# Certificate of compliance

| | |
|---|---|
| **Applicant:** | **KATEK Memmingen GmbH**<br>Mammostrasse 1<br>87700 Memmingen<br>**Germany** |
| **Product:** | **Photovoltaic (PV) inverter** |
| **Model:** | StecaGrid 1511; StecaGrid 2011; StecaGrid 2511; StecaGrid 3011_2; StecaGrid 3011; StecaGrid 3611; StecaGrid 3611_2 |

**Use in accordance with regulations:**

Automatic disconnection device with single-phase mains surveillance in accordance with Engineering Recommendation G98/1 for photovoltaic systems with a single-phase parallel coupling via an inverter in the public mains supply. The automatic disconnection device is an integral part of the aforementioned inverter. This serves as a replacement for the disconnection device with isolating function, which can be accessed the distribution network provider at any time.

**Applied rules and standards:**

**Engineering Recommendation G98/1-4:2019**
Requirements for the connection of Fully Type Tested Micro-generators (up to and including 16 A per phase) in parallel with public Low Voltage Distribution Networks

**DIN V VDE V 0126-1-1:2006-02 (4.1 Functional safety)**
Automatic disconnection device between a generator and the public low-voltage grid

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

| | | | |
|---|---|---|---|
| **Report number:** | **18TH316-G98-1_0** | **Certification program:** | **NSOP-0032-DEU-ZE-V01** |
| **Certificate number:** | **U20-0634** | **Date of issue:** | **2020-08-06** |

**Certification body**

Thomas Lammel

*Certification body Bureau Veritas Consumer Products Services Germany GmbH accredited according to DIN EN ISO/IEC 17065*
*A partial representation of the certificate requires the written approval of Bureau Veritas Consumer Products Services Germany GmbH*

## Appendix C Type Test Verification Report

**Extract from test report according to the Engineering Recommendation G98/1** **Nr. 18TH316-G98-1_0**

| **Type Approval and declaration of compliance with the requirements of Engineering Recommendation G98/1.** | | | |
|---|---|---|---|
| **PGM Technology** | Photovoltaic inverter | | |
| **Manufacturer** | KATEK Memmingen GmbH | | |
| **Address** | Mammostrasse 1<br>87700 Memmingen<br>Germany | | |
| **Tel** | +49 (0) 8331 85 58-0 | **Fax:** | +49 (0) 8331 85 58-131 |
| **Email** | info@steca.de | **Website:** | www.steca.com |

| **Rated values** | StecaGrid 1511 | StecaGrid 2011 | StecaGrid 2511 | StecaGrid 3011_2 |
|---|---|---|---|---|
| **MPP DC voltage range [V]** | 75-360 | 75-360 | 75-360 | 125-600 |
| **Input DC voltage range [V]** | Max 450 | Max 450 | Max 450 | Max 750 |
| **Input DC current [A]** | 13 | 13 | 13 | 13 |
| **Output AC voltage [V]** | 230 | 230 | 230 | 230 |
| **Output AC current [A]** | 12 | 12 | 14 | 14 |
| **Output power [VA]** | 1500 | 2000 | 2500 | 3000 |

| **Rated values** | StecaGrid 3011 | StecaGrid 3611 | StecaGrid 3611_2 | - |
|---|---|---|---|---|
| **MPP DC voltage range [V]** | 125-600 | 150-600 | 150-600 | - |
| **Input DC voltage range [V]** | Max 750 | Max 750 | Max 750 | - |
| **Input DC current [A]** | 13 | 13 | 13 | - |
| **Output AC voltage [V]** | 230 | 230 | 230 | - |
| **Output AC current [A]** | 14 | 16 | 16 | - |
| **Output power [VA]** | 3000 | 3680 | 3680 | - |

| | |
|---|---|
| **Firmware version** | PU_APP_4.1.0 and PAR_23.0.10 or higher |
| **Measurement period:** | 14-05-2020 to 04-08-2020 |

**Description of the structure of the power generation unit:**

The power generation unit is equipped with a PV and line-side EMC filter. The power generation unit has no galvanic isolation between DC input and AC output. Output switch-off is performed with single-fault tolerance based on two series-connected relays in line and neutral. This enables a safe disconnection of the power generation unit from the network in case of error.

