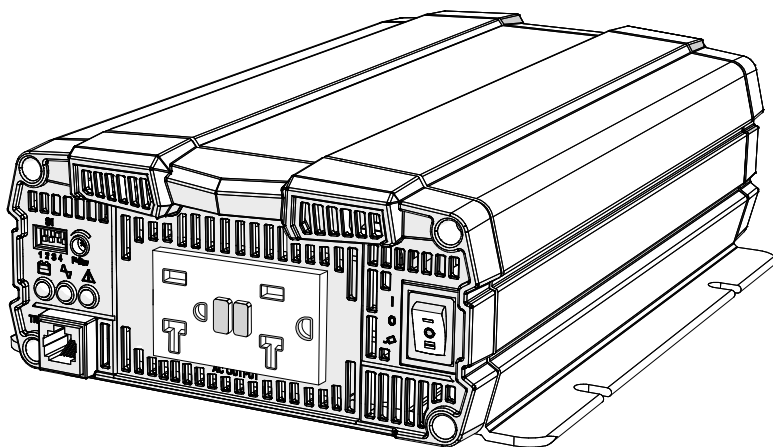


THE POWER OF

REDARC®

RS Series 12 V Inverters



R-12-1000RS-NA

R-12-1500RS-NA

R-12-2000RS-NA

R-12-3000RS-NA

RS SERIES INVERTERS

REDARC Pure Sine Wave Inverters produce a pure sine wave output. This means that the power output from a REDARC Pure Sine Wave Inverter is not only the same as the mains supply, it's often better.

The R-12-1000RS-NA and R-12-1500RS-NA are compliant for residential and industrial applications whereas the R-12-2000RS-NA and R-12-3000RS-NA are compliant for industrial applications only.

WARNINGS AND SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS — THIS MANUAL CONTAINS IMPORTANT SAFETY INSTRUCTIONS FOR THE REDARC RS SERIES PURE SINE WAVE INVERTERS.

DO NOT operate the Inverter unless you have read and understood this manual and the inverter is installed as per these installation instructions. REDARC recommends that the Inverter be installed by a suitably qualified person.

WARNING

RISK OF ELECTRICAL SHOCK. DO NOT DISASSEMBLE THE INVERTER — THE INTERNAL CIRCUITRY CONTAINS HAZARDOUS VOLTAGES. ATTEMPTING TO SERVICE THE UNIT YOURSELF MAY RESULT IN ELECTRIC SHOCK OR FIRE AND WILL VOID THE UNIT WARRANTY.

RISK OF ELECTRICAL SHOCK. DO NOT EXPOSE THE INVERTER TO RAIN, SNOW, SPRAY, BILGE OR DUST. DOING SO MAY RESULT IN DAMAGE TO THE INVERTER OR OTHER APPLIANCES INSTALLED IN THE SYSTEM OR RESULT IN ELECTRIC SHOCK OR FIRE.

RISK OF ELECTRICAL SHOCK. OPERATION OF THE INVERTER WITHOUT A PROPER AND RELIABLE GROUND CONNECTION MAY RESULT IN AN ELECTRICAL SAFETY HAZARD. ENSURE PROPER GROUND CONNECTION IS MADE DURING INSTALLATION AND IS MAINTAINED. FOR FIXED AND/OR TRANSPORTABLE (VEHICLE) INSTALLATIONS, INSTALL ACCORDING TO THE APPROPRIATE CODES AND STANDARDS IN USERS REGION. IF GROUNDING PATH BREAKS AT ANY POINT, USER IS AT RISK OF SHOCK OR ELECTROCUTION.

RISK OF ELECTRICAL SHOCK. ALL ELECTRICAL WORK MUST BE PERFORMED IN ACCORDANCE WITH LOCAL AND NATIONAL CODES, STANDARDS AND WIRING RULES. INSTALLATION MUST BE PERFORMED BY QUALIFIED PERSONAL WHO MEET ALL LOCAL AND GOVERNMENTAL CODE REQUIREMENTS FOR LICENSING AND TRAINING FOR THE INSTALLATION, MAINTENANCE AND CONNECTION OF ELECTRICAL POWER SYSTEMS. SAFETY REGULATIONS RELEVANT TO THE INSTALLATION AND USE LOCATION SHALL BE FOLLOWED DURING INSTALLATION, OPERATION AND MAINTENANCE OF THE INVERTER, IMPROPER OPERATION MAY HAVE A RISK OF ELECTRIC SHOCK, FIRE OR DAMAGE TO EQUIPMENT AND PROPERTY.

FIRE HAZARD. ENSURE GROUND, AC AND DC CABLE SIZES CONFORM TO LOCAL AND NATIONAL STANDARDS AND WIRING CODES.

RISK OF ELECTRICAL SHOCK AND FIRE. BEFORE PROCEEDING, CAREFULLY CHECK THAT THE INVERTER IS NOT CONNECTED TO ANY BATTERIES AND THAT ALL WIRING IS DISCONNECTED FROM ANY ELECTRICAL SOURCES.

RISK OF ELECTRIC SHOCK WHEN REMOVING THE COVER FOR SERVICING, INTERNAL HEAT-SINKS ARE NOT BONDED TO GROUND, TEST BEFORE TOUCHING

DO NOT CONNECT THE OUTPUT TERMINALS OF THE INVERTER TO AN INCOMING AC SOURCE.

CAUTION

1. This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they are supervised or have been instructed on how to use the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.
2. Do not operate the inverter with damaged or substandard wiring. Selecting the wrong cable or fuse size could result in harm to the installer or user and/or damage to the inverter or other appliances installed in the system. The installer is responsible for ensuring that the correct cable and fuse sizes are used when installing this inverter. Refer to Section 2.2.4 (page 19) for more information.

WARNINGS AND SAFETY INSTRUCTIONS

3. Ensure that all the DC connections are tight — torque between 9 to 10 ft lbf (11.7 to 13 Nm). Loose connections could result in overheating and can be a potential hazard.
4. Some components in the inverter can cause arcs and sparks. Do not put batteries, flammable materials, or anything that should be ignition-protected around the inverter. Doing so may result in fire or explosion. Be extra cautious so as to reduce the risk of dropping a metal tool onto a vehicle battery. Doing so might cause the battery to spark or might short-circuit the battery or other electrical parts that may cause an explosion.
5. Remove personal metal items such as rings, bracelets, necklaces, and watches when working with a battery. A battery can produce a short-circuit current high enough to weld a ring or the like to metal, causing a severe burn.
6. If battery acid contacts your skin or clothing, remove the affected clothing and wash the affected area of your skin immediately with soap and water. If battery acid enters your eye, immediately flood the eye with running cold water for at least 10 minutes and seek medical assistance immediately.
7. NEVER smoke or allow a spark or flame in the vicinity of a battery. This may cause the battery to explode.
8. Batteries are capable of providing very large currents in the case of a short circuit. A fuse must be installed on the positive supply cable as close as practical to the battery. Failure to do so provides inadequate protection against fire in the case of a short circuit. Only use high quality copper cable and keep the cable length short, refer to Section 2.2.4 (page 19) for more information.

