

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

MICRO-GENERATOR Type reference: <i>Fronius Symo Hybrid 5.0-3</i>		
Maximum continuous rating:		5000W
Manufacturer: <i>Fronius International GmbH</i>	Tel: +43-7242-241-0	Address: <i>Guenter Fronius Str 1 4600 Wels-Thalheim, Austria</i>
	Fax: +43-7242-241-224	
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	+43-7242-241-0
Facsimile number	+43-7242-241-224
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)	<i>0.051</i>	<i>0.079</i>	<i>0.101</i>	<i>0.044</i>	<i>0.058</i>	<i>0.043</i>	<i>0.046</i>	<i>See TR LF 13030</i>

Voltage Fluctuations and Flicker				
	Starting	Stopping	Running	
Limit*	4%	4%	$P_{st} = 1.0$	$P_{lt} = 0.65$
Test value	0 **	0 **	0,137 **	0.135 **

*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	1,00	1,00	1,00

Under / Over frequency tests

	Under Frequency		Over Frequency	
Parameter	Frequency (Hz)	Time (s)	Frequency (Hz)	Time (s)
Protection limit	48 Hz	0,5 sec	50,5 Hz	0,5 sec
Actual setting	48,02 Hz	0,46 sec	50,48 Hz	0,46 sec
Trip value	48,01 Hz	0,48 sec	50,49 Hz	0,48 sec

Under / Over voltage tests (single stage protection)

	Under Voltage		Over Voltage	
Parameter	Voltage (V)	Time (s)	Voltage (V)	Time (s)
Protection limit	207 V	0,5 sec	253 V	0,5 sec
Actual setting	209 V	0,46 sec	250,4 V	0,46 sec
Trip value	214,53 V	0,47 sec	252,4 V	0,49 sec



LoM test

Method used	Frequency shift		
Output power level*	10%	55%	100%
Trip setting clearance time	0,5 sec	0,5 sec	0,5 sec
Trip value clearance time	0,12 sec	0,18 sec	0,20 sec

*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 24A on the PV input side.
Because of electronic current control short circuit current is limited to 20A on the Battery input side.

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.