

M70A_260 Flex (RPI703M260xxx)

Installation and Commissioning Instructions

Europe

Legal statements

This manual applies to the inverter models:

- M70A_260 Flex (Delta part number RPI703M260xxx) and Delta Service Software (DSS) version 6.0 or later

The Delta part number can be found on the type plate of the inverter.

Delta manuals undergo continuous revision in order to provide complete information regarding the installation and operation of its inverters. Therefore, before starting installation work, **always** consult solarsolutions.delta-emea.com to check whether a newer version of this manual or the Installation and Operating Manual is available.

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This manual is intended for use by electrical installers who are trained and approved for installation and commissioning of grid-connected solar inverters.

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All information and specifications can be modified without prior notice.

All translations of this manual not authorized by Delta Electronics (Germany) GmbH must include the annotation: "Translation of the original operation manual".

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EU Declaration of Conformity

Delta Electronics (Netherlands) B.V. hereby declares that this device complies with the Radio Equipment Directive 2014/53/EU.

The full text of the EU Declaration of Conformity is available at: solarsolutions.delta-emea.com.

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1. About this manual

1.1 Information about the versions of this manual

Changes compared to the previous version are underlined in blue in the document.

Version	Date	Changes
1.0	2024-04-04	First edition
2.0	2025-01-03	Chapter “9 Commissioning”, page 49 extended to include additional function settings with the DeltaSolar App and the Delta Service Software.
3.0	2025-01-28	The description for switching the RS485 protocol has been adapted to the new version (2.11) of the DeltaSolar app, see “9.6.8 Changing the RS485 protocol to SUNSPEC (optional)”, page 66 and “9.6.9 Changing the RS485 protocol to DELTA (optional)”, page 68.
4.0	2025-04-08	Section “10 Characteristic curves”, page 73 and “11 Technical Data”, page 75 A note on reactive power feed-in has been added.
5.0	2025-06-18	“11 Technical Data”, page 75: The information on the “MPP voltage range with maximum power” has been corrected.

1.2 Purpose of this manual

This manual is part of the inverter and supports the installation, commissioning and operation of the inverter.

Read this manual **before** working on the inverter.

Always follow the safety instructions and work instructions in this manual. This will ensure that the inverter can be safely installed, commissioned and operated.

Store this manual in a safe place in the vicinity of the inverter so that it is always quickly available when working on the inverter.

Delta Electronics is not responsible for damage resulting from failure to follow the safety and operating instructions set out in this manual.

1.3 Target audience of this manual

This manual is intended for installers who are trained and approved for the installation, commissioning and operation of solar inverters in grid-connected solar systems.

1.4 Warning notices and warning symbols

This manual uses the following warning notices and symbols to describe potential dangers and the measures necessary for reducing these dangers.

Always follow the instructions in the warning notices.

Warning levels

DANGER

Indicates a hazardous situation that, if not avoided, **will result** in death or serious injury.

WARNING

Indicates a hazardous situation that, if not avoided, **could result** in death or serious injury.

CAUTION

Indicates a hazardous situation that, if not avoided, **could result** in minor or moderate injury.

NOTICE

Indicates possible **material damage** that can be caused to other objects by the inverter.

A note provides information on efficient use of the inverter.

If necessary, the warning labels are also marked with warning symbols indicating the source of the danger.



High electrical voltages or currents



Hot surfaces



Heavy weight



General danger

1.5 Writing and labeling conventions

Some sections in this manual are specially labeled.

Labeling of work instructions

Work instructions that must be performed in a specific sequence are numbered accordingly. Numbered work instructions must **always** be performed in the specified sequence.

1. First step
   → Where necessary, the result of the work step is described here. This is used for checking that the work step has been completed correctly.
2. Second step
3. Third step

☑ Work step is now complete.

If the work instructions consist of just one single step or the work steps can be performed in any desired sequence then the work steps are labeled as follows:

► Step

► Step

Labeling of inverter components

LEDs ***ALARM*** LED

LED	Meaning
	LED stays on.
	LED flashes.
	LED is off.

2. Basic safety instructions

DANGER



Electric shock
Potentially fatal voltages are present in the inverter during operation.
- ► All electrical work must only be carried out by electrical installers who are trained and approved for work on grid-connected solar inverters.

DANGER



Electric shock
Potentially fatal voltages are present in the inverter during operation. When the inverter is disconnected from all power sources, this voltage remains in the inverter for up to 60 seconds.

Potentially fatal voltages are present at the DC connections of the inverter. When light falls on the solar modules, they immediately start to generate electricity. This also happens when light does not fall directly on the solar modules.
- ► Disconnect the inverter from all voltage sources and check that it is voltage-free before performing any work.

DANGER



Electric shock
The inverter has a high leakage current value.
- ► **Always** connect the ground cable first, then the AC and DC cables.

WARNING



Electric shock
In the event of a fault, the inverter housing may be live.
- ► Always comply with local regulations relating to grounding cable requirements.
- ► To increase the safety of the system, always ground the inverter housing even when this is not required by the local regulations.
- ► Always ground the inverter housing before connecting the inverter to the grid and the solar modules.
- ► The grounding cable cross-section must be at least 6 mm^2.

WARNING



Electric shock
The IP66 protection degree is no longer guaranteed when the door is open.
- ► Only open the door when absolutely necessary.
- ► Do not open the door if water or dirt might enter the inverter.
- ► After work is completed, ensure that the door is properly shut and the screws tightened again. Check that the door is properly sealed.

WARNING



Heavy weight
The inverter is very heavy, see “11. Technical Data”, page 75.
- ► Lift and move the inverter with at least 2 people or a suitable lifting device.

WARNING



Hot surfaces
The surface of the inverter can get very hot during operation.
- Always wear safety gloves when touching the inverter.

IMPORTANT

Ingress of moisture
Moisture can enter via open DC connectors.
- ► To ensure protection degree IP66, close unused DC connectors with the rubber plugs that are attached to the DC connectors.

IMPORTANT

Handling aluminum cables
To ensure safe and reliable contact with aluminum conductors, always perform the following work steps:
- ► Always observe the applicable regulations and rules for the use of aluminum cables.
- ► Keep the installation location as free as possible from moisture or corrosive atmospheres.
- ► Connect the aluminum cables quickly.
- ► Clean the stripped end of the aluminum conductor mechanically (for example, using a knife blade to scrape off the oxide layer), then immediately dip the aluminum conductor into acid-fee and alkaline-free (= neutral) Vaseline and straight away insert it into the Al-Cu compression joint.

IMPORTANT

Working in freezing conditions

In frosty conditions, the rubber seal of the front door can freeze to the enclosure, tear when opened and thus become leaky.

► Before opening the front door, defrost the rubber seal with some warm air.

► Open the front door slowly.

- To comply with IEC 62109-5.3.3 safety requirements and avoid injury or material damage, the inverter must be installed and operated in accordance with the safety and operating instructions set out in this manual. Delta Electronics is not responsible for damage resulting from failure to follow the safety and operating instructions set out in this manual.
- The inverter may only be installed and commissioned by installers who have been trained and approved for the installation and operation of grid-connected solar inverters.
- All repair work on the inverter must be carried out by Delta Electronics. Otherwise the warranty will be void.
- Warning notices, warning symbols and other markings attached to the inverter by Delta Electronics must not be removed.
- To avoid the risk of arcing, do not disconnect cables when the inverter is under load.
- To prevent damage due to lightning strikes, follow the applicable regulations in your country.
- All external connections must be sufficiently sealed in order to ensure an IP66 protection degree. Seal any unused connections with the cover caps supplied.
- The covers inside the inverter do **not** have to be removed for the standard installation. All connections required for the standard installation are also accessible with the covers attached.
- Only equipment that complies with SELV (EN 60950) may be connected to the RS485 interfaces.

3. Installing type 1+2 DC surge protection devices (optional)

Install the surge protection devices before installing the inverter.

3.1 Removing type 2 DC surge protection devices

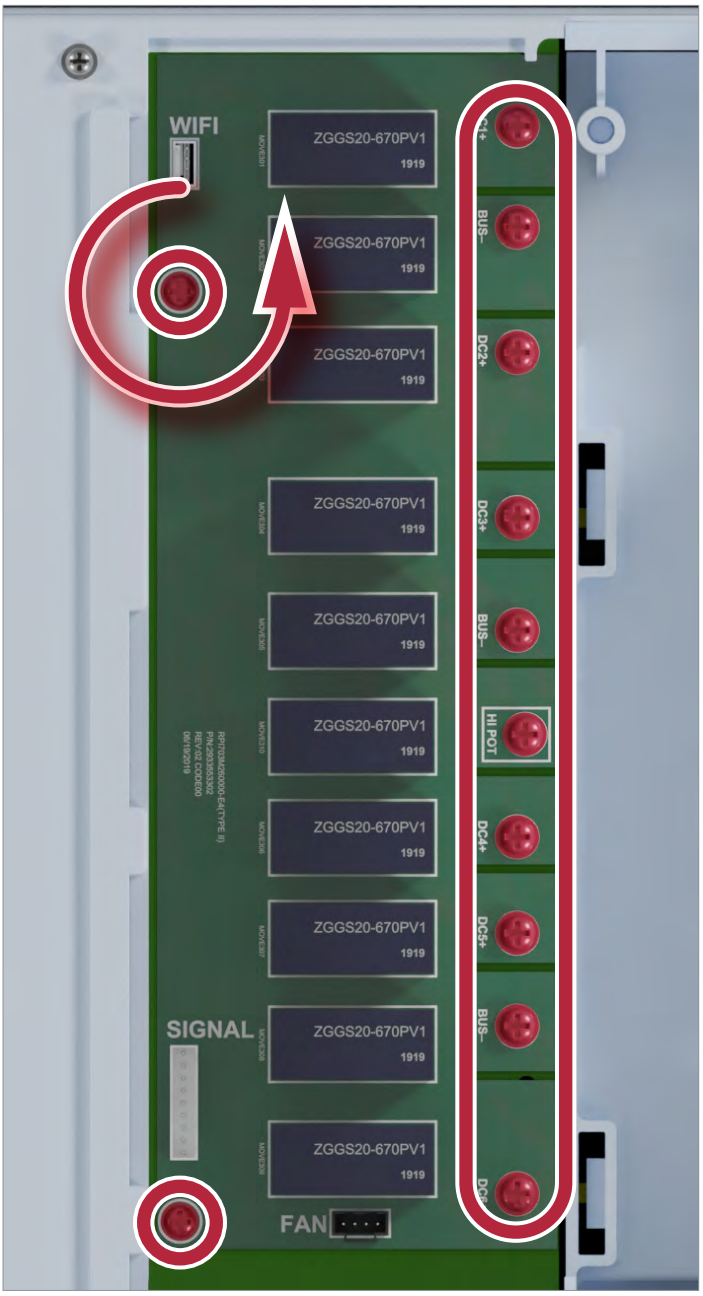
Surge protection devices are supplied without screws!

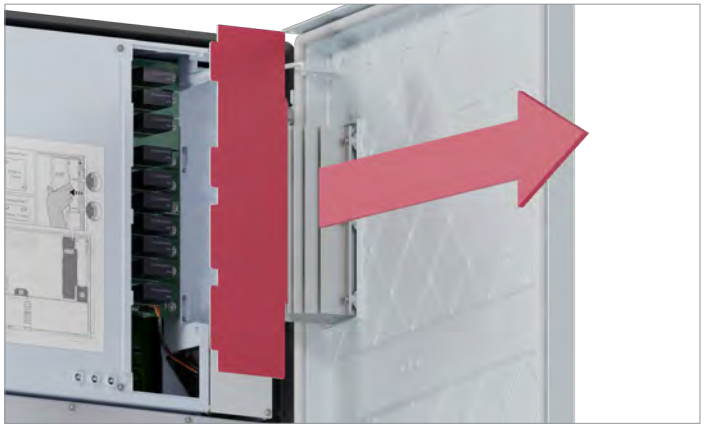
All screws including spring washers and washers of the old surge protection devices must be reused for the new surge protection devices.

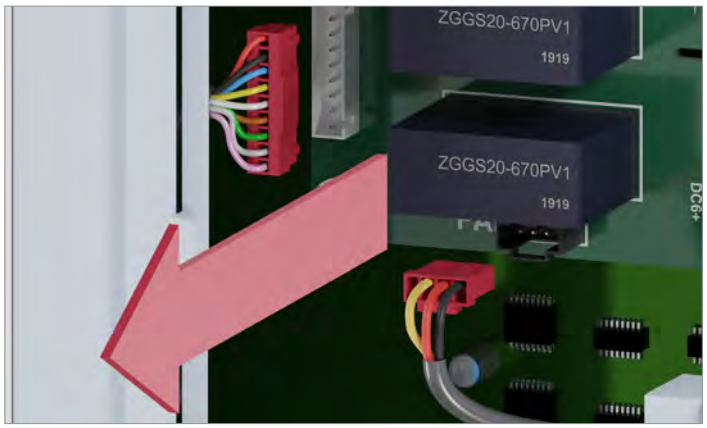
Use an insulated, strongly magnetic screwdriver.

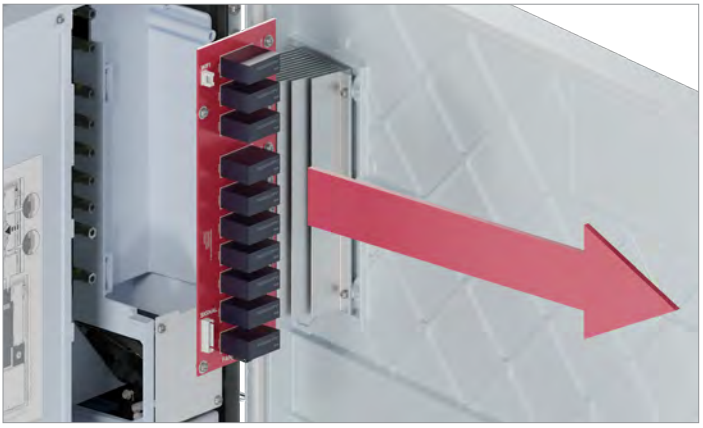
The two mounting screws are only pushed through and can easily fall down!

The screws on the AC or DC bus cannot fall out and must be pulled out and inserted against a certain resistance.

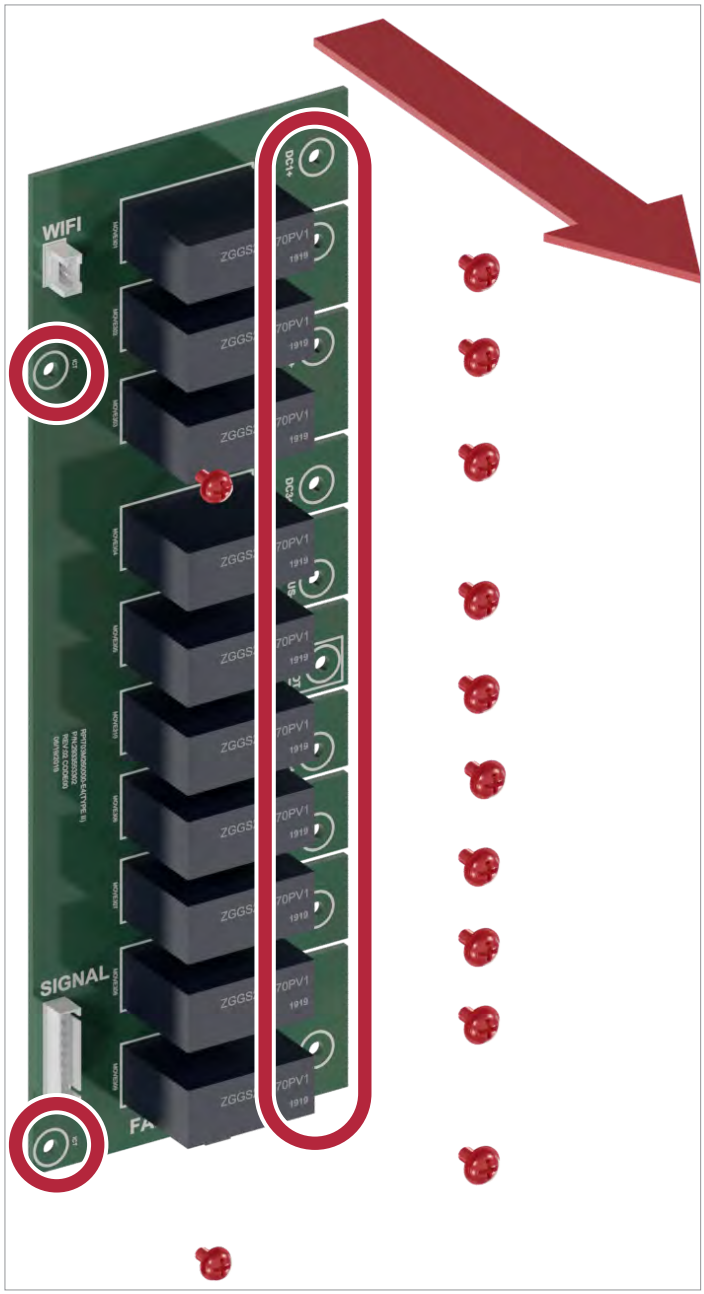








3.2 Transfer screws for the type 1+2 DC surge protection devices

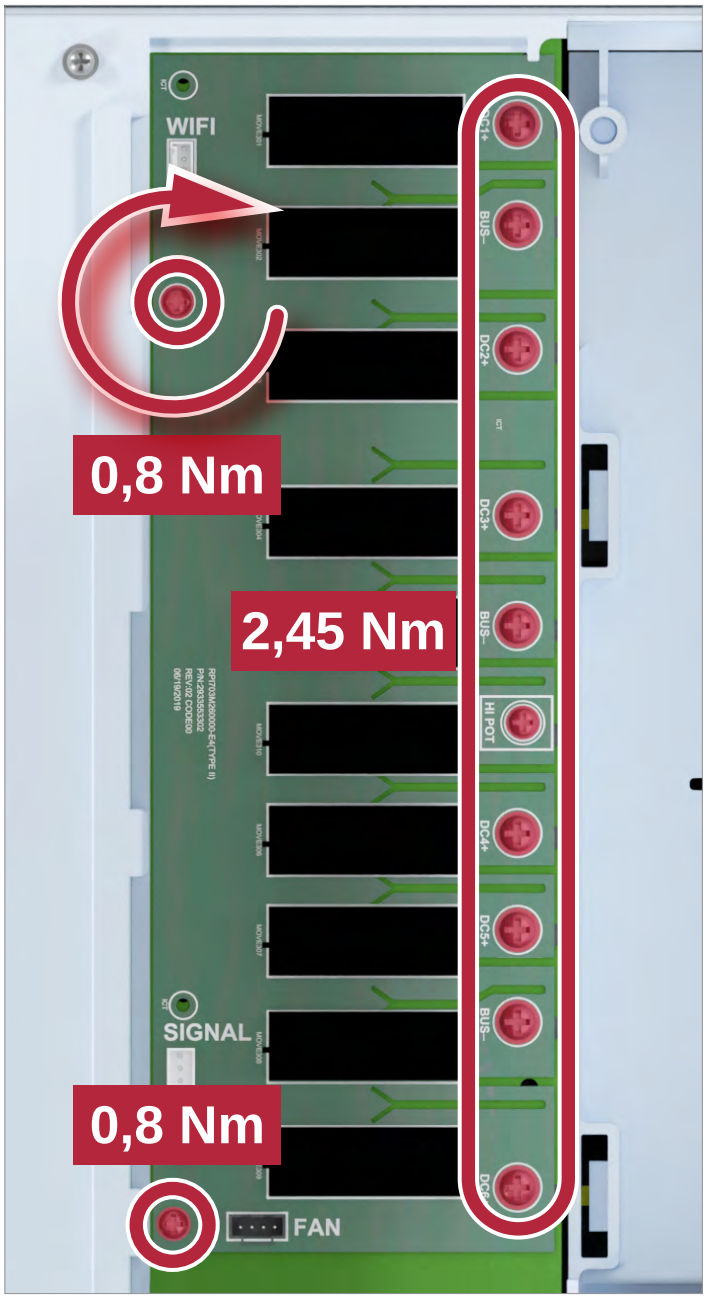


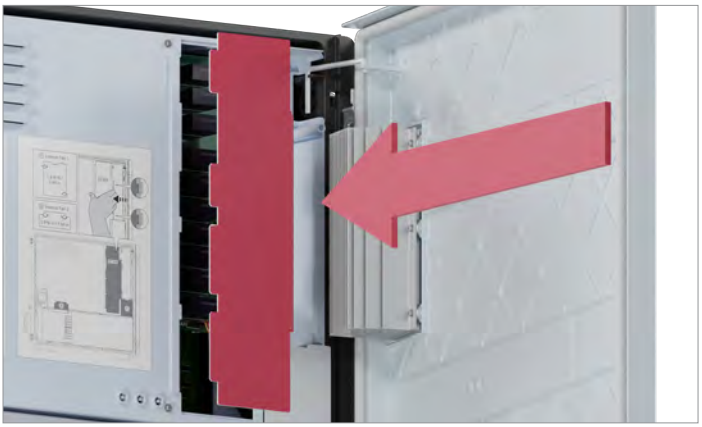
3.3 Installing type 1+2 DC surge protection devices

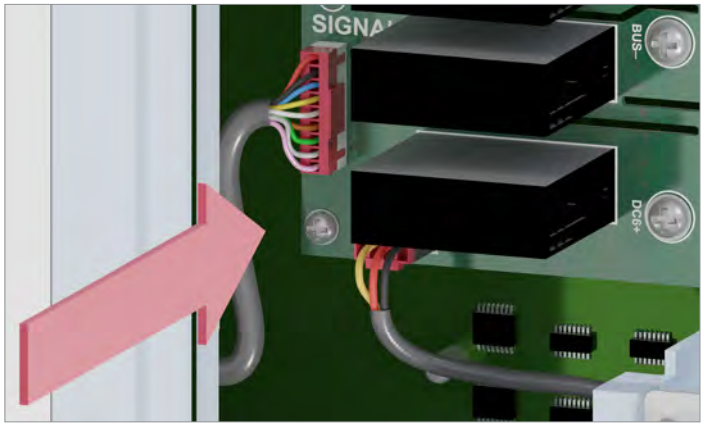
First tighten the card with the DC bus screws on the right.

Then tighten the two mounting screws on the left.




WIFI
0,8 Nm
2,45 Nm
SIGNAL
0,8 Nm
FAN
BUS–
DC2+
DC3+
BUS–
HI POT
DC4+
DC5+
BUS–




BUS–
DC6+

4. Installing type 1+2 AC surge protection devices (optional)

Install the surge protection devices before installing the inverter.

4.1 Removing type 2 AC surge protection devices

Surge protection devices are supplied without screws!

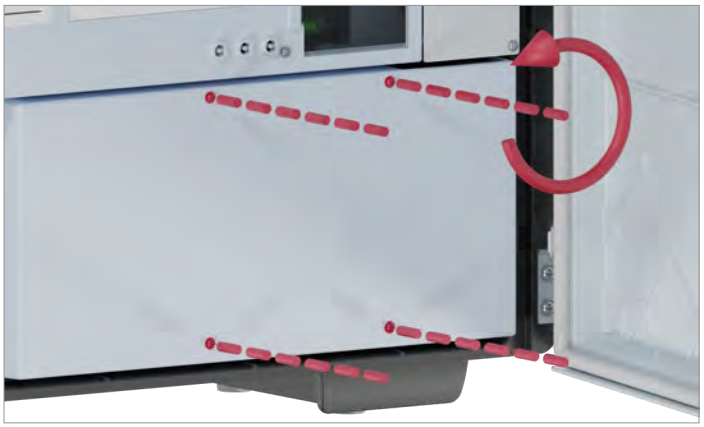
All screws including spring washers and washers of the old surge protection devices must be reused for the new surge protection devices.

Use an insulated, strongly magnetic screwdriver.

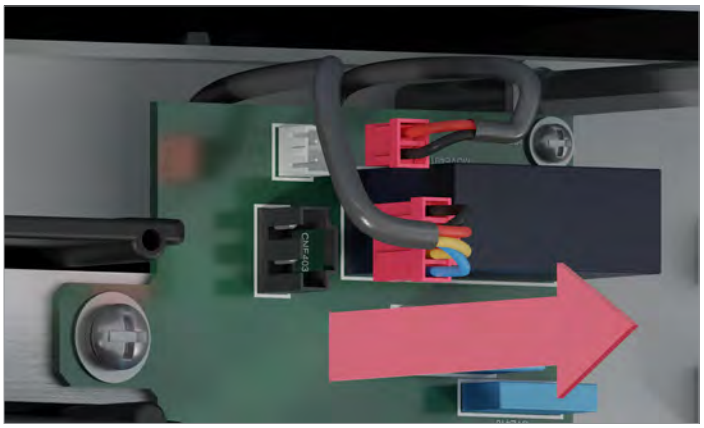
The two mounting screws are only pushed through and can easily fall down!

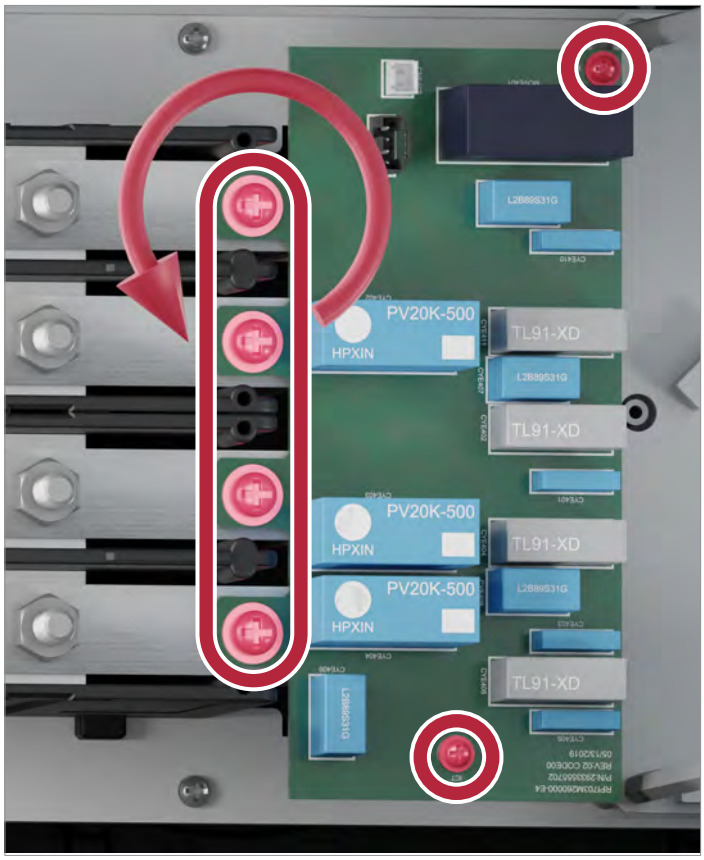
The screws on the AC or DC bus cannot fall out and must be pulled out and inserted against a certain resistance.

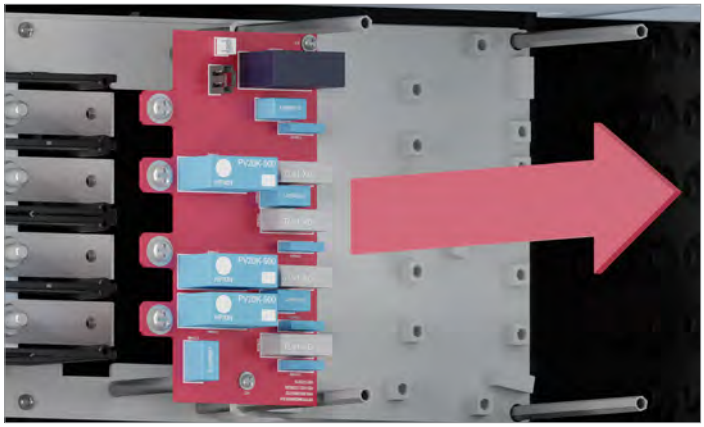




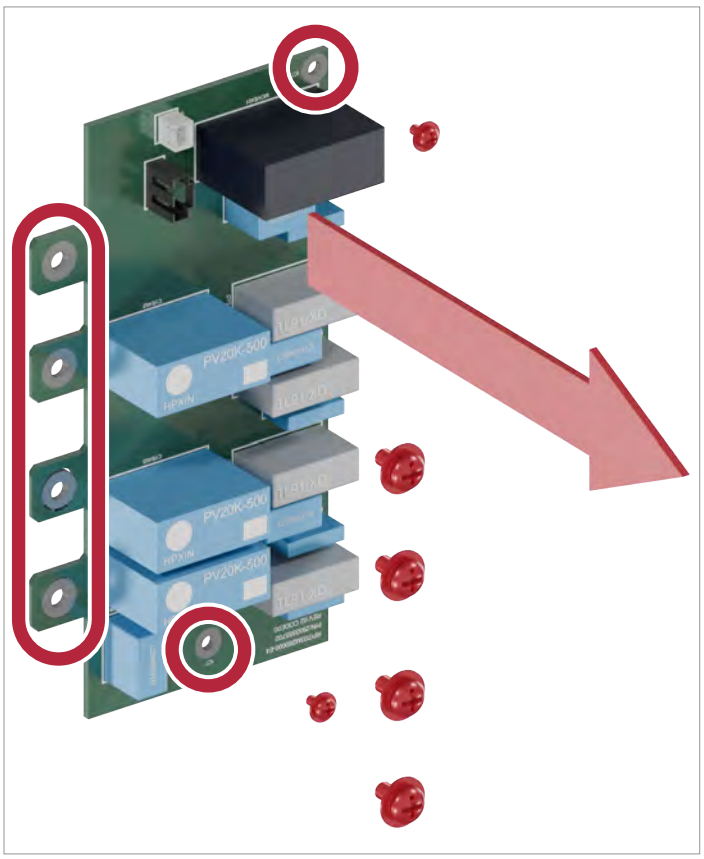








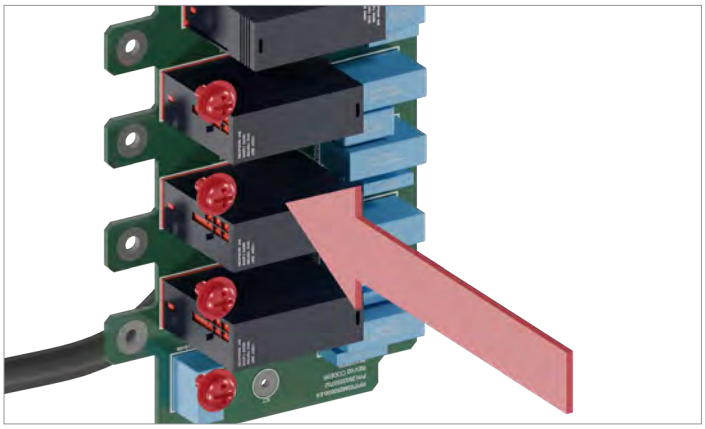
4.2 Transfer screws for the type 1+2 AC surge protection devices



4.3 Installing type 1+2 AC surge protection devices

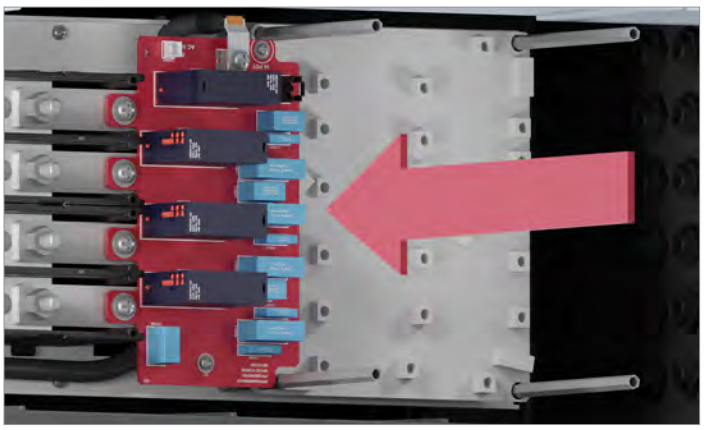


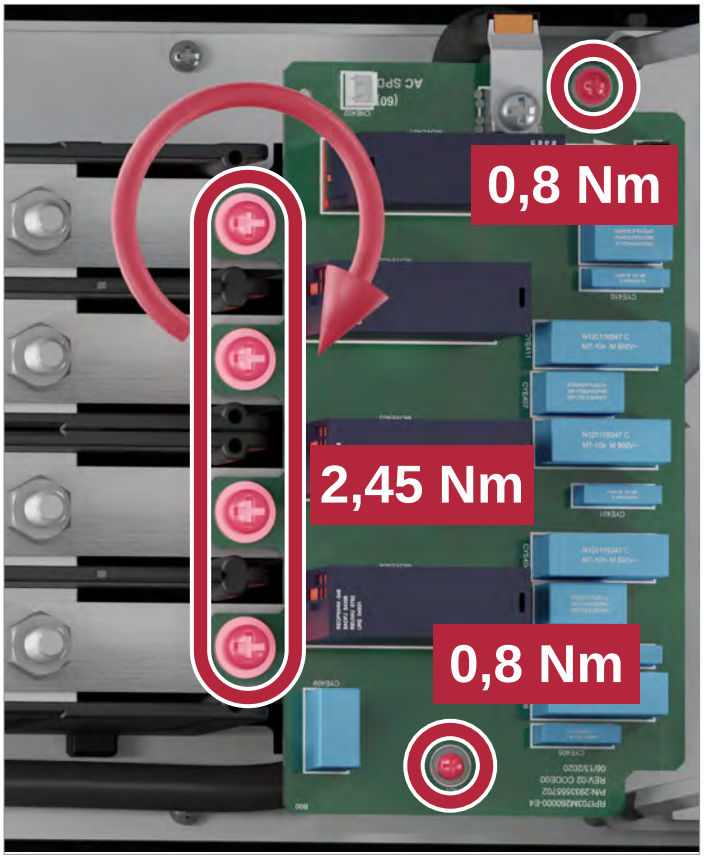




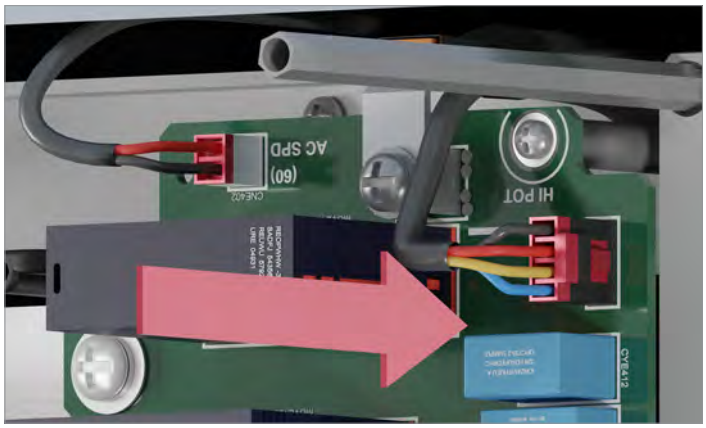
First tighten the card with the AC bus screws on the left.

