
# Installation and operation manual

RPI M6A
RPI M8A
RPI M10A

Europe United Kingdom

solarsolutions.delta-emea.com

**This manual applies to the following inverter models:**

- **RPI M6A (Delta part number RPI602FA0E1000)**
- **RPI M8A (Delta part number RPI802FA0E1000)**
- **RPI M10A (Delta part number RPI103FA0E1000)**

With the firmware versions:

**DSP: 1.51 / RED: 1.15 / COMM: 1.34 or higher**

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

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 Therefore, before starting installation work, **always** consult solarsolutions.delta-emea.com to check whether a newer version of the Quick Installation Guide or the Installation and Operation Manual is available.



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## 1. About this manual

### 1.1 Purpose of this manual

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

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

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

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

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

### 1.2 Target audience of this manual

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

### 1.3 Warning notices and warning symbols

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

Always follow the instructions in the warning notices.

**Warning levels**

**DANGER**

Indicates a dangerous situation that will **always** lead to death or severe injuries if not avoided.

**WARNING**

Indicates a dangerous situation that **can lead** to death or severe injuries if not avoided.

**CAUTION**

Indicates a dangerous situation that **can lead** to light or medium injuries if not avoided.

***ATTENTION***

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

A notice provides information on efficient use of the inverter.

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

High electrical voltages or currents

Hot surfaces

Heavy weight

General danger

## 1.4 Writing and labeling conventions

Some sections in this manual are specially labeled.

### Labeling of work instructions

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

1. First step

   → Where necessary, the result of the work step is described here. This is used for checking that the work step has been completed correctly.

2. Second step
3. Third step

☑ Work step is now complete.

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

► Step

► Step

### Labeling of inverter components

| | |
|---|---|
| Buttons | ENT |
| Text on the inverter display | **`Inverter info.`** |
| LEDs | ***ALARM*** LED |

| LED | Meaning |
|---|---|
| ● | LED stays on. |
| ✺ | LED flashes. |
| ○ | LED is off. |

## 2. Basic safety instructions

**DANGER**

**Electric shock**

Potentially fatal voltages are present in the inverter during operation. When the inverter is disconnected from all power sources, this voltage regrid in the inverter for up to 60 seconds. You should therefore always carry out the following steps before working on the inverter:

1. Turn the AC/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 restored accidentally.
3. Wait at least 60 seconds for the internal capacitors to discharge.

**DANGER**

► Electric shock

► Potentially fatal voltages are present at the DC connections of the inverter. When light falls on the solar modules, they immediately start to generate electricity. This also happens when light does not fall directly on the solar modules.

► Never disconnect the inverter from the solar modules when it is under load.

► Turn the AC/DC disconnector to the ***OFF*** position.

► Disconnect the connection to the grid so that the inverter cannot feed energy into the grid.

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

► Ensure that the DC cables cannot be touched accidentally.

**DANGER**

**Electric shock**

The inverter has a high leakage current value.

► **Always** connect the ground cable first, then the AC and DC cables.

- To comply with IEC 62109-5.3.3 safety requirements and avoid injury or material damage, the inverter must be installed and operated in accordance with the safety and operating instructions set out in this manual. Delta Electronics is not responsible for damage resulting from failure to follow the safety and operating instructions set out in this manual.
- The inverter may only be installed and commissioned by installers who have been trained and approved for the installation and operation of grid-connected solar inverters.
- All repair work on the inverter must be carried out by Delta Electronics. Otherwise the warranty will be void.
- Warning notices, warning symbols and other markings attached to the inverter by Delta Electronics must not be removed.
- To avoid the risk of arcing, do not disconnect cables when the inverter is under load.
- To prevent damage due to lightning strikes, follow the applicable regulations in your country.
- The surface of the inverter can get very hot during operation. Always wear safety gloves when touching the inverter (except for the display).
- All connections must be sufficiently sealed in order to ensure the IP65 rating. Seal any connections that will not be used with the covering caps provided.
- Only equipment in accordance with SELV (EN 60950) may be connected to the RS485 interfaces.

# 3. Intended purpose

The inverter may be used only for the specified intended purpose.

The intended purpose of the inverter is defined as follows:

- Use in stationary solar systems connected to the public grid, for converting DC voltage generated by the solar modules in the solar system into AC voltage that is fed into the public grid.
- Use in conformance with the power specifications and environmental conditions specified by the manufacturer.

The following uses are regarded as **not for the intended purposes**:

- Use in stand-alone mode, i.e. without a connection to the public grid. The inverter has functions that prevent isolated operation.
- Use in mobile solar systems

## 4. Product overview

### 4.1 Scope of delivery

| Part | Quan-tity‹ | Figure / Description | Part | Qty | Figure / Description |
|---|---|---|---|---|---|
| Inverter | 1 |  | AC plug | 1 | Amphenol C16-3<br>  |
| Mounting plate | 1 |  | M4 mounting screws | 2 | For fastening the inverter to the mounting plate and for grounding the inverter housing. With washer, spring washer and toothed lock washer .<br>  |
| DC plug | M6A: 2<br>M8A: 2<br>M10A: 3 | Multi-contact MC4 for DC+ for 4/6 mm² (32.0017P0001-UR)<br>  | Quick Installation Guide | 1 |  |
| | M6A: 2<br>M8A: 2<br>M10A: 3 | Multi-contact MC4 for DC– for 4/6 mm² (32.0016P0001-UR)<br>  | | | |

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

Do not use any damaged components.

Keep the packaging.

## 4.2 Components and connectors

### 4.2.1 Overview of components and connections

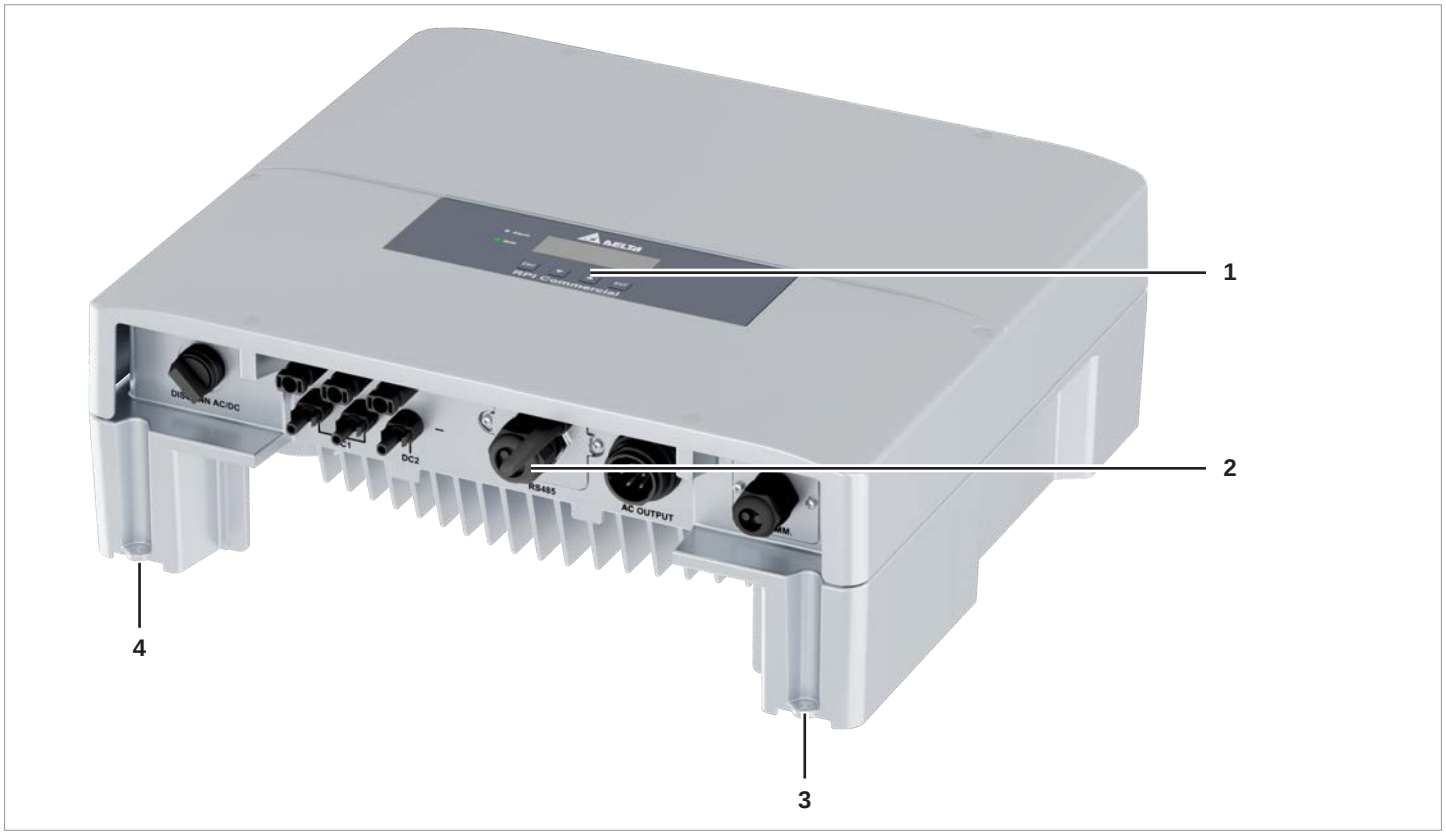



*Fig. 4.1: Overview of components and connections*

| | Component | Description in chapter |
|---|---|---|
| **1** | Display, operating keys, LED | See “4.3 Display, buttons, status LEDs”, Page 12 |
| **2** | Electrical connections | See “4.4 Electrical connections”, Page 13 |
| **3** | Mounting hole and housing ground | See “4.5 Mounting holes and grounding connection”, Page 18 |
| **4** | Mounting hole | |

## 4.3 Display, buttons, status LEDs


| Label | Naming | Use |
|---|---|---|
| **LEDs** | | |
| ***GRID*** | Grid | Green LED; lights up when the inverter is supplying power to the grid. |
| ***ALARM*** | Alarm | Red LED; displays a warning, an error or a fault. |
| | | |
| **Buttons** | | |
| ESC | Escape | Exit the current menu.<br>Cancel the setting for a parameter. Changes will not be applied. |
| ▼ | Down | Move downward in the menu.<br>Reduce the value of a configurable parameter. |
| ▲ | Up | Move upward in the menu.<br>Increase the value of a configurable parameter. |
| ENT | Enter | Select menu item.<br>Open a configurable parameter for editing.<br>Cancel the setting for a parameter. Changes will be applied. |

## 4.4 Electrical connections

### 4.4.1 Overview of electrical connections M6A, M8A

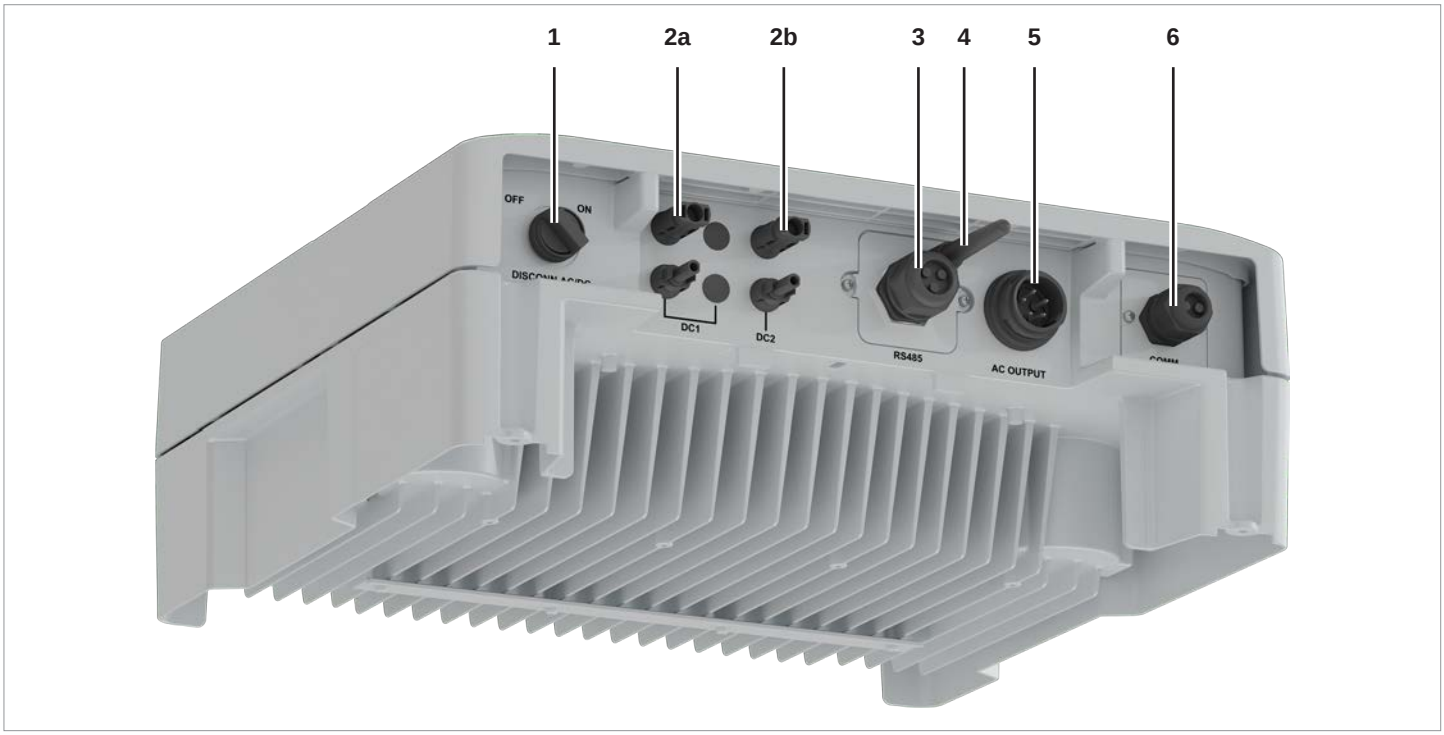



*Fig. 4.1: Overview of electrical connections M6A, M8A*

| | Component | Label on the inverter | Description in chapter |
|---|---|---|---|
| **1** | AC/DC disconnector | ***DISCONN. AC/DC*** | See “4.4.3 AC/DC disconnection switch”, Page 15 |
| **2a** | DC input DC1 (1x) | ***DC1*** | See “4.4.5 DC connection panel for solar modules”, Page 16 |
| **2b** | DC input DC2 (1x) | ***DC2*** | |
| **3** | RS485, 12 VDC supply voltage | ***RS485*** | See “4.4.6 RS485, 12-VDC connection, Wi-Fi”, Page 16 |
| **4** | Wi-Fi antenna | **-** | |
| **5** | AC output | ***AC OUTPUT*** | See “4.4.4 Power socket (AC)”, Page 15 |
| **6** | Digital inputs, external power-off (EPO), dry contacts | ***COMM.*** | See “4.4.7 Digital inputs, dry contacts, external power-off (EPO)”, Page 17 |

## 4.4.2 Overview of electrical connections M10A

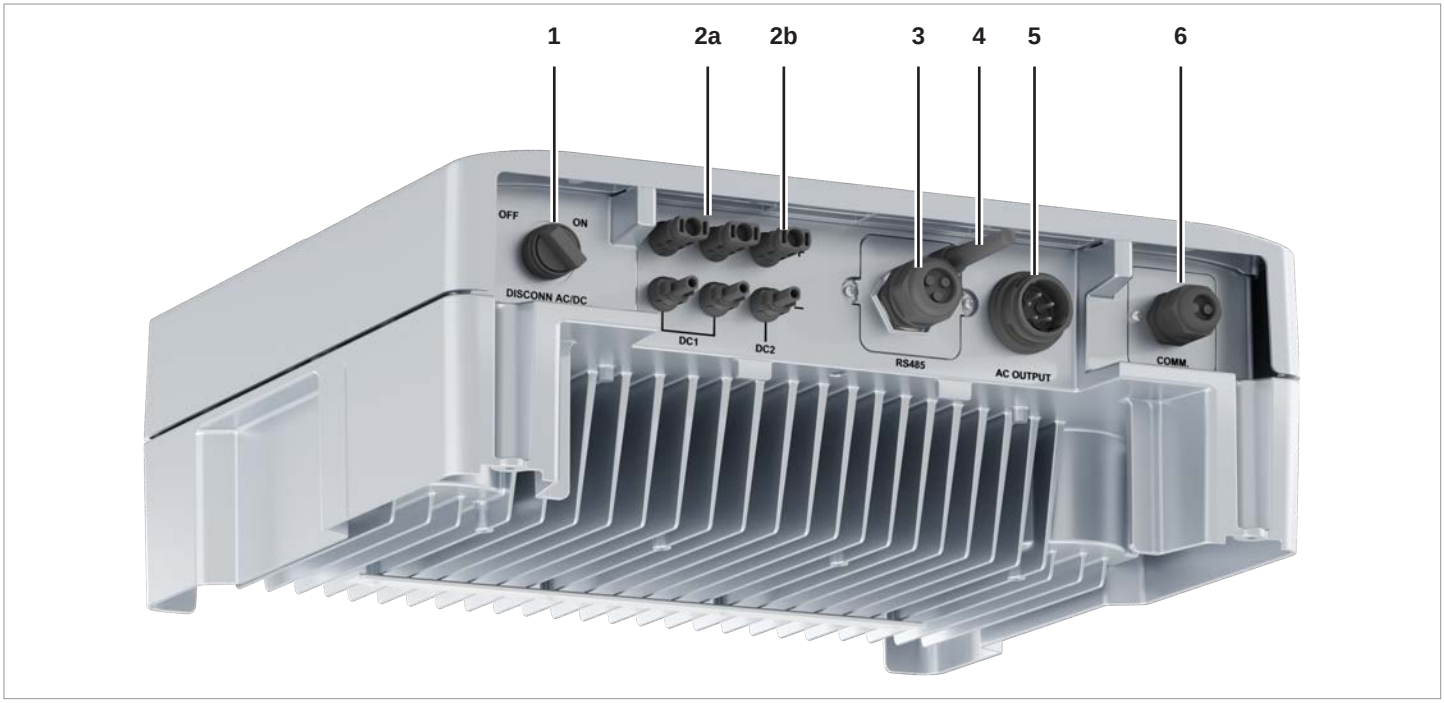



*Fig. 4.1: Overview of electrical connections M10A*

| | Component | Label on the inverter | Description in chapter |
|---|---|---|---|
| **1** | AC/DC disconnector | ***DISCONN. AC/DC*** | See “4.4.3 AC/DC disconnection switch”, Page 15 |
| **2a** | DC input DC1 (2x) | ***DC1*** | See “4.4.5 DC connection panel for solar modules”, Page 16 |
| **2b** | DC input DC2 (1x) | ***DC2*** | |
| **3** | RS485, 12 VDC supply voltage | ***RS485*** | See “4.4.6 RS485, 12-VDC connection, Wi-Fi”, Page 16 |
| **4** | Wi-Fi Antenna | **-** | |
| **5** | AC output | ***AC OUTPUT*** | See “4.4.4 Power socket (AC)”, Page 15 |
| **6** | Digital inputs, external power-off (EPO), dry contacts | ***COMM.*** | See “4.4.7 Digital inputs, dry contacts, external power-off (EPO)”, Page 17 |

### 4.4.3 AC/DC disconnection switch


*Fig. 4.2: AC/DC disconnector*

**Intended purpose**

By turning the AC/DC circuit breaker, the connections from the inverter to the grid and the solar modules are disconnected or closed. The disconnection of the connections is a basic prerequisite for safe working on the inverter.

**Technical design**

Rotary switch with two positions: ***OFF***and ***ON***

**How does it work?**

The inverter is **disconnected** from the grid (AC) and the solar modules (DC) when the AC/DC disconnection switch is in position ***OFF***.


*Fig. 4.3: AC/DC isolating switches in the **ON** position*

The inverter is **connected** to the grid (AC) and the solar modules (DC) when the AC/DC disconnection switch is in position ***ON***.

### 4.4.4 Power socket (AC)


*Fig. 4.4: AC socket*

**Intended purpose**

The power supply socket is used to connect the inverter to the grid to supply AC power to the grid

- Feeding AC power into the public grid.
- Providing power for the display from the grid when power is not available from the solar modules.

**Grid types that can be used**

- 3-phase networks with neutral conductor: 3P4W (L1, L2, L3, N, PE)
- 3-phase networks without neutral conductor: 3P3W (L1, L2, L3, PE).

**AC plug**

| Inverter | Type of AC plug |
|---|---|
| M6A, M8A, M10A | China Aviation Optical-Electrical Technology Co. PVE5T50KP73 |

*Table 4.1.:AC plug used*

The AC plug is included in the scope of delivery.

## 4.4.5 DC connection panel for solar modules

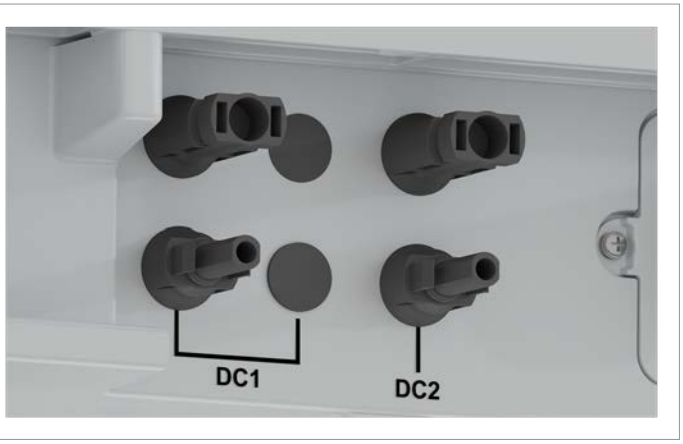



*Fig. 4.5: DC connection panel for solar modules, M6A and M8A*

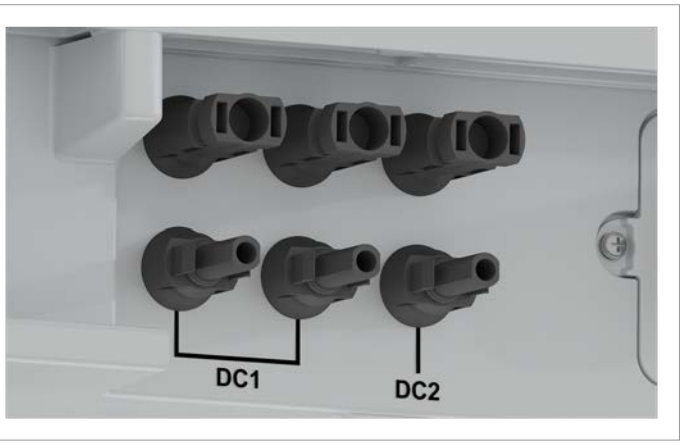



*Fig. 4.6: DC connection panel for solar modules, M10A*

**Intended purpose**

The DC connection panel for the solar modules has 2 DC inputs, marked on the inverter with DC1 and DC2. On the M6A and M8A, a DC socket pair is available at each DC input for connecting a module string. On the M10A, DC1 has 2 pairs of DC sockets, DC2 1 pair of DC sockets.

| Inverter | Type of DC plug |
|---|---|
| M6A, M8A | Negative socket:<br>Stäubli MC4 32.0010P0001-UR |
| | Positive socket:<br>Stäubli MC4 32.0011P0001-UR |
| M10A | Negative socket:<br>Stäubli MC4 32.0016P0001-UR |
| | Positive socket:<br>Stäubli MC4 32.0017P0001-UR |

*Table 4.2.: DC connectors used*

M6A, M8A: 2 pairs of DC plugs are supplied in the scope of delivery.

M10A: 3 pairs of DC plugs are supplied in the scope of delivery.

## 4.4.6 RS485, 12-VDC connection, Wi-Fi


*Fig. 4.7: RS485 connection + Wi-Fi antenna*

Available connections:

| Connection | Connection type |
|---|---|
| 2x RS485 (DATA+ and DATA–) | Terminal block |
| 1x VCC (12 V, 0.5 A) | Terminal block |
| Wi-Fi | Antenna |

### 4.4.7 Digital inputs, dry contacts, external power-off (EPO)


*Fig. 4.8: Cable gland for digital inputs, dry contacts, external power-off*

Available connections:

| Connection | Connection type |
|---|---|
| 6x digital inputs | RJ45 |
| 1x dry contacts | Terminal block |
| 1x external power-off (EPO) | RJ45 |

## 4.5 Mounting holes and grounding connection

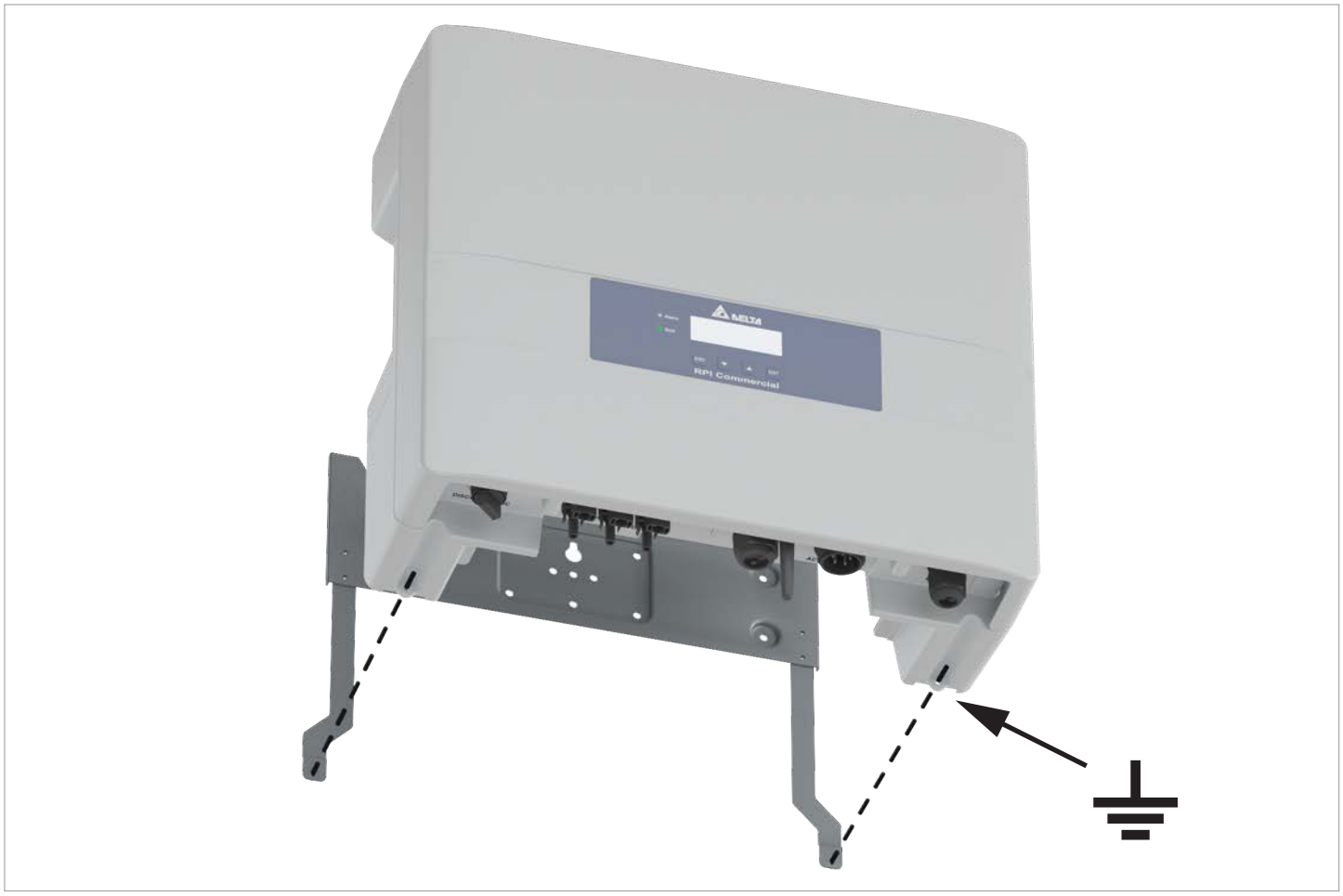



*Fig. 4.9: Location of the mounting holes and the grounding connection on the inverter*

The inverter is screwed to the mounting plate by the mounting holes.

The right mounting hole is also used as a ground connection for grounding the inverter housing.

The mounting material (M4 screw, spring washer, washer and toothed washer) is included.

## 4.6 Information on the type plate

**Symbols on the type label**

| Symbol | Description |
|---|---|
|  <br>60 seconds | **Risk of death due to electric shock**<br>Potentially fatal voltage is present inside the inverter during operation and this voltage regrid for 60 seconds after the power supply is disconnected.<br>Never open the inverter housing. The inverter does not contain any components that need to be maintained or repaired by the operator or installer. Opening the inverter housing will void the warranty. |
|  | Before working on the inverter, read the supplied manual and follow the instructions provided. |
|  | Hot surfaces.<br>The inverter housing can get very hot during operation. |
|  | The inverter housing must be grounded if this is required by local regulations. |
|  | The inverter meets the Australian Electrical Standards and the EMC standard. This applies only to Australia and New Zealand. |
|  | WEEE<br>The inverter may not be disposed of alongside normal household waste. Always follow the waste disposal regulations for electrical appliances in your country or region. |

# 4 Product overview

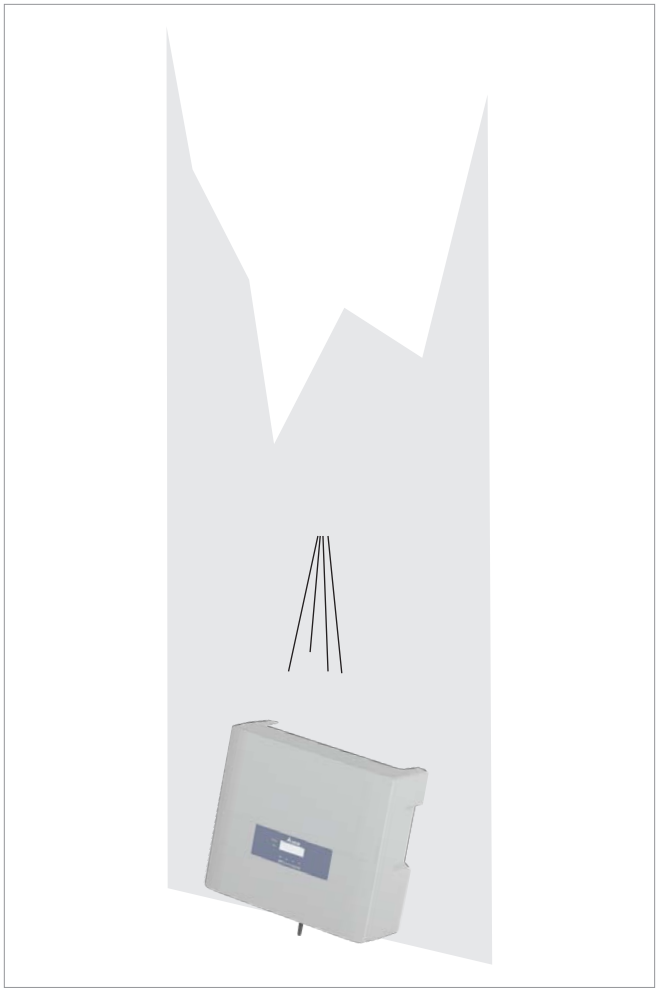
**Technical data and other information on the type label**

| M6A | M8A | M10A | |
|---|---|---|---|
| Model: RPI M6A | Model: RPI M8A | Model: RPI M10A | Delta model name |
| P/N: RPI602FA0E1000 | P/N: RPI802FA0E1000 | P/N: RPI103FA0E1000 | Delta part number |
| DC INPUT | | | DC input |
| 200–1000 Vdc | 200–1000 Vdc | 200–1000 Vdc | DC input voltage range |
| MPPT 315-800 V DC | MPPT 415-800 V DC | MPPT 415-800 V DC | MPP input voltage range with full power (with symmetrical load) |
| 1000Vdc | 1000Vdc | 1000Vdc | Maximum DC input voltage |
| 10A/10A max | 10A/10A max | 15A/10A max | Maximum DC input current for DC input DC1/DC2 |
| Total 20A max. | Total 20A max. | Total 25A max. | Maximum DC total current |
| Voc: 1000 VDC max | Voc: 1000 VDC max | Voc: 1000 VDC max | Maximum DC open circuit voltage |
| Isc: 13A/13A max | Isc: 13A/13A max | Isc: 19.5A/13A max | Maximum DC short-circuit current per DC input |
| **AC OUTPUT** | | | AC output |
| 220/380, 230/400 Vac | 220/380, 230/400 Vac | 220/380, 230/400 Vac | AC nominal voltage |
| 50/60 Hz | 50/60 Hz | 50/60 Hz | AC nominal frequency |
| 6 kVA nom | 8 kVA nom | 10 kVA nom | Nominal reactive power |
| 6.3kVA max.<br>(1) 4.99 kW max. for AU/NZ PL 4.99k | 8.4kVA max. | 10.5kVA max. | Maximum reactive power;<br>The RPI M6A will be limited to 4.99 kW if grid type **AU/NZ PL 4.99k** is selected (applies to Australia and New Zealand only) |
| 9.7A max | 13A max | 16A max | Maximum AC current |
| 3P3W or 3P4W | 3P3W or 3P4W | 3P3W or 3P4W | The inverter can be connected to 3-phase grids without neutral conductors (3P3W, 3 phases + PE) and 3-phase grids with neutral conductors (3P4W, 3 phases + N + PE). |
| cosφ 0.8ind~0.8cap | cosφ 0.8ind~0.8cap | cosφ 0.8ind~0.8cap | Setting range of the displacement factor cos φ |
| | | | |
| VDE 0126-1-1/A1 | VDE 0126-1-1/A1 | VDE 0126-1-1/A1 | The inverter fulfills the requirements of VDE 0126-1-1/A1. |
| VDE-AR-N 4105 | VDE-AR-N 4105 | VDE-AR-N 4105 | The inverter fulfills the requirements of VDE-AR-N 4105. |
| CE | CE | CE | CE mark. By applying this mark, Delta declares that the inverter satisfies the provisions of the applicable EU directives. |
| | | | |
| Safety Class: 1 | Safety Class: 1 | Safety Class: 1 | Safety class as per EN 61140 |
| OVC: III | OVC: III | OVC: III | Overvoltage category according to IEC 62109-1 |
| Ambient temp:<br>-25°C...+60°C. | Ambient temp:<br>-25°C...+60°C. | Ambient temp:<br>-25°C...+60°C. | Operating temperature range |
| IP65 | IP65 | IP65 | Protection degree according to EN 60529 |

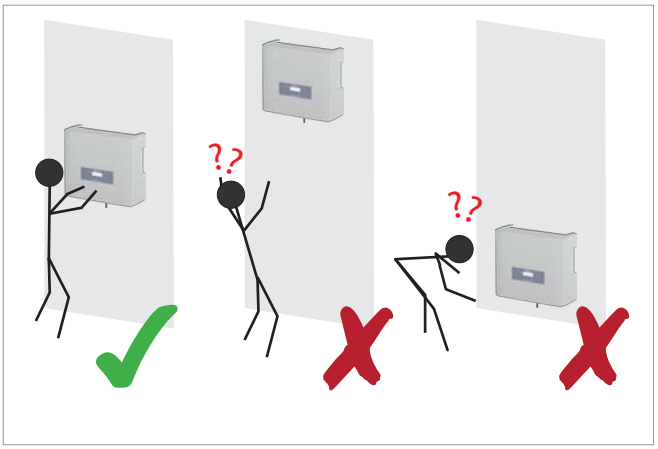
# 5. Planning the installation

This chapter describes only the **planning** of the installation work. The **execution**of the installation work and the associated dangers are described in chapter “6. Installation”, Page 44.

