Fronius IG-TL
3.0 / 3.6 / 4.0 / 4.6 / 5.0

GB Operating Instructions

Inverter for grid-connected photovoltaic systems

42,0426,0074,EA 012011

Dear Fronius Customer,

Introduction

Thank you for choosing Fronius - and congratulations on your new, high-quality, high-tech Fronius product. This introduction should provide you with general information about the equipment. Please read it carefully to learn about the many great features of your new Fronius product. This is the best way to get the most out of all the advantages that it has to offer.

Please also note the safety information and the safety precautions for the product installation location. Following all product instructions will ensure long-lasting quality and reliability. And these are the essential ingredients for outstanding results.

Safety Instructions

DANGER!

“DANGER!“ indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING!

“WARNING!“ indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury.

CAUTION!

“CAUTION!“ indicates a potentially harmful situation which, if not avoided, may result in minor and moderate injury or property damage.

NOTE

“NOTE“ indicates a situation which could adversely affect work results and may cause damage to equipment.

Important

“Important“ indicates practical tips and other useful information. It is not a signal word for a harmful or dangerous situation.

Please pay special attention when one of the above symbols appears in the manual.

General

This equipment has been manufactured using state-of-the-art technology and in accordance with general safety regulations. However, incorrect operation or misuse may endanger:

- the life and well-being of the operator or third parties
- the equipment and other property of the owner/operator
- the efficient operation of the equipment.

All persons involved with equipment startup, service and maintenance must:

- be suitably qualified
- be familiar with electrical installations
- have completely read and followed these operating instructions

The operating instructions must be available at the equipment location at all times. In addition to the operating instructions, all applicable local rules and regulations regarding accident prevention and environmental protection must also be followed.

All safety instructions and warning signs on the equipment itself:

- must be maintained in legible condition
- must not be damaged
- must not be removed
- must not be covered or painted over

General
(continued)

For information about where the safety instructions and warning signs are located on the equipment, please refer to the “General“ section of your equipment’s operating instructions.

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

Your safety is at stake.

Intended Use

The equipment may only be operated in compliance with its intended use.

Any other purpose does not constitute intended use. The manufacturer is not responsible for any damages resulting from unintended use.

Intended use also includes:
- reading and complying with all general information as well as safety information and warnings from the operating instructions
- compliance with all inspection and maintenance requirements
- installation as per operating instructions

Where appropriate, the following guidelines should also be applied:
- Utility company regulations regarding grid feed-in
- Information from solar module manufacturer

Ambient Conditions

Operation and/or storage of the device outside of the stipulated range does not constitute intended use. The manufacturer is not responsible for any damages resulting from unintended use.

Please refer to the technical data in your operating instructions for information about permitted ambient conditions.

Qualified Personnel

The service information in these operating instructions is only intended for qualified personnel. An electrical shock can be fatal. Please do not carry out any activities other than those referred to in the documentation even if you are suitably qualified.

All cables and wires must be secured, undamaged, insulated and adequately dimensioned. Loose connections, scorched, damaged or under-dimensioned cables and wires must be repaired immediately by an authorized specialist.

Maintenance and repair may only be carried out by an authorized specialist.

The use of third-party parts does not guarantee that they were designed and manufactured according to operational demands and safety requirements. Use only original spare parts (also applies to standard parts).

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

Immediately replace any components that are not in perfect condition.

Safety Precautions at Equipment Location

When installing devices with air vents, make sure that cool air can flow freely through the vents unobstructed. The device should only be operated in accordance with the protection class listed on the rating plate.

USA

Information on Noise Emission Values

The inverter generates a maximum sound power level of <80dB(A) (ref. 1pW) at full-load operation according to IEC 62109-1.

The cooling of the device takes place via an electronic temperature control system at the lowest possible noise level and depends on the power used, ambient temperature and the soiling level of the device, etc.

A workplace-related emissions value cannot be provided for this device because the actual noise level that occurs depends strongly on the installation situation, the grid quality, the surrounding walls and the general properties of the space.

EMC Device Classifications

Devices of emission class A:
- Are only for use in industrial areas.
- Can cause line-bound and radiated interference in other areas.

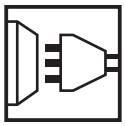
Devices of emission class B:
- Meet the emission requirements for residential and industrial areas. This is also true for residential areas in which the energy is supplied from the public low voltage grid.

EMC device classification as per rating plate or technical data

EMC Precautions

In special cases, there may still be interference for the specified application area despite maintaining standardized emission limit values (e.g. when sensitive equipment is located at the setup location or when the setup location is near radio or television receivers).
In this case, the operator is obliged to take proper action to rectify the situation.

Grid connection



Devices with a high output (> 16 A) can influence the voltage quality of the grid due to a high current input into the main supply.
This can affect several device types in the form of:
- Connection limitations
- Requirements regarding permitted mains impedance *)
- Requirements regarding minimum required short circuit power *)

*) for each interface to the public grid

See technical data

In this case, the operator or the user of the device must make sure whether or not the device may be connected, if necessary by contacting the power supply company.

Electrical Installations

Electrical installations may only be carried out in accordance with relevant national and local standards and regulations.

ESD Precautions

Danger of damage to electronic components due to electrostatic discharge. Take appropriate ESD precautions when replacing and installing components.

Safety Precautions in Normal-Operation

The device should only be operated when all safety equipment is fully functional. If safety equipment is not fully functional, there is a danger to:

- the life and well-being of the operator or third parties
- the equipment and other property of the owner/operator
- the efficient operation of the equipment

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 equipment.

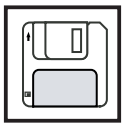
Safety Markings

Equipment with the CE marking fulfils the basic requirements of the Guideline Governing Low-Voltage and Electromagnetic Compatibility. (For more information, please see the attachment and/or the “Technical Data“ section in your documentation).

Disposal

This device should not be disposed of in residential waste.
To comply with 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 find an approved collection and recycling facility in your area.
Ignoring this EU Directive may have adverse affects on the environment and your health.

Data Security



The user is responsible for backing up data relating to changes made to factory settings. The manufacturer will not accept liability if personal settings are deleted.

Copyright

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General information

Protection of persons and equipment

Safety

WARNING! Incorrect operation and work performed incorrectly can cause serious injury & damage! Only qualified staff are authorized to install your inverter and only within the scope of the respective technical regulations. Do not start operation or carry out maintenance work before you have read the chapter ‘Safety instructions.’

Protection of persons and equipment

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

The inverter provides operator and equipment protection through:
a) RCMU
b) monitoring the grid

RCMU

RCMU = Residual Current Monitoring Unit

The inverter is equipped with an RCMU according to DIN VDE 0126-1-1. It monitors residual currents from the solar module up to the inverter grid connection and disconnects the inverter from the grid when an improper residual current is detected.
Additional residual current protection may be needed depending on the protection system of the installation or the requirements of the utility company. In this case, use a residual current circuit breaker with a release current of at least 100 mA.

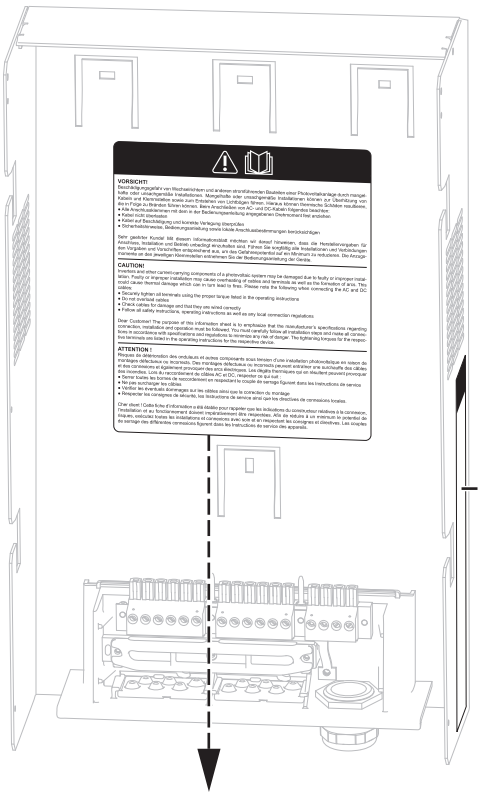
Monitoring the grid

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.

Grid monitoring is carried out by:
- monitoring voltage
- monitoring frequency
- monitoring islanding conditions

Warning notices affixed to the device

The inverter wall bracket 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.



VORSICHT!
Beschädigungsgefahr von Wechselrichtern und anderen stromführenden Bauteilen einer Photovoltaikanlage durch mangelhafte oder unsachgemäße Installationen. Mangelhafte oder unsachgemäße Installationen können zur Überhitzung von Kabeln und Klemmstellen sowie zum Entstehen von Lichtbögen führen. Hieraus können thermische Schäden resultieren, die in Folge zu Bränden führen können. Beim Anschließen von AC- und DC-Kabeln folgendes beachten:
- Alle Anschlussklemmen mit dem in der Bedienungsanleitung angegebenen Drehmoment fest anziehen
- Kabel nicht überlasten
- Kabel auf Beschädigung und korrekte Verlegung überprüfen
- Sicherheitshinweise, Bedienungsanleitung sowie lokale Anschlussbestimmungen berücksichtigen

Sehr geehrter Kunde! Mit diesem Informationsblatt möchten wir darauf hinweisen, dass die Herstellervorgaben für Anschluss, Installation und Betrieb unbedingt einzuhalten sind. Führen Sie sorgfältig alle Installationen und Verbindungen den Vorgaben und Vorschriften entsprechend aus, um das Gefahrenpotential auf ein Minimum zu reduzieren. Die Anzugsmomente an den jeweiligen Klemmstellen entnehmen Sie der Bedienungsanleitung der Geräte.

CAUTION!
Inverters and other current-carrying components of a photovoltaic system may be damaged due to faulty or improper installation. Faulty or improper installation may cause overheating of cables and terminals as well as the formation of arcs. This could cause thermal damage which can in turn lead to fires. Please note the following when connecting the AC and DC cables:
- Securely tighten all terminals using the proper torque listed in the operating instructions
- Do not overload cables
- Check cables for damage and that they are wired correctly
- Follow all safety instructions, operating instructions as well as any local connection regulations

Dear Customer! The purpose of this information sheet is to emphasize that the manufacturer's specifications regarding connection, installation and operation must be followed. You must carefully follow all installation steps and make all connections in accordance with specifications and regulations to minimize any risk of danger. The tightening torques for the respective terminals are listed in the operating instructions for the respective device.

ATTENTION !
Risques de détérioration des onduleurs et autres composants sous tension d'une installation photovoltaïque en raison de montages défectueux ou incorrects. Des montages défectueux ou incorrects peuvent entraîner une surchauffe des câbles et des connexions et également provoquer des arcs électriques. Les dégâts thermiques qui en résultent peuvent provoquer des incendies. Lors du raccordement de câbles AC et DC, respecter ce qui suit :
- Serrer toutes les bornes de raccordement en respectant le couple de serrage figurant dans les Instructions de service
- Ne pas surcharger les câbles
- Vérifier les éventuels dommages sur les câbles ainsi que la correction du montage
- Respecter les consignes de sécurité, les Instructions de service ainsi que les directives de connexions locales.

Cher client ! Cette fiche d'information a été établie pour rappeler que les indications du constructeur relatives à la connexion, l'installation et au fonctionnement doivent impérativement être respectées. Afin de réduire à un minimum le potentiel de risques, exécutez toutes les installations et connexions avec soin et en respectant les consignes et directives. Les couples de serrage des différentes connexions figurent dans les Instructions de service des appareils.

WARNUNG!
Ein elektrischer Schlag kann tödlich sein.
Vor dem Öffnen des Gerätes dafür sorgen, dass Eingangsseite und Ausgangsseite vor dem Gerät spannungsfrei sind!
Entladezeit der Kondensatoren abwarten. Die Entladezeit beträgt 3 Minuten.
Gefährliche Spannung durch Solarmodule, die Licht ausgesetzt sind!
Der Anschlussbereich darf nur von lizenzierten Elektro-Installateuren geöffnet werden.

WARNING!
An electrical shock can be fatal.
Before opening the machine, it must be de-energised at the input and output!
You must wait until the capacitors have discharged. Discharge takes 3 minutes.
Solar modules exposed to light create dangerous voltage.
The connection area should only be opened by a licensed electrician.

AVVISO!
Una scossa elettrica può avere esiti mortali.
Prima di aprire l'apparecchio, è necessario interromperne l'alimentazione elettrica in entrata e in uscita!
Attendere il tempo di scaricamento dei condensatori. Il tempo di scaricamento è di 3 minuti.
I pannelli solari esposti alla luce producono tensione pericolosa!
La scatola dei collegamenti può essere aperta solo da elettroinstallatori qualificati.

¡ADVERTENCIA!
Una descarga eléctrica puede ser mortal.
Antes de abrir el aparato se debe procurar que el lado de entrada y salida delante del inversor esté sin tensión.
Esperar el tiempo de descarga de los condensadores. El tiempo de descarga es de 3 minutos.
¡Los paneles solares expuestos a la luz generan una tensión peligrosa!
Sólo instaladores eléctricos oficiales pueden abrir la zona de conexión.

AVERTISSEMENT !
Un choc électrique peut être mortel.
Avant d'ouvrir l'appareil, celui-ci doit être commuté hors tension à l'entrée et à la sortie !
Attendre l'expiration de la durée de décharge des condensateurs. Cette durée correspond à 3 minutes.
Les panneaux solaires exposés à la lumière produisent une tension dangereuse !
Seuls des installateurs agréés sont habilités à ouvrir la zone de raccordement.

Warning notices affixed to the device (continued)

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:

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- Check cables for damage and that they are wired correctly
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Utilization in accordance with „intended purpose“

Utilization in accordance with „intended purpose“

The Fronius IG TL 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 IG TL that are not expressly recommended by Fronius
- Installation of components that are not expressly recommended or sold by Fronius

The manufacturer shall not be liable for any damage resulting from such improper 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

NOTE The inverter is designed exclusively to be connected and used with non-grounded solar modules (protection class II). The solar modules cannot be grounded at either the positive or negative pole.
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.

The Fronius IG TL unit in the PV system

General

The Fronius IG TL solar inverter is the highly complex link between solar modules and the grid.

Tasks

The main tasks of the inverter include:
- Converting DC into AC current
- Fully automatic operation management
- Display function and data communication

Converting DC into 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.

Fully automatic operation management

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 into the grid.

The control system of the inverter ensures that the maximum possible power output is drawn from the solar modules at all times.
This function is called MPPT (Maximum Power Point Tracking).

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

Display function and data communication

The display on the inverter is the interface between the inverter and the operator. The design of the display is geared towards simple operation and making system data available at all times.

Display function and data communication
(continued)

The inverter is equipped with basic logging functions for recording minimum and maximum data on a daily, yearly, and 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.

Solar module string monitoring

The inverter has a function that can monitor incoming solar module strings to detect errors in the solar module field.

System upgrades

The inverter is designed for various system upgrades, e.g.:
- Datalogger (when using a PC to record and manage data from your photovoltaic system), includes Datalogger and a modem interface
- Various large-format displays
- Actuators (e.g., relays, alarms)
- Fronius Sensor Box (sensors for temperature, irradiance, energy measurement, etc.)
- Fronius DC Box 60/12 (collection box)

Active inverter cooling

The inverter's temperature-controlled, variable-speed fan with ball-bearing support provides:
- optimal inverter cooling
- higher efficiency
- cooler parts, thus extending the service life
- least possible energy consumption and lowest possible noise level
- weight reduction due to a reduction of the cooling element surface

Power derating

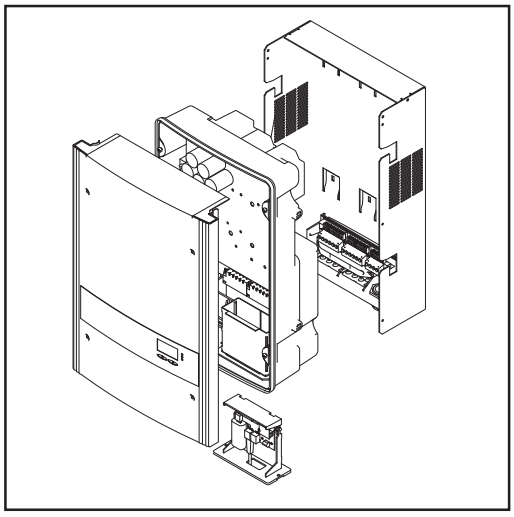
Should there be insufficient heat dissipation in spite of the fan operating at maximum speed (for example, inadequate heat transfer away from the heat sinks), the power will be derated to protect the inverter when the ambient temperature reaches 40 °C and above.

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.

Installation and startup

Fronius IG TL installation and connection

Fronius IG TL construction



Fronius IG TL main components

The inverter consists of the following main components:

- Wall bracket with connection area
- Power stage set with data communication rack
- Housing cover

The inverter is supplied with these components assembled.

Overview

'Fronius IG TL installation and connection' contains the following sections:

- Choosing the location
- Connection options and knockouts on the Fronius IG TL
- Attaching the wall bracket
- Connecting the Fronius IG TL to the public grid (AC)
- Connecting solar module strings to the Fronius IG TL (DC)
- Inserting string fuses
- Criteria for the proper selection of string fuses
- Clipping power stage sets onto the wall bracket

Choosing the location

Choosing the location in general

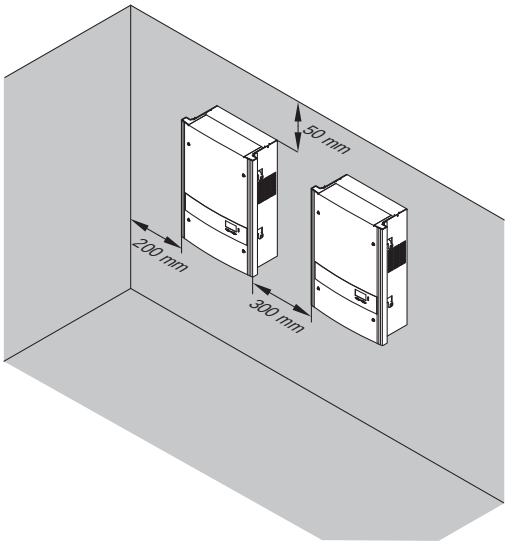
Please note the following criteria when choosing a location for the inverter:

Only install:
- on a stable, vertical wall
- on a non-combustible subsurface

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

Relative humidity: 0 - 95 %

For use at altitudes above sea level: up to 2000 m
- There should be a 200 mm clearance on both sides of the inverter for the cool air vents.
- When installing more than one unit, keep a distance of 300 mm between individual Fronius IG TL units.



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

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

The inverter is designed for installation both indoors and outdoors.

Choosing a location for inside installation

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

Do not install the inverter in:

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

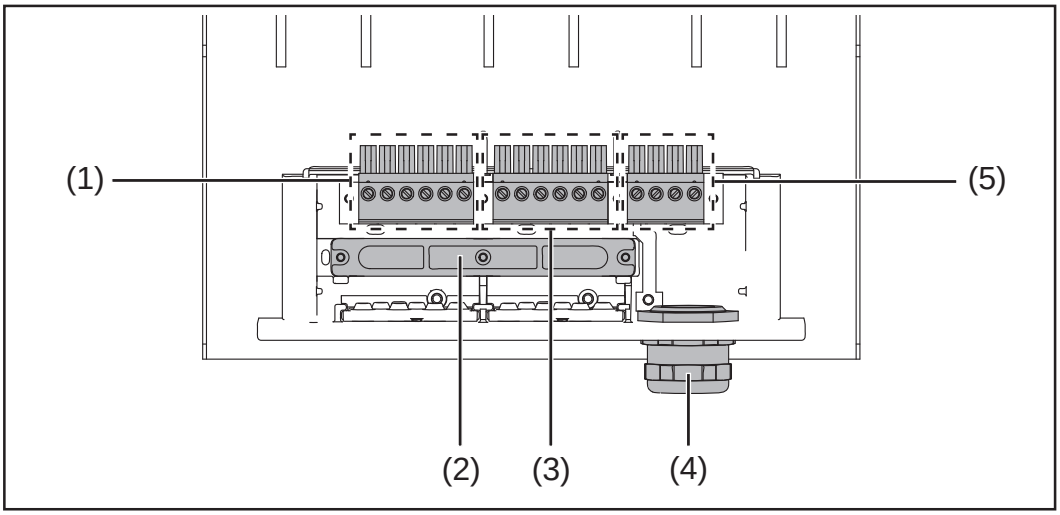
Choosing a location for outside installation

Because of its IP 55 degree of protection, the inverter is not susceptible to hose water from any direction and can also be operated in moist environments.

The inverter should not be exposed to direct sunlight to keep inverter heating as low as possible. Ideally, the inverter should be installed in a protected location, e.g., near the solar modules or under a roof overhang.

Connection options and knockouts on the Fronius IG TL

Connection options on the Fronius IG TL

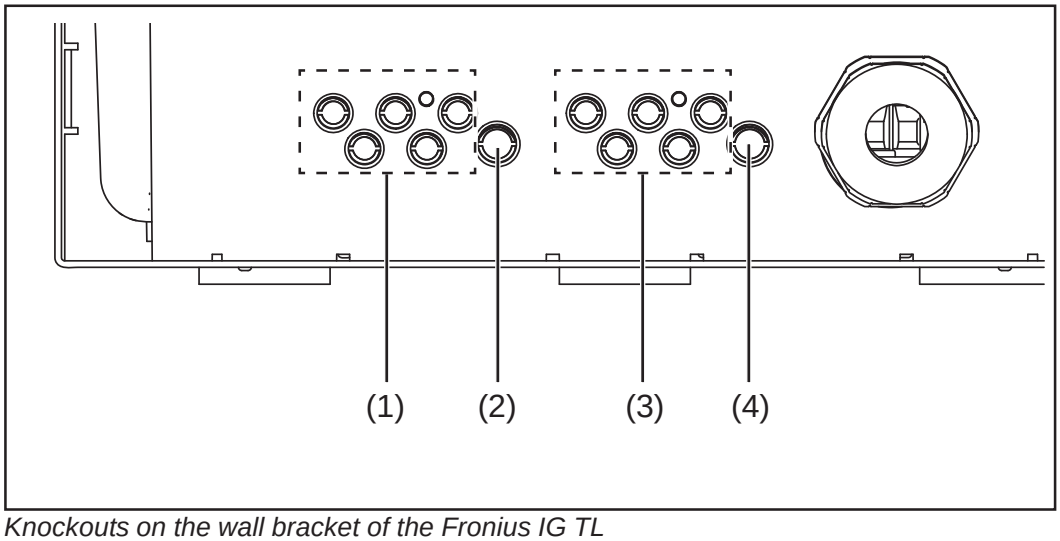


Connection options on the wall bracket of the Fronius IG TL

Item	Description
(1)	DC+ terminals
(2)	Strain-relief device
(3)	DC- terminals
(4)	Metric screw joint M32 or M40 (AC connection)
(5)	AC terminals

Knockouts on the Fronius IG TL

The connection area contains several knockouts of different sizes. When knocked out, the openings are used as inputs for the DC wires.



Knockouts on the wall bracket of the Fronius IG TL

Knockouts on the Fronius IG TL
(continued)

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

Item	Description
(1)	5 inputs for DC+ cables, cable diameter min. 4 - max. 9 mm
(2)	1 input for DC+ cable, cable diameter min. 4 - max. 11 mm
(3)	5 inputs for DC- cables, cable diameter min. 4 - max. 9 mm
(4)	1 input for DC- cable, cable diameter min. 4 - max. 11 mm

Attaching the wall bracket

Selecting dowels and screws

Important Depending on the subsurface, different dowels and screws may be required for installing the wall bracket. 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.

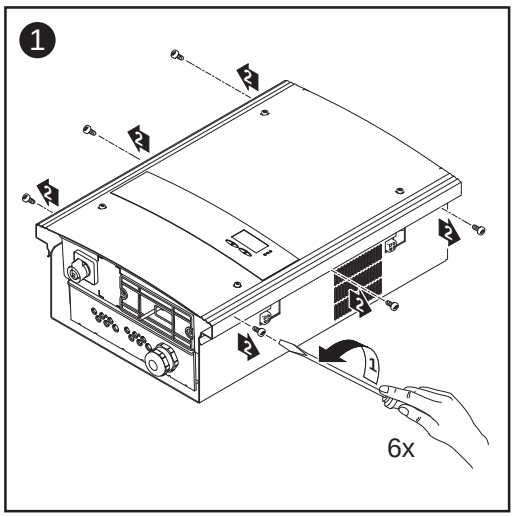
The screw head height of the screws used may be a maximum of 6 mm. When using washers, the maximum screw head height is reduced by the thickness of the washers.

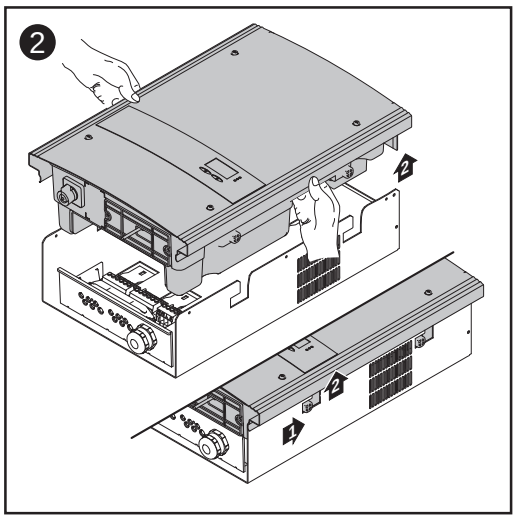
Screw recommendation

Fronius recommends using screws with a min. diameter of 6 mm for inverter installation.

Separating the wall bracket and power stage set

The side areas of the housing cover are designed to function as carrying grips and/or handles.





CAUTION! An inadequate grounding conductor connection can cause serious injuries to persons and damage to (or loss of) property. The housing screws 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.

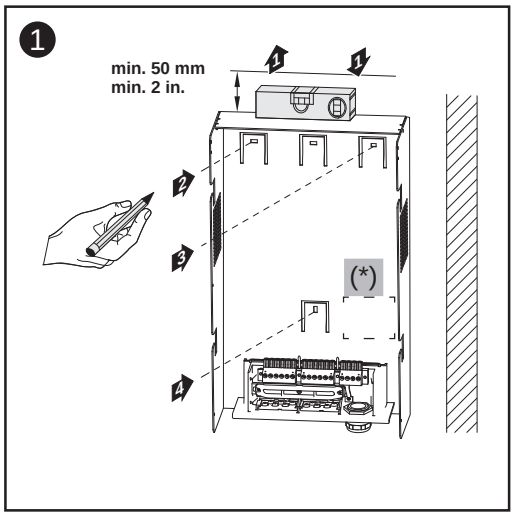
Installation position

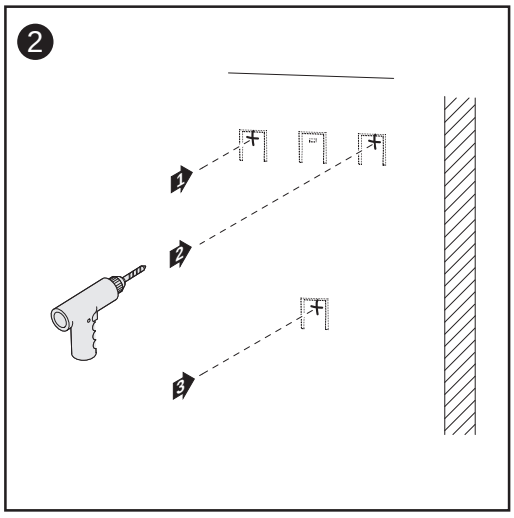
NOTE The inverter should only be installed upright on a non-combustible subsurface, e.g., on the wall, on a column, or on a metal carrier.

Attaching the wall bracket - Wall installation

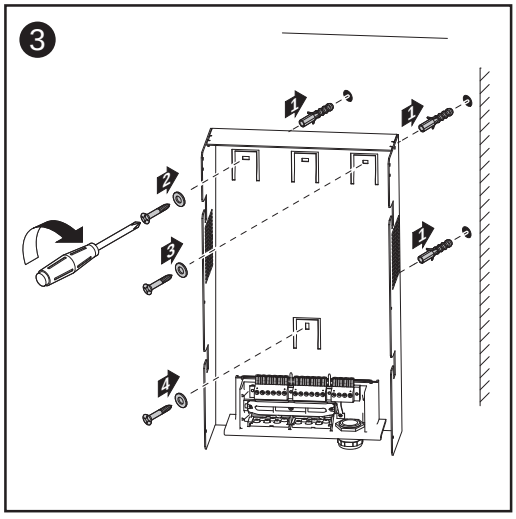
CAUTION! The inverter can be damaged by soiling or water on the terminals and contacts of the connection area.

- When drilling, make sure that terminals and contacts in the connection area do not become soiled or wet.
- The wall bracket without the power stage set does not correspond to the degree of protection of the complete inverter and, therefore, should not be attached without a power stage set.
  Protect the wall bracket from soiling and moisture during installation.





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

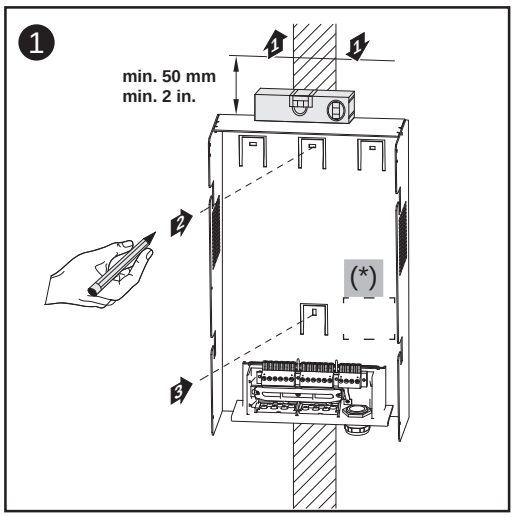


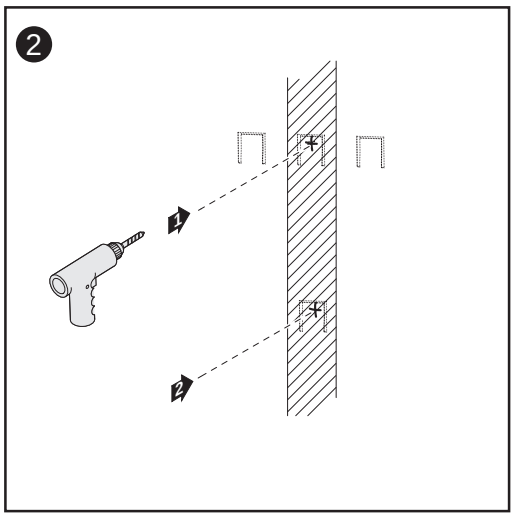
NOTE When attaching the wall bracket to the wall, make sure that the wall bracket is not warped or deformed.

Attaching the wall bracket - Column installation

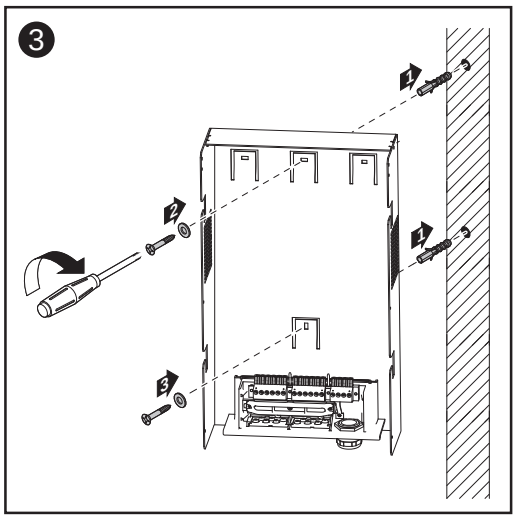
CAUTION! The inverter can be damaged by soiling or water on the terminals and contacts of the connection area.

- When drilling, make sure that terminals and contacts in the connection area do not become soiled or wet.
- The wall bracket without the power stage set does not correspond to the degree of protection of the complete inverter and, therefore, should not be attached outdoors without a power stage set.
  Protect the wall bracket from soiling and moisture during installation.





