Certificate of compliance

Applicant:	**AISWEI Technology Co., Ltd.** Room 905B, 757 Mengzi Road, Huangpu District, 200023 Shanghai, **P.R. China**
Product:	**Photovoltaic (PV) inverter**
Model:	**ASW75K-LT** **ASW80K-LT** **ASW100K-LT** **ASW110K-LT**

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 G99/1-9:2022
Requirements for the connection of generation equipment in parallel with public distribution networks

DIN VDE V 0124-100:2020 (5.5.2.1 Functional safety of network and system protection)
Grid integration of generator plants - Low-voltage - Test requirements for generator units to be connected to and operated in parallel with low-voltage distribution networks

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:	**PVGB2211WDG0067-1**	**Certification program:**	**NSOP-0032-DEU-ZE-V01**
Certificate number:	**U23-0044**	**Date of issue:**	**2023-01-27**

Certification body

Alf Assenkamp

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

Testing laboratory accredited according to DIN EN ISO/IEC 17025

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. PVGB2211WDG0067-1**

Type Approval and declaration of compliance with the requirements of Engineering Recommendation G99.			
PGM Technology:	Photovoltaic (PV) inverter		
Manufacturer / applicant:	AISWEI Technology Co., Ltd.		
Address:	Room 905B, 757 Mengzi Road, Huangpu District, 200023 Shanghai, P.R.China		
Tel	--	**Fax:**	--
Email:	--	**Website:**	--

Rated values	ASW75K-LT	ASW80K-LT	ASW100K-LT	ASW110K-LT
Max. input DC voltage [V]	1100			
Input DC voltage range [V]	200-1100			
Max. Input DC current [A]	8*32		10*32	
Output AC voltage [V]	3L/N/PE, 230V, 50Hz			
Max. Output AC current [A]	114,0	127,0	158,8	174,7
Nominal Output power [kW]	75	80	100	110
Max. Output power [kVA]	75	88	110	121

Firmware version	Main DSP Software version: V610-04001-00 Slave DSP Software version: V610-04002-00 Safety package (Flash) version: V610-12001-00

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 models ASW75K-LT, ASW80K-LT, ASW100K-LT and ASW110K-LT are almost identical in hardware and software, expected the components are desctription as below table and the output power derated by software.

Item	Type	ASW75K-LT, ASW80K-LT	ASW100K-LT, ASW110K-LT
		Quantity	Quantity
PV connector	PV-FT-C2M-HSG	8*2	10*2
	PV-FT-C2F-HSG	8*2	10*2
DC switch	GHX5-32P/4P1100-32	1	2
BOOST-IGBT	MPBQ75N120BF	8	10
BOOST-DIODE	SDS120J040H2	8	10
BOOST-Inductor	TRDK3J3383-2-30-85-L9	0	1
	TRDK3J3383-2-30-85-L10	0	1

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. PVGB2211WDG0067-1**

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:	Always connected
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	Voltage = 100% of nominal (230 V) Frequency = 50,0 Hz Power Factor = 1 Period of test 90 minutes
Connection:	Always connected
Limit:	Always connected
Test 6	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. PVGB2211WDG0067-1**

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	184,6V	2,523s	188V / 5,0s	No trip
					180V / 2,45s	No trip
O/V stage 1	262,2	1,0	262,6V	1,004s	258,2V 5,0s	No trip
O/V stage 2	273,7	0,5	274,1V	0,519s	269,7V 0,95s	No trip
					277,7V 0,45s	No trip

Protection. Voltage tests.						
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	184,3V	2,529s	188V / 5,0s	No trip
					180V / 2,45s	No trip
O/V stage 1	262,2	1,0	262,3V	1,009s	258,2V 5,0s	No trip
O/V stage 2	273,7	0,5	273,7V	0,504s	269,7V 0,95s	No trip
					277,7V 0,45s	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. PVGB2211WDG0067-1**

Protection. Voltage tests.						
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	184,7V	2,501s	188V / 5,0s	No trip
					180V / 2,45s	No trip
O/V stage 1	262,2	1,0	262,0V	1,014s	258,2V 5,0s	No trip
O/V stage 2	273,7	0,5	273,4V	0,512s	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.						

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	47,50Hz	20,01s	47,7Hz / 30s	No trip
U/F stage 2	47	0,5	47,00Hz	0,513s	47,2Hz / 19,5s	No trip
					46,8Hz / 0,45s	No trip
O/F stage 2	52	0,5	52,00Hz	0,502s	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. PVGB2211WDG0067-1**

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 [ms]	72	66	116	77	86	162
Trip time. Ph2 fuse removed [ms]	72	66	116	77	86	162
Trip time. Ph3 fuse removed [ms]	72	66	116	77	86	162
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	66,4s
Under Voltage	
Time delay setting	**Measured delay**
20s	66,4s
Over Frequency	
Time delay setting	**Measured delay**
20s	66,4s
Under Frequency	
Time delay setting	**Measured delay**
20s	66,3s

	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

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

Extract from test report according to the Engineering Recommendation G99 — **Nr. PVGB2211WDG0067-1**

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

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]:	N/A	119,79	113,74	102,85	113,74	119,79	N/A
$P_{measured}$ [kW]:	121,41	120,17	113,23	100,67	113,21	120,19	121,52
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]:	N/A	59,29	53,24	42,35	53,24	59,29	N/A
$P_{measured}$ [kW]:	60,80	59,37	52,56	40,06	51,23	59,28	121,38

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]:	120,79	120,78	120,78	120,79	120,76	120,76
ΔP/Pmax [%]:		-0,008	-0,008	0,000	-0,025	-0,025

Note.

For a CHP the test point a) at 50,00Hz is taken as Registered capacity (P_{max}) due to limited discrete operating points of the CHP's thermal process.

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. PVGB2211WDG0067-1**

Power Quality. Harmonics.

