

Certificate

Applicant: **SolarEdge Technologies LTD**
1 HaMada Street
4673335 Herzeliya
Israel

Product: **Photovoltaic Inverter with integrated automatic disconnection device between a generator and the public low-voltage grid**

| | | | | |
|----------------|----------------|----------------|----------------|----------------|
| Model: | SE2200H | SE3000H | SE3500H | SE3680H |
| Rating: | 2,2kVA | 3,0kVA | 3,5kVA | 3,68kVA |

Intended use:

An automatic disconnection device with single-phase mains surveillance in accordance with Engineering Recommendation G83/2 for photovoltaic systems with a single-phase parallel coupling via an inverter to the public mains supply. The automatic disconnection device is an integral part of the aforementioned inverter.

Applied standards and guidelines:

Engineering Recommendation G83/2
Issue 2 – August 2012

Recommendations for the connection of small-scale embedded generators in parallel with public low-voltage distribution networks.

The safety concept of an aforementioned representative product corresponds at the time of issue of this certificate to the valid safety specifications for the specified use in accordance with regulations.

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Certification Department



Power Quality. Harmonics.

Equipment Phases: Single Phase

| Harmonic: | At 45-55% of rated output | At 45-55% of rated output | Harmonic Limit (A) |
|-----------|---------------------------|---------------------------|--------------------|
| | Measured Value (A) | | |
| 2nd | 0,013 | 0,024 | 1,080 |
| 3rd | 0,162 | 0,264 | 2,300 |
| 4th | 0,011 | 0,019 | 0,430 |
| 5th | 0,018 | 0,022 | 1,140 |
| 6th | 0,005 | 0,011 | 0,300 |
| 7th | 0,069 | 0,064 | 0,770 |
| 8th | 0,008 | 0,014 | 0,230 |
| 9th | 0,098 | 0,117 | 0,400 |
| 10th | 0,013 | 0,016 | 0,184 |
| 11th | 0,018 | 0,032 | 0,330 |
| 12th | 0,006 | 0,013 | 0,153 |
| 13th | 0,118 | 0,091 | 0,210 |
| 14th | 0,011 | 0,019 | 0,131 |
| 15th | 0,090 | 0,091 | 0,150 |
| 16th | 0,014 | 0,014 | 0,115 |
| 17th | 0,026 | 0,024 | 0,132 |
| 18th | 0,006 | 0,011 | 0,102 |
| 19th | 0,024 | 0,021 | 0,118 |
| 20th | 0,003 | 0,010 | 0,092 |
| 21st | 0,019 | 0,013 | 0,107 |
| 22nd | 0,003 | 0,003 | 0,084 |
| 23rd | 0,019 | 0,011 | 0,098 |
| 24th | 0,002 | 0,003 | 0,077 |
| 25th | 0,013 | 0,010 | 0,090 |
| 26th | 0,002 | 0,002 | 0,071 |
| 27th | 0,010 | 0,005 | 0,083 |
| 28th | 0,002 | 0,002 | 0,066 |
| 29th | 0,010 | 0,005 | 0,078 |
| 30th | 0,002 | 0,002 | 0,061 |
| 31st | 0,010 | 0,006 | 0,073 |
| 32nd | 0,000 | 0,002 | 0,058 |
| 33rd | 0,008 | 0,005 | 0,068 |
| 34th | 0,000 | 0,002 | 0,054 |
| 35th | 0,008 | 0,005 | 0,064 |
| 36th | 0,000 | 0,002 | 0,051 |
| 37th | 0,006 | 0,005 | 0,061 |
| 38th | 0,000 | 0,002 | 0,048 |
| 39th | 0,006 | 0,005 | 0,058 |
| 40th | 0,002 | 0,002 | 0,046 |

Power Quality. Voltage Fluctuations and Flicker.

| | Starting | | | Stopping | | | Running | |
|----------------------------------|----------|-------|---------------|----------|------|---------------|---------|-------------|
| | dmax | dc | d(t) | Dmax | dc | d(t) | Pst | Plt 2 hours |
| Measured Values | 0,60% | 0,54% | 0 | 0,78 | 0,78 | 0 | 0,059 | 0,059 |
| Normalised to standard impedance | 0,60% | 0,54% | 0 | 0,78 | 0,78 | 0 | 0,059 | 0,059 |
| Limits | 4% | 3,3% | 3,3% 500ms | 4% | 3,3% | 3,3% 500ms | 1,0 | 0,65 |