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



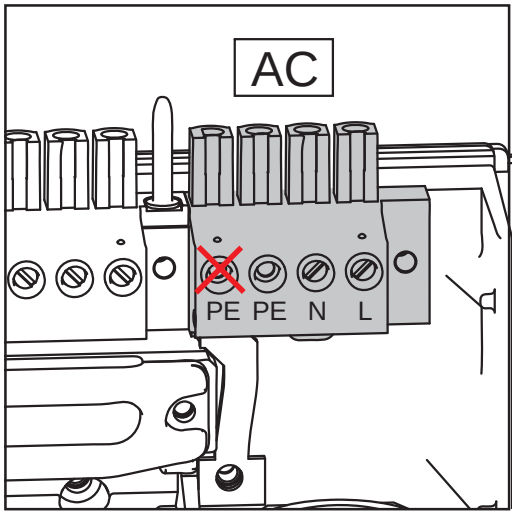
NOTE When attaching the wall bracket to the wall, make sure that the wall bracket is not warped or deformed.

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

Monitoring the grid

Important For optimal functioning of grid monitoring, the resistance in the leads to the AC connection terminals must be as low as possible.

AC terminals



Legend:

L Phase conductor
N Neutral conductor
PE Grounding conductor / Ground

Max. cable cross section per conductor cable: 16 mm²

Min. cable cross section per conductor cable: corresponds to the AC-side overcurrent-protected value, but at least 2.5 mm²

NOTE Do not connect a conductor cable to the left AC terminal, because this terminal is bridged internally.

NOTE Connect the phase (L), neutral conductor (N), and grounding conductor (PE) cables correctly!

Connecting aluminum cables

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

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

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

Connection requirements:

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

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

Connecting aluminum cables (continued)

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

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

Cross section of the AC cable

For a standard M32 metric screw joint with a reducer:
Cable diameter 7 - 15 mm

For an M32 metric screw joint (reducer removed):
Cable diameter 11 - 21 mm
(a cable diameter of 11 mm reduces the strain relief force from 100 N to a max. of 80 N)

For an M40 metric screw joint (option):
Cable diameter 19 - 28 mm

If required, use reducers for smaller cable diameters.

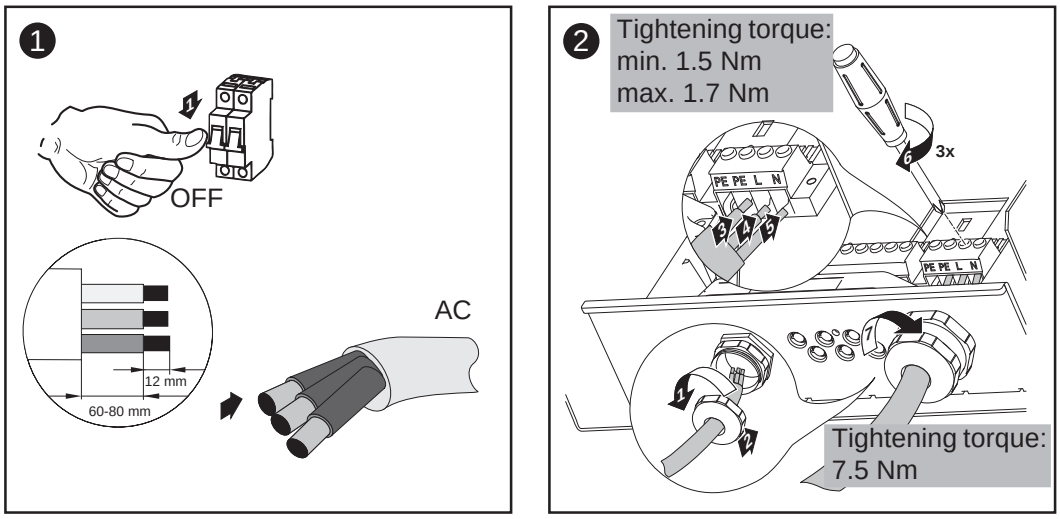
Safety

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.

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

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

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



NOTE When attaching the AC cable using metric screw joints, make sure that no kinks form in the connected conductor cables. Otherwise, you may no longer be able to close the inverter.

NOTE Make sure that the grid neutral conductor is grounded. For IT networks (isolated networks without grounding), this is not the case and operation of the inverter is not possible.

Recommendation for the AC-side overcurrent protection

Inverter	Number of phases	Max. output	Fuse protection
Fronius IG TL 3.0	1	3130 W	1 x C 25 A
Fronius IG TL 3.6	1	3760 W	1 x C 25 A
Fronius IG TL 4.0	1	4190 W	1 x C 32 A
Fronius IG TL 4.6	1	4820 W	1 x C 32 A
Fronius IG TL 5.0	1	5250 W	1 x C 32 A

NOTE The inverter is equipped with an RCMU according to DIN VDE 0126-1-1. It monitors residual currents from the solar module up to the inverter grid connection and disconnects the inverter from the grid when an improper residual current is detected.
If an external residual current circuit breaker is required due to local regulations, it must have a rated current of at least 100 mA. A type A residual current circuit breaker is generally sufficient in this case.
If more than one inverter is used, a rated current of 100 mA per connected inverter must be provided. For example, for two inverters connected to a common residual current circuit breaker, a residual current circuit breaker with at least 200 mA must be used.

Connecting solar module strings to the Fronius IG TL (DC)

Fronius IG TL field of application

NOTE The inverter is designed exclusively to be connected and used with non-grounded solar modules (protection class II). The solar modules cannot be grounded at either the positive or negative pole.
Use with other DC generators (e.g., wind generators) is not permitted.

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:

- The open circuit voltage of the solar modules increases as the temperature decreases (assuming constant irradiance). Open circuit voltage may not exceed 850 V.
  If the open circuit voltage exceeds 850 volts, the inverter may be damaged, and all warranty rights will become null and void.
- Note the temperature coefficients in the solar module data sheet
- More exact data for sizing the solar array for the particular location can be obtained using calculations tools such as 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.
Note the safety instructions and specifications of the solar module manufacturer regarding solar module grounding.
Solar modules that require a ground at the positive or negative pole cannot be used with the Fronius IG TL.

Safety

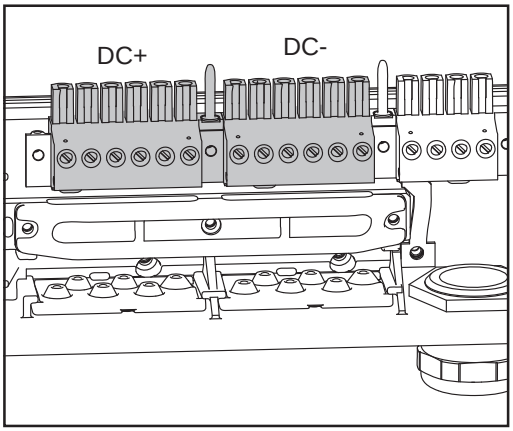
WARNING! An electrical shock can be fatal. Danger from grid voltage and DC voltage from solar modules.
- Never work with live wires! Prior to all connection work, make sure that the AC and DC wires are not charged.
- Only an authorized electrician is permitted to connect this inverter to the public grid and to the solar modules.

Safety
(continued)

CAUTION! Danger of damaging the inverter due to 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.

CAUTION! Danger of damaging the inverter by overload. Only connect a maximum of 20 A to an individual DC terminal.

DC terminals



DC+ and DC- terminals on the Fronius IG TL

Connecting aluminum cables

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

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

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

Connection requirements:

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

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

Connecting aluminum cables (continued)

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

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

Cable cross section of solar module strings

The cable cross section for solar module strings should be a maximum of 16 mm² per cable.
The min. cable cross section is 2.5 mm².

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

Polarity reversal of solar module strings

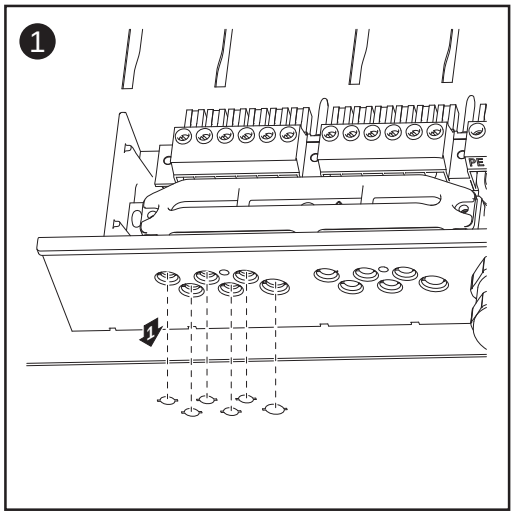
The inverter comes standard with 6 metal bolts in fuse holders in the power stage set. These metal bolts ensure that the inverter is protected against reversed polarity. Any reverse polarity of the solar module strings will not cause any damage to the inverter.

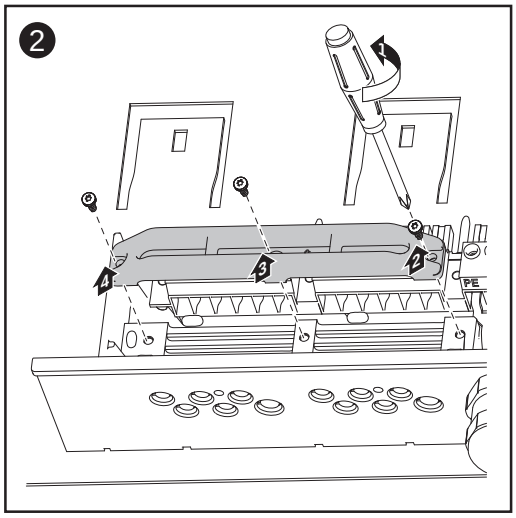
If string fuses are used instead of the metal bolts, the reverse polarity of an individual solar module string can cause damage to the inverter and cause an inverter fire.

CAUTION! Risk of damage and fire to inverter due to reverse polarity of solar module strings when using string fuses.
Reverse polarity of solar module strings can lead to an unacceptable overload to a string fuse being used. This can cause a strong arc, which can lead to an inverter fire.
When using string fuses, always make sure that the polarity is correct before connecting the individual solar module strings.

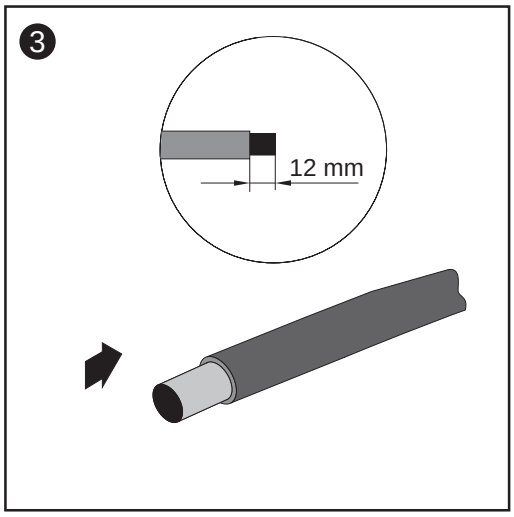
Connecting solar module strings to the Fronius IG TL (DC)

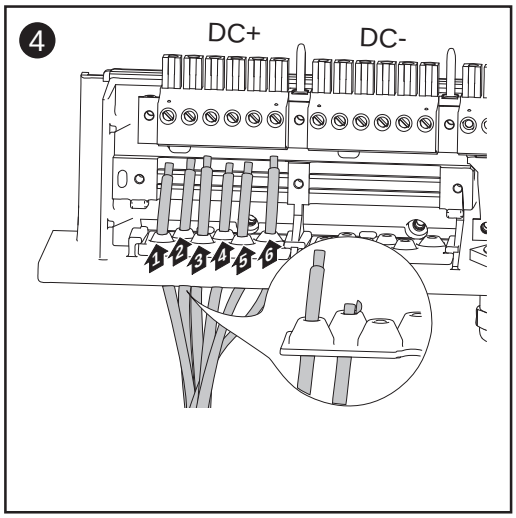
NOTE You should only remove the number of knockouts required for the available cables (e.g., 3 openings for 3 DC cables).

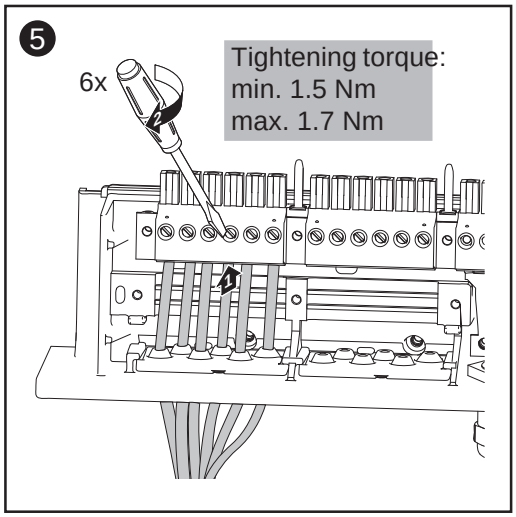


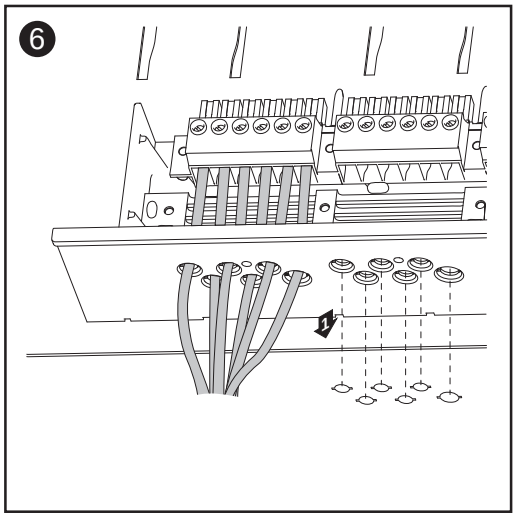


NOTE Finely stranded cables up to conductor class 5 can be connected to the DC-side terminals without wire end ferrules.

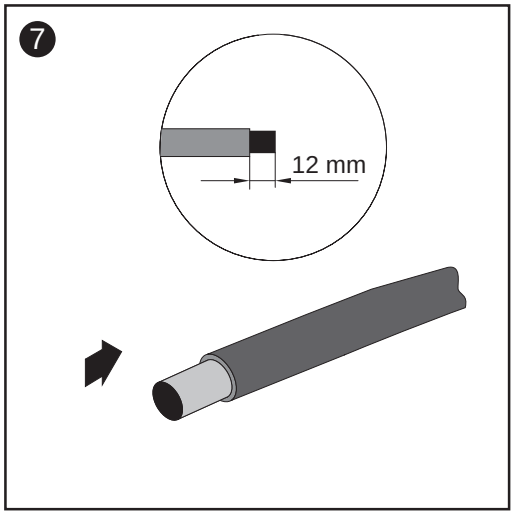


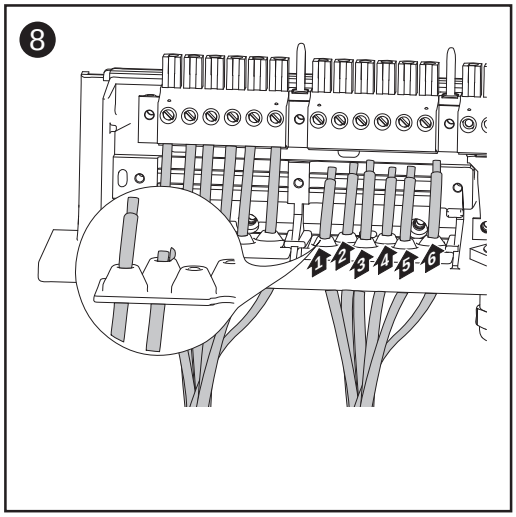


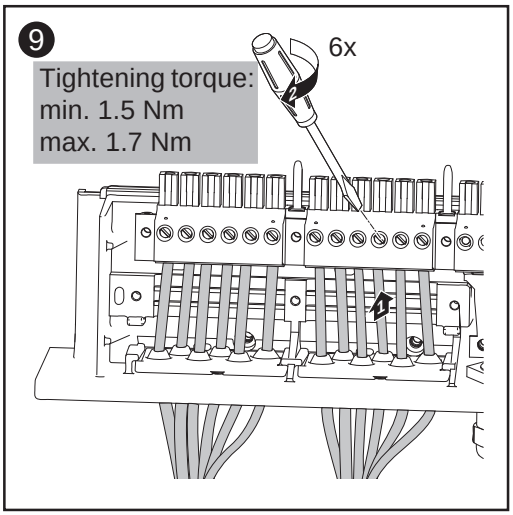


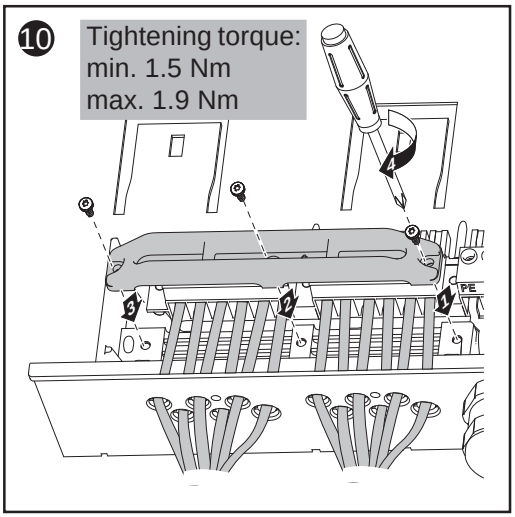


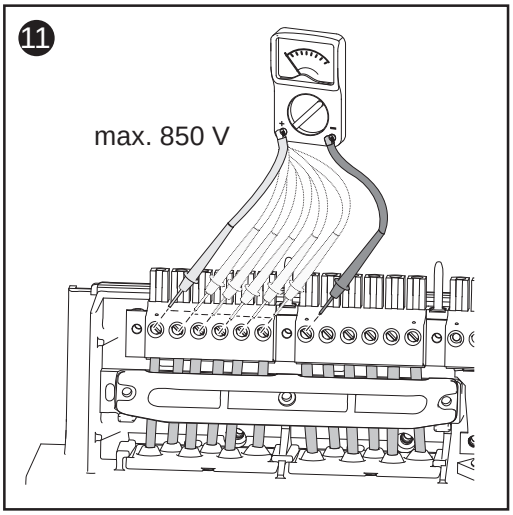
Connecting solar module strings to the Fronius IG TL (DC)
(continued)











Important Check the polarity and voltage of the solar module strings: the voltage should be a max. of 850 V, the difference between the individual solar module strings should be a max. of 10 V.

NOTE When attaching the DC cables using a strain-relief device, make sure that no kinks form in the connected DC cables. Otherwise, you may no longer be able to close the inverter.

Inserting string fuses into the Fronius IG TL

General

The steps described in the ‘Inserting string fuses into the Fronius IG TL’ section should only be carried out if the solar module manufacturer requires the use of string fuses for operation.

Selecting string fuses

If the solar module manufacturer requires the use of string fuses for operation:
Select string fuses according to the information from the solar module manufacturer or as per the ‘Criteria for the proper selection of string fuses’ section:- max. 20 A per fuse holder

- max. 6 DC inputs
- max. 11 A per measuring channel if solar module string monitoring is activated and being used
- max. 20 A of total input current
- Fuse dimensions: diameter 10.3 x 35 - 38 mm

Important

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

Safety

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

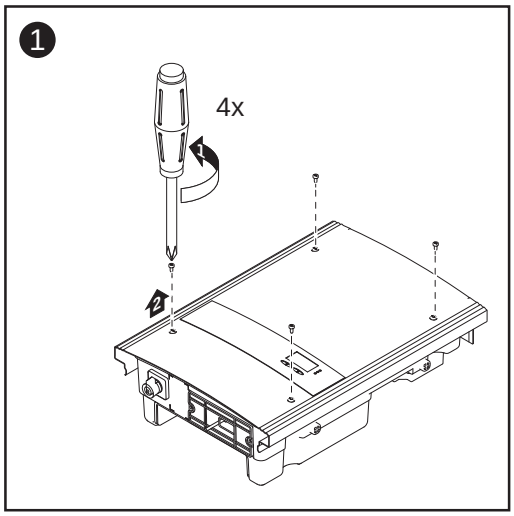
- The DC main switch is only used to switch off power to the power stage set. When the DC main switch is turned off, the connection area is still energized.
- Only licensed electricians should access the connection area.
- All maintenance and service work should only be carried out when the power stage set has been disconnected from the connection area.
- Maintenance and service work on the inverter power stage set should only be carried out by Fronius-trained personnel.

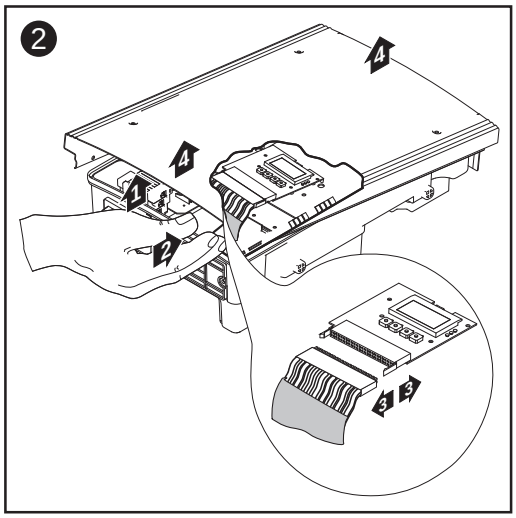
WARNING! An electrical shock can be fatal. Danger from residual voltage from capacitors.
You must wait until the capacitors have discharged. Discharge takes 3 minutes.

Inserting string fuses into the Fronius IG TL

Important If you add string fuses at a later date, follow all safety information.

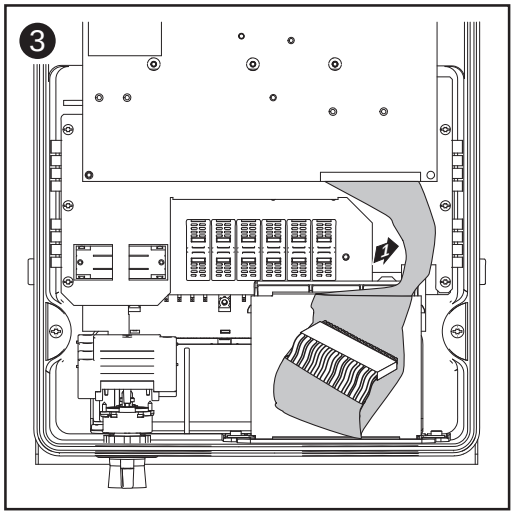
CAUTION! If screws are not tightened correctly, there is a danger of damage resulting from water getting into the device. The housing cover screws help to seal the power stage set and must not be replaced by different screws.

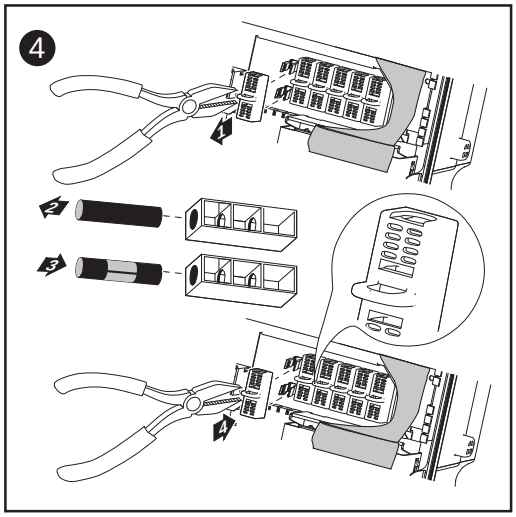




- *Carefully lift up the housing cover on the bottom of the power stage set*
- *Reach into the opening*
- *Disconnect the ribbon cable from the display PC board*

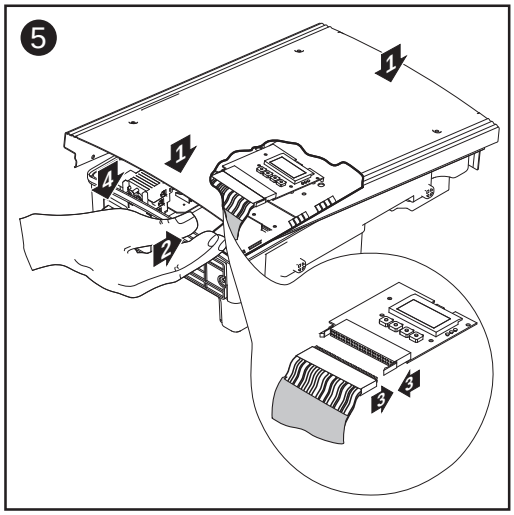
Inserting string fuses into the Fronius IG TL
(continued)

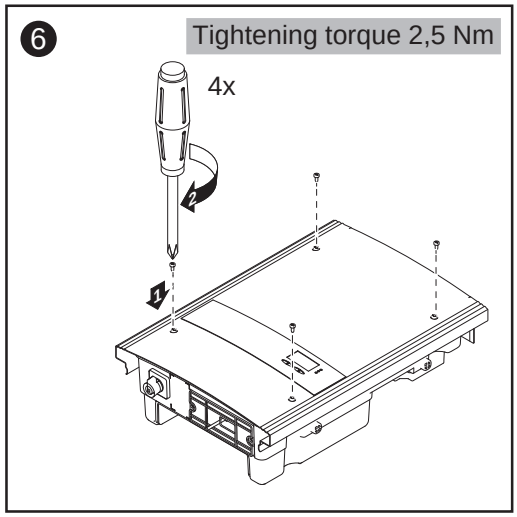




NOTE

- Use pliers to insert fuses with a fuse cover into the respective fuse holder
- To prevent the fuse from falling out, only insert the fuse cover into the fuse holder with the opening upright.
- Do not operate the inverter without fuse covers





- *Place the housing cover at an angle on the power stage set so that there is an opening at the bottom of the power stage set*
- *Reach into the opening*
- *Connect the ribbon cable to the display PC board*

Important Check the polarity of solar module strings.

Criteria for the proper selection of string fuses

General

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

Criteria for the proper selection of string fuses

The following criteria must be fulfilled for each solar module string when using fuse protection:

- $I_N > 1.5 \times I_{SC}$
- $I_N < 2.00 \times I_{SC}$
- U_N >/= 850 V DC
- Fuse dimensions: Diameter 10.3 x 35 - 38 mm

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

Effects of using underrated fuses

In underrated fuses, the nominal current value is less than the short circuit current of the solar module.
Effect:
The fuse may trip in intensive lighting conditions.

Fuse recommendations

NOTE Only select fuses suitable for a voltage of 850 V DC.

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

- Cooper Bussmann PV fuses

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

Application example

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

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

The fuse that should be selected according to the ‘Fuses’ table: PV-10A10F with 10.0 A and nominal voltage 1000 V DC.

Fuses

Nominal current value	Fuse	Nominal current value	Fuse
1.0 A	PV-1A10F	6.0 A	PV-6A10F
2.0 A	PV-2A10F	8.0 A	PV-8A10F
3.0 A	PV-3A10F	10.0 A	PV-10A10F
4.0 A	PV-4A10F	12.0 A	PV-12A10F
5.0 A	PV-5A10F	15.0 A	PV-15A10F

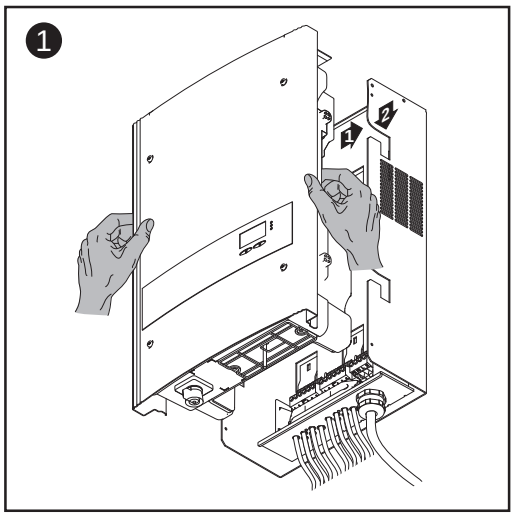
‘Fuses’ table: Excerpt of suitable fuses, e.g., Cooper Bussmann fuses

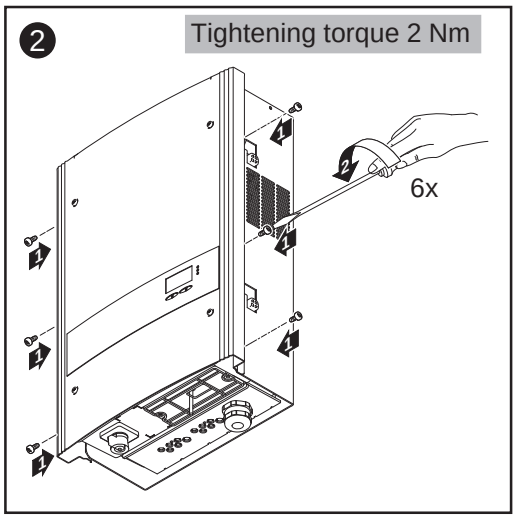
Clipping power stage sets onto the wall bracket

Clipping power stage sets onto the wall bracket

The side areas of the housing cover are designed to function as carrying grips and/or handles.

CAUTION! An inadequate grounding conductor connection can cause serious injuries to persons and damage to (or loss of) property. The housing screws 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.





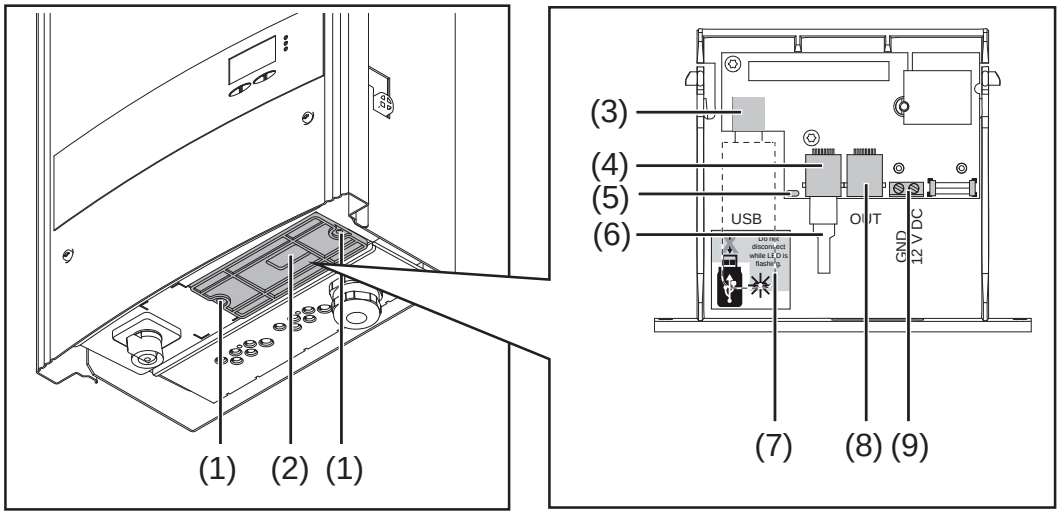
Data communication and Solar Net

Data communication rack

The inverter is equipped with a rack for data communication devices on the bottom of the unit.
The rack can be pulled out after removing the 2 screws, making the data communication connections accessible.

Important When closing the data communication rack make sure that both screws have been reattached in order to securely seal the inverter.

Data communication connections



Data communication rack with connections

Item	Description
(1)	Screws for fixing the data communication rack
(2)	Sealing insert for data communication cable
(3)	USB A socket For connecting a USB stick with a max. size of l x w x h = 80 x 33 x 20 mm The USB stick can act as a datalogger for an inverter. The USB stick is not part of the scope of supply for the inverter.
(4)	Solar Net IN connection 'Fronius Solar Net' input for connecting other DATCOM components (e.g., inverters, sensor cards)
(5)	'Data transfer' LED Flashes when logging data are being recorded

Data communication connections (continued)

Item	Description
(6)	Termination plug When networking several DATCOM components, a termination plug must be placed on the IN or OUT connection on the first and last DATCOM components (see example on the next page). The termination plug is not part of the scope of supply for the inverter.
(7)	Safety information for removing a USB stick
(8)	Solar Net OUT connection 'Fronius Solar Net' output for connecting other DATCOM components (e.g., inverters, sensor box)
(9)	12 V message output (normally-open contact) Used to connect a finely stranded conductor with a max. 1.5 mm² cross section for controlling common 12 V signaling systems such as alarm horns, indicator lamps or installation relays; 12 V (+ 0 V / - 2 V / 300 mA)

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 that 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.

