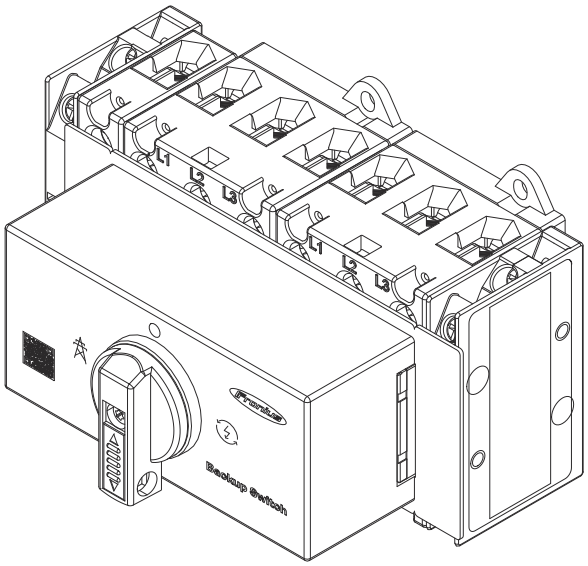
Operating Instructions

Fronius Backup Switch 1PN/3PN-63A



EN-US | Operating instructions

42,0426,0537,EA 001-26082024

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Safety Instructions

Safety rules

Explanation of Safety Instructions

⚠ DANGER!

Indicates an immediate danger.

▶ Death or serious injury may result if appropriate precautions are not taken.

⚠ WARNING!

Indicates a possibly dangerous situation.

▶ Death or serious injury may result if appropriate precautions are not taken.

⚠ CAUTION!

Indicates a situation where damage or injury could occur.

▶ Minor injury or damage to property may result if appropriate precautions are not taken.

NOTE!

Indicates the possibility of flawed results and damage to the equipment.

General

The device has been manufactured using state-of-the-art technology and according to recognized safety standards. If used incorrectly or misused, however, it can cause

- serious or fatal injury to the operator or a third party,
- and damage to the device and other material assets belonging to the operating company.

All persons involved in start-up operation, maintenance and servicing of the device must

- be suitably qualified,
- have knowledge of and experience in dealing with electrical installations and
- have fully read and precisely followed these Operating Instructions.

The Operating Instructions must always be kept on hand wherever the device is being used. In addition to the Operating Instructions, all applicable local rules and regulations regarding accident prevention and environmental protection must also be followed.

All safety and danger notices on the device

- must be kept in a legible state
- must not be damaged/marked
- must not be removed
- must not be covered, pasted, or painted over.

The terminals can reach high temperatures.

Only operate the device when all protection devices are fully functional. If the protection devices are not fully functional, there is a risk of

- serious or fatal injury to the operator or a third party,
- and damage to the device and other material assets belonging to the operating company.

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

Never bypass or disable protection devices.

For the location of the safety and danger notices on the device, refer to the section headed “General” in the Operating Instructions for the device.

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

Your personal safety is at stake!

Environmental conditions

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

Qualified personnel

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

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

Maintenance and repair work must only be carried out by an authorized specialist.

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

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

Components that are not in perfect condition must be changed immediately.

Copyright

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

General information

General information

Intended use

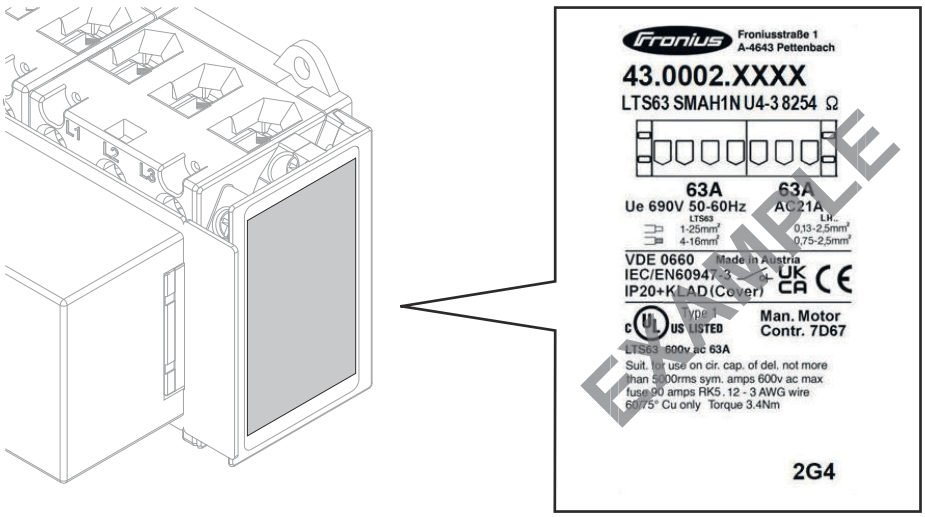
The Fronius Backup Switch is a piece of stationary equipment that was developed for use in public power grids with TN/TT systems. In the event of a grid failure, all connected loads and producers can be manually disconnected from the public grid in accordance with the specifications of the grid operator. The Fronius Backup Switch enables manual switching to the backup power supply. As soon as the public grid is stable again, the Fronius Backup Switch can be used to switch manually back to the power supply from the public grid. The Fronius Backup Switch can only be used in systems equipped with a battery storage system.

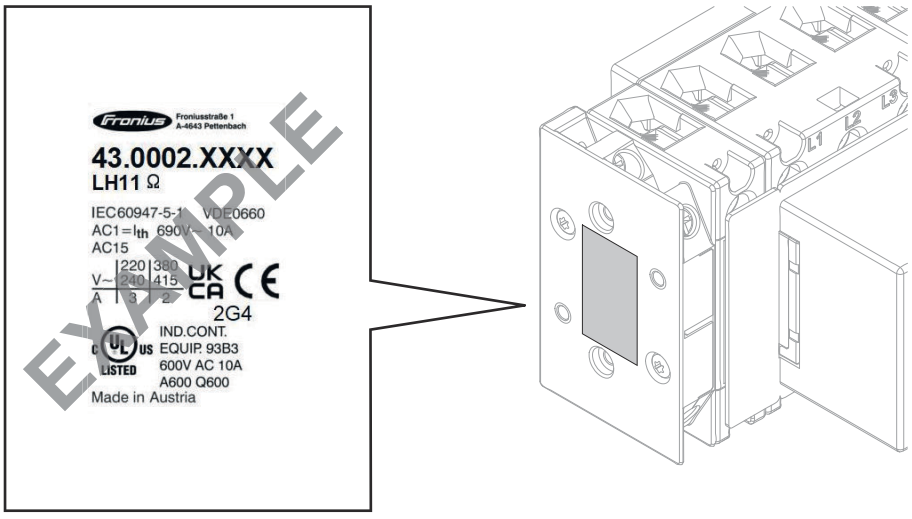
Foreseeable misuse

The Fronius Backup Switch is not suitable for the backup power supply of life-sustaining medical devices.

