Quick Installation Guide

Solar inverters
H2.5_210 Flex
H3A_220 Flex
H4A_220 Flex
H5A_220 Flex

United Kingdom Europe

This quick installation guide applies for the following inverter models:
H2.5_210 (Delta part number RPI252H210000)
H3A_220 (Delta part number RPI302H220000)
H4A_220 (Delta part number RPI402H220000)
H5A_220 (Delta part number RPI502H220000)

with firmware versions:
DSP: 4.00 / COM: 2.24 / Wi-Fi: 1.7.3 or higher

The Delta part number can be found on the type plate of the inverter. The Product Version is shown by the last letters of the serial number, which is also located on the type plate.

The Delta manuals undergo continuous revision in order to provide you with complete information regarding the installation and operation of our inverters. Therefore, before starting installation work, **always** consult www.solar-inverter.com to check whether a newer version of the Quick Installation Guide or of the comprehensive Installation and Operation Manual is available.

The inverter may be installed and commissioned only by installers who have been trained and certified for the installation and operation of mains-based solar inverters.

The information in this manual is to be treated as confidential and no part of this manual may be reproduced without prior written permission from Delta Electronics. The information in this manual may not be used for any purpose not directly connected to the use of the inverter.

All information and specifications can be modified without prior notice.

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

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DANGER

Electric shock

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

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

1. Disconnect the inverter from all AC and DC voltage sources and make sure that none of the connections can be accidentally restored.
2. Wait at least 60 seconds until the internal capacitors have discharged.

DANGER

Electric shock

Potentially fatal voltages are present at the inverter DC connections. 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.
- ► 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

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 and solar modules.
- ► The grounding cable cross-section must be at least 6 mm^2.

ATTENTION

Incorrectly dimensioned solar system.

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".

ATTENTION

Overheating of the DC connections.

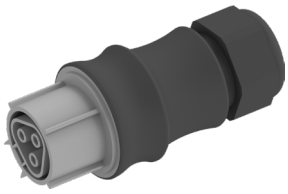
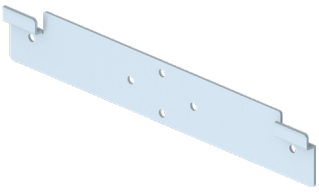
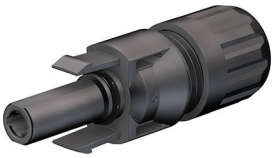
Exceeding the maximum current can cause overheating of the DC connections and result in a fire.

- ► Always take into account the maximum current of the DC connections when dimensioning the solar system.

Basic safety instructions

- To comply with the 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 be installed and commissioned only by installers who have been trained and certified for the installation and operation of mains-based solar inverters.
- All repair work on the inverter must be carried out by Delta Electronics. Otherwise, the warranty will be void.
- Never open the housing of the inverter. The inverter contains no components that can be maintained or repaired by the operator or installer. Opening the inverter housing will void the warranty.
- Warning instructions and warning symbols attached to the inverter by Delta Electronics 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. Always wear safety gloves when you touch the inverter.
- To ensure the protection degree IP65 the junction box and all connections must be sufficiently well sealed. Seal any unused connection openings with the closure caps supplied.

Scope of supply

Part	Quan-tity‹	Figure / Description	Part	Quan-tity	Figure / Description
Inverter	1		AC plug	1	Wieland RST25I3S (96.031.4154.3) 
Mounting plate	1		Quick installation guide and basic safety instruc-tions	1	
DC plug	H2.5: 1 H3A: 2 H4A: 2 H5A: 2	Multi-contact MC4 for DC+ for 4/6 mm² (32.0017P0001-UR) 	DC plug	H2.5: 1 H3A: 2 H4A: 2 H5A: 2	Multi-contact MC4 for DC– for 4/6 mm² (32.0016P0001-UR) 

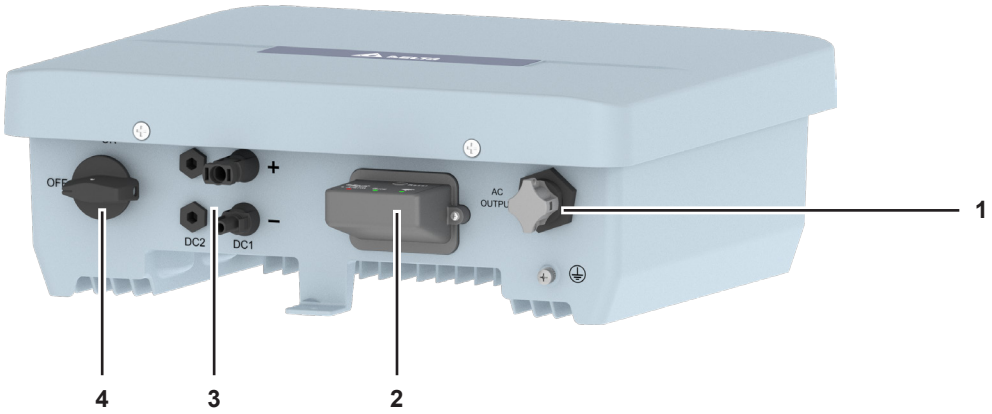
Check the delivery for completeness and all components for damage before starting installation work.

Do not use any damaged components.

Keep the packaging.

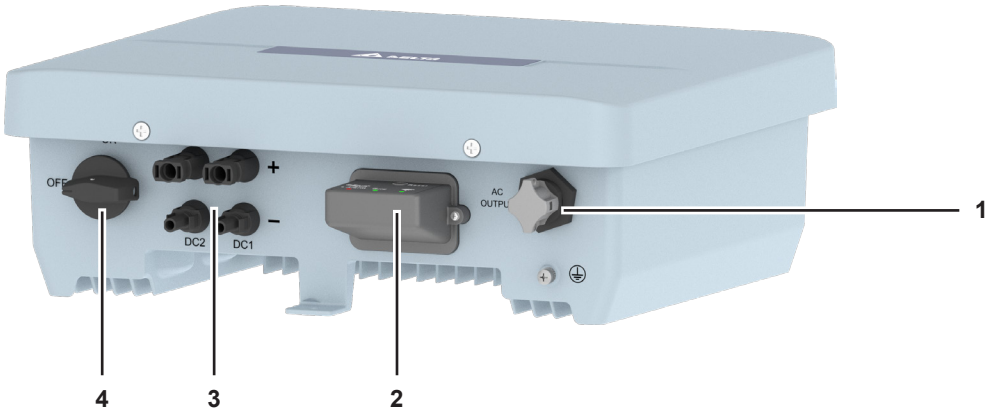
Components of the inverter

H2.5 Flex

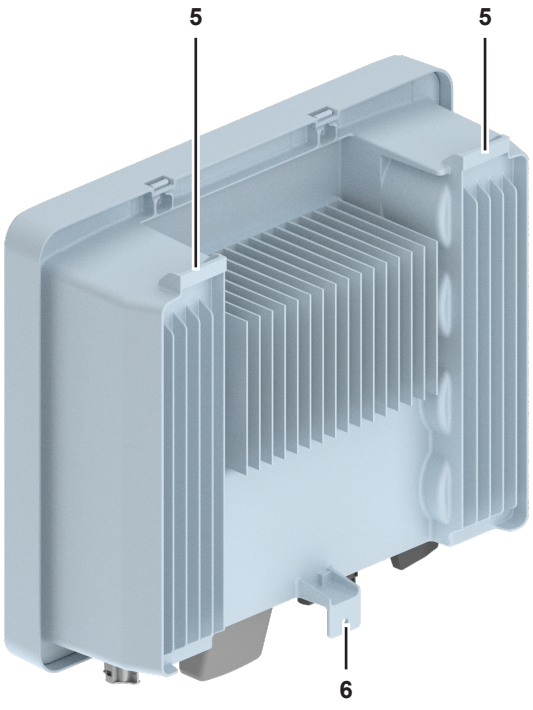


1 AC output (mains)
2 Operating field with Wi-Fi module
3 DC input (solar modules), 1 x MC4
4 DC isolating switch for solar modules

H3A Flex
H4A Flex
H5A Flex



1 AC output (mains)
2 Operating field with Wi-Fi module
3 DC inputs (solar modules), 2 x MC4
4 DC isolating switch for solar modules



5 Loop for mounting on the mounting plate
6 Mounting hole for attaching to the wall

Operating field

Earth Fault / Alarm	Isolation fault / error	Red LED. Flashes in the event of **E34 isolation fault**. Shines in the event of all other errors.
Grid	Mains	Green LED. Flashes while the inverter powers up. Lights up when the inverter is connected with the mains grid.
Wi-Fi	Wi-Fi	Lights up when the Wi-Fi module is transferring data.

