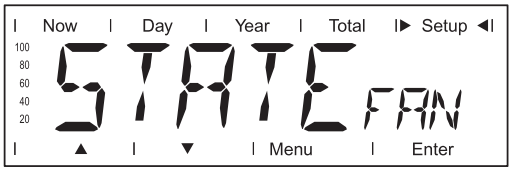
POWER LIM
Constant apparent power limiting

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 FAN



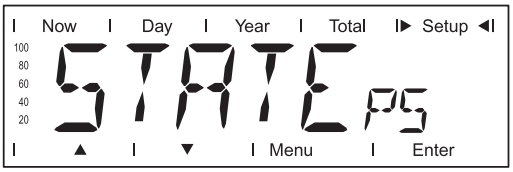
Fan status indicator

Display area	N.I. FAN / SAFETY X and STOP X / SELF and TEST / O.K. FAN
N.I. FAN	No communication between the inverter control unit (IG Brain) and the fan controller (Snowball)
SAFETY X and STOP X	Fans are stopped for safety reasons; 'x' describes the error: 0 ... general error (over-temperature, overcurrent) 1 ... left fan malfunction 2 ... right fan malfunction 3 ... left and right fan malfunction 4 ... fan in connection area malfunction 5 ... left fan and fan in connection area malfunction 6 ... right fan and fan in connection area malfunction 7 ... all 3 fans malfunction
SELF and TEST	Running a self test
O.K. FAN	Fans are OK and operating normally

When there is a communication connection and no self test has been run, you can trigger the fan controller self test by pressing the "Enter" key.

- "TEST" is displayed after pressing the "Enter" key.
- Repressing ‘Enter’ triggers the fan controller self test. The display then switches back to the ‘STATE FAN’ menu item.

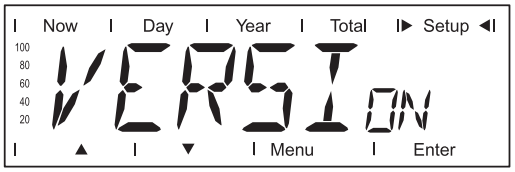
STATE PS



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 the electronic components (e.g., IG Brain, power stage sets, display, country setup)

Unit	-
Display area	MAIN CTRL / LCD / PS (PS00, PS01 ... PS14) / SNOW BALL
Factory setting	-

MAINCTRL	Version information of the IG Brain unit (inverter controller)
LCD	Version information of the display
PS	Version information of the power stage sets (PS00 - PS14)
SNOW BALL	Version information of the Snowball PC board (controls the fan among other things)

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.

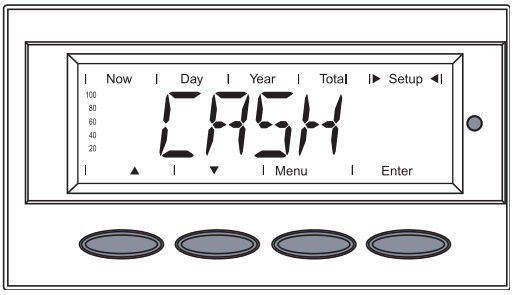
Press the "Esc" key to not save the selection.

The currently selected menu item is displayed.

Examples of Setting and Displaying Menu Items

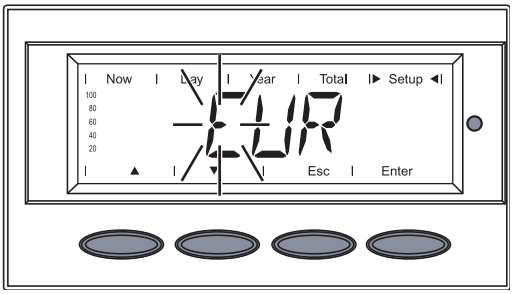
The following examples describe how to set and display menu items:
- Setting the Currency and Charge Rate
- Displaying and Setting Parameters in the "DATCOM" Menu Item
- Setting Time and Date

Setting the Currency and Charge Rate



1 Select the "CASH" menu item

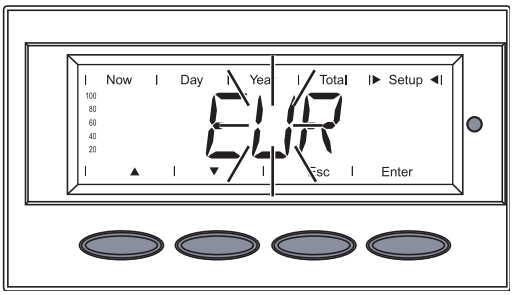
2 Press the "Enter" key



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
▲ ▼

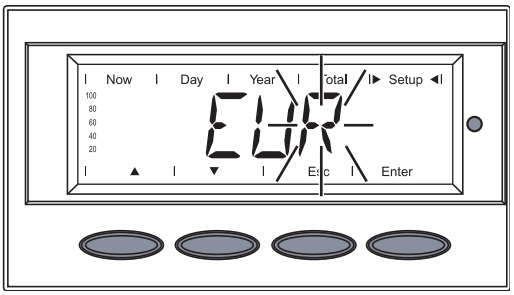
4 Press the "Enter" key



The second character flashes.

5 Use the "Up" and "Down" keys to
▲ ▼
select a letter for the second character

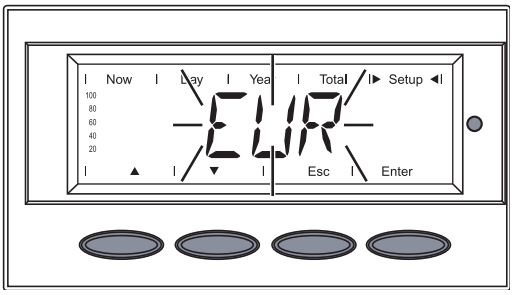
6 Press the "Enter" key



The third character flashes.

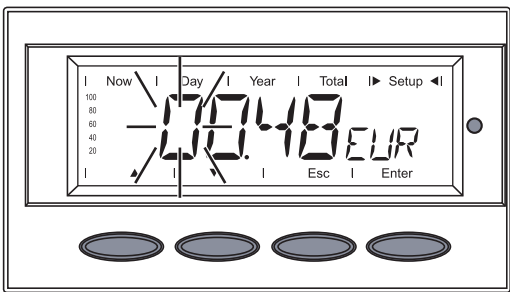
7 Use the "Up" and "Down" keys to select a letter for the third character
▲ ▼

8 Press the "Enter" key



The set currency flashes.

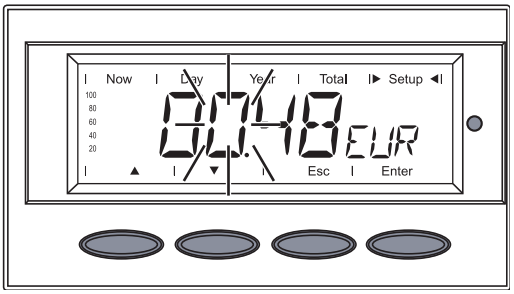
9 Press the "Enter" key



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

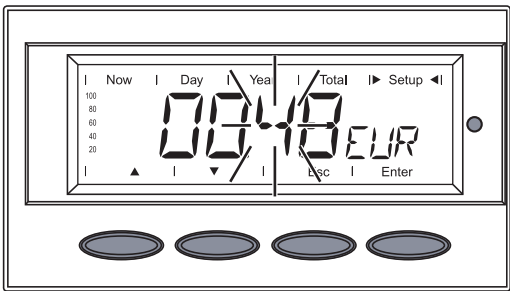


The second digit flashes.

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

▲ ▼

13 Press the "Enter" key

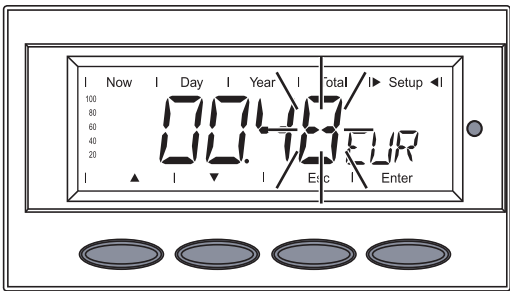


The first digit after the decimal point flashes.

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



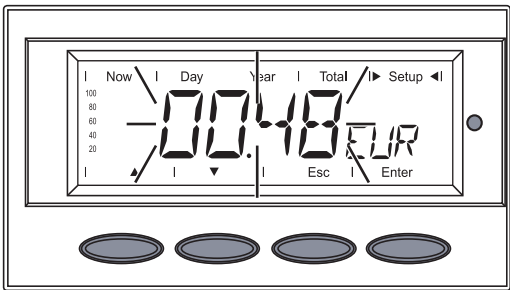
The second digit after the decimal point flashes.

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



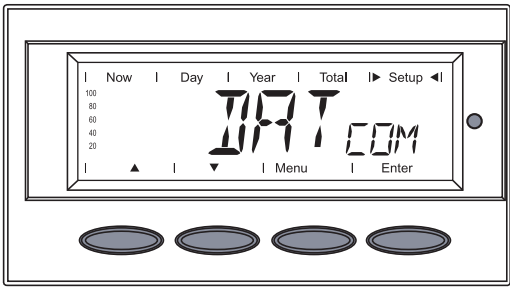
The set charge rate flashes.

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 "DATCOM" menu item



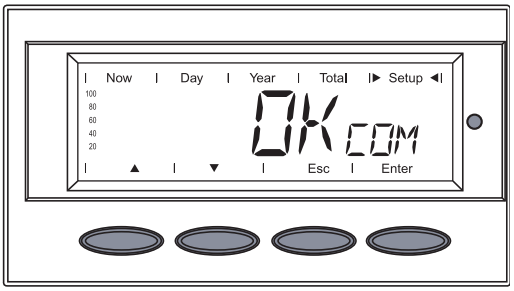
1 Select the "DATCOM" menu item

2 Press the "Enter" key

The following displays depend on whether

- a data connection is available
- a data connection is faulty or an option is not installed

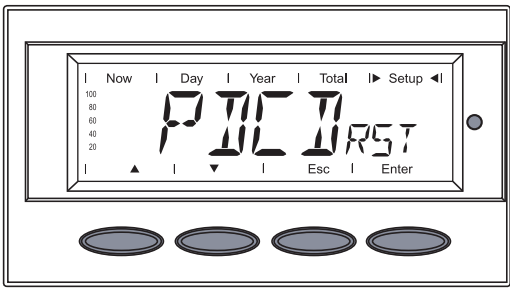
Data connection available



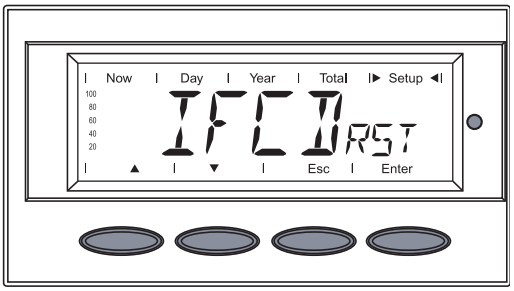
If there is a data connection available, "OK-COM" is shown.

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

▼

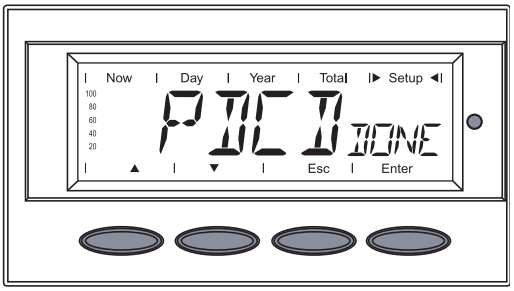


e.g., Reset Personal Display Card ("PDCD RST") ...



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

4 Press the "Enter" key



'PDCD DONE'...

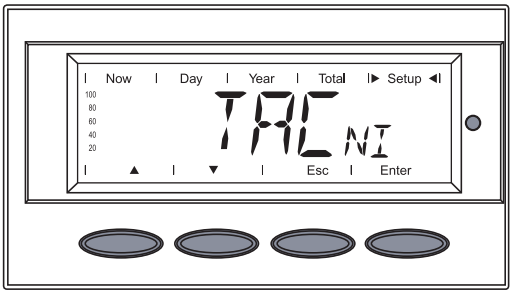
...or...

