**Tesla, Inc.**
3500 Deer Creek Road
Palo Alto, California, 94304

## Product: Powerwall 3, Model #: 1707000-xx-y
## Registered Capacity: 3.68kW

# Manufacturers Declaration of Conformity

Tesla, Inc. certify and declare under their sole responsibility that the above-referenced product(s), is in conformity with the following specifications applied:

G98 Issue 1 – Amendment 7
Engineering Recommendation G98 Issue 3 Oct 2022 Amendment 7
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 on or after 27 April 2019

Products must be installed and operated with reference to the instructions in the Product Manual.

The following Notified Body; SGS Tecnos S.A. located at C/ Trespaderne, 29 - Edificio Barajas 1 28042 Madrid, Spain has issued a positive Statement of Opinion based on test report number 230419RECO01B_AM1.

Mehran Zamani

Staff Compliance Engineer

04/11/2024 (mm/dd/yyyy)

Date

# Form C: Type Test Verification Report

All Micro-generators connected to the **DNO Distribution Network** shall be **Fully Type Tested**. This form is the **Manufacturer**'s declaration of compliance with the requirements of EREC G98.

This form should be used when making a Type Test submission to the Energy Networks Association (ENA) Type Test Register.

If the **Micro-generator** is **Fully Type Tested** and already registered with the ENA Type Test Register, the **Installation Document** should include the **Manufacturer**'s Reference Number (the system reference), and this form does not need to be submitted.

| | |
|---|---|
| **Manufacturer's** reference number | Powerwall 3 1707000-xx-y |
| **Micro-generator** technology | Grid-Connected Converter with Battery Storage |
| **Manufacturer** name | Tesla, Inc. |
| Address | 3500 Deer Creek Road<br>Palo Alto, California, 94304 |

| | | | |
|---|---|---|---|
| Tel | 408-876-1303 | Fax | |
| E-mail | mzamani@tesla.com | Web site | www.tesla.com |

| | | |
|---|---|---|
| **Registered Capacity**, use separate sheet if more than one connection option. | Connection Option | |
| | 3.68 | kW single phase, single, split or three phase system |
| | | kW three phase |
| | | kW two phases in three phase system |
| | | kW two phases split phase system |
| Energy storage capacity for **Electricity Storage** devices | 13.5 | kWh |

**Manufacturer Type Test** declaration. - I certify that all products supplied by the company with the above **Fully Type Tested** reference number will be manufactured and tested to ensure that they perform as stated in this 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.

| | | | |
|---|---|---|---|
| Signed |  | On behalf of | Tesla, Inc. |

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.

**Operating Range:** This test should be carried out as specified in A.1.2.10.

<table>
<tr><td colspan="2">Pass or failure of the test should be indicated in the fields below (right hand side), for example with the statement “Pass”, “No disconnection occurs”, etc. Graphical evidence is preferred.<br>.</td></tr>
<tr><td>Test 1<br>Voltage = 85% of nominal (195.5 V)<br>Frequency = 47.0 Hz<br>Power factor = 1<br>Period of test 20 seconds</td><td>Test results or chart to confirm operation<br><table><tr><th>Voltage measured (p.u)</th><th>Frequency measured (Hz)</th><th>Active Power measured (p.u)</th><th>Time measured</th><th>Discon.</th></tr><tr><td>0.850</td><td>47.00</td><td>0.844 (*)</td><td>47 s</td><td>☐ YES<br>☒ NO</td></tr></table></td></tr>
<tr><td>Test 2<br>Voltage = 85% of nominal (195.5 V)<br>Frequency = 47.5 Hz<br>Power factor = 1<br>Period of test 90 minutes</td><td>Test results or chart to confirm operation<br><table><tr><th>Voltage measured (p.u)</th><th>Frequency measured (Hz)</th><th>Active Power measured (p.u)</th><th>Time measured</th><th>Discon.</th></tr><tr><td>0.851</td><td>47.50</td><td>0.847 (*)</td><td>>90 min</td><td>☐ YES<br>☒ NO</td></tr></table></td></tr>
<tr><td>Test 3<br>Voltage = 110% of nominal (253 V).<br>Frequency = 51.5 Hz<br>Power factor = 1<br>Period of test 90 minutes</td><td>Test results or chart to confirm operation<br><table><tr><th>Voltage measured (p.u)</th><th>Frequency measured (Hz)</th><th>Active Power measured (p.u)</th><th>Time measured</th><th>Discon.</th></tr><tr><td>1.101</td><td>51.50</td><td>0.984</td><td>>93 min</td><td>☐ YES<br>☒ NO</td></tr></table></td></tr>
</table>

