



## Fronius Primo - Installation

EN

Installation instructions

Grid-connected inverter



42,0426,0204,EN 016-14092020



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# Installation location and position

## Explanation of safety notices

### **DANGER!**

Indicates **immediate danger**.

- ▶ If not avoided, death or serious injury will result.

### **WARNING!**

Indicates a **potentially hazardous situation**.

- ▶ If not avoided, death or serious injury may result.

### **CAUTION!**

Indicates a **situation where damage or injury could occur**.

- ▶ If not avoided, minor injury and/or damage to property may result.

### **NOTE!**

Indicates a **risk of flawed results and possible damage to the equipment**.

## Safety

### **WARNING!**

**Danger due to incorrect operation and incorrectly performed work.**

This can result in serious injury and damage to property.

- ▶ Only qualified personnel are authorised to commission your inverter and only within the scope of the respective technical regulations.
- ▶ Read the Installation and Operating Instructions before installing and commissioning the equipment.

### **WARNING!**

**Danger due to work that has been carried out incorrectly.**

This may result in serious injury and damage to property.

- ▶ Surge protective devices must only ever be installed and connected by a qualified electrical installation engineer!
- ▶ Follow the safety rules.
- ▶ Ensure that both the AC side and the DC side of the inverter are de-energised before carrying out any installation and connection work.

## Fire prevention

### CAUTION!

#### **Danger due to poor or unprofessional installation.**

This may result in damage to inverters and other live photovoltaic system components. Poor or unprofessional installation can cause overheating of cables and terminal connections and result in arcs. These can cause heat damage, which in turn may lead to fires.

Observe the following when connecting AC and DC cables:

- ▶ Tighten all terminals to the torque specified in the operating instructions
  - ▶ Tighten all grounding terminals (PE / GND), including free ones, to the torque specified in the operating instructions
  - ▶ Do not overload cables
  - ▶ Check cables for damage and verify that they are laid correctly
  - ▶ Take note of the safety instructions, Operating Instructions and any local connection regulations
- 
- ▶ Using fastening screws, always screw the inverter firmly to the mounting bracket to the torque specified in the Operating Instructions.
  - ▶ Ensure that the fastening screws are tight before starting the inverter!

**Note!** Fronius will not accept any costs associated with production downtimes, installer costs, etc., that may arise as the result of a detected arc and its consequences. Fronius accepts no liability for fires that can occur despite the presence of the integrated arc detection/extinguishing system (e.g. fires caused by a parallel arc).

**Note!** After an arc has been detected, the entire photovoltaic system must be checked for possible damage before resetting the inverter.

Observe the manufacturer's connection, installation and operating instructions at all times. To reduce the hazard potential to a minimum, perform all installation and connection work carefully according to the instructions and regulations.

Refer to the device Installation Instructions for the tightening torques to be used at the relevant terminal connections.

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## Proper use

The inverter is designed to be connected and used exclusively in conjunction with ungrounded solar modules. The solar modules must not be grounded at either the positive or negative pole.

The solar inverter is intended exclusively to convert direct current from solar modules into alternating current and to feed this into the public grid.

Utilisation not in accordance with the intended purpose comprises:

- any use above and beyond this purpose
- making any modifications to the inverter that have not been expressly approved by Fronius
- the installation of components that are not distributed or expressly approved by Fronius.

Fronius shall not be liable for any damage resulting from such action.

No warranty claims will be entertained.

Proper use also includes

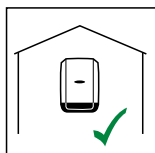
- carefully reading and obeying all the instructions and all the safety and danger notices in the operating instructions
- performing all stipulated inspection and maintenance work
- installation as specified in the operating instructions

When designing the photovoltaic system, ensure that all of its components are operated within their permitted operating ranges at all times.

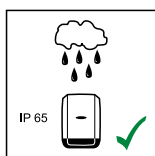
Observe all the measures recommended by the solar module manufacturer to ensure the lasting maintenance of the properties of the solar module.

Obey the regulations of the power supply company regarding energy fed into the grid.

### Explanation of symbols and choice of location

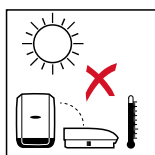


The inverter is suitable for indoor installation.

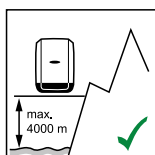
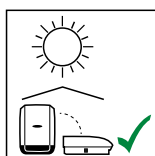


The inverter is suitable for outdoor installation.

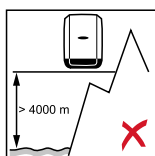
Because of its IP 65 protection class, the inverter is resistant to water jets from any direction and can also be used in damp environments.



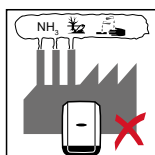
In order to minimise the heating up of the inverter, do not expose it to direct insolation. Install the inverter in a protected location, e.g. in the vicinity of the solar modules or beneath the eaves.



Can be used at altitudes of up to 4000 m

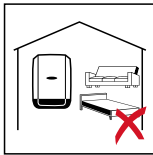


**IMPORTANT!** The inverter must not be installed or used at altitudes above 4000 m.

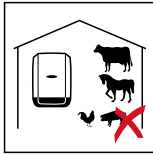


Do not install the inverter in:

- Areas where ammonia, corrosive vapours, acids or salts are present (e.g. fertiliser stores, ventilation openings from cattle sheds, chemical plants, tanneries, etc.)

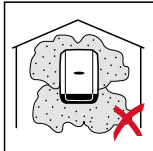


During certain operating phases the inverter may produce a slight noise. For this reason it should not be installed close to living areas.



Do not install the inverter in:

- Places where there is an increased risk of damage from farm animals (horses, cattle, sheep, pigs, etc.)
- Stables or adjoining areas
- Storage areas for hay, straw, chaff, animal feed, fertilisers, etc.



Do not install the inverter in:

- Places and environments subject to a heavy build-up of dust
- Places and environments in which a heavy build-up of dust containing conductive particles (e.g. iron chips) is likely



Do not install the inverter in:

- Greenhouses
- Storage or processing areas for fruit, vegetables or viticulture products
- Areas used in the preparation of grain, green fodder or animal feeds

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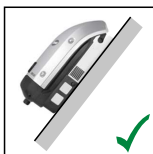
### Explanation of symbols - installation position



The inverter is suitable for vertical installation on a vertical wall or column.



The inverter is suitable for a horizontal installation position.



The inverter is suitable for installation on a sloping surface.



Do not install the inverter on a sloping surface with its connection sockets at the top.





Do not install the inverter at an angle on a vertical wall or column.



Do not install the inverter horizontally on a vertical wall or pillar.



Do not install the inverter on a vertical wall or pillar with its connection sockets facing upwards.



Do not install the inverter overhanging with the connection sockets at the top.



Do not install the inverter overhanging with the connection sockets at the bottom.



Do not install the inverter on the ceiling.

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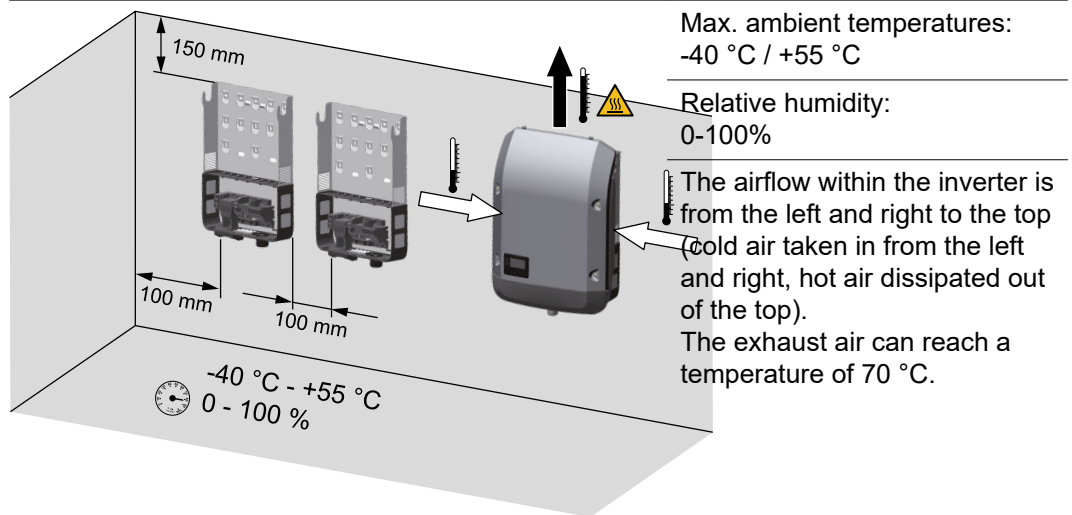
**General comments regarding choice of location**

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

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Only install on a solid, non-flammable surface

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If the inverter is installed in a switch cabinet or a similar sealed area, then forced-air ventilation must be provided to ensure adequate heat dissipation.

If the inverter is to be installed on the outer wall of a cattle shed, maintain a minimum all-round clearance of 2 m between the inverter and all ventilation and other openings in the building.

The installation location must not be exposed to ammonia, corrosive vapours, salts or acids.

# Attaching the Mounting Bracket

## Safety

### **WARNING!**

#### **Danger due to residual voltage in capacitors.**

This may result in an electric shock.

- ▶ Wait for the capacitors to discharge. The discharge time is five minutes.

### **CAUTION!**

#### **Danger due to dirt or water on the terminals and contacts of the inverter's connection area.**

This may result in damage to the inverter.

- ▶ When drilling, ensure that terminals and contacts in the connection area do not become dirty or wet.
- ▶ The mounting bracket without a power stage set does not conform to the protection class of the inverter as a whole, and therefore must not be installed without a power stage set.
- ▶ The mounting bracket should be protected from dirt and moisture during installation.

Note! Degree of protection IP 65 is only applicable if

- the inverter is placed in the mounting bracket and permanently attached using screws,
- the cover for the data communication area is permanently attached to the inverter with screws.

Degree of protection IP 20 applies to the mounting bracket with no inverter and the venting duct.

## Selecting wall plugs and screws

**Important!** Different fixings may be required to fit the mounting bracket depending on the type of underlying surface. Fixings are therefore not included in the scope of supply of the inverter. The installer is responsible for selecting the right type of fixing.

## Recommended screws

To install the inverter, the manufacturer recommends the use of steel or aluminium screws with a diameter of 6 - 8 mm.

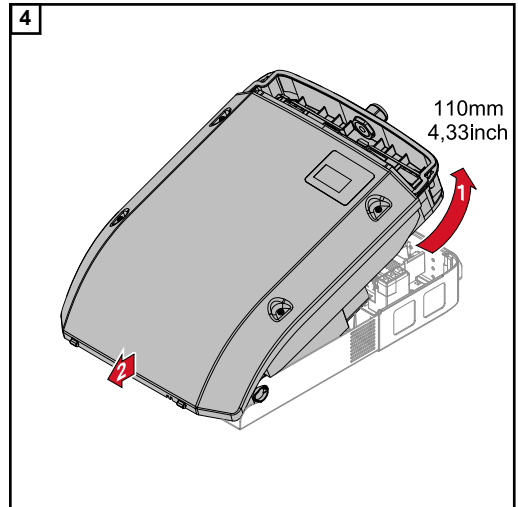
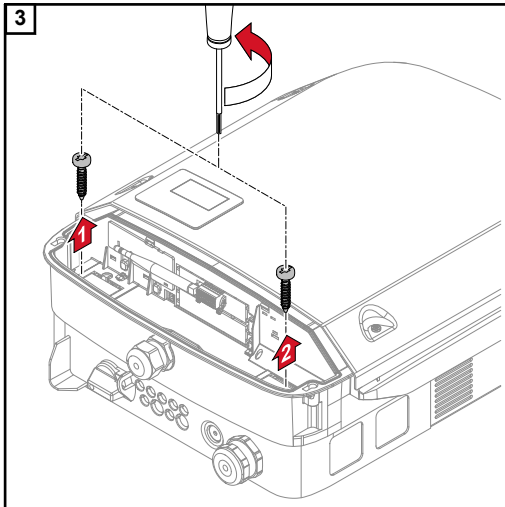
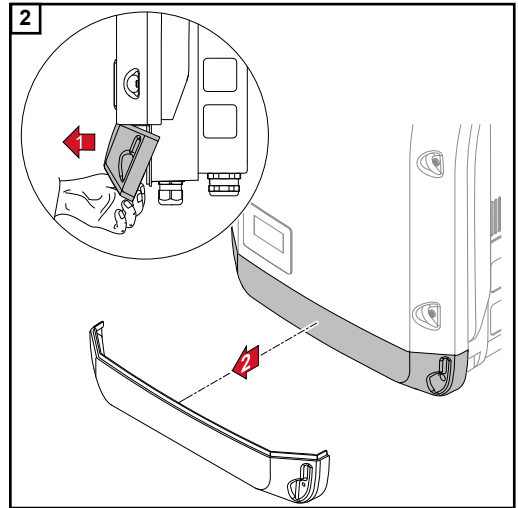
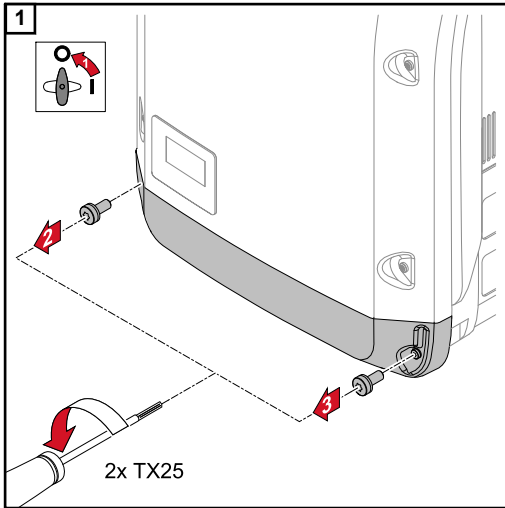
## Opening the inverter

