

Certificate of Conformity

No. ESY 090762 0100 Rev. 00

Holder of Certificate: **Pylon Technologies Co., Ltd.**

No.300, Miaoqiao Road, Kangqiao Town
Pudong New Area
201315 Shanghai
PEOPLE'S REPUBLIC OF CHINA

Product:

Energy Storage System
Energy storage system
(Force H3X Energy storage system)

Model(s):

FH3X-3.6K-HY-1P-5, FH3X-3.6K-HY-1P-10, FH3X-3.6K-HY-1P-15,
FH3X-3.6K-HY-1P-20, FH3X-5K-HY-1P-5, FH3X-5K-HY-1P-10,
FH3X-5K-HY-1P-15, FH3X-5K-HY-1P-20, FH3X-6K-HY-1P-5,
FH3X-6K-HY-1P-10, FH3X-6K-HY-1P-15, FH3X-6K-HY-1P-20,
FH3X-8K-HY-1P-5, FH3X-8K-HY-1P-10, FH3X-8K-HY-1P-15,
FH3X-8K-HY-1P-20

Parameters:

See next pages.

Applicable standards:

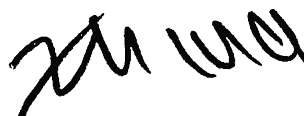
VDE-AR-N 4105:2018
DIN VDE V 0124-100 (VDE V 0124-100):2020

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.:

704092459603-00

Date, 2025-01-24



(Zhengdong Ma)

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Model	FH3X-3.6K-HY-1P-5, FH3X-3.6K-HY-1P-10, FH3X-3.6K-HY-1P-15, FH3X-3.6K-HY-1P-20	FH3X-5K-HY-1P-5, FH3X-5K-HY-1P-10, FH3X-5K-HY-1P-15, FH3X-5K-HY-1P-20
PV input parameters		
Max. input voltage	DC 600 V	
Mppt voltage range	DC 80, ..., 550 V	
Max. input current	DC 16 A/16 A	
Isc PV (absolute maximum)	DC 25 A/25 A	
Grid output parameters		
Nominal grid voltage	1/N/PE~, 230 V	
Nominal grid frequency	50 Hz	
Max. (rated) continuous current to grid	AC 15.7 A	AC 21.7 A
Nominal active power to grid	3600 W	5000 W
Max. (rated) apparent power to grid	3600 VA	5000 VA
Power factor range	-0.8, ..., +0.8	

Model	FH3X-6K-HY-1P-5, FH3X-6K-HY-1P-10, FH3X-6K-HY-1P-15, FH3X-6K-HY-1P-20	FH3X-8K-HY-1P-5, FH3X-8K-HY-1P-10, FH3X-8K-HY-1P-15, FH3X-8K-HY-1P-20
PV input parameters		
Max. input voltage	DC 600 V	
Mppt voltage range	DC 80, ..., 550 V	
Max. input current	DC 16 A/16 A	DC 16 A/16 A/16 A
Isc PV (absolute maximum)	DC 25 A/25 A	DC 25 A/25 A/25 A
Grid output parameters		
Nominal grid voltage	1/N/PE~, 230 V	
Nominal grid frequency	50 Hz	
Max. (rated) continuous current to grid	AC 26.1 A	AC 34.8 A
Nominal active power to grid	6000 W	8000 W
Max. (rated) apparent power to grid	6000 VA	8000 VA
Power factor range	-0.8, ..., +0.8	

Model	FH3X-3.6K-HY-1P-5, FH3X-5K-HY-1P-5, FH3X-6K-HY-1P-5, FH3X-8K-HY-1P-5	FH3X-3.6K-HY-1P-10, FH3X-5K-HY-1P-10, FH3X-6K-HY-1P-10, FH3X-8K-HY-1P-10	FH3X-3.6K-HY-1P-15, FH3X-5K-HY-1P-15, FH3X-6K-HY-1P-15, FH3X-8K-HY-1P-15	FH3X-3.6K-HY-1P-20, FH3X-5K-HY-1P-20, FH3X-6K-HY-1P-20, FH3X-8K-HY-1P-20
Battery parameters				
Battery module	FH10050			
Number of packs	1	2	3	4
Energy	5.12 kWh	10.24 kWh	15.36 kWh	20.48 kWh
Nominal voltage	DC 102.4 V	DC 204.8 V	DC 307.2 V	DC 409.6 V

