



APPLICATION GUIDE - COMMISSIONING BACKUP POWER ON FRONIUS GEN24 PLUS INVERTERS

Version 1 / 20.06.2020

© Fronius International GmbH

Version 01 06/2020

BU SE

Fronius behält sich alle Rechte, insbesondere das Recht der Vervielfältigung und Verbreitung sowie der Übersetzung vor. Kein Teil des Werkes darf in irgendeiner Form ohne schriftliche Genehmigung von Fronius reproduziert oder unter Verwendung elektrischer Systeme gespeichert, verarbeitet, vervielfältigt oder verbreitet werden. Es wird darauf hingewiesen, dass alle Angaben in diesem Dokument trotz sorgfältiger Bearbeitung ohne Gewähr erfolgen und eine Haftung des Autors oder von Fronius ausgeschlossen ist.
Geschlechterspezifische Formulierungen beziehen sich gleichermaßen auf die weibliche und männliche Form

CONTENT

1.	General information about backup power with Fronius Symo GEN24	4
2.	Schematics and operation	5,6
3.	Cabling of the components.....	7
4.	Commissioning.....	8

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.

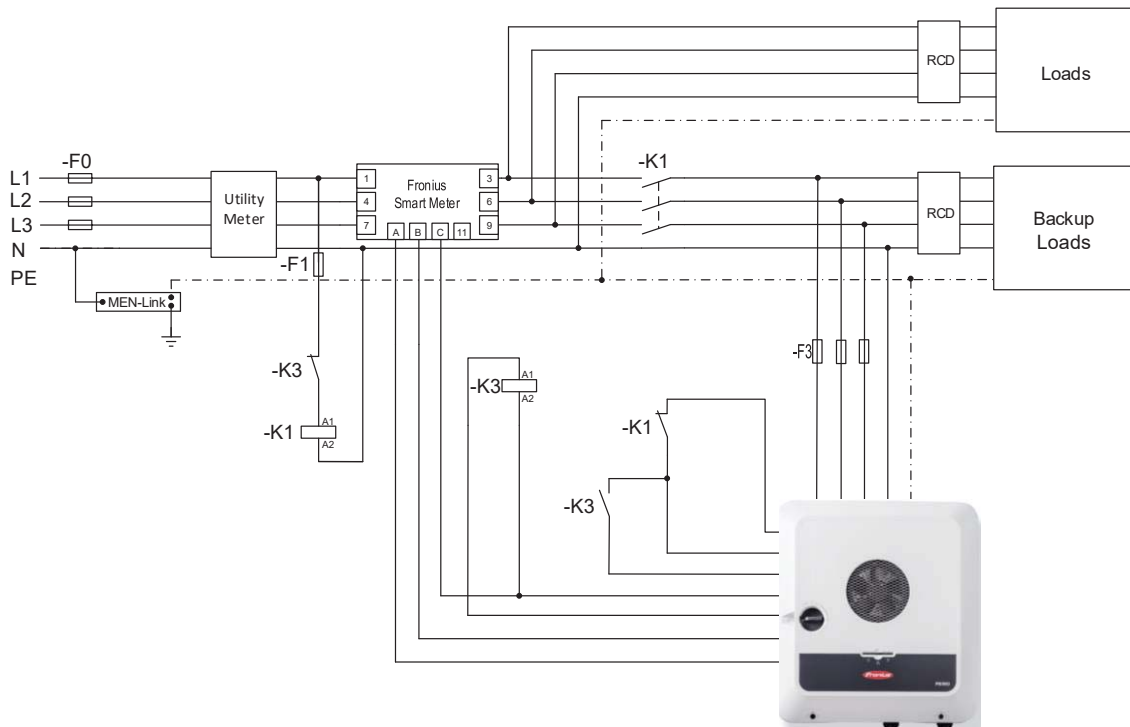
Enwitec is a company that offers Fronius-approved pre-fabricated switchover boxes (<https://enwitec.eu/net-changing-box/?lang=en>)

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.

