

## Certificate

## IRELAND EN 50438

The results of tests performed according to reference standard IRELAND EN 50438 are summarized in this certificate. Power-One Italy S.p.a. declares that the units set for IRELAND EN 50438 operations are characterized by the following features:

- The internal specification and parameters are set to be compliant with IRELAND EN 50438 engineering requirements.
- All units have identical internal parameters setting.
- These parameters cannot be changed without the usage of password protected tool.

### SSEG DETAILS (Small-Scale Embedded Generator)

SSEG Type Reference:	PHOTO-VOLTAIC GRID TIED INVERTER
SSEG Model Reference:	PVI-8.0-TL-OUTD PVI-8.0-TL-OUTD-S PVI-8.0-TL-OUTD-FS PVI-6.0-TL-OUTD PVI-6.0-TL-OUTD-S PVI-6.0-TL-OUTD-FS
Maximum export capability (SSEG rating less parasitic load)	8900W (PVI-8.0-TL-OUTD and derived models) 6600W (PVI-6.0-TL-OUTD and derived models)
Nominal Output AC Power	8000W (PVI-8.0-TL-OUTD and derived models) 6000W (PVI-6.0-TL-OUTD and derived models)

### MANUFACTURER and TEST HOUSE DETAILS

Name:	Power-one Italy S.p.A. - R.& D. Department
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### TEST RESULTS SUMMARY

Power Quality:

- Harmonic Current Emission as per EN-61000-3-2
- Voltage Fluctuation and Flickers as per EN-61000-3-3
- DC Injection as per IEC 61727
- Power Factor as per VDE 0126

Protection:

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

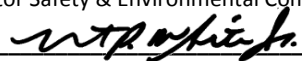
Power-One Italy S.p.a.

Terranuova Bracciolini,

March 22, 2013

Robert White

(Director Safety & Environmental Compliance)



## IRELAND EN 50438 TEST RESULTS DETAILS – TYPE VERIFICATION TEST SHEET

### POWER QUALITY

PVI-8.0-TL-OUTD									
Harmonic Current Emission as per EN-61000-3-2									
Harmonic		3rd [A]	5rd [A]	7rd [A]	9rd [A]	11rd [A]	13rd [A]	THD [A%]	PWHD [A%]
Limit		2.3	1.14	0.77	0.4	0.33	0.21	-	-
Result	Test value L1	0.152	0.051	0.005	0.012	0.023	0.030	1.627	-
	Test value L2	0.070	0.045	0.037	0.008	0.010	0.044	1.082	-
	Test value L3	0.083	0.084	0.035	0.006	0.026	0.040	1.319	-

PVI-6.0-TL-OUTD									
Harmonic Current Emission as per EN-61000-3-2									
Harmonic		3rd [A]	5rd [A]	7rd [A]	9rd [A]	11rd [A]	13rd [A]	THD [A%]	PWHD [A%]
Limit		2.3	1.14	0.77	0.4	0.33	0.21	-	-
Result	Test value L1	0.167	0.024	0.030	0.015	0.029	0.027	2.331	-
	Test value L2	0.124	0.040	0.028	0.010	0.019	0.052	1.972	-
	Test value L3	0.089	0.043	0.006	0.012	0.030	0.036	1.543	-

PVI-8.0-TL-OUTD					
Voltage Fluctuation and Flickers as per EN-61000-3-3					
Voltage Disturbance	Pst	Plt	D(t) > 3%	dc (%)	dmax (%)
Limit	1	0.65	0.5	3.3	4
Test Value	0.17	0.15	0	1.8	2.18

PVI-6.0-TL-OUTD					
Voltage Fluctuation and Flickers as per EN-61000-3-3					
Voltage Disturbance	Pst	Plt	D(t) > 3%	dc (%)	dmax (%)
Limit	1	0.65	0.5	3.3	4
Test Value	0.17	0.15	0	1.8	2.18

PVI-8.0-TL-OUTD							
IEC 61727 Limit 0.25% of 13A	DC injection [mA]				Power Factor		
	33mA, tested at three power levels				0.95 lag - 0.95 lead at three voltage levels		
Test Level	10%	50%	100%	210 Vac	230 Vac	250 Vac	
Test Value	L1	-16.0	-11.0	7.0	0.99	0.99	0.99
	L2	7.0	7.0	-14.0			
	L3	8.0	4.0	10.0			

PVI-6.0-TL-OUTD							
IEC 61727 Limit 0.25% of 10A	DC injection [mA]				Power Factor		
	25mA, tested at three power levels				0.95 lag - 0.95 lead at three voltage levels		
Test Level	10%	50%	100%	210 Vac	230 Vac	250 Vac	
Test Value	L1	3.7	2.8	-11.1	0.99	0.99	0.99
	L2	-16.1	9.5	2.1			
	L3	5.0	-10.7	9.2			

## PROTECTION

### PVI-8.0-TL-OUTD and PVI-6.0-TL-OUTD

UNDER FREQUENCY TEST						
Fnom=50Hz	IRELAND EN 50438 Limit		Settings		Results	
Under Frequency <	Frequency [Hz]	Time [s]	Frequency [Hz]	Time [s]	Frequency [Hz]	Time [s]
	48.00	0.50	48.00	0.42	47.99	0.43

OVER FREQUENCY TEST						
Fnom=50Hz	IRELAND EN 50438 Limit		Settings		Results	
Over Frequency >	Frequency [Hz]	Time [s]	Frequency [Hz]	Time [s]	Frequency [Hz]	Time [s]
	50.50	0.50	50.50	0.42	50.51	0.42

UNDER VOLTAGE TEST						
Vφ-n nom =230V	IRELAND EN 50438 Limit		Settings		Results	
Under Voltage <	Voltage [V]	Time [s]	Voltage [V]	Time [s]	Voltage [V]	Time [s]
L1-N	207.0	0.50	207.0	0.44	206.8	0.47
L2-N					206.5	0.47
L3-N					206.2	0.47
L1-L2-L3	358.5	0.50	358.5	0.44	358.1	0.47

OVER VOLTAGE TEST						
Vφ-n nom =230V	IRELAND EN 50438 Limit		Settings		Results	
Over Voltage >	Voltage [V]	Time [s]	Voltage [V]	Time [s]	Voltage [V]	Time [s]
L1-N	253.0	0.50	253.0	0.44	251.5	0.46
L2-N					251.3	0.46
L3-N					251.7	0.46
L1-L2-L3	438.2	0.50	438.2	0.44	435.9	0.46

RECONNECTION TIMES			
	Under/Over voltage	Under/Over Frequency	Loss of Main
Minimum Value Limit [s]	20	20	20
Actual setting [s]	20	20	20
Recorded value [s]	24	24	24

LOSS OF MAIN TESTS			
Method used	Rate Of Change Of Frequency and Active Power Variation		
Output power Level	10%Prated	55%Prated	100%Prated
IRELAND EN 50438 Limit [s]	5	5	5
Trip setting [s]	5	5	5
Trip value [s]	< 4	< 4	< 4

**SSEG Short Circuit Current Contribution Test**

RMS Value over 1 Period (Cycle)	13.28	[Aac]
Peak Current	204.0	[A]

**SELF MONITORING – SOLID STATE SWITCHING**

Not applicable because electro-mechanical relays are used

**SSEG ACCURACY**

Voltage reading accuracy = +/- 1%

Frequency reading accuracy = +/- 0.05Hz