

Fronius Power Control Box

Operating instructions

Data communication



Dear Reader

Introduction

Thank you for choosing Fronius - and congratulations on your new, technically high-grade Fronius product! This instruction manual will help you get to know your new machine. Read the manual carefully and you will soon be familiar with all the many great features of your new Fronius product. This really is the best way to get the most out of all the advantages that your machine has to offer.

Please also take special note of the safety rules - and observe them! In this way, you will help to ensure more safety at your product location. And of course, if you treat your product carefully, this definitely helps to prolong its enduring quality and reliability - things which are both essential prerequisites for getting outstanding results.

Safety rules

DANGER!



“**DANGER!**” indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. This signal word must be limited to the most extreme situations. This signal word is not used for hazards relating to property damage unless there is also a risk of personal injury appropriate to this level.

WARNING!



“**WARNING!**” indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury. This signal word is not used for hazards relating to property damage unless there is also a risk of personal injury appropriate to this level.

CAUTION!



“**CAUTION!**” indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to draw attention to unsafe practices that may cause damage to property.

NOTE!



“**NOTE!**” indicates a situation which implies a risk of impaired results and damage to the equipment.

Important!

“**Important!**” indicates practical hints and other particularly useful information. It is not a signal word for a harmful or dangerous situation.

Whenever you see any of the symbols shown above, pay close attention to the contents of the manual!

General Remarks



This equipment has been manufactured in accordance with the state of the art and general safety-engineering principles. Nevertheless, incorrect operation or misuse may still endanger

- the life and well-being of the operator or of third parties,
- the equipment and other tangible assets belonging to the owner/operator,
- working efficiently with the equipment.

All persons involved in any way with starting up, servicing and maintaining the equipment must

- be suitably qualified
- have good knowledge of dealing with electrical installations and
- read this instruction manual thoroughly and follow the instructions to the letter.

The instruction manual must be kept at the machine location at all times. In addition to the instruction manual, it is important to comply with both the generally applicable and local accident prevention and environmental protection regulations.

All the safety instructions and warning signs on the machine itself:

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

General Remarks (continued)

For information about where the safety instructions and warning signs are located on the machine, please refer to the section of your machine's instruction manual headed "General Remarks".

Any malfunctions which might impair machine safety must be remedied immediately before the machine is switched on.

Your safety is at stake!

Utilisation for Intended Purpose Only



The machine may only be used for jobs as defined by the "intended purpose".

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

Utilisation in accordance with the "intended purpose" also comprises

- thorough reading of and compliance with all the instructions, safety instructions and warnings given in this manual
- performing all stipulated inspection and servicing work
- installation in accordance with the instruction manual

Where appropriate, the following guidelines should also be applied:

- regulations of the power supply company for input to the grid
- information provided by the manufacturer of the solar modules

Ambient Conditions



Operation or storage of the machine outside the stipulated range is deemed "not in accordance with the intended use". The manufacturer shall not be liable for any damage resulting therefrom.

Please refer to the technical data in your instruction manual for accurate information about the permissible ambient conditions.

Qualified Staff



The servicing information provided in this instruction manual is only intended for qualified staff. An electric shock can be fatal. Please do not carry out any activities other than those referred to in the documentation. This also applies even if you are suitably qualified.



All cables and other leads must be firmly attached, undamaged, properly insulated and adequately dimensioned. Have loose connections, scorched, damaged or under-dimensioned cables and wires repaired immediately by an authorised specialist company.



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

There is no guarantee in the case of parts sourced from other suppliers that these parts have been designed and manufactured to cope with the stresses and safety requirements that will be placed on them. Use only original spare parts (this also applies to standard parts).

Do not carry out any alterations, installations or modifications to the machine without first getting the manufacturer's permission.

Replace immediately any components that are not in perfect condition.

Safety Precautions at the Machine Location

Ensure when installing machines with cooling-air vents that the cooling air can flow freely through the air vents without obstruction. Only operate the machine with the degree of protection specified on the rating plate.

Information on noise emission values



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

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 with emission class A:

- are only designed for use in an industrial setting
- can cause conducted and emitted interference in other areas.

