/ Perfect Charging / Perfect Welding / Solar Energy



# Fronius Agilo Outdoor 75.0-3 / 100.0-3



Grid-connected inverter





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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 familiarise yourself with the product. Reading the instructions carefully will enable you to learn about the many different features it has to offer. This will allow you to make full use of its advantages.

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

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### Safety rules

Explanation of safety symbols

**DANGER!** Indicates immediate and real danger. If it is not avoided, death or serious injury will result.

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



**CAUTION!** Indicates a situation where damage or injury could occur. If it is not avoided, minor injury and/or damage to property may result.



**NOTE!** Indicates a risk of flawed results and possible 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" chapter, special care is required.

#### General



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

- injury or death to the operator or a third party,
- damage to the device and other material assets belonging to the operating company,
- 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 remarks" in the operating instructions for the device.

Before switching on the device, rectify any malfunctions that could compromise safety.

Your personal safety is at stake!

#### Proper use



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

Any use above and beyond this purpose is deemed improper. The manufacturer shall not be liable for any damage resulting from such improper use.

Proper use 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 company providing the mains power supply
- Instructions from the PV 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 shall not be held liable for any damage arising from such usage.

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 applies even if you are qualified to do so.



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



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

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

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

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

Safety measures<br/>at the installationWhen installing devices with openings for cooling air, ensure that the cooling air can enter<br/>and exit unhindered through the air ducts. Only operate the charger in accordance with the<br/>degree of protection shown on the rating plate.

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 mains.

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.

### Mains connection



High-performance devices (> 16 A) can affect the voltage quality on the mains network because they can feed powerful current into the main supply.

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

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

\*) at the interface with the public mains supply

see Technical Data

In this case, the plant 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 set up set up to the 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 if 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 operator, inefficient operation of the device.

Any safety devices that are not functioning properly must be repaired by a suitably qualified engineer before the device is switched on.

Never bypass or disable safety devices.

### Safety symbol



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

### Disposal



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 either be returned to your dealer or given to one of the approved collection and recycling facilities in your area. Ignoring this European Directive may have potentially adverse affects on the environment and your health!

### Data protection



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

### Copyright



Copyright of these operating instructions remains with the manufacturer.

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

**General information** 

# Protection of people and equipment

Safety	WARNING! If the equipment is used or tasks are carried out incorrectly, serious injury or damage may result. Commissioning of the inverter may only be carried out by trained personnel in accordance with the technical regulations. It is essential that you read the "Safety Regulations" chapter before commissioning the equipment or carrying out maintenance work.
Protection of peo- ple and equip- ment	<ul> <li>The inverter is constructed and operated in the safest possible way, both in terms of installation and operation.</li> <li>The inverter fulfils the role of protecting people and equipment: <ul> <li>a) through galvanic (electrical) isolation</li> <li>b) by monitoring the grid</li> </ul> </li> </ul>
Galvanic (electri- cal) isolation	The inverter has a 50/60 Hz three-phase transformer that provides electrical isolation be- tween the DC side and the grid, thus guaranteeing the highest possible levels of safety.
Monitoring the grid	In the event of abnormal grid conditions, the inverter shuts down immediately according to national standards and guidelines and stops feeding energy into the grid (e.g. in the event of grid disconnection, interrupts, etc.) Grid monitoring is carried out by: - monitoring the voltage - monitoring the frequency - using over/undervoltage relays (option, depends on country setup) - monitoring the stand alone situation

### Warning notices on the device

There are warning notices and safety symbols on and in the inverter. These warning notices and safety symbols must not be removed or painted over. They warn against operating the device incorrectly, as this may result in serious injury and damage.



### Safety symbols:



Risk of serious injury and damage due to incorrect operation



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

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



Dangerous electrical voltage



Discharging of the energy storage device is time-controlled

Text of the warning notices:

WARNING!

An electric shock can be fatal. Make sure that both the input side and output side of the device are de-energised before opening the device. Wait for the capacitors to discharge (10 minutes).

## Proper use

Proper use	<ul> <li>The solar inverter is intended exclusively to convert direct current from solar modules into alternating current and to feed this into the public grid.</li> <li>Utilisation not in accordance with the intended purpose comprises: <ul> <li>utilisation for any other purpose or in any other manner</li> <li>making any modifications to the inverter that have not been expressly approved by Fronius</li> <li>the installation of parts that are not distributed or expressly approved by Fronius.</li> </ul> </li> <li>Fronius shall not be liable for any damage resulting from such action. No warranty claims will be entertained.</li> <li>Proper use also includes: <ul> <li>complying with all the instructions in the operating instructions</li> <li>performing all stipulated inspection and maintenance work</li> </ul> </li> </ul>
Application area	The inverter has been developed exclusively for use in grid-connected photovoltaic sys- tems; generating energy independently of the public grid is not possible.
Regulations gov- erning the photo- voltaic system	The inverter is designed to be connected and used exclusively in conjunction with solar modules. Use of the inverter with other DC generators (e.g. wind generators) is not permitted When designing the photovoltaic system, ensure that all its components are operated with- in their permitted operating ranges at all times. Observe all the measures recommended by the solar module manufacturer to ensure the lasting maintenance of the properties of the solar module.

# Functional principle

Functional principle	The inverter operates fully automatically. The control module starts monitoring the grid volt- age and frequency as soon as the solar modules produce enough energy after sunrise. When insolation has reached a sufficient level, the solar inverter will start to feed energy into the grid. The inverter works in a way that ensures the maximum power possible is obtained from the solar modules. This is known as "Maximum Power Point Tracking" (MPPT). As soon after dusk as the power available to feed into the mains falls below a sufficient level, the inverter disconnects from the mains supply. It retains all its settings and stored data.
Cooling of the in- verter through forced-air ventila- tion	Cooling of the inverter is performed by a forced-air ventilation system via a temperature- controlled radial fan. Air is sucked in from the front and fed, via a sealed duct, through the electronics compartment, before passing directly over the inductors and dissipating up- wards. The sealed air duct prevents the electronics compartment from coming into contact with the ambient air. This approach largely prevents any contamination of the electronics com- partment. The speed of the fan and temperature of the intake air are monitored. The variable-speed, ball-bearing mounted fans in the inverter permit the following: - optimum cooling of the inverter - a higher level of efficiency - cooler parts, therefore a longer service life - lowest-possible energy consumption and noise levels
Power derating	To protect the inverter if adequate heat dissipation is not possible, even with the fans run- ning at full speed (e.g. when installed in containers without proper heat dissipation meas- ures), the operation known as power derating takes place above an ambient temperature of approximately 45 °C. Power derating briefly reduces the power of the inverter to prevent the temperature ex- ceeding its permitted limit. The inverter remains operational for as long as possible without stopping.
Solar module grounding	The inverter is designed for use with non-grounded solar modules and those grounded on the negative pole. Grounding of the solar module on the negative pole is carried out inside the inverter via a fuse holder equipped with a corresponding fuse as required.

# The inverter in a photovoltaic system

General	The solar inverter acts as a highly sophisticated link between the solar modules and the public grid.
Tasks	<ul> <li>The main tasks of the inverter are as follows:</li> <li>converting DC to AC current</li> <li>fully automatic operational management</li> <li>display function and data communication</li> </ul>
Converting DC to AC current	The inverter converts the direct current created in the solar modules into alternating cur- rent. This alternating current is fed synchronously with the grid voltage into the in-house network or the public grid.
	<b>IMPORTANT!</b> The inverter has been developed exclusively for use in grid-connected pho- tovoltaic systems; generating energy independently of the public grid is not possible.
Display function and data commu- nication	The display on the inverter acts as the interface between the inverter and the user. The display design is oriented towards simple operation and to making the system data available at all times.
	The inverter has a range of basic functions for logging minimum and maximum values on a daily and total basis. The values are output on the display.
	An extensive selection of data communication elements opens up numerous recording and visualisation options.
System add-on	<ul> <li>The inverter is able to accommodate a wide variety of system add-ons, such as:</li> <li>a datalogger, to enable a PC to record and manage data from a photovoltaic system</li> <li>various large-format displays</li> <li>interfaces to transfer system data in a freely accessible format</li> <li>devices to combine and monitor solar module strings</li> </ul>
	The inverter is not designed to be used with entional plug in eards. System add and must

The inverter is not designed to be used with optional plug-in cards. System add-ons must be installed in a separate housing.

### **Description of the device**



### Item Description

- (1) Mounting lug (front and rear)
- (3) Front base-cover (opposite: rear base-cover)

Behind the front base-cover the forklift truck receptacle is located.

(4) DC main switch, lockable when switched off

### **IMPORTANT!** The door cannot be opened when the DC main switch is switched on.

(5)	Door
(6)	Control elements (display, buttons, monitoring and status LEDs)
(7)	Exhaust air hood
(8) (9)	Lifting eye for crane transport (front and rear, under the exhaust air hood)
(10) (11)	Lifting eye for crane transport (front and rear, under the exhaust air hood)
(12)	Air inlet grille

ltem	Description
(13)	Door handle (lockable)
(14)	Right side panel (opposite: left side panel)
(15) (16)	Mounting lug (front and rear)

#### Inverter interior



### Item Designation

- (1) Fan
- (behind the air inlet grille)
- (2) Data communication area
- (3) Fuse holder for operation with solar modules grounded to the negative pole: DC- to PE
- (4) 2-pin automatic circuit breaker to protect the AC power supply
- (5) 4-pin automatic circuit breaker to protect the measuring lines on the grid side
- (6) DC main switch

The DC main switch shaft is not fitted when the inverter is delivered.

- (7) Connection area
- (8) Door catch (not shown)

### Connection compartment



### Item Description

(1)	DC+ connectio	ns
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- (2) DC- connections
- (3) Openings for attaching the strain-relief clamps\* for the DC+ cable
- (4) Openings for attaching the strain-relief clamps\* for the DC- cable
- (5) Cable input opening with sliding cover and seal
- (6) Openings for attaching the strain-relief clamps\* for the AC cable
- (7) Grounding terminal for AC cable
- (8) AC power supply
- (9) Mains connections L1, L2, L3 and N
- \* The strain-relief clamps and other installation and connection accessories are part of the scope of supply of the inverter.



(1) (2)	for future use
(3)	Solar Net IN connection socket 'Fronius Solar Net' input, for connecting to other DATCOM components (e.g. in- verter, sensor box, etc.)
(4)	Solar Net OUT connection socket 'Fronius Solar Net' output, for connecting to other DATCOM components (e.g. in- verter, sensor box, etc.)
(5)	VSR connection socket for connecting an external measuring and monitoring relay
	The contact must be potential-free. Contact rating 24 V / 10 mA

### Item Description

(6) NO/alarm terminals



S3-2 EXT

for connecting an external NO contact, e.g. to isolate the device from the grid voltage using an AC contactor; connected using bracket when delivered.

- 3 4 IN1 for connecting and evaluating a floating alarm contact
- 5 -6 IN2 for connecting and evaluating a floating alarm contact
- 7 8 IN3 for connecting and evaluating a floating alarm contact

The contacts must be potential-free.