Phase 1

Generating Unit rating per phase (rpp)			ASW75K-LT			
	At 45-55% of rated output 37,91 kW		100% of rated output 74,70 kW			
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
1st	54,981	--	108,398	--	--	--
2nd	0,042	0,039	0,071	0,065	8%	8%
3rd	0,372	0,342	0,621	0,572	21,6%	N/A
4th	0,442	0,407	0,498	0,458	4%	4%
5th	0,249	0,229	0,230	0,212	10,7%	10,7%
6th	0,177	0,162	0,297	0,273	2,67%	2,67%
7th	0,120	0,111	0,113	0,104	7,2%	7,2%
8th	0,262	0,241	0,200	0,184	2%	2%
9th	0,132	0,121	0,160	0,148	3,8%	N/A
10th	0,163	0,150	0,122	0,112	1,6%	1,6%
11th	0,156	0,144	0,158	0,145	3,1%	3,1%
12th	0,187	0,172	0,182	0,167	1,33%	1,33%
13th	0,045	0,042	0,065	0,060	2%	2%
14th	0,292	0,269	0,229	0,211	N/A	N/A
15th	0,100	0,092	0,302	0,278	N/A	N/A
16th	0,213	0,196	0,127	0,117	N/A	N/A
17th	0,942	0,866	0,916	0,843	N/A	N/A
18th	0,131	0,121	0,230	0,211	N/A	N/A
19th	0,885	0,814	0,735	0,676	N/A	N/A
20th	0,254	0,234	0,292	0,269	N/A	N/A
21th	0,108	0,099	0,207	0,191	N/A	N/A
22th	0,269	0,248	0,255	0,235	N/A	N/A
23th	0,397	0,366	0,590	0,543	N/A	N/A
24th	0,208	0,191	0,124	0,114	N/A	N/A
25th	0,923	0,849	1,082	0,996	N/A	N/A
26th	0,067	0,062	0,140	0,129	N/A	N/A
27th	0,053	0,048	0,160	0,147	N/A	N/A
28th	0,148	0,137	0,214	0,197	N/A	N/A
29th	0,142	0,131	0,137	0,126	N/A	N/A
30th	0,262	0,241	0,284	0,262	N/A	N/A
31th	0,420	0,387	0,767	0,705	N/A	N/A
32th	0,143	0,132	0,153	0,141	N/A	N/A
33th	0,109	0,100	0,090	0,083	N/A	N/A
34th	0,045	0,041	0,107	0,099	N/A	N/A
35th	0,199	0,183	0,307	0,282	N/A	N/A
36th	0,137	0,126	0,238	0,219	N/A	N/A
37th	0,164	0,151	0,297	0,273	N/A	N/A
38th	0,139	0,128	0,131	0,121	N/A	N/A
39th	0,057	0,052	0,123	0,114	N/A	N/A
40th	0,077	0,071	0,102	0,094	N/A	N/A
THD_{50} [%]	1,888		2,167		23%	13%
PWHD [%]	8,002		9,423		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. PVGB2211WDG0067-1**

Power Quality. Harmonics.

Phase 2

Generating Unit rating per phase (rpp)			ASW75K-LT			
	At 45-55% of rated output 37,91 kW		100% of rated output 74,70 kW			
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
1st	53,904	--	106,577	--	--	--
2nd	0,027	0,025	0,061	0,056	8%	8%
3rd	0,696	0,640	0,759	0,698	21,6%	N/A
4th	0,567	0,522	0,596	0,548	4%	4%
5th	0,239	0,219	0,211	0,194	10,7%	10,7%
6th	0,074	0,068	0,146	0,135	2,67%	2,67%
7th	0,124	0,114	0,132	0,121	7,2%	7,2%
8th	0,323	0,298	0,303	0,278	2%	2%
9th	0,092	0,084	0,068	0,062	3,8%	N/A
10th	0,310	0,285	0,263	0,242	1,6%	1,6%
11th	0,170	0,157	0,132	0,122	3,1%	3,1%
12th	0,110	0,101	0,095	0,087	1,33%	1,33%
13th	0,051	0,047	0,067	0,062	2%	2%
14th	0,093	0,086	0,154	0,142	N/A	N/A
15th	0,065	0,060	0,098	0,090	N/A	N/A
16th	0,256	0,236	0,259	0,239	N/A	N/A
17th	0,963	0,886	0,977	0,899	N/A	N/A
18th	0,091	0,083	0,137	0,126	N/A	N/A
19th	0,829	0,763	0,597	0,549	N/A	N/A
20th	0,154	0,142	0,109	0,100	N/A	N/A
21th	0,082	0,076	0,134	0,123	N/A	N/A
22th	0,097	0,089	0,179	0,165	N/A	N/A
23th	0,531	0,489	0,753	0,692	N/A	N/A
24th	0,137	0,126	0,052	0,048	N/A	N/A
25th	0,986	0,908	1,060	0,976	N/A	N/A
26th	0,054	0,050	0,132	0,121	N/A	N/A
27th	0,075	0,069	0,096	0,088	N/A	N/A
28th	0,061	0,057	0,050	0,046	N/A	N/A
29th	0,059	0,054	0,221	0,204	N/A	N/A
30th	0,200	0,184	0,155	0,143	N/A	N/A
31th	0,476	0,438	0,879	0,809	N/A	N/A
32th	0,138	0,127	0,074	0,068	N/A	N/A
33th	0,088	0,081	0,162	0,149	N/A	N/A
34th	0,045	0,041	0,089	0,082	N/A	N/A
35th	0,178	0,164	0,197	0,181	N/A	N/A
36th	0,135	0,124	0,168	0,155	N/A	N/A
37th	0,169	0,156	0,388	0,357	N/A	N/A
38th	0,118	0,109	0,162	0,149	N/A	N/A
39th	0,039	0,036	0,105	0,096	N/A	N/A
40th	0,034	0,031	0,062	0,057	N/A	N/A
THD_{50} [%]	1,984		2,195		23%	13%
PWHD [%]	7,986		9,433		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. PVGB2211WDG0067-1**

Power Quality. Harmonics.

