Test Verification of Conformity

Verification Number: 2401B1675SHA-V1

On the basis of the tests undertaken, the sample<s> of the below product have been found to comply with the requirements of the referenced specification<s>/standard<s> at the time the tests were carried out. This verification is part of the full test report<s> and should be read in conjunction with it <them>.

Applicant Name & Address:	Shenzhen Lvyou Energy Technology Co., Ltd 103-104, Building 12, Dawangshan 2nd Industrial Zone, Shajing, Baoan District, Shenzhen, Guangdong, China
Product Description:	Micro Inverter
Ratings & Principle Characteristics:	See Appendix (Specifications table)
Models/Type References:	See Appendix (Specifications table)
Brand Name:	N/A
Relevant Standards:	VDE-AR-N 4105:2018 conjunction with DIN VDE V 0124-100 :2020
Verification Issuing Office Name & Address:	Intertek Testing Services Shanghai Building No.86, 1198 Qinzhou Road (North), Shanghai 200233, China
Date of Tests:	2023-09-04 to 2023-12-30
Test Report Number(s):	2401B1675SHA-001

Additional information in Appendix.

Signature

Name: Max Jin
Position: General Manager
Date: 2024-03-06

APPENDIX: Test Verification of Conformity

This is an Appendix to Test Verification of Conformity Number: 2401B1675SHA-V1

Manufacturer:	Same as applicant

Specifications table	
Model	ES-800
Input:	
Vmax PV (Vdc)	55
Isc PV (absolute Max.) (A)	24
Number MPP trackers	2
Number input strings	2
Max. PV input current(A)	14*2
MPPT voltage range (Vdc)	16 to 55
Output	
Normal Voltage(V)	☒1/N/PE 230Vac ☐3 φ /N/PE 230/400Vac
Frequency (Hz)	☒50 Hz ☒60Hz
Current (Max. continuous) (A)	3.13
Power rating (W)	720
Power Rating (VA)	720
Power factor /rated	≥0.99
others	
Protective class	Class I
Ingress protection (IP)	IP 67
Temperature (°C)	-40° C to +65° C
Inverter Isolation	☐Non-isolated ☒High frequency isolated
Overvoltage category	OVC III (AC Main), OVC II (PV)
Weight (kg)	1.8
Dimensions (WxHxD) (mm)	22.3 x 4.3 x 23

Annex E4: Verification of Conformity for power generation units

Verification of Conformity for power generation units	No.: **2401B1675SHA-V1**	
Manufacturer	Shenzhen Kingsource Technology Co., Ltd. 4F, Building 6, Antuoshan High-tech Industrial Park, Xinsha Road，Shajing Street, Bao'an District, Shenzhen, Guangdong, China	
Type power generation unit	Micro Inverter	
Model		ES-800
Assessment values	Max. active power P_{Emax}	720 W
	Max. apparent power S_{Emax}	720 VA
	Rated voltage	230Vac
Rated values	Rated current (AC) I_r	3.13A
	Initial short-circuit AC current	24A
Network connection rules	**VDE-AR-N 4105 "Power generation systems connected to the low-voltage network"** Technical minimum requirements for connection and parallel operation of power generation systems connected to the low voltage network	
Firmware version	KS-01	

Annex E.5 Test report "Network interactions" for power generation units

Extract from the test report on the certificate of units		2401B1675SHA-001				
Manufacturer:		Shenzhen Kingsource Technology Co., Ltd. 4F, Building 6, Antuoshan High-tech Industrial Park, Xinsha Road，Shajing Street, Bao'an District, Shenzhen, Guangdong, China				
Manufacturer indications:		System type	ES-800			
		Max. active power P_{Emax}	720 W			
		Rated voltage	230Vac			
Measurement period		2023-09-04 to 2023-12-30				
Rapid voltage changes			N/A			
Connection without provisions (regarding the primary energy carrier)			k_i = 0.12			
Most adverse case when switching between generator levels			N/A			
Connection at nominal conditions (of the primary energy carrier)			k_i = 1.00			
Disconnection at rated power			k_i = 0.98			
Worst value of all switching operations			k_{imax} = 1.02			
Flicker	Angle of network impedance Ψ_k:	32°	30°	50°	70°	85°
	Long-term flicker strength P_{lt}:	0.26	N/A	N/A	N/A	N/A
	Initial flicker factor c_Ψ:	N/A	N/A	N/A	N/A	N/A

