



Product Service

Compliance Document

No. D 090762 0123 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:** **Hybrid Energy Storage System**
Force H3X Energy storage system**Model(s):** FH3X-8K-HY-3P-10, FH3X-8K-HY-3P-15, FH3X-8K-HY-3P-20,
FH3X-8K-HY-3P-25, FH3X-8K-HY-3P-30, FH3X-8K-HY-3P-35,
FH3X-10K-HY-3P-10, FH3X-10K-HY-3P-15, FH3X-10K-HY-3P-20,
FH3X-10K-HY-3P-25, FH3X-10K-HY-3P-30, FH3X-10K-HY-3P-35,
FH3X-12K-HY-3P-10, FH3X-12K-HY-3P-15, FH3X-12K-HY-3P-20,
FH3X-12K-HY-3P-25, FH3X-12K-HY-3P-30, FH3X-12K-HY-3P-35,
FH3X-15K-HY-3P-10, FH3X-15K-HY-3P-15, FH3X-15K-HY-3P-20,
FH3X-15K-HY-3P-25, FH3X-15K-HY-3P-30, FH3X-15K-HY-3P-35**Parameters:** See next pages.**Tested according to:** EN 50549-1:2019
EIFS 2018:2

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.: 704092459618-00**Date,** 2025-05-23

(Zhengdong Ma)



Product Service

Compliance Document

No. D 090762 0123 Rev. 00

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PV input parameters		
Max. input voltage	DC 1000 V	
Mppt voltage range	DC 200, ..., 850 V	
Max. input current	DC 20 A/20 A/20 A	
Isc PV (absolute maximum)	DC 30 A/30 A/30 A	
Grid output parameters		
Nominal grid voltage	3/N/PE~, 230/400 V	
Nominal grid frequency	50 Hz	
Max. (rated) continuous current to grid	AC 11.6 A	AC 14.5 A
Nominal active power to grid	8000 W	10000 W
Max. (rated) apparent power to grid	8000 VA	10000 VA
Power factor range	-0.8, +0.8	

Model	FH3X-12K-HY-3P-10, FH3X-12K-HY-3P-15, FH3X-12K-HY-3P-20, FH3X-12K-HY-3P-25, FH3X-12K-HY-3P-30, FH3X-12K-HY-3P-35	FH3X-15K-HY-3P-10, FH3X-15K-HY-3P-15, FH3X-15K-HY-3P-20, FH3X-15K-HY-3P-25, FH3X-15K-HY-3P-30, FH3X-15K-HY-3P-35
PV input parameters		
Max. input voltage	DC 1000 V	
Mppt voltage range	DC 200, ..., 850 V	
Max. input current	DC 20 A/20 A/20 A	
Isc PV (absolute maximum)	DC 30 A/30 A/30 A	
Grid output parameters		
Nominal grid voltage	3/N/PE~, 230/400 V	
Nominal grid frequency	50 Hz	
Max. (rated) continuous current to grid	AC 17.4 A	AC 21.7 A
Nominal active power to grid	12000 W	15000 W
Max. (rated) apparent power to grid	12000 VA	15000 VA
Power factor range	-0.8, ..., +0.8	



Product Service

Compliance Document

No. D 090762 0123 Rev. 00

Model	FH3X-8K-HY-3P-10, FH3X-10K-HY-3P-10, FH3X-12K-HY-3P-10, FH3X-15K-HY-3P-10	FH3X-8K-HY-3P-15, FH3X-10K-HY-3P-15, FH3X-12K-HY-3P-15, FH3X-15K-HY-3P-15	FH3X-8K-HY-3P-20, FH3X-10K-HY-3P-20, FH3X-12K-HY-3P-20, FH3X-15K-HY-3P-20
Battery parameters			
Battery module	FH10050		
Number of packs	2	3	4
Energy	10.24 kWh	15.36 kWh	20.48 kWh
Nominal voltage	DC 204.8 V	DC 307.2 V	DC 409.6 V

