



CSR2 PURE SINE WAVE INVERTER

***Covers the range of
Compact Sine wave Inverters (CSI)
700W, 1000W, 1500W, 2000W, 3000W & 4000W***



INSTRUCTIONS FOR INSTALLATION AND USE

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1 GENERAL SAFETY INFORMATION

△ WARNING

BEFORE INSTALLING OR USING THE CSR2 RANGE OF INVERTERS YOU NEED TO READ THE FOLLOWING SAFETY INFORMATION CAREFULLY

1.1 General Precautions

- 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 under a fault condition could produce arcs or sparks. To prevent fire or explosion do not install in an enclosure containing batteries or flammable materials.
- Depending on the user scenario, the AC output of the inverter may require external installation of a breaker or fuse. In AC output hardwire applications, AC socket will not be fitted. The inverter incorporates standard AC short circuit protection.
- The following precautions should be taken when working on the inverter:
 - Remove watches, rings, or other metal objects
 - Use tools with insulated handles
 - Wear rubber gloves and boots

1.2 Other Safety Notes

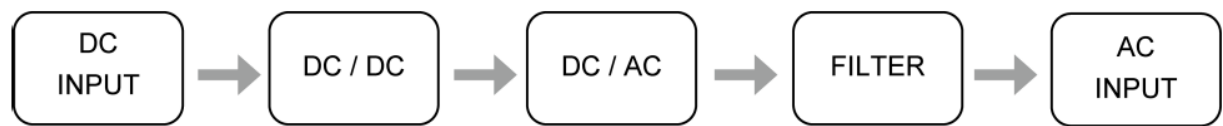
- Upon receipt, examine the carton box for damage. Notify the carrier immediately, before opening, if damage is evident please notify Antares.
- Do not operate near water or in excessive humidity.
- Do not open or disassemble the inverter, as warranty may be voided.
- The DC side connections should be 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.
- To ensure debris or liquid cannot enter the inverter it is preferable that the inverter is mounted such that the fan axis is horizontal.
- Do not operate the inverter close to combustible gas or open flame.
- 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°C to 40°C, otherwise the output efficiency may be affected. Air flow to the inverter must not be blocked.

2 FEATURES

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 (THD < 5%)
- Optional bypass relay(TR-40) function
- Intelligent software for power management
- Loading and temperature controlled cooling fan
- CR-8/CR-16 remote management and control
- RS-232 communication
- Dry contact terminal
- Efficiency max. 90%.
- Advanced Protection Features:
 - ❖ Input over/under voltage protection
 - ❖ Internal over temperature protection
 - ❖ Input reverse polarity protection (Fuse)
 - ❖ Output overload protection
 - ❖ Output short circuit protection

2.1 Block Diagram



2.2 Electrical Specification

2.2.1 SP-700 Series Specification

Electrical	Specification	Model No.		
	Item	SP-700-112	SP-700-124	SP-700-148
Input Characteristics	Voltage	12VDC	24VDC	48VDC
	Input Over-Voltage Protection	16.5 ± 0.3VDC	33 ± 0.5VDC	66 ± 1.0VDC
	Input Under-Voltage Protection	10.5 ± 0.3VDC	21 ± 0.5VDC	42 ± 1.0VDC
	Voltage Range	10.5~16.5VDC	21~33VDC	42~66VDC
	No Load Current	<1.5 A @12VDC	<0.8 A @24VDC	<0.5 A @48VDC
	Power Saving Mode	<0.1A @12VDC	<0.06A @24VDC	<0.05A @48VDC
Output Characteristics	Continuous Output Power	700 VA (± 3%)		
	Maximum output Power (1Min)	> 700 VA~810 VA (100%~115%)		
	Surge Power (1Sec)	< 1230 VA		
	Frequency	50 / 60 Hz ± 0.5% (Dip Switch Selectable)		
	Output Voltage	100 / 110 / 115 / 120 VAC (± 5%) (Dip Switch Selectable)		
	Efficiency max.	88%	89%	90%
	Short-Circuit Protection	1 Sec Shutdown		
Signal and Control	Output Waveform	Pure Sine Wave (THD < 5%@ Normal Load)		
	Remote Controller Panel Unit	CR-8 / CR-16 (optional)		
	LED Indicator	Red / Orange / Green LED		
	Dry Contact Terminal	By a relay		
Protection	Remote Control Terminal	6-port Green terminal (for inverter ON / OFF)		
	Input Protection	Over / Under Voltage, Reverse Polarity (Internal Fuse)		
	AC Output Protection	Short-Circuit, Overload		
Environment	Others	Over / Under Temperature Protection (by Heat sink Temperature +80°C/-20°C)		
	Operating Temp.	-20 C~40 C		
	Storage Temp.	-30 C~70 C		
Safety & EMC	Storage Temp. & Humidity	10 ~95% RH		
	Safety Standards	Certified UL 458 (UL only for GFCI receptacles)		—
	EMC standards	Certified FCC class B		
AC Transfer Function Accessories	E-mark	—		
	Dimension (W x H x D)	200.0mm x 83.0mm x 330.1mm		
	Weight	2.6 KG		
	Cooling	Temperature & Load Controlled cooling Fan		
	AC Transfer Function Accessories	TR-40 (optional)		

Table 1 SP-700 Series for Output 100/110/115/120 VAC Specification.

Note! Normal load Condition: Vin =12.5V/25V/50V, Vo=100/110/115/120VAC 80% Full load (PF=1.0)

Electrical	Specification	Model No.		
	Item	SP-700-212	SP-700-224	SP-700-248
Input Characteristics	Voltage	12VDC	24VDC	48VDC
	Input Over-Voltage Protection	16.5 ± 0.3VDC	33 ± 0.5VDC	66 ± 1.0VDC
	Input Under-Voltage Protection	10.5 ± 0.3VDC	21 ± 0.5VDC	42 ± 1.0VDC
	Voltage Range	10.5~16.5VDC	21~33VDC	42~66VDC
	No Load Current	<1.5 A @12VDC	<0.8A @24VDC	<0.4 A @48VDC
	Power Saving Mode	<0.1 A @12VDC	<0.05A @24VDC	<0.05 A @48VDC
Output Characteristics	Continuous Output Power	700 VA (± 3%)		
	Maximum output Power (1Min)	> 700 VA~810 VA (100%~115%)		
	Surge Power (1Sec)	< 1230 VA		
	Frequency	50 / 60 Hz ± 0.5% (Dip Switch Selectable)		
	Output Voltage	200 / 220 / 230 / 240 VAC (± 3%) (Dip Switch Selectable)		
	Efficiency max.	88%	89%	90%
	Short-Circuit Protection	1 Sec Shutdown		
Output Waveform	Pure Sine Wave (THD < 5%@ Normal Load)			
Signal and Control	Remote Controller Panel Unit	CR-8 / CR-16 (optional)		
	LED Indicator	Red / Orange / Green LED		
	Dry Contact Terminal	By a relay		
	Remote Control Terminal	6-port Green terminal (for inverter ON / OFF)		
Protection	Input Protection	Over / Under Voltage, Reverse Polarity (Internal Fuse)		
	AC Output Protection	Short-Circuit, Overload		
	Others	Over / Under Temperature Protection (by Heat sink Temperature +80°C/-20°C)		
Environment	Operating Temp.	-20 C~40 C		
	Storage Temp.	-30 C~70 C		
	Storage Temp. & Humidity	10 ~95% RH		
Safety & EMC	Safety Standards	Certified EN 60950-1		
	EMC standards	Certified EN 55022; EN 55024; EN 61000-3-2, -3-3 EN 61000-4-2, 3, 4, 5, 6, 8, 11		
	E-mark	Certified CISPR 25; ISO 11452-2; ISO 7637-2		
Dimension (W x H x D)		200.0mm x 83.0mm x 330.1mm		
Weight		2.6 KG		
Cooling		Temperature & Load Controlled cooling Fan		
AC Transfer Function Accessories		TR-40 (optional)		

Table 2 SP-700 Series for Output 200/220/230/240 VAC Specification.

