

Certificate of Conformity

No. ESY 115067 0042 Rev. 00

Holder of Certificate: **Xiamen Kehua Digital Energy Tech Co., Ltd.**

Room 208-38, Hengye Building
No. 100 Xiangxing Road
Torch High-tech Zone
(Xiang'an) Industrial Zone
361115 Xiamen
PEOPLE'S REPUBLIC OF CHINA

Product: **Converter
(Energy Storage Inverter)**

Model(s): **iStorageE3 5K, iStorageE3 6K, iStorageE3 8K,
iStorageE3 10K, iStorageE3 12K**

Parameters: See page 2-3

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.: 64290223111301

Date, 2022-11-08



(Billy Qiu)

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Parameters:

Max. Input Voltage	1000 Vd.c.
Min. MPP Voltage	150 Vd.c.
Max. MPP Voltage	900 Vd.c.
Max. DC Current:	16 Ad.c./16 Ad.c. (iStoragE3 5K, iStoragE3 6K) 27 Ad.c./16 Ad.c. (iStoragE3 8K, iStoragE3 10K, iStoragE3 12K)
Isc PV	20 Ad.c./20 Ad.c. (iStoragE3 5K, iStoragE3 6K) 34 Ad.c./20 Ad.c. (iStoragE3 8K, iStoragE3 10K, iStoragE3 12K)
Battery Voltage Range	650 ~ 900 Vd.c.
Maximum Battery Charge/Discharge current	24.6 Ad.c.*/ 8.5 Ad.c. (iStoragE3 5K) 24.6 Ad.c.*/ 10.2 Ad.c. (iStoragE3 6K) 24.6 Ad.c.*/ 13.5 Ad.c. (iStoragE3 8K) 24.6 Ad.c.*/ 16.9 Ad.c. (iStoragE3 10K) 24.6 Ad.c.*/ 18.5 Ad.c. (iStoragE3 12K)
Maximum charge current from grid to battery	8.5 Ad.c. (iStoragE3 5K) 10.2 Ad.c. (iStoragE3 6K) 13.5 Ad.c. (iStoragE3 8K) 16.9 Ad.c. (iStoragE3 10K) 18.5 Ad.c. (iStoragE3 12K)
Maximum Battery Charge/Discharge Power	16000 W*/ 5500 W (iStoragE3 5K) 16000 W*/ 6600 W (iStoragE3 6K) 16000 W*/ 8800 W (iStoragE3 8K) 16000 W*/ 11000 W (iStoragE3 10K) 16000 W*/ 12000 W (iStoragE3 12K)
Maximum charge power from grid to battery	5500 W (iStoragE3 5K) 6600 W (iStoragE3 6K) 8800 W (iStoragE3 8K) 11000 W (iStoragE3 10K) 12000 W (iStoragE3 12K)
Rated Grid Voltage	230/400 Va.c., 3W+N+PE
Rated Grid Frequency	50 Hz
Max. Current Output to Grid	7.9 Aa.c. (iStoragE3 5K) 9.6 Aa.c. (iStoragE3 6K) 12.8 Aa.c. (iStoragE3 8K) 16.0 Aa.c. (iStoragE3 10K) 17.4 Aa.c. (iStoragE3 12K)
Rated Active Power to Grid	5000 W (iStoragE3 5K) 6000 W (iStoragE3 6K) 8000 W (iStoragE3 8K) 10000 W (iStoragE3 10K) 12000 W (iStoragE3 12K)

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Max. Apparent Power to Grid	5500 VA (iStoragE3 5K) 6600 VA (iStoragE3 6K) 8800 VA (iStoragE3 8K) 11000 VA (iStoragE3 10K) 12000 VA (iStoragE3 12K)
Max. Apparent Power from Grid	10000 VA (iStoragE3 5K) 12000 VA (iStoragE3 6K) 16000 VA (iStoragE3 8K) 18000 VA (iStoragE3 10K) 18000 VA (iStoragE3 12K)
Max. active power $P_{E_{max}}$	5012.74 W (iStoragE3 5K) 6012.81 W (iStoragE3 6K) 8012.62 W (iStoragE3 8K) 10012.92 W (iStoragE3 10K) 12012.86 W (iStoragE3 12K)
Max. apparent power $S_{E_{max}}$	5522.06 VA (iStoragE3 5K) 6622.90 VA (iStoragE3 6K) 8823.08 VA (iStoragE3 8K) 11023.44 VA (iStoragE3 10K) 12020.66 VA (iStoragE3 12K)
Power Factor Range	0.8 leading to 0.8 lagging
Rated Back Up load Voltage:	230/400 Va.c., 3W+N+PE
Rated Back Up load Frequency	50 Hz
Max. Current to Back Up load	7.9 Aa.c. (iStoragE3 5K) 9.6 Aa.c. (iStoragE3 6K) 12.8 Aa.c. (iStoragE3 8K) 16.0 Aa.c. (iStoragE3 10K) 17.4 Aa.c. (iStoragE3 12K)
Max. Apparent Power to Back Up load	5500 VA (iStoragE3 5K) 6600 VA (iStoragE3 6K) 8800 VA (iStoragE3 8K) 11000 VA (iStoragE3 10K) 12000 VA (iStoragE3 12K)
Power Factor Range	0.8 leading to 0.8 lagging
NS protection	Integrated NS protection with interface switch inside
Remark: *: The maximum charge current (24.6 Ad.c.) and power (16000 W) only in PV+Grid supply to battery.	

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E.4 Unit certificate

(This form is intended for duplication by the user of this VDE application guide.)

Unit Certificate		No: 64.290.22.31113.01 Signed copy no. 1
Manufacturer	Xiamen Kehua Digital Energy Tech Co., Ltd.	
Power generation unit type	[converter]: iStoragE3 5K, iStoragE3 6K, iStoragE3 8K, iStoragE3 10K, iStoragE3 12K Remark: certified on representative model iStoragE3 12K of family design products, results of the measurement of iStoragE3 12K can be transferred to other models based on transferability rule of measurements in DIN VDE V 0124-100 (VDE V 0124-100):2020.	
Assessment values	max. active power $P_{E_{max}}$	5012.74 W (iStoragE3 5K) 6012.81 W (iStoragE3 6K) 8012.62 W (iStoragE3 8K) 10012.92 W (iStoragE3 10K) 12012.86 W (iStoragE3 12K)
	max. apparent power $S_{E_{max}}$	5522.06 VA (iStoragE3 5K) 6622.90 VA (iStoragE3 6K) 8823.08 VA (iStoragE3 8K) 11023.44 VA (iStoragE3 10K) 12020.66 VA (iStoragE3 12K)
	Rated voltage	230/400 Va.c., 3W+N+PE
	Rated current (AC) I_r	17.4 Aa.c. (iStoragE3 12K)
	Initial short-circuit AC current I''_k	17.4 Aa.c. (iStoragE3 12K)
Network connection rule	VDE-AR-N 4105 "Generators connected to the low-voltage distribution network" Technical minimum requirements for connection and parallel operation of power generation systems connected to the low-voltage network	
Test requirement	DIN VDE V 0124-100 (VDE V 0124-100) "Network integration of power generation systems – Low voltage" Test requirements for power generation units intended for connection to and parallel operation on the low-voltage network	
Test report	64.290.22.31113.01 from 2022.11.04	
The above designated power generation unit meets the requirements of VDE-AR-N 4105.		
Devices in customer installations with a rated power > 4.6 kVA may be connected single-phase if a balancing device ensures that the requirements for the 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.		

