

Certificate of Conformity

No. ESY 003364 0033 Rev. 00

Holder of Certificate: **Shanghai PYTES Energy Co., Ltd.**

No. 3492 Jinqian Road
Fengxian District
201406 Shanghai
PEOPLE'S REPUBLIC OF CHINA

Product: **Converter**
Hybrid inverter

Model(s): **JS3PL8K, JS3PL10K, JS3PL12K, JS3PL15K**

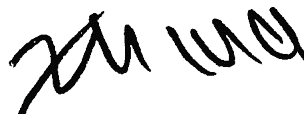
Parameters: See next pages.

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

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.: 704092541401-00

Date, 2025-04-11



(Zhengdong Ma)

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Model	JS3PL8K	JS3PL10K
PV input parameters:		
Max. input voltage	DC 1000 V	
MPPT voltage range	DC 200, ..., 850 V	
Max. input current	DC 20+40 A	
Isc PV (absolute maximum)	DC 30+50 A	
AC output parameters:		
Max. (Rated) apparent output Power	8000 VA	10000 VA
Nominal output voltage	3/N/PE AC 230V/400V	
Nominal Frequency	50 Hz	
Max. (Rated) output current	AC 11.5 A	AC 14.4 A
Power factor range	-0.8, ..., 1, ..., +0.8	
Battery parameters:		
Battery Type	Li-ion/Lead-acid	
Battery Voltage range	DC 40, ..., 60 V	
Max. Charge/discharge current	DC 180 A	DC 220 A

Model	JS3PL12K	JS3PL15K
PV input parameters:		
Max. input voltage	DC 1000 V	
MPPT voltage range	DC 200, ..., 850 V	
Max. input current	DC 20+40 A	DC 2*40 A
Isc PV (absolute maximum)	DC 30+50 A	DC 2*50 A
AC output parameters:		
Max. (Rated) apparent output Power	12000 VA	15000 VA
Nominal output voltage	3/N/PE AC 230V/400V	
Nominal Frequency	50 Hz	
Max. (Rated) output current	AC 17.3 A	AC 21.7 A
Power factor range	-0.8, ..., 1, ..., +0.8	
Battery parameters:		
Battery Type	Li-ion/Lead-acid	
Battery Voltage range	DC 40, ..., 60 V	
Max. Charge/discharge current	DC 250 A	DC 290 A

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E.4 Unit certificate

Unit certificate	No. 704092541401-00	
Manufacturer	Shanghai PYTES Energy Co., Ltd. No. 3492 Jingqian Road, Fengxian District, 201406 Shanghai, PEOPLE'S REPUBLIC OF CHINA	
Power generation unit type	[Hybrid inverter]: JS3PL8K, JS3PL10K, JS3PL12K, JS3PL15K Remark: certified on representative model JS3PL15K of family design products, results of the measurement of JS3PL15K can be transferred to the other models based on transferability rule of measurements in DIN VDE V 0124-100 (VDE V 0124-100):2020.	
☒ Inverter	☐ Asynchronous generator	☐ Synchronous generator
☐ Stirling generator	☐ Fuel cell	☐ others
Assessment values	Max. active power $P_{E_{max}}$	15 kW
	Max. apparent power $S_{E_{max}}$	15 kVA
	Rated voltage	3/N/PE AC 230/400 V
Rated values	Rated current (AC) I_r	21.7 Aa.c.
Rated values	Max. current (AC) I_{max}	21.7 Aa.c.
Rated values	Initial short-circuit current I_k''	27.0 Aa.c.
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. 704092541401-00
Generation unit manufacturer:	Shanghai PYTES Energy Co., Ltd. No. 3492 Jinqian Road, Fengxian District, 201406 Shanghai, PEOPLE'S REPUBLIC OF CHINA	
Manufacturer indications:	Type of system	Inverter for PV and Battery
	Max. active power $P_{E\max}$	8 kW (JS3PL8K) 10 kW (JS3PL10K) 12 kW (JS3PL12K) 15 kW (JS3PL15K)
	Rated voltage	3/N/PE AC 230/400 V
Period of measurement:	From 2024-09-15 to 2024-11-01, 2025-03-28	

Rapid voltage changes and flicker (DIN EN 61000-3-11)

