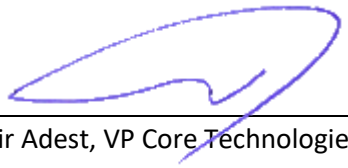
G59/3 (RoCoF amendment) Type Test Report – SE25K – SE27.6K

Engineering Recommendation G59/3			
Type Tested Reference Number		15PP010-05	
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 G59/3			

Herzeliya Israel	June 25 2018	
PLACE	Date	Meir Adest, VP Core Technologies

Generating Unit	SE25K	SE27.6K
Rated AC Power (kW)	25	27.6
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 (%)	1 Phase	3 Phase
2nd	0.076	0.190	0.172	0.430	8 %	8 %
3rd	0.120	0.300	0.320	0.820	21.6 %	Not stated
4th	0.076	0.190	0.180	0.450	4 %	4 %
5th	0.484	1.210	0.336	0.840	10.7 %	10.7 %
6th	0.036	0.900	0.112	0.280	2.67 %	2.67 %
7th	0.468	1.170	0.268	0.670	7.2 %	7.2 %
8th	0.020	0.050	0.032	0.080	2 %	2 %
9th	0.060	0.150	0.080	0.200	3.8 %	Not stated
10th	0.012	0.030	0.032	0.080	1.6 %	1.6 %
11th	0.272	0.680	0.220	0.550	3.1 %	3.1 %
12th	0.012	0.030	0.016	0.040	1.33 %	1.33 %
13th	0.196	0.490	0.204	0.510	2 %	2 %
THD	-	3.97	-	1.898	23 %	13 %
PWTHD	-	2.786	-	3.095	23 %	22 %

DC Current Injection			
Test Power Level	10 %	55 %	100 %
Limit	0.25 %		
Result	0.08 %	0.10 %	0.10 %

Power Factor			
Test Voltage	216.2 V	230 V	253 V
Limit	> 0.95		
Result	0.99	0.99	0.99

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	90.03 sec	51.3 Hz for 95 sec	No trip
O/F Stage 2	52 Hz	0.5 sec	52.0 Hz	0.540 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	20.03 sec	47.7 Hz for 25 sec	No trip
U/F Stage 2	47 Hz	0.5 sec	47.0 Hz	0.525 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	261.7 V	1.013 sec	258.2 V for 2 sec	No trip
O/V Stage 2	273.7 V	0.5 sec	273.2 V	0.511sec	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	200.0 V	2.515 sec	204.1 V for 3.5 sec	No trip
U/V Stage 2	184 V	0.5 sec	183.9 V	0.514 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	288 msec	265 msec	199 msec	149 msec	181 msec	226 msec
Phase Removed				1	2	3
Result				Trip	Trip	Trip

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				
Timer	Delay Setting	20 sec	Measured Delay	29 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	54.4 V	38.9 A
100 msec	52.9 V	39.9 A
250 msec	52.6 V	39.6 A
500 msec	21.1 V	0.1 A
Time to trip	0.48 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