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E.5 Test report "Network interactions" for power generation units with an input current > 75 A

(This form is intended for duplication by the user of this VDE application guide.)

Extract from test report for unit certificate "Determination of electrical properties"		No.: 64.290.22.31113.01
Generation unit manufacturer:	Xiamen Kehua Digital Energy Tech Co., Ltd.	
Manufacturer indications:	Type of system	Energy Storage Inverter for PV system
	Max. active power $P_{E_{max}}$	5012.74 W (iStoragE3 5K) 6012.81 W (iStoragE3 6K) 8012.62 W (iStoragE3 8K) 10012.92 W (iStoragE3 10K) 12012.86 W (iStoragE3 12K)
	Rated voltage	230/400 Va.c., 3W+N+PE
Period of measurement:	From 2022-09-20 to 2022-11-03	

Model	iStoragE3 10K	
Switching actions		
Making operation without default (of primary energy carrier):	k_i	0.48
Worst case at switch over of generator sections:	k_i	0.48
Making operation at reference conditions (of primary energy carrier):	k_i	0.98
Breaking operation at nominal power:	k_i	0.97
Worst-case value of all switching operations:	$k_{i\max}$	0.98

Model	iStoragE3 12K	
Switching actions		
Making operation without default (of primary energy carrier):	k_i	0.50
Worst case at switch over of generator sections:	k_i	0.50
Making operation at reference conditions (of primary energy carrier):	k_i	0.99
Breaking operation at nominal power:	k_i	0.99
Worst-case value of all switching operations:	$k_{i\max}$	0.99

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Voltage fluctuations and flicker (iStoragE3 10K)						
Simulated network frequency (Hz)		50 Hz		Short circuit power Sk (VA)		187000
Plt (Maximum measured Pst)		0.15/0.13/0.15		EZE nominal power Pn (W)		10000
Maximum flicker coefficient C _{φk}		2.81/2.43/2.81		--		--
Pst	#1	#2	#3	#4	#5	#6
L1	0.14	0.14	0.14	0.14	0.14	0.14
L2	0.13	0.12	0.13	0.13	0.12	0.13
L3	0.15	0.15	0.15	0.15	0.15	0.15
Pst	#7	#8	#9	#10	#11	#12
L1	0.14	0.14	0.14	0.14	0.14	0.15
L2	0.13	0.12	0.13	0.13	0.12	0.13
L3	0.15	0.15	0.15	0.15	0.15	0.15

Voltage fluctuations and flicker (iStoragE3 12K)						
Simulated network frequency (Hz)		50 Hz		Short circuit power Sk (VA)		187000
Plt (Maximum measured Pst)		0.15/0.13/0.16		EZE nominal power Pn (W)		12000
Maximum flicker coefficient C _{φk}		2.34/2.02/2.49		--		--
Pst	#1	#2	#3	#4	#5	#6
L1	0.14	0.13	0.14	0.14	0.13	0.14
L2	0.12	0.13	0.13	0.13	0.13	0.12
L3	0.15	0.15	0.16	0.15	0.15	0.15
Pst	#7	#8	#9	#10	#11	#12
L1	0.14	0.14	0.14	0.14	0.14	0.15
L2	0.13	0.13	0.12	0.13	0.13	0.13
L3	0.15	0.15	0.15	0.15	0.15	0.16

