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Product Service

Compliance Document

No. D 117109 0037 Rev. 01

Holder of Certificate: **Jiangsu Weiheng Intelligent Technology Co., Ltd.**
Sheng Xiang, Yaxi Community, Luoshe Town, Huishan District
214000 Wuxi, Jiangsu Province
PEOPLE'S REPUBLIC OF CHINA

Product: **PV inverter**
Hybrid 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.: 5040923003705-01

Date, 2023-09-15

(Zhengdong Ma)

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Model(s): **WH-THA502, WH-THA602, WH-THA802, WH-THA103, WH-THA123, WH-THA133**

Parameters:

Please see pages 3 to 7.

Tested according to: EN 50549-1:2019

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Models	WH-THA502	WH-THA602	WH-THA802
PV input parameters			
Max.DC input power	7500 W	9000 W	12000 W
Absolute max. voltage	DC 1000 V		
MPPT voltage range	DC 180 V, …, 980 V		
Rated operating voltage	DC 620 V		
Max. input current	DC 2*18 A		
Isc PV	DC 2*22 A		
AC output parameters			
Rated power	5000 W	6000 W	8000 W
Rated apparent power	5000 VA	6000 VA	8000 VA
Max. apparent power	5000 VA	6000 VA	8000 VA
Rated output current	AC 7.3 A	AC 8.7 A	AC 11.6 A
Max. output current	AC 8.1 A	AC 9.6 A	AC 12.8 A
Rated frequency	50 Hz		
Rated voltage	3/N/PE AC 230/400 V		
Power factor	1(-0.8, …, +0.8 adjustable)		
AC input parameters			
Rated current	AC 14.6 A	AC 17.4 A	AC 23.2 A
Max. input current	AC 16.2 A	AC 19.2 A	AC 25.6 A
Max. apparent power	10000 VA	12000 VA	16000 VA
Rated frequency	50 Hz		
Rated voltage	3/N/PE AC 230/400 V		
Power factor	-0.8, …, +0.8		
Battery input port parameters			
Battery type	Li-ion		
Battery voltage range	DC 160 V, …, 700 V		
Max. charge/discharge current	DC 25 A		

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Models	WH-THA103	WH-THA123	WH-THA133
PV input parameters			
Max.DC input power	15000 W	20000 W	
Absolute max. voltage	DC 1000 V		
MPPT voltage range	DC 180 V, …, 980 V		
Rated operating voltage	DC 620 V		
Max. input current	DC 2*18 A		
Isc PV	DC 2*22 A		
AC output parameters			
Rated power	10000 W	12000 W	13000 W
Rated apparent power	10000 VA	12000 VA	13000 VA
Max. apparent power	10000 VA	12000 VA	13000 VA
Rated output current	AC 14.5 A	AC 17.4 A	AC 18.9 A
Max. output current	AC 16.0 A	AC 19.2 A	AC 20.8 A
Rated frequency	50 Hz		
Rated voltage	3/N/PE AC 230/400 V		
Power factor	1(-0.8, …, +0.8 adjustable)		
AC input parameters			
Rated current	AC 26 A		
Max. input current	AC 26 A		
Max. apparent power	17900 VA		
Rated frequency	50 Hz		
Rated voltage	3/N/PE AC 230/400 V		
Power factor	-0.8, …, +0.8		
Battery input port parameters			
Battery type	Li-ion		
Battery Voltage Range	DC 160 V, …, 700 V		
Max. Charge/Discharge Current	DC 25 A		

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	0.1 s
	A,B	47.5 – 48.5 Hz Duration	30 – 90 min	90 min
	A,B	48.5 – 49.0 Hz Duration	30 – 90 min	90 min
	A,B	49.0 – 51.0 Hz Duration	not configurable	unlimited
	A,B	51.0 – 51.5 Hz Duration	30 – 90 min	90 min
	A,B	51.5 – 52 Hz Duration	0 – 15 min	0.1 s
4.4.3 Minimal requirement for active power delivery at	A,B	Reduction threshold	49 Hz – 49.5 Hz	N/A
	A,B	Maximum reduction rate	2 – 10 % P_M/Hz	N/A