Phase 3

Generating Unit rating per phase (rpp)			ASW75K-LT			
	At 45-55% of rated output 37,91 kW		100% of rated output 74,70 kW			
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
1st	55,680	--	108,877	--	--	--
2nd	0,049	0,045	0,070	0,065	8%	8%
3rd	0,306	0,281	0,217	0,199	21,6%	N/A
4th	0,574	0,528	0,695	0,640	4%	4%
5th	0,310	0,286	0,269	0,248	10,7%	10,7%
6th	0,127	0,117	0,323	0,297	2,67%	2,67%
7th	0,151	0,139	0,143	0,132	7,2%	7,2%
8th	0,455	0,418	0,426	0,392	2%	2%
9th	0,100	0,092	0,098	0,091	3,8%	N/A
10th	0,218	0,201	0,187	0,172	1,6%	1,6%
11th	0,194	0,179	0,163	0,150	3,1%	3,1%
12th	0,088	0,081	0,102	0,094	1,33%	1,33%
13th	0,058	0,053	0,072	0,067	2%	2%
14th	0,374	0,344	0,366	0,336	N/A	N/A
15th	0,081	0,075	0,220	0,202	N/A	N/A
16th	0,198	0,182	0,168	0,155	N/A	N/A
17th	0,982	0,904	0,768	0,706	N/A	N/A
18th	0,055	0,050	0,123	0,113	N/A	N/A
19th	0,892	0,820	0,769	0,707	N/A	N/A
20th	0,221	0,203	0,243	0,224	N/A	N/A
21th	0,144	0,132	0,214	0,197	N/A	N/A
22th	0,231	0,212	0,207	0,190	N/A	N/A
23th	0,509	0,468	0,526	0,484	N/A	N/A
24th	0,103	0,095	0,122	0,112	N/A	N/A
25th	1,009	0,928	1,138	1,047	N/A	N/A
26th	0,041	0,038	0,053	0,048	N/A	N/A
27th	0,044	0,041	0,235	0,216	N/A	N/A
28th	0,191	0,175	0,242	0,222	N/A	N/A
29th	0,139	0,128	0,337	0,310	N/A	N/A
30th	0,121	0,111	0,143	0,131	N/A	N/A
31th	0,508	0,467	0,932	0,857	N/A	N/A
32th	0,065	0,060	0,146	0,134	N/A	N/A
33th	0,076	0,070	0,078	0,072	N/A	N/A
34th	0,053	0,048	0,185	0,170	N/A	N/A
35th	0,151	0,139	0,123	0,113	N/A	N/A
36th	0,048	0,044	0,122	0,113	N/A	N/A
37th	0,210	0,193	0,429	0,394	N/A	N/A
38th	0,039	0,036	0,111	0,102	N/A	N/A
39th	0,048	0,044	0,138	0,127	N/A	N/A
40th	0,070	0,065	0,058	0,053	N/A	N/A
THD_{50} [%]	2,003		2,201		23%	13%
PWHD [%]	8,325		9,737		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. PVGB2211WDG0067-1**

Power Quality. Harmonics.

Phase 1

Generating Unit rating per phase (rpp)			ASW80K-LT			
	At 45-55% of rated output 43,80 kW		100% of rated output 87,97 kW			
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
1st	63,473	--	127,483	--		
2nd	0,043	0,034	0,049	0,038	8%	8%
3rd	0,378	0,296	0,601	0,471	21,6%	N/A
4th	0,460	0,361	0,483	0,379	4%	4%
5th	0,246	0,193	0,238	0,186	10,7%	10,7%
6th	0,194	0,152	0,262	0,206	2,67%	2,67%
7th	0,118	0,092	0,109	0,085	7,2%	7,2%
8th	0,270	0,212	0,185	0,145	2%	2%
9th	0,123	0,096	0,189	0,148	3,8%	N/A
10th	0,159	0,125	0,150	0,118	1,6%	1,6%
11th	0,161	0,126	0,152	0,119	3,1%	3,1%
12th	0,208	0,163	0,138	0,108	1,33%	1,33%
13th	0,044	0,035	0,071	0,055	2%	2%
14th	0,312	0,245	0,158	0,124	N/A	N/A
15th	0,118	0,092	0,337	0,264	N/A	N/A
16th	0,207	0,162	0,156	0,122	N/A	N/A
17th	0,953	0,747	0,944	0,740	N/A	N/A
18th	0,146	0,115	0,175	0,138	N/A	N/A
19th	0,877	0,688	0,722	0,566	N/A	N/A
20th	0,269	0,211	0,210	0,165	N/A	N/A
21th	0,107	0,084	0,217	0,170	N/A	N/A
22th	0,291	0,228	0,225	0,176	N/A	N/A
23th	0,386	0,302	0,663	0,520	N/A	N/A
24th	0,225	0,177	0,099	0,077	N/A	N/A
25th	0,916	0,718	1,118	0,877	N/A	N/A
26th	0,066	0,052	0,139	0,109	N/A	N/A
27th	0,057	0,044	0,222	0,174	N/A	N/A
28th	0,157	0,123	0,162	0,127	N/A	N/A
29th	0,145	0,114	0,174	0,137	N/A	N/A
30th	0,288	0,226	0,218	0,171	N/A	N/A
31th	0,421	0,330	0,820	0,643	N/A	N/A
32th	0,152	0,119	0,134	0,105	N/A	N/A
33th	0,121	0,095	0,073	0,057	N/A	N/A
34th	0,047	0,037	0,085	0,067	N/A	N/A
35th	0,195	0,153	0,359	0,281	N/A	N/A
36th	0,154	0,121	0,173	0,136	N/A	N/A
37th	0,162	0,127	0,300	0,235	N/A	N/A
38th	0,138	0,108	0,131	0,102	N/A	N/A
39th	0,065	0,051	0,125	0,098	N/A	N/A
40th	0,081	0,063	0,101	0,079	N/A	N/A
THD_{50} [%]	1,627		1,870		23%	13%
PWHD [%]	6,877		8,220		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. PVGB2211WDG0067-1**

Power Quality. Harmonics.

