

Certificate of Conformity

No. ESY 087538 0006 Rev. 01

Holder of Certificate: Shenzhen Senergy Technology Co., Ltd.

Block D, BC Park, No.18, Xiusha Rd.
Shatian Kengzi Sub-district
Pingshan District
518122 Shenzhen
PEOPLE'S REPUBLIC OF CHINA

Product: **Converter**
(PV Inverter)

Model(s): **SE 5KTL-D3/G2, SE 6KTL-D3/G2,**
SE 8KTL-D3/G2
SE 10KTL-D3/G2, SE 10KTL-D3/G2P
SE 12KTL-D3/G2, SE 15KTL-D3/G2
SE 15KTL-D3/G2P, SE 17KTL-D3/G2
SE 20KTL-D3/G2, SE 22KTL-D3/G2
SE 25KTL-D3/G2, SE 30KTL-D3/G2

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.: 64290233003602

Date, 2024-05-24



(Billy Qiu)

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Parameters:

Model	SE 5KTL-D3/G2	SE 6KTL-D3/G2	SE 8KTL-D3/G2	SE 10KTL-D3/G2	SE 10KTL-D3/G2P
PV terminal parameters					
Maximum PV voltage [V _{DC}]	1100				
Rated voltage [V _{DC}]	620	620	620	620	620
MPPT voltage range [V _{DC}]	160 - 1000				
MPPT voltage range (full load) [V _{DC}]	170-850	210-850	270-850	340-850	510-850
Maximum input current [A _{DC}]	15/15				15/30
Isc PV [A _{DC}]	20/20				20/40
MPPT tracker number	2				
Maximum input power [W]	5500	6600	8800	11200	11000
Grid output terminal parameters					
Rated output voltage [V _{AC}]	3P+N+PE, 230/400				
Rated output frequency [Hz]	50				
Rated output current [A _{AC}]	7.2	8.7	11.6	14.5	14.5
Maximum continuous output current [A _{AC}]	8.4	10.1	13.4	17.0	16.8
Rated output active power [W]	5000	6000	8000	10000	10000
Maximum output active power P _{E_{max}} [W]	5500	6600	8800	11200	11000
Maximum output apparent power S _{E_{max}} [VA]	5500	6600	8800	11200	11000
Power factor range	0.8 under-excited to 0.8 over-excited				

Model	SE 12KTL-D3/G2	SE 15KTL-D3/G2	SE 15KTL-D3/G2P	SE 17KTL-D3/G2
PV terminal parameters				
Maximum PV voltage [V _{DC}]	1100			
Rated voltage [V _{DC}]	620	620	620	620
MPPT voltage range [V _{DC}]	160 - 1000			
MPPT voltage range (full load) [V _{DC}]	270-850	340-850	380-850	290-850
Maximum input current [A _{DC}]	15/30		30/30	
Isc PV [A _{DC}]	20/40		40/40	
MPPT tracker number	2			
Maximum input power [W]	13200	16700	16500	18700
Grid output terminal parameters				
Rated output voltage [V _{AC}]	3P+N+PE, 230/400			
Rated output frequency [Hz]	50			
Rated output current [A _{AC}]	17.4	21.7	21.7	24.6
Maximum continuous output current [A _{AC}]	20.2	25.3	25.3	28.6
Rated output active power [W]	12000	15000	15000	17000
Maximum output active power P _{E_{max}} [W]	13200	16700	16500	18700
Maximum output apparent power S _{E_{max}} [VA]	13200	16700	16500	18700
Power factor range	0.8 under-excited to 0.8 over-excited			

