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Fronius
SHIFTING THE LIMITS

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

EN-US

Operating Instructions

Inverter for grid-connected photo-voltaic systems



42,0426,0074,EA 008-31072015

Dear reader,

Introduction

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

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

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Safety Instructions

Explanation of Safety Instructions

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

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

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

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

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

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

General

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

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

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

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

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

All safety and danger notices on the device

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

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

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

Your personal safety is at stake!

Utilization in Accordance with "Intended Purpose"



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

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

Utilization in accordance with the "intended purpose" also includes
- carefully reading and obeying all the instructions and all the safety and danger notices in the operating instructions
- performing all stipulated inspection and servicing work
- installation as specified in the operating instructions

The following guidelines should also be applied where relevant:
- Regulations of the utility regarding energy fed into the grid
- Instructions from the solar module manufacturer

Environmental Conditions



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

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

Qualified Service Engineers



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



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



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

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

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

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

Safety Measures at the Installation Location

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

Data Regarding Noise Emission Values



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

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

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

EMC Device Classifications



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

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

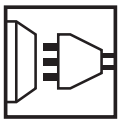
EMC device classification as per the rating plate or technical data.

EMC Measures



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

Grid Connection



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

This may affect a number of types of device in terms of:
- connection restrictions
- criteria with regard to maximum permissible mains impedance *)
- criteria with regard to minimum short-circuit power requirement *)



*) at the interface with the public grid

see Technical Data

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

Electrical Installations



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

Protective Measures against ESD



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

Safety measures in normal operation



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

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

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

Never bypass or disable safety devices.

Safety Symbols



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

Disposal



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

Backup



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

Copyright



Copyright of these operating instructions remains with the manufacturer.

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

General Information

Protection of Persons and Equipment

Safety

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

Protection of Persons and Equipment

The design and function of the inverter 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 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 installation's protection system or the requirements of the utility company. In this case, use a type A residual current circuit breaker with a release current of at least 100 mA.

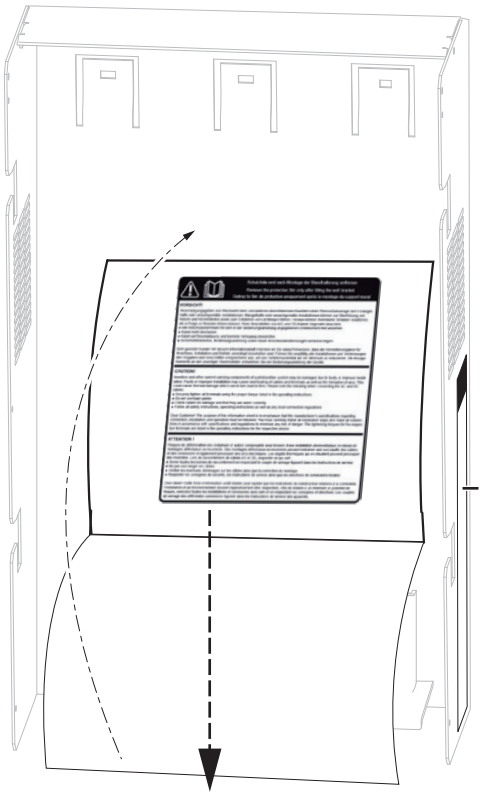
Monitoring the Grid

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

Grid monitoring is carried out using:
- Voltage monitoring
- Frequency monitoring
- Monitoring islanding conditions

Warning notices affixed to the device

The inverter 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.



Schutzfolie erst nach Montage der Wandhalterung entfernen

Remove the protective film only after fitting the wall bracket

Retirez le film de protection uniquement après le montage du support mural

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 Sie 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 rapeler 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.

Safety Symbols:



Risk of serious injury or damage due to incorrect operation



Do not use the functions described until you have thoroughly read and understood the following documents:
- These operating instructions
- All operating instructions for the system components of the photovoltaic system, especially the safety rules



Dangerous electrical voltages

Warning Notice Texts:

WARNING!
An electric shock can be fatal. Before opening the machine, it must be de-energized 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 service area should only be opened by a licensed electrician.

CAUTION!
Inverters and other current-carrying components of a photovoltaic system may be damaged through 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 in turn may 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 each respective device.

Information on Dummy Devices

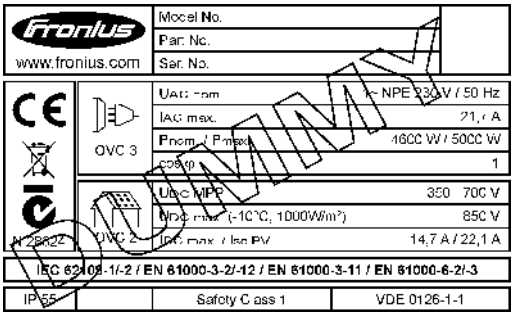
A dummy device should not be connected to a photovoltaic system for real operation and may only be used for demonstration purposes.

IMPORTANT! When using a dummy device:
- you should never connect a live DC cable to the DC connection sockets
- you should never connect the public grid to the AC connection sockets.

You may connect live cables or cable pieces for demonstration purposes.

Dummy devices receive their power supply from a separate power unit.

Dummy devices can be recognized by their device rating plate:



Dummy device rating plate

Utilization in accordance with "intended purpose"

Utilization in Conformity 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 to be not in conformity with its intented purpose:
- Utilization for any other purpose, or in any other manner
- Alterations 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 is not responsible for any damages resulting from unintended use. All warranty claims are voided.

Utilization in conformity 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 in 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 solar inverter is the highly complex link between the solar modules and the public grid.

Tasks

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

Converting DC 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 energy, the automatic control unit starts monitoring grid voltage and frequency. As soon as there is a sufficient level of irradiance, your solar inverter starts feeding energy into the grid.

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

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

Display function and data communication

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

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 many possibilities for 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.:
- Data logger (when using a PC to record and manage data from your photovoltaic system), includes a data logger 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 (general mailbox)

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
- The least possible energy consumption and lowest possible noise level
- Weight reduction due to the reduction of the cooling element surface

Power derating

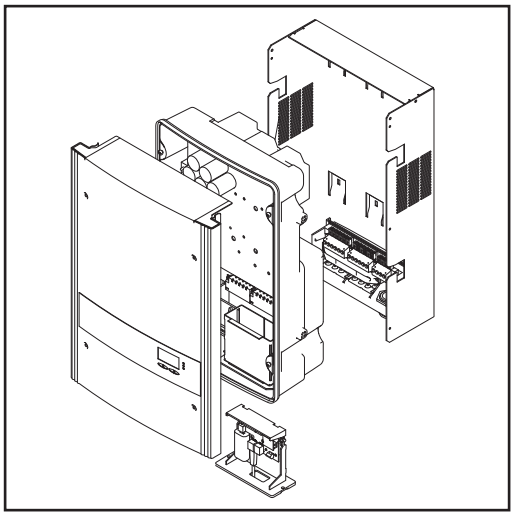
Should there be insufficient heat dissipation in spite of the fan operating at maximum speed (for example, inadequate heat transfer away from the heat sinks), the power will be derated to protect the inverter when the ambient temperature reaches approx. 40 °C and above.

Derating the power reduces the output of the inverter for a short period sufficient to ensure that the temperature will not exceed the permissible limit.
Your inverter will remain ready for operation as long as possible without any interruption.

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 delivered 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 Fronius IG TL Dummy to the Public Grid Using a Separate Power Supply Unit (AC)
- Connecting Fronius IG TL to the Public Grid (AC)
- Connecting Solar Module Strings to 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 (General)

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

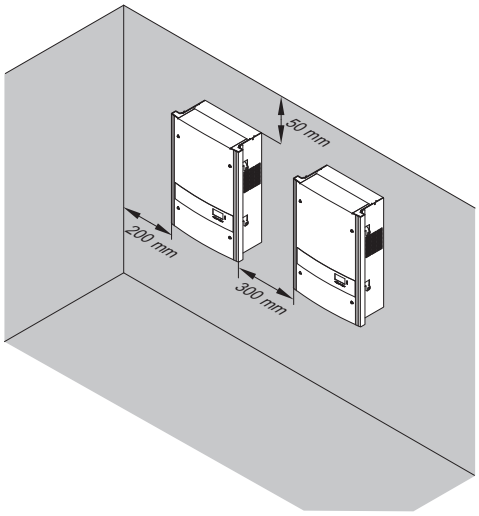
Only install on a stable, vertical wall

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

Relative humidity: 0–95%

Altitude above sea level: up to 2,000 m

- There should be a 200 mm clearance on both sides of the inverter for the cooling air openings.
- Keep a distance of 300 mm either side between the individual Fronius IG TL units.



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

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

The inverter is designed for installation both indoors and outdoors.

If you wish to install the inverter on the outer walls of cattle stables, it is important to keep a minimum clearance of 2 m between all sides of the inverter and air vents and other openings.
The place of installation should not be exposed to ammonia, corrosive gases, salts, or acids.

Choosing a Location for Inside Installation

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

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

Choosing a Location for Outdoor Installation

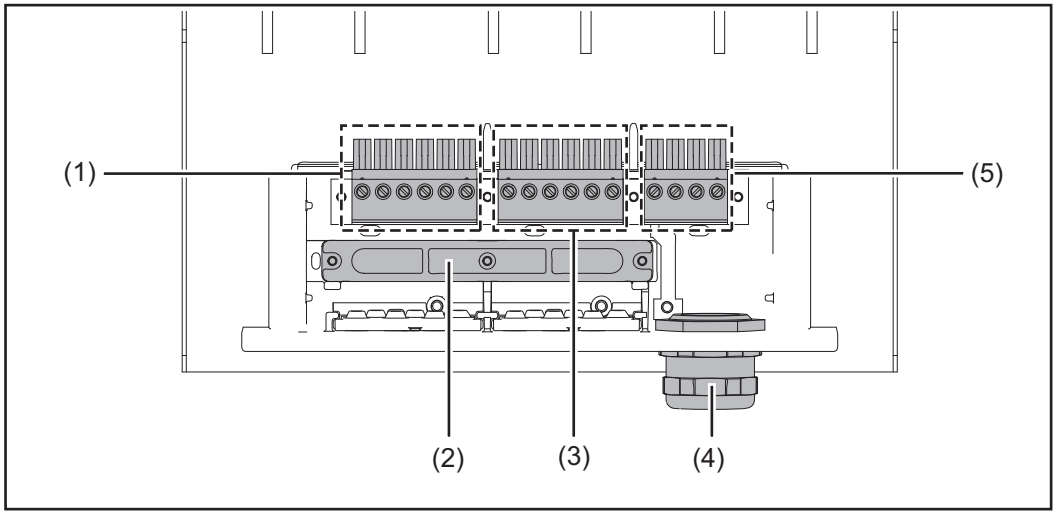
Because of its IP 44 protection class, the inverter is not susceptible to hose water on any side and can also be operated in moist environments.

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

Do not install the inverter:
- where it may be exposed to ammonia, corrosive gases, acids or salts (e.g., fertilizer storage areas, vent openings for livestock stables, chemical plants, tanneries, etc.).

Connection Options and Knockouts on the Fronius IG TL

Connection options on the Fronius IG TL

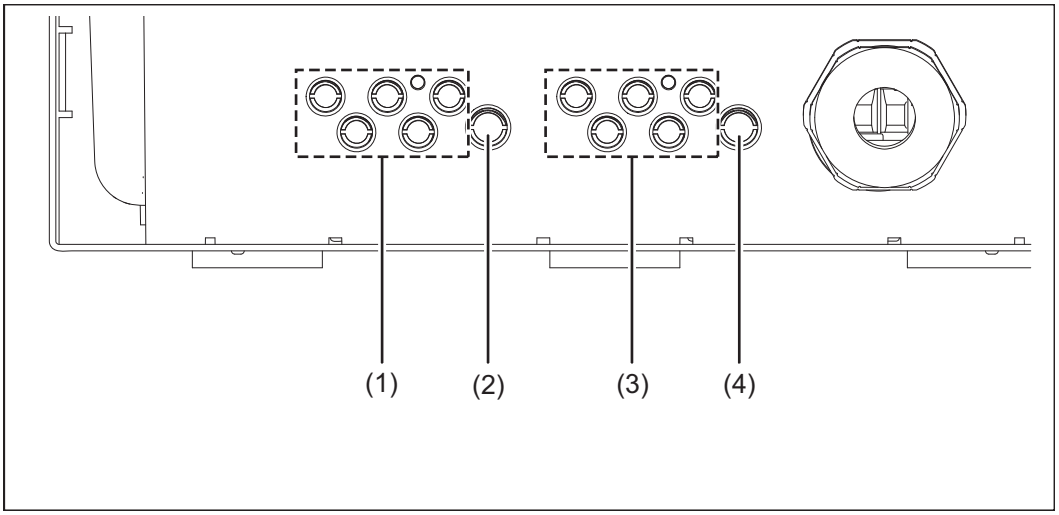


Connection options on the wall bracket of the Fronius IG TL

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 5.0

NOTE! You should only remove the number of knockouts required for the available cables (e.g., 3 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 surface, different dowels and screws may be required for installing the wall bracket. Therefore, these dowels and screws are not part of the scope of supply for the inverter. The system installer is responsible for selecting the proper dowels and screws.

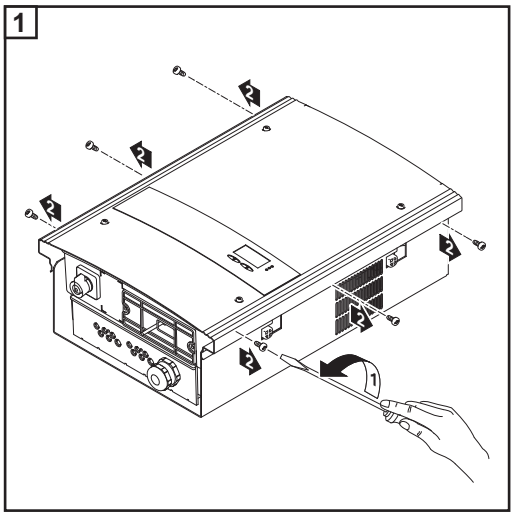
The head height of the screws used may be a maximum of 6 mm.
When using washers, the maximum head height of th screws is reduced by the thickness of the washers.

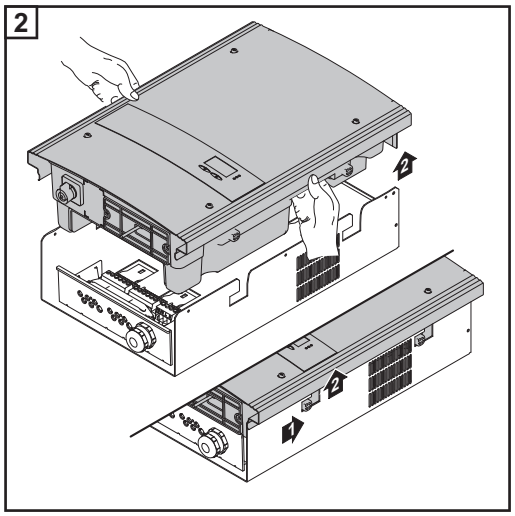
Screw recommendation

The manufacturer 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.





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

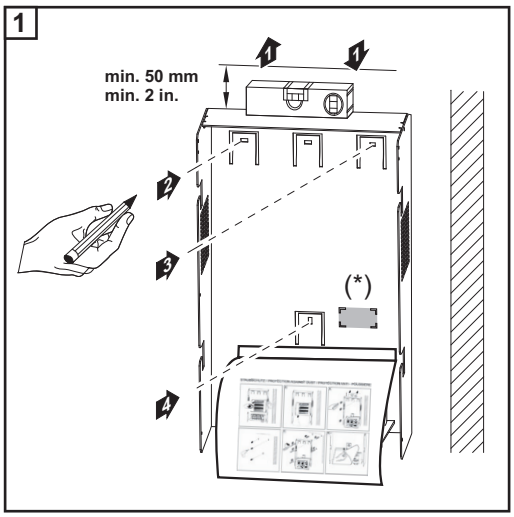
Installation position

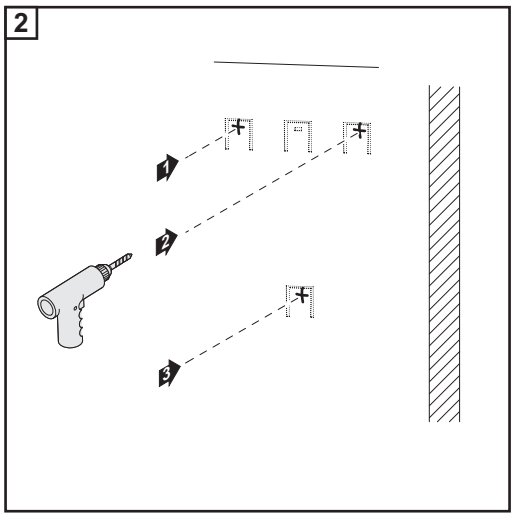
NOTE! The inverter should only be installed upright, e.g., on a wall, column, or metal carrier.

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.

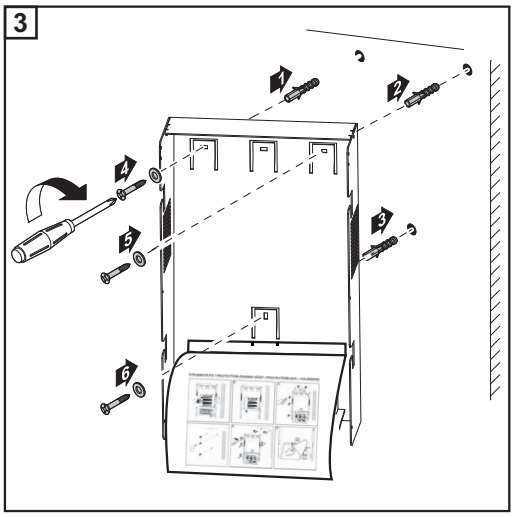
- When drilling, make sure that terminals and contacts in the connection area do not become soiled or wet. Leave the dust cover in position.
- The wall bracket apart from the power stage set does not possess the degree of protection of the complete inverter and, therefore, should not be attached without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

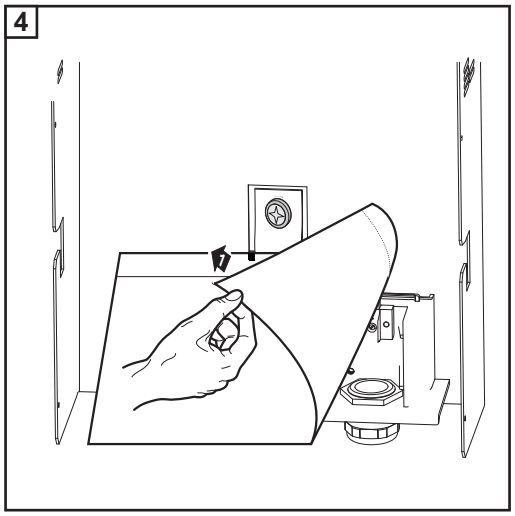




IMPORTANT! Attach the wall bracket so that the display marking (*) on the wall bracket is at eye level.

