C E R T I F I C A T E

of Conformity

Registration No.:	AK 60179976 0001
Report No.:	IT24UK44 004
Holder:	Fronius International GmbH Günter-Fronius-Str. 1 4600 Thalheim bei Wels Austria
Product:	PV-Inverter *Solar Grid Tied Inverter*

Type designation listed on the next page

The certificate of conformity refers to the above-mentioned product. This is to certify that the specimen is in conformity with the assessment requirement mentioned on the next page. This certificate does not imply assessment of the production of the product and does not permit the use of a TÜV Rheinland mark of conformity.

Certification Body

Date: 2024-12-18

Marco Piva

TÜV Rheinland LGA Products GmbH
TÜVRheinland®
Zertifizierungsstelle

TÜV Rheinland LGA Products GmbH - Tillystraße 2 - 90431 Nürnberg

C E R T I F I C A T E

of Conformity

Registration No.: AK 60179976 0001

Product: PV-Inverter
Solar Grid Tied Inverter

Tested according to: EN 50549-2:2019+A1
EN 50549-10:2022

Identification: Type Designation

Trademark: FRONIUS

Model: Verto XX.X
XX.X may be:
25.0; 27.0; 30.0; 33.3

See table in Appendix 1 to this certificate (3 pages)
for an overview over all electric tested parameters

- requirements for type A and type B generation units
- COMMISSION REGULATION (EU) 2016/631 (RfG)

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Appendix 1 to certificate: AK60179975 0001 and AK60179976_0001				
Clause(s) / subclause(s) of this EN 50549-1/-2	**Parameter**	**configurable value range**	**Default value**	
4.3.2 Interface switch	Single fault tolerance for interface switch	not configurable	yes	
4.4.2 Operating frequency range	47.0 – 47.5 Hz Duration	not configurable (limitation via protection settings)	unlimited	
	47.5 – 48.5 Hz Duration	not configurable (limitation via protection settings)	unlimited	
	48.5 – 49.0 Hz Duration	not configurable (limitation via protection settings)	unlimited	
	49.0 – 51.0 Hz Duration	not configurable	unlimited	
	51.0 – 51.5 Hz Duration	not configurable (limitation via protection settings)	unlimited	
	51. 5 – 52 Hz Duration	not configurable (limitation via protection settings)	unlimited	
4.4.3 Minimal requirement for active power delivery at underfrequency	Reduction threshold	not configurable	no reduction	
	Maximum reduction rate	not configurable	0 % P_M/Hz	
4.4.4 Continuous operating voltage range	Upper limit	not configurable	115% U_n	
	Lower limit	not configurable	80% U_n	
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: synchronous generating technology:	not configurable	8 Hz/s	
4.5.3.2 Generating plant with nonsynchronous generating technology	Maximum power resumption time	not defined	< 1 s	
	Voltage-Time-Diagram	not configurable (limitation via protection settings)	Time [s]	U [p.u.]
			0.000	0.0
			0.260	0.0
			0.760	0.2
			1.760	0.5
			2.400	0.75
			60.000	0.9
4.5.4 Over-voltage ride through (OVRT)	Voltage-Time-Diagram	not configurable (limitation via protection settings)	Time [s]	U [p.u.]
			0.000	1.25
	--	--	0.100	1.25
			0.100	1.25
			5.000	1.20
			60.000	1.15
			60.000	1.10
4.6.1 Power response to overfrequency	Threshold frequency f_1	50.2 Hz – 52 Hz	50.2 Hz	
	Droop	2 % – 12 %	5 %	
	Power reference	P_M | P_{max}	P_M	
	Intentional delay	0 – 2 s	0s	
	Deactivation threshold f	50.0 Hz – f_1	deactivated	
	Deactivation time t_{stop}	0 – 600 s	--	
	Acceptance of staged disconnection	yes | no	deactivated (possible via protection setting)	
4.6.2 Power response to underfrequency	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 s	

