COTEK

SR-1600 PLUS User's Manual

EN
[Page 3]

Telecom / Datacom
PURE SINE WAVE INVERTER

Legal Provisions

Table of Contents

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 compartments containing batteries or flammable materials or in locations 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.
- 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

Warning! For the terminals on the backplane including AC, battery, output, signal, please do not change or rework the terminal wiring unless you are a qualified engineer

1-2. Other Safety Notes

- Upon receipt, examine the carton box for damage. Notify the carrier immediately, before opening, if damage is evident.
- 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.
- 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 -25℃ 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 SR-1600 PLUS is a highly reliable, modular design DC-AC inverter system, designed with advanced power electronic and microprocessor technology offering the following features：

- Simple setting and scalable system capacity supports up to 32 pcs (51.2KW)
- Seamless switch between AC and DC source
- Built-in input and output full isolation
- Adjustable wide AC input range (150-265V for 230V system / 75-132V for 120V system).
- High efficiency (~95%)
- Power factor ≧ 0.99
- Advanced Protection Features
  - Input protection：polarity reverse, under-voltage, over voltage protection
  - Output protection：short circuit, over load, over temperature, over voltage protection
- Operating mode
  - AC mode (Default)：AC utility power is the main source. DC power is the secondary source. PFC>0.99. Max efficiency 95%. When the AC utility is abnormal, the switching time is 0 second.
  - AC Ratio mode：DC and AC input at same time. The percentage of AC and DC load can be assigned to 100%. If AC set 70%, then remaining 30% is DC.

Note：

The AC input power must be higher than 300W after assigning DC and AC ratio.

  - DC mode：DC power is the main source. AC utility is the secondary source. THD<3%, Max efficiency is 91%. The switching time between AC and DC power is 0 second.

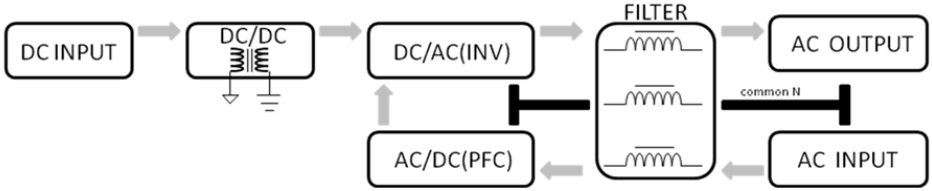
2-2. Electrical Specification

Electrical	Specification Item	Model No. SR-1600-124 PLUS	SR-1600-148 PLUS	SR-1600-224 PLUS	SR-1600-248 PLUS
AC Input	Nominal Voltage	120VAC		230VAC	
	Voltage Range (default)	90~130VAC ± 3%		180~260VAC ± 2%	
	Voltage Range (adjustable)	75-132.5Vac		150-265Vac	
	Power Factor	> 0.99 @ rating power			
	Frequency	50 / 60 Hz			
	Synchronization Range	47~53 Hz, 57~63 Hz			
DC Input	Nominal Voltage (Voltage range)	24VDC	48VDC	24VDC	48VDC
	Voltage Range	18~34VDC ± 3%	36~68VDC ± 3%	18~34VDC ± 3%	36~68VDC ± 3%
	Nominal Current	56A	37A	56A	37A
	Max. Input Current (15 sec.)	90A	60A	90A	60A
AC Output	Rating Power	1200W/1600VA	1600W/1600VA	1200W/1600VA	1600W/1600VA
	Overload Capacity	105%~150% rated power (15 seconds)			
	Nominal Voltage	120VAC		230VAC	
	Output Voltage Range	100~120VAC ± 3%		200~240VAC ± 2%	
	Max. Efficiency(AC)	94%		95%	
	Max. Efficiency(DC)	89%	90%	90%	91%
	Frequency	50 / 60Hz			
	THD	< 3% (Above 80% Resistive Load)			
	Turn ON Delay	< 10 seconds			
	Crest Factor at Nominal Power With short circuit management and protection	DC mode: 3 times nominal current AC mode: 6 times nominal current		DC mode: 3 times nominal current AC mode: 10 times nominal current	
Control & Signal	Indicator	LED			
	Advanced Control (Comm. protocol)	RS-485 control module (MODBUS)			
	Failure Indicator	Buzzer alarm			
Protection	DC Input	Over Voltage / Under Voltage / Reverse Polarity			
	AC Input	Over Voltage / Under Voltage / Over Current			
	Output	Short Circuit / Overload / Over Temperature			
Transfer	Inverter to Utility AC	0 second			

Electrical	Specification	Model No.			
	Item	SR-1600-124 PLUS	SR-1600-148 PLUS	SR-1600-224 PLUS	SR-1600-248 PLUS
Performance	Utility AC to Inverter	0 second			
Environment	Operating Temp.	-25°C ~ 40°C; refer to SR-1600 PLUS power de-rating curve			
	Storage Temp.	-40℃~70℃			
	Relative Humidity	95%, non-condensing			
	Vibration	Meet BS EN 61373			
Safety & EMC	Safety standards	Meet UL 62368-1		Certificated EN 62368-1	
	EMC standard	Certificated FCC Class B		EN 55032: 2015+A11:2020 EN 55035: 2017 / A11: 2020	
Others	Dimension-Module	105x83x410 mm / 4.13x3.27x16.14 inch			
	Dimension-Shelf	446x85x509mm / 17.56x3.35x20.04 inch			
	Weight (net)	Module：3.8kg; 4pcs / Shelf：6.5kg; 1pcs			

