



# TEST REPORT

## AS/NZS 4777.2

### Grid connection of energy systems via inverters Part 2: Inverter requirements

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                              |
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| <b>Report reference number .....</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>PVAU180906N022</b>                                                                                                                                                                                        |
| <b>Date of issue .....</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>2018-10-29</b>                                                                                                                                                                                            |
| <b>Total number of pages .....</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>93</b>                                                                                                                                                                                                    |
| <b>Testing laboratory name .....</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>Bureau Veritas Shenzhen Co., Ltd. Dongguan Branch</b>                                                                                                                                                     |
| <b>Address .....</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | No. 34, Chenwulu Section, Guantai Rd., Houjie Town, Dongguan City, Guangdong 523942, China                                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                        |
| <b>Applicant's name.....</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Huawei Technologies Co., Ltd.</b>                                                                                                                                                                         |
| <b>Address .....</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C                                                                                  |
| <b>Test specification</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                              |
| <b>Standard.....</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>AS/NZS 4777.2:2015</b>                                                                                                                                                                                    |
| <b>Certificate.....</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Certificate of compliance</b>                                                                                                                                                                             |
| <b>Test report form number .....</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>AS4777_C</b>                                                                                                                                                                                              |
| <b>Master TRF .....</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Bureau Veritas Consumer Products Services Germany GmbH</b>                                                                                                                                                |
| <b>Test item description .....</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>SOLAR INVERTER</b>                                                                                                                                                                                        |
| <b>Trademark.....</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                           |
| <b>Model / Type .....</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 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 |
| <small>This report is governed by, and incorporates by reference, CPS Conditions of Service as posted at the date of issuance of this report at <a href="http://www.bureauveritas.com/home/about-us/our-business/cps/about-us/terms-conditions">http://www.bureauveritas.com/home/about-us/our-business/cps/about-us/terms-conditions</a> and is intended for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. Measurement uncertainty is only provided upon request for accredited tests. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence or if you require measurement uncertainty; provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents.</small> |                                                                                                                                                                                                              |

|                                  |                                     |                                     |                                       |
|----------------------------------|-------------------------------------|-------------------------------------|---------------------------------------|
| <b>Ratings .....</b>             | SUN2000-3KTL-M0,<br>SUN2000-3KTL-M1 | SUN2000-4KTL-M0,<br>SUN2000-4KTL-M1 | SUN2000-5KTL-M0,<br>SUN2000-5KTL-M1   |
| MPP DC voltage range [V] .....   | 140-980                             |                                     |                                       |
| Input DC voltage range [V] ..... | 140-1100, max. 1100                 |                                     |                                       |
| Input DC current [A] .....       | Max. 11 x 2 strings                 |                                     |                                       |
| Output AC voltage [V] .....      | 230, 3(N)~ + PE, 50Hz               |                                     |                                       |
| Output AC current [A] .....      | Max. 5,1                            | Max. 6,8                            | Max. 8,5                              |
| Nominal Output power [kVA] ..... | 3,0                                 | 4,0                                 | 5,0                                   |
| Maximum Output power [kVA] ..... | 3,3                                 | 4,4                                 | 5,5                                   |
|                                  |                                     |                                     |                                       |
| <b>Ratings .....</b>             | SUN2000-6KTL-M0,<br>SUN2000-6KTL-M1 | SUN2000-8KTL-M0,<br>SUN2000-8KTL-M1 | SUN2000-10KTL-M0,<br>SUN2000-10KTL-M1 |
| MPP DC voltage range [V] .....   | 140-980                             |                                     |                                       |
| Input DC voltage range [V] ..... | 140-1100, max. 1100                 |                                     |                                       |
| Input DC current [A] .....       | Max. 11 x 2 strings                 |                                     |                                       |
| Output AC voltage [V] .....      | 230, 3(N)~ + PE, 50Hz               |                                     |                                       |
| Output AC current [A] .....      | Max. 10,1                           | Max. 13,5                           | Max. 16,9                             |
| Nominal Output power [kVA] ..... | 6,0                                 | 8,0                                 | 10,0                                  |
| Maximum Output power [kVA] ..... | 6,6                                 | 8,8                                 | 11,0                                  |

|                                                   |                                                                                                                              |
|---------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| <b>Testing Location .....</b>                     | <b>Bureau Veritas Shenzhen Co., Ltd. Dongguan Branch</b>                                                                     |
| <b>Address .....</b>                              | No. 34, Chenwulu Section, Guantai Rd., Houjie Town, Dongguan City, Guangdong 523942, China                                   |
| <b>Tested by<br/>(name and signature) .....</b>   | James Huang                                |
| <b>Approved by<br/>(name and signature) .....</b> | Ted Wu                                     |
| <b>Manufacturer's name .....</b>                  | <b>Huawei Technologies Co., Ltd.</b>                                                                                         |
| <b>Manufacturer address .....</b>                 | Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C  |
| <b>Factory's name 1 .....</b>                     | <b>Huawei Machine Co., Ltd.</b>                                                                                              |
| <b>Factory address 1 .....</b>                    | No. 2 New City Avenue, Songshan Lake Sci. & Tech. Industry Park, 523808, Dongguan, People's Republic of China.               |
| <b>Factory's name 2 .....</b>                     | <b>Shenzhen Dongzhou New Energy Technologies Co., Ltd.</b>                                                                   |
| <b>Factory address 2 .....</b>                    | Shenzhen Pingshan Factory Zone A, Yingzhan Industrial Park Kengzi Street, Pingshan New District Shenzhen, 518125, P.R. China |

| Document History           |                    |                                |          |
|----------------------------|--------------------|--------------------------------|----------|
| Date                       | Internal reference | Modification / Change / Status | Revision |
| 2018-10-29                 | James Huang        | Initial report was written     | --       |
| Supplementary information: |                    |                                |          |

### Test items particulars

Equipment mobility..... : Permanent connection  
 Operating condition ..... : Continuous  
 Class of equipment ..... : Class I  
 Protection against ingress of water... : IP65 according to EN 60529  
 Mass of equipment [kg] ..... : 18

### Test case verdicts

Test case does not apply  
 to the test object..... : N/A  
 Test item does meet  
 the requirement ..... : P(ass)  
 Test item does not meet  
 the requirement ..... : F(ail)

### Testing

Date of receipt of test item ..... : 2018-09-06  
 Date(s) of performance of test ..... : 2018-09-06 to 2018-10-24

### General remarks:

The test result presented in this report relate only to the object(s) tested.  
 This report shall not be reproduced, except in full, without the written approval of the applicant.  
 "(see Annex #)" refers to additional information appended to the report.  
 "(see appended table)" refers to a table appended to the report.  
 Throughout this report a comma is used as the decimal separator.

### This Test Report consists of the following documents:

- Test Results
- Annex No. 1 – Pictures of the unit
- Annex No. 2 – Test equipment list

### Copy of marking plate

 型号 Model: SUN2000-3KTL-M0  
名称 Name: 太阳能光伏逆变器  
SOLAR INVERTER

最大输入电压 d.c. Max. Input Voltage: 1100 Vd.c.  
最大输入电流 d.c. Max. Input Current: 11 A/11 A  
输入短路电流 Isc: 15 A/15 A  
MPPT电压范围 d.c. MPPT Range: 140~980Vd.c.  
输出电压 a.c. Output Nominal Voltage:  
220/380Va.c., 230/400Va.c., 3(N)~+⊕  
输出频率 a.c. Nominal Operating Frequency: 50/60 Hz  
额定输出功率 a.c. Output Rated Power: 3kVA \*  
最大视在功率 a.c. Max. Output Apparent Power: 3.3kVA  
最大输出电流 a.c. Max. Output Current: 5.1A  
功率因数 Power Factor: 0.8(lagging)-0.8(leading)  
温度范围 Operating Temperature Range: -25 ~ +60 °C  
海拔Altitude: 4000m (>3000m refer to user manual)  
过电压类别 Overvoltage Category: II(DC)/III(AC)  
通讯方式 Communication: RS485/WLAN/PLC  
逆变器拓扑 Inverter Topology: Non-Isolation  
防护等级 Enclosure: IP65  
保护等级 Protection Class: I  
\*: CEI 0-16 & CEI 0-21: 3kW

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HUAWEI TECHNOLOGIES CO., LTD.  
HQ of Huawei, Bantian, Longgang District, Shenzhen, 518129, P.R.C.

中国制造  
MADE IN CHINA

 型号 Model: SUN2000-3KTL-M0  
名称 Name: 太阳能光伏逆变器  
SOLAR INVERTER

最大输入电压 d.c. Max. Input Voltage: 1100 Vd.c.  
最大输入电流 d.c. Max. Input Current: 11 A/11 A  
输入短路电流 Isc: 15 A/15 A  
MPPT电压范围 d.c. MPPT Range: 140~980Vd.c.  
输出电压 a.c. Output Nominal Voltage:  
220/380Va.c., 230/400Va.c., 3(N)~+⊕  
输出频率 a.c. Nominal Operating Frequency: 50/60 Hz  
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温度范围 Operating Temperature Range: -25 ~ +60 °C  
海拔Altitude: 4000m (>3000m refer to user manual)  
过电压类别 Overvoltage Category: II(DC)/III(AC)  
通讯方式 Communication: RS485/WLAN/PLC  
逆变器拓扑 Inverter Topology: Non-Isolation  
防护等级 Enclosure: IP65  
保护等级 Protection Class: I  
\*: CEI 0-16 & CEI 0-21: 3kW

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MADE IN CHINA

 型号 Model: SUN2000-3KTL-M0  
名称 Name: 太阳能光伏逆变器  
SOLAR INVERTER

最大输入电压 d.c. Max. Input Voltage: 1100 Vd.c.  
最大输入电流 d.c. Max. Input Current: 11 A/11 A  
输入短路电流 Isc: 15 A/15 A  
MPPT电压范围 d.c. MPPT Range: 140~980Vd.c.  
输出电压 a.c. Output Nominal Voltage:  
220/380Va.c., 230/400Va.c., 3(N)~+⊕  
输出频率 a.c. Nominal Operating Frequency: 50/60 Hz  
额定输出功率 a.c. Output Rated Power: 3kVA \*  
最大视在功率 a.c. Max. Output Apparent Power: 3.3kVA  
最大输出电流 a.c. Max. Output Current: 5.1A  
功率因数 Power Factor: 0.8(lagging)-0.8(leading)  
温度范围 Operating Temperature Range: -25 ~ +60 °C  
海拔Altitude: 4000m (>3000m refer to user manual)  
过电压类别 Overvoltage Category: II(DC)/III(AC)  
通讯方式 Communication: RS485/WLAN/PLC  
逆变器拓扑 Inverter Topology: Non-Isolation  
电池 Battery: 1100VDC Max; 16A Max  
防护等级 Enclosure: IP65  
保护等级 Protection Class: I  
\*: CEI 0-16 & CEI 0-21: 3kW

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HQ of Huawei, Bantian, Longgang District, Shenzhen, 518129, P.R.C.

中国制造  
MADE IN CHINA

 型号 Model: SUN2000-3KTL-M0  
名称 Name: 太阳能光伏逆变器  
SOLAR INVERTER

最大输入电压 d.c. Max. Input Voltage: 1100 Vd.c.  
最大输入电流 d.c. Max. Input Current: 11 A/11 A  
输入短路电流 Isc: 15 A/15 A  
MPPT电压范围 d.c. MPPT Range: 140~980Vd.c.  
输出电压 a.c. Output Nominal Voltage:  
220/380Va.c., 230/400Va.c., 3(N)~+⊕  
输出频率 a.c. Nominal Operating Frequency: 50/60 Hz  
额定输出功率 a.c. Output Rated Power: 3kVA \*  
最大视在功率 a.c. Max. Output Apparent Power: 3.3kVA  
最大输出电流 a.c. Max. Output Current: 5.1A  
功率因数 Power Factor: 0.8(lagging)-0.8(leading)  
温度范围 Operating Temperature Range: -25 ~ +60 °C  
海拔Altitude: 4000m (>3000m refer to user manual)  
过电压类别 Overvoltage Category: II(DC)/III(AC)  
通讯方式 Communication: RS485/WLAN/PLC  
逆变器拓扑 Inverter Topology: Non-Isolation  
电池 Battery: 1100VDC Max; 16A Max  
防护等级 Enclosure: IP65  
保护等级 Protection Class: I  
\*: CEI 0-16 & CEI 0-21: 3kW

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HQ of Huawei, Bantian, Longgang District, Shenzhen, 518129, P.R.C.

中国制造  
MADE IN CHINA

 型号 Model: SUN2000-4KTL-M0  
名称 Name: 太阳能光伏逆变器  
SOLAR INVERTER

最大输入电压 d.c. Max. Input Voltage: 1100 Vd.c.  
最大输入电流 d.c. Max. Input Current: 11 A/11 A  
输入短路电流 Isc: 15 A/15 A  
MPPT电压范围 d.c. MPPT Range: 140~980Vd.c.  
输出电压 a.c. Output Nominal Voltage:  
220/380Va.c., 230/400Va.c., 3(N)~+⊕  
输出频率 a.c. Nominal Operating Frequency: 50/60 Hz  
额定输出功率 a.c. Output Rated Power: 4kVA \*  
最大视在功率 a.c. Max. Output Apparent Power: 4.4kVA  
最大输出电流 a.c. Max. Output Current: 6.8A  
功率因数 Power Factor: 0.8(lagging)-0.8(leading)  
温度范围 Operating Temperature Range: -25 ~ +60 °C  
海拔Altitude: 4000m (>3000m refer to user manual)  
过电压类别 Overvoltage Category: II(DC)/III(AC)  
通讯方式 Communication: RS485/WLAN/PLC  
逆变器拓扑 Inverter Topology: Non-Isolation  
防护等级 Enclosure: IP65  
保护等级 Protection Class: I  
\*: CEI 0-16 & CEI 0-21: 4kW

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输入短路电流 Isc: 15 A/15 A  
MPPT电压范围 d.c. MPPT Range: 140~980Vd.c.  
输出电压 a.c. Output Nominal Voltage:  
220/380Va.c., 230/400Va.c., 3(N)~+⊕  
输出频率 a.c. Nominal Operating Frequency: 50/60 Hz  
额定输出功率 a.c. Output Rated Power: 4kVA \*  
最大视在功率 a.c. Max. Output Apparent Power: 4.4kVA  
最大输出电流 a.c. Max. Output Current: 6.8A  
功率因数 Power Factor: 0.8(lagging)-0.8(leading)  
温度范围 Operating Temperature Range: -25 ~ +60 °C  
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通讯方式 Communication: RS485/WLAN/PLC  
逆变器拓扑 Inverter Topology: Non-Isolation  
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MADE IN CHINA



### Copy of marking plate

 **型号 Model: SUN2000-4KTL-M0**  
**名称 Name: 太阳能光伏逆变器**  
**SOLAR INVERTER**

最大输入电压 d.c. Max. Input Voltage: 1100 Vd.c.  
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输出频率 a.c. Nominal Operating Frequency: 50/60 Hz  
额定输出功率 a.c. Output Rated Power: 4kVA \*  
最大视在功率 a.c. Max. Output Apparent Power: 4.4kVA  
最大输出电流 a.c. Max. Output Current: 8.8A  
功率因数 Power Factor: 0.8(lagging)-0.8(leading)  
温度范围 Operating Temperature Range: -25 ~ +60 °C  
海拔Altitude: 4000m (>3000m refer to user manual)  
过电压类别 Overvoltage Category: II(DC)/III(AC)  
通讯方式 Communication: RS485/WLAN/PLC  
逆变器拓扑 Inverter Topology: Non-Isolation  
电池 Battery: 1100VDC Max; 16A Max  
防护等级 Enclosure: IP65  
保护等级 Protection Class: I  
\*: CEI 0-16 & CEI 0-21:4kW

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HQ of Huawei, Bantian, Longgang District, Shenzhen, 518129, P.R.C

中国制造  
MADE IN CHINA

 **型号 Model: SUN2000-4KTL-M0**  
**名称 Name: 太阳能光伏逆变器**  
**SOLAR INVERTER**

最大输入电压 d.c. Max. Input Voltage: 1100 Vd.c.  
最大输入电流 d.c. Max. Input Current: 11 A/11 A  
输入短路电流 Isc: 15 A/15 A  
MPPT电压范围 d.c. MPPT Range: 140~980Vd.c.  
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220/380Va.c., 230/400Va.c., 3(N)~+⊕  
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\*: CEI 0-16 & CEI 0-21:4kW

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中国制造  
MADE IN CHINA

 **型号 Model: SUN2000-5KTL-M0**  
**名称 Name: 太阳能光伏逆变器**  
**SOLAR INVERTER**

最大输入电压 d.c. Max. Input Voltage: 1100 Vd.c.  
最大输入电流 d.c. Max. Input Current: 11 A/11 A  
输入短路电流 Isc: 15 A/15 A  
MPPT电压范围 d.c. MPPT Range: 140~980Vd.c.  
输出电压 a.c. Output Nominal Voltage:  
220/380Va.c., 230/400Va.c., 3(N)~+⊕  
输出频率 a.c. Nominal Operating Frequency: 50/60 Hz  
额定输出功率 a.c. Output Rated Power: 5kVA \*  
最大视在功率 a.c. Max. Output Apparent Power: 5.5kVA  
最大输出电流 a.c. Max. Output Current: 8.5A  
功率因数 Power Factor: 0.8(lagging)-0.8(leading)  
温度范围 Operating Temperature Range: -25 ~ +60 °C  
海拔Altitude: 4000m (>3000m refer to user manual)  
过电压类别 Overvoltage Category: II(DC)/III(AC)  
通讯方式 Communication: RS485/WLAN/PLC  
逆变器拓扑 Inverter Topology: Non-Isolation  
电池 Battery: 1100VDC Max; 16A Max  
防护等级 Enclosure: IP65  
保护等级 Protection Class: I  
\*: CEI 0-16 & CEI 0-21:5kW

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HUAWEI TECHNOLOGIES CO., LTD.  
HQ of Huawei, Bantian, Longgang District, Shenzhen, 518129, P.R.C

中国制造  
MADE IN CHINA

 **型号 Model: SUN2000-5KTL-M0**  
**名称 Name: 太阳能光伏逆变器**  
**SOLAR INVERTER**

最大输入电压 d.c. Max. Input Voltage: 1100 Vd.c.  
最大输入电流 d.c. Max. Input Current: 11 A/11 A  
输入短路电流 Isc: 15 A/15 A  
MPPT电压范围 d.c. MPPT Range: 140~980Vd.c.  
输出电压 a.c. Output Nominal Voltage:  
220/380Va.c., 230/400Va.c., 3(N)~+⊕  
输出频率 a.c. Nominal Operating Frequency: 50/60 Hz  
额定输出功率 a.c. Output Rated Power: 5kVA \*  
最大视在功率 a.c. Max. Output Apparent Power: 5.5kVA  
最大输出电流 a.c. Max. Output Current: 8.5A  
功率因数 Power Factor: 0.8(lagging)-0.8(leading)  
温度范围 Operating Temperature Range: -25 ~ +60 °C  
海拔Altitude: 4000m (>3000m refer to user manual)  
过电压类别 Overvoltage Category: II(DC)/III(AC)  
通讯方式 Communication: RS485/WLAN/PLC  
逆变器拓扑 Inverter Topology: Non-Isolation  
电池 Battery: 1100VDC Max; 16A Max  
防护等级 Enclosure: IP65  
保护等级 Protection Class: I  
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最大输入电流 d.c. Max. Input Current: 11 A/11 A  
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MPPT电压范围 d.c. MPPT Range: 140~980Vd.c.  
输出电压 a.c. Output Nominal Voltage:  
220/380Va.c., 230/400Va.c., 3(N)~+⊕  
输出频率 a.c. Nominal Operating Frequency: 50/60 Hz  
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最大视在功率 a.c. Max. Output Apparent Power: 5.5kVA  
最大输出电流 a.c. Max. Output Current: 8.5A  
功率因数 Power Factor: 0.8(lagging)-0.8(leading)  
温度范围 Operating Temperature Range: -25 ~ +60 °C  
海拔Altitude: 4000m (>3000m refer to user manual)  
过电压类别 Overvoltage Category: II(DC)/III(AC)  
通讯方式 Communication: RS485/WLAN/PLC  
逆变器拓扑 Inverter Topology: Non-Isolation  
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最大输入电流 d.c. Max. Input Current: 11 A/11 A  
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功率因数 Power Factor: 0.8(lagging)-0.8(leading)  
温度范围 Operating Temperature Range: -25 ~ +60 °C  
海拔Altitude: 4000m (>3000m refer to user manual)  
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通讯方式 Communication: RS485/WLAN/PLC  
逆变器拓扑 Inverter Topology: Non-Isolation  
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 **型号 Model: SUN2000-6KTL-M0**  
**名称 Name: 太阳能光伏逆变器**  
**SOLAR INVERTER**

最大输入电压 d.c. Max. Input Voltage: 1100 Vd.c.  
最大输入电流 d.c. Max. Input Current: 11 A/11 A  
输入短路电流 Isc: 15 A/15 A  
MPPT电压范围 d.c. MPPT Range: 140~980Vd.c.  
输出电压 a.c. Output Nominal Voltage:  
220/380Va.c., 230/400Va.c., 3(N)~+⊕  
输出频率 a.c. Nominal Operating Frequency: 50/60 Hz  
额定输出功率 a.c. Output Rated Power: 6kVA \*  
最大视在功率 a.c. Max. Output Apparent Power: 6.6kVA  
最大输出电流 a.c. Max. Output Current: 10.1A  
功率因数 Power Factor: 0.8(lagging)-0.8(leading)  
温度范围 Operating Temperature Range: -25~+60 °C  
海拔Altitude: 4000m (>3000m refer to user manual)  
过电压类别 Overvoltage Category: II(DC)/III(AC)  
通讯方式 Communication: RS485/WLAN/PLC  
逆变器拓扑 Inverter Topology: Non-isolation  
防护等级 Enclosure: IP65  
保护等级 Protection Class: I  
\*: CEI 0-16 & CEI 0-21: 8kW



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输出电压 a.c. Output Nominal Voltage:  
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输出频率 a.c. Nominal Operating Frequency: 50/60 Hz  
额定输出功率 a.c. Output Rated Power: 6kVA \*  
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最大输出电流 a.c. Max. Output Current: 10.1A  
功率因数 Power Factor: 0.8(lagging)-0.8(leading)  
温度范围 Operating Temperature Range: -25~+60 °C  
海拔Altitude: 4000m (>3000m refer to user manual)  
过电压类别 Overvoltage Category: II(DC)/III(AC)  
通讯方式 Communication: RS485/WLAN/PLC  
逆变器拓扑 Inverter Topology: Non-isolation  
防护等级 Enclosure: IP65  
保护等级 Protection Class: I  
电击故障保护 AFCI: TYPE I  
\*: CEI 0-16 & CEI 0-21: 8kW



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过电压类别 Overvoltage Category: II(DC)/III(AC)  
通讯方式 Communication: RS485/WLAN/PLC  
逆变器拓扑 Inverter Topology: Non-isolation  
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保护等级 Protection Class: I  
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输出频率 a.c. Nominal Operating Frequency: 50/60 Hz  
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最大视在功率 a.c. Max. Output Apparent Power: 6.6kVA  
最大输出电流 a.c. Max. Output Current: 10.1A  
功率因数 Power Factor: 0.8(lagging)-0.8(leading)  
温度范围 Operating Temperature Range: -25~+60 °C  
海拔Altitude: 4000m (>3000m refer to user manual)  
过电压类别 Overvoltage Category: II(DC)/III(AC)  
通讯方式 Communication: RS485/WLAN/PLC  
逆变器拓扑 Inverter Topology: Non-isolation  
防护等级 Enclosure: IP65  
保护等级 Protection Class: I  
电击故障保护 AFCI: TYPE I  
\*: CEI 0-16 & CEI 0-21: 8kW



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输入短路电流 Isc: 15 A/15 A  
MPPT电压范围 d.c. MPPT Range: 140~980Vd.c.  
输出电压 a.c. Output Nominal Voltage:  
220/380Va.c., 230/400Va.c., 3(N)~+⊕  
输出频率 a.c. Nominal Operating Frequency: 50/60 Hz  
额定输出功率 a.c. Output Rated Power: 6kVA \*  
最大视在功率 a.c. Max. Output Apparent Power: 6.6kVA  
最大输出电流 a.c. Max. Output Current: 13.5A  
功率因数 Power Factor: 0.8(lagging)-0.8(leading)  
温度范围 Operating Temperature Range: -25~+60 °C  
海拔Altitude: 4000m (>3000m refer to user manual)  
过电压类别 Overvoltage Category: II(DC)/III(AC)  
通讯方式 Communication: RS485/WLAN/PLC  
逆变器拓扑 Inverter Topology: Non-isolation  
防护等级 Enclosure: IP65  
保护等级 Protection Class: I  
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 **型号 Model: SUN2000-6KTL-M0**  
**名称 Name: 太阳能光伏逆变器**  
**SOLAR INVERTER**

最大输入电压 d.c. Max. Input Voltage: 1100 Vd.c.  
最大输入电流 d.c. Max. Input Current: 11 A/11 A  
输入短路电流 Isc: 15 A/15 A  
MPPT电压范围 d.c. MPPT Range: 140~980Vd.c.  
输出电压 a.c. Output Nominal Voltage:  
220/380Va.c., 230/400Va.c., 3(N)~+⊕  
输出频率 a.c. Nominal Operating Frequency: 50/60 Hz  
额定输出功率 a.c. Output Rated Power: 6kVA \*  
最大视在功率 a.c. Max. Output Apparent Power: 8.8kVA  
最大输出电流 a.c. Max. Output Current: 13.5A  
功率因数 Power Factor: 0.8(lagging)-0.8(leading)  
温度范围 Operating Temperature Range: -25~+60 °C  
海拔Altitude: 4000m (>3000m refer to user manual)  
过电压类别 Overvoltage Category: II(DC)/III(AC)  
通讯方式 Communication: RS485/WLAN/PLC  
逆变器拓扑 Inverter Topology: Non-isolation  
防护等级 Enclosure: IP65  
保护等级 Protection Class: I  
电击故障保护 AFCI: TYPE I  
\*: CEI 0-16 & CEI 0-21: 8kW



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 型号 Model: SUN2000-8KTL-M0  
名称 Name: 太阳能光伏逆变器  
SOLAR INVERTER

最大输入电压 d.c. Max. Input Voltage: 1100 Vd.c.  
最大输入电流 d.c. Max. Input Current: 11 A/11 A  
输入短路电流 Isc: 15 A/15 A  
MPPT电压范围 d.c. MPPT Range: 140 ~ 980Vd.c.  
输出电压 a.c. Output Nominal Voltage:  
220/380Va.c., 230/400Va.c., 3(N)~+⊕  
输出频率 a.c. Nominal Operating Frequency: 50/60 Hz  
额定输出功率 a.c. Output Rated Power: 8kVA\*  
最大视在功率 a.c. Max. Output Apparent Power: 8.8kVA  
最大输出电流 a.c. Max. Output Current: 13.5A  
功率因数 Power Factor: 0.8(lagging)-0.8(leading)  
温度范围 Operating Temperature Range: -25 ~ +60 °C  
海拔Altitude: 4000m (>3000m refer to user manual)  
过电压类别 Overvoltage Category: II(DC)/III(AC)  
通讯方式 Communication: RS485/WLAN/PLC  
逆变器拓扑 Inverter Topology: Non-Isolation  
电池 Battery: 1100VDC Max; 16A Max  
防护等级 Enclosure: IP65  
保护等级 Protection Class: I  
\*: CEI 0-16 & CEI 0-21:8kW

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最大输入电流 d.c. Max. Input Current: 11 A/11 A  
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MPPT电压范围 d.c. MPPT Range: 140 ~ 980Vd.c.  
输出电压 a.c. Output Nominal Voltage:  
220/380Va.c., 230/400Va.c., 3(N)~+⊕  
输出频率 a.c. Nominal Operating Frequency: 50/60 Hz  
额定输出功率 a.c. Output Rated Power: 8kVA\*  
最大视在功率 a.c. Max. Output Apparent Power: 8.8kVA  
最大输出电流 a.c. Max. Output Current: 13.5A  
功率因数 Power Factor: 0.8(lagging)-0.8(leading)  
温度范围 Operating Temperature Range: -25 ~ +60 °C  
海拔Altitude: 4000m (>3000m refer to user manual)  
过电压类别 Overvoltage Category: II(DC)/III(AC)  
通讯方式 Communication: RS485/WLAN/PLC  
逆变器拓扑 Inverter Topology: Non-Isolation  
电池 Battery: 1100VDC Max; 16A Max  
防护等级 Enclosure: IP65  
保护等级 Protection Class: I  
\*: CEI 0-16 & CEI 0-21:8kW

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 型号 Model: SUN2000-10KTL-M0  
名称 Name: 太阳能光伏逆变器  
SOLAR INVERTER

最大输入电压 d.c. Max. Input Voltage: 1100 Vd.c.  
最大输入电流 d.c. Max. Input Current: 11 A/11 A  
输入短路电流 Isc: 15 A/15 A  
MPPT电压范围 d.c. MPPT Range: 140 ~ 980Vd.c.  
输出电压 a.c. Output Nominal Voltage:  
220/380Va.c., 230/400Va.c., 3(N)~+⊕  
输出频率 a.c. Nominal Operating Frequency: 50/60 Hz  
额定输出功率 a.c. Output Rated Power: 10kVA\*  
最大视在功率 a.c. Max. Output Apparent Power: 11 kVA  
最大输出电流 a.c. Max. Output Current: 16.9A  
功率因数 Power Factor: 0.8(lagging)-0.8(leading)  
温度范围 Operating Temperature Range: -25 ~ +60 °C  
海拔Altitude: 4000m (>3000m refer to user manual)  
过电压类别 Overvoltage Category: II(DC)/III(AC)  
通讯方式 Communication: RS485/WLAN/PLC  
逆变器拓扑 Inverter Topology: Non-Isolation  
防护等级 Enclosure: IP65  
保护等级 Protection Class: I  
\*: CEI 0-16 & CEI 0-21 : 10kW

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最大输入电流 d.c. Max. Input Current: 11 A/11 A  
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输出频率 a.c. Nominal Operating Frequency: 50/60 Hz  
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最大视在功率 a.c. Max. Output Apparent Power: 11kVA  
最大输出电流 a.c. Max. Output Current: 16.9A  
功率因数 Power Factor: 0.8(lagging)-0.8(leading)  
温度范围 Operating Temperature Range: -25 ~ +60 °C  
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过电压类别 Overvoltage Category: II(DC)/III(AC)  
通讯方式 Communication: RS485/WLAN/PLC  
逆变器拓扑 Inverter Topology: Non-Isolation  
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保护等级 Protection Class: I  
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温度范围 Operating Temperature Range: -25 ~ +60 °C  
海拔Altitude: 4000m (>3000m refer to user manual)  
过电压类别 Overvoltage Category: II(DC)/III(AC)  
通讯方式 Communication: RS485/WLAN/PLC  
逆变器拓扑 Inverter Topology: Non-Isolation  
电池 Battery: 1100VDC Max; 16A Max  
防护等级 Enclosure: IP65  
保护等级 Protection Class: I  
\*: CEI 0-16 & CEI 0-21:10kW

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 型号 Model: SUN2000-10KTL-M0  
名称 Name: 太阳能光伏逆变器  
SOLAR INVERTER

最大输入电压 d.c. Max. Input Voltage: 1100 Vd.c.  
最大输入电流 d.c. Max. Input Current: 11 A/11 A  
输入短路电流 Isc: 15 A/15 A  
MPPT电压范围 d.c. MPPT Range: 140 ~ 980Vd.c.  
输出电压 a.c. Output Nominal Voltage:  
220/380Va.c., 230/400Va.c., 3(N)~+⊕  
输出频率 a.c. Nominal Operating Frequency: 50/60 Hz  
额定输出功率 a.c. Output Rated Power: 10kVA\*  
最大视在功率 a.c. Max. Output Apparent Power : 11kVA  
最大输出电流 a.c. Max. Output Current: 16.9A  
功率因数 Power Factor: 0.8(lagging)-0.8(leading)  
温度范围 Operating Temperature Range: -25 ~ +60 °C  
海拔Altitude: 4000m (>3000m refer to user manual)  
过电压类别 Overvoltage Category: II(DC)/III(AC)  
通讯方式 Communication: RS485/WLAN/PLC  
逆变器拓扑 Inverter Topology: Non-Isolation  
电池 Battery: 1100VDC Max; 16A Max  
防护等级 Enclosure: IP65  
保护等级 Protection Class: I  
\*: CEI 0-16 & CEI 0-21:10kW

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 型号 Model: SUN2000-3KTL-M1  
名称 Name: 太阳能光伏逆变器  
SOLAR INVERTER

最大输入电压 d.c. Max. Input Voltage: 1100 Vd.c.  
最大输入电流 d.c. Max. Input Current: 11 A/11 A  
输入短路电流 Isc: 15 A/15 A  
MPPT电压范围 d.c. MPPT Range: 140~980Vd.c.  
输出电压 a.c. Output Nominal Voltage:  
220/380Va.c., 230/400Va.c., 3(N)~+⊕  
输出频率 a.c. Nominal Operating Frequency: 50/60 Hz  
额定输出功率 a.c. Output Rated Power: 3kVA \*  
最大视在功率 a.c. Max. Output Apparent Power: 3.3kVA  
最大输出电流 a.c. Max. Output Current: 5.1A  
功率因数 Power Factor: 0.8(lagging)-0.8(leading)  
温度范围 Operating Temperature Range: -25 ~ +60 °C  
海拔Altitude: 4000m (>3000m refer to user manual)  
过电压类别 Overvoltage Category: II(DC)/III(AC)  
通讯方式 Communication: RS485/WLAN/PLC  
逆变器拓扑 Inverter Topology: Non-isolation  
防护等级 Enclosure: IP65  
保护等级 Protection Class: I  
\*: CEI 0-16 & CEI 0-21: 3kW

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 型号 Model: SUN2000-3KTL-M1  
名称 Name: 太阳能光伏逆变器  
SOLAR INVERTER

最大输入电压 d.c. Max. Input Voltage: 1100 Vd.c.  
最大输入电流 d.c. Max. Input Current: 11 A/11 A  
输入短路电流 Isc: 15 A/15 A  
MPPT电压范围 d.c. MPPT Range: 140~980Vd.c.  
输出电压 a.c. Output Nominal Voltage:  
220/380Va.c., 230/400Va.c., 3(N)~+⊕  
输出频率 a.c. Nominal Operating Frequency: 50/60 Hz  
额定输出功率 a.c. Output Rated Power: 3kVA \*  
最大视在功率 a.c. Max. Output Apparent Power: 3.3kVA  
最大输出电流 a.c. Max. Output Current: 5.1A  
功率因数 Power Factor: 0.8(lagging)-0.8(leading)  
温度范围 Operating Temperature Range: -25 ~ +60 °C  
海拔Altitude: 4000m (>3000m refer to user manual)  
过电压类别 Overvoltage Category: II(DC)/III(AC)  
通讯方式 Communication: RS485/WLAN/PLC  
逆变器拓扑 Inverter Topology: Non-isolation  
防护等级 Enclosure: IP65  
保护等级 Protection Class: I  
电弧故障保护 AFCI: TYPE I  
\*: CEI 0-16 & CEI 0-21: 3kW

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 型号 Model: SUN2000-3KTL-M1  
名称 Name: 太阳能光伏逆变器  
SOLAR INVERTER

最大输入电压 d.c. Max. Input Voltage: 1100 Vd.c.  
最大输入电流 d.c. Max. Input Current: 11 A/11 A  
输入短路电流 Isc: 15 A/15 A  
MPPT电压范围 d.c. MPPT Range: 140~980Vd.c.  
输出电压 a.c. Output Nominal Voltage:  
220/380Va.c., 230/400Va.c., 3(N)~+⊕  
输出频率 a.c. Nominal Operating Frequency: 50/60 Hz  
额定输出功率 a.c. Output Rated Power: 3kVA \*  
最大视在功率 a.c. Max. Output Apparent Power: 3.3kVA  
最大输出电流 a.c. Max. Output Current: 5.1A  
功率因数 Power Factor: 0.8(lagging)-0.8(leading)  
温度范围 Operating Temperature Range: -25 ~ +60 °C  
海拔Altitude: 4000m (>3000m refer to user manual)  
过电压类别 Overvoltage Category: II(DC)/III(AC)  
通讯方式 Communication: RS485/WLAN/PLC  
逆变器拓扑 Inverter Topology: Non-isolation  
电池 Battery: 1100VDC Max; 16A Max  
防护等级 Enclosure: IP65  
保护等级 Protection Class: I  
\*: CEI 0-16 & CEI 0-21: 3kW

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 型号 Model: SUN2000-3KTL-M1  
名称 Name: 太阳能光伏逆变器  
SOLAR INVERTER

最大输入电压 d.c. Max. Input Voltage: 1100 Vd.c.  
最大输入电流 d.c. Max. Input Current: 11 A/11 A  
输入短路电流 Isc: 15 A/15 A  
MPPT电压范围 d.c. MPPT Range: 140~980Vd.c.  
输出电压 a.c. Output Nominal Voltage:  
220/380Va.c., 230/400Va.c., 3(N)~+⊕  
输出频率 a.c. Nominal Operating Frequency: 50/60 Hz  
额定输出功率 a.c. Output Rated Power: 3kVA \*  
最大视在功率 a.c. Max. Output Apparent Power: 3.3kVA  
最大输出电流 a.c. Max. Output Current: 5.1A  
功率因数 Power Factor: 0.8(lagging)-0.8(leading)  
温度范围 Operating Temperature Range: -25 ~ +60 °C  
海拔Altitude: 4000m (>3000m refer to user manual)  
过电压类别 Overvoltage Category: II(DC)/III(AC)  
通讯方式 Communication: RS485/WLAN/PLC  
逆变器拓扑 Inverter Topology: Non-isolation  
电池 Battery: 1100VDC Max; 16A Max  
防护等级 Enclosure: IP65  
保护等级 Protection Class: I  
电弧故障保护 AFCI: TYPE I  
\*: CEI 0-16 & CEI 0-21: 3kW

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 型号 Model: SUN2000-4KTL-M1  
名称 Name: 太阳能光伏逆变器  
SOLAR INVERTER

最大输入电压 d.c. Max. Input Voltage: 1100 Vd.c.  
最大输入电流 d.c. Max. Input Current: 11 A/11 A  
输入短路电流 Isc: 15 A/15 A  
MPPT电压范围 d.c. MPPT Range: 140~980Vd.c.  
输出电压 a.c. Output Nominal Voltage:  
220/380Va.c., 230/400Va.c., 3(N)~+⊕  
输出频率 a.c. Nominal Operating Frequency: 50/60 Hz  
额定输出功率 a.c. Output Rated Power: 4kVA \*  
最大视在功率 a.c. Max. Output Apparent Power: 4.4kVA  
最大输出电流 a.c. Max. Output Current: 6.8A  
功率因数 Power Factor: 0.8(lagging)-0.8(leading)  
温度范围 Operating Temperature Range: -25 ~ +60 °C  
海拔Altitude: 4000m (>3000m refer to user manual)  
过电压类别 Overvoltage Category: II(DC)/III(AC)  
通讯方式 Communication: RS485/WLAN/PLC  
逆变器拓扑 Inverter Topology: Non-isolation  
防护等级 Enclosure: IP65  
保护等级 Protection Class: I  
\*: CEI 0-16 & CEI 0-21: 4kW

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 型号 Model: SUN2000-4KTL-M1  
名称 Name: 太阳能光伏逆变器  
SOLAR INVERTER

最大输入电压 d.c. Max. Input Voltage: 1100 Vd.c.  
最大输入电流 d.c. Max. Input Current: 11 A/11 A  
输入短路电流 Isc: 15 A/15 A  
MPPT电压范围 d.c. MPPT Range: 140~980Vd.c.  
输出电压 a.c. Output Nominal Voltage:  
220/380Va.c., 230/400Va.c., 3(N)~+⊕  
输出频率 a.c. Nominal Operating Frequency: 50/60 Hz  
额定输出功率 a.c. Output Rated Power: 4kVA \*  
最大视在功率 a.c. Max. Output Apparent Power: 4.4kVA  
最大输出电流 a.c. Max. Output Current: 6.8A  
功率因数 Power Factor: 0.8(lagging)-0.8(leading)  
温度范围 Operating Temperature Range: -25 ~ +60 °C  
海拔Altitude: 4000m (>3000m refer to user manual)  
过电压类别 Overvoltage Category: II(DC)/III(AC)  
通讯方式 Communication: RS485/WLAN/PLC  
逆变器拓扑 Inverter Topology: Non-isolation  
防护等级 Enclosure: IP65  
保护等级 Protection Class: I  
电弧故障保护 AFCI: TYPE I  
\*: CEI 0-16 & CEI 0-21: 4kW

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 型号 Model: SUN2000-4KTL-M1  
名称 Name: 太阳能光伏逆变器  
SOLAR INVERTER

最大输入电压 d.c. Max. Input Voltage: 1100 Vd.c.  
最大输入电流 d.c. Max. Input Current: 11 A/11 A  
输入短路电流 Isc: 15 A/15 A  
MPPT电压范围 d.c. MPPT Range: 140~980Vd.c.  
输出电压 a.c. Output Nominal Voltage:  
220/380Va.c., 230/400Va.c., 3(N)~+⊕  
输出频率 a.c. Nominal Operating Frequency: 50/60 Hz  
额定输出功率 a.c. Output Rated Power: 4kVA \*  
最大视在功率 a.c. Max. Output Apparent Power: 4.4kVA  
最大输出电流 a.c. Max. Output Current: 8.8A  
功率因数 Power Factor: 0.8(lagging)-0.8(leading)  
温度范围 Operating Temperature Range: -25 ~ +60 °C  
海拔Altitude: 4000m (>3000m refer to user manual)  
过电压类别 Overvoltage Category: II(DC)/III(AC)  
通讯方式 Communication: RS485/WLAN/PLC  
逆变器拓扑 Inverter Topology: Non-Isolation  
电池 Battery: 1100VDC Max; 16A Max  
防护等级 Enclosure: IP65  
保护等级 Protection Class: I  
\*: CEI 0-16 & CEI 0-21: 4kW



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 型号 Model: SUN2000-4KTL-M1  
名称 Name: 太阳能光伏逆变器  
SOLAR INVERTER