Devices with emission class B:

- satisfy the emissions criteria for residential and industrial areas. This also applies to residential areas in which power is supplied from the public low-voltage grid.

EMC device classification as per the rating plate or technical specifications

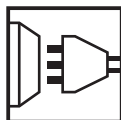
EMC measures



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

*) at the interface with the public mains network

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 may only be executed in accordance with the relevant national and regional standards and specifications.

ESD Protective Measures



Danger of damage to electronic components due to electrostatic discharge. Take appropriate protective measures when replacing and installing the components.

Safety Precautions in Normal Operation



Only operate the machine if all its protective features are fully functional. If any of the protective features are not fully functional, there is a danger to:

- the life and well-being of the operator or other persons
- the equipment and other tangible assets belonging to the owner/operator
- working efficiently with the equipment.

Have any safety features that are not fully functional repaired by an authorised specialist company before switching the machine on again.

Never bypass or disable safety features.

Safety markings



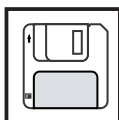
Equipment with the CE mark fulfils the basic requirements of the Guideline Governing Low-Voltage and Electromagnetic Compatibility. (More detailed information about this may be found in the Annex or in the section of your documentation headed "Technical Data".)

Disposal



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

Data security



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

Copyright



Copyright to this instruction manual remains the property of the manufacturer.

The text and illustrations are all technically correct at the time of going to print. The right to make modifications is reserved. The contents of the instruction manual shall not provide the basis for any claims whatever on the part of the purchaser. We should be most grateful for your comments if you have any suggestions for improvement, or can point out to us any mistakes which you may have found in the manual.

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General

General

The Fronius Power Control Box limits the maximum output power of a photovoltaic system in accordance with power supply company stipulations.

As and when required, the power supply company can use a ripple control signal receiver to set 4 different limit levels.

The Fronius Power Control Box forwards the incoming information along the Fronius Solar Net to the inverters on the photovoltaic system, which then independently adjust the output power as appropriate.

Maximum output power limitations

The power supply company may limit the maximum output power at the following levels:

Level	Limitation	Description
1	100 %	no power limitation; energy is fed into the grid in optimum light conditions and at the maximum possible output power of the inverter
2	60 %	power limitation at 60 %; energy is fed into the grid in optimum light conditions and at 60 % of the maximum possible output power of the inverter
3	30 %	power limitation at 30 %; energy is fed into the grid in optimum light conditions and at 30 % of the maximum possible output power of the inverter
4	0 %	power limitation at 0 %; no energy is fed into the grid

Prerequisites for operation

The following components are required to operate the 'Fronius Power Control Box':

- a Fronius Datalogger in the Fronius Solar Net
- a 'Fronius Com Card' for each inverter or an inverter with Com Card function

The Fronius Power Control Box may be used with the following inverters:

- Fronius IG Plus
- Fronius IG Plus V
- Fronius CL
- Fronius IG-TL
- Fronius Agilo

All inverters from serial number 20220769 onwards are compatible with the Fronius Power Control Box.

**Prerequisites
for operation**
(continued)

The following electronic component versions are required on the inverter to operate the Fronius Power Control Box:

Electronic component	Inverter	Version
IG-BRAIN	Fronius IG Plus Fronius IG Plus V Fronius CL	V. 4.28.20
PINCI	Fronius IG Plus Fronius IG Plus V	V. 1.4.32
CERBO	Fronius IG-TL	V. 1.1.0.0
TL-5 KW	Fronius IG-TL	V. 1.1.0.0
MECERCAP	Fronius Agilo	since the beginning
Power stage set	Fronius Agilo	since the beginning

Scope of supply

1 Fronius Power Control Box
1 wall bracket
1 operating instructions
2 dowels
2 screws

Option

Fronius 12 V DC mains adapter for external power supply
15 VA / 1.25 A output power