'IFCD DONE' is displayed

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

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

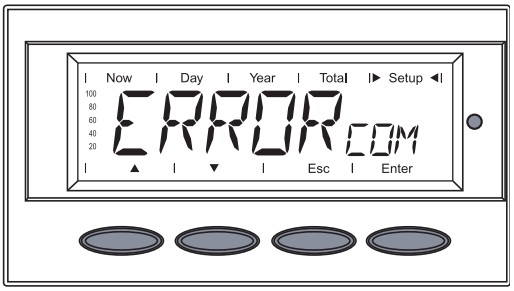
▼



"TAC NI" is displayed

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

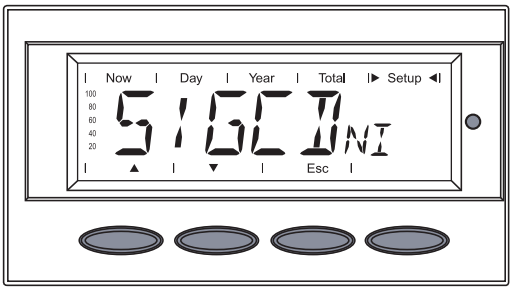
Data connection faulty or DATCOM is not installed



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

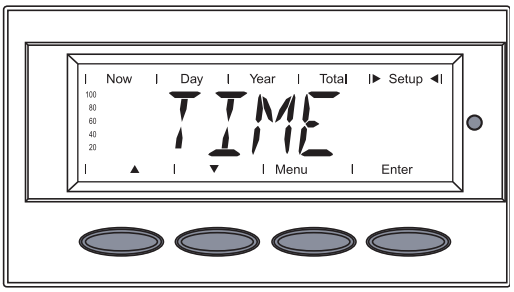
▼



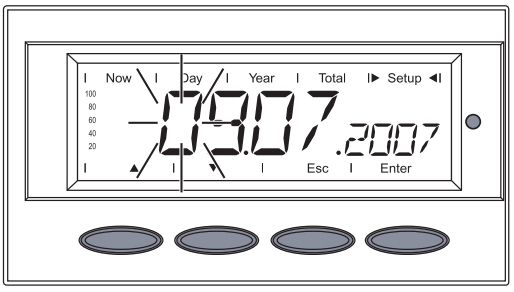
"SIGCD NI" (Signal Card not installed) or
"PDCD NI" (Personal Display Card not installed) or
"IFCD NI" (Interface Card not installed) or
"TAC NI" (TAC Card not installed)
is displayed.

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

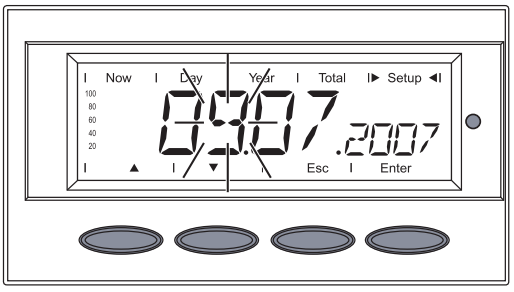


The **date** is displayed (DD.MM.YYYY), the first digit for the day flashes.

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

▲ ▼

4 Press the "Enter" key

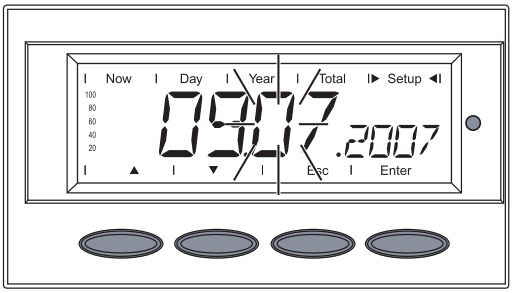


The second digit for the day flashes.

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

▲ ▼

6 Press the "Enter" key

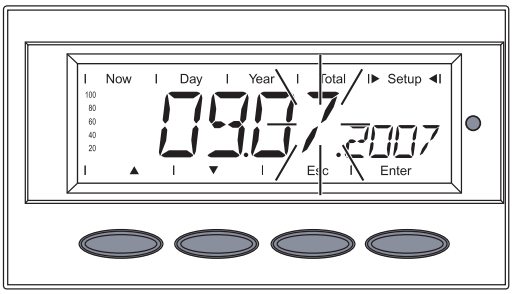


The first digit for the month flashes.

7 Use the "Up" and "Down" keys to select a value for the first month digit

▲ ▼

8 Press the "Enter" key

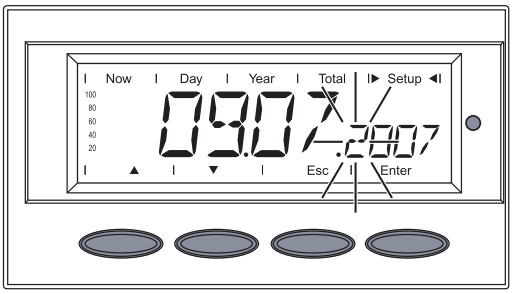


The second digit for the month flashes.

9 Use the "Up" and "Down" keys to select a value for the second month digit

▲ ▼

10 Press the "Enter" key

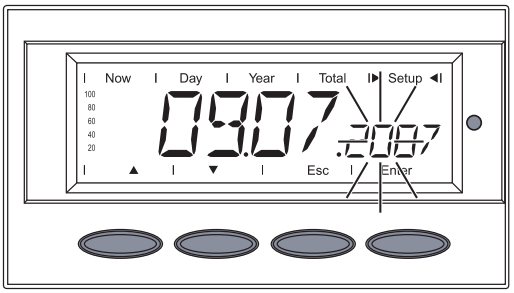


The first digit for the year flashes.

11 Use the "Up" and "Down" keys to select a value for the first year digit

▲ ▼

12 Press the "Enter" key

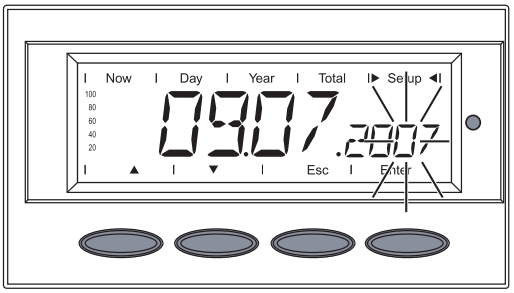


The second digit for the year flashes.

13 Use the "Up" and "Down" keys to select a value for the second year digit

▲ ▼

14 Press the "Enter" key

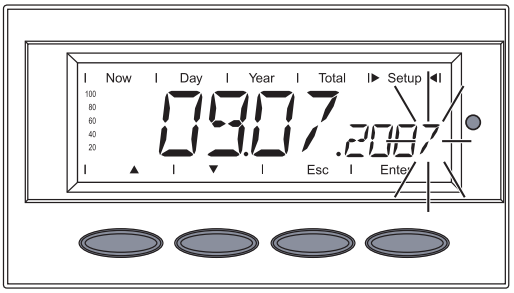


The third digit for the year flashes.

15 Use the "Up" and "Down" keys to select a value for the third year digit

▲ ▼

16 Press the "Enter" key

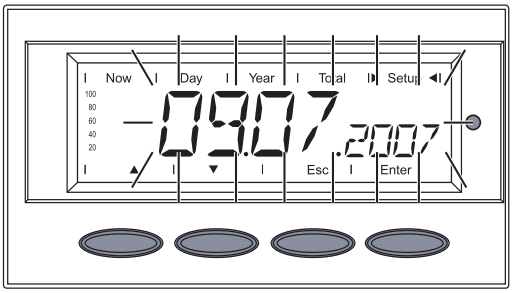


The fourth digit for the year flashes.

17 Use the "Up" and "Down" keys to select a value for the fourth year digit

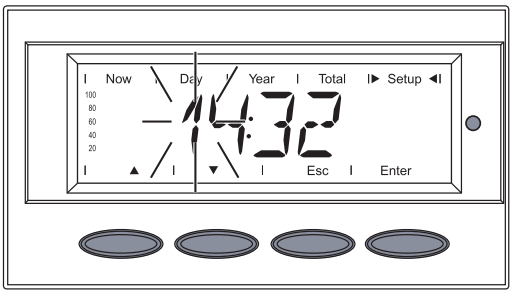
▲ ▼

18 Press the "Enter" key



The set date then flashes.

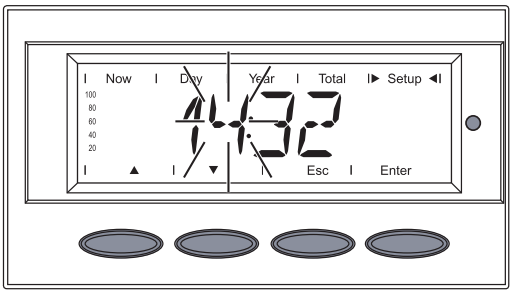
19 Press the "Enter" key



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
▲ ▼

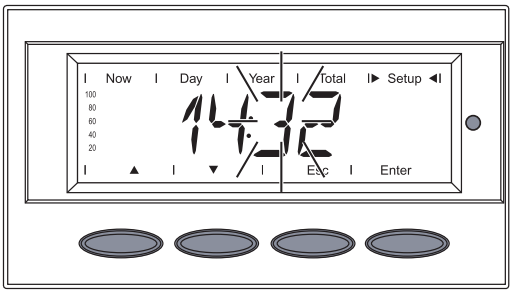
21 Press the "Enter" key



The second digit for the hour flashes.

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

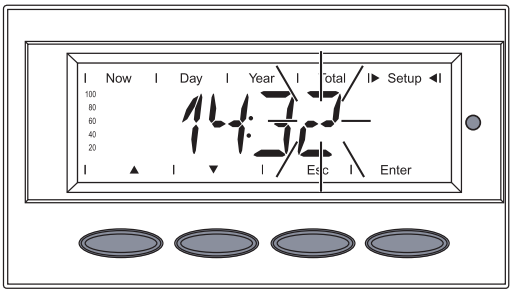
23 Press the "Enter" key



The first digit for the minutes flashes.

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

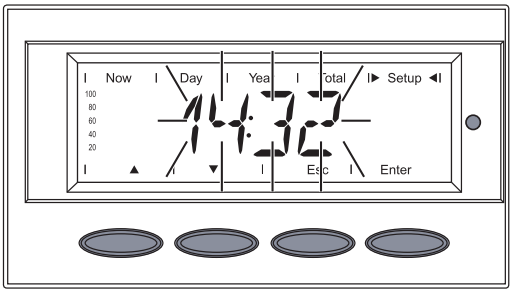
25 Press the "Enter" key



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

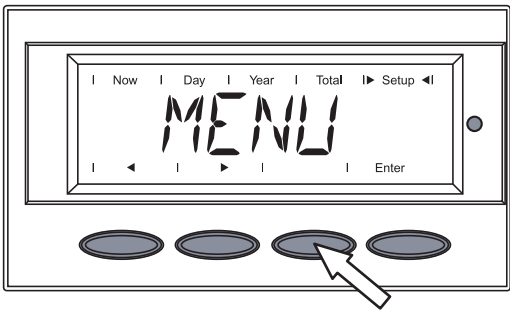
29 Press the "Esc" key to exit the "TIME" menu item

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

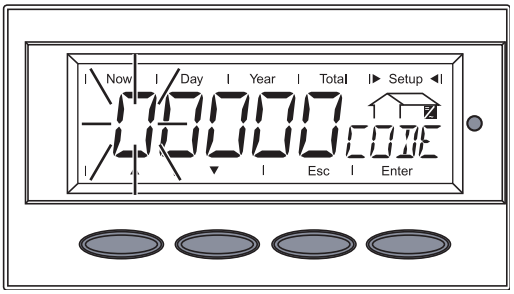


1 Press the "Menu" key

"Menu" is shown.