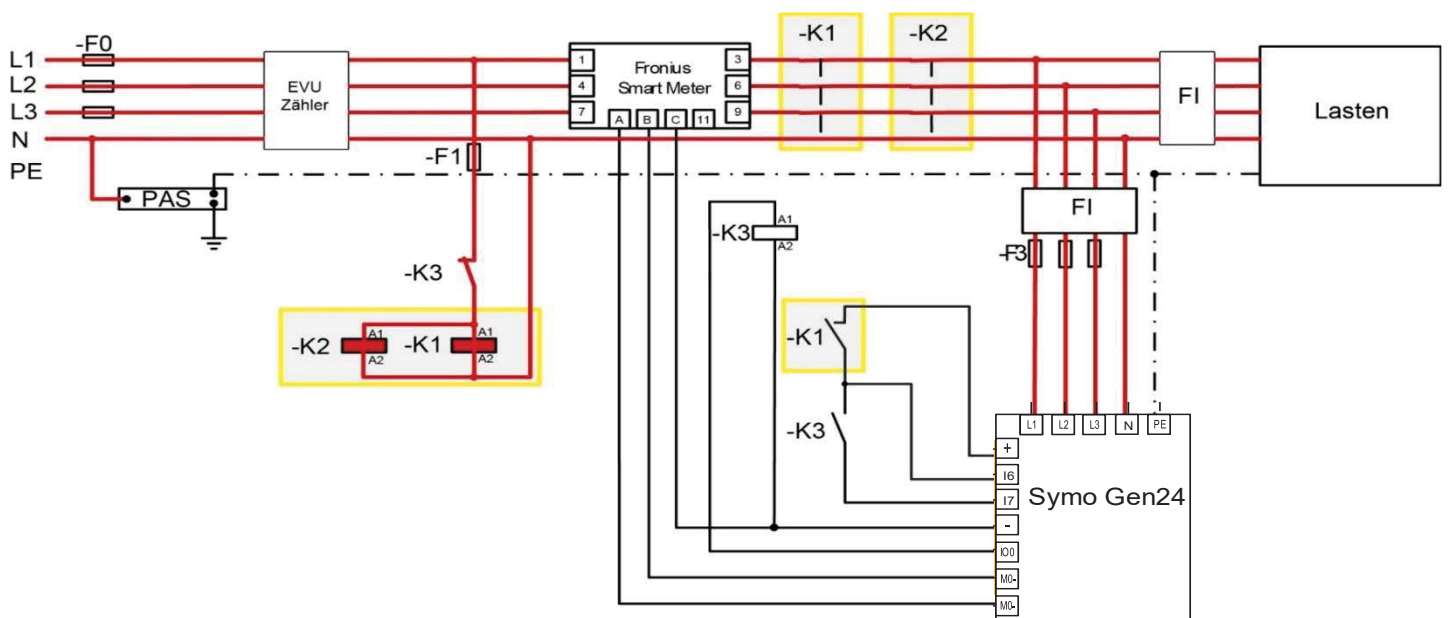
2. SCHEMATICS AND OPERATION

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



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.

The diagram illustrates the electrical connection for a Symo Gen24 inverter. The AC supply (L1, L2, L3, N, PE) enters from the left, passing through an EVU meter and a Fronius Smart Meter. The supply is then connected to a circuit breaker (-K1) and a fuse (-F1). The supply is then connected to a second circuit breaker (-K2) and a fuse (-F3) before entering the Symo Gen24 inverter. The inverter's output is connected to a load (Lasten) through a fuse (FI) and a circuit breaker (-K3). The diagram also shows the connection of the inverter's DC input terminals (+, -) to a battery bank (not shown). A red dashed line indicates a 53Hz frequency warning.

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 8x0,5mm²). 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!

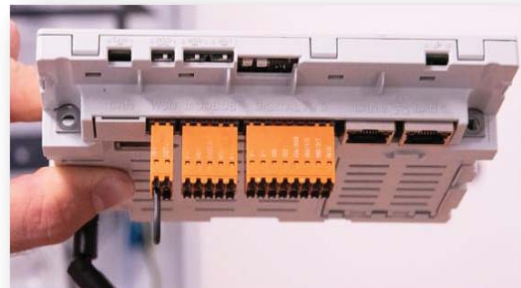
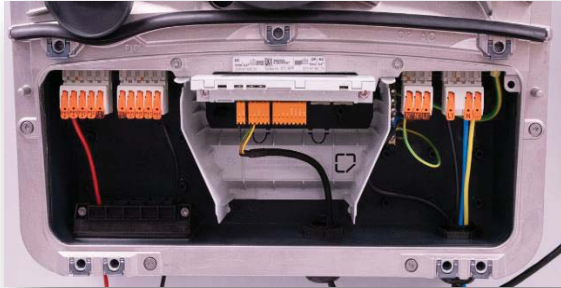


Figure 1 and 2: Communication interface on GEN24 in the middle (10 and 16 pole plug)

