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Product Service

Compliance Document

No. D 121007 0003 Rev. 00

Holder of Certificate: **Shanghai SIGEN New Energy Technology Co., Ltd.**
No.175 Weizhan Rd.
Lin-gang
201304 Shanghai
PEOPLE'S REPUBLIC OF CHINA

Product: **Converter**
Grid interactive inverter

This Compliance document confirms the compliance with the listed standards on a voluntary basis. It refers only to the sample submitted for testing and certification and does not certify the quality or safety of the serial products. For details see: www.tuvsud.com/ps-cert

Test report no.: 5040923022410-00

Date, 2023-06-13

(Zhengdong Ma)

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Model(s):

SigenStor EC 3.0 SP, SigenStor EC 3.6 SP, SigenStor EC 4.0 SP, SigenStor EC 4.6 SP, SigenStor EC 5.0 SP, SigenStor EC 6.0 SP, SigenStor AC 3.0 SP, SigenStor AC 3.6 SP, SigenStor AC 4.0 SP, SigenStor AC 4.6 SP, SigenStor AC 5.0 SP, SigenStor AC 6.0 SP, Sigen Hybrid 3.0 SP, Sigen Hybrid 3.6 SP, Sigen Hybrid 4.0 SP, Sigen Hybrid 4.6 SP, Sigen Hybrid 5.0 SP, Sigen Hybrid 6.0 SP, Sigen PV Max 3.0 SP, Sigen PV Max 3.6 SP, Sigen PV Max 4.0 SP, Sigen PV Max 4.6 SP, Sigen PV Max 5.0 SP, Sigen PV Max 6.0 SP.

Parameters:

Please see pages 3 to 9.

Tested according to:

EN 50549-1:2019/AC:2019

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Sigen Energy Controller				
Model	SigenStor EC 3.0 SP	SigenStor EC 3.6 SP	SigenStor EC 4.0 SP	SigenStor EC 4.6 SP
PV input parameters				
Max. PV input voltage	DC 600 V	DC 600 V	DC 600 V	DC 600 V
MPPT voltage range	DC 50-550 V	DC 50-550 V	DC 50-550 V	DC 50-550 V
Max. input current	DC 16/16 A	DC 16/16 A	DC 16/16 A	DC 16/16 A
Isc PV	DC 20/20 A	DC 20/20 A	DC 20/20 A	DC 20/20 A
AC output parameters				
Rated active power	3.0 kW	3.68 kW	4.0 kW	4.6 kW
Max. apparent power	3.3 kVA	3.68 kVA	4.4 kVA	5.0 kVA
Rated frequency	50 Hz	50 Hz	50 Hz	50 Hz
Rated voltage	AC 230 V	AC 230 V	AC 230 V	AC 230 V
Max. continuous current	AC 15 A	AC 16 A	AC 20 A	AC 22.7 A
Power factor	0.8 leading…1…0.8 lagging			
Battery input port parameters				
Battery voltage range	DC 300-600 V			
Battery Maximum Continuous Current	DC 12 A			

Sigen Energy Controller		
Model	SigenStor EC 5.0 SP	SigenStor EC 6.0 SP
PV input parameters		
Max. PV input voltage	DC 600 V	DC 600 V
MPPT voltage range	DC 50-550 V	DC 50-550 V
Max. input current	DC 16/16 A	DC 16/16 A
Isc PV	DC 20/20 A	DC 20/20 A
AC output parameters		
Rated active power	5.0 kW	6.0 kW
Max. apparent power	5.5 kVA	6.6 kVA
Rated frequency	50 Hz	50 Hz
Rated voltage	AC 230 V	AC 230 V
Max. continuous current	AC 25 A	AC 30 A
Power factor	0.8 leading…1…0.8 lagging	
Battery input port parameters		
Battery voltage range	DC 300-600 V	
Battery Maximum Continuous Current	DC 12 A	

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Sigen Storage Controller				
Model	SigenStor AC 3.0 SP	SigenStor AC 3.6 SP	SigenStor AC 4.0 SP	SigenStor AC 4.6 SP
Battery input port parameters				
Battery voltage range	DC 300-600 V	DC 300-600 V	DC 300-600 V	DC 300-600 V
Battery Maximum Continuous Current	DC 12 A	DC 12 A	DC 12 A	DC 12 A
AC output parameters				
Rated active power	3.0 kW	3.68 kW	4.0 kW	4.6 kW
Max. apparent power	3.3 kVA	3.68 kVA	4.4 kVA	5.0 kVA
Rated frequency	50 Hz	50 Hz	50 Hz	50 Hz
Rated voltage	AC 230 V	AC 230 V	AC 230 V	AC 230 V
Max. continuous current	AC 15 A	AC 16 A	AC 20 A	AC 22.7 A
Power factor	0.8 leading…1…0.8 lagging			

