

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

Safety and grid requirements

Country setup



WARNING

Danger from unauthorized fault analyses and repair work.

This can result in serious 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.

Absolute Generation Limit

Activating this function limits the output power of the inverter to the specified value in watts.

Feed-in limit

Energy companies or utilities can prescribe feed-in limits for inverters (e.g., max. 70% of the kWp or max. 5 kW). The inverter limits the active power at the grid connection point (installation location of the Fronius Smart Meter or primary meter) to the set value.

The inverter takes account of self-consumption in the household before the power is reduced. An individual limit can be set.

In order to minimize the yield losses due to the feed-in limit, the power available from the module array can be:

- Used for controllable system components, such as Fronius Ohmpilot or Fronius Wattpilot
- Used by loads controlled via I/Os
- Stored in a battery

If these possibilities have been exhausted, the power drawn from the module array is reduced to such an extent that the feed-in limit is not exceeded.

Installation variants with an inverter, Fronius Smart Meter, and system components are listed under [Different operating modes](#).

Total DC power of the system

The input field for the total DC power of the entire system in Wp. Always enter this value if the **Maximum grid feed-in power** is specified in %.

Power Control disabled

The inverter converts all available PV energy.

Power Control enabled

Feeding in limited with the following selection options:

- **Total Power Limit**
Set the value of the permissible total power of feeding in for the photovoltaic system.
- **Limit per phase - asymmetric generation**
The inverter determines the optimum per phase. The inverter regulates the individual phases in such a way that none of the phases exceeds the set value.
- **Limit per phase - weakest phase**
The inverter measures each individual phase. If the permissible feed-in limit is exceeded on one phase, the inverter symmetrically reduces the total power for all phases until the limit is reached.

IMPORTANT! Implement the settings for **Limit per phase** if national standards and regulations require a limitation of the single-phase power. Set the value for the permissible power of feeding in for each phase.

IMPORTANT! **Power Control** settings are automatically applied for the dynamic feed-in limit of I/O power management. **Total Power Limit** is the default configuration.

Dynamic feed-in limit (Soft Limit)

If this value is exceeded, the inverter readjusts down to the set value.

Export Limit Protection ($P_{AV,E}$ protection)

This function monitors compliance with the feed-in limit. If **Dynamic feed-in limit (Soft Limit)** is enabled, the inverter controls the power of feeding in in such a way that this function is usually not enabled. If the specified limit values and the switch-off times are exceeded, this protection function disconnects the inverter from the grid.

The **Maximum grid feed-in power ($P_{AV,E}$)** in the case of an asymmetric feed-in (**Limit per phase - asymmetric generation** or **Limit per phase - weakest phase**) can be combined with the export limit protection ($P_{AV,E}$ protection) function. The **Maximum grid feed-in power** is calculated as follows: **Maximum grid feed-in power per phase ($P_{AV,E}$)** $\times 3$.

The export limit protection ($P_{AV,E}$ protection) function is only possible if a Smart Meter IP configured with MQTT is installed at the feed-in point.

Export Limit Protection (Hard Limit Trip)

IMPORTANT! This function is only available if **Dynamic feed-in limit (Soft Limit)** is enabled.

Maximum grid feed-in power

Input field for the **Maximum grid feed-in power** in W or % (setting range: -10% to 100%).

If there is no meter in the system or if the primary meter has failed, the inverter limits its output power to the set value.

If this value is exceeded, the inverter switches off within max. 5 s. This value must be higher than the value set for **Export Limit Control (Soft Limit)**.

If required, enable the fail-safe function **Reduce inverter power to 0% if meter connection has been lost**. When this function is enabled, the inverter activates standby mode. No feed-in takes place.

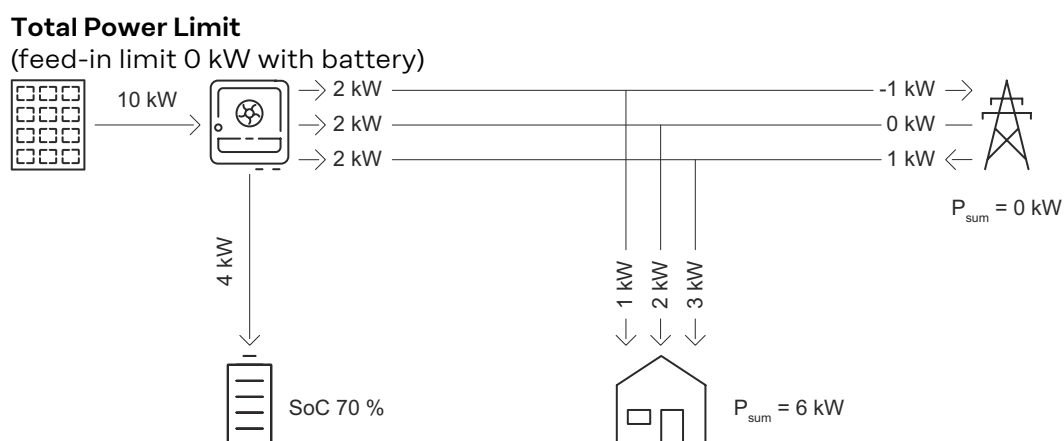
The use of WiFi for communication between the Fronius Smart Meter and the inverter is not recommended with the fail-safe function activated at the same time. Even short-term disconnections can cause the inverter to shut down. This

problem arises with weak WiFi signal strengths, a slow or overloaded WiFi connection, and automatic channel selection of the router.

Import limitation Energy companies or grid operators can prescribe import limitations for inverters. The amperage is limited to the set value.

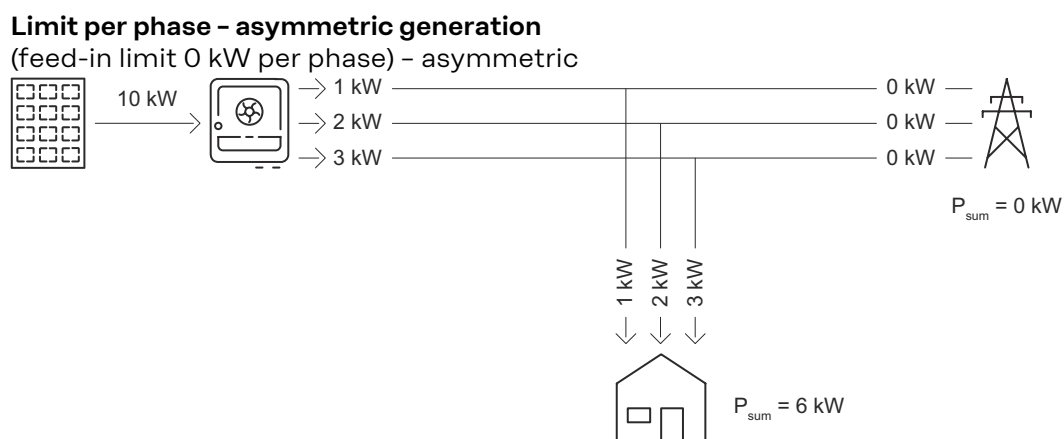
- 1 Under **Limit** select **Current Limitation**.
- 2 Enter the **limit value** in amperes.
- 3 Click on **Save**.

Feed-in limit - examples



Explanation

No power (0 kW) may be fed into the public grid at the grid feed-in point. The load requirement in the home network (6 kW) is supplied by the power generated by the inverter. Surplus production (4 kW) is stored in the battery.

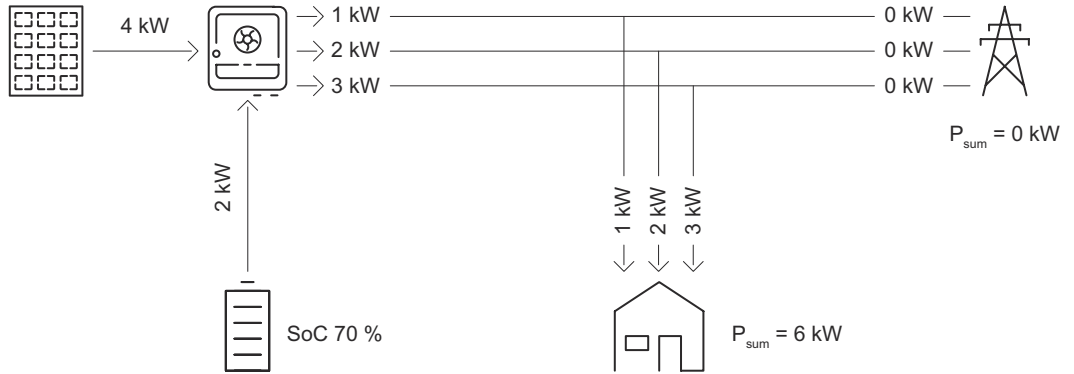


Explanation

The load requirement in the home network per phase is determined and supplied.

Limit per phase - asymmetric generation

(feed-in limit 0 kW per phase with battery) – asymmetric

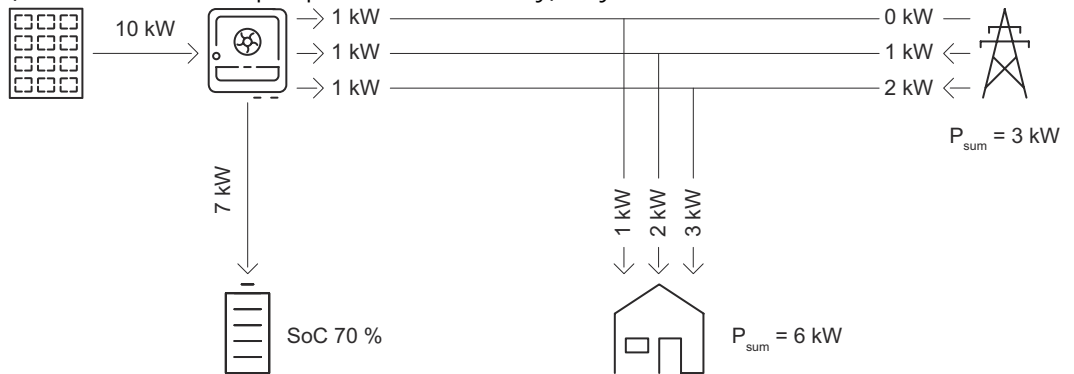


Explanation

The load requirement in the home network per phase is determined and supplied. Additional power required (2 kW) is provided by the battery.

Limit per phase - weakest phase

(feed-in limit 0 kW per phase with battery) – symmetrical



Explanation

The weakest phase in the load requirement in the home network is determined (phase 1 = 1 kW). The result of the weakest phase (1 kW) is applied to all phases. Phase 1 (1 kW) can be supplied. Phase 2 (2 kW) and phase 3 (3 kW) cannot be supplied, power from the public grid is required (phase 2 = 1 kW, phase 3 = 2 kW). Surplus production (7 kW) is stored in the battery.

Multiple Inverter Control

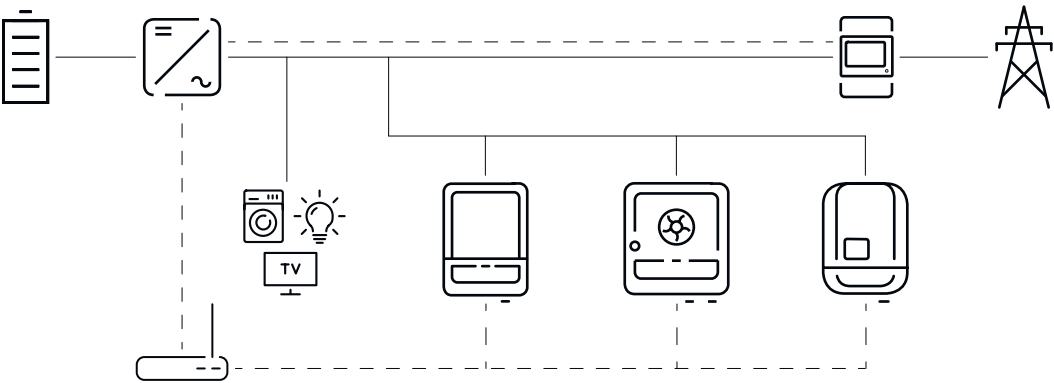
IMPORTANT! To view and change settings in this menu item, select the **Technician** user. Enter and confirm the password for the **Technician** user. Settings in this menu area may only be made by technical specialists.

The inverter can be used as a primary device to control dynamic feed-in limits for additional Fronius inverters (secondary devices) so that feed-in limits prescribed by energy companies or utilities can be centrally managed. This control refers to the **Soft Limit** feed-in limit, see [Feed-in limit](#). To do so, the following requirements must be met:

- A Fronius Smart Meter is configured as a primary meter and connected to the master.
- **Power Control** is enabled and configured in the **Feed-in limit** menu on the user interface of the primary device. The power control limit is set to **Total Power Limit**.
- Master and secondary device(s) are physically connected to the same network router via LAN.
- If **Use Modbus TCP** is enabled, the inverter control via Modbus TCP must be activated and configured for all secondary devices.

IMPORTANT! Only one primary meter is required for the primary device.

IMPORTANT! If an inverter with a battery is connected, use this inverter as the primary device for **Multiple Inverter Control**.



Example connection diagram for Multiple Inverter Control

System limits

- Systems with a maximum of 20 inverters (1 primary device + 19 secondary devices) are supported if the **Use Modbus TCP** function is enabled. Otherwise, a maximum of one primary device and two secondary devices are supported.
- The control system is designed for photovoltaic systems with a total output of up to 300 kW.
- In the case of larger system capacities, the control times in the system are extended.
- The use of a plant controller is recommended for systems >300 kW.

External grid and system protection

Regional standards and guidelines may require the installation of external grid and system protection for systems >30 kVA (see [Central grid and system protection](#)).

Multiple Inverter Control is available for the following device combinations:

Primary devices	Secondary devices
GEN24, Verto, Tauro	- GEN24 - Verto - Tauro - Argeno - SnapINverter with Fronius Datamanager 2.0*

** Up to four additional SnapINverters can be connected to each SnapINverter with Fronius Datamanager 2.0.*

Primary meter

One Fronius Smart Meter acts as the only primary meter and is connected directly to the primary device. This Smart Meter measures the total output power of all inverters into the grid and passes this information to the primary device.

Primary device

Configure the feed-in limit on the user interface of the inverter:

- 1 In the **Safety and Grid Regulations > Feed-in limit** menu area, enable the **Power Control** function and select **Total Power Limit**.
- 2 Configure the country-specific settings.

- 3** In the **Safety and Grid Regulations > Multiple Inverter Control** menu area, enable the **Multiple Inverter Control** function.
The primary device automatically scans the network for available secondary devices.
- ✓ *A list shows the inverters found.*

To perform the search again, press the Refresh button. ↻

If **Use Modbus TCP** is enabled, it is also possible to select Fronius SnapINverters with Datamanager 2.0 and Fronius Argeno with **Use Inverter**.

- 4** Enable **Use Inverter** against all secondary devices to which a common feed-in limit applies. Click **Use all Inverters** to enable the function for the primary device and all secondary devices.

The status of the inverters listed is displayed as follows:

- **Inactive:** Secondary device is not configured for the power control or a firmware update is required.
- **Disconnected:** Secondary device is configured, network connection not possible.
- **Connected:** Secondary device is configured and accessible via the network of the primary device.

- 5** In the **Safety and Grid Regulations > I/O Power Management** menu area, set the controlling priorities as follows:
1. **I/O Power Management**
 2. **Feed-in limit**
 3. **Modbus Control**

Adding Fronius Argeno and other inverters manually

- 1** In the **Multiple Inverter Control** menu, select the **Multiple Inverter Control** function.
- 2** Select additional inverters and click **+ Add**.
- 3** Enter the name, hostname or IP address, and the Modbus address of the secondary device.
- 4** Click **Add**.

For more information on configuring the Fronius Argeno or Fronius Datamanager 2.0 as a secondary device, refer to the respective operating instructions.

Secondary device

Each secondary device takes over the settings for the feed-in limit from the primary device. A secondary device does not transmit any data for the feed-in limit to the primary device. To do so, the following requirements must be met:

- **Multiple Inverter Control** is enabled and configured in the **Multiple Inverter Control** menu on the user interface of the primary device.

Set the following configurations for the feed-in limit on the secondary device:

User interface secondary device GEN24 / Verto / Tauro

- 1** Select the user **Technician** and enter the password for the user **Technician**.

Only carry out work steps 2 and 3 if **Use Modbus TCP** is enabled on the primary device.

- 2** In the **Communication > Modbus** menu area, enable **TCP Server** mode and the **Allow Control** function.

- 3 For a fail-safe scenario, in the **Safety and Grid Regulations > I/O Power Management** menu area, set the controlling priorities as follows:
 1. **Modbus Control**
 2. **Feed-in limit**
 3. **I/O Power Management**
- 4 In the **Safety and Grid Regulations > Feed-in limit** menu area, select and edit the following settings:
 - Enable the **Power Control** function.
 - Select **Total Power Limit** and specify the **Total DC power of the system** in watts.
 - Enable the **Dynamic feed-in limit (Soft Limit)** and enter a value of 0 W for the **Maximum grid feed-in power**.
 - Enable the **Reduce inverter power to 0% if meter connection has been lost** function.

I/O Power Management

General

Settings relevant to the grid operator are defined as rules under this menu item. This relates to an effective power limit in % or watts and/or a power factor specification. To view and change settings, select the **Technician** user, and enter and confirm the password. Only technical specialists may make settings in this menu area.

Under **Rules**, expand a menu area (e.g., **Rule 1**). Configure the following settings:

Limitation

IMPORTANT!

A dynamic feed-in limit for several inverters can be configured under [Feed-in limit](#). I/O power management rules are transferred from the inverter (primary device) to connected inverters in the system (secondary devices).

Select the following rules for power management:

- **I/O Generation Limit (%)**: The total output power of the connected inverter is statically limited to the defined value of the absolute rated power.
- **Export Limit Control (W)**: The active power fed in at the grid connection point is limited to the set value (e.g., 5000 watts). The output powers of the inverters (primary and secondary devices) are dynamically adjusted depending on their self-consumption.
- **Shutdown single device**: The inverter stops grid power feed operation and switches to standby mode.

IMPORTANT!

The rules for shutdown apply to this device and cannot be applied to other inverters in the system.

Input pattern (assignment of individual I/Os)

1 click = white, contact open
 2 clicks = blue, contact closed
 3 clicks = gray, not used

Power Factor ($\cos \varphi$) (define value)

Impedance response

- **Capacitive**
- **Inductive**

DNO Feedback

If the rule is activated, always configure the **DNO Feedback** output, e.g., for operating a signal device.

The **Import** and **Export** of defined rules can be carried out in the data format *.fpc. The rules and pin assignments in the following connection examples are not the only possible configurations. For pin assignment, take into account the available connections at the [Data communication area](#) and settings of the device configuration.

If there is an active rule for the control of the inverter, the device indicates this in the **overview** of the user interface under **Device State**.

Controlling Priorities

Used to set controlling priorities for I/O Power Management (DRM or ripple control receiver), the feed-in limit, and control via Modbus.

1 = highest priority, 3 = lowest priority

Local priorities of the I/O power management, the feed-in limit, and the Modbus interface are deactivated by cloud control commands (regulatory purposes and virtual power plants) – see [Cloud control](#) – and by backup power.

In terms of controlling priorities, the device differentiates between **power control** and **inverter shutdown**. Inverter shutdown always takes precedence over power control. An inverter shutdown command is always executed and does not need to be prioritized.

Power control

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

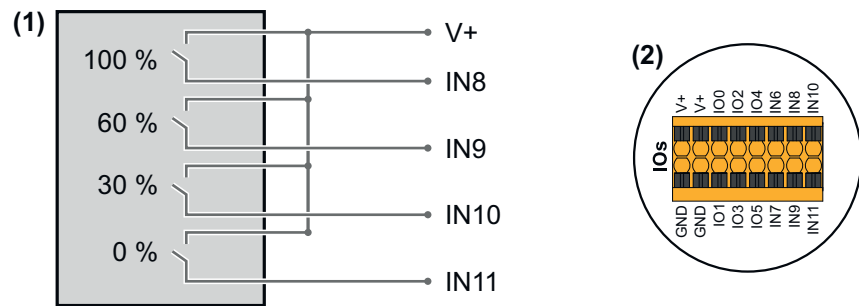
Inverter shutdown

- Shutdown single device
- Export Limitation (Hard Limit)
- Modbus (shutdown command) – according to command

4-relay connection example

Connect the ripple control signal receiver and the I/O terminals of the inverter to one another as shown in the connection diagram.

For distances greater than 10 m between the inverter and the ripple control signal receiver, use a shielded data communication cable (CAT 5 or higher) with twisted cable pairs. Connect the shielding on one side to the terminal of the data communication area (SHIELD).



- (1) Ripple control signal receiver with 4 relays for effective power limitation.
- (2) I/O connection terminals 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 settings – 4 relay example

I/O Power Management

V+/GND

V+

V+

GND

GND

I/O

0

2

4

6

8

10

1

3

5

7

9

11

I

0

2

4

6

8

10

1

3

5

7

9

11

DNO feedback pin

Not used

Rules

+ Add

Rule 1

0

2

4

6

8

10

1

3

5

7

9

11

Limitation

I/O Generation Limit (%)

Active Power *

100

%

Power Factor (cos φ) *

1

Impedance response

Capacitive

DNO Feedback

Rule 2

0

2

4

6

8

10

1

3

5

7

9

11

Limitation

I/O Generation Limit (%)

Active Power *

60

%

Power Factor (cos φ) *

1

Impedance response

Capacitive

DNO Feedback

Rule 3

0

2

4

6

8

10

1

3

5

7

9

11

Limitation

I/O Generation Limit (%)

Active Power *

30

%

Power Factor (cos φ) *

1

Impedance response

Capacitive

DNO Feedback

Rule 4

0

2

4

6

8

10

1

3

5

7

9

11

Limitation

I/O Generation Limit (%)

Active Power *

0

%

Power Factor (cos φ) *

1

Impedance response

Capacitive

DNO Feedback

Import

Export

0

Activate Backup interlock

1

Rule 1

2

None

3

None

4

None

5

None

6

Open grid relais feedback

7

Backup interlock feedback

8

I/O control

9

I/O control

10

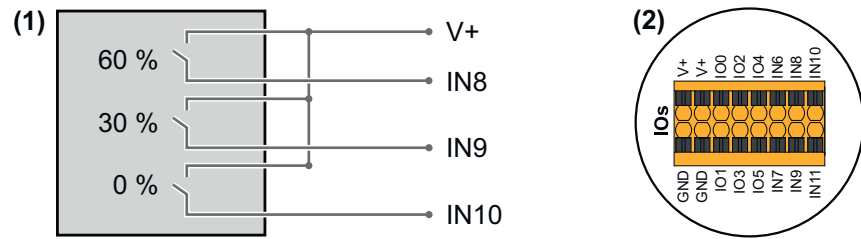
I/O control

11

I/O control

3-relay connection example

Connect the ripple control signal receiver and the I/O terminals of the inverter to one another as shown in the connection diagram. For distances greater than 10 m between the inverter and the ripple control signal receiver, use a shielded data communication cable (CAT 5 or higher) with twisted cable pairs. Connect the shielding on one side to the terminal of the data communication area (SHIELD).



- (1) Ripple control signal receiver with 3 relays for effective power limitation.
- (2) I/O connection terminals 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 settings – 3 relay example

I/O Power Management

V+/GND

V- V+

GND GND

I/O

0 2 4 6 8 10

1 3 5 7 9 11

I

0 2 4 6 8 10

1 3 5 7 9 11

DNO feedback pin

Not used

Rules

+ Add

Rule 1

0 2 4 6 8 10

1 3 5 7 9 11

Limitation

I/O Generation Limit (%)

Active Power *

100

%

Power Factor (cos φ) *

1

Impedance response

Capacitive

DNO Feedback

Rule 2

0 2 4 6 8 10

1 3 5 7 9 11

Limitation

I/O Generation Limit (%)

Active Power *

60

%

Power Factor (cos φ) *

1

Impedance response

Capacitive

DNO Feedback

Rule 3

0 2 4 6 8 10

1 3 5 7 9 11

Limitation

I/O Generation Limit (%)

Active Power *

30

%

Power Factor (cos φ) *

1

Impedance response

Capacitive

DNO Feedback

Rule 4

0 2 4 6 8 10

1 3 5 7 9 11

Limitation

I/O Generation Limit (%)

Active Power *

0

%

Power Factor (cos φ) *

1

Impedance response

Capacitive

DNO Feedback

Import

Export

0 Activate Backup interlock

1 Rule 1

2 None

3 None

4 None

5 None

6 Open grid relais feedback

7 Backup interlock feedback

8 I/O control

9 I/O control

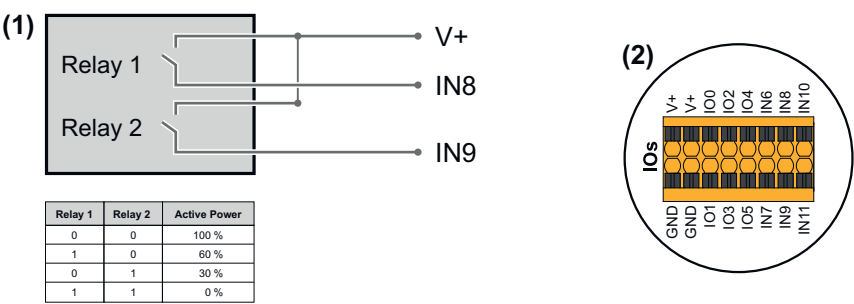
10 I/O control

11 None

2-relay connection example

Connect the ripple control signal receiver and the I/O terminals of the inverter to one another as shown in the connection diagram.
For distances greater than 10 m between the inverter and the ripple control sig-

nal receiver, use a shielded data communication cable (CAT 5 or higher) with twisted cable pairs. Connect the shielding on one side to the terminal of the data communication area (SHIELD).



- (1) Ripple control signal receiver with 2 relays for effective power limitation.
- (2) I/O connection terminals 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 settings – 2 relay example

I/O Power Management

V+/GND

V+

V+

GND

GND

I/O

0

2

4

6

8

10

1

3

5

7

9

11

I

0

2

4

6

8

10

1

3

5

7

9

11

DNO feedback pin

Not used

Rules

+ Add

Rule 1

0

2

4

6

8

10

1

3

5

7

9

11

Limitation

I/O Generation Limit (%)

Active Power *

100

%

Power Factor (cos φ) *

1

Impedance response

Capacitive

DNO Feedback

Rule 2

0

2

4

6

8

10

1

3

5

7

9

11

Limitation

I/O Generation Limit (%)

Active Power *

60

%

Power Factor (cos φ) *

1

Impedance response

Capacitive

DNO Feedback

Rule 3

0

2

4

6

8

10

1

3

5

7

9

11

Limitation

I/O Generation Limit (%)

Active Power *

30

%

Power Factor (cos φ) *

1

Impedance response

Capacitive

DNO Feedback

Rule 4

0

2

4

6

8

10

1

3

5

7

9

11

Limitation

I/O Generation Limit (%)

Active Power *

0

%

Power Factor (cos φ) *

1

Impedance response

Capacitive

DNO Feedback

Import

Export

0

Activate Backup interlock

1

Rule 1

2

None

3

None

4

None

5

None

6

Open grid relais feedback

7

Backup interlock feedback

8

I/O control

9

I/O control

10

None

11

None

1-relay connection example

Connect the ripple control signal receiver and the I/O terminals of the inverter to one another as shown in the connection diagram. For distances greater than 10 m between the inverter and the ripple control signal receiver, use a shielded data communication cable (CAT 5 or higher) with twisted cable pairs. Connect the shielding on one side to the terminal of the data communication area (SHIELD).



- (1) Ripple control signal receiver with 1 relay for effective power limitation.
- (2) I/O connection terminals 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 example

I/O Power Management

V+/GND

I/O

I

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

DNO feedback pin
Not used

Rules

+ Add

Rule 1

0

2

4

6

8

10

1

3

5

7

9

11

Limitation

I/O Generation Limit (%)

Active Power *

100

%

Power Factor (cos φ) *

1

Impedance response

Capacitive

DNO Feedback

Rule 2

0

2

4

6

8

10

1

3

5

7

9

11

Limitation

I/O Generation Limit (%)

Active Power *

0

%

Power Factor (cos φ) *

1

Impedance response

Capacitive

DNO Feedback

Import

Export

0

1

2

3

4

5

6

7

8

9

10

11

Activate Backup interlock

Rule 1

None

None

None

None

Open grid relais feedback

Backup interlock feedback

I/O control

None

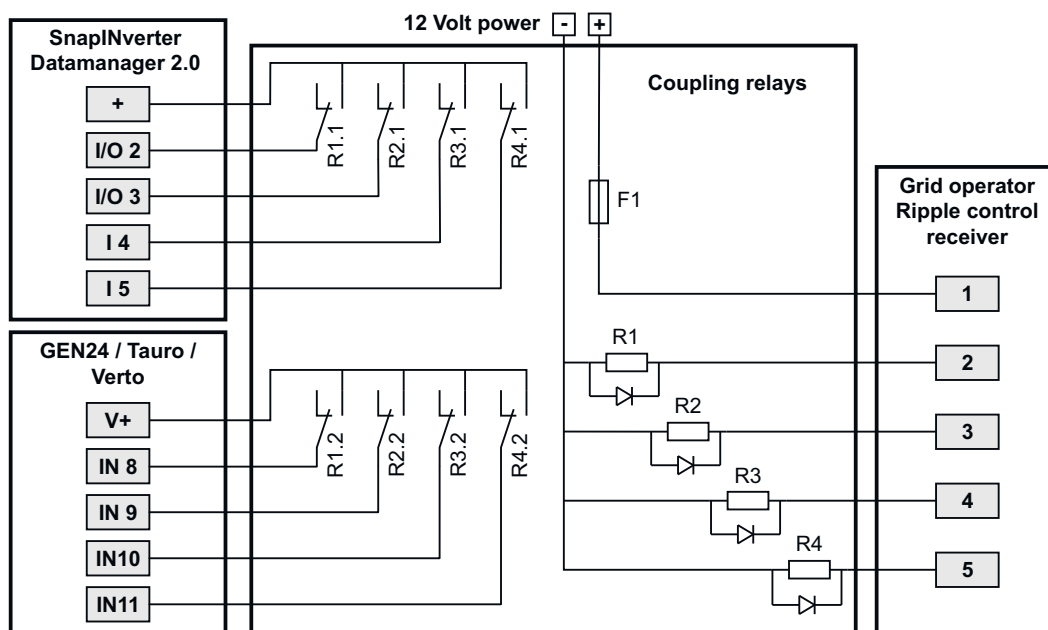
None

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 active power and/or the power factor of the photovoltaic system.

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Connection diagram for ripple control receiver with several inverters

Connect the following Fronius inverters to a ripple control receiver via a distributor (coupling relay):

- Symo GEN24
- Primo GEN24
- Tauro
- Verto
- SnapINverter (only devices with Fronius Datamanager 2.0)

On the user interface of each inverter connected to the ripple control receiver, set the same parameters for I/O power management.

Autotest (CEI 0-21)

Description

The **Autotest** makes it possible to check the Italian protection function, required by the applicable standard for monitoring the voltage and frequency limit values of the inverter during commissioning. In normal operation, the inverter constantly checks the real-time actual value of the voltage and frequency of the grid.

Once the Autotest has started, different individual tests are carried out automatically, in succession. Depending on the grid conditions, the duration of the test is approximately 15 minutes.

IMPORTANT!

In Italy, the inverter may only be commissioned following a successfully completed Autotest (CEI 0-21). If an Autotest is not passed, grid power feed operation may not take place. Once the Autotest is started, it must be completed successfully. The Autotest cannot be started during backup power mode.

Umax	Test for checking the maximum voltage in the phase conductors
Umin	Test for checking the minimum voltage in the phase conductors
fmax	Test for checking the maximum mains frequency
fmin	Test for checking the minimum mains frequency
fmax alt	Test for checking an alternative maximum mains frequency

fmin alt	Test for checking an alternative minimum mains frequency
U outer min	Test for checking the minimum outer voltages
U longT.	Test for checking the 10 min. voltage average

Print to PDF

- 1 Click the **Print to PDF** button.
- 2 Enter the file name into the input field and click on the **Print** button.

✓ *The PDF is created and shown.*

Note on the Autotest

The limit values are set in the **Safety and Grid Regulations > Country Setup> Grid Support Functions** menu area.

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 (see chapter [Requesting inverter codes in Solar.SOS](#) on page 142).

Options

Surge protection device (SPD)

General

A surge protection device (SPD) protects against temporary overvoltages and diverts surge currents (e.g., lightning strike). Based on an overall lightning protection concept, the SPD contributes to the protection of the photovoltaic system components.

For detailed information on the wiring diagram of the surge protection device, see chapter [Surge protection device \(SPD\)](#) on page 252.

If the surge protection device is triggered, the color of the indicator changes from green to red (mechanical display) and the operating status LED of the inverter lights up red (see chapter [Button functions and LED status indicator](#) on page 41). The error code **1030 WSD Open** is displayed on the user interface of the inverter in the **System > Event Log** menu area or in the user menu under **Notifications** and in Fronius Solar.web. In this case, the inverter must be repaired by an authorized specialist company.

IMPORTANT!

The inverter also switches off if the 2-pin signal cable of the surge protection device is interrupted or damaged.

External surge protection device

To receive a notification when external surge protection devices are triggered, it is recommended to connect the feedback contacts connected in series to the WSD input.

Safety



WARNING

Danger due to electrical voltage on live parts of the photovoltaic system.

This can result in serious injury and damage to property.

- ▶ Disconnect live parts of the photovoltaic system on all pins and on all sides.
- ▶ Secure against re-activation in accordance with national regulations.
- ▶ Allow the capacitors of the inverter to discharge (2 minutes).
- ▶ Check that the inverter is de-energized with a suitable measuring device.



WARNING

Danger due to work that has been carried out incorrectly.

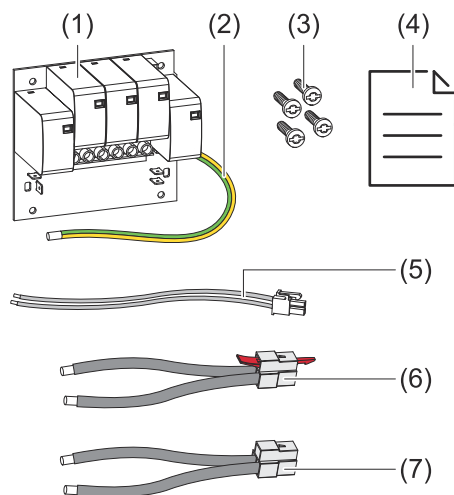
This can result in serious injury and damage to property.

