



Certificate of compliance

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

Product: SOLAR INVERTER

Model: SUN2000-3KTL-M0, SUN2000-4KTL-M0,
SUN2000-5KTL-M0, SUN2000-6KTL-M0,
SUN2000-8KTL-M0, SUN2000-10KTL-M0,
SUN2000-3KTL-M1, SUN2000-4KTL-M1,
SUN2000-5KTL-M1, SUN2000-6KTL-M1,
SUN2000-8KTL-M1, SUN2000-10KTL-M1

Use in accordance with regulations:

Automatic disconnection device with three-phase mains surveillance in accordance with EN 50438:2013 for photovoltaic systems with a three-phase parallel coupling via an inverter in the public mains supply. The automatic disconnection device is an integral part of the aforementioned inverter.

Applied rules and standards:

EN 50438:2013, PN-EN 50438:2014

Requirements for micro-generating plants to be connected in parallel with public low-voltage distribution networks

DIN V VDE V 0126-1-1:2006-02 (Functional safety)

Automatic disconnection device between a generator and the public low-voltage grid

The generator(s) SUN2000-10KTL-M0, SUN2000-10KTL-M1 are rated >16A per phase. However all requirements of the EN 50438:2013 are fulfilled.

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: PVPL180906N022

Certificate number: U18-0631

Date of issue: 2018-11-22

Certification body



Holger Schaffer

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



Appendix E Type Verification Test Report

Extract from test report according to EN 50438

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| Type Approval and declaration of compliance with the requirements of EN 50438. | | | |
|--|--|------------------------------------|--------------------------------------|
| Manufacturer / applicant: | Huawei Technologies Co., Ltd. Administration Building, Headquarters of Huawei Technologies Co., Ltd. Bantian, Longgang District, Shenzhen, 518129 P.R.C | | |
| Micro-generator Type | SOLAR INVERTER | | |
| Rated values | SUN2000-3KTL-M0 SUN2000-3KTL-M1 | SUN2000-4KTL-M0 SUN2000-4KTL-M1 | SUN2000-5KTL-M0 SUN2000-5KTL-M1 |
| Rated capacity | 3 kW | 4 kW | 5 kW |
| Rated voltage | SUN2000-6KTL-M0 SUN2000-6KTL-M1 | SUN2000-8KTL-M0 SUN2000-8KTL-M1 | SUN2000-10KTL-M0 SUN2000-10KTL-M1 |
| Rated capacity | 6 kW | 8 kW | 10 kW |
| Rated voltage | 230V/400V | 230V/400V | 230V/400V |
| Firmware version | V100R001 | | |
| Measurement period: | 2018-09-06 to 2018-10-30 | | |

Description of the structure of the power generation unit (Figure 1):

The power generation unit is equipped with a PV and line-side EMC filter. The power generation unit has no galvanic isolation between DC input and AC output. Output switch-off is performed with single-fault tolerance based on two series-connected relays in line and neutral. This enables a safe disconnection of the power generation unit from the network in case of error.

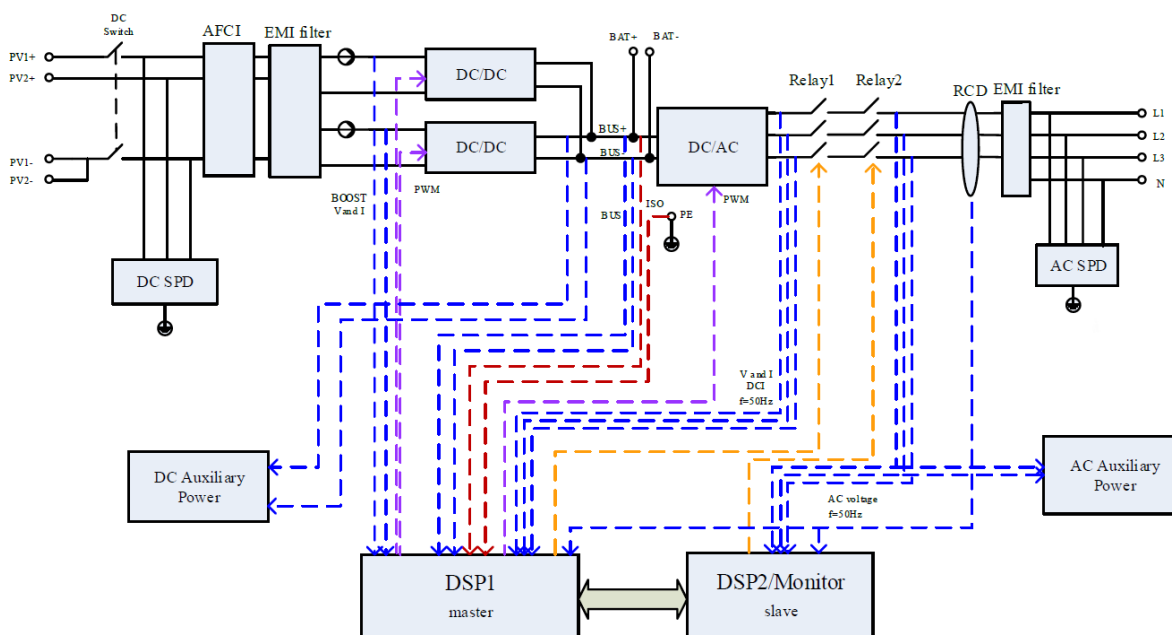


Figure 1 – Schematic structure of the power generation unit

The above stated micro-generators are tested according to the requirements in the EN 50438. 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 of the EN 50438.

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Type testing of the interface protection

| Over-/under-voltage tests | | | | | | |
|---------------------------|------------------|------------------------|----------------|------------------------|--------------------------|------------------------|
| Phase1 | | | | | | |
| Parameter | Protection limit | | Actual setting | | Trip value (test result) | |
| | Voltage [V] | Disconnection time [s] | Voltage [V] | Disconnection time [s] | Voltage [V] | Disconnection time [s] |
| Over-voltage stage 1 | 253,0 | 3* / 600* | 253,0 | 3* / 600* | 253,7 | 2,985 / 526* |
| Over-voltage stage 2 | 264,5 | 0,2 | 264,5 | 0,2 | 265,2 | 0,184 |
| Under-voltage stage 1 | 195,5 | 1,5 | 195,5 | 1,5 | 194,8 | 1,495 |
| Phase2 | | | | | | |
| Parameter | Protection limit | | Actual setting | | Trip value (test result) | |
| | Voltage [V] | Disconnection time [s] | Voltage [V] | Disconnection time [s] | Voltage [V] | Disconnection time [s] |
| Over-voltage stage 1 | 253,0 | 3* / 600* | 253,0 | 3* / 600* | 253,5 | 2,980 / 536* |
| Over-voltage stage 2 | 264,5 | 0,2 | 264,5 | 0,2 | 265,1 | 0,182 |
| Under-voltage stage 1 | 195,5 | 1,5 | 195,5 | 1,5 | 194,2 | 1,482 |
| Phase3 | | | | | | |
| Parameter | Protection limit | | Actual setting | | Trip value (test result) | |
| | Voltage [V] | Disconnection time [s] | Voltage [V] | Disconnection time [s] | Voltage [V] | Disconnection time [s] |
| Over-voltage stage 1 | 253,0 | 3* / 600* | 253,0 | 3* / 600* | 253,8 | 2,995 / 533* |
| Over-voltage stage 2 | 264,5 | 0,2 | 264,5 | 0,2 | 265,3 | 0,187 |
| Under-voltage stage 1 | 195,5 | 1,5 | 195,5 | 1,5 | 194,7 | 1,491 |

Note.

Minimum operation time according to default interface protection:

Over-voltage stage 1 -
 Over-voltage stage 2 0,1s
 Under-voltage 1,2s

* The over-voltage-stage 1 is a 10-min-mean-value according to EN 50160. The disconnection after detection of an overvoltage at the 10-min-mean-value takes place within 200ms.

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| Over-/under-frequency tests | | | | | | |
|-----------------------------|------------------|------------------------|----------------|------------------------|--------------------------|------------------------|
| Parameter | Protection limit | | Actual setting | | Trip value (test result) | |
| | Frequency [Hz] | Disconnection time [s] | Frequency [Hz] | Disconnection time [s] | Frequency [Hz] | Disconnection time [s] |
| Over-frequency | 52,00 | 0,5 | 52,00 | 0,5 | 51,98 | 0,477 |
| Under-frequency | 47,50 | 0,5 | 47,50 | 0,5 | 47,51 | 0,487 |

Note.
Minimum operation time according to default interface protection:
Over-frequency 0,5 s
Under-frequency 0,5 s

| LoM test | | | | | | |
|--------------------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|--------------------------|
| Method used | EN 62116 | | | | | |
| Balancing load on islanded network | 33% of -5% Q Test 22 | 66% of -5% Q Test 12 | 100% of -5% P Test 5 | 33% of +5% Q Test 31 | 66% of +5% Q Test 21 | 100% of +5% P Test 10 |
| Trip time. Phase 1 fuse removed [ms] | 169 | 173 | 291 | 255 | 248 | 270 |
| Trip time. Phase 2 fuse removed [ms] | 169 | 173 | 291 | 255 | 248 | 270 |
| Trip time. Phase 3 fuse removed [ms] | 169 | 173 | 291 | 255 | 248 | 270 |

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Type testing of a micro-generator

Operating range

Test 1: U = 195,5 V; f = 47,5 Hz; P = 1,00 Sn; cosφ = 1

Test 2: U = 253,0 V; f = 51,5 Hz; P = 1,00 Sn; cosφ = 1

| Test sequence | Voltage [V] | Frequency [Hz] | Output power [W] | Cos φ [1] |
|---------------|-------------|----------------|------------------|-----------|
| 1 | 196,00 | 47,50 | 9984 | 0,9990 |
| 2 | 253,14 | 51,50 | 10000 | 0,9997 |

Active power at under-frequency

| 5-min mean value (each) | a) 50 ± 0,01 [Hz] | b) - 0,4 to - 0,5 [Hz] | c) - 2,4 to - 2,5 [Hz] |
|-------------------------|-------------------|------------------------|------------------------|
| Frequency [Hz]: | 50,00 | 49,55 | 47,55 |
| Active power [W]: | 9995 | 9995 | 9996 |
| ΔP/PM [%] per 1 Hz: | | | 0 |

Power response to over-frequency

| 1-min mean value [Hz]: | a) 50,00 | b) 50,25 | c) 50,70 | d) 51,15 | e) 50,70 | f) 50,25 | g) 50,00 |
|---|--------------------------|----------|----------|----------|----------|----------|----------|
| 1. Measurement a) to g): Active power output > 80% P_n | | | | | | | |
| Frequency [Hz]: | 50,00 | 50,25 | 50,70 | 51,15 | 50,70 | 50,25 | 50,00 |
| PM [kW]: | N/A | 9,789 | 7,990 | 6,191 | 7,990 | 9,788 | N/A |
| PE60 [kW]: | 9,994 | 9,794 | 7,997 | 6,197 | 7,996 | 9,794 | 9,994 |
| ΔPE60/PM [%]: | N/A | 0,05 | 0,07 | 0,06 | 0,06 | 0,06 | N/A |
| 2. Measurement a) to g): Active power output 40% and 60% after freezing > 80% P_n | | | | | | | |
| Frequency [Hz]: | 50,00 | 50,25 | 50,70 | 51,15 | 50,70 | 50,25 | 50,00 |
| PM [kW]: | N/A | 4,954 | 4,044 | 3,133 | 4,043 | 4,954 | N/A |
| PE60 [kW]: | 5,057 | 4,958 | 4,049 | 3,143 | 4,049 | 4,958 | 9,990 |
| ΔPE60/PM [%]: | N/A | 0,04 | 0,05 | 0,10 | 0,06 | 0,04 | N/A |
| Limit ΔP/P _{1min} : | + 10 % of P _M | | | | | | |

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Appendix E Type Verification Test Report