2 Select the "Setup" mode using the "Left" or "Right" keys
◀ ▶

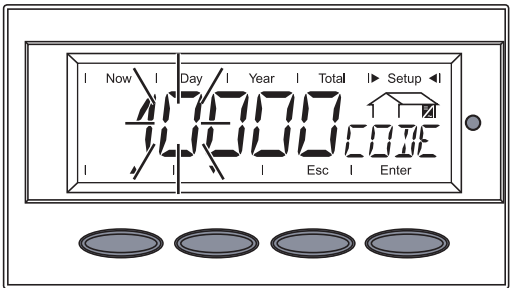
3 Press the unoccupied "Esc" key 5 x



"CODE" is displayed, the first digit flashes.

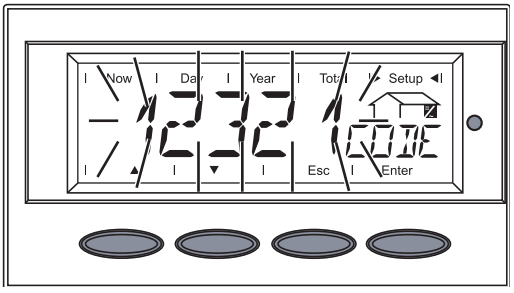
4 Enter the access code 12321: Use the "Up" and "Down" keys to select a value for the first digit of the access code
▲ ▼

5 Press the "Enter" key



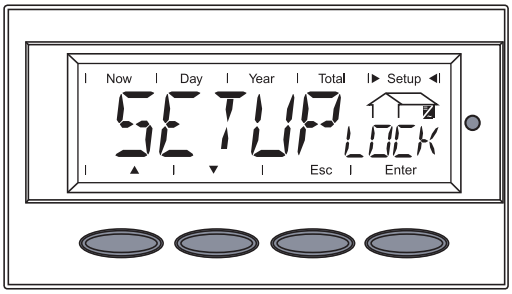
The second digit flashes.

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



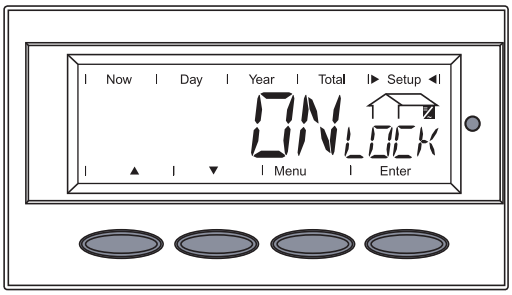
... the access code flashes.

7 Press the "Enter" key



"SETUP LOCK" is displayed.

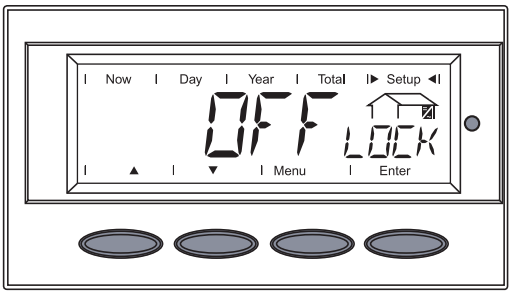
8 Press the "Enter" key



"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

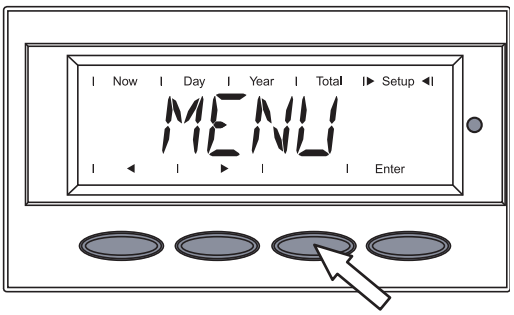
Select Log Entry function

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

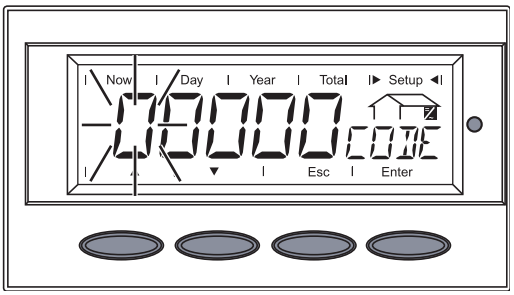


1 Press the "Menu" key

"Menu" is shown.

2 Select the "Setup" mode using the "Left" or "Right" keys ◀ ▶

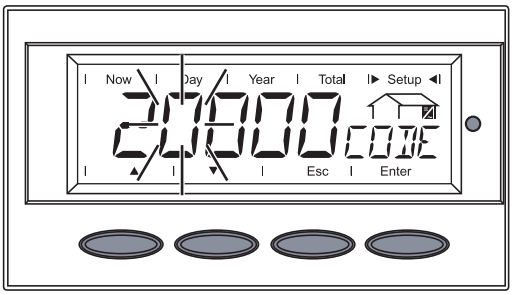
3 Press the unassigned "Esc" key five times



"CODE" is displayed, the first digit flashes.

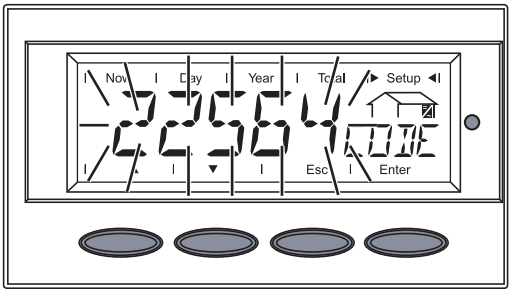
4 Enter the access code 22564: Use the "Up" and "Down" keys to select a value for the first digit of the access code ▲ ▼

5 Press the "Enter" key



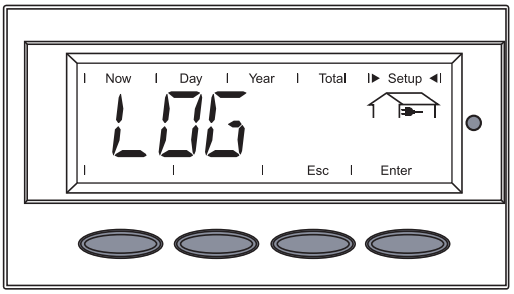
The second digit flashes.

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

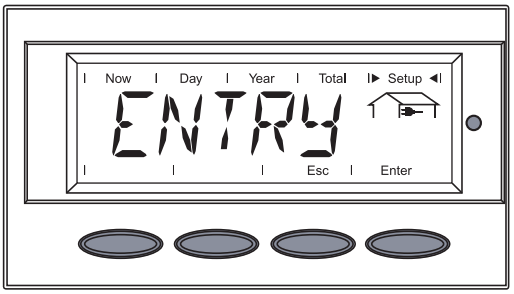


... the access code flashes.

7 Press the "Enter" key

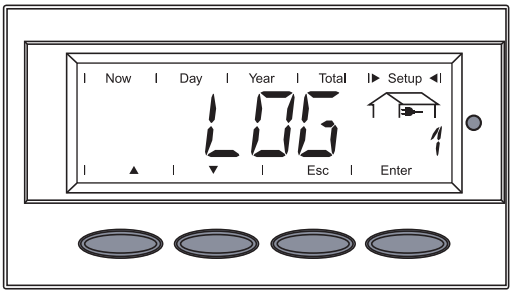


"LOG" and ...



... "ENTRY" are displayed alternately.

8 Press the "Enter" key



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

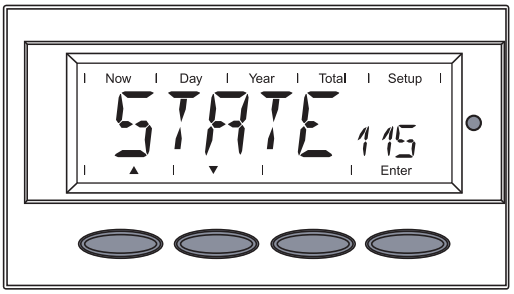
9 Use the "Up" and "Down" keys to select the desired grid error

▲ ▼

LOG 1 ... contains the most recent grid error

LOG 5 ... contains the oldest grid error

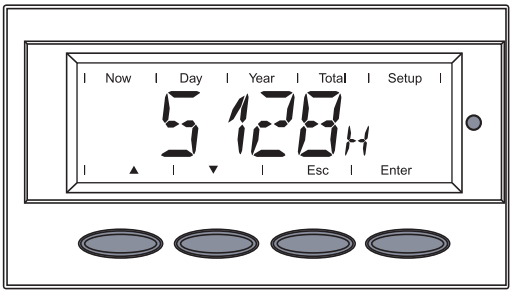
10 Press the "Enter" key to display the grid error



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

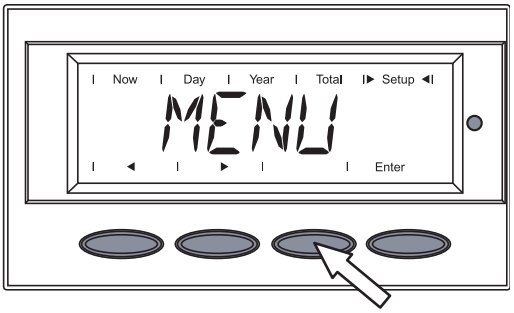
General

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

The switch contact is switched off,
- when no current is being fed into the public grid 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

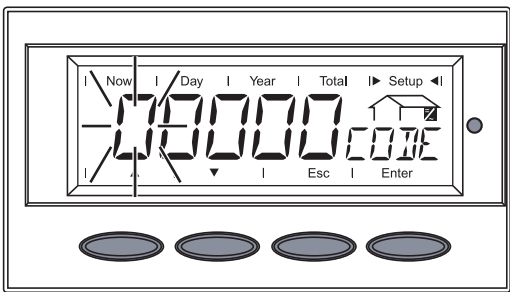


1 Press the "Menu" key

"Menu" is displayed.

2 Select the "Setup" mode using the "Left" or "Right" keys ◀ ▶

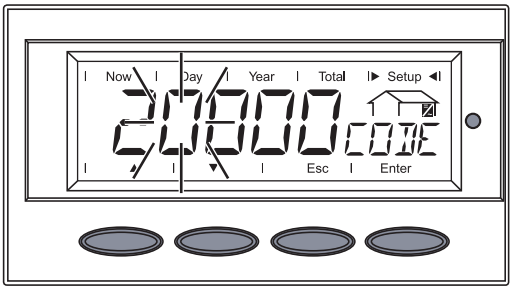
3 Press the unassigned "Esc" key five times



"CODE" is displayed, the first digit flashes.

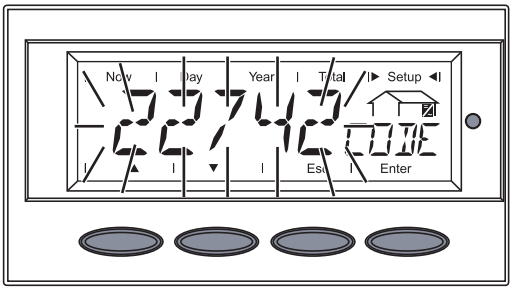
4 Enter access code 22742: Use the "Up" and "Down" keys to select a value for the first digit of the access code ▲ ▼

5 Press the "Enter" key



The second digit flashes.

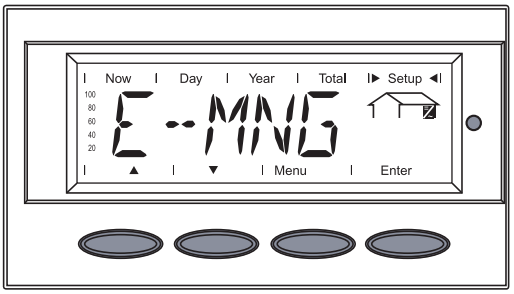
6 Repeat steps 4 and 5 for the second, third, fourth and fifth digits of the access code until...



the access code flashes.

