ZERTIFIKAT ◆ CERTIFICATE ◆ 認證證書 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

DAkkS Deutsche Akkreditierungsstelle D-ZE-11321-01-00

TÜV SÜD Product Service

Certificate of Conformity

No. ESY 109576 0004 Rev. 00

Holder of Certificate: **WeCo SRL**
Viale Kennedy 113-121 Scarperia e San Piero
50038 Florence
ITALY

Product: **Converter (Hybrid Inverter)**

Model(s): **H-ESY-6K, H-ESY-8K, H-ESY-10K, H-ESY-12K, H-ESY-15K, H-ESY-6KT, H-ESY-8KT, H-ESY-10KT, H-ESY-12KT, H-ESY-15KT**

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.: 64290233158201

Date, 2024-07-01

(Billy Qiu)

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Parameters:

Model	H-ESY-6K	H-ESY-8K	H-ESY-10K	H-ESY-12K	H-ESY-15K
PV terminal parameters					
Maximum PV voltage [V_{DC}]	1000				
Rated voltage [V_{DC}]	700				
MPPT voltage range [V_{DC}]	180-850				
MPPT voltage range (full load) [V_{DC}]	180-850	240-850	300-850	360-850	410-850
Maximum input current [A_{DC}]	18/18				20/20
Isc PV [A_{DC}]	25/25				30/30
MPPT tracker number	2				
Maximum input power [W]	9000	12000	15000	18000	22500
Battery input/output parameters					
Battery type	Lithium-ion				
Maximum voltage [V_{DC}]	600				
Battery rated voltage [V_{DC}]	200	250	300	350	400
Battery voltage range [V_{DC}]	125-600				
Maximum charge power [W]	6600	8800	11000	13200	16500
Maximum discharge power [W]	6600	8800	11000	13200	16500
Maximum charge current [A_{DC}]	50				
Maximum discharge current [A_{DC}]	50				
Maximum charge power from grid to battery [W]	6600	8800	11000	13200	16500
Grid input terminal parameters					
Rated input voltage [V_{AC}]	3P+N+PE, 230/400				
Rated input frequency [Hz]	50				
Maximum continuous input current from grid to battery [A_{AC}]	9.5	12.7	15.9	19.1	23.8
Maximum continuous input current [A_{AC}]	19	25.5	31.9	38.2	43.5
Maximum continuous input power from grid to battery [W]	6600	8800	11000	13200	16500
Maximum continuous input active power [W]	13200	17600	22000	26400	30000
Maximum continuous input apparent power [VA]	13200	17600	22000	26400	30000
Grid output terminal parameters					
Rated output voltage [V_{AC}]	3P+N+PE, 230/400				
Rated output frequency [Hz]	50				
Rated output current [A_{AC}]	8.7	11.6	14.5	17.4	21.7
Maximum continuous output current [A_{AC}]	9.5	12.7	15.9	19.1	23.8
Rated output active power [W]	6000	8000	10000	12000	15000
Maximum output active power P_{Emax} [W]	6000	8000	10000	12000	15000
Maximum output apparent power S_{Emax} [VA]	6600	8800	11000	13200	16500
Power factor range	0.9 under-excited to 0.9 over-excited				