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| SUN2000-10KTL-M0 | | | |
|------------------|--------|--------|--------|
| Test Voltage | 211,6V | 230V | 248,4V |
| Output power | | | |
| 25% PN | 0,999i | 0,999i | 0,999i |
| 50% PN | 0,999i | 0,999i | 0,999i |
| 75% PN | 0,999i | 0,999i | 0,999i |
| 100% PN | 0,999i | 0,999i | 0,999i |
| Limit | >0,95 | >0,95 | >0,95 |

| SUN2000-3KTL-M0 | | | |
|-----------------|--------|--------|--------|
| Test Voltage | 211,6V | 230V | 248,4V |
| Output power | | | |
| 25% PN | 0,999i | 0,999i | 0,999i |
| 50% PN | 0,999i | 0,999i | 0,999i |
| 75% PN | 0,999i | 0,999i | 0,999i |
| 100% PN | 0,999i | 0,999i | 0,999i |
| Limit | >0,95 | >0,95 | >0,95 |

| Controllable reactive power SUN2000-10KTL-M0 | | | | |
|--|------------------|----------------------|----------------------|--------------|
| Inductive (supply reactive power) | | | | |
| Power-BIN | Active power [W] | Reactive power [Var] | Power factor (cos φ) | DC power [W] |
| 0% - 10% | 913 | 4390 | 0,2035 | 972 |
| 10% - 20% | 1814 | 4390 | 0,3819 | 1890 |
| 20% - 30% | 2703 | 4388 | 0,5247 | 2775 |
| 30% - 40% | 3603 | 4381 | 0,6350 | 3690 |
| 40% - 50% | 4515 | 4380 | 0,7175 | 4617 |
| 50% - 60% | 5426 | 4380 | 0,7780 | 5536 |
| 60% - 70% | 6309 | 4380 | 0,8214 | 6441 |
| 70% - 80% | 6309 | 4380 | 0,8214 | 7350 |
| 80% - 90% | 8104 | 4372 | 0,8800 | 8263 |
| 90% - 100% | 8993 | 4371 | 0,8993 | 9195 |
| Capacitive (supply reactive power) | | | | |
| Power-BIN | Active power [W] | Reactive power [Var] | Power factor (cos φ) | DC power [W] |
| 0% - 10% | 900 | -4350 | 0,2025 | 1025 |
| 10% - 20% | 1806 | -4350 | 0,3831 | 1946 |
| 20% - 30% | 2716 | -4351 | 0,5292 | 2827 |
| 30% - 40% | 3630 | -4360 | 0,6397 | 3823 |
| 40% - 50% | 4530 | -4360 | 0,7203 | 4743 |
| 50% - 60% | 5410 | -4368 | 0,7783 | 5606 |
| 60% - 70% | 6300 | -4370 | 0,8219 | 6457 |
| 70% - 80% | 7200 | -4370 | 0,8549 | 7485 |
| 80% - 90% | 8110 | -4375 | 0,8802 | 8380 |
| 90% - 100% | 8980 | -4381 | 0,8988 | 9293 |

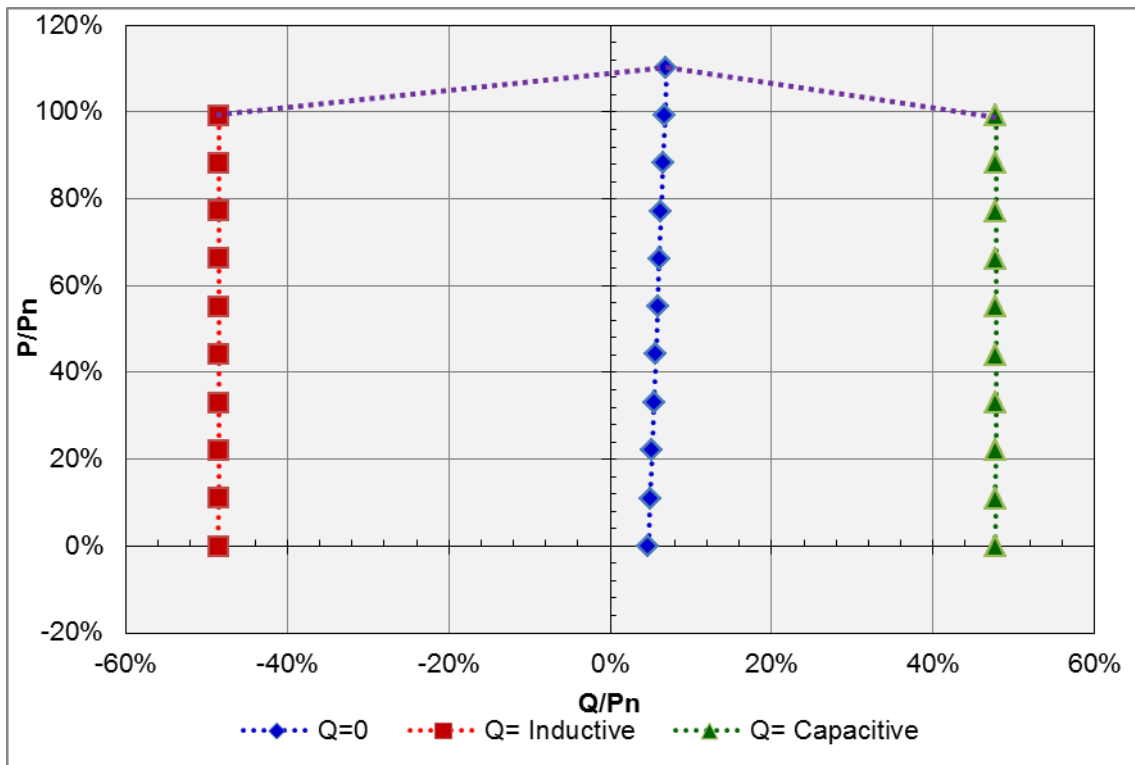
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| Reactive power supply with set point Q=0 | | | | |
|--|------------------|----------------------|----------------------|--------------|
| Power-BIN | Active power [W] | Reactive power [Var] | Power factor (cos φ) | DC power [W] |
| 0% - 10% | 989 | 133 | 0,9910 | 1013 |
| 10% - 20% | 1981 | 116 | 0,9983 | 2052 |
| 20% - 30% | 2975 | 112 | 0,9993 | 3075 |
| 30% - 40% | 4150 | 110 | 0,9996 | 4271 |
| 40% - 50% | 4948 | 107 | 0,9998 | 5116 |
| 50% - 60% | 5994 | 104 | 0,9998 | 6155 |
| 60% - 70% | 6931 | 102 | 0,9999 | 7182 |
| 70% - 80% | 8083 | 151 | 0,9998 | 8257 |
| 80% - 90% | 9038 | 155 | 0,9998 | 9238 |
| 90% - 100% | 9995 | 173 | 0,9998 | 10238 |

Diagram of inductive reactive power absorption



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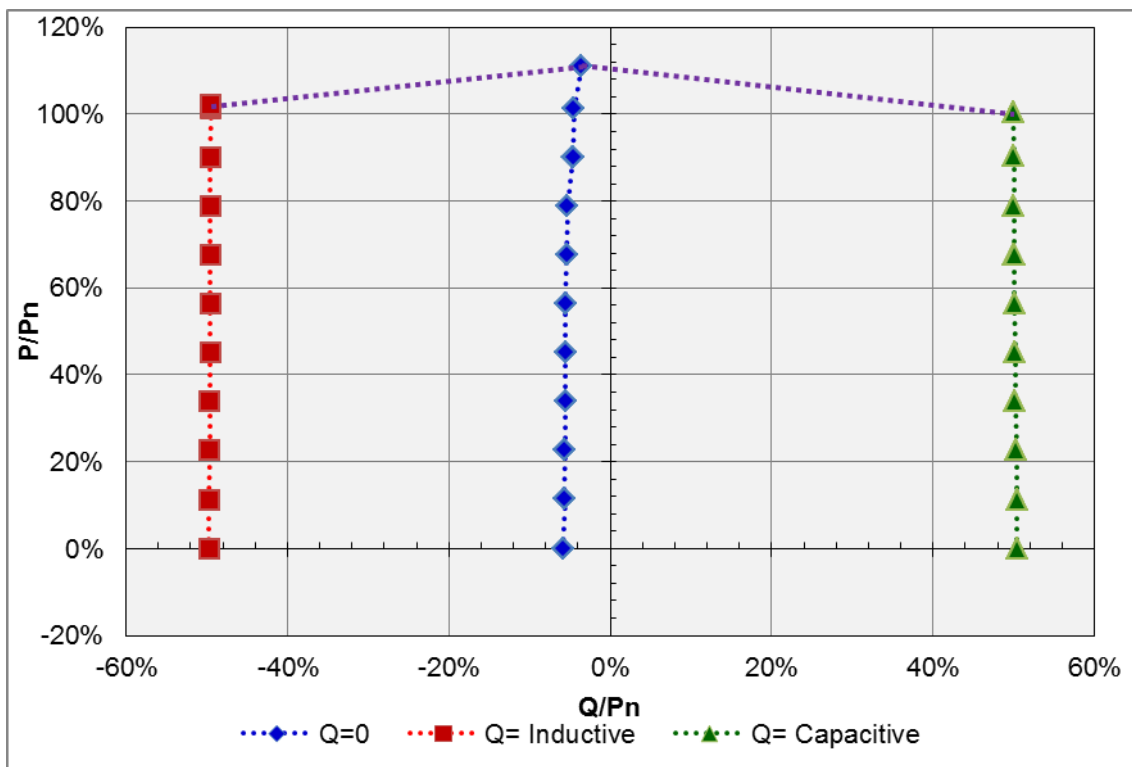
| Controllable reactive power SUN2000-3KTL-M0 | | | | |
|---|------------------|----------------------|----------------------|--------------|
| Inductive (supply reactive power) | | | | |
| Power-BIN | Active power [W] | Reactive power [Var] | Power factor (cos φ) | DC power [W] |
| 0% - 10% | -2 | 1512 | -0,0010 | 40 |
| 10% - 20% | 338 | 1511 | 0,2180 | 382 |
| 20% - 30% | 678 | 1509 | 0,4100 | 724 |
| 30% - 40% | 1018 | 1506 | 0,5600 | 1067 |
| 40% - 50% | 1356 | 1504 | 0,6700 | 1408 |
| 50% - 60% | 1694 | 1503 | 0,7480 | 1749 |
| 60% - 70% | 2032 | 1501 | 0,8040 | 2091 |
| 70% - 80% | 2370 | 1501 | 0,8450 | 2432 |
| 80% - 90% | 2708 | 1500 | 0,8750 | 2773 |
| 90% - 100% | 3012 | 1498 | 0,8950 | 3079 |
| Capacitive (supply reactive power) | | | | |
| Power-BIN | Active power [W] | Reactive power [Var] | Power factor (cos φ) | DC power [W] |
| 0% - 10% | -2 | -1492 | -0,0010 | 54 |
| 10% - 20% | 338 | -1491 | 0,2210 | 394 |
| 20% - 30% | 677 | -1490 | 0,4140 | 735 |
| 30% - 40% | 1016 | -1489 | 0,5640 | 1075 |
| 40% - 50% | 1354 | -1488 | 0,6730 | 1416 |
| 50% - 60% | 1692 | -1488 | 0,7510 | 1756 |
| 60% - 70% | 2031 | -1487 | 0,8070 | 2097 |
| 70% - 80% | 2369 | -1487 | 0,8470 | 2439 |
| 80% - 90% | 2707 | -1486 | 0,8770 | 2779 |
| 90% - 100% | 3043 | -1484 | 0,8990 | 3117 |
| Reactive power supply with set point Q=0 | | | | |
| Power-BIN | Active power [W] | Reactive power [Var] | Power factor (cos φ) | DC power [W] |
| 0% - 10% | -2 | -175 | -0,0100 | 37 |
| 10% - 20% | 341 | -169 | 0,8960 | 381 |
| 20% - 30% | 684 | -168 | 0,9710 | 725 |
| 30% - 40% | 1021 | -166 | 0,9870 | 1067 |
| 40% - 50% | 1359 | -165 | 0,9930 | 1408 |
| 50% - 60% | 1695 | -165 | 0,9950 | 1749 |
| 60% - 70% | 2032 | -162 | 0,9970 | 2089 |
| 70% - 80% | 2370 | -158 | 0,9980 | 2430 |
| 80% - 90% | 2705 | -139 | 0,9990 | 2763 |
| 90% - 100% | 3041 | -135 | 0,9990 | 3102 |
| 110% | 3334 | -106 | 0,9990 | 3386 |