## 5.1 Mounting location



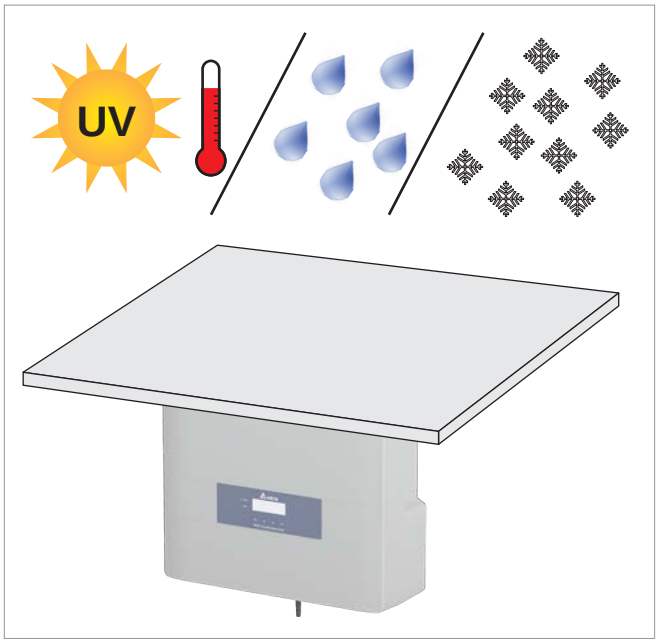
- ► The inverter is heavy. The wall or mounting system must be able to bear the heavy weight of the inverter.
- ► Always use the mounting plate supplied with the inverter.
- ► Use mounting materials (dowels, screws etc.) that are suitable for the wall or the mounting system as well as the heavy weight 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, choose the place of installation carefully.
- ► Mount the inverter on a fireproof wall.



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

- ► Mount the inverter vertically.

## 5.2 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.

## 5.3 Mounting clearances and air circulation

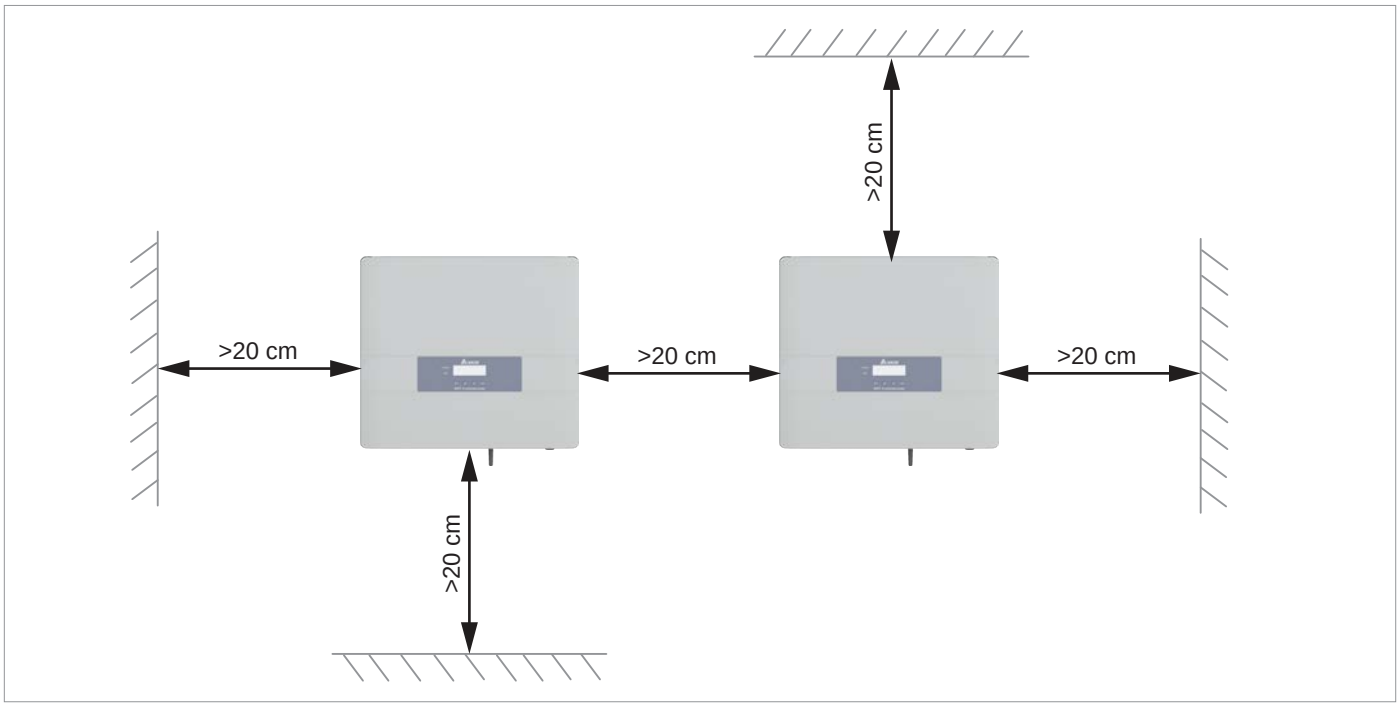



*Fig. 5.1.: Mounting clearances*

- ► 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 grid.

  When the *Operating temperature range* is exceeded, the inverter stops feeding AC power into the grid.

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

## 5.4 Characteristic curves

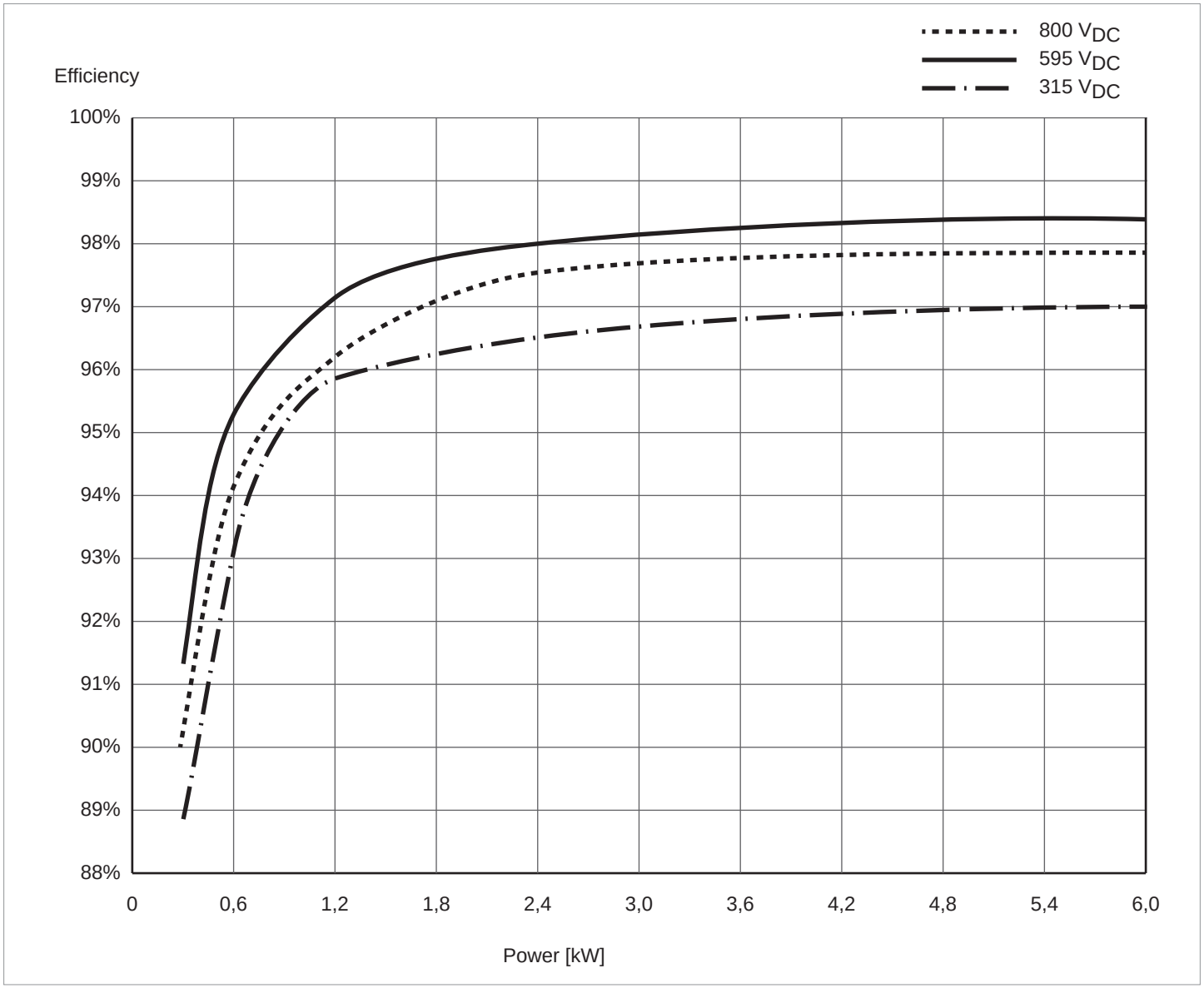



*Fig. 5.2: M6A: Efficiency characteristic*

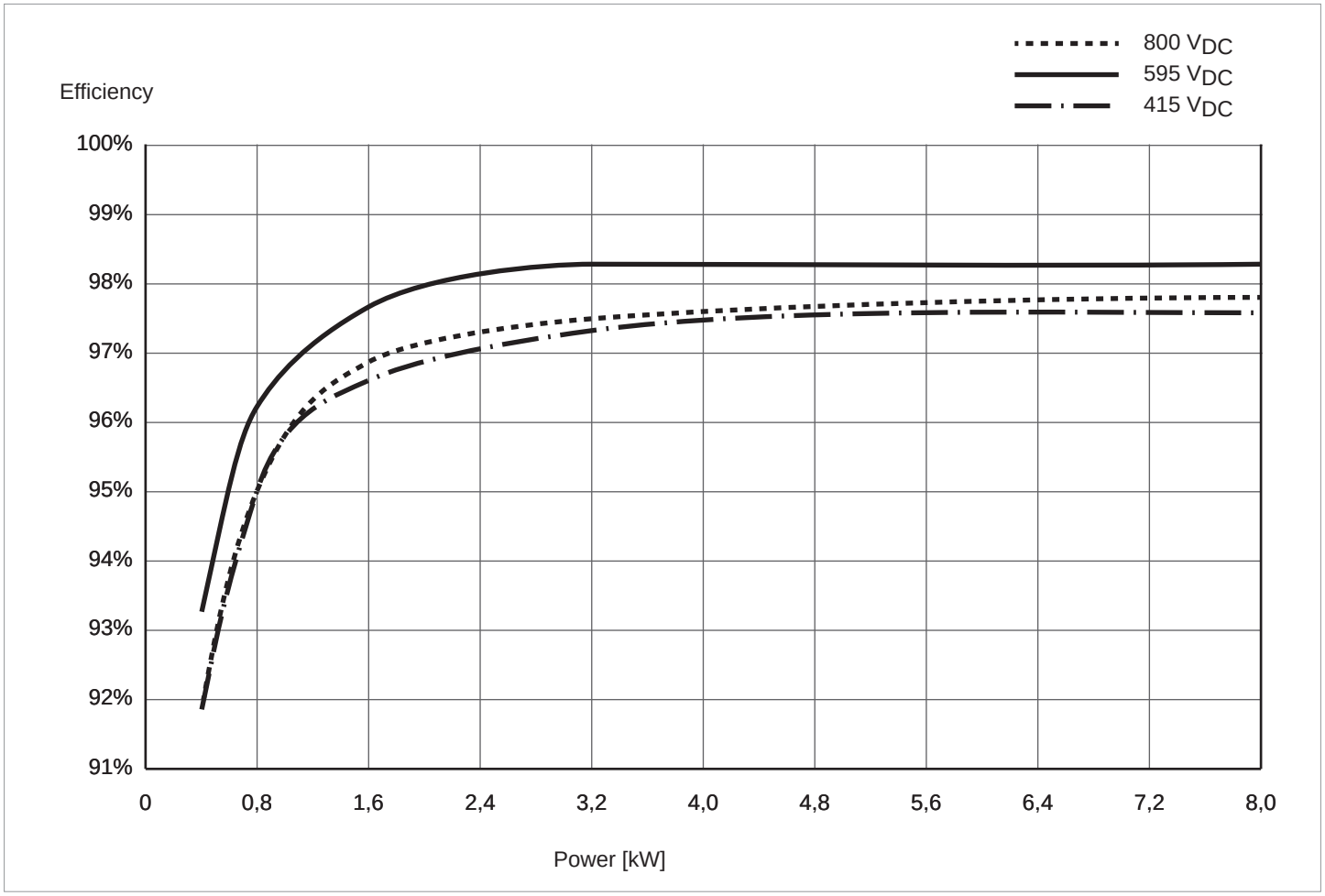



*Fig. 5.3: M8A: Efficiency characteristic*

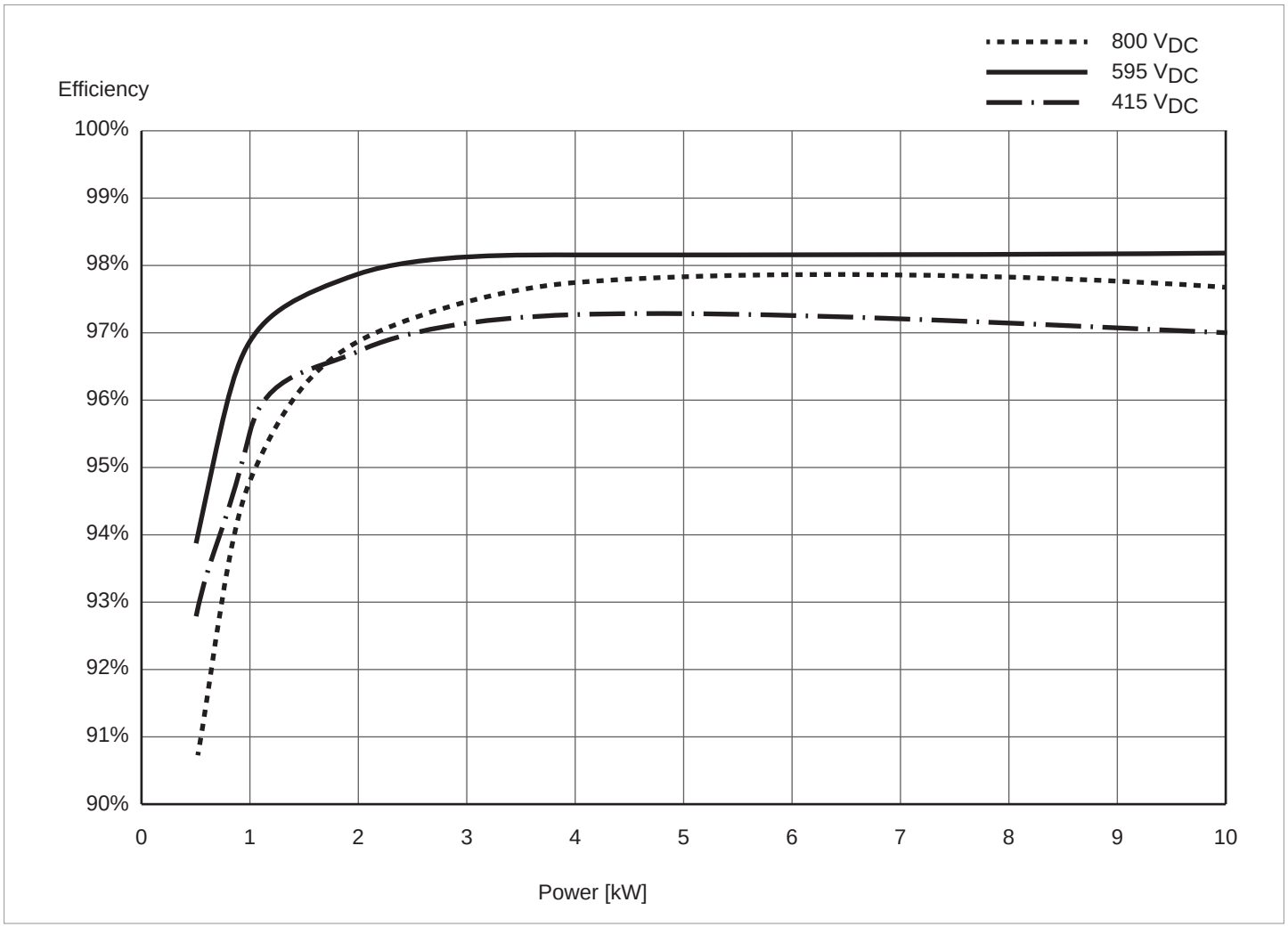



*Fig. 5.4: M10A: Efficiency characteristic*

## 5.5 Dimensions

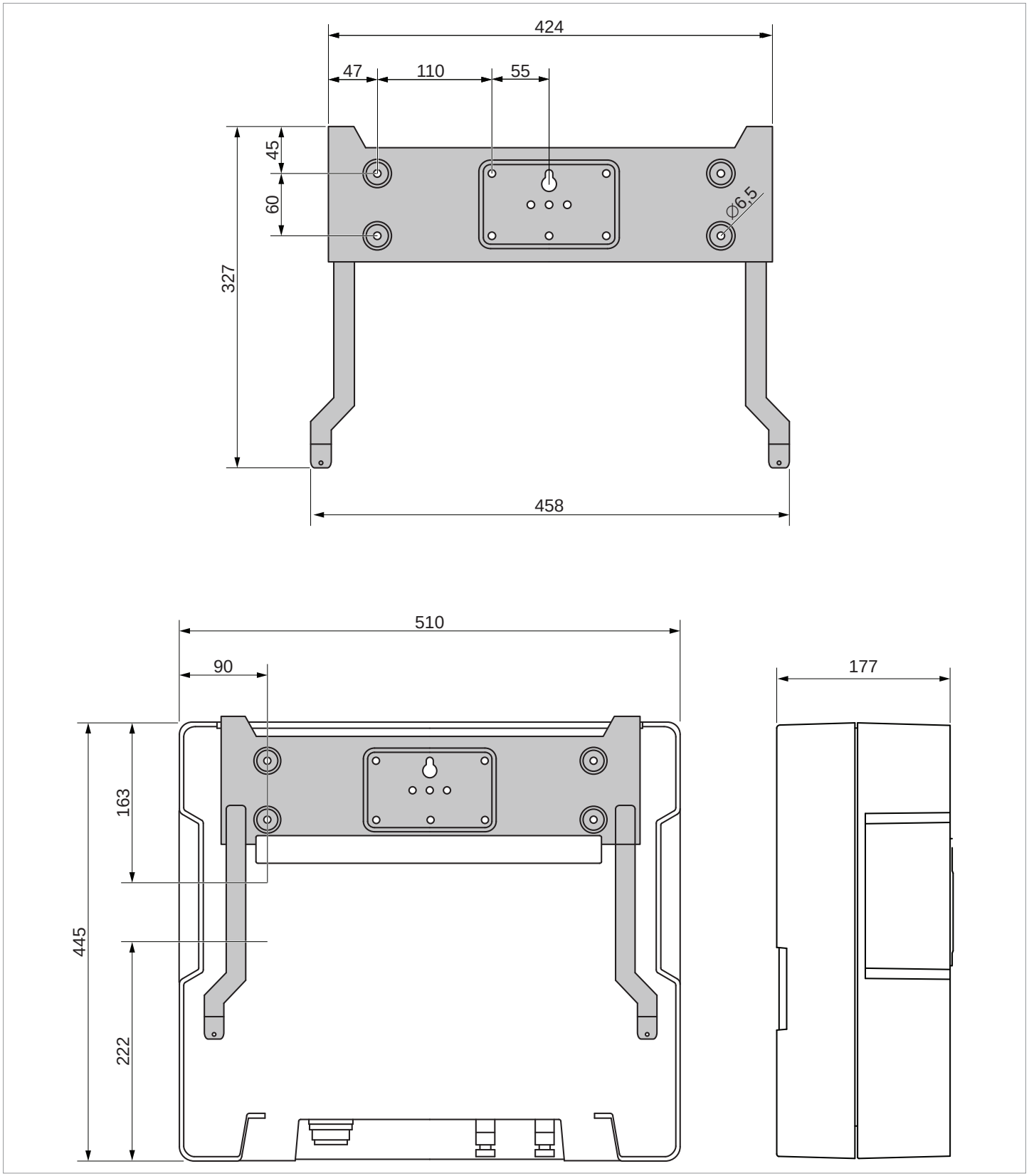



*Fig. 5.5: Dimensions (in mm)*

## 5.6 Grid connection (AC)

### 5.6.1 Important safety instructions

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

| Model | Upstream circuit breaker |
|---|---|
| RPI M6A | 16 A |
| RPI M8A | 16 A |
| RPI M10A | 20 A |

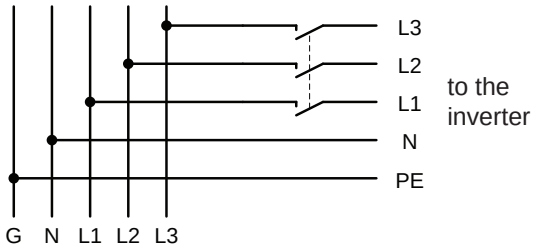



*Fig. 5.6.: Position of the upstream circuit breaker*

### 5.6.2 Residual current circuit breaker

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

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

| | |
|---|---|
| Minimum tripping current of the type A residual current circuit breaker | ≥ 100 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.

### 5.6.3 Integrated residual current monitoring unit

The integrated, universal current-sensitive residual current monitoring unit (RCMU) is certified in accordance with VDE 0126 1-1/ A1:2012-02 §6.6.2.

### 5.6.4 Cable requirements

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

| | |
|---|---|
| Plug type | Amphenol C16-3 |
| Nominal current | ≤ 25 A |
| Min./max. Cable diameter | 11 / 20 mm |
| Min./max. Wire cross-section | 5/8 mm² |
| Recommended torque for terminal screws | ≥ 0.7 Nm |

The AC plug can only be used with a flexible copper cable.

Consider the following factors when calculating the cable cross-section:

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

- ► Always follow the 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 VDE 0100-712. This standard contains the requirements for minimum cable diameters and for avoiding overheating due to high currents.
- ► Australia/New Zealand: Follow the installation regulations of AS/NZS 5033:2005. This standard contains the requirements for minimum cable diameters and for avoiding overheating due to high currents.

### 5.6.5 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 the purpose.

### 5.6.6 Permissible grounding systems

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

### 5.6.7 Requirements for the grid voltage

| 3P3W | Voltage Range | 3P4W | Voltage Range |
|---|---|---|---|
| L1-L2 | 400 $V_{AC}$ ± 20% | L1-N | 230 $V_{AC}$ ± 20% |
| L1-L3 | 400 $V_{AC}$ ± 20% | L2-N | 230 $V_{AC}$ ± 20% |
| L2-L3 | 400 $V_{AC}$ ± 20% | L3-N | 230 $V_{AC}$ ± 20% |

## 5.7 Connecting the solar modules (DC)

**NOTICE**

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

► Always take the technical specifications of the inverter (input voltage range, maximum current and maximum input power) into account when calculating the number of solar modules.

**NOTICE**

**Overheating of the DC connections.**
Exceeding the maximum current can cause the DC connections to overheat and catch fire.

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

## 5.7.1 Symmetrical and asymmetrical configuration of the DC inputs

The inverter has a separate MPP tracker for each DC input (DC1 and DC2).

The two MPP trackers work independently, i.e. the optimum working point is set separately for DC1 and DC2. This allows the module strings connected to DC1 and DC2 to be differently aligned and differently dimensioned. A typical application example is a building with a gable roof where the roof halves are oriented to the east and west.

**Variant 1: Symmetrical configuration of the DC inputs**

The total input power is evenly divided (50%/50%) between DC1 and DC2.

**Variant 2: Asymmetrical configuration of the DC inputs**

The maximum permissible total input power can be distributed between DC1 and DC2 in the range 67%/33% to 33%/67% (M10A: Only 60%/40%). A distribution of 55%/45% or 45%/55% is also possible, for example.

The percentages always relate to the instantaneous input power. In an east-west roof-mounted system, this allows installing 67% of the maximum input power on both roofs. This utilizes the effect that the solar modules on both roofs provide maximum power at different times of the day.

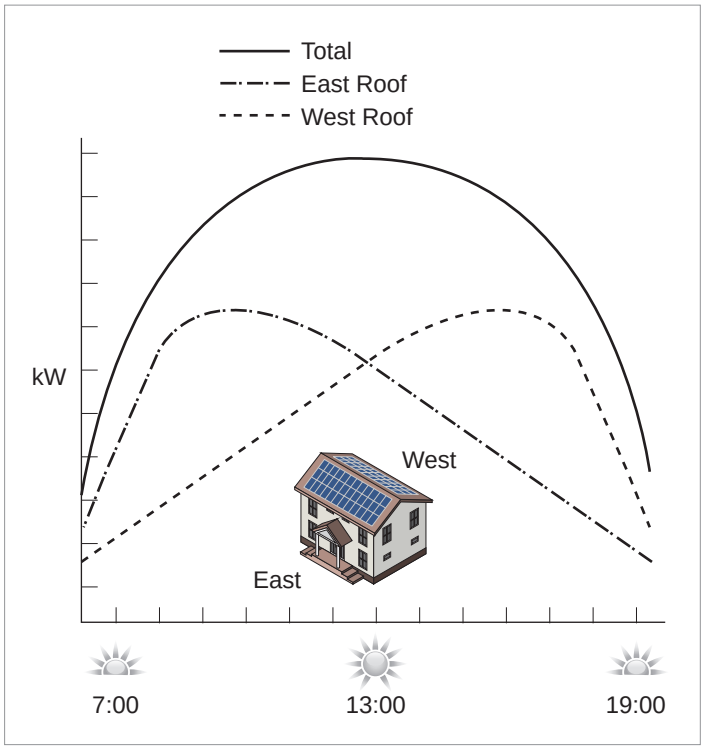
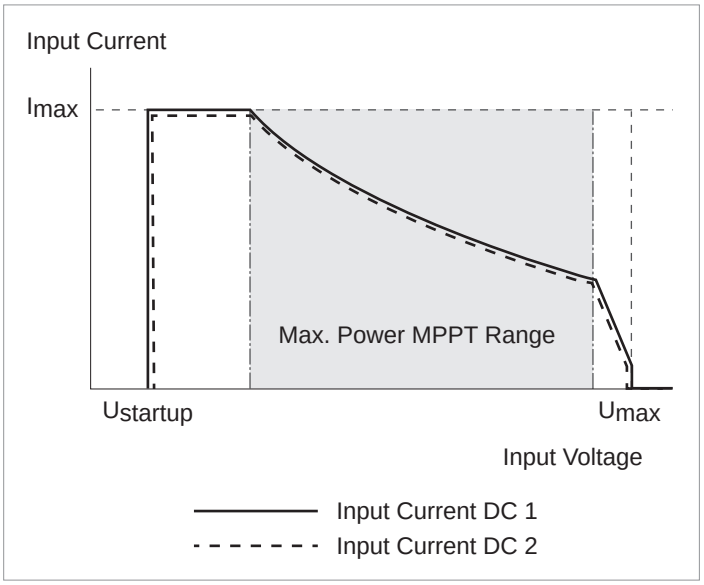



*Fig. 5.7: Concept for a system with 2 MPP trackers and asymmetric load distribution across the DC inputs*

**Symmetrical design**




**Asymmetrical design**

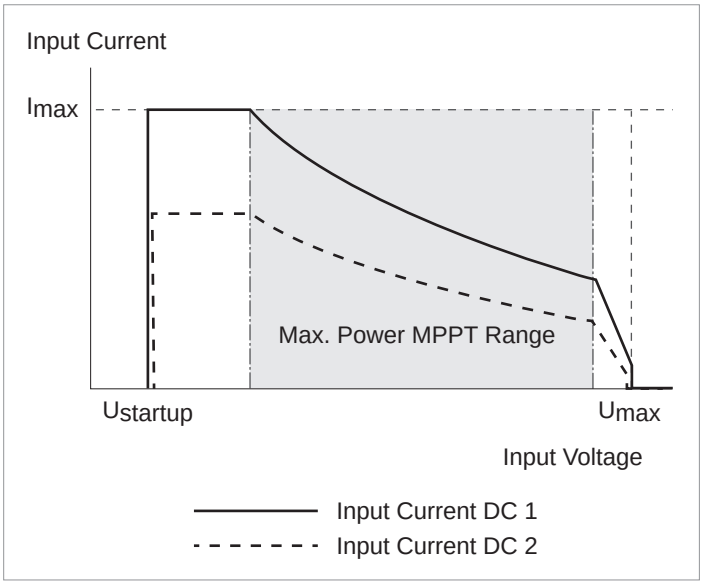



*Fig. 5.8: I-U characteristic curves for symmetric and asymmetric configuration of the DC inputs (illustration of principle)*


See “13. Technical Data”, Page 142 for currents and voltages.

### 5.7.2 Separately connected DC inputs

The module strings are connected directly to the DC inputs DC1 and DC2. MPP tracker 1 regulates the module strings at DC1, MPP tracker 2 regulates the module strings at DC2.

Both symmetrically and asymmetrically configured DC inputs can be implemented by connecting the DC inputs separately.

This DC cabling variant **must not** be used with grounded solar modules.

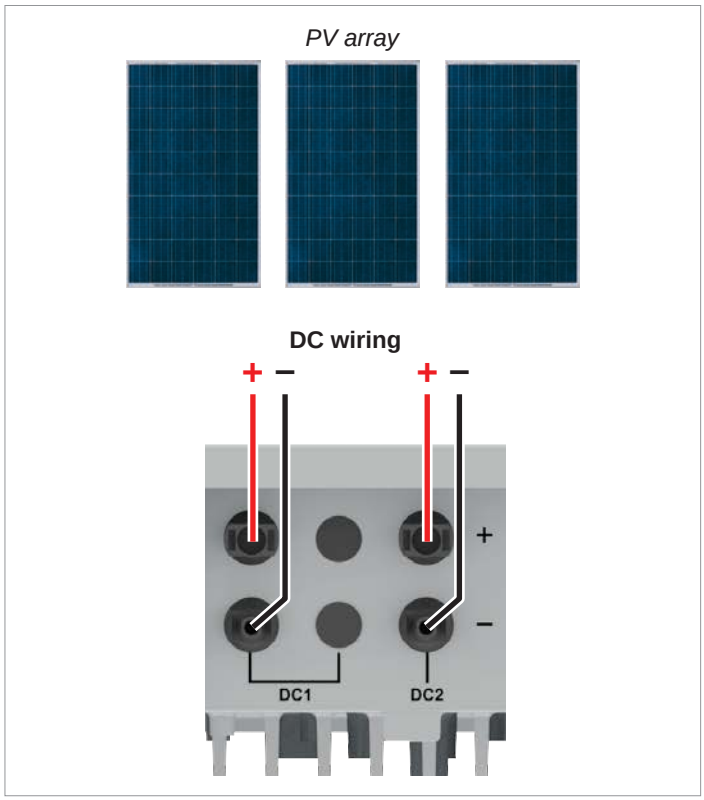



*Fig. 5.9: Separately connected DC inputs for M6A and M8A*

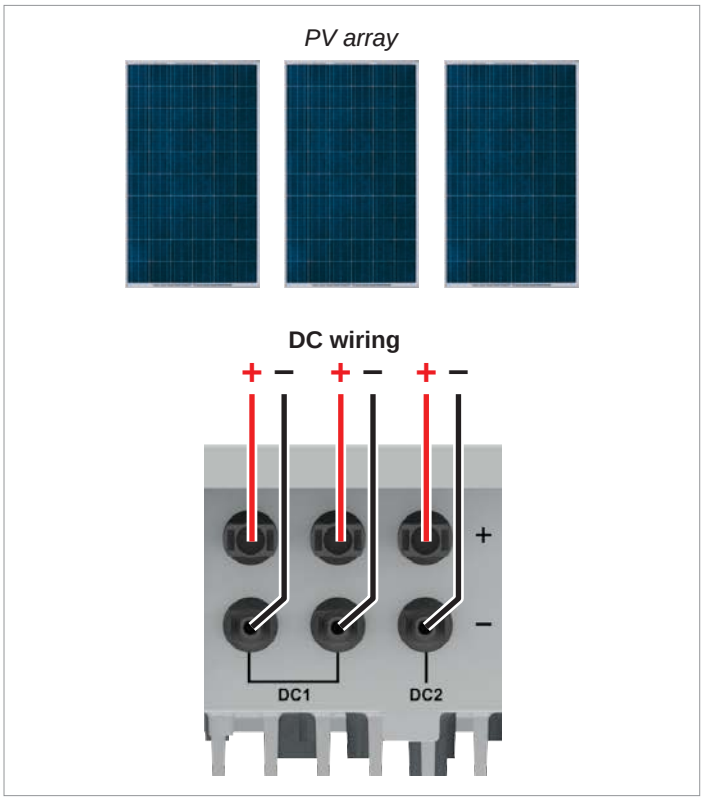



*Fig. 5.10: Separately connected DC inputs on the M10A*

## 5.7.3 Parallel-connected DC inputs

With DC inputs connected in parallel, a generator connection box (GAK) is connected between the solar modules and the inverter. The module strings are connected together in the GAK and then the DC cables are routed to the DC inputs DC1 and DC2 of the inverter.

In this situation, MPP tracker 1 regulates all module strings, MPP tracker 2 is not used.

This allows implementation of symmetric configurations only at the DC inputs.

This DC cabling variant **is mandatory by law** for use with grounded solar modules.

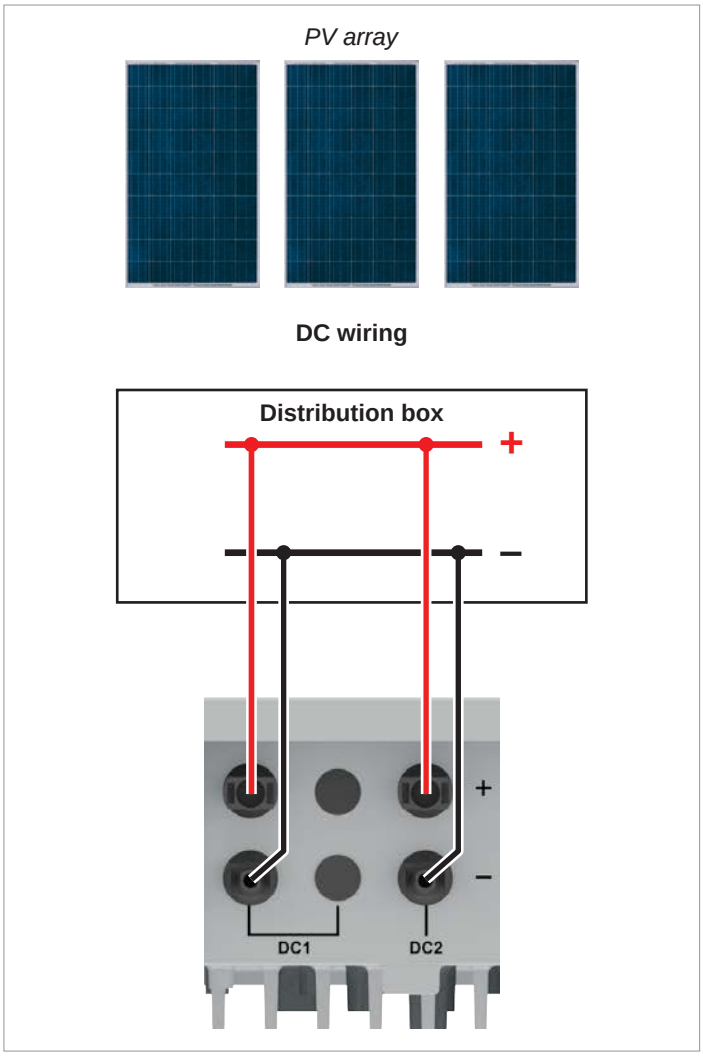



*Fig. 5.11: DC inputs connected in parallel for M6A and M8A*

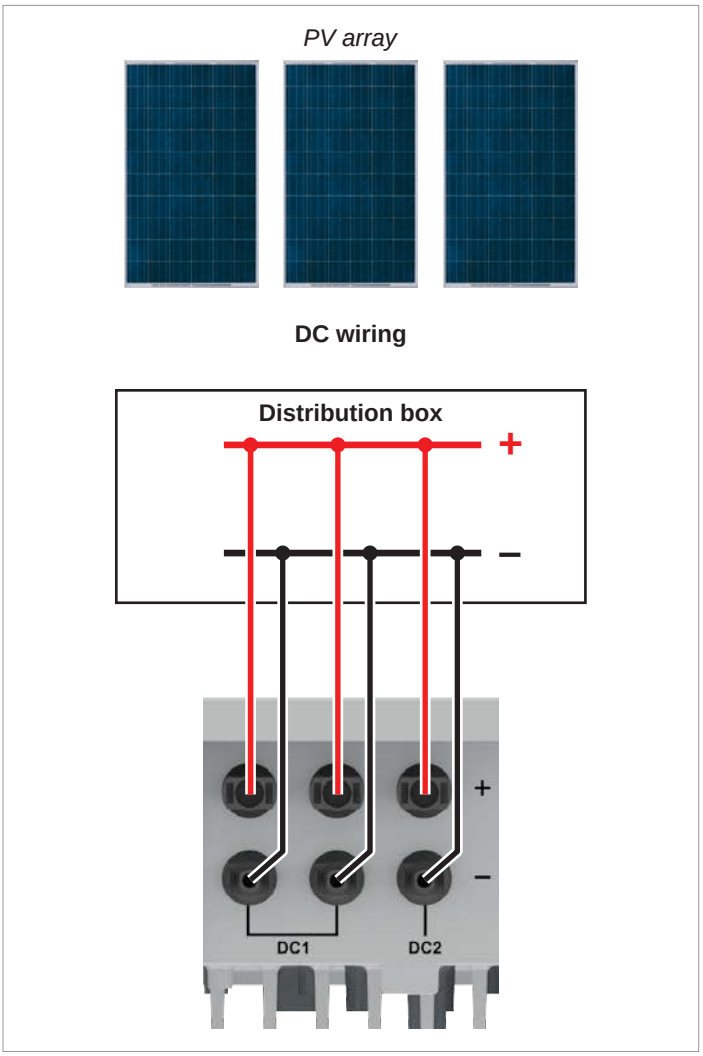



*Fig. 5.12: DC inputs connected in parallel on the M10A*

### 5.7.4 Connection of solar modules that are not grounded

The DC inputs can be connected to the DC inputs separately or in parallel when using non-grounded solar modules.

