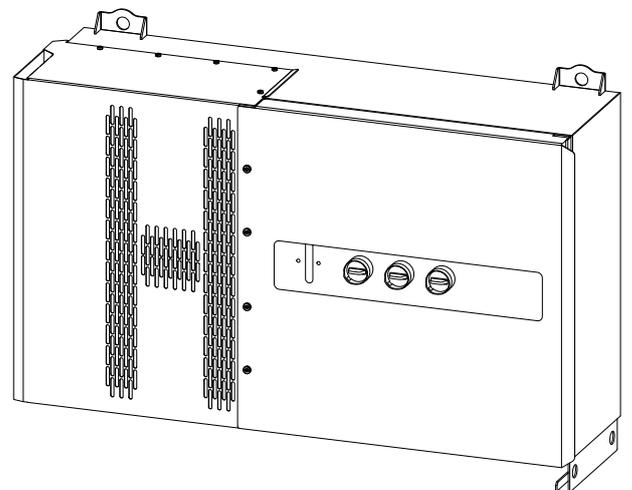# Operating Instructions

Fronius Tauro 50-3
Fronius Tauro ECO 50-3
Fronius Tauro ECO 99-3
Fronius Tauro ECO 100-3

EN-US | Operating instructions

Table of contents

Safety rules

Explanation of safety instructions

⚠️ **WARNING!**

Indicates a potentially dangerous situation.
▶ Death or serious injury may result if appropriate precautions are not taken.

⚠️ **CAUTION!**

Indicates a potentially harmful situation.
▶ Minor injury or damage to property may result if appropriate precautions are not taken.

NOTE!

Indicates a possibility of flawed work results and possible damage to the equipment.

Please pay special attention when one of the symbols from the "Safety rules" chapter appears in these instructions.

How information is presented in the document

The conventions regarding how information is presented in the document, which are set out below, have been defined in order to increase the readability and comprehensibility of the document.

Application notes

IMPORTANT! Indicates application notes and other useful information. It does not indicate a harmful or dangerous situation.

Software

Software functions and elements of a graphical user interface (e.g., buttons, menu items) are highlighted in the text with this **mark up**.

Example: Click **Save**.

Instructions for action

1 Action steps are displayed with consecutive numbering.
✓ *This symbol indicates the result of the action step or the entire instruction.*

General

The device has been manufactured in line with the state of the art and taking into account recognized safety regulations. If used incorrectly or misused, there is a risk of:
- Serious or fatal injury to the operator or third parties
- Damage to the device and other material assets belonging to the operating company

All personnel involved in device commissioning and maintenance must:
- Be suitably qualified
- Have knowledge of and experience in dealing with electrical installations
- Have fully read and precisely followed these operating instructions

In addition to the operating instructions, all applicable local regulations regarding accident prevention and environmental protection must also be followed.

All safety and danger notices on the device:
- Must be kept in a legible state
- Must not be damaged
- Must not be removed
- Must not be covered, have anything stuck on them, or painted over

Only operate the device when all safety devices are fully functional. If the safety devices are not fully functional, there is a danger of:
- Serious or fatal injury to the operator or third parties
- Damage to the device and other material assets belonging to the operating company

Any safety devices that are not fully functional must be repaired by an authorized specialist before the device is switched on.

Never bypass or disable safety devices.

For the location of the safety and danger notices on the device, refer to the chapter headed "Information on the device" in the operating instructions for your device.

Any equipment malfunctions which impair safety must be remedied before the device is turned on.

Environmental conditions

Operation or storage of the device outside the stipulated area will be deemed as not in accordance with the intended purpose. The manufacturer accepts no liability for any damage resulting from improper use.

Qualified personnel

The servicing information contained in these operating instructions is intended only for the use of qualified service engineers. An electric shock can be fatal. Do not carry out any actions other than those described in the documentation. This also applies to qualified personnel.

All cables must be secured, undamaged, insulated, and adequately dimensioned. Loose connections, damaged or under-dimensioned cables must be repaired immediately by an authorized specialist company.

Repair work must only be carried out by an authorized specialist company.

It is impossible to guarantee that third-party parts are designed and manufactured to meet the demands made on them, or that they satisfy safety requirements. Use only original spare parts (also applies to standard parts).

Do not carry out any alterations, installations, or modifications to the device without first obtaining the manufacturer's permission.

Replace any damaged components or have them replaced immediately.

Safety measures at the installation site

When installing devices with ventilation slots, ensure that the ambient air can enter and exit unhindered through the vents. When selecting the installation site, observe the protection class (IP).

Data on noise emission values

The sound pressure level of the inverter is indicated in the **Technical data**.

The cooling of the device takes place via an electronic temperature control system at the lowest possible noise level and depends on the power used, ambient temperature, and the soiling level of the device, etc.

It is not possible to provide a workplace-related emission value for this device, because the actual sound pressure level is heavily influenced by the installation situation, the power quality, the surrounding walls, and the properties of the room in general.

EMC measures

In certain cases, even though a device complies with the standard limit values for emissions, it may affect the application area for which it was designed (e.g., when there is equipment that is susceptible to interference at the same location or if the site where the device is installed is close to either radio or television receivers). If this is the case, the operator is obliged to take action to rectify the situation.

Data backup

With regard to data security, the user is responsible for:
- backing up any changes made to the factory settings
- saving and storing personal settings

Copyright

Copyright of these operating instructions remains with the manufacturer.

Text and illustrations were accurate at the time of printing, subject to change. We are grateful for suggestions for improvement and information on any discrepancies in the operating instructions.

Protective earthing (PE)

Connection of a point in the device, system or installation to earth to protect against electric shock in the event of a fault. When installing the Tauro inverter, the PE connection is mandatory as it is a protection class 1 device. When connecting the PE conductor, ensure that it is secured against accidental disconnection. All points listed under "Connecting the inverter to the public grid (AC side)" must be observed, including the use of washers, screw locks, and nuts with the defined torque.

It must be ensured that when using the strain-relief devices, the ground conductor is the last to be disconnected in the event of a possible failure. When connecting the ground conductor, the minimum cross-section requirements specified by the respective national regulations must be observed. In addition, the minimum cross-section of the PE conductor must be at least half of the phase cross-sections according to the product standard IEC 62109-1, as a cross-section of at least 35 mm² (50 kW) or 70 mm² (99.99 / 100 kW) must be used for the phases (L1 / L2 / L3).

Maintenance   In principle, Tauro inverters are maintenance-free. If maintenance work is nevertheless carried out on the inverter, such as cleaning or replacing components, this must be done in consultation with a Fronius-trained service technician. The manufacturer accepts no liability for damage caused by improper use.

General information

Product description

Description of the device

The inverter transforms the direct current generated by the PV modules into alternating current. This alternating current is fed into the public grid and synchronized with the mains voltage in use.
The inverter has been designed exclusively for use in grid-connected photovoltaic systems. It cannot generate electric power independently of the grid.

The inverter also has a design and functions that ensure it can offer maximum safety during installation and during operation.

AC Daisy Chain

With the "AC Daisy Chain" inverter version, the AC lead can be fed directly from the inverter to another inverter. Several Tauro inverters, up to an output power of max. 200 kW, can be thereby be quickly connected to one another.

The minimum cable cross-section is defined by the fuse at the mains connection point. A larger cable cross-section can be selected at any time. The applicable national standards must be taken into account and applied.
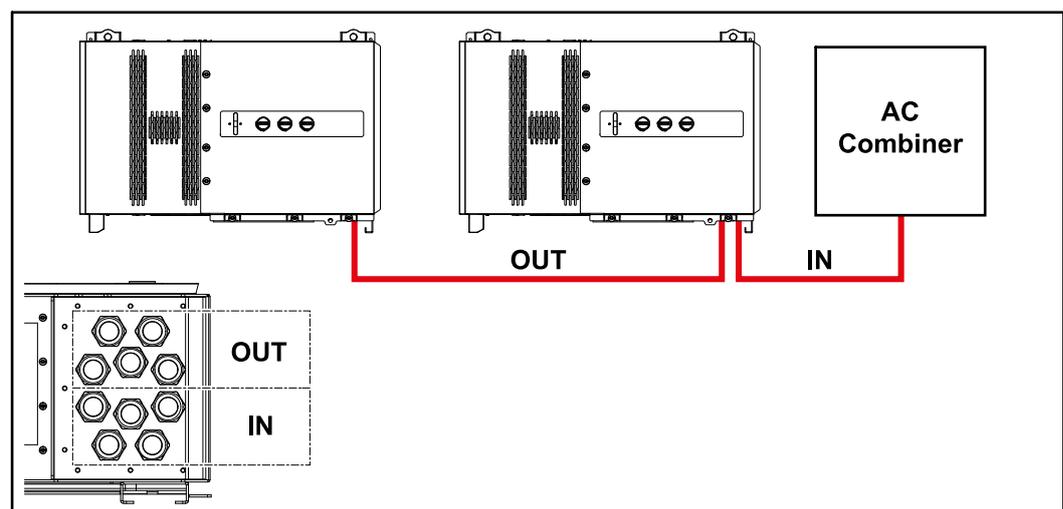
String fuses

Only applies to device types Fronius Tauro 50-3-D / Eco 50-3-D / Eco 99-3-D / Eco 100-3-D (direct):

String fuses are used in the Fronius Tauro to provide additional protection for the solar modules.
The maximum short circuit current I_{sc}, the maximum module return current I_R or the maximum string fuse rating specified in the module data sheet of the respective solar module is crucial in affording the solar modules the correct fuse protection.

The national regulations regarding fuse protection must be observed. The electrical engineer carrying out the installation is responsible for the correct choice of string fuses.

To replace the string fuses, see chapter **Replacing the string fuses** on page **60**.

Eco 50-3-D
Eco 99-3-D / Eco 100-3-D Standard
F1.1 - F2.7
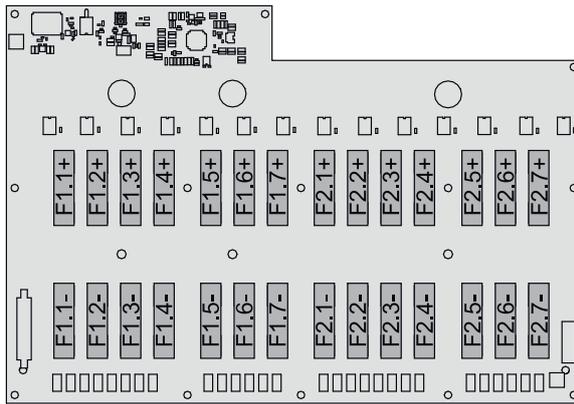
Eco 99-3-D / Eco 100-3-D Standard
F3.1 - F3.8
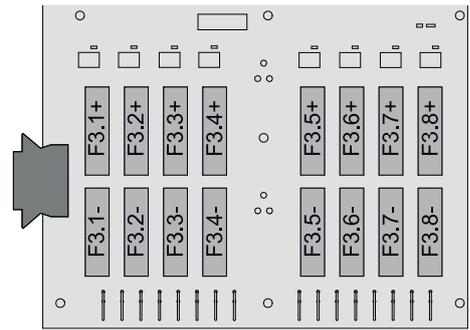
50-3-D
F1.1 - F3.7
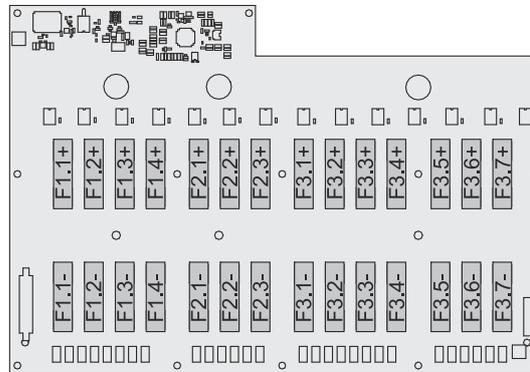
Eco 50-3-D
30A fuses F1.1 - F2.5
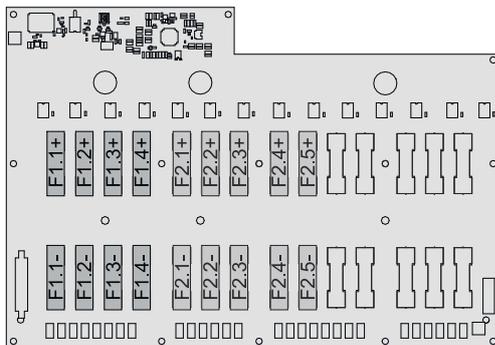
50-3-D / Eco 99-3-D / Eco 100-3-D
30A fuses F1.1 - F3.5
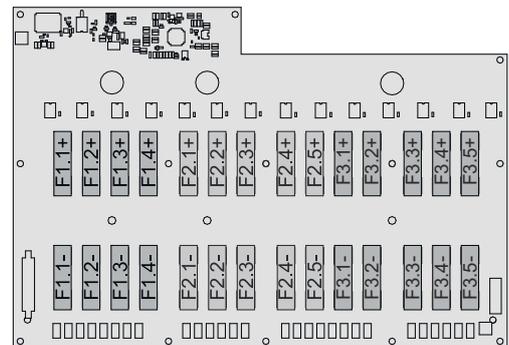
Fronius Solar.web

System owners and installers can easily monitor and analyze the PV system using Fronius Solar.web or Fronius Solar.web Premium. With the appropriate configuration, the inverter transmits data such as power, yield, load, and energy balance to Fronius Solar.web. More detailed information can be found at **Solar.web - Monitoring & analysis**.

Configuration is carried out using the Setup wizard; see the chapter headed **Installation with the app** on page **68** or **Installation with the browser** on page **69**.

Requirements for configuration:
- Internet connection (download: min. 512 kbit/s, upload: min. 256 kbit/s)*.
- User account at **solarweb.com**.
- Completed configuration using the Setup wizard.

*   These specifications do not provide an absolute guarantee of flawless operation. High error rates in the transmission, fluctuating receptions or misfires can have an adverse effect on data transfer. Fronius recommends on-site testing to ensure that the connections meet the minimum requirements.

Local communication

The inverter can be found via the Multicast DNS (mDNS) protocol. We recommend searching for the inverter using the assigned host name.

The following data can be called up via mDNS:
- NominalPower
- Systemname
- DeviceSerialNumber
- SoftwareBundleVersion

Protection of people and equipment

Safety

<table>
<tr><td>⚠   WARNING!</td></tr>
<tr><td>

Danger due to incorrect operation and incorrectly performed work.
This can result in serious injury and damage to property.
▶   All the work and functions described in this document must only be carried out by trained and qualified personnel.
▶   Read and understand this document.
▶   Read and understand all the Operating Instructions for the system components, especially the safety rules.

</td></tr>
</table>

<table>
<tr><td>⚠   WARNING!</td></tr>
<tr><td>

Danger from electromagnetic fields. Electromagnetic fields are generated during operation.
Effects on the health of persons (e.g., those wearing a pacemaker) can result.
▶   Do not remain closer than 20 cm from the inverter for a prolonged period of time.

</td></tr>
</table>

Information on the device
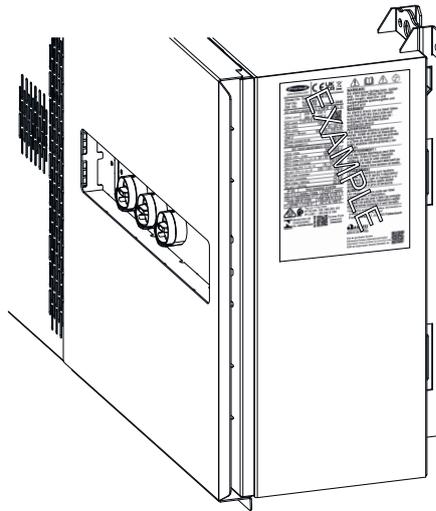
There are warning notices and safety symbols on the inside and outside of the inverter. These warning notices and safety symbols must not be removed or painted over. They warn against incorrect operation, as this may result in serious injury and property damage.

Symbols on the rating plate:

CE label — confirms compliance with applicable EU directives and regulations.

UKCA marking — confirms compliance with applicable UK directives and regulations.

WEEE marking — waste electrical and electronic equipment must be collected separately and recycled in an environmentally sound manner in accordance with the European Directive and national law.

RCM marking — tested according to the requirements of Australia and New Zealand.

ICASA marking — tested according to the requirements of the Independent Communications Authority of South Africa.

CMIM marking — tested according to IMANOR requirements for import regulations and compliance with Moroccan standards.

Safety symbols:

Risk of serious injury and property damage due to incorrect operation.

Do not use the functions described here until you have fully read and understood the following documents:
- These operating instructions.
- All operating instructions for the system components of the photovoltaic system, especially the safety rules.

Dangerous electrical voltage.

Wait until the capacitors have discharged before opening the device.

Warning notice text:

WARNING!
An electric shock can be fatal. Before opening the device, ensure that the input and output sides are de-energized and isolated.

Central grid and system protection

The inverter offers the option to use the integrated AC relays as section switches in conjunction with a central grid and system protection unit (in accordance with VDE-AR-N 4105:2018:11 §6.4.1). For this purpose, the central trigger device (switch) must be integrated into the WSD chain as described in chapter **WSD (wired shutdown)** on page **17**.

WSD (wired shutdown)

The wired shutdown (WSD) interrupts the inverter's grid power feed if the trigger device (switch, e.g., Emergency Stop or fire alarm contact) has been activated.

If an inverter (slave) fails, it is bypassed and the other inverters continue operating. If a second inverter (slave) or the inverter (master) fails, the operation of the entire WSD chain is interrupted.

For installation, see **WSD (wired shutdown)** on page **67**.

RCMU

The inverter is equipped with an RCMU (RCMU = residual current monitoring unit) according to IEC 62109-2 and IEC63112.
It monitors residual currents from the PV module up to the AC output and disconnects the inverter from the grid when an improper residual current is detected.

Surge protection device (SPD)
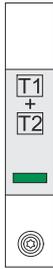
The surge protection device (SPD) protects against temporary over-voltages and dissipates surge currents (e.g., lightning strike). Building on an overall lightning protection concept, the SPD helps to protect your PV system components.

If the surge protection device is triggered, the color of the indicator changes from green to red (mechanical display).

A tripped SPD must be replaced immediately by an authorized specialist company with a functioning SPD in order to maintain the full protective function of the unit.

There is the option of a digital indication when an SPD has tripped. For setting this function, see PDF "Temporary SPD Triggering" in the Service & Support area at www.fronius.com

IMPORTANT!
After setting the function described above, the inverter will also respond if the 2-pole signal cable of the surge protection device is interrupted or damaged.

AFCI – Arc Fault Circuit Interrupter (Arc-Guard)

Available ex works.

AFCI (Arc Fault Circuit Interrupter) protects against arcing faults and in the narrower sense is a protection device against contact faults. The AFCI evaluates any faults that occur in the current and voltage curve with an electronic circuit and switches off the circuit when a contact fault is detected. This prevents overheating on poor contacts and possible fires.

IMPORTANT!
Active solar module electronics can interfere with the function of the ArcGuard. Fronius does not guarantee the correct functioning when using Fronius ArcGuard in combination with active solar module electronics.

> ⚠ **CAUTION!**
>
> **Danger due to incorrect or unprofessional DC installation.**
> This can result in risk of damage and, in turn, risk of fire to the PV system due to inadmissible thermal loads that arise with an arc.
> ▶ Check that plug connections are in good condition.
> ▶ Repair incorrect insulation as appropriate.
> ▶ Complete connections as per the specifications.

IMPORTANT!
Fronius will not accept any costs associated with production downtimes, installer costs, etc., that may arise as the result of a detected arc and its consequences. Fronius accepts no liability for damage that can occur despite the presence of the integrated Arc Fault Circuit Interrupter/extinguishing system (e.g., caused by a parallel arc).

Automatic reconnection
To restart the AFCI, no manual procedure is required if a minimum interruption time of 5 minutes is ensured before continuing operation.
When interrupting for the fifth time within a 24 h period, the AFCI is only allowed to be reset manually before the AFCI does reconnect. Afterwards, the AFCI may return to automatic reconnection mode.

Safe state   If one of the following safety devices trips, the inverter will change to a safe state:
- WSD
- isolation measurement
- RCMU and
- AFCI

In the safe state, the inverter no longer feeds into the grid and is disconnected from the grid by opening the AC relays.

Utilization in accordance with "intended purpose"

Intended use
The inverter is designed exclusively to convert direct current from PV modules into alternating current and feed this power into the public grid.

Intended use also includes following all information from the operating instructions.

Foreseeable misuse
The following circumstances are considered to be reasonably foreseeable misuse:
- Any use that is not the intended use or goes beyond the intended use.
- Alternations to the inverter are not expressly recommended by Fronius.
- Installation of components that are not expressly recommended or sold by Fronius.

The manufacturer shall not be liable for any resulting damage. In addition, no warranty claims will be entertained.

Provisions for the photovoltaic system
The inverter is designed exclusively to be connected and used with PV modules. Use with other DC generators (e.g., wind generators) is not permitted.

When configuring the photovoltaic system, make sure that all photovoltaic system components are operating exclusively within their permitted operating range.

All measures recommended by the PV module manufacturer for maintaining the PV module properties must be followed.

Functional principle

Operating principle

The inverter is fully automatic. Starting at sunrise, as soon as the PV modules are generating enough energy, the inverter starts checking the PV system (insulation measurement) and the grid (mains voltage and mains frequency). If all values are within the normative framework, the system is automatically connected to the grid and grid power feed operation begins.

The control system of the inverter ensures that the maximum possible power output is drawn from the PV modules at all times. This function is called MPPT (Maximum Power Point Tracking). In the event of shady conditions affecting the PV modules, a large part of the local maximum power point (LMPP) of the PV system can still be obtained via the "Dynamic Peak Manager" function.

As dusk starts and there is no longer sufficient energy available to feed energy into the grid, the inverter shuts down the connection of the power electronics to the grid completely and stops operating. All settings and recorded data are saved.

Cooling of the inverter through forced-air ventilation

Cooling of the inverter is performed by a forced-air ventilation system via temperature-controlled fans. Air is sucked in from the front and fed, via a sealed duct, through the AC and DC heat sink, before passing directly over the inductors and dissipating.
The sealed air duct prevents the electronics compartment from coming into contact with the ambient air. This approach largely prevents any contamination of the electronics compartment.
The fan speed and temperature of the inverter are monitored.

The variable-speed, ball-bearing mounted fans in the inverter permit the following:
- Optimum cooling of the inverter
- Cooler components, therefore a longer service life
- Lowest-possible energy consumption
- High output power including in top temperature range of the inverter

Overload performance

When the device temperature gets too high, the inverter automatically reduces the current output power in order to protect itself. Reasons for an excessively high device temperature can be a high ambient temperature or insufficient heat dissipation (for example, when installed in containers without sufficient heat dissipation).

The output of the inverter is reduced such that the temperature will not exceed the permissible limit.
If a maximum temperature is exceeded, the inverter switches off in a safe state and resumes grid power feed operation only after the device has cooled down.

Operating controls and connections

Controls and displays
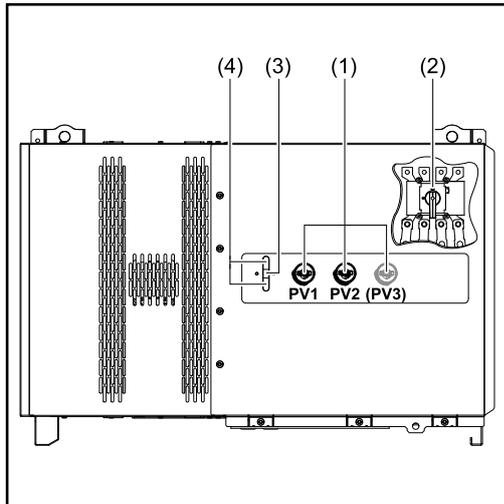
(1) **DC disconnector**
Disconnects the electrical connection from the solar modules to the inverter. Depending on the device type, 2 or 3 DC disconnectors are installed.
The DC disconnectors can be secured against switching on with a padlock.

(2) **AC disconnector option**
The optional AC disconnector breaks the connection from the inverter to the grid

(3) **Button function**
For further information about the button function, see **Button functions and LED status indicator**

(4) **LED status indicator**
For further information about the LED status indicator, see **Button functions and LED status indicator**

PV connections - Tauro 50-3-D (direct)
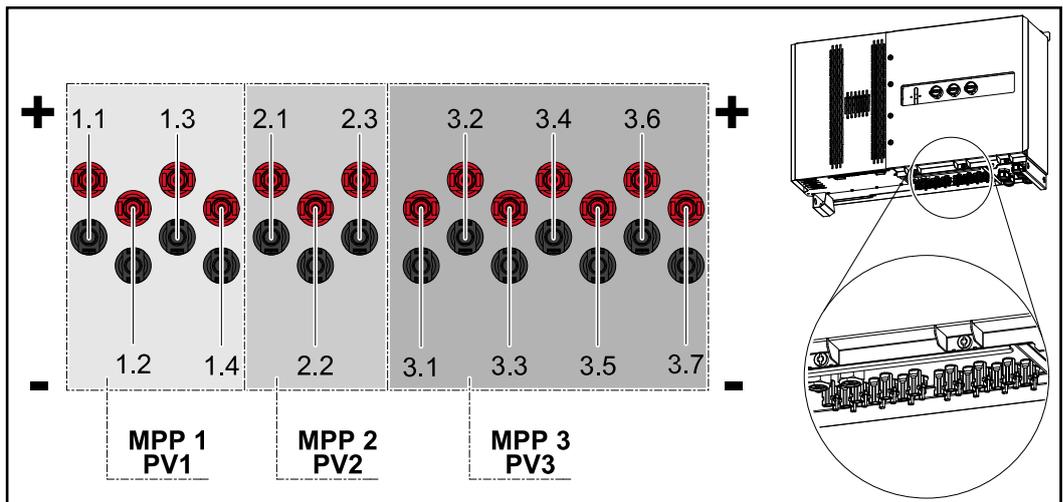
PV connections - Tauro Eco 50-3-D (direct)
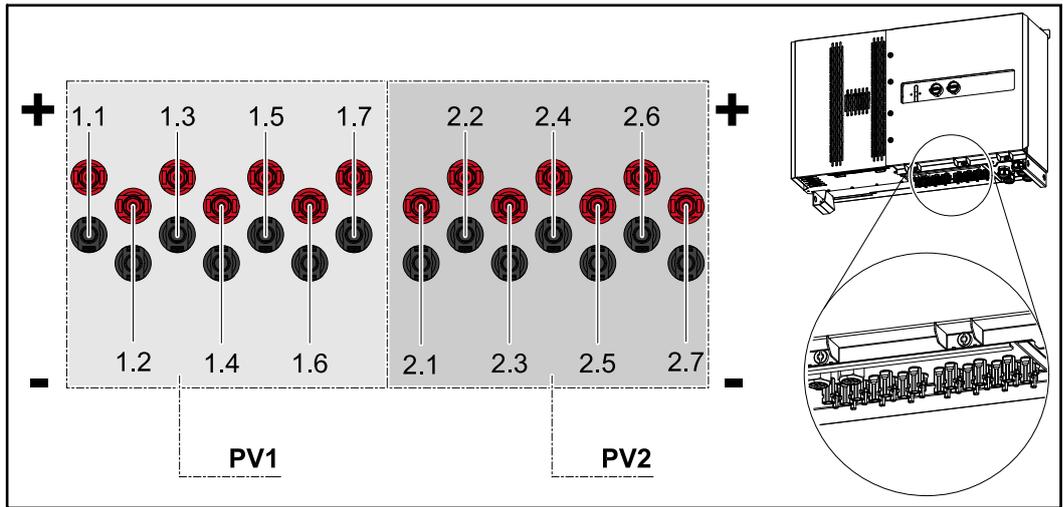
+

1.1 1.3 1.5 1.7   2.2 2.4 2.6   +

1.2 1.4 1.6   2.1 2.3 2.5 2.7   -

PV1   PV2

PV connections - Tauro 50-3-D (30 A fuses)

+

1.1 1.3   2.1 2.3 2.5   3.2 3.4   +

1.2 1.4   2.2 2.4   3.1 3.3 3.5   -

PV1   PV2   PV3

PV connections - Tauro Eco 50-3-D (30 A fuses)