Different system upgrades are automatically recognized by Solar Net.

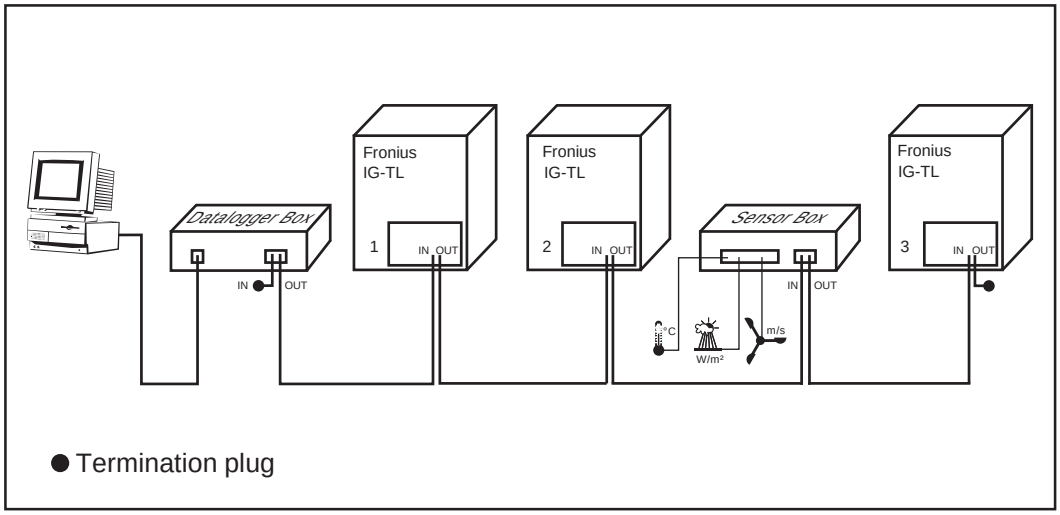
In order to distinguish among several identical system upgrades, each one must be assigned a unique number.

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.'

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

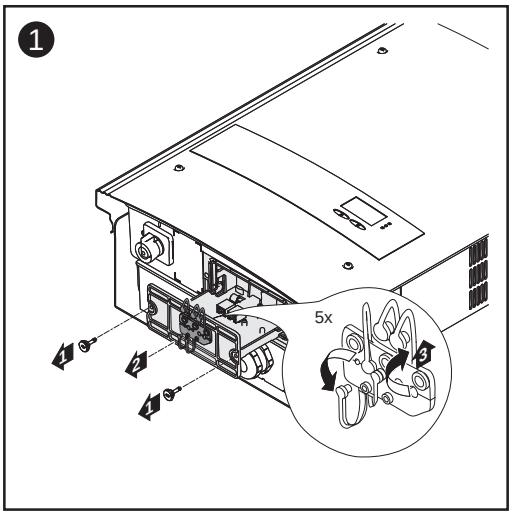
Logging and archiving data from the inverter and sensor using a Fronius Datalogger Box and Fronius Sensor Box:

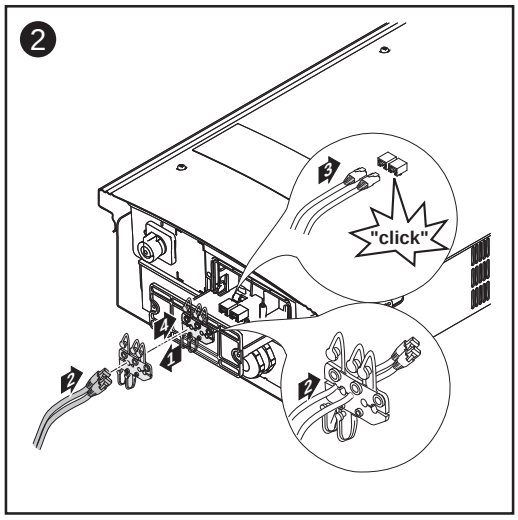


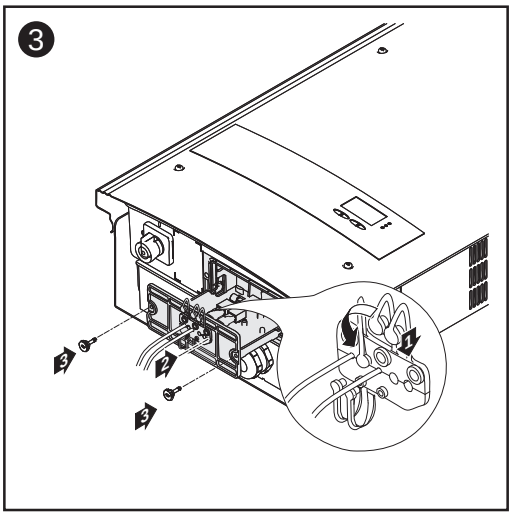
Data network with 3 inverters, one Datalogger Box and one Sensor Box

External communication (Solar Net) takes place in the inverter via the data communication rack. The data communication rack is equipped with two RS485 interfaces - an input and an output. RJ45 plug connectors are used to establish the connection.

Connecting data communication cables to inverters







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

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

USB stick as datalogger and for updating inverter software

USB stick as datalogger

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

Logging data saved to the USB stick can at any time
- be imported into Fronius Solar.access via the included FLD file
- be viewed directly in third-party applications (e.g., Microsoft® Excel) via the included CSV file Older Excel versions (up to Excel 2007) have a row limit of 65536.

Data on the USB stick

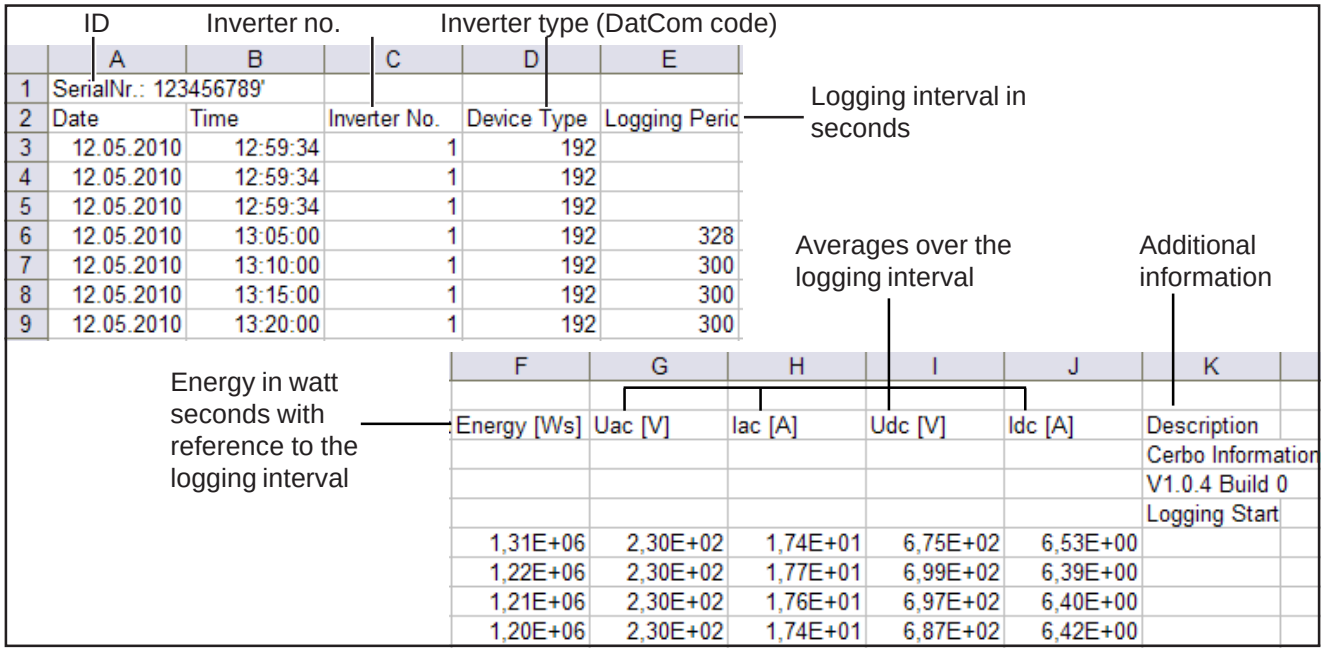
If the USB stick is used as a datalogger, three files are automatically created:

- System file *.sys: This file saves information from the inverter that is irrelevant to the customer. The file must not be deleted individually. Only delete all files together (sys, fld, csv).

- Log file TLxxx_yy.fld (xxx = IG number, yy = serial 2-digit number): Log file for reading out data in Fronius Solar.access.

- Log file TLxxx_yy.csv (xxx = IG number, yy = serial 2-digit number): Log file for reading out data in a spreadsheet program (e.g., Microsoft® Excel)

  Structure of the CSV file:



	A	B	C	D	E
1	SerialNr.: 123456789'				
2	Date	Time	Inverter No.	Device Type	Logging Peric
3	12.05.2010	12:59:34	1	192	
4	12.05.2010	12:59:34	1	192	
5	12.05.2010	12:59:34	1	192	
6	12.05.2010	13:05:00	1	192	328
7	12.05.2010	13:10:00	1	192	300
8	12.05.2010	13:15:00	1	192	300
9	12.05.2010	13:20:00	1	192	300

F	G	H	I	J	K
Energy [Ws]	Uac [V]	Iac [A]	Udc [V]	Idc [A]	Description
					Cerbo Information
					V1.0.4 Build 0
					Logging Start
1,31E+06	2,30E+02	1,74E+01	6,75E+02	6,53E+00	
1,22E+06	2,30E+02	1,77E+01	6,99E+02	6,39E+00	
1,21E+06	2,30E+02	1,76E+01	6,97E+02	6,40E+00	
1,20E+06	2,30E+02	1,74E+01	6,87E+02	6,42E+00	

Data amount and memory capacity

One USB stick with a memory capacity of 128 MB, for example, can record logging data at a logging interval of 5 minutes for approx. 7 years.

Important Make regular backups to avoid a loss of data!

CSV file
CSV files can store only 65536 rows (data records) (up to Microsoft® Excel version 2007, afterwards no limit). At a logging interval of 5 minutes, the 65536 rows are written within approx. 7 months (CSV data size of approx. 8 MB). To avoid a loss of data, the CSV file should be backed up to a PC within these 7 months and deleted from the USB stick. If the logging interval is set longer, this time frame is extended accordingly.

FLD file
The FLD file should not be larger than 16 MB. At a logging interval of 5 minutes, this corresponds to a storage duration of approx. 7 years.
If the file exceeds this 16 MB limit, it should be backed up to a PC and all data should be deleted from the USB stick.

After you have backed up the data and removed it from the USB stick, the stick should be immediately reinserted so that it can record logging data; no further steps are required.

NOTE A full USB stick can lead to the loss of data or the overwriting of data.
When inserting the USB stick, make sure that it has a sufficient memory capacity.

Buffer memory

If the USB stick is removed (e.g., to back up data), the logging data are written to a buffer memory in the inverter. As soon as the USB stick is reinserted, the data are automatically transferred from the buffer memory to the USB stick.

The buffer memory can store a maximum of 24 logging points. Data are logged only during inverter operation (power greater than 0 W). The following time spans for storing data result for the different logging intervals:

Logging interval [min]	Time span [min]
5	120
10	240
15	360
20	480
30	720

Buffer memory
(continued)

When the buffer memory is full, the oldest data in the buffer memory are written over with the new data.

Important The buffer memory requires a constant power supply. If there is an AC power outage during operation, all data in the buffer memory are lost. The automatic night switch-off must be deactivated so that the data are not lost at night (set Night Mode to ON - see chapter „Setting and displaying menu items," section „Displaying and setting parameters in the 'DATCOM' menu item")

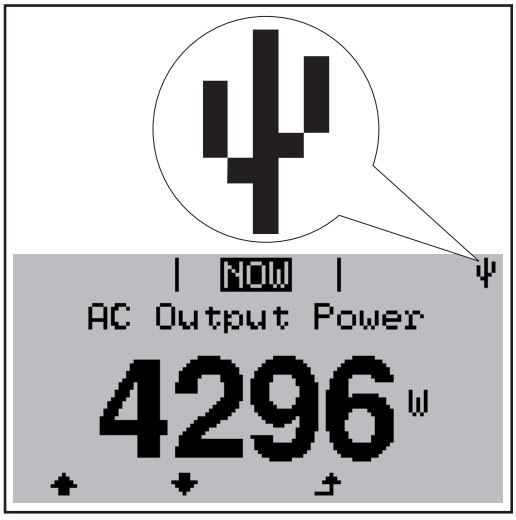
Suitable USB sticks

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

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

The inverter supports USB sticks using the following file systems:
- FAT12
- FAT16
- FAT32

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



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

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

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

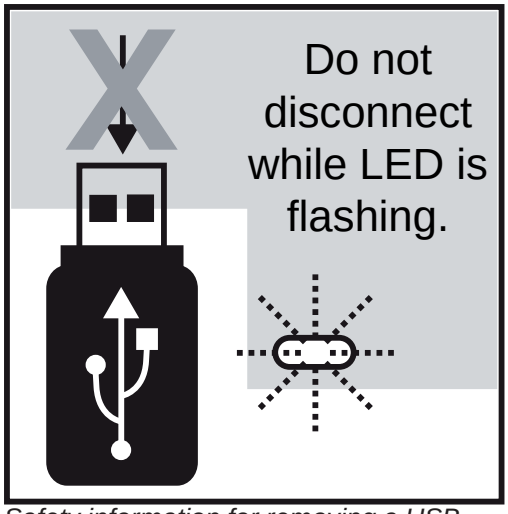
NOTE Please be aware that in outdoor applications the USB stick may only function in a limited temperature range. Make sure for outdoor applications that the USB stick will also function at low temperatures, for example.

USB stick for updating inverter software

End customers can also use the USB stick to update the inverter software: the update file is first saved to the USB stick and then transferred to the inverter.
For more information about updating inverter software using a USB stick, please see the section ‘Setting and displaying menu items’ in the chapter ‘Operation.’

The inverter software can also be updated through a Datalogger or Smart-Converter (connection through PC) using a special Fronius update program (see „Fronius Solar.update IG TL“ operating instructions“).

Removing the USB stick



Safety information for removing a USB stick

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

- only via the Setup menu, ‘USB / Disconnect Device’ menu item
- when the ‘Data Transfer’ LED is no longer flashing or lit

First startup

Factory preset configuration

The inverter has been pre-configured at the factory. The language and the time must be set during the first startup.

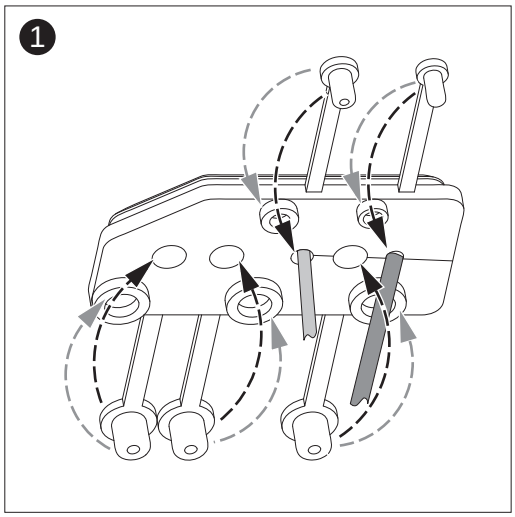
To change your inverter settings, please see section ‘The Setup menu’ in these instructions.

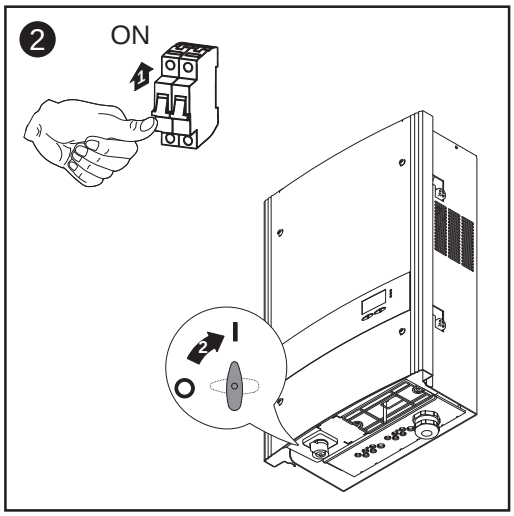
First startup

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

NOTE To ensure the degree of protection of the inverter:

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

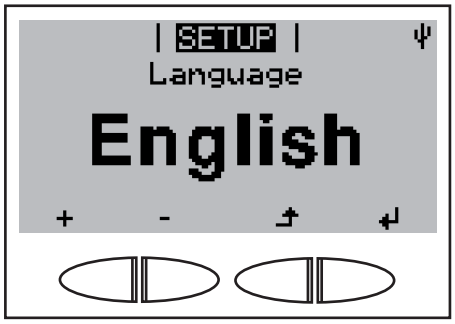




- As soon as the solar modules produce sufficient power, the Startup LED lights up orange. The inverter switches to the Startup phase. The orange LED indicates that the feed-in mode of the inverter will begin shortly.
- After the automatic inverter start, the Operating Status LED lights up green.
- Provided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

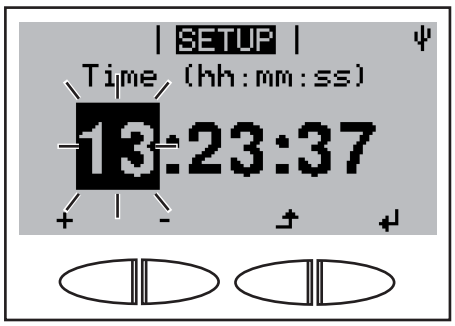
First startup
(continued)

- A display appears for setting the language:



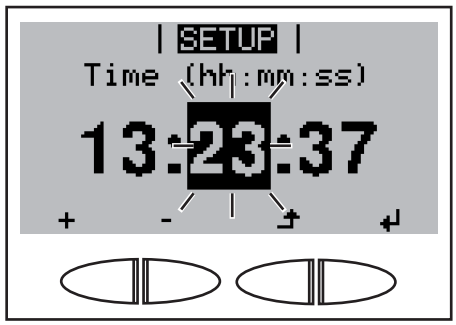
3. Use the ‘Up’ and ‘Down’ keys to select the desired language
4. Press the ‘Enter’ key to apply the language

- Finally, the time and date must still be set:



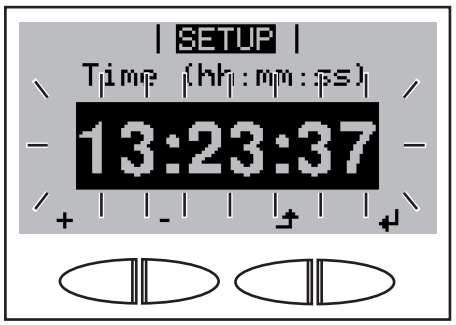
The **time** is shown (HH:MM:SS, 24 h display), the digits for the hour flash.

5. Use the ‘Up’ and ‘Down’ keys to select a value for the hour
6. Press the ‘Enter’ key



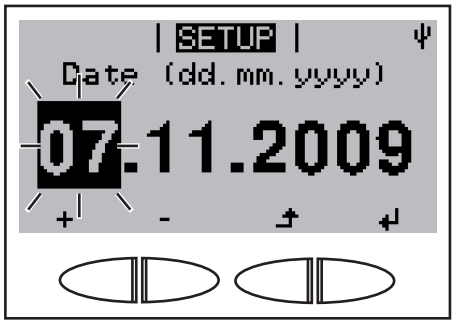
The digits for the minutes flash.

7. Repeat steps 5 and 6 for the minutes and seconds until ...



The set time flashes.

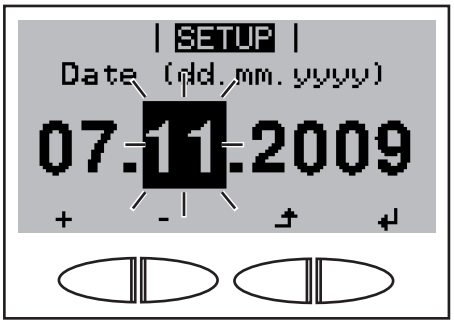
8. Press the ‘Enter’ key



The time is applied. The **date** is shown. (DD.MM.YYYY), the digits for the day flash.

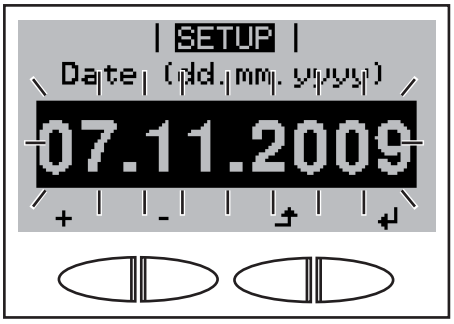
9. Use the ‘Up’ and ‘Down’ keys to select a value for the day
10. Press the ‘Enter’ key

Start-up operation
(continued)



The digits for the month flash.

11. Repeat steps 9 and 10 for the month and the last 2 digits of the year until ...



The set date then flashes.

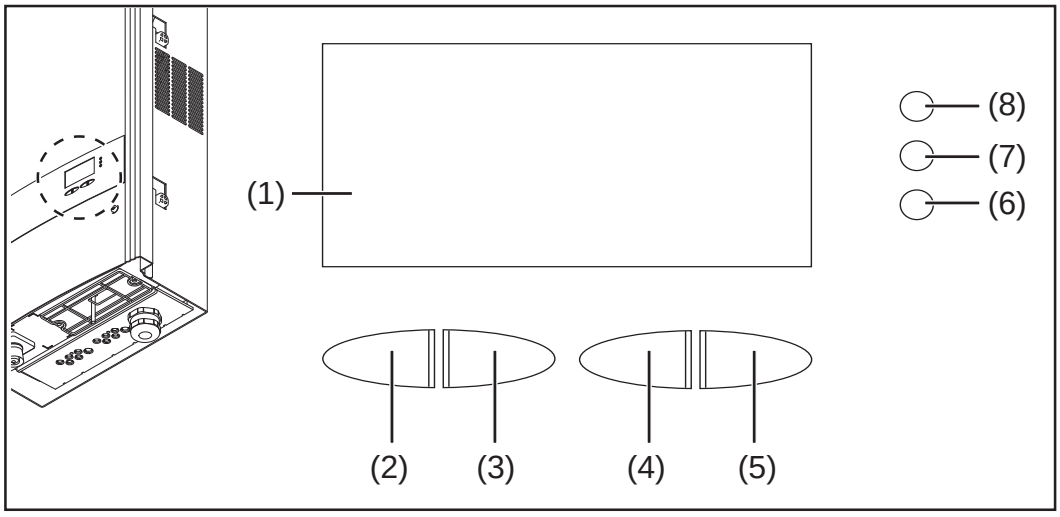
↵ 12. Press the ‘Enter’ key

If the language and time settings are skipped with the Back key and no settings are made in the Setup, these two queries will reappear again the next time the inverter starts.

Operation

Keys and symbols

Keys and symbols



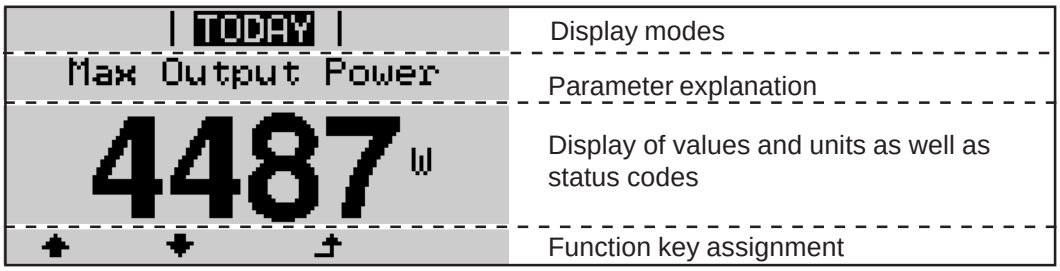
Keys and symbols on the Fronius IG TL

Item	Description
(1)	Display for displaying values, settings and menus
	Function keys - each has a different function depending on the selection:
(2)	'Left/Up' key for navigating left and up
(3)	'Down/Right' key for navigating down and right
(4)	'Menu / Back' key for switching to the menu level for exiting the Setup menu
(5)	'Enter' key for confirming a selection
	Control and Status LEDs
(6)	Operating Status LED (green) for displaying the operating status
(7)	Startup LED (orange) indicates whether or not the inverter is in the start phase or in standby mode
(8)	General Status LED (red) indicates when a status message is shown on the display

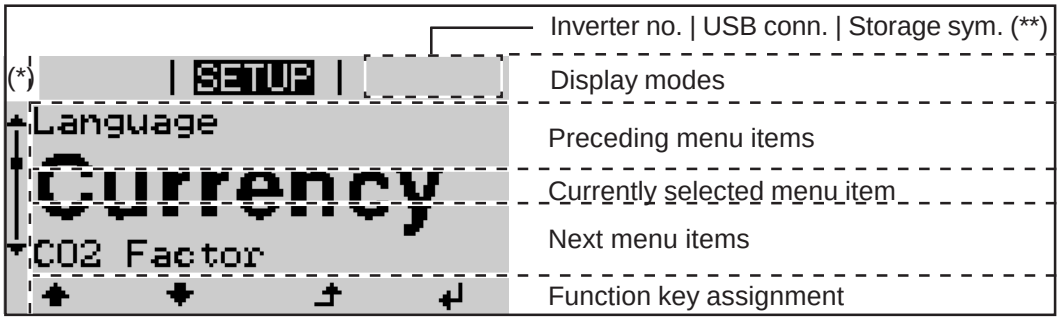
Display

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

Important The inverter display is not a calibrated measuring instrument. A slight deviation of a few percentage points from the utility company meter is intrinsic to the system. A calibrated meter is required to make calculations for the utility company.



Display area, display mode



Display area, setup mode

(*) Scroll bars
(**) Inverter no. = inverter DATCOM number, USB connection - appears if a USB stick was connected, storage symbol - appears briefly when set values are stored

Symbols for function key functions

The following symbols are shown on the display for function key assignment:

Navigation: Left

Navigation: Up

Increase value

Navigation: Right

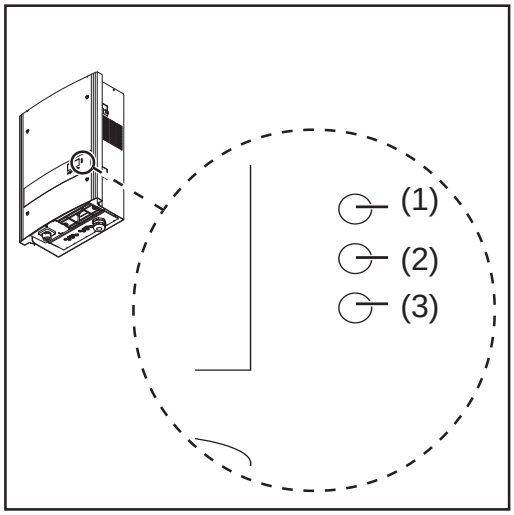
Navigation: Down

Reduce value

Symbols for function key functions (continued)

Menu / Back	
Enter	

Control and Status LEDs



(1) General Status LED (red)

(2) Startup LED (orange)

(3) Operating Status LED (green)

LED	Color	Action	Explanation
(1)	red	lights up	General status: the respective status code is shown on the screen
			Interruption of feed operation
			During troubleshooting (the inverter is waiting to be reset or for an error to be corrected)
(2)	orange	lights up	The inverter will enter the automatic startup or self test phase as soon as the solar modules yield sufficient power output after sunrise
			The inverter has been set to standby operation in the Setup menu (manual shutoff of operation)
			The inverter software is being updated
(3)	green	lights up	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 equipment.

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 feeding energy into the grid

Startup phase

The inverter carries out the following tests and checks after being turned on automatically:

a) Self-test of essential inverter components - the inverter goes through a virtual checklist

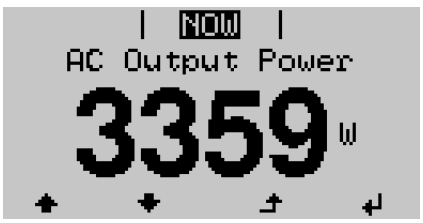
b) Synchronization with grid

c) Startup test
Before the inverter starts feeding energy into the grid, the conditions of the grid are tested in accordance with local regulations.
The startup test can take anything from just a few seconds up to several minutes depending on national regulations.

During the startup phase
- The Operating Status LED lights up orange
- 'wait ...' appears on the display and the component currently being tested is displayed, e.g.:

Operation of feeding energy into the grid

- Once the tests have been completed the inverter starts feeding power into the grid
- Once connected to the grid, the inverter checks the relay function without power: within 1 second, several relay switching operations can be heard.
- The display shows the present power feeding into the grid, e.g.:



- 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.

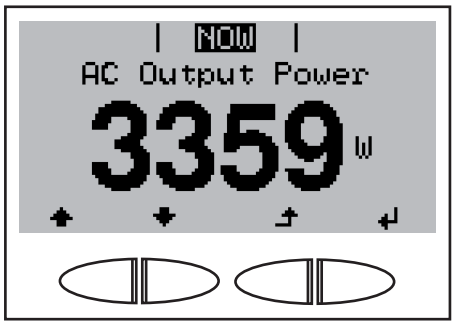
The Setup menu also offers a choice between a permanently lit or permanently dark display.

Automatic deactivation of display illumination / Switching to the 'NOW' display mode

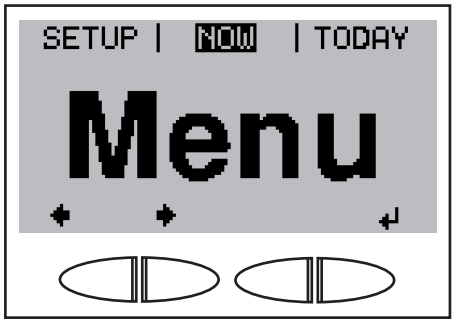
If no key is pressed for 2 minutes,

- the display illumination turns off automatically and the inverter switches to the 'NOW' display mode (if the display illumination is set to automatic).
  The inverter switches to the 'NOW' display mode from anywhere within the display modes or the Setup menu except for the 'Standby' menu item.
- the current output power is displayed

Accessing the menu level



1. Press the 'Menu' key



Menu level

'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

Display modes

Display modes

The following display modes are available for the inverter:

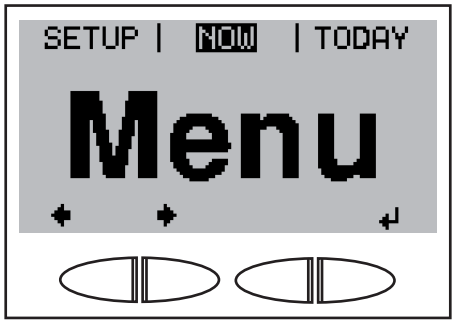
‘NOW’ display mode shows current data

‘TODAY’ display mode shows data for the current day

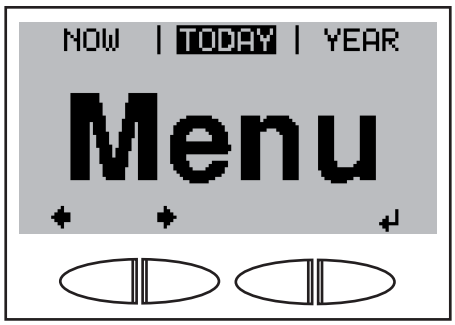
‘YEAR’ display mode shows data for the current calendar year

‘TOTAL’ display mode shows data since your inverter first started operating

Selecting a display mode

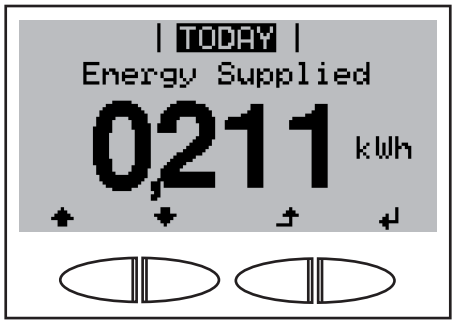


1. Access the menu level
2. Use the ‘left’ or ‘right’ keys to select your preferred display mode



Example: ‘TODAY’ display mode

3. Press the ‘Enter’ key



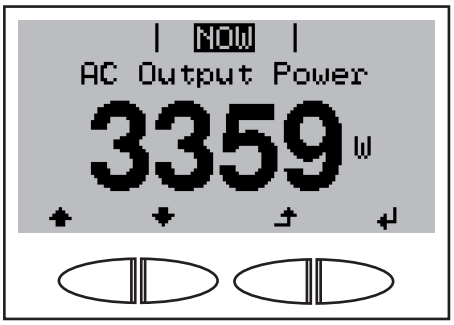
The first display value of the selected display mode is shown.

