**ENA** **EREC** **G98/NI:2019**

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| Type Approval and Manufacturer declaration of compliance with the requirements of G98/NI.This form should be used when making a Type Test submission to the Energy Networks Association (ENA).  If the AC-coupled Inverter is Fully Type Tested and already registered with the ENA Type Test Verification Report Register, the Installation Document should include the Manufacturer’s Reference Number (the Product ID), and this form does not need to be submitted.  Where the AC-coupled Inverter is not registered with the ENA Type Test Verification Report Register this form needs to be completed and provided to the DNO, to confirm that the AC-coupled Inverter has been tested to satisfy the requirements of this EREC G98/NI. | | | |
| SSEG Type reference number | | HAT-10.0HV-EUG1 | |
| SSEG Type | | AC-coupled Inverter | |
| System Supplier name | | Hoymiles Power Electronics Inc. | |
| Address | | No. 18 Kangjing road, Hangzhou, Zhejiang Province, P.R. China | |
| Tel | +86 571 28056101 | Fax | +86 571 28056137 |
| E:mail | zhangxingyao@hzconverter.co m | Web site | www.hoymiles.com |
| Maximum rated capacity,use separate sheet if more than one connection option. | Connection Option | | |
| NA | kW single phase, single, split or three phase system | |
| 10.0 | kW three phase | |
| NA | kW two phases in three phase system | |
| NA | kW two phases split phase system | |
| SSEG manufacturer/supplier declaration | | | |
| Manufacturer Type Test declaration. - I certify that all products supplied by the company with the above Type Tested reference number will be manufactured and tested to ensure that they perform as stated inthis document, prior to shipment to site and that no site modifications are required to ensure that the product meets all the requirements of EREC G98/NI. | | | |
| Signed |  | On behalf of | Hoymiles Power Electronics Inc. |

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| Note that testing can be done by the Manufacturer of an individual component or by an external test house.  Where parts of the testing are carried out by persons or organisations other than the Manufacturer then that person or organisation shall keep copies of all test records and results supplied to them to verify that the testing has been carried out by people with sufficient technical competency to carry out the tests. |

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| **Operating Range** | |
|  | Test 1: 195.5V~47.0Hz, PF=1 |
| **HAT-10.0HV-EUG1** |  |
|  | Test 2: 195.5V~47.5Hz, PF=1 |
| **HAT-10.0HV-EUG1** |  |
|  | Test 3: 253V~51.5Hz, PF=1 |
| **HAT-10.0HV-EUG1** |  |
|  | Test 4: 253V~52Hz, PF=1 |
| **HAT-10.0HV-EUG1** |  |
|  | Test 5: 230V~50.0Hz, PF=1 |
| **HAT-10.0HV-EUG1** |  |
|  | Test 6: RoCoF withstand |
| **HAT-10.0HV-EUG1** |  |