Contact rating 24 V / 10 mA Cable cross-section: 0.5 - 6 mm<sup>2</sup> Tightening torque of terminals: 0.8 - 1.6 Nm

(7) 'Solar Net' LED shows the current status of the Fronius Solar Net
(8) Fuse F1 for switched-mode power supply, 4 A slow-blow

#### Item Description

(9) Relay output terminals



Possible relay contact functions	Function	Switch contact ac- tivation criterion <sup>1)</sup>	Switch contact de- activation criteri- on <sup>2)</sup>	Description
	Off	-	Permanently OFF	Function switched off
	On	Permanently ON	-	Test function for NO/ alarm contact
	AC Open	AC contactor is open	AC contactor is closed	No contactor error signal or AC grid

Function	Switch contact ac- tivation criterion <sup>1)</sup>	Switch contact de- activation criteri- on <sup>2)</sup>	Description	
Fan On	Cabinet fan in opera- tion	Cabinet fan not working		
> 40 °C	max. internal tem- perature >/= 40 °C	max. internal tem- perature = 30 °C</td <td colspan="2">External ventilation / air conditioning can be activated</td>	External ventilation / air conditioning can be activated	
> 50 °C	max. internal tem- perature >/= 50 °C	max. internal tem- perature = 40 °C</td <td></td>		
Sig. Rel.	NO/alarm contact trips	Error confirmation at the touch of a button	Status indicator / re- lay contact switches	
Running	Inverter feeding en- ergy into the grid	Inverter not feeding energy into the grid	Control of powered non-return valve	
Warning	Defined warning sta- tus codes	Error confirmation at the touch of a button	NO/alarm contact activation, when cer- tain warning status codes occur at a specific frequency according to the 'Er- ror-Counter' Service menu	
Error	Defined error status codes	Error confirmation at the touch of a button	NO/alarm contact activation, when cer- tain error status codes occur at a specific frequency according to the 'Er- ror-Counter' Service menu	

<sup>1)</sup> Activation = the NC for the relay contact opens, the NO closes

<sup>2)</sup> Deactivation = the NC for the relay contact closes, the NO opens

# Data communication and Solar Net

Solar Net and data interface	Fronius Solar Net was developed to make 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 more than one inverter to be linked up using system add-ons.
	It is a bus system. A single cable is all that is required for one or more inverters to com- municate with all the system add-ons.
	Fronius Solar Net automatically recognises a wide variety of system add-ons.
	In order to distinguish between several identical system add-ons, each one must be as- signed a unique number.
	Similarly, every inverter on the Fronius Solar Net must be assigned a unique number. Refer to the section entitled 'The Setup-Menu' for instructions on how to assign a unique number.
	More detailed information on the individual system add-ons can be found in the relevant operating instructions or on the internet at http://www.fronius.com.
	More detailed information on cabling DATCOM components can be found at http://www.fronius.com - Solar Electronics / Info & Support / Document downloads / Op- erating instructions / System monitoring / Fronius DATCOM cabling guide.
Overcurrent and undervoltage cut- out	The data communications electronics have a cut-out function that interrupts the power sup- ply in the Fronius Solar Net: - in response to overcurrent, e.g. in the event of a short circuit - in response to undervoltage
	The overcurrent and undervoltage cut-out does not depend on the current flow direction. If the Fronius Solar Net measures a current flow > 3 A or a voltage < 6.5 V, the power supply in the Fronius Solar Net is interrupted. The power supply is restored automatically.
Description of the 'Fronius Solar	The 'Fronius Solar Net' LED is on: the power supply for data communication within the Fronius Solar Net is OK
	The 'Fronius Solar Net' LED is off:
	<ul> <li>data communication error in the Fronius Solar Net</li> <li>Overcurrent (current flow &gt; 3 A, e.g. resulting from a short circuit in the Fronius Solar</li> </ul>
	<ul> <li>Undervoltage (not a short circuit, voltage in Fronius Solar Net &lt; 6.5 V, e.g. if there are too many DATCOM components on the Fronius Solar Net and not enough electrical power is available)</li> </ul>
	In this case, power for the DATCOM components must be supplied by connecting an external power unit to one of the DATCOM components.
	To detect the presence of an undervoltage, check some of the other DATCOM components as required.
	The 'Fronius Solar Net' LED flashes briefly every 5 seconds: following a shutdown as the result of an overcurrent or undervoltage, the inverter attempts to restore the power supply to the Fronius Solar Net every 5 seconds while the fault per- sists.

#### **Example** Recording and archiving of inverter data using Fronius Datalogger Web, data output on external display:



#### Captions:

Fronius Solar Net data network with

- 1 Fronius Agilo Outdoor
- 1 Fronius IG Plus with a 'Fronius Com Card'
- 1 Fronius Datalogger Web with LAN interface for connecting to a PC/laptop
- 1 Fronius Public Display Box
- 1 external display

Communication between the individual components themselves is handled by Fronius Solar Net.

# Installation and commissioning

### **Choice of location**

General com- ments regarding choice of location	The inverter is primarily designed for installation outdoors. Provided there is sufficient ventilation, the inverter may also be used in an indoor environ- ment.			
	The following points in the cabling into the the specified berrich adequate bearing Fronius Agilo Our Fronius Agilo Our IMPORTANT! The are ducing and setting up	must also be taken int he inverter, nding radii of the cable g capacity per m² of flu itdoor 100.0-3 806 l itdoor 75.0-3 732 kg dequate bearing capa o the inverter!	o account in the choice es, oor for weight of the inv <g city of the floor must be</g 	of location: verter:
Cabling into the inverter	The AC cable, DC ca the inverter as follow	able and the data com s:	nunications cable, if rea	quired, can be fed into
	a)	b)	c)	Plan view

from below (e.g. via a cable duct or a false floor, maximum cable cross-section = 240 a) mm<sup>2</sup>)

from the side through the base b)

2

c) from the rear through the base

Feeding the cabling through the base is only possible for cables with a cross-section of max. 120 mm<sup>2</sup>.

Feeding the cabling from the rear is only possible for cables with a cross-section of max. 95 mm².

IMPORTANT! If AC cables, DC cables and data communication cables are fed together into the inverter, ensure adequate insulation is provided between the AC/DC cables and the data communication cables.

Criteria influenc-
ing choice of lo-
cation

Place on a solid, even. level and fire-resistant surface only.

Max. ambient temperatures: -25 °C; +50 °C

### Can be used at altitudes of up to 2000 m

Maintain the following lateral clearances between the inverter and a wall:



Wall - left side of inverter:

min. 400 mm (to permit the door to be opened fully)

min. 50 mm (to open the door 90°)

\*\* Wall - right side of inverter:

min. 200 mm (to permit the air inlet grille to be opened fully)

min. 80 mm (to open the air inlet grille 90°)

Two or more inverters can be placed side-by-side or back-to-back.

The airflow within the inverter is from the front to the top (cold air taken in at the front, hot air emitted out of the top).

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

Ideally, the inverter should be installed in a protected location, e.g., under a roof overhang.

Unsuitable loca- tions	<ul> <li>Do not install the inverter:</li> <li>in areas in which a heavy build-up of dust containing conductive particles (e.g. iron chips) is likely.</li> </ul>
	<ul> <li>where it can be exposed to ammonia, corrosive gasses, acids or salts (e.g., fertilizer-storage areas, vent openings of livestock stables, chemical plants, tanneries)</li> <li>in areas where there is an increased risk of damage from farm animals (horses, cattle, sheep pigs etc.)</li> </ul>

### Transport

### Transport

The inverter weighs approx. 806 kg and can be transported as follows:

- by its lifting eyes, e.g. using a crane or other suitable lifting gear and tackle
  - by its forklift truck receptacle, e.g. using a forklift truck, lift truck or crane in conjunction with pallet forks

Transporting by its lifting eyes using a crane

Transporting by its lifting eyes using a crane is only possible, when the exhaust air hood is dismantled .



- WARNING! Falling equipment can cause serious or even fatal injury. When
- always use all four of the lifting eyes provided for this purpose,
- the length of the lifting tackle (chain, rope, strap, etc.) must be chosen so that the angle between the lifting tackle and the horizontal is at least 60°.





Transporting by crane using pallet fork

- WARNING! Falling equipment can cause serious or even fatal injury. When transporting the inverter using a crane and pallet fork
- the pallet fork must have a headroom of at least 1950 mm
  - always insert the pallet fork into the forklift truck receptacle
  - always insert the pallet fork completely into the forklift truck receptacle
  - secure the inverter to prevent it slipping off the pallet fork

Remove the front and rear base covers from on the inverter before transporting it using a pallet fork, forklift truck or lift truck.



Remove the front base cover

Remove the rear base cover

Transporting by forklift truck or lift truck

**WARNING!** Equipment that falls or topples over can cause serious or even fatal injury.

- always insert the fork into the forklift truck receptacle
- always insert the fork completely into the forklift truck receptacle
- secure the inverter to prevent it slipping off the fork or falling over
  - avoid sudden changes in direction, braking or acceleration

Remove the front base-cover and the rear base-cover from the inverter before transporting it using a pallet fork, forklift truck or lift truck.



Removing the front base-cover



Removing the rear base-cover
## Positioning the inverter

### Prerequisites

- **WARNING!** Equipment that falls or topples over can cause serious or even fatal injury.
  - Place the inverter on a solid, level surface in such a way that it remains stable.
    - Do not under any circumstances tip the inverter while it is being positioned.

Before positioning the inverter, clarify how the cables are going to be fed in. If it is not going to be possible to feed any cables into the inverter once it has been positioned, all the AC, DC and data communication cables must, before the inverter is put in place,

- be dimensioned accordingly,
- protrude at least 650 mm out of the floor.



**CAUTION!** Risk of cable damage as a result of shearing or bending. if any cables are protruding out of the floor, use a crane or forklift truck to lift the inverter over the cables and position the inverter in its desired location.

#### **Positioning the inverter IMPORTANT!** Ensure that any covers which were removed previously are refitted before the inverter is moved to its final position (e.g. fit the rear base-cover before positioning the inverter up against a wall).

WARNING! Equipment that topples over can cause serious or even fatal injury.
 Place the inverter on a solid, level surface in such a way that it remains stable.

Fix the inverter at the mounting lugs firmly to the ground.

Fixing material for fixing the inverter on the ground is not included with the inverter. The installer is responsible for the proper selection of dowels, screws, etc..

- Transport the inverter to its location
- Fit any covers that will no longer be accessible once the inverter is in its final position
- 3 Move the inverter into its final position
- Adjust the inverter horizontally using the leveling feet.

The leveling feet are located at the bottom of the inverter, for better accessibility optionally remove the left and right base-cover.

5 Depending on the accessibility fix the inverter with suitable dowels and screws ideally 4 x at the mounting lugs on the floor.

Notes regarding the air supply

If the inverter is positioned in a protected area, the air supply to the inverter must be at least 1200 m<sup>3</sup>/h (approx. 20 m<sup>3</sup>/min).

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

Monitoring the grid

**IMPORTANT!** To provide the best possible grid monitoring, the resistance in the leads to the mains connections should be as low as possible.

Mains connections



Legend:

- L1 Phase conductor
- L2 Phase conductor
- L3 Phase conductor
- N Neutral conductor
- PE Ground conductor / grounding



**NOTE!** Ensure that the grid neutral conductor is grounded.

**IMPORTANT!** Only the following cables may be connected to V-type terminals:

- RE (round single-wire)
- RM (round multi-strand)
- SE (sector-shaped single-wire)
- SM (sector-shaped multi-strand)
- fine-core cables, in conjunction with ferrules only

Fine-core cables without ferrules may only be connected to the M10 threaded bolts of the mains connections using a suitable M10 cable lug; tightening torque = 18 Nm

 Connecting aluminium cables
 Aluminium cables can be connected to the mains connections.

 MOTE! When connecting aluminium cables:
 Observe national and international guidelines regarding the connection of aluminium cables

 observe national and international guidelines regarding the connection of aluminium cables

 follow the instructions of the cable manufacturer

- check every year that the cables are securely attached in accordance with the specified torque.

Max. cross-section of AC cables when feeding them in from below is 240 mm<sup>2</sup>.

WARNING! An electric shock can be fatal. Danger due to grid voltage and DC
voltage from solar modules that are exposed to light.
- Make sure that both the AC side and the DC side of the inverter are de-ener-

- Make sure that both the AC side and the DC side of the invert gised before carrying out any connection work.
  - Only an authorised electrical engineer is permitted to connect this equipment to the public grid.



CAUTION! Risk of damage to the inverter as the result of incorrectly tightened cable connections. Incorrectly tightened cable connections can cause heat damage to the inverter that may result in a fire. When connecting AC and DC cables, ensure that all the cables are tightened to the inverter terminals with the specified torque.