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

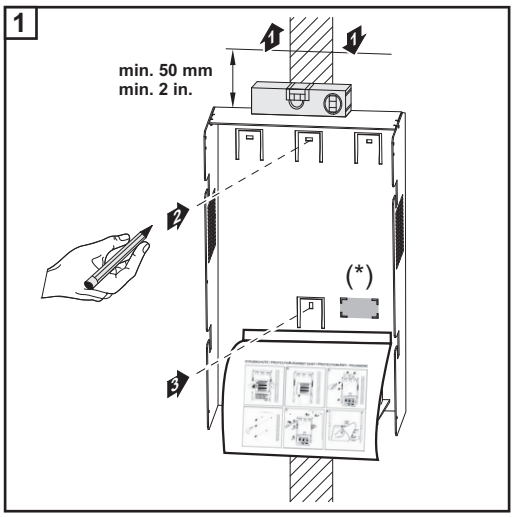


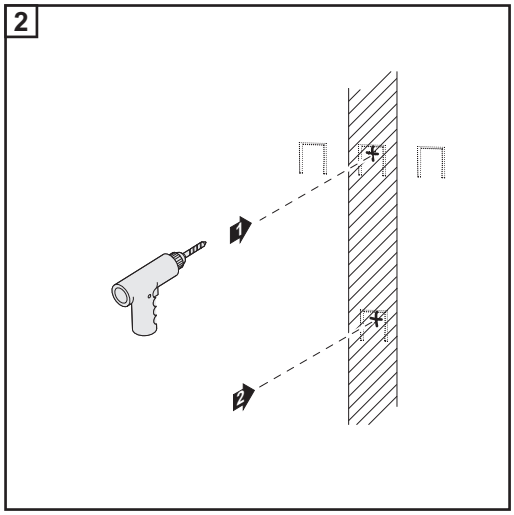


Attaching the wall bracket - Column installation

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

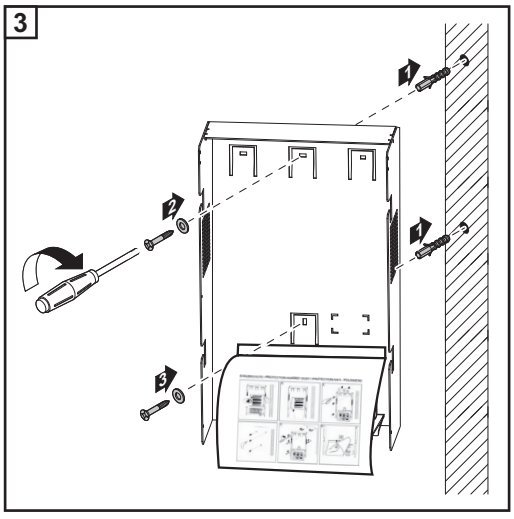
- When drilling, make sure that terminals and contacts in the connection area do not become soiled or wet. Leave the dust cover in position.
- The wall bracket without the power stage set does not possess the same degree of protection as the complete inverter and, therefore, should not be attached without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

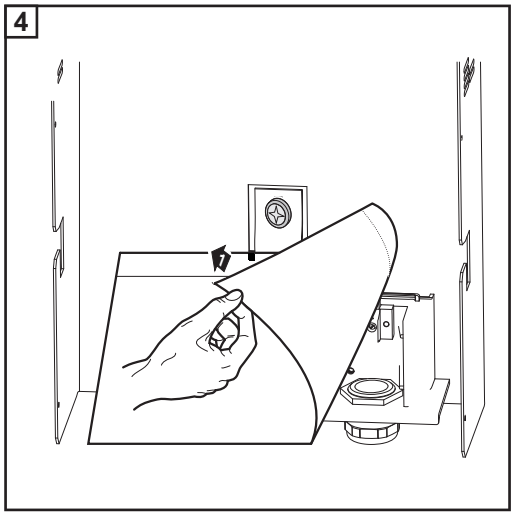




IMPORTANT! Attach the wall bracket so that the display marking (*) on the wall bracket is at eye level.

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





Connecting Fronius IG TL Dummy to the Public Grid Using a Separate Power Supply Unit

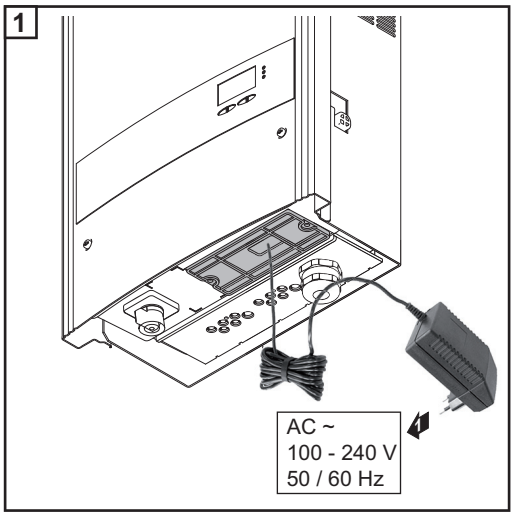
General

Dummy devices receive their power supply from the power unit provided with the dummy device.

IMPORTANT! Do not connect any live AC cables to the AC terminals on the wall brackets.

You may connect live cables or cable pieces for demonstration purposes.

Connecting Fronius IG TL Dummy to the Public Grid Using a Separate Power Supply Unit (AC)

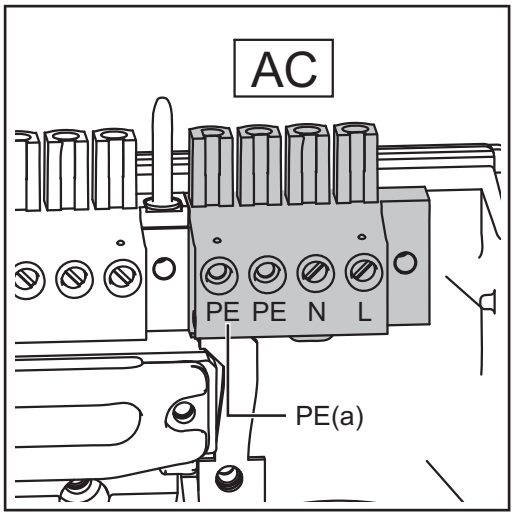


Connecting the Fronius IG TL to the public grid (AC)

Monitoring the Grid

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

AC terminals



Legend:

L	Phase conductor
N	Neutral conductor
PE	Grounding conductor / Ground
PE (a)	Connection option for additional 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! Connect the phase (L), neutral conductor (N), and grounding conductor (PE) cables correctly!

Connecting Aluminum Cables

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

- 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 end of the cable, e.g., using a knife.

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

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

3 Then immediately connect it to the terminal.

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

AC cable cross section

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.

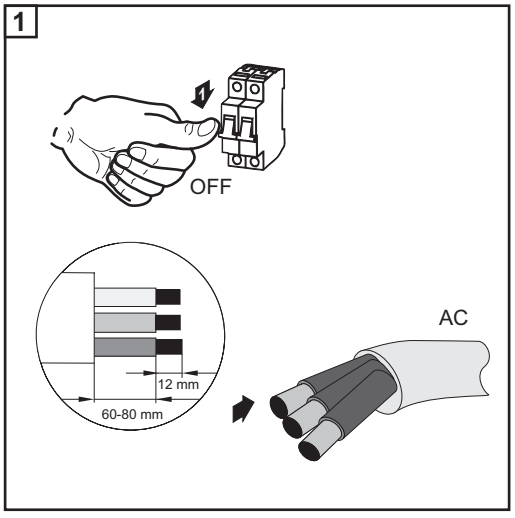
Safety

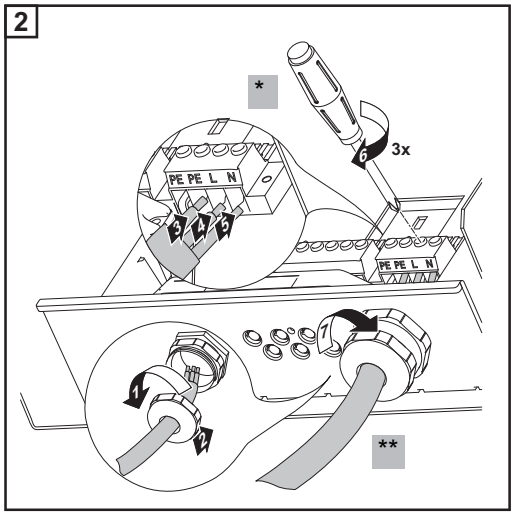
WARNING! An electric shock can be fatal. Danger from grid voltage and DC voltage from solar modules.
- Never work with live wires! Prior to all connection work, make sure that the AC and DC wires are not charged.
- Only an authorized electrician is permitted to connect this inverter to the public grid.

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

Connecting the Fronius IG 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.





* Tightening torque:
min. 1.5 Nm
max. 1.7 Nm

** Tightening torque: 7.5 Nm

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.
- To use the inverter, a neutral conductor connector is required.
  The infeed of the inverter can be adversely affected by a neutral conductor with small dimensions. Therefore, the neutral conductor must have the same dimensions as the other current-bearing conductors.

Maximum AC-side Overcurrent Protection

Inverter	Number of phases	Max. output	Fuse protection
Fronius IG TL 3.0	1	3130 W	1 x C 20 A
Fronius IG TL 3.6	1	3760 W	1 x C 20 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 a universal current-sensitive RCMU according to DIN VDE 0126-1-1. This 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.
In this case, a type A residual current circuit breaker can be used.

If more than one inverter is used, a rated current of 100 mA must be provided for each connected inverter; 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. The solar modules must correspond to protection class II and class A according to IEC 61730, and they 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 electric shock can be fatal. Danger from grid voltage and DC voltage from solar modules.

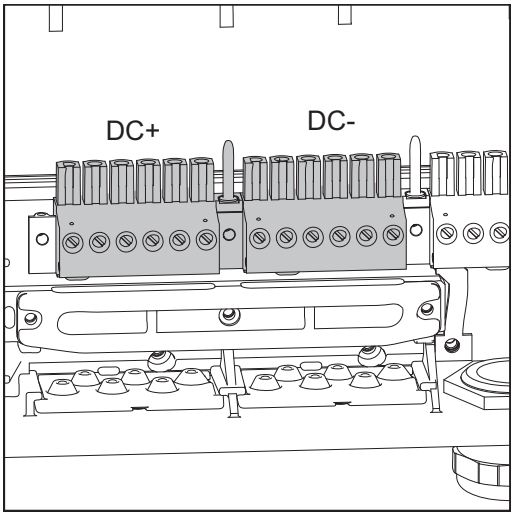
- Never work with live wires! Prior to all connection work, make sure that the AC and DC wires are not charged.
- Only an authorized electrician is permitted to connect this inverter to the public grid.

CAUTION! Danger of injury from hazardous electrical voltage. Transformerless systems can transfer leakage currents to solar module frames and mounts due to their topology.
Connect and ground all solar module frames and mounts and other conductive surfaces.
To ground solar module frames or mounts, please refer to the specifications provided by the solar module manufacturer and national guidelines.

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

CAUTION! Overloading the inverter may damage it. Only connect a maximum of 20 A to each DC terminal.

DC terminals



DC+ and DC- terminals on the Fronius IG TL

Connecting aluminum cables

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

- 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 end of the cable, e.g., using a knife.

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

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

3 Then immediately connect it 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 should be 2.5 mm².

NOTE! To ensure that the strain relief device is effective 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. Reverse polarity in the solar module strings will not cause any damage to the inverter.

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

Information on Dummy Devices

A dummy device (which is labeled as such on its rating plate) should not be connected to a photovoltaic system for real operation and may only be used for demonstration purposes.

IMPORTANT! When using a dummy device, you should never connect a live DC cable to the DC connection sockets.

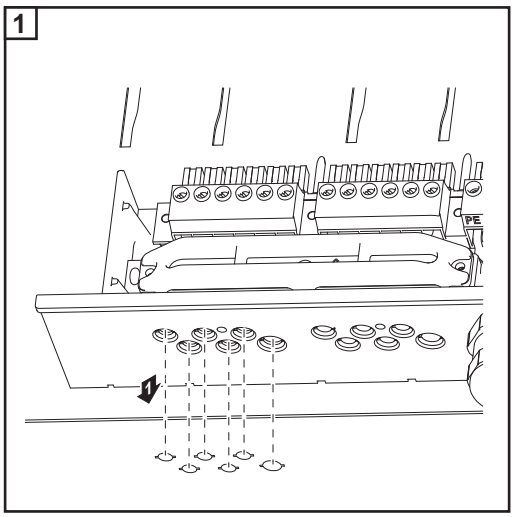
You may connect live cables or cable pieces for demonstration purposes.

The following section "Connecting Solar Module Strings to the Fronius IG TL (DC)" only applies to genuine inverters.

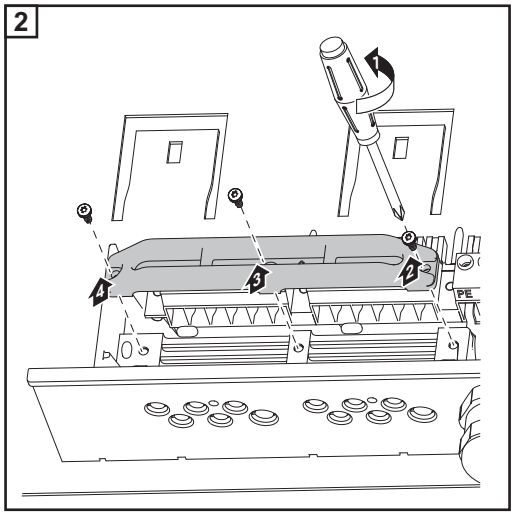
Connecting Solar Module Strings to the Fronius IG TL (DC)

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

1

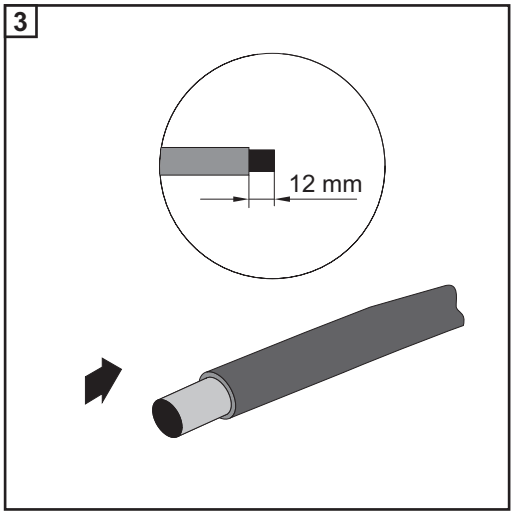


2

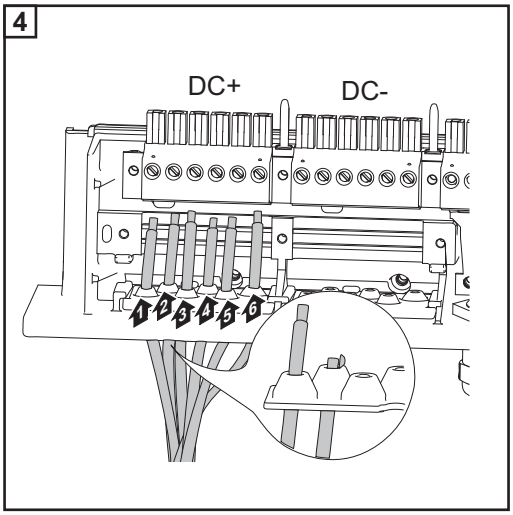


NOTE! Finely stranded cables up to conductor class 5 can be connected to the DC-side terminals without wire end ferrules.

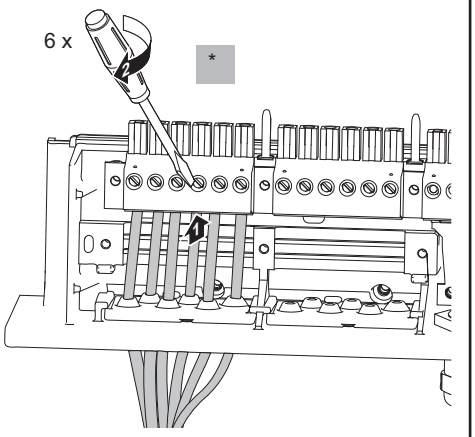
3



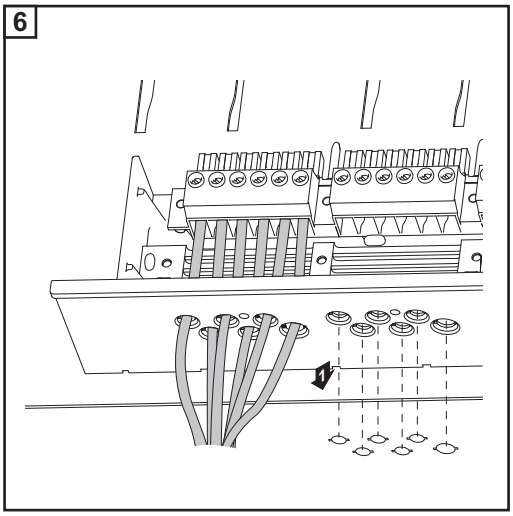
4



5

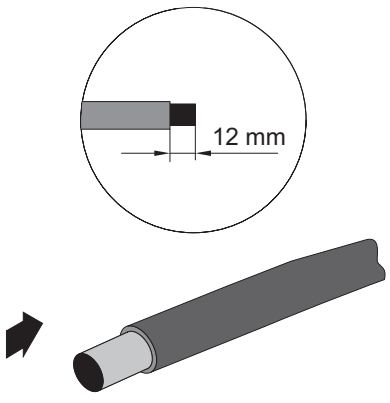


6

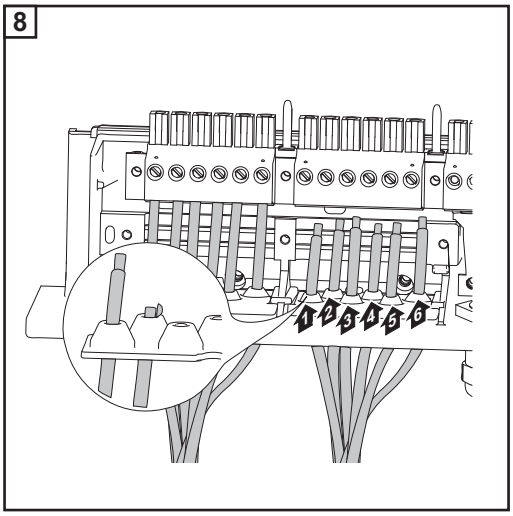


* Tightening torque:
min. 1.5 Nm
max. 1.7 Nm

7

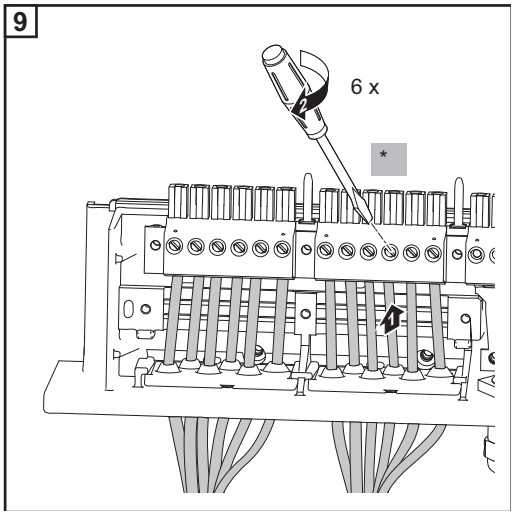


8



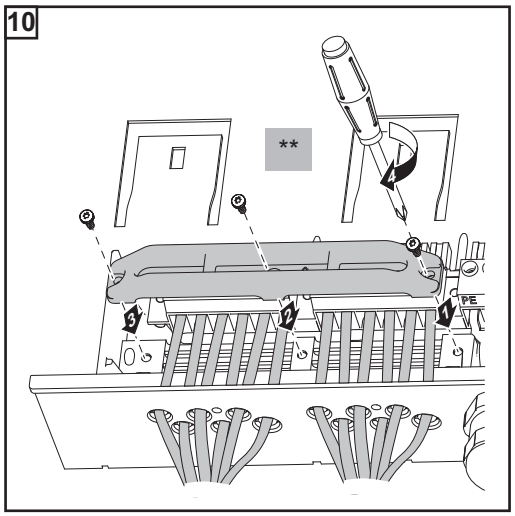
NOTE! When attaching the DC cables using a strain-relief device, make sure that no kinks form in the connected DC cables. Otherwise, you may no longer be able to close the inverter.

9



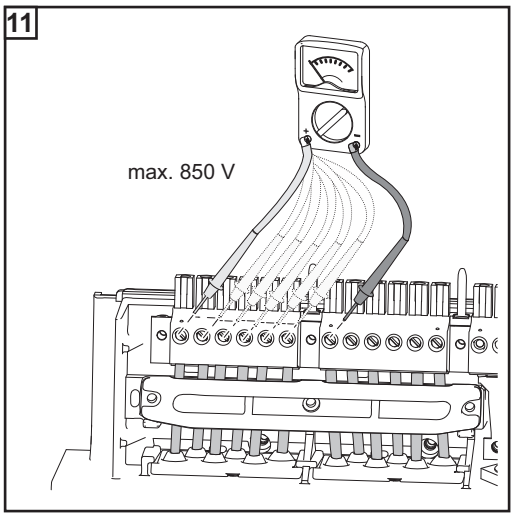
* Tightening torque:
min. 1.5 Nm
max. 1.7 Nm

10



** Tightening torque:
min. 1.5 Nm
max. 1.9 Nm

11



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.

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 according to 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 electric 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 electric shock can be fatal. Danger from residual voltage from capacitors.

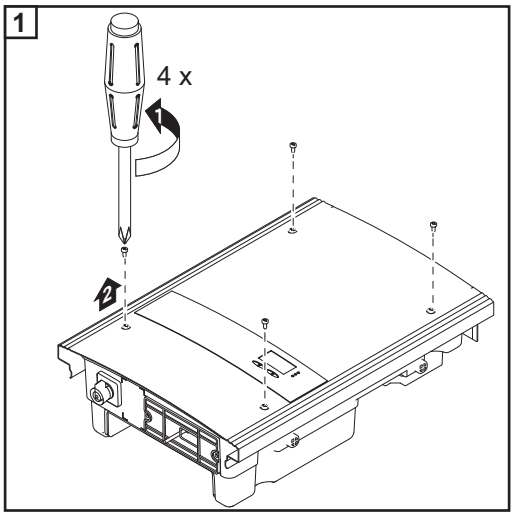
You must wait until the capacitors have discharged. Discharge takes 3 minutes.