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Harmonics												
Model		iStorageE3 10K										
Phase L1-N												
Harmon. Nr.	P/P _{E_{max}}											Limit (A)
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	
0	0.003	0.026	0.027	0.029	0.033	0.035	0.039	0.044	0.050	0.055	0.061	0.073
1	0.073	1.453	2.909	4.356	5.807	7.272	8.728	10.185	11.620	13.079	14.527	-
2	0.009	0.051	0.048	0.037	0.042	0.045	0.050	0.056	0.060	0.063	0.067	1.08
3	0.028	0.152	0.144	0.109	0.126	0.133	0.150	0.167	0.183	0.171	0.182	2.30
4	0.009	0.057	0.054	0.042	0.048	0.051	0.057	0.063	0.069	0.050	0.052	0.43
5	0.024	0.094	0.088	0.068	0.078	0.082	0.092	0.103	0.111	0.174	0.184	1.14
6	0.008	0.060	0.058	0.044	0.050	0.053	0.060	0.067	0.073	0.064	0.067	0.30
7	0.020	0.084	0.081	0.061	0.071	0.074	0.085	0.094	0.102	0.195	0.208	0.77
8	0.009	0.060	0.058	0.044	0.050	0.053	0.060	0.067	0.072	0.051	0.053	0.23
9	0.026	0.133	0.127	0.095	0.109	0.116	0.132	0.148	0.159	0.165	0.176	0.40
10	0.008	0.051	0.048	0.037	0.043	0.045	0.050	0.056	0.060	0.054	0.057	0.18
11	0.016	0.057	0.054	0.041	0.047	0.050	0.056	0.063	0.067	0.107	0.112	0.33
12	0.006	0.027	0.026	0.020	0.023	0.024	0.027	0.029	0.032	0.025	0.027	0.15
13	0.013	0.109	0.104	0.078	0.091	0.096	0.109	0.122	0.130	0.103	0.109	0.21
14	0.006	0.027	0.025	0.020	0.022	0.024	0.026	0.029	0.032	0.028	0.029	0.13
15	0.013	0.118	0.113	0.085	0.099	0.104	0.117	0.132	0.142	0.099	0.105	0.15
16	0.007	0.030	0.028	0.022	0.025	0.026	0.029	0.033	0.035	0.024	0.025	0.12
17	0.011	0.089	0.085	0.064	0.073	0.077	0.089	0.099	0.107	0.081	0.086	0.13
18	0.006	0.021	0.020	0.016	0.018	0.019	0.021	0.023	0.024	0.020	0.020	0.10
19	0.012	0.085	0.081	0.062	0.071	0.074	0.085	0.095	0.103	0.074	0.079	0.12
20	0.005	0.025	0.024	0.018	0.021	0.022	0.024	0.027	0.029	0.018	0.019	0.09
21	0.011	0.088	0.084	0.063	0.073	0.077	0.087	0.097	0.105	0.084	0.089	0.11
22	0.006	0.026	0.025	0.019	0.022	0.023	0.026	0.028	0.030	0.022	0.023	0.08
23	0.006	0.037	0.035	0.027	0.030	0.032	0.036	0.040	0.043	0.037	0.038	0.10
24	0.005	0.011	0.011	0.009	0.010	0.010	0.011	0.012	0.013	0.011	0.012	0.08
25	0.007	0.034	0.033	0.025	0.029	0.030	0.034	0.038	0.040	0.029	0.031	0.09
26	0.005	0.012	0.011	0.009	0.010	0.010	0.011	0.012	0.013	0.010	0.010	0.07
27	0.007	0.030	0.029	0.022	0.026	0.027	0.030	0.033	0.036	0.032	0.034	0.08
28	0.004	0.011	0.011	0.009	0.010	0.010	0.011	0.012	0.013	0.013	0.013	0.07
29	0.006	0.032	0.031	0.024	0.026	0.028	0.031	0.035	0.037	0.041	0.043	0.08
30	0.005	0.011	0.011	0.009	0.010	0.010	0.011	0.012	0.012	0.012	0.012	0.06
31	0.006	0.038	0.037	0.028	0.032	0.034	0.038	0.042	0.046	0.039	0.041	0.07
32	0.005	0.012	0.012	0.010	0.010	0.011	0.012	0.013	0.014	0.012	0.013	0.06
33	0.007	0.037	0.036	0.028	0.032	0.033	0.037	0.041	0.044	0.032	0.033	0.07
34	0.004	0.011	0.010	0.009	0.010	0.010	0.011	0.012	0.012	0.011	0.011	0.05
35	0.005	0.019	0.018	0.014	0.016	0.017	0.019	0.021	0.022	0.019	0.020	0.06
36	0.004	0.007	0.007	0.006	0.006	0.006	0.007	0.007	0.008	0.007	0.007	0.05
37	0.004	0.019	0.018	0.015	0.016	0.017	0.019	0.021	0.022	0.021	0.022	0.06
38	0.004	0.008	0.008	0.007	0.007	0.007	0.008	0.008	0.009	0.007	0.007	0.05
39	0.005	0.020	0.019	0.015	0.017	0.017	0.019	0.021	0.023	0.020	0.021	0.06
40	0.003	0.008	0.008	0.007	0.007	0.007	0.008	0.008	0.009	0.007	0.007	0.05
THD	0.463%	2.559%	2.440%	1.851%	2.130%	2.245%	2.539%	2.835%	3.062%	3.120%	3.465%	5%
Phase L2-N												
Harmon.	P/P _{E_{max}}											Limit

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Nr.	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	(A)
0	0.005	0.025	0.026	0.029	0.030	0.032	0.035	0.039	0.042	0.048	0.052	0.073
1	0.073	1.450	2.904	4.348	5.796	7.258	8.711	10.164	11.596	13.053	14.498	-
2	0.009	0.050	0.048	0.036	0.042	0.044	0.050	0.055	0.060	0.064	0.067	1.08
3	0.027	0.151	0.145	0.109	0.125	0.131	0.149	0.169	0.181	0.172	0.182	2.30
4	0.009	0.058	0.055	0.042	0.048	0.051	0.057	0.064	0.068	0.050	0.053	0.43
5	0.023	0.094	0.089	0.067	0.077	0.081	0.093	0.103	0.111	0.174	0.184	1.14
6	0.008	0.060	0.057	0.044	0.050	0.053	0.060	0.067	0.072	0.064	0.068	0.30
7	0.020	0.086	0.081	0.061	0.070	0.074	0.084	0.095	0.101	0.194	0.208	0.77
8	0.009	0.060	0.058	0.043	0.050	0.053	0.060	0.066	0.071	0.051	0.053	0.23
9	0.026	0.132	0.128	0.096	0.110	0.116	0.133	0.147	0.158	0.164	0.175	0.40
10	0.007	0.051	0.048	0.037	0.042	0.044	0.050	0.056	0.060	0.053	0.057	0.18
11	0.015	0.056	0.054	0.041	0.048	0.050	0.057	0.062	0.067	0.106	0.113	0.33
12	0.006	0.027	0.026	0.020	0.023	0.024	0.026	0.029	0.032	0.025	0.027	0.15
13	0.013	0.109	0.104	0.079	0.090	0.095	0.109	0.121	0.131	0.102	0.110	0.21
14	0.006	0.027	0.026	0.020	0.022	0.024	0.026	0.029	0.031	0.027	0.029	0.13
15	0.013	0.119	0.113	0.085	0.098	0.104	0.117	0.131	0.142	0.100	0.106	0.15
16	0.007	0.030	0.028	0.022	0.025	0.026	0.030	0.033	0.035	0.024	0.025	0.12
17	0.011	0.090	0.084	0.063	0.074	0.078	0.087	0.098	0.106	0.080	0.086	0.13
18	0.006	0.021	0.020	0.016	0.018	0.019	0.021	0.023	0.024	0.019	0.021	0.10
19	0.012	0.085	0.081	0.061	0.072	0.076	0.085	0.095	0.103	0.073	0.079	0.12
20	0.006	0.025	0.024	0.018	0.021	0.022	0.024	0.027	0.029	0.018	0.019	0.09
21	0.011	0.088	0.084	0.064	0.073	0.077	0.086	0.097	0.105	0.084	0.090	0.11
22	0.006	0.026	0.025	0.019	0.022	0.023	0.026	0.028	0.030	0.022	0.023	0.08
23	0.006	0.037	0.035	0.027	0.031	0.032	0.036	0.040	0.043	0.037	0.038	0.10
24	0.005	0.011	0.011	0.009	0.010	0.010	0.011	0.012	0.013	0.011	0.012	0.08
25	0.007	0.035	0.033	0.025	0.029	0.030	0.034	0.038	0.040	0.029	0.031	0.09
26	0.005	0.011	0.011	0.009	0.010	0.010	0.012	0.012	0.013	0.010	0.010	0.07
27	0.007	0.031	0.029	0.023	0.026	0.027	0.030	0.033	0.036	0.032	0.034	0.08
28	0.005	0.011	0.011	0.009	0.010	0.010	0.011	0.012	0.012	0.013	0.013	0.07
29	0.006	0.032	0.030	0.024	0.027	0.028	0.031	0.035	0.037	0.041	0.043	0.08
30	0.004	0.011	0.011	0.009	0.010	0.010	0.011	0.012	0.012	0.012	0.012	0.06
31	0.006	0.039	0.037	0.028	0.032	0.034	0.038	0.042	0.045	0.039	0.041	0.07
32	0.005	0.012	0.011	0.010	0.010	0.011	0.012	0.013	0.014	0.012	0.013	0.06
33	0.007	0.038	0.036	0.027	0.031	0.033	0.037	0.041	0.044	0.031	0.033	0.07
34	0.004	0.011	0.010	0.009	0.009	0.010	0.011	0.012	0.012	0.011	0.011	0.05
35	0.005	0.019	0.018	0.014	0.016	0.017	0.019	0.020	0.022	0.019	0.020	0.06
36	0.004	0.007	0.007	0.006	0.006	0.006	0.007	0.007	0.007	0.007	0.007	0.05
37	0.005	0.019	0.018	0.014	0.016	0.017	0.019	0.021	0.022	0.021	0.022	0.06
38	0.003	0.008	0.007	0.006	0.007	0.007	0.008	0.008	0.009	0.007	0.007	0.05
39	0.005	0.020	0.019	0.015	0.017	0.017	0.019	0.021	0.023	0.020	0.021	0.06
40	0.004	0.008	0.008	0.007	0.007	0.007	0.008	0.008	0.009	0.007	0.007	0.05
THD	0.456%	2.563%	2.445%	1.849%	2.125%	2.239%	2.535%	2.831%	3.047%	3.112%	3.468%	5%
Phase L3-N												
Harmon. Nr.	P/P _{E_{max}}											Limit (A)
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	
0	0.005	0.025	0.026	0.029	0.03	0.032	0.035	0.039	0.042	0.048	0.052	0.073
1	0.073	1.45	2.904	4.348	5.796	7.258	8.711	10.164	11.596	13.053	14.498	-
2	0.009	0.05	0.048	0.036	0.042	0.044	0.05	0.055	0.06	0.064	0.067	1.08