Table 1: Overview of LED messages

Reset	Press for 3 to 10 seconds	The LED flashes once per 0.5 seconds. Reset the Wi-Fi module.
	Press for 10 to 20 seconds	The LED flashes once per second. Reset the Wi-Fi module. Reset the password to “DELTA-SOL”.

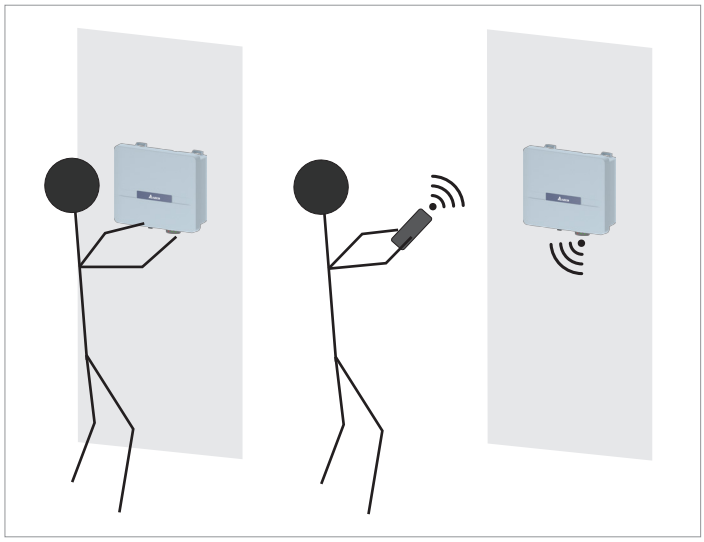
Table 2: Functions of the **Reset** *button*

Information on the type plate

	**Danger to life through electric shock** Potentially fatal voltage is present inside the inverter during operation and this voltage remains present for up to 60 seconds after disconnection from all power sources. The inverter may not be opened!
	Before working on the inverter, read the supplied manual and follow the instructions contained therein.
	Hot surfaces. The inverter housing can get very hot during operation.
	The housing of the inverter must be grounded if this is required by local regulations.
	The inverter satisfies the Australian standard for electrical safety and the EMC standard. Applies only to Australia and New Zealand.
	WEEE mark 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.

Planning the installation

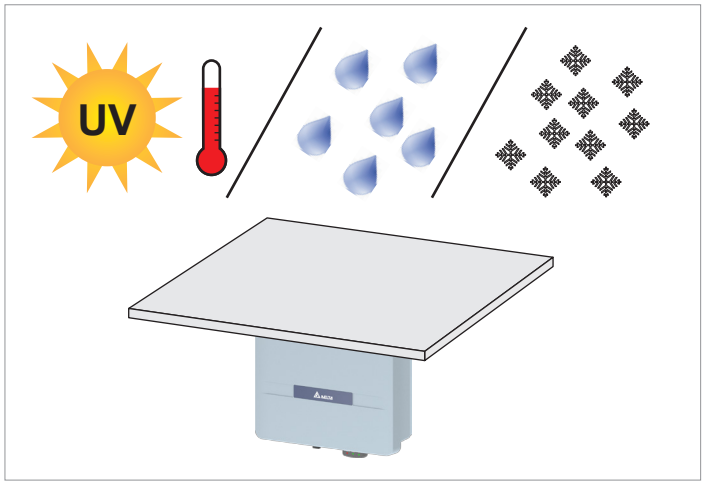
Installation location of the inverter



- ► Attach the inverter so that the LED displays on the operating field can be read without any problems.
- ► The inverter is set up via the “MyDeltaSolar” Delta app. A direct connection (peer-to-peer) must be possible between the inverter and your mobile device. For this reason, make sure that no objects are blocking the Wi-Fi connection. The distance between your mobile device and the inverter should not be more than 8 meters.

- ► The wall or mounting system must be able to bear the 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 weight of the inverter.
- ► Mount the inverter on a vibration-free wall to avoid disruptions.
- ► Mount the inverter on a fireproof wall.
- ► Mount the inverter on a flat wall. Brick wall can cause problems if they are not flat enough.

Outdoor installations

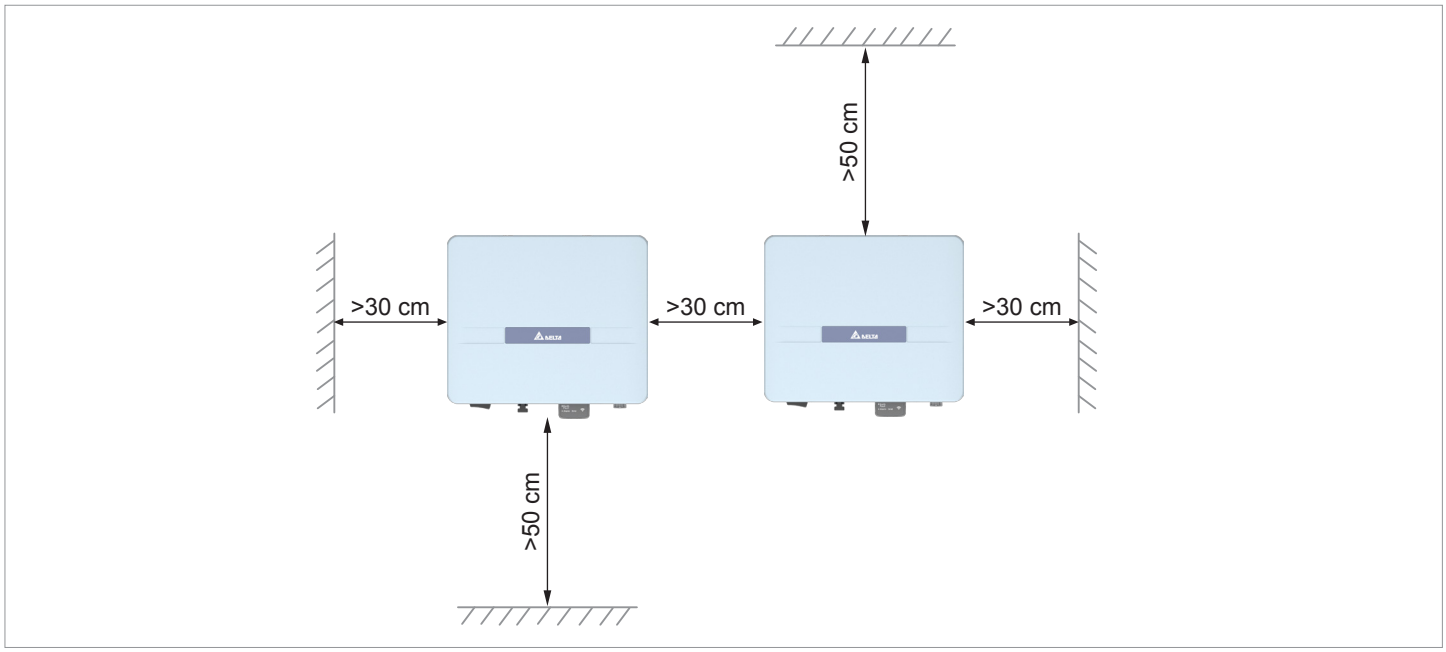


- ► The inverter has a protection degree of IP65 and can be installed indoors and outdoors. Despite this, the inverter should be protected by a roof against direct solar irradiation, rain and snow. For example, the power of the inverter will be reduced if it is too heavily heated by solar radiation.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

Mounting alignment

► Mount the inverter vertically.