Inserting string fuses into the Fronius IG TL

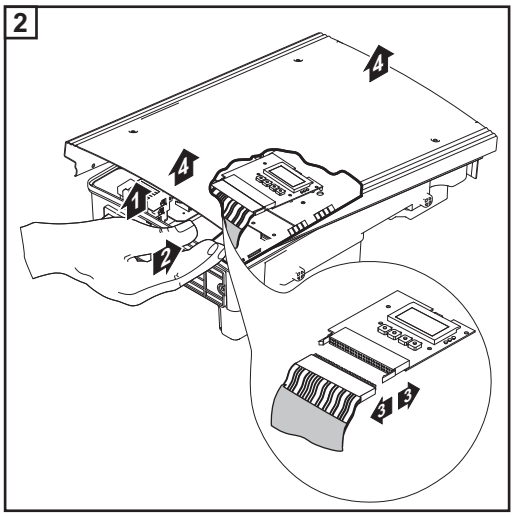
IMPORTANT! If you add string fuses at a later date, follow all safety information.

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.

1

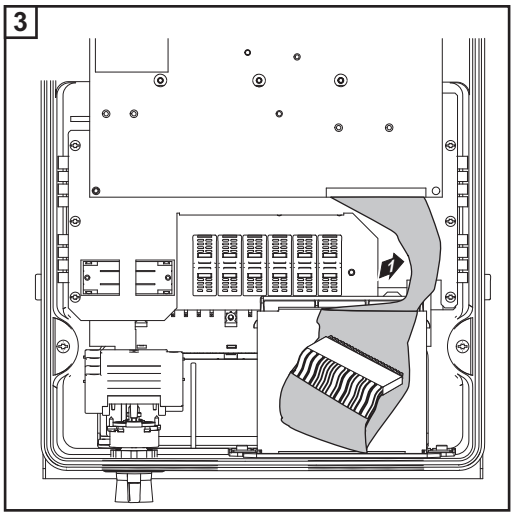


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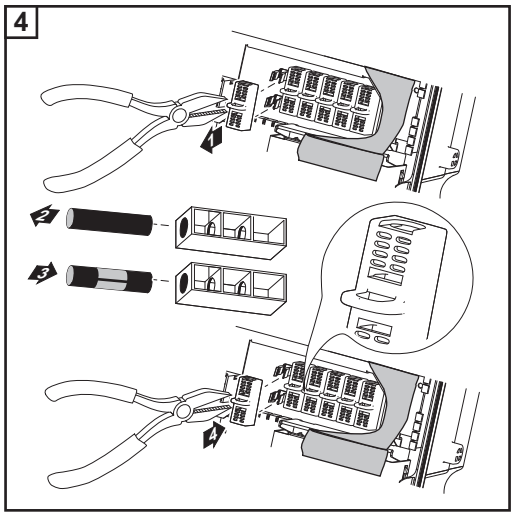


- Carefully lift up the housing cover on the bottom of the power stage set
- Reach into the opening
- Disconnect the ribbon cable from the PC display board

3



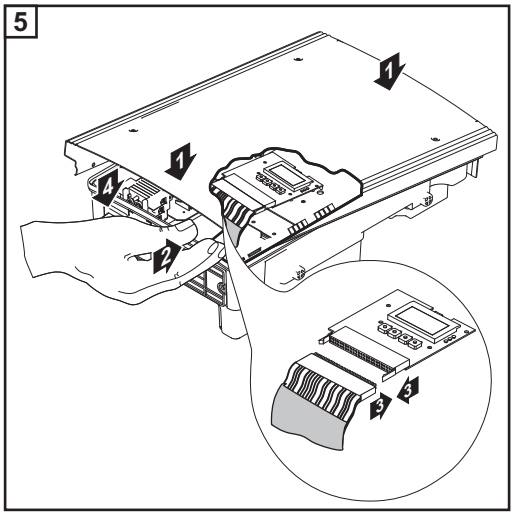
4



NOTE!

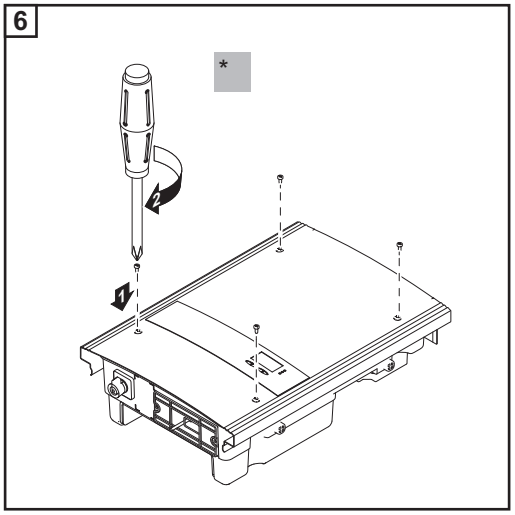
- Use pliers to insert fuses with a fuse cover into their respective fuse holder
- To prevent the fuse from falling out, only insert the fuse cover into the fuse holder with the opening upright.
- Do not operate the inverter without fuse covers

5



- 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

6



* Tightening torque: 2.5 Nm

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 met for each solar module string when using fuse protection:
- $I_N > 1.5 \times I_{SC}$
- $I_N < 2.0 \times I_{SC}$
- $U_N \geq 850$ V DC
- Fuse dimensions: Diameter 10.3 x 35 - 38 mm

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

Effects of Using Underrated Fuses

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

Fuse recommendations

NOTE! Only select fuses suitable for a voltage of 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. Moreover, all warranty claims are voided.

Application example

Example: Maximum short circuit current (I_{SC}) for 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 A and nominal voltage of 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: Selection of suitable fuses, e.g., Cooper Bussmann fuses

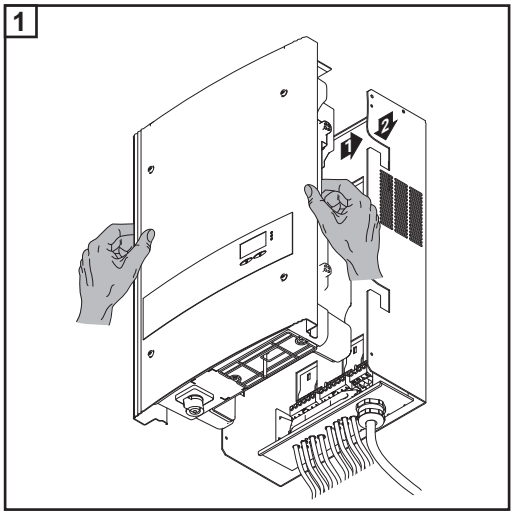
Clipping Power Stage Sets onto the Wall Bracket

Clipping power stage sets onto the wall bracket

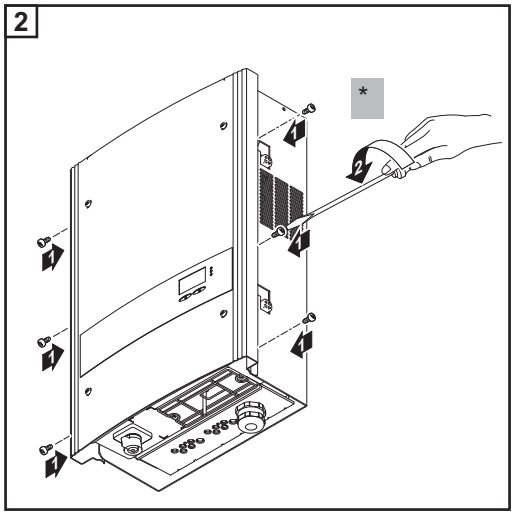
The side areas of the housing cover are designed to function as carrying grips and/or handles.

WARNING! 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 be replaced under any circumstances by other screws that do not provide a proper grounding conductor connection.

1



2



* Tightening torque: 2 Nm

Data Communication and Solar Net

Fronius Solar Net and Data Interface

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

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

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

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

In order to clearly define each inverter in Fronius Solar Net, each inverter must also be assigned an individual number.
You can assign individual numbers as per the "SETUP Menu" section in this manual.

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

More detailed information on cabling DATCOM components can be found at



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

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 seal the inverter securely.

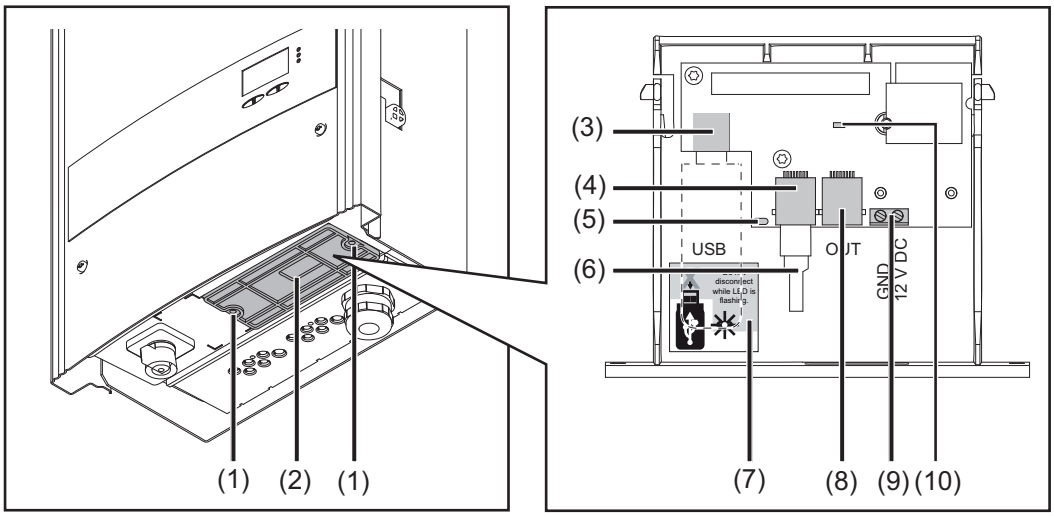
Overcurrent and under-voltage shutdown

The data communication rack has a shutdown function that interrupts the energy supply to Fronius Solar Net and to the 12 V signaling output:
- in the event of overcurrent, e.g., in case of a short circuit
- in the event of under-voltage

The overcurrent and under-voltage shutdown function does not depend on the direction of the current flow. When a current flow of > 3 A or a voltage of < 6.5 V is measured in Fronius Solar Net, the energy supply is interrupted to Fronius Solar Net.
The energy supply is re-established automatically.

Data communication connections

Data communication rack with connections:



Item	Description
(1)	Screw for attaching 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 A 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
(6)	Termination plug When networking several DATCOM components, a termination plug must be placed on each free IN and/or OUT connection of a DATCOM component. The termination plug is not part of the scope of supply for the inverter.
(7)	Safety information for removing USB sticks
(8)	Solar Net OUT connection 'Fronius Solar Net' output for connecting other DATCOM components (e.g., inverters, sensor box)
(9)	12 V output (no 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)
(10)	'Solar Net' LED Indicates the current status of Fronius Solar Net and the 12 V signaling output

'Solar Net' LED description

The 'Solar Net' LED lights up:
Power supply for data communication within Fronius Solar Net and the 12 V signaling output are OK

The 'Solar Net' LED flashes continually 3x per second:
Overcurrent or short circuit at the 12 V signaling output (e.g. connected consumer load is too high or faulty), data communication in Fronius Solar Net is OK

The 'Solar Net' LED is off:
Error in data communication in Fronius Solar Net; the 12 V signaling output is deactivated
- Overcurrent (current flow > 3 A, e.g. due to a short circuit in Fronius Solar Net)
- Under-voltage (no short circuit, voltage in Fronius Solar Net < 6.5 V, e.g. if too many DATCOM components are in Fronius Solar Net and the electrical supply is insufficient)

  In this case, the DATCOM components require an external energy supply via an external power supply unit.

  Check other DATCOM components to detect any under-voltage present.

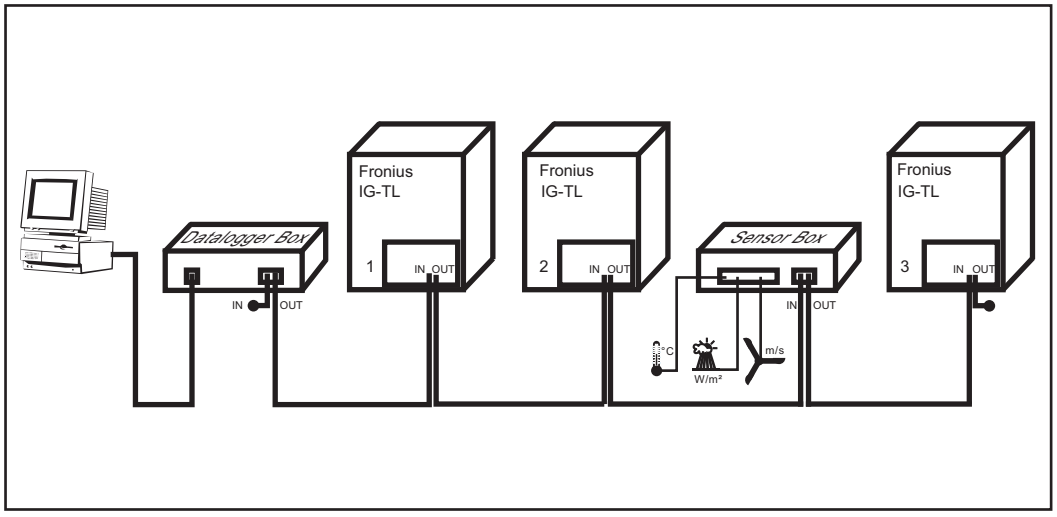
The 'Solar Net' flashes briefly every 5 seconds:
After a shutdown due to over-current or under-voltage, the inverter tries to restore the energy supply in the Fronius Solar Net every 5 seconds so long as there is an error, for example.

Once the error has been corrected, power is restored to Fronius Solar Net within 5 seconds and then to the 12 V signaling output 1 second later.

During this time the 'Solar Net' LED flashes 3x per second. Once there is no longer an error at the signaling output, the 'Solar Net' LED lights up again.

Example

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



= terminating plug

Explanation of illustration:
Data network with 3 inverters, one Data Logger 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 RS 422 interfaces - an input and an output.
RJ45 plug connectors are used to establish the connection.

Maximum output current for data communication and the 12 V signaling output

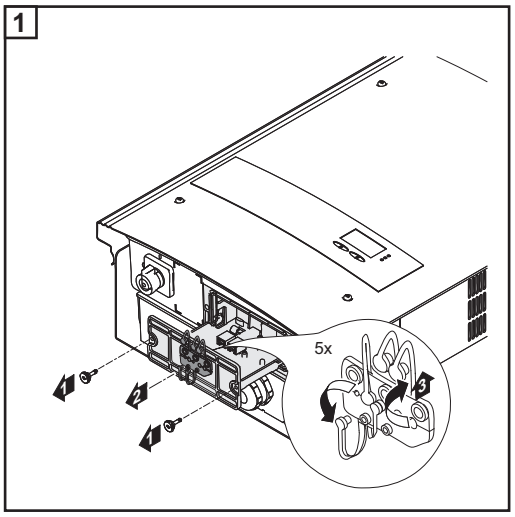
The maximum total output current for data communication and the 12 V signaling output is 500 mA, which can be divided up as follows:

Data communication	200 mA	500 mA
12 V signaling output	+ 300 mA	+ 0 mA
Total	500 mA	500 mA

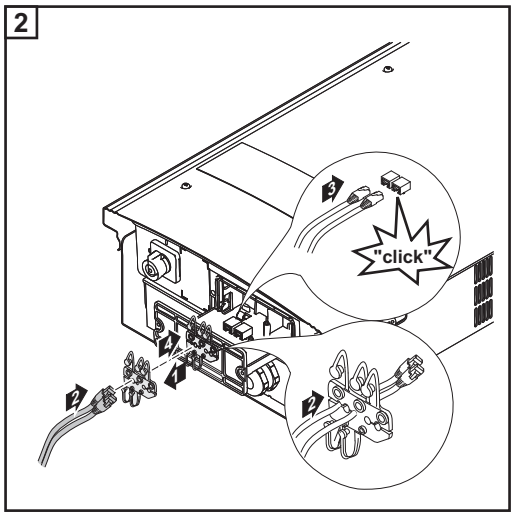
For more information about DATCOM components, see the "DATCOM Detail" operating instructions.

Connecting data communication cables to inverters

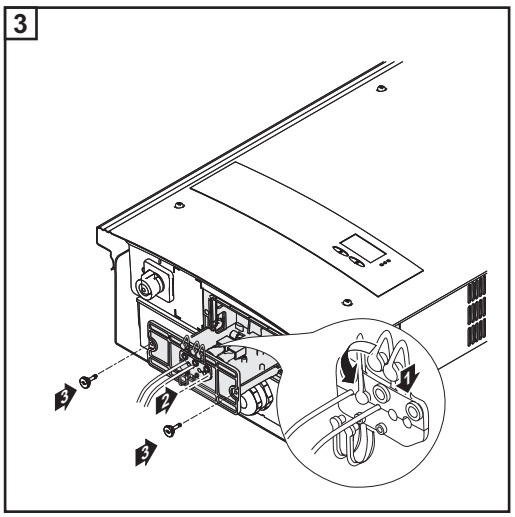
1



2



3



IMPORTANTWhen networking several DATCOM components, a terminating 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 the appropriate blanking plugs.

USB Stick as a Data Logger and for Updating Inverter Software

USB stick as a data logger

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

Logging data saved to the USB stick can at any time
- be imported into the Fronius Solar.access software via the included FLD file,
- be viewed directly in third-party applications (e.g., Microsoft® Excel) via the included CSV file.

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

Data on the USB stick

If a USB stick is used as a data logger, 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 = a serial 2-digit number):
  Log file for reading out data in Fronius Solar.access.

  You can find additional information on the Fronius Solar.access Software in the "DATCOM Detail" operating instructions at http://www.fronius.com

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

Structure of the CSV file:

(1) (2) (3) (4)

	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

(5) (6) (7)

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	

(1) ID
(2) Inverter no.
(3) Inverter type (DATCOM code)
(4) Logging interval in seconds
(5) Energy in watt-seconds with reference to the logging interval
(6) Averages over the logging interval
(7) Additional information

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.

CSV file
CSV files can store only 65535 rows (data records) (up to Microsoft® Excel version 2007, afterwards there is 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 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 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 from the different logging intervals:

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

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

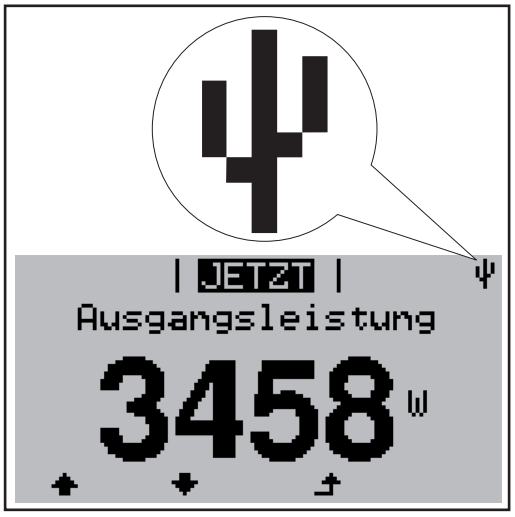
Due to the number of USB sticks on the market, we cannot guarantee that every USB stick will be recognized by the inverter.

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 (it may also be flashing).

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

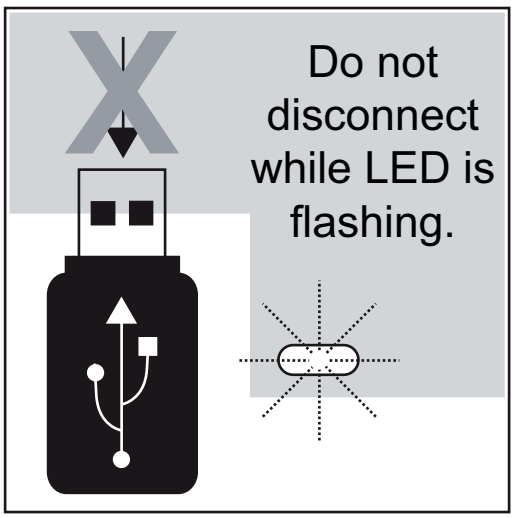
USB stick for updating inverter software

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 be updated through a data logger or a Fronius SmartConverter (= through a PC/ laptop connection) in conjunction with the Fronius solar.update Software (see 'Fronius Solar.update' 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 pre-set configuration

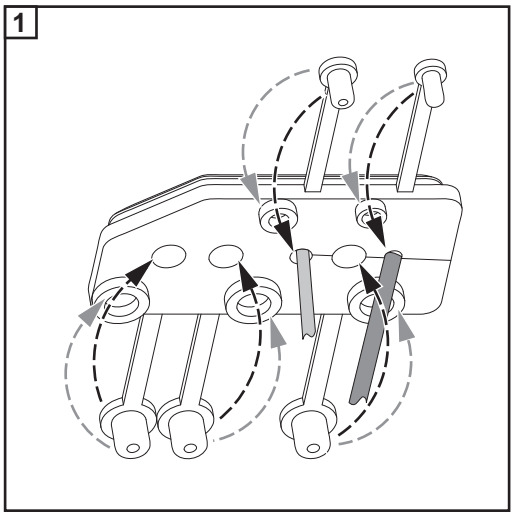
The inverter has been pre-configured at the factory. The language and time must be set during the first startup.