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3	0.027	0.151	0.145	0.109	0.125	0.131	0.149	0.169	0.181	0.172	0.182	2.30
4	0.009	0.058	0.055	0.042	0.048	0.051	0.057	0.064	0.068	0.05	0.053	0.43
5	0.023	0.094	0.089	0.067	0.077	0.081	0.093	0.103	0.111	0.174	0.184	1.14
6	0.008	0.06	0.057	0.044	0.05	0.053	0.06	0.067	0.072	0.064	0.068	0.30
7	0.02	0.086	0.081	0.061	0.07	0.074	0.084	0.095	0.101	0.194	0.208	0.77
8	0.009	0.06	0.058	0.043	0.05	0.053	0.06	0.066	0.071	0.051	0.053	0.23
9	0.026	0.132	0.128	0.096	0.11	0.116	0.133	0.147	0.158	0.164	0.175	0.40
10	0.007	0.051	0.048	0.037	0.042	0.044	0.05	0.056	0.06	0.053	0.057	0.18
11	0.015	0.056	0.054	0.041	0.048	0.05	0.057	0.062	0.067	0.106	0.113	0.33
12	0.006	0.027	0.026	0.02	0.023	0.024	0.026	0.029	0.032	0.025	0.027	0.15
13	0.013	0.109	0.104	0.079	0.09	0.095	0.109	0.121	0.131	0.102	0.11	0.21
14	0.006	0.027	0.026	0.02	0.022	0.024	0.026	0.029	0.031	0.027	0.029	0.13
15	0.013	0.119	0.113	0.085	0.098	0.104	0.117	0.131	0.142	0.1	0.106	0.15
16	0.007	0.03	0.028	0.022	0.025	0.026	0.03	0.033	0.035	0.024	0.025	0.12
17	0.011	0.09	0.084	0.063	0.074	0.078	0.087	0.098	0.106	0.08	0.086	0.13
18	0.006	0.021	0.02	0.016	0.018	0.019	0.021	0.023	0.024	0.019	0.021	0.10
19	0.012	0.085	0.081	0.061	0.072	0.076	0.085	0.095	0.103	0.073	0.079	0.12
20	0.006	0.025	0.024	0.018	0.021	0.022	0.024	0.027	0.029	0.018	0.019	0.09
21	0.011	0.088	0.084	0.064	0.073	0.077	0.086	0.097	0.105	0.084	0.09	0.11
22	0.006	0.026	0.025	0.019	0.022	0.023	0.026	0.028	0.03	0.022	0.023	0.08
23	0.006	0.037	0.035	0.027	0.031	0.032	0.036	0.04	0.043	0.037	0.038	0.10
24	0.005	0.011	0.011	0.009	0.01	0.01	0.011	0.012	0.013	0.011	0.012	0.08
25	0.007	0.035	0.033	0.025	0.029	0.03	0.034	0.038	0.04	0.029	0.031	0.09
26	0.005	0.011	0.011	0.009	0.01	0.01	0.012	0.012	0.013	0.01	0.01	0.07
27	0.007	0.031	0.029	0.023	0.026	0.027	0.03	0.033	0.036	0.032	0.034	0.08
28	0.005	0.011	0.011	0.009	0.01	0.01	0.011	0.012	0.012	0.013	0.013	0.07
29	0.006	0.032	0.03	0.024	0.027	0.028	0.031	0.035	0.037	0.041	0.043	0.08
30	0.004	0.011	0.011	0.009	0.01	0.01	0.011	0.012	0.012	0.012	0.012	0.06
31	0.006	0.039	0.037	0.028	0.032	0.034	0.038	0.042	0.045	0.039	0.041	0.07
32	0.005	0.012	0.011	0.01	0.01	0.011	0.012	0.013	0.014	0.012	0.013	0.06
33	0.007	0.038	0.036	0.027	0.031	0.033	0.037	0.041	0.044	0.031	0.033	0.07
34	0.004	0.011	0.01	0.009	0.009	0.01	0.011	0.012	0.012	0.011	0.011	0.05
35	0.005	0.019	0.018	0.014	0.016	0.017	0.019	0.02	0.022	0.019	0.02	0.06
36	0.004	0.007	0.007	0.006	0.006	0.006	0.007	0.007	0.007	0.007	0.007	0.05
37	0.005	0.019	0.018	0.014	0.016	0.017	0.019	0.021	0.022	0.021	0.022	0.06
38	0.003	0.008	0.007	0.006	0.007	0.007	0.008	0.008	0.009	0.007	0.007	0.05
39	0.005	0.02	0.019	0.015	0.017	0.017	0.019	0.021	0.023	0.02	0.021	0.06
40	0.004	0.008	0.008	0.007	0.007	0.007	0.008	0.008	0.009	0.007	0.007	0.05
THD	0.456%	2.563%	2.445%	1.849%	2.125%	2.239%	2.535%	2.831%	3.047%	3.112%	3.468%	5%
Harmonics of PGU test according to IEC 61000-3-2; This table is applied to devices with rated current of ≤16A												
Harmonics												
Model		iStorageE3 12K										
Phase L1-N												
Harmon. Nr.	P/P _{Emax}											Limit (%)
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	
0	0.004	0.026	0.028	0.031	0.034	0.038	0.044	0.053	0.058	0.067	0.074	0.087
1	0.43%	10.01%	20.04%	30.08%	40.09%	50.09%	60.15%	70.16%	80.19%	90.28%	100.20%	-
2	0.07%	0.33%	0.29%	0.23%	0.27%	0.29%	0.33%	0.36%	0.39%	0.42%	0.46%	8.0