Note! Normal load Condition: Vin =12.5V/25V/50V, Vo=200/220/230/240VAC 80% Full load (PF=1.0)

2.2.2 SP-1000 Series Specification

Electrical	Specification	Model No.		
	Item	SP-1000-112	SP-1000-124	SP-1000-148
Input Characteristics	Voltage	12VDC	24VDC	48VDC
	Input Over-Voltage Protection	16.5 ± 0.3VDC	33 ± 0.5VDC	66 ± 1.0VDC
	Input Under-Voltage Protection	10.5 ± 0.3VDC	21 ± 0.5VDC	42 ± 1.0VDC
	Voltage Range	10.5~16.5 VDC	21~33 VDC	42~66VDC
	No Load Current	<1.5 A @12VDC	<0.8 A @24VDC	<0.4 A @48VDC
	Power Saving Mode	<0.1A @12VDC	<0.05A @24VDC	<0.05A @48VDC
Output Characteristics	Continuous Output Power	1000 VA(± 3%)		
	Maximum output Power (1 Min)	> 1000 VA~1150 VA (100%~115%)		
	Surge Power (1 Sec)	< 1750 VA		
	Frequency	50 / 60 Hz ± 0.5% (Dip Switch Selectable)		
	Output Voltage	100 / 110 / 115 / 120 VAC (± 5%) (Dip Switch Selectable)		
	Efficiency max.	88%	89%	90%
	Short-Circuit Protection	1 Sec Shutdown		
	Output Waveform	Pure Sine Wave (THD < 5%@ Normal Load)		
Signal and Control	Remote Controller Panel Unit	CR-8 / CR-16 (optional)		
	LED Indicator	Red / Orange / Green LED		
	Dry Contact Terminal	By a relay		
	Remote Control Terminal	6-port Green terminal (for inverter ON / OFF)		
Protection	Input Protection	Over / Under Voltage, Reverse Polarity (Internal Fuse)		
	AC Output Protection	Short-Circuit, Overload		
	Others	Over / Under Temperature Protection (by Heat sink Temperature +80°C/-20°C)		
Environment	Operating Temp.	-20 C~40 C		
	Storage Temp.	-30 C~70 C		
	Storage Temp. & Humidity	10 ~95% RH		
Safety & EMC	Safety Standards	Certified UL 458 (UL only for GFCI receptacles)		
	EMC standards	Certified FCC class B		
	E-mark	—		
Dimension (W x H x D)		200.0mm x 83.0mm x 372.2mm		
Weight		3.26 KG		
Cooling		Temperature & Load Controlled cooling Fan		
AC Transfer Function Accessories		TR-40 (optional)		

Table 3. SP-1000 Series for Output 100/110/115/120 VAC Specification.

Note! Normal load Condition: Vin =12.5V/25V/50V, Vo=100/110/115/120VAC 80% Full load (PF=1.0)

Electrical	Specification	Model No.		
	Item	SP-1000-212	SP-1000-224	SP-1000-248
Input Characteristics	Voltage	12VDC	24VDC	48VDC
	Input Over-Voltage Protection	16.5 ± 0.3VDC	33 ± 0.5VDC	66 ± 1.0VDC
	Input Under-Voltage Protection	10.5 ± 0.3VDC	21 ± 0.5VDC	42 ± 1.0VDC
	Voltage Range	10.5~16.5 VDC	21~33 VDC	42~66VDC
	No Load Current	<1.5 A @12VDC	<0.8 A @24VDC	<0.4 A @48VDC
	Power Saving Mode	< 0.1A @12VDC	<0.05A @24VDC	<0.05A @48VDC
Output Characteristics	Continuous Output Power	1000 VA(± 3%)		
	Maximum output Power (1 Min)	> 1000 VA~1150 VA (100%~115%)		
	Surge Power (1 Sec)	< 1750 VA		
	Frequency	50 / 60 Hz ± 0.5% (Dip Switch Selectable)		
	Output Voltage	200 / 220 / 230 / 240 VAC (± 3%) (Dip Switch Selectable)		
	Efficiency max.	88%	89%	90%
	Short-Circuit Protection	1 Sec Shutdown		
Output Waveform	Pure Sine Wave (THD < 5%@ Normal Load)			
Signal and Control	Remote Controller Panel Unit	CR-8 / CR-16 (optional)		
	LED Indicator	Red / Orange / Green LED		
	Dry Contact Terminal	By a relay		
	Remote Control Terminal	6-port Green terminal (for inverter ON / OFF)		
Protection	Input Protection	Over / Under Voltage, Reverse Polarity (Internal Fuse)		
	AC Output Protection	Short-Circuit, Overload		
	Others	Over / Under Temperature Protection (by Heat sink Temperature +80°C/-20°C)		
Environment	Operating Temp.	-20 C~40 C		
	Storage Temp.	-30 C~70 C		
	Storage Temp. & Humidity	10 ~95% RH		
Safety & EMC	Safety Standards	Certified EN 60950-1		
	EMC standards	Certified EN 55022; EN 55024; EN 61000-3-2, -3-3 EN 61000-4-2, 3, 4, 5, 6, 8, 11		
	E-mark	Certified CISPR 25; ISO 11452-2; ISO 7637-2		
Dimension (W x H x D)		200.0mm x 83.0mm x 372.2mm		
Weight		3.26 KG		
Cooling		Temperature & Load Controlled cooling Fan		
AC Transfer Function Accessories		TR-40 (optional)		

Table 4. SP-1000 Series for Output 200/220/230/240 VAC Specification.

Note! Normal load Condition: Vin =12.5V/25V/50V, Vo=200/220/230/240VAC 80% Full load (PF=1.0)

2.2.3 SP-1500 Series Specification

Electrical	Specification	Model No.		
	Item	SP-1500-112	SP-1500-124	SP-1500-148
Input Characteristics	Voltage	12VDC	24VDC	48VDC
	Input Over-Voltage Protection	16.5 ± 0.3VDC	33 ± 0.5VDC	66 ± 1.0VDC
	Input Under-Voltage Protection	10.5 ± 0.3VDC	21 ± 0.5VDC	42 ± 1.0VDC
	Voltage Range	10.5~16.5 VDC	21~33 VDC	42~66VDC
	No Load Current	<1.8A @12VDC	<0.9 A @24VDC	<0.5 A @48VDC
	Power Saving Mode	<0.1A @12VDC	<0.05A @24VDC	<0.05A @48VDC
Output Characteristics	Continuous Output Power	1500 VA(± 3%)		
	Maximum output Power (1 Min)	> 1500 VA~1730VA (100%~115%)		
	Surge Power (1 Sec)	<2650 VA		
	Frequency	50 / 60 Hz ± 0.5% (Dip Switch Selectable)		
	Output Voltage	100 / 110 / 115 / 120 VAC (± 5%) (Dip Switch Selectable)		
	Efficiency max.	88%	89%	90%
	Short-Circuit Protection	1 Sec Shutdown		
Signal and Control	Output Waveform	Pure Sine Wave (THD < 5% @ Normal Load)		
	Remote Controller Panel Unit	CR-8 / CR-16 (optional)		
	LED Indicator	Red / Orange / Green LED		
	Dry Contact Terminal	By a relay		
Protection	Remote Control Terminal	6-port Green terminal (for inverter ON / OFF)		
	Input Protection	Over / Under Voltage, Reverse Polarity (Internal Fuse)		
	AC Output Protection	Short-Circuit, Overload		
Environment	Others	Over / Under Temperature Protection (by Heat sink Temperature +80°C/-20°C)		
	Operating Temp.	-20 C~40 C		
	Storage Temp.	-30 C~70 C		
Safety & EMC	Storage Temp. & Humidity	10 ~95% RH		
	Safety Standards	Certified UL 458 (UL only for GFCI receptacles)		
	EMC standards	Certified FCC class B		
AC Transfer Function Accessories		E-mark		
Dimension (W x H x D)		248.0mm x 83.0mm x 421.3mm		
Weight		4.14 KG		
Cooling		Temperature & Load Controlled cooling Fan		
AC Transfer Function Accessories		TR-40 (optional)		

Table 5. SP-1500 Series for Output 100/110/115/120 VAC Specification.

