Certificate of compliance

Applicant:	**SolarEdge Technologies Ltd.** 1 HaMada Street Herzliya 4673335 **Israel**			
Product:	**Grid-tied photovoltaic inverter**			
Model:	**SE33.3K**	**SE30K**	**SE27.6K**	**SE25K**

Use in accordance with regulations:

Automatic disconnection device with three-phase mains surveillance in accordance with Engineering Recommendation G99/1 for photovoltaic systems with a three-phase parallel coupling via an inverter in the public mains supply. The automatic disconnection device is an integral part of the aforementioned inverter. This serves as a replacement for the disconnection device with isolating function, which can be accessed the distribution network provider at any time.

Applied rules and standards:

Engineering Recommendation G99/1-6:2020
Requirements for the connection of generation equipment in parallel with public distribution networks
A2-3 Tests for a Type A Inverter Connected Power Generating Modules

DIN V VDE V 0126-1-1:2006-02 (4.1 Functional safety)
Automatic disconnection device between a generator and the public low-voltage grid

At the time of issue of this certificate the safety concept of an aforementioned representative product corresponds to the valid safety specifications for the specified use in accordance with regulations.

Report number:	**19TH0534-G99/1_0**	**Certification program:**	**NSOP-0032-DEU-ZE-V01**
Certificate number:	**U20-0934**	**Date of issue:**	**2020-11-25**

Certification body

Thomas Lammel

Certification body Bureau Veritas Consumer Products Services Germany GmbH accredited according to DIN EN ISO/IEC 17065

A partial representation of the certificate requires the written approval of Bureau Veritas Consumer Products Services Germany GmbH

Appendix A2-3 Compliance Verification Report for Inverter Connected Power Generating Modules	
Extract from test report according to the Engineering Recommendation G99	**Nr. 19TH0534-G99/1_0**

Type Approval and declaration of compliance with the requirements of Engineering Recommendation G99.				
PGM Technology:	Photovoltaic Inverter			
Manufacturer / applicant:	SolarEdge Technologies Ltd.			
Address:	1 HaMada Street Herzliya 4673335 Israel			
Tel	+972-9-957-6620	**Fax**	+972-9-957-6591	
Email:	info@solaredge.com	**Website**	www.solaredge.com	
Rated values	SE25K	SE27.6K	SE30K	SE33.3K
Input DC voltage range [V]	680 – 1000			
Input DC current [A]	36,25	40,0	43,5	48,25
Output AC voltage [V]	220/230 Vac, L-N 380/400 Vac, L-L			
Output AC current [A]	36,25	40	43,5	48,25
Output power [VA]	25000	27600	30000	33300
Firmware version	Main DSP software version is 1.20 Aux DSP software version is 2.20			
Measurement period:	2020-06-01 – 2020-10-28			
Description of the structure of the power generation unit: The power generation unit is equipped with a PV and line-side EMC filter. The power generation unit has no galvanic isolation between DC input and AC output. Output switch-off is performed with single-fault tolerance based on two series-connected relays in line and neutral. This enables a safe disconnection of the power generation unit from the network in case of error.				
Differences between Generating Units: The inverters of the SExx.xK series consist of following models: SE33.3K, SE30K, SE27.6K and SE25K. All the models use the same hardware and software. The different powers between SE25K, SE27.6k SE30K and SE33.3K is realized by software derating. The all models are equipped with four DC input.				
The above stated Generating Units are tested according the requirements in the Engineering Recommendation G99/1. Any modification that affects the stated tests must be named by the manufacturer/supplier of the product to ensure that the product meets all requirements of the Engineering Recommendation G99/1.				

Appendix A2-3 Compliance Verification Report for Inverter Connected Power Generating Modules	
Extract from test report according to the Engineering Recommendation G99	**Nr. 19TH0534-G99/1_0**

Operating Range.	
Test 1	Voltage = 85% of nominal (195,5V) Frequency = 47Hz Power Factor = 1 Period of test 20 s
Connection:	Always connected
Limit:	Always connected
Test 2	Voltage = 85% of nominal (195,5V) Frequency = 47,5Hz Power Factor = 1 Period of test 90 minutes
Connection:	Always connected
Limit:	Always connected
Test 3	Voltage = 110% of nominal (253V) Frequency = 51,5Hz Power Factor = 1 Period of test 90 minutes
Connection:	
Limit:	Always connected
Test 4	Voltage = 110% of nominal (253V) Frequency = 52,0Hz Power Factor = 1 Period of test 15 minutes
Connection:	Always connected
Limit:	Always connected
Test 5	Confirm that the Power Generating Module is capable of staying connected to the Distribution Network and operate at rates of change of frequency up to 1 Hzs^{-1} as measured over a period of 500ms. Note that this is not expected to be demonstrated on site.
Connection:	Always connected
Limit:	Always connected

Appendix A2-3 Compliance Verification Report for Inverter Connected Power Generating Modules

Extract from test report according to the Engineering Recommendation G99 **Nr. 19TH0534-G99/1_0**

Protection. Voltage tests.

Phase 1

Function	Setting		Trip test		No trip test	
	Voltage [V]	Time delay [s]	Voltage [V]	Time delay [s]	Voltage / time	Confirm no trip
U/V	184	2,5	183,6	2,578	188V / 5,0s	No trip
					180V / 2,45s	No trip
O/V stage 1	262,2	1,0	262,1	1,078	258,2V 5,0s	No trip
O/V stage 2	273,7	0,5	273,7	0,578	269,7V 0,95s	No trip
					277,7V 0,45s	No trip

Phase 2

Function	Setting		Trip test		No trip test	
	Voltage [V]	Time delay [s]	Voltage [V]	Time delay [s]	Voltage / time	Confirm no trip
U/V	184	2,5	183,2	2,578	188V / 5,0s	No trip
					180V / 2,45s	No trip
O/V stage 1	262,2	1,0	261,9	1,072	258,2V 5,0s	No trip
O/V stage 2	273,7	0,5	273,5	0,572	269,7V 0,95s	No trip
					277,7V 0,45s	No trip

Phase 3

Function	Setting		Trip test		No trip test	
	Voltage [V]	Time delay [s]	Voltage [V]	Time delay [s]	Voltage / time	Confirm no trip
U/V	184	2,5	183,5	2,571	188V / 5,0s	No trip
					180V / 2,45s	No trip
O/V stage 1	262,2	1,0	262,1	1,065	258,2V 5,0s	No trip
O/V stage 2	273,7	0,5	273,5	0,565	269,7V 0,95s	No trip
					277,7V 0,45s	No trip

Note. For Voltage tests the Voltage required to trip is the setting ±3,45V. The time delay can be measured at a larger deviation than the minimum required to operate the protection. The No trip tests need to be carried out at the setting ±4V and for the relevant times as shown in the table above to ensure that the protection will not trip in error.

Appendix A2-3 Compliance Verification Report for Inverter Connected Power Generating Modules

Extract from test report according to the Engineering Recommendation G99 **Nr. 19TH0534-G99/1_0**

Protection. Frequency tests.						
Function	**Setting**		**Trip test**		**No trip test**	
	Frequency [Hz]	**Time delay [s]**	**Frequency [Hz]**	**Time delay [s]**	**Frequency / time**	**Confirm no trip**
U/F stage 1	47,5	20	47,50	20,083	47,7Hz / 30s	No trip
U/F stage 2	47	0,5	46,99	0,592	47,2Hz / 19,5s	No trip
					46,8Hz / 0,45s	No trip
O/F stage 2	52	0,5	52,00	0,578	51,8Hz / 120s	No trip
					52,2Hz / 0,45s	No trip
Note. For Frequency Trip tests the Frequency required to trip is the setting ±0,1Hz. In order to measure the time delay a larger deviation than the minimum required to operate the projection can be used. The “No-trip tests” need to be carried out at the setting ±0,2Hz and for the relevant times as shown in the table above to ensure that the protection will not trip in error.						