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Model	SE 20KTL-D3/G2	SE 22KTL-D3/G2	SE 25KTL-D3/G2	SE 30KTL-D3/G2
PV terminal parameters				
Maximum PV voltage [V_{DC}]	1100			
Rated voltage [V_{DC}]	620	620	620	620
MPPT voltage range [V_{DC}]	160 -1000			
MPPT voltage range (full load) [V_{DC}]	340-850	380-850	430-850	510-850
Maximum input current [A_{DC}]	30/30			40/30
Isc PV [A_{DC}]	40/40			50/37.5
MPPT tracker number	2			
Maximum input power [W]	22000	24200	27500	33000
Grid output terminal parameters				
Rated output voltage [V_{AC}]	3P+N+PE, 230/400			
Rated output frequency [Hz]	50			
Rated output current [A_{AC}]	29.0	31.9	36.2	43.5
Maximum continuous output current [A_{AC}]	33.7	37.0	39.8	50.2
Rated output active power [W]	20000	22000	25000	30000
Maximum output active power $P_{E_{max}}$ [W]	22000	24200	27500	33000
Maximum output apparent power $S_{E_{max}}$ [VA]	22000	24200	27500	33000
Power factor range	0.8 under-excited to 0.8 over-excited			

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E.4 Unit certificate

Unit certificate		
Manufacturer	Shenzhen Senergy Technology Co., Ltd.	
Power generation unit type	[PV Inverter]: <u>SE 5KTL-D3/G2, SE 6KTL-D3/G2, SE 8KTL-D3/G2</u> <u>SE 10KTL-D3/G2, SE 10KTL-D3/G2P, SE 12KTL-D3/G2</u> <u>SE 15KTL-D3/G2, SE 15KTL-D3/G2P, SE 17KTL-D3/G2</u> <u>SE 20KTL-D3/G2, SE 22KTL-D3/G2, SE 25KTL-D3/G2</u> <u>SE 30KTL-D3/G2.</u> Remark: certified on representative model <u>SE 15KTL-D3/G2</u> of family design products, results of the measurement of <u>SE 15KTL-D3/G2</u> can be transferred to other models based on transferability rule of measurements in DIN VDE V 0124-100 (VDE V 0124-100):2020-06.	
Assessment values	max. active power $P_{E_{max}}$	<u>16700 W (SE 15KTL-D3/G2)</u>
	max. apparent power $S_{E_{max}}$	<u>16700 VA (SE 15KTL-D3/G2)</u>
	Rated voltage	<u>3/N/PE~, 230/400 V_{AC}</u>
	Rated current (AC) I_r	<u>21.7 A (SE 15KTL-D3/G2)</u>
	Initial short-circuit AC current I''_k	<u>25.3 A (SE 15KTL-D3/G2)</u>
Network connection rule	VDE-AR-N 4105:2018-11 “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):2020-06 “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>64.290.23.30036.02 from 2024-05-07</u>	
The above designated power generation unit meets the requirements of VDE-AR-N 4105:2018-11.		

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

Extract of the test report for power generation units "Determination of electrical properties"		
System manufacturer:	Shenzhen Senergy Technology Co., Ltd. Block D, BC Park, No.18, Xiusha Rd., Shatian Kengzi Sub-district, Pingshan District, 518112 Shenzhen, PEOPLE'S REPUBLIC OF CHINA	
Manufacturer indications:	Type of system	PV Inverter
	Max. active power $P_{E_{max}}$	5500 W (SE 5KTL-D3/G2) 6600 W (SE 6KTL-D3/G2) 8800 W (SE 8KTL-D3/G2) 11200 W (SE 10KTL-D3/G2) 11000 W (SE 10KTL-D3/G2P) 13200 W (SE 12KTL-D3/G2) 16700 W (SE 15KTL-D3/G2) 16500 W (SE 15KTL-D3/G2P) 18700 W (SE 17KTL-D3/G2) 22000 W (SE 20KTL-D3/G2) 24200 W (SE 22KTL-D3/G2) 27500 W (SE 25KTL-D3/G2) 33000 W (SE 30KTL-D3/G2)
	Rated voltage	3/N/PE~, 230/400 V _{AC}
Measurement period:	From 2022-12-30 to 2023-03-03, 2024-03-28 to 2024-04-28	

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Rapid voltage change	
Model	<u>SE 30KTL-D3/G2</u>
Connection without provisions (regarding the primary energy carrier)	$K_i=0.03$
Most adverse case when switching between generator levels	$K_i=0.51$
Connection at nominal conditions (of the primary energy carrier)	$K_i=0.03$
Disconnection at rated power	$K_i=1.01$
Worst value of all switching operations	$K_{i\max}=1.01$