Note! Normal load Condition : Vin =12.5V/25V/50V, Vo=100/110/115/120VAC 80% Full load (PF=1.0)

Electrical	Specification	Model No.		
	Item	SP-1500-212	SP-1500-224	SP-1500-248
Input Characteristics	Voltage	12VDC	24VDC	48VDC
	Input Over-Voltage Protection	16.5 ± 0.3VDC	33 ± 0.5VDC	66 ± 1.0VDC
	Input Under-Voltage Protection	10.5 ± 0.3VDC	21 ± 0.5VDC	42 ± 1.0VDC
	Voltage Range	10.5~16.5 VDC	21~33 VDC	42~66VDC
	No Load Current	<1.8A @12VDC	<0.9 A @24VDC	<0.5 A @48VDC
	Power Saving Mode	<0.1A @12VDC	<0.05A @24VDC	<0.05A @48VDC
Output Characteristics	Continuous Output Power	1500 VA(± 3%)		
	Maximum output Power (1 Min)	> 1500 VA~1730VA (100%~115%)		
	Surge Power (1 Sec)	<2650 VA		
	Frequency	50 / 60 Hz ± 0.5% (Dip Switch Selectable)		
	Output Voltage	200 / 220 / 230 / 240 VAC (± 3%) (Dip Switch Selectable)		
	Efficiency max.	88%	89%	90%
	Short-Circuit Protection	1 Sec Shutdown		
Output Waveform	Pure Sine Wave (THD < 5%@ Normal Load)			
Signal and Control	Remote Controller Panel Unit	CR-8 / CR-16 (optional)		
	LED Indicator	Red / Orange / Green LED		
	Dry Contact Terminal	By a relay		
	Remote Control Terminal	6-port Green terminal (for inverter ON / OFF)		
Protection	Input Protection	Over / Under Voltage, Reverse Polarity (Internal Fuse)		
	AC Output Protection	Short-Circuit, Overload		
	Others	Over / Under Temperature Protection (by Heat sink Temperature +80°C/-20°C)		
Environment	Operating Temp.	-20 C~40 C		
	Storage Temp.	-30 C~70 C		
	Storage Temp. & Humidity	10 ~95% RH		
Safety & EMC	Safety Standards	Certified EN 60950-1		
	EMC standards	Certified EN 55022; EN 55024; EN 61000-3-2, -3-3 EN 61000-4-2, 3, 4, 5, 6, 8, 11		
	E-mark	Certified CISPR 25; ISO 11452-2; ISO 7637-2		
Dimension (W x H x D)		248.0mm x 83.0mm x 421.3mm		
Weight		4.14 KG		
Cooling		Temperature & Load Controlled cooling Fan		
AC Transfer Function Accessories		TR-40 (optional)		

Table 6. SP-1500 Series for Output 200/220/230/240 VAC Specification.

Note! Normal load Condition : Vin =12.5V/25V/50V, Vo=200/220/230/240VAC 80% Full load (PF=1.0)

2.2.4 SP-2000 Series Specification

Electrical	Specification	Model No.		
	Item	SP-2000-112	SP-2000-124	SP-2000-148
Input Characteristics	Voltage	12VDC	24VDC	48VDC
	Input Over-Voltage Protection	16.5 ± 0.3VDC	33 ± 0.5VDC	66 ± 1.0VDC
	Input Under-Voltage Protection	10.5 ± 0.3VDC	21 ± 0.5VDC	42 ± 1.0VDC
	Voltage Range	10.5~16.5 VDC	21~33 VDC	42~66VDC
	No Load Current	<1.8 A @12VDC	<0.9 A @24VDC	<0.5 A @48VDC
	Power Saving Mode	<0.1A @12VDC	<0.05A @24VDC	<0.05A @48VDC
Output Characteristics	Continuous Output Power	2000 VA(± 3%)		
	Maximum output Power (1 Min)	> 2000 VA~2300 VA (100%~115%)		
	Surge Power (1 Sec)	< 3500 VA		
	Frequency	50 / 60 Hz ± 0.5% (Dip Switch Selectable)		
	Output Voltage	100 / 110 / 115 / 120 VAC (± 5%) (Dip Switch Selectable)		
	Efficiency max.	88%	89%	90%
	Short-Circuit Protection	1 Sec Shutdown		
	Output Waveform	Pure Sine Wave (THD < 5%@ Normal Load)		
Signal and Control	Remote Controller Panel Unit	CR-8 / CR-16 (optional)		
	LED Indicator	Red / Orange / Green LED		
	Dry Contact Terminal	By a relay		
	Remote Control Terminal	6-port Green terminal (for inverter ON / OFF)		
Protection	Input Protection	Over / Under Voltage, Reverse Polarity (Internal Fuse)		
	AC Output Protection	Short-Circuit, Overload		
	Others	Over / Under Temperature Protection (by Heat sink Temperature +80°C/-20°C)		
Environment	Operating Temp.	-20 C~40 C		
	Storage Temp.	-30 C~70 C		
	Storage Temp. & Humidity	10 ~95% RH		
Safety & EMC	Safety Standards	Certified UL 458 (UL only for GFCI receptacles)		
	EMC standards	Certified FCC class B		
	E-mark	—		
Dimension (W x H x D)		248.0mm x 83.0mm x 443.3mm		
Weight		5.24 KG		
Cooling		Temperature & Load Controlled cooling Fan		
AC Transfer Function Accessories		TR-40 (optional)		

Table 7. SP-2000 Series for Output 100/110/115/120 VAC Specification.

Note! Normal load Condition : Vin =12.5V/25V/50V, Vo=100/110/115/120VAC 80% Full load (PF=1.0)

Electrical	Specification	Model No.		
	Item	SP-2000-212	SP-2000-224	SP-2000-248
Input Characteristics	Voltage	12VDC	24VDC	48VDC
	Input Over-Voltage Protection	16.5 ± 0.3VDC	33 ± 0.5VDC	66 ± 1.0VDC
	Input Under-Voltage Protection	10.5 ± 0.3VDC	21 ± 0.5VDC	42 ± 1.0VDC
	Voltage Range	10.5~16.5 VDC	21~33 VDC	42~66VDC
	No Load Current	<1.8 A @12VDC	<0.9 A @24VDC	<0.5 A @48VDC
	Power Saving Mode	<0.1A @12VDC	<0.05A @24VDC	<0.05A @48VDC
Output Characteristics	Continuous Output Power	2000 VA(± 3%)		
	Maximum output Power (1 Min)	> 2000 VA~2300 VA (100%~115%)		
	Surge Power (1 Sec)	< 3500 VA		
	Frequency	50 / 60 Hz ± 0.5% (Dip Switch Selectable)		
	Output Voltage	200 / 220 / 230 / 240 VAC (± 3%) (Dip Switch Selectable)		
	Efficiency max.	89%	89%	90%
	Short-Circuit Protection	1 Sec Shutdown		
Output Waveform	Pure Sine Wave (THD < 5%@ Normal Load)			
Signal and Control	Remote Controller Panel Unit	CR-8 / CR-16 (optional)		
	LED Indicator	Red / Orange / Green LED		
	Dry Contact Terminal	By a relay		
	Remote Control Terminal	6-port Green terminal (for inverter ON / OFF)		
Protection	Input Protection	Over / Under Voltage, Reverse Polarity (Internal Fuse)		
	AC Output Protection	Short-Circuit, Overload		
	Others	Over / Under Temperature Protection (by Heat sink Temperature +80°C/-20°C)		
Environment	Operating Temp.	-20 C~40 C		
	Storage Temp.	-30 C~70 C		
	Storage Temp. & Humidity	10 ~95% RH		
Safety & EMC	Safety Standards	Certified EN 60950-1		
	EMC standards	Certified EN 55022; EN 55024; EN 61000-3-2, -3-3 EN 61000-4-2, 3, 4, 5, 6, 8, 11		
	E-mark	Certified CISPR 25; ISO 11452-2; ISO 7637-2		
Dimension (W x H x D)		248.0mm x 83.0mm x 443.3mm		
Weight		5.24 KG		
Cooling		Temperature & Load Controlled cooling Fan		
AC Transfer Function Accessories		TR-40 (optional)		

Table 8. SP-2000 Series for Output 200/220/230/240 VAC Specification.