最大输入电压 d.c. Max. Input Voltage: 1100 Vd.c.  
最大输入电流 d.c. Max. Input Current: 11 A/11 A  
输入短路电流 Isc: 15 A/15 A  
MPPT电压范围 d.c. MPPT Range: 140~980Vd.c.  
输出电压 a.c. Output Nominal Voltage:  
220/380Va.c., 230/400Va.c., 3(N)~+⊕  
输出频率 a.c. Nominal Operating Frequency: 50/60 Hz  
额定输出功率 a.c. Output Rated Power: 4kVA \*  
最大视在功率 a.c. Max. Output Apparent Power: 4.4kVA  
最大输出电流 a.c. Max. Output Current: 8.8A  
功率因数 Power Factor: 0.8(lagging)-0.8(leading)  
温度范围 Operating Temperature Range: -25 ~ +60 °C  
海拔Altitude: 4000m (>3000m refer to user manual)  
过电压类别 Overvoltage Category: II(DC)/III(AC)  
通讯方式 Communication: RS485/WLAN/PLC  
逆变器拓扑 Inverter Topology: Non-Isolation  
电池 Battery: 1100VDC Max; 16A Max  
防护等级 Enclosure: IP65  
保护等级 Protection Class: I  
电弧故障保护 AFCI: TYPE I  
\*: CEI 0-16 & CEI 0-21: 4kW



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 型号 Model: SUN2000-5KTL-M1  
名称 Name: 太阳能光伏逆变器  
SOLAR INVERTER

最大输入电压 d.c. Max. Input Voltage: 1100 Vd.c.  
最大输入电流 d.c. Max. Input Current: 11 A/11 A  
输入短路电流 Isc: 15 A/15 A  
MPPT电压范围 d.c. MPPT Range: 140~980Vd.c.  
输出电压 a.c. Output Nominal Voltage:  
220/380Va.c., 230/400Va.c., 3(N)~+⊕  
输出频率 a.c. Nominal Operating Frequency: 50/60 Hz  
额定输出功率 a.c. Output Rated Power: 5kVA \*  
最大视在功率 a.c. Max. Output Apparent Power: 5.5kVA  
最大输出电流 a.c. Max. Output Current: 8.5A  
功率因数 Power Factor: 0.8(lagging)-0.8(leading)  
温度范围 Operating Temperature Range: -25 ~ +60 °C  
海拔Altitude: 4000m (>3000m refer to user manual)  
过电压类别 Overvoltage Category: II(DC)/III(AC)  
通讯方式 Communication: RS485/WLAN/PLC  
逆变器拓扑 Inverter Topology: Non-Isolation  
电池 Battery: 1100VDC Max; 16A Max  
防护等级 Enclosure: IP65  
保护等级 Protection Class: I  
\*: CEI 0-16 & CEI 0-21: 5kW



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 型号 Model: SUN2000-5KTL-M1  
名称 Name: 太阳能光伏逆变器  
SOLAR INVERTER

最大输入电压 d.c. Max. Input Voltage: 1100 Vd.c.  
最大输入电流 d.c. Max. Input Current: 11 A/11 A  
输入短路电流 Isc: 15 A/15 A  
MPPT电压范围 d.c. MPPT Range: 140~980Vd.c.  
输出电压 a.c. Output Nominal Voltage:  
220/380Va.c., 230/400Va.c., 3(N)~+⊕  
输出频率 a.c. Nominal Operating Frequency: 50/60 Hz  
额定输出功率 a.c. Output Rated Power: 5kVA \*  
最大视在功率 a.c. Max. Output Apparent Power: 5.5kVA  
最大输出电流 a.c. Max. Output Current: 8.5A  
功率因数 Power Factor: 0.8(lagging)-0.8(leading)  
温度范围 Operating Temperature Range: -25 ~ +60 °C  
海拔Altitude: 4000m (>3000m refer to user manual)  
过电压类别 Overvoltage Category: II(DC)/III(AC)  
通讯方式 Communication: RS485/WLAN/PLC  
逆变器拓扑 Inverter Topology: Non-Isolation  
电池 Battery: 1100VDC Max; 16A Max  
防护等级 Enclosure: IP65  
保护等级 Protection Class: I  
电弧故障保护 AFCI: TYPE I  
\*: CEI 0-16 & CEI 0-21: 5kW



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 型号 Model: SUN2000-5KTL-M1  
名称 Name: 太阳能光伏逆变器  
SOLAR INVERTER

最大输入电压 d.c. Max. Input Voltage: 1100 Vd.c.  
最大输入电流 d.c. Max. Input Current: 11 A/11 A  
输入短路电流 Isc: 15 A/15 A  
MPPT电压范围 d.c. MPPT Range: 140~980Vd.c.  
输出电压 a.c. Output Nominal Voltage:  
220/380Va.c., 230/400Va.c., 3(N)~+⊕  
输出频率 a.c. Nominal Operating Frequency: 50/60 Hz  
额定输出功率 a.c. Output Rated Power: 5kVA \*  
最大视在功率 a.c. Max. Output Apparent Power: 5.5kVA  
最大输出电流 a.c. Max. Output Current: 8.5A  
功率因数 Power Factor: 0.8(lagging)-0.8(leading)  
温度范围 Operating Temperature Range: -25 ~ +60 °C  
海拔Altitude: 4000m (>3000m refer to user manual)  
过电压类别 Overvoltage Category: II(DC)/III(AC)  
通讯方式 Communication: RS485/WLAN/PLC  
逆变器拓扑 Inverter Topology: Non-Isolation  
电池 Battery: 1100VDC Max; 16A Max  
防护等级 Enclosure: IP65  
保护等级 Protection Class: I  
\*: CEI 0-16 & CEI 0-21: 5kW



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 型号 Model: SUN2000-5KTL-M1  
名称 Name: 太阳能光伏逆变器  
SOLAR INVERTER

最大输入电压 d.c. Max. Input Voltage: 1100 Vd.c.  
最大输入电流 d.c. Max. Input Current: 11 A/11 A  
输入短路电流 Isc: 15 A/15 A  
MPPT电压范围 d.c. MPPT Range: 140~980Vd.c.  
输出电压 a.c. Output Nominal Voltage:  
220/380Va.c., 230/400Va.c., 3(N)~+⊕  
输出频率 a.c. Nominal Operating Frequency: 50/60 Hz  
额定输出功率 a.c. Output Rated Power: 5kVA \*  
最大视在功率 a.c. Max. Output Apparent Power: 5.5kVA  
最大输出电流 a.c. Max. Output Current: 8.5A  
功率因数 Power Factor: 0.8(lagging)-0.8(leading)  
温度范围 Operating Temperature Range: -25 ~ +60 °C  
海拔Altitude: 4000m (>3000m refer to user manual)  
过电压类别 Overvoltage Category: II(DC)/III(AC)  
通讯方式 Communication: RS485/WLAN/PLC  
逆变器拓扑 Inverter Topology: Non-Isolation  
电池 Battery: 1100VDC Max; 16A Max  
防护等级 Enclosure: IP65  
保护等级 Protection Class: I  
电弧故障保护 AFCI: TYPE I  
\*: CEI 0-16 & CEI 0-21: 5kW



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 型号 Model: SUN2000-6KTL-M1  
名称 Name: 太阳能光伏逆变器  
SOLAR INVERTER

最大输入电压 d.c. Max. Input Voltage: 1100 Vd.c.  
最大输入电流 d.c. Max. Input Current: 11 A/11 A  
输入短路电流 Isc: 15 A/15 A  
MPPT电压范围 d.c. MPPT Range: 140~980Vd.c.  
输出电压 a.c. Output Nominal Voltage:  
220/380Va.c., 230/400Va.c., 3(N)~+⊕  
输出频率 a.c. Nominal Operating Frequency: 50/60 Hz  
额定输出功率 a.c. Output Rated Power: 6kVA \*  
最大视在功率 a.c. Max. Output Apparent Power: 6.6kVA  
最大输出电流 a.c. Max. Output Current: 10.1A  
功率因数 Power Factor: 0.8(lagging)-0.8(leading)  
温度范围 Operating Temperature Range: -25~+60 °C  
海拔Altitude: 4000m (>3000m refer to user manual)  
过电压类别 Overvoltage Category: II(DC)/III(AC)  
通讯方式 Communication: RS485/WLAN/PLC  
逆变器拓扑 Inverter Topology: Non-isolation  
防护等级 Enclosure: IP65  
保护等级 Protection Class: I  
\*: CEI 0-16 & CEI 0-21: 6kW



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 型号 Model: SUN2000-6KTL-M1  
名称 Name: 太阳能光伏逆变器  
SOLAR INVERTER

最大输入电压 d.c. Max. Input Voltage: 1100 Vd.c.  
最大输入电流 d.c. Max. Input Current: 11 A/11 A  
输入短路电流 Isc: 15 A/15 A  
MPPT电压范围 d.c. MPPT Range: 140~980Vd.c.  
输出电压 a.c. Output Nominal Voltage:  
220/380Va.c., 230/400Va.c., 3(N)~+⊕  
输出频率 a.c. Nominal Operating Frequency: 50/60 Hz  
额定输出功率 a.c. Output Rated Power: 6kVA \*  
最大视在功率 a.c. Max. Output Apparent Power: 6.6kVA  
最大输出电流 a.c. Max. Output Current: 10.1A  
功率因数 Power Factor: 0.8(lagging)-0.8(leading)  
温度范围 Operating Temperature Range: -25~+60 °C  
海拔Altitude: 4000m (>3000m refer to user manual)  
过电压类别 Overvoltage Category: II(DC)/III(AC)  
通讯方式 Communication: RS485/WLAN/PLC  
逆变器拓扑 Inverter Topology: Non-isolation  
防护等级 Enclosure: IP65  
保护等级 Protection Class: I  
电涌故障保护 AFCI: TYPE I  
\*: CEI 0-16 & CEI 0-21: 6kW



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 型号 Model: SUN2000-6KTL-M1  
名称 Name: 太阳能光伏逆变器  
SOLAR INVERTER

最大输入电压 d.c. Max. Input Voltage: 1100 Vd.c.  
最大输入电流 d.c. Max. Input Current: 11 A/11 A  
输入短路电流 Isc: 15 A/15 A  
MPPT电压范围 d.c. MPPT Range: 140~980Vd.c.  
输出电压 a.c. Output Nominal Voltage:  
220/380Va.c., 230/400Va.c., 3(N)~+⊕  
输出频率 a.c. Nominal Operating Frequency: 50/60 Hz  
额定输出功率 a.c. Output Rated Power: 6kVA \*  
最大视在功率 a.c. Max. Output Apparent Power: 6.6kVA  
最大输出电流 a.c. Max. Output Current: 10.1A  
功率因数 Power Factor: 0.8(lagging)-0.8(leading)  
温度范围 Operating Temperature Range: -25~+60 °C  
海拔Altitude: 4000m (>3000m refer to user manual)  
过电压类别 Overvoltage Category: II(DC)/III(AC)  
通讯方式 Communication: RS485/WLAN/PLC  
逆变器拓扑 Inverter Topology: Non-isolation  
防护等级 Enclosure: IP65  
保护等级 Protection Class: I  
\*: CEI 0-16 & CEI 0-21: 6kW



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 型号 Model: SUN2000-6KTL-M1  
名称 Name: 太阳能光伏逆变器  
SOLAR INVERTER

最大输入电压 d.c. Max. Input Voltage: 1100 Vd.c.  
最大输入电流 d.c. Max. Input Current: 11 A/11 A  
输入短路电流 Isc: 15 A/15 A  
MPPT电压范围 d.c. MPPT Range: 140~980Vd.c.  
输出电压 a.c. Output Nominal Voltage:  
220/380Va.c., 230/400Va.c., 3(N)~+⊕  
输出频率 a.c. Nominal Operating Frequency: 50/60 Hz  
额定输出功率 a.c. Output Rated Power: 6kVA \*  
最大视在功率 a.c. Max. Output Apparent Power: 6.6kVA  
最大输出电流 a.c. Max. Output Current: 10.1A  
功率因数 Power Factor: 0.8(lagging)-0.8(leading)  
温度范围 Operating Temperature Range: -25~+60 °C  
海拔Altitude: 4000m (>3000m refer to user manual)  
过电压类别 Overvoltage Category: II(DC)/III(AC)  
通讯方式 Communication: RS485/WLAN/PLC  
逆变器拓扑 Inverter Topology: Non-isolation  
电池 Battery: 1100VDC Max; 16A Max  
防护等级 Enclosure: IP65  
保护等级 Protection Class: I  
电涌故障保护 AFCI: TYPE I  
\*: CEI 0-16 & CEI 0-21: 6kW



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输出电压 a.c. Output Nominal Voltage:  
220/380Va.c., 230/400Va.c., 3(N)~+⊕  
输出频率 a.c. Nominal Operating Frequency: 50/60 Hz  
额定输出功率 a.c. Output Rated Power: 6kVA \*  
最大视在功率 a.c. Max. Output Apparent Power: 8.8kVA  
最大输出电流 a.c. Max. Output Current: 13.5A  
功率因数 Power Factor: 0.8(lagging)-0.8(leading)  
温度范围 Operating Temperature Range: -25~+60 °C  
海拔Altitude: 4000m (>3000m refer to user manual)  
过电压类别 Overvoltage Category: II(DC)/III(AC)  
通讯方式 Communication: RS485/WLAN/PLC  
逆变器拓扑 Inverter Topology: Non-isolation  
防护等级 Enclosure: IP65  
保护等级 Protection Class: I  
\*: CEI 0-16 & CEI 0-21: 8kW



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最大输入电压 d.c. Max. Input Voltage: 1100 Vd.c.  
最大输入电流 d.c. Max. Input Current: 11 A/11 A  
输入短路电流 Isc: 15 A/15 A  
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输出电压 a.c. Output Nominal Voltage:  
220/380Va.c., 230/400Va.c., 3(N)~+⊕  
输出频率 a.c. Nominal Operating Frequency: 50/60 Hz  
额定输出功率 a.c. Output Rated Power: 6kVA \*  
最大视在功率 a.c. Max. Output Apparent Power: 8.8kVA  
最大输出电流 a.c. Max. Output Current: 13.5A  
功率因数 Power Factor: 0.8(lagging)-0.8(leading)  
温度范围 Operating Temperature Range: -25~+60 °C  
海拔Altitude: 4000m (>3000m refer to user manual)  
过电压类别 Overvoltage Category: II(DC)/III(AC)  
通讯方式 Communication: RS485/WLAN/PLC  
逆变器拓扑 Inverter Topology: Non-isolation  
防护等级 Enclosure: IP65  
保护等级 Protection Class: I  
电涌故障保护 AFCI: TYPE I  
\*: CEI 0-16 & CEI 0-21: 8kW



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### Copy of marking plate

 **型号 Model: SUN2000-8KTL-M1**  
**名称 Name: 太阳能光伏逆变器**  
**SOLAR INVERTER**

最大输入电压 d.c. Max. Input Voltage: 1100 Vd.c.  
最大输入电流 d.c. Max. Input Current: 11 A/11 A  
输入短路电流 Isc: 15 A/15 A  
MPPT电压范围 d.c. MPPT Range: 140~980Vd.c.  
输出电压 a.c. Output Nominal Voltage:  
220/380Va.c., 230/400Va.c., 3(N)~+⊕  
输出频率 a.c. Nominal Operating Frequency: 50/60 Hz  
额定输出功率 a.c. Output Rated Power: 8kVA\*  
最大视在功率 a.c. Max. Output Apparent Power: 8.8kVA  
最大输出电流 a.c. Max. Output Current: 13.5A  
功率因数 Power Factor: 0.8(lagging)-0.8(leading)  
温度范围 Operating Temperature Range: -25 ~ +60 °C  
海拔Altitude: 4000m (>3000m refer to user manual)  
过电压类别 Overvoltage Category: II(DC)/III(AC)  
通讯方式 Communication: RS485/WLAN/PLC  
逆变器拓扑 Inverter Topology: Non-Isolation  
电池 Battery: 1100VDC Max; 16A Max  
防护等级 Enclosure: IP65  
保护等级 Protection Class: I  
\*: CEI 0-16 & CEI 0-21: 8kW



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 **型号 Model: SUN2000-8KTL-M1**  
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最大输入电压 d.c. Max. Input Voltage: 1100 Vd.c.  
最大输入电流 d.c. Max. Input Current: 11 A/11 A  
输入短路电流 Isc: 15 A/15 A  
MPPT电压范围 d.c. MPPT Range: 140~980Vd.c.  
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220/380Va.c., 230/400Va.c., 3(N)~+⊕  
输出频率 a.c. Nominal Operating Frequency: 50/60 Hz  
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最大视在功率 a.c. Max. Output Apparent Power: 8.8kVA  
最大输出电流 a.c. Max. Output Current: 13.5A  
功率因数 Power Factor: 0.8(lagging)-0.8(leading)  
温度范围 Operating Temperature Range: -25 ~ +60 °C  
海拔Altitude: 4000m (>3000m refer to user manual)  
过电压类别 Overvoltage Category: II(DC)/III(AC)  
通讯方式 Communication: RS485/WLAN/PLC  
逆变器拓扑 Inverter Topology: Non-Isolation  
电池 Battery: 1100VDC Max; 16A Max  
防护等级 Enclosure: IP65  
保护等级 Protection Class: I  
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**SOLAR INVERTER**

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最大输入电流 d.c. Max. Input Current: 11 A/11 A  
输入短路电流 Isc: 15 A/15 A  
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输出电压 a.c. Output Nominal Voltage:  
220/380Va.c., 230/400Va.c., 3(N)~+⊕  
输出频率 a.c. Nominal Operating Frequency: 50/60 Hz  
额定输出功率 a.c. Output Rated Power: 10kVA\*  
最大视在功率 a.c. Max. Output Apparent Power: 11 kVA  
最大输出电流 a.c. Max. Output Current: 16.9A  
功率因数 Power Factor: 0.8(lagging)-0.8(leading)  
温度范围 Operating Temperature Range: -25 ~ +60 °C  
海拔Altitude: 4000m (>3000m refer to user manual)  
过电压类别 Overvoltage Category: II(DC)/III(AC)  
通讯方式 Communication: RS485/WLAN/PLC  
逆变器拓扑 Inverter Topology: Non-Isolation  
电池 Battery: 1100VDC Max; 16A Max  
防护等级 Enclosure: IP65  
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最大输出电流 a.c. Max. Output Current: 16.9A  
功率因数 Power Factor: 0.8(lagging)-0.8(leading)  
温度范围 Operating Temperature Range: -25 ~ +60 °C  
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通讯方式 Communication: RS485/WLAN/PLC  
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最大输入电流 d.c. Max. Input Current: 11 A/11 A  
输入短路电流 Isc: 15 A/15 A  
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温度范围 Operating Temperature Range: -25 ~ +60 °C  
海拔Altitude: 4000m (>3000m refer to user manual)  
过电压类别 Overvoltage Category: II(DC)/III(AC)  
通讯方式 Communication: RS485/WLAN/PLC  
逆变器拓扑 Inverter Topology: Non-Isolation  
电池 Battery: 1100VDC Max; 16A Max  
防护等级 Enclosure: IP65  
保护等级 Protection Class: I  
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MPPT电压范围 d.c. MPPT Range: 140~980Vd.c.  
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220/380Va.c., 230/400Va.c., 3(N)~+⊕  
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|      |                                     |      |                          |      |                          |
|------|-------------------------------------|------|--------------------------|------|--------------------------|
| DRM0 | <input checked="" type="checkbox"/> | DRM1 | <input type="checkbox"/> | DRM2 | <input type="checkbox"/> |
| DRM3 | <input type="checkbox"/>            | DRM4 | <input type="checkbox"/> | DRM5 | <input type="checkbox"/> |
| DRM6 | <input type="checkbox"/>            | DRM7 | <input type="checkbox"/> | DRM8 | <input type="checkbox"/> |

## General product information:

The Solar converter converts DC voltage into AC voltage.  
The DC input of Solar converter can be supplied from PV array.

The input and output are protected by Varistors to Earth. The unit is providing EMC filtering at the output toward mains. The unit does not provide galvanic separation from input to output (transformerless). The output is switched off redundant by the high power switching bridge and a two relays. This assures that the opening of the output circuit will also operate in case of one error.

## Description of the electrical circuit: (Figure 1):

The internal control is redundant built. It consists of Microcontroller DSP (U3) and MCU (U33).

The DSP (U3) control the relays by switching signals; measures the PV voltage, PV current, Bus voltage, grid voltage, frequency, AC current with injected DC and the array insulation resistance to ground. In addition it tests the current sensors and the RCMU circuit before each start up.

The MCU (U33) is measures the grid voltage, grid frequency, DCI and residual current, also can switch off the relays independently, and communicate with the DSP (U3) each other.

The current is measured by a current sensor. The AC current signal and the injected DC current signal are sent to the DSP (U3). The DSP (U3) tests and calibrates before each start up all current sensors.

The unit provides two relays in series in all output conductors. When single fault applied to one relay, alarm an error code in display panel, another redundant relay provides basic insulation maintained between the PV array and the mains. All the relays are tested before each start up.

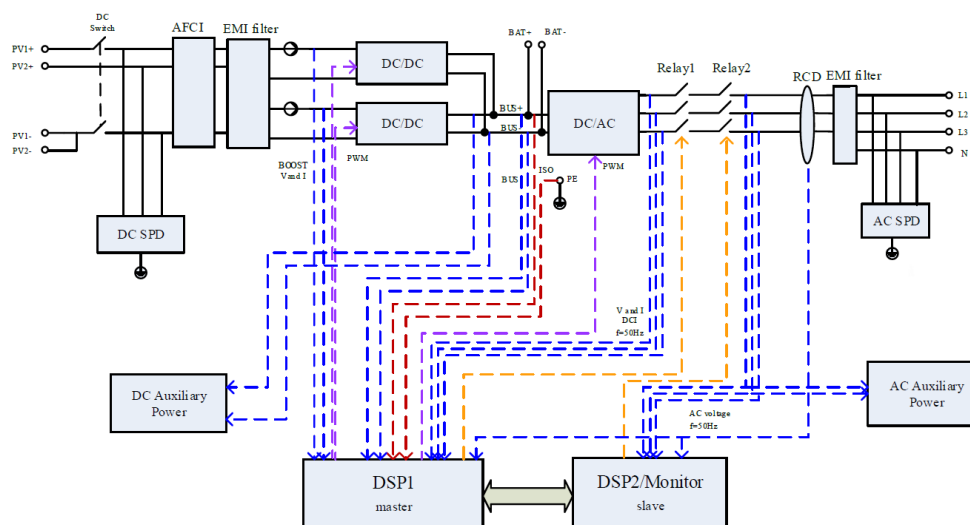


Figure 1 – Block diagram

## Differences of the models:

The models SUN2000-3KTL-M0, SUN2000-4KTL-M0, SUN2000-5KTL-M0, SUN2000-6KTL-M0, SUN2000-8KTL-M0 and SUN2000-10KTL-M0 are almost identical in hardware except current sampling circuit and the output power derated by software.

The models SUN2000-3KTL-M1, SUN2000-4KTL-M1, SUN2000-5KTL-M1, SUN2000-6KTL-M1, SUN2000-8KTL-M1 and SUN2000-10KTL-M1 are almost identical in hardware except current sampling circuit and the output power derated by software.

The model SUN2000-10KTL-M1 and SUN2000-10KTL-M0 are almost identical in hardware except the J6 port and a Hi3911V200 chip.

**The product was tested on:**

Hardware: V100R001

Software: V100R001

All tests were performed on EUT of SUN2000-10KTL-M0. Tests of the EUT of SUN2000-10KTL-M0 applicable for the models SUN2000-3KTL-M0, SUN2000-4KTL-M0, SUN2000-5KTL-M0, SUN2000-6KTL-M0, SUN2000-8KTL-M0, SUN2000-3KTL-M1, SUN2000-4KTL-M1, SUN2000-5KTL-M1, SUN2000-6KTL-M1, SUN2000-8KTL-M1 and SUN2000-10KTL-M1 were performed on the concerned models and a statement is given at the relevant test.



| AS/NZS 4777.2 – 2015 |                                                                                                                                                                                                                                                                          |                                                                                                       |          |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|----------|
| Clause               | Requirement – Test                                                                                                                                                                                                                                                       | Result - Remark                                                                                       | Verdict  |
| <b>5</b>             | <b>GENERAL REQUIREMENTS</b>                                                                                                                                                                                                                                              |                                                                                                       | <b>P</b> |
| 5.1                  | Electrical safety                                                                                                                                                                                                                                                        |                                                                                                       | P        |
|                      | Inverters for use in inverter energy systems with photovoltaic (PV) arrays shall comply with the appropriate electrical safety requirements of IEC 62109-1 and IEC 62109-2, and the requirements within this Standard.                                                   | An applicable test report according to IEC 62109-1, IEC 62109-2 must be provided by the manufacturer. | P        |
|                      | Inverters for use in inverter energy systems that have energy storage (batteries) as the only possible energy source shall comply with the electrical safety requirements of AS 62040.1.1, and the requirements within this Standard.                                    | No such the energy storage system.                                                                    | N/A      |
|                      | Inverters for use in inverter energy systems that incorporate energy sources other than photovoltaic (PV) arrays or batteries shall comply with the applicable electrical safety requirements of IEC 62109-1 and IEC 62109-2, and the requirements within this Standard. | An applicable test report according to IEC 62109-1, IEC 62109-2 must be provided by the manufacturer. | P        |
| 5.2                  | Provision for external connections                                                                                                                                                                                                                                       | Provided in the installation manual.                                                                  | P        |
|                      | Inverters shall be used and installed as fixed equipment only.                                                                                                                                                                                                           |                                                                                                       | P        |
|                      | Inverter provisions for external connection -                                                                                                                                                                                                                            | See below.                                                                                            | P        |
|                      | (a) shall be for fixed equipment only; and                                                                                                                                                                                                                               | Complied.                                                                                             | P        |
|                      | (b) shall provide for safe and reliable connection to any d.c. source or load or any a.c. source or load.                                                                                                                                                                | Provided in the installation manual.                                                                  | P        |
|                      | All inverter ports (except communications ports) shall incorporate connection types for either -                                                                                                                                                                         | See below.                                                                                            | P        |
|                      | (i) permanently connected equipment; or                                                                                                                                                                                                                                  |                                                                                                       | P        |
|                      | (ii) pluggable type B equipment.                                                                                                                                                                                                                                         | Permanently connected equipment                                                                       | N/A      |
|                      | Inverter source or load connections shall not incorporate connection types for pluggable type A equipment.                                                                                                                                                               |                                                                                                       | P        |
|                      | Permanently connected inverters shall have suitable terminals for connection to fixed installation wiring.                                                                                                                                                               | Complied.                                                                                             | P        |
|                      | Pluggable type B equipment shall have one of the following means of connection:                                                                                                                                                                                          | Permanently connected equipment                                                                       | N/A      |
|                      | (A) A non-detachable cord for connection to the supply by means of a connector.                                                                                                                                                                                          | Permanently connected equipment                                                                       | N/A      |

|     |                                                                                                                                                                                                                                                                       |                                                                                                       |     |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|-----|
|     | (B) An appliance inlet suitable for connection to a matching connector.                                                                                                                                                                                               | Permanently connected equipment                                                                       | N/A |
|     | Pluggable type B equipment shall not incorporate -                                                                                                                                                                                                                    | See below.                                                                                            | N/A |
|     | (1) a connection by a connector or inlet complying with any of the dimensional sheets of AS/NZS 60320.1;                                                                                                                                                              |                                                                                                       | N/A |
|     | (2) a connection by a plug conforming to AS/NZS 3112; or                                                                                                                                                                                                              | No such plug used.                                                                                    | N/A |
|     | (3) a connection by a connector or inlet where hazardous voltages are accessible by the standard test finger.                                                                                                                                                         | No such devices..                                                                                     | N/A |
| 5.3 | Photovoltaic (PV) array earth fault/earth leakage detection                                                                                                                                                                                                           |                                                                                                       | P   |
|     | For inverter energy systems used with PV array systems that require earth fault detection and a residual current detection, either internal or external to the inverter, the type of detection used shall be declared in accordance with IEC 62109-1 and IEC 62109-2. | An applicable test report according to IEC 62109-1, IEC 62109-2 must be provided by the manufacturer. | P   |
|     | If an external residual current device (RCD) is required, the manufacturer's installation instructions shall state the need for an RCD and shall specify its rating, type and required circuit location in accordance with Clause 9.                                  |                                                                                                       | N/A |
|     | Where the additional detection for functionally earthed PV arrays, as required by AS/NZS 5033, is present in the inverter, this additional detection shall, before start-up of the system -                                                                           | See below.                                                                                            | P   |
|     | (a) open circuit the functional earth connection to the PV array;                                                                                                                                                                                                     |                                                                                                       | P   |
|     | (b) measure the resistance to earth of each conductor of the PV array;                                                                                                                                                                                                | An applicable test report according to IEC 62109-1, IEC 62109-2 must be provided by the manufacturer. | P   |
|     | (c) if the earth resistance is above the resistance limit (Riso limit) threshold specified in Table 1, the system shall reconnect the functional earth and shall be allowed to start; and                                                                             | An applicable test report according to IEC 62109-1, IEC 62109-2 must be provided by the manufacturer. | P   |
|     | (d) if the earth resistance is equal to or less than the resistance limit (Riso limit) threshold specified in Table 1, the inverter shall shut down and initiate an earth fault alarm in accordance with the requirements of IEC 62109-2.                             | An applicable test report according to IEC 62109-1, IEC 62109-2 must be provided by the manufacturer. | P   |
| 5.4 | Compatibility with electrical installation                                                                                                                                                                                                                            |                                                                                                       | P   |
|     | The inverter shall be compatible with wiring practices for LV electrical                                                                                                                                                                                              | Considered.                                                                                           | P   |

|     |                                                                                                                                                                                                                                                      |                                                          |   |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|---|
|     | installations of AS/NZS 3000 and variations as required in AS/NZS 4777.1. The inverter a.c. voltage and frequency operation shall comply with the limits specified in AS 60038 (for Australia), or IEC 60038 (for New Zealand).                      |                                                          |   |
| 5.5 | Power factor                                                                                                                                                                                                                                         |                                                          | P |
|     | The displacement power factor of the inverter, considered as a load from the perspective of the grid, shall, for all current outputs from 25% to 100% of rated current, operate at unity power factor within the range 0.95 leading to 0.95 lagging. | See appendix table.                                      | P |
|     | Operation at power factor other than unity is acceptable where the inverter operates in power quality response modes.                                                                                                                                | See Clause 6.3.                                          | P |
| 5.6 | Harmonic currents                                                                                                                                                                                                                                    |                                                          | P |
|     | The harmonic currents of the inverter shall not exceed the limits specified in Tables 2 and 3 and the total harmonic current distortion (ITHD) to the 50th harmonic shall be less than 5%.                                                           | See appendix table 5.6 Harmonic currents.                | P |
| 5.7 | Voltage fluctuations and flicker                                                                                                                                                                                                                     |                                                          | P |
|     | The inverter shall conform to the voltage fluctuation and flicker limits specified in AS/NZS 61000.3.3 for equipment with rated current less than or equal to 16 A per phase (a.c.).                                                                 | See appendix table 5.7 Voltage Fluctuations and Flicker. | P |
|     | For equipment with rated current greater than 16 A per phase (a.c.), The impedance shall be determined in accordance with the methods given in AS/NZS 61000.3.11.                                                                                    | See appendix table 5.7 Voltage Fluctuations and Flicker. | P |
| 5.8 | Transient voltage limits                                                                                                                                                                                                                             |                                                          | P |
|     | To prevent damage to electrical equipment connected to the same circuit as the inverter, disconnection of the inverter from the grid shall not result in transient overvoltages beyond the limits specified in Table 4.                              | See appendix table 5.8 Transient Voltage Limits          | P |
| 5.9 | D.C. current injection                                                                                                                                                                                                                               |                                                          | P |
|     | In the case of a single-phase inverter, the d.c. output current of the inverter at any a.c. port including the grid-interactive and/or stand-alone port shall not exceed 0.5% of the inverter's rated current or 5 mA, whichever is the greater.     | See appendix table 5.9 Direct current injection.         | P |
|     | In the case of a three-phase inverter, the d.c. output current of the inverter at any                                                                                                                                                                | This is three-phase grid inverter.                       | P |



|      |                                                                                                                                                                                                       |                          |   |
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|      | a.c. port, including the grid-interactive and/or stand-alone port, measured in each of the phases, shall not exceed 0.5% of the inverter's per-phase rated current or 5 mA, whichever is the greater. |                          |   |
| 5.10 | Current balance for three-phase inverters                                                                                                                                                             |                          | P |
|      | In the case of a three-phase inverter the a.c. output current shall be generated and injected into the three-phase electrical installation as a three-phase balanced current.                         | See appendix table 5.10. | P |

|          |                                                                                                                                                                                 |                         |          |
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| <b>6</b> | <b>OPERATIONAL MODES AND MULTIPLE MODE INVERTERS</b>                                                                                                                            |                         | <b>P</b> |
| 6.1      | General                                                                                                                                                                         |                         | P        |
|          | Unless otherwise stated, the modes in the following Clauses are for the grid-interactive port of the inverter.                                                                  |                         | P        |
| 6.2      | Inverter demand response modes (DRMs)                                                                                                                                           |                         | P        |
| 6.2.1    | General                                                                                                                                                                         | See below.              | P        |
|          | The inverter shall support the demand response mode DRM 0 of Table 5. The inverter should support the other demand response modes of Table 5.                                   | See appendix table 6.2. | P        |
|          | The inverter shall detect and initiate a response to all supported demand response commands within 2 s. The inverter shall continue to respond while the mode remains asserted. | See appendix table 6.2. | P        |
| 6.2.2    | Interaction with demand response enabling device (DRED)                                                                                                                         | See below.              | P        |
|          | The inverter shall have a means of connecting to a DRED. This means of connection shall include a terminal block or RJ45 socket.                                                | Considered.             | P        |
|          | The terminal block or RJ45 socket shall comply with the minimum electrical specifications in Table 6.                                                                           | Considered.             | P        |
|          | The DRED asserts demand response modes by shorting together terminals or pins as specified in Table 7.                                                                          | Considered.             | P        |
| 6.3      | Inverter power quality response modes                                                                                                                                           |                         | P        |
| 6.3.1    | General                                                                                                                                                                         | See below.              | P        |
|          | The inverter may have the capability of operating in modes which will -                                                                                                         |                         | P        |
|          | (a) contribute to maintaining the power quality at the point of connection with the customer installation; or                                                                   |                         | P        |
|          | (b) provide characteristics which are                                                                                                                                           |                         | P        |

|         |                                                                                                                                                                                                                                                                                                      |                              |     |
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|         | outside the typical operation of an inverter for the purpose of providing support to a grid.                                                                                                                                                                                                         |                              |     |
| 6.3.2   | Volt response modes                                                                                                                                                                                                                                                                                  |                              | P   |
| 6.3.2.1 | General                                                                                                                                                                                                                                                                                              | See below.                   | P   |
|         | The intent of including the volt response modes, which respond to voltage changes at the inverter terminals, is to increase the number of systems which can be connected at a point on the grid without adversely affecting the voltage within an electrical installation.                           |                              | P   |
|         | The volt-watt and volt-var response modes specified in Clause 6.3.2.2 and Clause 6.3.2.3 shall use the volt response reference values specified in Table 9.                                                                                                                                          |                              | P   |
| 6.3.2.2 | Volt-watt response mode                                                                                                                                                                                                                                                                              |                              | P   |
|         | The inverter should have the volt-watt response mode. If this mode is available, it shall be enabled by default.                                                                                                                                                                                     |                              | P   |
|         | The response curve required for the volt-watt response mode is defined by the volt response reference values in Table 9 and corresponding power levels. The default values are listed in Table 10 and example response modes are shown in Figure 2(A) for Australia and Figure 2(B) for New Zealand. | See appendix table 6.3.2.2.  | P   |
| 6.3.2.3 | Volt-var response mode                                                                                                                                                                                                                                                                               |                              | P   |
|         | The inverter should have the volt-var response capability. If this mode is available, it shall be disabled by default.                                                                                                                                                                               |                              | P   |
|         | The response curve required for the volt-var response is defined by the volt response reference values specified in Table 9 and corresponding var levels. The default values are listed in Table 11 and shown in Figure 3.                                                                           | See appendix table.          | P   |
| 6.3.2.4 | Voltage balance modes                                                                                                                                                                                                                                                                                |                              | P   |
|         | Three-phase inverters, or single-phase inverters used in a three-phase combination may be used for voltage balancing between phases by injecting unbalanced three-phase currents into the electrical installation.                                                                                   | Considered.                  | P   |
|         | If the voltage balance mode is available, the following requirements apply:                                                                                                                                                                                                                          | see below.                   | P   |
|         | (a) The voltage balance mode shall be disabled by default.                                                                                                                                                                                                                                           |                              | N/A |
|         | (b) For single-phase inverters used in a                                                                                                                                                                                                                                                             | The EUT is three-phase type. | N/A |

|         |                                                                                                                                                                                                               |                           |     |
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|         | three-phase combination, the requirements of Clause 8.2 apply.                                                                                                                                                |                           |     |
|         | (c) The voltage balancing mode shall be able to -                                                                                                                                                             | See below.                | P   |
|         | (i) operate correctly with a single fault applied;                                                                                                                                                            |                           | P   |
|         | (ii) detect the fault or loss of operability and cause the inverter to revert to injecting current into the three-phase electrical installation as a three-phase balanced current; or                         |                           | P   |
|         | (iii) detect the fault or loss of operability and disconnect the inverter from the electrical installation.                                                                                                   |                           | P   |
| 6.3.3   | Fixed power factor mode and reactive power mode                                                                                                                                                               |                           | P   |
|         | These modes shall be disabled by default.                                                                                                                                                                     |                           | P   |
|         | If the inverter is capable of operating with reactive power mode, the maximum ratio of reactive power (vars) to rated apparent power should be 100%.                                                          | See appendix table 6.3.3. | P   |
|         | If the inverter is capable of operating with fixed power factor mode, the minimum range of settings should be 0.8 leading to 0.8 lagging.                                                                     | See appendix table 6.3.3. | P   |
| 6.3.4   | Characteristic power factor curve for $\cos \phi$ (P) (Power response)                                                                                                                                        |                           | P   |
|         | If this mode is available, it shall be disabled by default.                                                                                                                                                   |                           | P   |
|         | The response curve required for the $\cos \phi$ (P) response should be defined within displacement power factor range of 0.9 leading to 0.9 lagging. One possible $\cos \phi$ (P) curve is shown in Figure 4. | See appendix table 6.3.4. | P   |
| 6.3.5   | Power rate limit                                                                                                                                                                                              |                           | P   |
| 6.3.5.1 | General                                                                                                                                                                                                       | See below.                | P   |
|         | The power rate limit for an inverter is a power quality response mode.                                                                                                                                        |                           | P   |
|         | The inverter shall have the capability to rate limit changes in power generation through the grid-interactive port.                                                                                           |                           | P   |
|         | Inverters capable of multiple mode operation should have the capability to rate limit changes in power consumption (for example increasing/decreasing of charging rates of connected energy storage).         |                           | N/A |
|         | The power rate limit does not apply when the inverter disconnection device is                                                                                                                                 |                           | P   |



|           |                                                                                                                                                                                                                                |                              |     |
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|           | required to operate (i.e. to disconnect).                                                                                                                                                                                      |                              |     |
| 6.3.5.2   | Gradient of power rate limit                                                                                                                                                                                                   |                              | P   |
|           | The default setting for the power rate limit (WGr <sub>a</sub> ) for increase and decrease shall be 16.67% of rated power per minute which is a nominal ramp time of 6 min.                                                    | See appendix table 6.3.5.    | P   |
|           | The power rate limit (WGr <sub>a</sub> ) shall be adjustable within the range 5% to 100% of rated power per minute.                                                                                                            | See appendix table 6.3.5.    | P   |
|           | It is acceptable to have two separate power rate limits for increase and decrease in output power, as follows:                                                                                                                 |                              | N/A |
|           | (a) To rate limit an increase in power (WGr <sub>a</sub> <sup>+</sup> ).                                                                                                                                                       | Considered.                  | P   |
|           | (b) To rate limit a decrease in power (WGr <sub>a</sub> <sup>-</sup> ).                                                                                                                                                        | Considered.                  | P   |
| 6.3.5.3   | Power rate limit modes                                                                                                                                                                                                         |                              | P   |
| 6.3.5.3.1 | General                                                                                                                                                                                                                        |                              | P   |
|           | The inverter power rate limit (WGr <sub>a</sub> ) is applicable to operate in the following modes:                                                                                                                             |                              | P   |
| 6.3.5.3.2 | Soft ramp up after connect or reconnect                                                                                                                                                                                        |                              | P   |
|           | All inverters shall have this mode. This mode shall be enabled as per Clause 7.7 and for the increase in power required by Clause 7.5.3 after frequency decreased to the required limit.                                       | See appendix table.          | P   |
| 6.3.5.3.3 | Changes in a.c. operation and control                                                                                                                                                                                          | No such function.            | N/A |
|           | If available, this mode shall be enabled for a change in a demand response mode of Clause 6.2 (except for DRM 0).                                                                                                              |                              | N/A |
|           | The power rate limit for changes in a.c. operation and control does not apply to those inverters that are correcting for sags and swells of less than 1 min.                                                                   |                              | N/A |
| 6.3.5.3.4 | Changes in energy source operation                                                                                                                                                                                             | No energy source in the EUT. | N/A |
|           | This mode only applies to multiple mode inverters with energy storage. It operates when there is a change in the energy resource available to the inverter, which causes a change in output through the grid-interactive port. |                              | N/A |
|           | For this mode the power rate limit (WGr <sub>a</sub> ) should apply to the increase or decrease in power generation or consumption, and to the transitions between power output levels.                                        |                              | N/A |
|           | For this mode, the power rate limit (WGr <sub>a</sub> )                                                                                                                                                                        |                              | N/A |

|         |                                                                                                                                                                                                                                                                                                                                                                  |                                  |     |
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|         | should be able to be enabled or disabled.                                                                                                                                                                                                                                                                                                                        |                                  |     |
|         | The power rate limit shall be disabled by default.                                                                                                                                                                                                                                                                                                               |                                  | N/A |
|         | The increase or decrease for transitions between power output levels is contingent on external situations (such as amount of available solar energy, wind energy or discharge capacity).                                                                                                                                                                         |                                  | N/A |
|         | Only for increases or decreases in the output which are faster than the power rate limit (WGr <sub>a</sub> ) does a control action to limit the ramp rate apply.                                                                                                                                                                                                 |                                  | N/A |
| 6.3.5.4 | Nonlinearity of power rate limit changes                                                                                                                                                                                                                                                                                                                         |                                  | P   |
|         | The nonlinearity (NL) of the power rate limit (WGr <sub>a</sub> ) in response to an increase of the inverter power output, as defined by the characteristic curve depicted in Figure 5, shall be less than 10%.                                                                                                                                                  |                                  | P   |
| 6.4     | Multiple mode inverter operation                                                                                                                                                                                                                                                                                                                                 | No multiple mode.                | N/A |
| 6.4.1   | General                                                                                                                                                                                                                                                                                                                                                          | See below.                       | N/A |
|         | When the multiple mode inverter is disconnected from the grid any stand-alone port shall ensure that all active conductors are also isolated from the grid-interactive port.                                                                                                                                                                                     |                                  | N/A |
|         | Multiple mode inverters shall be arranged to ensure that the continuity of the neutral conductor to the load from the electrical installation is not interrupted when the inverter disconnects from the grid and supplies a load via the stand-alone port.                                                                                                       |                                  | N/A |
|         | When the multiple mode inverter is providing the stand-alone function and is disconnected from the grid, the stand-alone port shall comply with the requirements for d.c. current injection (refer to Clause 5.9) into the connected load circuits. The type of RCD compatible with and for use on the stand-alone function outputs shall be declared.           |                                  | N/A |
| 6.4.2   | Sinusoidal output in stand-alone mode                                                                                                                                                                                                                                                                                                                            | The EUT is a Grid-tied inverter. | N/A |
|         | The a.c. output voltage waveform of a stand-alone port of a multiple mode inverter operating in stand-alone mode, shall comply with the requirements of this Clause (6.4.2). The a.c. output voltage waveform of a stand-alone mode shall have a voltage total harmonic distortion (THD) not exceeding of 5% and no individual harmonic at a level exceeding 5%. |                                  | N/A |

