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Certificate of compliance

Applicant: Fronius International GmbH
Günter Fronius Straße 1
4600 Wels-Thalheim
Austria

Product: Photovoltaic and battery inverter (Hybrid-Inverter)

Model: Symo GEN24 6.0 Plus SC Symo GEN24 6.0 SC
Symo GEN24 7.0 Plus SC Symo GEN24 7.0 SC
Symo GEN24 8.0 Plus SC Symo GEN24 8.0 SC
Symo GEN24 9.0 Plus SC Symo GEN24 9.0 SC
Symo GEN24 10.0 Plus SC Symo GEN24 10.0 SC
Symo GEN24 12.0 Plus SC Symo GEN24 12.0 SC

The device is designed to work as a generation unit of the type: A and B

Inverter for three-phase parallel connection to the public grid or via transformer to a MV and HV distribution network.

Applied rules and standards:

EN 50549-2:2019/A1:2023

Requirements for generating plants to be connected in parallel with distribution networks - Part 2: Connection to a MV distribution network - Generating plants up to and including Type B

- 4.4 Normal operating range
- 4.5 Immunity to disturbances
- 4.6 Active response to frequency deviation
- 4.7 Power response to voltage variations and voltage changes
- 4.8 EMC and power quality
- 4.9 Interface protection
- 4.10 Connection and starting to generate electrical power
- 4.11 Ceasing and reduction of active power on set point
- 4.12 Remote information exchange

EN 50549-10:2022

Requirements for generating plants to be connected in parallel with distribution networks - Part 10: Tests for conformity assessment of generating units

Commission Regulation (EU) 2016/631 of 14 April 2016

Establishing a network code on requirements for grid connection of generators (NC RFG).
Type approval for generation units to use in Type A and B plants.

Note

This certificate proves the conformity of a generating unit based on NC RFG. However, some requirements, such as frequency sensitive mode (FSM), reactive power capacity etc. can be applicable on the generating plant level, which assessment can be out of the scope of this certificate. Consequently, it is possible that the conformity assessment of a generating unit does not cover all aspects of the above-mentioned standardization documents, typically when a requirement is rather evaluated on a plant level.

At the time of issue of this certificate, the safety concept of an aforementioned representative product corresponds to the valid safety specifications for the specified use in accordance with regulations.

Report number: SGP-24964_0_R2
SGP-24964_1_R2

Certification Program: NSOP-0032-DEU-ZE-V10

Certificate number: U24-1215

Date of issue: 2024-12-12

Accreditation



Accredited certification body by Deutsche Akkreditierungsstelle GmbH (DAkKS) according to ISO/IEC 17065. The accreditation is valid only for the scope listed in the annex of the accreditation certificate D-ZE-12024-01-00. The Deutsche Akkreditierungsstelle GmbH (DAkKS) is signatory of the multilateral arrangements of EA, ILAC and IAF for mutual recognition.

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Extract from test report SGP-24964_0_R2 and SGP-24964_1_R2 issued by a testing laboratory accredited by "Akkreditierung Austria" according to ISO/IEC 17025. The accreditation is only valid for the scope listed in the annex of the accreditation certificate "0001".

Type Approval and declaration of compliance with the requirements of EN 50549-2 and Commission Regulation (EU) 2016/631 of 14 April 2016

Manufacturer	Fronius International GmbH Günter Fronius Straße 1 4600 Wels-Thalheim Austria			
Product type	Photovoltaic and battery inverter (Hybrid-Inverter)			
Static converter model	SYMO GEN24 6.0 Plus SC SYMO GEN24 6.0 SC	SYMO GEN24 7.0 Plus SC SYMO GEN24 7.0 SC	SYMO GEN24 8.0 Plus SC SYMO GEN24 8.0 SC	SYMO GEN24 9.0 PLUS SC SYMO GEN24 9.0 SC
Input DC (photovoltaic)				
MPP voltage range [V]	148 – 800	172 – 800	197 – 800	222 – 800
Max. input voltage [V]	1000	1000	1000	1000
Max. input current per MPPT [A]	28,0 / 14,0	28,0 / 14,0	28,0 / 14,0	28,0 / 14,0
Input DC (battery)				
DC voltage range [V]	160-700	160-700	160-700	160-700
Max. DC voltage [V]	700	700	700	700
Max. DC current per DC input [A]	22,0	22,0	22,0	22,0
Output AC				
Rated AC voltage [V]	3L; N, 400 V; 50 Hz	3L; N, 400 V; 50 Hz	3L; N, 400 V; 50 Hz	3L; N, 400 V; 50 Hz
Rated output current [A]	9,1	10,6	12,1	13,6
Max. output current [A]	18,5	18,5	18,5	18,5
Nom. converter output (P _{NINV}) [kW]	6,0	7,0	8,0	9,0
Rated apparent power [kVA]	6,0	7,0	8,0	9,0
Output AC Backup Mode				
P _{sn} (nom. discharge power) [kW]	6,0	7,0	8,0	9,0
P _{smax} (max. discharge power) [kW]	6,0	7,0	8,0	9,0