Note! Normal load Condition : Vin =12.5V/25V/50V, Vo=200/220/230/240VAC 80% Full load (PF=1.0)

2.2.5 SP-3000 Series Specification

Electrical	Specification	Model No.		
	Item	SP-3000-112	SP-3000-124	SP-3000-148
Input Characteristics	Voltage	12VDC	24VDC	48VDC
	Input Over-Voltage Protection	16.5 ± 0.3VDC	33 ± 0.5VDC	66 ± 1.0VDC
	Input Under-Voltage Protection	10.5 ± 0.3VDC	21 ± 0.5VDC	42 ± 1.0VDC
	Voltage Range	10.5~16.5 VDC	21~33 VDC	42~66 VDC
	No Load Current	<3.8 A @12VDC	<1.9 A @24VDC	<1.0 A @48VDC
	Power Saving Mode	<0.4A @12VDC	<0.2A @24VDC	<0.1A @48VDC
Output Characteristics	Continuous Output Power	3000 VA(± 3%)		
	Maximum output Power (1 Min)	> 3000 VA~3450 VA (100%~115%)		
	Surge Power (1 Sec)	< 6000 VA		
	Frequency	50 / 60 Hz ± 0.5% (Dip Switch Selectable)		
	Output Voltage	100 / 110 / 115 / 120 VAC (± 5%) (Dip Switch Selectable)		
	Efficiency max.	88%	89%	90%
	Short-Circuit Protection	1 Sec Shutdown		
Signal and Control	Output Waveform	Pure Sine Wave (THD < 5%@ Normal Load)		
	Remote Controller Panel Unit	CR-8 / CR-16 (optional)		
	LED Indicator	Red / Orange / Green LED		
	Dry Contact Terminal	By a relay		
Protection	Remote Control Terminal	6-port Green terminal (for inverter ON / OFF)		
	Input Protection	Over / Under Voltage, Reverse Polarity (Internal Fuse)		
	AC Output Protection	Short-Circuit, Overload		
Environment	Others	Over / Under Temperature Protection (by Heat sink Temperature +80°C/-20°C)		
	Operating Temp.	-20 C~40 C		
	Storage Temp.	-30 C~70 C		
Safety & EMC	Storage Temp. & Humidity	10 ~95% RH		
	Safety Standards	Certified UL 458 ----		
	EMC standards	Certified FCC class A		
	E-mark	—		
Dimension (W x H x D)		255.0mm x 158.0mm x 442.0mm		
Weight		8.2 KG		
Cooling		Temperature & Load Controlled cooling Fan		
AC Transfer Function Accessories		TR-40 (optional)		

Table 9. SP-3000 Series for Output 100/110/115/120 VAC Specification.

Note! Normal load Condition : Vin =12.5V/25V/50V, Vo=100/110/115/120VAC 80% Full load (PF=1.0)

Electrical	Specification	Model No.		
	Item	SP-3000-212	SP-3000-224	SP-3000-248
Input Characteristics	Voltage	12VDC	24VDC	48VDC
	Input Over-Voltage Protection	16.5 ± 0.3VDC	33 ± 0.5VDC	66 ± 1.0VDC
	Input Under-Voltage Protection	10.5 ± 0.3VDC	21 ± 0.5VDC	42 ± 1.0VDC
	Voltage Range	10.5~16.5 VDC	21~33 VDC	42~66 VDC
	No Load Current	<3.8 A @12VDC	<1.9 A @24VDC	<1.0 A @48VDC
	Power Saving Mode	<0.4A @12VDC	<0.2A @24VDC	<0.1A @48VDC
Output Characteristics	Continuous Output Power	3000 VA(± 3%)		
	Maximum output Power (1 Min)	> 3000 VA~3450 VA (100%~115%)		
	Surge Power (1 Sec)	< 6000 VA		
	Frequency	50 / 60 Hz ± 0.5% (Dip Switch Selectable)		
	Output Voltage	200 / 220 / 230 / 240 VAC (± 3%) (Dip Switch Selectable)		
	Efficiency max.	88%	89%	90%
	Short-Circuit Protection	1 Sec Shutdown		
Output Waveform	Pure Sine Wave (THD < 5%@ Normal Load)			
Signal and Control	Remote Controller Panel Unit	CR-8 / CR-16 (optional)		
	LED Indicator	Red / Orange / Green LED		
	Dry Contact Terminal	By a relay		
	Remote Control Terminal	6-port Green terminal (for inverter ON / OFF)		
Protection	Input Protection	Over / Under Voltage, Reverse Polarity (Internal Fuse)		
	AC Output Protection	Short-Circuit, Overload		
	Others	Over / Under Temperature Protection (by Heat sink Temperature +80°C/-20°C)		
Environment	Operating Temp.	-20 C~40 C		
	Storage Temp.	-30 C~70 C		
	Storage Temp. & Humidity	10 ~95% RH		
Safety & EMC	Safety Standards	Certified EN 60950-1		
	EMC standards	Certified EN 55022; EN 55024; EN 61000-3-2, -3-3 EN 61000-4-2, 3, 4, 5, 6, 8, 11		
	E-mark	Certified CISPR 25; ISO 11452-2; ISO 7637-2		
Dimension (W x H x D)		255.0mm x 158.0mm x 442.0mm		
Weight		8.2 KG		
Cooling		Temperature & Load Controlled cooling Fan		
AC Transfer Function Accessories		TR-40 (optional)		

Table 10. SP-3000 Series for Output 200/220/230/240 VAC Specification.

Note! Normal load Condition : Vin =12.5V/25V/50V, Vo=200/220/230/240VAC 80% Full load (PF=1.0)

2.2.6 SP-4000 Series Specification

Electrical	Specification	Model No.	
	Item	SP-4000-124	SP-3000-148
Input Characteristics	Voltage	24VDC	48VDC
	Input Over-Voltage Protection	33 ± 0.5VDC	66 ± 1.0VDC
	Input Under-Voltage Protection	21 ± 0.5VDC	42 ± 1.0VDC
	Voltage Range	21~33 VDC	42~66 VDC
	No Load Current	<1.9 A @24VDC	<1.0 A @48VDC
	Power Saving Mode	<0.2A @24VDC	<0.1A @48VDC
Output Characteristics	Continuous Output Power	4000 VA(± 3%)	
	Maximum output Power (1Min)	> 4000 VA~4600 VA (100%~115%)	
	Surge Power (1 Sec)	< 8000 VA	
	Frequency	50 / 60 Hz ± 0.5% (Dip Switch Selectable)	
	Output Voltage	100 / 110 / 115 / 120 VAC (± 5%) (Dip Switch Selectable)	
	Efficiency max.	88%	89%
	Short-Circuit Protection	1 Sec Shutdown	
Output Waveform	Pure Sine Wave (THD < 5% @ Normal Load)		
Signal and Control	Remote Controller Panel Unit	CR-8 / CR-16 (optional)	
	LED Indicator	Red / Orange / Green LED	
	Dry Contact Terminal	By a relay	
	Remote Control Terminal	6-port Green terminal (for inverter ON / OFF)	
Protection	Input Protection	Over / Under Voltage, Reverse Polarity (Internal Fuse)	
	AC Output Protection	Short-Circuit, Overload	
	Others	Over / Under Temperature Protection (by Heat sink Temperature +80°C/-20°C)	
Environment	Operating Temp.	-20 C~40 C	
	Storage Temp.	-30 C~70 C	
	Storage Temp. & Humidity	10 ~95% RH	
Safety & EMC	Safety Standards	Certified UL 458	----
	EMC standards	Certified FCC class A	
	E-mark	—	
Dimension (W x H x D)		255.0mm x 158.0mm x 462.0mm	
Weight		10 KG	
Cooling		Temperature & Load Controlled cooling Fan	
AC Transfer Function Accessories		TR-40 (optional)	

Table 11. SP-4000 Series for Output 100/110/115/120 VAC Specification.

Note! Normal load Condition : Vin =25V/50V, Vo=100/110/115/120VAC 80% Full load (PF=1.0)

Electrical	Specification	Model No.	
	Item	SP-4000-224	SP-3000-248
Input Characteristics	Voltage	24VDC	48VDC
	Input Over-Voltage Protection	33 ± 0.5VDC	66 ± 1.0VDC
	Input Under-Voltage Protection	21 ± 0.5VDC	42 ± 1.0VDC
	Voltage Range	21~33 VDC	42~66 VDC
	No Load Current	<1.9 A @24VDC	<1.0 A @48VDC
	Power Saving Mode	<0.2A @24VDC	<0.1A @48VDC
Output Characteristics	Continuous Output Power	4000 VA(± 3%)	
	Maximum output Power (1Min)	> 4000 VA~4600 VA (100%~115%)	
	Surge Power (1 Sec)	< 8000 VA	
	Frequency	50 / 60 Hz ± 0.5% (Dip Switch Selectable)	
	Output Voltage	200 / 220 / 230 / 240 VAC (± 3%) (Dip Switch Selectable)	
Output Characteristics	Efficiency max.	88%	89%
	Short-Circuit Protection	1 Sec Shutdown	
	Output Waveform	Pure Sine Wave (THD < 5%@ Normal Load)	
Signal and Control	Remote Controller Panel Unit	CR-8 / CR-16 (optional)	
	LED Indicator	Red / Orange / Green LED	
	Dry Contact Terminal	By a relay	
	Remote Control Terminal	6-port Green terminal (for inverter ON / OFF)	
Protection	Input Protection	Over / Under Voltage, Reverse Polarity (Internal Fuse)	
	AC Output Protection	Short-Circuit, Overload	
	Others	Over / Under Temperature Protection (by Heat sink Temperature +80°C/-20°C)	
Environment	Operating Temp.	-20 C~40 C	
	Storage Temp.	-30 C~70 C	
	Storage Temp. & Humidity	10 ~95% RH	
Safety & EMC	Safety Standards	Certified EN 60950-1	
	EMC standards	Certified EN 55022; EN 55024; EN 61000-3-2, -3-3; EN 61000-4-2, 3, 4, 5, 6, 8, 11	
	E-mark	Certified CISPR 25; ISO 11452-2; ISO 7637-2	
Dimension (W x H x D)		255.0mm x 158.0mm x 462.0mm	
Weight		10 KG	
Cooling		Temperature & Load Controlled cooling Fan	
AC Transfer Function Accessories		TR-40 (optional)	

Table 12. SP-4000 Series for Output 100/110/115/120 VAC Specification.

