

Certificate G59/2

The manufacturer: **Steca Elektronik GmbH**
Mammostrasse 1
D-87700 Memmingen
Germany

herby certifies, that its photovoltaic inverters (with G59/2 settings) for connection to the low voltage grid

StecaGrid 1800, StecaGrid 1800x
StecaGrid 2300, StecaGrid 2300x
StecaGrid 3010, StecaGrid 3010x
StecaGrid 3000
StecaGrid 3600, StecaGrid 3600x
StecaGrid 4200, StecaGrid 4200x

comply with the requirements of the Engineering Recommendation G59/2. The detailed results are summarized for the product on the following pages.

Memmingen, the 2nd of July 2012



Ralf Griepentrog
Head of R&D Department, Authorized Signatory

APPENDIX 4 TYPE VERIFICATION TEST SHEET

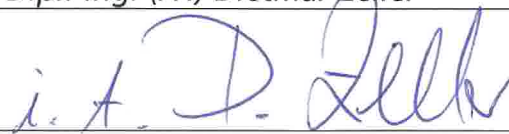
SSEG DETAILS

SSEG Type reference: <i>StecaGrid 1800 / StecaGrid 2300 / StecaGrid 3010 / StecaGrid 3000 / StecaGrid 3600 / StecaGrid 4200 / StecaGrid 1800x / StecaGrid 2300x / StecaGrid 3010x / StecaGrid 3600x / StecaGrid 4200x</i>		
Generating Plant Technology: <i>PHOTO-VOLTAIC</i>		
Manufacturer: <i>Steca Elektronik GmbH</i>	Tel: <i>+49 8331 8558-0</i>	Address: <i>Mammostrasse 1 87700 Memmingen Germany</i>
	Fax: <i>+49 8331 8558-132</i>	
Technical file reference No: <i>MES100809</i>		
Maximum export capability (Generating Plant rating less parasitic load): <i>1,800 W / 2,300 W / 3,000 W / 3,000 W / 3,600 W or 4,200 W</i>		

TEST HOUSE DETAILS

Name and address of test house	<i>Steca R&D Laboratories, Steca Elektronik GmbH, Mammostrasse 1, 87700 Memmingen, Germany</i>
Telephone number	<i>+49 8331 8558-0</i>
Facsimile number	<i>+49 8331 8558-132</i>
E-mail address	<i>info@steca.de</i>

TEST DETAILS

Date of test	<i>See according test reports</i>
Name of tester	<i>Dipl.-Ing. (FH) Dietmar Zeller</i>
Signature of tester	
Test location if different from above	<i>See above</i>

POWER QUALITY

Harmonic current emissions (A)									
Minimal Short Circuit Ratio R_{SCE} :									
Value of Short Circuit Power S_{SC} corresponding to R_{SCE} :									
Equipment Phases: Single Phase									
Description	Harmonic Current % = $100I_r/I_1$							Harmonic Current Distortion Factors (%)	
Harmonic		3 rd	5 th	7 th	9 th	11 th	13 th	THD	PWHD
Limit *		21.6	10.7	7.2	3.8	3.1	2	23 (13)	23 (22)
Test value		0.05	0.07	0.02	0.04	0.02	0.04		

Note Detailed requirements are specified in BS EN 61000-3-12

Voltage Fluctuations and Flicker				
Equipment meets BS EN 61000-3-3				
	Starting	Stopping	Running (at rated power)	
Limit *	4%	4%	$P_{st} = 1.0$	$P_{lt} = 0.65$
Test value	2.8%	2.8%	0.162	0.162

Note Detailed requirements are specified in BS EN 61000-3-11 and BS EN 61000-3-3.

	DC injection			Power factor		
G59/2 Limit	20 mA			0.95 lag– 0.95 lead at three voltage levels		
Test level	10%	55%	100%	212 V	230 V	248 V
Test value	17	10	18	1.0	1.0	1.0

PROTECTION TESTS				
Protection	Settings		Test Results	
Over Voltage Stage 1	Volts %	Sec	Volts %	Sec
L1 - N	110	1.0	110	0.98
L2 - N				
L3 - N				
L1 - L2				
L1 - L3				
L2 - L3				
Over Voltage Stage 2	Volts %	Sec	Volts %	Sec
L1 - N	115	0.5	115	0.48
L2 - N				
L3 - N				
L1 - L2				
L1 - L3				
L2 - L3				
Under Voltage Stage 1	Volts %	Sec	Volts %	Sec
L1 - N	87	2.5	87	2.27
L2 - N				
L3 - N				
L1 - L2				
L1 - L3				
L2 - L3				
Under Voltage Stage 2	Volts %	Sec	Volts %	Sec
L1 - N	80	0.5	80	0.49
L2 - N				
L3 - N				
L1 - L2				
L1 - L3				
L2 - L3				
	Hz	Sec	Hz	Sec
Over Frequency Stage 1	51.5	20	51.5	0.476
Over Frequency Stage 2	52.0	0.5	52.0	0.476
Under Frequency Stage 1	47.5	20	47.5	0.447
Under Frequency Stage 2	47.0	0.5	47.0	0.447

LOSS OF MAINS TEST

Method used	<i>frequency shift</i>		
Output power level *	10%	55%	100%
Trip setting	-	-	-
Trip value	<0.5 sec	<0.5 sec	<0.5 sec

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

RECONNECTION TIMES

	Under/Over voltage	Under/Over Frequency	Loss of mains
Minimum value	180 seconds	180 seconds	180 seconds
Actual Setting	180 seconds	180 seconds	180 seconds
Recorded value	181 seconds	181 seconds	181 seconds

FAULT LEVEL CONTRIBUTION

As SSEG's for PV are inverter-connected, they are deemed to automatically comply with regulations and no further tests are required.

SELF MONITORING – SOLID STATE SWITCHING

Not applicable as electro-mechanical relays used.