

## VI) SPECIFICATIONS

- Input:** 115/230 VAC  $\pm$  10%, 50-60 Hz.
- Output:** 13.8 VDC  
20 Amps Surge (10% duty cycle, 10 minutes max.)  
5 Amps continuous (100% duty cycle)
- Regulation:** 1% Line and Load
- Ripple:** 4 mV RMS (@5 amp continuous duty rating)
- Current Limit:** Power supply current limit set @ 110% of continuous duty rating.
- Low Voltage Alarm:** Engages @ 10.7-10.9 VDC Output Terminal Voltage
- Low Voltage Disconnect:** 10.3 VDC Output Terminal Voltage
- Internal Battery(s):** Sealed, Lead-Acid, Rechargeable, Deep-Cycle  
12 Volt, 7 Amp-Hour
- Back-Up Battery Float Voltage:** 13.8 VDC
- Dimensions (H x W X D):** 5.25" x 9" x 10.5"
- Weight:** 16 lbs. (with one battery)  
22 lbs. (with two batteries)

# POWER-PAC OPERATOR'S MANUAL



M-PWRPAC-B

# NEWMAR<sup>®</sup>

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### NEWMAR LIMITED WARRANTY

Newmar warrants the original purchaser of this Power-Pac that it shall be free from defects in material and workmanship for a period of one (1) year from the date of original purchase.

In the event of failure caused by a defect in material or workmanship return to place of purchase or to either address listed on page 1. Please include proof of purchase, date of purchase and a written explanation of the alleged defect. If this product is determined to be defective by Newmar, Newmar will repair the product without charge. Any repairs or adjustments to be made on a defective product shall be determined by Newmar.

This warranty does not apply to products that have not been properly installed nor to products that have been damaged through accident, negligence, misuse, alteration, abuse or normal wear and tear. For proper installation have the authorized Newmar dealer install the product or an electronic technician of your choice may install the product by carefully following the directions provided at the time of purchase.

Newmar limits its liability under this warranty to the repair of the product or reimbursement of the cost of the product to the consumer. This warranty does not cover postal and freight charges to return the product for repair.

For your own protection, check the product upon receipt of any damage during shipping. Any such damage should be referred to the carrier.

No person, including any Newmar dealer, is authorized to assume any further liability on behalf of Newmar beyond the warranty. Any purchaser should be referred exclusively to this warranty.

Newmar reserves the right to make changes in design and improvements on its products without assuming any obligations to install these improvements or otherwise modify any previously manufactured product.

There are no other warranties either express or implied that shall exist beyond the terms of this warranty.

Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

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### I) GENERAL DESCRIPTION

The Power-Pac is a regulated linear power supply which produces a 13.8 VDC output from either a 115 or 230 VAC input. It incorporates a built-in battery which will continue to supply the 12 volt load with DC power in the event of a temporary loss of AC input to the supply. Provision is made for increasing the amount of time available for operating on emergency back-up with the addition of another internal or external battery.

### II) FEATURES

**Regulated Noise-free Output** — The Power-Pac features a highly regulated, low ripple output (see specifications) to power radios and other sensitive communications equipment without causing RF or audio interference.

**Battery Back-up** — A 7 amp-hour battery is built into the unit to provide up to 20 amps of emergency transmit power. It is charged automatically by the output of the Power-Pac during normal operation. In addition, mounting space and battery terminals are provided within the unit for an optional second 7 amp-hour battery (available from NEWMAR), thus allowing the operator to double the amount of time that the radio can operate on emergency power. If more back-up power is desired, terminals are provided for the addition of an external battery.

**Battery and Input/Output Status Indicators** — The operator is kept informed of all important functions such as AC input, DC output and battery status with front-panel indicator lights and a warning buzzer.

**Automatic Low Battery Disconnect** — The battery is protected against damage from extreme discharge by a circuit which will automatically disconnect the load when output voltage reaches 10.3 VDC.

**Over-Voltage Protection** — The radio being powered is protected against damage from any condition which might cause excessive output voltage by an over-voltage protection (OVP) circuit.

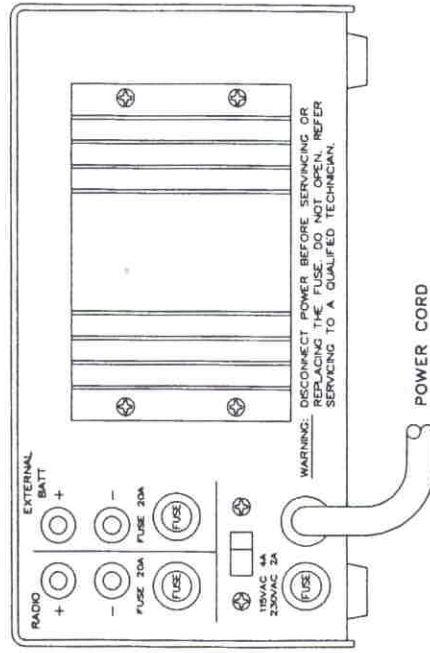
**Current Limit Protection** — The Power-Pac is protected against damage due to overloads or shorts on the output by an automatic current limiting circuit.

