# Certificate of compliance

| | |
|---|---|
| **Applicant:** | **Hoymiles Power Electronics Inc.**<br>No.18 Kangjing Road Hangzhou Zhejiang Province<br>**P.R.China** |
| **Product:** | **HiFlow Microinverter** |
| **Model:** | **HF-800-WB** |

**The device is designed to work as a generation unit of the type: A**

Inverter for single phase parallel connection to the public grid. The network monitoring and disconnection device is an integral part of the above-mentioned model.

**Applied rules and standards:**

**EN 50549-1:2019/A1:2023**
Requirements for parallel connection of installations with distribution networks - Part 1: Connection to an LV distribution network - Production of installations up to and including Type B

4.4 Normal operating range
4.5 Immunity to disturbances
4.6 Active response to frequency deviation
4.7 Power response to voltage variations and voltage changes
4.8 EMC and power quality
4.9 Interface protection
4.10 Connection and starting to generate electrical power
4.11 Ceasing and reduction of active power on set point
4.13 Requirements regarding single fault tolerance of interface protection system and interface switch

**EN 50549-10:2022**
Requirements for generating plants to be connected in parallel with distribution networks - Part 10: Tests for conformity assessment of generating units

**Commission Regulation (EU) 2016/631 of 14 April 2016**
Establishing a network code on requirements for grid connection of generators (NC RFG).
Type approval for generation units to use in Type A plants.

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:** **BMH-ESH-P25071697**
**Certification Program:** **NSOP-0032-DEU-ZE-V10**
**Certificate number:** **U25-0713**
**Date of issue:** **2025-07-30**

**Certification body**

Domenik Koll
Head of Energy Systems Germany

**Accreditation**

DAkkS Deutsche Akkreditierungsstelle D-ZE-12024-01-00

| **Type Approval and declaration of compliance with the requirements of EN 50549-1 and Commission Regulation (EU) 2016/631 of 14 April 2016** | | | | |
|---|---|---|---|---|
| **Manufacturer** | **Hoymiles Power Electronics Inc.**<br>No.18 Kangjing Road Hangzhou Zhejiang Province<br>**P.R.China** | | | |
| | | | | |
| **Product type** | **HiFlow Microinverter** | | | |
| | | | | |
| **Static converter model** | **HF-800-WB** | -- | -- | -- |
| **Input DC (photovoltaic)** | | | | |
| MPP voltage range [V] | 16-96 | -- | -- | -- |
| Max. input voltage [V] | 100 | -- | -- | -- |
| Max. input current per MPPT [A] | 16 | -- | -- | -- |
| **Output AC** | | | | |
| Rated AC voltage [V] | 230, L/N/PE, 50Hz | -- | -- | -- |
| Rated output current [A] | 3,48 | -- | -- | -- |
| Max. output current [A] | 3,48 | -- | -- | -- |
| Nom. converter output ($P_{NINV}$) [W] | 800 | -- | -- | -- |
| Rated apparent power [VA] | 800 | -- | -- | -- |
| | | | | |

| | |
|---|---|
| **Interface protection system and interface switch (Network and system protection "NS-protection")** | |
| **Type of protection** | Integrated NS-protection |
| **Assigned to generation unit type** | HF-800-WB |
| **Integrated interface switch** | Type of switching equipment 1: galvanic separation HF-Transformer<br>Type of switching equipment 2: Relay (Model RT2 DC) |
| | Note: The output is switched off by the inverter bridge and one relay in series in each line and neutral. |
| **Firmware version** | V1.08.00 |

**Note**

The settings of the interface protection are password protected adjustable.

In case the above stated generators are used with an external protection device, the protection settings of the inverters are to be adjusted according to the manufacturer's declaration.