Then tighten the two mounting screws on the right.






14,7 Nm


AC SPD
(60)
HI POT




0,8 Nm

5. Installation

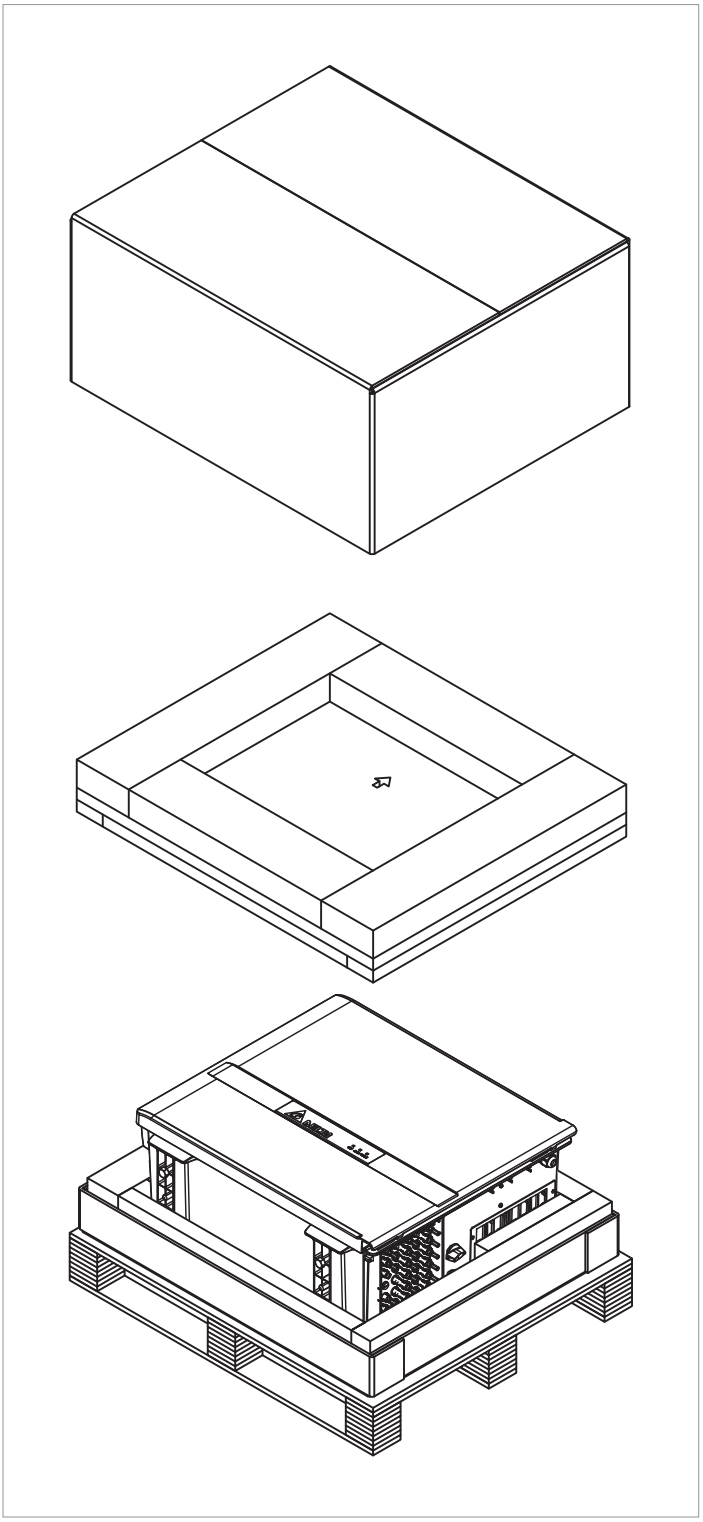
5.1 Lifting and transporting the inverter

- ► Lift and move the inverter with at least two people or a suitable lifting device.
- ► Screw threads for eyelet screws are on the top side of the inverter (M12 x P1.75; L ≤ 20 mm; 42 Nm).





5.2 Unpacking the inverter



Unpacking the inverter

5.3 Requirements for the wall, floor and mounting system

- ► The inverter can be suspended or mounted in a standing position. Feet are available for ground mounting and must be ordered separately.
- ► The inverter is heavy. The wall, floor and mounting system must be able to bear the weight of the inverter.
- ► Always use the mounting plate supplied with the inverter when mounted in a suspended position.
- ► Use mounting materials (dowels, screws etc.) that are suitable for the wall or the mounting system as well as the heavy weight of the inverter.
- ► Mount the inverter on a vibration-free wall to avoid faults.
- ► When using the inverter in residential areas or in buildings with animals, possible noise emissions can be disturbing. Therefore, choose the installation location carefully.
- ► Mount the inverter on a fireproof wall.

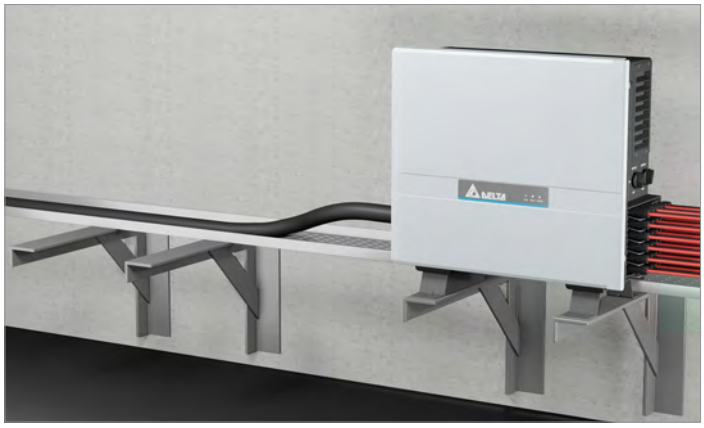
Special notes on ground mounting

In principle, the inverter can be mounted directly onto the ground or directly onto the roof in the case of roof systems.

However, if there is a risk of flooding (for example in heavy rain) or snow drifts, you should place the inverter in an elevated position.

For example, if there is a circumferential boundary wall on the roof, it can be used for installation.

The image shows example use of mounting brackets so that the inverter is positioned off the ground. The cable duct is located behind the inverter.



Standing installation with clearance from the ground

5.4 Installation height

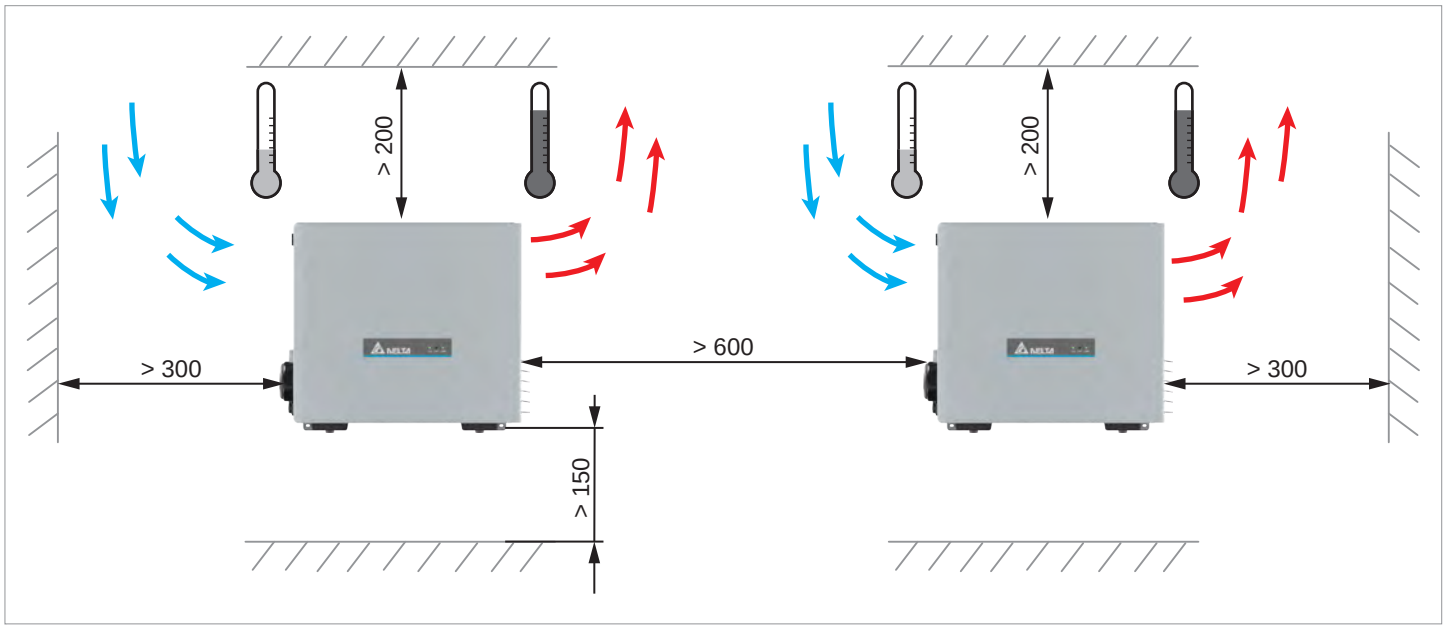
- ► Mount the inverter so that the LEDs are always visible and all components are easily accessible.

5.5 Installation position

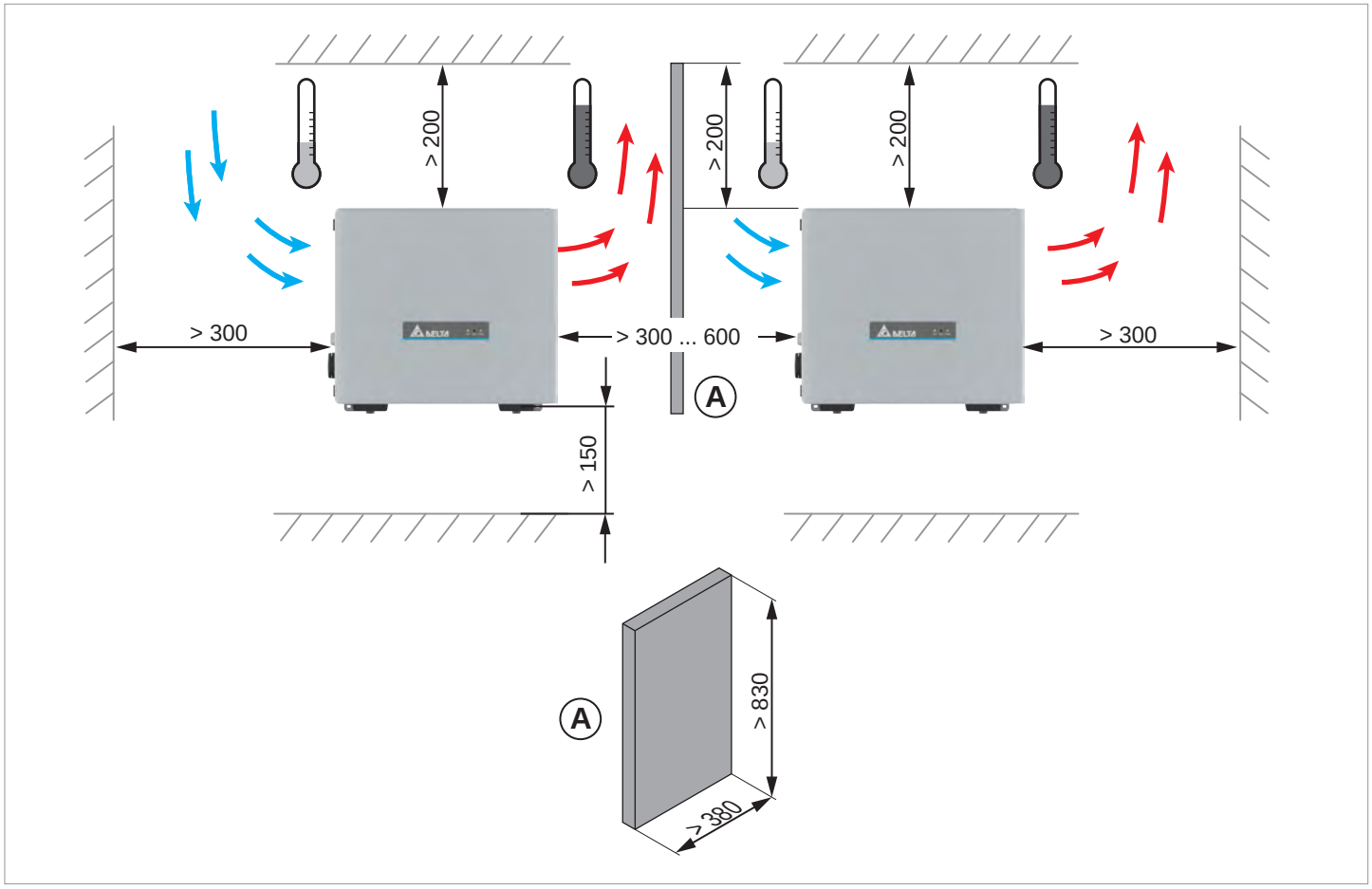


Installation position

5.6 Installation clearances and air circulation

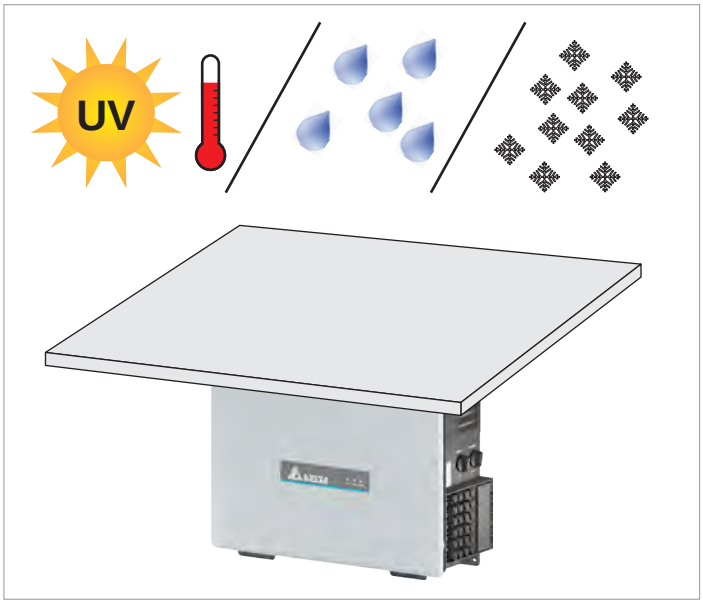


Mounting distances and air circulation, variant 1 (in mm)



Mounting distances and air circulation, variant 2 (in mm)

5.7 Outdoor installations

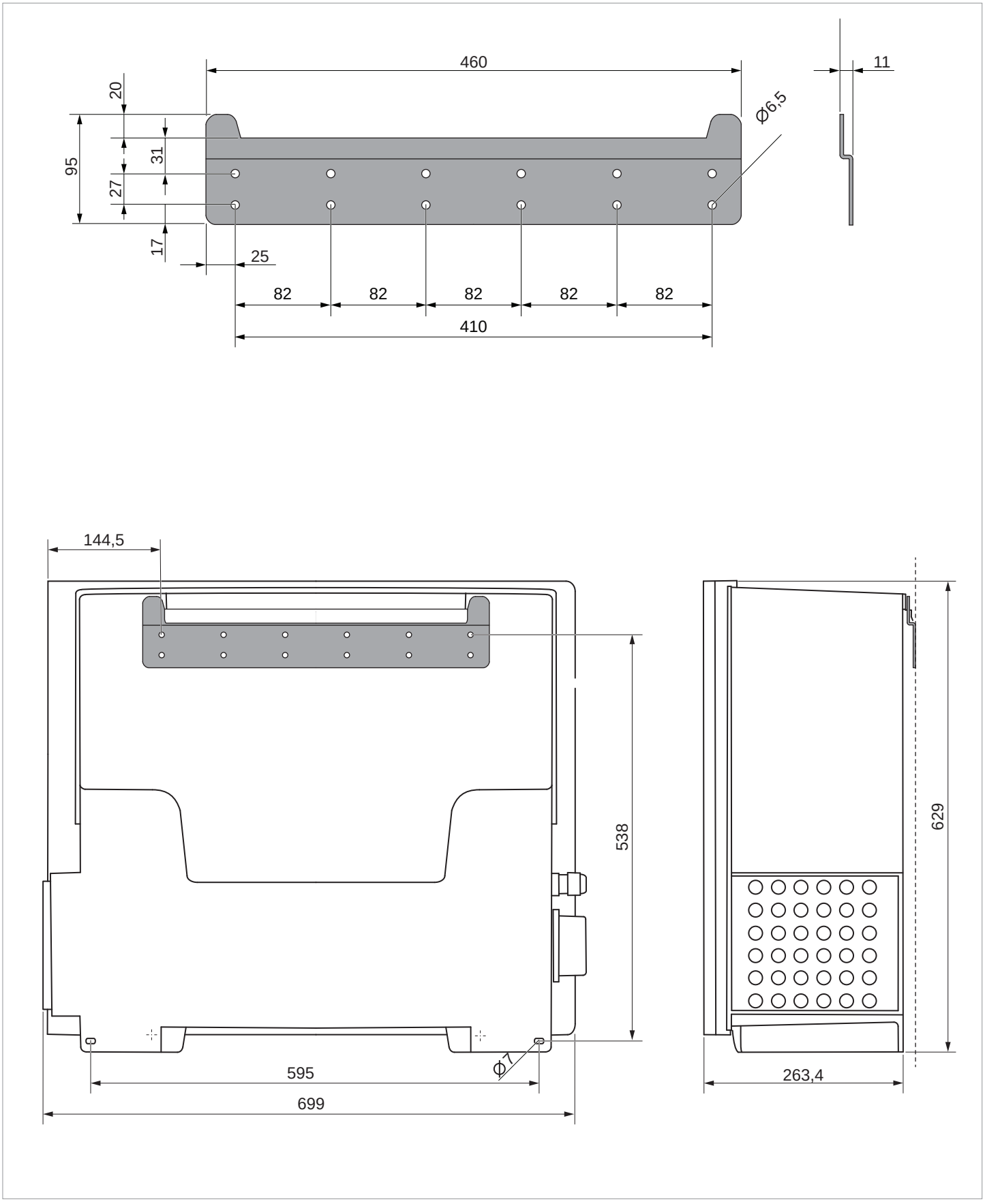


For outdoor installations, protect the inverter from direct sun, UV radiation, rain and snow

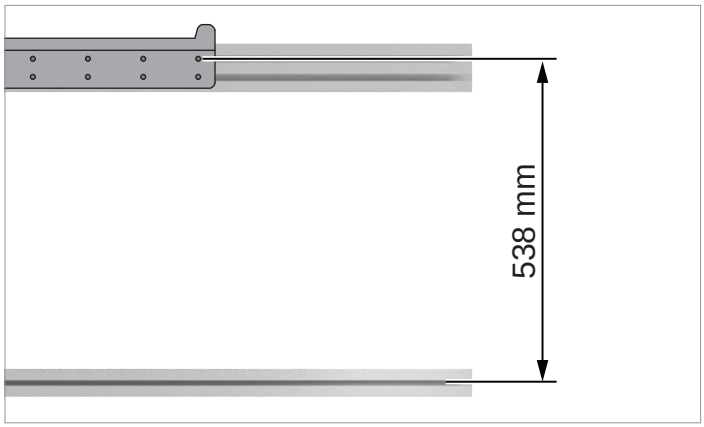
The inverter has a protection degree of IP66 and can be installed indoors and outdoors. Despite this, the inverter should be protected by a roof against direct sun, UV radiation, rain and snow.

For example, the power of the inverter will be reduced if it heated excessively by sunlight. This is normal operating behavior for the inverter and is necessary to protect the internal electronics.

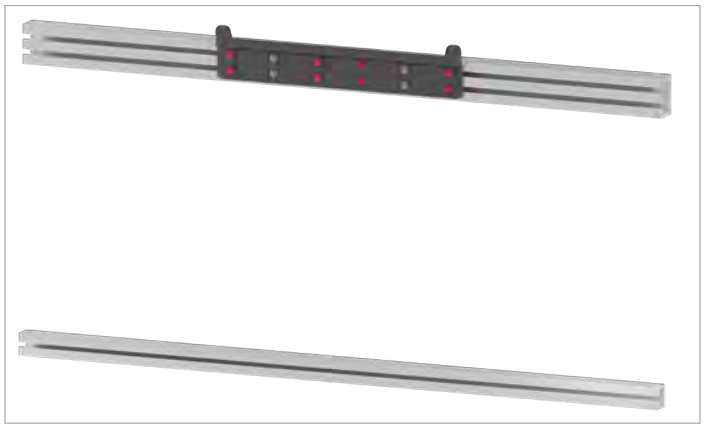
5.8 Wall mounting (suspended)



Dimensions for wall mounting

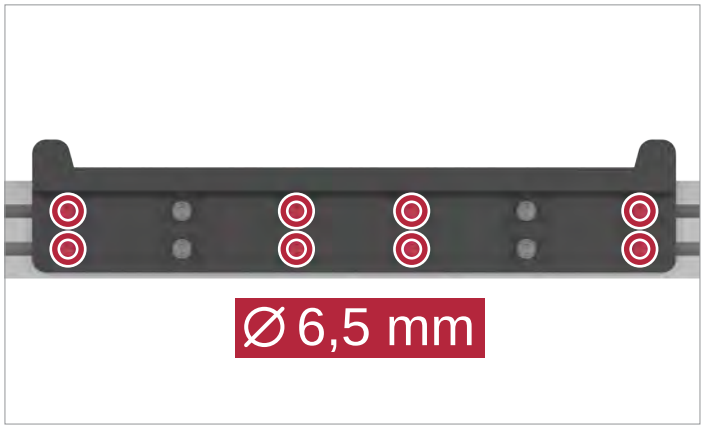










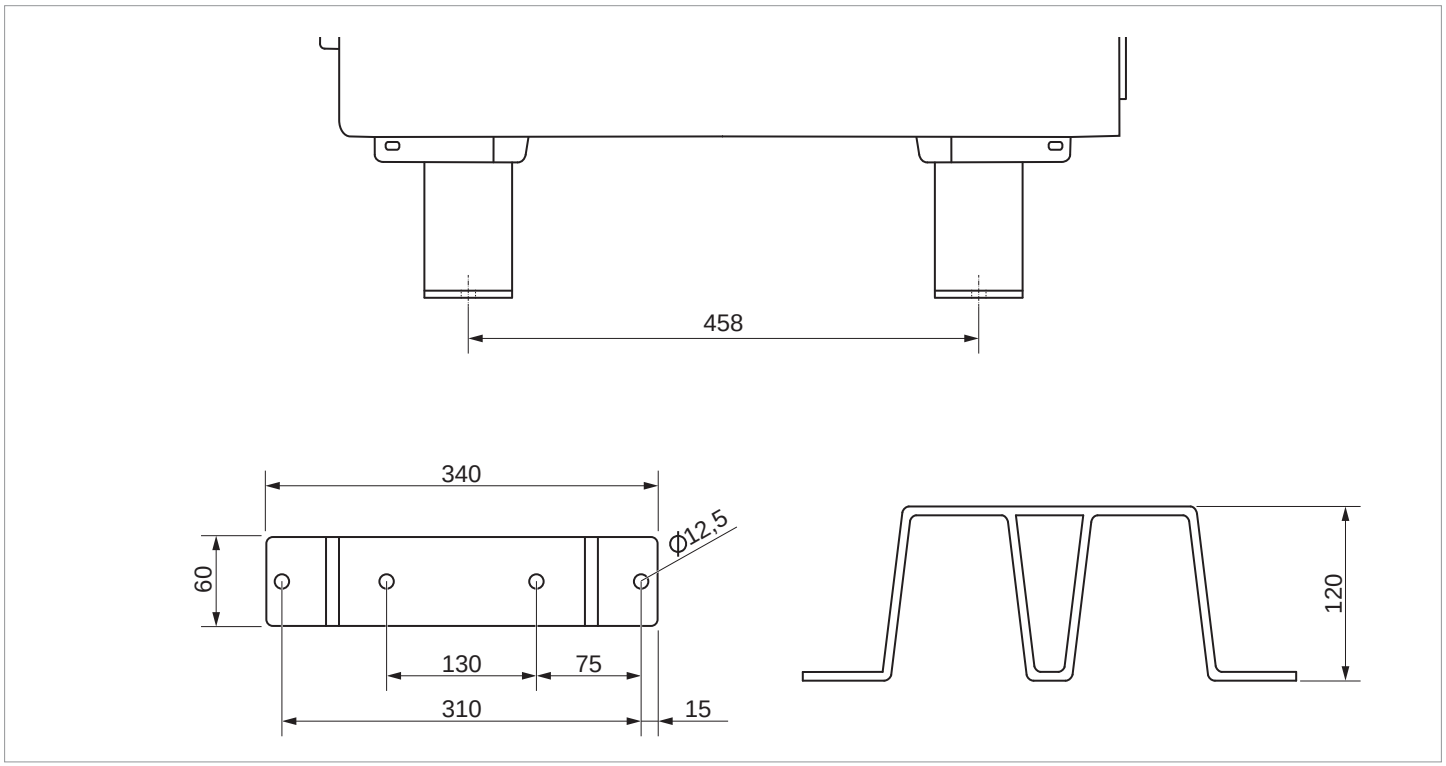


If you want to use one of the mounting holes to ground the inverter housing, observe the instructions in section “5.10 Grounding the inverter housing via the external ground connection”, page 23.

Screw the lower left and right sides of the inverter onto the wall or mounting system using a screw, spring washer and washer on each side.



5.9 Floor mounting (upright, optional)



Feet for floor mounting. Dimensions (in mm)

The feet for floor mounting must be ordered separately.







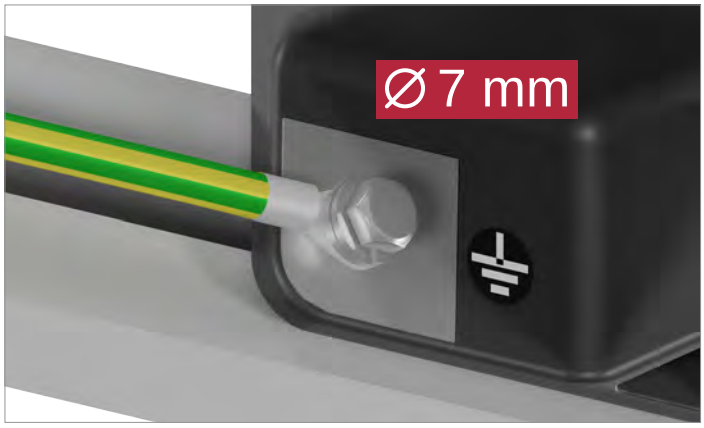
5.10 Grounding the inverter housing via the external ground connection

WARNING

High current

- ► Always comply with local regulations relating to grounding cable requirements.
- ► To increase the safety of the system, always ground the inverter housing even when this is not required by the local regulations.
- ► Always ground the inverter housing **before** connecting the inverter to the grid and the solar modules.
- ► The grounding cable cross-section must be at least 6 mm².

Alternatively, the inverter housing can be grounded using one of the two PE bolts of the AC connection, see “7. Connecting the grid (AC)”, page 38.



1. Screw the grounding cable onto the underside of the inverter. This requires a screw, spring washer and washer. A toothed washer is **not** required.

2. Perform a continuity check of the grounding connection.
   → If there is not a sufficiently conductive connection, clean the contact surface on the grounding screw or use a toothed washer if necessary.

6. Device communication and system monitoring

6.1 Introduction



The M50A, M70A and M100A inverters are essentially identical in design. The commissioning instructions apply to all of these inverters, especially if they are combined in one solar system.

Solar inverters from Delta provide you with several options for implementing commissioning, device communication and plant monitoring.

Which variant you choose has an impact on the following activities:

- Mechanical and electrical installation
- Commissioning
- System Monitoring
- Setting parameters on the inverter

You should therefore clarify the points in the section “6.2 Checklist for planning device communication”, page 25 at the start of the planning phase.

6.2 Checklist for planning device communication

Checkpoint	Description	Solution approach
How many inverters of this type (M50A, M70A, M100A) are installed in the solar system?	A smartphone with the DeltaSolar app can only be connected to one inverter at a time.	Windows PC with Delta Service Software (DSS). The inverters must be connected to each other via RS485. The PC is integrated into the RS485 bus as master using standard USB-RS485 adapter. Temporarily connect a DC1 data collector to the RS485 bus and carry out commissioning with the DeltaSolar app. Once the activities are complete, you can disconnect the DC1 and take it with you to the next solar system.
Is this solar system intended to be managed in the MyDeltaSolar Cloud?	This inverter cannot be connected directly to an Internet router.	You must install a DC1 data collector to manage data exchange with the MyDeltaSolar Cloud. You may also find a P3 power meter to be a useful extension module for the DC1, as the combination of DC1 and P3 offers more options for data acquisition and data evaluation. Deployment of a DC1 and P3 has an impact on the electrical installation.
Does a ripple control receiver need to be connected?		There are 6 digital inputs on the communication card for this purpose (see “6.8 Ripple control receiver”, page 34).
Should certain events occurring during inverter operation (e.g. "Disconnection from grid”) be indicated using an external alarm device?		The inverter has two relays for triggering external alarm devices (see “6.7 External alarm devices”, page 33).
Should it be possible to disconnect the inverter from the grid connection point via an external signal (external power-off)?		There is a connection on the communication card for this purpose (see “6.9 External power-off”, page 35)

6.3 Communication software

The following software is available for making settings on the inverter described in this chapter:

- DeltaSolar app for mobile devices (smartphone or tablet) with iOS and Android
- Delta Service Software (DSS) for Windows PC. Download at partnerportal.delta-emea.com (registration required).

6.4 Communication hardware

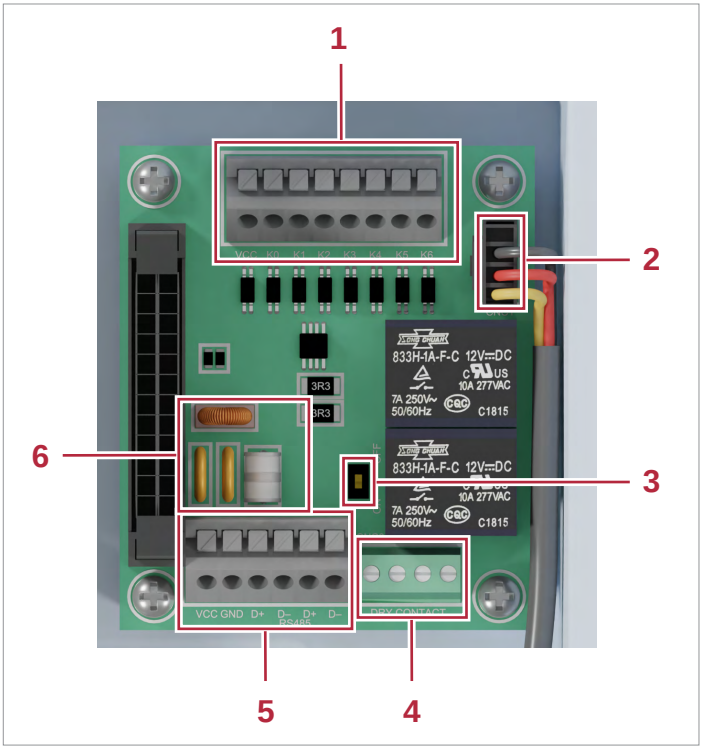
6.4.1 Bluetooth interface

The inverter has an integrated Bluetooth antenna for wireless connection to a mobile device (smartphone or tablet).