### **WARNING!**

#### **Danger from inadequate ground conductor connection.**

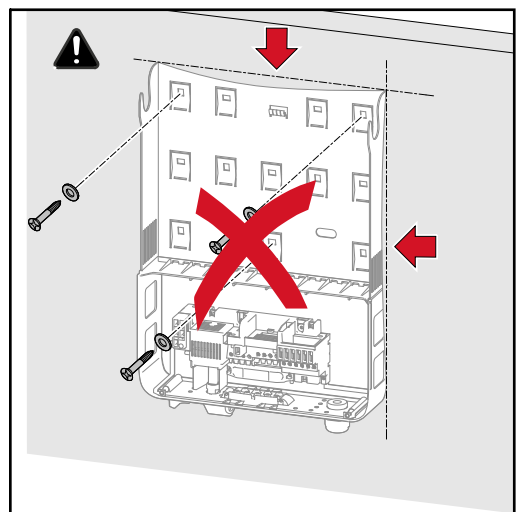
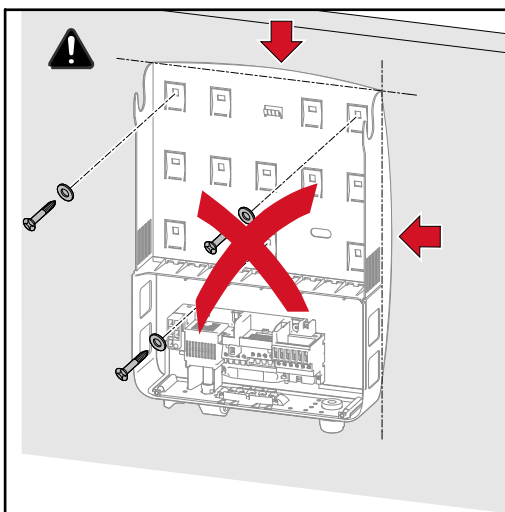
This can result in serious injury and damage to property.

- ▶ The housing screws provide a suitable ground conductor connection for grounding the housing and must NOT be replaced by any other screws that do not provide a reliable ground conductor connection.

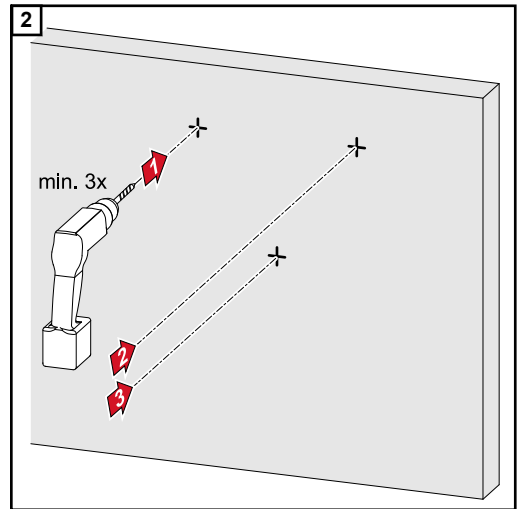
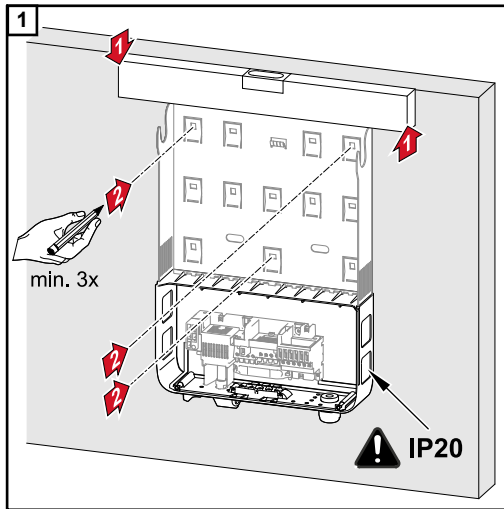


**Do not warp or deform the mounting bracket**

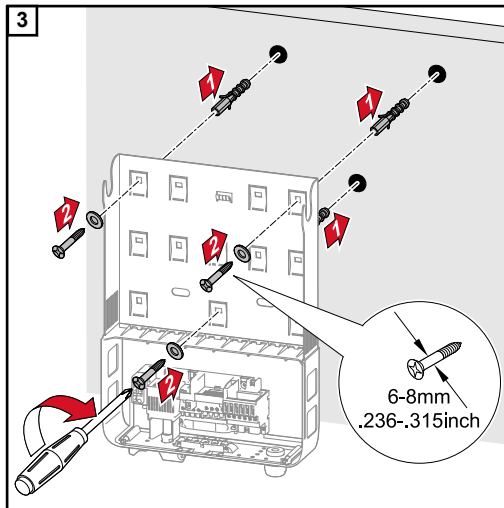
**Note!** When fitting the mounting bracket to the wall, ensure that the mounting bracket does not become warped or deformed.



### Fitting the mounting bracket to a wall

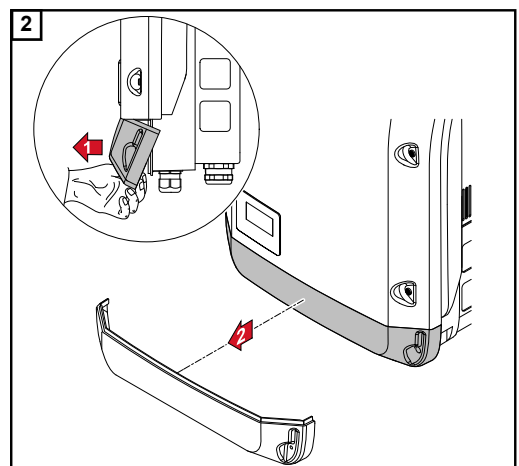
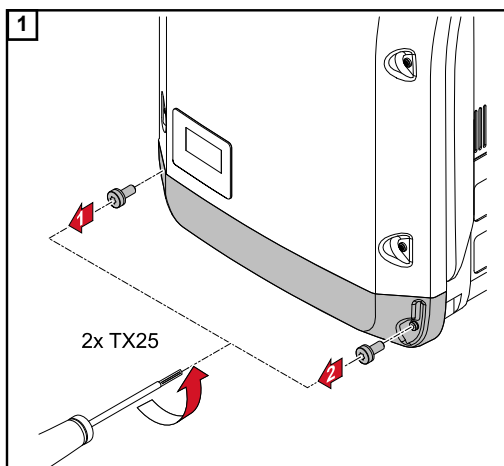


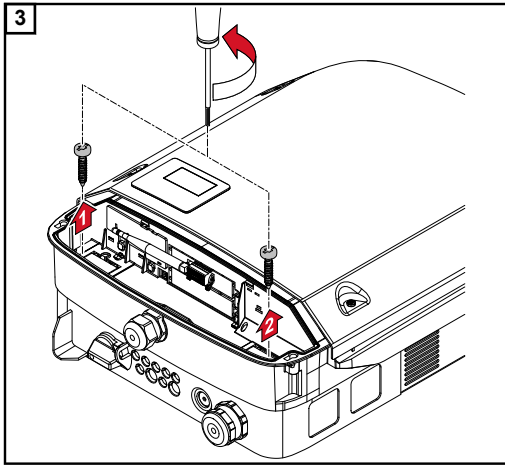
Tip: Install the inverter so that its display is at eye level



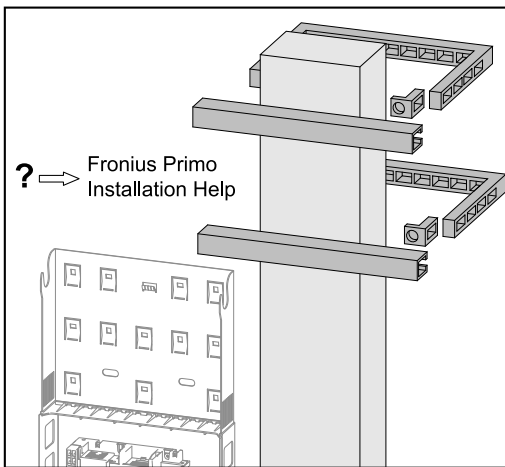
**Note!** When mounting the mounting bracket on the wall, ensure that the mounting bracket does not become warped or deformed.

### Attaching the mounting bracket





**Mounting the inverter on a mast**



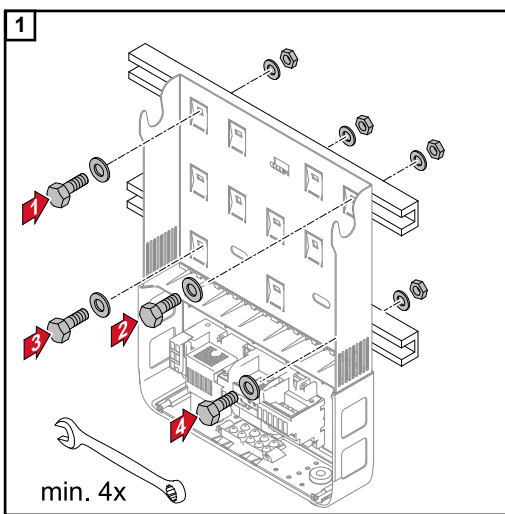
Example of a mast fixing kit

When mounting the inverter on a mast or a vertical carrier, Fronius recommends the use of a standard mast fixing kit.

This kit enables the inverter to be mounted on round or rectangular masts with various cross-sections.

**Fitting the mounting bracket to metal supports**

The mounting bracket must be affixed at a minimum of four points.



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

## Safety

### **WARNING!**

**Incorrect operation or poorly executed work can cause serious injury or damage.** Only qualified staff are authorised to commission your inverter and only within the scope of the respective technical regulations. Read the Installation and Operating Instructions before installing and commissioning the equipment.

### **WARNING!**

#### **An electric shock can be fatal.**

Danger due to grid voltage and DC voltage from solar modules that are exposed to light.

- ▶ Ensure 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.

### **WARNING!**

#### **An electric shock can be fatal.**

Danger due to grid voltage and DC voltage from solar modules.

- ▶ 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.
- ▶ Ensure that the power stage set and connection area are disconnected from one another before carrying out any maintenance or service tasks.
- ▶ The power stage set is only to be disconnected from the mounting bracket once it is de-energised.
- ▶ Maintenance and servicing in the power stage set of the inverter must only be carried out by Fronius-trained service technicians.

### **CAUTION!**

#### **Risk of damage to the inverter as the result of incorrectly tightened terminals.**

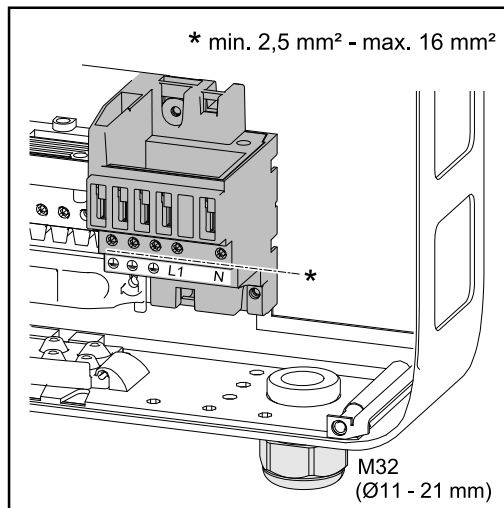
Incorrectly tightened terminals can cause heat damage to the inverter that may result in a fire. When connecting AC and DC cables, ensure that all the terminals are tightened to the specified torque.