Phase		P _{st}	d(t) - 500ms [%]	dc [%]	dmax [%]
Limit		1.0	3.3%	3.3%	4%
1	L-N	0.35/0.35/0.35	0.00/0.00/0.00	0.13/0.14/0.17	0.30/0.72/0.58
2	L-N	0.35/0.35/0.36	0.00/0.00/0.00	0.04/0.26/0.14	0.71/0.59/0.33
3	L-N	0.34/0.35/0.35	0.00/0.00/0.00	0.06/0.09/0.18	0.66/0.63/0.28
4	L-N	0.35/0.35/0.35	0.00/0.00/0.00	0.05/0.14/0.15	0.17/0.79/0.48
5	L-N	0.20/0.20/0.21	0.00/0.00/0.00	0.11/0.18/0.15	0.55/0.18/0.82
6	L-N	0.35/0.35/0.35	0.00/0.00/0.00	0.02/0.19/0.28	0.54/0.79/0.29
7	L-N	0.35/0.36/0.36	0.00/0.00/0.00	0.19/0.20/0.25	0.61/0.66/0.27
8	L-N	0.20/0.20/0.21	0.00/0.00/0.00	0.02/0.02/0.04	0.56/0.32/0.74
9	L-N	0.35/0.35/0.36	0.00/0.00/0.00	0.25/0.12/0.03	0.29/0.53/0.68
10	L-N	0.35/0.35/0.35	0.00/0.00/0.00	0.02/0.10/0.32	0.55/0.71/0.32
11	L-N	0.16/0.16/0.17	0.00/0.00/0.00	0.07/0.01/0.07	0.38/0.36/0.80
12	L-N	0.35/0.35/0.36	0.00/0.00/0.00	0.25/0.16/0.14	0.25/0.55/0.65
P _{It} measured		0.03/0.03/0.03		P _{It} limit	0.65
		d(t) - 500ms [%]		dc [%]	dmax [%]
START		0.00/0.00/0.00		0.31/0.28/0.37	
STOP		0.00/0.00/0.00		0.46/0.44/0.39	
LIMIT		3.3%		3.3%	
Supplementary information:					

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Harmonics (IEC 61000-3-2 (≤ 16A))(JS3PL15K)												
L1												
Power P/Pn[%]	5	10	20	30	40	50	60	70	80	90	100	Limit
Ordina l numbe r	A	A	A	A	A	A	A	A	A	A	A	A
2	0.019	0.023	0.023	0.005	0.005	0.007	0.005	0.009	0.007	0.009	0.026	1.080
3	0.009	0.005	0.004	0.011	0.013	0.010	0.011	0.011	0.013	0.014	0.019	2.300
4	0.002	0.002	0.002	0.006	0.004	0.003	0.006	0.005	0.007	0.006	0.010	0.430
5	0.009	0.018	0.013	0.055	0.064	0.082	0.083	0.095	0.099	0.104	0.111	1.140
6	0.002	0.002	0.001	0.015	0.013	0.015	0.012	0.012	0.010	0.012	0.012	0.300
7	0.008	0.006	0.013	0.015	0.018	0.037	0.042	0.054	0.063	0.064	0.071	0.770
8	0.001	0.001	0.002	0.005	0.003	0.005	0.003	0.005	0.003	0.007	0.004	0.230
9	0.028	0.013	0.031	0.006	0.003	0.005	0.004	0.004	0.004	0.005	0.007	0.400
10	0.003	0.002	0.001	0.005	0.003	0.004	0.005	0.004	0.004	0.005	0.007	0.184
11	0.008	0.004	0.012	0.041	0.032	0.007	0.006	0.025	0.035	0.041	0.049	0.330
12	0.003	0.003	0.002	0.008	0.011	0.009	0.006	0.008	0.007	0.008	0.009	0.153
13	0.002	0.006	0.008	0.046	0.038	0.023	0.014	0.007	0.022	0.026	0.038	0.210
14	0.001	0.001	0.001	0.008	0.005	0.005	0.003	0.004	0.004	0.005	0.005	0.131
15	0.013	0.016	0.011	0.005	0.006	0.004	0.003	0.004	0.006	0.006	0.006	0.150
16	0.001	0.000	0.001	0.003	0.004	0.005	0.004	0.004	0.004	0.004	0.005	0.115
17	0.004	0.005	0.003	0.036	0.039	0.033	0.027	0.009	0.009	0.015	0.024	0.132
18	0.003	0.004	0.004	0.007	0.007	0.008	0.005	0.005	0.005	0.006	0.006	0.102
19	0.002	0.002	0.002	0.019	0.025	0.036	0.033	0.017	0.009	0.007	0.015	0.118
20	0.001	0.001	0.000	0.004	0.006	0.004	0.005	0.005	0.004	0.007	0.005	0.092

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21	0.005	0.003	0.001	0.005	0.003	0.004	0.005	0.005	0.005	0.004	0.005	0.107
22	0.001	0.000	0.000	0.005	0.005	0.005	0.004	0.005	0.005	0.006	0.008	0.084
23	0.002	0.003	0.001	0.010	0.005	0.030	0.031	0.018	0.013	0.012	0.013	0.098
24	0.001	0.000	0.001	0.006	0.009	0.007	0.007	0.005	0.006	0.004	0.005	0.077
25	0.001	0.002	0.001	0.023	0.013	0.018	0.027	0.022	0.018	0.015	0.012	0.090
26	0.001	0.0011	0.001	0.004	0.005	0.004	0.005	0.003	0.005	0.003	0.005	0.071
27	0.003	0.005	0.001	0.003	0.004	0.005	0.004	0.004	0.004	0.004	0.005	0.083
28	0.001	0.001	0.000	0.005	0.003	0.003	0.007	0.004	0.004	0.008	0.005	0.066
29	0.001	0.003	0.001	0.022	0.023	0.004	0.010	0.016	0.023	0.016	0.010	0.078
30	0.001	0.001	0.000	0.005	0.006	0.005	0.005	0.005	0.005	0.003	0.004	0.061
31	0.001	0.001	0.001	0.021	0.022	0.006	0.004	0.016	0.025	0.022	0.013	0.073
32	0.001	0.001	0.001	0.002	0.002	0.005	0.003	0.006	0.003	0.003	0.004	0.058
33	0.002	0.002	0.001	0.003	0.003	0.005	0.003	0.003	0.004	0.005	0.004	0.068
34	0.001	0.001	0.001	0.003	0.003	0.004	0.002	0.003	0.003	0.003	0.004	0.054
35	0.002	0.002	0.002	0.003	0.007	0.013	0.011	0.015	0.023	0.021	0.010	0.064
36	0.001	0.001	0.001	0.004	0.004	0.005	0.004	0.004	0.004	0.004	0.004	0.051
37	0.001	0.002	0.001	0.008	0.003	0.016	0.013	0.015	0.022	0.019	0.011	0.061
38	0.001	0.001	0.001	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.048
39	0.002	0.002	0.002	0.003	0.003	0.004	0.003	0.003	0.003	0.003	0.003	0.058
40	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.004	0.046

