Installation and Operation Manual

RPI H3_110

Europe

This manual applies for solar inverter models:

● **RPI H3_110**

with firmware version: DSP: 2.02 / RED: 2.01 / COMM: 2.00

If you experience deviations between the descriptions in this quick installation guide and the information on the inverter display, please check www.solar-inverter.com for a quick installation guide that matches the firmware version on the inverter. The standard manual can also be downloaded from our website.

Delta Energy Systems (Germany) GmbH

Tscheulinstrasse 21

79331 Teningen

Germany

Table of Contents

Table of Contents

1. About this manual

1.1 Purpose of this manual

This manual is part of the inverter and will help you become familiar with the inverter.

Always follow the safety instructions given in this manual. You can help keep the product durable and reliable during its use by handling it carefully.

Read the manual carefully and thoroughly and follow the instructions contained therein. This manual contains important information on the installation, commissioning and operation of the inverter.

Always follow the general safety instructions (see "2 General safety instructions", p. 7).

Store the manual in a safe place near the inverter, so that installer and operator have easy access to this manual.

The inverter can be safely and normally operated if installed and used in accordance with this manual. Delta Energy Systems is not responsible for damage incurred by failure to comply with the installation and operating instructions in this manual.

1.2 Target audience of this manual

This manual is aimed at qualified electricians who have received a sufficient training to apply safe methods of work to install a micro-generator in compliance with the requirements of the applying standard.

Only chapter "9 Measurements and statistics", p. 52 is relevant to the operator. All other activities may only be performed by qualified electricians.

1.3 Warnings and symbols

Where hazards may arise when working with the *inverter*, the following hazard levels and symbols are used to indicate these hazards:

⚠ **DANGER**

DANGER indicates a hazardous situation which, if not avoided, **will** result in death or serious injury.

⚠ **WARNING**

WARNING indicates a hazardous situation which, if not avoided, **could** result in death or serious injury.

⚠ **CAUTION**

CAUTION indicates a hazardous situation which, if not avoided, **could** result in minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to physical injury.

ⓘ A note provides general information on using the inverter. A note does **not** indicate hazardous situations.

Where required, further, supplementary warning symbols are used. Type and source of the hazard is explained in the safety instructions or warnings.

⚡ This symbol is a warning of a risk of electric shock due to high voltage.

♨ This symbol is a warning of a hot surface.

⚠ This symbol is a warning of general hazards.

1 About this manual

1.4 Conventions used in this manual

Order of instructions

Numbered instructions must be performed in the specified order.

1. First instruction step

→ When the inverter reacts to a step, this reaction is

marked with an arrow.

2. Second instruction step

3. Third instruction step

Instructions consisting of only one step or when the order of the instruction steps is not important, are shown as follows:

► Instruction step
► Instruction step

Device buttons and LEDs

Device buttons and LEDs are shown in this manual as follows:

Buttons on the inverter: ESC button.

LEDs on the inverter: *ALARM* LED

LED symbol	Meaning
🟢	LED stays on.
🔆	LED flashes.
⚪	LED is off.

Information on Display

Information shown on the inverter display includes menus, settings and messages.

This information is shown in this manual as follows:

Display texts: ***User settings*** menu

Parameter names: `Cos phi` parameter

2. General safety instructions

> ⚠️ **DANGER**
>
> **Risk of death by electrocution**
> Potentially fatal voltage is applied to the solar inverter during operation. This potentially fatal voltage is still present for 5 minutes after all power sources have been disconnected.
> ► Never open the solar inverter.
> ► Always disconnect the solar inverter from power before installation, open the DC disconnection switch and make sure neither can be accidentally reconnected.
> ► Wait at least 5 minutes until the capacitors have discharged.

> ⚠️ **DANGER**
>
> **Risk of death or serious injury from electrocution**
> Potentially fatal voltage may be applied to the DC connections of the solar inverter. When light is falling on solar modules, they immediately start producing energy. They do so, even when the sun is not shining.
> ► Never disconnect the solar modules when the solar inverter is powered.
> ► First switch off the grid connection so that the solar inverter cannot feed energy into the grid.
> ► Turn the DC disconnection switch to position **OFF**.
> ► Make sure the DC connections cannot be accidentally touched.

- Read this quick installation guide **before** you start installing the inverter.
- The solar inverter can be safely and normally operated if installed and used in accordance with this manual (see IEC 62109-5.3.3). Delta Energy Systems is not responsible for damage incurred by failure to observe the installation and commissioning instructions in this manual. For this reason, be sure to observe and follow all instructions!
- Installation and commissioning may only be performed by qualified electricians using the installation and commissioning instructions found in this manual.
- The solar inverter must be disconnected from power and the solar modules before any work on it can be performed.
- The solar inverter has a high leakage current value. The ground wire **must** be connected before commissioning.
- Do not remove any warning signs that the manufacturer has installed on the solar inverter.
- Improper handling of the solar inverter may result in physical injury and damage to property. For this reason, observe and follow all general safety instructions and warnings.
- The solar inverter contains no components that must be maintained or repaired by the operator or installer. All repairs must be performed by Delta Energy Systems. Opening the cover will void the warranty.
- Do not disconnect any cables when the solar inverter is powered due to risk of a fault arc.

- To prevent lightning strikes, follow the relevant regulations applicable in your country.
- The surface of the solar inverter can become very hot during operation. Use safety gloves when working on the solar inverter.
- Only devices in compliance with SELV (EN 60950) may be connected to the RS485 interfaces.
- All connections must be sufficiently insulated in order to comply with the IP65 protection rating. Unused connections must be closed by placing cover caps on the solar inverter.

3.   Intended use

The solar inverter may only be used as intended.

Proper use of the solar inverter meets the following criteria:

● Use in stationary PV systems connected to the local power grid for converting the direct current in the PV system to alternating current and feeding it into the grid.

● Use within the specified power range (see) and under the specified ambient conditions (see).

Any of the following uses of the solar inverter is considered improper:

● Isolated operation. The solar inverter has anti-islanding and other monitoring features.

● Use in mobile PV systems.

EC Declaration of Conformity

Producer: Delta Energy Systems (Germany) GmbH
Address: Tscheulinstr. 21, 79331 Teningen, Germany

Product
Description: **Solar Inverter for Grid operation**

Model: **RPI H3**

The product described above in the form as delivered is in conformity with the provisions of the following European Directives:

2004/108/EC Council Directive on the approximation of the laws of the Member States relating to electromagnetic compatibility

EN 61000-6-1:2007 / EN 61000-6-2:2005
EN 61000-6-3:2007+A1 :2011 / EN 61000-6-4:2007+A1 :2011
EN 61000-3-2:2009 / EN 61000-3-3:2008
EN 61000-4-2:2009 / EN 61000-4-3:2010
EN 61000-4-4:2012 / EN 61000-4-5:2006
EN 61000-4-6:2009 / IEC 61000-4-8: 2010
EN 61000-4-11:2004 / IEC 61000-4-16:2011
IEC 61000-4-18:2011 / IEC 61000-4-29:2000

2006/95/EC Council Directive on the approximation of the laws of the Member States related to electrical equipment designed for use within certain voltage limits

IEC 62109-1:2010, IEC 62109-2:2011

2011/65/EU Council Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment

Teningen, July 7th 2015

Patrick Schahl   Andreas Hoischen

Product   Senior Director
Management EU
Name, Function   Signature   Name, Function   Signature

This declaration certifies the conformity to the specified directives but contains no assurance of properties. The safety documentation accompanying the product shall be considered in detail.

Deschap   RPI H3 EC_Decl EN 201507.doc

4 Product overview

4. Product overview

4.1 Scope of delivery

Part	Qty	Image/Description	Part	Qty	Image/Description
Inverter	1		M5 mounting nuts	2	To fasten the inverter to the mounting plate and to ground the inverter housing. With washer, washer spring and toothed ring.
Mounting plate	1		Quick Installation Guide and General Safety Instructions	1	Installation and Operation Manual
AC plug	1	Wieland RST25i3S S1AZR2V BG03 (part number 96. 032.4154.3)			

4.2   Components and connectors

Display, Buttons, LEDs

Electrical connectors

Type label

Hole for mounting
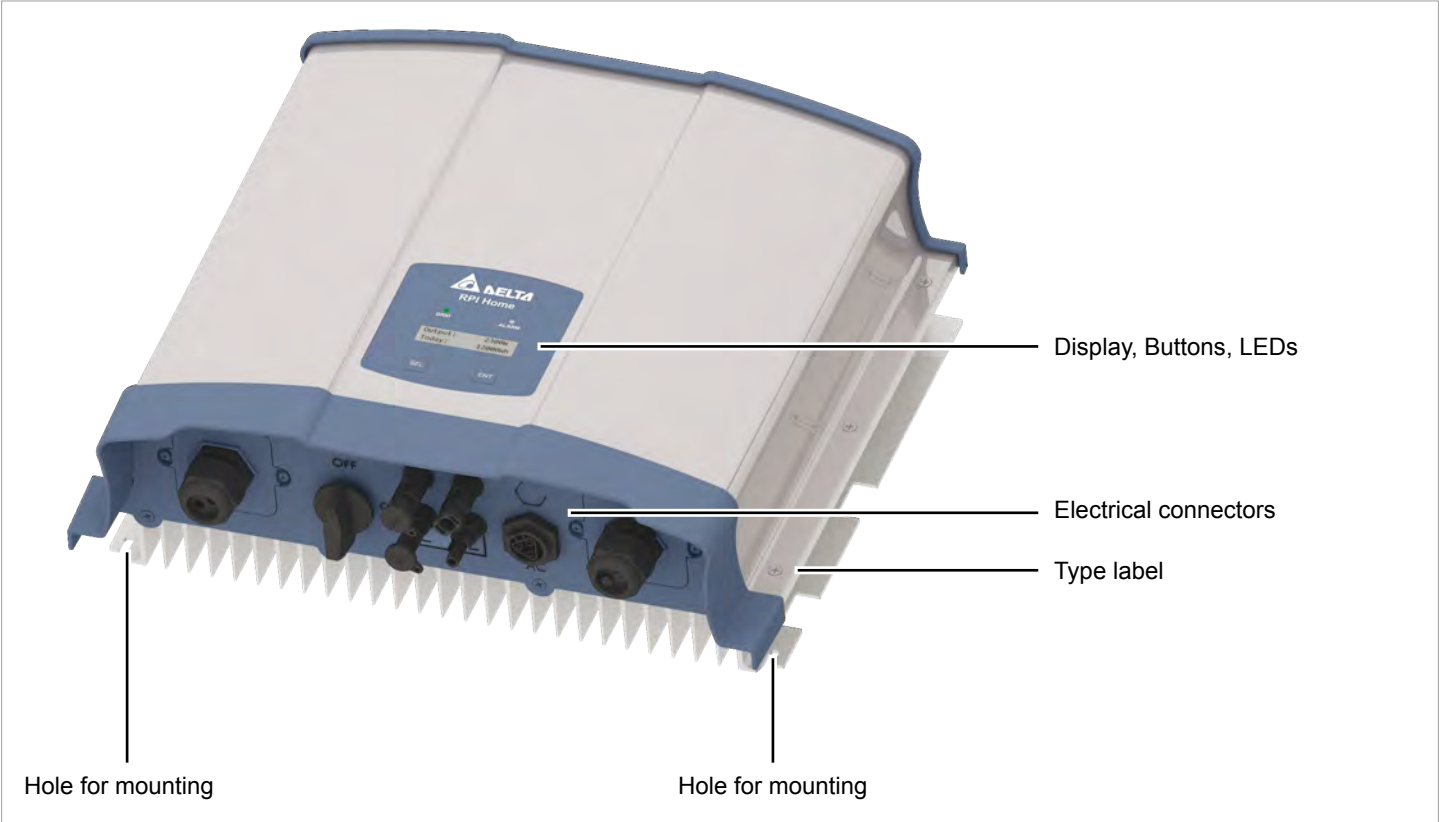
Hole for mounting

Component / connector	Description
Display, buttons, status LEDs	See "4.3 Display, buttons, status LEDs", p. 12
Type label	See "4.7 Information on the type label", p. 16
Electrical connectors	See "4.4 Electrical connectors", p. 13
Holes for mounting	See "4.5 Parts for mounting", p. 15

4 Product overview

4.3 Display, buttons, status LEDs

Label	Designation	Usage
LEDs		
G*RID*	Grid	Green; lights up when the inverter feeds into the grid
A*LARM*	Alarm	Red; indicates an error, fault, or warning
Buttons		
SEL	Select	Move to the next menu entry. Change a value. Cancel value setting.
ENT	Enter	Select menu item. Open configurable value for editing. Finish editing (adopt set value).

4.4 Electrical connectors

4.4.1 Overview

RS485 port   DC Inputs   Communication port

DC Switch   AC Connector
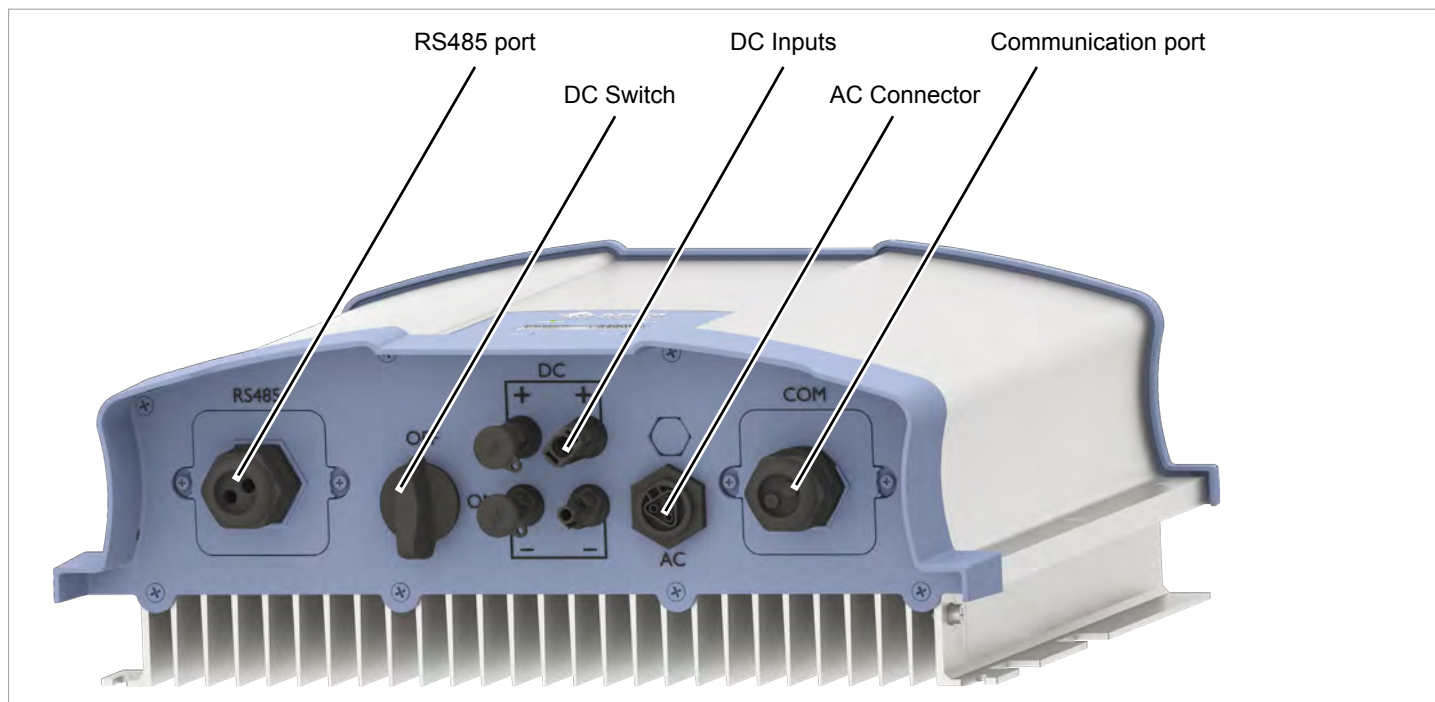
Component / connector	Description
DC Disconnection switch	See "4.4.2 DC switch", p. 14
DC inputs	See "4.4.4 DC connectors (DC inputs)", p. 14
AC connector	See "4.4.3 AC connector (AC output)", p. 14
RS485 port	See "4.4.5 RS485 port", p. 14
Communication port	See "4.4.6 Communication port", p. 15

4 Product overview

4.4.2 DC switch
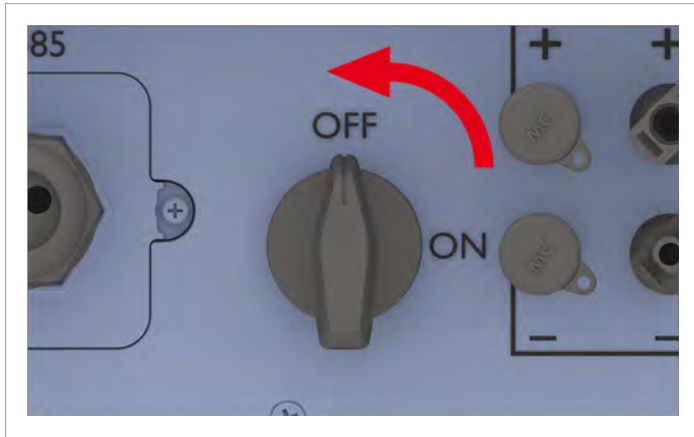
The inverter is **disconnected** from the solar modules (DC) when the *DC switch* is in position **OFF**.
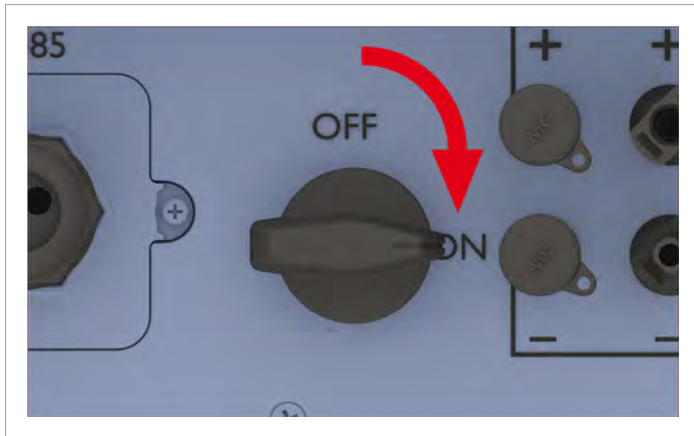
The inverter is **connected** to the solar modules (DC) when the *DC switch* is in position **ON**.

