Certificate | UK-G59/2-1

The results of the UK-G59/2-1 tests are summarized in this certificate.
Power-One Italy S.p.a. declares that the units shipped to the UK are characterized by the following features:

- The internal specification and parameters are set to be compliant with UK-G59/2-1 engineering requirements.
- All units have identical internal parameter setting.
- These parameters cannot be changed without the usage of password protected tool.
- All units are tested before shipping according to UK-G59/2-1 engineering specification.

SSEG DETAILS (Small-Scale Embedded Generator)

SSEG Type Reference:	PHOTO-VOLTAIC and EOLIC GRID TIED INVERTER
SSEG Model Reference:	PVI-3.8-I-OUTD PVI-3.8-I-OUTD-S SSWI-3.8-I-OUTD PVI-4.6-I-OUTD PVI-4.6-I-OUTD-S SSWI-4.6-I-OUTD
Manufacturer:	Power-one Italy S.p.A.
Telephone number:	+39-055-919551
Fax number:	+38-055-9195248
Address	Via S. Giorgio, 642 52028 Terranuova Bracciolini Arezzo - Italy
Maximum export capability (SSEG rating less parasitic load)	4600W (PVI-4.6-I-OUTD and derived models) 4200W (PVI-3.8-I-OUTD and derived models)
Nominal Output AC Power	4600W (PVI-4.6-I-OUTD and derived models) 3800W (PVI-3.8-I-OUTD and derived models)

TEST HOUSE DETAILS

Name:	Power-one Italy S.p.A. - R.& D. Department
Address:	Via S. Giorgio 642, 52028 Terranuova Bracciolini
Telephone number:	+39-055-919551
Fax number:	+38-055-9195248
E-mail address	service@power-one.com

TEST RESULTS SUMMARY

Power Quality:

- Harmonic Current Emission as per BS EN-61000-3-12
- Voltage Fluctuation and Flickers as per BS EN-61000-3-11
- DC Injection as per UK G59/2-1
- Power Factor as per UK G59/2-1

Protection:

- Under/Over Frequency Tests
- Under/Over Voltage Tests
- Reconnection Times
- Loss of Mains Test

Power-One Italy S.p.a.
Terranuova Bracciolini, 15 novembre 2012

Robert White
(Director Safety & Environmental Compliance)

UK-G59/2-1 TEST RESULTS DETAILS – TYPE VERIFICATION TEST SHEET

POWER QUALITY

(PVI-4.6-I-OUTD and derived models)	Value of Short Circuit Power SSC = 0.1518 MVA @ RSCE = 33							
Harmonic Current Emission as per BS EN-61000-3-12								
Harmonic	3rd [A%]	5rd [A%]	7rd [A%]	9rd [A%]	11rd [A%]	13rd [A%]	THD [A%]	PWHD [A%]
Limit	21.6	10.7	7.2	3.8	3.1	2	13	22
Test value	1.0964	0.7422	0.1582	0.432	0.3248	0.2948	1.736	3.677135

(PVI-3.8-I-OUTD and derived models)	Value of Short Circuit Power SSC = 0.1254 MVA @ RSCE = 33							
Harmonic Current Emission as per BS EN-61000-3-12								
Harmonic	3rd [A%]	5rd [A%]	7rd [A%]	9rd [A%]	11rd [A%]	13rd [A%]	THD [A%]	PWHD [A%]
Limit	21.6	10.7	7.2	3.8	3.1	2	13	22
Test value	1.0558	0.586	0.1312	0.4554	0.3424	0.2996	2.3156	4.076565

(PVI-4.6-I-OUTD and derived models)					
Voltage Fluctuation and Flickers as per BS EN-61000-3-11					
Voltage Disturbance	Pst	Plt	D(t) > 3%	dc (%)	dmax (%)
Limit	1	0.65	0.5	3.3	6
Test Value	0.17	0.14	0.1	2	2.13