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No. ESY 109576 0004 Rev. 00

Model	H-ESY-6KT	H-ESY-8KT	H-ESY-10KT	H-ESY-12KT	H-ESY-15KT
PV terminal parameters					
Maximum PV voltage [V_{DC}]	1000				
Rated voltage [V_{DC}]	700				
MPPT voltage range [V_{DC}]	180-850				
MPPT voltage range (full load) [V_{DC}]	250-850	330-850	430-850	510-850	620-850
Maximum input current [A_{DC}]	13/13				
Isc PV [A_{DC}]	16/16				25/25
MPPT tracker number	2				
Maximum input power [W]	9000	12000	15000	18000	22500
Battery input/output parameters					
Battery type	Lithium-ion				
Maximum voltage [V_{DC}]	600				
Battery rated voltage [V_{DC}]	200	250	300	350	400
Battery voltage range [V_{DC}]	125-600				
Maximum charge power [W]	15000				
Maximum discharge power [W]	15000				
Maximum charge current [A_{DC}]	50				
Maximum discharge current [A_{DC}]	50				
Maximum charge power from grid to battery [W]	6600	8800	11000	13200	16500
Grid input terminal parameters					
Rated input voltage [V_{AC}]	3P+N+PE, 230/400				
Rated input frequency [Hz]	50				
Maximum continuous input current from grid to battery [A_{AC}]	9.5	12.7	15.9	19.1	23.8
Maximum continuous input current [A_{AC}]	19	25.5	31.9	38.2	43.5
Maximum continuous input power from grid to battery [W]	6600	8800	11000	13200	16500
Maximum continuous input active power [W]	13200	17600	22000	26400	30000
Maximum continuous input apparent power [VA]	13200	17600	22000	26400	30000
Grid output terminal parameters					
Rated output voltage [V_{AC}]	3P+N+PE, 230/400				
Rated output frequency [Hz]	50				
Rated output current [A_{AC}]	8.7	11.6	14.5	17.4	21.7
Maximum continuous output current [A_{AC}]	9.5	12.7	15.9	19.1	23.8
Rated output active power [W]	6000	8000	10000	12000	15000
Maximum output active power P_{Emax} [W]	6000	8000	10000	12000	15000
Maximum output apparent power S_{Emax} [VA]	6600	8800	11000	13200	16500
Power factor range	0.9 under-excited to 0.9 over-excited				

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Certificate of Conformity

No. ESY 109576 0004 Rev. 00

E.4 Unit certificate

Unit certificate		
Manufacturer	WECO SRL	
Power generation unit type	[Hybrid Inverter]: H-ESY-6K, H-ESY-8K, H-ESY-10K, H-ESY-12K, H-ESY-15K, H-ESY-6KT, H-ESY-8KT, H-ESY-10KT, H-ESY-12KT, H-ESY-15KT. Remark: certified on representative model H-ESY-15KT of family design products, results of the measurement of H-ESY-15KT 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_{Emax}	15000 W (H-ESY-15KT)
	max. apparent power S_{Emax}	16500 VA (H-ESY-15KT)
	Rated voltage	3/N/PE~, 230/400 V_{AC}.
	Rated current (AC) I_r	21.7 A_{AC} (H-ESY-15KT)
	Initial short-circuit AC current I''_k	23.8 A_{AC} (H-ESY-15KT)
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	64.290.23.31582.01 from 2024-06-19	
The above designated power generation unit meets the requirements of VDE-AR-N 4105:2018-11.		

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No. ESY 109576 0004 Rev. 00

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:	WECO SRL Viale Kennedy 113-121 Scarperia e San Piero 50038 Florence ITALY	
Manufacturer indications:	Type of system	Hybrid Inverter
	Max. active power P_{Emax}	6000 W (H-ESY-6KT) 8000 W (H-ESY-8KT) 10000 W (H-ESY-10KT) 12000 W (H-ESY-12KT) 15000 W (H-ESY-15KT) 6000 W (H-ESY-6K) 8000 W (H-ESY-8K) 10000 W (H-ESY-10K) 12000 W (H-ESY-12K) 15000 W (H-ESY-15K)
	Rated voltage	3/N/PE~, 230/400 V_{AC}.
Measurement period:	From 2022-04-01 to 2022-08-22, 2023-09-06 to 2024-01-11, 2024-02-18 to 2024-02-28	

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Rapid voltage change	
Model	H-ESY-15KT
Connection without provisions (regarding the primary energy carrier)	K_i=0.50
Most adverse case when switching between generator levels	K_i=0.50
Connection at nominal conditions (of the primary energy carrier)	K_i=1.00
Disconnection at rated power	K_i=1.00
Worst value of all switching operations	K_{imax}=1.00

Rapid voltage change	
Model	H-ESY-15K
Connection without provisions (regarding the primary energy carrier)	K_i=0.50
Most adverse case when switching between generator levels	K_i=0.50
Connection at nominal conditions (of the primary energy carrier)	K_i=1.01
Disconnection at rated power	K_i=1.01
Worst value of all switching operations	K_{imax}=1.01

