Quick Installation Guide

M88H_122 (CF) Solar Inverter

United Kingdom

Europe general

This quick installation guide applies for the following inverter models:

- **M88H_122 (CF), Delta part number RPI883M122000**

with the firmware versions:

DSP: 1.18 / RED: 1.03 / COM: 1.18

The Delta part number can be found on the type plate of the inverter. The firmware versions are listed on the view in the `Inverter Info.` menu.

If you notice discrepancies between the descriptions in this quick installation guide and the information on the inverter display, go to www.solar-inverter.com and download the version of the quick installation guide that matches the model number and the firmware version of your inverter.

On the website, you will also find the installation and operation manual with detailed information about the inverter.

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Basic safety instructions

DANGER

Electrical shock

Potentially fatal voltage is applied to the inverter during operation. When the inverter is disconnected from all power sources, this voltage remains present in the inverter for up to 100 seconds.

Therefore, always carry out the following steps before working on the inverter

1. Turn the DC disconnector to the ***OFF*** position.
2. Disconnect the inverter from all AC and DC voltage sources and make sure that none of the connections can be accidentally restored.
3. Wait for at least 100 seconds until the internal capacitors have discharged.

DANGER

Electrical shock

Potentially fatal voltage is applied to the inverter's DC connections during operation. 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.

- ► Never disconnect the inverter from the solar modules when it is under load.
- ► Turn the DC disconnector to the ***OFF*** position.
- ► Uncouple the connection to the mains grid so that the inverter cannot supply energy to the mains grid.
- ► Disconnect the inverter from all AC and DC voltage sources. Ensure that none of the connections can be restored accidentally.
- ► Ensure that the DC cables cannot be touched accidentally.

WARNING

Electrical shock

When the cover is removed from the wiring box, this exposes voltage-carrying parts and protection conforming to IP65 is no longer guaranteed.

- ► Remove the cover only when it is absolutely necessary.
- ► Do not remove the cover if water might enter the inverter.
- ► After work is completed, ensure that the cover is properly replaced and screwed in. Check that the cover is properly sealed.

- To comply with the IEC 62109-5.3.3 safety requirements and avoid injury or damage to property, the inverter must be installed and operated in accordance with the safety and operating instructions set out in this manual. Delta Energy Systems 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 certified for the installation and operation of grid-based solar inverters.
- All repair work on the inverter must be carried out by Delta Energy Systems. Otherwise, the warranty will be void.
- Warning instructions and warning symbols attached to the inverter by Delta Energy Systems must not be removed.
- The inverter has a high leakage current value. The grounding cable **must** be connected before commencing operation.
- Do not disconnect any cables while the inverter is under load due to risk of a fault arc.
- To prevent damage due to lightning strikes, follow the provisions that apply in your country.
- The surface of the inverter can get very hot during operation. Only touch the inverter (outside of the display) with safety gloves.
- The inverter is very heavy. The inverter must be lifted and carried by at least three people.
- Only equipment in accordance with SELV (EN 60950) may be connected to the RS485 interfaces.
- All connections must be sufficiently insulated in order to ensure the IP65 protection class. Unused connections must be closed using cover caps.

Scope of delivery

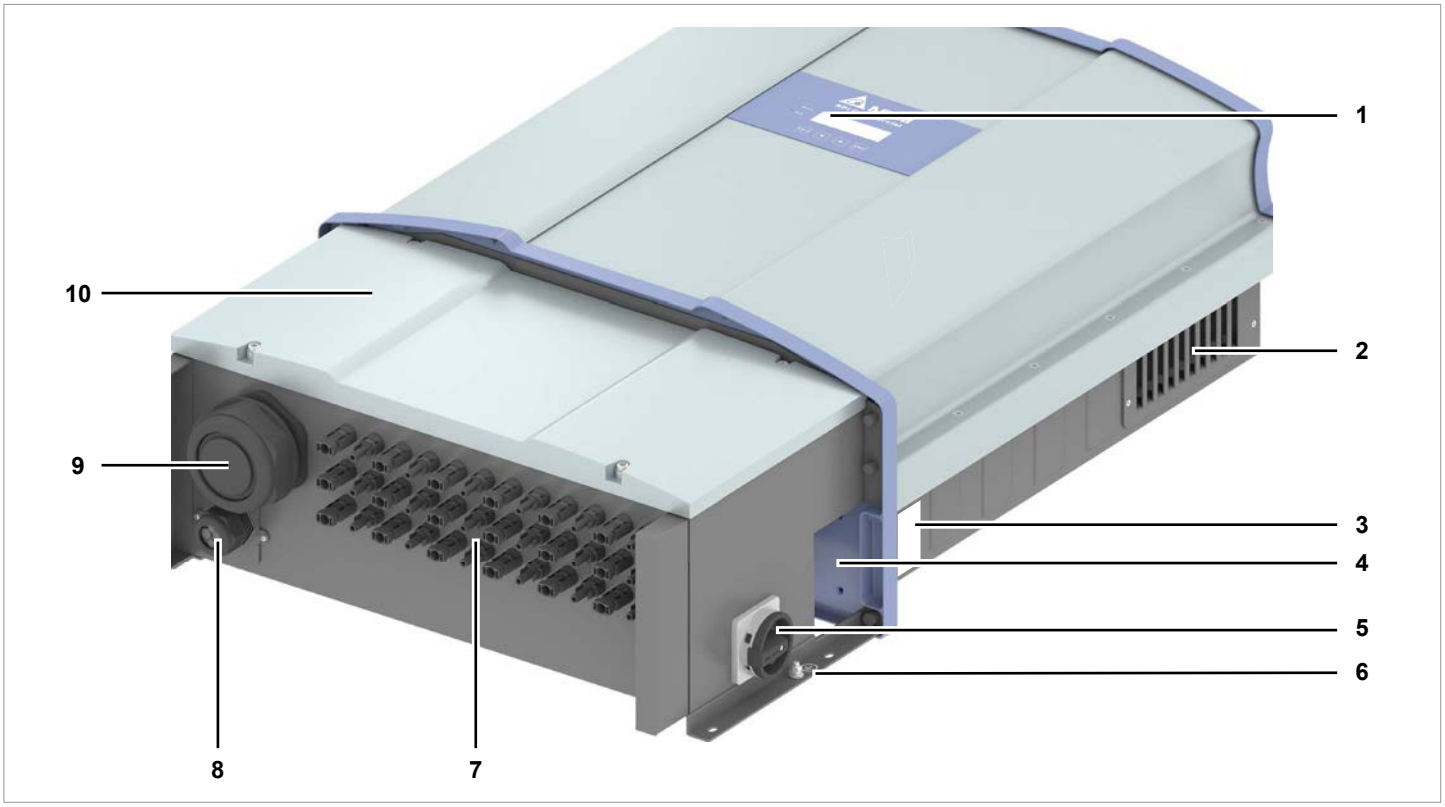
Part		Description	Part		Description
Inverter with wiring box	1		Mounting plate	1	
Cover caps	2	For closing the upper cable feed-throughs on the wiring box when the inverter part is disconnected. The cover caps are fitted to the mounting plate. 		1	
DC plug	18	Multi-contact MC4-plug for DC + (32.0017P0001-UR for 4/6 mm²) 	M6 grounding screw	1	For grounding the inverter housing; with spring washer, washer and lock washer; mounted on the inverter. 
	18	Multi-contact MC4-plug for DC– (32.0016P0001-UR for 4/6 mm²) 	M6 mounting screw	4	For fastening the wiring box to the mounting plate; with spring washer and washer 
Cable gland for the AC connection	1	For feeding the AC cable into the wiring box 	Quick installation guide and basic safety instructions	1	 Quick Installation Guide
Cable gland for the communication connection	1	For fastening the communication cable to the wiring box 			

Check the delivery for completeness and all components for damage before starting installation work.

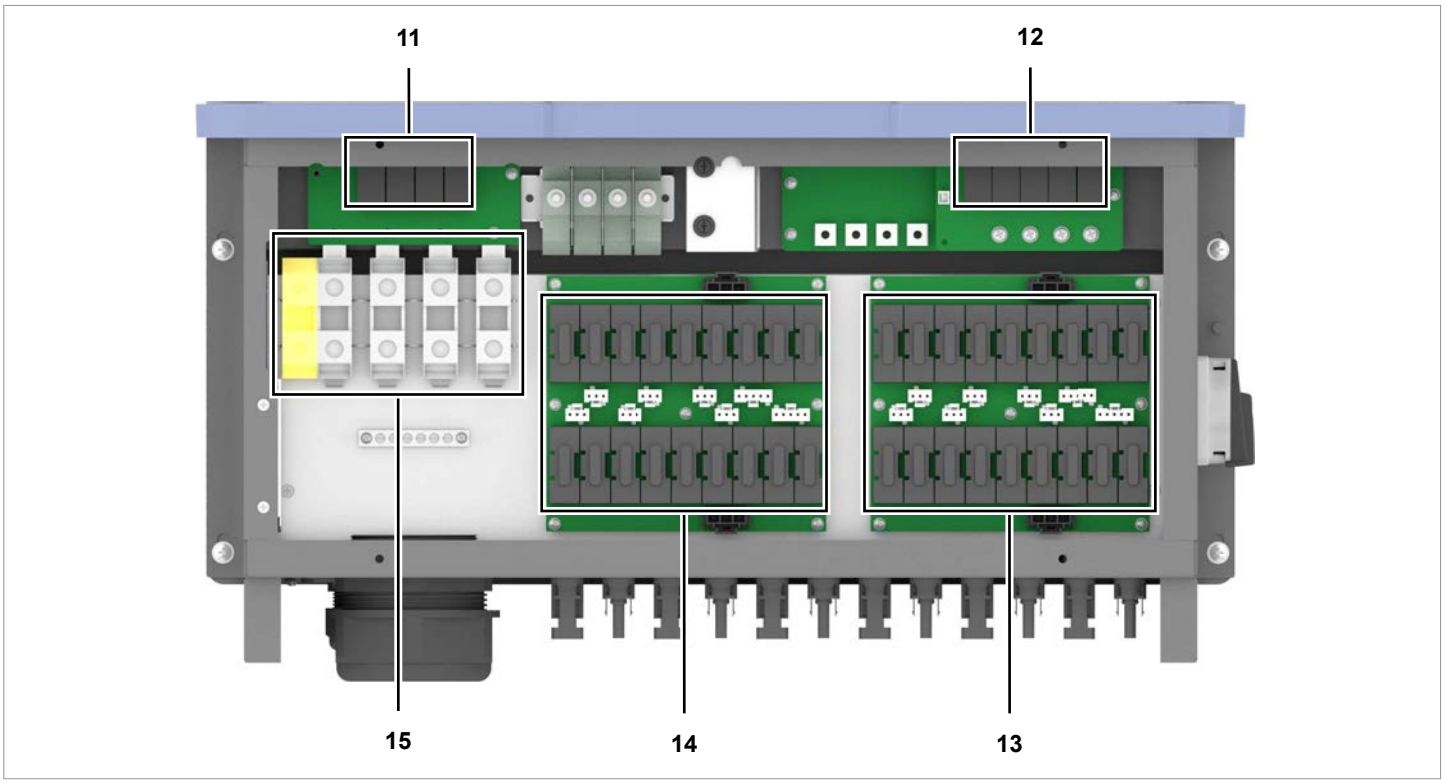
Do not use any damaged components.