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Diagram of inductive reactive power absorption



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| Q adjustment | | | | |
|------------------------|----------------------------------|---------------------------------|----------------|--|
| Test 50%P _n | Reactive power set point Q [Var] | Measured reactive power Q [Var] | Measured cos φ | Deviation compared to setpoint ΔQ / PN [%] |
| - Qmin | -4359 | -4437 | 0,7516 | -0,78 |
| 0 | 0 | 130 | 0,9997 | 1,30 |
| + Qmax | 4359 | 4391 | 0,7560 | 0,32 |

| Connection and starting to generate electrical power | | |
|--|--|---|
| Test according EN 50438 with standard setting | Min. voltage for connection to grid: | 195,5 V |
| | Max. voltage for connection to grid: | 253,0 V |
| | Min. frequency for connection to grid: | 47,50 Hz |
| | Max. frequency for connection to grid: | 50,05 Hz |
| | Observation time (≥60s) | 60 s |
| Connection and starting to generate electrical power | | |
| | Voltage conditions | |
| a) Start up for voltage range | <85% Un for twice of observation time | >110% Un for twice of observation time |
| Connection: | No connection | No connection |
| Limit: | No connection allowed | |
| b) In voltage range at start-up | ≥85% Un within twice setting observation time | ≤110% Un within twice setting observation time |
| Reconnection time [s] | 66,0 | 65,8 |
| Limit: | Connected after setting observation time (≥60s) | |
| Gradient: | For adjustable micro generators the maximum occurring active power gradient after connection respectively start generating electrical power is less than the configured maximum active power per minute Max gradient: 10%Pn/min. | |
| c) In voltage range after voltage failure | ≥85% Un for twice of setting observation time | ≤110% Un for twice of setting observation time |
| Reconnection time [s] | 65,8 | 65,8 |
| Limit: | Reconnection after setting observation time (≥60s) | |
| Gradient: | For adjustable micro generators the maximum occurring active power gradient after connection respectively start generating electrical power is less than the configured maximum active power per minute Max gradient: 10%Pn/min. | |
| | Frequency conditions | |
| d) Start up for frequency range | <47,5 Hz for twice of setting observation time | >50,1 Hz for twice of setting observation time |
| Connection: | No connection | No connection |
| Limit: | No connection allowed | |
| e) In frequency range at start-up | ≥47,5 Hz within twice of setting observation time | ≤50,1 Hz within twice of setting observation time |
| Reconnection time [s] | 66,4 | 65,6 |
| Limit: | Connected after setting delay time(≥60s) | |
| Gradient: | For adjustable micro generators the maximum occurring active power gradient after connection respectively start generating electrical power is less than the configured maximum active power per minute Max gradient: 10%Pn/min. | |

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| | | |
|--|--|--|
| f) In frequency range after frequency failure | ≥47,5 Hz for twice of setting observation time | ≤50,05 Hz for twice of setting observation time |
| Reconnection time [s] | 66,2 | 65,8 |
| Limit: | Reconnection after setting observation time (≥60s) | |
| Gradient: | For adjustable micro generators the maximum occurring active power gradient after connection respectively start generating electrical power is less than the configured maximum active power per minute Max gradient: 10%Pn/min. | |

| Short-circuit current contribution | | | | | |
|--|----------|-------|-----------------------------------|-------|------------|
| Short-circuit current parameters | | | | | |
| For a directly coupled micro-generator | | | For a Inverter micro-generator L1 | | |
| Parameter | Symbol | Value | Time after fault | Volts | Amps |
| Peak Short Circuit current | I_p | N/A | 20ms | 54 | 12,9 |
| Initial Value of aperiodic current | A | N/A | 100ms | 39 | 7,7 |
| Initial symmetrical short-circuit current* | I_k | N/A | 250ms | N/A | N/A |
| Decaying (aperiodic) component of short circuit current* | i_{dc} | N/A | 500ms | N/A | N/A |
| Reactance/Resistance Ratio of source* | X/R | N/A | Time to trip | 0,074 | In seconds |
| For a directly coupled micro-generator | | | For a Inverter micro-generator L2 | | |
| Parameter | Symbol | Value | Time after fault | Volts | Amps |
| Peak Short Circuit current | I_p | N/A | 20ms | 49 | 13,1 |
| Initial Value of aperiodic current | A | N/A | 100ms | 38 | 8,2 |
| Initial symmetrical short-circuit current* | I_k | N/A | 250ms | N/A | N/A |
| Decaying (aperiodic) component of short circuit current* | i_{dc} | N/A | 500ms | N/A | N/A |
| Reactance/Resistance Ratio of source* | X/R | N/A | Time to trip | 0,074 | In seconds |
| For a directly coupled micro-generator | | | For a Inverter micro-generator L3 | | |
| Parameter | Symbol | Value | Time after fault | Volts | Amps |
| Peak Short Circuit current | I_p | N/A | 20ms | 37 | 13,3 |
| Initial Value of aperiodic current | A | N/A | 100ms | 35 | 7,7 |
| Initial symmetrical short-circuit current* | I_k | N/A | 250ms | N/A | N/A |
| Decaying (aperiodic) component of short circuit current* | i_{dc} | N/A | 500ms | N/A | N/A |
| Reactance/Resistance Ratio of source* | X/R | N/A | Time to trip | 0,074 | In seconds |

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| Power Quality. Harmonic current emission | | | | |
|--|--|------------------|---------|--|
| micro-generator | | SUN2000-3KTL-M0 | | |
| Harmonic order n | Current Magnitude [A] at 100% rated output power | % of Fundamental | Phase | Harmonic current limit EN 61000-3-2, Class A [A] |
| 1st | 4,357 | 99,980 | Phase 1 | - |
| 2nd | 0,008 | 0,189 | Phase 1 | 1,080 |
| 3rd | 0,012 | 0,278 | Phase 1 | 2,300 |
| 4th | 0,006 | 0,140 | Phase 1 | 0,430 |
| 5th | 0,009 | 0,207 | Phase 1 | 1,140 |
| 6th | 0,005 | 0,117 | Phase 1 | 0,300 |
| 7th | 0,007 | 0,157 | Phase 1 | 0,770 |
| 8th | 0,004 | 0,102 | Phase 1 | 0,230 |
| 9th | 0,009 | 0,196 | Phase 1 | 0,400 |
| 10th | 0,005 | 0,117 | Phase 1 | 0,184 |
| 11th | 0,007 | 0,152 | Phase 1 | 0,330 |
| 12th | 0,005 | 0,113 | Phase 1 | 0,153 |
| 13th | 0,006 | 0,141 | Phase 1 | 0,210 |
| 14th | 0,005 | 0,115 | Phase 1 | 0,131 |
| 15th | 0,007 | 0,153 | Phase 1 | 0,150 |
| 16th | 0,004 | 0,098 | Phase 1 | 0,115 |
| 17th | 0,007 | 0,160 | Phase 1 | 0,132 |
| 18th | 0,005 | 0,122 | Phase 1 | 0,102 |
| 19th | 0,006 | 0,139 | Phase 1 | 0,118 |
| 20th | 0,005 | 0,111 | Phase 1 | 0,092 |
| 21th | 0,006 | 0,131 | Phase 1 | 0,107 |
| 22th | 0,005 | 0,113 | Phase 1 | 0,084 |
| 23th | 0,007 | 0,170 | Phase 1 | 0,098 |
| 24th | 0,006 | 0,144 | Phase 1 | 0,077 |
| 25th | 0,007 | 0,167 | Phase 1 | 0,090 |
| 26th | 0,006 | 0,136 | Phase 1 | 0,071 |
| 27th | 0,006 | 0,135 | Phase 1 | 0,083 |
| 28th | 0,006 | 0,131 | Phase 1 | 0,066 |
| 29th | 0,006 | 0,141 | Phase 1 | 0,078 |
| 30th | 0,006 | 0,132 | Phase 1 | 0,061 |
| 31th | 0,005 | 0,126 | Phase 1 | 0,073 |
| 32th | 0,007 | 0,152 | Phase 1 | 0,058 |
| 33th | 0,007 | 0,150 | Phase 1 | 0,068 |
| 34th | 0,004 | 0,092 | Phase 1 | 0,054 |
| 35th | 0,005 | 0,111 | Phase 1 | 0,064 |
| 36th | 0,005 | 0,106 | Phase 1 | 0,051 |
| 37th | 0,005 | 0,104 | Phase 1 | 0,061 |
| 38th | 0,004 | 0,095 | Phase 1 | 0,048 |
| 39th | 0,004 | 0,097 | Phase 1 | 0,058 |
| 40th | 0,004 | 0,086 | Phase 1 | 0,046 |

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| Power Quality. Harmonic current emission | | | | |
|--|--|------------------|---------|--|
| micro-generator | | SUN2000-3KTL-M0 | | |
| Harmonic order n | Current Magnitude [A] at 100% rated output power | % of Fundamental | Phase | Harmonic current limit EN 61000-3-2, Class A [A] |
| 1st | 4,385 | 99,977 | Phase 2 | - |
| 2nd | 0,009 | 0,204 | Phase 2 | 1,080 |
| 3rd | 0,025 | 0,576 | Phase 2 | 2,300 |
| 4th | 0,007 | 0,156 | Phase 2 | 0,430 |
| 5th | 0,009 | 0,210 | Phase 2 | 1,140 |
| 6th | 0,005 | 0,125 | Phase 2 | 0,300 |
| 7th | 0,008 | 0,177 | Phase 2 | 0,770 |
| 8th | 0,005 | 0,123 | Phase 2 | 0,230 |
| 9th | 0,007 | 0,165 | Phase 2 | 0,400 |
| 10th | 0,006 | 0,135 | Phase 2 | 0,184 |
| 11th | 0,007 | 0,153 | Phase 2 | 0,330 |
| 12th | 0,005 | 0,110 | Phase 2 | 0,153 |
| 13th | 0,006 | 0,145 | Phase 2 | 0,210 |
| 14th | 0,005 | 0,119 | Phase 2 | 0,131 |
| 15th | 0,007 | 0,161 | Phase 2 | 0,150 |
| 16th | 0,005 | 0,121 | Phase 2 | 0,115 |
| 17th | 0,007 | 0,165 | Phase 2 | 0,132 |
| 18th | 0,006 | 0,129 | Phase 2 | 0,102 |
| 19th | 0,006 | 0,144 | Phase 2 | 0,118 |
| 20th | 0,005 | 0,115 | Phase 2 | 0,092 |
| 21th | 0,008 | 0,171 | Phase 2 | 0,107 |
| 22th | 0,005 | 0,113 | Phase 2 | 0,084 |
| 23th | 0,007 | 0,161 | Phase 2 | 0,098 |
| 24th | 0,007 | 0,159 | Phase 2 | 0,077 |
| 25th | 0,008 | 0,174 | Phase 2 | 0,090 |
| 26th | 0,006 | 0,145 | Phase 2 | 0,071 |
| 27th | 0,009 | 0,195 | Phase 2 | 0,083 |
| 28th | 0,005 | 0,124 | Phase 2 | 0,066 |
| 29th | 0,006 | 0,142 | Phase 2 | 0,078 |
| 30th | 0,006 | 0,139 | Phase 2 | 0,061 |
| 31th | 0,006 | 0,129 | Phase 2 | 0,073 |
| 32th | 0,006 | 0,144 | Phase 2 | 0,058 |
| 33th | 0,007 | 0,148 | Phase 2 | 0,068 |
| 34th | 0,005 | 0,105 | Phase 2 | 0,054 |
| 35th | 0,005 | 0,111 | Phase 2 | 0,064 |
| 36th | 0,006 | 0,126 | Phase 2 | 0,051 |
| 37th | 0,005 | 0,104 | Phase 2 | 0,061 |
| 38th | 0,004 | 0,101 | Phase 2 | 0,048 |
| 39th | 0,007 | 0,168 | Phase 2 | 0,058 |
| 40th | 0,004 | 0,089 | Phase 2 | 0,046 |