Note! Normal load Condition : Vin =25V/50V, Vo=200/220/230/240VAC 80% Full load (PF=1.0)

2.2.7 Voltage & temperature performance

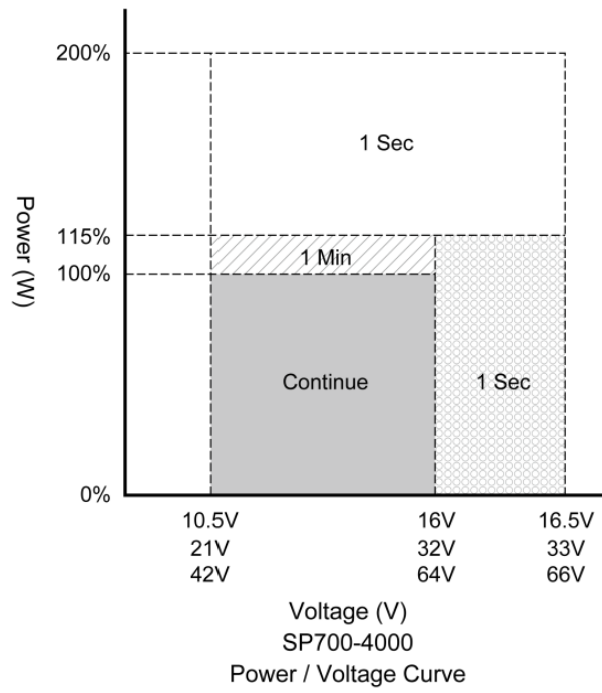


Figure 1 Output power vs. input voltage

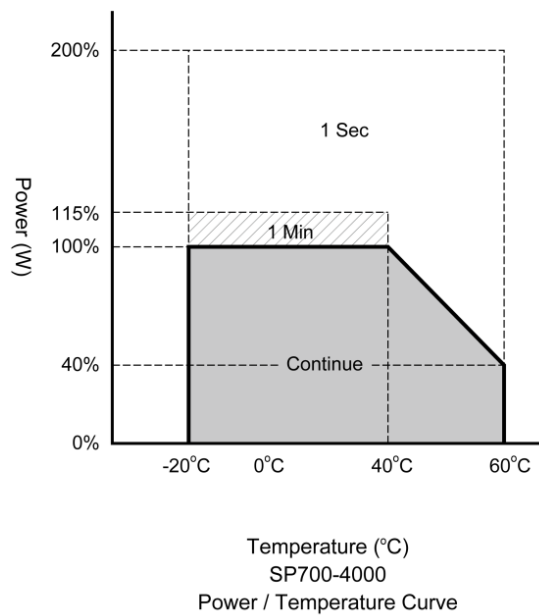


Figure 2 Output power vs. input voltage

2.3 Mechanical Drawings

2.3.1 SP series drawing

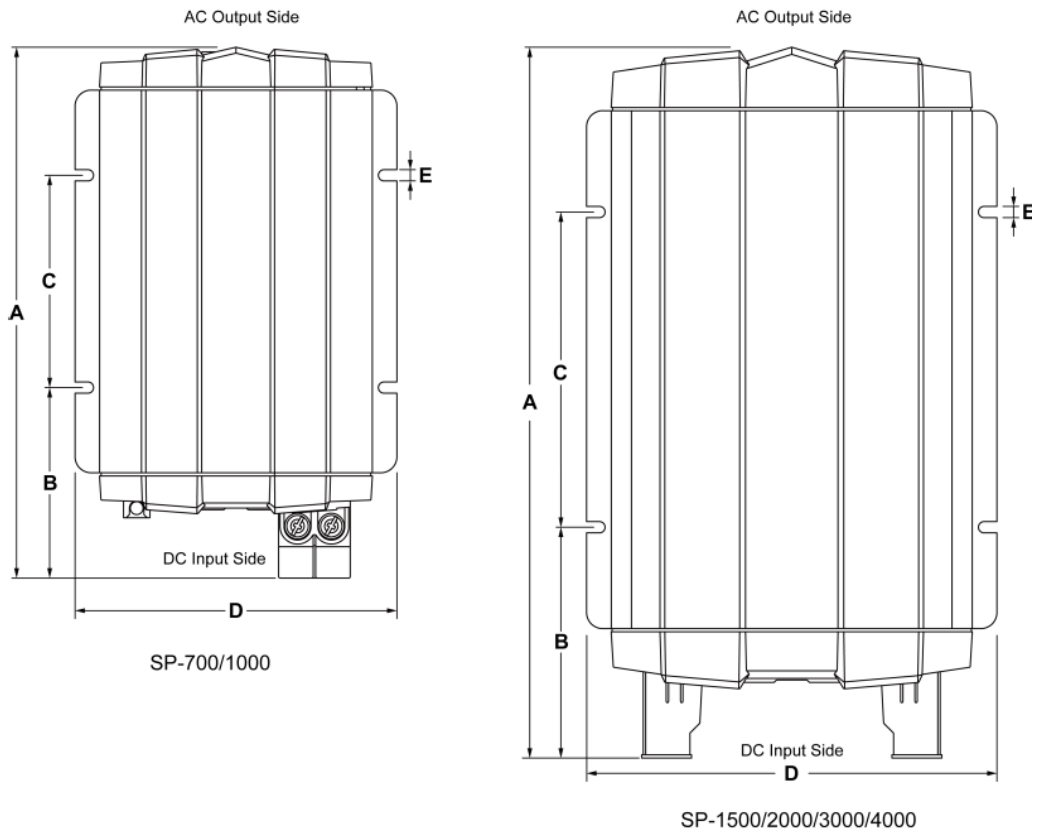


Figure 3. SP series drawing (Top View)

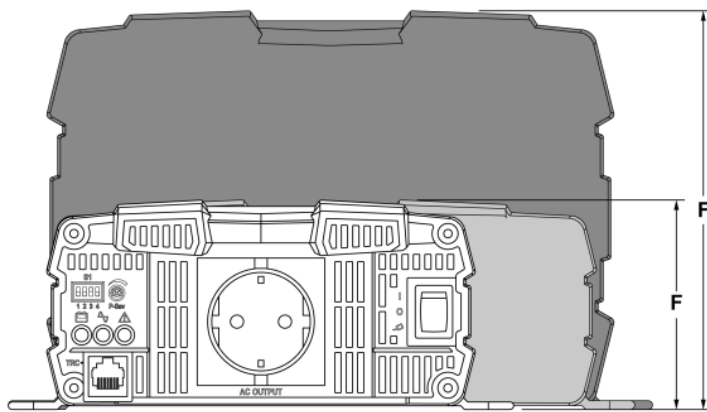


Figure 4. SP series drawing (Side View)

Model	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)
SP-700	330.1	118.5	132	200	7	83
SP-1000	372.2	107.5	196	200	7	83
SP-1500	421.3	133.2	196	248	7	83
SP-2000	443.3	144.2	196	248	7	83
SP-3000	442	143.5	196	255	7	158
SP-4000	462	153.5	196	255	7	158

