

TYPE TEST CERTIFICATION TEST RESULT SHEET

MICRO-GENERATOR DETAILS

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|---|--|---|
| MICRO-GENERATOR Type reference: <i>StecaGrid 3203 / StecaGrid 3203x / StecaGrid 4003 / StecaGrid 4003x / StecaGrid 4803 / StecaGrid 4803x / StecaGrid 5503 / StecaGrid 5503x StecaGrid 5003 / StecaGrid 6003</i> | | |
| Maximum continuous rating: 3,200 W / 4,000 W / 4,800 W / 5,500 W / 5,000 W / 6,000W | | |
| Manufacturer: <i>Steca Elektronik GmbH</i> | Tel: <i>+49 8331 8558-0</i> Fax: <i>+49 8331 8558-132</i> | Address: <i>Mammostrasse 1 87700 Memmingen Germany</i> |
| Maximum export capability (SSEG rating less parasitic load): <i>3,200 W / 4,000 W / 4,800 W / 5,500 W / 5,000 W / 6,000W</i> | | |

TEST HOUSE DETAILS

| | |
|--------------------------------|--|
| Name and address of test house | <i>Steca Elektronik GmbH, Mammostrasse 1, 87700 Memmingen, Germany</i> |
| Telephone number | <i>+49 8331 8558-0</i> |
| Facsimile number | <i>+49 8331 8558-132</i> |
| E-mail address | <i>info@steca.de</i> |

TEST DETAILS

| | |
|---------------------------------------|---------------------------------------|
| Date of test | <i>26th of February 2014</i> |
| Name of test Engineer | <i>Dipl.-Ing. (FH) Dietmar Zeller</i> |
| Signature of tester | <i>i.A. D. Zeller</i> |
| Test location if different from above | |

POWER QUALITY

| Harmonic current emission | | | | | | | | |
|---|--|-----------------|-----------------|-----------------|-----------------|------------------|------------------|---|
| | Maximum permissible harmonic current as per EN 61000-3-2 Class A | | | | | | | |
| Harmonic | 2 nd | 3 rd | 5 th | 7 th | 9 th | 11 th | 13 th | 15 th ≤ n ≤ 39 th |
| Limit | 1.08 | 2.3 | 1.14 | 0.77 | 0.4 | 0.33 | 0.21 | 0.15 x (15/n) |
| Test value | 0.001 | 0.023 | 0.208 | 0.041 | 0.010 | 0.022 | 0.011 | < limit EN61000-3-2 A |
| ^a 50% of some other declared value close to the mid point between minimum and maximum. | | | | | | | | |

| Voltage Fluctuations and Flicker | | | | |
|----------------------------------|---|----------|----------------|-----------------|
| | Maximum permissible voltage fluctuation (expressed as a percentage of nominal voltage at 100 % power) and flicker as per EN 61000-3-3 | | | |
| | Starting | Stopping | Running | |
| Limit | 3.3 % | 3.3 % | $P_{st} = 1.0$ | $P_{It} = 0.65$ |
| Test value | < 3.0% | < 3.0% | 0.025 | 0.025 |

| Power factor | | | |
|---|--------------------------------------|-------|-------|
| Protection limit | + 0.95 – 0.95 at three voltage level | | |
| | 210 V | 230 V | 250 V |
| Test value | 1.0 | 1.0 | 1.0 |
| ^a 50% of some other declared value close to the mid point between minimum and maximum. | | | |

UNDER / OVER FREQUENCY TESTS

| Parameter | Under frequency | | Over frequency | |
|---|-----------------|-----------|----------------|-----------|
| | Frequency | Time | Frequency | Time |
| Protection limit (from Table 1 or Annex A) | 48 Hz | 0.5 sec | 50.5 Hz | 0.5 sec |
| Actual setting (as applied to interface protection) | 48 Hz | 0.5 sec | 50.5 Hz | 0.5 sec |
| Trip value (test result) | 48 Hz | < 0.5 sec | 50.5 Hz | < 0.5 sec |

UNDER / OVER VOLTAGE TESTS (SINGLE STAGE PROTECTION)

| Parameter | Under voltage | | Over voltage | |
|---|---------------|-----------|--------------|-----------|
| | Voltage | Time | Voltage | Time |
| Protection limit (from Table 1 or Annex A) | 207 V | 0.5 sec | 253 V | 0.5 sec |
| Actual setting (as applied to interface protection) | 207 V | 0.5 sec | 253 V | 0.5 sec |
| Trip value (test result) | 207 V | < 0.5 sec | 253 V | < 0.5 sec |

LOM TEST

| | | | |
|--|------------------------|-----------|-----------|
| Method used | 3phase grid monitoring | | |
| Output power level ^a | 10 % | 55 % | 100 % |
| Trip setting clearance time | - | - | - |
| Trip value clearance time | < 0.2 sec | < 0.2 sec | < 0.2 sec |
| ^a Indicative values are shown for minimum, medium and maximum power levels. | | | |

FAULT LEVEL CONTRIBUTION

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|--|
| Short-circuit current at micro-generator terminals |
| Short-circuit applied to micro-generator at normal running condition 0 – 2.0 s plot |

MICRO-GENERATOR SHORT-CIRCUIT PARAMETERS

| Parameter | Symbol | Value 1 | Value 2 | Value 3 | Value 4 | Value 5 |
|---|----------|---------|---------|---------|---------|---------|
| Peak short-circuit current | i_p | | | | | |
| Initial value of aperiodic component | A | | | | | |
| Initial symmetrical short-circuit current | I_K | | | | | |
| Decaying (aperiodic) component of short-circuit current | i_{DC} | | | | | |
| Reactance / Resistance ratio of source | x / R | | | | | |

COMMENTS

Fault level contribution: Steca inverters are line-commutated to ensure a very low harmonic distortion and a power factor very close to 1 (see above). The output current is directly controlled by the inverter and cannot exceed the maximum current, even in case of fault close to the inverter. Short circuit current cannot be a multiple of the nominal current like it can be at a synchronous generator or an induction generator.