Note that restrictions apply (see “6.2 Checklist for planning device communication”, page 25).

6.4.2 Communication card

6.4.2.1 Connections



Connections on the communication card

1 Digital inputs and external power-off (terminal block)
2 Power supply for internal fan 1
3 DIP switch for the RS485 termination resistor
4 2 x dry contacts (terminal block)
5 RS485 (terminal block)
6 Protection against electromagnetic interference (EMI)

Connection	Connection type
2x RS485 (DATA+ and DATA–)	Terminal block
1x VCC (12 V, 0.5 A)	Terminal block
6x digital inputs	Terminal block
2x dry contacts	Terminal block
1x external power-off (EPO)	Terminal block

Connections on the communication card

6.4.2.2 Specification of the communication cable

Cable type	Shielded and twisted pair cable (CAT5 or CAT6)
Cable diameter	7.2 / 8 / 10 mm
Wire cross-section	0.25 to 1.5 mm²

Specification of the communication cable

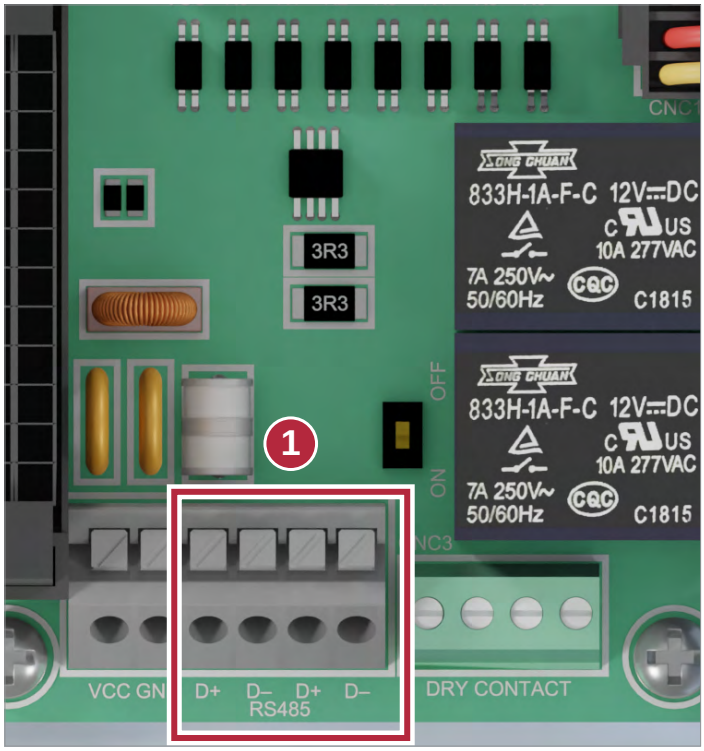
6.4.2.3 Cable gland for the communication connection



Cable gland for up to four communication cables

6.5 Connecting a data logger

6.5.1 Introduction



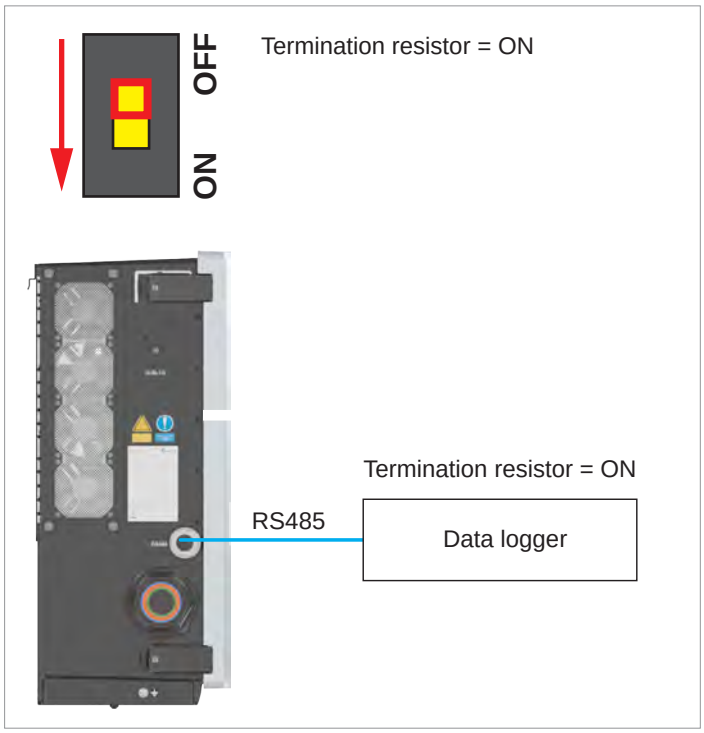
RS485 terminals for connecting a data logger

The data logger and the inverter are connected via RS485.

Data is transferred via SUNSPEC protocol with Modbus RTU.

Take the following sections into account for ensuring a stable data connection.

6.5.2 Connecting a single inverter to a data logger



Connection between a single inverter and a data logger

- ► Switch on the RS485 termination resistor at the inverter and data logger.
- ► Lay the communication cable with a suitable clearance to the AC and DC cables to prevent interference in the data connection.

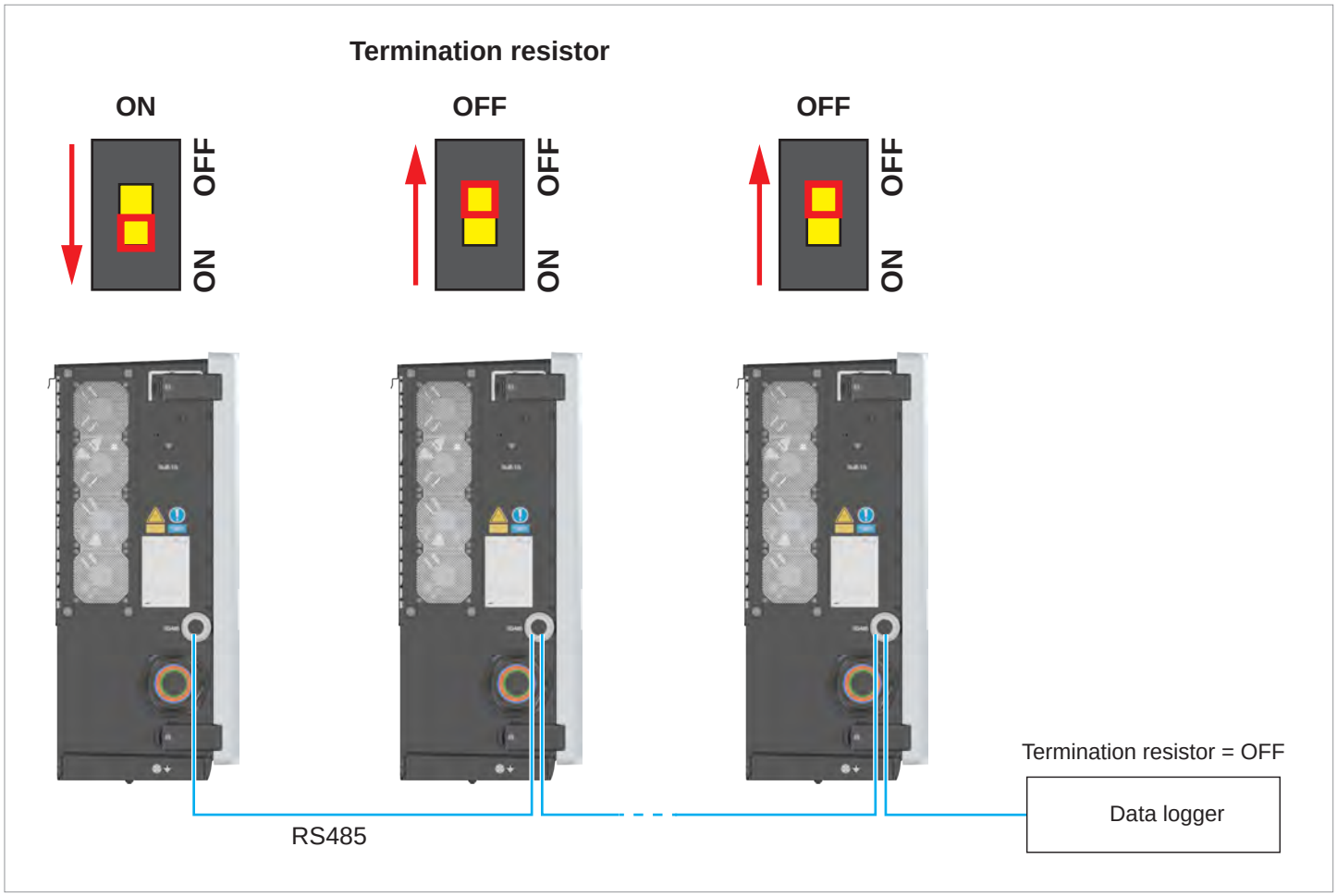
6.5.3 Connecting multiple inverters to a data logger

6.5.3.1 General notes

- ► Set a different inverter ID for each inverter. Otherwise the data logger cannot identify the individual inverters.
- ► Set the same RS485 baud rate at each inverter (factory setting: 19200).
- ► Lay the RS485 cable with a suitable clearance to the AC and DC cables to prevent interference in the data connection.

6.5.3.2 Consideration of the position of the data logger in the RS485 bus

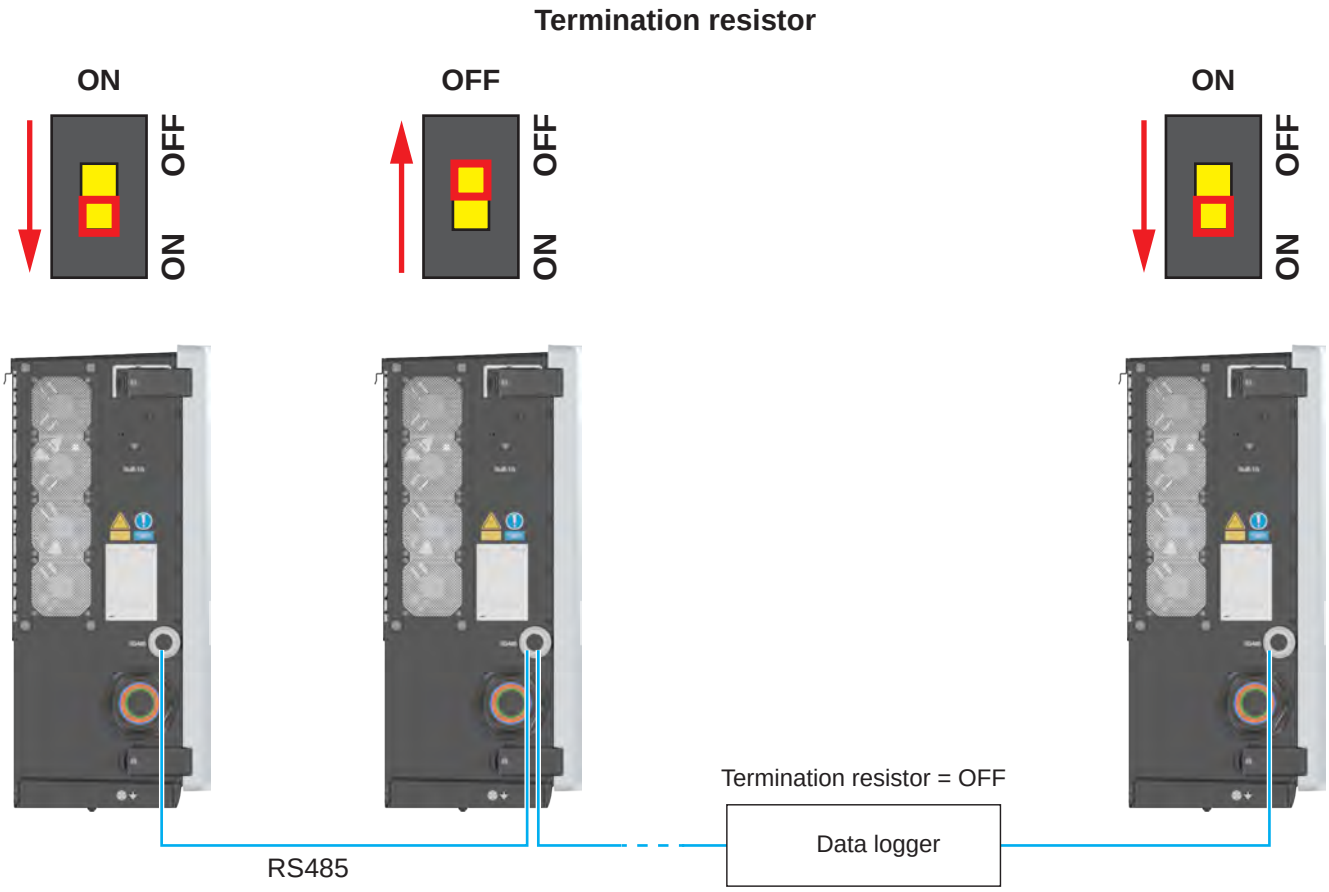
The data logger is located at one of the two ends of the RS485 bus



Connection of multiple inverters with a data logger at the end of the RS485 bus

- ► Switch the RS485 termination resistor of the data logger and inverter at the other end of the RS485 bus **on**.
- ► Switch the RS485 termination resistor on all other inverters **off** (default setting from the factory).

The data logger is located in the middle of the RS485 bus



Connection of multiple inverters with a data logger in the middle of the RS485 bus

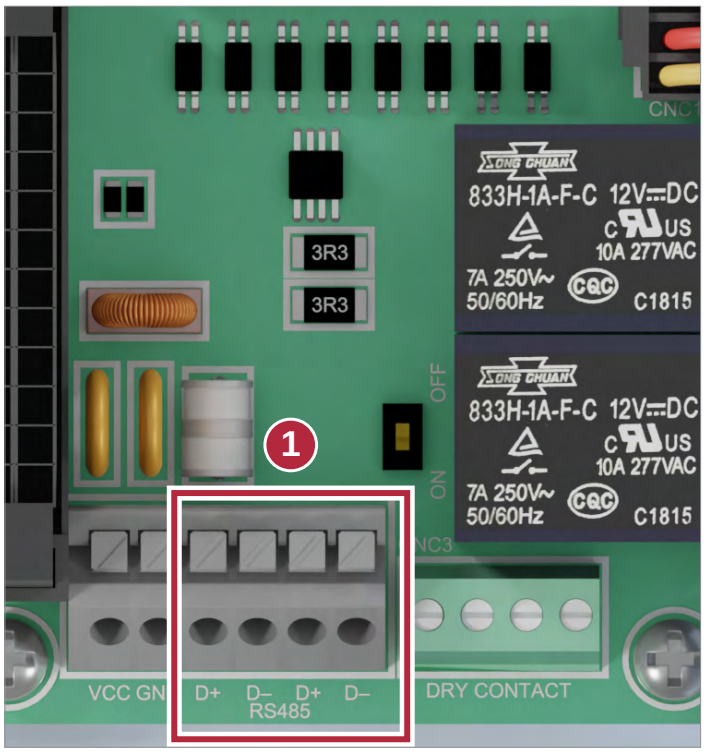
- ► Switch the RS485 termination resistor of the data logger **off**.
- ► Switch the RS485 termination resistor of the two inverters at the ends of the RS485 bus **on**.
- ► Switch the RS485 termination resistor on all other inverters **off** (default setting from the factory).

6.6 Connection of a DC1 data collector from Delta

6.6.1 Introduction

Application scenarios for the DC1 data collector:

- Simultaneous commissioning and setup of multiple inverters
- Updating the firmware
- Connecting the solar system to the MyDeltaSolar Cloud or another monitoring system



RS485 for connection of a data logger

The data logger and the inverter are connected via RS485.

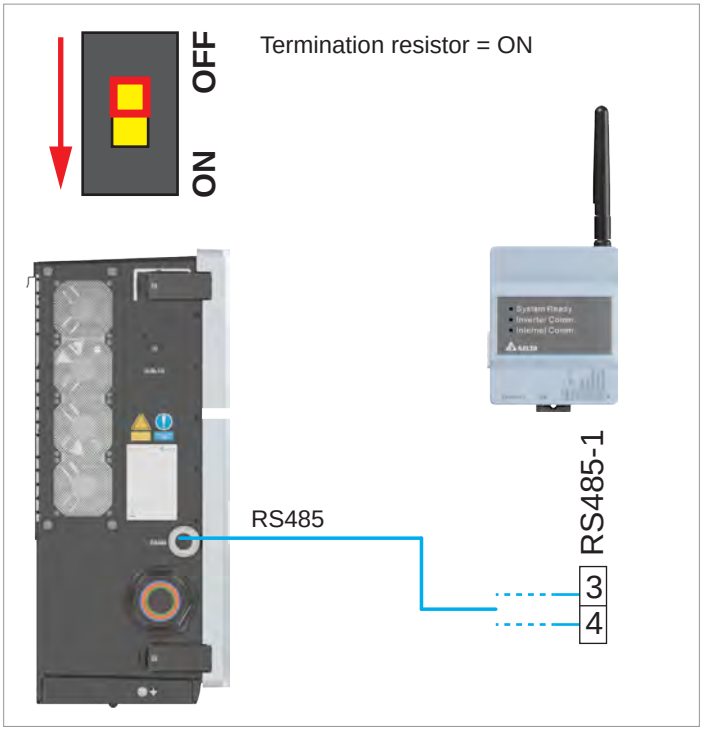
Data is transferred via SUNSPEC protocol with Modbus RTU.

Take the following sections into account for ensuring a stable data connection.

In order to access the DC1 and the inverter through it, you need a mobile device (smartphone, tablet) with the DeltaSolar app. The connection is made via the Wi-Fi interface of the DC1.

You can download the DC1 installation instructions here: https://solarsolutions.delta-emea.com/de/DC1-data-collector-2277.htm

6.6.2 Connecting a single inverter to the DC1



Connection of a single inverter to the DC1

► Always use the RS485-1 connection on the DC1!

► Switch on the RS485 termination resistor on the inverter.

► The DC1 **does not** have an integrated RS485 termination resistor. Therefore, a 120-ohm resistor must be connected!

► Lay the communication cable with a suitable clearance to the AC and DC cables to prevent interference in the data connection.

6.6.3 Connecting multiple inverters to the DC1

6.6.3.1 General notes

► Make sure that both cables are connected to the RS485-1 connection on the DC1!

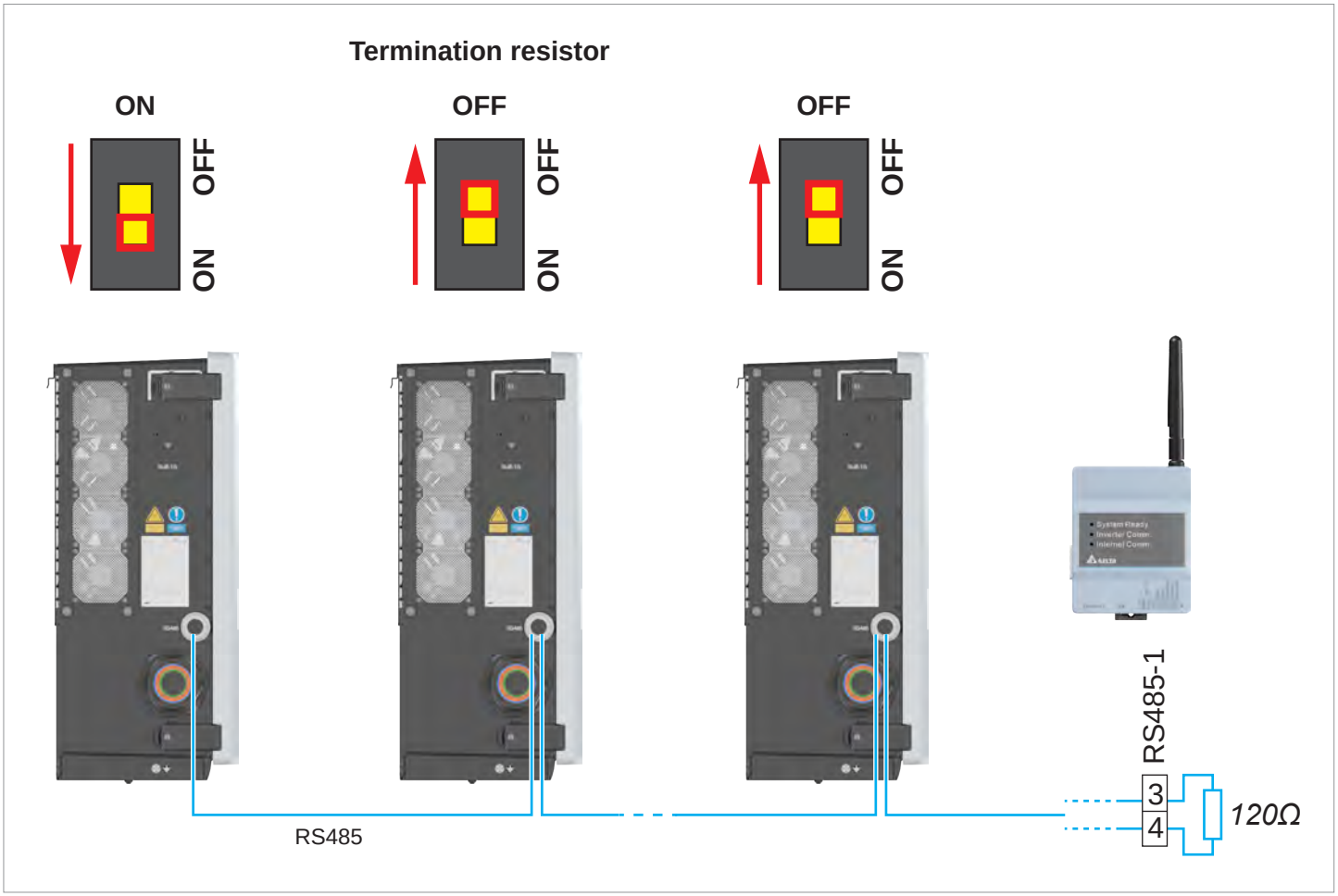
► Set a different inverter ID for each inverter. Otherwise the DC1 cannot identify the individual inverters.

► Set the same RS485 baud rate at each inverter (factory setting: 19200).

► Lay the RS485 cable with a suitable clearance to the AC and DC cables to prevent interference in the data connection.

6.6.3.2 Consideration of the position of the DC1 in the RS485 bus

The DC1 is located at one of the two ends of the RS485 bus



Connection of multiple inverters with the DC1 at the end of the RS485 bus

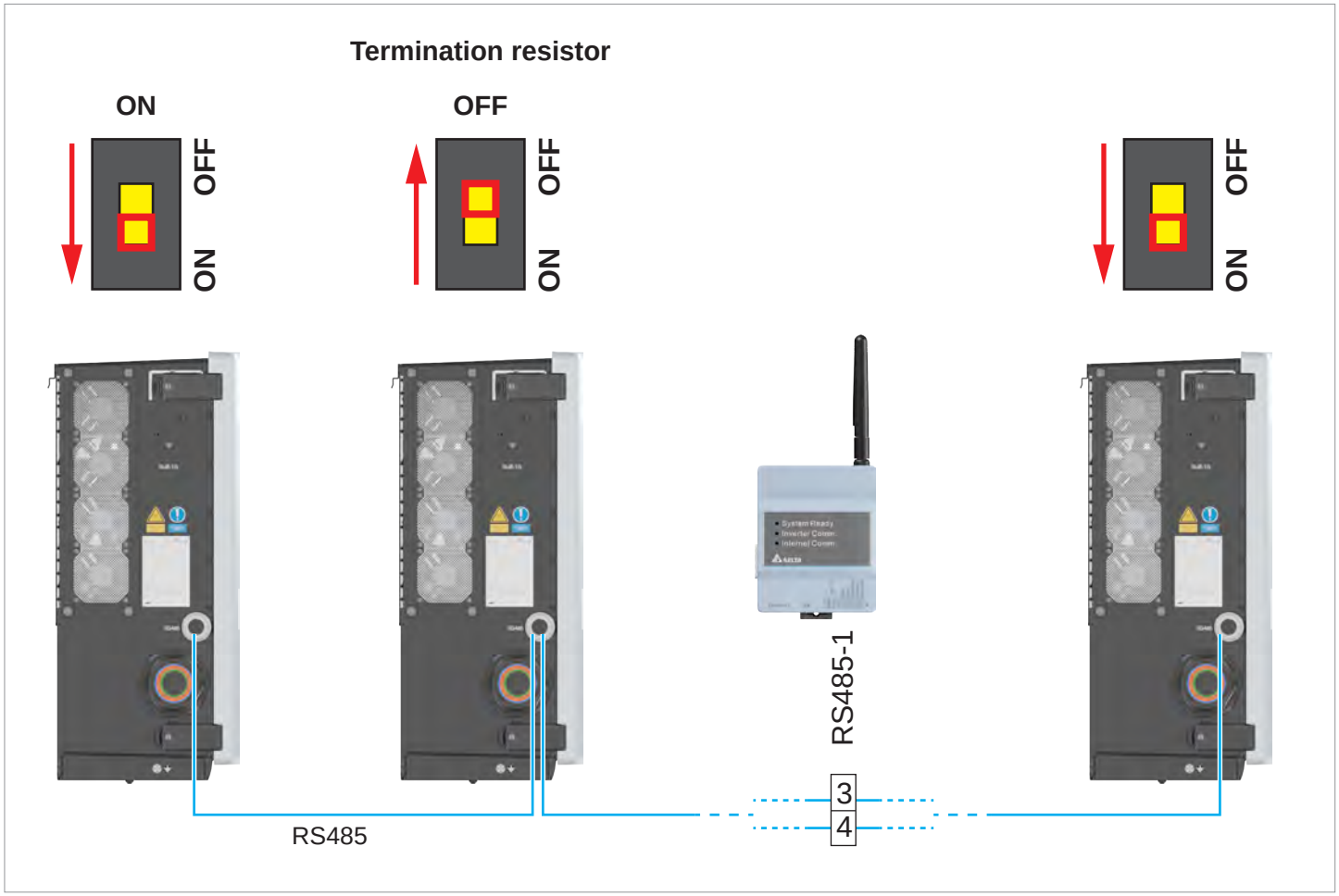
► Switch the RS485 termination resistor of the data logger and inverter at the other end of the RS485 bus **on**.

► Switch the RS485 termination resistor on all other inverters **off** (default setting from the factory).

The data logger is located in the middle of the RS485 bus

5 Device communication and system monitoring

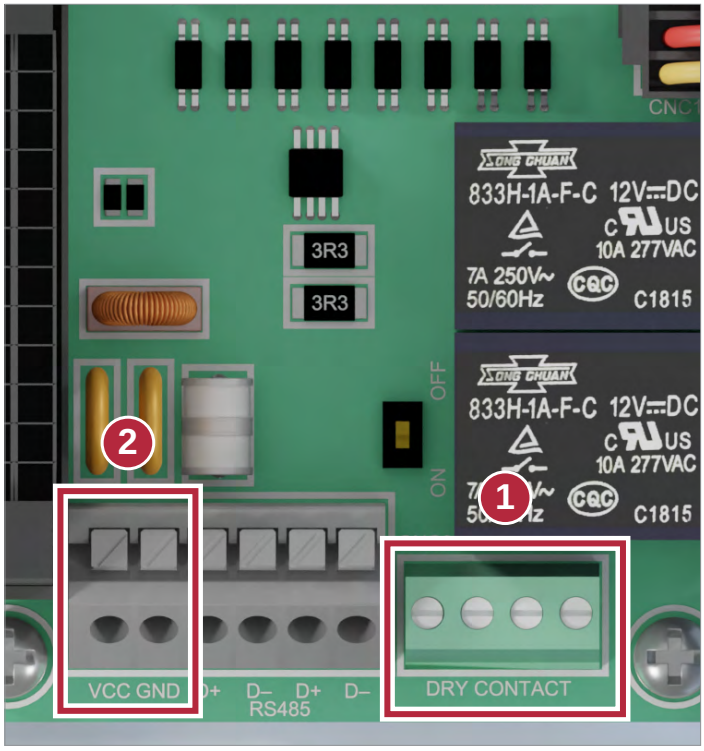
Connection of a DC1 data collector from Delta



Connection of multiple inverters with the DC1 within the RS485 bus

- ► Switch the RS485 termination resistor of the data logger **off**.
- ► Switch the RS485 termination resistor of the two inverters at the ends of the RS485 bus **on**.
- ► Switch the RS485 termination resistor on all other inverters **off** (default setting from the factory).

6.7 External alarm devices



Dry contacts and 12-VDC power supply

The inverter has two relays with dry contacts **(1)**, each for an external acoustic or visual alarm device.

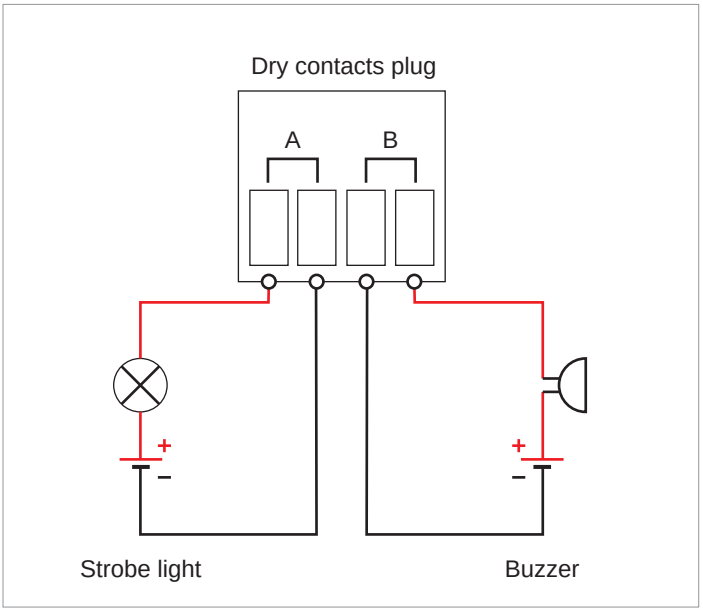
The RS485 terminal block has a 12-VDC power supply **(2)**.

Both relays are designed as normally open contacts.

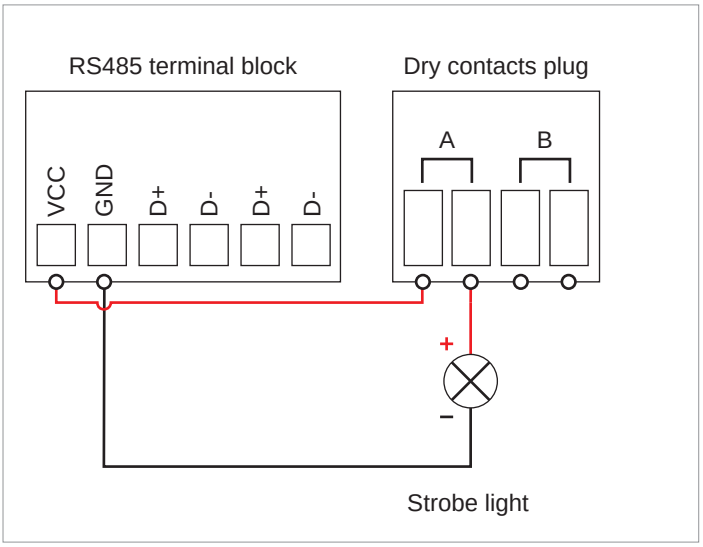
An event can be assigned to the dry contacts with Delta Service Software or the MyDeltaSolar app after commissioning.

Event	Description
`Disabled`	The function is disabled.
`On Grid`	The inverter is connected to the grid.
`Fan defective`	The fans are defective.
`Insulation`	The insulation test has failed.
`Alarm`	An error event message, fault message or warning has been sent.
`Error`	An error event message has been sent.
`Fault`	A fault message has been sent.
`Warning`	A warning message has been sent.