4.7.2.2 Capabilities	Active factor range overexcited	0 – 1	0 – 1
	Active factor range underexcited	0 – 1	0 – 1
4.7.2.3 Control modes	Enabled control mode	Q setp. Q(U) cos φ setp. cos φ (P) Q(P)	Q setpoint
4.7.2.3.2 Setpoint control modes	Q setpoint and excitation	0 – 100 % P_D	0
	cos φ setpoint and excitation	1 – 0	1
4.7.2.3.3 Voltage related control modes	Characteristic curve	4 points	-
	Time constant	0.01 s – 60 s	10 s
	Min cos φ	0.0 – 1	0
	Lock in power	0 % – 100 %	deactivated
	Lock out power	0 % – 100 %	deactivated
4.7.2.3.4 Power related control mode	Characteristic curve	4 points	--
only EN 50549-2:2019, 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	110 % U_c
	Static voltage range undervoltage	80 % U_c – 100 % U_c	90 % U_c
/ Generating Plant with non-synchronous generator	Insensitivity range of ΔU_{50per}	0 % – 15 %	5 %
	Gradient k1	0 – 10	2
	Gradient k2	0 – 10	2
only EN 50549-2:2019, 4.7.4.2.1.2 Optional Modes / Generating Plant with non-synchronous generator	Active power priority	enable | disable	disable
	Reactive current limitation [% rated current]	0 %–100 %	disable
	Zero current threshold	20 % U_c – 100 % U_c	disable
4.7.4.2.2 Zero current mode for converter connected generating technology	Enabling	enable | disable	disabled
	Static voltage range overvoltage	100 % U_n – 130 % U_n	120 % U_n
	Static voltage range undervoltage	0 % U_n – 100 % U_n	50 % U_n
	Undervoltage threshold stage 1	0.15 U_n – 1 U_n	0.8 U_n
	Undervoltage operate time stage 1	0.1 s – 300 s	3 s
	Undervoltage threshold stage 2	0.15 U_n – 1 U_n	0.45 U_n
	Undervoltage operate time stage 2	0.1 s – 300 s	0.3 s
	Overvoltage threshold stage 1	1.0 U_n – 1.25 U_n	1.15 U_n
	Overvoltage operate time stage 1	0.1 s – 300 s	1 s
	Overvoltage threshold stage 2	1.0 U_n – 1.25 U_n	1.22 U_n
	Overvoltage operate time stage 2	0.1 s – 300 s	0.1 s
	Overvoltage threshold 10 min mean protection	1.0 U_n – 1.25 U_n	1.1 U_n
	Underfrequency threshold stage 1	45.0 Hz– 50.0 Hz	47.5 Hz
	Underfrequency operate time stage 1	0.1 s – 300 s	0.1 s
	Underfrequency threshold stage 2	45.0 Hz – 50.0 Hz	47.5 Hz
	Underfrequency operate time stage 2	0.1 s – 300 s	0.1 s
	Overfrequency threshold stage 1	50.0 Hz – 58.0 Hz	51.5 Hz
	Overfrequency operate time stage 1	0.1 s – 300 s	0.1 s
	Overfrequency threshold stage 2	50.0 Hz – 58.0 Hz	51.5 Hz
	Overfrequency operate time stage 2	0.1 s – 300 s	0.1 s
	RoCoF protection	0.95 – 99 Hz/sec	deactivated
	Loss of mains (EN 62116)	yes | no	yes
only EN 50549-2:2019, 4.9.3 Requirements on	Positive sequence under-voltage protection threshold	not integrated	
	Positive sequence under-voltage protection operate time	not integrated	

voltage and frequency protection	Negative sequence over-voltage protection threshold	not integrated	--
	Negative sequence over-voltage protection operate time	not integrated	--
	Zero sequence over- voltage protection threshold	not integrated	--
	Zero sequence over- voltage protection operate time	not integrated	--
4.10.2 Automatic reconnection after tripping	Lower frequency	47.0 Hz – 50.0 Hz	49.5 Hz
	Upper frequency	50.0 Hz – 52.0 Hz	50.2 Hz
	Lower voltage	50 % U_n – 100 % U_n	85 % U_n
	Upper voltage	100 % U_n – 120 % U_n	110 % U_n
	Observation time	10 s – 600 s	60 s
	Active power increase gradient	6 % – 3000 %/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 – 52.0 Hz	50.1 Hz
	Lower voltage	50 % – 100 % U_n	85 % U_n
	Upper voltage	100 % – 120 % Un	110 % U_n
	Observation time	10 s – 600 s	60 s
	Active power increase gradient	6 % – 3000 %/min	disabled
4.11.1 Ceasing active power	Remote operation of the logic interface	yes | no	yes digital input, Fronius Solar API (JSON), sunspec
4.11.2 Reduction of active power on set point	Remote operation	yes | no	yes digital input, Fronius Solar API (JSON), sunspec
4.12 Remote information exchange	Remote information exchange required	yes | no	yes Fronius Solar API (JSON), sunspec

Certification Body

Date : 18.12.2024

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