

## G59/3 (RoCoF amendment) Type Test Report – SE2200H – SE3680H

Engineering Recommendation G59/3			
Type Tested Reference Number		15PP010-05	
Generating Unit Technology		Photovoltaic Inverter	
Manufacturer		SolarEdge Technologies Ltd	
Address		1 HaMada Street Herzeliya 673335 Israel	
Tel	+972-9-957-6620	Fax	+972-9-957-6591
Email	<a href="mailto:info@solaredge.com">info@solaredge.com</a>	Website	<a href="http://www.solaredge.com">www.solaredge.com</a>
<p>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 G59/3</p>			

Herzeliya  
Israel

June 30 2017

PLACE

Date

  
Meir Adest, VP Core Technologies

Generating Unit	SE2200H	SE3000H	SE3500H	SE3680H
Rated AC Power (kW)	2.2	3	3.5	3.68

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	50% of rated output		100% of rated output		BS EN 61000-3-2 Limit - Class A
	Result (A)	Result (%)	Result (A)	Result (%)	
2nd	0.026	0.10	0.057	0.22	8 %
3rd	0.047	0.18	0.110	0.42	21.6 %
4th	0.010	0.04	0.037	0.14	4 %
5th	0.157	0.60	0.138	0.53	10.7 %
6th	0.013	0.05	0.010	0.04	2.67 %
7th	0.052	0.20	0.037	0.14	7.2 %
8th	0.010	0.04	0.010	0.04	2 %
9th	0.031	0.12	0.052	0.20	3.8 %
10th	0.005	0.02	0.018	0.07	1.6 %
11th	0.039	0.15	0.115	0.44	3.1 %
12th	0.010	0.04	0.023	0.09	1.33 %
13th	0.133	0.51	0.190	0.73	2 %
THD	-	2.07	-	1.46	23 %
PWTHD	-	4.26	-	3.36	23 %

Voltage Fluctuations and Flicker				
BS EN 61000-3-11				
	Starting	Stopping	Running	
Limit	4 %	4 %	Pst = 1.0	Plt = 0.65
Result	0.60%	0.60 %	0.06	0.06

DC Current Injection			
Test Power Level	10 %	55 %	100 %
Limit	0.25 %		
Result	0.09 %	0.12 %	0.13%

Power Factor			
Test Voltage	216.2 V	230 V	253 V
Limit	> 0.95		
Result	0.999	0.999	0.999

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	90.10 sec	51.3 Hz for 95 sec	No trip
O/F Stage 2	52 Hz	0.5 sec	52.0 Hz	0.610 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	20.15 sec	47.7 Hz for 25 sec	No trip
U/F Stage 2	47 Hz	0.5 sec	47.0 Hz	0.528 sec	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	262 V	1.095 sec	258.2 V for 2 sec	No trip
O/V Stage 2	273.7 V	0.5 sec	273.3 V	0.592 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	199.6 V	2.590 sec	204.1 V for 3.5 sec	No trip
U/V Stage 2	184 V	0.5 sec	183.6 V	0.592 sec	188 V for 2.48 sec	No trip
					180 V for 0.48 sec	No trip

Loss of Mains and Single Phase Tests						
BS EN 62116						
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 - Frequency Shift	104 msec	114 msec	128 msec	135 msec	130 msec	114 msec
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

Frequency Change Stability Test				
	Start Frequency	Change	End Frequency	Result
Positive Vector Shift	49.5 Hz	+9 degrees	-	No trip
Negative Vector Shift	50.5 Hz	-9 degrees	-	No trip
Positive Frequency drift	49.5 Hz	+0.19 Hz/sec	51.5 Hz	No trip
Negative Frequency Drift	50.5 Hz	-0.19 Hz/sec	47.5 Hz	No trip

Re-connection Timer				
Timer	Delay Setting	20 sec	Measured Delay	36 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	34.2 V	11.9 A
100 msec	23.3 V	15.9 A
250 msec	10.8 V	16 A
500 msec	42.7V	9.9 A
Time to trip	0.508 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