Information on the device

Technical data and markings are provided on the Fronius Backup Switch. They must not be removed or painted over.





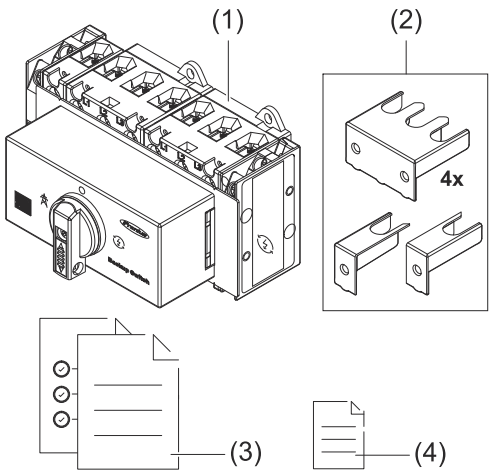
Markings

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

C UL US LISTED marking – confirms compliance with applicable standards for Canada and the USA.

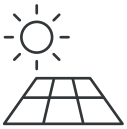
IMPORTANT!
NO power categories of the US versions of the Fronius product series "Primo GEN24 X.X **208-240** (Plus) (SC)" are compatible with the Fronius Backup Switch.

Scope of supply



(1) 1 pc Fronius Backup Switch
(2) 4 pcs large protective cover incl. 8 pcs screws B2.2x6.5 mm (not shown)
2 pcs small protective cover incl. 2 pcs screws B2.2x6.5 mm (not shown)
(3) 1 pc Quick Start Guide
(4) 1 pc "backup power supply" sticker

Explanation of symbols



PV module
generates direct current

Fronius GEN24 inverter
converts direct current into alternating current and charges the battery (battery charging is only possible with Fronius GEN24 Plus inverters). The integrated system monitoring enables the inverter to be integrated into a network by means of WLAN.

Fronius Backup Switch
In the event of a power failure or grid malfunction, this enables all connected loads and producers to be disconnected from the public grid manually and safely in accordance with the specifications of the grid operator. Once grid stability has been restored, manual reconnection to the public grid is possible.

Inverter in the system
e.g. Fronius Primo, Fronius Symo, etc.

Primary meter (Fronius Smart Meter)
records the load curve of the system and makes the measured data available for energy profiling in Fronius Solar.web. The primary meter also regulates the dynamic feed-in control.

Utility meter
measures the metering data relevant for the billing of electricity quantities (primarily the kilowatt hours of grid purchases and grid power feed). On the basis of the data relevant for billing, the electricity retailer invoices a grid purchase and the purchaser of the surplus pays for the grid power feed.

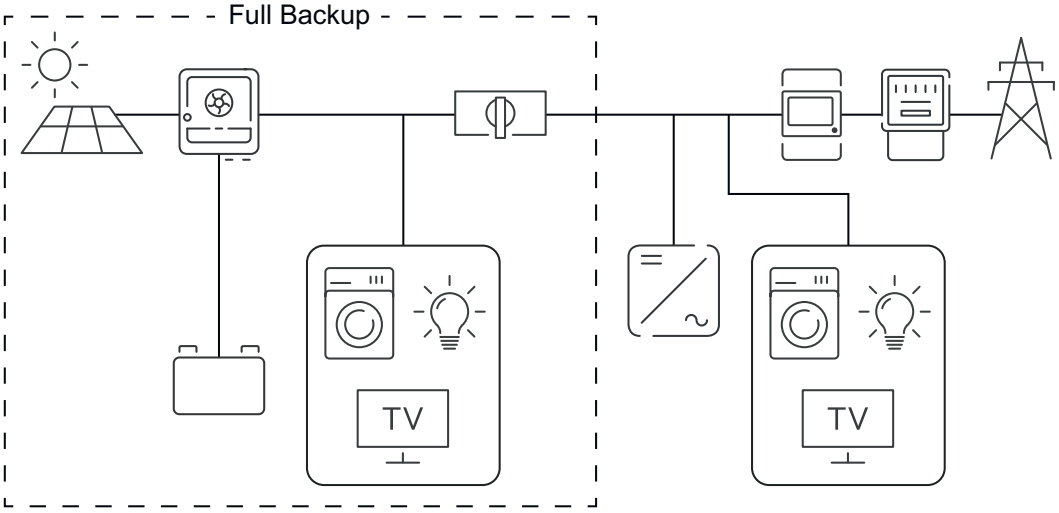
Grid
supplies the loads in the system if insufficient power is being generated by the PV modules or supplied by the battery.

Battery
is coupled to the inverter on the direct current side, and stores electrical energy.

Loads in the system
e.g. washing machine, lights, television, etc.

Positioning

The Fronius Backup Switch must be installed at the following position in the system.



Compatible devices

Compatible inverters
- Fronius Primo GEN24 Plus
- Fronius Symo GEN24 Plus

IMPORTANT!
NO power categories of the US versions of the Fronius product series "Primo GEN24 X.X **208-240** (Plus) (SC)" are compatible with the Fronius Backup Switch.

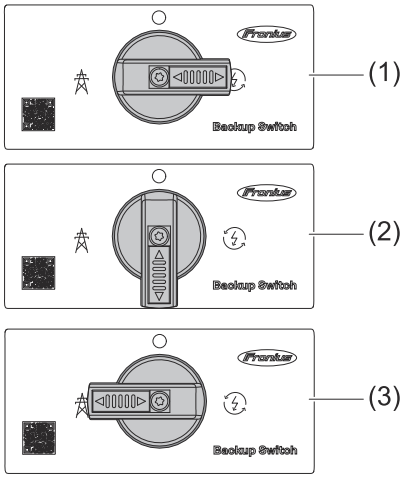
Compatible Smart Meters

- Fronius Smart Meter IP
- Fronius Smart Meter 50kA-3
- Fronius Smart Meter 63A-1
- Fronius Smart Meter 63A-3
- Fronius Smart Meter TS 5kA-3
- Fronius Smart Meter TS 65A-3
- Fronius Smart Meter TS 100A-1

Details on how to connect a Fronius Smart Meter can be found in the respective operating instructions.
To download the Smart Meter operating instructions, either click on the link **Smart Meter operating instructions** or visit the page **fronius.com/en/solar-energy/installers-partners/downloads** on an end device and enter the search term "Smart Meter".

