



**BUREAU
VERITAS**

Certificate of compliance

with the requirements of the standard CEI 0-21

CERTIFICATION ORGANIZATION: Bureau Veritas Consumer Products Services Germany GmbH
Accreditation to DAkkS, D-ZE-12024-01-00, ref. to DIN EN ISO/IEC 17065

STANDARD / GUIDE: CEI 0-21: 2019-04
CEI 0-21: V1: 2020-12 Edition December 2020
Reference technical rules for the connection of active and passive users to the LV electrical Utilities

TYPE OF SYSTEM DECLARED:

| INTERFACE DEVICE | PROTECTION INTERFACE | STATIC ELECTRONIC INVERTER | ROTATING GENERATION MACHINE |
|------------------|----------------------|----------------------------|-----------------------------|
| X | X | X | |

MANUFACTURER: Ningbo Sunways technologies Co., Ltd.
No. 1, Second Road, Green Industrial Zone, Chongshou Town,
Cixi City, ZheJiang Province
PEOPLE'S REPUBLIC OF CHINA

| PRODUCT TYPE: | Photovoltaic Inverter | | | | |
|---------------------|-----------------------|--------------|------------|--------------|------------|
| MODEL: | STS-1KTL-S | STS-1.5KTL-S | STS-2KTL-S | STS-2.5KTL-S | STS-3KTL-S |
| NOMINAL POWER [kW]: | 1,0 | 1,5 | 2,0 | 2,5 | 3,0 |

FIRMWARE VERSION: beginning with V1.00

PHASE NUMBER: Single-Phase

NOTE:

The device is able to limit the Idc to 0,5% of the nominal current.

The device is for systems up to 11,08kW

The inverters of Ningbo Sunways technologies Co., Ltd. have a maximum apparent power limit. In the case where a system should be able to reach in every working condition a determined power factor, it is necessary to set the maximum active power in such a way, that you can reach at any time the cos φ wanted.

LABORATORY THAT HAS DONE THE TESTING:

Bureau Veritas Consumer Products Services Germany GmbH
Accreditation to DAkkS, D-PL-12024-03-03, ref. to DIN EN ISO/IEC 17025

After verifying the ISO 9001 of the Manufacturer with No. 02819Q11035R0S, issued by Benjing Zhong-An-Zhi-Huan Certification Center Co., Ltd. and verifying the test reports according to CEI 0-21 with No. CEXQ-ESH-P21123032, issued by the laboratory Bureau Veritas Consumer Products Services Germany GmbH and verifying the EMC test report with No. 4861920246800, issued laboratory TÜV SÜD Certification and Testing (China) Co., Ltd. accredited by CNAS (No. L2282) and No. J21-174-WT, issued laboratory SiTiiAS accredited by CNAS (No. L0130), the listed product(s) are conform with the requirements according to CEI 0-21: 2019-04, CEI 0-21: V1: 2020-12.

Certificate number: U22-0006 **Certification Program:** NSOP-0032-DEU-ZE-V01

Data of issue: 2022-03-18

Certification body



Thomas Lammel

Certification body Bureau Veritas Consumer Products Services Germany GmbH accreditation to DIN EN ISO/IEC 17065

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



Table Interface Protection System (SPI)

Extracts from test report No. CEXQ-ESH-P21123032

Photovoltaic Inverter

| | | | | | |
|---|---|--------------|------------|--------------|------------|
| Manufacturer: | Ningbo Sunways technologies Co., Ltd. No. 1, Second Road, Green Industrial Zone, Chongshou Town, Cixi City, ZheJiang Province PEOPLE'S REPUBLIC OF CHINA | | | | |
| Model: | STS-1KTL-S | STS-1.5KTL-S | STS-2KTL-S | STS-2.5KTL-S | STS-3KTL-S |
| Nominal Power [kW]: | 1,0 | 1,5 | 2,0 | 2,5 | 3,0 |
| Firmware version: | Beginning with V1.00 | | | | |
| Number of phases (single-phase/three-phase): | Single-Phase | | | | |