Events for which the relay can trigger

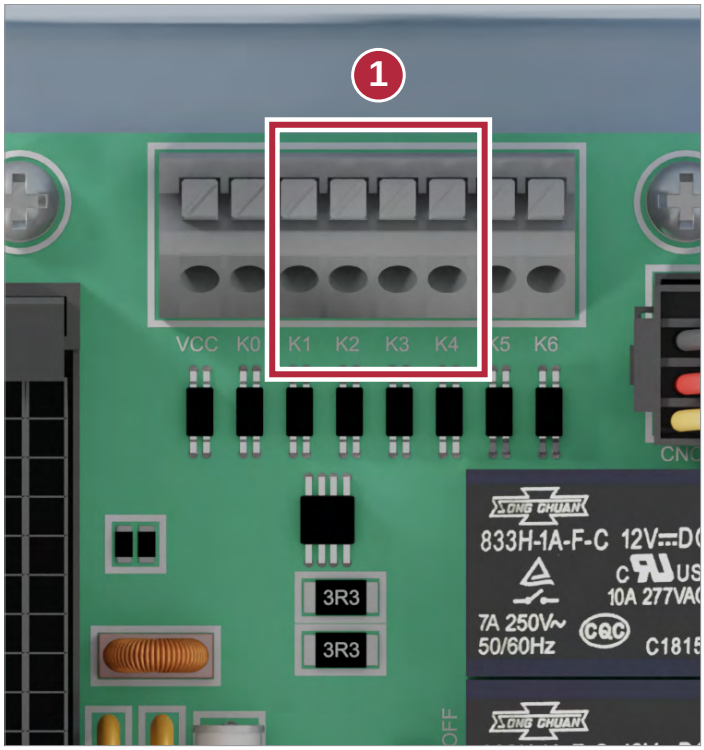


Connection diagram for wiring two external alarm devices with an external 12-VDC power supply



Connection diagram for wiring one external alarm device with an internal 12-VDC power supply

6.8 Ripple control receiver

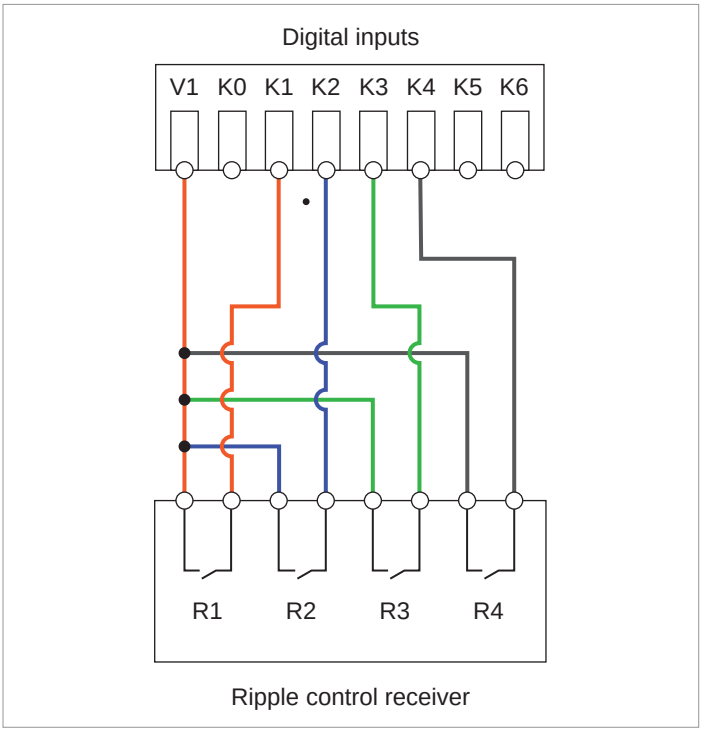


Terminal block with digital inputs

The inverter has 4 digital inputs **(1)** for connecting a ripple control receiver.

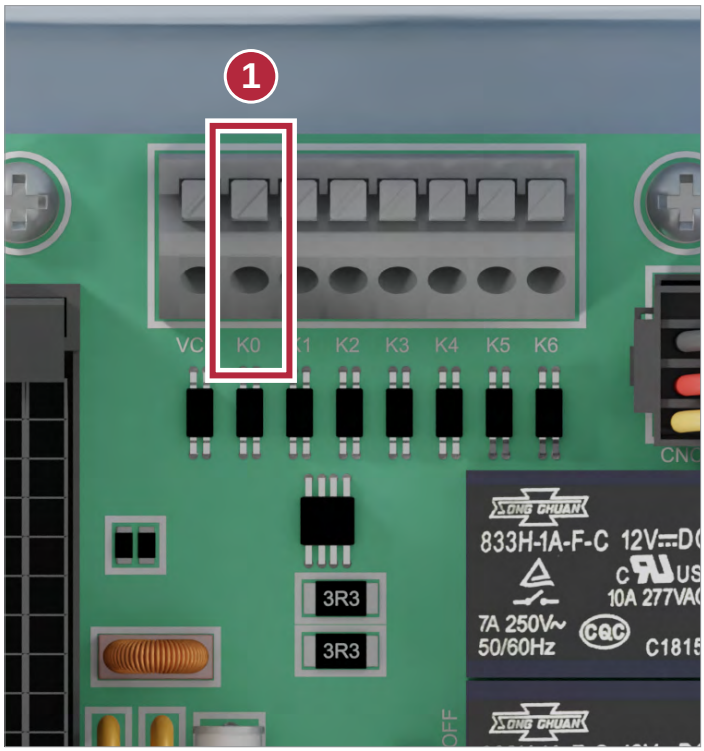
Pin	Naming	Short circuit	Assigned action
1	V1	-	-
2	K0	V1 + K0	External power-off (EPO)
3	K1	V1 + K1	Maximum active power limited to 0%
4	K2	V1 + K2	Maximum active power limited to 30%
5	K3	V1 + K3	Maximum active power limited to 60%
6	K4	V1 + K4	Maximum active power limited to 100%
7	K5	V1 + K5	Reserved
8	K6	V1 + K6	Reserved

Pin assignment of the terminal block with digital inputs for connecting a ripple control receiver



Connection diagram for a ripple control receiver

6.9 External power-off



Terminal block with digital inputs

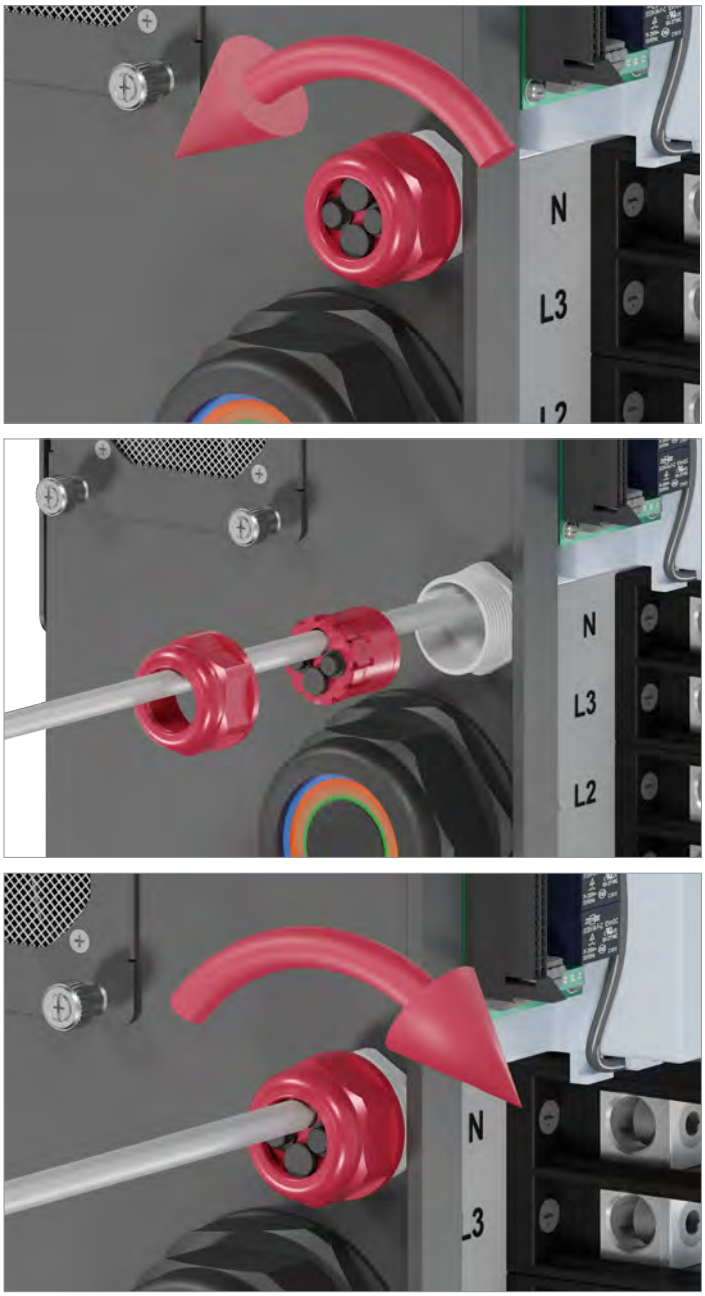
To disconnect the inverter AC-side from the grid connection point, a switching signal can be sent via digital input K0 **(1)**.

The relay is designed at the factory as a normally open contact. In the inverter settings, you can set the relay as a normally closed contact.

Pin	Naming	Short circuit	Assigned action
1	V1	-	-
2	K0	V1 + K0	External power-off (EPO)
3	K1	V1 + K1	Maximum active power limited to 0%
4	K2	V1 + K2	Maximum active power limited to 30%
5	K3	V1 + K3	Maximum active power limited to 60%
6	K4	V1 + K4	Maximum active power limited to 100%
7	K5	V1 + K5	Reserved
8	K6	V1 + K6	Reserved

Pin assignment of the terminal block for the external power-off

6.10 Threading the communication cable



6.11 Grounding the RS485 cable

IMPORTANT

Unwanted currents

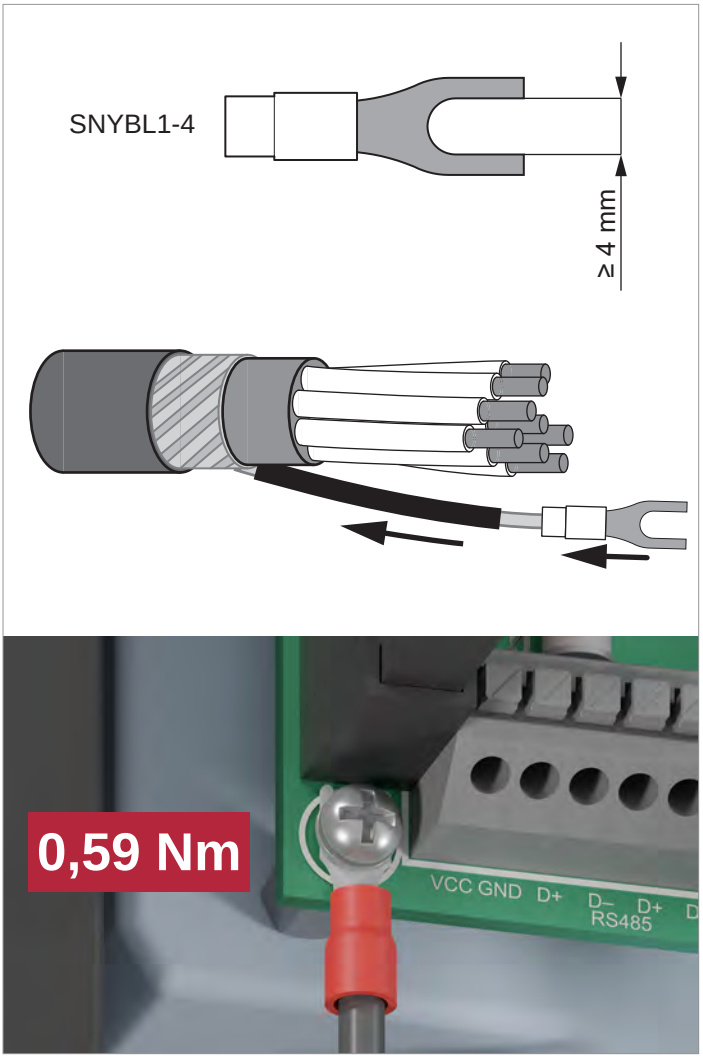
In some installation variants, unwanted currents can flow when multiple inverters are connected via RS485.

- ► Do not use GND and VCC on the communication card.
- ► If the cable shield is used for providing lightning protection then the housing of only one inverter in the RS485 chain should be grounded.



Grounding the RS485 cable

The cable shield of the RS485 cable can be grounded at the bottom left mounting screw of the communication card.



Grounding the RS485 cable

1. Twist the cable shield.
2. Insulate the twisted-open cable shield (e.g. with a rubber tube).
3. Crimp a fork-type cable lug.
4. Screw on the cable shield to the bottom left mounting screw on the communication card.

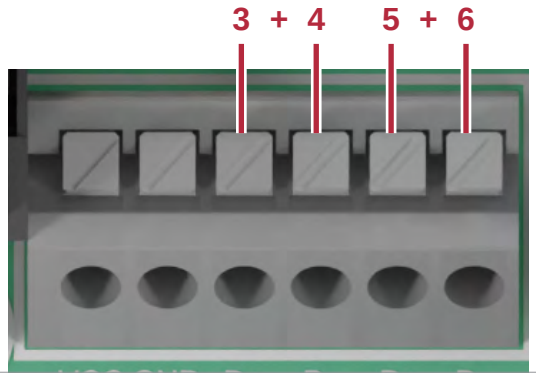
6.12 Connecting a PC via RS485 (optional)

Note that you must disconnect the PC from the inverter again after commissioning!

Accessories	Description
Standard USB/RS485 adaptor	For connecting the PC to the inverter.
Delta Service Software (DSS)	For changing the inverter settings.

To select a suitable USB/RS485 adaptor, please contact Delta Customer Service.

You can download the DSS at https://solarsolutions.delta-emea.com.



You can use terminal pairs 3+4 or 5+6 to connect the PC.

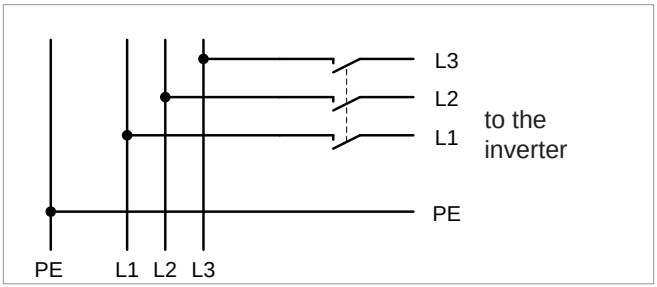
DATA+	Terminal 3 or 5
DATA–	Terminal 4 or 6

7. Connecting the grid (AC)

7.1 Important safety instructions

- ► Always follow the specific regulations of your country or region.
- ► Always follow the specific regulations of your energy provider.
- ► Install all the stipulated safety and protective devices (such as automatic circuit breakers and/or surge protection devices).
- ► Protect the inverter with a suitable upstream circuit breaker:

Upstream circuit breaker	160 A recommended



- ► Select the protective devices for the grid cables to the transformer for the grid feed-in point: always take into account the impedance between the PE of the inverter and the system and/or operational ground of the distribution network. This applies in particular for IT networks.

7.2 Residual current circuit breaker

Due to its design, the inverter cannot supply the grid with DC residual current. This means that the inverter meets the requirements of DIN VDE 0100-712.

Possible error events were assessed by Delta in accordance with the current installation standards. The assessments showed that no hazards arise from operating the inverter in combination with an upstream, type A residual current circuit breaker (FI circuit breaker, RCD). There is no need to use a type B residual current circuit breaker.

Minimum tripping current of the type A residual current circuit breaker	≥300 mA

The required tripping current of the residual current circuit breaker depends first and foremost on the quality of the solar modules, the size of the PV system, and the ambient conditions (for example, humidity). The tripping current must not, however, be less than the specified minimum tripping current.

7.3 Integrated residual current monitoring unit

The integrated universal current-sensitive residual current monitoring unit (RCMU) is certified in accordance with VDE 0126 1-1:2013-08 §6.6.2.

7.4 AC surge protection devices

The inverter is equipped with type 2 AC surge protection devices. Replacements can be ordered from Delta Electronics.

Alternatively, type 1+2 combined AC surge protection devices can be ordered from Delta Electronics.

7.5 Permitted grounding systems

Grounding system	TN-S	TN-C	TN-C-S	TT	IT
Allowed	Yes	Yes	Yes	Yes	Yes

7.6 Grounding the inverter housing

WARNING

Electric shock

In the event of a fault, the inverter housing may be live.

- ► Always comply with local regulations relating to grounding cable requirements.
- ► To increase the safety of the system, always ground the inverter housing even when this is not required by the local regulations.
- ► Always ground the inverter housing before connecting the inverter to the grid and the solar modules.
- ► The grounding cable cross-section must be at least 6 mm².

Alternatively, the inverter housing can be grounded using the PE bolts of the AC connection (see “7.8 Specification for the AC terminal block”, page 39).

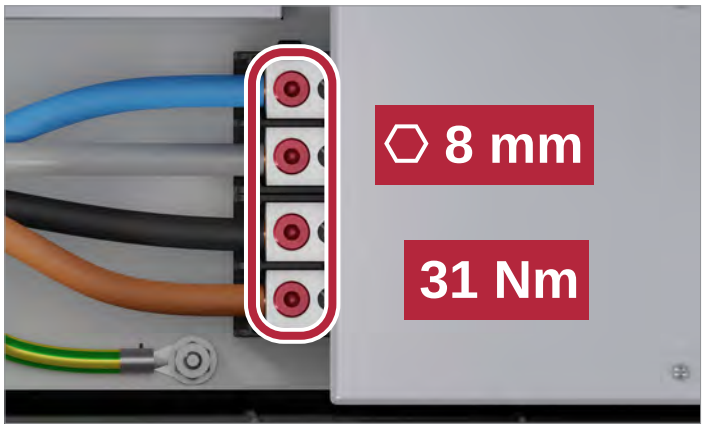


Grounding connection on left and right mounting holes

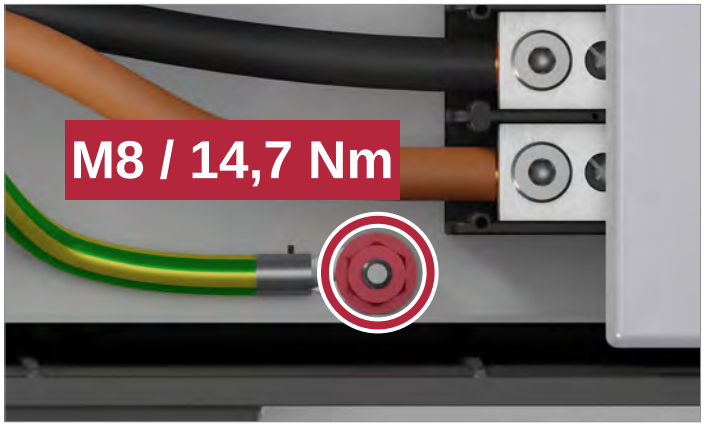
7.7 Permissible grid voltages

3P3W	Voltage range	3P4W	Voltage range
L1-L2	400 V_{AC} -20%/+30%	L1-N	230 V_{AC} -20%/+30%
L1-L3	400 V_{AC} -20%/+30%	L2-N	230 V_{AC} -20%/+30%
L2-L3	400 V_{AC} -20%/+30%	L3-N	230 V_{AC} -20%/+30%

7.8 Specification for the AC terminal block



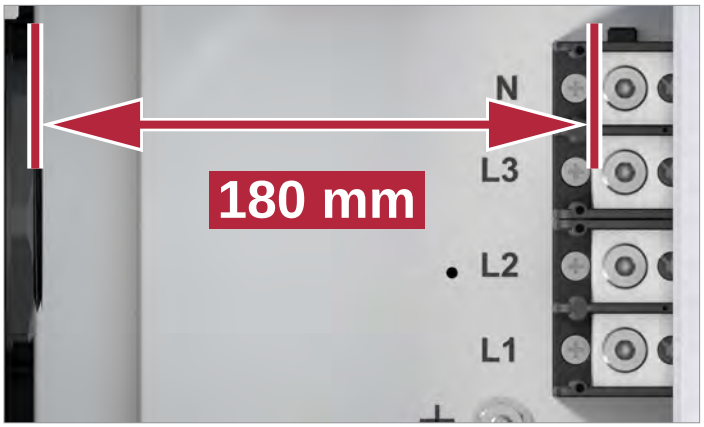
Torques at the AC terminal block



Torques at the PE connection

Connection type	Screws with hexagon socket head
Type of attachment	• 8 mm hexagon socket (L1, L2, L3, N) • M8 nut (PE)
Tightening torque	• 31 Nm (L1, L2, L3, N) • 14.7 Nm (PE)

Specification for the AC terminal block



Free space for wiring on the AC terminal block

7.9 Selecting the AC cable

7.9.1 Notes on calculating the cable cross-section

► Consider the following factors when calculating the cable cross-section:
  – Cable material
  – Temperature conditions
  – Cable length
  – Installation type
  – Voltage drop
  – Loss of power in the cable

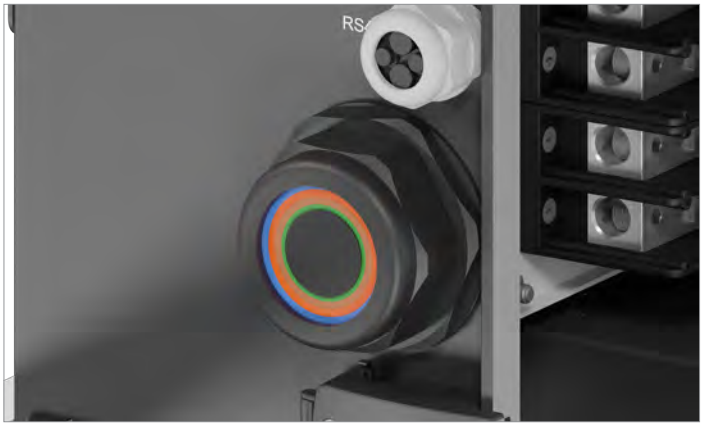
► Always follow the IEC 60364-5-52 requirements and your country-specific installation instructions.

► France: Follow the installation instructions of UTE 15-712-1. This standard contains the requirements for minimum cable diameters and for avoiding overheating due to high currents.

► Germany: Follow the installation instructions of VDE 0100-712. This standard contains the requirements for minimum cable diameters and for avoiding overheating due to high currents.

7.9.2 AC cable specifications

The PE conductor can be connected as part of a cable with four or five conductors or as a separate cable with a single conductor.



AC cable gland

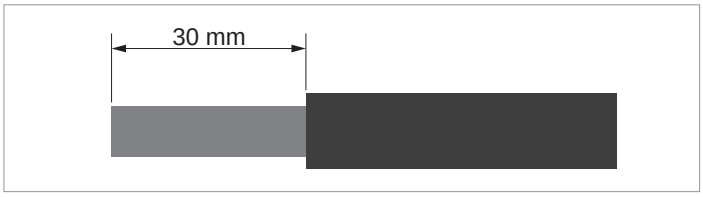
Min./max. Cable diameter	26.0 to 57.0 mm
Min./max. Wire cross-section	
Without wire end sleeve	
• Rigid cable	35 to 120 mm²
• Multi-wire cable	35 to 120 mm²
With wire end sleeve	
• Flexible cable	35 to 120 mm²

Specifications for copper AC cables

Min./max. Cable diameter	26.0 to 57.0 mm
Min./max. Wire cross-section	
Without wire end sleeve	
• round, single-wire (rs)	60 to 120 mm²
• round, multi-wire (rm)	60 to 120 mm²
• sector-shaped (ss) [1)]	60 to 120 mm²

1) Observe the installation instructions for the use of sector-shaped aluminum cables (see "7.9.5 Instructions for the use of sector-shaped aluminum cables", page 41)

Specifications for aluminum AC cables



Stripping length for phase and neutral conductors

7.9.3 Use of cable lugs for PE conductors

PE bolt material: nickel-plated	
Cables	**Cable lug**
Copper	• Copper, tin coated • Pure copper
Aluminum	• Aluminum, tin-coated • Al-Cu crimp connectors

Material of the cable lugs for the PE conductor

7.9.4 Handling aluminum conductors during installation work

The special properties of aluminum must be taken into consideration when using aluminum conductors:

- Aluminum "flows," i.e. it gives way under pressure.
- During stripping, a thin non-conductive oxide layer forms within a few minutes, which increases the contact resistance between the conductor and clamping point.
- The specific conductivity and hence the current carrying capacity is approximately one third less than that of copper.

IMPORTANT

Handling aluminum cables

To ensure safe and reliable contact with aluminum conductors, always perform the following work steps:

► Always observe the applicable regulations and rules for the use of aluminum cables.

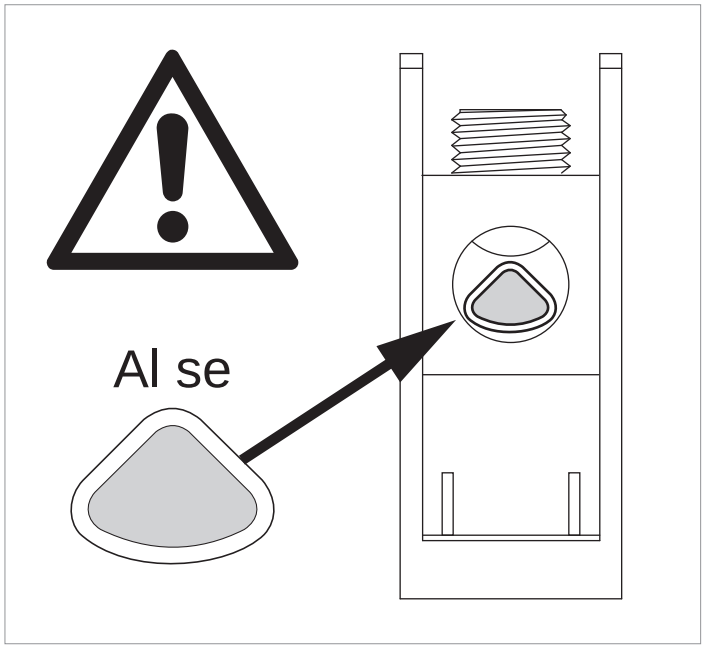
► Keep the installation location as free as possible from moisture or corrosive atmospheres.

► Connect the aluminum cables quickly.

► Clean the stripped end of the aluminum conductor mechanically (for example, using a knife blade to scrape off the oxide layer), then immediately dip the aluminum conductor into acid-fee and alkaline-free (= neutral) Vaseline and straight away insert it into the Al-Cu compression joint.

7.9.5 Instructions for the use of sector-shaped aluminum cables

When using sector-shaped aluminum cables without Al-Cu compression joints, insert each cable into the clamping point as shown in the picture.



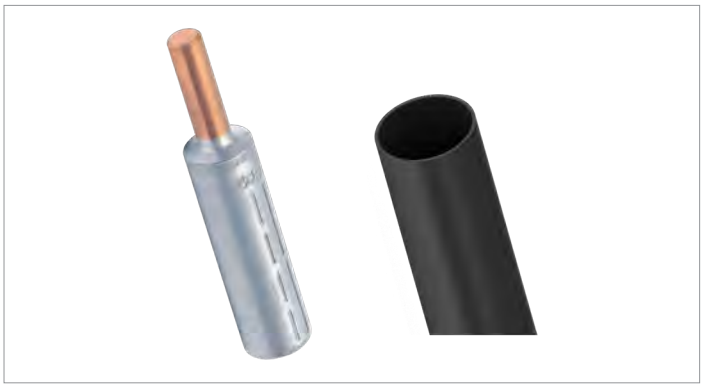
Correct position of sector-shaped aluminum cables (1)



Correct position of sector-shaped aluminum cables (2)

When using sector-shaped aluminum cables with Al-Cu compression joints e.g. from Klauke, Elpress or Mecatraction), observe the following instructions.

- ► Select compression joints suitable for the type of cable that is used.
- ► Comply with the installation instructions issued by the manufacturer of the compression joints.
- ► Always use heat-shrink sleeving.
- ► Secure the cables with an external strain relief element.



Al-Cu compression joint and heat-shrink sleeving for sector-shaped aluminum cables

7.10 Special tools required

Use an insulated torque wrench.



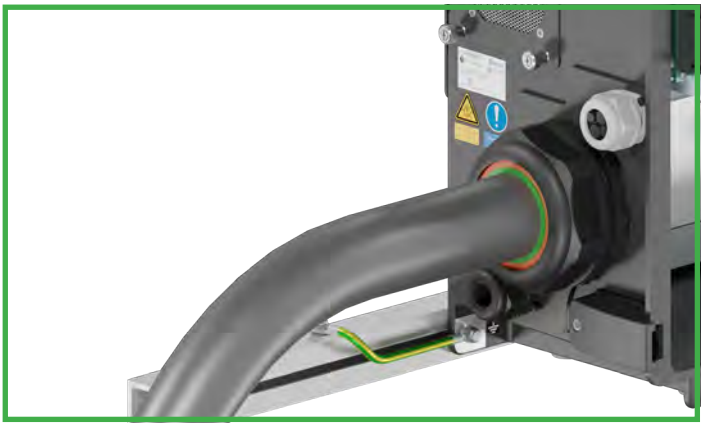
Use an insulated torque spanner for an AC terminal block

7.11 Grid and system protection

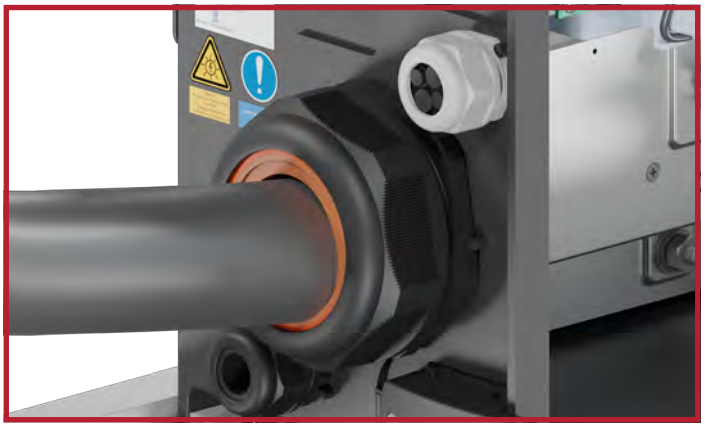
1. The German standard VDE-AR-N 4105 requires external grid and system protection with a coupling switch for PV systems larger than 30 kVA.
2. Alternatively, VDE-AR-N 4105 allows the use of an inverter with an internal coupling switch when this switch disconnects the inverter from the grid in less than 100 ms.

This inverter meets the requirement in (2). External grid and system protection (coupling switch) is not required.

7.12 Information on routing the AC cable



Feed the cable from the bottom or back. Insert the cable horizontally so that the sealing rings of the AC cable gland are tight.



If the cable is inserted from above and tilted, water could enter.

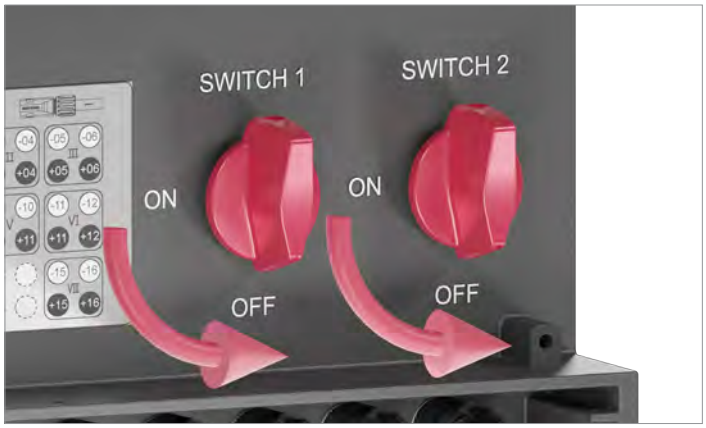


7.13 Connecting the AC cables

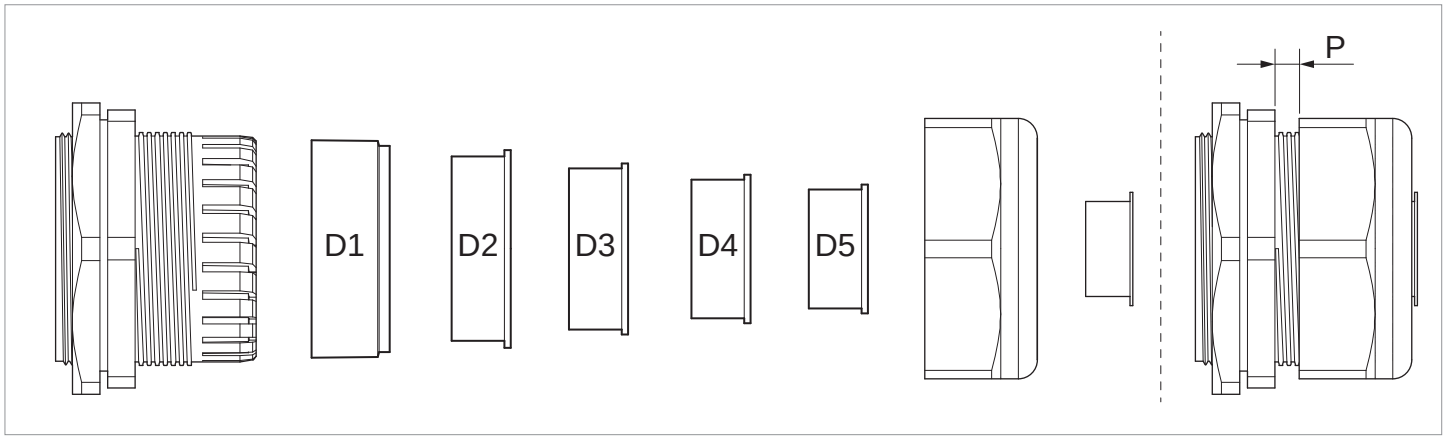
There is normally an isolating switch (for example in an equipment wiring box) between the inverter and the grid connection box and between the inverter and the solar modules. This isolates the inverter from all the AC and DC voltage sources and renders it de-energized.

1. To ensure that no voltage can be applied to the inverter during installation work, open the isolating switches between the inverter and the grid connection point and between the inverter and the solar modules.

   Secure all the isolating switches to prevent them from being switched back on accidentally.