- ▶ Installing and connecting an option must only be carried out by service personnel trained by Fronius and only within the scope of the respective technical regulations.
- ▶ Follow the safety rules.

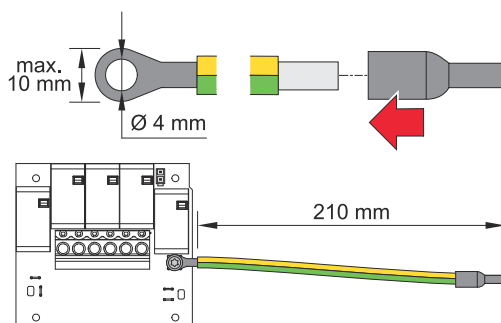
Scope of supply

The surge protection device (SPD) is available as an option and can be retrofitted to the inverter.

For technical data, see chapter [Technical data](#) on page 201.



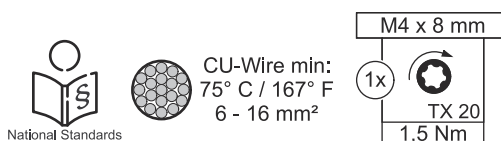
1. PC board
2. 4 TX20 screws
3. Ground conductor
4. 2-pin signal cable
5. PV- cable
6. PV+ cable
7. User information



IMPORTANT!

A larger ground conductor cross-section may be required depending on national standards and regulations.

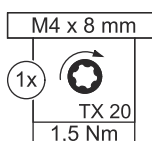
Fit a ring cable lug (internal diameter: 4 mm, outer diameter: max. 10 mm) as well as a corresponding ferrule. Fasten the ground conductor to the PC board with a torque of 1.5 Nm.



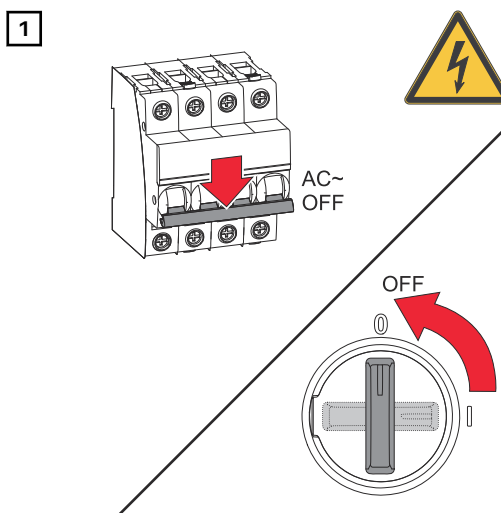
National Standards



CU-Wire min:
75° C / 167° F
6 - 16 mm²



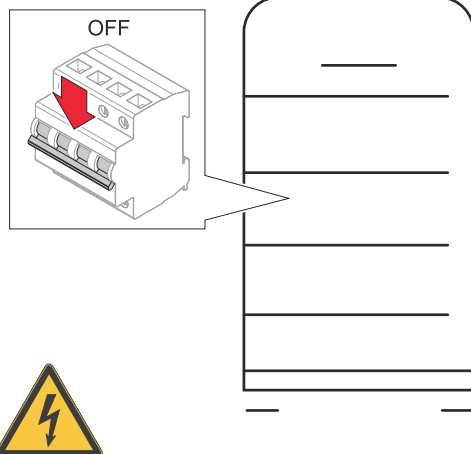
De-energizing the inverter



Turn off the automatic circuit breaker. Set the DC disconnect to the "off" switch position.

- 2 Disconnect connections from the solar module strings (+/-).

3



Switch off the battery connected to the inverter.

Wait for the capacitors of the inverter to discharge (2 minutes).

Installation

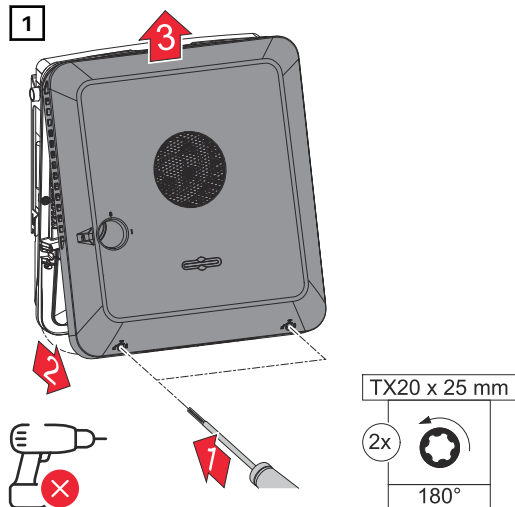
⚠ CAUTION

Danger due to insufficiently dimensioned ground conductors.

This may result in damage to the inverter due to thermal overload.

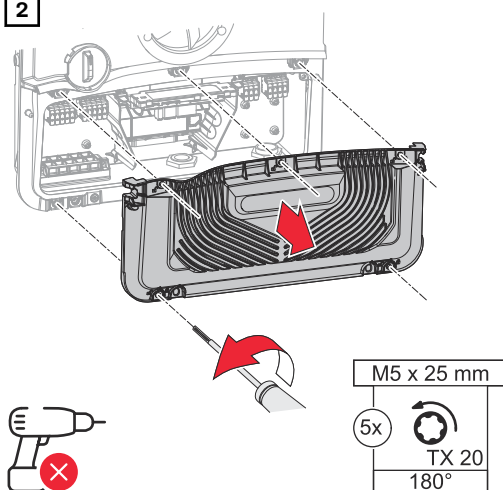
- The national standards and regulations must be observed for dimensioning of the ground conductor.

1



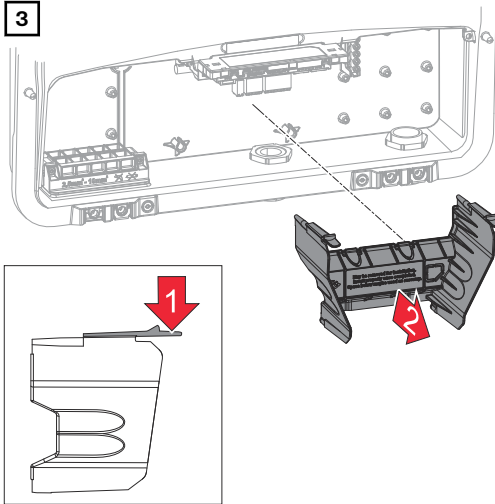
Loosen the 2 screws on the underside of the housing cover by rotating them 180° to the left using a screwdriver (TX20). Then lift the housing cover away from the inverter at the bottom and detach from above.

2



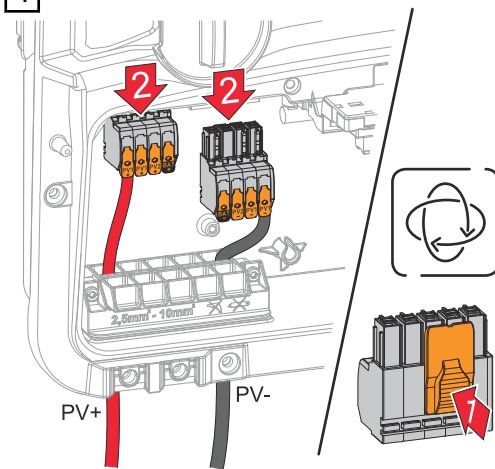
Loosen the 5 screws on the connection area cover by rotating them 180° to the left using a screwdriver (TX20). Remove the connection area cover from the device.

3



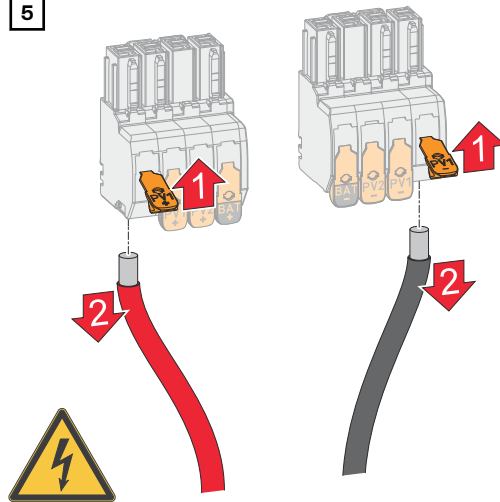
Remove the connection area divider by pressing the snap tabs.

4



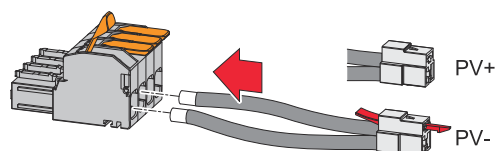
Remove the DC push-in terminals from the slots and disconnect them from the cables (only necessary for an existing installation).

5



Remove cables from the terminals (only necessary for an existing installation).

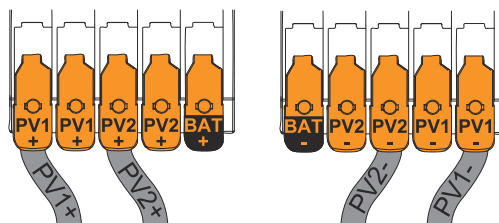
6



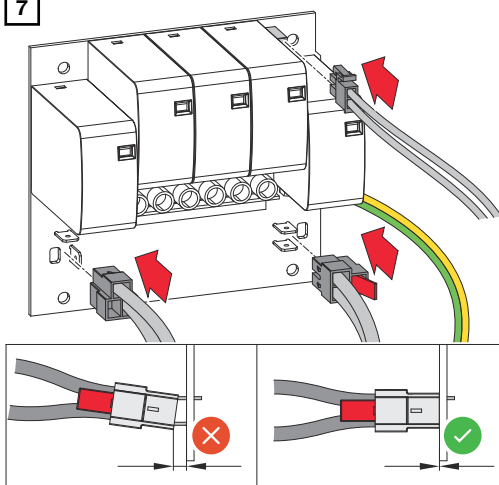
Connect the PV+/PV- cables supplied to the corresponding connection sockets.

IMPORTANT!

When connecting, note the labeling on the cables.



7

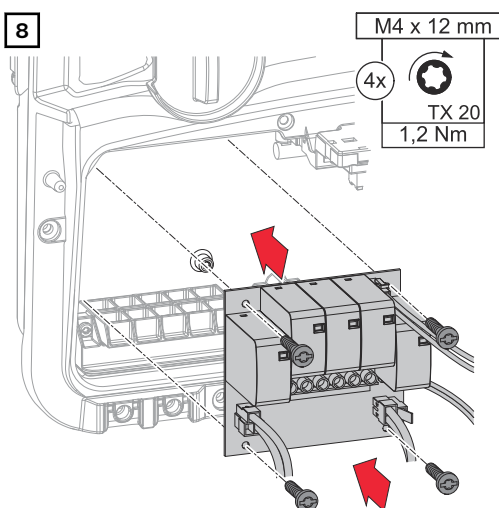


Connect the cables supplied to the corresponding connection sockets on the PC board.

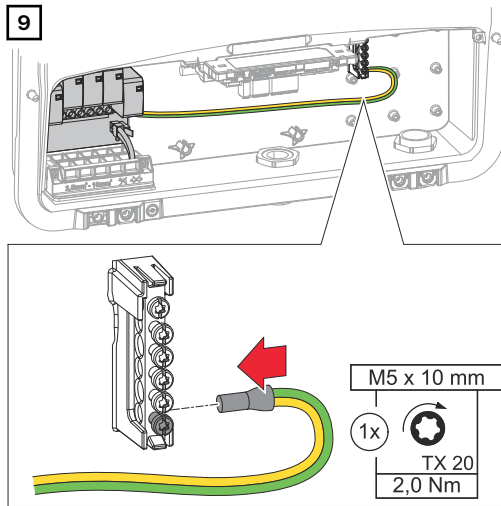
IMPORTANT!

The plugs must be plugged in to the stops on the PC board.

8



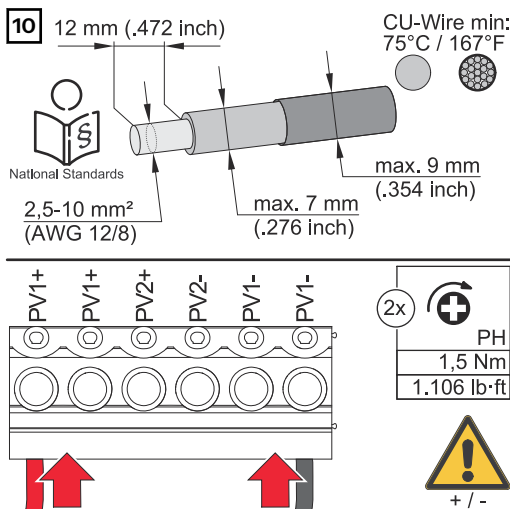
Insert the PC board into the inverter and fasten it using the 4 screws supplied (TX20) and a torque of 1.2 Nm.



Fasten the ground conductor to the first input from the bottom on the ground electrode terminal using a screwdriver (TX20) and a torque of 2 Nm.

IMPORTANT!

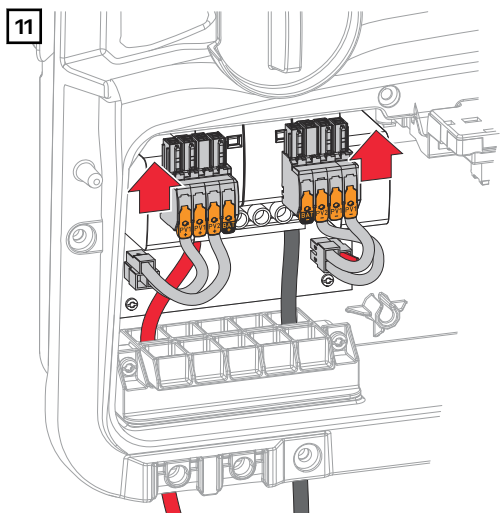
Using other inputs can make the use of the connection area dividers more difficult or damage the ground conductor.



Strip 12 mm of insulation from the single conductors. Fasten to the respective slot of the terminal located on the PC board with a torque of 1.5 Nm.

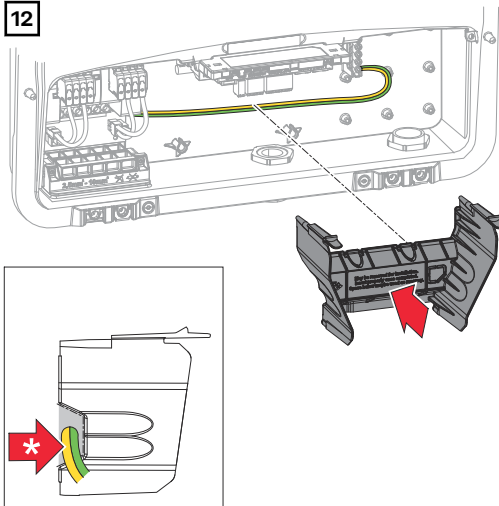
IMPORTANT!

The cable cross-section must be selected according to the specifications for the respective power category of the inverter (see chapter [Permitted cables for the electrical connection](#) on page 75).



Push the DC push-in terminals into the corresponding slot until there is an audible click.

12



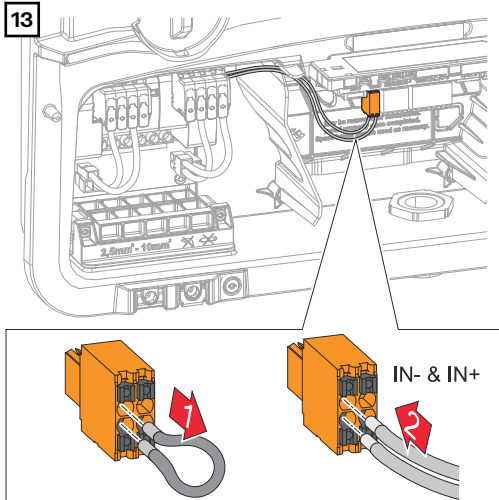
Re-insert the connection area divider.

* Lay the ground conductor in the integrated cable duct.

IMPORTANT!

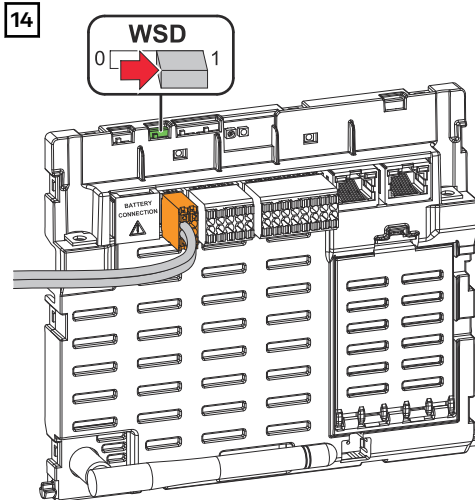
Ensure that the ground conductors are not damaged (e.g., broken, kinked, crushed, etc.) when inserting the connection area divider.

13

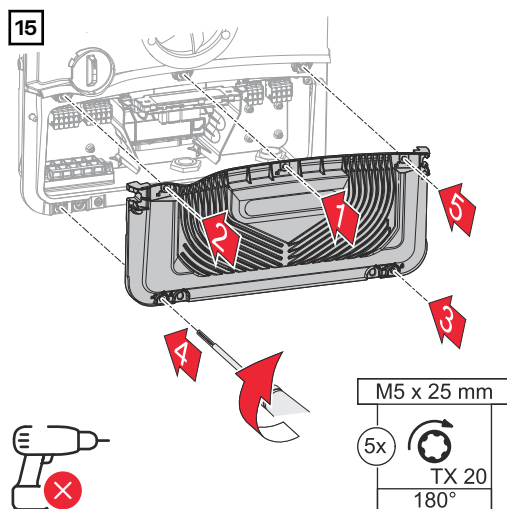


Remove the bypass installed ex works on the push-in WSD terminal. Connect the signal cables to the IN- and IN+ slots in accordance with the labeling on the push-in WSD terminal.

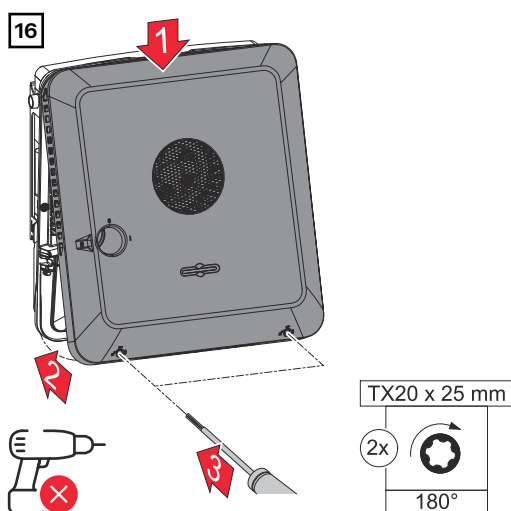
14



Check whether the WSD switch is in position 1 (factory setting).



Place the cover on the connection area. Tighten the 5 screws by rotating them 180° to the right in the indicated order using a screwdriver (TX20).



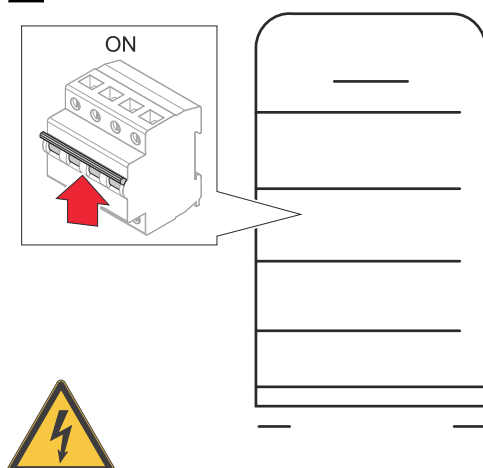
Clip the housing cover into the inverter from above. Press on the lower part of the housing cover and tighten the 2 screws by rotating them 180° to the right using a screwdriver (TX20).

Starting up the inverter

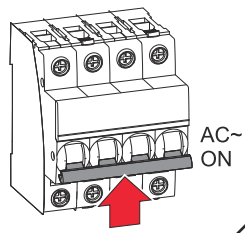
1 Connect the solar module strings (+/-).

2

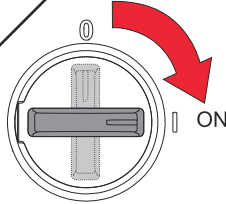
Switch on the battery connected to the inverter.



3



Set the DC disconnecter to the "on" switch position. Turn on the automatic circuit breaker.



DC Connector Kit GEN24

General

The DC Connector Kit GEN24 (item number: 4,240,046) enables PV-connection strings with the following total currents to be connected:

- Symo GEN24: > 25 A
- Symo GEN24 SC: > 28 A
- Primo GEN24: > 25 A
- Primo GEN24 SC: > 22 A

IMPORTANT!

Do not use the DC Connector Kit GEN24 if the device has an integrated Arc Fault Circuit Interrupter (AFCI), which is used for the arc detection requirement according to IEC 63027. Carry out installation in accordance with the nationally applicable standards and guidelines.

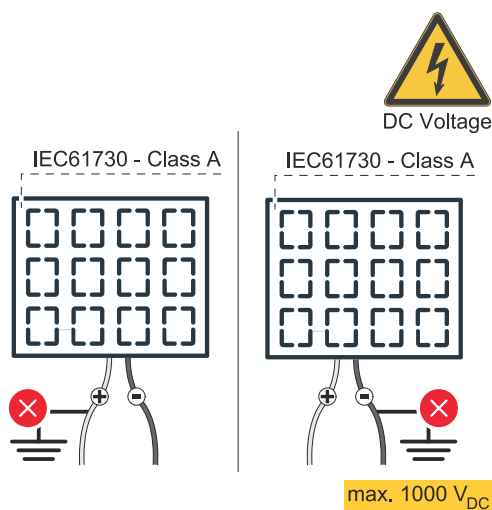
General information about PV modules

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 max. permissible system voltage. An open circuit voltage above the indicated values will damage the inverter, and all warranty rights will become null and void.
- 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.



IMPORTANT!

The PV modules connected to the inverter must comply with the IEC 61730 Class A standard.

IMPORTANT!

Solar module strings must not be grounded.

Safety



WARNING

Danger from incorrect operation and work that is not carried out properly.

This can result in severe personal injury and damage to property.

- ▶ The commissioning, maintenance, and service work in the inverter's power stage set may only be carried out by Fronius-trained service personnel in accordance with the technical specifications.
- ▶ Read the installation instructions and operating instructions before installing and commissioning the equipment.



WARNING

Danger from mains voltage and DC voltage from PV modules that are exposed to light.

This can result in severe personal injury and damage to property.

- ▶ All connection, maintenance, and service work should only be carried out when the AC and DC sides have been disconnected from the inverter and are de-energized.
- ▶ Only an authorized electrical engineer is permitted to connect this equipment to the public grid.



WARNING

Danger of an electric shock due to improperly connected terminals/PV plug connectors.

An electric shock can be fatal.

- ▶ When connecting, ensure that each pole of a string is routed via the same PV input, e.g.:
+ pole string 1 to the input **PV 1.1+** and - pole string 1 to the input **PV 1.1-**



WARNING

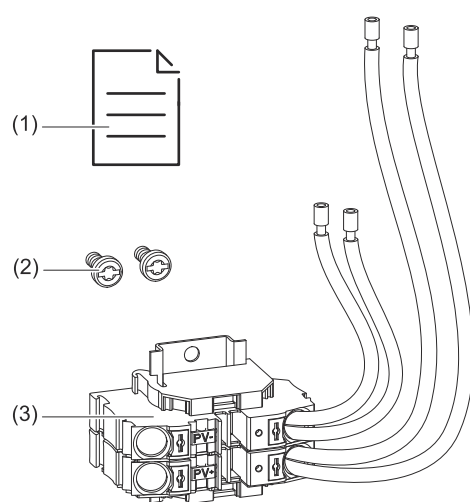
Danger from damaged and/or contaminated terminals.

This can result in severe personal injury and damage to property.

- ▶ Prior to connection work, check the terminals for damage and contamination.
- ▶ Remove any contamination while the equipment is de-energized.
- ▶ Have defective terminals replaced by an authorized specialist company.

Scope of supply

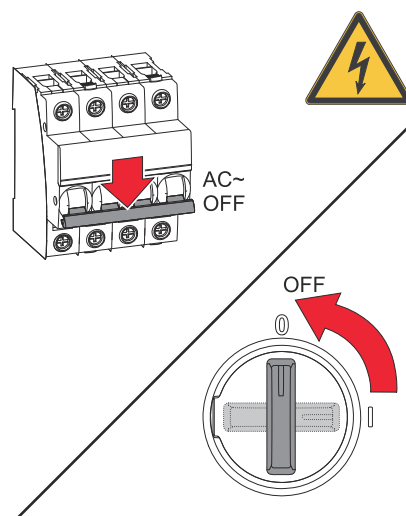
The DC Connector Kit GEN24 is available as an option and can be retrofitted to the inverter.



1. User information
2. 2 TX20 screws
3. DC Connector Kit GEN24

De-energizing the inverter

1

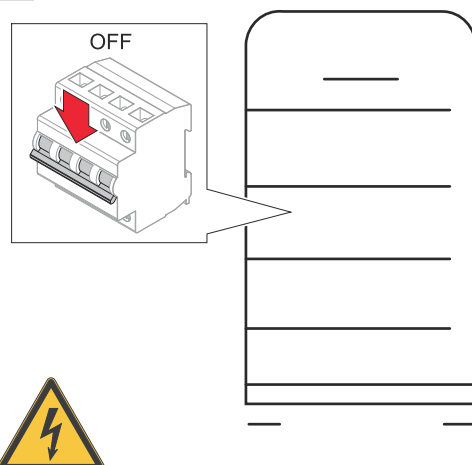


Turn off the automatic circuit breaker. Set the DC disconnect to the "off" switch position.

2

Disconnect connections from the solar module strings (+/-).

3



Switch off the battery connected to the inverter.

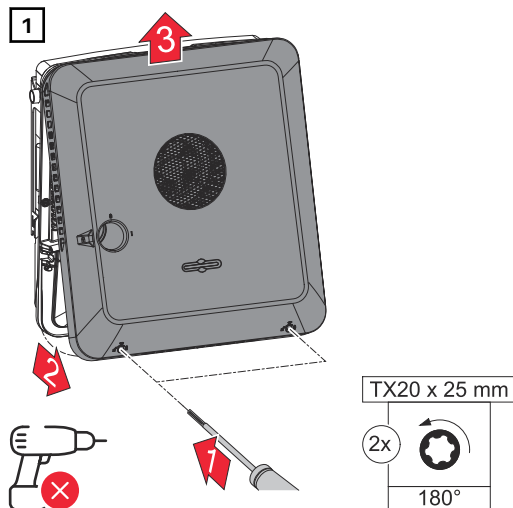
Wait for the capacitors of the inverter to discharge (2 minutes).

⚠ CAUTION

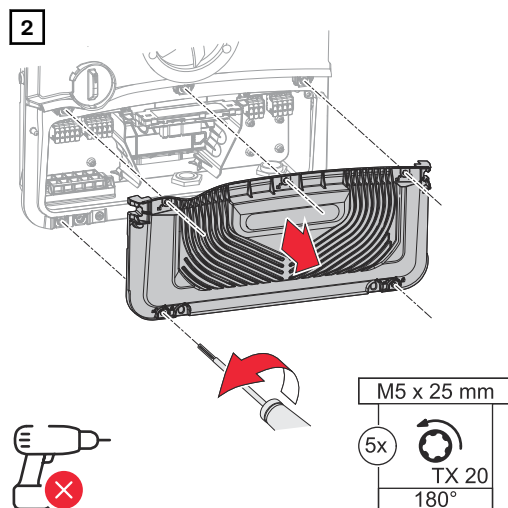
Risk due to insufficiently dimensioned DC cables.

This may result in damage to the inverter due to thermal overload.

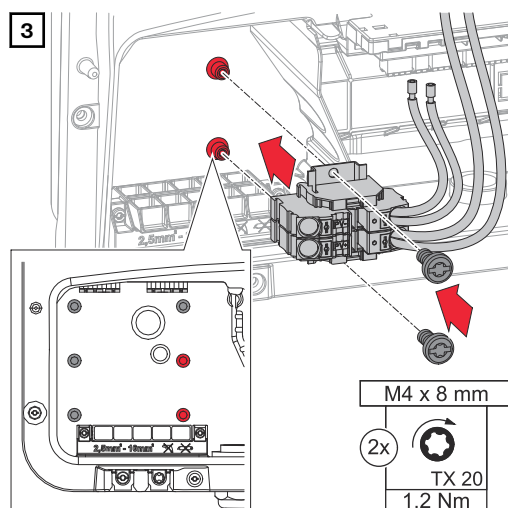
- For dimensioning the DC cables, observe the information according to chapter [Permitted cables for the electrical connection](#) on page 75.



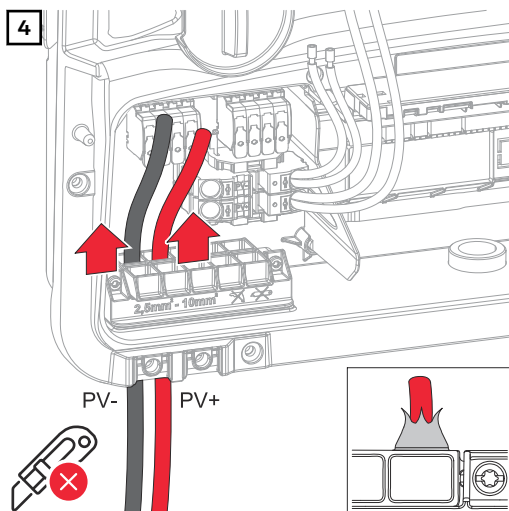
Loosen the 2 screws on the underside of the housing cover by rotating them 180° to the left using a screwdriver (TX20). Then lift the housing cover away from the inverter at the bottom and detach from above.



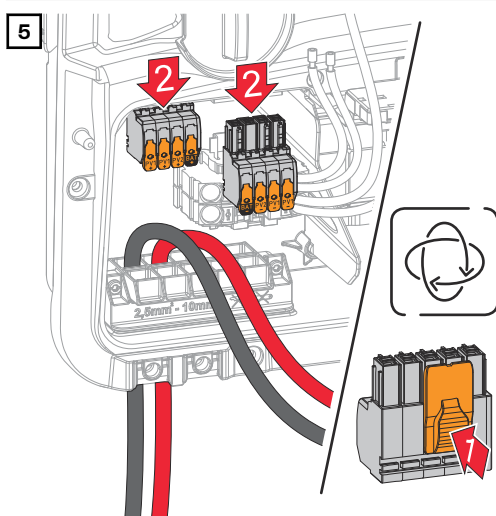
Loosen the 5 screws on the connection area cover by rotating them 180° to the left using a screwdriver (TX20). Remove the connection area cover from the device.



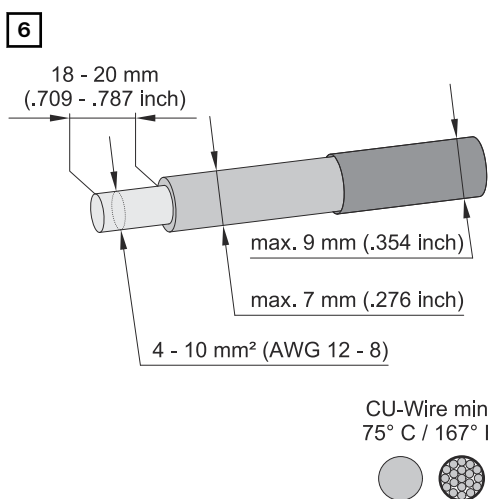
Insert the DC Connector GEN24 into the inverter and fasten it using the 2 screws supplied (TX20) and a torque of 1.2 Nm.



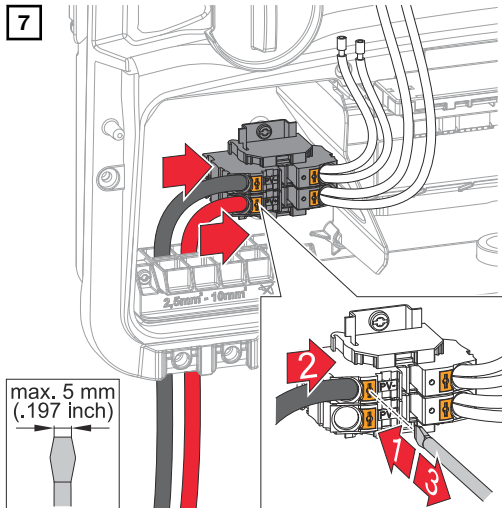
Push the DC cables through the DC bushings by hand.



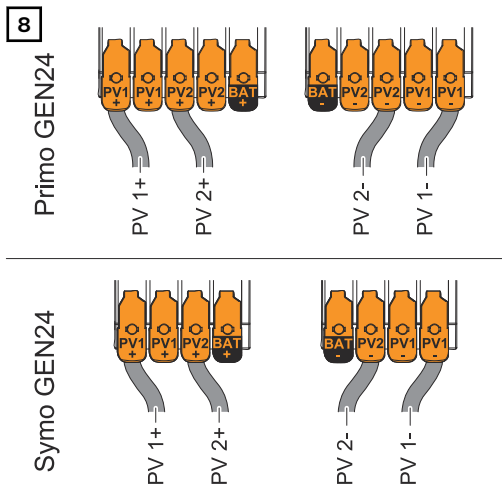
Press the latch on the back of the terminal and remove the DC terminals.



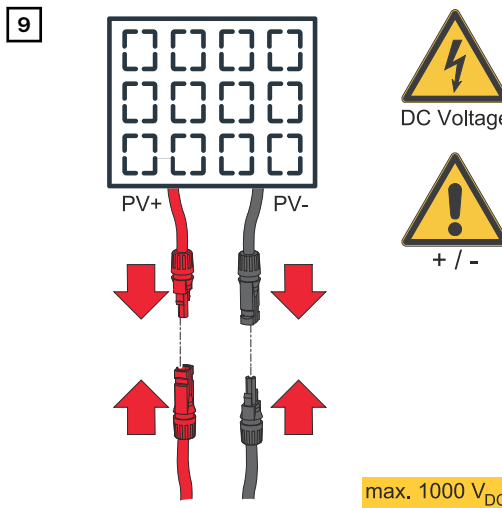
Strip the insulation of the single conductors by 18 - 20 mm. Select the cable cross-section in accordance with the instructions in [Permitted cables for the electrical connection](#) from page 75.



Press the latch on the terminal with a slotted screwdriver. Insert the stripped single conductor into the slot provided in the terminal as far as it will go. Then remove the slotted screwdriver from the latch.



Lift the operating lever of the terminal to open. Insert the stripped single conductor into the slot provided in the terminal as far as it will go. Then close the operating lever until it engages.



Connect the solar module strings (+/-).