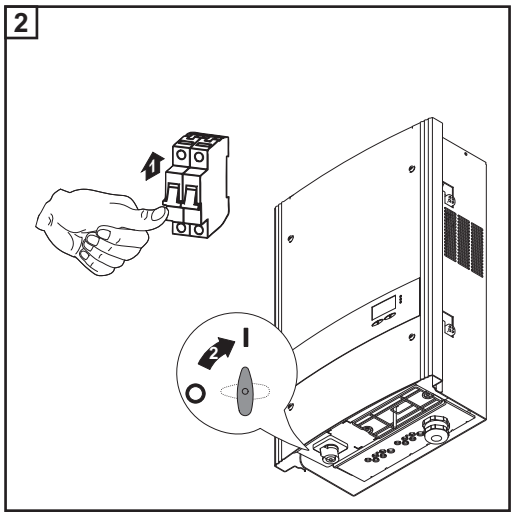
To change your inverter settings, please see ‘The Setup Menu’ section in these instructions.

First startup

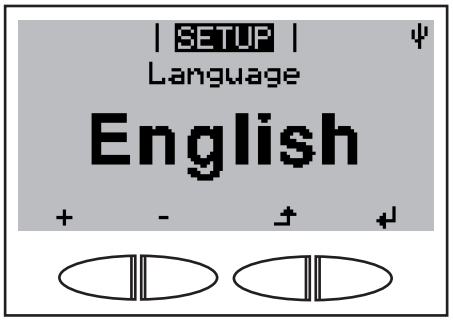
Once the inverter has been connected to the solar modules (DC) and the public grid (AC), turn the main switch to position - 1 -.

NOTE! To ensure the inverter maintains its degree of protection:
- Insert blanking plugs into all openings at the sealing insert where there are no cables
- If cables are run through the sealing insert, insert the remaining blanking plugs in the recesses located on the outside





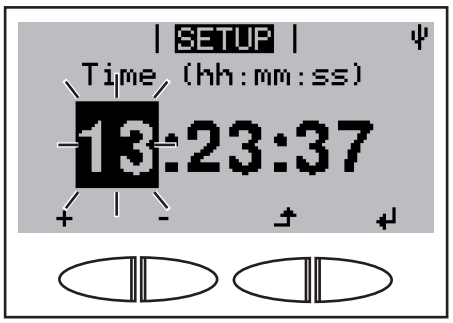
- As soon as the solar modules produce sufficient power, the Startup LED lights up orange. The inverter switches to the Startup phase. The orange LED indicates that the feed-in mode of the inverter will begin shortly.
- After the automatic inverter start, the Operating Status LED lights up green.
- Provided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

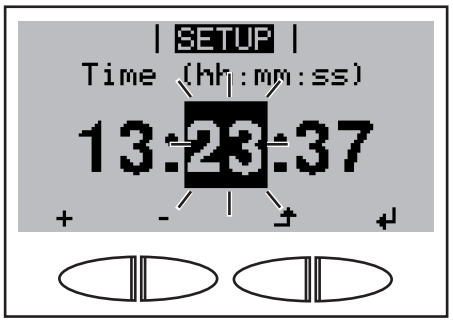
- Finally, the time and date must still be set:



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

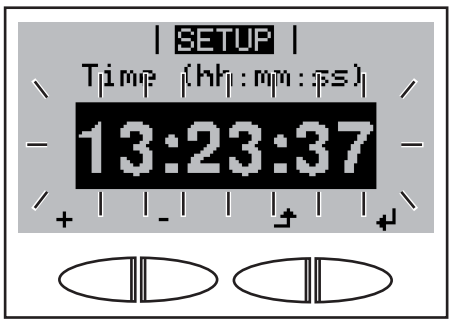
+ – 5 Use the ‘Up’ and ‘Down’ keys to select a value for the hour.

↵ 6 Press the "Enter" key.



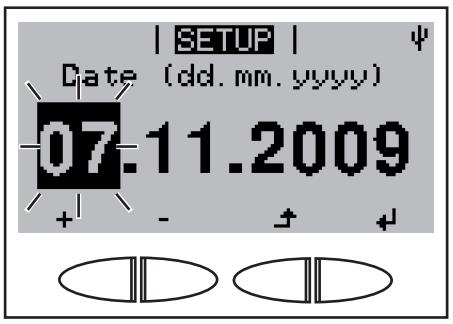
The digits for the minutes flash.

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



the set time flashes.

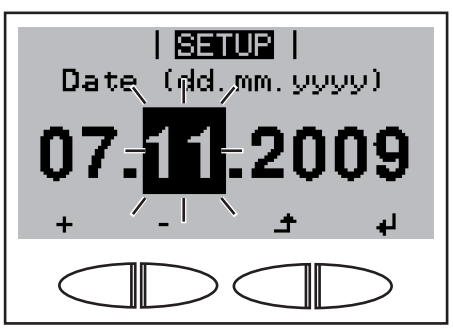
↵ 8 Press the ‘Enter’ key



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

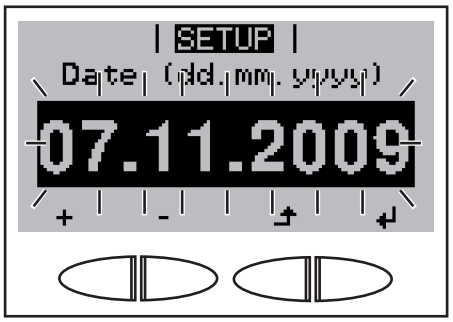
+ – 9 Use the ‘Up’ and ‘Down’ keys to select a value for the day.

↵ 10 Press the ‘Enter’ key



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 flashes.

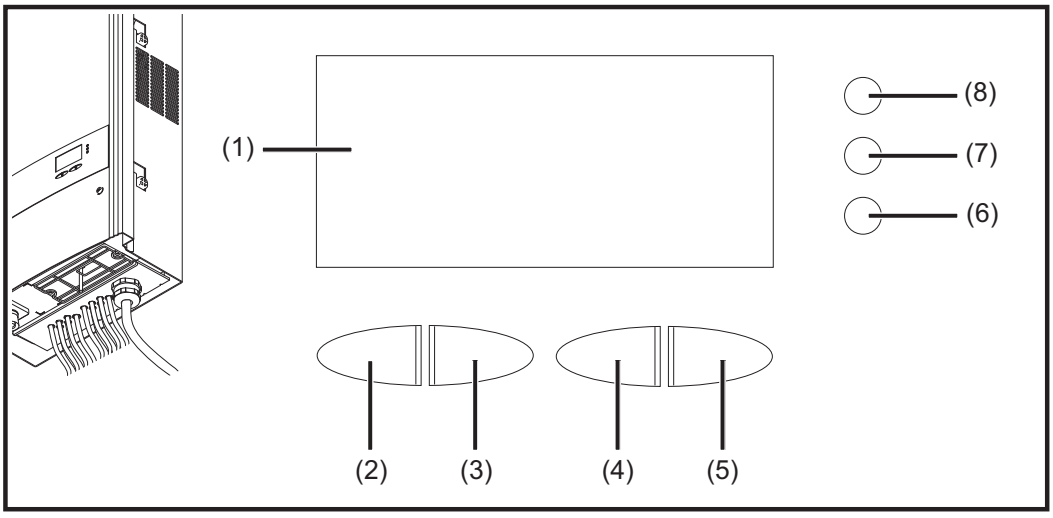
↵ 12 Press the ‘Enter’ key

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

Operation

Keys and symbols

Keys and Symbols

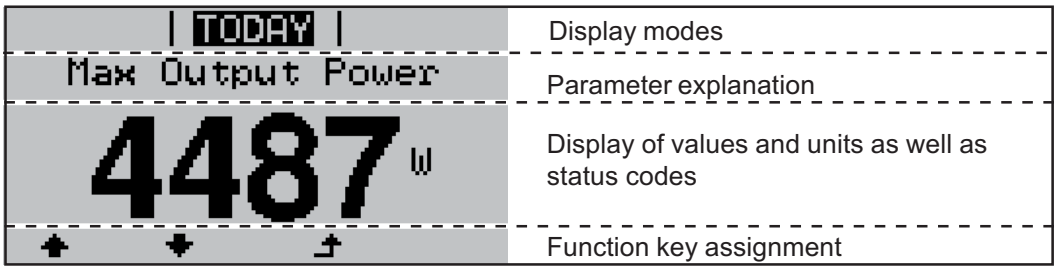


Item	Description
(1)	Display for displaying values, settings and menus
	Function keys - each has a different function depending on the selection:
(2)	‘Left/Up’ key for navigating left and up
(3)	‘Down/Right’ key for navigating down and right
(4)	'Menu/Esc' key for switching to the menu level to exit 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

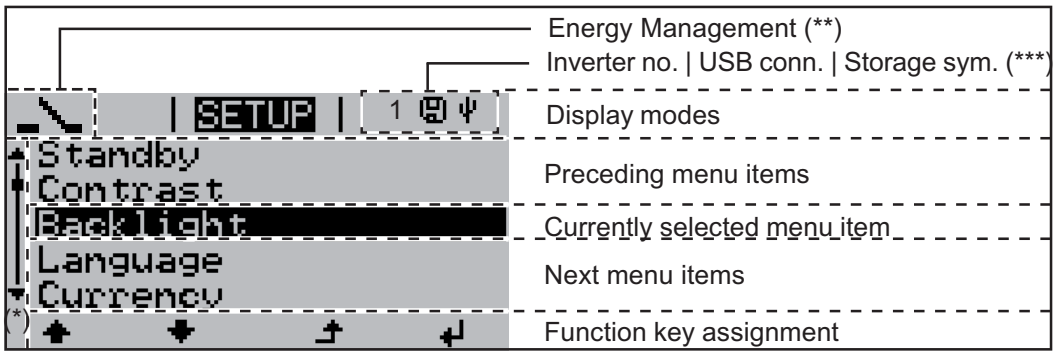
Display

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

IMPORTANT! The inverter display is not a calibrated measuring instrument. 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

(**) The Energy Manager symbol is displayed, if the Energy Manager function has been activated

(***) WR no. = InverterDATCOM number,
Store icon - appears briefly when set values are stored,
USB connection - appears if a USB stick has been inserted

Symbols for function key functions

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

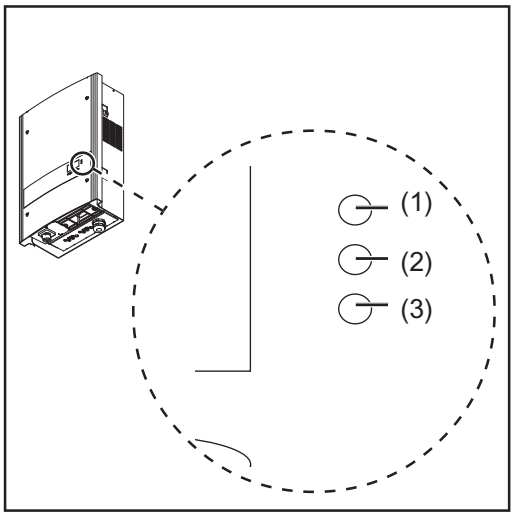
◀	Navigation: Left
▲	Navigation: Up
+	Increase value
▶	Navigation: Right
▼	Navigation: Down
–	Reduce value





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 appropriate 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 lights up as soon as the inverter has completed the startup phase, and stays green as long as the operation of feeding power into the grid continues. It indicates problem-free operation of the photovoltaic system.

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’, under the section ‘Status diagnosis and troubleshooting.’

Startup Phase and Grid Feed-in Mode

Startup phase

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

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

b) Synchronization with the grid

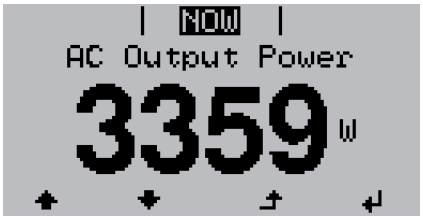
c) Startup test
Before the inverter starts feeding energy into the grid, the conditions of the grid are tested in accordance with local regulations.
The startup test can take anything from just a few seconds to several minutes depending on national regulations.

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.:



The operation of feeding energy into the grid

- After the tests are completed, the inverter starts feeding energy 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.

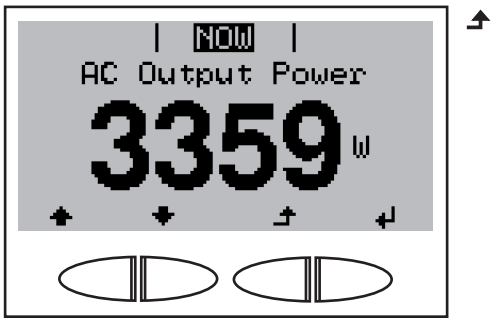
The display illumination is activated.

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

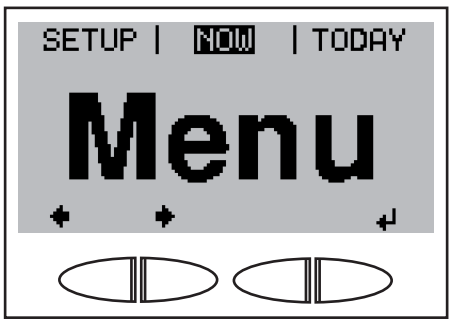
Automatic Deactivation of Display Illumination / Switching to the "NOW" Display Mode

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 can be switched to the "NOW" display mode from any menu level, except for the "Standby" menu item
- the current output power is displayed.

Accessing the menu level



1 Press the ‘Menu’ key.



‘Menu’ appears on the display.

The inverter is now at the menu level.

From the menu level you can
- Set the desired display mode
- Access the Setup menu

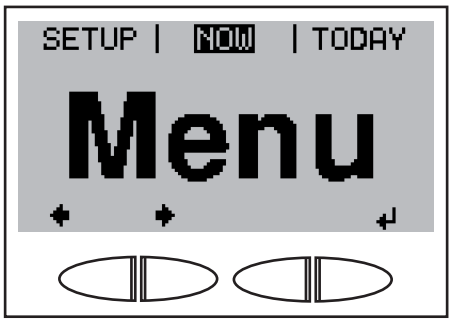
The Display Modes

Display modes

The following display modes are available for the inverter:

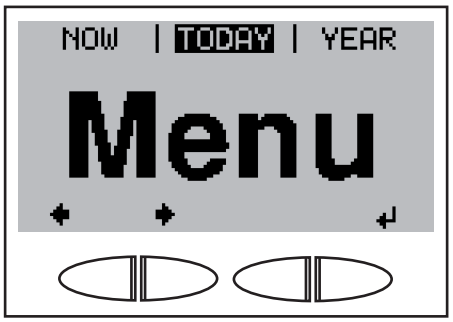
The ‘NOW’ display mode	.....	Displays real-time values
The ‘TODAY’ display mode	.....	Displays values for power fed into the grid during that day
The ‘YEAR‘ display mode	.....	Shows data for the current calendar year
The ‘TOTAL’ display mode	.....	Displays values for power fed into the grid since your inverter first started operating

Selecting a display mode

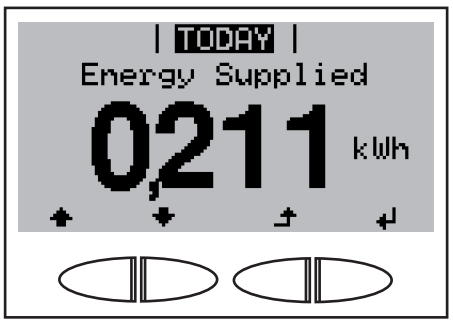


1 Access the menu level

2 Use the ‘left’ or ‘right’ keys to select your preferred display mode



3 Press the ‘Enter’ key



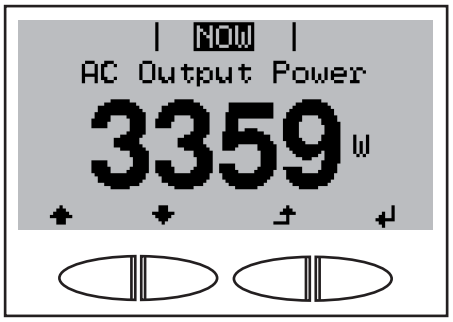
The first display value of the selected display mode is shown.

Overview of display values

Display mode	Unit	Display value
'NOW'	W	Output Power Daily Characteristic Curve
	V	AC Grid Voltage
	A	Output Current
	Hz	AC Grid Frequency
	V	PV Array Voltage
	A	Solar Power String Control Status
	HH:MM $_{SS}$	Clock
	DD.MM $_{YY}$	Date
'TODAY' 'YEAR'	kWh / MWh	Fed-In Energy Daily Characteristic Curve ('TODAY')
'TOTAL'	Currency	Yield
	g / kg	CO_2 Savings
	W	Max. Output
	V	Max. Grid Voltage
	V	Max. PV Array Voltage
	HH:MM	Operating Hours

Display Values in the ‘NOW’ Display Mode

Selecting a display mode



First display value in the ‘NOW’ display mode

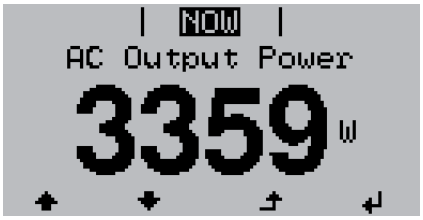
◆▶ 1 Selecting the ‘NOW’ display mode

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

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

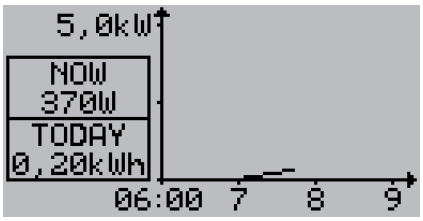
▲ Use the ‘Up’ key to scroll back.

Display values in the ‘NOW’ display mode



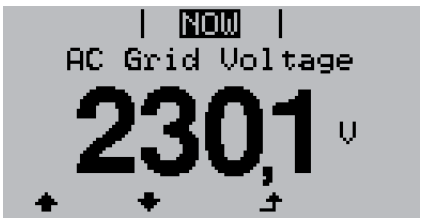
Output
power supplied to the grid at a given moment (Watts)

Press the ‘Enter’ key to display the daily characteristic curve.

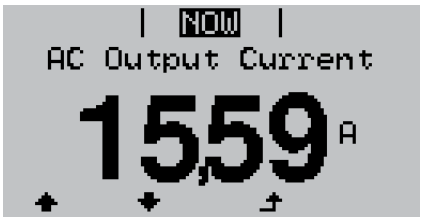


Daily Characteristic Curve
graphically represents the course of power output during the day. The time axis is automatically scaled.

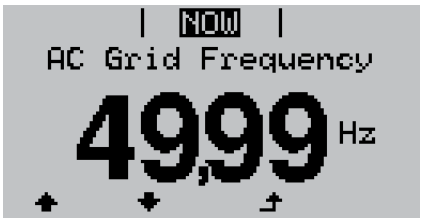
Press the ‘Back’ key to close the display.



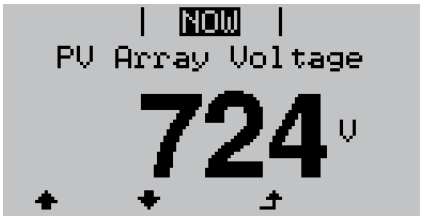
Grid Voltage
(Volts)



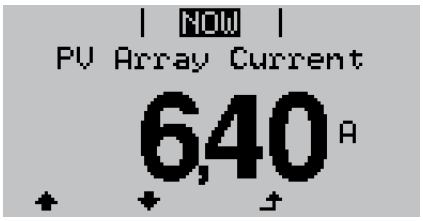
Output Current
current supplied to the grid at a given moment (Amperes)



Grid Frequency
(Hertz)



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



Solar Power
current supplied by solar array at the moment of data display (Amperes)

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



String Control Status
displays the PV array current produced during the day on channel 1 and channel 2, respectively, and the present deviation between them.