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| **Power Quality – Harmonics:** These tests should be carried out as specified in BS EN 61000-3-2. | | | | | | | | | | | | |
| SSEG rating per phase (rpp) | | | | 3.33 | | | | kW | | NV=MV\*3.68/rpp | |
| Single or three phase measurements (for single phase measurements, only complete L1 columns below). | | | | | |  | | | |  | |
| Harmoni c | At 45-55% of rated output | | | | | | | | | Limit in BS EN 61000-3-2 in Amps | Higher limit for  odd harmonics 21 and above |
|  | Measured Value (MV) in Amps | | | | Normalized Value (NV) in Amps | | | | |
|  | L1 | L2 | L3 | | L1 | | L2 | | L3 |  |  |
| 2 | 0.0189 | 0.0207 | 0.0198 | | 0.0209 | | 0.0229 | | 0.0219 | 1.080 |  |
| 3 | 0.2209 | 0.2240 | 0.2454 | | 0.2441 | | 0.2475 | | 0.2712 | 2.300 |  |
| 4 | 0.0034 | 0.0074 | 0.0040 | | 0.0038 | | 0.0082 | | 0.0044 | 0.430 |  |
| 5 | 0.0777 | 0.0860 | 0.0950 | | 0.0859 | | 0.0950 | | 0.1050 | 1.140 |  |
| 6 | 0.0033 | 0.0076 | 0.0028 | | 0.0036 | | 0.0084 | | 0.0031 | 0.300 |  |
| 7 | 0.0388 | 0.0514 | 0.0580 | | 0.0429 | | 0.0568 | | 0.0641 | 0.770 |  |
| 8 | 0.0012 | 0.0060 | 0.0015 | | 0.0013 | | 0.0066 | | 0.0017 | 0.230 |  |
| 9 | 0.0261 | 0.0281 | 0.0322 | | 0.0288 | | 0.0311 | | 0.0356 | 0.400 |  |
| 10 | 0.0014 | 0.0042 | 0.0013 | | 0.0015 | | 0.0046 | | 0.0014 | 0.184 |  |
| 11 | 0.0189 | 0.0260 | 0.0283 | | 0.0209 | | 0.0287 | | 0.0313 | 0.450 |  |
| 12 | 0.0010 | 0.0020 | 0.0014 | | 0.0011 | | 0.0022 | | 0.0015 | 0.153 |  |
| 13 | 0.0245 | 0.0239 | 0.0223 | | 0.0271 | | 0.0264 | | 0.0246 | 0.210 |  |
| 14 | 0.0017 | 0.0015 | 0.0019 | | 0.0019 | | 0.0017 | | 0.0021 | 0.131 |  |
| 15 | 0.0037 | 0.0105 | 0.0090 | | 0.0041 | | 0.0116 | | 0.0099 | 0.150 |  |
| 16 | 0.0015 | 0.0014 | 0.0015 | | 0.0017 | | 0.0015 | | 0.0017 | 0.115 |  |
| 17 | 0.0112 | 0.0077 | 0.0100 | | 0.0124 | | 0.0085 | | 0.0111 | 0.132 |  |
| 18 | 0.0011 | 0.0013 | 0.0018 | | 0.0012 | | 0.0014 | | 0.0020 | 0.102 |  |
| 19 | 0.0051 | 0.0067 | 0.0073 | | 0.0056 | | 0.0074 | | 0.0081 | 0.118 |  |
| 20 | 0.0013 | 0.0021 | 0.0016 | | 0.0014 | | 0.0023 | | 0.0018 | 0.092 |  |
| 21 | 0.0064 | 0.0061 | 0.0062 | | 0.0071 | | 0.0067 | | 0.0069 | 0.107 |  |
| 22 | 0.0013 | 0.0015 | 0.0021 | | 0.0014 | | 0.0017 | | 0.0023 | 0.084 |  |
| 23 | 0.0039 | 0.0033 | 0.0026 | | 0.0043 | | 0.0036 | | 0.0029 | 0.098 | 0.147 |
| 24 | 0.0006 | 0.0009 | 0.0017 | | 0.0007 | | 0.0010 | | 0.0019 | 0.077 |  |
| 25 | 0.0029 | 0.0046 | 0.0047 | | 0.0032 | | 0.0051 | | 0.0052 | 0.090 | 0.135 |
| 26 | 0.0011 | 0.0017 | 0.0014 | | 0.0012 | | 0.0019 | | 0.0015 | 0.071 |  |
| 27 | 0.0021 | 0.0047 | 0.0016 | | 0.0023 | | 0.0052 | | 0.0018 | 0.083 | 0.124 |
| 28 | 0.0009 | 0.0017 | 0.0022 | | 0.0010 | | 0.0019 | | 0.0024 | 0.066 |  |
| 29 | 0.0012 | 0.0025 | 0.0051 | | 0.0013 | | 0.0028 | | 0.0056 | 0.078 | 0.117 |
| 30 | 0.0020 | 0.0012 | 0.0014 | | 0.0022 | | 0.0013 | | 0.0015 | 0.061 |  |
| 31 | 0.0017 | 0.0021 | 0.0030 | | 0.0019 | | 0.0023 | | 0.0033 | 0.073 | 0.109 |
| 32 | 0.0017 | 0.0016 | 0.0016 | | 0.0019 | | 0.0018 | | 0.0018 | 0.058 |  |
| 33 | 0.0020 | 0.0019 | 0.0021 | | 0.0022 | | 0.0021 | | 0.0023 | 0.068 | 0.102 |
| 34 | 0.0006 | 0.0009 | 0.0021 | | 0.0007 | | 0.0010 | | 0.0023 | 0.054 |  |
| 35 | 0.0016 | 0.0028 | 0.0009 | | 0.0018 | | 0.0031 | | 0.0010 | 0.064 | 0.096 |
| 36 | 0.0011 | 0.0010 | 0.0010 | | 0.0012 | | 0.0011 | | 0.0011 | 0.051 |  |
| 37 | 0.0010 | 0.0013 | 0.0033 | | 0.0011 | | 0.0014 | | 0.0036 | 0.061 | 0.091 |
| 38 | 0.0010 | 0.0010 | 0.0012 | | 0.0011 | | 0.0011 | | 0.0013 | 0.048 |  |
| 39 | 0.0025 | 0.0018 | 0.0007 | | 0.0028 | | 0.0020 | | 0.0008 | 0.058 | 0.087 |
