

# Centurion Rectifier System



Models:  
CR48-10: 48 Volt, 10 Amp Rectifier  
CR24-20: 24 Volt, 20 Amp Rectifier  
CRS: Rectifier Shelf (3 rectifier bay controller)

## INSTALLATION / OPERATION MANUAL

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M-CR-CRS  
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## I) Overview

The Centurion Rectifier System comprises a low profile 3.5" (2 RU) shelf which accommodates up to three 550 watt, -48 or +24 volt hot-swap rectifiers and a system controller/monitor module. The system is scalable/adaptable for N, N+1 or N+2 configurations.

Front panel test points and single point voltage adjustment pot are provided for fine-tuning output to the requirements of sensitive loads or float charge requirements.

Alarm contacts enable remote alarms for the rectifier system. Front panel OK/FAIL LED's allow monitoring status of each rectifier individually.

The Centurion system is engineered for compatibility with NEWMAR's Power Function Manager (PFM 400) and circuit breaker distribution panel (DST 20/10). See section VIII, optional system components.

## II) Shelf Installation

### A) Mounting

Two sets of mounting ears are provided for 19" and 23" rack mounting. Ear attachments are in the 6" forward mounting position and at the four corners for four point cabinet mounting (contact Newmar for additional mounting ears.) Use the six #6-32 x 1/4" pan head mounting screws and lock washers to secure the ears.

**Note: Flush mounting is only recommended with rear support or four point cabinet mounting.**

The Centurion Rectifiers are front-to-back forced-air cooled, therefore no empty rack positions are necessary either above or below the unit to maintain proper operating temperature. Other rack components may be installed above or below rectifier shelf. Maintain at least 6" in front of and behind shelf to allow air circulation.

### B) AC Input

The Centurion Shelf/Rectifiers operates from 90-264 VAC, 47-63 Hz input. The rectifier shelf is designed for hard wiring however a power cord can be fitted to the shelf if desired.

#### AC Input Wiring Chart:

Input	Recommended AC Input Wire Size	Recommended AC Input Circuit Size
115VAC	12AWG	25Amp
230VAC	14AWG	15Amp

To access the AC wiring compartment, loosen the two screws securing the compartment cover as shown figure 1:

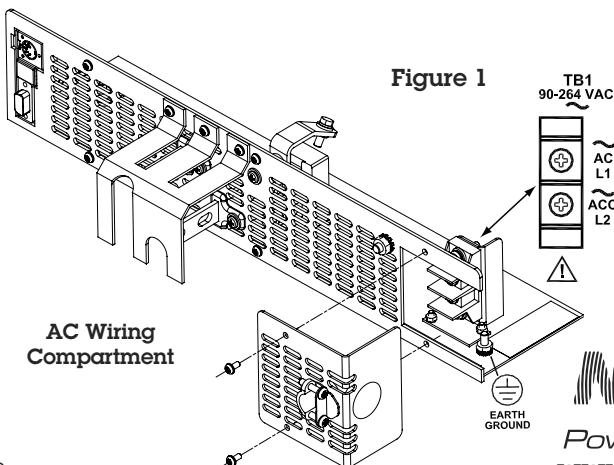


Figure 1

### AC Wiring Compartment

Two AC cable entry points are provided. Feed the AC cable thru the strain relief and then attach AC wires to the input terminal block (TB1) as shown in figure 1. For line to neutral sources, connect Hot/Line to "AC/L1" & Neutral to "ACC/L2". A chassis mounted 10-32 stud is provided for earth grounding.

**CAUTION (230V AC applications only): 230V AC sources should be protected by a double pole circuit breaker.**

After wiring is completed securely tighten the two cable strain relief screws and secure cable entry screws.