+

1.1 1.3   2.2 2.4   +

1.2 1.4   2.1 2.3 2.5   -

PV1   PV2
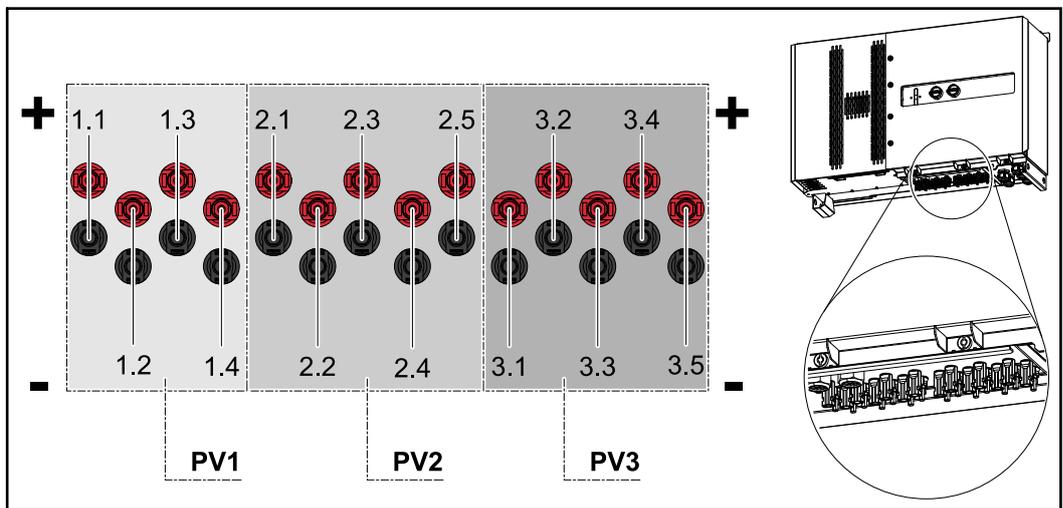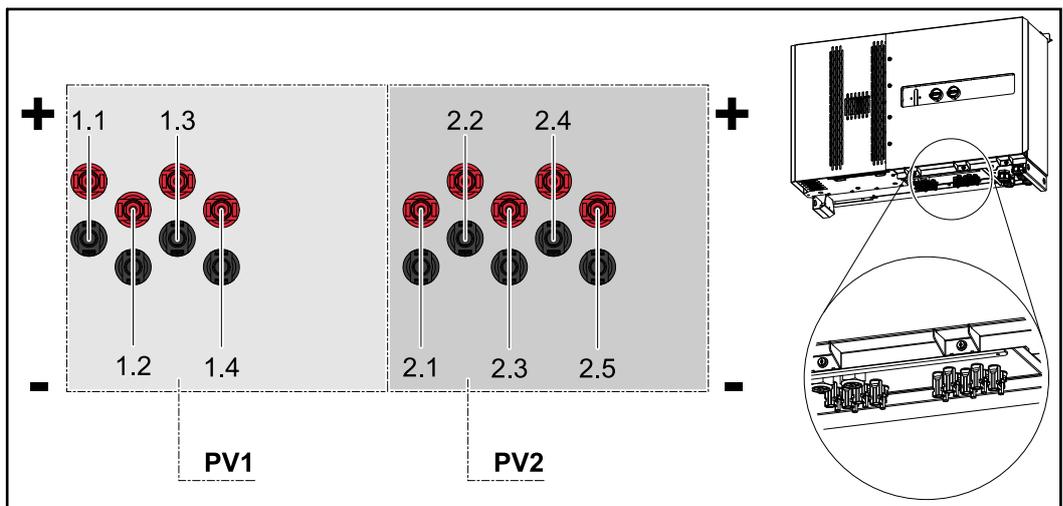
PV connections - Tauro Eco 99-3-D / 100-3-D (direct, 20 A option)
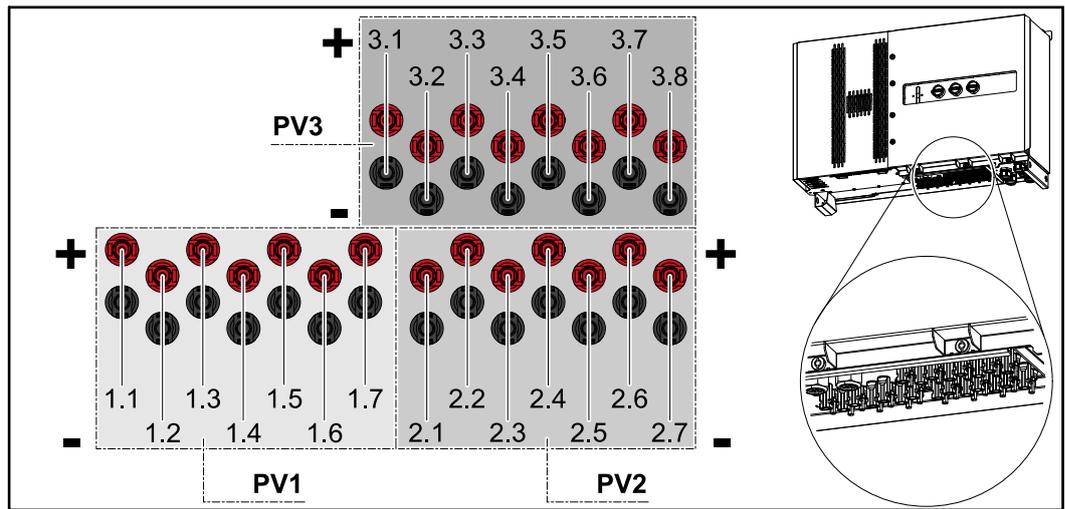
PV connections - Tauro Eco 99-3-D / 100-3-D (direct, 30 A option)
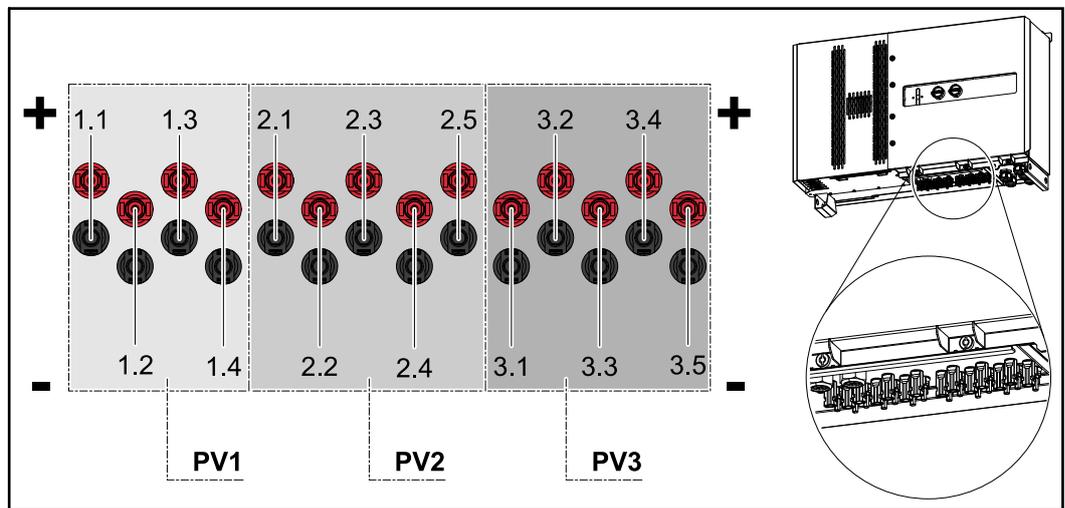
String arrangement in Solar.web

The currents of the individual strings are visible in Solar.web under **History** - **Devices** - **Channels**.

Solar.web Current DC string #	20 A option			30 A option		
	50-3-D	ECO 50-3-D	ECO 99-3-D / 100-3-D	50-3-D	ECO 50-3-D	ECO 99-3-D / 100-3-D
1	PV1.1	PV1.1	PV1.1	PV1.1	PV1.1	PV1.1
2	PV1.2	PV1.2	PV1.2	PV1.2	PV1.2	PV1.2
3	PV1.3	PV1.3	PV1.3	PV1.3	PV1.3	PV1.3
4	PV1.4	PV1.4	PV1.4	PV1.4	PV1.4	PV1.4
5	PV2.1	PV1.5	PV1.5	PV2.1	PV2.1	PV2.1

Solar.web Current DC string #	20 A option			30 A option		
	50-3-D	ECO 50-3-D	ECO 99-3-D / 100-3-D	50-3-D	ECO 50-3-D	ECO 99-3-D / 100-3-D
6	PV2.2	PV1.6	PV1.6	PV2.2	PV2.2	PV2.2
7	PV2.3	PV1.7	PV1.7	PV2.3	PV2.3	PV2.3
8	PV3.1	PV2.1	PV2.1	PV2.4	PV2.4	PV2.4
9	PV3.2	PV2.2	PV2.2	PV2.5	PV2.5	PV2.5
10	PV3.3	PV2.3	PV2.3	PV3.1		PV3.1
11	PV3.4	PV2.4	PV2.4	PV3.2		PV3.2
12	PV3.5	PV2.5	PV2.5	PV3.3		PV3.3
13	PV3.6	PV2.6	PV2.6	PV3.4		PV3.4
14	PV3.7	PV2.7	PV2.7	PV3.5		PV3.5
15			PV3.1			
16			PV3.2			
17			PV3.3			
18			PV3.4			
19			PV3.5			
20			PV3.6			
21			PV3.7			
22			PV3.8			

PV connections - pre-combined

Tauro Eco 50-3-P / 99-3-P / 100-3-P
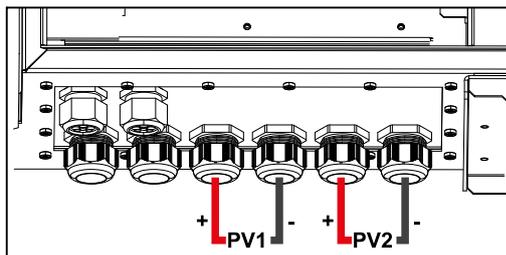
Tauro 50-3-P
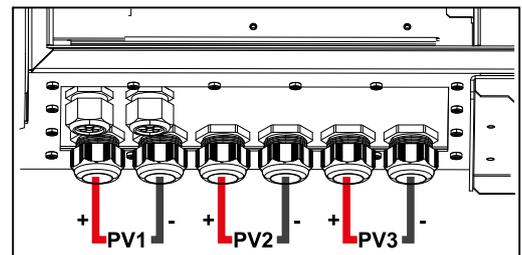
Mounting option for third-party components

-40 °C - +85 °C

14,5 cm

N L1 L2 L3
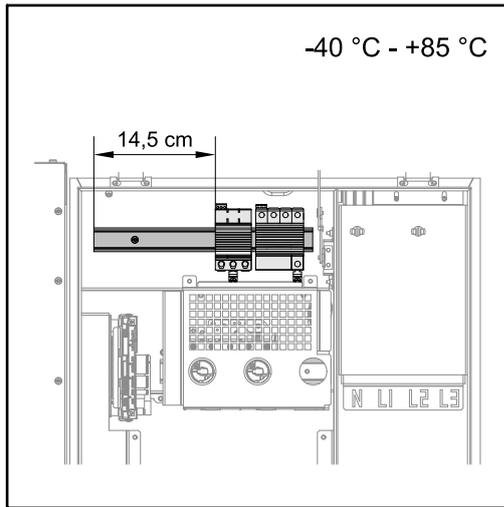
Above the DC connection area there is space for mounting third-party components. Components up to a maximum width of 14.5 cm (8 DU) can be mounted on the DIN rail. The components must have a temperature resistance of -40 °C to +85 °C.

Data communication area in the inverter

The data communication area (Pilot PC board) is located above the DC connections in the inverter.

Data communication area

LED

WSD
0 ___ 1

Modbus 0
Terminating resistor
0 ___ 1

Modbus 1
Terminating resistor
0 ___ 1

LED

Technical Data (WLAN)
Frequency band: channel 1-14(2412-2462 MHz)
Radio-frequency power: <100 mW (<20 dBm)
IP WLAN: 192.168.250.181
IP LAN 1: 169.254.0.180

LAN 1

LAN 2 → Reserved for internal use

Modbus
V+
M0+
SHIELD
M1+
V+
GND
M0-
SHIELD
M1-
GND

RS485 (0/1) → Fronius Smart Meter, Ohmpilot, Battery (only GEN24), Sunspec, Interface, ...

WSD
IN+
OUT+
IN-
OUT-
Factory default

WSD > wired disconnection of grid feed-in

IOs
V+
V+
IO0
IO2
IO4*
IN6*
IN8*
IN10
GND
GND
IO1
IO3
IO5*
IN7*
IN9*
IN11

I/Os → Load Management, Demand Respone Mode (DRM)*, Back-up power, IO control, ...

* Demand Response Mode (DRM)
IO4 = RG0 (Ref GEN/0)
IO5 = CL0 (COM LOAD/0)
IN6 = 1/5
IN7 = 2/6
IN8 = 3/7
IN9 = 4/8

⏻ **Operating status LED**	Indicates the inverter operating status.
WSD (wired shutdown) switch	Defines the inverter as a WSD primary device or WSD secondary device. **Position 1:** WSD primary device **Position 0:** WSD secondary device
Modbus 0 (MB0) switch	Switches the terminating resistor for Modbus 0 (MB0) on/off. **Position 1:** Terminating resistor on (factory setting) **Position 0:** Terminating resistor off
Modbus 1 (MB1) switch	Switches the terminating resistor for Modbus 1 (MB1) on/off. **Position 1:** Terminating resistor on (factory setting) **Position 0:** Terminating resistor off
☟ **Optical sensor**	To operate the inverter. See chapter **Button functions and LED status indicator** on page **28**.
📶 **Communication LED**	Indicates the inverter connection status.
LAN 1	Ethernet connection for data communication (e.g., WLAN router, home network or for commissioning with a laptop see chapter **Installation with the browser** on page **69**).
LAN 2	Reserved for future functions. Only use LAN 1 to avoid malfunctions.
I/Os terminal	Push-in terminal for digital inputs/outputs. See chapter **Permitted cables for the data communication area** on page **64**. The designations (RG0, CL0, 1/5, 2/6, 3/7, 4/8) on the terminal refer to the Demand Response Mode function, see chapter **UC Editor—AUS—Demand Response Modes (DRM)** on page **77**.
WSD terminal	Push-in terminal for the WSD installation. See chapter "**WSD (wired shutdown)**" on page **17**.
Modbus terminal	Push-in terminal for the installation of Modbus 0, Modbus 1, 12 V, and GND (ground). The data connection to the connected components is established via the Modbus terminal. **Inputs M0 and M1 can be selected for this purpose.** Max. 4 Modbus participants per input, see chapter **Modbus participants** on page **64**.

Schematic in-ternal wiring of IOs

The V+/GND pin provides the possibility of feeding in a voltage in the range of 12.5 to 24 V (+ max. 20%) using an external power supply unit. Outputs IO 0 - 5 can then be operated using the external voltage that has been fed in. A maximum of 1 A may be drawn per output, whereby a total of max. 3 A is permitted. The fuse protection must take place externally.

> ⚠ **CAUTION!**
>
> **Danger from polarity reversal at the terminals due to improper connection of external power supply units.**
> This may result in severe damage to the inverter.
> ▶ Check the polarity of the external power supply unit with a suitable meas-uring device before connecting it.
> ▶ Connect the cables to the V+/GND outputs while ensuring the correct po-larity.

IMPORTANT!
If the total output (6W) is exceeded, the inverter switches off the entire external power supply.
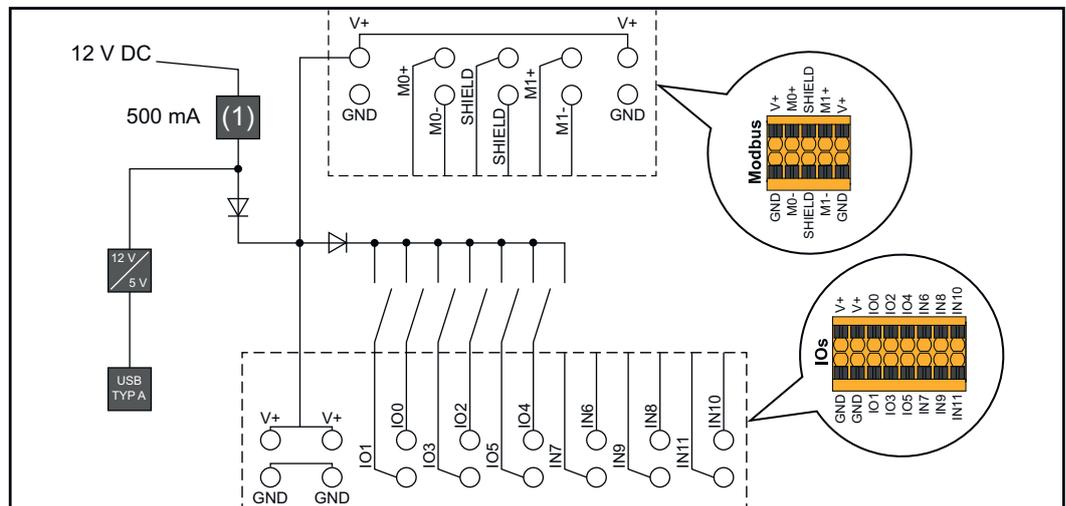
(1) Current limitation

Button functions and LED status indicator
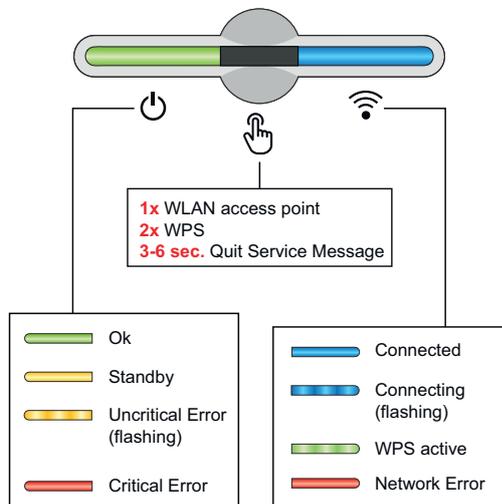
⏻ The operating status LED dis-plays the status of the inverter. In case of faults, follow the in-dividual steps in the Fronius Solar.web live app.

👆 The optical sensor is actuated by touching it with a finger.

📶 The communications LED dis-plays the connection status. To establish a connection, follow the individual steps in the Fronius Solar.web live app.

Sensor functions	
	1x 🖐 = WLAN access point (AP) is opened. 🛜 Flashes blue
	2x 🖐 = WLAN protected setup (WPS) is activated. 🛜 Flashes green
	3 seconds 🖐 (max. 6 seconds) = The service message disappears. 🖐 Flashes white (quickly)

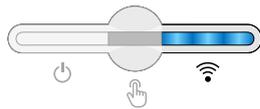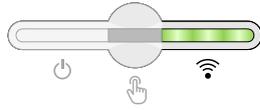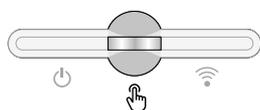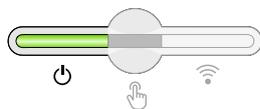|	
LED status indicator	
	The inverter is operating correctly. ⏻ Lights up green
	The inverter is starting. ⏻ Flashes green
	The inverter is on standby, is not operating (e.g., no energy fed into the grid at night), or is not configured. ⏻ Lights up yellow
	The inverter displays a non-critical status. ⏻ Flashes yellow
	The inverter displays a critical status and no energy is fed into the grid. ⏻ Lights up red
	The network connection is being established via WPS. 2x🖐= WPS search mode. 🛜 Flashes green
	The network connection is being established via WLAN AP. 1x🖐= WLAN AP search mode (active for 30 minutes). 🛜 Flashes blue
	The network connection is not configured. 🛜 Lights up yellow
	A network error is displayed, the inverter is operating correctly. 🛜 Lights up red
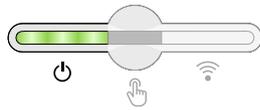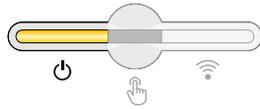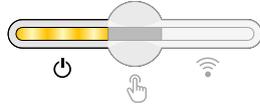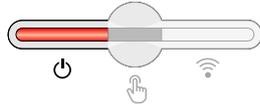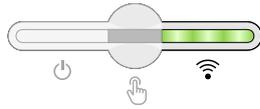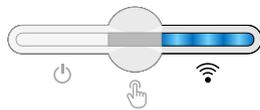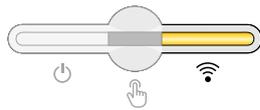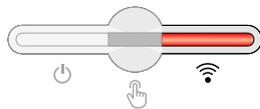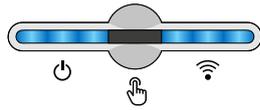
LED status indicator	
	The inverter is performing an update. ⏻ / 📶 Flash blue
	There is a service message. 👆 Lights up white
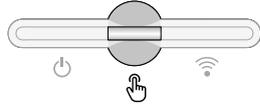
30

Installation and Startup

General

**System compon-
ent compatibility**
All components installed in the photovoltaic system must be compatible and have the necessary configuration options. The installed components must not restrict or negatively influence the functioning of the photovoltaic system.

> **NOTE!**
>
> **Risk due to components in the photovoltaic system that are not compatible and/or have limited compatibility.**
> Incompatible components may limit and/or negatively affect the operation and/or functioning of the photovoltaic system.
> ▶ Only install components recommended by the manufacturer in the photovoltaic system.
> ▶ Before installation, check the compatibility of components not expressly recommended with the manufacturer.

Installation location and position

Choosing the location of the inverter

Please observe the following criteria when choosing a location for the inverter:

Only install on a solid, non-flammable surface
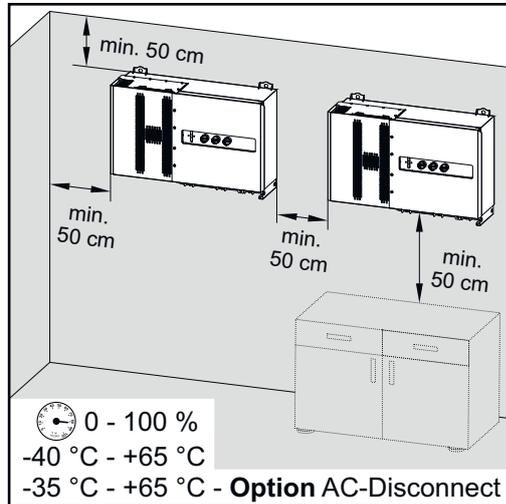
Max. ambient temperatures: -40 °C / +65 °C
* with built-in optional AC disconnector: -35 °C / +65 °C

Relative humidity: 0 - 100%

When installing the inverter in a switch cabinet or similar closed environment, ensure adequate heat dissipation by forced-air ventilation.

When installing the inverter on the outer walls of cattle sheds, it is important to maintain a minimum clearance of 2 m between all sides of the inverter and the ventilation and building openings.

The following surfaces are permitted for installation:
- Walls (corrugated metal walls [mounting rails], brick walls, concrete walls or other non-flammable surfaces sufficiently capable of bearing loads)
- Poles (installed using mounting rails, behind the PV modules directly on the PV mounting system)
- Flat roofs (if this is for a foil roof, make sure that the foils comply with the fire protection requirements and are not highly flammable. Ensure compliance with the national provisions.)
- Covered parking lot roofs (no overhead installation)

The DC disconnectors must always be freely accessible after installation of the inverter.
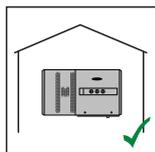
The inverter is suitable for indoor installation.
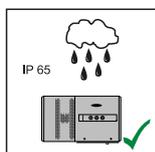
The inverter is suitable for outdoor installation.

Because of its IP 65 protection class, the inverter is not susceptible to hose water on any side and can also be operated in moist environments.
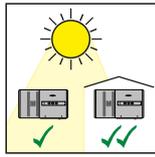
The inverter is suitable for outdoor installation.

In order to keep inverter heating as low as possible, it is recommended that the inverter is not exposed to direct sunlight. The inverter should be installed in a protected location, for example, near the solar modules or under an overhanging roof.
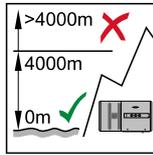
IMPORTANT! The inverter must not be installed or operated at more than 4000 m above sea level.
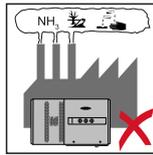
Do not install the inverter:
- Where it may be exposed to ammonia, corrosive gases, acids, or salts (for example, fertilizer storage areas, vent openings for livestock stables, chemical plants, tanneries, etc.)
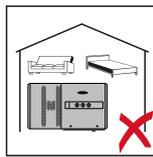
During certain operating phases the inverter may produce a noise. For this reason it should not be installed in an occupied living area.
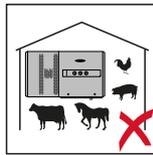
Do not install the inverter in:
- Areas where there is an increased risk of accidents from farm animals (horses, cattle, sheep, pigs, etc.)
- Stables or adjoining areas
- Storage areas for hay, straw, chaff, animal feed, fertilizers, etc.
- Storage or processing areas for fruit, vegetables, or viticulture products
- Areas used in the preparation of grain, green fodder, or animal feeds

The inverter is designed to be dust-proof (IP 65). However, in areas of high dust accumulation, the cooling surfaces can become dusty, which can impair the thermal performance. In this case, the dust must be removed regularly. We therefore recommend not installing the inverter in areas and environments with high dust accumulation.

Installation position
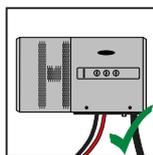
The inverter is designed to be installed vertically on a vertical wall. The optional floor racks must not be used for vertical mounting.
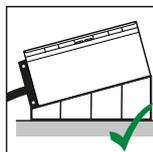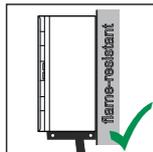
The inverter should have a minimum inclination of 3° in a horizontal installation position so that water can run off. Mounting of the optional floor racks is recommended. The floor racks may only be used on an installation position of 0 - 45°.
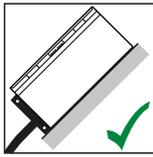
The inverter is suitable for installation on a sloping surface.
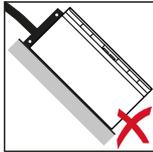
Do not install the inverter on a sloping surface with its connection sockets at the top.
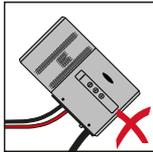
Do not install the inverter at an angle on a vertical wall or column.
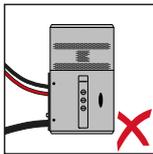
Do not install the inverter horizontally on a vertical wall or pillar.
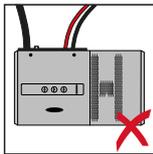
Do not install the inverter on a vertical wall or pillar with its connection sockets facing upwards.
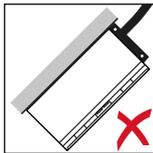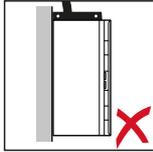
Do not install the inverter overhanging with the connection sockets at the top.
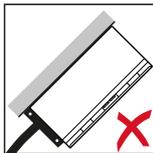
Do not install the inverter overhanging with the connection sockets at the bottom.
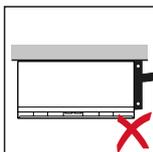
Do not install the inverter on the ceiling.

Transport

Crane transport
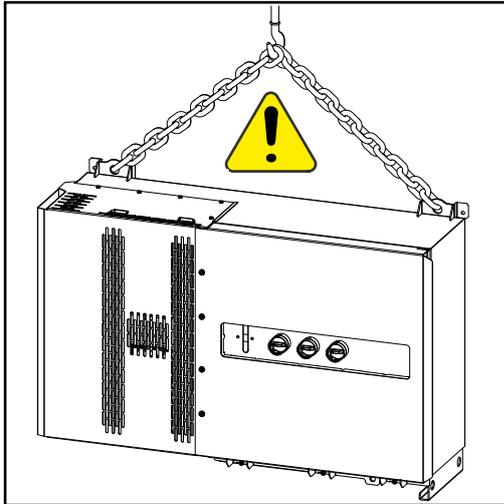
> ⚠️ **WARNING!**
>
> **Danger of serious injury and damage from articles being dropped or falling over.**
>
> When transporting by crane:
> - ▶ Hook chains and ropes onto the suspension points only
> - ▶ Always hook chains and ropes onto both suspension points

Transport using a forklift or lift truck

> ⚠️ **WARNING!**
>
> **Falling or toppling devices can be deadly.**
> - ▶ When transporting the inverter by forklift or lift truck secure the inverter from falling.
> - ▶ Do not turn, brake, or accelerate in a sudden, jerking manner

Installing the inverter

Selecting the mounting material

Use the corresponding fixing materials depending on the subsurface and observe the screw dimension recommendations for the mounting bracket.
The installer is responsible for selecting the right type of fixing.