(PVI-3.8-I-OUTD and derived models)					
Voltage Fluctuation and Flickers as per BS EN-61000-3-11					
Voltage Disturbance	Pst	Plt	D(t) > 3%	dc (%)	dmax (%)
Limit	1	0.65	0.5	3.3	6
Test Value	0.17	0.14	0.1	2	2.13

(PVI-4.6-I-OUTD and derived models)							
UK G59/2-1 Limit 0.25% of 23A	DC injection [mA] 57.5mA, tested at three power levels				Power Factor 0.95 lag - 0.95 lead at three voltage levels		
Test Level		10%	55%	100%	216 Vac	240 Vac	259.2 Vac
Test Value		5.6	7.2	6.2	0.9998	0.9998	0.9998

(PVI-3.8-I-OUTD and derived models)							
UK G59/2-1 Limit 0.25% of 16.5A	DC injection [mA] 40mA, tested at three power levels				Power Factor 0.95 lag - 0.95 lead at three voltage levels		
Test Level		10%	55%	100%	216 Vac	240 Vac	259.2 Vac
Test Value		15	18.6	7.8	0.9997	0.9997	0.9996

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PROTECTION

(PVI-4.6-I-OUTD and derived models) and (PVI-3.8-I-OUTD and derived models)

UNDER FREQUENCY TEST						
Fnom=50Hz	UK-G59/2-1 Limit		Settings		Results	
Under Frequency <	Frequency [Hz]	Time [s]	Frequency [Hz]	Time [s]	Frequency [Hz]	Time [s]
	47.50	20.0	47.55	20.0	47.54	20.08
Under Frequency <<	Frequency [Hz]	Time [s]	Frequency [Hz]	Time [s]	Frequency [Hz]	Time [s]
	47.00	0.5	47.05	0.42	47.04	0.42

OVER FREQUENCY TEST						
Fnom=50Hz	UK-G59/2-1 Limit		Settings		Results	
Over Frequency >	Frequency [Hz]	Time [s]	Frequency [Hz]	Time [s]	Frequency [Hz]	Time [s]
	51.50	90.0	51.45	90.0	51.46	90.15
Over Frequency >>	Frequency [Hz]	Time [s]	Frequency [Hz]	Time [s]	Frequency [Hz]	Time [s]
	52.00	0.5	51.95	0.42	51.96	0.42

UNDER VOLTAGE TEST						
Vφ-n nom =240V	UK-G59/2-1 Limit		Settings		Results	
Under Voltage <	Voltage [V]	Time [s]	Voltage [V]	Time [s]	Voltage [V]	Time [s]
L1-N	208.8	2.5	211.1	2.3	210.9	2.31
Under Voltage <<	Voltage [V]	Time [s]	Voltage [V]	Time [s]	Voltage [V]	Time [s]
L1-N	192.0	0.5	194.3	0.44	194.2	0.46

OVER VOLTAGE TEST						
Vφ-n nom =240V	UK-G59/2-1 Limit		Settings		Results	
Over Voltage >	Voltage [V]	Time [s]	Voltage [V]	Time [s]	Voltage [V]	Time [s]
L1-N	264.0	1.0	261.7	0.9	262.2	0.91
Over Voltage >>	Voltage [V]	Time [s]	Voltage [V]	Time [s]	Voltage [V]	Time [s]
L1-N	276.0	0.5	273.7	0.44	274.1	0.45

RECONNECTION TIMES			
	Under/Over voltage	Under/Over Frequency	Loss of Main
Minimum Value Limit [s]	180	180	180
Actual setting [s]	180	180	180
Recorded value [s]	196	195	197

LOSS OF MAIN TESTS			
Method used	Rate Of Change Of Frequency and Active Power Variation		
Output power Level	10%Prated	55%Prated	100%Prated
UK-G59/2-1 Limit [s]	5.0	5.0	5.0
Trip setting [s]	5.0	5.0	5.0
Trip value [s]	4	4	4

SSEG Short Circuit Current Contribution Test

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

SELF MONITORING – SOLID STATE SWITCHING

Not applicable because electro-mechanical relays are used

ACCURACY

Voltage reading accuracy = +/- 1%

Frequency reading accuracy = +/- 0.05Hz