## C) DC Output/Battery Connection Points

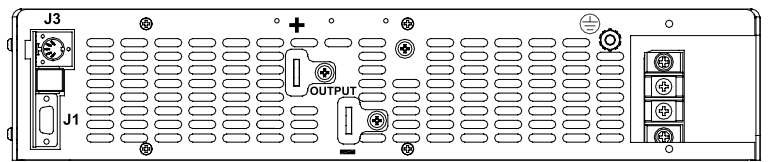
**Note: Refer to the CRS Rear Panel Diagram, figure 2 below for wiring DC output.**

### Minimum Output Wire Size

24 Volt (60 Amps) 6 AWG ■ 48 Volt (30 Amps) 10 AWG

### Centurion Shelf Rear Panel Diagram

Figure 2



## III) Rectifier Installation/Operation

### A) Installation

The Centurion Shelf is voltage specific, 24 or 48 volt and accepts either model CR 48-10 (-48 VDC) or CR 24-20 (+24 VDC) Rectifier Modules respectively. The modules are keyed so that a 24V module cannot be inserted into a 48V shelf, and visa versa. The system is designed for module installation while the shelf is "hot", therefore the modules may be removed or inserted while AC is being applied to the shelf and loads are being powered. CAUTION: Ensure that the power switch on the front panel of the rectifier is in the OFF position prior to inserting or removing the module.

Slide the rectifier into the open RECTIFIER A position and secure it using the front panel captive retaining screws. Two blank panels for covering unused bays are factory installed in the RECTIFIER B and C positions and are easily removed for installing additional rectifiers. These should be left in place in any unused bay(s) to optimize proper air flow from the fans through the shelf.

### B) Rectifier Module Output Indications

This indicator will glow green whenever the rectifier module is producing normal operating voltage. In the event of failure or the inserted power module's power switch is in the off position, the LED will glow orange.

## IV) Shelf Controller & Rectifier Operation/Adjustment

### A) Start-up

- 1) Apply recommended AC voltage to the shelf AC input terminal block.
- 2) Turn the on/off power switch located on each installed rectifier to the on position.
- 3) Verify each installed rectifier's "Output Power" LED is illuminated green.
- 4) Verify the "Output OK" green LED on the controller is illuminated.

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## B) Output Voltage Adjustment

The factory output voltage settings and user adjustment range are as follows:

	Factory Setting	Adjustment Range
CRS, 48V:	54.4 VDC	50-58 VDC
CRS, 24V:	27.2 VDC	25-29.4 VDC

Controller front panel test points are provided for calibrating output voltage with an external voltmeter. Adjustment is made at the controller front panel potentiometer.

Using a digital voltmeter, front panel test points and voltage adjustment potentiometer set the rectifiers shelf output to the recommended float voltage as defined from the battery manufacturer.

**Note: Contact Newmar if unable to perform the above procedure.**

## C) Controller Indications

### Output OK

Indicates DC output power is available for charging. Extinguished LED indicates excessively low or no output voltage.

### Major Alarm

Indicates DC output voltage has dropped to a level no longer providing charging current to batteries.

### Minor Alarm

Indicates loss of DC voltage and/or one or more rectifier modules have failed.

### Battery Over Temp

When the optional Temperature Probe has been connected to the CRS this LED will illuminate if the battery temperature has reached or exceeded 50 degrees Celsius and will reduce output voltage in order to prevent damage to the batteries.

## V) Alarm Contacts

### Alarm Connections

**A) Minor Alarm form-C contacts are provided at J1 pins 1 (com), 2 (N/O) and 3 (N/C)**

J1-1 and J1-2 will short on FAIL

J1-1 and J1-3 will open on FAIL

**B) Major Alarm and Output OK contacts are provided at J1 pin 6 (Output Status COM), pin 7 (Major Alarm N/O) and pin 8 (Output OK N/C)**

J1-6 and J1-7 will short on low or no Bus voltage

J1-6 and J1-8 will short when output is providing the correct voltage

(Note: Major Alarm and Output OK 'com' connections are the same)

### C) Alarm Connector Wire Assembly

J1 alarm connections for mating wire assembly harness with 9 pin D sub connector Part No. 873-4625-0

Color code:

Pin	Wire Color	Pin	Wire Color	Pin	Wire Color
J1-1	Brown	J1-4	Yellow	J1-7	Violet
J1-2	Red	J1-5	Green	J1-8	Gray
J1-3	Orange	J1-6	Blue	J1-9	White

## VI) Battery Charging

### Standard Float Charging

The Centurion system is designed to simultaneously maintain back-up batteries and supply the system load, up to the power level of the inserted modules. Battery float voltage (output voltage) of each

system is as listed in (section IX) "specifications". Float voltage adjustment can be accomplished as specified in section IVB.

**Automatic Temperature Compensation Option** via use of a temperature compensation sensor, Model TP-TEMP (445-4129-0) output voltage to batteries will automatically be adjusted based on sensed temperatures as listed in table below.

