



66 Treffers Road, Christchurch, 8042, New Zealand
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Certificate G59/2

TYPE VERIFICATION TEST SHEET

GENERATING PLANT DETAILS

Generating Plant Type Reference:		EnaSolar 5kWGT-UK	
Generating Plant Technology (as per Annex):		Photovoltaic	
Manufacturer:	Address:	Telephone:	Fax:
EnaSolar Ltd	66 Treffers Road Christchurch 8042 New Zealand	0064 3 366 4550	0064 3 366 0884
Maximum Export Capability) (Generating Plant Rating Less Parasitic Load)		5000W	

TEST HOUSE DETAILS

Name and Address of Test House	EnaSolar Ltd 66 Treffers Road Christchurch 8042 New Zealand
Telephone Number	+64 3 366 4550
Facsimile Number	+64 3 366 0884
Email Address	support@enasolar.net

TEST DETAILS

Date of Test	August 2012
Name of Tester	Ian Rees
Signature of Tester	<i>IR</i>
Test Location if Different from Above	Same as above

Test Results

POWER QUALITY

Harmonic Current Emissions								
Minimal Short Circuit Ratio R_{scc} :							33	
Value of Short Circuit Power S_{sc} corresponding to R_{scc} :							0.235MVA	
Equipment Phases:							Single Phase	
Description	Harmonic Current % = $100I_n/I_1$						Harmonic Current Distortion Factors (%)	
Harmonic	3rd	5th	7th	9th	11th	13th	THD	PWHD
Limit*	21.6	10.7	7.2	3.8	3.1	2	23	23
Actual Values:	0.21	2.22	0.80	0.45	2.25	0.62	4.21	11.61

*Maximum permissible harmonic current As per BS EN 61000-3-12 Table 2-4

Voltage Fluctuation and Flicker					
Equipment meets BSEN 61000-3-3? No					
If equipment does not meet BSEN 61000-3-3:					
i) Does equipment require a supply rated $\geq 100A$? No					
ii) If answer to i) is no, specify the value of Z_{ref} : (0.4+j25)#					
Voltage Disturbance					
	P_{st}	P_{lt}	$d(t) > 3.3\%$	$d_c\%$	$d_{max}\%$
Limit at Z_{ref} *	1.0	0.65	0.5	3.3	4.0
Actual Values #:	0.16	0.08	0.0	1.15	1.15

*Detailed requirements are specified in BS EN 61000-3-3 and BS EN 61000-3-11

#Per Austest report "0803ENA_4.0&5.0kWGT 61000-3-11.12"

	DC injection			Power Factor		
G59/2 Limit	20mA, tested at three power levels			0.95 lag-0.95 lead at three voltage levels		
Test Level	10%	55%	100%	212V	230V	248V
Actual Values:	13mA*	12mA*	9mA*	0.999	0.999	0.999

*Measured values are below 0.25% of the rated current

UNDER/OVER FREQUENCY TESTS

	G59/2 Limit		Setting		Test Results	
	Frequency	Time	Frequency	Time	Frequency	Time
Under frequency Stage 1	47.5Hz	20s	47.5Hz	19.9s	47.48Hz	19.7s
Under frequency Stage 2	47Hz	0.5s	47Hz	0.4s	46.99Hz	440ms
Over frequency Stage 1	51.5Hz	90s	51.5Hz	89s	51.53Hz	88s
Over frequency Stage 2	52Hz	0.5s	52Hz	0.4s	52.01Hz	432ms

UNDER/OVER VOLTAGE TESTS

	G59/2 Limit		Setting		Test Results	
	Voltage	Time	Voltage	Time	Voltage	Time
Under voltage Stage 1	208.8V	2.5s	208.8V	2.4s	207.9V	2400ms
Under voltage Stage 2	192V	0.5s	192V	0.4s	191.2V	406ms
Over voltage Stage 1	264V	1.0s	264V	0.9s	264V	956ms
Over voltage Stage 2	276V	0.5s	270V	0.4s	269V	458ms

LOSS OF MAINS TEST

Method Used	Reactive current injection		
Output Power Level	500W (10%)	2750W (55%)	5000W (100%)
G59/2 Limit	2.5s	2.5s	2.5s
Trip Setting	NA	NA	NA
Actual Values:	<50ms	600ms	1390ms

RECONNECTION TIMES

Reconnection Time	Under/Over Voltage	Under/Over Frequency	Loss of Mains
Minimum Value	180 seconds	180 seconds	180 seconds
Actual Setting	180 seconds	180 seconds	180 seconds
Recorded Value	183 seconds	183 seconds	183 seconds

FAULT LEVEL CONTRIBUTION

As Photovoltaic Generating Plants are inverter connected, they are deemed to comply with regulations and no further tests are required.

SELF MONITORING – SOLID STATE SWITCHING

Not applicable as electro-mechanical relays are used.

COMMENTS

These tests have been carried out with the specifications and parameters set to meet the requirements of G59/2. It is hereby declared by the manufacturer that all units shipped to the UK will have identical parameter settings and that these parameters cannot be changed by a user, installer or any other person without the use of password protected software.