Appendix A2-3 Compliance Verification Report for Inverter Connected Power Generating Modules	
Extract from test report according to the Engineering Recommendation G99	**Nr. 19TH0534-G99/1_0**

Protection. Loss of Mains.						
Inverters tested according to BS EN 62116.						
Balancing load on islanded network	33% of -5% Q Test 22	66% of -5% Q Test 12	100% of -5% P Test 5	33% of +5% Q Test 31	66% of +5% Q Test 21	100% of +5% P Test 10
Trip time. Ph1 fuse removed [s]	0,132	0,150	0,274	0,172	0,097	0,193
Trip time. Ph2 fuse removed [s]	0,132	0,150	0,274	0,172	0,097	0,193
Trip time. Ph3 fuse removed [s]	0,132	0,150	0,274	0,172	0,097	0,193
Note. Trip time limit is 0,5s.						

Protection. Re-connection timer.	
Test should prove that the reconnection sequence starts in no less than 20 seconds for restoration of voltage and frequency to within the stage 1 settings of table 10.1.	
Over Voltage	
Time delay setting	**Measured delay**
20s	37,0s
Under Voltage	
Time delay setting	**Measured delay**
20s	35,0s
Over Frequency	
Time delay setting	**Measured delay**
20s	34,0s
Under Frequency	
Time delay setting	**Measured delay**
20s	35,0s

	Checks on no reconnection when voltage or frequency is brought to just outside stage 1 limits of table 1.			
	At 266,2V	At 180,0V	At 47,4Hz	At 52,1Hz
Confirmation that the Generating Unit does not re-connect.	No reconnection	No reconnection	No reconnection	No reconnection

Protection. Frequency change, Stability test.				
	Start Frequency [Hz]	**Change**	**Test Duration**	**Confirm no trip**
Positive Vector Shift	49,5	+50 degrees		No trip
Negative Vector Shift	50,5	-50 degrees		No trip
Positive Frequency drift	49,0 to 51,0	+0,95Hz/sec	2,1s	No trip
Negative Frequency drift	51,0 to 49,0	-0,95Hz/sec	2,1s	No trip

Appendix A2-3 Compliance Verification Report for Inverter Connected Power Generating Modules

Extract from test report according to the Engineering Recommendation G99 **Nr. 19TH0534-G99/1_0**

Limited Frequency Sensitive Mode – Over Frequency							
1-min mean value [Hz]:	**a) 50,00**	**b) 50,45**	**c) 50,70**	**d) 51,15**	**e) 50,70**	**f) 50,45**	**g) 50,00**
1. Measurement a) to g): Active power output > 80% Pn							
Frequency [Hz]:	50,00	50,45	50,70	51,15	50,70	50,45	50,00
$P_{expected}$ [kW]:	33096	32725	31076	28105	31085	32741	33124
$P_{measured}$ [kW]:	33100	32755	31101	28120	31101	32755	33100
2. Measurement a) to g): Active power output 40% and 60% Pn							
Frequency [Hz]:	50,00	50,45	50,70	51,15	50,70	50,45	50,00
$P_{expected}$ [kW]:	16764	16437	14779	11797	14778	16434	24950
$P_{measured}$ [kW]:	16764	16418	14765	11785	14764	16418	19400

Output Power with falling Frequency						
Frequency setpoint [Hz]:	50,00	49,50	49,00	48,00	47,60	47,10
Frequency [Hz]:	50,00	49,50	49,00	48,00	47,60	47,10
Active power [kW]:	32,84	32,85	32,86	32,87	32,88	32,88
ΔP/Pmax [%]:		0,03	0,07	0,10	0,11	0,13

Note.
Electronic inverter no power reduction take place.

Appendix A2-3 Compliance Verification Report for Inverter Connected Power Generating Modules

Extract from test report according to the Engineering Recommendation G99 **Nr. 19TH0534-G99/1_0**

Power Quality. Harmonics.

SE25K, Phase 1

Generating Unit rating per phase (rpp)						
	At 45-55% of rated output 4,208kW		100% of rated output 8,391kW			
Harmonic	Measured Value (MV) in [A]	Measured Value (MV) in [%]	Measured Value (MV) in [A]	Measured Value (MV) in [%]	Limit in BS EN61000-3-12 in %	
					1 phase	3 phase
2nd	18,208	50,264	36,226	100,000	8%	8%
3rd	0,035	0,097	0,041	0,113	21,6%	N/A
4th	0,050	0,137	0,050	0,138	4%	4%
5th	0,016	0,045	0,023	0,064	10,7%	10,7%
6th	0,186	0,513	0,154	0,425	2,67%	2,67%
7th	0,017	0,046	0,016	0,045	7,2%	7,2%
8th	0,129	0,356	0,108	0,297	2%	2%
9th	0,014	0,038	0,013	0,037	3,8%	N/A
10th	0,039	0,108	0,039	0,108	1,6%	1,6%
11th	0,012	0,033	0,012	0,033	3,1%	3,1%
12th	0,097	0,269	0,099	0,272	1,33%	1,33%
13th	0,011	0,030	0,010	0,028	2%	2%
14th	0,065	0,179	0,054	0,148	N/A	N/A
15th	0,011	0,031	0,011	0,031	N/A	N/A
16th	0,024	0,067	0,027	0,076	N/A	N/A
17th	0,010	0,028	0,010	0,027	N/A	N/A
18th	0,046	0,128	0,044	0,121	N/A	N/A
19th	0,008	0,023	0,008	0,022	N/A	N/A
20th	0,033	0,092	0,027	0,073	N/A	N/A
21th	0,009	0,026	0,009	0,026	N/A	N/A
22th	0,008	0,023	0,009	0,024	N/A	N/A
23th	0,009	0,024	0,009	0,024	N/A	N/A
24th	0,021	0,058	0,018	0,049	N/A	N/A
25th	0,007	0,019	0,007	0,019	N/A	N/A
26th	0,014	0,039	0,011	0,031	N/A	N/A
27th	0,009	0,024	0,008	0,023	N/A	N/A
28th	0,005	0,013	0,005	0,015	N/A	N/A
29th	0,008	0,023	0,008	0,023	N/A	N/A
30th	0,009	0,025	0,006	0,016	N/A	N/A
31th	0,006	0,016	0,006	0,017	N/A	N/A
32th	0,005	0,015	0,009	0,024	N/A	N/A
33th	0,008	0,022	0,008	0,021	N/A	N/A
34th	0,006	0,015	0,005	0,014	N/A	N/A
35th	0,007	0,020	0,007	0,020	N/A	N/A
36th	0,007	0,020	0,008	0,022	N/A	N/A
37th	0,005	0,013	0,005	0,015	N/A	N/A
38th	0,005	0,014	0,009	0,026	N/A	N/A
39th	0,007	0,020	0,007	0,020	N/A	N/A
40th	0,004	0,010	0,004	0,011	N/A	N/A
THD_{40} [%]	1,52		0,68		23%	13%
PWHD [%]	0,003		0,001		23%	22%

Appendix A2-3 Compliance Verification Report for Inverter Connected Power Generating Modules

Extract from test report according to the Engineering Recommendation G99 **Nr. 19TH0534-G99/1_0**

Power Quality. Harmonics.