|       |                                                                                                                                                                                                                                                                                                      |                                      |     |
|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-----|
| 6.4.3 | Volt-watt response mode for charging of energy storage                                                                                                                                                                                                                                               | No energy storage system in the EUT. | N/A |
|       | A multiple mode inverter with energy storage which can be charged from the grid shall have this volt-watt response mode.                                                                                                                                                                             |                                      | N/A |
|       | This volt-watt response mode is only active when power from the grid is required to charge the energy storage.                                                                                                                                                                                       |                                      | N/A |
|       | The response curve required for the volt-watt response is defined by the volt response reference values in Table 9 and corresponding power consumption from the grid through the grid-interactive port for charging energy storage. The default values are listed in Table 12 and shown in Figure 6. |                                      | N/A |
| 6.5   | Security of operational settings                                                                                                                                                                                                                                                                     |                                      | P   |
|       | The internal settings of the demand response or power quality response modes of the inverter shall be secured against inadvertent or unauthorized tampering.                                                                                                                                         | Considered.                          | P   |
|       | Changes to the internal settings shall require the use of a tool and special instructions not provided to unauthorized personnel.                                                                                                                                                                    | Provide in installation manual.      | P   |

|          |                                                                                                                                                               |                                                                                                        |          |
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| <b>7</b> | <b>PROTECTIVE FUNCTIONS FOR CONNECTION TO ELECTRICAL INSTALLATIONS AND THE GRID</b>                                                                           |                                                                                                        | <b>P</b> |
| 7.1      | General                                                                                                                                                       | See below.                                                                                             | P        |
|          | The automatic disconnection device shall operate -                                                                                                            | The automatic disconnection device is integral part of the inverter.                                   | P        |
|          | (a) if supply from the grid is disrupted;                                                                                                                     | Considered.                                                                                            | P        |
|          | (b) when the grid goes outside preset parameters (e.g. undervoltage/overvoltage, under-frequency/over-frequency); or                                          | Considered.                                                                                            | P        |
|          | (c) when the demand response mode DRM 0 (see Clause 6.2) is asserted.                                                                                         | Considered.                                                                                            | P        |
|          | For inverter energy systems connected to multiple phases the automatic disconnection device shall operate if any of the above conditions is met on any phase. | Considered.                                                                                            | P        |
| 7.2      | Automatic disconnection device                                                                                                                                |                                                                                                        | P        |
|          | The automatic disconnection device shall provide isolation in all live conductors                                                                             | The unit is switched off redundant by the high power bridge of the inverter and the relays in line and | P        |

|       |                                                                                                                                                                                                                       |                                                            |   |
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|       |                                                                                                                                                                                                                       | neutral.                                                   |   |
|       | The automatic disconnection device shall be capable of interrupting at least the rated current.                                                                                                                       | Considered.                                                | P |
|       | The settings of the automatic disconnection device shall not exceed the capability of the inverter.                                                                                                                   | Considered.                                                | P |
|       | A semiconductor (solid-state) device shall not be used for isolation purposes.                                                                                                                                        | Considered.                                                | P |
| 7.3   | Active anti-islanding protection                                                                                                                                                                                      | See below.                                                 | P |
|       | The automatic disconnection device shall incorporate at least one method of active anti-islanding protection.                                                                                                         | Considered.                                                | P |
|       | The method used to provide active anti-islanding protection shall be declared.                                                                                                                                        | Rate of change of frequency (RoCof) detection method used. | P |
|       | To prevent islanding, the active anti-islanding protection system shall operate the automatic disconnection device (see Clause 7.2) within 2 s of disruption to the power supply from the grid.                       | See appendix table . 7.3.                                  | P |
|       | Compliance shall be determined by type testing in accordance with the active anti-islanding tests specified in Appendix F or IEC 62116.                                                                               | Considered.                                                | P |
| 7.4   | Voltage and frequency limits (passive anti-islanding protection)                                                                                                                                                      | See below.                                                 | P |
|       | The automatic disconnection device shall incorporate the following forms of passive anti-islanding protection:                                                                                                        | Considered.                                                | P |
|       | (a) Undervoltage and overvoltage protection.                                                                                                                                                                          | See appendix table 7.4                                     | P |
|       | (b) Under-frequency and over-frequency protection.                                                                                                                                                                    | See appendix table 7.4                                     | P |
| 7.5   | Limits for sustained operation                                                                                                                                                                                        |                                                            | P |
| 7.5.1 | General                                                                                                                                                                                                               | See below.                                                 | P |
|       | The inverter or inverter energy system shall remain connected over the range of voltages and frequencies that it is required to be compatible with. Refer to Clause 5.4.                                              | Considered.                                                | P |
| 7.5.2 | Sustained operation for voltage variations                                                                                                                                                                            |                                                            | P |
|       | The inverter shall operate the automatic disconnection device (see Clause 7.2) within 3 s when the average voltage for a 10 min period exceeds the $V_{nom\_max}$ , where $V_{nom\_max}$ lies in the range 244–258 V. | See appendix table 7.5.2                                   | P |



|         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                 |     |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|-----|
|         | The default set-point for Vnom-max shall be as follows:<br>(a) In Australia: 255 V.<br>(b) In New Zealand: 248 V.                                                                                                                                                                                                                                                                                                                                                                                                                                           | See appendix table 7.5.2        | P   |
| 7.5.3   | Sustained operation for frequency variations                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                 | P   |
| 7.5.3.1 | Response to an increase in frequency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                 | P   |
|         | The inverter shall be capable of supplying rated power between 47 Hz and 50.25 Hz for Australia.                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Considered.                     | P   |
|         | The inverter shall be capable of supplying rated power between 45 Hz and 50.25 Hz for New Zealand.                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Considered.                     | P   |
|         | The power level present at the time the frequency reaches or exceeds 50.25 Hz shall be held as the reference power level used to calculate the required response to the increasing frequency.                                                                                                                                                                                                                                                                                                                                                               | Considered.                     | P   |
|         | This is expressed in the equation below:<br>$P_{out} = P_{ref} \left[ 1 - \frac{(f - 50.25)}{(f_{stop} - 50.25)} \right]$<br>where<br>P <sub>out</sub> = required output for a frequency between 50.25 Hz and f <sub>stop</sub><br>P <sub>ref</sub> = reference power level when the frequency reaches or exceeds 50.25 Hz<br>f = frequency between 50.25 Hz and f <sub>stop</sub><br><br>When the frequency exceeds f <sub>stop</sub> the inverter power output shall be ceased (i.e. 0 W).<br>The default set-point for f <sub>stop</sub> shall be 52 Hz. | See appendix table 7.5.3.1      | P   |
|         | Unconstrained power operation may recommence 6 min after the frequency returns to and remains at less than 50.15 Hz.                                                                                                                                                                                                                                                                                                                                                                                                                                        | See appendix table 7.5.3.1      | P   |
| 7.5.3.2 | Response to a decrease in grid frequency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | The EUT without energy storage. | N/A |
|         | This requirement applies only to inverters with energy storage.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                 | N/A |
|         | The inverter shall be capable of charging the energy storage between 49.75 Hz and 52.0 Hz.                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                 | N/A |
|         | The power input level for charging present at the time the frequency reaches or falls below 49.75 Hz shall be held as the reference charge rate used to calculate the required response to the decreasing                                                                                                                                                                                                                                                                                                                                                   |                                 | N/A |

|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                       |     |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
|     | frequency.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                       |     |
|     | <p>This is expressed in the equation below:</p> $P_{\text{charge}} = P_{\text{ref}} \left[ 1 - \frac{(49.75 - f)}{(49.75 - f_{\text{stop-CH}})} \right]$ <p>where</p> <p><math>P_{\text{charge}}</math> = charge rate of the storage element for a frequency between 49.75 Hz and <math>f_{\text{stop-CH}}</math></p> <p><math>P_{\text{ref-CH}}</math> = charge rate of the storage element when the frequency reaches or falls below 49.75 Hz</p> <p><math>f</math> = frequency between 49.75 Hz and <math>f_{\text{stop-CH}}</math></p> <p>When the frequency falls below <math>f_{\text{stop-CH}}</math>, the inverter should have ceased charging the storage element (i.e. 0 W). The default set-point for <math>f_{\text{stop-CH}}</math> should be 49 Hz.</p> |                                                                                                                                                       | N/A |
|     | Unconstrained charging of the storage element may recommence 6 min after the frequency returns to and remains above than 49.85 Hz.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                       | N/A |
| 7.6 | Disconnection on external signal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | See below                                                                                                                                             | P   |
|     | The automatic disconnection device shall incorporate the ability to disconnect on an external signal.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | The automatic disconnection device is integral part of the inverter.                                                                                  | P   |
|     | If an external signal or demand response 'DRM 0' condition is asserted, the automatic disconnection device shall operate within 2 s.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Considered.                                                                                                                                           | P   |
| 7.7 | Connection and reconnection procedure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | See below                                                                                                                                             | P   |
|     | Only after all of the following conditions have been met shall the automatic disconnection device operate to connect or reconnect the inverter to the grid -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | The unit provides monitoring of the voltage, frequency and synchronisation. If one of these conditions is not met, then the unit is not switching on. | P   |
|     | (a) the voltage of the grid has been maintained within the limits of AS 60038 (for Australia) or IEC 60038 (for New Zealand) for at least 60 s;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Considered.                                                                                                                                           | P   |
|     | (b) the frequency of the grid has been maintained within the range 47.5 Hz to 50.15 Hz for at least 60 s;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Considered.                                                                                                                                           | P   |
|     | (c) the inverter and the grid are synchronized and in-phase with each other; and                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Considered.                                                                                                                                           | P   |
|     | (d) no external signal is present or DRM 0 asserted requiring the system to be disconnected.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Considered.                                                                                                                                           | P   |

|     |                                                                                                                                                                                                                                                               |                                                                                                                             |   |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|---|
| 7.8 | Security of protection settings                                                                                                                                                                                                                               |                                                                                                                             | P |
|     | The internal settings of the automatic disconnection device shall be secured against inadvertent or unauthorized tampering. Changes to the internal settings shall require the use of a tool and special instructions not provided to unauthorized personnel. | Changes to the internal settings shall require the use of a tool and special instructions provided to authorized personnel. | P |

|          |                                                                                                                                                                                                                                                                                                   |                                                                                    |            |
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| <b>8</b> | <b>MULTIPLE INVERTER COMBINATIONS</b>                                                                                                                                                                                                                                                             |                                                                                    | <b>N/A</b> |
| 8.1      | General                                                                                                                                                                                                                                                                                           | See below.                                                                         | N/A        |
|          | If a combination is not tested, it should not be used or external devices should be used in accordance with the requirements of AS/NZS 4777.1.                                                                                                                                                    | This is a three-phase grid inverter, and it's not used for parallel installations. | N/A        |
|          | Possible combinations are single-phase inverters used in parallel, single-phase inverters used in multiple phase installations and three-phase inverters used in parallel.                                                                                                                        | This is a three-phase grid inverter, and it's not used for parallel installations. | N/A        |
| 8.2      | Inverter current balance across multiple phases                                                                                                                                                                                                                                                   | This is a three-phase grid inverter, and it's not used for parallel installations. | N/A        |
|          | The maximum current imbalance in a three-phase inverter system comprised of individual single-phase inverters shall be no more than 21.7 A.                                                                                                                                                       | This is a three-phase grid inverter, and it's not used for parallel installations. | N/A        |
| 8.3      | Grid disconnection                                                                                                                                                                                                                                                                                |                                                                                    | N/A        |
|          | When any inverter within the inverter energy system disconnects as required by Clause 7, all inverters within the inverter energy system shall disconnect within 2 s of the first inverter disconnecting.                                                                                         | No energy system in the EUT.                                                       | N/A        |
|          | This applies to all inverters used in combination for single-phase or multiple phases.                                                                                                                                                                                                            | This is a three-phase grid inverter.                                               | N/A        |
| 8.4      | Grid connection and reconnection                                                                                                                                                                                                                                                                  | No such installation.                                                              | N/A        |
|          | When multiple inverters are used together in a multiple phase combination, only after all the conditions of Clause 7.7 have been met on all connected phases shall the automatic disconnection device operate to connect or reconnect any inverter of the multiple phase combination to the grid. |                                                                                    | N/A        |
|          | Where any inverter used in a multiple phase combination has a rated current exceeding 21.7 A per phase, the requirement of Clause 8.2 shall be met when connecting or reconnecting.                                                                                                               |                                                                                    | N/A        |

|       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                    |     |
|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-----|
| 8.5   | Testing combinations                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                    | N/A |
| 8.5.1 | Single-phase combinations                                                                                                                                                                                                                                                                                                                                                                                                                                                    | This is a three-phase grid inverter.                                               | N/A |
|       | Single-phase parallel combinations of inverters shall be tested for combinations with total rated current ( $I_{rated}$ ) equal to or up to the maximum of 6 A per phase.                                                                                                                                                                                                                                                                                                    | This is a three-phase grid inverter.                                               | N/A |
|       | <p>To determine the number of inverters to be tested, the following equation shall be used:</p> $N = \frac{6}{I_{rated}}$ <p>where<br/>           N = number to be tested, rounded up to next whole number<br/> <math>I_{rated}</math> = rating of the inverter in amperes</p> <p>If <math>N \geq 2</math>, the minimum number of inverters to be tested shall be N. If <math>N &gt; 6</math>, the maximum number of inverters to be tested in a combination shall be 6.</p> | This is a three-phase grid inverter.                                               | N/A |
| 8.5.2 | Single-phase inverters used in three-phase combinations                                                                                                                                                                                                                                                                                                                                                                                                                      | This is a three-phase grid inverter.                                               | N/A |
|       | For single-phase inverters with rated current ( $I_{rated}$ ) greater than or equal to 5 A used in three-phase combinations, three inverters shall be tested in a three-phase arrangement [refer to Figure 8(a)].                                                                                                                                                                                                                                                            | This is a three-phase grid inverter.                                               | N/A |
|       | Single-phase inverters with rated current less than 5 A and to be used in three-phase combinations shall be tested in combination with at least two inverters per phase [refer to Figure 8(b)].                                                                                                                                                                                                                                                                              | This is a three-phase grid inverter.                                               | N/A |
| 8.5.3 | Required tests for multiple inverter combinations                                                                                                                                                                                                                                                                                                                                                                                                                            | This is a three-phase grid inverter.                                               | N/A |
|       | Any single-phase inverter used in a multiple inverter combination shall be tested individually and meet all the requirements of this Standard. Any single-phase inverter which is to be used as part of a multiple inverter combination shall be tested in combination as specified in Clauses 8.5.1 and 8.5.2.                                                                                                                                                              | This is a three-phase grid inverter.                                               | N/A |
| 8.5.4 | Multiple inverters with one automatic disconnection device                                                                                                                                                                                                                                                                                                                                                                                                                   | This is a three-phase grid inverter, and it's not used for parallel installations. | N/A |
|       | Where the inverter does not have an internal automatic disconnection device, or requires an external automatic disconnection device to provide the required disconnection function, or both,                                                                                                                                                                                                                                                                                 | This is a three-phase grid inverter, and it's not used for parallel installations. | N/A |



|  |                                                                                                                                                                                                                                                                                |  |  |
|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
|  | testing shall be conducted with the automatic disconnection device and with either the number of inverters required by Clause 8.5.1 and 8.5.2 or with the automatic disconnection device configured with the number of inverters specified by the manufacturer's instructions. |  |  |
|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|

|          |                                                                  |                                                                                                                                                             |          |
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| <b>9</b> | <b>INVERTER MARKING AND DOCUMENTATION</b>                        |                                                                                                                                                             | <b>P</b> |
| 9.1      | General                                                          |                                                                                                                                                             | P        |
|          | All markings and documentation shall be in the English language. | Considered.                                                                                                                                                 | P        |
| 9.2      | Marking                                                          |                                                                                                                                                             | P        |
| 9.2.1    | General                                                          |                                                                                                                                                             | P        |
| 9.2.2    | Equipment ratings                                                |                                                                                                                                                             | P        |
|          | <b>Photovoltaic</b>                                              |                                                                                                                                                             | -        |
|          | Vmax PV (absolute maximum)                                       | 1100V                                                                                                                                                       | P        |
|          | Isc PV (absolute maximum)                                        | 2×15Ad.c.                                                                                                                                                   | P        |
|          | <b>Wind (a.c. or d.c.)</b>                                       |                                                                                                                                                             | -        |
|          | Voltage (nominal or range)                                       |                                                                                                                                                             | N/A      |
|          | Rated current (maximum continuous)                               |                                                                                                                                                             | N/A      |
|          | Frequency (nominal or range) (a.c. wind only)                    |                                                                                                                                                             | N/A      |
|          | <b>Energy storage ports</b>                                      |                                                                                                                                                             | -        |
|          | Voltage (nominal)                                                |                                                                                                                                                             | N/A      |
|          | Voltage (range)                                                  |                                                                                                                                                             | N/A      |
|          | Rated current (maximum continuous)                               |                                                                                                                                                             | N/A      |
|          | Storage type                                                     |                                                                                                                                                             | N/A      |
|          | <b>Other energy sources or inputs (a.c. or d.c.)</b>             |                                                                                                                                                             | -        |
|          | Voltage (nominal or range)                                       |                                                                                                                                                             | N/A      |
|          | Rated current (maximum continuous)                               |                                                                                                                                                             | N/A      |
|          | Power factor (range)                                             |                                                                                                                                                             | N/A      |
|          | Frequency (nominal or range) (a.c. sources only)                 |                                                                                                                                                             | N/A      |
|          | <b>a.c. output ratings (for each port)</b>                       |                                                                                                                                                             | -        |
|          | Voltage (nominal or range)                                       | 3(N)~400Vac                                                                                                                                                 |          |
|          | Rated current                                                    | SUN2000-3KTL-M0: 4,4A,<br>SUN2000-4KTL-M0: 5,8A,<br>SUN2000-5KTL-M0: 7,3A,<br>SUN2000-6KTL-M0: 8,7A,<br>SUN2000-8KTL-M0: 11,6A,<br>SUN2000-10KTL-M0: 14,5A, | P        |

|       |                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                  |     |
|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
|       |                                                                                                                                                                                                                                                                                                                                                                           | SUN2000-3KTL-M1: 4,4A,<br>SUN2000-4KTL-M1: 5,8A,<br>SUN2000-5KTL-M1: 7,3A,<br>SUN2000-6KTL-M1: 8,7A,<br>SUN2000-8KTL-M1: 11,6A,<br>SUN2000-10KTL-M1: 14,5A.                                                                                                                                                                                      |     |
|       | Frequency (nominal or range)                                                                                                                                                                                                                                                                                                                                              | 50,00Hz                                                                                                                                                                                                                                                                                                                                          | P   |
|       | Rated apparent power                                                                                                                                                                                                                                                                                                                                                      | SUN2000-3KTL-M0: 3300VA,<br>SUN2000-4KTL-M0: 4400VA,<br>SUN2000-5KTL-M0: 5500VA,<br>SUN2000-6KTL-M0: 6600VA,<br>SUN2000-8KTL-M0: 8800VA,<br>SUN2000-10KTL-M0: 11000VA,<br>SUN2000-3KTL-M1: 3300VA,<br>SUN2000-4KTL-M1: 4400VA,<br>SUN2000-5KTL-M1: 5500VA,<br>SUN2000-6KTL-M1: 6600VA,<br>SUN2000-8KTL-M1: 8800VA,<br>SUN2000-10KTL-M1: 11000VA. | P   |
|       | Power factor range                                                                                                                                                                                                                                                                                                                                                        | 1,0(adjustable+/-0,8)                                                                                                                                                                                                                                                                                                                            | P   |
|       | <b>d.c. output ratings</b>                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                  | -   |
|       | Voltage (nominal or range)                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                  | N/A |
|       | Rated current                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                  | N/A |
|       | Inverter topology                                                                                                                                                                                                                                                                                                                                                         | Non-isolated.                                                                                                                                                                                                                                                                                                                                    | P   |
|       | Protective class (I, II or III)                                                                                                                                                                                                                                                                                                                                           | Class I                                                                                                                                                                                                                                                                                                                                          | P   |
|       | Ingress protection (IP) rating                                                                                                                                                                                                                                                                                                                                            | IP65                                                                                                                                                                                                                                                                                                                                             | P   |
| 9.2.3 | Ports                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                  | P   |
|       | Each port shall be marked with its classification and indicate whether a.c or d.c. voltage as appropriate.                                                                                                                                                                                                                                                                | The classification marking were provided adjacent to the terminals of each port.                                                                                                                                                                                                                                                                 | P   |
| 9.2.4 | External and ancillary equipment                                                                                                                                                                                                                                                                                                                                          | Ref to installation manual.                                                                                                                                                                                                                                                                                                                      | P   |
| 9.2.5 | Residual current devices (RCDs)                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                  | N/A |
|       | Where an external RCD is required, the inverter shall be marked with a warning along with the rating and type of RCD required. The warning shall be located in a prominent position and written in lettering at least 5 mm high. It shall contain the following or an equivalent statement:<br><br><b>WARNING: AN RCD IS REQUIRED ON THE [NAME] PORTS OF THE INVERTER</b> | The Residual current devices (RCDs) are integral part of inverter. An applicable test report according to IEC 62109-1, IEC 62109-2 must be provided by the manufacturer.                                                                                                                                                                         | N/A |
|       | If the inverter energy system requires a Type B RCD, the inverter shall be marked with a warning. The warning shall be located in a prominent position and written in lettering at least 5 mm high. It shall contain the following:                                                                                                                                       | The Residual current devices (RCDs) are integral part of inverter. An applicable test report according to IEC 62109-1, IEC 62109-2 must be provided by the manufacturer.                                                                                                                                                                         | N/A |

|       |                                                                                                                                                                                                                                                      |                                                                                                                                           |     |
|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|-----|
|       | <b>WARNING: A TYPE B RCD IS REQUIRED ON THE [NAME] PORTS OF THE INVERTER</b>                                                                                                                                                                         |                                                                                                                                           |     |
| 9.2.6 | Demand response modes                                                                                                                                                                                                                                |                                                                                                                                           | P   |
|       | The demand response modes supported by the inverter should be permanently marked on the name plate or on a durable sticker located on or near the demand response interface port to indicate the demand response modes of which the unit is capable. | The demand response modes supported by the inverter has permanently marked on the name plate closed the communication terminals for DRED. | P   |
| 9.3   | Documentation                                                                                                                                                                                                                                        |                                                                                                                                           | P   |
| 9.3.1 | General                                                                                                                                                                                                                                              |                                                                                                                                           | P   |
| 9.3.2 | Equipment ratings                                                                                                                                                                                                                                    |                                                                                                                                           | P   |
|       | <b>Photovoltaic</b>                                                                                                                                                                                                                                  |                                                                                                                                           | -   |
|       | Vmax PV (absolute maximum)                                                                                                                                                                                                                           | 1100V                                                                                                                                     | P   |
|       | PV input operating voltage range                                                                                                                                                                                                                     | 140-1100Vdc                                                                                                                               | P   |
|       | Maximum operating PV input current                                                                                                                                                                                                                   | 2×11Ad.c.                                                                                                                                 | P   |
|       | Isc PV (absolute maximum)                                                                                                                                                                                                                            | 2×15Ad.c.                                                                                                                                 | P   |
|       | Maximum inverter backfeed current to array                                                                                                                                                                                                           | 0A                                                                                                                                        | P   |
|       | <b>Wind (a.c. or d.c.)</b>                                                                                                                                                                                                                           |                                                                                                                                           | -   |
|       | Voltage (nominal or range)                                                                                                                                                                                                                           |                                                                                                                                           | N/A |
|       | Rated current (maximum continuous)                                                                                                                                                                                                                   |                                                                                                                                           | N/A |
|       | Current (inrush)                                                                                                                                                                                                                                     |                                                                                                                                           | N/A |
|       | Frequency (nominal or range) (a.c. wind only)                                                                                                                                                                                                        |                                                                                                                                           | N/A |
|       | <b>Energy storage ports</b>                                                                                                                                                                                                                          |                                                                                                                                           | -   |
|       | Voltage (nominal or range)                                                                                                                                                                                                                           |                                                                                                                                           | N/A |
|       | Nominal battery voltage                                                                                                                                                                                                                              |                                                                                                                                           | N/A |
|       | Rated current (maximum continuous) input and output                                                                                                                                                                                                  |                                                                                                                                           | N/A |
|       | Storage type                                                                                                                                                                                                                                         |                                                                                                                                           | N/A |
|       | <b>Other energy sources or inputs (a.c. or d.c.)</b>                                                                                                                                                                                                 |                                                                                                                                           | -   |
|       | Voltage (nominal or range)                                                                                                                                                                                                                           |                                                                                                                                           | N/A |
|       | Rated current (maximum continuous)                                                                                                                                                                                                                   |                                                                                                                                           | N/A |
|       | Power factor (range)                                                                                                                                                                                                                                 |                                                                                                                                           | N/A |
|       | Frequency (nominal or range) (a.c. sources only)                                                                                                                                                                                                     |                                                                                                                                           | N/A |
|       | <b>a.c. output ratings (for each port)</b>                                                                                                                                                                                                           |                                                                                                                                           | -   |
|       | Voltage (nominal or range)                                                                                                                                                                                                                           | 3(N)~400Vac                                                                                                                               | P   |

|  |                                       |                                                                                                                                                                                                                                                                                                                                                  |     |
|--|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
|  | Rated current                         | SUN2000-3KTL-M0: 4,4A,<br>SUN2000-4KTL-M0: 5,8A,<br>SUN2000-5KTL-M0: 7,3A,<br>SUN2000-6KTL-M0: 8,7A,<br>SUN2000-8KTL-M0: 11,6A,<br>SUN2000-10KTL-M0: 14,5A,<br>SUN2000-3KTL-M1: 4,4A,<br>SUN2000-4KTL-M1: 5,8A,<br>SUN2000-5KTL-M1: 7,3A,<br>SUN2000-6KTL-M1: 8,7A,<br>SUN2000-8KTL-M1: 11,6A,<br>SUN2000-10KTL-M1: 14,5A.                       | P   |
|  | Current (inrush)                      | SUN2000-3KTL-M0: 5,0A,<br>SUN2000-4KTL-M0: 6,7A,<br>SUN2000-5KTL-M0: 8,3A,<br>SUN2000-6KTL-M0: 10,0A,<br>SUN2000-8KTL-M0: 13,3A,<br>SUN2000-10KTL-M0: 16,7A,<br>SUN2000-3KTL-M1: 5,0A,<br>SUN2000-4KTL-M1: 6,7A,<br>SUN2000-5KTL-M1: 8,3A,<br>SUN2000-6KTL-M1: 10,0A,<br>SUN2000-8KTL-M1: 13,3A,<br>SUN2000-10KTL-M1: 16,7A.                     | P   |
|  | Frequency (nominal or range)          | 50,00Hz                                                                                                                                                                                                                                                                                                                                          | P   |
|  | Rated apparent power                  | SUN2000-3KTL-M0: 3300VA,<br>SUN2000-4KTL-M0: 4400VA,<br>SUN2000-5KTL-M0: 5500VA,<br>SUN2000-6KTL-M0: 6600VA,<br>SUN2000-8KTL-M0: 8800VA,<br>SUN2000-10KTL-M0: 11000VA,<br>SUN2000-3KTL-M1: 3300VA,<br>SUN2000-4KTL-M1: 4400VA,<br>SUN2000-5KTL-M1: 5500VA,<br>SUN2000-6KTL-M1: 6600VA,<br>SUN2000-8KTL-M1: 8800VA,<br>SUN2000-10KTL-M1: 11000VA. | P   |
|  | Power factor range                    | 1,0(adjustable+/-0,8)                                                                                                                                                                                                                                                                                                                            | P   |
|  | Maximum output fault current          | 31,8A                                                                                                                                                                                                                                                                                                                                            | P   |
|  | Maximum output overcurrent protection | RMS 31.8A for software<br>overcurrent protection, 40.3A for<br>first level hardware overcurrent<br>protection, 49.9A for second level<br>hardware overcurrent protection.                                                                                                                                                                        | P   |
|  | <b>d.c. output ratings</b>            |                                                                                                                                                                                                                                                                                                                                                  | -   |
|  | Voltage (nominal or range)            |                                                                                                                                                                                                                                                                                                                                                  | N/A |
|  | Rated current                         |                                                                                                                                                                                                                                                                                                                                                  | N/A |
|  | Inverter topology                     | Non-isolated.                                                                                                                                                                                                                                                                                                                                    | P   |
|  | Active anti-islanding method          |                                                                                                                                                                                                                                                                                                                                                  | P   |
|  | Protective class (I, II or III)       | Class I                                                                                                                                                                                                                                                                                                                                          | P   |
|  | Over voltage category                 | DC side: OVC II;                                                                                                                                                                                                                                                                                                                                 | P   |



|       |                                  |                                        |     |
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|       |                                  | AC side: OVC III                       |     |
|       | Ingress protection (IP) rating   | IP65                                   | P   |
|       | Temperature operating range      | -25° C ~ +60° C (above 45° C derating) | P   |
| 9.3.3 | Ports                            |                                        | P   |
| 9.3.4 | External and ancillary equipment | Provided in installation manual.       | P   |
| 9.3.5 | RCDs                             |                                        | P   |
| 9.3.6 | Multiple mode inverters          | No such mode.                          | N/A |
| 9.3.7 | Multiple inverter combinations   | No such combinations.                  | N/A |

|                   |                                                            |          |
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| <b>APPENDIX A</b> | <b>GENERAL TEST AND REPORTING REQUIREMENTS (Normative)</b> | <b>P</b> |
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| <b>APPENDIX B</b> | <b>POWER FACTOR TEST (Normative)</b> | <b>P</b> |
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| <b>APPENDIX C</b> | <b>HARMONIC CURRENT LIMIT TEST (Normative)</b> | <b>P</b> |
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| <b>APPENDIX D</b> | <b>TRANSIENT VOLTAGE LIMIT TEST (Normative)</b> | <b>P</b> |
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| <b>APPENDIX E</b> | <b>D.C. INJECTION TEST (Normative)</b> | <b>P</b> |
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| <b>APPENDIX F</b> | <b>ACTIVE ANTI-ISLANDING TEST (Normative)</b> | <b>P</b> |
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| <b>APPENDIX G</b> | <b>VOLTAGE AND FREQUENCY LIMITS (PASSIVE ANTI-ISLANDING PROTECTION) TESTS (Normative)</b> | <b>P</b> |
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|                   |                                                   |          |
|-------------------|---------------------------------------------------|----------|
| <b>APPENDIX H</b> | <b>LIMITS FOR SUSTAINED OPERATION (Normative)</b> | <b>P</b> |
|-------------------|---------------------------------------------------|----------|

|                   |                                                                                                              |          |
|-------------------|--------------------------------------------------------------------------------------------------------------|----------|
| <b>APPENDIX I</b> | <b>DEMAND AND POWER QUALITY RESPONSE MODE TESTING INCLUDING DISCONNECTION ON EXTERNAL SIGNAL (Normative)</b> | <b>P</b> |
|-------------------|--------------------------------------------------------------------------------------------------------------|----------|

|                   |                                              |            |
|-------------------|----------------------------------------------|------------|
| <b>APPENDIX J</b> | <b>MULTIPLE INVERTER TESTING (Normative)</b> | <b>N/A</b> |
|-------------------|----------------------------------------------|------------|

|                   |                                        |          |
|-------------------|----------------------------------------|----------|
| <b>APPENDIX K</b> | <b>RELATED DOCUMENTS (Informative)</b> | <b>P</b> |
|-------------------|----------------------------------------|----------|

## Test Results

| 5.5 Power factor<br>Appendix B Power factor test |                       |                      |         |         |         | P        |
|--------------------------------------------------|-----------------------|----------------------|---------|---------|---------|----------|
| SUN2000-3KTL-M0                                  |                       |                      |         |         |         |          |
| Mode                                             | Meausrement           | Rated Output Current |         |         |         |          |
|                                                  |                       | 15+/-5%              | 25+/-5% | 50+/-5% | 75+/-5% | 100+/-5% |
| Unity                                            | Vrms (V)              | 230,30               | 230,32  | 229,85  | 229,85  | 229,86   |
|                                                  | Arms (A)              | 0,888                | 1,243   | 2,197   | 3,275   | 4,370    |
|                                                  | Apparent Power (kVA)  | 0,449                | 0,752   | 1,515   | 2,258   | 3,013    |
|                                                  | Power (kW)            | 0,448                | 0,752   | 1,509   | 2,254   | 3,009    |
|                                                  | Recative power (kVar) | 0,029                | 0,027   | -0,141  | -0,141  | -0,146   |
|                                                  | PF cos (phi)          | 0,9979               | 0,9994  | 0,9957  | 0,9981  | 0,9988   |
| Lag limit                                        | Vrms (V)              | 230,30               | 230,32  | 230,48  | 230,38  | 230,50   |
|                                                  | Arms (A)              | 1,011                | 1,481   | 2,926   | 4,150   | 4,774    |
|                                                  | Apparent Power (kVA)  | 0,560                | 0,938   | 2,023   | 2,840   | 3,301    |
|                                                  | Power (kW)            | 0,450                | 0,753   | 1,632   | 2,279   | 2,655    |
|                                                  | Recative power (kVar) | 0,334                | 0,559   | 1,178   | 1,694   | 1,943    |
|                                                  | PF cos (phi)          | 0,8036               | 0,8029  | 0,8067  | 0,8026  | 0,8045   |
| Lead limit                                       | Vrms (V)              | 230,30               | 230,31  | 230,35  | 230,38  | 230,49   |
|                                                  | Arms (A)              | 1,020                | 1,497   | 2,811   | 4,170   | 4,859    |
|                                                  | Apparent Power (kVA)  | 0,566                | 0,947   | 1,899   | 2,853   | 3,360    |
|                                                  | Power (kW)            | 0,449                | 0,753   | 1,513   | 2,275   | 2,655    |
|                                                  | Recative power (kVar) | -0,344               | -0,573  | -1,146  | -1,721  | -2,040   |
|                                                  | PF cos (phi)          | 0,7938               | 0,7956  | 0,7972  | 0,7976  | 0,7902   |
| Modes                                            | Vrms (V)              | N/A                  | N/A     | N/A     | N/A     | N/A      |
|                                                  | Arms (A)              | N/A                  | N/A     | N/A     | N/A     | N/A      |
|                                                  | Apparent Power (kVA)  | N/A                  | N/A     | N/A     | N/A     | N/A      |
|                                                  | Power (kW)            | N/A                  | N/A     | N/A     | N/A     | N/A      |
|                                                  | Recative power (kVar) | N/A                  | N/A     | N/A     | N/A     | N/A      |
|                                                  | PF cos (phi)          | N/A                  | N/A     | N/A     | N/A     | N/A      |

| SUN2000-10KTL-M0 |                       |                      |         |         |         |          |
|------------------|-----------------------|----------------------|---------|---------|---------|----------|
| Mode             | Measurement           | Rated Output Current |         |         |         |          |
|                  |                       | 15+/-5%              | 25+/-5% | 50+/-5% | 75+/-5% | 100+/-5% |
| Unity            | Vrms (V)              | 229,85               | 229,86  | 230,53  | 229,89  | 230,63   |
|                  | Arms (A)              | 2,248                | 3,686   | 7,909   | 10,843  | 15,712   |
|                  | Apparent Power (kVA)  | 1,550                | 2,541   | 5,470   | 7,479   | 10,871   |
|                  | Power (kW)            | 1,542                | 2,536   | 5,465   | 7,478   | 10,867   |
|                  | Recative power (kVar) | 1,550                | 2,541   | -0,052  | 7,479   | -0,059   |
|                  | PF cos (phi)          | 0,9951               | 0,9981  | 0,9992  | 0,9998  | 0,9996   |
| Lag limit        | Vrms (V)              | 230,34               | 229,87  | 230,53  | 229,91  | 230,60   |
|                  | Arms (A)              | 2,727                | 4,572   | 9,752   | 13,496  | 15,944   |
|                  | Apparent Power (kVA)  | 1,884                | 3,152   | 6,744   | 9,309   | 11,030   |
|                  | Power (kW)            | 1,510                | 2,531   | 5,415   | 7,442   | 8,842    |
|                  | Recative power (kVar) | 1,125                | 3,152   | 4,011   | 9,309   | 6,581    |
|                  | PF cos (phi)          | 0,8022               | 0,8031  | 0,8028  | 0,7994  | 0,8017   |
| Lead limit       | Vrms (V)              | 230,35               | 229,87  | 230,53  | 229,90  | 230,64   |
|                  | Arms (A)              | 2,785                | 4,602   | 9,827   | 13,450  | 16,124   |
|                  | Apparent Power (kVA)  | 1,900                | 3,174   | 6,796   | 9,277   | 11,149   |
|                  | Power (kW)            | 1,514                | 2,525   | 5,404   | 7,423   | 8,901    |
|                  | Recative power (kVar) | -1,147               | -1,923  | -4,112  | -5,564  | -6,714   |
|                  | PF cos (phi)          | 0,7970               | 0,7956  | 0,7952  | 0,8002  | 0,7983   |
| Modes            | Vrms (V)              | N/A                  | N/A     | N/A     | N/A     | N/A      |
|                  | Arms (A)              | N/A                  | N/A     | N/A     | N/A     | N/A      |
|                  | Apparent Power (kVA)  | N/A                  | N/A     | N/A     | N/A     | N/A      |
|                  | Power (kW)            | N/A                  | N/A     | N/A     | N/A     | N/A      |
|                  | Recative power (kVar) | N/A                  | N/A     | N/A     | N/A     | N/A      |
|                  | PF cos (phi)          | N/A                  | N/A     | N/A     | N/A     | N/A      |

**Note:**

Inverter shall be connected to test circuit Figure B1 (AS/NZS 4777.2),

The required accuracy for the measurement and reporting of results is  $\pm 0.01$  PF. The vars at the 15% test point are required to be the same or less than the vars at the 25% test point when operating at unity power factor.

c: capacitive / leading

i: inductive / lagging

The test had been performed on the models SUN2000-3KTL-M0 and SUN2000-10KTL-M0, the test results are valid for the SUN2000-4KTL-M0, SUN2000-5KTL-M0, SUN2000-6KTL-M0, SUN2000-8KTL-M0, SUN2000-3KTL-M1, SUN2000-4KTL-M1, SUN2000-5KTL-M1, SUN2000-6KTL-M1, SUN2000-8KTL-M1 and SUN2000-10KTL-M1 except current sampling circuit and the output power derated by software.