E.5 Test report "Network interactions" for power generation units

(5.2.4)	TABLE: Harmonics										P	
Harmonics												
P/P_n [%]	0	10	20	30	40	50	60	70	80	90	100	Limit
Order No.	I/In [%]											
2	0.73	0.37	0.35	0.34	0.36	0.37	0.38	0.34	0.41	0.44	0.56	--
3	0.58	0.98	0.36	0.29	0.23	0.21	0.17	0.22	0.19	0.21	0.30	--
4	0.47	0.21	0.19	0.21	0.16	0.15	0.16	0.13	0.12	0.17	0.27	--
5	0.56	1.16	0.69	0.59	0.53	0.51	0.44	0.34	0.32	0.39	0.50	--
6	0.56	0.18	0.03	0.05	0.07	0.07	0.08	0.09	0.09	0.03	0.07	--
7	0.53	0.74	0.56	0.44	0.39	0.38	0.42	0.40	0.36	0.28	0.18	--
8	0.60	0.09	0.03	0.05	0.04	0.02	0.01	0.01	0.04	0.05	0.08	--
9	0.58	0.05	0.40	0.36	0.33	0.28	0.25	0.25	0.25	0.21	0.05	--
10	0.47	0.10	0.09	0.06	0.06	0.03	0.03	0.03	0.22	0.03	0.06	--
11	0.51	0.12	0.25	0.23	0.21	0.20	0.20	0.20	0.17	0.14	0.05	--
12	0.51	0.11	0.04	0.02	0.03	0.03	0.02	0.04	0.29	0.04	0.04	--
13	0.49	0.14	0.03	0.09	0.11	0.10	0.07	0.08	0.08	0.05	0.03	--
14	0.49	0.08	0.06	0.07	0.05	0.02	0.01	0.01	0.02	0.04	0.04	--
15	0.47	0.20	0.02	0.05	0.05	0.07	0.08	0.06	0.05	0.02	0.03	--
16	0.40	0.07	0.06	0.03	0.02	0.02	0.03	0.03	0.01	0.03	0.04	--
17	0.38	0.07	0.09	0.04	0.02	0.01	0.02	0.03	0.05	0.05	0.04	--
18	0.47	0.09	0.04	0.02	0.03	0.02	0.02	0.03	0.04	0.02	0.02	--
19	0.44	0.20	0.07	0.03	0.02	0.03	0.03	0.04	0.04	0.05	0.03	--
20	0.42	0.09	0.07	0.03	0.01	0.02	0.02	0.01	0.03	0.02	0.02	--
21	0.38	0.05	0.05	0.07	0.05	0.04	0.03	0.03	0.06	0.05	0.02	--
22	0.40	0.03	0.08	0.04	0.02	0.03	0.03	0.03	0.04	0.05	0.01	--
23	0.38	0.16	0.08	0.06	0.04	0.04	0.05	0.07	0.09	0.08	0.03	--
24	0.36	0.08	0.02	0.04	0.02	0.01	0.01	0.01	0.03	0.03	0.02	--
25	0.36	0.13	0.05	0.06	0.07	0.07	0.08	0.09	0.11	0.11	0.02	--
26	0.33	0.12	0.04	0.07	0.04	0.04	0.05	0.04	0.02	0.03	0.01	--
27	0.29	0.21	0.08	0.07	0.06	0.07	0.08	0.10	0.11	0.10	0.02	--
28	0.31	0.11	0.03	0.03	0.03	0.02	0.01	0.02	0.01	0.02	0.02	--
29	0.29	0.17	0.09	0.08	0.09	0.08	0.09	0.11	0.10	0.07	0.02	--
30	0.33	0.04	0.01	0.04	0.05	0.04	0.04	0.03	0.01	0.01	0.01	--
31	0.31	0.22	0.13	0.09	0.07	0.08	0.09	0.09	0.10	0.07	0.02	--
32	0.29	0.02	0.02	0.03	0.03	0.02	0.02	0.02	0.01	0.02	0.02	--
33	0.27	0.20	0.11	0.07	0.06	0.06	0.07	0.09	0.07	0.06	0.02	--
34	0.29	0.12	0.04	0.01	0.04	0.03	0.03	0.03	0.02	0.01	0.02	--
35	0.18	0.18	0.11	0.05	0.03	0.03	0.03	0.05	0.04	0.05	0.02	--
36	0.18	0.06	0.03	0.04	0.02	0.01	0.01	0.02	0.02	0.02	0.02	--
37	0.24	0.18	0.10	0.03	0.01	0.01	0.01	0.01	0.02	0.02	0.02	--
38	0.20	0.04	0.03	0.02	0.02	0.02	0.01	0.01	0.03	0.04	0.01	--
39	0.22	0.14	0.08	0.03	0.03	0.02	0.03	0.02	0.02	0.01	0.02	--
40	0.18	0.07	0.04	0.04	0.04	0.03	0.01	0.00	0.02	0.02	0.01	--

