Type Certificate

Applicant: **Huawei Technologies Co., Ltd.**

Address: Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129
P.R. China

Type of power generating unit:	**Grid-Tied Solar Inverter**	**SUN2000-168 - 215KTL (Inverter Family)** (for details see *Supplement of Certificate* on p.2)
Technical data:	Max. apparent power:	215 kVA
	Nominal output AC voltage:	800 V (3P + PE)
	Nominal frequency:	50 Hz
Technical data determined by measurements:	Max. active power P_{Emax} / Max. active power peak P_{600}:	(for details see *Supplement of Certificate* on p.2)
Firmware version:	**V300R001** or higher	
Software version:	**V300R001C00SPC107** or higher	

Validated type model:	Model file:	Huawei_19-0650_1_TR4_SUN2000-168-215KTL_V2.zip
	Identification number (MD5):	922c8ff5d481200bc7140ea28cedfef2

Grid connection regulation:
VDE-AR-N 4110:2023-09 – Technical requirements for the connection and operation of customer installations to the medium voltage network (TCR medium voltage) [1]
VDE-AR-N 4120:2018-11 – Technical requirements for the connection and operation of customer installations to the high voltage network (TCR high voltage) [2]
VDE-AR-N 4130:2018-11 – Technical requirements for the connection and operation of customer installations to the extra-high voltage network (TCR extra-high voltage) [3]

Pertinent standards / Guidelines: Technical guidelines:
FGW TR 3 Rev. 25 [4], FGW TR 4 Rev. 09 [5], FGW TR 8 Rev. 09 [6]

The power generating units, stated in the certificate, were tested and certified according to the technical guidelines referenced to the grid connection regulation. The electrical characteristics fulfil the requirements of the grid connection regulation:

- Quasi-steady-state operation
- Dynamic network stability (reactive current characteristic according to TCR medium voltage)
- Active power output and network security management
- Active power adjustment as a function of the grid frequency
- Protection technology and protection settings on generating unit level
- Power quality

The manufacturer has provided proof of certification of the quality management system of his production facility in accordance with ISO 9001

Restrictions, deviations or notes on usage: see *Supplement of Certificate* on p.2.

The certificate includes the following information:

- technical data of the power generating unit, the auxiliary equipment used and the software version used;
- schematic structure of the power generating units;
- summarized information on the properties of the power generating unit.

The certificate is comprised of 110 pages (including Annex of 108 pages).

BV project number	:	**19TH0240**			
Certificate no.	:	**19-0650_2**	**Certification scheme**	:	**NSOP-0032-DEU-ZE-V10**
Issued	:	**2024-11-29**	**Valid until**	:	**2029-11-28**

Certification body

Georg LORITZ
Lab Supervisor Energy Systems

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

Certification body of 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

BUREAU VERITAS
Consumer Products Services Germany GmbH
Oehleckerring 40, 22419 Hamburg, Germany
Tel: +49 40 74041-0
cps-hamburg@de.bureauveritas.com
www.bureauveritas.de/cps

Supplement of Certificate (19-0650_2)

Type of power generating unit:	**Grid-tied photovoltaic inverter**	**SUN2000-168KTL-H1**	**SUN2000-185KTL-H1**	**SUN2000-215KTL-H0 SUN2000-215KTL-H3**
Technical data:	Nominal active output power [1)]	150 kW	175 kW	200 kW
	Max. apparent / active output power:	168 kVA / KW	185 kVA / KW	215 kVA / KW
	Nominal voltage:	800 V (3P + PE)		
	Nominal frequency:	50 Hz		
Technical data determined by measurements:	Max. active power P_{Emax} / Max. active power peak P_{600} [2), 3)]:	167,87 kW	185,61 kW	214,91 kW

Firmware version:	**V300R001** or higher
Software version:	**V300R001C00SPC107** or higher

Note:

1) The nominal active output power P_n is just a nominal value defined by manufacturer, for details see p.51.

2) The P_{Emax} is *the highest 10-min mean of the active power of a power generating unit* defined according to VDE-AR-N 4110:2023 [1]. The P_{600} is *the maximum active power peak of the overall system (averaging period 10 min)* defined according to FGW TR 3 Rev. 25 [4].

3) The stated measurement results were determined according to test 4.1.1, FGW TR 3 Rev. 25 [4].

Restrictions, deviations or notes on usage:

- The PGUs in the series do not provide test terminals for on-site testing. For necessary on-site testing, a separate test terminal must be installed additionally.
- The PGUs in the series do not provide display for checking the protection setting. Settings of the integrated protection relay can only be checked per remote via WebUI or via SUN2000 app using a mobile phone. Authentic identification is ensured via the serial number of the device, which is displayed on the Web-UI or SUN2000 app.
- Only one Interface for specifying active power implemented on the PGU. Separate specifying active power by grid operator and direct seller is not possible. For prioritization of different setpoints must be carried out on the plant level e.g. in the superimposed PGS controller.
- The on the PGU level implemented reactive power set point changes (parameter No. 30 in provided parameter list, see Annex 5) does not provide PT1 filtering effect.

  The on the PGU level implemented Q(U) control function deviates from requirements according to VDE-AR-N 4110:2023-09[1].

  The PGUs in the series provide only one kind of Q(U) control function. The on the PGU level implanted Q(U) control function can be used as *reactive power with voltage limitation function* by suitable setting of the characteristic curve. But this also deviates from requirements according to VDE-AR-N 4110:2023-09 [1].

  These need to be considered for project planning. If needed, these have to be implemented on the plant level e.g. in the superimposed PGS controller.
- The default configuration of the units may not meet the reactive power requirement at the grid connection point. A permanent active power reduction may be needed (see p.51 to 52). This needs to be considered for project planning.
- Active power prioritization is not possible on the PGU level, it has to be implemented on the plant controller level.
- To fulfil the requirements according to VDE 4130:2018-11, primary control energy provision must be implemented on the plant controller level.

The certificate is comprised of 110 pages (including Annex of 108 pages).

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