Keep the packaging.

Components of the inverter



1 Display, buttons, and LED
2 Air outlets and replaceable fan block
3 Type plate
4 Air inlets
5 DC disconnector
6 Grounding connection
7 DC connections
8 Communication connection
9 AC cable feed-through
10 Wiring box cover



11 AC surge protection devices
12 DC surge protection devices
13 DC1 string fuses
14 DC2 string fuses
15 AC terminal block

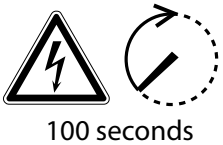
Components of the inverter

Display, buttons, and LEDs

GRID	Mains grid	Green LED. Lights up when the inverter is supplying electricity to the mains grid.
ALARM	Alarm	Red LED. Indicates an error, a failure or a warning.

EXIT	EXIT	Exit the current menu. Cancel the setting for a parameter. Changes are not adopted.
▼	Down	Move downwards in the menu. Reduce the value of a configurable parameter.
▲	Up	Move upwards in the menu. Increase the value of a configurable parameter.
ENT	ENTER	Select menu item. Open a configurable parameter for editing. Cancel the setting for a parameter. Changes are adopted.

Information on the type plate

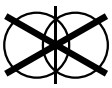


Danger to life through electric shock

Potentially fatal voltage is applied to the inverter during operation. This voltage persists even 100 seconds after disconnection of the power supply.

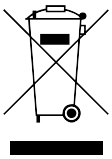
Only the wiring box may be opened. All other device parts may not be opened.

Before working with the inverter, you must read the supplied manual and follow the instructions contained therein.



This inverter is not separated from the grid with a transformer.

The housing of the inverter must be grounded if this is required by local regulations.



WEEE marking

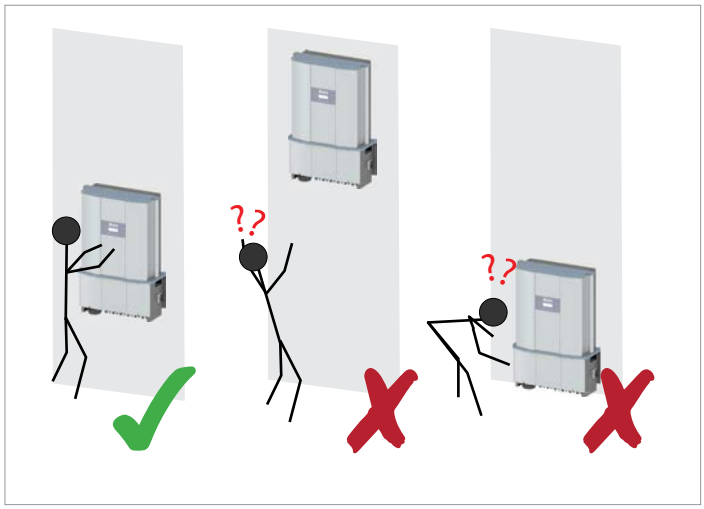
The inverter must not be disposed of as standard household waste, but in accordance with the applicable electronic waste disposal regulations of your country or region.

The noise level can be very high when the fans are running. Always wear hearing protection in this case.

Planning the installation

Installation location of the inverter

► Attach the inverter so that the information on the display and the buttons can be read without any problems.



► The inverter is very heavy. The wall has to be able to bear the heavy weight of the inverter.

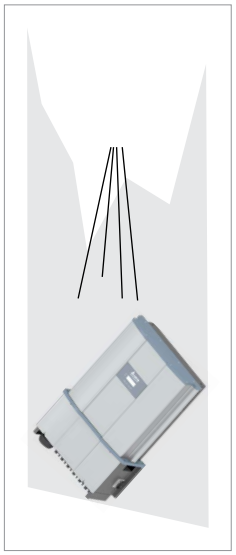
► Always use the mounting plate supplied with the inverter.

► 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 disruptions.

► When using the inverter in residential areas or in buildings with animals, possible noise emissions can be disturbing. Therefore, carefully choose the place of installation.

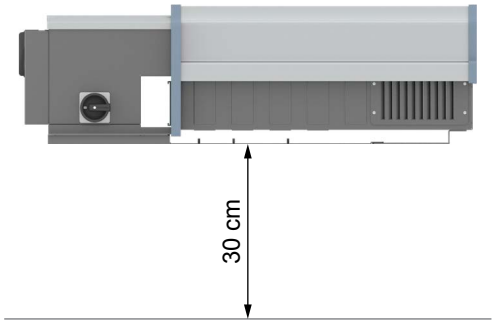
► Mount the inverter on a fireproof wall.



Mounting alignment

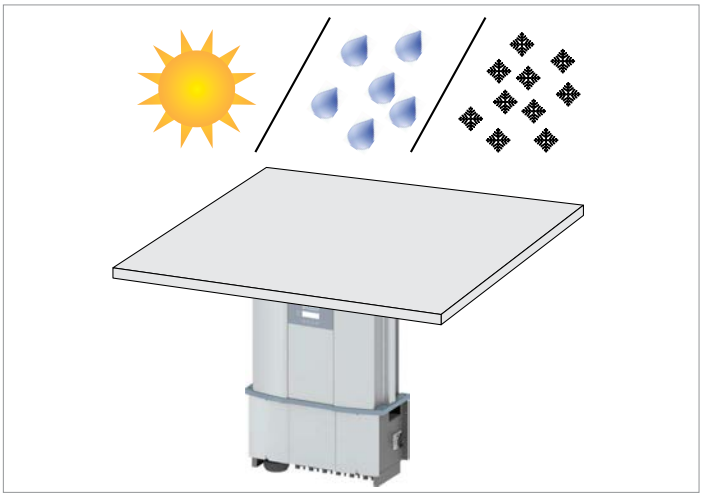
Vertical installation

Horizontal installation

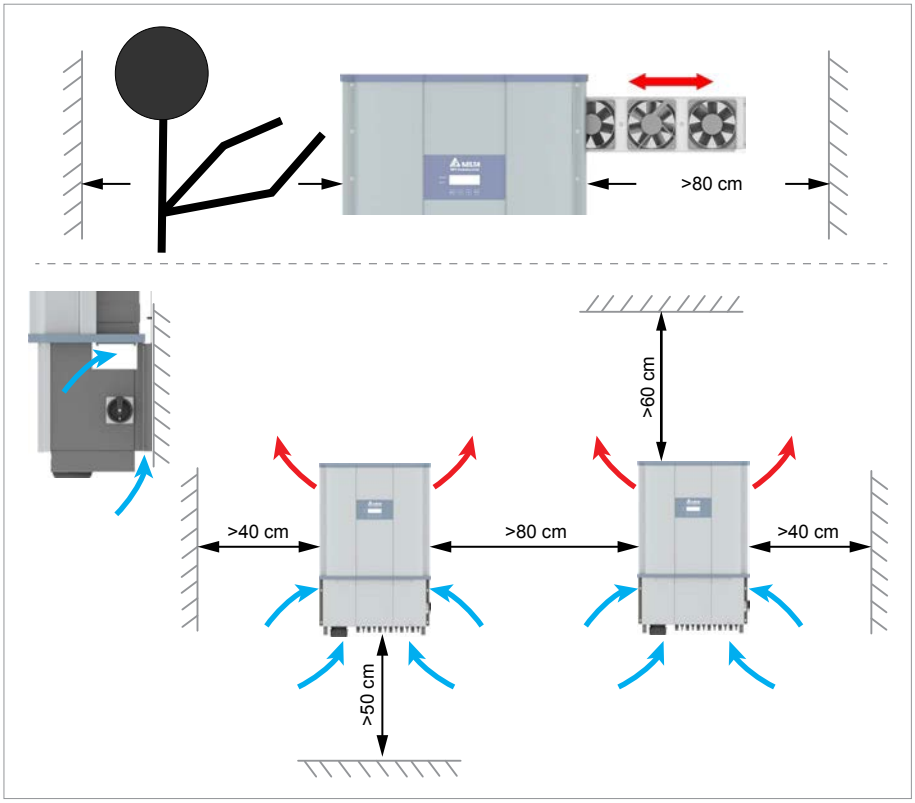


Outdoor installations

► The inverter has a protection class of IP65 and can be installed indoors and outdoors. Despite this, the inverter should be protected by a roof against direct solar irradiation, rain and snow. For example, the power of the inverter will be reduced if it is too heavily heated by solar irradiation. This is normal operating behavior for the inverter and is necessary to protect the internal electronics.



