

# Certificate of Conformity

No. ESY 105515 0079 Rev. 00

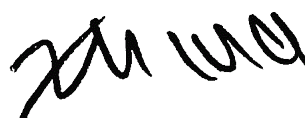
**Holder of Certificate:** **Suzhou Hypontech Co., Ltd.**  
No.1508 Xiangjiang Road,  
SND,  
215010 Suzhou  
PEOPLE'S REPUBLIC OF CHINA

**Product:** **PV inverter**  
**Hybrid inverter**

This Certificate of Conformity confirms the compliance with the above listed standards on a voluntary basis. It refers only to the sample submitted to TÜV SÜD Product Service GmbH and does not certify the quality or safety of the serial products. It was issued according to TÜV SÜD Product Service certification program Photovoltaics and Grid Integration. For details see: [www.tuvsud.com/ps-cert](http://www.tuvsud.com/ps-cert)

**Test report no.:** 5040922010514-00

**Date,** 2022-12-30



( Zhengdong Ma )



Product Service

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**Model(s):** HHT-5000, HHT-6000, HHT-8000,  
HHT-10000, HHT-12000

**Parameters:**  
Please see pages 3 to 9.

**Applicable standards:** VDE-AR-N 4105:2018  
DIN VDE V 0124-100 (VDE V 0124-100):2020

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Model name	HHT-5000	HHT-6000	HHT-8000
PV input parameters			
Max. input voltage	1000 Vd.c.		
MPP voltage range	150 – 850 Vd.c.		
Max. input current	2*15 Ad.c.		
Isc PV(absolute maximum)	2*20 Ad.c.		
AC output parameters			
Rated grid voltage	3/N/PE~, 230/400 V		
Rated grid frequency	50 Hz		
Rated AC output active power	5000 W	6000 W	8000 W
Max. AC output apparent power	5500 VA	6600 VA	8800 VA
Max. continuous output current	8.5 Aa.c.	10 Aa.c.	13.5 Aa.c.
Adjustable cos( $\varphi$ )	0.8ind...0.8cap		
Others			
Inverter topology	Non-isolated		
Operating temperature range	-25...+60°C		
Ingress protection	IP65		
Protective class	I		
Overvoltage category	II(PV), III(MAINS)		

Model name	HHT-10000	HHT-12000
PV input parameters		
Max. input voltage	1000 Vd.c.	
MPP voltage range	150 – 850 Vd.c.	
Max. input current	2*15 Ad.c.	
Isc PV(absolute maximum)	2*20 Ad.c.	
AC output parameters		
Rated grid voltage	3/N/PE~, 230/400 V	
Rated grid frequency	50 Hz	
Rated AC output active power	10000 W	12000 W
Max. AC output apparent power	11000 VA	13200 VA
Max. continuous output current	16 Aa.c.	20 Aa.c.
Adjustable cos( $\varphi$ )	0.8ind...0.8cap	
Others		
Inverter topology	Non-isolated	
Operating temperature range	-25...+60°C	
Ingress protection	IP65	
Protective class	I	
Overvoltage category	II(PV), III(MAINS)	

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## E.4 Unit certificate

<b>Unit certificate</b>	No. 50.409.22.0105.14-00	
<b>Manufacturer</b>	Suzhou Hypontech Co., Ltd. No.1508 Xiangjiang Road, SND, 215010, Suzhou, PEOPLE'S REPUBLIC OF CHINA	
<b>Power generation unit type</b>	[Inverter]: HHT-5000, HHT-6000, HHT-8000, HHT-10000, HHT-12000, Remark: certified on representative model HHT-12000 of family design products, results of the measurement of HHT-12000 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
<b>Assessment values</b>	Max. active power $P_{E_{max}}$	13.23 kW
	Max. apparent power $S_{E_{max}}$	13.30 kVA
	Rated voltage	3/N/PE~, 230/400 V
<b>Rated values</b>	Rated current (AC) $I_r$	13.39
<b>Rated values</b>	Max. current (AC) $I_{max}$	20 A
<b>Rated values</b>	Initial short-circuit current $I_k$ "	20 A
<b>Network connection rules</b>	<b>VDE-AR-N 4105:2018-11/Corrigendum 1:2020-10</b> Generators connected to the low-voltage distribution network - Technical requirements for the connection to and parallel operation with low-voltage distribution networks.	
<b>Test requirement</b>	<b>DIN VDE V 0124-100 (VDE V 0124-100):2020-06 "Network integration of power generation system – Low voltage"</b> 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.		

