

Test Verification of Conformity

Verification Number: 210403960SHA-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: Afore New Energy Technology (Shanghai)Co., Ltd.

Build No.7, 333 Wanfang Road, Minhang District, Shanghai, China 201112

Product Description: Grid-connected PV inverter

Ratings & Principle See Appendix(Specifications table)

Characteristics:

Brand Name: Afore

Models/Type References:

Relevant Standards: VDE-AR-N 4105:2018

conjunction with DIN VDE V 0124-100 :2020

Verification Issuing Office Intertek Testing Services Shanghai

Name & Address: Building No.86, 1198 Qinzhou Road (North), Shanghai 200233, China

See Appendix(Specifications table)

Date of Tests: 2021-04-29 to 2021-05-21

Test Report Number(s): 210403960SHA-001

Additional information in Appendix.

Signature

Name: Jonny Jing Position: Manager Date: 2021-05-21



APPENDIX: Test Verification of Conformity

This is an Appendix to Test Verification of Conformity Number: 210403960SHA-V1

Manufacturer: Same as applicant

	Specifications table					
Model	HNS1000TL-1	HNS1500TL-1	HNS2000TL-1			
Input:						
Vmax PV (Vdc)	500	500	500			
Isc PV (absolute Max.) (A)	18	18	18			
Number MPP trackers	1	1	1			
Number input strings	1	1	1			
Max. PV input current(A)	14	14	14			
MPPT voltage range (Vdc)	50-500	50-500	50-500			
Vdc range @ full power (Vdc)	70-500	110-500	145-500			
Output						
Normal Voltage(V)	L/N	N/PE, 220Vac, 230Vac, 240	Vac			
Frequency (Hz)		50 / 60				
Current (normal) (A)	4.4	6.6	8.7			
Current (Max. continuous) (A)	6	9	12			
Power rating (W)	1000	1500	2000			
Power Rating (VA)	1000	1500	2000			
Power factor /rated	1 (-0,8~+0,8 adjustable)	1 (-0,8~+0,8 adjustable)	1 (-0,8~+0,8 adjustable)			
others						
Protective class	. \	Class I	7			
Ingress protection (IP)	IP 65					
Temperature ($^{\circ}\!\mathbb{C}$)	-25℃ to +60℃ (up 45℃ derating)					
Inverter Isolation	Non-isolated Non-isolated					
Overvoltage category	OVC III (AC Main), OVC II (PV)					
Weight (kg)		6				
Dimensions (WxHxD) (mm)		260 x 280 x 116				



	Specification	ons table				
Model	HNS2500TL-1	HNS2500TL-1 HNS3000TL-1				
Input:						
Vmax PV (Vdc)	500	500				
Isc PV (absolute Max.) (A)	18	18				
Number MPP trackers	1	1				
Number input strings	1	1				
Max. PV input current(A)	14	14				
MPPT voltage range (Vdc)	50-500	50-500				
Vdc range @ full power (Vdc)	180-500	220-500				
Output						
Normal Voltage(V)	L/N	N/PE, 220Vac, 230Vac, 240\	/ac			
Frequency (Hz)		50 / 60				
Current (normal) (A)	10.9	13.1	10			
Current (Max. continuous) (A)	13	15	10			
Power rating (W)	2500 3000					
Power Rating (VA)	2500	3000	- 10			
Power factor /rated	1(-0,8~0,8 adjustable)	1(-0,8~0,8 adjustable)				
others						
Protective class		Class I				
Ingress protection (IP)		IP 65				
Temperature (°C)	-25°	${\mathbb C}$ to +60 ${\mathbb C}$ (up 45 ${\mathbb C}$ derat	ing)			
Inverter Isolation		Non-isolated	///			
Overvoltage category	(OVC III (AC Main), OVC II (PV	")			
Weight (kg)	6					
Dimensions (WxHxD) (mm)	260 x 280 x 116					



Annex E4: Verification of Conformity for power generation units

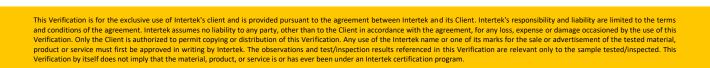
Verification of Conformity for power generation units	No: 210403960SHA-V1				
Manufacturer	Afore New Energy Technology (Shanghai)Co., Ltd. Build No.7, 333 Wanfang Road, Minhang District, Shanghai, China 201112				
Type power generation unit	Grid-connected PV inverter				
Model	HNS1000TL-1, HNS1500TL-1, HNS2000TL-1, HNS2500TL-1, HNS3000TL-1				
Accomment values	Max. active power PEmax (W)	1040	HNS1000TL-1		
Assessment values		3037	HNS3000TL-1		
	Max. apparent power	1056	HNS1000TL-1		
	SEmax (VA)	3052	HNS3000TL-1		
	Rated voltage	1/N/PE~ 230Vac			
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	V06				
The above mentioned power gene	The above mentioned power generation unit meets the requirements of VDE-AR-N 4105.				