3 INSTALLATION AND MAINTENANCE

3.1 AC Output Side (Front Panel) Introduction

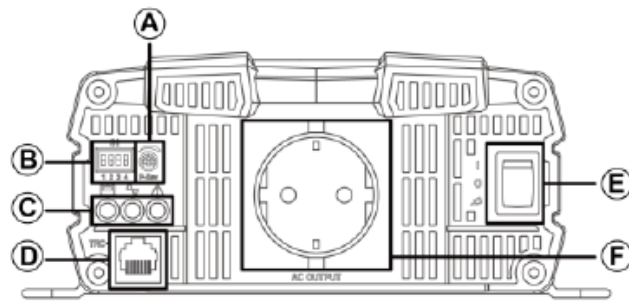


Figure 5. SP-700/1000 AC output panel view

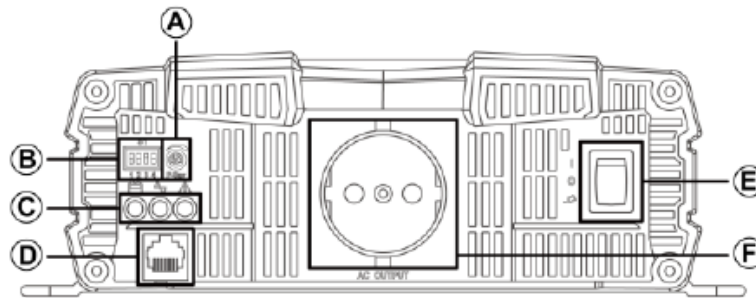


Figure 6. SP-1500/2000 AC output panel view

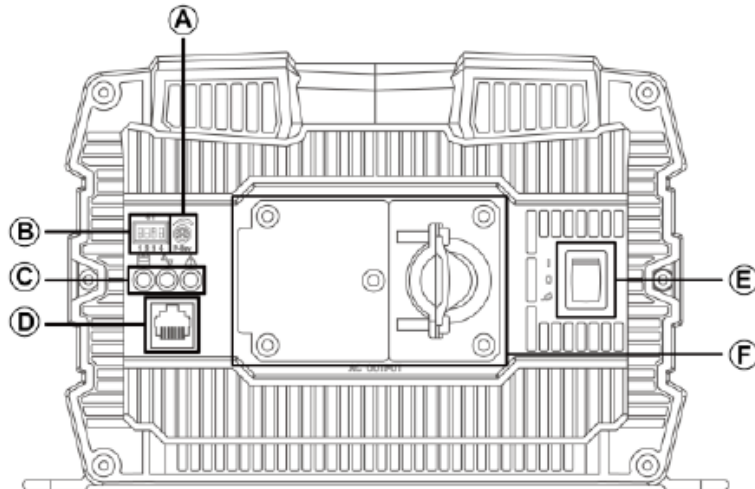


Figure 7. SP-3000/4000 AC output panel view

Model	Model SP-700, SP-1000, SP-1500, SP-2000	SP-3000, SP-4000
(A)	Saving power adjustment	
(B)	Function switch	
(C)	Function LED	
(D)	TRC port	
(E)	Main switch	
(F)	AC output socket	AC output terminal

3.1.1 Main Switch

The 3-stage rocker switch (E) is for turning on, turning off and remote mode.

3.1.2 LED Indicators

3.1.2.1 Left LED, Input (Battery) voltage level display

LED status (C)	DC 12V	DC 24V	DC 48V
Red	< 11.0V	< 22.0V	< 44.0V
Orange	11.0 ~ 11.5V	22.0 ~ 23.0V	44.0~46.0V
Green	11.5 ~ 15.0V	23.0 ~ 30.0V	46.0~60.0V
Orange	15.0 ~ 15.5V	30.0 ~ 31.0V	60.0~62.0V
Red	>15.5V	>31.0V	>62.0V

Table 15. Input Voltage Level LED Indicator

3.1.2.2 Center LED, Output AC Load Level (PF=1)

LED status (C)	Green	Orange	Red
SP-700	0 ~ 700 VA	700 ~ 805 VA	> 805 VA
SP-1000	0 ~ 1000 VA	1000 ~ 1150 VA	> 1150 VA
SP-1500	0 ~ 1500 VA	1500 ~ 1725 VA	> 1725 VA
SP-2000	0 ~ 2000 VA	2000 ~ 2300 VA	> 2300 VA
SP-3000	0 ~ 3000 VA	3000 ~ 3450 VA	> 3450 VA
SP-4000	0 ~ 4000 VA	4000 ~ 4600 VA	> 4600 VA

Table 16. Output Load Level LED Indicator

3.1.2.3 Right LED, Inverter Status / Fault condition

LED status (C)	Status	Recovery point
Green	Normal	
Red	OCP/OLP (AC output short and over load)	
Red Blink	UVP (Input DC voltage under spec)	12.5V @ DC12V system 25V @ DC24V system 50V @ DC48V system
Red Fast Blink	OVP (Input DC voltage over spec)	14.5V @ DC12V system 29V @ DC24V system 58V @ DC48V system
Orange	Device start-up process abnormal	X
Orange Fast Blink	UTP (Heat sink temp. under -20 degree)	< 0 degree C
Orange Slow Blink	OTP (Heat sink temp. over 80 degree)	60 degree C (heat sink temperature)

Table 17. Inverter LED Status Indicator

3.1.3 Function Switch Introduction

3.1.3.1 Function Switch Definition

Dip Switch (B)	Function
S1	Voltage select
S2	Voltage select
S3	Frequency Select
S4	Power saving ON/OFF

Table 18. Function Switch Definition

3.1.3.2 Output voltage selection (S1 & S2)

Output voltage	S1	S2
100V / 200V	OFF	OFF
110V / 220V	ON	OFF
115V / 230V	OFF	ON
120V / 240V	ON	ON

Table 19. Function Switch definition: output voltage selection

Note! 100V series can be selected between 100/110/115/120VAC, and 200V series can be selected between 200/220/230/240VAC.

3.1.3.3 Output Frequency Selection (S3)

Frequency	S3
50Hz	OFF
60Hz	ON

Table 20. Function Switch definition: Output Frequency selection

3.1.3.4 Power Saving Selection (S4)

Saving function	S4
OFF	OFF
ON	ON

Table 21. Function Switch definition: Power Saving selection

3.1.3.5 Power Saving Load Adjustment

The user can adjust the variable resistor (VR) to set the wake up power saving threshold according the load condition, the setting range is shows below:

(A) VR	Input Saving Power (Min)	Saving Wake up Power (Min)
SP-700	<20 VA	>40 VA
SP-1000	<20 VA	>40 VA
SP-1500	<20 VA	>40 VA
SP-2000	<20 VA	>40 VA
SP-3000	<40 VA	>60 VA
SP-4000	<40 VA	>60 VA

Table 22. Power saving setting range (Min)

(A) VR	Input Saving Power (Max)	Saving Wake up Power (Max)
SP-700	<110 VA	>160 VA
SP-1000	<110 VA	>160 VA

(A) VR	Input Saving Power (Max)	Saving Wake up Power (Max)
SP-1500	<110 VA	>160 VA
SP-2000	<110 VA	>160 VA
SP-3000	<240 VA	>280 VA
SP-4000	<240 VA	>280 VA

Table 23. Power saving setting range (Max)

3.1.4 TRC Port (RJ-45)

Pin Number	Signal Description (0)	
1	Reserved	--
2	PH-L	Zero-Crossing Signal
3	PH-N	Zero-Crossing Signal
4	Bypass	Transfer Relay Driver Signal
5	12V	Internal power for TR40 controller
6	5V	Internal power for TR40 controller
7	GND	The same polarity and the negative battery
8	Reserved	--

Table 24. SP Series TRC Port: RJ-45.