Table 1. SR-1600 PLUS specification

2-3. Block Diagram



2-4. Mechanical Drawings

2-4-1. SR-1600 PLUS Single Module

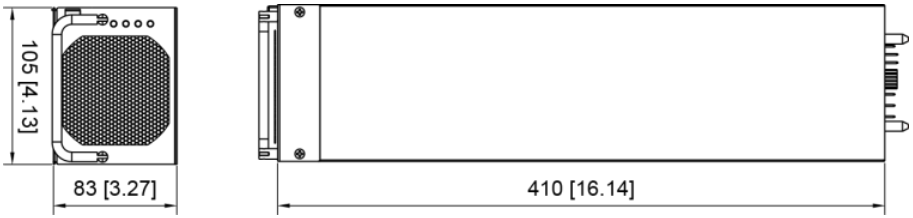


Figure 1. SR-1600 PLUS mechanical drawing-single module

2-4-2. SR-1600 PLUS Rack (19” 2U)

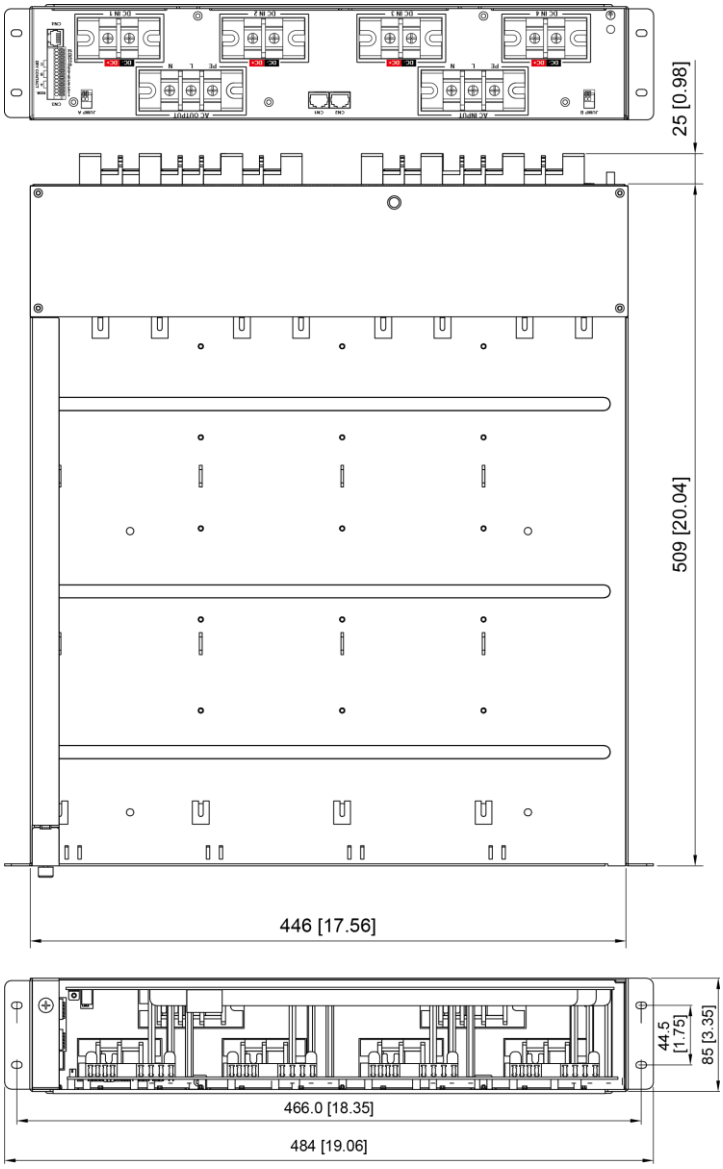


Figure 2. SR-1600 PLUS mechanical drawing-rack

2-5. SR-1600 PLUS De-rating Curve

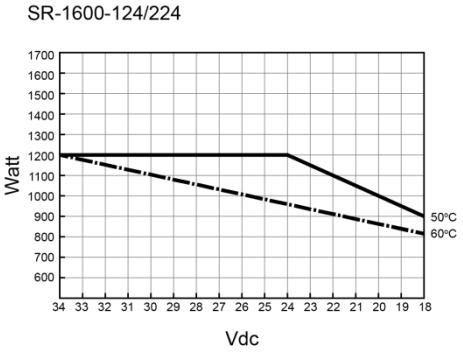


Figure 3. SR-1600 PLUS de-rating curve: SR-1600-124/224 PLUS

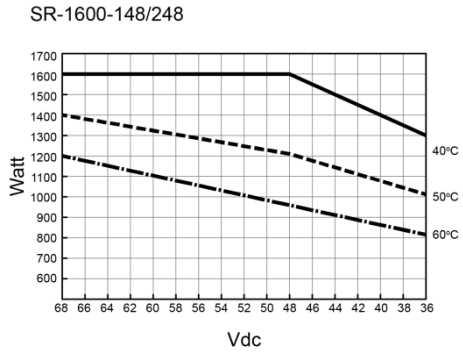


Figure 4. SR-1600 PLUS de-rating curve: SR-1600-148/248 PLUS

2-6. Protection Mechanism

Type	Over Voltage			Under Voltage		
	Shutdown	Restart	Alarm	Shutdown	Restart	Alarm
110 Vac	130±3%	125±3%	125±3%	90±3%	95±3%	95±3%
230 Vac	260±3%	250±3%	250±3%	180±3%	190±3%	190±3%
24 Vdc	34±0.5	28±0.5	33±0.5	18±0.5	25±0.5	21±0.5
48 Vdc	68±1	56±1	66±1	36±1	50±1	42±1

Table 2. SR-1600 PLUS protection mechanism

3. Installation and Maintenance

3-1. Introduction

3-1-1. Front panel

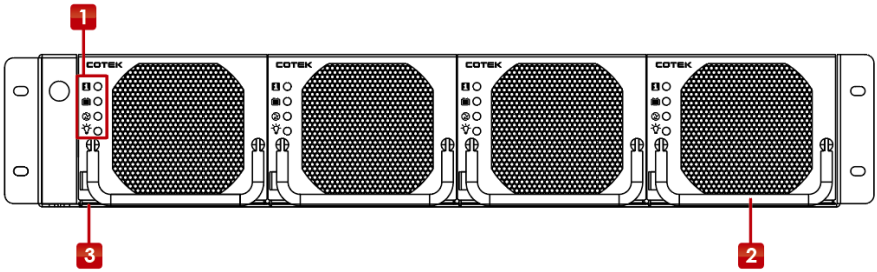


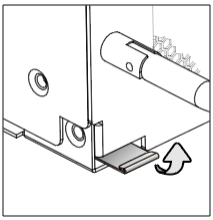
Figure 5. SR-1600 PLUS shelf front panel view