Operating controls and connections

Switch positions of the Backup Switch



The backup switch has three switch positions:

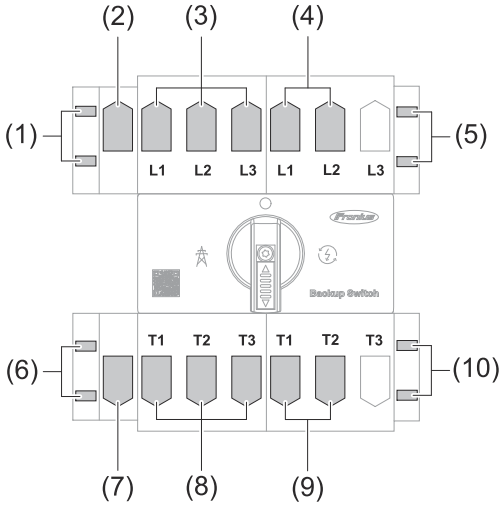
(1) **Grid operation**
The power is supplied by the public grid.

(2) **o-position** (de-energized)
The power supply is safely disconnected from the public grid or from the backup power supply.

(3) **Backup power mode**
The power is supplied as backup power via the inverter or the battery.

IMPORTANT!
In the switch position (2) the Backup Switch can be secured to prevent it from being switched on/off using a standard padlock. The national guidelines must be complied with in this respect.

Connection area



(1) Auxiliary contact switch terminals: Data communication
(2) Load disconnector 63 A terminals: Neutral conductor
(3) Load disconnector 63 A terminals: Grid
(4) Load disconnector 63 A terminals: Neutral conductor ground connection
(5) Auxiliary contact switch terminals: Data communication
(6) Auxiliary contact switch terminals: Data communication
(7) Load disconnector 63 A terminals: Neutral conductor
(8) Load disconnector 63 A terminals: Load
(9) Load disconnector 63 A terminals: Neutral conductor ground connection
(10) Auxiliary contact switch terminals: Data communication

For information about installing data communication, see chapter **Connecting the data communication cables** on page **27**.

Installation and Startup

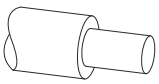
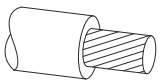
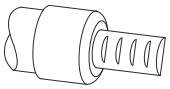
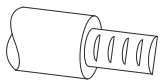
Requirements for connecting the Backup Switch

Protective circuit

For safe operation of the Fronius Backup Switch, the following components must be installed in the switch cabinet:

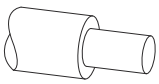
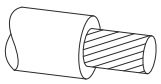
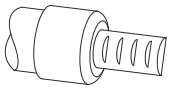
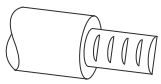
- Upstream overcurrent protection according to the information in the chapter **Technical data** on page **35**.
- A surge protection device (SPD) as specified in chapter **Technical data** on page **35**.

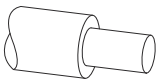
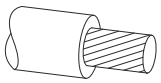
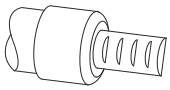
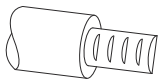
Various cable types

Solid	Fine-stranded	Fine-stranded with ferrule and collar	Fine-stranded with ferrule without collar
			

Permitted cables for the electrical connection

Connect only round copper wires to the terminals. See tables below:

Terminals on load disconnector 63 A[1)]			
			
1 - 25 mm²	4 - 16 mm²	2.5 - 16 mm²	2.5 - 16 mm²
max. 2 x 10 mm²	max. 2 x 10 mm²		

Terminals on auxiliary contact switch			
			
0.13 - 2.5 mm²	0.75 - 2.5 mm²	0.5 - 1.5 mm²	0.5 - 1.5 mm²

[1)] Select the cross-section of the sufficiently large cable. The cable cross-section depends on the power actually connected.

Permitted connection screws

	Load disconnector 63 A	Auxiliary contact switch
Connection screw	M5	M3.5
Tightening torque	2 - 4 Nm	0.8 - 1.4 Nm
Conductors per terminal	2	2

Preparing for the installation

Safety

⚠ WARNING!

Danger due to short circuits resulting from foreign bodies in the connection area.
An electric shock can lead to serious injury or death.
- ▶ Keep foreign objects away from the connection area or remove them if necessary.

⚠ WARNING!

Danger from incorrect operation and work that is not carried out properly.
This can result in severe personal injury and damage to property.
- ▶ Only trained service technicians who have received training from the respective inverter or battery manufacturer are authorized to perform commissioning, maintenance, and service activities for inverters and batteries, and only within the scope of the technical regulations.
- ▶ Read the installation instructions and operating instructions from the respective manufacturer before installing and commissioning the equipment.

⚠ WARNING!

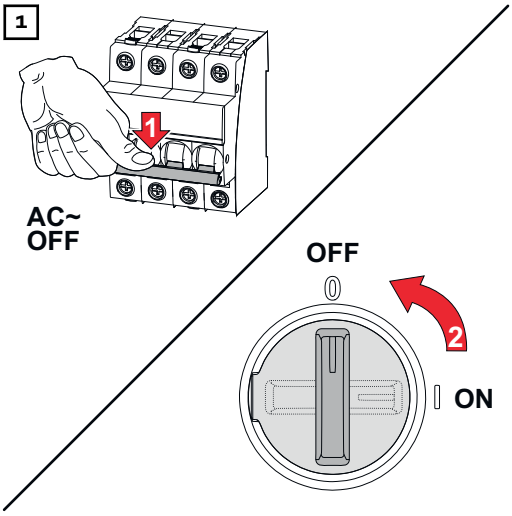
Danger from mains voltage and DC voltage from PV modules that are exposed to light, as well as batteries.
This can result in severe personal injury and damage to property.
- ▶ All connection, maintenance and service work should only be carried out when the AC and DC sides have been disconnected from the inverter and battery, and are de-energized.
- ▶ Only an authorized electrical engineer is permitted to make the connection to the public grid.

⚠ 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 repaired by an authorized specialist.

