

Certificate of Conformity

No. ESY 105515 0082 Rev. 00

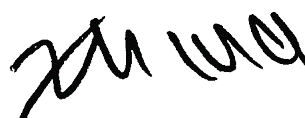
Holder of Certificate: **Suzhou Hypontech Co., Ltd.**
No.1508 Xiangjiang Road,
SND,
215010 Suzhou
PEOPLE'S REPUBLIC OF CHINA

Product: **PV inverter**
Solar 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

Test report no.: 5040922010515-00

Date, 2023-03-07



(Zhengdong Ma)



Product Service

Certificate of Conformity

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Model(s): HPT-15K, HPT-17K, HPT-20K, HPT-25K.

Parameters:
Please see pages 3 to 11.

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

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Model	HPT-15K	HPT-17K	HPT-20K	HPT-25K
PV input parameters:				
Max. input voltage	d.c. 1000 V			
MPP voltage range	d.c. 200-900 V			
Max. input current	d.c. 2*26 A			
Isc PV (absolute maximum)	d.c. 2*40 A			
AC output parameters:				
Rated grid voltage	3/N/PE~, 400/230 V			
Rated grid frequency	50 Hz			
Rated AC output active power	15000 W	17000 W	20000 W	25000 W
Max. AC output apparent power	16500 VA	19000 VA	22000 VA	25000 VA
Max. continuous output current	a.c. 24 A	a.c. 27.6 A	a.c. 31.9 A	a.c. 36.3 A
Adjustable cos(φ)	0.8ind...0.8cap			

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E.4 Unit certificate

Unit certificate	No. 50.409.22.0105.15-00	
Manufacturer	Suzhou Hypontech Co., Ltd. No.1508 Xiangjiang Road, SND, 215010, Suzhou, PEOPLE'S REPUBLIC OF CHINA	
Power generation unit type	[Inverter]: HPT-15K, HPT-17K, HPT-20K, HPT-25K. Remark: certified on representative model HPT-25K of family design products, results of the measurement of HPT-25K 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 $P_{E_{max}}$	24944 W (HPT-25K)
	Max. apparent power $S_{E_{max}}$	25130 VA (HPT-25K)
	Rated voltage	3/N/PE~, 230/400 V
Rated values	Rated current (AC) I_r	36.3 A (HPT-25K)
Rated values	Max. current (AC) I_{max}	36.3 A (HPT-25K)
Rated values	Initial short-circuit current I_k''	36.3 A (HPT-25K)
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.		

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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. 50.409.22.0105.15-00	
Generation unit manufacturer:	Suzhou Hypontech Co., Ltd. No.1508 Xiangjiang Road, SND, 215010, Suzhou, PEOPLE'S REPUBLIC OF CHINA		
Manufacturer indications:	Type of system	Inverter for PV system	
	Max. active power $P_{E_{max}}$	16500 W (HPT-15K)	
		19000 W (HPT-17K)	
Rated voltage	3/N/PE~, 230/400 V		
Period of measurement:	From 2022-10-08 to 2022-12-05		

Flicker (DIN EN 61000-3-3) (HPT-25K)					
Test condition	$d_{(t)} - 500ms$ [%]	d_c [%]	d_{max} [%]	P_{st}	P_{It}
Continuous operation	0/0/0	0.10/0.08/0.08	0.34/0.33/0.34	0.23/0.22/0.23	0.23/0.22/0.23
Start	0/0/0	0.08/0.06/0.08	0.34/0.34/0.35	-	-
Stop	0/0/0	0.10/0.10/0.11	0.39/0.39/0.41	-	-
Limit	3.3%	3.3%	4%	1.0	0.65

DIN EN 61000-3-12 (HPT-25K)														
L1														
Description	Admissible individual harmonic current I_n/I_{ref} % (Minimum $R_{s_{ce}}=33$)												Admissible harmonic parameters (%)	
Harmonic:	I_2	I_3	I_4	I_5	I_6	I_7	I_8	I_9	I_{10}	I_{11}	I_{12}	I_{13}	THC/ I_{ref}	PWHC/ I_{ref}
Limit:	8,0	-	4,0	10,7	2,7	7,2	2,0	-	1,6	3,1	1,3	2,0	13	22
Actual Value	0.088	0.047	0.189	0.769	0.147	0.867	0.124	0.096	0.033	0.551	0.029	0.208	1.378	2.341