Correction: correct the model name SUN2000-10KTL-M10 to SUN2000-10KTL-M1 due to the typo.

| 5.6 Harmonic currents<br>Appendix C Harmonic Current Limit Test |                               |               |                  |                               |               |                  | P                         |
|-----------------------------------------------------------------|-------------------------------|---------------|------------------|-------------------------------|---------------|------------------|---------------------------|
| SUN2000-10KTL-M0                                                |                               |               |                  |                               |               |                  |                           |
| L1 phase                                                        |                               |               |                  |                               |               |                  |                           |
| Generating Unit rating per phase (rpp)                          |                               |               |                  |                               |               |                  |                           |
|                                                                 | At 50% of rated ouput current |               |                  | 100% of rated output currentA |               |                  |                           |
|                                                                 | Watts                         | 1840          |                  | Watts                         | 3370          |                  |                           |
|                                                                 | VA                            | 1840          |                  | VA                            | 3371          |                  |                           |
|                                                                 | Vrms                          | 230,56        |                  | Vrms                          | 230,75        |                  |                           |
|                                                                 | Arms                          | 7,982         |                  | Arms                          | 14,609        |                  |                           |
|                                                                 | PF                            | 0,9993        |                  | PF                            | 0,9996        |                  |                           |
|                                                                 | Frequency                     | 50,00         |                  | Frequency                     | 50,00         |                  |                           |
| Harmonic                                                        | Value A                       | Angle degrees | % of fundamental | Value A                       | Angle degrees | % of fundamental | Limit in % of fundamental |
| 0                                                               | N/A                           | N/A           | N/A              | N/A                           | N/A           | N/A              | --                        |
| 1st                                                             | 7,981                         | N/A           | 55,068           | 14,608                        | N/A           | 100,796          | --                        |
| 2nd                                                             | 0,015                         | N/A           | 0,102            | 0,015                         | N/A           | 0,106            | 1%                        |
| 3rd                                                             | 0,016                         | N/A           | 0,113            | 0,024                         | N/A           | 0,168            | 4%                        |
| 4th                                                             | 0,008                         | N/A           | 0,053            | 0,011                         | N/A           | 0,073            | 1%                        |
| 5th                                                             | 0,034                         | N/A           | 0,235            | 0,017                         | N/A           | 0,117            | 4%                        |
| 6th                                                             | 0,008                         | N/A           | 0,052            | 0,013                         | N/A           | 0,093            | 1%                        |
| 7th                                                             | 0,016                         | N/A           | 0,109            | 0,008                         | N/A           | 0,057            | 4%                        |
| 8th                                                             | 0,007                         | N/A           | 0,050            | 0,009                         | N/A           | 0,062            | 1%                        |
| 9th                                                             | 0,007                         | N/A           | 0,046            | 0,010                         | N/A           | 0,068            | 2%                        |
| 10th                                                            | 0,007                         | N/A           | 0,049            | 0,010                         | N/A           | 0,068            | 0,5%                      |
| 11th                                                            | 0,024                         | N/A           | 0,169            | 0,011                         | N/A           | 0,077            | 2%                        |
| 12th                                                            | 0,008                         | N/A           | 0,052            | 0,012                         | N/A           | 0,085            | 0,5%                      |
| 13th                                                            | 0,023                         | N/A           | 0,158            | 0,008                         | N/A           | 0,057            | 2%                        |
| 14th                                                            | 0,008                         | N/A           | 0,052            | 0,010                         | N/A           | 0,070            | 0,5%                      |
| 15th                                                            | 0,007                         | N/A           | 0,051            | 0,009                         | N/A           | 0,063            | 1%                        |
| 16th                                                            | 0,007                         | N/A           | 0,051            | 0,009                         | N/A           | 0,065            | 0,5%                      |
| 17th                                                            | 0,012                         | N/A           | 0,081            | 0,010                         | N/A           | 0,066            | 1%                        |
| 18th                                                            | 0,008                         | N/A           | 0,054            | 0,013                         | N/A           | 0,092            | 0,5%                      |
| 19th                                                            | 0,011                         | N/A           | 0,073            | 0,008                         | N/A           | 0,054            | 1%                        |
| 20th                                                            | 0,008                         | N/A           | 0,053            | 0,009                         | N/A           | 0,066            | 0,5%                      |
| 21th                                                            | 0,006                         | N/A           | 0,044            | 0,010                         | N/A           | 0,070            | 0,6%                      |
| 22th                                                            | 0,007                         | N/A           | 0,048            | 0,009                         | N/A           | 0,065            | 0,5%                      |
| 23th                                                            | 0,006                         | N/A           | 0,040            | 0,008                         | N/A           | 0,058            | 0,6%                      |
| 24th                                                            | 0,008                         | N/A           | 0,054            | 0,014                         | N/A           | 0,095            | 0,5%                      |
| 25th                                                            | 0,007                         | N/A           | 0,048            | 0,010                         | N/A           | 0,069            | 0,6%                      |
| 26th                                                            | 0,008                         | N/A           | 0,054            | 0,011                         | N/A           | 0,077            | 0,5%                      |
| 27th                                                            | 0,005                         | N/A           | 0,037            | 0,012                         | N/A           | 0,083            | 0,6%                      |
| 28th                                                            | 0,007                         | N/A           | 0,048            | 0,011                         | N/A           | 0,074            | 0,5%                      |
| 29th                                                            | 0,006                         | N/A           | 0,039            | 0,011                         | N/A           | 0,078            | 0,6%                      |
| 30th                                                            | 0,007                         | N/A           | 0,051            | 0,016                         | N/A           | 0,111            | 0,5%                      |
| 31th                                                            | 0,012                         | N/A           | 0,085            | 0,011                         | N/A           | 0,075            | 0,6%                      |
| 32th                                                            | 0,007                         | N/A           | 0,050            | 0,013                         | N/A           | 0,092            | 0,5%                      |
| 33th                                                            | 0,005                         | N/A           | 0,033            | 0,014                         | N/A           | 0,094            | 0,6%                      |
| 34th                                                            | 0,007                         | N/A           | 0,047            | 0,015                         | N/A           | 0,103            | --                        |
| 35th                                                            | 0,021                         | N/A           | 0,148            | 0,013                         | N/A           | 0,093            | --                        |
| 36th                                                            | 0,006                         | N/A           | 0,044            | 0,017                         | N/A           | 0,120            | --                        |
| 37th                                                            | 0,041                         | N/A           | 0,284            | 0,015                         | N/A           | 0,101            | --                        |
| 38th                                                            | 0,006                         | N/A           | 0,039            | 0,015                         | N/A           | 0,100            | --                        |
| 39th                                                            | 0,005                         | N/A           | 0,033            | 0,017                         | N/A           | 0,119            | --                        |
| 40th                                                            | 0,005                         | N/A           | 0,036            | 0,014                         | N/A           | 0,096            | --                        |

|                  |       |     |       |       |     |       |    |
|------------------|-------|-----|-------|-------|-----|-------|----|
| 41th             | 0,021 | N/A | 0,144 | 0,020 | N/A | 0,138 | -- |
| 42th             | 0,006 | N/A | 0,039 | 0,018 | N/A | 0,125 | -- |
| 43th             | 0,027 | N/A | 0,183 | 0,046 | N/A | 0,317 | -- |
| 44th             | 0,005 | N/A | 0,035 | 0,015 | N/A | 0,103 | -- |
| 45th             | 0,005 | N/A | 0,034 | 0,015 | N/A | 0,102 | -- |
| 46th             | 0,004 | N/A | 0,030 | 0,016 | N/A | 0,109 | -- |
| 47th             | 0,020 | N/A | 0,139 | 0,025 | N/A | 0,175 | -- |
| 48th             | 0,005 | N/A | 0,036 | 0,015 | N/A | 0,106 | -- |
| 49th             | 0,019 | N/A | 0,134 | 0,046 | N/A | 0,318 | -- |
| 50th             | 0,005 | N/A | 0,034 | 0,015 | N/A | 0,102 | -- |
| THD<br>(to 50th) | N/A   | N/A | 0,635 | N/A   | N/A | 0,786 | 5% |

## L2 phase

| Generating Unit rating per phase (rpp) |                                      |                                      |           |        |
|----------------------------------------|--------------------------------------|--------------------------------------|-----------|--------|
|                                        | <b>At 50% of rated ouput current</b> | <b>100% of rated output currentA</b> |           |        |
|                                        | Watts                                | 1830                                 | Watts     | 3386   |
|                                        | VA                                   | 1830                                 | VA        | 3387   |
|                                        | Vrms                                 | 230,54                               | Vrms      | 230,71 |
|                                        | Arms                                 | 7,936                                | Arms      | 14,681 |
|                                        | PF                                   | 0,9990                               | PF        | 0,9996 |
|                                        | Frequency                            | 50,00                                | Frequency | 50,00  |

| Harmonic | Value<br>A | Angle<br>degrees | % of<br>fundamental | Value<br>A | Angle<br>degrees | % of<br>fundamental | Limit in % of<br>fundamental |
|----------|------------|------------------|---------------------|------------|------------------|---------------------|------------------------------|
| 0        | N/A        | N/A              | N/A                 | N/A        | N/A              | N/A                 | --                           |
| 1st      | 7,936      | N/A              | 58,455              | 14,680     | N/A              | 101,291             | --                           |
| 2nd      | 0,010      | N/A              | 0,141               | 0,018      | N/A              | 0,125               | 1%                           |
| 3rd      | 0,012      | N/A              | 0,278               | 0,027      | N/A              | 0,187               | 4%                           |
| 4th      | 0,009      | N/A              | 0,144               | 0,011      | N/A              | 0,078               | 1%                           |
| 5th      | 0,025      | N/A              | 0,383               | 0,018      | N/A              | 0,121               | 4%                           |
| 6th      | 0,007      | N/A              | 0,122               | 0,014      | N/A              | 0,094               | 1%                           |
| 7th      | 0,018      | N/A              | 0,184               | 0,009      | N/A              | 0,065               | 4%                           |
| 8th      | 0,007      | N/A              | 0,107               | 0,010      | N/A              | 0,071               | 1%                           |
| 9th      | 0,008      | N/A              | 0,121               | 0,013      | N/A              | 0,092               | 2%                           |
| 10th     | 0,008      | N/A              | 0,092               | 0,010      | N/A              | 0,067               | 0,5%                         |
| 11th     | 0,026      | N/A              | 0,235               | 0,010      | N/A              | 0,067               | 2%                           |
| 12th     | 0,007      | N/A              | 0,119               | 0,012      | N/A              | 0,082               | 0,5%                         |
| 13th     | 0,025      | N/A              | 0,393               | 0,012      | N/A              | 0,083               | 2%                           |
| 14th     | 0,008      | N/A              | 0,112               | 0,011      | N/A              | 0,075               | 0,5%                         |
| 15th     | 0,008      | N/A              | 0,190               | 0,008      | N/A              | 0,058               | 1%                           |
| 16th     | 0,008      | N/A              | 0,105               | 0,010      | N/A              | 0,069               | 0,5%                         |
| 17th     | 0,017      | N/A              | 0,502               | 0,008      | N/A              | 0,055               | 1%                           |
| 18th     | 0,008      | N/A              | 0,122               | 0,013      | N/A              | 0,087               | 0,5%                         |
| 19th     | 0,012      | N/A              | 0,236               | 0,008      | N/A              | 0,058               | 1%                           |
| 20th     | 0,008      | N/A              | 0,128               | 0,010      | N/A              | 0,066               | 0,5%                         |
| 21th     | 0,007      | N/A              | 0,130               | 0,008      | N/A              | 0,056               | 0,6%                         |
| 22th     | 0,007      | N/A              | 0,111               | 0,010      | N/A              | 0,068               | 0,5%                         |
| 23th     | 0,006      | N/A              | 0,234               | 0,008      | N/A              | 0,058               | 0,6%                         |
| 24th     | 0,007      | N/A              | 0,114               | 0,014      | N/A              | 0,096               | 0,5%                         |
| 25th     | 0,008      | N/A              | 0,199               | 0,008      | N/A              | 0,058               | 0,6%                         |
| 26th     | 0,008      | N/A              | 0,131               | 0,011      | N/A              | 0,078               | 0,5%                         |
| 27th     | 0,006      | N/A              | 0,138               | 0,010      | N/A              | 0,072               | 0,6%                         |
| 28th     | 0,007      | N/A              | 0,109               | 0,012      | N/A              | 0,084               | 0,5%                         |
| 29th     | 0,006      | N/A              | 0,367               | 0,010      | N/A              | 0,069               | 0,6%                         |
| 30th     | 0,007      | N/A              | 0,129               | 0,014      | N/A              | 0,096               | 0,5%                         |
| 31th     | 0,013      | N/A              | 0,150               | 0,012      | N/A              | 0,083               | 0,6%                         |
| 32th     | 0,007      | N/A              | 0,097               | 0,014      | N/A              | 0,095               | 0,5%                         |



|                  |       |     |       |       |     |       |      |
|------------------|-------|-----|-------|-------|-----|-------|------|
| 33th             | 0,010 | N/A | 0,155 | 0,016 | N/A | 0,108 | 0,6% |
| 34th             | 0,006 | N/A | 0,100 | 0,014 | N/A | 0,096 | --   |
| 35th             | 0,022 | N/A | 0,288 | 0,015 | N/A | 0,105 | --   |
| 36th             | 0,006 | N/A | 0,121 | 0,020 | N/A | 0,136 | --   |
| 37th             | 0,041 | N/A | 0,347 | 0,017 | N/A | 0,118 | --   |
| 38th             | 0,006 | N/A | 0,079 | 0,019 | N/A | 0,129 | --   |
| 39th             | 0,006 | N/A | 0,111 | 0,019 | N/A | 0,131 | --   |
| 40th             | 0,005 | N/A | 0,076 | 0,018 | N/A | 0,122 | --   |
| 41th             | 0,024 | N/A | 0,205 | 0,022 | N/A | 0,149 | --   |
| 42th             | 0,005 | N/A | 0,100 | 0,020 | N/A | 0,135 | --   |
| 43th             | 0,028 | N/A | 0,316 | 0,047 | N/A | 0,323 | --   |
| 44th             | 0,005 | N/A | 0,087 | 0,018 | N/A | 0,126 | --   |
| 45th             | 0,006 | N/A | 0,092 | 0,016 | N/A | 0,111 | --   |
| 46th             | 0,004 | N/A | 0,091 | 0,012 | N/A | 0,083 | --   |
| 47th             | 0,022 | N/A | 0,220 | 0,035 | N/A | 0,238 | --   |
| 48th             | 0,005 | N/A | 0,090 | 0,017 | N/A | 0,118 | --   |
| 49th             | 0,021 | N/A | 0,308 | 0,043 | N/A | 0,297 | --   |
| 50th             | 0,005 | N/A | 0,088 | 0,015 | N/A | 0,103 | --   |
| THD<br>(to 50th) | N/A   | N/A | 0,664 | N/A   | N/A | 0,829 | 5%   |

### L3 phase

| Generating Unit rating per phase (rpp) |                                |        |                               |        |
|----------------------------------------|--------------------------------|--------|-------------------------------|--------|
|                                        | At 50% of rated output current |        | 100% of rated output currentA |        |
|                                        | Watts                          | 1830   | Watts                         | 3368   |
|                                        | VA                             | 1830   | VA                            | 3370   |
|                                        | Vrms                           | 230,52 | Vrms                          | 230,68 |
|                                        | Arms                           | 7,952  | Arms                          | 14,608 |
|                                        | PF                             | 0,9993 | PF                            | 0,9995 |
|                                        | Frequency                      | 50,00  | Frequency                     | 50,00  |

| Harmonic | Value<br>A | Angle<br>degrees | % of<br>fundamental | Value<br>A | Angle<br>degrees | % of<br>fundamental | Limit in % of<br>fundamental |
|----------|------------|------------------|---------------------|------------|------------------|---------------------|------------------------------|
| 0        | N/A        | N/A              | N/A                 | N/A        | N/A              | N/A                 | 0,5%                         |
| 1st      | 7,952      | N/A              | 54,866              | 14,607     | N/A              | 100,789             | 100%                         |
| 2nd      | 0,019      | N/A              | 0,131               | 0,017      | N/A              | 0,119               | 1%                           |
| 3rd      | 0,023      | N/A              | 0,160               | 0,028      | N/A              | 0,191               | 4%                           |
| 4th      | 0,008      | N/A              | 0,052               | 0,012      | N/A              | 0,081               | 1%                           |
| 5th      | 0,042      | N/A              | 0,291               | 0,016      | N/A              | 0,109               | 4%                           |
| 6th      | 0,007      | N/A              | 0,051               | 0,011      | N/A              | 0,078               | 1%                           |
| 7th      | 0,020      | N/A              | 0,136               | 0,010      | N/A              | 0,067               | 4%                           |
| 8th      | 0,007      | N/A              | 0,048               | 0,011      | N/A              | 0,077               | 1%                           |
| 9th      | 0,009      | N/A              | 0,060               | 0,010      | N/A              | 0,072               | 2%                           |
| 10th     | 0,007      | N/A              | 0,051               | 0,011      | N/A              | 0,078               | 0,5%                         |
| 11th     | 0,027      | N/A              | 0,189               | 0,009      | N/A              | 0,062               | 2%                           |
| 12th     | 0,008      | N/A              | 0,052               | 0,010      | N/A              | 0,069               | 0,5%                         |
| 13th     | 0,028      | N/A              | 0,195               | 0,010      | N/A              | 0,068               | 2%                           |
| 14th     | 0,007      | N/A              | 0,050               | 0,012      | N/A              | 0,085               | 0,5%                         |
| 15th     | 0,006      | N/A              | 0,043               | 0,011      | N/A              | 0,074               | 1%                           |
| 16th     | 0,007      | N/A              | 0,050               | 0,012      | N/A              | 0,083               | 0,5%                         |
| 17th     | 0,016      | N/A              | 0,109               | 0,011      | N/A              | 0,074               | 1%                           |
| 18th     | 0,008      | N/A              | 0,055               | 0,010      | N/A              | 0,072               | 0,5%                         |
| 19th     | 0,010      | N/A              | 0,071               | 0,010      | N/A              | 0,069               | 1%                           |
| 20th     | 0,008      | N/A              | 0,052               | 0,011      | N/A              | 0,077               | 0,5%                         |
| 21th     | 0,008      | N/A              | 0,053               | 0,010      | N/A              | 0,069               | 0,6%                         |
| 22th     | 0,007      | N/A              | 0,049               | 0,012      | N/A              | 0,080               | 0,5%                         |
| 23th     | 0,006      | N/A              | 0,042               | 0,009      | N/A              | 0,061               | 0,6%                         |
| 24th     | 0,008      | N/A              | 0,054               | 0,014      | N/A              | 0,098               | 0,5%                         |

|                  |       |     |       |       |     |       |      |
|------------------|-------|-----|-------|-------|-----|-------|------|
| 25th             | 0,008 | N/A | 0,057 | 0,010 | N/A | 0,066 | 0,6% |
| 26th             | 0,007 | N/A | 0,050 | 0,012 | N/A | 0,082 | 0,5% |
| 27th             | 0,006 | N/A | 0,039 | 0,012 | N/A | 0,086 | 0,6% |
| 28th             | 0,007 | N/A | 0,047 | 0,013 | N/A | 0,087 | 0,5% |
| 29th             | 0,008 | N/A | 0,052 | 0,010 | N/A | 0,069 | 0,6% |
| 30th             | 0,008 | N/A | 0,052 | 0,013 | N/A | 0,092 | 0,5% |
| 31th             | 0,012 | N/A | 0,083 | 0,012 | N/A | 0,081 | 0,6% |
| 32th             | 0,006 | N/A | 0,043 | 0,013 | N/A | 0,089 | 0,5% |
| 33th             | 0,007 | N/A | 0,050 | 0,017 | N/A | 0,118 | 0,6% |
| 34th             | 0,006 | N/A | 0,042 | 0,016 | N/A | 0,111 | --   |
| 35th             | 0,023 | N/A | 0,156 | 0,013 | N/A | 0,091 | --   |
| 36th             | 0,006 | N/A | 0,044 | 0,019 | N/A | 0,129 | --   |
| 37th             | 0,036 | N/A | 0,251 | 0,016 | N/A | 0,113 | --   |
| 38th             | 0,005 | N/A | 0,036 | 0,019 | N/A | 0,129 | --   |
| 39th             | 0,005 | N/A | 0,031 | 0,016 | N/A | 0,113 | --   |
| 40th             | 0,005 | N/A | 0,033 | 0,019 | N/A | 0,128 | --   |
| 41th             | 0,024 | N/A | 0,163 | 0,023 | N/A | 0,160 | --   |
| 42th             | 0,006 | N/A | 0,039 | 0,019 | N/A | 0,131 | --   |
| 43th             | 0,026 | N/A | 0,181 | 0,050 | N/A | 0,343 | --   |
| 44th             | 0,005 | N/A | 0,032 | 0,018 | N/A | 0,124 | --   |
| 45th             | 0,004 | N/A | 0,029 | 0,017 | N/A | 0,120 | --   |
| 46th             | 0,004 | N/A | 0,028 | 0,018 | N/A | 0,123 | --   |
| 47th             | 0,022 | N/A | 0,150 | 0,036 | N/A | 0,247 | --   |
| 48th             | 0,005 | N/A | 0,038 | 0,016 | N/A | 0,113 | --   |
| 49th             | 0,020 | N/A | 0,141 | 0,039 | N/A | 0,270 | --   |
| 50th             | 0,004 | N/A | 0,030 | 0,014 | N/A | 0,096 | --   |
| THD<br>(to 50th) | N/A   | N/A | 0,710 | N/A   | N/A | 0,837 | 5%   |

**Note:**

Inverter shall be connected to test circuit Figure C1 (AS4777.2), Grid nominal voltage within +/-5%, AC-Frequency 50+/-1Hz and Phase angle between 3 phases shall be 120+/-1.5°. Via DC-input set AC-output power (VA) so that it equals to 100+/-5% of rated output. Harmonic ratios of the test voltage shall be measured. Limits based on percentage of fundamental! Total harmonic distortion to the 50th harmonic 5%.

| 5.6 Harmonic currents<br>Appendix C Harmonic Current Limit Test |                                |               |                  |                               |               |                  | P                         |
|-----------------------------------------------------------------|--------------------------------|---------------|------------------|-------------------------------|---------------|------------------|---------------------------|
| SUN2000-3KTL-M0                                                 |                                |               |                  |                               |               |                  |                           |
| L1 phase                                                        |                                |               |                  |                               |               |                  |                           |
| Generating Unit rating per phase (rpp)                          |                                |               |                  |                               |               |                  |                           |
|                                                                 | At 50% of rated output current |               |                  | 100% of rated output currentA |               |                  |                           |
|                                                                 | Watts                          | 582           |                  | Watts                         | 1002          |                  |                           |
|                                                                 | VA                             | 588           |                  | VA                            | 1004          |                  |                           |
|                                                                 | Vrms                           | 230,40        |                  | Vrms                          | 230,46        |                  |                           |
|                                                                 | Arms                           | 2,551         |                  | Arms                          | 4,358         |                  |                           |
|                                                                 | PF                             | 0,9898        |                  | PF                            | 0,9980        |                  |                           |
|                                                                 | Frequency                      | 50,00         |                  | Frequency                     | 50,00         |                  |                           |
| Harmonic                                                        | Value A                        | Angle degrees | % of fundamental | Value A                       | Angle degrees | % of fundamental | Limit in % of fundamental |
| 0                                                               | N/A                            | N/A           | N/A              | N/A                           | N/A           | N/A              | --                        |
| 1st                                                             | 2,550                          | N/A           | 58,646           | 4,357                         | N/A           | 100,212          | --                        |
| 2nd                                                             | 0,011                          | N/A           | 0,250            | 0,008                         | N/A           | 0,189            | 1%                        |
| 3rd                                                             | 0,018                          | N/A           | 0,411            | 0,012                         | N/A           | 0,279            | 4%                        |
| 4th                                                             | 0,006                          | N/A           | 0,131            | 0,006                         | N/A           | 0,141            | 1%                        |
| 5th                                                             | 0,020                          | N/A           | 0,450            | 0,009                         | N/A           | 0,208            | 4%                        |
| 6th                                                             | 0,005                          | N/A           | 0,121            | 0,005                         | N/A           | 0,117            | 1%                        |
| 7th                                                             | 0,012                          | N/A           | 0,281            | 0,007                         | N/A           | 0,158            | 4%                        |
| 8th                                                             | 0,004                          | N/A           | 0,101            | 0,004                         | N/A           | 0,102            | 1%                        |
| 9th                                                             | 0,010                          | N/A           | 0,240            | 0,009                         | N/A           | 0,196            | 2%                        |
| 10th                                                            | 0,004                          | N/A           | 0,103            | 0,005                         | N/A           | 0,118            | 0,5%                      |
| 11th                                                            | 0,014                          | N/A           | 0,332            | 0,007                         | N/A           | 0,153            | 2%                        |
| 12th                                                            | 0,005                          | N/A           | 0,116            | 0,005                         | N/A           | 0,113            | 0,5%                      |
| 13th                                                            | 0,022                          | N/A           | 0,512            | 0,006                         | N/A           | 0,141            | 2%                        |
| 14th                                                            | 0,005                          | N/A           | 0,118            | 0,005                         | N/A           | 0,116            | 0,5%                      |
| 15th                                                            | 0,007                          | N/A           | 0,168            | 0,007                         | N/A           | 0,153            | 1%                        |
| 16th                                                            | 0,004                          | N/A           | 0,103            | 0,004                         | N/A           | 0,098            | 0,5%                      |
| 17th                                                            | 0,022                          | N/A           | 0,509            | 0,007                         | N/A           | 0,160            | 1%                        |
| 18th                                                            | 0,005                          | N/A           | 0,120            | 0,005                         | N/A           | 0,123            | 0,5%                      |
| 19th                                                            | 0,008                          | N/A           | 0,190            | 0,006                         | N/A           | 0,140            | 1%                        |
| 20th                                                            | 0,006                          | N/A           | 0,141            | 0,005                         | N/A           | 0,111            | 0,5%                      |
| 21th                                                            | 0,007                          | N/A           | 0,155            | 0,006                         | N/A           | 0,131            | 0,6%                      |
| 22th                                                            | 0,005                          | N/A           | 0,117            | 0,005                         | N/A           | 0,113            | 0,5%                      |
| 23th                                                            | 0,012                          | N/A           | 0,274            | 0,007                         | N/A           | 0,170            | 0,6%                      |
| 24th                                                            | 0,005                          | N/A           | 0,122            | 0,006                         | N/A           | 0,144            | 0,5%                      |
| 25th                                                            | 0,009                          | N/A           | 0,212            | 0,007                         | N/A           | 0,167            | 0,6%                      |
| 26th                                                            | 0,006                          | N/A           | 0,142            | 0,006                         | N/A           | 0,137            | 0,5%                      |
| 27th                                                            | 0,006                          | N/A           | 0,141            | 0,006                         | N/A           | 0,136            | 0,6%                      |
| 28th                                                            | 0,004                          | N/A           | 0,102            | 0,006                         | N/A           | 0,131            | 0,5%                      |
| 29th                                                            | 0,014                          | N/A           | 0,324            | 0,006                         | N/A           | 0,141            | 0,6%                      |
| 30th                                                            | 0,006                          | N/A           | 0,130            | 0,006                         | N/A           | 0,132            | 0,5%                      |
| 31th                                                            | 0,008                          | N/A           | 0,188            | 0,005                         | N/A           | 0,126            | 0,6%                      |
| 32th                                                            | 0,004                          | N/A           | 0,096            | 0,007                         | N/A           | 0,153            | 0,5%                      |
| 33th                                                            | 0,006                          | N/A           | 0,130            | 0,007                         | N/A           | 0,150            | 0,6%                      |
| 34th                                                            | 0,004                          | N/A           | 0,086            | 0,004                         | N/A           | 0,093            | --                        |
| 35th                                                            | 0,013                          | N/A           | 0,290            | 0,005                         | N/A           | 0,111            | --                        |
| 36th                                                            | 0,005                          | N/A           | 0,104            | 0,005                         | N/A           | 0,106            | --                        |
| 37th                                                            | 0,015                          | N/A           | 0,335            | 0,005                         | N/A           | 0,104            | --                        |
| 38th                                                            | 0,004                          | N/A           | 0,088            | 0,004                         | N/A           | 0,095            | --                        |
| 39th                                                            | 0,004                          | N/A           | 0,103            | 0,004                         | N/A           | 0,097            | --                        |
| 40th                                                            | 0,004                          | N/A           | 0,090            | 0,004                         | N/A           | 0,086            | --                        |

|                  |       |     |       |       |     |       |    |
|------------------|-------|-----|-------|-------|-----|-------|----|
| 41th             | 0,008 | N/A | 0,191 | 0,038 | N/A | 0,881 | -- |
| 42th             | 0,004 | N/A | 0,093 | 0,004 | N/A | 0,101 | -- |
| 43th             | 0,014 | N/A | 0,331 | 0,027 | N/A | 0,617 | -- |
| 44th             | 0,004 | N/A | 0,091 | 0,003 | N/A | 0,075 | -- |
| 45th             | 0,005 | N/A | 0,108 | 0,005 | N/A | 0,105 | -- |
| 46th             | 0,004 | N/A | 0,088 | 0,004 | N/A | 0,086 | -- |
| 47th             | 0,010 | N/A | 0,236 | 0,022 | N/A | 0,499 | -- |
| 48th             | 0,004 | N/A | 0,083 | 0,004 | N/A | 0,086 | -- |
| 49th             | 0,013 | N/A | 0,303 | 0,021 | N/A | 0,472 | -- |
| 50th             | 0,004 | N/A | 0,094 | 0,004 | N/A | 0,093 | -- |
| THD<br>(to 50th) | N/A   | N/A | 1,544 | N/A   | N/A | 1,569 | 5% |

## L2 phase

| Generating Unit rating per phase (rpp) |                               |        |                               |        |  |
|----------------------------------------|-------------------------------|--------|-------------------------------|--------|--|
|                                        | At 50% of rated ouput current |        | 100% of rated output currentA |        |  |
|                                        | Watts                         | 579    | Watts                         | 1008   |  |
|                                        | VA                            | 586    | VA                            | 1010   |  |
|                                        | Vrms                          | 230,38 | Vrms                          | 230,41 |  |
|                                        | Arms                          | 2,543  | Arms                          | 4,386  |  |
|                                        | PF                            | 0,9880 | PF                            | 0,9980 |  |
|                                        | Frequency                     | 50,00  | Frequency                     | 50.00  |  |

| Harmonic | Value<br>A | Angle<br>degrees | % of<br>fundamental | Value<br>A | Angle<br>degrees | % of<br>fundamental | Limit in % of<br>fundamental |
|----------|------------|------------------|---------------------|------------|------------------|---------------------|------------------------------|
| 0        | N/A        | N/A              | N/A                 | N/A        | N/A              | N/A                 | --                           |
| 1st      | 2,542      | N/A              | 58,455              | 4,385      | N/A              | 100,845             | --                           |
| 2nd      | 0,006      | N/A              | 0,141               | 0,009      | N/A              | 0,205               | 1%                           |
| 3rd      | 0,012      | N/A              | 0,278               | 0,025      | N/A              | 0,581               | 4%                           |
| 4th      | 0,006      | N/A              | 0,144               | 0,007      | N/A              | 0,157               | 1%                           |
| 5th      | 0,017      | N/A              | 0,383               | 0,009      | N/A              | 0,211               | 4%                           |
| 6th      | 0,005      | N/A              | 0,122               | 0,005      | N/A              | 0,126               | 1%                           |
| 7th      | 0,008      | N/A              | 0,184               | 0,008      | N/A              | 0,179               | 4%                           |
| 8th      | 0,005      | N/A              | 0,107               | 0,005      | N/A              | 0,124               | 1%                           |
| 9th      | 0,005      | N/A              | 0,121               | 0,007      | N/A              | 0,166               | 2%                           |
| 10th     | 0,004      | N/A              | 0,092               | 0,006      | N/A              | 0,136               | 0,5%                         |
| 11th     | 0,010      | N/A              | 0,235               | 0,007      | N/A              | 0,154               | 2%                           |
| 12th     | 0,005      | N/A              | 0,119               | 0,005      | N/A              | 0,111               | 0,5%                         |
| 13th     | 0,017      | N/A              | 0,393               | 0,006      | N/A              | 0,146               | 2%                           |
| 14th     | 0,005      | N/A              | 0,112               | 0,005      | N/A              | 0,120               | 0,5%                         |
| 15th     | 0,008      | N/A              | 0,190               | 0,007      | N/A              | 0,163               | 1%                           |
| 16th     | 0,005      | N/A              | 0,105               | 0,005      | N/A              | 0,122               | 0,5%                         |
| 17th     | 0,022      | N/A              | 0,502               | 0,007      | N/A              | 0,167               | 1%                           |
| 18th     | 0,005      | N/A              | 0,122               | 0,006      | N/A              | 0,130               | 0,5%                         |
| 19th     | 0,010      | N/A              | 0,236               | 0,006      | N/A              | 0,145               | 1%                           |
| 20th     | 0,006      | N/A              | 0,128               | 0,005      | N/A              | 0,116               | 0,5%                         |
| 21th     | 0,006      | N/A              | 0,130               | 0,008      | N/A              | 0,173               | 0,6%                         |
| 22th     | 0,005      | N/A              | 0,111               | 0,005      | N/A              | 0,114               | 0,5%                         |
| 23th     | 0,010      | N/A              | 0,234               | 0,007      | N/A              | 0,163               | 0,6%                         |
| 24th     | 0,005      | N/A              | 0,114               | 0,007      | N/A              | 0,160               | 0,5%                         |
| 25th     | 0,009      | N/A              | 0,199               | 0,008      | N/A              | 0,175               | 0,6%                         |
| 26th     | 0,006      | N/A              | 0,131               | 0,006      | N/A              | 0,146               | 0,5%                         |
| 27th     | 0,006      | N/A              | 0,138               | 0,009      | N/A              | 0,197               | 0,6%                         |
| 28th     | 0,005      | N/A              | 0,109               | 0,005      | N/A              | 0,125               | 0,5%                         |
| 29th     | 0,016      | N/A              | 0,367               | 0,006      | N/A              | 0,143               | 0,6%                         |
| 30th     | 0,006      | N/A              | 0,129               | 0,006      | N/A              | 0,141               | 0,5%                         |
| 31th     | 0,007      | N/A              | 0,150               | 0,006      | N/A              | 0,130               | 0,6%                         |
| 32th     | 0,004      | N/A              | 0,097               | 0,006      | N/A              | 0,146               | 0,5%                         |

|                  |       |     |       |       |     |       |      |
|------------------|-------|-----|-------|-------|-----|-------|------|
| 33th             | 0,007 | N/A | 0,155 | 0,007 | N/A | 0,150 | 0,6% |
| 34th             | 0,004 | N/A | 0,100 | 0,005 | N/A | 0,106 | --   |
| 35th             | 0,013 | N/A | 0,288 | 0,005 | N/A | 0,112 | --   |
| 36th             | 0,005 | N/A | 0,121 | 0,006 | N/A | 0,127 | --   |
| 37th             | 0,015 | N/A | 0,347 | 0,005 | N/A | 0,105 | --   |
| 38th             | 0,003 | N/A | 0,079 | 0,004 | N/A | 0,102 | --   |
| 39th             | 0,005 | N/A | 0,111 | 0,007 | N/A | 0,170 | --   |
| 40th             | 0,003 | N/A | 0,076 | 0,004 | N/A | 0,089 | --   |
| 41th             | 0,009 | N/A | 0,205 | 0,036 | N/A | 0,817 | --   |
| 42th             | 0,004 | N/A | 0,100 | 0,005 | N/A | 0,109 | --   |
| 43th             | 0,014 | N/A | 0,316 | 0,024 | N/A | 0,547 | --   |
| 44th             | 0,004 | N/A | 0,087 | 0,005 | N/A | 0,110 | --   |
| 45th             | 0,004 | N/A | 0,092 | 0,005 | N/A | 0,124 | --   |
| 46th             | 0,004 | N/A | 0,091 | 0,004 | N/A | 0,083 | --   |
| 47th             | 0,010 | N/A | 0,220 | 0,023 | N/A | 0,518 | --   |
| 48th             | 0,004 | N/A | 0,090 | 0,004 | N/A | 0,103 | --   |
| 49th             | 0,013 | N/A | 0,308 | 0,018 | N/A | 0,424 | --   |
| 50th             | 0,004 | N/A | 0,088 | 0,005 | N/A | 0,120 | --   |
| THD<br>(to 50th) | N/A   | N/A | 1,396 | N/A   | N/A | 1,624 | 5%   |

### L3 phase

| Generating Unit rating per phase (rpp) |                               |        |                               |        |  |
|----------------------------------------|-------------------------------|--------|-------------------------------|--------|--|
|                                        | At 50% of rated ouput current |        | 100% of rated output currentA |        |  |
|                                        | Watts                         | 579    | Watts                         | 1002   |  |
|                                        | VA                            | 585    | VA                            | 1005   |  |
|                                        | Vrms                          | 230,35 | Vrms                          | 230,39 |  |
|                                        | Arms                          | 2,540  | Arms                          | 4,361  |  |
|                                        | PF                            | 0,9897 | PF                            | 0,9973 |  |
|                                        | Frequency                     | 50.00  | Frequency                     | 50.00  |  |

| Harmonic | Value A | Angle degrees | % of fundamental | Value A | Angle degrees | % of fundamental | Limit in % of fundamental |
|----------|---------|---------------|------------------|---------|---------------|------------------|---------------------------|
| 0        | N/A     | N/A           | N/A              | N/A     | N/A           | N/A              | 0,5%                      |
| 1st      | 2,539   | N/A           | 58,397           | 4,360   | N/A           | 100,287          | 100%                      |
| 2nd      | 0,013   | N/A           | 0,301            | 0,006   | N/A           | 0,144            | 1%                        |
| 3rd      | 0,012   | N/A           | 0,268            | 0,014   | N/A           | 0,320            | 4%                        |
| 4th      | 0,009   | N/A           | 0,203            | 0,007   | N/A           | 0,160            | 1%                        |
| 5th      | 0,014   | N/A           | 0,312            | 0,006   | N/A           | 0,129            | 4%                        |
| 6th      | 0,005   | N/A           | 0,116            | 0,005   | N/A           | 0,116            | 1%                        |
| 7th      | 0,010   | N/A           | 0,238            | 0,006   | N/A           | 0,141            | 4%                        |
| 8th      | 0,004   | N/A           | 0,095            | 0,006   | N/A           | 0,128            | 1%                        |
| 9th      | 0,005   | N/A           | 0,112            | 0,008   | N/A           | 0,174            | 2%                        |
| 10th     | 0,004   | N/A           | 0,098            | 0,006   | N/A           | 0,131            | 0,5%                      |
| 11th     | 0,013   | N/A           | 0,292            | 0,005   | N/A           | 0,121            | 2%                        |
| 12th     | 0,005   | N/A           | 0,112            | 0,005   | N/A           | 0,115            | 0,5%                      |
| 13th     | 0,020   | N/A           | 0,449            | 0,006   | N/A           | 0,142            | 2%                        |
| 14th     | 0,004   | N/A           | 0,101            | 0,005   | N/A           | 0,114            | 0,5%                      |
| 15th     | 0,005   | N/A           | 0,122            | 0,009   | N/A           | 0,217            | 1%                        |
| 16th     | 0,004   | N/A           | 0,100            | 0,005   | N/A           | 0,122            | 0,5%                      |
| 17th     | 0,025   | N/A           | 0,581            | 0,007   | N/A           | 0,157            | 1%                        |
| 18th     | 0,005   | N/A           | 0,119            | 0,006   | N/A           | 0,136            | 0,5%                      |
| 19th     | 0,006   | N/A           | 0,127            | 0,005   | N/A           | 0,124            | 1%                        |
| 20th     | 0,005   | N/A           | 0,122            | 0,006   | N/A           | 0,135            | 0,5%                      |
| 21th     | 0,006   | N/A           | 0,127            | 0,007   | N/A           | 0,160            | 0,6%                      |
| 22th     | 0,005   | N/A           | 0,107            | 0,006   | N/A           | 0,149            | 0,5%                      |
| 23th     | 0,012   | N/A           | 0,271            | 0,006   | N/A           | 0,149            | 0,6%                      |
| 24th     | 0,005   | N/A           | 0,115            | 0,007   | N/A           | 0,156            | 0,5%                      |



|                  |       |     |       |       |     |       |      |
|------------------|-------|-----|-------|-------|-----|-------|------|
| 25th             | 0,010 | N/A | 0,226 | 0,007 | N/A | 0,157 | 0,6% |
| 26th             | 0,005 | N/A | 0,124 | 0,007 | N/A | 0,163 | 0,5% |
| 27th             | 0,005 | N/A | 0,119 | 0,010 | N/A | 0,219 | 0,6% |
| 28th             | 0,004 | N/A | 0,088 | 0,006 | N/A | 0,143 | 0,5% |
| 29th             | 0,012 | N/A | 0,287 | 0,005 | N/A | 0,126 | 0,6% |
| 30th             | 0,005 | N/A | 0,109 | 0,005 | N/A | 0,122 | 0,5% |
| 31th             | 0,007 | N/A | 0,167 | 0,005 | N/A | 0,114 | 0,6% |
| 32th             | 0,004 | N/A | 0,086 | 0,005 | N/A | 0,118 | 0,5% |
| 33th             | 0,006 | N/A | 0,134 | 0,013 | N/A | 0,290 | 0,6% |
| 34th             | 0,003 | N/A | 0,076 | 0,005 | N/A | 0,108 | --   |
| 35th             | 0,010 | N/A | 0,219 | 0,005 | N/A | 0,124 | --   |
| 36th             | 0,005 | N/A | 0,105 | 0,006 | N/A | 0,137 | --   |
| 37th             | 0,013 | N/A | 0,305 | 0,005 | N/A | 0,113 | --   |
| 38th             | 0,003 | N/A | 0,071 | 0,005 | N/A | 0,107 | --   |
| 39th             | 0,004 | N/A | 0,084 | 0,007 | N/A | 0,160 | --   |
| 40th             | 0,003 | N/A | 0,068 | 0,005 | N/A | 0,107 | --   |
| 41th             | 0,007 | N/A | 0,172 | 0,036 | N/A | 0,836 | --   |
| 42th             | 0,004 | N/A | 0,093 | 0,005 | N/A | 0,105 | --   |
| 43th             | 0,012 | N/A | 0,278 | 0,026 | N/A | 0,598 | --   |
| 44th             | 0,003 | N/A | 0,076 | 0,005 | N/A | 0,106 | --   |
| 45th             | 0,004 | N/A | 0,081 | 0,006 | N/A | 0,146 | --   |
| 46th             | 0,003 | N/A | 0,078 | 0,004 | N/A | 0,101 | --   |
| 47th             | 0,009 | N/A | 0,206 | 0,023 | N/A | 0,527 | --   |
| 48th             | 0,004 | N/A | 0,081 | 0,003 | N/A | 0,076 | --   |
| 49th             | 0,012 | N/A | 0,279 | 0,021 | N/A | 0,492 | --   |
| 50th             | 0,003 | N/A | 0,080 | 0,004 | N/A | 0,091 | --   |
| THD<br>(to 50th) | N/A   | N/A | 1,382 | N/A   | N/A | 1,603 | 5%   |

**Note:**

Inverter shall be connected to test circuit Figure C1 (AS4777.2), Grid nominal voltage within +/-5%, AC-Frequency 50+/-1Hz and Phase angle between 3 phases shall be 120+/-1.5°. Via DC-input set AC-output power (VA) so that it equals to 100+/-5% of rated output. Harmonic ratios of the test voltage shall be measured. Limits based on percentage of fundamental! Total harmonic distortion to the 50th harmonic 5%.

The test had been performed on the models SUN2000-3KTL-M0 and SUN2000-10KTL-M0, the test results are valid for the SUN2000-4KTL-M0, SUN2000-5KTL-M0, SUN2000-6KTL-M0, SUN2000-8KTL-M0, SUN2000-3KTL-M1, SUN2000-4KTL-M1, SUN2000-5KTL-M1, SUN2000-6KTL-M1, SUN2000-8KTL-M1 and SUN2000-10KTL-M1 except current sampling circuit and the output power derated by software.