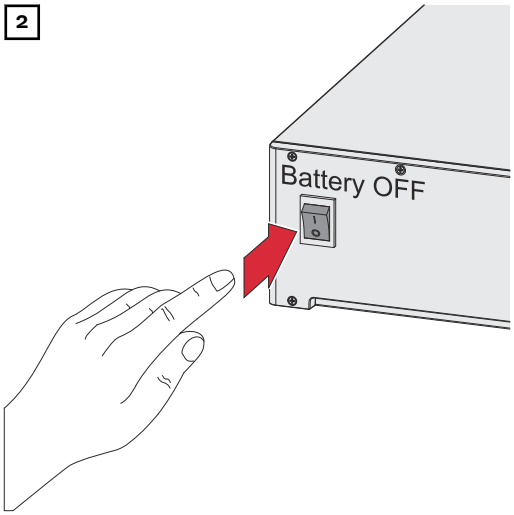
General disconnection of the power supply

1



Turn off the automatic circuit breaker. Set the DC disconnector to the "off" (OFF) switch position.

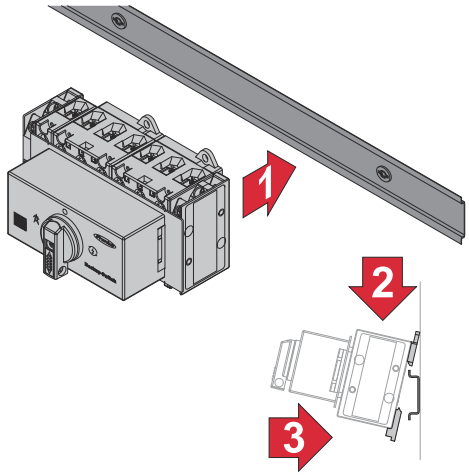
2



Switch off the battery connected to the inverter.

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

Installation



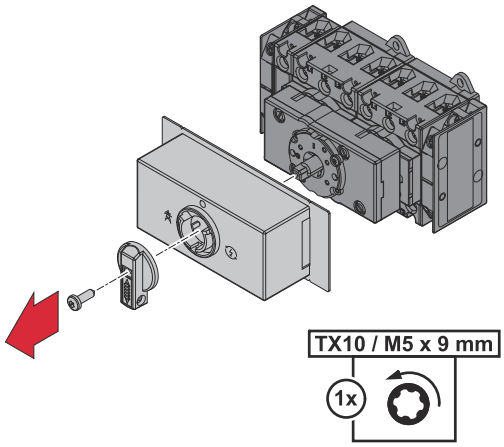
The Fronius Backup Switch can be mounted on a 35 mm DIN rail.

Housing dimensions according to DIN 4388:

- 7.7 TE (horizontal pitch) with left and right end tabs (corresponds to the delivery condition)
- 7.5 TE without end tabs

Disassembly of the switch and the housing cover

Before connecting the cables, the housing cover must be removed.



1. Set the switch to position "0".
2. Push the switch lock down.
   ✓ *The switch is now unlocked.*
3. Remove the screw.

✓ *The switch and housing cover can now be removed.*

Stripping lengths

Load disconnector 63 A	Auxiliary contact switch
14 mm (0.55 in.)	8 mm (0.31 in.)

2-pin installation

Connecting the Backup Switch 2-pin to the public grid

⚠ WARNING!

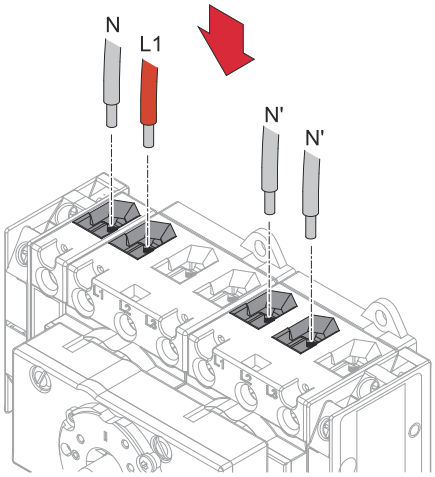
Danger from loose and/or incorrectly clamped single conductors in the terminal.

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

- ▶ Check that the single conductors are secure in the terminal.
- ▶ Make sure that the single conductor has been fully inserted into the terminal and that no single wires are protruding out of the terminal.

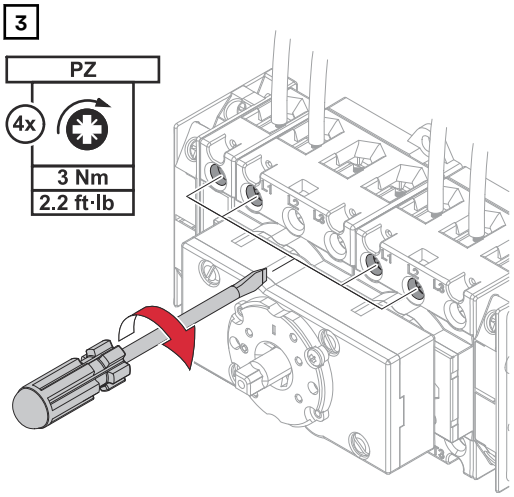
1 Before starting the connection work, strip all cables of their insulation in accordance with the specifications. See chapter **Stripping lengths** on page **22**.

2



Plug the individual conductor (L1) coming from the grid and the neutral conductor (N) coming from the grid into the terminals. Plug the two neutral conductors (N') from the backup circuit into the terminals.

3



Screw the single conductor (L1) and the neutral conductor (N) into the terminals. Screw the two neutral conductors (N') into the terminals. For permissible connection screws and torques, see **Permitted connection screws** on page **19**.

Connecting load 2-pin in the backup power circuit to the Backup Switch

⚠ WARNING!

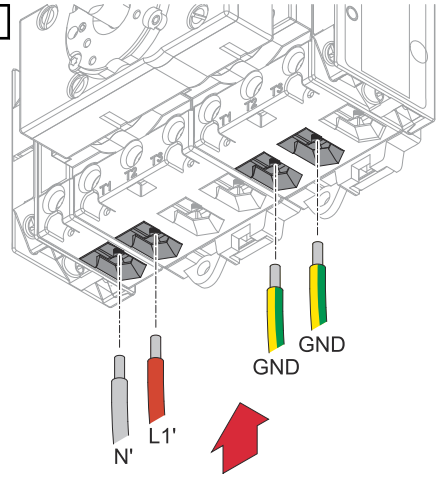
Danger from loose and/or incorrectly clamped single conductors in the terminal.