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Static converter model	SYMO GEN24 10.0 PLUS SC SYMO GEN24 10.0 SC	SYMO GEN24 12.0 PLUS SC SYMO GEN24 12.0 SC	--	--
Input DC (photovoltaic)				
MPP voltage range [V]	246 – 800	295 – 800	--	--
Max. input voltage [V]	1000	1000	--	--
Max. input current per MPPT [A]	28,0 / 14,0	28,0 / 14,0	--	--
Input DC (battery)				
DC voltage range [V]	160-700	160-700	--	--
Max. DC voltage [V]	700	700	--	--
Max. DC current per DC input [A]	22,0	22,0	--	--
Output AC				
Rated AC voltage [V]	3L; N, 400 V; 50 Hz	3L; N, 400 V; 50 Hz	--	--
Rated output current [A]	15,2	18,2	--	--
Max. output current [A]	18,5	18,5	--	--
Nom. converter output (P _{NINV}) [kW]	10,0	12,0	--	--
Rated apparent power [kVA]	10,0	12,0	--	--
Output AC Backup Mode				
P _{sn} (nom. discharge power) [kW]	10,0	12,0	--	--
P _{smax} (max. discharge power) [kW]	10,0	12,0	--	--



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Interface protection system and interface switch (Network and system protection “NS-protection”)	
Type of protection	Integrated NS-protection
Assigned to generation unit type	Symo GEN24 6.0 Plus SC Symo GEN24 7.0 Plus SC Symo GEN24 8.0 Plus SC Symo GEN24 9.0 Plus SC Symo GEN24 10.0 Plus SC Symo GEN24 12.0 Plus SC Symo GEN24 6.0 SC Symo GEN24 7.0 SC Symo GEN24 8.0 SC Symo GEN24 9.0 SC Symo GEN24 10.0 SC Symo GEN24 12.0 SC
Integrated interface switch	Type of switching equipment 1: Relay (Song Chuan 110BHA-1AH1-F-C E01) Type of switching equipment 2: Relay (Song Chuan 110BHA-1AH1-F-C E01) Note: The output is switched off by the inverter bridge and two relay in series in each line and neutral.
Firmware version	1.32.5-1
Note The settings are password protected adjustable. In case the above stated generators are used with an external protection device, the protection settings of the inverters are to be adjusted according to the manufacturer’s declaration. The above stated generators are tested according to the requirements in the EN 50549-2:2019/A1:2023 and Commission Regulation (EU) 2016/631 of 14 April 2016. Any modification that affects the stated tests must be named by the manufacturer/supplier of the product to ensure that the product meets all requirements.	