2. Turn both DC isolating switches to the ***OFF*** position.



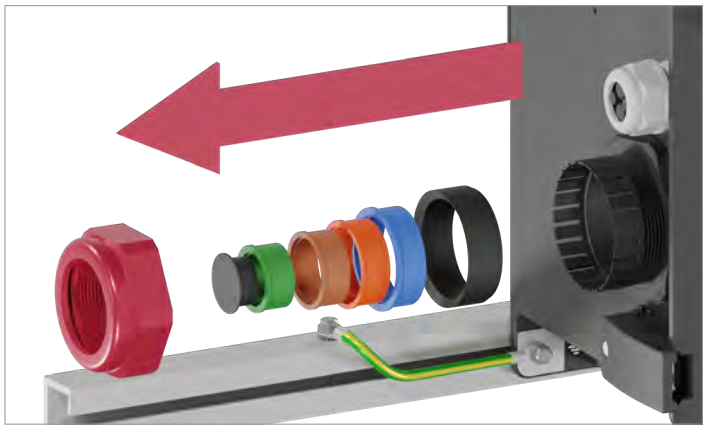
Use of the parts of the AC cable glands depending on the cable diameter

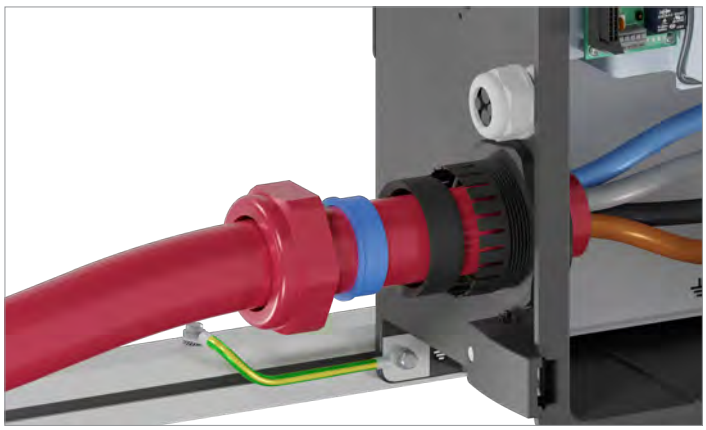
	Cable diameter	Torque	P
D1	51.0 to 57.0 mm	8.5 Nm	7 mm
D2	43.0 to 50.0 mm	8.5 Nm	5 mm
D3	36.0 to 43.0 mm	8.0 Nm	5 mm
D4	30.0 to 36.0 mm	8.5 Nm	5 mm
D5	26.0 to 30.0 mm	8.5 Nm	5 mm

IMPORTANT

Feed the AC cable from the bottom or back and insert it straight (horizontally).



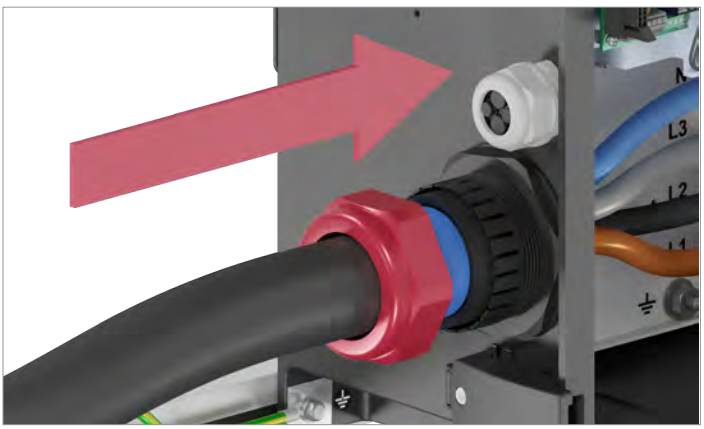




IMPORTANT

When fitting the seals, make sure that the claws of the largest sealing ring D1 hook correctly into the groove of the largest sealing ring.







8. Connecting the solar modules

8.1 General information

IMPORTANT

Incorrectly dimensioned solar system
If the solar system is dimensioned incorrectly, this may damage the inverter.

► When dimensioning the module string, always pay attention to technical specifications of the inverter (*input voltage range*, *maximum input current* and *maximum input power*, see Technical Data).

IMPORTANT

Overheating of the DC connections
Exceeding the *maximum input current* can cause the DC connections to overheat and result in a fire.

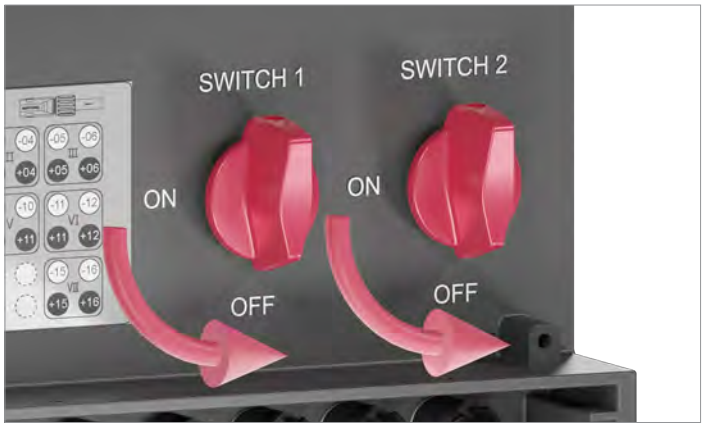
► When dimensioning the module strings, always take into account the *maximum input current* of the DC connections (see Technical Data).

IMPORTANT

Ingress of moisture
Moisture can enter via open DC connectors.

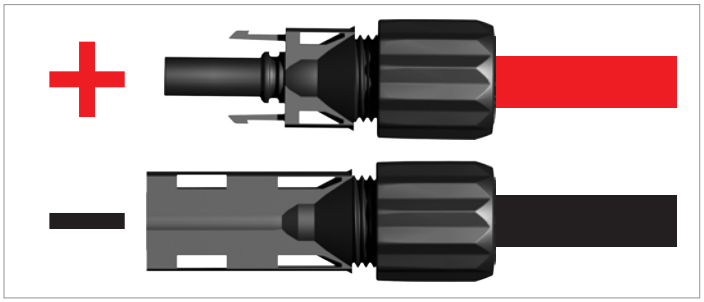
► To ensure protection degree IP66, close unused DC connectors with the rubber plugs that are attached to the DC connectors.

Before connecting the solar modules, turn both DC isolating switches to the ***OFF*** position.



8.2 Polarity of the DC voltage

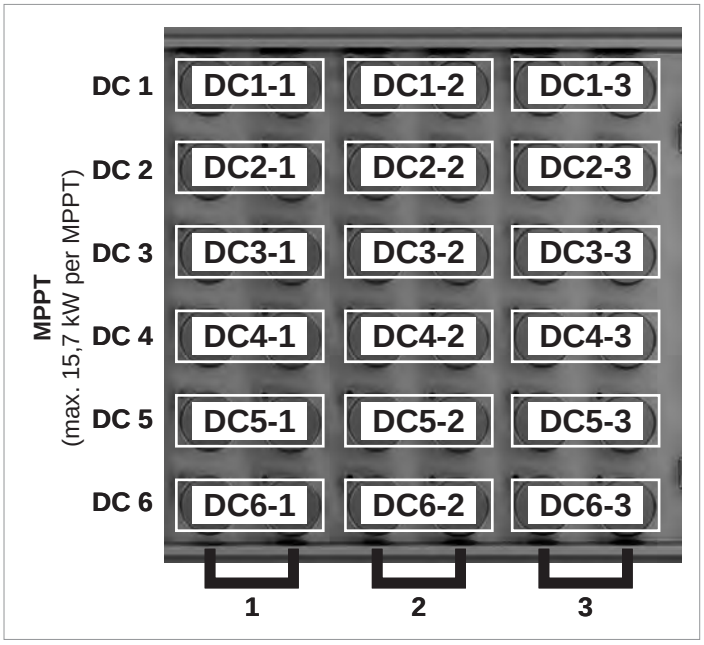
► Check the polarity of the DC voltage of the module strings before connecting the solar modules.



The inverter has an integrated function for detecting reverse polarity on the DC side. If such reverse polarity is detected, the inverter triggers an error message. This error message is indicated by the ***ALARM*** LED as soon as the inverter is switched on.

8.3 Arrangement of the DC inputs on the DC connection panel

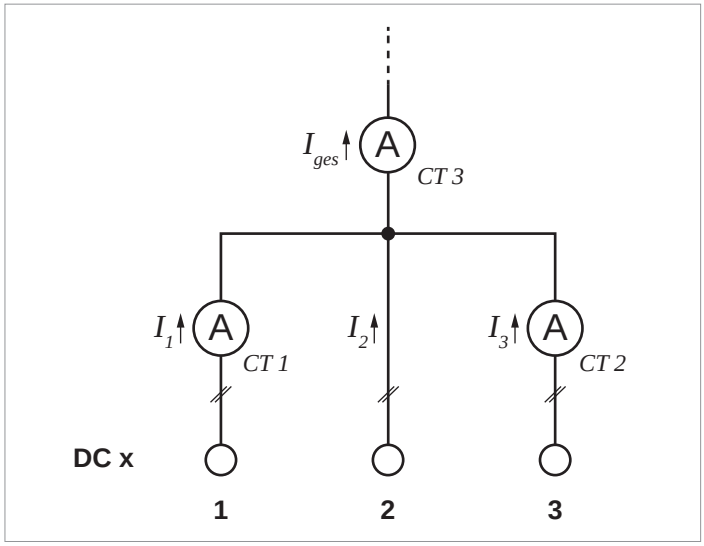
The inverter has 8 DC inputs (DC1 to DC6), each with 2 DC connections. Up to 16 module strings can therefore be connected to the inverter. Each DC input has its own MPP tracker.



Arrangement of the DC inputs on the DC connection panel

8.4 Functioning of integrated string monitoring

The string is monitored via current sensors. The image shows the distribution of the current sensors to the module strings of a DC input.

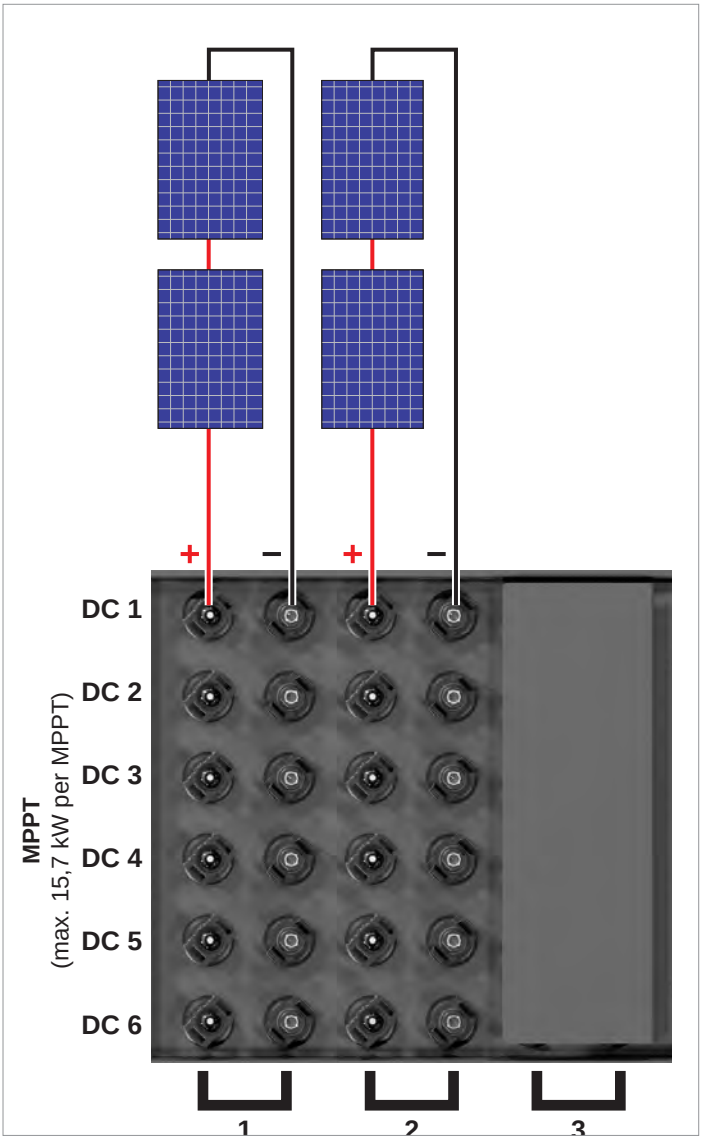


Arrangement of the current sensors of a DC input

DC connection 1 has a current sensor (*CT 1*). Current sensor *CT 2* measures the total current of the two module strings. The current in module string 2 is calculated by the difference: $I_2 = I_{ges} - I_1$.

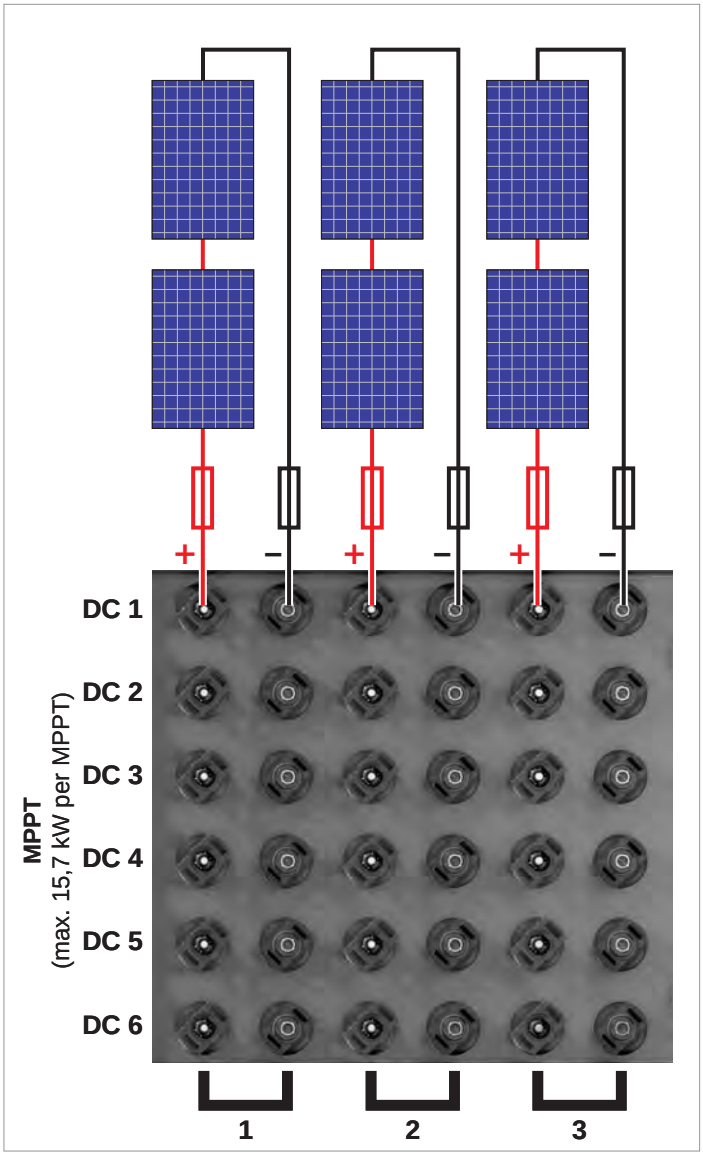
8.5 Use of string fuses

A maximum of two module strings can be connected to a single MPP tracker of this inverter. Therefore, no string fuses are required.



When connecting one or two module strings per DC input (= MPP tracker) no string fuses are necessary

String fuses **must** be used when there are three module strings per DC input.



Connection of three module strings per DC input (= MPP tracker): string fuses recommended

Note that no string fuses are installed in the inverter! Suitable string fuses with 15 A and 20 A are available as accessories from Delta. These string fuses are integrated into the DC cable.

Should you require this, please contact Delta Support by telephone. You can find the contact information on the last page of this manual.

When selecting protective devices, always take into account the *maximum current rating* of the solar modules.

8.6 Specification for the DC cables

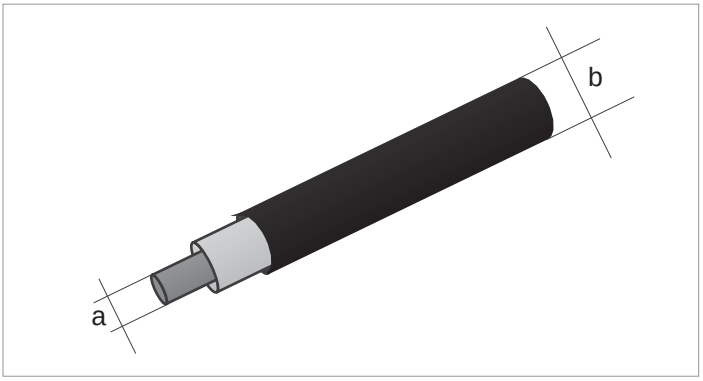
The DC plugs for all DC connectors are supplied with the inverter.

The DC plugs are only suitable for copper wire.

You can download the assembly instructions for the DC plugs from Amphenol at: www.amphenol-solar.com.

If you want to order more or need a different size, see the information in the following table.

	DC plugs for DC cables	DC connections on the inverter
DC–		
DC+		



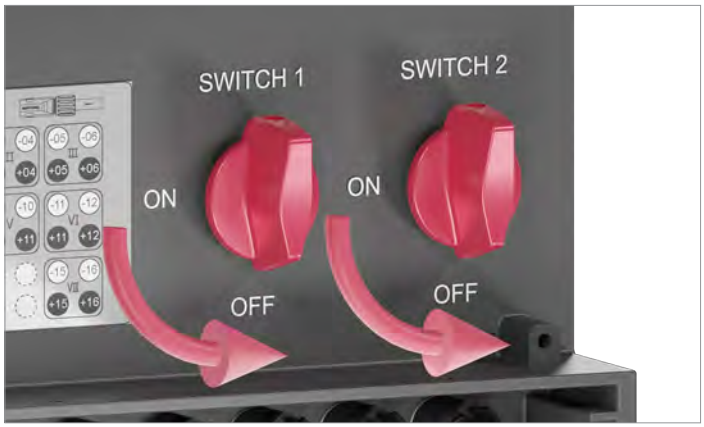
	a	b	Amphenol DC plug [1]
	mm²	mm	
DC+	4/6	5.3 to 7.65	H4CFC4D●S
DC–	4/6	5.3 to 7.65	H4CMC4D●S

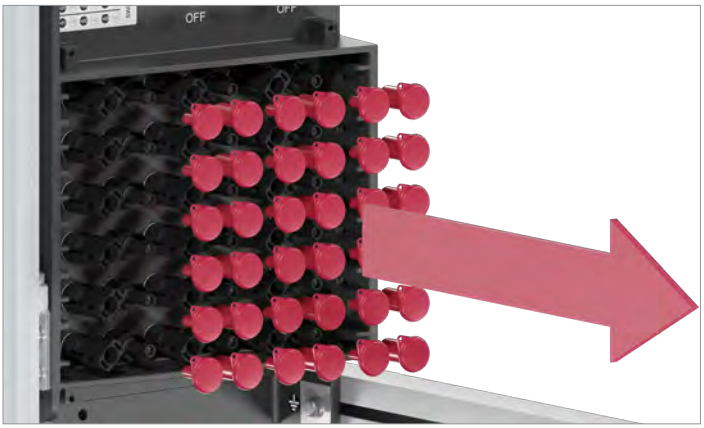
[1] Included in scope of delivery

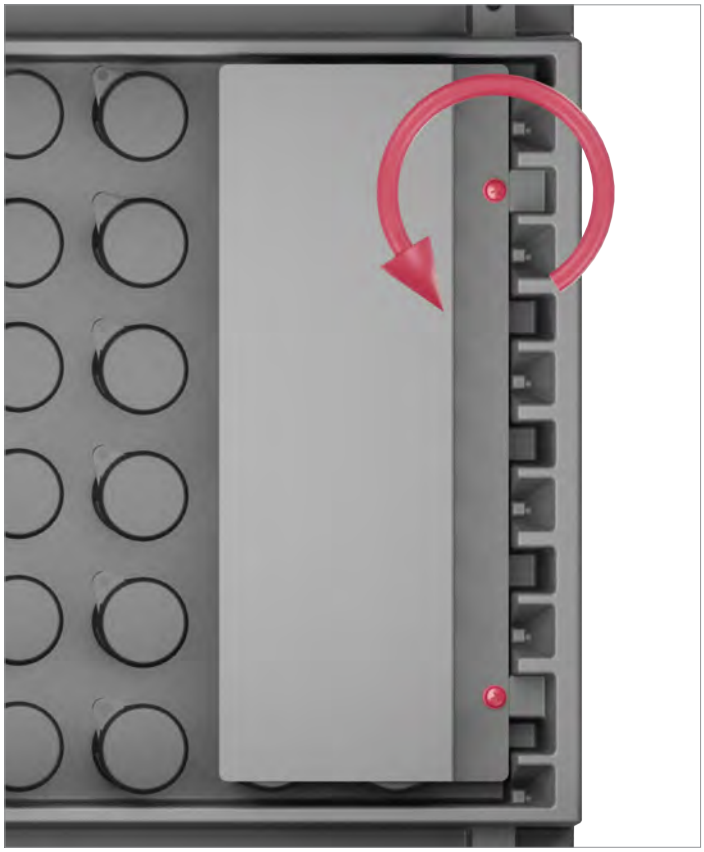
8.7 Connecting the DC cables



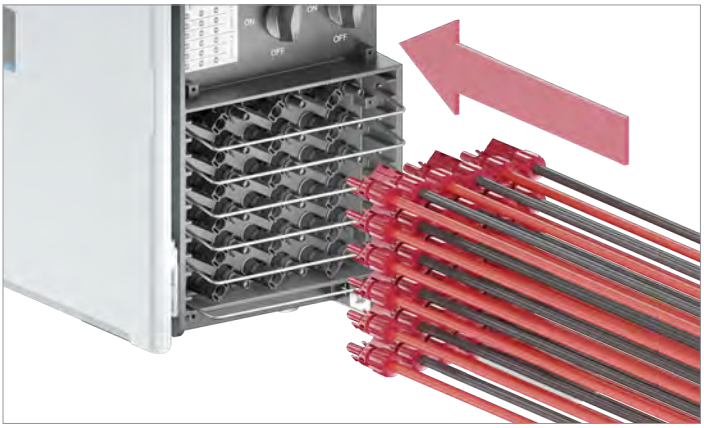
Mounting tools for DC connectors (included in delivery)

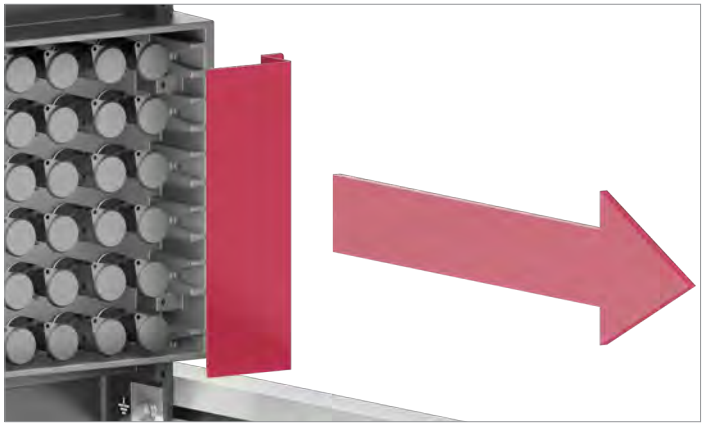

SWITCH 1
SWITCH 2
ON
ON
OFF
OFF


OFF










OFF

9. Commissioning

9.1 Software for commissioning

9.1.1 DeltaSolar app with direct connection to the inverter via Bluetooth

The DeltaSolar app is available for mobile devices (smartphone, tablet) with iOS or Android.

The mobile device is connected directly to the inverter via Bluetooth (point-to-point connection).

Since this creates a point-to-point connection between the mobile device and the inverter, you must commission and set each inverter individually.

9.1.2 DeltaSolar App and DC1 Data Collector

If a DC1 data collector is present in the PV system, you have the option of accessing all connected inverters simultaneously with the DeltaSolar app.

You can perform the following tasks on the inverters connected to the DC1 via RS485:

- Commissioning all inverters.
- Setting all parameters.
- Updating the firmware.

9.1.3 Delta Service Software (DSS)

The Delta Service Software is available for Windows PCs. It can be downloaded from partnerportal.delta-emea.com (registration required).

The PC is connected to the RS485 terminal block of an inverter in the RS485 bus.

You can perform the following tasks on the inverters on the RS485 bus:

- Commissioning all inverters.
- Setting all parameters.
- Updating the firmware.

9.2 Commissioning several inverters

If several inverters are installed in the solar system and these are all connected via RS485, commissioning is best carried out via the DSS. This allows parallel and simultaneous access to all inverters on the RS485 bus.

Alternatively, you can temporarily connect a DC1 data collector to the RS485 bus for commissioning. All inverters are then commissioned simultaneously via the DC1 with the DeltaSolar app. After commissioning, disconnect the DC1 from the RS485 bus.

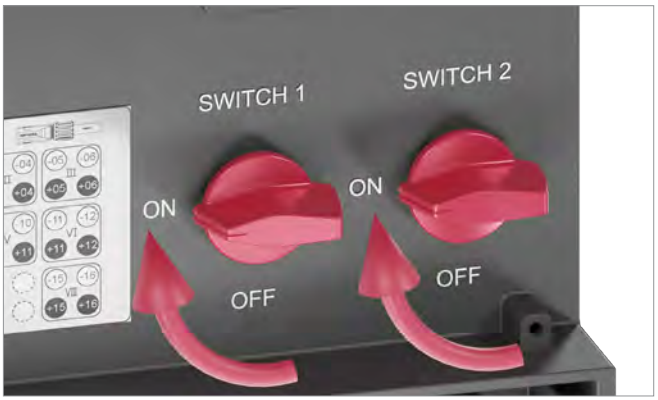
9.3 Registering the solar system in the MyDeltaSolar Cloud

The solar system can only be managed in the MyDeltaSolar Cloud if a DC1 data collector is installed.

The DeltaSolar app must be used to register the system!

9.4 General requirements

- The inverter must be supplied with power, either via AC or DC.
- If all inverters on the RS485 bus are to be commissioned simultaneously, each of these inverters must be supplied with power.
- Both DC isolating switches must be in the **ON** (**EIN**) position.



9.5 LED indicator

GRID	Grid	LED: green
ALARM	Alarm	LED: red / yellow
COMM.	Communication	LED: red / yellow / green

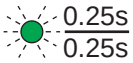
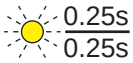
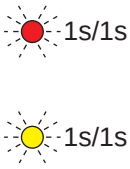
Use and color of the LEDs

	LED is off.
	LED flashes yellow in the specified rhythm (on/off).
	LED flashes green in the specified rhythm (on/off).
	LED flashes red in the specified rhythm (on/off).
	LED is illuminated yellow.
	LED is illuminated green.
	LED is illuminated red.

Meaning of the LED symbols used in this manual

9 Commissioning

LED indicator

GRID	*ALARM*	Explanation
 1s/1s		Boot sequence.
		The inverter is connected to the grid.
		Inverter failure. Power-off via external signal.
		Inverter warning.
		
		Solar panel system failure.
		Solar system warning.
		No DC. Also appears when both DC disconnectors are open.
 0.25s / 0.25s	 0.25s / 0.25s	DC problem.
 1s/1s	 1s/1s	Updating firmware.
 1s/1s	 1s/1s	Standby mode.
	 1s/1s 1s/1s	System locked.

Meaning of the operating status LED indicators

9.6 Commissioning with the DeltaSolar app

9.6.1 Introduction

Since the smartphone is directly connected to the inverter via Bluetooth, only one inverter can be commissioned at a time.

Special requirements

- The DeltaSolar app is installed on the mobile device (smartphone, tablet with iOS or Android).

Procedure

1. Launch the DeltaSolar app.
2. Perform the commissioning steps.

If no inverters are found in step 2, turn the Bluetooth function on your smartphone off and on again. Then repeat step 2.

If multiple inverters are connected to the solar system, set a different inverter ID for each inverter. This means that each inverter can be uniquely identified.

Overview of the commissioning steps

- ► Always perform the conversion to the SUNSPEC protocol as the final commissioning step. Once you have changed the RS485 protocol to SUNSPEC, you can no longer access the inverter with the DeltaSolar app!
- ► To reset the RS485 protocol to the DELTA, see “9.6.9 Changing the RS485 protocol to DELTA (optional)”, page 68.

“9.6.2 Basic Settings”, page 52. These settings must always be performed.

“9.6.3 Arc detection (optional)”, page 56.

“9.6.4 AC connection (optional)”, page 58.

“9.6.5 Anti-PID (optional)”, page 60.

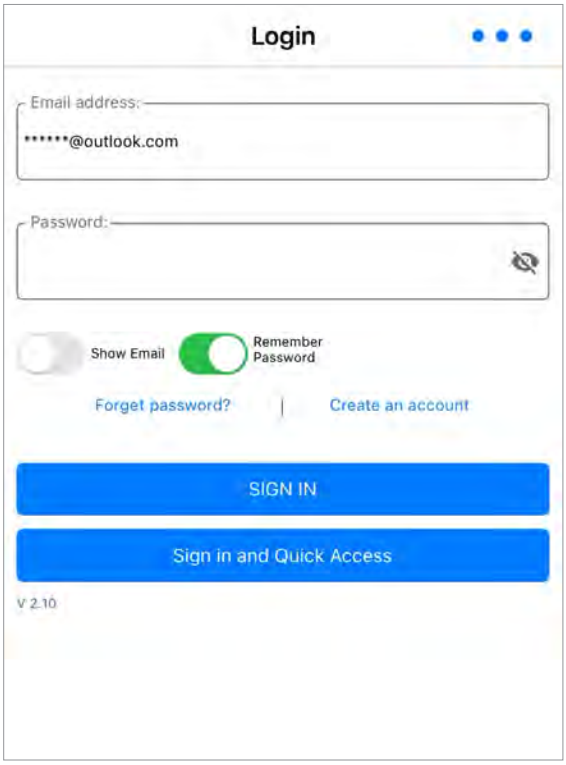
“9.6.6 External power off (EPO, emergency power off) (optional)”, page 62.

“9.6.7 Insulation (optional)”, page 64.

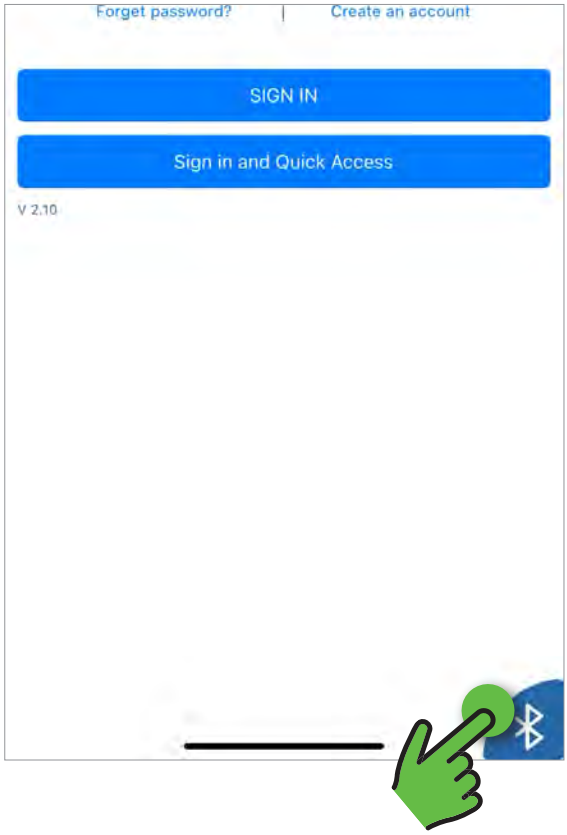
“9.6.8 Changing the RS485 protocol to SUNSPEC (optional)”, page 66.

9.6.2 Basic Settings

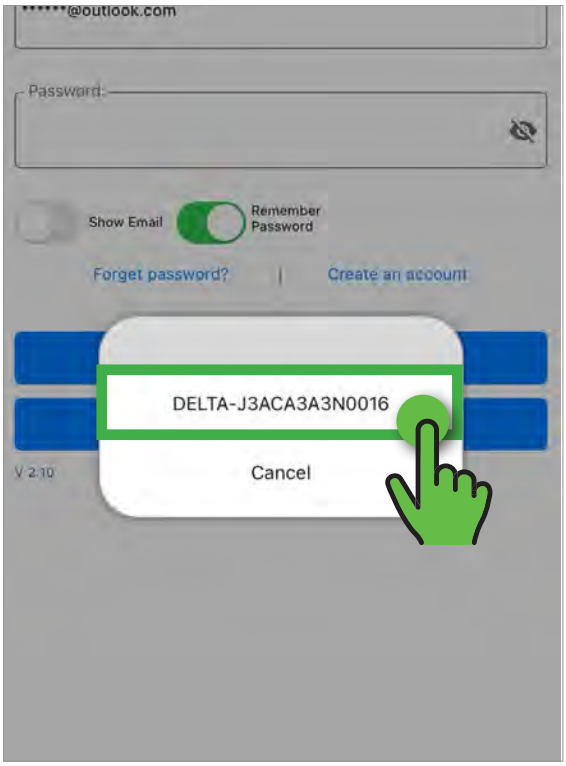
1 Start the DeltaSolar app and enter your login details. Create an account if you do not already have one.