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Flicker (H-ESY-10KT)					
Network impedance angle Ψk	30°	50°	70°	85°	32°
Coefficient of system flicker c_ψ (Maximum)					
L1	--	--	--	--	27.324
L2	--	--	--	--	32.967
L3	--	--	--	--	14.355

Flicker (H-ESY-10K)					
Network impedance angle Ψk	30°	50°	70°	85°	32°
Coefficient of system flicker c_ψ (Maximum)					
L1	--	--	--	--	2.541
L2	--	--	--	--	5.511
L3	--	--	--	--	5.610

Flicker (H-ESY-15KT)					
Network impedance angle Ψk	30°	50°	70°	85°	32°
Coefficient of system flicker c_ψ (Maximum)					
L1	--	--	--	--	2.574
L2	--	--	--	--	5.082
L3	--	--	--	--	2.211

Flicker (H-ESY-15K)					
Network impedance angle Ψk	30°	50°	70°	85°	32°
Coefficient of system flicker c_ψ (Maximum)					
L1	--	--	--	--	25.212
L2	--	--	--	--	23.925
L3	--	--	--	--	24.420

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Harmonics (≤16 A) (H-ESY-10KT)												
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	0.036	0.164	0.221	0.223	0.205	0.192	0.180	0.173	0.106	0.159	0.161	1.080
3	0.210	0.209	0.205	0.207	0.211	0.207	0.204	0.208	0.218	0.211	0.214	2.300
4	0.040	0.065	0.038	0.055	0.066	0.069	0.066	0.064	0.019	0.068	0.067	0.430
5	0.100	0.109	0.107	0.108	0.112	0.116	0.118	0.114	0.112	0.117	0.115	1.140
6	0.008	0.018	0.040	0.028	0.032	0.033	0.035	0.033	0.008	0.028	0.025	0.300
7	0.049	0.059	0.068	0.073	0.074	0.075	0.078	0.081	0.079	0.079	0.082	0.770
8	0.015	0.044	0.023	0.022	0.027	0.027	0.027	0.024	0.006	0.023	0.023	0.230
9	0.037	0.035	0.046	0.052	0.057	0.056	0.056	0.057	0.064	0.060	0.060	0.400
10	0.018	0.024	0.027	0.021	0.016	0.017	0.019	0.020	0.005	0.020	0.018	0.184
11	0.022	0.020	0.024	0.029	0.035	0.037	0.037	0.036	0.040	0.039	0.039	0.330
12	0.016	0.014	0.034	0.023	0.017	0.020	0.020	0.021	0.005	0.024	0.022	0.153
13	0.019	0.027	0.074	0.031	0.081	0.117	0.148	0.164	0.094	0.207	0.225	0.210
14	0.013	0.019	0.015	0.018	0.013	0.011	0.013	0.011	0.004	0.014	0.014	0.131
15	0.034	0.034	0.043	0.028	0.034	0.059	0.077	0.091	0.060	0.105	0.114	0.150