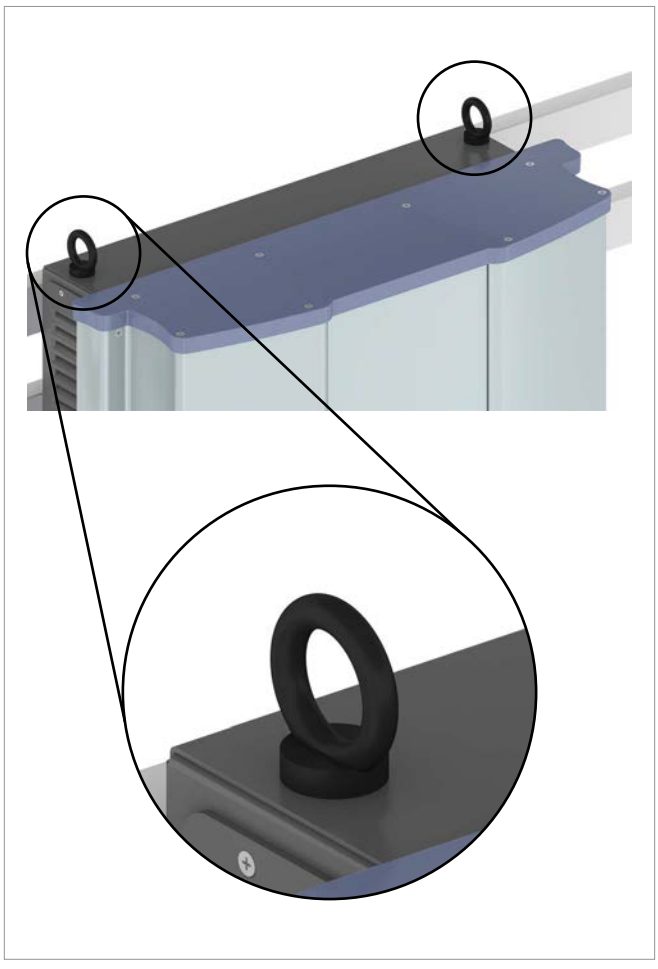
Mounting distances and air circulation



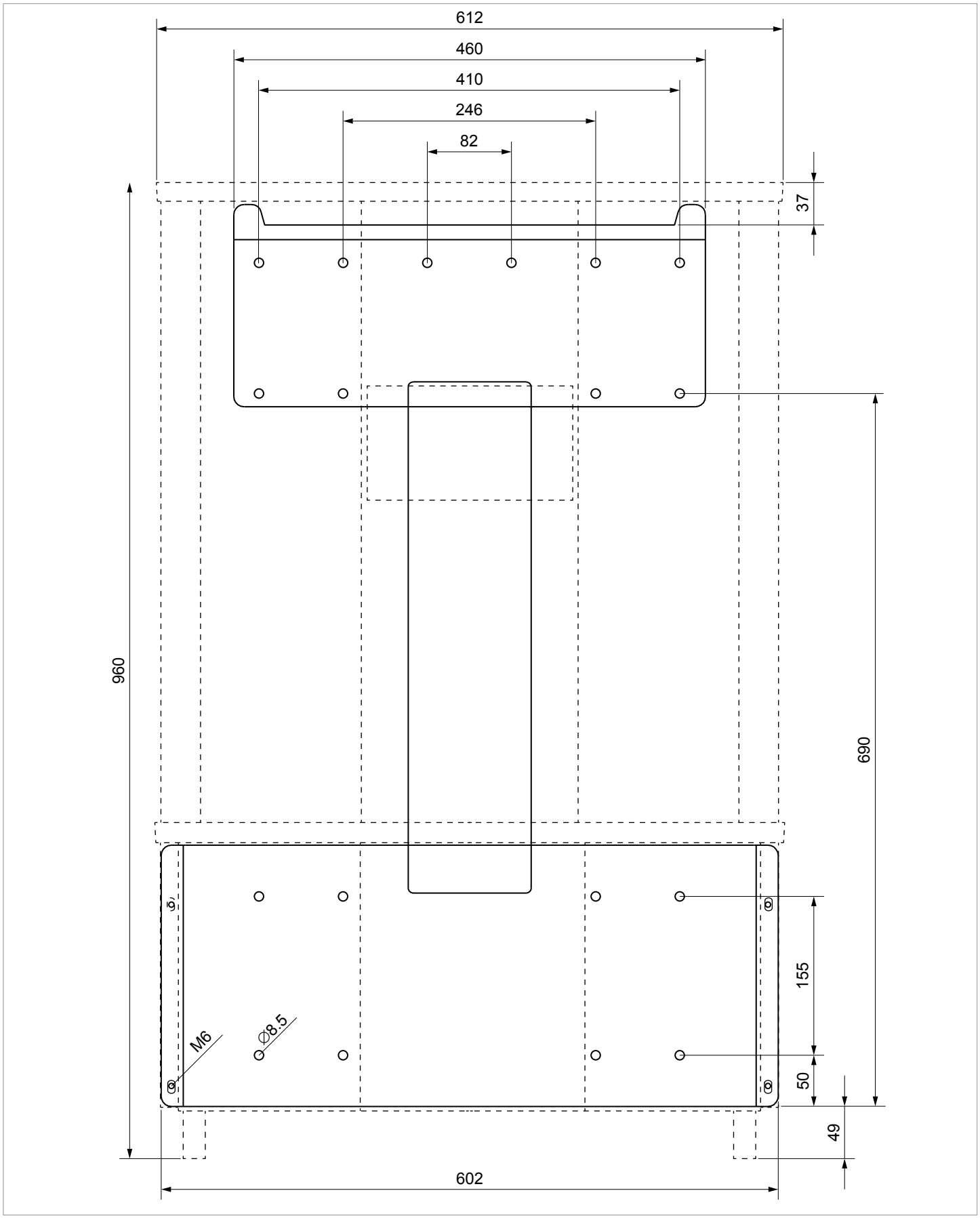
- Ensure sufficient air circulation. Hot air must be able to dissipate upwards. Leave enough space around each inverter.
- Do not install inverters above one another so that they do not heat each other.
- Note the *Operating temperature range without derating* and the *Operating temperature range*. When the *Operating temperature range without derating* is exceeded the inverter reduces the AC power fed into the mains grid. When the *Operating temperature range* is exceeded the inverter stops feeding AC power into the mains grid. This is normal operating behavior for the inverter and is necessary to protect the internal electronics.
- In areas with many trees or fields, pollen can clog the air inlets and outlets, hindering the air flow.

Lifting and transporting the inverter

- Screw eyebolts onto the upper side of the inverter. The screw eyebolts are not included in the scope of delivery.
- Lift the inverter with a block and tackle or crane.



Dimensions

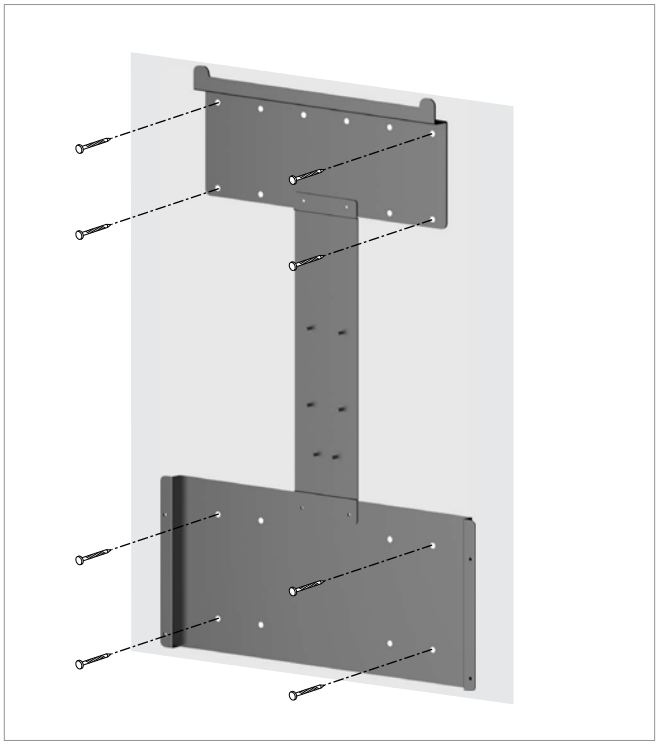


Dimensions

Mounting the inverter

Mounting the inverter on the wall

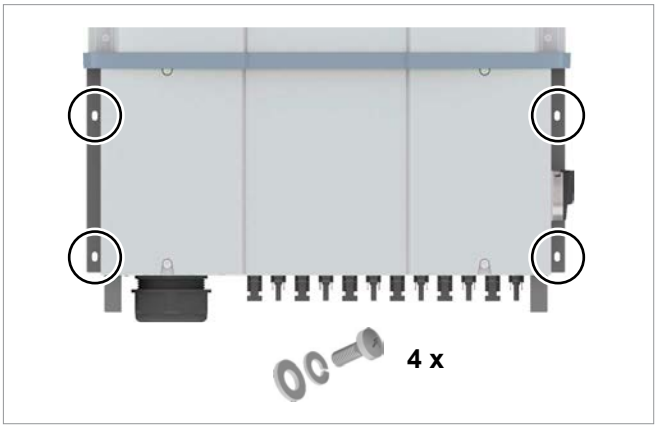
1. Attach the mounting plate to the wall or the mounting system using M8 screws according to the following illustration.

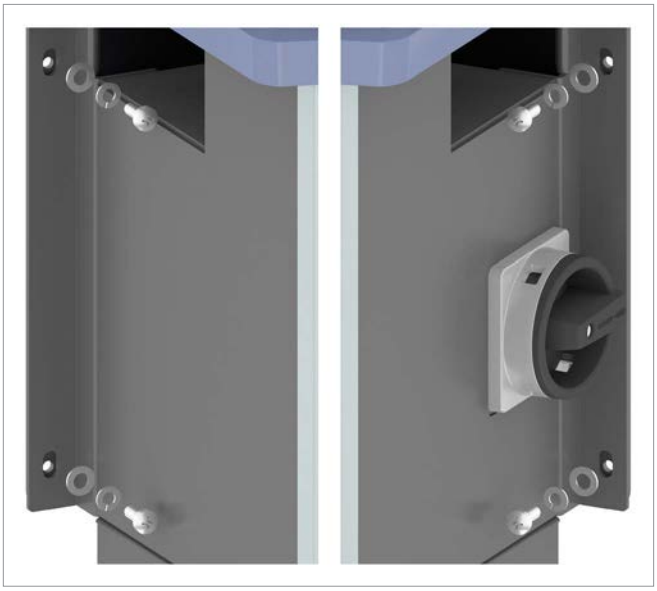


2. Mount the inverter on the mounting plate.

3. Check that the inverter is correctly mounted on the mounting plate.

4. Screw the inverter to the mounting plate using the 4 M5 screws, spring washer and washer. The screws are supplied in the scope of delivery.





Perform a continuity check of the grounding connection. If there is no sufficient conductive connection, scratch away the paint from the inverter housing under the lock washer to achieve a better electrical contact.

Grounding the inverter housing

WARNING

High current

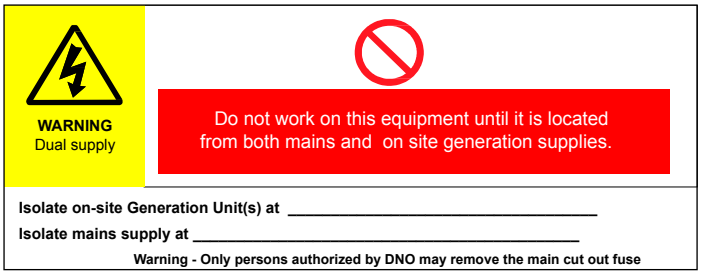
- ► Always observe the local regulations relating to grounding cable requirements.
- ► To increase the safety of the system, always ground the inverter housing even when this is not required by the local regulations.
- ► Always ground the inverter housing before connecting the inverter to the mains grid and solar modules.
- ► The cable cross-section must be at least 6 mm^2.

5. Screw the grounding cable onto the inverter. M6 screw, spring washer, washer, and lock washer are already mounted on the inverter.

Attaching warning notices to the inverter

► Attach all necessary warning notices to the inverter. Always follow the local regulations.

Some examples of warnings are listed below.