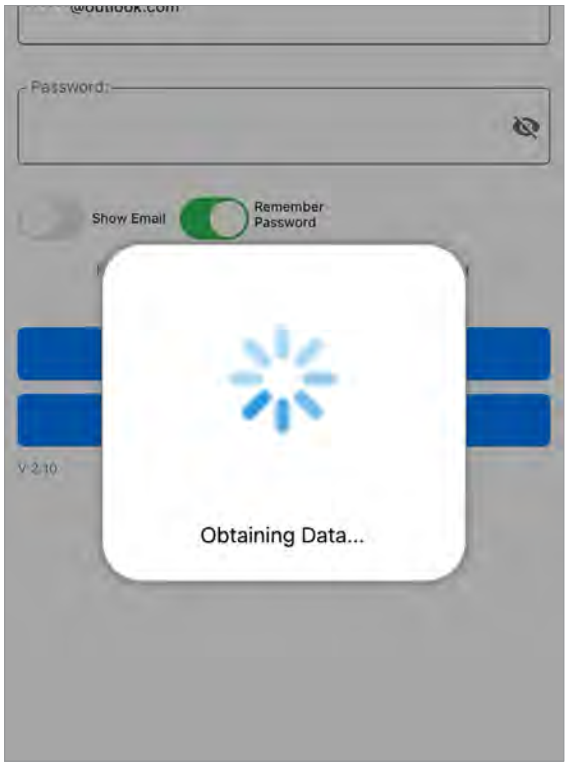
2 Tap the Bluetooth icon.



3 Tap the serial number of the inverter. Move closer to the inverter if it is not displayed.



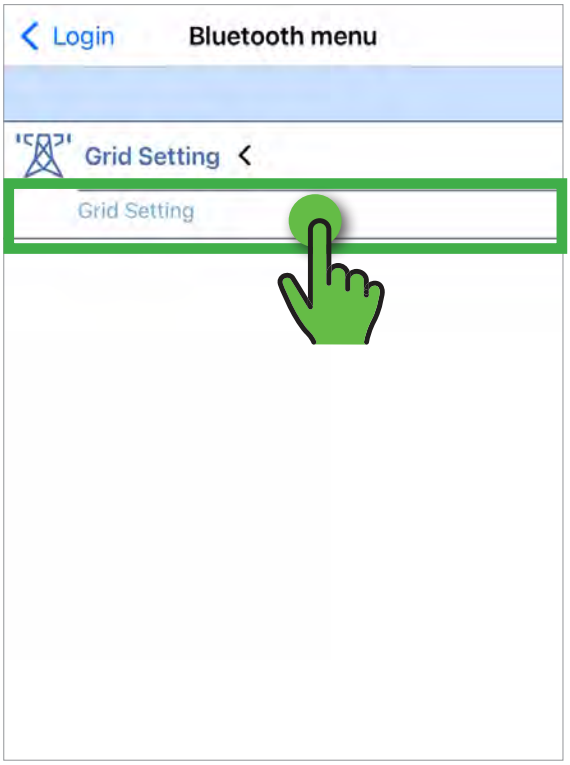
4 The DeltaSolar app connects to the inverter.



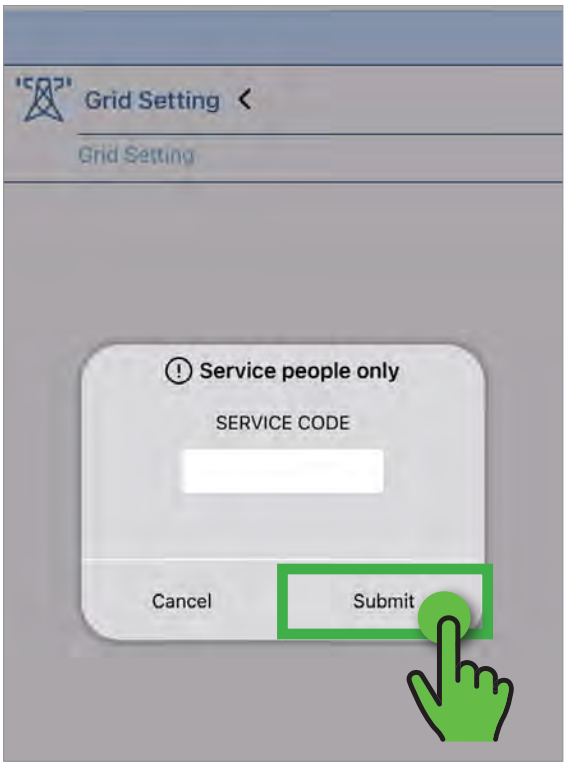
5 Tap **Local Setting**.



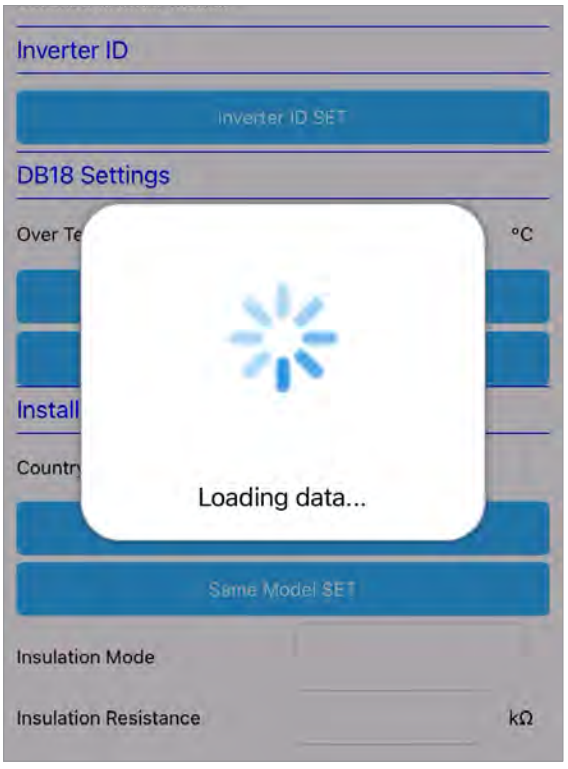
6 Tap **Grid settings**.



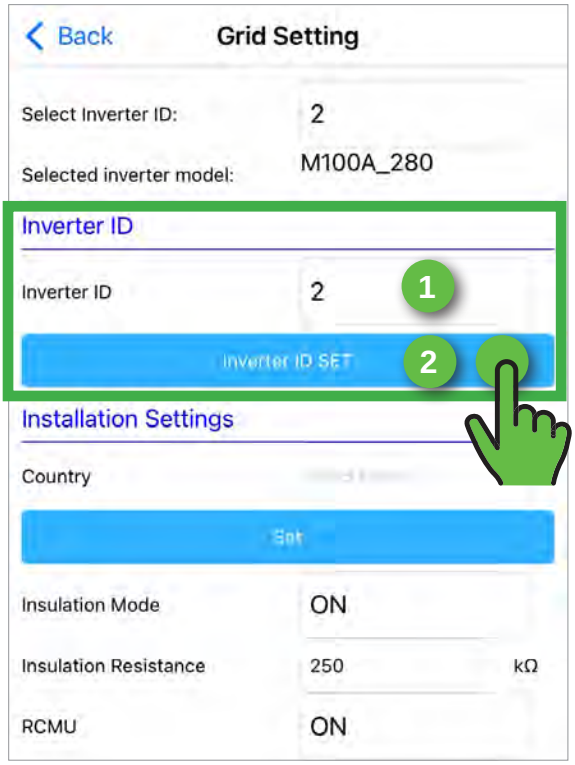
7 Enter the service code and tap **Submit**. The service code can be obtained from Delta Customer Service.



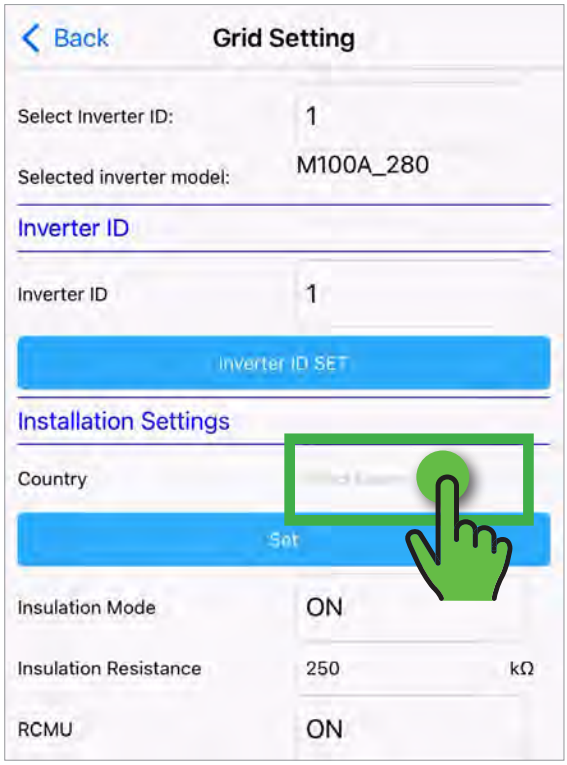
8 The grid settings of the inverter are loaded.



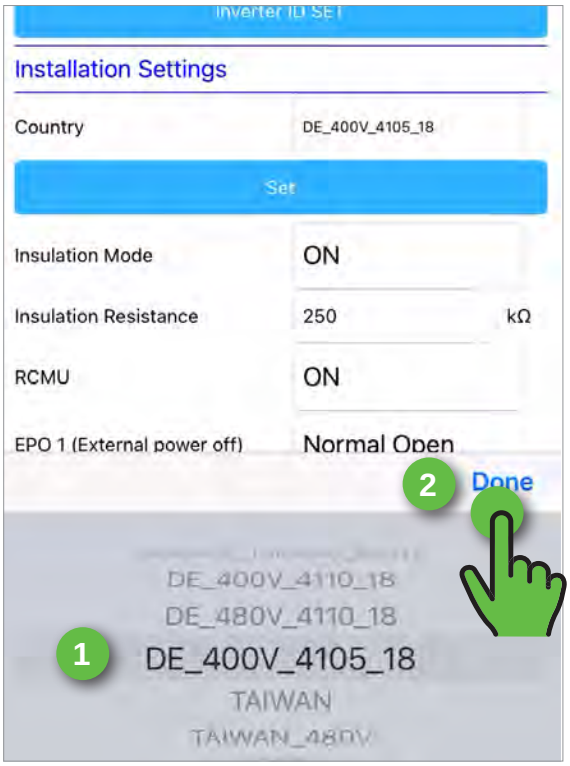
9 Set the inverter ID (1) and save (2). Each inverter in the PV system must have a different ID.



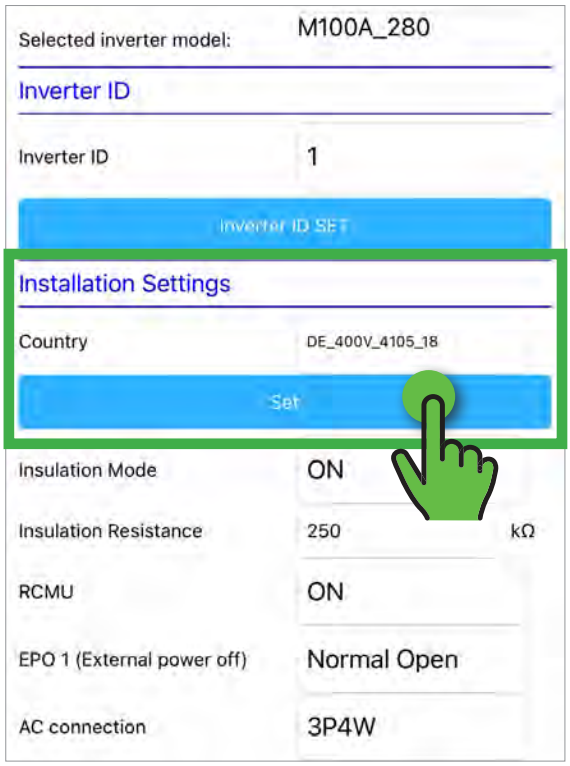
10 In the **Installation settings** section, tap `Select country`.



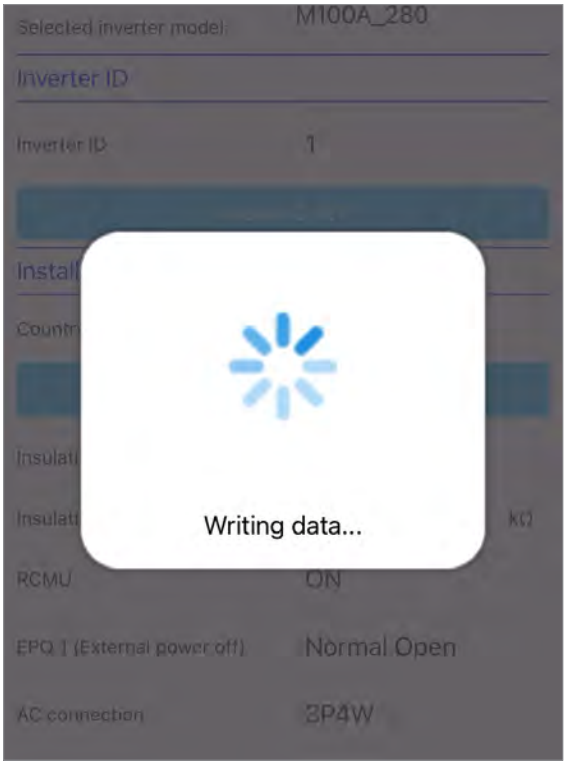
11 Select the country or grid standard (1). Submit by tapping **Done** (2).



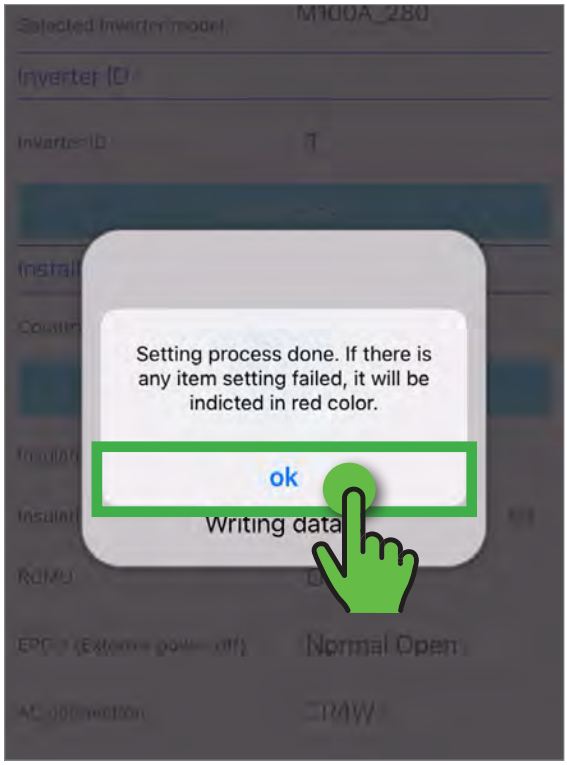
12 To save the country or grid standard, tap **Set** in the **Installation settings** section.



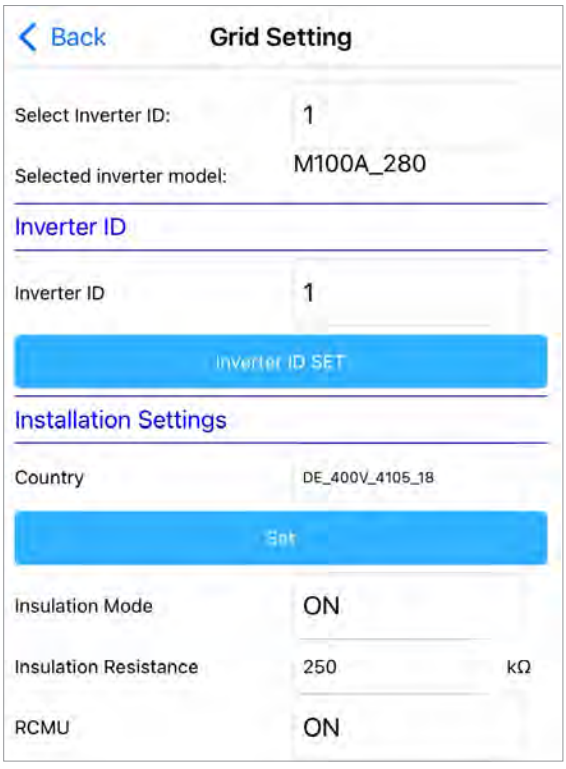
13 The inverter is automatically set up according to the selected country.



14 Acknowledge the message that appears after saving.



15 This completes the basic settings and the inverter goes into feed-in operation after a few seconds.



If you wish to make further settings, stay in the **Grid settings** section.

The following settings are optional. The conversion of the RS485 protocol to SUNSPEC must **always** be the final step. The other settings can be performed in any order.

"9.6.3 Arc detection (optional)", page 56.

"9.6.4 AC connection (optional)", page 58.

"9.6.5 Anti-PID (optional)", page 60.

"9.6.6 External power off (EPO, emergency power off) (optional)", page 62.

"9.6.7 Insulation (optional)", page 64.

"9.6.8 Changing the RS485 protocol to SUNSPEC (optional)", page 66.

9.6.3 Arc detection (optional)

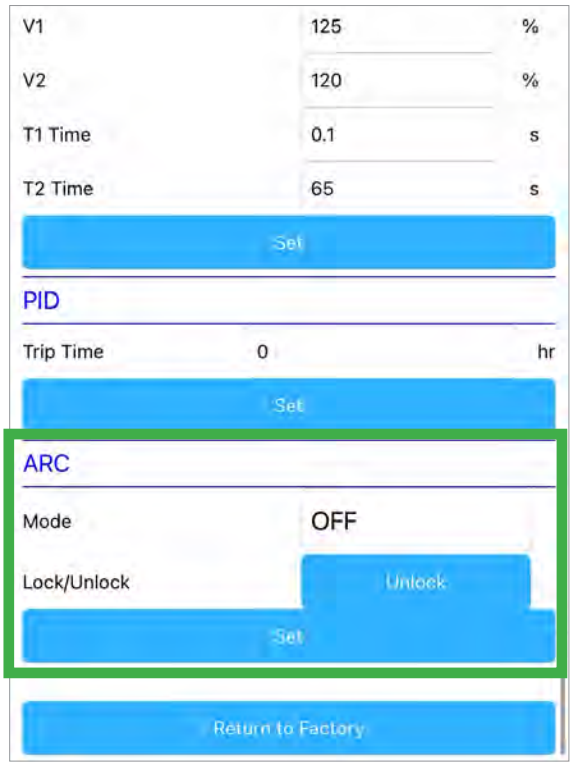
Arc detection is deactivated at the factory. This section describes how to activate this feature with the DeltaSolar app and which setting options are available.

The descriptions in this section apply to the M50A Flex, M70A Flex and M100A Flex inverters.

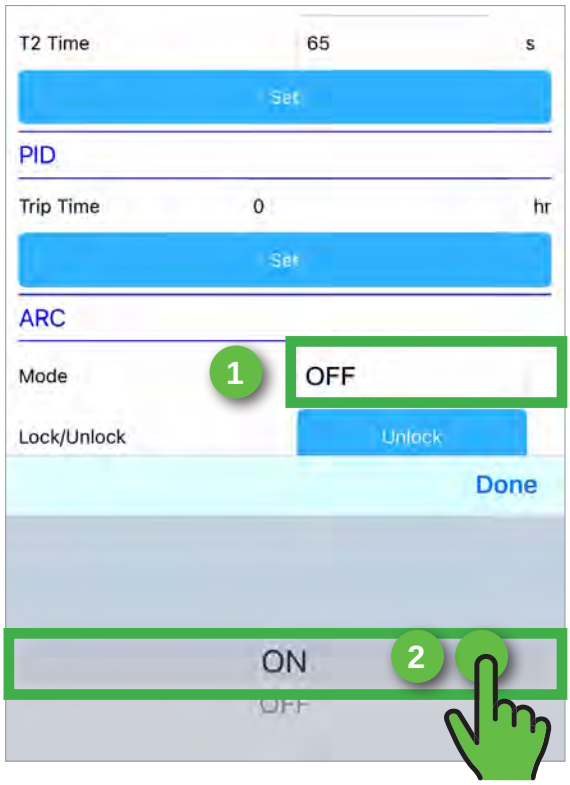
Parameter/button	Description	Setting range
Mode	Activate/deactivate arc detection.	**OFF** | **ON**
Lock/unlock	If an arc is detected, the inverter is shut down and locked. **UNLOCK** can be used to unlock the inverter.	**UNLOCK**
Set	Saves the changed settings. After pressing **UNLOCK**, the inverter is also restarted.	

Tab. 9.1.: Setting parameters for the arc detection function

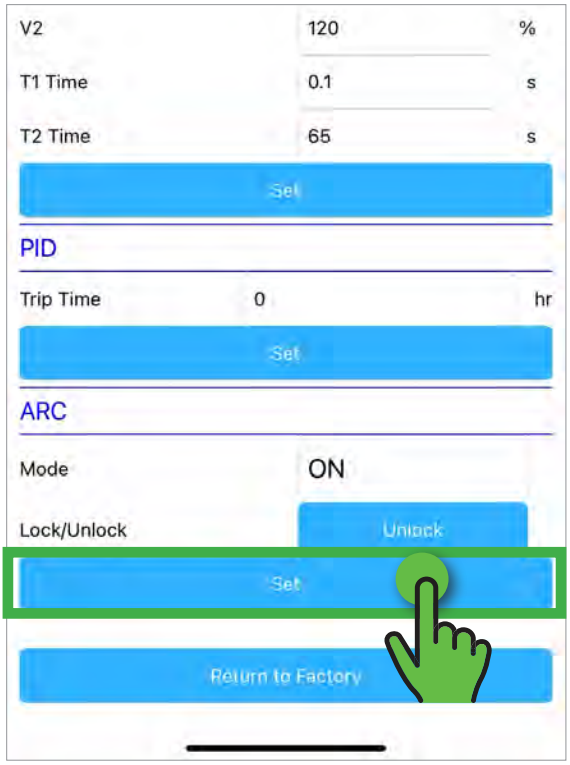
1 Under Grid settings, scroll to the **ARC** section.



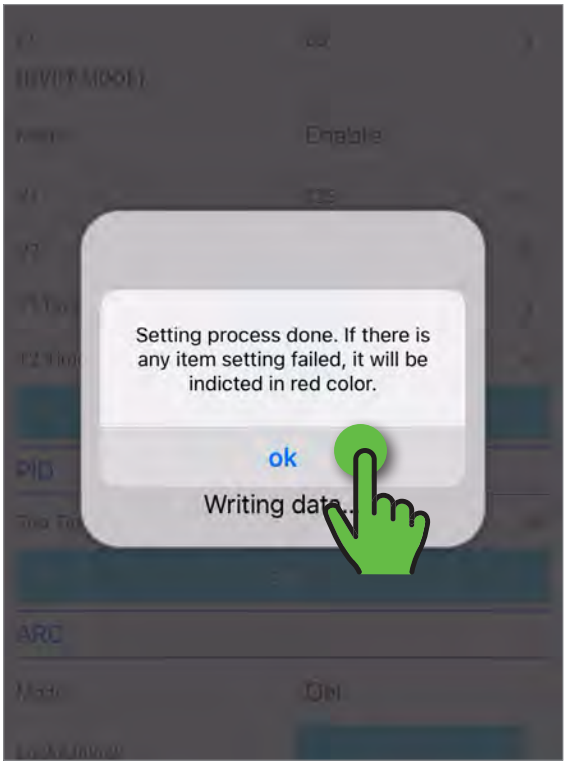
2 To activate arc detection, set the **Mode** parameter (1) to **ON** (2).



3 To save, tap **Set** at the end of the **ARC** section.



4 Acknowledge the message that appears after saving.



5 Arc detection is activated.



9.6.4 AC connection (optional)

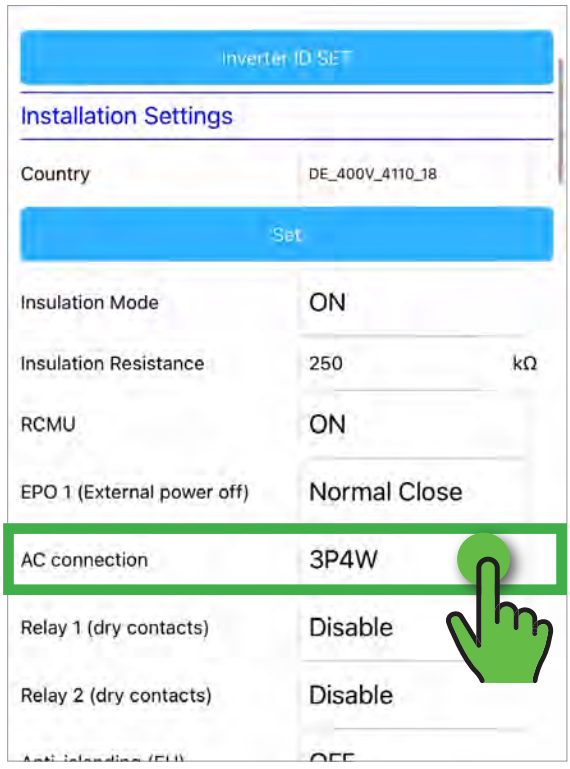
The AC connection is set **with a neutral conductor** (3P4W) at the factory. If the AC connection is set **without a neutral conductor** (3P3W), the **`AC connection`** parameter must be changed. This parameter is located under Grid settings in the **Installation settings** section.

The descriptions in this section apply to the M50A Flex, M70A Flex and M100A Flex inverters.

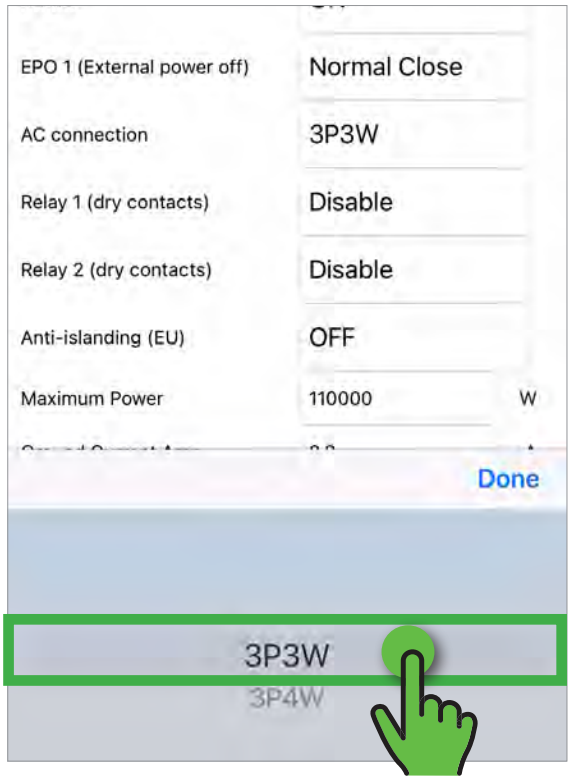
Parameter/button	Description	Setting range
`AC connection`	Switches the inverter to AC connection **with** neutral conductor (**`3P4W`**, default setting) or **without** neutral conductor (**`3P3W`**).	**`3P3W`** | **`3P4W`**
Set	Located at the end of the **Installation settings** section, saves all parameters in that section.	

Tab. 9.2.: Setting parameters for the AC connection function

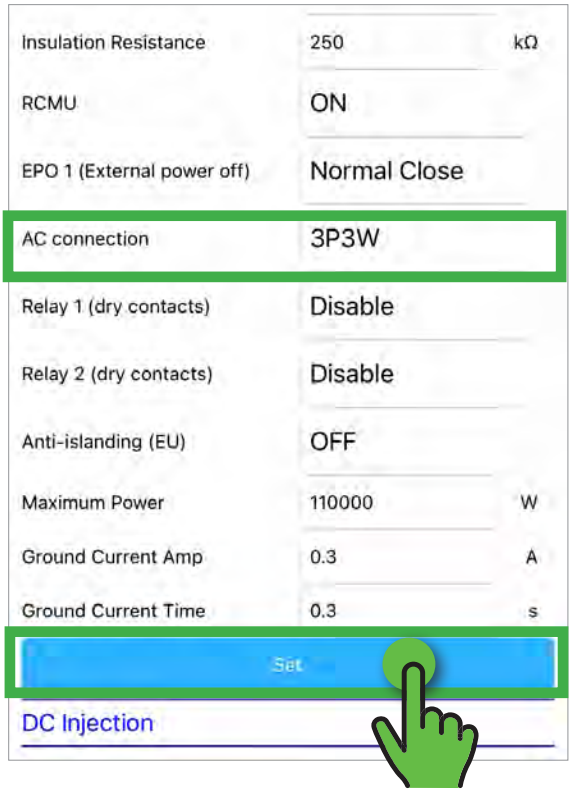
1 Under Grid settings, tap **AC connection** in the **Installation settings** section.



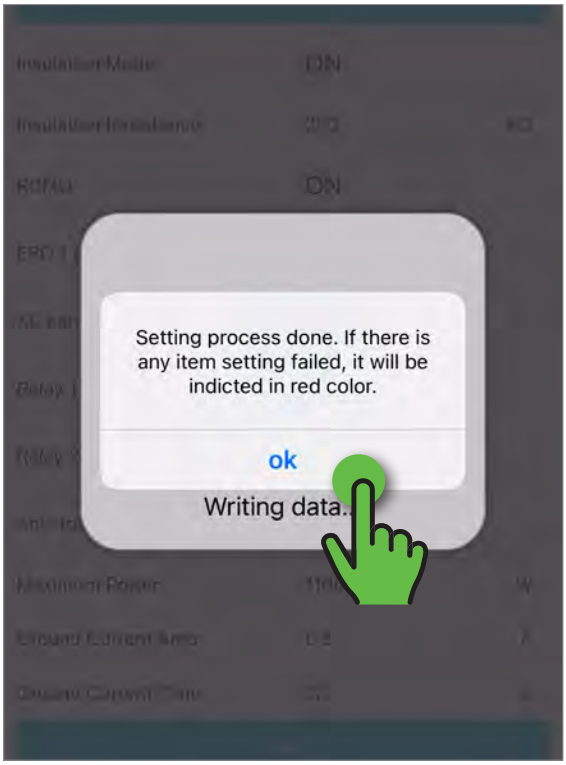
2 Select the **`3P3W`** entry. This means that 3 phases are connected, but no neutral conductor.



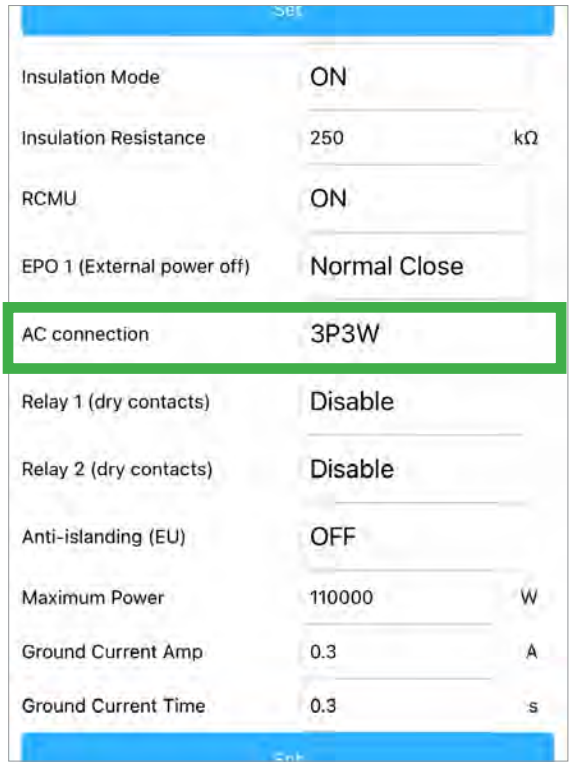
3 To save, tap **Set** at the end of the **Installation settings** section.



4 Acknowledge the message that appears after saving.



5 The setting of the AC connection is complete.



9.6.5 Anti-PID (optional)

Potential-induced degradation (PID) occurs when high voltage differences between PV cells and ground potential lead to a buildup of charge. This causes the migration of ions in the module material, which increases the internal resistance of the cells and gradually decreases their performance.

The anti-PID function reduces potential-induced degradation.

The descriptions in this section apply to the M50A Flex, M70A Flex and M100A Flex inverters.

How it works

The function is active when a tripping time > 0 is set. When switching to the "No DC" status (e.g. at sunset), a timer starts. If this status is maintained for at least 30 minutes, the inverter feeds a current of 2 mA with reverse polarity into the PV modules for the duration set in the **`Trip time`** parameter (1 to 10 hours). If the tripping time is set to **`AUTO`**, the inverter feeds in until DC is applied again (e.g. at sunrise).