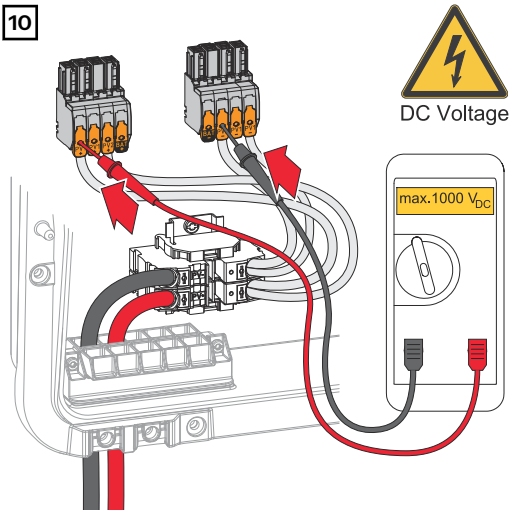
NOTE

Danger due to polarity reversal at the terminals.

This may result in severe damage to the inverter.

- Use a suitable measuring instrument to check the voltage (**max. 1000 V_{DC}**) and the polarity of the DC cabling.

10



Use a suitable measuring instrument to check the voltage and polarity of the DC cabling.

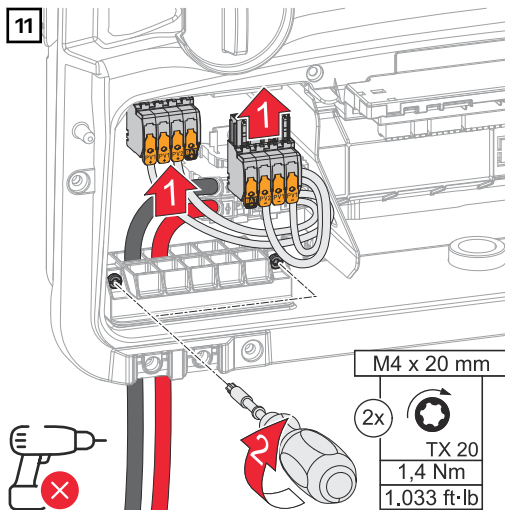
NOTE

Risk due to overtorque at the strain-relief device.

Damage to the strain-relief device may result.

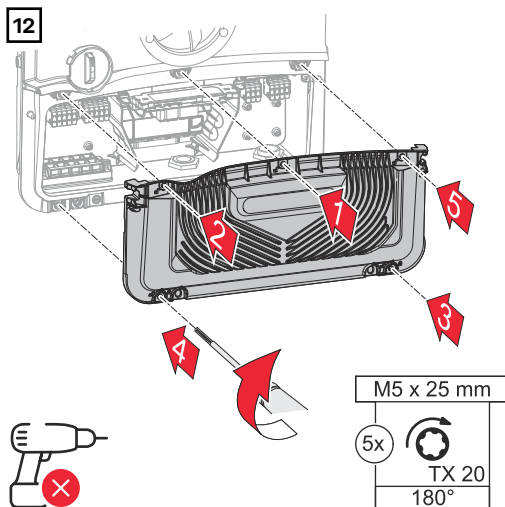
- Do not use a drill driver.

11

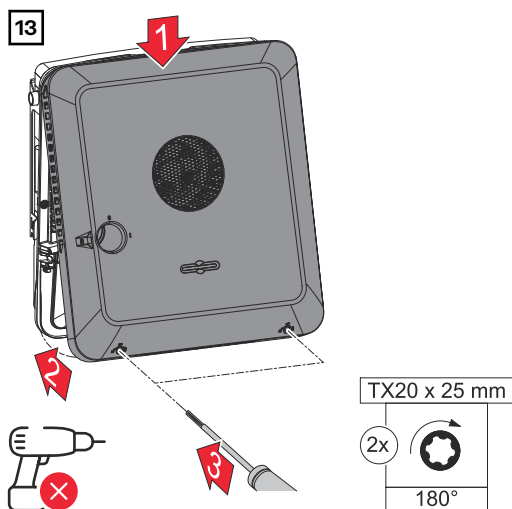


Insert the DC terminals into the respective slot until they engage. Fasten the screws of the strain-relief device to the housing using a screwdriver (TX20) and a torque of 1.4 Nm.

12



Place the cover on the connection area. Tighten the 5 screws by rotating them 180° to the right in the indicated order using a screwdriver (TX20).

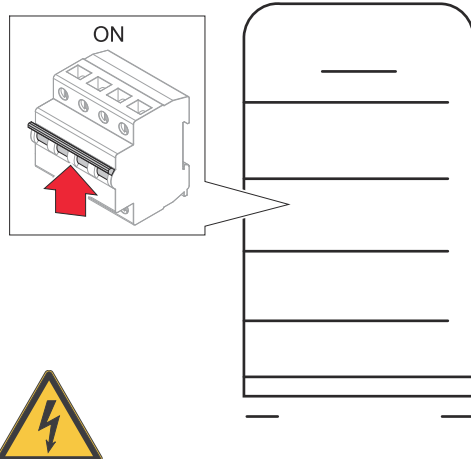


Clip the housing cover into the inverter from above.
Press on the lower part of the housing cover and tighten the 2 screws by rotating them 180° to the right using a screwdriver (TX20).

Starting up the inverter

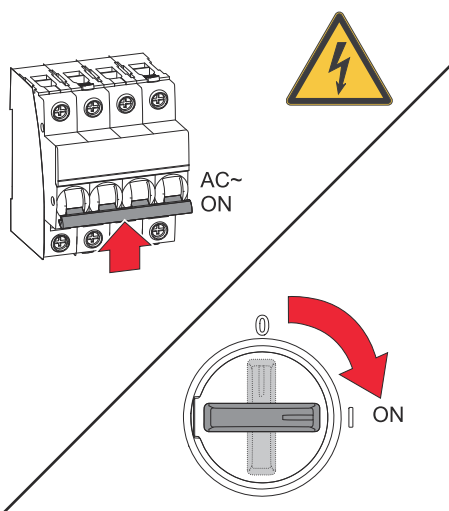
1 Connect the solar module strings (+/-).

2



Switch on the battery connected to the inverter.

3



Set the DC disconnect to the "on" switch position. Turn on the automatic circuit breaker.

PV Point Comfort

Safety



WARNING

Danger due to electrical voltage on live parts of the photovoltaic system.

This can result in serious injury and damage to property.

- ▶ Disconnect live parts of the photovoltaic system on all pins and on all sides.
- ▶ Secure against re-activation in accordance with national regulations.
- ▶ Allow the capacitors of the inverter to discharge (2 minutes).
- ▶ Check that the inverter is de-energized with a suitable measuring device.



WARNING

Danger due to work that has been carried out incorrectly.

This can result in serious injury and damage to property.

- ▶ Installing and connecting an option must only be carried out by service personnel trained by Fronius and only within the scope of the respective technical regulations.
- ▶ Follow the safety rules.



WARNING

Danger due to damaged and/or contaminated terminals.

This can result in serious injury and damage to property.

- ▶ Before making any connections, check the terminals for damage and contamination.
- ▶ Remove contamination in the de-energized state.
- ▶ Have defective terminals repaired by an authorized specialist.



CAUTION

Danger due to electrostatic discharge (ESD).

This may result in damage to electronic components.

- ▶ Pay attention to the ESD marking on the product and/or on the packaging.
- ▶ Take ESD protection measures (grounding, neutralizing, and shielding).

NOTE

The continuous supply via the PV Point depends on the available PV power.

If the solar modules are not supplying enough power, interruptions may occur.

- ▶ Do not connect any loads that require an uninterruptible supply.

IMPORTANT!

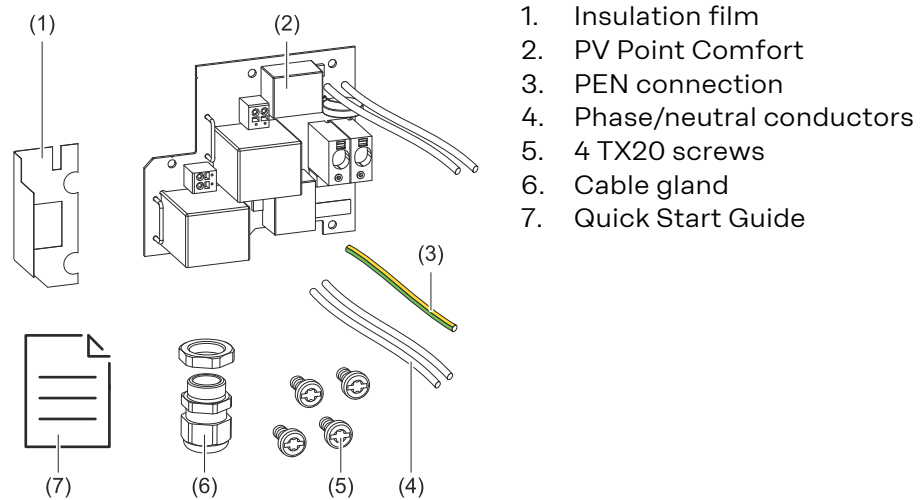
The valid national laws, standards, and provisions, as well as the specifications of the relevant grid operator are to be taken into account and applied.

It is highly recommended that the specific installation be agreed with the grid operator and explicitly approved by this operator. This obligation applies to system constructors in particular (e.g., installers).

Scope of supply

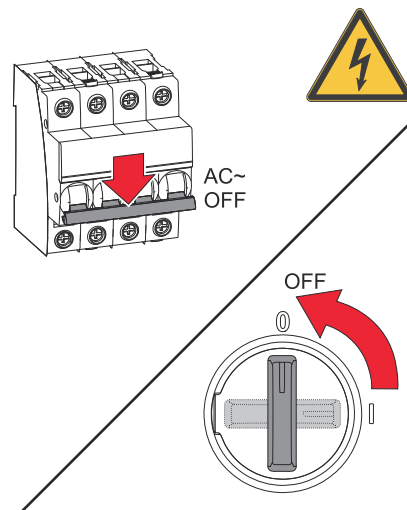
The PV Point Comfort is available as an option and can be retrofitted to the inverter.

For technical data, see chapter [Technical data](#) on page 201.



De-energizing the inverter

1

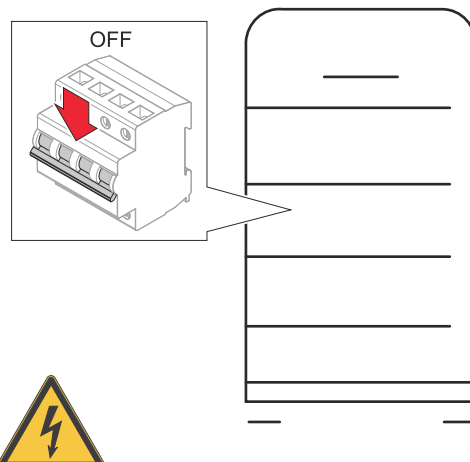


Turn off the automatic circuit breaker. Set the DC disconnect to the "off" switch position.

2

Disconnect connections from the solar module strings (+/-).

3



Switch off the battery connected to the inverter.

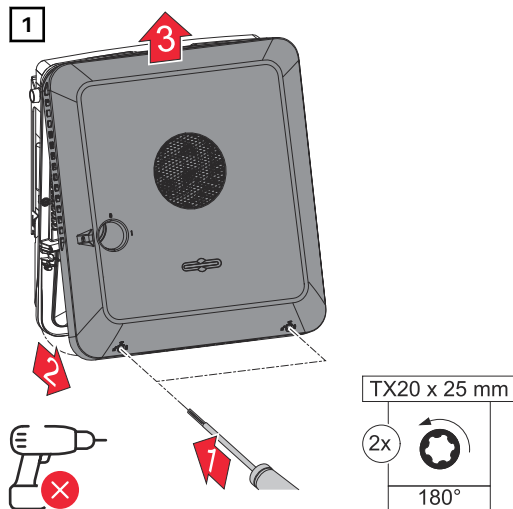
Wait for the capacitors of the inverter to discharge (2 minutes).

NOTE

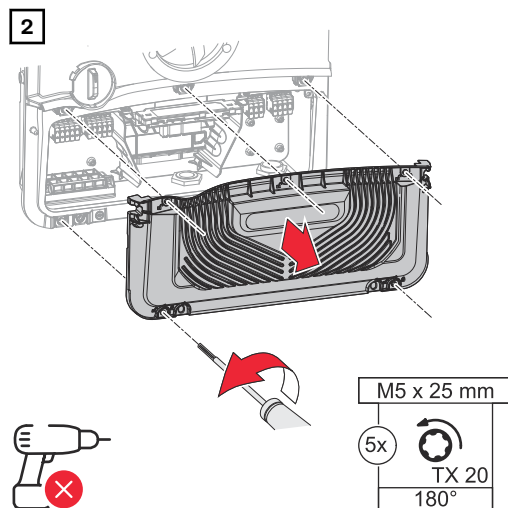
Danger due to insufficiently dimensioned ground conductors.

This may result in damage to the inverter due to thermal overload.

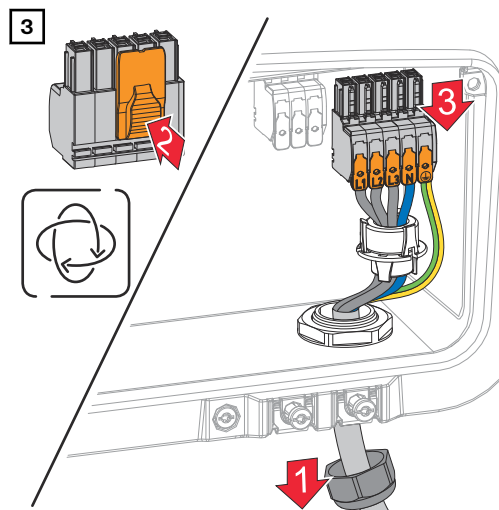
- Observe the national standards and regulations for dimensioning of the ground conductor.



Loosen the 2 screws on the underside of the housing cover by rotating them 180° to the left using a screwdriver (TX20). Then lift the housing cover away from the inverter at the bottom and detach from above.

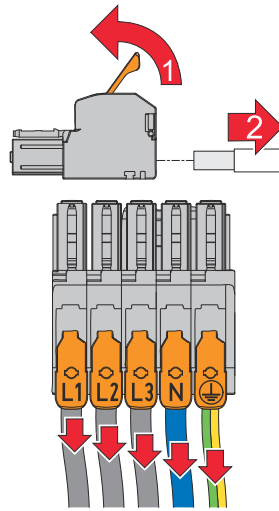


Loosen the 5 screws on the connection area cover by rotating them 180° to the left using a screwdriver (TX20). Remove the connection area cover from the device.



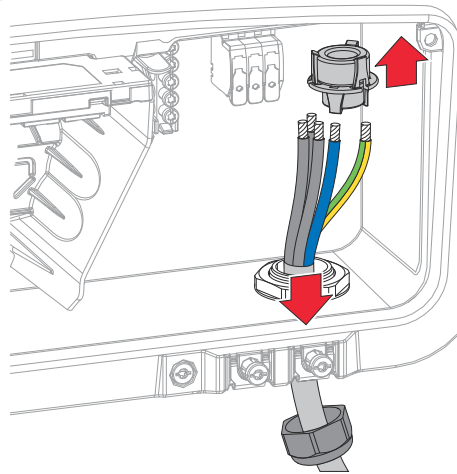
Press the latch on the back of the terminal and remove the AC terminals. Loosen the cable gland.

4



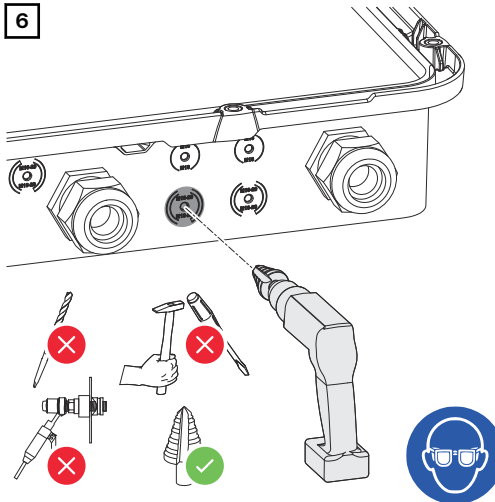
Disconnect the single conductors from the AC terminal (only necessary for an existing installation).

5



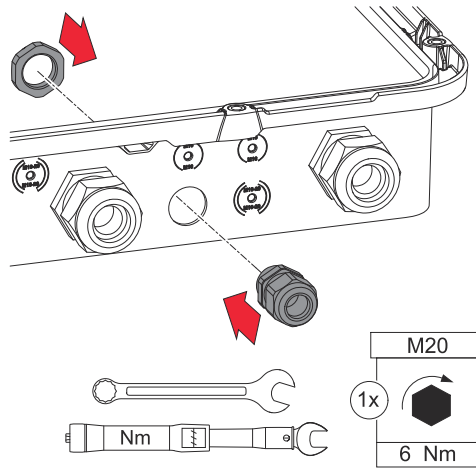
Remove the ferrite core and the mains cable from the inverter.

6



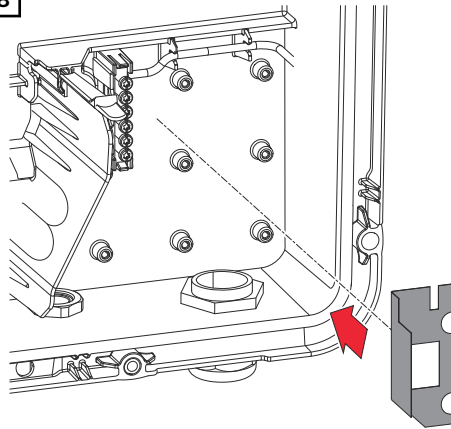
Drill out the optional cable gland with a step drill.

7



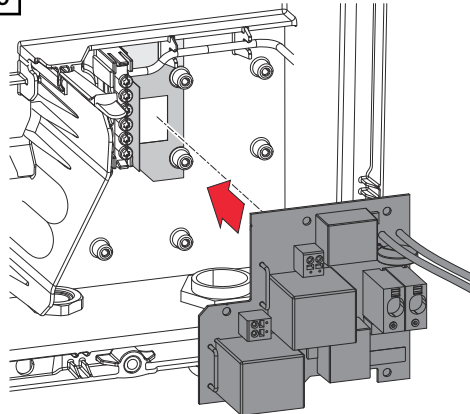
Insert the cable gland into the hole and fasten with a torque of 6 Nm.

8

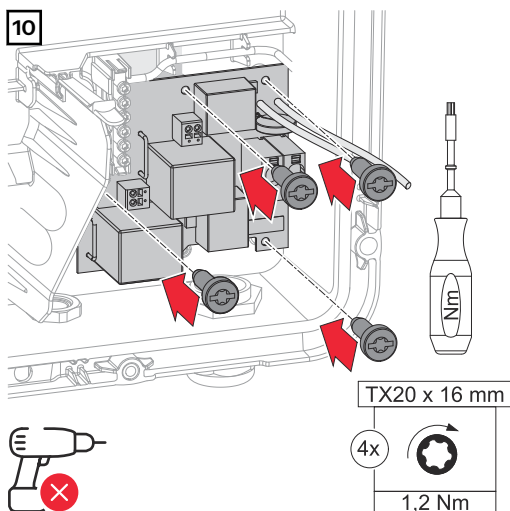


Insert the insulating film on the right side of the ground electrode terminal.

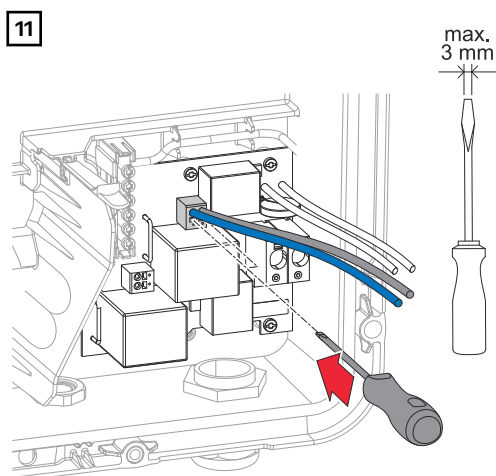
9



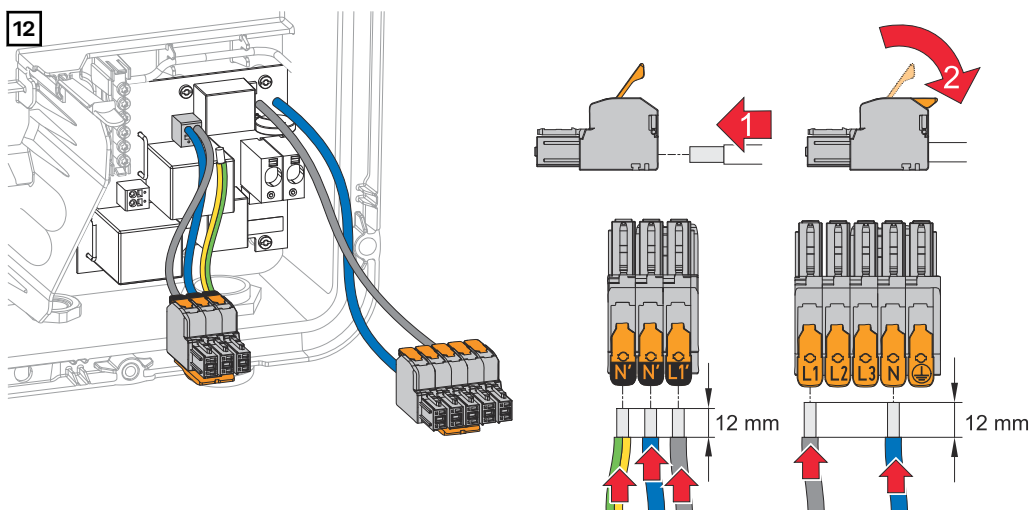
Insert the PC board into the inverter.



Fasten the PC board using the 4 screws supplied (TX20) and a torque of 1.2 Nm.



Fasten the supplied phase and neutral conductors to the terminal using a slotted screwdriver.

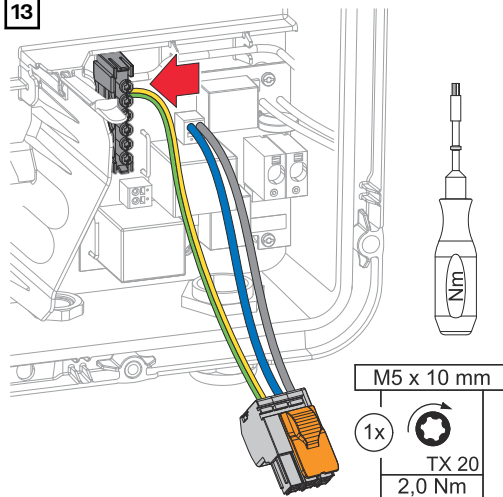


Strip 12 mm of insulation from the single conductors. Lift the operating lever of the AC terminal to open. Insert the stripped single conductor into the slot provided in the AC terminal as far as it will go. Then close the operating lever until it engages.

IMPORTANT!

Establish the PEN connection in accordance with national regulations. If necessary, replace the supplied PEN connection.

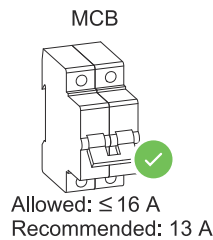
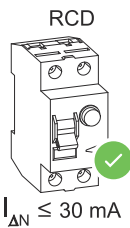
13



Fasten the PEN connection to the ground electrode terminal at the second input from above using a screwdriver (TX20) and a torque of 1.8 - 2 Nm.

14

Inverter (AC~)		$\varnothing$	
Symo GEN24 3 - 10 kW	Cu	2,5 - 10 mm ²	12 mm
PV Point		$\varnothing$	
	Cu	1,5 - 2,5 mm ²	12 mm

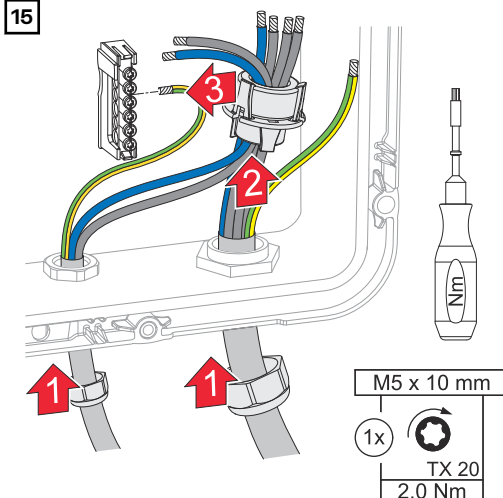


Strip 12 mm of the insulation from the single conductors. Select the cable cross-section according to the specifications for the respective power category of the inverter (see chapter [Permitted cables for the electrical connection](#) on page 75). Execute the residual current circuit breaker and automatic circuit breaker in accordance with national regulations.

IMPORTANT!

If necessary, use an automatic circuit breaker with a maximum 16 A for fuse protection. A max of 13 A can be supplied in backup power mode. If the inverter is protected with an automatic circuit breaker with a maximum 16 A, it is possible to dispense with an additional automatic circuit breaker.

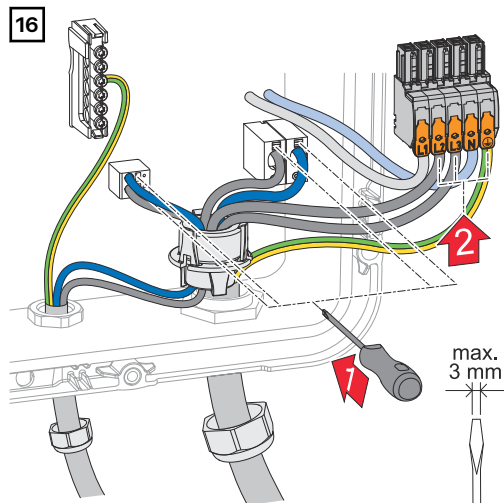
15



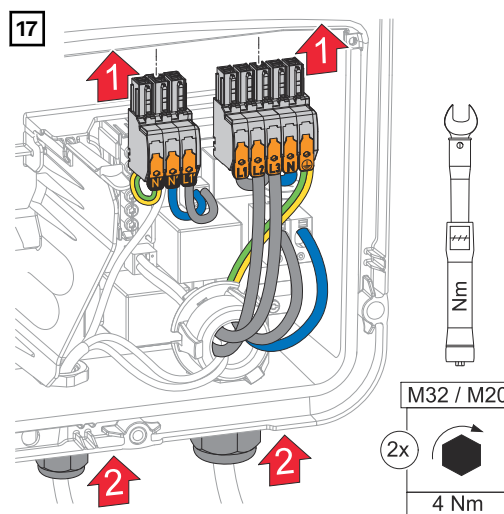
Pass the phase/neutral conductors through the ferrite core. Fasten the ground conductor to the ground electrode terminal at the third input from above using a screwdriver (TX20) and a torque of 1.8 - 2 Nm.

IMPORTANT!

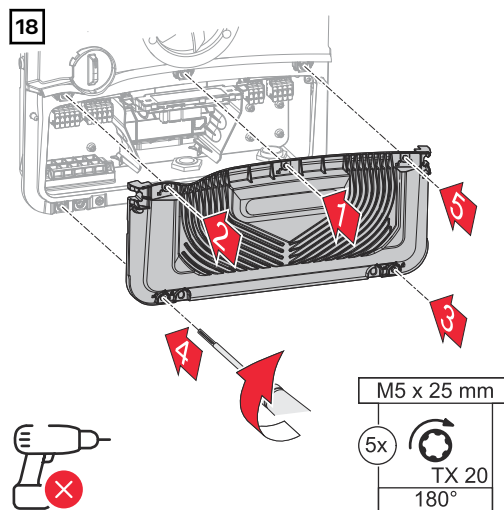
The ground conductors must not be passed through the ferrite core and must be connected using a movement loop so that the ground conductors are disconnected last if the cable glands fail.



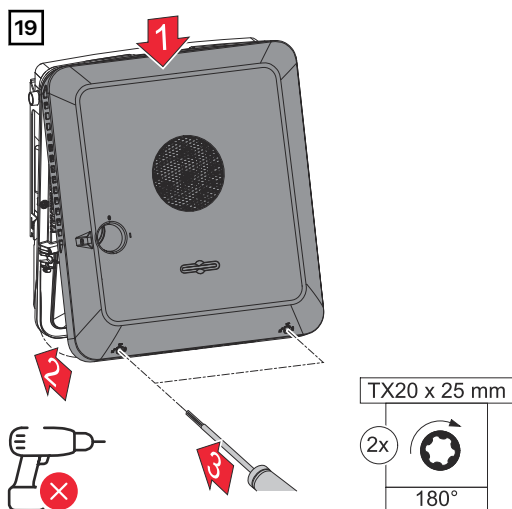
Connect the stripped phase/neutral conductors to the terminals provided.



Insert the terminals into the respective slot until they engage. Fasten the union nuts of the cable glands with a torque of 4 Nm.



Place the cover on the connection area. Tighten the 5 screws by rotating them 180° to the right in the indicated order using a screwdriver (TX20).

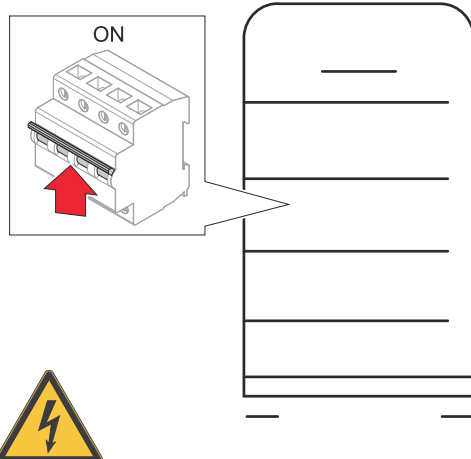


Clip the housing cover into the inverter from above.
Press on the lower part of the housing cover and tighten the 2 screws by rotating them 180° to the right using a screwdriver (TX20).

Starting up the inverter

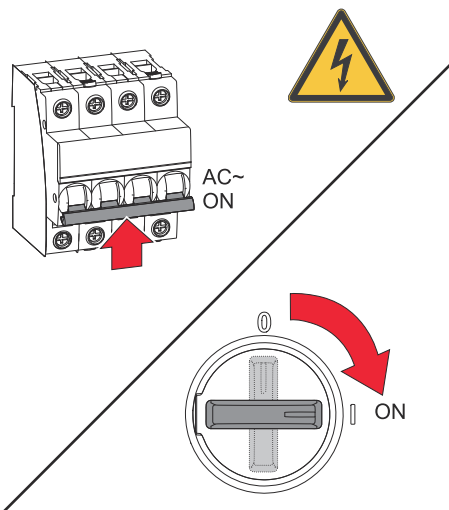
1 Connect the solar module strings (+/-).

2



Switch on the battery connected to the inverter.

3



Set the DC disconnect to the "on" switch position. Turn on the automatic circuit breaker.

Configuring the PV Point Comfort

Firmware version 1.25.2 or higher is required to commission the PV Point Comfort. Outdated firmware versions could lead to incompatibilities between the inverter and PV Point Comfort. In this case, the inverter firmware should be updated in accordance with the chapter headed [Update](#) on page 134.

- 1** Call up the user interface of the inverter.
 - Open web browser.
 - In the browser's address bar, enter the IP address (IP address for WLAN: 192.168.250.181, IP address for LAN: 169.254.0.180) or enter and confirm the host and domain name of the inverter.

✓ *The user interface of the inverter is displayed.*
 - 2** Click on the **Device Configuration** button.
 - 3** Log in to the login area with user **Technician** and the technician password.
 - 4** Go to the **Device Configuration > Functions and I/Os** menu area.
 - 5** Enable the **Backup Power** function.
 - 6** Select **PV Point** mode in the **Backup Power Mode** drop-down list.
 - 7** Click the **Save** button to save the settings.
- ✓ *The **PV Point** backup power mode has been configured.*
-

Testing backup power mode

Testing backup power mode:

- during first-time installation and configuration
- after working on the switch cabinet
- during ongoing operation (recommendation: at least every 6 months)

A battery charge of min. 30% is recommended for test mode.

A description of how to run the test mode can be found in the [checklist – Backup power](https://www.fronius.com/de/download-center?search-word=42,0426,0365) (<https://www.fronius.com/de/download-center?search-word=42,0426,0365>).

Appendix

Service, maintenance and disposal

General	The inverter is designed so that it does not require additional maintenance work. Nevertheless, a few points must be considered during operation to ensure that the inverter works perfectly.
----------------	---

Maintenance	Maintenance and service work may only be carried out by a technical specialist.
--------------------	---

Cleaning	Wipe the inverter, if necessary, with a damp cloth. Do not use cleaning agents, scouring agents, solvents, or similar products to clean the inverter.
-----------------	--

Safety	The DC disconnect is used only to switch off power to the power stage set. When the DC disconnect is turned off, the connection area is still energized.
---------------	--



WARNING

Danger from mains voltage and DC voltage from PV modules.

This can result in severe personal injury and damage to property.

- ▶ The connection area must only be opened by an authorized electrician.
- ▶ The separate power stage set area must only be opened by Fronius-trained service technicians.
- ▶ Prior to any connection work, ensure that the inverter is de-energized on the AC side and the DC side.



WARNING

Danger of residual voltage from capacitors.

This can result in severe personal injury and damage to property.

- ▶ Allow the capacitors of the inverter to discharge (2 minutes).

Operation in dusty environments
--

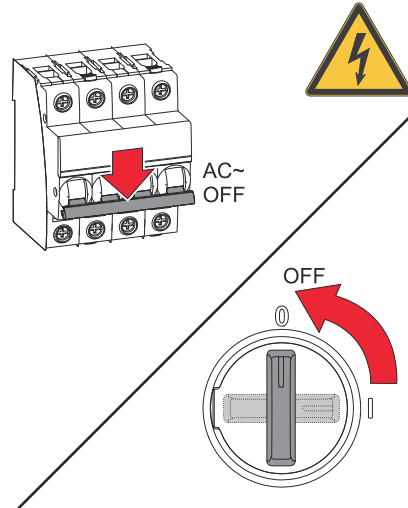
NOTE

If the inverter is operated in dusty environments, dirt may build up on the heat sink and fan.

This may result in a loss of power due to insufficient cooling of the inverter.

