EQUIPMENT CERTIFICATE

Certificate No.:	Issued:	Valid until:	GCC class
TC-GCC-DNVGL-SE-0124-07661-0	2021-06-02	Unlimited	TC_I

Issued for:

PV Inverters HPT[3000-10000] (PPM Type A)

With specifications and software version as listed in Annex 2

Issued to:

Suzhou Hypontech Co.,Ltd.

No. 1508 Xiangjiang Rd, SND, Suzhou 215129, China

According to:

DNVGL-SE-0124, 2016-03: Certification of Grid Code Compliance

PTPiREE, 2020-03: Conditions and procedures for using certificates in the process of connecting power generating modules to power networks

32016R0631, 2016-04: Requirements for Generators (NC RfG)

PSE, 2018-12: Requirements of general application resulting from Commission Regulation (EU) 2016/631 of 14 April 2016

detailed in Annex 1

Based on the document:

CR-GCC-DNVGL-SE-0124-07661_A072-0 Network Code Requirements for a PGM of Type A - Poland, Certification Report, dated 2021-06-02

Further assessment information, including scope and conditions, is found in Annex 1. Description of the PV inverters and type tests performed is found in Annex 2 and Annex 3 respectively.

Hamburg, 2021-06-02

For DNV Renewables Certification

Bente Vestergaard
Director and Service Line Leader Type and Component Certification

DAkkS Deutsche Akkreditierungsstelle D-ZE-11053-01-00

By DAkkS according DIN EN IEC/ISO 17065 accredited Certification Body for products. The accreditation is valid for the fields of certification listed in the certificate.

Hamburg, 2021-06-02

For DNV Renewables Certification

Liselotte Ulvgaard
Project Manager

EQUIPMENT CERTIFICATE – ANNEX 1

Conditions, assessment criteria and scope of assessment

Provided that the conditions listed in section 1 are considered at project level, the PV inverters as further specified in Annex 2 comply with the requirements within scope of this certification, as specified in section 3.

1 Conditions

- Changes of the system design, hardware or the software of the certified PV inverters are to be approved by DNV.
- Inverter settings must finally be agreed and checked at project level to ensure full grid code compliance, based on the requirements of relevant System Operator (SO). For the functionalities within scope of this certification, more information about the settings assessed is found in section 4.2 and sections 5.1-5.4 of the certification report CR-GCC-DNVGL-SE-0124-07661_A072-0.
- For cessation of active power, the unit is dependent on external equipment to achieve remote access, which can be achieved by using a Wi-Fi-stick. The set-up for this must be agreed with relevant System Operator (SO) at project level. More information is found in section 5.3 of the certification report CR-GCC-DNVGL-SE-0124-07661_A072-0.

2 Assessment criteria and normative references for this certificate:

/A/ Service Specification DNVGL-SE-0124: Certification of Grid Code Compliance, DNV GL, March 2016

/B/ Conditions and procedures for using certificates in the process of connecting power generating modules to power networks, Warunki i procedury wykorzystania certyfikatów w procesie przyłączenia modułów wytwarzania energii do sieci elektroenergetycznych, version 1.1, PTPiREE, dated 2020-03-20, (in the following: PTPiREE 2020-03)

/C/ Requirements of general application resulting from Commission Regulation (EU) 2016/631 of 14 April 2016 establishing a network code on requirements for grid connection of generators (NC RfG) – as approved by the decision of the President of the Energy Regulatory Office DRE.WOSE.7128.550.2.2018.ZJ dated January 2nd 2019, Wymogi ogólnego stosowania wynikające z Rozporządzenia Komisji (UE) 2016/631 z dnia 14 kwietnia 2016 r. ustanawiającego kodeks sieci dotyczący wymogów w zakresie przyłączenia jednostek wytwórczych do sieci (NC RfG), PSE S.A., dated 2018-12-18 zatwierdzone Decyzją Prezesa Urzędu Regulacji Energetyki DRE.WOSE.7128.550.2.2018.ZJ z dnia 2 stycznia 2019 r, (in the following: PSE 2018-12)

/D/ Commission Regulation (EU) 2016/631 of 14 April 2016 establishing a network code on requirements for grid connection of generators, published in the Official Journal of the European Union L112/1, The European Comission, 27/04/2016. Document 32016R0631, (in the following: NC RfG)

3 Scope of assessment and results

The following functionalities have been assessed based on the rules for the use of equipment certificates for Power Park Modules (PPMs), as specified in chapter 7 and 9 of the PTPiREE 2020-03 /C/. The functions denoted “Not Applicable” in the table of chapter 7 has not been included.