Appendix E Type Verification Test Report

Extract from test report according to EN 50438

Nr. PVPL180906N022

| Power Quality. Harmonic current emission | | | | |
|--|--|------------------|---------|--|
| micro-generator | | SUN2000-3KTL-M0 | | |
| Harmonic order n | Current Magnitude [A] at 100% rated output power | % of Fundamental | Phase | Harmonic current limit EN 61000-3-2, Class A [A] |
| 1st | 4,360 | 99,976 | Phase 3 | - |
| 2nd | 0,006 | 0,144 | Phase 3 | 1,080 |
| 3rd | 0,014 | 0,319 | Phase 3 | 2,300 |
| 4th | 0,007 | 0,160 | Phase 3 | 0,430 |
| 5th | 0,006 | 0,128 | Phase 3 | 1,140 |
| 6th | 0,005 | 0,116 | Phase 3 | 0,300 |
| 7th | 0,006 | 0,141 | Phase 3 | 0,770 |
| 8th | 0,006 | 0,128 | Phase 3 | 0,230 |
| 9th | 0,008 | 0,173 | Phase 3 | 0,400 |
| 10th | 0,006 | 0,130 | Phase 3 | 0,184 |
| 11th | 0,005 | 0,120 | Phase 3 | 0,330 |
| 12th | 0,005 | 0,114 | Phase 3 | 0,153 |
| 13th | 0,006 | 0,141 | Phase 3 | 0,210 |
| 14th | 0,005 | 0,114 | Phase 3 | 0,131 |
| 15th | 0,009 | 0,217 | Phase 3 | 0,150 |
| 16th | 0,005 | 0,122 | Phase 3 | 0,115 |
| 17th | 0,007 | 0,156 | Phase 3 | 0,132 |
| 18th | 0,006 | 0,135 | Phase 3 | 0,102 |
| 19th | 0,005 | 0,124 | Phase 3 | 0,118 |
| 20th | 0,006 | 0,135 | Phase 3 | 0,092 |
| 21th | 0,007 | 0,160 | Phase 3 | 0,107 |
| 22th | 0,006 | 0,149 | Phase 3 | 0,084 |
| 23th | 0,006 | 0,148 | Phase 3 | 0,098 |
| 24th | 0,007 | 0,156 | Phase 3 | 0,077 |
| 25th | 0,007 | 0,156 | Phase 3 | 0,090 |
| 26th | 0,007 | 0,163 | Phase 3 | 0,071 |
| 27th | 0,010 | 0,218 | Phase 3 | 0,083 |
| 28th | 0,006 | 0,142 | Phase 3 | 0,066 |
| 29th | 0,005 | 0,126 | Phase 3 | 0,078 |
| 30th | 0,005 | 0,122 | Phase 3 | 0,061 |
| 31th | 0,005 | 0,114 | Phase 3 | 0,073 |
| 32th | 0,005 | 0,118 | Phase 3 | 0,058 |
| 33th | 0,013 | 0,289 | Phase 3 | 0,068 |
| 34th | 0,005 | 0,108 | Phase 3 | 0,054 |
| 35th | 0,005 | 0,123 | Phase 3 | 0,064 |
| 36th | 0,006 | 0,137 | Phase 3 | 0,051 |
| 37th | 0,005 | 0,113 | Phase 3 | 0,061 |
| 38th | 0,005 | 0,107 | Phase 3 | 0,048 |
| 39th | 0,007 | 0,159 | Phase 3 | 0,058 |
| 40th | 0,005 | 0,107 | Phase 3 | 0,046 |

Appendix E Type Verification Test Report

Extract from test report according to EN 50438

Nr. PVPL180906N022

| Power Quality. Harmonic current emission | | | | |
|--|--|------------------|---------|--|
| micro-generator | | SUN2000-4KTL-M0 | | |
| Harmonic order n | Current Magnitude [A] at 100% rated output power | % of Fundamental | Phase | Harmonic current limit EN 61000-3-2, Class A [A] |
| 1st | 5,870 | 99,969 | Phase 1 | - |
| 2nd | 0,038 | 0,645 | Phase 1 | 1,080 |
| 3rd | 0,017 | 0,290 | Phase 1 | 2,300 |
| 4th | 0,016 | 0,268 | Phase 1 | 0,430 |
| 5th | 0,026 | 0,447 | Phase 1 | 1,140 |
| 6th | 0,005 | 0,084 | Phase 1 | 0,300 |
| 7th | 0,033 | 0,564 | Phase 1 | 0,770 |
| 8th | 0,012 | 0,203 | Phase 1 | 0,230 |
| 9th | 0,007 | 0,124 | Phase 1 | 0,400 |
| 10th | 0,017 | 0,292 | Phase 1 | 0,184 |
| 11th | 0,014 | 0,247 | Phase 1 | 0,330 |
| 12th | 0,007 | 0,124 | Phase 1 | 0,153 |
| 13th | 0,023 | 0,388 | Phase 1 | 0,210 |
| 14th | 0,004 | 0,076 | Phase 1 | 0,131 |
| 15th | 0,007 | 0,122 | Phase 1 | 0,150 |
| 16th | 0,007 | 0,120 | Phase 1 | 0,115 |
| 17th | 0,069 | 1,169 | Phase 1 | 0,132 |
| 18th | 0,007 | 0,118 | Phase 1 | 0,102 |
| 19th | 0,045 | 0,761 | Phase 1 | 0,118 |
| 20th | 0,006 | 0,103 | Phase 1 | 0,092 |
| 21th | 0,006 | 0,107 | Phase 1 | 0,107 |
| 22th | 0,007 | 0,111 | Phase 1 | 0,084 |
| 23th | 0,009 | 0,158 | Phase 1 | 0,098 |
| 24th | 0,007 | 0,120 | Phase 1 | 0,077 |
| 25th | 0,015 | 0,247 | Phase 1 | 0,090 |
| 26th | 0,011 | 0,188 | Phase 1 | 0,071 |
| 27th | 0,007 | 0,127 | Phase 1 | 0,083 |
| 28th | 0,011 | 0,183 | Phase 1 | 0,066 |
| 29th | 0,012 | 0,210 | Phase 1 | 0,078 |
| 30th | 0,009 | 0,146 | Phase 1 | 0,061 |
| 31th | 0,010 | 0,163 | Phase 1 | 0,073 |
| 32th | 0,020 | 0,333 | Phase 1 | 0,058 |
| 33th | 0,008 | 0,134 | Phase 1 | 0,068 |
| 34th | 0,014 | 0,234 | Phase 1 | 0,054 |
| 35th | 0,009 | 0,156 | Phase 1 | 0,064 |
| 36th | 0,007 | 0,121 | Phase 1 | 0,051 |
| 37th | 0,012 | 0,196 | Phase 1 | 0,061 |
| 38th | 0,012 | 0,208 | Phase 1 | 0,048 |
| 39th | 0,011 | 0,187 | Phase 1 | 0,058 |
| 40th | 0,012 | 0,198 | Phase 1 | 0,046 |

Appendix E Type Verification Test Report

Extract from test report according to EN 50438

Nr. PVPL180906N022

| Power Quality. Harmonic current emission | | | | |
|--|--|------------------|---------|--|
| micro-generator | | SUN2000-4KTL-M0 | | |
| Harmonic order n | Current Magnitude [A] at 100% rated output power | % of Fundamental | Phase | Harmonic current limit EN 61000-3-2, Class A [A] |
| 1st | 5,902 | 99,972 | Phase 2 | - |
| 2nd | 0,023 | 0,391 | Phase 2 | 1,080 |
| 3rd | 0,010 | 0,162 | Phase 2 | 2,300 |
| 4th | 0,016 | 0,268 | Phase 2 | 0,430 |
| 5th | 0,027 | 0,458 | Phase 2 | 1,140 |
| 6th | 0,005 | 0,090 | Phase 2 | 0,300 |
| 7th | 0,029 | 0,496 | Phase 2 | 0,770 |
| 8th | 0,016 | 0,266 | Phase 2 | 0,230 |
| 9th | 0,016 | 0,274 | Phase 2 | 0,400 |
| 10th | 0,018 | 0,302 | Phase 2 | 0,184 |
| 11th | 0,014 | 0,232 | Phase 2 | 0,330 |
| 12th | 0,008 | 0,131 | Phase 2 | 0,153 |
| 13th | 0,022 | 0,372 | Phase 2 | 0,210 |
| 14th | 0,007 | 0,121 | Phase 2 | 0,131 |
| 15th | 0,006 | 0,095 | Phase 2 | 0,150 |
| 16th | 0,007 | 0,111 | Phase 2 | 0,115 |
| 17th | 0,069 | 1,176 | Phase 2 | 0,132 |
| 18th | 0,006 | 0,106 | Phase 2 | 0,102 |
| 19th | 0,045 | 0,764 | Phase 2 | 0,118 |
| 20th | 0,007 | 0,124 | Phase 2 | 0,092 |
| 21th | 0,008 | 0,130 | Phase 2 | 0,107 |
| 22th | 0,007 | 0,114 | Phase 2 | 0,084 |
| 23th | 0,010 | 0,166 | Phase 2 | 0,098 |
| 24th | 0,008 | 0,138 | Phase 2 | 0,077 |
| 25th | 0,014 | 0,245 | Phase 2 | 0,090 |
| 26th | 0,012 | 0,198 | Phase 2 | 0,071 |
| 27th | 0,008 | 0,136 | Phase 2 | 0,083 |
| 28th | 0,013 | 0,220 | Phase 2 | 0,066 |
| 29th | 0,009 | 0,152 | Phase 2 | 0,078 |
| 30th | 0,007 | 0,123 | Phase 2 | 0,061 |
| 31th | 0,008 | 0,134 | Phase 2 | 0,073 |
| 32th | 0,010 | 0,172 | Phase 2 | 0,058 |
| 33th | 0,009 | 0,147 | Phase 2 | 0,068 |
| 34th | 0,010 | 0,174 | Phase 2 | 0,054 |
| 35th | 0,007 | 0,122 | Phase 2 | 0,064 |
| 36th | 0,008 | 0,143 | Phase 2 | 0,051 |
| 37th | 0,012 | 0,206 | Phase 2 | 0,061 |
| 38th | 0,014 | 0,236 | Phase 2 | 0,048 |
| 39th | 0,008 | 0,141 | Phase 2 | 0,058 |
| 40th | 0,013 | 0,216 | Phase 2 | 0,046 |