NOTICE

- Upon receipt, examine the box for damage. If you have found any damage on the box please notify the company you purchased this unit from.
- Install the inverter in a well-ventilated area with reasonable clearance. Do not install the inverter in a zero-clearance compartment or obstruct the ventilation openings. Doing so may result in the inverter overheating and ultimately damage the inverter.
- Reverse Polarity connection will blow the internal fuse and may damage the inverter permanently and will void warranty.
- Do not operate appliances that may feed power back into the inverter. Damage to the inverter may occur as a result.
- Ensure that the frequency output of the inverter matches the frequency requirements of all appliances and equipment to be used with the inverter. Attempting to use appliances that requires an AC frequency different to the inverter output may result in damage to your appliances. Output AC frequency is dip switch selectable, see Section 2.1.3 (page 14).
- All RS Series Inverters are suitable for indoor use only.
- The direction of fan air flow must be horizontal.

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1 INTRODUCTION

1.1 Specifications

Model: R-12-1000RS-NA

Input Characteristics	Max. Rated Input Current	105 A
	Voltage	12 VDC
	Over-Voltage Protection	16.5 ± 0.3 VDC
	Under-Voltage Protection	10.5 ± 0.3 VDC
	Voltage Range	10.5 ~ 16.5 VDC
	No Load Current	≤ 1.5 A @ 12 VDC
	Power Saving Mode	< 0.1 A @ 12 VDC
Output Characteristics	Continuous Output Power	1000 W (VA) (± 3%)
	Maximum Output Power (1 min)	> 1000 ~ 1150 W (VA) (100% ~ 115%)
	Surge Power (<3 sec)	< 1750 W (VA)
	Frequency	50 / 60 Hz ± 0.5% (Dip Switch Selectable)
	Output Voltage	100 / 110 / 115 / 120 VAC (± 5%) (Dip Switch Selectable)
	Efficiency Max	92%
	Short-Circuit Protection	1 Sec Shutdown, Restart to Recover
Output Waveform⁽¹⁾	Pure Sine Wave (THD < 5% @ Normal Load)	
Signal and Control	Remote Controller Panel Input	REMOTE-RS (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⁽²⁾	Over / Under Voltage, Reverse Polarity (Internal Fuse)
	AC Output Protection	Short-Circuit, Overload
	Others	Over / Under Temperature Protection (by heat sink) Temperature 176°F (80°C) / -4°F (-20°C)
Environment	Operating Temp.	-4 ~ 104°F — Derates to 140°F (-20 ~ 40°C — Derates to 60°C)
	Storage Temp.	-22 ~ 158°F (-30 ~ 70°C)
	Storage Temp. and Humidity	10 ~ 95% RH
Safety and EMC	Safety Standards	UL 458, C22.2 No. 107.1
	EMC Standards⁽³⁾	FCC Class B, CAN ICES-003 (B) / NMB-003(B)
Weight		7.2 lb (3.3 kg)
Cooling		Temperature and Load Controlled cooling Fan
Dimensions (W × H × D)		7.9" × 3.3" × 14.7" (200 × 83 × 372 mm)

(1) Normal load condition: $V_{in} = 12.5\text{ V} / 25\text{ V} / 50\text{ V}$, $V_o = 100 / 110 / 115 / 120\text{ VAC}$ 80% load (PF = 1.0)

(2) Reverse polarity connection can blow the internal fuse and may damage the inverter permanently.

(3) Refer to page 26 for compliance information.

1 INTRODUCTION

Model: R-12-1500RS-NA

Input Characteristics	Max. Rated Input Current	157 A
	Voltage	12 VDC
	Over-Voltage Protection	16.5 ± 0.3 VDC
	Under-Voltage Protection	10.5 ± 0.3 VDC
	Voltage Range	10.5 ~ 16.5 VDC
	No Load Current	≤ 1.8 A @ 12 VDC
	Power Saving Mode	< 0.1 A @ 12 VDC
Output Characteristics	Continuous Output Power	1500 W (VA) (± 3%)
	Maximum Output Power (1 min)	> 1500 ~ 1730 W (VA) (100% ~ 115%)
	Surge Power (<3 sec)	< 2650 W (VA)
	Frequency	50 / 60 Hz ± 0.5% (Dip Switch Selectable)
	Output Voltage	100 / 110 / 115 / 120 VAC (± 5%) (Dip Switch Selectable)
	Efficiency Max	91%
	Short-Circuit Protection	1 Sec Shutdown, restart to recover
	Output Waveform ⁽¹⁾	Pure Sine Wave (THD < 5% @ Normal Load)
Signal and Control	Remote Controller Panel Input	REMOTE-RS (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 ⁽²⁾	Over / Under Voltage, Reverse Polarity (Internal Fuse)
	AC Output Protection	Short-Circuit, Overload
	Others	Over / Under Temperature Protection (by Heat sink Temperature 176°F (80°C) / -4°F (-20°C))
Environment	Operating Temp.	-4 ~ 104°F — Derates to 140°F (-20 ~ 40°C — Derates to 60°C)
	Storage Temp.	-22 ~ 158°F (-30 ~ 70°C)
	Storage Temp. and Humidity	10 ~ 95% RH
Safety and EMC	Safety Standards	UL 458, C22.2 No. 107.1
	EMC Standards ⁽³⁾	FCC Class B, CAN ICES-003 (B) / NMB-003(B)
Weight		9.7 lb (4.4 kg)
Cooling		Temperature and Load Controlled cooling Fan
Dimensions (W × H × D)		9.8" × 3.3" × 16.6" (248 × 83 × 421 mm)

(1) Normal load condition: $V_{in} = 12.5\text{ V} / 25\text{ V} / 50\text{ V}$, $V_o = 100 / 110 / 115 / 120\text{ VAC}$ 80% load (PF = 1.0)

(2) Reverse polarity connection can blow the internal fuse and may damage the inverter permanently.

(3) Refer to page 26 for compliance information.

1 INTRODUCTION

Model: R-12-2000RS-NA

Input Characteristics	Max. Rated Input Current	209 A
	Voltage	12 VDC
	Over-Voltage Protection	16.5 ± 0.3 VDC
	Under-Voltage Protection	10.5 ± 0.3 VDC
	Voltage Range	10.5 ~ 16.5 VDC
	No Load Current	≤ 1.8 A @ 12 VDC
	Power Saving Mode	< 0.1 A @ 12 VDC
Output Characteristics	Continuous Output Power	2000 W (VA) (± 3%)
	Maximum Output Power (1 min)	> 2000 ~ 2300 W (VA) (100% ~ 115%)
	Surge Power (<3 sec)	< 3500 W (VA)
	Frequency	50 / 60 Hz ± 0.5% (Dip Switch Selectable)
	Output Voltage	100 / 110 / 115 / 120 VAC (± 5%) (Dip Switch Selectable)
	Efficiency Max	92%
	Short-Circuit Protection	1 Sec Shutdown
	Output Waveform⁽¹⁾	Pure Sine Wave (THD < 5% @ Normal Load)
Signal and Control	Remote Controller Panel Input	REMOTE-RS (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⁽²⁾	Over / Under Voltage, Reverse Polarity (Internal Fuse)
	AC Output Protection	Short-Circuit, Overload
	Others	Over / Under Temperature Protection (by Heat sink) Temperature 176°F (80°C) / -4°F (-20°C))
Environment	Operating Temp.	-4 ~ 104°F — Derates to 140°F (-20 ~ 40°C — Derates to 60°C)
	Storage Temp.	-22 ~ 158°F (-30 ~ 70°C)
	Storage Temp. and Humidity	10 ~ 95% RH
Safety and EMC	Safety Standards	UL 458, C22.2 No. 107.1
	EMC Standards⁽³⁾	FCC Class A, CAN ICES-003 (A) / NMB-003(A)
Weight		11.6 lb (5.2 kg)
Cooling		Temperature and Load Controlled cooling Fan
Dimensions (W × H × D)		9.8" × 3.3" × 17.4" (248 × 83 × 443 mm)