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

- ▶ Check that the single conductors are secure in the terminal.
- ▶ Make sure that the single conductor has been fully inserted into the terminal and that no single wires are protruding out of the terminal.

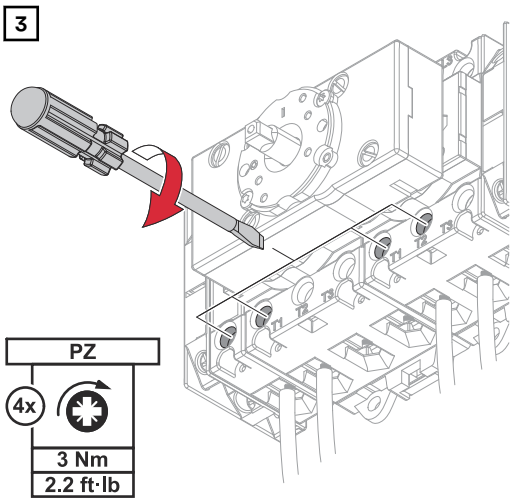
1 Before starting the connection work, strip all cables of their insulation in accordance with the specifications. See chapter **Stripping lengths** on page **22**.

2



Plug the individual conductor (L1‘) coming from the backup power circuit and the neutral conductor (N‘) coming from the backup power circuit into the terminals. Plug the grounding cables (GND) of the house wiring into the terminals.

3



Screw the single conductor (L1‘) and the neutral conductor (N‘) into the terminals. Screw the grounding cables (GND) of the house wiring into the terminals.

IMPORTANT!

The neutral conductor (N‘) must be connected to the neutral conductor (N) from the public grid.

4-pin installation

Connecting the Backup Switch 4-pin to the public grid

⚠ WARNING!

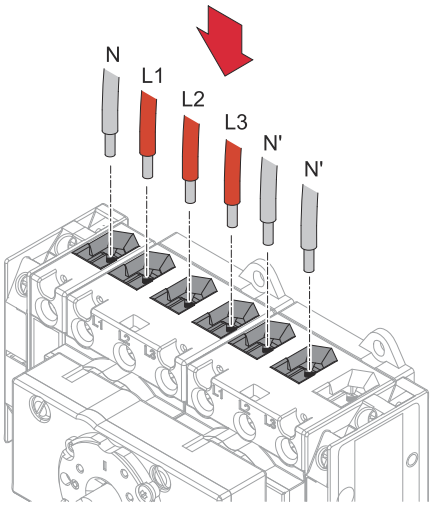
Danger from loose and/or incorrectly clamped single conductors in the terminal.

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

- ▶ Check that the single conductors are secure in the terminal.
- ▶ Make sure that the single conductor has been fully inserted into the terminal and that no single wires are protruding out of the terminal.

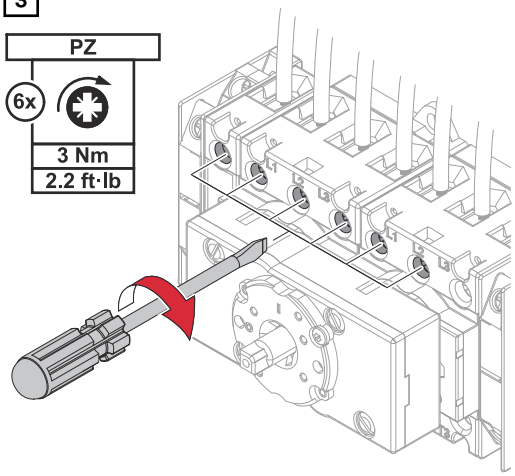
1 Before starting the connection work, strip all cables of their insulation in accordance with the specifications. See chapter **Stripping lengths** on page **22**.

2



Plug the individual conductor (L1, L2, L3) coming from the grid and the neutral conductor (N) coming from the grid into the terminals. Plug the two neutral conductors (N') from the backup circuit into the terminals.

3



Screw the single conductors (L1, L2, L3) and the neutral conductor (N) into the terminals. Screw the two neutral conductors (N') into the terminals. For permissible connection screws and torques, see **Permitted connection screws** on page **19**.

Connecting load 4-pin in the backup power circuit to the Backup Switch

⚠ WARNING!

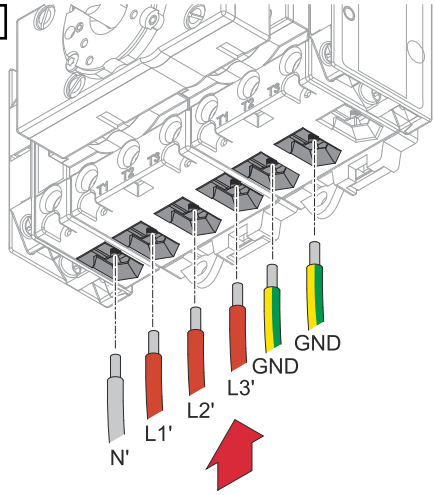
Danger from loose and/or incorrectly clamped single conductors in the terminal.

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

- ▶ Check that the single conductors are secure in the terminal.
- ▶ Make sure that the single conductor has been fully inserted into the terminal and that no single wires are protruding out of the terminal.

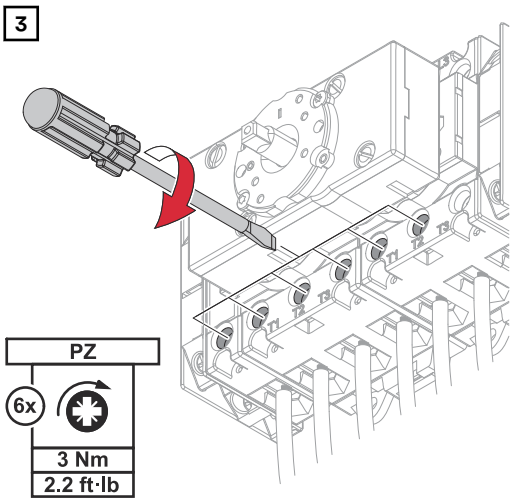
1 Before starting the connection work, strip all cables of their insulation in accordance with the specifications. See chapter **Stripping lengths** on page **22**.

2



Plug the individual conductor (L1', L2', L3') coming from the backup power circuit and the neutral conductor (N') coming from the backup power circuit into the terminals. Plug the grounding cables (GND) of the house wiring into the terminals provided.

3



Screw the single conductors (L1', L2', L3') and the neutral conductor (N') into the terminals. Screw the grounding cables (GND) of the house wiring into the terminals.