Warning
Two voltage sources
- Distribution network
- PV modules

Prior to any work, disconnect both sources

Connecting the mains grid (AC)

NOTICE

Ingress of moisture
If the wiring box cover is removed, the protection class is no longer IP65.
► Only remove the cover when the inverter is in a dry environment.

Important safety instructions

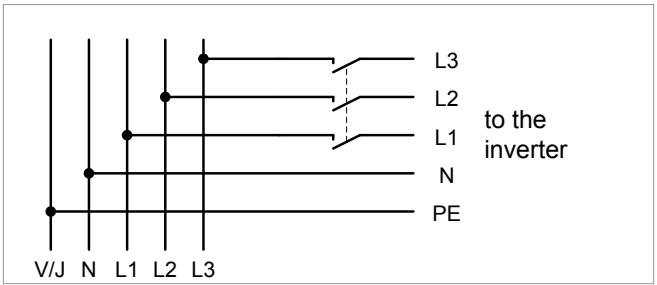
► Always follow the specific regulations of your country or region.

► Always follow the specific regulations of your energy provider.

► Install all stipulated safety and protective devices (e.g. automatic circuit breakers and/or surge arresters).

► Protect the inverter with a suitable upstream circuit breaker:

Upstream circuit breaker	125 A



Residual current circuit breaker

Due to its design, the inverter cannot supply the mains 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 (e.g. humidity). The tripping current must not, however, be less than the specified minimum tripping current.

Integrated residual current monitoring unit

The integrated, universal current-sensitive residual current monitoring unit (RCMU) is certified in accordance with VDE 0126 1-1/A1:2013-08 §6.6.2.

Integrated AC surge protection devices

► Surge protection devices are available from Delta.

Grounding the inverter

The inverter must be grounded via the PE conductor. To do this, connect the PE conductor of the AC cable to the AC plug pin provided for that purpose.

Allowable grounding systems

Grounding system	TN-S	TN-C	TN-C-S	TT	IT
Allowed	Yes	Yes	Yes	Yes	No

Requirements for the grid voltage

3P3W	Voltage range	3P4W	Voltage range
L1-L2	400 V_{AC} ± 30%	L1-N	230 V_{AC} ± 30%
L1-L3	400 V_{AC} ± 30%	L2-N	230 V_{AC} ± 30%
L2-L3	400 V_{AC} ± 30%	L3-N	230 V_{AC} ± 30%
L1-L2	480 V_{AC} ± 20%	L1-N	277 V_{AC} ± 20%
L1-L3	480 V_{AC} ± 20%	L2-N	277 V_{AC} ± 20%
L2-L3	480 V_{AC} ± 20%	L3-N	277 V_{AC} ± 20%

Tools

Use an insulated torque wrench with an M8 Allen key bit for the contact screws.

Notes on calculating the cable cross-section

Consider the following factors when calculating the cable diameter:

- Cable material
- Temperature conditions
- Cable length
- Installation type
- Voltage drop
- Loss of power in the cable

► Always follow the installation regulations for AC cables applicable in your country.

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 UTE VDE 0100-712. This standard contains the requirements for minimum cable diameters and for avoiding overheating due to high currents.

Notes on using aluminum conductors

The special properties of aluminum must be taken in to consideration when using aluminum:

- Aluminum "flows", i.e. it gives way under pressure.
- A thin non-conductive oxide layer forms immediately on de-insulation, which increases the contact resistance between the conductor and clamping point.
- The current carry capacity is approximately one third less than that of copper.

NOTICE

Extreme heating of the clamping point through excessively high contact resistance of aluminum conductors

If the contact resistance between the aluminum conductor and clamping point is too high, the clamping point can become very hot and even catch fire in extreme cases.

To ensure a safe and reliable contact, **always** perform the following work steps:

► Use a conductor cross-section at least one number larger due to the lower current-carrying capacity.

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

► Use a knife blade to scrape the oxide layer off the de-insulated end of the aluminum conductor and then immediately immerse the aluminum conductor in acid-fee and alkaline-free (= neutral) Vaseline.

► Insert the aluminum conductor directly into the terminal, i.e. without a cable lug or pin sleeve.

► Tighten the clamping screw in the clamping body with the maximum permissible tightening torque.

Connecting the mains grid (AC)

AC terminal block specifications

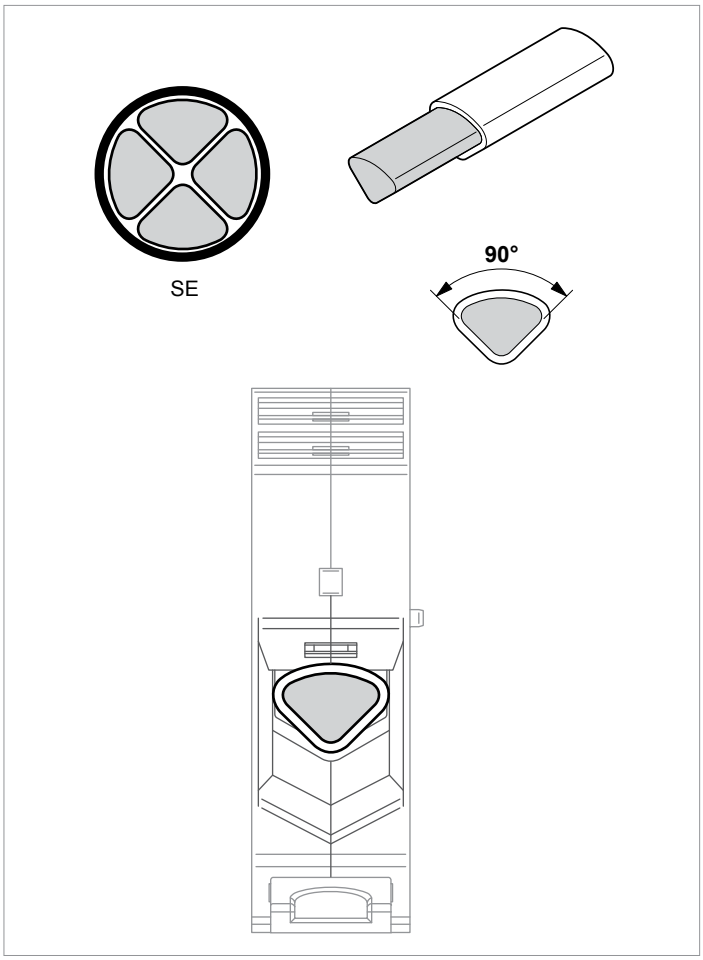
Designation	Phoenix Contact UKH 70
Connection type	Screw connection
Screw thread	M8
Tightening torque	8 ... 10 Nm

Specification for copper cable

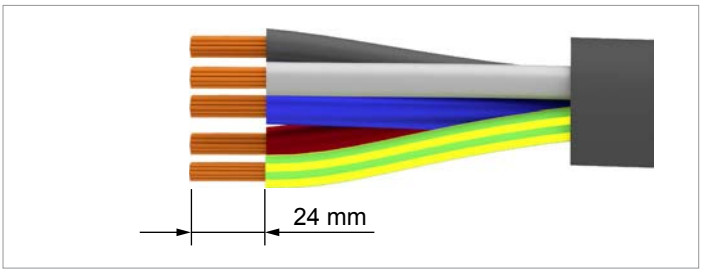
Nominal current	106 A
Nominal current	96 A
Min./max. cable diameter	39.8 ... 65.8 mm
Min./max. Wire cross-section	
Without wire end sleeve	
• Solid cable	16 ... 95 mm²
• Flexible cable	25 ... 70 mm²
With wire end sleeve	
• Flexible cable (wire end sleeve without plastic sleeve)	16 ... 70 mm²
• Flexible cable (wire end sleeve with plastic sleeve)	16 ... 70 mm²
Stripping length	24 mm

Specification for aluminum cable

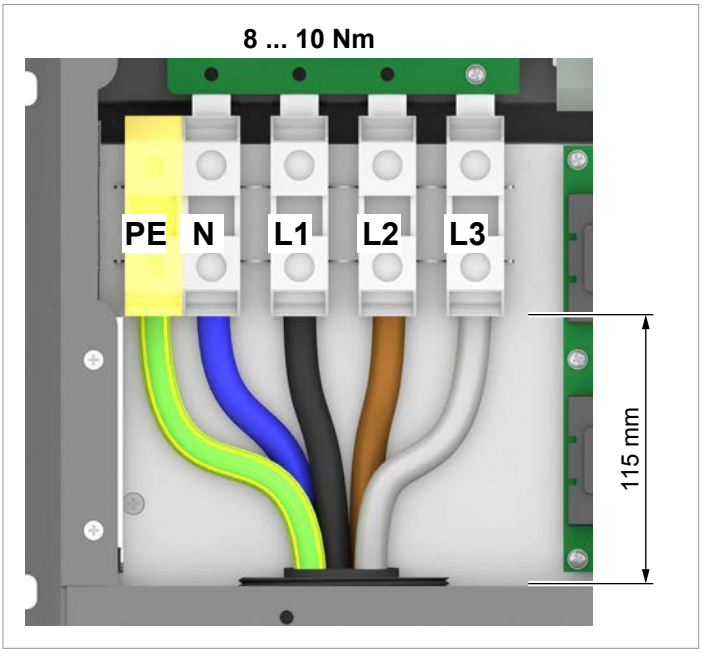
► Use single-wire, sector-shaped conductors (SE):



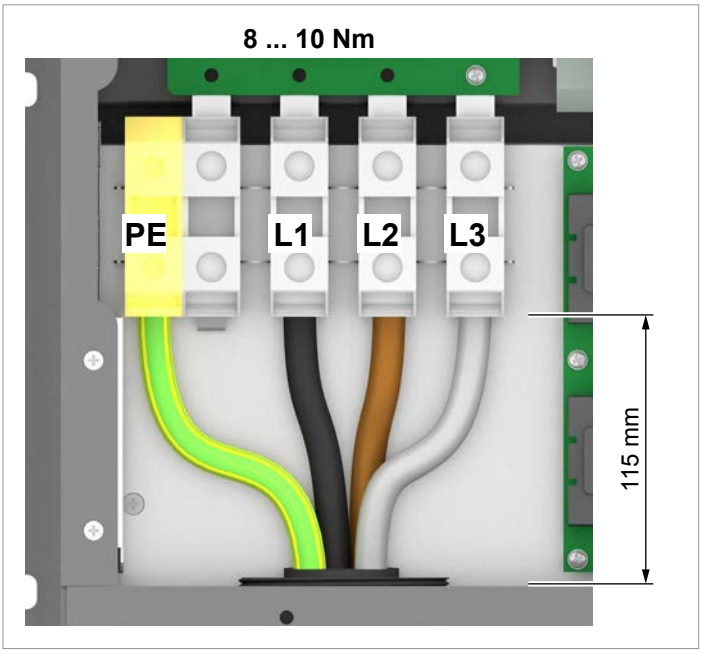
Min./max. cable diameter	39.8 ... 65.8 mm
Min./max. Conductor cross-section	50 / 70 mm²
Stripping length	24 mm