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Battery parameters			
Battery module	FH10050		
Number of packs	5	6	7
Energy	25.60 kWh	30.72 kWh	35.84 kWh
Nominal voltage	DC 512 V	DC 614.4 V	DC 716.8 V

Specific technical requirement (e.g. grid codes)		EN 50549-1:2019 EIFS 2018:2 ALP(ED.3):2020 Clause 4.2 (Protection relay and fault clearance)			
Clause(s) / subclause(s) of EN 50549-1:2019	Parameter	Remarks/ additional information	Configurable value range	Default value	Remarks/additional information
4.4.2 Operating frequency range	47.0 – 47.5 Hz Duration	--	0 – 20 s	5 s	Introduced by EN 50549-1, but not required in EIFS 2018:2
	47.5 – 48.5 Hz Duration	--	30 – 90 min	30 min	-
	48.5 – 49.0 Hz Duration	--	30 – 90 min	30 min	-
	49.0 – 51.0 Hz Duration	--	not configurable	unlimited	-
	51.0 – 51.5 Hz Duration	--	30 – 90 min	30 min	-
	51.5 – 52 Hz Duration	--	0 – 15 min	5 s	Introduced by EN 50549-1, but not required in EIFS 2018:2
4.4.3 Minimal requirement for active power delivery at underfrequency	Reduction threshold	--	not configurable	N/A	More stringent than EIFS 2018:2
	Maximum reduction rate	--	not configurable	N/A	
4.4.4 Continuous operating voltage range	Upper limit	--	not configurable	110%Un	-
	Lower limit	--	not configurable	85%Un	-



Compliance Document

No. D 090762 0123 Rev. 00

4.5.2 Rate of change of frequency (ROCOF) immunity	ROCOF withstand capability (defined with a sliding measurement window of 500 ms)	--	not configurable	2 Hz/s	-
4.5.3.2 Under-voltage ride through (UVRT) Generating plant with non-synchronous generating technology	Maximum power resumption time	--	not configurable	1 s	-
	Voltage-Time-Diagram	--	See figure 6 most stringent curve of EN 50549-1:2019	Time [s] 0.0 0.05 0.25 0.05 3.0 0.85	-
4.5.4 Over-voltage ride through (OVRT)	Voltage-Time-Diagram	--	not configurable See figure 8 of EN 50549-1:2019	Time [s] 0.0 1.25 0.1 1.25 0.1 1.20 5.0 1.20 5.0 1.15 60 1.15 60 1.10	Introduced by EN 50549-1, but not required in EIFS 2018:2
4.6.1 Power response to overfrequency	Threshold frequency f_1	--	50.2 Hz – 52 Hz	50.5 Hz	-
	Droop	--	2 % – 12 %	8 %	-
	Power reference	--	PM P _{max}	P _{max} for ESS	-
	Intentional delay	--	0 – 2 s	0 s	-
	Deactivation threshold f_{stop}	--	50.0 Hz – f_1	deactivated	-
	Deactivation time t_{stop}	--	0 – 600 s	-	-
	Acceptance of staged disconnection	--	yes no	yes	-
4.6.2 Power response to underfrequency	Threshold frequency f_1	--	49.8 Hz – 46 Hz	49.8 Hz	Introduced by EN 50549-1, but not required in EIFS 2018:2
	Droop	--	2 – 12 %	5 %	-
	Power reference	--	PM P _{max}	P _{max}	-
	Intentional delay	--	0 – 2 s	0 s	-
4.7.2.2 Voltage support by reactive power - Capabilities	Active factor / Reactive power (%Pd) range overexcited	--	0.8 – 1 / 60 %P _{max} – 0	0.8 – 1 / 60 %P _{max} – 0	Introduced by EN 50549-1, but not required in EIFS 2018:2
	Active factor / Reactive power (%Pd) range underexcited	--	0.8 – 1 / 60 %P _{max} – 0	0.8 – 1 / 60 %P _{max} – 0	-
4.7.2.3 Voltage support by reactive power - Control modes	Enabled control mode	--	Q setp. Q(U) Cos ϕ setp. Cos ϕ (P)	Q setp.	Introduced by EN 50549-1, but not required in EIFS 2018:2