**Differences between Generating Units:**

The models 1511, 2011 and 2511 have identical hardware and software. The different power are realized by software derating. The models 3011, 3011_2, 3611 and 3611_2 have similar hardware and software. The models 3011 and 3611 have one PV string and the models 3011_2, 3611_2 have two PV strings. The different powers are realized by software derating. The models 1511, 2011 and 2511 have a different AC filter then the models 3011, 3011_2, 3611 and 3611_2

The above stated Generating Units are tested according the requirements in the Engineering Recommendation G98/1. Any modification that affects the stated tests must be named by the manufacturer/supplier of the product to ensure that the product meets all requirements of the Engineering Recommendation G98/1.

## Appendix C Type Test Verification Report

**Extract from test report according to the Engineering Recommendation G98/1** **Nr. 18TH316-G98-1_0**

| **Operating Range.** | |
|---|---|
| Test 1 | Voltage = 85% of nominal (195,5 V)<br>Frequency = 47,5 Hz<br>Power Factor = 1<br>Period of test 90 minutes |
| Connection: | Always connected |
| Limit: | Always connected |
| Test 2 | Voltage = 110% of nominal (253 V)<br>Frequency = 51,5 Hz<br>Power Factor = 1<br>Period of test 90 minutes |
| Connection: | Always connected |
| Limit: | Always connected |
| Test 3 | Voltage = 110% of nominal (253 V)<br>Frequency = 52,0 Hz<br>Power Factor = 1<br>Period of test 15 minutes |
| Connection: | Always connected |
| Limit: | Always connected |

**Protection. Voltage tests.**

| **Function** | **Setting** | | **Trip test** | | **No trip test** | |
|---|---|---|---|---|---|---|
| | **Voltage [V]** | **Time delay [s]** | **Voltage [V]** | **Time delay [s]** | **Voltage / time** | **Confirm no trip** |
| **U/V** | 184 | 2,5 | 185,5 | 2,7 | 188V / 5s | No trip |
| | | | | | 180V / 2,45s | No trip |
| **O/V stage 1** | 262,2 | 1,0 | 259,6 | 1,2 | 258,2V 5,0s | No trip |
| **O/V stage 2** | 273,7 | 0,5 | 271,1 | 0,7 | 269,7V 0,95s | No trip |
| | | | | | 277,7V 0,45s | No trip |

Note. For Voltage tests the Voltage required to trip is the setting ±3,45V. The time delay can be measured at a larger deviation than the minimum required to operate the protection. The No trip tests need to be carried out at the setting ±4V and for the relevant times as shown in the table above to ensure that the protection will not trip in error.

## Appendix C Type Test Verification Report

**Extract from test report according to the Engineering Recommendation G98/1** **Nr. 18TH316-G98-1_0**

**Protection. Frequency tests.**

| Function | Setting | | Trip test | | No trip test | |
|---|---|---|---|---|---|---|
| | Frequency [Hz] | Time delay [s] | Frequency [Hz] | Time delay [s] | Frequency / time | Confirm no trip |
| **U/F stage 1** | 47,5 | 20 | 47,51 | 20,181 | 47,7Hz / 30s | No trip |
| **U/F stage 2** | 47 | 0,5 | 47,03 | 0,579 | 47,2Hz / 19,5s | No trip |
| | | | | | 46,8Hz / 0,45s | No trip |
| **O/F stage 2** | 52 | 0,5 | 51,97 | 0,669 | 51,8Hz / 120s | No trip |
| | | | | | 52,2Hz / 0,45s | No trip |

Note. For Frequency Trip tests the Frequency required to trip is the setting ±0,1Hz. In order to measure the time delay a larger deviation than the minimum required to operate the projection can be used. The “No-trip tests” need to be carried out at the setting ±0,2Hz and for the relevant times as shown in the table above to ensure that the protection will not trip in error.

**Protection. Loss of Mains.**

Inverters tested according to BS EN 62116.

| **Balancing load on islanded network** | 33% of -5% Q Test 22 | 66% of -5% Q Test 12 | 100% of -5% P Test 5 | 33% of +5% Q Test 31 | 66% of +5% Q Test 21 | 100% of +5% P Test 10 |
|---|---|---|---|---|---|---|
| **Trip time. Ph1 fuse removed [s]** | 0,525 | 0,378 | 0,413 | 0,424 | 0,407 | 0,533 |

Note. Trip time limit is 0,5s.