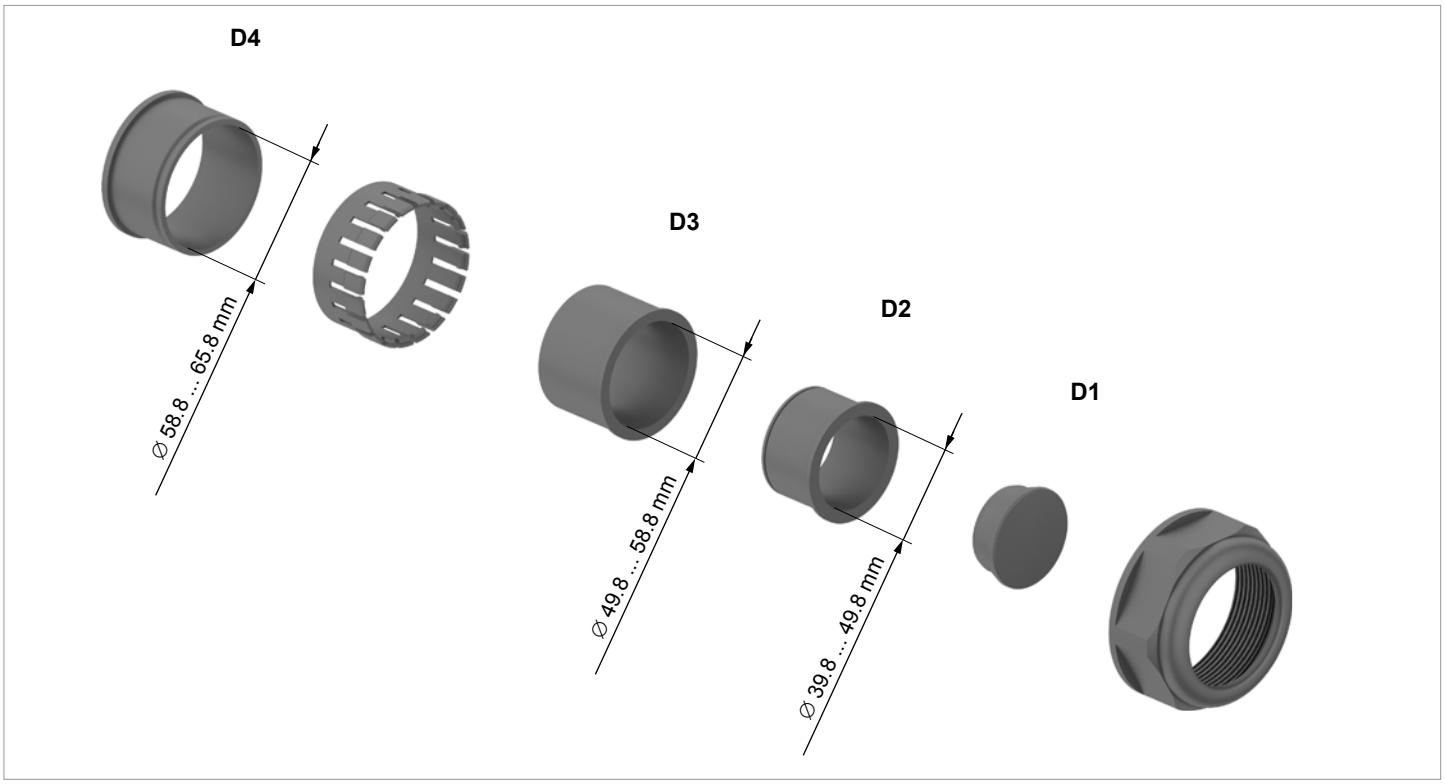
Wiring for grids with a neutral conductor (3P4W)

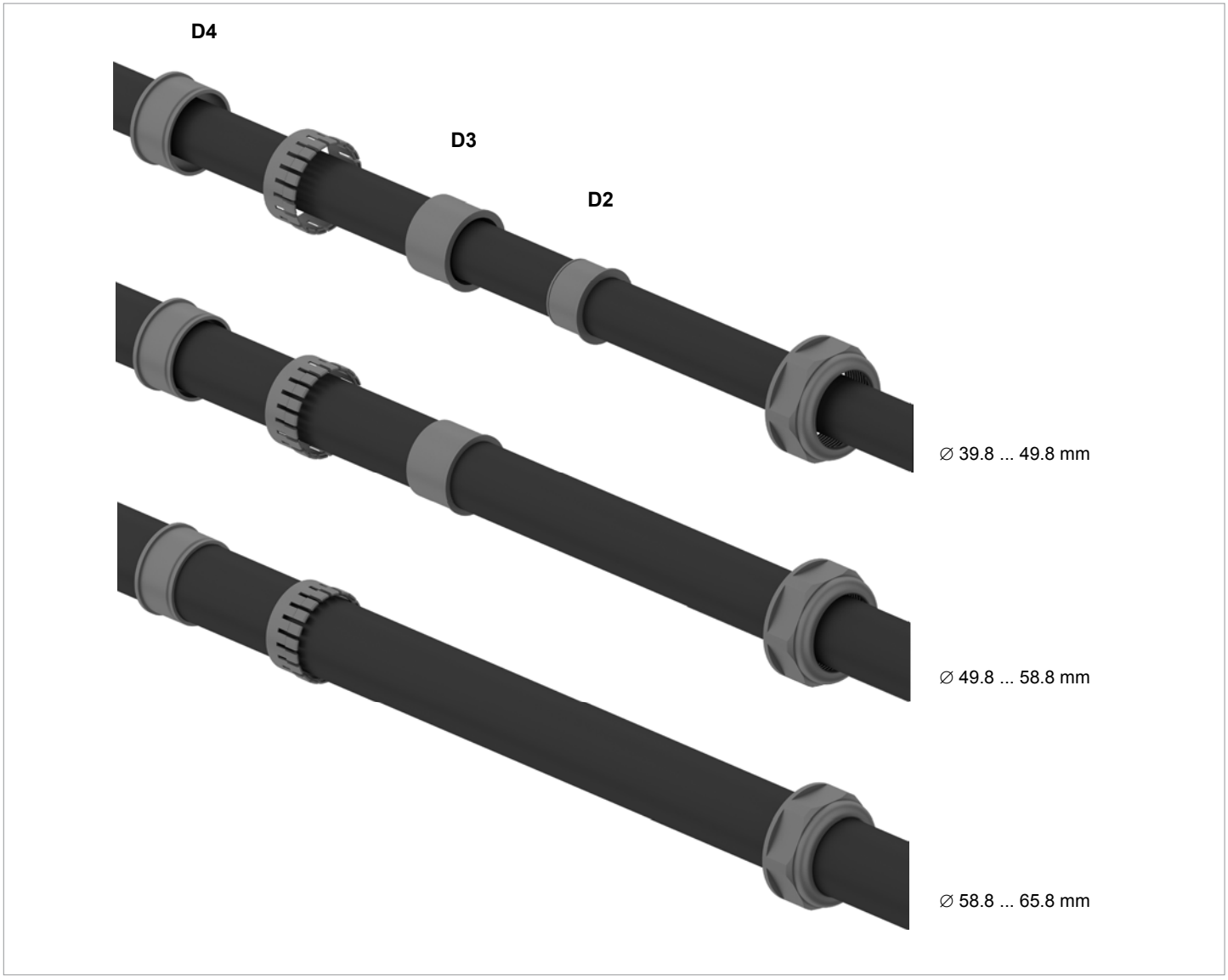


Wiring for grids without a neutral conductor (3P3W)



The cable specifications are defined by Phoenix Contact. Check if the technical specifications have changed before starting installation work, see www.phoenixcontact.com.


D4
D3
D2
D1
∅ 58.8 ... 65.8 mm
∅ 49.8 ... 58.8 mm
∅ 39.8 ... 49.8 mm


D4
D3
D2
∅ 39.8 ... 49.8 mm
∅ 49.8 ... 58.8 mm
∅ 58.8 ... 65.8 mm

Connecting solar modules (DC)

DANGER

Electrical shock
Potentially fatal voltage is applied to the inverter's DC connections during operation. When light falls on the solar modules, they immediately start to generate electricity. This also happens when light does not shine directly on the solar modules.

- ► Never disconnect the inverter from the solar modules when it is under load.
- ► Turn the DC disconnector to the **OFF** position.
- ► Uncouple the connection to the mains grid so that the inverter cannot supply energy to the mains grid.
- ► Disconnect the inverter from all AC and DC voltage sources. Ensure that none of the connections can be restored accidentally.
- ► Ensure that the DC cables cannot be touched accidentally.

NOTICE

Maximum power at the DC connections.
Exceeding the maximum current can cause overheating of the DC connections.

- ► Always take into account the maximum current of the DC connections when planning the installation.

NOTICE

Incorrectly dimensioned solar plant.
An solar system of the wrong size may cause damage to the inverter.

- ► When calculating the module string, always pay attention to technical specifications (input voltage range, maximum current and maximum input power), see chapter "Technical data".

NOTICE

Ingress of moisture.
Moisture can enter via open DC connections.

- ► To ensure protection class IP65, close unused DC connections with the rubber plugs that are attached to the DC connections.

- ► AC voltage must be present in order to start the inverter!

Integrated string fuses and DC surge protection devices

- ► Replace damaged string fuses with devices of the same type and from the same manufacturer.
- ► Surge protection devices are available from Delta.

Tools

The protective caps lock the DC plug so that it can only be disconnected from DC connections using the mounting tool.

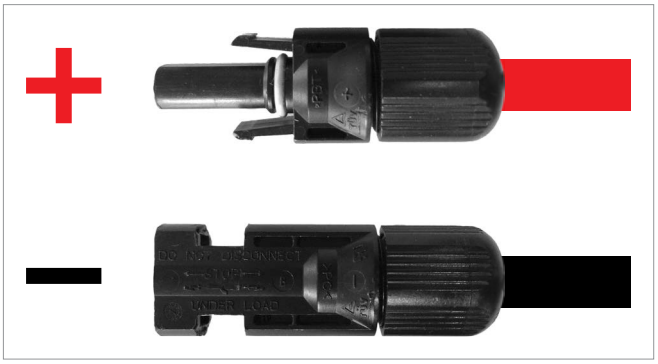
- ► Observe the local regulations with regards to the protective caps.

France: The protective caps must be used.

Mounting tool for disconnecting the DC plug and the protective caps from the DC connections. Available from multi-contact.