Parameter Table according to EN 50549-10					
Name of parameter set		Grid Code Id: 1507365 (0x170025), Grid Code Version V 01.00.08.00			
Specific technical requirement		EN 50549-10			
Clause of EN 50549-1	Parameter	Remarks / additional information	setting range	default settings used	
4.3.2 Interface switch (EN 50549-1)	Single fault tolerance for interface switch		yes no	yes	
4.4.2 Operating frequency range	47,0 – 47,5 Hz Duration		0 – 20 s	0s	
	47,5 – 48,5 Hz Duration		30 – 90 min	≥ 30 min	
	48,5 – 49,0 Hz Duration		30 – 90 min	≥ 30 min	
	49,0 – 51,0 Hz Duration		not configurable	unlimited	
	51,0 – 51,5 Hz Duration		30 – 90 min	≥ 30 min	
	51, 5 – 52 Hz Duration		0 – 15 min	0 s	
4.4.3 Minimal requirement for active power delivery at under frequency	Reduction threshold	Electronic inverter, no power reduction take place	not configurable	49,5 Hz	
	Maximum reduction rate	≤ 2 % P _M /Hz (inverter) ≤ 10 % P _M /Hz (generator)	not configurable	≤ 2 % P _M /Hz	
4.4.4 Continuous operating voltage range	Upper limit		not configurable	110 % U _c	
	Lower limit		not configurable	90 % U _c	
4.5.2 Rate of change of frequency (ROCOF) immunity	ROCOF withstand capability (defined with a sliding measurement window of 500 ms) non-synchronous generating technology (inverter): synchronous generating technology:		not defined	2 Hz/s	
			yes		
			no		
4.5.3.2 Generating plant with non-synchronous generating technology (FRT)	Maximum power resumption time		not defined	≤ 1 s	
	Voltage-Time-Diagram		see Figure 6, EN 50549-2	Time [s]	U [p.u.]
				0,0	0,2
				0,15	0,2
				1,5	0,85
				180	0,85
	180	0,9			



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4.5.4 Over-voltage ride through (OVRT)	Voltage-Time-Diagram		not configurable	Time [s]	U [p.u.]
				0,0	1,25
				0,1	1,25
				0,1	1,20
				5,0	1,20
				5,0	1,15
				60	1,15
				60	1,10
4.6.1 Power response to over frequency (LFSM-O)	Threshold frequency f_1		50,2 Hz – 52 Hz	50,2 Hz	
	Droop		2 % – 12 %	5 %	
	Power reference		P_M P_{max}	P_M P_{max} , for synchronous generating technology and EESS P_M for other non-synchronous generating technology	
	Intentional delay		0 – 2 s	0,5 s	
	Deactivation threshold f_{stop}		50,0 Hz – f_1	deactivated	
	Deactivation time t_{stop}		0 – 600 s	-	
	Acceptance of staged disconnection		yes no	yes	
4.6.2 Power response to under frequency (LFSM-U)	Threshold frequency f_1		49,8 Hz – 46 Hz	49,8 Hz	
	Droop		2 – 12 %	5 %	
	Power reference		P_M P_{max}	P_{max}	
	Intentional delay		0 – 2 s	0,5 s	
4.7.2.2 Capabilities	Active factor range overexcited		0,9 – 1 / 48 % $P_D - 0$ 0,95 – 1 / 33 % $P_D - 0$	0,9 – 1 / 43,6 % $P_D - 0$	
	Active factor range underexcited		0,9 – 1 / 48 % $P_D - 0$ 0,95 – 1 / 33 % $P_D - 0$	0,9 – 1 / 43,6 % $P_D - 0$	
4.7.2.3 Control modes	Enabled control mode	All functions can be set	Q setp. Q(U) Q(P) cos φ setp. cos φ (P)	Q setp.	
4.7.2.3.2 Set point control modes	Q setpoint and excitation		0 – 48 % P_D , 0 – 33 % P_D	0	
	cos φ setpoint and excitation		1 – 0,9	1	
4.7.2.3.3 Voltage related control modes	Characteristic curve		Q(U) P(U)	indicate default characteristic	
	Time constant		3 s – 60 s	10 s	
	Min cos φ		0,0 – 1	0,9	
	Lock in power		0 % – 20 %	deactivated	
	Lock out power		0 % – 20 %	deactivated	