**CAUTION!** Risk of damage to the inverter due to the ingress of moisture.

Never open the inverter during rain.

Do not establish any connections or carry out any maintenance work during rain.

### Connecting the inverter to the public grid

NOTE! Ensure that the phases are connected in the right order: L1, L2, L3, N and PE.

After connecting the phases, check the rotary field of the grid using a rotary field measuring device. The inverter is designed for a clockwise rotary field.

## **IMPORTANT!**

Minimum cable cross section for the ground conductor PE: 10 mm<sup>2</sup> für Copper wire 16 mm<sup>2</sup> für Aluminium wire







- Feed the AC cable into the inverter, observing the bending radii specified by the cable manufacturer
- Strip sheath from AC cable
- Strip at least 20 mm of wire from phase conductors L1 L3, neutral conductor N and ground conductor PE
- Align phase conductors L1 L3 and neutral conductor N with the grid connections according to the phase
- Push the AC terminal over the phase conductor, the neutral conductor and the ground conductor
- Push the AC terminal up and over the grid connection and the bare end of the cable
- Tighten the AC terminal: 5 mm Allen key

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Tightening torque = 12 Nm

- Place the insulation caps onto the grid connections
- Repeat the process for phase conductors L2 and L3 and the neutral conductor N



- Align the ground conductor PE with the grounding terminal
- Push the PE terminal up and over the grounding terminal and the bare end of the cable
- Tighten the PE terminal:
   5 mm Allen key

Tightening torque = 12 Nm





NOTE! Different openings are available on the rail for attaching the clamps of the strain-relief device, depending on the cable routing.

strain-relief device

device to the rail

A B C	
LI LZ L3 N	

e.g.:

А

В

С

- cable routed at an angle from the bottom right - attach the clamp for the strain-relief device to positions 3 and 4
- cable routed at an angle from the bottom left - attach the clamp for the strain-relief device to positions 1 and 2
- vertical cable routing attach the clamp for the strain-relief device to positions 5 and 6

**Connecting AC** cables with a cable lug

Alternatively, an AC cable with a cable lug can be connected to the M10 threaded bolts on the mains connections in order to connect the AC cables to the V-type terminals.



NOTE! Ensure that the phases are connected in the right order: L1, L2, L3, N and PE.

After connecting the phases, check the rotary field of the grid using a rotary field measuring device. The inverter is designed for a clockwise rotary field.



Maximum fuse	Inverter	Phases	Nominal output	Fuse protection
ing current side	Fronius Agilo 75.0-3	3	100 kVA	3 x 200 A
	Fronius Agilo 100.0-3	3	100 kVA	3 x 200 A

Connecting an external AC supply for the inverter Procedure for connecting an external AC supply for the inverter (e.g. to provide an external supply to controllers or fans):



If present, connect ground conductor to grounding terminal 9

## Fitting and connecting optional overvoltage protection

General	Standard type II overvoltage protection can be fitted in the inverter as an option:
	- for the DC side,

for the AC side,

for the external AC supply of the inverter.

DIN rails and passage openings to the AC and DC terminals for the cables are provided in the inverter for fitting overvoltage protection.

The existing remote contacts on the overvoltage protection can be connected to the NO/ alarm contact terminals in the data communication area. In the event of a fault, the incoming signals can then be evaluated and shown on the display.

Overvoltage protection is not included in the scope of supply of the inverter. The engineer is responsible for the correct selection of the relevant overvoltage protection so as to comply with national and international regulations.

### Safety



WARNING! Work that is carried out incorrectly can cause serious injury and damage. Overvoltage protection must only ever be installed and connected by a qualified electrical installation engineer!
Follow the safety rules!
Make sure that both the AC side and the DC side of the inverter are de-energised before carrying out any installation or connection work.



**NOTE!** Installing a Type I overvoltage protection device in the inverter is prohibited.

### Fitting and connecting overvoltage protection on the DC side

### IMPORTANT!

- Provide a separate grounding terminal for each overvoltage protection device
- Make sure that the cables have adequate insulation resistance.
- Fit overvoltage protection to the DIN rail on the DC side according to the manufacturer's instructions
- Fit a grounding terminal to the DIN rail on the DC side
- [3] Remove the 2 blank screw joints on the DC side
- Insert 2 M20 screw joints from the inverter's accessories kit into the openings and secure them with the hexagonal nuts of the blank screw joint
- 5 Prepare the cable:
  - Strip the cable on the overvoltage protection side
  - Fit the M10 cable lug on the DC connection side

Max. cable cross-section must comply with the instructions of the overvoltage protection manufacturer.

- 6 Open the M20 screw joints
- Feed the cable through



ΕN

- **9** Use the M10 hexagonal nut and the washer to connect the cable with the correct polarity at the central M10 threaded bolt of the relevant DC connection
- 10 Close the M20 screw joints
- Connect the overvoltage protection to the grounding terminal
- **12** If available, connect the remote contacts of the overvoltage protection device with two cables to the NO/alarm contact terminals in the data communication area

Fitting and con- necting overvolt- age protection on	<ul> <li>IMPORTANT!</li> <li>Provide a separate grounding terminal for each overvoltage protection device</li> <li>Make sure that the cables have adequate insulation resistance.</li> </ul>
the AC side	Fit overvoltage protection to the DIN rail on the AC side according to the manufactur- er's instructions
	Fit a grounding terminal to the DIN rail on the AC side
	<ul> <li>Remove 3-4 blank screw joints on the AC side, depending on the overvoltage protection</li> </ul>
	Insert 3-4 M20 screw joints from the inverter's accessories kit into the openings and secure them with the hexagonal nuts of the blank screw joint
	<ul> <li>Frepare the cable:</li> <li>Strip the cable on the overvoltage protection side</li> <li>Fit the M10 cable lug on the AC connection side</li> </ul>
	Max. cable cross-section must comply with the instructions of the overvoltage protection manufacturer.
	6 Open the M20 screw joints
	7 Feed the cable through
	<ul> <li>Connect the cable to the overvoltage protection device according to the manufactur- er's instructions</li> </ul>
	<ul> <li>Connect the cable to the upper part of the relevant AC connection in the correct phase sequence</li> <li>Tightening torque = 18 Nm</li> </ul>
	Close the M20 screw joints
	Connect the overvoltage protection to the grounding terminal
	12 If available, connect the remote contacts of the overvoltage protection device with two cables to the NO/alarm contact terminals in the data communication area
Fitting and con-	IMPORTANT!
necting overvolt- age protection for the AC- supply	<ul> <li>Provide a separate grounding terminal for each overvoltage protection device</li> <li>Make sure that the cables have adequate insulation resistance.</li> </ul>
	Fit overvoltage protection to the DIN rail on the AC side according to the manufactur- er's instructions
	2 Fit a grounding terminal to the DIN rail
	3 Strip the cable on both sides
	Max. cable cross-section must comply with the instructions of the overvoltage protec- tion manufacturer.

Connect cables L1 and N on the overvoltage protection device according to the manufacturer's instructions

- **5** Run the cable to the 2-pin automatic circuit breaker to safeguard the AC power supply
- 6 Connect cables L1 and N on the automatic circuit breaker in the correct phase sequence
- [7] Connect the overvoltage protection to the grounding terminal
- **B** If available, connect the remote contacts of the overvoltage protection device with two cables to the NO/alarm contact terminals in the data communication area
- **9** Bind the cable with cable ties if necessary

## Connecting the DC cable to the inverter

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

- If insolation is constant and the temperature is falling, the open circuit voltage of the solar modules will increase. The open circuit voltage must not exceed 950 V. If the open circuit voltage exceeds 950 V, the inverter will be destroyed and no warranty claims will be entertained.
- More exact values for dimensioning the solar modules can be provided by suitable calculation programs, like the Fronius Solar.configurator (which can be downloaded from www.fronius.com).



NOTE! Before connecting the solar modules, check:

- that the voltage specified by the manufacturer corresponds to the actual measured voltage.
- whether the solar modules need to be grounded.





**IMPORTANT!** Only the following cables may be connected to V-type terminals:

- RE (round single-wire)
- RM (round multi-strand)
- SE (sector-shaped single-wire)
- SM (sector-shaped multi-strand)
- fine-core cables, in conjunction with ferrules only

Fine-core cables without ferrules may only be connected to the M10 threaded bolts of the DC connections using a suitable M10 cable lug; tightening torque = 30 Nm

**Connecting alu-** Aluminium cables can also be connected to the DC connections.

minium cables

**NOTE!** When connecting aluminium cables:

- observe national and international guidelines regarding the connection of aluminium cables
- follow the instructions of the cable manufacturer
- Once a year, make sure that the cables are securely connected according to the specified torque.

 

 Max. cross-section of DC cables
 The DC connections on the inverter are designed for cables with a cross-section of max. 240 mm<sup>2</sup>.

With this maximum cross-section, 2 cables can be connected to each pole.

**WARNING!** An electric shock can be fatal. Danger due to grid voltage and DC voltage from solar modules that are exposed to light.

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

**CAUTION!** Risk of damage to the inverter as the result of incorrectly tightened terminals. Incorrectly tightened terminals can cause heat damage to the inverter that may result in a fire. When connecting AC and DC cables, ensure that all the terminals are tightened to the specified torque.

## Connecting DC cables

- Remove contact protectors
- 2 Feed the DC cable into the inverter, observing the bending radii specified by the cable manufacturer
- 3 Strip at least 25 mm of insulation from the DC cable
- Align the DC cable with the DC connections



- Push the DC terminal over the DC cable
- Push the DC terminal up and over the DC connection and the bare end of the cable
- Tighten the DC terminal: 6 mm Allen key

Tightening torque = 25 Nm

- Repeat this process for every DC cable



- Place the DC cable in the clamp of the strain-relief device
- Attach the clamp of the strain-relief device to the rail
- Secure the DC cable with the clamp of the strain-relief device
  - Repeat this process for every DC cable





**NOTE!** Different openings are available on the rail for attaching the clamps of the strain-relief device, depending on the cable routing.



e.g.:

А

В

С

- cable routed at an angle from the bottom right - attach the clamp for the strain-relief device to positions 1 and 2
- cable routed at an angle from the bottom left - attach the clamp for the strain-relief device to positions 3 and 4
- vertical cable routing attach the clamp for the strain-relief device to positions 5 and 6

Connecting DC cables with a cable lug

Alternatively, a DC cable with a cable lug can be connected to the M10 threaded bolts on the DC connections in order to connect the DC cables to the V-type terminals.



**NOTE!** Ensure the polarity is correct when connecting the DC cables.



### Fuse protection against polarity reversal of DC cables

The inverter is fitted with a fuse to protect against any polarity reversal of the DC cables. The fuse will blow if the inverter is activated with the polarity of the DC cables reversed. Status code 307 "DC low" is shown on the display, even in the event of sufficient levels of insolation.

Should this occur, the reverse polarity protection fuse must be replaced as described under "Replacing fuses" in the "Troubleshooting and maintenance" section.

## Grounding the solar modules in the inverter

### General

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

se.



Locking ring for solar module grounding on the negative pole

Grounding the solar module to the negative pole via a fuse

Grounding the solar module to the negative pole via a fuse



(1) Solar module

Inside the inverter is a means for grounding solar modules to the negative pole via a fu-

- (2) Inverter
- (3) Fuse

Fronius recommends the following fuse when grounding the solar module to the negative pole:

nominal current rating 3 A / 1000 V, fuse dimensions 10 x 38 mm

**IMPORTANT!** Fuses for grounding the solar module are not part of the scope of supply of the inverter. If the manufacturer of the solar module stipulates that grounding is required, an appropriate fuse must be ordered separately



**WARNING!** An electric shock can be fatal. Danger of electric shock if the solar module is not grounded or is not grounded properly. To comply with IEC 62109-2, any grounding required by the manufacturer of the solar module within the inverter must only be carried out via the specified fuse.