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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. <u>50.409.22.0105.14-00</u>
Generation unit manufacturer:	<u>Suzhou Hypontech Co., Ltd.</u> <u>No.1508 Xiangjiang Road, SND, 215010, Suzhou, PEOPLE'S REPUBLIC OF CHINA</u>	
Manufacturer indications:	Type of system	<u>Inverter for PV system</u>
	Max. active power $P_{E_{max}}$	<u>5500 W (HHT-5000)</u> <u>6600 W (HHT-6000)</u> <u>8800 W (HHT-8000)</u> <u>11000 W (HHT-10000)</u> <u>13200 W (HHT-12000)</u>
	Rated voltage	<u>3/N/PE~, 230/400 V</u>
Period of measurement:	<u>From 2022-11-02 to 2022-12-14</u>	

Flicker (EN 61000-3-11) (HHT-12000 )					
Test condition	$d_{(t)} - 500ms$ [%]	$d_c$ [%]	$d_{max}$ [%]	$P_{st}$	$P_{It}$
Continuous operation	0/0/0	0.16/0.17/0.18	0.46/0.37/0.45	0.23/0.22/0.22	0.22/0.21/0.22
Start	0/0/0	0.11/0.09/0	0.28/0.36/0	-	-
Stop	0/0/0	0.25/0.19/0.16	0.26/0.21/0.21	-	-
Limit	3.3%	3.3%	4%	1.0	0.65