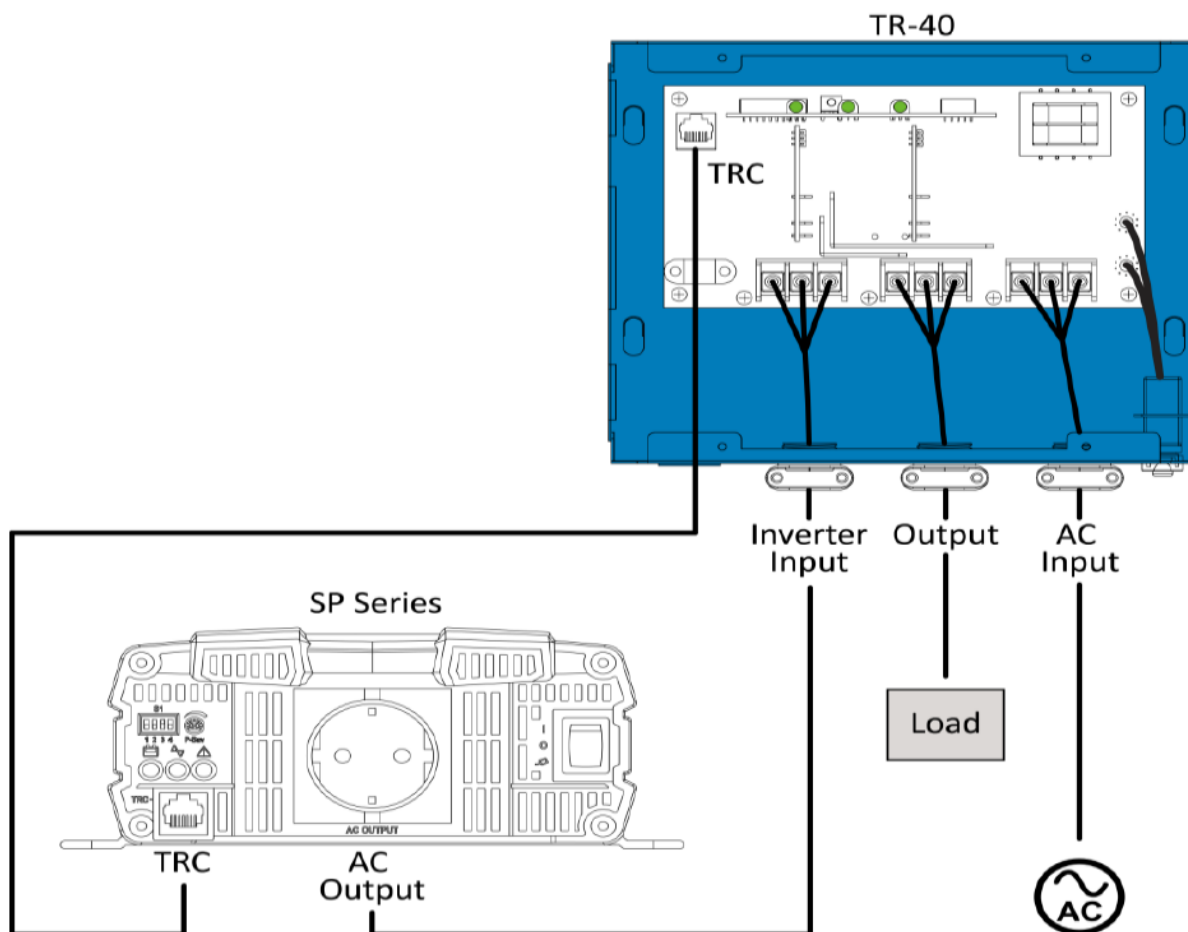


Figure 8. Wiring between SP series and TR-40

Note! TR-40 refer to the TR40 user manual

3.1.5 AC output Interface

3.1.5.1 SP-700/1000/1500/2000 AC output interface

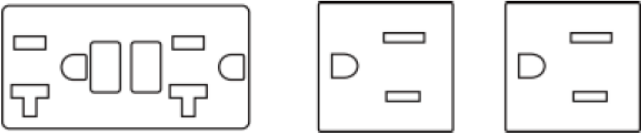
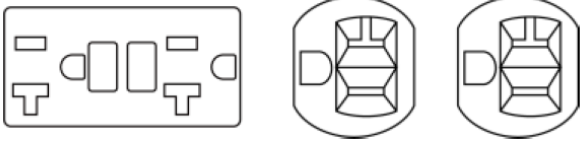
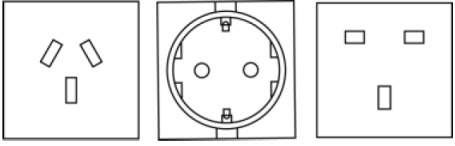

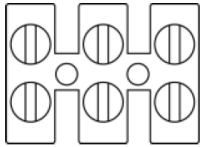
Socket Type (F)	Applicable Model
	SP-700/1000/1500-112/124/148
	SP-2000-112/124/148
	SP-700/1000/1500/2000-212/224/248
	SP-700/1000/1500/2000-112/124/148 SP-700/1000/1500/2000-212/224/248
	SP-3000-112/124/148/212/224/248 SP-4000-124/148/224/248

Table 25. SP Series AC Socket vs. Model

3.1.5.2 SP-3000/4000 AC output interface

Terminal	(F)	Wire colour	Wire length / gauge
AC terminal	Line (L)	Black	Within 16 feet / AWG# 200-240VAC: AWG12 100-120VAC: AWG10
	Neutral (N)	White	
FG (Ground)		Green / Yellow or Bare copper	26~32 feet / AWG# 10 ~12

Table 26. SP-3000/4000 Series AC output wiring

3.2 DC Input Side (Rear Panel) Introduction

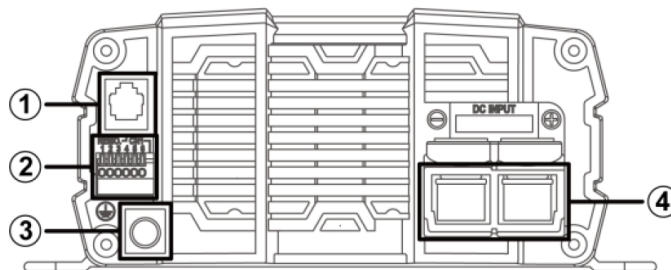


Figure 9. SP-700/1000

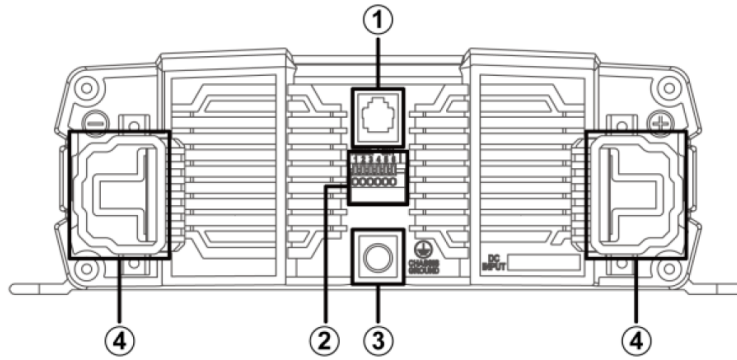


Figure 10. SP-1500/2000

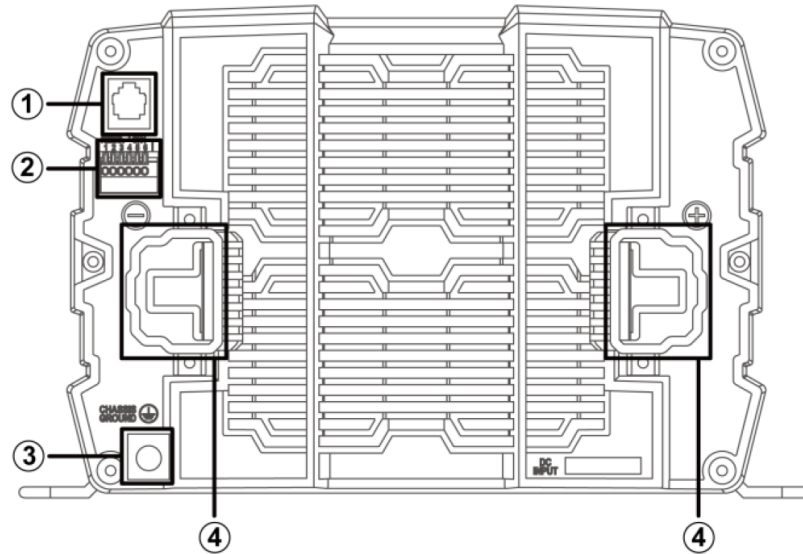


Figure 11. SP-3000/4000

Model	SP-700, SP-1000, SP-1500, SP-2000, SP-3000, SP-4000
(1)	Remote port (RJ11)
(2)	Remote control terminal
(3)	Chassis ground
(4)	DC input connector

Table 27. Series DC input side introduction

3.2.1 Remote Port (RJ-11)

The SP Series Inverter can be compatible with CR-8, and CR-16 remote control via RS-232 Communication. Before using the remote control, make sure the main switch on inverter is set to the “REMOTE” position.

Pin Number	Signal Description (1)	
1	Not used	--
2	GND	The same polarity and the negative battery
3	RXD	RS232 RXD
4	TXD	RS232 TXD
5	RMT	Remote Controller Panel Positive supply
6	VCC	Internal power for Remote controller

Table 28. SP Series Remote Port: RJ-11

3.2.2 Remote Control Terminal (2)

Dry contact terminals (2) may be connected to a Form C relay for “FAULT” indication. When “FAULT” occurs, the relay switches.

