APPENDIX D Type certification test results sheet

Micro-generator details

MICRO-GENERATOR Type reference: *Fronius Symo 10.0-3-M*		
Maximum continuous rating: 10000W		
Manufacturer: *Fronius International GmbH*	Tel: *+43-7242-241-0* Fax: *+43-7242-241-224*	Address: *Guenter Fronius Str 1* *4600 Wels-Thalheim, Austria*
Technical file reference No.: TR21220		

Test house details

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

Test details

Date of test	Monday, 30 June 2014

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	*0,93*	*0,99*	*0,159*	*0,065*	*0,058*	*0,047*	*0,091*	*PASS*

Voltage Fluctuations and Flicker				
	Starting	Stopping	Running	
Limit*	3,3%	3,3%	P_{st} = 1,0	P_{lt} = 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 61000-3-3.

** 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

	Under Frequency		Over Frequency	
Parameter	Frequency (Hz)	Time (s)	Frequency (Hz)	Time (s)
Protection limit	47 Hz	0,5 sec	51 Hz	0,5 sec
Actual setting	47 Hz	0,46 sec	51 Hz	0,46 sec
Trip value	47 Hz	< 0,5sec	51 Hz	< 0,5sec

Under / Over voltage tests (single stage protection)

	Under Voltage		Over Voltage	
Parameter	Voltage (V)	Time (s)	Voltage (V)	Time (s)
Protection limit	195,5 V	1,5 sec	264,5 V	0,2 sec
Actual setting	195,5 V	1,46 sec	264,5 V	0,16 sec
Trip value	195,5 V	< 1,5 sec	264,5 V	< 0,2 sec

LoM test

Method used	Frequency shift		
Output power level a)	Min.	Medium	Max.
Trip setting clearance time	0,5 sec	0,5 sec	0,5 sec
Trip value clearance time	< 0,5 sec	< 0,5 sec	< 0,5 sec
a) 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 20A.

COMMENTS