Correction: correct the model name SUN2000-10KTL-M10 to SUN2000-10KTL-M1 due to the typo.

| 5.6 Harmonic currents<br>Appendix C3 Harmonic Voltage Limit Test<br>SUN2000-10KTL-M0 |                                    |                     |                                   |                     | P                            |
|--------------------------------------------------------------------------------------|------------------------------------|---------------------|-----------------------------------|---------------------|------------------------------|
| Generating Unit rating per phase (rpp)                                               |                                    |                     |                                   |                     |                              |
|                                                                                      | At 50% of rated ouput current<br>A |                     | 100% of rated output current<br>A |                     |                              |
| Harmonic                                                                             | Value<br>V                         | % of<br>fundamental | Value<br>V                        | % of<br>fundamental | Limit in % of<br>fundamental |
| L1 phase                                                                             |                                    |                     |                                   |                     |                              |
| 2nd                                                                                  | 0,007                              | 0,015               | 0,016                             | 0,007               | 0,2%                         |
| 3rd                                                                                  | 0,020                              | 0,046               | 0,044                             | 0,019               | 4%                           |
| 4th                                                                                  | 0,005                              | 0,012               | 0,013                             | 0,006               | 0,2%                         |
| 5th                                                                                  | 0,022                              | 0,050               | 0,049                             | 0,021               | 4%                           |
| 6th                                                                                  | 0,006                              | 0,014               | 0,015                             | 0,007               | 0,2%                         |
| 7th                                                                                  | 0,014                              | 0,031               | 0,030                             | 0,013               | 4%                           |
| 8th                                                                                  | 0,006                              | 0,014               | 0,014                             | 0,006               | 0,2%                         |
| 9th                                                                                  | 0,012                              | 0,027               | 0,026                             | 0,011               | 2%                           |
| 10th                                                                                 | 0,006                              | 0,014               | 0,013                             | 0,006               | 0,2%                         |
| 11th                                                                                 | 0,010                              | 0,023               | 0,023                             | 0,010               | 0,1%                         |
| 12th                                                                                 | 0,005                              | 0,012               | 0,012                             | 0,005               | 0,1%                         |
| 13th                                                                                 | 0,008                              | 0,018               | 0,018                             | 0,008               | 0,1%                         |
| 14th                                                                                 | 0,004                              | 0,010               | 0,010                             | 0,005               | 0,1%                         |
| 15th                                                                                 | 0,006                              | 0,014               | 0,014                             | 0,006               | 0,1%                         |
| 16th                                                                                 | 0,005                              | 0,011               | 0,011                             | 0,005               | 0,1%                         |
| 17th                                                                                 | 0,005                              | 0,012               | 0,012                             | 0,005               | 0,1%                         |
| 18th                                                                                 | 0,005                              | 0,011               | 0,010                             | 0,004               | 0,1%                         |
| 19th                                                                                 | 0,005                              | 0,011               | 0,011                             | 0,005               | 0,1%                         |
| 20th                                                                                 | 0,005                              | 0,012               | 0,012                             | 0,005               | 0,1%                         |
| 21th                                                                                 | 0,005                              | 0,012               | 0,012                             | 0,005               | 0,1%                         |
| 22th                                                                                 | 0,004                              | 0,010               | 0,010                             | 0,004               | 0,1%                         |
| 23th                                                                                 | 0,005                              | 0,012               | 0,012                             | 0,005               | 0,1%                         |
| 24th                                                                                 | 0,005                              | 0,012               | 0,011                             | 0,005               | 0,1%                         |
| 25th                                                                                 | 0,005                              | 0,011               | 0,010                             | 0,004               | 0,1%                         |
| 26th                                                                                 | 0,005                              | 0,011               | 0,010                             | 0,004               | 0,1%                         |
| 27th                                                                                 | 0,005                              | 0,010               | 0,011                             | 0,005               | 0,1%                         |
| 28th                                                                                 | 0,004                              | 0,010               | 0,010                             | 0,004               | 0,1%                         |
| 29th                                                                                 | 0,005                              | 0,011               | 0,011                             | 0,005               | 0,1%                         |
| 30th                                                                                 | 0,004                              | 0,010               | 0,011                             | 0,005               | 0,1%                         |
| 31th                                                                                 | 0,005                              | 0,011               | 0,010                             | 0,004               | 0,1%                         |
| 32th                                                                                 | 0,005                              | 0,011               | 0,010                             | 0,004               | 0,1%                         |
| 33th                                                                                 | 0,005                              | 0,011               | 0,010                             | 0,004               | 0,1%                         |
| 34th                                                                                 | 0,004                              | 0,010               | 0,009                             | 0,004               | 0,1%                         |
| 35th                                                                                 | 0,005                              | 0,011               | 0,011                             | 0,005               | 0,1%                         |
| 36th                                                                                 | 0,005                              | 0,011               | 0,010                             | 0,004               | 0,1%                         |
| 37th                                                                                 | 0,005                              | 0,011               | 0,010                             | 0,004               | 0,1%                         |
| 38th                                                                                 | 0,005                              | 0,011               | 0,010                             | 0,004               | 0,1%                         |
| 39th                                                                                 | 0,005                              | 0,011               | 0,010                             | 0,004               | 0,1%                         |
| 40th                                                                                 | 0,006                              | 0,013               | 0,011                             | 0,005               | 0,1%                         |
| 41th                                                                                 | 0,005                              | 0,011               | 0,010                             | 0,005               | 0,1%                         |
| 42th                                                                                 | 0,005                              | 0,011               | 0,010                             | 0,004               | 0,1%                         |
| 43th                                                                                 | 0,005                              | 0,011               | 0,010                             | 0,004               | 0,1%                         |
| 44th                                                                                 | 0,005                              | 0,011               | 0,010                             | 0,004               | 0,1%                         |
| 45th                                                                                 | 0,005                              | 0,011               | 0,009                             | 0,004               | 0,1%                         |
| 46th                                                                                 | 0,005                              | 0,010               | 0,009                             | 0,004               | 0,1%                         |
| 47th                                                                                 | 0,005                              | 0,011               | 0,010                             | 0,004               | 0,1%                         |

|                 |       |       |       |       |      |
|-----------------|-------|-------|-------|-------|------|
| 48th            | 0,005 | 0,011 | 0,010 | 0,004 | 0,1% |
| 49th            | 0,005 | 0,011 | 0,010 | 0,004 | 0,1% |
| 50th            | 0,004 | 0,010 | 0,010 | 0,004 | 0,1% |
| THD             | N/A   | 0,068 | N/A   | 0,066 | 5%   |
| <b>L2 phase</b> |       |       |       |       |      |
| 2nd             | 0,014 | 0,006 | 0,015 | 0,006 | 0,2% |
| 3rd             | 0,045 | 0,019 | 0,043 | 0,019 | 4%   |
| 4th             | 0,012 | 0,005 | 0,012 | 0,005 | 0,2% |
| 5th             | 0,060 | 0,026 | 0,054 | 0,023 | 4%   |
| 6th             | 0,014 | 0,006 | 0,013 | 0,006 | 0,2% |
| 7th             | 0,033 | 0,015 | 0,033 | 0,015 | 4%   |
| 8th             | 0,013 | 0,005 | 0,012 | 0,005 | 0,2% |
| 9th             | 0,031 | 0,014 | 0,029 | 0,013 | 2%   |
| 10th            | 0,013 | 0,006 | 0,012 | 0,005 | 0,2% |
| 11th            | 0,026 | 0,011 | 0,024 | 0,010 | 0,1% |
| 12th            | 0,010 | 0,005 | 0,010 | 0,004 | 0,1% |
| 13th            | 0,019 | 0,008 | 0,018 | 0,008 | 0,1% |
| 14th            | 0,010 | 0,004 | 0,010 | 0,004 | 0,1% |
| 15th            | 0,015 | 0,006 | 0,014 | 0,006 | 0,1% |
| 16th            | 0,011 | 0,005 | 0,010 | 0,004 | 0,1% |
| 17th            | 0,012 | 0,005 | 0,012 | 0,005 | 0,1% |
| 18th            | 0,010 | 0,004 | 0,010 | 0,004 | 0,1% |
| 19th            | 0,011 | 0,005 | 0,011 | 0,005 | 0,1% |
| 20th            | 0,010 | 0,004 | 0,011 | 0,005 | 0,1% |
| 21th            | 0,012 | 0,005 | 0,012 | 0,005 | 0,1% |
| 22th            | 0,010 | 0,005 | 0,010 | 0,004 | 0,1% |
| 23th            | 0,012 | 0,005 | 0,012 | 0,005 | 0,1% |
| 24th            | 0,011 | 0,005 | 0,011 | 0,005 | 0,1% |
| 25th            | 0,011 | 0,005 | 0,010 | 0,004 | 0,1% |
| 26th            | 0,011 | 0,005 | 0,010 | 0,005 | 0,1% |
| 27th            | 0,011 | 0,005 | 0,011 | 0,005 | 0,1% |
| 28th            | 0,010 | 0,004 | 0,010 | 0,004 | 0,1% |
| 29th            | 0,011 | 0,005 | 0,012 | 0,005 | 0,1% |
| 30th            | 0,011 | 0,005 | 0,011 | 0,005 | 0,1% |
| 31th            | 0,012 | 0,005 | 0,010 | 0,005 | 0,1% |
| 32th            | 0,011 | 0,005 | 0,010 | 0,004 | 0,1% |
| 33th            | 0,011 | 0,005 | 0,010 | 0,004 | 0,1% |
| 34th            | 0,011 | 0,005 | 0,009 | 0,004 | 0,1% |
| 35th            | 0,011 | 0,005 | 0,011 | 0,005 | 0,1% |
| 36th            | 0,011 | 0,005 | 0,010 | 0,004 | 0,1% |
| 37th            | 0,011 | 0,005 | 0,010 | 0,004 | 0,1% |
| 38th            | 0,011 | 0,005 | 0,010 | 0,004 | 0,1% |
| 39th            | 0,011 | 0,005 | 0,011 | 0,005 | 0,1% |
| 40th            | 0,011 | 0,005 | 0,009 | 0,004 | 0,1% |
| 41th            | 0,011 | 0,005 | 0,010 | 0,005 | 0,1% |
| 42th            | 0,010 | 0,005 | 0,010 | 0,004 | 0,1% |
| 43th            | 0,011 | 0,005 | 0,010 | 0,004 | 0,1% |
| 44th            | 0,011 | 0,005 | 0,010 | 0,004 | 0,1% |
| 45th            | 0,011 | 0,005 | 0,010 | 0,004 | 0,1% |
| 46th            | 0,011 | 0,005 | 0,009 | 0,004 | 0,1% |
| 47th            | 0,012 | 0,005 | 0,010 | 0,004 | 0,1% |
| 48th            | 0,011 | 0,005 | 0,010 | 0,004 | 0,1% |
| 49th            | 0,011 | 0,005 | 0,010 | 0,004 | 0,1% |
| 50th            | 0,010 | 0,004 | 0,010 | 0,004 | 0,1% |
| THD             | N/A   | 0,071 | N/A   | 0,070 | 5%   |
| <b>L3 phase</b> |       |       |       |       |      |
| 2nd             | 0,057 | 0,025 | 0,060 | 0,026 | 0,2% |

|      |       |       |       |       |      |
|------|-------|-------|-------|-------|------|
| 3rd  | 0,036 | 0,016 | 0,037 | 0,016 | 4%   |
| 4th  | 0,048 | 0,021 | 0,056 | 0,024 | 0,2% |
| 5th  | 0,045 | 0,019 | 0,041 | 0,018 | 4%   |
| 6th  | 0,038 | 0,016 | 0,039 | 0,017 | 0,2% |
| 7th  | 0,020 | 0,009 | 0,019 | 0,008 | 4%   |
| 8th  | 0,030 | 0,013 | 0,029 | 0,013 | 0,2% |
| 9th  | 0,016 | 0,007 | 0,017 | 0,007 | 2%   |
| 10th | 0,025 | 0,011 | 0,022 | 0,009 | 0,2% |
| 11th | 0,014 | 0,006 | 0,013 | 0,006 | 0,1% |
| 12th | 0,019 | 0,008 | 0,016 | 0,007 | 0,1% |
| 13th | 0,012 | 0,005 | 0,012 | 0,005 | 0,1% |
| 14th | 0,014 | 0,006 | 0,012 | 0,005 | 0,1% |
| 15th | 0,011 | 0,005 | 0,011 | 0,005 | 0,1% |
| 16th | 0,012 | 0,005 | 0,011 | 0,005 | 0,1% |
| 17th | 0,011 | 0,005 | 0,012 | 0,005 | 0,1% |
| 18th | 0,011 | 0,005 | 0,011 | 0,005 | 0,1% |
| 19th | 0,012 | 0,005 | 0,012 | 0,005 | 0,1% |
| 20th | 0,012 | 0,005 | 0,012 | 0,005 | 0,1% |
| 21th | 0,011 | 0,005 | 0,011 | 0,005 | 0,1% |
| 22th | 0,011 | 0,005 | 0,010 | 0,004 | 0,1% |
| 23th | 0,012 | 0,005 | 0,012 | 0,005 | 0,1% |
| 24th | 0,012 | 0,005 | 0,011 | 0,005 | 0,1% |
| 25th | 0,011 | 0,005 | 0,010 | 0,005 | 0,1% |
| 26th | 0,011 | 0,005 | 0,010 | 0,004 | 0,1% |
| 27th | 0,011 | 0,005 | 0,011 | 0,005 | 0,1% |
| 28th | 0,010 | 0,005 | 0,010 | 0,004 | 0,1% |
| 29th | 0,012 | 0,005 | 0,012 | 0,005 | 0,1% |
| 30th | 0,011 | 0,005 | 0,011 | 0,005 | 0,1% |
| 31th | 0,012 | 0,005 | 0,010 | 0,004 | 0,1% |
| 32th | 0,011 | 0,005 | 0,010 | 0,004 | 0,1% |
| 33th | 0,011 | 0,005 | 0,010 | 0,004 | 0,1% |
| 34th | 0,011 | 0,005 | 0,010 | 0,004 | 0,1% |
| 35th | 0,011 | 0,005 | 0,011 | 0,005 | 0,1% |
| 36th | 0,011 | 0,005 | 0,010 | 0,004 | 0,1% |
| 37th | 0,010 | 0,005 | 0,010 | 0,004 | 0,1% |
| 38th | 0,011 | 0,005 | 0,010 | 0,004 | 0,1% |
| 39th | 0,011 | 0,005 | 0,011 | 0,005 | 0,1% |
| 40th | 0,012 | 0,005 | 0,010 | 0,004 | 0,1% |
| 41th | 0,011 | 0,005 | 0,010 | 0,004 | 0,1% |
| 42th | 0,011 | 0,005 | 0,010 | 0,004 | 0,1% |
| 43th | 0,011 | 0,005 | 0,011 | 0,005 | 0,1% |
| 44th | 0,011 | 0,005 | 0,011 | 0,005 | 0,1% |
| 45th | 0,011 | 0,005 | 0,009 | 0,004 | 0,1% |
| 46th | 0,010 | 0,005 | 0,009 | 0,004 | 0,1% |
| 47th | 0,012 | 0,005 | 0,010 | 0,004 | 0,1% |
| 48th | 0,011 | 0,005 | 0,011 | 0,005 | 0,1% |
| 49th | 0,011 | 0,005 | 0,010 | 0,004 | 0,1% |
| 50th | 0,011 | 0,005 | 0,010 | 0,004 | 0,1% |
| THD  | N/A   | 0,094 | N/A   | 0,089 | 5%   |

**Note:**

Inverter shall be connected to test circuit Figure C1 (AS4777.2), Grid nominal voltage within  $\pm 5\%$ , AC-Frequency 50 $\pm 1$ Hz and Phase angle between 3 phases shall be 120 $\pm 1.5^\circ$ . Via DC-input set AC-output power (VA) so that it equals to 100 $\pm 5\%$  of rated output. Harmonic ratios of the test voltage shall be measured. Limits based on percentage of fundamental! Total harmonic distortion to the 50th harmonic 5%.

| 5.7 Voltage Fluctuations and Flicker |           |            | P |
|--------------------------------------|-----------|------------|---|
| SUN2000-3KTL-M0                      |           |            |   |
| Phase 1                              |           |            |   |
| Limit                                | Pst = 1,0 | Plt = 0,65 |   |
| Test value                           | 0,07      | 0,07       |   |
| Phase 2                              |           |            |   |
| Limit                                | Pst = 1,0 | Plt = 0,65 |   |
| Test value                           | 0,07      | 0,07       |   |
| Phase 3                              |           |            |   |
| Limit                                | Pst = 1,0 | Plt = 0,65 |   |
| Test value                           | 0,07      | 0,07       |   |
| SUN2000-4KTL-M0                      |           |            |   |
| Phase 1                              |           |            |   |
| Limit                                | Pst = 1,0 | Plt = 0,65 |   |
| Test value                           | 0,07      | 0,07       |   |
| Phase 2                              |           |            |   |
| Limit                                | Pst = 1,0 | Plt = 0,65 |   |
| Test value                           | 0,07      | 0,07       |   |
| Phase 3                              |           |            |   |
| Limit                                | Pst = 1,0 | Plt = 0,65 |   |
| Test value                           | 0,07      | 0,07       |   |
| SUN2000-5KTL-M0                      |           |            |   |
| Phase 1                              |           |            |   |
| Limit                                | Pst = 1,0 | Plt = 0,65 |   |
| Test value                           | 0,07      | 0,07       |   |
| Phase 2                              |           |            |   |
| Limit                                | Pst = 1,0 | Plt = 0,65 |   |
| Test value                           | 0,07      | 0,07       |   |
| Phase 3                              |           |            |   |
| Limit                                | Pst = 1,0 | Plt = 0,65 |   |
| Test value                           | 0,07      | 0,07       |   |
| SUN2000-6KTL-M0                      |           |            |   |
| Phase 1                              |           |            |   |
| Limit                                | Pst = 1,0 | Plt = 0,65 |   |
| Test value                           | 0,07      | 0,07       |   |
| Phase 2                              |           |            |   |
| Limit                                | Pst = 1,0 | Plt = 0,65 |   |
| Test value                           | 0,07      | 0,07       |   |
| Phase 3                              |           |            |   |
| Limit                                | Pst = 1,0 | Plt = 0,65 |   |
| Test value                           | 0,07      | 0,07       |   |



| Phase 3                 |           |            |
|-------------------------|-----------|------------|
| Limit                   | Pst = 1,0 | Plt = 0,65 |
| Test value              | 0,07      | 0,07       |
| <b>SUN2000-8KTL-M0</b>  |           |            |
| Phase 1                 |           |            |
| Limit                   | Pst = 1,0 | Plt = 0,65 |
| Test value              | 0,07      | 0,07       |
| Phase 2                 |           |            |
| Limit                   | Pst = 1,0 | Plt = 0,65 |
| Test value              | 0,07      | 0,07       |
| Phase 3                 |           |            |
| Limit                   | Pst = 1,0 | Plt = 0,65 |
| Test value              | 0,07      | 0,07       |
| <b>SUN2000-10KTL-M0</b> |           |            |
| Phase 1                 |           |            |
| Limit                   | Pst = 1,0 | Plt = 0,65 |
| Test value              | 0,10      | 0,08       |
| Phase 2                 |           |            |
| Limit                   | Pst = 1,0 | Plt = 0,65 |
| Test value              | 0,08      | 0,08       |
| Phase 3                 |           |            |
| Limit                   | Pst = 1,0 | Plt = 0,65 |
| Test value              | 0,08      | 0,08       |

Note:

The inverter shall conform to the voltage fluctuation and flicker limits specified in AS/NZS 61000.3.3 for equipment with rated current less than or equal to 16 A per phase (a.c.).

For equipment with rated current greater than 16 A per phase (a.c.), if the inverter cannot meet the requirements of AS/NZS 61000.3.3, the maximum permissible connection point impedance ( $Z_{max}$ ) shall be determined such that the voltage fluctuation and flicker limits specified in AS/NZS 61000.3.3 can be met. The impedance shall be determined in accordance with the methods given in AS/NZS 61000.3.11.

The test had been performed on the models SUN2000-3KTL-M0 and SUN2000-10KTL-M0, the test results are valid for the SUN2000-4KTL-M0, SUN2000-5KTL-M0, SUN2000-6KTL-M0, SUN2000-8KTL-M0, SUN2000-3KTL-M1, SUN2000-4KTL-M1, SUN2000-5KTL-M1, SUN2000-6KTL-M1, SUN2000-8KTL-M1 and SUN2000-10KTL-M1 except current sampling circuit and the output power derated by software.

Correction: correct the model name SUN2000-10KTL-M10 to SUN2000-10KTL-M1 due to the typo.

| 5.8 Transient Voltage Limits (phase to neutral)<br>Appendix D Transient Voltage Limit Test |                           |                     |                           |                     |                            | P                   |
|--------------------------------------------------------------------------------------------|---------------------------|---------------------|---------------------------|---------------------|----------------------------|---------------------|
| L1 to N                                                                                    |                           |                     |                           |                     |                            |                     |
|                                                                                            | 10+/-5% Output Power (VA) |                     | 50+/-5% Output Power (VA) |                     | 100+/-5% Output Power (VA) |                     |
|                                                                                            | Duration (s)              | Line to neutral (V) | Duration (s)              | Line to neutral (V) | Duration (s)               | Line to neutral (V) |
| Limit                                                                                      | 0,002                     | 580                 | 0,002                     | 580                 | 0,002                      | 580                 |
| Test value                                                                                 | 0,002                     | 317,2               | 0,002                     | 298,9               | 0,002                      | 238,4               |
| Limit                                                                                      | 0,006                     | 470                 | 0,006                     | 470                 | 0,006                      | 470                 |
| Test value                                                                                 | 0,006                     | 445,9               | 0,006                     | 280,4               | 0,006                      | 385,4               |
| Limit                                                                                      | 0,02                      | 420                 | 0,02                      | 420                 | 0,02                       | 420                 |
| Test value                                                                                 | 0,02                      | 110,7               | 0,02                      | 76,6                | 0,02                       | 135,9               |
| Limit                                                                                      | >0,06                     | 390                 | >0,06                     | 390                 | >0,06                      | 390                 |
| Test value                                                                                 | >0,06                     | 17,92               | >0,06                     | 131,7               | >0,06                      | 102,9               |
| L2 to N                                                                                    |                           |                     |                           |                     |                            |                     |
|                                                                                            | 10+/-5% Output Power (VA) |                     | 50+/-5% Output Power (VA) |                     | 100+/-5% Output Power (VA) |                     |
|                                                                                            | Duration (s)              | Line to neutral (V) | Duration (s)              | Line to neutral (V) | Duration (s)               | Line to neutral (V) |
| Limit                                                                                      | 0,002                     | 580                 | 0,002                     | 580                 | 0,002                      | 580                 |
| Test value                                                                                 | 0,002                     | 269,1               | 0,002                     | 250,7               | 0,002                      | 256,1               |
| Limit                                                                                      | 0,006                     | 470                 | 0,006                     | 470                 | 0,006                      | 470                 |
| Test value                                                                                 | 0,006                     | 117,2               | 0,006                     | 373,9               | 0,006                      | 256,1               |
| Limit                                                                                      | 0,02                      | 420                 | 0,02                      | 420                 | 0,02                       | 420                 |
| Test value                                                                                 | 0,02                      | 89,7                | 0,02                      | 307,6               | 0,02                       | 97,7                |
| Limit                                                                                      | >0,06                     | 390                 | >0,06                     | 390                 | >0,06                      | 390                 |
| Test value                                                                                 | >0,06                     | 75,6                | >0,06                     | 188,4               | >0,06                      | 177,9               |

| <b>L3 to N</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                           |                     |                           |                     |                            |                     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|---------------------|---------------------------|---------------------|----------------------------|---------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 10+/-5% Output Power (VA) |                     | 50+/-5% Output Power (VA) |                     | 100+/-5% Output Power (VA) |                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Duration (s)              | Line to neutral (V) | Duration (s)              | Line to neutral (V) | Duration (s)               | Line to neutral (V) |
| Limit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0,002                     | 580                 | 0,002                     | 580                 | 0,002                      | 580                 |
| Test value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0,002                     | 479,6               | 0,002                     | 255,4               | 0,002                      | 382,5               |
| Limit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0,006                     | 470                 | 0,006                     | 470                 | 0,006                      | 470                 |
| Test value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0,006                     | 255,4               | 0,006                     | 365,5               | 0,006                      | 242,2               |
| Limit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0,02                      | 420                 | 0,02                      | 420                 | 0,02                       | 420                 |
| Test value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0,02                      | 246,3               | 0,02                      | 275,8               | 0,02                       | 118,3               |
| Limit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | >0,06                     | 390                 | >0,06                     | 390                 | >0,06                      | 390                 |
| Test value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | >0,06                     | 52,6                | >0,06                     | 165,5               | >0,06                      | 191,8               |
| <p><b>Note:</b><br/> Results shall not exceed limits in Table 4 of AS/NZS 4777.2. Test Specifications: Inverter shall be connected to test circuit AS/NZS 4777.2 Figure D1. Grid nominal voltage within +/-5%, Via DC-input set AC- output power so that it equals to 10+/-5% of rated output (VA). Switch S shall be opened and the output voltage duration (Sample frequency of at least 10kHz) of the inverter shall be recorded. Test shall be repeated at 50+/-5% and 100+/-5% of rated output power.</p> <p>The test had been performed on the model SUN2000-10KTL-M0, the test results are valid for the SUN2000-3KTL-M0, SUN2000-4KTL-M0, SUN2000-5KTL-M0, SUN2000-6KTL-M0, SUN2000-8KTL-M0, SUN2000-3KTL-M1, SUN2000-4KTL-M1, SUN2000-5KTL-M1, SUN2000-6KTL-M1, SUN2000-8KTL-M1 and SUN2000-10KTL-M1 except current sampling circuit and the output power derated by software.</p> |                           |                     |                           |                     |                            |                     |

| 5.8 Transient Voltage Limits (phase to phase)<br>Appendix D Transient Voltage Limit Test |                           |                     |                           |                     |                            | P                   |
|------------------------------------------------------------------------------------------|---------------------------|---------------------|---------------------------|---------------------|----------------------------|---------------------|
| <b>L1 to L2</b>                                                                          |                           |                     |                           |                     |                            |                     |
|                                                                                          | 10+/-5% Output Power (VA) |                     | 50+/-5% Output Power (VA) |                     | 100+/-5% Output Power (VA) |                     |
|                                                                                          | Duration (s)              | Line to neutral (V) | Duration (s)              | Line to neutral (V) | Duration (s)               | Line to neutral (V) |
| Limit                                                                                    | 0,002                     | 1010                | 0,002                     | 1010                | 0,002                      | 1010                |
| Test value                                                                               | 0,002                     | 770,3               | 0,002                     | 551,6               | 0,002                      | 682,8               |
| Limit                                                                                    | 0,006                     | 810                 | 0,006                     | 810                 | 0,006                      | 810                 |
| Test value                                                                               | 0,006                     | 90,44               | 0,006                     | 698,6               | 0,006                      | 719,6               |
| Limit                                                                                    | 0,02                      | 720                 | 0,02                      | 720                 | 0,02                       | 720                 |
| Test value                                                                               | 0,02                      | 90,44               | 0,02                      | 91,6                | 0,02                       | 88,9                |
| Limit                                                                                    | >0,06                     | 670                 | >0,06                     | 670                 | >0,06                      | 670                 |
| Test value                                                                               | >0,06                     | 91,98               | >0,06                     | 37,1                | >0,06                      | 58,1                |
| <b>L2 to L3</b>                                                                          |                           |                     |                           |                     |                            |                     |
|                                                                                          | 10+/-5% Output Power (VA) |                     | 50+/-5% Output Power (VA) |                     | 100+/-5% Output Power (VA) |                     |
|                                                                                          | Duration (s)              | Line to neutral (V) | Duration (s)              | Line to neutral (V) | Duration (s)               | Line to neutral (V) |
| Limit                                                                                    | 0,002                     | 1010                | 0,002                     | 1010                | 0,002                      | 1010                |
| Test value                                                                               | 0,002                     | 241,8               | 0,002                     | 686,3               | 0,002                      | 30,8                |
| Limit                                                                                    | 0,006                     | 810                 | 0,006                     | 810                 | 0,006                      | 810                 |
| Test value                                                                               | 0,006                     | 603,3               | 0,006                     | 153,4               | 0,006                      | 421,1               |
| Limit                                                                                    | 0,02                      | 720                 | 0,02                      | 720                 | 0,02                       | 720                 |
| Test value                                                                               | 0,02                      | 113,3               | 0,02                      | 410,3               | 0,02                       | 660,0               |
| Limit                                                                                    | >0,06                     | 670                 | >0,06                     | 670                 | >0,06                      | 670                 |
| Test value                                                                               | >0,06                     | 86,9                | >0,06                     | 81,7                | >0,06                      | 53,6                |

| <b>L1 to L3</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                           |                     |                           |                     |                            |                     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|---------------------|---------------------------|---------------------|----------------------------|---------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 10+/-5% Output Power (VA) |                     | 50+/-5% Output Power (VA) |                     | 100+/-5% Output Power (VA) |                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Duration (s)              | Line to neutral (V) | Duration (s)              | Line to neutral (V) | Duration (s)               | Line to neutral (V) |
| Limit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 0,002                     | 1010                | 0,002                     | 1010                | 0,002                      | 1010                |
| Test value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 0,002                     | 552,7               | 0,002                     | 197,0               | 0,002                      | 42,7                |
| Limit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 0,006                     | 810                 | 0,006                     | 810                 | 0,006                      | 810                 |
| Test value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 0,006                     | 699,7               | 0,006                     | 556,2               | 0,006                      | 661,4               |
| Limit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 0,02                      | 720                 | 0,02                      | 720                 | 0,02                       | 720                 |
| Test value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 0,02                      | 16,8                | 0,02                      | 509,3               | 0,02                       | 417,7               |
| Limit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | >0,06                     | 670                 | >0,06                     | 670                 | >0,06                      | 670                 |
| Test value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | >0,06                     | 46,2                | >0,06                     | 55,3                | >0,06                      | 30,8                |
| <p><b>Note:</b><br/>Results shall not exceed limits in Table 4 of AS/NZS 4777.2. Test Specifications: Inverter shall be connected to test circuit AS/NZS 4777.2 Figure D1. Grid nominal voltage within +/-5%, Via DC-input set AC- output power so that it equals to 10+/-5% of rated output (VA). Switch S shall be opened and the output voltage duration (Sample frequency of at least 10kHz) of the inverter shall be recorded. Test shall be repeated at 50+/-5% and 100+/-5% of rated output power.</p> <p>The test had been performed on the model SUN2000-10KTL-M0, the test results are valid for the SUN2000-3KTL-M0, SUN2000-4KTL-M0, SUN2000-5KTL-M0, SUN2000-6KTL-M0, SUN2000-8KTL-M0, SUN2000-3KTL-M1, SUN2000-4KTL-M1, SUN2000-5KTL-M1, SUN2000-6KTL-M1, SUN2000-8KTL-M1 and SUN2000-10KTL-M1 except current sampling circuit and the output power derated by software.</p> |                           |                     |                           |                     |                            |                     |

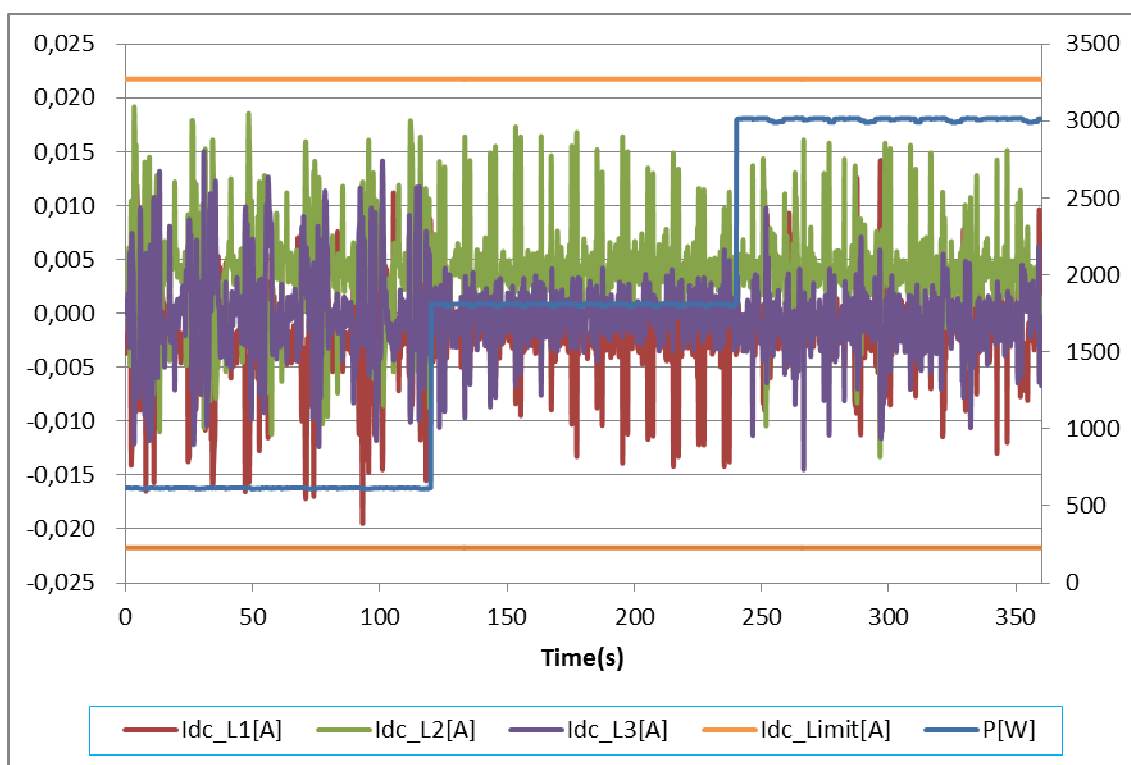


**5.9 Direct current injection  
Appendix E D.C. injection test**

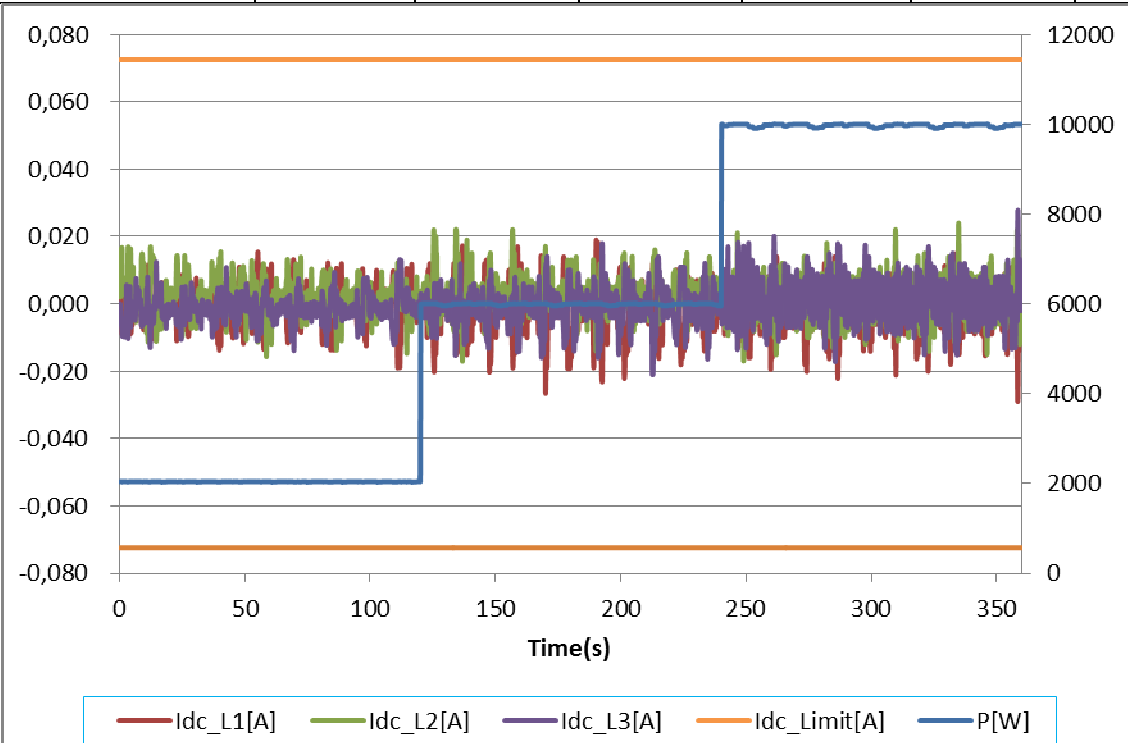
**P**

**SUN2000-3KTL-M0**

|                         | Testing at 20+/-5% Output Power  |               |               |              |              |              |
|-------------------------|----------------------------------|---------------|---------------|--------------|--------------|--------------|
| Phases                  | L1-L2<br>(mA)                    | L1-L3<br>(mA) | L2-L3<br>(mA) | L1-N<br>(mA) | L2-N<br>(mA) | L3-N<br>(mA) |
| Abs. Max. Test Value:L1 | --                               | --            | --            | 16,5         | 19,0         | 11,8         |
| Abs. Ave. Test Value:L1 | --                               | --            | --            | 1,9          | 3,8          | 0,0          |
|                         | Testing at 60+/-5% Output Power  |               |               |              |              |              |
| Phases                  | L1-L2<br>(mA)                    | L1-L3<br>(mA) | L2-L3<br>(mA) | L1-N<br>(mA) | L2-N<br>(mA) | L3-N<br>(mA) |
| Abs. Max. Test Value:L2 | --                               | --            | --            | 16,3         | 17,9         | 12,0         |
| Abs. Ave. Test Value:L2 | --                               | --            | --            | 2,5          | 3,7          | 0,6          |
|                         | Testing at 100+/-5% Output Power |               |               |              |              |              |
| Phases                  | L1-L2<br>(mA)                    | L1-L3<br>(mA) | L2-L3<br>(mA) | L1-N<br>(mA) | L2-N<br>(mA) | L3-N<br>(mA) |
| Abs. Max. Test Value:L3 | --                               | --            | --            | 17,1         | 18,5         | 9,6          |
| Abs. Ave. Test Value:L3 | --                               | --            | --            | 2,8          | 4,2          | 0,6          |



| SUN2000-10KTL-M0                 |               |               |               |              |              |              |
|----------------------------------|---------------|---------------|---------------|--------------|--------------|--------------|
| Testing at 20+/-5% Output Power  |               |               |               |              |              |              |
| Phases                           | L1-L2<br>(mA) | L1-L3<br>(mA) | L2-L3<br>(mA) | L1-N<br>(mA) | L2-N<br>(mA) | L3-N<br>(mA) |
| Abs. Max. Test Value:L1          | --            | --            | --            | 10,9         | 17,0         | 12,8         |
| Abs. Ave. Test Value:L1          | --            | --            | --            | 0,1          | 3,3          | 3,0          |
| Testing at 60+/-5% Output Power  |               |               |               |              |              |              |
| Phases                           | L1-L2<br>(mA) | L1-L3<br>(mA) | L2-L3<br>(mA) | L1-N<br>(mA) | L2-N<br>(mA) | L3-N<br>(mA) |
| Abs. Max. Test Value:L2          | --            | --            | --            | 13,8         | 15,2         | 10,6         |
| Abs. Ave. Test Value:L2          | --            | --            | --            | 0,2          | 2,9          | 1,5          |
| Testing at 100+/-5% Output Power |               |               |               |              |              |              |
| Phases                           | L1-L2<br>(mA) | L1-L3<br>(mA) | L2-L3<br>(mA) | L1-N<br>(mA) | L2-N<br>(mA) | L3-N<br>(mA) |
| Abs. Max. Test Value:L3          | --            | --            | --            | 13,5         | 13,1         | 13,9         |
| Abs. Ave. Test Value:L3          | --            | --            | --            | 0,1          | 2,2          | 1,2          |

Note:

In the case of a single-phase inverter: not exceed 0.5% of the inverter's rated current or 5 mA, whichever is the greater.

In the case of a three-phase inverter: shall not exceed 0.5% of the inverter's per-phase rated current or 5 mA, whichever is the greater.

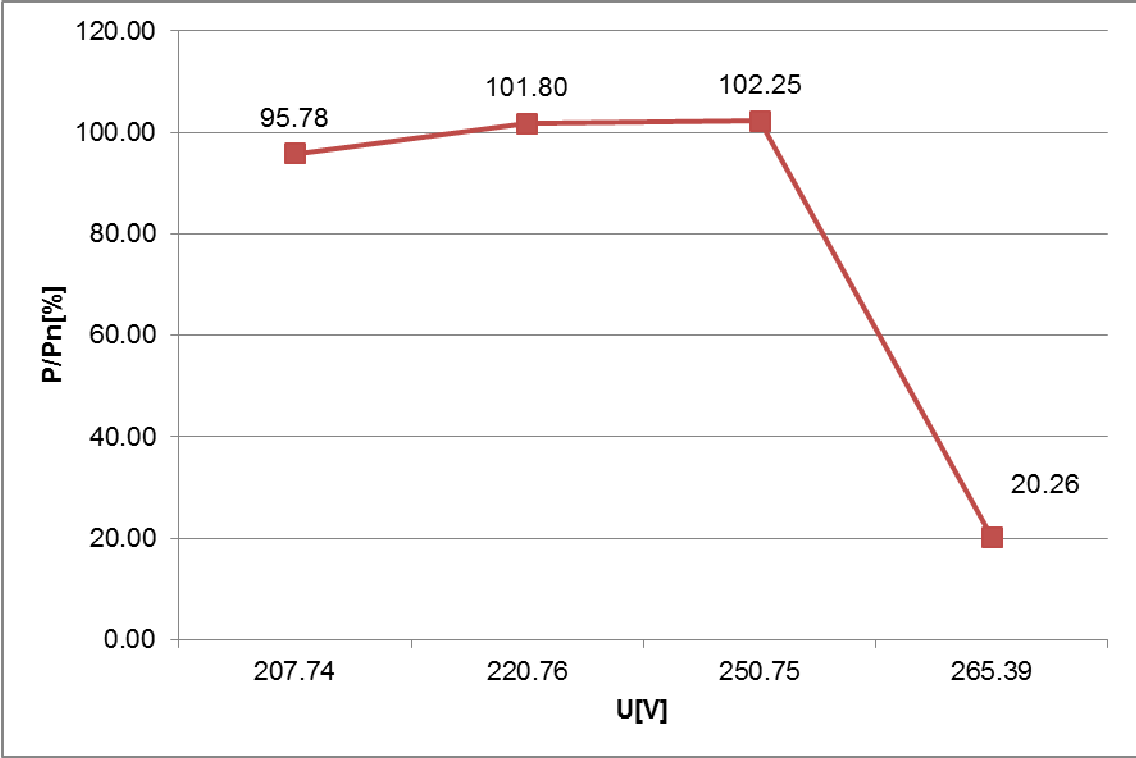
The test had been performed on the models SUN2000-3KTL-M0 and SUN2000-10KTL-M0, the test results are valid for the SUN2000-4KTL-M0, SUN2000-5KTL-M0, SUN2000-6KTL-M0, SUN2000-8KTL-M0, SUN2000-3KTL-M1, SUN2000-4KTL-M1, SUN2000-5KTL-M1, SUN2000-6KTL-M1, SUN2000-8KTL-M1 and SUN2000-10KTL-M1 except current sampling circuit and the output power derated by software.