Sigen Storage Controller		
Model	SigenStor AC 5.0 SP	SigenStor AC 6.0 SP
Battery input port parameters		
Battery voltage range	DC 300-600 V	DC 300-600 V
Battery Maximum Continuous Current	DC 12 A	DC 12 A
AC output parameters		
Rated active power	5.0 kW	6.0 kW
Max. apparent power	5.5 kVA	6.6 kVA
Rated frequency	50 Hz	50 Hz
Rated voltage	AC 230 V	AC 230 V
Max. continuous current	AC 25 A	AC 30 A
Power factor	0.8 leading…1…0.8 lagging	

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Sigen Hybrid Inverter				
Model	Sigen Hybrid 3.0 SP	Sigen Hybrid 3.6 SP	Sigen Hybrid 4.0 SP	Sigen Hybrid 4.6 SP
PV input parameters				
Max. PV input voltage	DC 600 V	DC 600 V	DC 600 V	DC 600 V
MPPT voltage range	DC 50-550 V	DC 50-550 V	DC 50-550 V	DC 50-550 V
Max. input current	DC 16/16 A	DC 16/16 A	DC 16/16 A	DC 16/16 A
Isc PV	DC 20/20 A	DC 20/20 A	DC 20/20 A	DC 20/20 A
AC output parameters				
Rated active power	3.0 kW	3.68 kW	4.0 kW	4.6 kW
Max. apparent power	3.3 kVA	3.68 kVA	4.4 kVA	5.0 kVA
Rated frequency	50 Hz	50 Hz	50 Hz	50 Hz
Rated voltage	AC 230 V	AC 230 V	AC 230 V	AC 230 V
Max. continuous current	AC 15 A	AC 16 A	AC 20 A	AC 22.7 A
Power factor	0.8 leading…1…0.8 lagging			
Battery input port parameters				
Battery voltage range	DC 300-600 V			
Battery Maximum Continuous Current	DC 12 A			

Sigen Hybrid Inverter		
Model	Sigen Hybrid 5.0 SP	Sigen Hybrid 6.0 SP
PV input parameters		
Max. PV input voltage	DC 600 V	DC 600 V
MPPT voltage range	DC 50-550 V	DC 50-550 V
Max. input current	DC 16/16 A	DC 16/16 A
Isc PV	DC 20/20 A	DC 20/20 A
AC output parameters		
Rated active power	5.0 kW	6.0 kW
Max. apparent power	5.5 kVA	6.6 kVA
Rated frequency	50 Hz	50 Hz
Rated voltage	AC 230 V	AC 230 V
Max. continuous current	AC 25 A	AC 30 A
Power factor	0.8 leading…1…0.8 lagging	
Battery input port parameters		
Battery voltage range	DC 300-600 V	
Battery Maximum Continuous Current	DC 12 A	

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Sigen PV Inverter				
Model	Sigen PV Max 3.0 SP	Sigen PV Max 3.6 SP	Sigen PV Max 4.0 SP	Sigen PV Max 4.6 SP
PV input parameters				
Max. PV input voltage	DC 600 V	DC 600 V	DC 600 V	DC 600 V
MPPT voltage range	DC 50-550 V	DC 50-550 V	DC 50-550 V	DC 50-550 V
Max. input current	DC 16/16 A	DC 16/16 A	DC 16/16 A	DC 16/16 A
Isc PV	DC 20/20 A	DC 20/20 A	DC 20/20 A	DC 20/20 A
AC output parameters				
Rated active power	3.0 kW	3.68 kW	4.0 kW	4.6 kW
Max. apparent power	3.3 kVA	3.68 kVA	4.4 kVA	5.0 kVA
Rated frequency	50 Hz	50 Hz	50 Hz	50 Hz
Rated voltage	AC 230 V	AC 230 V	AC 230 V	AC 230 V
Max. continuous current	AC 15 A	AC 16 A	AC 20 A	AC 22.7 A
Power factor	0.8 leading…1…0.8 lagging			

