



Certificate EN 50438/2007

European Standard

Manufacturer	SMA Solar Technology AG
Address	Sonnenallee 1, 34266 Niestetal (Germany)

Type Tested reference number	ZE_EN50438_2007_STPxx000TLEE-10_en_10
Generating Unit technology	Three Phase inverter
Test house details	SMA Solar Technology AG
Test period	From 2013-12-04 until 2014-05-26

Type reference	Max. apparent AC power (VA)	Rated AC power (W)	From FW Pack
STP 20000TLEE-10	20000	20000	2.61.05.R
STP 15000TLEE-10	15000	15000	2.61.05.R

The results of the EN 50438/2007 are summarized in this certificate. SMA declares that all units shipped to Poland, with at least the aforementioned FW version, are within the specifications and parameters set by the EN 50438/2007 European Standard. Note that all tests were carried out in the biggest inverter of the family under test. The results for the other inverters of the family are equivalent.



Test Results

Power quality

Harmonics as per BS EN 61000-3-12								
Order	Frequency [Hz]	Thresholds I/In [%]	P/Pn [%]				Max. MV / Limit [%]	
			50		100			
			MV		MV			
2	100	8,00%	0,025 A	0,09%	0,029 A	0,10%	1,25%	✓
3	150	-	0,025 A	0,09%	0,04 A	0,14%	-	-
4	200	4,00%	0,008 A	0,03%	0,01 A	0,03%	0,82%	✓
5	250	10,70%	0,074 A	0,26%	0,026 A	0,09%	2,40%	✓
6	300	2,67%	0,007 A	0,02%	0,006 A	0,02%	0,92%	✓
7	350	7,20%	0,085 A	0,29%	0,059 A	0,20%	4,06%	✓
8	400	2,00%	0,009 A	0,03%	0,005 A	0,02%	1,49%	✓
9	450	-	0,011 A	0,04%	0,012 A	0,04%	-	-
10	500	1,60%	0,012 A	0,04%	0,008 A	0,03%	2,52%	✓
11	550	3,10%	0,069 A	0,24%	0,033 A	0,11%	7,68%	✓
12	600	1,33%	0,007 A	0,03%	0,006 A	0,02%	1,93%	✓
13	650	2,00%	0,068 A	0,24%	0,049 A	0,17%	11,79%	✓
14	700	-	0,009 A	0,03%	0,006 A	0,02%	-	-
15	750	-	0,011 A	0,04%	0,013 A	0,04%	-	-
16	800	-	0,01 A	0,04%	0,006 A	0,02%	-	-
17	850	-	0,056 A	0,19%	0,035 A	0,12%	-	-
18	900	-	0,006 A	0,02%	0,006 A	0,02%	-	-
19	950	-	0,047 A	0,16%	0,039 A	0,13%	-	-
20	1000	-	0,007 A	0,02%	0,005 A	0,02%	-	-
21	1050	-	0,009 A	0,03%	0,012 A	0,04%	-	-
22	1100	-	0,008 A	0,03%	0,005 A	0,02%	-	-
23	1150	-	0,039 A	0,13%	0,029 A	0,10%	-	-
24	1200	-	0,005 A	0,02%	0,005 A	0,02%	-	-
25	1250	-	0,028 A	0,10%	0,035 A	0,12%	-	-
26	1300	-	0,005 A	0,02%	0,005 A	0,02%	-	-
27	1350	-	0,007 A	0,03%	0,01 A	0,04%	-	-
28	1400	-	0,005 A	0,02%	0,004 A	0,01%	-	-
29	1450	-	0,029 A	0,10%	0,026 A	0,09%	-	-
30	1500	-	0,004 A	0,01%	0,005 A	0,02%	-	-
31	1550	-	0,017 A	0,06%	0,081 A	0,28%	-	-
32	1600	-	0,004 A	0,01%	0,005 A	0,02%	-	-
33	1650	-	0,009 A	0,03%	0,022 A	0,08%	-	-
34	1700	-	0,005 A	0,02%	0,007 A	0,02%	-	-
35	1750	-	0,015 A	0,05%	0,09 A	0,31%	-	-
36	1800	-	0,003 A	0,01%	0,004 A	0,01%	-	-
37	1850	-	0,014 A	0,05%	0,052 A	0,18%	-	-
38	1900	-	0,004 A	0,01%	0,005 A	0,02%	-	-
39	1950	-	0,004 A	0,01%	0,01 A	0,04%	-	-
40	2000	-	0,003 A	0,01%	0,003 A	0,01%	-	-

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MV=Measured Value



Test Results

Power quality

Voltage fluctuations and flicker as per EN 61000-3-11				
	Starting	Stopping	Running	
	dmax	dmax	Pst	Plt (2hours)
Limit	4,0%	4,0%	1	0,65
MV	0,1%	0,1%	0,09	0,09
Verification	✓	✓	✓	✓

Power factor			
	Voltage [V]		
	218,2	230	253
Limit	0,95	0,95	0,95
MV	1,00	1,00	1,00
Verification	✓	✓	✓

MV - Measured value

Protection - Grid monitoring and reconnection time

Trip Tests	EN 50438:2007		Setting		Measures Values		Verification
	Magnitude	Time	Magnitude	Time	Magnitude	Time	
Undervoltage	195,5 V	1500 ms	195,5 V	1500 ms	195,5 V	1493 ms	✓
Overvoltage	264,5 V	200 ms	264,5 V	200 ms	264,5 V	193 ms	✓
Underfrequency	47 Hz	500 ms	47 Hz	500 ms	47,05 Hz	481 ms	✓
Overfrequency	51Hz	500 ms	51Hz	500 ms	51,01 Hz	483 ms	✓
Tolerances on trip values:							
- Voltage: ±1% Vnom - Frequency: ± 0,5% fnom - Clearance time: ± 10%							

Fault level contribution		
Time after fault	Voltage (V)	Current (A)
< 50 ms	230,62	20,65
100 ms	11,52	0,04
250 ms	11,48	0,04
500 ms	11,45	0,04

Reconnection time			
Limit	Setting	MV	Verification
20 s	20 s	23,93 s	✓

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