Appendix E Type Verification Test Report

Extract from test report according to EN 50438

Nr. PVPL180906N022

| Power Quality. Harmonic current emission | | | | |
|--|--|------------------|---------|--|
| micro-generator | | SUN2000-4KTL-M0 | | |
| Harmonic order n | Current Magnitude [A] at 100% rated output power | % of Fundamental | Phase | Harmonic current limit EN 61000-3-2, Class A [A] |
| 1st | 5,872 | 99,972 | Phase 3 | - |
| 2nd | 0,031 | 0,525 | Phase 3 | 1,080 |
| 3rd | 0,012 | 0,213 | Phase 3 | 2,300 |
| 4th | 0,014 | 0,234 | Phase 3 | 0,430 |
| 5th | 0,035 | 0,598 | Phase 3 | 1,140 |
| 6th | 0,006 | 0,095 | Phase 3 | 0,300 |
| 7th | 0,033 | 0,554 | Phase 3 | 0,770 |
| 8th | 0,013 | 0,220 | Phase 3 | 0,230 |
| 9th | 0,007 | 0,122 | Phase 3 | 0,400 |
| 10th | 0,018 | 0,301 | Phase 3 | 0,184 |
| 11th | 0,011 | 0,181 | Phase 3 | 0,330 |
| 12th | 0,005 | 0,093 | Phase 3 | 0,153 |
| 13th | 0,025 | 0,433 | Phase 3 | 0,210 |
| 14th | 0,006 | 0,106 | Phase 3 | 0,131 |
| 15th | 0,008 | 0,141 | Phase 3 | 0,150 |
| 16th | 0,006 | 0,108 | Phase 3 | 0,115 |
| 17th | 0,070 | 1,198 | Phase 3 | 0,132 |
| 18th | 0,006 | 0,105 | Phase 3 | 0,102 |
| 19th | 0,046 | 0,786 | Phase 3 | 0,118 |
| 20th | 0,007 | 0,123 | Phase 3 | 0,092 |
| 21th | 0,006 | 0,094 | Phase 3 | 0,107 |
| 22th | 0,007 | 0,119 | Phase 3 | 0,084 |
| 23th | 0,011 | 0,179 | Phase 3 | 0,098 |
| 24th | 0,007 | 0,118 | Phase 3 | 0,077 |
| 25th | 0,014 | 0,231 | Phase 3 | 0,090 |
| 26th | 0,009 | 0,159 | Phase 3 | 0,071 |
| 27th | 0,008 | 0,128 | Phase 3 | 0,083 |
| 28th | 0,010 | 0,171 | Phase 3 | 0,066 |
| 29th | 0,010 | 0,176 | Phase 3 | 0,078 |
| 30th | 0,007 | 0,122 | Phase 3 | 0,061 |
| 31th | 0,007 | 0,119 | Phase 3 | 0,073 |
| 32th | 0,014 | 0,239 | Phase 3 | 0,058 |
| 33th | 0,006 | 0,099 | Phase 3 | 0,068 |
| 34th | 0,013 | 0,216 | Phase 3 | 0,054 |
| 35th | 0,008 | 0,141 | Phase 3 | 0,064 |
| 36th | 0,007 | 0,116 | Phase 3 | 0,051 |
| 37th | 0,010 | 0,174 | Phase 3 | 0,061 |
| 38th | 0,011 | 0,195 | Phase 3 | 0,048 |
| 39th | 0,009 | 0,154 | Phase 3 | 0,058 |
| 40th | 0,009 | 0,149 | Phase 3 | 0,046 |

Appendix E Type Verification Test Report

Extract from test report according to EN 50438

Nr. PVPL180906N022

| Power Quality. Harmonic current emission | | | | |
|--|--|------------------|---------|--|
| micro-generator | | SUN2000-5KTL-M0 | | |
| Harmonic order n | Current Magnitude [A] at 100% rated output power | % of Fundamental | Phase | Harmonic current limit EN 61000-3-2, Class A [A] |
| 1st | 7,340 | 99,982 | Phase 1 | - |
| 2nd | 0,015 | 0,203 | Phase 1 | 1,080 |
| 3rd | 0,017 | 0,233 | Phase 1 | 2,300 |
| 4th | 0,007 | 0,097 | Phase 1 | 0,430 |
| 5th | 0,041 | 0,552 | Phase 1 | 1,140 |
| 6th | 0,007 | 0,102 | Phase 1 | 0,300 |
| 7th | 0,031 | 0,420 | Phase 1 | 0,770 |
| 8th | 0,005 | 0,069 | Phase 1 | 0,230 |
| 9th | 0,008 | 0,111 | Phase 1 | 0,400 |
| 10th | 0,006 | 0,076 | Phase 1 | 0,184 |
| 11th | 0,032 | 0,432 | Phase 1 | 0,330 |
| 12th | 0,006 | 0,084 | Phase 1 | 0,153 |
| 13th | 0,013 | 0,173 | Phase 1 | 0,210 |
| 14th | 0,007 | 0,094 | Phase 1 | 0,131 |
| 15th | 0,009 | 0,122 | Phase 1 | 0,150 |
| 16th | 0,006 | 0,086 | Phase 1 | 0,115 |
| 17th | 0,032 | 0,443 | Phase 1 | 0,132 |
| 18th | 0,006 | 0,079 | Phase 1 | 0,102 |
| 19th | 0,048 | 0,655 | Phase 1 | 0,118 |
| 20th | 0,008 | 0,112 | Phase 1 | 0,092 |
| 21th | 0,011 | 0,144 | Phase 1 | 0,107 |
| 22th | 0,006 | 0,085 | Phase 1 | 0,084 |
| 23th | 0,012 | 0,165 | Phase 1 | 0,098 |
| 24th | 0,007 | 0,092 | Phase 1 | 0,077 |
| 25th | 0,012 | 0,160 | Phase 1 | 0,090 |
| 26th | 0,009 | 0,118 | Phase 1 | 0,071 |
| 27th | 0,009 | 0,119 | Phase 1 | 0,083 |
| 28th | 0,008 | 0,103 | Phase 1 | 0,066 |
| 29th | 0,010 | 0,130 | Phase 1 | 0,078 |
| 30th | 0,010 | 0,142 | Phase 1 | 0,061 |
| 31th | 0,009 | 0,120 | Phase 1 | 0,073 |
| 32th | 0,010 | 0,132 | Phase 1 | 0,058 |
| 33th | 0,009 | 0,125 | Phase 1 | 0,068 |
| 34th | 0,008 | 0,108 | Phase 1 | 0,054 |
| 35th | 0,009 | 0,121 | Phase 1 | 0,064 |
| 36th | 0,009 | 0,128 | Phase 1 | 0,051 |
| 37th | 0,007 | 0,102 | Phase 1 | 0,061 |
| 38th | 0,010 | 0,141 | Phase 1 | 0,048 |
| 39th | 0,009 | 0,127 | Phase 1 | 0,058 |
| 40th | 0,008 | 0,103 | Phase 1 | 0,046 |



Appendix E Type Verification Test Report

Extract from test report according to EN 50438

Nr. PVPL180906N022

| Power Quality. Harmonic current emission | | | | |
|--|--|------------------|---------|--|
| micro-generator | | SUN2000-5KTL-M0 | | |
| Harmonic order n | Current Magnitude [A] at 100% rated output power | % of Fundamental | Phase | Harmonic current limit EN 61000-3-2, Class A [A] |
| 1st | 7,335 | 99,981 | Phase 2 | - |
| 2nd | 0,010 | 0,140 | Phase 2 | 1,080 |
| 3rd | 0,025 | 0,345 | Phase 2 | 2,300 |
| 4th | 0,007 | 0,101 | Phase 2 | 0,430 |
| 5th | 0,036 | 0,492 | Phase 2 | 1,140 |
| 6th | 0,007 | 0,093 | Phase 2 | 0,300 |
| 7th | 0,030 | 0,413 | Phase 2 | 0,770 |
| 8th | 0,006 | 0,078 | Phase 2 | 0,230 |
| 9th | 0,007 | 0,091 | Phase 2 | 0,400 |
| 10th | 0,006 | 0,081 | Phase 2 | 0,184 |
| 11th | 0,030 | 0,405 | Phase 2 | 0,330 |
| 12th | 0,006 | 0,087 | Phase 2 | 0,153 |
| 13th | 0,014 | 0,194 | Phase 2 | 0,210 |
| 14th | 0,007 | 0,089 | Phase 2 | 0,131 |
| 15th | 0,009 | 0,118 | Phase 2 | 0,150 |
| 16th | 0,007 | 0,097 | Phase 2 | 0,115 |
| 17th | 0,029 | 0,392 | Phase 2 | 0,132 |
| 18th | 0,009 | 0,123 | Phase 2 | 0,102 |
| 19th | 0,045 | 0,607 | Phase 2 | 0,118 |
| 20th | 0,010 | 0,134 | Phase 2 | 0,092 |
| 21th | 0,008 | 0,103 | Phase 2 | 0,107 |
| 22th | 0,007 | 0,098 | Phase 2 | 0,084 |
| 23th | 0,011 | 0,143 | Phase 2 | 0,098 |
| 24th | 0,007 | 0,092 | Phase 2 | 0,077 |
| 25th | 0,012 | 0,164 | Phase 2 | 0,090 |
| 26th | 0,007 | 0,102 | Phase 2 | 0,071 |
| 27th | 0,008 | 0,109 | Phase 2 | 0,083 |
| 28th | 0,008 | 0,102 | Phase 2 | 0,066 |
| 29th | 0,007 | 0,100 | Phase 2 | 0,078 |
| 30th | 0,011 | 0,148 | Phase 2 | 0,061 |
| 31th | 0,007 | 0,096 | Phase 2 | 0,073 |
| 32th | 0,010 | 0,130 | Phase 2 | 0,058 |
| 33th | 0,009 | 0,117 | Phase 2 | 0,068 |
| 34th | 0,009 | 0,118 | Phase 2 | 0,054 |
| 35th | 0,008 | 0,112 | Phase 2 | 0,064 |
| 36th | 0,009 | 0,118 | Phase 2 | 0,051 |
| 37th | 0,010 | 0,134 | Phase 2 | 0,061 |
| 38th | 0,010 | 0,133 | Phase 2 | 0,048 |
| 39th | 0,008 | 0,112 | Phase 2 | 0,058 |
| 40th | 0,010 | 0,135 | Phase 2 | 0,046 |

Appendix E Type Verification Test Report

Extract from test report according to EN 50438

Nr. PVPL180906N022

| Power Quality. Harmonic current emission | | | | |
|--|--|------------------|---------|--|
| micro-generator | | SUN2000-5KTL-M0 | | |
| Harmonic order n | Current Magnitude [A] at 100% rated output power | % of Fundamental | Phase | Harmonic current limit EN 61000-3-2, Class A [A] |
| 1st | 7,297 | 99,983 | Phase 3 | - |
| 2nd | 0,015 | 0,200 | Phase 3 | 1,080 |
| 3rd | 0,009 | 0,126 | Phase 3 | 2,300 |
| 4th | 0,007 | 0,095 | Phase 3 | 0,430 |
| 5th | 0,048 | 0,654 | Phase 3 | 1,140 |
| 6th | 0,005 | 0,070 | Phase 3 | 0,300 |
| 7th | 0,035 | 0,482 | Phase 3 | 0,770 |
| 8th | 0,006 | 0,079 | Phase 3 | 0,230 |
| 9th | 0,006 | 0,079 | Phase 3 | 0,400 |
| 10th | 0,005 | 0,069 | Phase 3 | 0,184 |
| 11th | 0,029 | 0,398 | Phase 3 | 0,330 |
| 12th | 0,005 | 0,075 | Phase 3 | 0,153 |
| 13th | 0,010 | 0,137 | Phase 3 | 0,210 |
| 14th | 0,006 | 0,083 | Phase 3 | 0,131 |
| 15th | 0,007 | 0,103 | Phase 3 | 0,150 |
| 16th | 0,007 | 0,096 | Phase 3 | 0,115 |
| 17th | 0,023 | 0,310 | Phase 3 | 0,132 |
| 18th | 0,008 | 0,109 | Phase 3 | 0,102 |
| 19th | 0,044 | 0,601 | Phase 3 | 0,118 |
| 20th | 0,007 | 0,097 | Phase 3 | 0,092 |
| 21th | 0,008 | 0,116 | Phase 3 | 0,107 |
| 22th | 0,006 | 0,088 | Phase 3 | 0,084 |
| 23th | 0,011 | 0,146 | Phase 3 | 0,098 |
| 24th | 0,007 | 0,091 | Phase 3 | 0,077 |
| 25th | 0,009 | 0,128 | Phase 3 | 0,090 |
| 26th | 0,007 | 0,100 | Phase 3 | 0,071 |
| 27th | 0,010 | 0,141 | Phase 3 | 0,083 |
| 28th | 0,008 | 0,108 | Phase 3 | 0,066 |
| 29th | 0,010 | 0,138 | Phase 3 | 0,078 |
| 30th | 0,008 | 0,106 | Phase 3 | 0,061 |
| 31th | 0,008 | 0,112 | Phase 3 | 0,073 |
| 32th | 0,010 | 0,130 | Phase 3 | 0,058 |
| 33th | 0,010 | 0,139 | Phase 3 | 0,068 |
| 34th | 0,008 | 0,103 | Phase 3 | 0,054 |
| 35th | 0,008 | 0,116 | Phase 3 | 0,064 |
| 36th | 0,009 | 0,121 | Phase 3 | 0,051 |
| 37th | 0,010 | 0,139 | Phase 3 | 0,061 |
| 38th | 0,008 | 0,114 | Phase 3 | 0,048 |
| 39th | 0,011 | 0,144 | Phase 3 | 0,058 |
| 40th | 0,009 | 0,118 | Phase 3 | 0,046 |