| 40 | 0.0008 | 0.0011 | 0.0016 | | 0.0009 | | 0.0012 | | 0.0018 | 0.046 |  |
| Harmoni c | At 100% of rated output | | | | | | | | | Limit in BS EN 61000-3-2 in Amps | Higher limit for  odd harmonics 21 and above |
|  | Measured Value (MV) in Amps | | | | Normalized Value (NV) in Amps | | | | |
|  | L1 | L2 | L3 | | L1 | | L2 | | L3 |  |  |
| 2 | 0.0162 | 0.0199 | 0.0189 | | 0.0179 | | 0.0220 | | 0.0209 | 1.080 |  |
| 3 | 0.2992 | 0.3001 | 0.3238 | | 0.3306 | | 0.3316 | | 0.3578 | 2.300 |  |
| 4 | 0.0031 | 0.0088 | 0.0047 | | 0.0034 | | 0.0097 | | 0.0052 | 0.430 |  |
| 5 | 0.0890 | 0.0963 | 0.1078 | | 0.0984 | | 0.1064 | | 0.1191 | 1.140 |  |
| 6 | 0.0038 | 0.0089 | 0.0032 | | 0.0042 | | 0.0098 | | 0.0035 | 0.300 |  |
| 7 | 0.0354 | 0.0501 | 0.0599 | | 0.0391 | | 0.0554 | | 0.0662 | 0.770 |  |
| 8 | 0.0013 | 0.0062 | 0.0020 | | 0.0014 | | 0.0069 | | 0.0022 | 0.230 |  |
| 9 | 0.0329 | 0.0348 | 0.0399 | | 0.0364 | | 0.0385 | | 0.0441 | 0.400 |  |
| 10 | 0.0021 | 0.0042 | 0.0018 | | 0.0023 | | 0.0046 | | 0.0020 | 0.184 |  |
| 11 | 0.0202 | 0.0287 | 0.0322 | | 0.0223 | | 0.0317 | | 0.0356 | 0.450 |  |
| 12 | 0.0013 | 0.0020 | 0.0016 | | 0.0014 | | 0.0022 | | 0.0018 | 0.153 |  |
| 13 | 0.0237 | 0.0263 | 0.0265 | | 0.0262 | | 0.0291 | | 0.0293 | 0.210 |  |
| 14 | 0.0012 | 0.0017 | 0.0017 | | 0.0013 | | 0.0019 | | 0.0019 | 0.131 |  |
| 15 | 0.0039 | 0.0106 | 0.0128 | | 0.0043 | | 0.0117 | | 0.0141 | 0.150 |  |
| 16 | 0.0009 | 0.0021 | 0.0014 | | 0.0010 | | 0.0023 | | 0.0015 | 0.115 |  |
| 17 | 0.0129 | 0.0107 | 0.0151 | | 0.0143 | | 0.0118 | | 0.0167 | 0.132 |  |
| 18 | 0.0009 | 0.0017 | 0.0018 | | 0.0010 | | 0.0019 | | 0.0020 | 0.102 |  |
| 19 | 0.0078 | 0.0101 | 0.0100 | | 0.0086 | | 0.0112 | | 0.0111 | 0.118 |  |
| 20 | 0.0008 | 0.0018 | 0.0013 | | 0.0009 | | 0.0020 | | 0.0014 | 0.092 |  |
| 21 | 0.0041 | 0.0052 | 0.0045 | | 0.0045 | | 0.0057 | | 0.0050 | 0.107 |  |
| 22 | 0.0011 | 0.0012 | 0.0015 | | 0.0012 | | 0.0013 | | 0.0017 | 0.084 |  |
| 23 | 0.0050 | 0.0033 | 0.0054 | | 0.0055 | | 0.0036 | | 0.0060 | 0.098 | 0.147 |
| 24 | 0.0008 | 0.0009 | 0.0016 | | 0.0009 | | 0.0010 | | 0.0018 | 0.077 |  |
| 25 | 0.0023 | 0.0041 | 0.0060 | | 0.0025 | | 0.0045 | | 0.0066 | 0.090 | 0.135 |
| 26 | 0.0011 | 0.0019 | 0.0012 | | 0.0012 | | 0.0021 | | 0.0013 | 0.071 |  |
| 27 | 0.0017 | 0.0046 | 0.0042 | | 0.0019 | | 0.0051 | | 0.0046 | 0.083 | 0.124 |
| 28 | 0.0013 | 0.0020 | 0.0028 | | 0.0014 | | 0.0022 | | 0.0031 | 0.066 |  |
| 29 | 0.0027 | 0.0041 | 0.0056 | | 0.0030 | | 0.0045 | | 0.0062 | 0.078 | 0.117 |
| 30 | 0.0014 | 0.0011 | 0.0013 | | 0.0015 | | 0.0012 | | 0.0014 | 0.061 |  |
| 31 | 0.0029 | 0.0040 | 0.0019 | | 0.0032 | | 0.0044 | | 0.0021 | 0.073 | 0.109 |
| 32 | 0.0017 | 0.0015 | 0.0015 | | 0.0019 | | 0.0017 | | 0.0017 | 0.058 |  |
| 33 | 0.0027 | 0.0034 | 0.0021 | | 0.0030 | | 0.0038 | | 0.0023 | 0.068 | 0.102 |
| 34 | 0.0007 | 0.0013 | 0.0021 | | 0.0008 | | 0.0014 | | 0.0023 | 0.054 |  |
| 35 | 0.0035 | 0.0029 | 0.0013 | | 0.0039 | | 0.0032 | | 0.0014 | 0.064 | 0.096 |
| 36 | 0.0007 | 0.0016 | 0.0009 | | 0.0008 | | 0.0018 | | 0.0010 | 0.051 |  |
| 37 | 0.0015 | 0.0010 | 0.0048 | | 0.0017 | | 0.0011 | | 0.0053 | 0.061 | 0.091 |
| 38 | 0.0006 | 0.0010 | 0.0010 | | 0.0007 | | 0.0011 | | 0.0011 | 0.048 |  |
| 39 | 0.0011 | 0.0023 | 0.0016 | | 0.0012 | | 0.0025 | | 0.0018 | 0.058 | 0.087 |
| 40 | 0.0007 | 0.0017 | 0.0016 | | 0.0008 | | 0.0019 | | 0.0018 | 0.046 |  |
| Note the higher limits for odd harmonics 21 and above are only allowable under certain  conditions, if these higher limits are utilized please state the exemption used as detailed in part 6.2.3.4 of BS EN 61000-3-2 in the box below. | | | | | | | | | | | | |