SE25K, Phase 2

Generating Unit rating per phase (rpp)						
	At 45-55% of rated output 4,179kW		100% of rated output 8,339kW			
Harmonic	Measured Value (MV) in [A]	Measured Value (MV) in [%]	Measured Value (MV) in [A]	Measured Value (MV) in [%]	Limit in BS EN61000-3-12 in %	
					1 phase	3 phase
2nd	18,129	50,137	36,159	100,000	8%	8%
3rd	0,045	0,126	0,078	0,216	21,6%	N/A
4th	0,043	0,120	0,047	0,129	4%	4%
5th	0,013	0,037	0,021	0,059	10,7%	10,7%
6th	0,165	0,457	0,138	0,382	2,67%	2,67%
7th	0,019	0,053	0,017	0,048	7,2%	7,2%
8th	0,108	0,298	0,094	0,260	2%	2%
9th	0,011	0,031	0,011	0,031	3,8%	N/A
10th	0,035	0,096	0,044	0,120	1,6%	1,6%
11th	0,010	0,028	0,011	0,031	3,1%	3,1%
12th	0,077	0,213	0,087	0,240	1,33%	1,33%
13th	0,014	0,038	0,012	0,033	2%	2%
14th	0,052	0,143	0,040	0,111	N/A	N/A
15th	0,009	0,026	0,010	0,027	N/A	N/A
16th	0,022	0,060	0,025	0,069	N/A	N/A
17th	0,009	0,026	0,010	0,027	N/A	N/A
18th	0,033	0,092	0,035	0,096	N/A	N/A
19th	0,010	0,028	0,009	0,025	N/A	N/A
20th	0,029	0,081	0,019	0,051	N/A	N/A
21th	0,008	0,023	0,008	0,023	N/A	N/A
22th	0,008	0,022	0,009	0,026	N/A	N/A
23th	0,009	0,024	0,009	0,024	N/A	N/A
24th	0,018	0,048	0,012	0,034	N/A	N/A
25th	0,008	0,022	0,007	0,020	N/A	N/A
26th	0,017	0,046	0,014	0,039	N/A	N/A
27th	0,008	0,022	0,008	0,021	N/A	N/A
28th	0,006	0,017	0,006	0,016	N/A	N/A
29th	0,008	0,022	0,008	0,023	N/A	N/A
30th	0,012	0,032	0,005	0,014	N/A	N/A
31th	0,006	0,018	0,006	0,017	N/A	N/A
32th	0,006	0,018	0,007	0,021	N/A	N/A
33th	0,008	0,021	0,007	0,019	N/A	N/A
34th	0,005	0,014	0,005	0,015	N/A	N/A
35th	0,007	0,021	0,007	0,020	N/A	N/A
36th	0,006	0,015	0,004	0,012	N/A	N/A
37th	0,005	0,014	0,005	0,014	N/A	N/A
38th	0,004	0,010	0,006	0,017	N/A	N/A
39th	0,007	0,019	0,007	0,019	N/A	N/A
40th	0,004	0,011	0,004	0,011	N/A	N/A
THD_{40} [%]	1,33		0,63		23%	13%
PWHD [%]	0,002		0,001		23%	22%

Appendix A2-3 Compliance Verification Report for Inverter Connected Power Generating Modules

Extract from test report according to the Engineering Recommendation G99 **Nr. 19TH0534-G99/1_0**

Power Quality. Harmonics.

SE25K, Phase 3

Generating Unit rating per phase (rpp)						
	At 45-55% of rated output 4,208kW		100% of rated output 8,391kW			
Harmonic	Measured Value (MV) in [A]	Measured Value (MV) in [%]	Measured Value (MV) in [A]	Measured Value (MV) in [%]	Limit in BS EN61000-3-12 in %	
					1 phase	3 phase
2nd	36,386	100,000	18,248	50,150	8%	8%
3rd	0,078	0,215	0,045	0,123	21,6%	N/A
4th	0,024	0,065	0,023	0,064	4%	4%
5th	0,020	0,054	0,016	0,044	10,7%	10,7%
6th	0,110	0,301	0,146	0,402	2,67%	2,67%
7th	0,014	0,039	0,014	0,039	7,2%	7,2%
8th	0,112	0,307	0,132	0,362	2%	2%
9th	0,015	0,041	0,014	0,038	3,8%	N/A
10th	0,010	0,028	0,010	0,027	1,6%	1,6%
11th	0,011	0,030	0,012	0,032	3,1%	3,1%
12th	0,076	0,208	0,076	0,208	1,33%	1,33%
13th	0,009	0,025	0,009	0,026	2%	2%
14th	0,052	0,143	0,059	0,161	N/A	N/A
15th	0,012	0,034	0,011	0,031	N/A	N/A
16th	0,008	0,022	0,007	0,019	N/A	N/A
17th	0,009	0,024	0,010	0,026	N/A	N/A
18th	0,028	0,078	0,038	0,104	N/A	N/A
19th	0,007	0,018	0,007	0,020	N/A	N/A
20th	0,019	0,053	0,029	0,078	N/A	N/A
21th	0,010	0,029	0,010	0,027	N/A	N/A
22th	0,005	0,014	0,005	0,015	N/A	N/A
23th	0,007	0,021	0,009	0,024	N/A	N/A
24th	0,015	0,042	0,020	0,056	N/A	N/A
25th	0,005	0,015	0,006	0,016	N/A	N/A
26th	0,010	0,028	0,016	0,045	N/A	N/A
27th	0,009	0,026	0,009	0,025	N/A	N/A
28th	0,005	0,014	0,005	0,015	N/A	N/A
29th	0,007	0,019	0,008	0,022	N/A	N/A
30th	0,007	0,018	0,009	0,024	N/A	N/A
31th	0,005	0,013	0,005	0,013	N/A	N/A
32th	0,006	0,017	0,006	0,016	N/A	N/A
33th	0,008	0,023	0,008	0,023	N/A	N/A
34th	0,004	0,011	0,004	0,011	N/A	N/A
35th	0,007	0,018	0,007	0,020	N/A	N/A
36th	0,007	0,019	0,005	0,013	N/A	N/A
37th	0,004	0,011	0,004	0,011	N/A	N/A
38th	0,008	0,021	0,005	0,012	N/A	N/A
39th	0,008	0,021	0,007	0,020	N/A	N/A
40th	0,004	0,010	0,003	0,009	N/A	N/A
THD_{40} [%]	1,29		0,57		23%	13%
PWHD [%]	0,002		0,001		23%	22%

Appendix A2-3 Compliance Verification Report for Inverter Connected Power Generating Modules

Extract from test report according to the Engineering Recommendation G99 **Nr. 19TH0534-G99/1_0**

Power Quality. Harmonics.

