Certificate

Applicant: **SolarEdge Technologies LTD**
1 HaMada Street
4673335 Herzeliya
Israel

Product: **Photovoltaic Inverter with integrated automatic disconnection device between a generator and the public low-voltage grid**

Model/Rating:

SE2200H	**SE3000H**	**SE3500H**	**SE3680H**	**SE4000H**
2,2kVA	3,0kVA	3,5kVA	3,68kVA	4,0kVA
SE5000H	**SE6000H**	**SE8000H**	**SE10000H**	
5,0kVA	6,0kVA	8,0KVA	10,0kVA	

Intended use:

An automatic disconnection device with single-phase mains surveillance in accordance with Engineering Recommendation G83/2 for photovoltaic systems with a single-phase parallel coupling via an inverter to the public mains supply. The automatic disconnection device is an integral part of the aforementioned inverter.

Applied standards and guidelines:

Engineering Recommendation G83/2
Issue 2 – August 2012
Recommendations for the connection of small-scale embedded generators in parallel with public low-voltage distribution networks.

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

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DAkkS
Deutsche
Akkreditierungsstelle
D-ZE-12089-01-00

Tanja Rottach
- Digitally signed | see http://ca.primara.net for more details -

Certification Department

CERTIFICATION primara Test- und Zertifizier-GmbH Grid Code Compliance G83/2

Power Quality. Harmonics.

SE2200H, SE3000H, SE3500H, SE3680H

Equipment Phases: Single Phase

Harmonic:	At 45-55% of rated output	At 100% of rated output	Harmonic Limit (A)
	Measured Value (A)		
2nd	0,013	0,024	1,080
3rd	0,162	0,264	2,300
4th	0,011	0,019	0,430
5th	0,018	0,022	1,140
6th	0,005	0,011	0,300
7th	0,069	0,064	0,770
8th	0,008	0,014	0,230
9th	0,098	0,117	0,400
10th	0,013	0,016	0,184
11th	0,018	0,032	0,330
12th	0,006	0,013	0,153
13th	0,118	0,091	0,210
14th	0,011	0,019	0,131
15th	0,090	0,091	0,150
16th	0,014	0,014	0,115
17th	0,026	0,024	0,132
18th	0,006	0,011	0,102
19th	0,024	0,021	0,118
20th	0,003	0,010	0,092
21st	0,019	0,013	0,107
22nd	0,003	0,003	0,084
23rd	0,019	0,011	0,098
24th	0,002	0,003	0,077
25th	0,013	0,010	0,090
26th	0,002	0,002	0,071
27th	0,010	0,005	0,083
28th	0,002	0,002	0,066
29th	0,010	0,005	0,078
30th	0,002	0,002	0,061
31st	0,010	0,006	0,073
32nd	0,000	0,002	0,058
33rd	0,008	0,005	0,068
34th	0,000	0,002	0,054
35th	0,008	0,005	0,064
36th	0,000	0,002	0,051
37th	0,006	0,005	0,061
38th	0,000	0,002	0,048
39th	0,006	0,005	0,058
40th	0,002	0,002	0,046

Power Quality. Harmonics.

SE4000H, SE5000H, SE6000H

Equipment Phases: Single Phase

Harmonic:	At 45-55% of rated output	At 100% of rated output	Harmonic Limit (A)
	Measured Value (A)		
2nd	0,018	0,037	1,080
3rd	0,031	0,067	2,300
4th	0,006	0,025	0,430
5th	0,098	0,086	1,140
6th	0,006	0,006	0,300
7th	0,031	0,025	0,770
8th	0,006	0,006	0,230
9th	0,018	0,031	0,400
10th	0,006	0,012	0,184
11th	0,025	0,067	0,330
12th	0,006	0,012	0,153
13th	0,080	0,117	0,210
14th	0,006	0,006	0,131
15th	0,067	0,098	0,150
16th	0,006	0,006	0,115
17th	0,037	0,055	0,132
18th	0,006	0,006	0,102
19th	0,018	0,037	0,118
20th	0,006	0,006	0,092
21st	0,012	0,025	0,107
22nd	0,000	0,000	0,084
23rd	0,006	0,018	0,098
24th	0,000	0,000	0,077
25th	0,006	0,012	0,090
26th	0,000	0,000	0,071
27th	0,000	0,012	0,083
28th	0,000	0,000	0,066
29th	0,000	0,006	0,078
30th	0,000	0,000	0,061
31st	0,000	0,006	0,073
32nd	0,000	0,000	0,058
33rd	0,000	0,006	0,068
34th	0,000	0,000	0,054
35th	0,000	0,006	0,064
36th	0,000	0,000	0,051
37th	0,000	0,006	0,061
38th	0,000	0,000	0,048
39th	0,000	0,006	0,058
40th	0,000	0,000	0,046