Controls, connections and displays

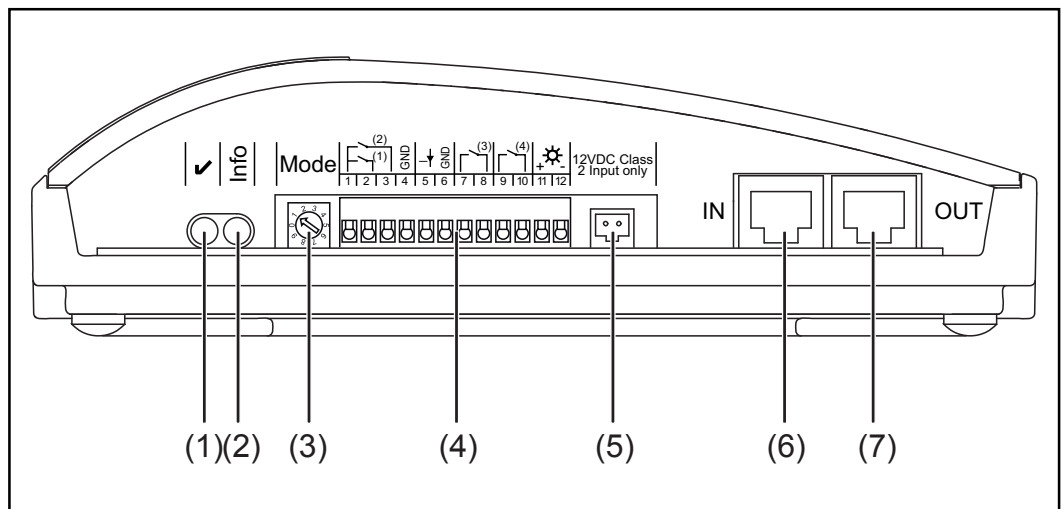
Safety



WARNING! Operating the equipment incorrectly can cause serious injury and damage. 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, especially the safety rules

Controls, connections and displays



No.	Function
(1)	Supply LED <ul style="list-style-type: none"> - lights up green: there is a sufficient power supply through the Fronius Solar Net - does not light up: there is an insufficient or no power supply through the Fronius Solar Net - an external power supply is required for the Fronius Power Control Box
(2)	LED status indicator lights up or flashes if an error occurs An exact description of the LED status indicator is provided in the „Troubleshooting“ section.
(3)	Operating mode adjusting dial for setting the operating mode of the Fronius Power Control Box
(4)	Terminals for connecting to a ripple control signal receiver

**Controls,
connections
and displays**
(continued)

No.	Function
(5)	External power supply connection for connecting an external power supply when there is not enough power in the Fronius Solar Net (e.g. if there are too many DATCOM components in the Fronius Solar Net). Important! Only use the original Fronius mains adapter to provide an external power supply to the Fronius Power Control Box. The supply LED (1) lights up green if there is a sufficient power supply.
(6)	Fronius Solar Net IN connection Fronius Solar Net input for connecting to other DATCOM components (e.g. inverter, sensor cards, etc.)
(7)	Fronius Solar Net OUT connection Fronius Solar Net output for connecting to other DATCOM components (e.g. inverter, sensor cards, etc.)