Overview of display values

Display mode	Unit	Optional	Display value
‘NOW’	W	-	Output Power
			Daily characteristic curve
	V	-	AC Grid Voltage
	A	-	AC Output Current
	Hz	-	AC Grid Frequency
	V	-	PV Array Voltage
	A	-	PV Array Current
			String Control Status
	HH:MM SS	-	Time
	DD.MM YY	-	Date
‘TODAY’	kWh / MWh	-	Energy Supplied
			Daily characteristic (‘Today’) curve
	Currency	-	Yield
	g / kg	-	CO_2 Savings
	W	-	Max Output Power
‘YEAR’ ‘TOTAL’	V	-	Max Grid Voltage
	V	-	Max PV Array Voltage
	HH:MM	-	Operating Hours

Display values in the ‘NOW’ display mode

Selecting the ‘NOW’ display mode



First display value in the ‘NOW’ display mode

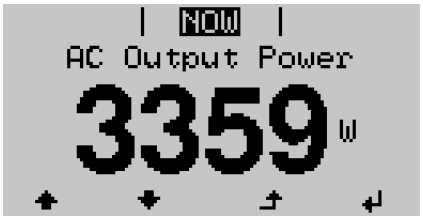
1. Selecting the ‘NOW’ display mode

   The first display value appears in the ‘NOW’ display mode

2. Use the ‘Down’ key to scroll to the next display value

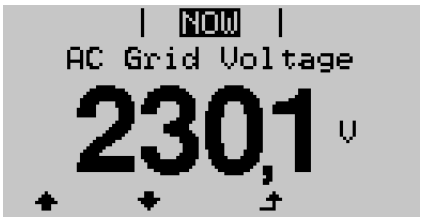
Scroll back using the ‘Up’ key

Display values in the ‘NOW’ display mode

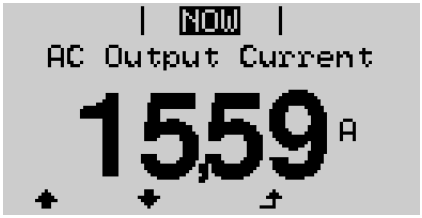


Output Power
power supplied to grid at the particular moment (watts)

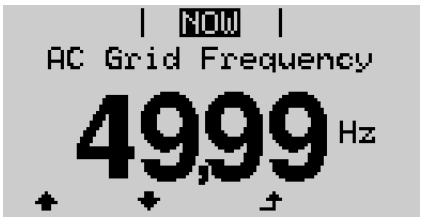
Press the ‘Enter’ key to display the daily characteristic curve (*)



AC Grid Voltage
(volts)



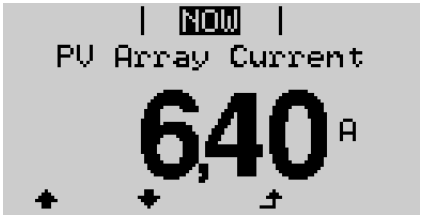
AC Output Current
current supplied to the grid at the particular moment (amperes)



AC Grid Frequency
(hertz)

PV Array Voltage
voltage of the solar array at the moment of data display (volts)

Display values in the ‘NOW’ display mode (continued)



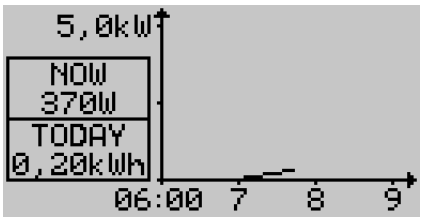
PV Array Current
Current supplied by solar modules at the moment of data display (amperes)

Press the ‘Enter’ key to arrive at the ‘String Control Status’ menu (**)

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

Date
When the date on the inverter or a system upgrade is changed, this changes the date on all devices connected via Solar Net.

(*)



Daily characteristic curve
graphically represents the course of the output power during the day. The time axis is automatically scaled. If no output power is supplied, no points are logged.

Press the ‘Back’ key to close the display

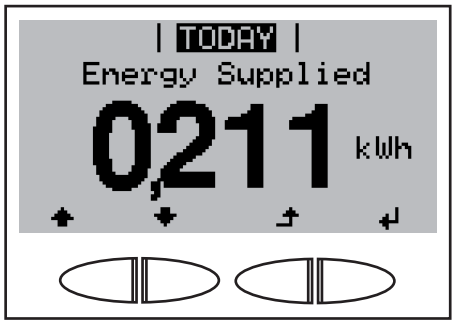
(**)

String Control Status
The PV array current of measuring channel 1 and measuring channel 2 produced during the day and the present deviation of the measuring channels from each other are displayed.

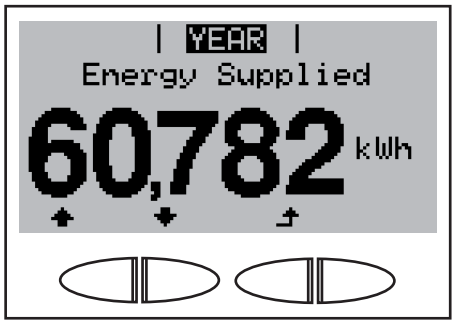
Press the ‘Back’ key to close the display

Display values in the ‘TODAY’ / ‘YEAR’ / ‘TOTAL’ display modes

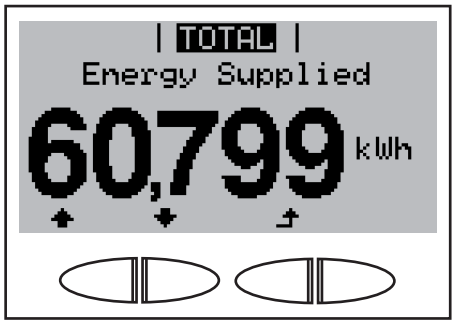
Selecting the ‘TODAY’ / ‘YEAR’ / ‘TOTAL’ display mode



First display value in the ‘TODAY’ display mode



First display value in the ‘YEAR’ display mode



First display value in the ‘TOTAL’ display mode

1. Selecting the ‘TODAY,’ ‘YEAR,’ or ‘TOTAL’ display modes

   The first display value appears in the selected display mode

2. Use the ‘Down’ key to scroll to the next display value

Scroll back using the ‘Up’ key

Display values in the ‘TODAY’ / ‘YEAR’ / ‘TOTAL’ display modes

Energy Supplied
energy supplied during the monitored period (kWh / MWh)
Press the ‘Enter’ key to display the daily characteristic curve (*) (only in the ‘Today’ menu)

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.

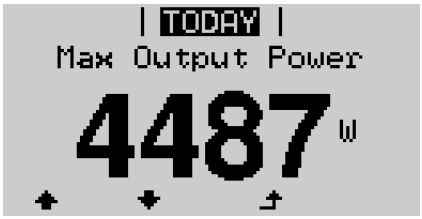
Yield
money earned during the monitored period (set currency and price per kWh in Setup menu)

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

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

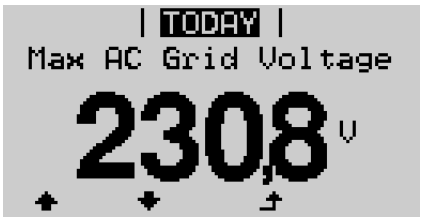
CO_2 Savings
CO_2 emissions saved during the monitored period
(g / kg)

The CO_2 meter gives an indication of CO_2 emissions that would be released during the generation of the same amount of electricity depending on the available power plant.
This is preset to 0.59 kg/kWh at the factory (source: DGS - German Society for Solar Energy).



Max Output Power
highest output power during observation period (watts)

Display values in the ‘TODAY’ / ‘YEAR’ / ‘TOTAL’ display modes (continued)



Max AC Grid Voltage
highest reading of grid voltage (V) during observation period

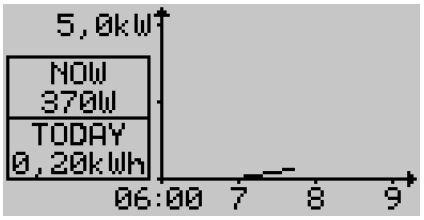
Max PV Array Voltage
highest reading of solar module voltage (V) during the observation period

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

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

Important The time must be set correctly for the proper display of day and year values.

(*)



Daily characteristic curve (only in the ‘Today’ menu)
graphically represents the course of the output power during the day. The time axis is automatically scaled. If no output power is supplied, no points are logged.

Press the ‘Back’ key to close the display

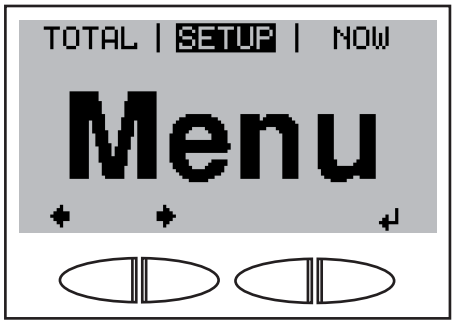
The Setup menu

Default settings

The inverter is designed for fully automatic operation. No manual control is necessary for feeding the power it generates into the grid.

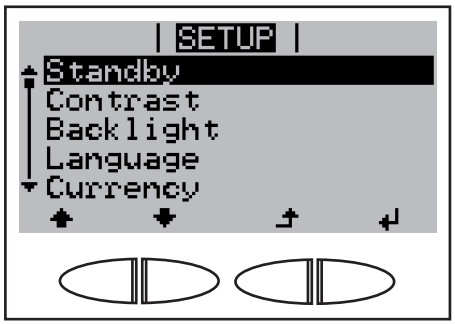
The Setup menu enables you to easily customize the inverter's preset parameters to your needs.

Accessing the Setup menu



'SETUP' mode selected in the menu level

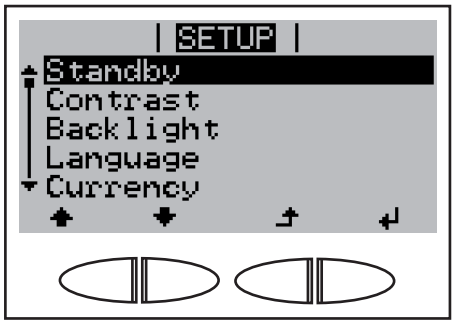
1. Switch to the menu level (press the 'Menu' key)
2. Select the 'SETUP' mode using the 'Left' or 'Right' keys
3. Press the 'Enter' key



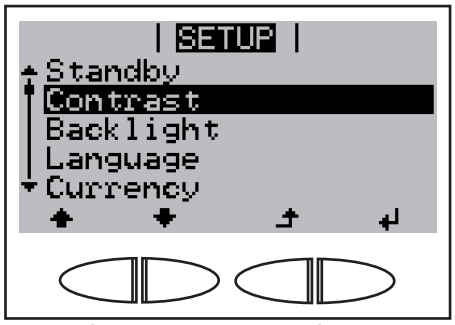
'Standby' menu item

The Setup menu's first menu item 'Standby' is shown.

Scrolling through menu items



Example: 'Standby' menu item



Example: 'Contrast' menu item

1. Access the Setup menu
2. Scroll through the available menu items using the 'Up' and 'Down' keys

Menu items in the Setup menu

Standby Manual activation/deactivation of the standby mode

Unit	-
Setting range	Enter
Factory setting	‘Standby’ deactivated

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

Contrast Contrast setting on LCD display

Unit	-
Setting range	0 - 10
Factory setting	5

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

Backlight Pre-setting of display illumination.

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

AUTO:	The display illumination is activated by pressing any key. If no key is pressed for 2 minutes, the display backlight goes out.
ON:	The display illumination will be permanently on when the inverter is active.
OFF:	The display illumination will be permanently off.

Important The ‘Backlight’ menu item only applies to the display background illumination and key illumination.

Language

Setting of the display language

Unit:	-
Display range	German, English, French, Dutch, Italian, Spanish, Czech, Slovak
Factory setting	(depends on the country setup)

Currency

Setting of currency and rate for invoicing the energy supplied

Unit	-
Display range	Currency / Feed-in Tariff
Factory setting	(depends on the country setup)

CO_2 Factor

Setting of CO_2 reduction factor

Unit	kg/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	Energy Meter Offset / Energy Meter Unit / Meter Calibration

Energy meter offset

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

Unit	Wh
Setting range	5-digit
Factory setting	0

Energy meter unit

Assignment of the SI prefix (k..., M...)

Unit	-
Setting range	k / M
Factory setting	-

Meter calibration

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

Unit	%
Setting range	-5,0 - +5,0
Factory setting	0

Inverter Number

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

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

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

DATCOM

Data communication control, signal activation, signal settings, signal test, DATCOM night mode, protocol settings

Setting range	State / Signal Mode / Signal Test / Night Mode / Protocol Type

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

Signal mode
Controls the switching of the 12 V message output on the data communications rack.

Unit	-
Setting range	Permanent / ALL / ON / OFF
Factory setting	ALL

Permanent / ALL:	Switches the 12 V message output for continual and temporary service codes (e.g., brief interruption of power being fed into the grid, a service code occurring more than 50 x per day)
ON:	The 12 V message output is turned on constantly while power is being fed into the grid (e.g., for power supply)
OFF:	The 12 V message output is not turned on

Signal test
Function test to determine whether or not the 12 V message output turns on periodically

DATCOM (continued)

Night mode

DATCOM night mode; controls DATCOM and display operation at night or when there is not enough DC voltage available

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

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

ON: DATCOM operation is constant so long as DATCOM components are connected to Solar Net (even when Solar Net is interrupted). The inverter provides 12 V constantly to supply Solar Net with power.
The display is always active.

Important When the DATCOM night mode is ON or on AUTO with connected Solar Net components, the power consumption of the inverter is increased at night to 7.3 W.

OFF: No DATCOM operation at night, the inverter requires no AC power to supply Solar Net.
The display is deactivated at night.

Protocol type

Defines the communication protocol used to transmit data:

Unit	
Setting range	Solar Net / Interface
Factory setting	Solar Net

USB

Value settings when using a USB stick

Setting range: Disconnect Device / Update Software / Logging Interval

Disconnect device

To remove a USB stick from the USB A socket on the data communication rack without losing data.
The USB stick can be removed:

- When OK is display
- When the ‘Data Transfer’ LED is no longer flashing or lit

USB
(continued)

Update software

For updating inverter software using a USB stick.
For more information about software updates using a USB stick, please see the section ‘Setting and displaying menu items.’

Logging interval

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

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

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

String Monitor

For monitoring incoming solar modules strings

Functional principle:

- The incoming solar module strings are combined at 2 measuring channels.
- The 2 measuring channels record the total current of the respective connected solar module strings over the entire charging day.
- The average solar module string current is used for an effective comparison of the two measuring channel values.
- The average solar module string current is calculated from the channel measurement value divided by the number of solar module strings connected per channel.
- The difference of the two average values is calculated and displayed as a % with the smaller average value being deducted from the larger average value.
- A warning is shown on the display when
  a) The difference of the two average values is larger than the defined maximum deviation

     and

  b) The threshold value defined for the average solar module string current of a measuring channel is exceeded.

String Monitor (continued)

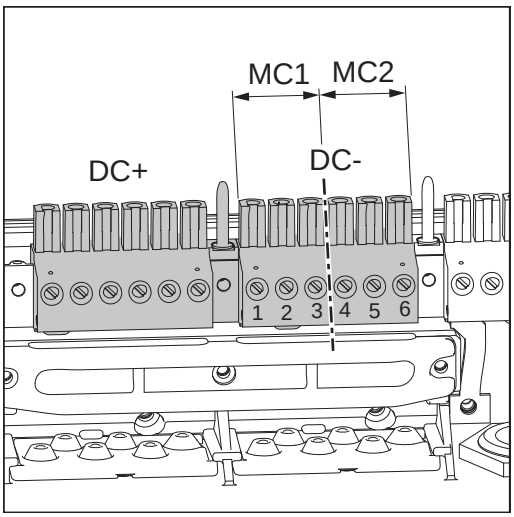
Setting range: Display: Status / Config Channel #1 / Config Channel #2 / max. Deviation / Threshold

Important The time must be set correctly in order for the solar module string monitoring function to work properly.

Status
Actual value display of the average solar module string current of measuring channel 1, measuring channel 2 and their present deviation

Config channel #1
Used to set the number of solar module strings connected to measuring channel 1 (MC1), Measuring channel 1 = DC- terminals 1 - 3

Config channel #2
Used to set the number of solar module strings connected to measuring channel 2 (MC2), Measuring channel 2 = DC- terminals 4 - 6



Unit	-
Setting range	0 - 99; 0 = No measuring channel monitoring
Factory setting	0

Max. deviation
Used to enter a % value for how large the difference between the two average values can be.

Unit	%
Setting range	5 - 99
Factory setting	20

Threshold
Used to enter a value in Ah for the average solar module string currents of the measuring channels that will trigger a warning on the display if it is exceeded.

Unit	Ah
Setting range	2 - 50
Factory setting	4

Device Info

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

Display range	Setup / UIL max / UIL min / ULL / FIL max / FIL min / LGMTi / LGMTr / DC mode / FIX / User / Group

Setup	Country setup
UIL max	Upper grid voltage value in V
UIL min	Lower grid voltage value in V
ULL	Grid voltage average value over 10 minutes in V
FIL max	Upper grid frequency value in Hz
FIL min	Lower grid frequency value in Hz
LGMTi	Startup time of the inverter in s
LGMTr	Restart time in s after a grid error
DC mode	DC operating mode
FIX	Voltage value in V for fixed voltage operation
User	Voltage value in V for MPP user operation
Group	Group for updating inverter software

Clock

Date and time setting

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

Important The correct setting of the time and date is required for:
- correct functioning of solar module string monitoring
- the proper display of day and year values, the daily characteristic curve
- a correct logging function with a set logging interval

State PS

Status display of the last error that occurred in the inverter can be displayed

Important Status codes 306 (Power low) and 307 (DC low) appear naturally every morning and evening due to low solar irradiance. These status codes are not the result of a fault.

Version

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

Unit	-
Display range	Display / Interface / Power Stage / EMI Filter
Factory setting	-

Setting and displaying menu items

General menu item settings

1. Access the Setup menu
2. Use the ‘Up’ and ‘Down’ keys to select the desired menu item
3. Press the ‘Enter’ key
4. Use the ‘Up’ and ‘Down’ keys to change the value of the menu item

To save the changed values:

5. Press the ‘Enter’ key
   - the changed values are saved in the menu item
   - the currently selected menu item is shown

To not save the changed values:

5. Press the ‘Back’ key
   - the changed values are not saved in the menu item
   - the currently selected menu item is shown

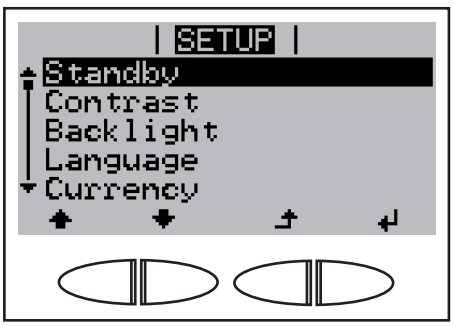
Exiting a menu item

1. To exit a menu item, press the ‘Back’ key

The menu level is displayed:

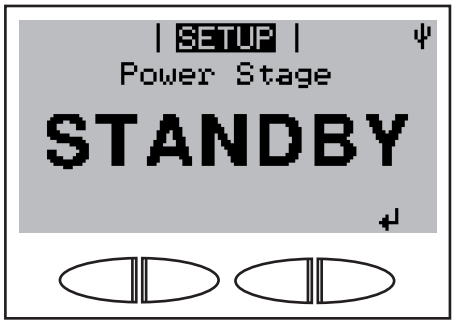
If no key is pressed for 2 minutes,
- the inverter switches to the ‘NOW’ display mode from anywhere within the Setup menu (exception: ‘Standby’ menu item)
- the display illumination turns off
- the current output power is displayed

Setting standby mode - Manual shutoff of feeding energy into the grid



1. Select the ‘Standby’ menu item
2. Press the ‘Enter’ key

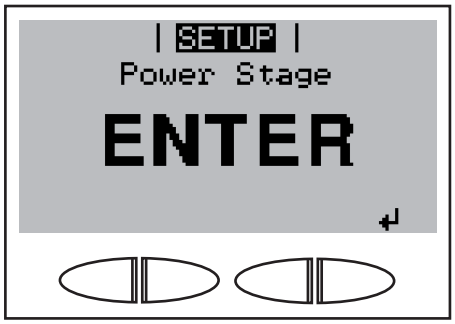
Setting stand-by mode - Manual shu-toff of feeding energy into the grid (continued)



The display switches between ...

'STANDBY'

and ...

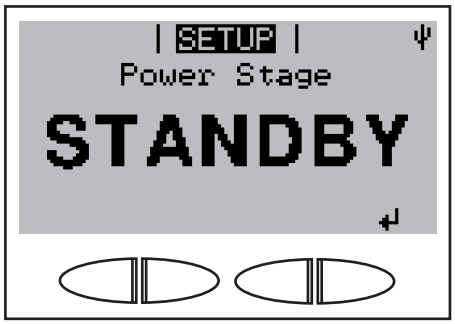


'ENTER'

The Standby mode is now activated (manual shutoff of feeding energy into the grid).

The Startup LED lights up orange.

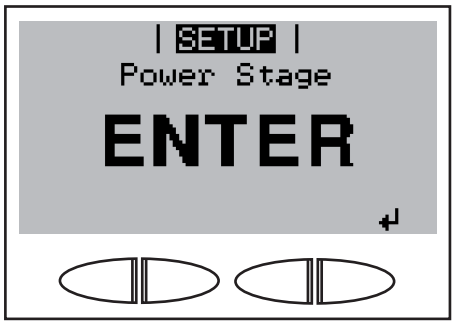
Restoring the grid feed



During standby operation the display switches between ...

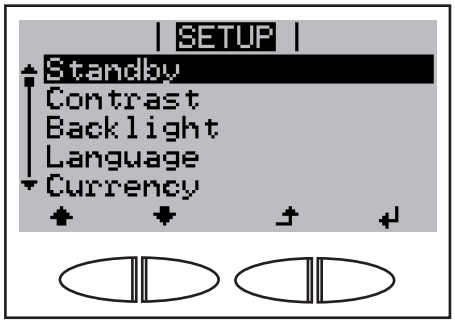
'STANDBY'

and ...



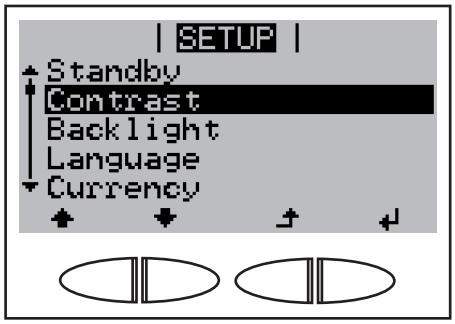
'ENTER'

1. Press 'Enter' to restore the grid feed

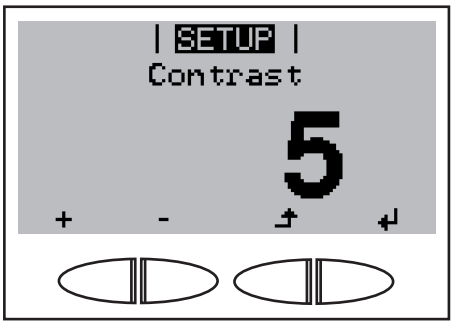


The 'Standby' menu item is displayed.
The inverter also switches to the Startup phase.
After the grid feed is restored, the Operation Status LED lights up green.

Setting the display contrast

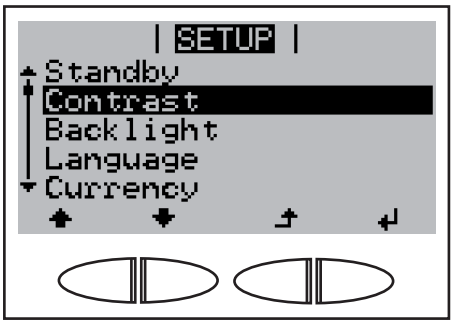


1. Select the ‘Contrast’ menu item
2. Press the ‘Enter’ key



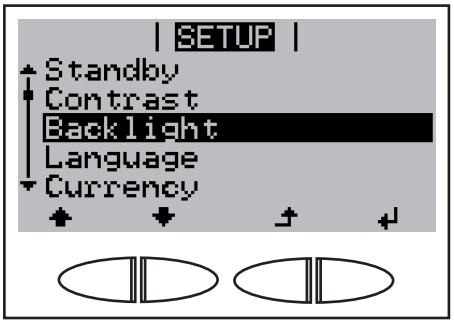
The present contrast setting is displayed.

3. Use the ‘Up’ and ‘Down’ keys to select the desired level of contrast
4. Press the ‘Enter’ key to accept the setting

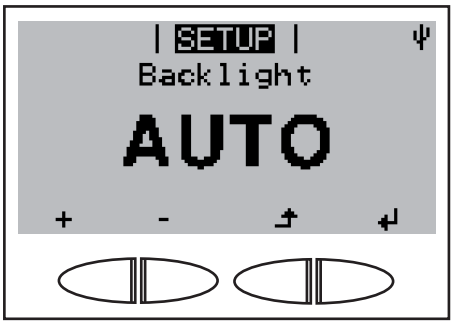


The set contrast is applied. The ‘Contrast’ menu item is displayed.

Setting the display illumination



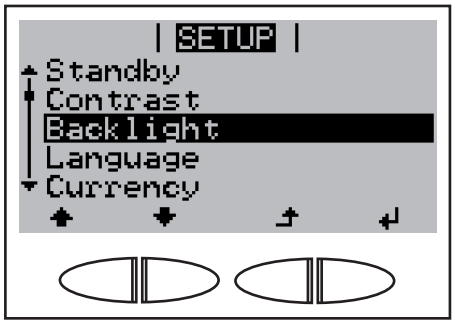
1. Select the ‘Backlight’ menu item
2. Press the ‘Enter’ key



The present display illumination setting is displayed.

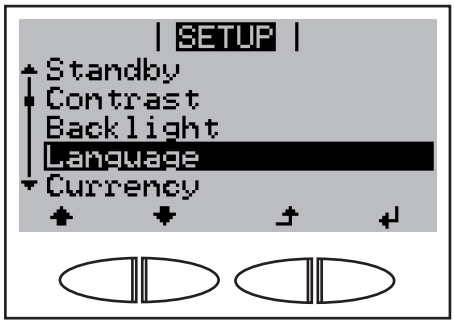
3. Use the ‘Up’ and ‘Down’ keys to select the desired setting for the display illumination
4. Press the ‘Enter’ key to accept the setting

Setting the display illumination (continued)

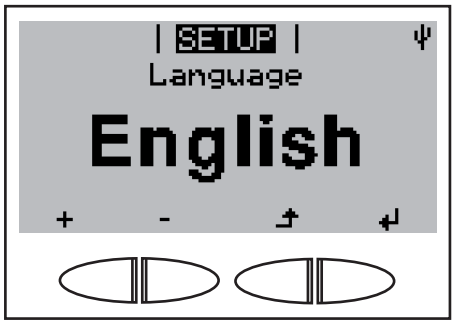


The display illumination setting is applied. The ‘Backlight’ menu item is displayed.

Setting the display language

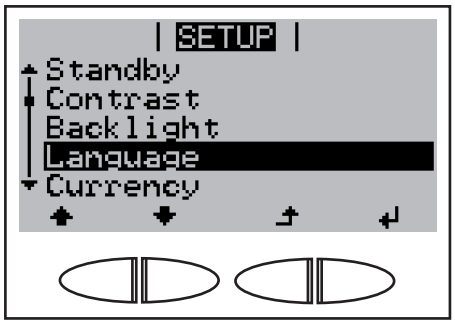


1. Select the ‘Language’ menu item
2. Press the ‘Enter’ key



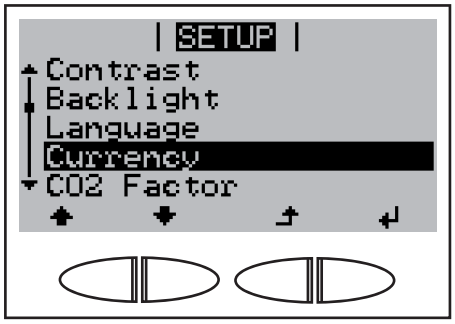
The respective setting is displayed depending on the country setup.

3. Use the ‘Up’ and ‘Down’ keys to select the desired language
4. Press the ‘Enter’ key to apply the language



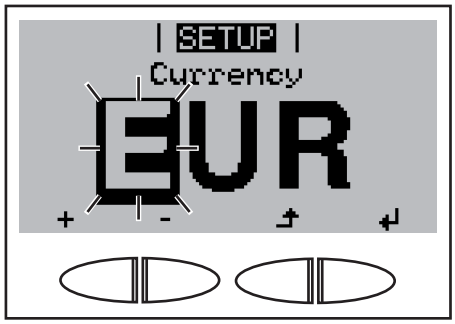
The language is applied. The ‘Language’ menu item is displayed in the selected language.

Setting the currency and feed-in tariff



1. Select the ‘Currency’ menu item
2. Press the ‘Enter’ key

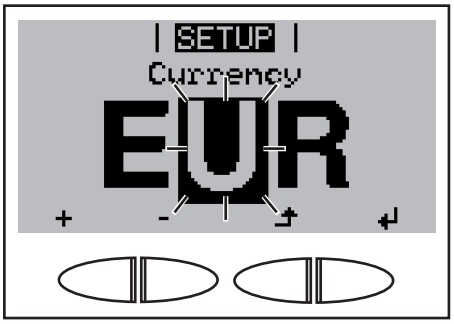
Setting the currency and feed-in tariff
(continued)



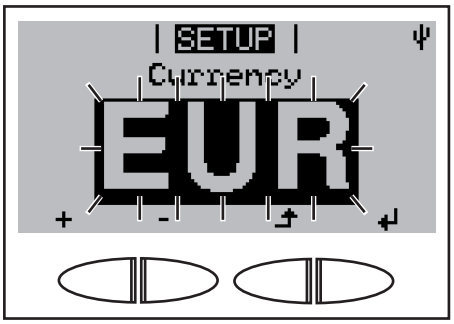
The currently set **currency** is shown
Factory setting = ‘EUR’
The first of 3 characters flashes.

+ − 3. Use the ‘Up’ and ‘Down’ keys to select a letter for the first character

↵ 4. Press the ‘Enter’ key
The second character flashes.

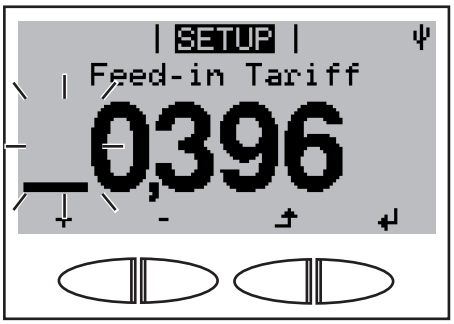


+ − 5. Repeat steps 3 and 4 for the second and third characters until ...



The set currency flashes.

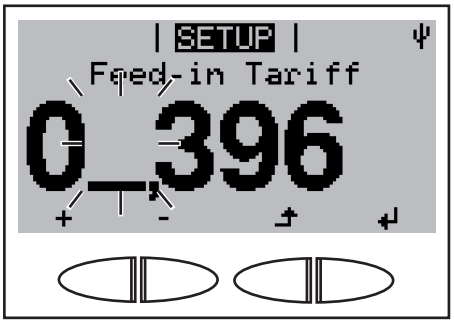
↵ 6. Press the ‘Enter’ key



The currency is applied. The currently set **feed-in tariff** is displayed in currency/kWh
Factory setting = 0.43 EUR / kWh
The first digit flashes.

+ − 7. Use the ‘Up’ and ‘Down’ keys to select a value for the first digit (e.g., 0)

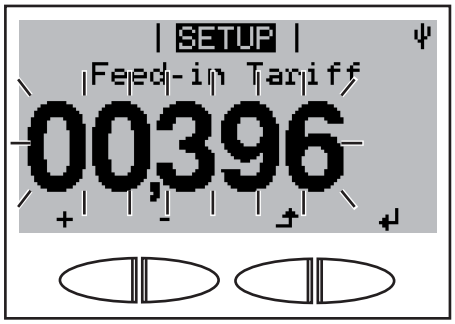
↵ 8. Press the ‘Enter’ key



The second digit flashes.