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

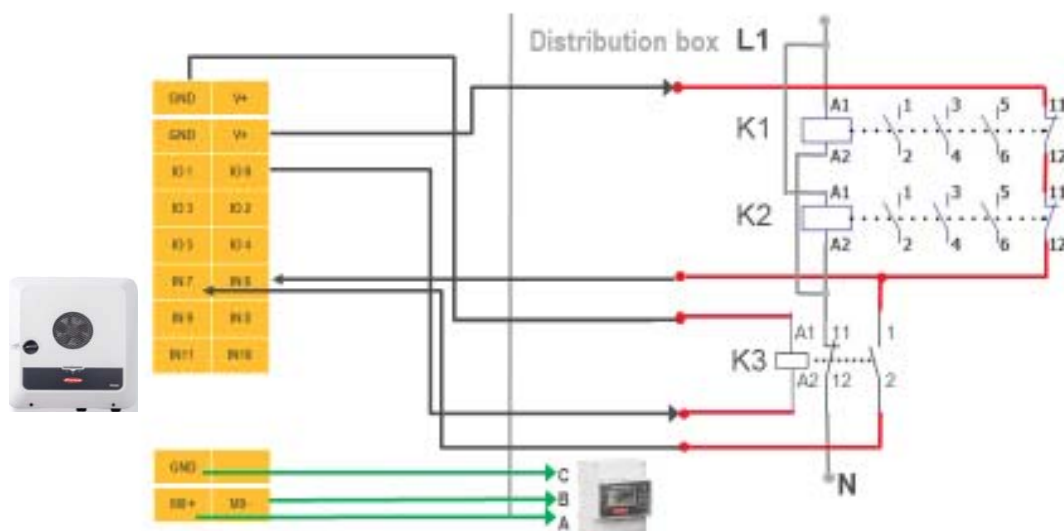


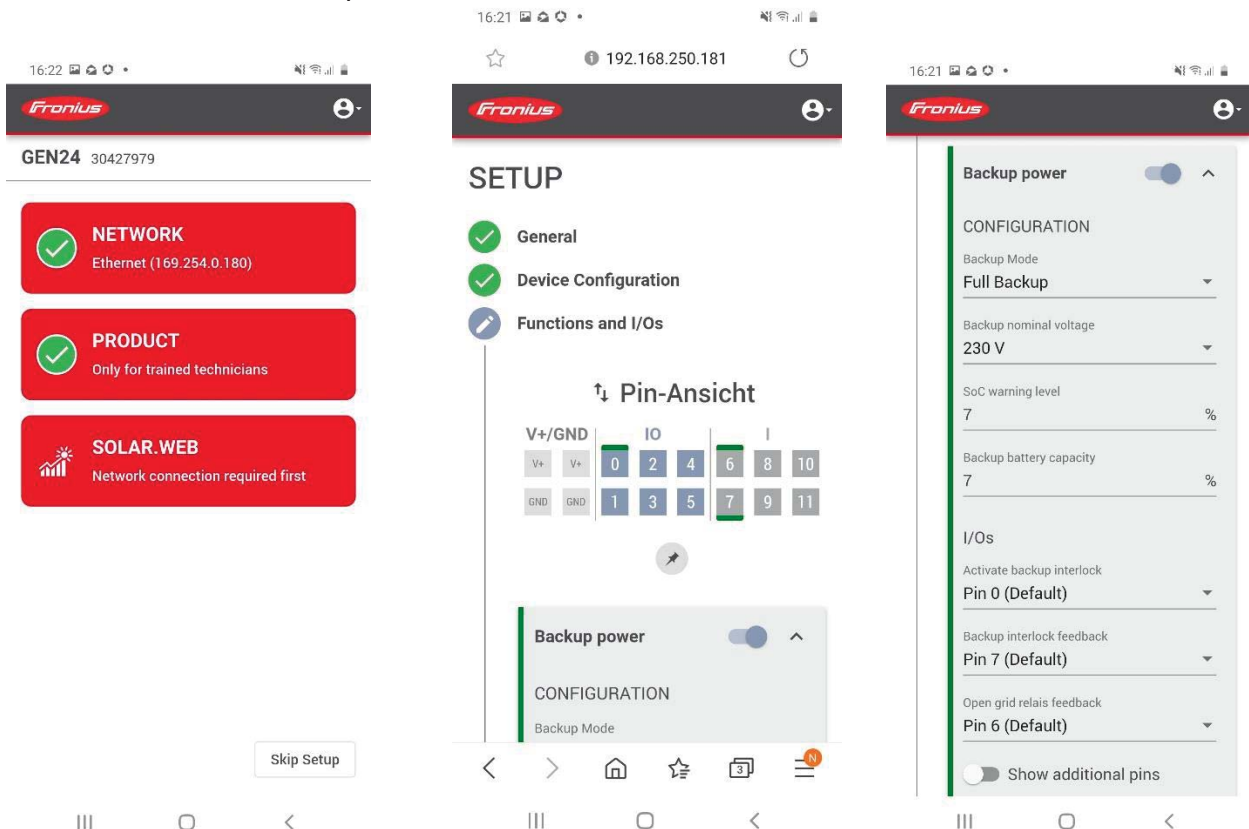
Figure 3: Wiring of communication cables from GEN24 to backup power contactors K1,K2 and relays K3.