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3	0.16%	0.99%	0.87%	0.69%	0.80%	0.89%	0.99%	1.08%	1.20%	1.30%	1.42%	21.6
4	0.06%	0.37%	0.33%	0.27%	0.30%	0.33%	0.37%	0.41%	0.45%	0.49%	0.53%	4.0
5	0.16%	0.60%	0.54%	0.43%	0.50%	0.55%	0.60%	0.68%	0.74%	0.80%	0.87%	10.7
6	0.07%	0.39%	0.35%	0.28%	0.32%	0.35%	0.39%	0.43%	0.47%	0.51%	0.55%	2.67
7	0.18%	0.55%	0.49%	0.39%	0.45%	0.49%	0.55%	0.61%	0.67%	0.72%	0.79%	7.2
8	0.06%	0.39%	0.35%	0.28%	0.32%	0.35%	0.39%	0.43%	0.47%	0.51%	0.55%	2.0
9	0.15%	0.87%	0.77%	0.61%	0.70%	0.78%	0.86%	0.96%	1.04%	1.15%	1.24%	3.8
10	0.06%	0.33%	0.29%	0.24%	0.27%	0.30%	0.33%	0.36%	0.40%	0.43%	0.46%	1.6
11	0.10%	0.37%	0.33%	0.26%	0.30%	0.33%	0.36%	0.40%	0.44%	0.48%	0.52%	3.1
12	0.04%	0.17%	0.15%	0.13%	0.14%	0.16%	0.17%	0.19%	0.20%	0.22%	0.24%	1.33
13	0.10%	0.72%	0.63%	0.50%	0.58%	0.64%	0.71%	0.79%	0.86%	0.93%	1.03%	2.0
14	0.04%	0.17%	0.15%	0.13%	0.14%	0.15%	0.17%	0.19%	0.20%	0.22%	0.24%	-
15	0.10%	0.77%	0.69%	0.54%	0.63%	0.69%	0.76%	0.85%	0.94%	1.01%	1.11%	-
16	0.04%	0.19%	0.17%	0.14%	0.16%	0.17%	0.19%	0.21%	0.23%	0.25%	0.27%	-
17	0.08%	0.58%	0.51%	0.41%	0.47%	0.52%	0.57%	0.64%	0.70%	0.76%	0.83%	-
18	0.03%	0.13%	0.12%	0.10%	0.11%	0.12%	0.13%	0.15%	0.16%	0.17%	0.18%	-
19	0.08%	0.56%	0.50%	0.40%	0.45%	0.50%	0.56%	0.61%	0.68%	0.73%	0.79%	-
20	0.03%	0.16%	0.14%	0.12%	0.13%	0.14%	0.16%	0.17%	0.19%	0.20%	0.22%	-
21	0.09%	0.57%	0.51%	0.41%	0.46%	0.51%	0.58%	0.63%	0.70%	0.75%	0.82%	-
22	0.04%	0.16%	0.15%	0.12%	0.14%	0.15%	0.17%	0.18%	0.20%	0.21%	0.23%	-
23	0.05%	0.24%	0.21%	0.17%	0.19%	0.21%	0.24%	0.26%	0.28%	0.31%	0.33%	-
24	0.03%	0.07%	0.06%	0.05%	0.06%	0.07%	0.07%	0.08%	0.08%	0.09%	0.09%	-
25	0.04%	0.22%	0.20%	0.16%	0.18%	0.20%	0.22%	0.24%	0.26%	0.29%	0.31%	-
26	0.03%	0.07%	0.07%	0.06%	0.06%	0.07%	0.07%	0.08%	0.08%	0.09%	0.10%	-
27	0.04%	0.20%	0.17%	0.14%	0.16%	0.18%	0.19%	0.22%	0.23%	0.25%	0.28%	-
28	0.03%	0.07%	0.06%	0.05%	0.06%	0.06%	0.07%	0.07%	0.08%	0.09%	0.09%	-
29	0.05%	0.21%	0.18%	0.15%	0.17%	0.19%	0.21%	0.22%	0.24%	0.26%	0.29%	-
30	0.03%	0.07%	0.06%	0.05%	0.06%	0.06%	0.07%	0.07%	0.08%	0.08%	0.09%	-
31	0.05%	0.25%	0.22%	0.18%	0.21%	0.22%	0.25%	0.27%	0.30%	0.32%	0.35%	-
32	0.03%	0.08%	0.07%	0.06%	0.07%	0.07%	0.08%	0.08%	0.09%	0.09%	0.10%	-
33	0.04%	0.24%	0.22%	0.17%	0.20%	0.22%	0.24%	0.27%	0.29%	0.31%	0.34%	-
34	0.03%	0.07%	0.06%	0.05%	0.06%	0.06%	0.07%	0.07%	0.08%	0.08%	0.09%	-
35	0.03%	0.12%	0.11%	0.09%	0.10%	0.11%	0.12%	0.13%	0.14%	0.15%	0.16%	-
36	0.02%	0.04%	0.04%	0.04%	0.04%	0.04%	0.04%	0.05%	0.05%	0.05%	0.05%	-
37	0.03%	0.12%	0.11%	0.09%	0.10%	0.11%	0.12%	0.13%	0.14%	0.16%	0.17%	-
38	0.02%	0.05%	0.04%	0.04%	0.04%	0.05%	0.05%	0.05%	0.05%	0.06%	0.06%	-
39	0.03%	0.12%	0.11%	0.09%	0.10%	0.11%	0.12%	0.14%	0.15%	0.16%	0.17%	-
40	0.02%	0.05%	0.04%	0.04%	0.04%	0.05%	0.05%	0.05%	0.05%	0.06%	0.06%	-
THD	0.45%	2.42%	2.14%	1.72%	1.96%	2.16%	2.41%	2.66%	2.92%	3.16%	3.45%	13
PWHD	1.13%	6.42%	5.71%	4.60%	5.25%	5.76%	6.40%	7.06%	7.73%	8.36%	9.11%	22
Phase L2-N												
Harmon. Nr.	P/P _{E_{max}}											Limit (%)
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	
0	0.004	0.026	0.028	0.030	0.032	0.035	0.040	0.044	0.049	0.057	0.063	0.087
1	0.43%	9.99%	20.00%	30.01%	40.01%	49.99%	60.03%	70.02%	80.03%	90.11%	100.00%	-
2	0.07%	0.32%	0.29%	0.23%	0.27%	0.29%	0.33%	0.36%	0.39%	0.42%	0.46%	8.0
3	0.16%	0.99%	0.88%	0.70%	0.79%	0.88%	0.98%	1.10%	1.20%	1.30%	1.41%	21.6
4	0.06%	0.37%	0.33%	0.27%	0.30%	0.34%	0.37%	0.41%	0.45%	0.49%	0.53%	4.0