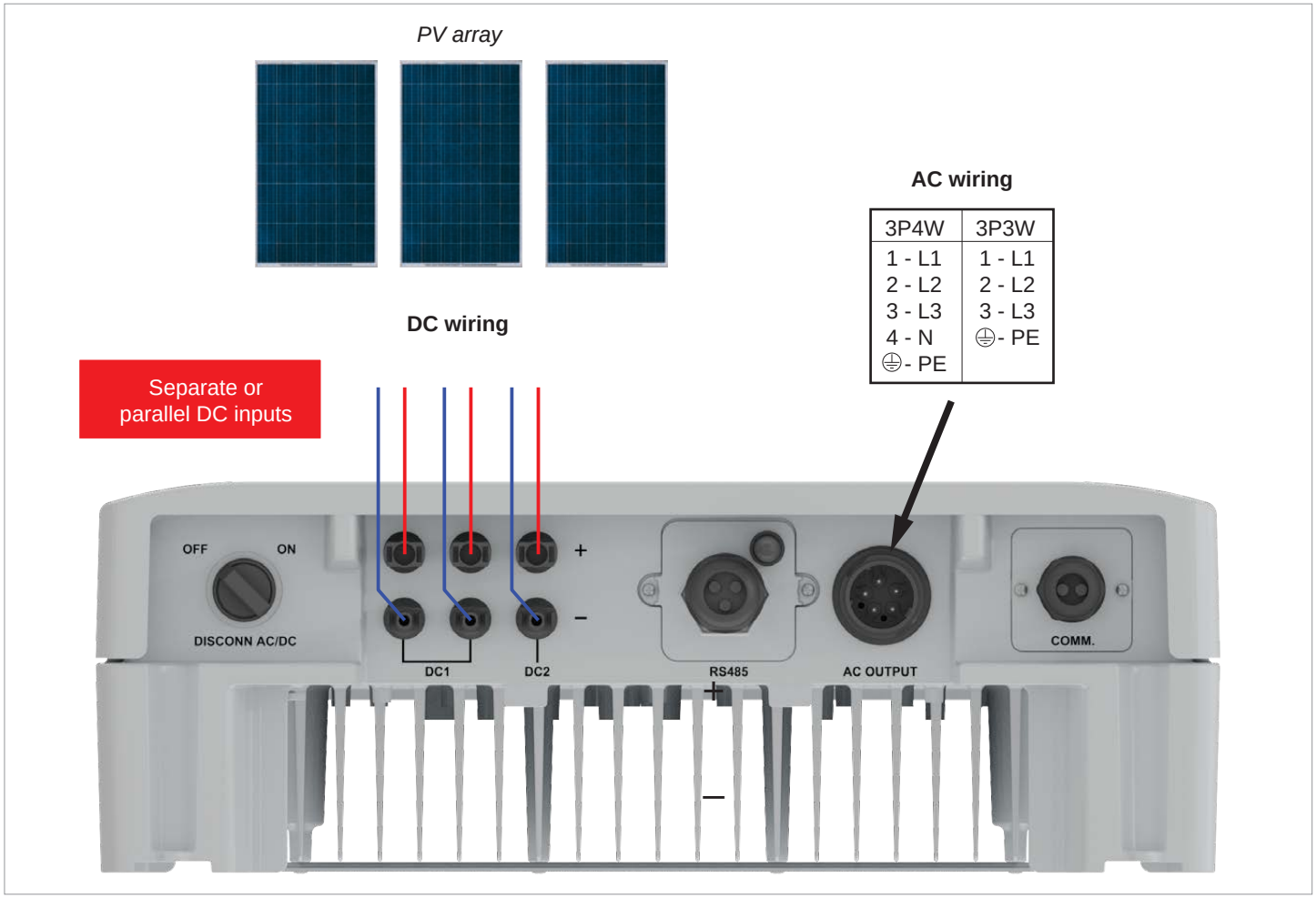



*Fig. 5.13: System design when connecting solar modules that are not grounded (example for M10A)*

## 5.7.5 Connecting grounded solar modules

The DC inputs must be connected in parallel when using grounded solar modules.

- ► An isolation transformer must be connected between the grid and the AC connection of the inverter.
- ► The insulation monitoring can be set on the inverter display after commissioning, see “8.4.2 Insulation”, Page 81.

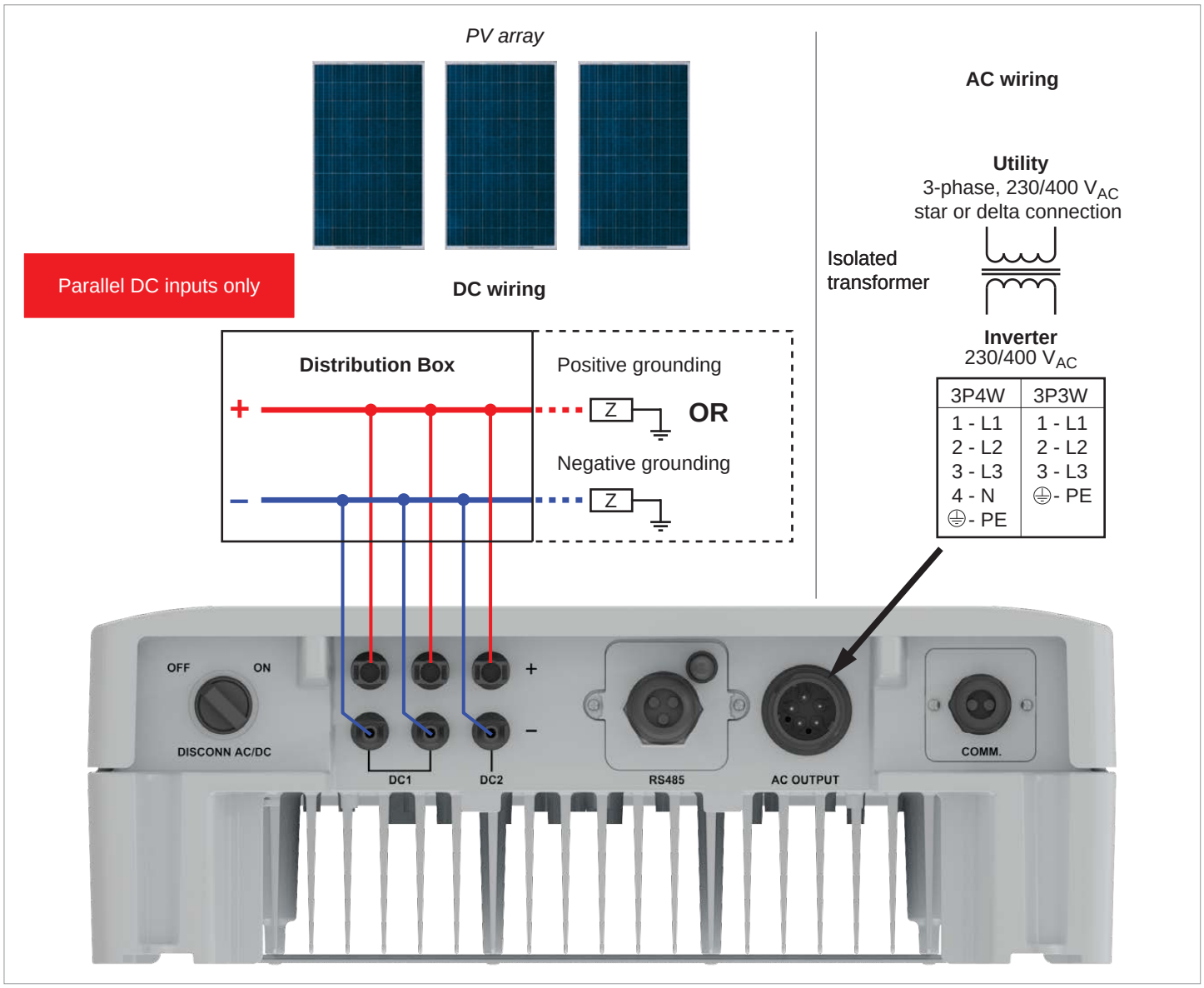



*Fig. 5.14: System design for connection of grounded solar modules (example for M10A)*

### 5.7.6 Connecting the module strings to the DC inputs

- ► Check the polarity of the DC voltage before connecting the module strings to the inverter.
- ► Connect the negative pole of the solar modules to DC–, connect the positive pole to DC+.

**Standard: Connect a module string to each DC socket pair**

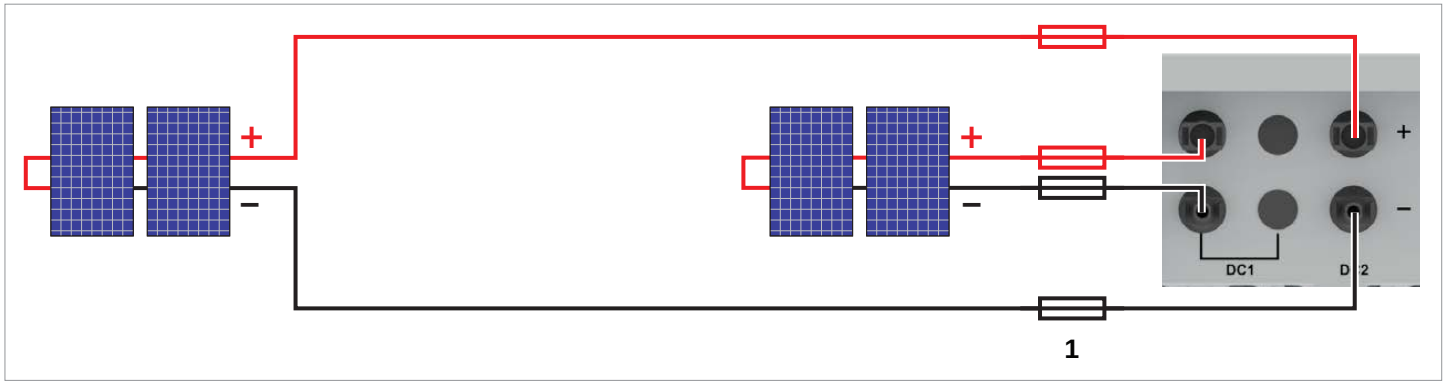



*Fig. 5.15: M6A, M8A: Connection of one module string per DC socket pair*

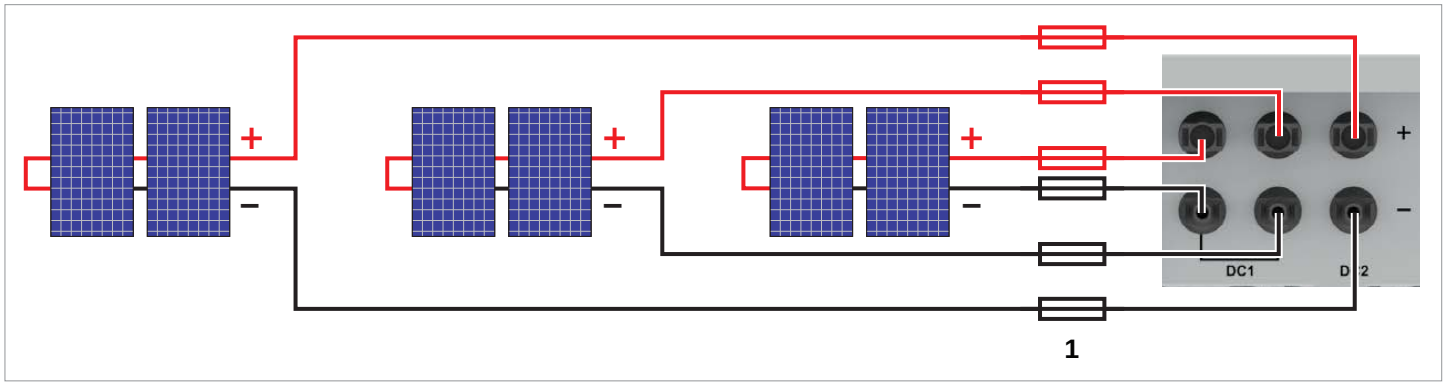



*Fig. 5.16: M10A: Connection of 3 module strings (1 module string per DC socket pair)*

| | |
|---|---|
| **1** | ► When selecting protective devices (such as fuses), always cater for the *maximum current rating* of the solar modules. |

### Special case: Connecting a single module string

The inverter only starts if voltage is present at both DC inputs. Therefore, the positive terminals of DC1 and DC2 must be bridged.

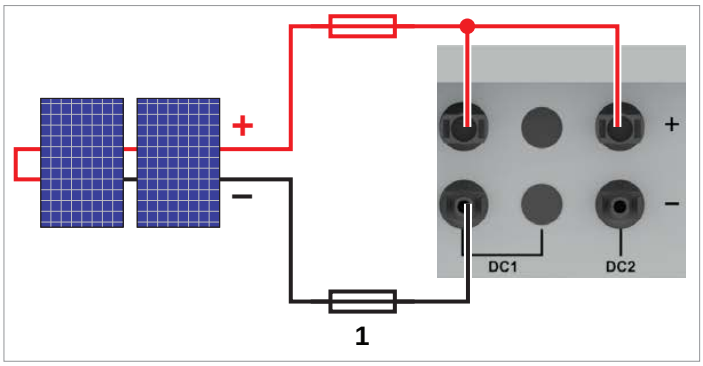



*Fig. 5.17: Connecting a single module string on M6A or M8A*

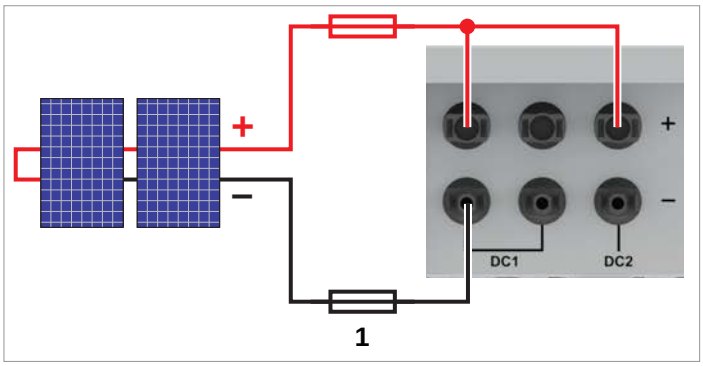



*Fig. 5.18: Connecting a single module string on M10A*

### Special case M10A: Connecting only two module strings

► Connect one module string to DC1. It does not matter which pair of sockets you use. Connect the second module string to DC2.

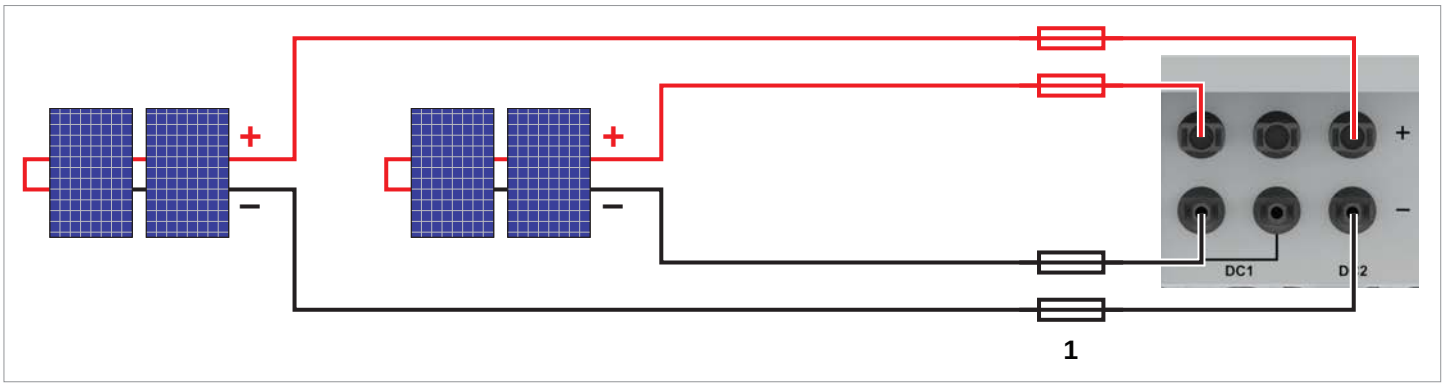


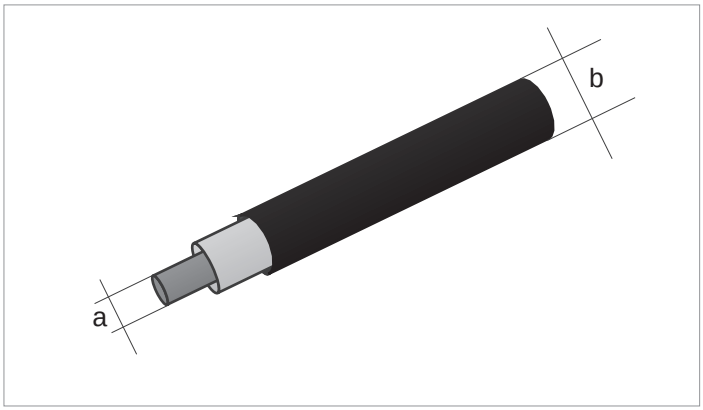

*Fig. 5.19: M10A: Connecting only 2 module strings*

| | |
|---|---|
| **1** | ► When selecting protective devices (such as fuses), always cater for the *maximum current rating* of the solar modules. |

### 5.7.7 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 | | | |
|---|---|---|---|---|---|
| | | | a | b | MultiContact |
| | | | mm² | mm | |
| DC– |  |  | 1,5 / 2,5 | 3-6- | 32.0010P0001-UR [1] |
| | | | | 5.5-9 | 32.0012P0001-UR |
| | | | 4/6 | 3-6 | 32.0014P0001-UR |
| | | | | 5.5-9 | 32.0016P0001-UR [2] |
| DC+ |  |  | 1,5 / 2,5 | 3-6 | 32.0011P0001-UR [1] |
| | | | | 5.5-9 | 32.0013P0001-UR |
| | | | 4/6 | 3-6 | 32.0015P0001-UR |
| | | | | 5.5-9 | 32.0017P0001-UR [2] |

1) Included in the scope of delivery of the M6A/M8A (2 pairs of plugs)
2) Included in the scope of delivery of the M10A (3 pairs of plugs)

## 5.8 Connecting a data logger

The inverter can be connected to a data logger via RS485, e.g. for monitoring the PV system or changing the inverter settings.

Multiple inverters can be connected in series to a data logger.

Note the following recommendations for ensuring a stable data connection.

### Connecting a single inverter to a data logger

► Switch on the RS485 termination resistor.

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

### Connecting multiple inverters to a data logger

► Switch on the RS485 termination resistor at the last inverter in the chain.

► If the data logger does not have an integrated RS485 termination resistor then also switch on the RS485 termination resistor at the first inverter in the chain.

► Switch off the RS485 termination resistor at all other inverters in the chain.

► A different inverter ID must be set at each inverter. Otherwise the data logger cannot identify the individual inverters.

► Set the same RS485 Baud rate at all inverters.

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

### Cable requirements

- Shielded twisted-pair cable (CAT5 or CAT6) with solid conductors
- Cable diameter: 5 mm
- Wire cross-section: 1 $mm^2$

## 5.9 Connecting an external alarm unit

The inverter has a multifunction relay allowing connection of an acoustic or visual alarm unit.

An event can be assigned to the dry contacts on the inverter display after commissioning, see “8.4.6 Dry contacts”, Page 95.

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

The default setting is **Disable**.

### Cable requirements

- Shielded twisted-pair cable (CAT5 or CAT6) with solid conductors
- Cable diameter: 5 mm
- Wire cross-section: 1 $mm^2$

## 5.10 Connecting a ripple control receiver

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

**Pin assignments**

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

- Shielded twisted-pair cable (CAT5 or CAT6) with solid conductors
- Cable diameter: 5 mm
- Wire cross-section: 0.25 ... 1.5 $mm^2$

## 5.11 External power-off

The inverter has a multifunction relay allowing an external shutdown of the inverter to be triggered.

**Pin assignments**

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

After commissioning, the relays for the external power-off (EPO) can be defined on the display as having normally closed or normally open contacts, “8.4.8 EPO (External Shutdown)”, Page 98.

**Cable requirements**

- Shielded twisted-pair cable (CAT5 or CAT6) with solid conductors
- Cable diameter: 5 mm
- Wire cross-section: 0.25 ... 1.5 $mm^2$

## 5.12 Using external grid and system protection

1. The German standard VDE-AR-N 4105, Section 6.1, requires external grid and system protection with a coupling switch for PV system larger than 30 kVA.
2. Alternatively, VDE-AR-N 4105, Section 6.4.1, allows the use of an inverter with an internal coupling switch when this switch disconnects the inverter from the grid in less than 100 ms.

This inverter meets the requirement in (2) if the following firmware versions are installed: DSP ≥ 1.30 / RED ≥ 1.20 / COMM ≥ 1.10. No external grid or system protection is required for inverters with these firmware versions.

## 5.13 Connecting a PC

The inverter settings can be changed using a PC. This requires the following accessories.

| Accessories | Description |
|---|---|
| Standard USB/RS485 adapter | For connecting a PC to the inverter |
| Delta Service Software | For changing the inverter settings |

The Delta Service Software can be downloaded from www.solar-inverter.com.

**Cable requirements**

Bell wire. Both ends open.

## 5.14 Tools and materials required

This sections lists the necessary tools and materials not included in the scope of delivery.

### 5.14.1 For mounting the inverter

| Part | Qty | Description |
|---|---|---|
| M5 mounting screws | 8 | The mounting plate has to be secured with 8 M5 screws.<br>Depending on the nature of the wall or the mounting system, additional mounting equipment is required: dowels, washers, toothed washers, nuts, etc.<br>Always take the conditions at the installation location into account when selecting the mounting materials.<br>Galvanic corrosion can occur when using mounting materials made of different materials. |

### 5.14.2 For connecting to the grid (AC)

| Part | Qty | Description |
|---|---|---|
| AC cable | - | See “5.6.4 Cable requirements”, Page 28 for notes on selecting the AC cable. |
| Wire end-sleeves | 5 | Wire end-sleeves must be used at the wire ends of the AC cable to ensure adequate electrical contact between the AC plug and the AC cable.<br>Attach the wire end-sleeves to the wires using a crimping tool.<br>  |

## 5.14.3 For connecting to the solar modules (DC)

| Part | Qty | Description |
|---|---|---|
| DC cable | - | See “5.7.7 DC cable requirements”, Page 37 for notes on selecting the DC cable. |
| DC protective caps | M6A/M8A: up to 4<br>M10A: up to 6 | The protective caps lock the DC plug so that it can only be disconnected from the DC connections using the special DC mounting tool. Available from Multi-Contact.<br>Observe the local regulations regarding the use of DC protective caps.<br>France: The DC protective caps must be used.<br>  |
| DC mounting tool | 1 | Mounting tool for disconnecting the DC plug and the DC protective caps from the DC connections. Available from Multi-Contact.<br>  |

## 5.14.4 For grounding the inverter housing

| Part | Qty | Description |
|---|---|---|
| Grounding cable with cable lug | - | Typically a yellow-green copper cable with a conductor cross-section of at least 6 $mm^2$.<br>Observe the local regulations relating to grounding cable requirements. |

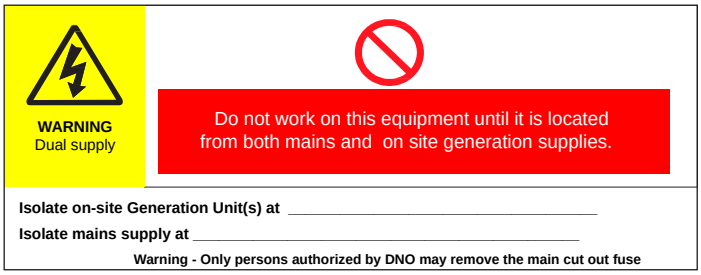
## 5.14.5 For wiring the RS485 connections, the digital inputs and the dry contacts

| Part | Qty | Description |
|---|---|---|
| Cables | - | ● Shielded twisted-pair cable (CAT5 or CAT6) with solid conductors<br>● Cable diameter: 5 mm<br>● Wire cross-section: 1 $mm^2$ |

## 5.14.6 For connection of a PC

| Part | Qty | Description |
|---|---|---|
| USB/RS485 adapter | 1 | Standard USB/RS485 adapter |
| 2-core cable | 1 | Bell wire. Both ends open. |
| Delta Service Software | 1 | The Delta Service Software can be downloaded from www.solar-inverter.com. |

## 5.14.7 Other parts

| Part | Qty | Description |
|---|---|---|
| Warning stickers | - | Observe the local regulations regarding the application of warning labels.<br>  <br>  <br>Warning<br>Two voltage sources present<br>- Distribution network<br>- PV modules<br>  <br>Disconnect both sources prior to any work |

# 6. Installation

► Read chapter “8. Settings”, page 73 and this chapter in full before you start installation.

## 6.1 Safety Instructions

**DANGER**

**Electric shock**
Potentially fatal voltages are present in the inverter during operation. When the inverter is disconnected from all power sources, this voltage regrid in the inverter for up to 60 seconds. You should therefore always carry out the following steps before working on the inverter:

1. Turn the AC/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 restored accidentally.
3. Wait at least 60 seconds for the internal capacitors to discharge.

**DANGER**

► Electric shock
► Potentially fatal voltages are present at the DC connections of the inverter. When light falls on the solar modules, they immediately start to generate electricity. This also happens when light does not fall directly on the solar modules.
► Never disconnect the inverter from the solar modules when it is under load.
► Turn the AC/DC disconnector to the ***OFF*** position.
► Disconnect the connection to the grid so that the inverter cannot feed energy into the grid.
► Disconnect the inverter from all AC and DC voltage sources. Make sure that none of the connections can be restored accidentally.
► Ensure that the DC cables cannot be touched accidentally.

**DANGER**

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

***NOTICE***

**Water ingress.**
► All sealing caps removed during installation should be stored for later use (e.g. e.g. transportation or storage).

► Never open the housing of the inverter. Otherwise the warranty will be void.

## 6.2 Overview

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

The connections inside the inverter are difficult to access.

► The best way to connect dry contacts, digital inputs and external shutdown is before mounting the inverter.

Recommended order of installation steps:

1. Connect RS485
2. Connecting dry contacts, digital inputs and EPO (each optional)
3. Mounting the inverter
4. Grounding the inverter housing
5. Connect AC plug
6. Connect DC plugs

## 6.3 Connecting a data logger via RS485

### 6.3.1 Components of the RS485 card

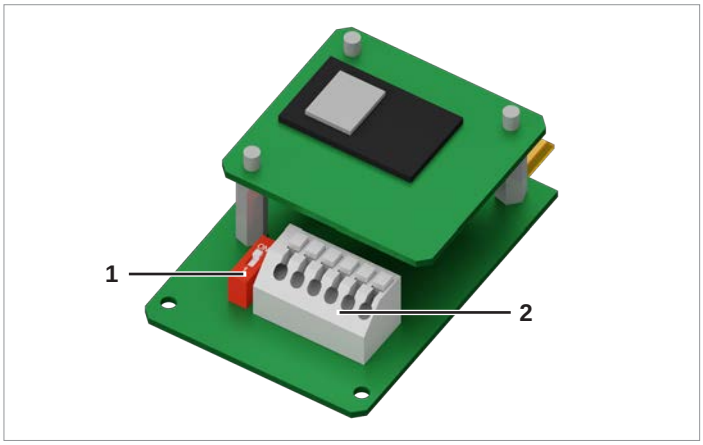



*Fig. 6.1: Components of the RS485 card*

**1** RS485 (terminal block)
**2** DIP switch for the RS485 termination resistor

**Terminal assignment of the RS485 terminal block**

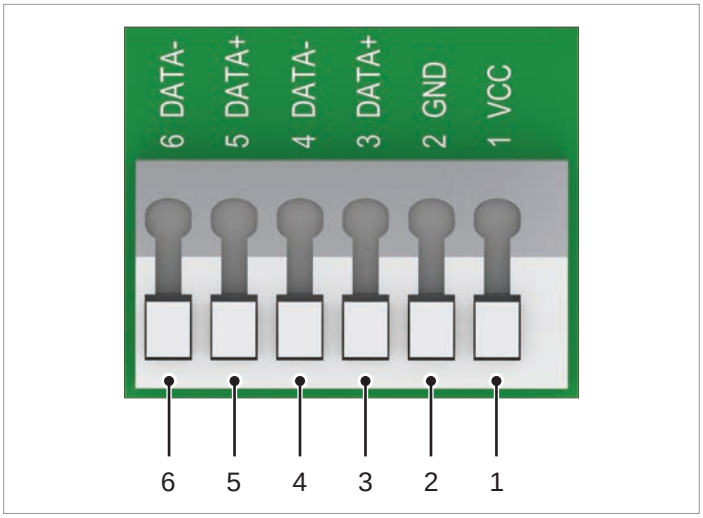



*Fig. 6.2: Terminal assignments on the RS485 terminal blocks*

**1** VCC (+12 V; 0.5 A)
**2** GND
**3** DATA+ (RS485)
**4** DATA– (RS485)
**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 “8.3.3 Baud rate”, page 79.

**DIP switch for the RS485 termination resistor**


*Fig. 6.3: DIP switch for the RS485 termination resistor*

### RS485 connection diagram for a single inverter

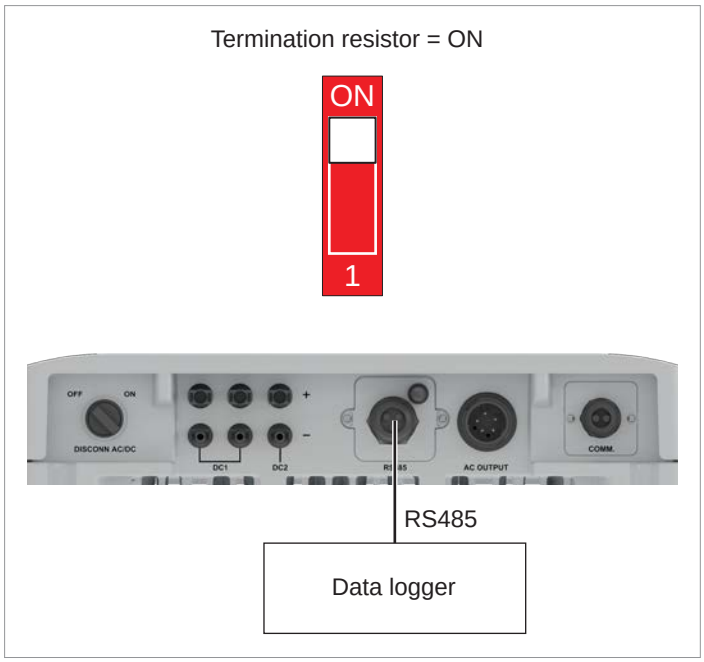



*Fig. 6.4: RS485 connection diagram for connecting a single inverter to a data logger*

### RS485 connection diagram for several inverters

- ► If the data logger does not have an integrated RS485 termination resistor, switch on the RS485 termination resistor on the first inverter.
- ► After the commissioning of each inverter, configure another inverter ID, see “8.4 “Installation settings” menu area”, page 80.

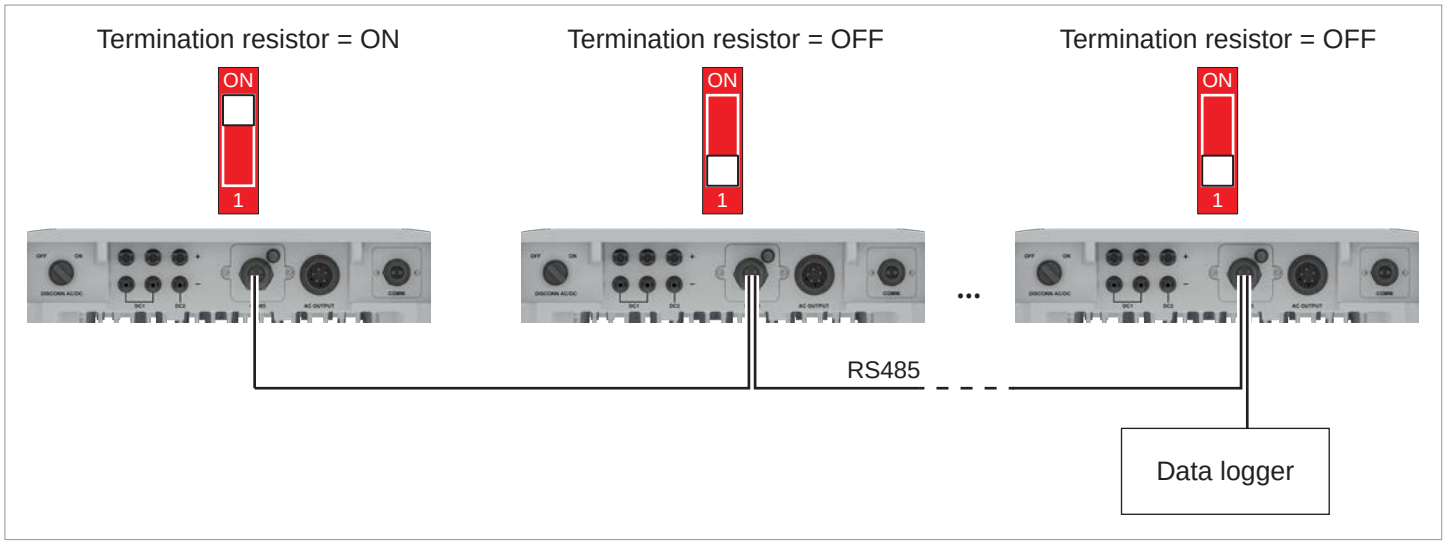
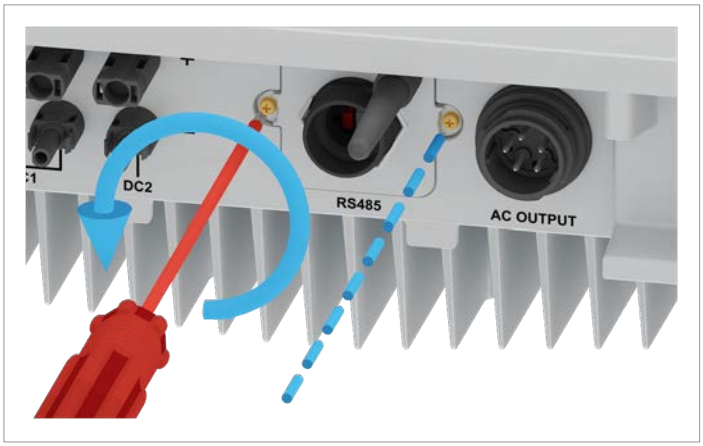


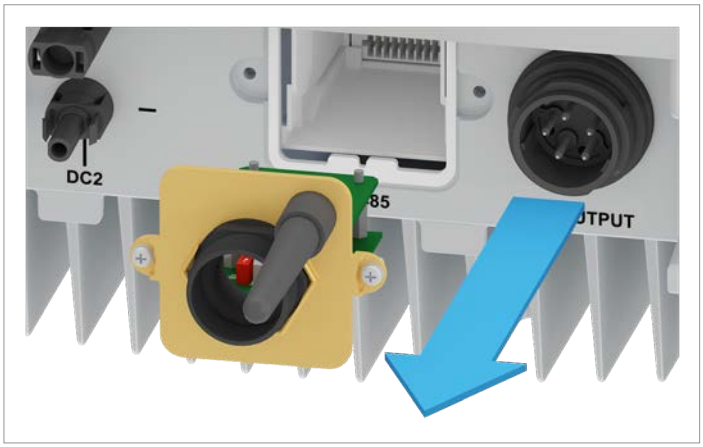

*Fig. 6.5: RS485 connection diagram for connecting several inverters to a data logger*

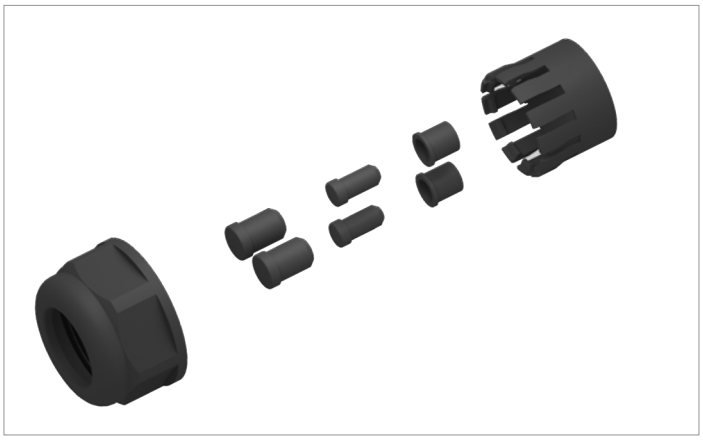
## 6.3.2 Preparing for work on the RS485 card


1. Unscrew the cable gland for the RS485 connection, remove the cable gland and seal.

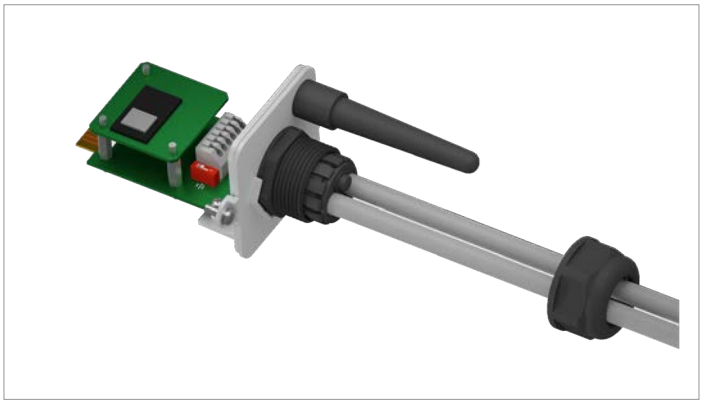




2. Unscrew the cover of the RS845 connection and pull it out carefully. The RS845 card is screwed onto the cover.



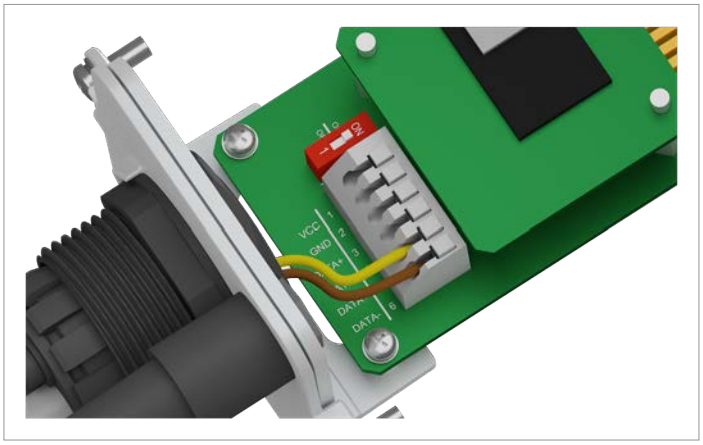


3. Remove the same number of rubber plugs from the seal corresponding to the number of cables to be connected.
   Do not remove the rubber plugs from the unused seal feed-throughs.