Installing the Fronius Power Control Box

Choice of location

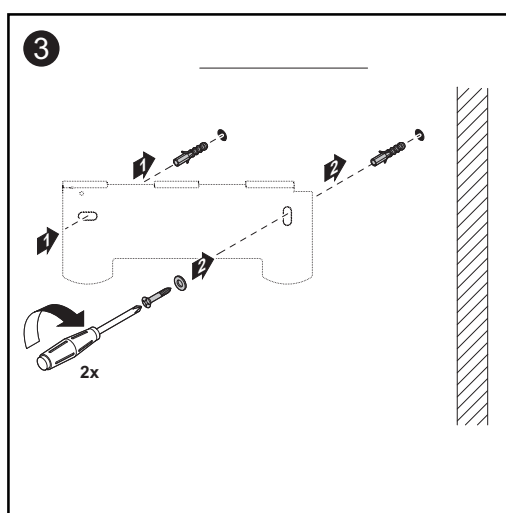
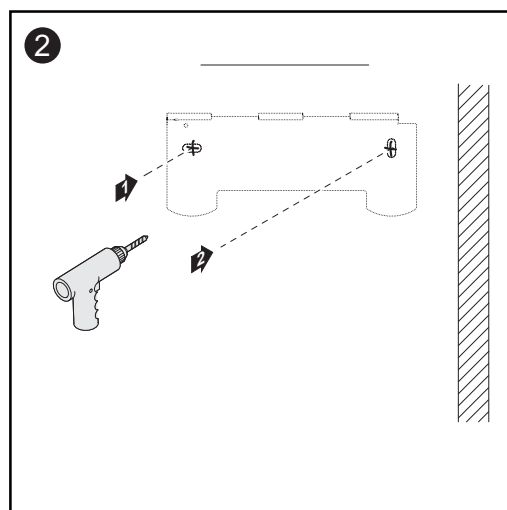
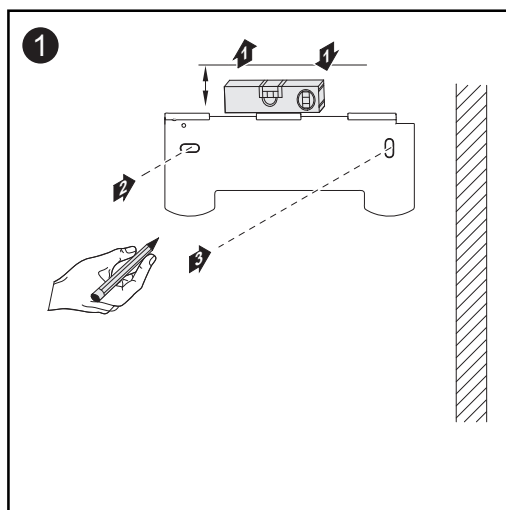
Note the following criteria when choosing the location:

- Only install on a firm surface
- The ambient temperature must not fall below 0 °C or exceed +55 °C
- The IP 20 degree of protection of the Fronius Power Control Box dictates that it be installed exclusively in enclosed spaces, switch cabinets or containers.

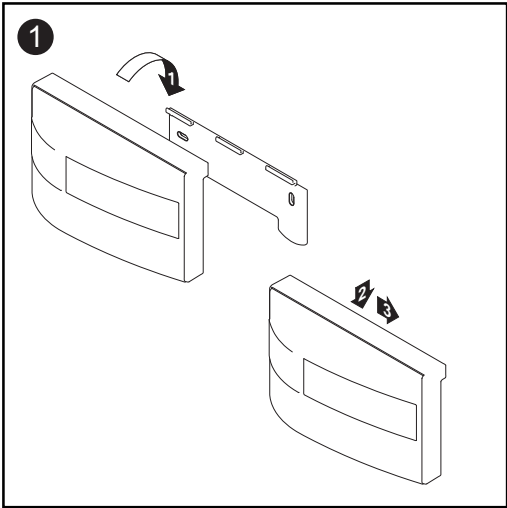
Installation position

The Fronius Power Control Box can be installed horizontally or vertically in any position. If it is not installed horizontally, the cable entries and outlets should ideally point downwards.

Fixing the wall bracket to the wall



**Attaching the
Fronius Power
Control Box to
the wall bra-
cket**



Connecting the Fronius Power Control Box to a ripple control signal receiver

Safety



WARNING! If the equipment is used or tasks are carried out incorrectly, serious injury or damage may result. The Fronius Power Control Box must only be commissioned by trained personnel in accordance with the technical regulations. 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, especially the safety rules



CAUTION! Risk of serious injury from electric shock and risk of damage to the Fronius Power Control Box.

The ripple control signal receiver contacts must be potential-free.

- Before making the connection, ensure that the ripple control signal receiver contacts are potential-free.
- Follow the manufacturer's safety instructions



NOTE! The signals to be connected from the ripple control signal receiver must be safely isolated from circuits under dangerous voltages and must not exceed a voltage of 60 V DC.