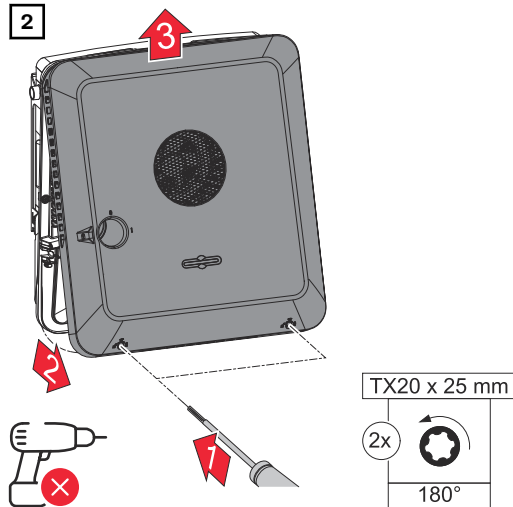
- ▶ Make sure that the ambient air can always flow through the inverter's ventilation slots unimpeded.
- ▶ Remove any build-ups of dirt from the heat sink and the fan.

1



Switch off power to the inverter and wait for the capacitors to discharge (2 minutes) and the fan to shut down. Turn the DC disconnect to the "off" switch setting.

2



Loosen the screws on the underside of the housing cover by rotating them 180° to the left using a screwdriver (TX20). Then lift the housing cover away from the inverter at the bottom and detach from above.

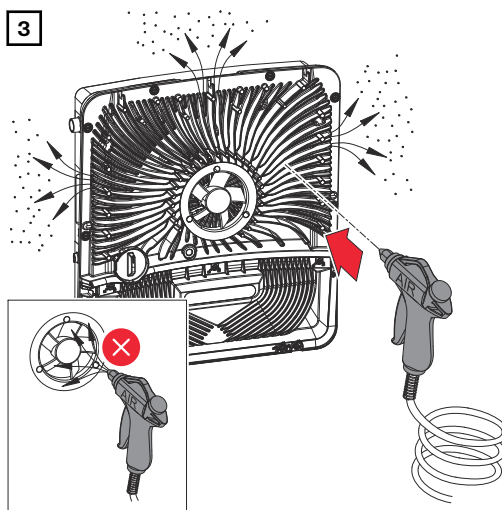
NOTE

Risk due to damage to the fan bearing in the event of incorrect cleaning.

Excessive speeds and the application of pressure to the fan bearing can cause damage.

- Block the fan and clean with compressed air.
- When using a cloth or brush, clean the fan without applying any pressure.

3



Remove any build-up of dirt on the heat sink and fan using compressed air, a cloth, or a brush.

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

Disposal

In accordance with the EU Directive and national law, the following products must be disposed of separately and recycled:

- Waste electrical and electronic equipment
- Used batteries (portable batteries, industrial batteries)

Used equipment and batteries must be returned to the distributor or an authorized local collection system. Do not dispose of batteries with domestic waste. Protect batteries from high temperatures, direct sunlight, moisture and corrosive environments.

Arrange for the safe collection and proper disposal of damaged, leaking or used batteries by a battery recycling company or the Fronius Service Partner.

In addition, it should be noted that batteries contain substances that, if disposed of improperly, can have a significant negative impact on the environment as well as on human health and the safety of persons, in particular due to the leakage of hazardous substances such as heavy metals or electrolytes, which can contaminate soil, water and air.

This ensures environmental protection and the sustainable use of natural resources.

Packaging materials

- Collect separately
- Observe local regulations
- Compress the cardboard box to reduce volume

Warranty provisions

Warranty

Detailed warranty conditions specific to your country can be found at <https://www.fronius.com/en/download-center?searchword=Warranty+conditions>.

If there is a warranty for the relevant product, register the product at <https://warranty.fronius.com/> and activate or extend the warranty.

Components for switching to backup power

Components for automatic backup power changeover to Full Backup

Fronius components

With the Fronius components, no additional components are required for the automatic changeover to backup power. If components are not available depending on national availability, automatic changeover to backup power can be implemented with the following third-party components.

Product	Item number
Fronius Backup Controller 3P-35A	4,240,047,CK
Fronius Backup Controller 3PN-35A	4,240,048,CK
Fronius Smart Meter IP 5kA-3	42,0411,0347
Fronius Smart Meter 63A-3	43,0001,1473
Fronius Smart Meter 50kA-3	43,0001,1478
Fronius Smart Meter TS 65A-3	43,0001,0044
Fronius Smart Meter TS 5kA-3	43,0001,0046
Fronius Smart Meter WR	43,0001,3591

Third-party components

Manufacturers/types other than the product examples listed are permissible, provided that they meet the same technical and functional requirements.

Switchover box	
Manufacturer/type	enwitec electronic GmbH – switchover box for Fronius

Grid and system protection	
Manufacturer/type	Bender GmbH & Co. KG VMD460-NA-D-2 Tele Haase Steuergeräte Ges.m.b.H. RE-NA003-M64

K1 and K2 - AC installation contactor with auxiliary contact	
Number of pins	3-pin or 4-pin (depending on the cabling variant)
Rated current	depending on the house connection
Coil voltage	230 V _{AC}
Rated frequency	50/60 Hz
Coil fuse	6 A
Minimum short circuit current	3 kA (contacts)
Test standard	IEC 60947-4-1
Auxiliary contact	
Number of NC contacts	1
Switching voltage	12-230 V @ 50/60 Hz

K1 and K2 - AC installation contactor with auxiliary contact	
Minimum nominal current	1 A
Minimum short circuit current	1 kA
Manufacturer/type	ISKRA IK63-40 / Schrack BZ326461

Buffer power supply - fault ride through cabling variant	
Manufacturer/type	BKE JS-20-240/DIN_BUF

K1 and K2 - DC installation contactor with auxiliary contact (fault ride through)	
Number of pins	3-pin or 4-pin (depending on the cabling variant)
Rated current	depending on the house connection
Coil voltage	24 V _{DC}
Minimum short circuit current	3 kA (contacts)
Test standard	IEC 60947-4-1
Auxiliary contact	
Number of NC contacts	1
Switching voltage	24 V _{DC}
Minimum nominal current	1 A
Minimum short circuit current	1 kA
Manufacturer/type	Finder 22.64.0.024.4710

K3 - Modular relay	
Number of changeover contacts	2
Coil voltage	12 V _{DC}
Test standard	IEC 60947-4-1
Manufacturer/type	Finder 22.23.9.012.4000 / Schrack relay RT424012 (bracket RT17017, relay base RT78725)

K4 and K5 - Installation contactor	
Number of NC contacts	2 (25 A)
Coil voltage	230 V AC (2P)
Rated frequency	50/60 Hz
Coil fuse	6 A
Minimum short circuit current	3 kA (contacts)

K4 and K5 - Installation contactor

Test standard	IEC 60947-4-1
Manufacturer/type	ISKRA IKA225-02

**Components for
manual backup
power
changeover to
Full Backup**

Product	Item number
Fronius Smart Meter 63A-3	43,0001,1473
Fronius Smart Meter TS 65A-3	43,0001,0044
Fronius Backup Switch 1P/3P-63A	4,050,221
Fronius Backup Switch 1PN/3PN-63A	4,050,220

Status codes and remedy

Display

Status codes are displayed on the user interface of the inverter in the **System > Event Log** menu area or in the user menu under **Notifications** and in Fronius Solar.web*.

* If configured accordingly, see chapter [Fronius Solar.web](#) on page 24.

Status codes

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 primary device).



WARNING

Danger from work that is not carried out properly.

This can result in serious 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.

Technical data

Fronius Symo GEN24 3.0 SC / 3.0 Plus SC

DC input data	
MPP voltage range (at rated power)	115 - 800 V
Maximum connected load ($P_{PV \max}$)	
Total	4500 Wp
PV 1	4500 Wp
PV 2	4500 Wp
Maximum processable PV power	
Total	3150 Wp
PV 1	3150 Wp
PV 2	3150 Wp
Maximum input voltage (at 1000 W/m ² /-10 °C in an open circuit)	1000 V
Minimum input voltage	80 V
Feed-in start voltage in grid operation 5)	80 V
Maximum input current	
PV 1	14 A
PV 2	14 A
Maximum short circuit current for module array ($I_{SC \text{ PV}}$)	
PV 1	20 A
PV 2	20 A
Maximum total short circuit current for module array ($I_{SC \text{ PV1}} + I_{SC \text{ PV2}} = I_{SC \max}$)	40 A
Max. inverter backfeed current to the array ³⁾	
PV 1	20 A
PV 2	20 A
Number of inputs—PV 1	2
Number of inputs—PV 2	1
Maximum capacity of the PV generator or against ground	1000 nF
Limit value of the insulation resistance test between module array and ground (on delivery) ⁸⁾	100 kΩ
Adjustable range of insulation resistance test between module array and ground ⁷⁾	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

DC input data	
Limit value and trip time of continuous residual fault current monitoring (on delivery)	300/300 mA/ms
Adjustable range of continuous residual current monitoring ⁷⁾	30-300 mA
Cyclic repetition of the insulation resistance test (on delivery)	24 h
Adjustable range for cyclic repetition of the insulation resistance test	-

DC input data battery	
Maximum voltage	700 V
Minimum voltage	160 V
Maximum current	14 A
Maximum output	3300 W
DC inputs	1

AC input/output data	
Rated power (P_{nom})	3000 W
Maximum output power	3000 W
Rated apparent power	3000 VA
Nominal mains voltage	3 ~ NPE 220 V/380 V 3 ~ NPE 230 V/400 V
Grounding systems	TN-S (allowed) TN-C-S (allowed) IT (not allowed)
Minimum mains voltage	154 V ¹⁾
Maximum mains voltage	280 V ¹⁾
Maximum output current	8 A
Rated output current (at 230 V)	4.3 A
Current (inrush) ⁶⁾	9.9 A/4 ms
Nominal frequency	50/60 Hz ¹⁾
Initial symmetrical short-circuit current/phase I_K''	8 A
Total harmonic distortion	< 3.5%
Power factor $\cos \phi$ ²⁾	0-1 (adjustable) 0.7-1 (recommended)
Maximum permitted grid impedance Z_{max} on PCC ⁴⁾	None
Maximum output fault current / duration	7.5 A/157 ms

AC output data PV Point/PV Point Comfort	
Maximum output power	4133 W (for 5 s)
Nominal output power	3000 W
Rated output current	13 A
Nominal mains voltage	1 ~ NPE 220 V/230 V/240 V
Nominal frequency	53/63 Hz ¹⁾
Switching time	~ 15 s
Power factor cos phi ²⁾	0 - 1

General data	
Maximum efficiency	98.1%
Europ. efficiency (U _{mpp nom})	96.6%
Europ. efficiency (U _{mpp max})	95.8%
Europ. efficiency (U _{mpp min})	94.9%
Self-consumption at night	< 10 W
Cooling	Controlled forced-air ventilation
Ingress protection rating	IP 66
Dimensions H × W × D	530 × 474 × 165 mm
Weight	15.25 kg
Inverter topology	Non-insulated, no transformer
Permitted ambient temperature	-25 °C - +60 °C
Permissible humidity	0-100% (incl. condensation)
EMC emission class (in accordance with IEC 61000-6-2, IEC 61000-6-3)	B
DC/AC overvoltage category (in accordance with IEC 62109-1)	2/3
Pollution degree	2
Sound pressure level	36 dB(A) (ref. 20 µPA)
Protective class	1

Protective devices	
DC isolation measurement ⁹⁾	Warning/shutdown at R _{ISO} < 100 kOhm
Overload performance	Operating point shift, power limit
DC disconnect	Integrated
RCMU ⁹⁾	Integrated
RCMU classification	The software class of the safety platform(s) is defined as a class B control function (single-channel with periodic self-test) in accordance with IEC 60730 Annex H.

Protective devices	
Active anti-islanding method	Frequency point shift method
AFCI	Integrated
AFPE (AFCI) classification (according to IEC 63027) ⁹⁾	= F-I-AFPE-1-3-1 Full coverage Integrated AFPE 1 monitored string per input port 3 input ports per channel (MPP1: 2, MPP2: 1) 1 monitored channel

Data communication	
WiFi SMA-RP connection (FCC ID: QKWPILOT1/IC 12270A-PI-LOT1)	802.11b/g/n (WPA, WPA2) Frequency: 2.4 GHz
Ethernet (LAN)	RJ 45, 10/100 Mbit
Wired shutdown (WSD)	Max. 28 devices/WSD chain Max. distance between two devices = 100 m
Modbus RTU SunSpec (2x)	RS485 2-wire
Battery connection	Modbus O/RJ 45/12 V power supply
Voltage level of digital inputs	Low: min. 0 V-max. 1.8 V High: min. 4.5 V-max. 28.8 V
Input currents of digital inputs	depending on the input voltage; input resistance = 70 kOhm
Total power for digital output (with internal supply)	6 W at 12 V
Power per digital output (with external supply)	1 A at >12.5 V-24 V (max. 3 A in total)
Datalogger/web server	Integrated

**Fronius Symo
GEN24 6.0/6.0
Plus**

DC input data	
MPP voltage range (at rated power)	174 - 800 V
Maximum connected load ($P_{PV \max}$)	
Total	9000 Wp
PV 1	7500 Wp
PV 2	6500 Wp
Maximum processable PV power	
Total	6220 Wp
PV 1	6220 Wp
PV 2	6000 Wp
Maximum input voltage at 1000 W/m ² /-10 °C in an open circuit	1000 V

DC input data	
Feed-in start voltage in grid operation 5)	80 V
Maximum input current PV 1 PV 2	25.0 A 12.5 A
Maximum short circuit current for module array ($I_{SC\ PV}$) PV 1 PV 2	40 A 20 A
Maximum total short circuit current for module array ($I_{SC\ PV1} + I_{SC\ PV2} = I_{SC\ max}$)	60 A
Max. inverter backfeed current to the array 3) PV 1 PV 2	40 A 20 A
Number of inputs—PV 1	2
Number of inputs—PV 2	1
Maximum capacity of the PV generat- or against ground	1200 nF
Limit value of the insulation resist- ance test between module array and ground (on delivery) 10)	100 kΩ
Adjustable range of insulation resist- ance test between module array and ground 9)	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 continu- ous residual fault current monitoring (on delivery)	300/300 mA/ms
Adjustable range of continuous resid- ual current monitoring 9)	30-300 mA
Cyclic repetition of the insulation res- istance test (on delivery)	24 h
Adjustable range for cyclic repetition of the insulation resistance test	-

DC input data battery 8)	
Maximum voltage	700 V
Minimum voltage	160 V
Maximum current	22 A
Maximum output	6220 W
DC inputs	1

AC input/output data	
Rated power (P_{nom})	6000 W
Maximum output power	6000 W
Rated apparent power	6000 VA
Nominal mains voltage	3 ~ NPE 220 V/380 V 3 ~ NPE 230 V/400 V
Grounding systems	TN-S (allowed) TN-C-S (allowed) IT (not allowed)
Minimum mains voltage	154 V ¹⁾
Maximum mains voltage	280 V ¹⁾
Maximum output current	16.4 A
Rated output current (at 230 V)	8.7 A
Current (inrush) ⁶⁾	9.9 A/4 ms
Nominal frequency	50/60 Hz ¹⁾
Initial symmetrical short-circuit current/phase I_K''	16.4 A
Nominal frequency for Full Backup	53/63 Hz ¹⁾
Total harmonic distortion	< 3.5%
Power factor $\cos \phi$ ²⁾	0-1 (adjustable) 0.7-1 (recommended)
Maximum permitted grid impedance Z_{max} on PCC ⁴⁾	None
Maximum output fault current / duration	80.7 A/10 ms

AC output data PV Point/PV Point Comfort	
Maximum output power	4133 W (for 5 s)
Nominal output power	3000 W
Rated output current	13 A
Nominal mains voltage	1 ~ NPE 220 V/230 V/240 V
Nominal frequency	53/63 Hz ¹⁾
Switching time	~ 15 s
Power factor $\cos \phi$ ²⁾	0 - 1

AC output data Full Backup ⁸⁾	
Maximum output power	12,400 W (for 5 s)
Maximum output power (per phase)	4133 W (for 5 s)
Nominal output power	6000 W
Nominal output power (per phase) ⁷⁾	3680 W

AC output data Full Backup ⁸⁾	
Rated output current (per phase)	16 A
Nominal mains voltage	3 ~ NPE 220 V/380 V 3 ~ NPE 230 V/400 V
Nominal frequency for Full Backup	53/63 Hz ¹⁾
Switching time	~ 10 s
Switching time with Rapid switch mode	< 20 ms
Power factor cos phi ²⁾	0 - 1

General data	
Maximum efficiency	98.2%
Europ. efficiency (U _{mpp nom})	97.7%
Europ. efficiency (U _{mpp max})	97.3%
Europ. efficiency (U _{mpp min})	96.5%
Self-consumption at night	≤ 10 W
Cooling	Controlled forced-air ventilation
Ingress protection rating	IP 66
Dimensions H × W × D	595 × 529 × 180 mm
Weight	23.4 kg
Inverter topology	Non-insulated, no transformer
Permitted ambient temperature	-25 °C - +60 °C
Permissible humidity	0-100% (incl. condensation)
EMC emission class (in accordance with IEC 61000-6-2, IEC 61000-6-3)	B
DC/AC overvoltage category (in accordance with IEC 62109-1)	2/3
Pollution degree	2
Sound pressure level	47 dB(A) (ref. 20μPA)
Protective class	1

Protective devices	
DC isolation measurement	Warning/shutdown at R _{ISO} < 100 kOhm
Overload performance	Operating point shift, power limit
DC disconnect	Integrated
RCMU	Integrated

Protective devices	
RCMU classification	The software class of the safety platform(s) is defined as a class B control function (single-channel with periodic self-test) in accordance with IEC 60730 Annex H.
Active anti-islanding method	Frequency point shift method

Data communication	
WiFi SMA-RP connection (FCC ID: QKWPILOT1/IC 12270A-PILOT1)	802.11b/g/n (WPA, WPA2) Frequency: 2.4 GHz
Ethernet (LAN)	RJ 45, 10/100 Mbit
Wired shutdown (WSD)	Max. 28 devices/WSD chain Max. distance between two devices = 100 m
Modbus RTU SunSpec (2x)	RS485 2-wire
Battery connection	Modbus O/RJ 45/12 V power supply
Voltage level of digital inputs	Low: min. 0 V-max. 1.8 V High: min. 4.5 V-max. 28.8 V
Input currents of digital inputs	depending on the input voltage; input resistance = 70 kOhm
Total power for digital output (with internal supply)	6 W at 12 V
Power per digital output (with external supply)	1 A at >12.5 V-24 V (max. 3 A in total)
Datalogger/web server	Integrated

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DC input data	
MPP voltage range (at rated power)	148 - 800 V
Maximum connected load ($P_{PV \max}$) Total PV 1 PV 2	9000 Wp 7500 Wp 7500 Wp
Maximum processable PV power Total PV 1 PV 2	6180 Wp 6180 Wp 6180 Wp
Maximum input voltage (at 1000 W/m ² /-10 °C in an open circuit)	1000 V
Minimum input voltage	80 V
Feed-in start voltage in grid operation 5)	80 V

DC input data	
Maximum input current PV 1 PV 2	28.0 A 14.0 A
Maximum short circuit current for module array ($I_{SC\ PV}$) PV 1 PV 2	40 A 20 A
Maximum total short circuit current for module array ($I_{SC\ PV1} + I_{SC\ PV2} = I_{SC\ max}$)	60 A
Max. inverter backfeed current to the array ³⁾ PV 1 PV 2	40 A 20 A
Number of inputs—PV 1	2
Number of inputs—PV 2	1
Maximum capacity of the PV generat- or against ground Total PV 1 PV 2	1200 nF 1000 nF 1000 nF
Limit value of the insulation resist- ance test between module array and ground (on delivery) ¹⁰⁾	100 kΩ
Adjustable range of insulation resist- ance test between module array and ground ⁹⁾	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 continu- ous residual fault current monitoring (on delivery)	300/300 mA/ms
Adjustable range of continuous resid- ual current monitoring ⁹⁾	30-300 mA
Cyclic repetition of the insulation res- istance test (on delivery)	24 h
Adjustable range for cyclic repetition of the insulation resistance test	-

DC input data battery ⁸⁾	
Maximum voltage	700 V
Minimum voltage	160 V
Maximum current	22 A
Maximum output	6220 W
DC inputs	1

AC input/output data	
Rated power (P_{nom})	6000 W
Maximum output power	6000 W
Rated apparent power	6000 VA
Nominal mains voltage	3 ~ NPE 220 V/380 V 3 ~ NPE 230 V/400 V
Grounding systems	TN-S (allowed) TN-C-S (allowed) IT (not allowed)
Minimum mains voltage	154 V ¹⁾
Maximum mains voltage	280 V ¹⁾
Maximum output current	18.5 A
Rated output current (at 230 V)	8.7 A
Current (inrush) ⁶⁾	9.9 A/4 ms
Nominal frequency	50/60 Hz ¹⁾
Initial symmetrical short-circuit current/phase I_K''	18.5 A
Nominal frequency for Full Backup	53/63 Hz ¹⁾
Total harmonic distortion	< 3.5%
Power factor $\cos \phi$ ²⁾	0-1 (adjustable) 0.7-1 (recommended)
Maximum permitted grid impedance Z_{max} on PCC ⁴⁾	None
Maximum output fault current / duration	80.7 A/10 ms

AC output data PV Point/PV Point Comfort	
Maximum output power	4255 W (for 5 s)
Nominal output power	3000 W
Rated output current	13 A
Nominal mains voltage	1 ~ NPE 220 V/230 V/240 V
Nominal frequency	53/63 Hz ¹⁾
Switching time	~ 15 s
Power factor $\cos \phi$ ²⁾	0 - 1

AC output data Full Backup ⁸⁾	
Maximum output power	12,765 W (for 5 s)
Maximum output power (per phase)	4255 W (for 5 s)
Nominal output power	6000 W
Nominal output power (per phase) ⁷⁾	4133 W
Rated output current (per phase)	16 A

AC output data Full Backup ⁸⁾	
Nominal mains voltage	3 ~ NPE 220 V/380 V 3 ~ NPE 230 V/400 V
Nominal frequency for Full Backup	53/63 Hz ¹⁾
Switching time	~ 10 s
Switching time with Rapid switch mode	< 20 ms
Power factor cos phi ²⁾	0 - 1

General data	
Maximum efficiency	98.3%
Europ. efficiency (U _{mpp nom})	97.9%
Europ. efficiency (U _{mpp max})	97.6%
Europ. efficiency (U _{mpp min})	96.3%
Self-consumption at night	≤ 10 W
Cooling	Controlled forced-air ventilation
Ingress protection rating	IP 66
Dimensions H × W × D	595 × 529 × 180 mm
Weight	22.8 kg
Inverter topology	Non-insulated, no transformer
Permitted ambient temperature	-25 °C - +60 °C
Permissible humidity	0-100% (incl. condensation)
EMC emission class (in accordance with IEC 61000-6-2, IEC 61000-6-3)	B
DC/AC overvoltage category (in accordance with IEC 62109-1)	2/3
Pollution degree	2
Sound pressure level	47 dB(A) (ref. 20 µPA)
Protective class	1

Protective devices	
DC isolation measurement ¹¹⁾	Warning/shutdown at R _{ISO} < 100 kOhm
Overload performance	Operating point shift, power limit
DC disconnect	Integrated
RCMU ¹¹⁾	Integrated
RCMU classification	The software class of the safety platform(s) is defined as a class B control function (single-channel with periodic self-test) in accordance with IEC 60730 Annex H.
Active anti-islanding method	Frequency point shift method

Protective devices	
AFCI	Integrated
AFPE (AFCI) classification (according to IEC 63027) ¹¹⁾	= F-I-AFPE-1-3-1 Full coverage Integrated AFPE 1 monitored string per input port 3 input ports per channel (MPP1: 2, MPP2: 1) 1 monitored channel

Data communication	
WiFi SMA-RP connection (FCC ID: QKWPILOT1/IC 12270A-PI-LOT1)	802.11b/g/n (WPA, WPA2) Frequency: 2.4 GHz
Ethernet (LAN)	RJ 45, 10/100 Mbit
Wired shutdown (WSD)	Max. 28 devices/WSD chain Max. distance between two devices = 100 m
Modbus RTU SunSpec (2x)	RS485 2-wire
Battery connection	Modbus O/RJ 45/12 V power supply
Voltage level of digital inputs	Low: min. 0 V-max. 1.8 V High: min. 4.5 V-max. 28.8 V
Input currents of digital inputs	depending on the input voltage; input resistance = 70 kOhm
Total power for digital output (with internal supply)	6 W at 12 V
Power per digital output (with external supply)	1 A at >12.5 V-24 V (max. 3 A in total)
Datalogger/web server	Integrated

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DC input data	
MPP voltage range (at rated power)	224 - 800 V
Maximum connected load ($P_{PV \max}$)	
Total	12,000 Wp
PV 1	10,000 Wp
PV 2	7000 Wp
Maximum processable PV power	
Total	8260 Wp
PV 1	8260 Wp
PV 2	6000 Wp
Maximum input voltage at 1000 W/m ² /-10 °C in an open circuit	1000 V
Feed-in start voltage in grid operation 5)	80 V

DC input data	
Maximum input current PV 1 PV 2	25.0 A 12.5 A
Maximum short circuit current for module array ($I_{SC\ PV}$) PV 1 PV 2	40 A 20 A
Maximum total short circuit current for module array ($I_{SC\ PV1} + I_{SC\ PV2} = I_{SC\ max}$)	60 A
Max. inverter backfeed current to the array ³⁾ PV 1 PV 2	40 A 20 A
Number of inputs—PV 1	2
Number of inputs—PV 2	1
Maximum capacity of the PV generat- or against ground	1600 nF
Limit value of the insulation resist- ance test between module array and ground (on delivery) ¹⁰⁾	100 kΩ
Adjustable range of insulation resist- ance test between module array and ground ⁹⁾	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 continu- ous residual fault current monitoring (on delivery)	300/300 mA/ms
Adjustable range of continuous resid- ual current monitoring ⁹⁾	30-300 mA
Cyclic repetition of the insulation res- istance test (on delivery)	24 h
Adjustable range for cyclic repetition of the insulation resistance test	-

DC input data battery ⁸⁾	
Maximum voltage	700 V
Minimum voltage	160 V
Maximum current	22 A
Maximum output	8260 W
DC inputs	1

AC input/output data	
Rated power (P_{nom})	8000 W

AC input/output data	
Maximum output power	8000 W
Rated apparent power	8000 VA
Nominal mains voltage	3 ~ NPE 220 V/380 V 3 ~ NPE 230 V/400 V
Grounding systems	TN-S (allowed) TN-C-S (allowed) IT (not allowed)
Minimum mains voltage	154 V ¹⁾
Maximum mains voltage	280 V ¹⁾
Maximum output current	16.4 A
Rated output current (at 230 V)	11.6 A
Current (inrush) ⁶⁾	9.9 A/4 ms
Nominal frequency	50/60 Hz ¹⁾
Initial symmetrical short-circuit current/phase I_K''	16.4 A
Nominal frequency for Full Backup	53/63 Hz ¹⁾
Total harmonic distortion	< 3.5%
Power factor cos phi ²⁾	0-1 (adjustable) 0.7-1 (recommended)
Maximum permitted grid impedance Z_{max} on PCC ⁴⁾	None
Maximum output fault current / duration	80.7 A/10 ms

AC output data PV Point/PV Point Comfort	
Maximum output power	4133 W (for 5 s)
Nominal output power	3000 W
Rated output current	13 A
Nominal mains voltage	1 ~ NPE 220 V/230 V/240 V
Nominal frequency	53/63 Hz ¹⁾
Switching time	~ 15 s
Power factor cos phi ²⁾	0 - 1

AC output data Full Backup ⁸⁾	
Maximum output power	12,400 W (for 5 s)
Maximum output power (per phase)	4133 W (for 5 s)
Nominal output power	8000 W
Nominal output power (per phase) ⁷⁾	3680 W
Rated output current (per phase)	16 A

AC output data Full Backup ⁸⁾	
Nominal mains voltage	3 ~ NPE 220 V/380 V 3 ~ NPE 230 V/400 V
Nominal frequency for Full Backup	53/63 Hz ¹⁾
Switching time	~ 10 s
Switching time with Rapid switch mode	< 20 ms
Power factor cos phi ²⁾	0 - 1

General data	
Maximum efficiency	98.2%
Europ. efficiency (U _{mpp nom})	97.8%
Europ. efficiency (U _{mpp max})	97.5%
Europ. efficiency (U _{mpp min})	96.9%
Self-consumption at night	≤ 10 W
Cooling	Controlled forced-air ventilation
Ingress protection rating	IP 66
Dimensions H × W × D	595 × 529 × 180 mm
Weight	23.4 kg
Inverter topology	Non-insulated, no transformer
Permitted ambient temperature	-25 °C - +60 °C
Permissible humidity	0-100% (incl. condensation)
EMC emission class (in accordance with IEC 61000-6-2, IEC 61000-6-3)	B
DC/AC overvoltage category (in accordance with IEC 62109-1)	2/3
Pollution degree	2
Sound pressure level	47 dB(A) (ref. 20μPA)
Protective class	1

Protective devices	
DC isolation measurement	Warning/shutdown at R _{ISO} < 100 kOhm
Overload performance	Operating point shift, power limit
DC disconnect	Integrated
RCMU	Integrated
RCMU classification	The software class of the safety platform(s) is defined as a class B control function (single-channel with periodic self-test) in accordance with IEC 60730 Annex H.
Active anti-islanding method	Frequency point shift method

Data communication	
WiFi SMA-RP connection (FCC ID: QKWPILOT1/IC 12270A-PI-LOT1)	802.11b/g/n (WPA, WPA2) Frequency: 2.4 GHz
Ethernet (LAN)	RJ 45, 10/100 Mbit
Wired shutdown (WSD)	Max. 28 devices/WSD chain Max. distance between two devices = 100 m
Modbus RTU SunSpec (2x)	RS485 2-wire
Battery connection	Modbus O/RJ 45/12 V power supply
Voltage level of digital inputs	Low: min. 0 V-max. 1.8 V High: min. 4.5 V-max. 28.8 V
Input currents of digital inputs	depending on the input voltage; input resistance = 70 kOhm
Total power for digital output (with internal supply)	6 W at 12 V
Power per digital output (with external supply)	1 A at >12.5 V-24 V (max. 3 A in total)
Datalogger/web server	Integrated

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8.0 Plus SC**

DC input data	
MPP voltage range (at rated power)	197 - 800 V
Maximum connected load ($P_{PV \max}$) Total PV 1 PV 2	12,000 Wp 10,000 Wp 8500 Wp
Maximum processable PV power Total PV 1 PV 2	8240 Wp 8240 Wp 8240 Wp
Maximum input voltage (at 1000 W/m ² /-10 °C in an open circuit)	1000 V
Minimum input voltage	80 V
Feed-in start voltage in grid operation 5)	80 V
Maximum input current PV 1 PV 2	28.0 A 14.0 A
Maximum short circuit current for module array ($I_{SC \text{ PV}}$) PV 1 PV 2	40 A 20 A

DC input data	
Maximum total short circuit current for module array ($I_{SC\ PV1} + I_{SC\ PV2} = I_{SC\ max}$)	60 A
Max. inverter backfeed current to the array ³⁾ PV 1 PV 2	40 A 20 A
Number of inputs—PV 1	2
Number of inputs—PV 2	1
Maximum capacity of the PV generator against ground Total PV 1 PV 2	1600 nF 1330 nF 1130 nF
Limit value of the insulation resistance test between module array and ground (on delivery) ¹⁰⁾	100 k Ω
Adjustable range of insulation resistance test between module array and ground ⁹⁾	10-10,000 k Ω
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)	300/300 mA/ms
Adjustable range of continuous residual current monitoring ⁹⁾	30-300 mA
Cyclic repetition of the insulation resistance test (on delivery)	24 h
Adjustable range for cyclic repetition of the insulation resistance test	-

DC input data battery ⁸⁾	
Maximum voltage	700 V
Minimum voltage	160 V
Maximum current	22 A
Maximum output	8260 W
DC inputs	1

AC input/output data	
Rated power (P_{nom})	8000 W
Maximum output power	8000 W
Rated apparent power	8000 VA
Nominal mains voltage	3 ~ NPE 220 V/380 V 3 ~ NPE 230 V/400 V

AC input/output data	
Grounding systems	TN-S (allowed) TN-C-S (allowed) IT (not allowed)
Minimum mains voltage	154 V ¹⁾
Maximum mains voltage	280 V ¹⁾
Maximum output current	18.5 A
Rated output current (at 230 V)	11.6 A
Current (inrush) ⁶⁾	9.9 A/4 ms
Nominal frequency	50/60 Hz ¹⁾
Initial symmetrical short-circuit current/phase $I_{K''}$	18.5 A
Nominal frequency for Full Backup	53/63 Hz ¹⁾
Total harmonic distortion	< 3.5%
Power factor $\cos \phi$ ²⁾	0-1 (adjustable) 0.7-1 (recommended)
Maximum permitted grid impedance $Z_{\max}$ on PCC ⁴⁾	None
Maximum output fault current / duration	80.7 A/10 ms

AC output data PV Point/PV Point Comfort	
Maximum output power	4255 W (for 5 s)
Nominal output power	3000 W
Rated output current	13 A
Nominal mains voltage	1 ~ NPE 220 V/230 V/240 V
Nominal frequency	53/63 Hz ¹⁾
Switching time	~ 15 s
Power factor $\cos \phi$ ²⁾	0 - 1

AC output data Full Backup ⁸⁾	
Maximum output power	12,765 W (for 5 s)
Maximum output power (per phase)	4255 W (for 5 s)
Nominal output power	8000 W
Nominal output power (per phase) ⁷⁾	4133 W
Rated output current (per phase)	16 A
Nominal mains voltage	3 ~ NPE 220 V/380 V 3 ~ NPE 230 V/400 V
Nominal frequency for Full Backup	53/63 Hz ¹⁾
Switching time	~ 10 s
Switching time with Rapid switch mode	< 20 ms

AC output data Full Backup ⁸⁾	
Power factor cos phi ²⁾	0 - 1

General data	
Maximum efficiency	98.3%
Europ. efficiency (U _{mpp nom})	98.0%
Europ. efficiency (U _{mpp max})	97.8%
Europ. efficiency (U _{mpp min})	96.7%
Self-consumption at night	≤ 10 W
Cooling	Controlled forced-air ventilation
Ingress protection rating	IP 66
Dimensions H × W × D	595 × 529 × 180 mm
Weight	22.8 kg
Inverter topology	Non-insulated, no transformer
Permitted ambient temperature	-25 °C - +60 °C
Permissible humidity	0-100% (incl. condensation)
EMC emission class (in accordance with IEC 61000-6-2, IEC 61000-6-3)	B
DC/AC overvoltage category (in accordance with IEC 62109-1)	2/3
Pollution degree	2
Sound pressure level	47 dB(A) (ref. 20 µPA)
Protective class	1