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| **Power Quality - Voltage fluctuations and Flicker:** These tests should be undertaken in accordance with EREC G98/NI Annex A1 A.1.3.3 (Inverter connected) or Annex A2 A.2.3.3 (Synchronous).  The standard test impedance is 0.4 Q for a single phase **Power Generating Module** (and for a two phase unit in a three phase system) and 0.24 Q for a three phase **Power Generating Module** (and for a two phase unit in a split phase system). Please ensure that both test and standard impedance are completed on this form. If the test impedance (or the measured impedance) is different to the standard impedance, it must be normalised to the standard impedance as follows (where the **Power Factor** of the generation output is 0.98 or above):  d max normalised value = (Standard impedance / Measured impedance) x Measured value.  Where the **Power Factor** of the output is under 0.98 then the X to R ratio of the test impedance should be close to that of the standard impedance.  The stopping test should be a trip from full load operation.  The duration of these tests needs to comply with the particular requirements set out in the testing notes for the technology under test.  The test date and location must be declared. | | | | | | | | | | | |
| Test start date | | 2023-12-01 | | | | Test end date | | | 2023-12-01 | | |
| Test location | | SHANGHAI TESTING & INSPECTION INSTITUTE  FOR ELECTRICAL EQUIPMENT CO., LTD. | | | | | | | | | |
|  | Starting | | | | Stopping | | | | | Running | |
|  | d max | | d c | d(t) | d max | | d c | d(t) | | Pst | P It 2 hours |
| Measured Values at test impedance | 0.2321 | | 0.0005 | 0 | 0.5141 | | 0.0011 | 0 | | 0.0146 | 0.0123 |
| Normalised to standard impedance | 0.2321 | | 0.0005 | 0 | 0.5141 | | 0.0011 | 0 | | 0.0146 | 0.0123 |
| Normalised to required maximum impedance | 0.2321 | | 0.0005 | 0 | 0.5141 | | 0.0011 | 0 | | 0.0146 | 0.0123 |
| Limits set under BS EN 61000-3-11 | 4% | | 3.3% | 3.3% | 4% | | 3.3% | 3.3% | | 1.0 | 0.65 |
|  |  | |  | |  | |  |  | | |  |
| Test impedance | R | | 0.24 | | Ω | | XI | 0.15 | | | Ω |
| Standard impedance | R | | 0.24\*  0.4^ | | Ω | | XI | 0.15\*  0.25^ | | | Ω |
| Maximum impedance | R | | 0.24 | | Ω | | XI | 0.15 | | | Ω |