1 LED Indicator (For LED status, please refer to 5-1)

Icon	Description	Icon	Description
	System status LED indicator		AC input power indicator
	DC battery power indicator		Load indicator

2 Inverter handle

3 Release latch: Lift the release latch to unlock and remove the SR-1600 PLUS module from the chassis.



3-1-2. Rear panel

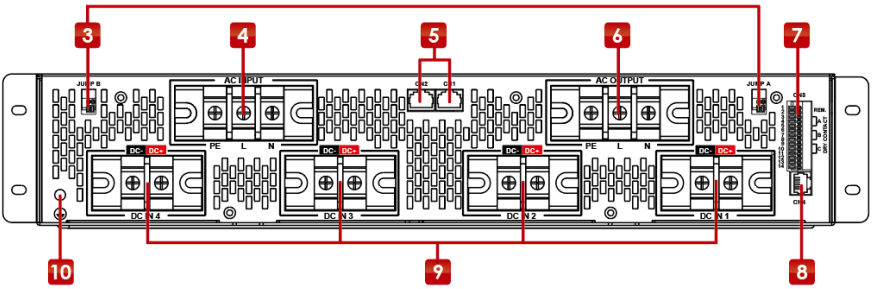


Figure 6. SR-1600 PLUS shelf rear panel

3 Jumper A & B (terminal resistor):
In parallel operation, adjust between OPEN and SHORT to complete the parallel setup (Refer to 3-3-2)

Short (Default)

Open

4 AC input terminal: Connect to AC utility (Refer to 3-2-2)

5 Parallel Connection Port: In parallel operation, the setup is completed by wiring between the CN1 and CN2 connection ports. (Refer to 3-3-2)

6 AC output terminal: Connect to AC load (Refer to 3-2-2)

7 Dry contact and remote: (Refer to 3-4)

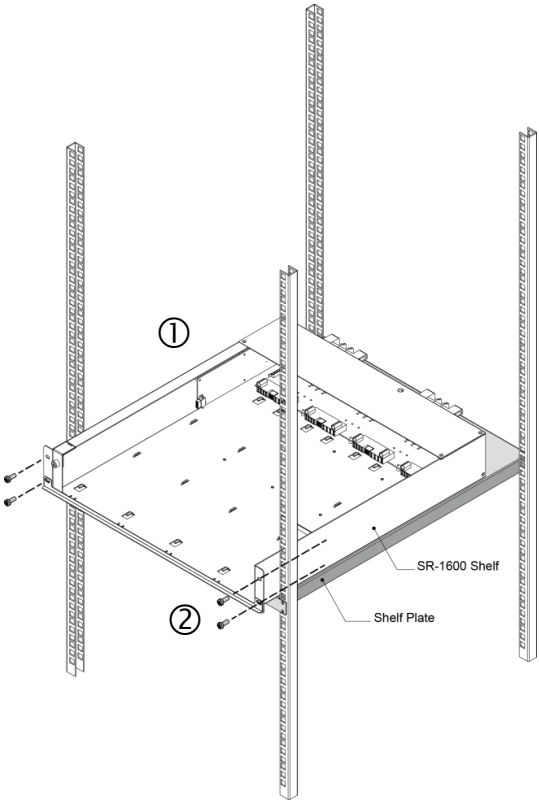
8 RS-485 Modbus: Modbus communication is available via the RJ45 port for computer monitoring and control.

9 DC input: Connect the 24V/48V battery (Refer to 3-2-3)

10 Chassis ground: To prevent the electric shock, please make sure the chassis ground is connected.

3-2. Installation

3-2-1. Hardware Installation



① Insert SR-1600 PLUS shelf into the shelf plate.

② Fix SR-1600 PLUS shelf by 4 screws at its front side.
Note: Please make sure the mounting bracket of your rack mount deceive is equipped before installing SR-1600 PLUS shelf.

③ Insert the SR-1600 PLUS into the shelf slot

④ Make sure the handle is in the down position

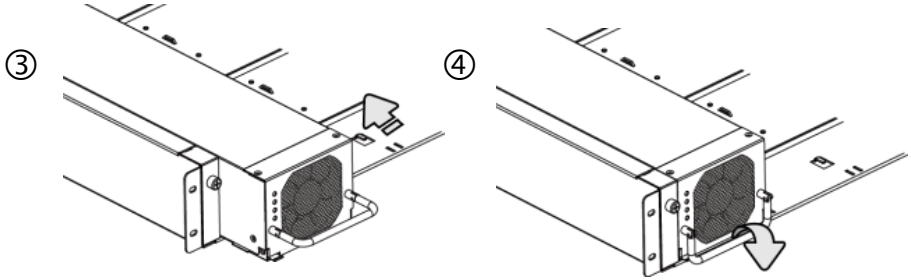


Figure 7. Install SR-1600 PLUS rack and modules

Please keep 20 cm clear space for air flow at front and rear side of SR-1600 PLUS.

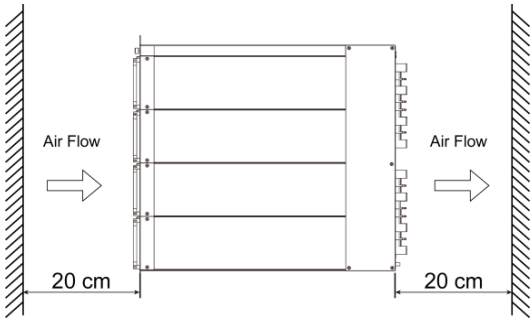


Figure 8. SR-1600 PLUS installation space requirement

3-2-2. AC Input and Output Connections

Connect the AC cable to the N, L, and PE terminals on both AC input and AC output on the rear side of SR-1600 PLUS.