Protective devices	
DC isolation measurement	Warning/shutdown at R _{ISO} < 100 kOhm
Overload performance	Operating point shift, power limit
DC disconnecter	Integrated
RCMU	Integrated
RCMU classification	The software class of the safety platform(s) is defined as a class B control function (single-channel with periodic self-test) in accordance with IEC 60730 Annex H.
Active anti-islanding method	Frequency point shift method
AFCI	Integrated

Protective devices	
AFPE (AFCI) classification (according to IEC 63027) ¹¹⁾	= F-I-AFPE-1-3-1 Full coverage Integrated AFPE 1 monitored string per input port 3 input ports per channel (MPP1: 2, MPP2: 1) 1 monitored channel

Data communication	
WiFi SMA-RP connection (FCC ID: QKWPILOT1/IC 12270A-PI-LOT1)	802.11b/g/n (WPA, WPA2) Frequency: 2.4 GHz
Ethernet (LAN)	RJ 45, 10/100 Mbit
Wired shutdown (WSD)	Max. 28 devices/WSD chain Max. distance between two devices = 100 m
Modbus RTU SunSpec (2x)	RS485 2-wire
Battery connection	Modbus O/RJ 45/12 V power supply
Voltage level of digital inputs	Low: min. 0 V-max. 1.8 V High: min. 4.5 V-max. 28.8 V
Input currents of digital inputs	depending on the input voltage; input resistance = 70 kOhm
Total power for digital output (with internal supply)	6 W at 12 V
Power per digital output (with external supply)	1 A at >12.5 V-24 V (max. 3 A in total)
Datalogger/web server	Integrated

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Plus**

DC input data	
MPP voltage range (at rated power)	278 - 800 V
Maximum connected load ($P_{PV \max}$) Total PV 1 PV 2	15,000 Wp 12,500 Wp 7500 Wp
Maximum processable PV power Total PV 1 PV 2	10,300 Wp 10,300 Wp 6000 Wp
Maximum input voltage (at 1000 W/m ² /-10 °C in an open circuit)	1000 V
Feed-in start voltage in grid operation ⁵⁾	80 V

DC input data	
Maximum input current PV 1 PV 2	25.0 A 12.5 A
Maximum short circuit current for module array ($I_{SC\ PV}$) PV 1 PV 2	40 A 20 A
Maximum total short circuit current for module array ($I_{SC\ PV1} + I_{SC\ PV2} = I_{SC\ max}$)	60 A
Max. inverter backfeed current to the array ³⁾ PV 1 PV 2	40 A 20 A
Number of inputs—PV 1	2
Number of inputs—PV 2	1
Maximum capacity of the PV generat- or against ground	2000 nF
Limit value of the insulation resist- ance test between module array and ground (on delivery) ¹⁰⁾	100 kΩ
Adjustable range of insulation resist- ance test between module array and ground ⁹⁾	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 continu- ous residual fault current monitoring (on delivery)	300/300 mA/ms
Adjustable range of continuous resid- ual current monitoring ⁹⁾	30-300 mA
Cyclic repetition of the insulation res- istance test (on delivery)	24 h
Adjustable range for cyclic repetition of the insulation resistance test	-

DC input data battery ⁸⁾	
Maximum voltage	700 V
Minimum voltage	160 V
Maximum current	22 A
Maximum output	10,300 W
DC inputs	1

AC input/output data	
Rated power (P_{nom})	10,000 W

AC input/output data	
Maximum output power	10,000 W
Rated apparent power	10,000 VA
Nominal mains voltage	3 ~ NPE 220 V/380 V 3 ~ NPE 230 V/400 V
Minimum mains voltage	154 V ¹⁾
Maximum mains voltage	280 V ¹⁾
Maximum output current	16.4 A
Rated output current (at 230 V)	14.5 A
Current (inrush) ⁶⁾	9.9 A/4 ms
Nominal frequency	50/60 Hz ¹⁾
Initial symmetrical short-circuit current/phase I_K''	16.4 A
Nominal frequency for Full Backup	53/63 Hz ¹⁾
Total harmonic distortion	< 3.5%
Power factor cos phi ²⁾	0-1 (adjustable) 0.7-1 (recommended)
Maximum permitted grid impedance Z_{max} on PCC ⁴⁾	None
Maximum output fault current / duration	80.7 A/10 ms

AC output data PV Point/PV Point Comfort	
Maximum output power	4133 W (for 5 s)
Nominal output power	3000 W
Rated output current	13 A
Nominal mains voltage	1 ~ NPE 220 V/230 V/240 V
Nominal frequency	53/63 Hz ¹⁾
Switching time	~ 15 s
Power factor cos phi ²⁾	0 - 1

AC output data Full Backup ⁸⁾	
Maximum output power	12,400 W (for 5 s)
Maximum output power (per phase)	4133 W (for 5 s)
Nominal output power	10,000 W
Nominal output power (per phase) ⁷⁾	3680 W
Rated output current (per phase)	16 A
Nominal mains voltage	3 ~ NPE 220 V/380 V 3 ~ NPE 230 V/400 V

AC output data Full Backup ⁸⁾	
Nominal frequency for Full Backup	53/63 Hz ¹⁾
Switching time	~ 10 s
Switching time with Rapid switch mode	< 20 ms
Power factor cos phi ²⁾	0 - 1

General data	
Maximum efficiency	98.2%
Europ. efficiency (U _{mpp nom})	97.9%
Europ. efficiency (U _{mpp max})	97.7%
Europ. efficiency (U _{mpp min})	97.1%
Self-consumption at night	≤ 10 W
Cooling	Controlled forced-air ventilation
Ingress protection rating	IP 66
Dimensions H × W × D	595 × 529 × 180 mm
Weight	23.4 kg
Inverter topology	Non-insulated, no transformer
Permitted ambient temperature	-25 °C - +60 °C
Permissible humidity	0-100% (incl. condensation)
EMC emission class (in accordance with IEC 61000-6-2, IEC 61000-6-3)	B
DC/AC overvoltage category (in accordance with IEC 62109-1)	2/3
Pollution degree	2
Sound pressure level	47 dB(A) (ref. 20μPA)
Protective class	1

Protective devices	
DC isolation measurement	Warning/shutdown at R _{ISO} < 100 kOhm
Overload performance	Operating point shift, power limit
DC disconnect	Integrated
RCMU	Integrated
RCMU classification	The software class of the safety platform(s) is defined as a class B control function (single-channel with periodic self-test) in accordance with IEC 60730 Annex H.
Active anti-islanding method	Frequency point shift method

Data communication	
WiFi SMA-RP connection (FCC ID: QKWPILOT1/IC 12270A-PI-LOT1)	802.11b/g/n (WPA, WPA2) Frequency: 2.4 GHz
Ethernet (LAN)	RJ 45, 10/100 Mbit
Wired shutdown (WSD)	Max. 28 devices/WSD chain Max. distance between two devices = 100 m
Modbus RTU SunSpec (2x)	RS485 2-wire
Battery connection	Modbus O/RJ 45/12 V power supply
Voltage level of digital inputs	Low: min. 0 V-max. 1.8 V High: min. 4.5 V-max. 28.8 V
Input currents of digital inputs	depending on the input voltage; input resistance = 70 kOhm
Total power for digital output (with internal supply)	6 W at 12 V
Power per digital output (with external supply)	1 A at >12.5 V-24 V (max. 3 A in total)
Datalogger/web server	Integrated

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10.0 Plus SC**

DC input data	
MPP voltage range (at rated power)	246 - 800 V
Maximum connected load ($P_{PV \max}$) Total PV 1 PV 2	15,000 Wp 12,500 Wp 9000 Wp
Maximum processable PV power Total PV 1 PV 2	10,300 Wp 10,300 Wp 8600 Wp
Maximum input voltage (at 1000 W/m ² /-10 °C in an open circuit)	1000 V
Minimum input voltage	80 V
Feed-in start voltage in grid operation 5)	80 V
Maximum input current PV 1 PV 2	28.0 A 14.0 A
Maximum short circuit current for module array ($I_{SC \text{ PV}}$) PV 1 PV 2	40 A 20 A

DC input data	
Maximum total short circuit current for module array ($I_{SC\ PV1} + I_{SC\ PV2} = I_{SC\ max}$)	60 A
Max. inverter backfeed current to the array ³⁾ PV 1 PV 2	40 A 20 A
Number of inputs—PV 1	2
Number of inputs—PV 2	1
Maximum capacity of the PV generator against ground Total PV 1 PV 2	2000 nF 1660 nF 1200 nF
Limit value of the insulation resistance test between module array and ground (on delivery) ¹⁰⁾	100 kΩ
Adjustable range of insulation resistance test between module array and ground ⁹⁾	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)	300/300 mA/ms
Adjustable range of continuous residual current monitoring ⁹⁾	30-300 mA
Cyclic repetition of the insulation resistance test (on delivery)	24 h
Adjustable range for cyclic repetition of the insulation resistance test	-

DC input data battery ⁸⁾	
Maximum voltage	700 V
Minimum voltage	160 V
Maximum current	22 A
Maximum output	10,300 W
DC inputs	1

AC input/output data	
Rated power (P_{nom})	10,000 W
Maximum output power	10,000 W
Rated apparent power	10,000 VA
Nominal mains voltage	3 ~ NPE 220 V/380 V 3 ~ NPE 230 V/400 V

AC input/output data	
Grounding systems	TN-S (allowed) TN-C-S (allowed) IT (not allowed)
Minimum mains voltage	154 V ¹⁾
Maximum mains voltage	280 V ¹⁾
Maximum output current	18.5 A
Rated output current (at 230 V)	14.5 A
Current (inrush) ⁶⁾	9.9 A/4 ms
Nominal frequency	50/60 Hz ¹⁾
Initial symmetrical short-circuit current/phase I_K''	18.5 A
Nominal frequency for Full Backup	53/63 Hz ¹⁾
Total harmonic distortion	< 3.5%
Power factor cos phi ²⁾	0-1 (adjustable) 0.7-1 (recommended)
Maximum permitted grid impedance Z_{max} on PCC ⁴⁾	None
Maximum output fault current / duration	80.7 A/10 ms

AC output data PV Point/PV Point Comfort	
Maximum output power	4255 W (for 5 s)
Nominal output power	3000 W
Rated output current	13 A
Nominal mains voltage	1 ~ NPE 220 V/230 V/240 V
Nominal frequency	53/63 Hz ¹⁾
Switching time	~ 15 s
Power factor cos phi ²⁾	0 - 1

AC output data Full Backup ⁸⁾	
Maximum output power	12,765 W (for 5 s)
Maximum output power (per phase)	4255 W (for 5 s)
Nominal output power	10,000 W
Nominal output power (per phase) ⁷⁾	4133 W
Rated output current (per phase)	16 A
Nominal mains voltage	3 ~ NPE 220 V/380 V 3 ~ NPE 230 V/400 V
Nominal frequency for Full Backup	53/63 Hz ¹⁾
Switching time	~ 10 s
Switching time with Rapid switch mode	< 20 ms

AC output data Full Backup ⁸⁾	
Power factor cos phi ²⁾	0 - 1

General data	
Maximum efficiency	98.3%
Europ. efficiency (U _{mpp nom})	98.1%
Europ. efficiency (U _{mpp max})	97.9%
Europ. efficiency (U _{mpp min})	97.0%
Self-consumption at night	≤ 10 W
Cooling	Controlled forced-air ventilation
Ingress protection rating	IP 66
Dimensions H × W × D	595 × 529 × 180 mm
Weight	22.8 kg
Inverter topology	Non-insulated, no transformer
Permitted ambient temperature	-25 °C - +60 °C
Permissible humidity	0-100% (incl. condensation)
EMC emission class (in accordance with IEC 61000-6-2, IEC 61000-6-3)	B
DC/AC overvoltage category (in accordance with IEC 62109-1)	2/3
Pollution degree	2
Sound pressure level	47 dB(A) (ref. 20 µPA)
Protective class	1

Protective devices	
DC isolation measurement	Warning/shutdown at R _{ISO} < 100 kOhm
Overload performance	Operating point shift, power limit
DC disconnecter	Integrated
RCMU	Integrated
RCMU classification	The software class of the safety platform(s) is defined as a class B control function (single-channel with periodic self-test) in accordance with IEC 60730 Annex H.
Active anti-islanding method	Frequency point shift method
AFCI	Integrated

Protective devices	
AFPE (AFCI) classification (according to IEC 63027) ¹¹⁾	= F-I-AFPE-1-3-1 Full coverage Integrated AFPE 1 monitored string per input port 3 input ports per channel (MPP1: 2, MPP2: 1) 1 monitored channel

Data communication	
WiFi SMA-RP connection (FCC ID: QKWPILOT1/IC 12270A-PI-LOT1)	802.11b/g/n (WPA, WPA2) Frequency: 2.4 GHz
Ethernet (LAN)	RJ 45, 10/100 Mbit
Wired shutdown (WSD)	Max. 28 devices/WSD chain Max. distance between two devices = 100 m
Modbus RTU SunSpec (2x)	RS485 2-wire
Battery connection	Modbus O/RJ 45/12 V power supply
Voltage level of digital inputs	Low: min. 0 V-max. 1.8 V High: min. 4.5 V-max. 28.8 V
Input currents of digital inputs	depending on the input voltage; input resistance = 70 kOhm
Total power for digital output (with internal supply)	6 W at 12 V
Power per digital output (with external supply)	1 A at >12.5 V-24 V (max. 3 A in total)
Datalogger/web server	Integrated

**Fronius Symo
GEN24 10.0 SC/
10.0 Plus SC
(Australia only)**

DC input data	
MPP voltage range (at rated power)	246 - 800 V
Maximum connected load ($P_{PV\ max}$) Total PV 1 PV 2	15,000 Wp 12,500 Wp 9000 Wp
Maximum processable PV power Total PV 1 PV 2	10,300 Wp 10,300 Wp 8600 Wp
Maximum input voltage (at 1000 W/m ² /-10 °C in an open circuit)	1000 V
Minimum input voltage	80 V
Feed-in start voltage in grid operation ⁵⁾	80 V

DC input data	
Maximum input current PV 1 PV 2	28.0 A 14.0 A
Maximum short circuit current for module array ($I_{SC\ PV}$) PV 1 PV 2	40 A 20 A
Maximum total short circuit current for module array ($I_{SC\ PV1} + I_{SC\ PV2} = I_{SC\ max}$)	60 A
Max. inverter backfeed current to the array ³⁾ PV 1 PV 2	40 A 20 A
Number of inputs—PV 1	2
Number of inputs—PV 2	1
Maximum capacity of the PV generator against ground Total PV 1 PV 2	2000 nF 1660 nF 1200 nF
Limit value of the insulation resistance test between module array and ground (on delivery) ¹⁰⁾	100 k Ω
Adjustable range of insulation resistance test between module array and ground ⁹⁾	10-10,000 k Ω
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)	300/300 mA/ms
Adjustable range of continuous residual current monitoring ⁹⁾	30-300 mA
Cyclic repetition of the insulation resistance test (on delivery)	24 h
Adjustable range for cyclic repetition of the insulation resistance test	-

DC input data battery ⁸⁾	
Maximum voltage	700 V
Minimum voltage	160 V
Maximum current	22 A
Maximum output	10,300 W
DC inputs	1

AC input/output data	
Rated power (P_{nom})	9999 W
Maximum output power	9999 W
Rated apparent power	9999 VA
Nominal mains voltage	3 ~ NPE 220 V/380 V 3 ~ NPE 230 V/400 V
Grounding systems	TN-S (allowed) TN-C-S (allowed) IT (not allowed)
Minimum mains voltage	154 V ¹⁾
Maximum mains voltage	280 V ¹⁾
Maximum output current	18.5 A
Rated output current (at 230 V)	14.5 A
Current (inrush) ⁶⁾	9.9 A/4 ms
Nominal frequency	50/60 Hz ¹⁾
Initial symmetrical short-circuit current/phase I_K''	18.5 A
Nominal frequency for Full Backup	53/63 Hz ¹⁾
Total harmonic distortion	< 3.5%
Power factor $\cos \phi$ ²⁾	0-1 (adjustable) 0.7-1 (recommended)
Maximum permitted grid impedance Z_{max} on PCC ⁴⁾	None
Maximum output fault current / duration	80.7 A/10 ms

AC output data PV Point/PV Point Comfort	
Maximum output power	4255 W (for 5 s)
Nominal output power	3000 W
Rated output current	13 A
Nominal mains voltage	1 ~ NPE 220 V/230 V/240 V
Nominal frequency	53/63 Hz ¹⁾
Switching time	~ 15 s
Power factor $\cos \phi$ ²⁾	0 - 1

AC output data Full Backup ⁸⁾	
Maximum output power	12,765 W (for 5 s)
Maximum output power (per phase)	4255 W (for 5 s)
Nominal output power	9999 W
Nominal output power (per phase) ⁷⁾	4133 W
Rated output current (per phase)	16 A

AC output data Full Backup ⁸⁾	
Nominal mains voltage	3 ~ NPE 220 V/380 V 3 ~ NPE 230 V/400 V
Nominal frequency for Full Backup	53/63 Hz ¹⁾
Switching time	~ 10 s
Switching time with Rapid switch mode	< 20 ms
Power factor cos phi ²⁾	0 - 1

General data	
Maximum efficiency	98.3%
Europ. efficiency (U _{mpp nom})	98.1%
Europ. efficiency (U _{mpp max})	97.9%
Europ. efficiency (U _{mpp min})	97.0%
Self-consumption at night	≤ 10 W
Cooling	Controlled forced-air ventilation
Ingress protection rating	IP 66
Dimensions H × W × D	595 × 529 × 180 mm
Weight	22.8 kg
Inverter topology	Non-insulated, no transformer
Permitted ambient temperature	-25 °C - +60 °C
Permissible humidity	0-100% (incl. condensation)
EMC emission class (in accordance with IEC 61000-6-2, IEC 61000-6-3)	B
DC/AC overvoltage category (in accordance with IEC 62109-1)	2/3
Pollution degree	2
Sound pressure level	47 dB(A) (ref. 20 µPA)
Protective class	1

Protective devices	
DC isolation measurement	Warning/shutdown at R _{ISO} < 100 kOhm
Overload performance	Operating point shift, power limit
DC disconnect	Integrated
RCMU	Integrated
RCMU classification	The software class of the safety platform(s) is defined as a class B control function (single-channel with periodic self-test) in accordance with IEC 60730 Annex H.
Active anti-islanding method	Frequency point shift method

Protective devices	
AFCI	Integrated
AFPE (AFCI) classification (according to IEC 63027) ¹¹⁾	= F-I-AFPE-1-3-1 Full coverage Integrated AFPE 1 monitored string per input port 3 input ports per channel (MPP1: 2, MPP2: 1) 1 monitored channel

Data communication	
WiFi SMA-RP connection (FCC ID: QKWPILOT1/IC 12270A-PI-LOT1)	802.11b/g/n (WPA, WPA2) Frequency: 2.4 GHz
Ethernet (LAN)	RJ 45, 10/100 Mbit
Wired shutdown (WSD)	Max. 28 devices/WSD chain Max. distance between two devices = 100 m
Modbus RTU SunSpec (2x)	RS485 2-wire
Battery connection	Modbus O/RJ 45/12 V power supply
Voltage level of digital inputs	Low: min. 0 V-max. 1.8 V High: min. 4.5 V-max. 28.8 V
Input currents of digital inputs	depending on the input voltage; input resistance = 70 kOhm
Total power for digital output (with internal supply)	6 W at 12 V
Power per digital output (with external supply)	1 A at >12.5 V-24 V (max. 3 A in total)
Datalogger/web server	Integrated

**Fronius Symo
GEN24 12.0 SC /
12.0 Plus SC**

DC input data	
MPP voltage range (at rated power)	295 - 800 V
Maximum connected load ($P_{PV \max}$)	
Total	18,000 Wp
PV 1	14,000 Wp
PV 2	9000 Wp
Maximum processable PV power	
Total	12,360 Wp
PV 1	12,360 Wp
PV 2	8600 Wp
Maximum input voltage (at 1000 W/m ² /-10 °C in an open circuit)	1000 V
Minimum input voltage	80 V

DC input data	
Feed-in start voltage in grid operation 5)	80 V
Maximum input current PV 1 PV 2	28.0 A 14.0 A
Maximum short circuit current for module array ($I_{SC\ PV}$) PV 1 PV 2	40 A 20 A
Maximum total short circuit current for module array ($I_{SC\ PV1} + I_{SC\ PV2} = I_{SC\ max}$)	60 A
Max. inverter backfeed current to the array ³⁾ PV 1 PV 2	40 A 20 A
Number of inputs—PV 1	2
Number of inputs—PV 2	1
Maximum capacity of the PV generat- or against ground Total PV 1 PV 2	2400 nF 1860 nF 1200 nF
Limit value of the insulation resist- ance test between module array and ground (on delivery) ¹⁰⁾	100 kΩ
Adjustable range of insulation resist- ance test between module array and ground ⁹⁾	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 continu- ous residual fault current monitoring (on delivery)	300/300 mA/ms
Adjustable range of continuous resid- ual current monitoring ⁹⁾	30-300 mA
Cyclic repetition of the insulation res- istance test (on delivery)	24 h
Adjustable range for cyclic repetition of the insulation resistance test	-

DC input data battery ⁸⁾	
Maximum voltage	700 V
Minimum voltage	160 V
Maximum current	22 A
Maximum output	11,682 W

DC input data battery ⁸⁾	
DC inputs	1

AC input/output data	
Rated power (P_{nom})	12,000 W
Maximum output power	12,000 W
Rated apparent power	12,000 VA
Nominal mains voltage	3 ~ NPE 220 V/380 V 3 ~ NPE 230 V/400 V
Grounding systems	TN-S (allowed) TN-C-S (allowed) IT (not allowed)
Minimum mains voltage	154 V ¹⁾
Maximum mains voltage	280 V ¹⁾
Maximum output current	18.5 A
Rated output current (at 230 V)	17.4 A
Current (inrush) ⁶⁾	9.9 A/4 ms
Nominal frequency	50/60 Hz ¹⁾
Initial symmetrical short-circuit current/phase I_K	18.5 A
Nominal frequency for Full Backup	53/63 Hz ¹⁾
Total harmonic distortion	< 3.5%
Power factor $\cos \phi$ ²⁾	0-1 (adjustable) 0.7-1 (recommended)
Maximum permitted grid impedance Z_{max} on PCC ⁴⁾	None
Maximum output fault current / duration	80.7 A/10 ms

AC output data PV Point/PV Point Comfort	
Maximum output power	4255 W (for 5 s)
Nominal output power	3000 W
Rated output current	13 A
Nominal mains voltage	1 ~ NPE 220 V/230 V/240 V
Nominal frequency	53/63 Hz ¹⁾
Switching time	~ 15 s
Power factor $\cos \phi$ ²⁾	0 - 1

AC output data Full Backup ⁸⁾	
Maximum output power	12,765 W (for 5 s)
Maximum output power (per phase)	4255 W (for 5 s)
Nominal output power	12,000 W

AC output data Full Backup ⁸⁾	
Nominal output power (per phase) ⁷⁾	4133 W
Rated output current (per phase)	17.4 A
Nominal mains voltage	3 ~ NPE 220 V/380 V 3 ~ NPE 230 V/400 V
Nominal frequency for Full Backup	53/63 Hz ¹⁾
Switching time	~ 10 s
Switching time with Rapid switch mode	< 20 ms
Power factor cos phi ²⁾	0 - 1

General data	
Maximum efficiency	98.2%
Europ. efficiency (U _{mpp nom})	97.9%
Europ. efficiency (U _{mpp max})	97.5%
Europ. efficiency (U _{mpp min})	97.0%
Self-consumption at night	≤ 10 W
Cooling	Controlled forced-air ventilation
Ingress protection rating	IP 66
Dimensions H × W × D	595 × 529 × 180 mm
Weight	22.8 kg
Inverter topology	Non-insulated, no transformer
Permitted ambient temperature	-25 °C - +60 °C
Permissible humidity	0-100% (incl. condensation)
EMC emission class (in accordance with IEC 61000-6-2, IEC 61000-6-3)	B
DC/AC overvoltage category (in accordance with IEC 62109-1)	2/3
Pollution degree	2
Sound pressure level	47 dB(A) (ref. 20 µPA)
Protective class	1

Protective devices	
DC isolation measurement	Warning/shutdown at R _{ISO} < 100 kOhm
Overload performance	Operating point shift, power limit
DC disconnect	Integrated
RCMU	Integrated

Protective devices	
RCMU classification	The software class of the safety platform(s) is defined as a class B control function (single-channel with periodic self-test) in accordance with IEC 60730 Annex H.
Active anti-islanding method	Frequency point shift method
AFCI	Integrated
AFPE (AFCI) classification (according to IEC 63027) ¹¹⁾	= F-I-AFPE-1-3-1 Full coverage Integrated AFPE 1 monitored string per input port 3 input ports per channel (MPP1: 2, MPP2: 1) 1 monitored channel

Data communication	
WiFi SMA-RP connection (FCC ID: QKWPILOT1/IC 12270A-PILOT1)	802.11b/g/n (WPA, WPA2) Frequency: 2.4 GHz
Ethernet (LAN)	RJ 45, 10/100 Mbit
Wired shutdown (WSD)	Max. 28 devices/WSD chain Max. distance between two devices = 100 m
Modbus RTU SunSpec (2x)	RS485 2-wire
Battery connection	Modbus O/RJ 45/12 V power supply
Voltage level of digital inputs	Low: min. 0 V-max. 1.8 V High: min. 4.5 V-max. 28.8 V
Input currents of digital inputs	depending on the input voltage; input resistance = 70 kOhm
Total power for digital output (with internal supply)	6 W at 12 V
Power per digital output (with external supply)	1 A at >12.5 V-24 V (max. 3 A in total)
Datalogger/web server	Integrated

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)

**Technical data of
surge protection
device DC SPD
type 1+2 GEN24**

General data	
Continuous operating current (I_{CPV})	< 0.1 mA
Rated discharge current (I_N) - 15 x 8/20 μ s pulses	20 kA
Lightning surge current (I_{imp}) Max. discharge capacity @ 10/350 μ s	6.25 kA
Protection level (U_p) (star-shaped mounting)	4 kV
Short circuit strength PV (I_{SCPV})	15 kA

Disconnecter	
Thermal disconnecter	Integrated
External fuse	None

Mechanical properties	
Disconnection indicator	Mechanical indicator (red)
Remote communication of the connection interruption	Output on the changeover contact
Housing material	Thermoplastic UL-94-V0
Test standards	IEC 61643-31 / DIN EN 50539-11 UL1449 ed.4 / VDE 0185-305-3 Bbl. 5

**Explanation of
footnotes**

- 1) The values provided are standard values. If required, the inverter is customized for a specific 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, this is 0 A.
- 4) Assured by the electrical design of the inverter.
- 5) For backup power mode (PV Point) without a battery, a min. voltage of 150 V is required.
- 6) Peak current when turning on the inverter.
- 7) The total nominal output power per phase must not exceed the nominal output power of the inverter.
- 8) Valid for Fronius inverter with battery support.
- 9) The values provided are standard values. These values must be adjusted according to requirements and PV output.
- 10) The value provided is a max. value. If this value is exceeded, this may impair the function.

**Integrated DC
disconnecter**

Symo GEN24 3-10 kW Plus

General data	
Product name	Benedict LS32 E 7905
Rated insulation voltage	1000 V _{DC}
Rated impulse withstand voltage	8 kV
Suitability for insulation	Yes, DC only
Utilization category and/or PV utilization category	according to IEC/EN 60947-3 utilization category DC-PV2
Rated short-time withstand current (I _{CW})	Rated short-time withstand current (I _{CW}): 1000 A
Rated short-circuit capacity (I _{CM})	Rated short-circuit capacity (I _{CM}): 1000 A

Rated operating current and rated breaking capacity				
Rated operating voltage (U _e)	Rated operating current (I _e)	I _(make) / I _(break)	Rated operating current (I _e)	I _(make) / I _(break)
≤ 500 V _{DC}	14 A	56 A	36 A	144 A
600 V _{DC}	8 A	32 A	30 A	120 A
700 V _{DC}	3 A	12 A	26 A	88 A
800 V _{DC}	3 A	12 A	17 A	68 A
900 V _{DC}	2 A	8 A	12 A	48 A
1000 V _{DC}	2 A	8 A	6 A	24 A
Number of pins	1	1	2	2

Symo GEN24 3-12 kW Plus SC

General data	
Product name	Benedict LSA32 E 8229
Rated insulation voltage	1000 V _{DC}
Rated impulse withstand voltage	6 kV
Suitability for insulation	Yes, DC only
Utilization category and/or PV utilization category	according to IEC/EN 60947-3 utilization category DC-PV2
Rated short-time withstand current (I _{CW})	Rated short-time withstand current (I _{CW}): 1000 A
Rated short-circuit capacity (I _{CM})	Rated short-circuit capacity (I _{CM}): 1000 A

Rated operating current and rated breaking capacity				
Rated operating voltage (U _e)	Rated operating current (I _e)	I _(make) / I _(break)	Rated operating current (I _e)	I _(make) / I _(break)
300 V _{DC}	27 A	108 A	47 A	188 A
400 V _{DC}	20 A	80 A	45 A	180 A
500 V _{DC}	14 A	56 A	38 A	152 A
600 V _{DC}	11.5 A	46 A	33 A	132 A

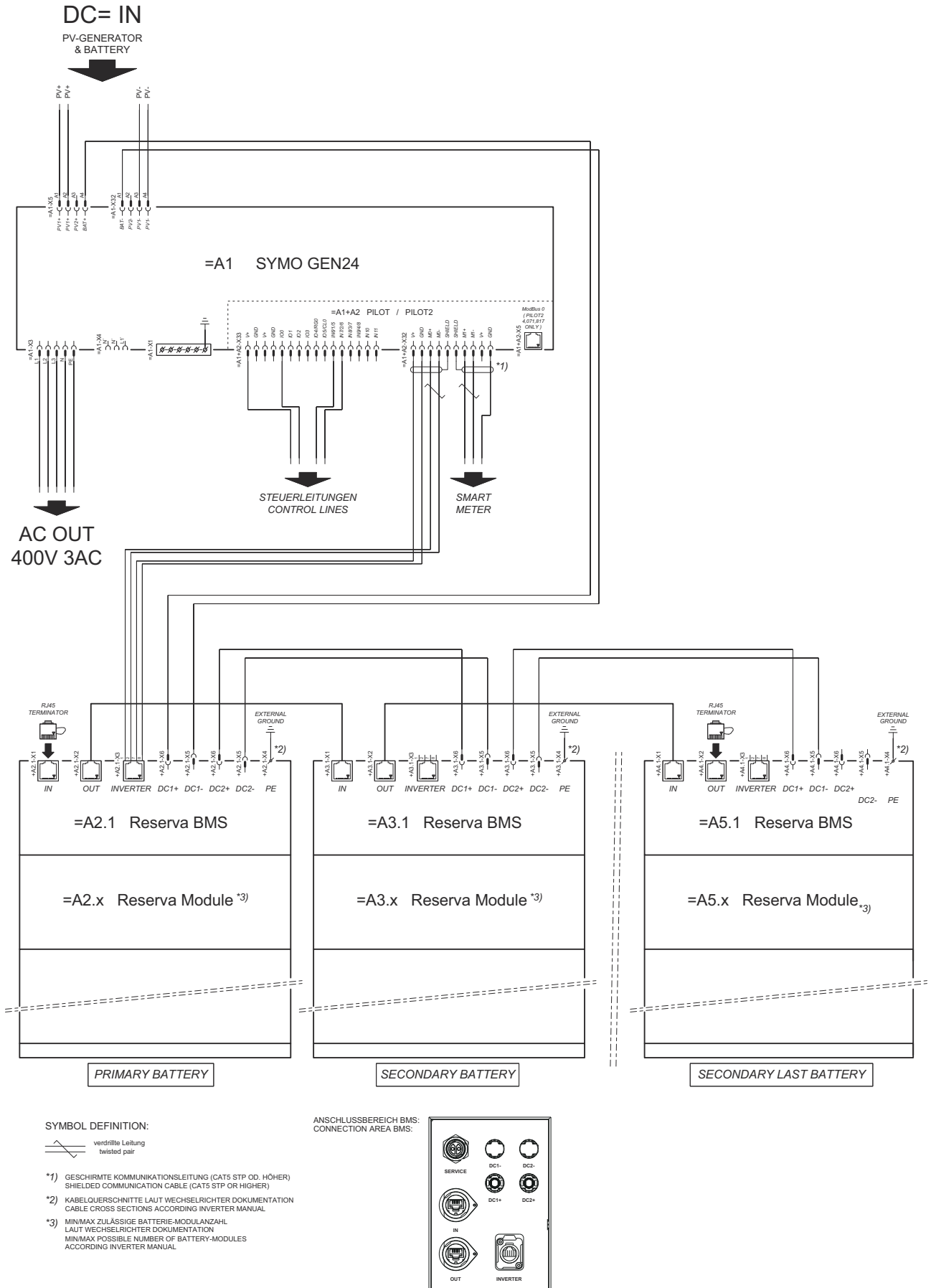
Rated operating current and rated breaking capacity				
700 V _{DC}	7.5 A	30 A	28 A	112 A
800 V _{DC}	5.75 A	23 A	23 A	92 A
900 V _{DC}	4.75 A	19 A	20 A	80 A
1000 V _{DC}	4 A	16 A	13 A	52 A
Number of pins	1	1	2	2