4.4.3 AC connector (AC output)
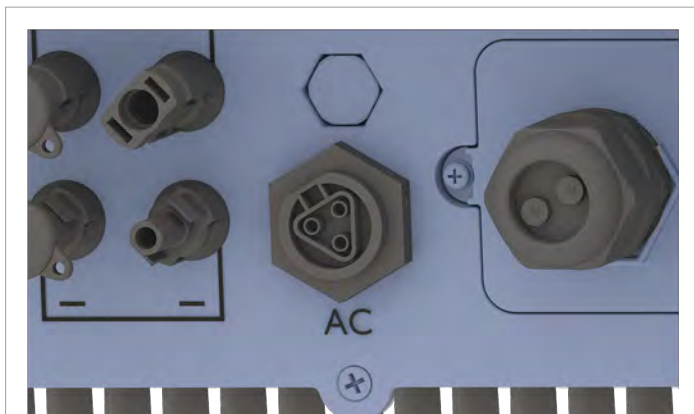
The *AC connector* is used for connecting the inverter to the grid.

Usage of the AC connection:

● Feeding AC current into the grid.
● Powering up the display when no DC voltage is available via the *DC connectors* (*DC inputs*).

The inverter can be connected to a 1-phase grid system (L, N, PE).

AC plug type: Wieland RST25i3S

The AC plug is delivered with the inverter.

4.4.4 DC connectors (DC inputs)
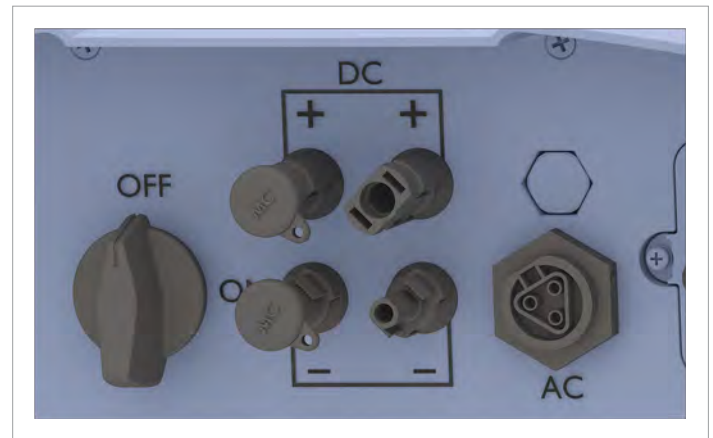
The *DC connectors* (*DC inputs*) are used for connecting the inverter to the solar module string(s).

Connector type:

● Multi-contact MC4
● 2 pairs with female socket for DC+ and male socket for DC–

For technical specifications, see "13. Technical data", p. 59.

4.4.5 RS485 port
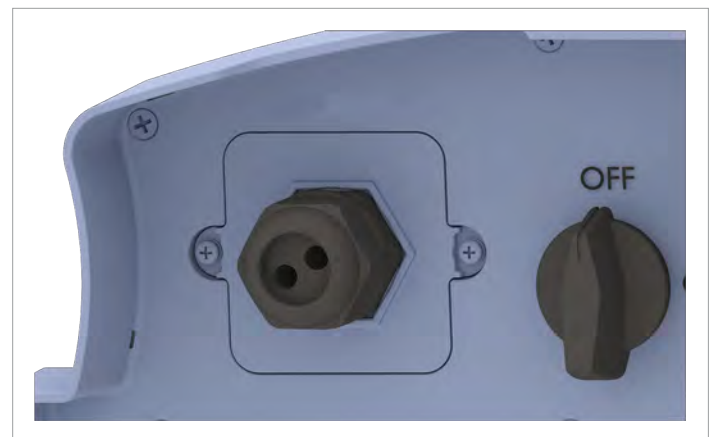
Functions of the *RS485 port*:

● 1 x RS485 in/out (e.g. for connecting to a datalogger or PC)
● 1 x VCC contacts (e.g. for connecting to an external relais)

For a detailed description, see "6.3 Connecting to datalogger via RS485", p. 34.

4.4.6 Communication port

Functions of the *Communication port*

- 1 x pair of dry contacts. The dry contacts indicate the status of the inverter.
- 1 x connector with four digital inputs and two digital outputs. The digital can for example be used to connect a ripple control receiver.

4.5 Parts for mounting
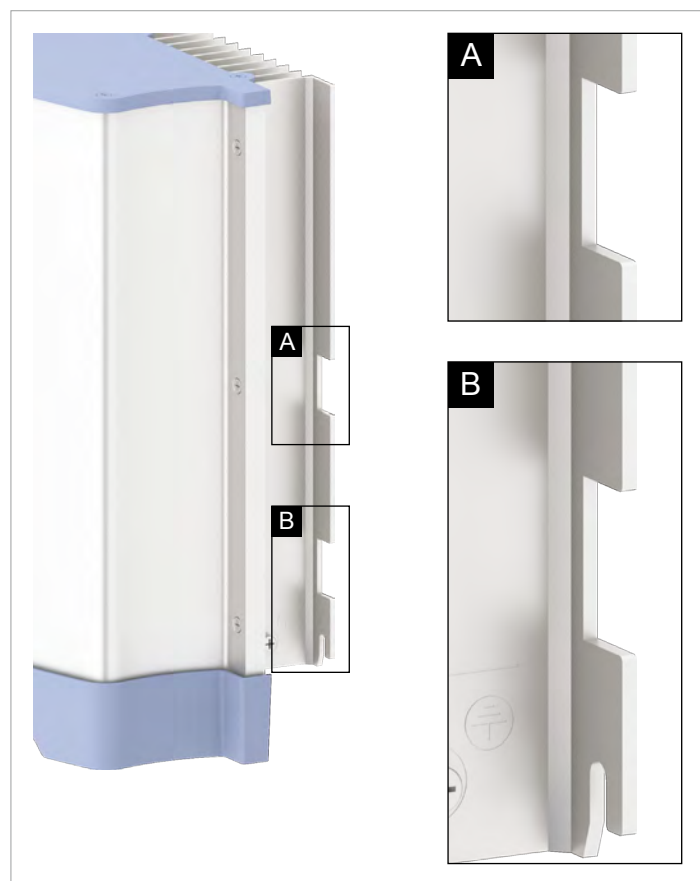
The Heatsink contains parts for hanging the inverter into the mounting plate (**A** and **B**) and for screwing the inverter to the mounting plate (**B**).

The mounting nuts (M4) with spring washer and washer are delivered with the inverter.

For a detailed description, see .

4.6 Parts for grounding the inverter housing
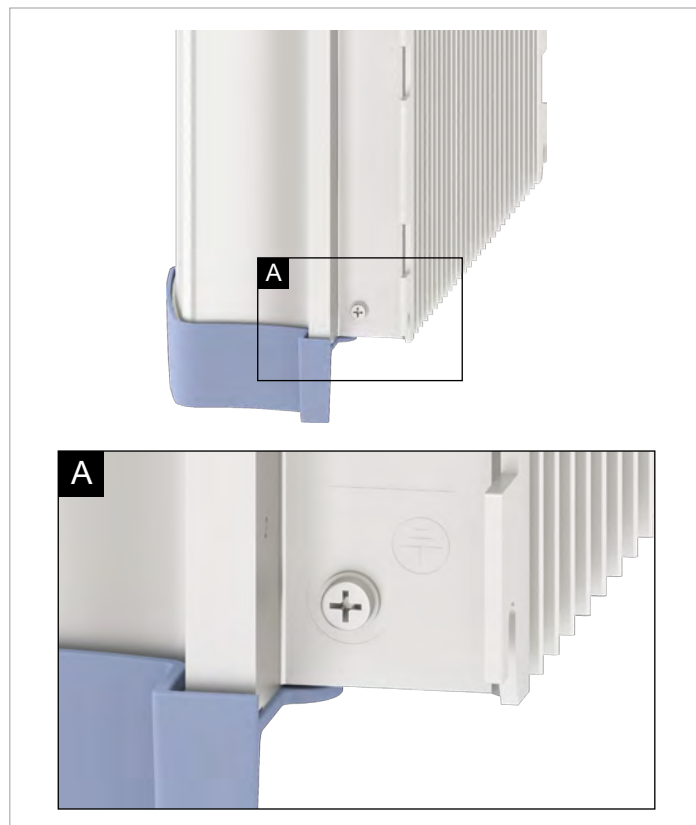
The screw (together with spring washer, washer and toothed ring) for grounding the inverter housing is already mounted to the right side of the heatsink.

4 Product overview

4.7 Information on the type label
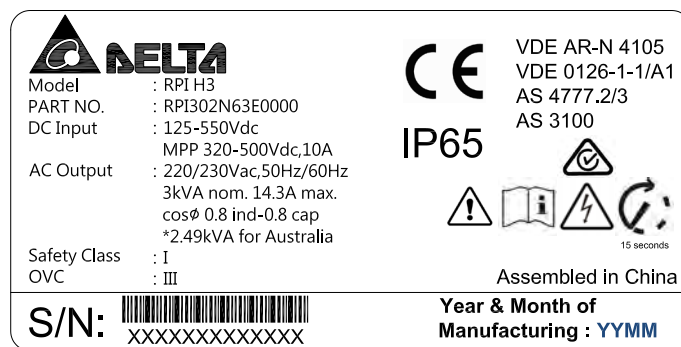
Fig. 4.1:   RPI H3 type label

Information on type label	Description
15 seconds	**Risk of death by electrocution** Potentially fatal voltage is present when the solar inverter is in operation that remains for 15 seconds after being disconnected from power. Never open the solar inverter. The solar inverter contains no components that must be maintained or repaired by the operator or installer. Opening the cover will void the warranty.
	Read the manual delivered with the inverter before working with the inverter and follow the instructions contained in the manual.
	The housing of the inverter must be grounded if this is required by local regulations.
	Regulatory Compliance Mark (RCM mark): The inverter is compliant with the Australian Electrical Safety and EMC standards. Applies only to Australia and New Zealand.
Model	The model number of the inverter.
P/N	Part number
DC Input	
100-550Vdc	DC input voltage range
MPP	MPP input voltage range with full power (with symmetrical load)
Voc	Maximum DC input voltage
each xxA	Maximum DC input current per DC input
Isc	DC short circuit current
AC Output	
220/230Vac	AC Nominal voltage
50/60Hz	AC Nominal frequency
xkVA nom.	Nominal reactive power
xkVA max.	Maximum reactive power
xx.xA max.	Maximum AC current
cos φ 0.8 ind ~ 0.8 cap	Range of cos φ
IP Code: IP65 (Electronics)	Protection degree for the electronics according to EN 60529

Information on type label	Description
Safety class	Safety class according to EN 61140
OVC	AC overvoltage category according to IEC 62109-1 / -2
IP65	Protection degree

5.   Planning the installation

! This chapter is for illustration purposes only and is not related to do any real actions.

Some of the actions can be dangerous. Chapter "6. Installation", p. 29 describes all actions and the potential risk in detail.

5.1   Where to mount the inverter
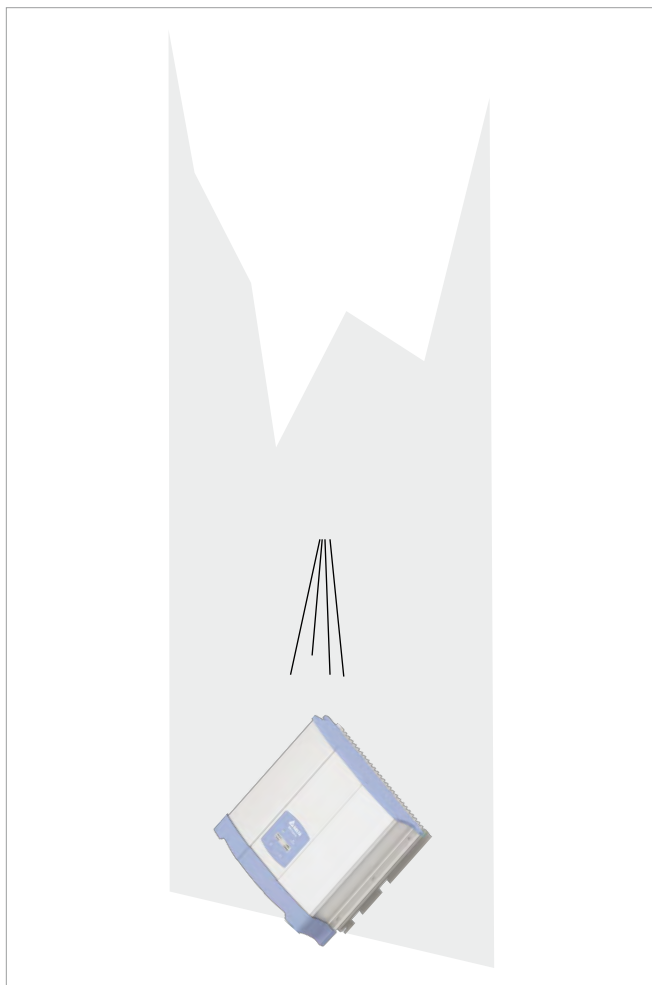
Fig. 5.1.:   Mounting on the right wall

► Always use the mounting plate delivered with the inverter.
► Check that the wall is capable of bearing the heavy weight of the inverter.
► Use dowels and screws that are suitable for the wall material and the heavy weight.
► Mount the inverter on a flat wall only. Brick walls can cause problems if they are too bumpy.
► Possible noise emissions can be disruptive when the inverter is used in living areas or in buildings with animals. Therefore, choose your installation location carefully.
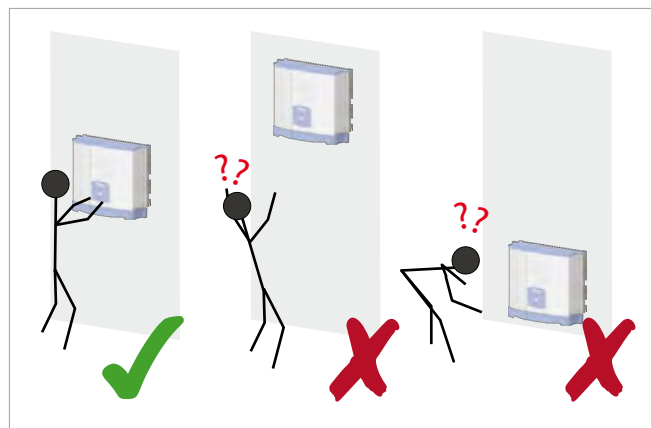
Fig. 5.2.:   Ensure readability of information on display

► Mount the inverter in a place where you can easily see the LEDs and the information on the display and where you can operate the buttons.

5.2   Mounting orientation

Fig. 5.3.:   Correct mounting orientation

► Mount the inverter vertically.