**IMPORTANT!** To ensure a proper ground connection, all three PE grounding terminals must be tightened to the specified torque when the inverter is installed.

## Monitoring the grid

To provide the best possible grid monitoring, the resistance in the leads to the AC-side terminals should be as low as possible.

## AC terminals



PE Ground conductor / earthing  
L1 Phase conductor  
N Neutral conductor

Max. cross-section of each conductor cable:  
16 mm<sup>2</sup>

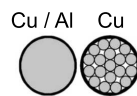
Min. cross-section of each conductor cable:  
in accordance with the fuse rating on the AC side, but at least 2.5 mm<sup>2</sup>

The AC cables can be connected to the AC terminals without ferrules.

**IMPORTANT!** When using ferrules for AC cables with a cross-section of 16 mm<sup>2</sup>, the ferrules must be crimped with a right-angled cross-section.  
The use of ferrules with insulating collars is only permitted up to a max. cable cross-section of 10 mm<sup>2</sup>.

## Type of AC cable

The following types of AC cable can be connected to the AC terminals of the inverter:



- Copper or aluminium: solid round conductor
- Copper: fine-stranded round conductor, up to conductor class 4

## Preparing the aluminium cables for connection

The AC-side terminals are suitable for connecting single-wire, round aluminium cables. Because of the formation of a non-conductive oxide layer due to the reaction of aluminium with air, the following points must be considered when connecting aluminium cables:

- the reduced rated currents for aluminium cables
- the connection conditions listed below

Always follow the cable manufacturer instructions when using aluminium cables.

When designing cable cross-sections, take local regulations into account.

### Connection conditions:

- 1 Carefully clean the oxide layer from the bare end of the cable by scraping it, e.g. with a knife

**IMPORTANT!** Do not use brushes, files or emery paper, as the aluminium particles get trapped and can be transferred to other conductors.

- 2 Once the oxide layer is removed, rub the end of the cable with a neutral grease, such as non-acidic and non-alkaline Vaseline
- 3 Immediately connect the cable end to the terminal

**IMPORTANT!** Repeat the procedure if the cable has been disconnected and is to be re-connected.

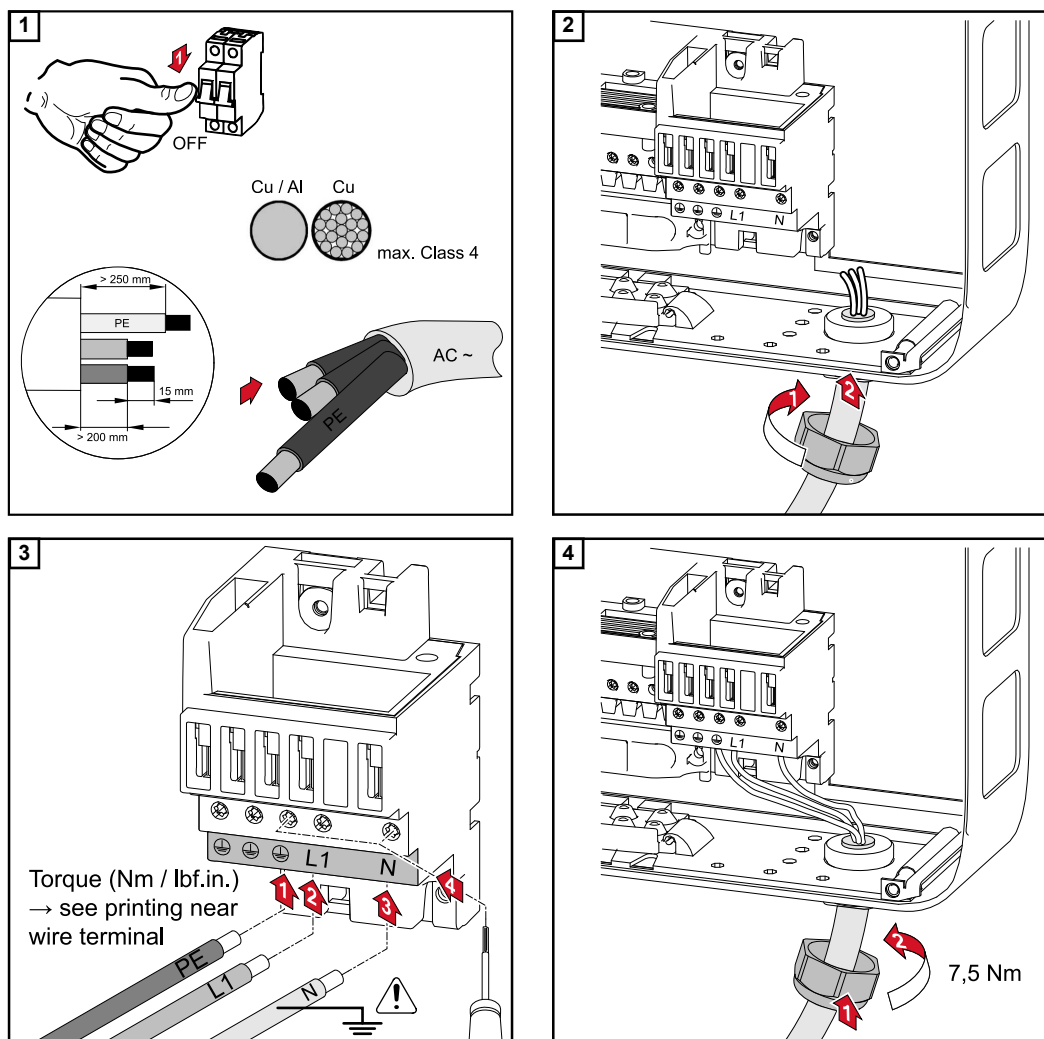


## Requirements for the neutral conductor

### Note!

- Ensure that the grid neutral conductor is grounded. This may not be the case for IT grids (insulated grids with no grounding); it will then not be possible to use the inverter.
- In order to use the inverter, the neutral conductor must be connected. A neutral conductor that is too small may adversely affect the inverter feeding energy into the grid. The neutral conductor must therefore be the same size as the other live conductors.

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



*Note! Observe the torque values marked on the side underneath the terminals.*

## Routing the AC cables

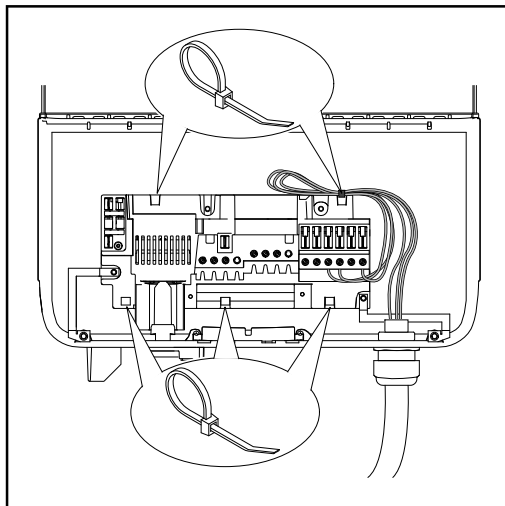
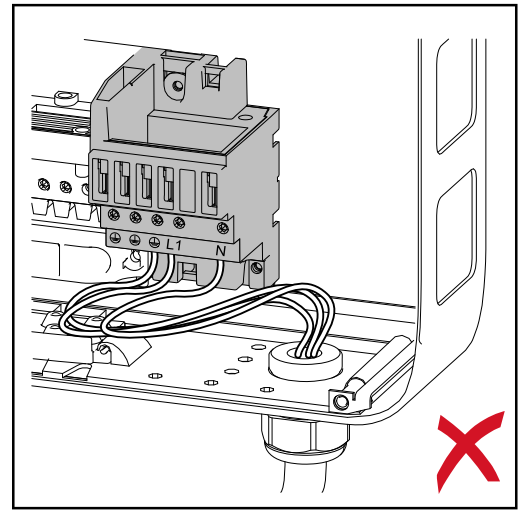
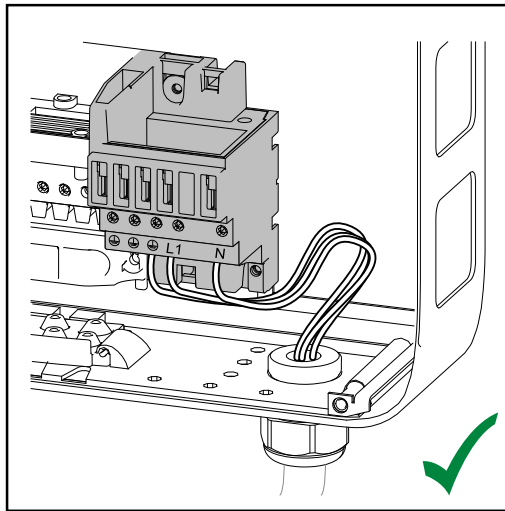
### Note!

- Form loops with the AC cables when connecting them to the AC terminals.
- When securing the AC cables using a metric screw joint, ensure that the loops do not protrude beyond the connection area. Otherwise, under certain circumstances it may no longer be possible to close the inverter.

**IMPORTANT!** The PE ground conductor of the AC cable must be laid in such a way that it is the last to be disconnected in the event that the strain-relief device should fail. This can be ensured, for example, by making it somewhat longer and by laying it in a loop.

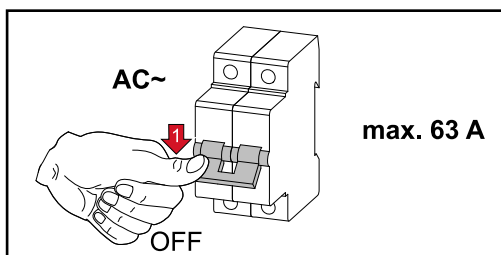
If AC cables are laid over the shaft of the DC main switch or across the connection block of the DC main switch, they may be damaged when the inverter is swung in, or they may even prevent the inverter from being swung in.

**IMPORTANT!** Do not lay AC cables over the shaft of the DC main switch or across the connection block of the DC main switch.



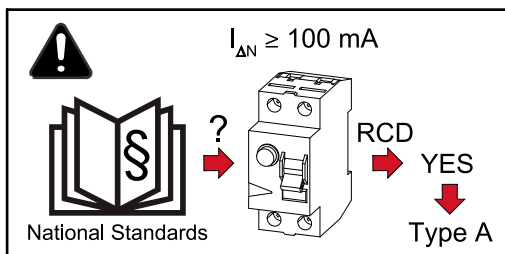
If overlength AC or DC cables are to be laid in loops in the connection area, attach the cables with cable ties to the eyelets provided on the top and bottom of the connection block.

**Maximum fuse rating on alternating current side**



Inverter	Phases	Max. output	Max. fuse rating
Fronius Primo 3.0-1	1	3000 W	1 x C 63 A
Fronius Primo 3.5-1	1	3500 W	1 x C 63 A
Fronius Primo 3.6-1	1	3600 W	1 x C 63 A
Fronius Primo 4.0-1	1	4000 W	1 x C 63 A
Fronius Primo 4.6-1	1	4600 W	1 x C 63 A

Inverter	Phases	Max. output	Max. fuse rating
Fronius Primo 5.0-1 AUS	1	5000 W	1 x C 63 A
Fronius Primo 5.0-1	1	5000 W	1 x C 63 A
Fronius Primo 5.0-1 SC	1	5000 W	1 x C 63 A
Fronius Primo 6.0-1	1	6000 W	1 x C 63 A
Fronius Primo 8.2-1	1	8200 W	1 x C 63 A



### NOTE!

**Local regulations, the energy company or other factors may require a residual current protective device (RCD) in the AC connection lead.**

For this situation, a type A residual current protective device is generally adequate. In particular cases, and depending on local factors, however, the type A residual current protective device may trip at the wrong time.

For this reason, Fronius recommends that an RCD suitable for frequency converters be used.

# Connecting solar module strings to the inverter

## Safety



### WARNING!

#### **Danger due to incorrect operation and incorrectly performed work.**

This can result in serious injury and damage to property.

- ▶ Only qualified staff are authorised to commission your inverter and only within the scope of the respective technical regulations.
- ▶ Read the Installation and Operating Instructions before installing and commissioning the equipment.



### WARNING!

#### **Danger due to grid voltage and DC voltage from solar modules that are exposed to light.**

This may result in an electric shock.

- ▶ Ensure 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.