Appendix E Type Verification Test Report

Extract from test report according to EN 50438

Nr. PVPL180906N022

| Power Quality. Harmonic current emission | | | | |
|--|--|------------------|---------|--|
| micro-generator | | SUN2000-6KTL-M0 | | |
| Harmonic order n | Current Magnitude [A] at 100% rated output power | % of Fundamental | Phase | Harmonic current limit EN 61000-3-2, Class A [A] |
| 1st | 8,756 | 99,987 | Phase 1 | - |
| 2nd | 0,012 | 0,136 | Phase 1 | 1,080 |
| 3rd | 0,018 | 0,211 | Phase 1 | 2,300 |
| 4th | 0,007 | 0,081 | Phase 1 | 0,430 |
| 5th | 0,037 | 0,424 | Phase 1 | 1,140 |
| 6th | 0,008 | 0,090 | Phase 1 | 0,300 |
| 7th | 0,030 | 0,342 | Phase 1 | 0,770 |
| 8th | 0,006 | 0,068 | Phase 1 | 0,230 |
| 9th | 0,011 | 0,128 | Phase 1 | 0,400 |
| 10th | 0,006 | 0,073 | Phase 1 | 0,184 |
| 11th | 0,005 | 0,062 | Phase 1 | 0,330 |
| 12th | 0,007 | 0,085 | Phase 1 | 0,153 |
| 13th | 0,024 | 0,278 | Phase 1 | 0,210 |
| 14th | 0,007 | 0,082 | Phase 1 | 0,131 |
| 15th | 0,006 | 0,072 | Phase 1 | 0,150 |
| 16th | 0,006 | 0,069 | Phase 1 | 0,115 |
| 17th | 0,052 | 0,592 | Phase 1 | 0,132 |
| 18th | 0,009 | 0,098 | Phase 1 | 0,102 |
| 19th | 0,055 | 0,632 | Phase 1 | 0,118 |
| 20th | 0,009 | 0,106 | Phase 1 | 0,092 |
| 21th | 0,006 | 0,071 | Phase 1 | 0,107 |
| 22th | 0,006 | 0,070 | Phase 1 | 0,084 |
| 23th | 0,008 | 0,088 | Phase 1 | 0,098 |
| 24th | 0,010 | 0,110 | Phase 1 | 0,077 |
| 25th | 0,020 | 0,226 | Phase 1 | 0,090 |
| 26th | 0,009 | 0,098 | Phase 1 | 0,071 |
| 27th | 0,006 | 0,072 | Phase 1 | 0,083 |
| 28th | 0,007 | 0,078 | Phase 1 | 0,066 |
| 29th | 0,008 | 0,097 | Phase 1 | 0,078 |
| 30th | 0,010 | 0,118 | Phase 1 | 0,061 |
| 31th | 0,008 | 0,097 | Phase 1 | 0,073 |
| 32th | 0,010 | 0,109 | Phase 1 | 0,058 |
| 33th | 0,010 | 0,109 | Phase 1 | 0,068 |
| 34th | 0,008 | 0,088 | Phase 1 | 0,054 |
| 35th | 0,007 | 0,085 | Phase 1 | 0,064 |
| 36th | 0,009 | 0,098 | Phase 1 | 0,051 |
| 37th | 0,017 | 0,189 | Phase 1 | 0,061 |
| 38th | 0,008 | 0,095 | Phase 1 | 0,048 |
| 39th | 0,007 | 0,085 | Phase 1 | 0,058 |
| 40th | 0,007 | 0,075 | Phase 1 | 0,046 |

Appendix E Type Verification Test Report

Extract from test report according to EN 50438

Nr. PVPL180906N022

| Power Quality. Harmonic current emission | | | | |
|--|--|------------------|---------|--|
| micro-generator | | SUN2000-6KTL-M0 | | |
| Harmonic order n | Current Magnitude [A] at 100% rated output power | % of Fundamental | Phase | Harmonic current limit EN 61000-3-2, Class A [A] |
| 1st | 8,750 | 99,985 | Phase 2 | - |
| 2nd | 0,010 | 0,110 | Phase 2 | 1,080 |
| 3rd | 0,024 | 0,273 | Phase 2 | 2,300 |
| 4th | 0,008 | 0,090 | Phase 2 | 0,430 |
| 5th | 0,035 | 0,400 | Phase 2 | 1,140 |
| 6th | 0,007 | 0,081 | Phase 2 | 0,300 |
| 7th | 0,033 | 0,378 | Phase 2 | 0,770 |
| 8th | 0,008 | 0,090 | Phase 2 | 0,230 |
| 9th | 0,006 | 0,066 | Phase 2 | 0,400 |
| 10th | 0,006 | 0,070 | Phase 2 | 0,184 |
| 11th | 0,009 | 0,100 | Phase 2 | 0,330 |
| 12th | 0,007 | 0,082 | Phase 2 | 0,153 |
| 13th | 0,021 | 0,240 | Phase 2 | 0,210 |
| 14th | 0,007 | 0,080 | Phase 2 | 0,131 |
| 15th | 0,009 | 0,098 | Phase 2 | 0,150 |
| 16th | 0,006 | 0,073 | Phase 2 | 0,115 |
| 17th | 0,049 | 0,562 | Phase 2 | 0,132 |
| 18th | 0,009 | 0,105 | Phase 2 | 0,102 |
| 19th | 0,055 | 0,629 | Phase 2 | 0,118 |
| 20th | 0,008 | 0,095 | Phase 2 | 0,092 |
| 21th | 0,007 | 0,082 | Phase 2 | 0,107 |
| 22th | 0,008 | 0,094 | Phase 2 | 0,084 |
| 23th | 0,010 | 0,117 | Phase 2 | 0,098 |
| 24th | 0,010 | 0,114 | Phase 2 | 0,077 |
| 25th | 0,015 | 0,170 | Phase 2 | 0,090 |
| 26th | 0,010 | 0,109 | Phase 2 | 0,071 |
| 27th | 0,011 | 0,129 | Phase 2 | 0,083 |
| 28th | 0,009 | 0,101 | Phase 2 | 0,066 |
| 29th | 0,014 | 0,163 | Phase 2 | 0,078 |
| 30th | 0,011 | 0,124 | Phase 2 | 0,061 |
| 31th | 0,012 | 0,138 | Phase 2 | 0,073 |
| 32th | 0,011 | 0,128 | Phase 2 | 0,058 |
| 33th | 0,009 | 0,098 | Phase 2 | 0,068 |
| 34th | 0,010 | 0,112 | Phase 2 | 0,054 |
| 35th | 0,009 | 0,104 | Phase 2 | 0,064 |
| 36th | 0,011 | 0,123 | Phase 2 | 0,051 |
| 37th | 0,010 | 0,110 | Phase 2 | 0,061 |
| 38th | 0,009 | 0,104 | Phase 2 | 0,048 |
| 39th | 0,015 | 0,170 | Phase 2 | 0,058 |
| 40th | 0,009 | 0,097 | Phase 2 | 0,046 |

Appendix E Type Verification Test Report

Extract from test report according to EN 50438

Nr. PVPL180906N022

| Power Quality. Harmonic current emission | | | | |
|--|--|------------------|---------|--|
| micro-generator | | SUN2000-6KTL-M0 | | |
| Harmonic order n | Current Magnitude [A] at 100% rated output power | % of Fundamental | Phase | Harmonic current limit EN 61000-3-2, Class A [A] |
| 1st | 8,706 | 99,986 | Phase 3 | - |
| 2nd | 0,009 | 0,105 | Phase 3 | 1,080 |
| 3rd | 0,013 | 0,154 | Phase 3 | 2,300 |
| 4th | 0,007 | 0,079 | Phase 3 | 0,430 |
| 5th | 0,048 | 0,553 | Phase 3 | 1,140 |
| 6th | 0,007 | 0,080 | Phase 3 | 0,300 |
| 7th | 0,034 | 0,390 | Phase 3 | 0,770 |
| 8th | 0,007 | 0,079 | Phase 3 | 0,230 |
| 9th | 0,005 | 0,060 | Phase 3 | 0,400 |
| 10th | 0,007 | 0,081 | Phase 3 | 0,184 |
| 11th | 0,007 | 0,086 | Phase 3 | 0,330 |
| 12th | 0,006 | 0,071 | Phase 3 | 0,153 |
| 13th | 0,027 | 0,313 | Phase 3 | 0,210 |
| 14th | 0,007 | 0,084 | Phase 3 | 0,131 |
| 15th | 0,008 | 0,091 | Phase 3 | 0,150 |
| 16th | 0,007 | 0,081 | Phase 3 | 0,115 |
| 17th | 0,049 | 0,567 | Phase 3 | 0,132 |
| 18th | 0,007 | 0,077 | Phase 3 | 0,102 |
| 19th | 0,055 | 0,630 | Phase 3 | 0,118 |
| 20th | 0,009 | 0,099 | Phase 3 | 0,092 |
| 21th | 0,006 | 0,064 | Phase 3 | 0,107 |
| 22th | 0,008 | 0,089 | Phase 3 | 0,084 |
| 23th | 0,008 | 0,095 | Phase 3 | 0,098 |
| 24th | 0,008 | 0,089 | Phase 3 | 0,077 |
| 25th | 0,016 | 0,186 | Phase 3 | 0,090 |
| 26th | 0,008 | 0,093 | Phase 3 | 0,071 |
| 27th | 0,007 | 0,086 | Phase 3 | 0,083 |
| 28th | 0,008 | 0,095 | Phase 3 | 0,066 |
| 29th | 0,017 | 0,191 | Phase 3 | 0,078 |
| 30th | 0,010 | 0,112 | Phase 3 | 0,061 |
| 31th | 0,012 | 0,133 | Phase 3 | 0,073 |
| 32th | 0,008 | 0,093 | Phase 3 | 0,058 |
| 33th | 0,008 | 0,092 | Phase 3 | 0,068 |
| 34th | 0,009 | 0,107 | Phase 3 | 0,054 |
| 35th | 0,009 | 0,100 | Phase 3 | 0,064 |
| 36th | 0,008 | 0,097 | Phase 3 | 0,051 |
| 37th | 0,015 | 0,174 | Phase 3 | 0,061 |
| 38th | 0,007 | 0,086 | Phase 3 | 0,048 |
| 39th | 0,008 | 0,090 | Phase 3 | 0,058 |
| 40th | 0,007 | 0,086 | Phase 3 | 0,046 |

