




Type Test Certification Test Result Sheet

acc. to CER/06/190

Micro-generator details

MICRO-GENERATOR Type reference	Sunny Boy SB 1100LV
	Windy Boy WB 1100LV
Maximum continuous rating	1000 W
Manufacturer	SMA Solar Technology AG
Technical file reference No.	

Test house

Date of test	
Name of test Engineer	Mr. Tim Speer (Dipl. Ing.)
Signature of test Engineer	i. A. 
Test location if different from above	

Test details

- Power quality
- Harmonic current emission
- Voltage fluctuations and flicker
- Power factor
- Under / Over frequency tests
- Under / Over frequency tests
- Under / Over voltage tests (single stage protection)
- LoM test
- Fault level contribution
- Micro-generator short-circuit parameters ²⁰⁾

Test results

Power quality

Harmonic current emission								
	Maximum permissible harmonic current as per EN 61000-3-2 Class A							
Harmonic	2 nd	3 rd	5 th	7 th	9 th	11 th	13 th	15 th ≤ n ≤ 39 th
Limit	1.08	2.3	1.14	0.77	0.4	0.33	0.21	0.15 ^a (15/n)
Test value	0.023	0.015	0.025	0.037	0.032	0.045	0.026	< Limit EN 61000-3-2 A

^a 50 % or some other declared value close to the mid point between minimum and maximum.

Voltage fluctuations and flicker				
	Maximum permissible voltage fluctuation (expressed as a percentage of nominal voltage at 100 % power) and flicker as per EN 61000-3-3			
	Starting	Stopping	Running	
Limit	3.3 %	3.3 %	P _{st} = 1.0	P _{it} = 0.65
Test value	< 1.21	< 1.06	0.18	0.17

Power factor			
Protection limit	+ 0.95 - 0.95 at three voltage levels		
	212 V	230 V	248 V
Test value	0.997	0.997	0.997

^a 50 % or some other declared value close to the mid point between minimum and maximum.

Under / Over frequency tests

Parameter	Under frequency		Over frequency	
	Frequency (Hz)	Time (s)	Frequency (Hz)	Time (s)
Protection limit (from Table 1 or Annex A)	50 Hz - 4 %	0.5 s	50 Hz + 1 %	0.5 s
Actual setting (as applied to interface protection)	49.7 Hz	-	50.3 Hz	-
Trip value (test result)	49.7 Hz	< 0.5 s	50.3 Hz	< 0.5 s

Under / Over voltage tests (single stage protection)

Parameter	Under voltage		Over voltage	
	Voltage (V)	Time (s)	Voltage (V)	Time (s)
Protection limit (from Table 1 or Annex A)	230 V - 10 %	0.5 s	230 V + 10 %	0.5 s
Actual setting (as applied to interface protection)	209 V	-	251 V	-
Trip value (test result)	> 207 V	< 0.5 s	< 253 V	< 0.5 s

LoM test

Method used	Vector Shift		
Output power level ^a	30 % P _{rated}	60 % P _{rated}	100 % P _{rated}
Trip setting clearance time	-	-	-
Trip value clearance time	0.23 s	0.25 s	0.38 s

^a Indicative values are shown for minimum, medium and maximum power levels.

*The inverter can withstand being re-energized from a source that is 180 degrees out of phase with the inverter in case that fault clearance time from the grid is shorter than disconnection time of the inverter.

Fault level contribution

Short-circuit current at micro-generator terminals
Short-circuit applied to micro-generator at normal running condition 0 – 2.0 s plot

Micro-generator short-circuit parameters ²⁰⁾

Parameter	Symbol	Value 1	Value 2	Value 3	Value 4	Value 5
Peak short-circuit current	i_p					
Initial value of aperiodic component	A					
Initial symmetrical short-circuit current	I_k					
Decaying (aperiodic) component of short-circuit current	i_{DC}					
Reactance/Resistance ratio of source	X/R					

Comments

Fault level contribution : SMA inverters are line-commutated to ensure a very low harmonic distortion and a power factor very closed to 1 (see above). The output current is directly controlled by the inverter and cannot exceed the maximum current, even in case of fault closed to the inverter. Short circuit current cannot be a multiple of the nominal current like it can be at a synchronous generator or an induction generator.

²⁰⁾ According to EN 60034 series.