**Fusing** — AC input and internal and external batteries are fused for additional protection against high current conditions.

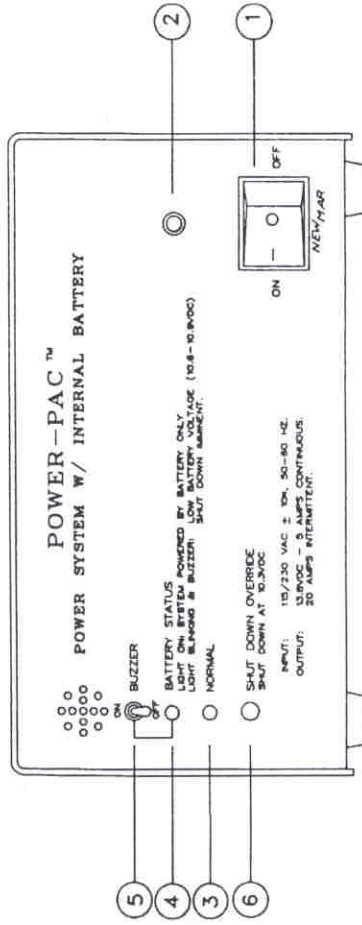
**Automatic Thermal Shutdown** — The Power-Pac is protected against overheating (when duty ratings are exceeded) by an automatic thermal shutdown circuit. When a safe operating temperature is restored, the Power-Pac automatically returns to service.

### III) FEATURES ILLUSTRATION

For this illustration, refer to section IV) A, B, C:



For this illustration, refer to the numbered items in section IV)-D:



## IV) OPERATION

A) **AC Input** — The Power-Pac comes from the factory wired for 115 VAC input. It is equipped with a UL-approved power cord with three-pin plug. The input fuseholder is on the rear of the unit to the left of the power cord. A 4 amp fuse has been installed. Should this fuse ever need replacing, be sure to do so with a standard AGC fuse. Do not replace with a slo-blo fuse.

If you require the Power-Pac to operate at 230 VAC input, take the following steps before you apply AC power:

- 1) Remove the 4 amp input fuse and replace it with a 2 amp fuse. (A 2 amp fuse is provided.)
- 2) Using a ball-point pen or similar tool, slide the input selector switch from the 115 to the 230 VAC position. This switch is located directly above the input fuseholder.
- 3) Cut off the three-pin plug from the power cord and replace with the appropriate type to match the available 230 VAC outlet. The black wire is hot (fused), white wire is neutral and green is earth/safety ground.

No adjustment is necessary to accommodate 50 or 60 Hz input.

B) **DC Output** — The DC output terminals are located on the rear of the unit and are labeled "RADIO". These terminals will accommodate standard banana plugs, spade lugs sized to fit a #10 stud, or stripped stranded wire leads.

The chart below can be used to determine the correct gauge for output wiring, based on the length of the wire from the Power-Pac to the radio.

<u>WIRE LENGTH (IN FEET)</u>			
<b>Wire gauge</b>	5'	10'	20'
	#14	#12	#10
		#10	#10

**NOTE:** If external battery back-up is used, the wire length is the total combined length of the wire from the battery bank to the Power-Pac and the Power-Pac to the radio.

C) **Battery Back-up** — The Power-Pac comes equipped with either (1) or (2) 7 amp-hour batteries installed. To find out whether your Power-Pac has 7 or 14 amp-hours of back-up, check the "BATTERY BACK-UP RATING" matrix on the bottom of the unit. The appropriate designation will be marked. If you have the 7 amp-hour model and wish to double the back-up capacity, an additional battery may be obtained from the factory. (Specify part number 360-2015-0.) Your Power-Pac already has an internal mounting space and bracket for the second battery, and is pre-wired with color coded leads that simply snap onto the battery terminals. If you install a second battery, be sure to mark the box next to the 14 amp-hour ratings in the matrix on the bottom of the unit.

The internal battery is a sealed rechargeable type and will normally last 5-7 years.