16	0.010	0.015	0.013	0.014	0.012	0.011	0.010	0.010	0.004	0.013	0.015	0.115
17	0.040	0.050	0.018	0.037	0.018	0.038	0.052	0.063	0.046	0.071	0.075	0.132
18	0.007	0.009	0.013	0.013	0.011	0.008	0.009	0.010	0.004	0.009	0.009	0.102
19	0.037	0.045	0.020	0.034	0.007	0.019	0.033	0.039	0.036	0.055	0.054	0.118
20	0.005	0.007	0.008	0.010	0.009	0.009	0.007	0.008	0.003	0.007	0.007	0.092
21	0.031	0.030	0.031	0.029	0.012	0.014	0.023	0.029	0.028	0.046	0.048	0.107
22	0.004	0.005	0.009	0.006	0.010	0.007	0.006	0.006	0.003	0.008	0.008	0.084
23	0.023	0.029	0.025	0.021	0.016	0.012	0.018	0.024	0.024	0.035	0.042	0.098
24	0.003	0.007	0.008	0.005	0.008	0.007	0.007	0.006	0.003	0.006	0.007	0.077
25	0.020	0.024	0.020	0.019	0.018	0.011	0.015	0.017	0.019	0.021	0.025	0.090
26	0.003	0.004	0.005	0.005	0.007	0.006	0.005	0.006	0.002	0.006	0.006	0.071
27	0.017	0.014	0.014	0.015	0.017	0.008	0.013	0.016	0.015	0.019	0.022	0.083
28	0.003	0.003	0.006	0.005	0.005	0.006	0.005	0.005	0.002	0.006	0.006	0.066
29	0.014	0.014	0.011	0.014	0.016	0.008	0.011	0.015	0.012	0.016	0.018	0.078
30	0.003	0.005	0.006	0.005	0.005	0.005	0.005	0.005	0.002	0.005	0.006	0.061
31	0.014	0.014	0.014	0.014	0.016	0.010	0.011	0.014	0.010	0.015	0.016	0.073
32	0.002	0.003	0.004	0.005	0.004	0.005	0.005	0.004	0.002	0.003	0.006	0.058
33	0.013	0.009	0.011	0.013	0.013	0.010	0.010	0.011	0.007	0.015	0.014	0.068
34	0.002	0.003	0.004	0.004	0.003	0.004	0.004	0.004	0.002	0.004	0.004	0.054
35	0.011	0.008	0.009	0.012	0.012	0.010	0.009	0.011	0.006	0.015	0.014	0.064
36	0.002	0.003	0.004	0.003	0.003	0.004	0.004	0.004	0.002	0.005	0.003	0.051
37	0.011	0.009	0.009	0.011	0.011	0.011	0.009	0.011	0.004	0.016	0.016	0.061
38	0.002	0.002	0.003	0.003	0.003	0.004	0.004	0.003	0.002	0.004	0.005	0.048
39	0.009	0.006	0.007	0.008	0.009	0.010	0.007	0.009	0.004	0.012	0.014	0.058
40	0.002	0.003	0.003	0.002	0.003	0.003	0.004	0.004	0.002	0.004	0.004	0.046
THD	1.801%	2.228%	2.443%	2.450%	2.379%	2.352%	2.405%	2.498%	2.142%	2.726%	2.839%	5%