Press the ‘Back’ key to close the display.



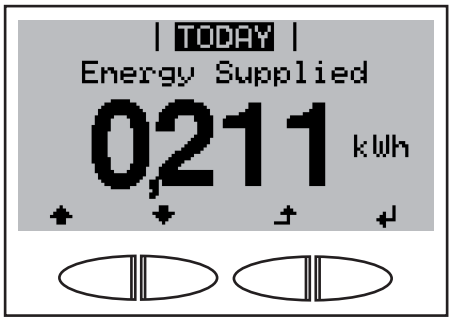
Time
When the time on the inverter or a system upgrade is changed, this changes the time on all devices connected via Solar Net.



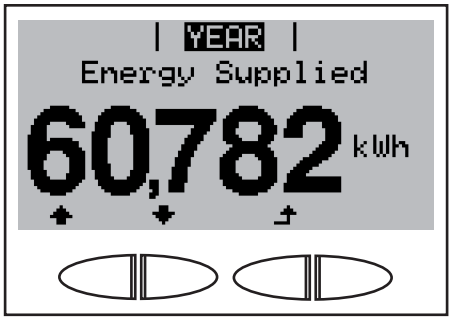
Date
When the date on the inverter or a system upgrade is changed, this changes the date on all devices connected via Solar Net.

Display Values in the ‘TODAY’ / ‘YEAR’ / ‘TOTAL’ Display Modes

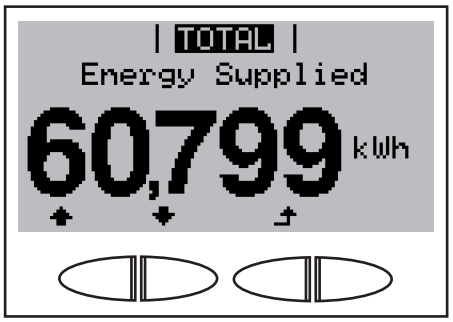
Selecting the ‘TODAY’ / ‘YEAR’ / ‘TOTAL’ display mode



The First Display Value in the ‘TODAY’ Display Mode



The first display value in the ‘YEAR’ display mode



The first display value in the ‘TOTAL’ display mode

◆ ▶ 1 Selecting the ‘TODAY,’ ‘YEAR,’ or ‘TOTAL’ display mode

The first display value appears in the selected display mode.

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

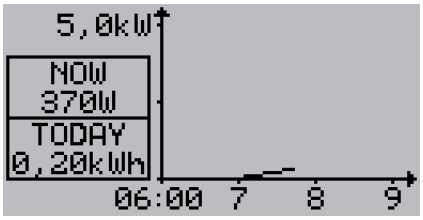
▲ Use the ‘Up’ key to scroll back.

Display values in the 'TODAY' / 'YEAR' / 'TOTAL' display modes



Output Energy
energy fed into the grid over a given period of time (kWh / MWh)

Press the 'Enter' key to display the daily characteristic curve (only in the 'Today' display mode).



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

Press the 'Back' key to close the display.

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



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

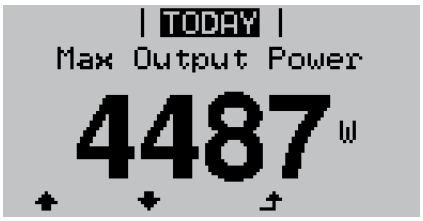
As was the case for the output energy, readings may differ from those of other instruments.

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

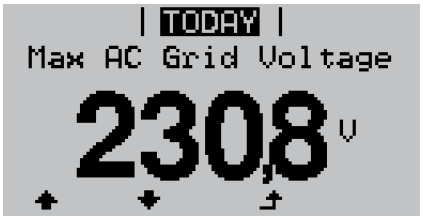


CO_2 Savings
CO_2emission (g / kg) saved during the period monitored

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



Maximum Output Power
highest output power during observation period (W)



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



maximum PV Array Voltage
highest reading of solar module voltage (V) during 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.

IMPORTANTThe time must be set correctly for day and year values to be displayed properly.

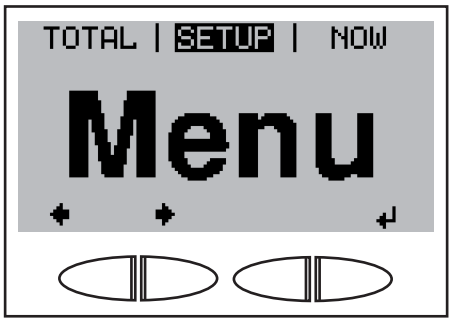
The Setup Menu

Presetting

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

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

Accessing the Setup menu

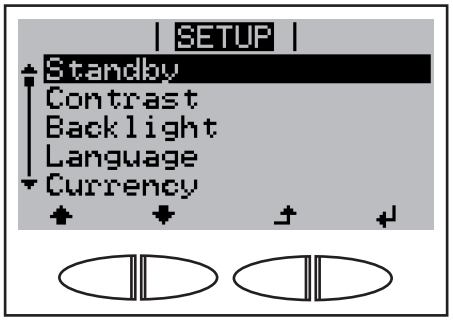


'SETUP' mode selected at the menu level

1 Switch to the menu level (by pressing the 'Menu' key).

2 Select the 'SETUP' mode using the 'Left' or 'Right' keys.

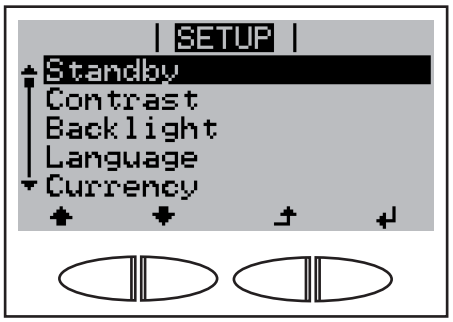
3 Press the 'Enter' key.



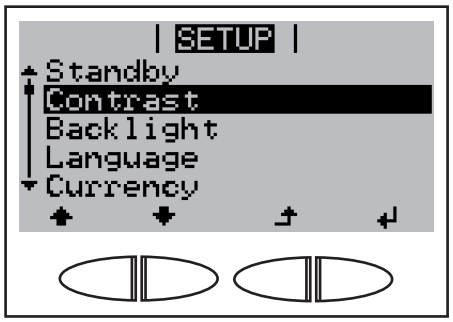
'Standby' menu item

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

Scrolling through menu items



Example: 'Standby' menu item



Example: 'Contrast' menu item

1 Accessing 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

- The power electronics are switched off in standby mode. No power is fed into the grid.
- The Startup LED lights up orange.
- In standby mode, no other menu item can be accessed or set in the Setup menu.
- 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’).

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

1 Select the ‘Standby’ menu item.

2 Press the ‘Enter’ key.

The display alternates between ‘STANDBY’ and ‘ENTER.’
The Standby mode is now activated.
The Startup LED lights up orange.

Restoring the grid feed:

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

1 Press ‘Enter’ to restore the grid feed.

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

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 Initial setting for 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 the display language

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

Currency Currency setting 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 the CO2 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., the 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

DATCOM

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

Setting range	Status / inverter number / night mode / protocol type

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

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

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

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

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 as long as a Data logger 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 as 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

Signal relay

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

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

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

Signal Mode
for selection of the various functions of the 12 V output to the data communications rack:
- Alarm function
- Active output
- Energy manager

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

Alarm function:

Permanent / ALL:	Switches the 12 V 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)

Active output:

ON:	The 12 V output is turned on continually while the inverter is operating (as long as the display lights up or displays.)
OFF:	The 12 V output is switched off.

Energy manager:

E-manager:	Via the 'Energy manager' function, the 12 V output can be triggered by assigning a power feed dependent switch-on or switch-off point, so that this functions as an actuator. You can find additional information on the 'Energy manager' function in the following sections: - Energy manager - Energy manager: Notes on configuring the switch-on and switch-off points - Energy manager: Example

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

Switch on point
(only when the 'Energy manager' function is activated)

for setting the effective power limit at which the 12 V output is switched on
Factory setting: 20% of the power rating

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

Switch off point
(only when the 'Energy manager' function is activated)

for setting the effective power limit at which the 12 V output is switched off
Factory setting: 0

Setting range	0 - Switch on point / W / kW / MW

Energy manager

Via the 'Energy manager' function, the 12 V output can be triggered so that this functions as an actuator.
A user connected to the 12 V output can thus be controlled by assigning a power feed dependent switch-on or switch-off point.

The 12 V output is switched off automatically
- When no current is being fed into the public grid supply by the inverter;
- When the inverter is switched manually to standby mode;
- When there is an effective power assignment of 10% of the power rating;
- When there is insufficient solar radiation.

To activate the 'Energy manager' function, select 'E-manager' and press the 'Enter' key. When the 'Energy manager' function is activated, the 'Energy manager' icon is displayed at the top left of the display:

 When the 12 V output is switched off (open contact)

 When the 12 V output is switched on (closed contact)

To deactivate the 'Energy manager' function, select another function and press the 'Enter' key.

Energy manager: Notes on configuring the switch-on and switch-off points

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

Insufficient difference between the switch-on point and the switch-off point or power fluctuations can cause frequent switching cycles.
To avoid excessive switching on and off, the difference between the switch-on and switch-off points should be at least 100 - 200 W.

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

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

Energy manager: Example

Switch on point = 2000 W
Switch off point = 1800 W

If the inverter supplies 2000 W or more, the 12 V output of the inverter is switched on.
If the inverter output sinks below 1800 W, the 12 V output is switched off.

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

IMPORTANT Do not connect any 230 V user directly to the 12 V output.
To control a 230 V user via the 12 V output extra relays or protection is required.

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

Update Software
Updating the inverter software using a USB stick.
For more information about updating inverter software 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 correctly.

String Control

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.

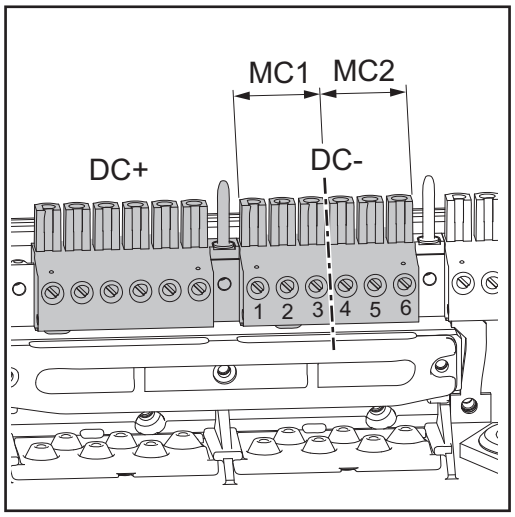
Setting range	Display: Status / Config. Channel ONE / Config. Channel TWO / max. Deviation / Threshold

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

Status
An actual value display of the average solar module string current from measuring channel 1, measuring channel 2, and their present deviation.

Config. Channel ONE
Used to set the number of solar module strings connected to measuring channel 1 (MC1); Measuring channel 1 = DC- terminals 1 - 3

Config. Channel TWO
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 for 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

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

Display range	General / MPP Tracker / Grid Monitoring / Voltage Limits / Frequency Limits / P AC Reduction

General:	
Setup	Country setup
Version	Country setup version
Group	Inverter software update group

MPP Tracker:	
DC mode	DC operating mode
FIX	Voltage value in V for fixed voltage operation
User	Voltage value in V for MPP user operation
Grid Monitoring:	
GMTi	Startup time of the inverter in s
GMTr	Restart time in s after a grid error
ULL	Grid voltage average value over 10 minutes in V.
LL Trip	Detection time for long-term voltage monitoring
Voltage Limits:	
UIL max	Upper inner grid voltage value in V
UIL min	Lower inner grid voltage value in V
UOL max	Upper outer grid voltage limit value in V
UOL min	Lower outer grid voltage limit value in V
Frequency Limits:	
FIL max	Upper inner grid frequency value in Hz
FIL min	Lower inner grid frequency value in Hz
FOL max	Upper outer grid frequency limit value in Hz
FOL min	Lower outer grid frequency limit value in Hz
P AC Reduction:	
Max. P AC	Manual power reduction
GPIS	SoftStart function
GFDPRv	Power reduction depending on grid frequency in %/Hz
GFDPRr	Back to nominal power in %/s (after a power reduction caused by the grid frequency)

Clock

Date and time setting

Unit	HH:MM, DDMMYYYY
Setting range	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

PS Status

The status display of the last error that occurred in the inverter can be shown.

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.

- After pressing the ‘Enter’ key, the power stage set status and the last error that ocurred are displayed.
- Use the ‘Up’ and ‘Down’ keys to scroll through the list.
- Press the ‘Back’ key to exit the status and error list.

Grid Status

The last 5 grid errors that occured can be displayed:
- After pressing the ‘Enter’ key, the last 5 grid errors that occured are displayed.
- Use the ‘Up’ and ‘Down’ keys to scroll through the list.
- Press the ‘Back’ key to exit the grid error display.

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. Accessing the Setup menu
2. Use the ‘Up’ and ‘Down’ keys to select the desired menu item.
   ▲ ▼
3. Press the ‘Enter’ key.
   ↵

The first digit of a value to be set flashes:

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

The second digit of the value flashes.

6. Repeat steps 4 and 5 until...

the entire value flashes.

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

   Press the ‘Esc’ key to not save the changes.
   ↰

The currently selected menu item is displayed.

The available settings are displayed:

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

   Press the ‘Esc’ key to not save the selection.
   ↰

The currently selected menu item is displayed.

Exiting a menu item

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

The menu level is displayed:

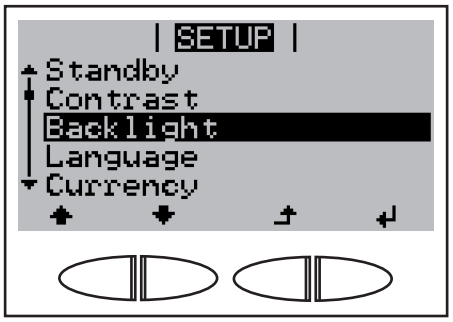


If no key is pressed for 2 minutes,
- the inverter switches to the ‘Now’ display mode from anywhere within the Setup menu (exception: ‘Standby’ menu item),
- the display illumination turns off
- the current output power is displayed

Examples of Setting and Displaying Menu Items

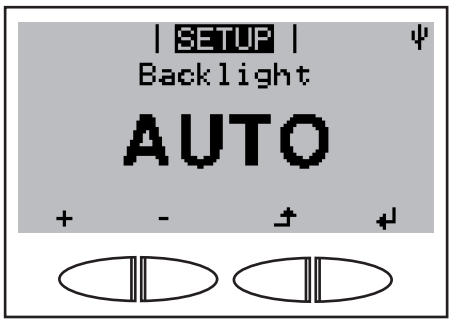
The following examples describe how to set and display menu items:
- Setting the display illumination
- Setting the currency and feed-in tariff
- Updating inverter software using a USB stick
- Safely removing USB sticks
- Activating solar module string monitoring
- Setting the time and date

Setting the display illumination



1 Select the ‘Backlight’ menu item.

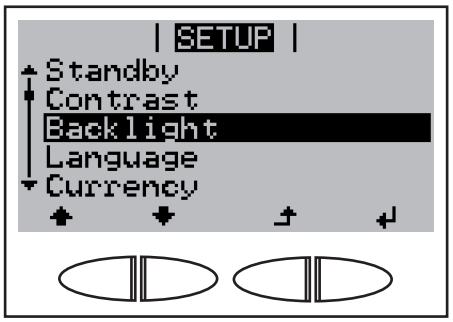
2 Press the ‘Enter’ key.



The present display illumination setting is shown.

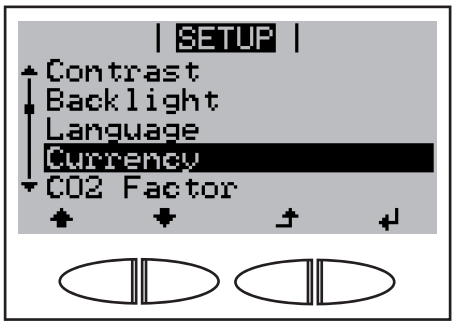
3 Use the ‘Up’ and ‘Down’ keys to select the desired setting for the display illumination.

4 Press the ‘Enter’ key to accept the setting.



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

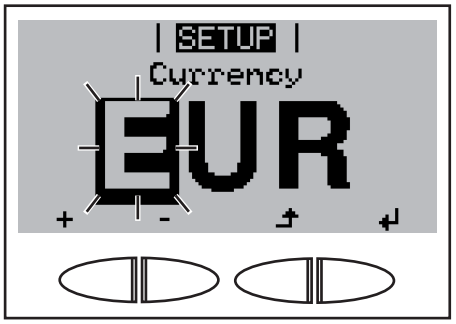
Setting the currency and feed-in tariff



↵

1 Select the ‘Currency’ menu item

2 Press the ‘Enter’ key to apply the currency



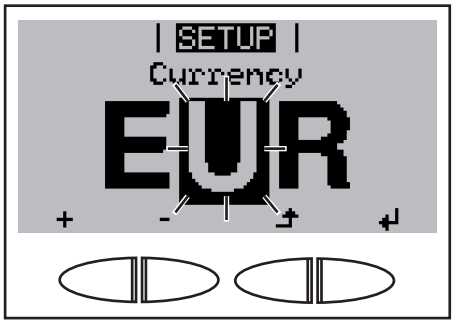
The currency is displayed, factory setting = ‘EUR’;
the first of 3 characters flashes.

\+ −

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

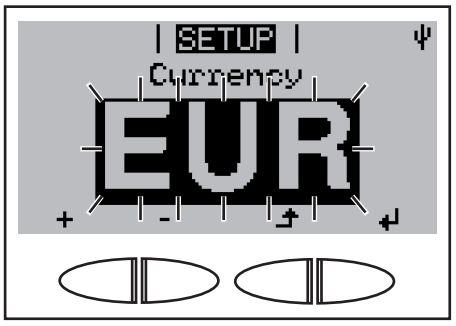
↵

4 Press the "Enter" key



The second digit flashes.

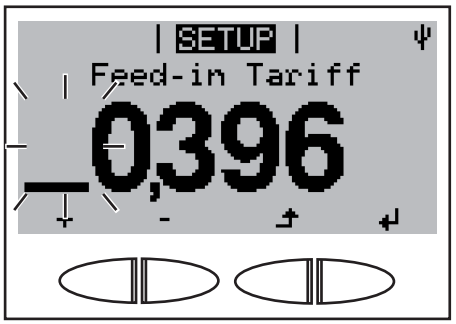
5 Repeat steps 3 and 4 for the second and third characters until...



The set currency flashes.

↵

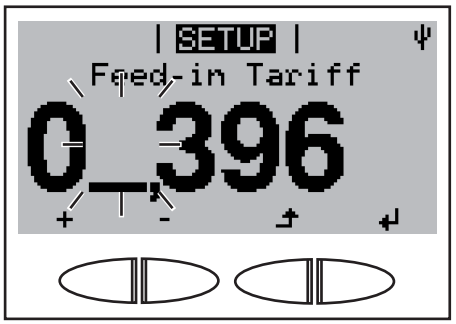
6 Press the "Enter" key



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.

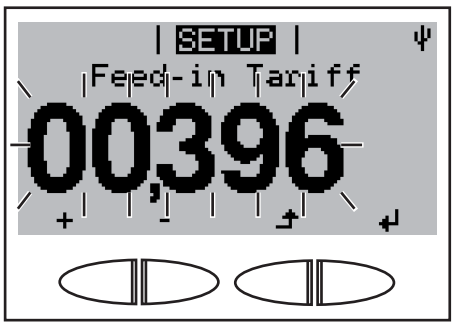
+ – 7 Use the ‘Up’ and ‘Down’ keys to select a value for the first digit (e.g., 0)

↵ 8 Press the "Enter" key



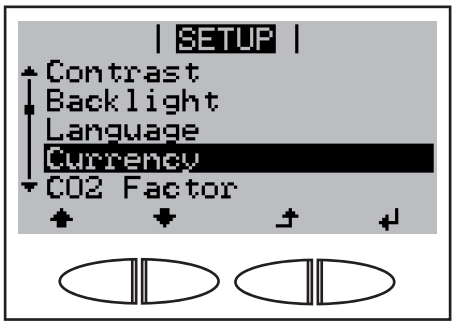
The second digit flashes.

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



The set feed-in tariff flashes.

