



# **APPLICATION GUIDE - COMMISSIONING BACKUP POWER ON FRONIUS GEN24 PLUS INVERTERS**

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This application guide describes all the necessary steps to activate and commission the backup power function with the Fronius GEN24 Plus inverters. On the picture below you can see the 3 required main components – inverter –battery storage and switch-over box.



## 1. GENERAL INFORMATION ABOUT BACKUP POWER

Fronius Symo GEN24 Plus offer the opportunity to supply the entire household consumers in case of a grid outage. Basic requirements for using the backup power function are a connected BYD battery box HVS/HVM and the implementation of a backup power switchover box.

### Technical data:

The following technical data apply to the devices in the Symo GEN24 Plus series in backup power mode:

	Symo GEN24 6.0	Symo GEN24 8.0	Symo GEN24 10.0
Max. nominal power	6.000 W	8.000 W	10.000 W
Max. power per phase	3.680 W	3.680 W	3.680 W
Max. charging and discharging current	22 A	22 A	22 A
Switch-over time	< 90 s	< 90 s	< 90 s

### Discharge power of the battery:

The maximum continuous output also depends on the battery voltage and discharge power of the connected battery. The voltage and discharge power of the battery can be found on the data sheet. Attention: the power can vary by up to +/- 20% depending on the state of charge.

### Nominal voltage and overcurrent:

The nominal voltage is available immediately after the device has been switched on.

In the short term, a maximum peak power of up to 12.100VA is possible. This value is valid for all device variants.

### Overload:

Short-term overloading is possible with all devices. This relates to the respective power per phase. In this overload scenario, the voltage is kept within the nominal voltage range, in contrast to overcurrent.

### Backup power switchover (grid disconnection):

The purpose of the backup power switchover is to disconnect the household from the grid before stand-alone operation is activated. This ensures that maintenance personnel are not endangered by energy that is fed in accidentally.

Depending on the grid operator, the demands on backup power switchover can vary. The exact nature of the backup power switchover itself is the responsibility of the installation company and must be agreed with the grid operator. Fronius provides some examples of circuit diagrams.

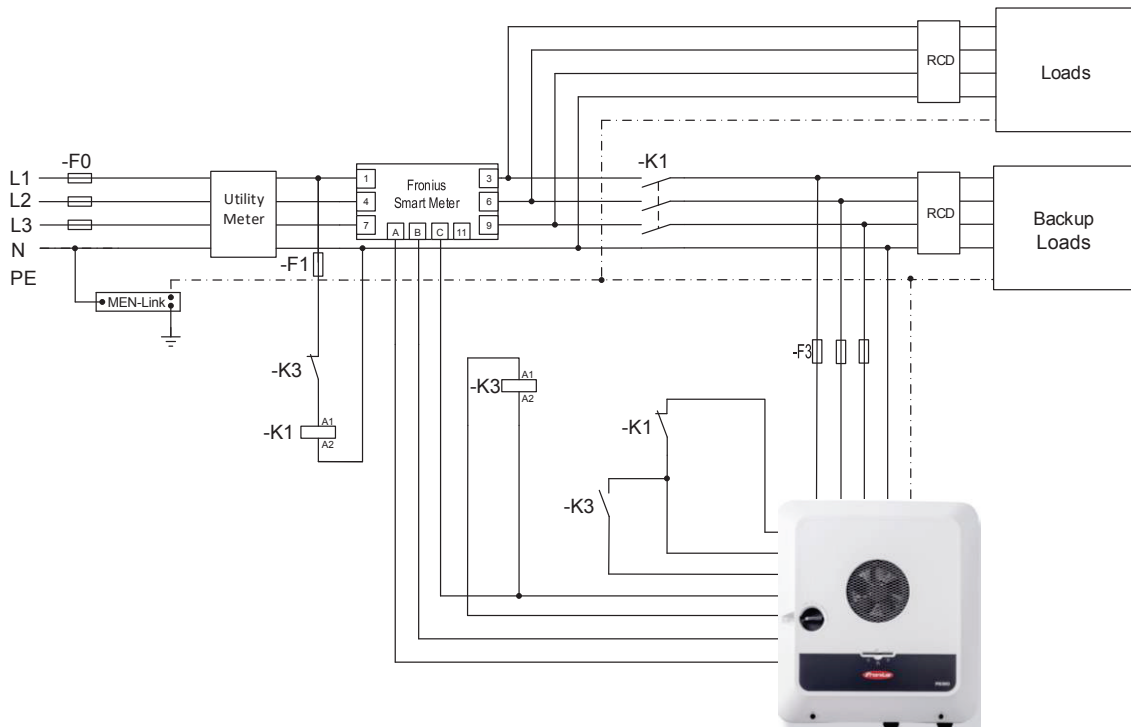
Enwitec is a company that offers Fronius-approved pre-fabricated switchover boxes (<https://enwitec.eu/net-changing-box/?lang=en>)