(1) Normal load condition: $V_{in} = 12.5\text{ V} / 25\text{ V} / 50\text{ V}$, $V_o = 100 / 110 / 115 / 120\text{ VAC}$ 80% load (PF = 1.0)

(2) Reverse polarity connection can blow the internal fuse and may damage the inverter permanently.

(3) Refer to page 26 for compliance information.

1 INTRODUCTION

Model: R-12-3000RS-NA

Input Characteristics	Max. Rated Input Current	318 A
	Voltage	12 VDC
	Over-Voltage Protection	16.5 ± 0.3 VDC
	Under-Voltage Protection	10.5 ± 0.3 VDC
	Voltage Range	10.5 ~ 16.5 VDC
	No Load Current	≤ 3.8 A @ 12 VDC
	Power Saving Mode	< 0.4 A @ 12 VDC
Output Characteristics	Continuous Output Power	3000 W (VA) (± 3%)
	Maximum Output Power (1 min)	> 3000 ~ 3450 W (VA) (100% ~ 115%)
	Surge Power (<1 sec)	< 6000 W (VA)
	Frequency	50 / 60 Hz ± 0.5% (Dip Switch Selectable)
	Output Voltage	100 / 110 / 115 / 120 VAC (± 5%) (Dip Switch Selectable)
	Efficiency Max	90%
	Short-Circuit Protection	1 Sec Shutdown
	Output Waveform⁽¹⁾	Pure Sine Wave (THD < 5% @ Normal Load)
Signal and Control	Remote Controller Panel Input	REMOTE-RS (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⁽²⁾	Over / Under Voltage, Reverse Polarity (Internal Fuse)
	AC Output Protection	Short-Circuit, Overload
	Others	Over / Under Temperature Protection (by Heat sink Temperature 176°F (80°C) / -4°F (-20°C))
Environment	Operating Temp.	-4 ~ 104°F — Derates to 140°F (-20 ~ 40°C — Derates to 60°C)
	Storage Temp.	-22 ~ 158°F (-30 ~ 70°C)
	Storage Temp. and Humidity	10 ~ 95% RH
Safety and EMC	Safety Standards⁽³⁾	UL 458 (provided used with approved GFCI connector) C22.2 No. 107.1
	EMC Standards⁽⁴⁾	FCC Class A, CAN ICES-003 (A) / NMB-003(A)
Weight		18 lb (8.2 kg)
Cooling		Temperature and Load Controlled cooling Fan
Dimensions (W × H × D)		10.1" × 6.2" × 17.4" (255 × 158 × 442 mm)

(1) Normal load condition: $V_{in} = 12.5\text{ V} / 25\text{ V} / 50\text{ V}$, $V_o = 100 / 110 / 115 / 120\text{ VAC}$ 80% load (PF = 1.0)

(2) Reverse polarity connection can blow the internal fuse and may damage the inverter permanently.

(3) Ground Fault Circuit Interrupter (GFCI) see 2.1.6 on (page 16).

(4) Refer to page 26 for compliance information.

1.2 Voltage and Temperature Performance

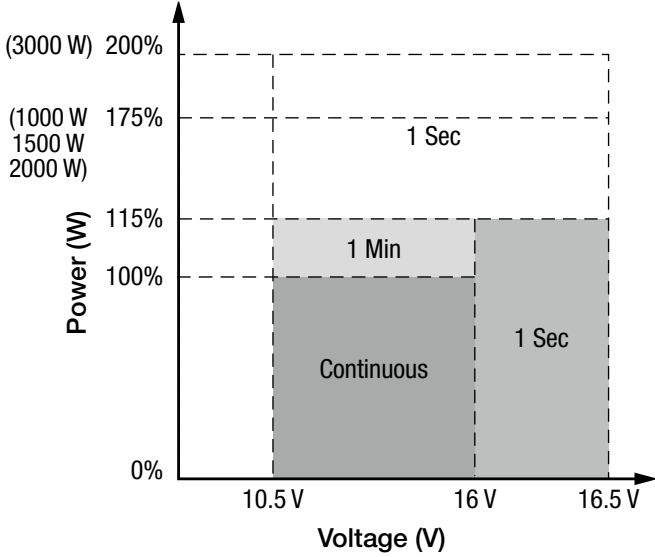


FIGURE 1.2.1: Output Power vs. Input Voltage (1000 – 3000 W)

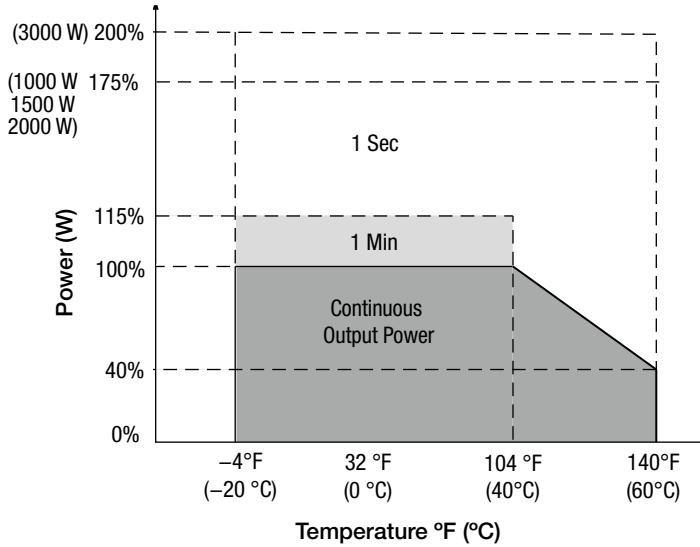
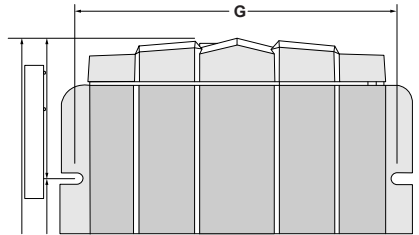
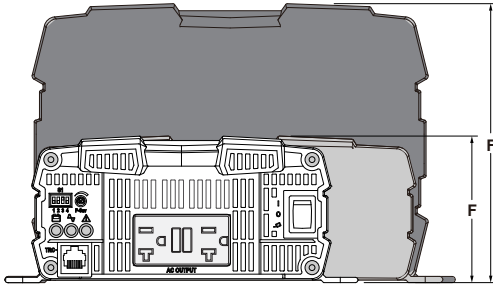
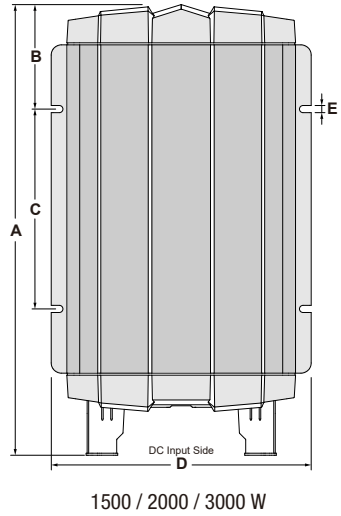
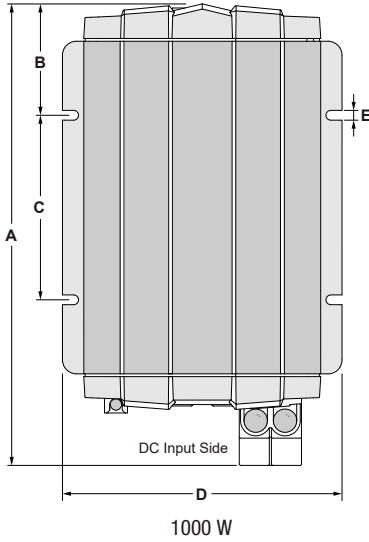


