

Compliance Document

No. D 111812 0017 Rev. 00

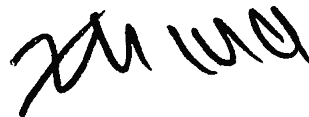
Holder of Certificate: **Suzhou Stealth Energy Technology Co.,Ltd**
8F,Zhenghe Mansion
No.198, Jinfeng Road
New District
215000 Suzhou
PEOPLE'S REPUBLIC OF CHINA

Product: **PV inverter**
Grid-Connected 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.: 5040922007802-00

Date, 2023-03-13



(Zhengdong Ma)



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Model(s): ST-INV-T5.0, ST-INV-T6.0,
ST-INV-T8.0, ST-INV-T10.0

Parameters:
Please see pages 3 to 9.

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



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Model	ST-INV-T5.0	ST-INV-T6.0	ST-INV-T8.0	ST-INV-T10.0
PV Input				
Max. input power	7500 W	9500 W	12000 W	15000 W
Absolute max. voltage	1000 Vd.c.			
MPPT voltage range	200-850 Vd.c.			
Nominal operating voltage	620 Vd.c.			
Max. input current	16/16 Ad.c.			
Max. short circuit current	21.2/21.2 Ad.c.			
AC Output				
Rated voltage	3/N/PE 400Va.c.			
Nominal frequency	50 Hz			
Max. continuous current	8.5 Aa.c.	10.5 Aa.c.	13.5 Aa.c.	15.9 Aa.c.
Max. continuous apparent power	5000 VA	6000 VA	8000 VA	10000 VA
Power factor	0.8leading...0.8lagging			

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E.4 Unit certificate

Unit certificate	No. 50.409.22.0078.02-00	
Manufacturer	Suzhou Stealth Energy Technology Co., Ltd. 8F, Zhenghe Mansion, No.198, Jinfeng Road, New District, 215000 Suzhou, PEOPLE'S REPUBLIC OF CHINA.	
Power generation unit type	[Inverter]: ST-INV-T5.0, ST-INV-T6.0, ST-INV-T8.0, ST-INV-T10.0 Remark: certified on representative model ST-INV-T10.0 of family design products, results of the measurement of ST-INV-T10.0 can be transferred to the other models based on transferability rule of measurements in DIN VDE V 0124-100 (VDE V 0124-100):2020.	
<input checked="" type="checkbox"/> Inverter	<input type="checkbox"/> Asynchronous generator	<input type="checkbox"/> Synchronous generator
<input type="checkbox"/> Stirling generator	<input type="checkbox"/> Fuel cell	<input type="checkbox"/> others
Assessment values	Max. active power $P_{E_{max}}$	9.87 kW
	Max. apparent power $S_{E_{max}}$	10.19 kVA
	Rated voltage	3/N/PE~, 230/400 V
Rated values	Rated current (AC) I_r	14.5A
Rated values	Max. current (AC) I_{max}	15.9 A
Rated values	Initial short-circuit current I_k''	15.9 A
Network connection rules	VDE-AR-N 4105:2018-11/Corrigendum 1:2020-10 Generators connected to the low-voltage distribution network - Technical requirements for the connection to and parallel operation with low-voltage distribution networks.	
Test requirement	DIN VDE V 0124-100 (VDE V 0124-100):2020-06 "Network integration of power generation system – Low voltage" Test requirements for power generation units intended for connection to and parallel operation on the low-voltage network.	
The above mentioned 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) Devices in customer installations with a rated power > 4.6 kVA may be connected single-phase, provided that a balancing device ensures that the requirements of maximum permissible unbalance <= 4.6kVA according to 5.5.2 of VDE-AR-N 4100 are met and a registration with the grid operator has been made.		

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E.5 Test report "Network interactions" for generating units with an input current > 75 A

Extract from test report for unit certificate "Determination of electrical properties"		No. 50.409.22.0078.02-00
Generation unit manufacturer:	Suzhou Stealth Energy Technology Co., Ltd. 8F, Zhenghe Mansion, No.198, Jinfeng Road, New District, 215000 Suzhou, PEOPLE'S REPUBLIC OF CHINA.	
Manufacturer indications:	Type of system	Inverter for PV system
	Max. active power $P_{E_{max}}$	5 kW (ST-INV-T5.0) 6 kW (ST-INV-T6.0) 8 kW (ST-INV-T8.0) 10 kW (ST-INV-T10.0)
	Rated voltage	3/N/PE~, 230/400 V
Period of measurement:	From 2022-10-07 to 2023-03-02	

Flicker (EN 61000-3-3) (ST-INV-T10.0)					
Test condition	$d_{(t)} - 500ms$ [%]	d_c [%]	d_{max} [%]	P_{st}	P_{it}
Continuous operation	0/0/0	0.001/0.086/0.103	0.252/0.253/0.321	0.014/0.014/0.014	0.044/0.048/0.046
Start	0/0.073/0.106	0/0/0	0.101/0.252/0.270	-	-
Stop	0.005/0.076/0.110	0/0/0	0.252/0.252/0.267	-	-
Limit	3.3%	3.3%	4%	1.0	0.65

