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 photovoltaic inverter**	**SUN2000-15-50KTL-M3 (Inverter Family)** (for details see *Supplement of Certificate – 1* on p.2)
Technical data:	Max. apparent power:	55 kVA
	Nominal output AC voltage:	400 / 480 V, 3(N)~ + 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 – 1* on p.2)
Firmware version:	**V100R001** or higher for 15-42 KTL-M3; **V200R023** or higher for 50KTL-M3	
Software version:	**V100R001** or higher for 15-42 KTL-M3; **V200R023** or higher for 50KTL-M3	

Validated type model:	Model file:	Huawei_21-0001_0_TR4_SUN2000-15-42KTL-M3_V1.zip
	Identification number (MD5):	d3b4ceb528076b0b7802b399253f190c

Grid connection regulation:
VDE-AR-N 4110:2018-11 – 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]

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

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.3

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 201 pages (including Annex of 198 pages).

BV project number : **20TH0373**
Certificate no. : **U21-0001_3**
Issued : **2023-08-28**
Certification scheme : **NSOP-0032-DEU-ZE-V01**
Valid until : **2026-04-28**

Certification body

Alf ASSENKAMP

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

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Supplement of Certificate – 1 (U21-0001_3)

Type of power generating unit:	**Grid-tied photovoltaic inverter**	**SUN2000-15KTL-M3**	**SUN2000-17KTL-M3**	**SUN2000-20KTL-M3**
Technical data:	Nominal active output power [1]	15,0 kW	17,0 kW	20,0 kW
	Max. apparent / active output power:	16,5 kVA / KW	18,7 kVA / KW	22,0 kVA / KW
	Nominal voltage:	400 V, 3(N)~ + PE		
	Nominal frequency:	50 Hz		
Technical data determined by measurements:	Max. active power P_{Emax} / Max. active power peak P_{600} [2]:	[3]	[3]	[3]

Type of power generating unit:	**Grid-tied photovoltaic inverter**	**SUN2000-23KTL-M3**	**SUN2000-28KTL-M3**	**SUN2000-30KTL-M3**
Technical data:	Nominal active output power [1]	23,0 kW	27,5 kW	30,0 kW
	Max. apparent / active output power:	23,0 kVA / KW	27,5 kVA / KW	33,0 kVA / KW
	Nominal voltage:	400 V, 3(N)~ + PE	480 V, 3~ + PE	400/480 V, 3(N)~ + PE
	Nominal frequency:	50 Hz		
Technical data determined by measurements:	Max. active power P_{Emax} / Max. active power peak P_{600} [2]:	[3]	[3]	[3]

Type of power generating unit:	**Grid-tied photovoltaic inverter**	**SUN2000-36KTL-M3**	**SUN2000-40KTL-M3**	**SUN2000-42KTL-M3**
Technical data:	Nominal active output power [1]	36,0 kW	40,0 kW	42,0 kW
	Max. apparent / active output power:	40,0 kVA / kW	44,0 kVA / kW	47,0 kVA / kW
	Nominal voltage:	400 / 480 V, 3(N)~ + PE		480 V, 3~ + PE
	Nominal frequency:	50 Hz		
Technical data determined by measurements:	Max. active power P_{Emax} / Max. active power peak P_{600} [2]:	[3]	44,26 kW [4]	47,31 kW
Firmware version:		**V100R001** or higher		
Software version:		**V100R001** or higher		

Type of power generating unit:	**Grid-tied photovoltaic inverter**	**SUN2000-50KTL-M3**
Technical data:	Nominal active output power [1]	50 kW
	Max. apparent / active output power:	55 kVA / kW
	Nominal voltage:	400 / 480 V, 3(N)~ + PE
	Nominal frequency:	50 Hz
Technical data determined by measurements:	Max. active power P_{Emax} / Max. active power peak P_{600} [2]:	[3]
Firmware version:		**V200R023** or higher
Software version:		**V200R023** or higher

The certificate is comprised of 201 pages (including Annex of 198 pages).

BV project number : **20TH0373**
Certificate no. : **U21-0001_3**
Issued : **2023-08-28**
Certification scheme : **NSOP-0032-DEU-ZE-V01**
Valid until : **2026-04-28**

Certification body

Alf ASSENKAMP

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

Supplement of Certificate – 2 (U21-0001_3)

Note:

1) The nominal active output power P_n is just a nominal value defined by manufacturer, for details see p.108.

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 4110:2018 [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 [3].

3) Due to spot testing the tests marked were not conducted.

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

The active power results of the *SUN2000-40KTL-M3 (400 V)* (tests were done on the variant with a line-to-line output voltage of 400 V), can be applied to the *SUN2000-40KTL-M3 (480 V), SUN2000-15KTL-M3, SUN2000-17KTL-M3, SUN2000-20KTL-M3, SUN2000-23KTL-M3, SUN2000-28KTL-M3, SUN2000-30KTL-M3*, *SUN2000-36KTL-M3 and SUN2000-50KTL-M3* scaled (by the factor $P_{max,\ notmeasure}$ / $P_{max,\ SUN2000\text{-}40KTL\text{-}M3}$).

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.
- 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 dynamic of Q-setpoints shows a gradient behaviour and does not provide PT1 filtering effect (see Annex 5 – Certification-relevant parameters).
- The on the PGU level implemented Q(U) control function deviates from requirements according to VDE-AR-N 4110:2018-11 [1] and VDE-AR-N 4120:2018-11 [2].
  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 4110:2018-11 [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.105 to 108). This needs to be considered for project planning.
- Measurement results for type SUN2000 50KTL-M3 are available up to Pn. According to manufacturer data operation is possible to 55 kW. On power plant level a limitation to Pn is therefore required.

The certificate is comprised of 201 pages (including Annex of 198 pages).

BV project number	:	**20TH0373**			
Certificate no.	:	**U21-0001_3**	**Certification scheme**	:	**NSOP-0032-DEU-ZE-V01**
Issued	:	**2023-08-28**	**Valid until**	:	**2026-04-28**

Certification body

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

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A partial representation of the certificate requires the written approval of Bureau Veritas Consumer Products Services Germany GmbH

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