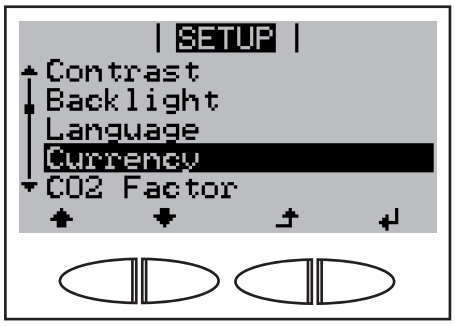
+ − 9. Repeat steps 7 and 8 for the second digit as well as the first, second and third digit after the decimal point until ...

Setting the currency and feed-in tariff (continued)



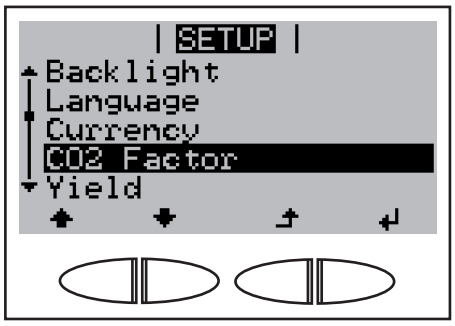
The set feed-in tariff flashes.

↵ 10. Press the ‘Enter’ key



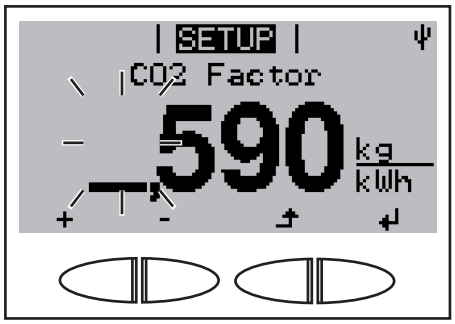
The feed-in tariff is applied. The ‘Currency’ menu item is displayed.

Setting the CO_2 reduction factor



↑ ↓ 1. Select the ‘CO_2 Factor’ menu item

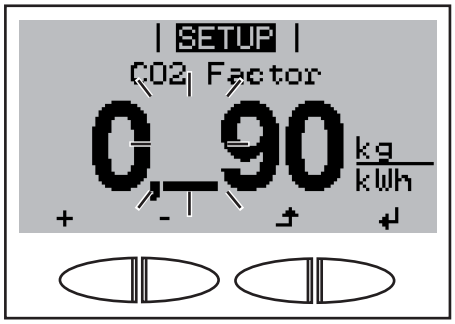
↵ 2. Press the ‘Enter’ key



The currently set CO_2 reduction factor is shown:
The first digit flashes.

+ − 3. Use the ‘Up’ and ‘Down’ keys to select a value for the first digit

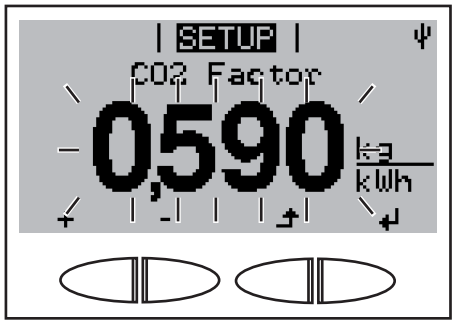
↵ 4. Press the ‘Enter’ key



The first digit after the decimal point flashes.

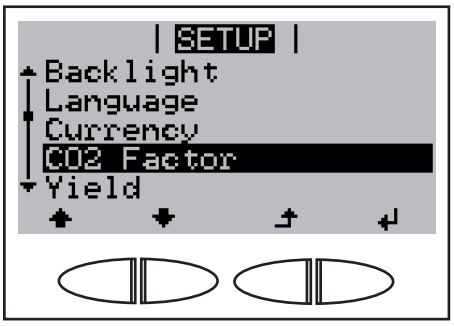
+ − 5. Repeat steps 3 and 4 for the first, second and third digit after the decimal point until ...

Setting the CO_2 reduction factor (continued)



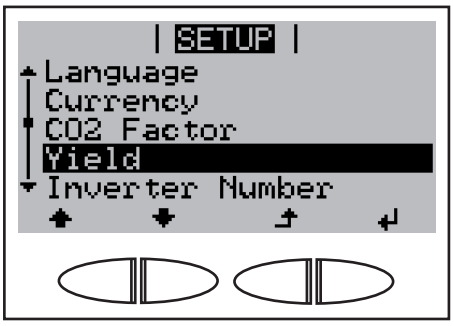
The set CO_2 reduction factor flashes.

↵ 6. Press the ‘Enter’ key

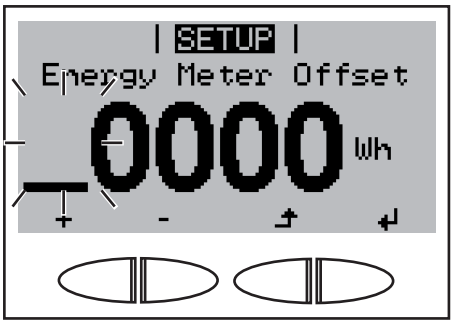


The set CO_2 reduction factor is applied. The ‘CO_2 Factor’ menu item is displayed.

Setting the offset value for total energy display and measurement correction value

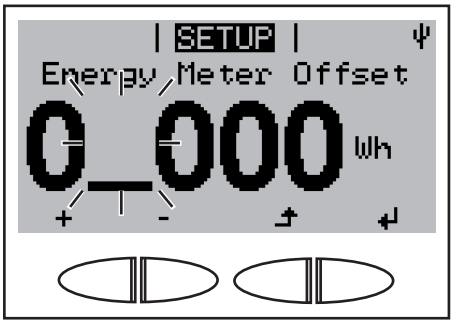


▲▼ 1. Select the ‘Yield’ menu item
↵ 2. Press the ‘Enter’ key



The currently set **energy meter offset** is shown, the first digit flashes.

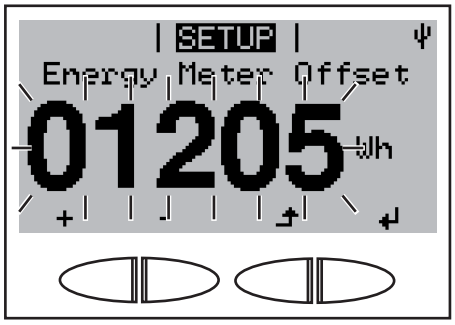
+ − 3. Use the ‘Up’ and ‘Down’ keys to select a value for the first digit
↵ 4. Press the ‘Enter’ key



The second digit of the energy meter offset flashes.

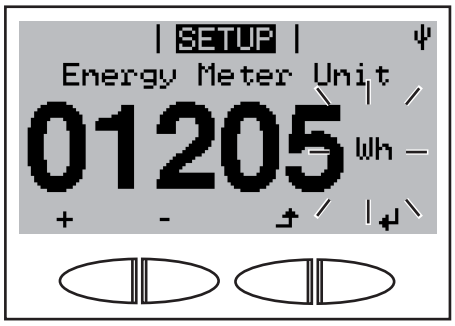
+ − 5. Repeat steps 3 and 4 for the second, third, fourth and fifth digit after the decimal point until ...

Setting the offset value for total energy display and measurement correction value
(continued)



The energy meter offset flashes.

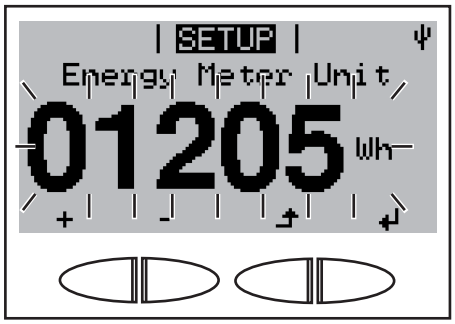
↵ 6. Press the ‘Enter’ key



‘Energy Meter Unit’ is displayed, the unit flashes.

+ − 7. Use the ‘Up’ and ‘Down’ keys to select the SI prefix:
1 kWh = 1000 Wh
1 MWh = 1,000,000 Wh

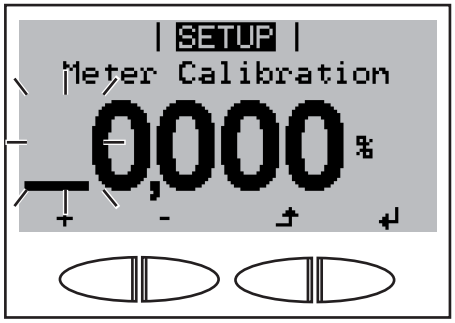
↵ 8. Press the ‘Enter’ key



The energy meter offset and the unit flash.

↵ 9. Press the ‘Enter’ key

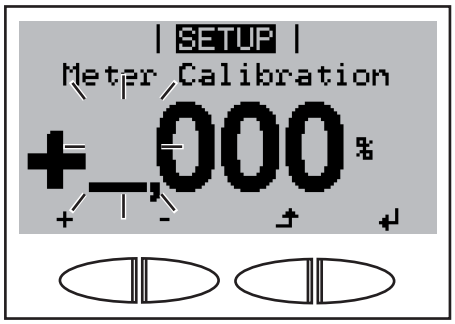
The set energy meter offset and the energy meter unit are applied.



‘Meter Calibration’ is shown, the digit for the sign flashes.

+ − 10. Use the ‘Up’ and ‘Down’ keys to select the sign

↵ 11. Press the ‘Enter’ key

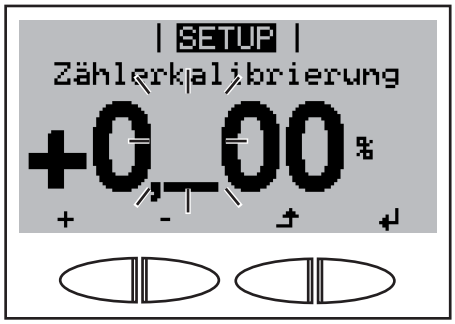


The first digit of the correction value flashes.

+ − 12. Use the ‘Up’ and ‘Down’ keys to select a value for the first digit

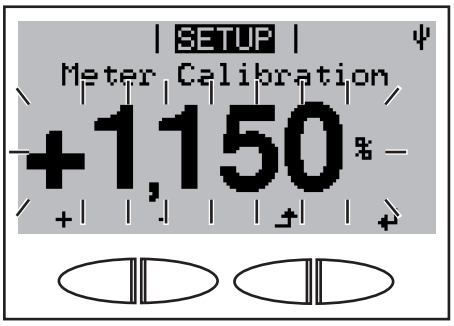
↵ 13. Press the ‘Enter’ key

Setting the offset value for total energy display and measurement correction value (continued)



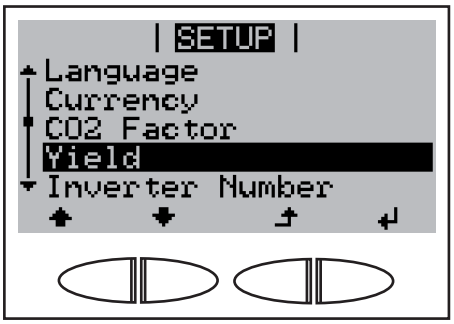
The first digit after the decimal point flashes.

+ − 14. Repeat steps 12 and 13 for the first, second and third digit after the decimal point until ...



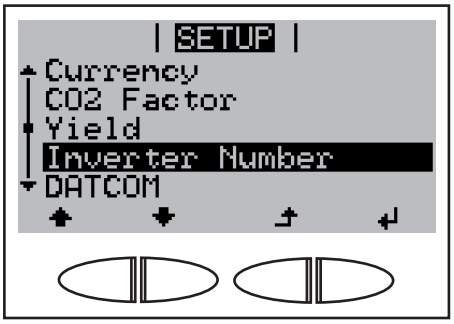
The correction value flashes.

↵ 27. Press the ‘Enter’ key



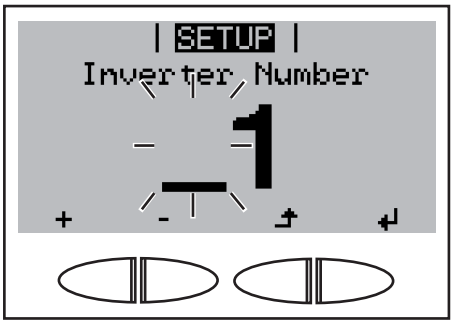
The set energy meter offset, the energy meter unit and the correction value are applied, the ‘Yield’ menu item is displayed.

Setting the inverter number



↑ ↓ 1. Select the ‘Inverter Number’ menu item

↵ 2. Press the ‘Enter’ key

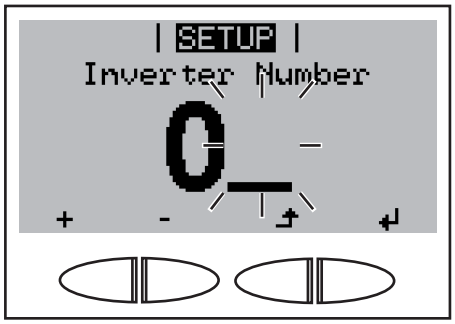


The currently set inverter number is shown, the first digit flashes.

+ − 3. Use the ‘Up’ and ‘Down’ keys to select a value for the first digit

↵ 4. Press the ‘Enter’ key

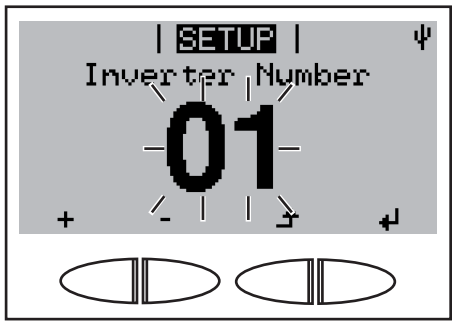
Setting the inverter number (continued)



The second digit flashes.

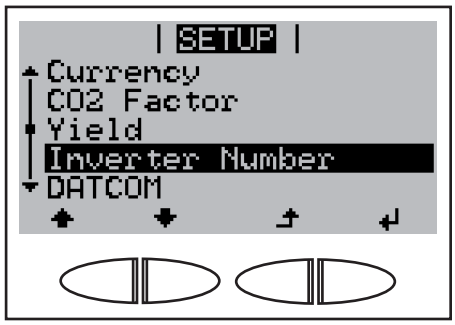
+ – 5. Use the ‘Up’ and ‘Down’ keys to select a value for the second digit

↵ 6. Press the ‘Enter’ key



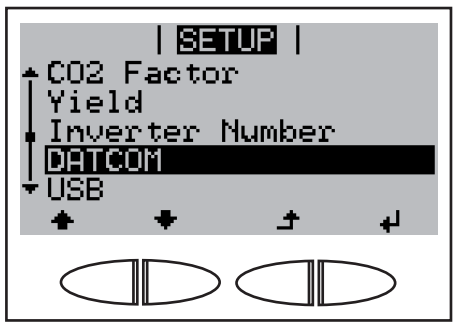
The inverter number flashes.

↵ 7. Press the ‘Enter’ key



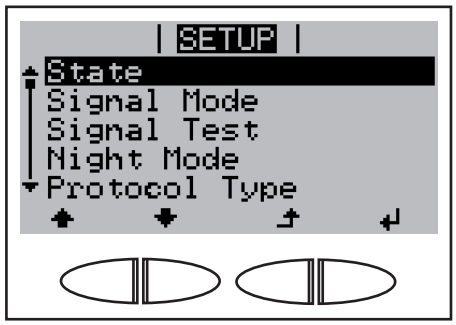
The inverter number is applied. The ‘Inverter Number’ menu item is displayed.

Displaying and setting parameters in the ‘DATCOM’ menu item



↑ ↓ 1. Select the ‘DATCOM’ menu item

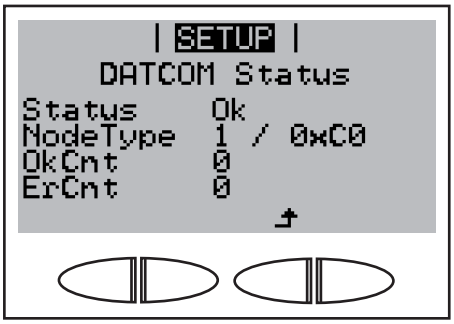
↵ 2. Press the ‘Enter’ key



The **‘State’ parameter** is displayed.

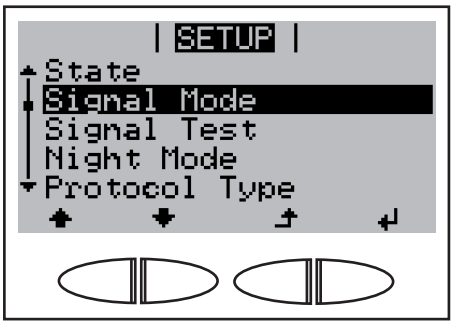
↵ 3. Press the ‘Enter’ key to open the detailed view

Displaying and setting parameters in the 'DATCOM' menu item (continued)



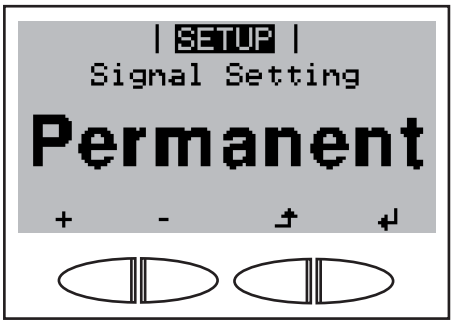
A status indication is displayed.

4. Press the 'Back' key
5. Press the 'Down' key



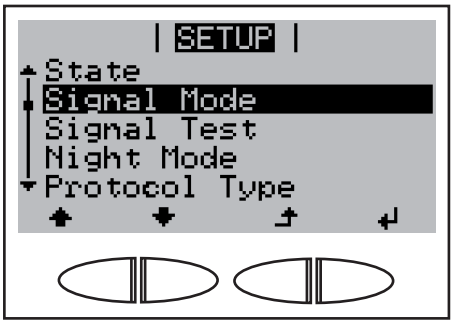
The **'Signal Mode'** parameter is displayed.

6. Press the 'Enter' key to set the signal mode



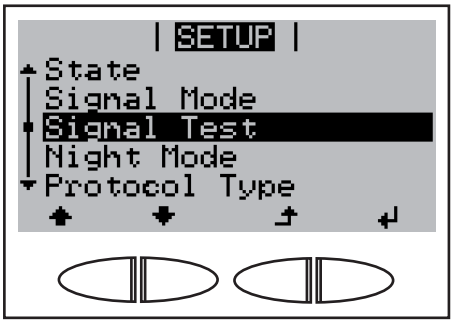
The 'Signal Setting' is shown.

7. Use the 'Up' and 'Down' keys to select the signal setting
8. Press the 'Enter' key



The 'Signal Mode' parameter is displayed.

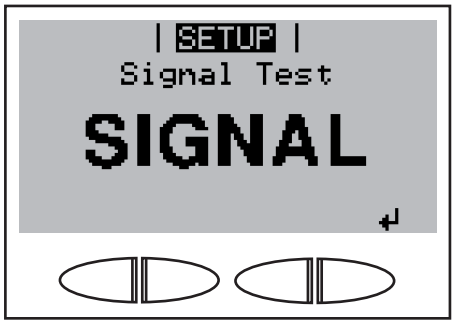
9. Press the 'Down' key



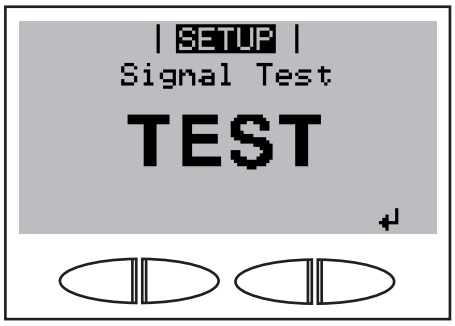
The **'Signal Test' parameter** is displayed.

10. Press the 'Enter' key to initiate the signal test

Displaying and setting parameters in the „DATCOM“ menu item
(continued)



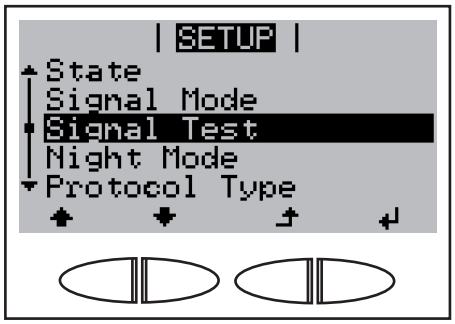
‘SIGNAL’ and ...



... ‘TEST’ are displayed alternately.

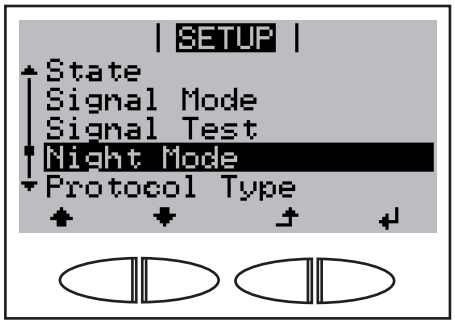
The 12 V message output switch can be heard.

↵ 11. Press the ‘Enter’ key to exit the signal test



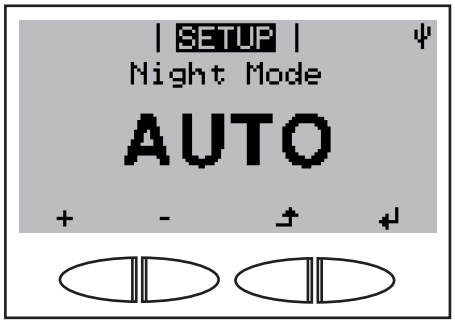
The ‘Signal Test’ parameter is displayed.

↓ 12. Press the ‘Down’ key



The **‘Night Mode’** parameter is displayed.

↵ 13. Press the ‘Enter’ key to set the DATCOM night mode

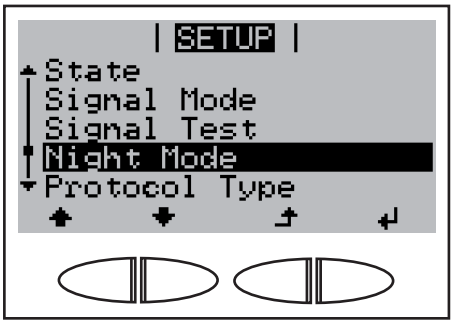


The first setting for the DATCOM night mode, ‘AUTO’, is displayed.

+ − 14. Use the ‘Up’ and ‘Down’ keys to select a DATCOM night mode

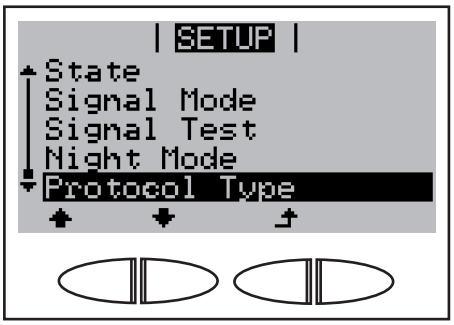
↵ 15. Press the ‘Enter’ key

Displaying and setting parameters in the 'DATCOM' menu item (continued)



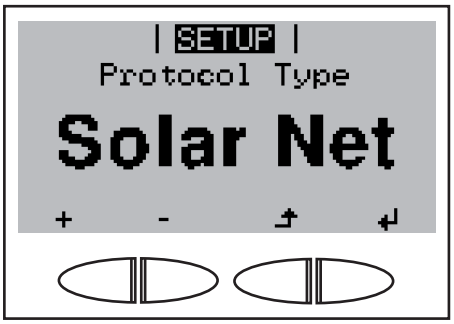
The selected DATCOM night mode is applied. The 'Night Mode' parameter is displayed.

16. Press the 'Down' key



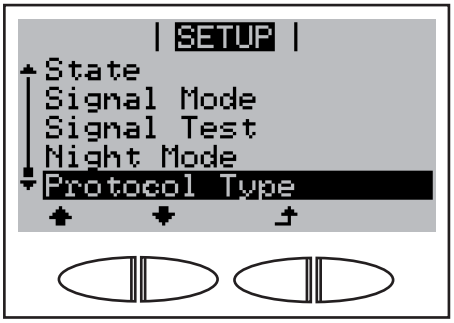
The '**Protocol Type**' parameter is displayed.

17. Press the 'Enter' key to set the communication transmission protocol properties



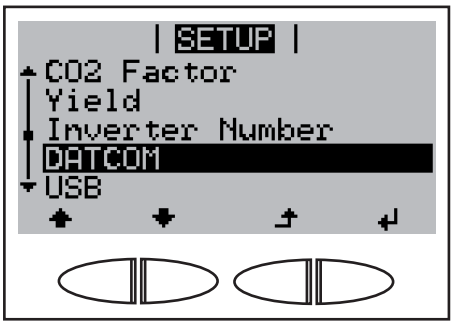
The first setting for the „Solar Net" communication transmission protocol is displayed.

18. Use the 'Up' and 'Down' keys to select a setting for the communication transmission protocol
19. Press the 'Enter' key



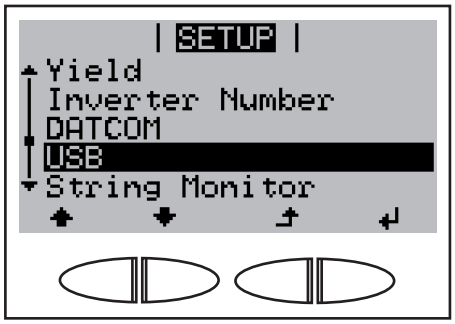
The selected setting for the communication transmission protocol is applied. 'Protocol Type' is displayed.

20. Press the 'Back' key

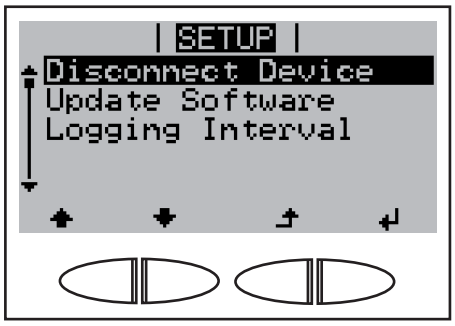


The 'DATCOM' menu item is displayed.

Safely removing USB sticks

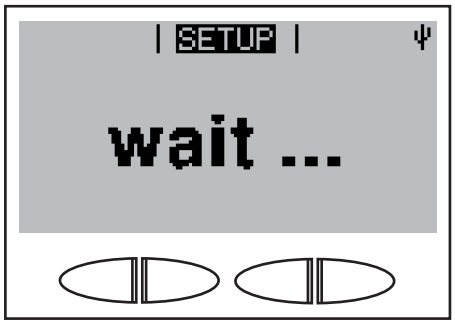


1. Remove the screws on the data communication rack
2. Pull out the data communication rack
3. Select the ‘USB’ menu item
4. Press the ‘Enter’ key

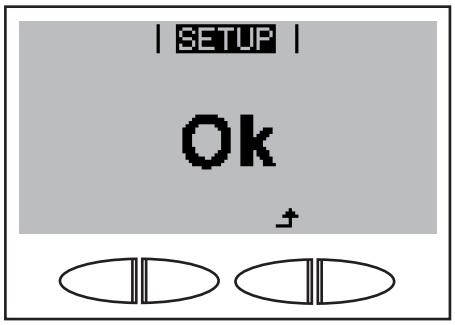


‘Disconnect Device’ is displayed.

5. Press the ‘Enter’ key



‘wait ...’ is briefly displayed.



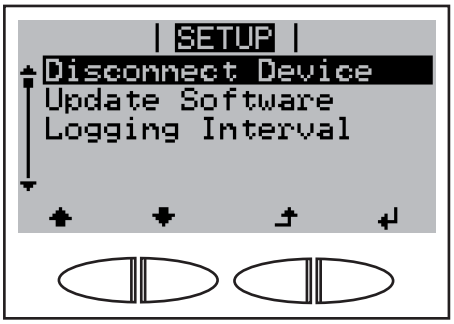
‘Ok’ is displayed.

6. Make sure that the ‘Data Transfer’ LED on the data communication rack is no longer flashing or lit
7. Remove the USB stick

NOTE If a logging interval for recording data has been set, then the inverter begins recording data again after the ‘Ok mode’ has been confirmed.

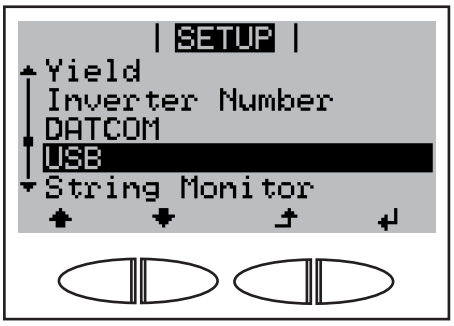
8. Insert (new) USB stick
9. Confirm the ‘Ok mode’ by pressing ‘Back’

Safely removing USB sticks (continued)



'Disconnect Device' is displayed.

10. Press the 'Back' key



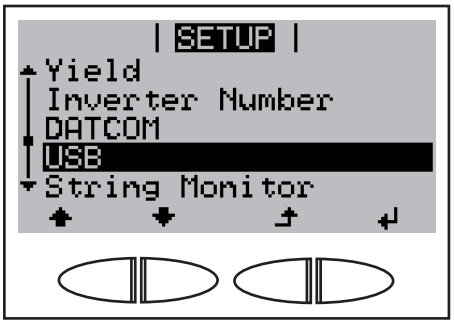
The 'USB' menu item is displayed.

Updating inverter software using a USB stick

1. Obtain the 'updatexx.tl' update file
   (e.g., at http://www.fronius.com, xx stands for the respective version number)

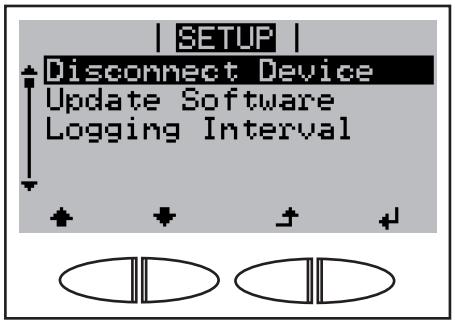
NOTE To ensure problem-free updating of the inverter software, the USB stick should have no hidden partitions and no encryption.

2. Save the update file to the highest data level of the USB stick
3. Remove the screws on the data communication rack
4. Pull out the data communication rack
5. Insert the USB stick with the update file into the USB socket on the data communication rack



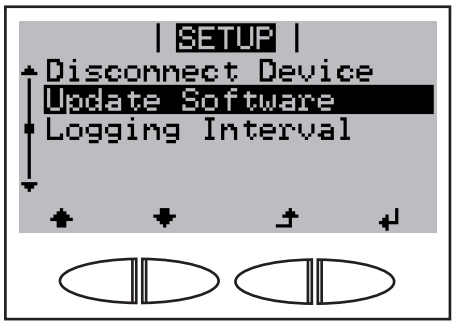
6. Select the 'USB' menu item
7. Press the 'Enter' key

Updating inverter software using a USB stick
(continued)

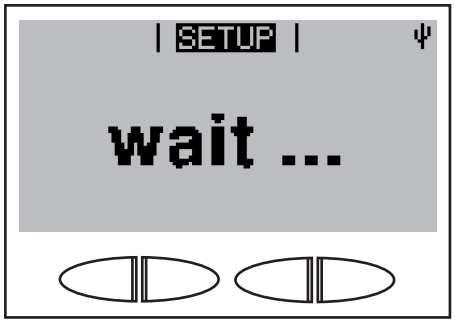


‘Disconnect Device’ is displayed.

