

# CERTIFICATE G83/1

## Engineering Recommendation

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

Electrical apparatus : Photovoltaic Inverter with HF-transformer  
Trademark : MASTERVOLT

Type designation	Rated power	Max. Export capability
Sunmaster XS4300 IP44	3300W	3465W
Sunmaster XS3200 IP44	2500W	2625W
Sunmaster XS2000 IP44	1500W	1575W

### 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

Power Factor

DC injection under normal operation and protection function

Under / Over Frequency switch off

Under / Over Voltage switch off

Loss Of Mains Test

Reconnection Time

Mastervolt declares that Sunmaster XS IP44 models with country setting [ UK ] as indicated on the LCD display are compliant with the specifications set by the G83/1 engineering recommendation version 015D, issued by Electricity Assosiation Services, London.

Mastervolt R&D department  
Amsterdam, 04-04-2008



Ing. D.R. Bassie.

# Test results

## 1. POWER QUALITY

Harmonic current emissions as per BS EN 61000-3-2-Class A								
Harmonic	2 <sup>nd</sup>	3 <sup>rd</sup>	5 <sup>th</sup>	7 <sup>th</sup>	9 <sup>th</sup>	11 <sup>th</sup>	13 <sup>th</sup>	15 <sup>th</sup> ... 39 <sup>th</sup>
Limit (Amp.)	1.08	2.3	1.14	0.77	0.4	0.33	0.21	0.15 x (15/n)
Test value	0.05	0.22	0.16	0.14	0.10	0.09	0.09	0.87
% of fund.	0.32	1.53	1.10	0.98	0.72	0.63	0.63	6.09

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 2%	Max 2%	Max 0.582 in 10 min.	Max 0.582 in 2 hrs.

G83/1 limit	DC injection			Power Factor		
	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	<5mA	<7mA	<8mA	0.998	0.997	0.996

DC injection protection		
Parameter	DC inj [mA]	Time[s]
Actual setting	+/- 75 mA	1s
Test value	+/- 75mA	570ms

## 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	47 Hz	47 Hz	47 Hz	0.5s	0.5s	0.5s	50.5 Hz	50.5 Hz	50.5 Hz	0.5s	0.5s	0.5s
Trip value	46.99 Hz	46.99 Hz	46.99 Hz	482ms	484ms	489ms	50.51 Hz	50.51 Hz	50.51 Hz	496ms	496ms	486ms

## 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	1.5s	1.5s	1.5s	264V	264V	264V	1.5s	1.5s	1.5s
Trip value	207.2V	206.9V	206.8V	1.49s	1.48s	1.48s	265.1V	264.5V	264.3V	1.46s	1.48s	1.48s

## 4. LOSS OF MAINS TEST

Method used	Frequency shift		
Output power level	10% $P_{rated}$	50% $P_{rated}$	100% $P_{rated}$
G83/1 limit	0.5s	0.5s	0.5s
Trip setting	0.5s	0.5s	0.5s
Trip value	266.9ms	295ms	313ms

## 5. RECONNECTION TIME MEASUREMENT

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

## 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.