4. Pull the cable through the cable gland and seal.

### 6.3.3 Wiring for a single inverter

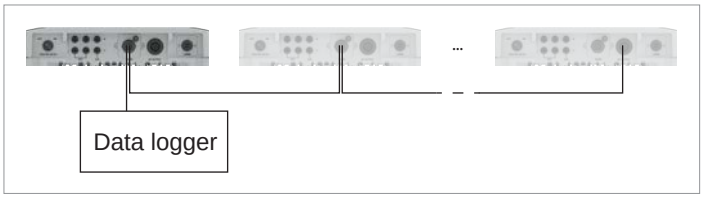


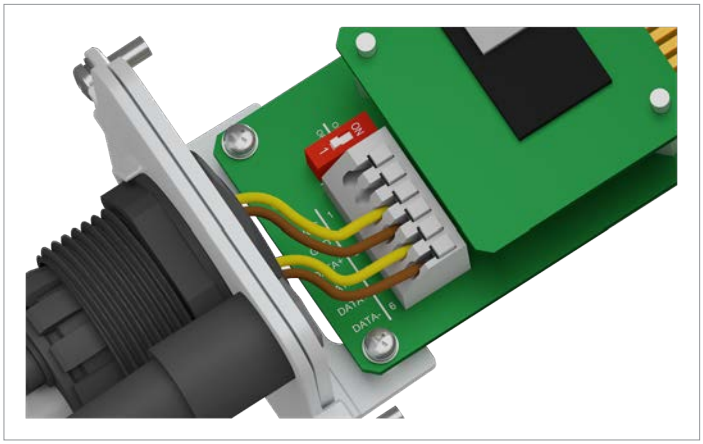

1. Connect the DATA+ wire to terminal 5 and the DATA– wire to terminal 6.


2. Set the DIP switch for the RS485 termination resistor (DIP 1) to the ***ON*** position.

## 6.3.4 Wiring for multiple inverters

This section describes how to connect RS485 if you have several M6A, M8A or M10A inverters installed in the solar system.

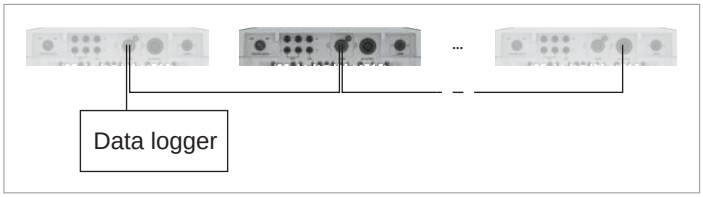


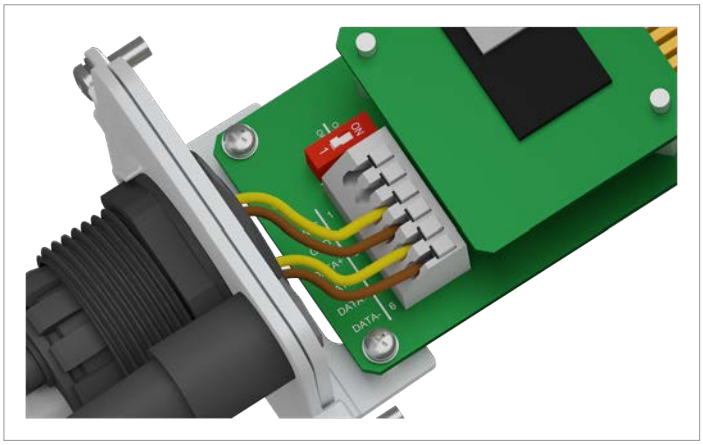




1. On the cable coming from the data logger: Connect the DATA+ wire to terminal 5 and the DATA– wire to terminal 6.

   On the cable going to the second inverter: Connect the DATA+ wire to terminal 3 and the DATA– wire to terminal 4.


2. Put the DIP switch for the RS485 termination resistor (DIP 1) in the **OFF** position.



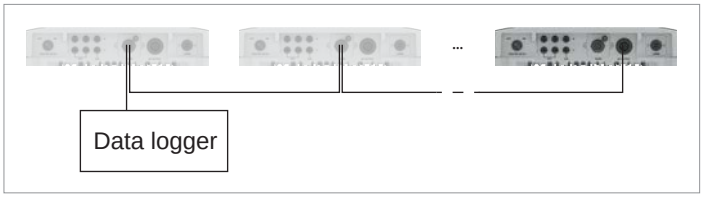

1. On the cable coming from the previous inverter: Connect the DATA+ wire to terminal 5 and the DATA– wire to terminal 6.

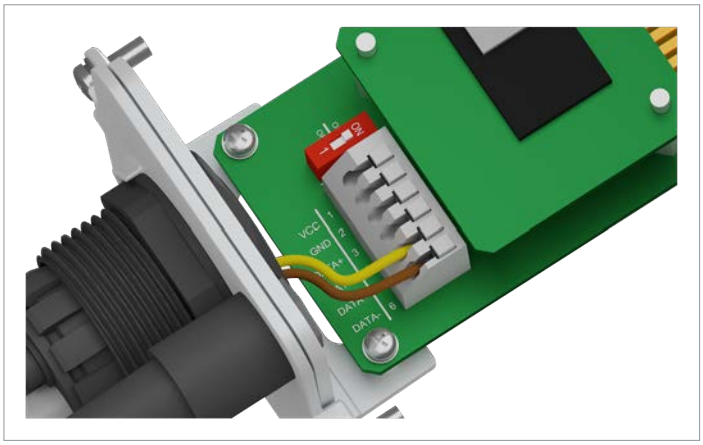
   On the cable going to the next inverter: Connect the DATA+ wire to terminal 3 and the DATA– wire to terminal 4.


2. Put the DIP switch for the RS485 termination resistor (DIP 1) in the **OFF** position.

# 6 Installation

## Connecting a data logger via RS485

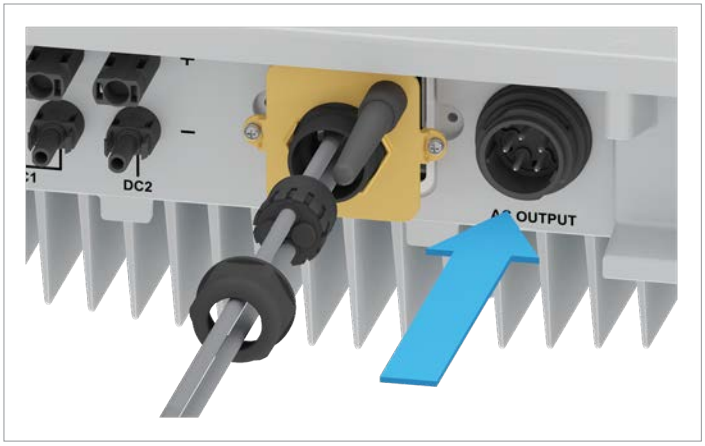


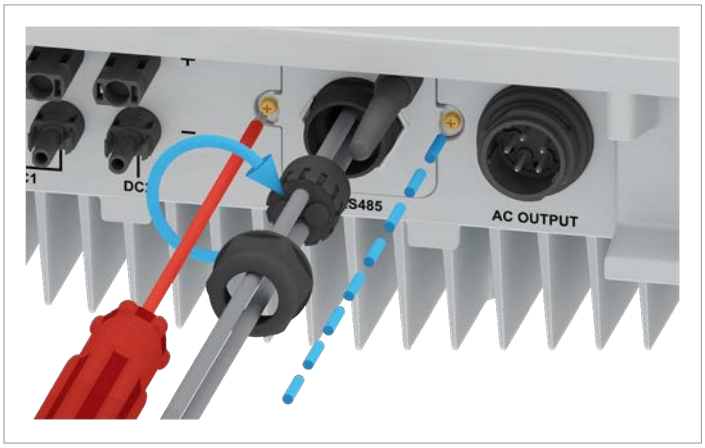

1. Connect the DATA+ wire to terminal 5 and the DATA– wire to terminal 6.


2. Put the DIP switch for the RS485 termination resistor (DIP 1) in the **ON** position.

### 6.3.5 Completing work on the RS485 card




1. Insert the cover along with the RS845 card and screw it in place.





2. Insert the seal and cable gland and screw the cable gland tight.

## 6.4 Connecting the communication card

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

### 6.4.1 Components of the communication card

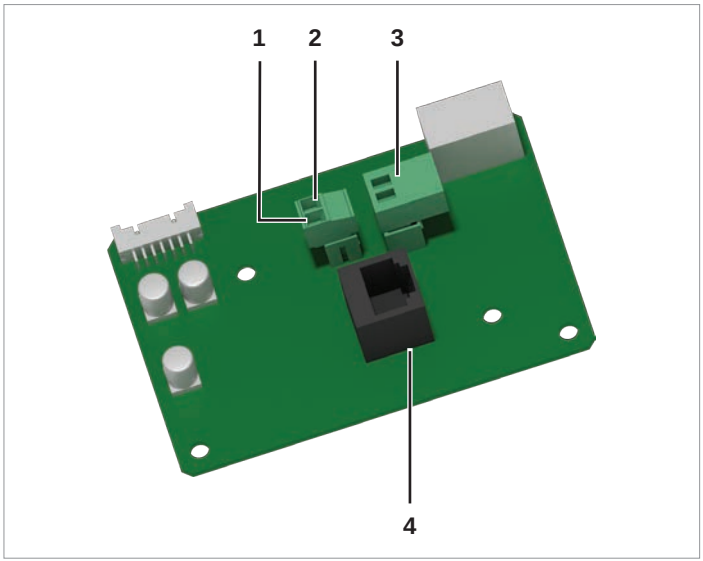


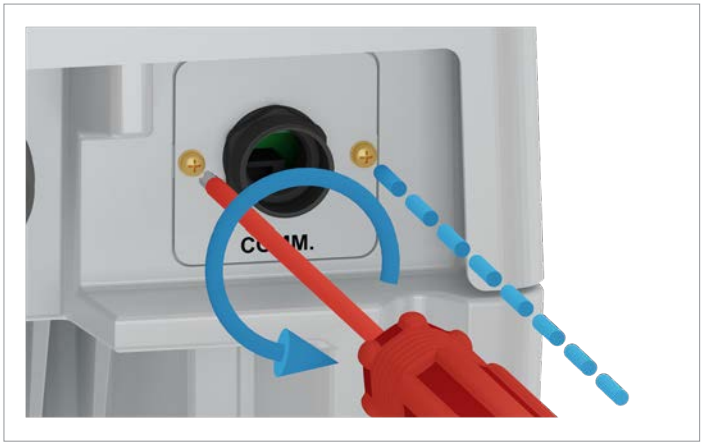

*Fig. 6.6: Components of the communication card*

**1** 12 $V_{DC}$ power supply - GND (plug with screw terminals)
**2** 12 $V_{DC}$ power supply - VCC (plug with screw terminals)
**3** Dry contacts (plug with screw terminals)
**4** Digital inputs and external power-off (EPO) (RJ45)

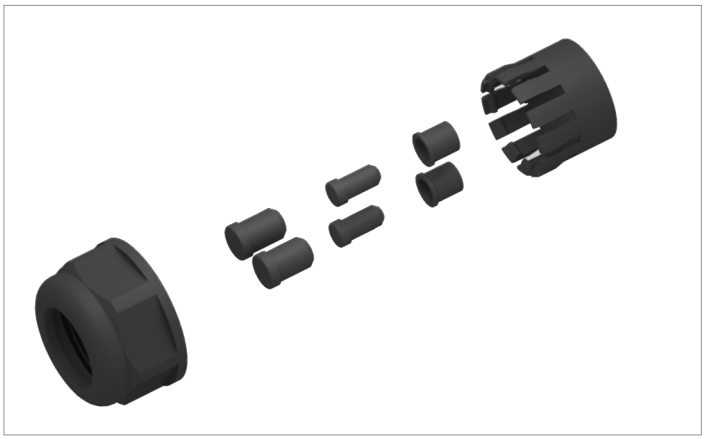
After commissioning, an event can be assigned to the dry contacts on the display, (see “8.4.6 Dry contacts”, page 95).

### 6.4.2 Preparing for work on the communication card


1. Unscrew the cable gland of the communication connection and remove the cable gland and seal.

2. Unscrew and remove the cover of the communication connection.

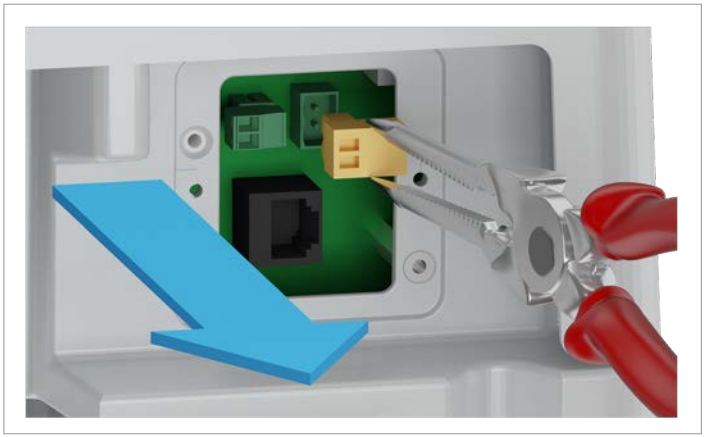


3. Remove the same number of rubber plugs from the seal corresponding to the number of cables to be connected.

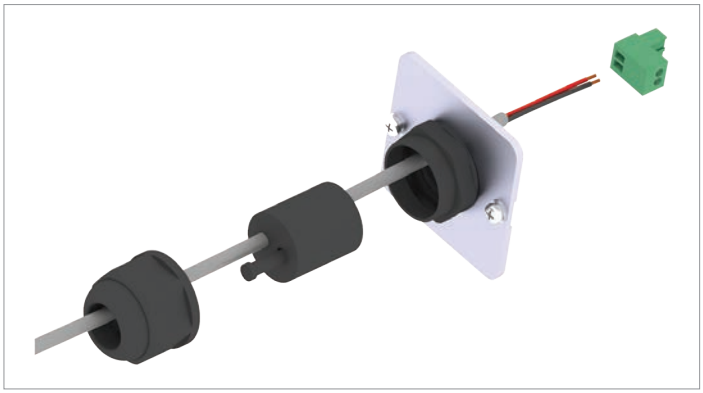
   Do not remove the rubber plugs from the unused seal feed-throughs.

4. Pull the cable through the cable gland and seal.

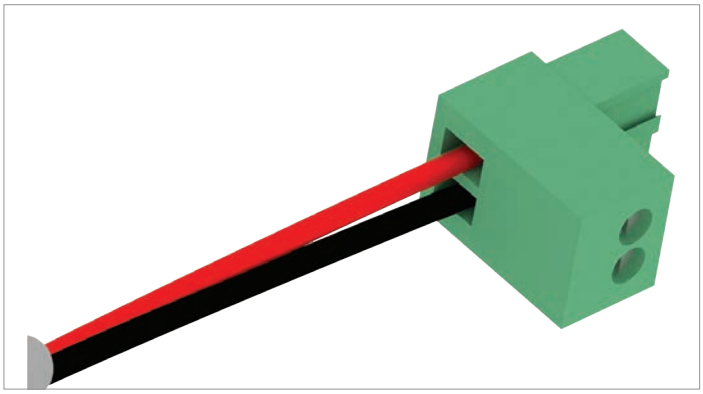
### 6.4.3 Wiring for an external alarm unit with an external 12 $V_{DC}$ power supply



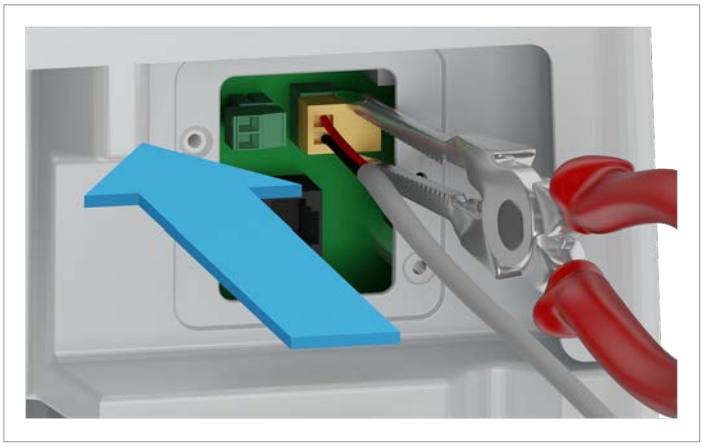
1. Carefully pull out the plug for the dry contacts using long-nose pliers.



2. Thread the cable through the cable gland and seal.



3. Wire the connector.



4. Carefully put in the wired plug by using long nose pliers.

### 6.4.4 Wiring for an external alarm unit with an internal 12 $V_{DC}$ power supply

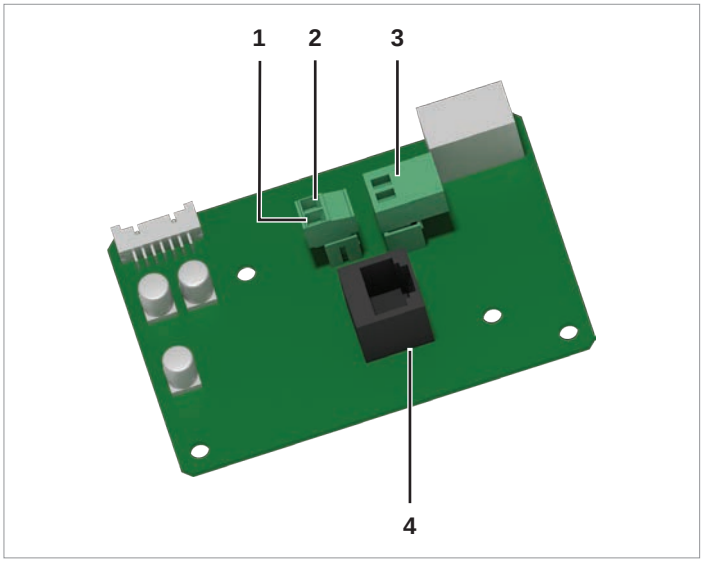



*Fig. 6.7: Components of the type 2 communication card*

**1** 12 $V_{DC}$ power supply - GND (plug with screw terminals)
**2** 12 $V_{DC}$ power supply - VCC (plug with screw terminals)
**3** Dry contacts (plug with screw terminals)
**4** Digital inputs and external power-off (EPO) (RJ45)

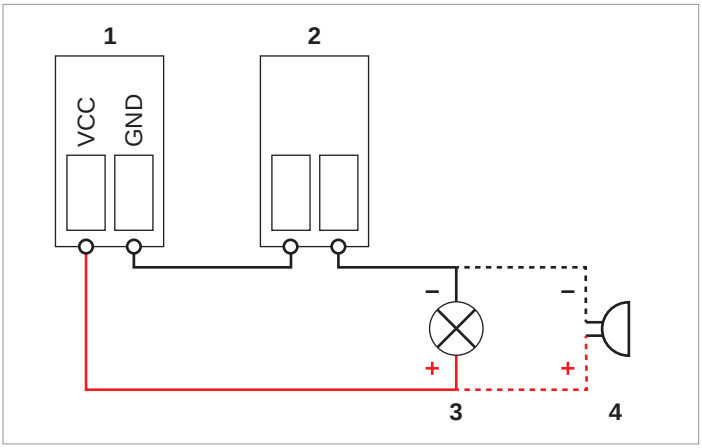



*Fig. 6.8: 12 $V_{DC}$ power supply for an external alarm device, variant 1*

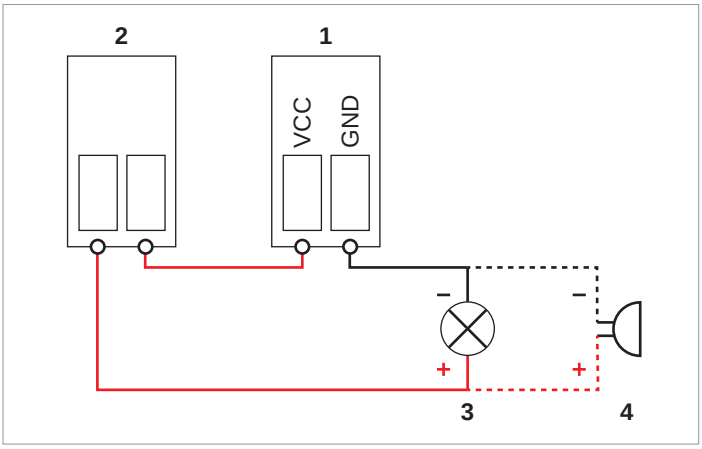
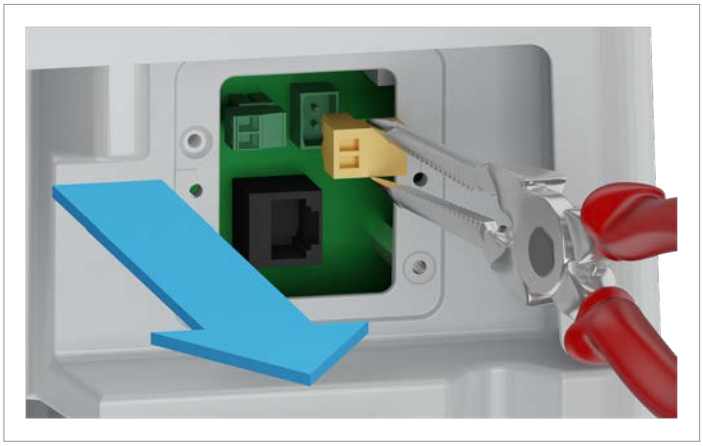
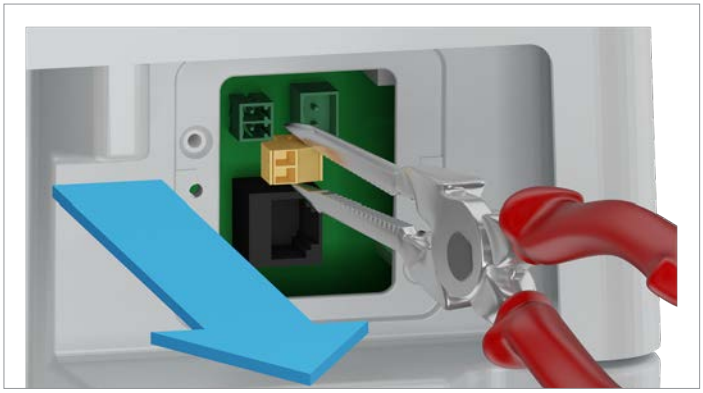



*Fig. 6.9: 12 $V_{DC}$ power supply for an external alarm device, variant 2*

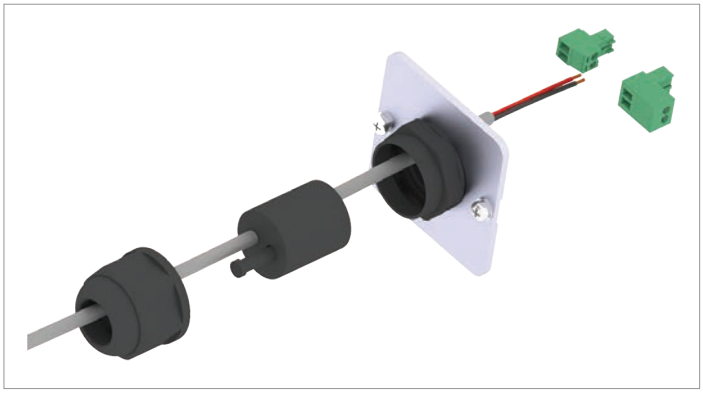
**1** Plug for the 12-$V_{DC}$ power supply
**2** Plug for the dry contacts
**3** External visual alarm device
**4** External audible alarm device



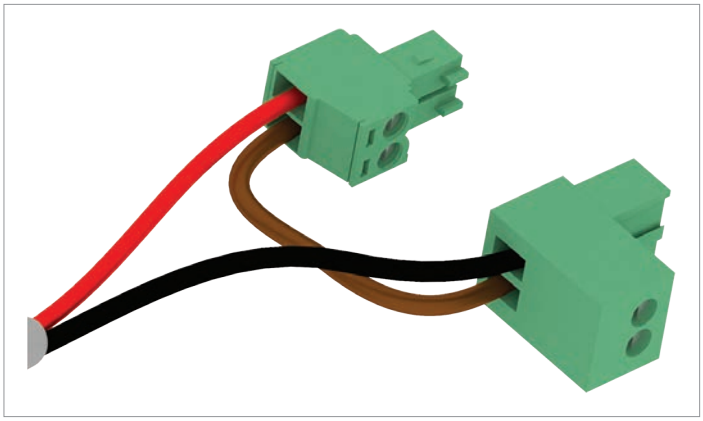
1. Carefully pull out the plug for the dry contacts using long-nose pliers.



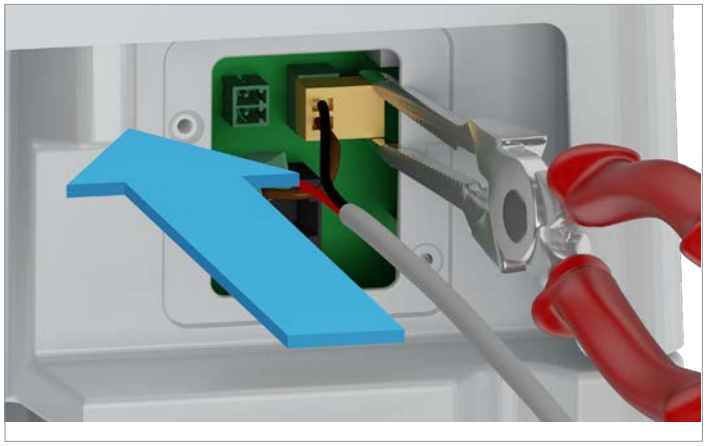
2. Carefully pull out the plug for the 12-$V_{DC}$ power supply using long-nose pliers.

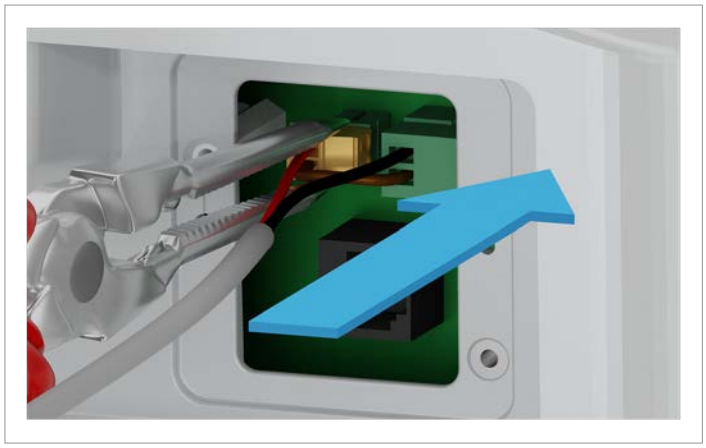


3. Thread the cable through the cable gland and seal.



4. Wire the connectors.





5. Carefully put in the wired plugs by using long nose pliers.

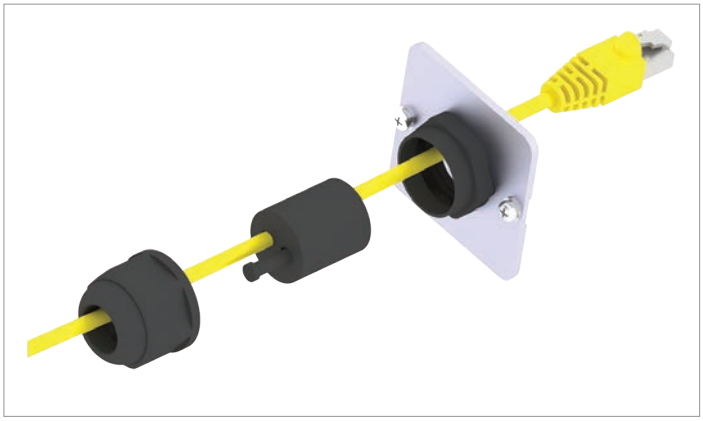
### 6.4.5 Wiring digital inputs and external power-off (EPO)

**Pin assignments**

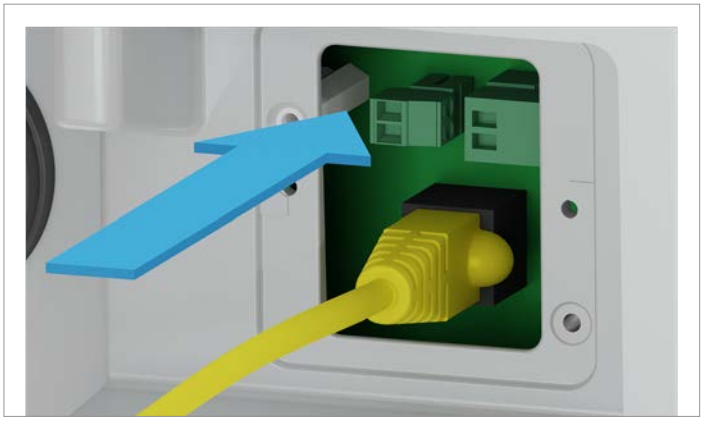
| Pin | Naming | Short circuit | Assigned action |
|---|---|---|---|
| 1 | K1 | VCC + K1 | Limiting maximum active power to 0% |
| 2 | K2 | VCC + K2 | Limiting maximum active power to 30 % |
| 3 | K3 | VCC + K3 | Limiting maximum active power to 60 % |
| 4 | K4 | VCC + K4 | Limiting maximum active power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

After commissioning, the relays for the external power-off (EPO) can be defined on the display as having normally closed or normally open contacts, see “8.4.8 EPO (External Shutdown)”, page 98.

### 6.4.6 Wiring digital inputs and external power-off

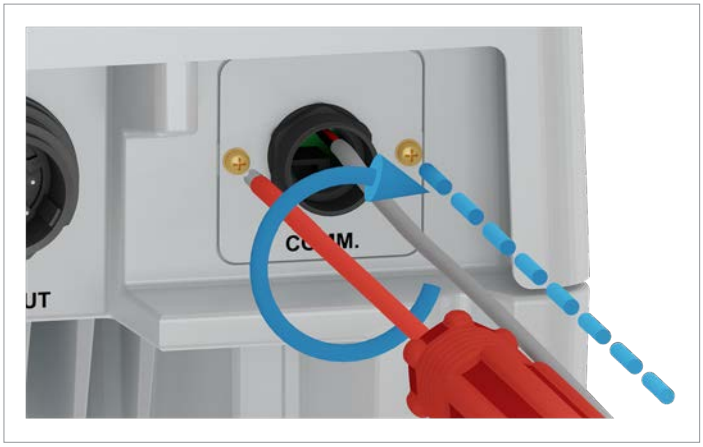


1. Thread the cable through the cable gland and seal. Do **not** remove the rubber plugs from the unused seal feed-throughs.



2. Put in the RJ45 plug.

## 6.4.7 Completing work on the communication card

3. Fit the cover of the communication connection and screw it into place.



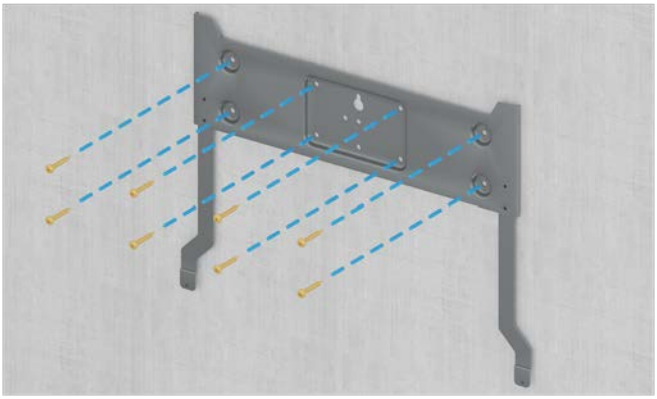
4. Fit the seal and cable gland and screw the cable gland tight.

## 6.5 Mounting the inverter and grounding the inverter housing

**DANGER**

**Electric shock**

- ► 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 grid and solar modules.
- ► Yellow/green copper cables with at least 6 mm² cable cross-section must normally be used.



1. Attach the mounting plate to the wall / the mounting system with 8 M6 screws.

2. Hang the inverter onto the mounting plate.

3. Check that the inverter hangs correctly on the mounting plate.

4. Screw the inverter securely onto the mounting plate. Use the screw on the right-hand side to provide additional grounding to the inverter housing.

   M6 screw, spring washer, washer and toothed washer are included in the scope of delivery.

5. 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.