7 Press the "Enter" key

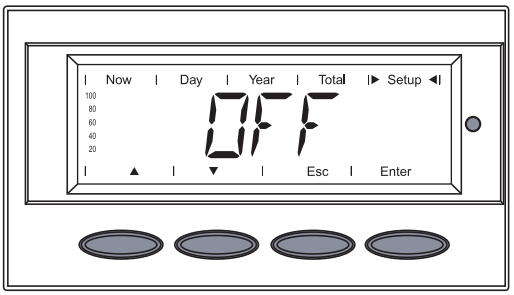
The inverter is now in the "Basic Service" menu, the first parameter "MIXMODE" is displayed:



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

▲ ▼

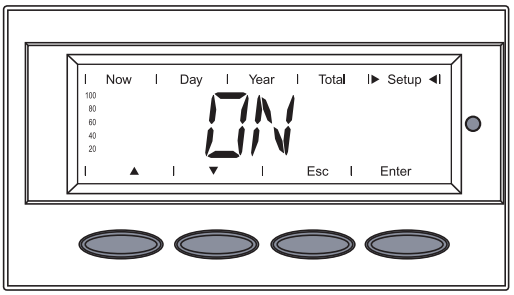
9 Press the "Enter" key



The current "Energy Management" status is displayed.

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

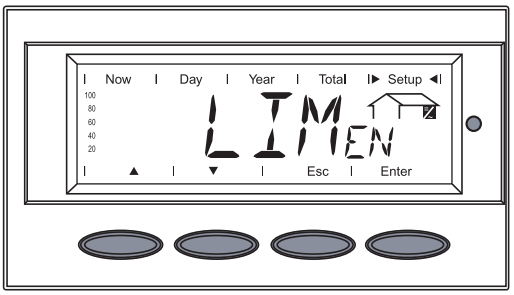
ON The "Energy Management" function is activated



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

▲ ▼

11 Press the "Enter" key

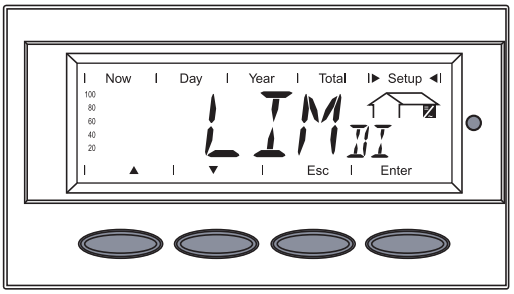


Effective power limits are displayed:

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



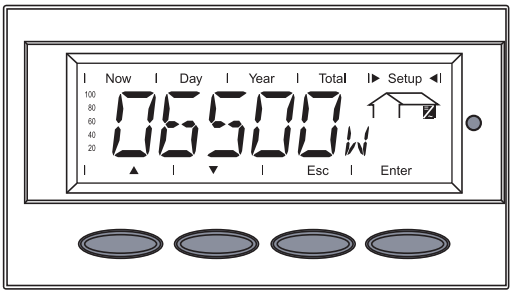
LIM DI = Limit disengage (switch-off point)

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

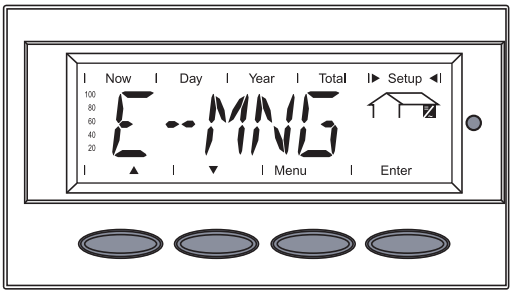
The corresponding effective power limit is displayed.

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

Deactivating the "Energy Management" function

1 Press the "Menu" key
2 Select the "Setup" mode using the "Left" or "Right" keys
◀ ▶
3 Press the unassigned "Esc" key five times
4 Enter access code 22742

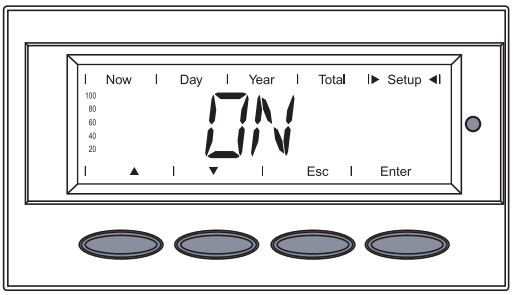
The inverter is now in the "Basic Service" menu, the first parameter "MIXMODE" is displayed.



5 Use the "Up" or "Down" keys to select the "E-MNG" parameter

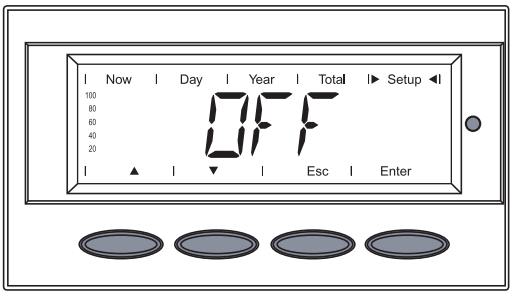
▲ ▼

6 Press the "Enter" key



The current "Energy Management" status is displayed.

ON The "Energy Management" function is activated



7 To deactivate the Energy Management function, select "OFF" using the "Up" or "Down" keys:

▲ ▼

8 Press the "Enter" key

The "Energy Management" function is deactivated.

NOTE! The "OFF" option can then only be selected if function number 9 "Energy Management" has not been assigned to either of two potential-free relays from the connection area under parameter "GPSC CFG" in the "Basic Service" menu. "OFF" is only displayed if a function other than 9 has been set for both relays.

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

Troubleshooting and Maintenance

Status Diagnosis and Troubleshooting

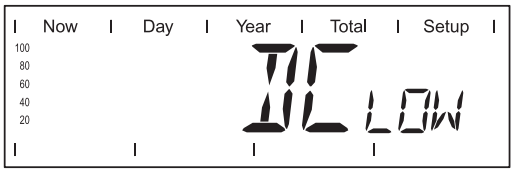
Displaying Status Codes

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.

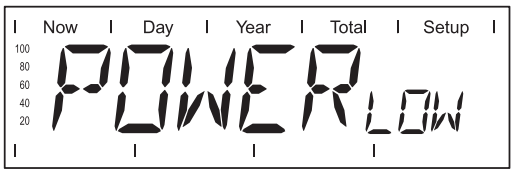
IMPORTANT! Status codes may sometimes appear briefly as a result of the control response from the inverter. If it subsequently continues to operate normally, there has not been a system error.

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:

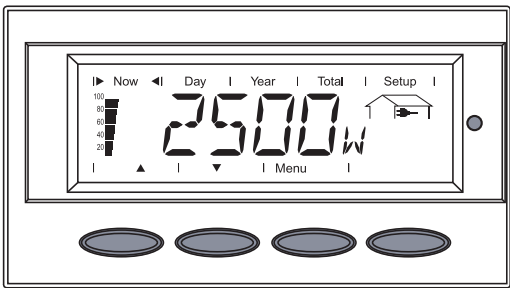
  Open circuit voltage < 260 V ... error in the photovoltaic system

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

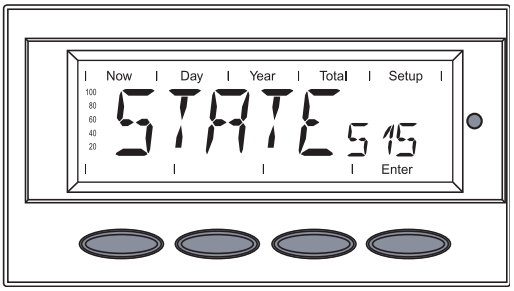
Power stage set error status codes

A special status code is triggered when there is an error in the inverter in one of the 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."

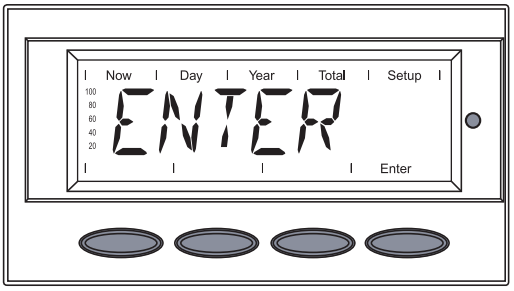


Display in normal operation



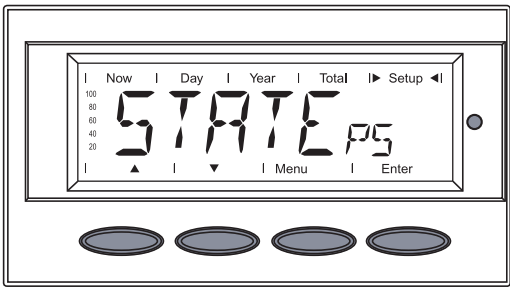
When there is an error in one of the two power stage sets, the display flashes between "STATE" and the corresponding status code
(e.g., "STATE 515")

and



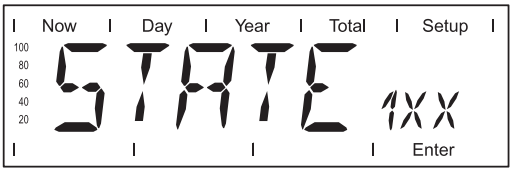
"ENTER"

- Press the "Enter" key twice



- The status display of the power stage sets appears "STATE PS"
- 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.

The GPIS soft start function is activated depending on the country setup:
according to the VDE-AR-N 4105 guideline, the output of the inverter increases continuously every minute by 10% after a shutdown due to an AC error.

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

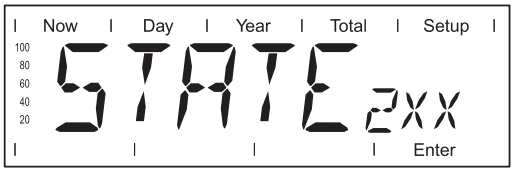
Behavior	Grid conditions are thoroughly tested and as soon as they are again within the permissible range, the inverter will resume feeding power into the grid.
Remedy	Should the status code persist, you should contact your system installer

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 2 status codes



Class 2 status codes can only occur in connection with the measurement and monitoring relay.

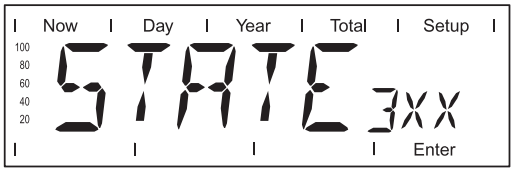
Class 2 status codes also affect grid parameters. Therefore, some of the testing methods overlap with those for service class 1. The inverter will react in exactly the same way as with class 1 status codes.

210

Grid contactor open or supply phase for grid contactor has failed

Description	No grid feed. Measurement and monitoring relay has triggered
Remedy	Should the status code persist, you should contact your system installer

Class 3 status codes



Class 3 comprises status codes that may appear during operation of feeding power supply 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

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

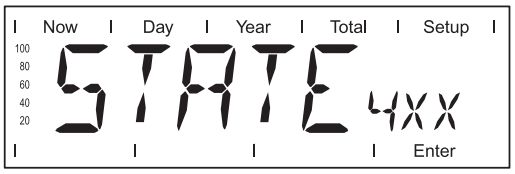
309
Power Low / Slave
(only in Balance mode)

Description	Short interruption of power feeding into the grid, caused by the message from a slave power stage set. The inverter returns to the startup phase.
Remedy	Fault is rectified automatically If this status code keeps recurring, contact your system installer

310
DC Low / Slave
(only in Balance mode)

Description	Short interruption of power feeding into the grid, caused by the message from a slave power stage set. 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

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

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

Throttle 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

471

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

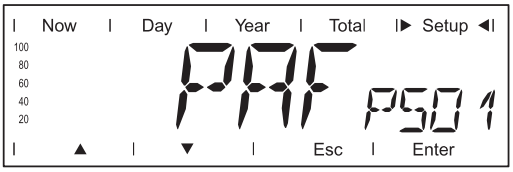
Description	The inverter stops feeding power into the grid, the display shows a critical error via a red Operating Status LED.
Remedy	Insert new fuse for the solar module ground so that the solar modules are grounded at the negative or positive pole. Fault is rectified automatically If this status code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

473

Incorrect phase allocation

Description	The setting of the dip switch on the power stage set does not match the slot (dip switch set incorrectly or incorrect slot)
Remedy	Set the dip switch for the respective slot

You can check the "STATEPS" menu item in the Setup menu to see which dip switch is affected. "PAF" and the number of the power stage set are displayed:

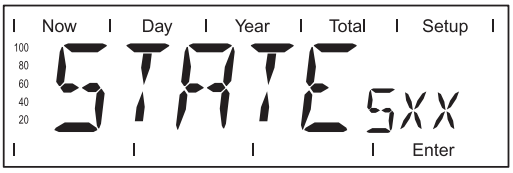


474

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

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 service code is acknowledged by pressing a key (the inverter, however, continues working normally in the background).