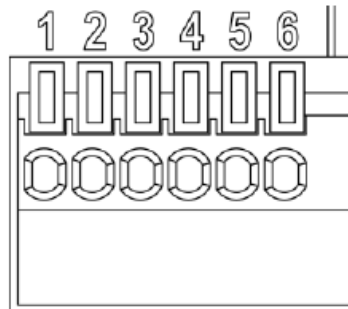


Figure 12. Remote control terminal

Terminal	Description	Terminal	Description
1	Dry contact (Normally open)	4	Enable+ (ENB)
2	Common	5	Enable- (ENB)
3	Dry contact (Normally closed)	6	Ground

Table 29. Dry contact terminal definition

Note! Pin-6 (Ground) is linked to battery negative terminal

Note! Fault conditions include Input under / over voltage, output short circuit / over load, over / under Temperature.

Caution! Please follow the following steps for the installation:

Before installing the inverter, ensure that the main switch is set to the “OFF” position

Before using the remote function, ensure that the main switch is set to the “REMOTE” position

Ensure that the remote contacts are off

Use 20 ~ 24 #AWG wire to connect the remote control terminals

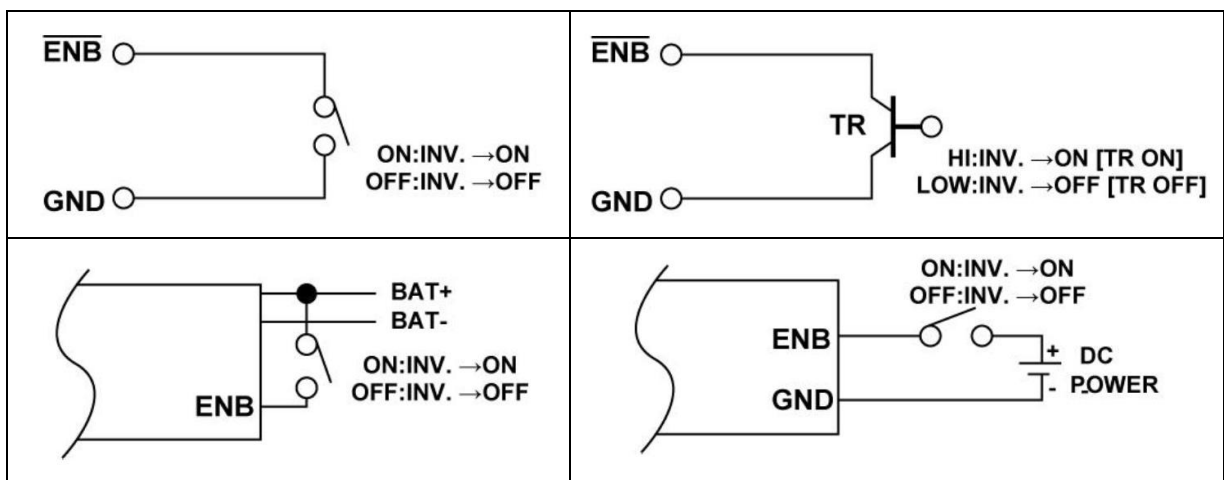


Figure 13. Wiring for control

3.2.3 General instructions for DC Input

3.2.3.1 Before installation:

The DC cables should be as short as possible (less than 1.8 metres ideally)

The size of the cable should be thick enough to limit the voltage drop to less than 2% when carrying the maximum input current. This prevents frequent low-input voltage warnings and shutdown.

UVP (Under Voltage Protection) warning may result if there is excessive voltage drop across the DC cables between the batteries and the inverter. Increasing your DC cable size will help improving the situation

Batteries are capable of providing very large currents in a short circuit condition. To prevent possibility of this hazard, use Very Fast Acting DC Fuse in line with the positive cable. The fuse should be as close to the positive battery terminal as possible. Use Bussmann ANN series fuses (which would require Fuse Block 4164) or equivalent.

The following sizes of cables and fuses are recommended for up to 1.8m distance between the batteries and the inverter.

Model	Wire AWG	Inline fuse	External fuse
SP-700-112 / 212	#4	100A	>100A
SP-700-124 / 224	#7	50 A	>50 A
SP-700-148 / 248	#10	25 A	>25 A
SP-1000-112 / 212	#2	143A	>143A
SP-1000-124 / 224	#4	72A	>72A
SP-1000-148 / 248	#8	36A	>36A
SP-1500-112 / 212	#1/0	214A	>214A
SP-1500-124 / 224	#4	107A	>107A
SP-1500-148 / 248	#7	54A	>54A
SP-2000-112 / 212	#2/0	286A	>286A
SP-2000-124 / 224	#2	143A	>143A
SP-2000-148 / 248	#4	72A	>72A
SP-3000-112 / 212	#4/0	429A	>429A
SP-3000-124 / 224	#1/0	215A	>215A
SP-3000-148 / 248	#4	108A	>108A
SP-4000-124 / 224	#2/0	286A	>286A
SP-4000-148 / 248	#2	143A	>143A

Table 30. SP Series Wiring Cable diameter and Inline Fuse

3.2.4 Chassis Ground (3)

Must be connected to earth / ground prior to making any other connections to the equipment (3).

3.3 Maintenance

Make sure that the fan vents are not blocked.

Use a Vacuum cleaner to remove any dust from the fan area. When cleaning the case or front panel, use a soft, dry cloth, only. If the case or front panel is very dirty, use a neutral, non-abrasive detergent. Do not use alcohol or ammonia based solutions.

Regular service, and relocation of the inverter, should be performed by a qualified service technician. Avoid spilling liquid on the inverter.

4 OPERATION

4.1 Connecting the DC cables

Connect the DC input terminals to the correct 12V / 24V / 48V battery or other DC power source [+] is positive, [-] is negative. Reverse polarity connection can blow the internal fuse and may damage the inverter permanently.



Figure 14. DC cable connection

Warning! Make sure that all the DC connections are tight (torque to 9 - 10 ft-lbs, 11.7 - 13 Nm). Loose connections could result in overheating and can be a potential hazard.

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.

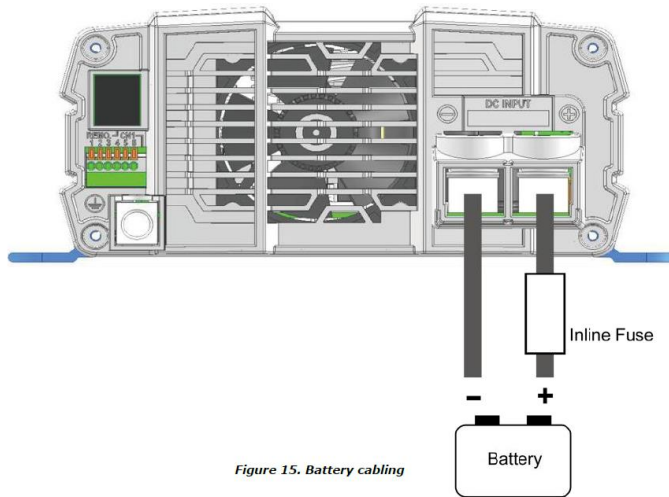


Figure 15. Battery cabling

Figure 15. Battery cabling

4.2 Connecting the input power

Before making the DC input side connections (4), the main switch (E) must be “OFF”.

4.3 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 is over the rated power of the inverter, remove any non-essential loads until the total power consumption is below the rated power.

4.4 Switch ON / OFF Inverter

Set the power switch to the “ON” position (E). The inverter will carry out self-diagnosis and, the LED's Note the LEDs are tri-colour. Set the power switch to the “OFF” position (E). The inverter stops and all the lights that are on will go off.

4.5 Protection Mechanism

Model	Over Voltage (DC)		Under Voltage Alarm	Under Voltage	
	Shutdown	Restart		Shutdown	Restart
12V	16.5V ± 0.3V	14.5V ± 0.3V	11V ± 0.3V	10.5V ± 0.3V	12.5V ± 0.3V
24V	33V ± 0.5V	29V ± 0.5V	22V ± 0.3V	21V ± -0.5V	25V ± 0.5V
48V	66 ± 1V	58V ± 1V	44V ± 0.3V	42V ± 1V	50 ± 1V

Table 31. Protection Mechanism

Model	Over temperature protection	
	Shutdown	Restart
12V	80°C	60°C
24V		
48V		

Table 32. Over Temperature Protection Mechanism

5 INFORMATION

5.1 Warning

Warning! Do not open or disassemble the SP series Inverter. Attempting to service the unit may cause risk of electrical shock or fire.

5.2 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 Antares TDC

Please note that we are only responsible for ensuring our products are operational before delivering.

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

Applications engineering, Antares have an experienced team of engineers who are happy to discuss the integration of the inverters into the application. Further details of all of our products can be found on our website www.antares.co.uk or by calling us on 01628 535440.