## 6.6 Connecting to the grid (AC)

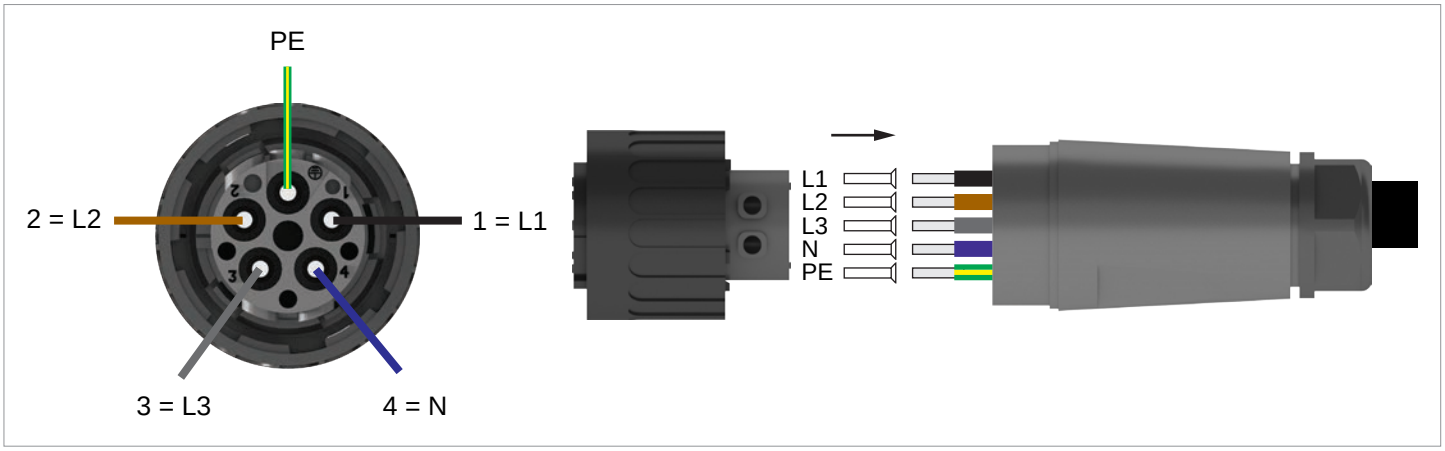
**NOTICE**

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

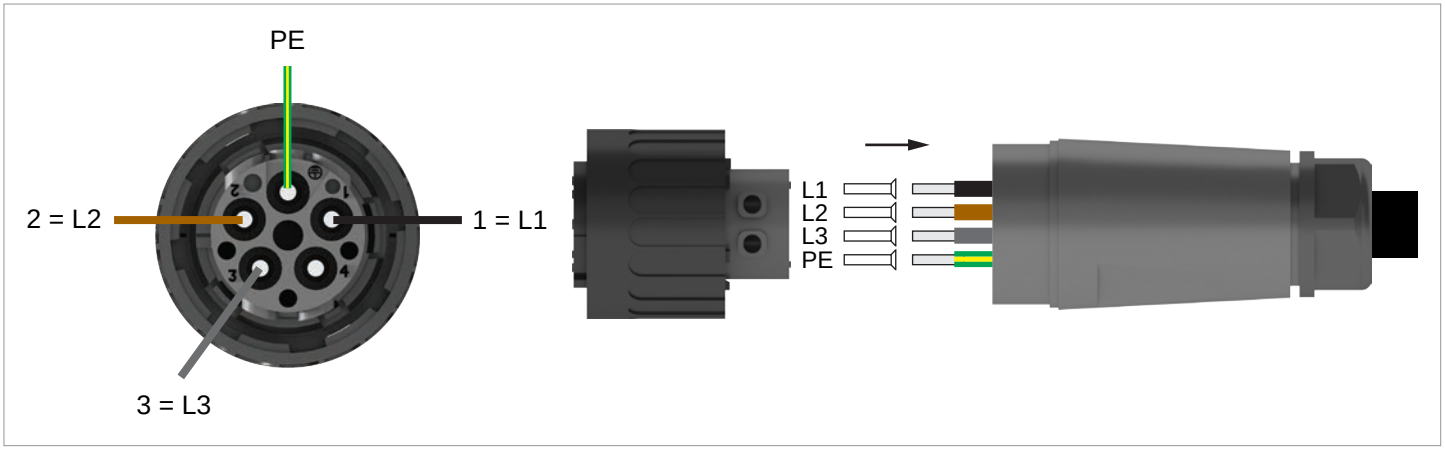
The inverter can be connected to 3-phase grids without neutral conductors (3P3W, 3 phases + PE) and 3-phase grids with neutral conductors (3P4W, 3 phases + N + PE).

► If the inverter is connected to a grid without a neutral conductor, the AC connection must be changed via the display to 3P3W after commissioning, see “8.4.9 AC connection”, page 99.

**Connecting to a 3-phase grid without a neutral conductor (3P3W)**



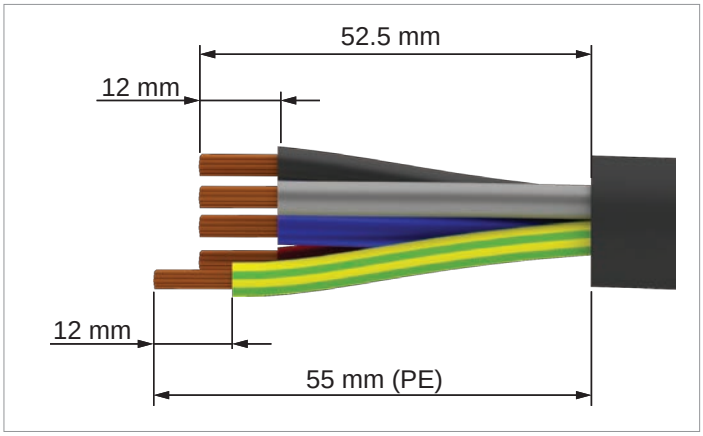

**Connecting to a 3-phase grid with a neutral conductor (3P4W)**



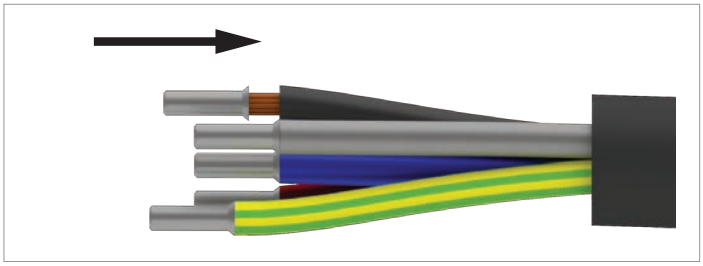
# 6 Installation

## Connecting to the grid (AC)

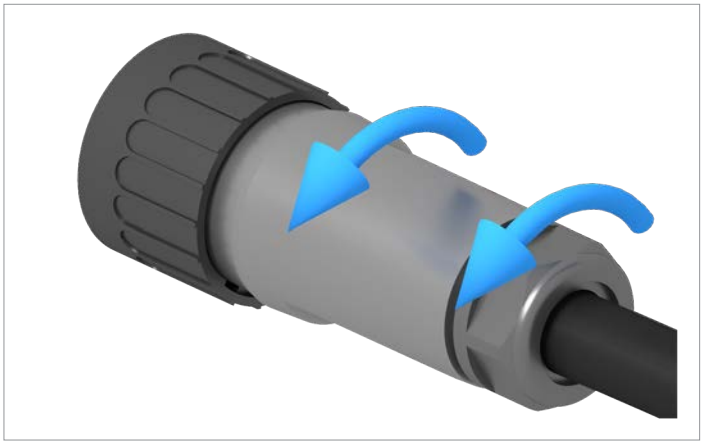

1. Turn the AC/DC disconnector to the ***OFF*** position.



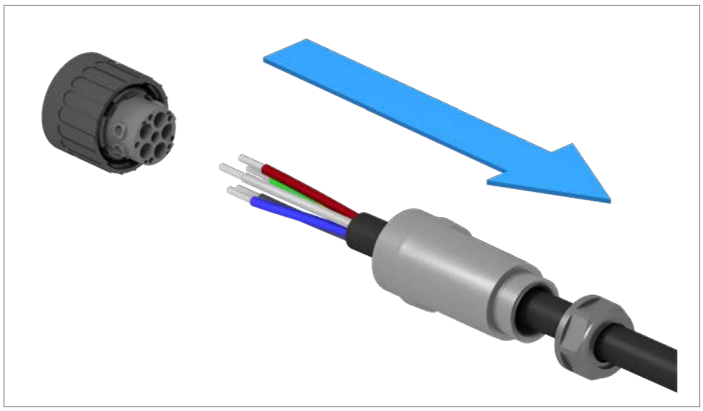

2. Remove the insulation from the cable and wires. Do not twist the wire ends because this reduces the contact surface area with the wire end sleeves.



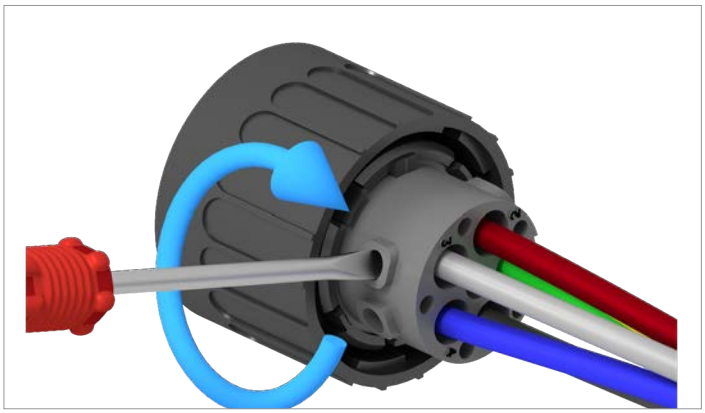
3. Fit and crimp the wire end sleeves to the ends of the wires.



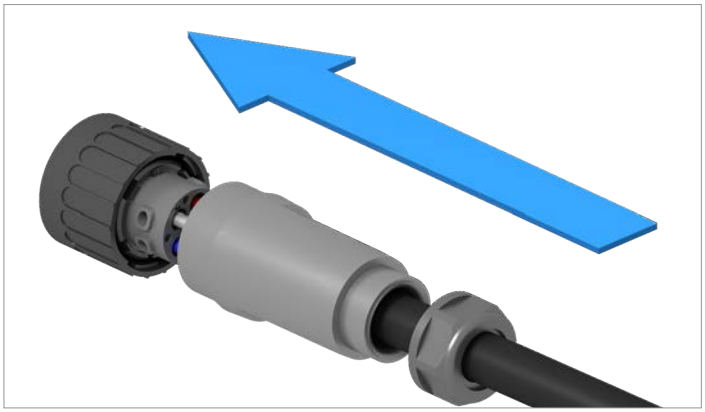
4. Unscrew the nut and housing from the AC plug.



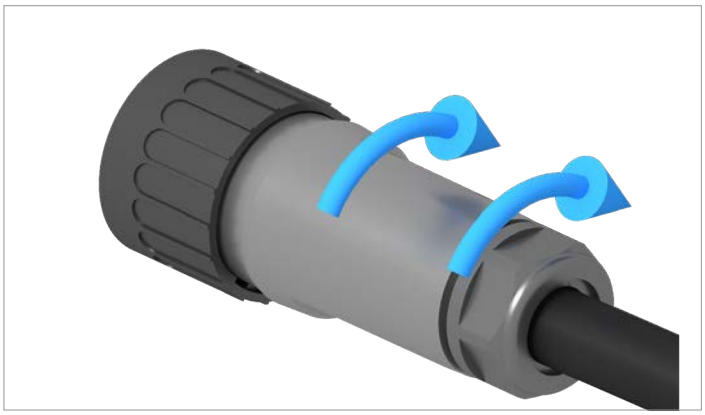
5. Pull the cable through the nut and housing.



6. Insert the wires of the AC cable into the correct pin inserts and tighten with a screwdriver.



7. Fit the housing and nut and tighten.




8. Plug the AC plug into the AC connection on the inverter and tighten.

9. Fasten the AC cable with a strain relief element.

10. If the inverter is connected to a grid without a neutral conductor, the AC connection type must be changed using the display to 3P3W **after** commissioning, see “8.4.9 AC connection”, page 99.

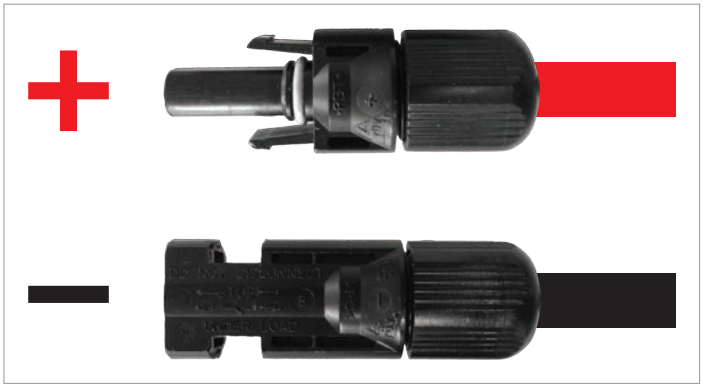
## 6.7 Connecting the solar modules (DC)

**DANGER**

**Electric shock**

Potentially fatal voltages are present at the DC connections of the inverter. When light falls on the solar modules, they immediately start to generate electricity. This also happens when light does not fall directly on the solar modules.

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



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


2. Turn the AC/DC disconnector 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.

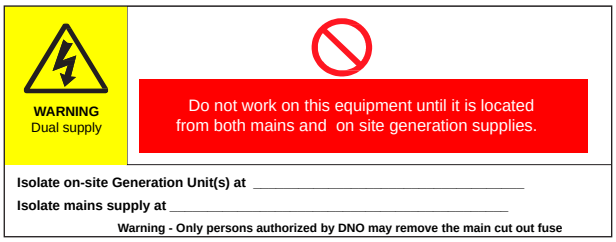

4. Plug the DC plugs with the DC cables into the DC connections on the inverter.

   The first image shows the DC cabling for RPI M6A and M8A, the second image for RPI M10A.

## 6.8 Attaching warning labels to the inverter

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

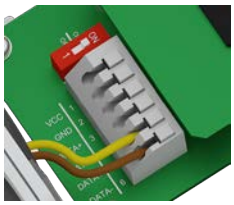
Some examples of warning labels are listed below.




Warning
Two voltage sources present
- Distribution network
- PV modules

Isolate both sources before carrying out any work

## 6.9 Connecting a PC via RS485

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

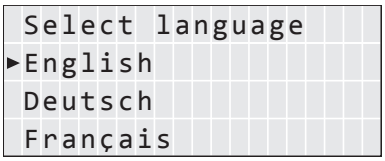
# 7. Commissioning

The inverter must be correctly installed, see “6. Installation”, page 44.

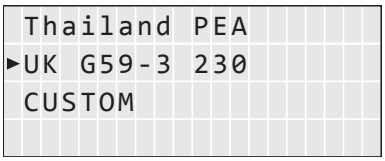
For information on operating the display keys, see “4.3 Display, buttons, status LEDs”, page 12.

The inverter must be supplied with alternating current (grid) or direct current (solar modules) in order to carry out commissioning.

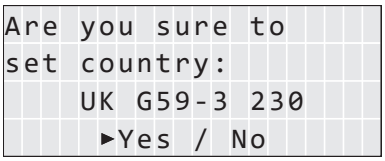

**1.** Turn the AC/DC disconnector to the ***ON*** position.




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



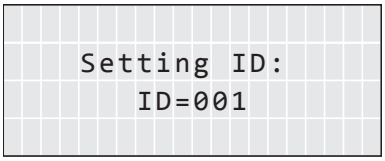

**3.** Use the ▼ and ▲ buttons to select a country or grid type and then press the ENT button.




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

To change the selection, press the ESC button.

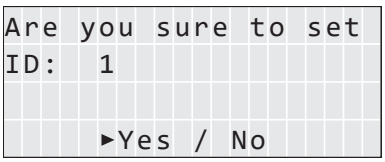
→ The inverter starts a self-test lasting approx. 2 minutes. The remaining time is shown on the display.




**NOTE**

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

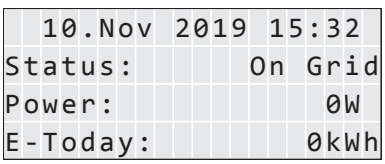
**5.** Use the ▼ and ▲ buttons to set the individual digits and then press the ENT button.




**6.** 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 ESC button to change the selection




☑ Commissioning is now complete. The main menu is displayed.

# 8. Settings

## 8.1 Overview

## 8.2 "Inverter info." menu area (current settings)

**Overview**

This function allows you to display the current inverter settings.

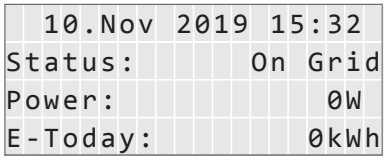
**Setting options**

None.

**Menu item path**

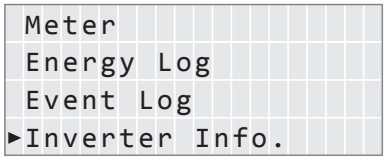
`Main menu > Inverter Info.`

**Displaying the inverter information**




1. When the default information is displayed, press any button to open the main menu.

   Otherwise, press the ESC button repeatedly until the main menu is displayed.



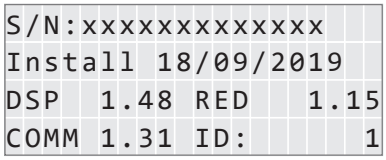

2. Use the ▼ and ▲ buttons to select the **`Inverter Info.`** entry and then press the ENT button.

3. Use the ▼ and ▲ buttons to page through the list.

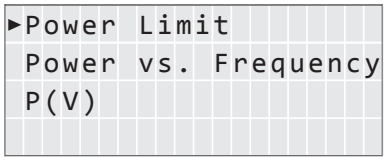
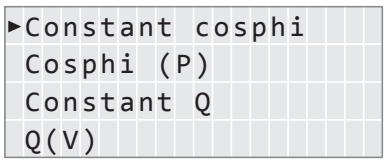
   **Note**: Some list items contain sub-items with additional information.

4. Press the ESC button to exit the menu.

**Overview of displayed information**

| Displayed information | Description | How can I change this setting |
|---|---|---|
|  | **`S/N: xxxxxxxxxxxxx`**<br>The 13-character serial number of the inverter. The serial number is also located on the type plate of the inverter. | This setting cannot be changed. |
| | **`Install`**<br>The installation date of the inverter | This setting cannot be changed. |
| | **`DSP 1.48`**, **`RED 1.15`**, **`COMM 1.31`**<br>The version numbers of the installed firmware. This manual relates to the three firmware versions listed here. | This setting cannot be changed. |
| | **`ID: 1`**<br>The inverter ID. This is required in order to uniquely identify an inverter when several inverters are installed in a system. | See "8.4 "Installation settings" menu area, page 80 for a detailed description and how to change the settings |

| Displayed information | Description | How can I change this setting |
|---|---|---|
| Country:<br>UK G59-3 230<br>Insulation: 250k<br>Baud Rate: 19200bps | **Country**<br>The configured country or grid type. | See “8.4.3 Country, page 83 for how to change the settings |
| | **Insulation**<br>The set insulation resistance. | See “8.4.2 Insulation, page 81 for a detailed description and how to change the settings |
| | **Baud rate:**<br>The RS485 Baud rate. | See “8.3.3 Baud rate, page 79 for a detailed description and how to change the settings |
| AC connection: 3P4W<br>Max. Power: 10000W<br>Dry Cont.: Disabled<br>EPO: Normal close | **AC connection**<br>The grid type (3 phases, with or without a neutral conductor). | See “8.4.9 AC connection, page 99 for a detailed description and how to change the settings |
| | **Max. power**<br>The maximum active power limit of the inverter. | See “8.4.11 Max. Power (Infeed Limiting), page 101 for a detailed description and how to change the settings |
| | **Dry Cont.**<br>The event at which the relay triggers the dry contacts. | See “5.9 Connecting an external alarm unit, page 38 for a detailed description and see “8.4.6 Dry contacts, page 95 for how to change the settings |
| | **EPO**<br>The setting for the external power off relay. | “8.4.8 EPO (External Shutdown), page 98 |
| ►Grid Settings<br>Active Pwr Settings<br>React Pwr Settings<br>FRT Settings | **Grid settings**<br>Sub-item with the current grid settings for voltage protection, frequency protection, reconnection time after line fault and reconnection behavior after line fault. | See “8.4.4 Grid settings, page 84 for a detailed description and how to change the settings |
| | **Active Pwr Settings**<br>Sub-item with the current settings for the functions controlling active power. | See below for a description. |
| | **React. Pwr Settings**<br>Sub-item with the current settings for the functions controlling reactive power. | See below for a description. |
| | **FRT Settings**<br>Current settings for operating behavior in the event of a grid voltage failure. | See “8.6 FRT (Fault Ride Through), page 121 for a detailed description and how to change the settings |

| Displayed information | Description | How can I change this setting |
|---|---|---|
| **Sub-item "Active Pwr Settings"** | | |
|  | **Power Limit**<br>Current settings for the function "Active power limitation". | See "8.5.1 Power limit, page 105 for a detailed description and how to change the settings |
| | **Power vs. Frequency**<br>Current settings for the function "Active power control depending on grid frequency". | See "8.5.2 Regulating the active power via the grid frequency, page 107 for a detailed description and how to change the settings |
| | **P(V)**<br>Current settings for the function "Active power control depending on grid voltage". | See "8.5.3 P (V) (regulating the active power via the grid voltage), page 110 for a detailed description and how to change the settings |
| **Sub-item "React. Pwr Settings"** | | |
|  | **Constant cos phi**<br>Current settings for the function "Constant cos phi (power factor)". | See "8.5.4 Constant cos phi (cos φ), page 112 for a detailed description and how to change the settings |
| | **Cos phi (P)**<br>Current settings for the function "Controlling cos phi (power factor) via active power". | See "8.5.5 Cos phi (P) (regulate cos phi via active power), page 114 for a detailed description and how to change the settings |
| | **Constant Q**<br>Current settings for the function "Constant reactive power". | See "8.5.6 Constant Q (constant reactive power), page 116 for a detailed description and how to change the settings |
| | **Q(V)**<br>Current settings for the function "Controlling reactive power depending on grid voltage". | See "8.5.7 Q (V) – Regulating reactive power via voltage, page 118 for a detailed description and how to change the settings |

## 8.3 "General settings" menu area

### 8.3.1 Language

**Overview**

This function allows you to set the display language.

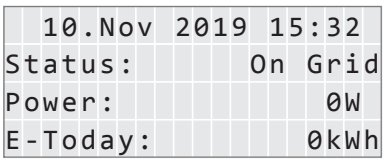
**Setting options**

| Configurable Parameters | Description | Setting range |
|---|---|---|
| **Language** | Display language | **Deutsch \| English \| Español \| Français \| Italiano \| Nederlands** |

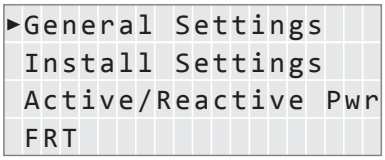
**Menu item path**

**Main menu > General Settings > Language**

**Set the display language**

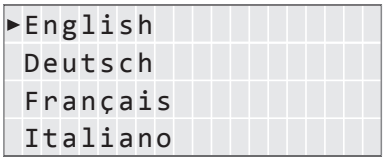



***1.*** When the default information is displayed, press any button to open the main menu. Otherwise, press the ESC button repeatedly until the main menu is displayed.




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


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




***4.*** Use the ▼ and ▲ buttons to select a language and then press the ENT button.

## 8.3.2 Date and Time

### Overview

This function allows you to set the date and time.

> The date and time must be set correctly for exact calculations of the statistics in the inverter or in a monitoring system.

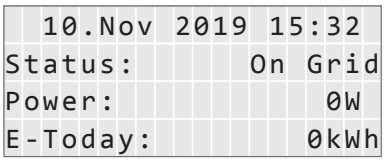
### Setting options

| Configurable Parameters | Description | Setting range |
|---|---|---|
| `Date & Time` | Date and time | – |

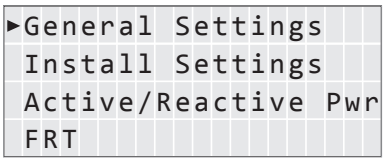
### Menu item path

`Main menu > General Settings > Date & Time`

### Setting the date and time

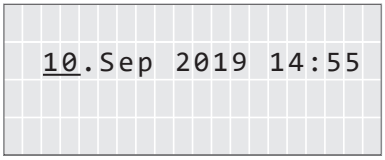



***1.*** When the default information is displayed, press any button to open the main menu. Otherwise, press the ESC button repeatedly until the main menu is displayed.




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


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




***4.*** Use the ▼ and ▲ buttons to change the currently selected (underlined) value and then press the ENT button.

→ The selection jumps to the next value.

### 8.3.3 Baud rate

**Overview**

This function allows you to set the RS485 Baud rate.

If multiple inverters are connected via RS485 then the same Baud rate must be set at every inverter.

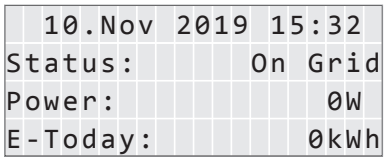
**Setting options**

| Configurable Parameters | Description | Setting range |
|---|---|---|
| **Baud rate** | Baud rate for RS485 | **9600 \| 19200 \| 38400** |

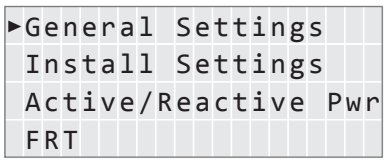
**Menu item path**

**Main menu > General Settings > Baud rate**

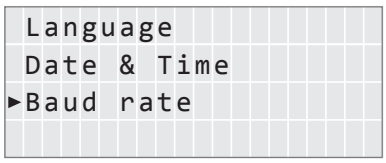
**Setting the Baud rate for RS485**



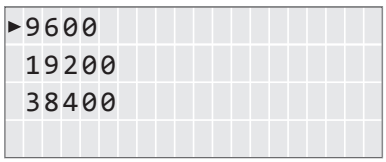

1. When the default information is displayed, press any button to open the main menu. Otherwise, press the ESC button repeatedly until the main menu is displayed.




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




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




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

## 8.4 "Installation settings" menu area

This menu area is password-protected because the settings in this menu area affect the energy production of the inverter.

► Exercise extra care with all settings in this menu area.

### 8.4.1 Inverter ID

**Overview**

This function allows you to set the inverter ID.

You can use this inverter ID to uniquely identify each inverter of a PV system, e.g. in a monitoring system, in the MyDeltaSolar app, in the MyDeltaSolar Cloud or in the Delta Service Software (DSS).

If multiple inverters are connected to the PV system, a different inverter ID must set for each inverter.

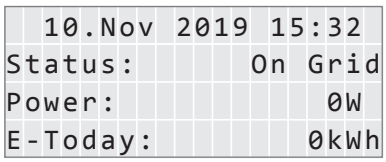
**Setting options**

| Configurable Parameters | Description | Setting range |
|---|---|---|
| `Setting ID` | The inverter ID. | `001 .. 254` |

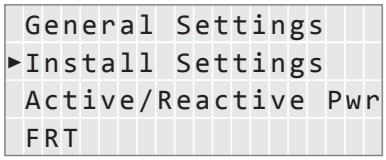
**Menu item path**

`Main Menu > Install Settings > Inverter ID`

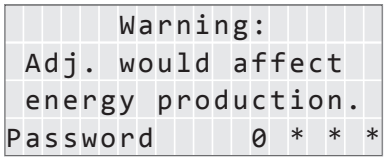
**Set the inverter ID**



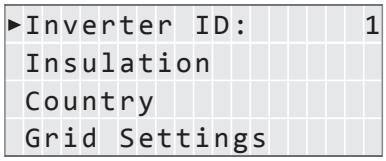

1. When the default information is displayed, press any button to open the main menu. Otherwise, press the ESC button repeatedly until the main menu is displayed.



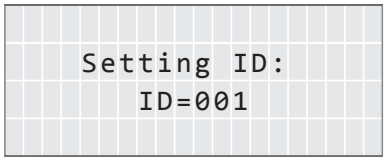

2. Use the ▼ and ▲ buttons to select the **`Install Settings`** entry and then press the ENT button.




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




4. Use the ▼ and ▲ buttons to select the **`Inverter ID`** entry and then press the ENT button. The current inverter ID is displayed after the entry.




5. Use the ▼ and ▲ buttons to set the inverter ID and then press the ENT button.

## 8.4.2 Insulation

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

### Overview

This function allows you to set the insulation mode and insulation resistance.

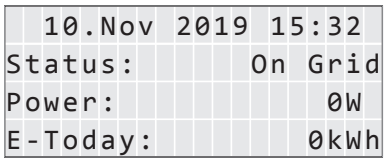
### Setting options

| Configurable Parameters | Description | Setting range |
|---|---|---|
| **Mode** | The insulation mode. | **ON**<br>**DC1 Only**<br>**DC2 Only**<br>**Plus grounding**<br>**Minus grounding**<br>**OFF** |
| **Resistance** | Insulation resistance. | **150 kΩ** \| **250 kΩ** \| **1100 kΩ** |

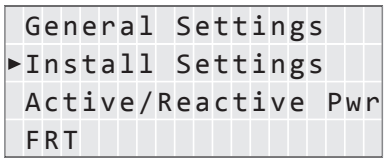
### Menu item path

**Main Menu > Install Settings > Insulation**

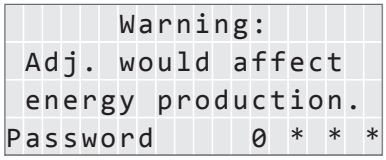
### Calling up the menu item



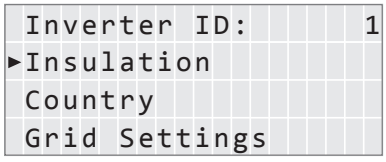

1. When the default information is displayed, press any button to open the main menu. Otherwise, press the ESC button repeatedly until the main menu is displayed.




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 numeral.

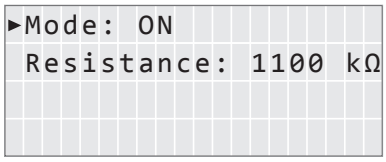



4. Use the ▼ and ▲ buttons to select the **Insulation** entry and then press the ENT button.

# 8 Settings

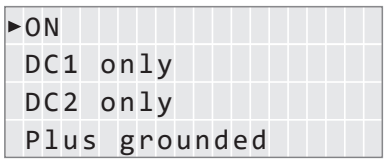
## "Installation settings" menu area

### Setting the mode



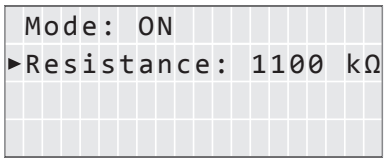

***5.*** Use the ▼ and ▲ buttons to select the **Mode** and then press the ENT button.

The currently set value is displayed after the entry.



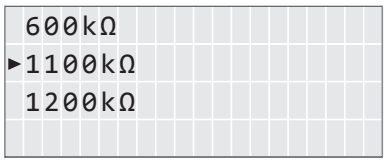

***6.*** Use the ▼ and ▲ buttons to select a mode and then press the ENT button.

### Changing the settings




***7.*** Use the ▼ and ▲ buttons to select the **Resistance** entry and then press the ENT button.

The currently set value is displayed after the entry.




***8.*** Use the ▼ and ▲ buttons to select a value and then press the ENT button.

### 8.4.3 Country

Change this setting only after consultation with Delta customer service.

**Overview**

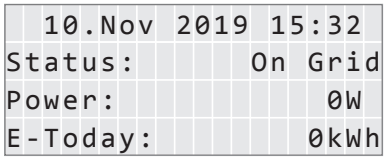
To change this setting, you need a special password provided by Delta customer service. You can find the contact information on the back of this document.

This function allows you to set the country and grid type.

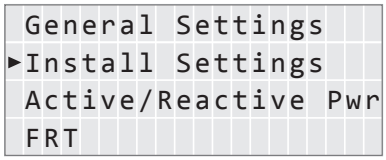
**Menu item path**

`Main Menu > Install Settings > Country`

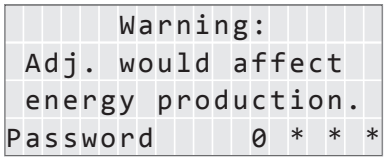
**Set the country or grid type**



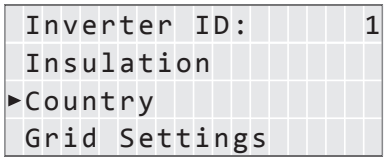

1. When the default information is displayed, press any button to open the main menu. Otherwise, press the ESC button repeatedly until the main menu is displayed.



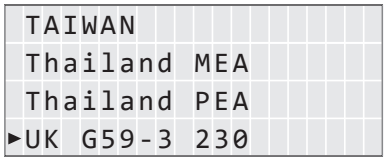

2. Use the ▼ and ▲ buttons to select the **`Install Settings`** entry. and then press the ENT button.




3. Enter the password provided by Delta customer service.
   Use the ▼ and ▲ buttons to set the individual numerals.
   Press the ENT button to confirm a numeral.




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




5. Use the ▼ and ▲ buttons to select a country or grid type and then press the ENT button.

## 8.4.4 Grid settings

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

### 8.4.4.1 Overview

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

This menu area is used to define the behavior of the inverter in the event of faults in the public grid.

The **`Grid Settings`** menu area has the following sub-areas:

| | |
|---|---|
| Voltage protection | The behavior of the inverter in the event of grid overvoltage or undervoltage. |
| Frequency protection | The behavior of the inverter in the event of grid overfrequency or underfrequency. |
| Reconnection time | The time that the inverter will wait before reconnecting to the grid after a grid fault. |
| P Ramp Up | The grid feed behavior of the inverter when reconnecting to the grid after a grid fault. |

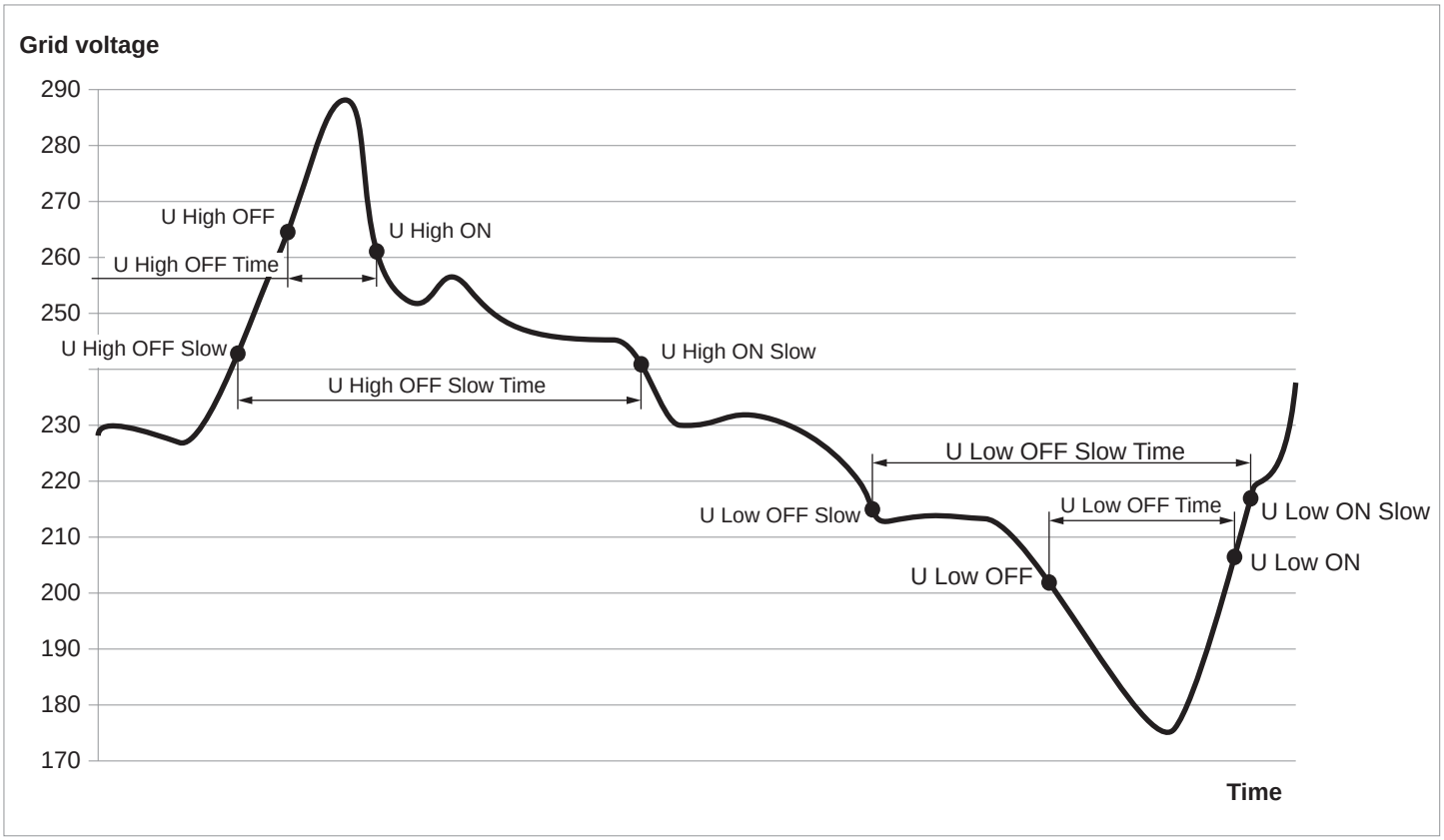
### 8.4.4.2 Voltage protection

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

**Overview**

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

This function allows you to defined the behavior of the inverter in the event of grid overvoltage or undervoltage.