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E.4 Unit certificate

Unit certificate	No. 704092459603-00	
Manufacturer	Pylon Technologies Co., Ltd. No.300, Miaogiao Road, Kangqiao Town, Pudong New Area, 201315 Shanghai, PEOPLE'S REPUBLIC OF CHINA	
Power generation unit type	FH3X-3.6K-HY-1P-5, FH3X-3.6K-HY-1P-10, FH3X-3.6K-HY-1P-15, FH3X-3.6K-HY-1P-20, FH3X-5K-HY-1P-5, FH3X-5K-HY-1P-10, FH3X-5K-HY-1P-15, FH3X-5K-HY-1P-20, FH3X-6K-HY-1P-5, FH3X-6K-HY-1P-10, FH3X-6K-HY-1P-15, FH3X-6K-HY-1P-20, FH3X-8K-HY-1P-5, FH3X-8K-HY-1P-10, FH3X-8K-HY-1P-15, FH3X-8K-HY-1P-20 Remark: certified on representative model FH3X-8K-HY-1P-20 of family design products, results of the measurement of FH3X-8K-HY-1P-20 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 $P_{E_{max}}$	8 kW (FH3X-8K-HY-1P-20)
	Max. apparent power $S_{E_{max}}$	8 kVA (FH3X-8K-HY-1P-20)
	Rated voltage	1/N/PE~, 230 V (FH3X-8K-HY-1P-20)
Rated values	Rated current (AC) I_r	34.8 A (FH3X-8K-HY-1P-20)
Rated values	Max. current (AC) I_{max}	34.8 A (FH3X-8K-HY-1P-20)
Rated values	Initial short-circuit current I_k	34.8 A (FH3X-8K-HY-1P-20)
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.	
<p>The above mentioned power generation unit meets the requirements of VDE-AR-N 4105:2018. 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.</p>		

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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. 704092459603-00
Generation unit manufacturer:	Pylon Technologies Co., Ltd. No.300, Miaoqiao Road, Kangqiao Town, Pudong New Area, 201315 Shanghai, PEOPLE'S REPUBLIC OF CHINA	
Manufacturer indications:	Type of system	Energy storage system (Force H3X Energy storage system)
	Max. active power $P_{E_{max}}$	8 kW (FH3X-8K-HY-1P-5, FH3X-8K-HY-1P-10, FH3X-8K-HY-1P-15, FH3X-8K-HY-1P-20) 6 kW (FH3X-6K-HY-1P-5, FH3X-6K-HY-1P-10, FH3X-6K-HY-1P-15, FH3X-6K-HY-1P-20) 5 kW (FH3X-5K-HY-1P-5, FH3X-5K-HY-1P-10, FH3X-5K-HY-1P-15, FH3X-5K-HY-1P-20) 3.6 kW (FH3X-3.6K-HY-1P-5, FH3X-3.6K-HY-1P-10, FH3X-3.6K-HY-1P-15, FH3X-3.6K-HY-1P-20)
	Rated voltage	1/N/PE~, 230 V
Period of measurement:	From 2024-10-21 to 2025-01-13	

Flicker (DIN EN 61000-3-11)			Model: FH3X-8K-HY-1P-20		
Test no.	Phase	P_{st}	d(t) - 500ms [%]	dc [%]	dmax [%]
Limit		1.0	3.3%	3.3%	4%
1	L-N	0.32	0.00	0.17	0.27
2	L-N	0.31	0.00	0.10	0.34
3	L-N	0.31	0.00	0.20	0.27
4	L-N	0.30	0.00	0.06	0.19
5	L-N	0.30	0.00	0.13	0.22
6	L-N	0.32	0.00	0.11	0.37
7	L-N	0.33	0.00	0.16	0.20
8	L-N	0.32	0.00	0.19	0.45
9	L-N	0.31	0.00	0.15	0.20
10	L-N	0.33	0.00	0.07	0.31
11	L-N	0.31	0.00	0.20	0.24
12	L-N	0.31	0.00	0.11	0.34
$P_{It \text{ measured}}$		0.33	$P_{It \text{ limit}}$		0.65
		d(t) - 500ms [%]	dc [%]		dmax [%]
Start		0.00	0.22		1.06
Stop		0.00	0.59		1.17
Limit		3.3%	3.3%		4%