FIGURE 1.2.2: Output Power vs. Input Air Temperature (1000 – 3000 W)

1 INTRODUCTION

1.3 Dimensions



	A	B	C	D	E	F	G
1000 W	14.65" (372 mm)	2.7" (69 mm)	7.7" (196 mm)	7.9" (200 mm)	0.3" (7.0 mm)	3.3" (83 mm)	7.25" (184 mm)
1500 W	16.6" (421 mm)	3.6" (92 mm)	7.7" (196 mm)	9.8" (248 mm)	0.3" (7.0 mm)	3.3" (83 mm)	9.1" (232 mm)
2000 W	17.4" (443 mm)	4.1" (103 mm)	7.7" (196 mm)	9.8" (248 mm)	0.3" (7.0 mm)	3.3" (83 mm)	9.1" (232 mm)
3000 W	17.4" (442 mm)	4.1" (103 mm)	7.7" (196 mm)	10.0" (255 mm)	0.3" (7.0 mm)	6.2" (158 mm)	9.4" (239 mm)

2.1 Front Panel Operation

WARNING: RISK OF ELECTRICAL SHOCK. DO NOT DISASSEMBLE THE INVERTER — THE INTERNAL CIRCUITRY CONTAINS HAZARDOUS VOLTAGES. ATTEMPTING TO SERVICE THE UNIT YOURSELF MAY RESULT IN ELECTRIC SHOCK OR FIRE AND WILL VOID THE UNIT WARRANTY.

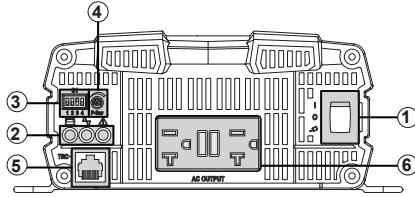


FIGURE 2.1.1: 1000 W Models

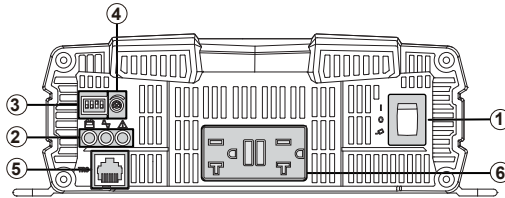


FIGURE 2.1.2: 1500 / 2000 W Models

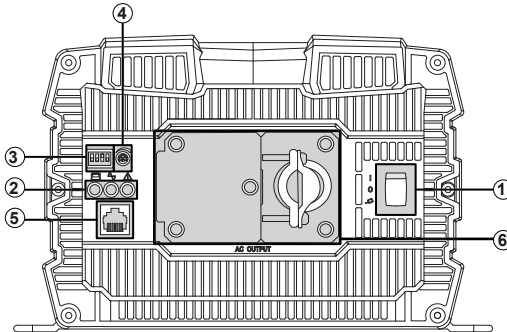


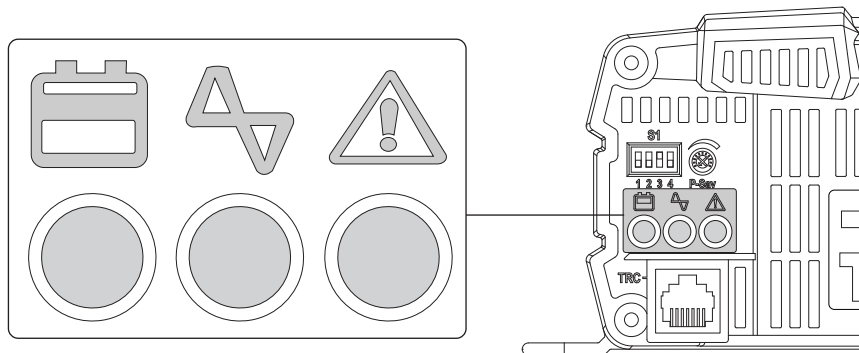
FIGURE 2.1.3: 3000 W Models

	1000 W	1500 W	2000 W	3000 W
1	Main Switch			
2	Indicator LEDs			
3	Function Switch			
4	Power Save Adjustment			
5	TRC Port (RJ45)			
6	1000 W / 1500 W / 2000 W			3000 W
	AC Output Socket			AC Output Terminals

2.1.1 Main Switch ①

The 3 stage switch is for turning the AC mains output to either ON, OFF or selecting the Remote mode. When setting the power switch to the first ON position or the second ON position (only to be used when operating the inverter through the REMOTE-RS inverter remote) the LEDs will glow GREEN. After setting the power switch to the OFF position the inverter will stop and the LEDs will turn off.

2.1.2 Indicator LED ②



Input Voltage Level:



LED Status	12 V Models
Red	< 11.0 V
Orange	11.0 ~ 11.5 V
Green	11.5 ~ 15.0 V
Orange	15.0 ~ 15.5 V
Red	> 15.5 V



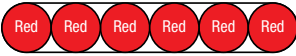




Output Load Level:



LED Status	Green	Orange	Red
1000 W	0 ~ 1000 W	1000 ~ 1150 W	> 1150 W
1500 W	0 ~ 1500 W	1500 ~ 1725 W	> 1725 W
2000 W	0 ~ 2000 W	2000 ~ 2300 W	> 2300 W
3000 W	0 ~ 3000 W	3000 ~ 3450 W	> 3450 W

Inverter Status and fault conditions:



Status	LED Status	Remedies
Power On / Normal		
Over Current / Over Load (AC output short and overload)		Reduce Load If output does not recover once load has been reduced to within specification, try turning the inverter's power switch on and off again.
Over Voltage Protection (Input DC voltage over spec) Recovery Points: 14.5 V (12 V Models)		Check input voltage Reduce input voltage to meet the inverter's specification.
Under Voltage Protection (Input DC voltage under spec) Recovery Points: 12.5 V (12 V Models)		Check input voltage and recharge battery. Check all input connections and cables. Once input conditions are within spec, try turning power switch off and on again.
Device Startup process abnormal		
Under Temperature (Heatsink temp. under -4°F (-20°C)) Recovery point: $> 32^{\circ}\text{F}$ (0°C)		Reduce load If output does not recover once load has been reduced to within specification, try turning off and on again using the power switch.
Over Temperature (Heatsink temp. over 176°F (80°C)) Recovery point: $< 60^{\circ}\text{F}$ (140°C)		Improve ventilation Make sure ventilation openings in inverter are not obstructed. Reduce ambient temperature.