Phase 2

Generating Unit rating per phase (rpp)			ASW80K-LT			
	At 45-55% of rated ouput 43,80 kW		100% of rated output 87,97 kW			
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
1st	62,266	--	125,508	--	--	--
2nd	0,032	0,025	0,054	0,042	8%	8%
3rd	0,703	0,551	0,741	0,581	21,6%	N/A
4th	0,581	0,455	0,591	0,463	4%	4%
5th	0,235	0,184	0,214	0,168	10,7%	10,7%
6th	0,064	0,050	0,136	0,107	2,67%	2,67%
7th	0,129	0,101	0,133	0,104	7,2%	7,2%
8th	0,307	0,241	0,340	0,266	2%	2%
9th	0,082	0,064	0,079	0,062	3,8%	N/A
10th	0,315	0,247	0,237	0,186	1,6%	1,6%
11th	0,174	0,136	0,129	0,101	3,1%	3,1%
12th	0,109	0,085	0,112	0,088	1,33%	1,33%
13th	0,047	0,037	0,068	0,053	2%	2%
14th	0,076	0,059	0,213	0,167	N/A	N/A
15th	0,068	0,053	0,116	0,091	N/A	N/A
16th	0,254	0,199	0,233	0,183	N/A	N/A
17th	0,996	0,781	1,002	0,786	N/A	N/A
18th	0,087	0,068	0,169	0,133	N/A	N/A
19th	0,824	0,646	0,569	0,446	N/A	N/A
20th	0,166	0,131	0,055	0,043	N/A	N/A
21th	0,078	0,061	0,163	0,128	N/A	N/A
22th	0,103	0,081	0,161	0,126	N/A	N/A
23th	0,534	0,419	0,776	0,608	N/A	N/A
24th	0,133	0,105	0,085	0,067	N/A	N/A
25th	0,984	0,772	1,053	0,826	N/A	N/A
26th	0,053	0,042	0,075	0,059	N/A	N/A
27th	0,076	0,060	0,088	0,069	N/A	N/A
28th	0,052	0,041	0,079	0,062	N/A	N/A
29th	0,063	0,050	0,232	0,182	N/A	N/A
30th	0,203	0,159	0,162	0,127	N/A	N/A
31th	0,480	0,377	0,936	0,734	N/A	N/A
32th	0,145	0,114	0,093	0,073	N/A	N/A
33th	0,094	0,074	0,161	0,126	N/A	N/A
34th	0,044	0,034	0,098	0,077	N/A	N/A
35th	0,182	0,143	0,207	0,162	N/A	N/A
36th	0,137	0,108	0,182	0,143	N/A	N/A
37th	0,172	0,135	0,416	0,327	N/A	N/A
38th	0,126	0,099	0,165	0,130	N/A	N/A
39th	0,042	0,033	0,118	0,092	N/A	N/A
40th	0,034	0,027	0,073	0,058	N/A	N/A
THD_{50} [%]	1,706		1,898		23%	13%
PWHD [%]	6,867		8,251		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. PVGB2211WDG0067-1**

Power Quality. Harmonics.

Phase 3

Generating Unit rating per phase (rpp)			ASW80K-LT			
	At 45-55% of rated output 43,80 kW		100% of rated output 87,97 kW			
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
1st	64,240	--	128,062	--	--	--
2nd	0,049	0,038	0,077	0,060	8%	8%
3rd	0,311	0,244	0,192	0,151	21,6%	N/A
4th	0,597	0,468	0,660	0,518	4%	4%
5th	0,307	0,241	0,273	0,214	10,7%	10,7%
6th	0,164	0,128	0,199	0,156	2,67%	2,67%
7th	0,149	0,117	0,138	0,108	7,2%	7,2%
8th	0,464	0,364	0,377	0,295	2%	2%
9th	0,091	0,072	0,111	0,087	3,8%	N/A
10th	0,224	0,175	0,159	0,125	1,6%	1,6%
11th	0,200	0,157	0,162	0,127	3,1%	3,1%
12th	0,111	0,087	0,050	0,039	1,33%	1,33%
13th	0,063	0,049	0,078	0,061	2%	2%
14th	0,377	0,295	0,312	0,245	N/A	N/A
15th	0,107	0,084	0,235	0,184	N/A	N/A
16th	0,196	0,154	0,131	0,103	N/A	N/A
17th	0,990	0,776	0,773	0,606	N/A	N/A
18th	0,071	0,056	0,067	0,053	N/A	N/A
19th	0,884	0,693	0,780	0,612	N/A	N/A
20th	0,229	0,179	0,206	0,162	N/A	N/A
21th	0,135	0,106	0,229	0,179	N/A	N/A
22th	0,234	0,184	0,188	0,147	N/A	N/A
23th	0,511	0,401	0,531	0,417	N/A	N/A
24th	0,122	0,096	0,107	0,084	N/A	N/A
25th	1,019	0,799	1,159	0,908	N/A	N/A
26th	0,035	0,028	0,078	0,061	N/A	N/A
27th	0,042	0,033	0,285	0,224	N/A	N/A
28th	0,193	0,151	0,227	0,178	N/A	N/A
29th	0,146	0,115	0,374	0,293	N/A	N/A
30th	0,147	0,115	0,072	0,056	N/A	N/A
31th	0,521	0,409	0,980	0,768	N/A	N/A
32th	0,072	0,056	0,158	0,124	N/A	N/A
33th	0,081	0,064	0,113	0,089	N/A	N/A
34th	0,051	0,040	0,165	0,130	N/A	N/A
35th	0,146	0,115	0,156	0,122	N/A	N/A
36th	0,058	0,046	0,060	0,047	N/A	N/A
37th	0,218	0,171	0,422	0,331	N/A	N/A
38th	0,036	0,028	0,126	0,099	N/A	N/A
39th	0,054	0,043	0,180	0,141	N/A	N/A
40th	0,076	0,060	0,063	0,050	N/A	N/A
THD_{50} [%]	1,729		1,870		23%	13%
PWHD [%]	7,170		8,475		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. PVGB2211WDG0067-1**

Power Quality. Harmonics.