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

Model: HNS3000TL-1

Model: HIVE	30001L-1				
Extract from the	test report on the certificate	21040	03960SHA	A-001	
of units					
Type of	Grid-connected PV	Manu	ıfacturer 's	data	
installation:	inverter				
		Type	of installa	tion: Grid-cor	nected PV
La a ta Ha Cara	Afore New Energy	invert	ter		
Installation	Technology(Shanghai)	Powe	er of norma	al output in no	ominal
manufacturer:	Co., Ltd.		itions):300		
	,		g voltage:		230 V
Period of		From 2021-04-29 to 2021-05-2	1		
measurement:			_		
		Maximum active Power P _{Emax} 3037 W Maxi	mum reac	tive Power S	S _{Emax} 3052 VA
			.1		
		Switching actions	100		
		Switching on without specification (to the primary	<i>k</i> i	0.15	
		energy carrier)			The limit of kimax
		Most unfavorable case when switching between	k i	0.15	is 1.0
		generator levels	_		
		Switching on during nominal conditions (of the	k i	0.14	
		primary energy carrier)		VIII.	
		Switching off during normal output	k i	0.31	
		Worst value of all switching operations	k_{imax}	0.31	
Flicker	107	Angle of network	iiiidh	32°	l .
	///	impedanceΨ _k :			
		Long-term flicker strength P _{II} :		0.17	
		3 3 "	•		





Model: HNS3000TL-1

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

		Load current: 100 %		
Ordinal number	Current (%) L1	Current (%) L2	Current (%) L3	Limit (%)
0	0.08	-	-	0.5% I
1		-	-	
2	1.513	-	-	1.08
3	1.959	-	-	2.3
4	0.345	-	-	0.43
5	0.628	-	-	1.14
6	0.163	-	-	0.30
7	0.450	-	-	0.77
8	0.069	-	-	0.23
9	0.139	-	-	0.40
10	0.145	- CO	-	0.184
11	0.254		-	0.33
12	0.157	W 0	-	0.153
13	0.487	A		0.21
14	0.108	AF 11 3	1	0.131
15	0.390			0.15
16	0.131	-		0.115
17	0.180	7		0.132
18	0.240		All and the second seco	0.102
19	0.257		100	0.118
20	0.144	10.5	10	0.092
21	0.309	-	-	0.107
22	0.112	-	-	0.084
23	0.153	-	-	0.098
24	0.209	-	-	0.077
25	0.350	-		0.09
26	0.188		·	0.071
27	0.220			0.083
28	0.082	-		0.066
29	0.132	-		0.078
30	0.161	-	-	0.061
31	0.293	-		0.073
32	0.175	_		0.058
33	0.109	-	- 40	0.068
34	0.061			0.054
35	0.100	in the second second	100	0.064
36	0.088	-		0.051
37	0.200	-	(1)	0.061
38	0.108			0.048
39	0.096	100		0.058
40	0.064	A B A	100	0.046
THD	2.952			5
PWHD	-		-	22%



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

Model: HNS3000TL-1

	=				
Extract from the test report for the NS protection		210403960SHA-00	1		
"Determination of electric	properties"				,
Test report NS Protection	on				
Type of NS protection:	Integral		Further manufactur	er instructions	
Software version:	<u>V06</u>				
Manufacturer:	Afore New Energy				
	Technology(Shanghai)	Co., Ltd.			
Period of measurement:	From 2021-04-29 to 202	21-05-21			
				Inverter(s)	
Protective	e function	Set value	Tripping value	Tripping value NS protection	
Rise-in-voltage protection	U >>	1.25 * <i>U</i> _n	287.8V	0.128 s	
Rise-in-voltage protection	U>	1.15 * <i>U</i> _n	265.0V	0.195 s	
Voltage drop protection U	<	0.8 * <i>U</i> _n	183.5V	2.880 s*	
Voltage drop protection U	<	0.45 * Un	103.0V	0.289 s	
Frequency decrease prote	ection f <	47.5Hz	47.48Hz	0.192 s	
Frequency increase prote	ction f >	51.5Hz	51.52Hz	0.196 s	
 The tripping time include switch. When planning the power obtained as indicated abo 	generation system, the re			signal to the interface	ue
				the interface switch) shall not exceed 20)0 ms
	of the rise-in-voltage prote	ction as a moving	10-minute-average	<u> </u>	
☐ For integrated NS predictions	otection		h .		
Assigned to power generation unit of type				Grid-connected PV inverter	
Type integrated interface switch				Power Relay	
Response time of interface switch for integrated NS protection				12ms	
Verification of the entire for	unctional chain "integrated	d NS protection –	interface switch" ha	s resulted in successful disconnection.	
NOTE1: Un=230V	A			. //	



Annex E.5 Test report "Network interactions" for power generation units Model: HNS1000TL-1