SE27.6K, Phase 1

Generating Unit rating per phase (rpp)						
	At 45-55% of rated output 4,638kW		100% of rated output 9,229kW			
Harmonic	Measured Value (MV) in [A]	Measured Value (MV) in [%]	Measured Value (MV) in [A]	Measured Value (MV) in [%]	Limit in BS EN61000-3-12 in %	
					1 phase	3 phase
2nd	20,100	50,283	39,974	100,000	8%	8%
3rd	0,037	0,092	0,040	0,099	21,6%	N/A
4th	0,050	0,125	0,050	0,125	4%	4%
5th	0,016	0,040	0,020	0,050	10,7%	10,7%
6th	0,174	0,436	0,134	0,336	2,67%	2,67%
7th	0,016	0,040	0,016	0,040	7,2%	7,2%
8th	0,124	0,310	0,099	0,247	2%	2%
9th	0,013	0,032	0,014	0,034	3,8%	N/A
10th	0,041	0,102	0,045	0,114	1,6%	1,6%
11th	0,011	0,028	0,011	0,027	3,1%	3,1%
12th	0,094	0,234	0,096	0,241	1,33%	1,33%
13th	0,010	0,025	0,010	0,024	2%	2%
14th	0,059	0,147	0,050	0,126	N/A	N/A
15th	0,010	0,026	0,011	0,028	N/A	N/A
16th	0,024	0,059	0,025	0,063	N/A	N/A
17th	0,009	0,024	0,009	0,023	N/A	N/A
18th	0,043	0,107	0,047	0,118	N/A	N/A
19th	0,008	0,019	0,008	0,019	N/A	N/A
20th	0,030	0,076	0,026	0,065	N/A	N/A
21th	0,009	0,022	0,009	0,023	N/A	N/A
22th	0,009	0,022	0,010	0,026	N/A	N/A
23th	0,008	0,021	0,009	0,021	N/A	N/A
24th	0,018	0,046	0,017	0,043	N/A	N/A
25th	0,006	0,016	0,006	0,016	N/A	N/A
26th	0,013	0,032	0,013	0,033	N/A	N/A
27th	0,008	0,020	0,008	0,021	N/A	N/A
28th	0,005	0,013	0,006	0,014	N/A	N/A
29th	0,008	0,020	0,008	0,020	N/A	N/A
30th	0,009	0,022	0,007	0,018	N/A	N/A
31th	0,005	0,014	0,006	0,015	N/A	N/A
32th	0,005	0,013	0,011	0,026	N/A	N/A
33th	0,008	0,019	0,008	0,021	N/A	N/A
34th	0,006	0,014	0,006	0,014	N/A	N/A
35th	0,007	0,017	0,007	0,018	N/A	N/A
36th	0,008	0,021	0,008	0,020	N/A	N/A
37th	0,005	0,012	0,005	0,013	N/A	N/A
38th	0,006	0,015	0,010	0,026	N/A	N/A
39th	0,007	0,017	0,007	0,017	N/A	N/A
40th	0,004	0,010	0,004	0,011	N/A	N/A
THD_{40} [%]	1,31		0,057		23%	13%
PWHD [%]	0,001		0,001		23%	22%

Appendix A2-3 Compliance Verification Report for Inverter Connected Power Generating Modules

Extract from test report according to the Engineering Recommendation G99 **Nr. 19TH0534-G99/1_0**

Power Quality. Harmonics.

SE27.6K, Phase 2

Generating Unit rating per phase (rpp)						
	At 45-55% of rated output 4,615kW		100% of rated output 9,203kW			
Harmonic	Measured Value (MV) in [A]	Measured Value (MV) in [%]	Measured Value (MV) in [A]	Measured Value (MV) in [%]	Limit in BS EN61000-3-12 in %	
					1 phase	3 phase
2nd	20,019	50,167	39,905	100,000	8%	8%
3rd	0,044	0,110	0,079	0,198	21,6%	N/A
4th	0,045	0,112	0,049	0,124	4%	4%
5th	0,014	0,036	0,019	0,048	10,7%	10,7%
6th	0,157	0,393	0,127	0,318	2,67%	2,67%
7th	0,017	0,043	0,015	0,038	7,2%	7,2%
8th	0,103	0,259	0,094	0,236	2%	2%
9th	0,011	0,028	0,011	0,029	3,8%	N/A
10th	0,037	0,093	0,045	0,113	1,6%	1,6%
11th	0,010	0,026	0,011	0,027	3,1%	3,1%
12th	0,075	0,188	0,087	0,219	1,33%	1,33%
13th	0,012	0,030	0,010	0,026	2%	2%
14th	0,044	0,111	0,031	0,076	N/A	N/A
15th	0,009	0,022	0,010	0,024	N/A	N/A
16th	0,021	0,053	0,026	0,066	N/A	N/A
17th	0,009	0,023	0,009	0,023	N/A	N/A
18th	0,030	0,076	0,037	0,092	N/A	N/A
19th	0,009	0,023	0,008	0,020	N/A	N/A
20th	0,026	0,066	0,020	0,051	N/A	N/A
21th	0,008	0,020	0,008	0,021	N/A	N/A
22th	0,009	0,022	0,010	0,026	N/A	N/A
23th	0,008	0,021	0,009	0,022	N/A	N/A
24th	0,015	0,038	0,013	0,032	N/A	N/A
25th	0,007	0,019	0,007	0,016	N/A	N/A
26th	0,016	0,039	0,014	0,034	N/A	N/A
27th	0,008	0,019	0,008	0,019	N/A	N/A
28th	0,007	0,017	0,006	0,015	N/A	N/A
29th	0,008	0,019	0,008	0,021	N/A	N/A
30th	0,011	0,027	0,005	0,013	N/A	N/A
31th	0,006	0,015	0,006	0,014	N/A	N/A
32th	0,006	0,014	0,009	0,024	N/A	N/A
33th	0,007	0,018	0,008	0,019	N/A	N/A
34th	0,005	0,013	0,006	0,015	N/A	N/A
35th	0,007	0,018	0,007	0,019	N/A	N/A
36th	0,006	0,016	0,005	0,012	N/A	N/A
37th	0,005	0,012	0,005	0,012	N/A	N/A
38th	0,004	0,011	0,007	0,018	N/A	N/A
39th	0,007	0,017	0,007	0,017	N/A	N/A
40th	0,004	0,010	0,004	0,011	N/A	N/A
THD_{40} [%]	1,15		0,56		23%	13%
PWHD [%]	0,001		0,001		23%	22%

Appendix A2-3 Compliance Verification Report for Inverter Connected Power Generating Modules

Extract from test report according to the Engineering Recommendation G99 **Nr. 19TH0534-G99/1_0**

Power Quality. Harmonics.

SE27.6K, Phase 3

Generating Unit rating per phase (rpp)						
	At 45-55% of rated output 4,645kW		100% of rated output 9,259kW			
Harmonic	Measured Value (MV) in [A]	Measured Value (MV) in [%]	Measured Value (MV) in [A]	Measured Value (MV) in [%]	Limit in BS EN61000-3-12 in %	
					1 phase	3 phase
2nd	20,148	50,184	40,148	100,000	8%	8%
3rd	0,043	0,107	0,080	0,200	21,6%	N/A
4th	0,024	0,060	0,022	0,056	4%	4%
5th	0,015	0,039	0,015	0,038	10,7%	10,7%
6th	0,132	0,329	0,098	0,244	2,67%	2,67%
7th	0,015	0,037	0,014	0,036	7,2%	7,2%
8th	0,128	0,319	0,111	0,276	2%	2%
9th	0,013	0,032	0,013	0,033	3,8%	N/A
10th	0,010	0,025	0,017	0,042	1,6%	1,6%
11th	0,011	0,028	0,011	0,028	3,1%	3,1%
12th	0,070	0,175	0,063	0,156	1,33%	1,33%
13th	0,010	0,024	0,009	0,022	2%	2%
14th	0,053	0,132	0,043	0,108	N/A	N/A
15th	0,011	0,026	0,011	0,027	N/A	N/A
16th	0,007	0,018	0,008	0,021	N/A	N/A
17th	0,009	0,023	0,009	0,022	N/A	N/A
18th	0,034	0,084	0,037	0,092	N/A	N/A
19th	0,007	0,018	0,007	0,017	N/A	N/A
20th	0,025	0,062	0,023	0,057	N/A	N/A
21th	0,009	0,023	0,010	0,024	N/A	N/A
22th	0,006	0,014	0,007	0,018	N/A	N/A
23th	0,008	0,020	0,008	0,020	N/A	N/A
24th	0,018	0,044	0,013	0,031	N/A	N/A
25th	0,006	0,014	0,005	0,013	N/A	N/A
26th	0,015	0,038	0,009	0,022	N/A	N/A
27th	0,008	0,021	0,009	0,022	N/A	N/A
28th	0,006	0,014	0,005	0,012	N/A	N/A
29th	0,008	0,019	0,008	0,019	N/A	N/A
30th	0,009	0,021	0,009	0,023	N/A	N/A
31th	0,005	0,012	0,005	0,012	N/A	N/A
32th	0,006	0,014	0,008	0,019	N/A	N/A
33th	0,008	0,020	0,008	0,020	N/A	N/A
34th	0,004	0,010	0,004	0,011	N/A	N/A
35th	0,007	0,017	0,007	0,017	N/A	N/A
36th	0,005	0,014	0,008	0,019	N/A	N/A
37th	0,004	0,010	0,004	0,010	N/A	N/A
38th	0,006	0,014	0,008	0,021	N/A	N/A
39th	0,007	0,018	0,007	0,018	N/A	N/A
40th	0,004	0,009	0,004	0,009	N/A	N/A
THD_{40} [%]	1,09		0,49		23%	13%
PWHD [%]	0,001		0,001		23%	22%