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| **Power quality-DC injection:** This test should be carried out in accordance with EN 50438 Annex D.3.10 | | | | |
| Test power level | 20% | 50% | 75% | 100% |
| Recorded value(mA) | 17.16/7.58/12.17 | 2.63/11.41/11.47 | 4.15/9.24/23.78 | 1.53/14.56/30.26 |
| as % of rated AC current | 0.12%/0.05%/0.08% | 0.02%/0.08%/0.08% | 0.03%/0.06%/0.16% | 0.01%/0.10%/0.21% |
| Limit | 0.25% | 0.25% | 0.25% | 0.25% |

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| **Power Quality-Power factor:** This test shall be carried out in accordance with EN 50538 Annex D.3.4.1 but with nominal voltage -6% and +10%. Voltage to be maintained within ±1.5% of the stated level during the test. | | | | |
|  | 216.2V | 230V | 253V |  |
| 20% of Registered  Capacity | 0.9938 | 0.9907 | 0.9920 |
| 50% of Registered  Capacity | 0.9996 | 0.9998 | 0.9996 |
| 75% of Registered  Capacity | 0.9998 | 0.9997 | 0.9997 |
| 100% of Registered  Capacity | 0.9993 | 0.9996 | 0.9992 |
| Limit(Leading) | >0.95 | >0.95 | >0.95 |
| Limit(Lagging) | >0.98 | >0.98 | >0.98 |  |

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| **Protection-Frequency tests:** These tests should be carried out in accordance with EN 50438 Annex D.2.4 and the notes in EREC G98/NI Annex A1 A.1.2.3 (Inverter connected) or Annex A2 A.2.2.3 (Synchronous) | | | | | | |
| Function | Setting | | Trip test | | “No trip tests” | |
|  | Frequency | Time delay | Frequency | Time delay | Frequency /time | Confirm  no trip |
| U/F | 48Hz | 0.5s | 48Hz | 0.51s | 48.2Hz/ 25s | No trip |
|  | | | | | 47.8Hz/ 0.45s | No trip |
| O/F stage 2 | 52Hz | 0.5s | 52Hz | 0.54s | 51.8Hz/ 120s | Confirmed |
| O/F | 52Hz | 1.0s | 52Hz | 1.02s | 51.8Hz/ 120s | No trip |
|  | | | | | 52.2Hz/ 0.98s | No trip |

