

Quick Installation Guide

Solar inverters

H2.5_210 Flex

H3_210 Flex

H4A_220 Flex

H5A_220 Flex







This quick installation guide applies for the following inverter models:

H2.5_210 (Delta part number RPI252H210000) H3_210 (Delta part number RPI302RH210000) H4A_220 (Delta part number RPI402H220000) H5A_220 (Delta part number RPI502H220000)

with firmware versions:

H2.5_210/H3_210: DSP: 1.33 / RED: 1.03 / COM: 1.16 or higher

H4A_220/H5A_220: DSP: 1.33 / RED: 1.03 / COM: 1.16 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 solar-inverter.com to check whether a newer version of the Quick Installation Guide or of the comprehensive Installation and Operation Manual is available.

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This manual is intended for installers.

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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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Basic safety instructions



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

- Disconnect the inverter from all AC and DC voltage sources and make sure that none of the connections can be accidentally restored.
- 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 mm².

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	Anex	AC plug	1	Wieland RST25I3S (96.031.4154.3)
Mounting plate	1		Quick installation guide and basic safety instruc- tions	1	Installationskurzanieitung
DC plug	H2.5: 1 H3: 1 H4A: 2 H5A: 2	Multi-contact MC4 for DC+ for 4/6 mm² (32.0017P0001-UR)	DC plug	H2.5: 1 H3: 1 H4A: 2 H5A: 2	Multi-contact MC4 for DC– for 4/6 mm² (32.0016P0001-UR)

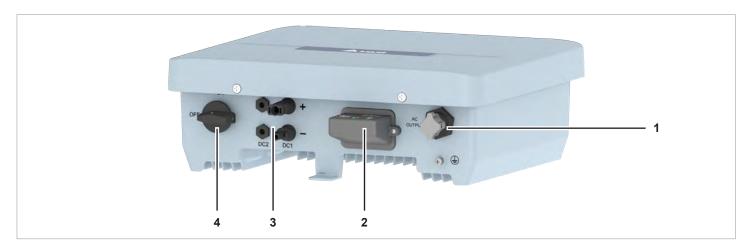


Check the delivery for completeness and all components for damage before starting installation work.

Do not use any damaged components.

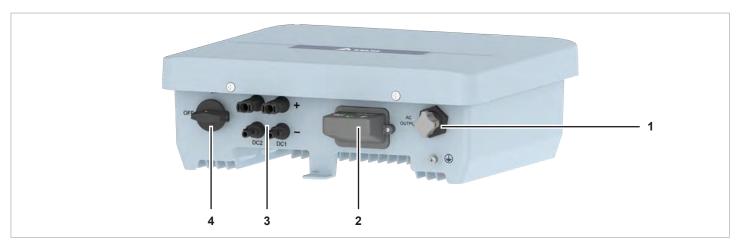
Keep the packaging.

Components of the inverter



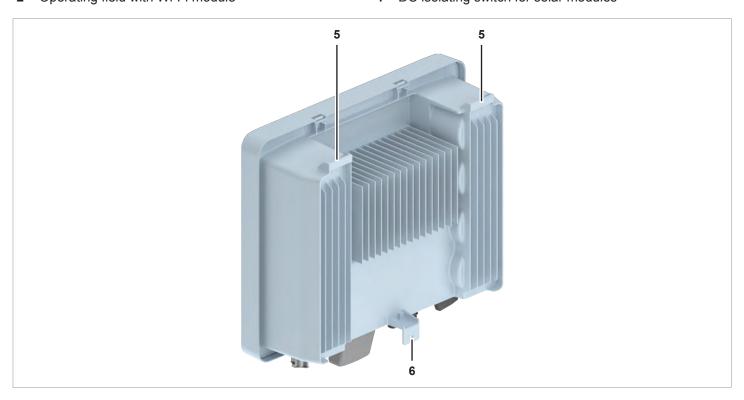
- 1 AC output (mains)
- 2 Operating field with Wi-Fi module

- 3 DC input (solar modules), 1 x MC4
- 4 DC isolating switch for solar modules



- 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

Components of the inverter

Operating field



		Red LED.
EARTH FAULT / ALARM	Isolation fault /	Flashes in the event of E34 isolation fault .
	error	Shines in the event of all other errors.
		Green LED.
GRID	Mains	Flashes while the inverter powers up.
		Lights up when the inverter is connected with the mains grid.
Wı-Fı	Wi-Fi	Lights up when the Wi-Fi module is transferring data.