↵ 10 Press the "Enter" key



The feed-in tariff is applied. The ‘Currency’ 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)

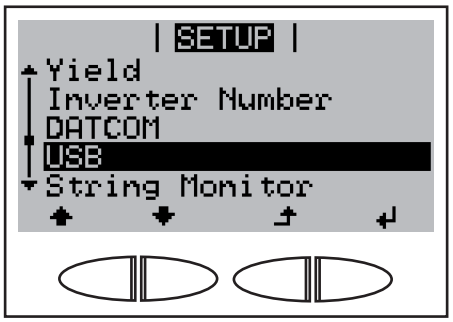
NOTE! To ensure problem-free updates of inverter software, the USB stick should have no hidden partitions and no encryption.

2 Save the update file to the highest data level of the USB stick.

3 Remove the screws on the data communication rack.

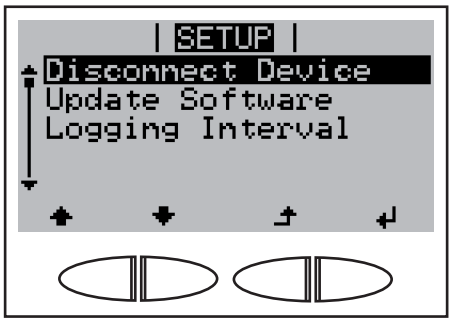
4 Pull out the data communication rack.

5 Insert the USB stick with the update file into the USB socket on the data communication rack.



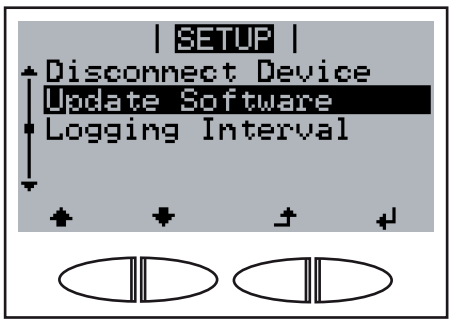
6 Select the ‘USB’ menu item.

7 Press the ‘Enter’ key.

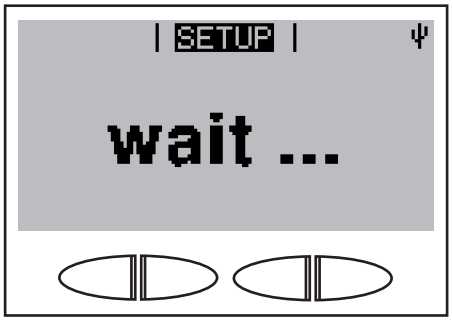


‘Disconnect Device’ is displayed.

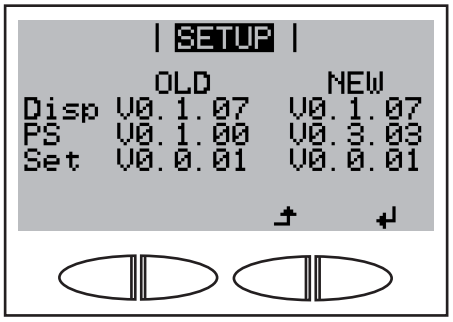
8 Use the ‘Up’ and ‘Down’ keys to select the ‘Update Software’ parameter.



9 Press the ‘Enter’ key.

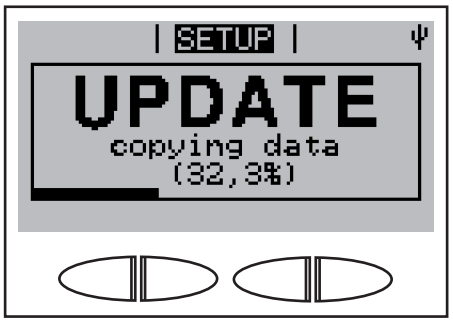


‘wait ...’ is displayed until ...



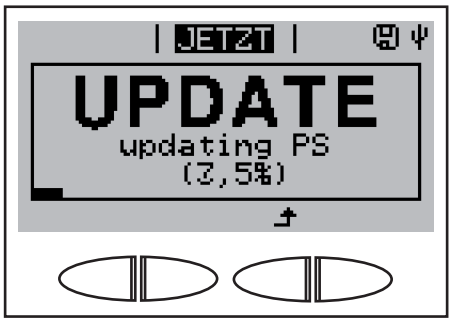
... a comparison of the current software version on the inverter and the new software version is displayed.

10 Press the ‘Enter’ key.



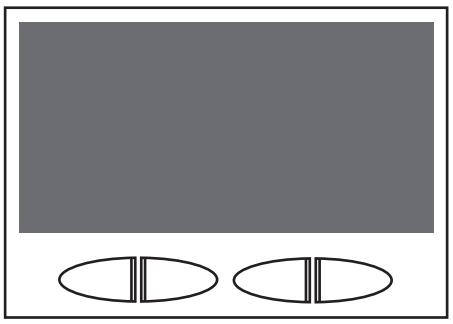
The inverter begins copying the data.

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

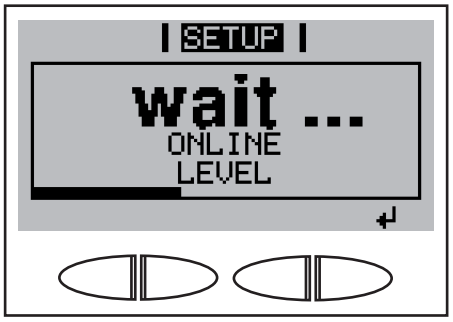


Once the data have been copied, the inverter updates the required electronic components in succession.

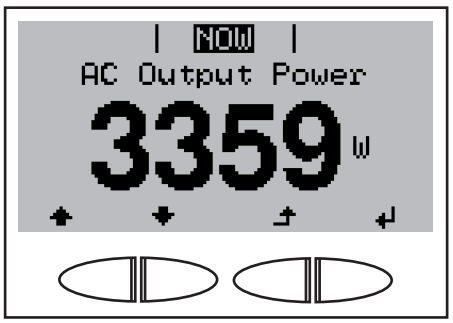
'UPDATE,' the affected component and the update progress (%) are displayed.



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 ...' appears on the display, and the component currently being tested is displayed.



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.

11 Re-insert the data communication rack.

12 Re-attach the screws to the data communication rack.

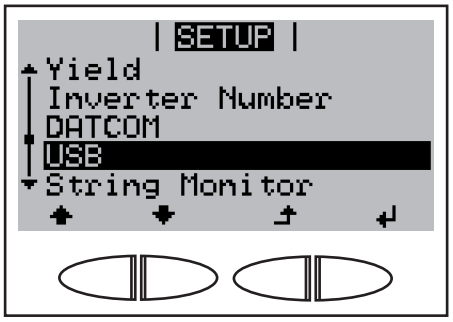
The current software version of the inverter can be viewed under the ‘Version’ menu item.

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

Safely removing USB sticks

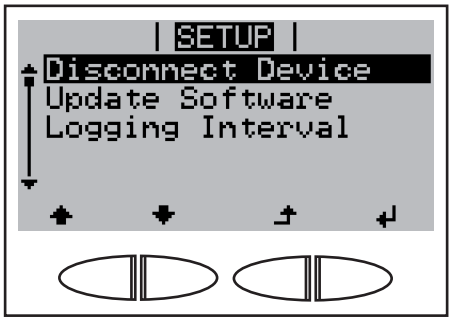
1 Remove the screws on the data communication rack.

2 Pull out the data communication rack.



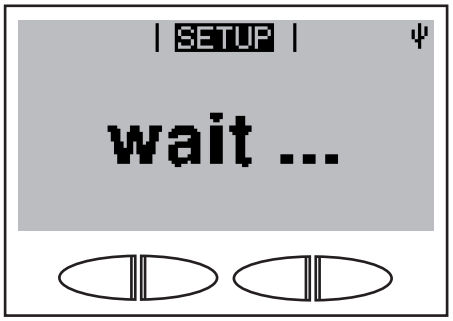
↑↓ 3 Select the ‘USB’ menu item.

↵ 4 Press the ‘Enter’ key.

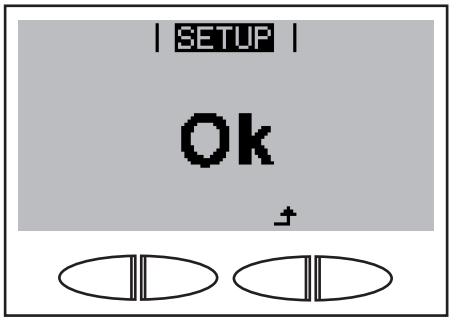


‘Disconnect Device’ is displayed.

↵ 5 Press the ‘Enter’ key.



‘wait ...’ is briefly displayed.

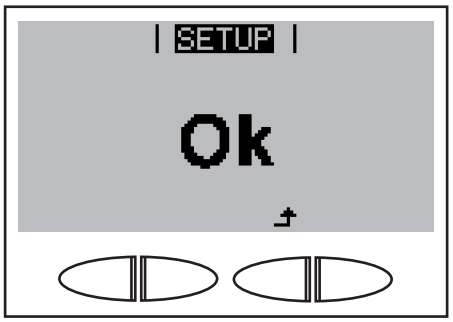


‘Ok’ is displayed.

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

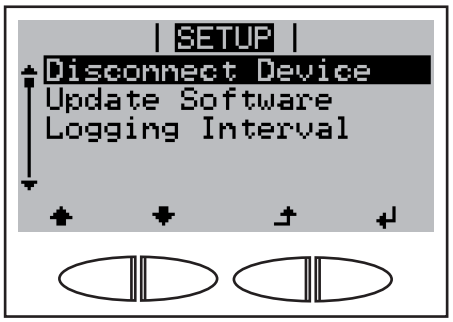
7 Remove the USB stick.

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.



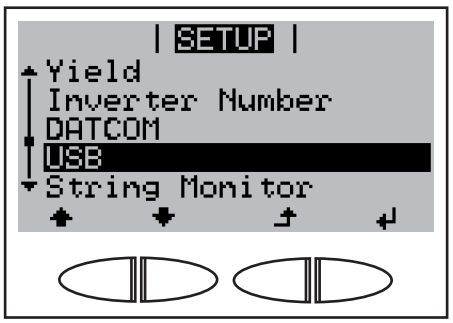
8 Insert (new) USB stick.

9 Confirm ‘Ok mode’ by pressing ‘Back.’



‘Disconnect Device’ is displayed.

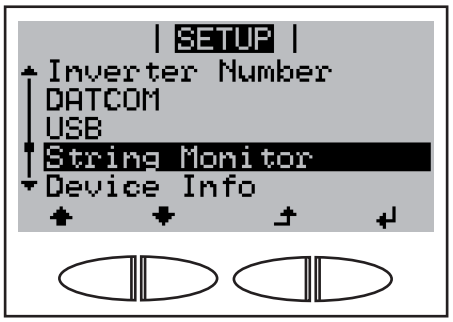
10 Press the ‘Back’ key.



The ‘USB’ menu item is displayed.

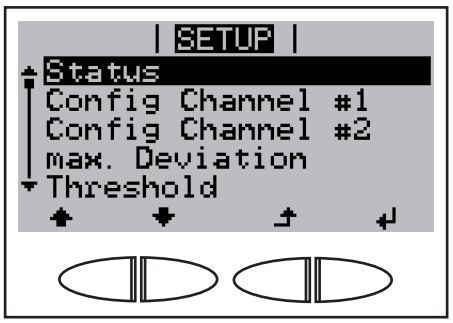
Activating solar module string monitoring

IMPORTANTA 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.



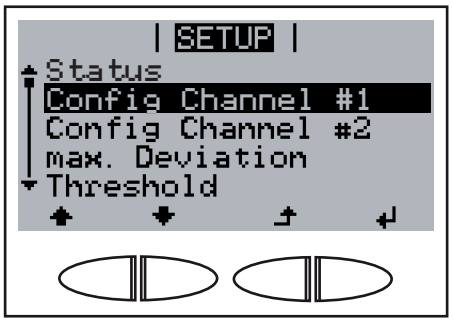
1 Select the ‘String Monitor’ menu item.

2 Press the ‘Enter’ key.

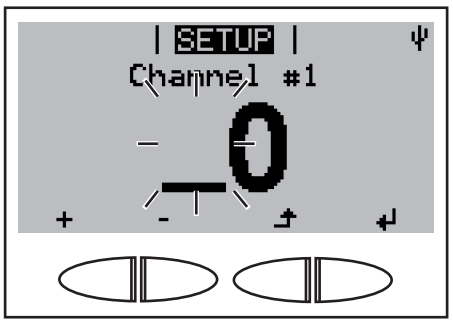


The ‘Status’ parameter is displayed.

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



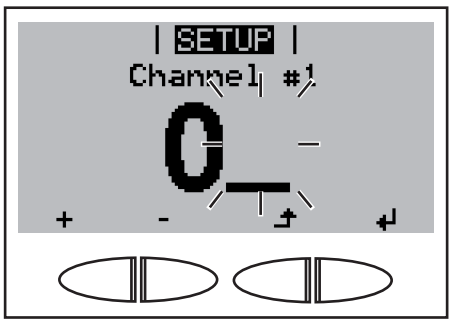
↵ 4 Press the ‘Enter’ key.



‘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.

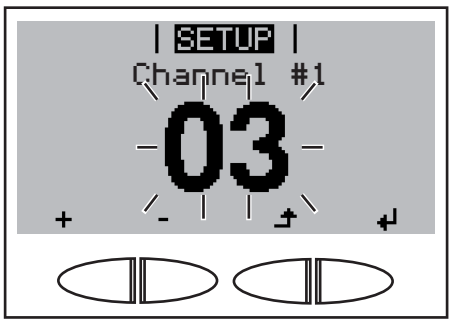
↵ 6 Press the ‘Enter’ key.



The second digit flashes.

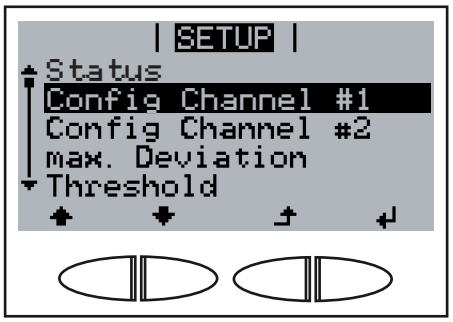
+ − 7 Use the ‘Up’ and ‘Down’ keys to select a value for the second digit.

↵ 8 Press the ‘Enter’ key.



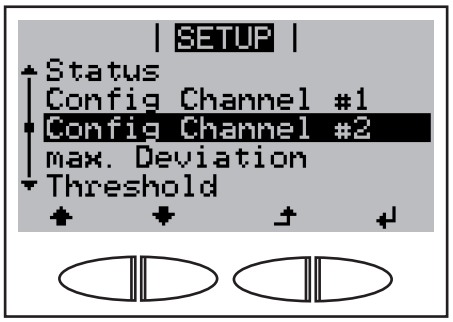
The number of solar modules strings connected to measuring channel 1 flashes.

↵ 9 Press the ‘Enter’ key.

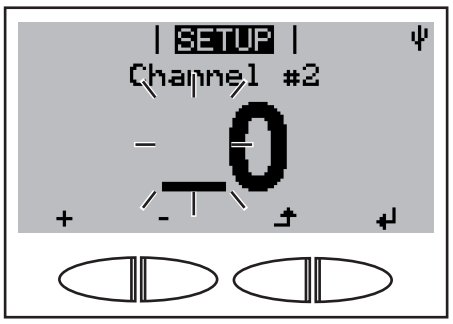


The ‘Config. Channel #1’ parameter is displayed.

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



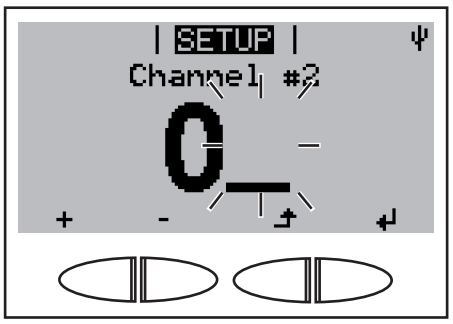
↵ **11** Press the ‘Enter’ key.



‘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.

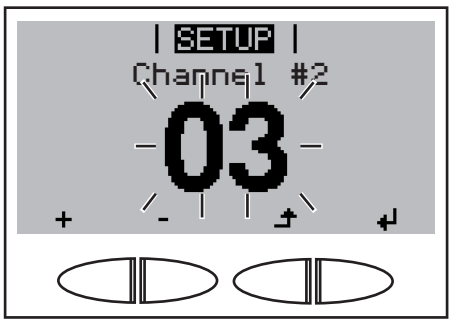
↵ **13** Press the ‘Enter’ key.



The second digit flashes.

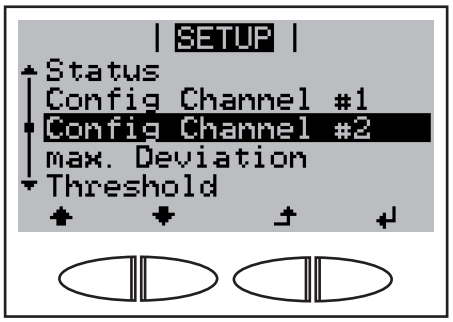
+ − **14** Use the ‘Up’ and ‘Down’ keys to select a value for the second digit.

↵ **15** Press the ‘Enter’ key.



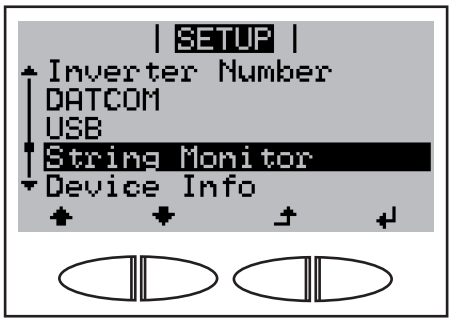
The number of solar modules strings connected to measuring channel 2 flashes.

↵ **16** Press the ‘Enter’ key.



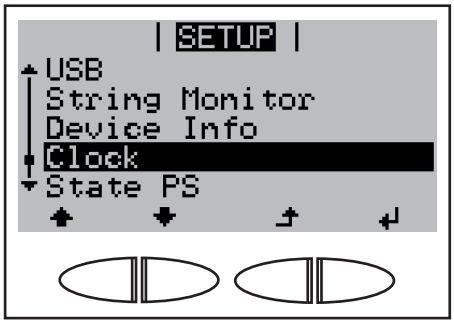
The ‘Config. Channel #2’ parameter is displayed.

17 Press the ‘Back’ key.



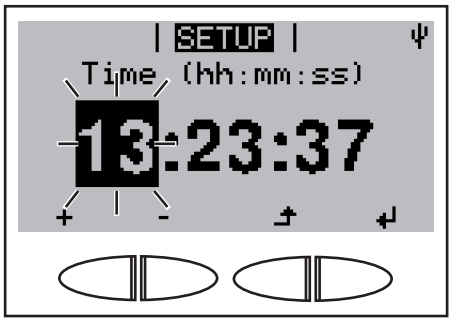
The ‘String Monitor’ menu item is displayed.

Setting the time and date



1 Select the ‘Clock’ menu item

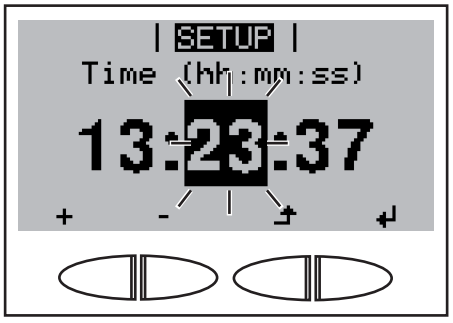
2 Press the "Enter" key



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

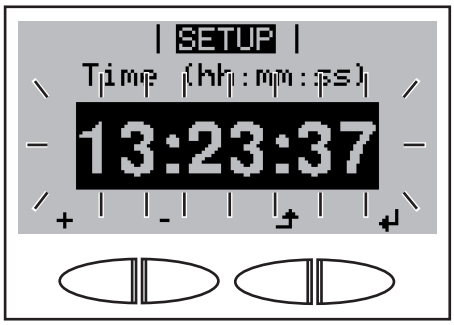
3 Use the ‘Up’ and ‘Down’ keys to select a value for the hour

4 Press the "Enter" key



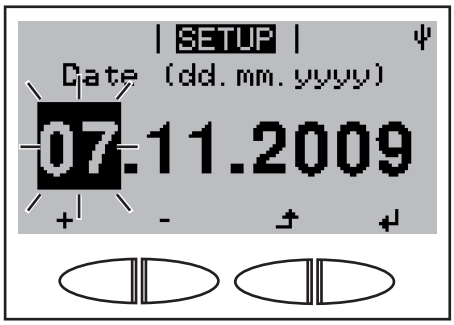
The digits for the minutes flash.

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



The set time flashes.