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| **Protection-Voltage tests:** These tests should be carried out in accordance with EN 50438 Annex D.2.3 and the notes in EREC G98/NI Annex A1 A.1.2.2(Inverter connected) or Annex A2 A.2.2.2 (Synchronous) | | | | | | |
| Function | Setting | | Trip test | | “No trip tests” | |
|  | Voltage | Time delay | Voltage | Time delay | Voltage /time | Confirm  no trip |
| U/V stage 1 | 195.5V | 3s | 195.2V | 3.02s | 199.5V/5.0s | No trip |
| U/V stage 2 | 138V | 2s | 138.3V | 2.02s | 142V/2.5s | No trip |
|  | | | | | 134V/1.98s | No trip |
| O/V stage 1 | 253V | 0.5s | 253V | 0.507s | 249V/5.0s | No trip |
|  | | | | | 257V/0.45s | No trip |
| Note for Voltage tests the Voltage required to trip is the setting ±3.45 V. 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 ±4 V and for the relevant times as shown in the table above to ensure that the protection will not trip in error. | | | | | | |

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| **Protection-Loss of Mains test:** For Hybrid Inverter shall be tested in accordance with BS EN62116. Other Inverters should be tested in accordance with EN 50438 Annex D.2.5 at 10%,55% and 100% of rated power. | | | | | | |
| Note: Inverter tested according to BS EN 50438. | | | | | | |
| Test Power and  imbalance | 10%  -5% Q  Test 22 | 55%  -5% Q  Test 12 | 100%  -5% P  Test 5 | 10%  +5% Q  Test 31 | 55%  +5% Q  Test 21 | 100%  +5% P  Test 10 |
| Trip time. Limit is 0.5s | 456ms | 458ms | 465ms | 460ms | 482ms | 476ms |

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| **Protection-Frequency change, Stability test:** This test should be carried out in  accordance with EREC G98/NI Annex A1 A.1.2.6(Inverter connected) or Annex A2 A.2.2.6 (Synchronous). | | | | |
|  | Start Frequency | Change | End Frequency | Confirm no trip |
| Positive Vector Shift | 49.5Hz | +50 degrees |  | No trip |
| Negative Vector Shift | 50.5Hz | - 50degrees |  | No trip |
| **Protection-Frequency change, RoCoF Stability test:** The requirement is specified in section 11.3, test procedure in Annex A.1.2.6 (Inverter connected) or Annex A2 A.2.2.6 (Synchronous). | | | | |
|  | Ramp range | Test frequency ramp: | Test Duration | Confirm no trip |
| Positive Frequency drift | 49Hz to 51Hz | +0.95Hz/sec | 2.1s | No trip |
| Negative Frequency drift | 51Hz to 49Hz | -0.95Hz/sec | 2.1s | No trip |

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| **Limited Frequency Sensitive Mode-Overfrequency test:** This test should be carried out in accordance with EN 50438 Annex D.3.3 Power response to over- frequency. The test should be carried out using the specific threshold frequency of 50.2 Hz and droop of 4%. | | | | |
| Test sequence at Registered  Capacity >80% | Measured  Active Power  Output | Frequency | Primary Power Source | Active Power  Gradient |
| Step a) 50.00 Hz ±0.01Hz | 9989.5W | 50Hz |  | - |
| Step b) 50.25 Hz ±0.05Hz | 9744.2W | 50.25Hz | - |
| Step c) 50.70 Hz ±0.10Hz | 7478.1W | 50.7Hz | - |
| Step d) 51.15 Hz ±0.05 Hz | 5239.6W | 51.15Hz | - |
| Step e) 50.70 Hz ±0.10Hz | 7505.8W | 50.7Hz | - |
| Step f) 50.25 Hz ±0.05Hz | 9729.2W | 50.25Hz | - |
| Step g) 50.00 Hz ±0.10Hz | 9978.9W | 50Hz | - |
| Test sequence at Registered Capacity  40% - 60% | Measured  Active Power  Output | Frequency | Primary Power Source | Active Power  Gradient |
| Step a) 50.00 Hz ±0.01Hz | 5011.3W | 50Hz |  | - |
| Step b) 50.25 Hz ±0.05Hz | 4738.4W | 50.25Hz | - |
| Step c) 50.70 Hz ±0.10Hz | 2491.5W | 50.7Hz | - |
| Step d) 51.15 Hz ±0.05 Hz | 240.8W | 51.15Hz | - |
| Step e) 50.70 Hz ±0.10Hz | 2501.5W | 50.7Hz | - |
| Step f) 50.25 Hz ±0.05Hz | 4729.2W | 50.25Hz | - |
| Step g) 50.00 Hz ±0.10Hz | 4986.3W | 50Hz | - |
| Steps as defined in EN 50438 | | | | |