Correction: correct the model name SUN2000-10KTL-M10 to SUN2000-10KTL-M1 due to the typo.

| 5.10 Current balance for three-phase inverters                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |              |        |        |                              |         | P       |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--------|--------|------------------------------|---------|---------|
| Setting values                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | PF cos φ = 1 |        |        | Rated output current: 14,5 A |         |         |
| Test value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | L1           | L2     | L3     | L1 – L2                      | L2 – L3 | L3 – L1 |
| 100% of rated current                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 14,656       | 14,738 | 14,766 | -0,083                       | -0,028  | 0,110   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 14,656       | 14,738 | 14,766 | -0,083                       | -0,028  | 0,110   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 14,656       | 14,738 | 14,766 | -0,083                       | -0,028  | 0,110   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 14,655       | 14,738 | 14,766 | -0,083                       | -0,028  | 0,111   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 14,656       | 14,739 | 14,766 | -0,083                       | -0,028  | 0,111   |
| Limit [A]: 5% of rated current                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 0,724A       |        |        |                              |         |         |
| Note:<br>The a.c. output current for each phase for three-phase balanced current shall be within 5% of the measured value of the other phases at rated current when injected into a balanced three phase voltage.<br><br>The test had been performed on the model SUN2000-10KTL-M0, the test results are valid for the SUN2000-3KTL-M0, SUN2000-4KTL-M0, SUN2000-5KTL-M0, SUN2000-6KTL-M0, SUN2000-8KTL-M0, SUN2000-3KTL-M1, SUN2000-4KTL-M1, SUN2000-5KTL-M1, SUN2000-6KTL-M1, SUN2000-8KTL-M1 and SUN2000-10KTL-M1 except current sampling circuit and the output power derated by software. |              |        |        |                              |         |         |

| 6.2 Inverter demand response modes (DRMs)<br>Appendix I Demand and power quality response                                                                                                                                                                                                                                                                                                                                  |                                                                                     |                  |                      |                    | P      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------|----------------------|--------------------|--------|
| Mode                                                                                                                                                                                                                                                                                                                                                                                                                       | Requirement                                                                         | Measurement      |                      |                    | Result |
|                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                     | Real current (A) | Reactive current (A) | Switching Time (s) |        |
| DRM 0                                                                                                                                                                                                                                                                                                                                                                                                                      | Operate the disconnection device                                                    | 0                | 0                    | 1,962              | P      |
| DRM 1                                                                                                                                                                                                                                                                                                                                                                                                                      | Do not consume power                                                                | N/A              | N/A                  | N/A                | N/A    |
| DRM 2                                                                                                                                                                                                                                                                                                                                                                                                                      | Do not consume at more than 50% of rated power                                      | N/A              | N/A                  | N/A                | N/A    |
| DRM 1 and DRM 2                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                     | N/A              | N/A                  | N/A                | N/A    |
| DRM 3                                                                                                                                                                                                                                                                                                                                                                                                                      | Do not consume at more than 75% of rated power AND Source reactive power if capable | N/A              | N/A                  | N/A                | N/A    |
| DRM 2 and DRM 3                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                     | N/A              | N/A                  | N/A                | N/A    |
| DRM 4                                                                                                                                                                                                                                                                                                                                                                                                                      | Increase power consumption (subject to constraints from other active DRMs)          | N/A              | N/A                  | N/A                | N/A    |
| DRM 5                                                                                                                                                                                                                                                                                                                                                                                                                      | Do not generate power                                                               | N/A              | N/A                  | N/A                | N/A    |
| DRM 6                                                                                                                                                                                                                                                                                                                                                                                                                      | Do not generate at more than 50% of rated power                                     | N/A              | N/A                  | N/A                | N/A    |
| DRM 5 and DRM 6                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                     | N/A              | N/A                  | N/A                | N/A    |
| DRM 7                                                                                                                                                                                                                                                                                                                                                                                                                      | Do not generate at more than 75% of rated power AND Sink reactive power if capable  | N/A              | N/A                  | N/A                | N/A    |
| DRM 6 and DRM 7                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                     | N/A              | N/A                  | N/A                | N/A    |
| DRM 8                                                                                                                                                                                                                                                                                                                                                                                                                      | Increase power generation (subject to constraints from other active DRMs)           | N/A              | N/A                  | N/A                | N/A    |
| <p>Note:</p> <p>Switching time limit : 2s</p> <p>The test had been performed on the model SUN2000-10KTL-M0, the test results are valid for the SUN2000-3KTL-M0, SUN2000-4KTL-M0, SUN2000-5KTL-M0, SUN2000-6KTL-M0, SUN2000-8KTL-M0, SUN2000-3KTL-M1, SUN2000-4KTL-M1, SUN2000-5KTL-M1, SUN2000-6KTL-M1, SUN2000-8KTL-M1 and SUN2000-10KTL-M1 except current sampling circuit and the output power derated by software.</p> |                                                                                     |                  |                      |                    |        |

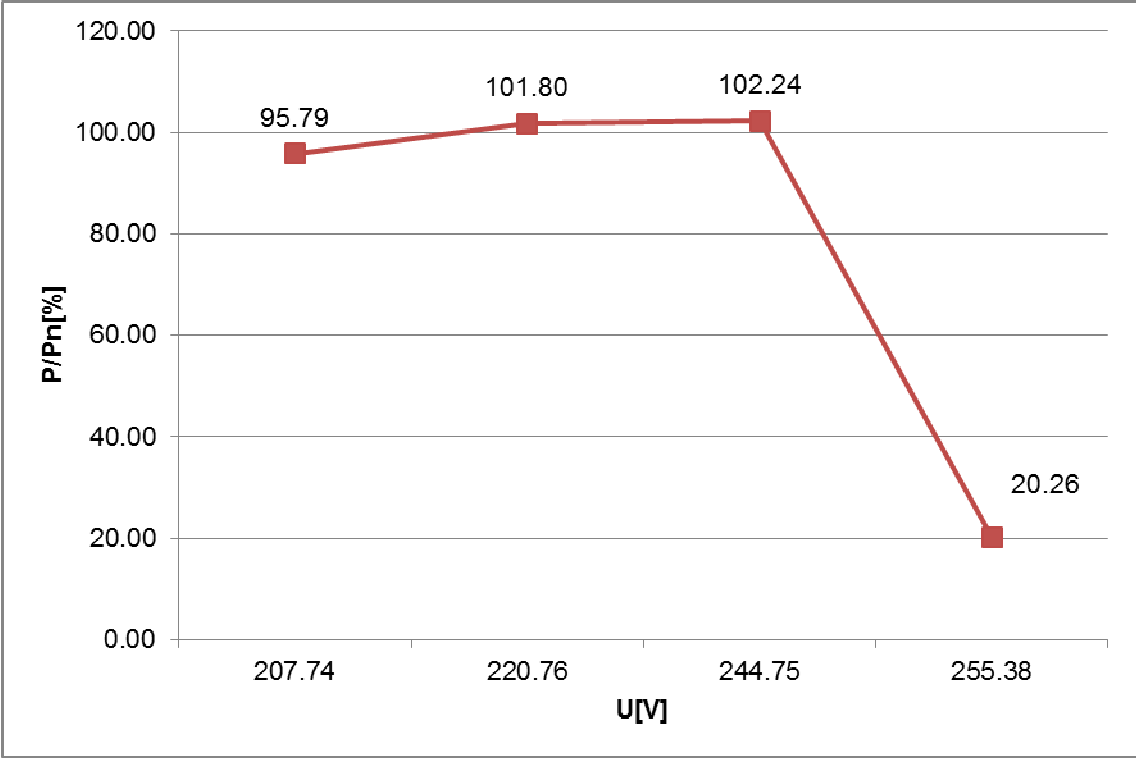
| 6.3.2.2 Volt-watt response mode (Australia Default Setting) |        |        |        |        | P |
|-------------------------------------------------------------|--------|--------|--------|--------|---|
| Test value                                                  | a) V1  | b) V2  | c) V3  | d) V4  |   |
| Voltage (V)                                                 | 207,74 | 220,76 | 250,75 | 265,39 |   |
| P (kW)                                                      | 10,536 | 11,199 | 11,248 | 2,229  |   |
| P/P <sub>rated</sub> (%)                                    | 95,78  | 101,80 | 102,25 | 20,26  |   |

Note:

The test had been performed on the model SUN2000-10KTL-M0, the test results are valid for the SUN2000-3KTL-M0, SUN2000-4KTL-M0, SUN2000-5KTL-M0, SUN2000-6KTL-M0, SUN2000-8KTL-M0, SUN2000-3KTL-M1, SUN2000-4KTL-M1, SUN2000-5KTL-M1, SUN2000-6KTL-M1, SUN2000-8KTL-M1 and SUN2000-10KTL-M1 except current sampling circuit and the output power derated by software.

| 6.3.2.2 Volt-watt response mode (New Zealand Default Setting) |        |        |        | P      |
|---------------------------------------------------------------|--------|--------|--------|--------|
| Test value                                                    | a) V1  | b) V2  | c) V3  | d) V4  |
| Voltage (V)                                                   | 207,74 | 220,76 | 244,75 | 255,38 |
| P (kW)                                                        | 10,537 | 11,198 | 11,247 | 2,229  |
| P/P <sub>rated</sub> (%)                                      | 95,79  | 101,80 | 102,24 | 20,26  |

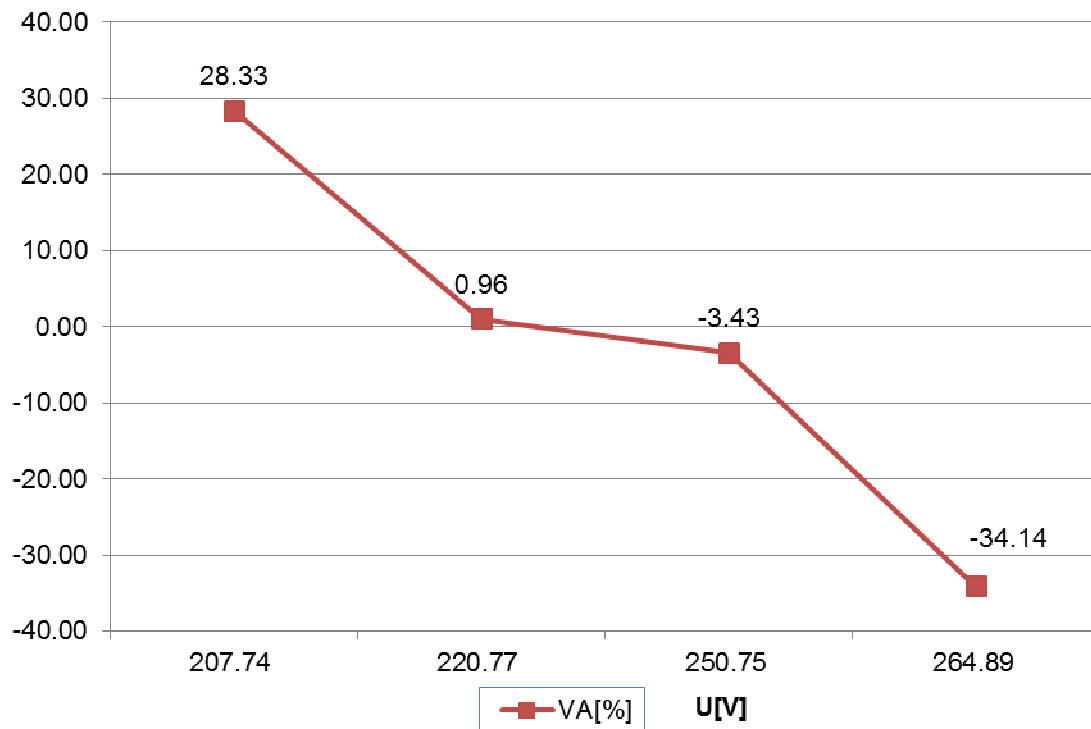
Note:

The test had been performed on the model SUN2000-10KTL-M0, the test results are valid for the SUN2000-3KTL-M0, SUN2000-4KTL-M0, SUN2000-5KTL-M0, SUN2000-6KTL-M0, SUN2000-8KTL-M0, SUN2000-3KTL-M1, SUN2000-4KTL-M1, SUN2000-5KTL-M1, SUN2000-6KTL-M1, SUN2000-8KTL-M1 and SUN2000-10KTL-M1 except current sampling circuit and the output power derated by software.



**6.3.2.3 Volt-var response mode (Australia Default Setting)**
**P**

| Test value         | a) V1  | b) V2  | c) V3  | d) V4  |
|--------------------|--------|--------|--------|--------|
| Voltage (V):       | 207,74 | 220,77 | 250,75 | 264,89 |
| Q (kVar)           | 3,116  | 0,105  | -0,378 | -3,755 |
| var / rated VA (%) | 28,33  | 0,96   | -3,43  | -34,14 |



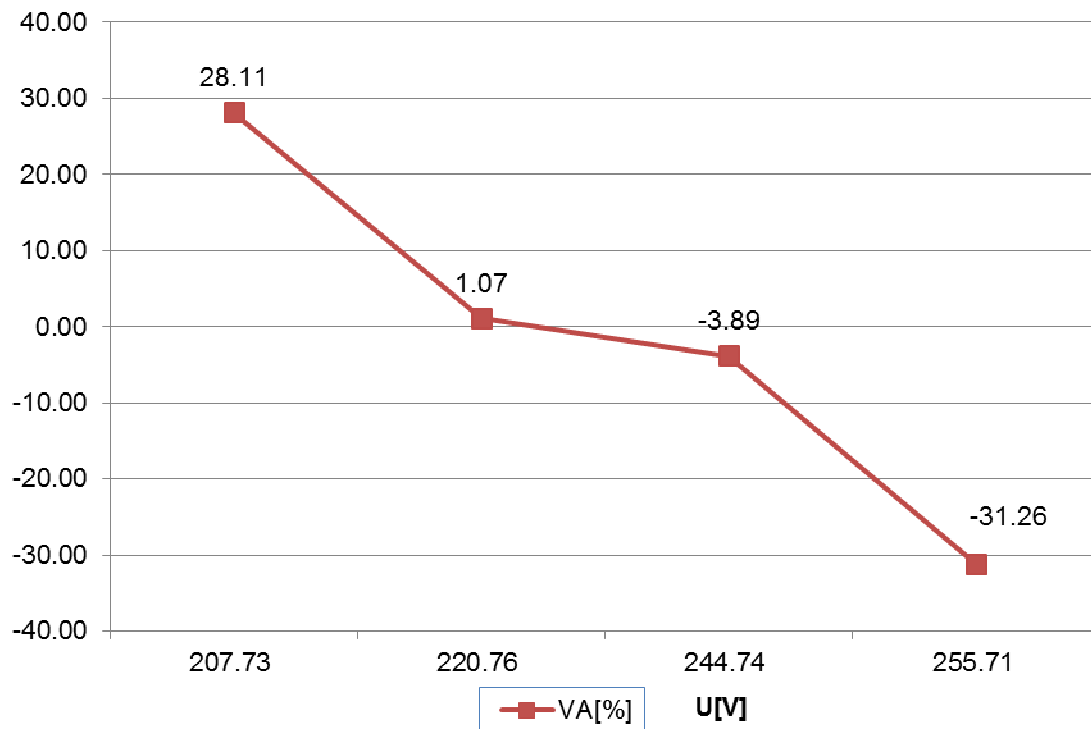
Note:

1. The percentage var/VA level leading is the inverter sourcing vars to the grid, whereas the percentage var/VA level lagging is the inverter sinking vars from the grid.
2. Inverters may provide a range up to 100% leading or lagging.
3. % of rated apparent power use for test.

The test had been performed on the model SUN2000-10KTL-M0, the test results are valid for the SUN2000-3KTL-M0, SUN2000-4KTL-M0, SUN2000-5KTL-M0, SUN2000-6KTL-M0, SUN2000-8KTL-M0, SUN2000-3KTL-M1, SUN2000-4KTL-M1, SUN2000-5KTL-M1, SUN2000-6KTL-M1, SUN2000-8KTL-M1 and SUN2000-10KTL-M1 except current sampling circuit and the output power derated by software.

### 6.3.2.3 Volt-var response mode (New Zealand Default Setting)

| Test value         | a) V1 | b) V2 | c) V3  | d) V4  |
|--------------------|-------|-------|--------|--------|
| Voltage (V):       | 207,7 | 220,8 | 244,7  | 255,7  |
| Q (kVar)           | 3,092 | 0,117 | -0,428 | -3,438 |
| var / rated VA (%) | 28,11 | 1,07  | -3,89  | -31,26 |



#### Note:

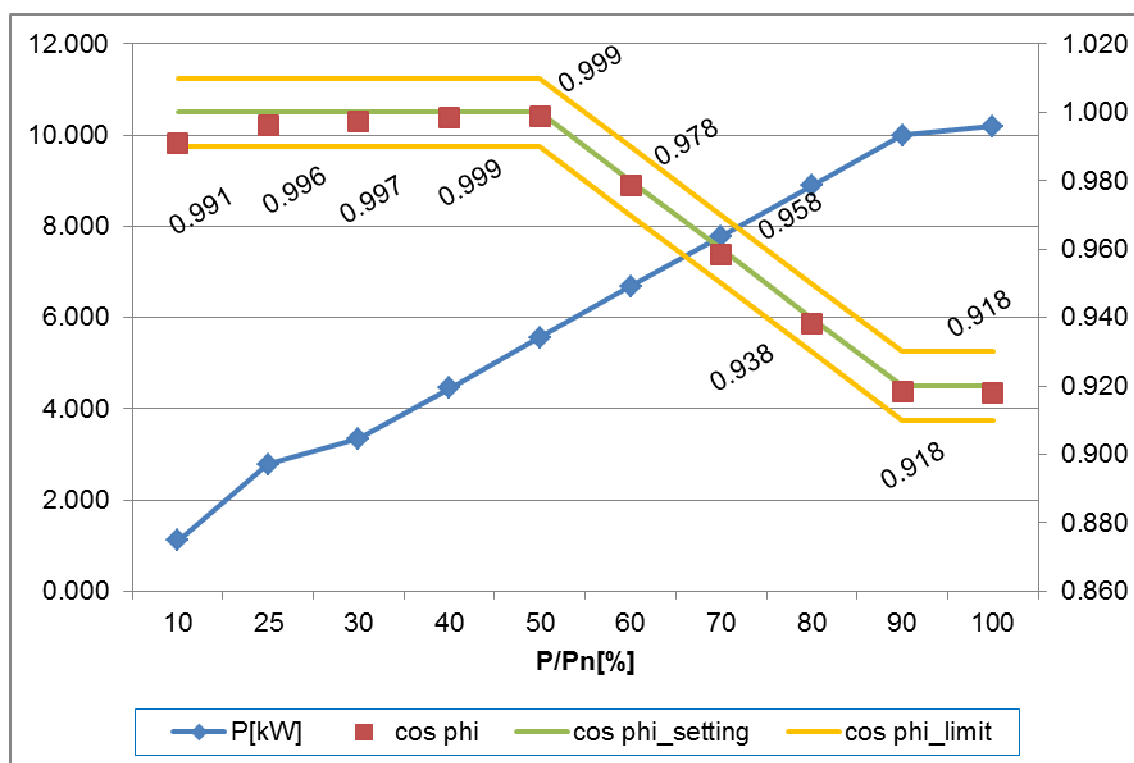
1. The percentage var/VA level leading is the inverter sourcing vars to the grid, whereas the percentage var/VA level lagging is the inverter sinking vars from the grid.
2. Inverters may provide a range up to 100% leading or lagging.
3. % of rated apparent power use for test.

The test had been performed on the model SUN2000-10KTL-M0, the test results are valid for the SUN2000-3KTL-M0, SUN2000-4KTL-M0, SUN2000-5KTL-M0, SUN2000-6KTL-M0, SUN2000-8KTL-M0, SUN2000-3KTL-M1, SUN2000-4KTL-M1, SUN2000-5KTL-M1, SUN2000-6KTL-M1, SUN2000-8KTL-M1 and SUN2000-10KTL-M1 except current sampling circuit and the output power derated by software.

| 6.3.3 Fixed power factor mode and reactive power mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |        |        |        |        |        |        |        |        | P      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| <b>SUN2000-10KTL-M0</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |        |        |        |        |        |        |        |        |        |        |
| P/P <sub>rated</sub> in %                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 10     | 25     | 30     | 40     | 50     | 60     | 70     | 80     | 90     | 100    |
| Setting PF cosφ = 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |        |        |        |        |        |        |        |        |        |        |
| U (V)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 230,31 | 230,47 | 230,49 | 230,51 | 230,53 | 230,55 | 230,57 | 230,59 | 230,61 | 230,63 |
| Power (W)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 1,004  | 2,214  | 3,300  | 4,384  | 5,465  | 6,543  | 7,621  | 8,675  | 9,745  | 10,867 |
| Reactive power (var)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0,077  | -0,048 | -0,050 | -0,051 | -0,052 | -0,053 | -0,054 | -0,055 | -0,057 | -0,059 |
| Power factor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 0,9970 | 0,9959 | 0,9981 | 0,9988 | 0,9992 | 0,9994 | 0,9995 | 0,9995 | 0,9996 | 0,9996 |
| PF = 0,8 leading                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |        |        |        |        |        |        |        |        |        |        |
| U (V)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 230,33 | 230,42 | 230,49 | 230,51 | 230,53 | 230,55 | 230,56 | 230,58 | 230,59 | 230,59 |
| Power (kW)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1,112  | 2,781  | 3,262  | 4,335  | 5,404  | 6,466  | 7,529  | 8,586  | 8,836  | 8,837  |
| Reactive power (kVar)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | -0,847 | -2,122 | -2,498 | -3,306 | -4,112 | -4,911 | -5,712 | -6,510 | -6,697 | -6,697 |
| Power factor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 0,7957 | 0,7950 | 0,7924 | 0,7942 | 0,7952 | 0,7958 | 0,7962 | 0,7964 | 0,7963 | 0,7963 |
| PF = 0,8 lagging                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |        |        |        |        |        |        |        |        |        |        |
| U (V)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 230,46 | 230,47 | 230,50 | 230,51 | 230,53 | 230,55 | 230,57 | 230,59 | 230,60 | 230,70 |
| Power (kW)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1,114  | 2,194  | 3,269  | 4,344  | 5,415  | 6,478  | 7,540  | 8,598  | 8,842  | 8,916  |
| Reactive power (kVar)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0,005  | 1,597  | 2,402  | 3,208  | 4,011  | 4,810  | 5,606  | 6,399  | 6,581  | 6,657  |
| Power factor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 0,8072 | 0,8057 | 0,8043 | 0,8035 | 0,8028 | 0,8023 | 0,8020 | 0,8017 | 0,8017 | 0,8013 |
| <p>Note:</p> <p>The grid-connected inverter of power plant type shall be evaluated.</p> <p>Each power-bin must be kept for at least 3 minute.</p> <p>If the inverter is capable of operating with reactive power mode, the maximum ratio of reactive power (vars) to rated apparent power should be 100%.</p> <p>If the inverter is capable of operating with fixed power factor mode, the minimum range of settings should be 0.8 leading to 0.8 lagging.</p> <p>The test had been performed on the model SUN2000-10KTL-M0, the test results are valid for the SUN2000-3KTL-M0, SUN2000-4KTL-M0, SUN2000-5KTL-M0, SUN2000-6KTL-M0, SUN2000-8KTL-M0, SUN2000-3KTL-M1, SUN2000-4KTL-M1, SUN2000-5KTL-M1, SUN2000-6KTL-M1, SUN2000-8KTL-M1 and SUN2000-10KTL-M1 except current sampling circuit and the output power derated by software.</p> |        |        |        |        |        |        |        |        |        |        |

| Reactive power mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |        |        |        |        |        |        |        |        |        |        |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Var/rated VA in %                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 10     | 25     | 30     | 40     | 50     | 60     | 70     | 80     | 90     | 100    |
| Q=0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |        |        |        |        |        |        |        |        |        |        |
| U (V)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 230,31 | 230,47 | 230,49 | 230,51 | 230,53 | 230,55 | 230,57 | 230,59 | 230,61 | 230,63 |
| Power (kW)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1,004  | 2,214  | 3,300  | 4,384  | 5,465  | 6,543  | 7,621  | 8,675  | 9,745  | 10,867 |
| Reactive power (kVar)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 0,077  | -0,048 | -0,050 | -0,051 | -0,052 | -0,053 | -0,054 | -0,055 | -0,057 | -0,059 |
| Power factor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 0,9970 | 0,9959 | 0,9981 | 0,9988 | 0,9992 | 0,9994 | 0,9995 | 0,9995 | 0,9996 | 0,9996 |
| Reactive power in leading                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |        |        |        |        |        |        |        |        |        |        |
| U (V)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 230,35 | 230,39 | 230,43 | 230,48 | 230,51 | 230,55 | 230,60 | 230,64 | 230,64 | 230,63 |
| Power (kW)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1,101  | 2,214  | 3,326  | 4,437  | 5,549  | 6,662  | 7,774  | 8,886  | 8,886  | 8,886  |
| Reactive power (kVar)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | -6,702 | -6,704 | -6,706 | -6,707 | -6,709 | -6,714 | -6,718 | -6,722 | -6,722 | -6,722 |
| Power factor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 0,1621 | 0,3135 | 0,4443 | 0,5518 | 0,6373 | 0,7043 | 0,7566 | 0,7975 | 0,7975 | 0,7975 |
| Reactive power in lagging                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |        |        |        |        |        |        |        |        |        |        |
| U (V)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 230,37 | 230,44 | 230,47 | 230,52 | 230,56 | 230,61 | 230,65 | 230,70 | 230,70 | 230,70 |
| Power (kW)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1,131  | 2,799  | 3,359  | 4,472  | 5,581  | 6,692  | 7,804  | 8,916  | 8,916  | 8,916  |
| Reactive power (kVar)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 6,668  | 6,665  | 6,664  | 6,662  | 6,661  | 6,659  | 6,658  | 6,656  | 6,657  | 6,657  |
| Power factor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 0,1673 | 0,3873 | 0,4498 | 0,5573 | 0,6423 | 0,7089 | 0,7608 | 0,8013 | 0,8013 | 0,8013 |
| Note:<br>The grid-connected inverter of power plant type shall be evaluated.<br>Each power-bin must be kept for at least 3 minute.<br>If the inverter is capable of operating with reactive power mode, the maximum ratio of reactive power (vars) to rated apparent power should be 100%.<br>If the inverter is capable of operating with fixed power factor mode, the minimum range of settings should be 0.8 leading to 0.8 lagging.<br><br>The test had been performed on the model SUN2000-10KTL-M0, the test results are valid for the SUN2000-3KTL-M0, SUN2000-4KTL-M0, SUN2000-5KTL-M0, SUN2000-6KTL-M0, SUN2000-8KTL-M0, SUN2000-3KTL-M1, SUN2000-4KTL-M1, SUN2000-5KTL-M1, SUN2000-6KTL-M1, SUN2000-8KTL-M1 and SUN2000-10KTL-M1 except current sampling circuit and the output power derated by software. |        |        |        |        |        |        |        |        |        |        |

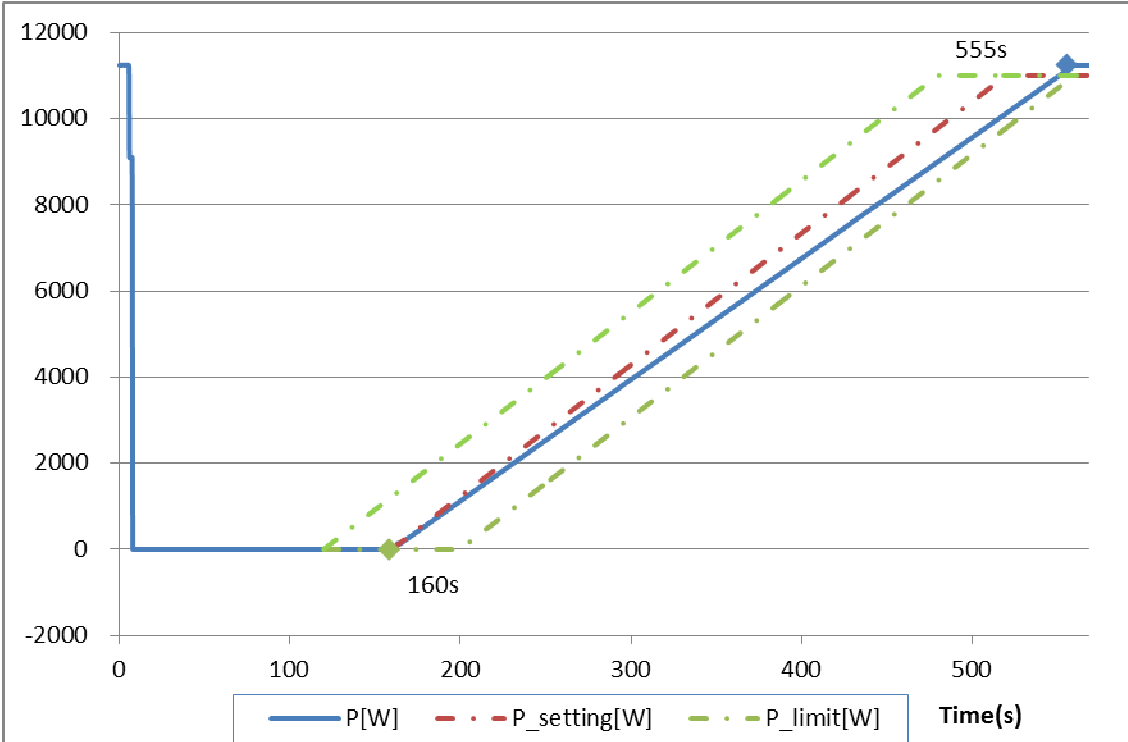
| 6.3.4 characteristic power factor curve for $\cos \varphi$ (P) (Power response) |                                           |        |        |        |        |        |        |        |        | P      |
|---------------------------------------------------------------------------------|-------------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| <b><math>\cos \varphi</math> (P):SUN2000-10KTL-M0</b>                           |                                           |        |        |        |        |        |        |        |        |        |
| P/P <sub>rated</sub> (%)                                                        | 10                                        | 25     | 30     | 40     | 50     | 60     | 70     | 80     | 90     | 100    |
| 30 s mean value                                                                 | 10% to 100% P <sub>rated</sub>            |        |        |        |        |        |        |        |        |        |
| U (V):                                                                          | 230,32                                    | 230,39 | 230,41 | 230,46 | 230,50 | 230,54 | 230,59 | 230,63 | 230,67 | 230,68 |
| P (kW):                                                                         | 1,110                                     | 2,790  | 3,350  | 4,450  | 5,560  | 6,679  | 7,780  | 8,890  | 10,000 | 10,200 |
| P / P <sub>rated</sub> (%):                                                     | 10,09                                     | 25,36  | 30,45  | 40,45  | 50,55  | 60,72  | 70,73  | 80,82  | 90,91  | 92,73  |
| Q (kVar):                                                                       | 0,243                                     | -0,238 | -0,238 | -0,242 | -0,249 | -1,409 | -2,320 | -3,279 | -4,316 | -4,413 |
| $\cos \varphi$ :                                                                | 0,9910                                    | 0,9963 | 0,9975 | 0,9985 | 0,9990 | 0,9784 | 0,9583 | 0,9383 | 0,9182 | 0,9181 |
| $\cos \varphi$ setpoint of P:                                                   | 1,00                                      | 1,00   | 1,00   | 1,00   | 1,00   | 0,98   | 0,96   | 0,94   | 0,92   | 0,92   |
| Limit $\cos \varphi$ :                                                          | $\cos \varphi_{\text{setpoint}} \pm 0,01$ |        |        |        |        |        |        |        |        |        |



Note:

The response curve required for the  $\cos \varphi$  (P) response should be defined within displacement power factor range of 0.9 leading to 0.9 lagging.

The test had been performed on the model SUN2000-10KTL-M0, the test results are valid for the SUN2000-3KTL-M0, SUN2000-4KTL-M0, SUN2000-5KTL-M0, SUN2000-6KTL-M0, SUN2000-8KTL-M0, SUN2000-3KTL-M1, SUN2000-4KTL-M1, SUN2000-5KTL-M1, SUN2000-6KTL-M1, SUN2000-8KTL-M1 and SUN2000-10KTL-M1 except current sampling circuit and the output power derated by software.

| 6.3.5 Power rate limit                                                                                     |        | P   |
|------------------------------------------------------------------------------------------------------------|--------|-----|
|                                                                                                            |        |     |
| 6.3.5.3.2 Test (a): Soft ramp up after connect or reconnect                                                |        |     |
| Time measurement from 0% to 100% P <sub>rated</sub> (min)                                                  | 395 s  |     |
| W <sub>Gra</sub>                                                                                           | 15,19% |     |
| Limit W <sub>Gra</sub> : (Default : 16,67%)                                                                | 16,67% |     |
| <div></div>             |        |     |
| 6.3.5.3.3 Test (b): Change in a.c. operation and control (DRM control only)                                |        |     |
| DRM mode                                                                                                   | N/A    | N/A |
| Power change (%)                                                                                           | N/A    | N/A |
| Time measurement                                                                                           | N/A    | N/A |
| W <sub>Gra</sub>                                                                                           | N/A    | N/A |
| Limit W <sub>Gra</sub> : (Default : 16,67%)                                                                | N/A    | N/A |
| N/A                                                                                                        |        |     |
| 6.3.5.3.4 Test ©: Change in energy source operation (only for multiple mode inverters with energy storage) |        |     |
| DRM mode                                                                                                   | N/A    | N/A |
| Power change                                                                                               | N/A    | N/A |
| Time measurement                                                                                           | N/A    | N/A |
| W <sub>Gra</sub>                                                                                           | N/A    | N/A |

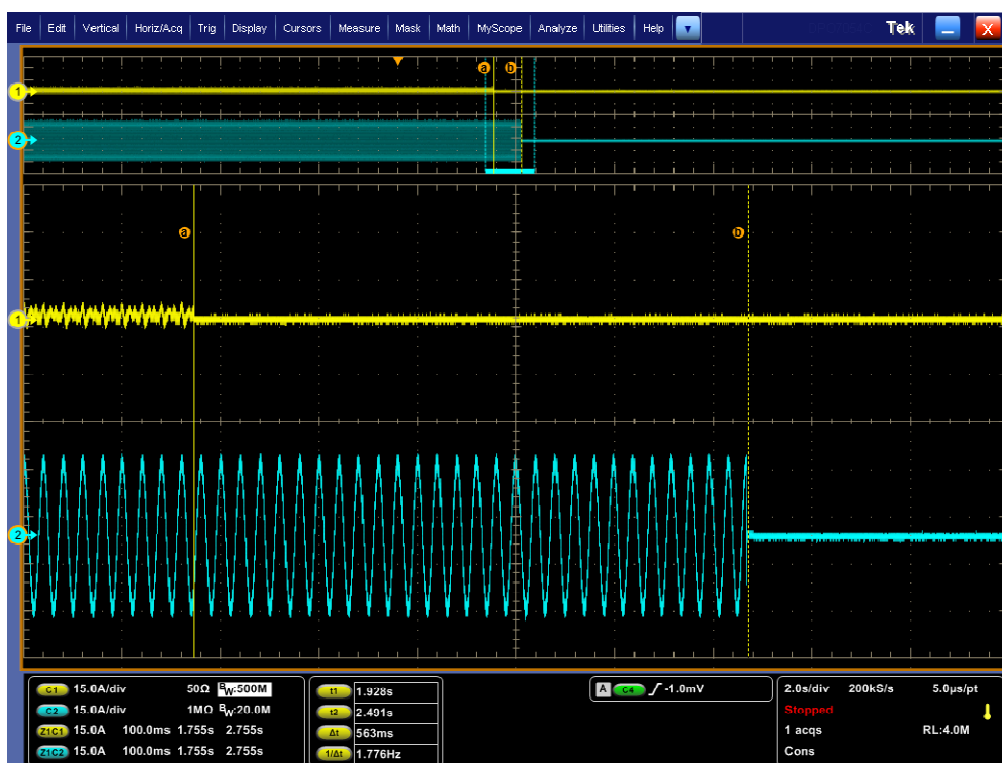


|                                                                                                                                                                                                                                                                                                                                                                                |                              |     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|-----|
| Limit $W_{Gra}$ : (Default : 16,67%)                                                                                                                                                                                                                                                                                                                                           | N/A                          | N/A |
| N/A                                                                                                                                                                                                                                                                                                                                                                            |                              |     |
| <b>6.3.5.4 Nonlinearity of power rate limit changes</b>                                                                                                                                                                                                                                                                                                                        |                              |     |
| DRM mode                                                                                                                                                                                                                                                                                                                                                                       | DRM 0                        | N/A |
| Power change                                                                                                                                                                                                                                                                                                                                                                   | Increase: __0__% to __100__% | N/A |
| Time measurement                                                                                                                                                                                                                                                                                                                                                               | 395 s                        | N/A |
| $W_{Gra}$                                                                                                                                                                                                                                                                                                                                                                      | 15,19%                       | N/A |
| Limit $W_{Gra}$ : (Default : 16,67%)                                                                                                                                                                                                                                                                                                                                           | 16,67%                       | N/A |
| <b>See table 6.3.5.3.2</b>                                                                                                                                                                                                                                                                                                                                                     |                              |     |
| Note:<br>The test had been performed on the model SUN2000-10KTL-M0, the test results are valid for the SUN2000-3KTL-M0, SUN2000-4KTL-M0, SUN2000-5KTL-M0, SUN2000-6KTL-M0, SUN2000-8KTL-M0, SUN2000-3KTL-M1, SUN2000-4KTL-M1, SUN2000-5KTL-M1, SUN2000-6KTL-M1, SUN2000-8KTL-M1 and SUN2000-10KTL-M1 except current sampling circuit and the output power derated by software. |                              |     |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                     |                                                                                                                                                         |                                                 |                                                 |                     |                         |                |                 |                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|-------------------------------------------------|---------------------|-------------------------|----------------|-----------------|-----------------------|
| 7.3 Active anti-islanding protection<br>IEC 62116 Active anti-islanding test<br>Load imbalance (real, reactive load) for test condition A (EUT output = 100%)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                     |                                                                                                                                                         |                                                 |                                                 |                     |                         |                |                 | P                     |
| SUN2000-10KTL-M0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                     |                                                                                                                                                         |                                                 |                                                 |                     |                         |                |                 |                       |
| Test conditions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                     | Frequency: 50+/-0,1Hz<br>U <sub>N</sub> =230+/-3Vac<br>RLC consumes inverter real power within +/- 3%<br>Distortion factor of chokes < 3%<br>Quality =1 |                                                 |                                                 |                     |                         |                |                 |                       |
| Disconnection limit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                     | 0,5s                                                                                                                                                    |                                                 |                                                 |                     |                         |                |                 |                       |
| No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | P <sub>EUT</sub> <sup>1)</sup><br>(% of EUT rating) | Reactive load<br>(% of Q <sub>L</sub> in 6.1.d) 1)                                                                                                      | P <sub>AC</sub> <sup>2)</sup><br>(% of nominal) | Q <sub>AC</sub> <sup>3)</sup><br>(% of nominal) | Run on Time<br>(ms) | P <sub>EUT</sub><br>(W) | Q <sub>f</sub> | V <sub>DC</sub> | Remarks <sup>4)</sup> |
| 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 100                                                 | 100                                                                                                                                                     | 0                                               | 0                                               | 563                 | 3300                    | 1,010          | 700             | Test A at BL          |
| 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 100                                                 | 100                                                                                                                                                     | -5                                              | -5                                              | 174                 | 3300                    | 1,037          | 700             | Test A at IB          |
| 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 100                                                 | 100                                                                                                                                                     | -5                                              | 0                                               | 291                 | 3300                    | 1,064          | 700             | Test A at IB          |
| 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 100                                                 | 100                                                                                                                                                     | -5                                              | +5                                              | 184                 | 3300                    | 1,090          | 700             | Test A at IB          |
| 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 100                                                 | 100                                                                                                                                                     | 0                                               | -5                                              | 164                 | 3300                    | 0,985          | 700             | Test A at IB          |
| 8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 100                                                 | 100                                                                                                                                                     | 0                                               | +5                                              | 232                 | 3300                    | 1,035          | 700             | Test A at IB          |
| 9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 100                                                 | 100                                                                                                                                                     | +5                                              | -5                                              | 172                 | 3300                    | 0,938          | 700             | Test A at IB          |
| 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 100                                                 | 100                                                                                                                                                     | +5                                              | 0                                               | 270                 | 3300                    | 0,962          | 700             | Test A at IB          |
| 11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 100                                                 | 100                                                                                                                                                     | +5                                              | +5                                              | 179                 | 3300                    | 0,986          | 700             | Test A at IB          |
| Parameter at 0%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                     | L= 50,07 mH                                                                                                                                             |                                                 | R= 15,89 Ω                                      |                     |                         | C= 202,38 μF   |                 |                       |
| Indicate additional shut down time included in above results.<br>(Disconnection device operation time)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                     |                                                                                                                                                         |                                                 |                                                 |                     |                         |                | 20ms            |                       |
| <b>Note:</b><br>Note for technologies which have a substantial shut down time this can be added to the 0.5 seconds in establishing that the trip occurred in less than 0.5s. Maximum shut down time could therefore be up to 1.0 seconds for these technologies.<br>RLC is adjusted to min. +/-1% of the inverter rated output power<br>1) P <sub>EUT</sub> : EUT output power<br>2) P <sub>AC</sub> : Real power flow at S1 in Figure 1. Positive means power from EUT to utility. Nominal is the 0 % test condition value.<br>3) Q <sub>AC</sub> : Reactive power flow at S1 in Figure 1. Positive means power from EUT to utility. Nominal is the 0 % test condition value.<br>4) BL: Balance condition, IB: Imbalance condition.<br>Condition A:<br>EUT output power P <sub>EUT</sub> = Maximum 5)<br>EUT input voltage 6) = >90% of rated input voltage range<br>5) Maximum EUT output power condition should be achieved using the maximum allowable input power. Actual output power may exceed nominal rated output.<br>6) Based on EUT rated input operating range. For example, If range is between X volts and Y volts, 90 % of range =X + 0,9 × (Y – X). Y shall not exceed 0,8 × EUT maximum system voltage (i.e., maximum allowable array open circuit voltage). In any case, the EUT should not be operated outside of its allowable input voltage range. |                                                     |                                                                                                                                                         |                                                 |                                                 |                     |                         |                |                 |                       |

The test had been performed on the model SUN2000-10KTL-M0, the test results are valid for the SUN2000-3KTL-M0, SUN2000-4KTL-M0, SUN2000-5KTL-M0, SUN2000-6KTL-M0, SUN2000-8KTL-M0, SUN2000-3KTL-M1, SUN2000-4KTL-M1, SUN2000-5KTL-M1, SUN2000-6KTL-M1, SUN2000-8KTL-M1 and SUN2000-10KTL-M1 except current sampling circuit and the output power derated by software.