Appendix E Type Verification Test Report

Extract from test report according to EN 50438

Nr. PVPL180906N022

| Power Quality. Harmonic current emission | | | | |
|--|--|------------------|---------|--|
| micro-generator | | SUN2000-8KTL-M0 | | |
| Harmonic order n | Current Magnitude [A] at 100% rated output power | % of Fundamental | Phase | Harmonic current limit EN 61000-3-2, Class A [A] |
| 1st | 11,646 | 99,991 | Phase 1 | - |
| 2nd | 0,017 | 0,145 | Phase 1 | 1,080 |
| 3rd | 0,023 | 0,198 | Phase 1 | 2,300 |
| 4th | 0,009 | 0,077 | Phase 1 | 0,430 |
| 5th | 0,058 | 0,502 | Phase 1 | 1,140 |
| 6th | 0,006 | 0,048 | Phase 1 | 0,300 |
| 7th | 0,031 | 0,264 | Phase 1 | 0,770 |
| 8th | 0,006 | 0,052 | Phase 1 | 0,230 |
| 9th | 0,016 | 0,134 | Phase 1 | 0,400 |
| 10th | 0,007 | 0,063 | Phase 1 | 0,184 |
| 11th | 0,007 | 0,060 | Phase 1 | 0,330 |
| 12th | 0,006 | 0,050 | Phase 1 | 0,153 |
| 13th | 0,030 | 0,261 | Phase 1 | 0,210 |
| 14th | 0,006 | 0,056 | Phase 1 | 0,131 |
| 15th | 0,005 | 0,046 | Phase 1 | 0,150 |
| 16th | 0,007 | 0,060 | Phase 1 | 0,115 |
| 17th | 0,026 | 0,219 | Phase 1 | 0,132 |
| 18th | 0,009 | 0,073 | Phase 1 | 0,102 |
| 19th | 0,034 | 0,293 | Phase 1 | 0,118 |
| 20th | 0,010 | 0,083 | Phase 1 | 0,092 |
| 21th | 0,008 | 0,069 | Phase 1 | 0,107 |
| 22th | 0,008 | 0,067 | Phase 1 | 0,084 |
| 23th | 0,009 | 0,077 | Phase 1 | 0,098 |
| 24th | 0,011 | 0,096 | Phase 1 | 0,077 |
| 25th | 0,015 | 0,131 | Phase 1 | 0,090 |
| 26th | 0,010 | 0,085 | Phase 1 | 0,071 |
| 27th | 0,009 | 0,075 | Phase 1 | 0,083 |
| 28th | 0,010 | 0,083 | Phase 1 | 0,066 |
| 29th | 0,009 | 0,073 | Phase 1 | 0,078 |
| 30th | 0,014 | 0,124 | Phase 1 | 0,061 |
| 31th | 0,016 | 0,138 | Phase 1 | 0,073 |
| 32th | 0,014 | 0,120 | Phase 1 | 0,058 |
| 33th | 0,011 | 0,091 | Phase 1 | 0,068 |
| 34th | 0,011 | 0,097 | Phase 1 | 0,054 |
| 35th | 0,012 | 0,099 | Phase 1 | 0,064 |
| 36th | 0,014 | 0,120 | Phase 1 | 0,051 |
| 37th | 0,010 | 0,084 | Phase 1 | 0,061 |
| 38th | 0,014 | 0,118 | Phase 1 | 0,048 |
| 39th | 0,014 | 0,121 | Phase 1 | 0,058 |
| 40th | 0,010 | 0,090 | Phase 1 | 0,046 |

Appendix E Type Verification Test Report

Extract from test report according to EN 50438

Nr. PVPL180906N022

| Power Quality. Harmonic current emission | | | | |
|--|--|------------------|---------|--|
| micro-generator | | SUN2000-8KTL-M0 | | |
| Harmonic order n | Current Magnitude [A] at 100% rated output power | % of Fundamental | Phase | Harmonic current limit EN 61000-3-2, Class A [A] |
| 1st | 11,640 | 99,991 | Phase 2 | - |
| 2nd | 0,015 | 0,129 | Phase 2 | 1,080 |
| 3rd | 0,027 | 0,232 | Phase 2 | 2,300 |
| 4th | 0,010 | 0,082 | Phase 2 | 0,430 |
| 5th | 0,053 | 0,459 | Phase 2 | 1,140 |
| 6th | 0,007 | 0,059 | Phase 2 | 0,300 |
| 7th | 0,033 | 0,283 | Phase 2 | 0,770 |
| 8th | 0,006 | 0,055 | Phase 2 | 0,230 |
| 9th | 0,007 | 0,060 | Phase 2 | 0,400 |
| 10th | 0,007 | 0,058 | Phase 2 | 0,184 |
| 11th | 0,006 | 0,049 | Phase 2 | 0,330 |
| 12th | 0,006 | 0,051 | Phase 2 | 0,153 |
| 13th | 0,029 | 0,252 | Phase 2 | 0,210 |
| 14th | 0,008 | 0,066 | Phase 2 | 0,131 |
| 15th | 0,009 | 0,075 | Phase 2 | 0,150 |
| 16th | 0,007 | 0,064 | Phase 2 | 0,115 |
| 17th | 0,020 | 0,175 | Phase 2 | 0,132 |
| 18th | 0,007 | 0,061 | Phase 2 | 0,102 |
| 19th | 0,036 | 0,308 | Phase 2 | 0,118 |
| 20th | 0,009 | 0,075 | Phase 2 | 0,092 |
| 21th | 0,011 | 0,094 | Phase 2 | 0,107 |
| 22th | 0,008 | 0,065 | Phase 2 | 0,084 |
| 23th | 0,009 | 0,075 | Phase 2 | 0,098 |
| 24th | 0,009 | 0,074 | Phase 2 | 0,077 |
| 25th | 0,017 | 0,148 | Phase 2 | 0,090 |
| 26th | 0,009 | 0,076 | Phase 2 | 0,071 |
| 27th | 0,008 | 0,072 | Phase 2 | 0,083 |
| 28th | 0,011 | 0,093 | Phase 2 | 0,066 |
| 29th | 0,012 | 0,106 | Phase 2 | 0,078 |
| 30th | 0,013 | 0,108 | Phase 2 | 0,061 |
| 31th | 0,016 | 0,138 | Phase 2 | 0,073 |
| 32th | 0,015 | 0,128 | Phase 2 | 0,058 |
| 33th | 0,012 | 0,104 | Phase 2 | 0,068 |
| 34th | 0,011 | 0,098 | Phase 2 | 0,054 |
| 35th | 0,017 | 0,146 | Phase 2 | 0,064 |
| 36th | 0,015 | 0,125 | Phase 2 | 0,051 |
| 37th | 0,012 | 0,100 | Phase 2 | 0,061 |
| 38th | 0,015 | 0,132 | Phase 2 | 0,048 |
| 39th | 0,014 | 0,122 | Phase 2 | 0,058 |
| 40th | 0,011 | 0,092 | Phase 2 | 0,046 |

Appendix E Type Verification Test Report

Extract from test report according to EN 50438

Nr. PVPL180906N022

| Power Quality. Harmonic current emission | | | | |
|--|--|------------------|---------|--|
| micro-generator | | SUN2000-8KTL-M0 | | |
| Harmonic order n | Current Magnitude [A] at 100% rated output power | % of Fundamental | Phase | Harmonic current limit EN 61000-3-2, Class A [A] |
| 1st | 11,583 | 99,991 | Phase 3 | - |
| 2nd | 0,007 | 0,065 | Phase 3 | 1,080 |
| 3rd | 0,018 | 0,159 | Phase 3 | 2,300 |
| 4th | 0,008 | 0,066 | Phase 3 | 0,430 |
| 5th | 0,074 | 0,636 | Phase 3 | 1,140 |
| 6th | 0,007 | 0,063 | Phase 3 | 0,300 |
| 7th | 0,035 | 0,300 | Phase 3 | 0,770 |
| 8th | 0,006 | 0,048 | Phase 3 | 0,230 |
| 9th | 0,007 | 0,058 | Phase 3 | 0,400 |
| 10th | 0,006 | 0,055 | Phase 3 | 0,184 |
| 11th | 0,007 | 0,063 | Phase 3 | 0,330 |
| 12th | 0,006 | 0,053 | Phase 3 | 0,153 |
| 13th | 0,032 | 0,276 | Phase 3 | 0,210 |
| 14th | 0,006 | 0,054 | Phase 3 | 0,131 |
| 15th | 0,008 | 0,071 | Phase 3 | 0,150 |
| 16th | 0,008 | 0,069 | Phase 3 | 0,115 |
| 17th | 0,025 | 0,218 | Phase 3 | 0,132 |
| 18th | 0,007 | 0,061 | Phase 3 | 0,102 |
| 19th | 0,034 | 0,296 | Phase 3 | 0,118 |
| 20th | 0,008 | 0,070 | Phase 3 | 0,092 |
| 21th | 0,007 | 0,060 | Phase 3 | 0,107 |
| 22th | 0,008 | 0,072 | Phase 3 | 0,084 |
| 23th | 0,008 | 0,067 | Phase 3 | 0,098 |
| 24th | 0,007 | 0,064 | Phase 3 | 0,077 |
| 25th | 0,017 | 0,145 | Phase 3 | 0,090 |
| 26th | 0,010 | 0,084 | Phase 3 | 0,071 |
| 27th | 0,010 | 0,083 | Phase 3 | 0,083 |
| 28th | 0,010 | 0,086 | Phase 3 | 0,066 |
| 29th | 0,014 | 0,123 | Phase 3 | 0,078 |
| 30th | 0,012 | 0,103 | Phase 3 | 0,061 |
| 31th | 0,014 | 0,117 | Phase 3 | 0,073 |
| 32th | 0,011 | 0,098 | Phase 3 | 0,058 |
| 33th | 0,011 | 0,099 | Phase 3 | 0,068 |
| 34th | 0,013 | 0,116 | Phase 3 | 0,054 |
| 35th | 0,015 | 0,134 | Phase 3 | 0,064 |
| 36th | 0,013 | 0,116 | Phase 3 | 0,051 |
| 37th | 0,010 | 0,083 | Phase 3 | 0,061 |
| 38th | 0,015 | 0,131 | Phase 3 | 0,048 |
| 39th | 0,013 | 0,115 | Phase 3 | 0,058 |
| 40th | 0,010 | 0,084 | Phase 3 | 0,046 |

Appendix E Type Verification Test Report

Extract from test report according to EN 50438

Nr. PVPL180906N022

| Power Quality. Harmonic current emission | | | | |
|--|--|------------------|---------|--|
| micro-generator | | SUN2000-10KTL-M0 | | |
| Harmonic order n | Current Magnitude [A] at 100% rated output power | % of Fundamental | Phase | Harmonic current limit EN 61000-3-2, Class A [A] |
| 1st | 14,408 | 99,993 | Phase 1 | - |
| 2nd | 0,030 | 0,207 | Phase 1 | 1,080 |
| 3rd | 0,043 | 0,299 | Phase 1 | 2,300 |
| 4th | 0,010 | 0,070 | Phase 1 | 0,430 |
| 5th | 0,017 | 0,117 | Phase 1 | 1,140 |
| 6th | 0,008 | 0,054 | Phase 1 | 0,300 |
| 7th | 0,011 | 0,074 | Phase 1 | 0,770 |
| 8th | 0,007 | 0,048 | Phase 1 | 0,230 |
| 9th | 0,010 | 0,069 | Phase 1 | 0,400 |
| 10th | 0,007 | 0,050 | Phase 1 | 0,184 |
| 11th | 0,010 | 0,071 | Phase 1 | 0,330 |
| 12th | 0,007 | 0,047 | Phase 1 | 0,153 |
| 13th | 0,009 | 0,064 | Phase 1 | 0,210 |
| 14th | 0,006 | 0,044 | Phase 1 | 0,131 |
| 15th | 0,006 | 0,044 | Phase 1 | 0,150 |
| 16th | 0,008 | 0,057 | Phase 1 | 0,115 |
| 17th | 0,009 | 0,062 | Phase 1 | 0,132 |
| 18th | 0,007 | 0,048 | Phase 1 | 0,102 |
| 19th | 0,008 | 0,055 | Phase 1 | 0,118 |
| 20th | 0,006 | 0,043 | Phase 1 | 0,092 |
| 21th | 0,006 | 0,043 | Phase 1 | 0,107 |
| 22th | 0,007 | 0,047 | Phase 1 | 0,084 |
| 23th | 0,009 | 0,063 | Phase 1 | 0,098 |
| 24th | 0,008 | 0,053 | Phase 1 | 0,077 |
| 25th | 0,008 | 0,059 | Phase 1 | 0,090 |
| 26th | 0,006 | 0,043 | Phase 1 | 0,071 |
| 27th | 0,009 | 0,061 | Phase 1 | 0,083 |
| 28th | 0,008 | 0,056 | Phase 1 | 0,066 |
| 29th | 0,008 | 0,055 | Phase 1 | 0,078 |
| 30th | 0,009 | 0,064 | Phase 1 | 0,061 |
| 31th | 0,009 | 0,060 | Phase 1 | 0,073 |
| 32th | 0,009 | 0,062 | Phase 1 | 0,058 |
| 33th | 0,013 | 0,089 | Phase 1 | 0,068 |
| 34th | 0,013 | 0,090 | Phase 1 | 0,054 |
| 35th | 0,048 | 0,330 | Phase 1 | 0,064 |
| 36th | 0,017 | 0,121 | Phase 1 | 0,051 |
| 37th | 0,026 | 0,178 | Phase 1 | 0,061 |
| 38th | 0,011 | 0,075 | Phase 1 | 0,048 |
| 39th | 0,025 | 0,171 | Phase 1 | 0,058 |
| 40th | 0,016 | 0,108 | Phase 1 | 0,046 |