Polarity of the DC voltage

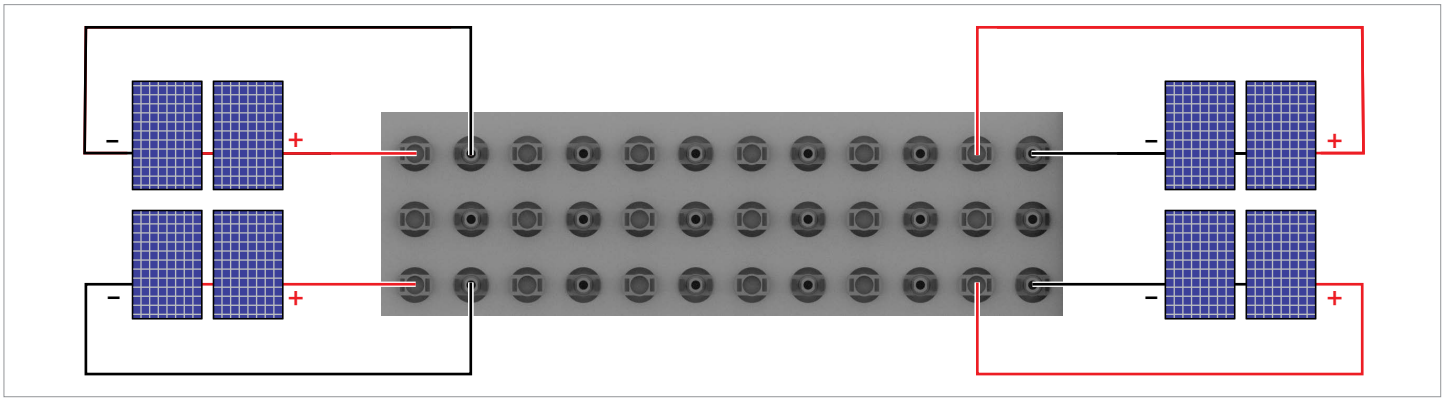
- ► Check the polarity of the DC voltage of the DC strings before connecting the solar modules.



Note on security

- ► Turn the DC disconnector to the **OFF** position before connecting the solar modules.

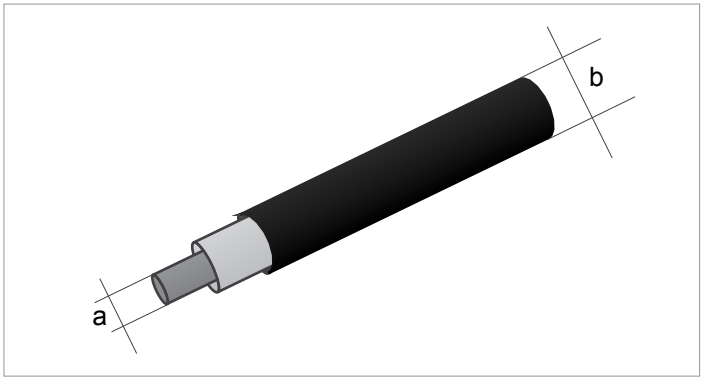
Protective devices
When selecting the necessary protective devices (e.g. fuses) take into account the **Maximum reverse current** of the solar modules.



DC plugs and DC cables

The DC plugs for all DC connections are provided along with the inverter.

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

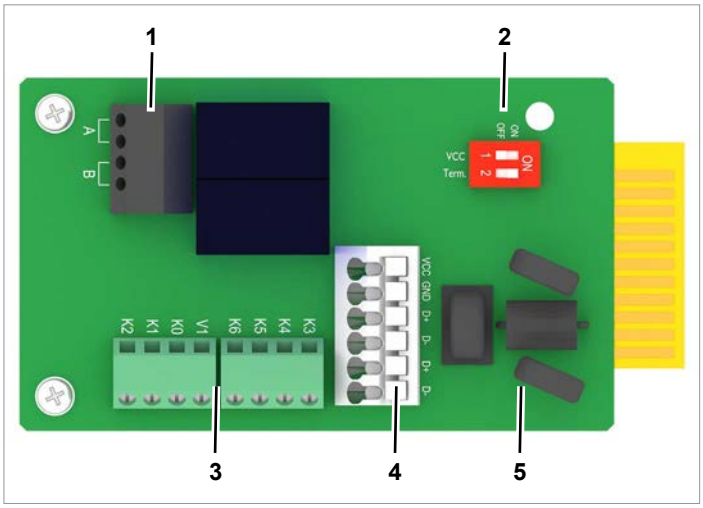


DC connections on the inverter		DC plugs for DC cables			
		a	b	MultiContact	
		mm²	mm		
DC–			4 / 6	3-6	32.0014P0001-UR
				5.5-9	32.0016P0001-UR [1]
			10	5.5-9	32.0034P0001
DC+			4 / 6	3-6	32.0015P0001-UR
				5.5-9	32.0017P0001-UR [1]
			10	5.5-9	32.0035P0001

[1] Included in delivery

Communication card

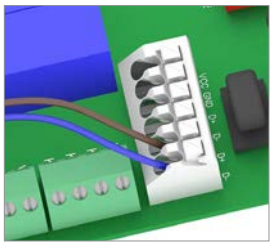
The connections for RS485, the digital inputs, the dry contacts and the external shutdown (EPO) are all on the communication card. This means that the installation work can be combined.



1 2 x dry contacts (terminal block)
2 DIP switch for RS485 termination resistor and VCC
3 Digital inputs and external shutdown (terminal block)
4 RS485 (terminal block)
5 Protection against electromagnetic interference (EMI)

Connecting a PC via RS485

If you wish to use a PC with the Delta Service Software for setting up the inverter you will need a USB/RS485 adapter in order to connect the PC to the inverter.

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

Cable and wiring requirements

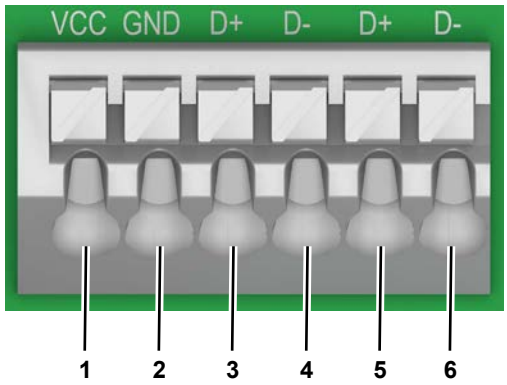
- Shielded twisted-pair cable with solid conductors.
- Cable diameter: 5 mm
- Wire cross-section: 1 mm²
- The cable should be separated from the AC cable and DC cables to prevent interference.

NOTICE

Unwanted currents.
Unwanted currents can flow when multiple inverters are connected via RS485.
► Do not use GND and VCC.
► If the cable shield is used for providing lightning protection then the housing of only one inverter in the RS485 chain should be grounded.

Connecting a data logger via RS485

RS485 terminal block



1 VCC (+12 V; 0.5 A)
2 GND
3 DATA+ (RS485)
4 DATA– (RS48 5)
5 DATA+ (RS485)
6 DATA– (RS485)

Terminal pairs 3/4 or 5/6 can be used. The second terminal pair is only required when connecting several inverters via RS485.

Data format

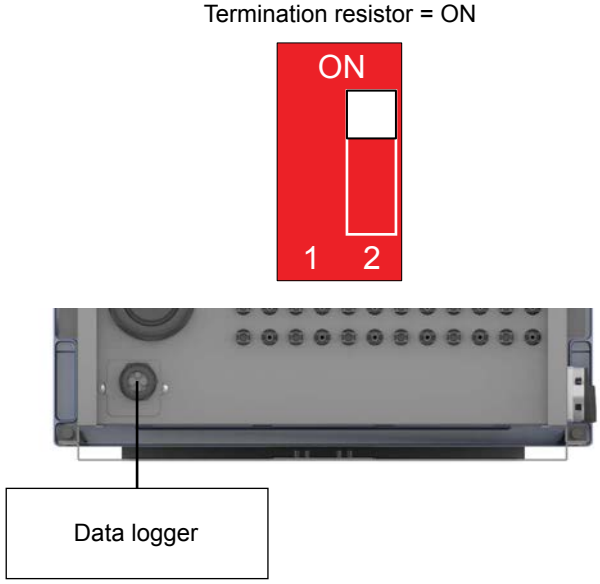
Baud rate	9600, 19200, 38400; standard: 19200
Data bits	8
Stop bit	1
Parity	Not applicable

The baud rate can be set on the inverter display after commissioning, see “Baud rate for RS485”, page 25.

DIP switch for RS485 termination resistor and VCC

1 VCC (+12 V; 0.5 A)
2 RS485 termination resistor

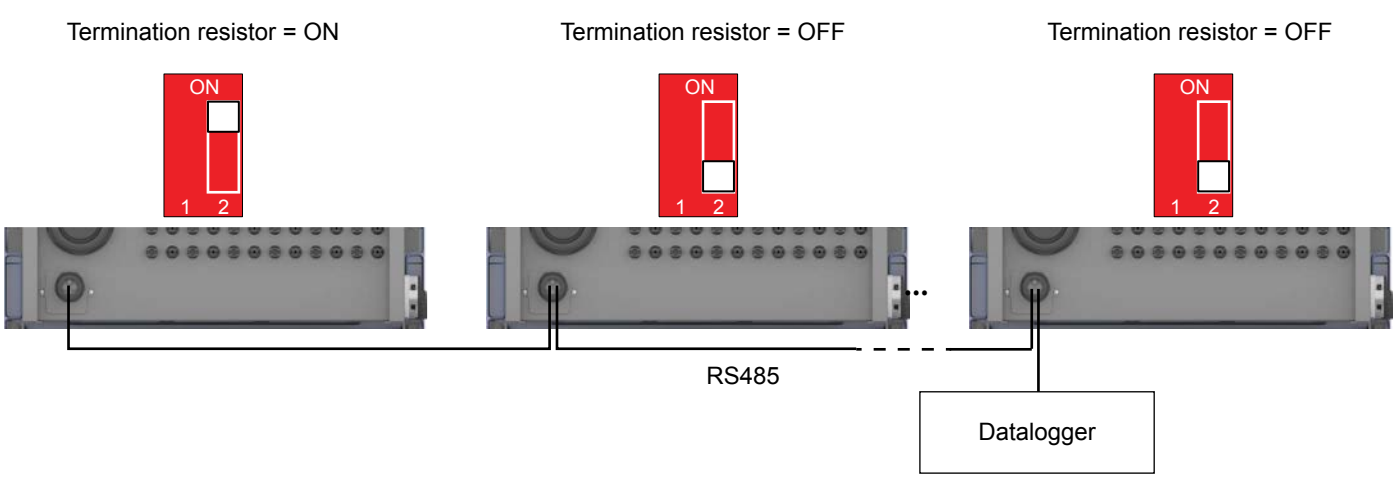
Connecting a single inverter to a data logger



Connecting multiple inverters to a data logger

► If the data logger does not have an integrated RS485 termination resistor, switch on the RS485 termination resistor on the first inverter.