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Harmonics (EN 61000-3-2) (HHT-12000 )												
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	0.176	0.222	0.211	0.257	0.304	0.290	0.335	0.442	0.439	0.396	0.333	8.0
3	0.266	0.363	0.470	0.546	0.622	0.713	0.796	0.879	0.980	1.090	1.226	-
4	0.021	0.018	0.036	0.032	0.041	0.044	0.046	0.071	0.085	0.077	0.063	4.0
5	0.121	0.193	0.144	0.072	0.090	0.109	0.125	0.135	0.151	0.167	0.185	10.7
6	0.023	0.025	0.037	0.028	0.037	0.026	0.039	0.073	0.067	0.068	0.070	2.67
7	0.060	0.033	0.073	0.075	0.068	0.063	0.076	0.078	0.086	0.095	0.106	7.2
8	0.039	0.013	0.029	0.031	0.024	0.016	0.010	0.014	0.026	0.031	0.022	2.0
9	0.336	0.175	0.235	0.417	0.499	0.546	0.551	0.528	0.574	0.624	0.663	-
10	0.020	0.018	0.010	0.021	0.016	0.013	0.014	0.016	0.017	0.016	0.014	1.6
11	0.123	0.147	0.062	0.163	0.209	0.238	0.264	0.257	0.253	0.275	0.316	3.1
12	0.008	0.023	0.009	0.023	0.023	0.017	0.020	0.013	0.013	0.019	0.015	1.33
13	0.029	0.130	0.016	0.108	0.159	0.181	0.206	0.212	0.216	0.218	0.223	2.0
14	0.012	0.018	0.009	0.019	0.022	0.019	0.014	0.017	0.013	0.011	0.009	-
15	0.136	0.141	0.053	0.113	0.188	0.235	0.264	0.271	0.296	0.317	0.327	-
16	0.017	0.010	0.011	0.008	0.013	0.009	0.010	0.009	0.008	0.008	0.013	-
17	0.088	0.045	0.051	0.050	0.087	0.109	0.127	0.127	0.131	0.149	0.168	-
18	0.017	0.006	0.013	0.007	0.011	0.013	0.009	0.019	0.015	0.014	0.014	-
19	0.036	0.051	0.060	0.032	0.070	0.092	0.111	0.114	0.125	0.131	0.147	-
20	0.009	0.009	0.014	0.009	0.012	0.017	0.012	0.016	0.011	0.009	0.006	-
21	0.061	0.106	0.101	0.022	0.079	0.110	0.137	0.142	0.159	0.170	0.186	-
22	0.011	0.014	0.010	0.007	0.006	0.010	0.009	0.007	0.012	0.006	0.006	-
23	0.042	0.071	0.072	0.016	0.045	0.058	0.067	0.070	0.074	0.083	0.093	-
24	0.014	0.015	0.009	0.008	0.007	0.008	0.012	0.005	0.008	0.006	0.007	-
25	0.019	0.042	0.058	0.014	0.033	0.050	0.065	0.074	0.077	0.082	0.090	-
26	0.010	0.011	0.008	0.008	0.005	0.007	0.009	0.012	0.009	0.010	0.007	-
27	0.038	0.034	0.068	0.028	0.033	0.057	0.076	0.084	0.100	0.112	0.125	-
28	0.008	0.007	0.008	0.008	0.006	0.007	0.010	0.016	0.010	0.011	0.007	-
29	0.025	0.041	0.045	0.026	0.028	0.039	0.043	0.044	0.046	0.055	0.062	-
30	0.008	0.012	0.007	0.006	0.006	0.005	0.007	0.010	0.009	0.005	0.008	-
31	0.026	0.039	0.033	0.026	0.019	0.029	0.038	0.045	0.051	0.057	0.061	-
32	0.008	0.011	0.006	0.007	0.004	0.004	0.006	0.007	0.009	0.007	0.006	-
33	0.043	0.023	0.051	0.043	0.019	0.032	0.043	0.049	0.058	0.073	0.088	-
34	0.006	0.009	0.007	0.005	0.005	0.006	0.005	0.009	0.009	0.009	0.008	-
35	0.032	0.027	0.049	0.041	0.019	0.030	0.033	0.031	0.033	0.032	0.039	-
36	0.007	0.008	0.009	0.005	0.007	0.005	0.004	0.006	0.008	0.009	0.005	-
37	0.034	0.025	0.044	0.039	0.013	0.020	0.026	0.031	0.034	0.039	0.044	-
38	0.007	0.007	0.009	0.006	0.005	0.006	0.005	0.006	0.005	0.007	0.006	-
39	0.045	0.026	0.053	0.049	0.015	0.026	0.028	0.029	0.031	0.044	0.054	-
40	0.008	0.008	0.011	0.007	0.006	0.005	0.005	0.006	0.006	0.007	0.006	-
THC/Iref	0	0	0	0	0	0	0	0	0	1.090	1.226	13
PWHC/Iref	0	0	0	0	0	0	0	0	0	0	0	22

Max. value of three phase are recorded for harmonics  
 For the calculation of THC and PWHC, individual harmonic currents below 1 % of the reference current are disregarded according to DIN EN 61000-3-12.

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## E.6 Certificate of the network and system protection

<b>Certificate of NS protection</b>	No. 50.409.22.0105.14-00		
<b>Manufacturer</b>	Suzhou Hypontech Co., Ltd. No.1508 Xiangjiang Road, SND, 215010, Suzhou, PEOPLE'S REPUBLIC OF CHINA		
<b>Type of NS protection</b>			
<b>Central NS protection</b>	<input type="checkbox"/>		
<b>Integrated NS protection</b>	<input checked="" type="checkbox"/>	Assigned to power generation unit type	5500 W (HHT-5000) 6600 W (HHT-6000) 8800 W (HHT-8000) 11000 W (HHT-10000) 13200 W (HHT-12000)
<b>Network connection rules</b>	<b>VDE-AR-N 4105:2018-11/Corrigendum 1:2020-10</b> Generators connected to the low-voltage distribution network - Technical requirements for the connection to and parallel operation with low-voltage distribution networks.		
<b>Test requirement</b>	<b>DIN VDE V 0124-100 (VDE V 0124-100):2020-06 "Network                  integration of power generation system – Low voltage"</b> 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