2.1.3 Function Switch ③

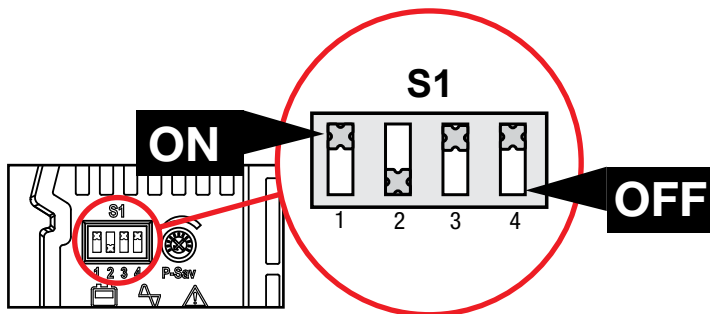


FIGURE 2.1.3.1: Dip Switch ON/OFF Positions

Input Voltage Level:

Dip Switch	Function
Switch 1	Output Voltage Select
Switch 2	
Switch 3	Frequency Select
Switch 4	Power Saving mode Select

Output Voltage Selection (Switches 1 and 2):

Output Voltage	Switch 1	Switch 2
100 V	OFF	OFF
110 V	ON	OFF
115 V	OFF	ON
120 V	ON	ON

Output Frequency (Switch 3):

Frequency (Hz)	Switch 3
50 Hz	OFF
60 Hz	ON

Power Saving mode Select:

Power Saving Function	Switch 4
Power Saving OFF	OFF
Power Saving ON	ON

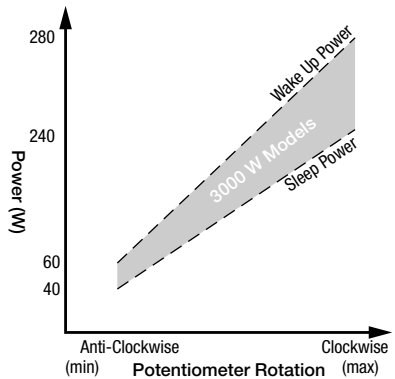
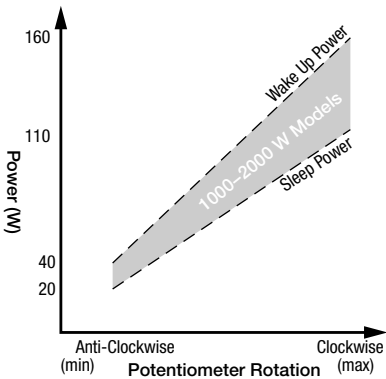
2.1.4 Power Saving Load Adjustment ④



FIGURE 2.1.4.1: Power Saving Load Adjustment

The user can adjust the potentiometer to set the input sleep and wake-up thresholds according to the load applied. The setting range is shown below:

Model	Minimum (Potentiometer turned fully anti-clockwise)		Maximum (Potentiometer turned fully clockwise)	
	Sleep Power	Wake Up Power	Sleep Power	Wake Up Power
1000 / 1500 / 2000 W	< 20 W	> 40 W	< 110 W	> 160 W
3000 W	< 40 W	> 60 W	< 240 W	> 280 W



2.1.5 TRC Port (RJ45) ⑤

Not currently used.

2.1.6 AC Output Interface ⑥

⚠ WARNING

ALL ELECTRICAL WORK MUST BE PERFORMED IN ACCORDANCE WITH THE LOCAL AND NATIONAL ELECTRICAL CODES. THESE INSTRUCTIONS ARE FOR USE BY QUALIFIED PERSONNEL WHO MEET ALL LOCAL AND GOVERNMENT CODE REQUIREMENTS FOR LICENSING AND TRAINING FOR THE INSTALLATION OF ELECTRICAL POWER SYSTEMS WITH AC AND DC VOLTAGE UP TO 600 VOLTS. INSTALLATION, MAINTENANCE AND CONNECTION OF INVERTERS MUST BE PERFORMED BY QUALIFIED PERSONNEL, IN COMPLIANCE WITH LOCAL ELECTRICAL STANDARDS AND CODES, WIRING RULES AND THE REQUIREMENTS OF LOCAL POWER AUTHORITIES AND/OR COMPANIES. SAFETY REGULATIONS RELEVANT TO THE LOCATION SHALL BE FOLLOWED DURING INSTALLATION, OPERATION AND MAINTENANCE

IMPROPER OPERATION MAY HAVE A RISK OF ELECTRIC SHOCK OR DAMAGE TO EQUIPMENT AND PROPERTY.

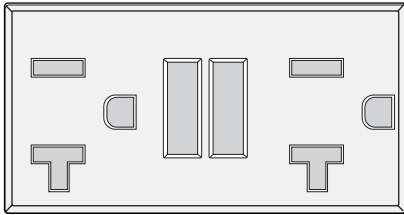


FIGURE 2.1.6.1: AC Output Interface for 1000 / 1500 / 2000 W Models

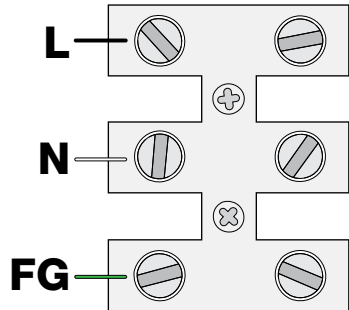


FIGURE 2.1.6.2: Standard Hard Wire Socket for 3000 W Models

R-12-3000RS-NA Output Interface

Terminal		Wire color	Wire length/gauge
AC terminal	Line (L)	Black	Within 6 feet / AWG8
	Neutral (N)	White	
FG (Ground)		Green / Yellow or Bare copper	26 ~ 32 feet / AWG# 10 ~ 8

In order for R-12-3000RS-NA to be UL 458 compliant it requires to be used with one or more of the following GFCI connectors:

- HUBBELL INC WIRING DEVICE DIV, Type GF20 and GFRST20 Rated 125 V, 20 A
- COOPER WIRING DEVICES, Type VGF20 and SGF20. Rated 125 V, 20 A
- LEVITON MFG CO INC, Type 7899 - W and GFNT2. Rated 125 V, 20 A
- PASS AND SEYMOUR INC, Type 2097. Rated 125 V, 20 A