System circuit diagrams

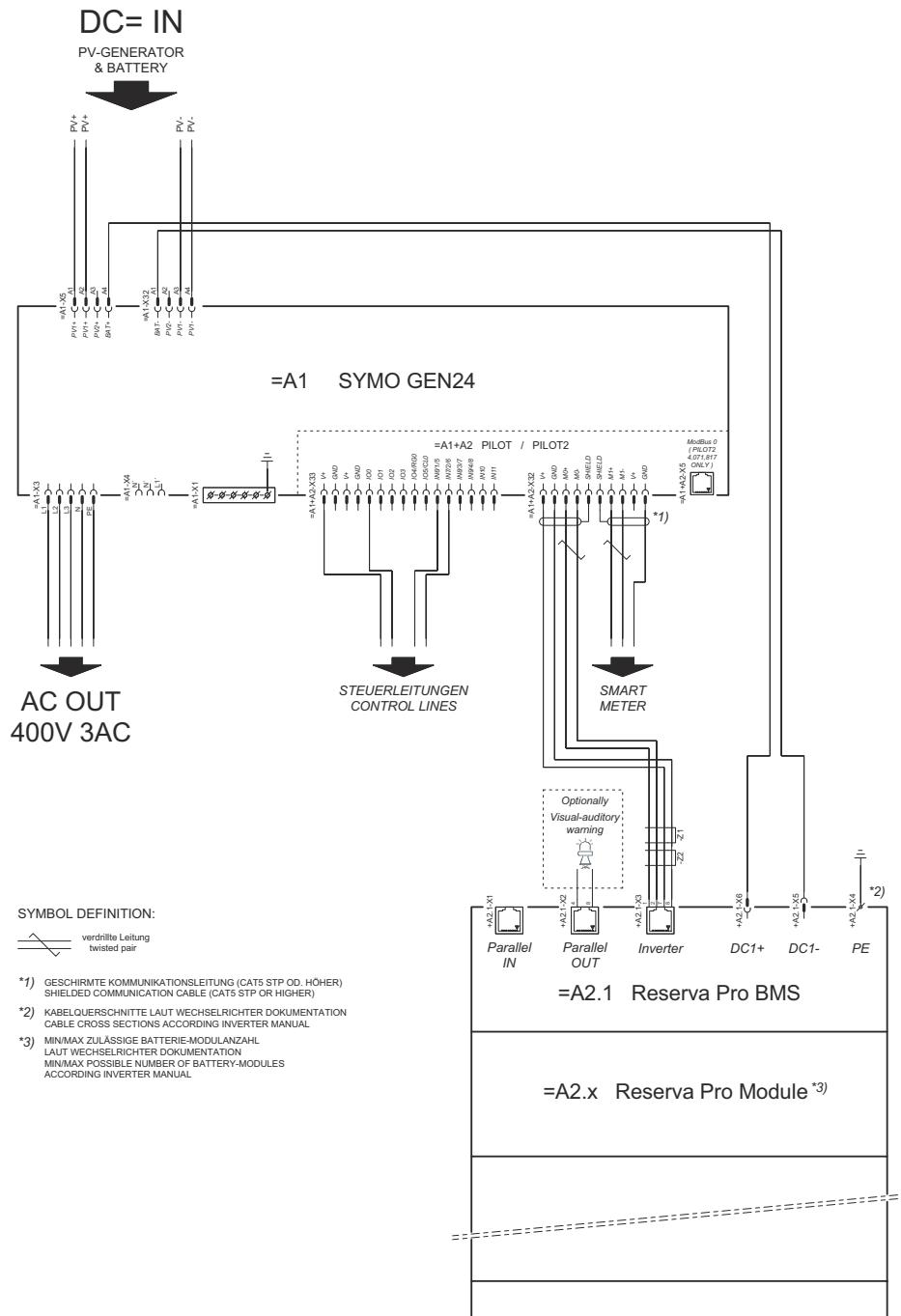
242



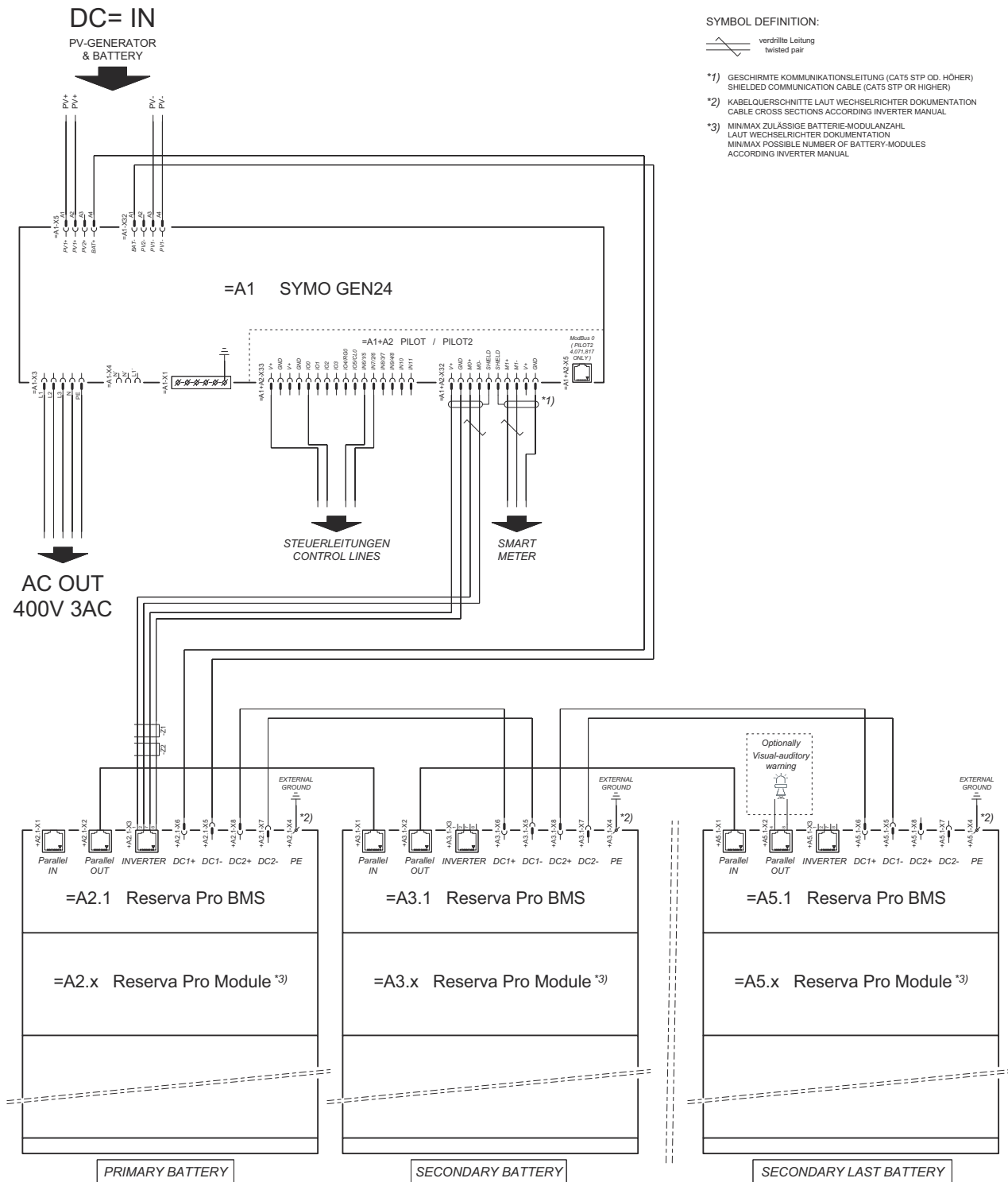
Fronius Symo GEN24 with Fronius Reserva connected in parallel



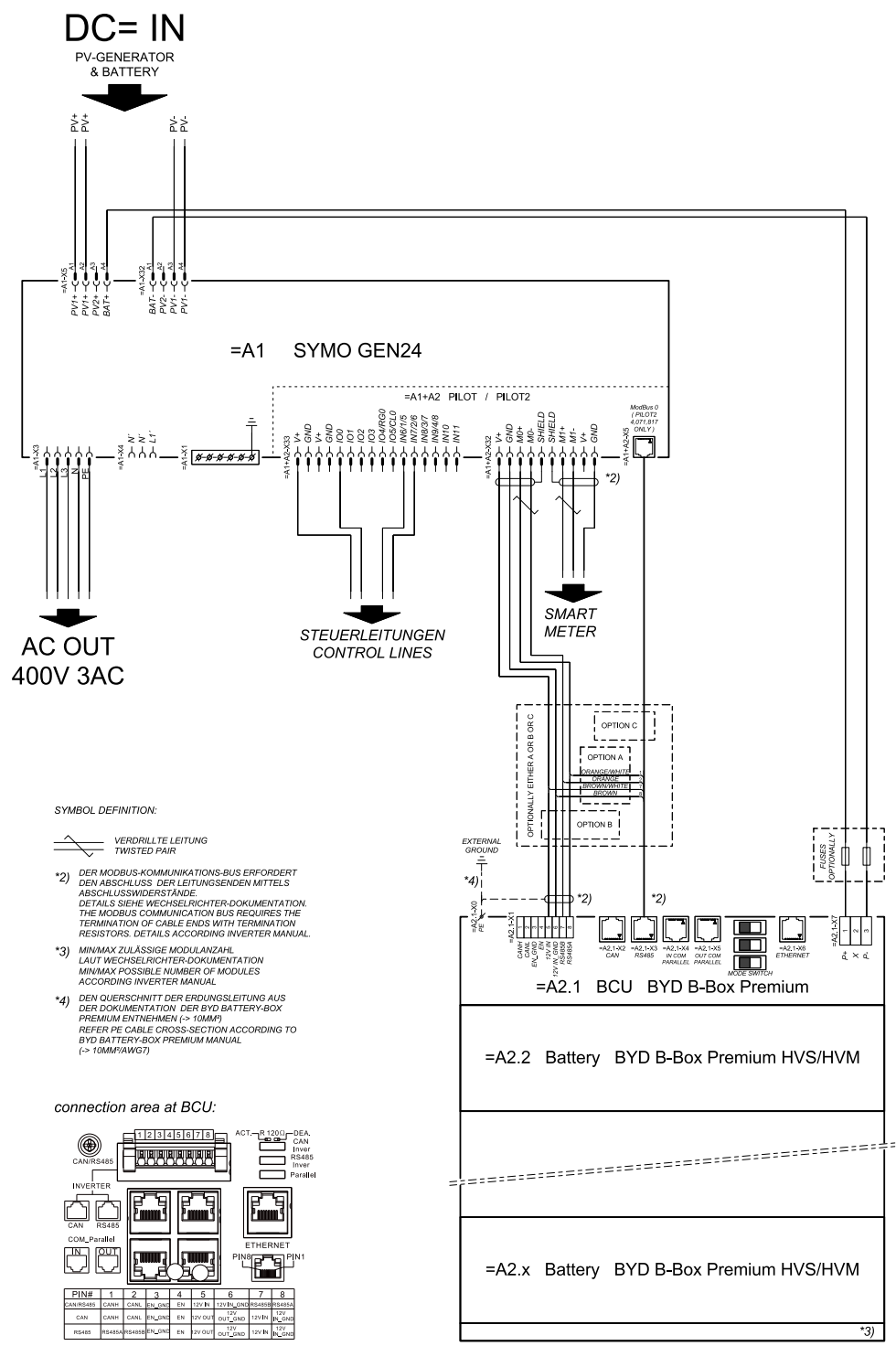
Fronius Symo GEN24 and Fronius Reserva Pro



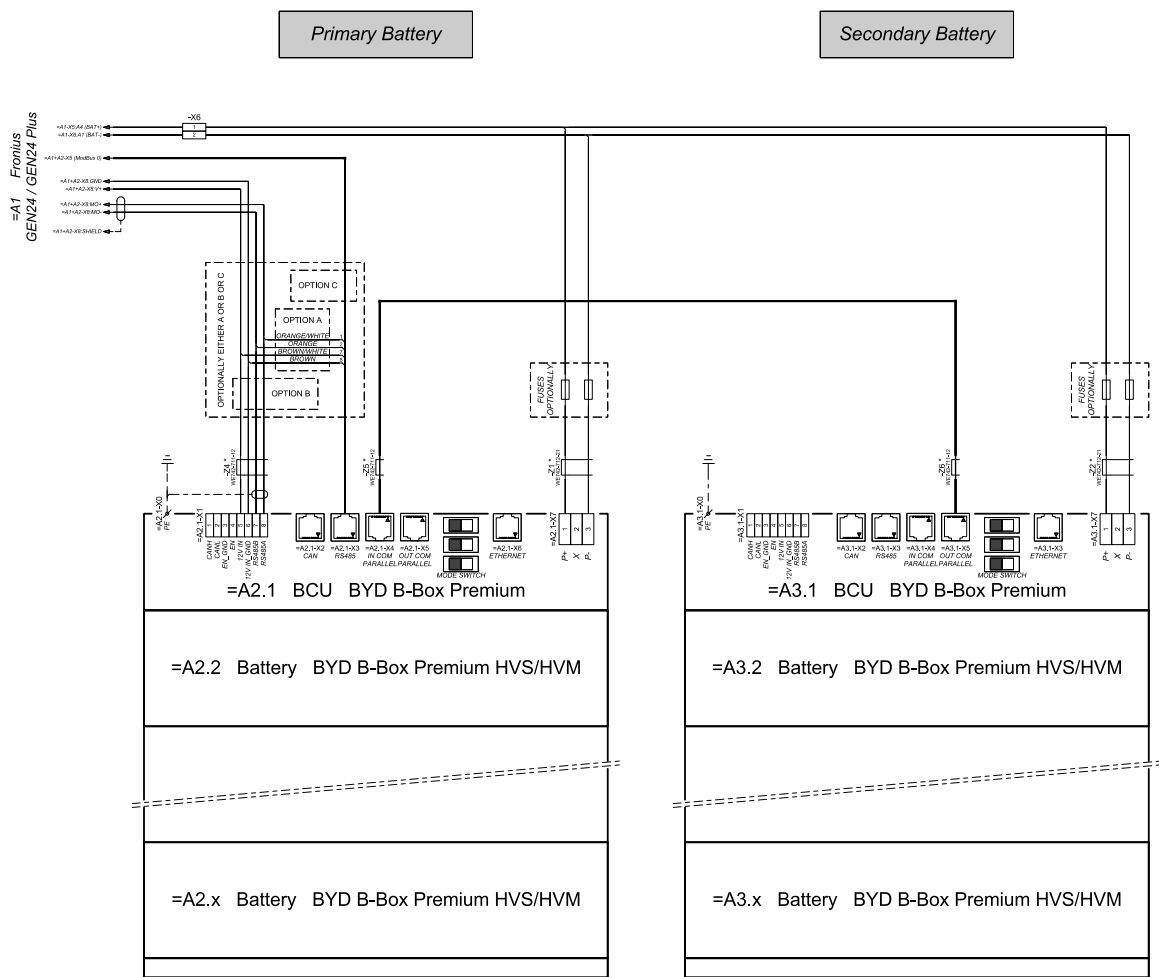
Fronius Symo GEN24 with Fronius Reserva Pro connected in parallel



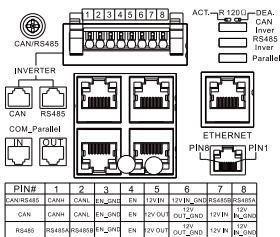
Fronius Symo GEN24 and BYD Battery-Box Premium HV



Fronius Symo GEN24 with two BYD Battery-Box Premium HV connected in parallel

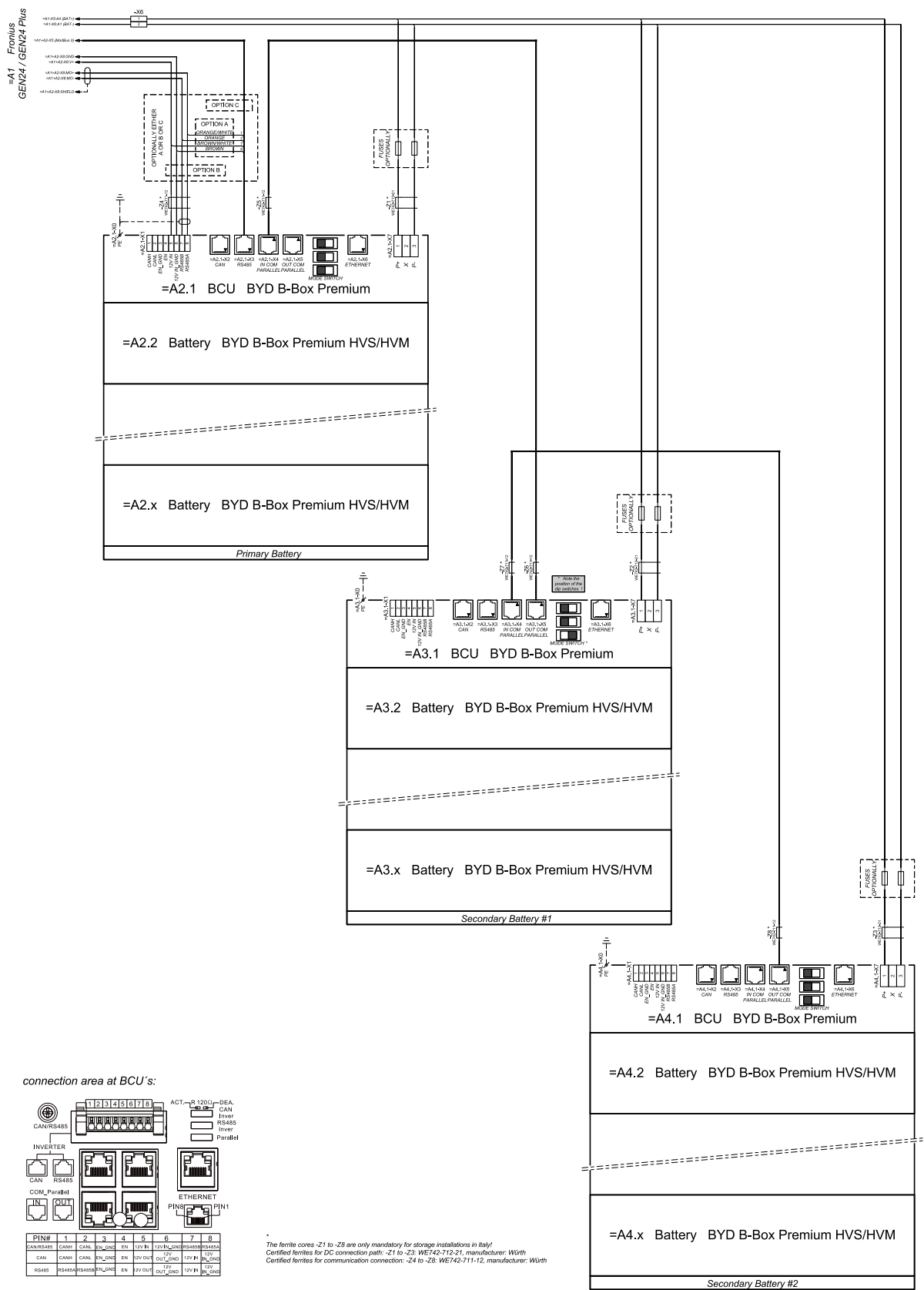


connection area at BCU's:

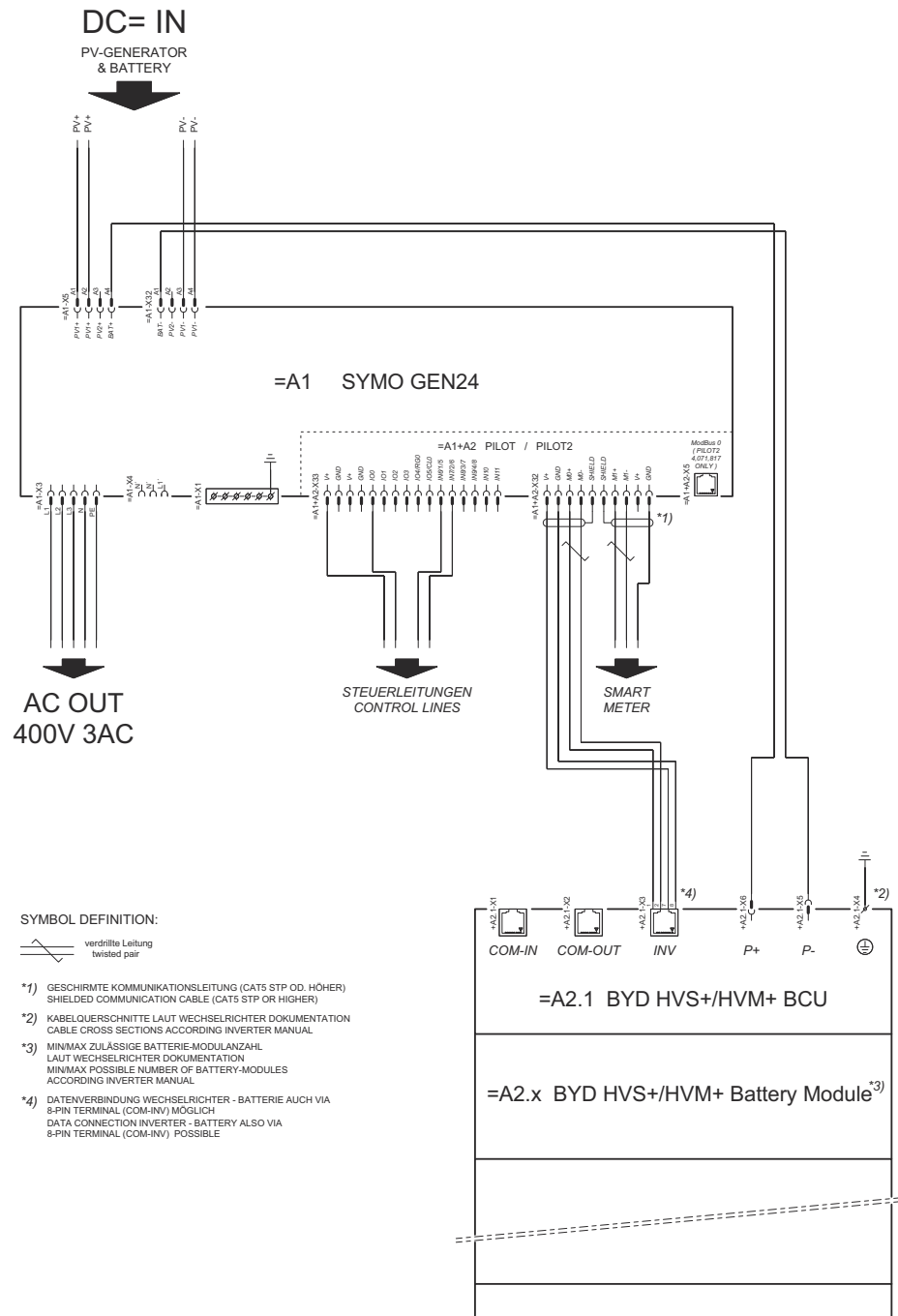


*
The ferrite cores -Z1 to -Z8 are only mandatory for storage installations in Italy!
Certified ferrites for DC connection path: -Z1 and -Z2: WE742-712-21, manufacturer: Würth
Certified ferrites for communication connection: -Z4 to -Z6: WE742-711-12, manufacturer: Würth

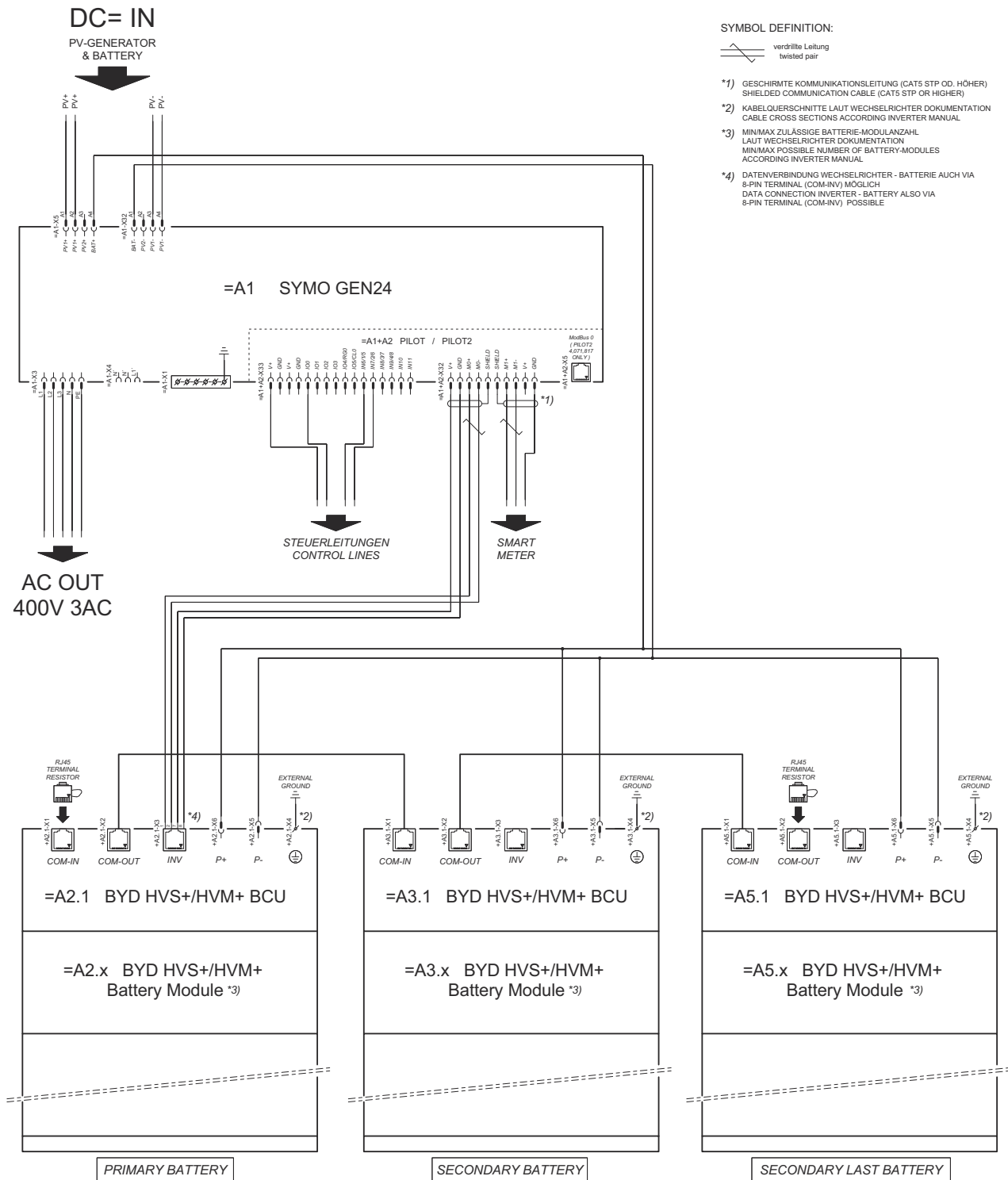
Fronius Symo GEN24 with three BYD Battery-Box Premium HV connected in parallel



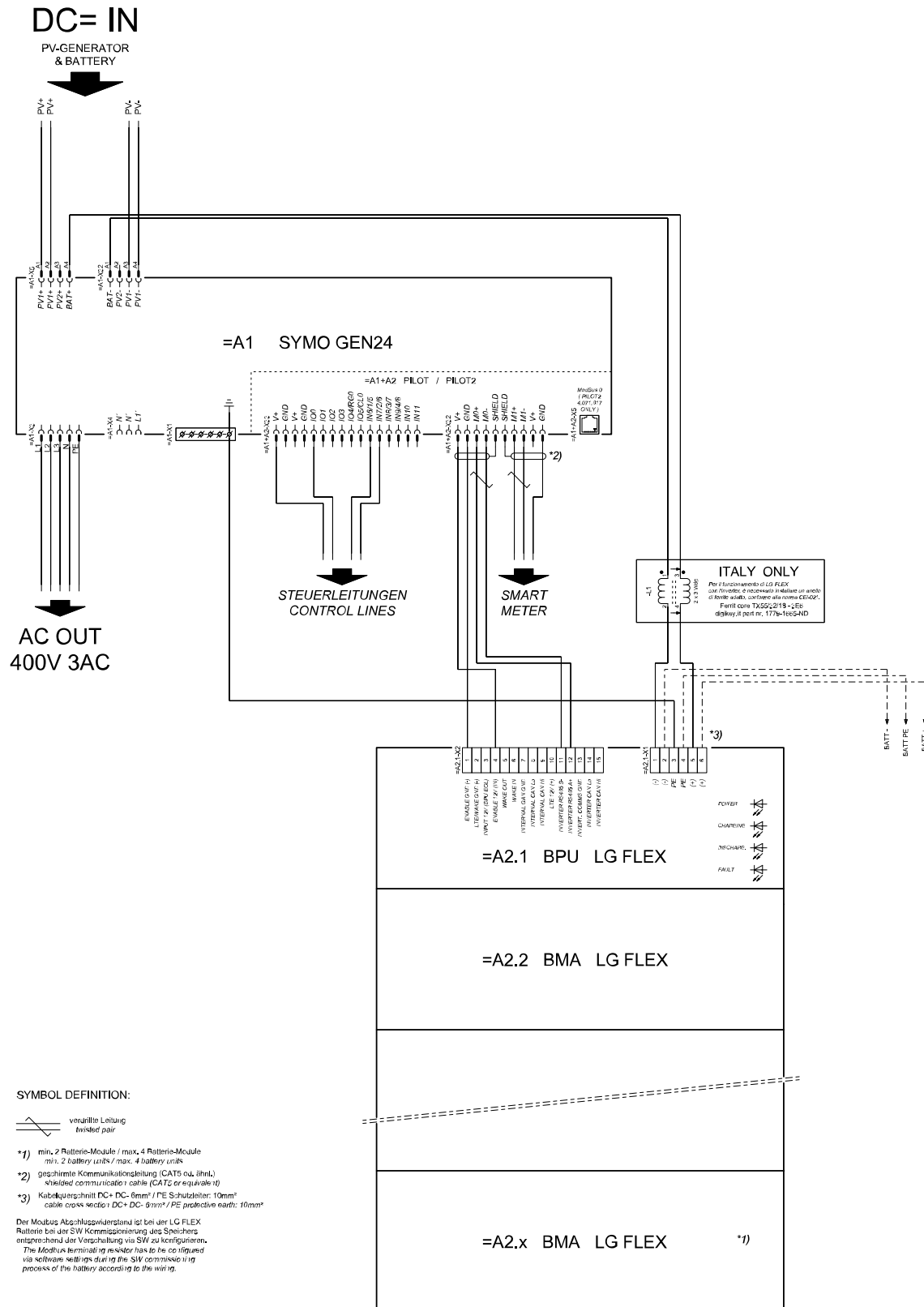
Fronius Symo GEN24 and BYD Battery-Box HVS +/HVM+



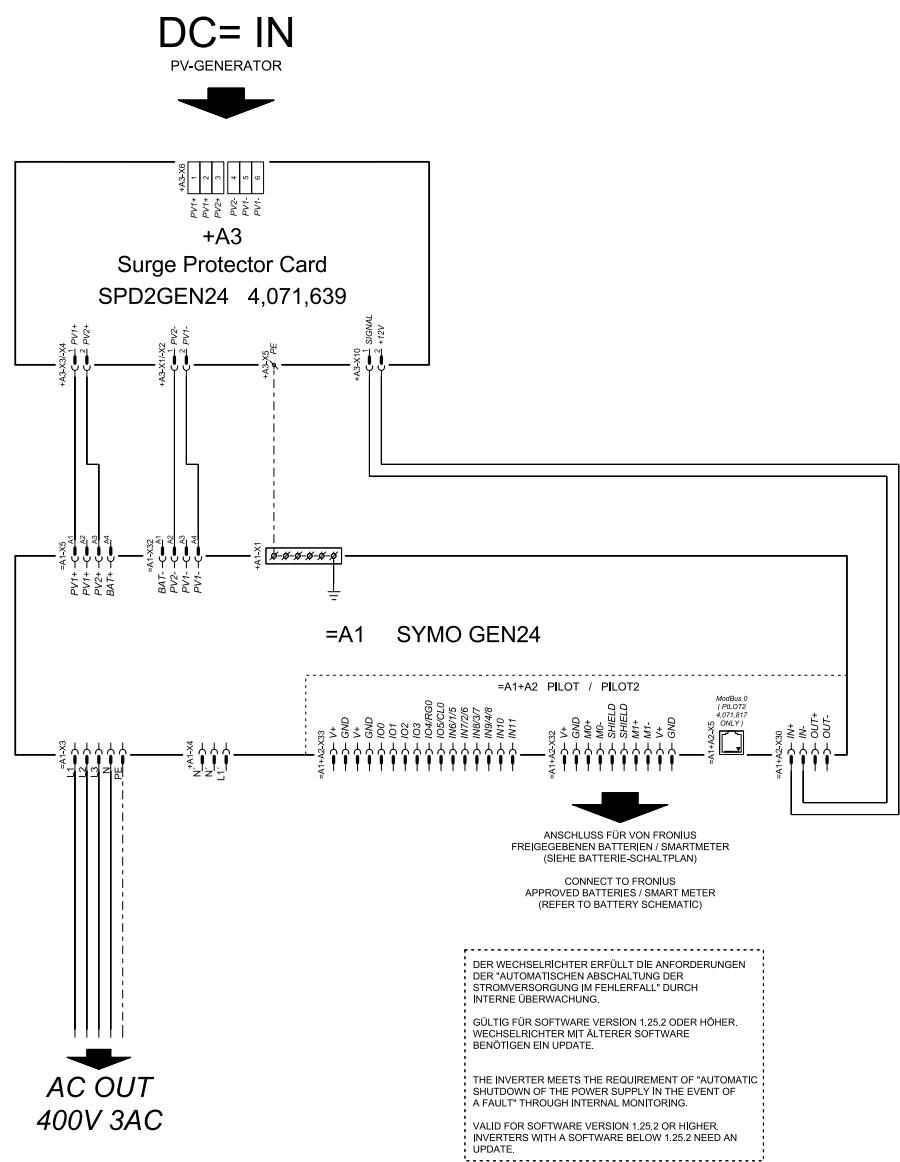
Fronius Symo GEN24 with BYD Battery-Box HVS +/HVM+ connected in parallel



Fronius Symo GEN24 and LG FLEX

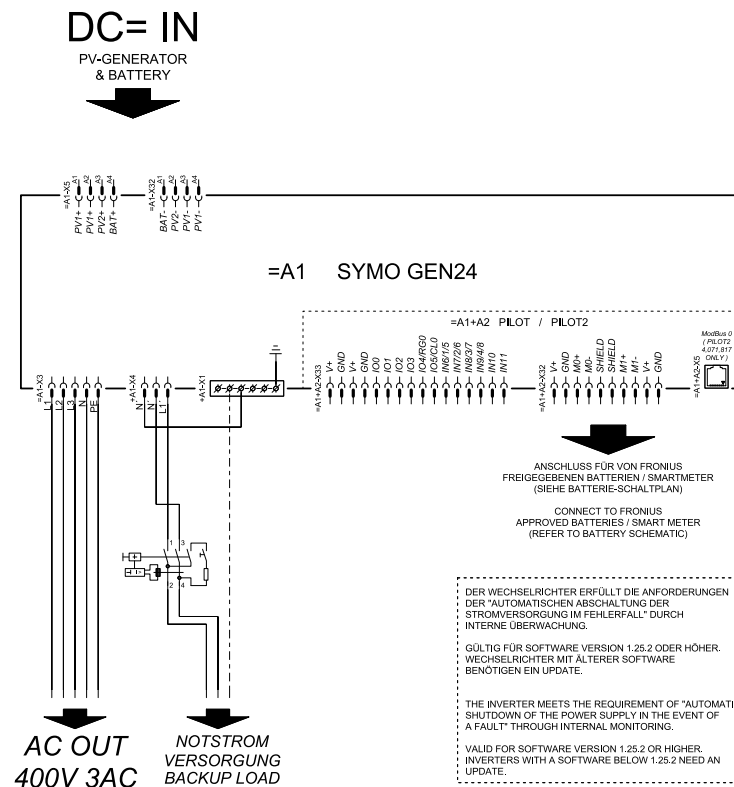


Surge protection device (SPD)