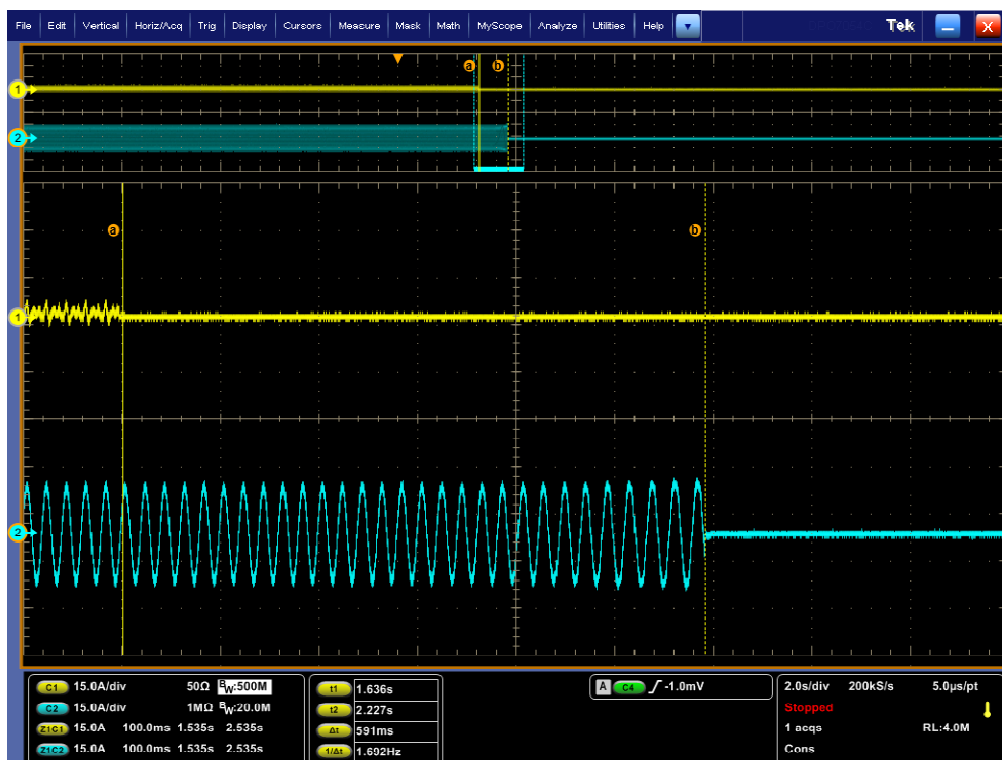
### Disconnection at $P_{AC}$ 0% and $Q_{AC}$ 0% reactive load and 100% nominal power



|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                     |                                                 |                                                                                                                                                         |                                                 |                  |                      |                |                 |                       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|------------------|----------------------|----------------|-----------------|-----------------------|
| 7.3 Active anti-islanding protection<br>IEC 62116 Active anti-islanding test<br>Load imbalance (reactive load) for test condition B (EUT output = 50 % – 66 %)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                     |                                                 |                                                                                                                                                         |                                                 |                  |                      |                |                 | P                     |
| SUN2000-10KTL-M0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                     |                                                 |                                                                                                                                                         |                                                 |                  |                      |                |                 |                       |
| Test conditions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                     |                                                 | Frequency: 50+/-0,1Hz<br>U <sub>N</sub> =230+/-3Vac<br>RLC consumes inverter real power within +/- 3%<br>Distortion factor of chokes < 3%<br>Quality =1 |                                                 |                  |                      |                |                 |                       |
| Disconnection limit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                     |                                                 | 0,5s                                                                                                                                                    |                                                 |                  |                      |                |                 |                       |
| No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | P <sub>EUT</sub> <sup>1)</sup><br>(% of EUT rating) | Reactive load (% of Q <sub>L</sub> in 6.1.d) 1) | P <sub>AC</sub> <sup>2)</sup><br>(% of nominal)                                                                                                         | Q <sub>AC</sub> <sup>3)</sup><br>(% of nominal) | Run on Time (ms) | P <sub>EUT</sub> (W) | Q <sub>f</sub> | V <sub>DC</sub> | Remarks <sup>4)</sup> |
| 12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 66                                                  | 66                                              | 0                                                                                                                                                       | -5                                              | 173              | 2200                 | 0,980          | 520             | Test B at IB          |
| 13                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 66                                                  | 66                                              | 0                                                                                                                                                       | -4                                              | 174              | 2200                 | 0,985          | 520             | Test B at IB          |
| 14                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 66                                                  | 66                                              | 0                                                                                                                                                       | -3                                              | 176              | 2200                 | 0,991          | 520             | Test B at IB          |
| 15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 66                                                  | 66                                              | 0                                                                                                                                                       | -2                                              | 195              | 2200                 | 0,996          | 520             | Test B at IB          |
| 16                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 66                                                  | 66                                              | 0                                                                                                                                                       | -1                                              | 247              | 2200                 | 1,001          | 520             | Test B at IB          |
| 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 66                                                  | 66                                              | 0                                                                                                                                                       | 0                                               | 591              | 2200                 | 1,006          | 520             | Test B at BL          |
| 17                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 66                                                  | 66                                              | 0                                                                                                                                                       | 1                                               | 347              | 2200                 | 1,011          | 520             | Test B at IB          |
| 18                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 66                                                  | 66                                              | 0                                                                                                                                                       | 2                                               | 300              | 2200                 | 1,016          | 520             | Test B at IB          |
| 19                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 66                                                  | 66                                              | 0                                                                                                                                                       | 3                                               | 271              | 2200                 | 1,021          | 520             | Test B at IB          |
| 20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 66                                                  | 66                                              | 0                                                                                                                                                       | 4                                               | 260              | 2200                 | 1,026          | 520             | Test B at IB          |
| 21                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 66                                                  | 66                                              | 0                                                                                                                                                       | 5                                               | 248              | 2200                 | 1,031          | 520             | Test B at IB          |
| Parameter at 0%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                     |                                                 | L= 77,13 mH                                                                                                                                             |                                                 | R= 24,38 Ω       |                      | C= 131,36µF    |                 |                       |
| Indicate additional shut down time included in above results.<br>(Disconnection device operation time)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                     |                                                 |                                                                                                                                                         |                                                 |                  |                      |                | 20ms            |                       |
| <b>Note:</b><br>RLC is adjusted to min. +/-1% of the inverter rated output power<br><sup>1)</sup> P <sub>EUT</sub> : EUT output power<br><sup>2)</sup> P <sub>AC</sub> : Real power flow at S1 in Figure 1. Positive means power from EUT to utility. Nominal is the 0 % test condition value.<br><sup>3)</sup> Q <sub>AC</sub> : Reactive power flow at S1 in Figure 1. Positive means power from EUT to utility. Nominal is the 0 % test condition value.<br><sup>4)</sup> BL: Balance condition, IB: Imbalance condition.<br>Condition B:<br>EUT output power P <sub>EUT</sub> = 50 % – 66 % of maximum<br>EUT input voltage <sup>5)</sup> = 50 % of rated input voltage range, ±10 %<br><sup>5)</sup> Based on EUT rated input operating range. For example, If range is between X volts and Y volts, 50 % of range =X + 0,5 × (Y – X). Y shall not exceed 0,8 × EUT maximum system voltage (i.e., maximum allowable array open circuit voltage). In any case, the EUT should not be operated outside of its allowable input voltage range. |                                                     |                                                 |                                                                                                                                                         |                                                 |                  |                      |                |                 |                       |

The test had been performed on the model SUN2000-10KTL-M0, the test results are valid for the SUN2000-3KTL-M0, SUN2000-4KTL-M0, SUN2000-5KTL-M0, SUN2000-6KTL-M0, SUN2000-8KTL-M0, SUN2000-3KTL-M1, SUN2000-4KTL-M1, SUN2000-5KTL-M1, SUN2000-6KTL-M1, SUN2000-8KTL-M1 and SUN2000-10KTL-M1 except current sampling circuit and the output power derated by software.

### Disconnection at $P_{AC}$ 0% and $Q_{AC}$ 0% reactive load and 66% nominal power



|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                     |                                                 |                                                                                                                                                         |                                                 |                  |                      |                |                 |                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|------------------|----------------------|----------------|-----------------|-----------------------|
| 7.3 Active anti-islanding protection<br>IEC 62116 Active anti-islanding test<br>Load imbalance (reactive load) for test condition C (EUT output = 25 % – 33 %)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                     |                                                 |                                                                                                                                                         |                                                 |                  |                      |                |                 | P                     |
| SUN2000-10KTL-M0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                     |                                                 |                                                                                                                                                         |                                                 |                  |                      |                |                 |                       |
| Test conditions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                     |                                                 | Frequency: 50+/-0,1Hz<br>U <sub>N</sub> =230+/-3Vac<br>RLC consumes inverter real power within +/- 3%<br>Distortion factor of chokes < 3%<br>Quality =1 |                                                 |                  |                      |                |                 |                       |
| Disconnection limit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                     |                                                 | 0,5s                                                                                                                                                    |                                                 |                  |                      |                |                 |                       |
| No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | P <sub>EUT</sub> <sup>1)</sup><br>(% of EUT rating) | Reactive load (% of Q <sub>L</sub> in 6.1.d) 1) | P <sub>AC</sub> <sup>2)</sup><br>(% of nominal)                                                                                                         | Q <sub>AC</sub> <sup>3)</sup><br>(% of nominal) | Run on Time (ms) | P <sub>EUT</sub> (W) | Q <sub>f</sub> | V <sub>DC</sub> | Remarks <sup>4)</sup> |
| 22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 33                                                  | 33                                              | 0                                                                                                                                                       | -5                                              | 169              | 1100                 | 0,984          | 304             | Test C at IB          |
| 23                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 33                                                  | 33                                              | 0                                                                                                                                                       | -4                                              | 174              | 1100                 | 0,990          | 304             | Test C at IB          |
| 24                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 33                                                  | 33                                              | 0                                                                                                                                                       | -3                                              | 179              | 1100                 | 0,995          | 304             | Test C at IB          |
| 25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 33                                                  | 33                                              | 0                                                                                                                                                       | -2                                              | 226              | 1100                 | 1,000          | 304             | Test C at IB          |
| 26                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 33                                                  | 33                                              | 0                                                                                                                                                       | -1                                              | 289              | 1100                 | 1,005          | 304             | Test C at IB          |
| 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 33                                                  | 33                                              | 0                                                                                                                                                       | 0                                               | 384              | 1100                 | 1,010          | 304             | Test C at BL          |
| 27                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 33                                                  | 33                                              | 0                                                                                                                                                       | 1                                               | 347              | 1100                 | 1,015          | 304             | Test C at IB          |
| 28                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 33                                                  | 33                                              | 0                                                                                                                                                       | 2                                               | 298              | 1100                 | 1,020          | 304             | Test C at IB          |
| 29                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 33                                                  | 33                                              | 0                                                                                                                                                       | 3                                               | 295              | 1100                 | 1,025          | 304             | Test C at IB          |
| 30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 33                                                  | 33                                              | 0                                                                                                                                                       | 4                                               | 268              | 1100                 | 1,030          | 304             | Test C at IB          |
| 31                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 33                                                  | 33                                              | 0                                                                                                                                                       | 5                                               | 255              | 1100                 | 1,035          | 304             | Test C at IB          |
| Parameter at 0%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                     |                                                 | L= 151,56 mH                                                                                                                                            |                                                 | R= 48,09 Ω       |                      | C= 66,85 μF    |                 |                       |
| Indicate additional shut down time included in above results.<br>(Disconnection device operation time)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                     |                                                 |                                                                                                                                                         |                                                 |                  |                      |                | 20ms            |                       |
| <b>Note:</b><br>RLC is adjusted to min. +/-1% of the inverter rated output power<br><sup>1)</sup> P <sub>EUT</sub> : EUT output power<br><sup>2)</sup> P <sub>AC</sub> : Real power flow at S1 in Figure 1. Positive means power from EUT to utility. Nominal is the 0 % test condition value.<br><sup>3)</sup> Q <sub>AC</sub> : Reactive power flow at S1 in Figure 1. Positive means power from EUT to utility. Nominal is the 0 % test condition value.<br><sup>4)</sup> BL: Balance condition, IB: Imbalance condition.<br>Condition C:<br>EUT output power P <sub>EUT</sub> = 25 % – 33 % <sup>5)</sup> of maximum<br>EUT input voltage <sup>6)</sup> = <10 % of rated input voltage range<br><sup>5)</sup> Or minimum allowable EUT output level if greater than 33 %.<br><sup>6)</sup> Based on EUT rated input operating range. For example, If range is between X volts and Y volts, 10 % of range =X + 0,1 × (Y – X). Y shall not exceed 0,8 × EUT maximum system voltage (i.e., maximum allowable array open circuit voltage). In any case, the EUT should not be operated outside of its allowable input voltage range. |                                                     |                                                 |                                                                                                                                                         |                                                 |                  |                      |                |                 |                       |



The test had been performed on the model SUN2000-10KTL-M0, the test results are valid for the SUN2000-3KTL-M0, SUN2000-4KTL-M0, SUN2000-5KTL-M0, SUN2000-6KTL-M0, SUN2000-8KTL-M0, SUN2000-3KTL-M1, SUN2000-4KTL-M1, SUN2000-5KTL-M1, SUN2000-6KTL-M1, SUN2000-8KTL-M1 and SUN2000-10KTL-M1 except current sampling circuit and the output power derated by software.

### Disconnection at $P_{AC}$ 0% and $Q_{AC}$ 0% reactive load and 33% nominal power



| 7.4 Voltage and frequency limits (passive anti-islanding protection)<br>Appendix G2 Under- and over-voltage trip settings and reconnection test |                    |                                                    |       |                                           |       |       | P                     |
|-------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------------------------------------------------|-------|-------------------------------------------|-------|-------|-----------------------|
| <b>L1 phase</b>                                                                                                                                 |                    |                                                    |       |                                           |       |       |                       |
|                                                                                                                                                 |                    | <b>Output Current level: 50+/-5% rated current</b> |       |                                           |       |       |                       |
|                                                                                                                                                 |                    |                                                    |       |                                           |       |       |                       |
| Test                                                                                                                                            | Under Voltage (V)  |                                                    |       | Time to disconnect (s)<br>(Trip delay 1s) |       |       | Time to reconnect (s) |
| Limit                                                                                                                                           | < 180 V            |                                                    |       | <=2s                                      |       |       | >=60s                 |
| Actual setting                                                                                                                                  | 180,0              |                                                    |       | 2,0                                       |       |       | 60,0                  |
| Trip value                                                                                                                                      | 178,9              | 178,9                                              | 178,9 | 1,970                                     | 1,980 | 1,975 | 74,0                  |
| Test                                                                                                                                            | Over Voltage 1 (V) |                                                    |       | Time to disconnect (s)<br>(Trip delay 1s) |       |       | Time to reconnect (s) |
| Limit                                                                                                                                           | > 260 V            |                                                    |       | <=2s                                      |       |       | >=60s                 |
| Actual setting                                                                                                                                  | 260,0              |                                                    |       | 2,0                                       |       |       | 60,0                  |
| Trip value                                                                                                                                      | 261,8              | 261,8                                              | 261,8 | 1,975                                     | 1,978 | 1,970 | 74,0                  |
| Test                                                                                                                                            | Over Voltage 2 (V) |                                                    |       | Time to disconnect (s)                    |       |       | Time to reconnect (s) |
| Limit                                                                                                                                           | > 265 V            |                                                    |       | <=0,2s                                    |       |       | >=60s                 |
| Actual setting                                                                                                                                  | 265,0              |                                                    |       | 0,2                                       |       |       | 60,0                  |
| Trip value                                                                                                                                      | 263,9              | 263,9                                              | 263,9 | 0,187                                     | 0,186 | 0,185 | 75,0                  |
| <b>L2 phase</b>                                                                                                                                 |                    |                                                    |       |                                           |       |       |                       |
|                                                                                                                                                 |                    | <b>Output Current level: 50+/-5% rated current</b> |       |                                           |       |       |                       |
|                                                                                                                                                 |                    |                                                    |       |                                           |       |       |                       |
| Test                                                                                                                                            | Under Voltage (V)  |                                                    |       | Time to disconnect (s)<br>(Trip delay 1s) |       |       | Time to reconnect (s) |
| Limit                                                                                                                                           | < 180 V            |                                                    |       | <=2s                                      |       |       | >=60s                 |
| Actual setting                                                                                                                                  | 180,0              |                                                    |       | 2,0                                       |       |       | 60,0                  |
| Trip value                                                                                                                                      | 178,9              | 178,9                                              | 178,9 | 1,985                                     | 1,970 | 1,990 | 66,2                  |
| Test                                                                                                                                            | Over Voltage 1 (V) |                                                    |       | Time to disconnect (s)<br>(Trip delay 1s) |       |       | Time to reconnect (s) |
| Limit                                                                                                                                           | > 260 V            |                                                    |       | <=2s                                      |       |       | >=60s                 |
| Actual setting                                                                                                                                  | 260,0              |                                                    |       | 2,0                                       |       |       | 60,0                  |
| Trip value                                                                                                                                      | 261,9              | 261,9                                              | 261,9 | 1,990                                     | 1,985 | 1,980 | 65,4                  |
| Test                                                                                                                                            | Over Voltage 2 (V) |                                                    |       | Time to disconnect (s)                    |       |       | Time to reconnect (s) |
| Limit                                                                                                                                           | > 265 V            |                                                    |       | <=0,2s                                    |       |       | >=60s                 |
| Actual setting                                                                                                                                  | 265,0              |                                                    |       | 0,2                                       |       |       | 60,0                  |
| Trip value                                                                                                                                      | 265,6              | 265,6                                              | 265,6 | 0,174                                     | 0,175 | 0,175 | 66,0                  |

| L3 phase                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |                                             |       |                                           |       |       |                       |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|---------------------------------------------|-------|-------------------------------------------|-------|-------|-----------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    | Output Current level: 50+/-5% rated current |       |                                           |       |       |                       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    |                                             |       |                                           |       |       |                       |
| Test                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Under Voltage (V)  |                                             |       | Time to disconnect (s)<br>(Trip delay 1s) |       |       | Time to reconnect (s) |
| Limit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | < 180 V            |                                             |       | <=2s                                      |       |       | >=60s                 |
| Actual setting                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 180,0              |                                             |       | 2,0                                       |       |       | 60,0                  |
| Trip value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 179,0              | 179,0                                       | 179,0 | 1,970                                     | 1,975 | 1,985 | 66,0                  |
| Test                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Over Voltage 1 (V) |                                             |       | Time to disconnect (s)<br>(Trip delay 1s) |       |       | Time to reconnect (s) |
| Limit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | > 260 V            |                                             |       | <=2s                                      |       |       | >=60s                 |
| Actual setting                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 260,0              |                                             |       | 2,0                                       |       |       | 60,0                  |
| Trip value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 262,0              | 262,0                                       | 262,0 | 1,968                                     | 1,976 | 1,981 | 65,6                  |
| Test                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Over Voltage 2 (V) |                                             |       | Time to disconnect (s)                    |       |       | Time to reconnect (s) |
| Limit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | > 265 V            |                                             |       | <=0,2s                                    |       |       | >=60s                 |
| Actual setting                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 265,0              |                                             |       | 0,2                                       |       |       | 60,0                  |
| Trip value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 265,7              | 265,7                                       | 265,7 | 0,173                                     | 0,174 | 0,174 | 66,2                  |
| <b>Note:</b><br>Actual settings are the settings of the inverter. The Trip value the measured value. It has to be in the range of $\pm 2V$ of the actual setting.<br><br>The test had been performed on the model SUN2000-10KTL-M0, the test results are valid for the SUN2000-3KTL-M0, SUN2000-4KTL-M0, SUN2000-5KTL-M0, SUN2000-6KTL-M0, SUN2000-8KTL-M0, SUN2000-3KTL-M1, SUN2000-4KTL-M1, SUN2000-5KTL-M1, SUN2000-6KTL-M1, SUN2000-8KTL-M1 and SUN2000-10KTL-M1 except current sampling circuit and the output power derated by software. |                    |                                             |       |                                           |       |       |                       |

Diagram of under-voltage protection:L1 phase

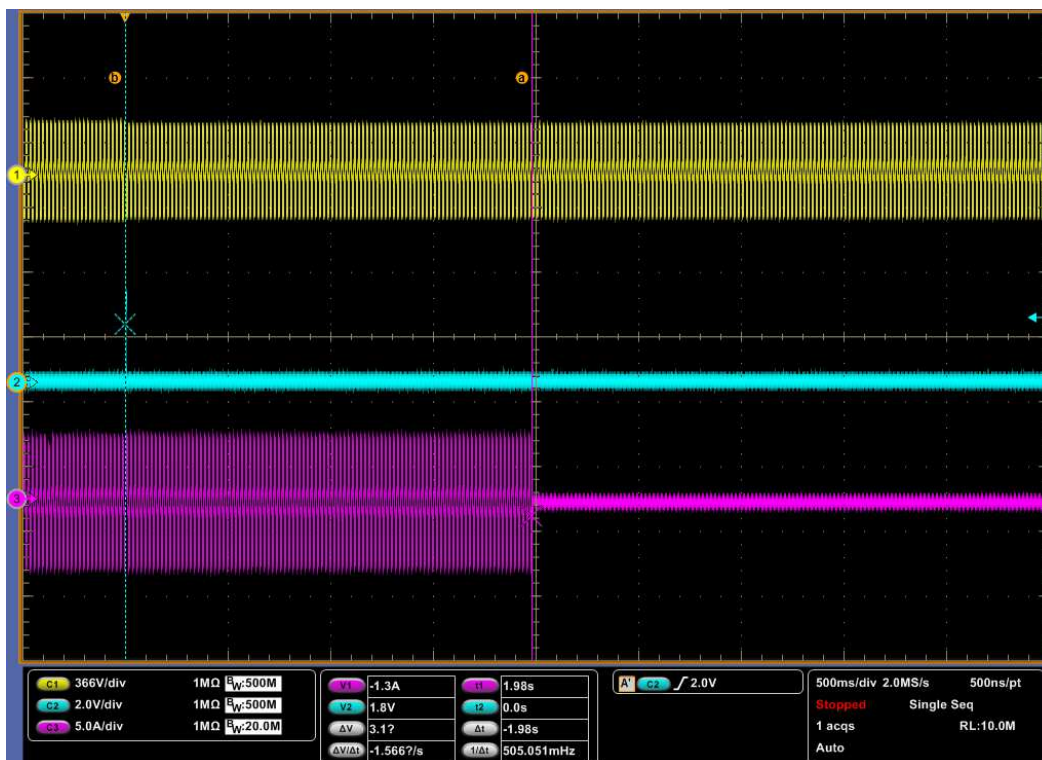


Diagram of over-voltage 1 protection:L1 phase

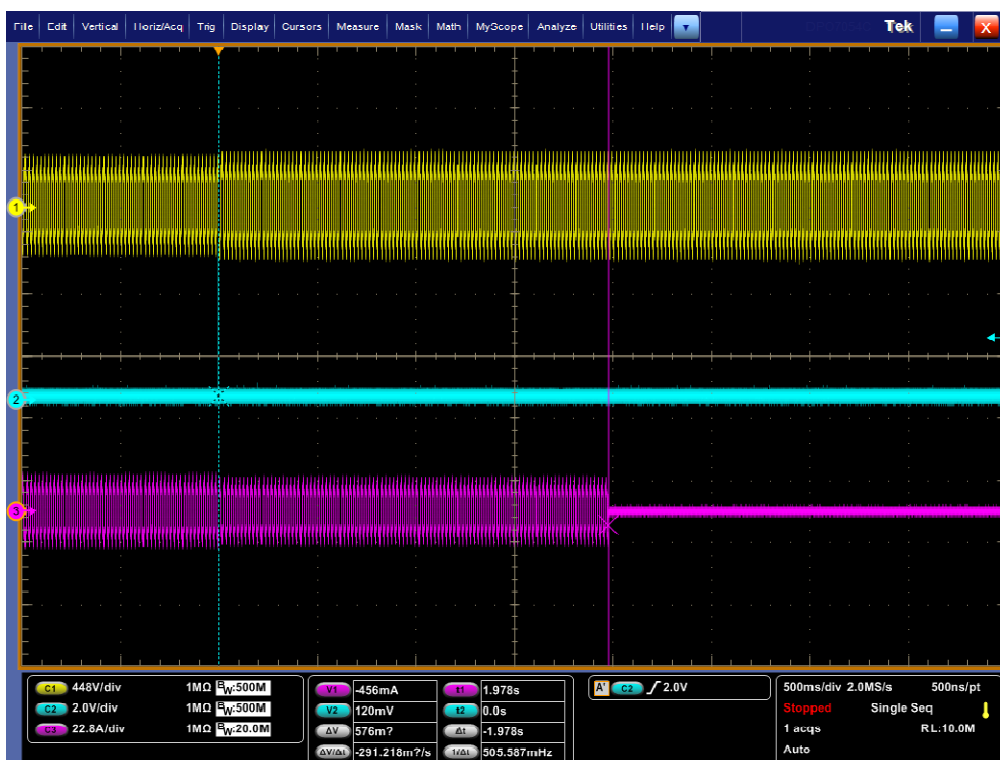


Diagram of over-voltage 2 protection:L1 phase



Diagram of under-voltage protection:L2 phase

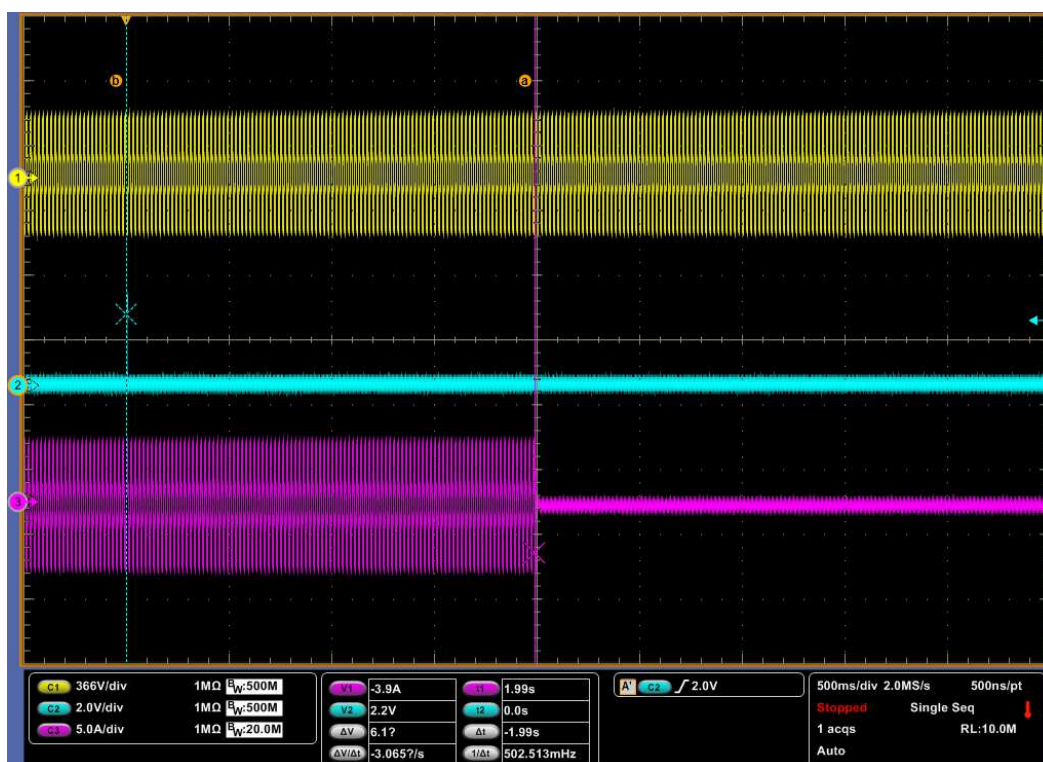




Diagram of over-voltage 1 protection:L2 phase

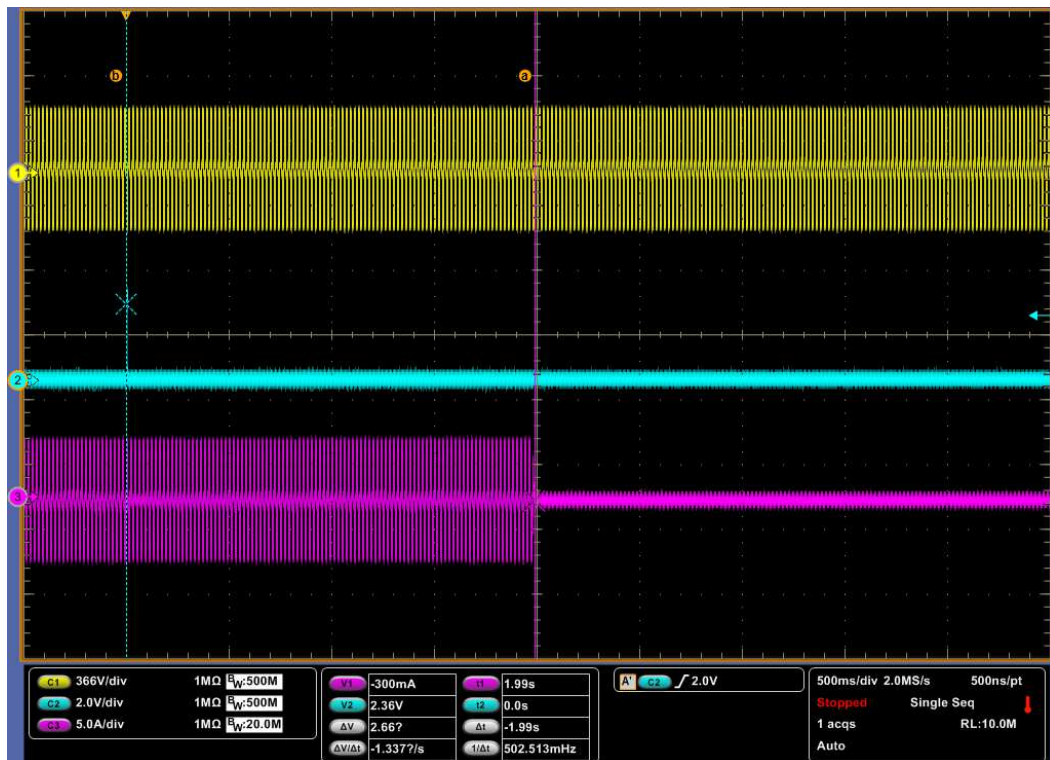


Diagram of over-voltage 2 protection:L2 phase

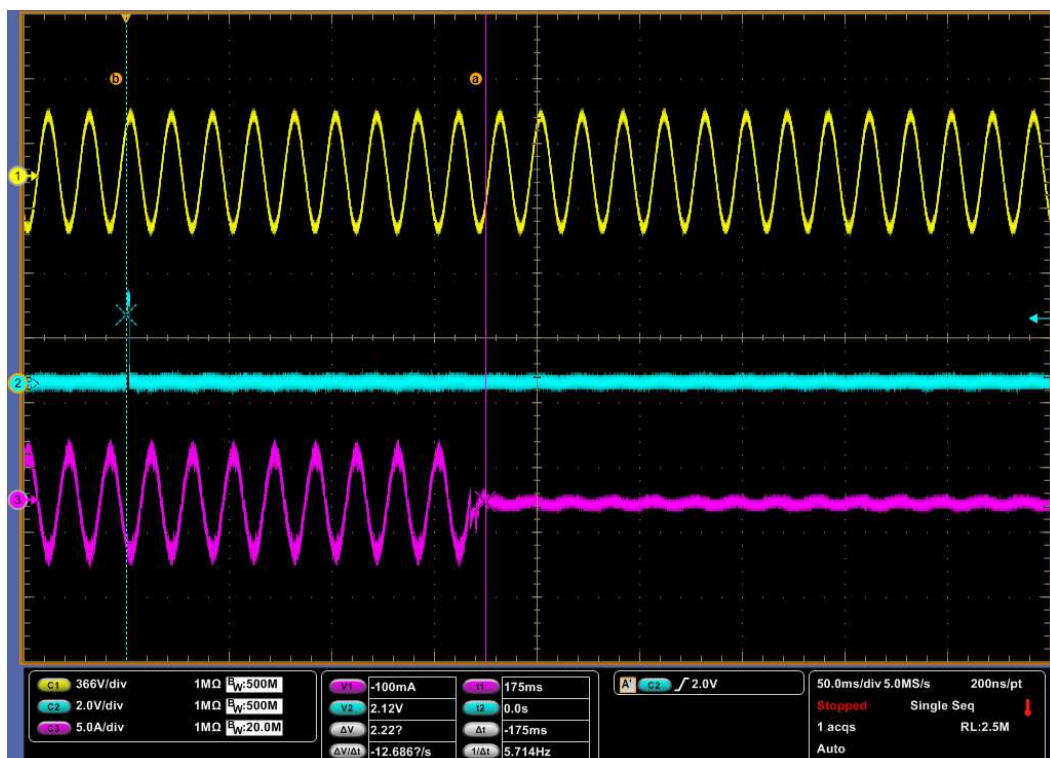




Diagram of under-voltage protection:L3 phase

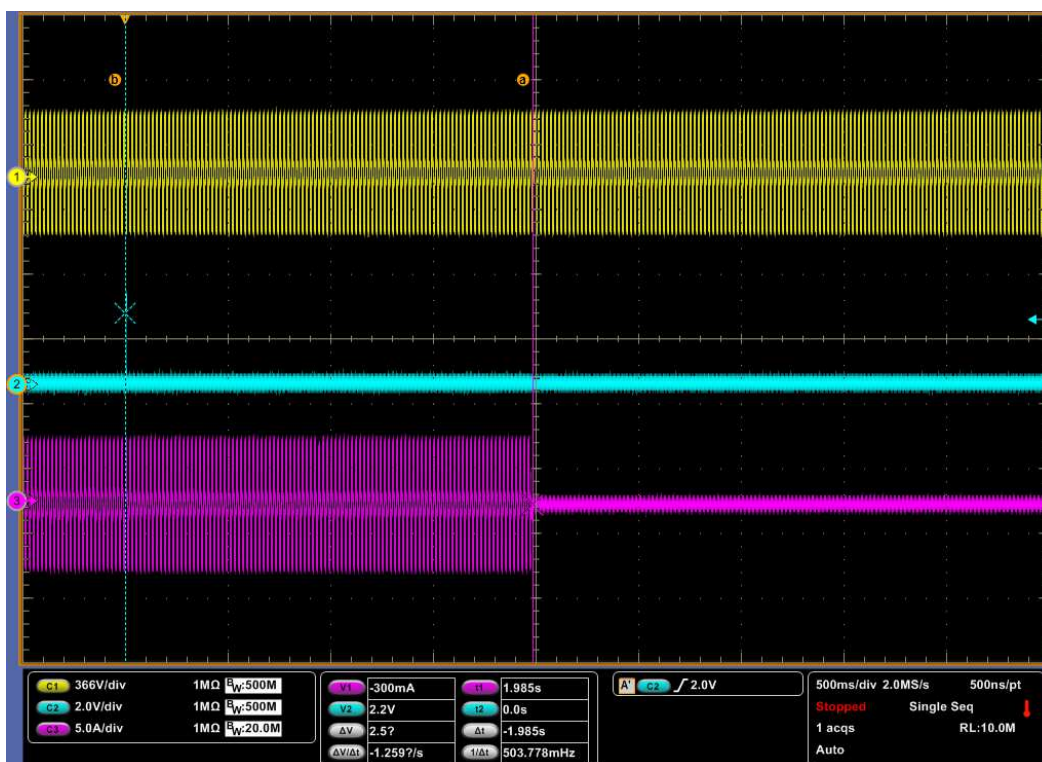
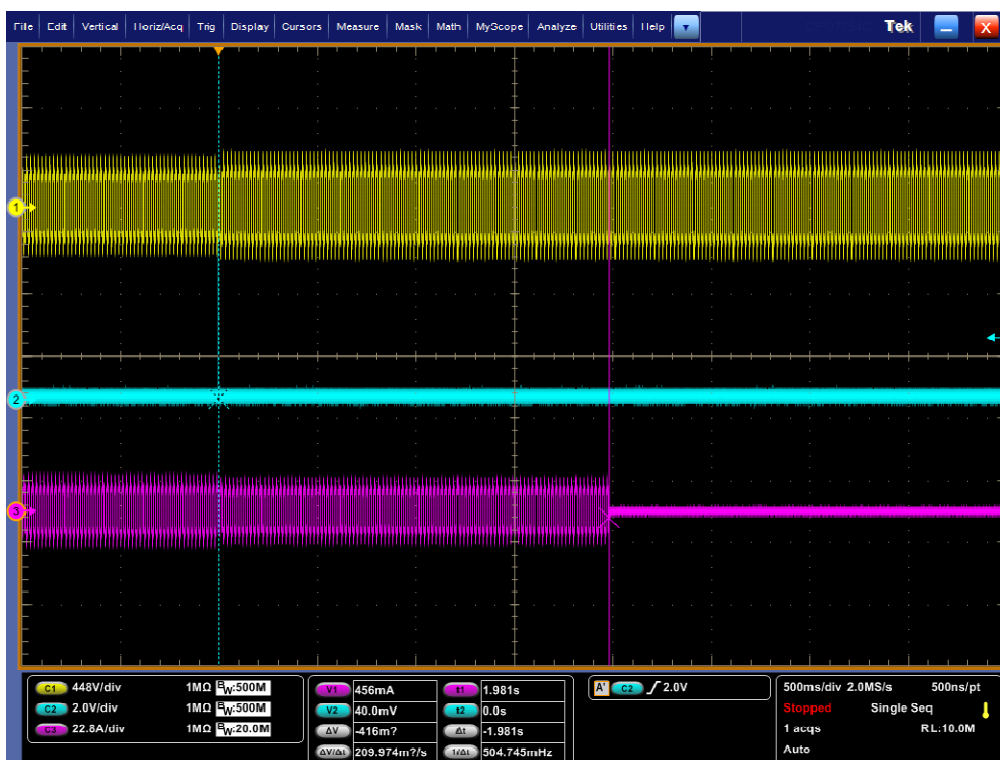
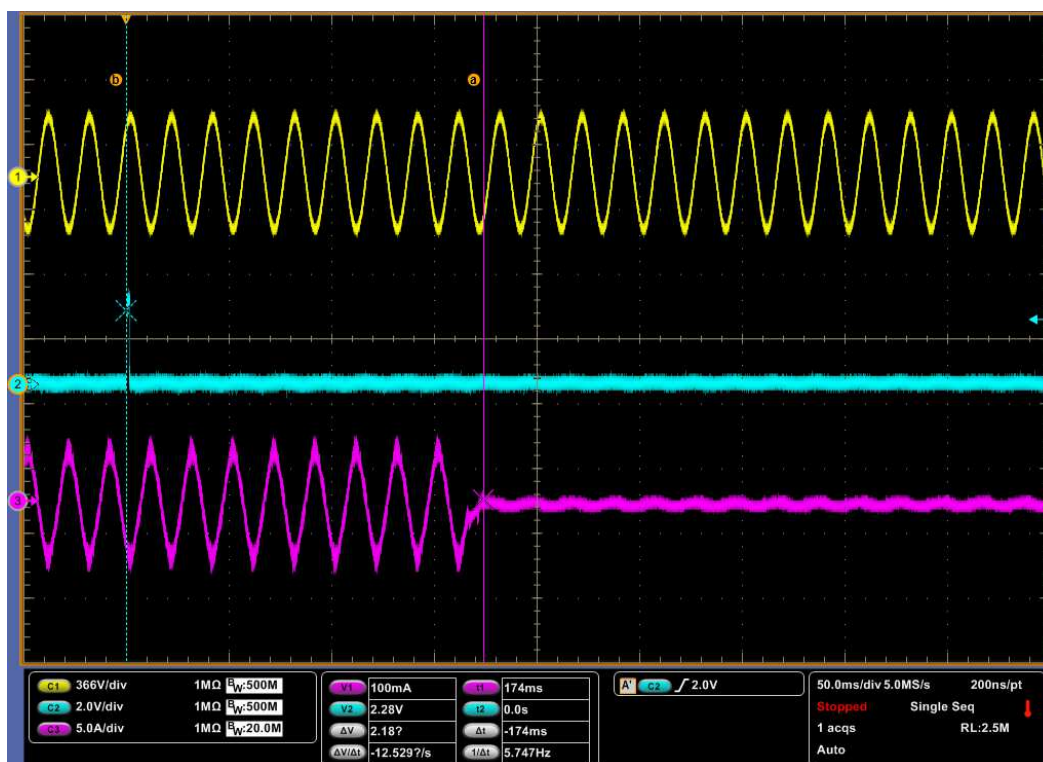