Appendix E Type Verification Test Report

Extract from test report according to EN 50438

Nr. PVPL180906N022

| Power Quality. Harmonic current emission | | | | |
|--|--|------------------|---------|--|
| micro-generator | | SUN2000-10KTL-M0 | | |
| Harmonic order n | Current Magnitude [A] at 100% rated output power | % of Fundamental | Phase | Harmonic current limit EN 61000-3-2, Class A [A] |
| 1st | 14,521 | 99,992 | Phase 2 | - |
| 2nd | 0,016 | 0,113 | Phase 2 | 1,080 |
| 3rd | 0,016 | 0,110 | Phase 2 | 2,300 |
| 4th | 0,012 | 0,084 | Phase 2 | 0,430 |
| 5th | 0,018 | 0,124 | Phase 2 | 1,140 |
| 6th | 0,009 | 0,060 | Phase 2 | 0,300 |
| 7th | 0,009 | 0,063 | Phase 2 | 0,770 |
| 8th | 0,009 | 0,062 | Phase 2 | 0,230 |
| 9th | 0,014 | 0,096 | Phase 2 | 0,400 |
| 10th | 0,008 | 0,057 | Phase 2 | 0,184 |
| 11th | 0,010 | 0,069 | Phase 2 | 0,330 |
| 12th | 0,007 | 0,049 | Phase 2 | 0,153 |
| 13th | 0,012 | 0,085 | Phase 2 | 0,210 |
| 14th | 0,008 | 0,058 | Phase 2 | 0,131 |
| 15th | 0,007 | 0,047 | Phase 2 | 0,150 |
| 16th | 0,008 | 0,058 | Phase 2 | 0,115 |
| 17th | 0,009 | 0,060 | Phase 2 | 0,132 |
| 18th | 0,007 | 0,048 | Phase 2 | 0,102 |
| 19th | 0,009 | 0,063 | Phase 2 | 0,118 |
| 20th | 0,007 | 0,045 | Phase 2 | 0,092 |
| 21th | 0,007 | 0,045 | Phase 2 | 0,107 |
| 22th | 0,007 | 0,049 | Phase 2 | 0,084 |
| 23th | 0,009 | 0,059 | Phase 2 | 0,098 |
| 24th | 0,008 | 0,052 | Phase 2 | 0,077 |
| 25th | 0,009 | 0,064 | Phase 2 | 0,090 |
| 26th | 0,007 | 0,050 | Phase 2 | 0,071 |
| 27th | 0,010 | 0,069 | Phase 2 | 0,083 |
| 28th | 0,010 | 0,071 | Phase 2 | 0,066 |
| 29th | 0,008 | 0,057 | Phase 2 | 0,078 |
| 30th | 0,011 | 0,074 | Phase 2 | 0,061 |
| 31th | 0,010 | 0,070 | Phase 2 | 0,073 |
| 32th | 0,018 | 0,126 | Phase 2 | 0,058 |
| 33th | 0,014 | 0,096 | Phase 2 | 0,068 |
| 34th | 0,018 | 0,121 | Phase 2 | 0,054 |
| 35th | 0,048 | 0,331 | Phase 2 | 0,064 |
| 36th | 0,020 | 0,141 | Phase 2 | 0,051 |
| 37th | 0,042 | 0,290 | Phase 2 | 0,061 |
| 38th | 0,025 | 0,174 | Phase 2 | 0,048 |
| 39th | 0,015 | 0,102 | Phase 2 | 0,058 |
| 40th | 0,025 | 0,172 | Phase 2 | 0,046 |

Appendix E Type Verification Test Report

Extract from test report according to EN 50438

Nr. PVPL180906N022

| Power Quality. Harmonic current emission | | | | |
|--|--|------------------|---------|--|
| micro-generator | | SUN2000-10KTL-M0 | | |
| Harmonic order n | Current Magnitude [A] at 100% rated output power | % of Fundamental | Phase | Harmonic current limit EN 61000-3-2, Class A [A] |
| 1st | 14,423 | 99,992 | Phase 3 | - |
| 2nd | 0,025 | 0,173 | Phase 3 | 1,080 |
| 3rd | 0,036 | 0,246 | Phase 3 | 2,300 |
| 4th | 0,015 | 0,102 | Phase 3 | 0,430 |
| 5th | 0,016 | 0,110 | Phase 3 | 1,140 |
| 6th | 0,008 | 0,053 | Phase 3 | 0,300 |
| 7th | 0,012 | 0,080 | Phase 3 | 0,770 |
| 8th | 0,009 | 0,063 | Phase 3 | 0,230 |
| 9th | 0,008 | 0,055 | Phase 3 | 0,400 |
| 10th | 0,008 | 0,055 | Phase 3 | 0,184 |
| 11th | 0,011 | 0,076 | Phase 3 | 0,330 |
| 12th | 0,007 | 0,050 | Phase 3 | 0,153 |
| 13th | 0,012 | 0,081 | Phase 3 | 0,210 |
| 14th | 0,008 | 0,057 | Phase 3 | 0,131 |
| 15th | 0,009 | 0,059 | Phase 3 | 0,150 |
| 16th | 0,007 | 0,051 | Phase 3 | 0,115 |
| 17th | 0,008 | 0,053 | Phase 3 | 0,132 |
| 18th | 0,008 | 0,054 | Phase 3 | 0,102 |
| 19th | 0,009 | 0,061 | Phase 3 | 0,118 |
| 20th | 0,007 | 0,046 | Phase 3 | 0,092 |
| 21th | 0,009 | 0,061 | Phase 3 | 0,107 |
| 22th | 0,007 | 0,050 | Phase 3 | 0,084 |
| 23th | 0,009 | 0,065 | Phase 3 | 0,098 |
| 24th | 0,007 | 0,050 | Phase 3 | 0,077 |
| 25th | 0,009 | 0,065 | Phase 3 | 0,090 |
| 26th | 0,007 | 0,048 | Phase 3 | 0,071 |
| 27th | 0,008 | 0,059 | Phase 3 | 0,083 |
| 28th | 0,010 | 0,070 | Phase 3 | 0,066 |
| 29th | 0,009 | 0,062 | Phase 3 | 0,078 |
| 30th | 0,011 | 0,077 | Phase 3 | 0,061 |
| 31th | 0,010 | 0,071 | Phase 3 | 0,073 |
| 32th | 0,017 | 0,119 | Phase 3 | 0,058 |
| 33th | 0,013 | 0,088 | Phase 3 | 0,068 |
| 34th | 0,015 | 0,105 | Phase 3 | 0,054 |
| 35th | 0,036 | 0,248 | Phase 3 | 0,064 |
| 36th | 0,016 | 0,110 | Phase 3 | 0,051 |
| 37th | 0,037 | 0,255 | Phase 3 | 0,061 |
| 38th | 0,026 | 0,180 | Phase 3 | 0,048 |
| 39th | 0,016 | 0,110 | Phase 3 | 0,058 |
| 40th | 0,019 | 0,135 | Phase 3 | 0,046 |

Appendix E Type Verification Test Report

Extract from test report according to EN 50438

Nr. PVPL180906N022

| Voltage fluctuation and Flicker. | | | | | |
|---|---|-------------|-----------------------|-------|-------|
| | Maximum permissible flicker and voltage fluctuation as per EN 61000-3-3 | | | | |
| Value | Pst | Plt 2 hours | d(t) _{500ms} | dc | dmax |
| Limit | 1,0 | 0,65 | 3,3% | 3,3% | 4% |
| Test value SUN2000-3KTL-M0 | | | | | |
| L1 Phase | 0,07 | 0,07 | 0,00% | 0,00% | 0,00% |
| L2 Phase | 0,07 | 0,07 | 0,00% | 0,00% | 0,00% |
| L3 Phase | 0,07 | 0,07 | 0,00% | 0,00% | 0,00% |
| Test value SUN2000-4KTL-M0 | | | | | |
| L1 Phase | 0,07 | 0,07 | 0,00% | 0,00% | 0,00% |
| L2 Phase | 0,07 | 0,07 | 0,00% | 0,00% | 0,00% |
| L3 Phase | 0,08 | 0,07 | 0,00% | 0,00% | 0,00% |
| Test value SUN2000-5KTL-M0 | | | | | |
| L1 Phase | 0,07 | 0,07 | 0,00% | 0,00% | 0,00% |
| L2 Phase | 0,07 | 0,07 | 0,00% | 0,00% | 0,00% |
| L3 Phase | 0,07 | 0,07 | 0,00% | 0,00% | 0,00% |
| Test value SUN2000-6KTL-M0 | | | | | |
| L1 Phase | 0,07 | 0,07 | 0,00% | 0,00% | 0,00% |
| L2 Phase | 0,07 | 0,07 | 0,00% | 0,00% | 0,00% |
| L3 Phase | 0,07 | 0,07 | 0,00% | 0,00% | 0,00% |
| Test value SUN2000-8KTL-M0 | | | | | |
| L1 Phase | 0,07 | 0,07 | 0,00% | 0,00% | 0,00% |
| L2 Phase | 0,07 | 0,07 | 0,00% | 0,00% | 0,00% |
| L3 Phase | 0,07 | 0,07 | 0,00% | 0,00% | 0,00% |
| Test value SUN2000-10KTL-M0 | | | | | |
| L1 Phase | 0,10 | 0,08 | 0,00% | 0,00% | 0,00% |
| L2 Phase | 0,08 | 0,08 | 0,00% | 0,00% | 0,00% |
| L3 Phase | 0,08 | 0,08 | 0,00% | 0,00% | 0,00% |

Appendix E Type Verification Test Report

Extract from test report according to EN 50438

Nr. PVPL180906N022

| DC-Injection. | | | | |
|--|--|-------------|------------|--------------|
| Protection limit SUN2000-10KTL-M0 | Tested at four power levels, limit 0,5% of IAC _{nom} (72mA) | | | |
| Output power | ~20% | ~50% | 75% | ~100% |
| Max. test value (phase L1) [mA] | 7,3 | 8,7 | 8,5 | 11,7 |
| Max. test value (phase L2) [mA] | 7,8 | 8,0 | 9,9 | 13,6 |
| Max. test value (phase L3) [mA] | 4,0 | 4,5 | 8,0 | 11,1 |
| Protection limit SUN2000-03KTL-M0 | Tested at four power levels, limit 0,5% of IAC _{nom} (22mA) | | | |
| Output power | ~20% | ~50% | 75% | ~100% |
| Max. test value (phase L1) [mA] | 6,8 | 8,5 | 9,3 | 9,0 |
| Max. test value (phase L2) [mA] | 6,6 | 9,5 | 10,8 | 9,2 |
| Max. test value (phase L3) [mA] | 1,5 | 6,5 | 6,0 | 6,2 |