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

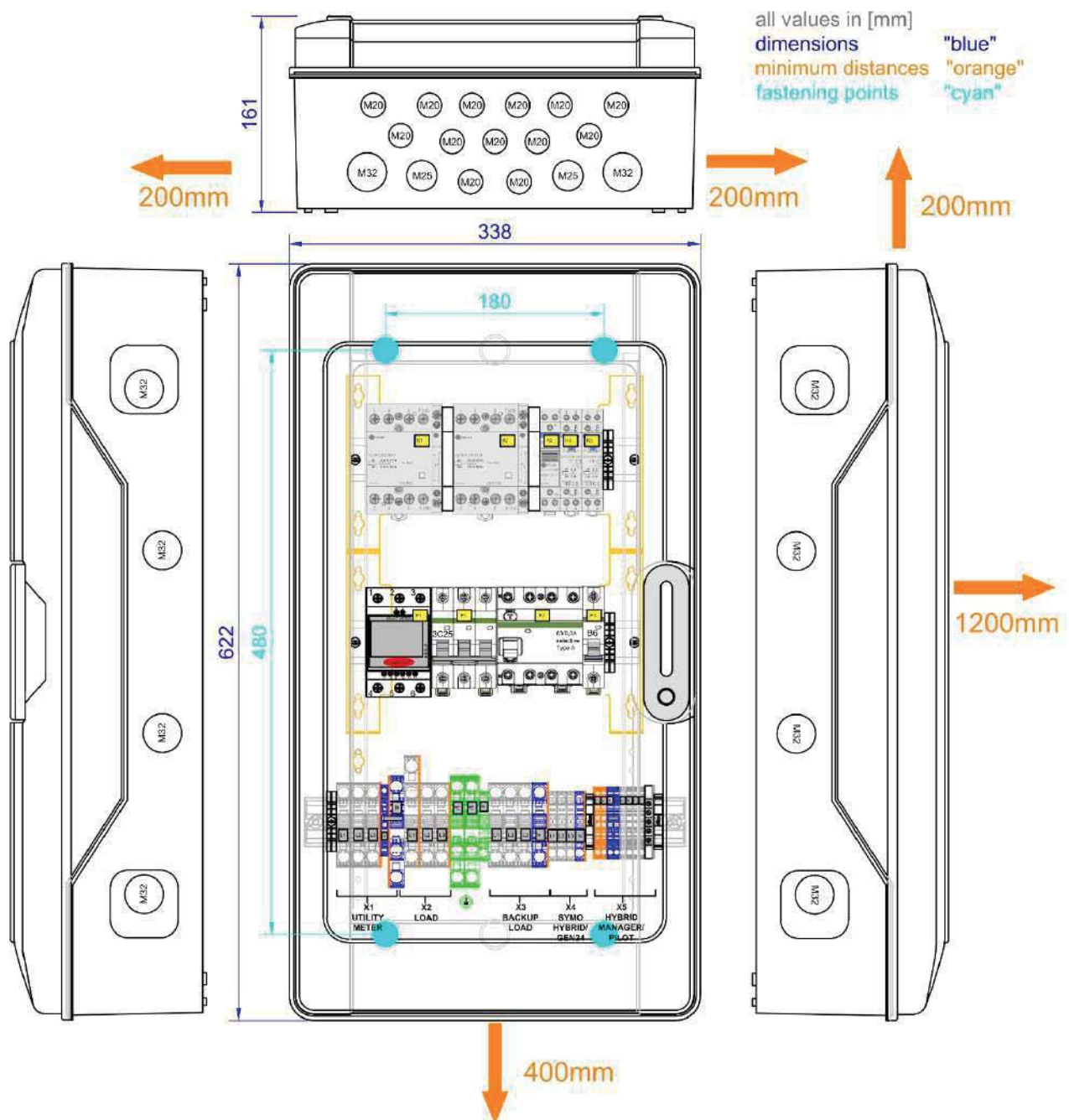
- Activate the Wifi Access Point of the inverter
- Connect to the hot spot via laptop, smartphone or tablet
- Search for the network "FRONIUS xxxx" on the device; password 12345678
- Enter into the web browser: the IP address <http://192.168.250.181>
- Commission by using the Wizard on the web interface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

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

DATA SHEET

Switchover Box for the Fronius Energy Package

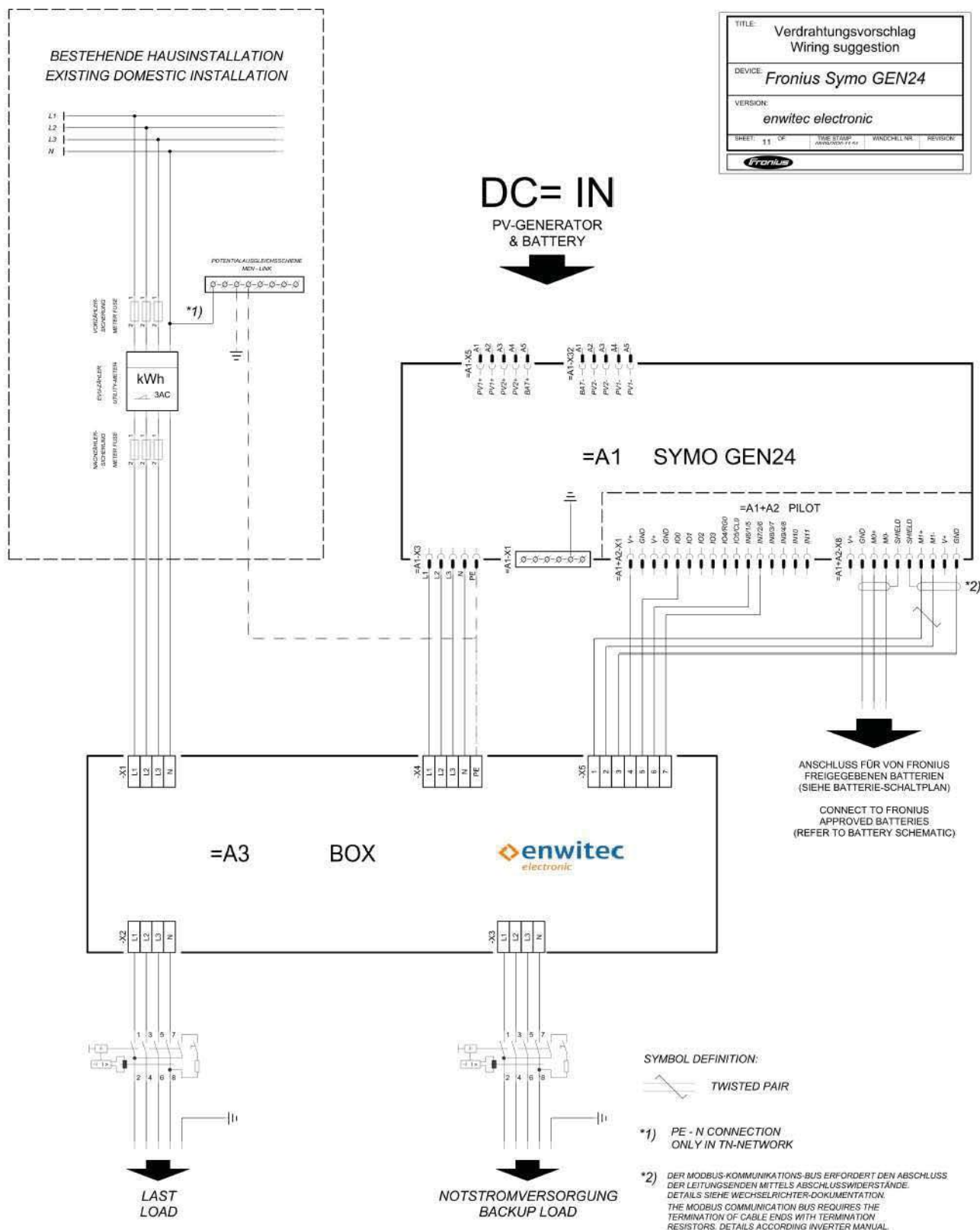
enwitec order number	10015  _V1.0 (previous: 10011465_V1.3)	All-pole; -standard-
Type designation	Switchover Box / Automatic transfer switch box	
Matchcode	3PH_FRO_BBDAP_20KW_3PH_1.0	
Application	Fronius Energy Package - Energy storage system	
Battery-inverter	<ul style="list-style-type: none"> • Symo GEN24 6.0 Plus/8.0 Plus/10.0 Plus • Symo Hybrid 3.0-3-S/4.0-3-S/5.0-3-S 	
Monitoring & Control	<ul style="list-style-type: none"> • Fronius Smart Meter TS65A-3 is integrated 	
Grid structure	<ul style="list-style-type: none"> • 3PH 230/400V - TT or TN-S System; NOT ANY TN-C System 	