Appendix A2-3 Compliance Verification Report for Inverter Connected Power Generating Modules

Extract from test report according to the Engineering Recommendation G99 **Nr. 19TH0534-G99/1_0**

Power Quality. Harmonics.

SE30K, Phase 1

Generating Unit rating per phase (rpp)						
	At 45-55% of rated output 5,042kW		100% of rated output 10,021kW			
Harmonic	Measured Value (MV) in [A]	Measured Value (MV) in [%]	Measured Value (MV) in [A]	Measured Value (MV) in [%]	Limit in BS EN61000-3-12 in %	
					1 phase	3 phase
2nd	21,852	50,345	43,404	100,000	8%	8%
3rd	0,035	0,080	0,048	0,111	21,6%	N/A
4th	0,048	0,110	0,053	0,121	4%	4%
5th	0,017	0,039	0,021	0,050	10,7%	10,7%
6th	0,169	0,389	0,131	0,302	2,67%	2,67%
7th	0,016	0,037	0,016	0,038	7,2%	7,2%
8th	0,118	0,271	0,097	0,224	2%	2%
9th	0,014	0,031	0,014	0,032	3,8%	N/A
10th	0,040	0,093	0,043	0,099	1,6%	1,6%
11th	0,012	0,027	0,012	0,027	3,1%	3,1%
12th	0,092	0,211	0,101	0,232	1,33%	1,33%
13th	0,010	0,024	0,010	0,024	2%	2%
14th	0,056	0,130	0,050	0,115	N/A	N/A
15th	0,011	0,025	0,011	0,025	N/A	N/A
16th	0,023	0,053	0,029	0,066	N/A	N/A
17th	0,010	0,023	0,010	0,023	N/A	N/A
18th	0,041	0,095	0,048	0,110	N/A	N/A
19th	0,008	0,019	0,008	0,020	N/A	N/A
20th	0,029	0,066	0,028	0,064	N/A	N/A
21th	0,009	0,022	0,009	0,021	N/A	N/A
22th	0,008	0,019	0,009	0,022	N/A	N/A
23th	0,009	0,020	0,009	0,022	N/A	N/A
24th	0,017	0,039	0,020	0,047	N/A	N/A
25th	0,007	0,015	0,007	0,016	N/A	N/A
26th	0,011	0,026	0,014	0,033	N/A	N/A
27th	0,009	0,020	0,009	0,020	N/A	N/A
28th	0,005	0,011	0,006	0,013	N/A	N/A
29th	0,008	0,019	0,008	0,020	N/A	N/A
30th	0,007	0,017	0,008	0,018	N/A	N/A
31th	0,006	0,013	0,006	0,015	N/A	N/A
32th	0,005	0,010	0,012	0,028	N/A	N/A
33th	0,008	0,018	0,008	0,018	N/A	N/A
34th	0,005	0,012	0,005	0,013	N/A	N/A
35th	0,007	0,016	0,008	0,017	N/A	N/A
36th	0,008	0,018	0,008	0,019	N/A	N/A
37th	0,005	0,011	0,006	0,014	N/A	N/A
38th	0,006	0,014	0,011	0,025	N/A	N/A
39th	0,007	0,017	0,007	0,017	N/A	N/A
40th	0,004	0,008	0,005	0,010	N/A	N/A
THD_{40} [%]	1,16		0,53		23%	13%
PWHD [%]	0,001		0,001		23%	22%

Appendix A2-3 Compliance Verification Report for Inverter Connected Power Generating Modules

Extract from test report according to the Engineering Recommendation G99 **Nr. 19TH0534-G99/1_0**

Power Quality. Harmonics.

SE30K, Phase 2

Generating Unit rating per phase (rpp)						
	At 45-55% of rated output 5,017kW		100% of rated output 9,993kW			
Harmonic	Measured Value (MV) in [A]	Measured Value (MV) in [%]	Measured Value (MV) in [A]	Measured Value (MV) in [%]	Limit in BS EN61000-3-12 in %	
					1 phase	3 phase
2nd	21,765	50,228	43,333	100,000	8%	8%
3rd	0,046	0,106	0,088	0,202	21,6%	N/A
4th	0,045	0,103	0,051	0,117	4%	4%
5th	0,014	0,033	0,020	0,047	10,7%	10,7%
6th	0,151	0,348	0,125	0,288	2,67%	2,67%
7th	0,019	0,043	0,017	0,039	7,2%	7,2%
8th	0,099	0,228	0,088	0,203	2%	2%
9th	0,011	0,025	0,012	0,028	3,8%	N/A
10th	0,037	0,086	0,048	0,111	1,6%	1,6%
11th	0,010	0,023	0,011	0,025	3,1%	3,1%
12th	0,073	0,168	0,090	0,207	1,33%	1,33%
13th	0,013	0,031	0,011	0,026	2%	2%
14th	0,041	0,094	0,035	0,082	N/A	N/A
15th	0,009	0,021	0,010	0,024	N/A	N/A
16th	0,021	0,048	0,027	0,062	N/A	N/A
17th	0,009	0,020	0,010	0,022	N/A	N/A
18th	0,029	0,066	0,039	0,091	N/A	N/A
19th	0,010	0,023	0,009	0,020	N/A	N/A
20th	0,024	0,056	0,018	0,042	N/A	N/A
21th	0,008	0,019	0,009	0,020	N/A	N/A
22th	0,008	0,018	0,011	0,024	N/A	N/A
23th	0,008	0,019	0,009	0,021	N/A	N/A
24th	0,013	0,030	0,015	0,035	N/A	N/A
25th	0,008	0,018	0,007	0,017	N/A	N/A
26th	0,014	0,033	0,015	0,035	N/A	N/A
27th	0,008	0,018	0,008	0,019	N/A	N/A
28th	0,006	0,013	0,005	0,013	N/A	N/A
29th	0,008	0,018	0,009	0,020	N/A	N/A
30th	0,010	0,022	0,005	0,012	N/A	N/A
31th	0,006	0,014	0,006	0,014	N/A	N/A
32th	0,005	0,011	0,010	0,023	N/A	N/A
33th	0,007	0,017	0,008	0,018	N/A	N/A
34th	0,005	0,012	0,006	0,014	N/A	N/A
35th	0,007	0,017	0,008	0,018	N/A	N/A
36th	0,005	0,013	0,005	0,011	N/A	N/A
37th	0,005	0,012	0,005	0,012	N/A	N/A
38th	0,004	0,010	0,007	0,017	N/A	N/A
39th	0,007	0,016	0,007	0,017	N/A	N/A
40th	0,004	0,009	0,004	0,010	N/A	N/A
THD_{40} [%]	1,02		0,52		23%	13%
PWHD [%]	0,001		0,001		23%	22%

Appendix A2-3 Compliance Verification Report for Inverter Connected Power Generating Modules

Extract from test report according to the Engineering Recommendation G99 **Nr. 19TH0534-G99/1_0**

Power Quality. Harmonics.