<table>
<tr>
<td>Test 4<br>Voltage = 110% of nominal (2no53 V).<br>Frequency = 52.0 Hz<br>Power factor = 1<br>Period of test 15 minutes</td>
<td>Test results or chart to confirm operation
<table>
<tr><th>Voltage measured (p.u)</th><th>Frequency measured (Hz)</th><th>Active Power measured (p.u)</th><th>Time measured</th><th>Discon.</th></tr>
<tr><td>1.101</td><td>52.00</td><td>0.985</td><td>>17 min</td><td>☐ YES<br>☒ NO</td></tr>
</table>
</td>
</tr>
<tr>
<td>Test 5<br>Voltage = 100% of nominal (230 V).<br>Frequency = 50.0 Hz<br>Power factor = 1<br>Period of test 90 minutes</td>
<td>Test results or chart to confirm operation
<table>
<tr><th>Voltage measured (p.u)</th><th>Frequency measured (Hz)</th><th>Active Power measured (p.u)</th><th>Time measured</th><th>Discon.</th></tr>
<tr><td>1.002</td><td>50.00</td><td>0.981</td><td>>94 min</td><td>☐ YES<br>☒ NO</td></tr>
</table>
</td>
</tr>
<tr>
<td>Test 6 RoCoF withstand<br>Confirm that the Micro-Generating Plant is capable of staying connected to the Distribution Network and operate at rates of change of frequency up to 1 $Hzs^{-8}$ as measured over a period of 500 ms.</td>
<td>Test results or chart to confirm operation
<table>
<tr><th></th><th>Ramp range desired</th><th>Final Value (Hz)</th><th>Ramp (Hz/s)</th></tr>
<tr><td>Positive frequency drift</td><td>49.00 to 51.00 Hz</td><td>51.00</td><td>+1.02</td></tr>
<tr><td>Negative frequency drift</td><td>51.00 to 49.00 Hz</td><td>49.00</td><td>-1.03</td></tr>
</table>
</td>
</tr>
</table>

(*) The desired value of active power has not been reached due to limitations in the maximum current of the inverter during this under voltage operation.

| **Power Quality – Harmonics**: These tests should be carried out as specified in BS EN 61000-3-2. The chosen test should be undertaken with a fixed source of energy at two power levels a) between 45 and 55% and b) at 100% of **Registered Capacity**. The test requirements are specified in Annex A1 A.1.3.1 (**Inverter** connected) or Annex A2 A.2.3.1 (Synchronous). | | | |
|---|---|---|---|
| **Micro-generator** tested to BS EN 61000-3-2 | | | |
| **Micro-generator** rating per phase (rpp) | 3.68 | kW | |
| For 3-phase **Micro-generator**s, tick this box if harmonic measurements are identical for all three phases. If the harmonics are not identical for each phase, please replicate this section with the results for each phase. | | | |