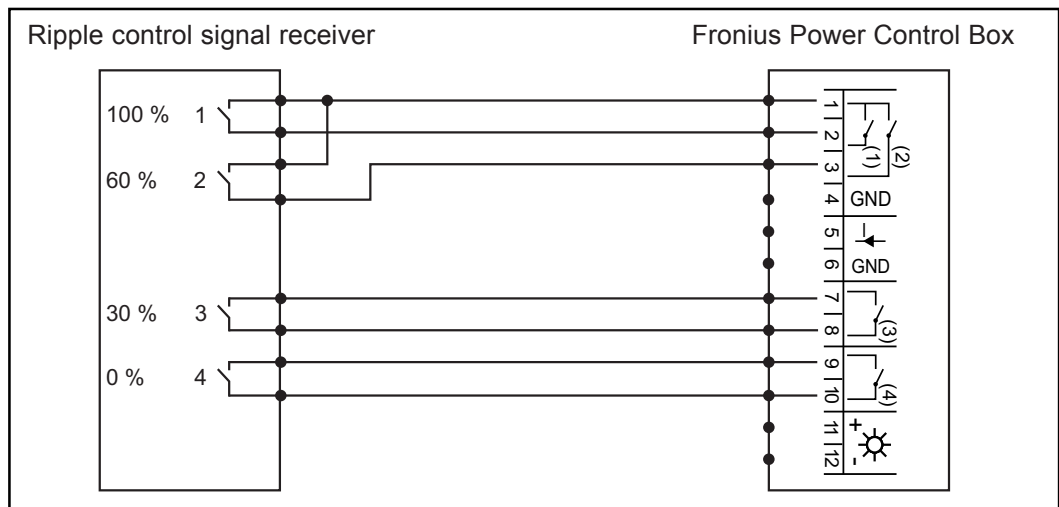
Maximum cable cross-section

The terminals on the Fronius Power Control Box are designed for a maximum cable cross-section of 1.5 mm².

Connecting the Fronius Power Control Box to a ripple control signal receiver with 4 relays

1. Connect the ripple control signal receiver and Fronius Power Control Box using a 7-pin cable in accordance with the connection diagram

The cable length must not exceed 10 m.

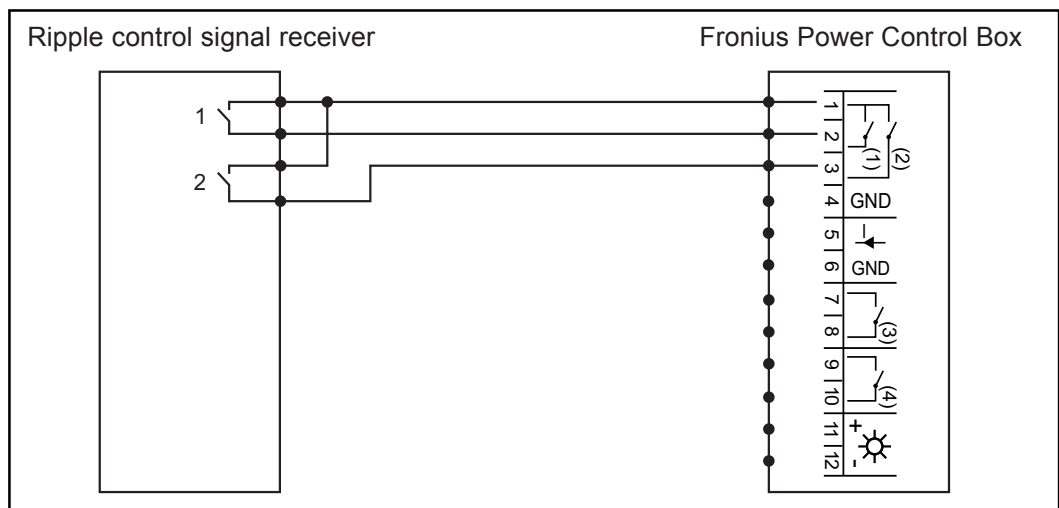


4-relay mode connection diagram

Connecting the Fronius Power Control Box to a ripple control signal receiver with 2 relays

1. Connect the ripple control signal receiver and Fronius Power Control Box using a 3-pin cable in accordance with the connection diagram

The cable length must not exceed 10 m.