### Recommendations for backup power installations.

- Combine important devices onto one backup power circuit
- Distribute loads evenly over all phases
- When using backup power, connect devices in a time-delayed sequence, if possible.

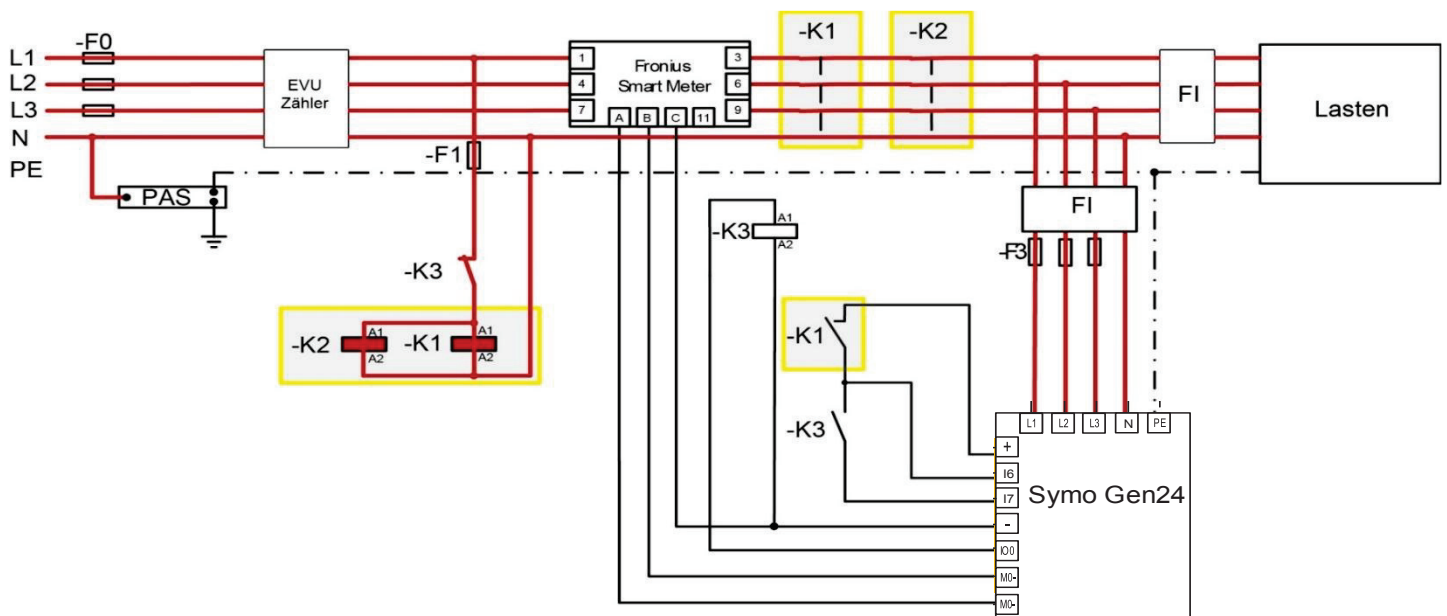
## 2. SCHEMATICS AND OPERATION

Below is the main circuit diagram for backup power switchover without using an additional external ENS (External Grid Monitoring Device). The appropriate design and circuitry for your system should always be agreed with your local grid operator. Usually K1 consists of two redundantly connected contactors.



