COTEK


# *SPT Series User's Manual*

**EN**
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SPT1200/2000/3000
PURE SINE WAVE INVERTER

# Table of Contents

EN

# 1. SAFETY INSTRUCTIONS

## 1-1. General Safety Precautions

**Warning!** Before using the Inverter, read the safety instructions.

- Do not expose the inverter to rain, snow, spray or dust. To reduce the risk of fire hazard, do not cover or obstruct the ventilation openings and do not install the inverter in a zero-clearance compartment.
- To avoid the risk of fire and electric shock, make sure that the existing wiring is in good electrical condition, and the wire size is not undersized.
- This equipment contains components which can produce arcs or sparks. To prevent fire or explosion do not install in compartment containing batteries or flammable materials or in location which require ignition protected equipment. This includes any space containing gasoline-powered machinery, fuel tanks, or joints, fittings, or other connection between components of the fuel system.
- Depending on the user scenario, the AC output of the inverter may require user installed breaker or fuse. In AC output hardwire application, AC socket will not be provided. The inverter incorporates standard AC short circuit protection.
- An over current protection at the time of installation shall be provided by others for the AC output circuit.
- The following precautions should be taken when working on the inverter：
  Step 1: Remove watches, rings, or other metal objects
  Step 2: Use tools with insulated handles
  Step 3: Wear rubber gloves and boots

## 1-2. Other Safety Notes

- Upon receipt, examine the carton box for damage. If you have found any damage on the carton box please notify the company you purchased this unit from.
- Do not operate near water or in excessive humidity.
- Do not open or disassemble the inverter, and warranty may be voided.
- The DC side connections should be firm and tight.
- Grounding： Reliable grounding should be maintained.
- Do not drop a metal tool on the battery. The resulting spark or short-circuit on the battery or on the other electrical part may cause an explosion.
- Install the inverter in a well-ventilated area. Do not block the front air vents, or the rear air exhausts of the unit.
- Wiring： Adequate input power must be supplied to the inverter for proper use; correct wiring sizes must be ensured.
- Mount the inverter such that the fan axis is horizontal.
- Do not operate the inverter close to combustible gas or open fire.
- Do not operate appliances that may feed power back into the inverter.
- Temperature： The inverter should be operated in an ambient temperature range of -20℃ to 40℃ otherwise the output efficiency may be affected. Air flow to the inverter must not be blocked.

# 2. FUNCTIONAL CHARACTERISTICS INTRODUCTION

## 2-1. System

The unit is a highly reliable DC-AC inverter system, designed with advanced power electronic and microprocessor technology offering the following features：

- Pure sine wave output waveform O/P voltage ： THD < 3 %
- Built-in AC power and inverter automatic transfer switch
- Energy-saving mode can be set
- Flexible output frequency and voltage settings
- 2-second double power output
- Load- and temperature-controlled cooling fan
- CR-8T / CR-22 remote management and control
- RS-485(Modbus) communication
- Dry contact terminal
- Advanced Protection Features
  - Input over/under voltage protection
  - Internal over temperature protection
  - Input reverse polarity protection
  - Output overload protection
  - Output short circuit protection

## 2-2. Block Diagram

## 2-3. Electrical Specification

2-3-1. SPT Series Specification

| Electrical | Item | SPT-1200-112 | SPT-1200-124 |
|---|---|---|---|
| | **Rated Power** | **1200VA** | |
| DC Input (Battery) | Rated input voltage | 12.5 VDC | 25.0 VDC |
| | Operation range | 10.0~16.5 ±0.3VDC | 20.0~33.0 ±0.3VDC |
| | Over voltage protection | > 16.5 ±0.3VDC | > 33.0 ±0.3VDC |
| | Over voltage warning | > 15.5 ±0.3VDC | > 31.0 ±0.3VDC |
| | Under voltage protection | < 10.0 ±0.3VDC | < 20.0 ±0.3VDC |
| | Under voltage warning | < 11.0 ±0.3VDC | < 22.0 ±0.3VDC |
| | Over voltage restart | < 12.5 ±0.3VDC | < 25.0 ±0.3VDC |
| | Under voltage restart | > 13.5 ±0.3VDC | > 27.0 ±0.3VDC |
| | Max. Input current (@ ON mode , Full load) | 133A @10.5VDC | 65A @21.0VDC |
| | Standby Current (@ ON mode , No load) | ≤ 1.8 A @12.5VDC | ≤ 0.9 A @25.0VDC |
| | Saving current (@ Saving mode , No load) | < 0.1 A @12.5VDC | < 0.06 A @25.0VDC |
| | Dark current (@ OFF mode) | < 100uA | |
| AC Output (Inverter or Grid) | INV. Overload (≤ 1 min.) | 1201 ~ 1440VA | |
| | INV. Peak Power (≤ 3 sec.) | 1441 ~ 2400VA | |
| | INV. Peak Power (≤ 2 sec.) | > 2400VA | |
| | INV. Output Frequency | 60/50Hz ±0.3Hz (User-selectable) | |
| | INV. Output Voltage | UL version：120 VAC ±3%<br>Non UL version：100 / 110 / 115 / 120 VAC ±3% (User-selectable) | |
| | INV. Max. Efficiency | 91% | 92% |
| | Output Waveform | Pure Sine Wave | |
| | Total Harmonic Distortion of Voltage (THD V) | < 3% (Bat. 12.5V / 25.0V @Resistive load) | |
| AC input | Nominal Voltage / Frequency | 120VAC, 60/50Hz (User-selectable) | |

| | | |
|---|---|---|
| (Grid) | Voltage Range | 70-150VAC |
| | Frequency Range | 60/50Hz ±3Hz |
| | Nominal current | 24A |
| Transfer switch | Transfer relay rating | 40A continuous |
| | Transfer Time | ≤ 20ms |
| Protection | DC Input Protection | OVP, UVP, OCP(fuse),<br>Reverse Polarity (mosfet) |
| | AC Output Protection | Short-Circuit, Overload, Misconnection |
| | AC Input Protection | OVP, OCP<br>(30A breaker @ automatic reset type) |
| | Temperature protection | OTP<br>(Enable by heatsink temperature > 95°C) |
| Signal and Control | Remote Control Panel (Optional) | CR-8T / CR-22 (112 only) |
| | Communication port | RJ45 x 2 |
| | Dry Terminal | ENB+, ENB-, GND, COM, N/C, N/O |
| Operating Temperature Range | Full Load | -20 ~ +40°C |
| | Power de-rating | +41 ~ +60°C (refer to 2-3-2) |
| | Storage | -40 ~ +70°C |
| | Operating Humidity Range | 0 ~ 95% RH, non-condensing |
| | Cooling | Temperature & Load Controlled Cooling Fan |
| Mechanical Specification | Dimension W x H x D (mm) | 227 x 86 x 332 |
| | Net Weight (kg) | 3.4 |
| Safety and EMC | Safety Standards | Certified UL458 |
| | EMC Standards | Certified FCC Class B |

***Table 1. SPT-1200-112/124 Specification.***

| Electrical | Item | SPT-2000-112 | SPT-2000-124 |
|---|---|---|---|
| | **Rated Power** | **2000VA** | |
| DC Input (Battery) | Rated input voltage | 12.5 VDC | 25.0 VDC |
| | Operation range | 10.0~16.5 ±0.3VDC | 20.0~33.0 ±0.3VDC |
| | Over voltage protection | > 16.5 ±0.3VDC | > 33.0 ±0.3VDC |
| | Over voltage warning | > 15.5 ±0.3VDC | > 31.0 ±0.3VDC |
| | Under voltage protection | < 10.0 ±0.3VDC | < 20.0 ±0.3VDC |
| | Under voltage warning | < 11.0 ±0.3VDC | < 22.0 ±0.3VDC |
| | Over voltage restart | < 12.5 ±0.3VDC | < 25.0 ±0.3VDC |
| | Under voltage restart | > 13.5 ±0.3VDC | > 27.0 ±0.3VDC |
| | Max. Input current (@ ON mode , Full load) | 220A @10.5VDC | 107A @21.0VDC |
| | Standby Current (@ ON mode , No load) | ≤ 2.0 A @12.5VDC | ≤ 1.0 A @25.0VDC |
| | Saving current (@ Saving mode , No load) | < 0.1 A @12.5VDC | < 0.06 A @25.0VDC |
| | Dark current (@ OFF mode) | < 100uA | |
| AC Output (Inverter or Grid) | INV. Overload (≤ 1 min.) | 2001 ~ 2400VA | |
| | INV. Peak Power (≤ 3 sec.) | 2401 ~ 4000VA | |
| | INV. Peak Power (≤ 2 sec.) | > 4000VA | |
| | INV. Output Frequency | $60/_{50}$Hz ± 0.3Hz (User-selectable) | |
| | INV. Output Voltage | UL version：120 VAC ±3%<br>Non UL version：100 / 110 / 115 / 120 VAC ±3% (User-selectable) | |
| | INV. Max. Efficiency | 91% | 92% |
| | Output Waveform | Pure Sine Wave | |
| | Total Harmonic Distortion of Voltage (THD V) | < 3% (Bat. 12.5V / 25.0V @Resistive load) | |
| AC input (Grid) | Nominal Voltage / Frequency | 120VAC, $60/_{50}$Hz (User-selectable) | |
| | Voltage Range | 70-150VAC | |
| | Frequency Range | $60/_{50}$Hz ±3Hz | |

