

Compliance Document

No. D 120072 0001 Rev. 00

Holder of Certificate: **Ningbo Austa Solar Tech Co., Ltd**
No. 128, Haichuan Rd
Jiangbei District
315600 Ningbo
PEOPLE'S REPUBLIC OF CHINA

Product: **Converter**
(PV grid-connected inverter)

Model(s): **AU-1P8002G, AU-1P6002G**

Parameters: See page 2

Tested according to: VDE-AR-N 4105:2018
DIN VDE V 0124-100 (VDE V 0124-100):2020

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.: 64290203026601C

Date, 2023-03-07



(Billy Qiu)

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Parameters:

Model:	AU-1P8002G	AU-1P6002G
PV input parameters:		
Maximum input power	1200 W	1200 W
Maximum input voltage	60 Vd.c.	60 Vd.c.
Rated input voltage	20 - 60 Vd.c.	20 - 60 Vd.c.
MPPT voltage range	22 - 55 Vd.c.	22 - 55 Vd.c.
Maximum input current	17 Ad.c. x 2	14 Ad.c. x 2
Isc PV	20 Ad.c. x 2	20 Ad.c. x 2
AC output rating		
Rated output voltage	230 Va.c.	230 Va.c.
Rated output frequency	50 Hz	50 Hz
Maximum continuous output current	3.26 Aa.c.	2.61 Aa.c.
Maximum output active power	750 W	600 W
Maximum output apparent power	750 VA	600 VA
Power factor range	0.95 un - 0.95 ov	0.95 un - 0.95 ov

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Unit Certificate		
Manufacturer	Ningbo Austa Solar Tech Co., Ltd	
Power generation unit type	[Inverter]: AU-1P8002G, AU-1P6002G Remark: certified on representative model AU-1P8002G of family design products, results of the measurement of AU-1P8002G can be transferred to other models based on transferability rule of measurements in DIN VDE V 0124-100 (VDE V 0124-100):2020.	
Technical data	Max. active power $P_{E_{max}}$	750W (AU-1P8002G)
	Max. apparent power $S_{E_{max}}$	759VA (AU-1P8002G)
	Rated voltage	230Va.c.
	Rated current (AC) I_r	3.26A (AU-1P8002G)
	Initial short-circuit AC current	9.6A (AU-1P8002G)
Network connection rule	VDE-AR-N 4105 “Generators connected to the low-voltage distribution network” Technical minimum requirements for connection and parallel operation of power generation systems connected to the low-voltage network	
Test requirement	DIN VDE V 0124-100 (VDE V 0124-100) “Network integration of power generation systems – Low voltage” Test requirements for power generation units intended for connection to and parallel operation on the low-voltage network	
Test report	64.290.20.30266.01C from 21.02.2023	
The above designated power generation unit meets the requirements of VDE-AR-N 4105		
This unit certificate includes extract report information of E.5 of VDE-AR-N 4105 for the power generation unit(s)		



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Certificate of NS protection	
Manufacturer	Ningbo Austa Solar Tech Co., Ltd
Type of NS protection	Integrated NS protection
Central NS protection	No
Integrated NS protection	Yes Assigned to power generation unit of type: <u>AU-1P8002G, AU-1P6002G</u>
Network connection rule	VDE-AR-N 4105 “Generators connected to the low-voltage distribution network” Technical minimum requirements for connection and parallel operation of power generation systems connected to the low-voltage network
Test requirement	DIN VDE V 0124-100 (VDE V 0124-100) “Network integration of power generation systems – Low voltage” Test requirements for power generation units intended for connection to and parallel operation on the low-voltage network
Test report	64.290.20.30266.01C from 21.02.2023
The network and system protection designated above meets the requirements of VDE-AR-N 4105.	
This certificate of NS protection includes extract report information of E.7 of VDE-AR-N 4105 for the NS protection.	