### WARNING!

#### **Risk of electric shock if the solar module ground is not grounded or is not grounded properly.**

An electric shock can be fatal.

- ▶ To comply with IEC 62109-2:2011, any grounding required by the manufacturer of the solar module ground within the inverter must only be carried out via the specified fuse.



### WARNING!

#### **Danger from DC voltage in solar modules.**

An electric shock can be fatal. The inverter's insulation monitoring is deactivated when the solar modules are grounded.

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



### WARNING!

#### **Danger due to grid voltage and DC voltage from solar modules.**

This may result in an electric shock.

- ▶ 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.
- ▶ Ensure that the power stage set and connection area are disconnected from one another before carrying out any maintenance or service tasks.
- ▶ The power stage set, which is enclosed in a separate housing, must only be disconnected from the connection area when in a de-energized state.
- ▶ Maintenance and servicing in the power stage set of the inverter must only be carried out by Fronius-trained service technicians.

**⚠ WARNING!****Danger from inadequate ground conductor connection.**

This can result in serious injury and damage to property.

- ▶ The housing screws provide a suitable ground conductor connection for grounding the housing and must NOT be replaced by any other screws that do not provide a reliable ground conductor connection.
- 

**⚠ CAUTION!****Danger due to dirt or water on the terminals and contacts of the connection area.**

This may result in damage to the inverter.

- ▶ When drilling, ensure that terminals and contacts in the connection area do not become dirty or wet.
  - ▶ The mounting bracket without a power stage set does not conform to the protection class of the inverter as a whole, and therefore must not be installed without a power stage set. The mounting bracket should be protected from dirt and moisture during installation.
- 

**⚠ CAUTION!****Danger due to incorrectly tightened terminals.**

This may result in heat damage to the inverter, which may lead to fire.

- ▶ When connecting AC and DC cables, ensure that all the terminals are tightened to the specified torque.
- 

**⚠ CAUTION!****Danger due to overloading.**

This may result in damage to the inverter.

- ▶ The maximum amperage when connecting to a single DC terminal is 20 A.
  - ▶ Connect the DC+ and DC- cables to the DC+ and DC- terminals on the inverter, taking care to ensure that the polarity is correct.
- 

**NOTE!** If solar modules are grounded by a built-in grounding protection device in the inverter, they will not be grounded if the DC main switch is in the OFF position.

**NOTE!** When connecting 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.

**NOTE!** The solar modules connected to the inverter must comply with the IEC 61730 Class A standard.

**NOTE!** When photovoltaic modules are exposed to light, they supply current to the inverter.

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

**NOTE!** For grounding solar module frames or racks, the relevant specifications from the solar module manufacturer must be taken into account along with national guidelines.

**NOTE!** If the inverter is installed in Australia or New Zealand (required standard: AS4777.2:2015), the following applies:

- Functional grounding is **not** permitted
- The inverter must **not** be used as part of a three-phase combination, as there is no communication link between the inverters

### 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:

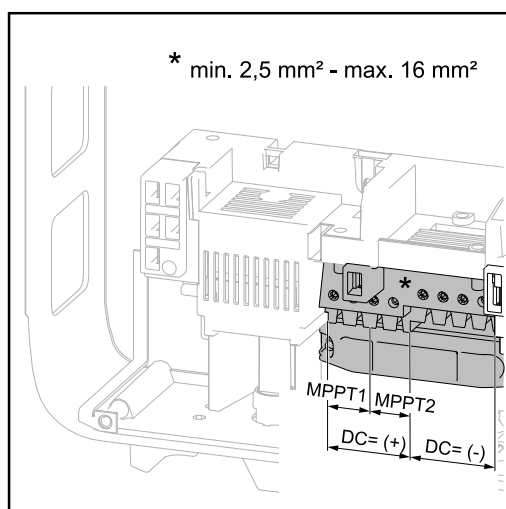
- If insolation is constant and the temperature is falling, the open circuit voltage of the solar modules will increase.
- The temperature coefficients on the solar modules data sheet must be observed
- More exact values for dimensioning the solar modules can be provided by suitable calculation programs, like the Fronius Solar.configurator (which can be downloaded from [www.fronius.com](http://www.fronius.com)).

### NOTE!

**Before connecting up the solar modules, check that the voltage for the solar modules specified by the manufacturer corresponds to the actual measured voltage.**

The solar module manufacturer's safety instructions and regulations regarding solar module grounding must be observed.

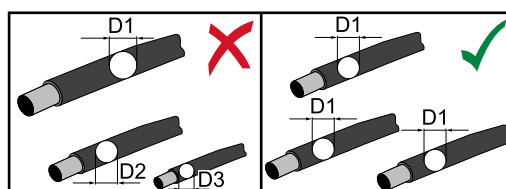
### DC terminals



Max. cross-section of each DC cable: 16 mm<sup>2</sup>

Min. cross-section of each DC cable: 2.5 mm<sup>2</sup>

The DC cables can be connected to the DC terminals without ferrules.



### NOTE!

**To ensure effective strain relief of the solar module strings, only use cables with identical cross-sections.**

**IMPORTANT!** When using ferrules for DC cables with a cross-section of 16 mm<sup>2</sup>, the ferrules must be crimped with a right-angled cross-section. The use of ferrules with insulating collars is only permitted up to a max. cable cross-section of 10 mm<sup>2</sup>.

### Connecting aluminium cables

The DC-side terminals are suitable for connecting single-wire, round aluminium cables. Because of the formation of a non-conductive oxide layer due to the reaction of aluminium with air, the following points must be considered when connecting aluminium cables:

- the reduced rated currents for aluminium cables
- the connection conditions listed below

**Note!** Always follow the cable manufacturer instructions when using aluminium cables.

**Note!** When designing cable cross-sections, take local regulations into account.

#### Connection conditions:

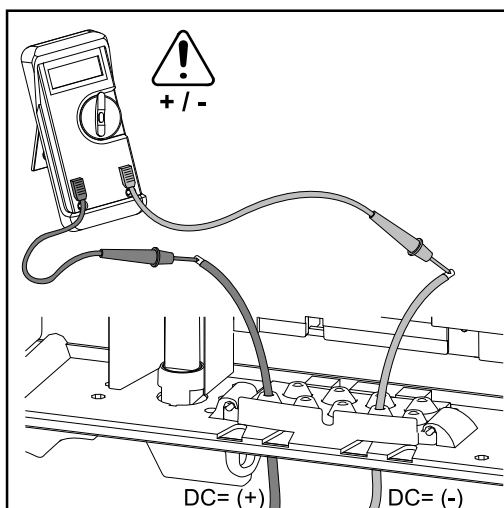
- 1 Carefully clean the oxide layer from the bare end of the cable by scraping it, e.g. with a knife

**IMPORTANT!** Do not use brushes, files or emery paper, as the aluminium particles get trapped and can be transferred to other conductors.

- 2 Once the oxide layer is removed, rub the end of the cable with a neutral grease, such as non-acidic and non-alkaline Vaseline
- 3 Immediately connect the cable end to the terminal

**IMPORTANT!** Repeat the procedure if the cable has been disconnected and is to be re-connected.

#### Solar module strings - checking the polarity and voltage



#### CAUTION!

#### Danger due to incorrect polarity and voltage.

This may result in damage to the inverter.

- Check the polarity and voltage of the solar module strings before making the connection

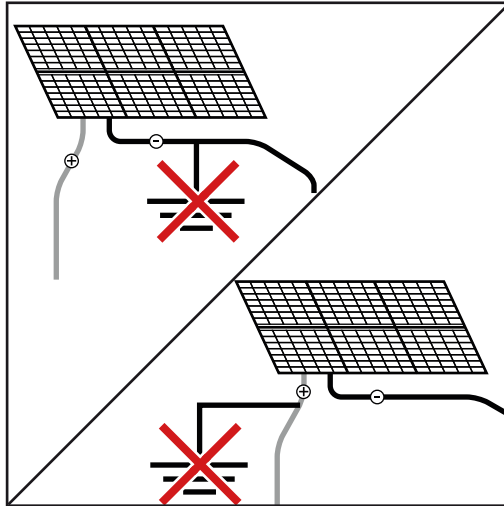
#### Notes regarding dummy devices

A dummy device is not suitable for connecting operationally to a photovoltaic system, and must only ever be used for demonstration purposes. Dummy devices are indicated as such on their rating plate.

**IMPORTANT!** Never connect DC cables to the DC connection sockets on a dummy device.

The connection of de-energised cables or sections of cable for demonstration purposes is permissible.

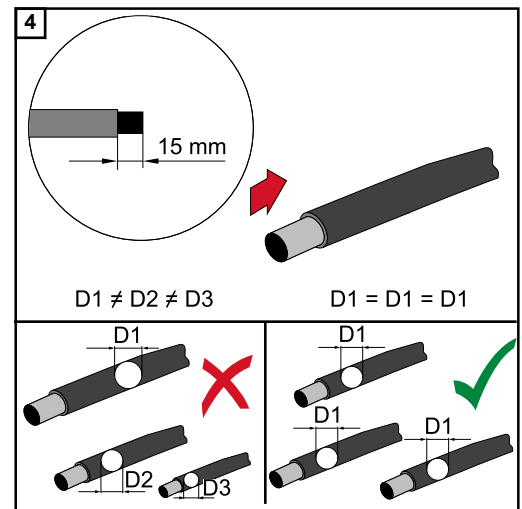
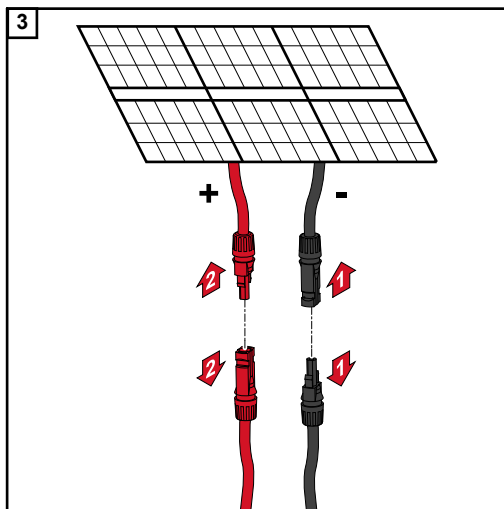
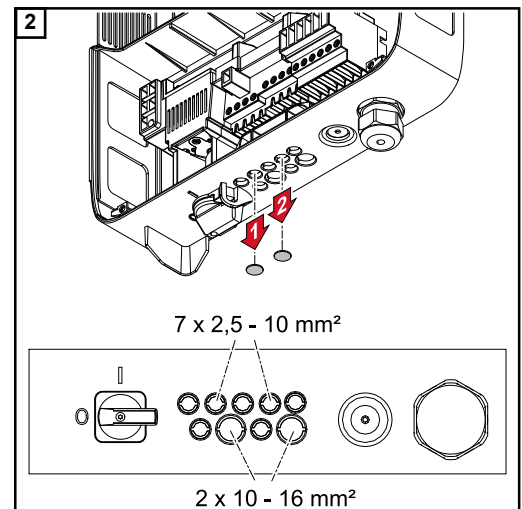
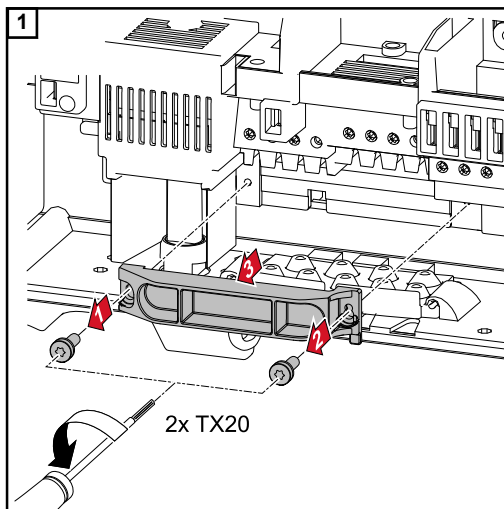
**Do not earth solar modules**