SE30K, Phase 3

Generating Unit rating per phase (rpp)						
	At 45-55% of rated output 5,053kW		100% of rated output 10,059kW			
Harmonic	Measured Value (MV) in [A]	Measured Value (MV) in [%]	Measured Value (MV) in [A]	Measured Value (MV) in [%]	Limit in BS EN61000-3-12 in %	
					1 phase	3 phase
2nd	21,913	50,245	43,612	100,000	8%	8%
3rd	0,046	0,106	0,087	0,200	21,6%	N/A
4th	0,023	0,053	0,026	0,059	4%	4%
5th	0,016	0,037	0,017	0,039	10,7%	10,7%
6th	0,130	0,299	0,090	0,205	2,67%	2,67%
7th	0,014	0,032	0,014	0,033	7,2%	7,2%
8th	0,123	0,282	0,103	0,237	2%	2%
9th	0,014	0,033	0,014	0,033	3,8%	N/A
10th	0,009	0,021	0,011	0,026	1,6%	1,6%
11th	0,011	0,026	0,012	0,027	3,1%	3,1%
12th	0,069	0,158	0,077	0,177	1,33%	1,33%
13th	0,009	0,021	0,009	0,020	2%	2%
14th	0,050	0,115	0,050	0,116	N/A	N/A
15th	0,011	0,026	0,012	0,027	N/A	N/A
16th	0,007	0,016	0,008	0,018	N/A	N/A
17th	0,009	0,022	0,009	0,021	N/A	N/A
18th	0,032	0,073	0,030	0,070	N/A	N/A
19th	0,007	0,016	0,007	0,015	N/A	N/A
20th	0,022	0,051	0,021	0,048	N/A	N/A
21th	0,010	0,022	0,010	0,024	N/A	N/A
22th	0,005	0,012	0,005	0,012	N/A	N/A
23th	0,008	0,019	0,009	0,020	N/A	N/A
24th	0,016	0,036	0,016	0,036	N/A	N/A
25th	0,006	0,013	0,005	0,012	N/A	N/A
26th	0,013	0,029	0,010	0,023	N/A	N/A
27th	0,009	0,020	0,010	0,022	N/A	N/A
28th	0,005	0,012	0,005	0,011	N/A	N/A
29th	0,008	0,018	0,008	0,019	N/A	N/A
30th	0,007	0,016	0,009	0,020	N/A	N/A
31th	0,005	0,011	0,004	0,010	N/A	N/A
32th	0,005	0,011	0,009	0,020	N/A	N/A
33th	0,008	0,018	0,009	0,020	N/A	N/A
34th	0,004	0,009	0,004	0,010	N/A	N/A
35th	0,007	0,017	0,007	0,017	N/A	N/A
36th	0,005	0,012	0,008	0,019	N/A	N/A
37th	0,004	0,009	0,004	0,009	N/A	N/A
38th	0,006	0,014	0,009	0,022	N/A	N/A
39th	0,007	0,017	0,008	0,018	N/A	N/A
40th	0,003	0,008	0,004	0,008	N/A	N/A
THD_{40} [%]	0,98		0,46		23%	13%
PWHD [%]	0,001		0,001		23%	22%

Appendix A2-3 Compliance Verification Report for Inverter Connected Power Generating Modules

Extract from test report according to the Engineering Recommendation G99 **Nr. 19TH0534-G99/1_0**

Power Quality. Harmonics.

SE33.3K, Phase 1

Generating Unit rating per phase (rpp)						
	At 45-55% of rated output 5,577kW		100% of rated output 11,068kW			
Harmonic	Measured Value (MV) in [A]	Measured Value (MV) in [%]	Measured Value (MV) in [A]	Measured Value (MV) in [%]	Limit in BS EN61000-3-12 in %	
					1 phase	3 phase
2nd	24,168	50,417	47,936	100,000	8%	8%
3rd	0,038	0,079	0,032	0,068	21,6%	N/A
4th	0,046	0,095	0,050	0,104	4%	4%
5th	0,015	0,032	0,026	0,053	10,7%	10,7%
6th	0,148	0,308	0,185	0,385	2,67%	2,67%
7th	0,016	0,034	0,016	0,033	7,2%	7,2%
8th	0,101	0,210	0,135	0,282	2%	2%
9th	0,014	0,028	0,021	0,044	3,8%	N/A
10th	0,035	0,073	0,042	0,087	1,6%	1,6%
11th	0,012	0,024	0,019	0,039	3,1%	3,1%
12th	0,084	0,175	0,116	0,241	1,33%	1,33%
13th	0,010	0,021	0,012	0,024	2%	2%
14th	0,050	0,104	0,063	0,131	N/A	N/A
15th	0,011	0,023	0,016	0,034	N/A	N/A
16th	0,020	0,041	0,025	0,051	N/A	N/A
17th	0,010	0,020	0,014	0,030	N/A	N/A
18th	0,036	0,074	0,053	0,112	N/A	N/A
19th	0,008	0,017	0,009	0,019	N/A	N/A
20th	0,024	0,050	0,031	0,066	N/A	N/A
21th	0,009	0,020	0,012	0,026	N/A	N/A
22th	0,006	0,013	0,008	0,017	N/A	N/A
23th	0,009	0,018	0,012	0,025	N/A	N/A
24th	0,014	0,030	0,024	0,051	N/A	N/A
25th	0,007	0,014	0,007	0,016	N/A	N/A
26th	0,009	0,018	0,019	0,039	N/A	N/A
27th	0,008	0,018	0,010	0,020	N/A	N/A
28th	0,005	0,010	0,006	0,012	N/A	N/A
29th	0,008	0,016	0,010	0,020	N/A	N/A
30th	0,007	0,014	0,012	0,025	N/A	N/A
31th	0,006	0,012	0,006	0,013	N/A	N/A
32th	0,005	0,010	0,015	0,032	N/A	N/A
33th	0,008	0,016	0,008	0,017	N/A	N/A
34th	0,005	0,010	0,006	0,012	N/A	N/A
35th	0,007	0,015	0,007	0,016	N/A	N/A
36th	0,007	0,015	0,011	0,023	N/A	N/A
37th	0,005	0,011	0,005	0,011	N/A	N/A
38th	0,006	0,013	0,013	0,027	N/A	N/A
39th	0,007	0,015	0,006	0,013	N/A	N/A
40th	0,003	0,007	0,005	0,010	N/A	N/A
THD_{40} [%]	0,93		0,61		23%	13%
PWHD [%]	0,001		0,001		23%	22%

Appendix A2-3 Compliance Verification Report for Inverter Connected Power Generating Modules

Extract from test report according to the Engineering Recommendation G99 **Nr. 19TH0534-G99/1_0**

Power Quality. Harmonics.