**Appendix C Type Test Verification Report**

**Extract from test report according to the Engineering Recommendation G98/1** **Nr. 18TH316-G98-1_0**

| **Protection. Re-connection timer.** | |
|---|---|
| Test should prove that the reconnection sequence starts in no less than 20 seconds for restoration of voltage and frequency to within the stage 1 settings of table 2. | |
| **Over Voltage** | |
| **Time delay setting** | **Measured delay** |
| 20s | 147 |
| **Under Voltage** | |
| **Time delay setting** | **Measured delay** |
| 20s | 147 |
| **Over Frequency** | |
| **Time delay setting** | **Measured delay** |
| 20s | 146 |
| **Under Frequency** | |
| **Time delay setting** | **Measured delay** |
| 20s | 148 |

| | Checks on no reconnection when voltage or frequency is brought to just outside stage 1 limits of table 1. | | | |
|---|---|---|---|---|
| | At 266,2V | At 180,0V | At 47,4Hz | At 52,1Hz |
| **Confirmation that the Generating Unit does not re-connect.** | No reconnection | No reconnection | No reconnection | No reconnection |

| **Protection. Frequency change, Stability test.** | | | | |
|---|---|---|---|---|
| | **Start Frequency [Hz]** | **Change** | **Test Duration** | **Confirm no trip** |
| **Positive Vector Shift** | 49,5 | +50 degrees | | No trip |
| **Negative Vector Shift** | 50,5 | -50 degrees | | No trip |
| **Positive Frequency drift** | 49,0 to 51,0 | +0,95Hz/sec | 2,1s | No trip |
| **Negative Frequency drift** | 51,0 to 49,0 | -0,95Hz/sec | 2,1s | No trip |

## Appendix C Type Test Verification Report

**Extract from test report according to the Engineering Recommendation G98/1** **Nr. 18TH316-G98-1_0**

| Limited Frequency Sensitive Mode – Over Frequency | | | | | | | |
|---|---|---|---|---|---|---|---|
| **1-min mean value [Hz]:** | **a) 50,00** | **b) 50,45** | **c) 50,70** | **d) 51,15** | **e) 50,70** | **f) 50,45** | **g) 50,00** |
| **1. Measurement a) to g): Active power output > 80% Pn** | | | | | | | |
| **Frequency [Hz]:** | 50,00 | 50,45 | 50,70 | 51,15 | 50,70 | 50,45 | 50,00 |
| **$P_{expected}$ [kW]:** | N/A | 3,60 | 3,42 | 3,09 | 3,42 | 3,60 | N/A |
| **$P_{measured}$ [kW]:** | 3,63 | 3,60 | 3,42 | 3,09 | 3,41 | 3,59 | 3,63 |
| **2. Measurement a) to g): Active power output 40% and 60% after freezing > 80% Pn** | | | | | | | |
| **Frequency [Hz]:** | 50,00 | 50,45 | 50,70 | 51,15 | 50,70 | 50,45 | 50,00 |
| **$P_{expected}$ [kW]:** | N/A | 1,79 | 1,70 | 1,54 | 1,70 | 1,79 | N/A |
| **$P_{measured}$ [kW]:** | 1,81 | 1,78 | 1,69 | 1,53 | 1,69 | 1,78 | 2,00 |

| Output Power with falling Frequency | | | |
|---|---|---|---|
| **5-min mean value (each)** | **a) 50 ± 0,01 Hz** | **b) - 0,4 to - 0,5 Hz** | **c) - 2,4 to - 2,5 Hz** |
| **Frequency [Hz]:** | 50,00 | 49,50 | 47,60 |
| **Active power [W]:** | 3625 | 3618 | 3615 |
| **ΔP/Pmax [%]:** | | | 0,1 |

Note.

For a CHP the test point a) at 50,00Hz is taken as Registered capacity (Pmax) due to limited discrete operating points of the CHP's thermal process.

Electronic inverter no power reduction take place.