| Harmonic | At 45-55% of **Registered Capacity**[1] | | 100% of **Registered Capacity** | | | |
|---|---|---|---|---|---|---|
| | Measured Value MV in Amps | | Measured Value MV in Amps | | Limit in BS EN 61000-3-2 in Amps | Higher limit for odd harmonics 21 and above |
| 2 | 0.033 | | 0.041 | | 1.080 | |
| 3 | 0.248 | | 0.244 | | 2.300 | |
| 4 | 0.013 | | 0.012 | | 0.430 | |
| 5 | 0.126 | | 0.239 | | 1.140 | |
| 6 | 0.013 | | 0.014 | | 0.300 | |
| 7 | 0.219 | | 0.181 | | 0.770 | |
| 8 | 0.026 | | 0.014 | | 0.230 | |
| 9 | 0.118 | | 0.130 | | 0.400 | |
| 10 | 0.022 | | 0.014 | | 0.184 | |
| 11 | 0.091 | | 0.095 | | 0.330 | |
| 12 | 0.013 | | 0.012 | | 0.153 | |
| 13 | 0.070 | | 0.074 | | 0.210 | |
| 14 | 0.017 | | 0.012 | | 0.131 | |
| 15 | 0.048 | | 0.062 | | 0.150 | |
| 16 | 0.018 | | 0.012 | | 0.115 | |
| 17 | 0.032 | | 0.042 | | 0.132 | |

1 See the note in A.2.3.1 if 45-55% of **Registered Capacity** is below the minimum stable operating level. If an alternative loading level is chosen, the level should be indicated on the test form and the reason for not testing at 45-55% of **Registered Capacity** should be stated. The additional comments box at the end of the harmonics test sheet can be used for this.

| | | | | | | |
|---|---|---|---|---|---|---|
| 18 | 0.013 | | 0.013 | | 0.102 | |
| 19 | 0.022 | | 0.030 | | 0.118 | |
| 20 | 0.012 | | 0.013 | | 0.092 | |
| 21 | 0.015 | | 0.019 | | 0.107 | 0.160 |
| 22 | 0.012 | | 0.011 | | 0.084 | |
| 23 | 0.016 | | 0.018 | | 0.098 | 0.147 |
| 24 | 0.013 | | 0.012 | | 0.077 | |
| 25 | 0.014 | | 0.015 | | 0.090 | 0.135 |
| 26 | 0.012 | | 0.014 | | 0.071 | |
| 27 | 0.014 | | 0.015 | | 0.083 | 0.124 |
| 28 | 0.012 | | 0.013 | | 0.066 | |
| 29 | 0.015 | | 0.015 | | 0.078 | 0.117 |
| 30 | 0.011 | | 0.012 | | 0.061 | |
| 31 | 0.015 | | 0.014 | | 0.073 | 0.109 |
| 32 | 0.011 | | 0.011 | | 0.058 | |
| 33 | 0.016 | | 0.016 | | 0.068 | 0.102 |
| 34 | 0.012 | | 0.011 | | 0.054 | |
| 35 | 0.016 | | 0.016 | | 0.064 | 0.096 |
| 36 | 0.011 | | 0.011 | | 0.051 | |
| 37 | 0.017 | | 0.017 | | 0.061 | 0.091 |
| 38 | 0.011 | | 0.011 | | 0.048 | |
| 39 | 0.018 | | 0.020 | | 0.058 | 0.087 |
| 40 | 0.011 | | 0.012 | | 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.

Additional comments:

**Power Quality – Voltage fluctuations and Flicker**: These tests should be undertaken in accordance with EREC G98 Annex A1 A.1.3.3 (**Inverter** connected) or Annex A2 A.2.3.3 (Synchronous).

The standard test impedance is 0.4 Ω for a single phase **Micro-generating Plant** (and for a two phase unit in a three phase system) and 0.24 Ω for a three phase **Micro-generating Plant** (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 | 08/12/2023 | Test end date | 14/03/2024 |
| Test location | 3500 Deer Creek Road<br>Palo Alto, California, 94304 | | |

| | Starting[1] | | | Stopping[1] | | | Running | |
|---|---|---|---|---|---|---|---|---|
| | d max | d c | d(t) | d max | d c | d(t) | $P_{st}$ | $P_{lt}$ 2 hours |
| Measured Values at test impedance | 0.46 | 0.35 | 0.00 | 0.46 | 0.35 | 0.00 | 0.07 | 0.07 |
| Normalised to standard impedance | 1.02 | 0.78 | 0.00 | 1.02 | 0.78 | 0.00 | 0.16 | 0.16 |
| Normalised to required maximum impedance | <4% | <3.3% | <3.3% | <4% | <3.3% | <3.3% | <1.0 | <0.65 |
| Limits set under BS EN 61000-3-11 | 4% | 3.3% | 3.3% | 4% | 3.3% | 3.3% | 1.0 | 0.65 |