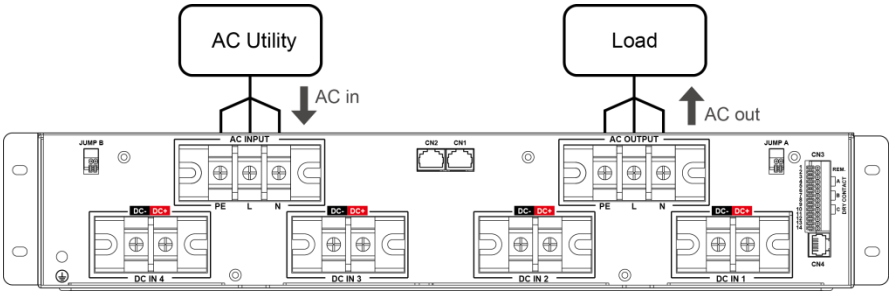


Figure 9. AC terminal connection

Terminal		Wire Color	Wire AWG
AC Input	Line (L)	Black	Breaker suggestion 200-240Vac：50A/Shelf/8AWG 100-120Vac：80A/Shelf/6AWG
	Neutral (N)	White	
AC Output	Line (L)	Black	
	Neutral (N)	White	
Ground		Green-Yellow	6 ~16AWG

Table 3. AC cabling definition

3-2-3. DC Input & Battery Cabling

Connect the 24V/48V battery [+] / [-] to the SR-1600 PLUS [DC+] / [DC-]

There are four battery input sets (DC+, DC-) on the SR-1600 PLUS rear side, and every set is independent. In case the user needs parallel connection, please do the parallel wiring outside the SR-1600 PLUS (please refer to following wiring figure).

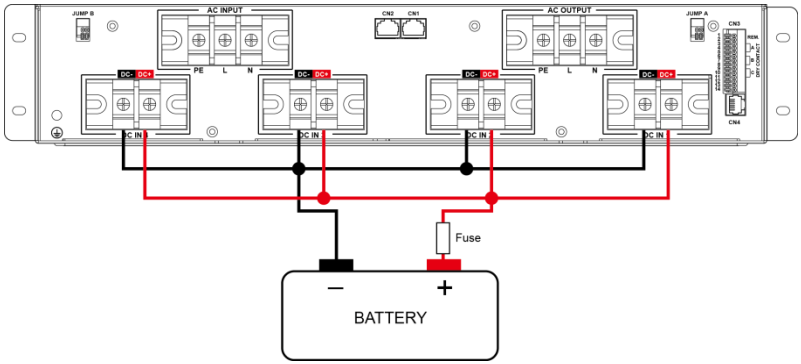


Figure 10. SR-1600 PLUS battery cabling

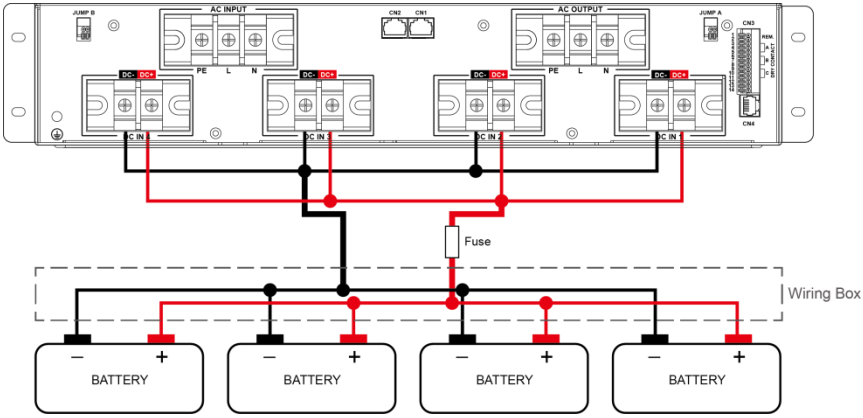


Figure 11. SR-1600 PLUS battery cabling (multi battery I)

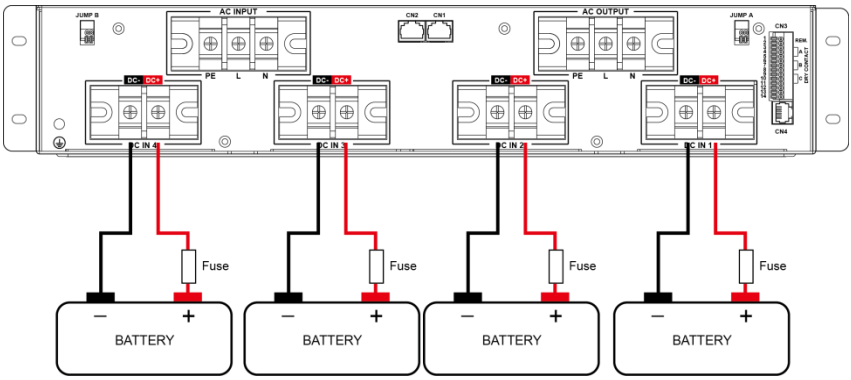


Figure 12. SR-1600 PLUS battery cabling (multi battery II)

Please refer to the suggested battery cable size.