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L2												
Power P/Pn[%]	5	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	0.040	0.040	0.039	0.014	0.012	0.015	0.012	0.013	0.008	0.012	0.066	1.080
3	0.016	0.012	0.008	0.046	0.043	0.034	0.033	0.033	0.035	0.036	0.046	2.300
4	0.005	0.002	0.003	0.019	0.008	0.009	0.010	0.016	0.018	0.015	0.026	0.430
5	0.013	0.034	0.030	0.126	0.142	0.178	0.198	0.218	0.242	0.244	0.268	1.140
6	0.005	0.004	0.003	0.013	0.020	0.017	0.020	0.018	0.020	0.023	0.031	0.300
7	0.013	0.011	0.028	0.042	0.033	0.079	0.103	0.121	0.146	0.144	0.168	0.770
8	0.004	0.004	0.002	0.009	0.008	0.008	0.016	0.010	0.016	0.010	0.014	0.230
9	0.062	0.032	0.077	0.020	0.011	0.013	0.018	0.015	0.018	0.025	0.018	0.400
10	0.005	0.002	0.005	0.012	0.009	0.024	0.013	0.023	0.013	0.026	0.020	0.184
11	0.023	0.006	0.022	0.094	0.070	0.017	0.011	0.046	0.078	0.085	0.111	0.330
12	0.007	0.006	0.006	0.012	0.008	0.009	0.011	0.009	0.009	0.009	0.016	0.153
13	0.003	0.012	0.013	0.104	0.091	0.049	0.027	0.017	0.050	0.053	0.086	0.210
14	0.002	0.002	0.002	0.010	0.011	0.014	0.011	0.010	0.015	0.015	0.012	0.131
15	0.033	0.042	0.030	0.011	0.014	0.011	0.017	0.016	0.024	0.018	0.024	0.150
16	0.004	0.002	0.001	0.007	0.014	0.013	0.010	0.016	0.009	0.010	0.013	0.115
17	0.012	0.014	0.006	0.078	0.090	0.075	0.062	0.025	0.021	0.033	0.057	0.132
18	0.008	0.009	0.010	0.009	0.009	0.009	0.012	0.009	0.010	0.011	0.013	0.102
19	0.006	0.007	0.002	0.040	0.060	0.079	0.077	0.037	0.024	0.014	0.034	0.118
20	0.002	0.002	0.001	0.011	0.014	0.013	0.016	0.018	0.015	0.013	0.013	0.092

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21	0.010	0.008	0.003	0.018	0.013	0.014	0.016	0.022	0.014	0.020	0.020	0.107
22	0.002	0.002	0.001	0.018	0.011	0.012	0.008	0.011	0.011	0.015	0.017	0.084
23	0.007	0.007	0.002	0.033	0.009	0.058	0.071	0.046	0.031	0.034	0.038	0.098
24	0.003	0.002	0.001	0.008	0.011	0.010	0.009	0.009	0.009	0.009	0.013	0.077
25	0.004	0.007	0.002	0.061	0.031	0.046	0.063	0.048	0.045	0.037	0.033	0.090
26	0.001	0.001	0.001	0.010	0.013	0.016	0.013	0.015	0.012	0.012	0.017	0.071
27	0.005	0.011	0.003	0.010	0.009	0.009	0.012	0.013	0.009	0.012	0.013	0.083
28	0.002	0.002	0.001	0.011	0.009	0.013	0.009	0.015	0.009	0.010	0.010	0.066
29	0.004	0.007	0.002	0.049	0.052	0.007	0.022	0.038	0.059	0.046	0.030	0.078
30	0.002	0.002	0.001	0.009	0.009	0.009	0.012	0.009	0.008	0.008	0.011	0.061
31	0.002	0.004	0.002	0.047	0.050	0.019	0.010	0.040	0.058	0.054	0.033	0.073
32	0.001	0.001	0.001	0.007	0.007	0.009	0.008	0.013	0.008	0.015	0.012	0.058
33	0.004	0.005	0.005	0.009	0.008	0.012	0.010	0.007	0.011	0.010	0.016	0.068
34	0.002	0.001	0.001	0.014	0.009	0.018	0.011	0.008	0.012	0.009	0.010	0.054
35	0.004	0.006	0.004	0.008	0.022	0.037	0.025	0.032	0.051	0.050	0.027	0.064
36	0.001	0.001	0.001	0.009	0.006	0.007	0.007	0.012	0.006	0.008	0.011	0.051
37	0.003	0.005	0.003	0.023	0.006	0.038	0.034	0.041	0.055	0.048	0.029	0.061
38	0.001	0.001	0.001	0.006	0.006	0.007	0.008	0.010	0.007	0.010	0.010	0.048
39	0.005	0.004	0.004	0.007	0.009	0.010	0.009	0.010	0.010	0.011	0.008	0.058
40	0.002	0.001	0.001	0.007	0.008	0.005	0.011	0.006	0.006	0.008	0.010	0.046