Compliance Document

No. D 090762 0123 Rev. 00

4.7.2.3.2 Voltage support by reactive power - Setpoint control modes	Q setpoint and excitation	--	0 – 60 % $P_{\max}$	0	Introduced by EN 50549-1, but not required in IIFS 2018:2
	$\cos \varphi$ setpoint and excitation	--	1 – 0.8	1	
4.7.2.3.3 Voltage support by reactive power - Voltage related control modes	Characteristic curve – Q (U)	--	--	Indicate default characteristic	Introduced by EN 50549-1, but not required in IIFS 2018:2
	Point a	--	50% U_n – 100% U_n	93 % U_n	
	Point b	--	50% U_n – 100% U_n	94 % U_n	
	Point c	--	100% U_n – 120% U_n	106 % U_n	
	Point d	--	100% U_n – 120% U_n	108 % U_n	
	Min. reactive power	--	0 – 60 % $P_{\max}$ ($Q_{\max \text{ under}}$)	60 % $P_{\max}$	
	Max. reactive power	--	0 – 60 % $P_{\max}$ ($Q_{\max \text{ over}}$)	60 % $P_{\max}$	
	Time constant	--	3 s – 60 s	3.0 s	
	Min $\cos \varphi$	--	0.0 – 1	0.4	
	Lock in power	--	0 % – 20 %	20%	
	Lock out power	--	0 % – 20 %	5%	
4.7.2.3.4 Voltage support by reactive power - Power related control mode	Characteristic curve – $\cos \varphi$ (P)	--	--	Indicate default characteristic	Introduced by EN 50549-1, but not required in IIFS 2018:2
	Point a	--	0 – 100% P_n / PF: -0.8, ..., +0.8	15% P_n / PF=0.8	
	Point b	--	0 – 100% P_n / PF: -0.8, ..., +0.8	20% P_n / PF=1	
	Point c	--	0 – 100% P_n / PF: -0.8, ..., +0.8	80% P_n / PF=1	
	Point d	--	0 – 100% P_n / PF: -0.8, ..., +0.8	90% P_n / PF=-0.8	
	$\cos \varphi$	--	0.8 – 1	0.8	
	Time constant	--	3 s – 60 s	3.33 s	
	Lock in voltage	--	105 % U_n	deactivated	
	Lock out voltage	--	100 % U_n	deactivated	
4.7.3 Voltage related active power reduction	Characteristic curve – P (U)	--	--	Indicate default characteristic	Introduced by EN 50549-1, but not required in IIFS 2018:2
	Point a	--	0 – 100% P_n / U: 0 V, ..., 264.5 V	100% P_n / U=207 V	
	Point b	--	0 – 100% P_n / U: 0 V, ..., 264.5 V	100% P_n / U=230 V	
	Point c	--	0 – 100% P_n / U: 0 V, ..., 264.5 V	100% P_n / U=248.4 V	
	Point d	--	0 – 100% P_n / U: 0 V, ..., 264.5 V	20% P_n / U=264.5 V	
	Time constant	--	3 s – 60 s	3.33 s	
4.7.4.2.2 Zero current mode for converter connected generating technology	Enabling	--	enable disable	disabled	Introduced by EN 50549-1, but not required in IIFS 2018:2
	Static voltage range overvoltage	--	100 % U_n – 120 % U_n	120 % U_n	
	Static voltage range undervoltage	--	20 % U_n – 100 % U_n	85 % U_n	
4.9.3 Requirements on voltage and	Threshold for protection as dedicated device [in	--	16 A – 250 kVA	Not specified, inverter integrated as	Introduced by the manual ALP published by