| | | |
|---|---|---|
| | Nominal current | 24A |
| Transfer switch | Transfer relay rating | 40A continuous |
| | Transfer Time | ≤ 20ms |
| Protection | DC Input Protection | OVP, UVP, OCP(fuse),<br>Reverse Polarity (mosfet) |
| | AC Output Protection | Short-Circuit, Overload, Misconnection |
| | AC Input Protection | OVP, OCP<br>(30A breaker @ automatic reset type) |
| | Temperature protection | OTP<br>(Enable by heatsink temperature > 95°C) |
| Signal and Control | Remote Control Panel (Optional) | CR-8T / CR-22 (112 only) |
| | Communication port | RJ45 x 2 |
| | Dry Terminal | ENB+, ENB-, GND, COM, N/C, N/O |
| Operating Temperature Range | Full Load | -20 ~ +40°C |
| | Power de-rating | +41 ~ +60°C (refer to 2-3-2) |
| | Storage | -40 ~ +70°C |
| | Operating Humidity Range | 0 ~ 95% RH, non-condensing |
| | Cooling | Temperature & Load Controlled Cooling Fan |
| Mechanical Specification | Dimension W x H x D (mm) | 253 x 86 x 366 |
| | Net Weight (kg) | 4.4 |
| Safety and EMC | Safety Standards | Certified UL458 |
| | EMC Standards | Certified FCC Class B |

***Table 2. SPT-2000-112/124 Specification.***

| Electrical | Item | SPT-3000-112 | SPT-3000-124 |
|---|---|---|---|
| | **Rated Power** | **3000VA** | |
| DC input (Battery) | Rated input voltage | 12.5 VDC | 25.0 VDC |
| | Operation range | 10.0~16.5 ±0.3VDC | 20.0~33.0 ±0.3VDC |
| | Over voltage protection | > 16.5 ±0.3VDC | > 33.0 ±0.3VDC |
| | Over voltage warning | > 15.5 ±0.3VDC | > 31.0 ±0.3VDC |
| | Under voltage protection | < 10.0 ±0.3VDC | < 20.0 ±0.3VDC |
| | Under voltage warning | < 11.0 ±0.3VDC | < 22.0 ±0.3VDC |
| | Over voltage restart | < 12.5 ±0.3VDC | < 25.0 ±0.3VDC |
| | Under voltage restart | > 13.5 ±0.3VDC | > 27.0 ±0.3VDC |
| | Max. Input current (@ ON mode , Full load) | 330A @10.5VDC | 161A @21.0VDC |
| | Standby Current (@ ON mode , No load) | ≤ 2.8 A @12.5VDC | ≤ 1.4 A @25.0VDC |
| | Saving current (@ Saving mode , No load) | < 0.1 A @12.5VDC | < 0.1 A @25.0VDC |
| | Dark current (@ OFF mode) | < 100uA | |
| AC Output (Inverter or Grid) | INV. Overload (≤ 1 min.) | 3001 ~ 3600VA | |
| | INV. Peak Power (≤ 3 sec.) | 3601 ~ 6000VA | |
| | INV. Peak Power (≤ 2 sec.) | > 6000VA | |
| | INV. Output Frequency | $60/_{50}$Hz ± 0.3Hz (User-selectable) | |
| | INV. Output Voltage | UL version：120 VAC ±3%<br>Non UL version：100 / 110 / 115 / 120 VAC ±3% (User-selectable) | |
| | INV. Max. Efficiency | 91% | 92% |
| | Output Waveform | Pure Sine Wave | |
| | Total Harmonic Distortion of Voltage (THD V) | < 3% (Bat. 12.5V / 25.0V @Resistive load) | |
| AC input (Grid) | Nominal Voltage / Frequency | 120VAC, $60/_{50}$Hz (User-selectable) | |
| | Voltage Range | 70-150VAC | |
| | Frequency Range | $60/_{50}$Hz ±3Hz | |

| | | |
|---|---|---|
| | Nominal current | 24A |
| Transfer switch | Transfer relay rating | 40A continuous |
| | Transfer Time | ≤ 20ms |
| Protection | DC Input Protection | OVP, UVP, OCP(fuse),<br>Reverse Polarity (mosfet) |
| | AC Output Protection | Short-Circuit, Overload, Misconnection |
| | AC Input Protection | OVP, OCP<br>(30A breaker @ automatic reset type) |
| | Temperature protection | OTP<br>(Enable by heatsink temperature > 95°C) |
| Signal and Control | Remote Control Panel (Optional) | CR-8T / CR-22 (112 only) |
| | Communication port | RJ45 x 2 |
| | Dry Terminal | ENB+, ENB-, GND, COM, N/C, N/O |
| Operating Temperature Range | Full Load | -20 ~ +40°C |
| | Power de-rating | +41 ~ +60°C (refer to 2-3-2) |
| | Storage | -40 ~ +70°C |
| | Operating Humidity Range | 0 ~ 95% RH, non-condensing |
| | Cooling | Temperature & Load Controlled Cooling Fan |
| Mechanical Specification | Dimension W x H x D (mm) | 290 x 102 x 408 |
| | Net Weight (kg) | 6.5 |
| Safety and EMC | Safety Standards | Certified UL458 |
| | EMC Standards | Certified FCC Class A |

***Table 3. SPT-3000-112/124 Specification.***

| Electrical | Item | SPT-1200-212 | SPT-1200-224 |
|---|---|---|---|
| | **Rated Power** | **1200VA** | |
| DC Input (Battery) | Rated input voltage | 12.5 VDC | 25.0 VDC |
| | Operation range | 10.0~16.5 ±0.3VDC | 20.0~33.0 ±0.3VDC |
| | Over voltage protection | > 16.5 ±0.3VDC | > 33.0 ±0.3VDC |
| | Over voltage warning | > 15.5 ±0.3VDC | > 31.0 ±0.3VDC |
| | Under voltage protection | < 10.0 ±0.3VDC | < 20.0 ±0.3VDC |
| | Under voltage warning | < 11.0 ±0.3VDC | < 22.0 ±0.3VDC |
| | Over voltage restart | < 12.5 ±0.3VDC | < 25.0 ±0.3VDC |
| | Under voltage restart | > 13.5 ±0.3VDC | > 27.0 ±0.3VDC |
| | Max. Input current (@ ON mode , Full load) | 133A @10.5VDC | 65A @21.0VDC |
| | Standby Current (@ ON mode , No load) | ≤ 1.8 A @12.5VDC | ≤ 0.9 A @25.0VDC |
| | Saving current (@ Saving mode , No load) | < 0.1 A @12.5VDC | < 0.06 A @25.0VDC |
| | Dark current (@ OFF mode) | < 100uA | |
| AC Output (Inverter or Grid) | INV. Overload (≤ 1 min.) | 1201 ~ 1440VA | |
| | INV. Peak Power (≤ 3 sec.) | 1441 ~ 2400VA | |
| | INV. Peak Power (≤ 2 sec.) | > 2400VA | |
| | INV. Output Frequency | $50/_{60}$Hz ±0.3Hz (User-selectable) | |
| | INV. Output Voltage | 200 / 220 / 230 / 240 VAC ±3% | |
| | INV. Max. Efficiency | 91% | 92% |
| | Output Waveform | Pure Sine Wave | |
| | Total Harmonic Distortion of Voltage (THD V) | < 3% (Bat. 12.5V / 25.0V @230VAC, Resistive load) | |
| AC input (Grid) | Nominal Voltage / Frequency | 230VAC, $50/_{60}$Hz (User-selectable) | |
| | Voltage Range | 150-277VAC | |
| | Frequency Range | $50/_{60}$Hz ±3Hz | |
| | Nominal current | 10A | |