Phase 1

Generating Unit rating per phase (rpp)			ASW100K-LT			
	At 45-55% of rated output 54,38 kW		100% of rated output 110,09 kW			
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
1st	78,985	--	160,949	--	--	--
2nd	0,048	0,030	0,058	0,037	8%	8%
3rd	0,556	0,349	0,777	0,487	21,6%	N/A
4th	0,484	0,304	0,612	0,384	4%	4%
5th	0,209	0,131	0,251	0,158	10,7%	10,7%
6th	0,253	0,158	0,438	0,275	2,67%	2,67%
7th	0,112	0,071	0,072	0,045	7,2%	7,2%
8th	0,279	0,175	0,235	0,148	2%	2%
9th	0,100	0,063	0,375	0,235	3,8%	N/A
10th	0,108	0,068	0,183	0,115	1,6%	1,6%
11th	0,182	0,114	0,133	0,084	3,1%	3,1%
12th	0,257	0,161	0,132	0,082	1,33%	1,33%
13th	0,072	0,045	0,046	0,029	2%	2%
14th	0,342	0,215	0,241	0,151	N/A	N/A
15th	0,194	0,121	0,414	0,260	N/A	N/A
16th	0,155	0,098	0,156	0,098	N/A	N/A
17th	0,887	0,556	0,963	0,604	N/A	N/A
18th	0,242	0,152	0,289	0,182	N/A	N/A
19th	0,744	0,466	0,634	0,398	N/A	N/A
20th	0,360	0,226	0,399	0,250	N/A	N/A
21th	0,136	0,086	0,280	0,176	N/A	N/A
22th	0,305	0,191	0,305	0,191	N/A	N/A
23th	0,460	0,289	0,791	0,496	N/A	N/A
24th	0,186	0,117	0,110	0,069	N/A	N/A
25th	0,923	0,579	1,015	0,637	N/A	N/A
26th	0,107	0,067	0,153	0,096	N/A	N/A
27th	0,048	0,030	0,276	0,173	N/A	N/A
28th	0,229	0,144	0,298	0,187	N/A	N/A
29th	0,116	0,073	0,150	0,094	N/A	N/A
30th	0,357	0,224	0,422	0,265	N/A	N/A
31th	0,523	0,328	0,753	0,472	N/A	N/A
32th	0,143	0,089	0,256	0,161	N/A	N/A
33th	0,145	0,091	0,147	0,092	N/A	N/A
34th	0,097	0,061	0,140	0,088	N/A	N/A
35th	0,176	0,110	0,386	0,242	N/A	N/A
36th	0,229	0,143	0,345	0,216	N/A	N/A
37th	0,215	0,135	0,243	0,152	N/A	N/A
38th	0,108	0,068	0,160	0,101	N/A	N/A
39th	0,103	0,065	0,187	0,117	N/A	N/A
40th	0,078	0,049	0,125	0,079	N/A	N/A
THD_{50} [%]	1,349		1,638		23%	13%
PWHD [%]	5,664		6,951		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. PVGB2211WDG0067-1**

Power Quality. Harmonics.

Phase 2

Generating Unit rating per phase (rpp)			ASW100K-LT			
	At 45-55% of rated output 54,38 kW		100% of rated output 110,09 kW			
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
1st	77,408	--	158,092	--	--	--
2nd	0,046	0,029	0,089	0,056	8%	8%
3rd	0,781	0,490	0,828	0,519	21,6%	N/A
4th	0,586	0,368	0,617	0,387	4%	4%
5th	0,240	0,150	0,202	0,127	10,7%	10,7%
6th	0,167	0,105	0,248	0,155	2,67%	2,67%
7th	0,138	0,086	0,110	0,069	7,2%	7,2%
8th	0,257	0,161	0,285	0,179	2%	2%
9th	0,057	0,036	0,206	0,129	3,8%	N/A
10th	0,309	0,194	0,265	0,166	1,6%	1,6%
11th	0,170	0,106	0,110	0,069	3,1%	3,1%
12th	0,132	0,083	0,080	0,050	1,33%	1,33%
13th	0,059	0,037	0,051	0,032	2%	2%
14th	0,073	0,046	0,206	0,129	N/A	N/A
15th	0,083	0,052	0,102	0,064	N/A	N/A
16th	0,262	0,165	0,324	0,203	N/A	N/A
17th	0,955	0,599	1,111	0,697	N/A	N/A
18th	0,080	0,050	0,115	0,072	N/A	N/A
19th	0,678	0,425	0,580	0,364	N/A	N/A
20th	0,225	0,141	0,151	0,095	N/A	N/A
21th	0,107	0,067	0,139	0,087	N/A	N/A
22th	0,124	0,078	0,258	0,162	N/A	N/A
23th	0,647	0,406	0,965	0,605	N/A	N/A
24th	0,066	0,042	0,073	0,046	N/A	N/A
25th	0,987	0,619	0,969	0,608	N/A	N/A
26th	0,114	0,071	0,195	0,123	N/A	N/A
27th	0,101	0,063	0,106	0,067	N/A	N/A
28th	0,038	0,024	0,067	0,042	N/A	N/A
29th	0,106	0,066	0,436	0,274	N/A	N/A
30th	0,189	0,118	0,222	0,139	N/A	N/A
31th	0,598	0,375	0,980	0,615	N/A	N/A
32th	0,118	0,074	0,091	0,057	N/A	N/A
33th	0,115	0,072	0,262	0,164	N/A	N/A
34th	0,040	0,025	0,124	0,078	N/A	N/A
35th	0,162	0,101	0,209	0,131	N/A	N/A
36th	0,153	0,096	0,205	0,128	N/A	N/A
37th	0,243	0,153	0,411	0,258	N/A	N/A
38th	0,149	0,093	0,179	0,112	N/A	N/A
39th	0,066	0,042	0,171	0,107	N/A	N/A
40th	0,044	0,028	0,074	0,047	N/A	N/A
THD_{50} [%]	1,387		1,651		23%	13%
PWHD [%]	5,623		7,166		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. PVGB2211WDG0067-1**

Power Quality. Harmonics.