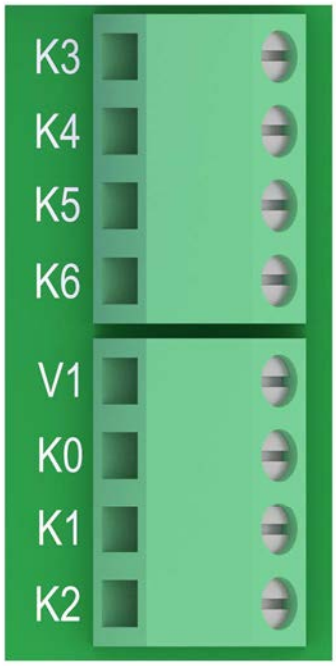
► Set a different inverter ID at each inverter during commissioning of the inverters, see “Inverter ID”, page 24.



Connecting the digital inputs, dry contacts and external power-off (optional)

Digital inputs and external power-off (EPO)

To control the active power, an external ripple control receiver can be connected to the digital inputs.

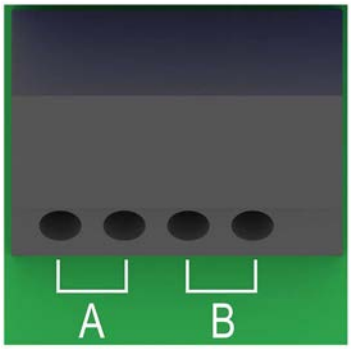


Pin	Short circuit	Assigned action
V1	-	-
K0	V1 + K0	External Power-Off (EPO)
K1	V1 + K1	Max. active power 0%
K2	V1 + K2	Max. active power 30%
K3	V1 + K3	Max. active power 60%
K4	V1 + K4	Max. active power 100%
K5	V1 + K5	Reserved
K6	V1 + K6	Reserved

After commissioning, the relays for the external power-off can be defined on the display as normally closed or normally open relays.

Dry contacts

The inverter has two dry contacts. The contacts are closed when the relays energize.

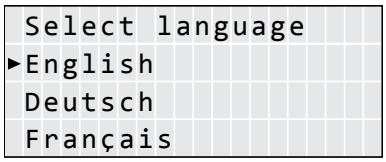


Event	Description
Disabled	The functions for the dry contacts are switched off.
On the mains grid	Inverter is connected to the mains grid.
Fan failure	The fans are defective.
Insulation	Insulation test failed.
Alarm	An error, failure or warning message is present.
Failure	An error message is present.
Failure	A failure message is present.
Warning	A warning message is present.

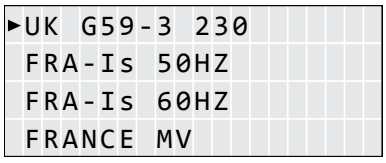
An event can be assigned to the dry contacts can be set on the inverter display after commissioning.

The default setting for both contacts is "Disabled".

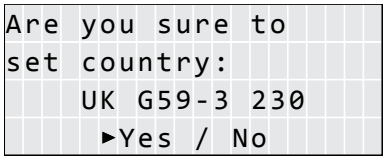
To make the settings as described in this chapter, the inverter must be powered with alternating current (mains grid). The inverter also needs a DC voltage in order to operate fully from the energy provider.



1. Use the ▼ and ▲ buttons to select the ***English*** language and then press the ENT button.



2. Use the ▼ and ▲ buttons to select to select your country or grid type and then press the ENT buttons.

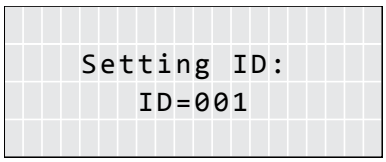


3. Check that the correct country or mains grid type is selected.

If the correct country is selected, use the ▼ and ▲ buttons to select the ***Yes*** entry and then press the ENT button.

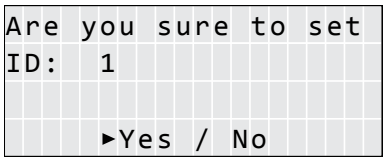
To change the selection, press the EXIT button.

→ The inverter starts a self-test lasting approx. 2 minutes. The remaining time is shown on the display.



NOTE
If multiple inverters are connected to the PV system then a different inverter ID must set for each inverter. For example, the inverter ID is used by monitoring systems to uniquely identify each inverter.

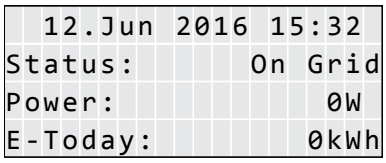
4. Use the ▼ and ▲ buttons to set the individual digits and then press the ENT button.



5. Check that the correct inverter ID is set.

If the correct inverter ID is selected, use the ▼ and ▲ buttons to select the ***Yes*** entry and then press the ENT button.

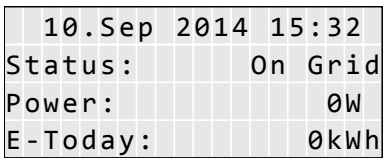
Press the EXIT button to change the selection



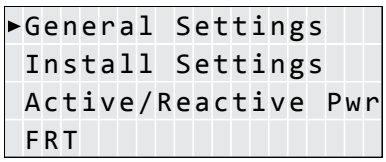
☑ The basic settings are now complete. The standard menu is displayed.

Commissioning – further settings (optional)

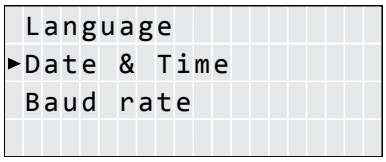
Date and time



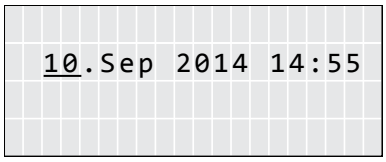
1. If the default information is displayed, press the EXIT button to open the main menu.
   Otherwise, press the EXIT button repeatedly until the main menu is displayed.



2. Use the ▼ and ▲ buttons to select the ***General Settings*** entry and then press the ENT button.



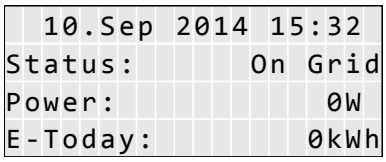
3. Use the ▼ and ▲ buttons to select the ***Date & Time*** entry and then press the ENT button.



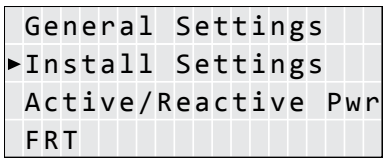
4. Press the ▼ and ▲ buttons to configure the value and then press the ENT button.
   Repeat the procedure for the other settings.

Inverter ID

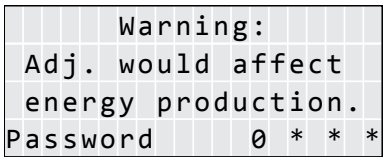
If multiple inverters are connected to the PV system then a different inverter ID must set for each inverter. For example, the inverter ID is used by monitoring systems to uniquely identify each inverter.



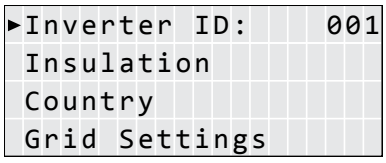
1. If the default information is displayed, press the EXIT button to open the main menu.
   Otherwise, press the EXIT button repeatedly until the main menu is displayed.



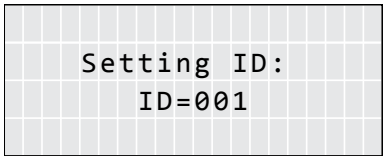
2. Use the ▼ and ▲ buttons to select the **`Install Settings`** entry and then press the ENT button.



3. This function is protected with password 5555.
   Use the ▼ and ▲ buttons to set the individual numerals.
   Press the ENT button to confirm a number.

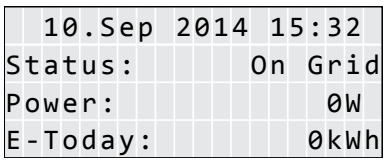


4. Use the ▼ and ▲ buttons to select the **`Inverter ID`** entry and then press the ENT button.

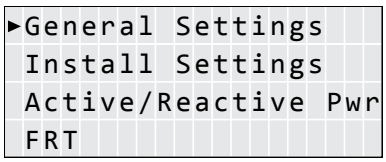


5. Use the ▼ and ▲ buttons to configure the value and then press the ENT button.

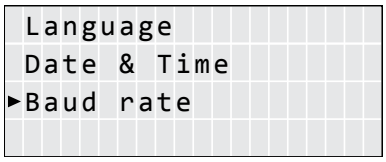
Baud rate for RS485



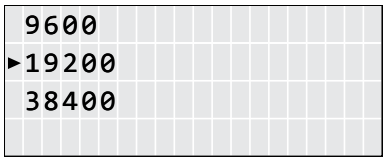
1. If the default information is displayed, press the EXIT button to open the main menu. Otherwise, press the EXIT button repeatedly until the main menu is displayed.



2. Use the ▼ and ▲ buttons to select the ***General Settings*** entry and then press the ENT button.



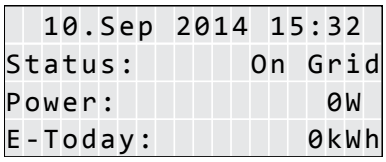
3. Use the ▼ and ▲ buttons to select the ***Baud rate*** entry and then press the ENT button.



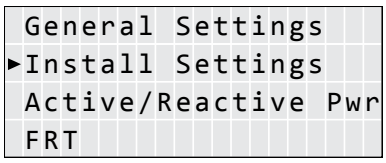
4. Use the ▼ and ▲ buttons to configure the value and then press the ENT button. Repeat the procedure for the other settings.

AC connection type

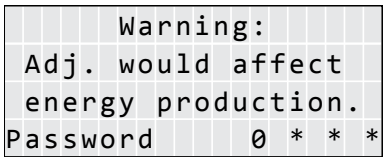
By default, the AC connection type is set to 3P4W (3 phases + N + PE). You only need to change this setting if you are using an AC system with 3 phases + PE (3P3W).



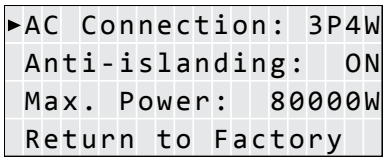
1. If the default information is displayed, press the EXIT button to open the main menu. Otherwise, press the EXIT button repeatedly until the main menu is displayed.