| | | |
|---|---|---|
| Transfer switch | Transfer relay rating | 40A continuous |
| | Transfer Time | ≤ 20ms |
| Protection | DC Input Protection | OVP, UVP, OCP(fuse),<br>Reverse Polarity (mosfet) |
| | AC Output Protection | Short-Circuit, Overload, Misconnection |
| | AC Input Protection | OVP, OCP<br>(20A breaker @ automatic reset type) |
| | Temperature protection | OTP<br>(Enable by heatsink temperature > 95°C) |
| Signal and Control | Remote Control Panel (Optional) | CR-8T |
| | Communication port | RJ45 x 2 |
| | Dry Terminal | ENB+, ENB-, GND, COM, N/C, N/O |
| Operating Temperature Range | Full Load | -20 ~ +40°C |
| | Power de-rating | +41 ~ +60°C (refer to 2-3-2) |
| | Storage | -40 ~ +70°C |
| | Operating Humidity Range | 0 ~ 95% RH, non-condensing |
| | Cooling | Temperature & Load Controlled Cooling Fan |
| Mechanical Specification | Dimension W x H x D (mm) | 227 x 86 x 332 |
| | Net Weight (kg) | 3.4 |
| Safety and EMC | Safety Standards | Certified CE EN 62368-1 |
| | EMC Standards | Certified EN 55032 Class B<br>Certified EN 55035 |
| | E-mark | Certified ECE R10 |

***Table 4. SPT-1200-212/224 Specification***

| Electrical | Item | SPT-2000-212 | SPT-2000-224 |
|---|---|---|---|
| | **Rated Power** | **2000VA** | |
| DC Input (Battery) | Rated input voltage | 12.5 VDC | 25.0 VDC |
| | Operation range | 10.0~16.5 ±0.3VDC | 20.0~33.0 ±0.3VDC |
| | Over voltage protection | > 16.5 ±0.3VDC | > 33.0 ±0.3VDC |
| | Over voltage warning | > 15.5 ±0.3VDC | > 31.0 ±0.3VDC |
| | Under voltage protection | < 10.0 ±0.3VDC | < 20.0 ±0.3VDC |
| | Under voltage warning | < 11.0 ±0.3VDC | < 22.0 ±0.3VDC |
| | Over voltage restart | < 12.5 ±0.3VDC | < 25.0 ±0.3VDC |
| | Under voltage restart | > 13.5 ±0.3VDC | > 27.0 ±0.3VDC |
| | Max. Input current (@ ON mode , Full load) | 220A @10.5VDC | 107A @21.0VDC |
| | Standby Current (@ ON mode , No load) | ≤ 2.0 A @12.5VDC | ≤ 1.0 A @25.0VDC |
| | Saving current (@ Saving mode , No load) | < 0.1 A @12.5VDC | < 0.06 A @25.0VDC |
| | Dark current (@ OFF mode) | < 100uA | |
| AC Output (Inverter or Grid) | INV. Overload (≤ 1 min.) | 2001 ~ 2400VA | |
| | INV. Peak Power (≤ 3 sec.) | 2401 ~ 4000VA | |
| | INV. Peak Power (≤ 2 sec.) | > 4000VA | |
| | INV. Output Frequency | $50/_{60}$Hz ±0.3Hz (User-selectable) | |
| | INV. Output Voltage | 200 / 220 / 230 / 240 VAC ±3% | |
| | INV. Max. Efficiency | 91% | 92% |
| | Output Waveform | Pure Sine Wave | |
| | Total Harmonic Distortion of Voltage (THD V) | < 3% (Bat. 12.5V / 25.0V @230VAC, Resistive load) | |
| AC input (Grid) | Nominal Voltage / Frequency | 230VAC, $50/_{60}$Hz (User-selectable) | |
| | Voltage Range | 150-277VAC | |
| | Frequency Range | $50/_{60}$Hz ±3Hz | |
| | Nominal current | 10A | |

| | | |
|---|---|---|
| Transfer switch | Transfer relay rating | 40A continuous |
| | Transfer Time | ≤ 20ms |
| Protection | DC Input Protection | OVP, UVP, OCP(fuse),<br>Reverse Polarity (mosfet) |
| | AC Output Protection | Short-Circuit, Overload, Misconnection |
| | AC Input Protection | OVP, OCP<br>(20A breaker @ automatic reset type) |
| | Temperature protection | OTP<br>(Enable by heatsink temperature > 95°C) |
| Signal and Control | Remote Control Panel (Optional) | CR-8T |
| | Communication port | RJ45 x 2 |
| | Dry Terminal | ENB+, ENB-, GND, COM, N/C, N/O |
| Operating Temperature Range | Full Load | -20 ~ +40°C |
| | Power de-rating | +41 ~ +60°C (refer to 2-3-2) |
| | Storage | -40 ~ +70°C |
| | Operating Humidity Range | 0 ~ 95% RH, non-condensing |
| | Cooling | Temperature & Load Controlled Cooling Fan |
| Mechanical Specification | Dimension W x H x D (mm) | 253 x 86 x 366 |
| | Net Weight (kg) | 4.4 |
| Safety and EMC | Safety Standards | Certified CE EN 62368-1 |
| | EMC Standards | Certified EN 55032 Class B<br>Certified EN 55035 |
| | E-mark | Certified ECE R10 |

***Table 5. SPT-2000-212/224 Specification.***

| Electrical | Item | SPT-3000-212 | SPT-3000-224 |
|---|---|---|---|
| | **Rated Power** | **3000VA** | |
| DC Input (Battery) | Rated input voltage | 12.5 VDC | 25.0 VDC |
| | Operation range | 10.0~16.5 ±0.3VDC | 20.0~33.0 ±0.3VDC |
| | Over voltage protection | > 16.5 ±0.3VDC | > 33.0 ±0.3VDC |
| | Over voltage warning | > 15.5 ±0.3VDC | > 31.0 ±0.3VDC |
| | Under voltage protection | < 10.0 ±0.3VDC | < 20.0 ±0.3VDC |
| | Under voltage warning | < 11.0 ±0.3VDC | < 22.0 ±0.3VDC |
| | Over voltage restart | < 12.5 ±0.3VDC | < 25.0 ±0.3VDC |
| | Under voltage restart | > 13.5 ±0.3VDC | > 27.0 ±0.3VDC |
| | Max. Input current (@ ON mode , Full load) | 330A @10.5VDC | 161A @21.0VDC |
| | Standby Current (@ ON mode , No load) | ≤ 2.8 A @12.5VDC | ≤ 1.4 A @25.0VDC |
| | Saving current (@ Saving mode , No load) | < 0.1 A @12.5VDC | < 0.06 A @25.0VDC |
| | Dark current (@ OFF mode) | < 100uA | |
| AC Output (Inverter or Grid) | INV. Overload (≤ 1 min.) | 3001 ~ 3600VA | |
| | INV. Peak Power (≤ 3 sec.) | 3601 ~ 6000VA | |
| | INV. Peak Power (≤ 2 sec.) | > 6000VA | |
| | INV. Output Frequency | $50/_{60}$Hz ±0.3Hz (User-selectable) | |
| | INV. Output Voltage | 200 / 220 / 230 / 240 VAC ±3% | |
| | INV. Max. Efficiency | 91% | 92% |
| | Output Waveform | Pure Sine Wave | |
| | Total Harmonic Distortion of Voltage (THD V) | < 3% (Bat. 12.5V / 25.0V @230VAC, Resistive load) | |
| AC input (Grid) | Nominal Voltage / Frequency | 230VAC, $50/_{60}$Hz (User-selectable) | |
| | Voltage Range | 150-277VAC | |
| | Frequency Range | $50/_{60}$Hz ±3Hz | |
| | Nominal current | 16A | |