Circuitry overview - Symo GEN24 Plus



Please observe the manual "Switchover boxes for Fronius Energy Package"



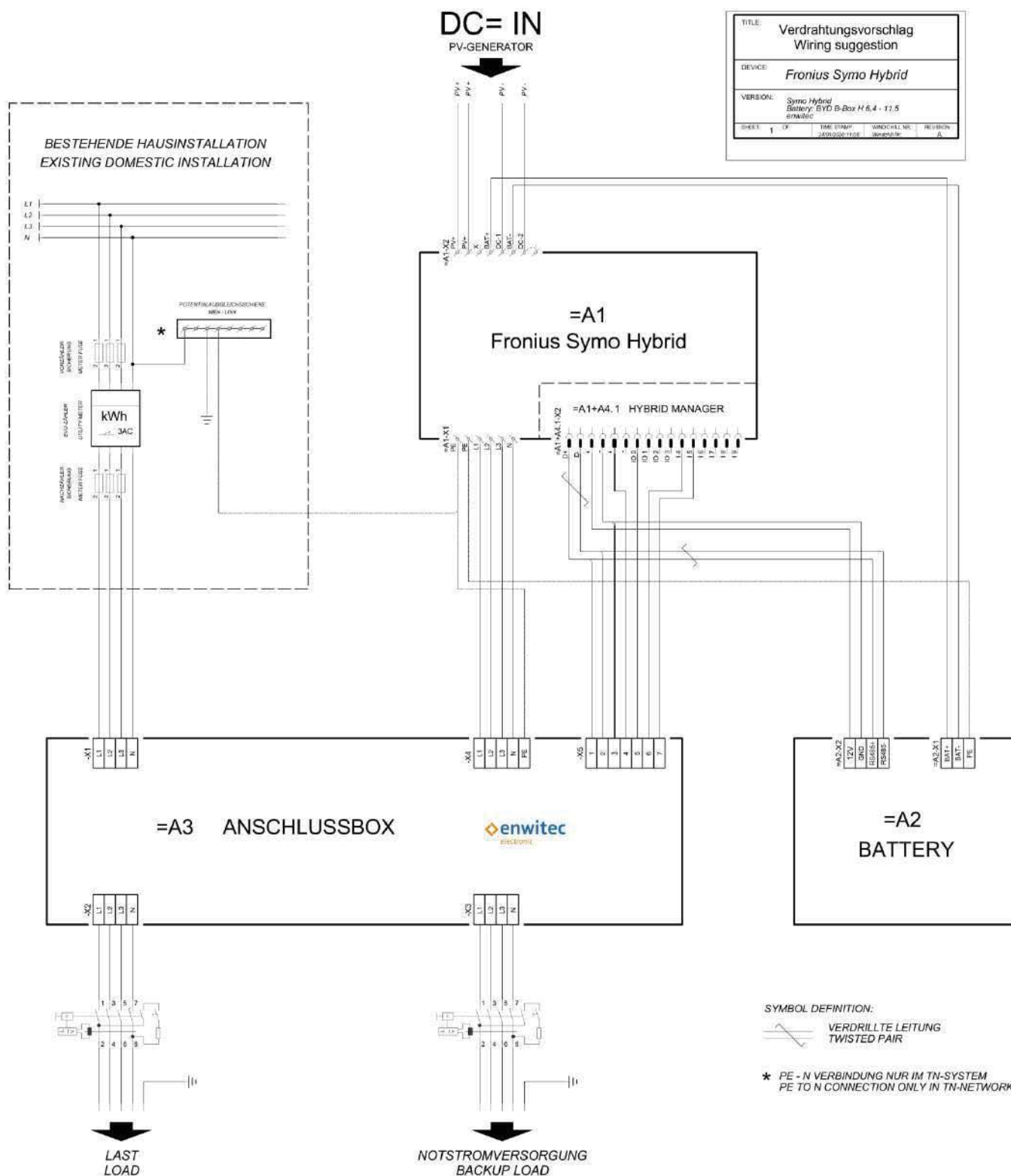
DATA SHEET

Switchover Box for the Fronius Energy Package

Circuitry overview - Symo Hybrid



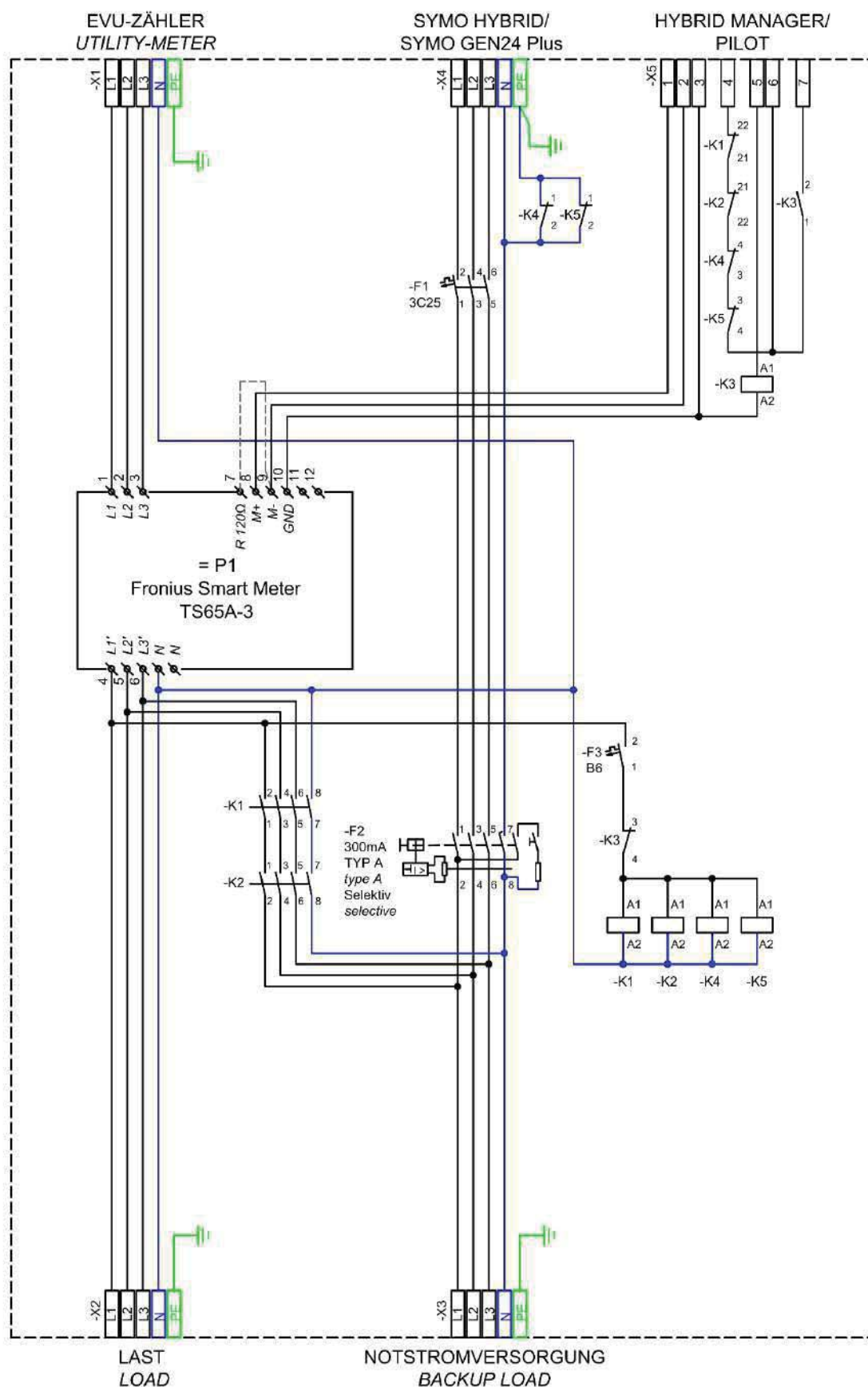
Please observe the manual "Switchover boxes for Fronius Energy Package"



DATA SHEET

Switchover Box for the Fronius Energy Package

Internal wiring - Switchover Box 10015 Rev. 1.0



DATA SHEET

Switchover Box for the Fronius Energy Package

TECHNICAL DATA

NOMINAL VALUES

Rated voltage	3PH [V]	230/400
Rated insulation voltage	[V]	400
Rated frequency	[Hz]	50/60
Max. prospective* short circuit current	[kA]	10
Permitted grid structure		TT/TN-S
Max. value of pre-fuses	[A]	63(gL/gG)
Grid disconnection		All pole
Max. thermal power	[kW]	20
Standby-loss ca.	[W]	14

CIRCUIT BREAKERS (MCBs)