2-relay mode connection diagram

The specified power limitations are as follows:

Power	Relay 1 actuated	Relay 2 actuated
100 %	no	no
60 %	yes	no
30 %	no	yes
0 %	yes	yes

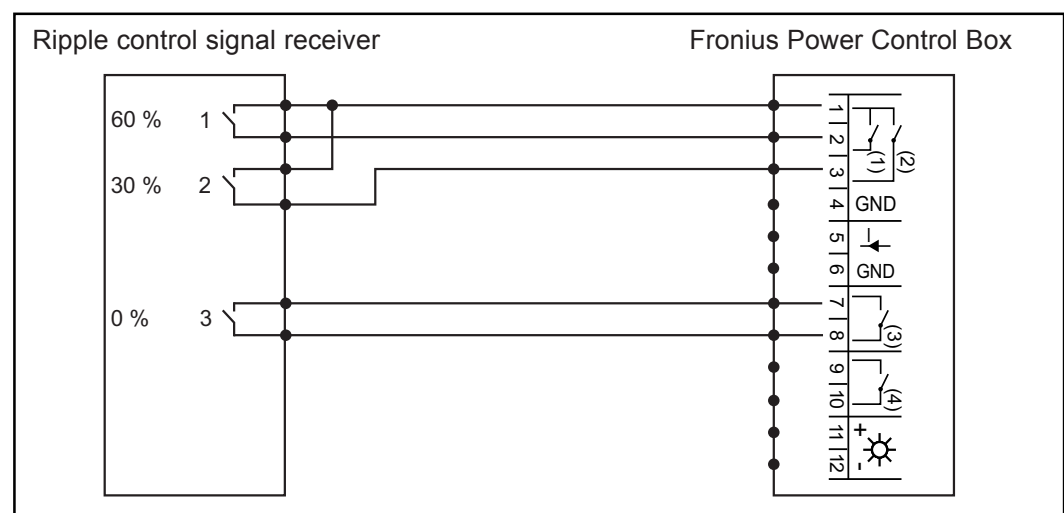
Connecting the Fronius Power Control Box to a ripple control signal receiver with 2 relays (continued)

Important! Lines are not monitored in 2-relay mode. Line breaks are not identified and displayed as faults.

Connecting the Fronius Power Control Box to a ripple control signal receiver with 3 relays

1. Connect the ripple control signal receiver and Fronius Power Control Box using a 5-pin cable in accordance with the connection diagram

The cable length must not exceed 10 m.



3-relay mode connection diagram

If none of the relays are actuated, there is no power limitation.

Important! Lines are not monitored in 3-relay mode. Line breaks are not identified and displayed as faults.

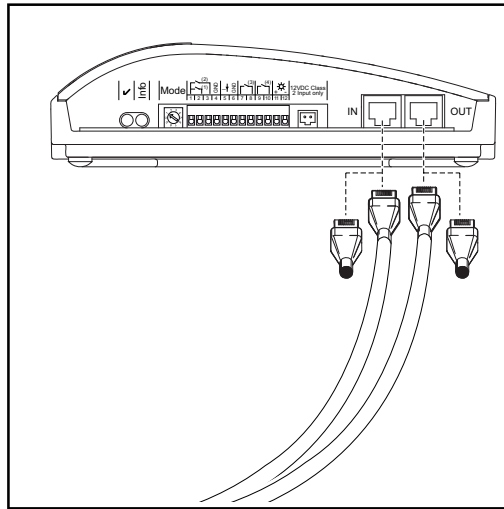
Integrating the Fronius Power Control Box in the Fronius Solar Net

General

If several DATCOM components are connected in the Fronius Solar Net, a terminating plug must be connected to any free IN or OUT connection on a DATCOM component.

Important! Observe the inverter and 'Fronius IG DATCOM Detail' operating instructions.