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5	0.16%	0.60%	0.53%	0.43%	0.49%	0.54%	0.60%	0.67%	0.73%	0.79%	0.86%	10.7
6	0.07%	0.39%	0.35%	0.28%	0.32%	0.35%	0.39%	0.43%	0.47%	0.51%	0.55%	2.67
7	0.18%	0.55%	0.49%	0.39%	0.45%	0.49%	0.55%	0.60%	0.66%	0.72%	0.78%	7.2
8	0.06%	0.39%	0.35%	0.28%	0.32%	0.35%	0.39%	0.43%	0.47%	0.51%	0.55%	2.0
9	0.15%	0.87%	0.76%	0.61%	0.70%	0.77%	0.86%	0.95%	1.05%	1.14%	1.24%	3.8
10	0.06%	0.33%	0.29%	0.24%	0.27%	0.29%	0.33%	0.36%	0.39%	0.43%	0.46%	1.6
11	0.10%	0.37%	0.32%	0.26%	0.30%	0.33%	0.36%	0.40%	0.44%	0.48%	0.52%	3.1
12	0.04%	0.17%	0.15%	0.13%	0.14%	0.15%	0.17%	0.19%	0.20%	0.22%	0.24%	1.33
13	0.10%	0.71%	0.63%	0.50%	0.58%	0.64%	0.71%	0.79%	0.85%	0.94%	1.02%	2.0
14	0.04%	0.17%	0.15%	0.13%	0.14%	0.16%	0.17%	0.19%	0.20%	0.22%	0.24%	-
15	0.10%	0.76%	0.68%	0.55%	0.62%	0.69%	0.77%	0.86%	0.92%	1.01%	1.10%	-
16	0.04%	0.19%	0.17%	0.14%	0.16%	0.17%	0.19%	0.21%	0.23%	0.24%	0.27%	-
17	0.08%	0.57%	0.51%	0.41%	0.47%	0.51%	0.58%	0.64%	0.70%	0.75%	0.82%	-
18	0.03%	0.13%	0.12%	0.10%	0.11%	0.12%	0.13%	0.14%	0.16%	0.17%	0.18%	-
19	0.08%	0.56%	0.50%	0.39%	0.45%	0.49%	0.56%	0.62%	0.67%	0.73%	0.79%	-
20	0.03%	0.16%	0.14%	0.12%	0.13%	0.14%	0.16%	0.17%	0.19%	0.20%	0.22%	-
21	0.09%	0.57%	0.50%	0.41%	0.46%	0.52%	0.57%	0.63%	0.69%	0.75%	0.82%	-
22	0.04%	0.17%	0.15%	0.12%	0.14%	0.15%	0.16%	0.18%	0.19%	0.21%	0.23%	-
23	0.05%	0.24%	0.21%	0.17%	0.19%	0.22%	0.24%	0.26%	0.28%	0.30%	0.33%	-
24	0.03%	0.07%	0.06%	0.05%	0.06%	0.07%	0.07%	0.08%	0.08%	0.09%	0.09%	-
25	0.04%	0.22%	0.20%	0.16%	0.18%	0.20%	0.22%	0.24%	0.26%	0.28%	0.31%	-
26	0.03%	0.07%	0.07%	0.06%	0.06%	0.07%	0.07%	0.08%	0.08%	0.09%	0.10%	-
27	0.04%	0.20%	0.17%	0.14%	0.16%	0.18%	0.20%	0.21%	0.23%	0.25%	0.28%	-
28	0.03%	0.07%	0.06%	0.05%	0.06%	0.06%	0.07%	0.07%	0.08%	0.08%	0.09%	-
29	0.05%	0.20%	0.18%	0.15%	0.17%	0.18%	0.20%	0.22%	0.24%	0.26%	0.28%	-
30	0.03%	0.07%	0.06%	0.05%	0.06%	0.06%	0.07%	0.07%	0.08%	0.08%	0.09%	-
31	0.05%	0.25%	0.22%	0.18%	0.20%	0.22%	0.25%	0.27%	0.30%	0.32%	0.35%	-
32	0.03%	0.07%	0.07%	0.06%	0.06%	0.07%	0.08%	0.08%	0.09%	0.09%	0.10%	-
33	0.04%	0.24%	0.22%	0.18%	0.20%	0.22%	0.24%	0.26%	0.29%	0.31%	0.34%	-
34	0.03%	0.07%	0.06%	0.05%	0.06%	0.06%	0.07%	0.07%	0.08%	0.08%	0.09%	-
35	0.03%	0.12%	0.11%	0.09%	0.10%	0.11%	0.12%	0.13%	0.14%	0.15%	0.16%	-
36	0.02%	0.04%	0.04%	0.04%	0.04%	0.04%	0.04%	0.04%	0.05%	0.05%	0.05%	-
37	0.03%	0.12%	0.11%	0.09%	0.10%	0.11%	0.12%	0.13%	0.14%	0.15%	0.17%	-
38	0.02%	0.05%	0.04%	0.04%	0.04%	0.05%	0.05%	0.05%	0.05%	0.06%	0.06%	-
39	0.03%	0.13%	0.11%	0.09%	0.10%	0.11%	0.12%	0.14%	0.15%	0.16%	0.17%	-
40	0.02%	0.05%	0.04%	0.04%	0.04%	0.05%	0.05%	0.05%	0.05%	0.06%	0.06%	-
THD	0.44%	2.41%	2.14%	1.72%	1.96%	2.16%	2.40%	2.66%	2.90%	3.15%	3.43%	13
PWHD	1.09%	6.40%	5.70%	4.61%	5.23%	5.76%	6.41%	7.07%	7.66%	8.33%	9.06%	22
Phase L3-N												
Harmon. Nr.	P/P _{E_{max}}											Limit (%)
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	
0	0.004	0.026	0.027	0.029	0.032	0.035	0.039	0.045	0.050	0.056	0.060	0.087
1	0.43%	9.97%	19.96%	29.95%	39.93%	49.88%	59.91%	69.88%	79.87%	89.92%	99.81%	-
2	0.07%	0.33%	0.29%	0.23%	0.27%	0.29%	0.33%	0.36%	0.39%	0.42%	0.46%	8.0
3	0.16%	0.98%	0.87%	0.70%	0.79%	0.89%	0.98%	1.09%	1.18%	1.28%	1.42%	21.6
4	0.06%	0.37%	0.33%	0.27%	0.30%	0.34%	0.37%	0.41%	0.45%	0.48%	0.53%	4.0
5	0.16%	0.60%	0.54%	0.43%	0.49%	0.55%	0.61%	0.66%	0.73%	0.80%	0.87%	10.7
6	0.07%	0.39%	0.34%	0.28%	0.32%	0.35%	0.39%	0.43%	0.47%	0.51%	0.56%	2.67