5.3 Outdoor installations
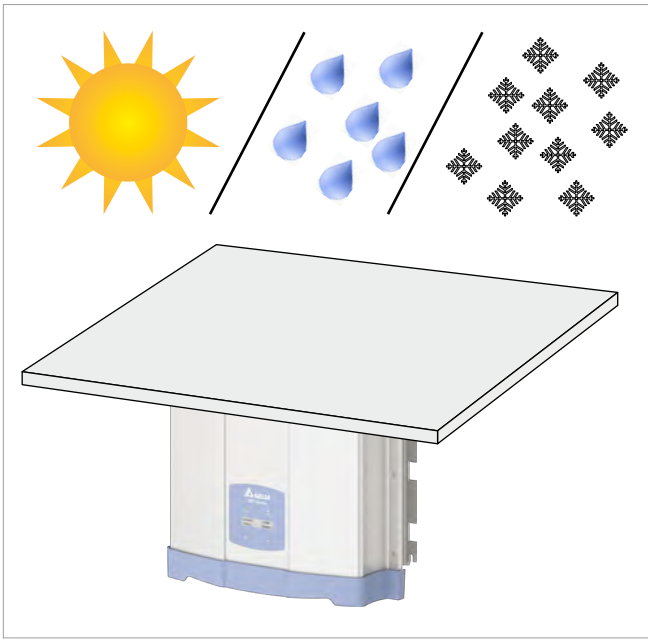
Fig. 5.4.:   Correct mounting orientation

► The inverter has protection degree IP65 and can be installed indoors or in outdoor areas. Nevertheless, to ensure high efficiency of power generation, the inverter should be protected by a roof against direct sun, rain or snow.

5.4 Ambient conditions and air circulation
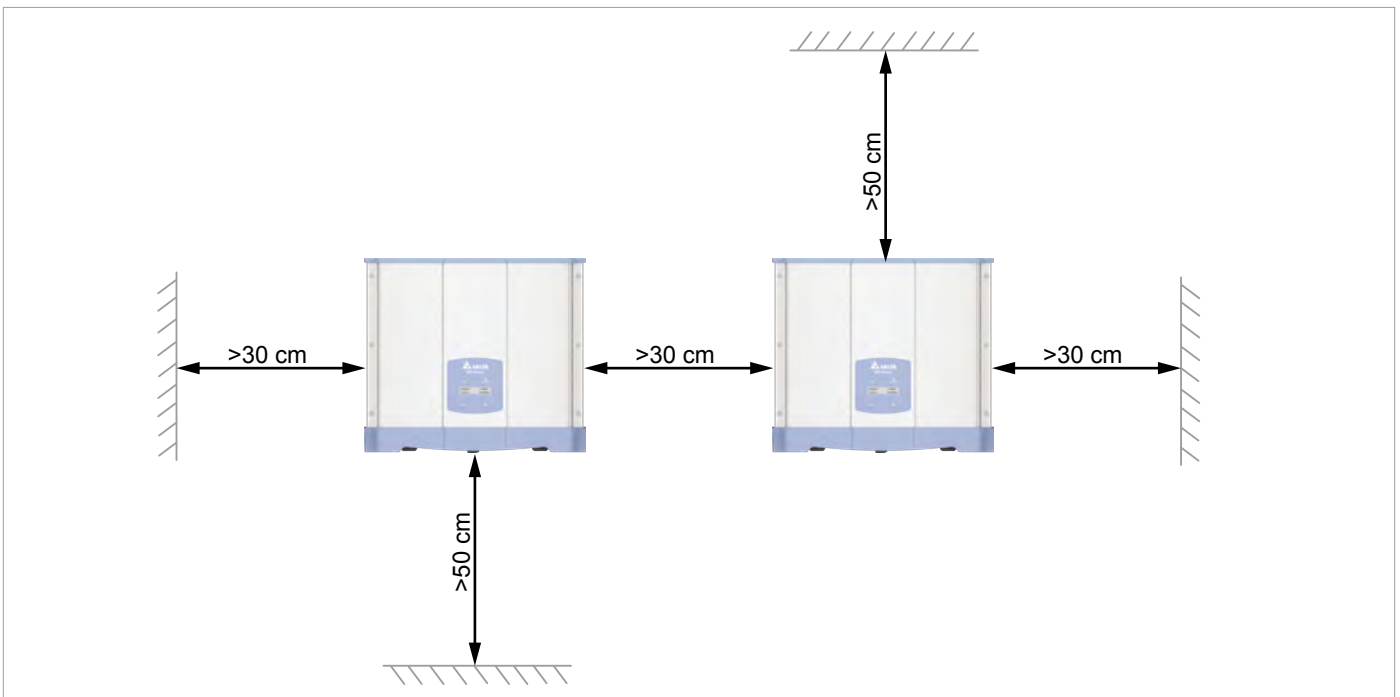
Fig. 5.5.:   Mounting distances

► Ensure adequate air circulation. Hot air must be able to dissipate. Keep enough space around the inverter.
► Do not install inverters directly one above the other. Otherwise, the upper one is warmed by the lower one.

► Consider the operating temperature range, see "13. Technical data", p. 59.
When the operating time is too high, the inverter reduces the amount of power generated. This process is called "derating" and protects the internal electronics against overheating. This is a standard behavior of inverters.

5 Planning the installation

5.5   Dimensions

Fig. 5.6:   Dimensions of the inverter in mm
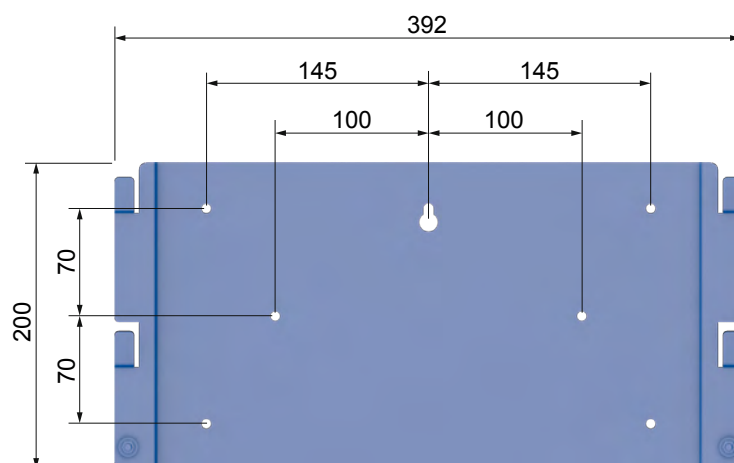
Fig. 5.7:   Dimensions of the mounting plate in mm

5.6   AC connection

Always adhere to the specific regulations applicable in your country or region.

Always adhere to the specific regulations defined by your grid operator.

For the safety of the user and for the security of your installation, install required safety and protection devices that are appicable for your installation environment (e.g.: automatic circuit breaker and/or over current protection equipment).

Use the proper upstream circuit breaker to protect the inverter:

Upstream circuit breaker	16 A
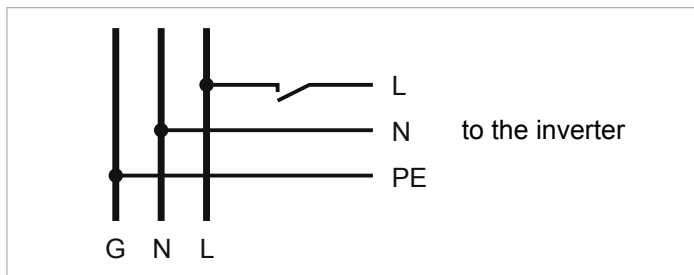
Fig. 5.8:   Position of upstream circuit breaker

Due to its design, the inverter is not capable of feeding DC residual current back into the grid. It fulfils this requirement in accordance with DIN VDE 0100-712.

When examining these possible fault situations in terms of the currently valid installation standards, Delta has come to the conclusion that there is no danger when operating the inverter in combination with a type A upstream residual-current device (RCD).

Therefore, faults that would otherwise require the use of a type B residual-current device due to the inverter can be excluded.

The integrated all-pole sensitive RCMU is certified according to VDE 0126 1-1/A1:2012-02 §6.6.2. RCD type A can be used for this inverter, according to the following table.

Minimum tripping current of the RCD	30 mA *

*) see description in the note below

> The value of the tripping current mainly depends on the quality of the solar modules, the size of the PV array and environmental conditions (e.g. humidty). The tripping current of the residual-current device must not be less than the specific minimum tripping current.

AC cable requirements

Use properly sized wires (see table).

AC plug	Wieland RST25i3S S1AZR2V
Current rating	≤ 25 A
Min. / max. cable diameter	10 ... 14 mm
Min. / max. wire diameter	0.75 ... 4 mm^2
Recommended torque for terminal screws	0.8 ... 1.0 Nm

Read and follow the instructions delivered with the AC pliug.

The AC plug delivered with the inverter can be used with flexible or rigid copper cable.

When calculating the cross section of the cable, consider:

● material used
● thermal conditions
● cable length
● type of installation
● AC voltage drop
● power losses in cable

Always follow the system installation requirement defined for your country!

Australia/New Zealand: Always follow the system installation requirements defined by AS/NZS 5033:2005 regarding minimum cable sections and protections against overheating due to high currents!

Grounding the inverter

The inverter must be grounded via the AC connector's PE conductor. To do this, connect the PE conductor to the designated terminal of the AC plug.

5 Planning the installation

5.7   DC connection

<div style="border:1px solid;">

NOTICE

⚡ **Overheating by high currents**
Exceeding the maximum current per DC input can cause an overheating of the DC inputs.
► Always consider the maximum current of the DC inputs (see "13. Technical data", p. 59) when planning the installation.

</div>

5.7.1   Use with solar modules that do not need to be grounded

When you use PV modules that do not need to be grounded, you can connect the DC inputs separately or in parallel.

The PV array can be connected to the inverter directly or via an external DC distribution box.
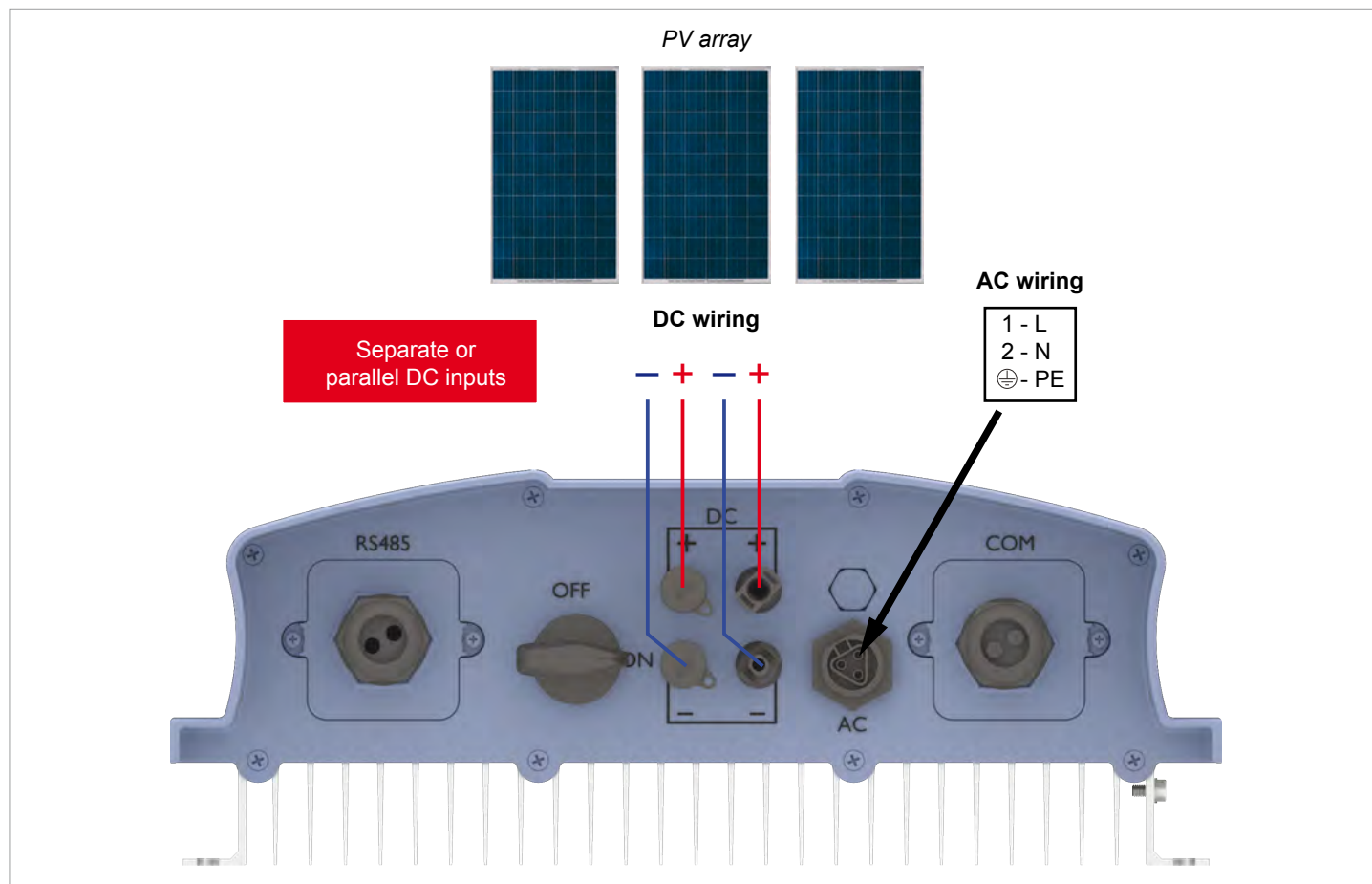
Fig. 5.9:   System design with floating DC inputs

5.7.2 Use with solar modules that have to be grounded

NOTICE

Machine and equipment damage may occur.
► When the DC inputs are grounded, all strings must be connected in parallel and then connected to the inverters.
► Additionally, an external isolation transformer must be installed to the AC side of the PV system. Otherwise, damage will result and the inverter will not work properly.

Depending on the DC connection type, different settings for insulation problems detection have to be used. To change the settings for insulation, you need a PC and the Delta Service Software. For information about how to connect a PC to the inverter see

Fig. 5.10:   System design with positive or negative grounding of the solar modules

---

5 Planning the installation

5.8 Connecting to a datalogger via RS485

The inverter can be connected to a datalogger via RS485, e.g. for monitoring, changing settings or software updates.

To ensure a properly working data connection, consider the following recommendations and instructions.

For a detailed description how to perform the activities described in this section, see .

Connecting a single inverter

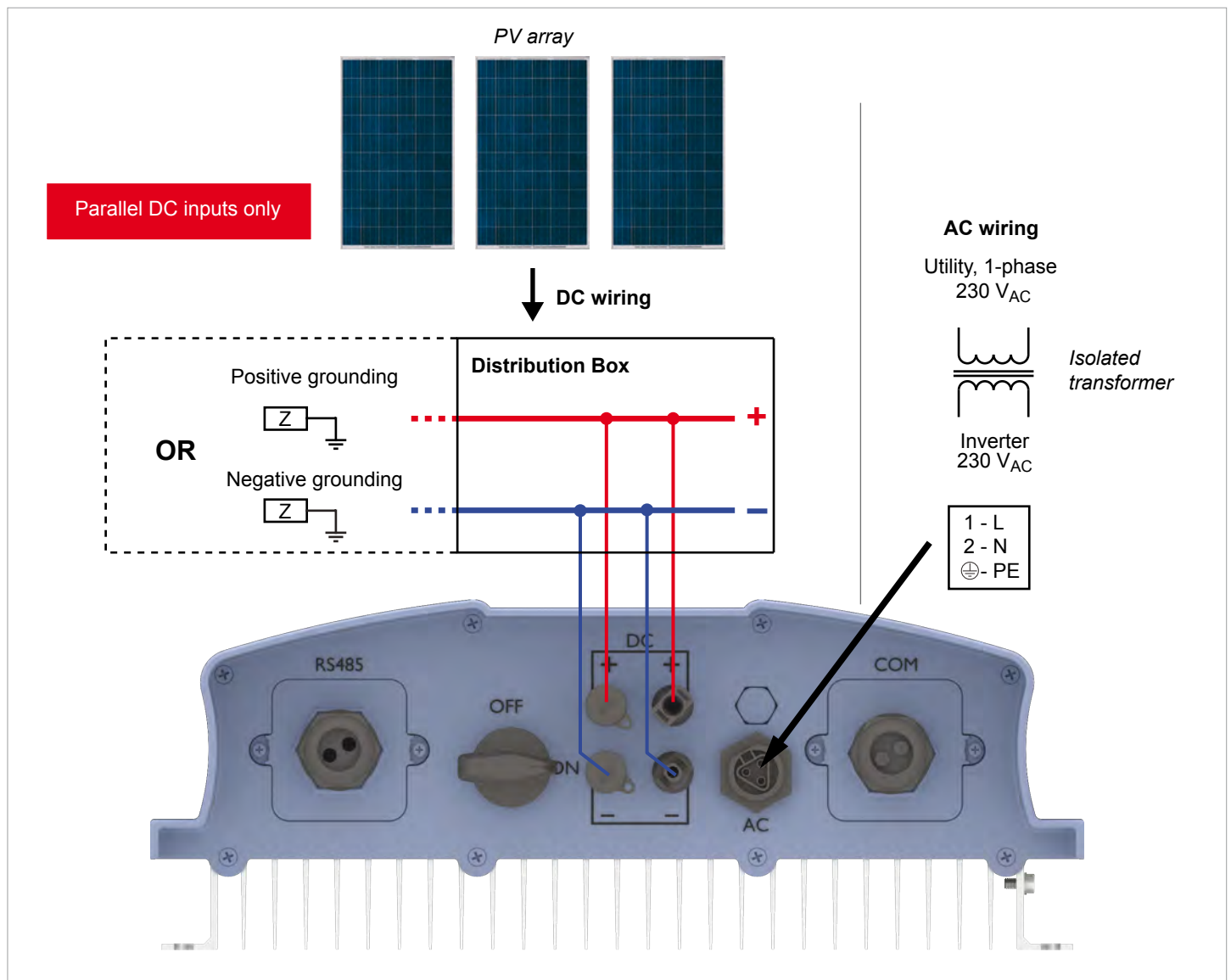● The termination resistor on the inverter has to be switched on.