### Safety

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

- Ensure that grounded solar modules are designed so that they are isolated according to Protection Class II
- Place the relevant safety sticker in a clearly visible place on the photovoltaic system
- Configure the inverter so that a warning message is displayed if the fuse trips.



Warning sticker for solar module grounding

**IMPORTANT!** The warning sticker and the fuse for grounding the solar module are not part of the scope of supply of the inverter and must be ordered separately.

Configuring the inverter for grounded solar modules The inverter's insulation monitoring must be deactivated when the solar modules are grounded. At the second level of the Setup menu, the inverter must be configured so that when the grounding fuse trips, an error message is displayed or the inverter is switched off (according to the country setup).

Access code 22742 must be entered in order to access the 2nd level of the Setup menu.

Grounding the solar module on the negative pole: inserting a fuse



**WARNING!** An electric shock can be fatal. Danger due to DC voltage from solar modules that are exposed to light.

The DC main switch is only to be used to de-energise the power stage set. Grounding of the solar module on the negative pole remains in effect, even when the DC main switch is switched off. Do not under any circumstances touch DC+ or DC-.



Inserting the fuse grounds the solar modules on the negative pole.

ЫN

## **Closing the inverter**

Closing the inverter

**WARNING!** An inadequate ground conductor connection can cause serious injury or damage.

The screws on the air inlet grille and on the covers provide a suitable ground conductor connection for the housing; these screws must not under any circumstances be replaced by other screws that do not provide a reliable ground conductor connection.

1 Check that all covers and contact protection devices are fitted; fit any covers and contact protection devices that are missing



Tightening torque = 3 Nm

F

**NOTE!** To avoid damaging the DC main switch, only close the door of the inverter once the switch itself is switched to the "OFF" position.





Tightening torque = 3 Nm

## Using for the first time

Factory configu- ration	The inverter is preconfigured in the factory. The language and the time must be set when the inverter is used for the first time. Refer to the section in this manual entitled 'The Setup Menu' for the individual configuration options.		
Using for the first time	After connecting the DC cable to the invention of the inverter of the inverter is about to start up automation of the inverter is about to start up automation. Provided that energy continues to be feed steady green to confirm that the inverter is about to start up automation. Provided that energy continues to be feed steady green to confirm that the inverter is about to start up automatic the inverter is about to start up automatic the inverter is a steady green. A window then appears for setting the later the inverter is a strain of the inverter is a s	verter : n - posif gh volt tically omatio d into f r is fur angua + - •	<ul> <li>and the inverter to the grid (AC):</li> <li>ition</li> <li>tage, the inverter will enter the startup phase. //</li> <li>ic startup, the operating state LED will show</li> <li>the grid, the operating state LED will remain notioning correctly.</li> <li>age:</li> <li><b>5</b> Use the 'Up' and 'Down' keys to select the desired language</li> <li><b>6</b> Press the 'Enter' key to set the language</li> </ul>
	Time (hh:mm:ss) <b>13</b> :23:37	+ - +	<ul> <li>The time is displayed (HH:MM:SS, 24-hour format), the hours field starts flashing.</li> <li>7 Use the 'Up' and 'Down' keys to select a value for the hour</li> <li>8 Press the 'Enter' key</li> </ul>

| <mark>SETUR</mark> | Time (hh:mm:ss)

13

The minutes field starts flashing.

**9** Repeats steps 7 and 8 for the minutes and seconds until...



If setting of the language and the time are skipped by pressing the Back key and no settings are made during the setup, these two prompts appear again the next time the inverter is started.

Configuring the inverter for existing solar module grounding

**NOTE!** If the solar module is already grounded on the negative pole, the appropriate grounding method must be set in the 'Basic Service Menu' when the inverter is switched on.

The access code 22742 must be entered in order to access the 'Basic Service Menu'.

2	Press	the	'Menu'	kev

Press the unassigned 'Menu / Esc' key 5 times

1 1		
1 1		

4 Enter the access code 22742

The inverter is now in the 'Basic Service Menu' and the first parameter 'DC operating mode' is displayed.



# Operation

## **Controls and indicators**

Controls and indicators



tem	Description	
(1)	Display	

for displaying values, settings and menus

Monitoring and status LEDs

$\langle \mathbf{O} \rangle$	
(2)	General status LED (red)
	lights when there is a status code on the display
(3)	Startup LED (orange)
	for displaying whether the inverter is in its startup phase or is on standby
(4)	Operating state LED (green)
	for displaying the operating state

Function keys - allocated different functions depending on the selection:

(5)	'Left/up' key for navigating to the left and up
(6)	'Down/right' key for navigating down and to the right
(7)	'Menu/Esc' key for switching to the menu level for quitting the Setup menu
(8)	'Enter' key for confirming a selection

Display

Power for the display comes from the mains voltage. The display is therefore available permanently.

**IMPORTANT!** The display on the inverter is not a calibrated measuring device. A slight inaccuracy of a few percent from the energy meter used by the energy supply company is intrinsic to the system. A calibrated meter will be needed to calculate the bills for the energy supply company.

	Display modes
AC Output Power	Parameter explanation
<b>94,00</b> ™	Display of values and units as well as status codes
<b>+ + +</b> +	Function key assignment

Display areas in display mode

	<ul> <li>Inverter no.   Storage sym. (**)</li> </ul>
	Display modes
≜Standby ¶Contrast	Preceding menu items
Backlight	
Language Currency	Next menu items
4 <del>+</del> +	Function key assignment

Display areas in setup mode

(\*) Scroll bar

(\*\*) INV no. = Inverter DATCOM number, Save symbol - appears briefly while the selected values are being saved



# Monitoring and status LEDs



- General status LED (red)
- (2) Startup LED (orange)

(1)

(3)

Operating state LED (green)

LED	Colour	Activity	Explanation
(1) red	red	lights up	General status: the relevant status code is shown on the display
		Interruption while feeding energy into the grid	
			While error handling (the inverter waits for an ac- knowledgement or for an error to be rectified)
(2) orange lights	orange	lights up	The inverter will enter its automatic startup or self-test phase as soon after sunrise as the solar modules are delivering sufficient power
		The inverter has been switched to standby mode in the setup menu = grid power feed operation switched off manually	
			The inverter software is being updated
(3)	green	lights up	The LED lights up after the automatic startup phase of the inverter, provided energy is being fed into the grid. The photovoltaic system is working properly.

A list of the relevant status codes, and causes and remedies can be found in the 'Status diagnosis and repair' section under 'Maintenance and service'.

## Startup phase and feeding energy into the grid

**Startup phase** Once it has been switched on automatically, the inverter carries out the following tests and checks:

- a) Self-test of all important inverter components the inverter runs through a virtual checklist
- b) Synchronisation with the grid
- c) Startup test

Before the inverter starts feeding energy into the grid, the grid conditions according to national regulations are tested.

Depending on the country-specific regulations, the startup test can last just a few seconds or take several minutes.

During the startup phase:

- the operating state LED shows orange,
- the string 'warte...' (wait...) and the currently tested component are displayed, e.g.:



## Feeding energy into the grid

Once the tests have been completed the inverter starts feeding energy into the grid The display shows the current energy level that is being fed into the grid, e.g.:



- The operating state LED shows green, the inverter is working.

## Navigation at the menu level

Activate display	1 Press any key			
backlighting	The display backlighting is activated.			
	The option remains in the setup menu to set the display backlighting so that it is on all the time or off all the time.			
Automatic deacti- vation of display backlighting / change to display mode 'NOW'	<ul> <li>If no key is pressed for 2 minutes,</li> <li>the display backlighting switches off automatically and the inverter switches to disp mode 'NOW' (assuming the display backlighting is set to automatic).</li> <li>The switchover to the 'NOW' display mode can happen from anywhere within the play modes or the Setup menu, with the exception of the 'Standby' menu item.</li> <li>The amount of energy currently fed in is displayed.</li> </ul>			
Open menu level	AC Output Power 94,00 kw	1 Press the 'Menu' key		
		<ul> <li>'Menu' will appear on the display</li> <li>The inverter is now at the menu level.</li> <li>From the menu level <ul> <li>the required display mode can be selected</li> <li>the Setup menu can be accessed</li> </ul> </li> </ul>		

## The display modes



overview of dis- play values	Display mode	Unit	Display value	
	'NOW'	W	Energy supplied Day characteristic	
		V	Three-phase AC grid voltage	
		А	Three-phase AC output current	
		Hz	AC grid frequency	
		V	PV array voltage	
		А	PV array current	
		°C	Ambient temperature	
		rpm	Fan speed	

Display mode	Unit	Display value
	HH:MM <sub>SS</sub>	Time
	DD.MM <sub>YY</sub>	Date
'TODAY' 'YEAR'	kWh / MWh	Energy Supplied Day characteristic ('TODAY')
'TOTAL'	Currency	Yield
	g / kg	CO <sub>2</sub> saving
	W	Max. output power
	V	Max. three-phase AC grid voltage
	V	Max. PV array voltage
	HH:MM	Operating hours

# Values in display mode 'NOW'

Choosing a dis- play mode	AC Output Power 94,000 kW First value in display mode 'NOW'	<ul> <li>Choose display mode 'NOW'         The first value in display mode 'NOW' appears     </li> <li>Scroll to the next display value using the 'Down' key</li> <li>Scroll back up using the 'Up' key</li> </ul>
Values in display mode 'NOW'	AC Output Power 94,00 kW	<b>AC Output Power</b> Power (in watts) currently being fed into the grid Press the 'Enter' key to display the day character- istic.
	100kW NOW 93,77kW TODAY 418kWh 05:00 9 13 17	<b>Day characteristic</b> Displays a plot showing the power output during the day. The time axis is scaled automatically. Press the 'Back' key to remove the display
	1000   AC Grid Voltage L1 -> L2 401,00 L2 -> L3 402,00 L3 -> L1 403,00 ♠ ♠ _ ↓ ↓	AC Grid Voltage Phase voltage (Volt) Press the 'Enter' key to display the string voltage.
	<b>№000</b>   String Voltage L1 228,7V L2 232,7V L3 228,5V <b>_</b> 3	<b>String Voltage</b> displays the string voltage of each phase. Press the 'Back' key to remove the display
	<b>NOCO</b>   AC Output Current L1 101,0A L2 102,0A L3 103,0A ♣ ♣ ♣ ـ★	<b>AC Output Current</b> Phase current currently being fed into grid (Ampere)

AC Grid Frequency	AC Grid Frequency (Hertz)
PV Array Voltage	<b>PV Array Voltage</b> Voltage currently present on the solar modules (Volt)
PV Array Current 115A	<b>PV Array Current</b> Current that is being supplied at present by the so- lar modules (Ampere)
Ambient Temperature	Ambient Temperature Temperature of the air sucked in to cool the invert- er (°C)
Fan Speed 3200 rpm	Fan Speed (rpm)
15:47 38	<b>Time</b> If the time is changed on an inverter or a system add-on, it will also be changed in any other devic- es that are connected via Fronius Solar Net.
30.10 09	<b>Date</b> If the date is changed on an inverter or a system add-on, it will also be changed in any other devic- es that are connected via Fronius Solar Net.

## Values in display modes 'TODAY / YEAR / TOTAL'



Values in display modes 'TODAY / YEAR / TOTAL'





### **Energy Supplied**

Energy fed into the grid during the period in question (kWh / MWh)

Press the 'Enter' key to display the day characteristic (only in display mode 'TODAY')

### **Day characteristic**

Displays a plot showing the power output during the day. The time axis is scaled automatically.

Press the 'Back' key to remove the display

There may be discrepancies with values displayed on other measuring instruments because of differences in measuring methods. As far as adding up the energy fed in is concerned, the only binding display values are those produced by the calibrated measuring device provided by the electricity supply company.



