# Certificate of compliance

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|---|---|
| **Certificate No.:** | **2088AP200709N028001** |
| **Equipment:** | **SOLAR INVERTER** |
| **Brand Name:** | **HUAWEI** |
| **Model:** | **SUN2000-2KTL-L1, SUN2000-3KTL-L1, SUN2000-3.6KTL-L1, SUN2000-4KTL-L1, SUN2000-4.6KTL-L1, SUN2000-5KTL-L1, SUN2000-6KTL-L1.** |
| **Applicant:** | **Huawei Technologies Co., Ltd.** Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C |
| **Report No.:** | **PVSP200709N028** |

**Applied rules and standards**

**UNE 217001 IN:2015**

Requirements and testing of systems to avoid energy emissions to distribution networks
Royal Decree No. 244 / 2019 of 5 April sets out the administrative, technical and economic conditions for self generation. Annex I: systems to prevent energy emissions to the network.

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**Technical Manager / New Energy Team**
**Date: 2020-08-25**

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| **Model..... :** | **SUN2000-2KTL-L1** | **SUN2000-3KTL-L1** | **SUN2000-3.68KTL-L1** |
|---|---|---|---|
| Input DC voltage [V] ..... : | Max.600 | | |
| MPP DC voltage range [V] ..... : | 90-560 | | |
| Input DC current [A]..... : | 12.5 / 12.5 | | |
| Isc PV [A]..... : | 18 / 18 | | |
| Output AC voltage [V]..... : | 230Vac, L/N/ PE, 50Hz | | |
| Output AC current [A] ..... : | 10 | 15 | 16 |
| Nominal Output power [kVA] ..... : | 2,0 | 3,0 | 3,68 |
| Maximum Output power [kVA]..... : | 2,2 | 3,3 | 3,68 |
| Battery input voltage [V] ..... : | 600V Max. | | |
| Battery current [A]..... : | 15A Max. | | |

| **Model..... :** | **SUN2000-4KTL-L1** | **SUN2000-4.6KTL-L1** |
|---|---|---|
| Input DC voltage [V] ..... : | Max.600 | |
| MPP DC voltage range [V] ..... : | 90-560 | |
| Input DC current [A]..... : | 12,5 / 12,5 | |
| Isc PV [A]..... : | 18 / 18 | |
| Output AC voltage [V]..... : | 230Vac, L/N/ PE, 50Hz | |
| Output AC current [A] ..... : | 20 | 23 |
| Nominal Output power [kVA] ..... : | 4,0 | 4,6 |
| Maximum Output power [kVA]..... : | 4,4 | 5,0 |
| Battery input voltage [V] ..... : | 600V Max. | |
| Battery current [A]..... : | 15A Max. | |

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| **Model..... :** | **SUN2000-5KTL-L1** | **SUN2000-6KTL-L1** |
|---|---|---|
| Input DC voltage [V] ..... : | Max.600 | |
| MPP DC voltage range [V] ..... : | 90-560 | |
| Input DC current [A]..... : | 12,5 / 12,5 | |
| Isc PV [A]..... : | 18 / 18 | |
| Output AC voltage [V]..... : | 230Vac, L/N/ PE, 50Hz | |
| Output AC current [A] ..... : | 25 | 27,3 |
| Nominal Output power [kVA] ..... : | 5,0 | 6,0 |
| Maximum Output power [kVA]..... : | 5,5 | 6,0 |
| Battery input voltage [V] ..... : | 600V Max. | |
| Battery current [A]..... : | 15A Max. | |

| **General information of external current transductor/ power meter** | |
|---|---|
| **Power meter** | |
| **Model ..... :** | **DDSU666-H** |
| **Electrical parameter** | |
| Regulated working voltage range Phase to neutral [Vac] ..... : | 176Vac-288Vac |
| Support network Single Phase / three Phase..... : | Single Phase |
| self -consumption ..... : | ≤ 1.5 W / 6 VA |
| Power consumption of current ..... : | ≤ 1 VA |
| **communication** | |
| Supported communication interfaces ..... : | RS485 |
| Communication protocol..... : | Modbus |
| Reaction time..... : | ≤1 s |

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| **General information of external current transductor/ power meter** | |
|---|---|
| **Current transducer** | |
| **Model..... :** | **SCT-16 100A/40mA 0.5 20Ω** |
| Rated Frequency..... : | 50/60 Hz |
| Rated primary current Ipr..... : | 100 A |
| Rated current ratio N..... : | 2500:1 |
| Rated load Rb..... : | 20Ω |
| Accuracy level..... : | 0.5 |
| Error limits..... : | Current error (ratio difference) ≤0,5%,Phase error (angular difference) at 1% to 120% of rated current ±0.25 degrees |
| AC withstand voltage ..... : | Power frequency voltage 3KV/min between primary winding and secondary winding, no breakdown and arc Phenomenon, leakage current < 1mA |
| Insulation resistance ..... : | Between primary winding and secondary winding ≥ 500 MΩ/500 Vdc |
| Operating temperature and humidity range ..... : | -40˚c to 70˚c, 95%rh or less (with no condensation) |
| IEEE C57.13 accuracy..... : | class 0.6 from 1% to 120% of rated current |
| IEC 60044-1 accuracy ..... : | class 0.5 from 1% to 120% of rated current |

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**Description of the vector system to depict test results:**

The regarded system of the voltage and current vectors is the generator reference system:

- If the inverter feeds to the grid the active power is measured with positive sign.
- If the load consumes from grid the active power is measured with negative sign.