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L3												
Power P/Pn[%]	5	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	0.040	0.035	0.034	0.018	0.018	0.027	0.019	0.024	0.292	0.025	0.070	1.080
3	0.023	0.014	0.012	0.022	0.015	0.016	0.026	0.022	0.029	0.032	0.056	2.300
4	0.008	0.009	0.007	0.008	0.010	0.009	0.011	0.014	0.068	0.012	0.033	0.430
5	0.019	0.036	0.028	0.126	0.149	0.189	0.203	0.227	0.247	0.254	0.271	1.140
6	0.003	0.008	0.006	0.026	0.017	0.019	0.013	0.013	0.061	0.010	0.018	0.300
7	0.018	0.017	0.029	0.052	0.042	0.087	0.105	0.132	0.127	0.156	0.174	0.770
8	0.005	0.002	0.004	0.007	0.009	0.014	0.014	0.017	0.040	0.015	0.015	0.230
9	0.065	0.032	0.075	0.011	0.009	0.009	0.014	0.010	0.024	0.016	0.013	0.400
10	0.006	0.003	0.005	0.015	0.011	0.021	0.010	0.018	0.028	0.018	0.017	0.184
11	0.019	0.010	0.025	0.096	0.076	0.024	0.011	0.045	0.055	0.089	0.112	0.330
12	0.007	0.007	0.008	0.011	0.021	0.019	0.009	0.017	0.021	0.018	0.015	0.153
13	0.005	0.014	0.015	0.108	0.086	0.042	0.034	0.021	0.041	0.063	0.084	0.210
14	0.006	0.005	0.005	0.015	0.009	0.012	0.011	0.009	0.021	0.013	0.011	0.131
15	0.032	0.040	0.029	0.009	0.009	0.012	0.015	0.011	0.015	0.013	0.013	0.150
16	0.005	0.004	0.003	0.008	0.011	0.013	0.012	0.016	0.017	0.009	0.013	0.115
17	0.009	0.011	0.005	0.077	0.087	0.070	0.055	0.024	0.027	0.032	0.058	0.132
18	0.008	0.009	0.010	0.019	0.013	0.022	0.021	0.016	0.020	0.016	0.012	0.102
19	0.005	0.007	0.003	0.045	0.061	0.085	0.082	0.034	0.041	0.011	0.034	0.118
20	0.002	0.002	0.002	0.008	0.008	0.009	0.012	0.013	0.022	0.011	0.012	0.092

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21	0.011	0.007	0.003	0.011	0.013	0.012	0.011	0.014	0.021	0.016	0.017	0.107
22	0.002	0.002	0.001	0.010	0.008	0.011	0.012	0.018	0.021	0.013	0.011	0.084
23	0.005	0.005	0.001	0.035	0.010	0.069	0.073	0.042	0.035	0.032	0.036	0.098
24	0.001	0.003	0.001	0.016	0.017	0.012	0.018	0.010	0.025	0.010	0.014	0.077
25	0.003	0.007	0.001	0.063	0.038	0.050	0.069	0.055	0.040	0.035	0.028	0.090
26	0.001	0.002	0.001	0.010	0.008	0.013	0.010	0.015	0.024	0.011	0.012	0.071
27	0.006	0.011	0.002	0.012	0.007	0.010	0.010	0.010	0.017	0.012	0.013	0.083
28	0.001	0.002	0.001	0.009	0.011	0.013	0.010	0.010	0.021	0.014	0.012	0.066
29	0.003	0.006	0.002	0.057	0.050	0.009	0.021	0.041	0.047	0.038	0.026	0.078
30	0.002	0.001	0.002	0.008	0.015	0.007	0.007	0.011	0.027	0.008	0.010	0.061
31	0.003	0.004	0.002	0.046	0.053	0.016	0.007	0.038	0.048	0.059	0.031	0.073
32	0.002	0.001	0.002	0.007	0.007	0.010	0.006	0.007	0.023	0.013	0.009	0.058
33	0.004	0.005	0.003	0.009	0.007	0.008	0.007	0.010	0.018	0.008	0.011	0.068
34	0.001	0.001	0.002	0.012	0.006	0.016	0.010	0.006	0.016	0.009	0.009	0.054
35	0.003	0.005	0.003	0.007	0.015	0.034	0.025	0.033	0.034	0.041	0.025	0.064
36	0.002	0.001	0.002	0.011	0.007	0.007	0.007	0.008	0.017	0.007	0.007	0.051
37	0.004	0.005	0.003	0.024	0.006	0.043	0.037	0.039	0.036	0.053	0.028	0.061
38	0.002	0.001	0.002	0.006	0.010	0.010	0.010	0.007	0.018	0.011	0.011	0.048
39	0.004	0.004	0.004	0.009	0.007	0.007	0.010	0.009	0.011	0.009	0.008	0.058
40	0.001	0.000	0.002	0.007	0.006	0.006	0.008	0.007	0.013	0.008	0.007	0.046