SE33.3K, Phase 1

Generating Unit rating per phase (rpp)						
	At 45-55% of rated output 5,554kW		100% of rated output 11,043kW			
Harmonic	Measured Value (MV) in [A]	Measured Value (MV) in [%]	Measured Value (MV) in [A]	Measured Value (MV) in [%]	Limit in BS EN61000-3-12 in %	
					1 phase	3 phase
2nd	24,088	50,305	47,884	100,000	8%	8%
3rd	0,042	0,087	0,061	0,127	21,6%	N/A
4th	0,044	0,093	0,046	0,097	4%	4%
5th	0,014	0,028	0,029	0,060	10,7%	10,7%
6th	0,125	0,261	0,178	0,372	2,67%	2,67%
7th	0,018	0,038	0,013	0,026	7,2%	7,2%
8th	0,089	0,185	0,130	0,272	2%	2%
9th	0,011	0,023	0,020	0,042	3,8%	N/A
10th	0,038	0,079	0,044	0,091	1,6%	1,6%
11th	0,010	0,021	0,020	0,042	3,1%	3,1%
12th	0,070	0,146	0,109	0,228	1,33%	1,33%
13th	0,012	0,026	0,010	0,021	2%	2%
14th	0,037	0,078	0,047	0,098	N/A	N/A
15th	0,009	0,019	0,015	0,031	N/A	N/A
16th	0,018	0,037	0,021	0,044	N/A	N/A
17th	0,009	0,018	0,015	0,032	N/A	N/A
18th	0,025	0,053	0,047	0,097	N/A	N/A
19th	0,009	0,020	0,008	0,017	N/A	N/A
20th	0,021	0,045	0,024	0,051	N/A	N/A
21th	0,008	0,017	0,011	0,023	N/A	N/A
22th	0,007	0,014	0,010	0,020	N/A	N/A
23th	0,008	0,017	0,013	0,026	N/A	N/A
24th	0,013	0,026	0,021	0,044	N/A	N/A
25th	0,007	0,016	0,007	0,015	N/A	N/A
26th	0,013	0,027	0,019	0,039	N/A	N/A
27th	0,008	0,016	0,009	0,018	N/A	N/A
28th	0,006	0,013	0,007	0,015	N/A	N/A
29th	0,008	0,016	0,011	0,022	N/A	N/A
30th	0,008	0,017	0,008	0,017	N/A	N/A
31th	0,006	0,013	0,006	0,013	N/A	N/A
32th	0,004	0,009	0,012	0,026	N/A	N/A
33th	0,007	0,015	0,007	0,015	N/A	N/A
34th	0,005	0,010	0,007	0,014	N/A	N/A
35th	0,007	0,015	0,008	0,017	N/A	N/A
36th	0,005	0,010	0,008	0,016	N/A	N/A
37th	0,005	0,010	0,005	0,011	N/A	N/A
38th	0,005	0,011	0,010	0,021	N/A	N/A
39th	0,007	0,014	0,006	0,012	N/A	N/A
40th	0,004	0,008	0,005	0,011	N/A	N/A
THD_{40} [%]	0,82		0,58		23%	13%
PWHD [%]	0,001		0,001		23%	22%

Appendix A2-3 Compliance Verification Report for Inverter Connected Power Generating Modules

Extract from test report according to the Engineering Recommendation G99 **Nr. 19TH0534-G99/1_0**

Power Quality. Harmonics.

SE33.3K, Phase 3

Generating Unit rating per phase (rpp)						
	At 45-55% of rated output 5,592kW		100% of rated output 11,109kW			
Harmonic	Measured Value (MV) in [A]	Measured Value (MV) in [%]	Measured Value (MV) in [A]	Measured Value (MV) in [%]	Limit in BS EN61000-3-12 in %	
					1 phase	3 phase
2nd	24,250	50,351	48,161	100,000	8%	8%
3rd	0,044	0,091	0,063	0,130	21,6%	N/A
4th	0,023	0,048	0,020	0,041	4%	4%
5th	0,015	0,031	0,025	0,052	10,7%	10,7%
6th	0,107	0,221	0,147	0,305	2,67%	2,67%
7th	0,013	0,028	0,011	0,024	7,2%	7,2%
8th	0,103	0,214	0,146	0,303	2%	2%
9th	0,014	0,029	0,023	0,047	3,8%	N/A
10th	0,009	0,019	0,012	0,025	1,6%	1,6%
11th	0,011	0,024	0,018	0,037	3,1%	3,1%
12th	0,064	0,133	0,092	0,190	1,33%	1,33%
13th	0,008	0,018	0,008	0,017	2%	2%
14th	0,047	0,097	0,065	0,135	N/A	N/A
15th	0,011	0,023	0,018	0,037	N/A	N/A
16th	0,008	0,016	0,008	0,016	N/A	N/A
17th	0,009	0,020	0,013	0,027	N/A	N/A
18th	0,025	0,052	0,040	0,082	N/A	N/A
19th	0,006	0,013	0,007	0,014	N/A	N/A
20th	0,018	0,037	0,027	0,057	N/A	N/A
21th	0,009	0,020	0,014	0,028	N/A	N/A
22th	0,005	0,010	0,006	0,013	N/A	N/A
23th	0,008	0,017	0,010	0,022	N/A	N/A
24th	0,014	0,030	0,021	0,044	N/A	N/A
25th	0,005	0,011	0,006	0,012	N/A	N/A
26th	0,011	0,023	0,015	0,032	N/A	N/A
27th	0,008	0,017	0,011	0,023	N/A	N/A
28th	0,005	0,010	0,006	0,012	N/A	N/A
29th	0,008	0,016	0,009	0,018	N/A	N/A
30th	0,005	0,011	0,012	0,025	N/A	N/A
31th	0,004	0,009	0,005	0,010	N/A	N/A
32th	0,004	0,008	0,012	0,024	N/A	N/A
33th	0,008	0,016	0,009	0,020	N/A	N/A
34th	0,004	0,008	0,005	0,010	N/A	N/A
35th	0,007	0,015	0,006	0,013	N/A	N/A
36th	0,006	0,012	0,011	0,024	N/A	N/A
37th	0,004	0,008	0,004	0,009	N/A	N/A
38th	0,006	0,013	0,012	0,025	N/A	N/A
39th	0,007	0,014	0,008	0,016	N/A	N/A
40th	0,003	0,007	0,004	0,007	N/A	N/A
THD_{40} [%]	0,76		0,54		23%	13%
PWHD [%]	0,001		0,001		23%	22%

Appendix A2-3 Compliance Verification Report for Inverter Connected Power Generating Modules

Extract from test report according to the Engineering Recommendation G99 **Nr. 19TH0534-G99/1_0**

Power Quality. Power factor.				
SE25K				
Output power	216,2V	230V	253V	Measured at three voltage levels and at full output. Voltage to be maintained within ±1,5% of the stated level during the test.
20%	0,993	0,992	0,992	
50%	0,999	0,999	0,999	
75%	1,000	1,000	1,000	
100%	1,000	1,000	1,000	
Limit	>0,95	>0,95	>0,95	
SE27.6K				
Output power	216,2V	230V	253V	Measured at three voltage levels and at full output. Voltage to be maintained within ±1,5% of the stated level during the test.
20%	0,994	0,993	0,993	
50%	0,999	0,999	0,999	
75%	1,000	1,000	1,000	
100%	1,000	1,000	1,000	
Limit	>0,95	>0,95	>0,95	
SE30K				
Output power	216,2V	230V	253V	Measured at three voltage levels and at full output. Voltage to be maintained within ±1,5% of the stated level during the test.
20%	0,996	0,995	0,995	
50%	0,999	0,999	0,999	
75%	1,000	1,000	1,000	
100%	1,000	1,000	1,000	
Limit	>0,95	>0,95	>0,95	
SE33.3K				
Output power	216,2V	230V	253V	Measured at three voltage levels and at full output. Voltage to be maintained within ±1,5% of the stated level during the test.
20%	0,997	0,996	0,995	
50%	0,999	0,999	1,000	
75%	1,000	1,000	1,000	
100%	1,000	1,000	1,000	
Limit	>0,95	>0,95	>0,95	

Appendix A2-3 Compliance Verification Report for Inverter Connected Power Generating Modules

Extract from test report according to the Engineering Recommendation G99 **Nr. 19TH0534-G99/1_0**

Power Quality. Voltage fluctuation and Flicker.