| | | |
|---|---|---|
| Transfer switch | Transfer relay rating | 40A continuous |
| | Transfer Time | ≤ 20ms |
| Protection | DC Input Protection | OVP, UVP, OCP(fuse),<br>Reverse Polarity (mosfet) |
| | AC Output Protection | Short-Circuit, Overload, Misconnection |
| | AC Input Protection | OVP, OCP<br>(30A breaker @ automatic reset type) |
| | Temperature protection | OTP<br>(Enable by heatsink temperature > 95°C) |
| Signal and Control | Remote Control Panel (Optional) | CR-8T |
| | Communication port | RJ45 x 2 |
| | Dry Terminal | ENB+, ENB-, GND, COM, N/C, N/O |
| Operating Temperature Range | Full Load | -20 ~ +40°C |
| | Power de-rating | +41 ~ +60°C (refer to 2-3-2) |
| | Storage | -40 ~ +70°C |
| | Operating Humidity Range | 0 ~ 95% RH, non-condensing |
| | Cooling | Temperature & Load Controlled Cooling Fan |
| Mechanical Specification | Dimension W x H x D (mm) | 290 x 102 x 408 |
| | Net Weight (kg) | 6.5 |
| Safety and EMC | Safety Standards | Certified CE EN 62368-1 |
| | EMC Standards | Certified EN 55032 Class A<br>Certified EN 55035 |
| | E-mark | Certified ECE R10 |

***Table 6. SPT-3000-212/224 Specification.***

## 2-3-2. Power operating area and derating curve

### 2-3-2-1. Output power & Battery voltage operating area

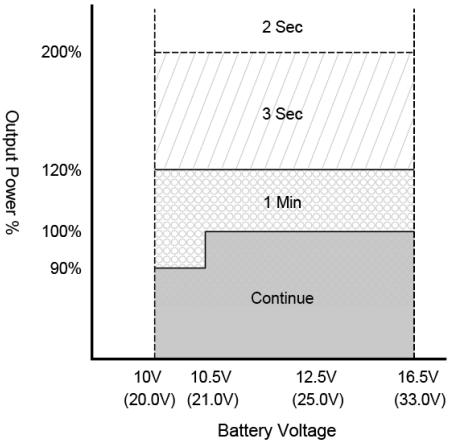



***Figure 1. Output power vs. Battery Voltage***

### 2-3-2-2. Output power & Ambient temperature derating curve

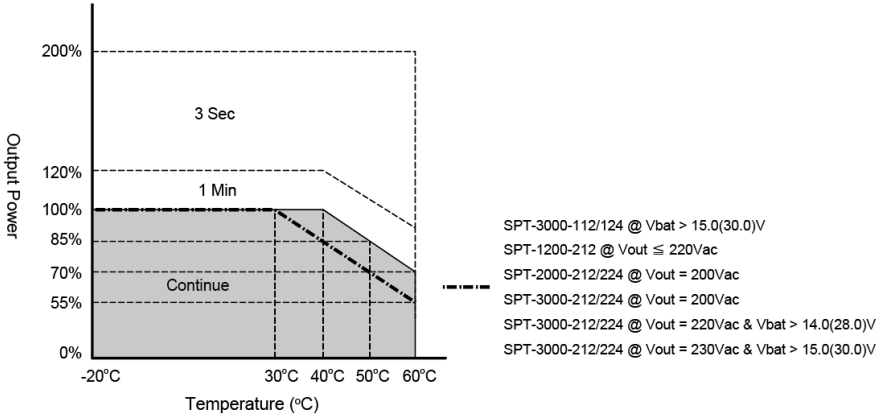



***Figure 2. Output power & Ambient temperature***

## 2-4. Mechanical Drawings

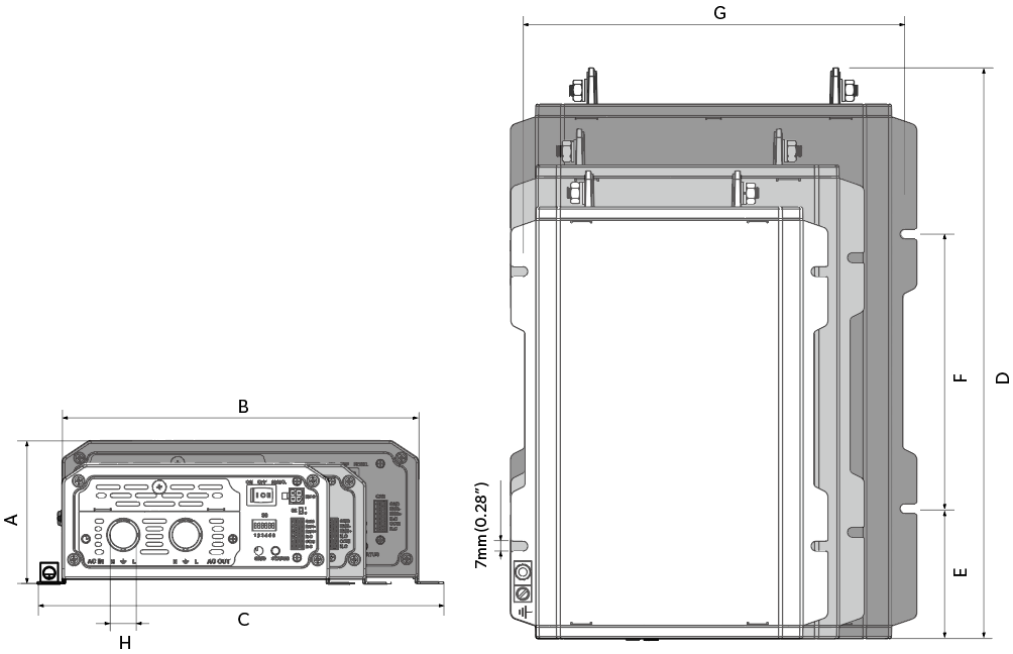



*Figure 3. SPT series drawing*

| Model | SPT-1200 | SPT-2000 | SPT-3000 |
|---|---|---|---|
| **A** | **86mm (3.37")** | **86mm (3.37")** | **102mm (4.02")** |
| **B** | 191mm (7.52") | 217mm (8.54") | 254.6mm (10.02") |
| **C** | **226.4mm (8.91")** | **253mm (9.96")** | **290mm (11.42")** |
| **D** | **332mm (13.07")** | **366mm (14.41")** | **408mm (16.06")** |
| **E** | 66mm (2.6") | 76mm (2.99") | 92.8mm (3.65") |
| **F** | 196mm (7.72") | 196mm (7.72") | 196mm (7.72") |
| **G** | 209.5mm (8.25") | 235.5mm (9.27") | 273mm (10.75") |
| **H** | 18.8mm (0.74") | 18.8mm (0.74") | 24mm (0.94") |

*Table 7. SPT Series Dimension*

# 3. INSTALLATION AND MAINTENANCE

## 3-1. AC Output Side (Front Panel) Introduction

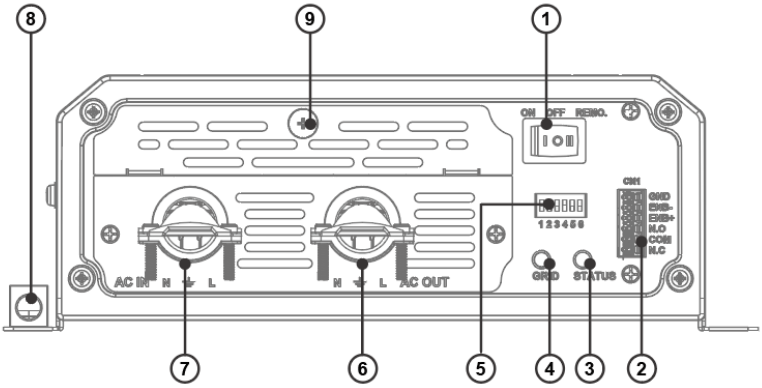



*Figure 4. SPT-1200/2000/3000 AC output panel view*

| Model | SPT-1200 / 2000 / 3000 |
|---|---|
| 1 | Main Switch (refer to 3-1-1) |
| 2 | Remote Black Terminal (ENB+/- & Dry contact) (refer to 3-1-2) |
| 3 | Unit Status LED (refer to 3-1-3) |
| 4 | AC Power Only Status LED (refer to 3-1-3) |
| 5 | Function Switch (6-Port) (refer to 3-1-4) |
| 6 | AC-OUT Terminal |
| 7 | AC-IN Terminal |
| 8 | Ground Lug |
| 9 | Panel Screw |

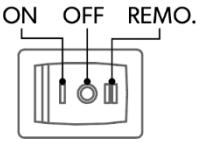
*Table 8. SPT Series AC output side introduction*

**Note：When the main switch is switched to REMO mode, only the CR-8T, CR-22, or Black Terminal (ENB+ or ENB-) can be used .**

3-1-1. Main Switch

Set the main switch to the “ON”. The inverter will turn on and the Unit Status LED on. Set the main switch to the “OFF” The inverter stops and the status LED off.