L2														
Description	Admissible individual harmonic current I_n/I_{ref} % (Minimum $R_{s_{ce}}=33$)												Admissible harmonic parameters (%)	
Harmonic:	I_2	I_3	I_4	I_5	I_6	I_7	I_8	I_9	I_{10}	I_{11}	I_{12}	I_{13}	THC/ I_{ref}	PWHC/ I_{ref}
Limit:	8,0	-	4,0	10,7	2,7	7,2	2,0	-	1,6	3,1	1,3	2,0	13	22
Actual Value	0.09	0.043	0.195	0.85	0.12	0.867	0.141	0.104	0.039	0.562	0.034	0.21	1.428	2.339

L3														
Description	Admissible individual harmonic current I_n/I_{ref} % (Minimum $R_{s_{ce}}=33$)												Admissible harmonic parameters (%)	
Harmonic:	I_2	I_3	I_4	I_5	I_6	I_7	I_8	I_9	I_{10}	I_{11}	I_{12}	I_{13}	THC/ I_{ref}	PWHC/ I_{ref}
Limit:	8,0	-	4,0	10,7	2,7	7,2	2,0	-	1,6	3,1	1,3	2,0	13	22
Actual Value	0.101	0.066	0.181	0.83	0.1	0.854	0.146	0.108	0.043	0.551	0.037	0.207	1.407	2.338

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Harmonics (DIN EN 61000-3-12) (HPT-25K)												
L1												
P/Pn [%]	0	10	20	30	40	50	60	70	80	90	100	Limit
Ordinal number	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]
2	0.088	0.055	0.055	0.068	0.057	0.072	0.084	0.055	0.065	0.058	0.061	8.0
3	0.022	0.015	0.022	0.018	0.021	0.030	0.040	0.034	0.040	0.044	0.047	-
4	0.189	0.060	0.035	0.070	0.048	0.047	0.046	0.033	0.037	0.036	0.038	4.0
5	0.130	0.175	0.247	0.382	0.396	0.408	0.477	0.559	0.616	0.684	0.769	10.7
6	0.012	0.010	0.021	0.042	0.147	0.085	0.054	0.019	0.028	0.020	0.021	2.67
7	0.422	0.269	0.301	0.425	0.553	0.623	0.638	0.675	0.724	0.800	0.867	7.2
8	0.098	0.021	0.017	0.032	0.124	0.090	0.088	0.025	0.030	0.027	0.029	2.0
9	0.013	0.017	0.012	0.017	0.033	0.031	0.096	0.023	0.024	0.020	0.018	-
10	0.024	0.014	0.016	0.021	0.027	0.023	0.033	0.017	0.019	0.017	0.020	1.6
11	0.011	0.057	0.073	0.077	0.197	0.276	0.389	0.494	0.514	0.547	0.551	3.1
12	0.011	0.009	0.009	0.015	0.029	0.022	0.029	0.016	0.022	0.016	0.016	1.33
13	0.126	0.166	0.156	0.201	0.201	0.208	0.131	0.032	0.065	0.078	0.120	2.0
14	0.069	0.024	0.015	0.015	0.034	0.025	0.038	0.031	0.033	0.030	0.030	-