Model: HNS		Γ			040400000	114 004		
of units	test report on the certificate				210403960S	HA-001		
Type of installation:	Grid-connected PV inverter				Manufacture	ʻs data		
Afore New Energy					Type of insta inverter	llation: PV Gr	id-conn	ected PV
Installation manufacturer:	Technology(Shanghai) Co., Ltd.		Power of normal output in nomin conditions):1000 W			nomina	l	
					Rating voltag	e:		230 V
Period of		Fron	n 2021-	04-29 to 2021	-05-21			
measurement:			_ \					
		- 40 0		_				
		Maximum active Power	P_{Emax}	3037 W	Maximum re	active Power	S_{Emax}	3052 VA
		40						
		Switching actions				·		
		Switching on without spe energy carrier)	cificatio	on (to the prim	ary <i>k</i> i	0.15	The	limit of k _{imax}
		Most unfavorable case was denerator levels	hen sw	vitching between	en <i>k</i> i	0.15		is 1.0
		Switching on during nom primary energy carrier)	inal cor	nditions (of the	e k i	0.14		
		Switching off during norm Worst value of all switchi			$\emph{k}_{ ext{i}}$	0.31		
Flicker	0	Ang	gle of ne	etwork	n _{imax}	32		
			edance					
		Lon	g-term	flicker strengt	h P _{lt} :	0.	17	



Model: HNS1000TL-1

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

		Load current: 100 %		
Ordinal number	Current (%) L1	Current (%) L2	Current (%) L3	Limit (%)
0	0.08	-	-	0.5% I
1		-	-	
2	1.513	-	-	1.08
3	1.959	-	-	2.3
4	0.345	-	-	0.43
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6	0.163	-	-	0.30
7	0.450	-	-	0.77
8	0.069	-	-	0.23
9	0.139		-	0.40
10	0.145	AND THE PERSON NAMED IN	-	0.184
11	0.254		-	0.33
12	0.157	M .	-	0.153
13	0.487			0.21
14	0.108	AV 11 3		0.131
15	0.390		10	0.15
16	0.131	V 10-	- 30	0.115
17	0.180	7		0.132
18	0.240		The state of the s	0.102
19	0.257		- 1	0.118
20	0.144	11.5	- 10	0.092
21	0.309	-	- 1	0.107
22	0.112	-	-	0.084
23	0.153	-	- 10	0.098
24	0.209	-	-	0.077
25	0.350	-	-	0.09
26	0.188		-	0.071
27	0.220	2 (0) (- 10 (0)	0.083
28	0.082	100 -	-	0.066
29	0.132			0.078
30	0.161	-	- 1	0.061
31	0.293	-	- 40	0.073
32	0.175	-	- 10	0.058
33	0.109	-	M - M	0.068
34	0.061		_ /// - ///	0.054
35	0.100	34	- AT	0.064
36	0.088		A	0.051
37	0.200	-	(4)	0.061
38	0.108	Oh -	N - N	0.048
39	0.096	- I		0.058
40	0.064	NA II A		0.046
THD	2.952	0. 11 //	-	5
PWHD	-		-	22%



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

Model: HNS1000TL-1

		210403960SHA-00	1		
"Determination of electric properties"					
Test report NS Protection	on				
Type of NS protection:	<u>Integral</u>		Further manufactur	er instructions	
Software version:	<u>V06</u>				
Manufacturer:	Afore New Energy				
	Technology(Shanghai)	Co., Ltd.			
Period of measurement:	From 2021-04-29 to 20	21-05-21			
				Inverter(s)	
Protective function		Set value	Tripping value	Tripping value NS protection	
Rise-in-voltage protection	1 U >>	1.25 * <i>U</i> _n	287.8V	0.128 s	
Rise-in-voltage protection	ı U >	1.15 * <i>U</i> _n	265.0V	0.195 s	
Voltage drop protection L	J <	0.8 * <i>U</i> _n	183.5V	2.880 s*	
Voltage drop protection L	J <	0.45 * Un	103.0V	0.289 s	
Frequency decrease prot	ection f <	47.5Hz	47.48Hz	0.192 s	
Frequency increase protection f > 51.5Hz		51.52Hz	0.196 s		
switch. When planning the power obtained as indicated about the power obtained as indicated as indindicated as indicated as indicated as indicated as indicated as i	ove.	esponse time of t	the interface switch s	shall be added to the maximum time va	
				the interface switch) shall not exceed 2	200 ms
Longest disconnection (of the rise-in-voltage prote	cuon as a movin	y 10-minute-average	i.	

⊠ Fo	r integrated	INS	protection
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Est of integration to protection	(3)			
Assigned to power generation unit of type	Grid-connected PV inverter			
Type integrated interface switch	Power Relay			
Response time of interface switch for integrated NS protection	12ms			
Verification of the entire functional chain "integrated NS protection – interface switch" has resulted in successful disconnection.				
NOTE1: Un=230V	_//			

Signature

Name: Jonny Jing Position: Manager Date: 2021-05-21