

CERTIFICATE G83/1

Engineering Recommendation

Applicant : FuturEnergy Ltd.
Address : 7 Ettington Park Business Centre
Postal code, place : Cv37 8BT Warwickshire
Country : United Kingdom

Manufacturer : Mastervolt B.V.
Address : Snijdersbergweg 93
Postal code, place : 1105AN Amsterdam
Country : The Netherlands

Electrical apparatus : Wind Inverter with HF-transformer
Trademark : MASTERVOLT
Type designation : Windmaster 500 OEM
Max. export capability : 550W
Rated power : 525W

Test details

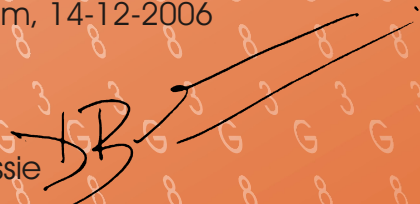
Power quality
Harmonic current emissions as per BS EN 61000-3-2 A
Voltage Fluctuations and Flicker as per BS EN 61000-3-3 A
DC injection / Power Factor
Under / Over Frequency switch off
Under / Over Voltage switch off
Loss Of Mains Test
Reconnection Time

The results of the G83/1 tests are summarized in this certificate. Complete documentation on test details are recorded in report no. 20061210_G83-2_EB

Mastervolt and its OEM partner FuturEnergy declare that all units sold in the UK are within the specifications and parameters set by the G83/1 engineering recommendation. These settings cannot be changed by an installer, user or by any person other than FuturEnergy or Mastervolt personnel.

Mastervolt R&D department
Amsterdam, 14-12-2006

David Bassie



FuturEnergy
Amsterdam, 14-12-2006

Peter Osborne



Test results

1. POWER QUALITY

Harmonic current emissions as per BS EN 61000-3-2-Class A								
Harmonic	2 nd	3 rd	5 th	7 th	9 th	11 th	13 th	15 th ... 39 th
Limit (Amp.)	1.08	2.3	1.14	0.77	0.4	0.33	0.21	0.15 x (15/n)
Test value	0.07	0.18	0.08	0.02	0.06	0.02	0.03	< limit BS EN 61000-2-3 A

Voltage fluctuations and Flicker as per BS EN 61000-3-3 Class A				
Harmonic	Starting	Stopping	Running	
Limit	4%	4%	$P_{st} = 1.0$	$P_{it} = 0.65$
Test value	Max 1.2%	Max 1.4%	Max 0.256 in 10 min.	Max 0.328 in 2 hrs.

	DC injection			Power Factor		
G83/1 limit	20mA, tested at three levels			0.95 lag - 0.95 lead at three voltage levels at P_{rated}		
Test level	10%	50%	100%	212V	230V	248V
Test value	< 1mA	< 1mA	< 1mA	0.999	0.993	0.991

2. UNDER / OVER FREQUENCY SWITCH OFF

Parameter	Under Frequency Switch Off						Over Frequency Switch Off					
	Frequency [Hz]			Time [s]			Frequency [Hz]			Time [s]		
G83/1 limit	47 Hz			0.5s			50.5 Hz			0.5s		
Output power	10%	50%	100%	10%	50%	100%	10%	50%	100%	10%	50%	100%
Actual setting	48 Hz	48 Hz	48 Hz	0.1s	0.1s	0.1s	50.55 Hz	50.55 Hz	50.55 Hz	0.1s	0.1s	0.1s
Trip value	48 Hz	48 Hz	48 Hz	<0.1s	<0.1s	<0.1s	50.5 Hz	50.5 Hz	50.5 Hz	<0.1s	<0.1s	<0.1s

3. UNDER / OVER VOLTAGE SWITCH OFF

Parameter	Under Voltage Switch Off						Over Voltage Switch Off					
	Voltage [V]			Time [s]			Voltage [V]			Time [s]		
G83/1 limit	207V			1.5s			264V			1.5s		
Output power	10%	50%	100%	10%	50%	100%	10%	50%	100%	10%	50%	100%
Actual setting	207V	207V	207V	0.1s	0.1s	0.1s	263V	263V	263V	0.1s	0.1s	0.1s
Trip value	208V	208V	208V	<0.1s	<0.1s	<0.1s	265V	265V	265V	<0.1s	<0.1s	<0.1s

4. LOSS OF MAINS TEST

Method used	Frequency shift		
Output power level	10% P_{rated}	50% P_{rated}	100% P_{rated}
G83/1 limit	0.500s	0.500s	0.500s
Trip setting	0.40s	0.40s	0.40s
Trip value	0.29s	0.154s	0.295s

5. RECONNECTION TIME MEASUREMENT

Reconnection time	Under / over Voltage	Under / over Frequency	Loss of Mains
Minimum value	180s	180s	180s
Actual setting	185s	185s	185s
Recorded value	183s	184s	183s

6. FAULT LEVEL CONTRIBUTION

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

7. SELF MONITORING - SOLID STATE SWITCHING

Not applicable as electro-mechanical relays are used.