Remark:
1. Iref=14.5 A.
2. The harmonic values are maximum values from all phases.

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Harmonics (≤16 A) (H-ESY-10K)												
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	0.020	0.060	0.092	0.117	0.123	0.117	0.105	0.108	0.113	0.103	0.124	1.080
3	0.218	0.217	0.207	0.210	0.214	0.211	0.208	0.215	0.223	0.218	0.220	2.300
4	0.013	0.023	0.020	0.021	0.015	0.014	0.014	0.016	0.020	0.019	0.017	0.430
5	0.105	0.115	0.113	0.112	0.115	0.119	0.118	0.111	0.112	0.118	0.115	1.140
6	0.004	0.009	0.012	0.013	0.011	0.009	0.007	0.010	0.009	0.006	0.007	0.300
7	0.051	0.061	0.073	0.077	0.077	0.078	0.083	0.088	0.080	0.077	0.081	0.770
8	0.003	0.009	0.010	0.009	0.009	0.008	0.007	0.014	0.007	0.006	0.007	0.230
9	0.039	0.036	0.050	0.057	0.060	0.060	0.062	0.061	0.064	0.062	0.057	0.400
10	0.003	0.006	0.009	0.009	0.007	0.007	0.013	0.006	0.005	0.004	0.006	0.184
11	0.021	0.021	0.026	0.032	0.039	0.040	0.039	0.039	0.041	0.045	0.043	0.330
12	0.002	0.007	0.005	0.006	0.006	0.006	0.005	0.005	0.005	0.004	0.005	0.153
13	0.019	0.012	0.044	0.018	0.047	0.067	0.077	0.086	0.092	0.100	0.108	0.210
14	0.002	0.005	0.006	0.003	0.005	0.009	0.005	0.005	0.004	0.004	0.005	0.131
15	0.016	0.026	0.027	0.019	0.026	0.042	0.050	0.055	0.059	0.063	0.067	0.150
16	0.002	0.003	0.007	0.003	0.004	0.004	0.004	0.004	0.004	0.004	0.005	0.115
17	0.025	0.034	0.014	0.023	0.014	0.028	0.037	0.041	0.044	0.048	0.050	0.132
18	0.002	0.004	0.004	0.002	0.003	0.003	0.003	0.004	0.004	0.003	0.004	0.102
19	0.023	0.024	0.008	0.022	0.008	0.020	0.028	0.032	0.035	0.038	0.040	0.118
20	0.001	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.092
21	0.022	0.020	0.018	0.020	0.008	0.012	0.019	0.023	0.026	0.029	0.031	0.107
22	0.001	0.002	0.003	0.003	0.003	0.002	0.002	0.003	0.003	0.002	0.003	0.084
23	0.019	0.023	0.022	0.017	0.011	0.007	0.014	0.019	0.022	0.025	0.027	0.098
24	0.001	0.002	0.002	0.003	0.002	0.002	0.002	0.002	0.003	0.002	0.003	0.077
25	0.015	0.016	0.016	0.013	0.013	0.005	0.010	0.014	0.017	0.020	0.022	0.090
26	0.001	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.071
27	0.014	0.012	0.010	0.011	0.014	0.004	0.007	0.011	0.013	0.016	0.018	0.083
28	0.001	0.002	0.003	0.002	0.001	0.002	0.002	0.002	0.002	0.002	0.003	0.066
29	0.012	0.012	0.010	0.011	0.013	0.003	0.006	0.008	0.011	0.013	0.015	0.078
30	0.001	0.001	0.002	0.002	0.001	0.001	0.002	0.002	0.002	0.002	0.003	0.061
31	0.010	0.011	0.012	0.012	0.012	0.005	0.006	0.007	0.008	0.010	0.013	0.073
32	0.001	0.002	0.001	0.001	0.002	0.001	0.002	0.002	0.002	0.002	0.002	0.058
33	0.011	0.009	0.011	0.012	0.011	0.007	0.005	0.006	0.007	0.008	0.010	0.068
34	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.054
35	0.010	0.009	0.009	0.011	0.009	0.007	0.005	0.006	0.006	0.006	0.008	0.064
36	0.001	0.001	0.002	0.002	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.051
37	0.009	0.008	0.007	0.010	0.009	0.008	0.005	0.006	0.006	0.006	0.006	0.061
38	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.048
39	0.009	0.005	0.007	0.009	0.008	0.009	0.004	0.006	0.006	0.005	0.004	0.058
40	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.002	0.002	0.002	0.046
THD	1.782%	1.876%	1.927%	2.006%	2.035%	2.024%	2.020%	2.094%	2.169%	2.166%	2.255%	5%

Remark:
1. Iref=14.5 A.
2. The harmonic values are maximum values from all phases.