<b>Extract from test report for NS protection</b> "Determination of electrical properties"		No. 50.409.22.0105.14-00	
<b>NS protection test report</b>			
<b>Type of NS system:</b>	Integrated NS protection	<b>Other Manufacturer indications</b>	
<b>Software version:</b>	V1.0		
<b>Manufacturer:</b>	Suzhou Hypontech Co., Ltd. No.1508 Xiangjiang Road, SND, 215010, Suzhou, PEOPLE'S REPUBLIC OF CHINA		
<b>Measuring period:</b>	From 2022-11-02 to 2022-12-14		
	<b>Inverter</b>		
	<b>directly coupled synchronous and asynchronous generators with Pn &gt; 30 kW</b>		
<b>Protection function</b>	<b>Setting value</b>	<b>Tripping value</b>	<b>Break time NS protection *</b>
Rise-in-voltage protection $U >>$	$1.25 \cdot U_n$	L1-N/L2-N/L3-N: 287 V, 287 V, 287 V, L1-N: 287 V, L2-N: 287 V, L3-N: 287 V, L1-L2: 497 V, L2-L3: 498 V, L3-L1: 499 V,	L1-N/L2-N/L3-N: 120 ms, L1-N: 115 ms, L2-N: 113 ms, L3-N: 115 ms, L1-L2: 120 ms, L2-L3: 115 ms, L3-L1: 113 ms,
Rise-in-voltage protection $U >$	$1.10 \cdot U_n$	$1.0 \cdot U_n$	ms**
Voltage drop protection $U <$	$0.8 \cdot U_n$	L1-N/L2-N/L3-N: 185.5 V, 185.5 V, 185.5 V, L1-N: 184 V, L2-N: 184 V, L3-N: 184 V, L1-L2: 319 V, L2-L3: 319 V, L3-L1: 319 V,	L1-N/L2-N/L3-N: 3013 ms, L1-N: 3028 ms, L2-N: 3003 ms, L3-N: 3008 ms, L1-L2: 3018 ms, L2-L3: 3028 ms, L3-L1: 3025 ms,
Voltage drop protection $U <<$	$0.45 \cdot U_n$	L1-N/L2-N/L3-N: 104 V, 104 V, 104 V, L1-N: 103 V, L2-N: 103 V, L3-N: 103 V, L1-L2: 179 V, L2-L3: 180 V, L3-L1: 179 V,	L1-N/L2-N/L3-N: 397 ms, L1-N: 400 ms, L2-N: 396 ms, L3-N: 397 ms, L1-L2: 382 ms, L2-L3: 400 ms, L3-L1: 398 ms,
Frequency decrease protection $f <$	47.5 Hz	47.49 Hz	149 ms
Frequency increase protection $f >$	51.5 Hz	51.52 Hz	138 ms
<p>*: The tripping time includes the period from the limit value violation <math>U/f</math> 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"> <li>542 s (L1-N) / 528 s (L2-N) / 534 s (L3-N) (from 600s@<math>U_n</math> to 112%<math>U_n</math>)</li> <li>Continuous operation (L1-N/L2-N/L3-N) (from 600s@<math>U_n</math> to 108%<math>U_n</math>)</li> <li>278 s (L1-N) / 262 s (L2-N) / 270 s (L3-N) (from 600s@106%<math>U_n</math> to 114%<math>U_n</math>)</li> </ol>			



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<input checked="" type="checkbox"/> as integrated NS protection	
Assigned to power generation unit type	HHT-5000 HHT-6000 HHT-8000 , HHT-10000 , HHT-12000 ,
Integrated interface switch type	Series-connected relays for both line and neutral conductors Relay type: FTR-K3AB012W-PS
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"/>