Connecting multiple inverters within the same PV system

● On the **last** inverter in the RS485 chain, the termination resistor has to be switched on.

● If your datalogger has no internal termination resistor, the termination resistor on the **first** inverter in the RS485 chain has to be switched on, too.

● To each inverter a different inverter ID has to be applied. Based on this inverter ID the datalogger can identify each inverter in the RS485 chain.

● The baud rate has to be the same on each inverter.

Cable and wire requirements

● Twisted and shielded cables with 2 solid wires
● Cable diameter: 5 mm
● Wire cross section: 1 mm^2
● The RS485 cables should be kept separate from the AC cable and the DC cables to avoid interferences.

5.9 Connecting dry contacts and digital inputs

Cable and wire requirements

● Twisted and shielded cable with 5 solid wires
● Cable diameter: 5 mm
● The RS485 cables should be kept separate from the AC cable and the DC cables to avoid interferences.

5.10 Setting a power limitation during the installation

When your grid operator requests you to set a power limitation, e.g. for the 70% regulation in Germany, you need the Delta Service Software to do this. It is not possible to change these parameters on the display of the inverter.

To connect a PC to the inverter, you need the following parts:

Part name	Description
USB-RS485 adapter with RS485 cable	To connect a PC to the inverter.
Delta Service Software	To set the parameters on the inverter.

USB-RS485 adapter and Delta Service Software are available at Delta. Please contact Delta Support in your country, see contact data on the last page of this document. The RS485 cable can be a standard cable.

5.11   What you need

Beside the parts delivered with the inverter (see "4.1 Scope of delivery", p. 10), you may need the following additional parts and tools.

5.11.1 For mounting the inverter

Part name	Quantity	Description
M5 mounting screws	6	The mounting plate has to be mounted with 8 M5 screws. Depending on where you mount the inverter (e.g. on a brick wall, concrete wall, metal frame, etc.), you may need additional mounting equipment: wall plugs (dowels), washers, spring washers, nuts, etc.

5.11.2 For connecting the inverter to the grid

Part name	Quantity	Description
AC cable	-	Use properly sized wire to connect to the correct poles.

AC plug	Wieland RST25i3S S1AZR2V BG03 (96.032.4154.3)
Current rating	≤ 25 A
Min. / max. cable diameter	10 ... 14 mm
Min. / max. wire diameter	0.75 ... 4 mm^2
Recommended torque for terminal screws	0.8 ... 1.0 Nm

The AC plug delivered with the inverter can be used with solid and flexible copper cable.

When calculating the cross section of the cable, consider:

● material used
● thermal conditions
● cable length
● type of installation
● AC voltage drop
● power losses in cable

Always follow the system installation requirements defined for your country!

France: Follow the system installation requirements defined by UTE 15-712-1 regarding minimum cable sections and protections against overheating due to high currents!

Germany: Follow the system installation requirements defined by VDE 0100 712 regarding minimum cable sections and protections against overheating due to high currents!

Australia/New Zealand: Always follow the system installation requirements defined by AS/NZS 5033:2005 regarding minimum cable sections and protections against overheating due to high currents!

For a description how to connect the AC cable to the AC connector see "6.6 Connecting to the grid (AC)", p. 41.

5 Planning the installation

Part name	Quantity	Description
		Wire end sleeves are needed to tightly mount the wires of the AC cables to the AC plug.
		Use a crimping tool to fasten the wire end sleeves to the wire.
Wire end sleeves (bootlace pins)	3	

5.11.3 For connecting the inverter to the solar modules

Part name	Quantity	Description
DC plugs	2 x female 2 x male	Two pairs of DC plugs are needed. Follow the description below to select the correct size

DC connectors on the inverter		DC plugs for DC cable		
		a	b	Multi-Contact part number
		mm^2	mm	
DC–		1.5 / 2.5	3 ... 6	32.0010P0001-UR
			5.5 ... 9	32.0012P0001-UR
		4 / 6	3 ... 6	32.0014P0001-UR
			5.5 ... 9	32.0016P0001-UR
DC+		1.5 / 2.5	3 ... 6	32.0011P0001-UR
			5.5 ... 9	32.0013P0001-UR
		4 / 6	3 ... 6	32.0015P0001-UR
			5.5 ... 9	32.0017P0001-UR

Part name	Quantity	Description
		Safety caps secure the DC cables to the DC inputs so that they cannot be removed without a special tool, an open end spanner. Safety caps must be used in France. Please check local regulations whether you have to use safety caps.
Safety caps	up to 4	

Part name	Quantity	Description
Open end spanner	1	Used to disconnect the DC plugs or safety caps from the DC inputs. Available at Multi-Contact.

5.11.4 For grounding the inverter housing

Part name	Quantity	Description
Grounding cable	-	Typically a yellow/green copper cable with minimum wire size of 6 mm^2 has to be used. M4 screw, washer, spring washer and toothed ring are delivered with the inverter. You need a cable lug. Always consider local regulations regarding the cable requirements.

5.11.5 For wiring RS485, digital inputs and dry contacts

Part name	Quantity	Description
Cable	-	Twisted and shielded cable with a wire cross-section of 1 mm^2 and a cable diameter of 5 mm.

5.11.6 For setting up a power limitation

Part name	Quantity	Description
USB-RS485 adapter with RS485 cable	1	To set up a power limitation during the installation, e.g. to fulfil the 70% regulation in Germany. The USB-RS485 adapter can be ordered at Delta. The RS485 cable can be standard cable.
Delta Service Software	1	To change the parameters for power limitation. Can be ordered at Delta.

5 Planning the installation

5.11.7 Other parts

Part name	Quantity	Description
Safety labels	-	Check local regulations whether you have to attach special safety labels to the inverter. **WARNING** **Dual Supply** Do not work on this equipment until it is isolated from both mains and on site generation supplies **Isolate on-site Generating Unit(s) at** .... **Isolate mains supply at**.. **Warning – Only persons authorised by the DNO may remove the main cut out fuse** **Warning** **Two sources of voltage present** **- distribution network** **- photovoltaic panels** Isolate both sources before carrying out any work

6.   Installation

6.1   Safety and general instructions

> **DANGER**
>
> **Risk of death or serious injury from electro-cution**
> Potentially fatal voltage may be applied to the DC connections of the solar inverter. When light is falling on solar modules, they immediately start producing energy. They do so, even when the sun is not shining directly onto the solar modules.
>
> ► Never disconnect the solar modules when the solar inverter is powered.
> ► First switch off the grid connection so that the solar inverter cannot feed energy into the grid.
> ► Turn the DC disconnection switch to position **OFF**.
> ► Make sure the DC connections cannot be accidentally touched.

> Read chapter „5. Planning the installation", and this chapter **before** you start installation.

> If you need to wire dry contacts, digital inputs or RS485, it is recommended to do this in a dry environment and before you hang the inverter onto the wall.
> Reasons for this are:
>
> ● You have to remove the covers from the connection ports. Moisture could leak into the inverter.
> ● The terminal blocks inside are difficult to access.

6 Installation

6.2 Connecting digital inputs and dry contacts (optional)

When your grid operator requests you to set a power limitation, e.g. for the 70% regulation in Germany, you need the Delta Service Software which is available at Delta.

If you need to wire dry contacts, digital inputs or RS485, it is recommended to do this in a dry environment and before you hang the inverter onto the wall.
Reasons for this are:

- You have to remove the cover from the connection ports. Water could leak into the inverter.
- The terminal blocks inside are difficult to reach.

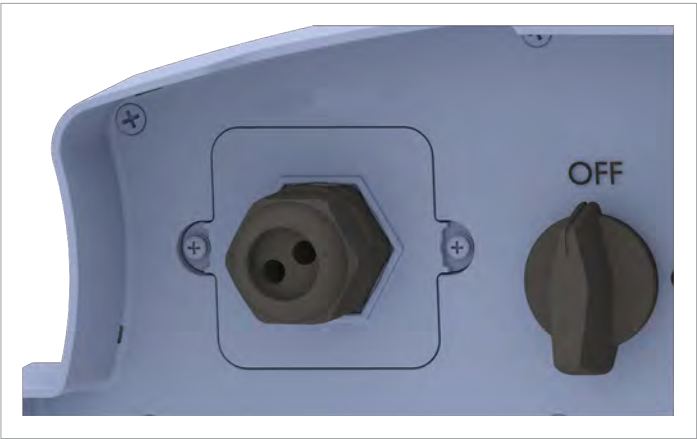### 6.2.1 Components of the digital inputs port
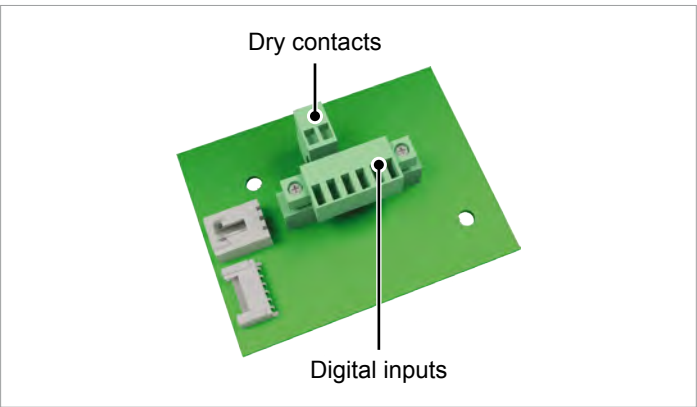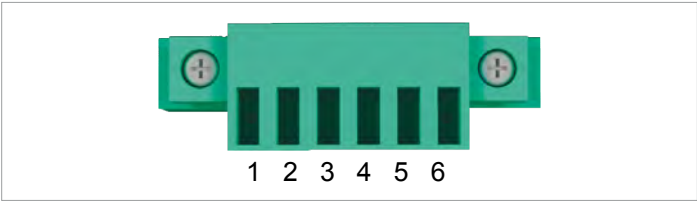

Fig. 6.1:   Digital inputs port

Fig. 6.2:   Terminal blocks on the digital inputs card

6.2.2 Pin assignment

Pin	Designation
1	Digital input 1 (DI 1)
2	Digital input 2 (DI 2)
3	Digital input 3 (DI 3)
4	Digital input 4 (DI 4)
5	Digital output 1 (DO 1)
6	Digital output 2 (DO 2)

Fig. 6.3:   Pin assignment of digital inputs

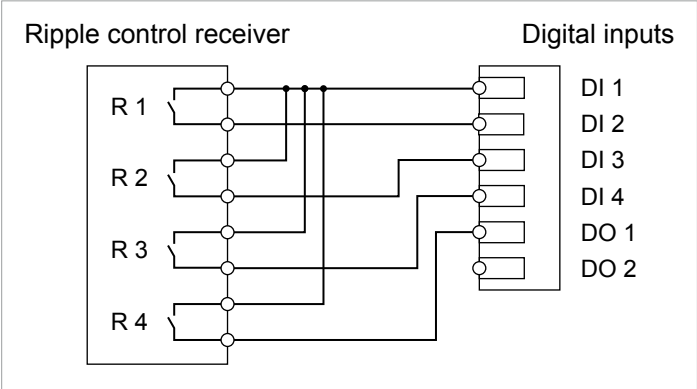### 6.2.3 Connecting a ripple control receiver (for Germany only)

Fig. 6.4:   Connecting a ripple control receiver

Active power ration P/P_n	DI 1	DI 2	DI 3	DI 4	DO 1	DO 2
0 %	1	0	0	0	1	1
30%	0	1	0	0	1	1
60%	0	0	1	0	1	1
100%	0	0	0	1	1	1

1: Relay is closed; 0: Relay is open

Table 6.1.: Function of digital inputs for ripple control receiver

6.2.4 Wiring dry contacts and digital inputs

1. Unscrew and remove the bolting.
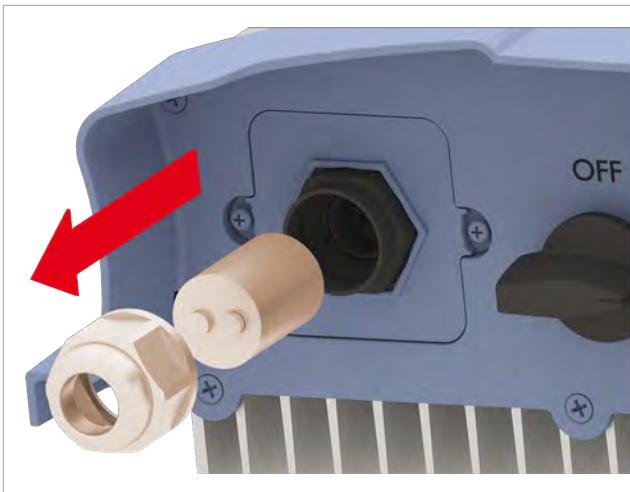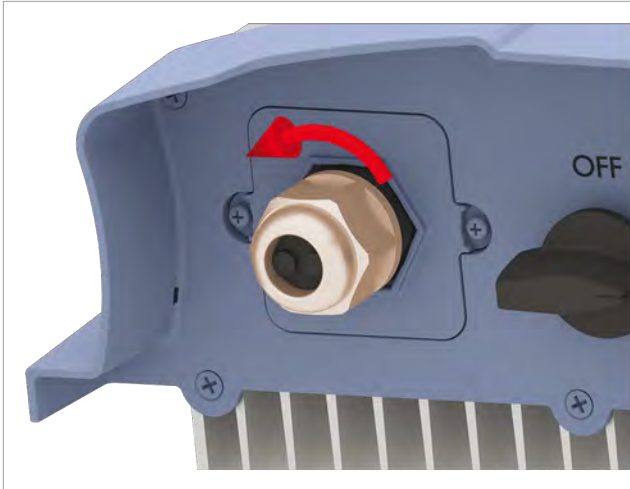
2. Unscrew and remove the cover of the digital inputs port.
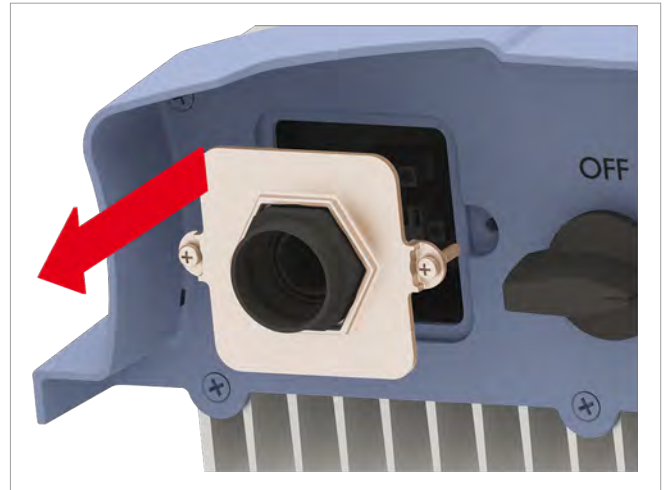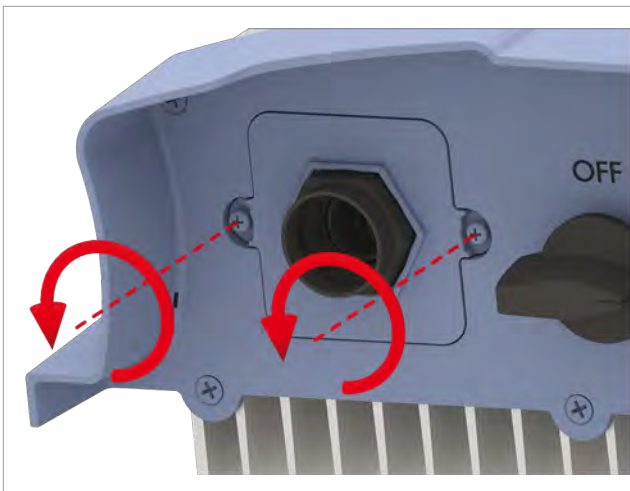