- press any key
- error message disappears

502

Insulation value too low

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 metering channels

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 or a power stage set has reported status code 473 (incorrect phase allocation)

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

530

Fan supply voltage exceeds limits

Description	Fan not functioning, possibly power derating
Remedy	Contact a Fronius-trained service technician

531

The fan controller has detected an over-temperature at the connection area fan

Description	Fan not functioning, possibly power derating
Remedy	Check ventilation slots Contact a Fronius-trained service technician

532

Supply air temperature sensor defective

Description	Temperature sensor defective or not connected
Remedy	Contact a Fronius-trained service technician

533

Fan controller temperature sensor defective

Description	Fan not functioning, possibly power derating
Remedy	Contact a Fronius-trained service technician

534
Fan voltage exceeds limits during fan controller self test

Description	Fan not functioning, possibly power derating
Remedy	Contact a Fronius-trained service technician

535
Fan defect detected during fan controller self test

Description	Target speed of one or both fans not reached Fan not functioning, possibly power derating
Remedy	Check "STATE FAN" in the Setup menu to determine which fan is affected

536
Fan defect detected during operation
Target speed not reached during operation

Description	Target speed of one or both fans not reached Fan not functioning, possibly power derating
Remedy	Check "STATE FAN" in the Setup menu to determine which fan is affected

537
High speed differences between the fans

Description	Target speed of one or both door fans not reached Door fan not functioning, possibly power derating
Remedy	Check "STATE FAN" in the Setup menu to determine which fan is affected

540
Overcurrent detected by fan controller

Description	Target speed of one or both door fans not reached Door fan not functioning, possibly power derating
Remedy	Contact a Fronius-trained service technician

541
Communications error with fan controller

Description	Target speed of one or both door fans not reached Door fan not functioning, possibly power derating
Remedy	Contact a Fronius-trained service technician

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

555

Power stage set fan defective (slot fan 1)

Description	The fan is sending no or an invalid speed signal
Remedy	Check plug connection, replace fan

557

Max. power input of fan controller exceeded

Description	The inverter continues to operate, power derating
Remedy	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 message 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)

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 electrical shock can be fatal. Danger from grid voltage and DC voltage from solar modules.
- Never work with live wires! Prior to all connection and maintenance work, make sure that the AC and DC wires are not charged.
- The connection area should only be opened by a licensed electrician.
- Power stage sets should only be opened by Fronius-trained service personnel.

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.

WARNING! An inadequate grounding conductor connection can cause serious injuries to persons and damage to (or loss of) property.
The screws on the covers provide an adequate grounding conductor connection for the housing ground and should not under any circumstances be replaced by other screws that do not provide a proper grounding conductor connection.

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.

Opening the Fronius CL for service/maintenance

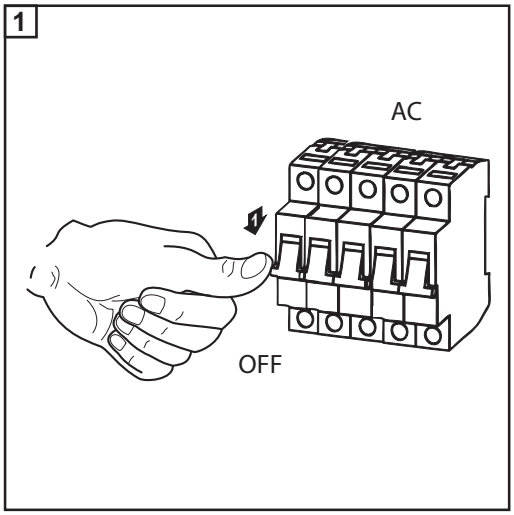
Procedure for opening the inverter for service or maintenance:

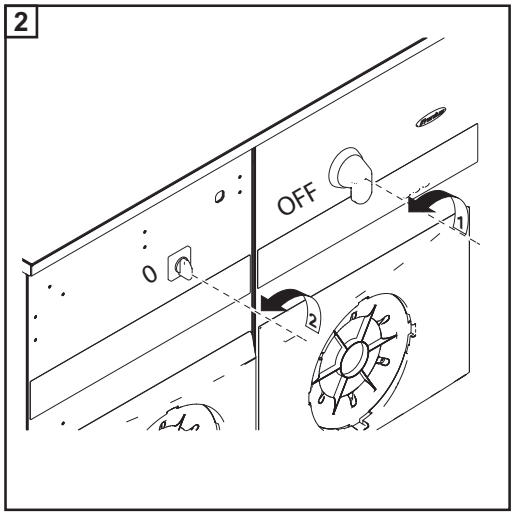
1. Disconnect AC and DC supply from the inverter
2. Turn off the AC and DC main switches
3. Allow the capacitors to discharge (5 minutes)
4. Unlock doors
5. Open doors
6. Remove covers
7. If available, remove the fuse for solar module ground
8. Disconnect DC wires
9. Disconnect AC wires

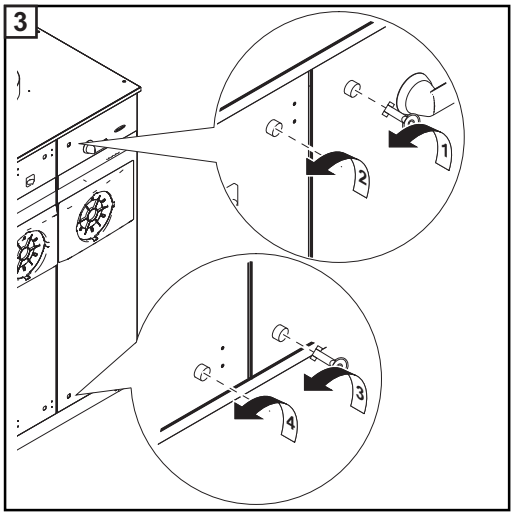
Operation in dusty environments

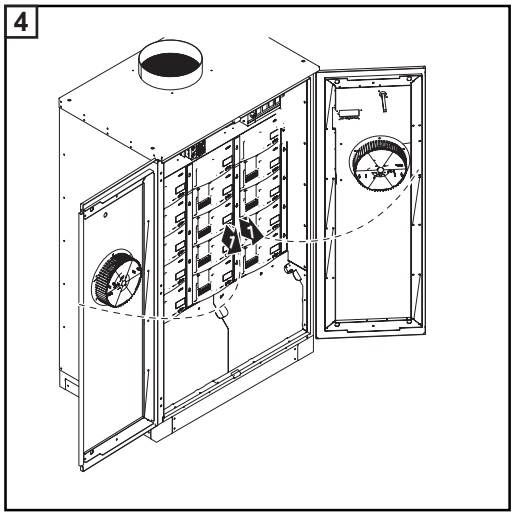
When operating the inverter in extremely dusty environments:
when necessary, clean the fan filter grates using clean compressed air.

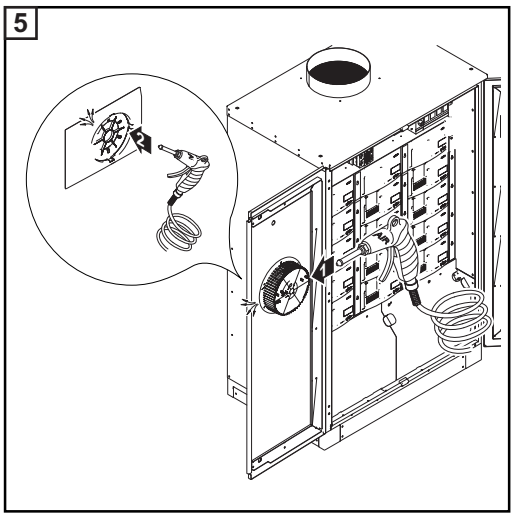
IMPORTANT Do not blow dust and dirt into the inverter.

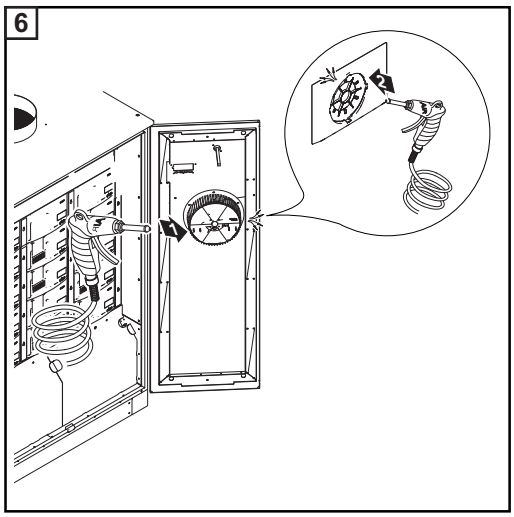












Replace fuses

Safety

WARNING! An electrical shock can be fatal. Danger from grid voltage and DC voltage from solar modules.
- Never work with live wires! Prior to all connection and maintenance work, make sure that the AC and DC wires are not charged.
- The connection area should only be opened by a licensed electrician.
- Power stage sets should only be opened by Fronius-trained service personnel.

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

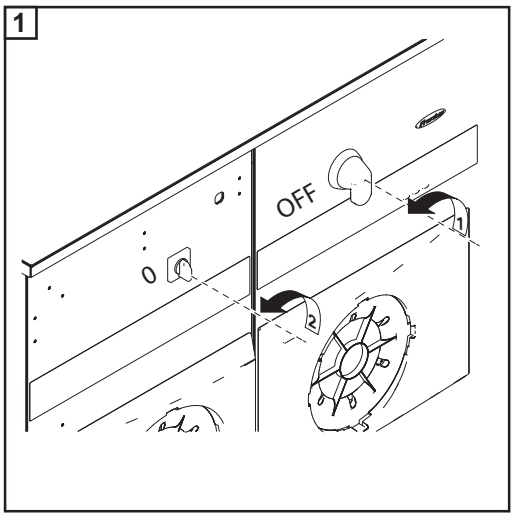
You must wait until the capacitors have discharged. Discharge takes 5 minutes.

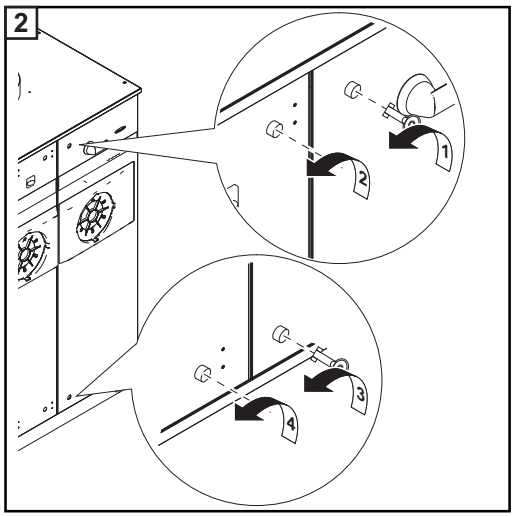
WARNING! An electrical shock can be fatal. Danger from DC voltage from solar modules.
The DC main switch is only used to switch off power to the power stage sets. When the DC main switch is turned off, the solar module ground at the positive or negative pole remains unaffected. Never touch the DC+ and DC-.