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underfrequency					
4.4.4 Continuous operating voltage range	n.a.	Upper limit	not configurable	125 % Un	
	n.a.	Lower limit	not configurable	80 % Un	
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:		2 Hz/s	
		synchronous generating technology:		N/A	
4.5.3.2 Generating plant with non-synchronous generating technology	B	Maximum power resumption time	not defined	1s	
	B	Voltage-Time-Diagram	see Figure 6	Time [s]	U [p.u.]
				0	0.05
				0.25	0.05
				3.00	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.]
				0.0	1.25
				0.1	1.25
				0.1	1.20
				5.0	1.20
				5.0	1.15
				60.0	1.15
				60.0	1.10
4.6.1 Power response to overfrequency	A,B	Threshold frequency f_1	50.2 Hz – 52 Hz	50.2 Hz	
	A,B	Droop	2 % – 12 %	5 %	
	A,B	Power reference	P_M | P_{max}	P_{max}	
	n.a.	Intentional delay	0 – 2 s	0 s	
	n.a.	Deactivation threshold f_{stop}	50,0 Hz – f_1	Deactivated	
	n.a.	Deactivation time t_{stop}	0 – 600 s	0 s	
	A	Acceptance of staged disconnection	yes | no	yes	
4.6.2 Power response to underfrequency	n.a.	Threshold frequency f_1	49.8 Hz – 46 Hz	49,8 Hz	
	n.a.	Droop	2 – 12 %	2%	
	n.a.	Power reference	P_M | P_{max}	Pmax	
	n.a.	Intentional delay	0 – 2 s	0 s	
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.	Disable	

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			cos φ (P)	
4.7.2.3.2 Setpoint control modes	n.a.	Q setpoint and excitation	0 – 43.6 % Pn	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.	Time constant	3 s – 60 s	10 s
	n.a.	Min cos φ	0.0 – 1	1
	n.a.	Lock in power	0 % – 20 %	20 %
	n.a.	Lock out power	0 % – 20 %	5 %
4.7.2.3.4 Power related control mode	n.a.	Characteristic curve	-	Yes
4.7.4.2.2 Zero current mode for converter connected generating technology	n.a.	Enabling	enable | disable	disabled
	n.a	Static voltage range overvoltage	100 % U_n – 120 % U_n	115 % Un
	n.a	Static voltage range undervoltage	20 % U_n – 100 % U_n	80 % 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 intergrated
	B	Undervoltage threshold stage 1	0.2 U_n – 1 U_n	0.8 Un
	B	Undervoltage operate time stage 1	0.1 s – 100 s	3 s
	B	Undervoltage threshold stage 2	0.2 U_n – 1 U_n	0.45 Un
	B	Undervoltage operate time stage 2	0.1 s – 5 s	0.3 s
	B	Overvoltage threshold stage 1	1.0 U_n – 1.2 U_n	1.25 Un
	B	Overvoltage operate time stage 1	0.1 s – 100 s	0.1 s
	B	Overvoltage threshold stage 2	1.0 U_n – 1.3 U_n	Disable as default setting
	B	Overvoltage operate time stage 2	0.1 s – 5 s	Disable as default setting
	B	Overvoltage threshold 10 min mean protection	1.0 U_n – 1.15 U_n	1.10 Un
	B	Underfrequency threshold stage 1	47.0 Hz– 50.0 Hz	47.50 Hz
	B	Underfrequency operate time stage 1	0.1 s – 100 s	0.1 s
	B	Underfrequency threshold stage 2	47.0 Hz – 50.0 Hz	Disable as default setting
	B	Underfrequency operate time stage 2	0.1 s – 5 s	Disable as default setting
	B	Overfrequency threshold stage 1	50.0 Hz – 52.0 Hz	51.50 Hz
	B	Overfrequency operate time stage 1	0.1 s – 100 s	0.1 s
	B	Overfrequency threshold stage 2	50.0 Hz – 52.0 Hz	Disable as default setting
	B	Overfrequency operate time stage 2	0.1 s – 5 s	Disable as default setting
4.10.2 Automatic	B	Lower frequency	47.0 Hz – 50.0 Hz	49.5 Hz

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reconnection after tripping	B	Upper frequency	50.0 Hz – 52.0 Hz	50.2 Hz
	B	Lower voltage	50 % U_n – 100 % U_n	85% Un
	B	Upper voltage	100 % U_n – 120 % U_n	110 % Un
	B	Observation time	10 s – 600 s	85 s
	B	Active power increase gradient	6 % – 3000 %/min	9 % Pn/min
4.10.3 Starting to generate electrical power	A,B	Lower frequency	47.0 Hz – 50.0 Hz	49.5 Hz
	A,B	Upper frequency	50.0 Hz – 52.0 Hz	50.2 Hz
	A,B	Lower voltage	50 % – 100 % U_n	85 % Un
	A,B	Upper voltage	100 % – 120 % U_n	110 % Un
	A,B	Observation time	10 s – 600 s	85 s
	A,B	Active power increase gradient	6 % – 3000 %/min	9%
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 spcdbyDNO)
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. (Logic interface shall be spcdbyDNO)
4.12 Remote information exchange	B	Remote information exchange required NOTE: If yes further definition is provided by the DSO	yes | no	N/A

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 EN 50549-1 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.