3. Unscrew and carefully pull out the terminal block of the dry contacts.
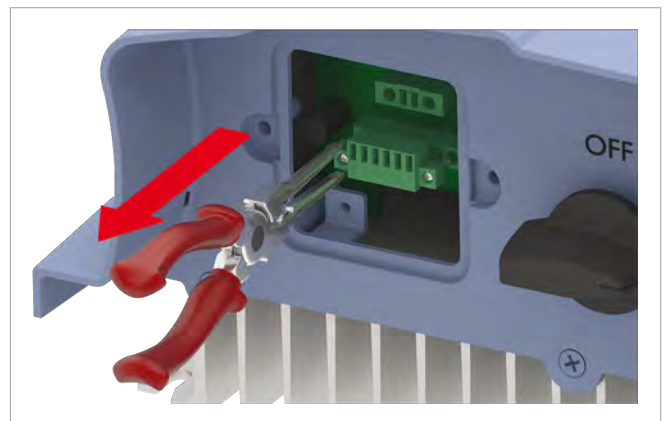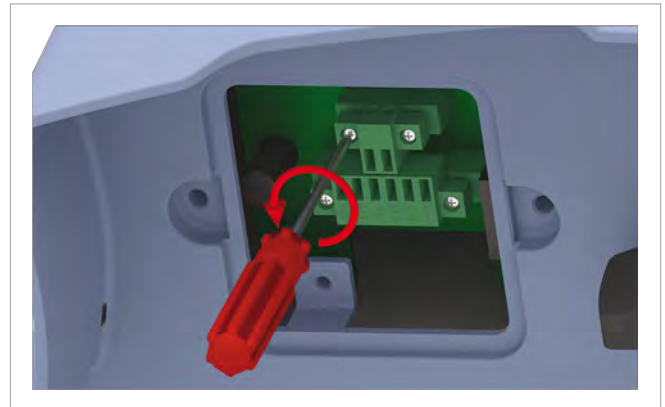
6 Installation

4. Unscrew and carefully pull out the terminal block of the digital inputs.
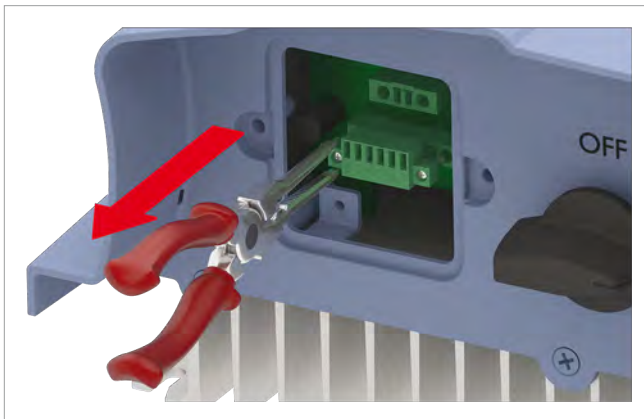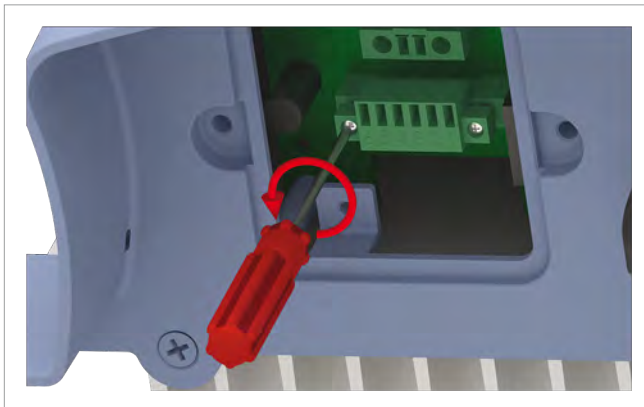
5. Pull the cable through the bolting and the cover.
If you use only cable, put a grommet into the unused hole to seal the bolting against penetrating moisture (second image).

grommet
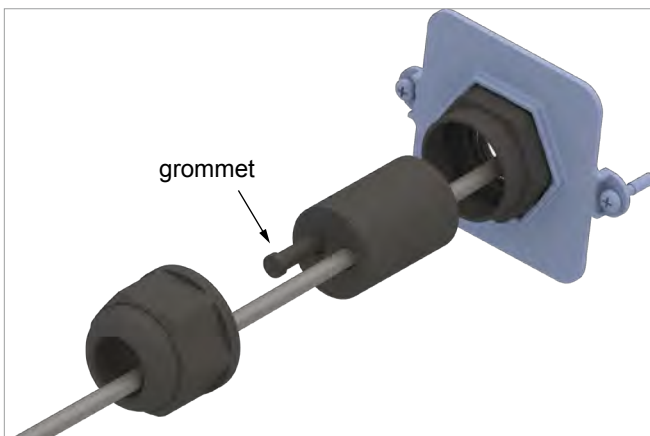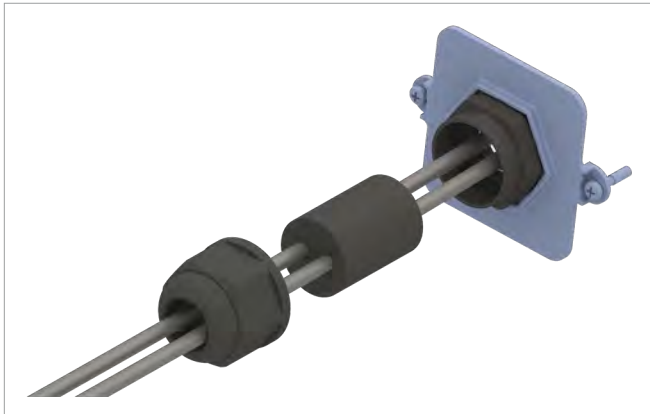
6. Wire the terminal blocks as needed. The images below are only examples how it could look like.
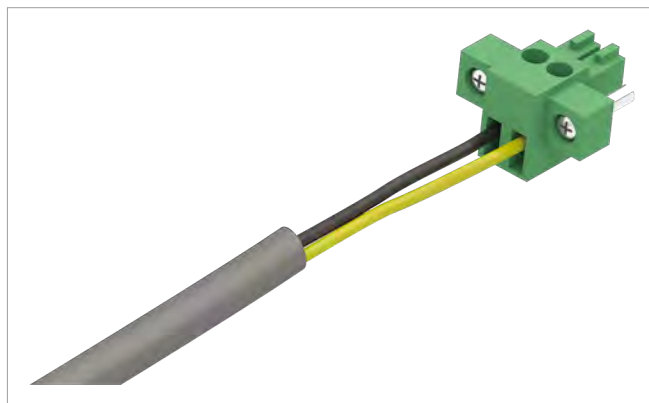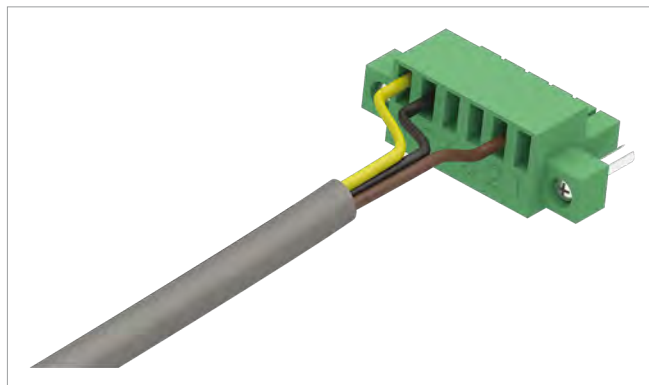
7. Carefully put in the terminal block of the digital inputs and tighten the screws.
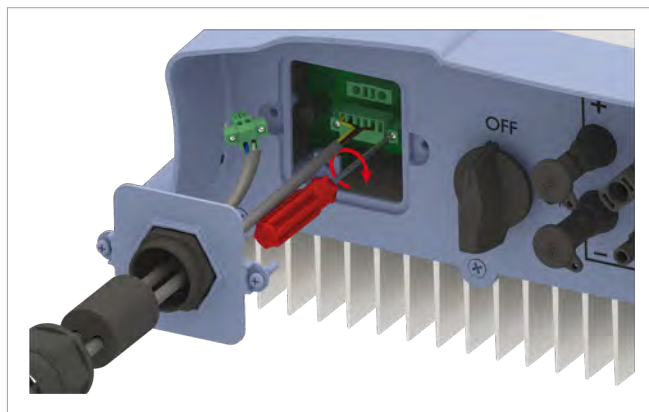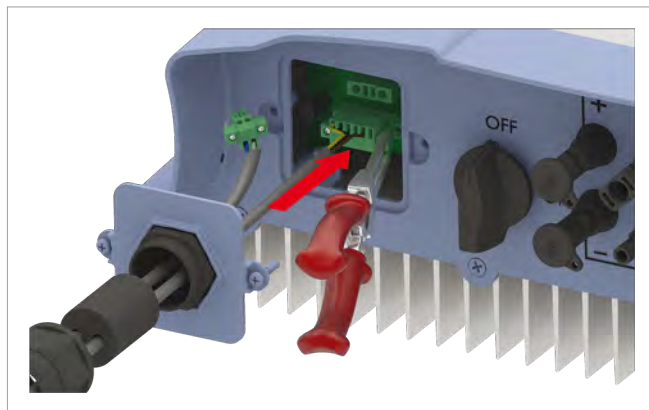
8. Carefully put in the terminal block of the dry contacts and tighten the screws.

☑ Wiring digital inputs and dry contacts is finished.
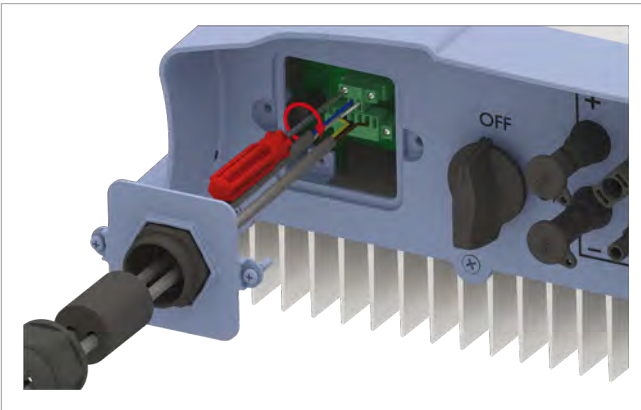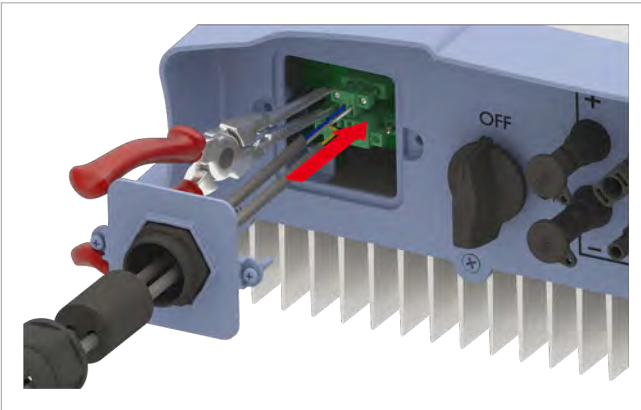
9. Screw the cover to the digital inputs port.
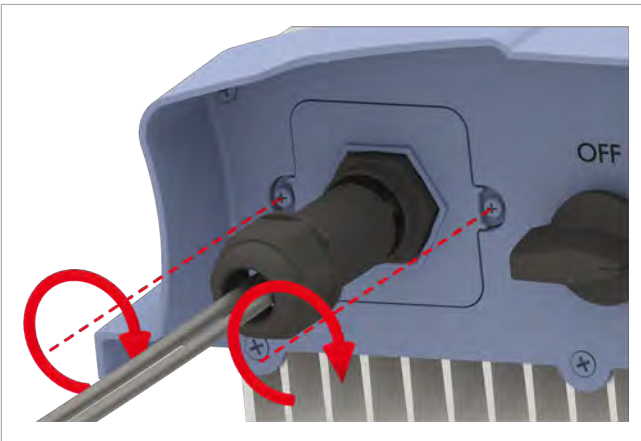
10. Screw the bolting to the digital inputs port.

6 Installation

6.3 Connecting to datalogger via RS485

> If you need to wire dry contacts, digital inputs or RS485, it is recommended to do this in a dry environment and before you hang the inverter onto the wall.
> Reasons for this are:
> - You have to remove the cover from the connection ports. Water could leak into the inverter.
> - The terminal blocks inside are difficult to reach.

6.3.1 Components of the communication port

Fig. 6.5:   Communication port

Fig. 6.6:   Components of the RS485 card

RS485 is used to connect the inverters of the PV plant via a data-logger to a monitoring system.

For connecting RS485, terminals 3/4 or 5/6 are used. It does not matter which pair of terminals you use. The second pair you only need when you connect multiple inverters via RS485.

If you want to use SOLIVIA Monitor, the Internet based monitoring from Delta, you will also need a SOLIVIA M1 G2 Gateway.

Default baud rate is 19200 which can be changed on the inverter (see).

Terminal assignment

Terminal	Designation
1	VCC (12 V, 1 A)
2	GND
3	DATA+ (RS485)
4	DATA– (RS485)
5	DATA+ (RS485)
6	DATA– (RS485)

Fig. 6.7:   RS485 terminal assignment

Data format

Baud rate	9600, 19200, 38400; Standard: 19200
Data bits	8
Stop bit	1
Parity	not applicable

6.3.2   Connecting to a Delta SOLIVIA Gateway M1 G2

On the inverter you connect single wires, on the gateway you have to use a RJ45 plug.

Connect inverter and gateway according to the following table:

Inverter		SOLIVIA Gateway M1 G2
		1 8
DATA+	Terminal 3 or 5	Pin 7
DATA–	Terminal 4 or 6	Pin 6 or 8

Fig. 6.8:   *Connecting the inverter to a Delta SOLIVIA Gateway M1 G2*

6 Installation

6.3.3 Connecting a single inverter to a datalogger

Termination resistor = ON

OFF [ ] ON
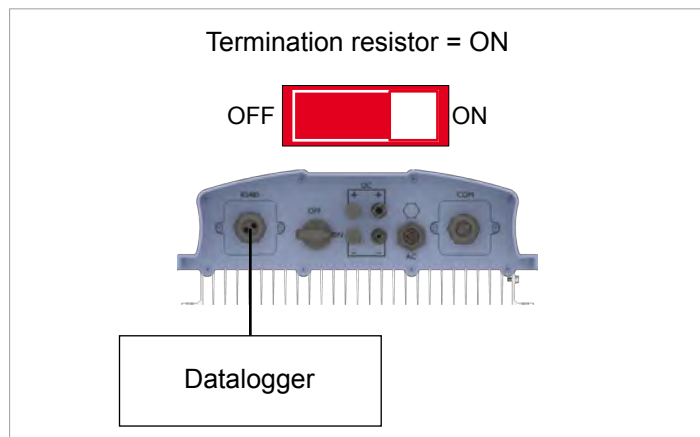
Datalogger

Fig. 6.9:   Connecting a single inverter to a datalogger

6.3.4 Connecting multiple inverters to a datalogger

If your datalogger has no integrated termination resistor, switch on the termination resistor on the first inverter in the RS485 line.

> ⓘ If you connect multiple inverters via RS485, set a different Inverter ID for each inverter (see „8.5 Inverter ID", p. 51).