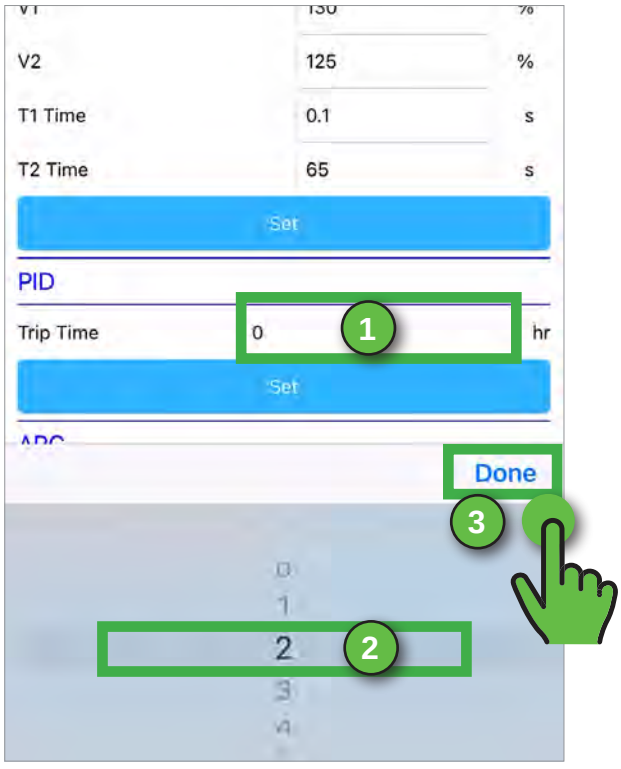
Parameter/button	Description	Setting range
`Trip time`	The period of time for which the anti-PID function is activated.	**`0`**
		`1`, **`2`**, ... **`9`**, **`10`**
		`Auto`
`Set`	Saves the settings in the **PID** section.	–

Tab. 9.3.: Setting parameters for the anti-PID function

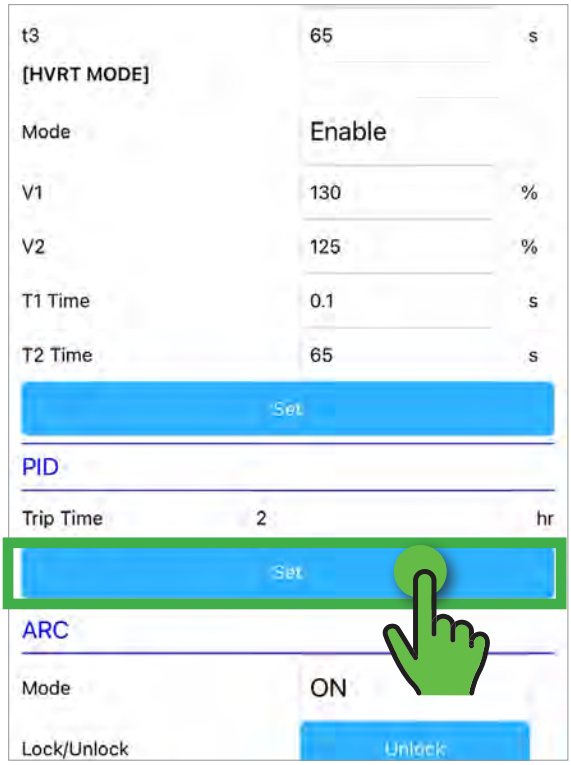
1 Under Grid settings, scroll to the **PID** section.



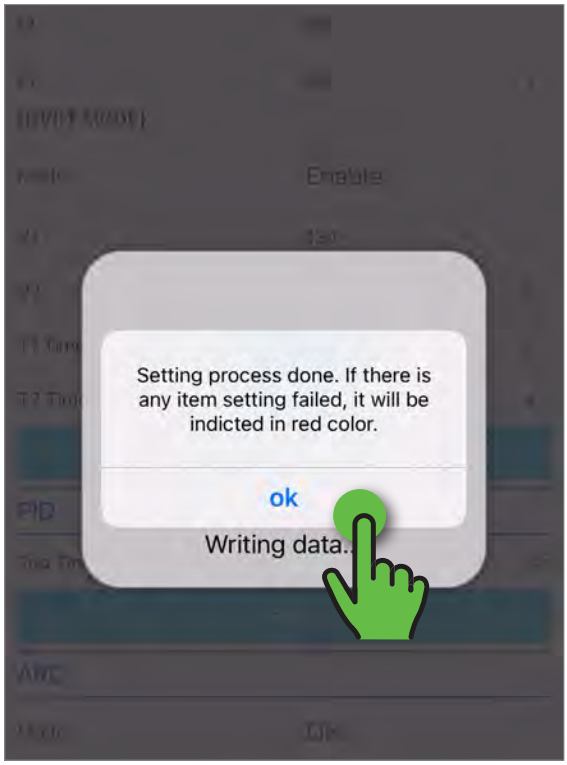
2 Tap **`Trip time`** (1), set the desired active time (2) of the anti-PID function. Then tap **Done** (3).



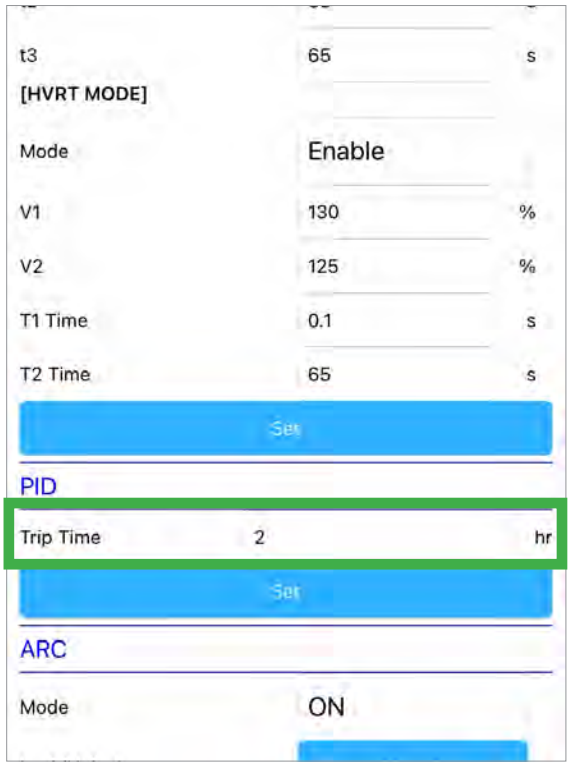
3 To save, tap **Set** at the end of the **PID** section.



4 Acknowledge the message that appears after saving.



5 The setting of the anti-PID function is complete.



9.6.6 External power off (EPO, emergency power off) (optional)

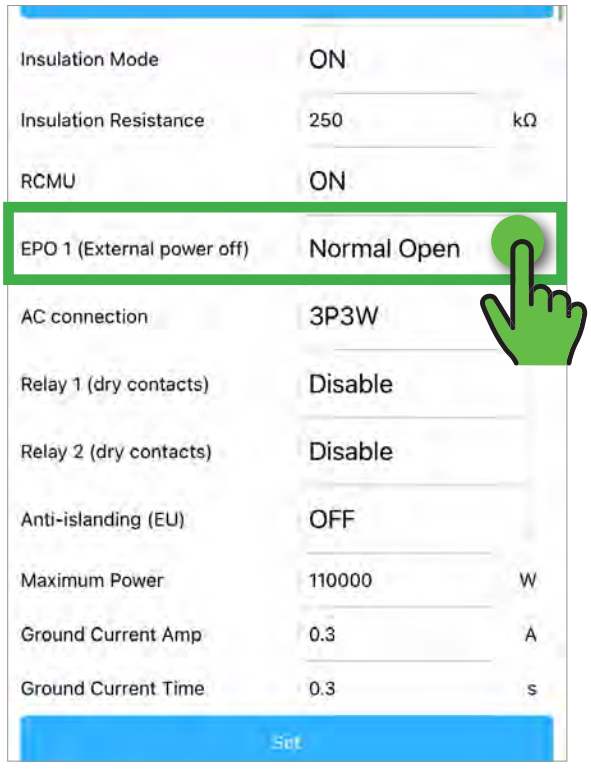
The relay for the external power off (emergency power off) can be defined as a normally closed or normally open contact. This parameter is located under Grid settings in the **Installation settings** section.

The descriptions in this section apply to the M50A Flex, M70A Flex and M100A Flex inverters.

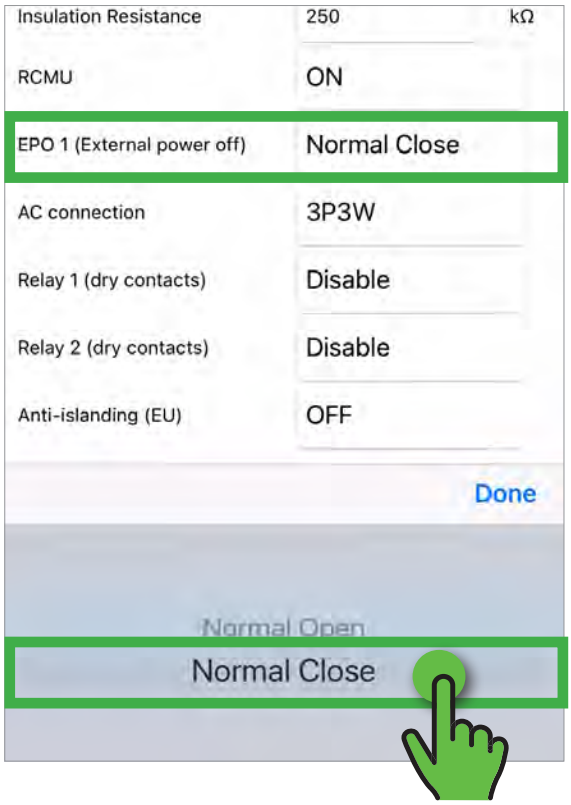
Parameter	Description	Setting range
`EPO 1 (external power off)`	Define the relay for the external power off (emergency power off) as a normally closed contact (**`Normally Closed`**) or a normally open contact (**`Normally open`**, default setting).	**`Normally Closed`** | **`Normally Open`**
Set	Located at the end of the **Installation settings** section, saves all parameters in that section.	

Tab. 9.4.: Setting parameters for the external power off (EPO) function

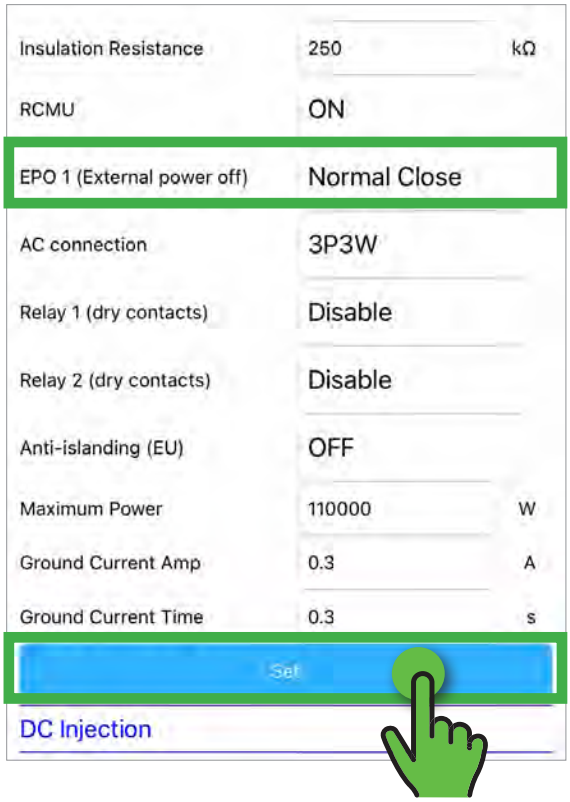
1 In the **Installation settings** section, tap the **`EPO 1`** parameter.



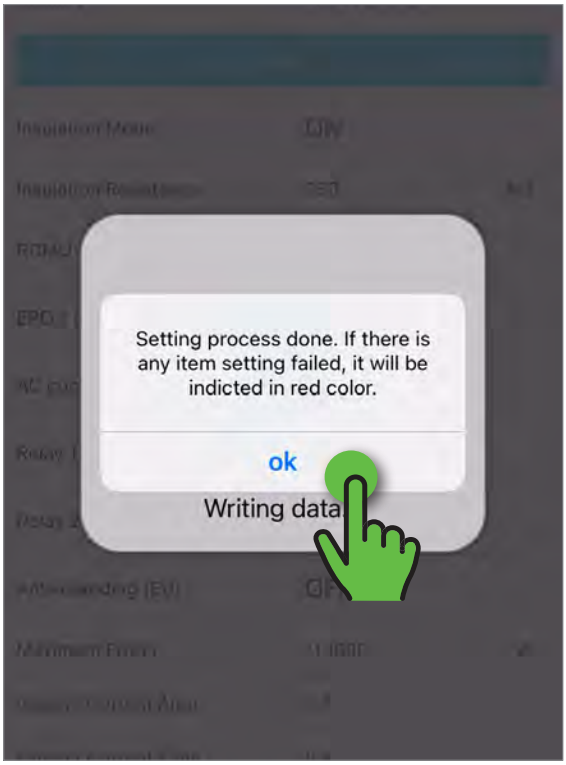
2 Select the desired setting.



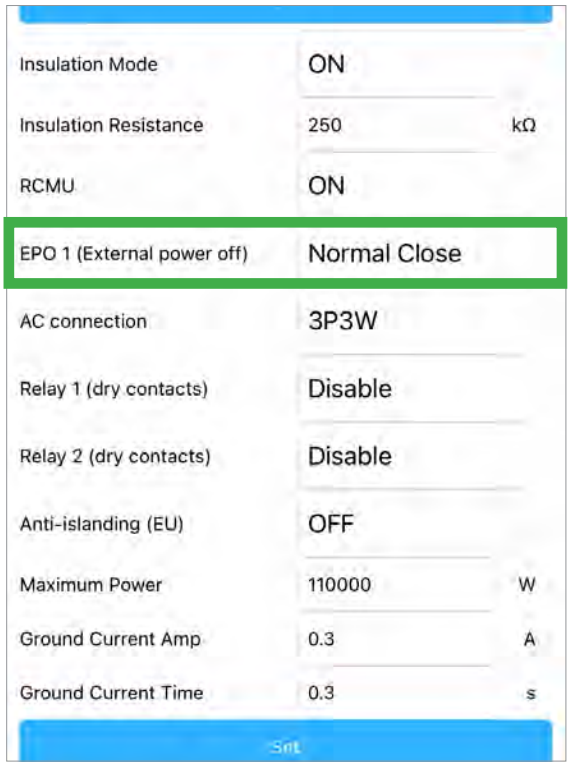
3 To save, tap **Set** at the end of the **Installation settings** section.



4 Acknowledge the message that appears after saving.



5 The setting of the relay for the external power off is complete.



9.6.7 Insulation (optional)

This parameter is set according to the requirements of the selected country. Changing the parameter settings can invalidate the type approval of the unit. Change this setting only after consultation with Delta customer service.

Activate or deactivate the insulation mode and set the insulation resistance. These parameters are located under Grid settings in the **Installation settings** section.

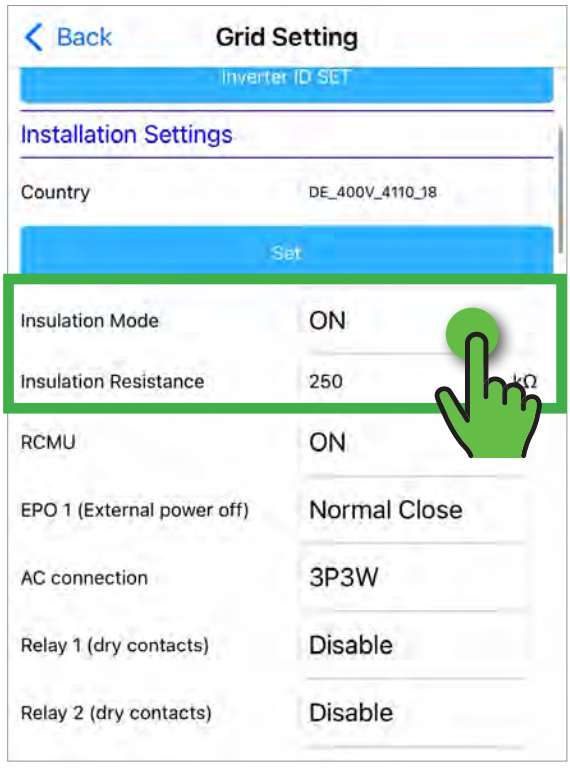
The descriptions in this section apply to the M50A Flex, M70A Flex and M100A Flex inverters.

Setting options

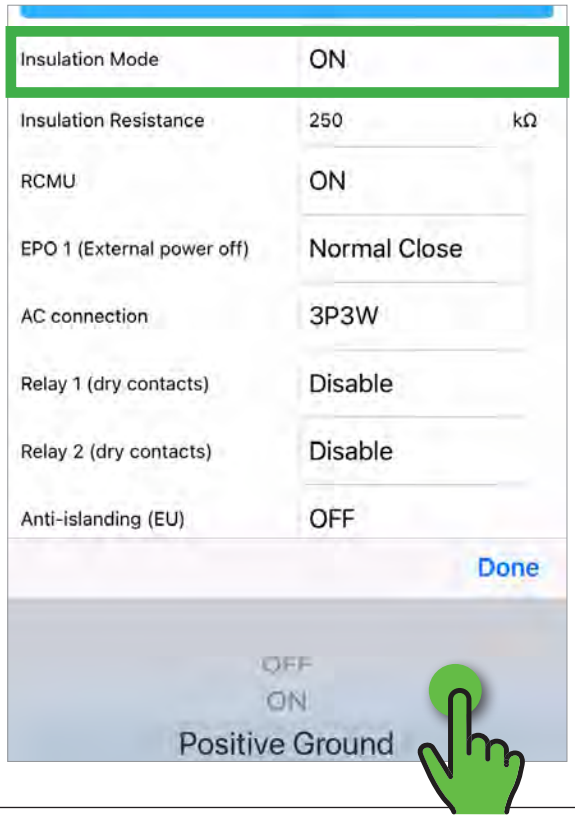
Parameter/button	Description	Setting range
`Insulation mode`	Activate insulation mode (**`ON`**, default setting) or deactivate (**`OFF`**). The other installation modes cannot be set for this inverter.	**`OFF`** | **`ON`**
`Insulation resistance`	Magnitude of the insulation resistance.	**`125 kΩ`** | **`250 kΩ`** | **`1200 kΩ`**
Set	Located at the end of the **Installation settings** section, saves all parameters in that section.	

Tab. 9.5.: Setting parameters for the insulation function

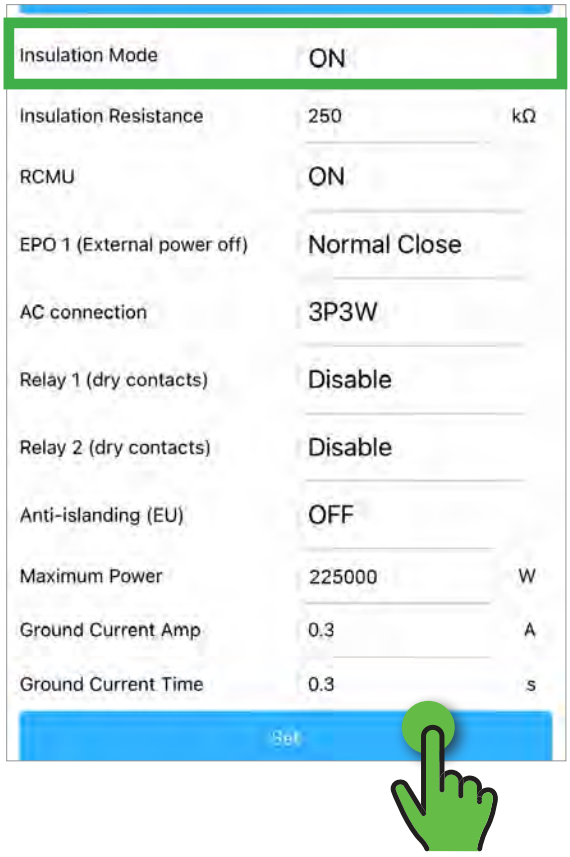
1 In the **Installation settings** section, tap **`Insulation mode`** or **`Insulation resistance`**.



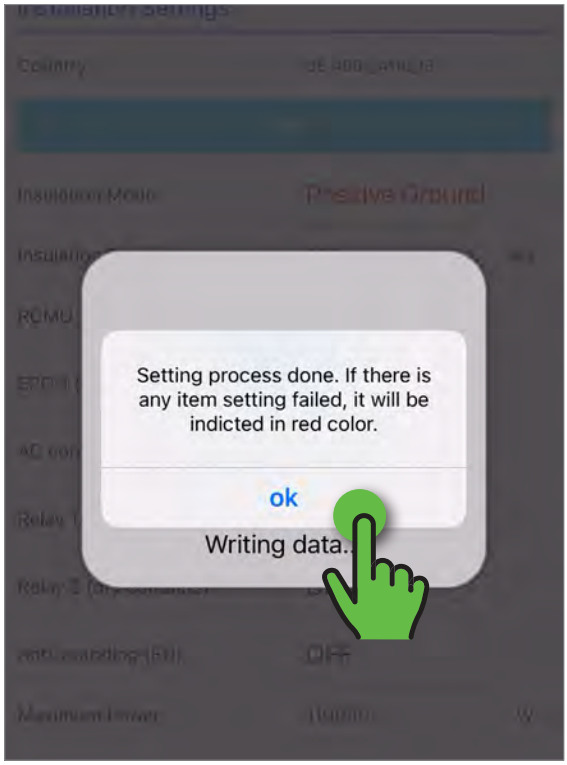
2 Make the desired changes.



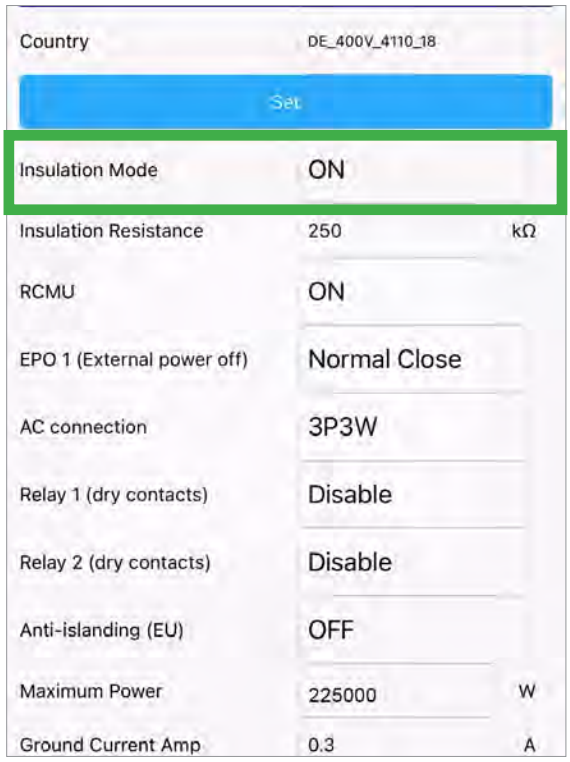
3 To save, tap **Set** at the end of the **Installation settings** section.



4 Acknowledge the message that appears after saving.



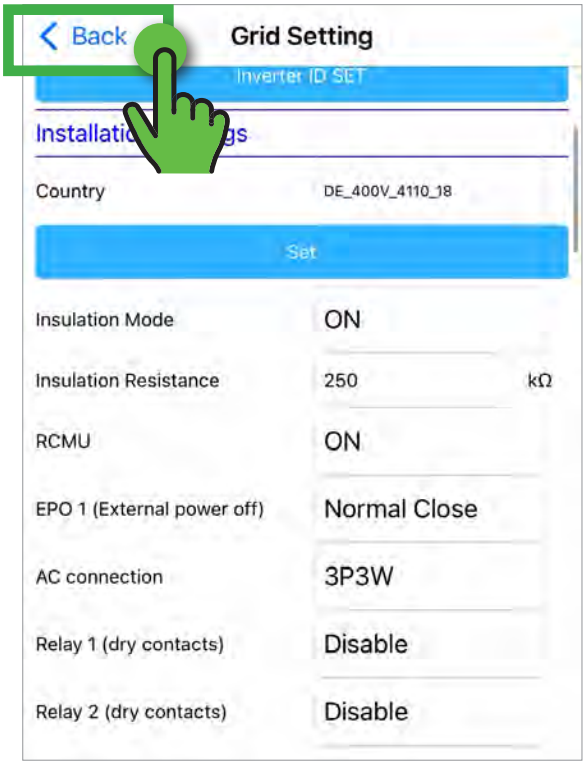
5 The setting of the insulation mode is complete.



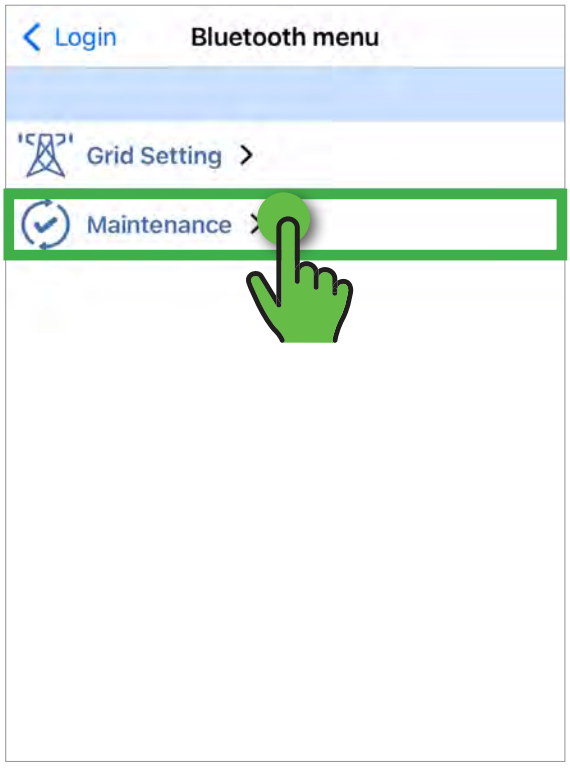
9.6.8 Changing the RS485 protocol to SUNSPEC (optional)

The settings for the RS485 protocol can be found under the menu item **Local settings** > **Maintenance** > **Change Protocol**.

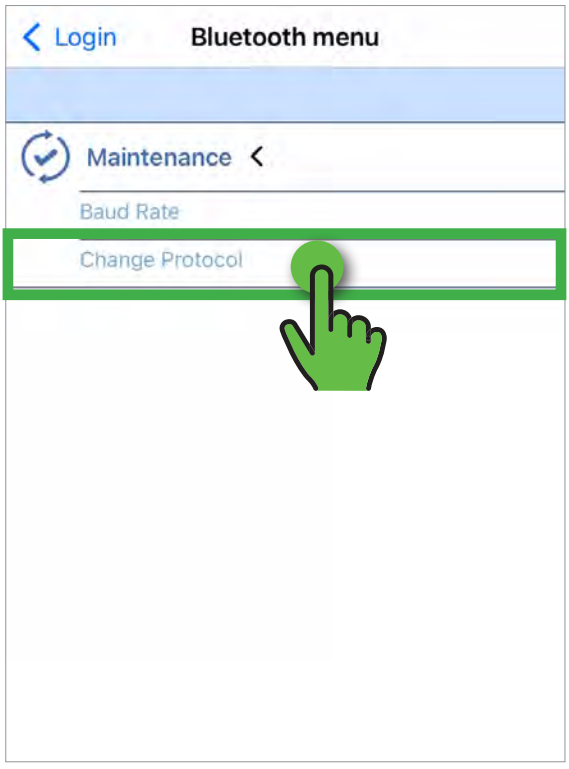
1 If you are not yet back in the **Installation settings** section, tap **Back**.



2 Tap **Maintenance**.



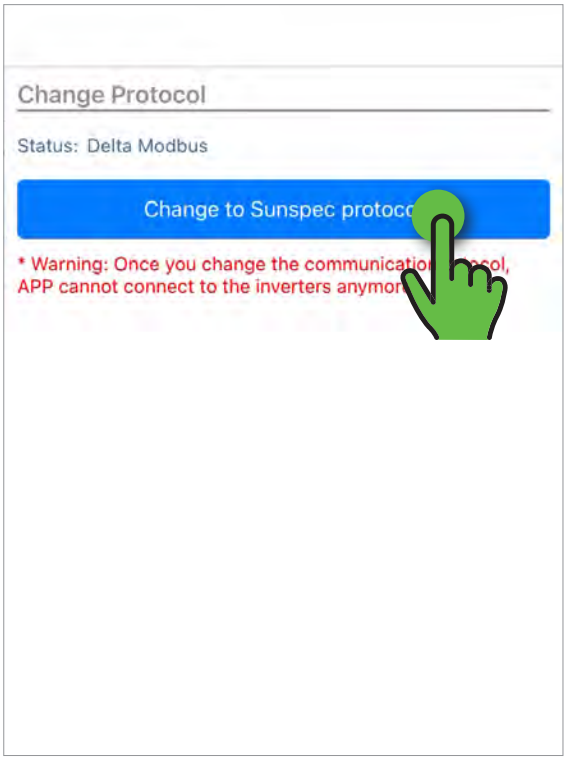
3 Tap **Change Protocol**.



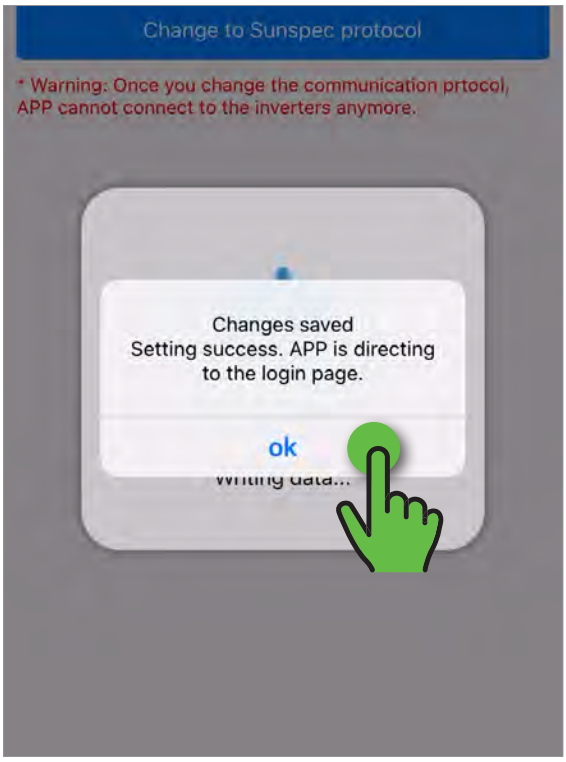
4 Enter the service code and tap **Submit**.



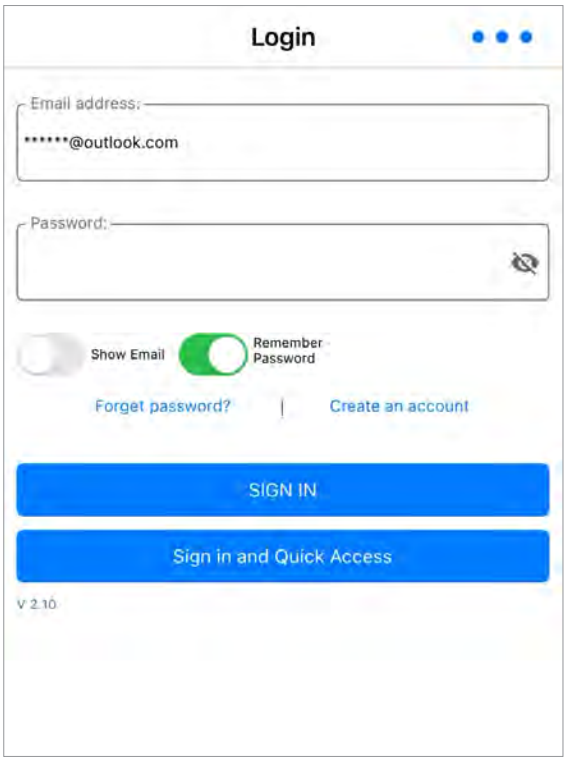
5 Tap **Change to Sunspec protocol**.