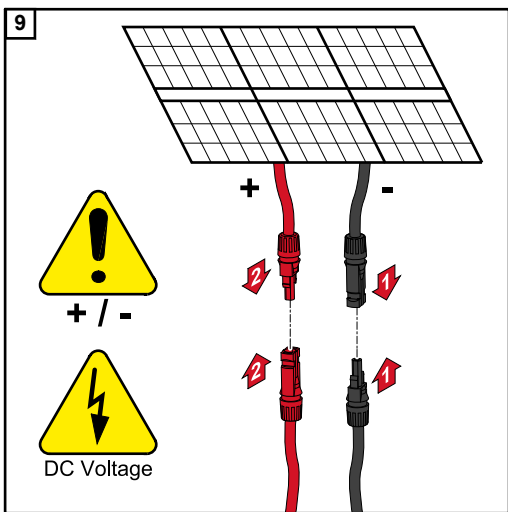
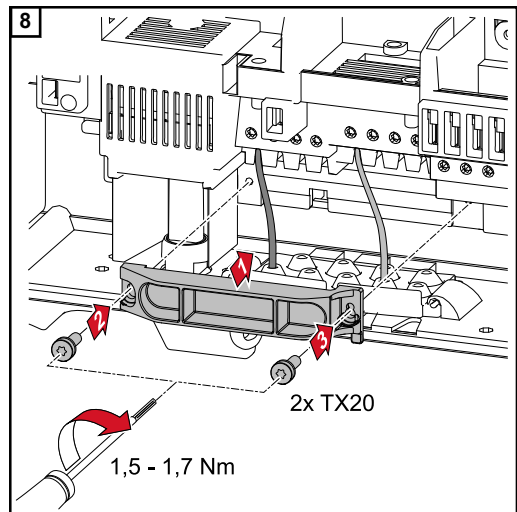
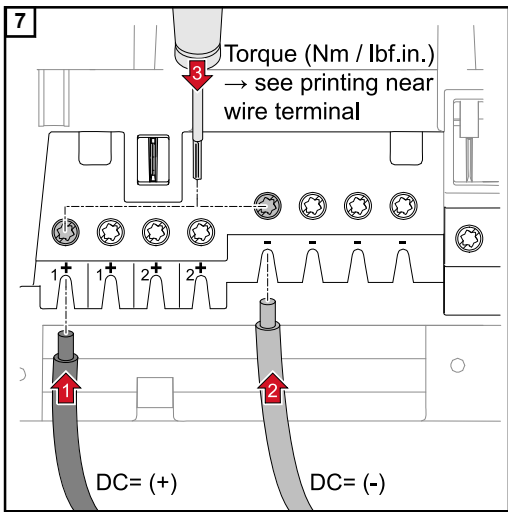
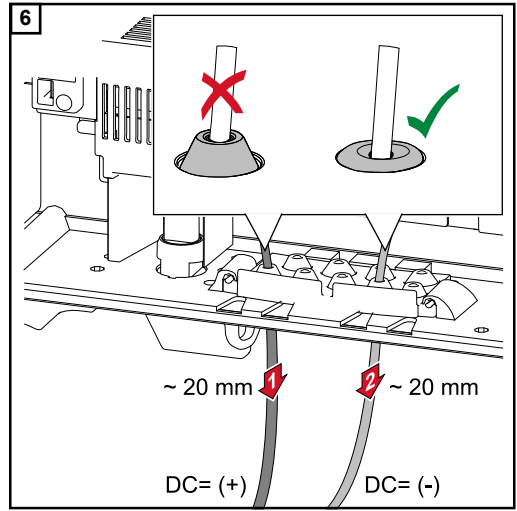
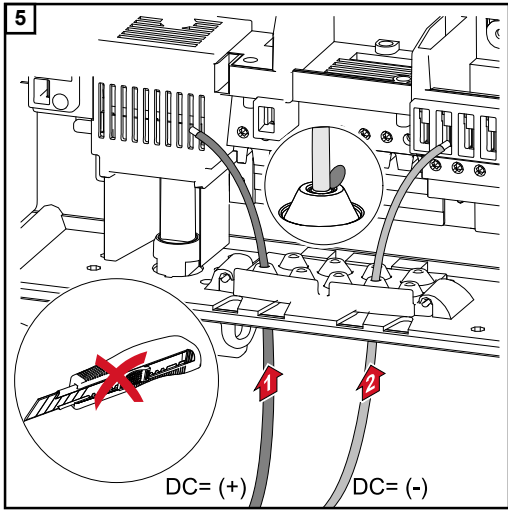
The inverter is designed to be connected and used exclusively in conjunction with ungrounded solar modules. The solar modules must not be grounded at either the positive or negative pole.

**Inverter DC connection**

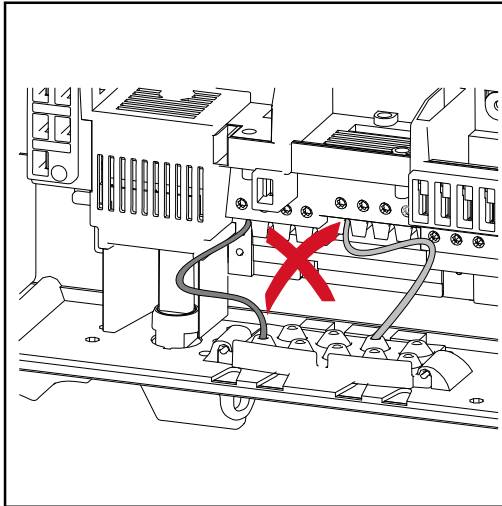
Only break out as many target break points as the number of cables that are provided (e.g. if there are 2 DC cables, then break out 2 recesses).







**Cable routing in the DC area**



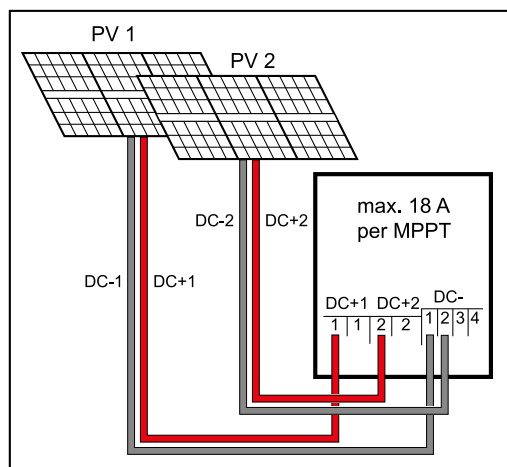
If DC cables are laid over the shaft of the DC main switch or across the connection block of the DC main switch, they may be damaged when the inverter is swung in or they may even prevent the inverter from being swung in.

**IMPORTANT!** Do not lay DC cables over the shaft of the DC main switch or across the connection block of the DC main switch.

**Multi MPP tracker inverters - Fronius Primo 3.0 - 8.2**

In the case of inverters with multiple MPP trackers, there are two independent DC inputs (MPP trackers) available. These can be connected to an unequal number of solar modules. There are two terminals for DC+ available per MPP tracker. In total there are four terminals for DC-.

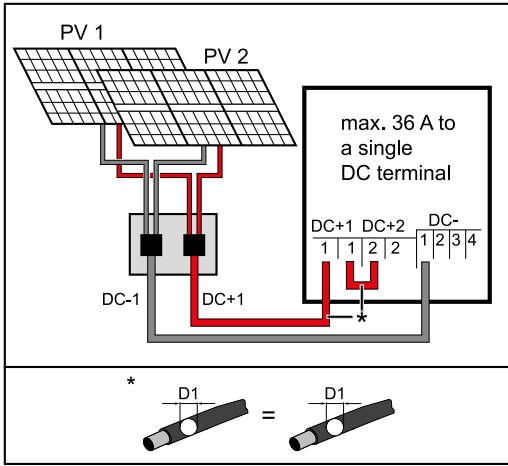
**Connecting two to four strings in multiple MPP tracker mode:**



Divide the strings between the two MPP tracker inputs (DC+1/DC+2). The DC- terminals can be used however you wish, as they are internally connected. When starting for the first time, set MPP TRACKER 2 to "ON" (this can also be done later in the Basic menu).

*Connecting two solar module fields to an inverter with multiple MPP trackers*

**Single MPP tracker mode on an inverter with multiple MPP trackers:**



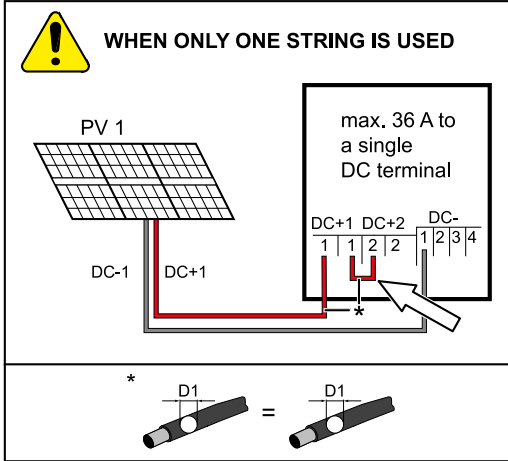
Connecting multiple interconnected solar module fields to an inverter with multiple MPP trackers using one lead

If the strings are connected using a string collection box and only one bus is used for connection to the inverter, the connection DC+1 (pin 2) and DC+2 (pin 1) must be jumpered. The cable cross-section of the DC connection lead and the jumpering must be the same. Jumpering of the DC- terminal is not necessary, as these terminals are jumpered internally.

When starting for the first time, set MPP TRACKER 2 to "OFF" (this can also be done later in the Basic menu).

If the inverter with multiple MPP trackers is operated in single MPP tracker mode, the currents from the connected DC leads are divided evenly across both inputs.

**Single MPP tracker mode with only one string on an inverter with multiple MPP trackers:**



Connecting only one string to an inverter with multiple MPP trackers

If only one string is used for connection to the inverter, the connection DC+1 (pin 2) and DC+2 (pin 1) must be jumpered. The cable cross-section of the DC connection lead and the jumpering must be the same. Jumpering of the DC- terminal is not necessary, as these terminals are jumpered internally.

When starting for the first time, set MPP TRACKER 2 to "OFF" (this can also be done later in the Basic menu).

If the inverter with multiple MPP trackers is operated in single MPP tracker mode, the currents from the connected DC leads are divided evenly across both inputs.

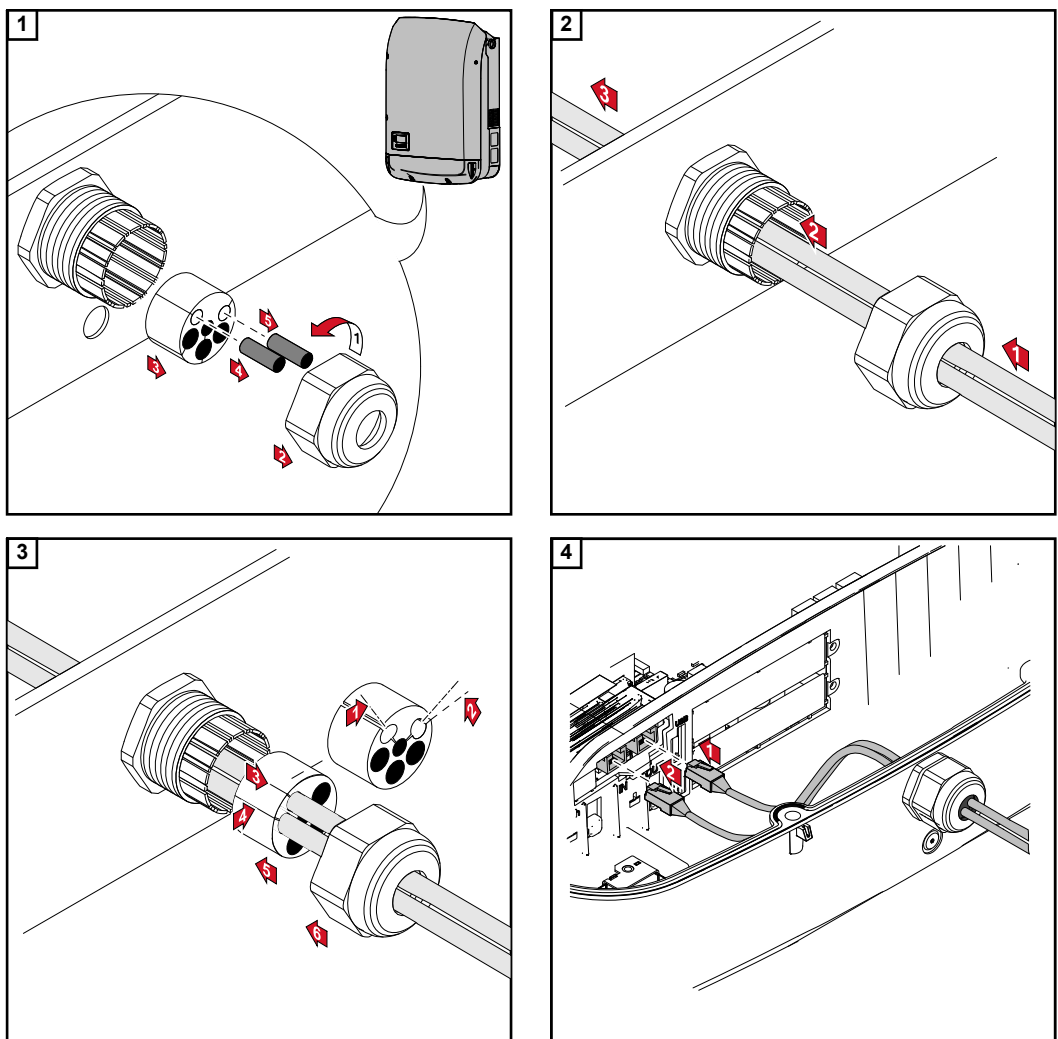
# Data communication

## Routing data communication cables

**IMPORTANT!** Operating the inverter with one option card and two broken-out option card slots is not permitted. To cater for this eventuality, a suitable blanking cover (42,0405,2020) is available from Fronius as an option.