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

EN

Like the energy supplied figure, the yield figure may also exhibit discrepancies with other measured values.

The 'Setup Menu' section explains how to select a currency and charge rate. The factory setting depends on the respective country setup.



 $CO_2$  Savings Amount by which  $CO_2$  emissions were reduced during the period in question (g / kg)

The value for  $CO_2$  savings depends on the power station facilities and corresponds to the  $CO_2$  emissions that would be released when generating the same amount of energy. The factory setting is 0.59 kg / kWh (source: DGS – Deutsche Gesellschaft für Sonnenenergie e.V. (German Society for Solar Energy)

Max Output Power 94,00 kW	Max. Output Power Largest amount of power (W) fed into the gird dur- ing the period in question
Import 1         Max       AC Grid Voltage         L1       ->       L2       401,00         L2       ->       L3       402,00         L3       ->       L1       403,00         +       +	Max. AC Grid Voltage Highest AC grid voltage (V) measured during the period in question
Max PU Array Voltage	Max. PV Array Voltage Highest PV array voltage (V) measured during the period in question



**Operating Hours** Length of time the inverter has been working (HH:MM).

Although the inverter does not operate during the night, the data required for the Sensor Box option is logged and stored 24 hours a day.

**IMPORTANT!** A prerequisite for the correct display of day and year values is that the time is set correctly.

## The Setup menu

### Initial setting

After completing comissioning the inverter is pre-configured depending on the country setup.

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

### Accessing the Switch to the menu level TOTAL | SETUP | NOW setup menu (press the 'Menu' key) Select 'Setup' mode using the 'Left' or 2 lenu 'Right' keys Press the 'Enter' key 3 'SETUP' menu level selected The first menu item in the Setup menu, SETUP 'Standby', is shown. Standby Contrast Backlight anguage Currency

'Standby' menu item

2



## Menu items in the Set-up menu

Standby	Manual activation / c	Manual activation / deactivation of Standby mode			
	<ul> <li>No energy is fed into the grid.</li> <li>The Startup LED will show steady orange.</li> <li>In Standby mode, no other menu item at menu level can be accessed or adjusted.</li> <li>The automatic switchover into the 'NOW' display mode after 2 minutes of keyboard inactivity does not occur.</li> <li>Standby mode can only be terminated manually by pressing the 'Enter' key.</li> <li>Feeding energy into the grid can be resumed at any time (deactivate 'Standby').</li> </ul>				
	Switching off Stand	dby mode (manually switching off feeding energy into the grid):			
	<ol> <li>Select the 'Stan</li> <li>Press the 'Enter</li> </ol>	<ol> <li>Select the 'Standby' item</li> <li>Press the 'Enter' key</li> </ol>			
	'STANDBY' and 'EN Standby mode is no The Startup LED sho	'STANDBY' and 'ENTER' appear alternately on the display. Standby mode is now active. The Startup LED shows steady orange.			
	Resuming feeding	Resuming feeding energy into the grid:			
	'STANDBY' and 'EN	'STANDBY' and 'ENTER' appear alternately on the display when in Standby mode.			
	1 Press the 'Enter' key to resume feeding energy into the grid				
	The 'Standby' menu item is displayed. At the same time, the inverter enters the startup phase. The operating state LED shows steady green when feeding energy into the grid has been resumed.				
Contrast	Adjusts contrast on t	djusts contrast on the display.			
	Unit	_			
	Setting range	0 - 10			
	Factory setting	5			
	Since the contrast is temperature-dependent, when the ambient conditions change it may be necessary to adjust the 'Contrast' menu item.				
Backlighting	Initial setting for display backlighting				
	Unit	_			
	Setting range	AUTO / ON / OFF			
	Factory setting	AUTO			
	AUTO:	Display backlighting is activated by pressing any key. If no key is pressed for 2 minutes, the display backlighting will go off again.			
ON:	The display backlighting remains permanently on when the in-				
-----	--				
	verter is switched on.				

OFF: The display backlighting is permanently switched off.

**IMPORTANT!** The 'Backlight' menu item only relates to the backlighting of the display and the keys.

Language	Setting the display la	Setting the display language		
	Unit	-		
	Display area	German, English, French, Dutch, Italian, Spanish, Czech, Slo- vak		
	Factory setting	(depends on country setup)		
Currency	Sets the currency ar	Sets the currency and charge rate for the energy fed into the grid		
	Unit	-		
	Display area	Currency/ feed-in tariff		
	Factory setting	(depends on country setup)		
<b>CO<sub>2</sub> factor</b> Setting the CO2 reduction factor		uction factor		
	Unit	kg/kWh		
	Setting range	00.01 - 99.99		
	Factory setting	0.59 kg/kWh		
Yield	d Setting - of an OFFSET value for the total energy display - of a measuring offset factor for the day, year and total energy d			
	Setting range	Meter deviation / meter unit of measurement / meter calibration		
	<b>Meter deviation</b> Input of a value for the fed-in energy that will be added to the energy currently carry-over value when replacing an inverter)			
	Unit	Wh		
	Setting range	Five digits		
	Factory setting	0		
	<b>Meter unit of meas</b> Input of a unit (k, N	Meter unit of measurement Input of a unit (k, M)		
	Unit	-		

Setting range	k/M
Factory setting	-

### Meter calibration

Input of a correction value to ensure that the value shown on the inverter display corresponds with the calibrated display on the electricity meter

Unit	%
Setting range	-5.0 - +5.0
Factory setting	0

DATCOM

Checking data communications, entering the inverter number, protocol settings

Setting range Status / inverter number / protocol type

#### Status

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

### Inverter number

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

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

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

#### **Protocol type**

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

Unit	-
Setting range	Solar Net / Interface
Factory setting	Solar Net

**Device Info** For displaying the settings that will be of relevance to an energy supply company. The values shown will depend on the country setup or the device-specific settings of the inverter.

Display area	General / MPP Tracker / Grid Monitoring / Voltage Limits / Fre- quency Limits / P AC Reduction	
General:		
Setup	Country setup	
Version	Version of country setup	
Group	Group for updating the inverter software	
MPP Tracker:		

DC Mode	DC mode	
FIX	Voltage value in V for fixed voltage operation	
User	Voltage value in V for MPP User operation	
Grid Monitoring:		
GMTi	Start-up time of inverter in s	
GMTr	Reconnection time in s following a grid fault	
ULL	Mean grid voltage over 10 minutes in V.	
LL Trip	Trip time for long-term voltage monitoring	
Voltage Limits:		
UIL max	Upper inner grid voltage in V	
UIL min	Lower inner grid voltage 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 in Hz	
FIL min	Lower inner grid frequency in Hz	
FOL max	Upper outer grid frequency limit value in Hz	
FOL min	Lower outer grid frequency limit value in Hz	
LVFRT:		
Status	Status of the LVFRT function (Low Voltage Fault Ride Through, according to BDEW TR3 5.7)	
DB min	Dead Band Value min. Lower voltage limit as % for the reactive power feed	
DB max	Dead Band Value max. Upper voltage limit as % for the reactive power feed	
k-Fac	Gradient showing how much reactive current is fed in as a func- tion of voltage	
P AC Reduction:		
Max. P AC	Manual power reduction	
GPIS	Softstart function	
GFDPRv	Grid frequency-dependent power reduction in %/Hz	
GFDPRr	Return to nominal output in %/s (following a grid frequency-in- duced power reduction)	

Device Status	For displaying the measured insulation resistance			
	Display area	Messwertanzeige PV Iso. (Value in MOhm)		
Time	Setting time and dat	e		
	Unit	HH:MM, DDMMYYYY		
	Setting range	Time/date		
	Factory setting	-		
	<b>IMPORTANT!</b> The c year values and the	<b>IMPORTANT!</b> The correct time and date is a prerequisite for the correct display of day and year values and the day characteristic.		
Status LT	The status display of the most recent inverter fault can be displayed.			
	<b>IMPORTANT!</b> Due to the low level of insolation early in the morning and in the evening, the status codes 306 (Power low) and 307 (DC low) are displayed routinely at these times of day. These status messages do not indicate any kind of fault.			
	<ul> <li>Press the 'Enter</li> <li>Use the 'Up' an</li> <li>Press the 'Back</li> </ul>	" key to see the status of the power stage set and the most recent fault d 'Down' keys to scroll through the list " key to close the status and fault list		
Grid Status	<ul> <li>The five most recent grid faults can be displayed:</li> <li>Press the 'Enter' key to see the five most recent grid faults</li> <li>Use the 'Up' and 'Down' keys to scroll through the list</li> <li>Press the 'Back' key to close the grid fault display</li> </ul>			
Fan test	To check that the fan is working correctly			
	Lipit			
	Setting range	- Start (Progress)		
	Factory setting	-		
	The fan test is started by pressing the 'Enter' key			
	While the test is ongoing, its ' Progress' is shown on the display.			
	OK Fan test suc	cessful		
	Fail Fan is defec	tive; the associated status code is displayed in 'NOW' view mode.		
Version	Displays the version and serial numbers of the PC boards in the inverter (e.g. for service purposes)			

Unit	-
Display area	Display / Display Software / Interface / SmartMedia Card / Con- trol / Control Software / Monitoring / Monitoring Software / Inter- face
Factory setting	-

## Setting and displaying the menu items

Setting the menu items, general	<ol> <li>Accessing the set-up menu</li> <li>Use the 'Up' or 'Down' buttons to select the desired menu item</li> <li>▲ ●</li> <li>Press 'Enter'</li> <li>↓</li> </ol>		
	The first digit of a value to be set flash- es:	The available settings are displayed:	
	<ul> <li>Use the 'Up' or 'Down' buttons to select a value for the first digit</li> </ul>	4 Use the 'Up' or 'Down' buttons to select the desired setting	
	5 Press 'Enter' ↓	<ul> <li>Fress the 'Enter' key to save and apply the setting.</li> </ul>	
	The second digit of the value flashes.	<b>T</b>	
	6 Repeat steps 4 and 5 until	To discard the setting, press the 'Esc' key.	
	the whole value to be set flashes.	<b>₽</b>	
	Press 'Enter' ↓		
	8 Repeat steps 4 - 6 as required for units or other values that are to be set until the appropriate unit or the value flashes.		
	<ul> <li>Press the 'Enter' key to save and apply the changes.</li> <li>↓</li> </ul>		
	To discard the changes, press the 'Esc' key. ♪		
	The currently selected menu item is displayed.	The currently selected menu item is dis- played.	

Exiting a menu item

To exit a menu item, press the 'Back' key ▲

The menu level appears:











The month field starts flashing.

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

the set date starts flashing.

↓ 10 Press the 'Enter' key

The date is applied and the 'Time' menu item is displayed.

# Switching the key lock on and off

General

The inverter has a key lock function. When the key lock is active, the Setup menu is not accessible, i.e. the setup data cannot be changed accidentally (or maliciously). The code 12321 has to be entered in order to activate / deactivate the key lock.