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Harmonics IEC 61000-3-12(>16 A and ≤75 A) (JS3PL15K)													
L1													
Power P/Pn [%]	5	10	20	30	40	50	60	70	80	90	100	IEC 61000-3-12 limit	
Ordinal number	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]	1 phase [%]	3 phase [%]
2	0.086	0.105	0.107	0.024	0.025	0.032	0.025	0.040	0.033	0.040	0.119	8%	8%
3	0.043	0.025	0.019	0.049	0.062	0.046	0.051	0.052	0.059	0.066	0.088	21.6%	Not stated
4	0.010	0.008	0.010	0.029	0.020	0.016	0.026	0.024	0.032	0.028	0.045	4%	4%
5	0.040	0.084	0.058	0.255	0.293	0.376	0.383	0.436	0.457	0.477	0.512	10.7%	10.7%
6	0.011	0.009	0.003	0.068	0.062	0.067	0.055	0.057	0.046	0.054	0.056	2.67%	2.67%
7	0.036	0.027	0.058	0.071	0.081	0.172	0.195	0.249	0.292	0.293	0.329	7.2%	7.2%
8	0.006	0.006	0.007	0.021	0.014	0.024	0.015	0.022	0.016	0.032	0.020	2%	2%
9	0.127	0.062	0.141	0.026	0.016	0.022	0.018	0.018	0.019	0.025	0.034	3.8%	Not stated
10	0.012	0.009	0.006	0.022	0.014	0.019	0.025	0.017	0.018	0.023	0.033	1.6%	1.6%
11	0.037	0.020	0.053	0.187	0.148	0.031	0.028	0.113	0.159	0.188	0.226	3.1%	3.1%
12	0.015	0.012	0.011	0.036	0.049	0.042	0.028	0.035	0.031	0.037	0.040	1.33%	1.33%
13	0.007	0.026	0.035	0.211	0.177	0.105	0.063	0.034	0.101	0.119	0.173	2%	2%
14	0.004	0.005	0.003	0.035	0.025	0.024	0.015	0.020	0.017	0.021	0.022	-	-
15	0.062	0.074	0.052	0.025	0.029	0.017	0.015	0.020	0.027	0.028	0.028	-	-
16	0.004	0.002	0.003	0.015	0.018	0.023	0.020	0.017	0.018	0.018	0.024	-	-
17	0.019	0.025	0.014	0.166	0.180	0.154	0.126	0.041	0.040	0.069	0.110	-	-
18	0.016	0.018	0.019	0.033	0.032	0.038	0.025	0.023	0.023	0.027	0.029	-	-
19	0.007	0.010	0.007	0.089	0.114	0.166	0.154	0.078	0.043	0.031	0.069	-	-
20	0.002	0.005	0.002	0.017	0.027	0.019	0.021	0.023	0.018	0.030	0.022	-	-

Certificate of Conformity

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21	0.023	0.015	0.006	0.025	0.016	0.020	0.022	0.023	0.022	0.020	0.022	-	-
22	0.003	0.002	0.001	0.024	0.023	0.022	0.018	0.022	0.021	0.029	0.039	-	-
23	0.010	0.013	0.004	0.048	0.023	0.136	0.142	0.081	0.061	0.054	0.058	-	-
24	0.004	0.002	0.002	0.029	0.040	0.030	0.033	0.024	0.026	0.020	0.024	-	-
25	0.005	0.011	0.003	0.107	0.061	0.082	0.125	0.100	0.085	0.068	0.054	-	-
26	0.001	0.002	0.002	0.020	0.021	0.018	0.024	0.015	0.023	0.015	0.021	-	-
27	0.012	0.021	0.004	0.016	0.020	0.021	0.020	0.018	0.018	0.018	0.024	-	-
28	0.003	0.003	0.002	0.024	0.014	0.012	0.030	0.019	0.018	0.036	0.025	-	-
29	0.006	0.012	0.005	0.101	0.105	0.018	0.048	0.073	0.104	0.074	0.044	-	-
30	0.003	0.004	0.001	0.021	0.029	0.021	0.023	0.022	0.023	0.015	0.018	-	-
31	0.004	0.006	0.005	0.098	0.102	0.028	0.020	0.072	0.115	0.100	0.058	-	-
32	0.002	0.002	0.001	0.011	0.011	0.023	0.015	0.028	0.014	0.012	0.018	-	-
33	0.008	0.010	0.005	0.014	0.014	0.021	0.015	0.013	0.018	0.021	0.018	-	-
34	0.003	0.001	0.001	0.012	0.013	0.020	0.010	0.016	0.013	0.012	0.017	-	-
35	0.007	0.011	0.007	0.013	0.032	0.061	0.049	0.069	0.104	0.098	0.047	-	-
36	0.002	0.002	0.002	0.019	0.018	0.021	0.020	0.017	0.019	0.020	0.020	-	-
37	0.006	0.009	0.006	0.039	0.013	0.076	0.061	0.069	0.101	0.088	0.049	-	-
38	0.002	0.003	0.001	0.014	0.013	0.013	0.012	0.015	0.015	0.012	0.014	-	-
39	0.009	0.009	0.007	0.012	0.014	0.017	0.012	0.013	0.016	0.015	0.015	-	-
40	0.002	0.002	0.001	0.008	0.010	0.009	0.011	0.010	0.011	0.015	0.018	-	-
THC/lre f	0.190	0.181	0.216	0.490	0.489	0.538	0.538	0.572	0.637	0.657	0.724	23%	13%
PWHD	0.316	0.382	0.248	1.344	1.342	1.453	1.438	1.176	1.410	1.258	1.006	23%	22%