Rapid voltage changes	
Model	<u>SE 25KTL-D3/G2</u>
Connection without provisions (regarding the primary energy carrier)	$K_i=0.05$
Most adverse case when switching between generator levels	$K_i=0.52$
Connection at nominal conditions (of the primary energy carrier)	$K_i=0.05$
Disconnection at rated power	$K_i=1.01$
Worst value of all switching operations	$K_{i\max}=1.01$

Rapid voltage changes	
Model	<u>SE 5KTL-D3/G2</u>
Connection without provisions (regarding the primary energy carrier)	$K_i=0.14$
Most adverse case when switching between generator levels	$K_i=0.51$
Connection at nominal conditions (of the primary energy carrier)	$K_i=0.14$
Disconnection at rated power	$K_i=1.01$
Worst value of all switching operations	$K_{i\max}=1.01$

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Flicker (SE 5KTL-D3/G2)					
Network impedance angle Ψ_k	30°	50°	70°	85°	32°
Coefficient of system flicker $c\psi$ (Maximum)					
L1	--	--	--	--	3.30
L2	--	--	--	--	3.63
L3	--	--	--	--	3.96

Flicker (SE 25KTL-D3/G2)					
Network impedance angle Ψ_k	30°	50°	70°	85°	32°
Coefficient of system flicker $c\psi$ (Maximum)					
L1	--	--	--	--	1.32
L2	--	--	--	--	1.32
L3	--	--	--	--	1.32

Flicker (SE 30KTL-D3/G2)					
Network impedance angle Ψ_k	30°	50°	70°	85°	32°
Coefficient of system flicker $c\psi$ (Maximum)					
L1	--	--	--	--	5.61
L2	--	--	--	--	2.97
L3	--	--	--	--	4.62

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Harmonics (≤16 A) (SE 5KTL-D3/G2)												
Active power P/Pn[%]	0	10	20	30	40	50	60	70	80	90	100	Limit value
Ordinal number	A	A	A	A	A	A	A	A	A	A	A	A
2	0.014	0.150	0.143	0.151	0.148	0.149	0.156	0.161	0.164	0.189	0.189	1.080
3	0.008	0.020	0.021	0.021	0.021	0.022	0.022	0.022	0.022	0.021	0.012	2.300
4	0.005	0.018	0.019	0.019	0.019	0.019	0.019	0.018	0.019	0.019	0.018	0.430
5	0.132	0.074	0.074	0.073	0.072	0.072	0.071	0.070	0.067	0.064	0.066	1.140
6	0.005	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.021	0.021	0.022	0.300
7	0.106	0.092	0.090	0.090	0.091	0.090	0.089	0.089	0.088	0.085	0.088	0.770
8	0.003	0.007	0.006	0.006	0.006	0.006	0.006	0.007	0.007	0.007	0.007	0.230
9	0.005	0.022	0.022	0.022	0.022	0.022	0.022	0.023	0.023	0.023	0.012	0.400
10	0.004	0.006	0.005	0.006	0.006	0.006	0.006	0.006	0.007	0.008	0.006	0.184