(5.2.4)	TABLE: Harmonic current limit test (EN 61000-3-2)						P
Model							
Harmonic	L1		--		--		Limits -A
	Magnitude (A)	% of I	Magnitude (A)	% of I	Magnitude (A)	% of I	
02	0.17	--	--	--	--	--	1.08
03	0.09	--	--	--	--	--	2.30
04	0.08	--	--	--	--	--	0.43
05	0.15	--	--	--	--	--	1.14
06	0.02	--	--	--	--	--	0.30
07	0.05	--	--	--	--	--	0.77
08	0.02	--	--	--	--	--	0.23
09	0.01	--	--	--	--	--	0.40
10	0.01	--	--	--	--	--	0.18
11	0.01	--	--	--	--	--	0.33
12	0.01	--	--	--	--	--	0.15
13	0.01	--	--	--	--	--	0.21
14	0.01	--	--	--	--	--	0.13
15	0.01	--	--	--	--	--	0.15
16	0.01	--	--	--	--	--	0.12
17	0.01	--	--	--	--	--	0.13
18	0.00	--	--	--	--	--	0.10
19	0.00	--	--	--	--	--	0.12
20	0.00	--	--	--	--	--	0.09
21	0.01	--	--	--	--	--	0.11
22	0.00	--	--	--	--	--	0.08
23	0.01	--	--	--	--	--	0.10
24	0.00	--	--	--	--	--	0.08
25	0.00	--	--	--	--	--	0.09
26	0.00	--	--	--	--	--	0.07
27	0.00	--	--	--	--	--	0.08
28	0.00	--	--	--	--	--	0.07
29	0.00	--	--	--	--	--	0.08
30	0.00	--	--	--	--	--	0.06
31	0.00	--	--	--	--	--	0.07
32	0.00	--	--	--	--	--	0.06
33	0.00	--	--	--	--	--	0.07
34	0.00	--	--	--	--	--	0.05
35	0.00	--	--	--	--	--	0.06
36	0.00	--	--	--	--	--	0.05
37	0.00	--	--	--	--	--	0.06
38	0.00	--	--	--	--	--	0.05
39	0.00	--	--	--	--	--	0.06
40	0.00	--	--	--	--	--	0.05
THD	--	4.97	--	--	--	--	--

Annex E.7 Requirements to the Test Report on the NS protection

Extract from the test report for the NS protection "Determination of electric properties"		2401B1675SHA-001
Test report NS Protection		
Type of NS protection:	Integrated NS protection	Further manufacturer indications
Software version:	KS-01	
Manufacturer:	Shenzhen Kingsource Technology Co., Ltd.	
Measurement period:	2023-09-04 to 2023-12-30	

	Inverter(s)		
Protective function	Set value	Tripping value	Tripping value NS protection
Rise-in-voltage protection U >>	1.25 * U_n	1.252 Un	291ms
Rise-in-voltage protection U >	1.10 * U_n	1.100 Un	536 s
Voltage drop protection U <	0.8 * U_n	0.800 Un	186ms
Voltage drop protection U <	0.45 * Un	0.448 Un	373 ms
Frequency decrease protection f <	47.5Hz	47.50 Hz	47 ms
Frequency increase protection f >	51.5Hz	51.50 Hz	51 ms

[a] The tripping time includes the period from the limit value violation U/f until the tripping signal to the interface switch.
When planning the power generation system, the response time of the interface switch shall be added to the maximum time value obtained as indicated above.
The disconnection time (sum of tripping time of the NS protection plus response time of the interface switch) shall not exceed 200 ms
* Longest disconnection of the rise-in-voltage protection as a moving 10-minute-average.

☒ **For integrated NS protection**	
Assigned to power generation unit of type	ES-800
Type integrated interface switch	(Hongfa) HF115F
Response time of interface switch for integrated NS protection	20ms
Verification of the entire functional chain "integrated NS protection – interface switch" has resulted in successful disconnection.	
NOTE1: Un=230V	

Remark:

The sample<s> covered in this VOC are incomplete in functional features or limited in performance capabilities and are intended for use and evaluation in other products. See test report for detail information.

Signature

Name: Max Jin
Position: General Manager
Date: 2024-03-06