Sigen PV Inverter		
Model	Sigen PV Max 5.0 SP	Sigen PV Max 6.0 SP
PV input parameters		
Max. PV input voltage	DC 600 V	DC 600 V
MPPT voltage range	DC 50-550 V	DC 50-550 V
Max. input current	DC 16/16 A	DC 16/16 A
Isc PV	DC 20/20 A	DC 20/20 A
AC output parameters		
Rated active power	5.0 kW	6.0 kW
Max. apparent power	5.5 kVA	6.6 kVA
Rated frequency	50 Hz	50 Hz
Rated voltage	AC 230 V	AC 230 V
Max. continuous current	AC 25 A	AC 30 A
Power factor	0.8 leading…1…0.8 lagging	

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Interface protection system default settings and power controls in inverter					
Clause(s) / subclause(s) of this EN	Ref	Parameter	Typical value range	Value default	
4.3.2 Interface switch	n.a.	Single fault tolerance for interface switch required	yes | no	yes	
4.4.2 Operating frequency range	A,B	47,0 – 47,5 Hz Duration	0 – 20 s	0.5s	
	A,B	47,5 – 48,5 Hz Duration	30 – 90 min	unlimited	
	A,B	48,5 – 49,0 Hz Duration	30 – 90 min	unlimited	
	A,B	49,0 – 51,0 Hz Duration	not configurable	unlimited	
	A,B	51,0 – 51,5 Hz Duration	30 – 90 min	unlimited	
	A,B	51, 5 – 52 Hz Duration	0 – 15 min	0.5s	
4.4.3 Minimal requirement for active power delivery at underfrequency	A,B	Reduction threshold	49 Hz – 49,5 Hz	No reduction	
	A,B	Maximum reduction rate	2 – 10 % PM/Hz	N/A	
4.4.4 Continuous operating voltage range	n.a.	Upper limit	not configurable	110%	
	n.a.	Lower limit	not configurable	85%	
4.5.2 Rate of change of frequency (ROCOF) immunity	A,B	ROCOF withstand capability (defined with a sliding measurement window of 500 ms)	not defined	2 Hz/s	
		non-synchronous generating technology:			
		synchronous generating technology:			
4.5.3.2 Generating plant with non-synchronous generating technology	B	Maximum power resumption time	not defined	1 s	
	B	Voltage-Time-Diagram	see Figure 6	Time [s]	U [p.u.]
				0	0.05
				0.25	0.05
				3	0.85
4.5.3.3 Generating plant with synchronous generating technology	B	Maximum power resumption time	not defined	N/A	
	B	Voltage-Time-Diagram	see Figure 7 (N/A)	Time [s]	U [p.u.]
				-	-
				-	-
				-	-
				-	-
				-	-
4.5.4 Over-voltage ride through (OVRT)	n.a.	Voltage-Time-Diagram	not configurable	Time [s]	U [p.u.]
				0	1.25
				0.1	1.25
				0.1	1.20
				5	1.20