# 8 Settings

## "Installation settings" menu area

### Setting options

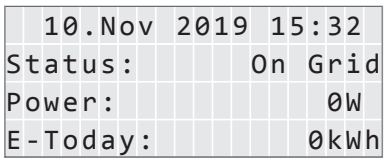
| Parameter | Description | Setting range |
|---|---|---|
| **High Off** | Voltage high off | **184.0 .. 276.0 V** |
| **High On** | Voltage high on | **184.0 .. 276.0 V** |
| **High Off T** | Disconnection time for voltage high off | **0.0 .. 5.0 s** |
| **Low Off** | Voltage low off | **184.0 .. 276.0 V** |
| **Low On** | Voltage low on | **184.0 .. 276.0 V** |
| **Low Off T** | Disconnection time for voltage high off | **0 .. 5.0 s** |
| **Hi Off Slow** | Voltage high off slowly | **184.0 .. 276.0 V** |
| **Hi On Slow** | Voltage high on slowly | **184.0 .. 276.0 V** |
| **Hi Off Sl T** | Disconnection time for voltage high off slowly | **0 .. 600 s** |
| **Lo Off Slow** | Voltage low off slowly | **184.0 .. 276.0 V** |
| **Lo On Slow** | Voltage low on slowly | **184.0 .. 276.0 V** |
| **Lo Off Sl T** | Disconnection time for voltage low off slowly | **0 .. 600 s** |

### Menu item path

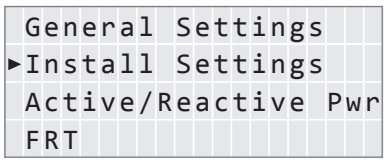
**Main Menu > Install Settings > Grid Settings > Voltage Protection**

### Changing the settings

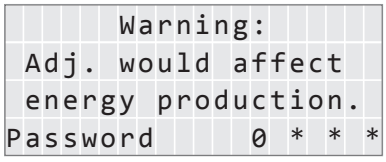
This procedure is the same for all parameters.




***1.*** When the default information is displayed, press any button to open the main menu. Otherwise, press the ESC button repeatedly until the main menu is displayed.

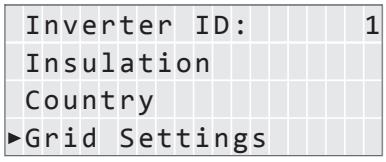



***2.*** Use the ▼ and ▲ buttons to select the **Install Settings** entry. and then press the ENT button.

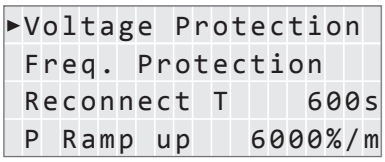



***3.*** Enter the password provided by Delta customer service. Use the ▼ and ▲ buttons to set the individual numerals.

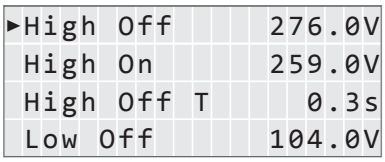
Press the ENT button to confirm a numeral.




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




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




***6.*** Use the ▼ and ▲ buttons to select a parameter and then press the ENT button.

→ If the shape of the arrow changes →|, the value can be changed.

The currently set value is displayed after the entry.

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

### 8.4.4.3 Frequency protection

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

#### Overview

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

This function allows you to defined the behavior of the inverter in the case of grid overfrequency or underfrequency.

#### Setting options

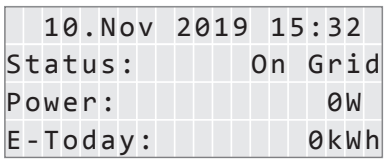
| Parameter | Description | Setting range |
|---|---|---|
| `High Off` | Frequency high off | `45 .. 65 Hz` |
| `High On` | Frequency high on | `45 .. 65 Hz` |
| `High Off T` | Disconnection time for frequency high off | `0.0 .. 5.0 s` |
| `Low Off` | Frequency low off | `45 .. 65 Hz` |
| `Low On` | Frequency low on | `45 .. 65 Hz` |
| `Low Off T` | Disconnection time for frequency high off | `0 .. 5.0 s` |
| `Hi Off Slow` | Frequency high off slowly | `45 .. 65 Hz` |
| `Hi On Slow` | Frequency high on slowly | `45 .. 65 Hz` |
| `Hi Off Sl T` | Disconnection time for frequency high off slowly | `0 .. 600 s` |
| `Lo Off Slow` | Frequency low off slowly | `45 .. 65 Hz` |
| `Lo On Slow` | Frequency low on slowly | `45 .. 65 Hz` |
| `Low Off Sl T` | Disconnection time for voltage low off slowly | `0 .. 600 s` |

#### Menu item path

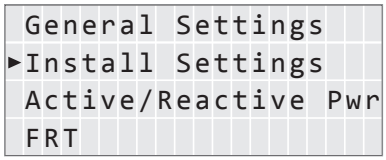
`Main Menu > Install Settings > Grid Settings > Freq. Protection`

### Changing the settings

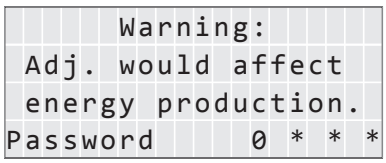
This procedure is the same for all parameters.



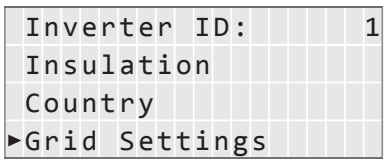

**1.** When the default information is displayed, press any button to open the main menu.
Otherwise, press the ESC button repeatedly until the main menu is displayed.



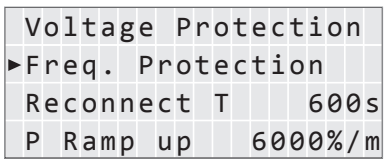

**2.** Use the ▼ and ▲ buttons to select the **Installation Settings** entry and then press the ENT button.



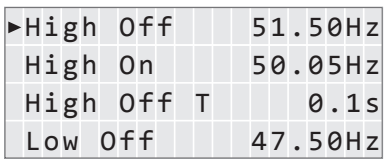

**3.** Enter the password provided by Delta customer service.
Use the ▼ and ▲ buttons to set the individual numerals.
Press the ENT button to confirm a numeral.




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




**5.** Use the ▼ and ▲ buttons to select the **Freq. Protection** entry and then press the ENT button.




**6.** Use the ▼ and ▲ buttons to select a parameter and then press the ENT button.
→ If the shape of the arrow changes →|, the value can be changed.
The currently set value is displayed after the entry.

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

### 8.4.4.4 Reconnection time

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

**Overview**

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

This function allows you to specify a reconnection time for cases where the inverter disconnects from the grid due to a voltage failure or frequency fault.

Once the fault has disappeared, the inverter waits for the specified reconnection time before reconnecting to the grid.

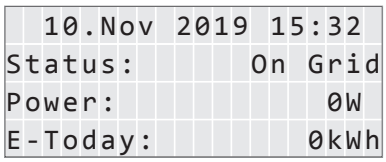
**Setting options**

| Parameter | Description | Setting range |
|---|---|---|
| **`Reconnection T`** | Reconnection time | **`0 .. 600 s`** |

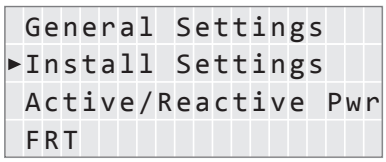
**Menu item path**

**`Main Menu > Install Settings > Grid Settings > Reconnection T`**

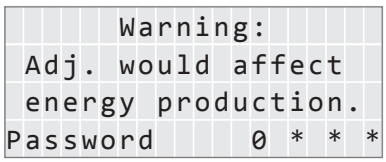
**Setting the reconnection time**



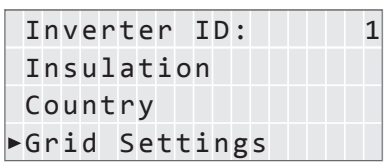

1. When the default information is displayed, press any button to open the main menu.
   Otherwise, press the ESC button repeatedly until the main menu is displayed.



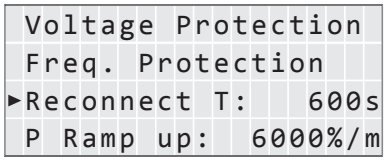

2. Use the ▼ and ▲ buttons to select the **`Installation Settings`** entry and then press the ENT button.




3. Enter the password provided by Delta customer service.
   Use the ▼ and ▲ buttons to set the individual numerals.
   Press the ENT button to confirm a numeral.




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




5. Use the ▼ and ▲ buttons to select the **`Reconnection T`** entry. and then press the ENT button.
   → If the shape of the arrow changes →|, the value can be changed.
   The currently set value is displayed after the entry.

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

### 8.4.4.5 Restart power P-ramp high

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

**Overview**

This function allows you to specify the active power increase ramp for cases where the inverter disconnects from the grid due to a voltage failure or frequency fault.

Once the fault has disappeared, the inverter continuously increases the active power according to the specified ramp.

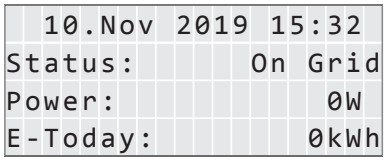
**Setting options**

| Parameter | Description | Setting range |
|---|---|---|
| `P Ramp Up` | Increase of the fed active power in percent per minute. | `0 .. 6000 %/min` |

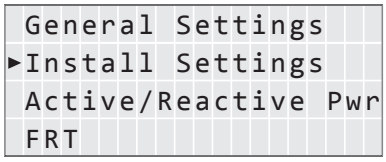
**Menu item path**

`Main Menu > Install Settings > Grid Settings > P Ramp Up`

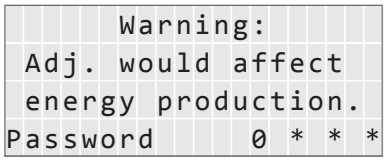
**Setting the active power increase ramp**



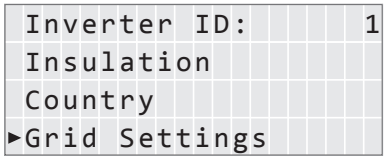

1. When the default information is displayed, press any button to open the main menu.
   Otherwise, press the ESC button repeatedly until the main menu is displayed.



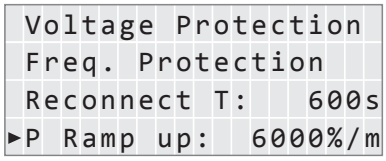

2. Use the ▼ and ▲ buttons to select the **`Install Settings`** entry. and then press the ENT button.




3. Enter the password provided by Delta customer service.
   Use the ▼ and ▲ buttons to set the individual numerals.
   Press the ENT button to confirm a numeral.




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




5. Use the ▼ and ▲ buttons to select the **`P Ramp Up`** entry and then press the ENT button.

   → If the shape of the arrow changes →|, the value can be changed.

   The currently set value is displayed after the entry.

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

### 8.4.5 DC Injection

Change this setting only after consultation with Delta customer service.

#### Overview

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

This function allows you to specify the behavior of the inverter when a DC component occurs in the infeed to the grid.

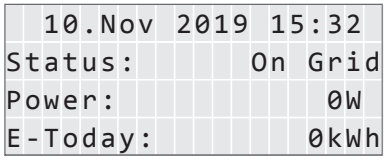
#### Setting options

| Parameter | Description | Setting range |
|---|---|---|
| `Mode` | Switch the function on and off. | `ON` \| `OFF` |
| `Trip Value` | The amount of DC current at which the inverter stops feeding into the grid. | `0.01 .. 1.00 A` |
| `Trip Time` | When the switch-off value is exceeded, the inverter waits for the specified time to see if the DC current drops below the switch-off value again.<br>When this time has expired, the inverter switches off. | `0.0 .. 5.0 s` |

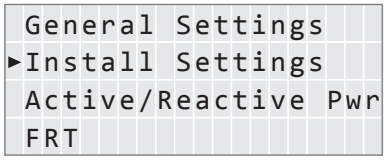
#### Menu item path

`Main Menu > Install Settings > DC Injection`

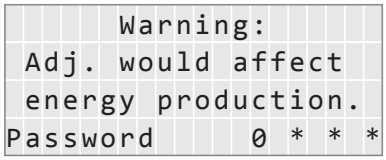
#### Calling up the menu item



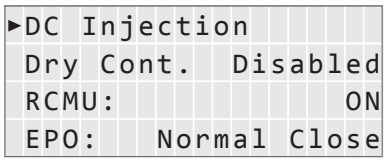

1. When the default information is displayed, press any button to open the main menu.
   Otherwise, press the ESC button repeatedly until the main menu is displayed.




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

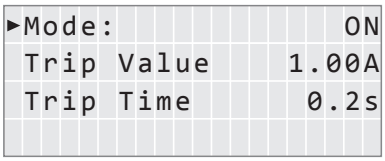



3. Enter the password provided by Delta customer service.
   Use the ▼ and ▲ buttons to set the individual numerals.
   Press the ENT button to confirm a numeral.




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

### Setting the mode




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

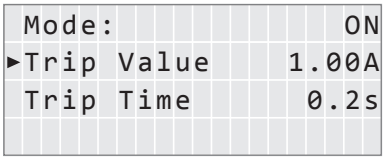
→ If the shape of the arrow changes →|, the mode can be changed.

The currently set mode is displayed after the entry.

***6.*** Use the ▼ and ▲ buttons to select a mode and then press the ENT button.

### Changing the settings

This procedure is the same for all parameters.




***7.*** Use the ▼ and ▲ buttons to select a parameter and then press the ENT button.

→ If the shape of the arrow changes →|, the mode can be changed.

The currently set value is displayed after the entry.

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

## 8.4.6 Dry contacts

**Overview**

If you have connected an external alarm unit to the dry contacts you can use this function to specify the events that trigger the external alarm unit.

You can specify a different event for each dry contact.

**Setting options**

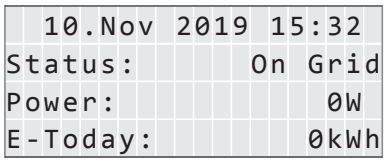
| Parameter | Description | Setting range |
|---|---|---|
| **Dry cont.** | The event for the dry contact. | **Disable** \| **On Grid** \| **Fan fault** \| **Insulation** \| **Alarm** \| **Error** \| **Fault** \| **Warning** |

| Event | Description |
|---|---|
| **Disable** | The function of the dry contacts is disabled. |
| **On Grid** | The inverter is connected to the grid. |
| **Fan Fail** | The fans are defective. |
| **Insulation** | The insulation test has failed. |
| **Alarm** | An error event message, fault message or warning has been sent. |
| **Error** | An error event message has been sent. |
| **Fault** | A fault message has been sent. |
| **Warning** | A warning message has been sent. |

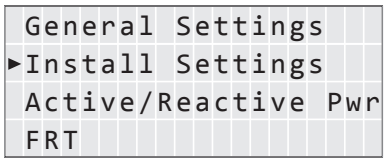
**Menu item path**

**Main Menu > Install Settings > Dry Cont.**

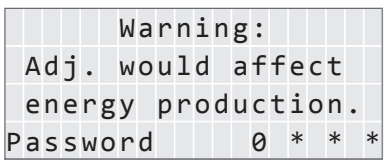
**Assigning events to the dry contacts**



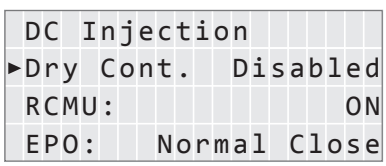

1. When the default information is displayed, press any button to open the main menu.
   Otherwise, press the ESC button repeatedly until the main menu is displayed.



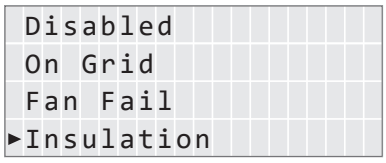

2. Use the ▼ and ▲ buttons to select the **Install Settings** entry. and then press the ENT button.




3. Enter the password provided by Delta customer service.
   Use the ▼ and ▲ buttons to set the individual numerals.
   Press the ENT button to confirm a numeral.




4. Use the ▼ and ▲ buttons to select the **Dry Cont.** entry and then press the ENT button.
   → If the shape of the arrow changes →|, the value can be changed.
   The currently set value is displayed after the entry.




***5.*** Use the ▼ and ▲ buttons to select an event and then press the ENT button.

### 8.4.7 RCMU (Integrated residual current monitoring unit)

Change this setting only after consultation with Delta customer service.

**Overview**

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

This function allows you to switch the integrated residual current monitoring unit on and off.

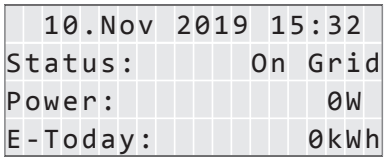
**Setting options**

| Parameter | Description | Setting range |
|---|---|---|
| **RCMU** | Switch the function on and off. | **ON** \| **OFF** |

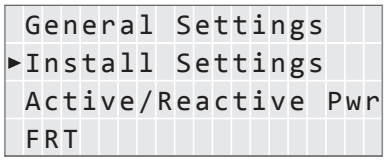
**Menu item path**

**Main Menu > Install Settings > RCMU**

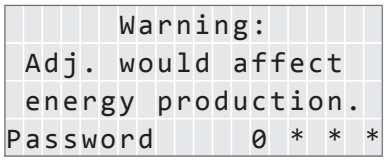
**Setting the integrated residual current monitoring unit**



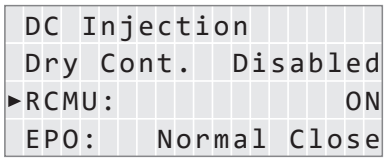

1. When the default information is displayed, press any button to open the main menu.
   Otherwise, press the ESC button repeatedly until the main menu is displayed.




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




3. Enter the password provided by Delta customer service.
   Use the ▼ and ▲ buttons to set the individual numerals.
   Press the ENT button to confirm a numeral.




4. Use the ▼ and ▲ buttons to select the **RCMU** entry and then press the ENT button.
   → If the shape of the arrow changes →|, the value can be changed.
   The currently set value is displayed after the entry.

5. Use the ▼ and ▲ buttons to select a mode and then press the ENT button.

## 8.4.8 EPO (External Shutdown)

### Overview

This function allows you to define the external shutdown (EPO) relay contacts as being normally closed or normally open contacts.

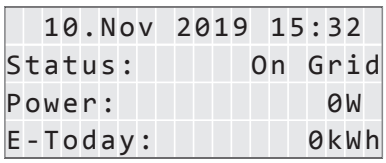
### Setting options

| Parameter | Description | Setting range |
|---|---|---|
| **EPO** | Defines how the relay functions for the external shutdown (EPO). | **nrm. open \| nrm. closed** |

### Menu item path

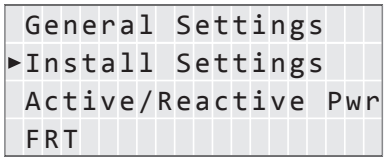
**Main Menu > Install Settings > EPO**

### Setting External Shutdown (EPO)

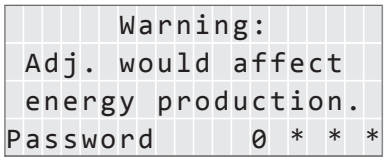



***1.*** When the default information is displayed, press any button to open the main menu.

Otherwise, press the ESC button repeatedly until the main menu is displayed.



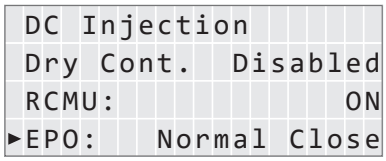

***2.*** Use the ▼ and ▲ buttons to select the **Install Settings** entry and then press the ENT button.




***3.*** This function is protected with password 5555.

Use the ▼ and ▲ buttons to set the individual numerals.

Press the ENT button to confirm a numeral.




***4.*** Use the buttons ▼ and ▲ to select the entry **EPO** and press the ENT button.

→ If the shape of the arrow changes →|, the value can be changed.

The currently set value is displayed after the entry.

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

## 8.4.9 AC connection

**Overview**

The inverter is configured by default for an AC connection with 3-phases and a neutral conductor (**3P4W**). If you wish to connect the inverter without a neutral conductor then you must set the AC connection type to **3P3W** after commissioning.

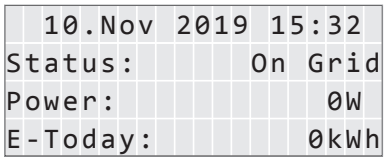
**Setting options**

| Parameter | Description | Setting range |
|---|---|---|
| | Set the AC connection type. | |
| **AC Connection** | **3P3W**: 3-phase system **without** a neutral conductor (L1, L2, L3, PE) | **3P3W** \| **3P4W** |
| | **3P4W**: 3-phase system **with** a neutral conductor (L1, L2, L3, N, PE) | |

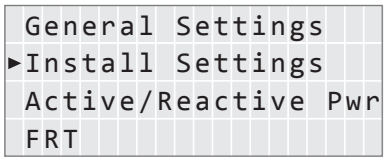
**Menu item path**

**Main Menu > Install Settings > AC Connection**

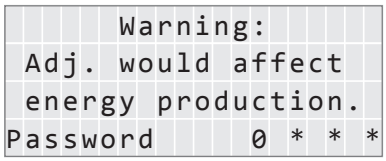
**Setting the AC connection type**



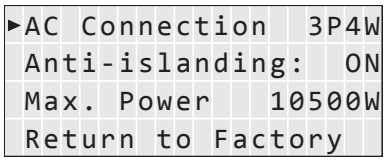

***1.*** When the default information is displayed, press any button to open the main menu.
Otherwise, press the ESC button repeatedly until the main menu is displayed.




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




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




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

→ If the shape of the arrow changes →|, the value can be changed.

The currently set value is displayed after the entry.

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

## 8.4.10 Anti-islanding

Change this setting only after consultation with Delta customer service.

### Overview

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

This function allows you to switch the anti-islanding protection on and off.

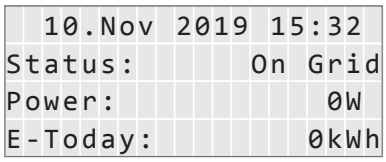
### Setting options

| Parameter | Description | Setting range |
|---|---|---|
| **Anti-islanding** | Switch the anti-islanding protection on and off. | **ON** \| **OFF** |

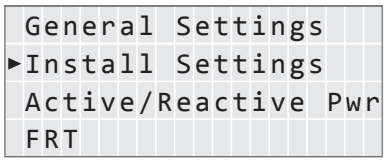
### Menu item path

**Main Menu > Install Settings > Anti-islanding**

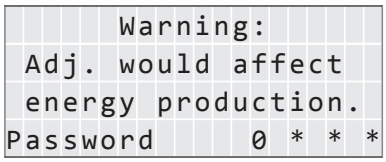
### Setting the anti-islanding



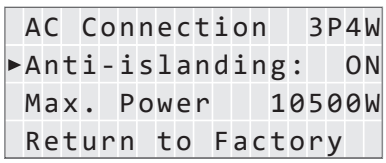

1. When the default information is displayed, press any button to open the main menu.
   Otherwise, press the ESC button repeatedly until the main menu is displayed.




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




3. Enter the password provided by Delta customer service.
   Use the ▼ and ▲ buttons to set the individual numerals.
   Press the ENT button to confirm a numeral.




4. Use the ▼ and ▲ buttons to select the **Anti-islanding** entry and then press the ENT button.
   → If the shape of the arrow changes →|, the value can be changed.
   The currently set value is displayed after the entry.
5. Use the ▼ and ▲ buttons to select a mode and then press the ENT button.

## 8.4.11 Max. Power (Infeed Limiting)

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

### Overview

This function allows you to set the maximum active power fed into the grid.

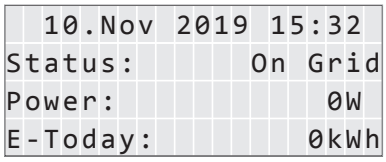
### Setting options

| Parameter | Description | Setting range |
|---|---|---|
| `Max. Power` | Limits the maximum power that can be fed into the grid. | `0 .. P`$_{MAX}$ |

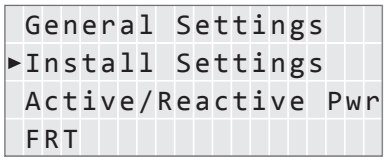
### Menu item path

`Main Menu > Install Settings > Max. Power`

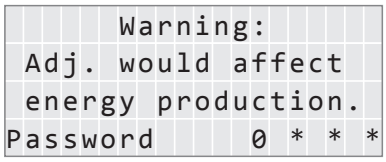
### Setting the maximum active power



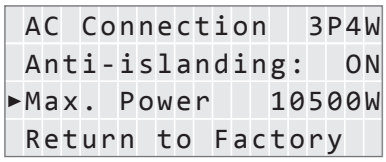

1. When the default information is displayed, press any button to open the main menu.
   Otherwise, press the ESC button repeatedly until the main menu is displayed.




2. Use the ▼ and ▲ buttons to select the **`Installation 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 numeral.




4. Use the ▼ and ▲ buttons to select **`Max. Power`** and then press the ENT button.
   → If the shape of the arrow changes →|, the value can be changed.
   The currently set value is displayed after the entry.

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

## 8.4.12 Loading the factory settings

Change this setting only after consultation with Delta customer service.

**Overview**

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

This function allows you to reset the inverter to the factory settings.

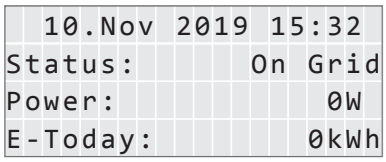
**Setting options**

| Parameter | Description | Setting range |
|---|---|---|
| `Return to Factory` | Reset the inverter to the factory settings. | None |

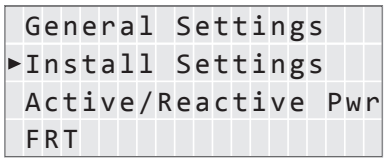
**Menu item path**

`Main Menu > Install Settings > Return to Factory`

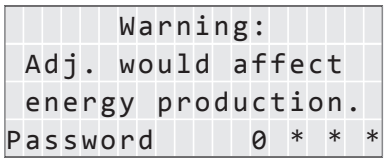
**Loading the factory settings**



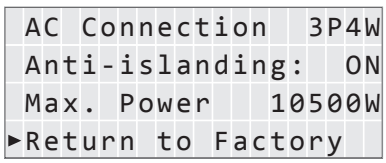

1. When the default information is displayed, press any button to open the main menu. Otherwise, press the ESC button repeatedly until the main menu is displayed.



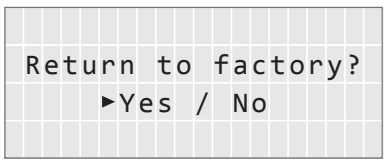

2. Use the ▼ and ▲ buttons to select the **`Install Settings`** entry. and then press the ENT button.




3. Enter the password provided by Delta customer service.
   Use the ▼ and ▲ buttons to set the individual numerals.
   Press the ENT button to confirm a numeral.




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




5. Use the ▼ and ▲ buttons to select the **`Yes`** entry and then press the ENT button
   → The factory settings are loaded.

## 8.4.13 Restart or reset the Wi-Fi module

### Overview

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

Use this feature to restart the inverter's Wi-Fi module or to reset it to the default settings.

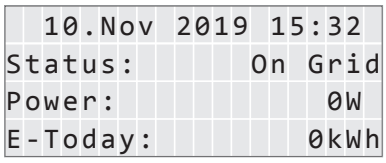
### Setting options

| Available Functions | Description | Setting range |
|---|---|---|
| **Wi-Fi reboot** | Restart the inverter's Wi-Fi module. | – |
| **Return to default** | Reset the Wi-Fi module to the default settings. | – |
| **Set Wi-Fi ON** | Turn on/off the Wi-Fi module. | – |

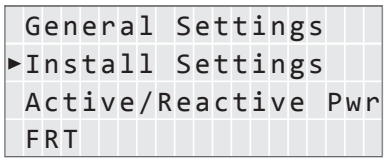
### Menu item path

**Main Menu > Install Settings > Wi-Fi Reset**

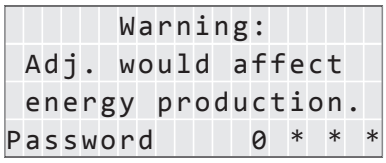
### Calling up the menu item



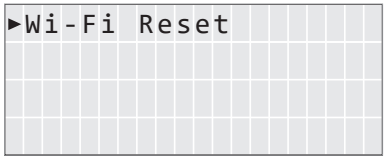

1. When the default information is displayed, press any button to open the main menu. Otherwise, press the ESC button repeatedly until the main menu is displayed.




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




3. Enter the password provided by Delta customer service.
Use the ▼ and ▲ buttons to set the individual numerals.
Press the ENT button to confirm a numeral.

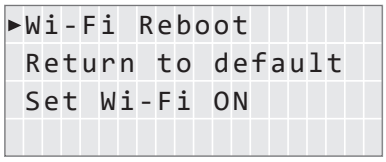



4. Use the ▼ and ▲ buttons to select the **Wi-Fi Reset** entry and then press the ENT button.

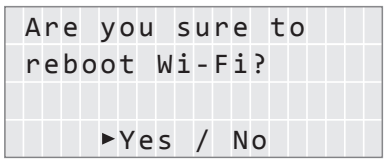
# 8 Settings

## "Installation settings" menu area

### Restart the Wi-Fi module



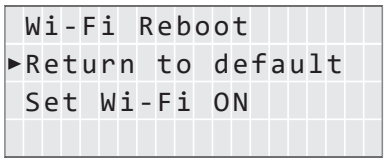

***1.*** Use the ▼ and ▲ buttons to select the **`Wi-Fi Reboot`** entry and then press the ENT button.



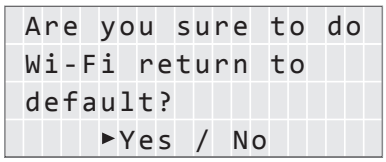

***2.*** Use the ▼ and ▲ buttons to select the **`Yes`** entry and then press the ENT button

→ The factory settings are loaded.

### Reset the Wi-Fi module



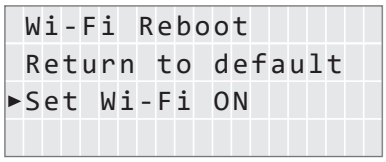

***1.*** Use the ▼ and ▲ buttons to select the **`Return to default`** entry and then press the ENT button.



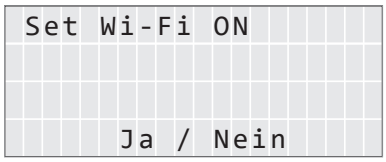

***2.*** Use the ▼ and ▲ buttons to select the **`Yes`** entry and then press the ENT button

→ The factory settings are loaded.

### Turn on/off Wi-Fi module




***1.*** Use the ▼ and ▲ buttons to select the **`Set Wi-Fi ON`** entry and then press the ENT button.




***2.*** Use the ▼ and ▲ buttons to select an entry:

Select **`Yes`** to turn on the Wi-Fi module.

Select **`No`** to turn off the Wi-Fi module.

Then press the ENT button.

→ The Wi-Fi module is switched on or off.

## 8.5 "Active/reactive power" menu area

This menu area is password-protected because the settings in this menu area affect the energy production of the inverter.

► Exercise extra care with all settings in this menu area.

### 8.5.1 Power limit

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

**Overview**

This function allows you to additionally limit the active power. The active power is specified as a percentage of the value set in the **`Max. power`** parameter (see "8.4.11 Max. Power (Infeed Limiting), page 101.

*Example*

Maximum power = 45,000 W

Power limit = 90%

Maximum active power = Max. power x power limit

Maximum active power = 45,000 W x 90% = 40,500 W

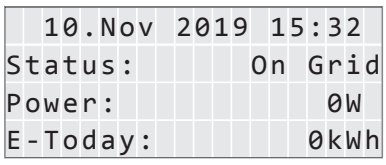
**Setting options**

| Parameter | Description | Setting range |
|---|---|---|
| **`Mode`** | Switch the function on and off. | **`ON`** \| **`OFF`** |
| **`Set Point`** | Additional active power limitation | **`0 .. 100%`** |

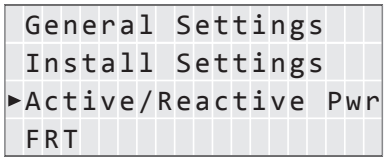
**Menu item path**

**`Main menu`** > **`Active/Reactive Pwr`** > **`Active Power Ctrl`** > **`Power Limit`**

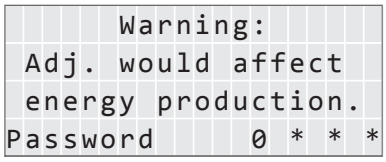
**Calling up the menu item**



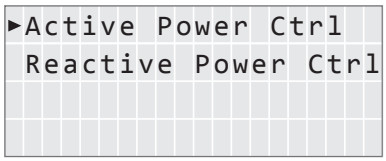

1. When the default information is displayed, press any button to open the main menu.
   Otherwise, press the ESC button repeatedly until the main menu is displayed.



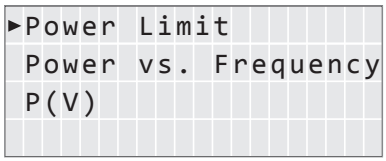

2. Use the ▼ and ▲ buttons to select the **`Active/Reactive Pwr`** entry and then press the button ENT.




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

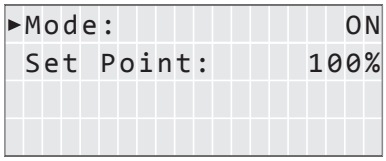



***4.*** Use the ▼ and ▲ buttons to select the **`Active Power Ctrl`** entry and then press the ENT button.




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

### Setting the mode



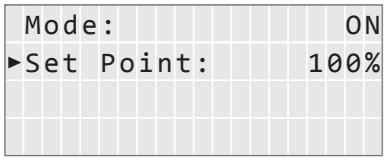

***6.*** Use the ▼ and ▲ buttons to select the **`Mode`** entry and then press the ENT button.

→ If the shape of the arrow changes →|, the mode can be changed.

The currently set mode is displayed after the entry.

***7.*** Use the ▼ and ▲ buttons to select a mode and then press the ENT button.

### Changing the settings




***8.*** Use the ▼ and ▲ buttons to select a parameter and then press the ENT button.

→ If the shape of the arrow changes →|, the parameter can be changed.

The currently set value is displayed after the entry.

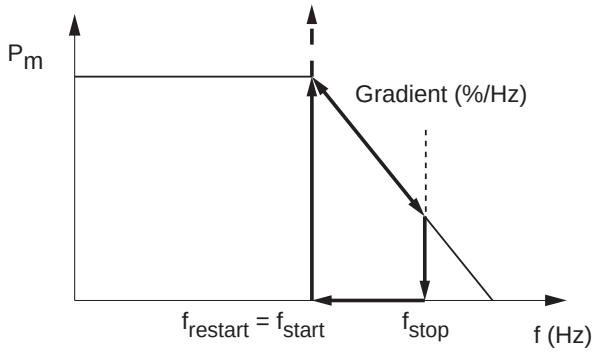
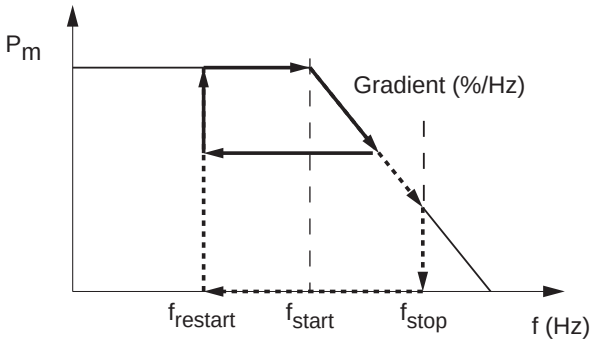
***9.*** Use the ▼ and ▲ buttons to configure the value and then press the ENT button.