Installation clearances and air circulation

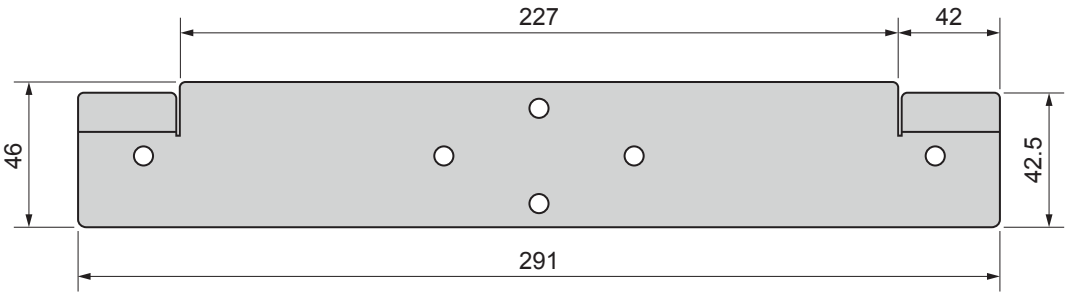


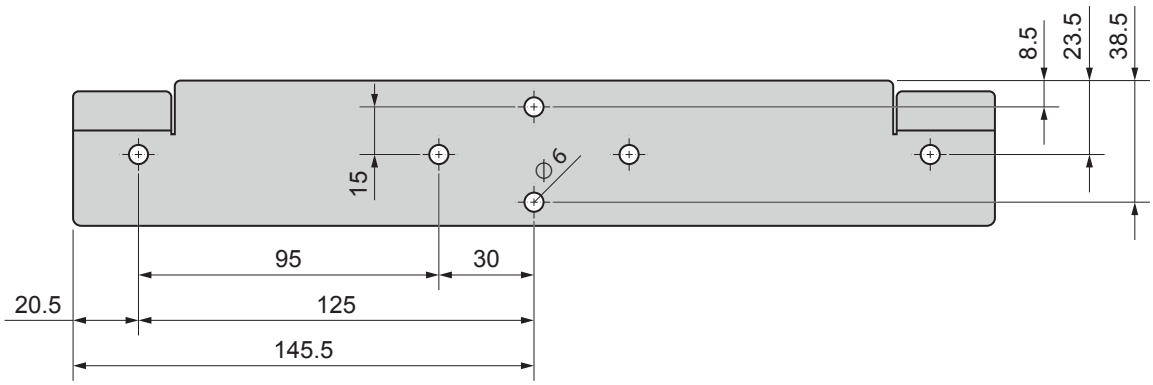
► Ensure sufficient air circulation. Hot air must be able to dissipate upwards. Leave enough space around each inverter.

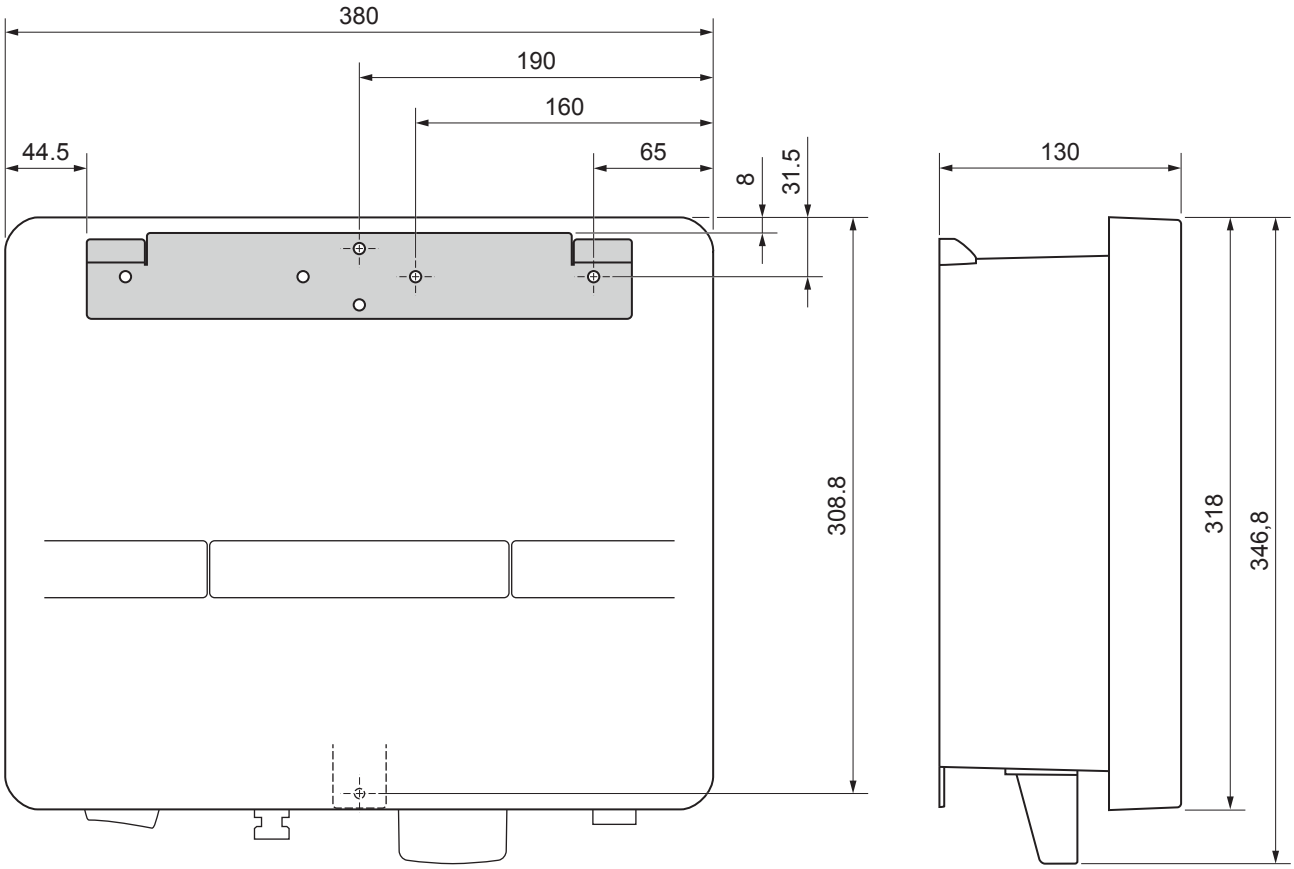
► Do not install inverters above one another so that they do not heat each other.

► 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. This is normal operating behavior for the inverter and is necessary to protect the internal electronics.