15	0.010	0.008	0.009	0.011	0.020	0.025	0.028	0.017	0.016	0.015	0.014	-
16	0.056	0.029	0.013	0.011	0.019	0.022	0.041	0.027	0.028	0.026	0.029	-
17	0.022	0.027	0.052	0.056	0.139	0.179	0.179	0.181	0.191	0.215	0.228	-
18	0.010	0.008	0.009	0.012	0.017	0.023	0.021	0.017	0.022	0.017	0.018	-
19	0.053	0.088	0.140	0.142	0.092	0.093	0.070	0.072	0.103	0.125	0.160	-
20	0.016	0.011	0.016	0.018	0.017	0.021	0.020	0.014	0.019	0.017	0.018	-
21	0.011	0.006	0.008	0.009	0.014	0.015	0.019	0.016	0.019	0.018	0.018	-
22	0.023	0.020	0.011	0.013	0.017	0.021	0.024	0.021	0.026	0.026	0.027	-
23	0.041	0.030	0.040	0.038	0.061	0.053	0.043	0.144	0.171	0.214	0.250	-
24	0.010	0.007	0.007	0.011	0.013	0.025	0.023	0.015	0.021	0.023	0.023	-
25	0.017	0.043	0.060	0.070	0.035	0.073	0.141	0.135	0.132	0.120	0.101	-
26	0.055	0.022	0.013	0.013	0.014	0.021	0.027	0.019	0.026	0.025	0.028	-
27	0.013	0.008	0.008	0.008	0.012	0.014	0.021	0.017	0.020	0.022	0.023	-
28	0.029	0.006	0.006	0.012	0.015	0.015	0.020	0.013	0.018	0.020	0.027	-
29	0.044	0.036	0.038	0.041	0.019	0.066	0.059	0.121	0.145	0.179	0.180	-
30	0.011	0.007	0.006	0.009	0.010	0.018	0.017	0.014	0.021	0.020	0.023	-
31	0.030	0.057	0.024	0.018	0.045	0.119	0.107	0.136	0.120	0.104	0.087	-
32	0.036	0.028	0.011	0.010	0.012	0.022	0.022	0.018	0.024	0.022	0.023	-
33	0.009	0.010	0.010	0.008	0.010	0.013	0.016	0.014	0.016	0.016	0.018	-
34	0.034	0.008	0.006	0.011	0.014	0.017	0.024	0.017	0.021	0.019	0.021	-
35	0.040	0.014	0.036	0.041	0.018	0.048	0.074	0.051	0.065	0.077	0.106	-
36	0.008	0.008	0.006	0.008	0.009	0.014	0.015	0.014	0.022	0.025	0.030	-
37	0.027	0.037	0.038	0.026	0.032	0.080	0.042	0.077	0.091	0.103	0.114	-
38	0.014	0.015	0.016	0.013	0.012	0.017	0.017	0.021	0.027	0.031	0.041	-
39	0.007	0.008	0.007	0.007	0.007	0.010	0.013	0.015	0.019	0.023	0.026	-
40	0.016	0.014	0.016	0.017	0.018	0.023	0.022	0.029	0.031	0.032	0.038	-
THC/I _{ref}	0.541	0.404	0.471	0.650	0.793	0.885	0.963	1.071	1.155	1.270	1.378	13
PWHC/I _{ref}	0.795	0.727	0.874	0.895	0.916	1.405	1.463	1.756	1.925	2.156	2.341	22