Power Quality. Harmonics.

SE8000H, SE10000H

Equipment Phases: Single Phase

Harmonic:	At 45-55% of rated output	At 100% of rated output	Harmonic Limit (A)
	Measured Value (A)		
2nd	0,011	0,022	1,080
3rd	0,033	0,063	2,300
4th	0,004	0,007	0,430
5th	0,063	0,063	1,140
6th	0,004	0,011	0,300
7th	0,037	0,029	0,770
8th	0,007	0,007	0,230
9th	0,026	0,037	0,400
10th	0,007	0,004	0,184
11th	0,037	0,048	0,330
12th	0,007	0,007	0,153
13th	0,052	0,066	0,210
14th	0,004	0,004	0,131
15th	0,048	0,063	0,150
16th	0,004	0,007	0,115
17th	0,029	0,040	0,132
18th	0,004	0,004	0,102
19th	0,018	0,029	0,118
20th	0,004	0,004	0,092
21st	0,015	0,022	0,107
22nd	0,004	0,000	0,084
23rd	0,007	0,015	0,098
24th	0,000	0,000	0,077
25th	0,007	0,011	0,090
26th	0,000	0,000	0,071
27th	0,004	0,011	0,083
28th	0,000	0,000	0,066
29th	0,004	0,007	0,078
30th	0,000	0,000	0,061
31st	0,004	0,007	0,073
32nd	0,000	0,000	0,058
33rd	0,004	0,004	0,068
34th	0,000	0,000	0,054
35th	0,004	0,004	0,064
36th	0,000	0,000	0,051
37th	0,004	0,004	0,061
38th	0,000	0,000	0,048
39th	0,004	0,004	0,058
40th	0,000	0,000	0,046

Power Quality. Voltage Fluctuations and Flicker.

SE2200H, SE3000H, SE3500H, SE3680H

	Starting			Stopping			Running	
	dmax	dc	d(t)	Dmax	dc	d(t)	Pst	Plt 2 hours
Measured Values	0,60%	0,54%	0	0,78	0,78	0	0,059	0,059
Normalised to standard impedance	0,60%	0,54%	0	0,78	0,78	0	0,059	0,059
Limits	4%	3,3%	3,3% 500ms	4%	3,3%	3,3% 500ms	1,0	0,65

SE4000H, SE5000H, SE6000H

	Starting			Stopping			Running	
	dmax	dc	d(t)	Dmax	dc	d(t)	Pst	Plt 2 hours
Measured Values	4,79%	5,05%	0	4,91%	5,08%	0	0,12	0,12
Normalised to maximum impedance of 0,26Ohms	3,11%	3,28%	0	3,19%	3,30%	0	0,08	0,08
Limits	4%	3,3%	3,3% 500ms	4%	3,3%	3,3% 500ms	1,0	0,65

SE8000H, SE10000H

	Starting			Stopping			Running	
	dmax	dc	d(t)	Dmax	dc	d(t)	Pst	Plt 2 hours
Measured Values	-6,69%	-6,65%	0	6,86%	6,61%	0	0,24	0,24
Normalised to maximum impedance of 0,26Ohms	-3,32%	-3,30%	0	3,40%	3,28%	0	0,12	0,12
Limits	4%	3,3%	3,3% 500ms	4%	3,3%	3,3% 500ms	1,0	0,65

Power Quality. DC Injection.