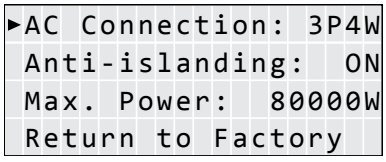
2. Use the ▼ and ▲ buttons to select the **`Install Settings`** entry and then press the ENT button.



3. This function is protected with password 5555.
   Use the ▼ and ▲ buttons to set the individual numerals.
   Press the ENT button to confirm a number.



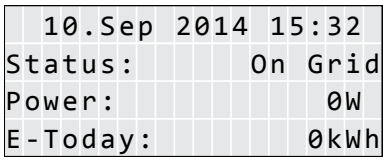
4. Use the ▼ and ▲ buttons to select the **`AC Connection`** entry and then press the ENT button.

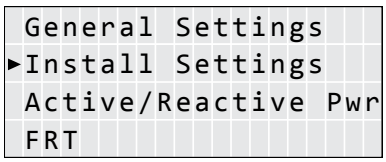


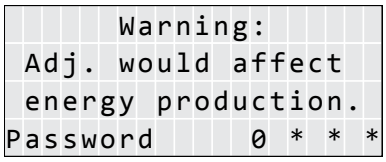
5. Use the ▼ and ▲ buttons to select the **`3P3W`** entry and then press the ENT button.

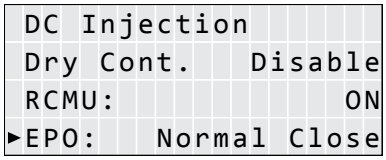
Commissioning – further settings (optional)

External shutdown (EPO)









1. If the default information is displayed, press the EXIT button to open the main menu.
   Otherwise, press the EXIT button repeatedly until the main menu is displayed.
2. Use the ▼ and ▲ buttons to select the **`Install Settings`** entry and then press the ENT button.
3. This function is protected with password 5555.
   Use the ▼ and ▲ buttons to set the individual numerals.
   Press the ENT button to confirm a number.
4. Use the ▼ and ▲ buttons to select the **`EPO`** entry and then press the ENT button.
5. Use the ▼ and ▲ buttons to select an option and then press the ENT button.

   Available options

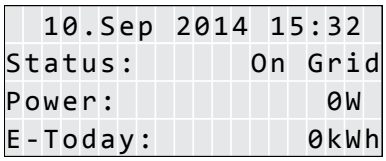
   `Normal Open`: The relay operates as a normally open device.

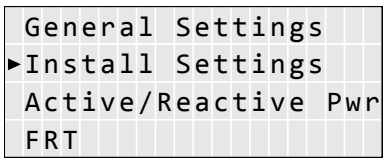
   `Normal Close`: The relay operates as a normally closed device.

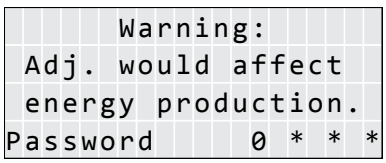
Active power limitation

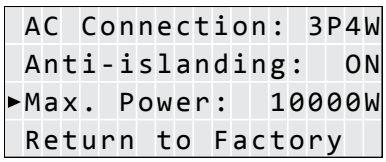
Change this setting only after consultation with Delta customer service.

To change this setting, you need a special password that you receive from Delta customer service. You can find the contact information on the back of this document.



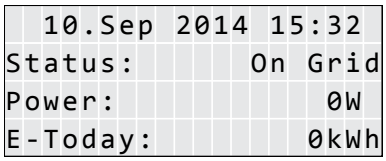




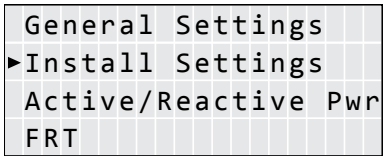


1. If the default information is displayed, press the EXIT button to open the main menu.
   Otherwise, press the EXIT button repeatedly until the main menu is displayed.
2. Use the ▼ and ▲ buttons to select the **`Install Settings`** entry and then press the ENT button.
3. Enter the password you were given by Delta customer service.
   Use the ▼ and ▲ buttons to set the individual numerals.
   Press the ENT button to confirm a number.
4. Use the ▼ and ▲ buttons to select the **`Max. Power`** entry and then press the ENT button.
5. Use the ▼ and ▲ buttons to configure the value and then press the ENT button.

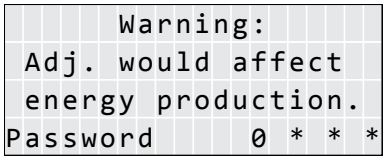
Dry contacts



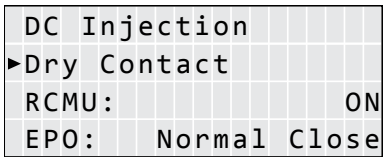
1. If the default information is displayed, press the EXIT button to open the main menu. Otherwise, press the EXIT button repeatedly until the main menu is displayed.



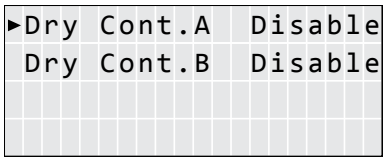
2. Use the ▼ and ▲ buttons to select the **`Install Settings`** entry and then press the ENT button.



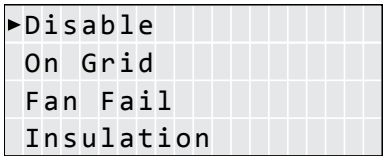
3. This function is protected with password 5555.
Use the ▼ and ▲ buttons to set the individual numerals.
Press the ENT button to confirm a number.



4. Use the ▼ and ▲ buttons to select the **`Dry Cont.`** entry and then press the ENT button.



5. Use the buttons ▼ and ▲ buttons to select a dry contact and then press the ENT button. The current setting is shown after the name of the dry contact.



6. Use the ▼ and ▲ buttons to select an option and then press the ENT button.
See "Connecting the digital inputs, dry contacts and external power-off (optional)", page 22 for the available options.

Technical data

Input (DC)	M88H_122 (CF)	
for Nominal AC voltage	**400 V_{AC}**	**480 V_{AC}**
Recommended maximum PV power	90 kW_P	110 kW_P
Maximum input power (total / per input)		
Symmetric design	76 kW / 38 kW	91 kW / 45.5 kW
Asymmetrical design	45.6 kW / 30.4 kW	54.6 kW / 36.4 kW
Nominal power	70 kW	84 kW
Maximum input voltage	1100 V_{DC}	
Operating input voltage range	200 ... 1000 V_{DC}	
Nominal voltage	595 V_{DC}	710 V_{DC}
Cut-in voltage	250 V_{DC}	
Cut-in power	150 W	
MPP input voltage range	200 ... 1000 V_{DC}	
MPP input voltage range with full power		
Symmetric design	540 ... 800 V_{DC}	650 ... 800 V_{DC}
Asymmetrical design (60% / 40%)	650 / 440 V_{DC}	780 / 520 V_{DC}
MPP input voltage range at rated power		
Symmetric design	500 ... 800 V_{DC}	600 ... 800 V_{DC}
Asymmetrical design (60% / 40%)	580 / 390 V_{DC}	710 / 475 V_{DC}
Asymmetrical design	60/40%; 40/60%	
Maximum total input current (DC1 / DC2)	140 A (70 A / 70 A)	
Maximum DC short-circuit current I_{SC}	180 A (90 A per DC input, 10 A per DC string)	
Maximum breaking current	120 A	
Open-circuit voltage V_{OC}	1000 V	
Number of MPP trackers	Parallel inputs: 1 MPP tracker; separate inputs: 2 MPP tracker	
Number of DC inputs, total (DC1/DC2)	18 (9 / 9)	
Electrical isolation	No	
Overvoltage category [1)]	II	
String fuses	15 A [2)]	
Surge protection device [3)]	Type 2, replaceable	

Output (AC)	M88H_122 (CF)	
AC rated voltage	**400 V_{AC}**	**480 V_{AC}**
Maximum apparent power [4)]	73 kVA [5)]	88 kVA [6)]
Nominal apparent power [5)]	66 kVA	80 kVA
Nominal voltage [7)]	400 ± 30% Δ and Y / 480 V_{AC} ± 20% Δ and Y 3 phases + PE or 3 phases + N + PE	
Nominal current	96 A	
Maximum current	106 A	
Maximum current under fault conditions	115.4 A_{rms}	
Switch-on current	40 A / 100 µs	
Nominal frequency	50 / 60 Hz	
Frequency range [7)]	45 ... 65 Hz	
Configurable power factor	0.8 cap ... 0.8 ind	
Total harmonic distortion	< 3% at rated apparent power	
DC infeed	<0.5% at rated current	
Power loss in night mode	<3 W	
Overvoltage category [1)]	III	
Surge protection device [8)]	Type 2, replaceable	

Mechanical details	M88H_122 (CF)
Dimensions (W x L x D)	960 × 615 × 275 mm
Weight	84 kg (power module: 68 kg)
Cooling	3 fans
AC connection type	Phoenix Contact UKH 70
DC connection type	Multi-Contact MC4
Communication interfaces	2 x RS485, 2 x dry contacts, 1 x external shutdown, 6 x digital inputs

General specifications	M88H_122 (CF)
Delta model name	RPI M88H_122
Delta part number	RPI883M122000
Maximum efficiency	98.8%
EU efficiency	98.5%
Operating temperature range	-25 ... +60 °C
Operating temperature range without derating	-25 ... +40 °C
Storage temperature range	-25 ... +60 °C
Relative humidity	0 ... 100%, non-condensing
Max. operating height	3000 m above sea level
Noise level (at a distance of 1 m)	75.8 dB(A)

Standards and guidelines	RPI M88H_12x
Protection degree	IP65
Safety class	I
Pollution degree	II
Overload behavior	Current limiting, power limiting
Safety	IEC 62109-1 / -2, CE-compliance
EMC	EN 61000-6-2, EN 61000-6-3
Fault-free operation	IEC 61000-4-2 / -3 / -4 / -5 / -6 / -8
Harmonic distortion	EN 61000-3-2
Fluctuations and fibrillations	EN 61000-3-3
Grid connection guidelines	You will find the current list at www.solar-inverter.com.

1) IEC 60664-1, IEC 62109-1
2) The specified value applies for a temperature of 25 °C in the interior of the inverter. At higher temperatures, the value can drop up to 10 A.
3) EN 50539-11
4) For cos phi = 1 (VA = W)
5) Possible under the following conditions: DC input voltage > 540 V; symmetrical design; ambient temperature < 35 °C.
6) Possible under the following conditions: DC input voltage > 650 V; symmetrical design; ambient temperature < 35 °C.
7) AC voltage and frequency range are programmed using the corresponding country specifications.
8) EN 61463-11

Service - Europe

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Czech Republic	podpora.czechia@solar-inverter.com	800 143 047 (toll free)
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France	support.france@solar-inverter.com	0800 919 816 (toll free)
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