Models	AWG	Cable diameter / per module	Fuse(slow) / per rack	Fuse(slow) / per module
SR-1600-124 / 224 PLUS	#6	4 mm	400A	100A
SR-1600-148 / 248 PLUS	#8	3.1 mm	300A	75A

Table 4. Cable and fuse size

3-3. Parallel Connection (up to 8 shelves)

3-3-1. General instructions for SR-1600 Plus parallel connection

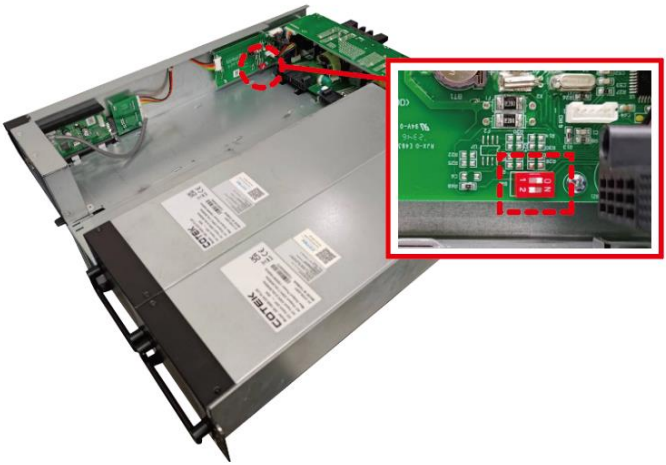
The parallel design of the SR-1600 PLUS is single phase and common-Neutral, AC phase and frequency synchronization is very critical. In a three-phase power supply, it is important that the same phase shall apply to all the shelves in parallel.

Please pay attention to the following parallel wiring instructions:

- AC Input: If N shelves are connected in parallel, single-phase AC input can only go through one circuit breaker and then be connected to the L and N ports of each shelf.
- AC Output: If N shelves are connected in parallel, it is recommended to use a BUS BAR to collectively connect the outputs of each shelf before wiring them to the load.

3-3-2. Parallel Connection Setting

Please make sure below DIP Switch (SW1 on RS485 board) setting is done following each parallel connection



3-3-2-1. Single Rack Setting (Default)

DIP SW1 at RS485 board

DIP Switch	RACK 1
1	ON
2	OFF

Figure 13-1. Single rack jumper & SIP SW1 setting

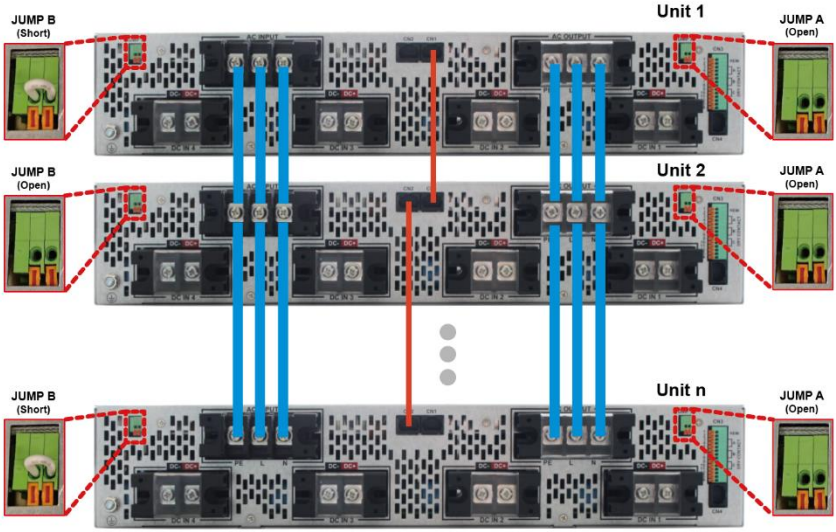
3-3-2-2. Two Racks Connection Setting

DIP SW1 at RS485 board

DIP Switch	RACK 1	RACK 2
1	ON	OFF
2	OFF	OFF

Figure 13-2. two racks jumper & SIP SW1 setting

3-3-2-3. Parallel Connection Setting



DIP SW1 at RS485 board

DIP Switch	RACK 1	RACK 2	RACK 3
1	ON	OFF	OFF
2	OFF	OFF	OFF

Figure 13-3. Parallel Connection jumper & DIP SW1 setting

Note： *If Parallel Connections are more than three racks,* please *turn on DIP Switch of RACK 1 and turn off DIP Switch for the rest of RACKs.*

Note： *All shelves, when connected in parallel, need to be linked by communication lines, namely CAN 1 & CAN 2 ports. This allows for signal synchronization between the shelves.*

Since CN1 and CN2 are internally connected in parallel, there is no difference between connecting CN1 or CN2 between the shelves.

Note: *SR-1600 PLUS utilizes Auto Master mechanism. The module that first acquires priority becomes the Master, while the other modules become Slaves.*

3-4. Dry contact and remote

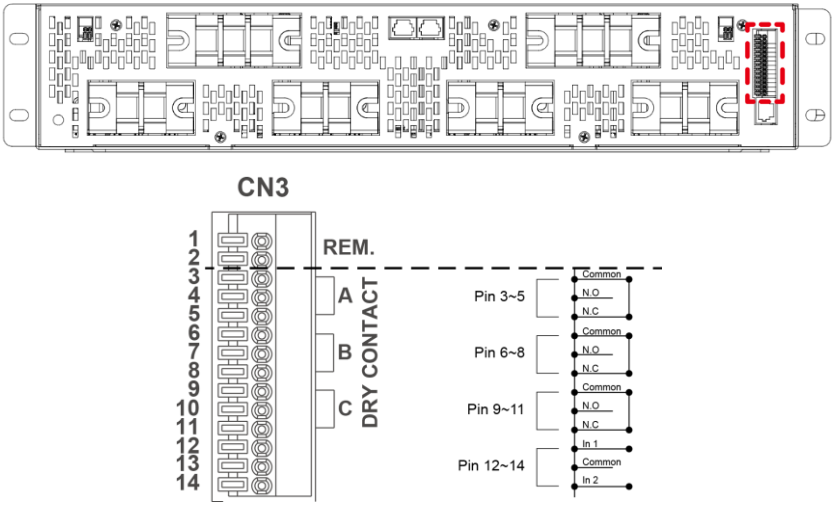


Figure 14. CN3 dry contact pin assignment

Pin	Function	Wiring	Status Description
Pin 1~2	Remote ON/OFF	Pin#1 and pin #2 short/open	Open：Normal output Short：Stop output
Pin 3~5	Major alarm	Switching power 60W Rating 2A at 30VDC wire size 20~24AWG	Normal：N.C-Common short Action：N.O-Common short (Refer to Figure 9.)
Pin 6~8	Minor alarm		
Pin 9~11	Selectable extra alarm to go with Major or minor alarm by RS485/LCM		
Pin 12~13	Digital signal input for Major alarm	Signal voltage：5V wire size 20~24AWG	High：+5V Action Low： 0V Normal
Pin 13~14	Digital signal input for Minor alarm		