Phase 3

Generating Unit rating per phase (rpp)			ASW100K-LT			
	At 45-55% of rated output 54,38 kW		100% of rated output 110,09 kW			
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
1st	79,560	--	161,357	--	--	--
2nd	0,049	0,031	0,092	0,058	8%	8%
3rd	0,279	0,175	0,089	0,056	21,6%	N/A
4th	0,659	0,414	0,845	0,530	4%	4%
5th	0,281	0,176	0,257	0,161	10,7%	10,7%
6th	0,316	0,198	0,543	0,341	2,67%	2,67%
7th	0,131	0,082	0,111	0,070	7,2%	7,2%
8th	0,458	0,287	0,512	0,321	2%	2%
9th	0,082	0,051	0,182	0,114	3,8%	N/A
10th	0,237	0,149	0,196	0,123	1,6%	1,6%
11th	0,205	0,128	0,152	0,095	3,1%	3,1%
12th	0,145	0,091	0,159	0,100	1,33%	1,33%
13th	0,088	0,055	0,064	0,040	2%	2%
14th	0,401	0,251	0,440	0,276	N/A	N/A
15th	0,140	0,088	0,312	0,196	N/A	N/A
16th	0,184	0,115	0,189	0,119	N/A	N/A
17th	0,875	0,549	0,763	0,478	N/A	N/A
18th	0,172	0,108	0,182	0,114	N/A	N/A
19th	0,741	0,465	0,812	0,509	N/A	N/A
20th	0,300	0,188	0,348	0,218	N/A	N/A
21th	0,164	0,103	0,262	0,164	N/A	N/A
22th	0,221	0,139	0,322	0,202	N/A	N/A
23th	0,544	0,341	0,586	0,367	N/A	N/A
24th	0,133	0,084	0,161	0,101	N/A	N/A
25th	1,029	0,645	1,056	0,663	N/A	N/A
26th	0,074	0,046	0,119	0,075	N/A	N/A
27th	0,064	0,040	0,382	0,240	N/A	N/A
28th	0,237	0,149	0,273	0,171	N/A	N/A
29th	0,201	0,126	0,516	0,324	N/A	N/A
30th	0,214	0,134	0,193	0,121	N/A	N/A
31th	0,667	0,418	0,992	0,622	N/A	N/A
32th	0,091	0,057	0,223	0,140	N/A	N/A
33th	0,084	0,053	0,124	0,077	N/A	N/A
34th	0,112	0,070	0,247	0,155	N/A	N/A
35th	0,111	0,070	0,212	0,133	N/A	N/A
36th	0,136	0,086	0,225	0,141	N/A	N/A
37th	0,303	0,190	0,470	0,295	N/A	N/A
38th	0,049	0,031	0,134	0,084	N/A	N/A
39th	0,078	0,049	0,178	0,112	N/A	N/A
40th	0,063	0,040	0,084	0,053	N/A	N/A
THD_{50} [%]	1,404		1,668		23%	13%
PWHD [%]	5,892		7,261		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. PVGB2211WDG0067-1**

Power Quality. Harmonics.

Phase 1

Generating Unit rating per phase (rpp)			ASW110K-LT			
	At 45-55% of rated output 60,26 kW		100% of rated output 120,49 kW			
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
1st	87,520	--	175,015	--	--	--
2nd	0,051	0,029	0,069	0,040	8%	8%
3rd	0,549	0,313	1,150	0,656	21,6%	N/A
4th	0,496	0,283	0,756	0,431	4%	4%
5th	0,225	0,128	0,354	0,202	10,7%	10,7%
6th	0,233	0,133	0,611	0,348	2,67%	2,67%
7th	0,115	0,066	0,046	0,026	7,2%	7,2%
8th	0,260	0,148	0,449	0,256	2%	2%
9th	0,099	0,056	0,512	0,292	3,8%	N/A
10th	0,130	0,074	0,305	0,174	1,6%	1,6%
11th	0,172	0,098	0,187	0,107	3,1%	3,1%
12th	0,202	0,115	0,433	0,247	1,33%	1,33%
13th	0,076	0,043	0,064	0,037	2%	2%
14th	0,278	0,159	0,570	0,325	N/A	N/A
15th	0,215	0,122	0,425	0,242	N/A	N/A
16th	0,153	0,087	0,670	0,382	N/A	N/A
17th	0,908	0,518	0,535	0,305	N/A	N/A
18th	0,209	0,119	0,662	0,377	N/A	N/A
19th	0,772	0,440	0,881	0,502	N/A	N/A
20th	0,304	0,173	0,671	0,383	N/A	N/A
21th	0,157	0,090	0,396	0,226	N/A	N/A
22th	0,273	0,156	0,063	0,036	N/A	N/A
23th	0,533	0,304	0,404	0,230	N/A	N/A
24th	0,151	0,086	0,470	0,268	N/A	N/A
25th	0,958	0,546	0,497	0,284	N/A	N/A
26th	0,107	0,061	0,532	0,303	N/A	N/A
27th	0,057	0,033	0,384	0,219	N/A	N/A
28th	0,208	0,118	0,230	0,131	N/A	N/A
29th	0,132	0,075	0,391	0,223	N/A	N/A
30th	0,315	0,180	0,256	0,146	N/A	N/A
31th	0,571	0,325	0,264	0,151	N/A	N/A
32th	0,143	0,081	0,069	0,039	N/A	N/A
33th	0,111	0,063	0,141	0,081	N/A	N/A
34th	0,096	0,055	0,287	0,164	N/A	N/A
35th	0,221	0,126	0,264	0,150	N/A	N/A
36th	0,204	0,117	0,232	0,132	N/A	N/A
37th	0,221	0,126	0,220	0,125	N/A	N/A
38th	0,120	0,068	0,093	0,053	N/A	N/A
39th	0,080	0,045	0,194	0,111	N/A	N/A
40th	0,078	0,045	0,158	0,090	N/A	N/A
THD_{50} [%]	1,238		1,639		23%	13%
PWHD [%]	5,253		5,801		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. PVGB2211WDG0067-1**

Power Quality. Harmonics.