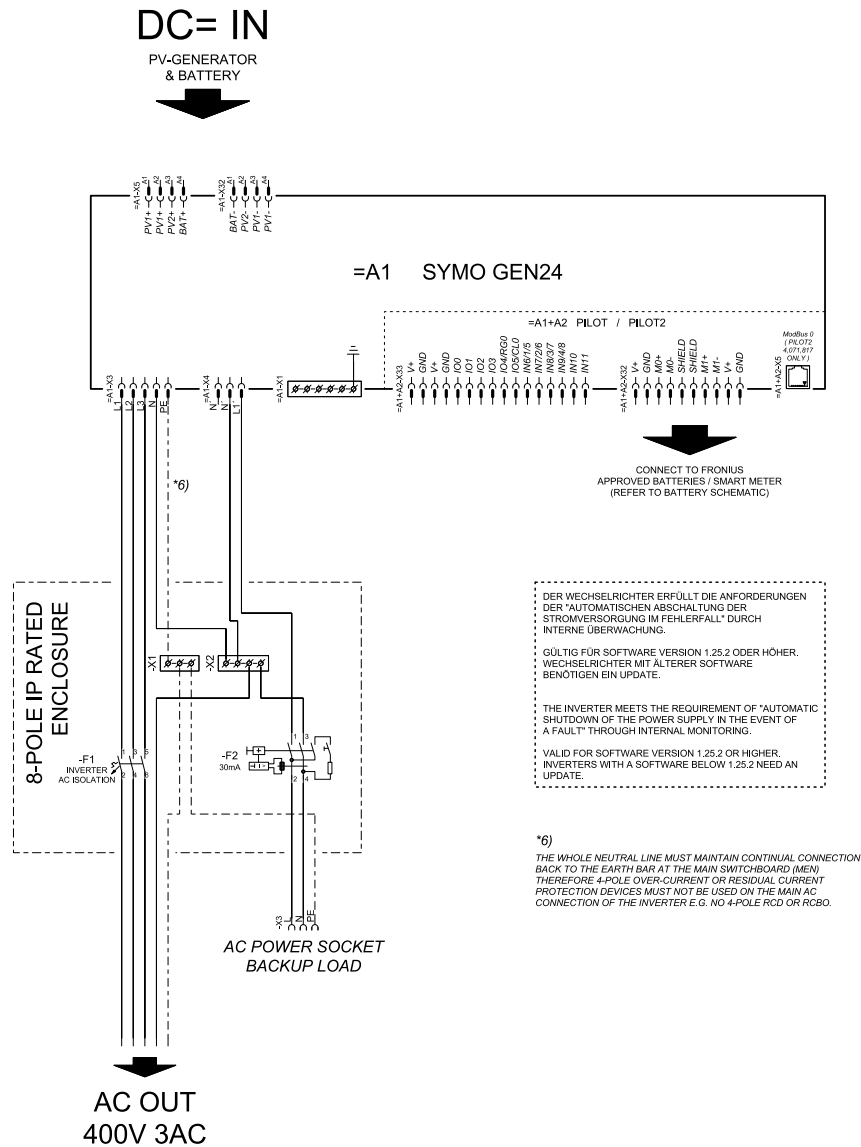


Circuit diagrams—PV Point

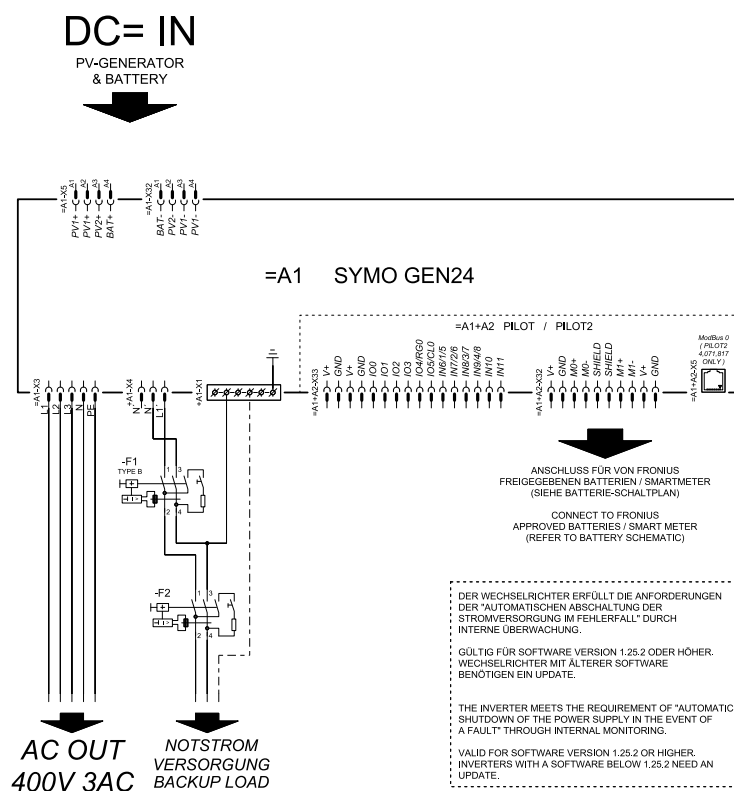
Emergency power terminal—PV Point (OP)



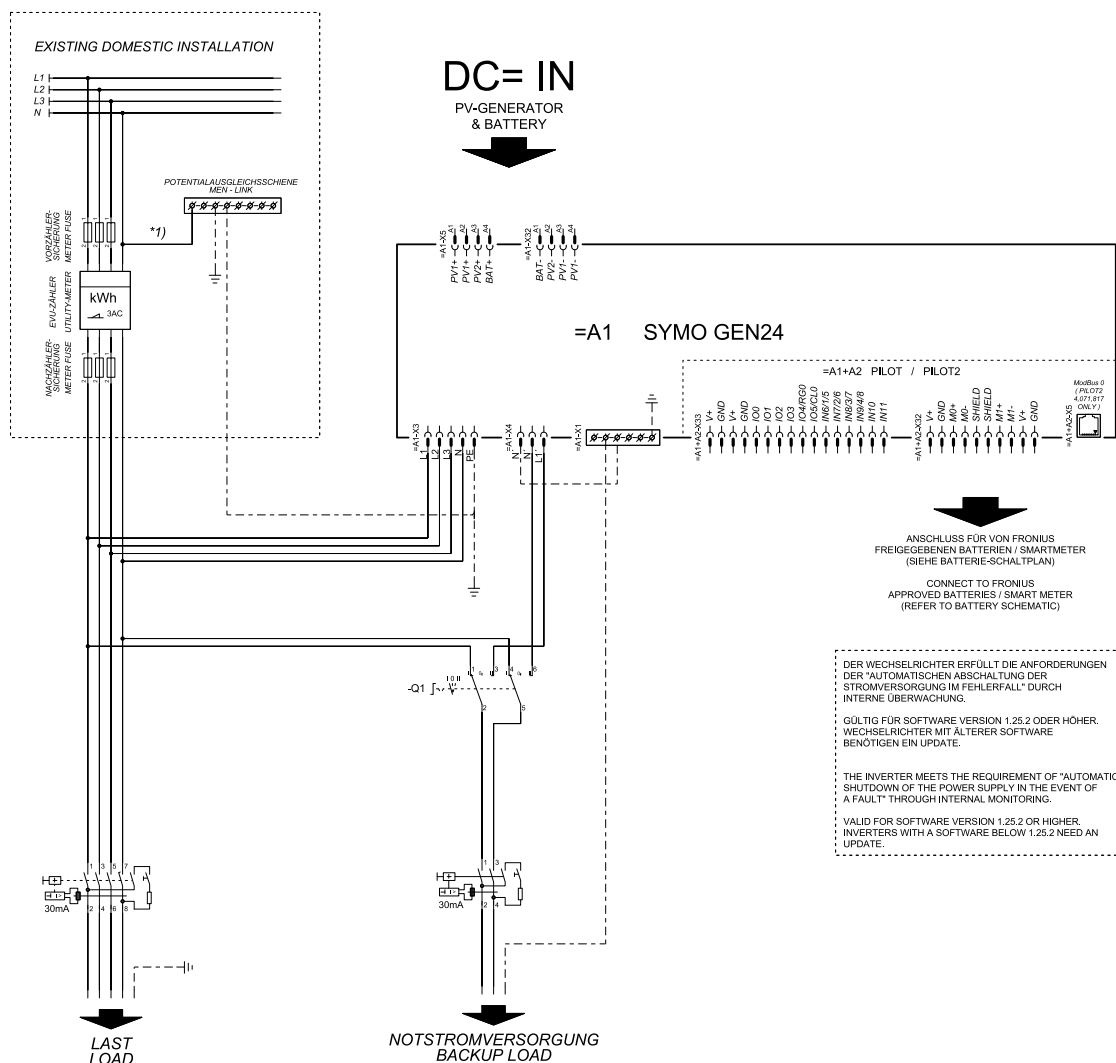
Circuit diagram - PV Point (OP) Australia



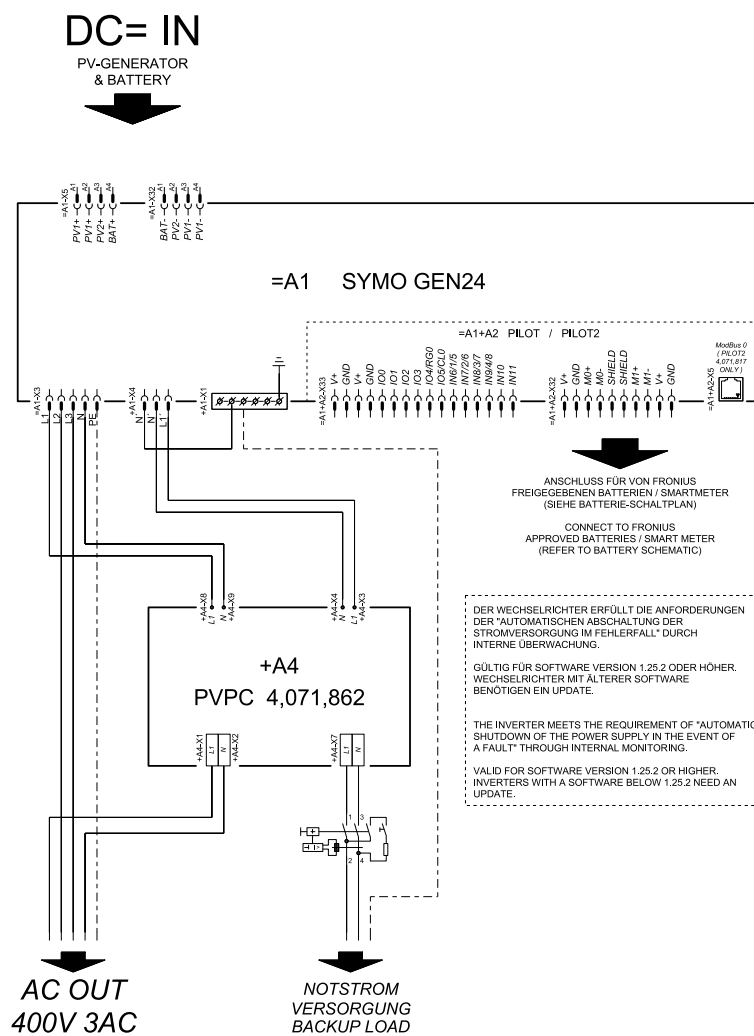
Backup power terminal - PV Point (OP) with battery only for France



Backup power terminal - PV Point (OP) manual changeover

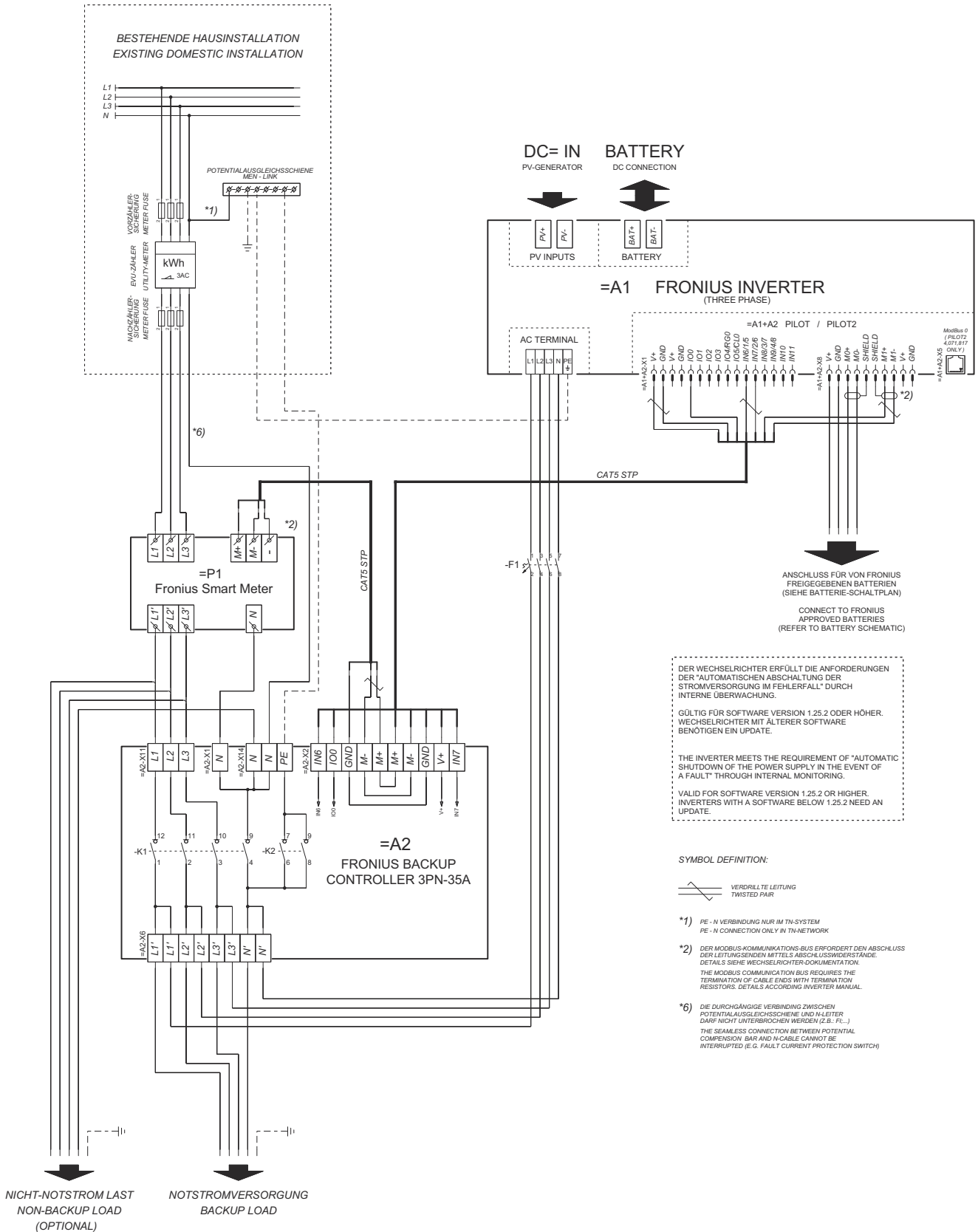


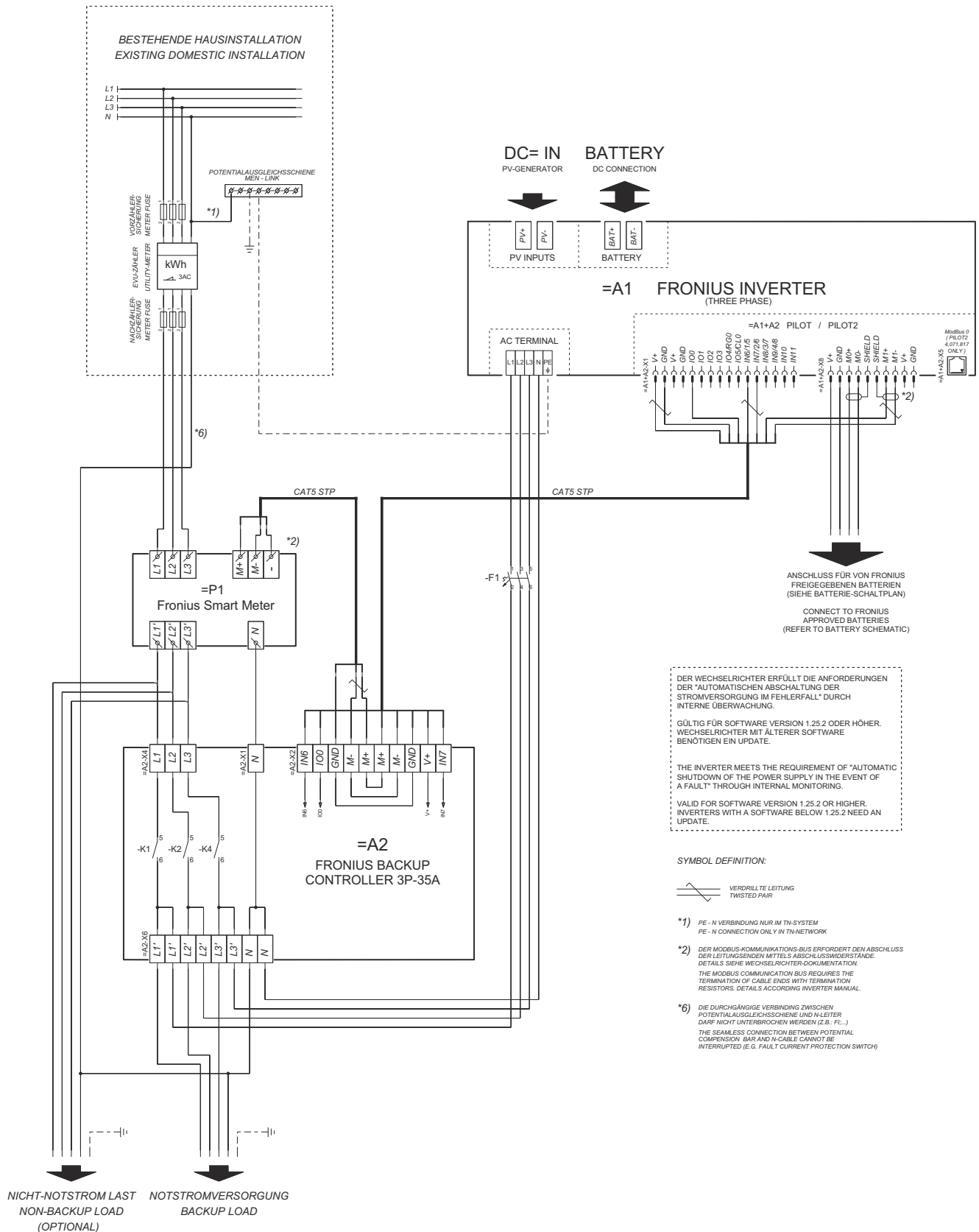
PV Point Comfort



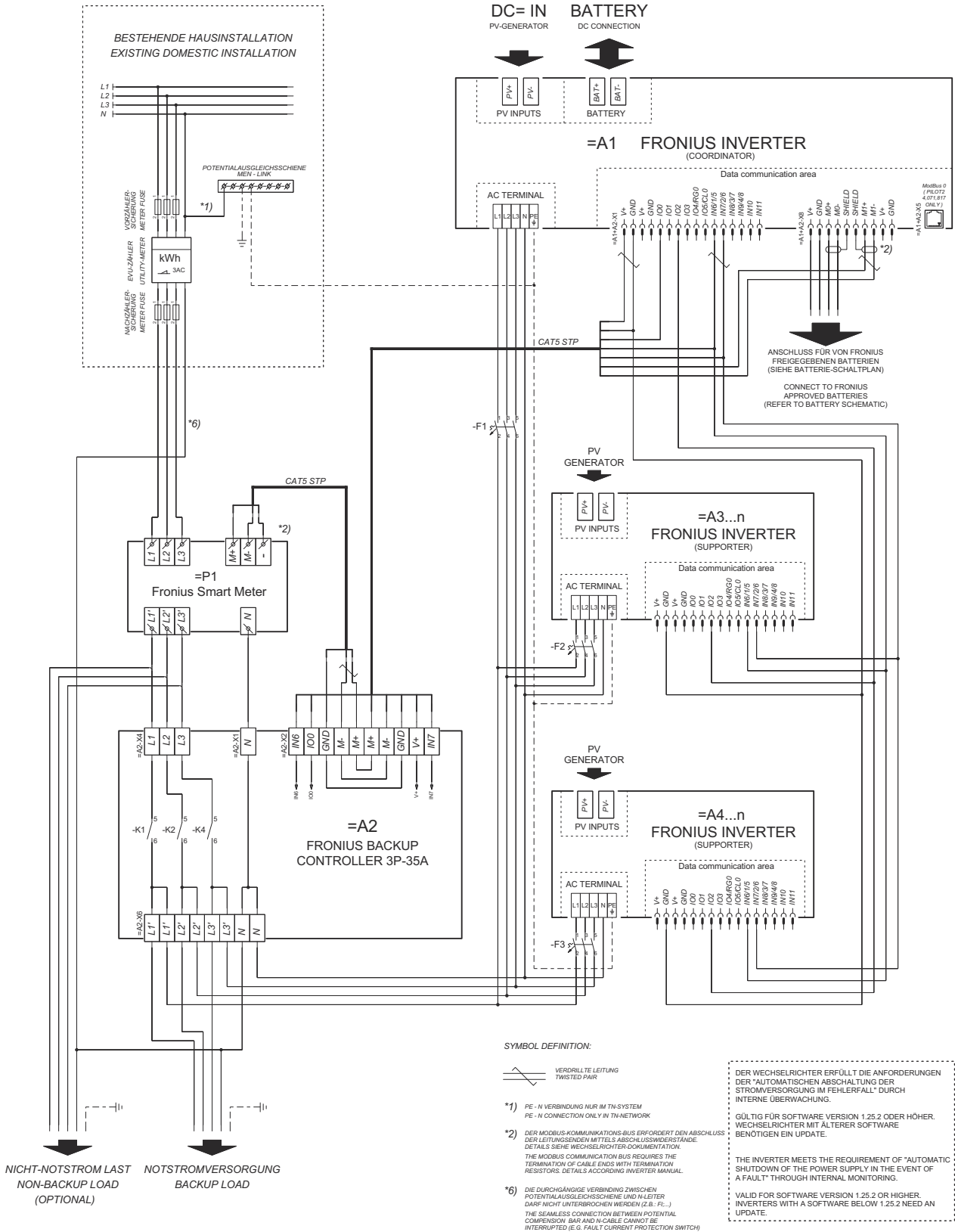
Circuit diagrams—automatic switch to backup power with Froni- us Backup Controller

Fronius Backup Controller 4-pin separation, e.g., Germany



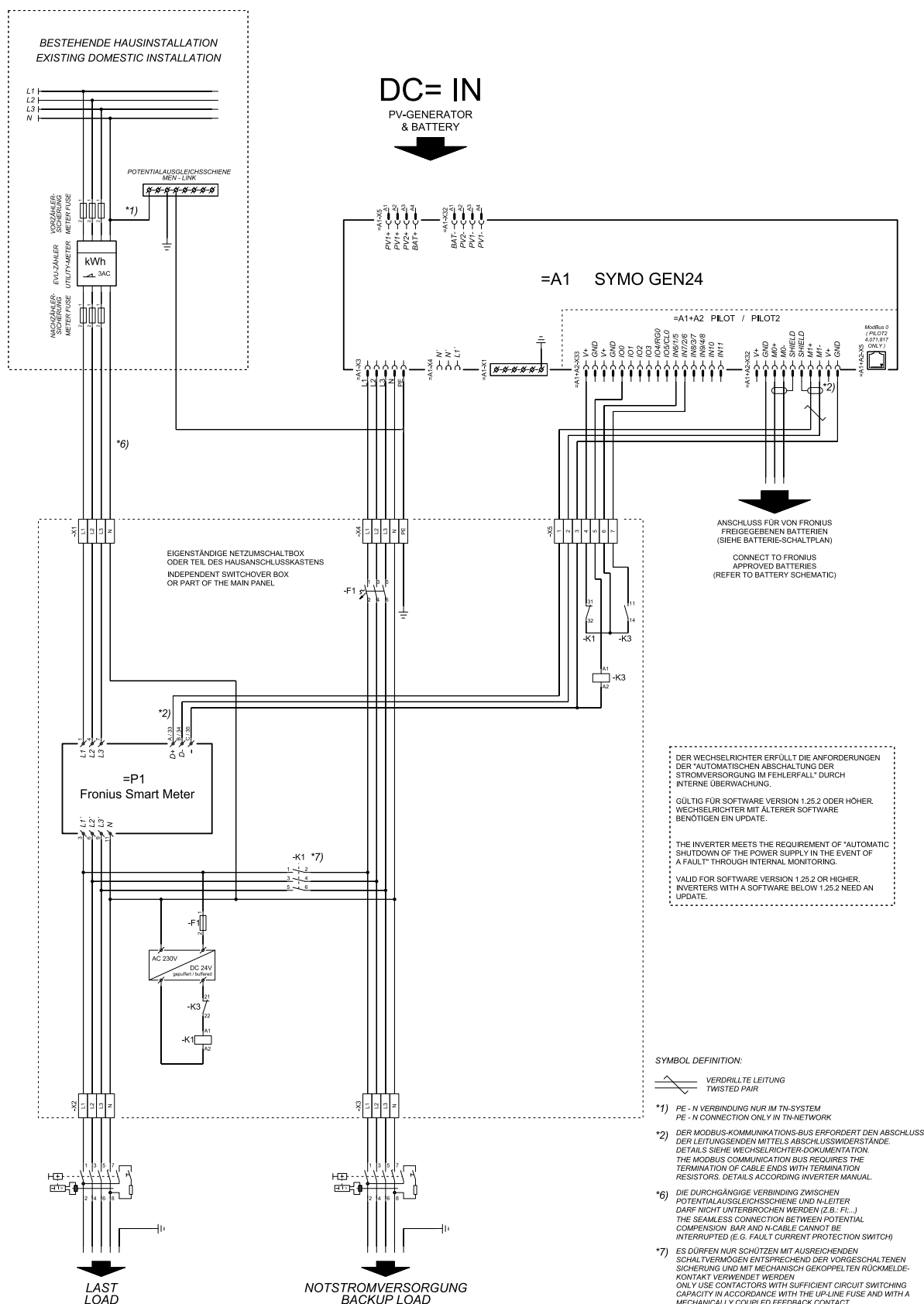


Fronius Backup Controller 3-pin separation, parallel backup

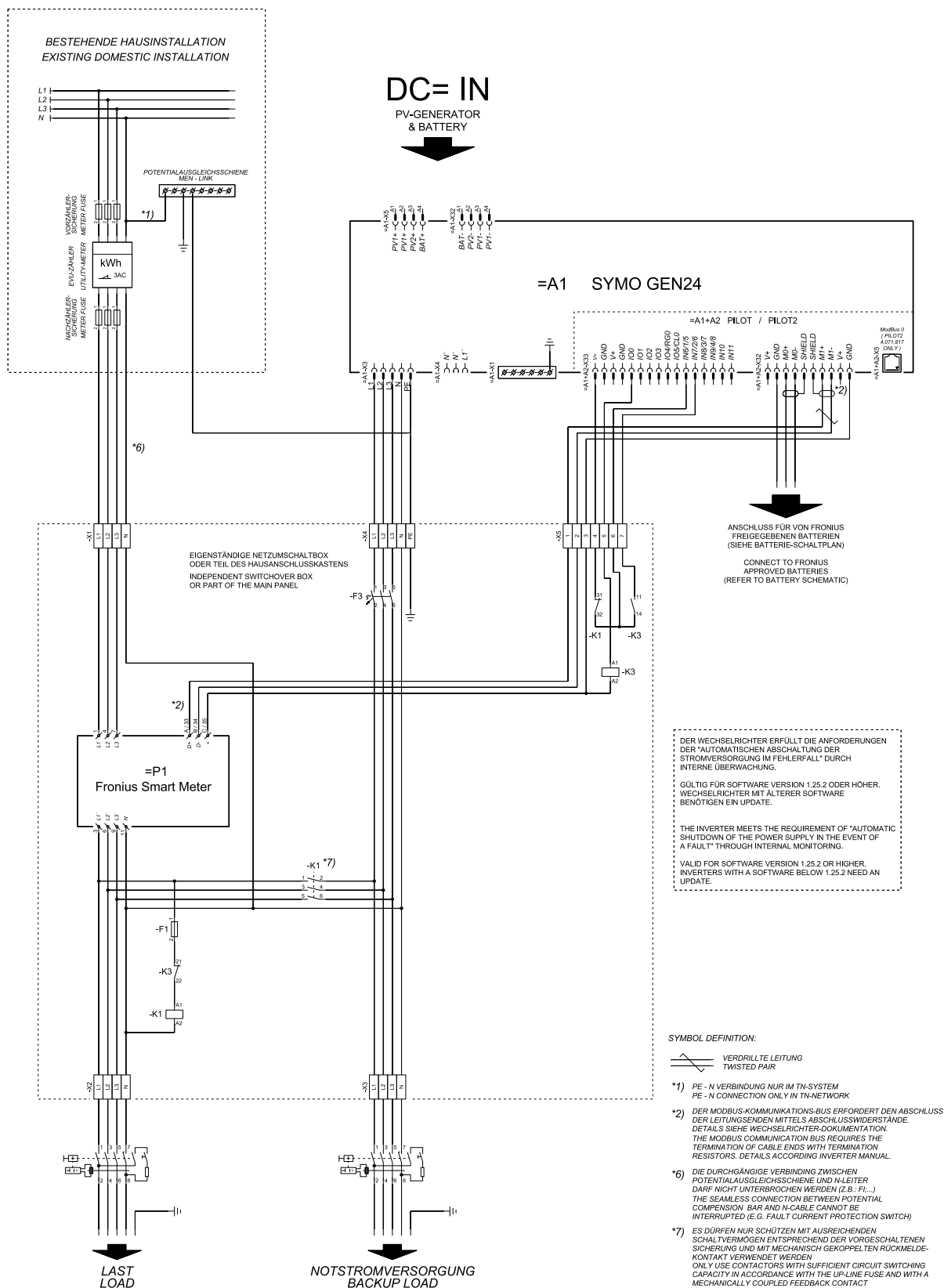


Circuit diagrams—automatic switch to backup power with third-party components

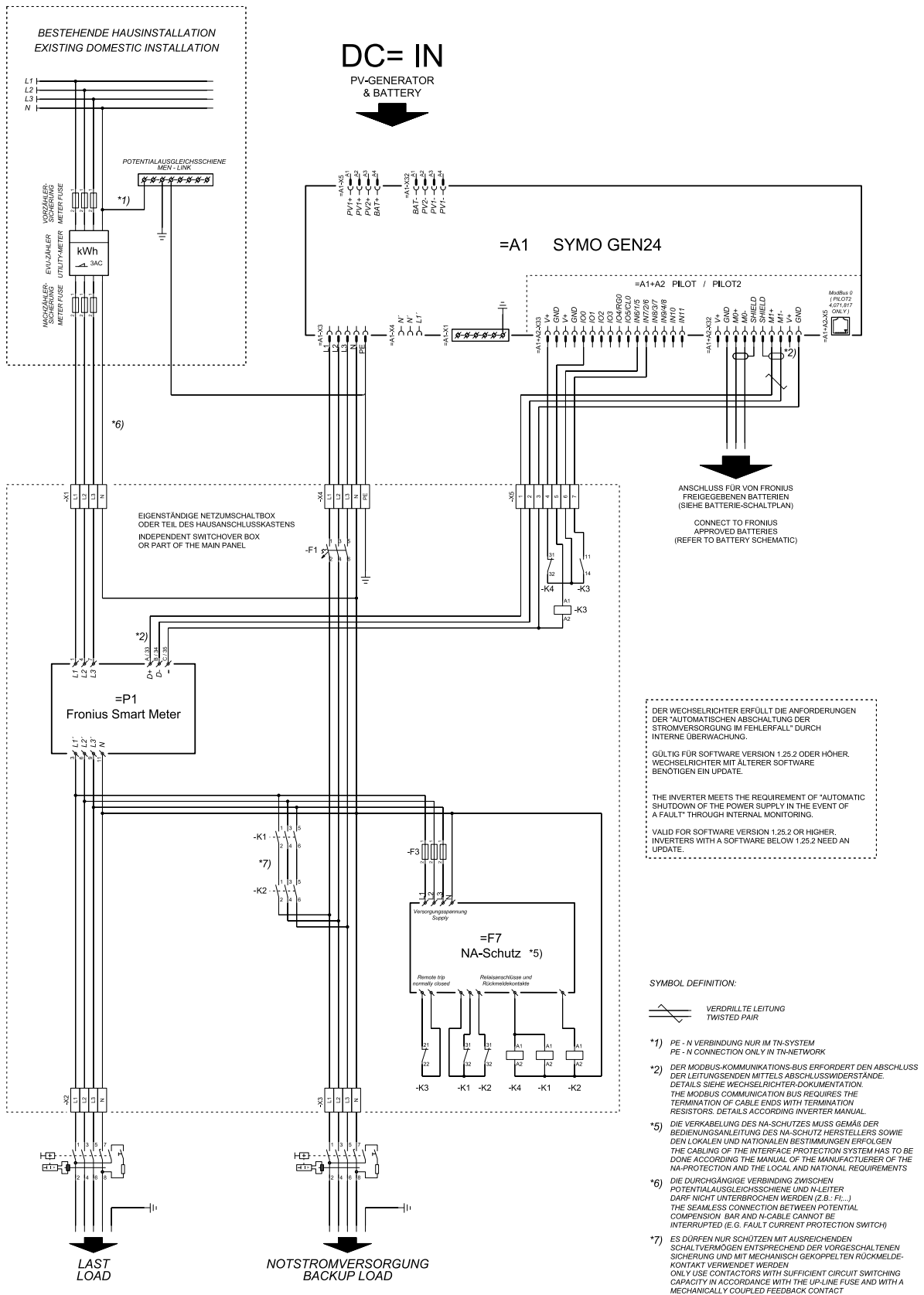
Automatic switch to backup power 3-pin single FRT-capable separation - e.g., Austria