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Harmonics (EN 61000-3-2) (ST-INV-T10.0)												
P/Pn [%]	0	10	20	30	40	50	60	70	80	90	100	Limit
Ordinal number	A	A	A	A	A	A	A	A	A	A	A	[A]
2	0.104	0.172	0.128	0.124	0.124	0.128	0.135	0.142	0.147	0.154	0.160	1.080
3	0.078	0.043	0.094	0.106	0.124	0.149	0.179	0.212	0.250	0.289	0.328	2.300
4	0.066	0.114	0.105	0.099	0.098	0.101	0.103	0.107	0.114	0.119	0.127	0.430
5	0.069	0.046	0.049	0.030	0.023	0.025	0.031	0.036	0.042	0.049	0.061	1.140
6	0.040	0.035	0.058	0.053	0.049	0.047	0.044	0.041	0.039	0.038	0.036	0.300
7	0.045	0.062	0.031	0.017	0.020	0.025	0.028	0.034	0.040	0.047	0.054	0.770
8	0.038	0.038	0.035	0.041	0.042	0.042	0.045	0.046	0.046	0.048	0.052	0.230
9	0.009	0.056	0.031	0.012	0.014	0.018	0.020	0.022	0.024	0.027	0.030	0.400
10	0.025	0.052	0.015	0.026	0.029	0.031	0.031	0.033	0.033	0.035	0.038	0.184
11	0.010	0.036	0.033	0.012	0.010	0.014	0.018	0.021	0.023	0.025	0.029	0.330
12	0.013	0.044	0.016	0.017	0.019	0.018	0.015	0.013	0.012	0.012	0.012	0.153
13	0.011	0.015	0.026	0.014	0.006	0.010	0.013	0.015	0.017	0.018	0.021	0.210
14	0.009	0.042	0.022	0.023	0.021	0.017	0.016	0.017	0.020	0.022	0.024	0.131
15	0.008	0.019	0.019	0.015	0.007	0.007	0.009	0.011	0.013	0.014	0.014	0.150
16	0.010	0.036	0.014	0.020	0.021	0.019	0.017	0.017	0.018	0.020	0.023	0.115
17	0.004	0.022	0.015	0.017	0.006	0.006	0.008	0.011	0.013	0.016	0.018	0.132
18	0.007	0.022	0.013	0.012	0.014	0.013	0.012	0.010	0.009	0.009	0.008	0.102
19	0.005	0.022	0.009	0.014	0.008	0.004	0.007	0.009	0.009	0.010	0.012	0.118
20	0.007	0.018	0.021	0.006	0.009	0.012	0.013	0.014	0.013	0.015	0.016	0.092
21	0.006	0.019	0.008	0.012	0.009	0.005	0.006	0.008	0.008	0.008	0.009	0.107
22	0.005	0.017	0.018	0.007	0.007	0.009	0.011	0.010	0.010	0.012	0.013	0.084
23	0.006	0.021	0.007	0.011	0.009	0.005	0.007	0.008	0.010	0.011	0.012	0.098
24	0.005	0.014	0.015	0.008	0.010	0.011	0.008	0.005	0.004	0.004	0.004	0.077
25	0.005	0.022	0.009	0.008	0.009	0.004	0.004	0.006	0.007	0.009	0.009	0.090
26	0.008	0.015	0.018	0.008	0.016	0.017	0.016	0.015	0.013	0.012	0.014	0.071
27	0.004	0.020	0.010	0.006	0.009	0.005	0.005	0.006	0.007	0.007	0.008	0.083
28	0.006	0.010	0.018	0.005	0.012	0.014	0.013	0.011	0.010	0.010	0.011	0.066
29	0.004	0.017	0.010	0.005	0.008	0.005	0.005	0.007	0.007	0.007	0.008	0.078
30	0.003	0.013	0.016	0.007	0.008	0.010	0.010	0.010	0.009	0.008	0.008	0.061
31	0.004	0.012	0.011	0.006	0.007	0.006	0.007	0.009	0.009	0.008	0.008	0.073
32	0.004	0.012	0.013	0.010	0.008	0.008	0.007	0.007	0.009	0.011	0.013	0.058
33	0.004	0.010	0.011	0.006	0.007	0.007	0.006	0.006	0.008	0.009	0.011	0.068
34	0.003	0.008	0.012	0.008	0.006	0.007	0.006	0.005	0.005	0.008	0.010	0.054
35	0.003	0.012	0.011	0.006	0.006	0.005	0.004	0.004	0.006	0.007	0.008	0.064
36	0.003	0.011	0.012	0.007	0.005	0.008	0.008	0.006	0.005	0.006	0.006	0.051
37	0.003	0.010	0.009	0.007	0.005	0.005	0.004	0.004	0.004	0.005	0.007	0.061
38	0.004	0.009	0.011	0.008	0.004	0.009	0.010	0.008	0.008	0.008	0.009	0.048
39	0.002	0.008	0.008	0.007	0.004	0.004	0.003	0.004	0.005	0.006	0.007	0.058
40	0.004	0.006	0.007	0.008	0.003	0.008	0.009	0.008	0.007	0.006	0.006	0.046