### 2.1. FUNCTION OF BACKUP POWER SWITCH-OVER

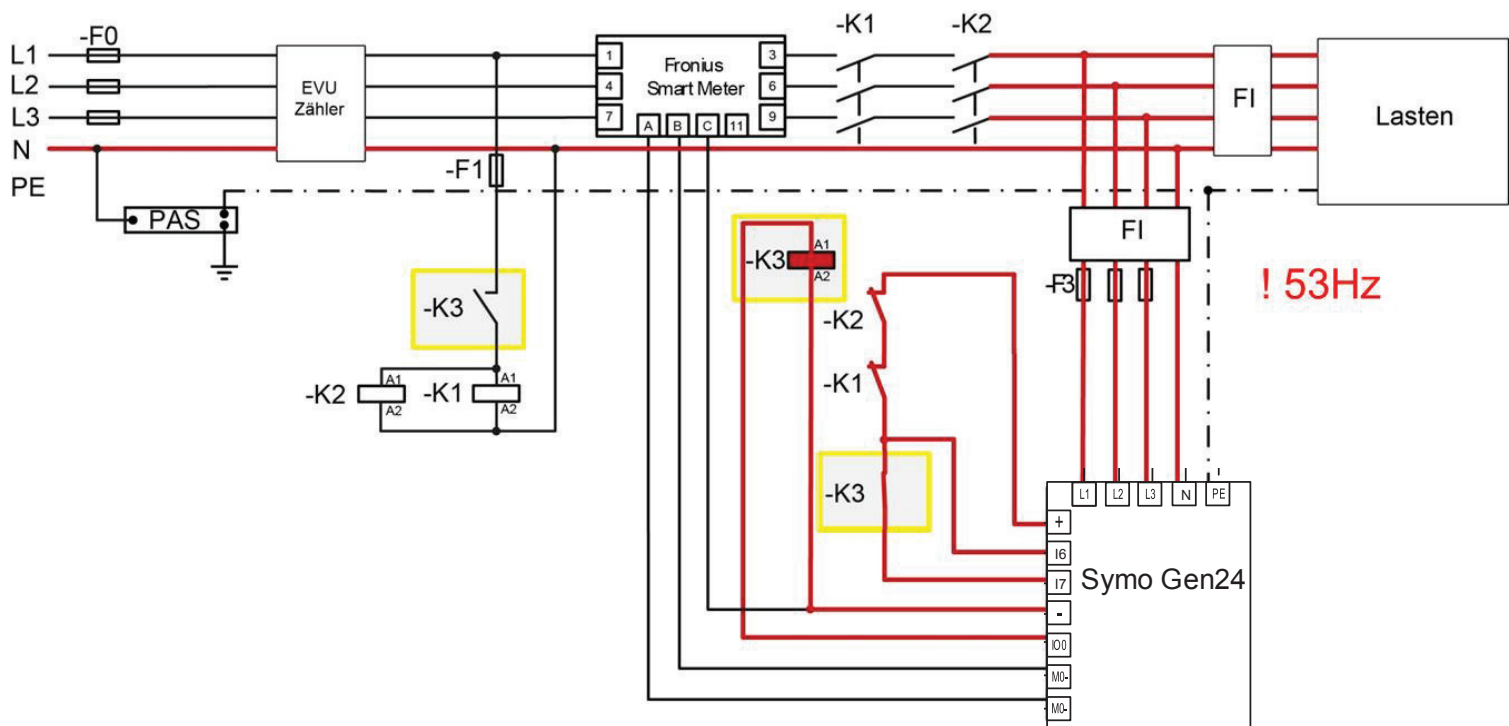
#### 2.1.1 GRID-CONNECTED OPERATION



During **grid-connected operation**, the levels from output IO0 or from inputs I6 and I7 are **low**.

No current flows through the coil of backup power control relay K3. This closes the N.C. contact of K3 and means that current is flowing through the coils of both contactors K1 and K2 and their N.O. contacts are closed. The feedback contact of K3 (normally open contact) is open. Input 7 is thus low. The feedback contacts of K1 and K2 (normally closed contacts) are open and so input 6 is also low. The system is in grid-connected operation.

## 2.1.2 BACKUP POWER MODE



During **backup power mode**, the levels from output IO0 or from inputs I6 and I7 are **high** (+12VDC).