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7	0.17%	0.55%	0.49%	0.39%	0.45%	0.50%	0.55%	0.60%	0.66%	0.71%	0.79%	7.2
8	0.06%	0.39%	0.34%	0.28%	0.32%	0.35%	0.39%	0.43%	0.47%	0.51%	0.56%	2.0
9	0.15%	0.86%	0.77%	0.61%	0.69%	0.78%	0.86%	0.95%	1.03%	1.13%	1.24%	3.8
10	0.06%	0.33%	0.29%	0.23%	0.27%	0.29%	0.33%	0.36%	0.39%	0.42%	0.46%	1.6
11	0.10%	0.36%	0.33%	0.26%	0.30%	0.33%	0.36%	0.41%	0.44%	0.48%	0.52%	3.1
12	0.04%	0.17%	0.15%	0.13%	0.14%	0.16%	0.17%	0.19%	0.20%	0.22%	0.24%	1.33
13	0.10%	0.71%	0.63%	0.51%	0.58%	0.64%	0.71%	0.79%	0.85%	0.93%	1.01%	2.0
14	0.04%	0.17%	0.15%	0.13%	0.14%	0.15%	0.17%	0.19%	0.20%	0.22%	0.24%	-
15	0.10%	0.77%	0.69%	0.54%	0.62%	0.69%	0.76%	0.85%	0.93%	1.01%	1.10%	-
16	0.04%	0.19%	0.17%	0.14%	0.16%	0.17%	0.19%	0.21%	0.23%	0.25%	0.27%	-
17	0.08%	0.57%	0.51%	0.41%	0.47%	0.52%	0.58%	0.63%	0.70%	0.75%	0.82%	-
18	0.03%	0.13%	0.12%	0.10%	0.11%	0.12%	0.13%	0.15%	0.16%	0.17%	0.18%	-
19	0.08%	0.55%	0.49%	0.39%	0.45%	0.50%	0.56%	0.62%	0.66%	0.72%	0.80%	-
20	0.03%	0.16%	0.14%	0.12%	0.13%	0.14%	0.16%	0.17%	0.19%	0.20%	0.22%	-
21	0.08%	0.57%	0.50%	0.41%	0.46%	0.51%	0.57%	0.62%	0.69%	0.74%	0.81%	-
22	0.04%	0.17%	0.15%	0.12%	0.14%	0.15%	0.16%	0.18%	0.19%	0.21%	0.23%	-
23	0.05%	0.23%	0.21%	0.17%	0.19%	0.21%	0.23%	0.26%	0.28%	0.30%	0.33%	-
24	0.03%	0.07%	0.06%	0.05%	0.06%	0.06%	0.07%	0.08%	0.08%	0.09%	0.09%	-
25	0.04%	0.22%	0.20%	0.16%	0.18%	0.20%	0.22%	0.24%	0.26%	0.28%	0.31%	-
26	0.03%	0.07%	0.07%	0.06%	0.06%	0.07%	0.07%	0.08%	0.08%	0.09%	0.09%	-
27	0.04%	0.19%	0.18%	0.14%	0.16%	0.18%	0.20%	0.21%	0.23%	0.25%	0.27%	-
28	0.03%	0.07%	0.06%	0.05%	0.06%	0.06%	0.07%	0.07%	0.08%	0.08%	0.09%	-
29	0.05%	0.20%	0.18%	0.15%	0.17%	0.18%	0.20%	0.22%	0.24%	0.26%	0.29%	-
30	0.03%	0.07%	0.06%	0.05%	0.06%	0.06%	0.07%	0.07%	0.08%	0.08%	0.09%	-
31	0.05%	0.25%	0.22%	0.18%	0.20%	0.22%	0.25%	0.27%	0.30%	0.32%	0.35%	-
32	0.03%	0.07%	0.07%	0.06%	0.06%	0.07%	0.08%	0.08%	0.09%	0.09%	0.10%	-
33	0.04%	0.24%	0.21%	0.17%	0.20%	0.22%	0.24%	0.26%	0.29%	0.31%	0.34%	-
34	0.03%	0.07%	0.06%	0.05%	0.06%	0.06%	0.07%	0.07%	0.08%	0.08%	0.09%	-
35	0.03%	0.12%	0.11%	0.09%	0.10%	0.11%	0.12%	0.13%	0.14%	0.15%	0.16%	-
36	0.02%	0.04%	0.04%	0.04%	0.04%	0.04%	0.04%	0.04%	0.05%	0.05%	0.05%	-
37	0.03%	0.12%	0.11%	0.09%	0.10%	0.11%	0.12%	0.13%	0.14%	0.16%	0.17%	-
38	0.02%	0.05%	0.04%	0.04%	0.04%	0.05%	0.05%	0.05%	0.05%	0.06%	0.06%	-
39	0.03%	0.12%	0.11%	0.09%	0.10%	0.11%	0.12%	0.14%	0.15%	0.16%	0.17%	-
40	0.02%	0.05%	0.05%	0.04%	0.04%	0.05%	0.05%	0.05%	0.05%	0.06%	0.06%	-
THD	0.44%	2.40%	2.14%	1.71%	1.95%	2.17%	2.40%	2.65%	2.89%	3.13%	3.43%	13
PWHD	1.08%	6.37%	5.69%	4.60%	5.23%	5.75%	6.37%	7.04%	7.67%	8.29%	9.06%	22

Harmonics of PGU test according to IEC 61000-3-12; This table is applied to devices with rated current of >16A and ≤75A.