Interface Protection System (SPI)

| Temperature Ambient | | Intervention thresholds | | Time of intervention | | Reset Ratio | | Time of relapse | |
|---------------------|-----|-------------------------|--------------------|----------------------|----------------|-------------|-----------------|-----------------|----------------|
| | | Detected [V] | Requested [V] ± 1% | Detected [ms] | Requested [ms] | Detected | Requested | Detected [ms] | Requested [ms] |
| Voltage Threshold | Min | 195,8 | 195,5 | 1546 | 1500 ± 20 | N/A | 1,03 ≤ r ≤ 1,05 | N/A | 40 ≤ tr ≤ 100 |
| | Max | 265,4 | 264,5 | 212 | 200 ± 20 | N/A | 0,95 ≥ r ≥ 0,97 | N/A | 40 ≤ tr ≤ 100 |

| Temperature -10 °C | | Intervention thresholds | | Time of intervention | | Reset Ratio | | Time of relapse | |
|--------------------|-----|-------------------------|--------------------|----------------------|----------------|-------------|-----------------|-----------------|----------------|
| | | Detected [V] | Requested [V] ± 1% | Detected [ms] | Requested [ms] | Detected | Requested | Detected [ms] | Requested [ms] |
| Voltage Threshold | Min | 195,7 | 195,5 | 1473 | 1500 ± 20 | N/A | 1,03 ≤ r ≤ 1,05 | N/A | 40 ≤ tr ≤ 100 |
| | Max | 265,4 | 264,5 | 191 | 200 ± 20 | N/A | 0,95 ≥ r ≥ 0,97 | N/A | 40 ≤ tr ≤ 100 |

| Temperature +55 °C | | Intervention thresholds | | Time of intervention | | Reset Ratio | | Time of relapse | |
|--------------------|-----|-------------------------|--------------------|----------------------|----------------|-------------|-----------------|-----------------|----------------|
| | | Detected [V] | Requested [V] ± 1% | Detected [ms] | Requested [ms] | Detected | Requested | Detected [ms] | Requested [ms] |
| Voltage Threshold | Min | 195,7 | 195,5 | 1457 | 1500 ± 20 | N/A | 1,03 ≤ r ≤ 1,05 | N/A | 40 ≤ tr ≤ 100 |
| | Max | 265,4 | 264,5 | 191 | 200 ± 20 | N/A | 0,95 ≥ r ≥ 0,97 | N/A | 40 ≤ tr ≤ 100 |

Note:
 ≤ 1 % for the voltage thresholds
 ≤ 3 % ± 20 ms for the times of intervention
 variation of the error during the repetition of the tests
 ≤ 2 % for the tensions
 - ≤ 1 % ± 20 ms for the times of intervention



Table Interface Protection System (SPI)

Extracts from test report No. CEXQ-ESH-P21123032

Frequency 49,8Hz ... 50,2Hz

| Temperature Ambient | | Intervention thresholds | | Time of intervention | | Reset Ratio | | Time of relapse | |
|---------------------|-----|-------------------------|-------------------------|----------------------|----------------|-------------|-------------------|-----------------|---------------|
| | | Detected [Hz] | Requested [Hz] ± 20 mHz | Detected [ms] | Requested [ms] | Detected | Requested | Detected [ms] | Requested ms] |
| Frequency Threshold | Min | 49,81 | 49,80 | 103 | 100 ± 20 ms | N/A | 1,001 ≤ r ≤ 1,003 | N/A | 40 ≤ tr ≤ 100 |
| | Max | 50,20 | 50,20 | 104 | 100 ± 20 ms | N/A | 0,997 ≥ r ≥ 0,999 | N/A | 40 ≤ tr ≤ 100 |

Temperature -10 °C

| Temperature -10 °C | | Intervention thresholds | | Time of intervention | | Reset Ratio | | Time of relapse | |
|---------------------|-----|-------------------------|-------------------------|----------------------|----------------|-------------|-------------------|-----------------|---------------|
| | | Detected [Hz] | Requested [Hz] ± 20 mHz | Detected [ms] | Requested [ms] | Detected | Requested | Detected [ms] | Requested ms] |
| Frequency Threshold | Min | 49,79 | 49,80 | 105 | 100 ± 20 ms | N/A | 1,001 ≤ r ≤ 1,003 | N/A | 40 ≤ tr ≤ 100 |
| | Max | 50,20 | 50,20 | 102 | 100 ± 20 ms | N/A | 0,997 ≥ r ≥ 0,999 | N/A | 40 ≤ tr ≤ 100 |