Set to “REMOTE” if you wish to use remote/dry contact to power on/off




3-1-2. Remote Black Terminal

| Item | Description |
|---|---|
| 1 | Ground (GND) |
| 2 | Enable- (ENB-) |
| 3 | Enable+ (ENB+) |
| 4 | Dry contact (Normal Open) |
| 5 | Common |
| 6 | Dry contact (Normal Closed) |

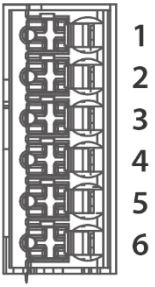



*Table 9. CN1 Black Terminal introduction*

**Note：Use 20 ~ 24 #AWG wire to connect the black terminal.**

**Stripping Length ： 8~9mm.**

3-1-2-1 Wiring for remote control ON/OFF

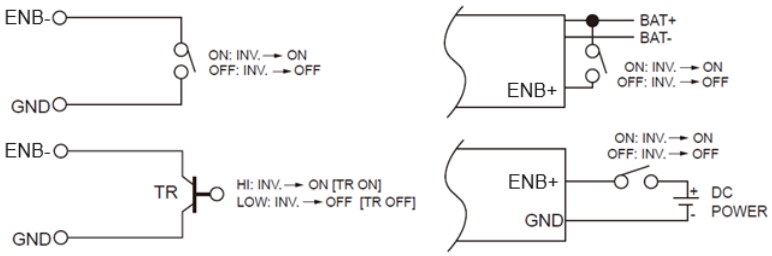



*Figure 5. Wiring for remote control ON/FF*

3-1-2-2 Dry contact specifications

| Maximum Voltage | Load | Contact Rating | | Number of operations | Operating/Storage Temperature |
|---|---|---|---|---|---|
| | | N.O | N.C | | |
| 125 VAC | Resistive | 0.5 A | --- | 100,000 | -40℃~85℃ |
| 125 VAC | Resistive | --- | 0.5 A | --- | |
| 30 VDC | Resistive | 2 A | --- | 100,000 | |
| 30 VDC | Resistive | --- | 2A | --- | |

*Table 10. Specifications of the Dry contact (Relay)*

3-1-3. Unit Status LED & Grid Status LED

| Unit Status LED | LED Signal | Status |
|---|---|---|
| Solid Green | | Inverter mode |
| Slow Blink Green | | Bypass mode |
| Slow Blink Orange | | Bat. Over Voltage Alarm |
| Fast Blink Orange | | Bat. Under Voltage Alarm |
| Intermittent Blink Red | | Over Temperature Protection |
| Intermittent Blink Red | | Bat. OVP Shut down |
| Intermittent Blink Red | | Bat. UVP Shut down |
| Fast Blink Red | | Over Load Protection |
| Solid Red | | AC Output Misconnection Protection |
| **Grid status LED** | **LED Signal** | **Status** |
| Solid Blue | | Grid In |

*Table 11. Unit Status LED Indicator*

### 3-1-4. Function Switch – S1

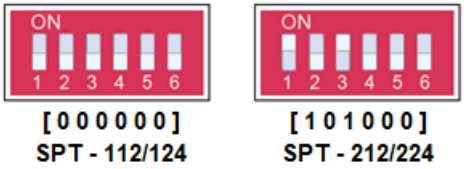



***Figure 6. DIP switch ON/OFF default position***

| s1 | s2 | s3 | s4 | s5 | s6 | Function Description |
|---|---|---|---|---|---|---|
| 0 | x | x | x | x | x | AC output frequency：60Hz |
| 1 | x | x | x | x | x | AC output frequency：50Hz |
| x | 0 | 0 | x | x | x | AC output voltage：120VAC/240VAC |
| x | 0 | 1 | x | x | x | AC output voltage：115VAC/230VAC |
| x | 1 | 0 | x | x | x | AC output voltage：110VAC/220VAC |
| x | 1 | 1 | x | x | x | AC output voltage：100VAC/200VAC |
| x | x | x | 0 | x | x | Power saving disable |
| x | x | x | 1 | x | x | Power saving enable |
| x | x | x | 1 | 0 | x | Power saving mode set to 5VA |
| x | x | x | 1 | 1 | x | Power saving mode set to 45VA |
| x | x | x | 1 | x | 0 | Power saving mode time out disable |
| x | x | x | 1 | x | 1 | Power saving mode time out (Default: 10min) |
| 0 | 0 | 0 | 0 | 0 | 0 | Ex1：120V(or 240V), 60Hz, Saving disable |
| 1 | 0 | 1 | 1 | 0 | 1 | Ex2：115V(or 230V), 50Hz, Saving enable, 5VA, 10min |

*1=ON / 0=OFF

***Table 12. DIP Switch set-up***

## 3-2. DC Input Side (Rear Panel) Introduction

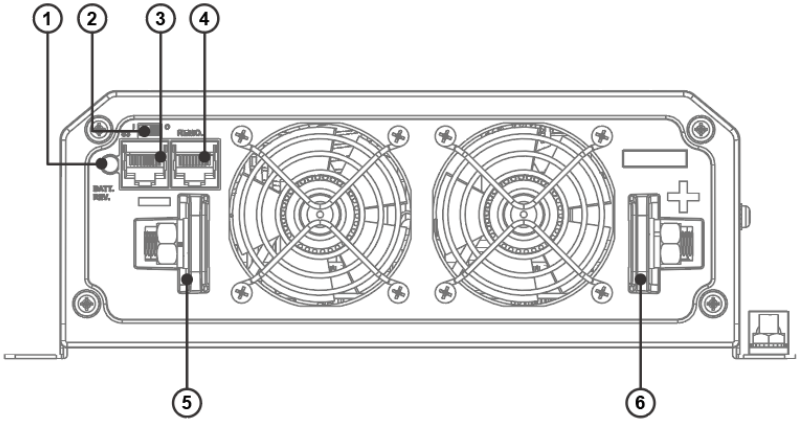



*Figure 7. SPT series rear panel*

| | |
|---|---|
| **1** | Battery in Reverse Status LED (refer to 3-2-1) |
| **2** | RS485 Terminator Switch (refer to 3-2-2) |
| **3** | Remote Port (RJ45) (refer to 3-2-3) |
| **4** | Remote Port (RJ45) (refer to 3-2-3) |
| **5** | Battery- Input Terminal<br>(Recommended torque value：120-130 kgf.cm [11.3-13N.m]) |
| **6** | Battery+ Input Terminal<br>(Recommended torque value：120-130 kgf.cm [11.3-13N.m]) |

*Table 13. SPT Series DC input side introduction*

### 3-2-1. Battery Power in Reverse Status LED Status

| Battery Power in Reverse Status LED | LED Signal | Status |
|---|---|---|
| Solid Red | | DC Reverse |

*Table 14. DC Reverse Status LED Status*

### 3-2-2. RS485 Terminator Switch (for Default OFF)

For the last connected, please slide the switch to the ON position for activating the terminating resistor.