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TÜV®

DAkkS Deutsche Akkreditierungsstelle D-ZE-11321-01-00

TÜV SÜD Product Service

Certificate of Conformity

No. ESY 109576 0004 Rev. 00

Harmonics (>16 A and ≤75 A) (H-ESY-15KT)												
Active power P/Pn[%]	0	10	20	30	40	50	60	70	80	90	100	Limit value
Ordinal number	Ih/Iref [%]											[%]
2	0.085	0.442	0.622	0.627	0.573	0.607	0.617	0.608	0.603	0.704	0.646	8
3	0.985	0.964	0.969	0.984	0.958	0.995	0.992	1.025	1.039	1.063	1.099	-
4	0.072	0.095	0.115	0.080	0.063	0.079	0.425	0.099	0.102	0.114	0.125	4
5	0.475	0.515	0.515	0.539	0.546	0.512	0.537	0.517	0.534	0.527	0.532	10.7
6	0.018	0.064	0.067	0.068	0.118	0.052	0.055	0.042	0.043	0.043	0.054	2.67
7	0.232	0.313	0.354	0.373	0.380	0.382	0.351	0.376	0.353	0.370	0.352	7.2
8	0.011	0.060	0.052	0.064	0.045	0.041	0.058	0.035	0.035	0.041	0.035	2
9	0.178	0.195	0.256	0.285	0.273	0.293	0.280	0.265	0.278	0.257	0.266	-
10	0.012	0.034	0.046	0.042	0.035	0.033	0.031	0.030	0.027	0.031	0.030	1.6
11	0.102	0.092	0.142	0.181	0.183	0.179	0.207	0.186	0.184	0.193	0.169	3.1
12	0.011	0.035	0.035	0.032	0.031	0.031	0.032	0.026	0.028	0.029	0.029	1.33
13	0.060	0.149	0.078	0.253	0.339	0.400	0.452	0.504	0.550	0.594	0.635	2
14	0.008	0.039	0.021	0.026	0.027	0.026	0.025	0.020	0.019	0.024	0.020	-
15	0.116	0.077	0.092	0.151	0.219	0.254	0.282	0.313	0.344	0.367	0.394	-
16	0.009	0.023	0.018	0.020	0.023	0.024	0.025	0.024	0.022	0.023	0.024	-
17	0.142	0.086	0.112	0.090	0.156	0.190	0.213	0.231	0.253	0.271	0.283	-
18	0.007	0.016	0.015	0.016	0.019	0.022	0.022	0.021	0.019	0.019	0.019	-
19	0.121	0.154	0.111	0.057	0.117	0.149	0.168	0.182	0.196	0.212	0.225	-
20	0.007	0.020	0.017	0.012	0.016	0.019	0.018	0.015	0.015	0.015	0.013	-
21	0.105	0.122	0.100	0.034	0.081	0.111	0.129	0.143	0.154	0.166	0.180	-
22	0.006	0.015	0.016	0.010	0.013	0.016	0.016	0.015	0.016	0.017	0.015	-
23	0.085	0.063	0.083	0.023	0.056	0.088	0.109	0.124	0.136	0.146	0.158	-
24	0.005	0.015	0.015	0.009	0.012	0.015	0.016	0.015	0.014	0.015	0.015	-
25	0.072	0.060	0.065	0.032	0.042	0.068	0.088	0.103	0.115	0.126	0.136	-
26	0.005	0.013	0.014	0.009	0.012	0.014	0.015	0.012	0.012	0.013	0.012	-
27	0.059	0.075	0.054	0.047	0.032	0.052	0.070	0.084	0.097	0.108	0.117	-
28	0.004	0.007	0.013	0.009	0.009	0.012	0.013	0.012	0.013	0.014	0.015	-
29	0.058	0.061	0.053	0.048	0.029	0.039	0.056	0.072	0.084	0.096	0.107	-
30	0.005	0.011	0.009	0.007	0.009	0.012	0.014	0.013	0.012	0.013	0.012	-
31	0.048	0.047	0.059	0.054	0.031	0.036	0.044	0.059	0.072	0.084	0.096	-
32	0.004	0.010	0.008	0.007	0.008	0.012	0.012	0.010	0.010	0.011	0.010	-
33	0.053	0.040	0.058	0.055	0.024	0.034	0.037	0.046	0.059	0.071	0.081	-
34	0.004	0.006	0.007	0.006	0.007	0.010	0.011	0.010	0.011	0.012	0.011	-
35	0.047	0.046	0.053	0.051	0.023	0.029	0.029	0.035	0.047	0.058	0.070	-
36	0.004	0.007	0.007	0.007	0.006	0.010	0.011	0.010	0.010	0.010	0.010	-
37	0.044	0.036	0.047	0.047	0.022	0.031	0.031	0.027	0.040	0.052	0.064	-
38	0.004	0.006	0.007	0.007	0.005	0.009	0.011	0.010	0.010	0.011	0.011	-
39	0.043	0.033	0.039	0.044	0.025	0.030	0.031	0.022	0.031	0.043	0.053	-
40	0.004	0.008	0.006	0.006	0.005	0.008	0.010	0.009	0.009	0.011	0.010	-
THC/I_{ref}	1.179	1.281	1.378	1.398	1.381	1.445	1.540	1.531	1.573	1.662	1.691	13
PWHC/I_{ref}	1.325	1.279	1.289	0.834	1.349	1.681	1.935	2.173	2.412	2.630	2.842	22

Remark:
1. Iref= 21.7 A
2. The harmonic values are maximum values from all phases.