In the event of a power outage, the 230VAC supply of the coils of K1 and K2 is automatically interrupted. This opens the N.O. contacts of K1 and K2 and disconnects the system from the public grid completely. The feedback contacts of K1 and K2 (normally closed contacts) are now closed, changing input I6 to high. The output IO 0 is now set to high. Current is thus flowing through the coil of backup power relay K3 and the N.C. contact of K3 is open and disconnects the coils of both contactors K1 and K2 from the grid. The feedback contact of K3 (normally open contact) is now closed. This ensures that, in backup power mode, the system does not switch to the grid in parallel that is suddenly back online.

### 3. CABLING OF THE COMPONENTS

To connect the inverter to switchover components a 8-pole CAT5-7 shielded communication cable is required (CAT 5 cable 8x0,5mm<sup>2</sup>). On the inverter the 16-pole plug (see figure 1 and 2 below) is used to connect the relays and contactors.

The Fronius Smart Meter will be connected on the 10-pole plug (see figure 1 and 2 below – middle positioned plug) use therefore the Pins M0+,M0- and GND. A termination is required on both ends of the Modbus communication!

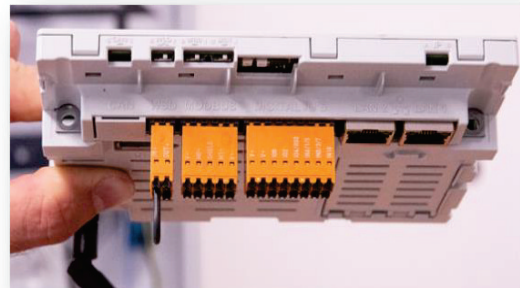
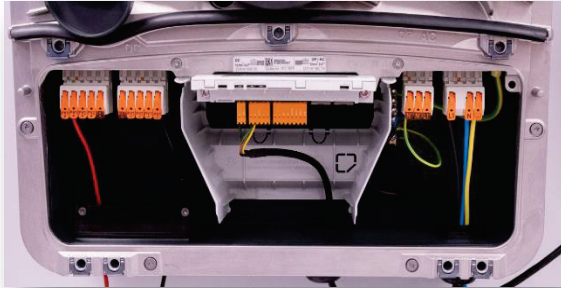


Figure 1 and 2: Communication interface on GEN24 in the middle (10 and 16 pole plug)

#### Cabling of the components:

- Cabling of the "backup power control relay" K3 and the "grid disconnecter" K1 and K2
- Cabling of the "control circuit" from the Fronius Symo GEN24 to K3, K1 and K2