Table 5. SR-1600 PLUS CN3 status description

Pin 1~2: Remote ON/OFF

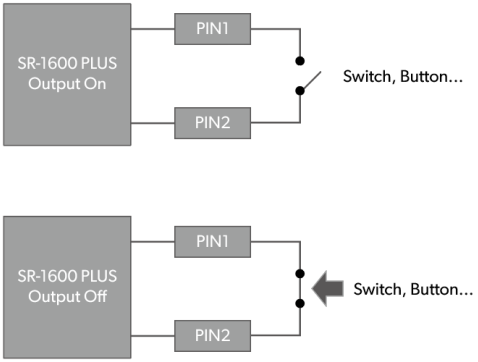


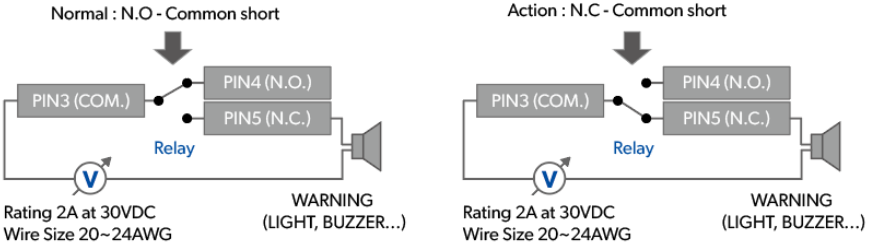
Figure 15-1. Application diagram of dry contact pin1~2

Pin 3~8: Major & Minor alarm

Alarm	Description	Possible Cause
Major	Over Load	System load exceeded the rated capacity for more than 15 seconds
	Module Fault	Internal Parallel Fault or Module Failure detected
	Over Temperature	Temperature is too high
	Both AC and DC abnormal	Both sources fail (AC&DC source abnormal)
	Major relay on	Major fault relay output (Pins 12-13) is energized (High)
	CAN Bus signal fail	CAN Bus signal lost, check termination or connection
Minor	Grid abnormal	AC source failure
	Over Load Alarm	System load has exceeded the rated capacity
	Fan failure	Cooling Fan is not operating
	Redundancy Fault	A redundant module has been removed or a module failure has occurred
	Minor relay on	Minor fault relay output (Pins 13-14) is energized (High)
	BAT. Low	Under DC voltage protection
	BAT. High	Over DC voltage protection
	BAT. Low Alarm	Under DC voltage Alarm
	BAT. High Alarm	Over DC voltage Alarm

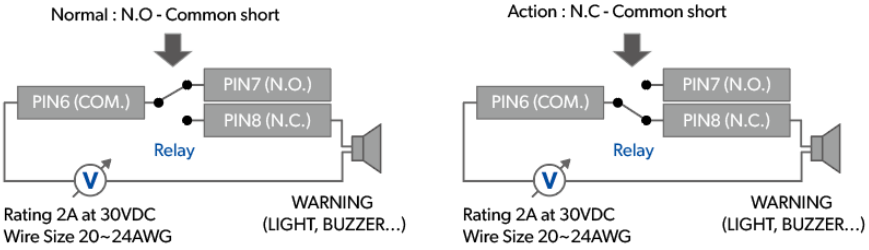
Table 6. Alarm list for dry contact

Major Alarm
Over Load
Module Fault
Over Temp.
DC Abnormal & Grid Abnormal
Major Relay On
CAN Signal Fail



Minor Alarm

Grid Abnormal	BAT. Low
Over Load Alarm	BAT. High
Fan Failure	BAT. Low Alarm
Redundancy Fault	BAT. High Alarm
Minor Relay On	



Pin 9~11: Selectable extra alarm to go with Major or minor alarm by RS485/LCM

Dry contact C setting reference
MODBUS Address: 0x2B(H)
0：Disable
1：Follow dry contact A (major alarm) (default)
2：Follow dry contact B (minor alarm)