11	0.086	0.117	0.116	0.117	0.116	0.116	0.115	0.117	0.114	0.112	0.119	0.330
12	0.005	0.010	0.008	0.008	0.008	0.008	0.009	0.010	0.010	0.012	0.008	0.153
13	0.071	0.122	0.122	0.122	0.122	0.122	0.122	0.123	0.122	0.122	0.127	0.210
14	0.005	0.008	0.007	0.008	0.007	0.007	0.007	0.008	0.008	0.009	0.008	0.131
15	0.005	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.009	0.150
16	0.004	0.006	0.005	0.005	0.005	0.006	0.006	0.006	0.006	0.007	0.005	0.115
17	0.042	0.065	0.064	0.065	0.064	0.065	0.065	0.065	0.065	0.065	0.069	0.132
18	0.006	0.010	0.009	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.009	0.102
19	0.036	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.056	0.056	0.058	0.118
20	0.004	0.006	0.005	0.006	0.005	0.006	0.005	0.006	0.006	0.006	0.006	0.092
21	0.005	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.009	0.008	0.107
22	0.005	0.006	0.006	0.006	0.007	0.006	0.006	0.007	0.007	0.007	0.007	0.084
23	0.026	0.035	0.036	0.036	0.036	0.036	0.036	0.036	0.036	0.036	0.032	0.098
24	0.009	0.023	0.023	0.023	0.022	0.022	0.023	0.023	0.022	0.024	0.023	0.077
25	0.025	0.020	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.022	0.090
26	0.004	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.071
27	0.005	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.005	0.008	0.083
28	0.004	0.007	0.006	0.006	0.006	0.007	0.007	0.006	0.006	0.007	0.007	0.066
29	0.016	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.010	0.010	0.078
30	0.009	0.012	0.011	0.011	0.012	0.011	0.012	0.012	0.012	0.012	0.010	0.061
31	0.011	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.012	0.073
32	0.004	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.058
33	0.004	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.004	0.004	0.005	0.068
34	0.003	0.008	0.008	0.008	0.007	0.008	0.007	0.008	0.008	0.007	0.008	0.054
35	0.012	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.064
36	0.003	0.004	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.051
37	0.009	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.009	0.061
38	0.003	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.048
39	0.005	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.058
40	0.004	0.011	0.012	0.011	0.012	0.012	0.012	0.011	0.012	0.012	0.011	0.046
THD	0.028	0.037	0.036	0.037	0.037	0.037	0.037	0.037	0.038	0.040	0.040	5%