NOTE: According to the standard the maximum limit for $d_{max}$ applied to equipment's which are automatically commutated more than twice a day is 6%. This inverter could be commutated automatically more than twice a day, so the limit applied is 6%.

| | | | | | | |
|---|---|---|---|---|---|---|
| Test Impedance | R | 0.15 | Ω | X | 0.15 | Ω |
| Standard Impedance | R | 0.24 *<br>0.4 ^ | Ω | X | 0.15 *<br>0.25 ^ | Ω |
| Maximum Impedance | R | -- | Ω | X | -- | Ω |

*Applies to three phase and split single phase **Micro-generators**. Delete as appropriate.

^ Applies to single phase **Micro-generators** and **Micro-generators** using two phases on a three phase system. Delete as appropriate.

([1]) Ramp up/down of 10 seconds.

**Power quality – DC injection:** This test should be carried out in accordance with A 1.3.4 as applicable.

| The % **DC** injection ("as % of rated AC current" below) is calculated as follows:<br>% **DC** injection = Recorded **DC** value in Amps / base current<br>where the base current is the **Registered Capacity** (W) / 230 V. The % **DC** injection should not be greater than 0.25%. | | | | |
|---|---|---|---|---|
| Test power level | 20% | 50% | 75% | 100% |
| Recorded **DC** value in Amps | 0.028 | 0.038 | 0.022 | 0.030 |
| as % of rated AC current | 0.18 | 0.23 | 0.14 | 0.19 |
| Limit | 0.25% | 0.25% | 0.25% | 0.25% |

| **Power Quality – Power factor**: This test shall be carried out in accordance with A.1.3.2 and A.2.3.2 at three voltage levels and at **Registered Capacity** and the measured **Power Factor** must be greater than 0.95 to pass. Voltage to be maintained within ±1.5% of the stated level during the test. | | | |
|---|---|---|---|
| | 216.2 V | 230 V | 253 V |
| Measured value | 0.994 | 0.993 | 0.990 |
| **Power Factor** Limit | >0.95 | >0.95 | >0.95 |

**Protection – Frequency tests:** These tests should be carried out in accordance with Annex A1 A.1.2.3 (**Inverter** connected) or Annex A2 A.2.2.3 (Synchronous). For trip tests, frequency and time delay should be stated. For “no trip tests”, “no trip” can be stated.

| Function | Setting | | Trip test | | “No trip tests” | |
|---|---|---|---|---|---|---|
| | Frequency | Time delay | Frequency (Hz) | Time delay (s) | Frequency /time | Confirm no trip |
| U/F stage 1 | 47.5 Hz | 20 s | 47.45 | 20.133 | 47.7 Hz<br>30 s | Confirmed No Trip |
| U/F stage 2 | 47 Hz | 0.5 s | 46.95 | 0.616 | 47.2 Hz<br>19.5 s | Confirmed No Trip |
| | | | | | 46.8 Hz<br>0.45 s | Confirmed No Trip |
| O/F stage 1 | 52 Hz | 0.5 s | 52.02 | 0.630 | 51.8 Hz<br>120.0 s | Confirmed No Trip |
| | | | | | 52.2 Hz<br>0.45 s | Confirmed No Trip |

Note. For frequency trip tests the frequency required to trip is the setting ± 0.1 Hz. 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 ± 0.2 Hz and for the relevant times as shown in the table above to ensure that the protection will not trip in error.