Certificate of Conformity

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L2													
Power P/Pn [%]	5	10	20	30	40	50	60	70	80	90	100	IEC 61000-3-12 limit	
Ordinal number	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]	1 phase [%]	3 phase [%]
2	0.074	0.054	0.036	0.214	0.196	0.158	0.154	0.151	0.160	0.166	0.211	8%	8%
3	0.023	0.008	0.016	0.086	0.037	0.042	0.046	0.073	0.083	0.069	0.121	21.6%	Not stated
4	0.059	0.158	0.137	0.581	0.656	0.822	0.911	1.006	1.116	1.124	1.233	4%	4%
5	0.024	0.019	0.012	0.061	0.091	0.079	0.092	0.085	0.094	0.106	0.145	10.7%	10.7%
6	0.062	0.049	0.129	0.194	0.152	0.362	0.475	0.556	0.675	0.663	0.773	2.67%	2.67%
7	0.017	0.018	0.011	0.040	0.039	0.039	0.073	0.047	0.072	0.045	0.066	7.2%	7.2%
8	0.286	0.148	0.353	0.093	0.049	0.060	0.083	0.068	0.081	0.116	0.085	2%	2%
9	0.023	0.011	0.021	0.056	0.043	0.112	0.058	0.104	0.059	0.119	0.094	3.8%	Not stated
10	0.108	0.029	0.103	0.431	0.322	0.080	0.050	0.212	0.361	0.391	0.512	1.6%	1.6%
11	0.034	0.026	0.027	0.057	0.039	0.041	0.050	0.040	0.043	0.040	0.073	3.1%	3.1%
12	0.014	0.057	0.062	0.480	0.418	0.226	0.126	0.077	0.231	0.243	0.395	1.33%	1.33%
13	0.010	0.009	0.009	0.045	0.052	0.063	0.049	0.047	0.069	0.071	0.055	2%	2%
14	0.150	0.192	0.140	0.052	0.066	0.049	0.078	0.074	0.110	0.084	0.110	-	-
15	0.019	0.010	0.006	0.034	0.066	0.059	0.045	0.073	0.043	0.045	0.062	-	-
16	0.057	0.065	0.027	0.361	0.415	0.347	0.285	0.116	0.097	0.152	0.264	-	-
17	0.038	0.042	0.045	0.042	0.041	0.040	0.057	0.043	0.047	0.052	0.059	-	-
18	0.026	0.034	0.008	0.183	0.275	0.365	0.356	0.170	0.111	0.063	0.155	-	-
19	0.007	0.007	0.005	0.049	0.064	0.059	0.075	0.084	0.068	0.059	0.061	-	-
20	0.074	0.054	0.036	0.214	0.196	0.158	0.154	0.151	0.160	0.166	0.211	-	-

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21	0.048	0.036	0.015	0.082	0.060	0.066	0.076	0.102	0.064	0.091	0.094	-	-
22	0.011	0.007	0.004	0.085	0.050	0.055	0.039	0.052	0.052	0.067	0.079	-	-
23	0.030	0.031	0.008	0.154	0.042	0.268	0.326	0.214	0.142	0.155	0.177	-	-
24	0.012	0.008	0.004	0.038	0.051	0.048	0.043	0.042	0.041	0.043	0.058	-	-
25	0.017	0.031	0.009	0.280	0.142	0.212	0.291	0.219	0.207	0.170	0.152	-	-
26	0.004	0.005	0.004	0.045	0.060	0.076	0.059	0.068	0.053	0.053	0.077	-	-
27	0.024	0.049	0.013	0.047	0.041	0.041	0.056	0.061	0.043	0.055	0.059	-	-
28	0.008	0.007	0.003	0.051	0.043	0.062	0.041	0.070	0.040	0.045	0.046	-	-
29	0.017	0.032	0.008	0.228	0.241	0.034	0.103	0.177	0.273	0.210	0.139	-	-
30	0.007	0.010	0.004	0.043	0.040	0.040	0.055	0.043	0.037	0.037	0.052	-	-
31	0.010	0.019	0.010	0.218	0.230	0.088	0.048	0.185	0.269	0.248	0.151	-	-
32	0.005	0.005	0.005	0.030	0.030	0.040	0.038	0.058	0.035	0.067	0.054	-	-
33	0.019	0.023	0.021	0.041	0.035	0.055	0.044	0.031	0.050	0.046	0.073	-	-
34	0.007	0.004	0.004	0.065	0.043	0.083	0.050	0.038	0.054	0.041	0.044	-	-
35	0.017	0.027	0.017	0.035	0.100	0.169	0.115	0.147	0.236	0.229	0.126	-	-
36	0.005	0.006	0.005	0.042	0.028	0.033	0.034	0.055	0.027	0.035	0.050	-	-
37	0.016	0.023	0.014	0.107	0.026	0.175	0.157	0.187	0.255	0.219	0.134	-	-
38	0.004	0.006	0.005	0.026	0.029	0.030	0.035	0.046	0.032	0.048	0.044	-	-
39	0.022	0.020	0.020	0.034	0.042	0.044	0.041	0.044	0.045	0.050	0.038	-	-
40	0.007	0.005	0.003	0.034	0.037	0.025	0.052	0.026	0.028	0.036	0.045	-	-
THC/lre f	0.422	0.381	0.484	1.137	1.107	1.189	1.277	1.324	1.533	1.529	1.742	23%	13%
PWHD	0.780	0.976	0.646	3.155	3.105	3.336	3.377	2.939	3.448	3.160	2.698	23%	22%