**Appendix C Type Test Verification Report**

**Extract from test report according to the Engineering Recommendation G98/1** **Nr. 18TH316-G98-1_0**

**Power Quality. Harmonics.**

**StecaGrid 3611**

| SSEG rating per phase (rpp) | | | | | | |
|---|---|---|---|---|---|---|
| | At 45-55% of rated ouput 1,78 kW | | 100% of rated output 3,68 kW | | | |
| Harmonic | Measured Value (MV) in [A] | Measured Value (MV) in [%] | Measured Value (MV) in [A] | Measured Value (MV) in [%] | Limit in BS EN61000-3-2 in Amps | Higher limit for odd harmonics 21 and above |
| 2nd | 0,023 | 0,149 | 0,016 | 0,103 | 1,080 | |
| 3rd | 0,065 | 0,418 | 0,023 | 0,146 | 2,300 | |
| 4th | 0,007 | 0,045 | 0,006 | 0,040 | 0,430 | |
| 5th | 0,026 | 0,164 | 0,007 | 0,047 | 1,140 | |
| 6th | 0,005 | 0,030 | 0,004 | 0,026 | 0,300 | |
| 7th | 0,011 | 0,071 | 0,006 | 0,036 | 0,770 | |
| 8th | 0,004 | 0,027 | 0,003 | 0,020 | 0,230 | |
| 9th | 0,012 | 0,080 | 0,008 | 0,054 | 0,400 | |
| 10th | 0,003 | 0,020 | 0,003 | 0,017 | 0,184 | |
| 11th | 0,015 | 0,098 | 0,007 | 0,047 | 0,330 | |
| 12th | 0,003 | 0,017 | 0,002 | 0,015 | 0,153 | |
| 13th | 0,008 | 0,049 | 0,003 | 0,016 | 0,210 | |
| 14th | 0,003 | 0,022 | 0,002 | 0,015 | 0,131 | |
| 15th | 0,003 | 0,020 | 0,003 | 0,020 | 0,150 | |
| 16th | 0,002 | 0,016 | 0,002 | 0,013 | 0,115 | |
| 17th | 0,003 | 0,018 | 0,002 | 0,014 | 0,132 | |
| 18th | 0,002 | 0,015 | 0,002 | 0,013 | 0,102 | |
| 19th | 0,003 | 0,018 | 0,002 | 0,014 | 0,118 | |
| 20th | 0,002 | 0,015 | 0,002 | 0,012 | 0,092 | |
| 21th | 0,003 | 0,018 | 0,002 | 0,015 | 0,107 | 0,160 |
| 22th | 0,003 | 0,018 | 0,002 | 0,014 | 0,084 | |
| 23th | 0,003 | 0,019 | 0,002 | 0,014 | 0,098 | 0,147 |
| 24th | 0,003 | 0,018 | 0,002 | 0,013 | 0,077 | |
| 25th | 0,003 | 0,020 | 0,002 | 0,014 | 0,090 | 0,135 |
| 26th | 0,003 | 0,018 | 0,002 | 0,013 | 0,071 | |
| 27th | 0,003 | 0,021 | 0,003 | 0,016 | 0,083 | 0,124 |
| 28th | 0,003 | 0,018 | 0,002 | 0,013 | 0,066 | |
| 29th | 0,003 | 0,021 | 0,002 | 0,014 | 0,078 | 0,117 |
| 30th | 0,003 | 0,017 | 0,002 | 0,013 | 0,061 | |
| 31th | 0,003 | 0,019 | 0,002 | 0,014 | 0,073 | 0,109 |
| 32th | 0,003 | 0,018 | 0,002 | 0,012 | 0,058 | |
| 33th | 0,003 | 0,021 | 0,002 | 0,014 | 0,068 | 0,102 |
| 34th | 0,003 | 0,017 | 0,002 | 0,012 | 0,054 | |
| 35th | 0,003 | 0,018 | 0,002 | 0,013 | 0,064 | 0,096 |
| 36th | 0,003 | 0,018 | 0,002 | 0,012 | 0,051 | |
| 37th | 0,003 | 0,017 | 0,002 | 0,012 | 0,061 | 0,091 |
| 38th | 0,003 | 0,017 | 0,002 | 0,011 | 0,048 | |
| 39th | 0,003 | 0,016 | 0,002 | 0,011 | 0,058 | 0,087 |
| 40th | 0,003 | 0,016 | 0,002 | 0,011 | 0,046 | |

Note the higher limits for odd harmonics 21 and above are only allowable under certain conditions, if these higher limits are utilised please state the exemption used as detailed in part 6.2.3.4 of BS EN 61000-3-2 in the box below.