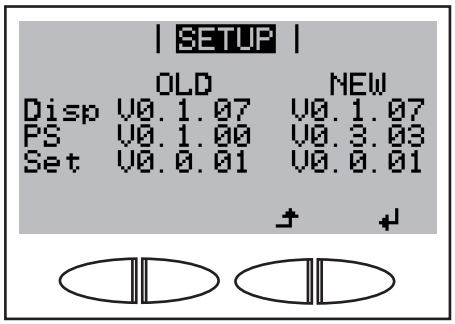
↑↓ 8. Use the ‘Up’ and ‘Down’ keys to select the ‘Update Software’ parameter



↵ 9. Press the ‘Enter’ key

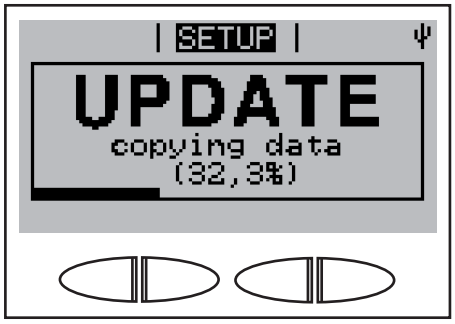


‘wait ...’ is displayed until ...



... the comparison of the current software version on the inverter and the new software version is displayed.

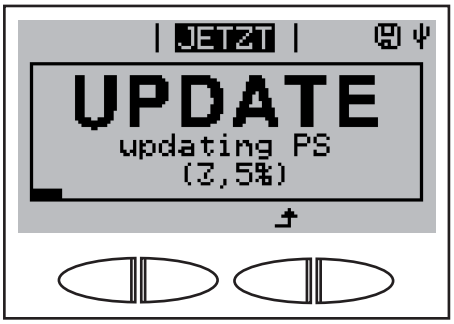
10. Press the ‘Enter’ key



The inverter begins copying the data.

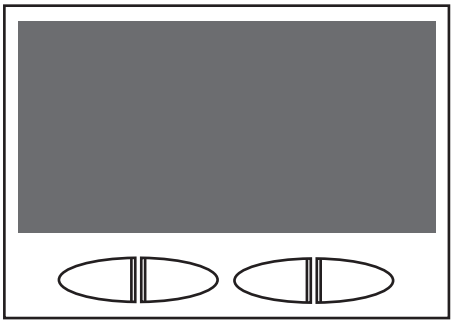
‘UPDATE’ and the save progress (%) are displayed until the data for all electronic components have been copied.

Updating inverter software using a USB stick
(continued)

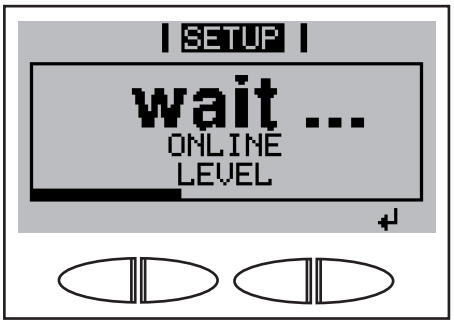


Once the data have been copied, the inverter updates the required electronic components in succession.

'UPDATE,' the affected component and the update progress (%) are displayed.

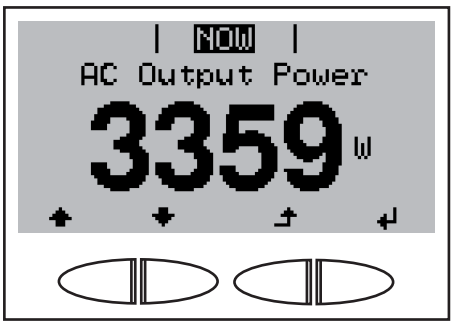


The inverter updates the display in the last step. The display remains dark for approx. 1 minute, the control and status LEDs flash.



Once the software update is complete, the inverter switches to the Startup phase:

- The Operating Status LED lights up orange
- 'wait ...' and the component presently being tested are shown on the display.



Following the Startup phase, the inverter begins to feed power into the grid.

The present output power is displayed and the Operating Status LED lights up green.

The connected USB stick can then also be used to record logging data.

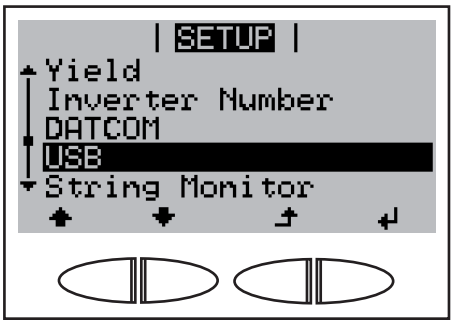
10. Re-insert the data communication rack
11. Re-attach the screws to the data communication rack

The current software version of the inverter can be viewed in the 'Version' menu item.

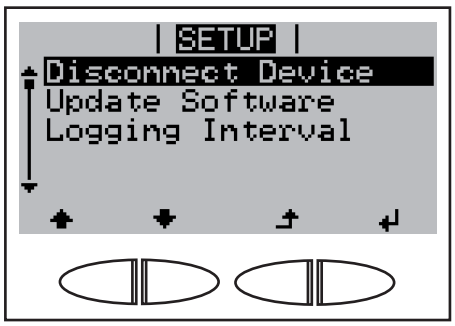
Individual settings in the Setup menu are retained when the inverter software is updated.

Setting the logging interval

NOTE To ensure problem-free logging of inverter data, the USB stick should have no hidden partitions and no encryption.

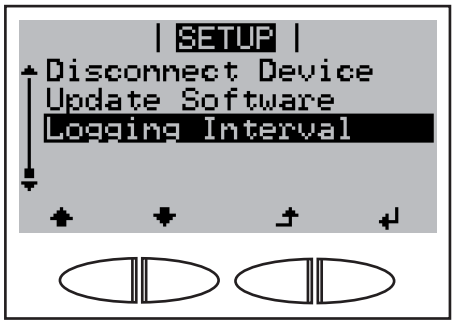


1. Select the ‘USB’ menu item
2. Press the ‘Enter’ key

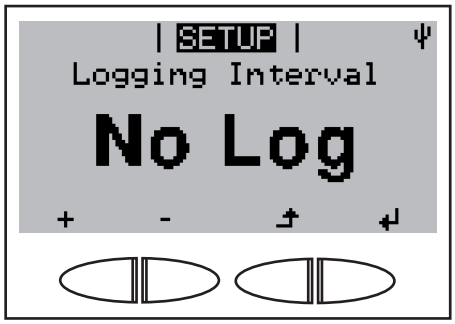


‘Disconnect Device’ is displayed.

3. Use the ‘Up’ and ‘Down’ keys to select the ‘Logging Interval’ parameter

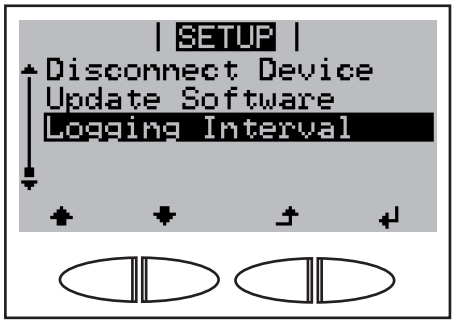


4. Press the ‘Enter’ key



The present logging interval setting is displayed, e.g., ‘No Log’ (no data saved).

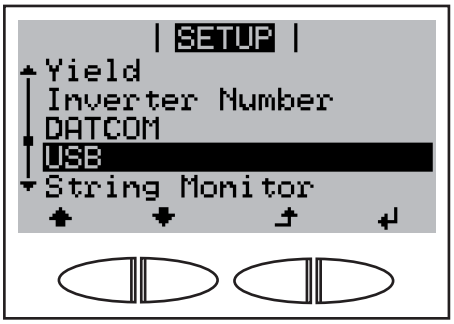
5. Use the ‘Up’ and ‘Down’ keys to select the desired logging interval
6. Press the ‘Enter’ key



The selected logging interval is applied. The ‘Logging Interval’ parameter is displayed.

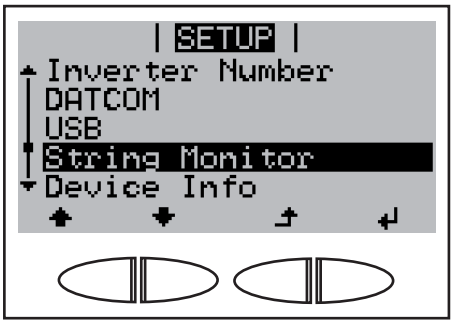
7. Press the ‘Back’ key

Setting the logging interval
(continued)

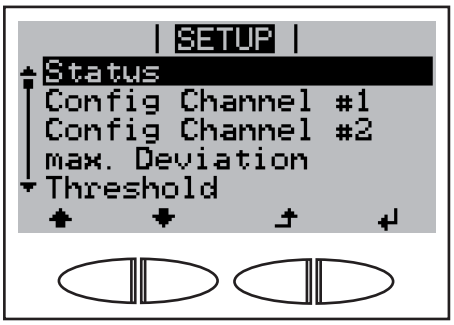


The ‘USB’ menu item is displayed.

Displaying the solar module string monitoring status

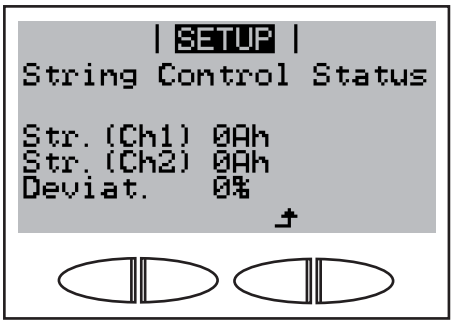


1. Select the ‘String Monitor’ menu item
2. Press the ‘Enter’ key



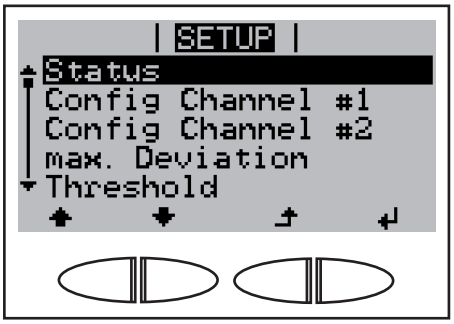
The ‘Status’ parameter is displayed.

3. Press the ‘Enter’ key



The actual values of the average solar module string current of measuring channel 1, measuring channel 2 and their present deviation are displayed.

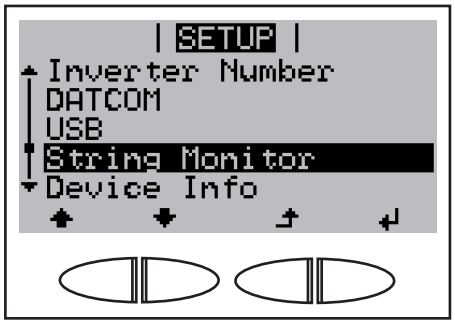
4. Press the ‘Back’ key



The ‘Status’ parameter is displayed.

5. Press the ‘Back’ key

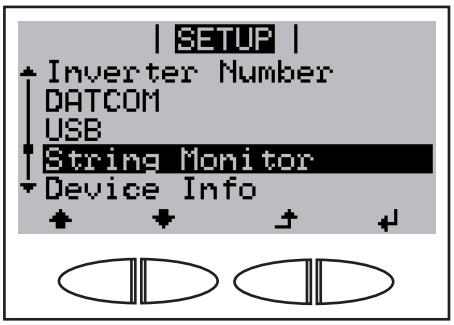
Displaying the solar module string monitoring status (continued)



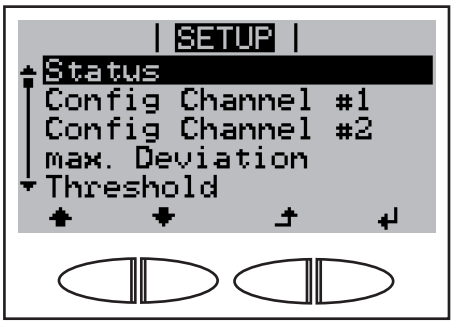
The ‘String Monitor’ menu item is displayed.

Activating solar module string monitoring

Important A value > 0 must be entered for both measuring channels in order to activate solar module string monitoring. For string monitoring, this value should correspond to the number of solar modules connected per string. The following steps describe how to set the number of solar module strings connected to measuring channels 1 and 2.

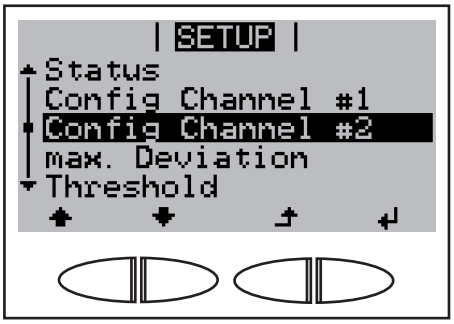


1. Select the ‘String Monitor’ menu item
2. Press the ‘Enter’ key

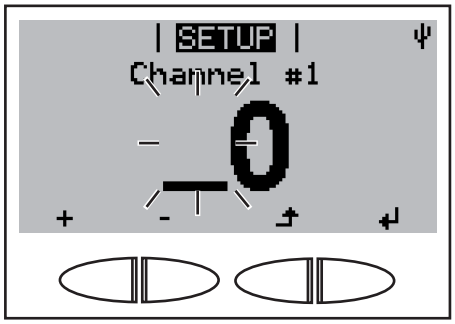


The ‘Status’ parameter is displayed.

3. Use the ‘Up’ and ‘Down’ keys to select the ‘Config Channel #1’ parameter



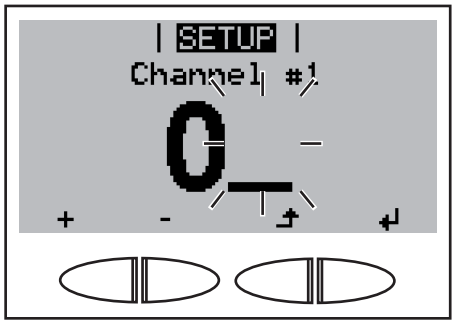
4. Press the ‘Enter’ key



‘Channel #1’ is displayed, the first digit of the currently set value flashes.

5. Use the ‘Up’ and ‘Down’ keys to select a value for the first digit
6. Press the ‘Enter’ key

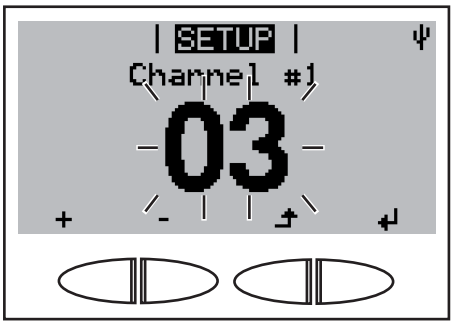
Activating solar module string monitoring
(continued)



The second digit flashes.

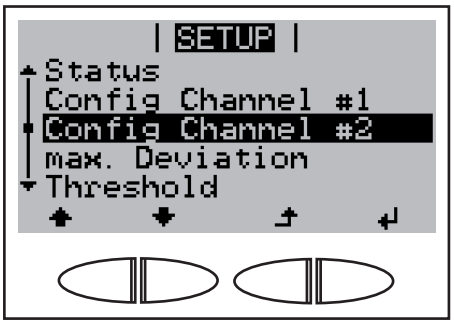
+ − 7. Use the ‘Up’ and ‘Down’ keys to select a value for the second digit

↵ 8. Press the ‘Enter’ key



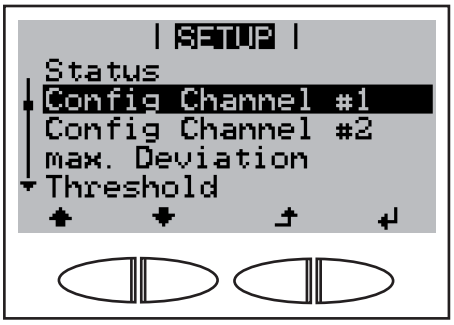
The number of solar modules strings connected to measuring channel 1 flashes

↵ 9. Press the ‘Enter’ key

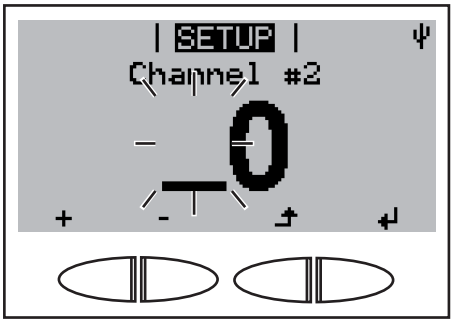


The ‘Config Channel #1’ parameter is displayed.

↓ 10. Use the ‘Down’ key to select the ‘Config Channel #2’ parameter



↵ 11. Press the ‘Enter’ key

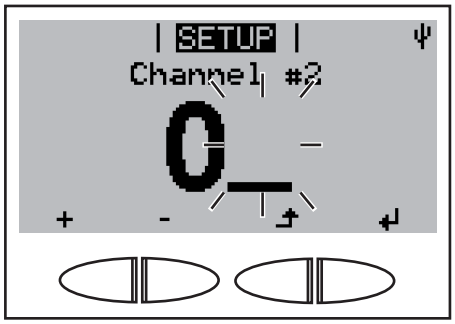


‘Channel #2’ is displayed, the first digit of the currently set value flashes.

+ − 12. Use the ‘Up’ and ‘Down’ keys to select a value for the first digit

↵ 13. Press the ‘Enter’ key

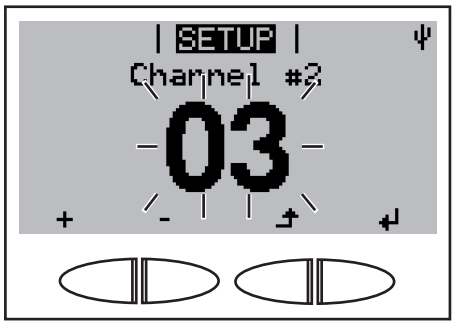
Activating solar module string monitoring
(continued)



The second digit flashes.

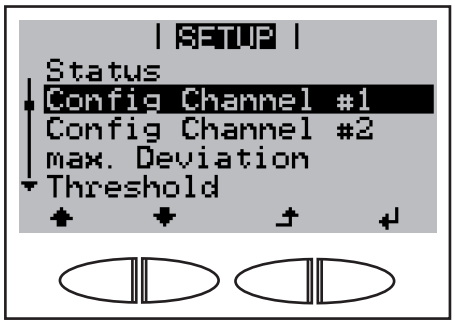
+ – 14. Use the ‘Up’ and ‘Down’ keys to select a value for the second digit

↵ 15. Press the ‘Enter’ key



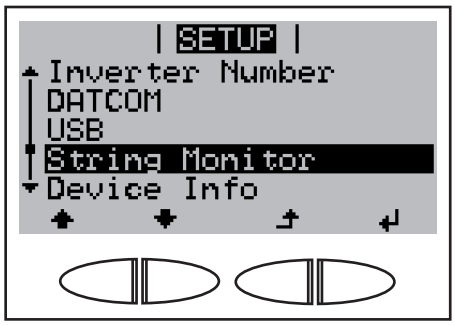
The number of solar modules strings connected to measuring channel 2 flashes

↵ 16. Press the ‘Enter’ key



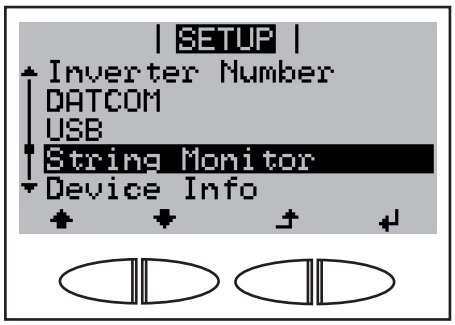
The ‘Config Channel #2’ parameter is displayed.

↵ 17. Press the ‘Back’ key



The ‘String Monitor’ menu item is displayed.

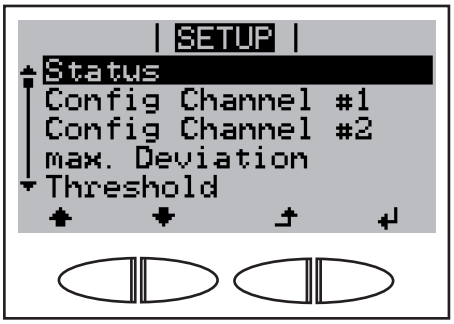
Setting the maximum deviation for solar module string monitoring



↑ ↓ 1. Select the ‘String Monitor’ menu item

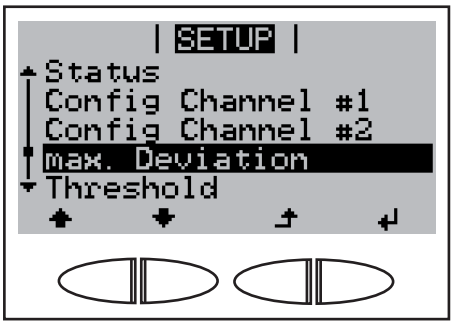
↵ 2. Press the ‘Enter’ key

Setting the maximum deviation for solar module string monitoring
(continued)

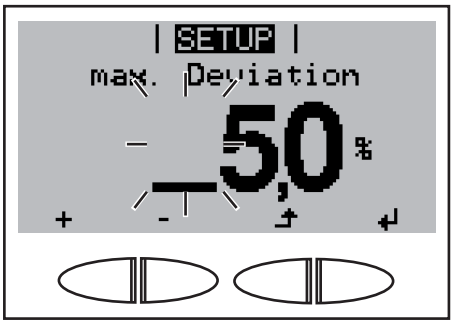


The ‘Status’ parameter is displayed.

↑ ↓ 3. Use the ‘Up’ and ‘Down’ keys to select the ‘max. Deviation’ parameter



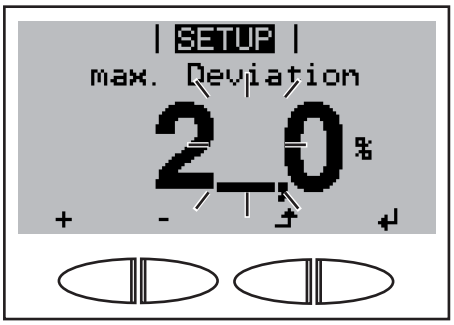
↵ 4. Press the ‘Enter’ key



‘max. Deviation’ is displayed, the first digit of the currently set value flashes.

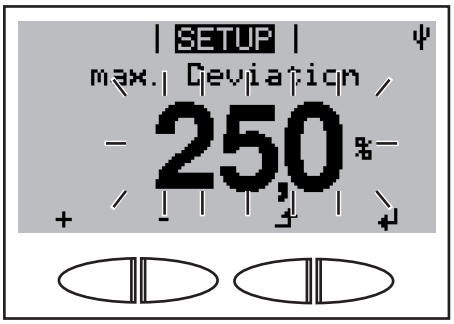
+ − 5. Use the ‘Up’ and ‘Down’ keys to select a value for the first digit

↵ 6. Press the ‘Enter’ key



The second digit flashes.

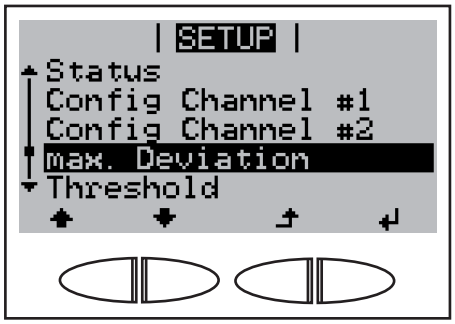
7. Repeat steps 5 and 6 for the second digit and for the first digit after the decimal point until ...



The maximum deviation flashes.

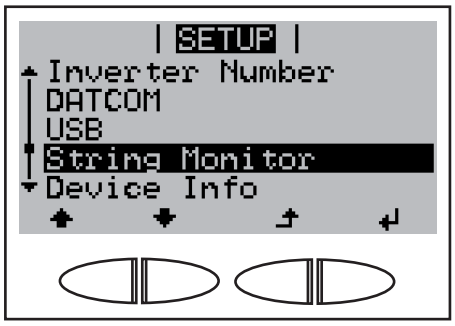
↵ 8. Press the ‘Enter’ key

Setting the maximum deviation for solar module string monitoring
(continued)



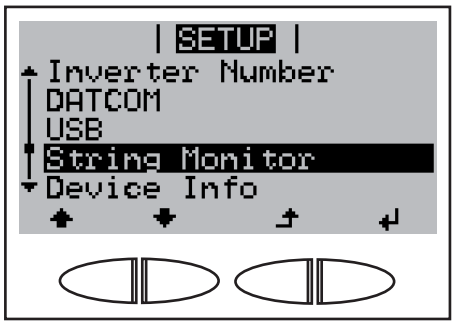
The ‘max. Deviation’ parameter is displayed.

9. Press the ‘Back’ key

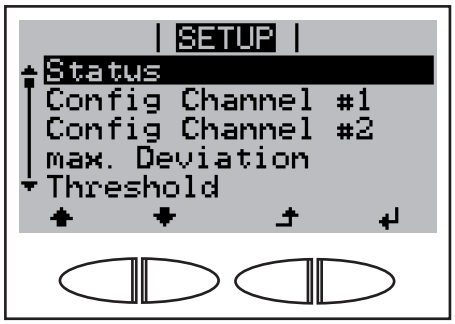


The ‘String Monitor’ menu item is displayed.

Setting the threshold for solar module string monitoring

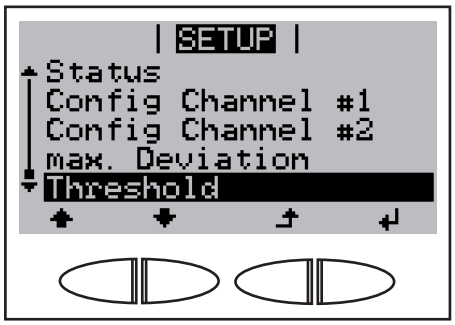


1. Select the ‘String Monitor’ menu item
2. Press the ‘Enter’ key



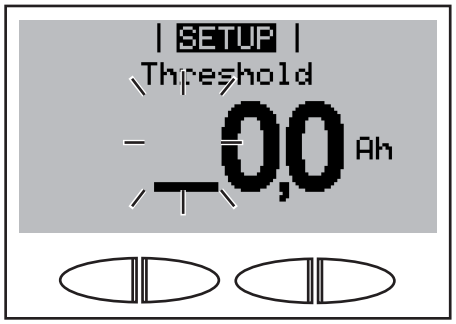
The ‘Status’ parameter is displayed.

3. Use the ‘Up’ and ‘Down’ keys to select the ‘Threshold’ parameter



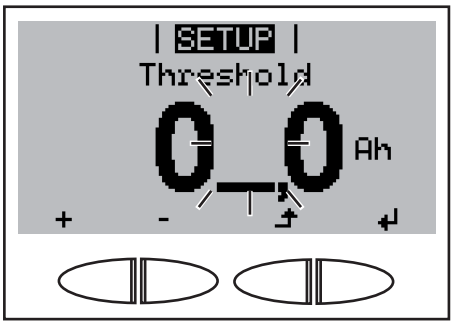
4. Press the ‘Enter’ key

Setting the threshold for solar module string monitoring
(continued)



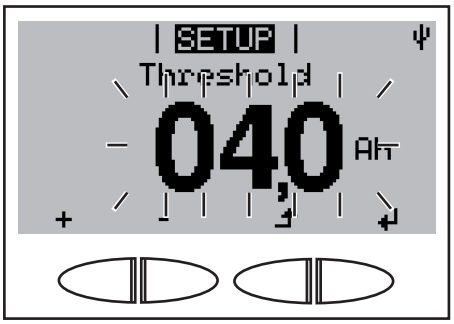
'Threshold' is displayed, the first digit of the currently set value flashes.

5. Use the 'Up' and 'Down' keys to select a value for the first digit
6. Press the 'Enter' key



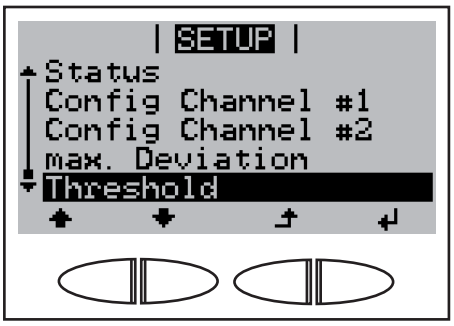
The second digit flashes.

7. Repeat steps 5 and 6 for the second digit and for the first digit after the decimal point until ...



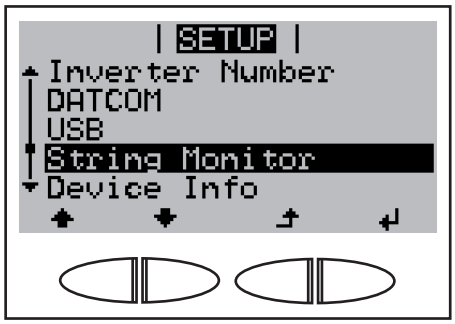
The threshold flashes.

8. Press the 'Enter' key



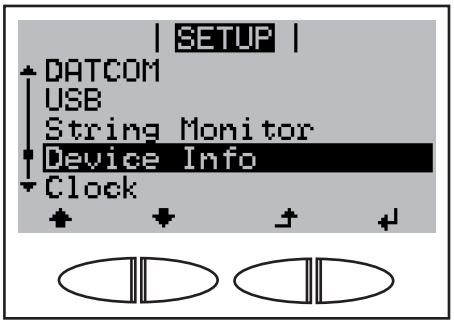
The 'Threshold' parameter is displayed.

9. Press the 'Back' key

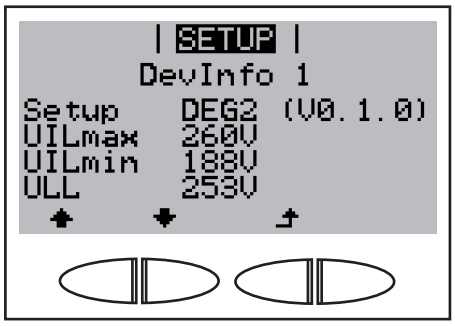


The 'String Monitor' menu item is displayed.

Displaying settings relevant to the utility company

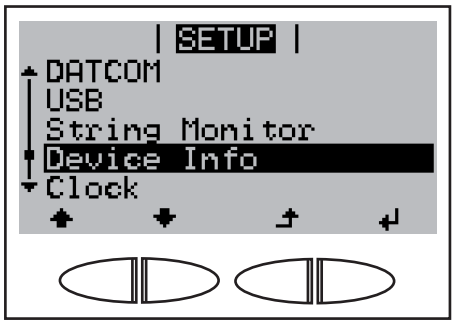


1. Select the ‘Device Info’ menu item
2. Press the ‘Enter’ key



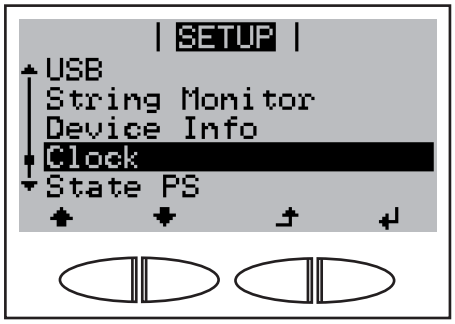
’Dev Info 1’ is displayed.

3. Use the ‘Up’ and ‘Down’ keys to select the ‘Dev Info 2’ or ‘Dev Info 3’ display
4. Press the ‘Back’ key

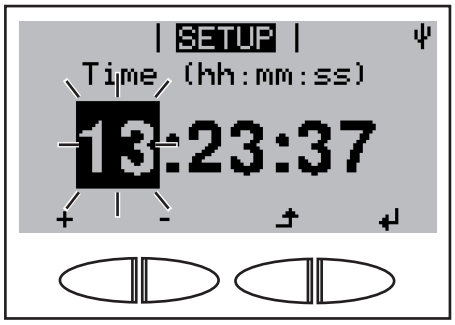


The ‘Device Info’ menu item is displayed.

Setting the time and date



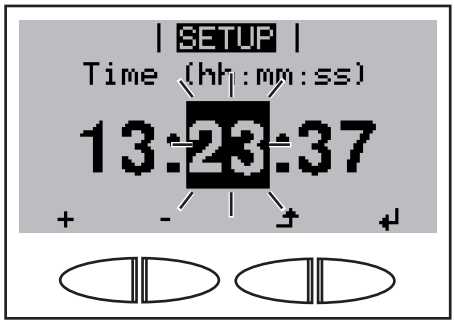
1. Select the ‘Clock’ menu item
2. Press the ‘Enter’ key



The **time** is shown (HH:MM:SS, 24 h display), the digits for the hour flash.