Table 1: Overview of LED messages

	Press for 3 to 10 seconds	The LED flashes once per 0.5 seconds. Reset the Wi-Fi module.
RESET	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.

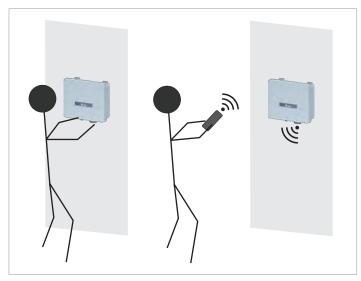


WEEE mark

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

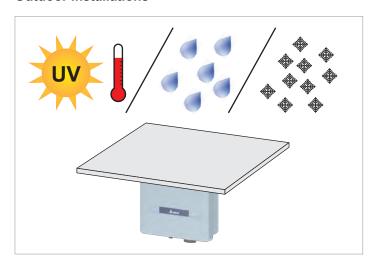


- ► Attach the inverter so that the LED displays on the operating field can be read without any problems.
- ► The inverter is set up via the "MyDeltaSolar" Delta app. A direct connection (peer-to-peer) must be possible between the inverter and your mobile device. For this reason, make sure that no objects 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.

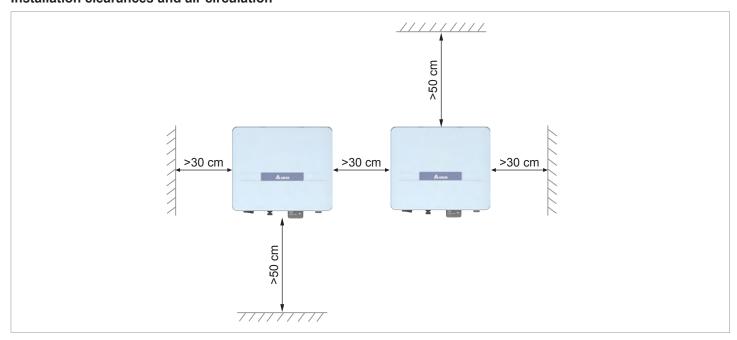
Planning the installation

Mounting alignment



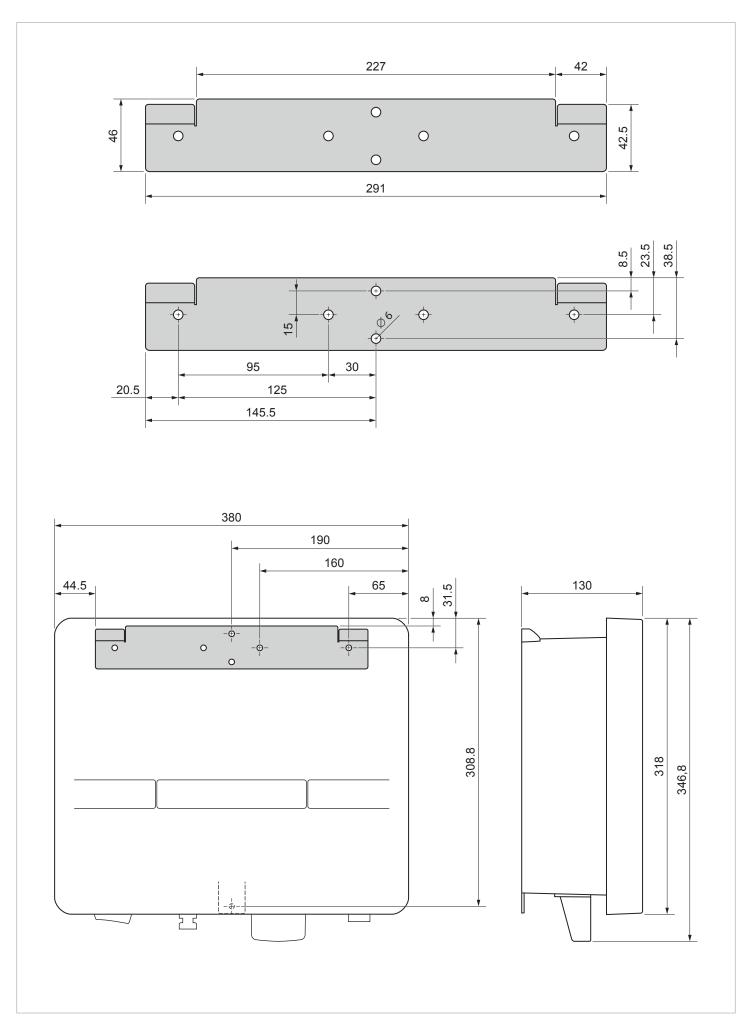
Mount the inverter vertically.