### 3-2-3. Pin Definition for Remote Port (RJ-45)

| Pin Number | Signal Description | |
|---|---|---|
| **1** | Reserved | Not used |
| **2** | Reserved | Not used |
| **3** | Reserved | Not used |
| **4** | 485B | RS485 B signal |
| **5** | 485A | RS485 A signal |
| **6** | RMT | Remote controller panel ON/OFF enable pin (Close to the **positive** polarity of the battery) |
| **7** | 12VP | Internal power for remote controller |
| **8** | GND | The same polarity as the battery **negative** side |

***Table 15. Pin define for Remote Port***

## 3-3. Mounting Instruction

3-3-1. Wall Mount

**Step 1.** Use the screws to mount the Drip shield and the product on the wall.

**Step 2.** Please make sure the bulkhead size requires at least 3 inches clearance each side of the inverter.

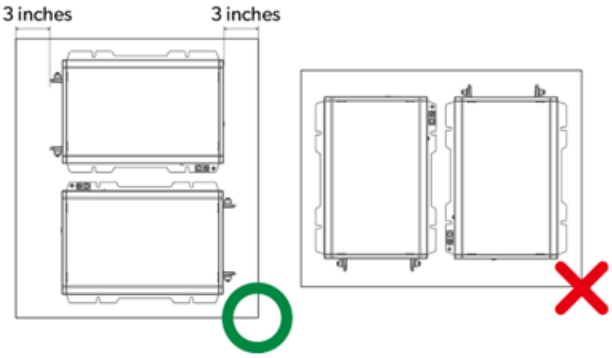



*Figure 8：Wall mount*

3-3-2. Ceiling Mount

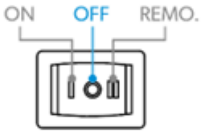
Use the screws to mount the product on the wall, and the product mounting requirement is as follow：

*Figure 9：Ceiling mount*

# 4. INSTALLATION

## 4-1. Connecting the DC cable

Before making the DC input side connections, the main switch must be at “OFF”.




Connect DC input terminals to 12V battery or other DC power source [ + ] is positive, [ - ] is negative. Reverse polarity connection will cause the DC Reverse Status LED to light up.

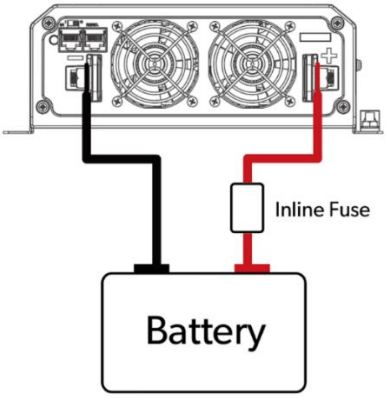



*Figure 10. DC cable connection*

## 4-2. DC input wire AWG/INLINE fuse

| Model | Wire AWG | Inline fuse |
|---|---|---|
| SPT-1200-112 / 124<br>SPT-1200-212 / 224 | #2 / #6 | ≥200A / ≥100A |
| SPT-2000-112 / 124<br>SPT-2000-212 / 224 | #2/0 / #2 | ≥400A / ≥200A |
| SPT-3000-112 / 124<br>SPT-3000-212 / 224 | #4/0 / #1/0 | ≥600A / ≥300A |

*Table 16. DC input wire AWG/INLINE fuse*

**Warning!** The recommended inline fuse should be installed as close to the battery positive terminal as possible failure to use a fuse on the “+” cable running between the inverter and battery may cause damage to the cable / inverter and will void warranty.

Also, only use high quality copper wire and keep the cable length short, within a maximum 3 - 6 feet.

## 4-3. Hardwire Installation

**Step 1.** Remove the three screws of AC wiring compartment and pull it out with care.

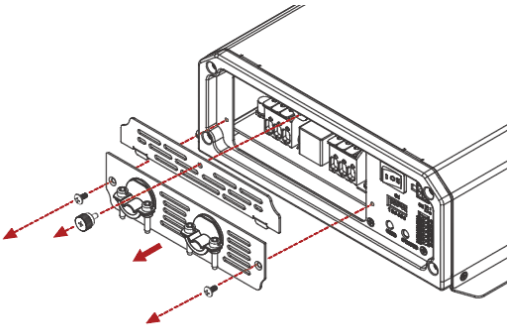


***Figure 11. Remove the three screws***

**Step 2.** Pull the line through the snap bushing of the AC wiring compartment cover then follow below picture operation.

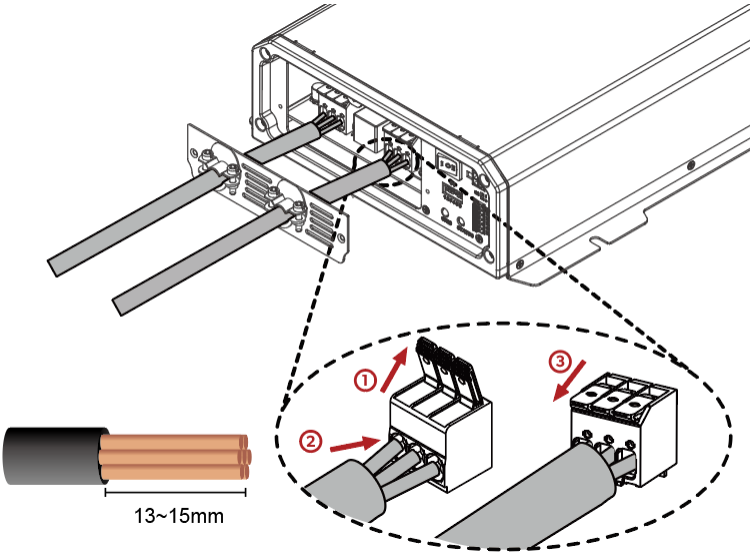



*Figure 12. AC wiring*

| AC terminal (In & output) | Wire color | Wire gauge / length |
|---|---|---|
| Line (L) | Black | AWG 10-14：Within 6 feet<br>SPT-1200-112/124/212/224<br>SPT-2000-212/224<br>AWG 10-12：Within 6 feet |
| Neutral (N) | White | SPT-2000-112/124<br>SPT-3000-212/224<br>AWG 8-10：Within 6 feet<br>SPT-3000-112/124 |
| Ground(G) | Green or Yellow-green | Same as L-N wire gauge / Within 32 feet |

*Table 17. AC input/output wire gauge(AWG)*

## 4-4. Connecting the loads

Calculate the total power consumption of the output load. Make sure that the total power consumption does not exceed the rated power.If the total power consumption over the rated power of the inverter, remove the non-critical： loads until the total power consumption is below the rated power.

| Appliance | Typical Wattage | Appliance | Typical Wattage |
|---|---|---|---|
| 13" Color TV | 50 | 3/8 Power Drill | 500 |
| 19" Color TV | 100 | Icemaker | 200 |
| VCR | 50 | Coffee Maker | 1000 |
| Lamp | 100 | 3cu' Refrigerator | 150 |
| Blender | 300 | 20cu' Refrigerator | 750 |
| Laptop Computer | 50 | Compact Microwave | 750 |
| Curling Iron | 50 | Full Size Microwave | 1500 |

*Table 18. Typical Power Consumption*

*Numerous electric motors exhibit momentary starting demands that surpass their operational ratings. Start-up wattage, when applicable, is specified. It's important to note that individual appliances may exhibit variations in performance based on their style and brand.

### 4-4-1. Neutral Grounding

For safety and compliance with electrical standards, it's best to have all electrical installations done by certified technicians in line with local codes.

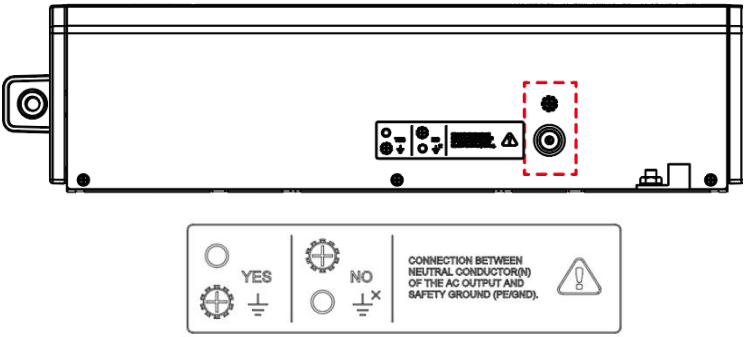
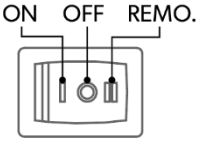



*Figure 13. Neutral Grounding*

## 4-5. Switch ON Inverter




If you choose to control the Power On/Off via the dry contact or the remote unit, please make the power switch at “REMO” position.