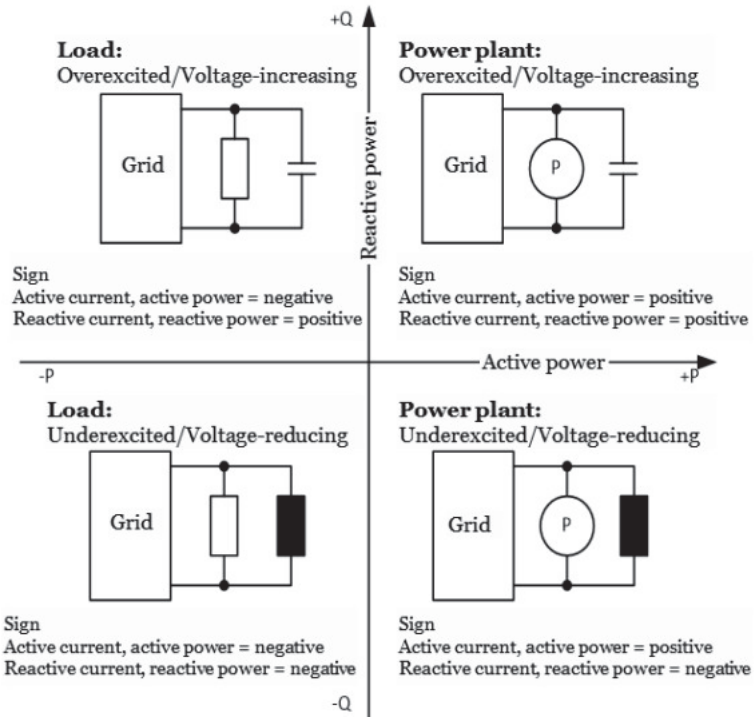


**Figure 1 – Generator reference arrow system**

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**General product information:**

The Solar converter converts DC voltage into AC voltage.

The DC input of Solar converter can be supplied from PV array and Batteries.

The charging current to batteries from PV array and power grid, battery management unit is integrated in External Energy storage.

The Solar converter is a single-phase type.

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**

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

The Main DSP (U3) can control the relays, measures voltage, and frequency, AC current with injected DC, insulation resistance and residual current, In addition it tests the array insulation resistance and the RCMU circuit before each start up.

The slave DSP (U33) is using for detect residual current, also can open the relays independently and communicate with Main DSP (U3).

The unit provides two relays in series on Line and Neutral 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 start up. Both controllers(Main DSP (U3), Slave DSP (U33) can open the relays.

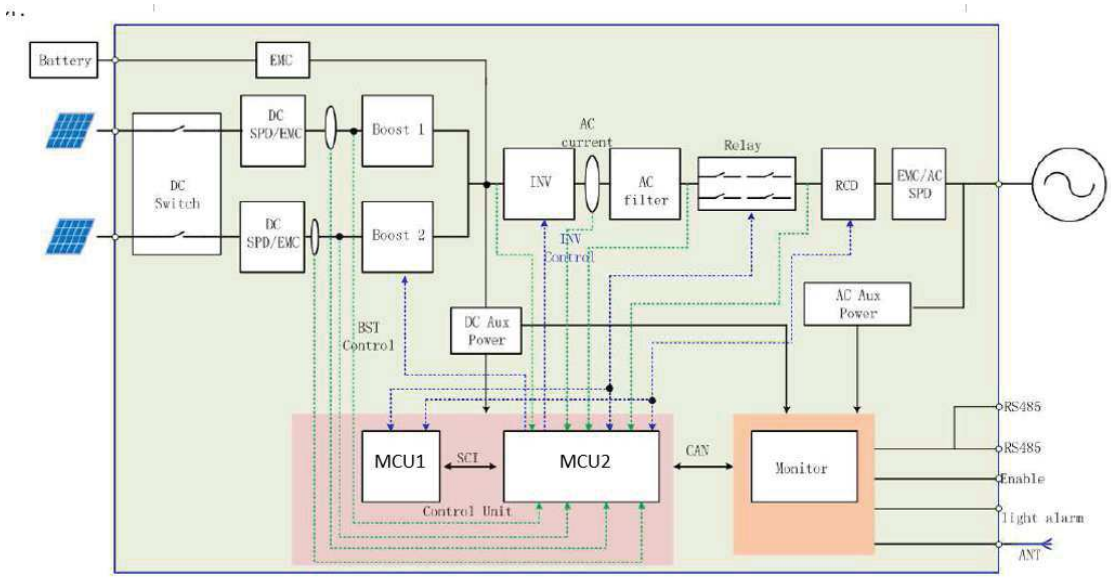


**Figure 2 – Block diagram**

## Application Scenarios

Scenario 1 *Stand-alone operation*: Solar inverter + smart power sensor + current sensor.