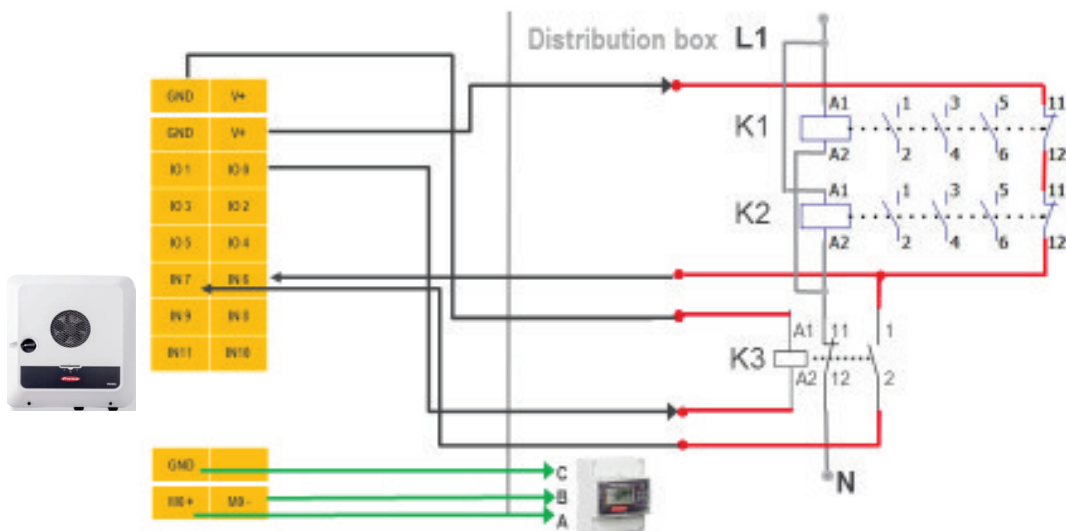


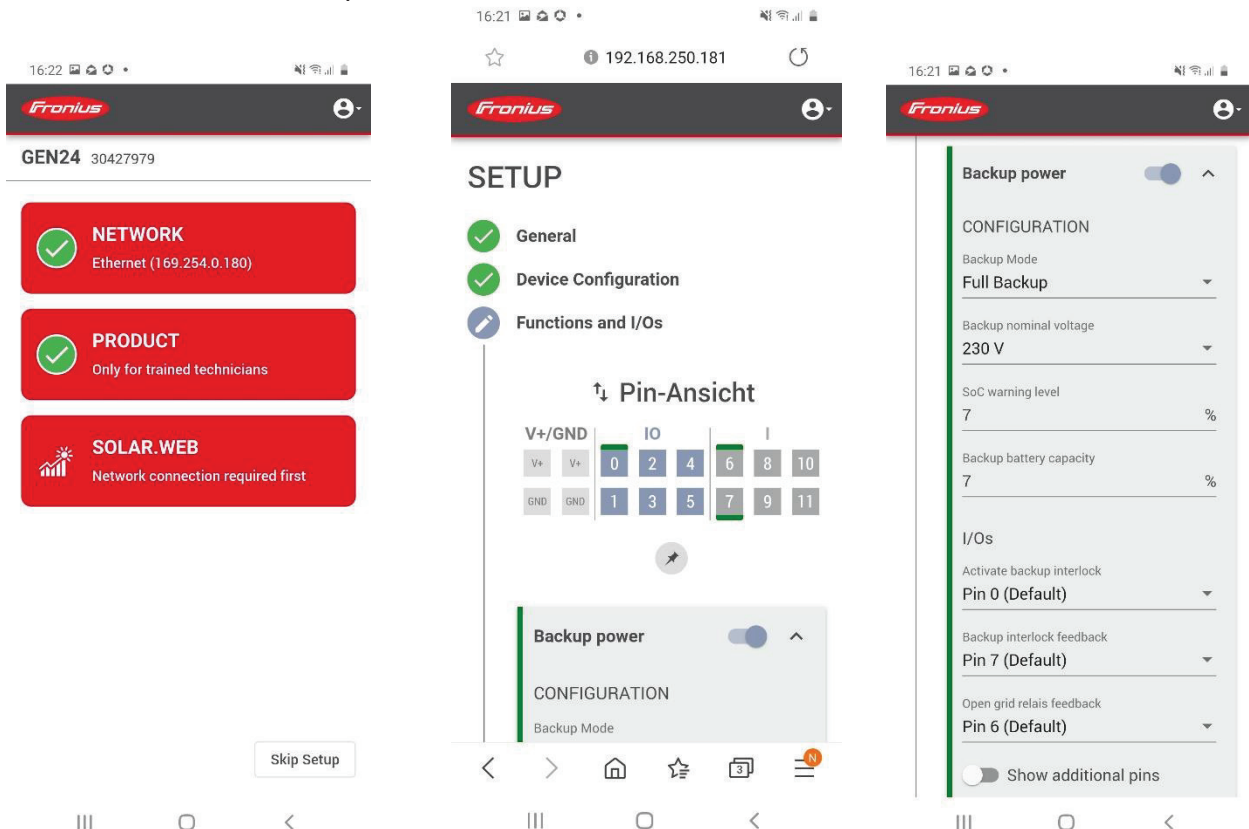
Figure 3: Wiring of communication cables from GEN24 to backup power contactors K1,K2 and relays K3.

Check with your grid operator for the regulatory statutes in your region.

## 4. COMMISSIONING GEN24 BACKUP POWER SWITCHOVER

### 4.1. Using the Fronius Start APP

- Download Fronius Solar.start App
- Select inverter Fronius GEN24 and start the Wifi access point
- Connect to inverter – see picture below
- Follow Setup Wizard – Product commissioning
- Activate “Full Backup” under Functions and I/Os.



### 4.2 Standard commissioning with Laptop

- Activate the Wifi Access Point of the inverter
- Connect to the hot spot via laptop, smartphone or tablet
- Search for the network "FRONIUS xxxx" on the device; password 12345678
- Enter into the web browser: the IP address <http://192.168.250.181>
- Commission by using the Wizard on the web interface of the inverter

A detailed explanation of the commissioning can be found in the operation manual of the inverter.