For the dry contact information, please refer to 3-1-2

## 4-6. Protection Mechanism

| Model | Over Voltage | | Voltage Warning | Under Voltage | |
|---|---|---|---|---|---|
| | Shutdown | Restart | | Shutdown | Restart |
| 12V | >16.5V ±0.3V | <13.5V ±0.3V | >15.5V or <11V ±0.3V | <10.0V ±0.3V | >12.5V ±0.3V |
| 24V | >33.0V ±0.3V | <27.0V ±0.3V | >31.0V or <22V ±0.3V | <20.0V ±0.3V | >25.0V ±0.3V |

| Model | Over temperature protection | |
|---|---|---|
| | Shutdown | Restart |
| 12/24V | 95°C | 60°C |

*Table 19. Protection Mechanism*

# 5. RS-485 COMMUNICATION AND OPERATION

## 5-1. RS-485 Connection settings

RS-485 Port：Serial port monitoring and control through computer interface.

The following are two examples of RS-485 connection settings.

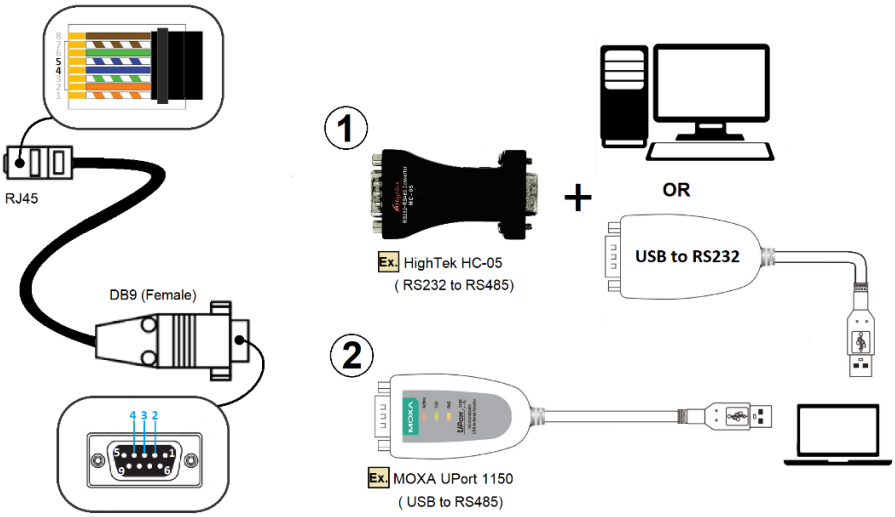



*Figure 14. RS-485 Connection settings*

| RJ45 | | DB9 (Female) | |
|---|---|---|---|
| **PIN Number** | **Description** | **PIN Number** | **Description** |
| 1 (White Orange) | Not used | 1 | 485A(Data+)① |
| 2 (Orange) | Not used | 2 | 485B(Data-)① |
| 3 (White Green) | Not used | 3 | 485A(Data+)②* |
| 4 (Blue) | 485B(Data-) | 4 | 485B(Data-)②* |
| 5 (White Blue) | 485A(Data+) | 5 | GND |
| 6 (Green) | RMT | 6 | Not used |
| 7 (White Brown) | 12VP | 7 | Not used |
| 8 (Brown) | GND | 8 | Not used |
| | | 9 | Not used |

*RJ45 Pin4 to DB9 Pin2 (or 4), RJ45 Pin5 to DB9 Pin1 (or 3)

*Refer to the actual device's PIN definition for DB9.

*Table 20. RS-485 interface pin definitions*

*UPort 1150 needs to be configured as RS-485 2W in Device Manager.

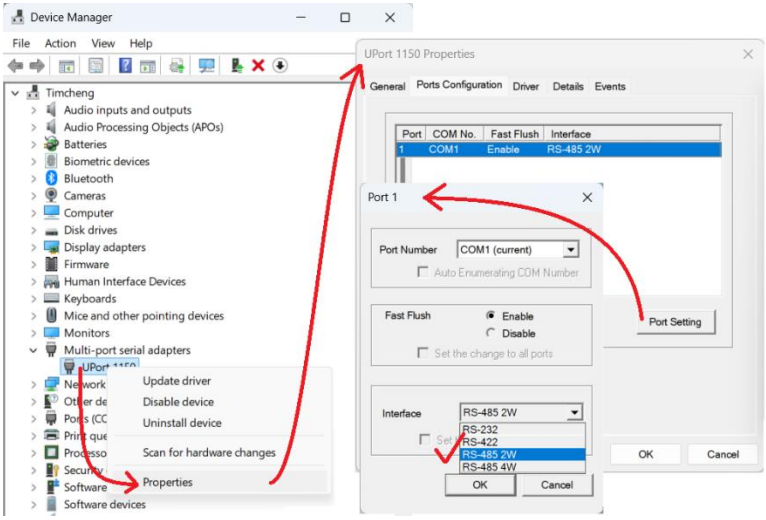



***Figure 15. MOXA UPort 1150 device setup***

## 5-2. RS-485 Port Operating

The following steps show the connection among inverter and computer.

Step 1 Connect the RS-485(RJ45) port to the SPT series unit on the rear panel (refer to 3-2 ③④)

Step 2 Run the computer communication program

Step 3 Set the transmission protocol
Baud rate：9600bps
Parity：None (default), Even, Odd
Character format：Always 8 bits per character

Step 4 Select the COM port and start the operation

## 5-3. MODBUS Command

5-3-1. MODBUS command format

This device uses the MODBUS communication protocol. Control commands are sent using hexadecimal characters, and the commands must include the following：

Slave ID, Function code, Starting address, Quantity of Coils, and CRC checksum.
The Slave ID of this device is 11H.

For Example：

1. Correctly querying the BOVP value：110300100001875F

| Slave ID | Function | Starting address | | Holding Registers | | CRC | |
|---|---|---|---|---|---|---|---|
| | | Hi | Lo | Hi | Lo | Hi | Lo |
| $11_H$ | $03_H$ | $00_H$ | $10_H$ | $00_H$ | $01_H$ | $87_H$ | $5F_H$ |

* For example：If Holding Registers is $0004_H$, the values at addresses $0010_H$, $0011_H$, $0012_H$ & $0013_H$ can be retrieved respectively.

SPT Response：11 03 02 06 72 FA 02

| Slave ID | Function | Byte Count | Holding Registers | | CRC | |
|---|---|---|---|---|---|---|
| $11_H$ | $03_H$ | $02_H$ | $06_H$ | $72_H$ | $FA_H$ | $02_H$ |

*Byte Count = 02 , Holding Registers = 2 Bytes

*Holding Registers：$0672_H = 1650_D$ (refer to 5-3-2-1)

2. Correctly setting the BOVP value：11 06 00 10 06 72 09 1A

| Slave ID | Function | Starting address | | Holding Registers | | CRC | |
|---|---|---|---|---|---|---|---|
| $11_H$ | $06_H$ | $00_H$ | $10_H$ | $06_H$ | $72_H$ | $09_H$ | $1A_H$ |

SPT Response：110600100672091A (Response the same value)

3. Incorrectly setting the BOVP value：11 06 00 10 06 73 C8 DA

| Slave ID | Function | Starting address | | Holding Registers | | CRC | |
|---|---|---|---|---|---|---|---|
| $11_H$ | $06_H$ | $00_H$ | $10_H$ | $06_H$ | $73_H$ | $C8_H$ | $DA_H$ |

SPT Response：11 86 04 42 66

| Slave ID | Function | Exception Code (refer to 5-3-1-1) | CRC | |
|---|---|---|---|---|
| $11_H$ | $86_H$ | $04_H$ | $42_H$ | $66_H$ |

5-3-1-1：Exception Codes

| Code | Name | Description |
|---|---|---|
| $01_H$ | Illegal function | Unsupported Function Code |
| $02_H$ | Illegal data address | Disallowed starting address or output quantity |
| $03_H$ | Illegal data value | Disallowed read/write value |
| $04_H$ | Slave device failure | Device read or write failure, possibly exceeding limit values |

***Table 21. Exception Codes***

5-3-2. MODBUS function list

The following table shows the useful command to operate SPT series.