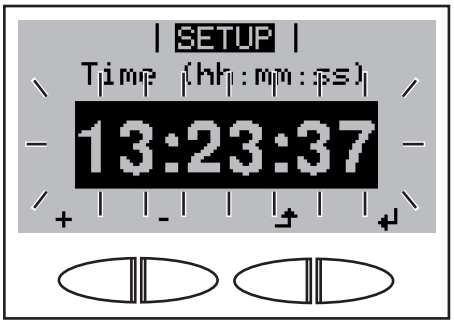
3. Use the ‘Up’ and ‘Down’ keys to select a value for the hour
4. Press the ‘Enter’ key

Setting the time and date
(continued)



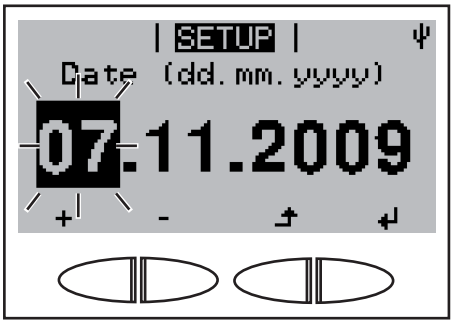
The digits for the minutes flash.

5. Repeat steps 3 and 4 for the minutes and seconds until ...



The set time flashes.

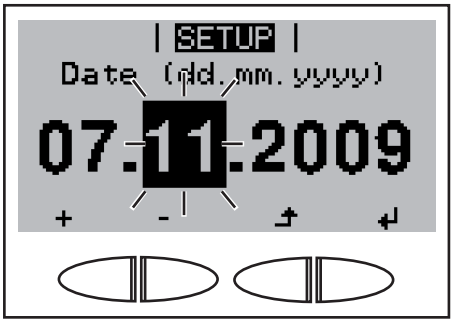
↵ 6. Press the ‘Enter’ key



The time is applied. The **date** is shown. (DD.MM.YYYY), the digits for the day flash.

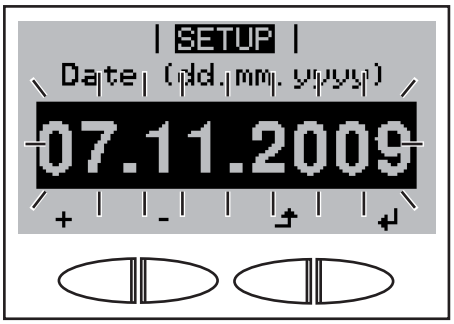
+ − 7. Use the ‘Up’ and ‘Down’ keys to select a value for the day

↵ 8. Press the ‘Enter’ key



The digits for the month flash.

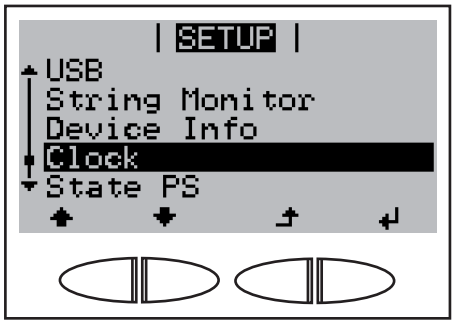
9. Repeat steps 7 and 8 for the month and the last 2 digits of the year until ...



The set date then flashes.

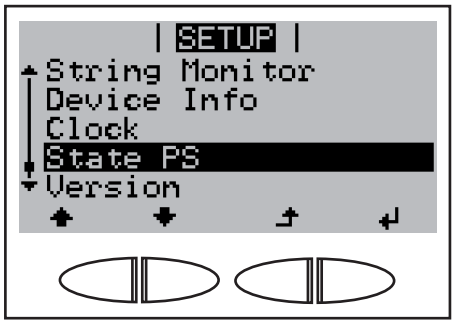
↵ 6. Press the ‘Enter’ key

Setting the time and date (continued)

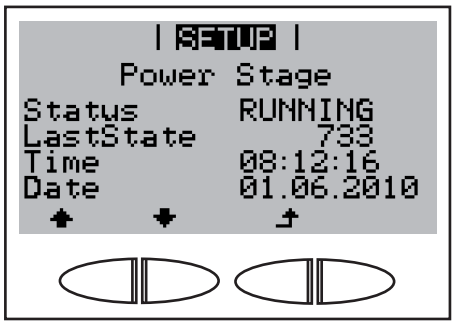


The date is applied. The ‘Clock’ menu item is displayed.

Displaying the power stage set status

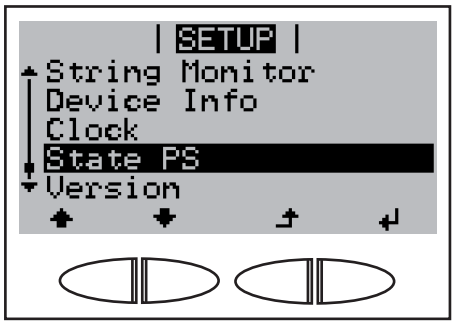


1. Select the ‘State PS’ menu item
2. Press the ‘Enter’ key



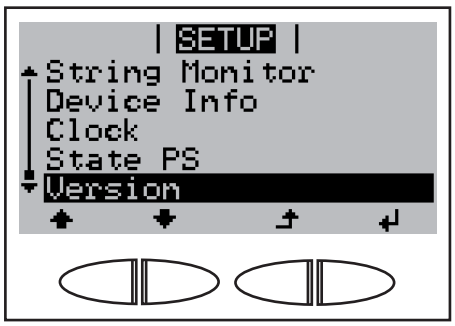
The power stage set status and the last error that occurred are displayed.

3. Use the ‘Up’ and ‘Down’ keys to scroll through the list
4. Press the ‘Back’ key to exit the status and error list



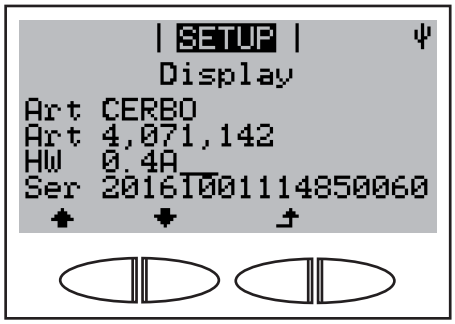
The ‘State PS’ menu item is displayed.

Displaying the version



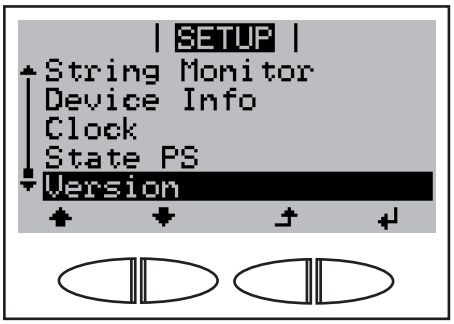
1. Select the ‘Version’ menu item
2. Press the ‘Enter’ key

Displaying the version
(continued)



The display version data are displayed.

3. You can use the ‘Up’ and ‘Down’ keys to display the version data of the software, display PC board, power stage set, filter, plug-in PC board and interface.



4. Press the ‘Back’ key to exit the version data.

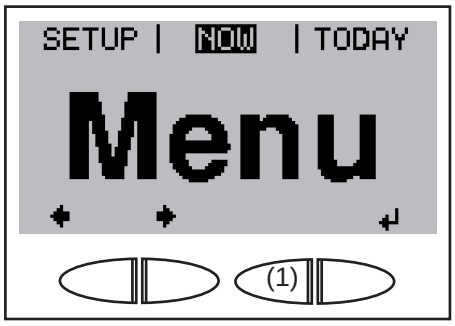
   The ‘Version’ menu item is displayed.

Switching the key lock on and off

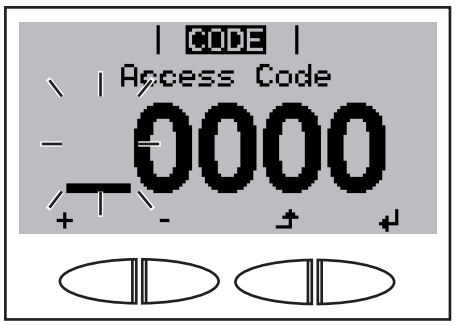
General

Using the Key Lock (LOCK) function, the Setup menu can be locked and unlocked. The Setup menu item is visible in the main menu when the Key Lock is set, but it cannot be opened.

Accessing the Key Lock menu (LOCK)



1. At the main menu level, press the ‘Menu / Back’ key (1) 5 times quickly.



The ‘CODE’ menu is displayed.

Enter the following 5-digit code: Code = 12321

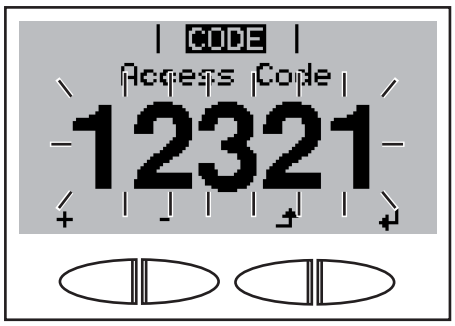
The first digit in the menu flashes.

2. Use the ‘Up’ and ‘Down’ keys to select a number for the first digit
3. Press the ‘Enter’ key

The next digit will now flash

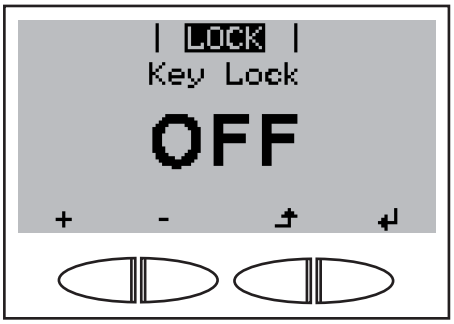
4. Repeat steps 2 and 3 for the other numbers

All numbers now flash



5. Press the ‘Enter’ key

Switching the key lock (LOCK) on and off



1. Access the ‘LOCK’ menu
2. Use the ‘Up’ and ‘Down’ keys to switch the key lock on or off
3. Press the ‘Enter’ key

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 or 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 Display of a status code for a short time may be the result of the control procedures of your inverter. If it subsequently continues to operate normally, there has not been a system error.

Total failure of the display

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

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

  Open circuit voltage < 350 V ... Error in the photovoltaic system

  Open circuit voltage > 350 V ... may indicate a basic fault in the inverter. In this case, notify a Fronius-trained service technician.

- Check the AC voltage at the connections of the inverter:
  the AC voltage must be 230 V (+ 10 % / - 15 %)*.

* The grid voltage tolerance depends on the country setup

Class 1 status codes

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

The first reaction of your inverter is to disconnect from the grid. Then, the grid will be checked for the duration of the observation period stipulated. If after the end of this period no further defect is identified, your inverter resumes operating and feeding power into the grid.

102
AC voltage too high

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

103
AC voltage too low

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

105
AC frequency too high

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

106
AC frequency too low

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

107
No AC grid detected

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

Class 1 status codes (continued)

108
Islanding detected

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

112
The RCMU has detected a fault current in the inverter

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

Class 3 status codes

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

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

301
Over-current (AC)

Description	Short interruption of power feeding into the grid, caused by over-current in the inverter circuit The inverter returns to the startup phase
Remedy	Error is corrected automatically Should the status code persist, you should contact your system installer

302
Over-current (DC)

Description	Short interruption of power feeding into the grid, caused by over-current in the DC circuit The inverter returns to the startup phase
Remedy	Error is corrected automatically Should the status code persist, you should contact your system installer

Class 3 status codes
(continued)

303
Over-temperature DC-side

Description	Short interruption of power feeding into the grid caused by over-temperature The inverter returns to the startup phase
Remedy	Error is corrected automatically Should the status code persist, you should contact your system installer

304
Interior temperature too high

Description	Short interruption of power feeding into the grid caused by over-temperature The inverter returns to the startup phase
Remedy	If required, clean cool air vents and cooling elements with compressed air Error is corrected automatically Should the status code persist, you should 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

306 (Power low)
Intermediate circuit voltage has dropped below permissible threshold value for feed-in.

Description	Short interruption of power feeding into the grid The inverter returns to the startup phase
Remedy	Corrected automatically Should the status code persist, you should contact your system installer

307 (DC low)
DC input voltage is too low for feed-in

Description	Short interruption of power feeding into the grid The inverter returns to the startup phase
Remedy	Corrected automatically Should the status code persist, you should contact your system installer

Important Status codes 306 (Power low) and 307 (DC low) appear naturally every morning and evening due to low solar irradiance. These status codes are not the result of a fault.

Class 3 status codes (continued)

308
Intermediate circuit voltage too high

Description	Short interruption of power feeding into the grid The inverter returns to the startup phase
Remedy	Error is corrected automatically Should the status code persist, you should contact your system installer

309
DC input voltage too high

Description	Short interruption of power feeding into the grid The inverter returns to the startup phase
Remedy	Error is corrected automatically Should the status code persist, you should 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	If status code persists: contact a Fronius-trained service technician

406
Error in temperature sensor

Description	The inverter disconnects from the grid for safety reasons
Remedy	If status code persists: Contact a Fronius-trained service technician

407
Error in temperature sensor

Description	The inverter disconnects from the grid for safety reasons
Remedy	If status code persists: Contact a Fronius-trained service technician

Class 4 status codes
(continued)

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 a value that is too low or too high.

Description	Fixed voltage lower than the present MPP voltage
Remedy	Remove excess solar modules so DC voltage lies within inverter limits. If status code persists: Contact a Fronius-trained service technician

416
No communication between power stage set and control unit

Description	The inverter disconnects from the grid for safety reasons
Remedy	If status code persists: Contact a Fronius-trained service technician

425
Communication with the power stage set is not possible

Description	The inverter disconnects from the grid for safety reasons and then attempts a restart.
Remedy	If status code persists: Contact a Fronius-trained service technician

426
The intermediate circuit charging takes too long

Description	Short interruption of power feeding into the grid The inverter returns to the startup phase
Remedy	Error is corrected automatically Should the status code persist, you should contact your system installer

427
Power stage set inoperative for too long (timeout)

Description	Short interruption of power feeding into the grid The inverter returns to the startup phase
Remedy	Error is corrected automatically Should the status code persist, you should contact your system installer

Class 4 status codes
(continued)

428
Timeout error during connection

Description	Short interruption of power feeding into the grid The inverter returns to the startup phase
Remedy	Error is corrected automatically Should the status code persist, you should contact your system installer

429
Timeout error when disconnecting

Description	Short interruption of power feeding into the grid The inverter returns to the startup phase
Remedy	Error is corrected automatically Should the status code persist, you should contact your system installer

431
Power stage set software being updated

Description	Inverter does not feed energy into the grid
Remedy	Update firmware using Fronius Solar.update or a USB stick

432
Internal database error during power stage set allocation

Description	The inverter disconnects from the grid for safety reasons and then attempts a restart.
Remedy	If status code persists: Contact a Fronius-trained service technician

433
No dynamic identification can be assigned to the power stage set
Internal database error during power stage set allocation

Description	The inverter disconnects from the grid for safety reasons and then attempts a restart.
Remedy	If status code persists: Contact a Fronius-trained service technician

436
Incorrect error information received from power stage set

Description	Short interruption of power feeding into the grid The inverter returns to the startup phase
Remedy	Error is corrected automatically Should the status code persist, you should contact your system installer

Class 4 status codes
(continued)

437
General troubleshooting started in power stage set

Description	Short interruption of power feeding into the grid The inverter returns to the startup phase
Remedy	Error is corrected automatically Should the status code persist, you should contact your system installer

438
Incorrect error information received from power stage set

Description	Short interruption of power feeding into the grid The inverter returns to the startup phase
Remedy	Error is corrected automatically Should the status code persist, you should contact your system installer

442
Power stage set was not detected

Description	The inverter disconnects from the grid for safety reasons and then attempts a restart.
Remedy	If status code persists: Contact a Fronius-trained service technician

443
Energy transfer not possible

Description	Inverter does not feed energy into the grid
Remedy	If status code persists: Contact a Fronius-trained service technician

445
Invalid power stage set configuration

Description	Inverter does not feed energy into the grid
Remedy	If status code persists: Contact a Fronius-trained service technician

447
Solar module ground, insulation error (connection between solar module and ground)

Description	The inverter disconnects from the grid for safety reasons
Remedy	Check solar modules and solar module cabling If status code persists: Contact a Fronius-trained service technician

Class 4 status codes
(continued)

450
Error in Guard Control

Description	Inverter does not feed energy into the grid
Remedy	If status code persists: Contact a Fronius-trained service technician

451
Guard Control memory is defective

Description	The inverter stops feeding power into the grid, a critical error is indicated by a red General 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	Inverter does not feed energy into the grid
Remedy	If status code persists: Contact a Fronius-trained service technician

453
Error in grid voltage recording of Guard Control

Description	Inverter does not feed energy into the grid
Remedy	If status code persists: Contact a Fronius-trained service technician

454
Error in grid frequency recording of Guard Control

Description	Inverter does not feed energy into the grid
Remedy	If status code persists: Contact a Fronius-trained service technician

456
Error in islanding check of Guard Control

Description	Inverter does not feed energy into the grid
Remedy	If status code persists: Contact a Fronius-trained service technician

457
Grid relay defective

Description	Inverter does not feed energy into the grid
Remedy	If status code persists: Contact a Fronius-trained service technician

458
DSP and Guard Control measure different RCMU values

Description	Inverter does not feed energy into the grid
Remedy	Check to ensure that phase and neutral conductor are connected properly If status code persists: Contact a Fronius-trained service technician

Class 4 status codes (continued)

459
Measurement signal recording not possible for the insulation test

Description	Inverter does not feed energy into the grid
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	Inverter does not feed energy into the grid
Remedy	If status code persists: Contact a Fronius-trained service technician

461
Error in DSP data memory

Description	Inverter does not feed energy into the grid
Remedy	If status code persists: Contact a Fronius-trained service technician

462
Error in DC feed-in monitoring routine

Description	Inverter does not feed energy into the grid
Remedy	If status code persists: Contact a Fronius-trained service technician

463
AC polarity inverted (L/N)

Description	Inverter does not feed energy into the grid.
Remedy	Check AC polarity (L/N) If status code persists: Contact a Fronius-trained service technician

474
RCMU sensor is defective

Description	Inverter does not feed energy into the grid
Remedy	Contact a Fronius-trained service technician

475
Error in safety relay

Description	Inverter does not feed energy into the grid
Remedy	Contact a Fronius-trained service technician

476
Internal component defective

Description	Inverter does not feed energy into the grid.
Remedy	Contact a Fronius-trained service technician

Class 5 status codes

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

Class 5 status codes (continued)

509
No feed-in within the last 24 hours

Description	Warning message is shown on the display
Remedy	Check if all conditions for problem-free feed-in operation are met. If status code persists: Contact a Fronius-trained service technician

515
Communication with solar module string monitoring not possible

Description	Warning message for solar module string monitoring
Remedy	If status code persists: Contact a Fronius-trained service technician

516
Communication with memory unit not possible

Description	Warning message of memory unit
Remedy	If status code persists: Contact a Fronius-trained service technician

517
Power derating due to excessive temperature

Description	Warning message due to power derating
Remedy	If status code persists: Contact a Fronius-trained service technician

518
Internal DSP malfunction

Description	Warning message is shown on the display
Remedy	If status code persists: Contact a Fronius-trained service technician

Class 7 status codes

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

701 - 720
Provides information about the internal processor program status

Description	Is not of concern if the inverter is functioning without problems and appears only in the “State PS” Setup menu item. In the event of an actual fault, this state code supports Fronius Tech Support in the failure analysis.

721
EEPROM was reinitialized

Description	Warning message is shown on the display
Remedy	If status code persists: Contact a Fronius-trained service technician

Class 7 status codes
(continued)

722 - 730
Provides information about the internal processor program status

Description	Is not of concern if the inverter is functioning without problems and appears only in the “State PS” Setup menu item. In the event of an actual fault, this state code supports Fronius Tech Support in the failure analysis.

731
Initialization error - USB stick is not supported

Description	Warning message is shown on the display
Remedy	Check or replace USB stick Check USB stick file system If status code persists: Contact a Fronius-trained service technician

732
Initialization error - over-current at USB stick

Description	Warning message is shown on the display
Remedy	Check or replace USB stick If status code persists: Contact a Fronius-trained service technician

733
No USB stick inserted

Description	Warning message is shown on the display
Remedy	Insert or check USB stick If status code persists: Contact a Fronius-trained service technician

734
Update file is not detected or is not available

Description	Warning message is shown on the display
Remedy	Check update file (e.g., for the proper file name) If status code persists: Contact a Fronius-trained service technician

735
The update file does not match the device

Description	Warning message is shown on the display, update process is canceled
Remedy	Check update file, if required, download the correct update file for the device (e.g., at http://www.fronius.com) If status code persists: Contact a Fronius-trained service technician

Class 7 status codes
(continued)

736
Write or read error occurred

Description	Warning message is shown on the display
Remedy	Check the USB stick and the files on the USB stick or replace the USB stick Remove the USB stick only when the ‘Data Transfer’ LED is no longer flashing or lit. If status code persists: Contact a Fronius-trained service technician

737
File could not be opened

Description	Warning message is shown on the display
Remedy	Error is corrected automatically, if required, remove and reinsert the USB stick If status code persists: Contact a Fronius-trained service technician

738
Log file could not be saved (e.g., USB stick is write-protected or full)

Description	Warning message is shown on the display
Remedy	Free up memory, remove write-protection, if required, check or replace USB stick If status code persists: Contact a Fronius-trained service technician

739
Initialization error (e.g., USB stick is write-protected, full, or faulty)

Description	Warning message is shown on the display
Remedy	Free up memory, remove write-protection, if required, check or replace USB stick If status code persists: Contact a Fronius-trained service technician

740
Initialization error - error in USB stick file system

Description	Warning message is shown on the display
Remedy	Check USB stick or reformat it on a PC to FAT12, FAT16 or FAT32 If status code persists: Contact a Fronius-trained service technician

Class 7 status codes
(continued)

741
Error when recording logging data

Description	Warning message is shown on the display
Remedy	Remove and reinsert the USB stick, if required, check or replace the USB stick If status code persists: Contact a Fronius-trained service technician

743
Error occurred during the update

Description	Warning message is shown on the display
Remedy	Repeat update process, check USB stick If status code persists: Contact a Fronius-trained service technician

744
Provides information about the internal processor program status

Description	Is not of concern if the inverter is functioning without problems and appears only in the “State PS” Setup menu item. In the event of an actual fault, this state code supports Fronius TechSupport in the failure analysis.

745
Fault in system file (*.sys)

Description	Warning message is shown on the display, update process is canceled
Remedy	Back up and remove data from USB stick, reinsert empty USB stick If status code persists: Contact a Fronius-trained service technician

746
Error occurred during the update

Description	Warning message is shown on the display, update process is canceled
Remedy	Restart update after waiting approx. 2 minutes If status code persists: Contact a Fronius-trained service technician

747
Transmission error or faulty update file

Description	Warning message is shown on the display, update process is canceled
Remedy	Check update file, if required download correct update file (e.g., at http://www.fronius.com) If status code persists: Contact a Fronius-trained service technician

Class 7 status codes
(continued)

748
Write or read error occurred during the update process

Description	Warning message is shown on the display, update process is canceled
Remedy	Check or replace the USB stick and the files on the USB stick If status code persists: Contact a Fronius-trained service technician

749
File could not be opened during the update process

Description	Warning message is shown on the display, update process is canceled
Remedy	Repeat update process If status code persists: Contact a Fronius-trained service technician

750
Communication with the power stage set is not possible during update process

Description	Warning message is shown on the display, update process is canceled
Remedy	Repeat update process If status code persists: Contact a Fronius-trained service technician

751
Incorrect time

Description	Warning message is shown on the display
Remedy	Reset the time and date If status code persists: Contact a Fronius-trained service technician

752
Real Time Clock module defective

Description	Warning message is shown on the display
Remedy	Reset the time and date If status code persists: Contact a Fronius-trained service technician

753
Time has not been set over a long period of time (> 1/2 year)

Description	Warning message is shown on the display
Remedy	Reset the time and date If status code persists: Contact a Fronius-trained service technician

Class 7 status codes
(continued)

754, 755
Provides information about the internal processor program status

Description	Is not of concern if the inverter is functioning without problems and appears only in the “State PS” Setup menu item. In the event of an actual fault, this state code supports Fronius Tech Support in the failure analysis.

756
Logging mode has been deactivated

Description:	While logging data were actively being recorded to the USB stick, the time was reset to a point in time before switch-on. When the error occurs, the logging data recording is turned off.
Remedy:	Delete data from USB stick, and reactivate logging data recording. If status code persists: Contact a Fronius-trained service technician

757
Hardware error in the Real Time Clock module

Description:	Warning message is shown on the display, the inverter does not feed energy into the grid
Remedy:	If status code persists: Contact a Fronius-trained service technician

761 - 765
Provides information about the internal processor program status

Description	Is not of concern if the inverter is functioning without problems and appears only in the “State PS” Setup menu item. In the event of an actual fault, this state code supports Fronius Tech Support in the failure analysis.

766
Emergency power limiter has been activated (max. 750 W)

Description	Warning message is shown on the display
Remedy	If status code persists: Contact a Fronius-trained service technician

767
Provides information about the internal processor program status

Description	Is not of concern if the inverter is functioning without problems and appears only in the “State PS” Setup menu item. In the event of an actual fault, this state code supports Fronius TechSupport in the failure analysis.

Class 7 status codes
(continued)

768
Power limit different in the hardware modules

Description	Warning message is shown on the display
Remedy	If status code persists: Contact a Fronius-trained service technician

771
String current monitoring has detected a deviation

Description	Warning message is shown on the display
Remedy	Press the ‘Enter’ key to confirm the error Check solar modules and cabling Should the status code persist, you should contact your system installer

772
Memory unit unavailable

Description	Warning message is shown on the display
Remedy	If status code persists: Contact a Fronius-trained service technician

773
Software update group 0 (invalid country setup)

Description	Warning message is shown on the display
Remedy	If status code persists: Contact a Fronius-trained service technician

774
No communication with the filter PC board

Description	Warning message is shown on the display
Remedy	Press the ‘Enter’ key to confirm the error If status code persists: Contact a Fronius-trained service technician

775
PMC power stage set unavailable

Description	Warning message is shown on the display
Remedy	Press the ‘Enter’ key to confirm the error If status code persists: Contact a Fronius-trained service technician

776
Device type invalid

Description	Warning message is shown on the display
Remedy	Press the ‘Enter’ key to confirm the error If status code persists: Contact a Fronius-trained service technician

Class 7 status codes (continued)

781 - 794

Provides information about the internal processor program status

Description	Is not of concern if the inverter is functioning without problems and appears only in the “State PS” Setup menu item. In the event of an actual fault, this state code supports Fronius Tech Support in the failure analysis.

Class 10 - 12 status codes

1000 - 1299

Provides information about the internal processor program status

Description	Is not of concern if the inverter is functioning without problems and appears only in the “State PS” Setup menu item. In the event of an actual fault, this state code supports Fronius Tech Support in the failure analysis.

Customer service

Important Please contact your Fronius dealer or a Fronius-trained service partner 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.

- The DC main switch is used only to switch off power to the power stage set. When the DC main switch is turned off, the connection area is still energized.
- Only licensed electricians should access the connection area.
- All maintenance and service work should only be carried out when the power stage set has been disconnected from the connection area.
- Maintenance and service work on the inverter power stage set should only be carried out by Fronius-trained personnel.

WARNING! An electrical shock can be fatal. Danger from residual voltage from capacitors.
You must wait until the capacitors have discharged. Discharge takes 3 minutes.

General

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

Opening Fronius IG TL for service/maintenance

Procedure for opening the inverter for service or maintenance:

CAUTION! An inadequate grounding conductor connection can cause serious injuries to persons and damage to (or loss of) property. The housing screws 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. Disconnect the AC supply from the inverter
2. Turn off DC main switch
3. Allow the capacitors to discharge (3 minutes)
4. Remove 6 side screws
5. Remove power stage set from the wall bracket

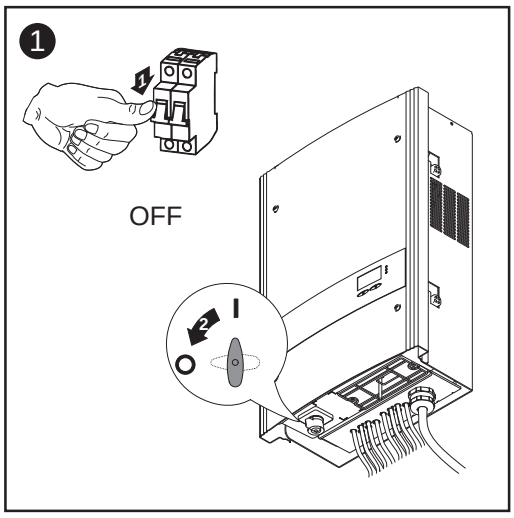
Opening Fronius IG TL for service/maintenance (continued)

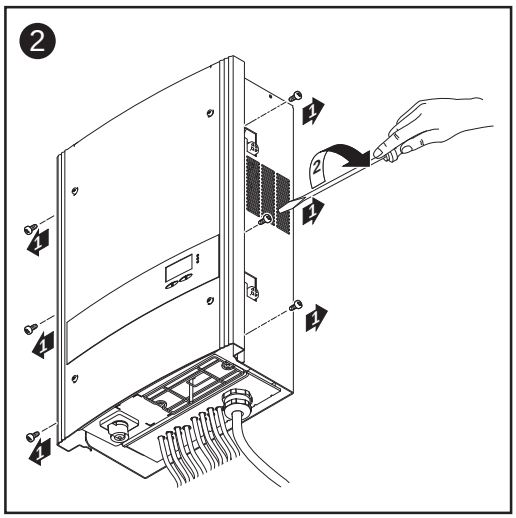
6. Protect the wall bracket from soiling and moisture
7. Remove the 4 cover screws
8. Carefully lift up the housing cover on the bottom of the power stage set
9. Reach into the opening
10. Disconnect the ribbon cable from the display PC board
11. Remove cover

Operation in dusty environments

When operating the inverter in extremely dusty environments:
when necessary, clean the cooling elements and fan on the back of the power stage set using clean compressed air.

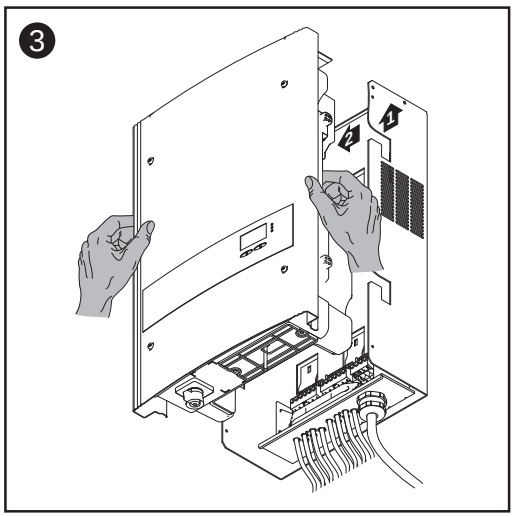
Procedure:

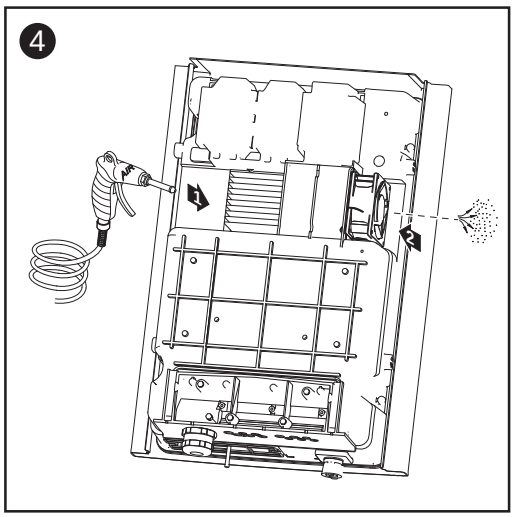




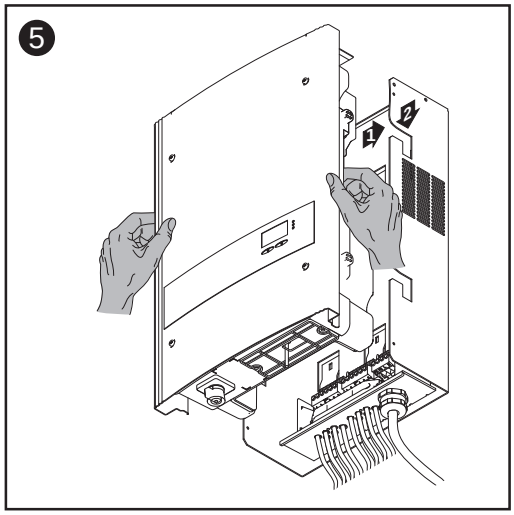
The side areas of the housing cover are designed to function as carrying grips and/or handles.