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| **Power output with falling frequency test:** This test should be carried out in accordance with EN 50438 Annex D.3.2 active power feed -in at under-frequency and under steady state conditions. | | | |
| Test sequence | Measured Active Power Output | Frequency | Primary power source |
| Test a) 50 Hz ± 0.01 Hz | 9961.8W | 50 Hz | DC Supply |
| Test b) Point between 49.5  Hz and 49.6 Hz | 9964.2W | 49.55Hz | DC Supply |
| Test c) Point between 47.5  Hz and 47.6 Hz | 9981W | 47.55Hz | DC Supply |
| NOTE: The operating point in Test (b) and (c) shall be maintained for at least 5 minutes | | | |

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| **Re-connection timer** | | | | | |
| Test should prove that the reconnection sequence starts after a minimum delay of 60 s for restoration of voltage and frequency to within the stage 1 settings of Table 2. | | | | | |
| Time delay setting | Measured  delay | Checks on no reconnection when voltage or frequency is brought to just outside stage 1 limits of table 2. | | | |
| 60.0s | 90.0s | At 257V | At 191.5V | At 47.9Hz | At 52.1Hz |
| Confirmation that the SSEG does not re-connect. | | Confirmed | Confirmed | Confirmed | Confirmed |

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| **Fault level contribution.** These tests shall be carried out in accordance with EREC G98/NI Annex A1 A.1.3.5 (Inverter connected) and Annex A2 A.2.3.4 (Synchronous). | | | | | |
| For machines with electro-magnetic output | | | For Inverter output | | |
| Parameter | Symbol | Value | Time after fault | Volts | Amps |
| Peak Short Circuit current | ip | N/A | 20ms | 126.79V | 6.876A |
| Initial Value of aperiodic current | A | N/A | 100ms | 0.282V | 0.015A |
| Initial symmetrical short-circuit current\* | Ik | N/A | 250ms | 0.25V | 0.009A |
| Decaying (aperiodic) component of short circuit current\* | iDC | N/A | 500ms | 0.246V | 0.009A |
| Reactance/Resistance Ratio of source\* | X/R | N/A | Time to trip | 0.0042s | (in seconds) |

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| **Logic interface (input port)** |  |
| Confirm that an input port is provided and can be used to reduce the Active Power output to zero. | Yes |
| Provide high level description of logic interface, e.g. details in 3.3.6 DTS Connection such as AC or DC signal (the additional comments box below can be used).  The power generation module connected to the distribution network of the inverter is equipped with a logical interface (input port) to stop the active power output within 5s after the input port receives the instruction. The signal from the generating module is a DC signal, and by default this logical interface takes the form of a simple binary output, operated by a simple switch or contactor. When the switch is closed, the generating module can work normally. When the switch is on, the generating module will reduce its active power to zero within 5s. The logic interface ultimately works in the way that the end user can send control command from Website or APP to the gateway (DTS) and the gateway will deliver the command to the inverter via WiFi signal. Following is the topology of the communication system. | Yes |

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| --- | --- |
| **Self-Monitoring solid state switching** : No specified test requirements. Refer to EREC G98/NI Annex A1 A.1.3.6 (Inverter connected). | Yes/or NA |
| It has been verified that in the event of the solid state switching device failing to disconnect the AC-coupled Inverter, the voltage on the output side of the switching device is reduced to a value below 50 V within 0.5 s. | N/A |

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| --- | --- |
| **Cyber security** |  |
| Confirm that the Manufacturer or Installer of the AC-coupled Inverter has provided a statement describing how the AC-coupled Inverter has been designed to comply with cyber security requirements, as detailed in 9.7.  This inverter and the associated equipment (such as the gateway and the database of the Cloud) are all designed and developed complied with the cyber security requirements of IEEE1547. | Yes |

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| Additional comments |
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