I_{ref}=25000/230/3= 36.2 A

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Harmonics (DIN EN 61000-3-12) (HPT-25K)												
L2												
P/Pn [%]	0	10	20	30	40	50	60	70	80	90	100	Limit
Ordinal number	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]
2	0.075	0.048	0.051	0.073	0.053	0.074	0.090	0.044	0.064	0.049	0.046	8.0
3	0.012	0.018	0.022	0.032	0.032	0.034	0.043	0.026	0.032	0.027	0.028	-
4	0.195	0.061	0.038	0.073	0.059	0.050	0.051	0.031	0.040	0.036	0.037	4.0
5	0.100	0.140	0.251	0.398	0.417	0.431	0.517	0.613	0.678	0.755	0.850	10.7
6	0.010	0.010	0.019	0.035	0.120	0.086	0.066	0.018	0.025	0.016	0.018	2.67
7	0.422	0.281	0.321	0.453	0.574	0.637	0.648	0.687	0.730	0.804	0.867	7.2
8	0.097	0.019	0.018	0.038	0.141	0.090	0.074	0.025	0.031	0.027	0.030	2.0
9	0.010	0.013	0.013	0.019	0.044	0.034	0.104	0.019	0.022	0.018	0.018	-
10	0.024	0.010	0.019	0.022	0.033	0.026	0.039	0.018	0.021	0.019	0.021	1.6
11	0.013	0.041	0.068	0.086	0.207	0.290	0.407	0.503	0.525	0.557	0.562	3.1
12	0.010	0.009	0.010	0.016	0.034	0.022	0.030	0.016	0.021	0.016	0.016	1.33
13	0.145	0.174	0.155	0.208	0.206	0.210	0.132	0.037	0.072	0.090	0.129	2.0
14	0.062	0.022	0.013	0.017	0.036	0.026	0.044	0.030	0.030	0.029	0.030	-
15	0.009	0.007	0.009	0.011	0.022	0.023	0.027	0.014	0.017	0.014	0.014	-
16	0.060	0.028	0.013	0.012	0.021	0.023	0.043	0.027	0.030	0.027	0.031	-
17	0.017	0.024	0.053	0.066	0.148	0.188	0.182	0.181	0.192	0.216	0.230	-
18	0.010	0.007	0.008	0.012	0.019	0.022	0.021	0.016	0.020	0.015	0.017	-
19	0.067	0.091	0.146	0.146	0.093	0.094	0.077	0.074	0.100	0.117	0.153	-
20	0.018	0.011	0.016	0.017	0.019	0.020	0.022	0.014	0.019	0.017	0.019	-
21	0.010	0.006	0.007	0.009	0.015	0.015	0.022	0.015	0.017	0.016	0.015	-
22	0.029	0.022	0.011	0.013	0.019	0.022	0.025	0.021	0.027	0.028	0.029	-
23	0.036	0.022	0.031	0.035	0.059	0.051	0.045	0.146	0.172	0.217	0.253	-
24	0.011	0.006	0.007	0.010	0.014	0.023	0.022	0.015	0.020	0.021	0.020	-
25	0.012	0.045	0.063	0.070	0.032	0.080	0.145	0.134	0.128	0.112	0.094	-
26	0.049	0.019	0.012	0.012	0.015	0.020	0.028	0.019	0.024	0.025	0.030	-
27	0.011	0.007	0.007	0.008	0.012	0.014	0.020	0.014	0.015	0.014	0.018	-
28	0.028	0.007	0.008	0.013	0.017	0.016	0.022	0.014	0.020	0.020	0.028	-
29	0.040	0.026	0.035	0.036	0.017	0.068	0.059	0.118	0.139	0.170	0.169	-
30	0.009	0.006	0.006	0.008	0.011	0.016	0.017	0.014	0.020	0.018	0.021	-
31	0.030	0.053	0.024	0.017	0.049	0.122	0.106	0.134	0.117	0.100	0.082	-
32	0.035	0.025	0.011	0.010	0.013	0.021	0.022	0.017	0.024	0.022	0.025	-
33	0.009	0.008	0.008	0.009	0.010	0.011	0.017	0.014	0.016	0.016	0.018	-
34	0.036	0.008	0.007	0.012	0.015	0.019	0.025	0.018	0.021	0.018	0.022	-
35	0.039	0.014	0.034	0.040	0.017	0.047	0.074	0.049	0.065	0.078	0.107	-
36	0.008	0.006	0.006	0.008	0.010	0.013	0.016	0.014	0.022	0.025	0.028	-
37	0.034	0.043	0.039	0.027	0.033	0.081	0.047	0.085	0.101	0.116	0.128	-
38	0.015	0.016	0.017	0.015	0.013	0.017	0.018	0.022	0.027	0.035	0.043	-
39	0.007	0.005	0.006	0.006	0.008	0.010	0.013	0.011	0.014	0.018	0.022	-
40	0.023	0.018	0.021	0.022	0.023	0.027	0.026	0.032	0.033	0.034	0.042	-
THC/I _{ref}	0.539	0.398	0.486	0.684	0.824	0.914	1.001	1.110	1.197	1.315	1.428	13
PWHC/I _{ref}	0.804	0.714	0.887	0.914	0.952	1.445	1.498	1.758	1.918	2.143	2.339	22