IMPORTANT!

The neutral conductor (N') must be connected to the neutral conductor (N) from the public grid.

Connecting the data communication cables

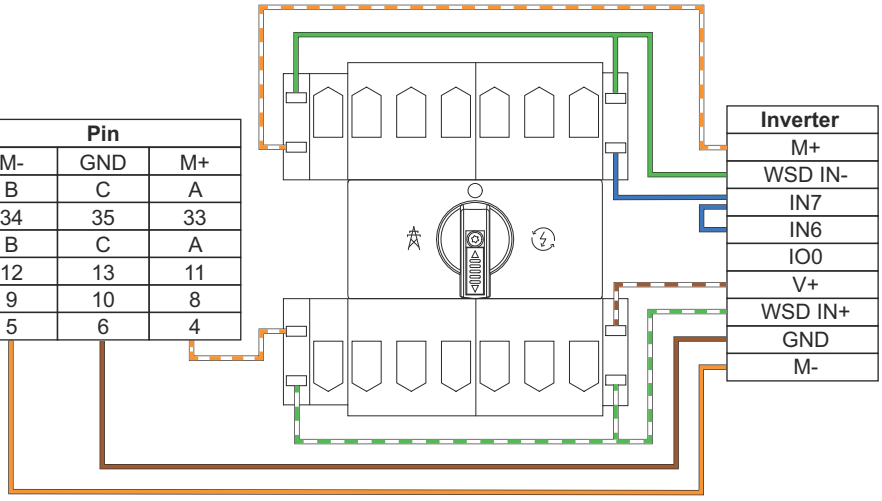
Connecting the data communication cable to the Backup Switch

IMPORTANT!

Observe the following information regarding connection of the data communication cable to the Backup Switch.

- Use network cables of type CAT5 STP or higher.
- Use a twisted cable pair for corresponding data cables.
- Use double insulated or sheathed data cables when near bare conductors.
- Use shielded twisted pair cables to avoid interference.

Smart Meter	Pin		
IP [1]	M-	GND	M+
50k A-3	B	C	A
63A-1	34	35	33
63A-3	B	C	A
TS 5kA-2	12	13	11
TS 5kA-3	9	10	8
TS 100A-1	5	6	4



[1] Wire the Fronius Smart Meter IP via Modbus so that the signal can be interrupted. The Fronius Smart Meter IP must not be connected to the network.

Description of the data communication

Feedback switch in backup power position (IN6/IN7)
When the Backup Switch is switched to backup power supply, the inverter checks the position of the switch. If this position is correct, the backup power supply of the connected loads in the backup power circuit is enabled.

Communication Modbus Smart Meter (M+/M-)
The communication between the inverter and the Fronius Smart Meter is interrupted via the contact. The interrupted communication prevents automatic termination of backup power mode. The inverter remains in backup power mode. If a stable power supply from the grid is available again, the switch of the Fronius Backup Switch must be switched to grid operation manually.

Wired Shut Down (WSD IN/WSD OUT)
In the "O" switch position, the WSD line is interrupted. The inverter switches off immediately. An asynchronous switchback to the grid is prevented.

Mounting the protective cover

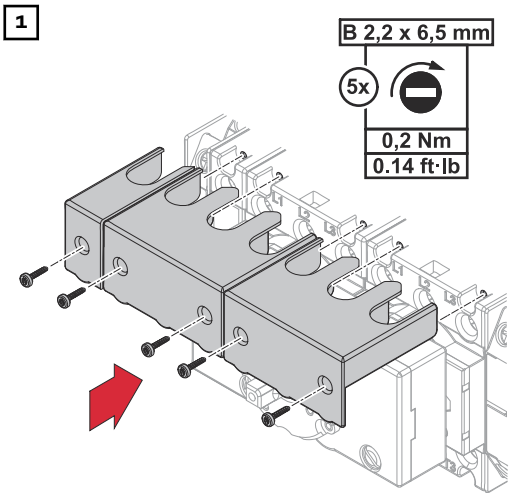
Mounting the protective covers

⚠ WARNING!

Danger due to electrical voltage from missing or incorrectly fitted protective covers.
Electric shocks can be fatal and/or cause serious property damage.
- ▶ Fit the protective covers immediately after installing the live cables
- ▶ Fit the protective covers correctly and check that they are secure.

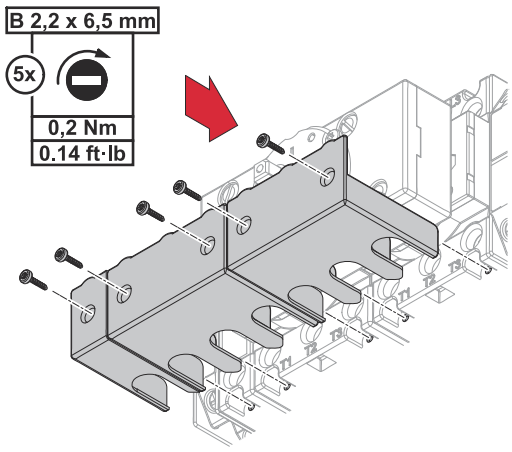
IMPORTANT!
The protective covers are used for additional insulation of the live lines to the data transfer lines.

1



Mount a top protective cover on each of the load disconnectors 63 A. Fit using the screws supplied with the delivery.

2

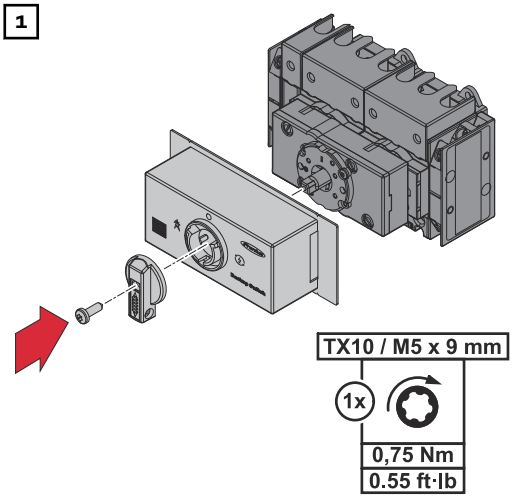


Mount a bottom protective cover on each of the load disconnectors 63 A. Fit using the screws supplied with the delivery.