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Harmonics (>16 A and ≤75 A) (H-ESY-15K)												
Active power P/Pn[%]	0	10	20	30	40	50	60	70	80	90	100	Limit value
Ordinal number	Ih/Iref [%]											[%]
2	0.102	0.324	0.433	0.460	0.475	0.474	0.484	0.500	0.502	0.518	0.532	8
3	1.119	1.085	1.030	1.047	1.020	1.061	1.058	1.091	1.109	1.131	1.169	-
4	0.041	0.094	0.078	0.074	0.060	0.067	0.075	0.079	0.098	0.095	0.116	4
5	0.507	0.605	0.565	0.576	0.582	0.549	0.580	0.559	0.576	0.571	0.570	10.7
6	0.020	0.048	0.049	0.040	0.031	0.035	0.032	0.029	0.030	0.026	0.030	2.67
7	0.253	0.331	0.377	0.367	0.387	0.388	0.363	0.385	0.361	0.371	0.357	7.2
8	0.009	0.044	0.039	0.033	0.030	0.024	0.027	0.024	0.020	0.024	0.020	2
9	0.176	0.204	0.279	0.278	0.274	0.299	0.286	0.272	0.285	0.268	0.275	-
10	0.011	0.024	0.040	0.028	0.024	0.018	0.015	0.019	0.016	0.014	0.017	1.6
11	0.096	0.100	0.163	0.187	0.176	0.177	0.212	0.192	0.187	0.194	0.166	3.1
12	0.006	0.035	0.025	0.027	0.022	0.018	0.017	0.014	0.017	0.016	0.014	1.33
13	0.124	0.066	0.141	0.318	0.390	0.444	0.497	0.545	0.591	0.636	0.679	2
14	0.005	0.025	0.013	0.022	0.022	0.016	0.015	0.013	0.012	0.013	0.011	-
15	0.073	0.050	0.089	0.198	0.254	0.285	0.311	0.340	0.371	0.394	0.419	-
16	0.005	0.018	0.009	0.018	0.018	0.017	0.016	0.016	0.013	0.012	0.014	-
17	0.055	0.073	0.089	0.134	0.189	0.216	0.236	0.252	0.272	0.291	0.307	-
18	0.005	0.012	0.011	0.015	0.017	0.017	0.016	0.015	0.014	0.013	0.013	-
19	0.071	0.104	0.090	0.088	0.141	0.167	0.185	0.198	0.212	0.227	0.239	-
20	0.004	0.017	0.013	0.014	0.016	0.016	0.014	0.012	0.012	0.011	0.008	-
21	0.081	0.085	0.082	0.053	0.101	0.129	0.146	0.159	0.172	0.184	0.196	-
22	0.006	0.012	0.012	0.010	0.012	0.014	0.013	0.012	0.012	0.012	0.011	-
23	0.075	0.065	0.065	0.031	0.075	0.103	0.123	0.136	0.149	0.159	0.170	-
24	0.004	0.007	0.011	0.009	0.012	0.012	0.012	0.012	0.010	0.011	0.010	-
25	0.065	0.082	0.049	0.017	0.054	0.081	0.100	0.114	0.127	0.137	0.146	-
26	0.005	0.009	0.010	0.008	0.012	0.011	0.011	0.009	0.009	0.009	0.008	-
27	0.064	0.082	0.039	0.017	0.039	0.064	0.083	0.097	0.111	0.122	0.130	-
28	0.004	0.008	0.008	0.006	0.009	0.010	0.009	0.009	0.009	0.009	0.010	-
29	0.053	0.061	0.044	0.024	0.028	0.051	0.070	0.084	0.098	0.110	0.119	-
30	0.004	0.008	0.006	0.006	0.009	0.009	0.009	0.009	0.008	0.007	0.007	-
31	0.050	0.059	0.051	0.030	0.021	0.041	0.058	0.072	0.085	0.097	0.106	-
32	0.004	0.006	0.004	0.005	0.010	0.009	0.009	0.008	0.008	0.007	0.006	-
33	0.042	0.055	0.053	0.035	0.020	0.031	0.047	0.061	0.075	0.086	0.096	-
34	0.004	0.006	0.005	0.004	0.007	0.008	0.008	0.008	0.008	0.007	0.007	-
35	0.038	0.047	0.047	0.035	0.020	0.022	0.038	0.051	0.063	0.073	0.082	-
36	0.004	0.006	0.006	0.004	0.008	0.009	0.009	0.008	0.007	0.006	0.006	-
37	0.037	0.041	0.037	0.035	0.022	0.021	0.032	0.044	0.057	0.067	0.075	-
38	0.004	0.006	0.006	0.005	0.008	0.008	0.009	0.008	0.007	0.007	0.006	-
39	0.034	0.033	0.034	0.034	0.023	0.022	0.026	0.038	0.050	0.060	0.068	-
40	0.005	0.005	0.006	0.006	0.007	0.008	0.008	0.008	0.008	0.007	0.007	-
THC/I_{ref}	1.293	1.373	1.374	1.385	1.414	1.478	1.525	1.581	1.632	1.688	1.750	13
$PWHC/I_{ref}$	0.949	1.208	1.080	1.094	1.585	1.911	2.181	2.418	2.668	2.885	3.074	22