## 8.5.2 Regulating the active power via the grid frequency

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

**Overview**

This function allows you to regulate the active power fed into the grid via the grid frequency.

| Standard behavior of low-voltage power grids in Germany (VDE-AR-N 4105) | Standard behavior of medium-voltage power grids in Germany (BDEW) |
|---|---|
|  |  |
| When the grid frequency exceeds $f_{start}$ the instantaneous value of the active power is stored and the fed active power is reduced according to the gradient.<br>The active power is regulated according to the gradient as long as the grid frequency lies between $f_{start}$ and $f_{stop}$.<br>The active power feed is stopped when the grid frequency exceeds $f_{stop}$.<br>Feeding regrid stopped until the grid frequency falls below $f_{start}$ again.<br>Feeding is resumed at the stored instantaneous value when the grid frequency falls below $f_{start}$ again. | When the grid frequency exceeds $f_{start}$ the instantaneous value of the active power is stored and the fed active power is reduced according to the gradient.<br>The subsequent grid feed behavior depends on changes in the grid frequency.<br>a)<br>When the grid frequency falls again, the fed active power stored at this time is maintained before reaching $f_{stop}$.<br>Feeding is resumed at the stored instantaneous value when the grid frequency falls below $f_{restart}$.<br>b)<br>The active power feed is stopped when the grid frequency exceeds $f_{stop}$.<br>Feeding regrid stopped until the grid frequency falls below $f_{restart}$.<br>Feeding is resumes at the stored instantaneous value when the grid frequency falls below $f_{restart}$ again. |

$f_{stop}$ is automatically calculated using the following formula:

$f_{stop} = f_{start} + (1 / \text{gradient})$

# 8 Settings

## "Active/reactive power" menu area

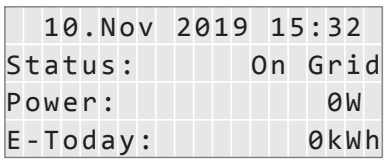
### Setting options

| Parameter | Description | Setting range |
|---|---|---|
| **Mode** | Switch the function on and off. | **ON** \| **OFF** |
| **F Start** | The grid frequency above which the active power being fed is reduced. | **50.00 .. 55.00 Hz** |
| **F recovery** | The grid frequency below which the active power being fed is no longer reduced. | **50.00 .. 55.00 Hz** |
| **Gradient** | When the grid frequency exceeds **F Start** the active power being fed is continuously reduced by the value specified here. | **0 .. 100%** |
| **T recovery** | When the grid frequency falls below **F recovery** again, the inverter waits for the time specified here before removing the previously imposed reduction of fed active power. | **0 .. 600 s** |

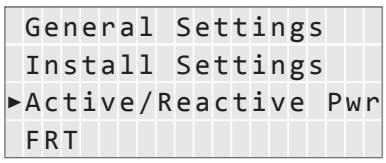
### Menu item path

**Main Menu** > **Active/Reactive Pwr** > **Active Power Ctrl** > **Power vs. Frequency**

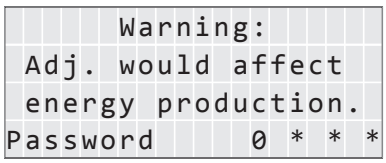
### Calling up the menu item



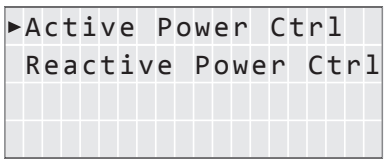

***1.*** When the default information is displayed, press any button to open the main menu.
Otherwise, press the ESC button repeatedly until the main menu is displayed.



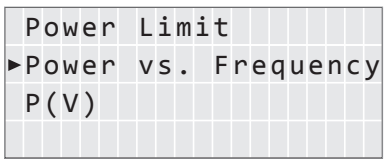

***2.*** Use the ▼ and ▲ buttons to select the **Active/Reactive Pwr** entry and then press the button ENT.




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

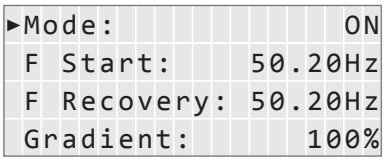



***4.*** Use the ▼ and ▲ buttons to select the **Active Power Ctrl** entry and then press the ENT button.




***5.*** Use the ▼ and ▲ buttons to select the **Power vs. Frequency** entry. and then press the ENT button.

### Setting the mode



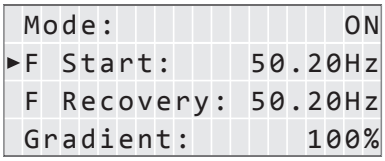

***6.*** Use the ▼ and ▲ buttons to select the **Mode** entry and then press the ENT button.

→ If the shape of the arrow changes →|, the mode can be changed.

The currently set mode is displayed after the entry.

***7.*** Use the ▼ and ▲ buttons to select a mode and then press the ENT button.

### Changing the settings




***8.*** Use the ▼ and ▲ buttons to select a parameter and then press the ENT button.

→ If the shape of the arrow changes →|, the parameter can be changed.

The currently set value is displayed after the entry.

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

## 8.5.3 P (V) (regulating the active power via the grid voltage)

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

### Overview

This function allows you to regulate the active power fed into the grid via the grid voltage.

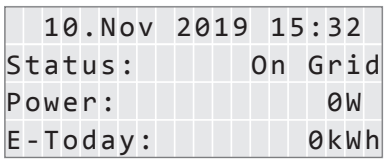
### Setting options

| Parameter | Description | Setting range |
|---|---|---|
| **Mode** | Switch the function on and off. | **ON** \| **OFF** |
| **P lock-in** | | **10 .. 100%** |
| **P lock-out** | | **0 .. 50%** |
| **V lock-in** | | **230.0 .. 292.0 V** |
| **V lock-out** | | **207.0 .. 292.0 V** |
| **T recovery** | | **10 .. 900 s** |

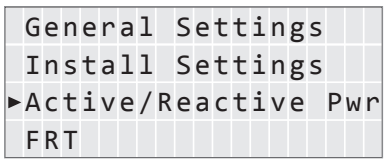
### Menu item path

**Main menu** > **Active/Reactive Pwr** > **Active Power Ctrl** > **P(V)**

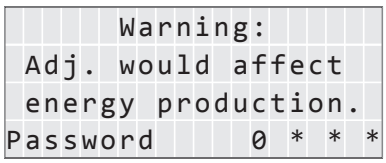
### Calling up the menu item



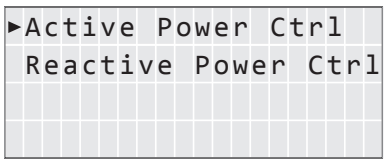

***1.*** When the default information is displayed, press any button to open the main menu. Otherwise, press the ESC button repeatedly until the main menu is displayed.



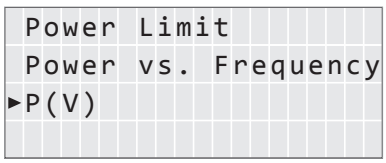

***2.*** Use the ▼ and ▲ buttons to select the **Active/Reactive Pwr** entry and then press the button ENT.




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

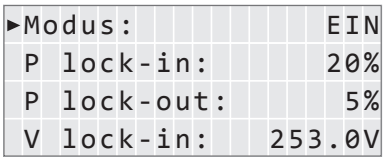



***4.*** Use the ▼ and ▲ buttons to select the **Active Power Ctrl** entry and then press the ENT button.




***5.*** Use the ▼ and ▲ buttons to select the **P(V)** entry and then press the ENT button.

### Setting the mode

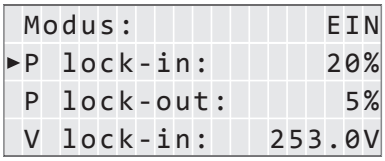



***6.*** Use the ▼ and ▲ buttons to select the **Mode** entry and then press the ENT button.

→ If the shape of the arrow changes →|, the mode can be changed.
The currently set mode is displayed after the entry.

***7.*** Use the ▼ and ▲ buttons to select a mode and then press the ENT button.

### Changing the settings




***8.*** Use the ▼ and ▲ buttons to select a parameter and then press the ENT button.

→ If the shape of the arrow changes →|, the parameter can be changed.
The currently set value is displayed after the entry.

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

## 8.5.4 Constant cos phi (cos φ)

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

### Overview

This function allows you to set a constant cos φ.

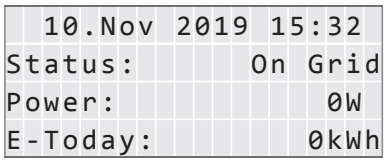
### Setting options

| Parameter | Description | Setting range |
|---|---|---|
| **Mode** | Switch the function on and off. | **ON** \| **OFF** |
| **Cos Phi** | Constant cos phi (cos φ), capacitive or inductive | **0.80 .. 0.99 cap**<br>**1**<br>**0.80 .. 0.99 ind** |

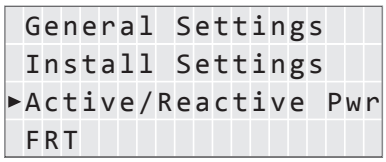
### Menu item path

**Main Menu** > **Active/Reactive Pwr** > **Reactive Power Ctrl** > **Constant cos phi**

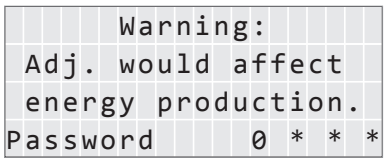
### Calling up the menu item



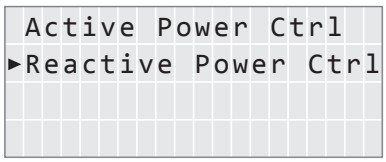

1. When the default information is displayed, press any button to open the main menu. Otherwise, press the ESC button repeatedly until the main menu is displayed.



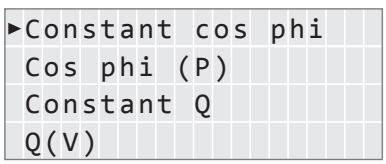

2. Use the ▼ and ▲ buttons to select the **Active/Reactive Pwr** entry and then press the button ENT.




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

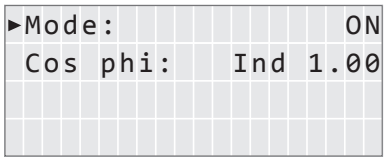



4. Use the ▼ and ▲ buttons to select the **Reactive Power Ctrl** and then press the ENT button.




5. Use the ▼ and ▲ buttons to select the **Constant cos phi** entry and then press the ENT button.

### Setting the mode



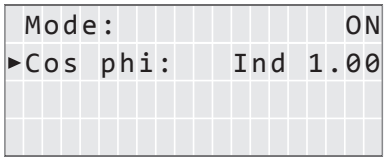

***6.*** Use the ▼ and ▲ buttons to select the **Mode** entry and then press the ENT button.

→ If the shape of the arrow changes →|, the mode can be changed.

The currently set mode is displayed after the entry.

***7.*** Use the ▼ and ▲ buttons to select a mode and then press the ENT button.

### Changing the settings




***8.*** Use the ▼ and ▲ buttons to select a parameter and then press the ENT button.

→ If the shape of the arrow changes →|, the parameter can be changed.

The currently set value is displayed after the entry.

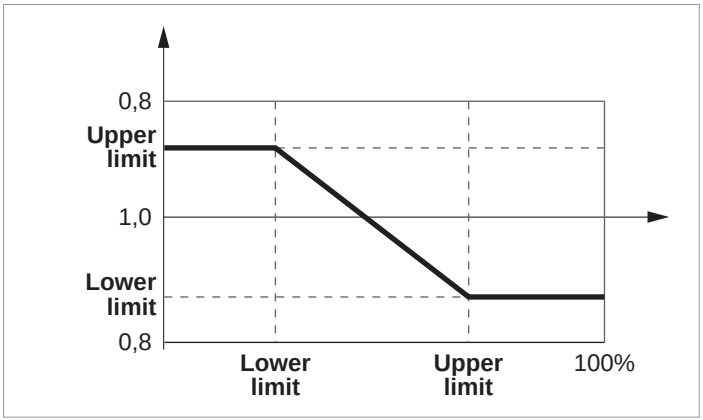
***9.*** Use the ▼ and ▲ buttons to configure the value and then press the ENT button.

## 8.5.5 Cos phi (P) (regulate cos phi via active power)

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

### Overview

This function allows you to regulate cos phi (cos φ) via the via active power.



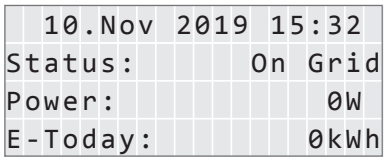

### Setting options

| Parameter | Description | Setting range |
|---|---|---|
| `Mode` | Switch the function on and off. | `ON` \| `OFF` |
| `Q upper` | The upper limit of cos phi (cos φ). | `0.80 .. 0.99 cap`<br>`1`<br>`0.80 .. 0.99 ind` |
| `P lower` | The lower limit of the active power. | `0 .. 100%` |
| `Q lower` | The lower limit of cos phi (cos φ). | `0.80 .. 0.99 cap`<br>`1`<br>`0.80 .. 0.99 ind` |
| `P upper` | The upper limit of the active power. | `0 .. 100%` |
| `V lock-in` | | `230.0 .. 253.0 V` |
| `V lock-out` | | `207.0 .. 230.0 V` |

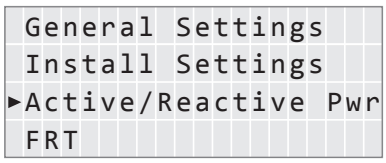
### Menu item path

`Main Menu` > `Active/Reactive Pwr` > `Reactive Power Ctrl` > `Cos phi (P)`

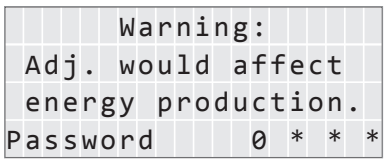
### Calling up the menu item



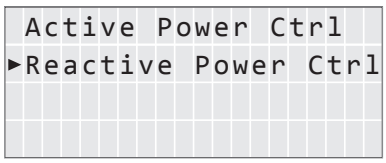

***1.*** When the default information is displayed, press any button to open the main menu. Otherwise, press the ESC button repeatedly until the main menu is displayed.



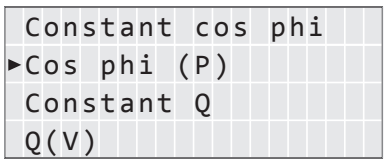

***2.*** Use the ▼ and ▲ buttons to select the **`Active/Reactive Pwr`** entry and then press the button ENT.




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

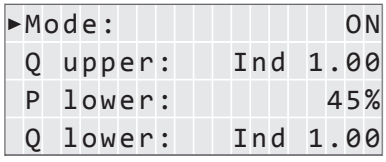



***4.*** Use the ▼ and ▲ buttons to select the **`Reactive Power Ctrl`** and then press the ENT button.




***5.*** Use the keys ▼ and ▲ to select the **`Cos phi (P)`** entry and then press the ENT button.

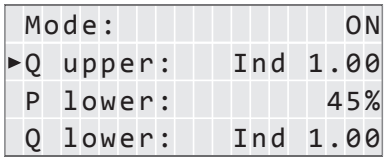
### Setting the mode




***6.*** Use the ▼ and ▲ buttons to select the **`Mode`** entry and then press the ENT button.
→ If the shape of the arrow changes →|, the mode can be changed.
The currently set mode is displayed after the entry.

***7.*** Use the ▼ and ▲ buttons to select a mode and then press the ENT button.

### Changing the settings




***8.*** Use the ▼ and ▲ buttons to select a parameter and then press the ENT button.
→ If the shape of the arrow changes →|, the parameter can be changed.
The currently set value is displayed after the entry.

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

## 8.5.6 Constant Q (constant reactive power)

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

### Overview

This function allows you to set constant reactive power.

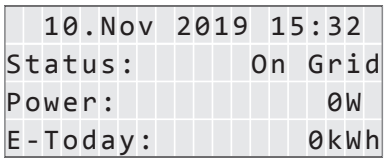
### Setting options

| Parameter | Description | Setting range |
|---|---|---|
| **Mode** | Switch the function on and off. | **ON** \| **OFF** |
| **Fix Q** | The constant reactive power as a percentage of the nominal apparent power. | **0 .. 100% cap**<br>**0%**<br>**0 .. 100% ind** |

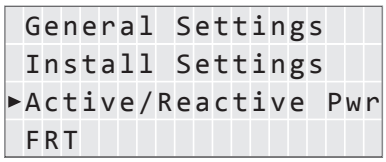
### Menu item path

**Main Menu** > **Active/Reactive Pwr** > **Reactive Power Ctrl** > **Constant Q**

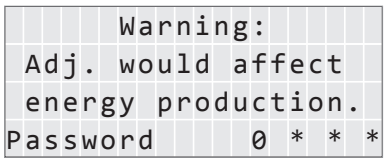
### Calling up the menu item



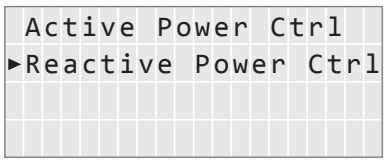

1. When the default information is displayed, press any button to open the main menu. Otherwise, press the ESC button repeatedly until the main menu is displayed.



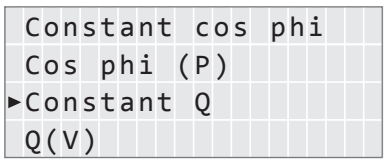

2. Use the ▼ and ▲ buttons to select the **Active/Reactive Pwr** entry and then press the button ENT.




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

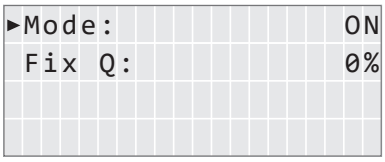



4. Use the ▼ and ▲ buttons to select the **Reactive Power Ctrl** and then press the ENT button.




5. Use the ▼ and ▲ buttons to select the **Constant Q** entry and then press the ENT button.

### Setting the mode



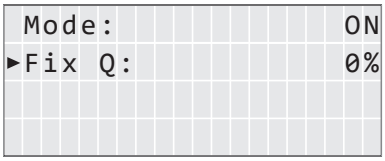

***6.*** Use the ▼ and ▲ buttons to select the **Mode** entry and then press the ENT button.

→ If the shape of the arrow changes →|, the mode can be changed.

The currently set mode is displayed after the entry.

***7.*** Use the ▼ and ▲ buttons to select a mode and then press the ENT button.

### Changing the settings




***8.*** Use the ▼ and ▲ buttons to select a parameter and then press the ENT button.

→ If the shape of the arrow changes →|, the parameter can be changed.

The currently set value is displayed after the entry.

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

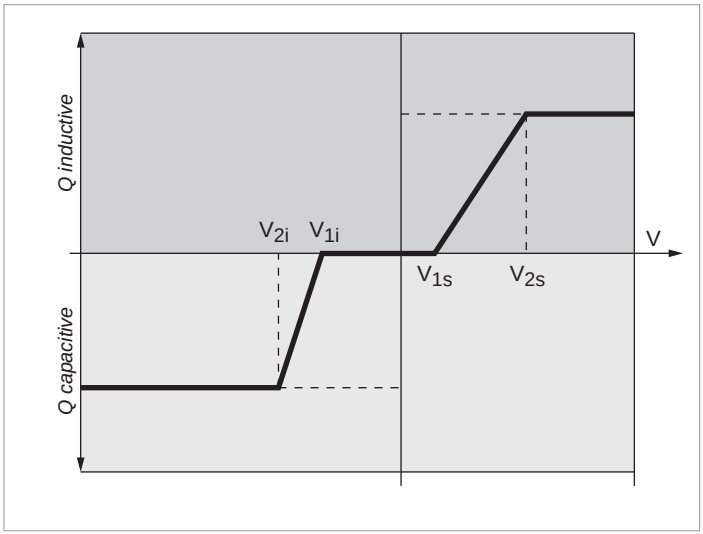
## 8.5.7 Q (V) – Regulating reactive power via voltage

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

### Overview

This function allows you to regulate the reactive power via the voltage.

This function is only available for medium-voltage grids.




*Case 1: Grid Voltage > Nominal Voltage*
When the grid voltage drops below the lower voltage limit **V1s** the inverter begins feeding inductive reactive power.

If the **Delay time** is greater than 0 (zero), the inverter waits for the time specified here to see if the grid voltage falls below **V1s** again, before feeding capacitive reactive power.

When the grid voltage increases again, the inductive reactive power is increased according to the ramp specified by the characteristic curve.

When the grid voltage exceeds the upper voltage limit **V2s** the inductive reactive power regrid at the level specified in **Qs Limit**.

*Case 2: Grid Voltage < Nominal Voltage*
When the grid voltage drops below the upper voltage limit **V1i** the inverter begins feeding capacitive reactive power.

If the **Delay time** is greater than 0 (zero), the inverter waits for the time specified here to see if the grid voltage rises above **V1i** again, before feeding capacitive reactive power.

When the grid voltage increases again, the capacitive reactive power is increased according to the ramp specified by the characteristic curve.

When the grid voltage drops below the lower voltage limit **V2i** the capacitive reactive power regrid at the level specified in **Qi limit**.

### Setting options

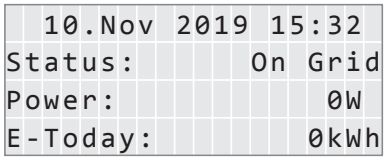
| Parameter | Description | Setting range |
|---|---|---|
| **Mode** | Switch the function on and off. | **ON** \| **OFF** |

| Parameter | Description | Setting range |
|---|---|---|
| **V1s** | The lower voltage limit for feeding inductive reactive power. | **220.0 .. 292.0 V** |
| **V2s** | The upper voltage limit for feeding inductive reactive power. | **220.0 .. 292.0 V** |
| **Qs limit** | The limit value for inductive reactive power. The value is set as a percentage of the nominal apparent power Sn. This value is connected to the parameter V2s. | **ind 63% .. 1% \| 0%** |
| **V1i** | The upper voltage limit for feeding capacitive reactive power. | **184.0 .. 254.0 V** |
| **V2i** | The lower voltage limit for feeding capacitive reactive power. | **184.0 .. 254.0 V** |
| **Qi limit** | The limit value for capacitive reactive power. The value is set as a percentage of the nominal apparent power Sn. This value is connected to the parameter V2i. | **cap 63% .. 1% \| 0%** |
| **T Delay** | Delay time before feeding reactive power. | **0 .. 120 s** |
| **Lock-in power** | The upper limit of the active power range in which the function is active. The value is set as a percentage of the nominal active power. | **0 .. 100%** |
| **Lock-out power** | The lower limit of the active power range in which the function is active. The value is set as a percentage of the nominal active power. | **0 .. 100%** |

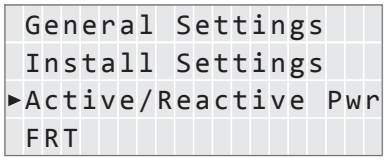
**Menu item path**

**Main Menu** > **Active/Reactive Pwr** > **Reactive Power Ctrl** > **Q(V)**

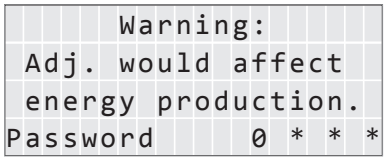
**Calling up the menu item**



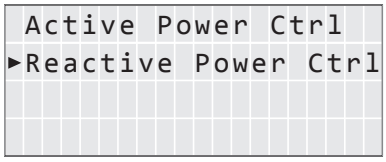

***1.*** When the default information is displayed, press any button to open the main menu. Otherwise, press the ESC button repeatedly until the main menu is displayed.



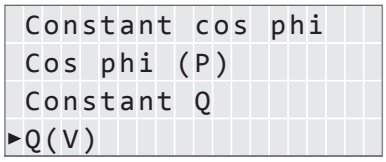

***2.*** Use the ▼ and ▲ buttons to select the **Active/Reactive Pwr** entry and then press the button ENT.




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

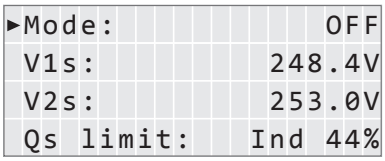



***4.*** Use the ▼ and ▲ buttons to select the **Reactive Power Ctrl** and then press the ENT button.




***5.*** Use the ▼ and ▲ buttons to select the **Q(V)** entry and then press the ENT button.

### Setting the mode



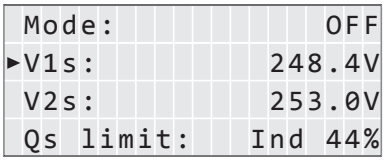

***6.*** Use the ▼ and ▲ buttons to select the **Mode** entry and then press the ENT button.

→ If the shape of the arrow changes →|, the mode can be changed.

The currently set mode is displayed after the entry.

***7.*** Use the ▼ and ▲ buttons to select a mode and then press the ENT button.

### Changing the settings




***8.*** Use the ▼ and ▲ buttons to select a parameter and then press the ENT button.

→ If the shape of the arrow changes →|, the parameter can be changed.

The currently set value is displayed after the entry.

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

## 8.6 FRT (Fault Ride Through)

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

### Overview

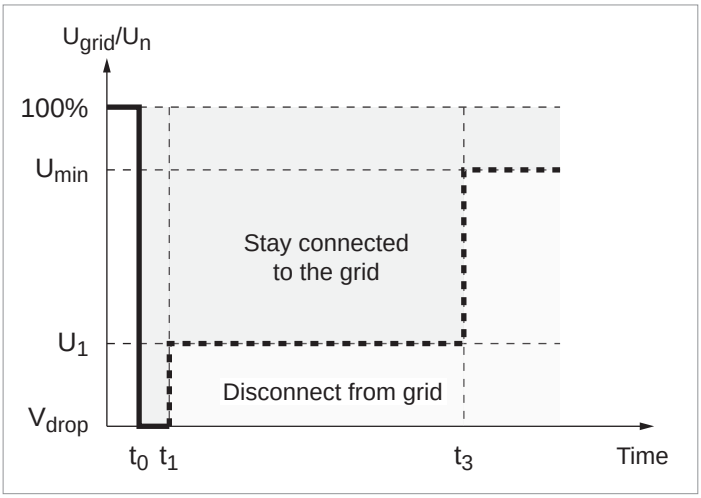
To change this setting, you need a special password provided by Delta customer service. You can find the contact information on the back of this document.

This function allows you to defined the behavior of the inverter in the event of short-term grid voltage dropouts.

### Menu item path

**Main menu** > **Settings** > **FRT**

### Setting options



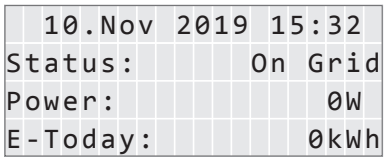

$t_0$ : The time at which a voltage collapse begins.

| Parameter | Description | Setting range |
|---|---|---|
| **Mode** | Switch the function on and off. | **ON** \| **OFF** |
| **Dead band** | The upper voltage limit of the voltage range in which this function **is not** active.<br>The percentage value relates to the nominal voltage. | **-20 .. 0%** |
| **Vdrop** | Voltage drop | **0 .. 90%** |
| **t1** | Time t1 | **0.0 .. 5.0 s** |
| **U1** | Voltage U1 | **20 .. 90%** |
| **t3** | Time t3 | **0.0 .. 5.0 s** |
| **K factor** | Switching current factor | **0.0 .. 10.0** |

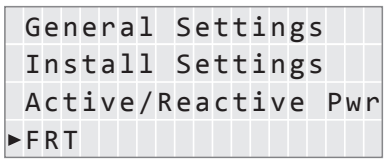
# 8 Settings

## FRT (Fault Ride Through)

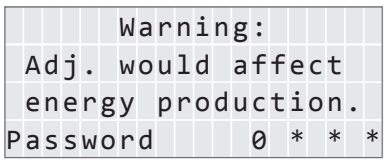
### Calling up the menu item




***1.*** When the default information is displayed, press any button to open the main menu.
Otherwise, press the ESC button repeatedly until the main menu is displayed.

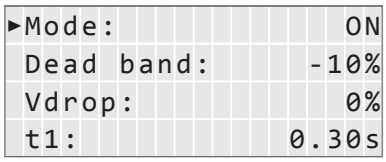



***2.*** Use the ▼ and ▲ buttons to select the **`Active/Reactive Pwr`** entry and then press the button ENT.




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

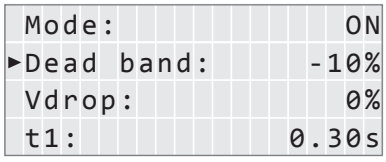
### Setting the mode




***4.*** Use the ▼ and ▲ buttons to select the **`Mode`** entry and then press the ENT button.
→ If the shape of the arrow changes →|, the mode can be changed.
The currently set mode is displayed after the entry.

***5.*** Use the ▼ and ▲ buttons to select a mode and then press the ENT button.

### Changing the settings




***6.*** Use the ▼ and ▲ buttons to select a parameter and then press the ENT button.
→ If the shape of the arrow changes →|, the parameter can be changed.
The currently set value is displayed after the entry.

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

# 9. Measurements and statistics

The following information is available:

| Type of information | Description |
|---|---|
| Meter | Current data for various parameters |
| Energy Log | Information on the energy generated over the entire usage period of the inverter |
| Event Log | A list of major events, e.g. warning messages, faults, parameter changes etc., with date and time. |
| Inverter Info. | Information on general settings, grid settings, active power and reactive power monitoring, firmware versions etc. (see “8.2 “Inverter info.” menu area (current settings)”, page 74) |

## 9.1 Measurements

**Overview**

This menu displays the current data for various parameters in real time.

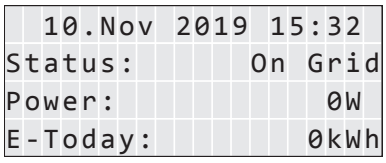
**Setting options**

The displayed information cannot be edited.

**Menu item path**

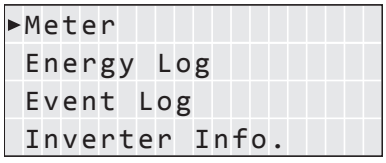
`Main menu > Meter`

**Displaying measurements**




***1.*** If the default information is displayed, press any button to open the main menu.

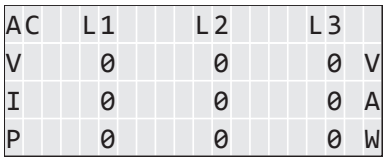
Otherwise, press the ESC button repeatedly until the main menu is displayed.




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

***3.*** Use the ▼ and ▲ buttons to page through the menu.

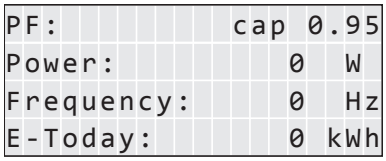
Press the ESC button to cancel.




AC page

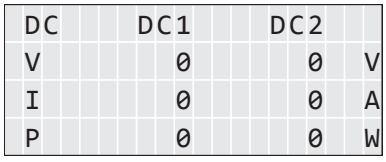
The instantaneous values for phases L1, L2 and L3 are shown.

**`V`**: AC voltage in V
**`I`**: AC current in A
**`P`**: AC active power in W




AC page

**`cos phi`**: Active power factor cos phi
**`Power`**: Currently supplied active power in kW
**`Frequency`** : Current grid frequency in Hz
**`E-today`**: Amount of energy generated today up to now




DC side

The instantaneous values for DC inputs DC1 and DC2 are shown.

**`V`**: DC voltage in V
**`I`**: DC current in A
**`P`**: DC active power in W

# 9 Measurements and statistics

## 9.2 Energy log

**Overview**

This menu shows the energy yields for various time periods.

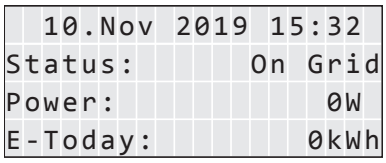
**Setting options**

The displayed information cannot be edited.

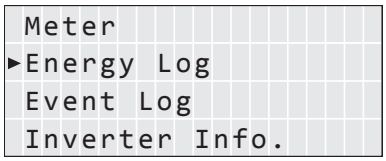
**Menu item path**

`Main menu > Energy Log`

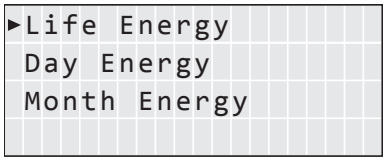
**Displaying the energy log**




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

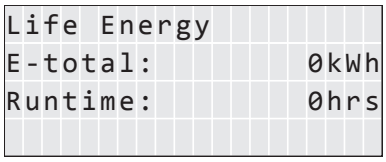



***2.*** Use the ▼ and ▲ buttons to select the **`Energy Log`** entry and then press the ENT button.




***3.*** Use the ▼ and ▲ buttons to page through the menu.
Press the ENT button to open a sub-menu.
Press the ESC button to cancel.

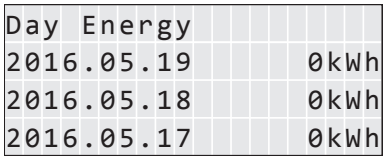
**`Life Energy`**




**`Total Energy`**: The energy generated over the runtime period.

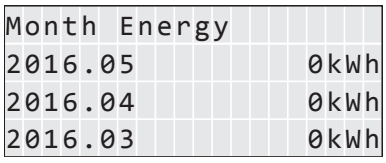
**`Runtime`**: Total runtime of the inverter.

**`Day Energy`**




Amount of energy generated per day.

**`Month Energy`**




Amount of energy generated per month.

## 9.3 Event log

The event log contains error event messages and a grid report.

### 9.3.1 Error events

**Overview**

This menu shows a list with the last 30 error events.

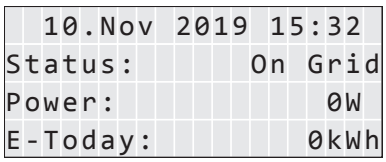
**Setting options**

The list can be deleted.

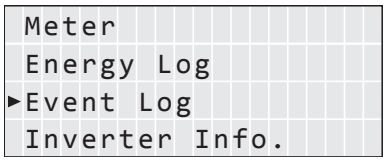
**Menu item path**

`Main Menu > Event Log > Error Events`

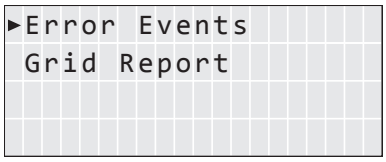
**Displaying error events**



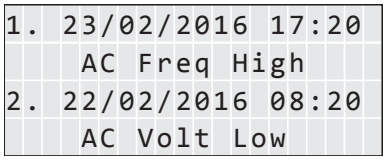

***1.*** If the default information is displayed, press any button to open the main menu. Otherwise, press the ESC button repeatedly until the main menu is displayed.




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



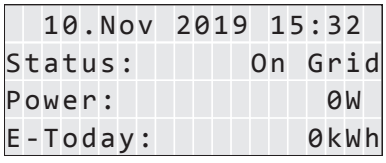

***3.*** Use the ▼ and ▲ buttons to select the **Error Events** entry and then press the ENT button.



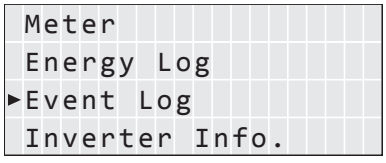

***4.*** Use the ▼ and ▲ buttons to page through the menu. Press the ESC button to cancel.

**Deleting error events**

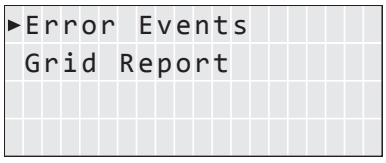
The grid report is also deleted together with the error events!




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

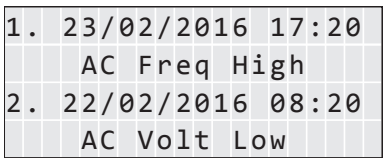



***2.*** Use the ▼ and ▲ buttons to select the **Event Log** entry and then press the ENT button.



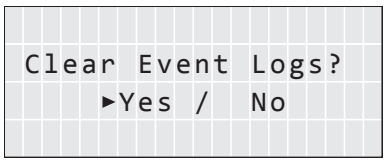

***3.*** Use the ▼ and ▲ buttons to select the **`Error Events`** entry and then press the ENT button.

→ The list of error events is displayed.