Installation clearances and air circulation

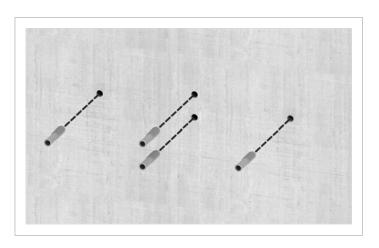


- ► Ensure sufficient air circulation. Hot air must be able to dissipate upwards. Leave enough space around each inverter.
- ▶ Do not install inverters above one another so that they do not heat each other.
- ▶ Note the Operating temperature range without derating and the Operating temperature range. 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



Mounting the inverter



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



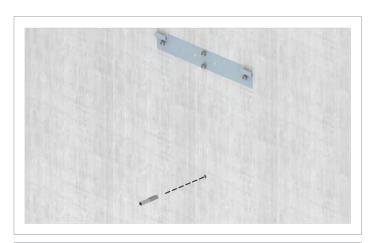
2. Mount the inverter on the mounting plate.



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



Mounting the inverter



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.

- 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.

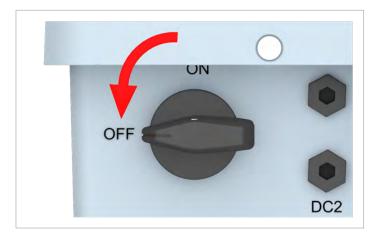


DANGER



Electric shock

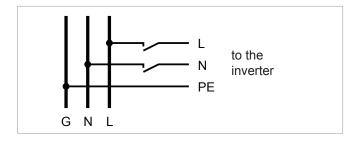
- Turn the DC isolating switch to the OFF position.
- ► First connect the AC cable to the inverter and then to the grid.



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/H3	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

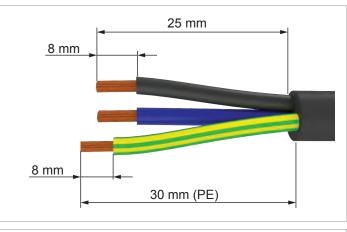
The inverter must be grounded via the PE conductor. To do this, connect the PE conductor of the AC cable to the AC plug pin provided for that purpose.

AC cable requirements

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

AC	plug	Wieland RST25I3S (96.031.4154.3)
No	minal current	≤25 A
Mi	n./max. Cable diameter	10 14 mm
Mi tio	n./max. Wire cross-sec- n	0.75/6 mm²
Wi	re end sleeves required	
•	Fine-strand cable up to 4 mm ²	Yes
•	Fine-strand cable up to 6 mm ²	No
Сс	nnection type	Screw connection
Re	commended torque	
•	Connection screws	0.8 1 Nm
•	Screw fitting	4 + 1 Nm
Re	commended 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 mm² 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.



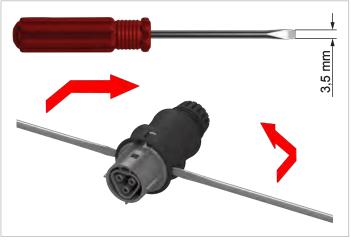
1. Remove the insulation from the cable and wires. Do not twist the wire ends because this reduces the contact surface area with the wire end sleeves.



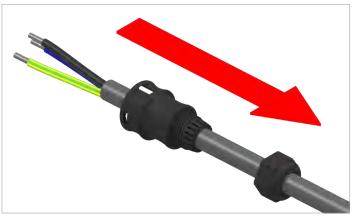
2. Fit and crimp the wire end sleeves to the ends of the wires.



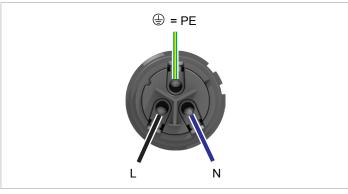
3. Unscrew the nut from the AC plug.

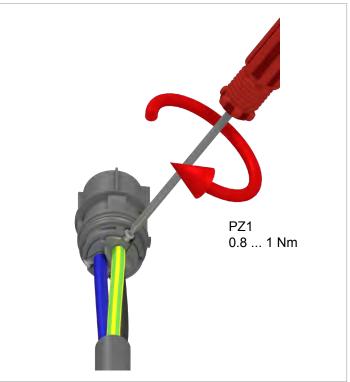


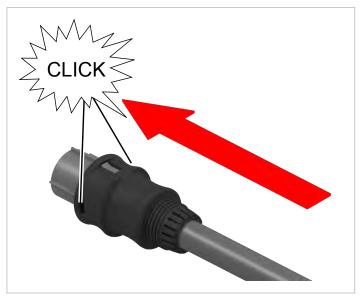
4. Detach the housing using a 3.5 mm flat-blade screwdriver.