Phase 2

Generating Unit rating per phase (rpp)			ASW110K-LT			
	At 45-55% of rated ouput 60,26 kW		100% of rated output 120,49 kW			
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
1st	85,826	--	171,481	--	--	--
2nd	0,048	0,027	0,084	0,048	8%	8%
3rd	0,775	0,442	1,074	0,612	21,6%	N/A
4th	0,574	0,327	0,998	0,569	4%	4%
5th	0,236	0,134	0,242	0,138	10,7%	10,7%
6th	0,142	0,081	0,193	0,110	2,67%	2,67%
7th	0,136	0,077	0,067	0,038	7,2%	7,2%
8th	0,270	0,154	0,300	0,171	2%	2%
9th	0,069	0,039	0,182	0,104	3,8%	N/A
10th	0,289	0,165	0,502	0,286	1,6%	1,6%
11th	0,167	0,095	0,183	0,104	3,1%	3,1%
12th	0,129	0,073	0,113	0,064	1,33%	1,33%
13th	0,065	0,037	0,051	0,029	2%	2%
14th	0,088	0,050	0,227	0,129	N/A	N/A
15th	0,079	0,045	0,107	0,061	N/A	N/A
16th	0,248	0,141	0,283	0,161	N/A	N/A
17th	0,958	0,547	1,036	0,591	N/A	N/A
18th	0,102	0,058	0,384	0,219	N/A	N/A
19th	0,665	0,379	1,378	0,786	N/A	N/A
20th	0,145	0,083	0,074	0,042	N/A	N/A
21th	0,123	0,070	0,313	0,178	N/A	N/A
22th	0,124	0,071	0,309	0,176	N/A	N/A
23th	0,691	0,394	0,518	0,295	N/A	N/A
24th	0,053	0,030	0,137	0,078	N/A	N/A
25th	0,988	0,563	0,288	0,164	N/A	N/A
26th	0,100	0,057	0,407	0,232	N/A	N/A
27th	0,088	0,050	0,313	0,179	N/A	N/A
28th	0,047	0,027	0,144	0,082	N/A	N/A
29th	0,134	0,076	0,475	0,271	N/A	N/A
30th	0,189	0,108	0,367	0,209	N/A	N/A
31th	0,650	0,370	0,301	0,172	N/A	N/A
32th	0,105	0,060	0,274	0,156	N/A	N/A
33th	0,119	0,068	0,332	0,189	N/A	N/A
34th	0,052	0,030	0,055	0,032	N/A	N/A
35th	0,162	0,093	0,056	0,032	N/A	N/A
36th	0,159	0,091	0,147	0,084	N/A	N/A
37th	0,260	0,148	0,305	0,174	N/A	N/A
38th	0,142	0,081	0,191	0,109	N/A	N/A
39th	0,066	0,038	0,231	0,132	N/A	N/A
40th	0,046	0,026	0,177	0,101	N/A	N/A
THD_{50} [%]	1,268		1,608		23%	13%
PWHD [%]	5,207		5,931		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. PVGB2211WDG0067-1**

Power Quality. Harmonics.

Phase 3

Generating Unit rating per phase (rpp)			ASW110K-LT			
	At 45-55% of rated ouput 60,26 kW		100% of rated output 120,49 kW			
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
1st	88,013	--	174,646	--	--	--
2nd	0,053	0,030	0,110	0,063	8%	8%
3rd	0,281	0,160	0,568	0,324	21,6%	N/A
4th	0,640	0,365	1,006	0,573	4%	4%
5th	0,288	0,164	0,316	0,180	10,7%	10,7%
6th	0,253	0,144	0,631	0,360	2,67%	2,67%
7th	0,130	0,074	0,025	0,014	7,2%	7,2%
8th	0,427	0,244	0,724	0,413	2%	2%
9th	0,088	0,050	0,394	0,225	3,8%	N/A
10th	0,202	0,115	0,253	0,144	1,6%	1,6%
11th	0,196	0,112	0,196	0,112	3,1%	3,1%
12th	0,090	0,051	0,448	0,255	1,33%	1,33%
13th	0,091	0,052	0,046	0,026	2%	2%
14th	0,357	0,204	0,522	0,298	N/A	N/A
15th	0,161	0,092	0,511	0,291	N/A	N/A
16th	0,166	0,095	0,543	0,310	N/A	N/A
17th	0,849	0,484	0,833	0,475	N/A	N/A
18th	0,121	0,069	0,440	0,251	N/A	N/A
19th	0,773	0,441	1,382	0,788	N/A	N/A
20th	0,252	0,144	0,618	0,352	N/A	N/A
21th	0,180	0,103	0,127	0,072	N/A	N/A
22th	0,210	0,119	0,339	0,193	N/A	N/A
23th	0,565	0,322	0,132	0,075	N/A	N/A
24th	0,114	0,065	0,436	0,249	N/A	N/A
25th	1,041	0,594	0,696	0,397	N/A	N/A
26th	0,045	0,026	0,183	0,105	N/A	N/A
27th	0,100	0,057	0,433	0,247	N/A	N/A
28th	0,235	0,134	0,347	0,198	N/A	N/A
29th	0,243	0,139	0,312	0,178	N/A	N/A
30th	0,160	0,091	0,162	0,092	N/A	N/A
31th	0,714	0,407	0,084	0,048	N/A	N/A
32th	0,111	0,063	0,278	0,158	N/A	N/A
33th	0,080	0,045	0,244	0,139	N/A	N/A
34th	0,124	0,070	0,279	0,159	N/A	N/A
35th	0,114	0,065	0,277	0,158	N/A	N/A
36th	0,108	0,062	0,166	0,095	N/A	N/A
37th	0,304	0,174	0,101	0,058	N/A	N/A
38th	0,050	0,029	0,121	0,069	N/A	N/A
39th	0,088	0,050	0,158	0,090	N/A	N/A
40th	0,056	0,032	0,132	0,075	N/A	N/A
THD_{50} [%]	1,266		1,700		23%	13%
PWHD [%]	5,418		6,197		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. PVGB2211WDG0067-1**

Power Quality. Power factor.				
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%	0,999	0,999	0,999	
50%	0,999	0,999	0,999	
75%	0,999	0,999	0,999	
100%	0,999	0,999	0,999	
Limit	>0,95	>0,95	>0,95	

Power Quality. Voltage fluctuation and Flicker.									
		Starting			**Stopping**			**Running**	
		dmax	**dc**	**d(t)**	**dmax**	**dc**	**d(t)**	**Pst**	**Plt 2 hours**
L1	**Measured values at test impedance**	0,108	0,028	0,00	0,078	0,027	0,00	0,342	0,310
	Normalized to standard impedance	0,108	0,028	0,00	0,078	0,027	0,00	0,342	0,310
L2	**Measured values at test impedance**	0,024	0,034	0,00	0,086	0,019	0,00	0,257	0,254
	Normalized to standard impedance	0,024	0,034	0,00	0,086	0,019	0,00	0,257	0,254
L3	**Measured values at test impedance**	0,209	0,051	0,00	0,156	0,054	0,00	0,252	0,251
	Normalized to standard impedance	0,209	0,051	0,00	0,156	0,054	0,00	0,252	0,251
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	0,240	Ω	Xl	0,15*	Ω
	Z	0,283	Ω			
Standard impedance	R	0,240	Ω	Xl	0,15*	Ω
	Z	0,283	Ω			
Maximum impedance	R	0,240	Ω	Xl	0,15*	Ω
	Zmax	0,283	Ω			