Remark:
1. Iref=7.2 A.
2. The harmonic values are maximum values from all phases.

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Harmonics (>16 A and ≤75 A) (SE 25KTL-D3/G2)												
Active power P/Pn[%]	0	10	20	30	40	50	60	70	80	90	100	Limit value
Ordinal number	Ih/Iref [%]											[%]
2	0.003	0.076	0.079	0.105	0.186	0.196	0.217	0.232	0.245	0.255	0.084	8
3	0.017	0.063	0.095	0.127	0.207	0.210	0.223	0.231	0.244	0.274	0.454	-
4	0.003	0.027	0.032	0.044	0.036	0.036	0.042	0.046	0.050	0.056	0.064	4
5	0.016	0.650	0.534	0.368	0.801	0.604	0.501	0.523	0.743	1.264	2.342	10.7
6	0.003	0.017	0.024	0.031	0.034	0.033	0.034	0.039	0.041	0.048	0.089	2.67
7	0.016	0.430	0.459	0.337	0.561	0.405	0.266	0.258	0.467	0.873	1.550	7.2
8	0.003	0.011	0.015	0.017	0.026	0.027	0.027	0.028	0.031	0.037	0.048	2
9	0.016	0.050	0.044	0.044	0.122	0.135	0.156	0.164	0.166	0.160	0.110	-
10	0.003	0.016	0.014	0.021	0.031	0.035	0.038	0.040	0.049	0.059	0.054	1.6
11	0.016	0.320	0.384	0.462	0.530	0.474	0.397	0.353	0.351	0.438	0.702	3.1
12	0.003	0.019	0.017	0.022	0.038	0.045	0.054	0.055	0.042	0.049	0.050	1.33
13	0.015	0.354	0.364	0.434	0.484	0.511	0.476	0.495	0.509	0.558	0.837	2
14	0.003	0.017	0.020	0.023	0.042	0.049	0.053	0.058	0.060	0.061	0.058	-
15	0.015	0.031	0.042	0.046	0.084	0.099	0.111	0.123	0.141	0.136	0.145	-
16	0.003	0.018	0.021	0.025	0.043	0.046	0.050	0.051	0.060	0.061	0.057	-
17	0.014	0.311	0.256	0.292	0.309	0.337	0.341	0.343	0.368	0.403	0.599	-
18	0.003	0.021	0.021	0.023	0.050	0.056	0.063	0.059	0.048	0.046	0.042	-
19	0.014	0.246	0.231	0.253	0.236	0.297	0.336	0.386	0.417	0.428	0.529	-
20	0.003	0.018	0.018	0.021	0.040	0.041	0.046	0.044	0.046	0.046	0.034	-
21	0.013	0.025	0.028	0.037	0.057	0.056	0.056	0.053	0.053	0.056	0.040	-
22	0.003	0.018	0.016	0.020	0.029	0.033	0.037	0.035	0.039	0.038	0.029	-
23	0.013	0.171	0.153	0.090	0.142	0.171	0.191	0.224	0.262	0.283	0.336	-
24	0.004	0.018	0.017	0.018	0.037	0.037	0.038	0.036	0.031	0.032	0.026	-
25	0.012	0.181	0.161	0.122	0.150	0.126	0.166	0.187	0.218	0.251	0.297	-
26	0.003	0.015	0.015	0.016	0.028	0.028	0.030	0.028	0.029	0.031	0.022	-
27	0.012	0.023	0.029	0.035	0.030	0.034	0.042	0.046	0.046	0.044	0.030	-
28	0.003	0.013	0.013	0.016	0.026	0.027	0.029	0.029	0.029	0.029	0.022	-
29	0.011	0.088	0.107	0.066	0.131	0.094	0.104	0.142	0.157	0.158	0.181	-
30	0.003	0.019	0.020	0.021	0.037	0.039	0.037	0.035	0.030	0.029	0.023	-
31	0.010	0.068	0.102	0.090	0.106	0.107	0.087	0.123	0.154	0.172	0.161	-
32	0.003	0.011	0.012	0.013	0.021	0.024	0.027	0.028	0.031	0.029	0.019	-
33	0.010	0.032	0.031	0.030	0.052	0.039	0.047	0.050	0.062	0.058	0.034	-
34	0.003	0.012	0.013	0.012	0.020	0.021	0.023	0.024	0.026	0.028	0.022	-
35	0.009	0.106	0.088	0.083	0.081	0.086	0.069	0.100	0.120	0.126	0.119	-
36	0.003	0.011	0.011	0.013	0.023	0.024	0.025	0.026	0.022	0.022	0.023	-
37	0.008	0.059	0.035	0.123	0.087	0.098	0.075	0.088	0.101	0.107	0.092	-
38	0.003	0.009	0.012	0.016	0.017	0.021	0.020	0.020	0.022	0.023	0.020	-
39	0.008	0.022	0.030	0.039	0.026	0.024	0.031	0.031	0.033	0.041	0.038	-
40	0.003	0.008	0.009	0.016	0.019	0.018	0.021	0.021	0.021	0.023	0.021	-
THC/I _{ref}	0.059	0.999	0.939	0.895	1.294	1.147	1.041	1.075	1.302	1.876	3.180	13
PWHC/I _{ref}	0.218	2.109	2.027	2.070	2.104	2.307	2.535	2.874	3.238	3.496	4.236	22

