



## Engineering Recommendation

<b>Manufacturer:</b>	<b>SMA Solar Technology AG</b>
<b>Address:</b>	Sonnenallee 1
<b>Postal code, place:</b>	34266 Niestetal
<b>Country:</b>	Germany

<b>Test house details:</b>	<b>SMA Solar Technology AG, R&amp;D Department, Niestetal</b>
<b>Test reference:</b>	<b>NR PV 501:2008, guideline for the KEMCO certificate test.</b>

<b>Type reference:</b>	SB 2000HF-30/SB 2500HF-30/SB 3000HF-30
<b>Max. AC power:</b>	2000 W / 2500 W / 3000 W
<b>Nominal AC power:</b>	2000 W / 2500 W / 3000 W

The results of the performed KEMCO tests are summarized in this certificate. The complete documentation can be viewed at SMA (headquarters) after prior announcement.

### Test details

- Under / Over voltage switch off
- Under / Over frequency switch off
- Power factor test
- Nominal efficiency test
- DC injection test
- Re-closing time after loss of main
- THDi test
- MPPT efficiency test

**SMA Solar Technology AG**

Niestetal, 2011-01-26

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(Director TMPM)

## Test results SB 2000HF-30

### Under / Over voltage switch off

Parameter	Under voltage switch off		Over voltage switch off	
	Voltage (V)	Time (s)	Voltage (V)	Time (s)
KEMCO limit	193.6 +/- 2%	2.0	242.0 +/- 2%	2.0
Trip value	193.8	1.99	241.2	1.99

### Under / Over frequency switch off

Parameter	Under frequency switch off		Over frequency switch off	
	Frequency (Hz)	Time (s)	Frequency (Hz)	Time (s)
KEMCO limit	59.3 +/- 0.05 Hz	0.16	60.5 +/- 0.05 Hz	0.16
Trip value	59.30	0.15	60.49	0.15

### Power factor test

Parameter	Power factor (%)
KEMCO limit	Over 95
Measured value	99.9

### Nominal efficiency test

Parameter	Nominal efficiency (%)
KEMCO limit	Over 90
Measured value	95.0

### DC injection test

Parameter	DC injection (%)
KEMCO limit	≤ 0.5
Measured value	0.45

### Re-closing time after loss of main

Parameter	Time (s)
KEMCO limit	Over 300
Measured value	302

### THDi test

Parameter	THDi (%)
KEPCO limit	≤ 5
Measured value	3.6

### MPPT efficiency test

Parameter	MPPT efficiency (%)
KEMCO limit	Over 95
Measured value	98.6

## Test results SB 2500HF-30

### Under / Over voltage switch off

Parameter	Under voltage switch off		Over voltage switch off	
	Voltage (V)	Time (s)	Voltage (V)	Time (s)
KEMCO limit	193.6 +/- 2 %	2.0	242.0 +/- 2 %	2.0
Trip value	193.8	1.99	241.1	1.99

### Under / Over frequency switch off

Parameter	Under frequency switch off		Over frequency switch off	
	Frequency (Hz)	Time (s)	Frequency (Hz)	Time (s)
KEMCO limit	59.3 +/- 0.05 Hz	0.16	60.5 +/- 0.05 Hz	0.16
Trip value	59.30	0.15	60.49	0.15

### Power factor test

Parameter	Power factor (%)
KEMCO limit	Over 95
Measured value	99.9

### Nominal efficiency test

Parameter	Nominal efficiency (%)
KEMCO limit	Over 90
Measured value	95.4

### DC injection test

Parameter	DC injection (%)
KEMCO limit	≤ 0.5
Measured value	0.45

### Re-closing time after loss of main

Parameter	Time (s)
KEMCO limit	Over 300
Measured value	302

### THDi test

Parameter	THDi (%)
KEPCO limit	≤ 5
Measured value	3.2

### MPPT efficiency test

Parameter	MPPT efficiency (%)
KEMCO limit	Over 95
Measured value	98.6

## Test results SB 3000HF-30

### Under / Over voltage switch off

Parameter	Under voltage switch off		Over voltage switch off	
	Voltage (V)	Time (s)	Voltage (V)	Time (s)
KEMCO limit	193.6 +/- 2 %	2.0	242.0 +/- 2 %	2.0
Trip value	192.6	1.99	241.1	1.99

### Under / Over frequency switch off

Parameter	Under frequency switch off		Over frequency switch off	
	Frequency (Hz)	Time (s)	Frequency (Hz)	Time (s)
KEMCO limit	59.3 +/- 0.05 Hz	0.16	60.5 +/- 0.05 Hz	0.16
Trip value	59.30	0.15	60.49	0.15

### Power factor test

Parameter	Power factor (%)
KEMCO limit	Over 95
Measured value	99.9

### Nominal efficiency test

Parameter	Nominal efficiency (%)
KEMCO limit	Over 90
Measured value	95.5

### DC injection test

Parameter	DC injection (%)
KEMCO limit	≤ 0.5
Measured value	0.45

### Re-closing time after loss of main

Parameter	Time (s)
KEMCO limit	Over 300
Measured value	302

### THDi test

Parameter	THDi (%)
KEPCO limit	≤ 5
Measured value	2.8

### MPPT efficiency test

Parameter	MPPT efficiency (%)
KEMCO limit	Over 95
Measured value	98.6