Mounting bracket dimensions

Dimensions of the mounting bracket—all dimensions in mm.
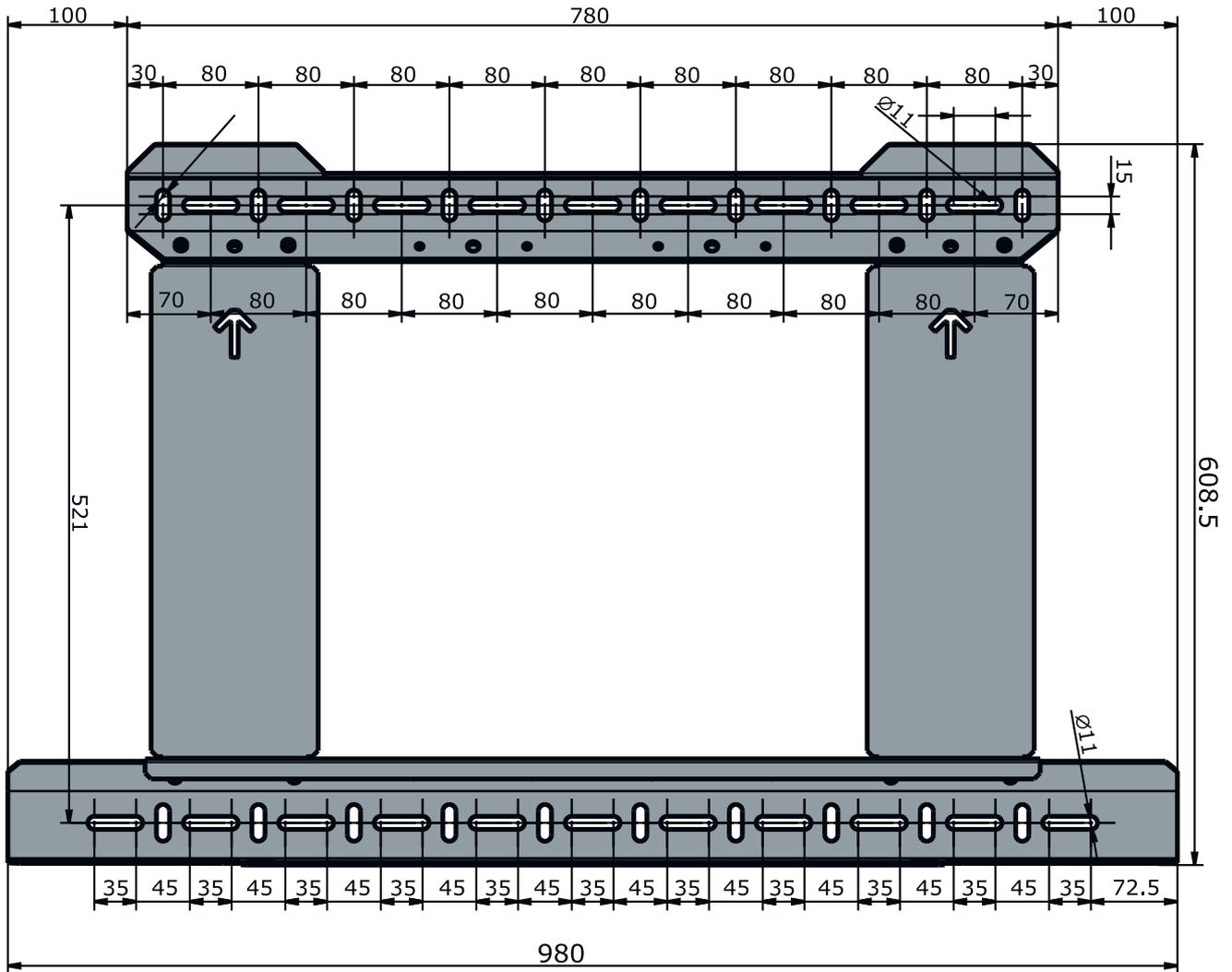
Mounting the inverter on the wall

1

min. 4x M8 ⚠

2

3

4

kg
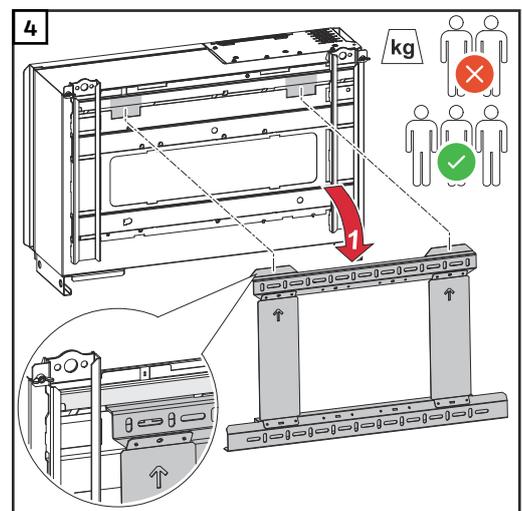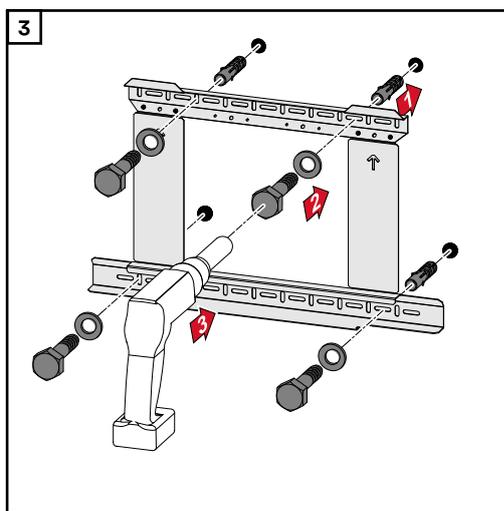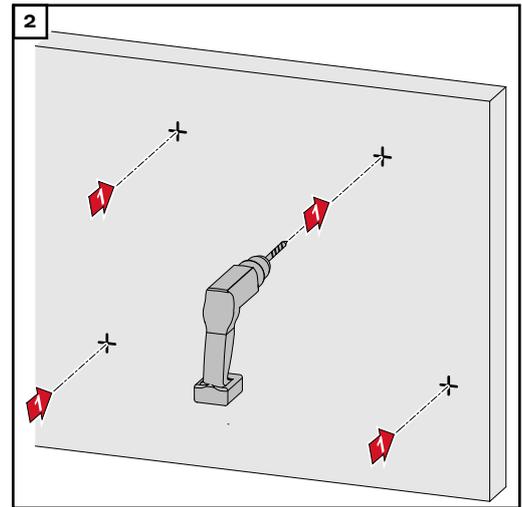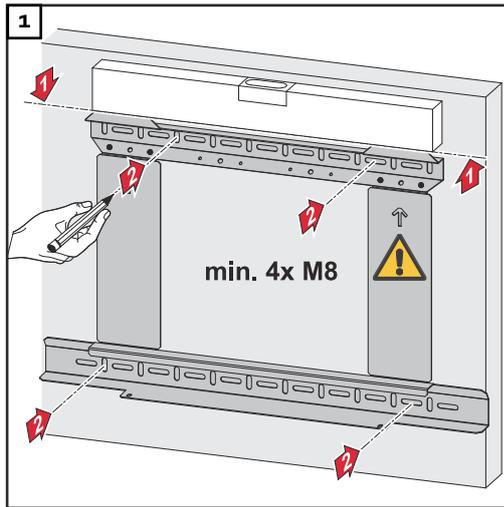
Observe the local regulations for lifting heavy loads or use a crane to lift the device (attach to crane-hoisting lugs)
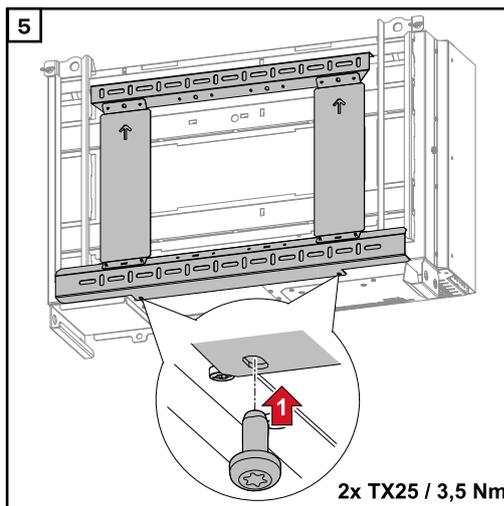
To attach the inverter to the mounting bracket, use only the screws included in the scope of delivery.

5

2x TX25 / 3,5 Nm

Mounting the inverter on floor racks

1 2x M8 / 24 Nm
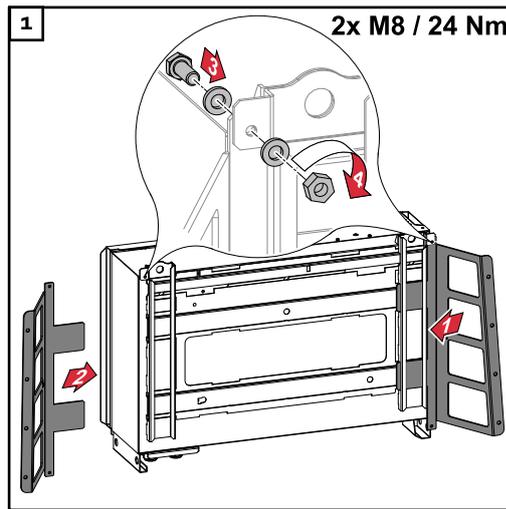
The floor racks can be ordered as an optional accessory.
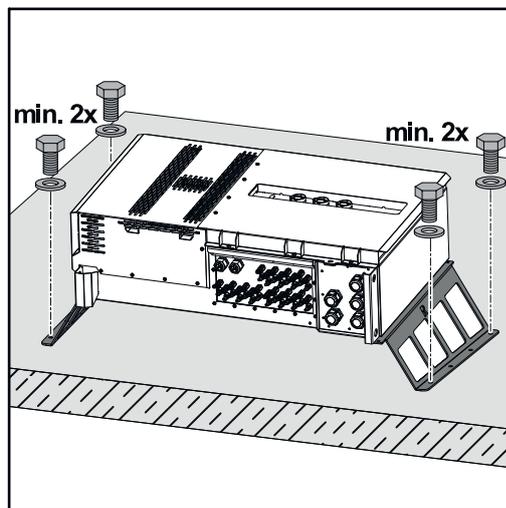
Mounting the inverter on a horizontal mounting surface is not mandatory, but recommended.
Depending on the surface, different wall plugs and screws are required for floor mounting the floor racks. Wall plugs and screws are therefore not included in the scope of supply of the inverter. The installer is responsible for selecting the correct wall plugs and screws.

min. 2x   min. 2x

2 Mount the inverter and floor racks securely to a suitable surface using the appropriate installation materials
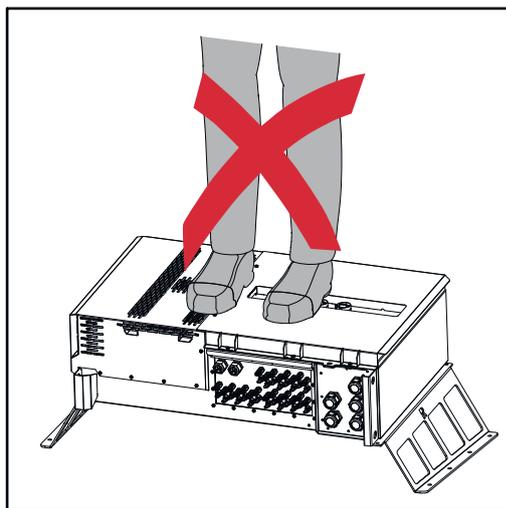
Do not climb onto the device!

Connecting the inverter to the public grid (AC side)

Monitoring the grid

IMPORTANT! To provide the best possible grid monitoring, the resistance in the leads to the mains connections should be as low as possible.

AC connection area

IMPORTANT! Only the following cables may be connected to V-type terminals:
- RE (solid round conductor)
- RM (stranded round conductor)
- SE (solid sector conductor)
- SM (stranded sector conductor)
- Fine-core cables only in conjunction with ferrules

Fine-core cables without ferrules may only be connected to the M12 threaded bolts of the grid connections using a suitable M12 cable lug;
torque = 32 Nm

Cable gland "Multicore" version

Ø 16 - 61,4 mm
Ø 0.63 - 2.42 inch
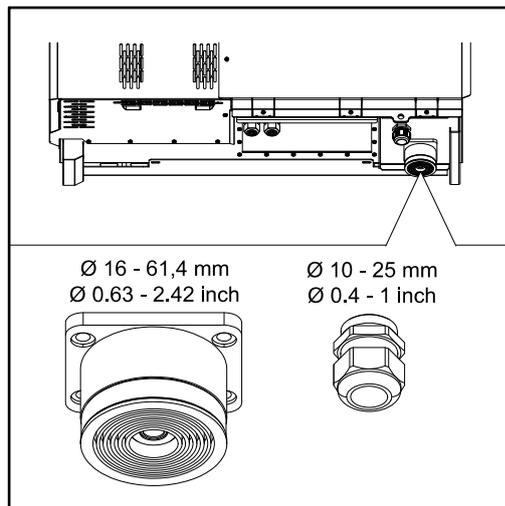
Ø 10 - 25 mm
Ø 0.4 - 1 inch

The following cable outer diameters are compatible with the larger bushing: 16 - 27.8 - 36.2 - 44.6 - 53 - 61.4 mm

For the small bushing (M32 PG gland), earth cables of 10 - 25 mm can be fed through.

Cable gland "Singlecore" version

Ø 10 - 28 mm
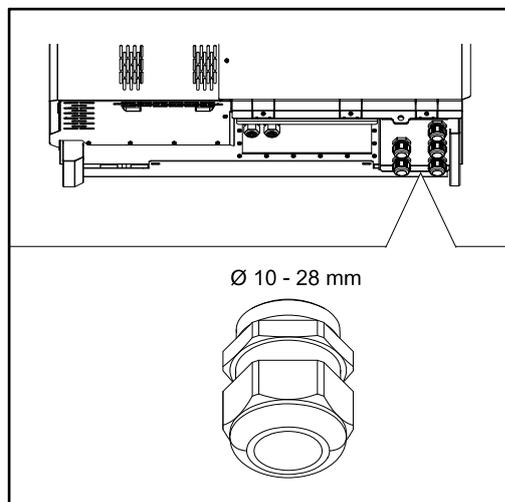
5 M40 bushings

Cable gland "AC Daisy Chain" version

10 M32 bushings

Ø 10 - 25 mm
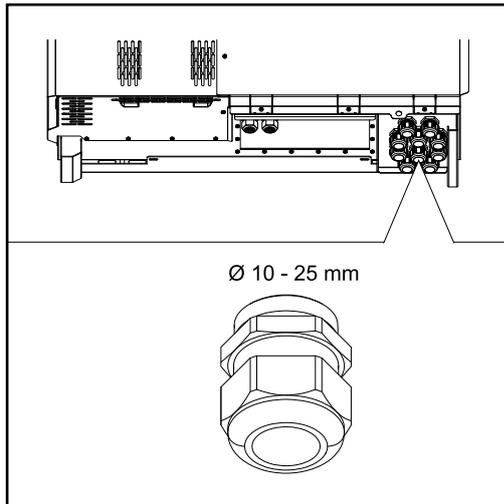
Connecting aluminum cables

Aluminum cables can also be connected to the AC connections.

> *NOTE!*
>
> **When using aluminum cables:**
> ▶ Follow all national and international guidelines regarding the connection of aluminum cables.
> ▶ Grease aluminum wires with appropriate grease to protect them from oxidation.
> ▶ Follow the instructions of the cable manufacturer.

Permitted cables

The temperature resistance of the AC cables must be at least 90 °C.

If cables are used that do not withstand this temperature requirement, fit the protective hose (item number: 4.251.050) over the phases (L1 / L2 / L3) and neutral conductor (N)! The grounding PE does not need to be protected with a protective hose.
With the AC daisy chain option, all phases and neutral conductors must be protected with the protective hose. This means that the AC daisy chain option requires two protective hose sets.

AC connections
Select a sufficiently large cable cross-section based on the power category and connection variant!

Power category	Connection variant	Cable cross-section
Tauro 50-3 Tauro Eco 50-3	Single core / multi-core	35 - 240 mm² *
	Optional AC disconnector	35 - 240 mm² *
	Daisy chain (without AC disconnector)	35 - 240 mm² *

Power category	Connection variant	Cable cross-section
Tauro ECO 99-3 Tauro ECO 100-3	Single core / multi-core	70 - 240 mm² *
	Optional AC disconnector	70 - 240 mm² *
	Daisy chain (without AC disconnector)	70 - 240 mm² *

* The cable cross-section of the neutral conductor can be reduced to 25 mm² if no local guidelines or standards require otherwise.

Maximum alternating current fuse protection

> **NOTE!**
>
> **There is no general requirement to use a residual current circuit breaker.**
> Nonetheless, if a residual current circuit breaker (RCD) is used then it must be a type B with a release current of at least 1000 mA.

> **NOTE!**
>
> **The inverter may be used with a maximum C355 A automatic circuit breaker.**

	50-3-D / 50-3-P	Eco 50-3-D / 50-3-P	Eco 99-3-P	Eco 99-3-D	Eco 100-3-P	Eco 100-3-D
Recommended output overcurrent protection [A] for 50 kW output power	80	80	-	-	-	-
Recommended output overcurrent protection [A] for 100 kW output power (Example: daisy chaining)	160	160	160	160	160	160
Recommended output overcurrent protection [A] for 150 kW output power (Example: daisy chaining)	250	250	250	250	250	250
Recommended output overcurrent protection [A] for 200 kW output power (Example: daisy chaining)	355	355	355	355	355	355

Changing the clamping area for V-type terminal

The clamping range of the V-type terminal is 35 - 150 mm² when delivered. The clamping range can be changed to 185 - 240 mm² by a simple modification of the V-type terminal.
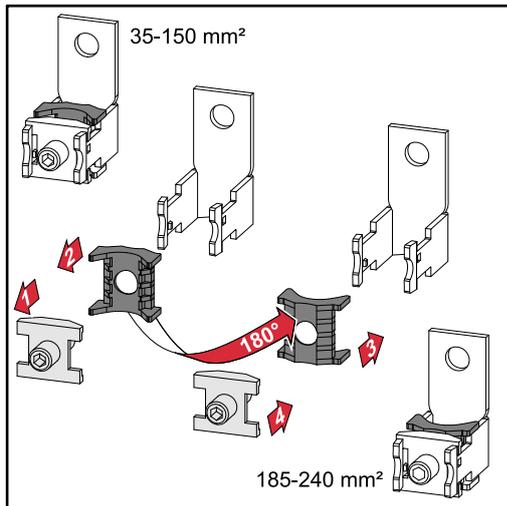
Sector conductors at the V-type terminal
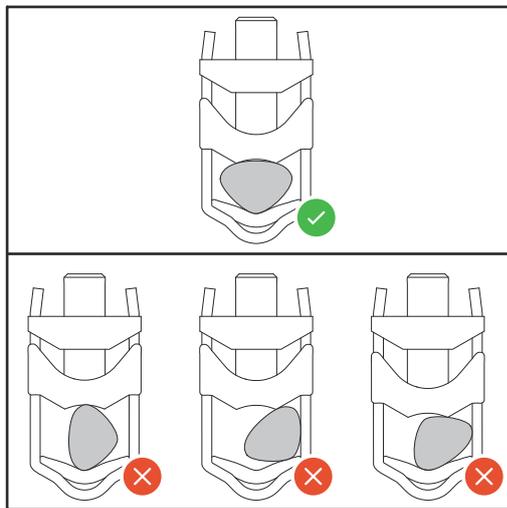
Additional PE introduction for earthing

An optional hole can be made on the right side of the housing at the bottom for an additional PE introduction.

> ⚠️ **CAUTION!**
>
> **Danger from faulty or incorrect holes.**
> This may lead to injuries to the eyes and hands as a result of flying debris and sharp edges, as well as damage to the inverter.
> ▶ When drilling, wear suitable protective goggles.
> ▶ Only use a step drill when drilling.
> ▶ Ensure that nothing is damaged inside the device (for example connection block).
> ▶ Adapt the diameter of the hole to match the corresponding connection.
> ▶ Deburr the holes using a suitable tool.
> ▶ Remove the drilling residues from the inverter.
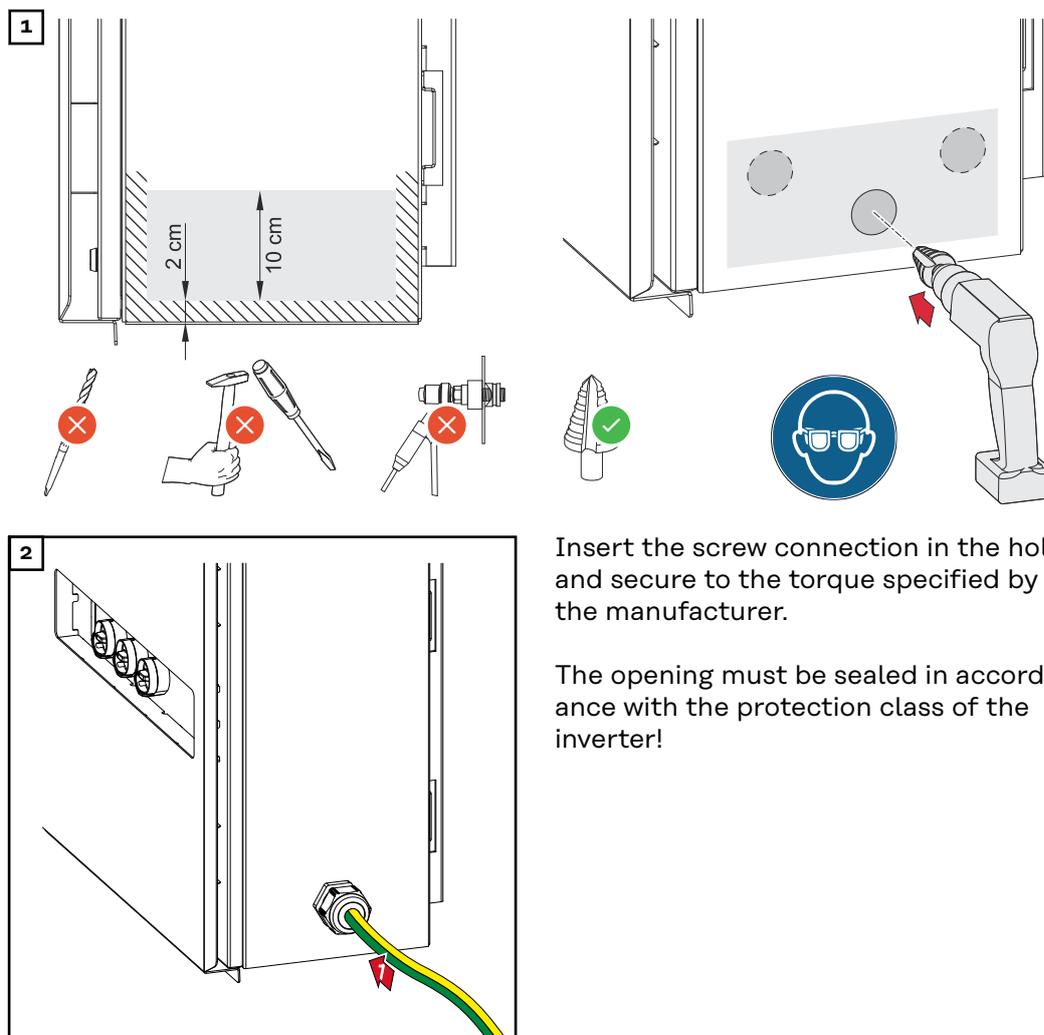
Insert the screw connection in the hole and secure to the torque specified by the manufacturer.

The opening must be sealed in accordance with the protection class of the inverter!

<div>

⚠ **WARNING!**

Danger from mains voltage and DC voltage from PV modules.
An electric shock can be fatal.
▶ Prior to any connection work, ensure that the inverter is de-energized on the AC side and the DC side.
▶ Only an authorized electrical engineer is permitted to connect this equipment to the public grid.

</div>

<div>

⚠ **CAUTION!**

Danger of damaging the inverter due to improperly connected wires.
Improperly connected wires can cause thermal damage to the inverter and may cause a fire.
▶ When connecting AC and DC wires, make sure that all cables are secured to the inverter connections using the correct torque.

</div>

IMPORTANT! For the PE connection, the requirements defined under "Safety rules" for safe connection of the PE conductor must also be observed.

Opening the inverter

TX25 - 7x
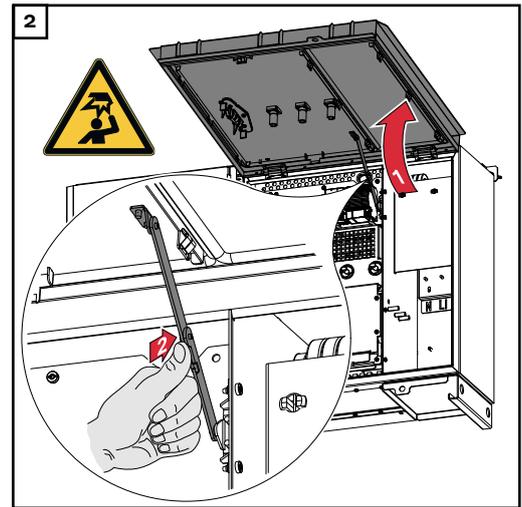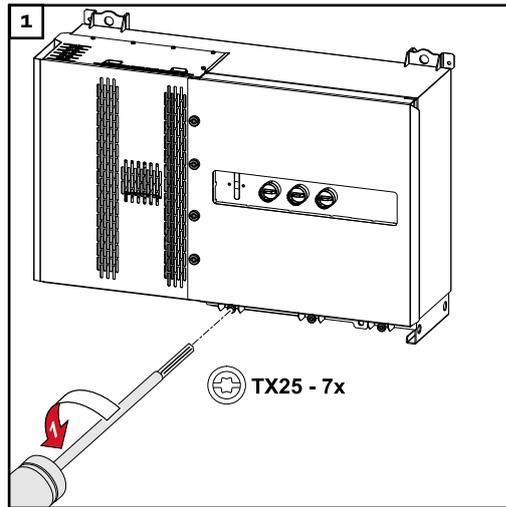
Switching off the AC disconnector option

Option

OFF
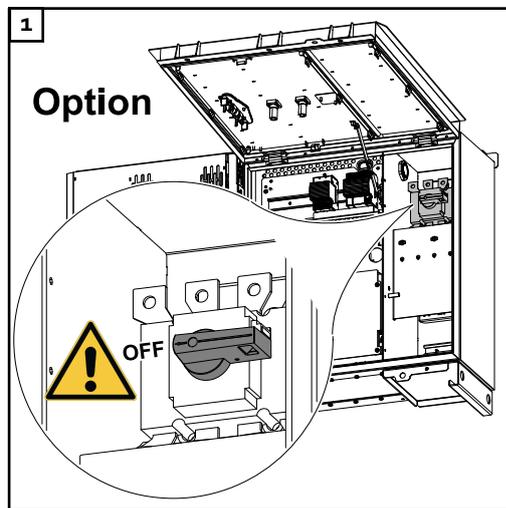
Connecting the inverter to the public grid - Singlecore

Ensure that the phases are connected in the right order: PE, N, L1, L2 and L3.