F1	Symo Hybrid/Symo GEN24 Plus	1 x 3C25
F3	Control circuit "Grid"	1 x B6A


RESIDUAL CURRENT DEVICE (RCCB) - type "A" selective

F2	Symo Hybrid/Symo GEN24 Plus	300mA
----	-----------------------------	-------


CONTACTORS IEC/EN61095; IEC/EN 60947-1; IEC 60947-5-1

K1/K2	"Grid disconnection"	AC1[A]	63
K4/K5	"Grounding device"	AC1[A]	25
K3	"Communication"	AC1[A]	20
K1/K2/K4/K5	"Control voltage"	AC[V]	230
K3	"Control voltage"	DC[V]	12
Hum-free			•

CONNECTIONS/TERMINALS - Max. cross section (Cu)

X1	"AC-Grid"	[mm ²]	16(25)
X2	"Loads - Not backuped"	[mm ²]	16(25)
X3	"Backup Load"	[mm ²]	16(25)
X4	Symo Hybrid/Symo GEN24 Plus	[mm ²]	6(10)
	"Equipotential bonding"	[mm ²]	16(25)
X5	Hybrid Manager/Pilot	[mm ²]	1,5(2,5)

CABLE GLANDS - Clamping range [Ø mm]

X1	"AC-Grid"	M32/M40	13-21/16-28
X2	"Loads - Not backuped"	M32/M40	13-21/16-28
X3	"Backup Load"	M32	15-25
X4	Symo Hybrid/Symo GEN24 Plus	M32	13-21
	"Equipotential bonding"	M20	7-13
X5	"Communication cable"	M20	7-13

• = met "-" = not met

GENERAL DATA

Width	[mm]	338
Height	[mm]	622
Depth	[mm]	161
Weight ca.	[kg]	11
Operating temperature range	[°C]	-5...+40
Temperatur - transport/storage	[°C]	-25...+55
Temporary max. 24 hours	[°C]	+70°C
Humidity - condensing allowed	•/-	-
Humidity - permitted range	[%]	5...95
Max. altitude above sea level	[m]	2000
Protection class IP	(EN 60529)	65
Outdoor-application permitted	•/-	-
Installation type		Indoor area
Protection against electric shock	(EN61140)	II
Cabinet - material		PC
RoHS-conformity	(2011/65/EU)	•
Cabinet's colour	(similar to RAL)	7035
Way of mounting		Wall
Cover		transparent
Locking system		tool-free

STANDARDS

Switching devices	EN 61439-1	•
	EN 61439-2	•
Distribution boards - operated by ordinary people (DBO)	EN 61439-3	•

SMART METER

Manufacturer	Fronius
Type	TS65A-3

MISCELLANEOUS

Customer tariff number	85371098
------------------------	----------

* characterizes the max. uninfluenced short circuit current of the network-connecting point (mains supply)



AUSWAHLKRITERIEN Netzumschaltboxen - Fronius Energy Package D-A-CH; ALLPOLIGE TRENNUNG insbesondere

Netzform
TN(C)-S
TN-S
TT

ALLPOLIGE TRENNUNG (KEIN durchgehender Netz – Neutralleiter)

- insbesondere für den deutschen und schweizerischen Markt
- auch in Österreich z.T. von Netzbetreibern gefordert
- ein TN-C Netz in der Kundenanlage ist bei keiner Ausführung erlaubt!

Nur die Netzumschaltboxen mit den Artikelnummern **10015610** und **10015612** ermöglichen der Anlage einen FRT (Fault ride through) gemäß den Anforderungen der österreichischen TOR Erzeuger Typ A für nichtsynchrone Stromerzeugungsanlagen (falls der Netzbetreiber dies einfordert). Die Betätigungsspulen der Netzschütze K1 und K2, der Erzeugungsschütze K3 und K4, sowie die Versorgung des zentralen Netzkupplungsrelais (NA-Schutzrelais oder „ENS“) werden hier bei Ausfall der Netzspannung für den FRT kurzzeitig gepuffert. In den relevanten deutschen und schweizerischen Normen/Standards sind KEINE FRT-Forderungen für Netzumschalteinrichtungen definiert.

„Standard“ Netzumschaltbox DE/CH

Keine Netzumschaltbox verfügbar

Zusätzlicher Anschluss von einem- oder mehreren PV-Wechselrichtern und eines Erzeugungszählers in der Netzumschaltbox erforderlich? (Bemerkung: Nur für den deutschen Markt relevant, da hier aufgrund des EEG bei PV-Anlagen >10kWp die gesamte Erzeugungsleistung über einen separaten Zähler geführt werden muss.)

Zusätzliche(r) NA-Schutz/„ENS“ erforderlich? (Anforderung vom Netzbetreiber!)

FRT-Fähigkeit der Anlage erforderlich?

Ein PV-Wechselrichter mit einer Leistung von ≤ 8.2KVA?

Ein PV-Wechselrichter mit einer Leistung von > 8.2 und ≤ 20.0KVA

Mehr als EIN PV-Wechselrichter und Summenleistung (incl. SYMO/GEN24) ≤ 35KVA?