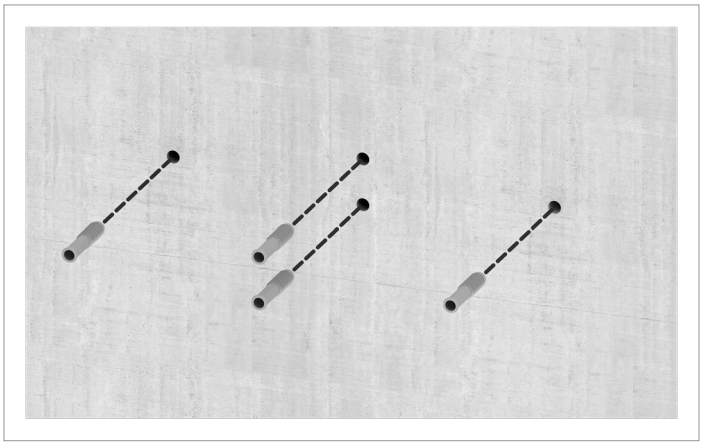
Dimensions


227
42
46
42.5
291

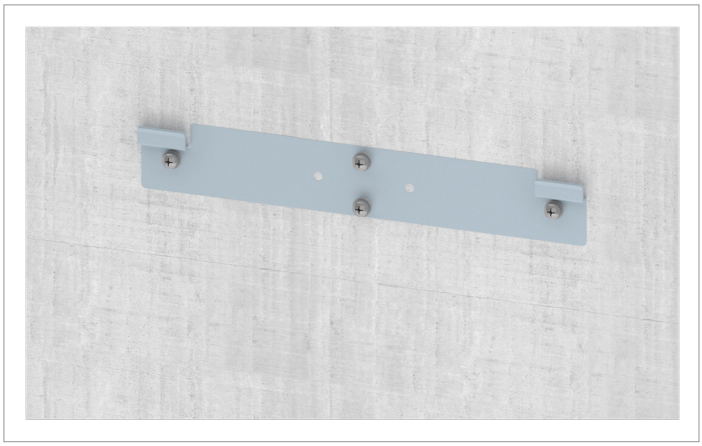

8.5
23.5
38.5
15
ϕ6
95
30
20.5
125
145.5

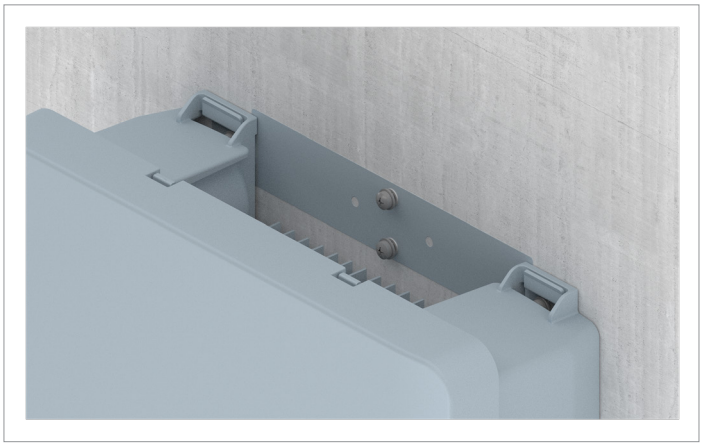

380
190
160
44.5
65
8
31.5
308.8
130
318
346,8

Mounting the inverter

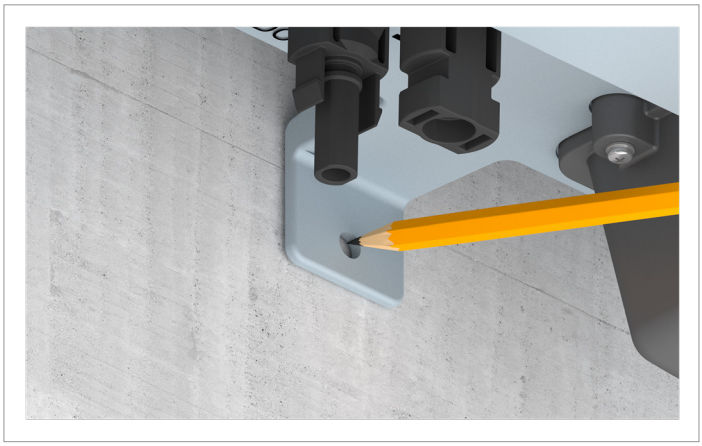


1. Attach the mounting plate to the wall/the mounting system using 4 M6 screws and washers.

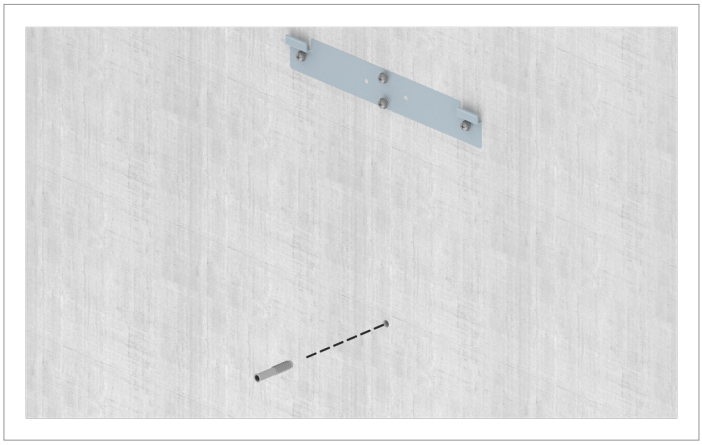




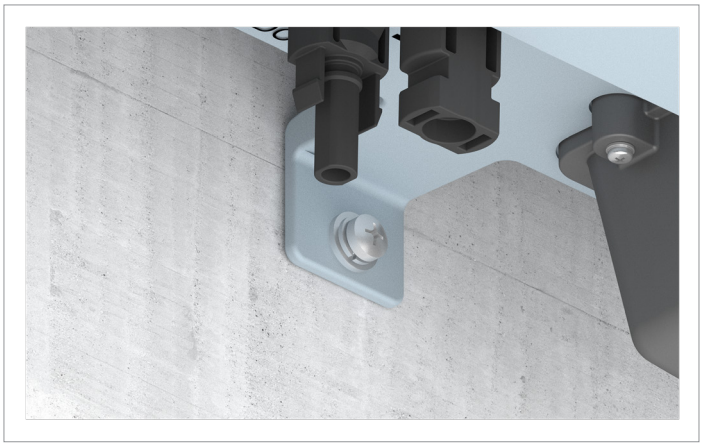
2. Mount the inverter on the mounting plate.



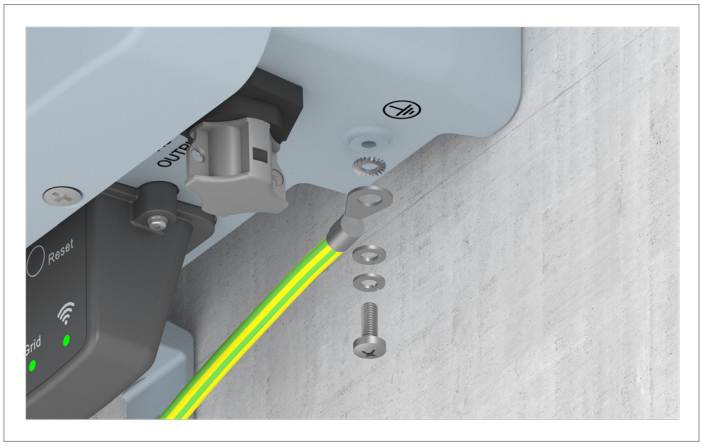
3. Mark the drilling hole for the mounting hole on the underside of the inverter and take down the inverter again.



4. Drill the hole.



5. Rehang the inverter and fasten the screws on the underside.



6. Bolt the grounding cable onto the inverter. Nut, spring washer, washer, and toothed lock washer are already mounted on the inverter.

7. Perform a continuity check of the grounding connection. If there is insufficient conductive connection, scratch away the paint from the inverter housing under the toothed lock washer to achieve a better electrical contact.

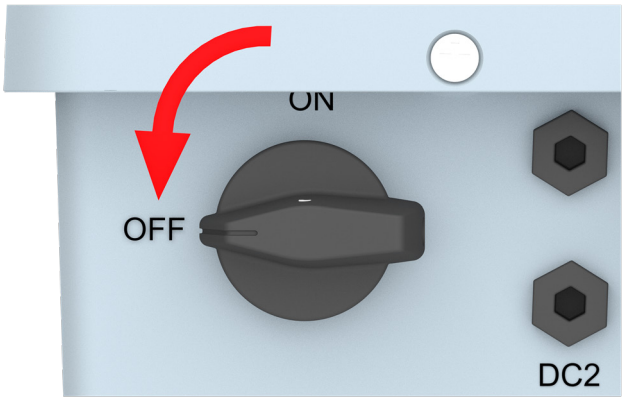
☑ Mounting of the inverter is now complete.

Connecting the mains (AC)

DANGER

Electric shock

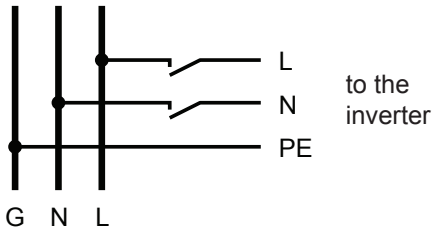
- ► Turn the DC isolating switch to the ***OFF*** position.
- ► First connect the AC cable to the inverter and then to the grid.



Important safety information

- ► 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 line protection	
H2.5 / H3A	20 A
H4A / H5A	25 A



Residual current circuit breaker

Due to its design, the inverter cannot supply the mains 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	30 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.

Belgium: The inverter can be used in a 3-phase grid when the voltage between two phases is 230 V.