## Appendix C Type Test Verification Report

**Extract from test report according to the Engineering Recommendation G98/1** **Nr. 18TH316-G98-1_0**

**Power Quality. Harmonics.**

**StecaGrid 1511**

| | SSEG rating per phase (rpp) | | | | | |
|---|---|---|---|---|---|---|
| | At 45-55% of rated ouput 0,75 kW | | 100% of rated output 1,50 kW | | | |
| Harmonic | Measured Value (MV) in [A] | Measured Value (MV) in [%] | Measured Value (MV) in [A] | Measured Value (MV) in [%] | Limit in BS EN61000-3-2 in Amps | Higher limit for odd harmonics 21 and above |
| 2nd | 0,014 | 0,216 | 0,009 | 0,146 | 1,080 | |
| 3rd | 0,041 | 0,638 | 0,019 | 0,296 | 2,300 | |
| 4th | 0,005 | 0,080 | 0,003 | 0,048 | 0,430 | |
| 5th | 0,013 | 0,196 | 0,005 | 0,084 | 1,140 | |
| 6th | 0,003 | 0,053 | 0,002 | 0,033 | 0,300 | |
| 7th | 0,011 | 0,177 | 0,004 | 0,058 | 0,770 | |
| 8th | 0,003 | 0,043 | 0,002 | 0,027 | 0,230 | |
| 9th | 0,003 | 0,048 | 0,004 | 0,064 | 0,400 | |
| 10th | 0,002 | 0,034 | 0,002 | 0,025 | 0,184 | |
| 11th | 0,004 | 0,064 | 0,002 | 0,028 | 0,330 | |
| 12th | 0,002 | 0,031 | 0,001 | 0,023 | 0,153 | |
| 13th | 0,002 | 0,033 | 0,002 | 0,029 | 0,210 | |
| 14th | 0,002 | 0,031 | 0,002 | 0,024 | 0,131 | |
| 15th | 0,004 | 0,064 | 0,003 | 0,041 | 0,150 | |
| 16th | 0,002 | 0,028 | 0,001 | 0,020 | 0,115 | |
| 17th | 0,002 | 0,038 | 0,004 | 0,065 | 0,132 | |
| 18th | 0,002 | 0,027 | 0,001 | 0,021 | 0,102 | |
| 19th | 0,004 | 0,062 | 0,005 | 0,074 | 0,118 | |
| 20th | 0,002 | 0,025 | 0,001 | 0,019 | 0,092 | |
| 21th | 0,003 | 0,045 | 0,002 | 0,038 | 0,107 | 0,160 |
| 22th | 0,001 | 0,023 | 0,001 | 0,019 | 0,084 | |
| 23th | 0,002 | 0,035 | 0,002 | 0,034 | 0,098 | 0,147 |
| 24th | 0,001 | 0,022 | 0,001 | 0,017 | 0,077 | |
| 25th | 0,002 | 0,029 | 0,002 | 0,027 | 0,090 | 0,135 |
| 26th | 0,001 | 0,023 | 0,001 | 0,018 | 0,071 | |
| 27th | 0,002 | 0,025 | 0,001 | 0,023 | 0,083 | 0,124 |
| 28th | 0,001 | 0,021 | 0,001 | 0,016 | 0,066 | |
| 29th | 0,001 | 0,021 | 0,001 | 0,018 | 0,078 | 0,117 |
| 30th | 0,001 | 0,023 | 0,001 | 0,019 | 0,061 | |
| 31th | 0,001 | 0,019 | 0,001 | 0,015 | 0,073 | 0,109 |
| 32th | 0,001 | 0,019 | 0,001 | 0,015 | 0,058 | |
| 33th | 0,001 | 0,022 | 0,001 | 0,019 | 0,068 | 0,102 |
| 34th | 0,001 | 0,018 | 0,001 | 0,015 | 0,054 | |
| 35th | 0,001 | 0,019 | 0,001 | 0,016 | 0,064 | 0,096 |
| 36th | 0,001 | 0,019 | 0,001 | 0,014 | 0,051 | |
| 37th | 0,001 | 0,018 | 0,001 | 0,015 | 0,061 | 0,091 |
| 38th | 0,001 | 0,017 | 0,001 | 0,014 | 0,048 | |
| 39th | 0,001 | 0,018 | 0,001 | 0,016 | 0,058 | 0,087 |
| 40th | 0,001 | 0,017 | 0,001 | 0,014 | 0,046 | |

Note the higher limits for odd harmonics 21 and above are only allowable under certain conditions, if these higher limits are utilised please state the exemption used as detailed in part 6.2.3.4 of BS EN 61000-3-2 in the box below.