Test power level	10%	55%	100%
As % of rated AC current	-0,09%	-0,12%	-0,13%
Limit	0,25%		

Power Quality. Power Factor.

Output Voltage	216,2V	230V	253V
Measured Value	0,999	0,999	0,999
Limit	>0,95		

Protection. Frquency Tests.

Function	Setting		Trip test		No trip test	
	Frequency	Time delay	Frequency	Time delay	Frequency time	Confirm no trip
U/F stage 1	47,5Hz	20s	47,49Hz	20,15s	47,7Hz 25s	No trip
U/F stage 2	47,0Hz	0,5s	46,99Hz	0,53s	47,2Hz 19,98s	No trip
					46,8Hz 0,48s	No trip
O/F stage 1	51,5Hz	90s	51,51Hz	90,10s	51,3Hz 95s	No trip
O/F stage 2	52,0Hz	0,5s	52,01Hz	0,61s	51,8Hz 89,98s	No trip
					52,2Hz 0,48s	No trip

Protection. Voltage Tests.

Function	Setting		Trip test		No trip test	
	Voltage	Time delay	Voltage	Time delay	Voltage time	Confirm no trip
U/V stage 1	200,1V	2,5s	199,6V	2,59s	204,1V 3,5s	No trip
U/V stage 2	184,0V	0,5s	183,6V	0,59s	188V 2,48s	No trip
					180V 0,48s	No trip
O/V stage 1	262,2V	1,0s	262,0V	1,09s	258,2V 2,0s	No trip
O/V stage 2	273,7V	0,5s	273,3V	0,59s	269,7V 0,98s	No trip
					277,7V 0,48s	No trip

Protection. Loss of Mains Test according BS EN 62116 for Inverters.

	SE2200H, SE3000H, SE3500H, SE3680H					
Test Power and imbalance	33% -5% Q	66% -5% Q	100% -5% Q	33% +5% Q	66% +5% Q	100% +5% Q
Trip time (s)	0,17	0,10	0,09s	0,05	0,10	0,13s
	SE4000H, SE5000H, SE6000H					
Test Power and imbalance	33% -5% Q	66% -5% Q	100% -5% Q	33% +5% Q	66% +5% Q	100% +5% Q
Trip time (s)	0,57	0,65	0,59s	0,60	0,59	0,60s
	SE8000H, SE10000H					
Test Power and imbalance	33% -5% Q	66% -5% Q	100% -5% Q	33% +5% Q	66% +5% Q	100% +5% Q
Trip time (s)	0,09	0,08	0,10s	0,09	0,09	0,10s

Protection. Reconnection Timer.

Reconnestion Time	**Under/Over voltage**	**Under/over frequency**	**Loss of mains**
Minimum value	20 seconds		
Actual settings (sec)	20s	20s	20s
Recorded value (sec)	36s	36s	36s

	At 266,2V	At 196,1V	At 47,4Hz	At 51,6Hz
Confirmation that the unit does not re-connect.	No connection to grid	No connection to grid	No connection to grid	No connection to grid

Faul Level Contribution.

SE2200H, SE3000H, SE3500H, SE3680H, SE4000H, SE5000H, SE6000H

For an inverter SEEG

Parameter	Symbol	Time after fault	Volts	Amps
Peak short circuit current	i_p	20ms	34,2	11,9
Initial Value of aperiodic current	A	100ms	23,3	15,9
Initial symmetrical short-circuit current	I_K	250ms	10,8	16,0
Decaying (aperiodic) component of short-circuit current	i_{DC}	500ms	42,7	9,9

As SSEGs (small-scale embedded generators) for PV are inverter-connected the max. short circuit current is the max. AC current.

SE8000H, SE10000H

For an inverter SEEG

Parameter	Symbol	Time after fault	Volts	Amps
Peak short circuit current	i_p	20ms	64,2	43,0
Initial Value of aperiodic current	A	100ms	23,5	45,7
Initial symmetrical short-circuit current	I_K	250ms	22,1	47,9
Decaying (aperiodic) component of short-circuit current	i_{DC}	500ms	22,1	47,9

As SSEGs (small-scale embedded generators) for PV are inverter-connected the max. short circuit current is the max. AC current.