Certificate of Conformity

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L3													
Power P/Pn [%]	5	10	20	30	40	50	60	70	80	90	100	IEC 61000-3-12 limit	
Ordinal number	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]	[%]	1 phase [%]	3 phase [%]
2	0.184	0.161	0.157	0.082	0.083	0.125	0.089	0.112	1.347	0.116	0.322	8%	8%
3	0.104	0.066	0.053	0.100	0.071	0.075	0.118	0.100	0.132	0.146	0.256	21.6%	Not stated
4	0.037	0.043	0.032	0.039	0.047	0.043	0.050	0.065	0.313	0.055	0.153	4%	4%
5	0.086	0.168	0.127	0.579	0.685	0.869	0.936	1.048	1.136	1.169	1.247	10.7%	10.7%
6	0.012	0.035	0.027	0.120	0.077	0.087	0.061	0.062	0.280	0.044	0.082	2.67%	2.67%
7	0.081	0.077	0.134	0.240	0.195	0.400	0.483	0.609	0.587	0.719	0.800	7.2%	7.2%
8	0.022	0.010	0.018	0.034	0.042	0.064	0.065	0.079	0.186	0.070	0.067	2%	2%
9	0.301	0.148	0.345	0.049	0.042	0.040	0.065	0.048	0.110	0.072	0.060	3.8%	Not stated
10	0.029	0.013	0.025	0.069	0.050	0.096	0.048	0.083	0.128	0.085	0.078	1.6%	1.6%
11	0.088	0.044	0.114	0.444	0.349	0.112	0.052	0.208	0.255	0.409	0.514	3.1%	3.1%
12	0.031	0.031	0.038	0.049	0.098	0.089	0.042	0.079	0.099	0.084	0.070	1.33%	1.33%
13	0.025	0.063	0.067	0.496	0.398	0.195	0.158	0.095	0.189	0.291	0.387	2%	2%
14	0.027	0.025	0.021	0.068	0.042	0.057	0.050	0.041	0.095	0.060	0.052	-	-
15	0.149	0.184	0.134	0.041	0.041	0.053	0.069	0.052	0.070	0.059	0.062	-	-
16	0.024	0.020	0.012	0.038	0.050	0.062	0.054	0.075	0.078	0.043	0.062	-	-
17	0.042	0.049	0.023	0.356	0.402	0.324	0.253	0.111	0.126	0.147	0.266	-	-
18	0.038	0.043	0.046	0.088	0.060	0.100	0.095	0.073	0.090	0.075	0.057	-	-
19	0.022	0.034	0.013	0.206	0.283	0.394	0.378	0.158	0.190	0.050	0.157	-	-
20	0.010	0.007	0.007	0.038	0.035	0.042	0.054	0.058	0.103	0.052	0.054	-	-