Additional breakers suitable for 20 A branch circuit protection shall be provided for the GFCI receptacles. Branch rated overcurrent protection for the AC output circuit is to be provided at the time of installation

2.2 Rear Panel Operation

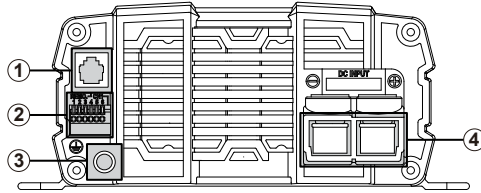


FIGURE 2.2.1: 1000 W Models

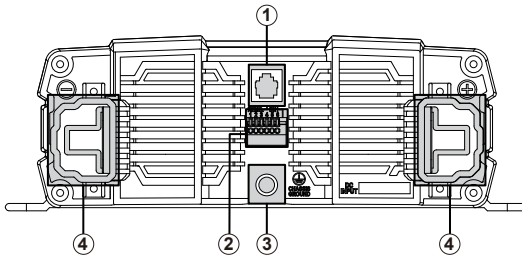


FIGURE 2.2.2: 1500 W / 2000 W Models

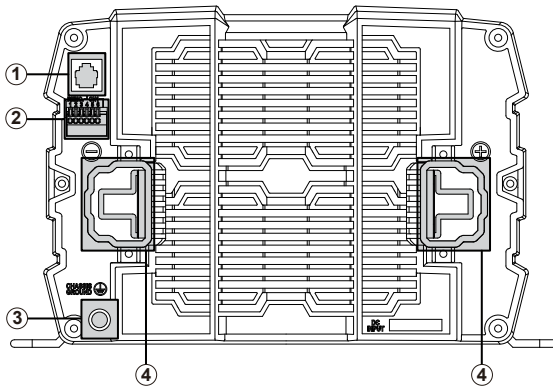


FIGURE 2.2.3: 3000 W Models

	1000 W	1500 W	2000 W	3000 W
1	Remote Port (RJ11)			
2	Remote Control Green Terminal			
3	Chassis Ground			
4	DC Input Connector			

2.2.1 Remote Port (RJ11) ①

The RS Series inverter can be used with the REMOTE-RS remote controls via RS-232 communication. To enable, set the main switch on the inverter to the REMOTE position.

Pin Number	Signal Description (1)	
1	Reserved	--
2	GND	Same Polarity as Battery Negative
3	RXD	RS232 RXD
4	TXD	RS232 TXD
5	RMT	Remote controller panel (positive)
6	VCC	Internal power for remote controller

2.2.2 Remote Control Green Terminal ②

The remote control green terminal is connected to a Form C relay for fault indication. When a fault occurs, the relay switches. Fault conditions include Input Under/Over voltage, output short-circuit/overload, Under/Over temperature.

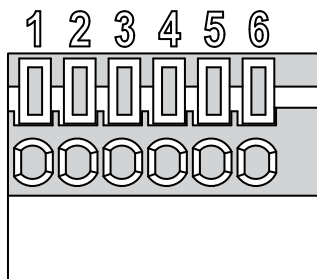


FIGURE 2.2.2.1: Remote Control Terminal

Pin Number	Terminal Description
1	Fault relay, Normally Open (16 V, 10 mA max.)
2	Fault relay, Common (16 V, 10 mA max.)
3	Fault relay, Normal Closed (16 V, 10 mA max.)
4	Enable + ($\overline{\text{ENB}}$)
5	Enable – (ENB)
6	Ground (Same polarity as battery negative)

NOTICE

- Before Installing — Make sure that the inverter main switch is at OFF position
- Before using the remote function, make sure the main switch is set to 'REMOTE'
- Use 20 to 24 AWG cable to connect the remote control terminals

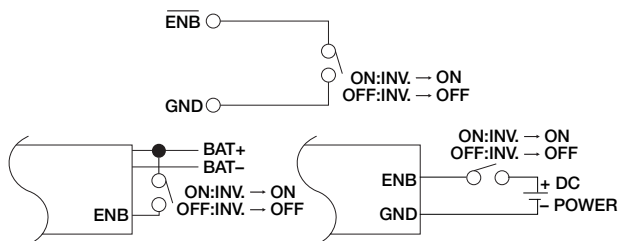


FIGURE 2.2.2.2: Wiring configurations for Remote Control Green Terminal

2.2.3 Chassis Ground 3

Use 16 AWG (1.5 mm²) or a thicker cable to connect the vehicle earth or chassis ground. Perform this connection prior to any other connection.

2.2.4 DC Input Connection 4

Prior to installation:

- The cable and fuse sizes in Table 2.2.4.1 are recommended for connection between supply battery and inverter. The DC supply cables should be as short as possible and no longer than the values shown in Table 2.2.4.1.
- The size of the cable should be thick enough to maintain a voltage drop of less than 2% when carrying the maximum input current. This will help prevent frequent low-input voltage warnings and shutdown.

TABLE 2.2.4.1: Recommended Fuse and Cable Sizing (12 V Install):

Recommended Fuse size				
12 V Inverter	1000 W	1500 W	2000 W	3000 W
Fuse Size	175 A	225 A	250 A	450 A
Recommended Fuse	Mega	Mega	Mega	Mega

Recommended Cable size AWG (nearest equivalent in mm ²)								
Cable length ft (m)	1000 W		1500 W		2000 W		3000 W	
0 – 6.6 (0 – 2)	0 (1/0)	54 mm ²	000 (3/0)	85 mm ²	0000 (4/0)*	105 mm ²	0000 (4/0)*	120 mm ²
6.6 – 9.8 (2 – 3)	00 (2/0)	68 mm ²	000 (3/0)	85 mm ²	0000 (4/0)*	105 mm ²	/	
9.8 – 13.1 (3 – 4)	/		0000 (4/0)	105 mm ²	0000 (4/0)*	120 mm ²	/	

Fuse ratings are suitable for these recommended minimum cable sizes.

High temperature (230°F / 110°C) or higher rated cable is required.

3 INSTALLATION

3.1 Mounting

Install the inverter in a well-ventilated area with reasonable clearance, avoid installing the inverter in a zero-clearance compartment or obstruct the ventilation openings, doing so may result in the inverter overheating and ultimately damage the inverter.

The power inverter should be used in an environment that meets the following requirements:

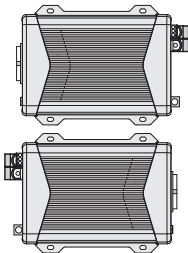
1. Dry — Do not allow water to drip on or enter into the inverter. Do not allow moisture to condense on the inverter.
2. Cool — Ambient air temperature should be between 32°F (0°C) and 104°F (40°C).
3. Safe — Do not install the inverter in a battery compartment or other areas where volatile fumes may exist, such as fuel storage areas or engine compartments.
4. Ventilated — Keep the inverter at a distance (at least 1" (25 mm) away from surrounding objects. Ensure the vents on the rear and the bottom of the unit are not obstructed.
5. Dust — Do not install the inverter in a dusty environment where the dust can enter into the unit both when the fan is operating and not operating.
6. Fused – A fuse must be fitted between the battery and the inverter, positioned as close to the battery as possible.
7. Do not mount the inverter where it will be exposed to the gasses produced by the battery. These gasses present a risk of explosion and are very corrosive, prolonged exposure may damage the inverter.