PE: Cu ≥ 10 mm²
Al ≥ 16 mm²

OFF

5x

25 mm
0.98 inch
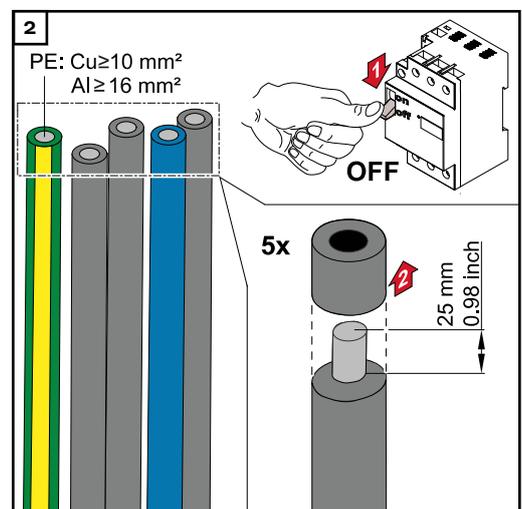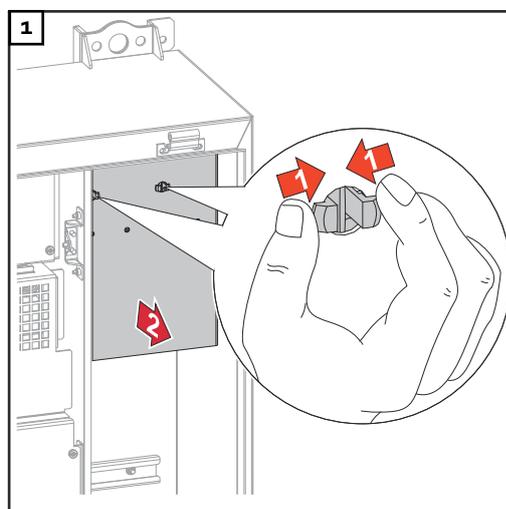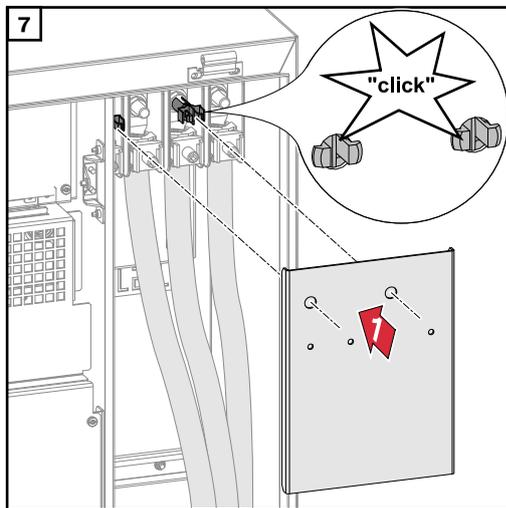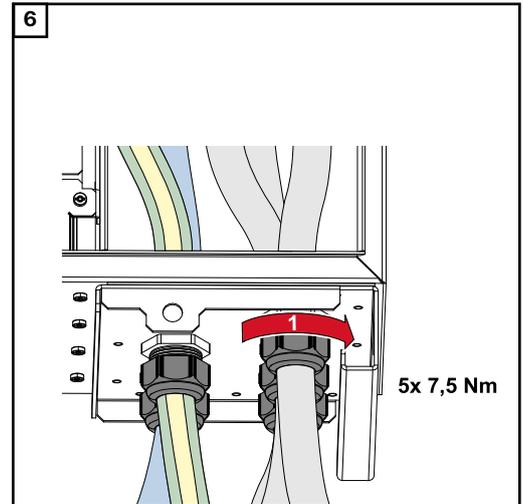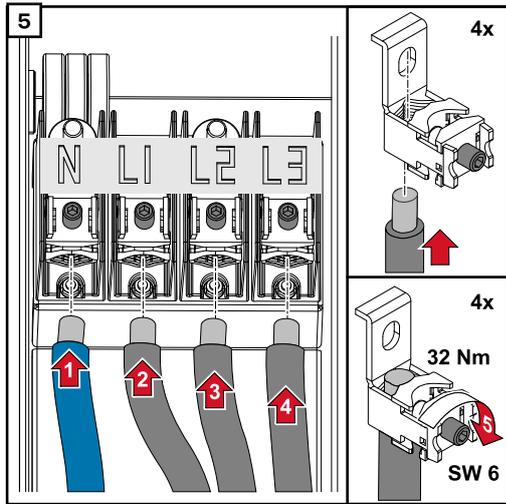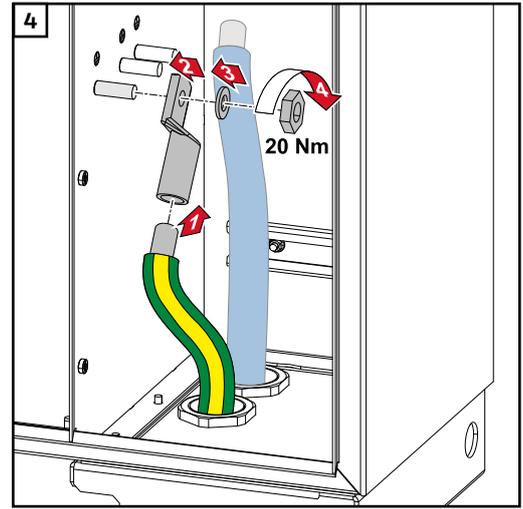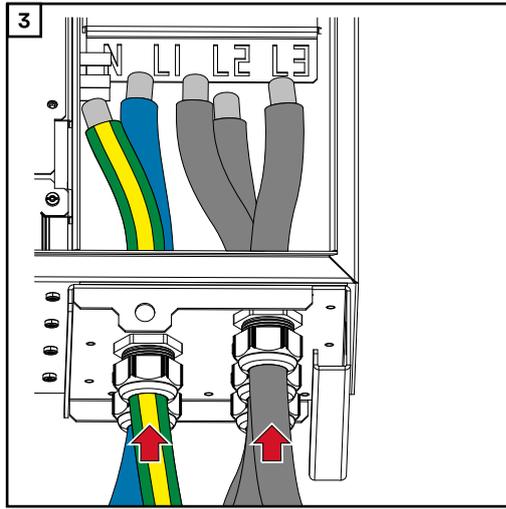
Connecting the inverter to the public grid - Singlecore with PEN conductor

Ensure that the phases are connected in the right order: PE, PEN, L1, L2 and L3.
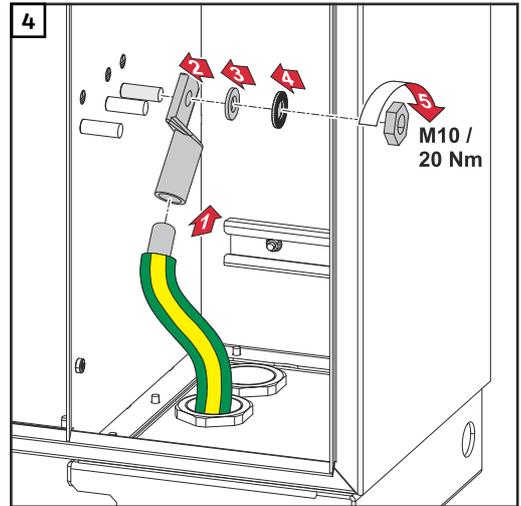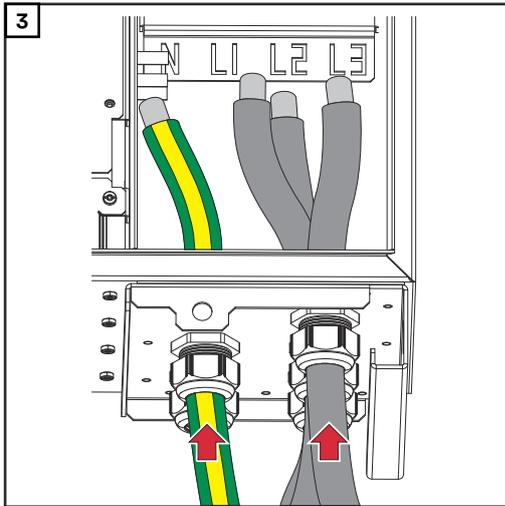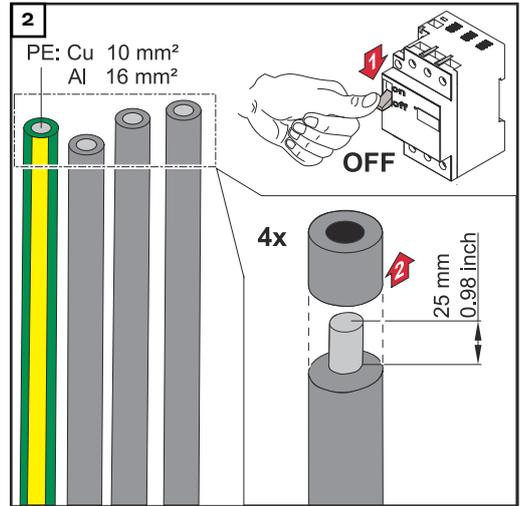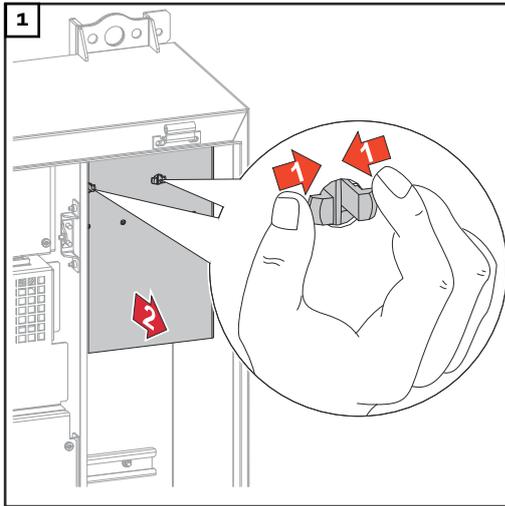
1

2

PE: Cu 10 mm²
    Al 16 mm²

OFF

4x

25 mm
0.98 inch

3

N L1 L2 L3

4

M10 /
20 Nm

5

M10 /
20 Nm

min. 25 mm²

6

N L1 L2 L3

4x

4x

32 Nm

HX 6

7

4x 7,5 Nm

8

"click"
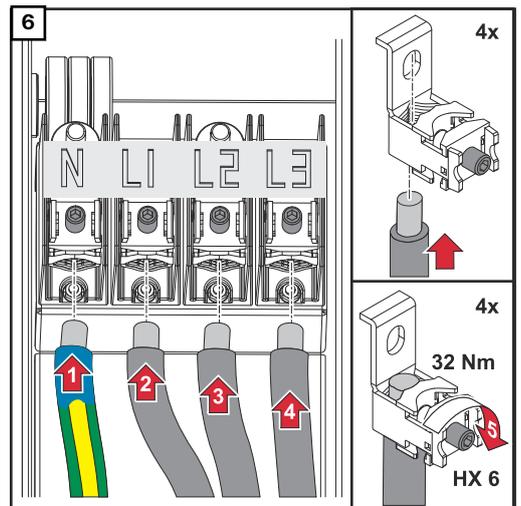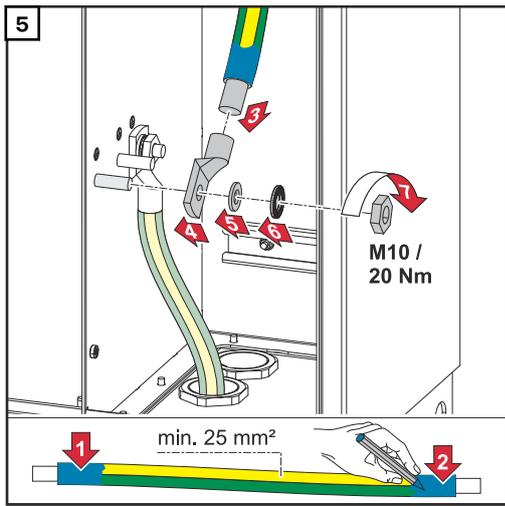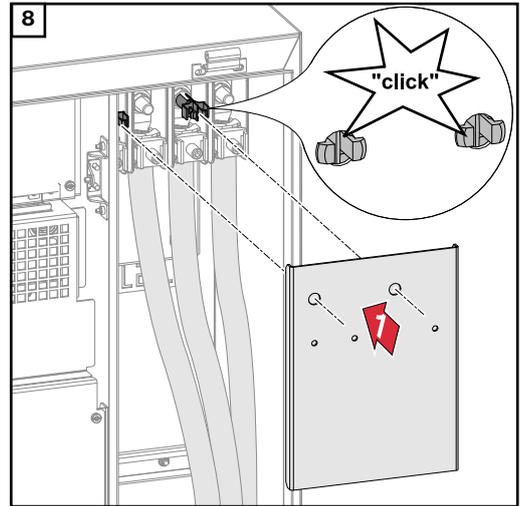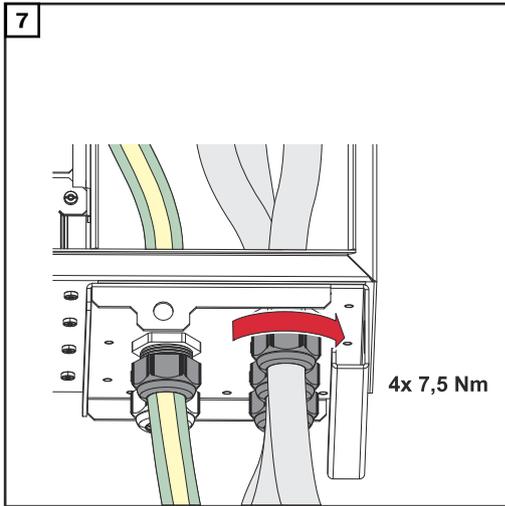
Connecting the inverter to the public grid - Multicore

When connecting, ensure that the phases are in the correct order: PE, N, L1, L2 and L3.

1

2

PE: Cu≥10 mm²
Al≥16 mm²

OFF

5x

25 mm
0.98 inch

3

N L1 L2 L3

4

Option

20 Nm

5

4x

4x

32 Nm

SW 6

6
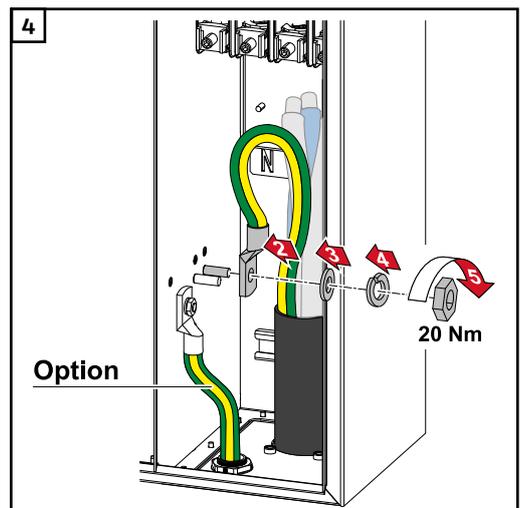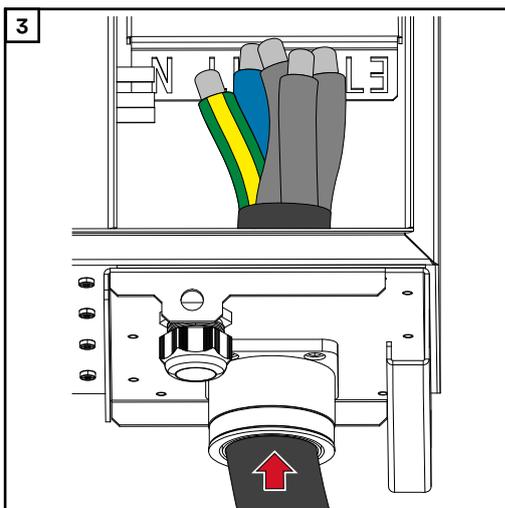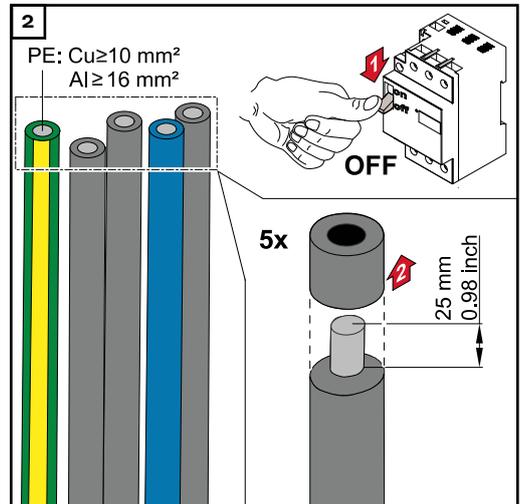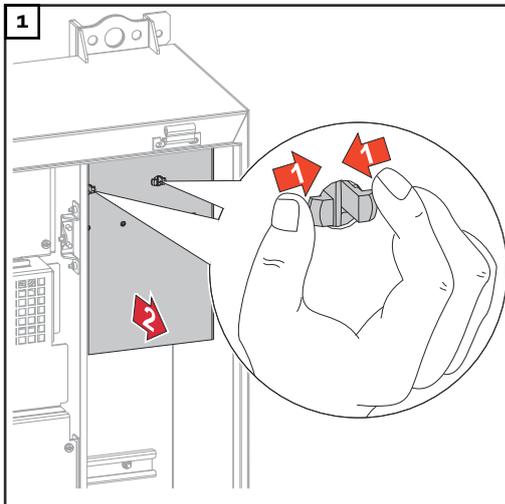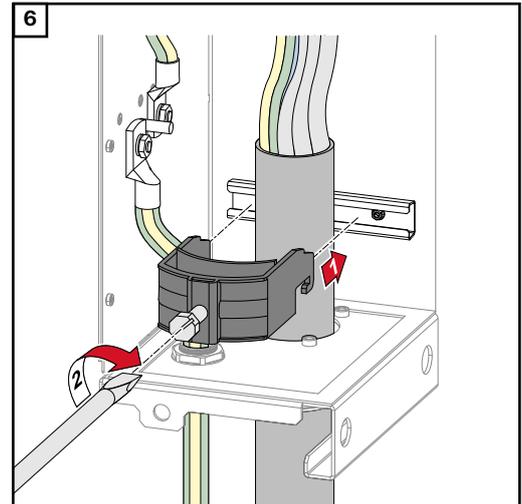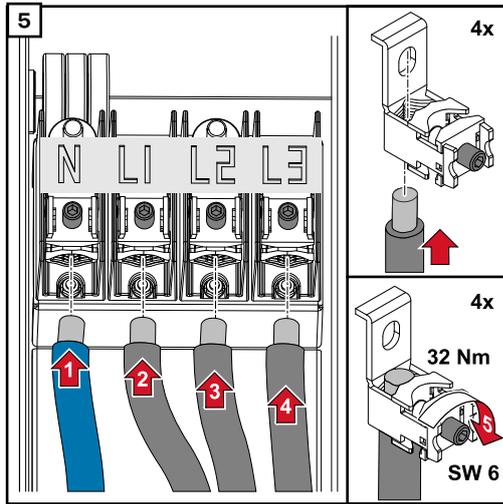
Secure to the torque specified by the manufacturer of the strain-relief device. The strain-relief device is not part of the scope of supply.
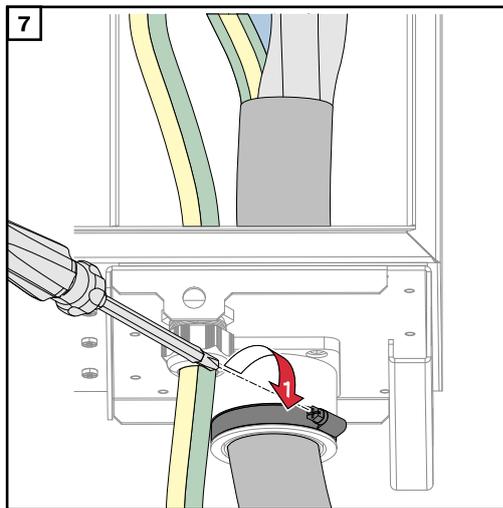
7

Secure to the torque specified by the manufacturer

8

7,5 Nm

9

"click"
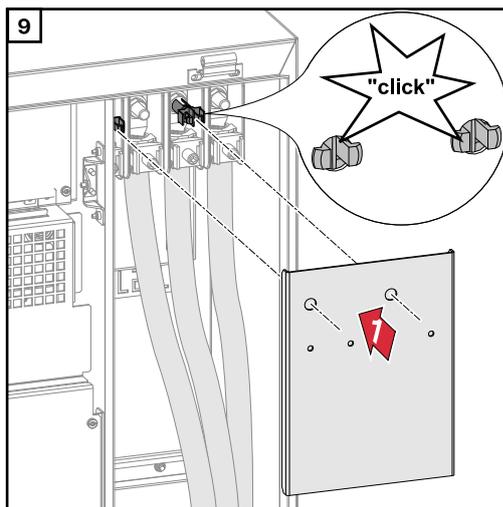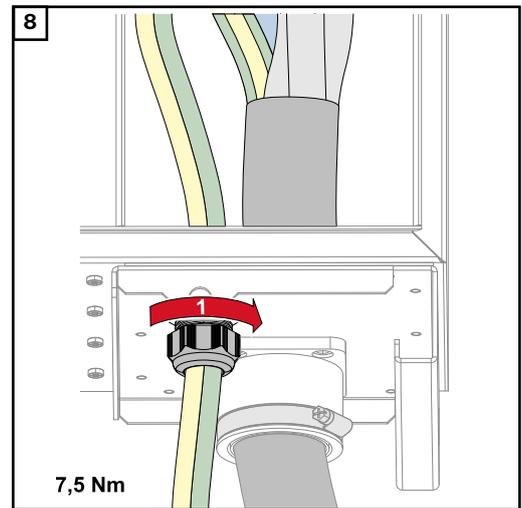
Connecting the inverter to the public grid - Daisy Chain

Ensure that the phases are connected in the right order: PE, N, L1, L2 and L3.
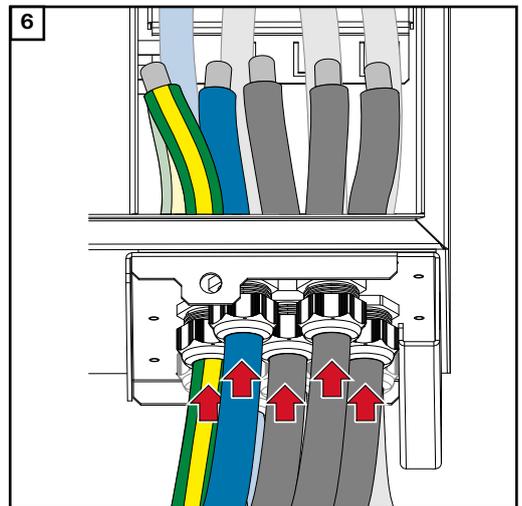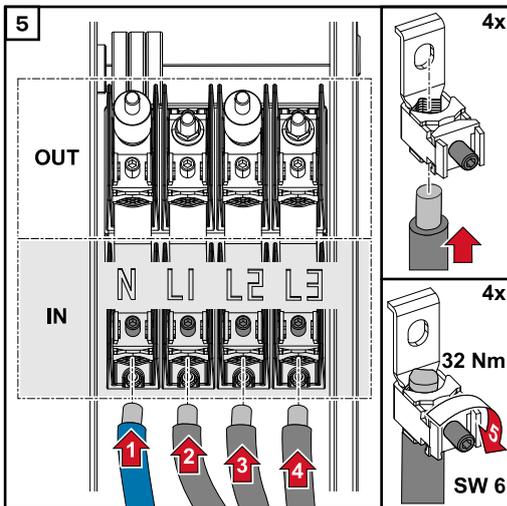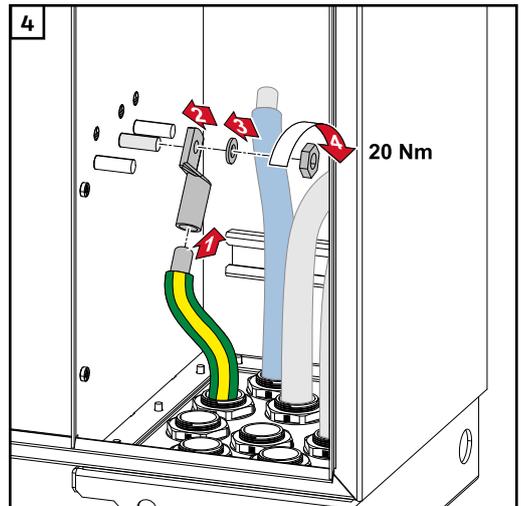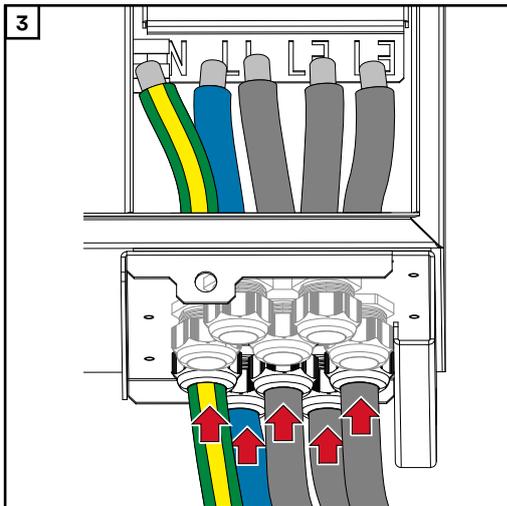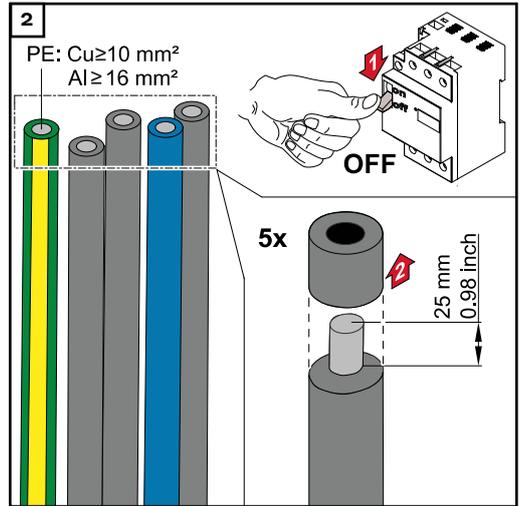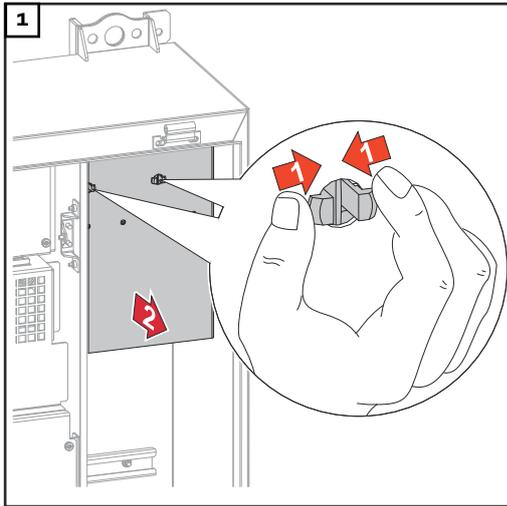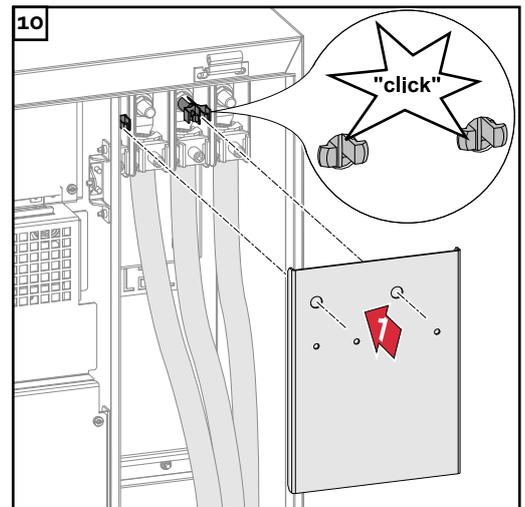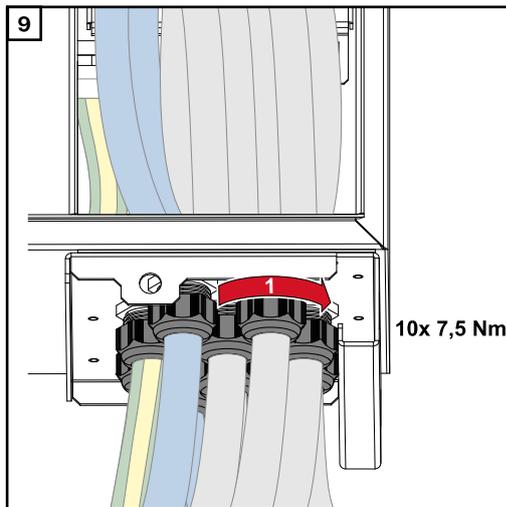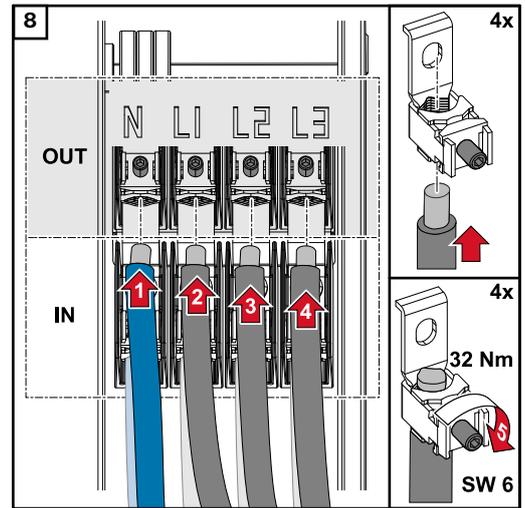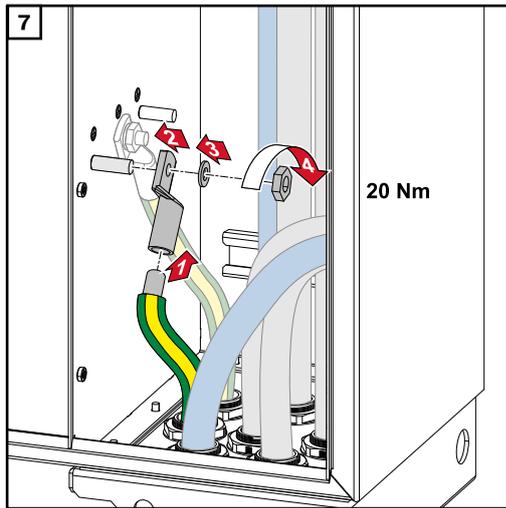
1

OFF

2

PE: Cu≥10 mm²
Al≥16 mm²

5x

25 mm
0.98 inch

3

N L1 L2 L3

4

20 Nm

5

OUT

IN

N L1 L2 L3

4x

4x

32 Nm

SW 6

6

7 — 20 Nm

8 — OUT: N L1 L2 L3 / IN — 4x / 4x 32 Nm SW 6

9 — 10x 7,5 Nm

10 — "click"

Connecting cables with a cable lug

Alternatively, a cable with a cable lug can be connected to the M12 threaded bolts on the grid connections in order to connect the cables to the V-type terminals.

M12

M12

32 Nm
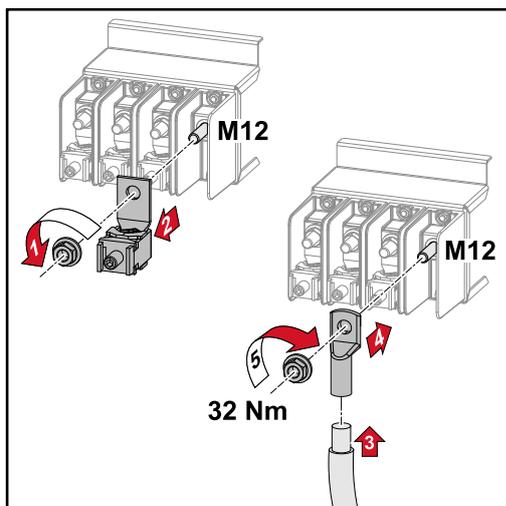
Connecting the PV cable to the inverter

Safety

> ⚠️ **WARNING!**
>
> **Danger due to grid voltage and DC voltage from solar modules that are exposed to light.**
> An electric shock can be fatal.
> ▶ Prior to any connection work, disconnect the inverter on the AC side and the DC side.
> ▶ Only an authorized electrical technician is permitted to connect this equipment to the public grid.

> ⚠️ **WARNING!**
>
> **Danger of electric shock due to incorrectly connected terminals / PV plug connectors.**
> An electric shock can be fatal.
> ▶ When connecting version D ("direct string"), ensure that every pole of a string is fed across the same PV input, e.g.:
> "+ pole string 1" at input PV 1.1+ and "- pole string 1" at input PV 1.1-

> ⚠️ **WARNING!**
>
> **Danger from DC voltage. Even when the DC disconnectors are switched off, the fuse boards (100-3-D / 99-3-D) / fuse board (50-3-D) and everything before the DC disconnectors are live.**
> An electric shock can be fatal.
> ▶ Prior to any connection work, disconnect the inverter on the AC side and the DC side.

> ⚠️ **CAUTION!**
>
> **Risk of damage to the inverter as the result of incorrectly tightened terminals.**
> Incorrectly tightened terminals can cause heat damage to the inverter that may result in a fire.
> ▶ When connecting AC and DC cables, ensure that all the terminals are tightened to the specified torque.