**IMPORTANT!** If data communication cables are wired into the inverter, observe the following points:

- Depending on the number and cross-section of the data communication cables that are being introduced, take the relevant blanking plugs out of the sealing insert and insert the data communication cables.
- The relevant blanking plugs must be inserted into the free openings on the sealing insert.



## Installing the Datamanager in the inverter

**⚠ WARNING!**

**Danger of residual voltage from capacitors.**

This may result in an electric shock.

- Wait for the capacitors to discharge. The discharge time is five minutes.



## WARNING!

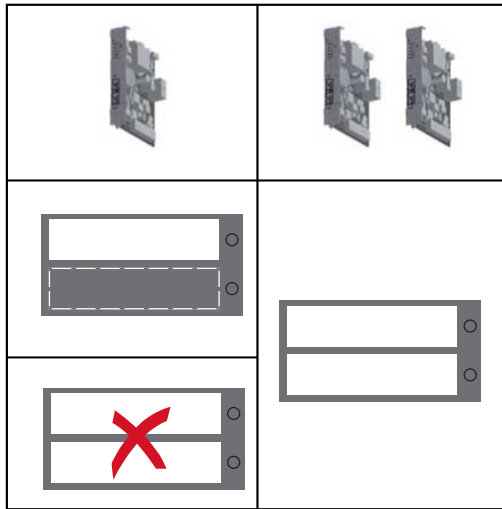
### Danger from inadequate ground conductor connection.

This can result in serious injury and damage to property.

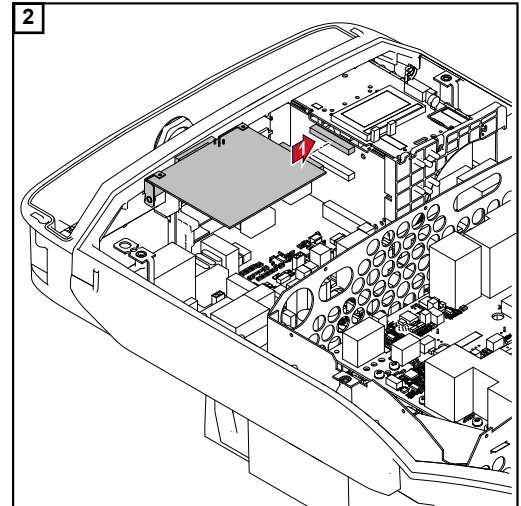
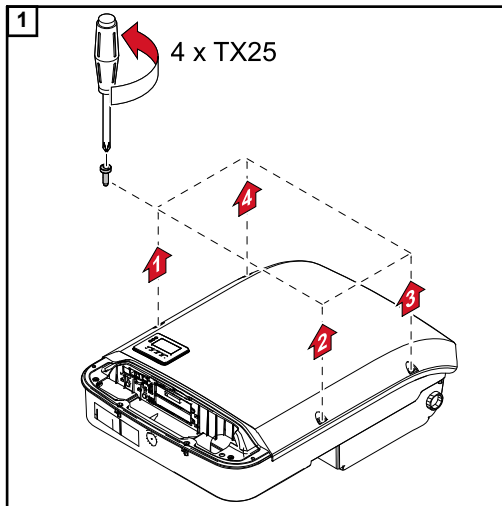
- ▶ The housing screws provide a suitable ground conductor connection for earthing the housing and must NOT be replaced by any other screws that do not provide a reliable ground conductor connection.

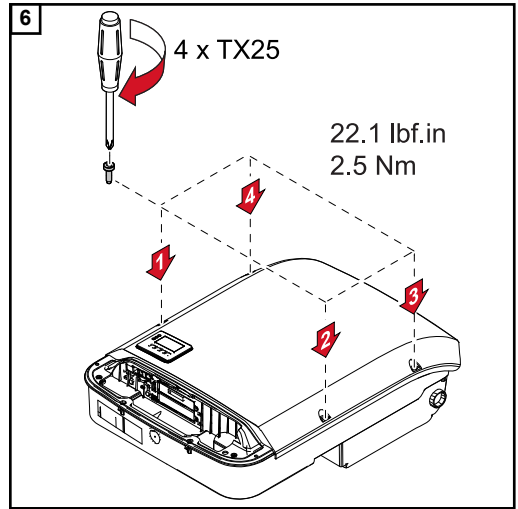
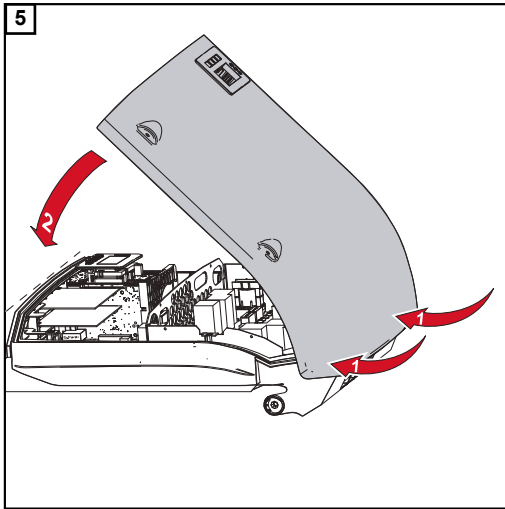
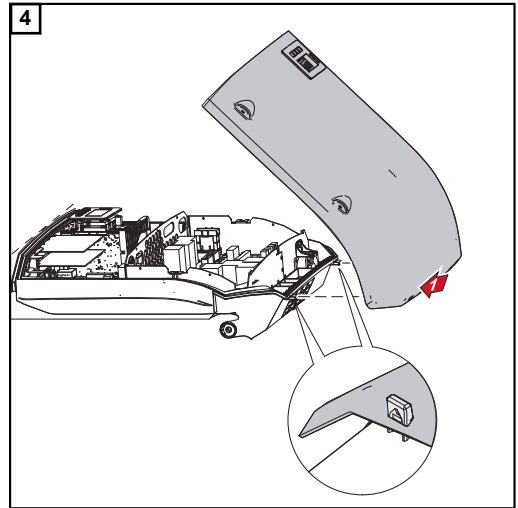
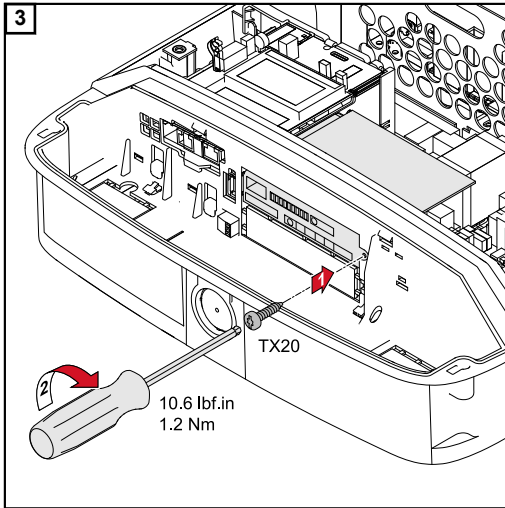
**IMPORTANT!** Observe the ESD guidelines when handling option cards.

**IMPORTANT!** Only one Fronius Datamanager in master mode is permitted per Fronius Solar Net ring. Switch any other Fronius Datamanagers to slave mode or remove them. Seal off the unoccupied option card slot by replacing the cover (item number 42,0405,2094); alternatively, use an inverter without a Fronius Datamanager (light version).



**IMPORTANT!** Only break out one opening for the PC board when installing a Datamanager in the inverter.





# Attaching the inverter to the mounting bracket

## Attaching the inverter to the mounting bracket

### **WARNING!**

#### **Danger from inadequate ground conductor connection.**

This can result in serious injury and damage to property.

- ▶ The housing screws provide a suitable ground conductor connection for grounding the housing and must NOT be replaced by any other screws that do not provide a reliable ground conductor connection.

The side sections of the housing lid are designed to function as holding and carrying handles.

**Note!** For safety reasons, the inverter is fitted with a latch that prevents the inverter from being swung into the mounting bracket unless the DC main switch is switched off.

- Never attach the inverter to the mounting bracket or swing it in unless the DC main switch is switched off.
- Never use force to attach the inverter or swing it in.

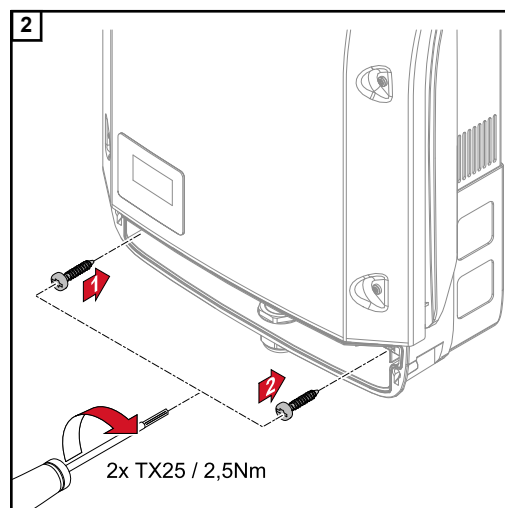
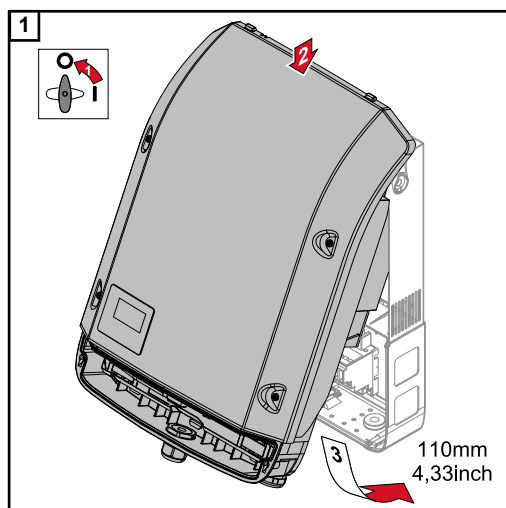
The fastening screws in the data communication area of the inverter are used for securing the inverter to the mounting bracket. Correctly tightened fastening screws are a prerequisite if proper contact is to be established between the inverter and mounting bracket.

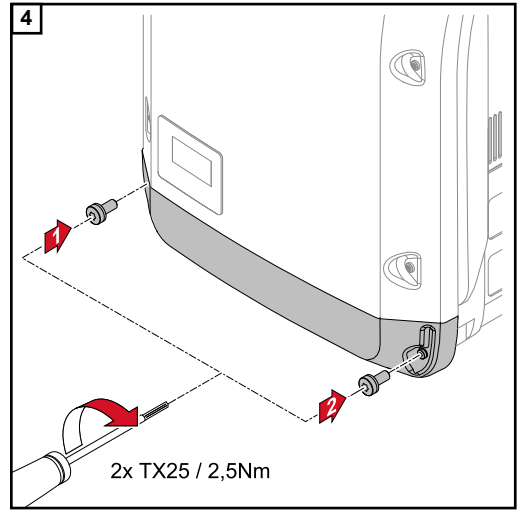
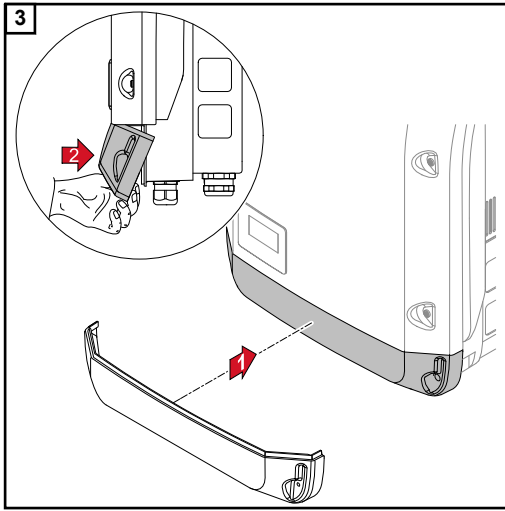
### **CAUTION!**

#### **Danger due to incorrectly tightened fastening screws.**

This may result in arcs occurring when the inverter is in operation, which may lead to fire.