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21	0.052	0.034	0.013	0.050	0.061	0.053	0.050	0.065	0.098	0.075	0.079	-	-
22	0.011	0.008	0.004	0.046	0.035	0.051	0.057	0.083	0.099	0.059	0.052	-	-
23	0.021	0.023	0.004	0.159	0.045	0.319	0.336	0.194	0.163	0.147	0.165	-	-
24	0.004	0.012	0.004	0.075	0.079	0.054	0.085	0.046	0.116	0.045	0.066	-	-
25	0.015	0.033	0.004	0.290	0.175	0.229	0.319	0.252	0.182	0.160	0.127	-	-
26	0.006	0.011	0.004	0.047	0.035	0.062	0.045	0.068	0.110	0.050	0.053	-	-
27	0.027	0.050	0.009	0.053	0.034	0.047	0.046	0.047	0.081	0.053	0.060	-	-
28	0.004	0.008	0.006	0.041	0.051	0.059	0.046	0.045	0.097	0.065	0.053	-	-
29	0.012	0.027	0.007	0.264	0.232	0.042	0.095	0.190	0.217	0.177	0.122	-	-
30	0.007	0.006	0.008	0.036	0.067	0.031	0.031	0.051	0.123	0.035	0.046	-	-
31	0.015	0.019	0.010	0.213	0.243	0.072	0.031	0.176	0.219	0.270	0.142	-	-
32	0.007	0.004	0.008	0.030	0.032	0.044	0.028	0.034	0.107	0.061	0.040	-	-
33	0.020	0.023	0.014	0.040	0.034	0.039	0.031	0.045	0.082	0.039	0.051	-	-
34	0.005	0.006	0.009	0.053	0.029	0.076	0.046	0.028	0.073	0.040	0.043	-	-
35	0.013	0.024	0.013	0.034	0.067	0.155	0.116	0.151	0.158	0.190	0.114	-	-
36	0.009	0.006	0.009	0.050	0.030	0.033	0.031	0.037	0.080	0.034	0.033	-	-
37	0.019	0.024	0.015	0.111	0.029	0.199	0.170	0.179	0.165	0.242	0.129	-	-
38	0.008	0.005	0.008	0.028	0.048	0.047	0.044	0.032	0.081	0.049	0.050	-	-
39	0.020	0.020	0.017	0.041	0.030	0.034	0.046	0.042	0.053	0.042	0.038	-	-
40	0.006	0.002	0.007	0.034	0.027	0.027	0.039	0.030	0.060	0.035	0.034	-	-
THC/lre f	0.442	0.382	0.474	1.155	1.121	1.248	1.306	1.374	2.058	1.588	1.757	23%	13%
PWHD	0.766	0.934	0.623	3.273	3.106	3.499	3.468	2.894	3.351	3.074	2.479	23%	22%

Certificate of Conformity

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E.6 Certificate of the network and system protection

Certificate of NS protection	No. 704092541401-00		
Manufacturer	Shanghai PYTES Energy Co., Ltd. No. 3492 Jinqian Road, Fengxian District, 201406 Shanghai, PEOPLE'S REPUBLIC OF CHINA		
Type of NS protection			
Central NS protection	☐		
Integrated NS protection	☒	Assigned to power generation unit type	JS3PL8K, JS3PL10K, JS3PL12K, JS3PL15K
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 003364 0033 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. 704092541401-00	
NS protection test report			
Type of NS system:	Integrated NS protection	Other Manufacturer indications	
Software version:	A1		
Manufacturer:	Shanghai PYTES Energy Co., Ltd. No. 3492 Jinqian Road, Fengxian District, 201406 Shanghai, PEOPLE’S REPUBLIC OF CHINA		
Measuring period:	From 2024-09-15 to 2024-11-01, 2025-03-28		
	Inverter(s) (JS3PL15K)		
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: 287.5 V / 287.3 V / 287.5 V L1-N: 287.4 V L2-N: 287.4 V L3-N: 287.6 V L1-L2: 497.3 V L2-L3: 497.3 V L3-L1: 497.7 V	L1-N/L2-N/L3-N: 109 ms L1-N: 134 ms L2-N: 127 ms L3-N: 135 ms L1-L2: 117 ms L2-L3: 122 ms L3-L1: 122 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: 184.3 V / 184.3 V / 184.3 V L1-N: 184.1 V L2-N: 184.1 V L3-N: 184.1 V L1-L2: 319.3 V L2-L3: 318.9 V L3-L1: 320.0 V	L1-N/L2-N/L3-N: 3028 ms L1-N: 3018 ms L2-N: 3018 ms L3-N: 3023 ms L1-L2: 3028 ms L2-L3: 3023 ms L3-L1: 3023 ms
Voltage drop protection $U <<$	$0.45 * U_n$	L1-N/L2-N/L3-N: 103.5 V / 103.5 V / 103.5 V L1-N: 103.6 V L2-N: 103.9 V L3-N: 103.9 V L1-L2: 179.2 V L2-L3: 179.4 V L3-L1: 179.2 V	L1-N/L2-N/L3-N: 332 ms L1-N: 333 ms L2-N: 330 ms L3-N: 333 ms L1-L2: 319 ms L2-L3: 319 ms L3-L1: 318 ms
Frequency decrease protection $f <$	47.5 Hz	47.50 Hz	122 ms
Frequency increase protection $f >$	51.5 Hz	51.50 Hz	123 ms

Certificate of Conformity

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*: 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.

** : Verification disconnection time of moving 10-min-average value.

Disconnecting time as below:

1. 519.7 s (L1-N) / 513.8 s (L2-N) / 527.3 s (L3-N) (from 600s@Un to 112%Un)
2. Continuous operation (L1-N/L2-N/L3-N) (from 600s@Un to 108%Un)
3. 332.9 s (L1-N) / 325.3 s (L2-N) / 342.1 s (L3-N) (from 600s@106%Un to 114%Un)

☒ as integrated NS protection

Assigned to power generation unit type	Hybrid inverter: JS3PL8K, JS3PL10K, JS3PL12K, JS3PL15K
Integrated interface switch type	Series-connected relays for both the neutral conductor and the line conductor; Power relay type: HF161F-40W/12-HTF(967)
Response time of interface switch for integrated NS protection	The response time of the interface switch: Operate time: Max. 20 ms Release time: Max. 10 ms
Verification of the entire functional chain "integrated NS protection – interface switch" has resulted in successful disconnection.	☒