> ⚠️ **CAUTION!**
>
> **Risk of damage to the inverter due to PV modules that are not connected with the correct polarity.**
> PV modules that are not connected with the correct polarity can cause thermal damage to the inverter.
> ▶ Measure the DC cables from the PV modules and connect them to the inverter with the correct polarity.

> ⚠ **CAUTION!**
>
> **Risk of damage to the inverter by exceeding the maximum input current per string.**
> Exceeding the maximum input current per string can cause damage to the inverter.
> ▶ Observe the maximum input current per string for the inverter according to the technical data.
> ▶ The maximum input current must not be exceeded even when using Y or T connectors.

General comments regarding PV modules

To enable suitable PV modules to be chosen and to use the inverter as efficiently as possible, it is important to bear the following points in mind:
- If insolation is constant and the temperature is falling, the open-circuit voltage of the PV modules will increase. The open-circuit voltage must not exceed the maximum permissible system voltage. If the open-circuit voltage exceeds the specified values, the inverter will be destroyed and all warranty claims will be forfeited.
- The temperature coefficients on the data sheet of the PV modules must be observed.
- Exact values for sizing the PV modules can be obtained using suitable calculation tools, such as the **Fronius Solar.creator**.

IMPORTANT!
Before connecting up the PV modules, check that the voltage for the PV modules specified by the manufacturer corresponds to the actual measured voltage.

DC Voltage

IMPORTANT!
The PV modules connected to the inverter must comply with the IEC 61730 Class A standard.
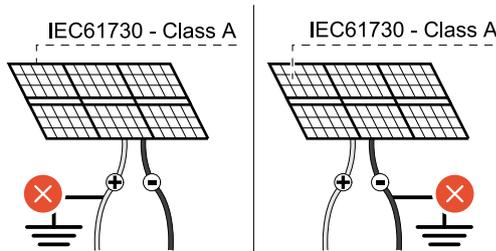
IMPORTANT!
Solar module strings must not be earthed.

max. 1000 V_{DC}

Permitted cables

DC connections
Select a sufficiently large cable cross-section based on the device type! The temperature resistance of the DC cables must be at least 90 °C.

Power category	Device type	Cable cross-section
Tauro 50-3 / Eco 50-3 / Eco 99-3 / Eco 100-3	pre-combined	25 - 95 mm²
	direct	2.5 - 10 mm² (see data sheet of the plug)

DC fuse protection - pre-combined

> ⚠ **CAUTION!**
>
> **Risk of damage to the inverter as the result of incorrectly fused PV lines.**
> PV lines for the "pre-combined" model that are not fused can cause damage to the inverter.
> ▶ PV lines must be fused in a combiner box before the inverter ("pre-combined" version).
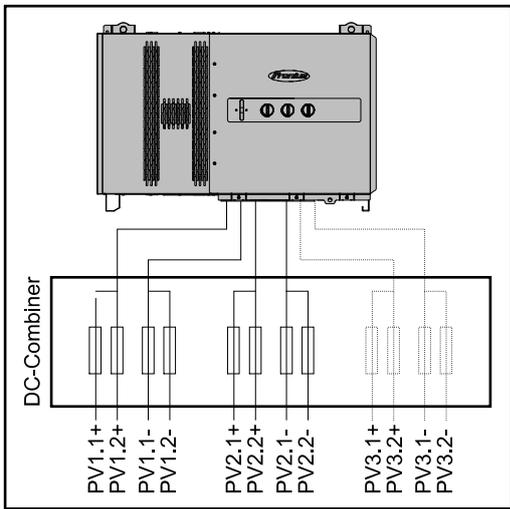
Example of Fronius Tauro Eco 50-3-P / 99-3-P / 100-3-P combiner box
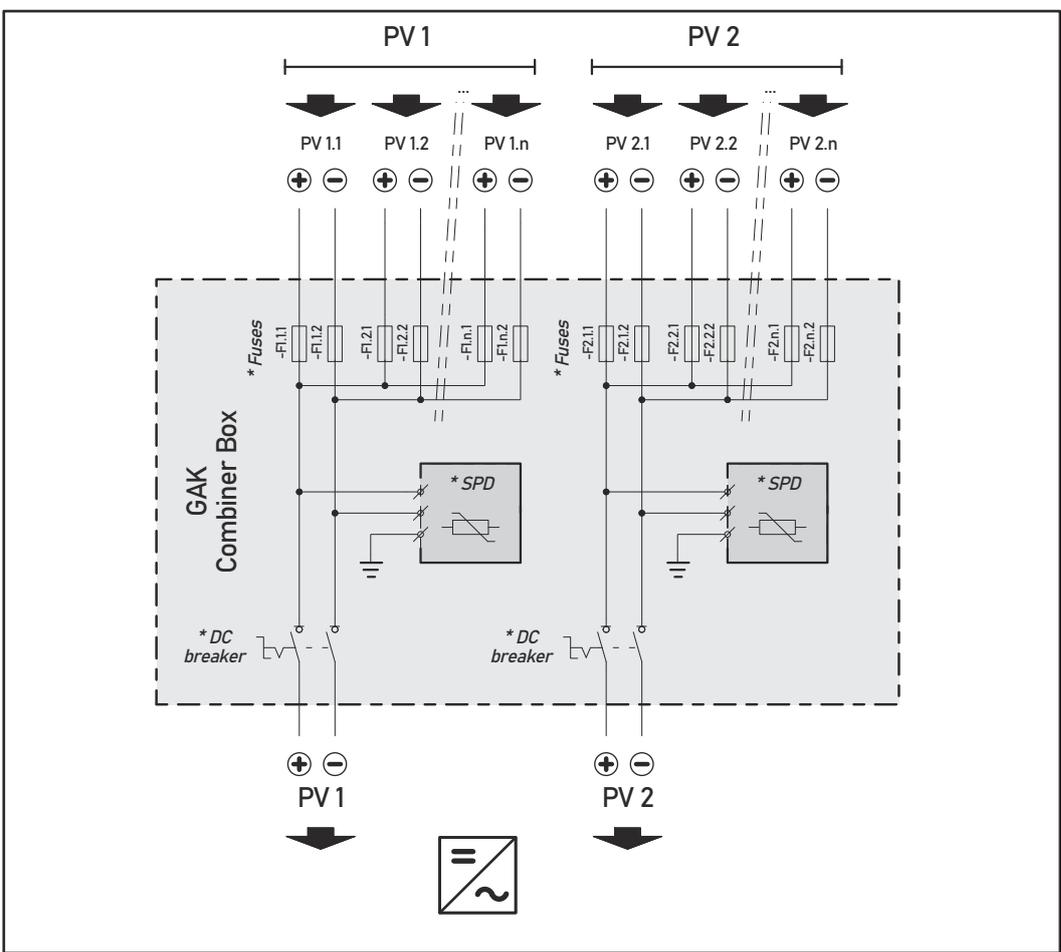
* DC fuse optional depending on national standard / DC breaker optional / DC SPD optional

Example Fronius Tauro 50-3-P combiner box
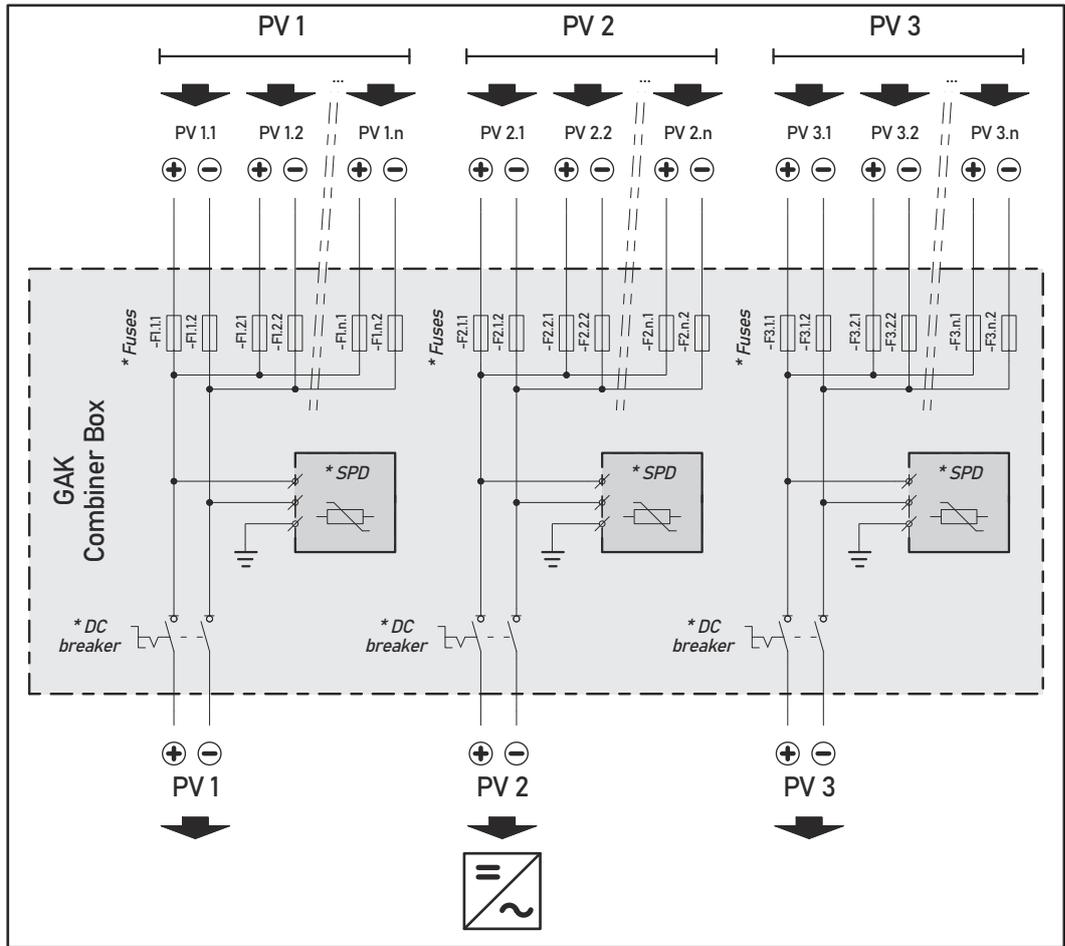
* DC fuse optional depending on national standard / DC breaker optional / DC SPD optional

Distribution of solar module strings in the direct variant

Distribute the existing solar module strings evenly between the PV inputs (PV1 / **PV2** / **PV3**) of the inverter.

Start with the odd inputs first and then fill the even inputs to distribute the power as evenly as possible and increase the service life of the fuses, for example: (1.1, **2.1**, **3.1**, 1.3, **2.3**etc.).
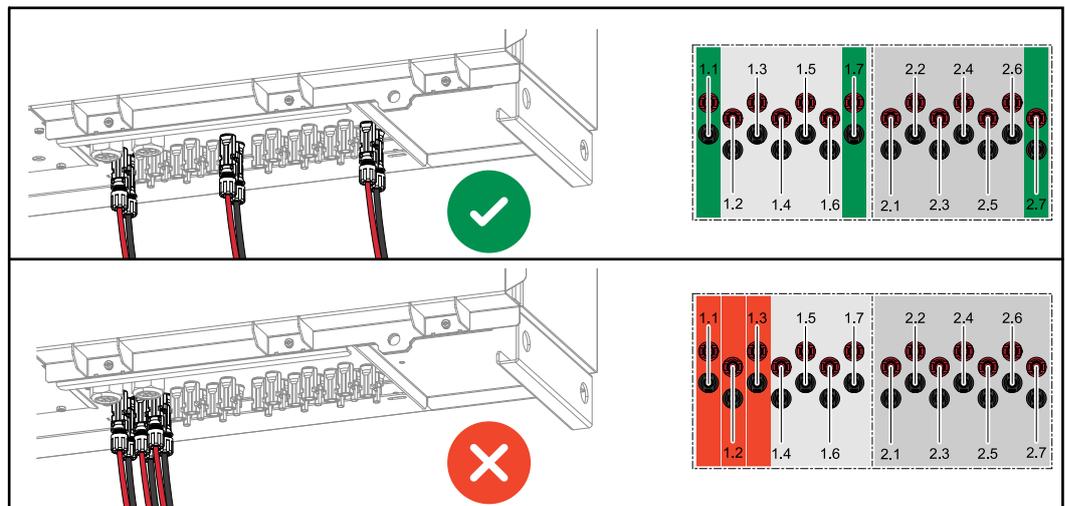
Connecting PV cables - MC4 connector
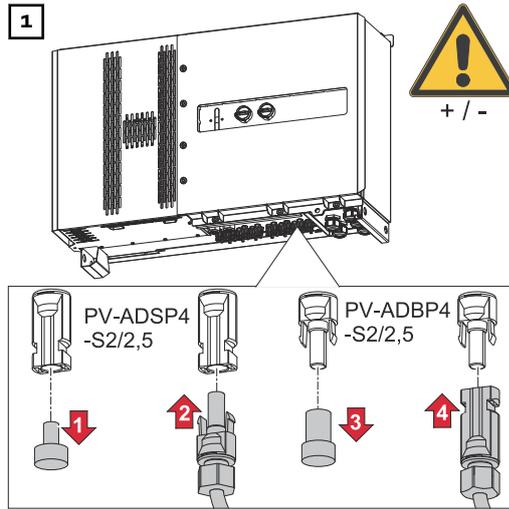
Connect the PV cables from the solar modules to the MC4 connectors as labeled

Unused MC4 connectors on the inverter must be covered with the cover plates supplied with the inverter.

MC4 connector cover

To protect the MC4 connectors, a cover plate can be mounted on the inverter. The cover plate can be ordered as an optional accessory together with the floor racks.
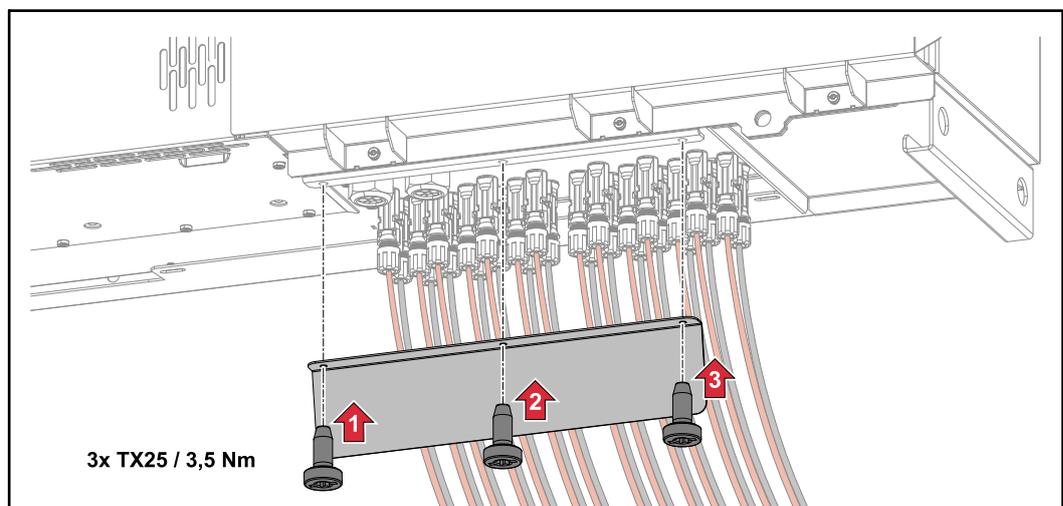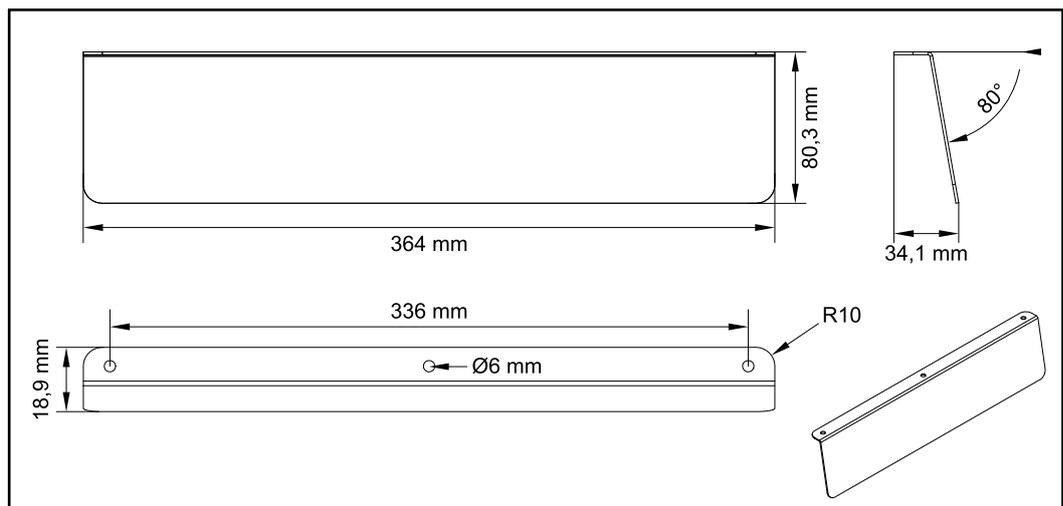
Connecting PV cables - pre-combined

Solar module strings that are combined in a DC combiner box, must, according to the applicable national regulations, be fused per string in the DC combiner box!
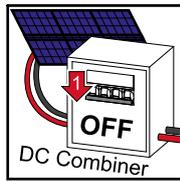
Before working in the connection area of the inverter, the DC voltage must be switched off. This can also be done in the DC combiner box.
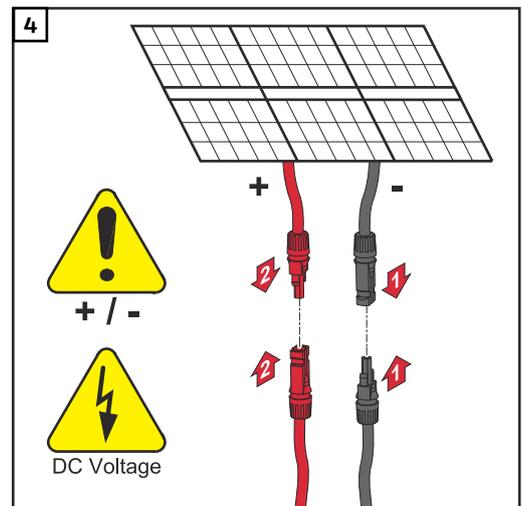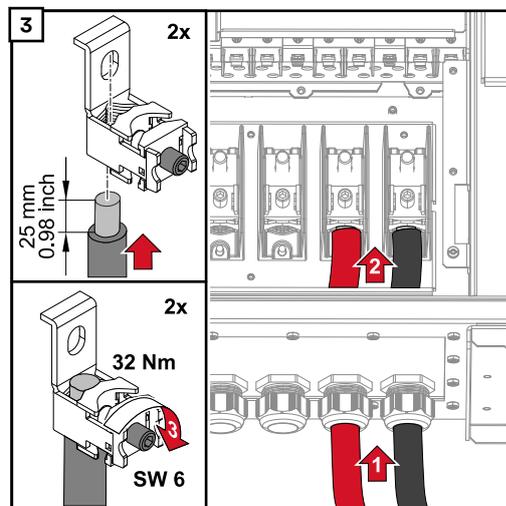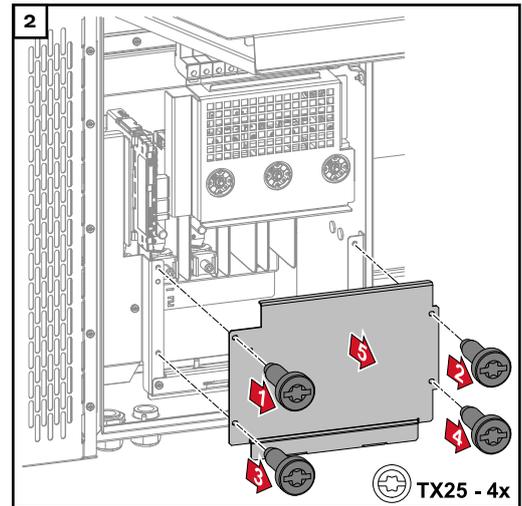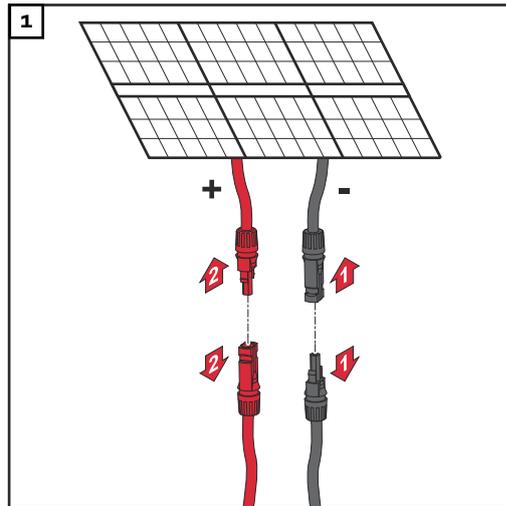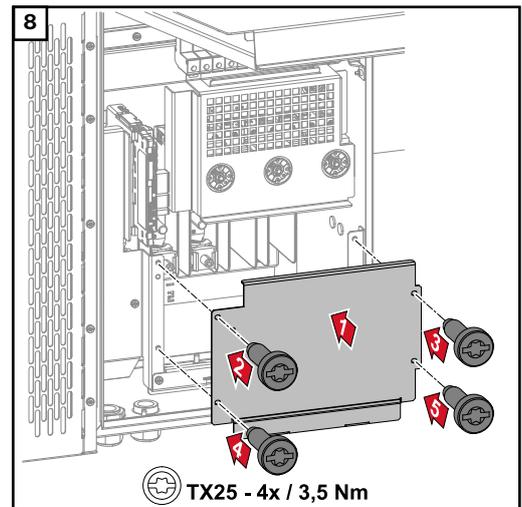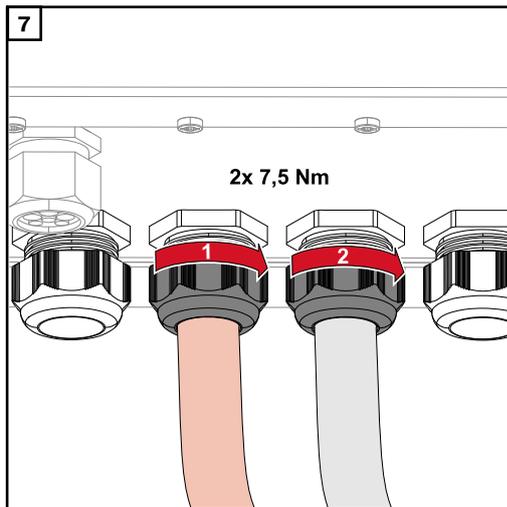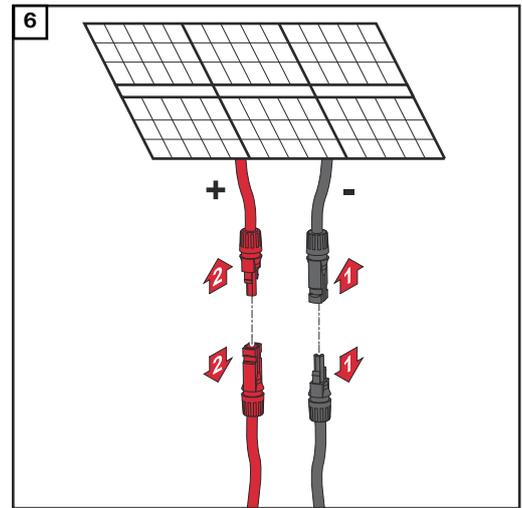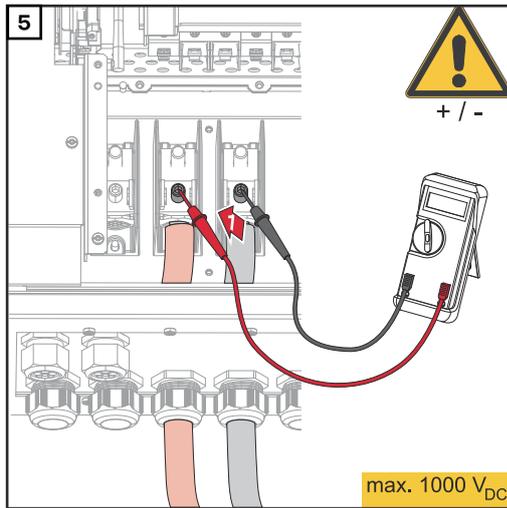
5 max. 1000 V_DC

$$\text{max. 1000 V}_{DC}$$

+ / -

6

7 2x 7,5 Nm

8 TX25 - 4x / 3,5 Nm

Connecting cables with a cable lug

Alternatively, a cable with a cable lug can be connected to the M12 threaded bolts on the grid connections in order to connect the cables to the V-type terminals.

M12

M12

32 Nm
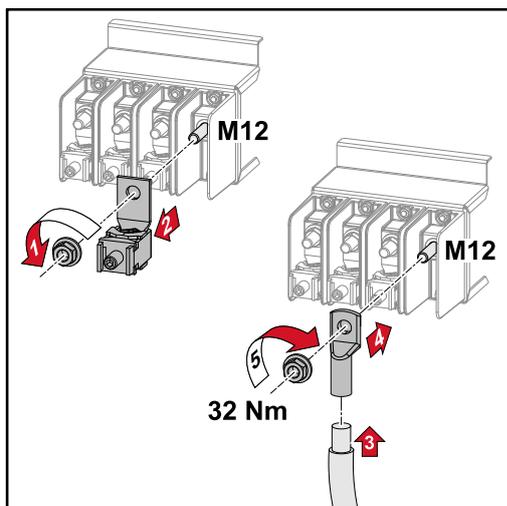
Replacing the string fuses

> ⚠️ **CAUTION!**
>
> **Danger due to faulty fuses.**
> This can lead to fires.
> ▶ Only replace faulty fuses with new ones of the same rating.
> ▶ Do not replace faulty fuses with bolts.