The above stated generators are tested according to the requirements in the EN 50549-1:2019 Commission Regulation (EU) 2016/631 of 14 April 2016. 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.

| **Name of parameter set** | | EN 50549-10 | | | |
|---|---|---|---|---|---|
| **specific technical requirement (e.g. grid codes)** | | EN 50549-1&EN 50549-10 | | | |
| **Clause(s) / subclause(s) of EN 50549-1:2019** | **Parameter[a]** | **Remarks/ additional information[b]** | **Configurable value range** | **default value** | |
| 4.3.2 Interface switch | Single fault tolerance for interface switch | | yes \| no | yes | |
| 4.4.2 Operating frequency range | 47,0 – 47,5 Hz Duration | | 0 – 20 s | 0s | |
| | 47,5 – 48,5 Hz Duration | | 30 – 90 min | 30 min | |
| | 48,5 – 49,0 Hz Duration | | 30 – 90 min | 30 min | |
| | 49,0 – 51,0 Hz Duration | | not configurable | unlimited | |
| | 51,0 – 51,5 Hz Duration | | 30 – 90 min | 30 min | |
| | 51, 5 – 52 Hz Duration | | 0 – 15 min | 0 s | |
| 4.4.3 Minimal requirement for active power delivery at underfrequency | Reduction threshold | | not configurable | 49,5 Hz | |
| | Maximum reduction rate | | not configurable | 10 % PM/Hz | |
| 4.4.4 Continuous operating voltage range | Upper limit | | not configurable | 110 % Un | |
| | Lower limit | | not configurable | 85 % Un | |
| 4.5.2 Rate of change of frequency (ROCOF) immunity | ROCOF withstand capability (defined with a sliding measurement window of 500 ms) non-synchronous generating technology: synchronous generating technology: | | not configurable | 2 Hz/s | |
| 4.5.3.2 Under-voltage ride through (UVRT) Generating plant with non-synchronous generating technology | Maximum power resumption time | | not configurable | 1 s | |
| | Voltage-Time-Diagram | | see Figure 6 of EN 50549-1:2019 | Time[s] | U[p.u.] |
| | | | | 0,00 | 0,20 |
| | | | | 0,15 | 0,20 |
| | | | | 1,50 | 0,85 |
| | | | | 180 | 0,85 |
| | Fast fault current | | Rated value | HF-800-WB: 3,48 A (rated current) | |
| | Active power recovery after a short circuit | | configurable | Start at 90% $U_n$ | |
| | Fault recovery of active power (times calculated from the removal of the short circuit) | | configurable | ≤ 5 s | |
| | Value for recovered active power | | configurable | ≥ 90 % | |
| | Accuracy for recovery of active power | | not configurable | ≤ 10 % | |
| | Reactive power contribution has priority | | yes \| no | Yes | |
| 4.5.4 Over-voltage ride through (OVRT) | Voltage-Time-Diagram | | not configurable see Figure 8 of | Time[s] | U[p.u.] |

