



## Certificate G83/1-1

### Engineering Recommendation

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

|                     |                                                                   |
|---------------------|-------------------------------------------------------------------|
| Test house details: | <b>SMA Solar Technology AG, R&amp;D Department, Niestetal (D)</b> |
|---------------------|-------------------------------------------------------------------|

|                   |                                                                                                  |
|-------------------|--------------------------------------------------------------------------------------------------|
| Type reference:   | Sunny Boy SB 2000HF-30 / 2500HF-30 / 3000HF-30<br>Windy Boy WB 2000HF-30 / 2500HF-30 / 3000HF-30 |
| Max. AC power:    | 2000 VA / 2500 VA / 3000 VA                                                                      |
| Nominal AC power: | 2000 VA / 2500 VA / 3000 VA                                                                      |

The results of the G83/1-1 tests are summarized in this certificate. SMA declares that all devices (with G83 setting) that are shipped to the UK comply with the requirements defined in engineering recommendation G83/1-1. These settings cannot be changed by an installer, user or by any other person without the use of a tool (password protected). The complete documentation can be viewed at SMA (headquarters) after prior announcement.

#### Test details

- Power quality
- Harmonic current emissions as per BS EN 61000-3-2 A
- Voltage fluctuations and flicker as per BS EN 61000-3-3 A
- DC injection / Power factor
- Under / Over frequency switch off
- Under / Over voltage switch off
- Loss of mains test
- Reconnection time

**SMA Solar Technology AG**

Niestetal, 22.10.2010

i. V. Frank Greizer  
Vice President T MP

## Test results

### Power quality

| Harmonic current emissions as per BS EN 61000-3-2 A |                 |                 |                 |                 |                 |                  |                  |                                       |
|-----------------------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------|------------------|---------------------------------------|
| Harmonic                                            | 2 <sup>nd</sup> | 3 <sup>rd</sup> | 5 <sup>th</sup> | 7 <sup>th</sup> | 9 <sup>th</sup> | 11 <sup>th</sup> | 13 <sup>th</sup> | 15 <sup>th</sup> ... 39 <sup>th</sup> |
| Limit [A]                                           | 1.08            | 2.3             | 1.14            | 0.77            | 0.4             | 0.33             | 0.21             | 0.15 x (15/n)                         |
| Test value [A]                                      | 0.01            | 0.27            | 0.13            | 0.09            | 0.07            | 0.06             | 0.05             | < limit BS EN 61000-3-2 A             |

| Voltage Fluctuations and Flicker |          |          |                       |                        |
|----------------------------------|----------|----------|-----------------------|------------------------|
| Harmonic                         | starting | stopping | running               |                        |
| Limit                            | 4 %      | 4 %      | P <sub>st</sub> = 1.0 | P <sub>lf</sub> = 0.65 |
| Test value                       | 0.1 %    | 0.1 %    | 0.1                   | 0.09                   |

|               | DC injection                  |         |         | Power factor                                                       |       |       |
|---------------|-------------------------------|---------|---------|--------------------------------------------------------------------|-------|-------|
| G83/1-1 Limit | 20 mA, tested at three levels |         |         | 0.95 lag - 0.95 lead at three voltage levels at P <sub>rated</sub> |       |       |
| Test level    | 10 %                          | 55 %    | 100 %   | 212 V                                                              | 230 V | 248 V |
| Test value    | < 12 mA                       | < 12 mA | < 12 mA | 0.99                                                               | 0.99  | 0.99  |

### Under / Over frequency switch off

| Parameter       | Under frequency switch off |          | Over frequency switch off |          |
|-----------------|----------------------------|----------|---------------------------|----------|
|                 | Frequency (Hz)             | Time (s) | Frequency (Hz)            | Time (s) |
| G83/1-1 Limit   | 47 Hz +/- 0.5 %            | 5 s      | 50.5 Hz +/- 0.5 %         | 5 s      |
| Actual setting* | 47.06 Hz                   | 4.96 s   | 50.44 Hz                  | 4.96 s   |
| Trip value      | 47.04 Hz                   | 4.57 s   | 50.46 Hz                  | 4.5 s    |

### Under / Over voltage switch off

| Parameter       | Under voltage switch off |          | Over voltage switch off |          |
|-----------------|--------------------------|----------|-------------------------|----------|
|                 | Voltage (V)              | Time (s) | Voltage (V)             | Time (s) |
| G83/1-1 Limit   | 207 V +/- 1.5 %          | 5 s      | 264 V +/- 1.5 %         | 5 s      |
| Actual setting* | 209.8 V                  | 4.94 s   | 261.2 V                 | 4.94 s   |
| Trip value      | 210.3 V                  | 4.97 s   | 263.3 V                 | 4.97 s   |

### Loss of mains test

| Method used        | Resonant Circuit as per Annex C |                         |                          |
|--------------------|---------------------------------|-------------------------|--------------------------|
| Output power level | 10 % P <sub>rated</sub>         | 55 % P <sub>rated</sub> | 100 % P <sub>rated</sub> |
| G83/1-1 Limit      | 5 s                             | 5 s                     | 5 s                      |
| Trip setting       | -                               | -                       | -                        |
| Trip value         | 4.11 s                          | 4.17 s                  | 4.16 s                   |

\* The settings in the user interface correspond to the limiting values of the G83/1-1 (207 V; 264 V; 47 Hz; 50.5 Hz).  
The voltage and frequency monitoring in the inverter takes the measuring tolerance into account resulting in the limiting values of the above mentioned tables.

## Reconnection time measurement

|                | Under / Over voltage | Under / Over frequency | Loss of mains |
|----------------|----------------------|------------------------|---------------|
| Minimum value  | 180 s                | 180 s                  | 180 s         |
| Actual setting | 180 s                | 180 s                  | 180 s         |
| Recorded value | 185 s                | 185 s                  | 185 s         |

## Fault level contribution

As SSEGs (small-scale embedded generators) for PV or wind turbine systems 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.