CR24-20: -0.06V/°C

CR48-10: -0.12V/°C

The temperature probe installs at the rear of the shelf in the port labeled J3, and the sensor should be attached to the battery.

### 3 Stage Charging Option:

The system can also be configured to cycle through a 3 stage charging regime every time ac power is interrupted; this will result in an absorption charge of 28.0 or 56.0 volts for up to 8 hours. Contact Newmar for information.

## VII) Removing and Installing the Controller Assembly

Controller assembly is located on the right side of the CRS assembly and can be removed while system is operating.

To remove controller assembly, remove the #6 screw securing it to the shelf chassis. Pull controller out approximately 2" until the ribbon cable connector is accessible. Remove ribbon cable from P2 by grabbing the connector firmly and pulling it away from the PCB. (Caution: Do not pull controller assembly out past the ribbon cable connector until the ribbon connector has been removed from the PCB.) Hold the ribbon connector away from the controller assembly and continue to pull the controller out of the shelf assembly.

To install controller assembly, hold the ribbon cable assembly away from the controller slot and align backing plate of controller to the controller guides located inside shelf. Slide controller into shelf until ribbon cable connector is close enough to reinstall into the P2 PCB connector. Reinstall ribbon cable and continue to slide controller in until front panel is flush with shelf chassis. Reinstall #6 screw to secure controller.

## VIII) System Component Options

### A) Power Function Manager, Model PFM-400

This 2RU rack mount device wires to the output hot of the Centurion system and provides the following functions:

1. Digital amperage and voltage read outs
2. Summary alarm contacts
3. 400 amp low voltage disconnect
4. 5 circuit breaker distribution

For details go to [www.newmar telecom.com](http://www.newmar telecom.com) and select Power Function Manager.

### B) Circuit Breaker Distribution Panels

Distribution panels can be added to a Centurion system, with or without using the PFM-400 above. Two models are available: DST-20 – Accommodates 20 plug in circuit breakers, and can be configured for dual or single input bus. DST-10 – Accommodates 10 plug in circuit breakers in a single input bus. For details go to [www.newmar telecom.com](http://www.newmar telecom.com) and select Distribution Panels.

For multiple loads a rack mount return Bus Bar is recommended. Model BBA-800



## IX) Specifications

### Centurion Rectifiers

**Input Voltage/Frequency:** 90-264 VAC\* / 47-63 Hz.

**Input Amperage:** 6 amps @ 115V and full load, 3 amps @ 230V and full load

**Power Factor:** .96-.99

**Output Voltage/Amperage\*:**

**CR48-10:** -54.4 VDC, 10 amps continuous

**CR24-20:** +27.2 VDC, 20 amps continuous

\* 100 % output power available from 105 VAC to 264 VAC; Derate output linearly from 100% @ 105 VAC to 80 % @ 90 VAC

**Line/Load**

**Regulation:** +/- 2 %

**Ripple:** CR24-20: 1% PK-PK

CR48-10: 1% PK-PK

**Protection:** Over-voltage, current limiting, over-temperature, input and output fuses.

**Fan Operation:** Continuous air flow front to rear.

**Indicators/Controls:**

- Output power indicators LED
- Power switch

**Operating Temperature:** -10°C to +60°C; 100 % load from 0°C to +50°C; Derate linearly to 80% load from +50°C to +60°C and 0°C to -10°C.

**Weight:** 6.0 lbs.

**Safety:**

- EN55022 Class A
- UL 1950
- CE mark

### Centurion Rectifier Shelf

**Model CRS**

**Input:** 115/230 VAC nominal

**Capacity:**

Up to Three Rectifiers, CR24-20 or CR48-10

**Alarms/Indicators/Controls:**

- Output failure contacts; Form A, Form B, Form C, Contact rating: 1 Amp Max.
- Front panel LED indications: Minor Alarm, Major Alarm, Output OK, Battery Over Temp
- Front panel voltage test points and adjustment Adjustment Range: 24V: 25-29.4V, 48V: 50-59V

**Battery Drain (with no AC input):** <200 mA 3 rectifiers and controller

**Mounting:** 19" or 23" rack

**Dimensions:** Refer to Dimensional Drawings

**Weight:** 10 lbs.

**Safety:** UL 1950 compliant

## X) Dimensional Drawings