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.

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.

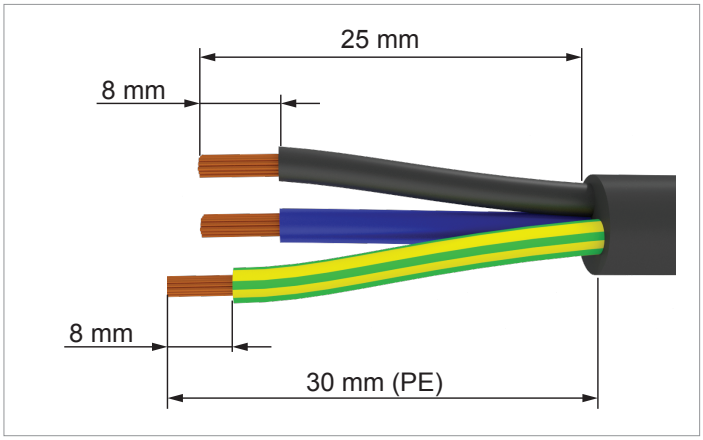
Connecting the mains (AC)

AC cable requirements

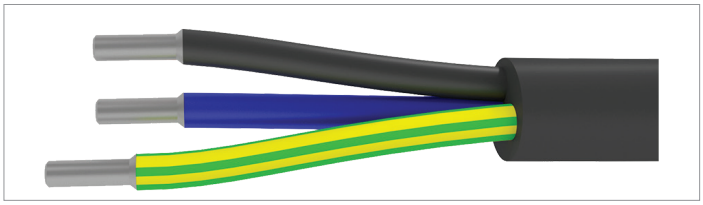
The AC plug provided with the inverter has the following technical characteristics:

AC plug	Wieland RST25I3S (96.031.4154.3)
Nominal current	≤25 A
Min./max. Cable diameter	10 ... 14 mm
Min./max. Wire cross-section	0.75 / 6 mm^2
Wire end sleeves required	
● Fine-strand cable up to 4 mm^2	Yes
● Fine-strand cable up to 6 mm^2	No
Connection type	Screw connection
Recommended torque	
● Connection screws	0.8 ... 1 Nm
● Screw fitting	4 + 1 Nm
Recommended crimping tool	Wieland 95.101.1300.0

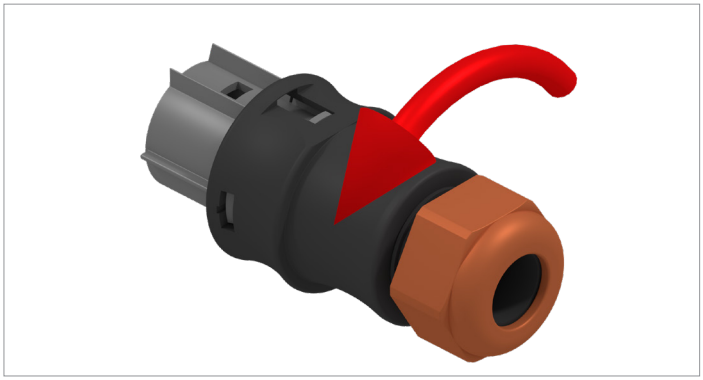
- ► Read and follow the instructions provided with the AC plug.
- ► The AC plug be used with flexible (with wire end sleeves) or solid-core copper cables.
- ► Crimp the wire end sleeve square
- ► For 6 mm^2 cables, the tensile and bending forces at the plug must be taken into account. Where necessary, suitable measures must be used to compensate for these forces.
- ► See https://eshop.wieland-electric.com for more information on the AC plug.
- ► 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.
- ► Germany: Follow the installation regulations of VDE 0100-712. This standard contains the requirements for minimum cable diameters and for avoiding overheating due to high currents.



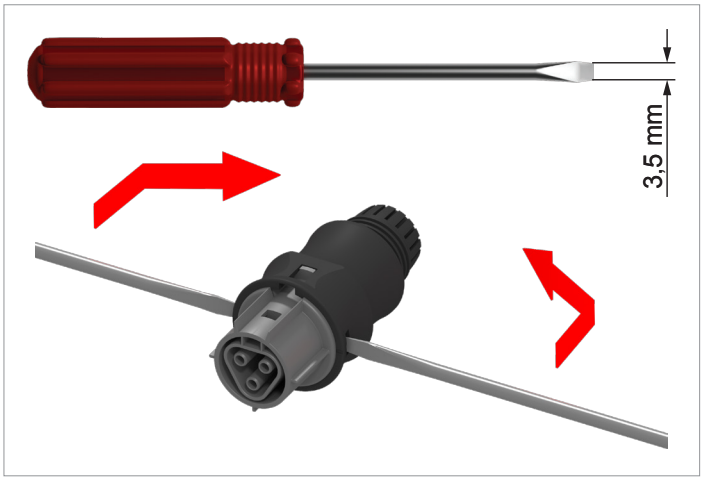
1. Remove the insulation from the cable and wires.
   Do not twist the wire ends because this reduces the contact surface area with the wire end sleeves.



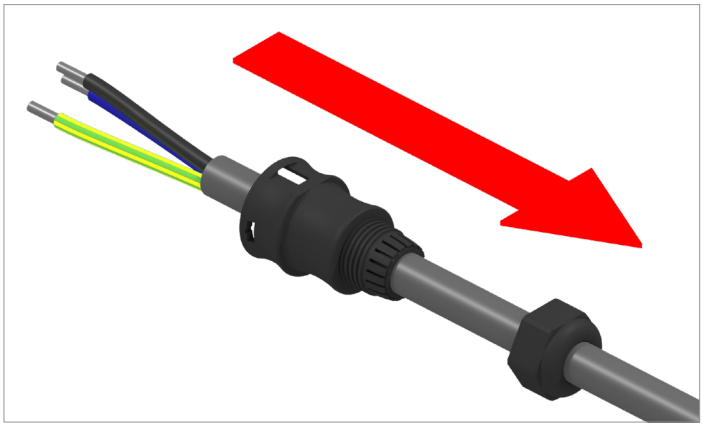
2. Fit and crimp the wire end sleeves to the ends of the wires.



3. Unscrew the nut from the AC plug.

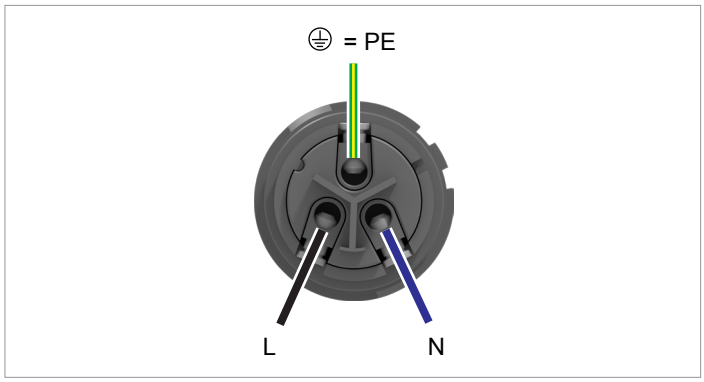


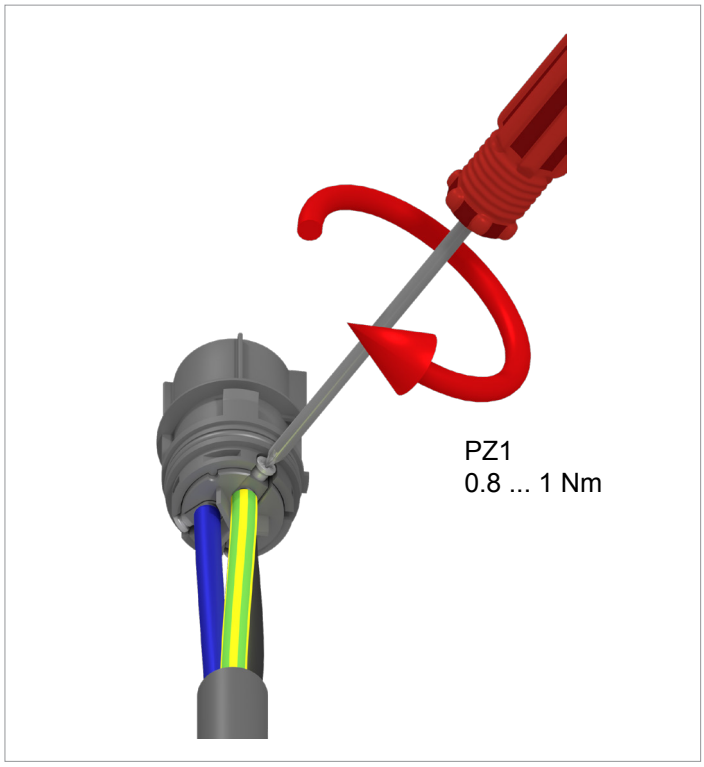
4. Detach the housing using a 3.5 mm flat-blade screwdriver.