> ⚠️ **CAUTION!**
>
> **Danger due to incorrectly dimensioned string fuses**
> Incorrectly dimensioned string fuses can cause damage to the inverter for these connected components.
> The following string fuses should be used for the -D (direct) version of the Fronius Tauro:
> ▶ Max. **10 A** per string → use of **15 A gPV fuse 1000 V** possible (Fronius item number: 41,0007,0230 - fuse 15 1000 F PV 15A)
> ▶ Max. **14.5 A** per string → use of **20 A gPV fuse 1000V** required (Fronius item number: 41,0007,0233 - fuse-HL 20 A 1KV fast)
> ▶ Max. **22 A** per string → use of **30 A gPV fuse 1000V** required (Fronius item number: 41,0007,0241 - fuse-HL 30 A 1KV fast)

Replacing fuses:
Fronius Tauro 50-3-D string 1.1 - 3.7 /
Fronius Tauro 50-3-D (30 A fuses) string 1.1 - 3.5 /
Fronius Tauro Eco 50-3-D string 1.1 - 2.7 /
Tauro Eco 50-3-D (30 A fuses) string 1.1 - 2.5 /
Fronius Tauro Eco 99 / 100-3-D string 1.1 - 2.7 /
Fronius Tauro Eco 99 / 100-3-D (30 A fuses) string 1.1 - 3.5
Check values! Only replace faulty fuses with new ones of the same rating.
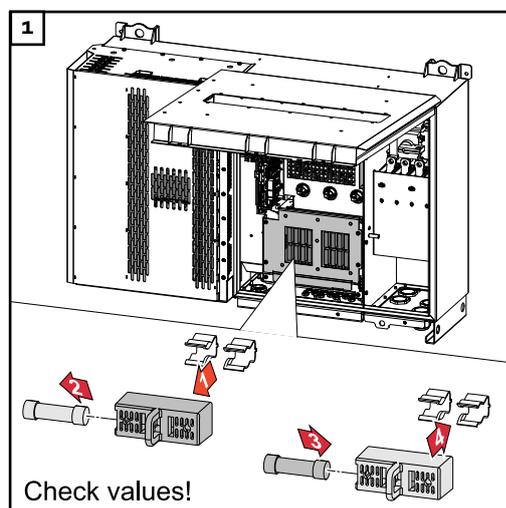
Replacing fuses:
Fronius Tauro Eco 99 / 100-3-D string 3.1 - 3.8
Check values! Only replace faulty fuses with new ones of the same rating.
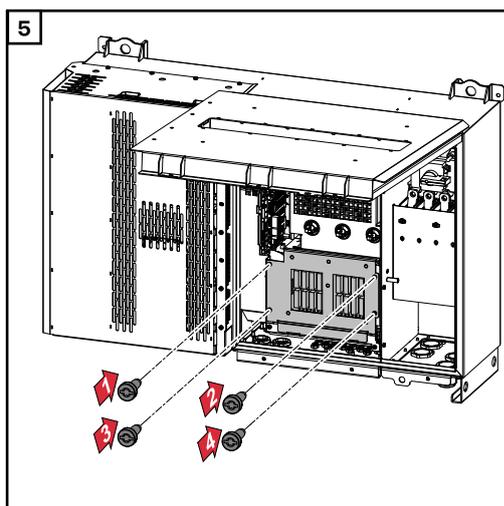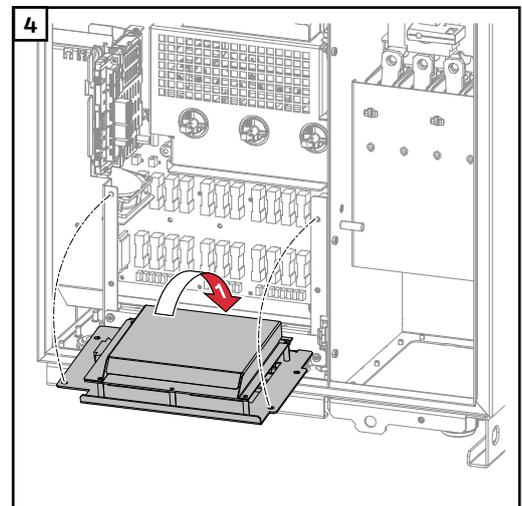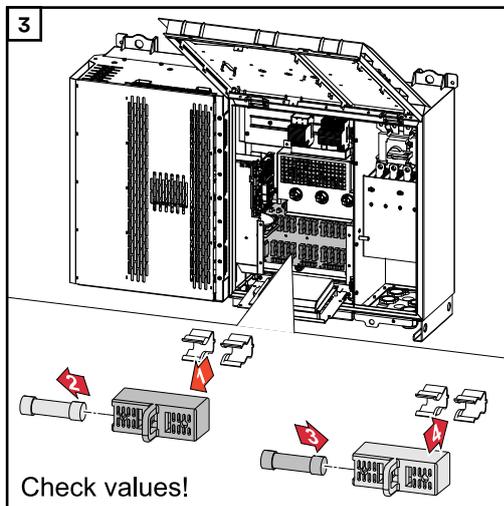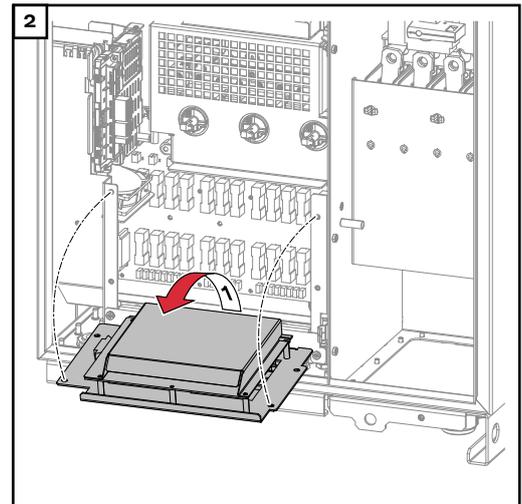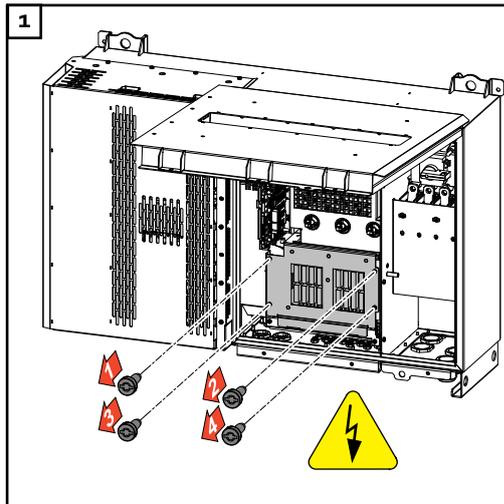
Closing and switching on the inverter

1

Option

ON

2

3

TX25 - 7x / 3,5 Nm

4

+   -

+ / -

DC Voltage
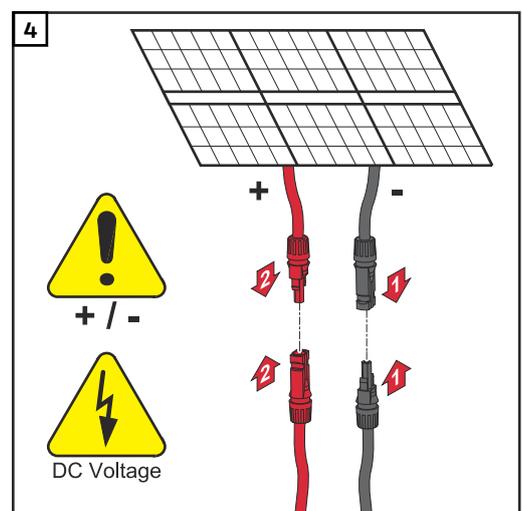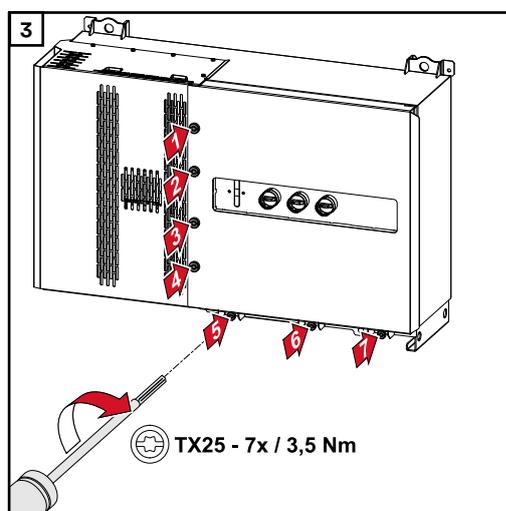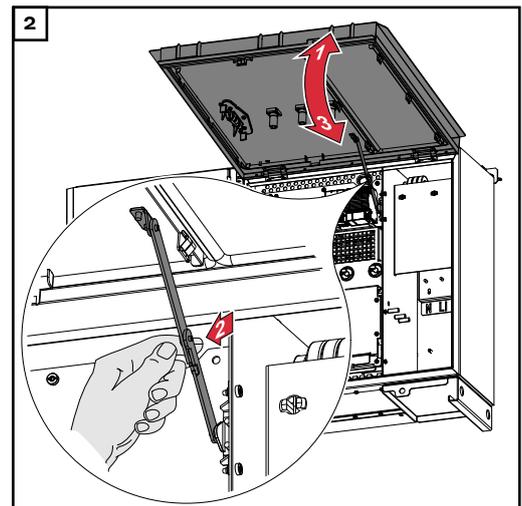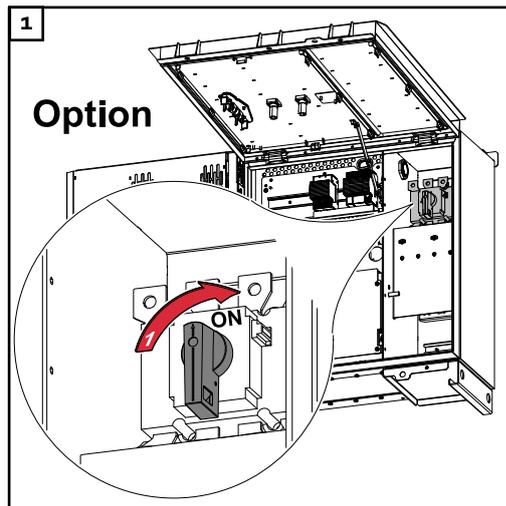
⚠ **WARNING!**

Danger due to DC disconnectors that are not switched on properly
This can result in serious injury and damage to property.

▶ Turn all existing DC disconnectors to the ON position before turning on the AC connection.

▶ The DC disconnectors may only ever be actuated simultaneously (one immediately after the other).

5

2-3x

ON

OFF
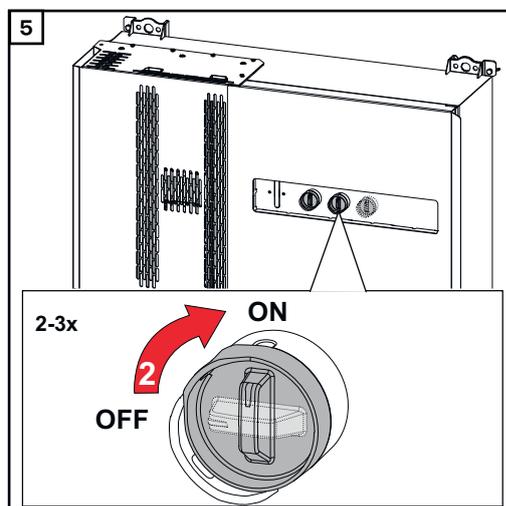
The WLAN access point can be opened with the optical sensor, see chapter **Button functions and LED status indicator** on page **28**
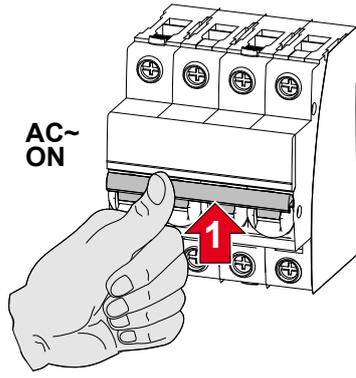
Connecting the data communication cables

Modbus participants

The inputs M0 and M1 can be freely selected. A maximum of 4 Modbus participants can be connected to the Modbus terminal on inputs M0 and M1.

IMPORTANT!
If the function **"Inverter control via Modbus"** is activated in the menu area **"Communication"** → **"Modbus"**, no Modbus participants are possible. It is not possible to send and receive data at the same time.

Permitted cables for the data communication area

Cables with the following design can be connected to the terminals of the inverter:

- Copper: round, solid

- Copper: round, fine-stranded

WSD connections with push-in terminal						
Distance max.	Stripping length	Solid	Fine-stranded	Fine-stranded with ferrules with collar	Fine-stranded with ferrules without collar	Cable recommendation
100 m	10 mm	0.14 - 1.5 mm^2	0.14 - 1.5 mm^2	0.14 - 1 mm^2	0.14 - 1.5 mm^2	min. CAT 5 UTP

Modbus connections with push-in terminal						
Distance max.	Stripping length	Solid	Fine-stranded	Fine-stranded with ferrules with collar	Fine-stranded with ferrules without collar	Cable recommendation
300 m	10 mm	0.14 - 1.5 mm^2	0.14 - 1.5 mm^2	0.14 - 1 mm^2	0.14 - 1.5 mm^2	min. CAT 5 STP

IO connections with push-in terminal						
Distance max.	Stripping length	Solid	Fine-stranded	Fine-stranded with ferrules with collar	Fine-stranded with ferrules without collar	Cable recommendation
30 m	10 mm	0.14 - 1.5 mm^2	0.14 - 1.5 mm^2	0.14 - 1 mm^2	0.14 - 1.5 mm^2	Single conductors possible

Fronius recommends using at least CAT 5 STP (shielded twisted pair) cables and a maximum distance of 100 m.

Multiple inverters in one network

The network cabling of the inverters must be in a star arrangement. Observe the maximum lengths and requirements for the cable!
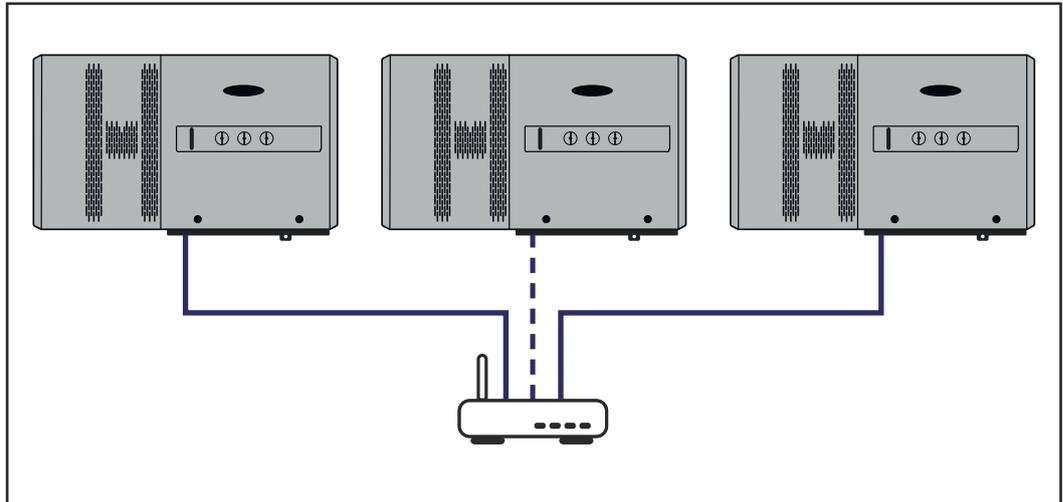
Routing data communication cables

To use the connection to Fronius Solar.web or Modbus TCP, each Tauro must be connected directly to the network via LAN.

IMPORTANT! If data communication cables are wired into the inverter, observe the following points:
- Depending on the number and cross section of the wired data communication cables, remove the corresponding blanking plugs from the sealing insert and insert the data communication cables.
- Make sure that you insert the corresponding blanking plugs into any free openings on the sealing insert.

Note! Should the blanking plugs be missing or improperly fitted, then protection class IP65 cannot be guaranteed.
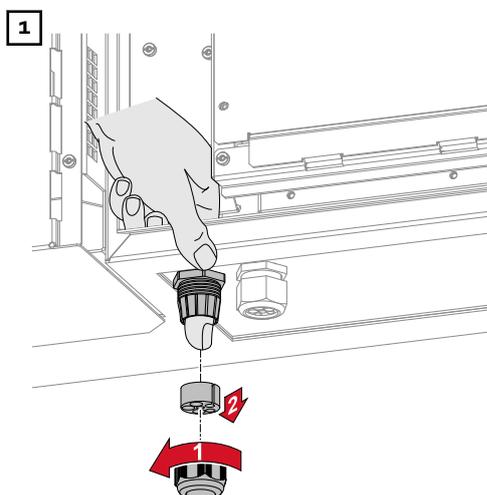
Undo the strain-relief device cap nut and push out the sealing ring and the blanking plug from the inside of the device.

2

3x Ø4,9-5,5mm (0.19-0.22inch)
3x Ø6,7-8,5mm (0.26-0.33inch)
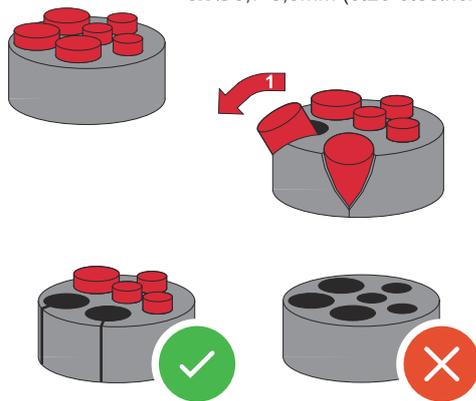
Open up the sealing ring at the location where the blanking plug is to be removed.

* Liberate the blanking plug by moving it sideways.

3
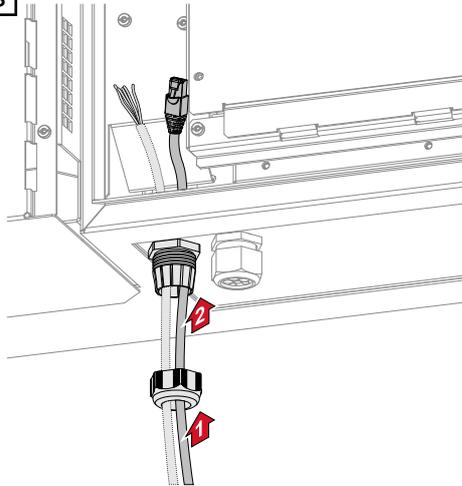
Guide the data cables first through the strain-relief device cap nut and then through the housing opening.

4
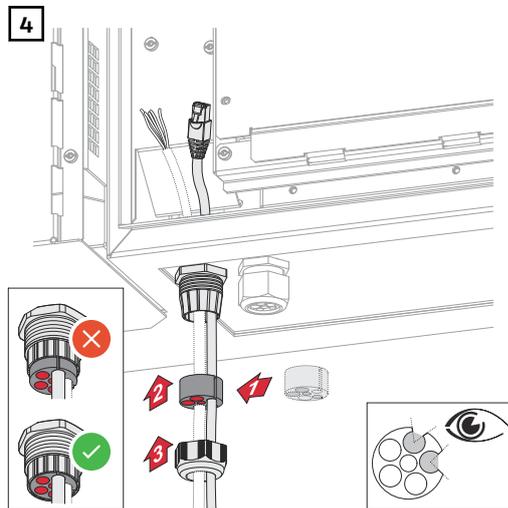
Insert the sealing ring between the cap nut and the housing opening. Press the data cables into the seal's cable guide. Then press in the seal until it reaches the underside of the strain-relief device.
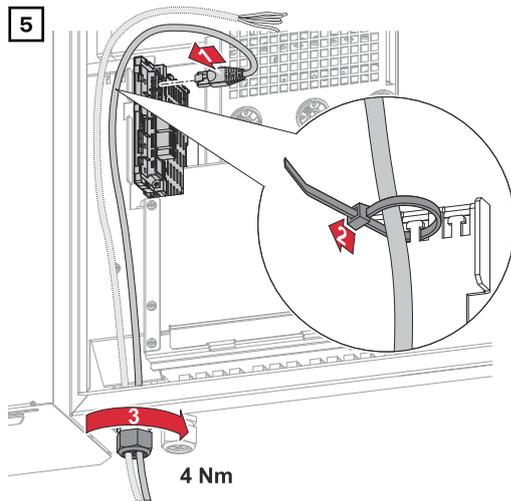
5 Connect the data cables to the data communication area using a movement loop, and fasten the cap nut with min. 2.5 to max. 4 Nm.

4 Nm

WSD (wired shutdown)

IN+   OUT+

IN-   OUT-
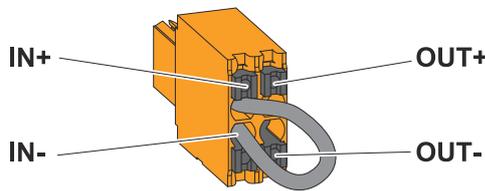
IMPORTANT!
The push-in WSD terminal in the inverter's connection area is delivered with a bypass ex works as standard. The bypass must be removed when installing a trigger device or a WSD chain.

The WSD switch of the first inverter with connected trigger device in the WSD chain must be in position 1 (master). The WSD switch of all other inverters should be in position 0 (slave).

Max. distance between two devices: 100 m
max. Number of devices: 28

CAT 5/6/7
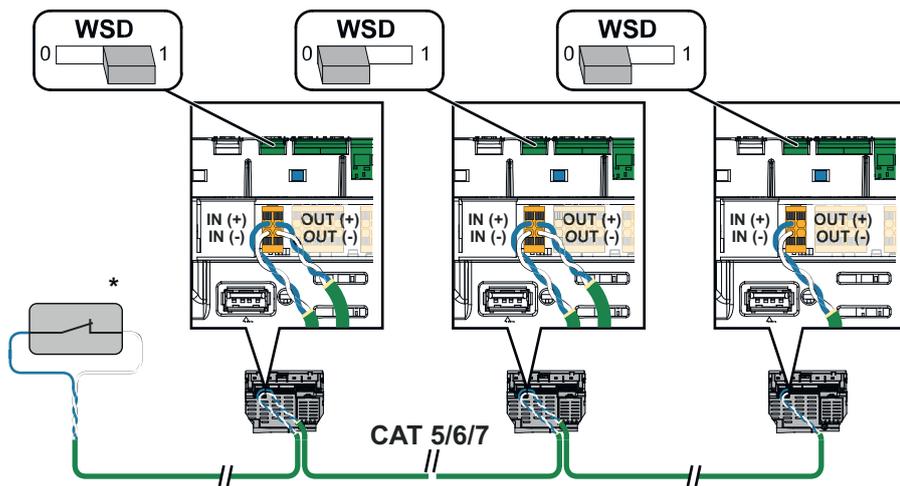
* Floating contact of the trigger device (e.g., central grid and system protection). If several floating contacts are used in a WSD chain, these must be connected in series.

First startup

Starting the inverter for the first time

When starting the inverter for the first time, various setup settings must be configured.

If the setup is canceled before completion, the input data is not saved and the start screen with the installation wizard is shown once again. The data is saved in the event of an interruption, e.g., a power failure. Commissioning is continued at the point at which the interruption occurred after the power supply is restored. If the setup was interrupted, the inverter feeds energy into the grid at maximum 500 W and the operating status LED flashes yellow.

The country setup can only be set when starting the inverter for the first time. If the country setup needs to be changed at a later date, contact your installer/technical support.

Fronius system monitoring (Pilot) display
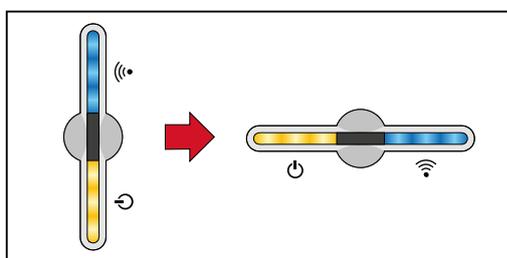
To simplify the display, the vertical installation position of the Pilot PC board (LED display) is shown horizontally below.

Installation with the app

The "Fronius Solar.start" app is required for this installation method. Depending on the end device with which the installation will be carried out, download the app for the respective platform.

Fronius Solar.start

Scan QR-Code and follow instructions
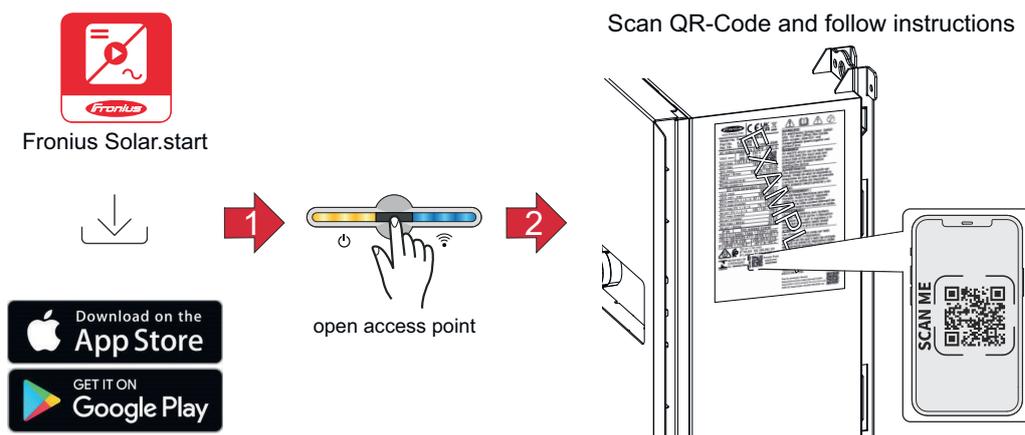
open access point

1	Download and install the Fronius Solar.start app.
2	Open the access point by touching the sensor 👆 → Communication LED flashes blue.
3	Open the Solar.start app and follow the installation wizard. Scan the QR code on the rating plate with a smartphone or tablet to connect to the inverter.
4	Add system components in Solar.web and start up the PV system.

The network wizard and the product setup can be carried out independently of each other. A network connection is required for the Solar.web installation wizard.

Installation with the browser

WLAN:
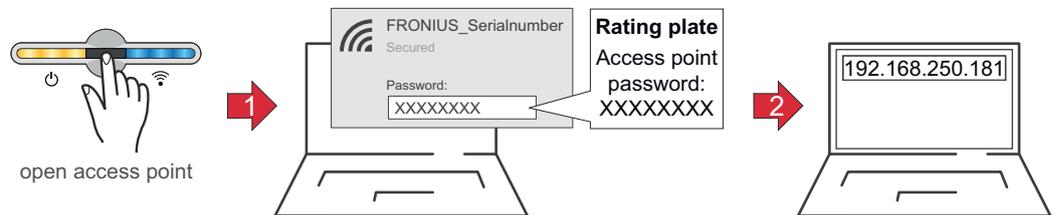
1 Open the access point by touching the sensor 👆

✓ *Communications LED flashes blue.*

2 Establish the connection to the inverter in the network settings (the inverter is displayed with the name "FRONIUS_" and the serial number of the device).

3 Enter the password from the rating plate and confirm.
IMPORTANT!
To enter the password in Windows 10, first select the **Connect using a security key instead** link to be able to establish the connection with the password.

4 Enter the IP address 192.168.250.181 in the address bar of the browser and confirm. The installation wizard opens.

5 Follow the installation wizard and complete the installation in the individual areas.

6 Add the system components in Fronius Solar.web and commission the PV system.

The network wizard and product setup can be performed independently. A network connection is required for the Fronius Solar.web installation wizard.

Ethernet:
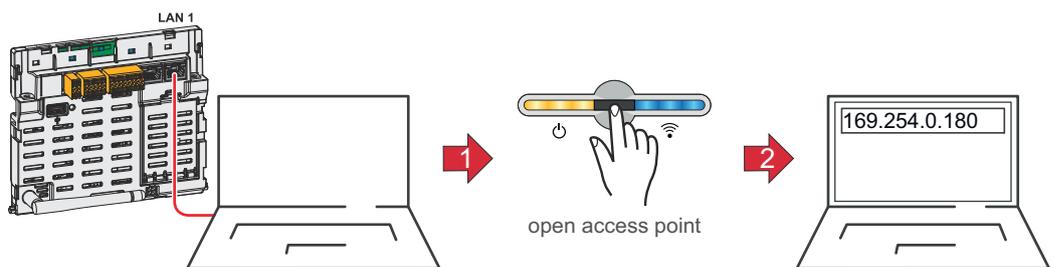
1 Establish a connection to the inverter (LAN1) using a network cable (min. CAT5 STP).

2 Open the access point by touching the sensor once 👆

✓ *Communications LED flashes blue.*

3 Enter the IP address 169.254.0.180 in the address bar of the browser and confirm. The installation wizard opens.

4 Follow the installation wizard and complete the installation in the individual areas.

5 Add the system components in Fronius Solar.web and commission the PV system.

The network wizard and product setup can be performed independently. A network connection is required for the Fronius Solar.web installation wizard.

De-energizing the inverter and switching it back on

De-energizing the inverter and switching it back on
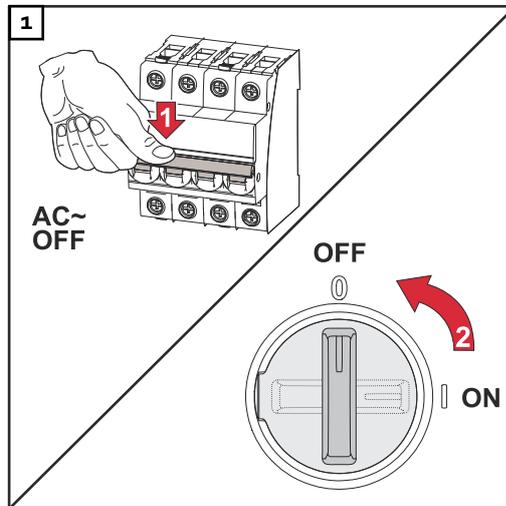
1. Turn off the automatic circuit breaker.
2. Turn the DC disconnector to the "off" switch setting.

To start up the inverter again, follow the steps listed above in reverse order.

IMPORTANT!
Wait for the capacitors of the inverter to discharge!

Settings – User interface of the inverter

User settings

User login

1. Open the user interface of the inverter in the browser.

2. In the **Login** menu area, log in with username and password, or, in the **User** > **User Login** menu area, log in with username and password.

IMPORTANT!
Depending on the authorization of the user, settings can be made in the individual menu areas.

Selecting languages

1. In the **User** > **Language** menu area, select the desired language.

Device configuration

Components

Select **"Add component+"** to add all available components to the system.

PV generator

Activate the particular PV generator and enter the connected PV power in the associated field.

Primary meter

To ensure smooth operation in conjunction with other energy producers, it is important to install the Fronius Smart Meter at the feed-in point. The inverter and other producers must be connected to the public grid via the Fronius Smart Meter.

This setting also affects how the inverter behaves overnight. If the function is deactivated, the inverter switches to standby mode as soon as there is no more PV power available. The message "Power low" is displayed. The inverter starts again as soon as sufficient PV power is available.

After connecting the meter, the position must be configured.

Several Fronius Smart Meters can be installed in the system. A different address needs to be set for each Smart Meter.

The Watt value on the generator meter is the sum of all generator meters. The Watt value on the consumption meter is the value of all consumption meters.

Ohmpilot

All Ohmpilots available in the system are displayed. Select the desired Ohmpilot and add it to the system via **"Add"**.

Functions and IOs

Lastmanagement

Up to four pins for the load management can be selected here. Further settings for the load management are available in the Load Management menu item.
Default: Pin 1

OFF—Demand Response Mode (DRM)

The pins for control via DRM can be set here:

Mode	Description	Information	Default pin
DRM0	Inverter disconnects from the grid	Grid relays open	
	REF GEN		RG0
	COM LOAD		CL0
		DRM0 occurs in the event of an interruption or short circuit on the REF GEN or COM LOAD lines. Or in the event of an invalid combination of DRM1—DRM8.	

IMPORTANT!

If the Demand Response Mode (DRM) function is activated and no DRM control is connected, the inverter switches into standby mode.

UC Editor—AUS —Demand Response Modes (DRM)

Here, for the Australian country setup, a value for the apparent power consumption and the apparent power output can be entered.

Demand Response Modes (DRM)

Here you can enter a value for the apparent power input and the apparent power output for the Australia country setup.

Inverter

"Force standby"
When this function is activated, the supply of energy from the inverter into the grid is interrupted. This makes it possible to shut down the inverter without power and protect its components. The standby function is automatically deactivated when the inverter is restarted.

"PV 1" and **"PV 2"**

Parameter	Value range	Description
"Mode"	Off	The MPP tracker is deactivated.
	Auto	The inverter uses the voltage at which the max. possible output of the MPP tracker is possible.
	Fix	The MPP tracker uses the voltage defined in **"UDC fixed"**.
"UDC fixed"	80 - 530 V	The inverter uses the fixed voltage that is used on the MPP tracker.
"Dynamic Peak Manager"	Off	Function is deactivated.
	On	The entire solar module string is checked for optimization potential and determines the best possible voltage for the supply of energy from the inverter into the grid.

"Ripple control signal"
Ripple control signals are signals that are sent by the energy company in order to switch controllable loads on and off. Depending on the installation situation, ripple control signals can be dampened or amplified by the inverter. This can be counteracted if necessary by applying the following settings.