Mounting housing cover and switch

Mounting the housing cover and the switch

1

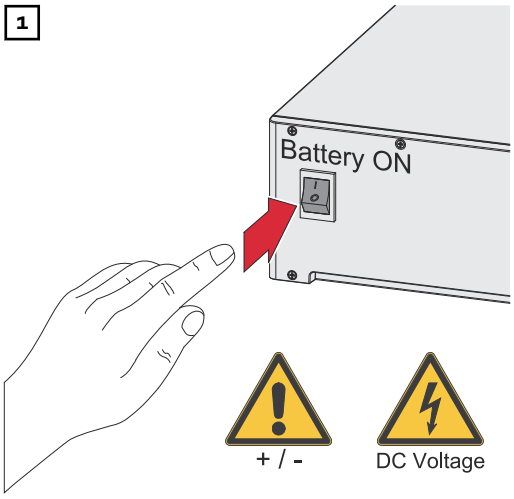


Install the housing cover and the switch and secure with the screw.

Commissioning

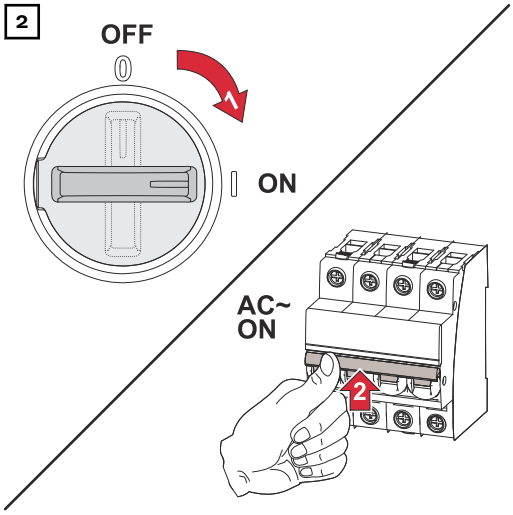
Putting the PV system into operation

1



Switch on the battery connected to the inverter.

2



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

General

IMPORTANT!
Settings in the **"Device configuration"** → **"Functions and I/Os"** menu item may only be implemented by staff trained to do so! The service password must be entered for the **"Device configuration"** menu item.

Backup power - Configuring a Full Backup

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 Log in to the login area with user **"Technician"** and the technician password.

3 In the **"Device configuration"** menu, click on the **"Functions and I/Os"** button.

4 Enable **"Backup power"** mode.

5 Select **"Full Backup"** mode in the **"Backup power mode"** drop-down list.

6 Click the **"Save"** button to save the settings.

The Full Backup power mode has been configured.

Testing backup power mode

Testing backup power mode is recommended:
- During the initial installation and configuration
- After working on the switch cabinet
- During ongoing operation (recommendation: at least once a year)

For test mode, a battery charge of min. 30% is recommended.

A description on how to run test mode can be found in the **backup power check-list** (https://www.fronius.com/en/search-page, item number: 42,0426,0365).

Appendix

Technical data

Technical data

Technical data [1]		Load disconnector 63 A	Auxiliary contact switch
Thermal rated operating current			
open I_{th}		63 A	10 A
encapsulated I_{the}		63 A	
Rated insulation voltage U_i [2]		690 V	690 V
Breaking capacity I_{eff}			
3 x 220 - 440 V		330 A	
3 x 500 V		330 A	
3 x 660 - 690 V		190 A	
Utilization categories AC21A, AC21B			
Rated operating current I_e	400 V	63 A	
Rated operating power	220 – 240 V	24 kW	
	380 – 440 V	42 kW	
3-phase 3-pin	660 – 690 V	72 kW	
Utilization categories AC23A, AC23B			
Rated operating current I_e	400 V	45 A	
Rated operating power	220 – 240 V	15 kW	
	380 – 440 V	22 kW	
	660 – 690 V	18.5 kW	
Fuse	gL (gG)	max. 63 A	max. 20 A

General data	
Weight	526 g
Permitted ambient temperature	-40 °C to +60 °C
Dimensions	64 x 135.4 x 91 mm
Protection class	IP20 + KLAD
Mains frequency	50 - 60 Hz
Nominal voltage	3 - 230 / 400 V
Grid disconnection	2-pin or 4-pin

[1] According to IEC 947-3, IEC 947-5-1, VDE 0660, EN 60947-3, EN 60947-5-1

[2] Applies to: Grids with grounded neutral point, overvoltage category I to III, pollution degree 3: Uimp = 6kV.

Service, warranty terms and conditions, and disposal

Maintenance

Maintenance and service work may only be carried out by Fronius-trained service technicians.

Disposal

Waste electrical and electronic equipment must be collected separately and recycled in an environmentally sound manner in accordance with the European Directive and national law. Used equipment must be returned to the distributor or through a local authorized collection and disposal system. Proper disposal of the used device promotes sustainable recycling of resources and prevents negative effects on health and the environment.

Packaging materials
- Collect separately
- Observe local regulations
- Crush cardboard boxes