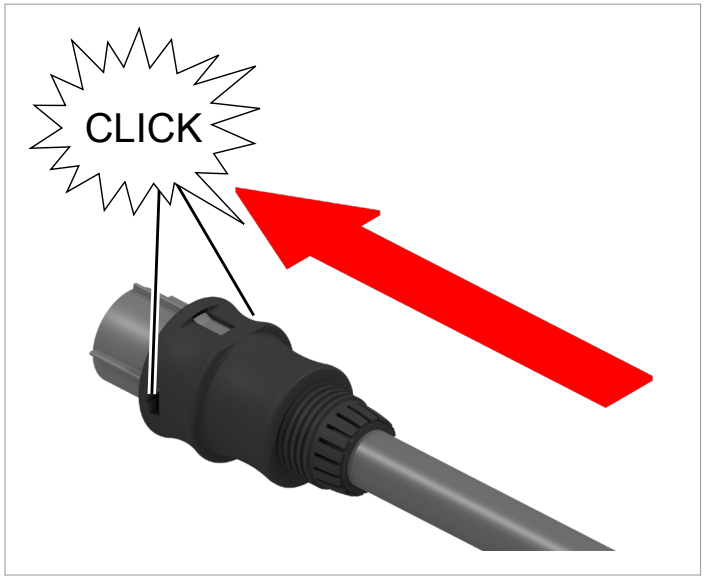


5. Unscrew the nut and housing over the cable.

Connecting the mains (AC)





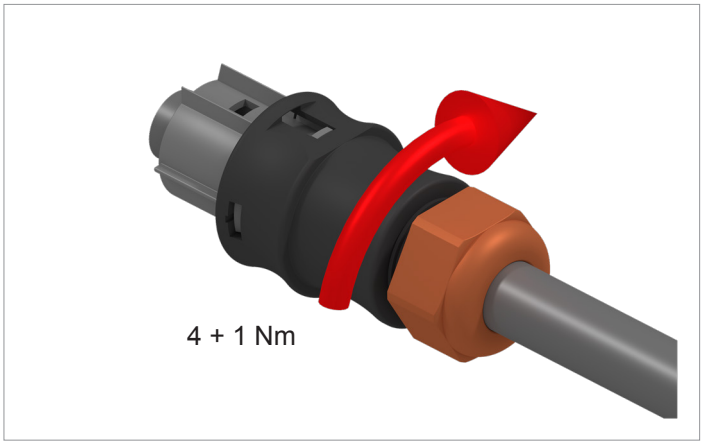


ATTENTION

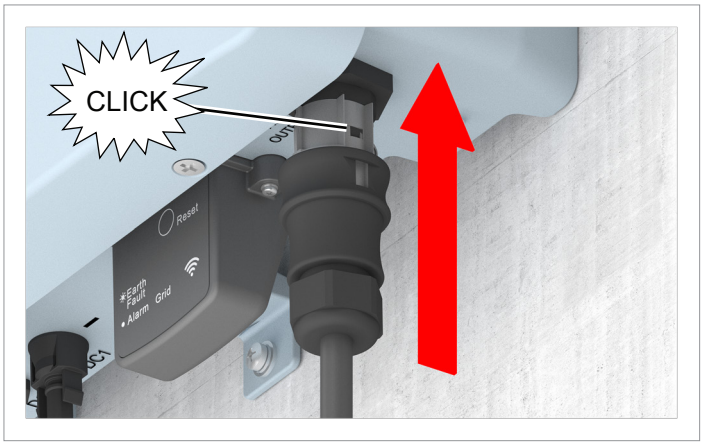
Pay attention to the correct phase assignments when connecting the AC cable to the AC plug. Incorrect wiring can destroy the inverter.

6. Push the wires of the AC cable into the connections and tighten (torque 0.8 to 1.0 Nm).

7. Push the housing into the socket insert until it locks into place.



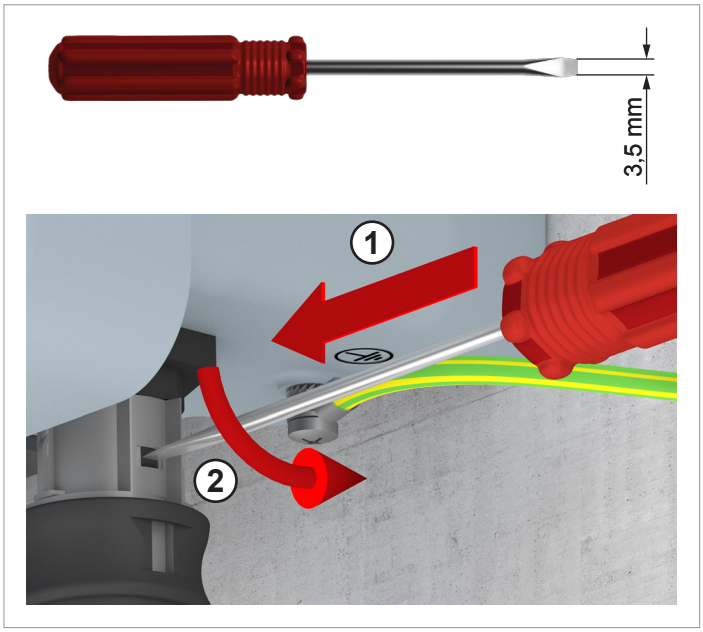
8. Tighten the nuts on the housing.



9. Plug the AC plug into the AC connection on the inverter.

☑ Work on the AC connection is now complete.

Unlocking and disconnecting the AC plug



► To disconnect the AC plug from the inverter, use a screwdriver to push down the locking mechanism on the AC socket.

Connecting the solar modules (DC)

DANGER

Electric shock

Potentially fatal voltages are present at the inverter DC connections. 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 isolating switch to the ***OFF*** position.
- ► Disconnect the connection to the mains so that the inverter cannot supply energy to the mains.
- ► 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.

ATTENTION

Overheating of the DC connections.

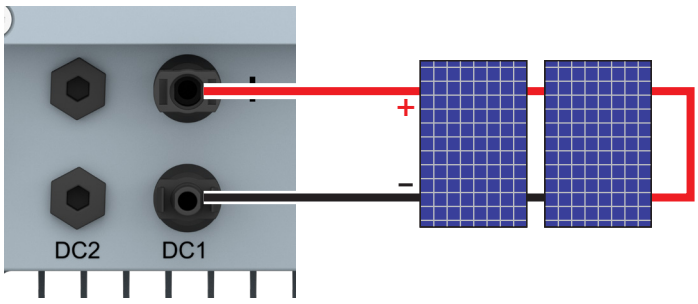
Exceeding the maximum current can cause overheating of the DC connections and result in a fire.

- ► The maximum open-circuit voltage of the PV field may not exceed 600 V_{DC}!