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

Extract of the test report for power generation units "Determination of electrical properties"		No.: 64.290.20.30266.01C				
System manufacturer:	Ningbo Austa Solar Tech Co., Ltd					
Manufacturer indications:	System type (BHKW, PV-WR, ...): PV grid-connected inverter					
AU-1P8002G	Max. active power $P_{E_{max}}$ (W)	750				
	Max. apparent power $S_{E_{max}}$ (VA)	759				
	Rated voltage (Va.c.)	230				
AU-1P6002G	Max. active power $P_{E_{max}}$ (W)	598				
	Max. apparent power $S_{E_{max}}$ (VA)	602				
	Rated voltage (Va.c.)	230				
Measurement period	2020-04-26 to 2021-09-26		-----			
Connection without provisions (regarding the primary energy carrier)		$k_i = \underline{0.37}$				
Most adverse case when switching between generator levels		$k_i = \underline{0.64}$				
Connection at nominal conditions (of the primary energy carrier)		$k_i = \underline{0.43}$				
Disconnection at rated power		$k_i = \underline{1.15}$				
Worst value of all switching operations		$k_{imax} = \underline{1.15}$				
Flicker	Network impedance angle Ψ_k	32° ^{a)}	30°	50°	70°	85°
	Initial flicker factor c_ψ	2.15	--	--	--	--
Remark: a) According to VDE V 0124-100, the worst case is measured at 32° network impedance angle and the other angles are waived.						

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Harmonics and inter-harmonics & Feed-in of direct currents												
Harmon Nr.	P/P _{E_{max}}											Limit (A)
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	
0	0.002	-0.010	-0.007	-0.015	-0.011	-0.009	-0.016	-0.007	-0.006	0.003	-0.012	0.5% I _R
1	0.001	0.383	0.597	1.017	1.387	1.584	2.064	2.249	2.742	3.039	3.217	-
2	0.000	0.018	0.010	0.012	0.021	0.018	0.010	0.026	0.034	0.011	0.028	1.08
3	0.000	0.073	0.069	0.054	0.048	0.040	0.033	0.037	0.029	0.026	0.026	2.30
4	0.001	0.006	0.004	0.003	0.005	0.012	0.007	0.018	0.016	0.011	0.012	0.43
5	0.000	0.046	0.046	0.036	0.033	0.034	0.023	0.018	0.021	0.014	0.009	1.14
6	0.002	0.005	0.003	0.006	0.006	0.003	0.006	0.010	0.010	0.007	0.007	0.30
7	0.000	0.031	0.036	0.028	0.031	0.030	0.023	0.009	0.015	0.016	0.010	0.77
8	0.001	0.003	0.002	0.002	0.004	0.005	0.009	0.010	0.012	0.008	0.009	0.23
9	0.001	0.026	0.028	0.025	0.024	0.021	0.018	0.013	0.011	0.011	0.011	0.40
10	0.002	0.004	0.002	0.007	0.001	0.004	0.004	0.004	0.008	0.007	0.009	0.18
11	0.001	0.024	0.024	0.027	0.027	0.022	0.019	0.023	0.012	0.012	0.014	0.33
12	0.001	0.001	0.005	0.004	0.002	0.003	0.003	0.003	0.008	0.009	0.008	0.15
13	0.000	0.025	0.026	0.028	0.027	0.027	0.020	0.027	0.017	0.015	0.014	0.21
14	0.000	0.003	0.003	0.006	0.010	0.005	0.002	0.003	0.010	0.003	0.012	0.13
15	0.001	0.021	0.025	0.029	0.024	0.025	0.021	0.031	0.017	0.016	0.019	0.15
16	0.001	0.004	0.003	0.008	0.011	0.008	0.007	0.001	0.006	0.002	0.011	0.12
17	0.001	0.014	0.020	0.024	0.028	0.025	0.026	0.031	0.016	0.023	0.022	0.13
18	0.002	0.006	0.006	0.010	0.010	0.007	0.006	0.001	0.007	0.009	0.006	0.10
19	0.001	0.009	0.020	0.015	0.026	0.029	0.026	0.031	0.030	0.023	0.027	0.12
20	0.001	0.011	0.005	0.004	0.015	0.001	0.010	0.009	0.011	0.007	0.008	0.09
21	0.000	0.008	0.010	0.024	0.017	0.036	0.021	0.025	0.024	0.027	0.027	0.11
22	0.000	0.013	0.015	0.006	0.007	0.012	0.014	0.007	0.006	0.017	0.013	0.08
23	0.001	0.030	0.037	0.037	0.043	0.048	0.039	0.038	0.006	0.020	0.011	0.10
24	0.001	0.036	0.035	0.036	0.037	0.027	0.046	0.030	0.026	0.035	0.024	0.08
25	0.000	0.024	0.009	0.013	0.020	0.033	0.020	0.031	0.023	0.021	0.020	0.09
26	0.000	0.009	0.002	0.002	0.003	0.010	0.007	0.007	0.004	0.013	0.008	0.07
27	0.001	0.021	0.017	0.008	0.006	0.024	0.028	0.023	0.029	0.032	0.035	0.08
28	0.002	0.004	0.006	0.008	0.007	0.007	0.011	0.007	0.010	0.004	0.008	0.07
29	0.001	0.021	0.017	0.016	0.015	0.012	0.025	0.028	0.034	0.042	0.030	0.08
30	0.001	0.003	0.003	0.012	0.004	0.003	0.008	0.004	0.011	0.004	0.015	0.06
31	0.001	0.023	0.021	0.019	0.014	0.007	0.016	0.021	0.035	0.037	0.036	0.07
32	0.000	0.000	0.004	0.008	0.010	0.004	0.005	0.009	0.010	0.009	0.009	0.06
33	0.000	0.020	0.025	0.027	0.024	0.002	0.011	0.018	0.036	0.030	0.033	0.07
34	0.001	0.001	0.003	0.014	0.015	0.006	0.011	0.007	0.012	0.010	0.015	0.05
35	0.001	0.016	0.017	0.017	0.027	0.005	0.012	0.011	0.028	0.035	0.029	0.06
36	0.001	0.005	0.003	0.013	0.009	0.008	0.008	0.007	0.008	0.005	0.015	0.05
37	0.001	0.011	0.018	0.026	0.026	0.018	0.003	0.007	0.021	0.025	0.030	0.06
38	0.002	0.004	0.005	0.008	0.012	0.010	0.009	0.004	0.011	0.013	0.010	0.05
39	0.002	0.006	0.011	0.019	0.029	0.020	0.012	0.014	0.023	0.020	0.017	0.06
40	0.001	0.007	0.002	0.007	0.008	0.011	0.011	0.012	0.013	0.006	0.012	0.05
THD	0.206%	4.002%	4.042%	3.903%	4.048%	3.837%	3.485%	3.665%	3.701%	3.702%	3.701%	5%