I_{ref}=25000/230/3= 36.2 A

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Harmonics (DIN EN 61000-3-12) (HPT-25K)												
L3												
P/Pn [%]	0	10	20	30	40	50	60	70	80	90	100	Limit
Ordinal number	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]
2	0.073	0.051	0.061	0.082	0.065	0.085	0.101	0.061	0.085	0.072	0.064	8.0
3	0.028	0.018	0.019	0.031	0.040	0.047	0.057	0.050	0.060	0.061	0.066	-
4	0.181	0.060	0.037	0.075	0.065	0.057	0.058	0.036	0.045	0.040	0.041	4.0
5	0.110	0.169	0.280	0.409	0.428	0.437	0.511	0.599	0.657	0.735	0.830	10.7
6	0.011	0.009	0.020	0.034	0.100	0.084	0.071	0.019	0.024	0.018	0.020	2.67
7	0.399	0.272	0.306	0.436	0.565	0.629	0.637	0.673	0.722	0.791	0.854	7.2
8	0.090	0.021	0.019	0.038	0.146	0.090	0.065	0.024	0.029	0.024	0.027	2.0
9	0.013	0.019	0.013	0.021	0.053	0.038	0.108	0.024	0.029	0.022	0.020	-
10	0.024	0.013	0.019	0.023	0.036	0.029	0.043	0.018	0.021	0.019	0.022	1.6
11	0.013	0.043	0.068	0.080	0.208	0.290	0.399	0.496	0.515	0.550	0.551	3.1
12	0.011	0.008	0.010	0.014	0.037	0.021	0.027	0.017	0.024	0.017	0.018	1.33
13	0.124	0.164	0.155	0.199	0.207	0.204	0.123	0.035	0.070	0.089	0.134	2.0
14	0.064	0.021	0.015	0.018	0.034	0.029	0.045	0.027	0.031	0.027	0.027	-
15	0.010	0.007	0.009	0.012	0.023	0.025	0.030	0.018	0.018	0.016	0.014	-
16	0.060	0.029	0.015	0.013	0.019	0.022	0.042	0.030	0.031	0.027	0.031	-
17	0.016	0.028	0.055	0.059	0.140	0.180	0.181	0.184	0.196	0.218	0.234	-
18	0.011	0.007	0.009	0.012	0.019	0.023	0.022	0.016	0.021	0.016	0.017	-
19	0.060	0.085	0.137	0.143	0.097	0.091	0.074	0.076	0.108	0.125	0.160	-
20	0.015	0.010	0.017	0.018	0.018	0.021	0.022	0.014	0.021	0.017	0.019	-
21	0.011	0.007	0.007	0.010	0.015	0.015	0.022	0.014	0.020	0.019	0.018	-
22	0.028	0.020	0.011	0.014	0.019	0.023	0.026	0.022	0.028	0.029	0.031	-
23	0.034	0.027	0.037	0.039	0.060	0.050	0.042	0.141	0.170	0.212	0.244	-
24	0.010	0.006	0.007	0.010	0.014	0.023	0.022	0.014	0.021	0.021	0.021	-
25	0.013	0.039	0.059	0.069	0.030	0.077	0.144	0.141	0.134	0.125	0.105	-
26	0.048	0.020	0.012	0.013	0.015	0.021	0.028	0.020	0.025	0.026	0.030	-
27	0.009	0.010	0.009	0.009	0.012	0.015	0.023	0.017	0.019	0.019	0.020	-
28	0.025	0.006	0.008	0.013	0.017	0.017	0.022	0.014	0.020	0.020	0.027	-
29	0.043	0.029	0.032	0.036	0.017	0.063	0.058	0.114	0.132	0.163	0.162	-
30	0.008	0.005	0.006	0.008	0.010	0.016	0.017	0.014	0.022	0.019	0.022	-
31	0.032	0.051	0.025	0.017	0.044	0.122	0.102	0.135	0.118	0.101	0.084	-
32	0.036	0.026	0.011	0.010	0.013	0.021	0.022	0.019	0.025	0.022	0.024	-
33	0.008	0.006	0.007	0.007	0.010	0.012	0.017	0.014	0.016	0.017	0.018	-
34	0.037	0.010	0.008	0.013	0.016	0.019	0.026	0.018	0.022	0.020	0.023	-
35	0.036	0.012	0.030	0.039	0.018	0.046	0.069	0.053	0.069	0.079	0.105	-
36	0.008	0.006	0.006	0.008	0.009	0.014	0.016	0.014	0.025	0.025	0.030	-
37	0.031	0.040	0.039	0.026	0.031	0.079	0.042	0.079	0.097	0.116	0.131	-
38	0.015	0.015	0.017	0.015	0.013	0.017	0.018	0.022	0.028	0.033	0.043	-
39	0.008	0.006	0.005	0.006	0.008	0.011	0.014	0.015	0.020	0.025	0.028	-
40	0.028	0.023	0.027	0.028	0.029	0.032	0.031	0.035	0.036	0.035	0.042	-
THC/I _{ref}	0.511	0.398	0.491	0.677	0.824	0.910	0.987	1.094	1.180	1.296	1.407	13
PWHC/I _{ref}	0.794	0.694	0.862	0.906	0.937	1.413	1.473	1.762	1.933	2.152	2.338	22