### Switching the key Press the 'Menu' key 1 4 lock on and off 'MENU' is displayed. TOTAL | SETUR | NOW Press the unassigned 'Menu / Esc' lenu key 5 times 'Access Code' is displayed in the 'CODE' CODE menu; the first digit starts flashing. Appess Code 3 Enter the code 12321: use the 'Up' and 'Down' keys to select a value for the first digit of the code. Press the 'Enter' key 4 4 The second digit starts flashing. Repeat steps 3 and 4 for the second, 5 third, fourth and fifth digit of the access code until ... the selected code starts flashing. Press the 'Enter' key 6 4 'Key Lock' is displayed in the 'LOCK' LOCK menu. Kev Lock Use the 'Up' and 'Down' keys to turn 7 the key lock on or off: ON = key lock is on (the Setup menu is not accessible) OFF = key lock is off (the Setup menu is accessible)

Press the 'Enter' key

# **Troubleshooting and maintenance**

# Status diagnostics and troubleshooting

Displaying status codes	The inverter performs a may occur and shows a malfunctions in the invertex faults. If the system self diagners shown on the display. IMPORTANT! Status of trol response. If the invertex means that there was not set the system set of the invertex of the invertex of the invertex of the system set of the invertex of the system set of the	a system self diagnosis that automatically detects many faults that them on the display. This means you are promptly made aware of erter and the photovoltaic system, or of any installation or operating osis has detected a specific fault, the associated status code will be odes may sometimes appear briefly as a result of the inverter's con- erter then continues working with no sign of any problem, this no fault.
Total failure of the display	<ul> <li>If the display fails to come on some time after sunrise:</li> <li>Check the AC voltage ON the inverter connections: the AC voltage must be 230 V (+ 10 % / - 5 %)*.</li> <li>* The mains voltage tolerance depends on the country setup</li> </ul>	
Class 1 status codes The initial response of the inverter in this case is is subsequently checked for the stipulated mor been detected by the end of this period, then the the grid. Depending on the country setup, the SoftStart- after cutting out due to an AC fault, the output creased by 10% every minute in line with the V		enerally only arise momentarily and are caused by the public grid. the inverter in this case is to disconnect itself from the grid. The grid ed for the stipulated monitoring period. If no further problem has and of this period, then the inverter will resume feeding energy into htry setup, the SoftStart-function GPIS is activated: an AC fault, the output power of the inverter is continuously in- minute in line with the VDE-AR-N 4105 guideline.
	102	
	AC voltage too high	
	Behaviour	Following careful testing and when the grid conditions are within the permissible range again, the inverter will resume feeding energy into the grid.
	Remedy	Check grid connections If this status code keeps recurring, contact your system engi- neer
	103	
	AC voltage too low	
	Behaviour	Following careful testing and when the grid conditions are within the permissible range again, the inverter will resume feeding energy into the grid.
	Remedy	Check grid connections If this status code keeps recurring, contact your system engi- neer

105	
AC frequency too high	
Behaviour	Following careful testing and when the grid conditions are within the permissible range again, the inverter will resume feeding energy into the grid.
Remedy	Check grid connections If this status code keeps recurring, contact your system engi- neer
106	
AC frequency too low	
Behaviour	Following careful testing and when the grid conditions are within the permissible range again, the inverter will resume feeding energy into the grid.
Remedy	Check grid connections If this status code keeps recurring, contact your system engi- neer
107	
No AC grid	
Behaviour	Following careful testing and when the grid conditions are within the permissible range again, the inverter will resume feeding energy into the grid.
Remedy	Check grid connections If this status code keeps recurring, contact your system engi- neer
108	
Stand alone operation of	letected
Behaviour	Following careful testing and when the grid conditions are within the permissible range again, the inverter will resume feeding energy into the grid.
Remedy	If this status code keeps recurring, contact your system engi- neer

# Class 3 statusClass 3 includes status codes that may occur while feeding energy into the grid, but gen-<br/>erally do not cause the process to be interrupted for any length of time.

The inverter disconnects automatically from the grid, the grid is then monitored as specified and the inverter attempts to resume feeding energy into the grid.

301		
Overcurrent (AC)		
Behaviour	Short-term interruption while feeding energy into the grid due to overcurrent in the alternating current circuit The inverter resumes with its startup routine.	
Remedy	Fault is rectified automatically If this status code keeps recurring, contact your system engi- neer	
303		
Power module overtemp	perature	
Behaviour	Short-term interruption while feeding energy into the grid due to overtemperature The inverter resumes with its startup routine.	
Remedy	Purge cooling air openings and heat sink if necessary; fault is rectified automatically If this status code keeps recurring, contact your system engi- neer	
304		
Internal temperature too	high	
Behaviour	Short-term interruption while feeding energy into the grid due to overtemperature The inverter resumes with its startup routine	
Remedy	Purge cooling air openings and heat sink if necessary; fault is rectified automatically If this status code keeps recurring, contact your system engi- neer	
305		
If the grid relay is closed, no energy is transferred to the grid		
Behaviour	Permanent interruption while feeding energy into the grid	
Remedy	If this status code keeps recurring, contact your system engineer	
307 (DC low)		
DC input voltage too low	v for feeding energy into the grid	

Behaviour Short-term interruption while feeding energy into the grid The inverter resumes with its startup routine.

	Remedy	Fault is rectified automatically If this status code keeps recurring, contact your system engi- neer	
	IMPORTANT! Due the status code 30 does not indicate a	e to the low level of insolation early in the morning and in the evening, 7 (DC low) is routinely displayed at these times of day. This status code any kind of fault.	
	309		
	DC input voltage t	oo high	
	Behaviour	Short-term interruption while feeding energy into the grid The inverter resumes with its startup routine.	
	Remedy	Fault is rectified automatically If this status code keeps recurring, contact your system engi- neer	
	321		
	Overcurrent (AC)		
	Behaviour	Short-term interruption while feeding energy into the grid due to a grid fault or a power module fault The inverter resumes with its startup routine.	
	Remedy	Fault is rectified automatically If this status code keeps recurring, contact your system engi- neer	
	322		
	Overtemperature	on the air intake sensor	
	Behaviour	Permanent interruption while feeding energy into the grid	
	Remedy	Reduce the ambient temperature and ensure that a suitable hot air extractor is installed if necessary If this status code keeps recurring, contact your system engi- neer	
Class 4 status codes	Some of the class 4 status codes necessitate intervention by a Fronius-trained service en- gineer.		
	401		
	No communication with power stage set possible		
	Behaviour	The inverter will automatically attempt to connect again and, if possible, will resume feeding energy into the grid	
	Remedy	If the status code is displayed all the time: notify a Fronius- trained service engineer	
	406		
	Power module ten	nperature sensor defective	
	Behaviour	The inverter is disconnected from the grid for safety reasons.	

Remedy	If the status code is displayed all the time: notify a Fronius- trained service engineer	
407		
Internal temperature ser	nsor defective	
Behaviour	The inverter is disconnected from the grid for safety reasons.	
Remedy	If the status code is displayed all the time: notify a Fronius- trained service engineer	
412		
Fixed voltage mode has age has been set at too	been selected instead of MPP voltage mode, and the fixing volt- low or too high a value.	
Behaviour	The fixed voltage is lower than the current MPP voltage.	
Remedy	Check module voltage and change the connection of the solar modules if the input voltage is too high; If the status code appears all the time: notify a Fronius-trained service engineer	
415		
External Emergency Sto	op line is blocked	
Behaviour	The inverter is disconnected from the grid for safety reasons.	
Remedy	Fault is rectified automatically; If this status code keeps recurring: notify a Fronius-trained ser- vice engineer	
416		
No communication poss	sible between power stage set and control system	
Behaviour	The inverter is disconnected from the grid for safety reasons.	
Remedy	If the status code is displayed all the time: notify a Fronius- trained service engineer	
425		
No communication poss	sible with the power module	
Behaviour	The inverter is disconnected from the grid for safety reasons and then attempts a restart.	
Remedy	If the status code is displayed all the time: notify a Fronius- trained service engineer	
426		
Intermediate circuit chai	rging takes too long	
Behaviour	Short-term interruption while feeding energy into the grid The inverter resumes with its startup routine.	
Remedy	Fault is rectified automatically If this status code keeps recurring, contact your system engi- neer	

427		
Power stage set not read	dy for too long (timeout)	
Behaviour	Short-term interruption while feeding energy into the grid The inverter resumes with its startup routine.	
Remedy	Fault is rectified automatically If this status code keeps recurring, contact your system engi- neer	
431		
Bootloading process inte	errupted	
Behaviour	The inverter is in bootloading mode and is not feeding any energy into the grid	
Remedy	Repeat the update process If the status code is displayed all the time: notify a Fronius- trained service engineer	
436		
Receiving incorrect fault	information from the power stage set	
Behaviour	Short-term interruption while feeding energy into the grid The inverter resumes with its startup routine.	
Remedy	Fault is rectified automatically If this status code keeps recurring, contact your system engi- neer	
437		
General error handling s	tarted in the power stage set	
Behaviour	Short-term interruption while feeding energy into the grid The inverter resumes with its startup routine.	
Remedy	Fault is rectified automatically If this status code keeps recurring, contact your system engi- neer	
438		
Receiving incorrect fault	information from the power stage set	
Behaviour	Short-term interruption while feeding energy into the grid The inverter resumes with its startup routine.	
Remedy	Fault is rectified automatically If this status code keeps recurring, contact your system engi- neer	
445		
<ul><li>Compatibility error (</li><li>Invalid power stage</li></ul>	e.g. due to replacement of a PC board) set configuration	
Behaviour	The inverter is not feeding any energy into the grid.	

Remedy	Update the inverter firmware; If the status code is displayed all the time: notify a Fronius- trained service engineer	
457		
Mains relay sticki	ng	
Behaviour	The inverter is not feeding any energy into the grid.	
Remedy	notify a Fronius-trained service engineer	
459		
Error when record	ding the measurement signal for the insulation test	
Behaviour	The inverter is not feeding any energy into the grid.	
Remedy	notify a Fronius-trained service engineer	
460		
Reference voltage ance	e source for the digital signal processor (DSP) is working out of toler-	
Behaviour	The inverter is not feeding any energy into the grid.	
Remedy	If the status code is displayed all the time: notify a Fronius- trained service engineer	
<b>461</b> Fault in the DSP	data memory	
Behaviour	The inverter is not feeding any energy into the grid.	
Remedy	If the status code is displayed all the time: notify a Fronius- trained service engineer	
463		
AC polarity revers	sed	
Behaviour	The inverter is not feeding any energy into the grid.	
Remedy	Update the inverter firmware If the status code is displayed all the time: notify a Fronius- trained service engineer	
472		
Fuse for solar mo	dule grounding is faulty	
Behaviour	The inverter is not feeding any energy into the grid.	
Remedy	Replace fuse for solar module grounding - notify a Fronius- trained service engineer; if this status code keeps recurring, contact your system engi- neer	
475		
Solar module gro	unding, insulation fault (connection between solar module and ground	

Behaviour The inverter is disconnected from the grid for safety reasons.

Remedy	If the status code is displayed all the time: notify a Fronius- trained service engineer	
486		
<ul> <li>External NO contact</li> <li>Optional measuring</li> </ul>	is open and monitoring relay has tripped	
Behaviour	The inverter is not feeding any energy into the grid.	
Remedy	Close external NO contact; check measuring and monitoring relay If this status code keeps recurring, contact your system engi- neer	
487		
Air inlet temperature sen	sor is faulty	
Behaviour	The inverter is not feeding any energy into the grid.	
Remedy	Replace air inlet temperature sensor - notify a Fronius-trained service engineer	
488		
AC measurement device	is faulty	
Behaviour	The inverter is not feeding any energy into the grid.	
Remedy	notify a Fronius-trained service engineer	
490, 491		
Internal communication e	error	
Behaviour	The inverter is not feeding any energy into the grid.	
Remedy	notify a Fronius-trained service engineer	
492		
DC main switch is switch	ied off	
Behaviour	The inverter is not feeding any energy into the grid.	
Remedy	Switch on DC main switch	
493		
DC relay is faulty		
Behaviour	The inverter is not feeding any energy into the grid.	
Remedy	notify a Fronius-trained service engineer	
494		
Grounding fault on the co	ontrol board	
Behaviour	The inverter is not feeding any energy into the grid.	
Remedy	notify a Fronius-trained service engineer	

### EN

### 495

Behaviour	The inverter is not feeding any energy into the grid.	
Remedy	notify a Fronius-trained service engineer	
496		
The 5 V supply voltage of	on the control board is faulty	
Behaviour	The inverter is not feeding any energy into the grid.	
Remedy	notify a Fronius-trained service engineer	
497		
The 14 V or 22 V supply	voltage for the PWM driver is faulty	
Behaviour	The inverter is not feeding any energy into the grid.	
Remedy	notify a Fronius-trained service engineer	
498		
The 24 V supply voltage for the power electronics is faulty		
Behaviour	The inverter is not feeding any energy into the grid.	
Remedy	notify a Fronius-trained service engineer	
499		
The 24 V supply voltage on the control board is faulty		
Behaviour	The inverter is not feeding any energy into the grid.	
Remedy	notify a Fronius-trained service engineer	

Class 5 statusClass 5 status codes do not generally interfere with feeding energy into the grid, but can<br/>cause restrictions. A status code is displayed until it is acknowledged by pressing a key<br/>(the inverter, however, continues to operate normally in the background).