Termination resistor = ON   Termination resistor = OFF   Termination resistor = OFF

OFF [ ] ON   OFF [ ] ON   OFF [ ] ON
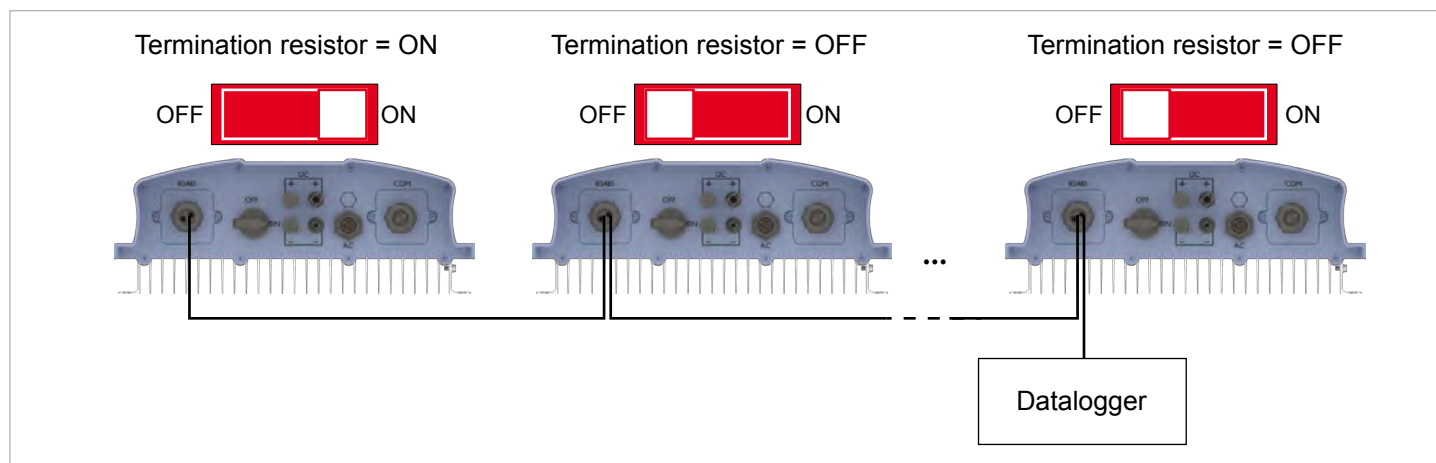
Datalogger

Fig. 6.10:   Connecting multiple inverters to a datalogger

6.3.5   Wiring the communication port

1.   Unscrew and remove the bolting of the communication port.

2.   Unscrew and remove the cover of the communication port.
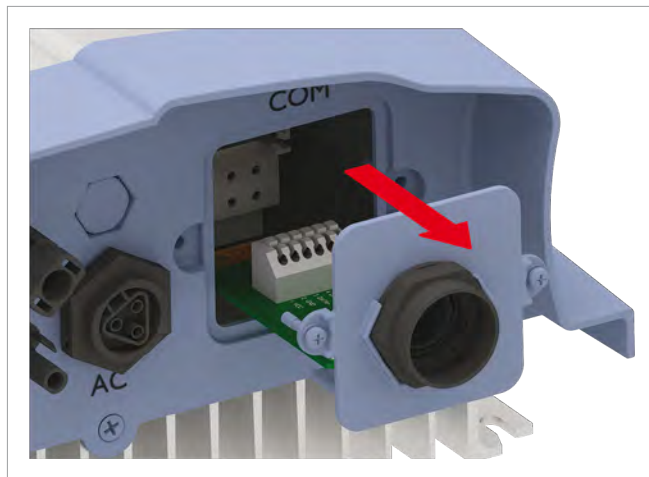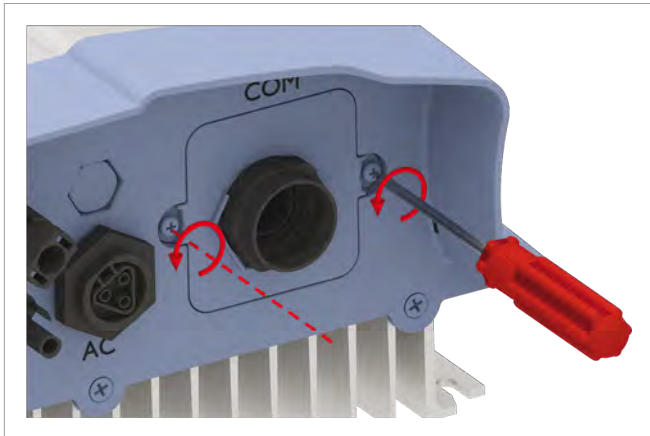
3.   Pull all cables you want to connect through the bolting and the cover.
When you connect a single inverter or - when you connect multiple inverters - for the last inverter in the RS485 chain, you need **one** cable with two wires. Put a grommet into the unused hole to seal the bolting against penetrating moisture.

grommet

to the datalogger
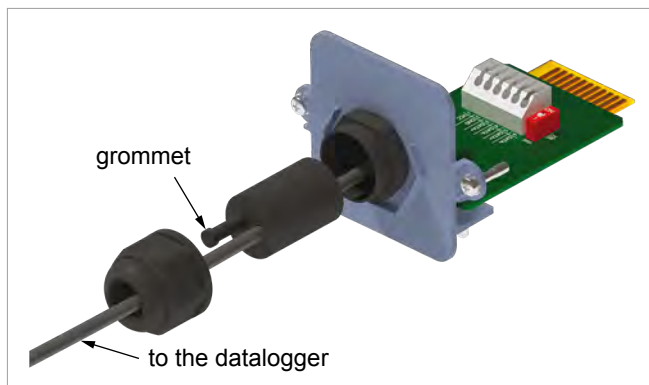
When you connect multiple inverters, you need **two** cables with two wires each for each inverter, except for the last inverter in the RS485 chain.

to the next inverter

to the datalogger or to the previous inverter
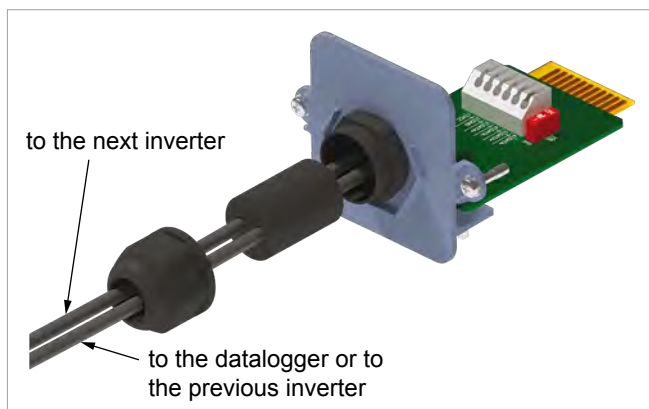
6 Installation

4. Connect the wires to *Pin Data-* and *Pin Data+*.
When you have only one RS485 cable, wiring should look like this.
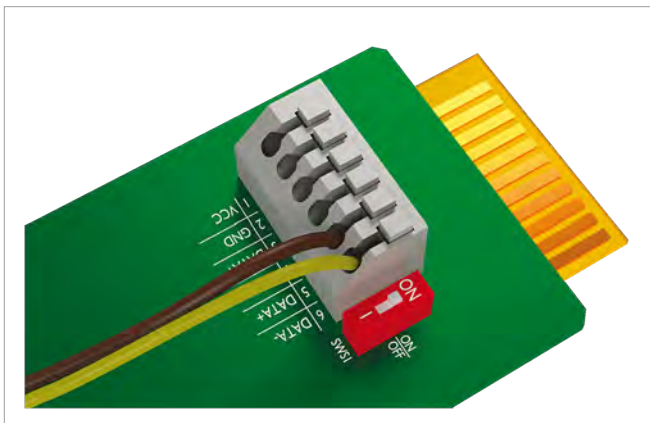
When you have two RS485 cables, wiring should look like this.
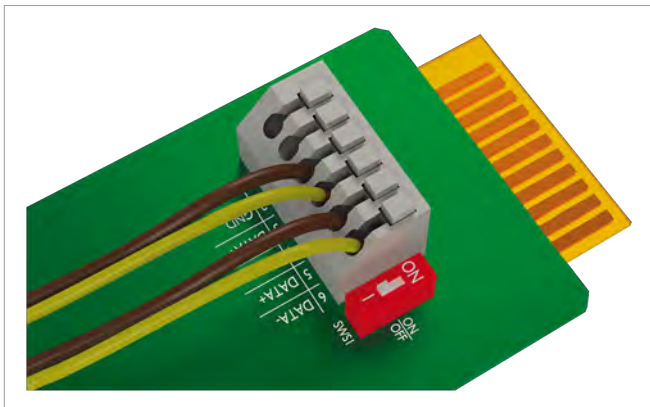
5. On a single inverter or on the last inverter in the RS485 chain, switch the RS485 termination resistor **ON**.
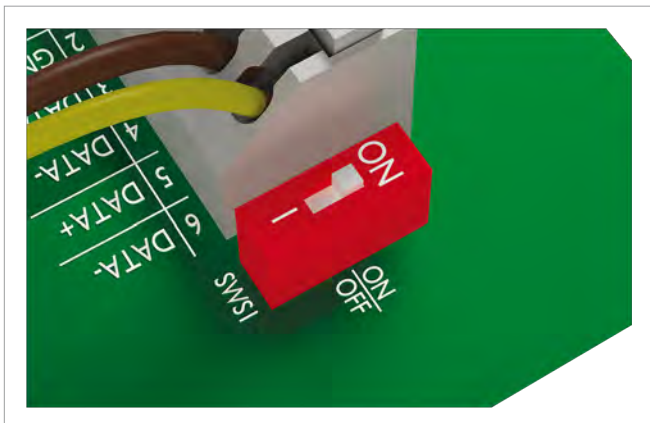
On all other inverters, switch the RS485 termination resistor **OFF**.

6. Tighten the cover to the communication port.
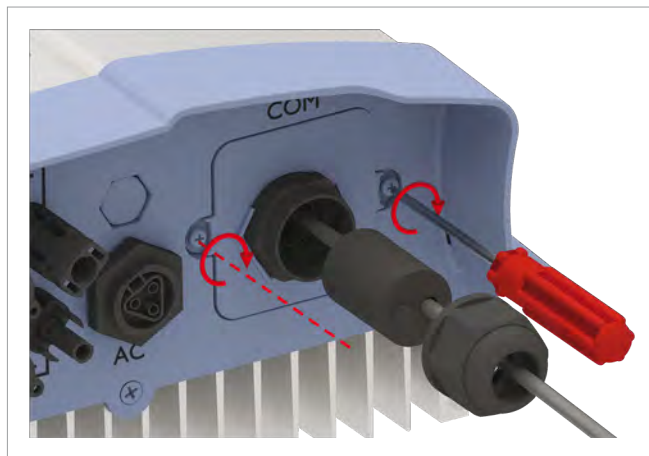
7. Tighten the bolting to the cover of the communication port.

8. When you have connected one cable, it should look like this.

6.4 Mounting the inverter

> ❗ Read chapter „5. Planning the installation", p. 18 **before** you start installation.

1. Attach the mounting plate with 6 M5 screws to the wall or to your mounting system.
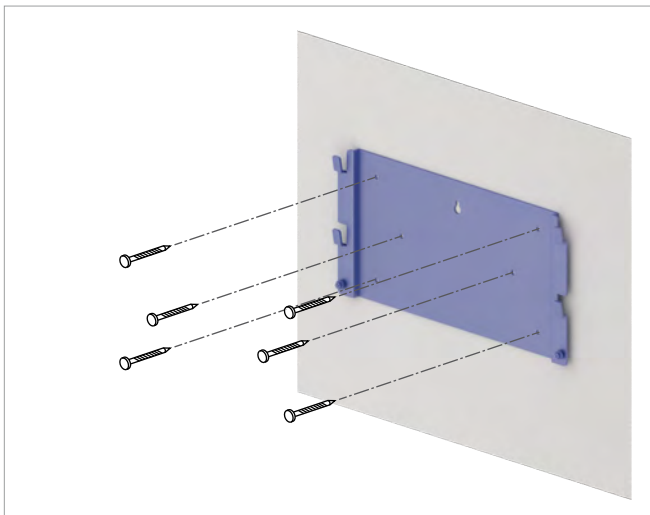
2. Hang the solar inverter into the mounting plate.

3. Check that the mounting rail of the inverter correctly hangs in the mounting plate.
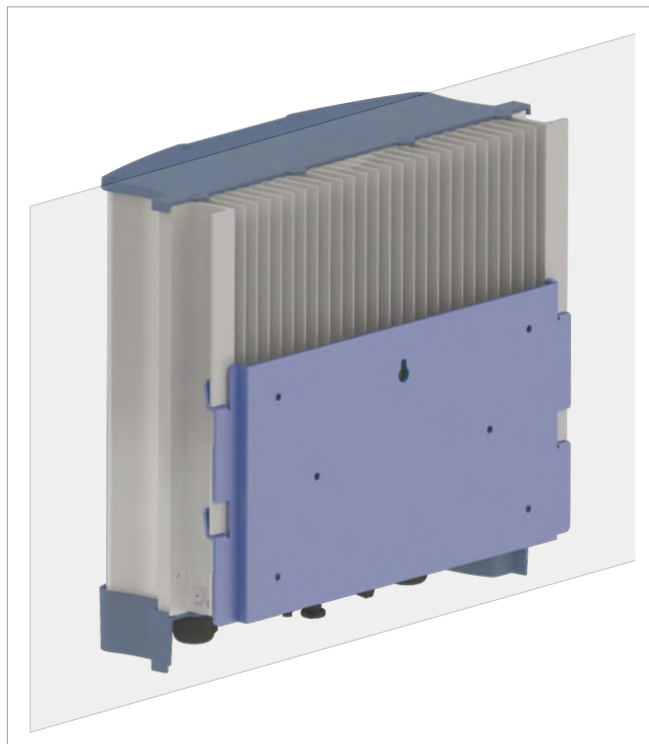
6 Installation

4. Tighten the inverter with the two mounting screws delivered with the inverter to the mounting plate.

6.5   Grounding the inverter housing

1. M4 grounding screw, washer, washer spring and toothed ring are delivered with the inverter and mounted to the inverter. You have to use a cable lug on the grounding cable. Ensure that all grounding parts are mounted in the order shown in the image.
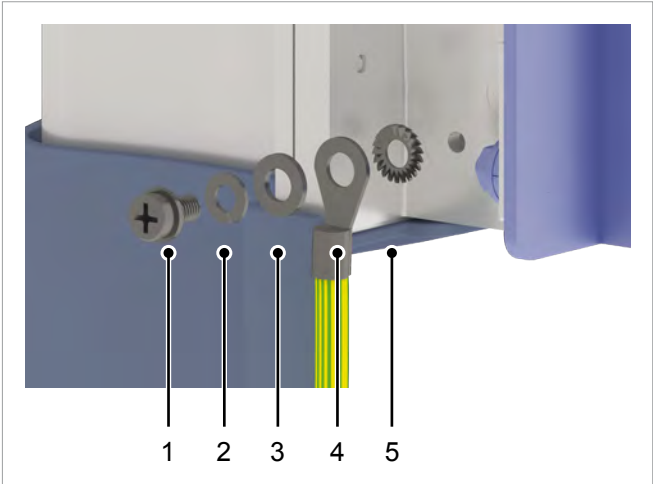
Terminal	Designation
1	M4 screw
2	Spring washer
3	Washer
4	Grounding cable with cable lug
5	Toothed ring

> Perform a continuity check for the grounding connection. If the test fails, scratch the paint off the inverter housing below the tooth lock washer to get a better electrical connection.

6.6 Connecting to the grid (AC)

Read chapter „5. Planning the installation", p. 18 and this chapter **before** you start installation.

<div style="border:1px solid red;">

⚠ DANGER

High electrocution
► Turn the DC disconnection switch to position **OFF**.
► First connect the AC cable to the inverter than to the grid.

</div>

<div style="border:1px solid blue;">

NOTICE

► Observe the correct phase sequence when wiring the AC plug. An incorrect wiring can damage the inverter.

</div>
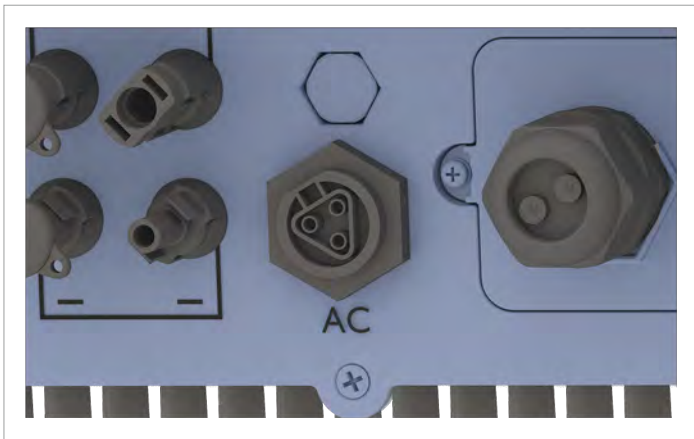
Fig. 6.11:   AC connector

1. Turn the DC disconnection switch to position **OFF**.
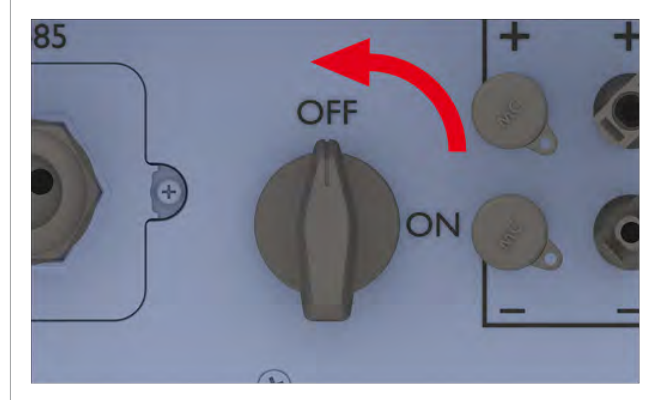
2. Remove the cable sheath as shown and remove 12 mm of insulation from each wire end. Do not twist wire ends as this reduces the surface contact area with the wire end sleeve (bootlace pin).
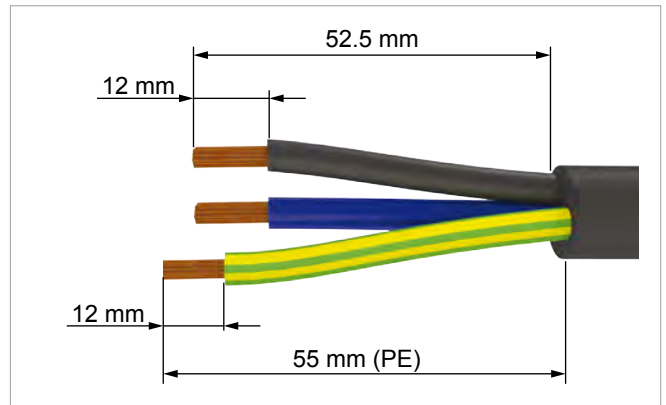
3. Place a wire end sleeve on each wire end and crimp them on tightly.

4. Connect the AC cable to the AC plug as described below.
► Unscrew the cable nut from the cable housing.

6 Installation

► Remove the cable housing with a 3.5 mm flat end screwdriver.