**Protection – Voltage tests:** These tests should be carried out in accordance with Annex A1 A.1.2.2 (**Inverter** connected) or Annex A2 A.2.2.2 (Synchronous). For trip tests, voltage and time delay should be stated. For “no trip tests”, “no trip” can be stated.

| Function | Setting | | Trip test | | “No trip tests” | |
|---|---|---|---|---|---|---|
| | Voltage | Time delay | Voltage (p.u) | Time delay (s) | Voltage /time | Confirm no trip |
| U/V | 184 V | 2.5 s | 0.791 | 2.545 | 188 V<br>5.0 s | Confirmed No Trip |
| | | | | | 180 V<br>2.45 s | Confirmed No Trip |
| O/V stage 1 | 262.2 V | 1.0 s | 1.133 | 1.122 | 258.2 V<br>5.0 s | Confirmed No Trip |
| O/V stage 2 | 273.7 V | 0.5 s | 1.186 | 0.628 | 269.7 V<br>0.95 s | Confirmed No Trip |
| | | | | | 277.7 V<br>0.45 s | Confirmed 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.

| **Protection – Loss of Mains test:** For PV **Inverter**s shall be tested in accordance with BS EN 62116. Other **Micro-generator**s should be tested in accordance with A.2.2.4 at 10%, 55% and 100% of rated power. | | | | | | |
|---|---|---|---|---|---|---|
| To be carried out at three output power levels with a tolerance of plus or minus 5% in Test Power levels.[2] | | | | | | |
| Test Power | 10% | 55% | 100% | 10% | 55% | 100% |
| Balancing load on islanded network | 95% of **Registered Capacity** | 95% of **Registered Capacity** | 95% of **Registered Capacity** | 105% of **Registered Capacity** | 105% of **Registered Capacity** | 105% of **Registered Capacity** |
| Trip time. Limit is 0.5 s | N/A | N/A | N/A | N/A | N/A | N/A |
| For Multi phase **Micro-generators** confirm that the device shuts down correctly after the removal of a single fuse as well as operation of all phases. | | | | | | |
| Test Power | 10% | 55% | 100% | 10% | 55% | 100% |
| Balancing load on islanded network | 95% of **Registered Capacity** | 95% of **Registered Capacity** | 95% of **Registered Capacity** | 105% of **Registered Capacity** | 105% of **Registered Capacity** | 105% of **Registered Capacity** |
| Trip time. Ph1 fuse removed | -- | -- | -- | -- | -- | -- |
| Test Power | 10% | 55% | 100% | 10% | 55% | 100% |
| Balancing load on islanded network | 95% of **Registered Capacity** | 95% of **Registered Capacity** | 95% of **Registered Capacity** | 105% of **Registered Capacity** | 105% of **Registered Capacity** | 105% of **Registered Capacity** |
| Trip time. Ph2 fuse removed | -- | -- | -- | -- | -- | -- |
| Test Power | 10% | 55% | 100% | 10% | 55% | 100% |
| Balancing load on islanded network | 95% of **Registered Capacity** | 95% of **Registered Capacity** | 95% of **Registered Capacity** | 105% of **Registered Capacity** | 105% of **Registered Capacity** | 105% of **Registered Capacity** |
| Trip time. Ph3 fuse removed | -- | -- | -- | -- | -- | -- |
| Note for technologies which have a substantial shut down time this can be added to the 0.5 s in establishing that the trip occurred in less than 0.5 s. Maximum shut down time could therefore be up to 1.0 s for these technologies. | | | | | | |
| Indicate additional shut down time included in above results. | | | | ms | | |
| Additional comments:<br>NOT APPLICABLE, EQUIPMENT IS A CONVERTER. | | | | | | |

2 See the note in A.2.2.4 if the suggested loading levels are below the minimum stable operating level. If alternative loading levels are chosen, the level should be indicated on the test form and the reason for not testing at 10%/55% of **Registered Capacity** should be stated. The additional comments box at the end of the loss of mains test sheet can be used for this.