5. Unscrew the nut and housing over the cable.







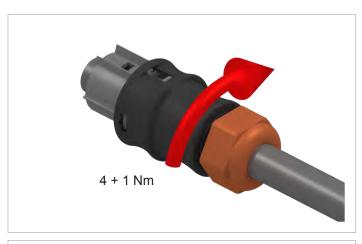
ATTENTION



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.



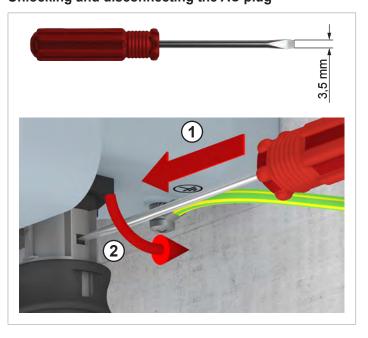
8. Tighten the nuts on the housing.



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.



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)!

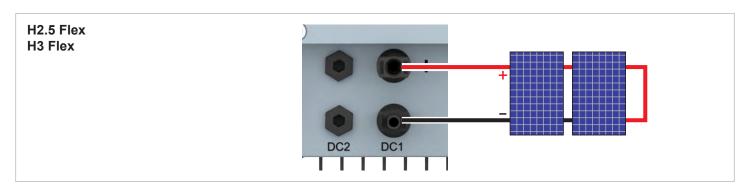
ATTENTION

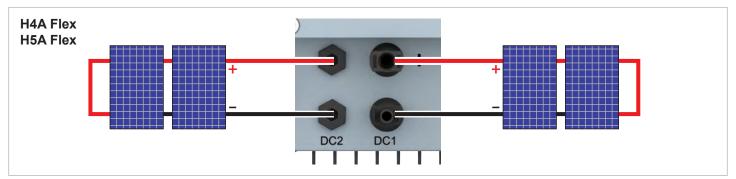


Overheating of the DC connections.

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_{pc}!





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

Connecting the solar modules (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+	14 m/2 m	

а	b	
mm²	mm	Multi-contact
4.5/0.5	3-6	32.0010P0001-UR
1.5/2.5	5.5-9	32.0012P0001-UR
4/6	3-6	32.0014P0001-UR
	5.5-9	32.0016P0001-UR ¹⁾
4 E/O E	3-6	32.0011P0001-UR
1.5/2.5	5.5-9	32.0013P0001-UR
4/6	3-6	32.0015P0001-UR
4/0	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.

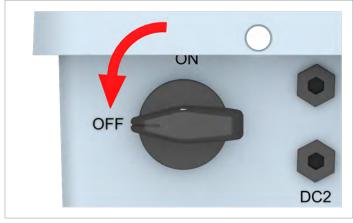


Mounting tool for disconnecting the DC plug and the protective caps from the DC connections. Available from Multi-Contact.

Connecting the solar modules (DC)



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.

Reset the Wi-Fi module



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. Delta provides a special app in iOS and Android for this purpose (Windows Mobile is no longer supported).

1. Download the "MyDeltaSolar" app to the mobile device.



- 2. Activate wireless network on the mobile device:
 - iOS: Settings > Wi-Fi
 - Android: Settings > Connections > Wi-Fi
- 3. Activate Wi-Fi direct on the mobile device:
 - iOS: Not necessary
 - Android: Select Wi-Fi direct.
- 4. In the list of connections, select **DELTA- XXXXXXXXXXXX**.

The xxxxxxxxxxxx stands for the SSID. The SSID is the 13-digit letter/figure combination on the type plate below the barcode.

- 5. Enter the standard password "DELTASOL" (everything in capital letters).
- 6. Start the "MyDeltaSolar" app.
 - → When the mobile device is connected with the inverter, the app automatically loads the data from the inverter.
- 7. Follow the instructions in the app.



Please change the default password in the app!

Setting up the inverter via the app



In order to complete the instructions in this 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.



This chapter describes the default settings that must be established. Additional installation settings can only be made by users with an installer account.



In order to set up the inverter via the app, the inverter must be supplied with AC voltage.



