

**APPENDIX 2 Type Test Certification Test Result Sheet****Micro-generator details**

MICRO-GENERATOR Type reference: <i>Fronius Symo 20.0-3-M</i>		
Maximum continuous rating:		20000W
Manufacturer:	Tel: +43-7242-241-0	Address:
<i>Fronius International GmbH</i>	Fax: +43-7242-241-224	<i>Guenter Fronius Str 1 4600 Wels-Thalheim, Austria</i>
Technical file reference No.:		

Test house details

Name and address of test house	<i>Fronius R&D Laboratories, Fronius International GmbH, Guenter Fronius Str 1, A-4600 Wels-Thalheim, Austria</i>
Telephone number	<i>+43-7242-241-0</i>
Facsimile number	<i>+43-7242-241-224</i>
E-mail address	<i>pv@fronius.com</i>

POWER QUALITY

Harmonic current emissions (A)								
Maximum permissible harmonic current as per BS EN 61000-3-2								
Harmonic	2 nd	3 rd	5 th	7 th	9 th	11 th	13 th	15 th – 39 th
Limit	1,08	2,3	1,14	0,77	0,4	0,33	0,21	0,15x(15/n)
Test value (max value of Phase1,2,3)	0,093	0,099	0,159	0,065	0,058	0,047	0,091	PASS

Voltage Fluctuations and Flicker				
	Starting	Stopping	Running	
Limit*	4%	4%	P _{st} = 1.0	P _{it} = 0.65
Test value	NA **	NA**	NA**	NA**

*Maximum permissible voltage fluctuation (expressed as a percentage of nominal voltage at 100% power) and flicker. As per BS EN 61000-3-11.

** The EUT itself does not produce flicker relevant variations of the line current, startup is made using a ramp function and does therefore not create relevant d_{MAX} values. Solar power variations naturally lead to variations of the electric power fed into the grid, however these variations are not significant for P_{ST} and P_{LT}.

	Power factor		
Protection Limit	+0.95 lag–0,95 at three voltage levels		
	210 V	230 V	250 V
Test value	0,99	0,99	0,99

Under / Over frequency tests

Parameter	Under Frequency		Over Frequency	
	Frequency (Hz)	Time (s)	Frequency (Hz)	Time (s)
Protection limit	48 Hz	500 ms	50,5 Hz	500 ms
Actual setting	48,04 Hz	400 ms	50,46 Hz	400 ms
Trip value	>48 Hz	<500 ms	<50,5 Hz	<500 ms

Under / Over voltage tests (single stage protection)

Parameter	Under Voltage		Over Voltage	
	Voltage (V)	Time (s)	Voltage (V)	Time (s)
Protection limit	207 V	500 ms	253 V	500 ms
Actual setting	209,07 V	400 ms	250,47 V	400 ms
Trip value	>207 V	<500 ms	>253 V	<500 ms

LoM test

Method used	Frequency shift		
Output power level*	10%	55%	100%
Trip setting clearance time	500 ms	500 ms	500 ms
Trip value clearance time	<500 ms	<500 ms	<500 ms

*indicative values are shown for minimum, medium and maximum power levels.

Fault level contribution

Because of electronic current control short circuit current is limited to 32 A.

COMMENTS

These tests have been carried out with specifications and parameters set to meet the requirements of CER/06/190. It is hereby declared by the manufacturer that all units shipped to Ireland will have identical parameter settings and that these parameters cannot be changed by a user, installer or by any person other than the manufacturer after the setup has been selected.