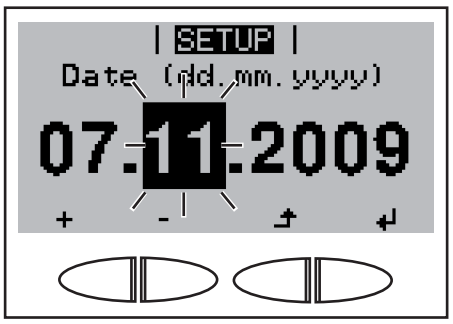
↵ 6 Press the "Enter" key



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

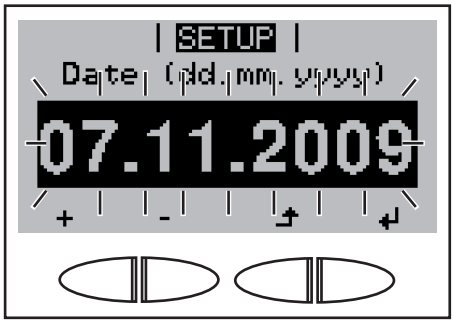
+ − 7 Use the ‘Up’ and ‘Down’ keys to select a value for the day

↵ 8 Press the "Enter" key



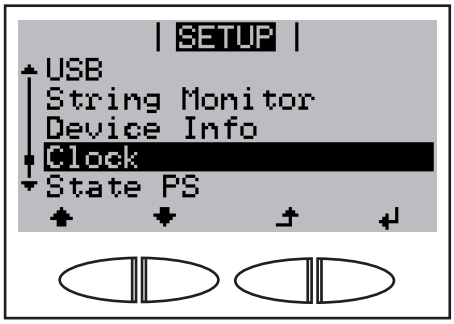
The digits for the month flash.

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



The set date then flashes.

↵ 10 Press the "Enter" key



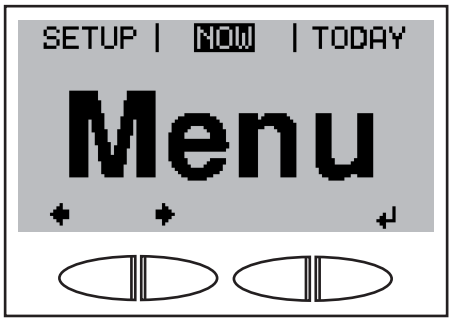
The date is applied; the ‘Clock’ menu item is displayed.

Switching the key lock on and off

General

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

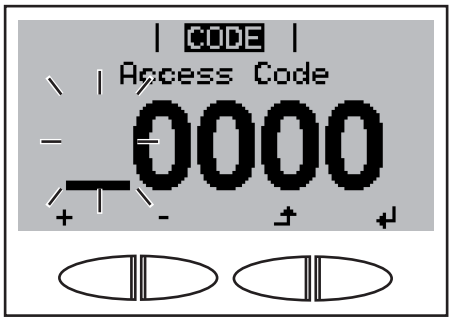
Switching the Key Lock On and Off



1 Press the ‘Menu’ key.

‘Menu’ is shown.

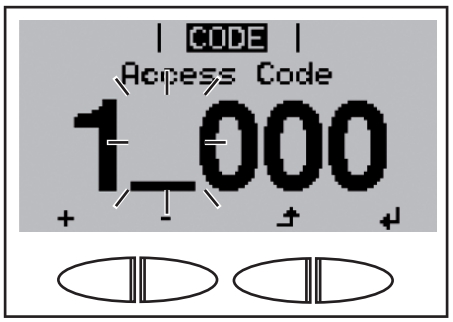
2 Press the unassigned ‘Menu / Esc’ key
5 x.



In the ‘CODE’ menu, the ‘Access Code’ is displayed, the first digit flashes.

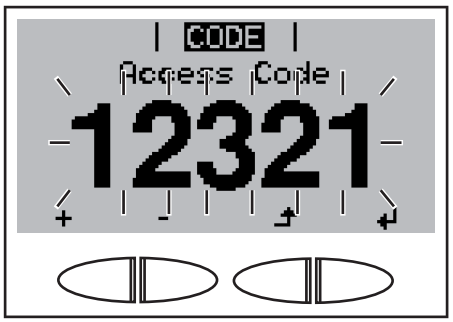
3 Enter code 12321: Use the ‘Up’ and ‘Down’ keys to select a value for the first digit.

4 Press the ‘Enter’ key.



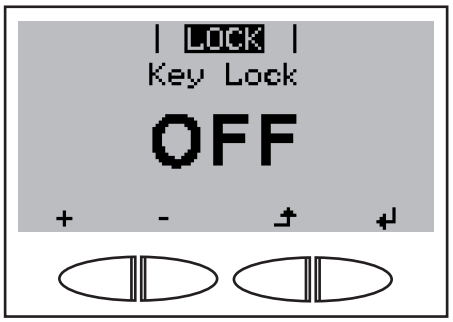
The second digit flashes.

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



...the set feed-in tariff flashes.

6 Press the ‘Enter’ key.



In the ‘LOCK’ menu, the ‘Key lock‘ function is displayed.

+ − 7 Use the ‘Up’ and ‘Down’ keys to switch the key lock on or off:

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

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

↵ 8 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, the photovoltaic system or any installation or operating errors.

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

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

Total failure of the display

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

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

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

* The grid voltage tolerance depends on the country setup.

Class 1 status codes

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

Your inverter's first reaction 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.

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

102	
AC voltage too high	
Description	Grid conditions are thoroughly tested, and as soon as they are again within the permissible range, the inverter will resume feeding power into the grid.
Remedy	Check grid connections. If this status code keeps recurring, contact your system installer.

103	
AC voltage too low	

Description	Grid conditions are thoroughly tested, and as soon as they are again within the permissible range, the inverter will resume feeding power into the grid.
Remedy	Check grid connections. If this status code keeps recurring, contact your system installer.

105

AC frequency too high

Description	Grid conditions are thoroughly tested, and as soon as they are again within the permissible range, the inverter will resume feeding power into the grid.
Remedy	Check grid connections. If this status code keeps recurring, contact your system installer.

106

AC frequency too low

Description	Grid conditions are thoroughly tested, and as soon as they are again within the permissible range, the inverter will resume feeding power into the grid.
Remedy	Check grid connections. If this status code keeps recurring, contact your system installer.

107

No AC grid detected

Description	Grid conditions are thoroughly tested, and as soon as they are again within the permissible range, the inverter will resume feeding power into the grid.
Remedy	Check grid connections. If this status code keeps recurring, contact your system installer.

108

Islanding detected

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

112

The RCMU has detected a fault current in the inverter.

Description	Grid conditions are thoroughly tested, and as soon as they are again within the permissible range, the inverter will resume feeding power into the grid.
Remedy	Check grid connections or fuses. If this status code keeps recurring, contact your system installer.

Class 3 status codes

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

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

301

Overcurrent (AC)

Description	A short interruption of power feeding into the grid due to overcurrent in the inverter circuit. The inverter returns to the startup phase.
Remedy	The fault is rectified automatically. If this status code keeps recurring, contact your system installer.

302

Overcurrent (DC)

Description	Description A short interruption of power feeding into the grid due to overcurrent in the inverter DC circuit. The inverter returns to the startup phase.
Remedy	The fault is rectified automatically. If this status code keeps recurring, contact your system installer.

303

Over-temperature cooling element

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

304

Interior temperature too high

Description	Short interruption of power feeding into the grid due to overtemperature. The inverter returns to the startup phase.

Remedy	If required, clean cool air vents and cooling elements with compressed air. The fault is rectified automatically. If this status code keeps recurring, contact your system installer.

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 the permissible threshold value for feed in.

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

IMPORTANTStatus 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.

308

Intermediate circuit voltage too high

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

Class 4 status codes

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

401

No internal communication with power stage set

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

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 current MPP voltage.
Remedy	Remove excess solar modules so DC voltage fits within inverter limits. If the status code persists: Contact a Fronius-trained service technician.

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 grid feed-in mode. The inverter returns to the Startup phase.
Remedy	The fault is rectified automatically. If this status code keeps recurring, contact your system installer.

427

Power stage set inoperative for too long (timeout)

Description	Short interruption of grid feed-in mode. The inverter returns to the Startup phase.
Remedy	The fault is rectified automatically. If this status code keeps recurring, contact your system installer.

428

Timeout error during connection

Description	Short interruption of grid feed-in mode. The inverter returns to the Startup phase.
Remedy	If this status code keeps recurring, contact your system installer.

429

Timeout error when disconnecting

Description	Short interruption of grid feed-in mode. The inverter returns to the Startup phase.
Remedy	If this status code keeps recurring, 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 grid feed-in mode. The inverter returns to the Startup phase.
Remedy	The fault is rectified automatically. If this status code keeps recurring, contact your system installer.

437

General troubleshooting started in power stage set

Description	Short interruption of grid feed-in mode. The inverter returns to the Startup phase.
Remedy	The fault is rectified automatically. If this status code keeps recurring, contact your system installer.

438

Incorrect error information received from power stage set

Description	Short interruption of grid feed-in mode. The inverter returns to the Startup phase.
Remedy	The fault is rectified automatically. If this status code keeps recurring, 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

- Compatibility error (e.g. due to a PC board replacement)
- Invalid power stage set configuration

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

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

457

Grid relay 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 conductors are connected properly. If the status code persists: Contact a Fronius-trained service technician.

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 feed-in mode, but can lead to limitations in feed-in mode. They will be displayed until the status code is acknowledged by pressing a key (the inverter, however, continues working normally in the background).

509

No feed-in within the last 24 hours

Description	Warning message is shown on the display
Remedy	Check whether all conditions for problem-free feed-in mode 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 display persists: Contact a Fronius-trained service technician.

517

Power derating due to excessive temperature

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

518

Internal DSP malfunction

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

558

Function incompatibility (one or more PC boards in the inverter are not compatible with each other, e.g. after PC board replacement)

Description	Possible error displays or malfunctions in the inverter
Remedy	Update the inverter firmware using a USB stick or Fronius Solar.update software; The current inverter firmware is available at http://www.fronius.com. If the status display persists, contact a Fronius-trained service technician.

560

Power derating due to over-frequency

Description	The status display is shown when the grid frequency is greater than 50.2 Hz When this occurs, the inverter then ramps down the power by 40%/Hz. At a grid frequency of 51.5 Hz, the inverter switches off. The status display continues to be shown until the inverter reverts to normal operation.
Remedy	From a frequency of 50.2 Hz, the inverter attempts to connect to the grid again. The error is rectified automatically as soon as the inverter reverts to normal operation. If the status display 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	This is of no concern if the inverter is functioning without problems and it appears only in the 'PS Status' Setup parameter. In the event of an actual fault, this status code supports Fronius TechSupport in the failure analysis.

721

EEPROM was reinitialized

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

722 - 730

Provides information about the internal processor program status

Description	This is of no concern if the inverter is functioning without problems and it appears only in the 'PS Status' Setup parameter. In the event of an actual fault, this status code supports Fronius TechSupport in the failure analysis.

731

Initialization error - USB stick is not supported

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

732

Initialization error - over-current at USB stick

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

733

No USB stick inserted

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

734

Update file is not detected or is not available

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

736

Write or read error occurred

Description	A 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	A warning message is shown on the display.
Remedy	Error is corrected automatically. If necessary, 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	A warning message is shown on the display.
Remedy	Free up memory. Remove write-protection. If necessary, check or replace the 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	A warning message is shown on the display.

Remedy	Free up memory. Remove write-protection. If necessary, check or replace the USB stick. If status code persists: Contact a Fronius-trained service technician

740

Initialization error - error in USB stick file system

Description	A 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

741

Error when recording logging data

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

743

Error occurred during the update

Description	A warning message is shown on the display.
Remedy	Repeat the update process. Check the USB stick. If status code persists: Contact a Fronius-trained service technician

744

Provides information about the internal processor program status

Description	This is of no concern if the inverter is functioning without problems and it appears only in the ‘PS Status’ Setup parameter. In the event of an actual fault, this status code supports Fronius TechSupport in the failure analysis.

745

Fault in system file (*.sys)

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

746

Error occurred during the update

Description	A warning message is shown on the display; the update process is canceled.

Remedy	Restart the update after waiting approx. 2 minutes. If status code persists: Contact a Fronius-trained service technician

747

Transmission error or faulty update file

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

748

Write or read error occurred during the update process

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

749

File could not be opened during the update process

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

750

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

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

751

Incorrect time

Description	A 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	A 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 for a long period of time (> 1/2 year)

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

754, 755

Provides information about the internal processor program status

Description	This is of no concern if the inverter is functioning without problems and it appears only in the 'PS Status' Setup parameter. In the event of an actual fault, this status code supports Fronius TechSupport 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, logging data recording is turned off.
Remedy	Delete data from USB stick, and reactivate logging data recording. If the status code persists: Contact a Fronius-trained service technician

757

Hardware error in the Real Time Clock module

Description	A 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	This is of no concern if the inverter is functioning without problems and it appears only in the 'PS Status' Setup parameter. In the event of an actual fault, this status code supports Fronius TechSupport in the failure analysis.

766

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

Description	A 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	This is of no concern if the inverter is functioning without problems and it appears only in the 'PS Status' Setup parameter. In the event of an actual fault, this status code supports Fronius TechSupport in the failure analysis.

768

Power limit is different in the hardware modules

Description	A 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	A warning message is shown on the display.
Remedy	Press the 'Enter' key to confirm the error. Check solar modules and cabling. If the status code persists, you should contact your system installer.

772

Memory unit unavailable

Description	A 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	A 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	A warning message is shown on the display.
Remedy	Press the 'Enter' key to confirm the error. If the status code persists: Contact a Fronius-trained service technician

775

PMC power stage set unavailable

Description	A warning message is shown on the display.

Remedy	Press the ‘Enter’ key to confirm the error. If the status code persists: Contact a Fronius-trained service technician

776

Invalid device type

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

781 - 794

Provides information about the internal processor program status

Description	This is of no concern if the inverter is functioning without problems and it appears only in the ‘PS Status’ Setup parameter. In the event of an actual fault, this status code supports Fronius TechSupport in the failure analysis.

Class 10–12 Status Codes

1000–1299 – Gives information regarding the internal processor program status

Description	This is of no concern if the inverter is functioning without problems and it appears only in the "PS Status" setup parameter. In the event of an actual fault, this status code supports Fronius Technical Support in the failure analysis.

Customer Service

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

Maintenance

Safety

WARNING! An electric shock can be fatal. Danger 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 electric 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:

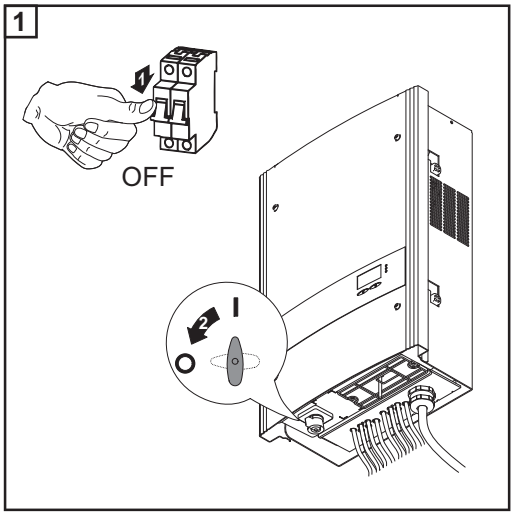
WARNING! An inadequate grounding conductor connection can cause serious injuries to persons and damage to (or loss of) property.
The housing screws provide an adequate grounding conductor connection for the housing ground and should not, under any circumstances, be replaced by different screws that do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

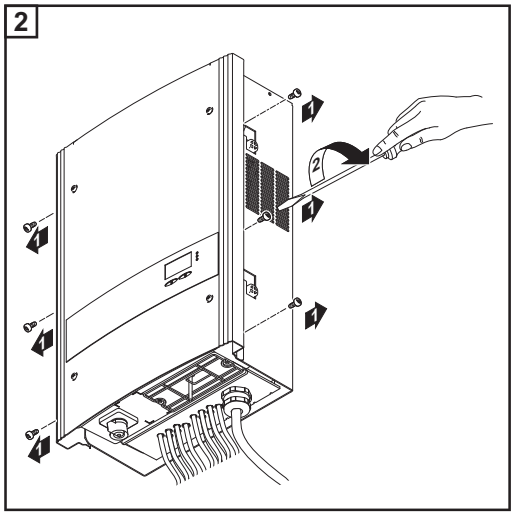
1. Disconnect the AC supply from the inverter.
2. Turn off the main DC switch.
3. Allow the capacitors to discharge (3 minutes).
4. Remove the 6 side screws.
5. Remove the power stage set from the wall bracket.
6. Protect the wall bracket from soiling and moisture.
7. Remove the 4 cover screws.
8. Carefully 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 PC display board.
11. Remove the 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.

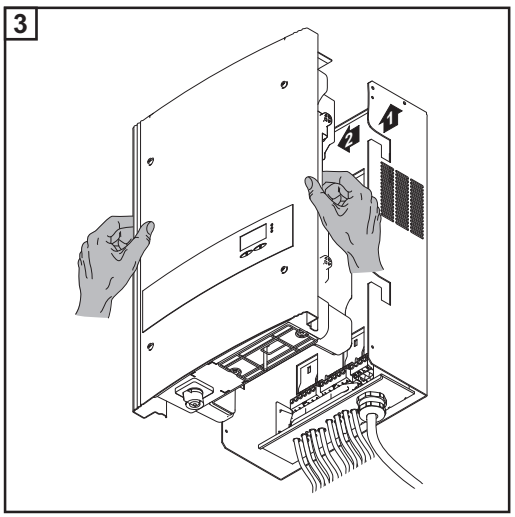
Procedure:

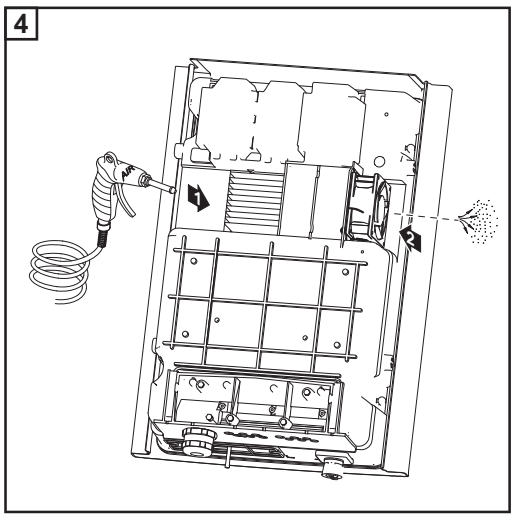




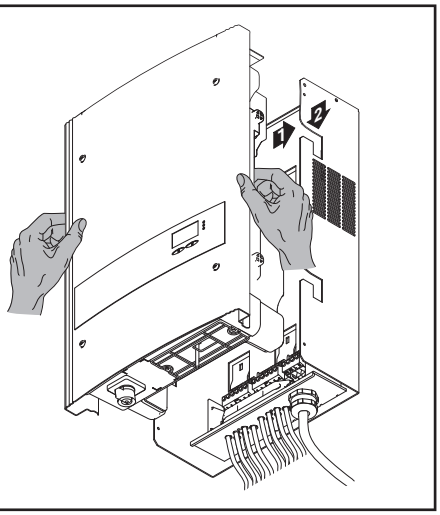
The side areas of the housing cover are designed to function as carrying grips and/or handles.

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

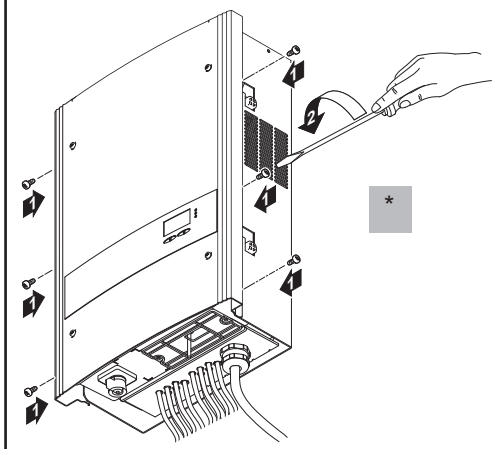




5

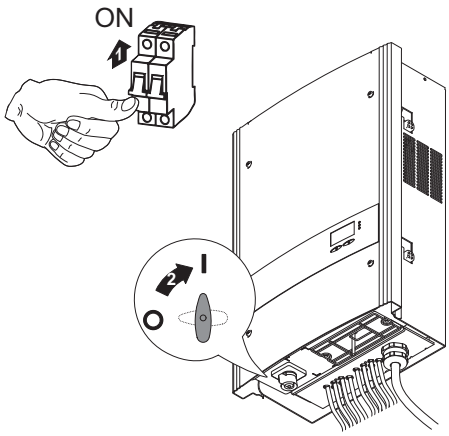


6



* Tightening torque: 2 Nm

7



Replacing String Fuses

Safety

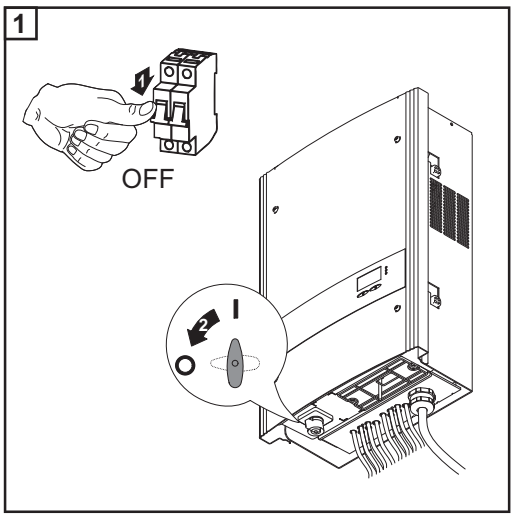
WARNING! An electric shock can be fatal. Danger from grid voltage and DC voltage from solar modules.