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E.6 Certificate of the network and system protection

(This form is intended for duplication by the user of this VDE application guide.)

Certificate of NS protection		No: 64.290.22.31113.01 Signed copy no. 1
Manufacturer	<u>Xiamen Kehua Digital Energy Tech Co., Ltd.</u> <u>Room 208-38, Hengye Building</u> <u>No. 100 Xiangxing Road</u> <u>Torch High-tech Zone</u> <u>(Xiang'an) Industrial Zone</u> <u>361115 Xiamen</u> <u>PEOPLE'S REPUBLIC OF CHINA</u>	
Type of NS protection	Integrated NS protection	
Central NS protection	☐	
Integrated NS protection	☒	Assigned to power generation unit of type: <u>iStoragE3 5K, iStoragE3 6K, iStoragE3 8K, iStoragE3 10K, iStoragE3 12K</u>
Network connection rule	VDE-AR-N 4105 "Generators connected to the low-voltage distribution network" Technical minimum requirements for connection and parallel operation of power generation systems connected to the low-voltage network	
Test requirement	DIN VDE V 0124-100 (VDE V 0124-100) "Network integration of power generation systems – Low voltage" Test requirements for power generation units intended for connection to and parallel operation on the low-voltage network	
Test report	<u>64.290.22.31113.01</u> from <u>04.11.2022</u>	
The network and system protection designated above meets the requirements of VDE-AR-N 4105.		

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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”		64.290.22.31113.01	
NS protection test report			
Type of NS system:	Integrated NS protection	Other Manufacturer indications	
Software version:	Software version: V1 Hardware version: V1		
Manufacturer:	Xiamen Kehua Digital Energy Tech Co., Ltd. Room 208-38, Hengye Building No. 100 Xiangxing Road Torch High-tech Zone (Xiangan) Industrial Zone 361115 Xiamen PEOPLE'S REPUBLIC OF CHINA		
Measuring period:	From 2022-09-20 to 2022-11-03		
		Inverter	
Protection function	Setting value	Tripping value	Break time NS protection *
Rise-in-voltage protection U >> (U _{L1-N} , U _{L2-N} , U _{L3-N})	1.25 * U _n	286.98 V 286.93 V 286.96 V	124.0 ms
Rise-in-voltage protection U >> (U _{L1-N})	1.25 * U _n	286.98 V 229.84 V 229.98 V	133.0 ms
Rise-in-voltage protection U >> (U _{L2-N})	1.25 * U _n	230.11 V 287.01 V 229.94 V	125.0 ms
Rise-in-voltage protection U >> (U _{L3-N})	1.25 * U _n	229.97 V 230.02 V 287.05 V	133.0 ms
Rise-in-voltage protection U >> (U _{L1-L2})	1.25 * U _n	-	- ms
Rise-in-voltage protection U >> (U _{L2-L3})	1.25 * U _n	-	- ms
Rise-in-voltage protection U >> (U _{L1-L3})	1.25 * U _n	-	- ms
Rise-in-voltage protection U >	1.10 * U _n	1.10 * U _n	ms**
Voltage drop protection U < (U _{L1-N} , U _{L2-N} , U _{L3-N})	0.8 * U _n	184.08 V 184.00 V 184.04 V	3.040 s
Voltage drop protection U < (U _{L1-N})	0.8 * U _n	183.03 V 229.96 V 229.92 V	3.050 s
Voltage drop protection U < (U _{L2-N})	0.8 * U _n	229.94 V 182.99 V 230.06 V	3.030 s

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Voltage drop protection $U < (U_{L3-N})$	$0.8 \cdot U_n$	230.04 V 229.93 V 183.07 V	3.050 s
Voltage drop protection $U < (U_{L1-L2})$	$0.8 \cdot U_n$	-	- s
Voltage drop protection $U < (U_{L2-L3})$	$0.8 \cdot U_n$	-	- s
Voltage drop protection $U < (U_{L1-L3})$	$0.8 \cdot U_n$	-	- s
Voltage drop protection $U \ll (U_{L1-N}, U_{L2-N}, U_{L3-N})$	$0.45 \cdot U_n$	102.43 V 102.55 V 102.54 V	340.0 ms
Voltage drop protection $U \ll (U_{L1-N})$	$0.45 \cdot U_n$	102.48 V 230.14 V 229.88 V	330.0 ms
Voltage drop protection $U \ll (U_{L2-N})$	$0.45 \cdot U_n$	230.07 V 103.05 V 230.07 V	340.0 ms
Voltage drop protection $U \ll (U_{L3-N})$	$0.45 \cdot U_n$	230.09 V 229.96 V 102.42 V	340.0 ms
Voltage drop protection $U \ll (U_{L1-L2})$	$0.45 \cdot U_n$	-	- ms
Voltage drop protection $U \ll (U_{L2-L3})$	$0.45 \cdot U_n$	-	- ms
Voltage drop protection $U \ll (U_{L1-L3})$	$0.45 \cdot U_n$	-	- ms
Frequency decrease protection $f <$	47.5 Hz	47.51 Hz	182.0 ms
Frequency increase protection $f >$	51.5 Hz	51.50 Hz	179.0 ms
*: 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 10min-average value. Disconnecting time as below: 496.4 s (from 600s@U_n to 112%U_n) - Continuous operation (from 600s@U_n to 108%U_n) 287.5 s (from 600s@106%U_n to 114%U_n)			
☒ as integrated NS protection			
Assigned to power generation unit type	iStoragE3 5K, iStoragE3 6K, iStoragE3 8K, iStoragE3 10K, iStoragE3 12K		
Integrated interface switch type	Series-connected relays for both the neutral conductor and the line conductor Relay type: HongFa, Model: HF161F-W/12-HT(477)		
Response time of interface switch for integrated NS protection	HongFa, Model: HF161F-W/12-HT(477): 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.	Yes		