	Starting			Stopping			Running	
	dmax	**dc**	**d(t)**	**dmax**	**dc**	**d(t)**	**Pst**	**Plt 2 hours**
Measured values at test impedance	2,99	2,04	0,00	2,81	1,98	0,00	0,24	0,24
Measured values at standard impedance	3,34	2,28	0,00	3,14	2,28	0,00	0,27	0,27
Values for maximum impedance	4,00	2,73	0,00	3,76	2,73	0,00	0,32	0,32
Limits set under BS EN 61000-3-11	4%	3,3%	3,3% 500ms	4%	3,3%	3,3% 500ms	1,0	0,65

Test impedance	R	0,19	Ω	Xl	0,12	Ω
	Z	0,23	Ω			
Standard impedance	R	0,24	Ω	Xl	0,15	Ω
	Z	0,25	Ω			
Maximum impedance	R	0,30	Ω	Xl	0,26	Ω
	Zmax	0,16	Ω			

Appendix A2-3 Compliance Verification Report for Inverter Connected Power Generating Modules

Extract from test report according to the Engineering Recommendation G99 **Nr. 19TH0534-G99/1_0**

Power Quality. DC injection.			
SE25K			
Phase 1			
Test level power [%]	10	55	100
Recorded value [mA]	-61,7	-66	-64,7
Recorded value [%]	-0,17	-0,18	-0,18
Limit [%]	0,25	0,25	0,25
Phase 2			
Test level power [%]	10	55	100
Recorded value [mA]	15	12,9	22,6
Recorded value [%]	0,04	0,04	0,06
Limit [%]	0,25	0,25	0,25
Phase 3			
Test level power [%]	10	55	100
Recorded value [mA]	-19,5	-23,9	-38,3
Recorded value [%]	-0,05	-0,07	-0,11
Limit [%]	0,25	0,25	0,25
SE27.6K			
Phase 1			
Test level power [%]	10	55	100
Recorded value [mA]	-61,7	-65,5	-65,1
Recorded value [%]	-0,15	-0,16	-0,16
Limit [%]	0,25	0,25	0,25
Phase 2			
Test level power [%]	10	55	100
Recorded value [mA]	15	13	23,1
Recorded value [%]	0,04	0,03	0,06
Limit [%]	0,25	0,25	0,25
Phase 3			
Test level power [%]	10	55	100
Recorded value [mA]	-19,5	-28,8	-41
Recorded value [%]	-0,05	-0,07	-0,10
Limit [%]	0,25	0,25	0,25
Note. DC-injection is tested at each phase of the inverter and a limit of 0,25% per phase was used as pass criteria.			

Appendix A2-3 Compliance Verification Report for Inverter Connected Power Generating Modules

Extract from test report according to the Engineering Recommendation G99 **Nr. 19TH0534-G99/1_0**

Power Quality. DC injection.			
SE30K			
Phase 1			
Test level power [%]	10	55	100
Recorded value [mA]	-64,2	-63,8	-66
Recorded value [%]	-0,15	-0,15	-0,15
Limit [%]	0,25	0,25	0,25
Phase 2			
Test level power [%]	10	55	100
Recorded value [mA]	15,8	16,2	24,6
Recorded value [%]	0,04	0,04	0,06
Limit [%]	0,25	0,25	0,25
Phase 3			
Test level power [%]	10	55	100
Recorded value [mA]	-20,6	-27,2	-40,8
Recorded value [%]	-0,05	-0,06	-0,09
Limit [%]	0,25	0,25	0,25
SE33.3K			
Phase 1			
Test level power [%]	10	55	100
Recorded value [mA]	-62,9	-68,5	-70,4
Recorded value [%]	-0,13	-0,14	-0,15
Limit [%]	0,25	0,25	0,25
Phase 2			
Test level power [%]	10	55	100
Recorded value [mA]	15,4	18,7	28,8
Recorded value [%]	0,03	0,04	0,06
Limit [%]	0,25	0,25	0,25
Phase 3			
Test level power [%]	10	55	100
Recorded value [mA]	-20,7	-27,9	-43,3
Recorded value [%]	-0,04	-0,06	-0,09
Limit [%]	0,25	0,25	0,25
Note. DC-injection is tested at each phase of the inverter and a limit of 0,25% per phase was used as pass criteria.			

Appendix A2-3 Compliance Verification Report for Inverter Connected Power Generating Modules

Extract from test report according to the Engineering Recommendation G99 **Nr. 19TH0534-G99/1_0**

Fault level Contribution.

SE33.3K

Phase 1

For a directly coupled SSEG			For a Inverter SSEG		
Parameter	**Symbol**	**Value**	**Time after fault**	**Volts [V]**	**Amps [A]**
Peak Short Circuit current	I_p	N/A	20ms	33,16	48,74
Initial Value of aperiodic current	A	N/A	100ms	32,82	48,11
Initial symmetrical short-circuit current*	I_k	N/A	250ms	32,89	48,19
Decaying (aperiodic) component of short circuit current*	i_{DC}	N/A	500ms	32,81	48,14
Reactance/Resistance Ratio of source*	X/R	N/A	**Time to Trip [s]**	2,598	

Phase 2

For a directly coupled SSEG			For a Inverter SSEG		
Parameter	**Symbol**	**Value**	**Time after fault**	**Volts [V]**	**Amps [A]**
Peak Short Circuit current	I_p	N/A	20ms	120,33	48,09
Initial Value of aperiodic current	A	N/A	100ms	61,15	48,15
Initial symmetrical short-circuit current*	I_k	N/A	250ms	46,28	48,48
Decaying (aperiodic) component of short circuit current*	i_{DC}	N/A	500ms	40,03	48,52
Reactance/Resistance Ratio of source*	X/R	N/A	**Time to Trip [s]**	2,598	

Phase 3

For a directly coupled SSEG			For a Inverter SSEG		
Parameter	**Symbol**	**Value**	**Time after fault**	**Volts [V]**	**Amps [A]**
Peak Short Circuit current	I_p	N/A	20ms	53,07	45,81
Initial Value of aperiodic current	A	N/A	100ms	37,51	47,56
Initial symmetrical short-circuit current*	I_k	N/A	250ms	34,63	47,97
Decaying (aperiodic) component of short circuit current*	i_{DC}	N/A	500ms	33,58	48,05
Reactance/Resistance Ratio of source*	X/R	N/A	**Time to Trip [s]**	2,598	

For rotating machines and linear piston machines the test should produce a 0s – 2s plot of the short circuit current as seen at the Generating Unit terminals.

* Values for these parameters should be provided where the short circuit duration is sufficiently long to enable interpolation of the plot.

Appendix A2-3 Compliance Verification Report for Inverter Connected Power Generating Modules	
Extract from test report according to the Engineering Recommendation G99	**Nr. 19TH0534-G99/1_0**

Self Monitoring – Solid state switching.	**N/A**
It has been verified that in the event of the solid state switching device failing to disconnect the Power Park Module, the voltage on the output side of the switching device is reduced to a value below 50 volts within 0,5 seconds.	N/A (No solid state switching device)
Note. Unit do not provide solid state switching relays. In case the semiconductor bridge is switched off, then the voltage on the output drops to 0. In this case the relays on the output will also open (Functional safety of the internal automatic disconnection device according to VDE 0126-1-1).	

Logic Interface (input port)	**P**
Confirm that an input port is provided and can be used to shut down the module.	Yes