Diagram of over-voltage 1 protection:L3 phase

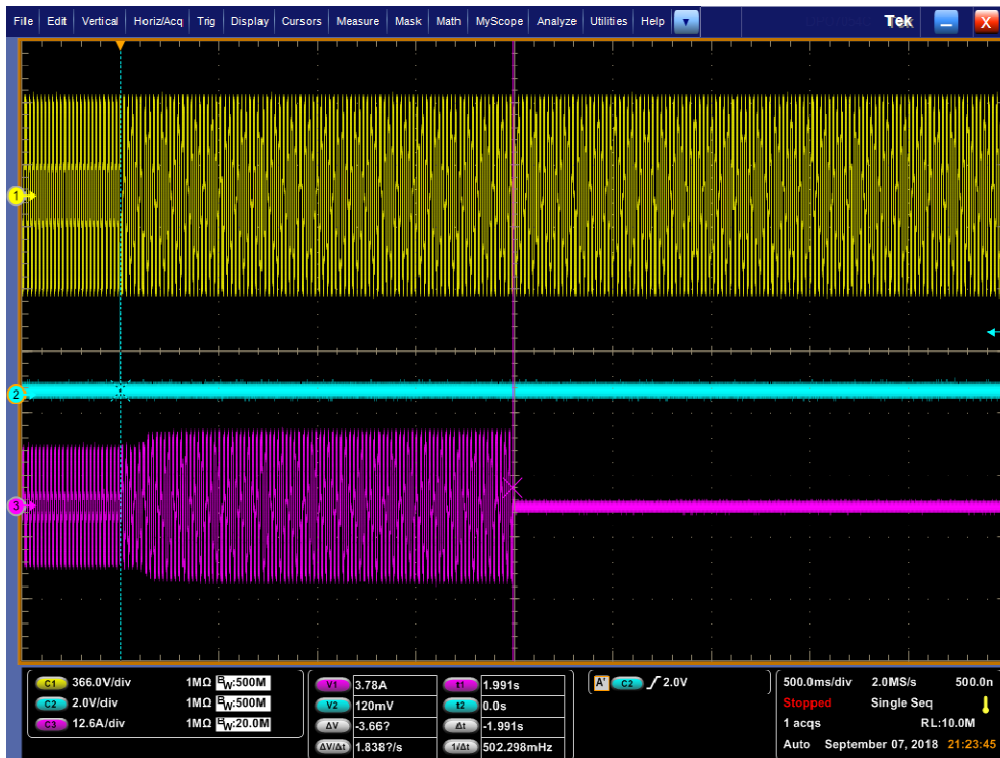


### Diagram of over-voltage 2 protection:L3 phase

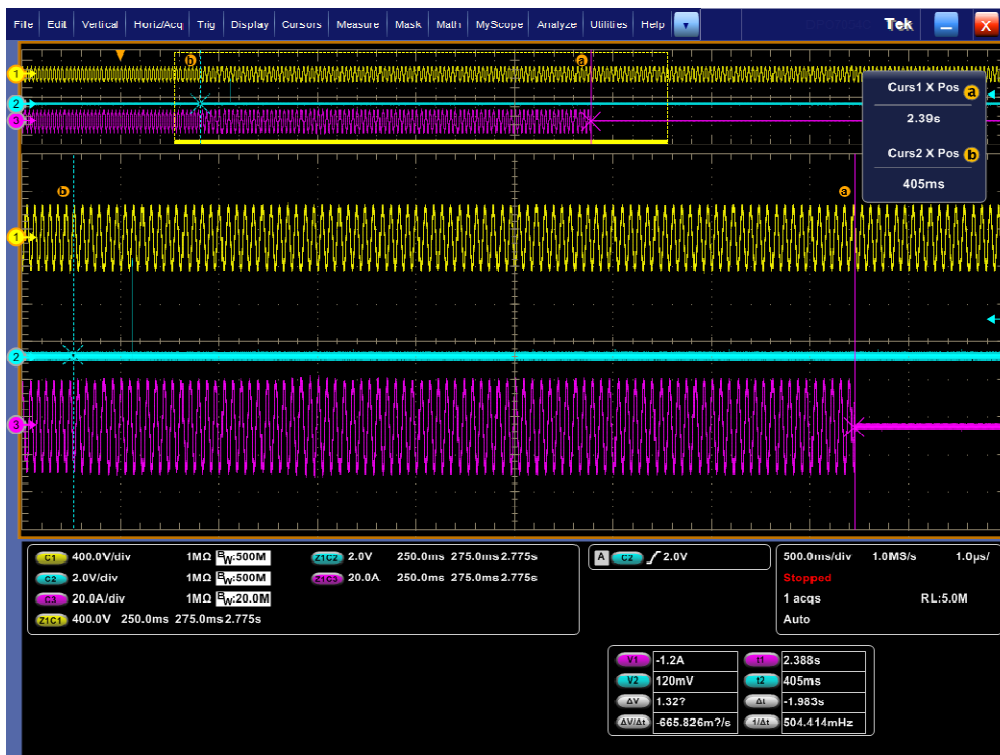


| 7.4 Voltage and frequency limits (passive anti-islanding protection)<br>Appendix G3 Under- and over-frequency trip settings and reconnection test                                                                                                                                                                                                                                                                                                                                                                                                           |                      |       |       |                                           |       |       | P                     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------|-------|-------------------------------------------|-------|-------|-----------------------|
| Output Current level: 50+/-5% rated current or 10A (whichever is the lesser)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |       |       |                                           |       |       |                       |
| Test                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Under Frequency (Hz) |       |       | Time to disconnect (s)<br>(Trip delay 1s) |       |       | Time to reconnect (s) |
| <b>Australia</b><br>Limit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | $\geq 47\text{Hz}$   |       |       | $\leq 2\text{s}$                          |       |       | $\geq 60\text{s}$     |
| Actual setting                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 47,0                 |       |       | 2,0                                       |       |       | 60,0                  |
| Trip value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 47,01                | 47,01 | 47,01 | 1,991                                     | 1,979 | 1,979 | 66,0                  |
| Test                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Under Frequency (Hz) |       |       | Time to disconnect (s)<br>(Trip delay 1s) |       |       | Time to reconnect (s) |
| <b>New Zealand</b><br>Limit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | $\geq 45\text{Hz}$   |       |       | $\leq 2\text{s}$                          |       |       | $\geq 60\text{s}$     |
| Actual setting                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 45,0                 |       |       | 2,0                                       |       |       | 60,0                  |
| Trip value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 45,01                | 45,01 | 45,01 | 1,983                                     | 1,980 | 1,975 | 66,0                  |
| Test                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Over Frequency (Hz)  |       |       | Time to disconnect (s)                    |       |       | Time to reconnect (s) |
| Limit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | $\leq 52\text{Hz}$   |       |       | $\leq 0,2\text{s}$                        |       |       | $\geq 60\text{s}$     |
| Actual setting                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 52,0                 |       |       | 0,2                                       |       |       | 60,0                  |
| Trip value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 51,99                | 51,99 | 51,99 | 0,184                                     | 0,184 | 0,194 | 66,0                  |
| <b>Note:</b><br>Actual settings are the settings of the inverter. The trip value is the measured value. It has to be in the range of $\pm 0.1\text{Hz}$ of the actual setting.<br><br>The test had been performed on the model SUN2000-10KTL-M0, the test results are valid for the SUN2000-3KTL-M0, SUN2000-4KTL-M0, SUN2000-5KTL-M0, SUN2000-6KTL-M0, SUN2000-8KTL-M0, SUN2000-3KTL-M1, SUN2000-4KTL-M1, SUN2000-5KTL-M1, SUN2000-6KTL-M1, SUN2000-8KTL-M1 and SUN2000-10KTL-M1 except current sampling circuit and the output power derated by software. |                      |       |       |                                           |       |       |                       |

### Diagram of under-frequency protection (for Australia)



### Diagram of under-frequency protection (for New Zealand)



### Diagram of over-frequency protection



| 7.5.2 Limits for sustained operation<br>Appendix H2 Sustained operation for voltage variations<br>Australia                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                       |                                                                                                                                                             |                          | P                                                                                 |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-----------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                       | Output power level: 50+/-5% Apparent Power                                                                                                                  |                          |                                                                                   |
| Setting values                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                       | Setting Vnom_max [V]                                                                                                                                        | 255,0                    |                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                       | Setting Tdisconnection [s]                                                                                                                                  | /                        |                                                                                   |
| Test:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                       |                                                                                                                                                             |                          |                                                                                   |
| a)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Step 1. The voltage is set to Vnom_max – 1 V. Maintained for 5 min.<br>Step 2. The voltage increase to Vnom_max + 1 V and proceeding 10 min.<br>Step 3. The 10 min average voltage shall be recorded. |                                                                                                                                                             |                          |                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                       |                                                                                                                                                             | Average Voltage (V)      | Limit                                                                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Phase 1                                                                                                                                                                                               | 1 <sup>st</sup> time                                                                                                                                        | 255,4                    | 1. Disconnection should take place.<br>2. Voltage within +/-1 % of the set-point. |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                       | 2 <sup>nd</sup> time                                                                                                                                        | 255,6                    |                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                       | 3 <sup>rd</sup> time                                                                                                                                        | 255,5                    |                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Phase 2                                                                                                                                                                                               | 1 <sup>st</sup> time                                                                                                                                        | 255,2                    |                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                       | 2 <sup>nd</sup> time                                                                                                                                        | 253,9                    |                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                       | 3 <sup>rd</sup> time                                                                                                                                        | 253,8                    |                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Phase 3                                                                                                                                                                                               | 1 <sup>st</sup> time                                                                                                                                        | 255,3                    |                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                       | 2 <sup>nd</sup> time                                                                                                                                        | 254,7                    |                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                       | 3 <sup>rd</sup> time                                                                                                                                        | 254,6                    |                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | b)                                                                                                                                                                                                    | Step 1. The voltage is set to Vnom_max and maintained for 10 min.<br>Step 2. Increase 2 V to trig the protection.<br>Step 3. Record the disconnection time. |                          |                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                       | Disconnection time (s)                                                                                                                                      | Limit                    |                                                                                   |
| Phase 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                       | 26,6                                                                                                                                                        | Disconnection time < 30s |                                                                                   |
| Phase 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                       | 16,8                                                                                                                                                        |                          |                                                                                   |
| Phase 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                       | 7,6                                                                                                                                                         |                          |                                                                                   |
| c)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Step 1. The output voltage of variable a.c. supply decrease the voltage to gird test voltage.<br>Step 2. Record the reconnection time.                                                                |                                                                                                                                                             |                          |                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                       |                                                                                                                                                             | Reconnection time (s)    | Limit                                                                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Phase 1                                                                                                                                                                                               |                                                                                                                                                             | 66,4                     | Reconnection time > 60s                                                           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Phase 2                                                                                                                                                                                               |                                                                                                                                                             | 66,4                     |                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Phase 3                                                                                                                                                                                               |                                                                                                                                                             | 66,4                     |                                                                                   |
| <b>Note:</b><br>1. The default set-point for Vnom-max shall be as follows:<br>(a) In Australia: 255 V.<br>(b) In New Zealand: 248 V.<br>2. The 10 min average value shall be compared against the limit Vnom_max at least every 3 s to determine when to disconnect.<br>3. The inverter shall operate the automatic disconnection device (see Clause 7.2) within 3 s when the average voltage for a 10 min period exceeds the Vnom_max.<br>The test had been performed on the model SUN2000-10KTL-M0, the test results are valid for the SUN2000-3KTL-M0, SUN2000-4KTL-M0, SUN2000-5KTL-M0, SUN2000-6KTL-M0, SUN2000-8KTL-M0, SUN2000-3KTL-M1, SUN2000-4KTL-M1, SUN2000-5KTL-M1, SUN2000-6KTL-M1, SUN2000-8KTL-M1 and SUN2000-10KTL-M1 except current sampling circuit and the output power derated by software. |                                                                                                                                                                                                       |                                                                                                                                                             |                          |                                                                                   |



| 7.5.2 Limits for sustained operation<br>Appendix H2 Sustained operation for voltage variations<br>New Zealand                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                       |                                                                                                                                                             |                          | P                                                                                 |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-----------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                       | Output power level: 50+/-5% Apparent Power                                                                                                                  |                          |                                                                                   |
| Setting values                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                       | Setting Vnom_max [V]                                                                                                                                        | 248,0                    |                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                       | Setting T <sub>disconnection</sub> [s]                                                                                                                      | /                        |                                                                                   |
| Test:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                       |                                                                                                                                                             |                          |                                                                                   |
| a)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Step 1. The voltage is set to Vnom_max – 1 V. Maintained for 5 min.<br>Step 2. The voltage increase to Vnom_max + 1 V and proceeding 10 min.<br>Step 3. The 10 min average voltage shall be recorded. |                                                                                                                                                             |                          |                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                       |                                                                                                                                                             | Average Voltage (V)      | Limit                                                                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Phase 1                                                                                                                                                                                               | 1 <sup>st</sup> time                                                                                                                                        | 248,9                    | 1. Disconnection should take place.<br>2. Voltage within +/-1 % of the set-point. |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                       | 2 <sup>nd</sup> time                                                                                                                                        | 248,9                    |                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                       | 3 <sup>rd</sup> time                                                                                                                                        | 248,9                    |                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Phase 2                                                                                                                                                                                               | 1 <sup>st</sup> time                                                                                                                                        | 248,4                    |                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                       | 2 <sup>nd</sup> time                                                                                                                                        | 248,5                    |                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                       | 3 <sup>rd</sup> time                                                                                                                                        | 248,4                    |                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Phase 3                                                                                                                                                                                               | 1 <sup>st</sup> time                                                                                                                                        | 248,0                    |                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                       | 2 <sup>nd</sup> time                                                                                                                                        | 248,1                    |                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                       | 3 <sup>rd</sup> time                                                                                                                                        | 248,1                    |                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | b)                                                                                                                                                                                                    | Step 1. The voltage is set to Vnom_max and maintained for 10 min.<br>Step 2. Increase 2 V to trig the protection.<br>Step 3. Record the disconnection time. |                          |                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                       | Disconnection time (s)                                                                                                                                      | Limit                    |                                                                                   |
| Phase 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                       | 13,8                                                                                                                                                        | Disconnection time < 30s |                                                                                   |
| Phase 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                       | 13,8                                                                                                                                                        |                          |                                                                                   |
| Phase 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                       | 19,2                                                                                                                                                        |                          |                                                                                   |
| c)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Step 1. The output voltage of variable a.c. supply decrease the voltage to gird test voltage.<br>Step 2. Record the reconnection time.                                                                |                                                                                                                                                             |                          |                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                       |                                                                                                                                                             | Reconnection time (s)    | Limit                                                                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Phase 1                                                                                                                                                                                               |                                                                                                                                                             | 62,8                     | Reconnection time > 60s                                                           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Phase 2                                                                                                                                                                                               |                                                                                                                                                             | 64,0                     |                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Phase 3                                                                                                                                                                                               |                                                                                                                                                             | 62,2                     |                                                                                   |
| <b>Note:</b><br>1. The default set-point for Vnom-max shall be as follows:<br>(a) In Australia: 255 V.<br>(b) In New Zealand: 248 V.<br>2. The 10 min average value shall be compared against the limit Vnom_max at least every 3 s to determine when to disconnect.<br>3. The inverter shall operate the automatic disconnection device (see Clause 7.2) within 3 s when the average voltage for a 10 min period exceeds the Vnom_max.<br>The test had been performed on the model SUN2000-10KTL-M0, the test results are valid for the SUN2000-3KTL-M0, SUN2000-4KTL-M0, SUN2000-5KTL-M0, SUN2000-6KTL-M0, SUN2000-8KTL-M0, SUN2000-3KTL-M1, SUN2000-4KTL-M1, SUN2000-5KTL-M1, SUN2000-6KTL-M1, SUN2000-8KTL-M1 and SUN2000-10KTL-M1 except current sampling circuit and the output power derated by software. |                                                                                                                                                                                                       |                                                                                                                                                             |                          |                                                                                   |

| 7.5.3.1 Response to an increase in frequency<br>Appendix H3.2 Test procedure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |            |            |            |            |            | P          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|------------|------------|------------|------------|------------|
| 1. Measurement a) to w): Power output: 50+/-5% of rated apparent power                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |            |            |            |            |            |            |            |
| 30s mean value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | a) 50,00Hz | b) 50,25Hz | c) 50,35Hz | d) 50,45Hz | e) 50,55Hz | f) 50,65Hz | g) 50,75Hz |
| Frequency [Hz]:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 50,00      | 50,25      | 50,35      | 50,45      | 50,55      | 50,65      | 50,75      |
| P <sub>setpoint</sub> [kW]:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 5,500      | 5,500      | 5,233      | 4,914      | 4,597      | 4,280      | 3,962      |
| P [kW]:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 5,567      | 5,555      | 5,236      | 4,918      | 4,600      | 4,282      | 3,969      |
| ΔP/P <sub>Setpoint</sub> [%]:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | -0,61      | -0,50      | -0,02      | -0,04      | -0,03      | -0,02      | -0,07      |
| 30s mean value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | h) 50,85Hz | i) 50,95Hz | j) 51,05Hz | k) 51,15Hz | l) 51,25Hz | m)51,35Hz  | n) 51,45Hz |
| Frequency [Hz]:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 50,85      | 50,95      | 51,05      | 51,15      | 51,25      | 51,35      | 51,45      |
| P <sub>setpoint</sub> [kW]:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 3,647      | 3,328      | 3,010      | 2,694      | 2,376      | 2,059      | 1,740      |
| P [kW]:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 3,654      | 3,334      | 3,013      | 2,696      | 2,377      | 2,059      | 1,740      |
| ΔP/P <sub>Setpoint</sub> [%]:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | -0,07      | -0,05      | -0,03      | -0,03      | 0,00       | 0,00       | 0,00       |
| 30s mean value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | o) 51,55Hz | p) 51,65Hz | q) 51,75Hz | r) 51,85Hz | s) 51,95Hz | t)52,05Hz  | u) 52,15Hz |
| Frequency [Hz]:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 51,55      | 51,65      | 51,75      | 51,85      | 51,95      | 52,05      | 52,15      |
| P <sub>setpoint</sub> [kW]:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1,425      | 1,107      | 0,789      | 0,461      | 0,154      | 0,000      | 0,000      |
| P [kW]:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1,421      | 1,103      | 0,784      | 0,457      | 0,147      | 0,000      | 0,000      |
| ΔP/P <sub>Setpoint</sub> [%]:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0,03       | 0,04       | 0,04       | 0,03       | 0,06       | 0,00       | 0,00       |
| <i>The frequency shall be decreased every 30 s in 0,2 Hz decrements from 52,25Hz until less than 50,15Hz. Maintained for 10 min or until the inverter reaches the maximum output power available. After frequency decreased to less than 50,15Hz, adjust output power to 100% rated power.</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |            |            |            |            |            |            |            |
| 30s mean value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | v) 52,25Hz | ->         | w) 50,05Hz | N/A        | N/A        | N/A        | N/A        |
| Frequency [Hz]:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 52,25      | N/A        | 50,05      | N/A        | N/A        | N/A        | N/A        |
| P <sub>setpoint</sub> [kW]:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 0,000      | N/A        | 0,000      | N/A        | N/A        | N/A        | N/A        |
| P [kW]:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 0,000      | N/A        | 0,000      | N/A        | N/A        | N/A        | N/A        |
| ΔP/P <sub>Setpoint</sub> [%]:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0,00       | N/A        | 0,00       | N/A        | N/A        | N/A        | N/A        |
| Limit W <sub>Gra</sub> :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | + 17 %     |            |            |            |            |            |            |
| <b>Note:</b><br>1. The output power at grid test voltage/50,00Hz shall be maintained for 5 min and the average power shall be used as the frozen value of power (Pref)<br>2. The frequency increase rate: 0.1Hz/step/30s.<br>3. The frequency decrease rate: 0.2Hz/step/30s.<br>4. While the frequency decrease less than 50,15Hz, the voltage and frequency shall be maintained for 10 min or until the inverter reaches the maximum output power available.<br>5 After frequency decrease less than 50,15Hz, adjust output power to 100% rated power.<br><br>The test had been performed on the model SUN2000-10KTL-M0, the test results are valid for the SUN2000-3KTL-M0, SUN2000-4KTL-M0, SUN2000-5KTL-M0, SUN2000-6KTL-M0, SUN2000-8KTL-M0, SUN2000-3KTL-M1, SUN2000-4KTL-M1, SUN2000-5KTL-M1, SUN2000-6KTL-M1, SUN2000-8KTL-M1 and SUN2000-10KTL-M1 except current sampling circuit and the output power derated by software. |            |            |            |            |            |            |            |

Diagram of overfrequency

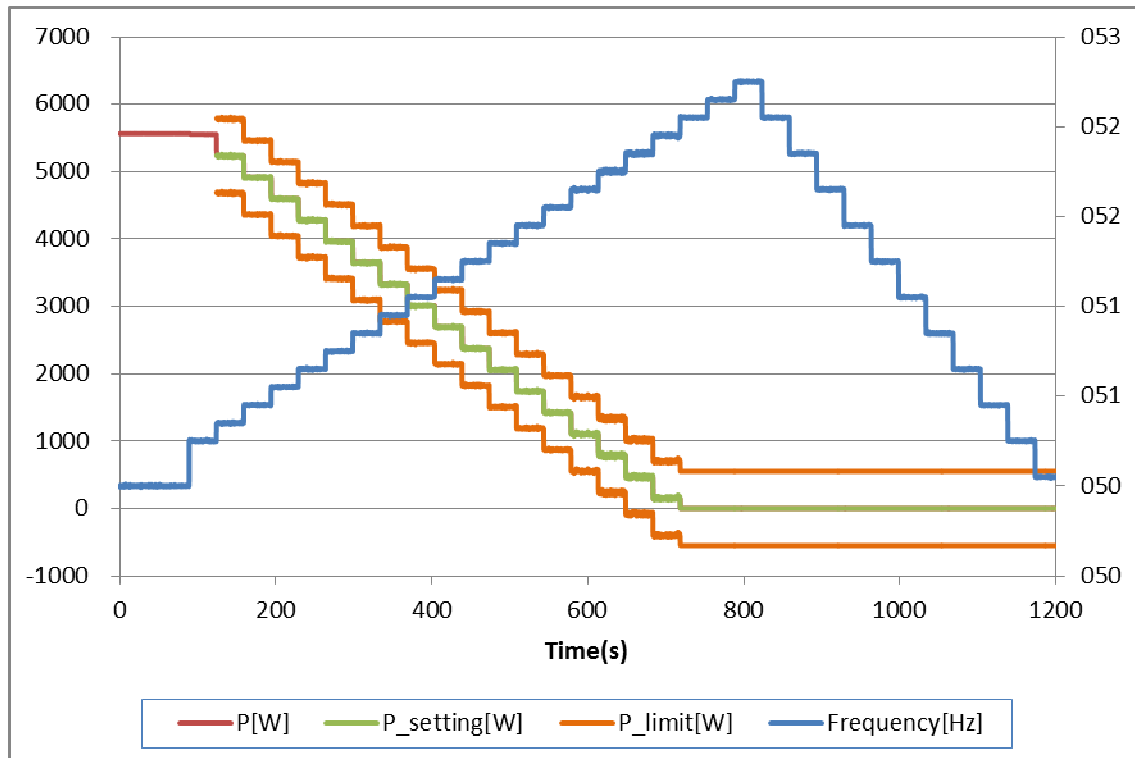
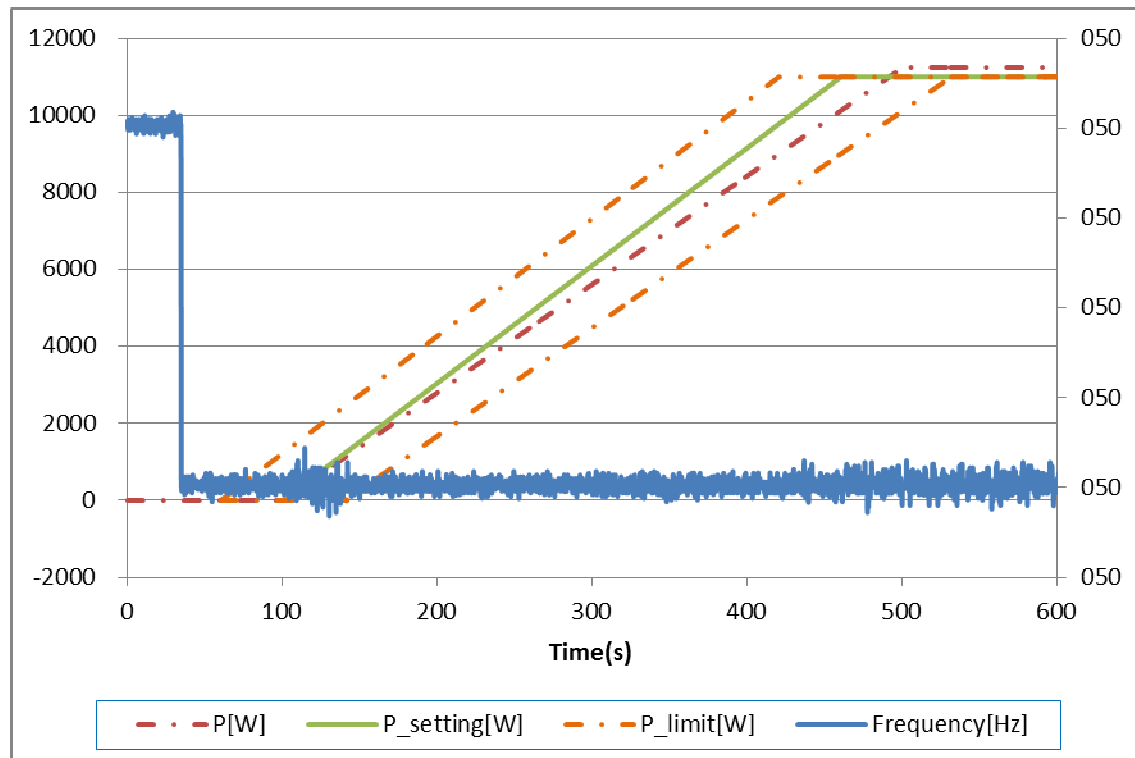


Diagram of power restore gradient line



| 7.5.3.1 Response to an increase in frequency (continued)<br>Appendix H3.2 Test procedure (continued)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |            |            |            |            |            |            | P          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|------------|------------|------------|------------|------------|
| 2. Measurement a) to o): Power output: 50+/-5% of rated apparent power                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |            |            |            |            |            |            |            |
| 30s mean value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | a) 50,00Hz | b) 50,25Hz | c) 50,35Hz | d) 50,45Hz | e) 50,55Hz | f) 50,65Hz | g) 50,75Hz |
| Frequency [Hz]:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 50,00      | 50,25      | 50,35      | 50,45      | 50,55      | 50,65      | 50,75      |
| P <sub>setpoint</sub> [kW]:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 5,500      | 5,500      | 5,182      | 4,869      | 4,552      | 4,237      | 3,924      |
| P [kW]:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 5,567      | 5,554      | 5,234      | 4,916      | 4,601      | 4,283      | 3,968      |
| ΔP/P <sub>Setpoint</sub> [%]:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | -1,335     | -1,072     | -1,045     | -0,956     | -0,979     | -0,919     | -0,880     |
| 30s mean value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | h) 50,85Hz | i) 50,95Hz | j) 51,05Hz | N/A        | N/A        | N/A        | N/A        |
| Frequency [Hz]:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 50,85      | 50,95      | 51,05      | N/A        | N/A        | N/A        | N/A        |
| P <sub>setpoint</sub> [kW]:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 3,609      | 3,294      | 2,982      | N/A        | N/A        | N/A        | N/A        |
| P [kW]:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 3,655      | 3,335      | 3,016      | N/A        | N/A        | N/A        | N/A        |
| ΔP/P <sub>Setpoint</sub> [%]:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | -0,901     | -0,824     | -0,687     | N/A        | N/A        | N/A        | N/A        |
| <i>The frequency shall be decreased every 30 s in 0,2 Hz decrements from 51,05Hz until less than 50,15Hz. Maintained for 10 min or until the inverter reaches the maximum output power available. After frequency decreased to less than 50,15Hz, adjust output power to 100% rated power.</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |            |            |            |            |            |            |            |
| 30s mean value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | k) 50,85Hz | l) 50,65Hz | m)50,45Hz  | n) 50,25Hz | o) 50,05Hz | N/A        | N/A        |
| Frequency [Hz]:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 50,85      | 50,65      | 50,45      | 50,25      | 50,05      | N/A        | N/A        |
| P <sub>setpoint</sub> [kW]:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2,982      | 2,982      | 2,982      | 2,982      | 2,982      | N/A        | N/A        |
| P [kW]:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 3,016      | 3,015      | 3,015      | 3,015      | 3,015      | N/A        | N/A        |
| ΔP/P <sub>Setpoint</sub> [%]:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | -0,673     | -0,670     | -0,670     | -0,669     | -0,669     | N/A        | N/A        |
| Limit W <sub>Gra</sub> :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | + 17 %     |            |            |            |            |            |            |
| <b>Note:</b><br>1. The output power at grid test voltage/50,00Hz shall be maintained for 5 min and the average power shall be used as the frozen value of power (Pref)<br>2. The frequency increase rate: 0.1Hz/step/30s.<br>3. The frequency decrease rate: 0.2Hz/step/30s.<br>4. While the frequency decrease less than 50,15Hz, the voltage and frequency shall be maintained for 10 min or until the inverter reaches the maximum output power available.<br>5 After frequency decrease less than 50,15Hz, adjust output power to 100% rated power.<br><br>The test had been performed on the model SUN2000-10KTL-M0, the test results are valid for the SUN2000-3KTL-M0, SUN2000-4KTL-M0, SUN2000-5KTL-M0, SUN2000-6KTL-M0, SUN2000-8KTL-M0, SUN2000-3KTL-M1, SUN2000-4KTL-M1, SUN2000-5KTL-M1, SUN2000-6KTL-M1, SUN2000-8KTL-M1 and SUN2000-10KTL-M1 except current sampling circuit and the output power derated by software. |            |            |            |            |            |            |            |

Diagram of overfrequency

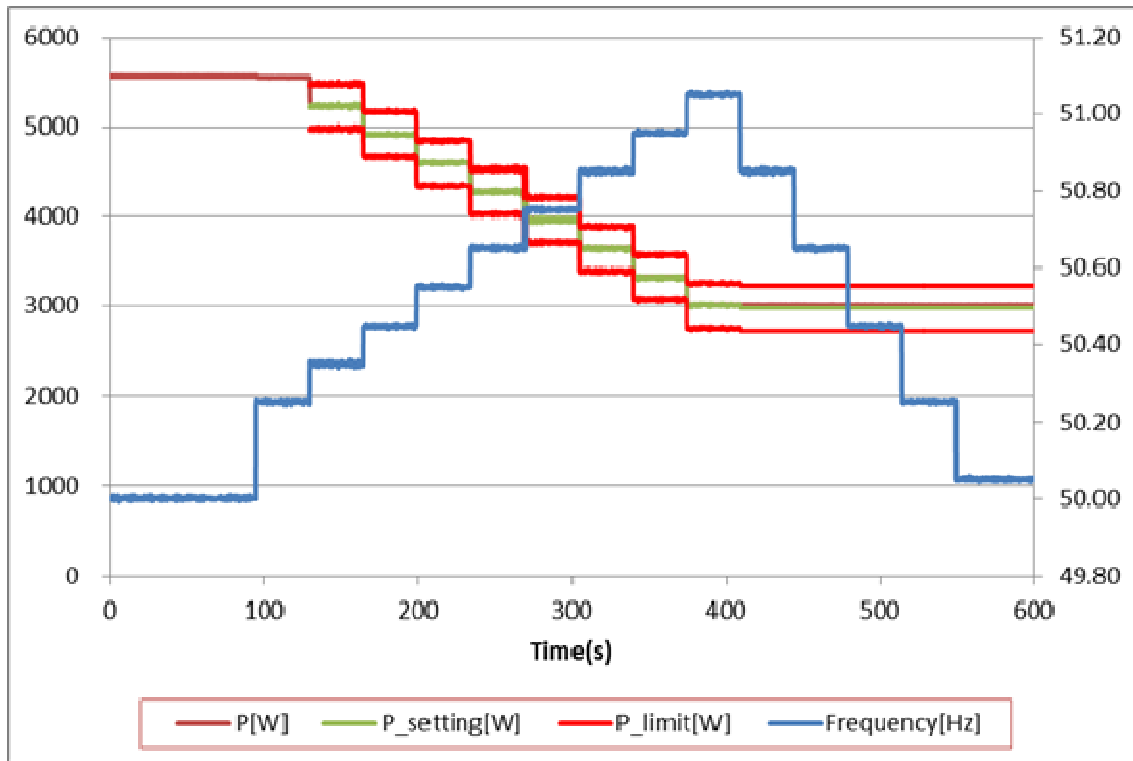
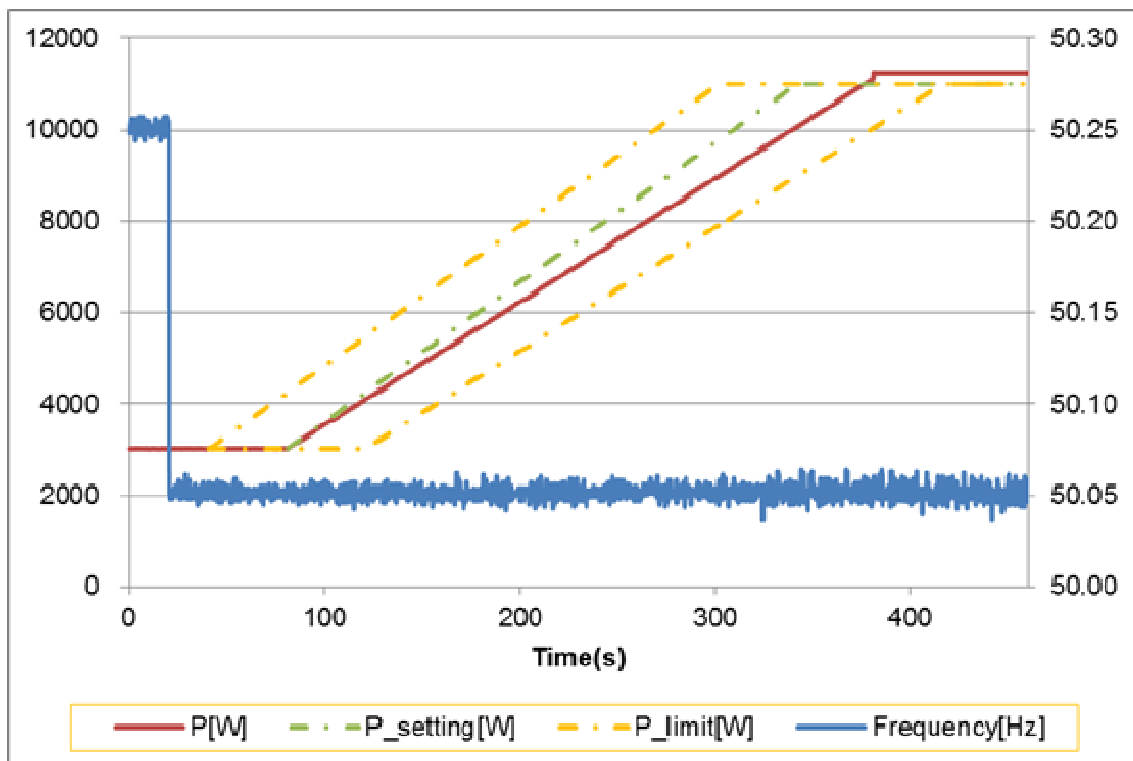


Diagram of power restore gradient line



# Annex 1

## Pictures of the unit

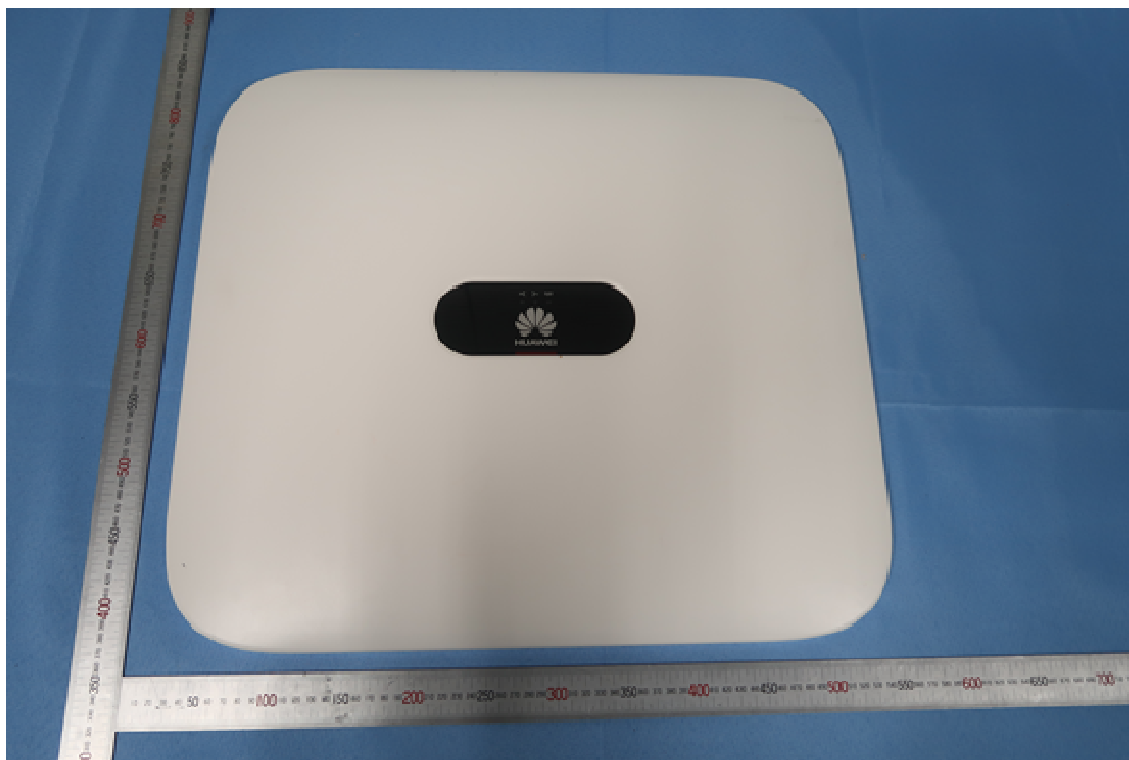
The full pictures refer to PHOTO DOCUMENT

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Date: 20181015



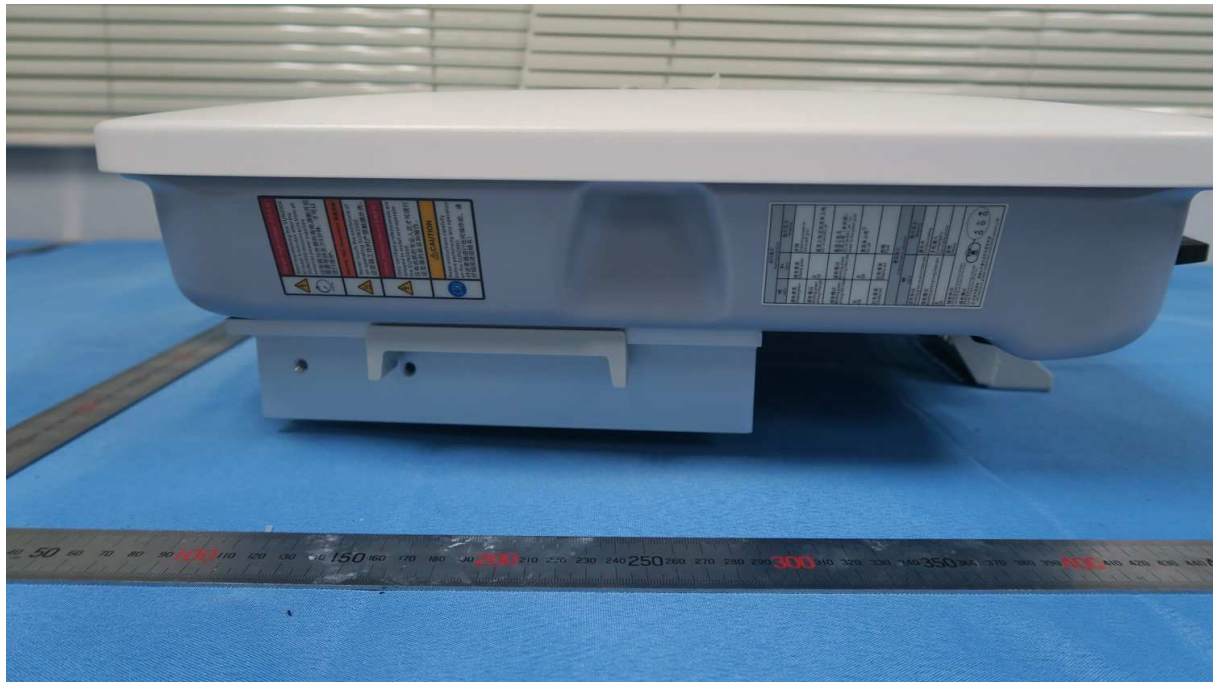
### Enclosure front view



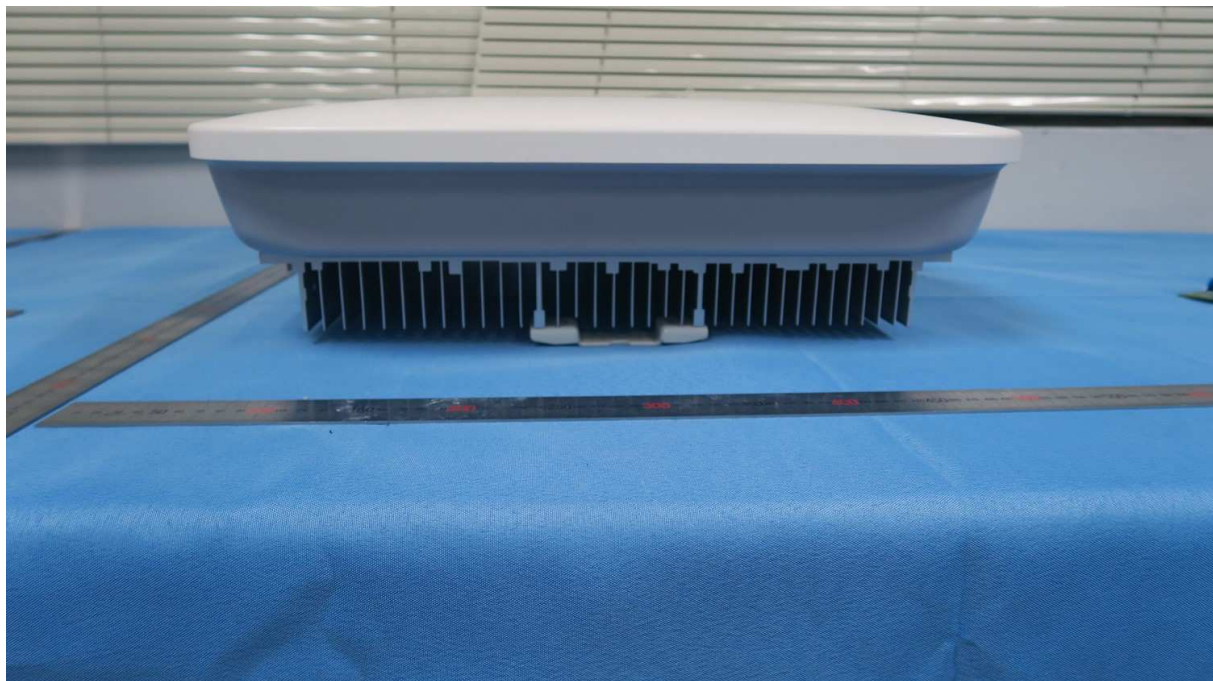
### Enclosure side view



Enclosure side view



Enclosure top view



Enclosure bottom view



Enclosure rear view



## Annex 2

### Test equipment list

**Test location: Bureau Veritas Shenzhen Co., Ltd. Dongguan Branch**  
**Dates of performance test: 2018-09-06 to 2018-10-24**

| Equipment                                         | Internal no.: | Manufacturer: | Type:            | Serial no.:   | Last calibration                  |
|---------------------------------------------------|---------------|---------------|------------------|---------------|-----------------------------------|
| Power Analyzer                                    | A4080002DG    | YOKOGAWA      | WT3000           | 91M210852     | Jan. 12, 2018                     |
| AC Source                                         | A7040019DG    | Chroma        | 61512            | 61512000439   | Monitored by<br>Power<br>Analyzer |
| AC Source                                         | A7040020DG    | Chroma        | 61512            | 61512000438   |                                   |
| DC Simulation<br>Power Supply                     | A7040015DG    | Chroma        | 62150H-<br>1000S | 62150EF00488  |                                   |
| DC Simulation<br>Power Supply                     | A7040016DG    | Chroma        | 62150H-<br>1000S | 62150EF00490  |                                   |
| DC Simulation<br>Power Supply                     | A7040017DG    | Chroma        | 620028           | 620028EF00120 |                                   |
| RLC Load                                          | A7150027DG    | Qunling       | ACLT-3803H       | 93VOO2869     |                                   |
| Eight Channel<br>Digital Phosphor<br>Oscilloscope | A4089017DG    | YOKOGAWA      | DL850            | 91N726247     | Sep. 07, 2018                     |
| Oscilloscope probel                               | A4089008DG    | Tektronix     | TPP1000          | C008230       | Dec. 14, 2017                     |
| Oscilloscope probel                               | A4089010DG    | Tektronix     | TPP1000          | C008228       | Dec. 15, 2017                     |
| Oscilloscope probel                               | A4089011DG    | Tektronix     | TPP1000          | C008229       | Dec. 15, 2017                     |
| Current transducer                                | A1060007DG    | YOKOGAWA      | CT200            | 1130700012    | Nov. 28, 2017                     |
| Current transducer                                | A1060008DG    | YOKOGAWA      | CT200            | 1130700017    | Nov. 22, 2017                     |
| Current transducer                                | A1060012DG    | YOKOGAWA      | CT200            | 1130700018    | Nov. 22, 2017                     |