502		
Insulation error on the so	blar modules	
Description	Warning message is shown on the display	
Remedy	If the status code is displayed all the time: notify a Fronius- trained service engineer	
509		
No energy fed into the g	rid in the past 24 hours	
Description	Warning message is shown on the display	
Remedy	Check that all the conditions for feeding energy into the grid without any problems have been satisfied. If the status code is displayed all the time: notify a Fronius- trained service engineer	
516		
No communication poss	ible with the storage unit	
Description	Storage unit warning message	
Remedy	If the status indicator appears all the time: notify a Fronius- trained service engineer	
517		
Power derating caused I	by too high a temperature	
Description	Warning message when power derating occurs	
Remedy	If the status indicator appears all the time: notify a Fronius- trained service engineer	
518		
Internal DSP malfunction	1	
Description	Warning message is shown on the display	
Remedy	If the status indicator appears all the time: notify a Fronius- trained service engineer	
535		
Error during fan self-test		
Description	Warning message is shown on the display	
Remedy	If the status indicator appears all the time: notify a Fronius- trained service engineer	
536		
Main fan error		

Description	
Remedy	If the status indicator appears all the time: notify a Fronius trained service engineer
551	
Fuse for solar mod	lule grounding is faulty
Description	Warning message is shown on the display
Remedy	Replace fuse for solar module grounding - notify a Fronius trained service engineer; if this status code keeps recurrin contact your system engineer
555	
Circulating fan erro	Dr
Description	Warning message is shown on the display
Remedy	If the status indicator appears all the time: notify a Fronius trained service engineer
558	
Functional incompa each other, e.g. af	atibility (one or more PC boards in the inverter are not compatible ter a PC board has been replaced)
Functional incompa each other, e.g. aff Description	atibility (one or more PC boards in the inverter are not compatible ter a PC board has been replaced) Possible device errors or malfunctions on the inverter
Functional incompa each other, e.g. aff Description Remedy	atibility (one or more PC boards in the inverter are not compatible ter a PC board has been replaced) Possible device errors or malfunctions on the inverter Update the inverter firmware using the Fronius Solar.upda software;
Functional incomp each other, e.g. aff Description Remedy	atibility (one or more PC boards in the inverter are not compatible ter a PC board has been replaced) Possible device errors or malfunctions on the inverter Update the inverter firmware using the Fronius Solar.upda software; the latest inverter firmware is available from
Functional incomp each other, e.g. aff Description Remedy	atibility (one or more PC boards in the inverter are not compatible ter a PC board has been replaced) Possible device errors or malfunctions on the inverter Update the inverter firmware using the Fronius Solar.upda software; the latest inverter firmware is available from http://www.fronius.com. If the status indicator appears all the time: notify a Fronius trained service engineer
Functional incompa each other, e.g. aff Description Remedy 560	atibility (one or more PC boards in the inverter are not compatible ter a PC board has been replaced) Possible device errors or malfunctions on the inverter Update the inverter firmware using the Fronius Solar.upda software; the latest inverter firmware is available from http://www.fronius.com. If the status indicator appears all the time: notify a Fronius trained service engineer
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Functional incompa each other, e.g. aff Description Remedy 560 Power derating car Description	atibility (one or more PC boards in the inverter are not compatible ter a PC board has been replaced) Possible device errors or malfunctions on the inverter Update the inverter firmware using the Fronius Solar.upda software; the latest inverter firmware is available from http://www.fronius.com. If the status indicator appears all the time: notify a Fronius trained service engineer used by overfrequency The status code is displayed from a grid frequency of 50.2 and above.
Functional incompa each other, e.g. aff Description Remedy 560 Power derating car Description	atibility (one or more PC boards in the inverter are not compatible ter a PC board has been replaced) Possible device errors or malfunctions on the inverter Update the inverter firmware using the Fronius Solar.upda software; the latest inverter firmware is available from http://www.fronius.com. If the status indicator appears all the time: notify a Fronius trained service engineer used by overfrequency The status code is displayed from a grid frequency of 50.2 and above. The inverter reduces the power along a 40%/Hz slope. Th
Functional incompa each other, e.g. aff Description Remedy 560 Power derating car Description	atibility (one or more PC boards in the inverter are not compatible ter a PC board has been replaced) Possible device errors or malfunctions on the inverter Update the inverter firmware using the Fronius Solar.upda software; the latest inverter firmware is available from http://www.fronius.com. If the status indicator appears all the time: notify a Fronius trained service engineer used by overfrequency The status code is displayed from a grid frequency of 50.2 and above. The inverter reduces the power along a 40%/Hz slope. Th verter switches off at a grid frequency of 51.5 Hz. The status indicator is displayed until the inverter returns to
Functional incompa each other, e.g. aff Description Remedy 560 Power derating car Description	atibility (one or more PC boards in the inverter are not compatible ter a PC board has been replaced) Possible device errors or malfunctions on the inverter Update the inverter firmware using the Fronius Solar.upda software; the latest inverter firmware is available from http://www.fronius.com. If the status indicator appears all the time: notify a Fronius trained service engineer used by overfrequency The status code is displayed from a grid frequency of 50.2 and above. The inverter reduces the power along a 40%/Hz slope. Th verter switches off at a grid frequency of 51.5 Hz. The status indicator is displayed until the inverter returns to mal operation.
Functional incompa each other, e.g. aff Description Remedy 560 Power derating car Description Remedy	atibility (one or more PC boards in the inverter are not compatible ter a PC board has been replaced) Possible device errors or malfunctions on the inverter Update the inverter firmware using the Fronius Solar.upda software; the latest inverter firmware is available from http://www.fronius.com. If the status indicator appears all the time: notify a Fronius trained service engineer used by overfrequency The status code is displayed from a grid frequency of 50.2 and above. The inverter reduces the power along a 40%/Hz slope. Th verter switches off at a grid frequency of 51.5 Hz. The status indicator is displayed until the inverter returns to mal operation. From a frequency of 50.2 Hz and above, the inverter tries f connect to the grid
Functional incompa each other, e.g. aff Description Remedy 560 Power derating car Description Remedy	<ul> <li>atibility (one or more PC boards in the inverter are not compatible ter a PC board has been replaced)</li> <li>Possible device errors or malfunctions on the inverter</li> <li>Update the inverter firmware using the Fronius Solar.upda software;</li> <li>the latest inverter firmware is available from http://www.fronius.com.</li> <li>If the status indicator appears all the time: notify a Fronius trained service engineer</li> <li>used by overfrequency</li> <li>The status code is displayed from a grid frequency of 50.2 and above.</li> <li>The inverter reduces the power along a 40%/Hz slope. Th verter switches off at a grid frequency of 51.5 Hz.</li> <li>The status indicator is displayed until the inverter returns to mal operation.</li> <li>From a frequency of 50.2 Hz and above, the inverter tries from to the grid.</li> <li>The fault is rectified automatically as soon as the inverter</li> </ul>
Functional incompa each other, e.g. aff Description Remedy 560 Power derating car Description Remedy	<ul> <li>atibility (one or more PC boards in the inverter are not compatible ter a PC board has been replaced)</li> <li>Possible device errors or malfunctions on the inverter</li> <li>Update the inverter firmware using the Fronius Solar.upda software;</li> <li>the latest inverter firmware is available from http://www.fronius.com.</li> <li>If the status indicator appears all the time: notify a Fronius trained service engineer</li> <li>used by overfrequency</li> <li>The status code is displayed from a grid frequency of 50.2 and above.</li> <li>The inverter reduces the power along a 40%/Hz slope. Th verter switches off at a grid frequency of 51.5 Hz.</li> <li>The status indicator is displayed until the inverter returns to mal operation.</li> <li>From a frequency of 50.2 Hz and above, the inverter tries is connect to the grid.</li> <li>The fault is rectified automatically as soon as the inverter turns to normal operation.</li> </ul>

External overvoltage protection has tripped (connected to the "IN1" NO/alarm contact ter minals)

Description Warning message is shown on the display

EN

	Remedy	Replace overvoltage protection - notify a Fronius-trained ser- vice engineer	
	598	-	
	External overvolta minals)	ge protection has tripped (connected to the "IN2" NO/alarm contact ter-	
	Description	Warning message is shown on the display	
	Remedy	Replace overvoltage protection - notify a Fronius-trained ser- vice engineer	
	599		
	External overvoltag minals)	ge protection has tripped (connected to the "IN3" NO/alarm contact ter-	
	Description	Warning message is shown on the display	
	Remedy	Replace overvoltage protection - notify a Fronius-trained ser- vice engineer	
Class 7 status codes	Class 7 status code cording, and may c	es relate to the control system, the configuration and inverter data re- directly or indirectly affect the process of feeding energy into the grid.	
	701 - 716		
	Provides informati	on about the internal processor program status	
	Description	Is of no concern when the inverter is working properly and only appears in the "Status PS" setup parameter. In the event of an actual error, this status code supports Fronius TechSupport during the error analysis.	
	721		
	EEPROM has been re-initialised		
	Description	Warning message is shown on the display	
	Remedy	If the status code is displayed all the time: notify a Fronius- trained service engineer	
	722 - 730		
	Provides information about the internal processor program status		
	Description	Is of no concern when the inverter is working properly and only appears in the "Status PS" setup parameter. In the event of an actual error, this status code supports Fronius TechSupport during the error analysis.	
	751		
	Time lost		
	Description	Warning message is shown on the display	
	Remedy	Reset the time and date If the status code is displayed all the time: notify a Fronius- trained service engineer	

### 752

Real Time Clock module faulty

Description	Warning message is shown on the display	
Remedy	Reset the time and date If the status code is displayed all the time: notify a Fronius- trained service engineer	
753		
Time not set for a long p	eriod (> 1/2 year)	
Description	Warning message is shown on the display	
Remedy	Reset the time and date If the status code is displayed all the time: notify a Fronius- trained service engineer	
754, 755		
Provides information abo	out the internal processor program status	
Description	Is of no concern when the inverter is working properly and only appears in the "Status PS" setup parameter. In the event of an actual error, this status code supports Fronius TechSupport during the error analysis.	
757		
Hardware error in the Re	eal Time Clock module	
Description	Warning message is shown on the display; the inverter is not feeding any energy into the grid	
Remedy	If the status code is displayed all the time: notify a Fronius- trained service engineer	
761 - 765		
Provides information abo	out the internal processor program status	
Description	Is of no concern when the inverter is working properly and only appears in the "Status PS" setup parameter. In the event of an actual error, this status code supports Fronius TechSupport during the error analysis.	
766		
Emergency derating has	been activated (max. 750 W)	
Description	Warning message is shown on the display	
Remedy	If the status code is displayed all the time: notify a Fronius- trained service engineer	
767		
Provides information abo	out the internal processor program status	
Description	Is of no concern when the inverter is working properly and only appears in the "Status PS" setup parameter. In the event of an actual error, this status code supports Fronius TechSupport	

during the error analysis.