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4.7.2.3.4 Power related control mode	Characteristic curve		cos φ (P)	indicate default characteristic
4.7.4.2.1 Voltage support during faults and voltage steps - general	Enabling		enable disable	disabled
	Static voltage range overvoltage		100 % U_c – 120 % U_c	120 % U_c
	Static voltage range undervoltage		80 % U_c – 100 % U_c	50 % U_c
	Intensitivity range $\Delta 50$ per		0 % - 15 %	5 %
	Gradient K1		0 – 6	2
	Gradient K2		0 – 6	2
4.7.4.2.1.2 Optional Modes	Active power priority		enable disable	disabled
	Reactive current limitation [% rated current]		0 % - 100 %	disabled
	Zero current threshold		20 % U_c – 100 % U_c	disabled
4.7.4.2.2 Zero current mode for converter connected generating technology	Enabling		enable disable	disabled
	Static voltage range overvoltage		100 % U_c – 120 % U_c	120 % U_c
	Static voltage range undervoltage		20 % U_c – 100 % U_c	50 % U_c
4.9.3 Requirements on voltage and frequency protection	Threshold for protection as dedicated device [in A or kW, kVA]		26 A Note: Rated current of internal safety device (relay)!	Internal protection device
	Undervoltage threshold stage 1		0,2 U_c – 1,0 U_c	0,8 U_c
	Undervoltage operate time stage 1		0,1 s – 100 s	3 s
	Undervoltage threshold stage 2		0,2 U_c – 1,0 U_c	0,45 U_c
	Undervoltage operate time stage 2		0,1 s – 5 s	0,3 s
	Overtvoltage threshold stage 1		1,0 U_c – 1,2 U_c	1,15 U_c
	Overtvoltage operate time stage 1		0,1 s – 100 s	0,1 s
	Overtvoltage threshold stage 2		1,0 U_c – 1,3 U_c	1,12 U_c
	Overtvoltage operate time stage 2		0,1 s – 5 s	0,1 s
	Overtvoltage threshold 10 min mean protection ^a		1,0 U_c – 1,15 U_c	1,1 U_c
	Overtvoltage operate time 10 min mean protection ^a		0 – 3 s	10 min (update every 3s)
	Underfrequency threshold stage 1		47,0 Hz – 50,0 Hz	47,5 Hz
	Underfrequency operate time stage 1		0,1 s – 100 s	0,1 s
	Underfrequency threshold stage 2		47,0 Hz – 50,0 Hz	47,5 Hz



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	Underfrequency operate time stage 2		0,1 s – 5 s	0,1 s
	Overfrequency threshold stage 1		50,0 Hz – 52,0 Hz	51,5 Hz
	Overfrequency operate time stage 1		0,1 s – 100 s	0,1 s
	Overfrequency threshold stage 2		50,0 Hz – 52,0 Hz	51,5 Hz
	Overfrequency operate time stage 2		0,1 s – 5 s	0,1 s
	Loss of mains according EN 62116 (LoM)		0 – 6000 s	ROCOF 2,5 Hz/s (0,5 s) active 2 s (5 s)
	Positive sequence under-voltage protection threshold	External device necessary.	20 % – 100 %	--
	Positive sequence under-voltage protection operate time	External device necessary.	0,2 s – 100 s	--
	Negative sequence over-voltage protection threshold	External device necessary.	1 % – 100 %	--
	Negative sequence over-voltage protection operate time	External device necessary.	0,2 s – 100 s	--
	Zero sequence over-voltage protection threshold	External device necessary.	1 % – 100 %	--
	Zero sequence over-voltage protection operate time	External device necessary.	0,2 s – 100 s	--
4.10.2 Automatic reconnection after tripping	Lower frequency		47,0 Hz – 50,0 Hz	49,5 Hz
	Upper frequency		50,0 Hz – 66,0 Hz	50,2 Hz
	Lower voltage		0 % U_c – 100 % U_c	85 % U_c
	Upper voltage		100 % U_c – 135,2 % U_c	110 % U_c
	Observation time		1 s – 900 s	60 s
	Active power increase gradient		0,06 % – 6000 %/min	10 % /min
4.10.3 Starting to generate electrical power	Lower frequency		47,0 Hz – 50,0 Hz	49,5 Hz
	Upper frequency		50,0 Hz – 66,0 Hz	50,1 Hz
	Lower voltage		0 % U_c – 100 % U_c	85 % U_c
	Upper voltage		100 % U_c – 135,22 % U_c	110 % U_c
	Observation time		1 s – 900 s	60 s
	Active power increase gradient		0,06 % – 6000 %/min	disabled



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4.11.1 Ceasing active power	Remote operation of the logic interface	available communication standards	yes no	yes digital input, Fronius Solar API (JSON), sunspec
4.11.2 Reduction of active power on set point	Remote operation NOTE: If yes further definition is provided by the DSO	available communication standards	yes no	yes digital input, Fronius Solar API (JSON), sunspec
4.12 Remote information exchange	Remote information exchange required NOTE: If yes further definition is provided by the DSO	available communication standards	yes no	Yes Fronius Solar API (JSON), sunspec