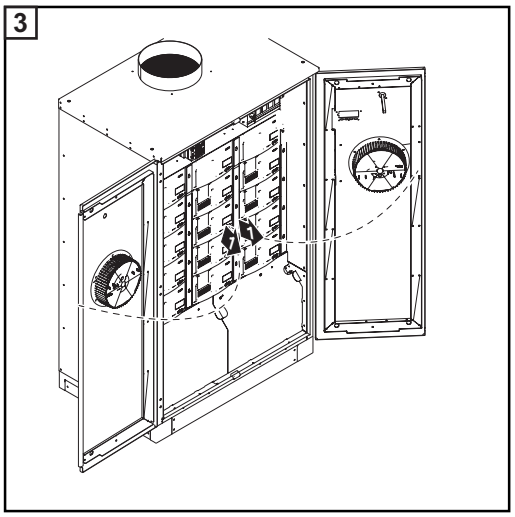
WARNING! An electric shock can be fatal. Normally grounded conductors may be ungrounded and energized when a ground fault is indicated. The ground fault has to be repaired before operation is resumed.

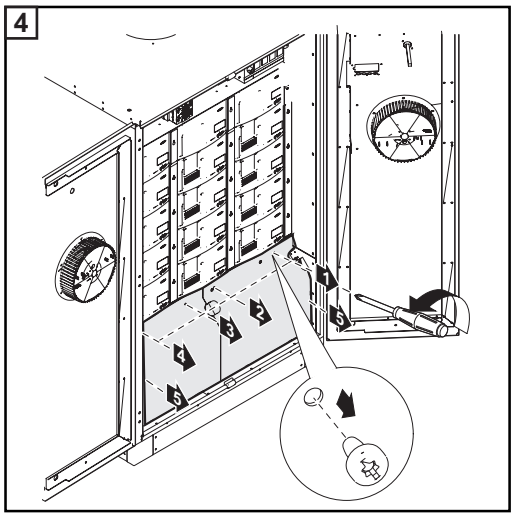
WARNING! An inadequate grounding conductor connection can cause serious injuries to persons and damage to (or loss of) property.
The screws on the covers provide an adequate grounding conductor connection for the housing ground and should not under any circumstances be replaced by other screws that do not provide a proper grounding conductor connection.

Opening the Fronius CL





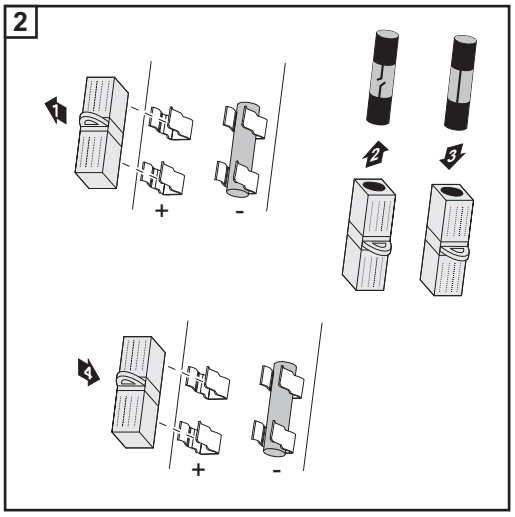




Replacing solar module ground fuses at the positive pole

NOTE! Only use fuses for the solar module ground that comply with the following fuse data:
- Diameter 10.3 x 35 - 38 mm
- 600 V DC
- 2 A for Fronius CL 36.0 and CL 48.0
- 3 A for Fronius CL 60.0

1 Test the left fuse holder for the solar module ground at the positive pole for continuity.
Measurement points: Ground terminal and above the fuse holder



- Remove the fuse cover with the defective fuse from the fuse holder
- Replace fuses
- Insert the new fuse with a fuse cover into the left fuse holder

IMPORTANT The right fuse holder for the solar module ground at the negative pole must have a plastic bolt inserted.

Inserting the fuse at the positive pole grounds the solar module.

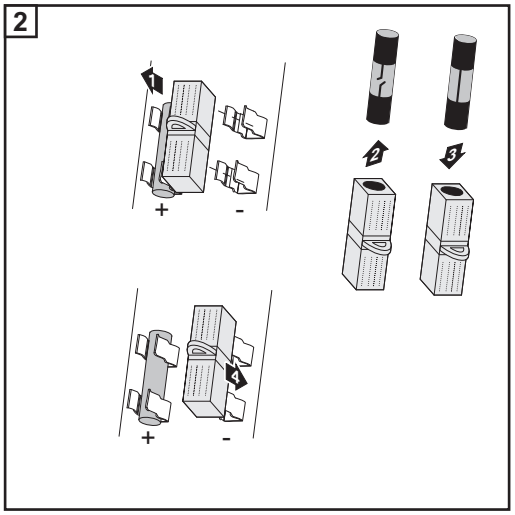
3 After replacing the fuse:
- Find out and correct the cause for the defective fuse

Replacing solar module ground fuses at the negative pole

NOTE! Only use fuses for the solar module ground that comply with the following fuse data:
- Diameter 10.3 x 35 - 38 mm
- 600 V DC
- 2 A for Fronius CL 36.0 and CL 48.0
- 3 A for Fronius CL 60.0

1 Test the right fuse holder for the solar module ground at the negative pole for continuity.
Measurement points: Ground terminal and above the fuse holder

2



- Remove the fuse cover with the defective fuse from the fuse holder
- Replace fuses
- Insert the new fuse with a fuse cover into the left fuse holder

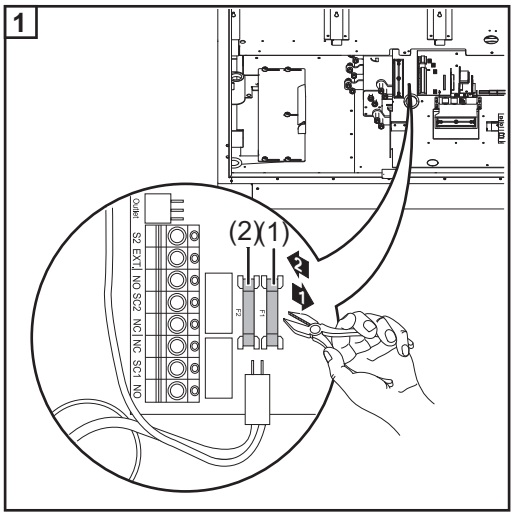
IMPORTANT The left fuse holder for the solar module ground at the positive pole must have a plastic bolt inserted.

Inserting the fuse at the negative pole grounds the solar module.

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

Replacing fuses for option cards and the switched-mode power supply

1



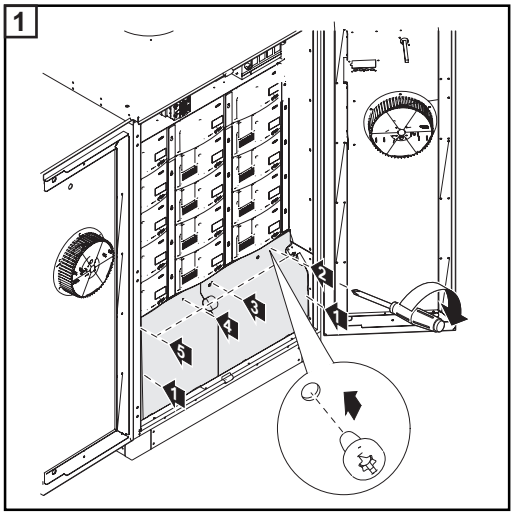
- Replace fuses using flat pliers

(1) F1 fuse for option cards
2 A delay
500 V DC
diameter 6.3 x 32 mm

(2) F2 fuse for switched-mode power supply
(fan supply)
10 A delay
500 V DC
diameter 6.3 x 32 mm

Closing the Fronius CL

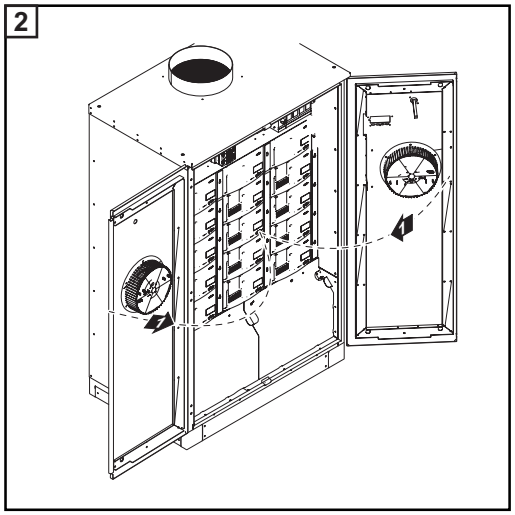
1



Tightening torque: 2.5 Nm

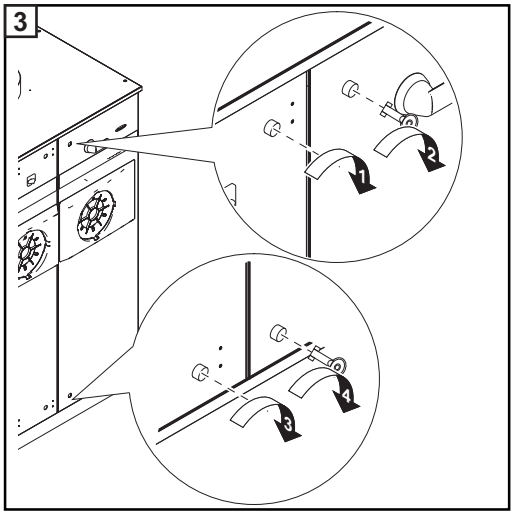
- Replace covers
- Secure with screws

2



- Close doors

3



- Close door latches

Replacing power stage sets

Safety

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

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

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

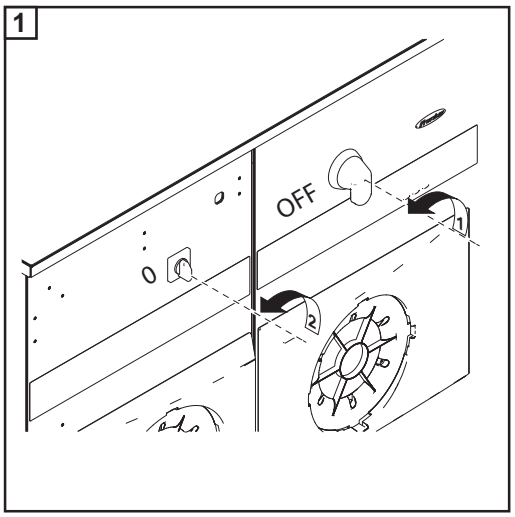
You must wait until the capacitors have discharged. Discharge takes 5 minutes.

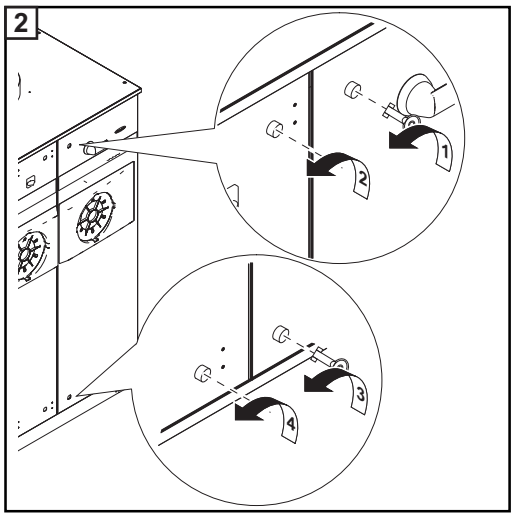
WARNING! An electrical shock can be fatal. Danger from DC voltage from solar modules.
The DC main switch is only used to switch off power to the power stage sets. When the DC main switch is turned off, the solar module ground at the positive or negative pole remains unaffected. Never touch the DC+ and DC-.