Capability	NC RfG /D/	PSE 2018-12 /C/	Type A	Assessment result
Frequency range	13.1 (a)	13.1 (a)(i)	x	Compliant
Rate of Change of Frequency (RoCoF) withstand capability, df/dt	13.1 (b)	13.1 (b)	x	Compliant
Remote cessation of active power	13.6	13.6	x	Compliant
Limited Frequency Sensitive Mode – Over Frequency (LFSM-O)	13.2	13.2 (a), (b), (f)	x	Compliant

EQUIPMENT CERTIFICATE – ANNEX 2

Schematic description and technical data of the generating units

1 Schematic description of the generating unit

The Hypontech solar inverter family HPT[3000-10000], consisting of: HPT-3000, HPT-4000, HPT-5000, HPT-6000, HPT-8000, HPT-10000 convert electrical energy generated by photovoltaic modules (DC) to three-phase alternating current (AC).

They run at 400 V rated output voltage with a rated active power output of 3 kW to 10 kW. The different output power variants are achieved through derating via software. Due to different power levels, the higher power variants differ by having different current sensors (higher range) and internal fans. There is no further difference in the hardware or firmware used.

The electrical data of the generating unit is summarized in the following section.

2 Technical data of main components

According to the documents provided by the manufacturer, the following components are used.

2.1 General Specifications

Generating Unit	HPT-3000	HPT-4000	HPT-5000
No. of phases	3	3	3
Rated apparent power	3,3 kVA	4,4 kVA	5,5 kVA
Rated active power	3 kW	4 kW	5 kW
Rated AC-voltage (phase to phase)	400 Vac	400 Vac	400 Vac
Rated frequency	50 Hz	50 Hz	50 Hz
Contribution to short circuit current (peak and duration)	39,6A@320us	39,6A@320us	39,6A@320us
Generating Unit	**HPT-6000**	**HPT-8000**	**HPT-10000**
No. of phases	3	3	3
Rated apparent power	6 kVA	8,8 kVA	10 kVA
Rated active power	6 kW	8 kW	10 kW
Rated AC-voltage (phase to phase)	400 Vac	400 Vac	400 Vac
Rated frequency	50 Hz	50 Hz	50 Hz
Contribution to short circuit current (peak and duration)	39,6A@320us	39,6A@320us	39,6A@320us

2.2 DC Input

Min. MPPT voltage	180 V
Max. MPPT voltage	850 V
Max. DC input voltage	1000 V
Max. DC input current	2 x 12,5 A

EQUIPMENT CERTIFICATE – ANNEX 2

2.3 Software Version

Firmware version	V1.0.00
Software version	V1.0.0.51

2.4 Unit transformer

The transformer is not part of the generating unit and consequently has not been part of the assessment.

2.6 Grid Protection

The protection is not part of certification scope

2.7 Control settings

The control interface allows for the selection of different parameter sets via the "*Safety type*" field, which provide default settings based on specific grid codes and national requirements. For this certification report the parameter set called "*PL EN 50549-1*" in the interface, was assessed for the functionalities within scope of this certification.

It should be noted that compliance can be achieved also with other parameter sets and control settings, but that changes to control settings will affect the inverter control behaviour which can thus affect compliance. It should be noted the final settings must be agreed on project level in agreement with relevant system operator.

.

EQUIPMENT CERTIFICATE – ANNEX 3

Type tests

1 Type tests

Tests were performed between 2021-03-17 and 2021-03-18 in the Hypontech lab in Suzhou in P.R. China. All tests were performed under ISO-17025 accreditation and they were performed on the HPT-10000 unit.

The results used for assessment are documented in the measurement report(s) as specified below:

Scope	Reference
Frequency range	3.1.1 and 3.1.2 of /1/
Rate of Change of Frequency (RoCoF) withstand capability, df/dt	3.2 of /1/
Remote cessation of active power	3.3 of /1/
Limited Frequency Sensitive Mode – over frequency (LFSM-O)	3.4 of /1/

Test report(s)	Document number	Content
/1/	*10288607-A-1-A*	Measurement of power control characteristics of a PV inverter of the type HPT-10000 according to FGW TG3 Rev. 25 and Polish Grid Code