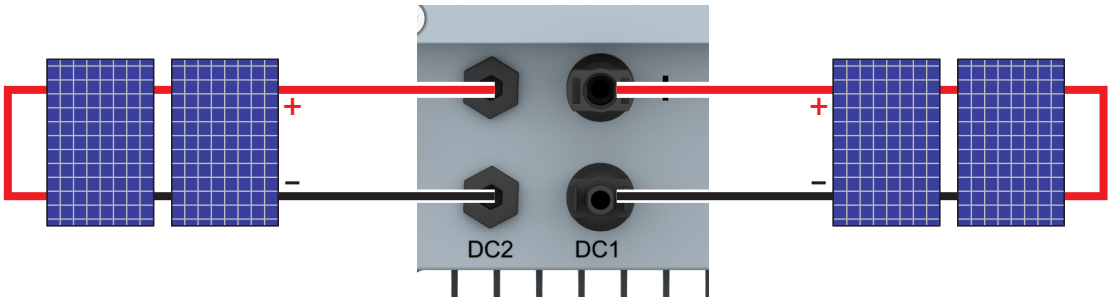
For the H4A_220, the current limit for each DC input is 11 A. In the sum of both DC inputs, however, the current limit of the H4A_220 is 18 A!

Consider this current limitation in project planning if you want to use both DC inputs (either one DC string per DC input or externally connected in parallel)!

H2.5 Flex



H3A Flex
H4A Flex
H5A Flex



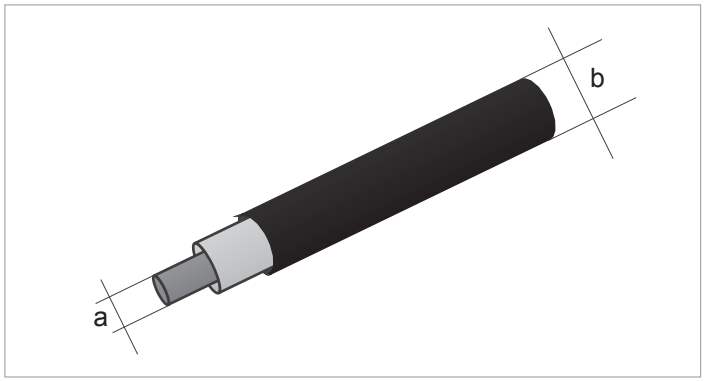
Connect the negative pole of the solar module string to DC–, connect the positive pole to DC+.

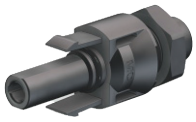
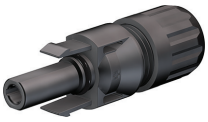
When selecting protective devices (such as fuses), always cater for the *maximum current rating* of the solar modules.

When selecting protective devices, always comply with the local safety regulations.

DC cable requirements

The DC plugs for all DC connections are supplied 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
DC–		
DC+		

a	b	Multi-contact
mm²	mm	
1.5/2.5	3-6	32.0010P0001-UR
	5.5-9	32.0012P0001-UR
4/6	3-6	32.0014P0001-UR
	5.5-9	32.0016P0001-UR [1)]
1.5/2.5	3-6	32.0011P0001-UR
	5.5-9	32.0013P0001-UR
4/6	3-6	32.0015P0001-UR
	5.5-9	32.0017P0001-UR [1)]

1) Supplied with the inverter

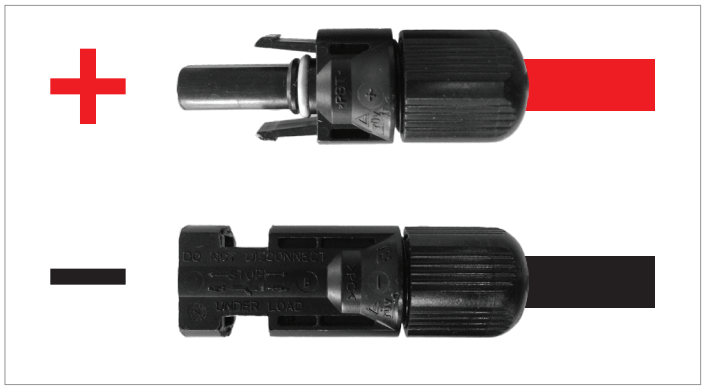
Special tools

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

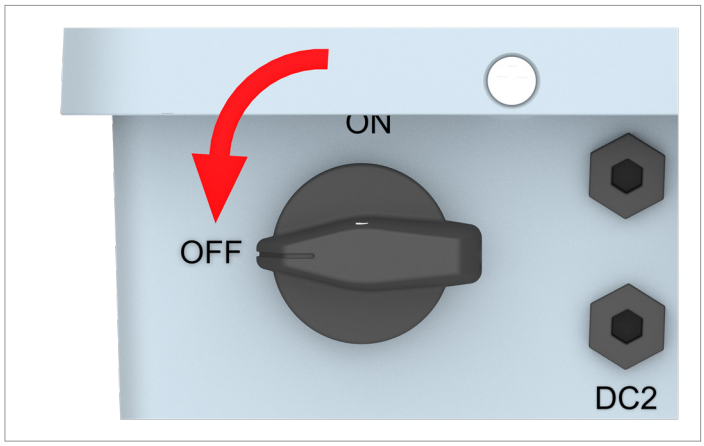
► Observe the local regulations with regards to the protective caps.

Mounting tool for disconnecting the DC plug and the protective caps from the DC connections. Available from Multi-Contact.

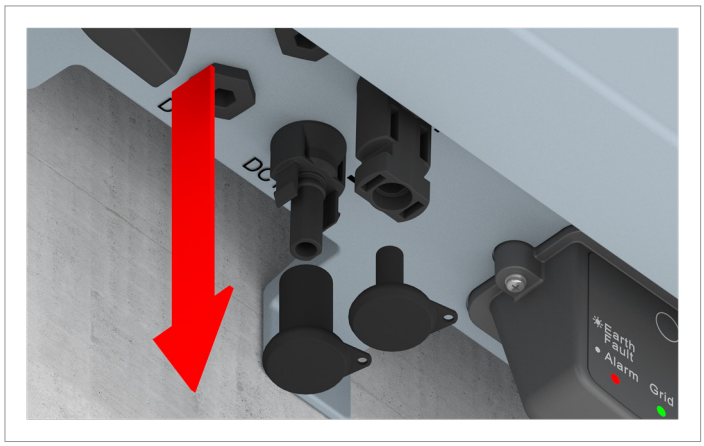
Connecting the solar modules (DC)



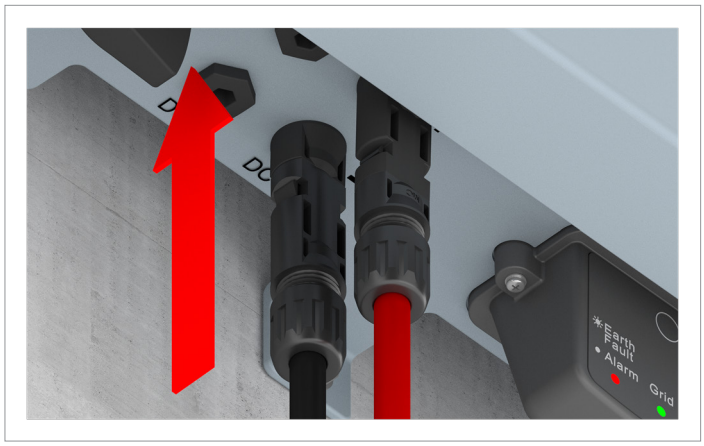
1. Use a red cable for DC+ and a black cable for DC–.
   Use a voltmeter to check the polarity.



2. Turn the DC isolating switch to the ***OFF*** position.



3. Remove the sealing caps from the DC connections and store in a safe place.
   Do not remove the sealing caps from the unused DC connections.
   Keep the sealing caps.



4. Plug the DC plugs with the DC cables into the DC connections on the inverter.

☑ Work on the DC connection is now complete.