Supplementary information: test according to DIN EN 61000-3-2(VDE 0838-2):2019.

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E.7 Requirements for the test report for the NS protection

Extract of the test report for NS protection				No.: 64.290.20.30266.01C		
"Determination of electrical properties"						
Test report NS protection						
Type of NS protection:	Integrated NS protection			Further manufacturer indications		
Software version:	9200-D			--		
Manufacturer:	Ningbo Austa Solar Tech Co., Ltd					
Measurement period:	2020-04-26 to 2021-09-26					
	Stirling generators, fuel cells			Inverter(s)		
	Synchronous and asynchronous generators coupled directly or via inverters with Pn ≤ 50 kW			directly coupled synchronous and asynchronous generators with Pn > 50 kW		
Protective function	Setting value	Tripping value	Tripping time NS protection *	Set value	Tripping value	Tripping time NS protection*
Rise-in-voltage protection $U \gg$	-	-	-	1.25 * Un	288.3V	169 ms
Rise-in-voltage protection $U >$	-	-	-	1.10 * Un	1.00Un – 1.12Un 230V – 257.6V	520 s
	-	-	-		1.00Un – 1.08Un 230V – 248.4V	No Disconnection
	-	-	-		1.06Un – 1.14Un 243.8V – 262.2V	298 s
Voltage drop protection $U <$	-	-	-	0.8 * Un	182.9 V	3.048 s
Voltage drop protection $U \ll$	-	-	-	0.45 * Un	102.7V	303 ms
Frequency decrease protection $f <$	-	-	-	47.5 Hz	47.48 Hz	114 ms
Frequency increase protection $f >$	-	-	-	51.5 Hz	51.52 Hz	135 ms
*: 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.						
<input checked="" type="checkbox"/> For integrated NS protection						
Assigned to power generation unit of type				Type 2		
Type integrated interface switch				Relay		



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<p>Response time of interface switch for integrated NS protection</p>	<p>Manufacture: ANHUI MINGGUANG LIFE ELECTRONIC CO., LTD. Model: BRT2-SS-205DM Rated current: 8 A Operating time: 10ms</p>
<p>Verification of the entire functional chain “integrated NS protection – interface switch” has resulted in successful disconnection.</p>	<p>Yes</p>