I_{ref}=25000/230/3= 36.2 A

Certificate of Conformity

No. ESY 105515 0082 Rev. 00

E.6 Certificate of the network and system protection

Certificate of NS protection	No. 50.409.22.0105.15-00		
Manufacturer	Suzhou Hypontech Co., Ltd. No.1508 Xiangjiang Road, SND, 215010, 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	HPT-15K, HPT-17K, HPT-20K, HPT-25K.
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.			

Certificate of Conformity

No. ESY 105515 0082 Rev. 00

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

Extract from test report for NS protection "Determination of electrical properties"		No. 50.409.22.0105.15-00	
NS protection test report			
Type of NS system:	Integrated NS protection	Other Manufacturer indications	
Software version:	V1.0.0.00		
Manufacturer:	Suzhou Hypontech Co., Ltd. No.1508 Xiangjiang Road, SND, 215010, Suzhou, PEOPLE'S REPUBLIC OF CHINA		
Measuring period:	From 2022-10-08 to 2022-12-05		
	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 $U \gg$	$1,25 * U_n$	L1-N/L2-N/L3-N: 287.6 V, 288.4 V, 285.5 V, L1-N: 287.5 V, L2-N: 287.4 V, L3-N: 288.5 V, L1-L2: 497.6 V, L2-L3: 497.5 V, L3-L1: 497.6 V.	L1-N/L2-N/L3-N: 183 ms, L1-N: 178 ms, L2-N: 184 ms, L3-N: 184 ms, L1-L2: 187 ms, L2-L3: 186 ms, L3-L1: 183 ms.
Rise-in-voltage protection $U >$	$1,10 * U_n$	$1,10 * U_n$	ms**
Voltage drop protection $U <$	$0,8 * U_n$	L1-N/L2-N/L3-N: 184.7 V, 184.8 V, 184.8 V, L1-N: 184.6 V, L2-N: 184.6 V, L3-N: 184.8 V, L1-L2: 319.1 V, L2-L3: 319.4 V, L3-L1: 319.1 V.	L1-N/L2-N/L3-N: 3017.5 ms, L1-N: 3032.5 ms, L2-N: 3022.5 ms, L3-N: 3027.5 ms, L1-L2: 3002.5 ms, L2-L3: 3007.5 ms, L3-L1: 3020 ms.
Voltage drop protection $U \ll$	$0,45 * U_n$	L1-N/L2-N/L3-N: 103.7 V, 103.8 V, 103.7 V, L1-N: 103.8 V, L2-N: 104.3 V, L3-N: 104.6 V, L1-L2: 179.8 V, L2-L3: 180.5 V, L3-L1: 180.3 V.	L1-N/L2-N/L3-N: 363 ms, L1-N: 364 ms, L2-N: 358 ms, L3-N: 360 ms, L1-L2: 397 ms, L2-L3: 398 ms, L3-L1: 399 ms.
Frequency decrease protection $f <$	47,5 Hz	47.48 Hz	147.5 ms
Frequency increase protection $f >$	51,5 Hz	51.46 Hz	126 ms

Certificate of Conformity

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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"> 479 s (L1-N) / 481 s (L2-N) / 480 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) 302 s (L1-N) / 288 s (L2-N) / 346 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	HPT-15K, HPT-17K, HPT-20K, HPT-25K.
Integrated interface switch type	Series-connected relays for both line and neutral conductors Relay type: FTR-K3AB012W-PS: (Applicable models: HPT-15K, HPT-17K, HPT-20K) HF165F/12-HT(797): (Applicable model: HPT-25K)
Response time of interface switch for integrated NS protection	Operate time: Max. 20 ms (FTR-K3AB012W-PS) Max. 15 ms (HF165F/12-HT(797)) 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"/>