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				5	1.15
				60	1.15
				60	1.10
4.6.1 Power response to overfrequency	A,B	Threshold frequency f1	50,2 Hz – 52 Hz	50.2Hz	
	A,B	Droop	2 % – 12 %	5%	
	A,B	Power reference	PM | Pmax	Pmax for EESS, P_M for non-synchronous generating technology	
	n.a.	Intentional delay	0 – 2 s	0s	
	n.a.	Deactivation threshold fstop	50,0 Hz – f1	50.1Hz	
	n.a.	Deactivation time tstop	0 – 600 s	30s	
	A	Acceptance of staged disconnection	yes | no	yes	
4.6.2 Power response to underfrequency	n.a.	Threshold frequency f1	49,8 Hz – 46 Hz	49.8Hz	
	n.a.	Droop	2 – 12 %	5%	
	n.a.	Power reference	PM | Pmax	Pmax	
	n.a.	Intentional delay	0 – 2 s	0s	
4.7.2.2 Capabilities	B	Active factor range overexcited	0,9 – 1	1	
	B	Active factor range underexcited	0,9 – 1	1	
4.7.2.3 Control modes	n.a.	Enabled control mode	Q setp. Q(U) cos φ setp. cos φ (P)	cos φ setp.	
4.7.2.3.2 Setpoint control modes	n.a.	Q setpoint and excitation	0 – 60 % S_{max}	0	
	n.a.	cos φ setpoint and excitation	1 – 0,9	1	
4.7.2.3.3 Voltage related control modes	n.a.	Characteristic curve	-	N/A	
	n.a.	Time constant	3 s – 60 s	N/A	
	n.a.	Min cos φ	0,0 – 1	N/A	
	n.a.	Lock in power	0 % – 20 %	N/A	
	n.a.	Lock out power	0 % – 20 %	N/A	
4.7.2.3.4 Power related control mode	n.a.	Characteristic curve	-	cos φ (P)	
4.7.4.2.2 Zero current mode for converter connected generating technology	n.a.	Enabling	enable | disable	enable	
	n.a	Static voltage range overvoltage	100 % Un – 120 % Un	115%Un	
	n.a	Static voltage range undervoltage	20 % Un – 100 % Un	85%Un	
4.9.2 Requirements on voltage and frequency protection	n.a	Threshold for protection as dedicated device [in A or kW, kVA]	16 A – 250 kVA	Interface protection integrated	
	B	Undervoltage threshold stage 1	0,2 Un – 1 Un	0.85Un	
	B	Undervoltage operate time stage 1	0,1 s – 100 s	3100ms	
	B	Undervoltage threshold stage 2	0,2 Un – 1 Un	0.2Un	
	B	Undervoltage operate time stage 2	0,1 s – 5 s	800ms	
	B	Overvoltage threshold stage 1	1,0 Un – 1,2 Un	1.15Un	
	B	Overvoltage operate time stage 1	0,1 s – 100 s	55100ms	
	B	Overvoltage threshold stage 2	1,0 Un – 1,3 Un	1.25Un	
	B	Overvoltage operate time stage 2	0,1 s – 5 s	200ms	
	B	Overvoltage threshold 10 min mean protection	1,0 Un – 1,15 Un	1.1Un	
	B	Underfrequency threshold	47,0 Hz– 50,0 Hz	47.5Hz	

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		stage 1		
	B	Underfrequency operate time stage 1	0,1 s – 100 s	3000ms
	B	Underfrequency threshold stage 2	47,0 Hz – 50,0 Hz	47Hz
	B	Underfrequency operate time stage 2	0,1 s – 5 s	500ms
	B	Overfrequency threshold stage 1	50,0 Hz – 52,0 Hz	51.5Hz
	B	Overfrequency operate time stage 1	0,1 s – 100 s	3000ms
	B	Overfrequency threshold stage 2	50,0 Hz – 52,0 Hz	52Hz
	B	Overfrequency operate time stage 2	0,1 s – 5 s	500ms
4.10.2 Automatic reconnection after tripping	B	Lower frequency	47,0 Hz – 50,0 Hz	49.5Hz
	B	Upper frequency	50,0 Hz – 52,0 Hz	50.2Hz
	B	Lower voltage	50 % Un – 100 % Un	0.85Un
	B	Upper voltage	100 % Un – 120 % Un	1.1Un
	B	Observation time	10 s – 600 s	60s
	B	Active power increase gradient	6 % – 3000 %/min	10%/min
4.10.3 Starting to generate electrical power	A,B	Lower frequency	47,0 Hz – 50,0 Hz	49.5Hz
	A,B	Upper frequency	50,0 Hz – 52,0 Hz	50.2Hz
	A,B	Lower voltage	50 % – 100 % Un	0.85Un
	A,B	Upper voltage	100 % – 120 % Un	1.1Un
	A,B	Observation time	10 s – 600 s	60s
	A,B	Active power increase gradient	6 % – 3000 %/min	10%/min
4.11.1 Ceasing active power	A,B	Remote operation of the logic interface	yes | no	Can be achieved by PGU. (Logic interface shall be specified by DNO)
4.11.2 Reduction of active power on set point	B	Remote operation NOTE: If yes further definition is provided by the DSO	yes | no	Can be achieved by PGU. (Definition shall be specified by DNO)
4.12 Remote information exchange	B	Remote information exchange required NOTE: If yes further definition is provided by the DSO	yes | no	No
The Column Ref specifies if a parameter is relevant for COMMISSION REGULATION 2016/631 and for what type of generating module the parameter is relevant. If n.a. is set, this parameter is: not applicable for 2016/631, but is introduce into EN50549-1 for local DSO network management reasons and is not considered as cross border issues. Unauthorised access to factory safety parameters setting and software should be prohibited. A reset to the factory safety parameters requires retesting and verification in conjunction with the end-use system.				

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