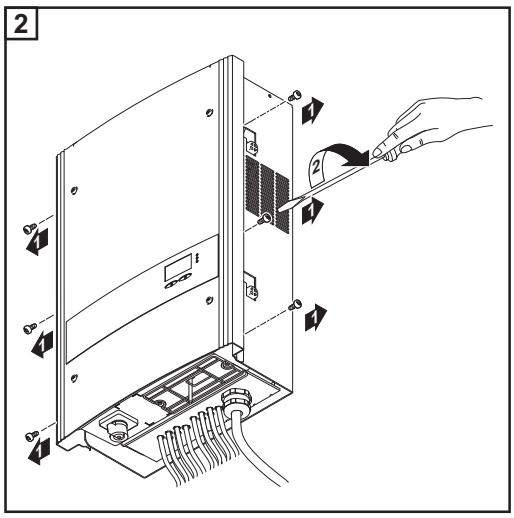
- The DC main switch is used only to switch off power to the power stage set. When the DC main switch is turned off, the connection area is still energized.
- Only licensed electricians should access the connection area.
- All maintenance and service work should only be carried out when the power stage 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 electric shock can be fatal. Danger from residual voltage from capacitors.
You must wait until the capacitors have discharged. Discharge takes 3 minutes.

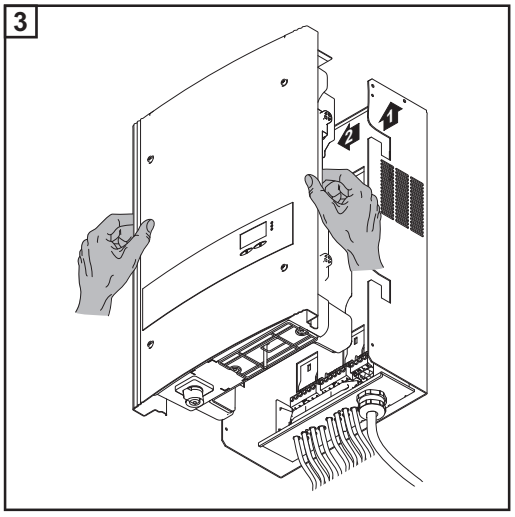
Preparation

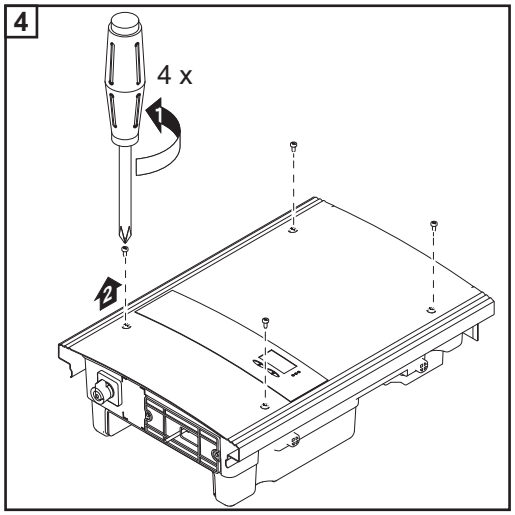
WARNING! An inadequate grounding conductor connection can cause serious injuries to persons and damage to (or loss of) property.
The housing screws provide an adequate grounding conductor connection for the housing ground and should not, under any circumstances, be replaced by different screws that do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

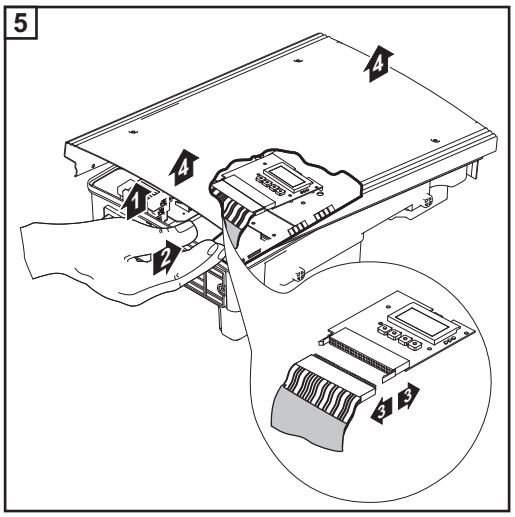




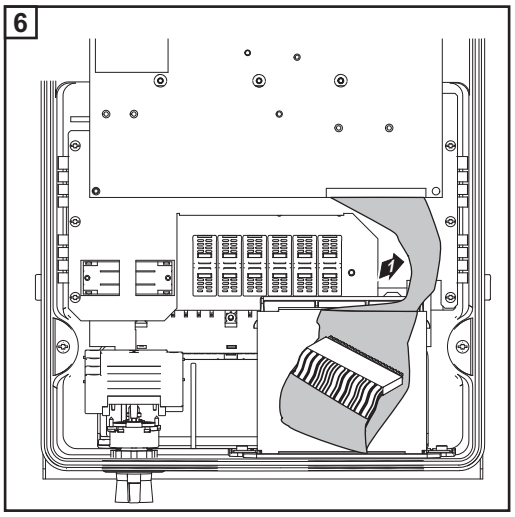
The side areas of the housing cover are designed to function as carrying grips and/or handles.





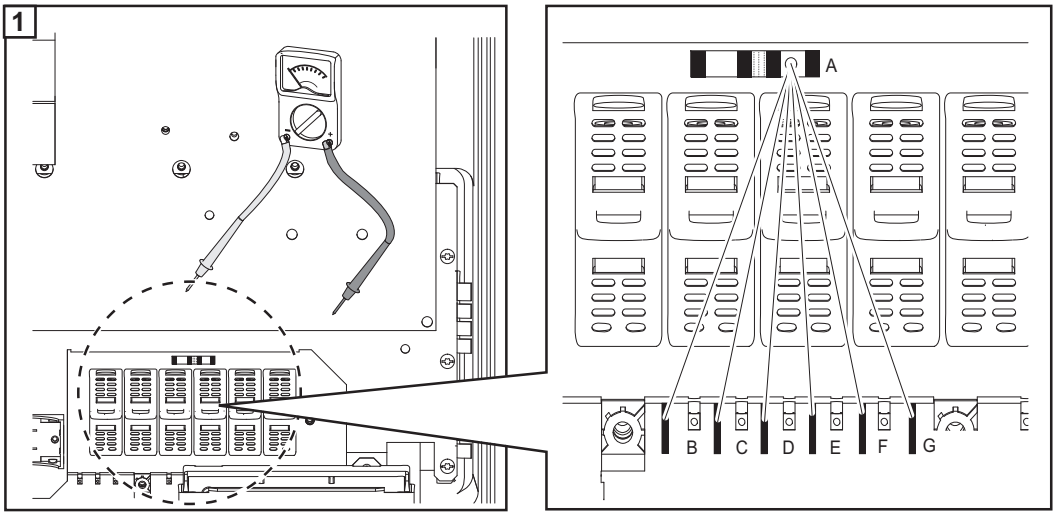


- Carefully lift up the housing cover on the bottom of the power stage set.
- Reach into the opening
- Disconnect the ribbon cable from the PC display board.



Replacing fuses

1

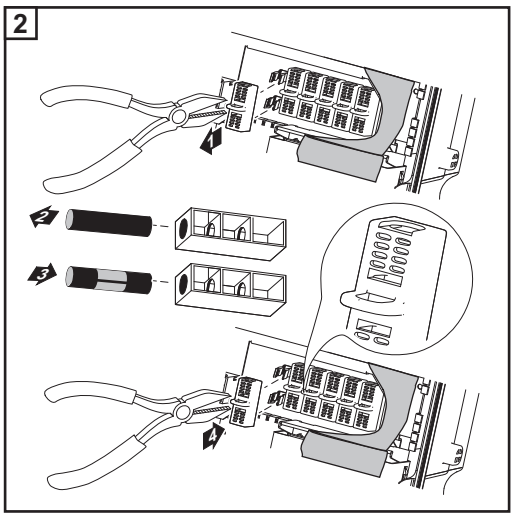


- Test the fuse holder at the terminal for continuity:
  measure from measuring point A to measuring points B - G.

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 fuse covers 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.

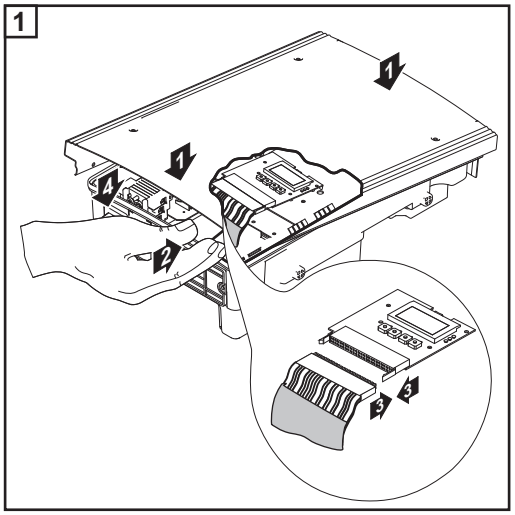
2



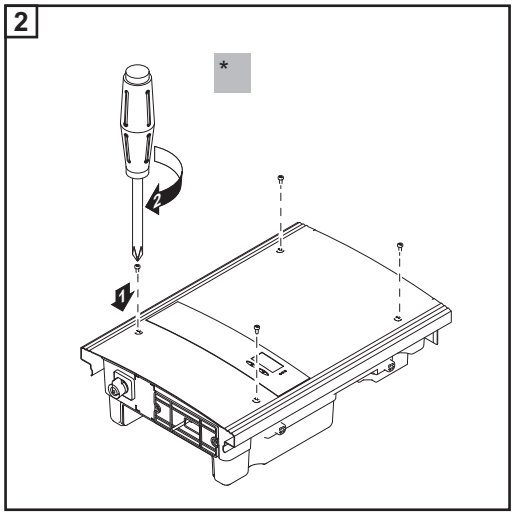
3 After replacing the fuse, find out and correct the cause for the defective fuse.

Finally...

1



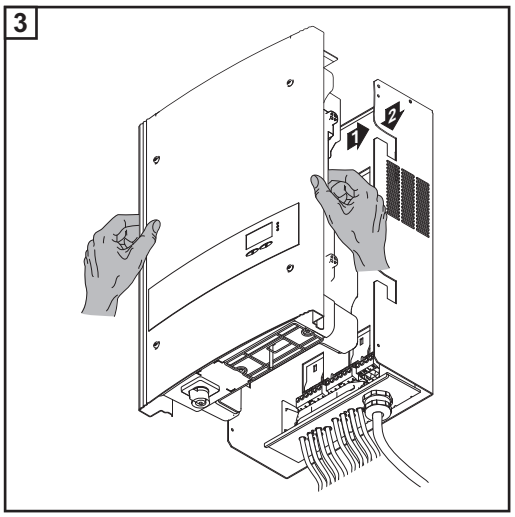
2



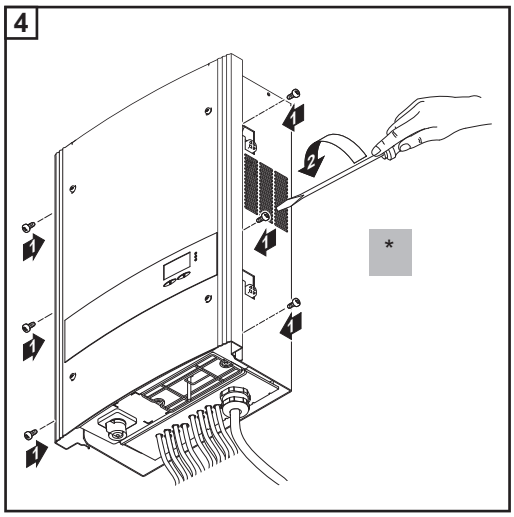
* Tightening torque: 2.5 Nm

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

3

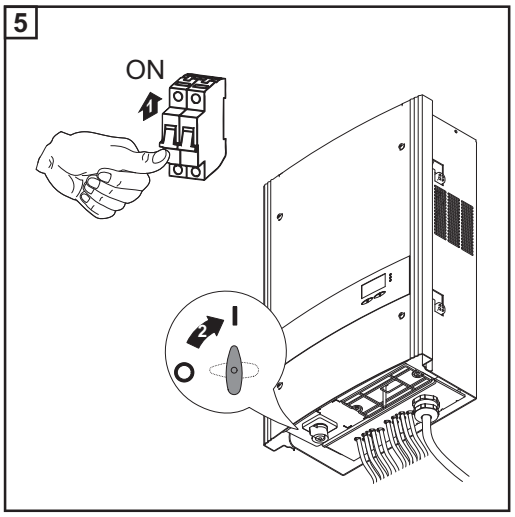


4



* Tightening torque: 2 Nm

5



Appendix

Technical Data

Fronius IG TL 3.0

Input data

Maximum DC power	3130 W
MPP voltage range	350 - 700 V DC
Max. input voltage (at 1000 W/m² / -10 °C in an open circuit)	850 V DC
Max. input current	8.8 A DC
Max. array short circuit current	13.2 A

Output data

Nominal output power (P_{nom})	3.0 kW
Max. output power [1)]	3.0 kW
Nominal AC output 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 [1)]
Harmonic distortion	< 3 %
Power factor (cos phi)	1
Max. permitted grid impedance Zmax at PCC[3)]	None
Max. recovery current [4)]	0 A [5)]
Switch-on current pulses [6)]	0 A [5)]
Maximum output fault current / duration	113 A / 89.5 µs

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
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 □
EMC emissions class	B
Inverter concept	Transformerless
Degree of pollution	3
Over-voltage category (OVC)	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
Max. input voltage (at 1000 W/m² / -10 °C in an open circuit)	850 V DC
Max. input current	10.8 A DC
Max. array short circuit current	16.2 A

Output data

Nominal output power (P_{nom})	3.68 kW
Max. output power [1)]	3.68 kW
Nominal AC output voltage [2)]	1 ~ NPE 230 V
Grid voltage range [2)]	180 - 270 V
Maximum output current (single phase)	16 A AC
Nominal frequency [2)]	50 - 60 Hz [1)]
Harmonic distortion	< 3 %
Power factor (cos phi)	1
Max. permitted grid impedance Zmax at PCC[3)]	None
Max. recovery current [4)]	0 A [5)]
Switch-on current pulses [6)]	0 A [5)]
Maximum output fault current / duration	113 A / 89.5 µs

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
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 □
EMC emissions class	B
Inverter concept	Transformerless
Degree of pollution	3
Over-voltage category (OVC)	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
Max. input voltage (at 1000 W/m² / -10 °C in an open circuit)	850 V DC
Max. input current	11.8 A DC
Max. array short circuit current	17.7 A

Output data

Nominal output power (P_{nom})	4.0 kW
Max. output power 1)	4.0 kW
Nominal AC output 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 1)
Harmonic distortion	< 3 %
Power factor (cos phi)	1
Max. permitted grid impedance Zmax at PCC3)	262 milliohms
Max. recovery current 4)	0 A 5)
Switch-on current pulses 6)	0 A 5)
Maximum output fault current / duration	113 A / 89.5 µs

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
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 □
EMC emissions class	B
Inverter concept	Transformerless
Degree of pollution	3
Over-voltage category (OVC)	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
Max. input voltage (at 1000 W/m² / -10 °C in an open circuit)	850 V DC
Max. input current	13.5 A DC
Max. array short circuit current	20.3 A

Output data

Nominal output power (P_{nom})	4.6 kW
Max. output power [1)]	4.6 kW
Nominal AC output 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 [1)]
Harmonic distortion	< 3 %
Power factor (cos phi)	1
Max. permitted grid impedance Zmax at PCC[3)]	262 milliohms
Max. recovery current [4)]	0 A [5)]
Switch-on current pulses [6)]	0 A [5)]
Maximum output fault current / duration	113 A / 89.5 µs

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
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 □
EMC emissions class	B
Inverter concept	Transformerless
Degree of pollution	3
Over-voltage category (OVC)	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
Max. input voltage (at 1000 W/m² / -10 °C in an open circuit)	850 V DC
Max. input current	14.7 A DC
Max. array short circuit current	22.1 A

Output data

Nominal output power (P_{nom})	5.0 kW
Max. output power [1)]	5.0 kW
Nominal AC output 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 [1)]
Harmonic distortion	< 3 %
Power factor (cos phi)	1
Max. permitted grid impedance Zmax at PCC[3)]	209 milliohms
Max. recovery current [4)]	0 A [5)]
Switch-on current pulses [6)]	0 A [5)]
Maximum output fault current / duration	113 A / 89.5 µs

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
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
Over-voltage category (OVC)	AC 3 / DC 2
Protection class as per IEC 62103	1

Fronius IG TL Dummy

Nominal grid voltage (separate power supply)	100–240 V
Nominal frequency	50–60 Hz [1)]
Protection class	IP 55
Dimensions	195 x 413 x 597 mm
Weight	10.5 kg

Protection devices for all inverters

DC insulation measurement	integrated
DC over-voltage protection	integrated
Protection against reverse polarity [8)]	integrated
Manifestation of DC overload	Operating point shift
RCMU	integrated
DC disconnect	integrated

Explanation of footnotes

1) Maximum continuous output power up to an ambient temperature of 40 °C guaranteed
2) The values provided are standard values. The inverter can be customized to its respective country according to requirements.
3) PCC = interface to the public grid
4) Max. current from the inverter to the solar module when there is an error in the inverter, or when the isolation between the AC and DC wires is defective.
5) Assured by the electrical design of the inverter
6) Peak current when turning on the inverter
7) Depending on the country setup
8) 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 with distribution networks" published by the Association of Austrian Electricity Companies.

Circuit to Prevent Islanding

The inverter has a circuit for preventing islanding which is approved by the Professional Association for Precision Mechanics and Electronic Engineering in accordance with DIN VDE 0126-1-1.

Grid Failure

The standard measurement and safety procedures integrated into the inverter ensure that the power feed is immediately interrupted in the event of a grid failure (shut-off by the utility or damage to lines).

Terms and conditions of warranty and disposal

Fronius Manufacturer's Warranty

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

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

Disposal

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

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

Wels-Thalheim, 2011-07-25

Die Firma	Manufacturer	La compagnie

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

erklärt in alleiniger Verantwortung, dass folgendes Produkt:	Hereby certifies on its sole responsibility that the following product:	se déclare seule responsable du fait que le produit suivant:
Fronius 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 IEC 62109-2:2011 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 62233:2008	European Standards including relevant amendments IEC 62109-1:2010 IEC 62109-2:2011 EN 50178:1997 EN 61000-3-2:2006 EN 61000-3-3:1995 EN 61000-3-11:2000 EN 61000-3-12:2005 EN 61000-6-2:2005 EN 61000-6-3:2007 EN 62233:2008	Normes européennes avec amendements correspondants IEC 62109-1:2010 IEC 62109-2:2011 EN 50178:1997 EN 61000-3-2:2006 EN 61000-3-3:1995 EN 61000-3-11:2000 EN 61000-3-12:2005 EN 61000-6-2:2005 EN 61000-6-3:2007 EN 62233:2008
Die oben genannte Firma hält Dokumentationen als Nachweis der Erfüllung der Sicherheitsziele und die wesentlichen Schutzanforderungen zur Einsicht bereit.	Documentation evidencing conformity with the requirements of the Directives is kept available for inspection at the above Manufacturer.	En tant que preuve de la satisfaction des demandes de sécurité la documentation peut être consultée chez la compagnie susmentionnée.

CE 2011

ppa. Mag.Ing.H.Hackl

DE German Deutsch	EN English English	FR French Française

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

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