| Description | Function | Address | Register |
|---|---|---|---|
| **Setting the Inverter to switch power on/off** | | | |
| Setting the Inverter Power OFF | $05_H$ | $0000_H$ | $0000_H$ |
| Setting the Inverter Power ON | $05_H$ | $0000_H$ | $FF00_H$ |
| **Query the Inverter status (Error code)** | | | |
| BUVP (Battery Under Voltage Protection) | $02_H$ | $0000_H$ | $0001_H$ |
| BOVP (Battery Over Voltage Protection) | $02_H$ | $0001_H$ | $0001_H$ |
| OLPL (Over Load Protection Low @ 101~120%) | $02_H$ | $0002_H$ | $0001_H$ |
| OLPM (Over Load Protection Middle @ 121~200%) | $02_H$ | $0003_H$ | $0001_H$ |
| OLPH (Over Load Protection High @ >200%) | $02_H$ | $0004_H$ | $0001_H$ |
| ILOCP (Over Current Protection) | $02_H$ | $0005_H$ | $0001_H$ |
| Not used | $02_H$ | $0006_H$ | |
| $OTP_{mos}$ (Over Temperature Protection @ MOSFET) | $02_H$ | $0007_H$ | $0001_H$ |
| $OTP_{IGBT}$ (Over Temperature Protection @ IGBT) | $02_H$ | $0008_H$ | $0001_H$ |
| Not used | $02_H$ | $0009_H$ | |
| Bempty (Battery empty Protection) | $02_H$ | $000A_H$ | $0001_H$ |
| BUVW (Battery Under Voltage Warning) | $02_H$ | $0010_H$ | $0001_H$ |
| BOVW (Battery Over Voltage Warning) | $02_H$ | $0011_H$ | $0001_H$ |
| **Query the Inverter electrical parameters** | | | |
| Query the Inverter output voltage | $04_H$ | $0000_H$ | $0001_H$ |
| Query the Inverter output current | $04_H$ | $0001_H$ | $0001_H$ |
| Query the Inverter output power | $04_H$ | $0002_H$ | $0001_H$ |
| Query the grid input voltage | $04_H$ | $0003_H$ | $0001_H$ |
| Query the battery voltage | $04_H$ | $0009_H$ | $0001_H$ |
| Query the mosfet temperature | $04_H$ | $000A_H$ | $0001_H$ |
| Query the Error signals | $04_H$ | $000B_H$ | $0001_H$ |
| Query the Warn signals | $04_H$ | $000C_H$ | $0001_H$ |
| **Query the Function value** | | | |

| Description | Function | Address | Register |
|---|---|---|---|
| BOVP setting | $03_H$ | $0010_H$ | $0001_H$ |
| BOVP restart | $03_H$ | $0011_H$ | $0001_H$ |
| BUVP setting | $03_H$ | $0012_H$ | $0001_H$ |
| BUVP restart | $03_H$ | $0013_H$ | $0001_H$ |
| Battery warning voltage | $03_H$ | $0014_H$ | $0001_H$ |
| Retry time | $03_H$ | $0015_H$ | $0001_H$ |
| Saving enable | $03_H$ | $0016_H$ | $0001_H$ |
| Saving power | $03_H$ | $0017_H$ | $0001_H$ |
| Saving time out | $03_H$ | $0018_H$ | $0001_H$ |
| **Setting the Function value** (Refer to 5-3-3-1) | | | |
| BOVP setting | $06_H$ | $0010_H$ | $05DC_H$ - $0672_H$ |
| BOVP restart | $06_H$ | $0011_H$ | $0000_H$ - $012C_H$ |
| BUVP setting | $06_H$ | $0012_H$ | $03E8_H$ - $047E_H$ |
| BUVP restart | $06_H$ | $0013_H$ | $00FA_H$ - $012C_H$ |
| Battery warning voltage | $06_H$ | $0014_H$ | $0000_H$ - $0064_H$ |
| Retry time | $06_H$ | $0015_H$ | $0000_H$ - $000F_H$ |
| Saving enable | $06_H$ | $0016_H$ | $0000_H$ - $0001_H$ |
| Saving power | $06_H$ | $0017_H$ | $0000_H$ - $0009_H$ |
| Saving time out | $06_H$ | $0018_H$ | $0000_H$ - $000A_H$ |

***Table 22. RS-485 function list***

5-3-2-1. Setting the Function value

| FUNC | SETT <value> | Default | Description |
|---|---|---|---|
| BOVP setting | $05DC_{(H)}$ – $0672_{(H)}$ < $1500_{(D)}$ – $1650_{(D)}$ > | $0672_{(H)}$ < $1650_{(D)}$ > | 16.50V = 1650*0.01V |
| BOVP restart | $0000_{(H)}$ – $012C_{(H)}$ < $0_{(D)}$ – $300_{(D)}$ > | $012C_{(H)}$ < $300_{(D)}$ > | 13.50V = (1650-300)*0.01V |
| BUVP setting | $03E8_{(H)}$ – $047E_{(H)}$ < $1000_{(D)}$ – $1150_{(D)}$ > | $03E8_{(H)}$ < $1000_{(D)}$ > | 10.00V = 1000*0.01V |
| BUVP restart | $0000_{(H)}$ – $012C_{(H)}$ < $0_{(D)}$ – $300_{(D)}$ > | $00FA_{(H)}$ < $250_{(D)}$ > | 12.50V = (1000+250)*0.01V |
| Bat.voltage warning | $0000_{(H)}$ – $00C8_{(H)}$ < $0_{(D)}$ – $200_{(D)}$ > | $0064_{(H)}$ < $100_{(D)}$ > | 15.50V = (1650-100)*0.01V<br>11.00V = (1000+100)*0.01V |
| Retry time | $0000_{(H)}$ – $000F_{(H)}$ < $0_{(D)}$ – $15_{(D)}$ > | $0003_{(H)}$ < $3_{(D)}$ > | Setting Retry times |
| Saving enable | $0000_{(H)}$ – $0001_{(H)}$ < $0_{(D)}$ – $1_{(D)}$ > | $0000_{(H)}$ < $0_{(D)}$ > | 0：Disable<br>1：Enable |
| Saving power | $0000_{(H)}$ – $0009_{(H)}$ < $0_{(D)}$ – $9_{(D)}$ > | $0001_{(H)}$ < $1_{(D)}$ > | 0：Disable 1：5VA,<br>2：10VA,… 9：45VA |
| Saving time out | $0000_{(H)}$ – $000A_{(H)}$ < $0_{(D)}$ – $10_{(D)}$ > | $0000_{(H)}$ < $0_{(D)}$ > | 0：Disable<br>10：10 minutes |

***Table 23. Setting the function value***

# 6. TROUBLE SHOOTING

| Status LED | Buzzer states | Status | Solution |
|---|---|---|---|
| Slow Blink Orange | N/A | Over Voltage Alarm | Check DC input voltage. |
| Fast Blink Orange | N/A | Under Voltage Alarm | 1.Check DC input voltage.<br>2.Check DC input connection and wiring cable. |
| Intermittent Blink Red | one short beeps per 1.6sec. | Over Temperature Protection | 1. Improve ventilation. Make sure ventilation openings in inverter are not obstructed.<br>2. Reduce ambient temperature. |
| Intermittent Blink Red | N/A | OVP Shut down | 1.Check DC input voltage and Reduce DC input voltage |
| Intermittent Blink Red | two short beeps per 1.6sec. | UVP Shut down | 1. Check DC input voltage. Increase DC input voltage.<br>2. Check DC input connection and wring cable.<br>3. Recharge battery. |
| Fast Blink Red | one short beeping per 0.7sec. | Over Load Protection | 1.Reduce load in case of restart failed.<br>2. Re-start the unit manually. |
| Solid Red | N/A | Hardware fault | 1.Contact local service center |
| **DC Reverse Status LED** | **Buzzer states** | **Status** | **Solution** |
| Solid Red | N/A | DC Reverse | 1.Check DC+ /DC- cable connection (refer 4.1) |

***Table 24. Trouble Shooting***

# 7. INFORMATION

## 7-1. Warning

**Warning!** Do not open or disassemble the Inverter. Attempting to do so may cause risk of electrical shock or fire.

## 7-2. Warranty

We guarantee this product against defects in materials and workmanship for a period of 24 months from the date of purchase. In case you need to repair or replace any defective power inverters, please contact COTEK local distributor.

This warranty will be considered void if the unit has been misused, altered, or accidentally damaged. COTEK is not liable for anything that occurs as a result of the user's fault.

COTEK

No.33, Sec. 2, Renhe Rd., Daxi Dist., Taoyuan City 33548, Taiwan
Phone：+886-3-3891999 FAX：+886-3-3802333
http：// www.cotek.com.tw
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