## Appendix C Type Test Verification Report

**Extract from test report according to the Engineering Recommendation G98/1** **Nr. 18TH316-G98-1_0**

**Power Quality. Power factor.**

| Output power | 216,2V | 230V | 253V | Measured at three voltage levels and at full output. Voltage to be maintained within ±1,5% of the stated level during the test. |
|---|---|---|---|---|
| 20% | 0,998 | 0,999 | 0,998 | |
| 50% | 0,999 | 0,999 | 0,999 | |
| 75% | 0,998 | 0,999 | 0,999 | |
| 100% | 0,999 | 0,999 | 0,998 | |
| Limit | >0,95 | >0,95 | >0,95 | |

**Power Quality. Voltage fluctuation and Flicker.**

| | Starting | | | Stopping | | | Running | |
|---|---|---|---|---|---|---|---|---|
| | dmax | dc | d(t) | dmax | dc | d(t) | Pst | Plt 2 hours |
| **Measured values at test impedance** | 2,78 | 1,98 | 0,0 | 2,78 | 1,98 | 0,0 | 0,455 | 0,439 |
| **Measured values at standard impedance** | 2,78 | 1,98 | 0,0 | 2,78 | 1,98 | 0,0 | 0,455 | 0,439 |
| **Values for maximum impedance** | 4,00 | 2,85 | 0,0 | 4,00 | 2,85 | 0,0 | 0,65 | 0,632 |
| **Limits set under BS EN 61000-3-11** | 4% | 3,3% | 3,3% 500ms | 4% | 3,3% | 3,3% 500ms | 1,0 | 0,65 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Test impedance** | R | 0,4 | Ω | Xl | 0,25 | Ω |
| | Z | 0,472 | Ω | | | |
| **Standard impedance** | R | 0,4 | Ω | Xl | 0,25 | Ω |
| | Z | 0,472 | Ω | | | |
| **Maximum impedance** | R | 0,576 | Ω | Xl | 0,360 | Ω |
| | Zmax | 0,679 | Ω | | | |

**Power Quality. DC injection.**

| **StecaGrid 1511** | | | | |
|---|---|---|---|---|
| **Test level power [%]** | 20 | 50 | 75 | 100 |
| **Recorded value [mA]** | 6,8 | 6,8 | 7,0 | 6,7 |
| **Recorded value [%]** | 0,04 | 0,04 | 0,04 | 0,04 |
| **Limit [%]** | 0,25 | 0,25 | 0,25 | 0,25 |
| **StecaGrid 1511** | | | | |
| **Test level power [%]** | 20 | 50 | 75 | 100 |
| **Recorded value [mA]** | 3,6 | 2,8 | 2,6 | 2,3 |
| **Recorded value [%]** | 0,02 | 0,02 | 0,02 | 0,01 |
| **Limit [%]** | 0,25 | 0,25 | 0,25 | 0,25 |

Note. DC-injection is tested at each phase of the inverter and a limit of 0,25% per phase was used as pass criteria.

| Appendix C Type Test Verification Report | |
|---|---|
| **Extract from test report according to the Engineering Recommendation G98/1** | **Nr. 18TH316-G98-1_0** |

| **Fault level Contribution.** | | | | | |
|---|---|---|---|---|---|
| **For a directly coupled SSEG** | | | **For a Inverter SSEG** | | |
| **Parameter** | **Symbol** | **Value** | **Time after fault** | **Volts [V]** | **Amps [A]** |
| **Peak Short Circuit current** | $I_p$ | N/A | 20ms | 27,7 | 0,94 |
| **Initial Value of aperiodic current** | A | N/A | 100ms | 27,7 | 0,94 |
| **Initial symmetrical short-circuit current*** | $I_k$ | N/A | 250ms | 27,7 | 0,04 |
| **Decaying (aperiodic) component of short circuit current*** | $i_{DC}$ | N/A | 500ms | 27,7 | 0,04 |
| **Reactance/Resistance Ratio of source*** | X/R | N/A | **Time to Trip [s]** | 0,02 | |
| For rotating machines and linear piston machines the test should produce a 0s – 2s plot of the short circuit current as seen at the Generating Unit terminals.<br>* Values for these parameters should be provided where the short circuit duration is sufficiently long to enable interpolation of the plot. | | | | | |

| **Self Monitoring – Solid state switching.** | **N/A** |
|---|---|
| It has been verified that in the event of the solid state switching device failing to disconnect the Generating Unit, the voltage on the output side of the switching device is reduced to a value below 50 volts within 0,5 seconds. | |
| Note. Unit do not provide solid state switching relays. In case the semiconductor bridge is switched off, then the voltage on the output drops to 0. In this case the relays on the output will also open (Functional safety of the internal automatic disconnection device according to VDE 0126-1-1). | |

| **Logic Interface (input port) Required by paragraph 11.1.3** | **P** |
|---|---|
| Confirm that an input port is provided and can be used to shut down the module. | Yes |