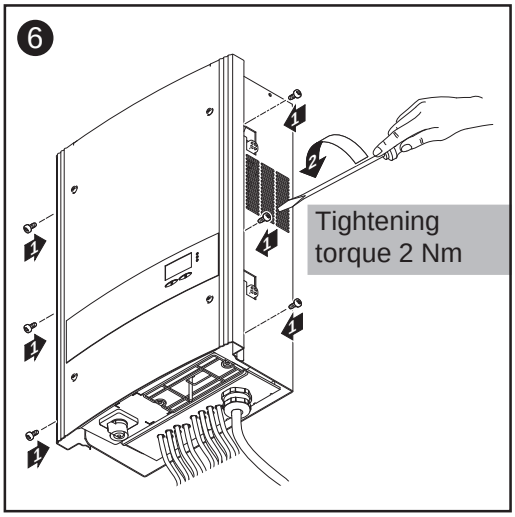
Important To avoid damage to the fan mount, block or secure the fan wheel when air-cleaning.

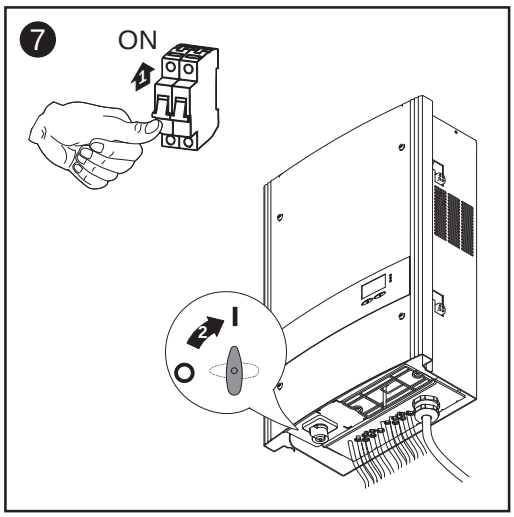




Operation in dusty environments
(continued)







Replacing string fuses

Safety

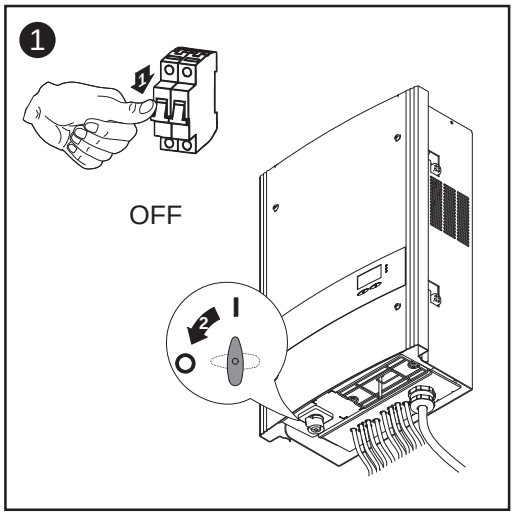
WARNING! An electrical shock can be fatal. Danger from grid voltage and DC voltage from solar modules.

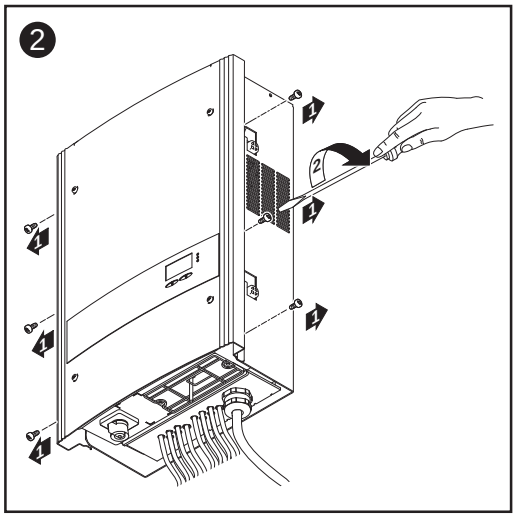
- The DC main switch is used only to switch off power to the power stage set. When the DC main switch is turned off, the connection area is still energized.
- Only licensed electricians should access the connection area.
- All maintenance and service work should only be carried out when the power stage set has been disconnected from the connection area.
- Maintenance and service work on the inverter power stage set should only be carried out by Fronius-trained personnel.

WARNING! An electrical shock can be fatal. Danger from residual voltage from capacitors.
You must wait until the capacitors have discharged. Discharge takes 3 minutes.

Preparation

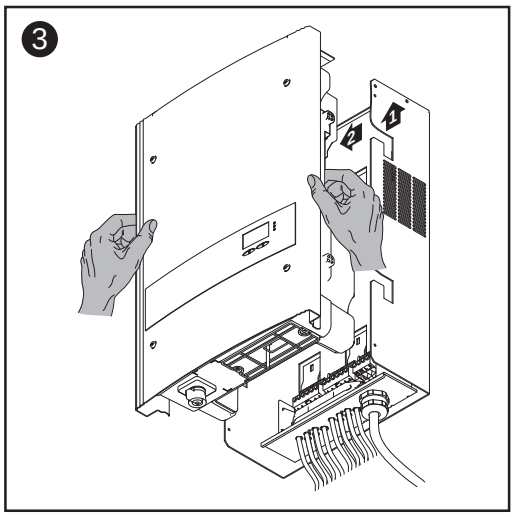
CAUTION! An inadequate grounding conductor connection can cause serious injuries to persons and damage to (or loss of) property. The housing screws provide an adequate grounding conductor connection for the housing ground and should not under any circumstances be replaced by other screws that do not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

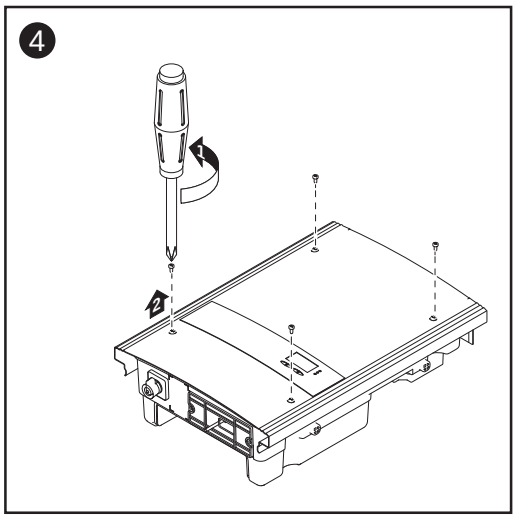


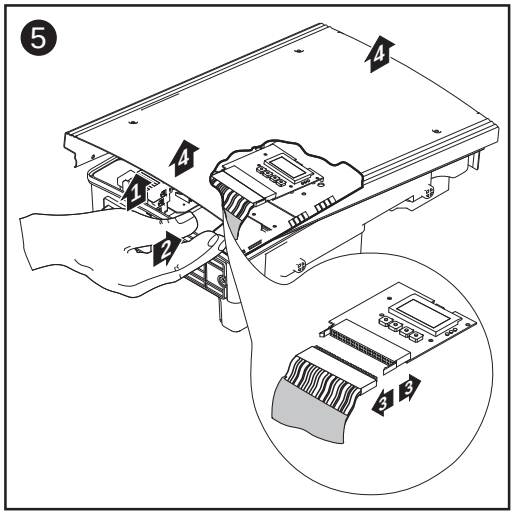


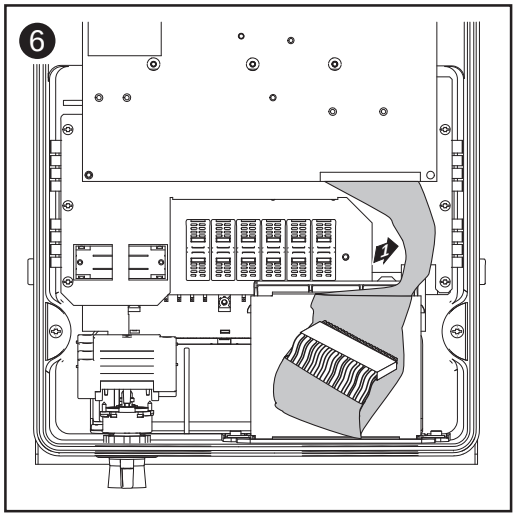
Preparation

The side areas of the housing cover are designed to function as carrying grips and/or handles.



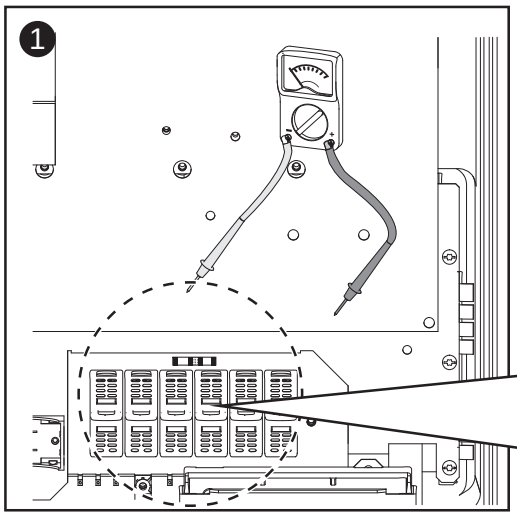


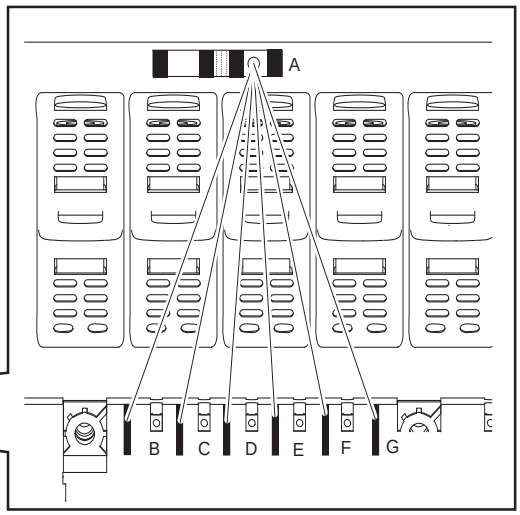




- *Carefully lift up the housing cover at the bottom of the power stage set*
- *Reach into the opening*
- *Disconnect the ribbon cable from the display PC board*

Replacing fuses



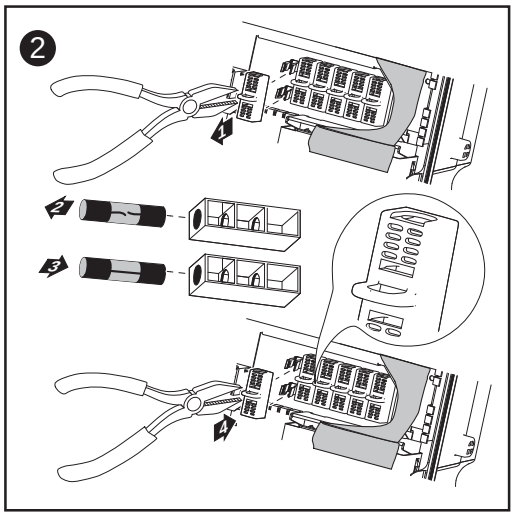


- *Test the fuse holder at the terminal for continuity: measure from measuring point A to measuring points B - G*

Replacing fuses
(continued)

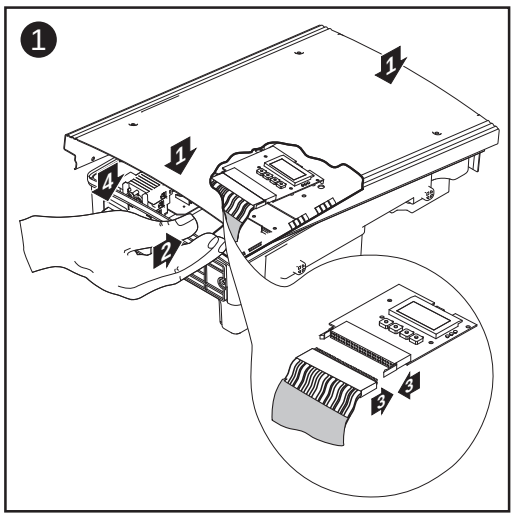
NOTE

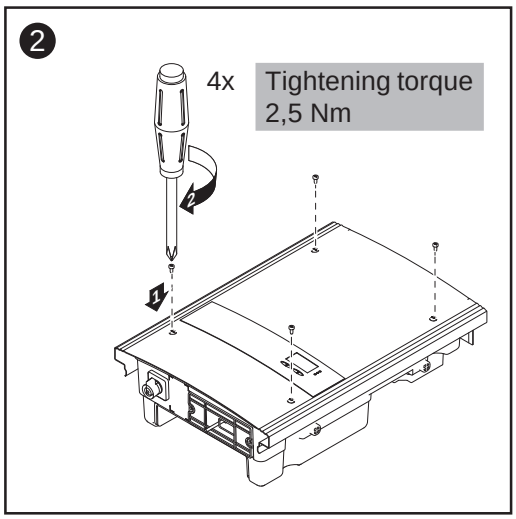
- Only use fuses for solar modules that meet the criteria for the proper selection of string fuses.
  Fuse dimensions: Diameter 10.3 x 35 - 38 mm
- Use pliers to insert fuses with a fuse cover into the respective fuse holder
- To prevent the fuse from falling out, only insert the fuse cover into the fuse holder with the opening upright.
- Do not operate the inverter without fuse covers



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

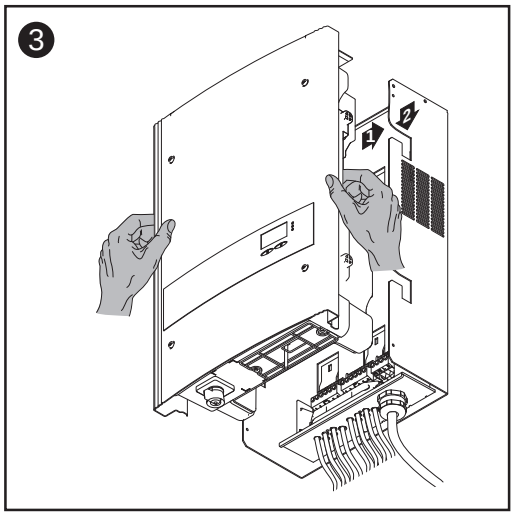
Finally...

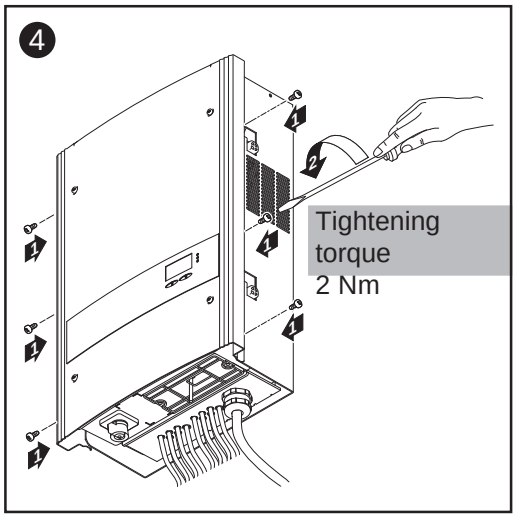


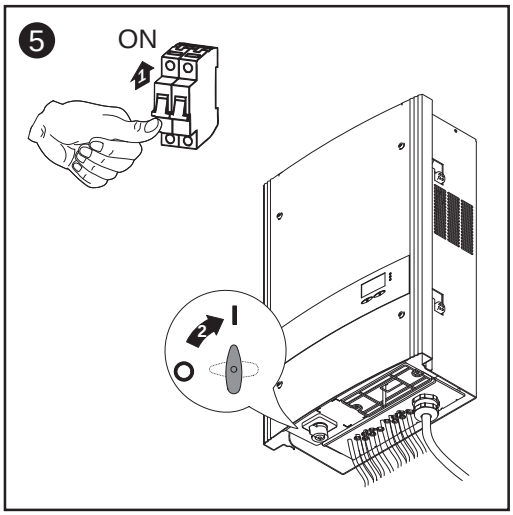


Finally...
(continued)

The side areas of the housing cover are designed to function as carrying grips and/or handles.







Appendix

Technical data

Fronius IG TL 3.0

Input data

Maximum DC output	3130 W
MPP voltage range	350 - 700 V DC
Maximum input voltage (at 1000 W/m² / -10 °C in an open circuit)	850 V DC
Maximum input current	8.8 A DC

Output data

Nominal output power (P_{nom})	3.0 kW
Maximum continuous output power [1)]	3.0 kW
Nominal grid voltage [2)]	1 ~ NPE 230 V
Grid voltage range [2)]	180 - 270 V
Maximum output current (single phase)	13 A AC
Nominal frequency [2)]	50 - 60 Hz
Harmonic distortion	< 3 %
Power factor (cos phi)	1
Max. permitted grid impedance Zmax at PCC [3)]	none

General data

MPP adjustment efficiency	99.9 %
Maximum efficiency	97.7 %
Euro. efficiency	97.1 %
Night consumption	0.2 W
Cooling	Controlled forced-air ventilation
Degree of protection	IP 55 (in Australia, IP 45)
Unit dimensions l x w x h	195 x 413 x 597 mm
Weight	19.1 kg
Permissible ambient temperature (with 95% rel. humidity)	-20 °C - +55 °C
EMC emissions class	B
Inverter concept	Transformerless
Degree of pollution	3
Overvoltage category	AC 3 / DC 2
Protection class as per IEC 62103	1

Fronius IG TL 3.6

Input data

Maximum DC power	3850 W
MPP voltage range	350 - 700 V DC
Maximum input voltage (at 1000 W/m² / -10 °C in an open circuit)	850 V DC
Maximum input current	10.8 A DC

Output data

Nominal output power (P_{nom})	3.68 kW
Maximum continuous output power [1)]	3.68 kW
Nominal grid voltage [2)]	1 ~ NPE 230 V
Grid voltage range [2)]	180 - 270 V
Maximum output current (single phase)	16.0 A AC
Nominal frequency [2)]	50 - 60 Hz
Harmonic distortion	< 3 %
Power factor (cos phi)	1
Max. permitted grid impedance Zmax at PCC [3)]	none

General data

MPP adjustment efficiency	99.9 %
Maximum efficiency	97.7 %
Euro. efficiency	97.2 %
Night consumption	0.2 W
Cooling	Controlled forced-air ventilation
Degree of protection	IP 55 (in Australia, IP 45)
Unit dimensions l x w x h	195 x 413 x 597 mm
Weight	19.1 kg
Permissible ambient temperature (with 95% rel. humidity)	-20 °C - +55 °C
EMC emissions class	B
Inverter concept	Transformerless
Degree of pollution	3
Overvoltage category	AC 3 / DC 2
Protection class as per IEC 62103	1

Fronius IG TL 4.0

Input data

Maximum DC power	4190 W
MPP voltage range	350 - 700 V DC
Maximum input voltage (at 1000 W/m² / -10 °C in an open circuit)	850 V DC
Maximum input current	11.8 A DC

Output data

Nominal output power (P_{nom})	4.0 kW
Maximum continuous output power [1)]	4.0 kW
Nominal grid voltage [2)]	1 ~ NPE 230 V
Grid voltage range [2)]	180 - 270 V
Maximum output current (single phase)	17.4 A AC
Nominal frequency [2)]	50 - 60 Hz
Harmonic distortion	< 3 %
Power factor (cos phi)	1
Max. permitted grid impedance Zmax at PCC [3)]	262 milliohms

General data

MPP adjustment efficiency	99.9 %
Maximum efficiency	97.7 %
Euro. efficiency	97.3 %
Night consumption	0.2 W
Cooling	Controlled forced-air ventilation
Degree of protection	IP 55 (in Australia, IP 45)
Unit dimensions l x w x h	195 x 413 x 597 mm
Weight	19.1 kg
Permissible ambient temperature (with 95% rel. humidity)	-20 °C - +55 °C
EMC emissions class	B
Inverter concept	Transformerless
Degree of pollution	3
Overvoltage category	AC 3 / DC 2
Protection class as per IEC 62103	1

Fronius IG TL 4.6

Input data

Maximum DC power	4820 W
MPP voltage range	350 - 700 V DC
Maximum input voltage (at 1000 W/m² / -10 °C in an open circuit)	850 V DC
Maximum input current	15.5 A DC

Output data

Nominal output power (P_{nom})	4.6 kW
Maximum continuous output power [1)]	4.6 kW
Nominal grid voltage [2)]	1 ~ NPE 230 V
Grid voltage range [2)]	180 - 270 V
Maximum output current (single phase)	20 A AC
Nominal frequency [2)]	50 - 60 Hz
Harmonic distortion	< 3 %
Power factor (cos phi)	1
Max. permitted grid impedance Zmax at PCC [3)]	262 milliohms

General data

MPP adjustment efficiency	99.9 %
Maximum efficiency	97.7 %
Euro. efficiency	97.3 %
Night consumption	0.2 W
Cooling	Controlled forced-air ventilation
Degree of protection	IP 55
Unit dimensions l x w x h	195 x 413 x 597 mm
Weight	19.1 kg
Permissible ambient temperature (with 95% rel. humidity)	-20 °C - +55 °C
EMC emissions class	B
Inverter concept	Transformerless
Degree of pollution	3
Overvoltage category	AC 3 / DC 2
Protection class as per IEC 62103	1

Fronius IG TL 5.0

Input data

Maximum DC power	5250 W
MPP voltage range	350 - 700 V DC
Maximum input voltage (at 1000 W/m² / -10 °C in an open circuit)	850 V DC
Maximum input current	14.7 A DC

Output data

Nominal output power (P_{nom})	4.6 kW
Maximum continuous output power [1)]	5.0 kW
Nominal grid voltage [2)]	1 ~ NPE 230 V
Grid voltage range [2)]	180 - 270 V
Maximum output current (single phase)	21.7 A AC
Nominal frequency [2)]	50 - 60 Hz
Harmonic distortion	< 3 %
Power factor (cos phi)	1
Max. permitted grid impedance Zmax at PCC [3)]	209 milliohms

General data

MPP adjustment efficiency	99.9 %
Maximum efficiency	97.7 %
Euro. efficiency	97.3 %
Night consumption	0.2 W
Cooling	Controlled forced-air ventilation
Degree of protection	IP 55 (in Australia, IP 45)
Unit dimensions l x w x h	195 x 413 x 597 mm
Weight	19.1 kg
Permissible ambient temperature (with 95% rel. humidity)	-20 °C - +55 °C
EMC emissions class	B
Inverter concept	Transformerless
Degree of pollution	3
Overvoltage category	AC 3 / DC 2
Protection class as per IEC 62103	1

Protection devices for all inverters

DC insulation measurement	integrated
DC over-voltage protection	integrated
Protection against reverse polarity [4)]	integrated
Manifestation of DC overload	Operating point shift
RCMU	integrated
DC disconnect	integrated

Explanation of footnotes

1) Maximum continuous output power guaranteed up to an ambient temperature of 40 °C
2) The values listed are standard values. Depending on the requirements, the inverter is customized specifically to the respective country.
3) PCC = interface to the public grid
4) Only when using standard metal bolts.
When using string fuses, the polarity of each individual solar module string must be completely correct.

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.

Relevant standards and directives

- EN 50178
  Electronic equipment for use in power installations
- EN 61000- 3-2:2006
  3-3:1995
  3-11:2000
  3-12:2005
  6-2:2005
  6-3:2007
- EN 50366:2003

Grid interface

- VDE V 0126-1-1
- ÖVE/ÖNORM E 8001-4-712

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” published by the Austrian association of electricity companies

Circuit to prevent islanding

The inverter has a circuit for preventing islanding that 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).

Warranty and disposal

Fronius manufacturer's warranty

Fronius IG TL inverters come standard with a manufacturer's warranty of 60 months from the date of installation. During this period, Fronius guarantees that the inverter will work correctly.

Extended warranty

An extended warranty can be purchased up to 6 months after the date of installation. Applications for an extended warranty after this date can be rejected by Fronius.

Services within the warranty period

If a defect should occur within the agreed upon warranty period for which Fronius is responsible, Fronius has the option of either

- repairing the defect at Fronius or onsite
- providing an equivalent replacement device or new device
- having a trained Fronius Service Partner (FSP) carry out these services

Transport

Fronius pays the transport costs for the inverter:

- in countries with a national Fronius subsidiary
- in countries of the EU
- in Switzerland
- between the respective national or nearest Fronius subsidiary and the retail site of the official Fronius sales partner from which the device was purchased.

Transport costs are not paid:

- from or to EU overseas territories
- from or to countries outside of the EU provided that there are no national Fronius subsidiaries there (see "Geographic validity" section).

For return transportation, devices or components must be packed in their original or equivalent packaging.

When making a warranty claim, attention should be paid to the following

The following are required as proof of your warranty claim: purchase invoice, serial number of the device as well as the commissioning log (transfer date, commissioning date, report from the power supply company).
The procedure for a warranty claim must be coordinated with Fronius. This is the only way to ensure that the above mentioned warranty services will be provided free of charge for the warrantee.

When making a warranty claim, attention should be paid to the following (continued)

If the device is replaced, the remaining warranty time will be transferred to the replacement device. This will be registered automatically by Fronius. You will not receive a new certificate.

Scope and validity of manufacturer's warranty

The manufacturer's warranty is only valid for the inverter that is uniquely identified by the serial number. Other photovoltaic system components as well as Fronius system upgrades (e.g., plug-in cards) are not covered by the warranty.

Exceptions to the Fronius manufacturer's warranty

Defects are not covered by the manufacturer's warranty if they are caused by the following:

- Non-compliance with operating instructions, installation instructions and maintenance instructions
- Errors during device installation
- Errors during device commissioning
- Damage during device transport
- Improper or incorrect operation of the device
- Insufficient device ventilation
- Tampering with the device by personnel not trained by Fronius
- Non-compliance with safety instructions and installation standards
- Acts of God (storm, lightning strike, overvoltage, fire, etc.)

This manufacturer's warranty also does not cover damage to the inverter that is attributed to the other system components as well as damage that does not adversely affect the proper functioning of the inverter, e.g., "cosmetic defects."

The warranty does not cover travel and accommodation costs or assembly and installation costs onsite.

Changes to the existing PV system, the building installation and the like, as well as any expenditure of time and the costs resulting from this are not covered by the warranty.

Due to technological progress, an equivalent replacement device or new device provided may not be compatible with the system monitoring (e.g., Fronius DATCOM) or other components installed on-site. Expenditures and costs resulting from this are not covered by the warranty.

No compensation is provided for lost power that has not been fed into the grid or for energy consumption that does not take place and the like.

Geographical validity

These warranty conditions are not valid for the United States of America (USA). Outside of the EU and Switzerland, the warranty conditions are only valid in countries with a national Fronius subsidiary.

As of September 2009, there are national Fronius subsidiaries in the following countries outside of the EU and the USA: Brazil, Canada, Mexico, Norway, Ukraine. Current information about this can be found on our website at www.fronius.com.

Other legal information

Along with the Fronius manufacturer's warranty, there are also warranty rights stipulated by law that are not affected by this manufacturer's warranty.
Claims that exceed those rights named in the warranty conditions are not covered by the manufacturer's warranty unless Fronius is legally liable for them. In such cases, please see your device vendor. Claims under the Product Liability Law remain unaffected.
The general terms and conditions located on our website (www.fronius.com) under „Legal info" are in effect unless these warranty conditions allow more favorable provisions.
Previously valid warranty conditions are replaced by these conditions.

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

Wels-Thalheim, 2011-03-04

Die Firma | Manufacturer | La compagnie

FRONIUS INTERNATIONAL GMBH
Günter Fronius Straße 1, A-4600 Wels-Thalheim

erklärt in alleiniger Verantwortung, dass folgendes Produkt:

Hereby certifies on its sole responsibility that the following product:

se déclare seule responsable du fait que le produit suivant:

Fronius IG TL 3.0 / 3.6 / 4.0 / 4.6 / 5.0
Solar-Wechselrichter

Fronius IG TL 3.0 / 3.6 / 4.0 / 4.6 / 5.0
Photovoltaic inverter

Fronius IG TL 3.0 / 3.6 / 4.0 / 4.6 / 5.0
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
EN 50178:1997
EN 61000-3-2:2006
EN 61000-3-3:1995
EN 61000-3-11:2000
EN 61000-3-12:2005
EN 61000-6-2:2005
EN 61000-6-3:2007
EN 50366:2003

European Standards including relevant amendments
IEC 62109-1:2010
EN 50178:1997
EN 61000-3-2:2006
EN 61000-3-3:1995
EN 61000-3-11:2000
EN 61000-3-12:2005
EN 61000-6-2:2005
EN 61000-6-3:2007
EN 50366:2003

Normes européennes avec amendements correspondants
IEC 62109-1:2010
EN 50178:1997
EN 61000-3-2:2006
EN 61000-3-3:1995
EN 61000-3-11:2000
EN 61000-3-12:2005
EN 61000-6-2:2005
EN 61000-6-3:2007
EN 50366:2003

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

Abgesandt 10.NOV.2009

Deutsche Gesetzliche Unfallversicherung

Fachausschuss Elektrotechnik

Fachausschuss Elektrotechnik
Gustav-Heinemann-Ufer 130
Prüf- und Zertifizierungsstelle
50968 Köln

FRONIUS International GmbH
Günter Fronius-Str.1
4600 Wels-Thalheim
Austria

Ihr Zeichen:
Ihre Nachricht vom:
Unser Zeichen (bitte stets angeben): UB.010.17 Pl/wi
Ansprechperson: Herr Pohl
E-Mail: pohl.wolfgang@bgete.de
Datum: 10.11.2009

ø Herren Pohl
Vorgang + C

Unbedenklichkeitsbescheinigung 09016
(Prüfschein)

Erzeugnis:	Selbsttätig wirkende Schaltstelle
Typ:	IG-TL
Bestimmungsgemäße Verwendung:	Selbsttätig wirkende, dem VNB unzugängliche Schaltstelle als Sicherheitsschnittstelle zwischen einer Eigenerzeugungsanlage und dem Niederspannungsnetz. Gleichwertiger Ersatz für eine jederzeit dem VNB zugängliche Schaltstelle mit Trennfunktion. Die Schaltstelle ist integrierter Bestandteil der PV-Wechselrichter: Fronius IG-TL
Prüfgrundlagen: DIN V VDE V 0126-1-1: 2006-02	„Selbsttätige Schaltstelle zwischen einer netzparallelen Erzeugungsanlage und dem öffentlichen Niederspannungsnetz“

Das mit Prüfbericht 2.03.02002.1.0 vom 02.10.2009 arsenal research geprüfte Sicherheitskonzept des o. g. Erzeugnisses, entspricht den zum Zeitpunkt der Ausstellung dieser Bescheinigung geltenden sicherheitstechnischen Anforderungen für die aufgeführte bestimmungsgemäße Verwendung.

Die Unbedenklichkeitsbescheinigung gilt befristet bis:

31.12.2013

- Mehlem -
Leiter der Prüf- und
Zertifizierungsstelle

Document of Compliance 09016

Product:	Automatic switching center
Type:	Fronius IG-TL
Intended Use:	Automatic switching center inaccessible to the DSO as a safety interface between an in-plant generation system and the low-voltage grid. Also a backup for a switching center always accessible to the DSO with an isolation function. The switching center is an integral part of the PV inverter type: Fronius IG-TL
Test specification: DIN V VDE 0126-1-1: 2006-02	„Automatic switching center between a parallel net generation system and the public low-voltage grid“

The safety concept of the above product tested with the report of 02.10.2009, ref. 2.03.02002.1.0 (arsenal research) corresponds to the safety requirements for the intended purpose valid at the time this certificate was issued.

This document of compliance is valid until:

31.12.2013

Fronius Worldwide - www.fronius.com/addresses

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http://www.fronius.com

(USA) **Fronius USA LLC** Solar Electronics Division
10421 Citation Drive, Suite 1100, Brighton, MI 48116
E-Mail: pv-us@fronius.com
http://www.fronius-usa.com

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