Parameter	Value range	Description
"Reduction of influence"	Off	Function is deactivated.
	On	Function is activated.
"Frequency of the ripple control signal"	100 - 3000 Hz	The frequency specified by the energy company must be entered here.
"Grid inductance"	0.00001 - 0.005 H	The value measured at the feed-in point must be entered here.

Measure against RCD false triggers
(when using a 30 mA residual current circuit breaker)

> **NOTE!**
>
> **A residual current circuit breaker for the AC connecting cable may be required depending on national regulations, the grid operator, and other conditions.**
> A type A residual current circuit breaker is generally sufficient in this case. Nevertheless, false alarms can be triggered for the type A residual current circuit breaker in individual cases and depending on local conditions. For this reason, Fronius recommends using a residual current circuit breaker suitable for frequency inverters with a release current of least 100 mA, taking into account national provisions.

Parameter	Value range	Description
Leakage current factor for reducing RCMU/RCD false trips	0 - 0.25 (default: 0.16)	By reducing the set value, the leakage current is reduced and the intermediate circuit voltage is increased, which slightly lowers the efficiency. - A set value of 0.16 ensures optimum efficiency. - Setting value 0 enables minimum leakage currents.
Switch-off before 30mA RCD trip	Off	The function for reducing the faulty tripping of the residual current circuit breaker is deactivated.
	On	The function for reducing the faulty tripping of the residual current circuit breaker is activated.
Rated non-trigger fault current limit value	0.015 - 0.3	Value of the non-trigger fault current determined by the manufacturer for the residual current circuit breaker, at which the residual current circuit breaker does not switch off under specified conditions.

"Insulation warning"

Parameter	Value range	Description
"Insulation warning"	Off	The insulation warning is deactivated.
	On	The insulation warning is activated. A warning is output in the event of an insulation fault.
"Insulation measurement mode"	Exact	Insulation monitoring takes place with the highest degree of accuracy and the measured insulation resistance is displayed on the user interface of the inverter.
	Fast	Insulation monitoring takes place with a lesser degree of accuracy, whereby the time to take the insulation measurement is shortened and the insulation value is not displayed on the user interface of the inverter.

Parameter	Value range	Description
"Threshold for the insulation warning"	10 - 10 000 kΩ	If the value drops below the threshold, status code 1083 is displayed on the user interface of the inverter.

System

General

1. Enter the name of the system in the input field **PV System Name** (max. 30 characters).

2. Select the **Timezone** and **Time zone location** in the drop-down lists. The date and time are taken over from the time zone entered.

2. Click **Save**.

✓ *System name, time zone, and time zone location are saved.*

Update

All available updates are provided on the product page and in the "Fronius Download Search" area at **www.fronius.com** .

Update

1. Drag the firmware file into the **Drag & drop file here** field, or select via **Browse file**.

✓ *Update is started.*

Setup wizard

The guided setup wizard can be accessed here.

Restoring factory settings

All settings
Resets all configuration data, apart from the country setup. Changes to the country setup may only be made by authorized personnel.

All settings without network
Resets all configuration data, apart from the country setup and the network settings. Changes to the country setup may only be made by authorized personnel.

Event log

Current messages All current events of the linked system components are displayed here.

IMPORTANT!
Depending on the type of event, this must be confirmed via the "tick" button so that it can be further processed.

History
All events of the linked system components that are no longer present are displayed here.

Information

All the information regarding the system and the current settings is displayed and provided for download in this menu area.

License Manager   The power data and functional scope of the inverter are stored in the license file. If the inverter, power stage set, or data communication area is replaced, the license file must also be replaced.

Licensing - online (recommended)
This requires an Internet connection and a completed Fronius Solar.web configuration.

1 Finish all installation work (refer to the chapter headed **Starting the inverter for the first time** on page **68**).

2 Establish a connection to the user interface of the inverter.

3 Enter the serial number and verification code (VCode) of the defective and replacement device. The serial number and VCode can be found on the rating plate of the inverter (refer to the chapter headed **Information on the device** on page **16**).

4 Click the **Start online licensing** button.

5 Skip past the Terms and conditions of use and Network settings menu items by clicking **Next**.

✓   *License activation is started.*

Licensing - offline
There must be no Internet connection in this case. If offline licensing is carried out while there is an active Internet connection, the license file is automatically loaded onto the inverter, resulting in the following error when the license file is uploaded: "The license has already been installed and the wizard can be closed".

1 Finish all installation work (refer to the chapter headed **First startup** on page **68**).

2 Establish a connection to the user interface of the inverter.

3 Enter the serial number and verification code (VCode) of the defective and replacement device. The serial number and VCode can be found on the rating plate of the inverter (refer to the chapter headed **Information on the device** on page **16**).

4 Click the **Start offline licensing** button.

5 Download the service file onto the mobile device by clicking the **Download service file** button.

6 Open **licensemanager.solarweb.com** and log in with username and password.

7 Drag the service file into the **Drag service file here or click to upload** field or click to upload it.

8 Download the newly generated license file onto the mobile device by clicking the **Download license file** button.

9 Switch to the user interface of the inverter and drag the license file into the **Drag & drop license file here** field or select via **Choose license file**.

✓   *License activation is started.*

Support   ### Activating the support user

1 Click the **Enable Support User Account** button.

✓   *The support user is activated.*

IMPORTANT!
The support user exclusively enables Fronius Technical Support to configure set-

tings on the inverter via a secure connection. Access is deactivated by clicking the **Terminate Support User Session** button.

Generating support info (for Fronius Support)

1 Click the **Generate support info** button.

2 The sdp.cry file is downloaded automatically. For manual download, click the **Download support info** button.

✓ *The sdp.cry file is saved in the downloads.*

Activating remote access

1 Click the **Activate Remote Access** button.

✓ *Remote access is activated for Fronius Support.*

IMPORTANT!
The remote access exclusively enables Fronius Technical Support to access the inverter via a secure connection. In this case, diagnostics data are transmitted, which are used for troubleshooting. The remote access can be activated only upon request by Fronius Support.

Communication

Network

Server addresses for data transfer
If a firewall is used for outgoing connections, the below protocols, server addresses, and ports must be allowed for successful data transfer, see:

**https://www.fronius.com/~/downloads/Solar%20Energy/firmware/
SE_FW_Changelog_Firewall_Rules_EN.pdf**

When using FRITZ!Box products, Internet access must be configured without any restrictions or limitations. The DHCP Lease Time (validity) must not be set to 0 (=infinite).

LAN:

Establishing a connection:

1 Enter the host name.

2 Select the connection type: **Automatic** or **Static**.

3 For the **Static** connection type, enter the IP address, subnet mask, DNS, and gateway.

4 Click the **Connect** button.

✓ *The connection is established.*

After connecting, the status of the connection should be checked (refer to the chapter headed **Internet services** on page **87**).

WLAN:

Establishing a connection via WPS:
☐ The access point of the inverter must be active. This is opened by touching the sensor 👆 > Communications LED flashes blue

1 Establish the connection to the inverter in the network settings (the inverter is displayed with the name "FRONIUS_" and the serial number of the device).

2 Enter the password from the rating plate and confirm.
IMPORTANT!
To enter the password in Windows 10, first select the **Connect using a security key instead** link to be able to establish the connection with the password.

3 Enter the IP address 192.168.250.181 in the address bar of the browser and confirm.

4 In the **Communication** > **Network** > **WLAN** > **WPS** menu area, click the **Activate** button.

5 Activate WPS on the WLAN router (see WLAN router documentation).

6 Click on the **Start** button. The connection is established automatically.

7 Log in to the user interface of the inverter.

8 Check the network details and connection to Fronius Solar.web.

After connecting, the status of the connection should be checked (refer to the chapter headed **Internet services** on page **87**).

Selecting and connecting to a WLAN network:
The networks found are displayed in the list. Clicking on the Refresh button will ↻ perform a new search for available WLAN networks. The selection list can be limited further via the **Search network** input field.

1 Select network from the list.

2 Select the connection type: **Automatic** or **Static**.

3 For the **Automatic** connection type, enter the WLAN password and host name.

4 For the **Static** connection type, enter the IP address, subnet mask, DNS, and gateway.

5 Click the **Connect** button.

✓ *The connection is established.*

After connecting, the status of the connection should be checked (refer to the chapter headed **Internet services** on page **87**).

Access point:

The inverter serves as the access point. A PC or smart device connects directly to the inverter. Connecting to the Internet is not possible. In this menu area, **Network Name (SSID)** and **Network Key (PSK)** can be assigned.
It is possible to operate a connection via WLAN and via the access point at the same time.

Modbus

To use the Modbus TCP or the connection to Fronius Solar.web, each Tauro must be connected directly to the network via LAN.

Modbus RTU interface 0 / 1

If one of the two Modbus RTU interfaces is set to Slave, the following input fields are available:

Baud rate
The baud rate influences the transmission speed between the individual components connected in the system. When selecting the baud rate, ensure that it is the same at both the sending and receiving end.

Parity
The parity bit can be used to check the parity. It detects transmission errors. A parity bit can safeguard a specific number of bits. The value (0 or 1) of the parity bit must be calculated by the sender and is checked by the recipient using the same calculation. The parity bit can be calculated for even and odd parity.

SunSpec Model Type
Depending on the SunSpec model, there are two different settings.

float: SunSpec Inverter Model 111, 112, 113 or 211, 212, 213.
int + SF: SunSpec Inverter Model 101, 102, 103 or 201, 202, 203.

Meter address

The value entered is the identification number (Unit ID) assigned to the meter. Can be found on the user interface of the inverter in the **Communication → Modbus** menu.
Factory setting: 200

Meter address
The value entered is the identification number (Unit ID) assigned to the meter.
Can be found on the user interface of the inverter in the **Communication → Modbus** menu.
Factory setting: 1

Slave as Modbus TCP

This setting is necessary to enable inverter control via Modbus. If the function **Slave as Modbus TCP** is activated, the following input fields are available:

Modbus port
Number of the TCP port that is to be used for Modbus communication.

SunSpec Model Type
Depending on the SunSpec model, there are two different settings.

float: SunSpec Inverter Model 111, 112, 113 or 211, 212, 213.
int + SF: SunSpec Inverter Model 101, 102, 103 or 201, 202, 203.

Meter address
The value entered is the identification number (Unit ID) assigned to the meter. Can be found on the user interface of the inverter in the **Communication → Modbus** menu.
Factory setting: 200

Inverter address
The value entered is the identification number (Unit ID) assigned to the inverter. Can be found on the user interface of the inverter in the **Communication → Modbus** menu.
Factory setting: This value is invariably defined as 1.

Inverter control via Modbus

If this option is activated, the inverter is controlled via Modbus.
Inverter control includes the following functions:
- on/off
- Power reduction
- Specification of a constant power factor (cos phi)
- Specification of a constant reactive power value

Restrict Control
An IP address can be entered here, which is the only one authorized to control the inverter.

Cloud control

The utility/energy supplier can influence the output power of the inverter with **Cloud control**. This requires the inverter to have an active Internet connection.

Parameter	Display	Description
Cloud control	Off	Cloud control of the inverter is deactivated.
	On	Cloud control of the inverter is activated.

Profile	Value range	Description
Allow cloud control for regulatory purposes (Technician)	Deactivated/ Activated	The function may be mandatory for proper operation of the system.*
Allow cloud control for Virtual Power Plants (Customer)	Deactivated/ Activated	If the **Allow remote control for regulatory purposes (technician)** function is activated (technician access required), the **Allow remote control for virtual power plants** function is automatically activated and cannot be deactivated.*

* Cloud control
A virtual power plant is an interconnection of multiple generators. This virtual power plant can be controlled by means of the cloud control via the Internet. An active inverter Internet connection is a prerequisite for this. System data are transferred.

Solar API

The **Solar API** is an IP-based, open JSON interface. If enabled, IOT devices in the local network may access inverter information without authentication. For security reasons, the interface is disabled by default and must be enabled if it is required for a third-party application (e.g., EV charger, smart home solutions, etc.) or the Fronius Wattpilot.

For monitoring, Fronius recommends using Fronius Solar.web, which provides secure access to inverter status and production information.

In the event of a firmware update to version 1.14.x, the Solar API setting is applied. In systems with a version below 1.14.x, the Solar API is activated; with higher versions, it is deactivated but can be switched on and off via the menu.

Activating the Fronius Solar API
On the user interface of the inverter in the **Communication** > **Solar API** menu area, activate thefunction **Activate communication via Solar API**.

Solar.web

In this menu, you can agree to the technically necessary data processing or reject it.

In addition, the transfer of analysis data and remote access via Solar.web can be enabled or disabled.

Internet services Information regarding connections and the current connection status is displayed in this menu. If there are problems with the connection, a short description of the error is displayed.

Safety and grid requirements

Country setup

> ⚠ **WARNING!**
>
> **Danger from unauthorized fault analyses and repair work.**
> This can result in severe personal injury and damage to property.
> ▶ Fault analyses and repair work on the PV system may only be carried out by installers/service technicians from authorized specialist companies in accordance with national standards and regulations.

> *NOTE!*
>
> **Risk due to unauthorized access.**
> Incorrectly set parameters can have a negative effect on the public grid and/or the grid power feed operation of the inverter and result in the loss of standard conformity.
> ▶ Parameters may only be adjusted by installers/service technicians from authorized specialist companies.
> ▶ Do not give the access code to third parties and/or unauthorized persons.

> *NOTE!*
>
> **Risk due to incorrectly set parameters.**
> Incorrectly set parameters can have a negative effect on the public grid and/or cause inverter malfunctions and failures and result in the loss of standard conformity.
> ▶ Parameters may only be adjusted by installers/service technicians from authorized specialist companies.
> ▶ Parameters may only be adjusted if this has been approved or requested by the utility.
> ▶ Any parameter adjustments must be made in compliance with nationally applicable standards and/or directives as well as the specifications of the utility.

The **Country Setup** menu area is intended exclusively for installers/service technicians from authorized specialist companies. To apply for the access code required for this menu area, see chapter **Requesting inverter codes in Solar.SOS**.

The selected country setup for the country in question contains preset parameters in accordance with nationally applicable standards and requirements. Changes may need to be made to the selected country setup depending on local grid conditions and the specifications of the utility.

Requesting inverter codes in Solar.SOS

The **Country Setup** menu area is intended exclusively for installers/service technicians from authorized specialist companies. The inverter access code required for this menu area can be requested in the Fronius Solar.SOS portal.

Requesting inverter codes in Fronius Solar.SOS:

1. Open **solar-sos.fronius.com** in the browser
2. Log in with your Fronius account
3. At the top right, click on the drop-down menu 👤

4 Select the **Show inverter codes** menu item

   ✓ *A contract page appears on which the request for the access code to change the grid parameters for Fronius inverters is located*

5 Accept the terms and conditions of use by checking **Yes, I have read and agree to the terms of use** and click **Confirm & Save**

6 After that, the codes can be retrieved in the drop-down menu at the top right under **Show inverter codes**

⚠ **CAUTION!**

Risk due to unauthorized access.
Incorrectly set parameters can have a negative effect on the public grid and/or the grid power feed operation of the inverter and result in the loss of standard conformity.

▶ Parameters may only be adjusted by installers/service technicians from authorized specialist companies.

▶ Do not give the access code to third parties and/or unauthorized persons.

Feed-in limitation

Due to hardware restrictions, the Fronius Tauro cannot reduce the power to 0%, but only to 0.5 to 1%.

Electricity retailers or grid operators can prescribe feed-in limits for an inverter (e.g., max. 70% of the kWp or max. 5 kW).
The feed-in limitation takes into account the self-consumption in the household before the power of an inverter is reduced:

There are two options for the feed-in limit:
a) Simple power reduction of an inverter using Fronius Smart Meter
b) Power reduction by external plant controller

The following formulas provide guidance as to which solution may apply:
P_{WRn} … Inverter power n

$0\% \ P_{WR1} + 100\% \ P_{WR2} + 100\% \ P_{WR3}… \leq$ Feed-in limit → Solution a)

$0\% \ P_{WR1} + 100\% \ P_{WR2} + 100\% \ P_{WR3}… >$ Feed-in limit → Solution b)

Solution a) - Power reduction of a single inverter.
The specifications can be met if the prescribed feed-in limit is achieved by reducing the power of a single inverter to ≥ 0%.

Example:
there are 3 inverters in a system: 1x Fronius Tauro 100 kW, 2x Fronius Tauro 50 kW. The specified feed-in limit at the transfer point must not exceed 100 kW.

Solution:
the Fronius Tauro can be regulated to 0% output power to meet the feed-in limit. The outputs of the other two inverters are not reduced and can feed in at any time without restriction.

If the power reduction of an inverter to 0% is not sufficient, solution b) must be applied.

Solution b) - Integration of a plant controller.
This solution is used if the specifications of the grid operator cannot be met by limiting a single inverter, or if permanent access (e.g., remote shutdown) is required. In this case, the integration of a PLANT CONTROLLER is recommended.

A detailed technical overview of this solution can be found at www.fronius.com under the keyword "feed-in management".

To benefit from the advantages of Fronius Solar.web, in addition to the monitoring function of the PLANT CONTROLLER SYSTEM a Fronius Smart Meter can also be installed. The integration of a Fronius Smart Meter ensures that the load and feed-in data of the PV system are visualized in Fronius Solar.web and are available for analysis.

I/O power management	**General**

General
Settings relevant to a grid operator are made under this menu item. An effective power limit in % and/or a power factor limit can be set.

IMPORTANT!
To view and change settings in this menu item, select the user **Technician**, and enter and confirm the password for the user **Technician**. Settings in this menu area may only be made by trained and qualified personnel.

Input pattern (assignment of individual I/Os)
1 click = white (contact open)
2 clicks = blue (contact closed)
3 clicks = gray (not used)

Power factor (cos phi)
- **Capacitive**
- **Inductive**

DNO feedback
If the rule is activated, the **DNO feedback** output (pin 1 recommended) must be configured (e.g., for operating a signal device).

The data format *.fpc is supported for **Import** and **Export**.

Controlling Priorities
Used to set controlling priorities for I/O power management (DRM or ripple control receiver), the export limitation, and control via Modbus.

1 = highest priority, 3 = lowest priority

Local priorities of the I/O power management, the export limitation, and the Modbus are overridden by cloud control commands (regulatory purposes and virtual power plants) — see **Cloud control** on page **86** and by backup power.

The controlling priorities are differentiated internally by **power control** and **inverter shutdown**. Inverter shutdown always takes precedence over power control. An inverter shutdown command is always executed, regardless of the priority.

Power control
- I/O Powerlimit (DRM/ripple control receiver signal) — according to command
- Export Limitation (Soft Limit) — always active
- Modbus (generation limit) — according to command

Inverter shutdown
- I/O Powerlimit with export limitation = 0% (DRM/ripple control receiver signal) — according to command
- Export Limitation (Hard Limit)
- Modbus (shutdown command) — according to command

Connection diagram - 4 relays

The ripple control signal receivers and the I/O terminals of the inverter can be connected to one another as shown in the connection diagram.
For distances of over 10 m between the inverter and the ripple control signal receiver, a CAT 5 STP cable is recommended as a minimum and the shielding must be connected on one side at the push-in terminal of the data communication area (SHIELD).
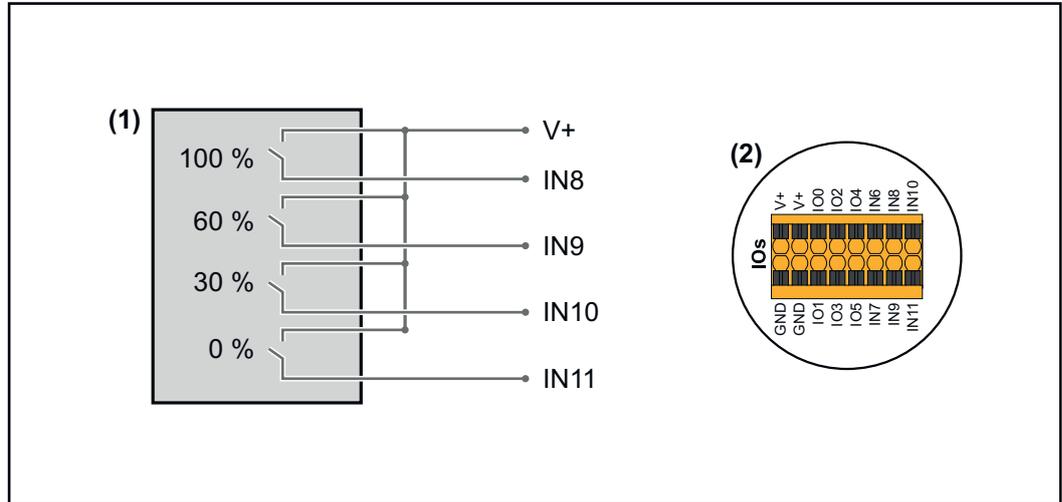
| (1) | Ripple control signal receiver with four relays for effective power limitation. |
| (2) | I/Os of the data communication area. |

Use pre-configured file for 4-relay operation:

1 Download the file (.fpc) under **4-relay operation** to the mobile device.

2 Upload the file (.fpc) in the **I/O Power Management** menu area by clicking the **Import** button.

3 Click **Save**.

✓ *The settings for 4-relay operation are saved.*
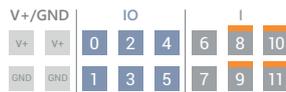
I/O Power Management

V+/GND   IO   I

V+ V+   0 2 4   6 8 10
GND GND 1 3 5   7 9 11

0	None
1	None
2	None
3	None
4	None
5	None
6	None
7	None
8	**IO control**
9	**IO control**
10	**IO control**
11	**IO control**

DNO Feedback
not used

DNO Rules

Rule 1

0 2 4 6 8 10
1 3 5 7 9 11

Active Power
100

Power Factor (cos φ)
1   cap

DNO Feedback

Rule 2

0 2 4 6 8 10
1 3 5 7 9 11

Active Power
60

Power Factor (cos φ)
1   cap

DNO Feedback

Rule 3

0 2 4 6 8 10
1 3 5 7 9 11

Active Power
30

Power Factor (cos φ)
1   cap

DNO Feedback

Rule 4

0 2 4 6 8 10
1 3 5 7 9 11

Active Power
0

Power Factor (cos φ)
1   cap

DNO Feedback

⬆ IMPORT   ⬇ EXPORT

Connection diagram - 3 relays

The ripple control signal receivers and the I/O terminals of the inverter can be connected to one another as shown in the connection diagram.
For distances of over 10 m between the inverter and the ripple control signal receiver, a CAT 5 STP cable is recommended as a minimum and the shielding must be connected on one side at the push-in terminal of the data communication area (SHIELD).
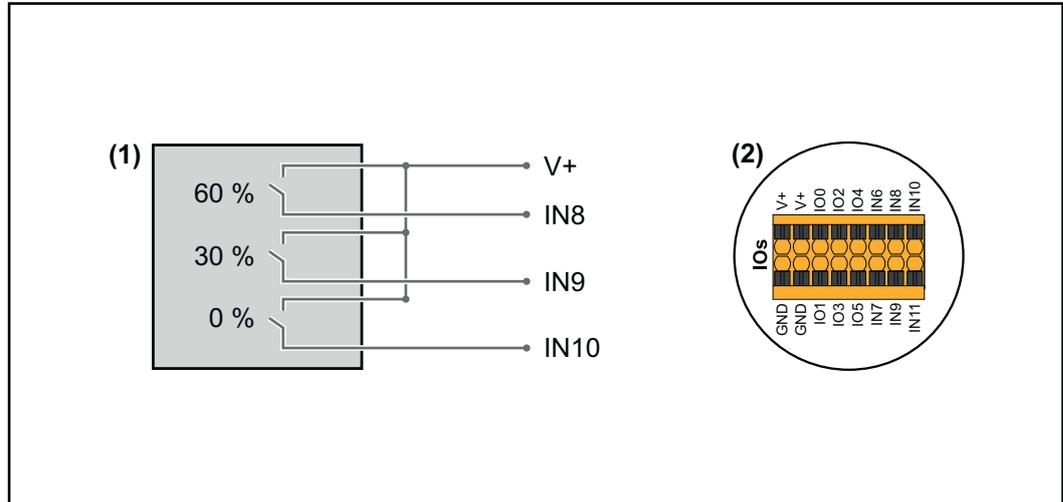
| (1) | Ripple control signal receiver with three relays for effective power limitation. |
| (2) | I/Os of the data communication area. |

Use pre-configured file for 3-relay operation:

1 Download the file (.fpc) under **3-relay operation** to the mobile device.

2 Upload the file (.fpc) in the **I/O Power Management** menu area by clicking the **Import** button.

3 Click **Save**.

✓ *The settings for 3-relay operation are saved.*
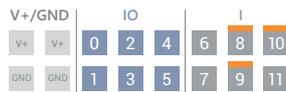
I/O Power Management

V+/GND		IO			I		
V+	V+	0	2	4	6	8	10
GND	GND	1	3	5	7	9	11

DNO Feedback
not used

DNO Rules ⊕

0	*None*
1	*None*
2	*None*
3	*None*
4	*None*
5	*None*
6	*None*
7	*None*
● 8	**IO control**
● 9	**IO control**
● 10	**IO control**
11	*None*

Rule 1 🗑 ⬤

0	2	4	6	8	10
1	3	5	7	9	11

Active Power
100

Power Factor (cos φ)
1   cap

DNO Feedback

Rule 2 🗑 ⬤

0	2	4	6	8	10
1	3	5	7	9	11

Active Power
60

Power Factor (cos φ)
1   cap

DNO Feedback

Rule 3 🗑 ⬤

0	2	4	6	8	10
1	3	5	7	9	11

Active Power
30

Power Factor (cos φ)
1   cap

DNO Feedback

Rule 4 🗑 ⬤

0	2	4	6	8	10
1	3	5	7	9	11

Active Power
0

Power Factor (cos φ)
1   cap

DNO Feedback

⬆ IMPORT   ⬇ EXPORT

Connection diagram - 2 relays

The ripple control signal receivers and the I/O terminals of the inverter can be connected to one another as shown in the connection diagram.
For distances of over 10 m between the inverter and the ripple control signal receiver, a CAT 5 STP cable is recommended as a minimum and the shielding must be connected on one side at the push-in terminal of the data communication area (SHIELD).

Relay 1	Relay 2	Active Power
0	0	100 %
1	0	60 %
0	1	30 %
1	1	0 %
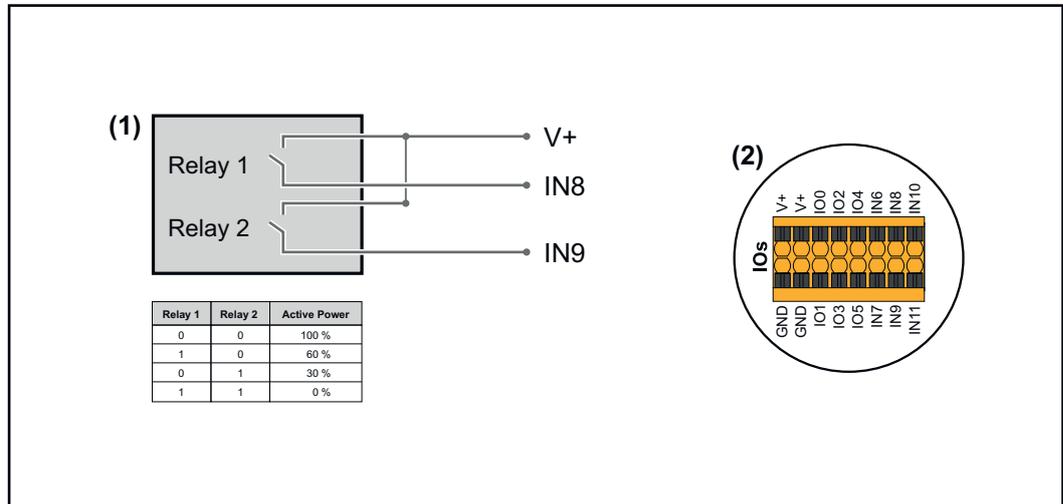
(1)   Ripple control signal receiver with two relays for effective power limitation.

(2)   I/Os of the data communication area.