3.5 mm
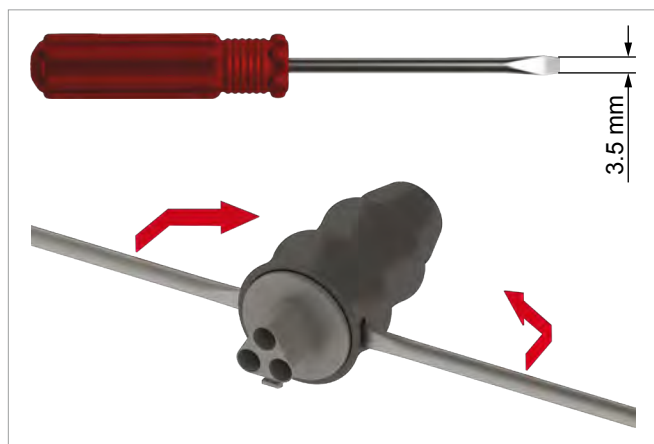
► Slide cable nut and cable housing onto the AC cable in the given order.
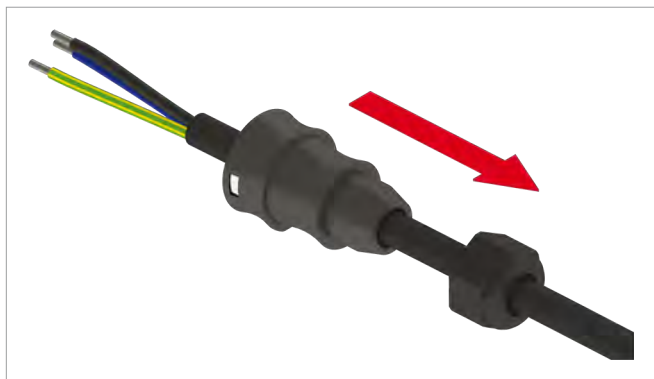
► Slide the wires of the AC Cable into the connections in the socket insert and screw them tightly (typical torque 0.8 to 1.0 Nm). Observe the correct phase sequence when wiring the AC plug.

⊕ = PE

N

N

L

L

0.8 ... 1 Nm
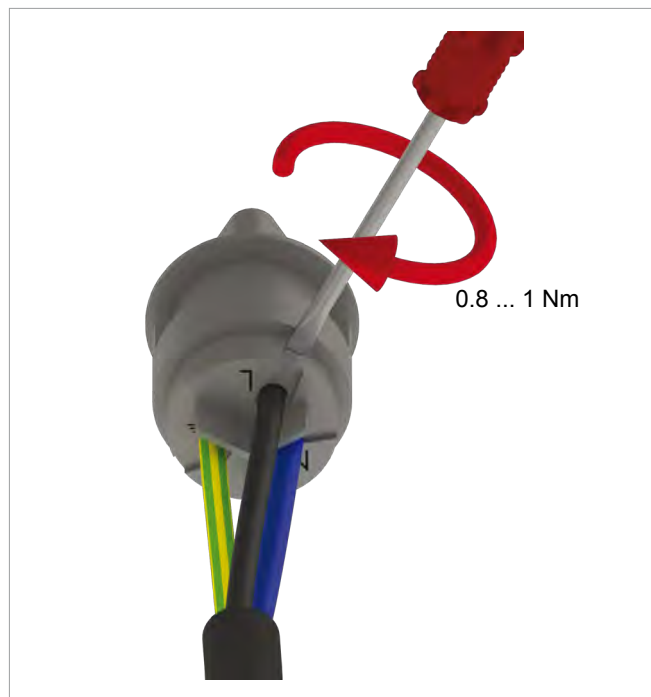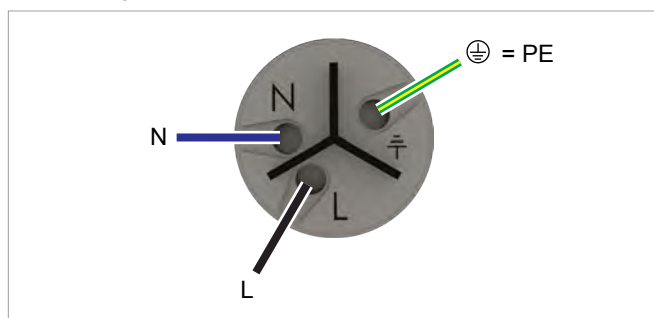
► Slide the cable housing into the socket insert until you can hear a "click" sound.

CLICK

► Fasten the cable nut to the cable housing (typical torque 4 + 1 Nm).

4 + 1 Nm
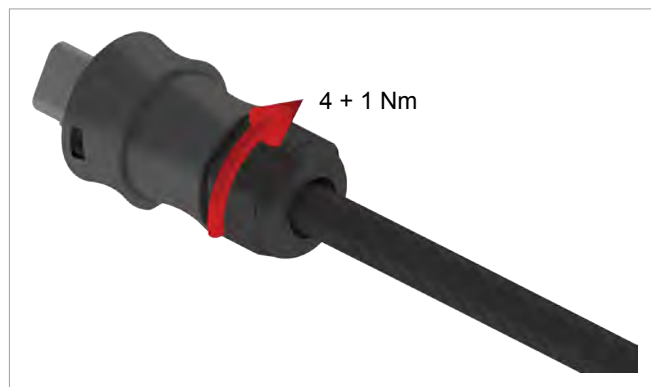
► Insert the AC plug into the AC connector on the inverter until you can hear a "click" sound.
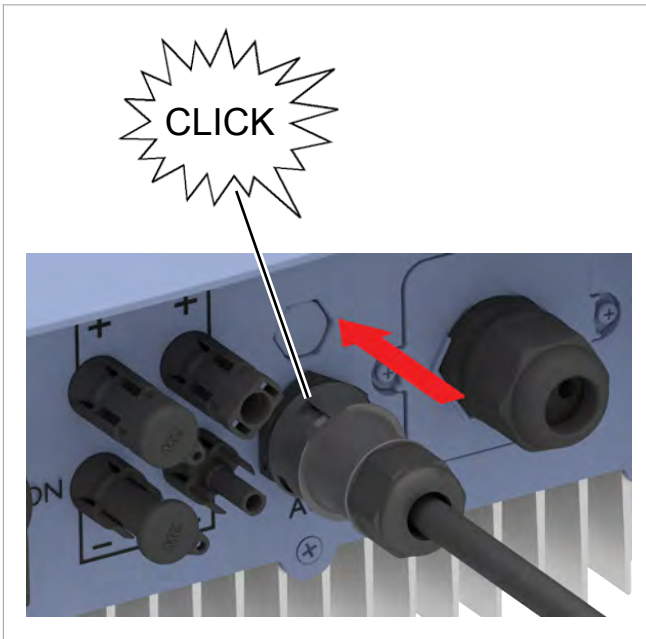
► We recommend using a strain-relief clamp directly behind the AC plug.

6 Installation

6.7   Connecting to the solar modules (DC)

Read chapter „5. Planning the installation", p. 18 and this chapter **before** you start installation.

⚠ DANGER

High electrocution
Potentially fatal voltage may be applied to the DC inputs of the solar inverter. When light is falling on solar modules, they immediately start producing energy. They do so, even when the sun is not shining.
► Never disconnect the solar modules when the solar inverter is powered.
► First switch off the grid connection so that the solar inverter cannot feed energy into the grid.
► Then turn the DC switch to position **OFF**.
► Make sure the DC inputs cannot be accidentally touched.

NOTICE

Improperly sized PV array.
An improperly sized PV array can cause damage to the inverter.
► Consider the technical specifications of the inverter (input voltage range, maximum currents and maximum input power, see „13. Technical data", p. 59) when planning the size of the PV array.

NOTICE

Penetrating humidity.
Humidity can penetrate through unused DC connectors into the inverter.
► To ensure protection degree IP65, protect all unused DC connectors with the caps delivered mounted onto the DC connectors.

NOTICE

High currents.
Exceeding the maximum current per DC input can cause an overheating of the DC inputs.
► Always consider the maximum current of the DC inputs when planning the installation.

► Check the polarity of the DC voltage before you connect the solar modules. The negative DC pole of the string is connected to the DC-MINUS connector; the positive DC pole to the DC-PLUS connector.
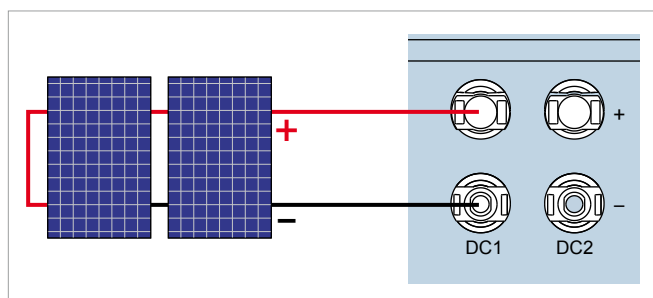
► Use a red cable for DC+ and a black cable for DC–.
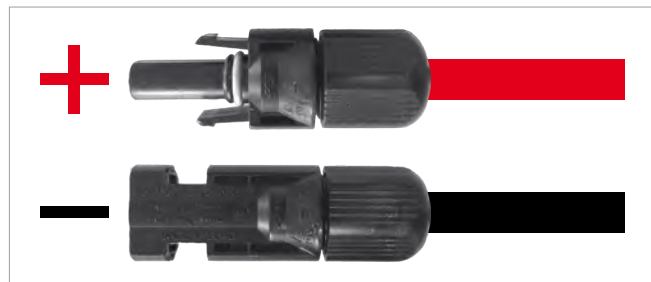
6.8   Putting labels on the inverter

► After finishing the installation, you have to put all necessary labels onto the inverter. Check local regulations about which labels are needed. See some samples below.
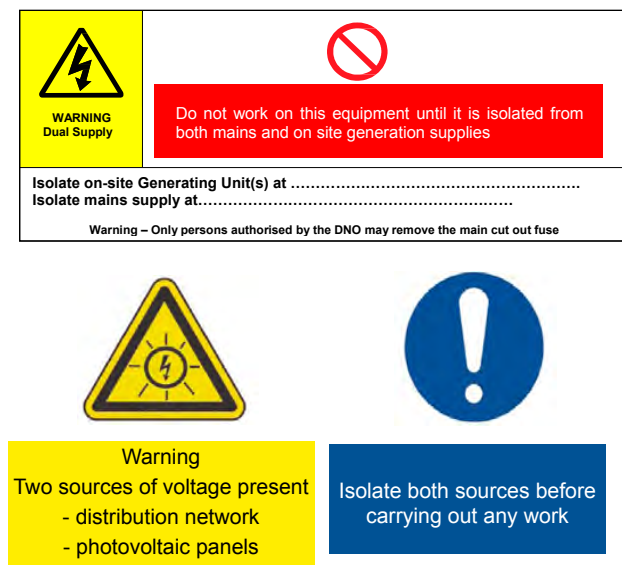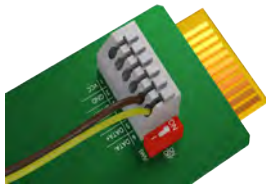
6.9   Connecting a PC via RS485

If you want to use a PC with the Delta Service Software to set up the inverter, you need a USB/RS485 adapter to connect the PC to the RS485 terminal block of the inverter.

The USB/RS485 adapter is available from Delta.

Connect the pins according to the following table:

Inverter		USB/RS485 adapter
DATA+	Pin 3 or 5	Pin 4
DATA–	Pin 4 or 6	Pin 5

7.   Commissioning

> The inverter must be correctly installed, see „6. Installation", p. 29.
> For information on how to operate the display, see „4.3 Display, buttons, status LEDs", p. 12.

> To commission the inverter, it needs to be powered either by AC (the grid) or DC (the solar modules).

1. Turn the DC disconnection switch into position **ON**.
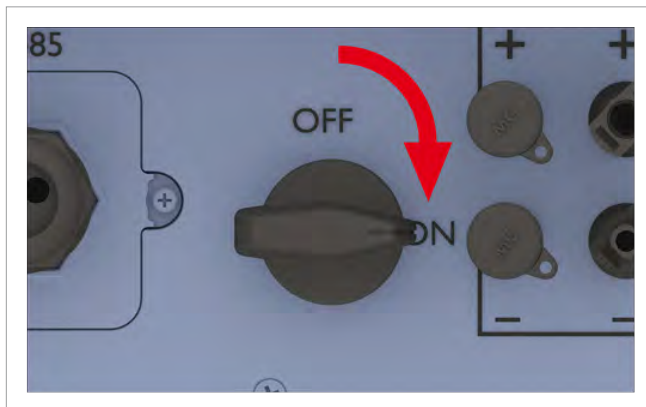

```
    UK G83-2
 Next / Enter
```

2. Use the button [SEL] to select your country or grid.

To confirm your selection, press the button [ENT].

```
    Exit ?
     N / Y
```

3. To finish the country selection, press the button [ENT].

To select another country or grid, press the button [SEL] and repeat step 1.

```
   Inverter
   5.0 kVA
```

☑ The basic setup is finished. The main menu is shown.

> Check chapter „8. Settings", p. 47 to find out whether you need further commissioning steps.

8. Settings

8.1 Overview

This chapter describes the settings that can be changed on the inverter display. For all other settings you need the Delta Service Software and a USB-RS485 adapter to connect a PC to the inverter.

For a description how to connect a PC to the inverter see .

8 Settings

8.2 Display language

Overview

With this function you can set the language used in the display.

Accessing the menu

Main menu > Country > Language
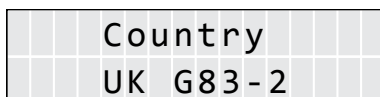
```
    Country
    UK G83-2
```

1. In the main menu, use the button [SEL] to select *Country*.

2. Press the buttons [SEL] and [ENT] at the same time and hold them for at least 10 seconds.

    → For a few seconds the following message is displayed.

```
    Inverter
    Shut down
```

```
    Language
    English
```
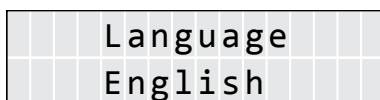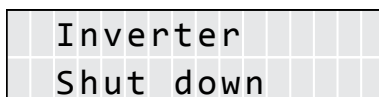
3. Use the button [SEL] to select *Language* and press the button [ENT].

```
    Deutsch
  Next / Enter
```
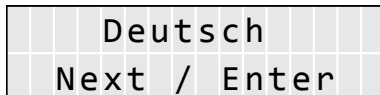
4. Use the button [SEL] to select another language.
To accept the selection, press the button [ENT].

```
    Deutsch
     N / Y
```
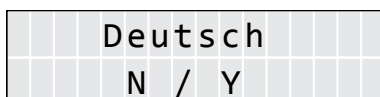
5. To finally confirm your selection, press the button [ENT].

    → The new language is used.

```
   Die Sprache
     Deutsch
```

```
   Beenden ?
    Nein/Ja
```
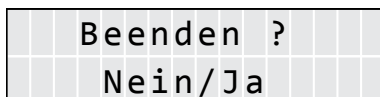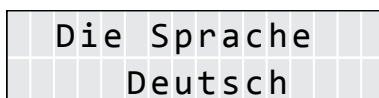
6. Use the button [SEL] to select *Beenden ?* and press the button [ENT] to finish.

8.3   Date and time

Overview

With this function you can set date and time.

> ►   For a precise calculation of the statistics in the inverter itself and in a monitoring system, date and time have to be correct.

Accessing the menu

Main menu > Country > Date & Time
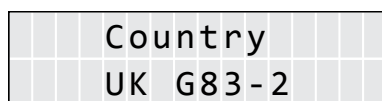
```
    Country
    UK G83-2
```

1. In the main menu, use the button SEL to select *Country*.

2. Press the buttons SEL and ENT at the same time and hold them for at least 10 seconds.

    →   For a few seconds the following message is displayed.

```
    Inverter
    Shut down
```

```
   26/11/2014
    14:05
```
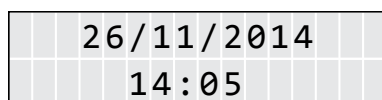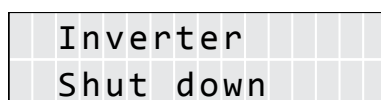
3. Use the button SEL to select the entry with time and date.
    To change the setting, press the button ENT.

    →   The day is flashing.

```
   26 11/2014
    14:05
```
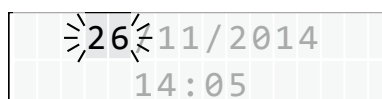
4. Use the button SEL to change the day.
    To confirm your setting, press the button ENT.

    →   The month is flashing.

```
   26 11 2014
    14:05
```
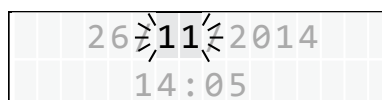
5. Repeat step *3* and *4* for month, year, hours and minutes.