The smart power sensor is used to realize power restriction for household energy management. It adopts RS485 communication, which can realize the electrical quantity measurement, energy metering function and in respond to the upper host for the real-time data query.

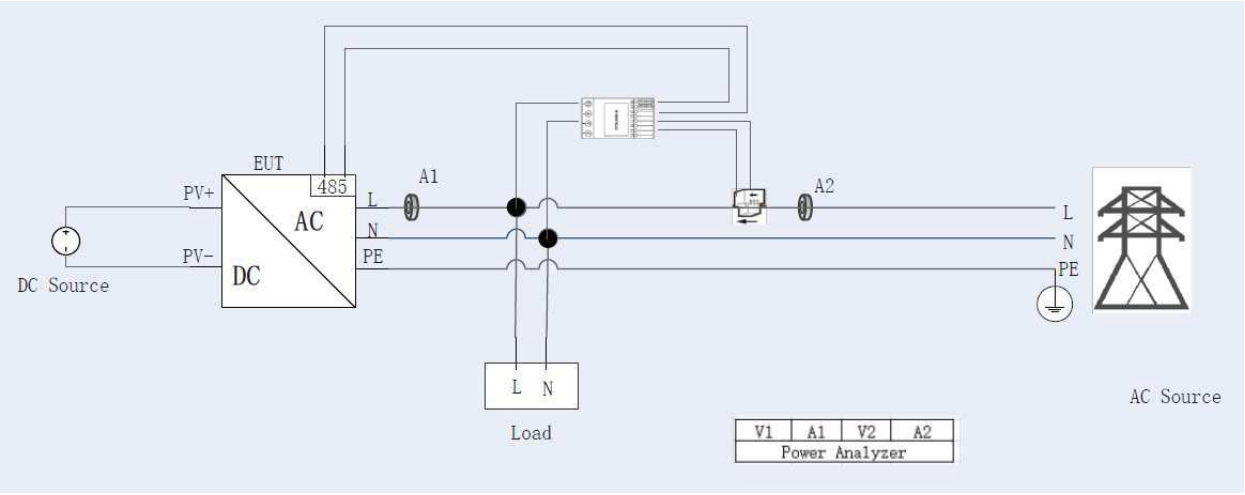


**Figure 3 –Scheme of stand-alone operation**

Scenario 2 *Parallel operation*: 2xSolar inverter + SmartLogger + smart power sensor + current sensor

SUN2000 system in parallel can be connected to the Smart Logger (data collector) via RS485 communication. The smart power sensor can be connected to the Smart Logger via RS485 communication for active power control.

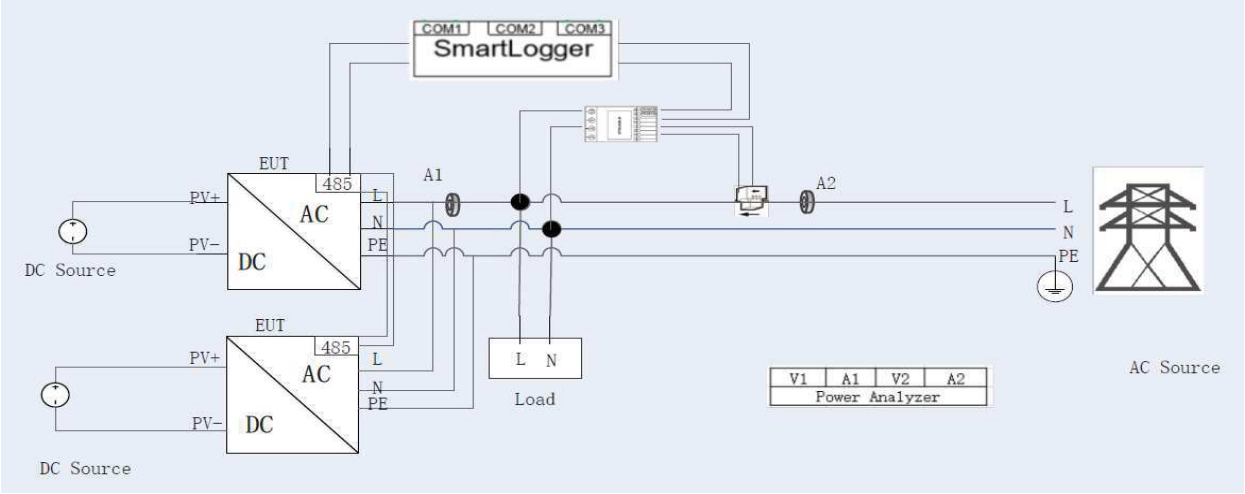


**Figure 4 –Scheme of parallel operation**