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29	0.029	0.257	0.062	0.073	0.098	0.123	0.148	0.171	0.193	0.206	0.101	-
30	0.003	0.004	0.002	0.002	0.002	0.003	0.003	0.003	0.004	0.007	0.005	-
31	0.030	0.272	0.064	0.066	0.089	0.112	0.135	0.156	0.176	0.190	0.073	-
32	0.003	0.004	0.002	0.002	0.002	0.002	0.002	0.003	0.004	0.003	0.005	-
33	0.035	0.249	0.059	0.057	0.079	0.101	0.121	0.141	0.159	0.172	0.083	-
34	0.003	0.004	0.002	0.002	0.002	0.002	0.003	0.003	0.003	0.003	0.005	-
35	0.037	0.198	0.054	0.052	0.072	0.091	0.110	0.128	0.145	0.155	0.070	-
36	0.003	0.004	0.002	0.002	0.002	0.003	0.002	0.002	0.003	0.004	0.005	-
37	0.037	0.165	0.043	0.045	0.065	0.084	0.101	0.118	0.133	0.145	0.069	-
38	0.003	0.004	0.002	0.002	0.002	0.002	0.002	0.004	0.004	0.004	0.004	-
39	0.037	0.158	0.034	0.040	0.059	0.078	0.094	0.110	0.125	0.135	0.070	-
40	0.003	0.004	0.002	0.002	0.002	0.002	0.003	0.003	0.003	0.004	0.004	-
THC/I _{ref}	1.375	1.247	0.804	0.502	0.636	0.812	0.971	1.126	1.271	1.379	0.628	23%
PWHC/I _{ref}	0.744	4.425	1.563	1.551	1.996	2.542	3.045	3.535	3.980	4.291	1.931	23%

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Harmonics (IEC 61000-3-2 (≤ 16A)) (FH3X-3.6K-HY-1P-20)												
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	0.063	0.002	0.004	0.006	0.005	0.004	0.004	0.004	0.004	0.005	0.005	1.080
3	0.073	0.103	0.077	0.059	0.026	0.027	0.030	0.034	0.038	0.042	0.047	2.300
4	0.037	0.007	0.003	0.004	0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.430
5	0.041	0.042	0.055	0.041	0.003	0.007	0.008	0.009	0.010	0.010	0.010	1.140
6	0.037	0.003	0.004	0.002	0.003	0.003	0.002	0.002	0.002	0.002	0.002	0.300
7	0.135	0.147	0.095	0.170	0.062	0.034	0.030	0.030	0.032	0.033	0.035	0.770
8	0.040	0.003	0.004	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.230
9	0.183	0.172	0.015	0.284	0.146	0.081	0.072	0.074	0.078	0.082	0.087	0.400
10	0.044	0.001	0.003	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.184
11	0.094	0.099	0.079	0.100	0.109	0.072	0.067	0.068	0.071	0.076	0.080	0.330
12	0.045	0.001	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.153
13	0.059	0.032	0.043	0.056	0.073	0.061	0.059	0.061	0.065	0.068	0.073	0.210
14	0.045	0.001	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.131
15	0.047	0.006	0.069	0.080	0.049	0.049	0.048	0.050	0.053	0.056	0.060	0.150
16	0.044	0.001	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.115
17	0.043	0.012	0.076	0.073	0.030	0.038	0.040	0.042	0.045	0.048	0.051	0.132
18	0.039	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.102
19	0.038	0.011	0.069	0.046	0.021	0.032	0.036	0.039	0.042	0.045	0.047	0.118
20	0.036	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.092
21	0.035	0.011	0.086	0.015	0.020	0.023	0.030	0.034	0.037	0.041	0.044	0.107
22	0.033	0.001	0.001	0.001	0.001	0.000	0.000	0.001	0.001	0.001	0.001	0.084
23	0.032	0.007	0.089	0.013	0.023	0.017	0.025	0.030	0.034	0.037	0.041	0.098
24	0.029	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.001	0.001	0.077
25	0.030	0.006	0.074	0.017	0.023	0.012	0.020	0.025	0.029	0.032	0.035	0.090
26	0.028	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.001	0.001	0.001	0.071
27	0.028	0.004	0.068	0.012	0.022	0.010	0.017	0.022	0.026	0.029	0.032	0.083
28	0.026	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.066
29	0.026	0.005	0.065	0.005	0.018	0.008	0.012	0.017	0.021	0.025	0.028	0.078