- ▶ Always use the specified torque when tightening the fastening screws.







# Starting for the first time

## Starting the inverter for the first time

### **WARNING!**

#### **Danger due to incorrect operation and incorrectly performed work.**

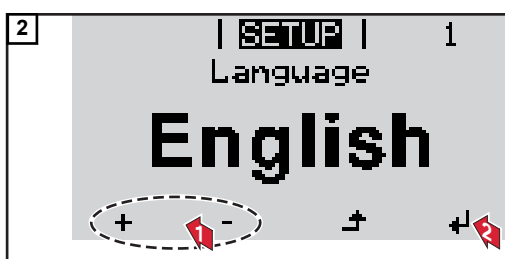
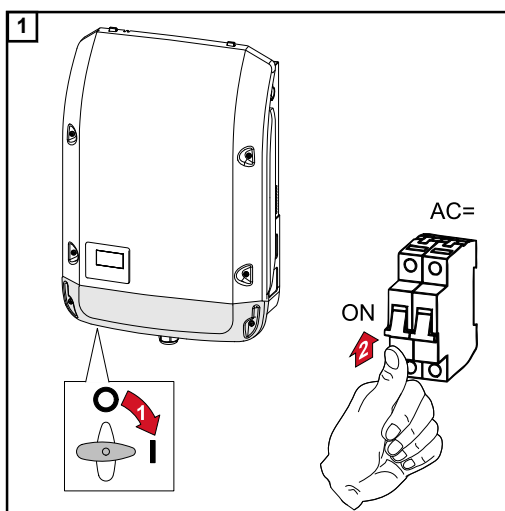
This can result in serious injury and damage to property.

- ▶ Only qualified personnel are authorised to commission your inverter and only within the scope of the respective technical regulations.
- ▶ Read the Installation and Operating Instructions before installing and commissioning the equipment.

When starting the inverter for the first time, it is necessary to select various setup settings.

If setup is interrupted before it is complete, it can be restarted by means of an AC reset. An AC reset can be carried out by switching the automatic circuit breaker off and on again.

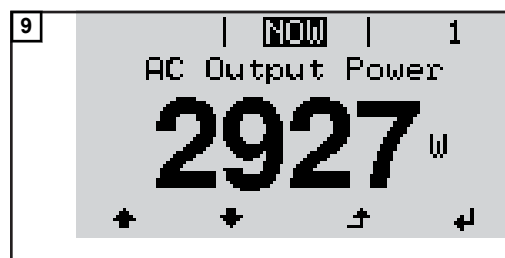
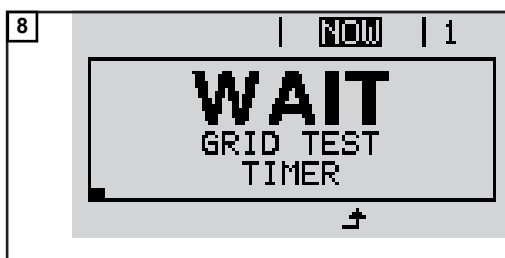
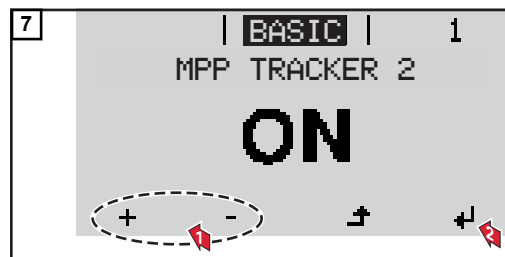
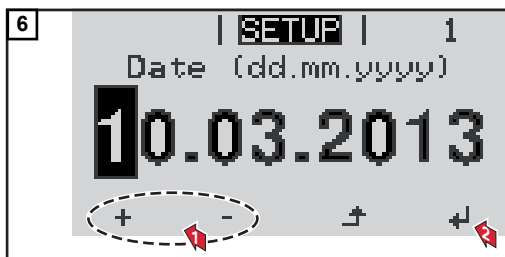
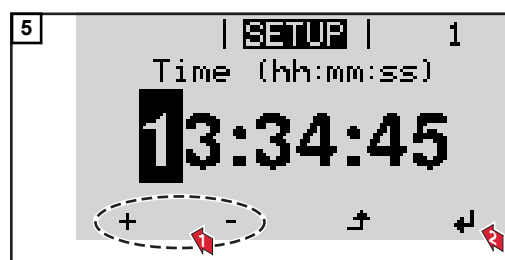
The country setup can only be set when using the inverter for the first time. If the country setup needs to be changed at a later date, please contact your Technical Support team.



### \* Country setup examples

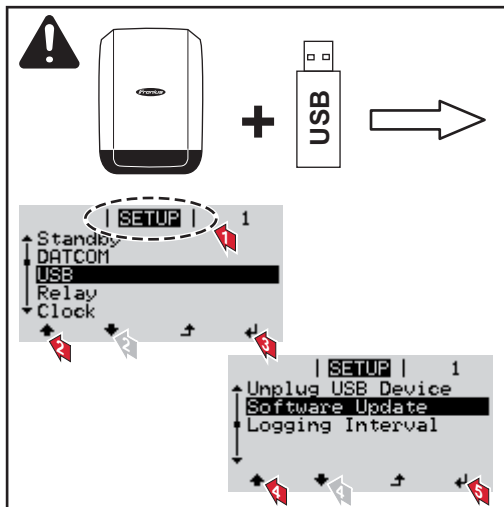
The available country setups may change during a software update. Therefore, the following list may not exactly match the display on the inverter.

50Hz	International 50 Hz	DE2F	Deutschland (> 4,6 kVA) - konst. cosPhi(1)	IT6	Italia ≤ 11,08 kVA 2019
60Hz	International 60 Hz	IT7	Italia > 11,08 kVA 2019	JO98	Jordan G98
AU1	Australia AUS1 - AS/ NZS4777.2	DE2P	Deutschland (> 4,6 kVA) - cosPhi(P) 0,9	JO99	Jordan G99
AU2	Australia AUS2 - VIC	DE2U	Deutschland (> 4,6 kVA) - Q(U)	LK	Sri Lanka
AU3	Australia AUS3 - NSW Ausgrid	DKA1	West Denmark - 125kW	MG50	Microgrid 50 Hz
AU4	Australia AUS4 - QLD	DU1	Dubai < 10 kW	MG60	Microgrid 60 Hz
AU5	Australia AUS5 - SA	EE	Estonia	NI98	Northern Ireland G98
AU6	Australia AUS6 - WA - WP	ES	España	NI99	Northern Ireland G99
AU7	Australia AUS7 - WA - HP	ESOS	Territorios españoles en el extranjero (Spanish Overseas Islands)	NL	Nederland
BE	Belgique / België	EULV	EU - low voltage	NO	Norge
BR2	Brasil: ≤ 6 kVA	EUMV	EU - medium voltage	NZ	New Zealand
BR3	Brasil: > 6 kVA	FR	France	PL	Poland
BR5	Brasil 240V: ≤ 6 kVA	G98	Great Britain GB - G98	PT	Portugal
BR6	Brasil 240V: > 6 kVA	G99	Great Britain GB - G99	RO	România
CH	Schweiz / Suisse / Svizzera / Svizra	GB	Great Britain	SA	Saudi Arabia
CL	Chile	GR	Ελλάδα	SE	Sverige
CY	Κύπρος / Kibris / Cyprus	HR	Hrvatska	SI	Slovenija
CZ	Česko	HU	Magyarország	SK	Slovensko
DE1F	Deutschland (≤ 4,6 kVA) - konst. cosPhi(1)	IE	Éire / Ireland	TH M	Thailand MEA
DE1P	Deutschland (≤ 4,6 kVA) - cosPhi(P) 0,95	IN	India	TH P	Thailand PEA
				TR	Türkiye
				UA	Україна
				ZA	South Africa / Suid-Afrika



# Notes regarding software updates

## Notes regarding software updates



If the inverter is supplied with a USB flash drive, the inverter software must be updated as soon as the inverter has been commissioned:

- 1 Plug the USB flash drive into the data communication area of the inverter
- 2 Open the Setup menu
- 3 Select the "USB" menu item
- 4 Select "Software Update"
- 5 Update the software

# USB Stick as a Data Logger and for Updating Inverter Software

## USB flash drive as a datalogger

If a USB flash drive is connected to the USB A socket it can function as a datalogger for an inverter.

The logging data stored on the USB flash drive can be viewed at any time in third-party programmes (e.g Microsoft® Excel) using the CSV file logged at the same time.

Older versions of Excel (before Excel 2007) are limited to a maximum of 65,536 rows.

## Data on the USB flash drive

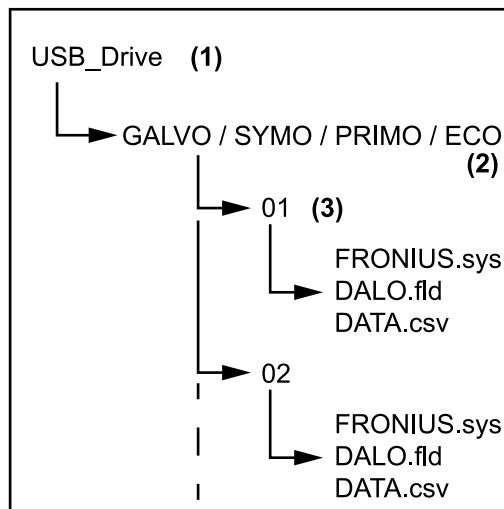
If the USB flash drive is being used as a data logger, three files will be created automatically:

- FRONIUS.sys system file:  
This file stores information from the inverter that is irrelevant to the customer. The file must not be deleted separately. Only delete all of the files (sys, fld, csv) at one time.

- DALO.fld log file:  
A log file for reading the data in the Fronius Solar.access software.

Further details on the Fronius Solar.access software can be found in the "DATCOM Details" operating instructions at <http://www.fronius.com>

- DATA.csv log file:  
A log file for reading the data in a spreadsheet program (e.g.: Microsoft® Excel)



- (1) USB root directory
- (2) Fronius inverters (Fronius Galvo, Fronius Symo, Fronius Primo or Fronius Eco)
- (3) Inverter number - can be set in the Setup menu under DATCOM

If there are several inverters with the same inverter number, the three files will be saved in the same folder. A digit is added to the file name as a suffix (e.g.: DALO\_02.fld)

Data structure on the USB flash drive

Structure of the CSV file:

	(1)	(2)	(3)	(4)	(5)	(6)	(7)						
	A	B	C	D	E	F	G	H					
1	SerialNr.:123456789987456321'												
2	Date	Time	Inverter No.	Device Type	Periode [s]	Energy [Ws]	Energy L[Var]	Energy C[Var]					
3	30.03.2013	17:15:19	1	247									
4	30.03.2013	17:15:19	1	247									
5	30.03.2013	17:15:19	1	247									
6	30.03.2013	17:15:20	1	247									

	(8)	(9)											
	I	J	K	L	M	N	O	P	Q	R	S		
	Uac L1 [V]	Uac L2 [V]	Uac L3 [V]	Iac L1 [A]	Iac L2 [A]	Iac L3 [A]	Udc S1[V]	Idc S1[A]	Description				
									Display Information				
									V0.1.5 Build 0				
									28.03.2013 23:59:49 Info 017, Counter 0092				
									Logging Start				

- (1) ID
- (2) Inverter no.
- (3) Inverter type (DATCOM code)
- (4) Logging interval in seconds
- (5) Energy in watts per second, relative to the logging interval
- (6) Inductive reactive power
- (7) Capacitive reactive power
- (8) Average values during the logging interval (AC voltage, AC current, DC voltage, DC current)
- (9) Additional information

### Data volume and storage capacity

A USB flash drive with a storage capacity of 1 GB can record logging data for roughly seven years at a logging interval of five minutes.

#### CSV file

CSV files can only store 65,535 lines (data records) (up to Microsoft® Excel 2007; there is no restriction from this version onwards).

At a five-minute logging interval, the 65,535 lines will be written within approximately seven months (CSV data size of approx. 8 MB).

In order to avoid data loss, the CSV file should be backed up to a PC and deleted from the USB flash drive within this seven-month period. If the logging interval is set to a longer period, this time frame will be increased accordingly.