Remark:
1. I_{ref}=36.2A
2. The harmonic values are maximum values from all phases.

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Harmonics (>16 A and ≤75 A) (SE 30KTL-D3/G2)												
Active power P/Pn[%]	0	10	20	30	40	50	60	70	80	90	100	Limit value
Ordinal number	Ih/Iref [%]											[%]
2	0.297	0.171	0.099	0.148	0.198	0.248	0.462	0.505	0.524	0.470	0.186	8
3	0.150	0.037	0.091	0.072	0.101	0.090	0.283	0.316	0.334	0.307	0.148	-
4	0.144	0.037	0.057	0.046	0.056	0.062	0.065	0.069	0.091	0.099	0.062	4
5	1.553	0.331	1.207	0.816	0.610	0.580	1.141	1.067	1.099	0.874	0.497	10.7
6	0.103	0.034	0.064	0.063	0.066	0.068	0.098	0.108	0.098	0.114	0.068	2.67
7	1.285	0.294	1.080	0.927	0.802	0.664	0.680	0.593	0.680	0.462	0.686	7.2
8	0.223	0.020	0.046	0.051	0.047	0.047	0.054	0.051	0.054	0.055	0.097	2
9	0.122	0.035	0.124	0.086	0.093	0.110	0.098	0.100	0.103	0.108	0.227	-
10	0.177	0.020	0.030	0.032	0.041	0.043	0.063	0.075	0.070	0.091	0.124	1.6
11	0.682	0.207	0.554	0.297	0.539	0.591	0.492	0.469	0.580	0.840	1.388	3.1
12	0.092	0.020	0.042	0.037	0.046	0.043	0.106	0.105	0.092	0.098	0.097	1.33
13	0.608	0.262	0.448	0.306	0.439	0.588	0.616	0.580	0.604	0.751	1.022	2
14	0.198	0.023	0.031	0.033	0.052	0.051	0.085	0.095	0.089	0.093	0.098	-
15	0.138	0.048	0.146	0.139	0.132	0.122	0.150	0.169	0.150	0.186	0.193	-
16	0.154	0.032	0.032	0.041	0.049	0.054	0.068	0.084	0.073	0.072	0.079	-
17	0.250	0.375	0.489	0.513	0.249	0.389	0.373	0.397	0.433	0.476	0.652	-
18	0.085	0.033	0.036	0.050	0.056	0.054	0.082	0.082	0.074	0.074	0.077	-
19	0.179	0.355	0.284	0.511	0.331	0.258	0.396	0.409	0.456	0.525	0.727	-
20	0.113	0.022	0.036	0.042	0.047	0.048	0.067	0.067	0.082	0.058	0.066	-
21	0.081	0.056	0.094	0.130	0.127	0.103	0.079	0.070	0.082	0.077	0.087	-
22	0.097	0.016	0.032	0.041	0.038	0.047	0.060	0.064	0.069	0.055	0.064	-
23	0.135	0.146	0.225	0.264	0.307	0.164	0.169	0.244	0.282	0.306	0.350	-
24	0.056	0.016	0.034	0.040	0.036	0.040	0.079	0.080	0.077	0.076	0.077	-
25	0.121	0.180	0.249	0.130	0.271	0.219	0.120	0.198	0.248	0.280	0.344	-
26	0.074	0.014	0.027	0.045	0.030	0.038	0.050	0.047	0.052	0.048	0.060	-
27	0.052	0.033	0.087	0.071	0.067	0.061	0.056	0.053	0.050	0.059	0.054	-
28	0.062	0.012	0.026	0.041	0.031	0.036	0.098	0.080	0.069	0.093	0.092	-
29	0.109	0.094	0.142	0.134	0.157	0.195	0.088	0.136	0.187	0.223	0.251	-
30	0.050	0.012	0.023	0.045	0.029	0.033	0.408	0.438	0.431	0.377	0.386	-
31	0.104	0.084	0.158	0.168	0.114	0.185	0.225	0.214	0.200	0.267	0.284	-
32	0.054	0.009	0.019	0.049	0.023	0.031	0.113	0.151	0.136	0.138	0.179	-
33	0.047	0.024	0.044	0.035	0.050	0.037	0.061	0.044	0.062	0.051	0.070	-
34	0.043	0.009	0.016	0.044	0.029	0.029	0.055	0.042	0.054	0.044	0.056	-
35	0.090	0.085	0.091	0.107	0.093	0.126	0.084	0.070	0.091	0.118	0.140	-
36	0.044	0.009	0.022	0.048	0.025	0.027	0.046	0.041	0.046	0.044	0.045	-
37	0.086	0.064	0.081	0.087	0.114	0.106	0.085	0.062	0.085	0.085	0.108	-
38	0.045	0.007	0.026	0.044	0.021	0.029	0.036	0.038	0.039	0.036	0.042	-
39	0.039	0.012	0.033	0.038	0.036	0.038	0.033	0.035	0.038	0.037	0.051	-
40	0.046	0.007	0.033	0.044	0.026	0.025	0.040	0.040	0.040	0.038	0.056	-
THC/I _{ref}	2.287	0.785	1.865	1.494	1.336	1.324	1.720	1.682	1.711	1.825	2.231	13
PWHC/I _{ref}	2.459	2.504	2.984	3.642	2.974	2.773	3.786	4.083	4.352	4.547	5.826	22
Remark: 1. Iref=43.5A 2. The harmonic values are maximum values from all phases.												