Use pre-configured file for 2-relay operation:

1 Download the file (.fpc) under **2-relay operation** to the mobile device.

2 Upload the file (.fpc) in the **I/O Power Management** menu area by clicking the **Import** button.

3 Click **Save**.

✓ *The settings for 2-relay operation are saved.*
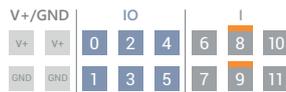
I/O Power Management

V+/GND		IO							I		
V+	V+	0	2	4		6	8	10			
GND	GND	1	3	5		7	9	11			

DNO Feedback
not used ▼

0	*None*
1	*None*
2	*None*
3	*None*
4	*None*
5	*None*
6	*None*
7	*None*
● 8	**IO control**
● 9	**IO control**
10	*None*
11	*None*

DNO Rules ⊕

Rule 1   🗑 ⬤━ ⌃

| 0 | 2 | 4 | 6 | 8 | 10 |
| 1 | 3 | 5 | 7 | 9 | 11 |

Active Power
━⬤ 100

Power Factor (cos φ)
⬤━ 1   cap ▼

⬤━ DNO Feedback

Rule 2   🗑 ⬤━ ⌃

| 0 | 2 | 4 | 6 | 8 | 10 |
| 1 | 3 | 5 | 7 | 9 | 11 |

Active Power
━⬤ 60

Power Factor (cos φ)
⬤━ 1   cap ▼

━⬤ DNO Feedback

Rule 3   🗑 ⬤━ ⌃

| 0 | 2 | 4 | 6 | 8 | 10 |
| 1 | 3 | 5 | 7 | 9 | 11 |

Active Power
━⬤ 30

Power Factor (cos φ)
⬤━ 1   cap ▼

━⬤ DNO Feedback

Rule 4   🗑 ⬤━ ⌃

| 0 | 2 | 4 | 6 | 8 | 10 |
| 1 | 3 | 5 | 7 | 9 | 11 |

Active Power
━⬤ 0

Power Factor (cos φ)
⬤━ 1   cap ▼

━⬤ DNO Feedback

⬆ IMPORT   ⬇ EXPORT

Connection diagram - 1 relay

The ripple control signal receivers and the I/O terminals of the inverter can be connected to one another as shown in the connection diagram.
For distances of over 10 m between the inverter and the ripple control signal receiver, a CAT 5 STP cable is recommended as a minimum and the shielding must be connected on one side at the push-in terminal of the data communication area (SHIELD).
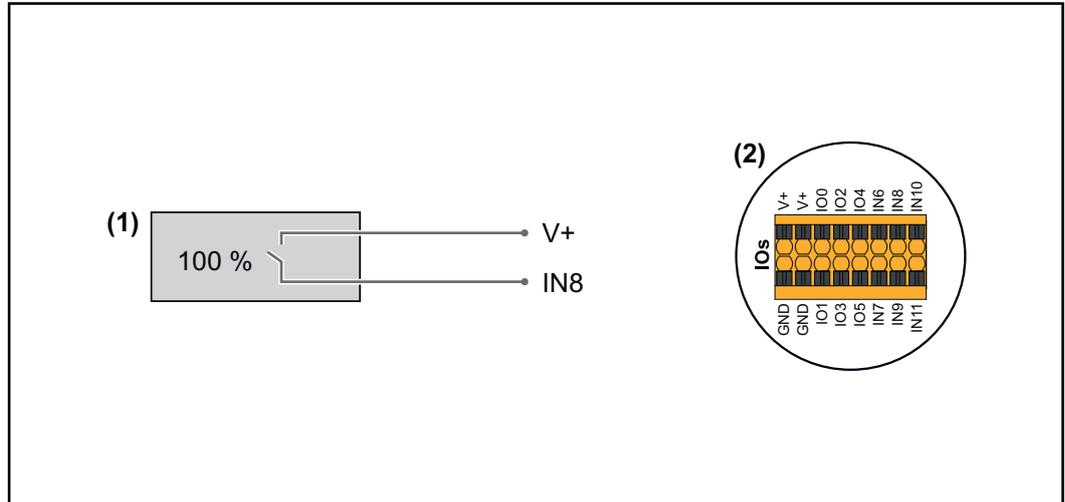
(1)   Ripple control signal receiver with one relay for effective power limitation.
(2)   I/Os of the data communication area.

Use pre-configured file for 1-relay operation:

1 Download the file (.fpc) under **1-relay operation** to the mobile device.

2 Upload the file (.fpc) in the **I/O Power Management** menu area by clicking the **Import** button.

3 Click **Save**.

✓   *The settings for 1-relay operation are saved.*

I/O power management settings - 1 relay

I/O Power Management

V+/GND		IO				I		
V+	V+	0	2	4	6	8	10	
GND	GND	1	3	5	7	9	11	

DNO Feedback
not used ▾

DNO Rules ⊕

Rule 1 🗑 ⬤ ⌃

0	2	4	6	8	10
1	3	5	7	9	11

Active Power
⬤ 100

Power Factor (cos φ)
◯ 1   cap ▾

⬤ DNO Feedback

Rule 2 🗑 ⬤ ⌃

0	2	4	6	8	10
1	3	5	7	9	11

Active Power
⬤ 0

Power Factor (cos φ)
◯ 1   cap ▾

⬤ DNO Feedback

⬆ IMPORT   ⬇ EXPORT

0	None
1	None
2	None
3	None
4	None
5	None
6	None
7	None
8	**IO control**
9	None
10	None
11	None

Connecting the ripple control receiver with several inverters

The grid operator may request the connection of one or more inverters to a ripple control receiver in order to limit the effective power and/or the power factor of the photovoltaic system.
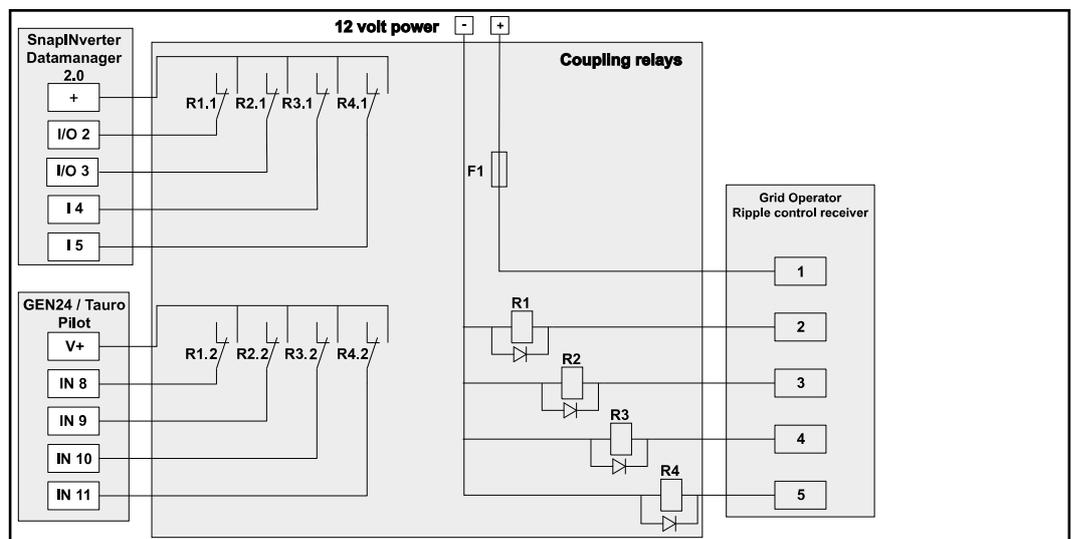
Connection diagram for ripple control receiver with several inverters

The following Fronius inverters can be connected to the ripple control receiver via a distributor (coupling relay):
- Symo GEN24
- Primo GEN24
- Tauro
- SnapINverter (only devices with Fronius Datamanager 2.0)

IMPORTANT!
On the user interface of each inverter connected to the ripple control receiver, the **4-relay mode** setting (see **Connection diagram - 4 relays** and **I/O power management settings - 4 relays**) must be activated.

Appendix

Status codes and remedy

1006 – ArcDetected (operation LED: flashes yellow)

Cause:	An arc was detected at a specific point on the PV system.
Remedy:	No action required. Feed-in mode is restarted again automatically after 5 minutes.

1030 – WSD Open (operating LED: flashes red)

Cause:	A device that is connected in the WSD chain has interrupted the signal line (e.g., surge protection device) or the bypass installed ex works as standard has been removed and no trigger device has been installed.
Remedy:	If the SPD surge protection device has tripped, the inverter must be repaired by an authorized specialist.
OR:	Install the bypass installed ex works as standard or a trigger device.
OR:	Turn the WSD (wired shutdown) switch to position 1 (WSD master).

⚠ **WARNING!**

Danger from work that is not carried out properly.
This can result in severe personal injury and damage to property.
▶ The installation and connection of an SPD surge protection device may only be carried out by Fronius-trained service personnel in accordance with the technical specifications.
▶ Observe safety rules.

1173 – ArcContinuousFault (operating LED: flashes red)

Cause:	An electric arc has been identified on the PV system, and the maximum number of automatic connections within 24 hours has been reached.
Remedy:	Keep the sensor pressed on the inverter for 3 seconds 👆(max. 6 seconds).
OR:	On the user interface of the inverter, in the **System** > **Event Log** menu area, confirm the status **1173 - ArcContinuousFault**.
OR:	On the user interface of the inverter, in the **Notifications** user menu, confirm the status **1173 - ArcContinuousFault**.

⚠ **CAUTION!**

Danger from damaged components of the PV system
Serious personal injury/damage to property may result.
▶ Before the status **1173 - ArcContinuousFault** is confirmed, the entire photovoltaic system affected must be checked for any possible damage.
▶ Damaged components must be repaired by qualified specialists.

Technical data

**Tauro 50-3-D /
50-3-P**

Input data	
Maximum input voltage (at 1000 W/m² / -10 °C in an open circuit)	1000 V_{DC}
Start-up input voltage	200 V_{DC}
MPP voltage range	400 - 870 V_{DC}
Number MPP-controller	3
Maximum input current ($I_{DC\ max}$) Total PV1 / PV2 / PV3 per string (only for D variant)	134 A 36 A / 36 A / 72 A 14.5 A (20 A fuses) / 22 A (30A fuses)
Max. short circuit current [8] Total PV1 / PV2 / PV3 per string (only for D variant)	240 A 72 A / 72 A / 125 A 20 A (20 A fuses) / 30 A (30A fuses)
Maximum PV field power ($P_{PV\ max}$) Total PV1 / PV2 / PV3	75 kWp 25 kWp / 25 kWp / 50 kWp
DC overvoltage category	2
Max. inverter backfeed current to the array [3] D variant PV1 / PV2 / PV3 P variant PV1 / PV2 / PV3	72 / 72 / 125 A[4] 0 / 0 / 0 A[4]
Max. capacity of the PV generator against earth inverter	10,000 nF
Max. capacity of the PV generator against earth per input PV1 / PV2 / PV3	3325 / 3325 / 6650 nF
Limit value of the insulation resistance test between PV generator and ground (on delivery) [7]	34 kΩ
Adjustable range of insulation resistance test between PV generator and ground [6]	10 - 10,000 kΩ
Limit value and trip time of sudden residual fault current monitoring (on delivery)	30 / 300 mA / ms 60 / 150 mA / ms 90 / 40 mA / ms
Limit value and trip time of continuous residual fault current monitoring (on delivery)	450 / 300 mA / ms
Adjustable range of continuous residual current monitoring [6]	30 - 1000 mA
Cyclic repetition of the insulation resistance test (on delivery)	24 h
Adjustable range for cyclic repetition of the insulation resistance test	-

Output data	
Grid voltage range	180 - 270 V_{AC}
Rated grid voltage	220 V_{AC} | 230 V_{AC}[1]
Rated power	50 kW
Rated apparent power	50 kVA
Rated frequency	50/60 Hz [1]
Maximum output current / phase	76 A

Output data

Initial symmetrical short-circuit current / phase I_K''	76 A
Power factor (cos phi)	0 - 1 ind./cap.[2]
Grid connection	3~ (N)PE 380 / 220 V_{AC} 3~ (N)PE 400 / 230 V_{AC}
Earthing systems	TT (allowed if UN_PE < 30V) TN-S (allowed) TN-C (allowed) TN-C-S (allowed) IT (not allowed)
Maximum output power	50 kW
Nominal output power	50 kW
Rated output current / phase	75.8 A / 72.5 A
Total harmonic distortion	< 3%
AC overvoltage category	3
Current (inrush) [5]	228 A peak / 26.6 A rms over 3.2 ms [4]
Max. output fault current / duration	44.7 A / 16.24 ms

General data

Night-time power loss = standby consumption	15 W
European Efficiency (400 / 600 / 800 / 870 V_{DC})	97.8 / 98.3 / 97.9 / 97.7%
Maximum efficiency	98.5%
Safety class	1
EMC emission class	B
Pollution degree	3
Permitted ambient temperature with built-in "AC disconnector" option	- 40 °C - +65 °C -35 °C - +65 °C
Permitted storage temperature	- 40 °C - +70 °C
Relative humidity	0 - 100%
Sound pressure level (600 V_{DC})	68.4 dB(A) (ref. 20 μPA)
Protection class	IP65
Dimensions (height x width x depth)	755 x 1109 x 346 mm
Weight	98 kg
Inverter topology	Non-insulated, no transformer

Protection devices

DC disconnector	Integrated
Cooling principle	Controlled forced-air ventilation
RCMU [9]	Integrated
DC isolation measurement [9]	integrated [2]
Overload performance	Operating point shift, power limitation
Active anti-islanding method	Frequency shift method
AFCI (only for D variant with 15/20 A fuse)	Optional

Protection devices	
AFPE (AFCI) classification (according to IEC 63027) [9] (only for D variant with 15/20 A fuse)	= F-I-AFPE-1-4/3/7-3 Full coverage Integrated AFPE 1 monitored string per input port 4/3/7 input ports per channel (AFD1: 4, AFD2: 3, AFD3: 7) 3 monitored channels

Tauro Eco 50-3-D / 50-3-P

Input data	
Maximum input voltage (at 1000 W/m² / -10 °C in an open circuit)	1000 V_{DC}
Start-up input voltage	650 V_{DC}
MPP voltage range	580 - 930 V_{DC}
Number MPP-controller	1
Maximum input current ($I_{DC\ max}$) Total PV1 / PV2 per string (only for D variant)	87.5 A 75 A / 75 A 14.5 A (20 A fuses) / 22 A (30A fuses)
Max. short circuit current 8) Total PV1 / PV2 per string (only for D variant)	178 A 125 A / 125 A 20 A (20 A fuses) / 30 A (30A fuses)
Maximum PV field power ($P_{PV\ max}$) Total PV1 / PV2	75 kWp 60 kWp / 60 kWp
DC overvoltage category	2
Max. inverter backfeed current to the array [3]	125 A[4]
Max. capacity of the PV generator against earth inverter	10,000 nF
Max. capacity of the PV generator against earth per input PV1 / PV2	7980 / 7980 nF
Limit value of the insulation resistance test between PV Generator and ground (on delivery) [7]	34 kΩ
Adjustable range of insulation resistance test between PV generator and ground [6]	10 - 10,000 kΩ
Limit value and trip time of sudden residual fault current monitoring (on delivery)	30 / 300 mA / ms 60 / 150 mA / ms 90 / 40 mA / ms
Limit value and trip time of continuous residual fault current monitoring (on delivery)	450 / 300 mA / ms
Adjustable range of continuous residual current monitoring [6]	30 - 1000 mA
Cyclic repetition of the insulation resistance test (on delivery)	24 h
Adjustable range for cyclic repetition of the insulation resistance test	-

Output data	
Grid voltage range	180 - 270 V_{AC}
Rated grid voltage	220 V_{AC} | 230 V_{AC}[1]
Rated power	50 kW

Output data

Rated apparent power	50 kVA
Rated frequency	50/60 Hz [1]
Maximum output current / phase	76 A
Initial symmetrical short-circuit current / phase I_K''	76 A
Power factor (cos phi)	0 - 1 ind./cap.[2]
Grid connection	3~ (N)PE 380 / 220 V_{AC} 3~ (N)PE 400 / 230 V_{AC}
Earthing systems	TT (allowed if UN_PE < 30V) TN-S (allowed) TN-C (allowed) TN-C-S (allowed) IT (not allowed)
Maximum output power	50 kW
Nominal output power	50 kW
Rated output current / phase	75.8 A / 72.5 A
Total harmonic distortion	< 3%
AC overvoltage category	3
Current (inrush) [5]	209 A peak / 30.5 A rms over 2.1 ms [4]
Max. output fault current / duration	37.2 A / 19.4 ms

General data

Night-time power loss = standby consumption	15 W
European Efficiency (580 / 800 / 930 V_{DC})	98.2 / 97.7 / 97.3%
Maximum efficiency	98.5%
Safety class	1
EMC emission class	B
Pollution degree	3
Permitted ambient temperature with built-in "AC disconnector" option	- 40 °C - +65 °C -35 °C - +65 °C
Permitted storage temperature	- 40 °C - +70 °C
Relative humidity	0 - 100%
Sound pressure level (580 V_{DC})	68.5 dB(A) (ref. 20 µPA)
Protection class	IP65
Dimensions (height x width x depth)	755 x 1109 x 346 mm
Weight	74 kg
Inverter topology	Non-insulated, no transformer

Protection devices

DC disconnector	Integrated
Cooling principle	Controlled forced-air ventilation
RCMU [9]	Integrated
DC isolation measurement [9]	integrated [2]
Overload performance	Operating point shift, power limitation
Active anti-islanding method	Frequency shift method

Protection devices	
AFCI (only for D variant with 15/20 A fuse)	Optional
AFPE (AFCI) classification (according to IEC 63027) [9] (only for D variant with 15/20 A fuse)	= F-I-AFPE-1-7/7-2 Full coverage Integrated AFPE 1 monitored string per input port 7/7 input ports per channel (AF-D1: 7, AFD2: 7) 2 monitored channels

Tauro Eco 99-3-D / 99-3-P

Input data	
Maximum input voltage (at 1000 W/m² / -10 °C in an open circuit)	$1000\ V_{DC}$
Start-up input voltage	$650\ V_{DC}$
MPP voltage range	$580 - 930\ V_{DC}$
Number MPP-controller	1
Maximum input current ($I_{DC\ max}$) Total P variant PV1 / PV2 D variant PV1 / PV2 / PV3 per string (only for D variant)	175 A 100 A / 100 A 75 A / 75 A / 75 A 14.5 A (20 A fuses) / 22 A (30A fuses)
Max. short circuit current [8] P variant Total D variant Total PV1 / PV2 / (PV3 only for D variant) per string (only for D variant)	250 A 355 A 125 A / 125 A / 125 A 20 A (20 A fuses) / 30 A (30A fuses)
Maximum PV field power ($P_{PV\ max}$) Total P variant PV1 / PV2 D variant PV1 / PV2 / PV3	150 kWp 79 kWp / 79 kWp 57 kWp / 57 kWp / 57 kWp
DC overvoltage category	2
Max. inverter backfeed current to the array [3] P variant Total D variant Total	 125 A[4] 250 A[4]
Max. capacity of the PV generator against earth inverter	19,998 nF
Max. capacity of the PV generator against earth per input P variant PV1 / PV2 per input D variant PV1 / PV2 / PV3	 10,507 / 10,507 nF 7581 / 7581 / 7581 nF
Limit value of the insulation resistance test between PV generator and ground (on delivery) [7]	34 kΩ
Adjustable range of insulation resistance test between PV generator and ground [6]	10 - 10,000 kΩ
Limit value and trip time of sudden residual fault current monitoring (on delivery)	30 / 300 mA / ms 60 / 150 mA / ms 90 / 40 mA / ms
Limit value and trip time of continuous residual fault current monitoring (on delivery)	900 / 300 mA / ms
Adjustable range of continuous residual current monitoring [6]	30 - 1000 mA
Cyclic repetition of the insulation resistance test (on delivery)	24 h
Adjustable range for cyclic repetition of the insulation resistance test	-

Output data

Output data	
Grid voltage range	180 - 270 V_{AC}
Rated grid voltage	220 V_{AC} | 230 V_{AC}[1]
Rated power	99.99 kW
Rated apparent power	99.99 kVA
Rated frequency	50/60 Hz [1]
Maximum output current / phase	152 A
Initial symmetrical short-circuit current / phase $I_K"$	152 A
Power factor (cos phi)	0 - 1 ind./cap.[2]
Grid connection	3~ (N)PE 380 / 220 V_{AC} 3~ (N)PE 400 / 230 V_{AC}
Earthing systems	TT (allowed if UN_PE < 30V) TN-S (allowed) TN-C (allowed) TN-C-S (allowed) IT (not allowed)
Maximum output power	99.99 kW
Nominal output power	99.99 kW
Rated output current / phase	151.5 A / 144.9 A
Total harmonic distortion	< 3%
AC overvoltage category	3
Current (inrush) [5]	244 A peak / 27.2 A rms over 3.2 ms [4]
Max. output fault current / duration	93.9 A / 22 ms

General data

General data	
Night-time power loss = standby consumption	15 W
European Efficiency (580 / 800 / 930 V_{DC})	98.2 / 97.7 / 97.3%
Maximum efficiency	98.5%
Safety class	1
EMC emission class	B
Pollution degree	3
Permitted ambient temperature with built-in "AC disconnector" option	- 40 °C - +65 °C -35 °C - +65 °C
Permitted storage temperature	- 40 °C - +70 °C
Relative humidity	0 - 100%
Sound pressure level (580 V_{DC} / 930 V_{DC})	74.4 / 79.3 dB(A) (ref. 20 µPA)
Protection class	IP65
Dimensions (height x width x depth)	755 x 1109 x 346 mm
Weight	103 kg
Inverter topology	Non-insulated, no transformer

Protection devices

Protection devices	
DC disconnector	Integrated
Cooling principle	Controlled forced-air ventilation
RCMU [9]	Integrated

Protection devices	
DC isolation measurement [9]	integrated [2]
Overload performance	Operating point shift, power limitation
Active anti-islanding method	Frequency shift method
AFCI (only for D variant with 15/20 A fuse)	Optional
AFPE (AFCI) classification (according to IEC 63027) [9] (only for D variant with 15/20 A fuse)	= F-I-AFPE-1-7/7/8-3 Full coverage Integrated AFPE 1 monitored string per input port 7/7/8 input ports per channel (AFD1: 7, AFD2: 7, AFD3: 8) 3 monitored channels

Tauro Eco 100-3-D / 100-3-P

Input data	
Maximum input voltage (at 1000 W/m² / -10 °C in an open circuit)	1000 V_{DC}
Start-up input voltage	650 V_{DC}
MPP voltage range	580 - 930 V_{DC}
Number MPP-controller	1
Maximum input current ($I_{DC\ max}$) Total P variant PV1 / PV2 D variant PV1 / PV2 / PV3 per string (only for D variant)	175 A 100 A / 100 A 75 A / 75 A / 75 A 14.5 A (20 A fuses) / 22 A (30A fuses)
Max. short circuit current [8] P variant Total D variant Total PV1 / PV2 / (PV3 only for D variant) per string (only for D variant)	250 A 355 A 125 A / 125 A / 125 A 20 A (20 A fuses) / 30 A (30A fuses)
Maximum PV field power ($P_{PV\ max}$) Total P variant PV1 / PV2 D variant PV1 / PV2 / PV3	150 kWp 79 kWp / 79 kWp 57 kWp / 57 kWp / 57 kWp
DC overvoltage category	2
Max. inverter backfeed current to the array [3] P variant Total D variant Total	125 A[4] 250 A[4]
Max. capacity of the PV generator against earth inverter	20,000 nF
Max. capacity of the PV generator against earth per input P variant PV1 / PV2 per input D variant PV1 / PV2 / PV3	10,507 / 10,507 nF 7581 / 7581 / 7581 nF
Limit value of the insulation resistance test between PV generator and ground (on delivery) [7]	34 kΩ
Adjustable range of insulation resistance test between PV generator and ground [6]	10 - 10,000 kΩ
Limit value and trip time of sudden residual fault current monitoring (on delivery)	30 / 300 mA / ms 60 / 150 mA / ms 90 / 40 mA / ms

Input data

Input data	
Limit value and trip time of continuous residual fault current monitoring (on delivery)	900 / 300 mA / ms
Adjustable range of continuous residual current monitoring [6]	30 - 1000 mA
Cyclic repetition of the insulation resistance test (on delivery)	24 h
Adjustable range for cyclic repetition of the insulation resistance test	-

Output data

Output data	
Grid voltage range	180 - 270 V_{AC}
Rated grid voltage	220 V_{AC} | 230 V_{AC}[1]
Rated power	100 kW
Rated apparent power	100 kVA
Rated frequency	50/60 Hz [1]
Maximum output current / phase	152 A
Initial symmetrical short-circuit current / phase $I_K"$	152 A
Power factor (cos phi)	0 - 1 ind./cap.[2]
Grid connection	3~ (N)PE 380 / 220 V_{AC} 3~ (N)PE 400 / 230 V_{AC}
Earthing systems	TT (allowed if UN_PE < 30V) TN-S (allowed) TN-C (allowed) TN-C-S (allowed) IT (not allowed)
Maximum output power	100 kW
Nominal output power	100 kW
Rated output current / phase	151.5 A / 144.9 A
Total harmonic distortion	< 3%
AC overvoltage category	3
Current (inrush) [5]	244 A peak / 27.2 A rms over 3.2 ms [4]
Max. output fault current / duration	93.9 A / 22 ms

General data

General data	
Night-time power loss = standby consumption	15 W
European Efficiency (580 / 800 / 930 V_{DC})	98.2 / 97.7 / 97.3%
Maximum efficiency	98.5%
Safety class	1
EMC emission class	B
Pollution degree	3
Permitted ambient temperature with built-in "AC disconnector" option	- 40 °C - +65 °C -35 °C - +65 °C
Permitted storage temperature	- 40 °C - +70 °C
Relative humidity	0 - 100%
Sound pressure level (580 V_{DC} / 930 V_{DC})	74.4 / 79.3 dB(A) (ref. 20 µPA)
Protection class	IP65
Dimensions (height x width x depth)	755 x 1109 x 346 mm

General data	
Weight	103 kg
Inverter topology	Non-insulated, no transformer

Protection devices	
DC disconnector	Integrated
Cooling principle	Controlled forced-air ventilation
RCMU [9]	Integrated
DC isolation measurement [9]	integrated [2]
Overload performance	Operating point shift, power limitation
Active anti-islanding method	Frequency shift method
AFCI (only for D variant with 15/20 A fuse)	Optional
AFPE (AFCI) classification (according to IEC 63027) [9] (only for D variant with 15/20 A fuse)	= F-I-AFPE-1-7/7/8-3 Full coverage Integrated AFPE 1 monitored string per input port 7/7/8 input ports per channel (AFD1: 7, AFD2: 7, AFD3: 8) 3 monitored channels

WLAN

Frequency range	2412 - 2462 MHz
Channels / power used	Channel: 1-11 b,g,n HT20 Channel: 3-9 HT40 <18 dBm
Modulation	802.11b: DSSS (1Mbps DBPSK, 2Mbps DQPSK, 5.5/11Mbps CCK) 802.11g: OFDM (6/9Mbps BPSK, 12/18Mbps QPSK, 24/36Mbps 16-QAM, 48/54Mbps 64-QAM) 802.11n: OFDM (6.5 BPSK, QPSK, 16-QAM, 64-QAM)

Explanation of footnotes

1) The values stated are defaults; the inverter is configured specifically to suit the requirements of the relevant country.
2) Depending on the country setup or device-specific settings (ind. = inductive; cap. = capacitive).
3) Maximum current from a defective PV module to all other PV modules. From the inverter itself to the PV side of the inverter, it is 0 A.
4) Guaranteed by the electrical configuration of the inverter.
5) Current peak when switching on the inverter.
6) Specified values are standard values; depending on the requirement and PV power, these values must be adjusted accordingly.
7) Specified value is a max. value; exceeding the max. value may negatively affect the function.

8) $I_{SC\ PV} = I_{CP\ PV} \geq I_{SC\ max} = I_{SC}$ (STC) x 1.25 according to e.g., IEC 60364-7-712, NEC 2020, AS/NZS 5033:2021

9) Software class B (single channel with periodic self-test) control function according to IEC60730-1 Annex H.

Integrated DC disconnector

General data	
Product name	EATON PV-DIS-10-125/2-REFOHA
Rated insulation voltage	1000 V_{DC}
Rated impulse withstand voltage	6 kV
Suitability for insulation	Yes, DC only
Rated operating current	Rated operating current Ie ≤ 100 A: DC-PV2 utilization category (according to IEC/EN 60947-3)
	Rated operating current Ie ≤ 125 A: DC-PV1 utilization category (according to IEC/EN 60947-3)
Utilization category and/or PV utilization category	according to IEC/EN 60947-3 utilization category DC-PV2
Rated short-time withstand current (I_{cw})	12 x le
Rated short-circuit capacity (I_{cm})	1 000 A

Rated operating current and rated breaking capacity				
Rated operating voltage (U_e)	Rated operating current (I_e) DC-PV1	$I_{(make)}$ / $I_{(break)}$ DC-PV1	Rated operating current (I_e) DC-PV2	$I_{(make)}$ / $I_{(break)}$ DC-PV2
≤ 500 V_{DC}	125 A	187.5 A	125 A	500 A
600 V_{DC}	125 A	187.5 A	125 A	500 A
800 V_{DC}	125 A	187.5 A	125 A	500 A
900 V_{DC}	125 A	187.5 A	110 A	440 A
1 000 V_{DC}	125 A	187.5 A	100 A	400 A

Relevant Standards and Directives

CE Conformity Marking   The equipment complies with all the requisite and relevant standards and directives that form part of the relevant EU directive, and therefore is permitted to display the CE mark.

WLAN   Compliance with 2014/53/EU Radio Equipment Directive (RED)

The above table of technical data lists the frequency ranges and maximum HF transmission power used by Fronius wireless products available for sale in the EU in accordance with Article 10.8 (a) and 10.8 (b) of the RED.

Fronius products must be installed and operated such that the product is always 20 cm or more away from the body.

Mains failure   The standard measurement and safety procedures integrated into the inverter ensure that the power feed is immediately interrupted in the event of a grid failure (for example shut-off by the grid operator or damage to lines).

Service, warranty terms and conditions, and disposal

Fronius SOS

Under **sos.fronius.com** you can retrieve warranty and device information at any time, start troubleshooting independently, and request replacement components.

For more information on spare parts, contact your installer or point of contact for the PV system.

Fronius manufacturer's warranty

Detailed, country-specific warranty conditions are available at **www.fronius.com/solar/warranty.**

To obtain the full warranty period for your newly installed Fronius product, please register at **www.solarweb.com**.

Disposal

The manufacturer, Fronius International GmbH, will take back the old device and arrange for it to be professionally recycled. Observe the national regulations for the disposal of electronic equipment.