Certificate | SPAIN RD 1699/2011

The results of tests performed according to reference standard SPAIN RD 1699/2011 are summarized in this certificate.
Power-One Italy S.p.a. declares that the units set for SPAIN RD 1699/2011 operations are characterized by the following:

- The internal specification and parameters are set to be compliant with SPAIN RD 1699/2011 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
Address:	Via S. Giorgio 642, 52028 Terranuova Bracciolini - Arezzo - Italy
Telephone number:	+39-055-91951
Fax number:	+39-055-9195248
E-mail address	service@power-one.com

TEST RESULTS SUMMARY

Power Quality:

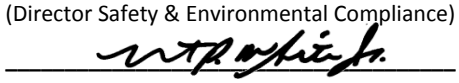
- Harmonic Current Emission as per EN-61000-3-2
- Voltage Fluctuation and Flickers as per EN-61000-3-3
- DC Injection as per VDE 0126
- Power Factor as per VDE 0126

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)



SPAIN RD 1699/2011 TEST RESULTS DETAILS – TYPE VERIFICATION TEST SHEET

POWER QUALITY

(UNO-2.5-I-OUTD and derived models)								
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	-	-
Test value	0.0944	0.0348	0.0358	0.0268	0.0322	0.028	1.1844	-

(UNO-2.0-I-OUTD and derived models)								
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	-	-
Test value	0.0632	0.0302	0.0388	0.031	0.0314	0.0276	1.4172	-

(UNO-2.5-I-OUTD and derived models)					
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	0.072	0.07	0.0001	0.031	0.379

(UNO-2.0-I-OUTD and derived models)					
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	0.08	0.077	0.0001	0.013	0.447

(UNO-2.5-I-OUTD and derived models)							
VDE 0126 Limit 0.5% of 12A	DC injection [mA] 60mA, tested at three power levels				Power Factor 0.95 lag - 0.95 lead at three voltage levels		
Test Level		10%	50%	100%	195.5 Vac	230 Vac	253 Vac
Test Value		27.8	28	32.2	0.99	0.99	0.99

(UNO-2.0-I-OUTD and derived models)							
VDE 0126 Limit 0.5% of 10A	DC injection [mA] 50mA, tested at three power levels				Power Factor 0.95 lag - 0.95 lead at three voltage levels		
Test Level		10%	50%	100%	195.5 Vac	230 Vac	253 Vac
Test Value		24.4	25.4	23.4	0.99	0.99	0.99

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PROTECTION

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

UNDER FREQUENCY TEST						
Fnom=50Hz	SPAIN RD 1699/2011 Limit		Settings		Results	
Under Frequency <	Frequency [Hz]	Time [s]	Frequency [Hz]	Time [s]	Frequency [Hz]	Time [s]
	48.00	3.00	48.00	2.92	48.00	2.94

OVER FREQUENCY TEST						
Fnom=50Hz	SPAIN RD 1699/2011 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	50.50	0.40

UNDER VOLTAGE TEST						
Vφ-n nom =230V	SPAIN RD 1699/2011 Limit		Settings		Results	
Under Voltage <	Voltage [V]	Time [s]	Voltage [V]	Time [s]	Voltage [V]	Time [s]
L1-N	195.5	1.50	195.5	1.44	196.3	1.46

OVER VOLTAGE TEST						
Vφ-n nom =230V	SPAIN RD 1699/2011 Limit		Settings		Results	
Over Voltage >	Voltage [V]	Time [s]	Voltage [V]	Time [s]	Voltage [V]	Time [s]
L1-N	253.0	1.50	253.0	1.44	253.5	1.45
Over Voltage >>	Voltage [V]	Time [s]	Voltage [V]	Time [s]	Voltage [V]	Time [s]
L1-N	264.5	0.20	264.5	0.16	265.3	0.18

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]	207	202	202

LOSS OF MAIN TESTS			
Method used	Current pulse for Impedance measurement and Active Power Variation		
Output power Level	10%Prated	55%Prated	100%Prated
SPAIN RD 1699/2011 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