    →   After changing the value for the minutes, the flashing stops.

```
    Exit ?
    N / Y
```

6. Use the button SEL to select *Exit ?* and press the button ENT to finish.

    →   The main menu is shown.

```
Output       0W
Today       0Wh
```

8 Settings

8.4   Baud rate for RS485

Overview

With this function you can set the baud rate (9600, 19200 or 38400) for the RS485 connection.

► If you connect multiple inverters via RS485, set the same baud rate on each inverter.

Accessing the menu

Main menu > Country > Baud rate

```
    Country
    UK G83-2
```

1. In the main menu, use the button [SEL] to select *Country*.

2. Press the buttons [SEL] and [ENT] at the same time and hold them for at least 10 seconds.

→ For a few seconds the following message is displayed.

```
    Inverter
    Shut down
```

```
  Baud rate
    19200
```

3. Use the button [SEL] to select *Baud rate* and press the button [ENT].

```
      9600
  Next / Enter
```

4. Use the button [SEL] to select another baud rate.
   To accept the selection, press the button [ENT].

```
      9600
      N / Y
```

5. To confirm your selection, press the button [ENT].

→ The new baud rate is shown.

```
    Baud rate
      9600
```

```
    Exit ?
    N / Y
```

6. Use the button [SEL] to select *Exit ?* and press the button [ENT] to finish.

→ The main menu is shown.

```
Output        0W
Today        0Wh
```

8.5   Inverter ID

Overview

With this function you can set an ID for the inverter. The inverter ID is used to identify the inverter in a RS485 connection. The inverter ID is also used in monitoring systems.

(!)	► Set a different inverter ID for each inverter in the PV plant. Otherwise, the inverters cannot be correctly identified. ► On the last inverter in the RS485 connection, switch on the RS485 termination resistor. For a description, see <u>"6.3 Connecting to datalogger via RS485", p. 34</u>.

Accessing the menu

Main menu > Inverter ID

```
Inverter
ID : 1
```

1. In the main menu, use the button SEL to select **_Inverter ID_**.

2. Press the buttons SEL and ENT at the same time and hold them for at least 3 seconds.

→ The menu to change the inverter ID is shown.

```
Setting ID:
ID = 1   ?
```

```
Setting ID:
ID = 1   ?
```

3. Use the button SEL to change the inverter ID.

4. To confirm the value, press the button ENT.

→ The new inverter ID is shown in the main menu.

```
Inverter
ID : 2
```

Configurable Parameters

Parameter	Description	Value range
Setting ID	Sets the inverter ID that is needed to identify the inverter when a PV plant contains multiple inverters.	001 .. 254

## 9.	Measurements and statistics

The inverter provides several measurements and statistics about the operating behavior and events that can have an influence on the operating behavior.

The following types of measurements and statistics are available:

Type of information	Description
Main menu	Current data of many parameters; energy information for total lifetime
Event log	A list of important events like failures, parameter changes etc. with date and time.
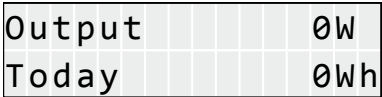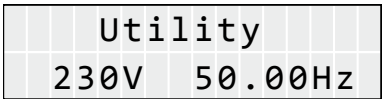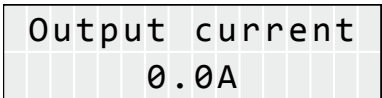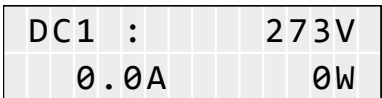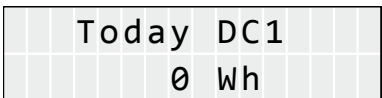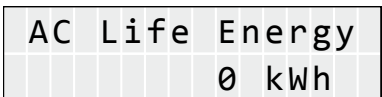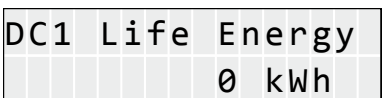
## 9.1	Main menu

Description

In the main menu you find the current data of several parameters in real time and the energy information for the total lifetime. The information can only be read and not edited.

Use the button SEL to scroll through the statistics.

The values shown in the following table are only examples. The values you see on your display may vary.

Main menu	
Output 0W Today 0Wh	**Output**: The currently generated power. **Today**: Today's total energy production.
Utility 230V 50.00Hz	The current grid voltage and grid frequency.
Output current 0.0A	The current output current.
DC1 : 273V 0.0A 0W	The current values for DC voltage, DC current and DC power.
Today DC1 0 Wh	Today's total DC energy production.
AC Life Energy 0 kWh DC1 Life Energy 0 kWh	Total energy production during the lifetime of the inverter for AC and DC.

9.2 Event list

Description

The event list contains information about important events that
happened during operation.

Accessing the Menu

Main menu > Event log

```
   Country
   UK G83-2
```

1. In the main menu, use the button SEL to select *Event list*.

2. Use the button SEL to scroll through the list of events.

10. Error messages and trouble shooting

When the solutions shown in this table do not solve your problem, please contact Delta Support in your country. You can find the contact data on the last page of this manual.

No.	Message	Possible causes	Proposal for solution
E01	Grid Freq. Over Rating	Current grid frequency is higher than the *OFR setting* (over frequency recognition).	Check the grid frequency on the inverter display.
		Incorrect country or grid setting.	Check country and grid setting.
E02	Grid Freq. Under Rating	Current grid frequency is lower than the *UFR setting* (under frequency recognition).	Check the grid frequency on the inverter display.
		Incorrect country or grid setting.	Check country and grid setting.
E07	Grid quality	Non-linear load in grid and near to the inverter.	Grid connection of inverter needs to be far away from non-linear load if necessary.
E09	No Grid	The upstream circuit breaker is open.	Close the upstream circuit breaker.
		AC plug is disconnected.	Check that the AC plug is correctly wired and plugged in.
E10	Grid Volt Under Rating	Current grid voltage is lower than the *UVR setting* (under voltage recognition).	Check the grid voltage on the inverter display.
		Current grid voltage is lower than the *Slow UVR setting*.	Check the grid voltage on the inverter display.
		Incorrect country or grid setting.	Check country and grid setting.
E13	Slow Over Voltage Range	Current grid voltage is higher than the *Slow OVR setting* (over voltage recognition).	Check the grid voltage on the inverter display.
		Incorrect country or grid setting.	Check country and grid setting.
E26	Slow Over Frequency Range	Current grid frequency is higher than the *Slow OFR setting* (over frequency recognition).	Check the grid frequency on the inverter display.
		Incorrect country or grid setting.	Check country and grid setting.
E27	Slow Under Frequency Range	Current grid frequency is lower than the *Slow UFR setting* (under frequency recognition).	Check the grid frequency on the inverter display.
		Incorrect country or grid setting.	Check country and grid setting.
E28	Slow Under Voltage Range	Current grid voltage is lower than the *Slow UVR setting* (over voltage recognition).	Check the grid voltage on the inverter display.
		Incorrect country or grid setting.	Check country and grid setting.
E30	DC Volt Over Rating	Current DC voltage at the DC inputs is higher than the maximum DC input voltage.	Modify the PV array string layout to reduce the DC input voltage.
E34	Ground fault	PV array insulation fault.	Check the insulation of the DC inputs.
		Large PV capacity between Plus to Ground or Minus to Ground or both.	Check the capacity. Dry PV panels if necessary.

No.	Message	Possible causes	Proposal for solution
A01	DC Offset Over Rating	Grid waveform is abnormal.	Check the grid waveform. The grid connection of the inverter has to be far away from non-linear load if necessary.
A05	NTC Over Temp	The temperature inside the inverter is too high.	Check the ambient temperature and the environmental conditions.
A06	Inside NTC Circuit Fail	The temperature inside the inverter is much too high (> 100 °C) or much too low (< -24 °C).	Check the ambient temperature and the environmental conditions.
A08	Heat Sink NTC1 Fail	The temperature of the boost heat sink is much too high (> 100 °C) or much too low (< -24 °C).	Check the ambient temperature and the environmental conditions.
A09	Heat Sink NTC2 Fail	The temperature of the inverter heat sink is much too high (> 100 °C) or much too low (< -24 °C).	Check the ambient temperature and the environmental conditions.
A15	DSP ADC V_grid / I_out Fail	Internal failure.	Contact Delta Support.
A16	DSP ADC I_in / V_bus Fail	Internal failure.	Contact Delta Support.
A17	DSP ADC I_in / I_boost Fail	Internal failure.	Contact Delta Support.
A18	DSP ADC V_grid Fail	Internal failure.	Contact Delta Support.
A19	DSP ADC I_out_dc Fail	Internal failure.	Contact Delta Support.
A20	Efficiency inconsistent	Callibration is incorrect.	Check the accuracy of current and power.
A22	Internal CommFault_R	Internal failure.	Contact Delta Support.
A23	Internal CommFault_D	Internal failure.	Contact Delta Support.
A24	Residual Curr Over Rating	PV array insulation fault.	Check the insulation of the DC inputs.
		Large PV capacity between Plus to Ground or Minus to Ground.	Capacity must be < 2.5 µF. Install an external transformer if necessary.
A27	RSMU Circuit Fail	Internal failure.	Contact Delta Support.
A28	Relay Short	Internal failure.	Contact Delta Support.
A29	Relay Open	Internal failure.	Contact Delta Support.
A35	Bus Volt Over Rating	Current DC voltage on the DC inputs is higher than the maximum DC input voltage.	Modify the PV array string layout to reduce the DC input voltage.
		Surge occurs during operation.	Contact Delta Support.
A36	Output Curr Transient Over	Internal failure.	Contact Delta Support.
A37	AC Curr Over Rating	Internal failure.	Contact Delta Support.
A42	CT Current Sensor Fail	Internal failure.	Contact Delta Support.
A50	Zero Cross Circuit Fail	Internal failure.	Contact Delta Support.
A56	Hardware incompatibility	Internal failure.	Contact Delta Support.
A60	DC1 Curr Over Rating	Internal failure.	Contact Delta Support.
A61	DC2 Curr Over Rating	Internal failure.	Contact Delta Support.
A70	DC1 Curr Transient Over	Internal failure.	Contact Delta Support.
A70	DC2 Curr Transient Over	Internal failure.	Contact Delta Support.

11. Maintenance and Repair

⚠ DANGER

High electrocution
Potentially fatal voltage is applied to the solar power inverter during operation. This potentially fatal voltage is still present for five minutes after all power sources have been disconnected.

► Never open the solar inverter. The solar inverter contains no components that must be maintained or repaired by the operator or installer. Opening the solar inverter will void the warranty.

---

12. Decommissioning

> ⚠ **DANGER**
>
> **Risk of death by electrocution**
> Potentially fatal voltage is applied to the solar inverter during operation. This potentially fatal voltage is still present for 5 minutes after all power sources have been disconnected.
> ► Never open the solar inverter.
> ► Always disconnect the solar inverter from power before installation, open the DC disconnection switch and make sure neither can be accidentally reconnected.
> ► Wait at least 5 minutes until the capacitors have discharged.

> ⚠ **DANGER**
>
> **Risk of death or serious injury from electrocution**
> Potentially fatal voltage may be applied to the DC connections of the solar inverter. When light is falling on solar modules, they immediately start producing energy. They do so, even when the sun is not shining.
> ► Never disconnect the solar modules when the solar inverter is powered.
> ► First switch off the grid connection so that the solar inverter cannot feed energy into the grid.
> ► Turn the DC disconnection switch to position **OFF**.
> ► Make sure the DC connections cannot be accidentally touched.

To put the inverter out of operation, e.g. for maintenance or to send it for repair, follow the instructions below.

1. Switch off the AC circuit breaker.

2. Turn the DC disconnection switch to position **OFF**.
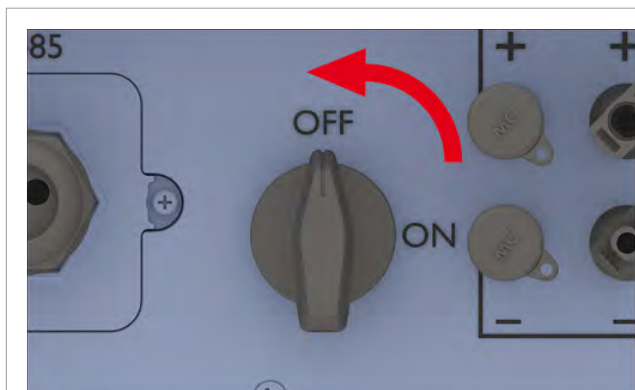
3. Use a voltage meter to check that the AC and DC power connections are de-energized.

4. Pull out the AC plug.

5. Pull out the DC plugs.

6. If installed, disconnect the cables from the communication port.

7. Unscrew the inverter on both sides from the mounting plate.

8. Remove the inverter from the mounting plate.

12 Decommissioning

9. Put the inverter into the original box.

10. When you store the inverter, consider the ambient conditions for storing, see .

13. Technical data

Input (DC)	RPI H3
Maximum recommended PV power	3780 W_P
Maximum input power	3200 W
Nominal power	3150 W
Voltage range	125 ... 600 V_{DC}
Maximum input voltage	600 V_{DC} [1]
MPP operating voltage range	125 ... 550 V_{DC}
MPP operating voltage range with full power	320 ... 500 V_{DC}
Nominal voltage	350 V_{DC}
Startup voltage	150 V_{DC}
Maximum input current	10 A
Maximum short circuit current in case of a failure	13.9 A
Number of MPP trackers	1
Number of DC inputs	2
Galvanic isolation	No
Overvoltage category [2]	II

Output (AC)	RPI H3
Maximum apparent power	3000 VA
Nominal apparent power	3000 VA
Voltage range [3]	230 V -20%/+22%, 1-phase (L, N, PE or L, L, PE)
Nominal current	13 A
Maximum current	14.3 A
Inrush current	30 A / 1 ms
Maximum output fault current	16 A
Nominal frequency	50 / 60 Hz
Frequency range [3]	50 ± 5 Hz / 60 ± 5 Hz
Power factor adjustable	0.8 cap ... 0.8 ind
Total harmonic distortion	<3%
DC current injection	<0.25% at rated current
Night-time consumption	<1 W
Overvoltage category [2]	III

[1] Can be increased to 630 V
[2] IEC 60664-1, IEC 62109-1 / -2
[3] AC voltage and frequency range will be programmed according to the individual country requirements.

13 Technical data

Mechanical Design	RPI H3
Dimensions (W x H x D)	420 x 367 x 157 mm
Weight	15 kg
Cooling	Natural convection
AC Connector type	Wieland RST25i3S B1G M01
DC Connector type	Multi-Contact MC4
Communication interfaces	2 x RS485, 1 x Dry contacts, 4 x Digital inputs

General Specification	RPI H3
Delta model name	RPI H3_110
Delta part number	RPI302N63E0000
Maximum efficiency	97.0%
EU efficiency	96.2%
Operating temperature range	-25 ... +60 °C
Operating temperature range without derating	-25 ... +40 °C
Storage temperature range	-25 ... +60 °C
Relative humidity	0 ... 95 %, non-condensing
Maximum operating altitude	2000 m above sea level

Standards and Directives	RPI H3
Protection degree	IP65
Safety class	I
Pollution degree	II
Overload behavior	Current limitation; power limitation
Safety	IEC 62109-1 / -2, CE compliance
EMC	EN 61000-6-2, EN 61000-6-3
Immunity	IEC 61000-4-2 / -3 / -4 / -5 / -6 / -8
Harmonics	EN 61000-3-2
Variations and flicker	EN 61000-3-3
Grid interfaces	See www.solar-inverter.com

Service Europe

Austria	service.oesterreich@solar-inverter.com	0800 291 512 (free call)
Belgium	support.belgium@solar-inverter.com	0800 711 35 (free call)
Bulgaria	support.bulgaria@solar-inverter.com	+421 42 4661 333
Czech Republic	podpora.czechia@solar-inverter.com	800 143 047 (free call)
Denmark	support.danmark@solar-inverter.com	8025 0986 (free call)
France	support.france@solar-inverter.com	0800 919 816 (free call)
Germany	service.deutschland@solar-inverter.com	0800 800 9323 (free call)
Greece	support.greece@solar-inverter.com	+49 7641 455 549
Israel	supporto.israel@solar-inverter.com	800 787 920 (free call)
Italy	supporto.italia@solar-inverter.com	800 787 920 (free call)
Netherlands	ondersteuning.nederland@solar-inverter.com	0800 022 1104 (free call)
Poland	serwis.polska@solar-inverter.com	+48 22 335 26 00
Portugal	suporte.portugal@solar-inverter.com	+49 7641 455 549
Slovakia	podpora.slovensko@solar-inverter.com	0800 005 193 (free call)
Slovenia	podpora.slovenija@solar-inverter.com	+421 42 4661 333
Spain	soporto.espana@solar-inverter.com	900 958 300 (free call)
Switzerland	support.switzerland@solar-inverter.com	0800 838 173 (free call)
Turkey	support.turkey@solar-inverter.com	+421 42 4661 333
United Kingdom	support.uk@solar-inverter.com	0800 051 4281 (free call)
Other European countries	support.europe@solar-inverter.com	+49 7641 455 549