RS485 MODBUS protocol please refer **MODBUS User's Manual**

Pin 12~14: Digital signal input for Major & Minor alarm

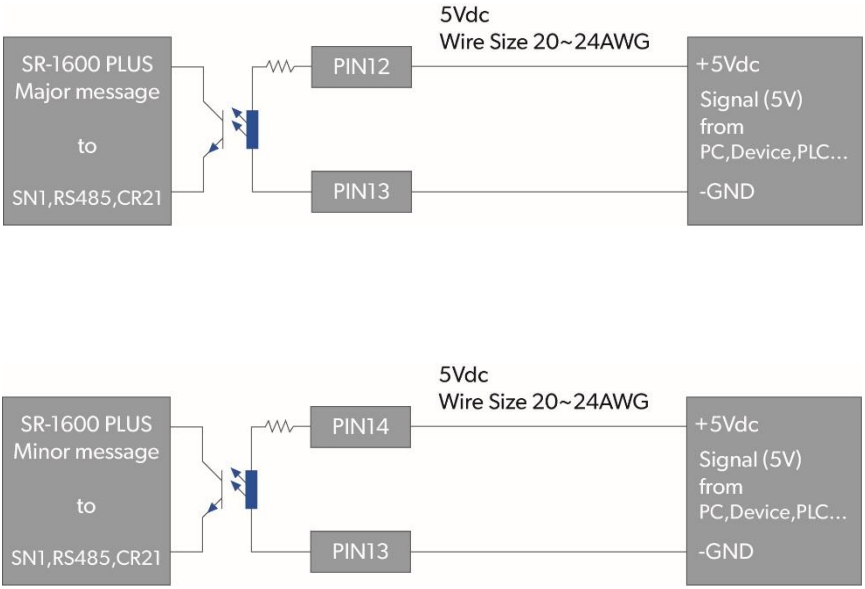


Figure 15-3. Application diagram of dry contact pin12~14

3-5. Maintenance

3-5-1. Inverter Module Replacement

3-5-1-1. Remove the inverter module

Step 1：Pull the SR-1600 PLUS handle upward from its lower position

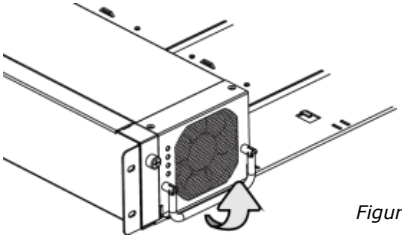


Figure 16. Remove the inverter module

Step 2：Remove the SR-1600 PLUS out of the shelf

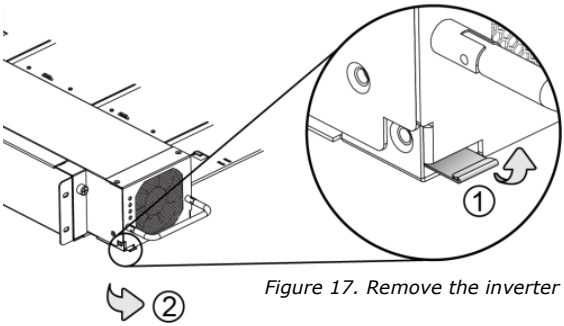


Figure 17. Remove the inverter module

3-5-1-2. Insert the inverter module

Step 1：Insert the SR-1600 PLUS module into the shelf slot and make sure it is fully seated all the way to the back.

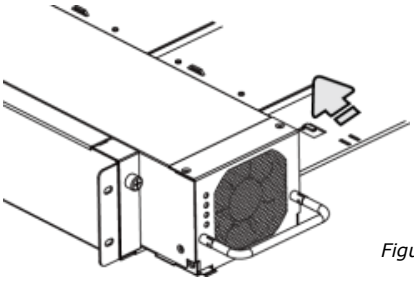


Figure 18. Insert the inverter module

Step 2：Make sure the handle has been returned to its original lower position.

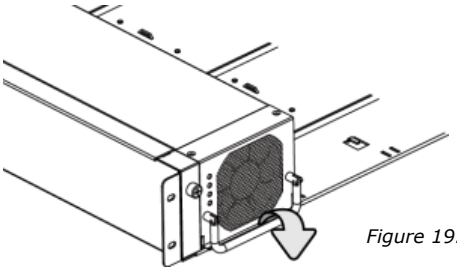


Figure 19. Insert the inverter module

3-5-2. Fan Module Replacement

Warning! Please contact technical person to replace fan module.

Step 1：Please follow the 3-5-1-1. to remove the SR-1600 PLUS module out of shelf.

Step 2：Use the screw driver to remove the 4 screws on the fan module (top side 2 pcs, rear side 2 pcs), and user can remove the fan module.

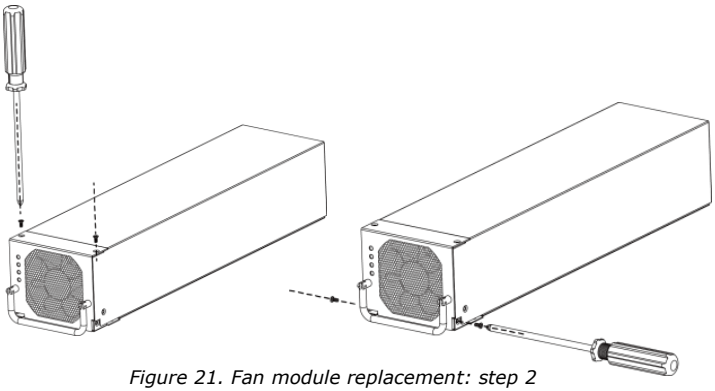


Figure 21. Fan module replacement: step 2

Step 3：Remove 4 screws and power cord on fan

Step 4：Replace the new fan and fix 4 screws and power cord on new fan

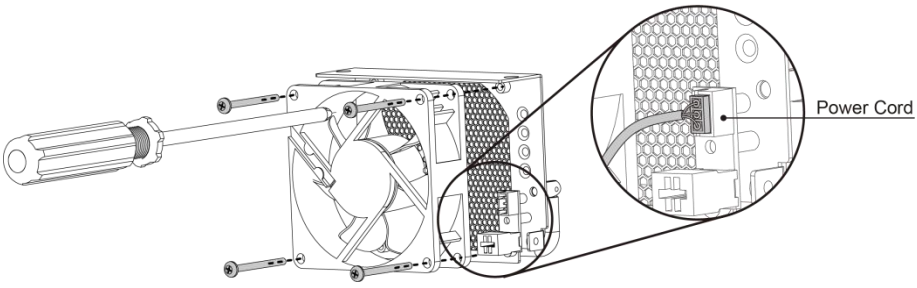


Figure 22. Fan module replacement: step 4

Step 5：Connect the fan module into the front side of inverter and make sure PCB pin plugged into the slot

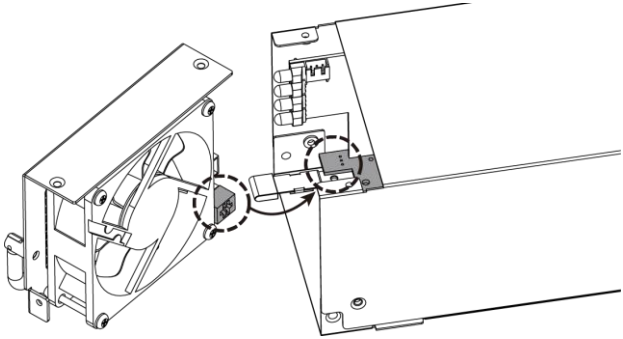


Figure 23. Fan module replacement: step 5

Step 6：Use the screw driver to fix 4 screws on fan module.