- PRODUCTION

 O W

 ENERGY TODAY

 O Wh

 INVERTER STATUS: STANDBY

 ENERGY TOTAL: O Wh
- First Connect Detected

 Direct To Install Setting

 OK

- 1. Make sure that Wi-Fi communication is working between the mobile device and the inverter; see "Reset the Wi-Fi module", page 21.
- 2. Open the "MyDeltaSolar" app.

The app start screen is displayed.

After around 5 seconds, the message **First connect detected** is displayed.

- 3. Tap on **OK**.
 - → The **Installation settings** window opens.

Setting up the inverter via the app



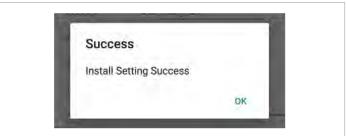
4. For **Country/Grid type**, tap the **Default** option.



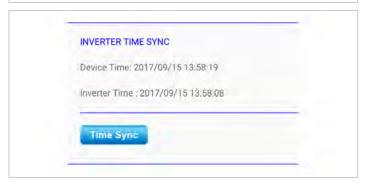
- For Germany, select the **Germany LV** option (Germany low voltage in accordance with VDE AR-N 4105).
 - → In the installation settings, under Country/Grid type, the system now displays Germany LV.



6. To save the installation settings, tap on the **Set** button.



The installation settings are saved.

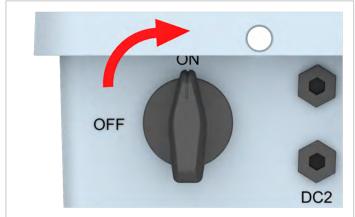


7. To synchronize the date and time settings on the inverter with the mobile device, in the *Inverter Time Sync* area, tap on the **Time Sync** button.

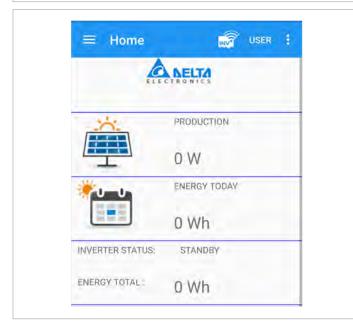
Setting up the inverter via the app



The date and time settings of the inverter are synchronized.



- 8. Turn the DC isolating switch to the *ON* position.
 - → The inverter starts and synchronizes with the grid. The *GRID* LED flashes during this.
 - → When the inverter is connected with the grid, the **GRID** LED shines constantly.



When the solar modules are generating energy, the power currently being created is displayed on the start screen of the app.

Input (DC)	H2.5_210 Flex	H3_210 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	30 550 V _{DC}				
MPP input voltage range with maximum power					
Symmetrical design	_		240 500 V _{DC}		
Asymmetrical design	_		380 500 V _{DC}	380 500 V _{DC}	
Maximum input current (total/per string)	11 A (11 A)		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%	94/6% ; 6/94%	
Number of MPP trackers	1 2				
Electrical isolation	None				
Overvoltage category 4)	II				

Output (AC)	H2.5_210 Flex	H3_210 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	30 A/1 ms			
Maximum fault current (rms)	16 A	16 A	20 A	25 A	
Nominal frequency	50 / 60 Hz	50 / 60 Hz			
Frequency range 6)	50 ± 5 Hz / 60 ±	50 ± 5 Hz / 60 ± 5 Hz			
Capacity rating	> 0.99 at rated p	> 0.99 at rated power			
Total harmonic distortion	< 3%	< 3%			
Overvoltage category 4)	III	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.

Technical data

Mechanical details	H2.5_210 Flex	H3_210 Flex	H4A_220 Flex	H5A_220 Flex	
Dimensions (W x H x D)	380 x 318 x 130 m	380 x 318 x 130 mm			
Weight	10 kg	10 kg		12 kg	
Cooling	Natural convection	Natural convection			
AC connection type	Wieland RST25I3	Wieland RST25I3S (96.031.4154.3)			
DC connection type	Multi-Contact MC4	Multi-Contact MC4			
Communication interfaces	Wi-Fi	Wi-Fi			
Mechanical DC isolating switch	Yes	Yes			

General specifications	H2.5_210 Flex	H3_210 Flex	H4A_220 Flex	H5A_220 Flex
Delta model number	H2.5_210	H3_210	H4A_220	H5A_220
Delta part number	RPI252H210000	RPI302H210000	RPI402H220000	RPI502H220000
Maximum efficiency	97.5%			98.3%
EU efficiency	96.8%	96.8%		
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	H3_210 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 www.solar-inverter.com			

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