| **Name of parameter set** | | EN 50549-10 | | | |
|---|---|---|---|---|---|
| **specific technical requirement (e.g. grid codes)** | | EN 50549-1&EN 50549-10 | | | |
| **Clause(s) / subclause(s) of EN 50549-1:2019** | **Parameter[a]** | **Remarks/ additional information[b]** | **Configurable value range** | **default value** | |
| 4.3.2 Interface switch | Single fault tolerance for interface switch | | yes \| no | yes | |
| | | | EN 50549-1:2019 | 0,0 | 1,25 |
| | | | | 0,1 | 1,25 |
| | | | | 0,1 | 1,20 |
| | | | | 5,0 | 1,20 |
| | | | | 5,0 | 1,15 |
| | | | | 60 | 1,15 |
| | | | | 60 | 1,10 |
| | Active power recovery after a short circuit | | configurable | Start at 90% $U_n$ | |
| | Fault recovery of active power (times calculated from the removal of the short circuit) | | configurable | ≤ 5 s | |
| | Value for recovered active power | | configurable | ≥ 90% | |
| | Accuracy for recovery of active power | | not configurable | ≤ 10% | |
| 4.6.1 Power response to overfrequency | Threshold frequency f1 | | 50,2 Hz – 52 Hz | 50,2 Hz | |
| | Droop | | 2 % – 12 % | 5 % | |
| | Power reference | | $P_M$ \| $P_{max}$ | $P_M$ for other non-synchronous generating technology (inverter) | |
| | Intentional delay | | 0 – 2 s | 0s | |
| | Deactivation threshold fstop | | 50,0 Hz – f1 | deactivated | |
| | Deactivation time tstop | | 0 – 600 s | - | |
| | Acceptance of staged disconnection | | yes \| no | yes | |
| 4.6.2 Power response to underfrequency | Threshold frequency f1 | | 49,8 Hz – 46 Hz | 49,8 Hz | |
| | Droop | | 2 % – 12 % | 5 % | |
| | Intentional delay | | $P_M$ \| $P_{max}$ | $P_{max}$ | |
| | | | 0 – 2 s | 0s | |
| 4.7.2.2 voltage support by reactive power -Capabilities | Active factor / Reactive power (%Pd) range overexcited | | 0,90 – 1 / 48% $P_d$ - 0<br>0,95 – 1 / 33% $P_d$ - 0 | 0,80 – 1 / 66% $P_d$ - 0 | |
| | Active factor / Reactive power (%Pd) range underexcited | | 0,90 – 1 / 48% Pd - 0<br>0,95 – 1 / 33% Pd - 0 | 0,80 – 1 / 66% $P_d$ - 0 | |
| 4.7.2.3 voltage support by reactive power - Control modes | Enabled control mode | | Q setp.<br>Q(U) | activated<br>deactivated | |

| **Name of parameter set** | | EN 50549-10 | | |
|---|---|---|---|---|
| **specific technical requirement (e.g. grid codes)** | | EN 50549-1&EN 50549-10 | | |
| **Clause(s) / subclause(s) of EN 50549-1:2019** | **Parameter[a]** | **Remarks/ additional information[b]** | **Configurable value range** | **default value** |
| 4.3.2 Interface switch | Single fault tolerance for interface switch | | yes \| no | yes |
| | | | Q(P)<br>cos φ setp.<br>cos φ (P) | deactivated<br>deactivated<br>deactivated |
| 4.7.2.3.2 voltage support by reactive power - Set point control modes | Q set point and excitation | | 0 – 48 % PD,<br>0 – 33 %PD | 0 |
| | cos φ set point and excitation | | 1 – 0,9 | 1 |
| 4.7.2.3.3 voltage support by reactive power - Voltage related control modes | Characteristic curve | | cos φ (P)<br>Q(P) | indicate default characteristic |
| | Time constant | | 3 s – 60 s | 10 s |
| | Min cos φ | | 0,0 – 1 | 0,4 |
| | Lock-in power | | 0 % – 20 % | deactivated |
| | Lock-out power | | 0 % – 20 % | deactivated |
| 4.7.2.3.4 voltage support by reactive power - Power related control mode | Characteristic curve | | Q(U)<br>P(U) | Q(U) (single-phase inverter)<br>0,00…-0,6<br>0,92…-0,6<br>0,94…0,0<br>1,06…0,0<br>1,08…0,6<br>1,20…0,6<br>P(U) deactivated |
| 4.7.4.2.2 Zero current mode for converter connected generating technology / Generating Plant with non-synchronous generator | Enabling | | enable \| disable | disable |
| | Static voltage range overvoltage | | 100 % Un – 120 % Un | 120 % Un |
| | Static voltage range undervoltage | | 20 % Un – 100 % Un | 50 % Un |
| 4.9.3 Requirements on voltage and frequency protection | Threshold for protection as dedicated device [ in A or kW, kVA] | | 16 A – 250 kVA | Internal safety device |
| | Undervoltage threshold stage 1 | | 0,2 Un – 1 Un | 0,85 $U_n$ |
| | Undervoltage operate time stage 1 | | 0,1 s – 100 s | 10,0 s |
| | Undervoltage threshold stage 2 | | 0,2 Un – 1 Un | 0,50 $U_n$ |
| | Undervoltage operate time stage 2 | | 0,1 s – 5 s | 0,1 s |
| | Overvoltage threshold stage 1 | | 1,0 Un – 1,2 Un | 1,20 $U_n$ |
| | Overvoltage operate time stage 1 | | 0,1 s – 100 s | 10,0 s |
| | Overvoltage threshold stage 2 | | 1,0 Un – 1,3 Un | 1,25 $U_n$ |
| | Overvoltage operate time stage 2 | | 0,1 s – 5 s | 0,1 s |