10015614
vormals 10013732

10015615
vormals 10013733

10015616
vormals 10012743

10015612
vormals 10011645

10015610
vormals 10011646

10015613
vormals 10011465

EG-Konformitätserklärung/EC Declaration of Conformity

Die Produkte
The products

Netzumschaltbox
Switchover box



Hersteller
manufacturer

enwitec electronic GmbH & Co. KG
Scherrwies 2
DE - 84329 Rogglfing

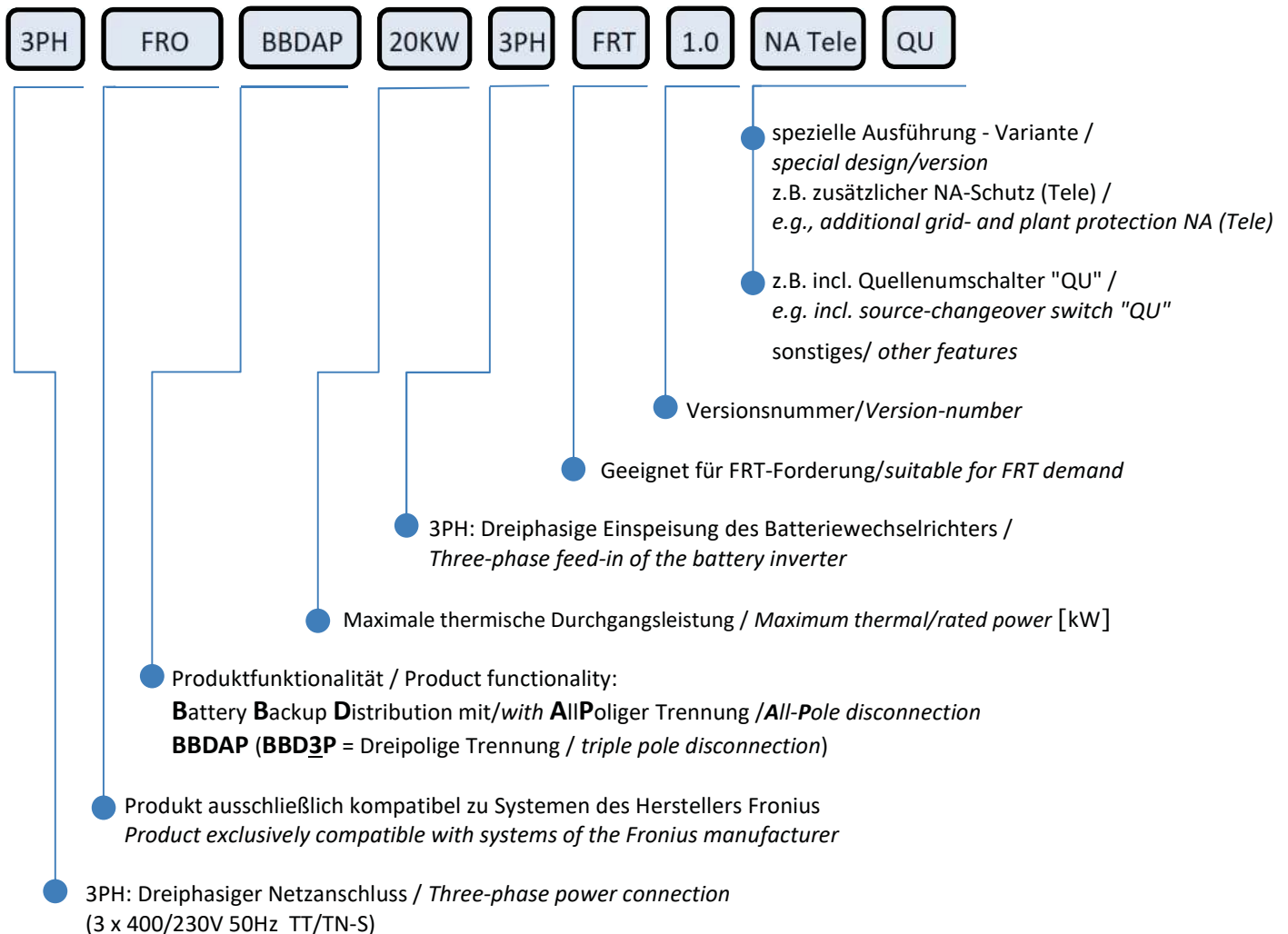
enwitec electronic - Artikelnummern
enwitec electronic - order numbers

**10011465/10011638/10011643/10011644/10011645/
10011646/10012743/10013571/10013732/10013733/
10015582/10015584/10015585/10015586/10015610/
10015612/10015613/10015614/10015615/10015616/
10015628**

Beschreibung
description

Netzumschaltbox für Fronius Energy Package System
Automatic Transfer Switch for the Fronius Energy Package System

Bezeichnungen (enwitec electronic - Matchcode)
type designation (enwitec electronic - match code)



auf welche sich diese Erklärung bezieht, stimmen mit folgenden Normen oder normativen Dokumenten überein:

to which this declaration relates is in conformity to the following standard(s) or normative document(s):

Norm/Standard **IEC/EN 61439-1**
 IEC/EN 61439-2

und entsprechen den Bestimmungen der folgenden EG-Richtlinien(n):
and is in accordance with the provisions of the following EC-directive(s):

Niederspannungs-Richtlinie 2014/35/EU
Low voltage directive (LVD) 2014/35/EU

Stoffverbote 2011/65/EU (RoHS)
Restriction of Hazardous Substances Directive (RoHS) 2011/65/EU

Jahr der erstmaligen Anbringung der CE-Kennzeichnung: **2016**
Year of affixing CE-marking:

2016	Artikelnummern / order numbers	10011465...10013733
2019	Artikelnummern / order numbers	10015582...10015628

Ausstelldatum: **10.11.2020**
Date of issue

enwitec electronic GmbH & Co. KG



NAME/UNTERSCHRIFT
Signature

Johann Wimmer
Geschäftsführung
CEO