



Test Report according to EN 50438:2007

with the deviations defined in SEK TK8

Manufacturer	SMA Solar Technology AG
Address	Sonnenallee 1
Postal code, place	34266, Niestetal
Country	Germany

Test house details	SMA Solar Technology AG
Test period	From 2013-12-01 until 2014-01-30

Type reference	Max. apparent AC power (VA)	Rated AC power (W)
SB 5000TL-21	5000	4600
SB 4000TL-21	4000	4000
SB 3600TL-21	3680	3680
SB 3000TL-21	3000	3000

The results of the EN 50438:2007 tests are summarized in this test report. This includes the standard requirements of the EN 50438:2007 with the deviations defined in the SEK TK8.

The complete documentation can be viewed at SMA (headquarters) after prior announcement.

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 EN 61000-3-2						
Order	Frequency [Hz]	Thresholds [A]	P/Pn [%]		Max. NV / Limit [%]	
			50	100		
			MV [A]	MV [A]		
2	100	1,08	0,008	0,022	2,04%	✓
3	150	2,3	0,117	0,214	9,30%	✓
4	200	0,43	0,004	0,011	2,56%	✓
5	250	1,14	0,049	0,058	5,09%	✓
6	300	0,3	0,003	0,007	2,33%	✓
7	350	0,77	0,041	0,055	7,14%	✓
8	400	0,23	0,003	0,006	2,61%	✓
9	450	0,4	0,032	0,046	11,50%	✓
10	500	0,184	0,003	0,006	3,26%	✓
11	550	0,33	0,024	0,035	10,61%	✓
12	600	0,153	0,003	0,006	3,91%	✓
13	650	0,21	0,02	0,028	13,33%	✓
14	700	0,131	0,003	0,005	3,80%	✓
15	750	0,15	0,017	0,024	16,00%	✓
16	800	0,115	0,003	0,005	4,35%	✓
17	850	0,132	0,017	0,02	15,11%	✓
18	900	0,102	0,003	0,005	4,89%	✓
19	950	0,118	0,014	0,015	12,67%	✓
20	1000	0,092	0,003	0,005	5,43%	✓
21	1050	0,107	0,013	0,013	12,13%	✓
22	1100	0,084	0,003	0,005	5,98%	✓
23	1150	0,098	0,011	0,01	11,24%	✓
24	1200	0,077	0,003	0,005	6,52%	✓
25	1250	0,09	0,01	0,011	12,22%	✓
26	1300	0,071	0,003	0,005	7,07%	✓
27	1350	0,083	0,009	0,01	12,00%	✓
28	1400	0,066	0,003	0,005	7,61%	✓
29	1450	0,078	0,008	0,009	11,60%	✓
30	1500	0,061	0,003	0,005	8,15%	✓
31	1550	0,073	0,007	0,009	12,40%	✓
32	1600	0,058	0,006	0,01	17,39%	✓
33	1650	0,068	0,006	0,007	10,27%	✓
34	1700	0,054	0,006	0,009	16,63%	✓
35	1750	0,064	0,005	0,008	12,44%	✓
36	1800	0,051	0,002	0,003	5,87%	✓
37	1850	0,061	0,005	0,006	9,87%	✓
38	1900	0,048	0,002	0,003	6,20%	✓
39	1950	0,058	0,004	0,006	10,40%	✓
40	2000	0,046	0,001	0,003	6,52%	✓

MV - Measured Value

ZE_EN50438_2007_SE_SBxx00TL21_en_10



Test Results

Power quality

Voltage fluctuations and flicker as per EN 61000-3-3				
	Starting	Stopping	Running	
	dmax	dmax	Pst	Plt (2hours)
Limit	4,0%	4,0%	1	0,65
MV	0,0%	0,0%	0,21	0,21
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	SEK TK8		Setting		Measures Values		Verification
	Magnitude	Time	Magnitude	Time	Magnitude	Time	
Undervoltage	195,5 V	200 ms	195,5 V	200 ms	196,8 V	182 ms	✓
Oversvoltage stage 1	255,3 V	60 s	255,3 V	60 s	254,5 V	59,95 s	✓
Oversvoltage stage 2	264,5 V	200 ms	264,5 V	200 ms	263,5 V	166 ms	✓
Underfrequency	47 Hz	500 ms	47 Hz	500 ms	47,04 Hz	467 ms	✓
Overfrequency	51Hz	500 ms	51Hz	500 ms	50,96 Hz	463 ms	✓

Loss of mains test according to the EN 62116						
Test power and imbalance	Time (ms)	L1 (ms) ¹	L2 (ms) ¹	L3 (ms) ¹	L1-L2-L3(ms) ¹²	Verification
29% / -5%Q (Test 22)	150	102	N/A	N/A	N/A	✓
58% / -5%Q (Test 12)	150	102	N/A	N/A	N/A	✓
100% / -5%P (Test 5)	150	125	N/A	N/A	N/A	✓
29% / +5%Q (Test 31)	150	116	N/A	N/A	N/A	✓
58% / +5%Q (Test 21)	150	114	N/A	N/A	N/A	✓
100% / +5%P (Test 10)	150	122	N/A	N/A	N/A	✓

¹ indicates the stop of feed in

² only applicable for three phase inverters

Fault level contribution		
Time after fault	Voltage (V)	Current (A)
< 50 ms	230,7	24,77
100 ms	12,6	0,03
250 ms	10,65	0,03
500 ms	11,57	0,03

Reconnection time			
Limit	Setting	MV	Verification
20 s	20 s	44,47 s	✓

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