⚠ WARNING

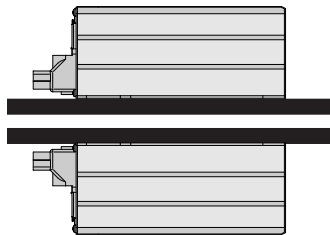
RISK OF ELECTRICAL SHOCK. DO NOT EXPOSE THE INVERTER TO RAIN, SNOW, SPRAY, BILGE OR DUST. DOING SO MAY RESULT IN DAMAGE TO THE INVERTER OR OTHER APPLIANCES INSTALLED IN THE SYSTEM OR RESULT IN ELECTRIC SHOCK OR FIRE.

RISK OF ELECTRICAL SHOCK. DO NOT DISASSEMBLE THE INVERTER - THE INTERNAL CIRCUITRY CONTAINS HAZARDOUS VOLTAGES. ATTEMPTING TO SERVICE THE UNIT YOURSELF MAY RESULT IN ELECTRIC SHOCK OR FIRE AND WILL VOID THE UNIT WARRANTY.

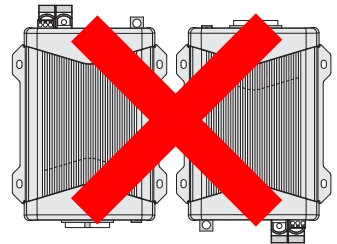
TABLE 3.1.4.1: Recommended Mounting



Horizontal Wall Mount, Base Down



Horizontal Mount, Base down / up



Do not mount in a vertical configuration

3.2 Ventilation Fan

The fan is load and temperature controlled and will operate when the AC Power Consumption and temperature requires it. The fan will also occasionally come on when no load is connected. Ensure that the fan is not obstructed and the inverter is at a distance of at least 1" (25 mm) from surrounding objects.

NOTICE

Install the inverter in a well-ventilated area with reasonable clearance. Do not install the inverter in a zero-clearance compartment or obstruct the ventilation openings. Doing so may result in the inverter overheating and ultimately damage the inverter.

3.3 Safety Before Installing DC Wiring Connections

3.3.1 Loads Are Disconnected

Make sure all loads are disconnected from the inverter's AC output and ensure that the inverter main switch is set to the OFF position before connecting DC cables.

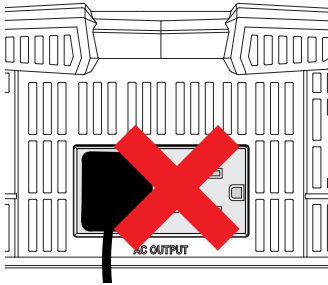


FIGURE 3.3.1: Ensuring loads are disconnected

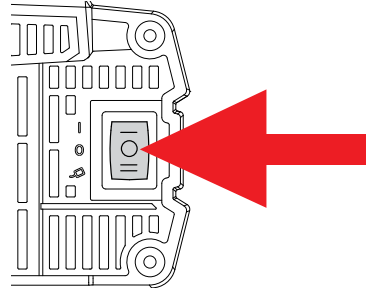


FIGURE 3.3.2: Switch is set to OFF position

WARNING

RISK OF ELECTRICAL SHOCK. BEFORE PROCEEDING, CAREFULLY CHECK THAT THE INVERTER IS NOT CONNECTED TO ANY BATTERIES AND THAT ALL WIRING IS DISCONNECTED FROM ANY ELECTRICAL SOURCES. DO NOT CONNECT THE OUTPUT TERMINALS OF THE INVERTER TO AN INCOMING AC SOURCE.

3.3.2 Check Cable and Fuse size

Make sure to use suitably rated cables and fuses for your installation, refer to Section 2.2.4 (page 19) for more information.

NOTICE

Use suitably rated cable as per section 2.2.4 (page 10). A cable below the recommended rated length will result in an increased voltage drop when the inverter is under load, which will ultimately effect the inverters performance.

Do not operate inverter with damaged or underrated cables or without an appropriately sized fuse. Under sized cables and/or an over-sized fuse may result in harm or damage to the installer and/or damage to the inverter or other appliances installed in the system.

⚠ WARNING

REVERSE POLARITY CONNECTION WILL BLOW THE INTERNAL FUSE AND MAY CAUSE PERMANENT DAMAGE TO THE INVERTER.

RISK OF FIRE. THESE INVERTERS CAN DRAW VERY LARGE DC CURRENTS. A BATTERY TYPE AND CONFIGURATION MUST BE SELECTED THAT CAN SAFELY AND RELIABLY SUPPLY BOTH THE STEADY STATE AND PEAK TRANSIENT CURRENTS DRAWN BY THE INVERTERS. THIS MAY REQUIRE MULTIPLE BATTERIES TO BE CONNECTED IN PARALLEL AND BE WIRED TO SHARE CURRENT EQUALLY. THE SELECTION OF BATTERIES AND WIRING MUST BE DONE BY A SUITABLE QUALIFIED PERSON.

3.4 Chassis Ground Connection

Connect Chassis Ground Terminal to the ground of vehicle, this applies to all negative ground vehicles. Chassis Ground must be connected to the ground of vehicle prior to making any other connections to the inverter.

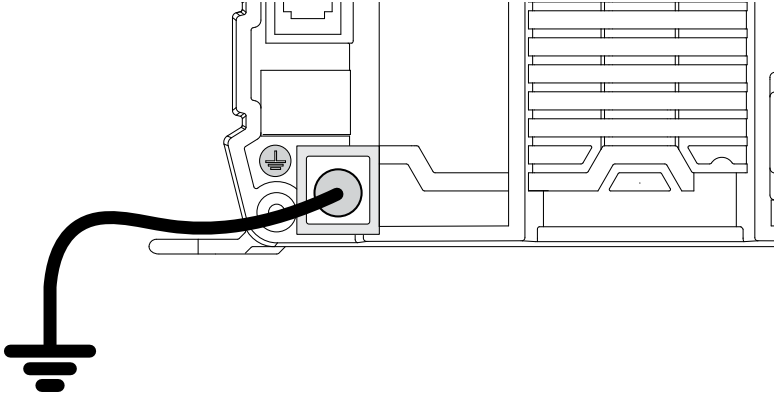


FIGURE 3.4.1: Chassis Ground Connection

3 INSTALLATION

3.5 DC Wiring Connections

Before inserting DC cables, remove the bolts with attached washers in the terminal

- Insert the crimped/terminated DC cable lugs into the input terminals, ensuring that the DC cables are connected to the correct terminal, positive (+) DC cable into positive terminal and negative (-) DC cable into the negative terminal.
- Screw bolts and attached washers in tightly
- Connect DC cables into an appropriate battery supply or other DC power source and connect to the DC cables to the correct positive (+) and negative (-) output.