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

Extract from test report according to the Engineering Recommendation G99 — **Nr. PVGB2211WDG0067-1**

Power Quality. DC injection.			
ASW75K-LT			
Phase 1			
Test level power [%]	10	55	100
Recorded value [mA]	22,7	112,4	245,0
Recorded value [%]	0,021	0,103	0,225
Limit [%]	0,25	0,25	0,25
Phase 2			
Test level power [%]	10	55	100
Recorded value [mA]	20,7	79,0	190,4
Recorded value [%]	0,019	0,073	0,175
Limit [%]	0,25	0,25	0,25
Phase 3			
Test level power [%]	10	55	100
Recorded value [mA]	25,4	99,0	197,5
Recorded value [%]	0,023	0,091	0,182
Limit [%]	0,25	0,25	0,25
Note. Informative measurement of DC-injection of each phase of the inverter and a limit of 0,25% per phase of the rated current per phase as pass criteria.			
Sum of all Phases Tests are carried out at three defined power levels ±5%. At 230 V a 75 kW three phase Inverter has a current output of 108,70 A so DC limit is 272 mA. These tests is undertaken in accordance with Annex A.7.1.4.4. The % DC injection (“as % of rated AC current” below) is calculated as follows: % DC injection = Recorded DC value in Amps / Base current where the base current is the Registered Capacity (W) / V phase. The % DC injection should not be greater than 0,25%.			
Sum of all Phases			
Test level power [%]	10	55	100
Recorded value [mA]	19,2	42,9	96,0
Recorded value [%]	0,018	0,039	0,088
Limit [%]	0,25	0,25	0,25

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

Extract from test report according to the Engineering Recommendation G99 — **Nr. PVGB2211WDG0067-1**

Power Quality. DC injection.			
ASW110K-LT			
Phase 1			
Test level power [%]	10	55	100
Recorded value [mA]	194,8	279,3	222,8
Recorded value [%]	0,111	0,159	0,127
Limit [%]	0,25	0,25	0,25
Phase 2			
Test level power [%]	10	55	100
Recorded value [mA]	148,1	201,7	252,6
Recorded value [%]	0,084	0,115	0,144
Limit [%]	0,25	0,25	0,25
Phase 3			
Test level power [%]	10	55	100
Recorded value [mA]	308,4	342,7	316,4
Recorded value [%]	0,176	0,195	0,180
Limit [%]	0,25	0,25	0,25

Note. Informative measurement of DC-injection of each phase of the inverter and a limit of 0,25% per phase of the rated current per phase as pass criteria.

Sum of all Phases

Tests are carried out at three defined power levels ±5%. At 230 V a 121 kW three phase Inverter has a current output of 175,36 A so DC limit is 438 mA. These tests is undertaken in accordance with Annex A.7.1.4.4.

The % DC injection (“as % of rated AC current” below) is calculated as follows:

% DC injection = Recorded DC value in Amps / Base current where the base current is the Registered Capacity (W) / V phase. The % DC injection should not be greater than 0,25%.

Sum of all Phases			
Test level power [%]	10	55	100
Recorded value [mA]	139,6	133,8	118,4
Recorded value [%]	0,080	0,076	0,068
Limit [%]	0,25	0,25	0,25

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

Extract from test report according to the Engineering Recommendation G99 **Nr. PVGB2211WDG0067-1**

Fault level Contribution.					
For a directly coupled SSEG			**For a Inverter SSEG**		
Phase 1					
Parameter	**Symbol**	**Value**	**Time after fault**	**Volts [V]**	**Amps [A]**
Peak Short Circuit current	I_p	N/A	20ms	6,60Vac	0,00 A
Initial Value of aperiodic current	A	N/A	100ms	N/A	N/A
Initial symmetrical short-circuit current*	I_k	N/A	250ms	N/A	N/A
Decaying (aperiodic) component of short circuit current*	i_{DC}	N/A	500ms	N/A	N/A
Phase 2					
Parameter	**Symbol**	**Value**	**Time after fault**	**Volts**	**Amps**
Peak Short Circuit current	I_p	N/A	20ms	4,84Vac	0,00 A
Initial Value of aperiodic current	A	N/A	100ms	N/A	N/A
Initial symmetrical short-circuit current*	I_k	N/A	250ms	N/A	N/A
Decaying (aperiodic) component of short circuit current*	i_{DC}	N/A	500ms	N/A	N/A
Phase 3					
Parameter	**Symbol**	**Value**	**Time after fault**	**Volts**	**Amps**
Peak Short Circuit current	I_p	N/A	20ms	10,07Vac	0,00 A
Initial Value of aperiodic current	A	N/A	100ms	N/A	N/A
Initial symmetrical short-circuit current*	I_k	N/A	250ms	N/A	N/A
Decaying (aperiodic) component of short circuit current*	i_{DC}	N/A	500ms	N/A	N/A
Reactance/Resistance Ratio of source*	X/R	N/A	**Time to Trip [s]**	0,001s	

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. PVGB2211WDG0067-1**

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
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 0124-100.	

Cyber security	**P**
Confirm that the Manufacturer or Installer of the Micro-generator has provided a statement describing how the Micro-generator has been designed to comply with cyber security requirements, as detailed in 9.7.	Yes
Note. Different levels of access, all are password protected, only certain parameters can be changed on maintenance level. Manufacturer information provided, see test report.	

Wiring functional tests if required by para. 15.2.1	**N/A**
Confirm that the relevant test schedule is attached (tests to be undertaken at time of commissioning).	N/A
Note. The inverter was tested in a test laboratory. The correct wiring functional test in the field has to be done by the responsible person for the installation of the plant.	

Logic Interface (input port) Required by paragraph 11.1.3.1	**P**
Confirm that an input port is provided and can be used to reduce the Active Power output to zero	Yes
Note. Manufacturer information provided. A Modbus signal can be used to cease Active Power output within 5 s. See test report.	
Provide high level description of logic interface, e.g. details in 11.1.3.1 such as AC or DC signal	Yes

Additional comments