In addition to providing back-up power in the event of an AC power failure, the battery will supplement the output of the Power-Pac to provide for loads up to 20 amps. At loads of 5 amps or less the Power-Pac both supplies the load and charges the battery to a finishing voltage of 13.8 VDC. **Note:** Installing additional back-up batteries does not increase the maximum amperage output of the Power-Pac, as the unit is current-limited at 20 amps. Additional batteries will only allow radio operation to continue for a longer period on back-up power.

If you wish to increase the back-up capacity beyond 14 amp-hours, a set of terminals are provided for you to add an additional battery bank. These terminals are located on the rear of the unit and are labeled "EXTERNAL BATT". The external battery will also be charged by the Power-Pac during normal operation. Refer to the wire size notes in Section B to determine the correct gauge for wires to the battery.

**Note:** Because all back-up batteries are in parallel it is important that they be of the same type and approximate age. Also, it is not recommended to increase total battery back-up capacity to more than 28 amp-hours, as the Power-Pac may not be able to recharge a larger bank if it should become deeply discharged during an extended AC power outage.

The fuseholder for the internal battery is located beneath the output "RADIO" terminals. The fuseholder for the external battery is directly beneath the "EXTERNAL BATT" terminals. To gain access to either fuse, depress the fuseholder cap slightly and turn counterclockwise. Should either fuse ever need replacing, be sure to use a standard 20 amp AGC fuse. As always, slo-blo fuses should be not used.

## D) Front Panel Controls and Indicators

- 1. On/Off Switch** — This rocker switch controls both AC power to the Power-Pac, as well as DC output. When the switch is in the "Off" position there will be no output from the supply or the back-up batteries to the load. (Exception: the back-up batteries will be engaged while the Override button is being depressed, but will disengage when you release it.) If you wish to engage the back-up batteries, and leave them engaged while there is no AC available to the Power-Pac, put the switch into the "On" position and press the Override button once. The batteries will come "on-line" to begin supplying the load with DC voltage and will stay on-line until AC power is restored or the batteries drain to the prescribed 10.3 VDC disconnect voltage.
- 2. AC Indicator Light** — This light, located directly above the On/Off switch will illuminate when there is AC available to the Power-Pac and the switch is in the "On" position. It is unrelated to DC output.
- 3. "Normal" Indicator Light** — This light will stay illuminated as long as the Power-Pac is on and the battery charging circuit is functioning normally. It will be extinguished when AC power to the Power-Pac is lost, the unit is manually shut off or if the unit has shut down due to thermal overload (see item 4).
- 4. Battery Status Light** — This light will illuminate and remain on when AC power to the Power-Pac is lost and battery back-up is activated. This is indicated when the light comes on while the AC Indicator and "Normal" lights are extinguished.

It may also illuminate when there is a load surge near 20 amps and the back-up battery is providing a substantial portion of the current. This is indicated if the Battery Status Light comes on while the AC Indicator and "Normal" lights remain on.

If the Power-Pac is operated beyond its temperature rating, the automatic thermal switch may cause the unit to shut down and the back-up battery to be engaged. In this case, the Battery Status Light will come on while the "Normal" light is extinguished and the AC Indicator light remains on. The Power-Pac will return automatically to normal service when a proper operating temperature is restored, however, the overload problem should be attended to immediately, as this thermal cycling will severely shorten the life of the Power-Pac.

If the back-up battery is engaged and continues to supply the load until battery output voltage drops to 10.9-10.7 VDC, the Battery Status Light will begin to flash. This is to alert the operator that back-up power is very limited and corrective steps should be taken immediately in order to maintain system operation.

**5. Buzzer** — When battery output voltage reaches the point where the Battery Status light begins to flash, at the same time an audible Buzzer will begin to sound. If desired, this automatic Buzzer may be disabled by positioning the Buzzer Switch to "Off".

**6. Shut-down Override Button** — Because batteries may be permanently damaged by being completely discharged, particularly if they are left discharged for a long period of time, the Power-Pac employs an automatic low-voltage disconnect circuit. If the back-up battery is drained to the point where only 10.3 VDC is sensed at the output terminals, the Power-Pac will automatically disconnect the load from the battery back-up.

Should emergency communication be necessary after this automatic shut-down, the Power-Pac provides a Shut-down Override Button. This button, when pressed, reconnects the battery to the radio or other communication load. This reconnect circuit works only when the Override Button is being pressed. Disconnect occurs when it is released. **Note:** Batteries may be permanently damaged by being re-engaged with the Override Button.

If the Power-Pac is already connected to the radio when AC power fails, engagement of the battery back-up is automatic. However, there may be occasion to install the Power-Pac when there is no AC power available initially. In this case, it will be necessary to position the On/Off switch to "On" and then press the Override Button once to engage the battery back-up.

## V) THEORY OF OPERATION