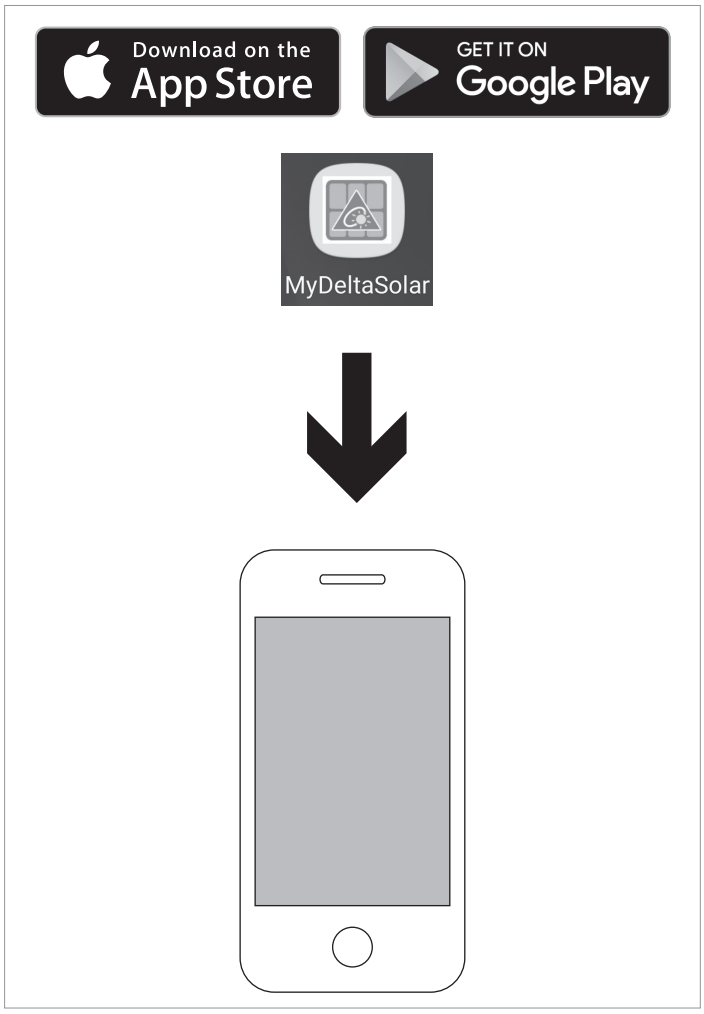
Commissioning the inverter with the MyDeltaSolar App

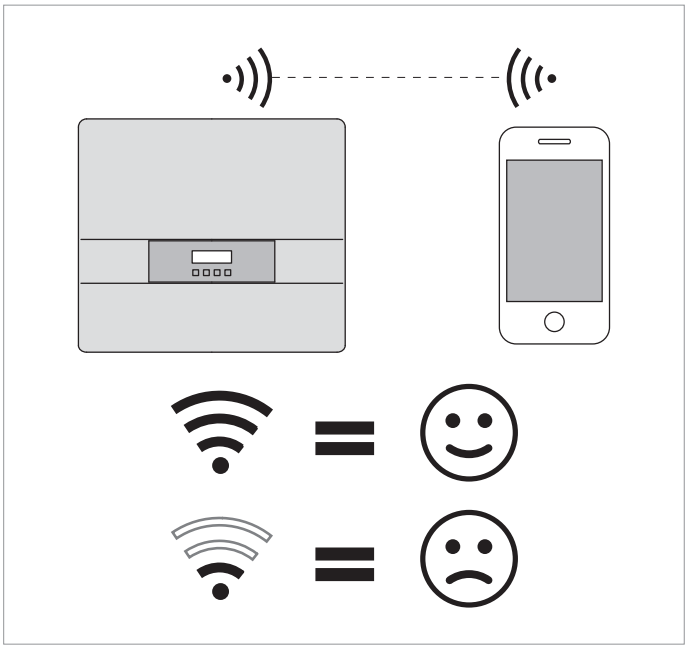
In order to complete the instructions in this and the next chapter, you must possess either an end user or an installer account for MyDeltaSolar Cloud.

If you do not yet have an account, please follow the registration instructions, which are also supplied with the inverter as a separate document.

As soon as the inverter is supplied with AC voltage via the AC connection, the Wi-Fi module activates automatically.

The configuration of the inverter is performed via Wi-Fi (WLAN) using a mobile device (e.g. a smartphone or tablet). Communication between the inverter and mobile device is carried out via a wireless direct connection (peer-to-peer). Only one mobile device can be active at any one time.





Technical data

Input (DC)	H2.5_210 Flex	H3A_220 Flex	H4A_220 Flex	H5A_220 Flex
Recommended maximum PV power	3200 W_P	3600 W_P	5000 W_P [1]	6300 W_P [1]
Rated power	2500 W	3000 W	4000 W	5000 W
Maximum input power	2600 W	3190 W	4320 W	5280 W
Operating input voltage range	30 ... 500 V_{DC}	30 ... 550 V_{DC}		
Maximum input voltage	500 V_{DC}	600 V_{DC}		
Nominal voltage	350 V_{DC}			
Cut-in voltage	35 V_{DC}			
MPP input voltage range	30 ... 500 V_{DC}	30 ... 550 V_{DC}		
MPP input voltage range with maximum power				
● Symmetrical design	–	180 ... 500 V_{DC}	240 ... 500 V_{DC}	
● Asymmetrical design	–	290 ... 500 V_{DC}	380 ... 500 V_{DC}	380 ... 500 V_{DC}
Maximum input current (total/per string)	11 A (11 A)	18 A (11 A) [2]	18 A (11 A) [2]	22 A (11 A)
Maximum short circuit current under fault conditions	13.9 A			
Number of DC inputs	1	2		
Asymmetrical design [3]	–	100/0% ; 0/100%	100/0% ; 0/100%	94/6% ; 6/94%
Number of MPP trackers	1	2		
Electrical isolation	None			
Overvoltage category [4]	II			

Output (AC)	H2.5_210 Flex	H3A_220 Flex	H4A_220 Flex	H5A_220 Flex
Maximum apparent power [5]	2500	3000 VA	4000 VA	5000 VA
Rated apparent power	2500	3000 VA	4000 VA	5000 VA
Nominal voltage 6[5]	230 -20%/+22%, 1-phase (L, N, PE)			
Nominal current	10.9 A	13 A	17.4 A	22 A
Maximum current	13.9 A	14.3 A	18.6 A	24 A
Maximum start-up current	30 A/1 ms			
Maximum fault current (rms)	16 A	16 A	20 A	25 A
Nominal frequency	50 / 60 Hz			
Frequency range [6]	50 ± 5 Hz / 60 ± 5 Hz			
Capacity rating	> 0.99 at rated power			
Total harmonic distortion	< 3%			
Overvoltage category [4]	III			

[1] When operating with symmetrical DC inputs (50/50%)
[2] When planning the project, consider the current limitation of the H4A_220 to 18 A if you want to use both DC inputs (either one DC string per DC input or externally connected in parallel)!
[3] Maximum DC input power per DC input: H4A_220: 4220 W; H5A_220: 4700 W
[4] IEC 60664-1, IEC 62109-1
[5] The maximum AC apparent power specifies the maximum power that an inverter is able to supply. This maximum apparent power is not necessarily achieved.
[6] AC voltage and frequency range are programmed using the corresponding country specifications.

Mechanical details	H2.5_210 Flex	H3A_220 Flex	H4A_220 Flex	H5A_220 Flex
Dimensions (W x H x D)	380 x 318 x 130 mm			
Weight	10 kg		11 kg	12 kg
Cooling	Natural convection			
AC connection type	Wieland RST25I3S (96.031.4154.3)			
DC connection type	Multi-Contact MC4			
Communication interfaces	Wi-Fi			
Mechanical DC isolating switch	Yes			

General specifications	H2.5_210 Flex	H3A_220 Flex	H4A_220 Flex	H5A_220 Flex
Delta model number	H2.5_210	H3A_220	H4A_220	H5A_220
Delta part number	RPI252H210000	RPI302H220000	RPI402H220000	RPI502H220000
Maximum efficiency	97.5%			98.3%
EU efficiency	96.8%			98.0%
Operating temperature range	-25 ... +60 °C			
Operating temperature range without derating	-25 ... +40 °C			
Storage temperature range	-25 ... +60 °C			
Relative humidity	0 ... 95%, non-condensing			
Max. operating height	2000 m above sea level			

Standards and guidelines	H2.5_210 Flex	H3A_220 Flex	H4A_220 Flex	H5A_220 Flex
Degree of protection	IP65			
Safety class	I			
Pollution degree	II			
Overload behavior	Current limit, power limit			
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			
Mains connection guidelines	See solarsolutions.delta-emea.com			

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