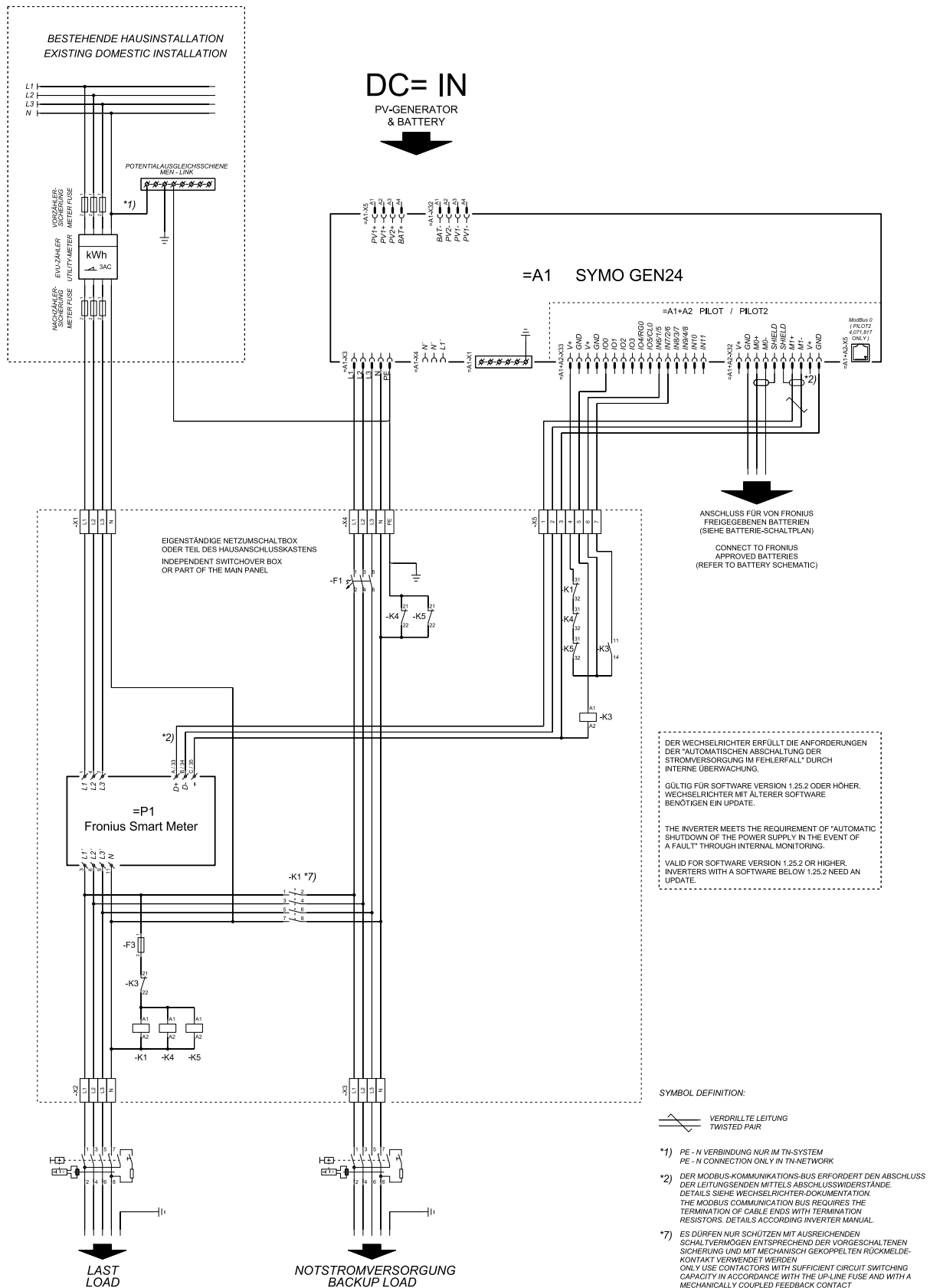
Automatic switch to backup power 3-pin single separation - e.g., Australia



Automatic switch to backup power 3-pin double separation with ext. grid and system protection



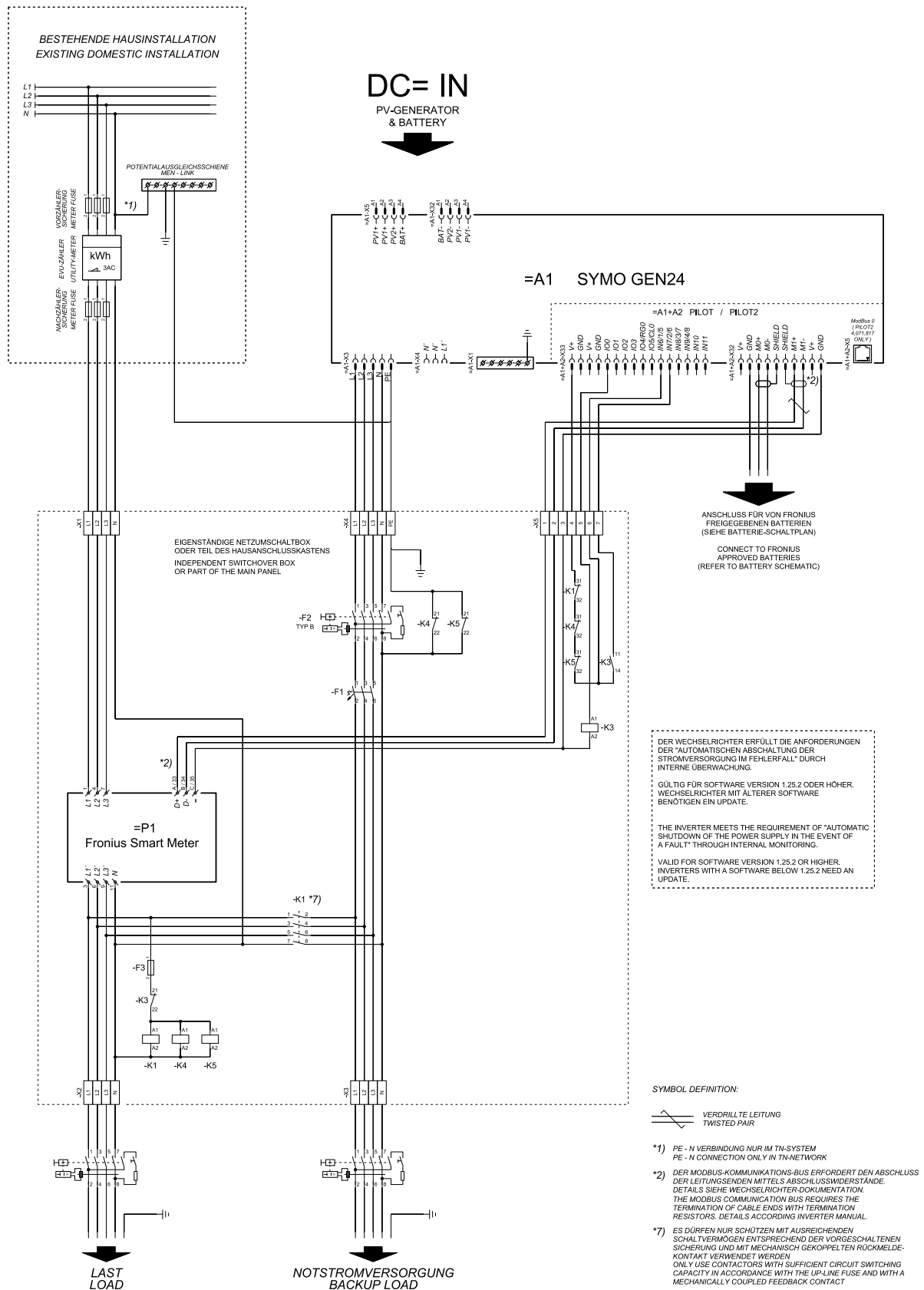
Automatic switch to backup power 4-pin single separation - e.g., Germany



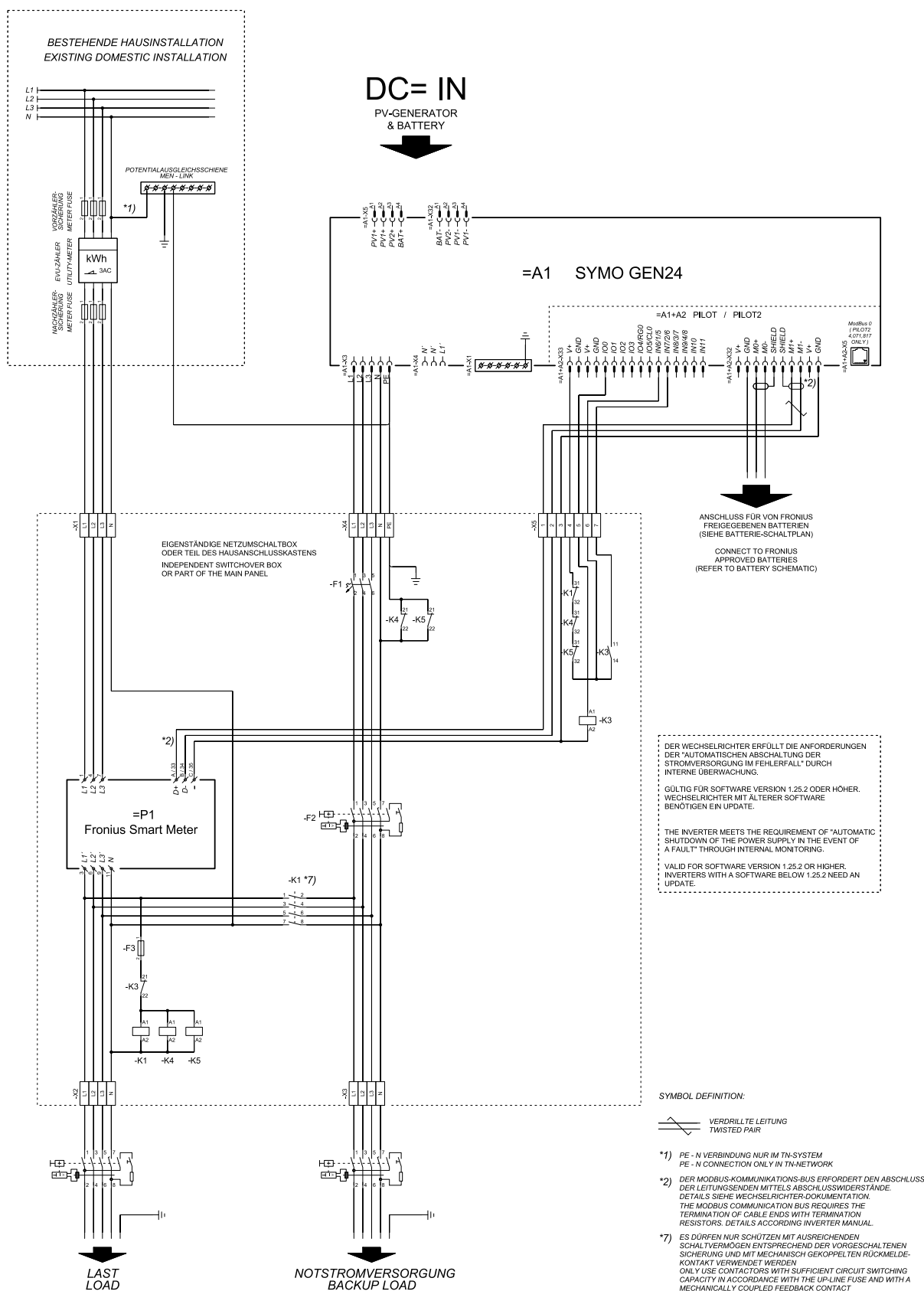
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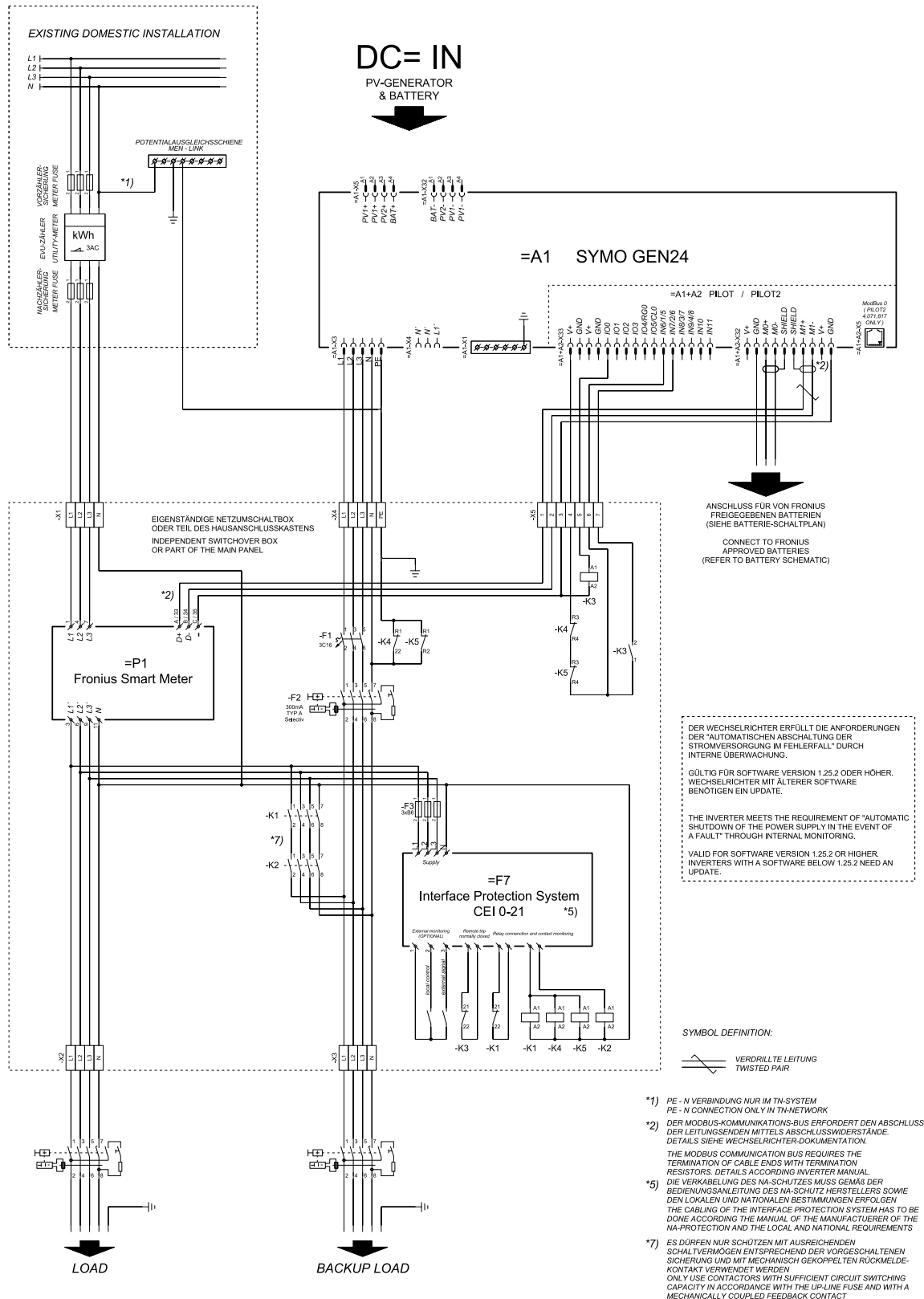
Automatic switch to backup power 4-pin single separation - e.g., France



Automatic switch to backup power 4-pin single separation - e.g., Spain

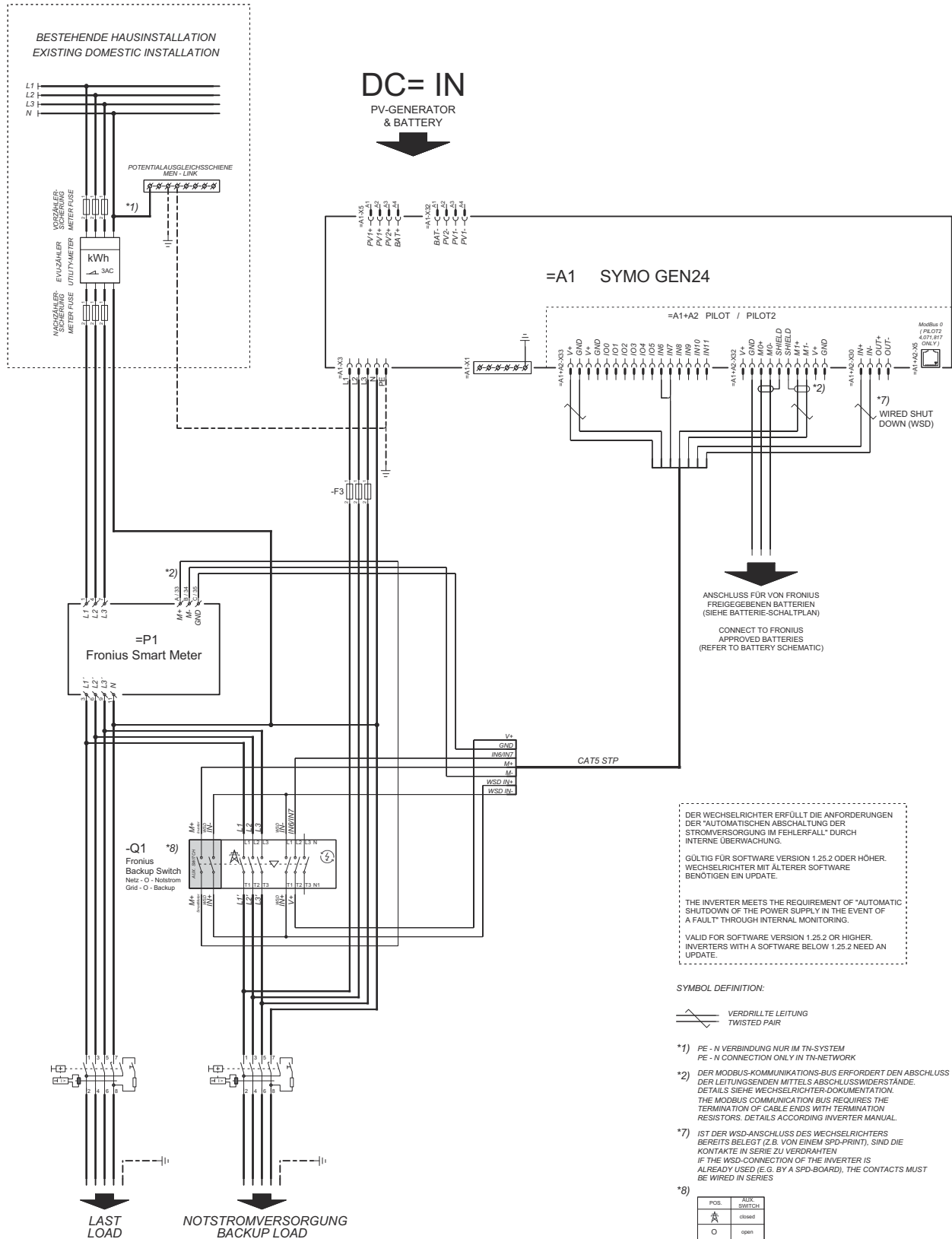


Automatic switch to backup power 4-pin double separation with ext. grid and system protection - e.g., Italy

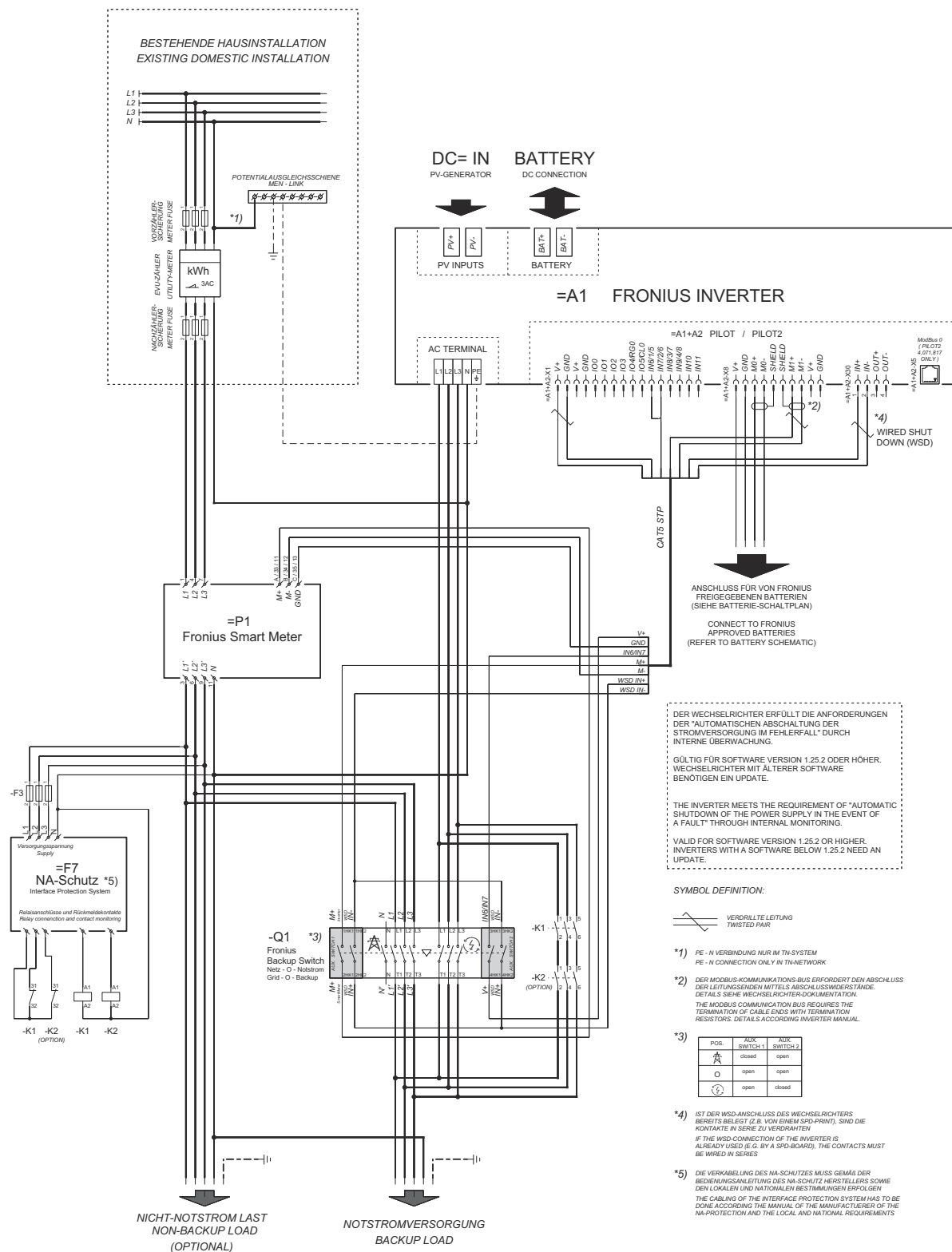


Circuit diagrams—manual switch to backup power with Fronius Backup Switch

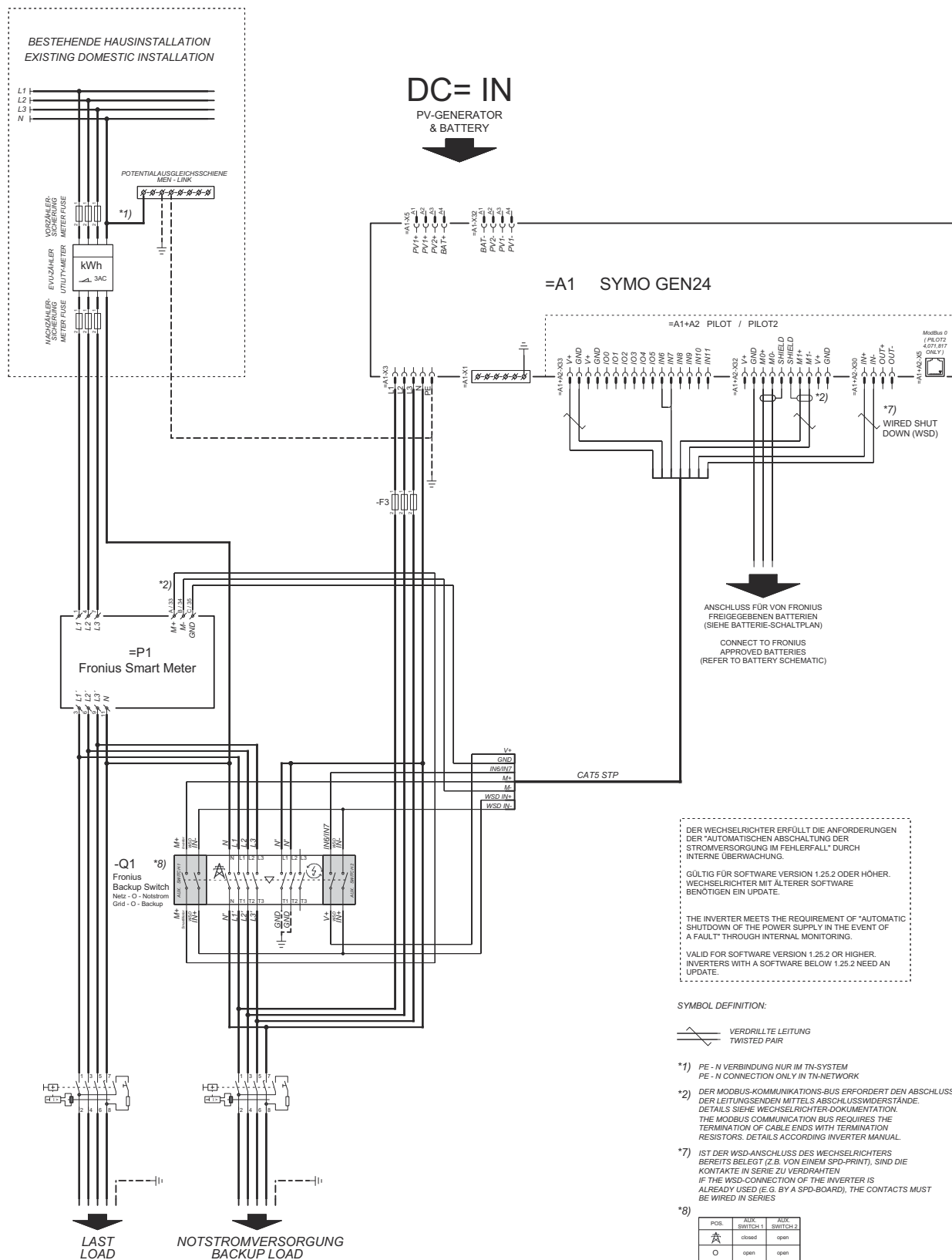
Manual switch to backup power 3-pin separation, e.g., Austria



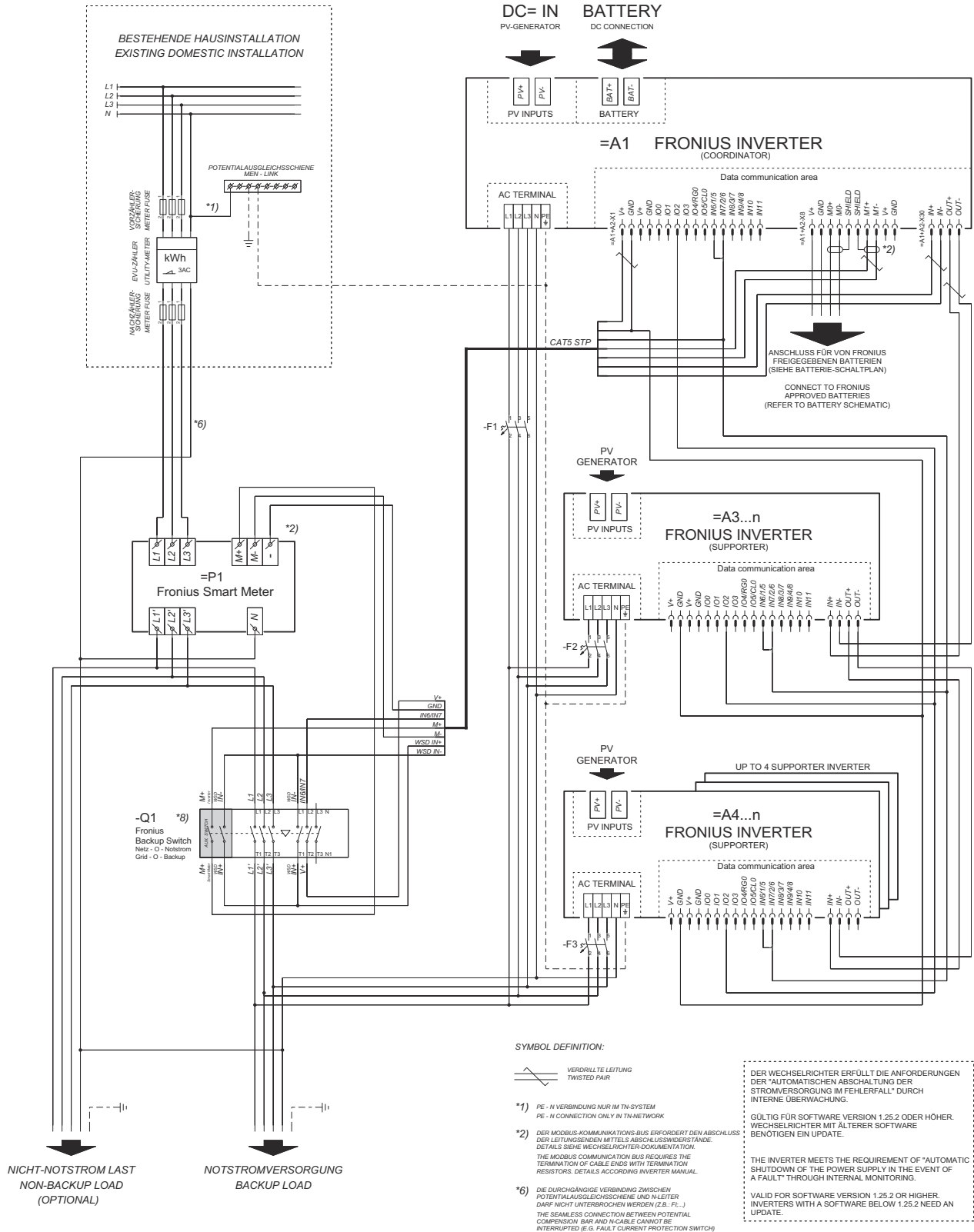
Manual switch to backup power 3-pin separation with grid and system protection



Manual switch to backup power 4-pin separation, e.g., Germany

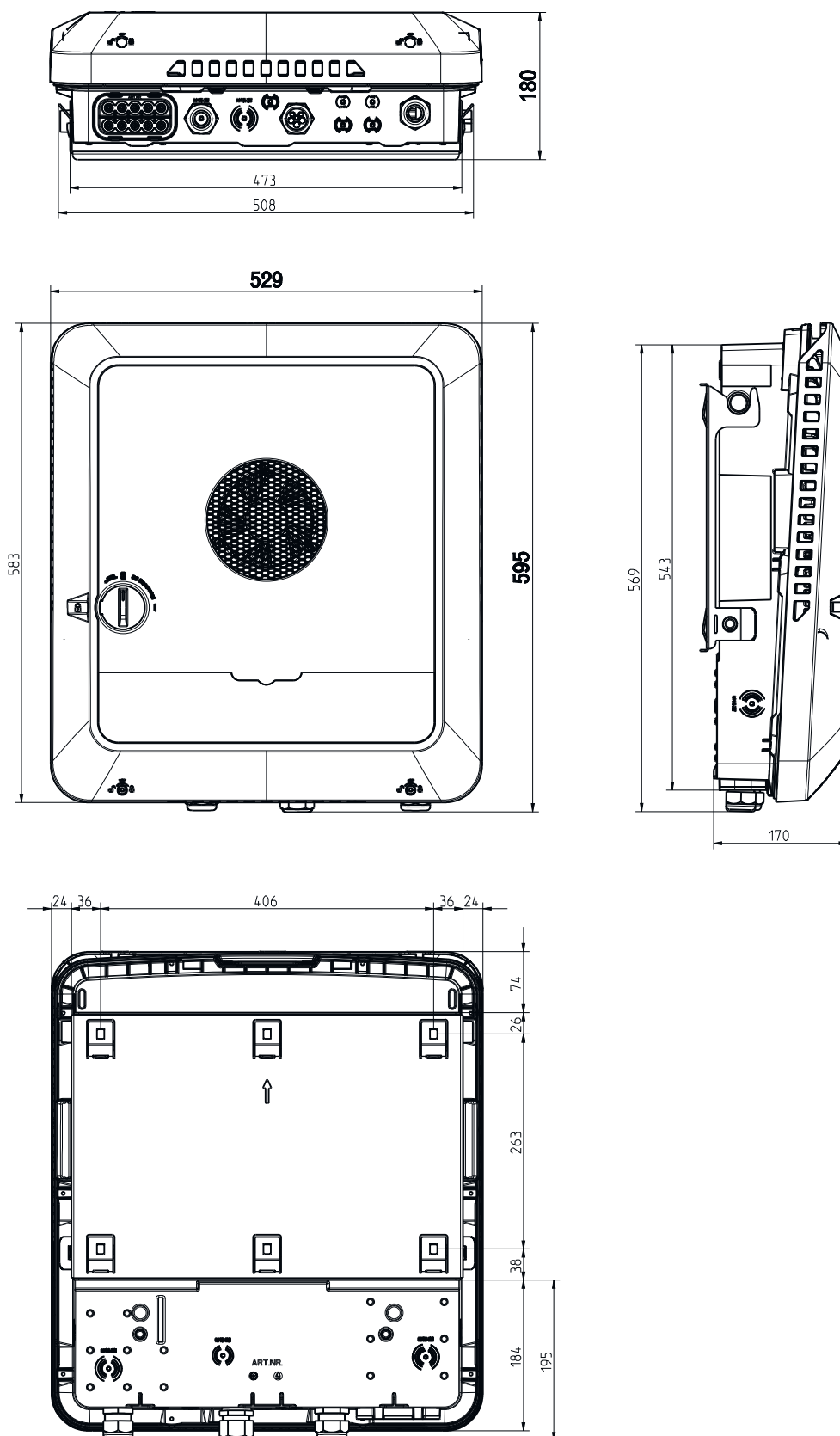


Manual switch to backup power 3-pin separation Parallel Backup with Backup Switch



Dimensions of the inverter

Fronius Symo GEN24 6 - 10 kW/Symo GEN24 6 - 12 kW SC





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