Max. value of three phase are recorded for harmonics

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E.6 Certificate of the network and system protection

Certificate of NS protection	No. 50.409.22.0078.02-00		
Manufacturer	Suzhou Stealth Energy Technology Co., Ltd. 8F, Zhenghe Mansion, No.198, Jinfeng Road, New District, 215000 Suzhou, PEOPLE'S REPUBLIC OF CHINA.		
Type of NS protection			
Central NS protection	<input type="checkbox"/>		
Integrated NS protection	<input checked="" type="checkbox"/>	Assigned to power generation unit type	5 kW (ST-INV-T5.0) 6 kW (ST-INV-T6.0) 8 kW (ST-INV-T8.0) 10 kW (ST-INV-T10.0)
Network connection rules	VDE-AR-N 4105:2018-11/Corrigendum 1:2020-10 Generators connected to the low-voltage distribution network - Technical requirements for the connection to and parallel operation with low-voltage distribution networks.		
Test requirement	DIN VDE V 0124-100 (VDE V 0124-100):2020-06 "Network integration of power generation system – Low voltage" Test requirements for power generation units intended for connection to and parallel operation on the low-voltage network.		
The network and system protection mentioned above meets the requirements of VDE-AR-N 4105.			

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

Extract from test report for NS protection "Determination of electrical properties"		No. 50.409.22.0078.02-00	
NS protection test report			
Type of NS system:	Integrated NS protection	Other Manufacturer indications	
Software version:	V1.1		
Manufacturer:	Suzhou Stealth Energy Technology Co., Ltd. 8F, Zhenghe Mansion, No.198, Jinfeng Road, New District, 215000 Suzhou, PEOPLE'S REPUBLIC OF CHINA.		
Measuring period:	From 2022-10-07 to 2023-03-02		
	Inverter		
	directly coupled synchronous and asynchronous generators with Pn > 50 kW		
Protection function	Setting value	Tripping value	Break time NS protection *
Rise-in-voltage protection $U >>$	$1.25 * U_n$	L1-N/L2-N/L3-N: 287 V, 287 V, 287 V, L1-N: 289 V, L2-N: 287 V, L3-N: 287 V, L1-L2: 498 V, L2-L3: 496 V, L3-L1: 497 V,	L1-N/L2-N/L3-N: 85 ms, L1-N: 92 ms, L2-N: 82 ms, L3-N: 97 ms, L1-L2: 76 ms, L2-L3: 65 ms, L3-L1: 71 ms,
Rise-in-voltage protection $U >$	$1.10 * U_n$	$1.0 * U_n$	ms**
Voltage drop protection $U <$	$0.8 * U_n$	L1-N/L2-N/L3-N: 184 V, 184 V, 184 V, L1-N: 184 V, L2-N: 183 V, L3-N: 183 V, L1-L2: 318 V, L2-L3: 318 V, L3-L1: 318 V,	L1-N/L2-N/L3-N: 3008 ms, L1-N: 3022 ms, L2-N: 3021 ms, L3-N: 3008 ms, L1-L2: 3017 ms, L2-L3: 3009 ms, L3-L1: 3010 ms,
Voltage drop protection $U <<$	$0.45 * U_n$	L1-N/L2-N/L3-N: 103 V, 103 V, 103 V, L1-N: 103 V, L2-N: 103 V, L3-N: 103 V, L1-L2: 178 V, L2-L3: 178 V, L3-L1: 178 V,	L1-N/L2-N/L3-N: 305 ms, L1-N: 333 ms, L2-N: 311 ms, L3-N: 311 ms, L1-L2: 313 ms, L2-L3: 314 ms, L3-L1: 322 ms,
Frequency decrease protection $f <$	47.5 Hz	47.49 Hz	72 ms
Frequency increase protection $f >$	51.5 Hz	51.50 Hz	57 ms

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<p>*: 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.</p> <p>**: Verification disconnection time of moving 10-min-average value.</p> <p>Disconnecting time as below:</p> <ol style="list-style-type: none"> 489 s (L1-N) / 477 s (L2-N) / 497 s (L3-N) (from 600s@U_n to 112%U_n) Continuous operation (L1-N/L2-N/L3-N) (from 600s@U_n to 108%U_n) 289 s (L1-N) / 360 s (L2-N) / 306 s (L3-N) (from 600s@106%U_n to 114%U_n) 	
<input checked="" type="checkbox"/> as integrated NS protection	
Assigned to power generation unit type	<u>ST-INV-T5.0</u> <u>ST-INV-T6.0</u> <u>ST-INV-T8.0</u> <u>ST-INV-T10.0</u>
Integrated interface switch type	Series-connected relays for both line and neutral conductors Relay type: PEDS150(R)-HM32-3
Response time of interface switch for integrated NS protection	Release time: Max. 10 ms
Verification of the entire functional chain "integrated NS protection – interface switch" has resulted in successful disconnection.	<input checked="" type="checkbox"/>