Product Service

Compliance Document

No. D 090762 0123 Rev. 00

frequency protection	A or kW, kVA]			default	Swedenergy
	Undervoltage threshold stage 1	--	0.2 Un – 1 Un	0.85 Un	
	Undervoltage operate time stage 1	--	0.1 s – 100 s	0.2 s	
	Undervoltage threshold stage 2	--	0.2 Un – 1 Un	--	
	Undervoltage operate time stage 2	--	0.1 s – 5 s	--	
	Overvoltage threshold stage 1	--	1.0 Un – 1.2 Un	1.1 Un	
	Overvoltage operate time stage 1	--	0.1 s – 100 s	60 s	
	Overvoltage threshold stage 2	--	1.0 Un – 1.3 Un	1.15 Un	
	Overvoltage operate time stage 2	--	0.1 s – 5 s	0.2 s	
	Overvoltage threshold 10 min mean protection	--	1.0 Un – 1.15 Un	1.06 Un	
	Underfrequency threshold stage 1	--	47.0 Hz– 50.0 Hz	47.5 Hz	
	Underfrequency operate time stage 1	--	0.1 s – 100 s	0.5 s	
	Underfrequency threshold stage 2	--	47.0 Hz – 50.0 Hz	--	
	Underfrequency operate time stage 2	--	0.1 s – 5 s	--	
	Overfrequency threshold stage 1	--	50.0 Hz – 52.0 Hz	51.5 Hz	
	Overfrequency operate time stage 1	--	0.1 s – 100 s	0.5 s	
	Overfrequency threshold stage 2	--	50.0 Hz – 52.0 Hz	--	
	Overfrequency operate time stage 2	--	0.1 s – 5 s	--	
	Protection from unwanted island operation threshold	--	2.0 Hz/s, 2.5 Hz/s,	2.5 Hz/s	
	Protection from unwanted island operation time	--	0.5 s	0.5 s	
4.10.2 Automatic reconnection after tripping	Lower frequency	--	47.0 Hz – 50.0 Hz	47.5 Hz	-
	Upper frequency	--	50.0 Hz – 52.0 Hz	50.1 Hz	-
	Lower voltage	--	50 %Un – 100 %Un	85 %Un	Introduced by EN 50549-1, but not required in EIFS 2018:2
	Upper voltage	--	100 %Un – 120 %Un	110 %Un	Introduced by EN 50549-1, but not required in EIFS 2018:2
	Observation time	--	10 s – 600 s	180 s	-
	Active power increase gradient	--	5% – 3000%/min	10 %/min	-



Product Service

Compliance Document

No. D 090762 0123 Rev. 00

4.10.3 Starting to generate electrical power	Lower frequency	--	47.0 Hz – 50.0 Hz	47.5 Hz	-
	Upper frequency	--	50.0 Hz – 52.0 Hz	50.1 Hz	-
	Lower voltage	--	50 %Un – 100 %Un	85 %Un	Introduced by EN 50549-1, but not required in EIFS 2018:2
	Upper voltage	--	100 %Un – 120 %Un	110 %Un	Introduced by EN 50549-1, but not required in EIFS 2018:2
	Observation time	--	10 s – 600 s	180 s	-
	Active power increase gradient	--	5% – 3000 %/min	10 %/min	Introduced by EN 50549-1, but not required in EIFS 2018:2
4.11.1 Ceasing active power	Activation option	--	Can be achieved by Modbus communication protocol, APP or cloud, decision should be made by the DSO and responsible party		Introduced by EN 50549-1, but not required in EIFS 2018:2
4.11.2 Reduction of active power on set point	Activation option	--	Can be achieved by Modbus communication protocol, APP or cloud, decision should be made by the DSO and responsible party		Introduced by EN 50549-1, but not required in EIFS 2018:2
4.12 Remote information exchange	Available communication standards	--	Standardized communication protocol not provided by manufacturer		Introduced by EN 50549-1, but not required in EIFS 2018:2