768	
Different power der	ating in the hardware modules
Description	Warning message is shown on the display
Remedy	If the status code is displayed all the time: notify a Fronius- trained service engineer
772	
Storage unit not ava	ailable
Description	Warning message is shown on the display
Remedy	If the status code is displayed all the time: notify a Fronius- trained service engineer
773	
Software update gr	oup 0 (invalid country setup)
Description	Warning message is shown on the display
Remedy	If the status code is displayed all the time: notify a Fronius- trained service engineer
775	
PMC power stage s	set not available
Description	Warning message is shown on the display
Remedy	Press the 'Enter' key to acknowledge the error If the status code is displayed all the time: notify a Fronius- trained service engineer
776	
Invalid device-type	
Description	Warning message is shown on the display
Remedy	Press the 'Enter' key to acknowledge the error If the status code is displayed all the time: notify a Fronius- trained service engineer
781 - 794	
Provides informatio	n about the internal processor program status
Description	Is of no concern when the inverter is working properly and on appears in the "Status PS" setup parameter. In the event of a actual error, this status code supports Fronius TechSupport during the error analysis.
799	
No communication	between the control board and the monitoring board
Behaviour	The inverter is not feeding any energy into the grid.
Pemedy	notify a Fronius trained service engineer

Class 10 - 12 sta- tus codes	1000 - 1299- Provide information on the status of the internal processor program			
	Description	Is of no concern when the inverter is working properly and only appears in the "Status PS" setup parameter. In the event of an actual error, this status code assists Fronius Technical Support during the error analysis.		

**Customer service** IMPORTANT! Contact your Fronius dealer or a Fronius-trained service technician if
an error appears frequently or all the time
an error appears that is not listed in the tables

# Maintenance

Safety			
Salety	<ul> <li>WARNING! An electric shock can be fatal. Danger due to grid voltage and DC voltage from solar modules that are exposed to light.</li> <li>The DC main switch is only to be used to de-energise the power stage set. The connection area is still live when the DC main switch is switched off.</li> <li>Work in the connection area must only be carried out by qualified electrical engineers.</li> <li>Maintenance and servicing in the power stage set of the inverter must only be carried out by Fronius-trained service technicians.</li> </ul>		
	WARNING! An electric shock can be fatal. Danger from residual voltage in ca- pacitors. Wait for the capacitors to discharge. The discharge time is 10 minutes.		
	<ul> <li>CAUTION! Risk of damage to the inverter due to the ingress of moisture.</li> <li>Never open the inverter during rain.</li> <li>Do not establish any connections or carry out any maintenance work during rain.</li> </ul>		
Maintenance guidelines	<ul> <li>To ensure that the inverter keeps working perfectly, the following maintenance activities must be carried out every year:</li> <li>To prevent defects occurring in the electronic components, check the inverter for dirt, dust or moisture.</li> <li>Re-tighten the DC and AC cable terminals to the specified torque</li> <li>Check that the installed inverter software is up-to-date and update the software if necessary</li> <li>Either in the Setup menu or using the Fronius Solar.Service software, run the main fan test to test that the air supply is working properly.</li> </ul> Fronius offers an optional maintenance contract for the inverter that includes annual maintenance by a Fronius engineer. More information can be found on the Fronius Homepage at http://www.fronius.com.		
Replacement of components	e following components should be replaced after 10 years: main fan both circulating fans (left and right beside the power stage set) MENT PC board (switched mode power supply) placement of components in accordance with the Fronius Agilo Service Manual; apply the relevant TechSupport for components.		
Opening the in- verter for mainte- nance work	<ul> <li>When the inverter must be opened for maintenance work, carry out the following proce dures:</li> <li>1 De-energise the AC and DC side of the inverter</li> <li>2 Switch off the DC main switch</li> <li>3 Wait for the capacitors to discharge (10 minutes)</li> <li>4 Open the door and air inlet grilles</li> </ul>		

5	Remove covers and/or contact protection
6	If present, remove fuse for solar module grounding

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When operating in environments subject to heavy accumulations of dust:

- if necessary, purge the filter grilles on the fans using clean compressed air.

check all 6 months the ventilation duct for pollution and clean it if necessary

**IMPORTANT!** Do not blow dust and impurities into the inverter.

## **Replacing fuses**

Safety

**WARNING!** An electric shock can be fatal. Danger due to grid voltage and DC voltage from solar modules that are exposed to light.

- Make sure that both the AC side and the DC side of the inverter are de-energised before making any connections and carrying out maintenance work.
- The connection area must only be opened by a qualified electrical engineer.
- The power stage set may only be opened by Fronius-trained service technicians.



**WARNING!** An electric shock can be fatal. Danger due to residual voltage in capacitors.

Wait for the capacitors to discharge. Discharge time is 5 minutes.



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

The DC main switch is only to be used to de-energise the power stage set. Grounding of the solar module remains in effect, even when the DC main switch is switched off. Do not under any circumstances touch DC+ or DC-.



**WARNING!** An electric shock can be fatal. If a ground fault occurs, a conductor that is normally grounded can lose its ground connection and become live. A ground fault must be repaired before operation is resumed.



**WARNING!** An inadequate ground conductor connection can cause serious injury or damage.

The screws on the covers provide a suitable ground conductor connection for the housing; these screws must not under any circumstances be replaced by other screws that do not provide a reliable ground conductor connection.



- **CAUTION!** Risk of damage to the inverter due to the ingress of moisture.
  - Never open the inverter during rain.

 Do not establish any connections or carry out any maintenance work during rain.

Replacing the reverse polarity protection fuse The inverter has been activated with the polarity of the DC cables reversed. Despite sufficient levels of insolation, status code 307 "DC low" appears on the display.



Remove the contact protection above the data communication area



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- Unplug the ribbon cable Unplug the 8-pin Molex plug (8p) Unplug the 2-pin Molex plug (2p)

- Remove 16 screws
- Pull out the bottom cover and remove from the front
- Open the fuse holder

Fit the spare fuse in the fuse holder

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- 6 8p 👔 1 7 í HA **H** 79 타미 3 <u>⊯</u> 2p 1E

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- Close the fuse holder
- Fit the cover -

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Fix the cover in place using 16 screws Tightening torque = 3 Nm

- Connect the ribbon cable \_
- \_
- Connect the 8-pin Molex plug (8p) Connect the 2-pin Molex plug (2p) \_

Fit the contact protection above the data communication area

# Appendix
### **Technical data**

Fronius Agilo Outdoor 75.0-3	Input data
	MPP voltage rai
	Max. input volta (at 1000 W/m²/

MPP voltage range	460 - 820 V DC
Max. input voltage (at 1000 W/m²/ -10 °C in an open circuit)	950 V DC
Max. input current	170.0 A
Max. short circuit current of the solar modules	255.0 A
Output data	
Nominal output power (P <sub>nom</sub> )	75 kVA
Max. output power	75 kVA
Nominal grid voltage	3~NPE 400 V / 230 V
Mains voltage tolerance	+10 / -5 % <sup>1)</sup>
Nominal output current (three-phase)	112.4 A
Nominal frequency	50 - 60 Hz <sup>1)</sup>
Total harmonic distortion	< 3 %
Power factor cos phi	1 0.8 - 1 ind./cap. <sup>2)</sup>
Max. permitted mains impedance Z <sub>max</sub> at PCC <sup>3)</sup>	66 mOhm
Max. feedback current <sup>4)</sup>	0 A <sup>5)</sup>
Starting current pulse <sup>6)</sup>	0 A <sup>5)</sup>
Max. output fault current per period	522 A / 2.47 ms)
General data	
Maximum efficiency	97.3 %
Europ. efficiency	96.7 %
Overnight self-consumption	36 W
Cooling	Controlled forced-air ventila- tion
Degree of protection	IP 44
Dimensions I x w x h	1205 x 863 x 1914 mm
Weight	732 kg
Permitted ambient temperature (4 - 100 % condensing)	- 25 °C - +50 °C

(4 - 100 % condensing)	
EMC emission class	A
Overvoltage category AC / DC	3 / 2
Degree of pollution	3

#### Protection devices

DC insulation measurement	Warning/shutdown <sup>7)</sup> at R <sub>ISO</sub> < 31.66 kOhm
Manifestation of DC overload	Operating point shift
	power limitation
DC disconnector	Integrated

### Fronius Agilo Outdoor 100.0-3

Input data

MPP voltage range	460 - 820 V DC
Max. input voltage (at 1000 W/m²/ -10 °C in an open circuit)	950 V DC
Max. input current	227.0 A
Max. short circuit current of the solar modules	340.5 A

### Output data

Nominal output power (P <sub>nom</sub> )	100 kVA
Max. output power	100 kVA
Nominal grid voltage	3 ~ NPE 400 V / 230 V
Grid voltage tolerance	+10 / -5 % <sup>1)</sup>
Nominal output current (three-phase)	150.2 A
Nominal frequency	50 - 60 Hz <sup>1)</sup>
Total harmonic distortion	< 3 %
Power factor cos phi	1
	0.8 - 1 ind./cap. <sup>2)</sup>
Max. permitted mains impedance Z <sub>max</sub> at PCC <sup>3)</sup>	52 mOHM
Max. feedback current <sup>4)</sup>	0 A <sup>5)</sup>
Starting current pulse <sup>6)</sup>	0 A <sup>5)</sup>
Max. output fault current per period	522 A / 2.47 ms

#### General data

Maximum efficiency	97.2 %
Europ. efficiency	96.6 %
Overnight internal consumption	36 W
Cooling	Controlled forced-air ventilation
Degree of protection	IP 44
Dimensions I x w x h	1205 x 863 x 1914 mm
Weight	806 kg
Permitted ambient temperature (4 - 100 % condensing)	- 25 °C - +50 °C
EMC emission class	A
Overvoltage category AC / DC	3/2
Degree of pollution	3
Protection devices	
DC insulation measurement	Warning/shutdown <sup>7)</sup> at R <sub>ISO</sub> < 40 kOhm
Manifestation of DC overload	Operating point shift power limitation

Integrated

DC circuit breaker

## Explanation of footnotes

- 1) The values quoted are default values; the inverter is configured specifically to meet the needs of the country in question.
- 2) Depending on the country setup or device-specific settings (ind. = inductive; cap. = capacitive)
- 3) PCC = interface to the public grid
- 4) Maximum current from the inverter to the solar module when an error occurs in the inverter or when the insulation between the AC and DC side is defective
- 5) Guaranteed by the electrical configuration of the inverter
- 6) Current peak when switching on the inverter
- 7) Depending on the country setup

# Applicable standards and guidelines

CE mark	The devices comply with all the requisite and relevant standards and guidelines that form part of the relevant EU Directive, and are therefore permitted to display the CE mark.
Parallel opera- tion of in-plant generation sys- tems	<ul> <li>The inverter complies with the</li> <li>"guidelines for connection and parallel operation of in-plant generation systems with the low-voltage grid" published by the German Electricity Industry Association (VDEW)</li> <li>"technical guidelines for parallel operation of in-plant generation systems" published by the Austrian Association of Electricity Companies</li> </ul>
Power failure	The standard measurement and safety procedures integrated into the inverter ensure that in the event of a grid failure, the feeding in of energy is immediately interrupted (e.g. switch-off by the energy supplier or damage to lines).

# Warranty terms and conditions, and disposal

Fronius manufac- turer's warranty	When the Fronius inverters are delivered, they come with a manufacturer's warranty that is valid worldwide for 60 months from the date of installation. This can be extended for an additional payment. While the warranty is in force, Fronius will ensure that the inverter is working properly. The detailed, country-specific warranty terms and conditions are available from the engi- neer installing the system, or on the Internet at the following address: http://www.fronius.com/solar/servicebasic/de
	To make a claim under the Fronius manufacturer's warranty, the relevant product invoice, the Service Basic terms and conditions and, if applicable, proof of payment from when the warranty was extended, must be submitted.
	Fronius therefore recommends that once the inverter has been commissioned, you print out an up-to-date copy of the Service Basic terms and conditions.
Disposal	If you decide in the future to replace your inverter, Fronius will take back the old device and arrange for it to be recycled in an appropriate manner.

### Fronius Worldwide - www.fronius.com/addresses

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