#### FLD file

The FLD file should not be larger than 16 MB. This will provide enough storage capacity for approximately six years at a logging interval of five minutes.

If the file exceeds the 16 MB limit, it should be backed up to a PC and all of the data on the USB flash drive should be deleted.

After backing up and removing the data, the USB flash drive can be reconnected immediately to resume recording the logging data without any further steps being required.

**Note!** Using a full USB flash drive can lead to data loss or data being overwritten. When using USB flash drives, always ensure that there is sufficient storage capacity on the flash drive.

## NOTE!

### Risk of USB flash drive becoming full.

This may result in data being lost or overwritten.

- ▶ When using USB flash drives, always ensure that there is sufficient storage capacity on the flash drive.
- 

### Buffer memory

If the USB stick is unplugged (e.g. for data backup purposes), the logging data is written to a buffer memory in the inverter.

As soon as the USB stick is plugged in again, the data is copied automatically from the buffer memory to the stick.

The buffer memory can store a maximum of six logging points. Data is only logged while the inverter is running (output greater than 0 W). The logging interval is permanently set at 30 minutes. Data can be recorded on the buffer memory for a three-hour time period as a result.

When the buffer memory is full, the oldest data in the memory will be overwritten by the next batch of data.

**IMPORTANT!** The buffer memory requires a permanent power supply.

If there is a power failure while the inverter is in operation, all the data in the buffer memory will be lost. To avoid losing data during the night, the automatic night switch-off facility must be deactivated (switch the "Night Mode" setup parameter to ON - see the Datamanager 2.0 Operating Instructions, section "Setting and displaying the menu items", "Viewing and adjusting parameters in the DATCOM menu item").

On the Fronius Eco or Fronius Symo 15.0-3 208, the buffer memory also functions with just a DC supply.

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### Suitable USB flash drives

Due to the variety of USB flash drives available on the market, it cannot be guaranteed that every USB flash drive will be detected by the inverter.

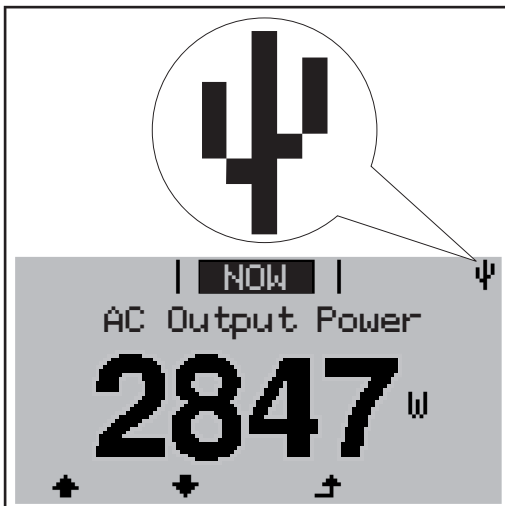
Fronius recommends that only certified, industry-grade USB flash drives are used (look out for the USB-IF logo).

The inverter supports USB flash drives with the following file systems:

- FAT12
- FAT16
- FAT32

Fronius recommends that the USB flash drive employed should only be used for recording logging data or updating the inverter software. The USB flash drives should not contain any other data.

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



If the inverter detects a USB flash drive, the USB symbol will appear in the top right corner of the display.

When inserting a USB flash drive, check whether the USB symbol is displayed (it may also flash).

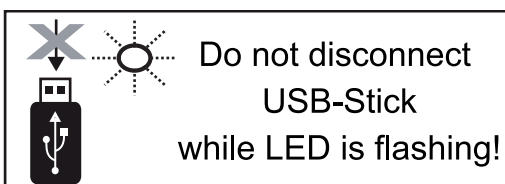
**Note!** Please note for outdoor applications that conventional USB flash drives are often only guaranteed to work within a restricted temperature range. For outdoor applications ensure that the USB flash drive also functions, for example, at low temperatures.

**USB stick for updating the inverter software**

With the help of the USB stick, end customers can also update the inverter software via the USB item on the SETUP menu: the update file is first saved to the USB stick, from where it is then transferred to the inverter. The update file must be saved in the root directory on the USB stick.

**Removing the USB flash drive**

Safety instruction concerning the removal of a USB flash drive:



**IMPORTANT!** To avoid any loss of data, a USB flash drive may only be removed if the following conditions are met:

- Only remove a USB flash drive via the 'Safely remove USB / HW' item on the SETUP menu
- The 'Data transmission' LED has stopped flashing or comes on steady.

# Notes regarding maintenance

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## Maintenance

**Note!** When installed outdoors in a horizontal position: once a year, check that all screw joints are tight!

Maintenance and servicing may only be carried out by Fronius-trained service technicians.

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## Cleaning

Clean the inverter as required with a damp cloth.

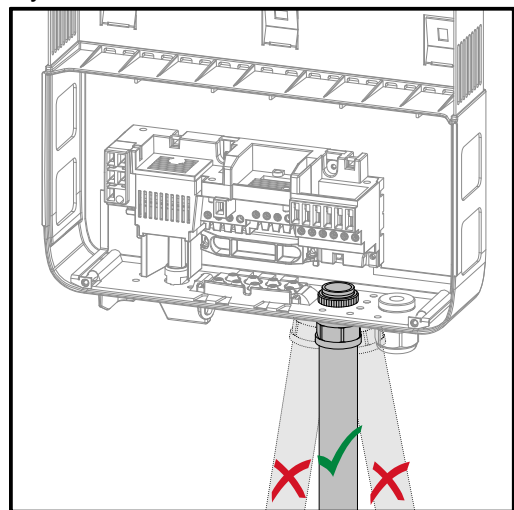
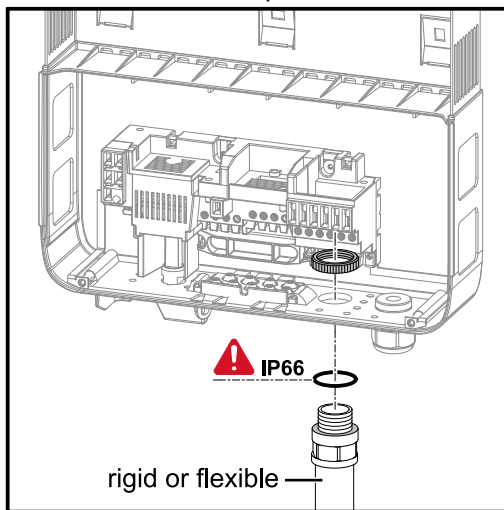
Do not use cleaning agents, abrasives solvents or similar to clean the inverter.



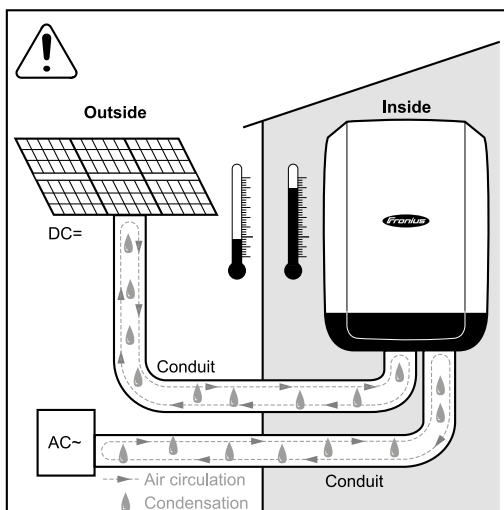
# Australian cable protection hoses

## Tightly sealing the protection hoses

Ensure that the cable protection hoses are tightly sealed.



## Seal conduits

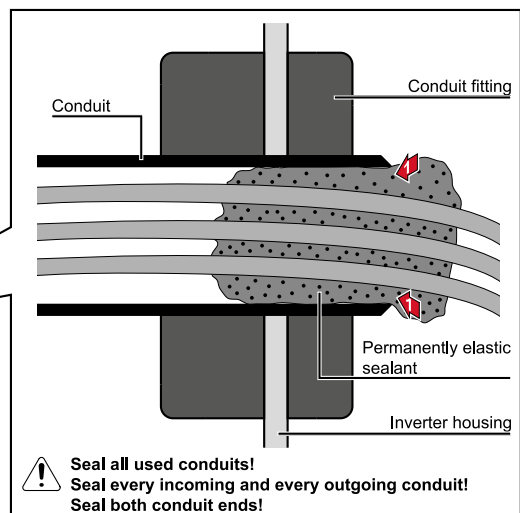
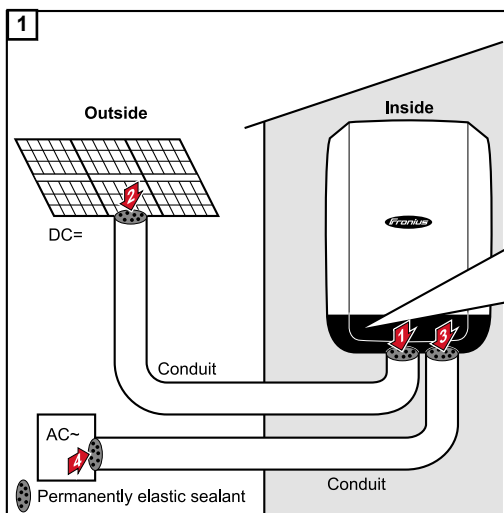


### NOTE!

**Condensation within the conduits can damage the inverter or components of the photovoltaic systems.**

To avoid undesirable air circulation and condensation in the conduits:

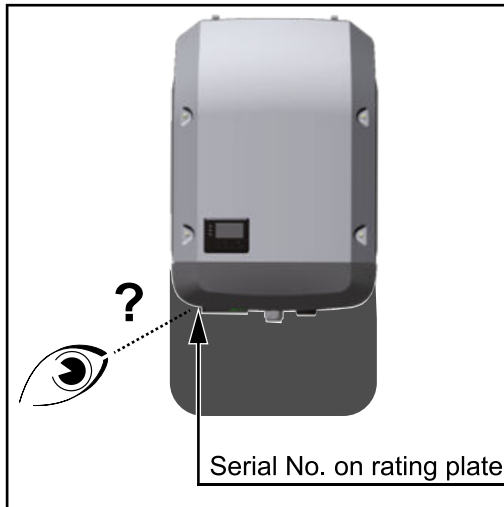
- ▶ Seal all conduits being used with a permanently elastic sealant
- ▶ Seal every incoming and outgoing conduit
- ▶ Seal both conduit ends.



- ▶ Seal all used conduits!
- ▶ Seal every incoming and every outgoing conduit!
- ▶ Seal both conduit ends!

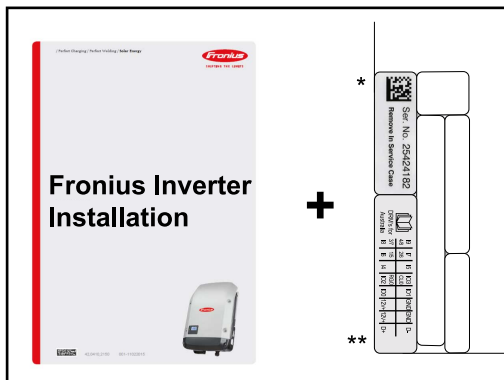
# Serial Number Sticker for Customer Use

## Serial number sticker for customer use



The serial number of the inverter is located on the rating plate on the bottom of the inverter.

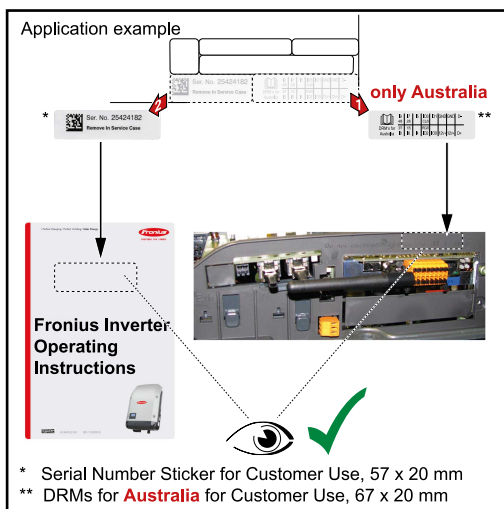
Depending on the installation position of the inverter, the serial number can be difficult to access or read, e.g. if the inverter has been installed in a dark or shaded area.



Two serial number stickers are enclosed with the inverter's installation instructions:

- \* 57 x 20 mm
- \*\* 67 x 20 mm

These can be affixed by the customer in a visible location of his choosing, e.g. on the front of the inverter or on the Operating Instructions.



Application example:

Serial number sticker on the Operating Instructions or on the front of the inverter

For Australia only:

Affix the DRM Australia sticker in the Datamanager area.



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