Temperature +55 °C

| Temperature +55 °C | | Intervention thresholds | | Time of intervention | | Reset Ratio | | Time of relapse | |
|---------------------|-----|-------------------------|-------------------------|----------------------|----------------|-------------|-------------------|-----------------|---------------|
| | | Detected [Hz] | Requested [Hz] ± 20 mHz | Detected [ms] | Requested [ms] | Detected | Requested | Detected [ms] | Requested ms] |
| Frequency Threshold | Min | 49,79 | 49,80 | 83 | 100 ± 20 ms | N/A | 1,001 ≤ r ≤ 1,003 | N/A | 40 ≤ tr ≤ 100 |
| | Max | 50,20 | 50,20 | 104 | 100 ± 20 ms | N/A | 0,997 ≥ r ≥ 0,999 | N/A | 40 ≤ tr ≤ 100 |

Frequency 47,5Hz ... 51,5Hz

| Temperature Ambient | | Intervention thresholds | | Time of intervention | | Reset Ratio | | Time of relapse | |
|---------------------|-----|-------------------------|-------------------------|----------------------|----------------|-------------|-------------------|-----------------|---------------|
| | | Detected [Hz] | Requested [Hz] ± 20 mHz | Detected [ms] | Requested [ms] | Detected | Requested | Detected [ms] | Requested ms] |
| Frequency Threshold | Min | 47,51 | 47,50 | 113 | 100 ± 20 ms | N/A | 1,001 ≤ r ≤ 1,003 | N/A | 40 ≤ tr ≤ 100 |
| | Max | 51,49 | 51,50 | 112 | 100 ± 20 ms | N/A | 0,997 ≥ r ≥ 0,999 | N/A | 40 ≤ tr ≤ 100 |

Temperature -10 °C

| Temperature -10 °C | | Intervention thresholds | | Time of intervention | | Reset Ratio | | Time of relapse | |
|---------------------|-----|-------------------------|-------------------------|----------------------|----------------|-------------|-------------------|-----------------|---------------|
| | | Detected [Hz] | Requested [Hz] ± 20 mHz | Detected [ms] | Requested [ms] | Detected | Requested | Detected [ms] | Requested ms] |
| Frequency Threshold | Min | 47,51 | 47,50 | 106 | 100 ± 20 ms | N/A | 1,001 ≤ r ≤ 1,003 | N/A | 40 ≤ tr ≤ 100 |
| | Max | 51,49 | 51,50 | 115 | 100 ± 20 ms | N/A | 0,997 ≥ r ≥ 0,999 | N/A | 40 ≤ tr ≤ 100 |

Temperature +55 °C

| Temperature +55 °C | | Intervention thresholds | | Time of intervention | | Reset Ratio | | Time of relapse | |
|---------------------|-----|-------------------------|-------------------------|----------------------|----------------|-------------|-------------------|-----------------|---------------|
| | | Detected [Hz] | Requested [Hz] ± 20 mHz | Detected [ms] | Requested [ms] | Detected | Requested | Detected [ms] | Requested ms] |
| Frequency Threshold | Min | 47,51 | 47,50 | 108 | 100 ± 20 ms | N/A | 1,001 ≤ r ≤ 1,003 | N/A | 40 ≤ tr ≤ 100 |
| | Max | 51,49 | 51,50 | 100 | 100 ± 20 ms | N/A | 0,997 ≥ r ≥ 0,999 | N/A | 40 ≤ tr ≤ 100 |

Note:
 ± 20 mHz for the frequency thresholds
 ≤ 3 % ± 20 ms for the times of intervention
 variation of the error during the repetition of the tests
 - ≤ 1 % ± 20 ms for the times of intervention