Power Quality. DC Injection.

| | | | |
|--------------------------|--------|--------|--------|
| Test power level | 10% | 55% | 100% |
| As % of rated AC current | -0,09% | -0,12% | -0,13% |
| Limit | 0,25% | | |

Power Quality. Power Factor.

| | | | |
|----------------|--------|-------|-------|
| Output Voltage | 216,2V | 230V | 253V |
| Measured Value | 0,999 | 0,999 | 0,999 |
| Limit | >0,95 | | |

Protection. Frquency Tests.

| Function | Setting | | Trip test | | No trip test | |
|-------------|-----------|------------|-----------|------------|------------------|-----------------|
| | Frequency | Time delay | Frequency | Time delay | Frequency time | Confirm no trip |
| U/F stage 1 | 47,5Hz | 20s | 47,49Hz | 20,15s | 47,7Hz 25s | No trip |
| U/F stage 2 | 47,0Hz | 0,5s | 46,99Hz | 0,53s | 47,2Hz 19,98s | No trip |
| | | | | | 46,8Hz 0,48s | No trip |
| O/F stage 1 | 51,5Hz | 90s | 51,51Hz | 90,10s | 51,3Hz 95s | No trip |
| O/F stage 2 | 52,0Hz | 0,5s | 52,01Hz | 0,61s | 51,8Hz 89,98s | No trip |
| | | | | | 52,2Hz 0,48s | No trip |

Protection. Voltage Tests.

| Function | Setting | | Trip test | | No trip test | |
|-------------|---------|------------|-----------|------------|-----------------|-----------------|
| | Voltage | Time delay | Voltage | Time delay | Voltage time | Confirm no trip |
| U/V stage 1 | 200,1V | 2,5s | 199,6V | 2,59s | 204,1V 3,5s | No trip |
| U/V stage 2 | 184,0V | 0,5s | 183,6V | 0,59s | 188V 2,48s | No trip |
| | | | | | 180V 0,48s | No trip |
| O/V stage 1 | 262,2V | 1,0s | 262,0V | 1,09s | 258,2V 2,0s | No trip |
| O/V stage 2 | 273,7V | 0,5s | 273,3V | 0,59s | 269,7V 0,98s | No trip |
| | | | | | 277,7V 0,48s | No trip |

Protection. Loss of Mains Test according BS EN 62116 for Inverters.

| | | | | | | |
|--------------------------|--------------|--------------|---------------|--------------|--------------|---------------|
| Test Power and imbalance | 33% -5% Q | 66% -5% Q | 100% -5% Q | 33% +5% Q | 66% +5% Q | 100% +5% Q |
| Trip time (s) | 0,17 | 0,10 | 0,09s | 0,05 | 0,10 | 0,13s |

Protection. Reconnection Timer.

| Reconnection Time | Under/Over voltage | Under/over frequency | Loss of mains |
|---|-----------------------|-----------------------|-----------------------|
| Minimum value | 20 seconds | | |
| Actual settings (sec) | 20s | 20s | 20s |
| Recorded value (sec) | 36s | 36s | 36s |
| | At 266,2V | At 196,1V | At 47,4Hz |
| Confirmation that the unit does not re-connect. | No connection to grid | No connection to grid | No connection to grid |

Fault Level Contribution.

For an inverter SEEG

| Parameter | Symbol | Time after fault | Volts | Amps |
|---|----------|------------------|-------|------|
| Peak short circuit current | i_p | 20ms | 34,2 | 11,9 |
| Initial Value of aperiodic current | A | 100ms | 23,3 | 15,9 |
| Initial symmetrical short-circuit current | I_k | 250ms | 10,8 | 16,0 |
| Decaying (aperiodic) component of short-circuit current | i_{DC} | 500ms | 42,7 | 9,9 |

As SSEGs (small-scale embedded generators) for PV are inverter-connected the max. short circuit current is the max. AC current.