| |
|---|
| |

| For **Inverters** tested to BS EN 62116 the following subset of tests should be recorded in the following table. | | | | | | |
|---|---|---|---|---|---|---|
| Test Power and imbalance | 33%<br>-5% Q<br>Test 22 | 66%<br>-5% Q<br>Test 12 | 100%<br>-5% P<br>Test 5 | 33%<br>+5% Q<br>Test 31 | 66%<br>+5% Q<br>Test 21 | 100%<br>+5% P<br>Test 10 |
| Trip time. Limit is 0.5 s[3] | 187 ms | 199 ms | 383 ms | 262 ms | 285 ms | 493 ms |

**Protection – Frequency change, Vector Shift Stability test:** This test should be carried out in accordance with EREC G98 Annex A1 A.1.2.6 (**Inverter** connected) or Annex A2 A.2.2.6 (Synchronous). Confirmation is required that the **Micro-generating Plant** does not trip under positive / negative vector shift.

| | Start Frequency | Change | Confirm no trip |
|---|---|---|---|
| Positive Vector Shift | 49.0 Hz | +50 degrees | Confirmed No Trip |
| Negative Vector Shift | 50.0 Hz | - 50 degrees | Confirmed 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). Confirmation is required that the **Micro-generating Plant** does not trip for the duration of the ramp up and ramp down test.

| Ramp range | Test frequency ramp: | Test Duration | Confirm no trip |
|---|---|---|---|
| 49.0 Hz to 51.0 Hz | +0.95 $Hzs^{-1}$ | 2.1 s | Confirmed No Trip |
| 51.0 Hz to 49.0 Hz | -0.95 $Hzs^{-1}$ | 2.1 s | Confirmed No Trip |

**Limited Frequency Sensitive Mode – Overfrequency test:** This test should be carried out in accordance with A.1.2.8. The test should be carried out using the specific threshold frequency of 50.4 Hz and **Droop** of 10%. The measurement tolerances are contained in A.1.2.8.

| Test sequence at **Registered Capacity** >80% | Measured **Active Power** Output (p.u) | Frequency (Hz) | Primary Power Source | **Active Power** Gradient |
|---|---|---|---|---|
| Step a) 50.00 Hz ±0.01 Hz | 0.988 | 50.00 | 100% | - |
| Step b) 50.45 Hz ±0.05 Hz | 0.977 | 50.45 | | - |
| Step c) 50.70 Hz ±0.10 Hz | 0.928 | 50.70 | | 19.6% Pn/Hz |
| Step d) 51.15 Hz ±0.05 Hz | 0.840 | 51.15 | | 19.6% Pn/Hz |
| Step e) 50.70 Hz ±0.10 Hz | 0.926 | 50.70 | | 19.1% Pn/Hz |

3 If the device requires additional shut down time (beyond 0.5 s but less than 1 s) then this should be stated on this form.

| | | | | |
|---|---|---|---|---|
| Step f) 50.45 Hz ±0.05 Hz | 0.977 | 50.45 | | 20.4% Pn/Hz |
| Step g) 50.00 Hz ±0.01 Hz | 0.989 | 50.00 | | - |
| Test sequence at **Registered Capacity** 40% - 60% | Measured **Active Power** Output (p.u) | Frequency (Hz) | Primary Power Source | **Active Power** Gradient |
| Step a) 50.00 Hz ±0.01 Hz | 0.493 | 50.00 | 50% | - |
| Step b) 50.45 Hz ±0.05 Hz | 0.481 | 50.45 | | - |
| Step c) 50.70 Hz ±0.10 Hz | 0.432 | 50.70 | | 19.6% Pn/Hz |
| Step d) 51.15 Hz ±0.05 Hz | 0.348 | 51.15 | | 18.7% Pn/Hz |
| Step e) 50.70 Hz ±0.10 Hz | 0.430 | 50.70 | | 18.2% Pn/Hz |
| Step f) 50.45 Hz ±0.05 Hz | 0.480 | 50.45 | | 20.0% Pn/Hz |
| Step g) 50.00 Hz ±0.01 Hz | 0.493 | 50.00 | | - |