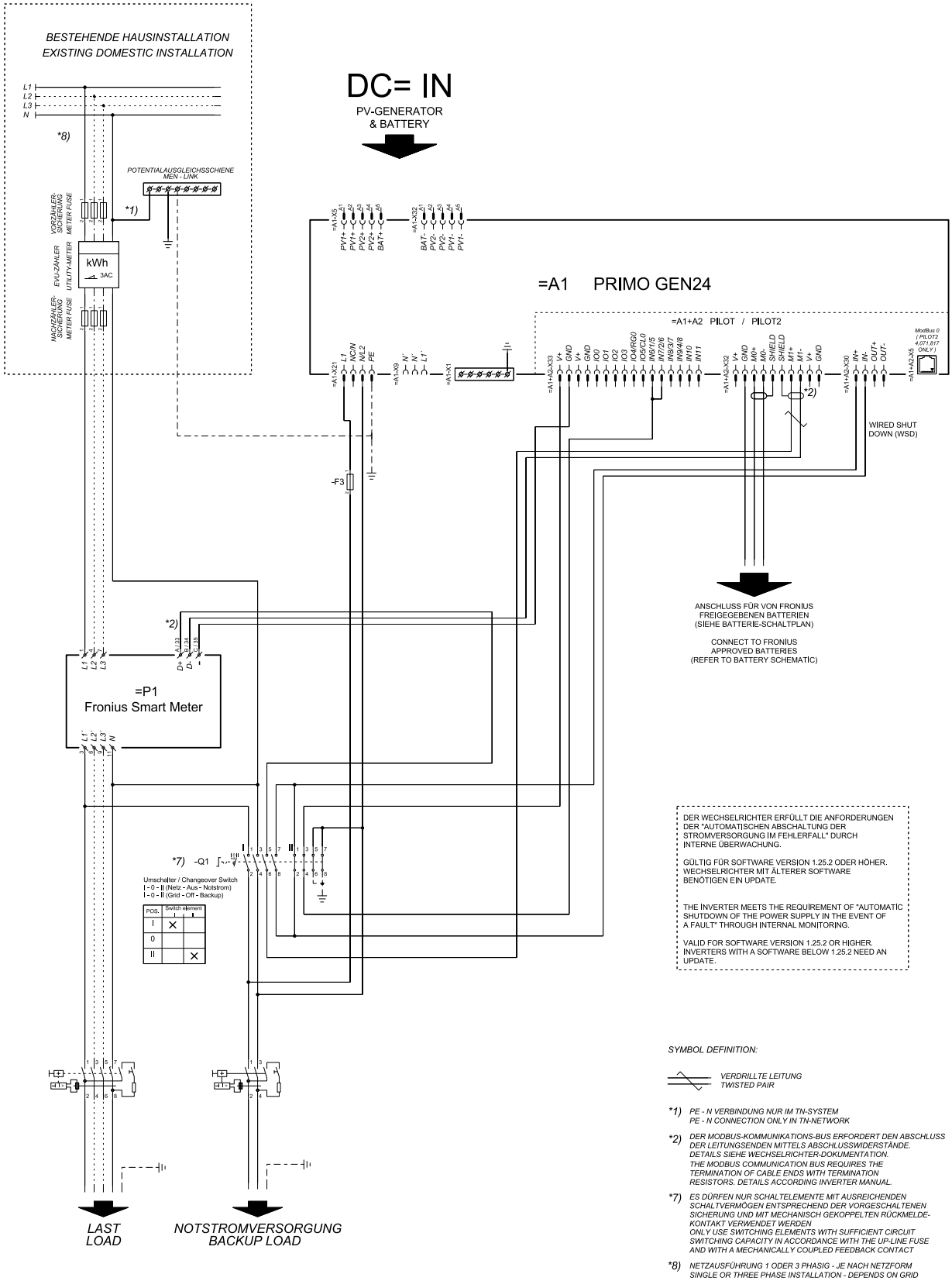
Fronius manufacturer's warranty

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

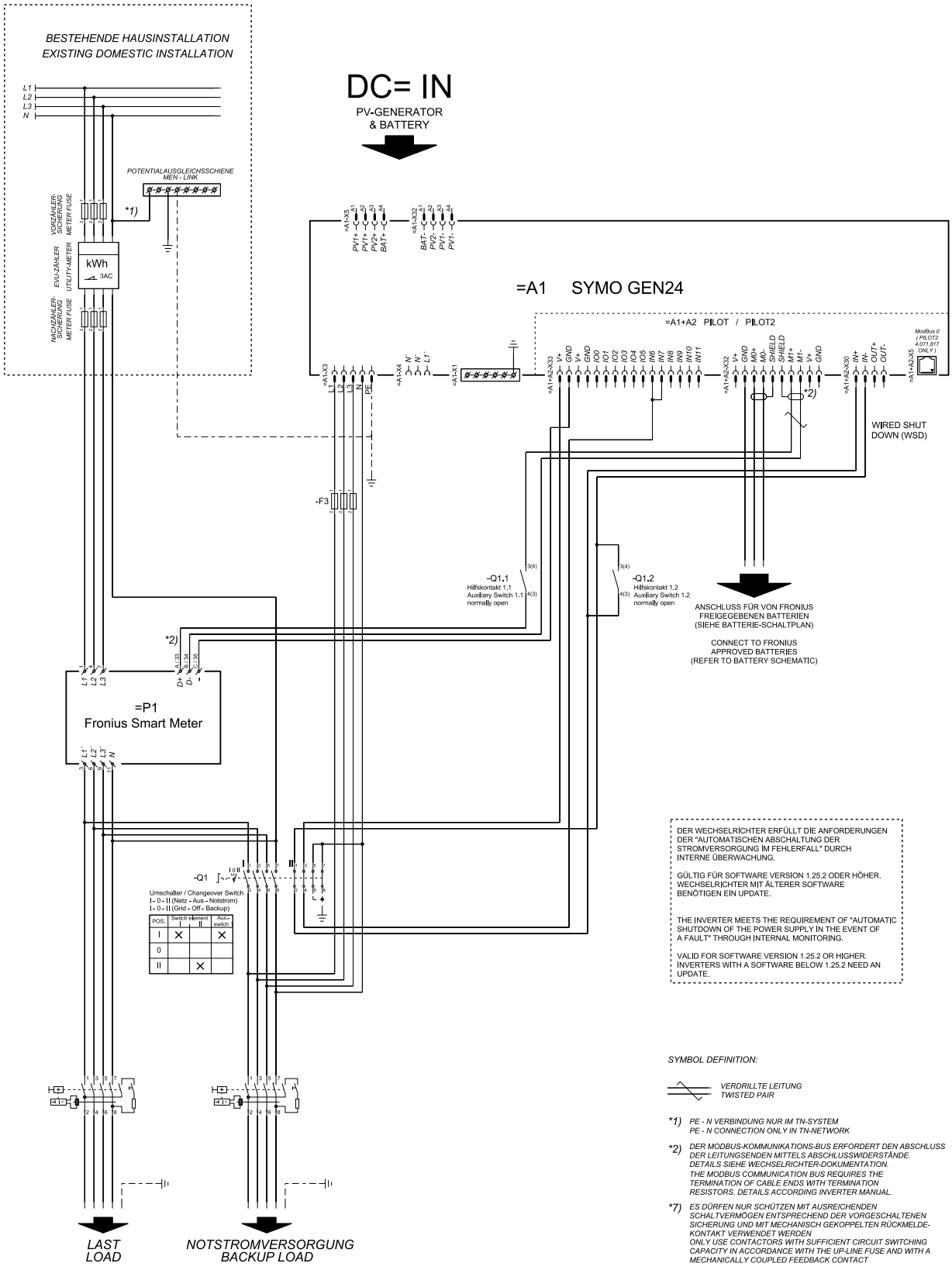
To obtain the full warranty period for your newly installed Fronius product, please register at **www.solarweb.com**.

Circuit Diagrams

Manual switch to backup power 2-pin separation, e.g., Germany



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



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At www.fronius.com/contact you will find the contact details of all Fronius subsidiaries and Sales & Service Partners.