Certificate of Conformity

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E.6 Certificate of the network and system protection

Certificate of NS protection	
Manufacturer	Shenzhen Senergy Technology Co., Ltd.
Type of NS protection	Integrated NS protection
Central NS protection	<input type="checkbox"/>
Integrated NS protection	<input checked="" type="checkbox"/> Assigned to power generation unit of type: SE 5KTL-D3/G2, SE 6KTL-D3/G2, SE 8KTL-D3/G2 SE 10KTL-D3/G2, SE 10KTL-D3/G2P SE 12KTL-D3/G2, SE 15KTL-D3/G2 SE 15KTL-D3/G2P, SE 17KTL-D3/G2 SE 20KTL-D3/G2, SE 22KTL-D3/G2 SE 25KTL-D3/G2, SE 30KTL-D3/G2.
Network connection rule	VDE-AR-N 4105:2018-11 “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):2020-06 “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	64.290.23.30036.02 from <u>2024-05-07</u>
The network and system protection designated above meets the requirements of VDE-AR-N 4105:2018-11.	
Where the sum of the maximum apparent powers of all power generation systems and/or storage units connected to the same network connection point whereat they feed into the low-voltage network of the network operator is a value $S_{Amax} > 30kVA$, a central NS protection shall be installed at final system installation.	

Certificate of Conformity

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

Extract from test report for NS protection			
"Determination of electrical properties"			
NS protection test report			
Type of NS system:	Integrated NS protection	Other Manufacturer indications	
Software version:	062511		
Manufacturer:	Shenzhen Senergy Technology Co., Ltd. Block D, BC Park, No.18, Xiusha Rd., Shatian Kengzi Sub-district, Pingshan District, 518112 Shenzhen, PEOPLE'S REPUBLIC OF CHINA		
Measuring period:	From 2022-12-30 to 2023-03-03, 2024-03-28 to 2024-04-28		
	Inverter		
Protection function	Setting value	Tripping value	Tripping time NS protection*
Rise-in-voltage protection $U >>$	$1.25 * U_n$	L1-N/L2-N/L3-N: 287.1V/287.1V/287.0V; L1-N: 287.1V; L2-N: 288.0V; L3-N: 288.9V;	L1-N/L2-N/L3-N: 122.5ms; L1-N: 127.4ms; L2-N: 125.9ms; L3-N: 129.1ms;
Rise-in-voltage protection $U >$	$1.10 * U_n$	$1.12 * U_n$	ms**
Voltage drop protection $U <$	$0.8 * U_n$	L1-N/L2-N/L3-N: 185.4V/185.3V/185.3V; L1-N: 184.3V; L2-N: 185.2V; L3-N: 185.1V;	L1-N/L2-N/L3-N: 3030.0ms; L1-N: 3030.0ms; L2-N: 3020.0ms; L3-N: 3020.0ms;
Voltage drop protection $U <<$	$0.45 * U_n$	L1-N/L2-N/L3-N: 104.9V/104.8V/104.8V; L1-N: 103.0V; L2-N: 104.2V; L3-N: 104.0V;	L1-N/L2-N/L3-N: 324.2ms; L1-N: 320.8ms; L2-N: 321.0ms; L3-N: 325.5ms;
Frequency decrease protection $f <$	47.5 Hz	47.52Hz	149.2ms
Frequency increase protection $f >$	51.5 Hz	51.50Hz	146.6ms

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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.</p> <p>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.</p> <p>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: 520.85s (L1-N&L2-N&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) 299.20s (L1-N&L2-N&L3-N from 600s@106%U_n to 114%U_n)</p>	
<p><input checked="" type="checkbox"/> as integrated NS protection</p>	
Assigned to power generation unit type	<p><u>SE 5KTL-D3/G2, SE 6KTL-D3/G2</u> <u>SE 8KTL-D3/G2, SE 10KTL-D3/G2</u> <u>SE 10KTL-D3/G2P, SE 12KTL-D3/G2</u> <u>SE 15KTL-D3/G2, SE 15KTL-D3/G2P</u> <u>SE 17KTL-D3/G2, SE 20KTL-D3/G2</u> <u>SE 22KTL-D3/G2, SE 25KTL-D3/G2</u> <u>SE 30KTL-D3/G2.</u></p>
Integrated interface switch type	<p>Series-connected relays for all phase conductors each</p> <p>Relay type: AZSR143-1AE-12D</p>
Response time of interface switch for integrated NS protection	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"/>