Integrating the Fronius Power Control Box in the Fronius Solar Net



1. Connect the data communication cables to the Fronius Solar Net IN and Fronius Solar Net OUT connections

Only if the Fronius Power Control Box is the first DATCOM component in the Fronius Solar Net:

- connect the terminating plug to the Fronius Solar Net IN connection

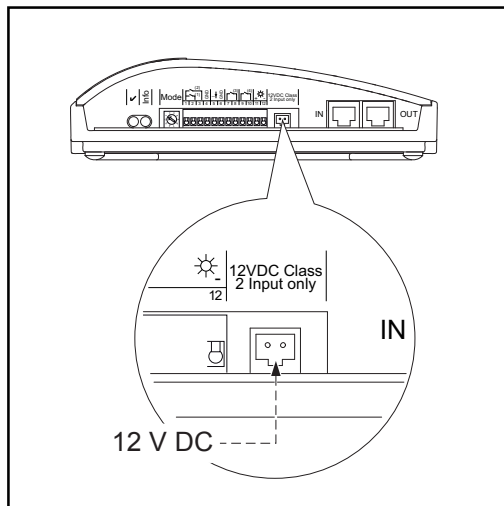
Only if the Fronius Power Control Box is the last DATCOM component in the Fronius Solar Net:

- connect the terminating plug to the Fronius Solar Net OUT connection

The supply LED will light up green once the data communication cables have been connected and if there is a sufficient power supply through the Fronius Solar Net.

If the supply LED does not light up, an external power supply is required for the Fronius Power Control Box.

Connecting the external power supply to the Fronius Power Control Box

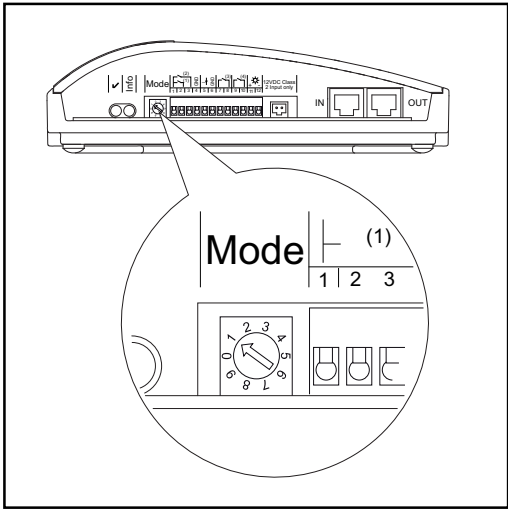


1. Connect the external mains adapter to the external power supply connection

The supply LED will light up green if there is a sufficient power supply.

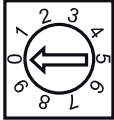
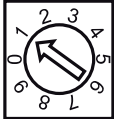
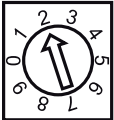
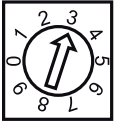
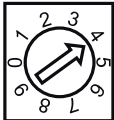
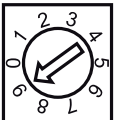
Setting the operating mode of the Fronius Power Control Box

The operating mode adjusting dial



The operating mode adjusting dial is used to control the inverter function.

Operating modes and settings

Setting	Description
 0	Test mode 10 % of the maximum possible output power is fed into the grid (irrespective of what is connected to the terminals).
 1	4-relay mode (factory setting) Depending on the limit set by the ripple control signal receiver, 100 %, 60 %, 30 % or 0 % of the maximum possible output power is fed into the grid.
 2	2-relay mode Depending on the combination in which the two relays are actuated on the ripple control signal receiver, 100 %, 60 %, 30 % or 0 % of the maximum possible output power is fed into the grid.
 3	3-relay mode Depending on the limit set by the ripple control signal receiver, 60 %, 30 % or 0 % of the maximum possible output power is fed into the grid.
 -  4 9	Reserved for other operating modes Settings 4 - 9 are currently assigned to 4-relay mode.

**Setting the
operating
mode of the
Fronius Power
Control Box**

1. Use a screwdriver on the operating mode adjusting dial to set the required mode for the Fronius Power Control Box

Important! A value between 1 and 9 must be set for the Fronius Power Control Box to work properly.

Inverter display

General

If the power supply company has issued a power reduction, then this is indicated on the inverter in display mode 'Now', which shows the energy currently being fed into the grid. The 'Enter' key is enabled.