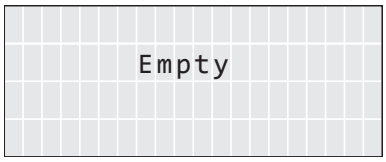



***4.*** Press and hold the ▼ , ▲ and ENT buttons simultaneously for at least 5 seconds.

→ A confirmation prompt is displayed.




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




☑ The event log has now been deleted.

### 9.3.2 Grid report

**Overview**

This menu shows a list with the last 5 error events.

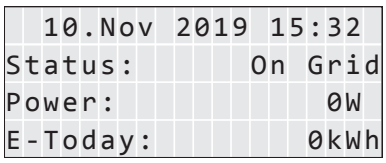
**Setting options**

The list can be deleted.

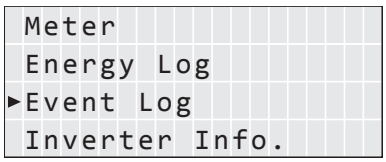
**Menu item path**

`Main Menu > Event Log > Grid Report`

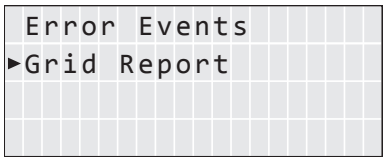
**Displaying the grid report**



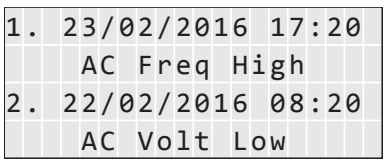

***1.*** If the default information is displayed, press any button to open the main menu.
Otherwise, press the ESC button repeatedly until the main menu is displayed.




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



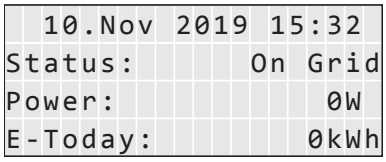

***3.*** Use the ▼ and ▲ buttons to select the **`Grid Report`** entry and then press the ENT button.



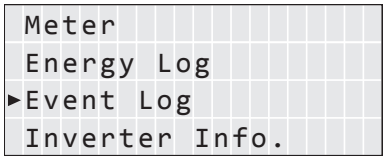

***4.*** Use the ▼ and ▲ buttons to page through the menu.
Press the ESC button to cancel.

### Deleting the grid report

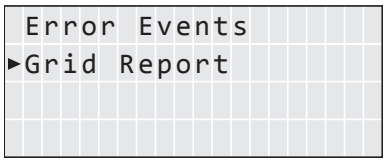
The error events are also deleted together with the grid report!




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

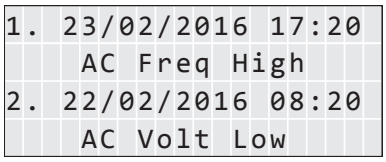



**2.** Use the ▼ and ▲ buttons to select the **Event Log** entry and then press the ENT button.




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

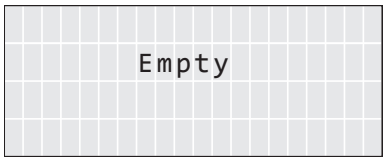
→ The list of error events is displayed.




**4.** Press and hold the ▼, ▲ and ENT buttons simultaneously for at least 5 seconds.

→ A confirmation prompt is displayed.


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




☑ The event log has now been deleted.

# 10. Error events and troubleshooting

**DANGER**

**Electric shock**

Potentially fatal voltages are present in the inverter during operation. When the inverter is disconnected from all power sources, this voltage regrid in the inverter for up to 60 seconds. You should therefore always carry out the following steps before working on the inverter:

1. Turn the AC/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 restored accidentally.
3. Wait at least 60 seconds for the internal capacitors to discharge.

**DANGER**

- ► Electric shock
- ► Potentially fatal voltages are present at the DC connections of the inverter. When light falls on the solar modules, they immediately start to generate electricity. This also happens when light does not fall directly on the solar modules.
- ► Never disconnect the inverter from the solar modules when it is under load.
- ► Turn the AC/DC disconnector to the ***OFF*** position.
- ► Disconnect the connection to the grid so that the inverter cannot feed energy into the grid.
- ► Disconnect the inverter from all AC and DC voltage sources. Make sure that none of the connections can be restored accidentally.
- ► Ensure that the DC cables cannot be touched accidentally.

**DANGER**

**Electric shock**

The inverter has a high leakage current value.

- ► **Always** connect the ground cable first, then the AC and DC cables.

The inverter contains no internal components that must be maintained or repaired by the operator or installer. All repairs must be performed by Delta Energy Systems. Opening the cover will void the warranty.

## 10.1 Faults

| Number | Message | Possible Cause | Solution |
|---|---|---|---|
| E01 | AC freq. High | Current grid frequency is above the ***OFR*** setting (over frequency recognition). | Check the grid frequency on the inverter display. |
| | | Incorrect country setting. | Check the country setting on the inverter display. |
| E02 | AC Freq Low | Current grid frequency is below the ***UFR*** setting (under frequency recognition). | Check the grid frequency on the inverter display. |
| | | Incorrect country or grid type setting. | Check the country and grid type settings. |
| E11, E13, E16, E18, E21, E23 | AC Volt High | Current grid voltage is above the ***OVR*** setting (over voltage recognition). | Check the grid voltage on the inverter display. |
| | | Grid voltage is over the ***Slow OVR*** setting during operation. | Check the grid voltage on the inverter display. |
| | | Incorrect country or grid type setting. | Check the country and grid type settings. |
| E10, E15, E20 | AC Volt Low | Grid grid voltage lies below the ***UVR*** setting (undervoltage detection). | Check the grid voltage connection at the inverter terminals. |
| | | Incorrect country or grid type setting. | Check the country and grid type settings. |
| | | Incorrectly wired AC plug. | Check the wiring of the AC plug. |
| E07 | Grid Quality | Non-linear load in the grid and in the vicinity of the inverter. | The grid connection of the inverter must be kept away from non-linear loads; if necessary, move it further away. |
| E08 | HW Connect Fail | Incorrectly wired AC plug. | Check the wiring of the AC plug. |
| E34 | Insulation | Insulation fault in the PV system. | Check the insulation of the DC inputs. |
| | | Large PV system capacitance between Plus and Ground or Minus and Ground or both. | Check the capacitance and dry the PV modules if necessary. |
| E09 | No Grid | AC/DC disconnection switch is in position **OFF**. | Turn the AC/DC disconnector to the **ON** position. |
| | | AC plug is not correctly connected. | Check the connection in the AC plug and its connection to the inverter. |
| | | Incorrectly wired AC plug. | Check the wiring of the AC plug. |
| E30 | Solar1 High | The DC input voltage at DC1 is greater than the maximum permissible DC input voltage. | Change the solar system setting so that the DC input voltage at DC1 is below the maximum permissible DC input voltage. |
| E31 | Solar2 High | The DC input voltage at DC2 is greater than the maximum permissible DC input voltage. | Change the solar system setting so that the DC input voltage at DC1 is below the maximum permissible DC input voltage. |

# 10 Error events and troubleshooting

## 10.2 Warnings

| Number | Message | Possible Cause | Solution |
|---|---|---|---|
| W01 | Solar1 Low | The DC input voltage at DC1 is less than the minimum required DC input voltage. | Check the DC input voltage at DC1 on the inverter display.<br>Maybe the solar irradiation is too low. |
| W02 | Solar2 Low | The DC input voltage at DC2 is less than the minimum required DC input voltage. | Check the DC input voltage at DC2 on the inverter display.<br>Maybe the solar irradiation is too low. |
| W11 | HW Fan | One or more fans are blocked. | Remove all objects that might be blocking the fans. |
| | | One or more fans are defective. | Replace the fans. |
| | | One or more fans are disconnected. | Check the connections for all fans. |
| | SPD Fail | The inverter has been hit by lightning. | Check the inverter status. |
| | | One or more SPDs (surge protection devices) are defective. | Replace the defective SPDs. |
| | | One or more SPDs are not correctly inserted. | Check all SPDs. |

## 10.3 Faults

| Number | Message | Possible Cause | Solution |
|---|---|---|---|
| F36, F37, F38, F39, F40, F41 | AC Current High | Overvoltage during operation. | Please contact Delta Support. |
| | | Internal error. | Please contact Delta Support. |
| F30 | Bus Unbalance | Incomplete independent or parallel configuration between the inputs. | Check the input connections. |
| | | Grounding of the PV system. | Check the insulation of the PV system. |
| | | Internal error. | Please contact Delta Support. |
| F60, F61, F70, F71 | DC Current High | Internal error. | Please contact Delta Support. |
| F24 | Ground Current | Insulation fault in the PV system. | Check the insulation of the DC inputs. |
| | | Large PV system capacitance between Plus and Ground or Minus and Ground. | Check the capacitance, it must be < 2.5 µF. Install an external transformer if necessary. |
| | | Internal error. | Please contact Delta Support. |
| F45 | HW AC OCR | Large grid harmonics. | Check the grid waveform. The grid connection of the inverter must be kept away from non-linear loads; if necessary, move it further away. |
| | | Internal error. | Please contact Delta Support. |
| F31, F33, F35 | HW Bus OVR | The DC input voltage is greater than the maximum permissible DC input voltage. | Change the solar system setting so that the DC input voltage at DC1 is below the maximum permissible DC input voltage. |
| | | Overvoltage during operation. | Please contact Delta Support. |
| | | Internal error. | Please contact Delta Support. |
| F23 | HW COMM1 | Internal error. | Please contact Delta Support. |
| F22 | HW COMM2 | Internal error. | Please contact Delta Support. |
| F26 | HW Connect Fail | Internal error. | Please contact Delta Support. |
| F42 | HW CT A Fail | Internal error. | Please contact Delta Support. |

| Number | Message | Possible Cause | Solution |
|---|---|---|---|
| F43 | HW CT B Fail | Internal error. | Please contact Delta Support. |
| F44 | HW CT C Fail | Internal error. | Please contact Delta Support. |
| F01, F02, F03 | HW DC Injection | The grid waveform is abnormal. | Check the grid waveform. The grid connection of the inverter must be kept away from non-linear loads; if necessary, move it further away. |
| | | Internal error. | Please contact Delta Support. |
| F15, F16, F17 | HW DSP ADC1, HW DSP ADC2, HW DSP ADC3 | The DC input voltage is less than the minimum required DC voltage. | Check the DC input voltage on the inverter display.<br>Maybe the solar irradiation is too low. |
| | | Internal error. | Please contact Delta Support. |
| F20 | HW Efficiency | Incorrect calibration. | Check the accuracy of the voltage and power. |
| | | Internal error. | Please contact Delta Support. |
| F06, F08, F09, F10 | HW NTC1 Fail, HW NTC2 Fail, HW NTC3 Fail, HW NTC4 Fail | Ambient temperature is > 90 °C or < -30 °C. | Check the system environment. |
| | | Detection circuit malfunction. | Check the detection circuit in the ***Inverter***. |
| F18, F19 | HW Red ADC1, HW Red ADC2 | The DC input voltage is less than the minimum required DC voltage. | Check the DC input voltage on the inverter display.<br>Maybe the solar irradiation is too low. |
| | | Internal error. | Please contact Delta Support. |
| F50 | HW ZC Fail | Internal error. | Please contact Delta Support. |
| F27 | RCMU Fail | Internal error. | Please contact Delta Support. |
| F13, F29 | Relay Open | Internal error. | Please contact Delta Support. |
| F28 | Relay Short | Internal error. | Please contact Delta Support. |
| | | Fault in the relay driver circuit. | Check the driver circuit in the ***inverter***. |
| F05 | Temperature High | The ambient temperature is > 60 °C. | Check the system environment. |
| F07 | Temperature Low | The ambient temperature is < -30 °C. | Check the system environment. |
| | | Internal error. | Please contact Delta Support. |

# 11. Maintenance

**DANGER**

**Electric shock**
Potentially fatal voltages are present in the inverter during operation. When the inverter is disconnected from all power sources, this voltage regrid in the inverter for up to 60 seconds. You should therefore always carry out the following steps before working on the inverter:

1. Turn the AC/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 restored accidentally.
3. Wait at least 60 seconds for the internal capacitors to discharge.

**DANGER**

- ► Electric shock
- ► Potentially fatal voltages are present at the DC connections of the inverter. When light falls on the solar modules, they immediately start to generate electricity. This also happens when light does not fall directly on the solar modules.
- ► Never disconnect the inverter from the solar modules when it is under load.
- ► Turn the AC/DC disconnector to the ***OFF*** position.
- ► Disconnect the connection to the grid so that the inverter cannot feed energy into the grid.
- ► Disconnect the inverter from all AC and DC voltage sources. Make sure that none of the connections can be restored accidentally.
- ► Ensure that the DC cables cannot be touched accidentally.

**DANGER**

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

The inverter contains no internal components that must be maintained or repaired by the operator or installer. All repairs must be performed by Delta Energy Systems. Opening the cover will void the warranty.

In order to ensure the normal operation of the inverter, do the following **visual inspections** every 6 months.

- Check on the display that the inverter is running correctly. Check data history and error events.
- Check the correct position of visible terminals, screws and cables but do not touch any of these parts.
- Check for damaged parts but do not touch any of these parts.

If any parts are damaged, contact a certified electrician or Delta Service.

# 12. Replacing the inverter

**DANGER**

**Electric shock**

Potentially fatal voltages are present in the inverter during operation. When the inverter is disconnected from all power sources, this voltage regrid in the inverter for up to 60 seconds. You should therefore always carry out the following steps before working on the inverter:

1. Turn the AC/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 restored accidentally.
3. Wait at least 60 seconds for the internal capacitors to discharge.

**DANGER**

- ► Electric shock
- ► Potentially fatal voltages are present at the DC connections of the inverter. When light falls on the solar modules, they immediately start to generate electricity. This also happens when light does not fall directly on the solar modules.
- ► Never disconnect the inverter from the solar modules when it is under load.
- ► Turn the AC/DC disconnector to the ***OFF*** position.
- ► Disconnect the connection to the grid so that the inverter cannot feed energy into the grid.
- ► Disconnect the inverter from all AC and DC voltage sources. Make sure that none of the connections can be restored accidentally.
- ► Ensure that the DC cables cannot be touched accidentally.

**DANGER**

**Electric shock**

The inverter has a high leakage current value.

- ► **Always** connect the ground cable first, then the AC and DC cables.

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

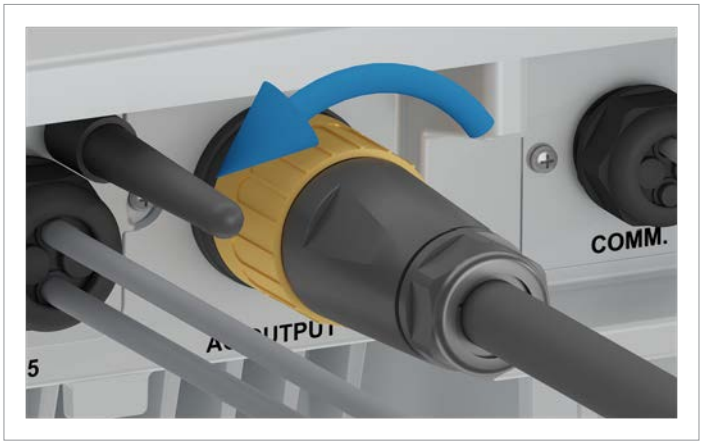
1. To shut off the inverter's AC voltage, open the load isolating switch between the inverter and the grid connection point.

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

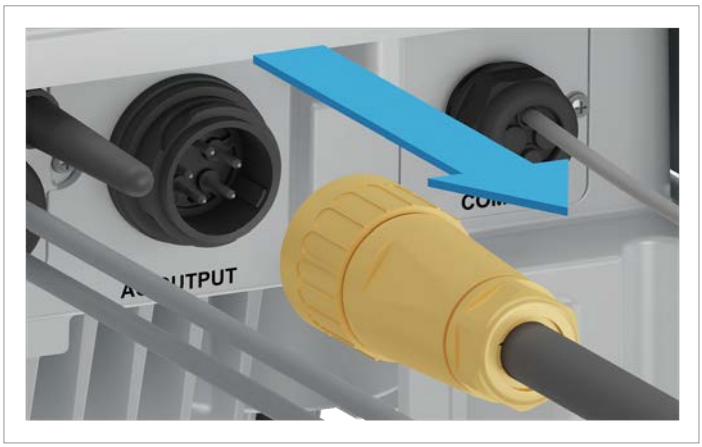

2. Turn the AC/DC disconnector to the ***OFF*** position.

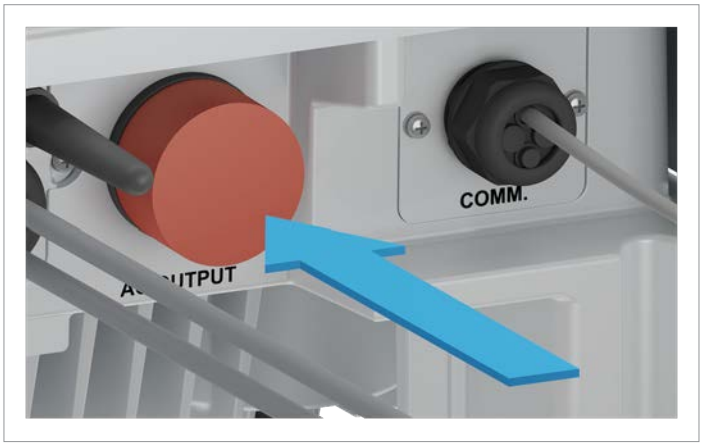
   Wait at least 60 seconds for the internal capacitors to discharge.

3. Use the mounting tool to release the DC cables and then pull them out.



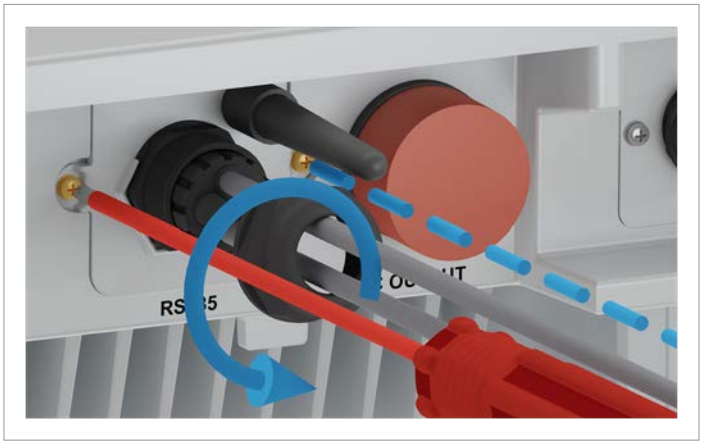

4. Disconnect the AC connector and pull it out along with the cable.



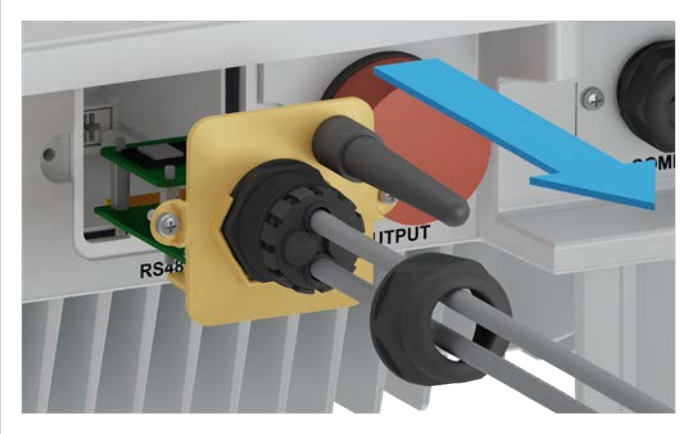


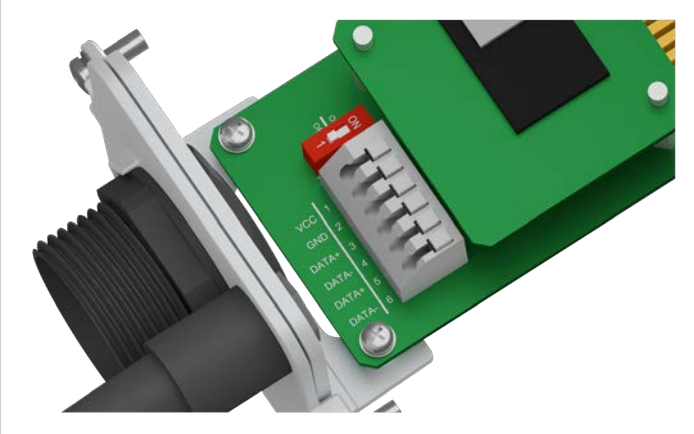

5. Fit the cover cap on the AC connection.


6. Unscrew the cable gland from the RS845 connection.

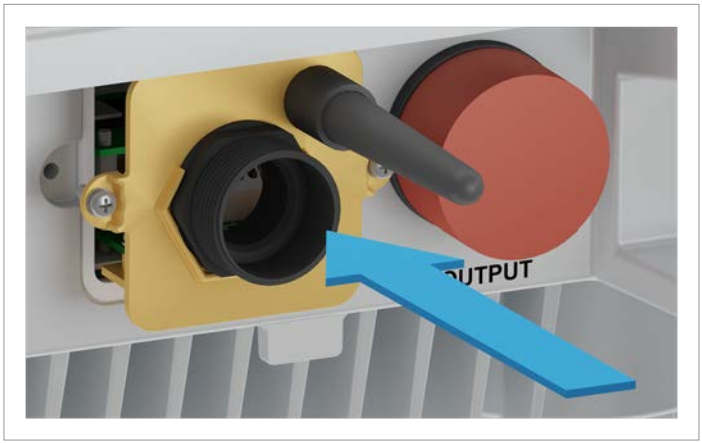


7. Unscrew the cover of the RS845 connection and pull it out carefully. The RS845 card is screwed onto the cover.

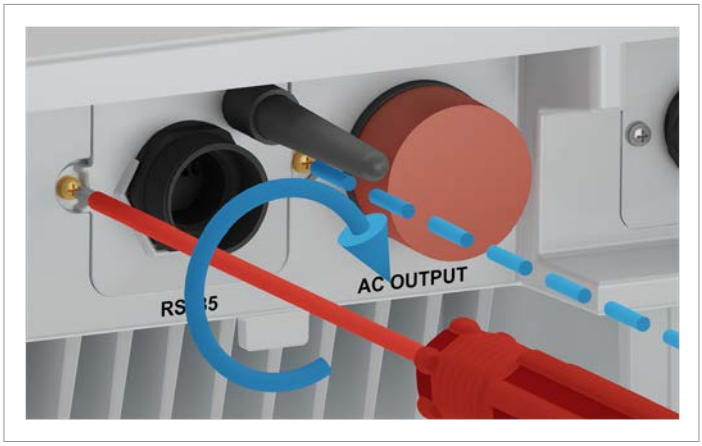


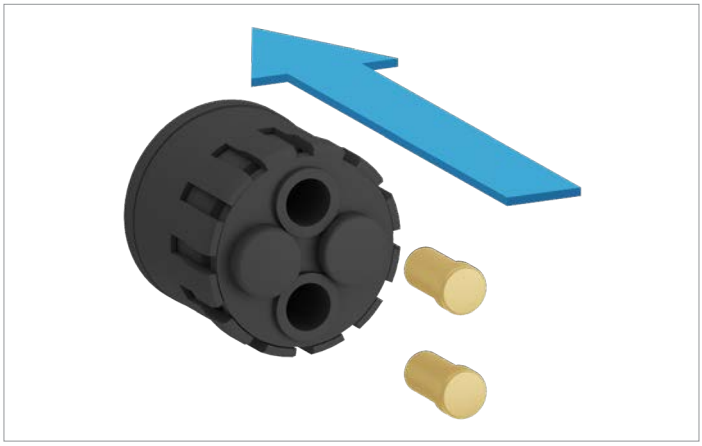



8. Remove all cables from the RS845 card.

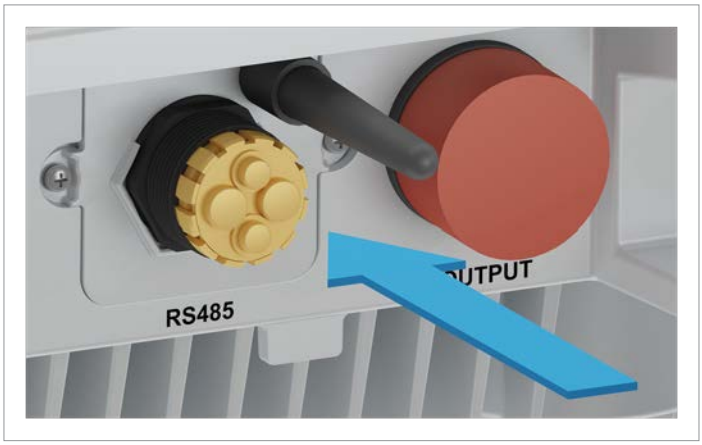


9. Insert the cover along with the RS845 card and screw it in place.



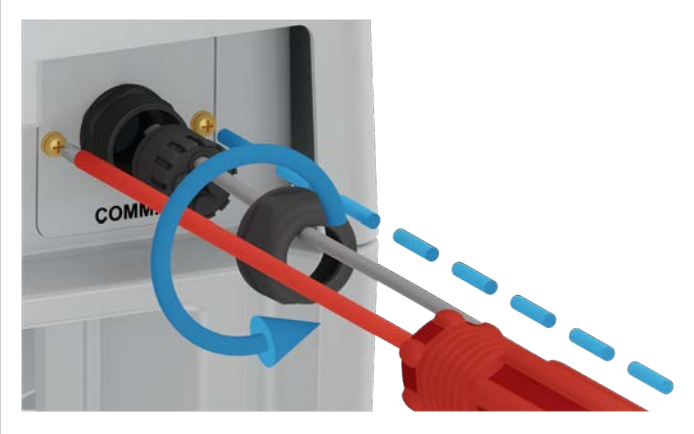



10. Insert all rubber plugs into the seal to prevent moisture from entering the openings.




11. Insert the seal and cable gland and screw the cable gland tight.

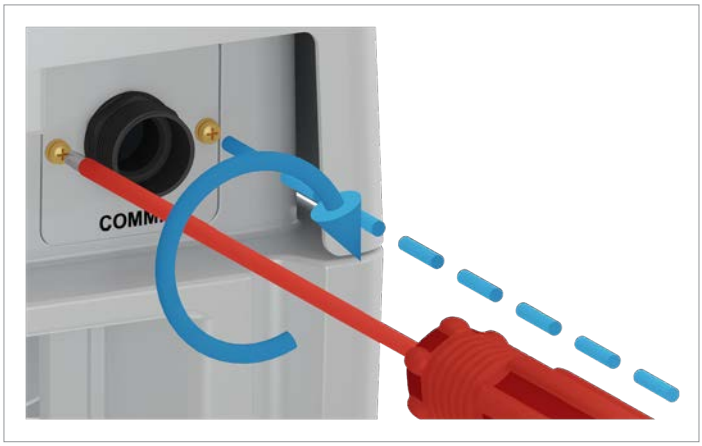

12. Unscrew the cable gland of the communication connection and carefully pull it out slightly.

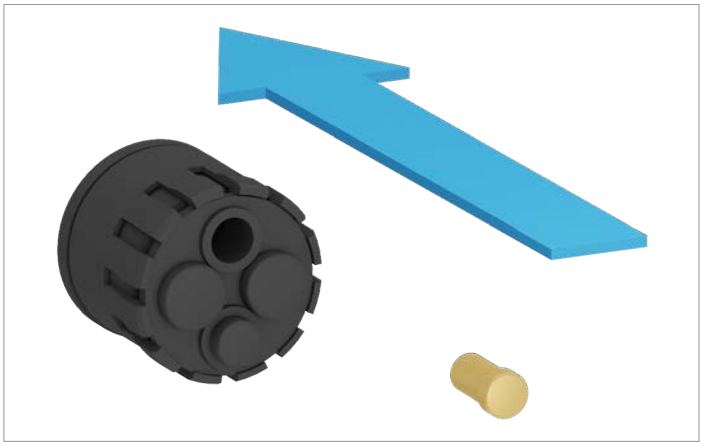




13. Unscrew and remove the cover of the communication connection.

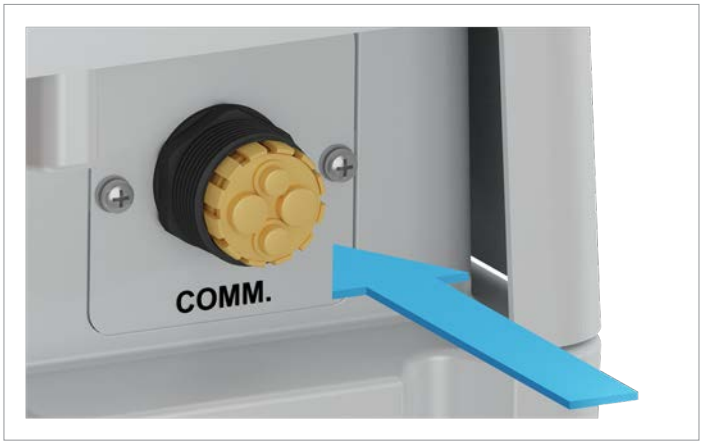
14. Remove all cables.


15. Fit the cover of the communication connection and screw it into place.



16. Insert all rubber plugs into the seal to prevent moisture from entering the openings.

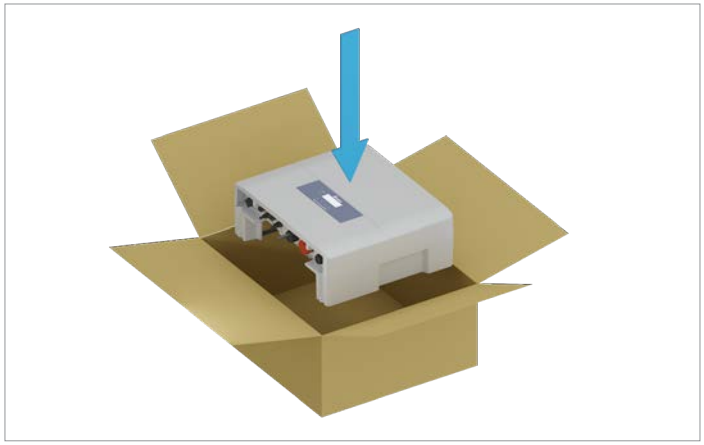



17. Insert the seal and cable gland of the communication connection and fasten the cable gland.


18. Unscrew the inverter from the mounting plate on the left and right.

19. Unhook the inverter from the mounting plate and place it on a clean surface.

20. You can continue to use the mounting plate.



21. Place the inverter in the original packaging of the replacement inverter.

    To return the defective inverter to Delta, follow the instructions provided with the replacement inverter.

22. Install and commission the replacement inverter according to the instructions provided with the replacement inverter.

## 13. Technical Data

| Input (DC) | RPI M6A | RPI M8A | RPI M10A |
|---|---|---|---|
| Maximum recommended PV power [1] | 7500 $W_P$ | 10000 $W_P$ | 12500 $W_P$ |
| Maximum output | 6600 W | 8800 W | 11,000 W |
| Input voltage range | 200 to 1000 $V_{DC}$ | | |
| Maximum input voltage | 1000 $V_{DC}$ | | |
| Rated voltage | 600 $V_{DC}$ | | |
| Switch-on voltage | >250 $V_{DC}$ | | |
| Switch-on power | 40 W | | |
| MPP operating voltage range | 200 to 1000 $V_{DC}$ | | |
| MPP operating voltage range at full power | | | |
| Symmetrical load | 315 to 800 $V_{DC}$ | 415 to 800 $V_{DC}$ | 415 to 800 $V_{DC}$ |
| Asymmetrical load (60/40%) | 425 to 800 $V_{DC}$ | 565 to 800 $V_{DC}$ | 415 to 800 $V_{DC}$ |
| Maximum input current, total (DC1/DC2) | 20 A (10 A/10 A) | 20 A (10 A/10 A) | 25 A (15 A/10 A) |
| Maximum short-circuit current in the event of failure | 13 A/13 A | 13 A/13 A | 19.5 A/13 A |
| Number of MPP trackers | Parallel inputs: 1 MPP tracker, separate inputs: 2 MPP trackers | | |
| Maximum asymmetry | 60/40% | | |
| Number of DC inputs, total (DC1/DC2) | 2 (1/1) | 2 (1/1) | 3 (2/1) |
| Galvanic isolation | No | | |
| Overvoltage category [2] | II | | |

| Output (AC) | RPI M6A | RPI M8A | RPI M10A |
|---|---|---|---|
| Max. Apparent power [3] | 6300 VA | 8400 VA | 10500 VA |
| Rated apparent power | 6000 VA [4] | 8000 VA | 10000 VA |
| Voltage range [5] | 230 ± 20%/400 $V_{AC}$ ± 20%; 3-phase + PE or 3-phase + N + PE | | |
| Rated current | 8.7 A | 11.6 A | 14.5 A |
| Maximum current | 9.7 A | 13 A | 16 A |
| Switch-on current | 31 A/100 µs | | |
| Rated frequency | 50/60 Hz | | |
| Frequency range [5] | 50 ± 5 Hz/60 ± 5 Hz | | |
| Adjustable power factor | 0.8 cap to 0.8 ind | | |
| Total harmonic distortion | < 3% | | |
| DC power supply | < 0.5% rated current | | |
| Power loss in night mode | < 2 W | | |
| Overvoltage category [2] | III | | |

| Mechanical details | RPI M6A | RPI M8A | RPI M10A |
|---|---|---|---|
| Dimensions (W x H x D) | 510 x 445 x 177 mm | | |
| Weight | 25 kg | 25 kg | 26 kg |
| Cooling | Natural convection | | |
| AC connection type | Amphenol C16-3 | | |
| DC connection type | Multi-contact MC4 | | |
| Communication interfaces | 2 x RS485, 1 x dry contact, 1 x EPO (E-Power off), 6 x digital inputs, 1 x Wi-Fi | | |

| General specifications | RPI M6A | RPI M8A | RPI M10A |
|---|---|---|---|
| Delta model name | RPI M6A | RPI M8A | RPI M10A |
| Delta part number | RPI602FA0E1000 | RPI802FA0E1000 | RPI103FA0E1000 |
| Maximum efficiency | 98.3 % | 98.3% | 98.3% |
| EU efficiency | 97.6 % | 97.9% | 98.0% |
| Operating temperature range | -25 to +60 °C | | |
| Operating temperature range without derating | -25 ... +40 °C | | |
| Storage temperature range | -25 ... +60 °C | | |
| Relative humidity | 0 to 100 %, non-condensing | | |
| Max. geographical operating height | 2000 m above sea level | | |

| Standards and guidelines | RPI M6A | RPI M8A | RPI M10A |
|---|---|---|---|
| IP rating | 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 | | |
| Noise immunity | IEC 61000-4-2/-3/-4/-5/-6/-8 | | |
| Distortion factor | EN 61000-3-2 | | EN 61000-3-12 |
| Fluctuations and fibrillations | EN 61000-3-3 | | EN 61000-3-11 |
| Grid interfaces | see solar-solutions.delta-emea.com | | |

[1] When operating with symmetrical DC inputs (50/50%)
[2] IEC 60664-1, IEC 62109-1
[3] The maximum AC apparent power specifies the maximum power that an inverter is able to supply. This maximum apparent power is not necessarily achieved.
[4] Limited to 4.99 kVA when grid type "AU/NZ PL 4.99k" is selected.
[4] AC voltage and frequency range will be programmed according to the specific country requirements.

| | | |
|---|---|---|
| Austria | service.oesterreich@solar-inverter.com | 0800 291 512 (toll free) |
| Belgium | support.belgium@solar-inverter.com | 0800 711 35 (toll free) |
| Bulgaria | support.bulgaria@solar-inverter.com | +421 42 4661 333 |
| Czech Republic | podpora.czechia@solar-inverter.com | 800 143 047 (toll free) |
| Denmark | support.danmark@solar-inverter.com | 8025 0986 (toll free) |
| France | support.france@solar-inverter.com | 0800 919 816 (toll free) |
| Germany | service.deutschland@solar-inverter.com | 0800 800 9323 (toll free) |
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| Israel | supporto.israel@solar-inverter.com | 800 787 920 (toll free) |
| Italy | supporto.italia@solar-inverter.com | 800 787 920 (toll free) |
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| Turkey | support.turkey@solar-inverter.com | +421 42 4661 333 |
| United Kingdom | support.uk@solar-inverter.com | 0800 051 4281 (toll free) |
| Other European countries | support.europe@solar-inverter.com | +49 7641 455 549 |