Remark:
1. Iref= 21.7 A
2. The harmonic values are maximum values from all phases.

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E.6 Certificate of the network and system protection

Certificate of NS protection		
Manufacturer	WECO SRL	
Type of NS protection	Integrated NS protection	
Central NS protection	☐	
Integrated NS protection	☒	Assigned to power generation unit of type: H-ESY-6K, H-ESY-8K, H-ESY-10K, H-ESY-12K, H-ESY-15K, H-ESY-6KT, H-ESY-8KT, H-ESY-10KT, H-ESY-12KT, H-ESY-15KT.
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	64.290.23.31582.01 from 2024-06-19	
The network and system protection designated above meets the requirements of VDE-AR-N 4105:2018-11.		

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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"		
NS protection test report		
Type of NS system:	Integrated NS protection	Other Manufacturer indications
Software version:	ARM: V1.03.08, DSP: V1.02.11	
Manufacturer:	WECO SRL Viale Kennedy 113-121 Scarperia e San Piero 50038 Florence ITALY	
Measuring period:	From 2022-04-01 to 2022-08-22, 2023-09-06 to 2024-01-11, 2024-02-18 to 2024-02-28	

	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: 288.0V; L1-N: 287.8V; L2-N: 287.7V; L3-N: 287.8V;	L1-N/L2-N/L3-N: 129.0ms; L1-N: 121.2ms; L2-N: 129.2ms; L3-N: 110.4ms;
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: 183.0V; L1-N: 183.1V; L2-N: 183.0V; L3-N: 183.0V;	L1-N/L2-N/L3-N: 3.030s; L1-N: 3.024s; L2-N: 3.028s; L3-N: 3.048s;
Voltage drop protection *U* <<	0.45 * U_n	L1-N/L2-N/L3-N: 103.3V; L1-N: 102.2V; L2-N: 102.6V; L3-N: 101.6V;	L1-N/L2-N/L3-N: 354.0ms; L1-N: 312.0ms; L2-N: 310.0ms; L3-N: 384.0ms;
Frequency decrease protection *f* <	47.5 Hz	47.50Hz	173.0ms
Frequency increase protection *f* >	51.5 Hz	51.51Hz	159.0ms

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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: 498.0s (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) 299.0s (L1-N&L2-N&L3-N from 600s@106%U_n to 114%U_n)	
☑ **as integrated NS protection**	
Assigned to power generation unit type	H-ESY-6K, H-ESY-8K, H-ESY-10K, H-ESY-12K, H-ESY-15K, H-ESY-6KT, H-ESY-8KT, H-ESY-10KT, H-ESY-12KT, H-ESY-15KT
Integrated interface switch type	Series-connected relays for all phase conductors each Relay type: azsr143
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.	☑