Display mode 'Now', energy currently fed into the grid with 'Enter' key enabled

Inverter display

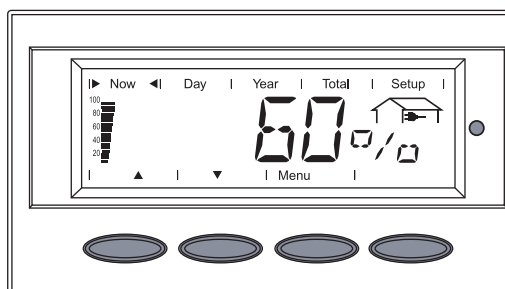


1. In the display mode 'Now', call up the energy currently being fed into the grid

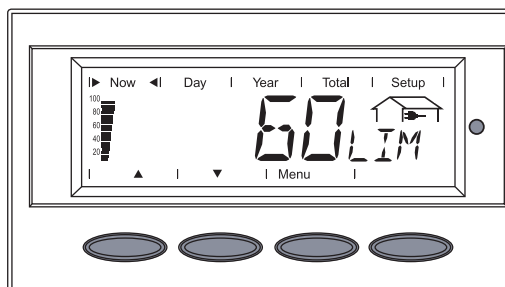
The 'Enter' key is enabled if the power supply company reduces the power.

2. Press the 'Enter' key

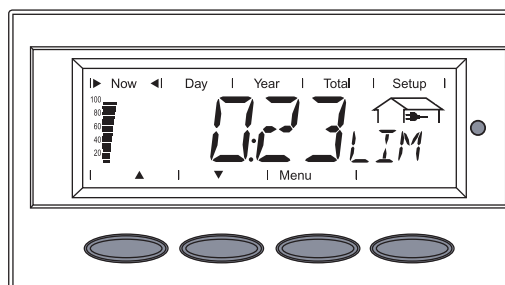
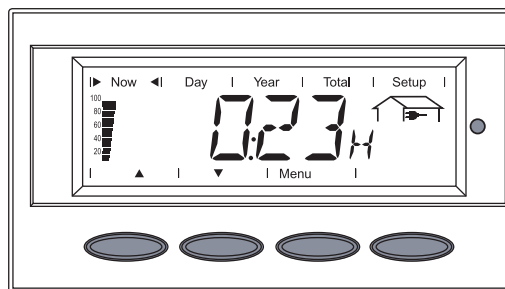
The current power reduction is displayed.
In the area for the display unit, '%' and 'LIM' are displayed alternately.



3. Press the 'Down' arrow



Inverter display (continued)



The length of time that the power reduction has been in effect is displayed in H:MM. In the area for the display unit, 'H' and 'LIM' are displayed alternately

4. Press the 'Menu' key to switch back to the current power value

Troubleshooting

General The LED status indicator lights up and flashes to indicate errors.

Troubleshooting

The LED status indicator lights up red

Cause: A Fronius Power Control Box is already in the Fronius Solar Net.

Remedy: Check Fronius Solar Net, remove Fronius Power Control Box

Cause: An error has occurred in the Fronius Solar Net (e.g. an interruption).

Remedy: Check Fronius Solar Net, rectify cause of interruption; check whether terminating plugs are connected to free Fronius Solar Net connections on the DATCOM components

The LED status indicator flashes quickly (approx. twice every second)

Cause: Contact fault, only in 4-relay mode (e.g. break in cable(s) from ripple control signal receiver to Fronius Power Control Box or cable(s) not plugged in)

Remedy: Check cables and connections

Cause: The ripple control signal receiver is faulty, only in 3-relay and 4-relay mode (e.g. no relay is actuated or more than one relay is actuated).

Remedy: Check cables and connections
Check relay functions on the ripple control signal receiver
Set the operating mode adjusting dial to „Test mode“ 0; if the LED is still flashing, an EEPROM error has occurred

Cause: EEPROM error

Remedy: Contact After-Sales Service

Important! If the ripple control signal receiver is faulty, 100 % of the maximum possible output power of the photovoltaic system is fed into the grid.

A power limitation is in effect

The LED status indicator flashes slowly (approx. every 2 seconds)

The power supply company has issued a power limitation.
(no error)

Technical data

Fronius Power Control Box

Supply voltage	12 V DC
Energy consumption	1.3 W
Degree of protection	IP 20
Dimensions (l x w x h)	
197 x 110 x 57 mm	
Interfaces	RS 485: RJ 45 „IN“ RS 485: RJ 45 „OUT“

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