**Power output with falling frequency test:** This test should be carried out in accordance with A.1.2.7.

| Test sequence | Measured **Active Power** Output (p.u) | Frequency (Hz) | Primary power source (p.u) |
|---|---|---|---|
| Test a) 50 Hz ± 0.01 Hz | 0.978 | 50.00 Hz | 1.000 |
| Test b) Point between 49.5 Hz and 49.6 Hz | 0.979 | 49.55 Hz | 1.000 |
| Test c) Point between 47.5 Hz and 47.6 Hz | 0.979 | 47.55 Hz | 0.960 |
| NOTE: The operating point in Test (b) and (c) shall be maintained for at least 5 minutes | | | |

**Re-connection timer**.

Test should prove that the reconnection sequence starts after a minimum delay of 20 s for restoration of voltage and frequency to within the stage 1 settings of Table 2. Both the time delay setting and the measured delay should be provided in this form; both should be greater than 20 s to pass. Confirmation should be provided that the **Micro-generating Plant** does not reconnect at the voltage and frequency settings below; a statement of "no reconnection" can be made.

| Time delay setting | Measured delay | | Checks on no reconnection when voltage or frequency is brought to just outside stage 1 limits of table 2. | | | |
|---|---|---|---|---|---|---|
| 20 | 20.20 | | At 266.2 V | At 180.0 V | At 47.4 Hz | At 52.1 Hz |
| Confirmation that the **Micro-generator** does not re-connect. | | | Confirmed No reconnection | Confirmed No reconnection | Confirmed No reconnection | Confirmed No reconnection |

**Fault level contribution**: These tests shall be carried out in accordance with EREC G98 Annex A1 A.1.3.5 (**Inverter** connected) and Annex A2 A.2.3.4 (Synchronous). Please complete each entry, even if the fault contribution is zero.

| For machines with electro-magnetic output | | | For **Inverter** output | | |
|---|---|---|---|---|---|
| Parameter | Symbol | Value | Time after fault | Volts | Amps |
| Peak Short Circuit current | $i_p$ | N/A | 20 ms | 181.1 | 30.8 |
| Initial Value of aperiodic current | $A$ | N/A | 100 ms | 5.1 | 10.3 |
| Initial symmetrical short-circuit current* | $I_k$ | N/A | 250 ms | 1.7 | 3.4 |
| Decaying (aperiodic) component of short circuit current* | $i_{DC}$ | N/A | 500 ms | 1.4 | 2.9 |
| Reactance/Resistance Ratio of source* | $X/R$ | N/A | Time to trip | 0.849 | In seconds |

For rotating machines and linear piston machines the test should produce a 0 s – 2 s plot of the short circuit current as seen at the **Micro-generator** terminals.

* Values for these parameters should be provided where the short circuit duration is sufficiently long to enable interpolation of the plot

**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 9.4.3 such as AC or **DC** signal (the additional comments box below can be used) | Yes |
| **Self-Monitoring solid state switching:** No specified test requirements. Refer to EREC G98 Annex A1 A.1.3.6 (**Inverter** connected). | NA |
| It has been verified that in the event of the solid state switching device failing to disconnect the **Micro-generator**, the voltage on the output side of the switching device is reduced to a value below 50 V within 0.5 s. | NA |

**Cyber security**

| | |
|---|---|
| Confirm that the **Manufacturer** or **Installer** of the **Micro-generator** has provided a statement describing how the **Micro-generator** has been designed to comply with cyber security requirements, as detailed in 9.7. | Yes |
| Additional comments | |
| • **Logic Interface (input port)** switch (4.5$V_{dc}$ Signal).<br>• Manufacturer has provided the following statement declaration for cybersecurity compliance.<br><br>The Tesla Energy Cybersecurity Program is modelled after the NISTIR 7628 framework, which itself is modelled after the following publications:<br>NIST 800-53, Revision 3, Recommended Security Controls for Federal Information Systems and Organizations, August 2009<br>NERC CIP 002, 003-009, Version 5<br>Catalog of Control Systems Security: Recommendations for Standards Developers, Department of Homeland Security, March 2010<br>ISA99 / IEC62443 | |