6 Acknowledge the message that appears after saving.



7 The SUNSPEC protocol is set. The DeltaSolar app separates from the inverter.

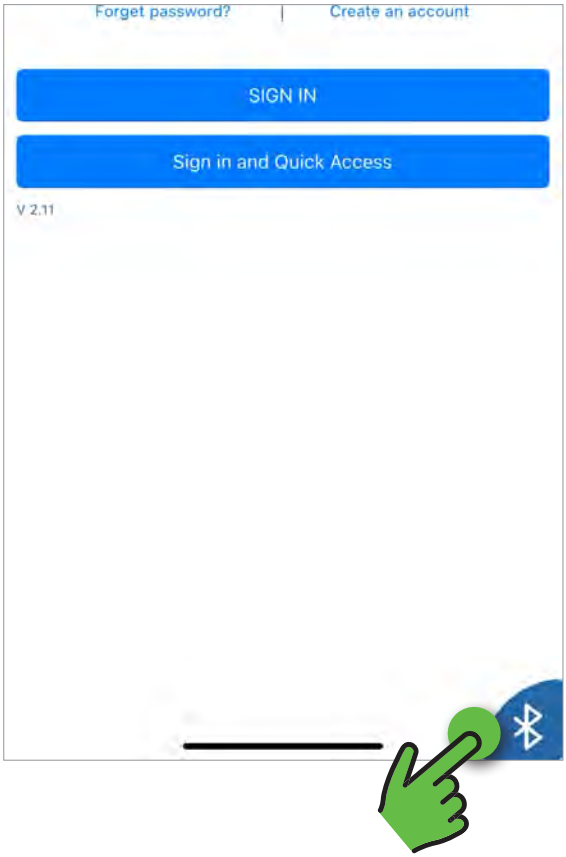


9.6.9 Changing the RS485 protocol to DELTA (optional)

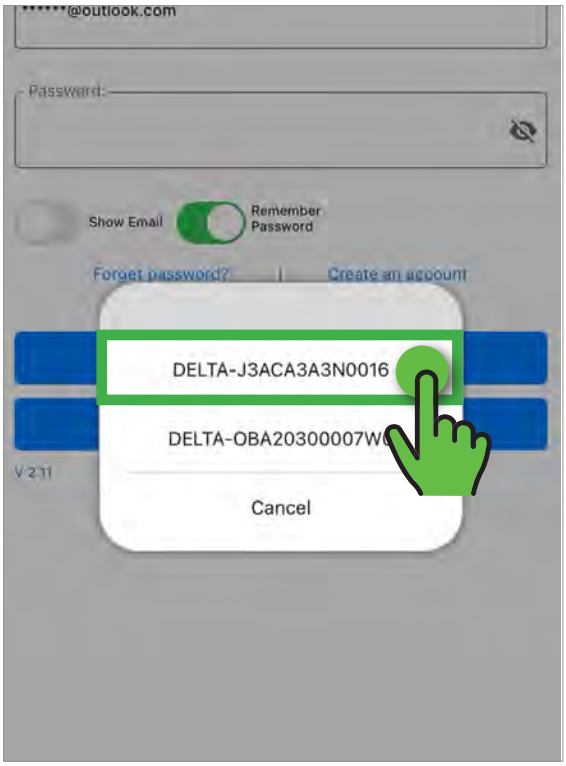
The RS485 protocol must be changed to DELTA protocol in order to be able to access the inverter with the DeltaSolar app.

The settings for the RS485 protocol can be found under the menu item **Local settings** > **Maintenance** > **Change Protocol**.

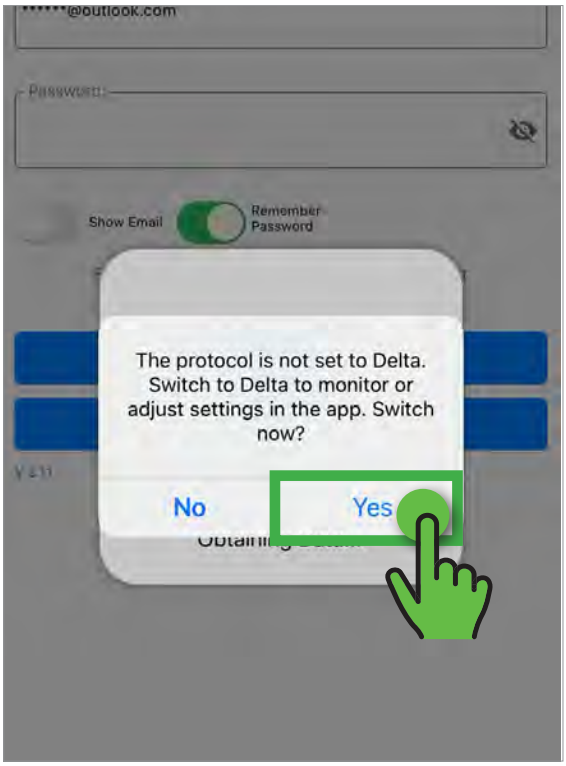
1 Tap the Bluetooth icon.



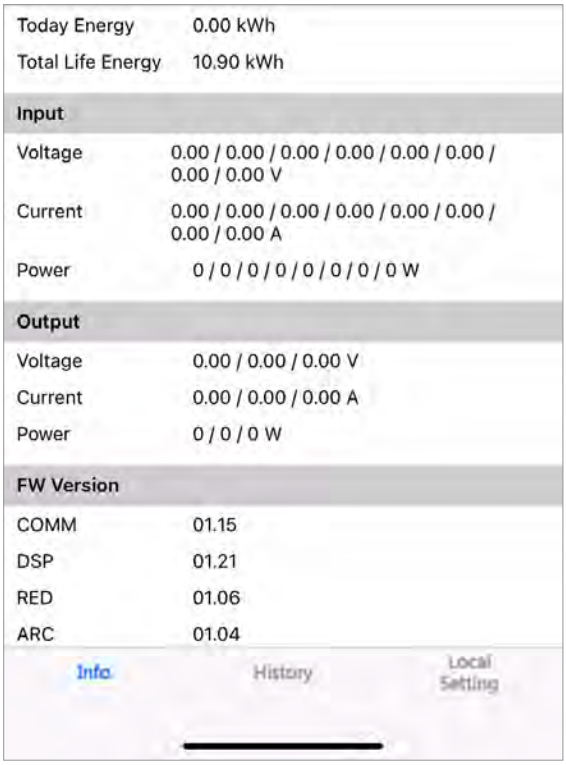
2 Tap the serial number of the inverter. Move closer to the inverter if it is not displayed.



3 Tap **Yes** to switch to DELTA protocol.



4 The changeover to the DELTA protocol is complete.



Do not forget to switch back to SUNSPEC after completing the settings! See “9.6.8 Changing the RS485 protocol to SUNSPEC (optional)”, page 66.

9.7 Commissioning with the Delta Service Software (DSS)

9.7.1 Prerequisites

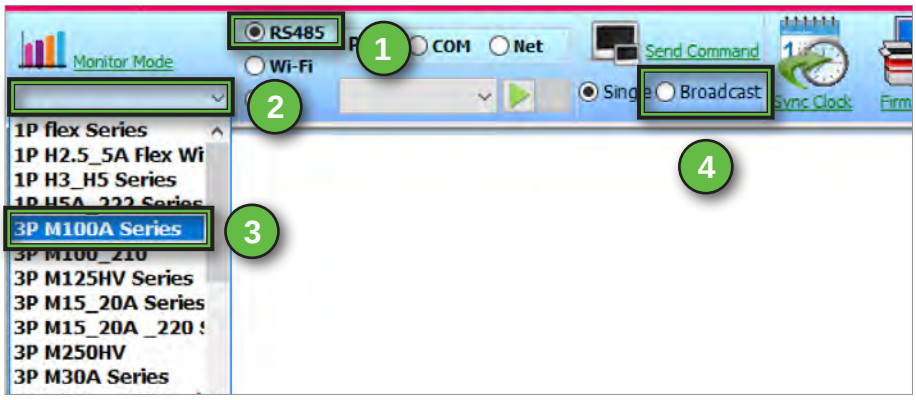
- All inverters are supplied with power and switched on.
- All inverters in the system are connected with one another via RS485.
- DSS is installed on the Windows PC. This can be downloaded from partnerportal.delta-emea.com (registration required).
- The Windows PC is connected to the inverters' RS485 network via a USB/RS485 adapter.

9.7.2 Basic Settings

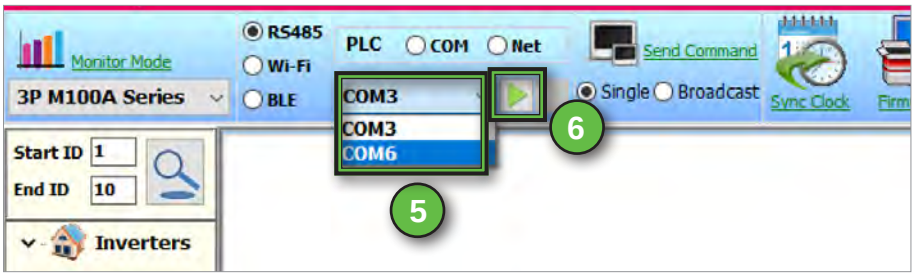
Procedure

1. Start the DSS.

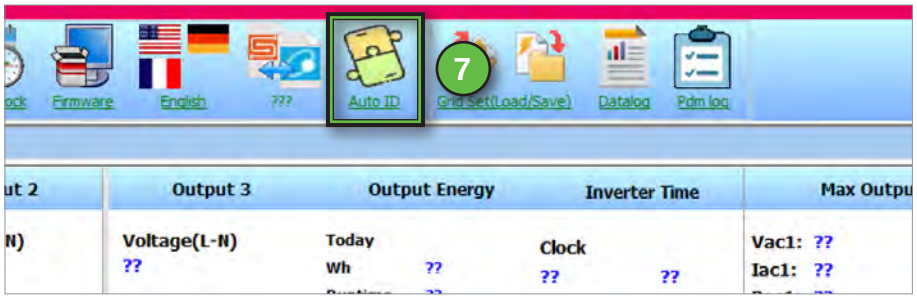
2. Perform the commissioning steps on the next three pages.



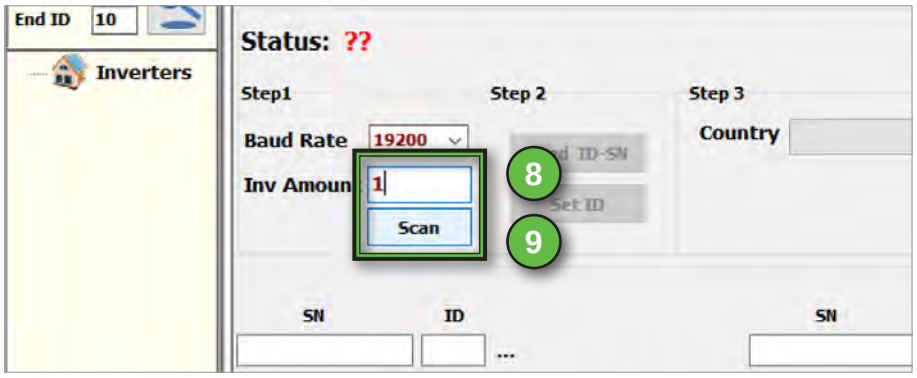
1. Select **RS485** (1).
2. Under **Monitor Mode** (2), select the inverter type (3).
3. Select **Broadcast** (4) to access all inverters in the RS485 bus.



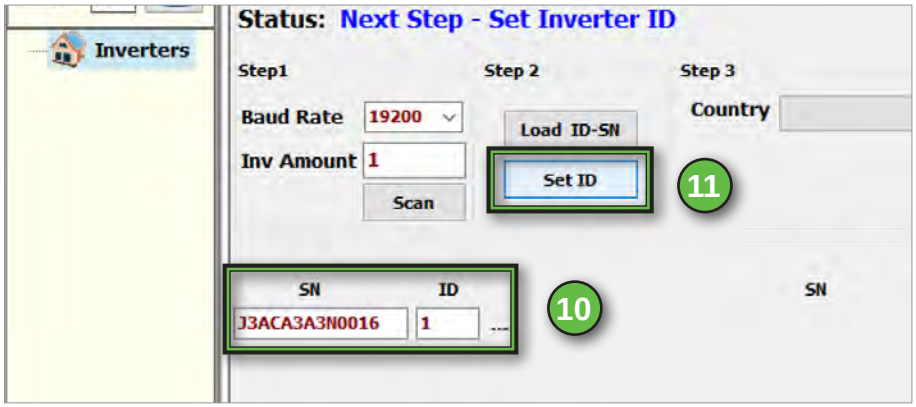
4. Select the COM port in which the USB/RS485 adapter is inserted (5). It is usually the last entry.
5. Click the play button (6) to connect to the COM port.



6. Start **Auto ID** (7). This function searches for inverters and automatically assigns inverter IDs.



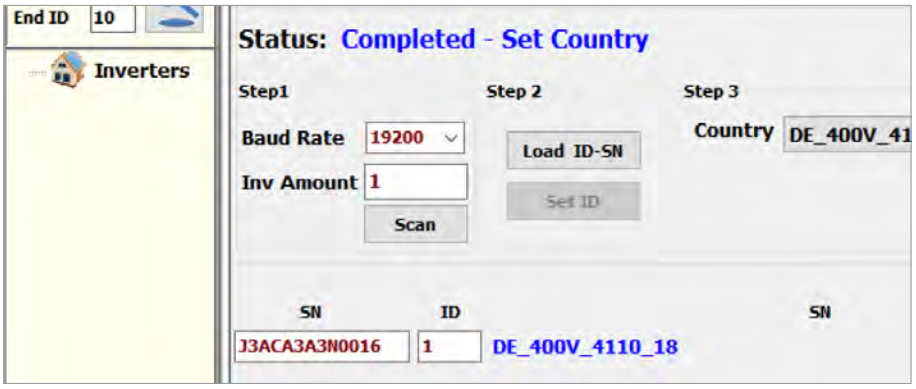
7. Enter the number of connected inverters (8) and use **Scan** to start the search for the inverters (9).



8. Adjust the inverter IDs if necessary 10 and save them by pressing Set ID 11.

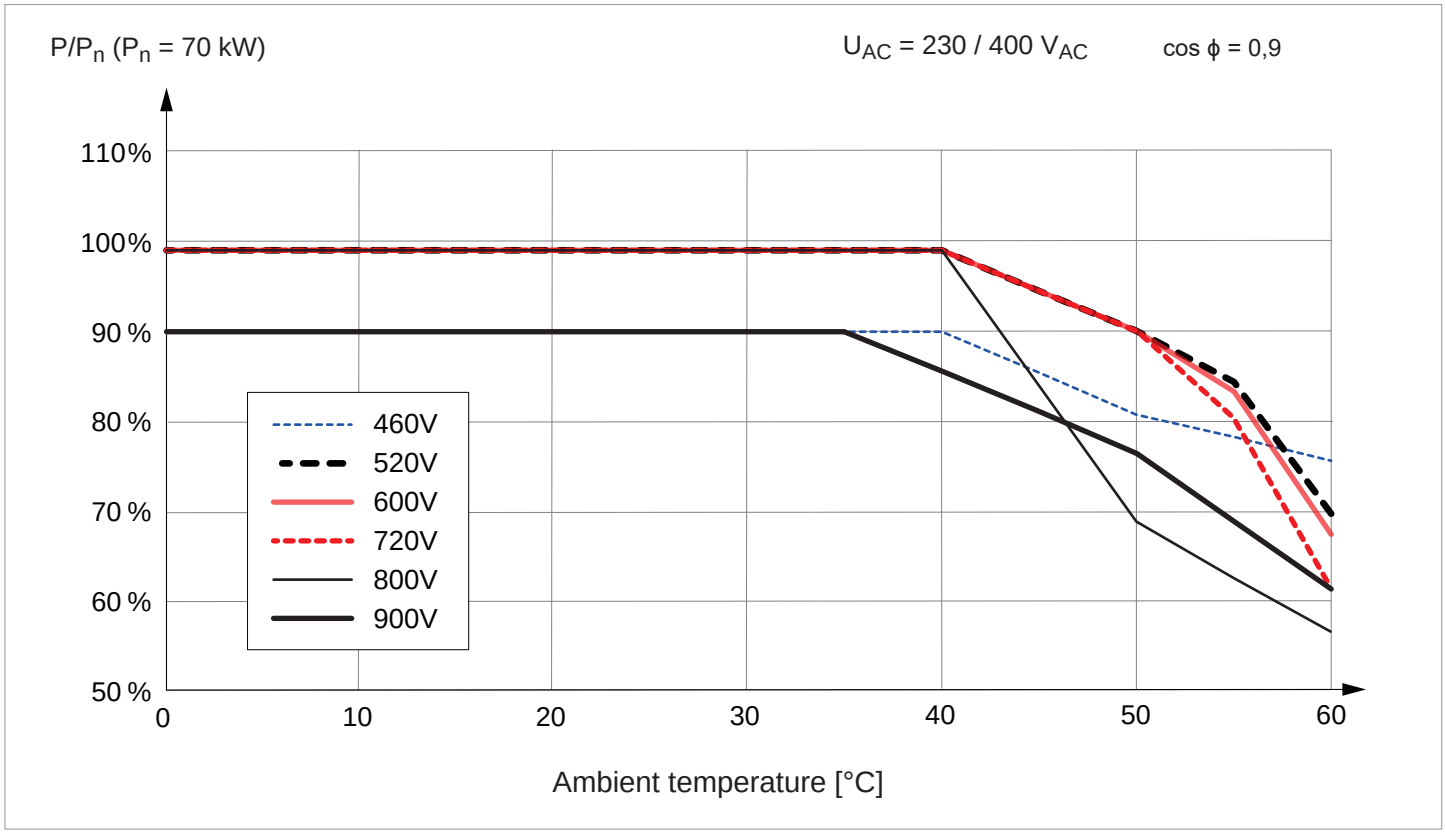


9. Select the country or grid type 12 and save by pressing **Set** 13.

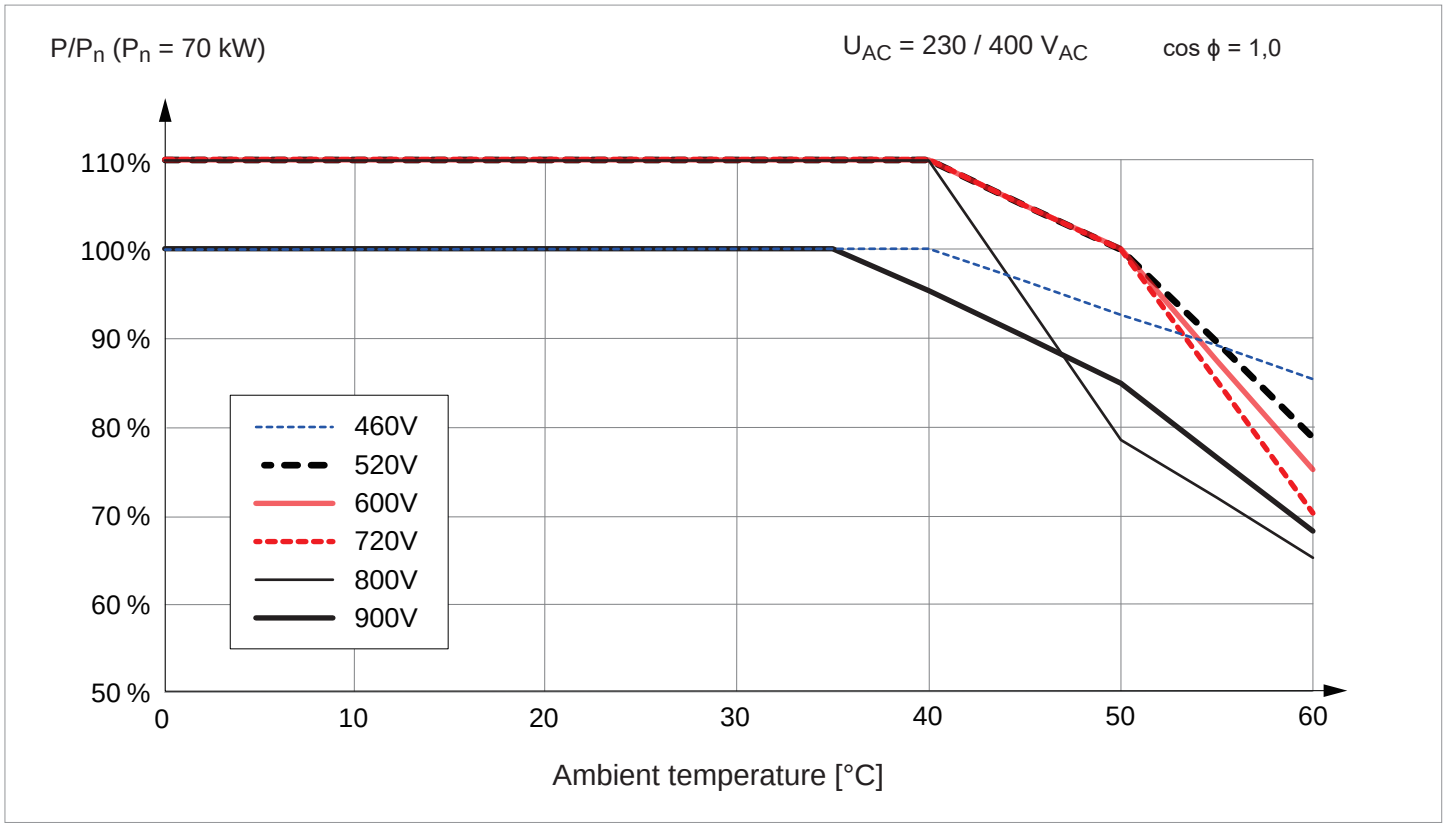


☑ The standard commissioning with the Delta Service Software has been completed.

10. Characteristic curves

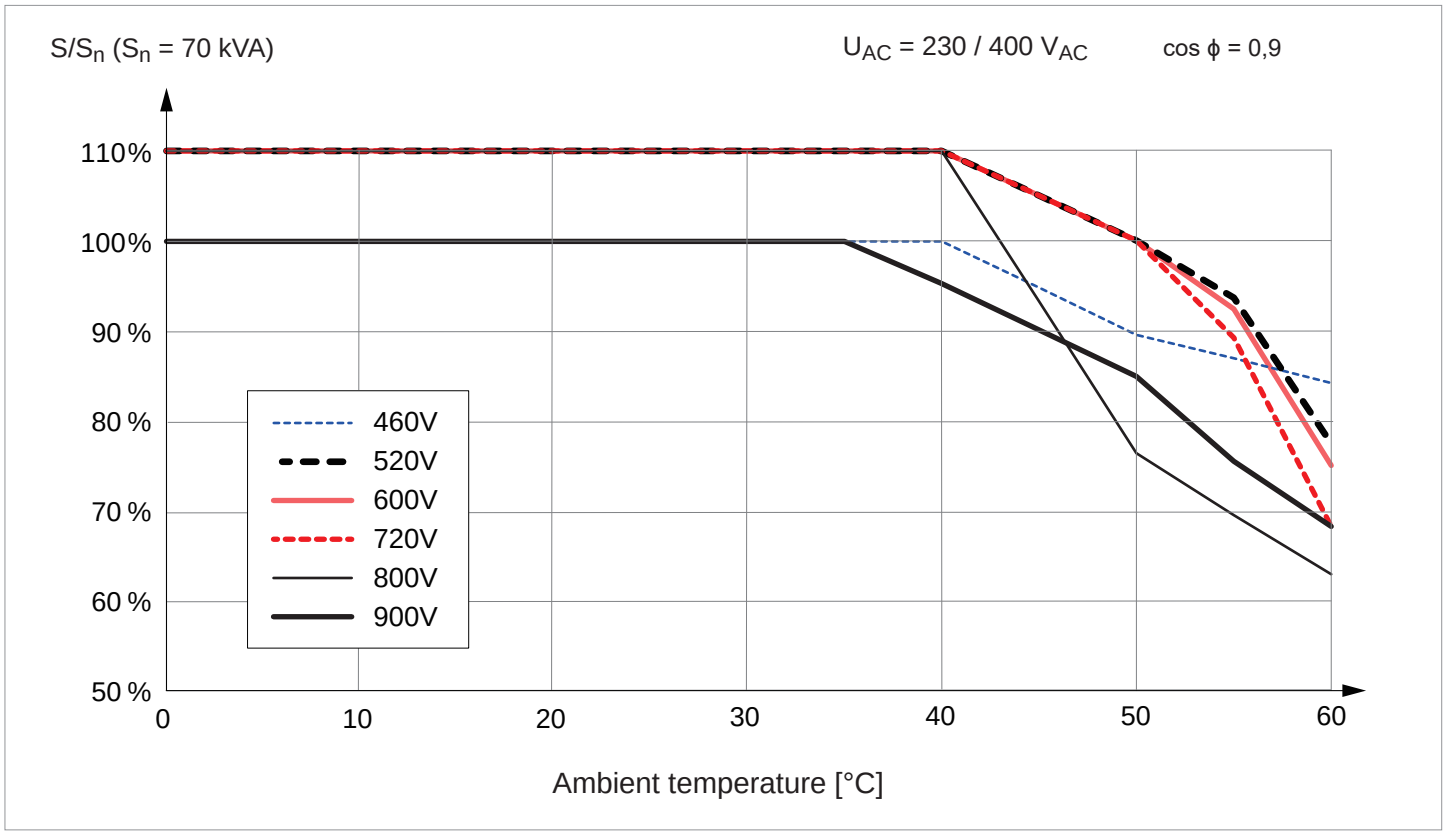


Characteristic curve "Active power control depending on the ambient temperature, cos φ = 0.90, AC voltage =230/400 V"



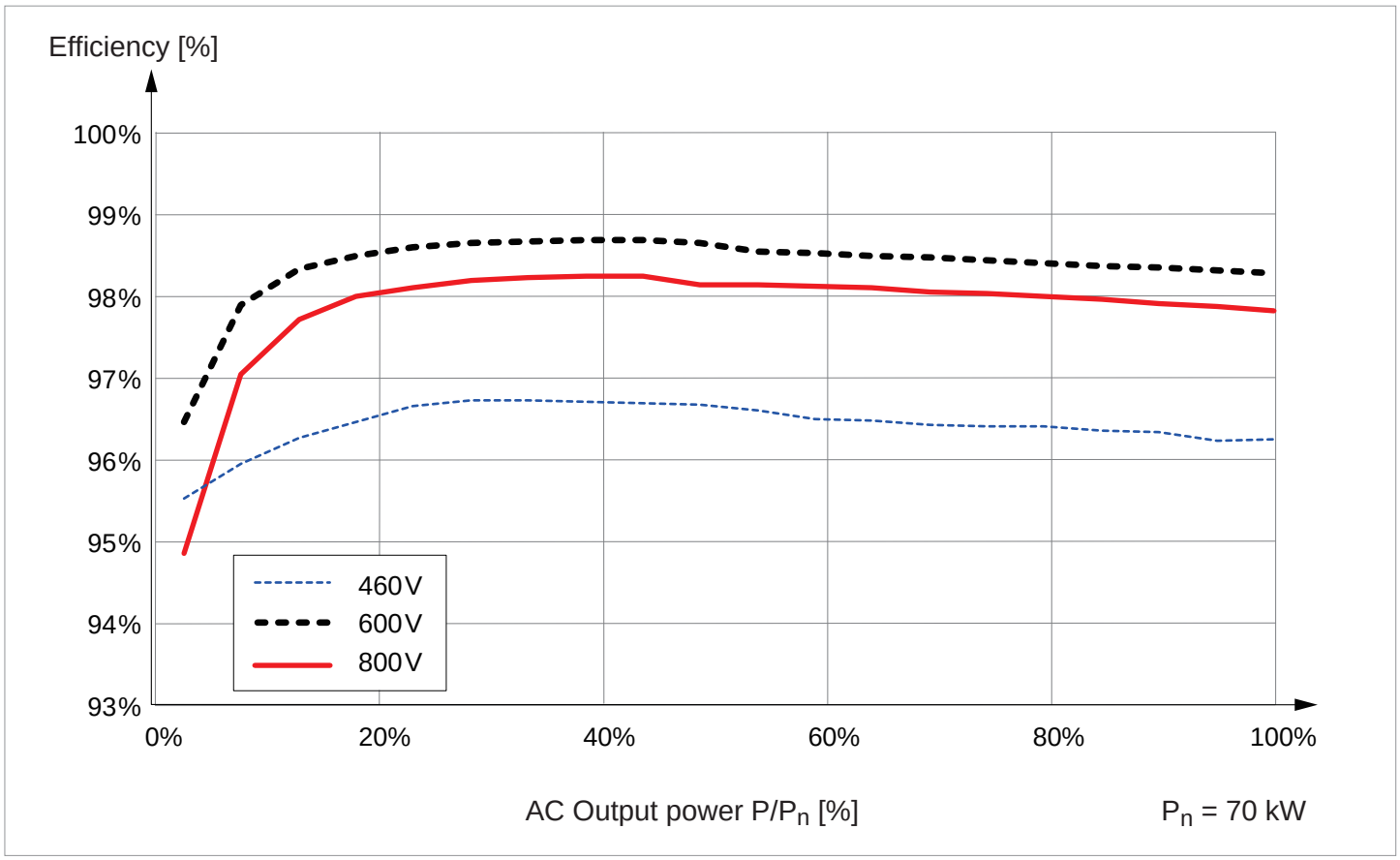
Characteristic curve "Active power control depending on the ambient temperature, cos φ = 1.0, AC voltage =230/400 V"

9 Characteristic curves



Characteristic curve "Apparent power control depending on the ambient temperature, cos φ = 0.90, AC voltage 230/400 V"

Note: Full reactive power up to 900 V V_{OC} available. Restart at a hysteresis value of 850 V.



Efficiency characteristic curve; AC voltage = 400 V_{AC}

11. Technical Data

Input (DC)	M70A
Maximum input power (per MPP Tracker/total)	15.7 kW/78.5 kW
Rated power	70 kW
Input voltage range for operation	200 to 1000 V_{DC}
Max. input voltage	1100 V_{DC} [1]
Nominal voltage	600 V_{DC}
MPP voltage range with maximum power	460 to 900 V_{DC} [2]
Number of MPP trackers	6
Asymmetrical design	15.7 kW/13 kW
Maximum input current (per MPP tracker/total)	26 A/156 A
DC short-circuit current I_{SC}	50 A per MPP tracker
Open-circuit voltage V_{OC}	1000 V_{DC}/1100 V_{DC} without damage
DC connection panel	
Connector type	Amphenol H4 connector
Number of DC connections	18 pairs
DC cable specifications	4/6 mm^2
Use of external string fuses	1 or 2 strings per MPPT: no external string fuses are required 3 strings per MPPT: external string fuses are required
Overvoltage category [3]	II
Überspannungsableiter	Type 2 (EN 50539- 11) replaceable, type 1+2 combined, up-gradeable
Galvanic isolation	No

Output (AC)	M70A
Maximum apparent power [4] [5]	77 kVA
Maximum active power [4] [6]	77 kW
Rated apparent power [4]	70 kVA
Rated voltage [7]	230/400 V -20%/+30%, 3 phases + PE (△), 3 phases + N + PE (Y)
Rated current	102 A
Maximum current	112 A
Frequency range [7]	50/60 Hz ± 5 Hz
Power factor adjustment range	0.8 cap. to 0.8 ind. (0.9 cap. to 0.9 ind. at maximum active power)
Total harmonic distortion	<3% at rated apparent power
Power consumption in night mode [8]	<3.5 W
AC connection	
Connector type	L1, L2, L3, N: Terminal with hexagon socket screw
	PE: M10 threaded bolt with nut
Copper cable specification	35 to 120 mm^2 (single wire, multi-wire, fine-wire with wire end sleeve)
Aluminum cable specifications	60 to 120 mm^2 (round single wire, round multi-wire, sector shaped)
Overvoltage category [3]	III
Überspannungsableiter	Type 2 (EN 61463- 11) replaceable, type 1+2 combined, up-gradeable

10 Technical Data

Mechanical design	M70A
Dimensions (W x H x D)	699 × 629 × 264 mm
Weight	69 kg
Cooling	1 fan module containing 4x fans for circulating ambient air, replaceable
	2x internal fans for preventing heat buildup, replaceable
Mounting options	suspended (mounting plate included in the scope of delivery)
	free-standing (mounting feet available as an accessory)

Communication and data visualization	M70A
Communication interfaces	2x RS485, 2x dry contacts, 1x EPO, 1x 12 V_{DC} power supply, 6x digital inputs
Communication	RS485, Bluetooth®
Communication protocols	Modbus RTU

General specifications	M70A
Delta model name	M70A_260
Delta part number	RPI703M260000
Overall operating temperature range	-25 to +60°C
Operating temperature range with rated power (70 kW)	-25 to +60°C
Relative humidity	0 to 100%, non-condensing
Max. operating height	4000 m above sea level
Noise level	<67.5 dB(A)

Standards and guidelines	M70A
Degree of protection	IP66
Safety class	II
Level of pollution	II
Overload behavior	Current limitation, power limitation
Safety	IEC 62109-1/-2, CE compliance
EMC	EN 61000-6-2/-6-3/-3-11/-3-12
Noise immunity	IEC 61000-4-2/-3/-4/-5/-6/-8
Distortion factor	EN 61000-3-2
Voltage fluctuations and flicker	EN 61000-3-3
Grid connection guidelines	You will find the current list at solarsolutions.delta-emea.com

1) The maximum withstand voltage is 1100 V_{DC}. The inverter starts to work if the input voltage falls below 1000 V_{DC}.
2) At ambient temperatures < 35 °C; from 35 °C to < 40 °C: 460 to 800 V_{DC}; from 40 °C to < 50 °C: 520 to 720 V_{DC}
3) IEC 60664-1, IEC 62109-1
4) For cos phi = 1 (VA = W)
5) Full reactive power up to 900 V V_{OC} available. Restart at a hysteresis value of 850 V_{DC}.
6) At ambient temperatures ≤ 40°C
7) AC voltage and frequency range will be programmed to comply with appropriate national regulations.
8) Power consumption with standby communication

Delta Customer Service

Send an email to: solarsupport.emea@deltaww.com

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France	0800 919 816 (toll free)
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Italy	800 787 920 (toll free)
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