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30	0.024	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.001	0.001	0.061
31	0.025	0.007	0.053	0.010	0.015	0.009	0.010	0.015	0.019	0.022	0.025	0.073
32	0.023	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.058
33	0.023	0.008	0.037	0.014	0.011	0.009	0.008	0.012	0.016	0.019	0.022	0.068
34	0.021	0.000	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.054
35	0.022	0.008	0.032	0.013	0.009	0.010	0.007	0.010	0.014	0.017	0.020	0.064
36	0.020	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.051
37	0.022	0.008	0.028	0.009	0.008	0.010	0.006	0.008	0.011	0.015	0.017	0.061
38	0.019	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.048
39	0.020	0.007	0.022	0.011	0.009	0.009	0.006	0.007	0.009	0.012	0.015	0.058
40	0.018	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.046

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E.6 Certificate of the network and system protection

Certificate of NS protection	No. 704092459603-00	
Manufacturer	Pylon Technologies Co., Ltd. No.300, Miaoqiao Road, Kangqiao Town, Pudong New Area, 201315 Shanghai, 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 FH3X-3.6K-HY-1P-5, FH3X-3.6K-HY-1P-10, FH3X-3.6K-HY-1P-15, FH3X-3.6K-HY-1P-20, FH3X-5K-HY-1P-5, FH3X-5K-HY-1P-10, FH3X-5K-HY-1P-15, FH3X-5K-HY-1P-20, FH3X-6K-HY-1P-5, FH3X-6K-HY-1P-10, FH3X-6K-HY-1P-15, FH3X-6K-HY-1P-20, FH3X-8K-HY-1P-5, FH3X-8K-HY-1P-10, FH3X-8K-HY-1P-15, FH3X-8K-HY-1P-20
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 4105:2018.		

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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. 704092459603-00	
NS protection test report			
Type of NS system:	Integrated NS protection	Other Manufacturer indications	
Software version:	BMS: V1.0; Inverter: V1.0		
Manufacturer:	Pylon Technologies Co., Ltd. No.300, Miaoqiao Road, Kangqiao Town, Pudong New Area, 201315 Shanghai, PEOPLE'S REPUBLIC OF CHINA		
Measuring period:	From 2024-10-21 to 2025-01-13		
	Inverter		
Protection function	Setting value	Tripping value	Break time NS protection *
Rise-in-voltage protection $U >>$	$1,25 \cdot U_n$	L-N:286.1 V	L-N:109.0 ms
Rise-in-voltage protection $U >$	$1,10 \cdot U_n$	$1.10 \cdot U_n$	ms**
Voltage drop protection $U <$	$0,8 \cdot U_n$	L-N:183.4 V	L-N:3019.0 ms
Voltage drop protection $U <<$	$0,45 \cdot U_n$	L-N:104.2 V	L-N:319.0 ms
Frequency decrease protection $f <$	47,5 Hz	47.5 Hz	114.0 ms
Frequency increase protection $f >$	51,5 Hz	51.5 Hz	131.0 ms
<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"> 502.38 s (L-N) (from 600s@U_n to 112%U_n) Continuous operation (L-N) (from 600s@U_n to 108%U_n) 334.24 s (L-N) (from 600s@106%U_n to 114%U_n) 			

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<input checked="" type="checkbox"/> as integrated NS protection	
Assigned to power generation unit type	FH3X-3.6K-HY-1P-5, FH3X-3.6K-HY-1P-10, FH3X-3.6K-HY-1P-15, FH3X-3.6K-HY-1P-20, FH3X-5K-HY-1P-5, FH3X-5K-HY-1P-10, FH3X-5K-HY-1P-15, FH3X-5K-HY-1P-20, FH3X-6K-HY-1P-5, FH3X-6K-HY-1P-10, FH3X-6K-HY-1P-15, FH3X-6K-HY-1P-20, FH3X-8K-HY-1P-5, FH3X-8K-HY-1P-10, FH3X-8K-HY-1P-15, FH3X-8K-HY-1P-20
Integrated interface switch type	Series-connected relays for both line and neutral conductors Relay type: HF165F/12/HT(A21)
Response time of interface switch for integrated NS protection	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.	<input checked="" type="checkbox"/>