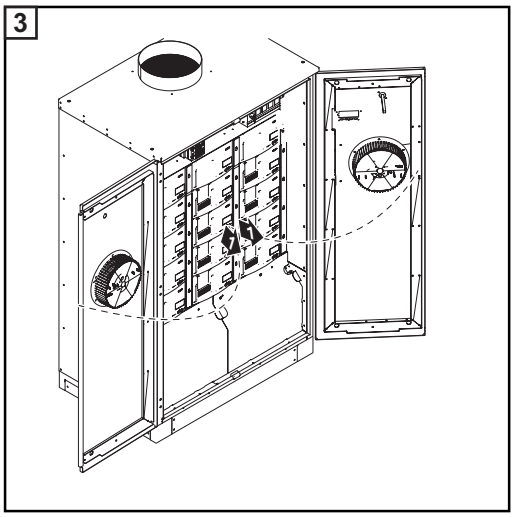
WARNING! An electric shock can be fatal. Normally grounded conductors may be ungrounded and energized when a ground fault is indicated. The ground fault has to be repaired before operation is resumed.

WARNING! An inadequate grounding conductor connection can cause serious injuries to persons and damage to (or loss of) property.
The screws on the covers provide an adequate grounding conductor connection for the housing ground and should not under any circumstances be replaced by other screws that do not provide a proper grounding conductor connection.

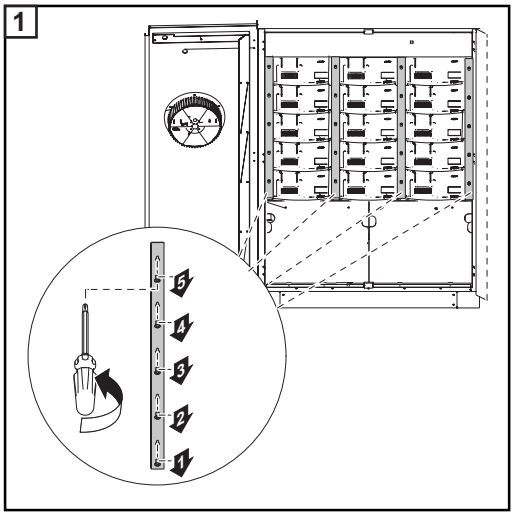
Opening the Fronius CL



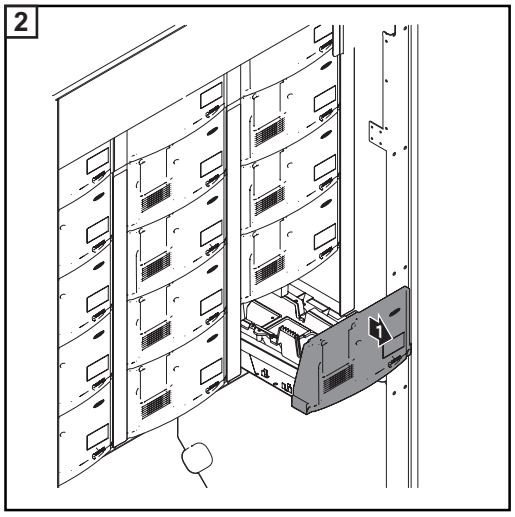




Removing power stage sets



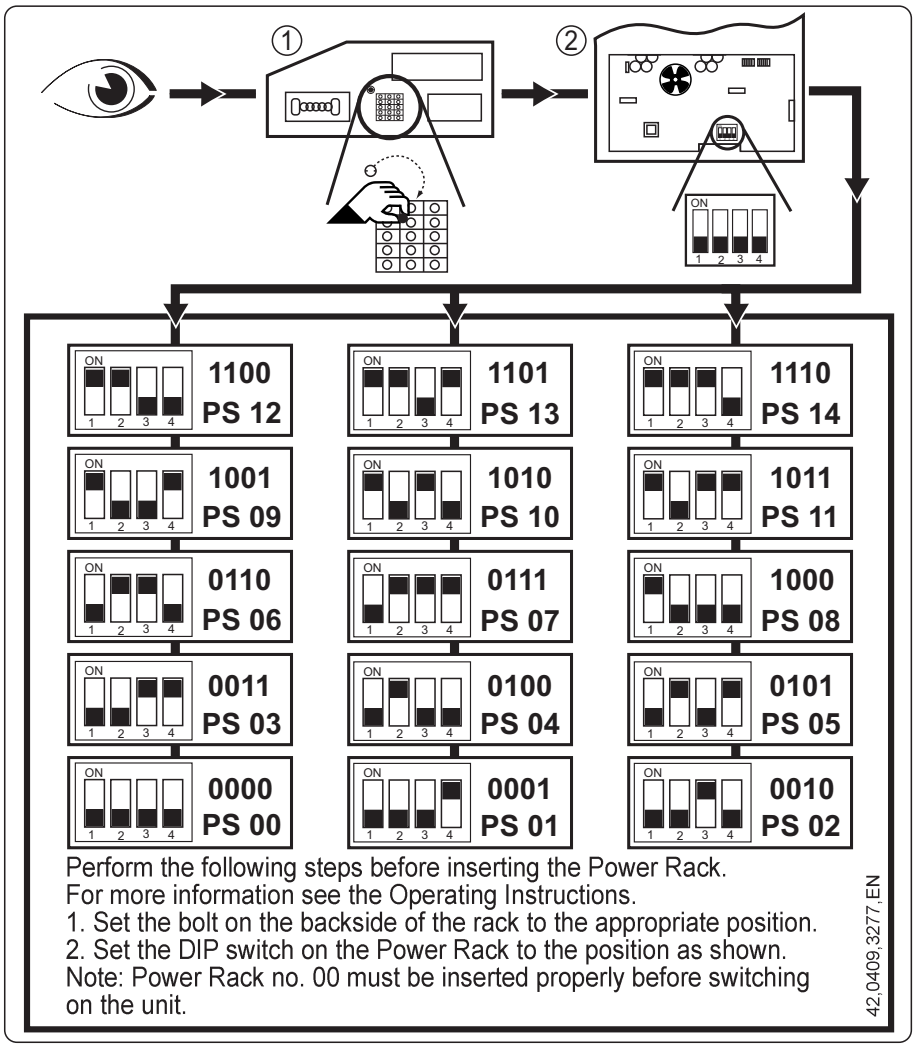
- Remove screws on the left and right rails from the defective power stage set
  (2 x 5 screws)
- Remove rails



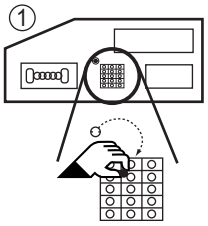
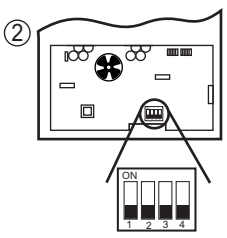
- Remove defective power stage set

Sticker for replacing power stage sets

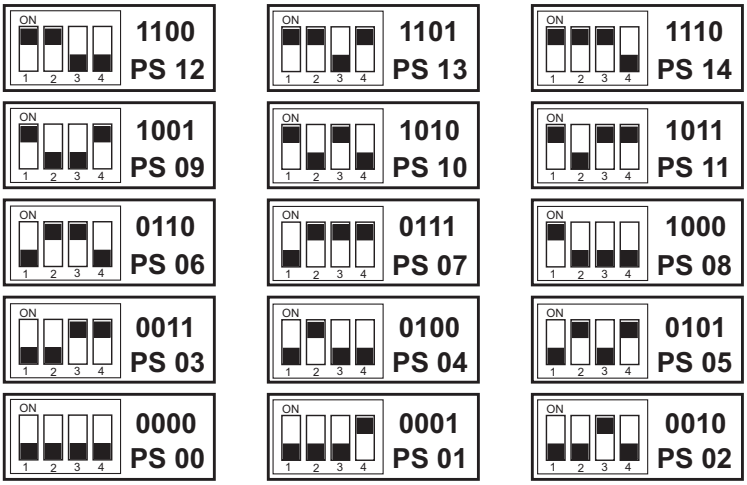
A sticker is located in the inverter on the top cover. The sticker provides an overview of the steps required for inserting replacement power stage sets.



Symbols on the sticker:

	- Check
	- Break off positioning bolt on the back of the new power stage set rack - Insert positioning bolt into the correct position for the power stage set rack
	- Set the dip switch on the power stage set front for the respective slot

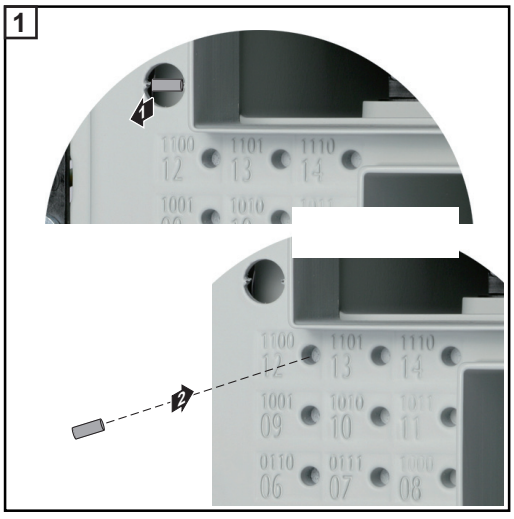
Arrangement of slots and dip switch settings:



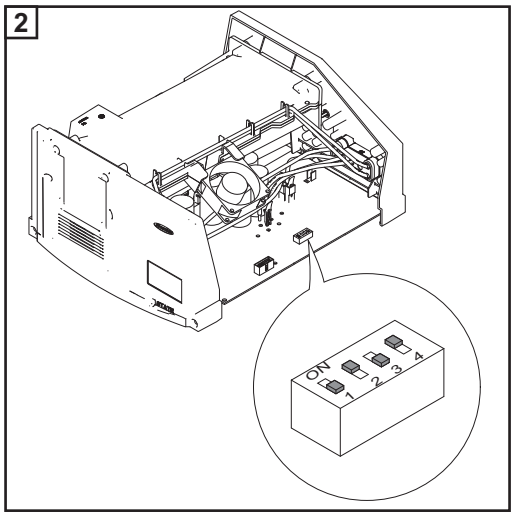
Text on sticker:

Perform the following steps before inserting the Power Rack.
For more information see the Operating Instructions.
1. Set the bolt on the backside of the rack to the appropriate position.
2. Set the DIP switch on the Power Rack to the position as shown.
Note: Power Rack no. 00 must be inserted properly before switching on the unit.

Inserting replacement power stage sets

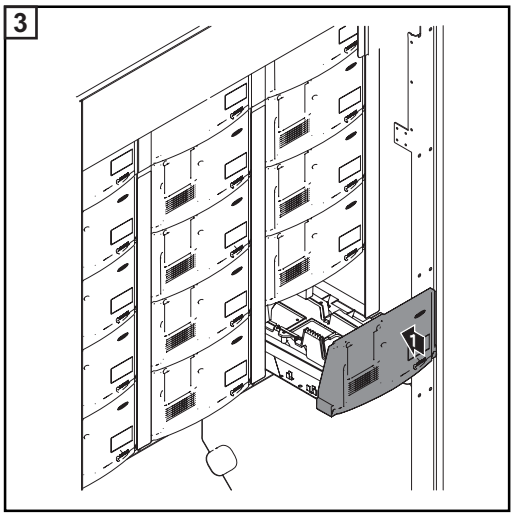


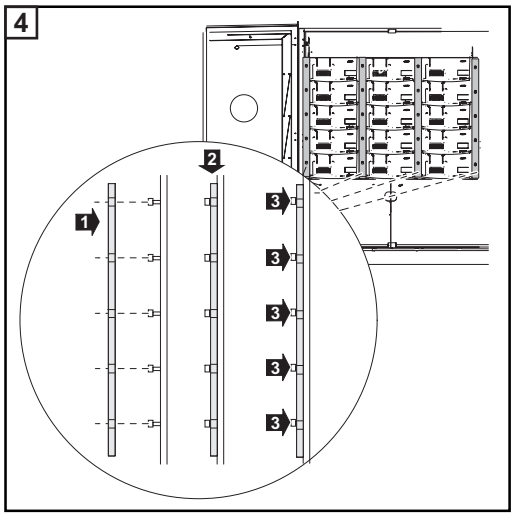
- Insert positioning bolt into the correct position



- Set dip switch according to the diagram

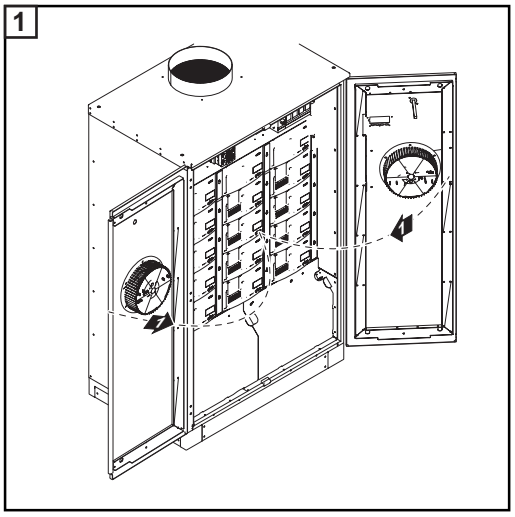
IMPORTANT When inserting power stage sets, the plastic front of the power stage set must be inserted flat against the side metal supports.
If a power stage set cannot be inserted completely into the inverter, then the power stage set has been inserted into the wrong slot.