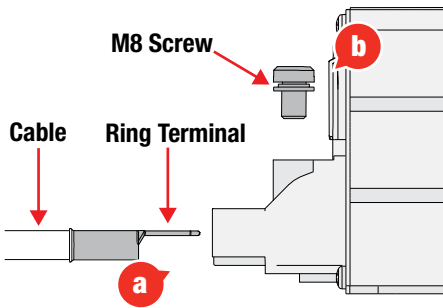


FIGURE 3.5.1: DC Cable Installation for 1000 W

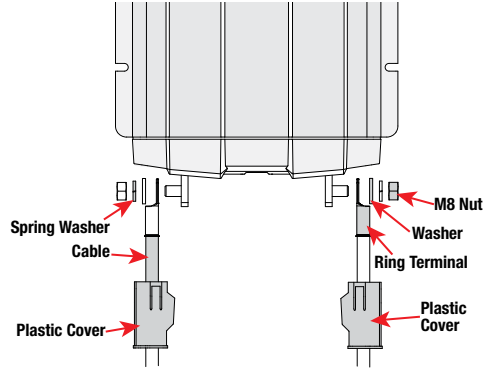


FIGURE 3.5.2: DC Cable Installation for 1500 W / 2000 W / 3000 W Model

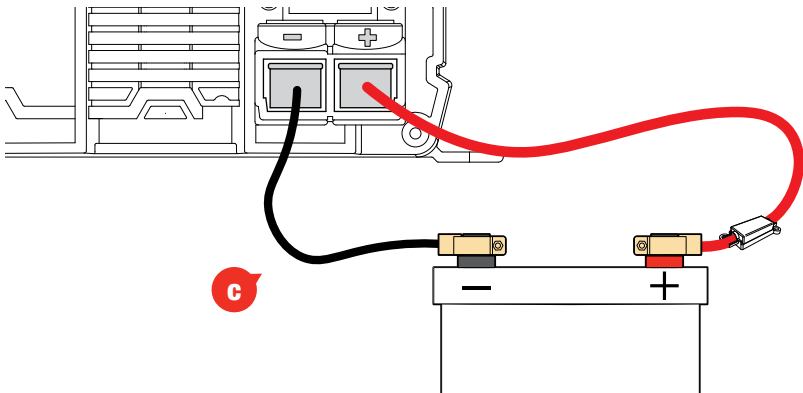


FIGURE 3.5.3: DC Cable Installation into Battery Source

3 INSTALLATION

CAUTION

ENSURE THAT ALL THE DC CONNECTIONS ARE TIGHT - TORQUE TO 1.5 FT-LBF (2.8 NM). LOOSE CONNECTIONS COULD RESULT IN OVERHEATING AND CAN BE A POTENTIAL HAZARD.

DO NOT OPERATE THE INVERTER WITH DAMAGED OR SUBSTANDARD WIRING. SELECTING THE WRONG CABLE OR FUSE SIZE COULD RESULT IN HARM TO THE INSTALLER OR USER AND/OR DAMAGE TO THE INVERTER OR OTHER APPLIANCES INSTALLED IN THE SYSTEM. THE INSTALLER IS RESPONSIBLE FOR ENSURING THAT THE CORRECT CABLE AND FUSE SIZES ARE USED WHEN INSTALLING THIS INVERTER. REFER TO SECTION 2.2.4 (PAGE 10) FOR MORE INFORMATION.

3.6 AC Safety Grounding

NOTICE

The R-12-1000RS-NA, R-12-1500RS-NA and R-12-2000RS-NA are fitted with a GFCI and is UL 458 compliant whereas the R-12-3000RS-NA is required to have a UL compliant GFCI added to be compliant with UL 458, refer to Section 2.1.6 (page 16) for more information.

All wiring, including grounding, must be performed by a suitably qualified person and must comply with all local and government code requirements that are application to the installation location and type.

3.7 Turning The Inverter On

3.7.1 Switch Controls

With the DC cables and Chassis Ground point correctly installed the power switch on the inverter can be turned ON to the single line side. The second ON switch is to be used ONLY when controlling the inverter through the REMOTE-RS inverter remote.

3.7.2 LEDs and Possible Issues

All LEDs will illuminate green once switching the inverter on. If the inverter status is not green refer to Section 2.1.2 (page 12).

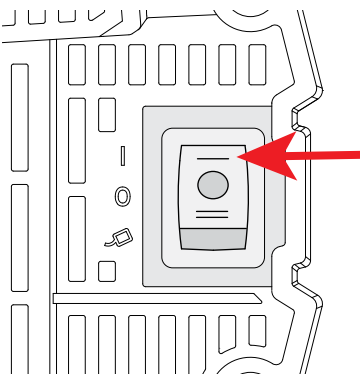


FIGURE 3.7.1: Switching Inverter ON

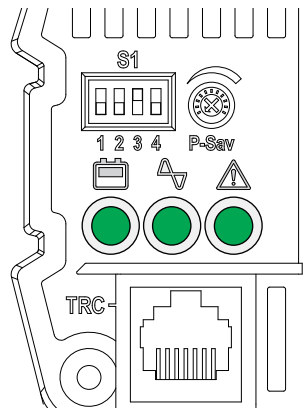


FIGURE 3.7.2: Correct Inverter Status

3 INSTALLATION

3.8 Connecting AC

If all LEDs are green, switch unit OFF, it is safe for installer to plug the AC cord(s) into the GFCI socket(s) connect loads to the Inverter AC output. Turn the inverter switch to ON.

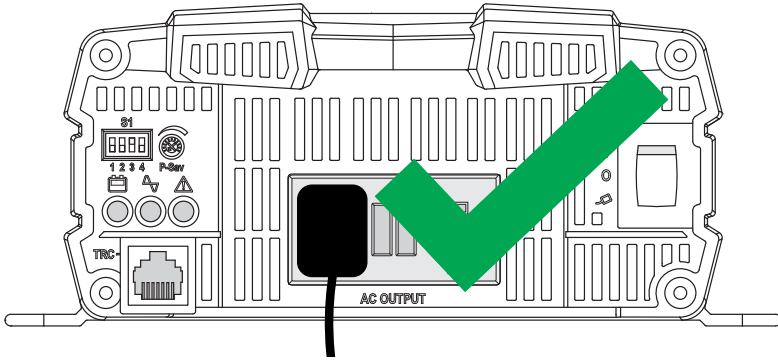


FIGURE 3.8.1: Safe Connection of AC Output for 1000 / 1500 / 2000 Model

3.9 Maintenance

Turn the unit OFF before cleaning. Very little maintenance is required to keep the inverter operating correctly. The exterior of the inverter should be cleaned periodically with a damp cloth to prevent accumulation of dust and dirt. At the same time, tighten the screws on the DC input terminals. A VACuum cleaner can be used to remove dust from ventilation openings and fan area.

COMPLIANCE

Compliance for 1000RS / 1500RS

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference
2. This device must accept any interference that may cause undesired operation

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio / TV technician for help.

Compliance for 2000RS / 3000RS

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions

1. This device may not cause harmful interference
2. This device must accept any interference that may cause undesired operation

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance to the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential are is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.

WARRANTY

Limited Warranty

For full warranty terms and conditions, visit the Warranty page of the REDARC website. Refer to the web address and contact details applicable to your region.

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