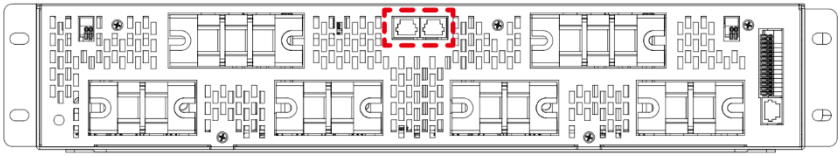
Step 7：Follow 3-5-1-2 to insert the inverter module.

Note：

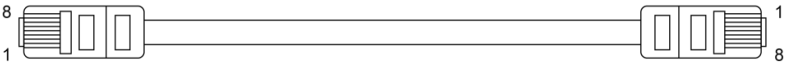
1. Please make sure the fan power cable is connected well.
2. It is recommended to clean the dust from the fan guard every three months to help extend the fan’s lifespan.

4. Cable Guide

4-1. Parallel Connection Cable for Shelves

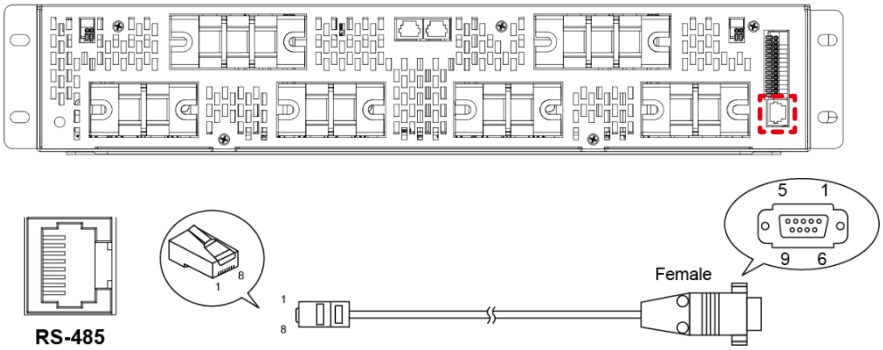


Please use RJ-45 cable to connect the shelves. For optimal performance, make sure the cable length is less than 100cm.



#Pin	CN 1	CN 2
1	CAN_H	CAN_H
2	CAN_L	CAN_L
3	Reserved	Reserved
4	Reserved	Reserved
5	Reserved	Reserved
6	Reserved	Reserved
7	GND	GND
8	5V	5V

4-2. RS-485 Modbus Cable



PIN Num.	RS-485 Description	RS-485Transfer RS-232(HC-05) D-SUB PIN Num.
1	Not used	Not used
2	Not used	Not used
3	Not used	Not used
4	Data+(A)	1
5	Data-(B)	2
6	Not used	Not used
7	Not used	Not used
8	GND	GND(Optional)

Table 7. RS-485 PIN Assignment

5. LED Status Description & Trouble shooting

5-1. LED Status Description

Example: SR-1600- 248 PLUS Type

LED Indicator			AC	
Off				No output
Solid ON (Green)	Power by AC (Grid)	Normal (48~66V)	Voltage & Frequency OK	Load 0~60%
Fast Blinking (Green)	Power by AC&DC (Grid & Battery)			
Slow Blinking (Green)	Startup		Frequency synchronization	
Solid ON (Orange)	Power by DC (Battery)	Battery Low voltage (42~48V)		Load 60~105%
Fast Blinking (Orange)		Battery High voltage alarm (Default > 66V)	Grid AC high voltage alarm (Default >250V)	Over load alarm (>105%)
Slow Blinking (Orange)	Remote off	Battery Low voltage alarm (Default < 42V)	Grid AC low voltage alarm (< 190V)	
Solid ON (Red)	Module failure			Over load /Short protection
Fast Blinking (Red)	Different system output voltage	Battery over voltage (Default >68V)	Over voltage (Default >260V)	
Slow Blinking (Red)	Different system frequency (50/60Hz)	Battery under voltage (Default <36V)	Under voltage (Default <180V)	
Intermittent Blinking (Red)	Temp. protection		Abnormal Frequency	
Intermittent Blinking (Red)	Fan failure			

5-2. Trouble shooting

LED status	Possible Description	Solution
LED red intermittent blinking — · · — · ·	Fan failure	1. Make sure the fan is not stuck 2. Replace the fan
LED red intermittent blinking — — — —	Over temperature protection (OTP)	1. Make sure the installation space 2. Check the fan and clean the fan filter 3. Reduce the environment temperature 4. Reduce the load
LED red fast blinking • • • • • •	Different output voltage module in the same rack	1. Confirm system output voltage 2. Remove abnormal module 3. Confirm module type
LED red slow blinking — — —	Module frequency mismatch	1. Confirm system frequency 2. Use RS-485 to set the frequency
LED red fast blinking • • • • • •	Input over voltage protection (OVP)	1. Check input voltage 2. Reduce the input voltage
LED red slow blinking — — —	Input under voltage protection (UVP)	1. Battery deep discharge: please charge the battery 2. Please check the battery connection A. Cable diameter B. Tighten the connector
LED red intermittent blinking — — — —	AC frequency not synchronization	1. Check the AC source frequency 2. Check the SR-1600 PLUS frequency setting
LED red slow blinking — — —	Under AC voltage	Check the AC source voltage
LED red fast blinking • • • • • •	Over AC voltage	Check the AC source voltage
LED red solid on ———	Short / Over load	1. Check the connection and make sure the cable is not short 2. Reduce the load

6. Warranty

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

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
2025.12