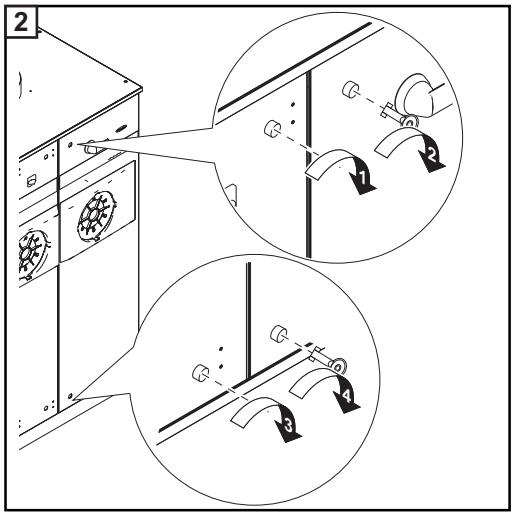


- Insert the left and right rails for the replaced power stage set
- Secure rails using 2 x 5 screws

Closing the Fronius CL



- Close doors



- Close door latches

Appendix

Technical Data

Fronius CL 36.0

Input data

MPP voltage range	230 - 500 V DC
Max. input voltage (at 1000 W/m² / -10 □ in an open circuit)	600 V DC
Max. input current	167.8 A DC
Max. array short circuit current	251.7 A

Output data

Nominal output power (P_{nom})	36 kW
Max. output power	36 kW
Nominal AC output voltage	3 ~ NPE 400 V / 230 V
Grid voltage tolerance	+10 / -15 % [1)]
Nominal output current (three-phase)	52.2 A AC
Nominal frequency	50 - 60 Hz [1)]
Harmonic distortion	< 3 %
Power factor (cos phi)	1 0.85 - 1 ind./cap.[2)]
Max. permitted grid impedance Zmax at PCC[3)]	145 milliohms
Maximum continuous utility backfeed current[4)]	0 A[5)]
Synchronization in-rush current[6)]	0 A[5)]
Maximum output fault current / duration	1020 A / 510 µs

General data

Maximum efficiency	95,9 %
Euro. efficiency	95,3 %
Night consumption	11.4 W
Cooling	Controlled forced-air ventilation
Degree of protection	IP 20
Unit dimensions w x h x d	1105 x 722 x 1730 mm
Mounting base dimensions l x w x h	1105 x 722 x 100 mm
Weight	248 kg
Permissible ambient temperature (with 95% rel. humidity)	- 20 °C - +50 °C
EMC emissions class	B

Safety equipment

DC insulation measurement	Warning / Shutdown [7)] at R_{ISO} < 500 kilohms
Manifestation of DC overload	Operating point shift Power limiter
DC circuit breaker	integrated

Fronius CL 48.0

Input data

MPP voltage range	230 - 500 V DC
Max. input voltage (at 1000 W/m² / -10 □ in an open circuit)	600 V DC
Max. input current	223.4 A DC
Max. array short circuit current	335.2 A

Output data

Nominal output power (P_{nom})	48 kW
Max. output power	48 kW
Nominal AC output voltage	3 ~ NPE 400 V / 230 V
Grid voltage tolerance	+10 / -15 % [1)]
Nominal output current (three-phase)	69.6 A AC
Nominal frequency	50 - 60 Hz [1)]
Harmonic distortion	< 3 %
Power factor (cos phi)	1 0.85 - 1 ind./cap.[2)]
Max. permitted grid impedance Zmax at PCC[3)]	108 milliohms
Maximum continuous utility backfeed current[4)]	0 A[5)]
Synchronization in-rush current[6)]	0 A[5)]
Maximum output fault current / duration	1020 A / 510 µs

General data

Maximum efficiency	95,9 %
Euro. efficiency	95,4 %
Night consumption	11.6 W
Cooling	Controlled forced-air ventilation
Degree of protection	IP 20
Unit dimensions l x w x h	1105 x 722 x 1730 mm
Mounting base dimensions l x w x h	1105 x 722 x 100 mm
Weight	276 kg
Permissible ambient temperature (with 95% rel. humidity)	- 20 °C - +50 °C
EMC emissions class	B

Safety equipment

DC insulation measurement	Warning / Shutdown [7)] at R_{ISO} < 500 kilohms
Manifestation of DC overload	Operating point shift Power limiter
DC circuit breaker	integrated

Fronius CL 60.0

Input data

MPP voltage range	230 - 500 V DC
Max. input voltage (at 1000 W/m² / -10 °C in an open circuit)	600 V DC
Max. input current	280.2 A DC
Max. array short circuit current	420.3 A

Output data

Nominal output power (P_{nom})	60 kW
Max. output power	60 kW
Nominal AC output voltage	3 ~ NPE 400 V / 230 V
Grid voltage tolerance	+10 / -15 % [1)]
Nominal output current (three-phase)	87.0 A AC
Nominal frequency	50 - 60 Hz [1)]
Harmonic distortion	< 3 %
Power factor (cos phi)	1 0.85 - 1 ind./cap.[2)]
Max. permitted grid impedance Zmax at PCC[3)]	87 milliohms
Maximum continuous utility backfeed current[4)]	0 A[5)]
Synchronization in-rush current[6)]	0 A[5)]
Maximum output fault current / duration	1020 A / 510 µs

General data

Maximum efficiency	95,9 %
Euro. efficiency	95,5 %
Night consumption	12.2 W
Cooling	Controlled forced-air ventilation
Degree of protection	IP 20
Unit dimensions l x w x h	1105 x 722 x 1730 mm
Mounting base dimensions l x w x h	1105 x 722 x 100 mm
Weight	303.0 kg
Permissible ambient temperature (with 95% rel. humidity)	- 20 °C - +50 °C
EMC emissions class	B

Safety equipment

DC insulation measurement	Warning / Shutdown [7)] at R_{ISO} < 500 kilohms
Manifestation of DC overload	Operating point shift Power limiter
DC circuit breaker	integrated

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

Detailed warranty terms and conditions specific to your country can be found online: www.fronius.com/solar/warranty

To take advantage of the full warranty duration for your newly installed Fronius inverter or accumulator, register your product at: www.solarweb.com.

Disposal

Should your inverter be replaced at some future date, Fronius will accept the obsolete equipment back and provide for its proper recycling.

EU-KONFORMITÄTSERKLÄRUNG 2011
EC-DECLARATION OF CONFORMITY 2011
DECLARATION DE CONFORMITE DE LA CE, 2011

Wels-Thalheim, 2011-07-25

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 CL 36.0 / 48.0 / 60.0 Solar-Wechselrichter	Fronius CL 36.0 / 48.0 / 60.0 Photovoltaic inverter	Fronius CL 36.0 / 48.0 / 60.0 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	Directive 2006/95/EC Electrical Apparatus Low Voltage Directive	Directive 2006/95/CE Outillages électriques Directive de basse tension
Richtlinie 2004/108/EG Elektromag. Verträglichkeit	Directive 2004/108/EC Electromag. compatibility	Directive 2004/108/CE Électromag. Compatibilité
Europäische Normen inklusive zutreffende Änderungen IEC 62109-1:2010 IEC 62109-2:2011 EN 50178:1997 EN 61000-6-3:2007 EN 61000-6-2:2005 EN 61000-3-12:2005 EN 61000-3-11:2000 EN 61000-3-2:2006	European Standards including relevant amendments IEC 62109-1:2010 IEC 62109-2:2011 EN 50178:1997 EN 61000-6-3:2007 EN 61000-6-2:2005 EN 61000-3-12:2005 EN 61000-3-11:2000 EN 61000-3-2:2006	Normes européennes avec amendements correspondants IEC 62109-1:2010 IEC 62109-2:2011 EN 50178:1997 EN 61000-6-3:2007 EN 61000-6-2:2005 EN 61000-3-12:2005 EN 61000-3-11:2000 EN 61000-3-2:2006
Die oben genannte Firma hält Dokumentationen als Nachweis der Erfüllung der Sicherheitsziele und die wesentlichen Schutzanforderungen 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.

CE **2011**

ppa. Mag.Ing.H.Hackl

DE	German	Deutsch	EN	English	English	FR	French	Française

Deutsche Gesetzliche Unfallversicherung

Fachausschuss Elektrotechnik

Fachausschuss Elektrotechnik
Gustav-Heinemann-Ufer 130

Prüf- und Zertifizierungsstelle
50968 Köln

FRONIUS International GmbH
Günter Fronius Straße 1
A-4600 Thalheim

Ihr Zeichen:	
Ihre Nachricht vom:	
Unser Zeichen (bitte stets angeben):	UB.010.17/10-1322 PlWi
Ansprechperson:	Herr Pohl
Telefon:	
Fax:	+49 221 3778-6322
E-Mail:	
Datum:	25.05.2010

Unbedenklichkeitsbescheinigung 10027
(Prüfschein)

Erzeugnis:	Selbsttätig wirkende Schaltstelle
Typ:	CL
Bestimmungsgemäße Verwendung:	Selbsttätig wirkende, dem Verteilnetzbetreiber (VNB) unzugängliche Schaltstelle, als Ersatz für eine jederzeit dem VNB zugängliche Schaltstelle mit Trennfunktion. Die Schaltstelle ist integrierter Bestandteil der PV-Wechselrichter: Fronius CL36.0, Fronius CL48.0, Fronius CL60.0
Prüfgrundlagen: DIN V VDE V 0126-1-1: 2006-02	„Selbsttätige Schaltstelle zwischen einer netzparallelen Eigenerzeugungsanlage und dem öffentlichen Niederspannungsnetz“

Das mit Prüfbericht 2.03.02105.1.0 vom 20.04.2010, AIT 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

10027_Fronius_CL_UB.doc

DOCUMENT OF COMPLIANCE
FRONIUS CL

Wels, April 27th 2011

Fronius International GmbH

Document of Compliance 10027

Product: Automatic AC disconnect switch

Type: Fronius CL

Including:
Fronius CL 36.0
Fronius CL 48.0
Fronius CL 60.0

Intended Use:

The product is to be used as an automatic AC disconnect switch that is inaccessible to the DSO as a safety function between the PV system and the low-voltage grid. The automatic AC disconnect switch is an integral part of the PV inverter type Fronius CL 36.0, Fronius CL 48.0 and Fronius CL 60.0.

Test specification:

DIN V VDE 0126-1-1: 2006-02 "Automatic AC disconnect switch between a grid connected generators and the public low-voltage-grid"

The safety concept of the above product tested with the report of 20.04.2010, ref. 2.03.02105.1.0 (AIT) 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

FRONIUS INTERNATIONAL GMBH
Solar Electronics Division
Froniusplatz 1
A-4600 Wels

ppa C Panhuber

DI Prok. Christoph Panhuber
Head of Solar Electronics Division

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http://www.fronius-usa.com

Under http://www.fronius.com/addresses you will find all addresses of our sales branches and partner firms!