| **Name of parameter set** | | EN 50549-10 | | |
|---|---|---|---|---|
| **specific technical requirement (e.g. grid codes)** | | EN 50549-1&EN 50549-10 | | |
| **Clause(s) / subclause(s) of EN 50549-1:2019** | **Parameter[a]** | **Remarks/ additional information[b]** | **Configurable value range** | **default value** |
| 4.3.2 Interface switch | Single fault tolerance for interface switch | | yes \| no | yes |
| | Overvoltage threshold 10 min mean protection | | 1,0 $U_n$ – 1,15 $U_n$ | 1,10 $U_n$ |
| | Overvoltage operate time 10 min mean protection | | 0,04 s – 10,00 s | 10 min (update every 3s) |
| | Underfrequency threshold stage 1 | | 47,0 Hz– 50,0 Hz | 47,5 Hz |
| | Underfrequency operate time stage 1 | | 0,1 s – 100 s | 2,0 s |
| | Underfrequency threshold stage 2 | | 47,0 Hz – 50,0 Hz | 47,0 Hz |
| | Underfrequency operate time stage 2 | | 0,1 s – 5 s | 0,1 s |
| | Overfrequency threshold stage 1 | | 50,0 Hz – 52,0 Hz | 51,5 Hz |
| | Overfrequency operate time stage 1 | | 0,1 s – 100 s | 2,0 s |
| | Overfrequency threshold stage 2 | | 50,0 Hz – 52,0 Hz | 52,0 Hz |
| | Overfrequency operate time stage 2 | | 0,1 s – 5 s | 0,1 s |
| | Loss of mains according EN 62116 (LoM) | | 0 s – 6000 s | ROCOF 2,0 Hz/s (0,5 s) active 2 s (5 s) |
| 4.10.2 Automatic reconnection after tripping | Lower frequency | | 47,0 Hz – 50,0 Hz | 49,5 Hz |
| | Upper frequency | | 50,0 Hz – 52,0 Hz | 50,2 Hz |
| | Lower voltage | | 50 % Un – 100 % Un | 85 % Un |
| | Upper voltage | | 100 % Un – 120 % Un | 110 % Un |
| | Observation time | | 10 s – 600 s | 60 s |
| | Active power increase gradient | | 6 % – 3000 %/min | 10 % /min |
| 4.10.3 Starting to generate electrical power | Lower frequency | | 47,0 Hz – 50,0 Hz | 49,5 Hz |
| | Upper frequency | | 50,0 Hz – 52,0 Hz | 50,1 Hz |
| | Lower voltage | | 50 % Un – 100 % Un | 85 % Un |
| | Upper voltage | | 100 % Un – 120 % Un | 110 % Un |
| | Observation time | | 10 s – 600 s | 60 s |
| | Active power increase gradient | | 6 % – 3000 %/min | disabled |
| 4.11.1 Ceasing active power | activation option | | Wi-Fi | |
| 4.11.2 Reduction of active power on set point | activation option | | Wi-Fi | |
| 4.12 Remote information exchange | available communication standards | | N/A | |

[a] If additional parameters have been evaluated during the test, these shall be added as additional lines in the table.
[b] This column should be used for manufacturer specific parameter descriptions.