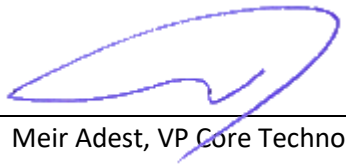
G83/2 (RoCoF amendment) Type Test Report – SE1000M – SE2500M

Engineering Recommendation G83/2			
Type Tested Reference Number		17TH0251-G83/2_0 U18-0076	
Generating Unit Technology		Photovoltaic Inverter	
Manufacturer		SolarEdge Technologies Ltd	
Address		1 HaMada Street Herzeliya 4673335 Israel	
Tel	+972-9-957-6620	Fax	+972-9-957-6591
Email	info@solaredge.com	Website	www.solaredge.com
I certify on behalf of the company named above as a supplier of a Generating Unit, that all products supplied by the company with the above Type Test reference number will be manufactured and tested to ensure that they perform as stated in this document, prior to shipment to site and that no site modifications are required to ensure that the product meets all the requirements of G83/2			

Herzeliya
Israel
PLACE

25rd May 2018
Date



Meir Adest, VP Core Technologies

Generating Unit	SE1000M	SE1500M	SE2000M	SE2500M
Rated AC Power (kW)	1	1.5	2	2.5
Note: All test results stated in the following document are obtained from testing the largest inverter covered by this Type Test Report. All smaller inverters named on this report will be equivalent values.				

Harmonics					
Generator tested to BS EN 61000-3-2					
Harmonic	45 - 55 % of rated output (1.25 kW)		100% of rated output (2.47 kW)		BS EN 61000-3-2 Limit - in Amps
	Measured Value (A)	Normalised Value (A)	Measured Value (A)	Normalised Value (A)	
2nd	0.020	0.058	0.014	0.020	1.080
3rd	0.077	0.224	0.068	0.102	2.300
4th	0.014	0.040	0.015	0.022	0.403
5th	0.036	0.104	0.034	0.051	1.140
6th	0.013	0.037	0.011	0.017	0.300
7th	0.033	0.097	0.026	0.039	0.770
8th	0.013	0.039	0.015	0.022	0.230
9th	0.031	0.090	0.030	0.044	0.400
10th	0.015	0.042	0.015	0.022	0.184
11th	0.030	0.087	0.032	0.047	0.300
12th	0.013	0.039	0.013	0.020	0.153
13th	0.033	0.098	0.030	0.044	0.210
14th	0.013	0.037	0.013	0.019	0.131
15th	0.033	0.097	0.029	0.043	0.150
16th	0.014	0.042	0.015	0.023	0.115
17th	0.034	0.100	0.033	0.049	0.132
18th	0.016	0.046	0.017	0.025	0.102
19th	0.032	0.094	0.033	0.049	0.118
20th	0.014	0.040	0.015	0.023	0.029
21st	0.034	0.100	0.029	0.043	0.107
22nd	0.011	0.033	0.016	0.023	0.084
23rd	0.033	0.096	0.030	0.044	0.098
24th	0.013	0.037	0.017	0.026	0.077
25th	0.033	0.097	0.030	0.044	0.090
26th	0.013	0.038	0.015	0.022	0.071
27th	0.031	0.091	0.031	0.046	0.083
28th	0.011	0.031	0.014	0.021	0.066
29th	0.029	0.085	0.028	0.042	0.078
30th	0.011	0.032	0.013	0.020	0.061
31st	0.025	0.072	0.023	0.034	0.073
32nd	0.009	0.027	0.011	0.016	0.058
33rd	0.021	0.062	0.022	0.032	0.068
34th	0.009	0.025	0.009	0.013	0.054
35th	0.020	0.058	0.021	0.031	0.064
36th	0.007	0.021	0.008	0.012	0.051
37th	0.019	0.056	0.020	0.029	0.061
38th	0.009	0.026	0.007	0.011	0.048
39th	0.017	0.048	0.018	0.027	0.580
40th	0.006	0.019	0.005	0.008	0.046

Voltage Fluctuations and Flicker				
BS EN 61000-3-3				
	Starting	Stopping	Running	
Limit	4 %	4 %	Pst = 1.0	Plt = 0.65
Result	1.195 %	1.195 %	0.213	0.166

DC Current Injection			
Test Power Level	10 %	55 %	100 %
Limit	0.25 %		
Result	0.08 %	0.07 %	0.09 %

Power Factor			
Test Voltage	216.2 V	230 V	253 V
Limit	> 0.95		
Result	0.998	0.997	0.997

Frequency Tests						
Function	Setting		Result		No Trip Test	
	Frequency	Time Delay	Frequency	Time Delay	Test Value	Result
O/F Stage 1	51.5 Hz	90 sec	51.5 Hz	90.000 sec	51.3 Hz for 95 sec	No trip
O/F Stage 2	52 Hz	0.5 sec	52.0 Hz	0.649 sec	51.8 Hz for 89.98 sec	No trip
					52.2 Hz for 0.48 sec	No trip
U/F Stage 1	47.5 Hz	20 sec	47.5 Hz	20.027 sec	47.7 Hz for 25 sec	No trip
U/F Stage 2	47 Hz	0.5 sec	47.0 Hz	0.549sec	47.2 Hz for 19.98 sec	No trip
					46.8 Hz for 0.48 sec	No trip

Voltage Tests						
Function	Setting		Result		No Trip Test	
	Voltage	Time Delay	Voltage	Time Delay	Test Value	Result
O/V Stage 1	262.2 V	1 sec	260.8 V	1.106 sec	258.2 V for 2 sec	No trip
O/V Stage 2	273.7 V	0.5 sec	272.1 V	0.606 sec	269.7 V for 0.98 sec	No trip
					277.7 V for 0.48 sec	No trip
U/V Stage 1	200.1 V	2.5 sec	198.8 V	2.586 sec	204.1 V for 3.5 sec	No trip
U/V Stage 2	184 V	0.5 sec	182.9 V	0.586 sec	188 V for 2.48 sec	No trip
					180 V for 0.48 sec	No trip

Loss of Mains and Single Phase Tests						
LoM methods	RoCoF					
Test Power and Imbalance	33 % -5 % Q Test 22	66 % -5 % Q Test 12	100 % -5 % Q Test 5	33 % 5 % Q Test 31	66 % 5 % Q Test 21	100 % 5 % Q Test 10
Limit	500 msec					
Result - RoCoF	93 ms	100 ms	84 ms	117 ms	115 ms	88 msd
Phase Removed				1	2	3
Result				Trip	N/A	N/A

Protection. Frequency change, RoCoF Stability test			
Ramp range	Test frequency ramp	Test Duration	Confirm no trip
49.0Hz to 51.0Hz	+0.95Hzs^{-1}	2.1s	PASS
51.0Hz to 49.0Hz	-0.95Hzs^{-1}	2.1s	PASS

Re-connection Timer				
Voltage	Delay Setting	20 sec	Measured Delay	25.7 sec
Frequency	Delay Setting	20 sec	Measured Delay	31.9 sec
Test Value	266.2 V	196.1 V	47.4 Hz	51.6 Hz
Result	No re-connect	No re-connect	No re-connect	No re-connect

Fault Level Contribution		
Time after fault	Volts	Amps
20 msec	51.1 V	12.7 A
100 msec	34.97V	9.63 A
250 msec	13.91 V	9.64 A
500 msec	30.86V	10.16 A
Time to trip	0.606 sec	

Self monitoring - Solid State Switching	
It has been verified that in the event of the solid state switching device failing to disconnect the Generating Unit, the voltage on the output side of the switching device is reduced to a value below 50 volts within 0.5 seconds.	Result
	NA