

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 and EOLIC GRID TIED INVERTER	
SSEG Model Reference:	UNO-2.0-I-OUTD UNO-2.0-I-OUTD-S UNO-2.0-I-OUTD-W UNO-2.5-I-OUTD UNO-2.5-I-OUTD-S UNO-2.5-I-OUTD-W	
Maximum export capability (SSEG rating less parasitic load)	2750W	(UNO-2.5-I-OUTD and derived models)
	2200W	(UNO-2.0-I-OUTD and derived models)
Nominal Output AC Power	2500W	(UNO-2.5-I-OUTD and derived models)
	2000W	(UNO-2.0-I-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,

September 14, 2013

Robert White
(Director Safety & Environmental Compliance)



IRELAND EN 50438 TEST RESULTS DETAILS – TYPE VERIFICATION TEST SHEET

POWER QUALITY

(UNO-2.5-I-OUTD and derived models)								
Harmonic Current Emission as per BS 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	-	-
Test value	0.094	0.035	0.036	0.027	0.032	0.028	1.184	-

(UNO-2.0-I-OUTD and derived models)								
Harmonic Current Emission as per BS 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	-	-
Test value	0.063	0.030	0.039	0.031	0.031	0.028	1.417	-

(UNO-2.5-I-OUTD and derived models)					
Voltage Fluctuation and Flickers as per BS EN-61000-3-3					
Voltage Disturbance	Pst	Plt	D(t) > 3%	dc (%)	dmax (%)
Limit	1	0.65	0.5	3.3	4
Test Value	0.072	0.07	0.0001	0.031	0.379

(UNO-2.0-I-OUTD and derived models)					
Voltage Fluctuation and Flickers as per BS EN-61000-3-3					
Voltage Disturbance	Pst	Plt	D(t) > 3%	dc (%)	dmax (%)
Limit	1	0.65	0.5	3.3	4
Test Value	0.08	0.077	0.0001	0.013	0.447

(UNO-2.5-I-OUTD and derived models)							
IEC-61727 Limit 0.25% of 12A	DC injection [mA]				Power Factor		
	30mA, tested at three power levels				0.95 lag - 0.95 lead at three voltage levels		
Test Level	10%	50%	100%	184 Vac	230 Vac	264.5 Vac	
Test Value	20.2	21.6	22.8	0.99	0.99	0.99	

(UNO-2.0-I-OUTD and derived models)							
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%	184 Vac	230 Vac	264.5 Vac	
Test Value	8.2	11.4	10.8	0.99	0.99	0.99	

PROTECTION

(UNO-2.5-I-OUTD and derived models) and (UNO-2.0-I-OUTD and derived models)

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	48.01

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

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	207.0

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	253.3

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]	60	77	60

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]	5.0	5.0	5.0
Trip setting [s]	5.0	5.0	5.0
Trip value [s]	1.4	1.4	1.2

SSEG Short Circuit Current Contribution Test

RMS Value over 1 Period (Cycle)	11.70	[Aac]
Peak Current	89.3	[A]

SELF MONITORING – SOLID STATE SWITCHING

Not applicable because electro-mechanical relays are used

ACCURACY

Voltage reading accuracy = +/- 1%
 Frequency reading accuracy = +/- 0.05Hz