General Information
The NAV-PAC protects electronics from voltage spikes, power surges, momentary power losses, abrupt voltage changes and noise interference on incoming DC power to MDTs, GPS, and other onboard electronics prone to memory loss or "crashes". NAV-PAC is a solid state device which provides "pure" power to navigation electronics by performing several essential functions.

1) Voltage Spike Protection: Engine cranking, pump and motor operation send voltage "spikes" through a mobile electrical system that often "bulldoze" their way through the electronic circuitry. NAV-PAC eliminates this ruinous condition.

2) R.F. Noise Filtering: The NEWMAR NAV-PAC contains a four-element low-pass LC filter which provides very high radio frequency attenuation in both positive and negative power leads to the receiver preventing noise from adversely affecting signal reception and related operation.

3) Back-Up Power: A long-life, completely sealed "Non-Spillable" valve regulated lead acid battery (AGM) pack is built-in the NAV-PAC which acts as a power reservoir and is charged from the onboard 12 Volt power. In the event of a drop in DC voltage due to engine cranking or total power interruption, the battery will maintain power to navigation and communication equipment for a short period of time. This is essential for preventing memory or data loss.

4) Timed Disconnect Circuit: This circuit prevents damage to the internal battery from extreme discharge by disconnecting the NAV-PAC battery approximately 15 minutes after abrupt drop or complete loss of DC input.

5) Low Battery Disconnect Circuit: This circuit prevents damage to the internal battery from extreme discharge by disconnecting the battery whenever battery voltage reaches 10.2 VDC

6) Optional Power Status Panel: P/N 773-5037-0

Materials Provided
Your NAV-PAC comes with the following materials:
(4) #8 ring lugs for 12-10 gauge wire
(1) Installation/Operation Manual
Check to see that these items have been included with the packaging. For any missing items, please contact factory.

Installation
1) After you have determined the best location in the system, locate a flat surface close to the power line that feeds the GPS or MDT. For best results, the NAV-PAC unit should be within 24" of the critical electronics. The case need not be grounded, so it is acceptable to mount the unit to wood or metal. Securely mount the NAV-PAC.

2) Using the table below, select the proper wire size for your installation.

<table>
<thead>
<tr>
<th>AMPS*</th>
<th>10</th>
<th>15</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 10 AMPS</td>
<td>14 AWG</td>
<td>12 AWG</td>
<td>12 AWG</td>
</tr>
<tr>
<td>10 - 20 AMPS</td>
<td>10 AWG</td>
<td>10 AWG</td>
<td>10 AWG</td>
</tr>
</tbody>
</table>

*Current draw of equipment being powered.

Replace terminal block cover to prevent accidental shortings the terminals.

Important Installation Note: If there is to be a continuous load on the NAV-PAC output during normal operations, the DC input must be a minimum of 13.4 VDC to prevent discharge of the internal battery.
Battery Charging/Replacement

Caution: Do not leave the battery discharged for extended periods of time. It may be permanently damaged and may not take a recharge.

The battery requires no maintenance and is completely sealed. Battery life is up to five years. To charge, the battery requires an input voltage of 13.8 to 14.8 VDC for 3-4 hours or more per month. To prevent discharging, the battery requires a nominal input of 13.4 to 14.4 VDC. These voltages are normally produced by an engine alternator or good quality battery charger.

The battery storage time @ 23° C is 400 days. The battery should be replaced no less frequently than every three (3) years to guarantee proper operation of the NAV-PAC. (Request P/N 591-0412-0).

To determine the age of the battery in your NAV-PAC, check the quality control sticker on the end of the unit. The first four digits of the serial number (designated "S/N") refer to the year and month of manufacture. For instance, a unit with a serial number starting "1535" was manufactured the 35th week of 2015. Be sure to mark the date of replacement on this sticker for future reference.

Battery Replacement Proceeds as Follows

Caution: Take care to ensure that you do not short the battery terminals during installation. The resulting high current can melt wires and cause other damage to the unit.

1) Turn off power to the input wiring and disconnect all input and output connections to the NAV-PAC. Remove the unit from the mounting surface.
2) Remove the fuse from the fuseholder labeled “BATTERY” on the front panel.
3) Remove the four screws on the top of the unit and the four screws on either side of the unit.
4) Remove the cover.
5) Disconnect the wires from the battery terminals.
6) Remove the four (4) screw/washer sets from the forward battery bracket. Slide out the battery bracket and battery from beneath the PCB.
7) Carefully observing battery terminal location and polarity, slide the replacement battery and battery bracket in beneath the PCB.

8) Re-install the four battery bracket screw/washer sets for the battery bracket and securely tighten all four (4) battery bracket screws.

9) Re-connect the battery series jumper wire and the -12V Battery Black and +12V Battery Red to the correct terminals.

10) Re-install cover, fuses, 12 volt output and input connections, and verify equipment receives 12 volt power.

11) See paragraph 1 of “Test/Troubleshooting” section to verify back-up power operation.

Dispose of the old battery properly and according to local codes. Although the batteries are sealed, they are a lead-acid type and there maybe restrictions on its disposal.

**Test / Troubleshooting**

To test the battery operation, disconnect the input power at the source or remove the input fuse, and, using a voltmeter, note that the DC output power is still present on the output terminals. Note that after approximately 15 minutes, the output will disconnect automatically to protect the internal battery. You should then measure no voltage on the output terminals. To reset this timed circuit, reconnect the NAV-PAC input to the ship/vehicle's battery.

The noise filtering and spike protection circuitry won’t require testing unless the NAV-PAC blows fuses repeatedly, or has had a nearby lightning strike, or other very high energy transient.

If the NAV-PAC blow fuses repeatedly (replace with 20 Amp Fast Acting Fuse: ABC-20 or AGC-20), this usually indicates a shorted component. Have a qualified technician perform the repairs or return the unit to NEWMAR for factory inspection.

Always verify that the replaced fuses are of the correct rating. Do not use slow-blow fuses.

**Theory of NAV-PAC Operation**

**Noise Filter/Voltage Transient Protector with Battery Back-Up**

The NAV-PAC is wired in series with the DC power to sensitive electronics and:

1) Filters out noise interference on incoming power lines
2) Clamps voltage spikes and transients to a safe level
3) Provides battery back-up power during voltage drops due to starter motors and momentary losses of power.

**Specifications**

- **Input:** 12 VDC, Nominal Charging: 13.8-14.8VDC
- **To Prevent Discharge:** 13.4-14.4 VDC, Maximum 15.5 VDC
- **Output:** Filtered, Voltage Spike Protected with Back-Up Battery 20 amps max
- **Back-Up Power:**
  - 12 VDC Nominal
  - 5.0 AH Capacity
  - 10.9 amps for Fifteen (15) Minutes
  - 16 amps for Eight (8) Minutes
  - 15 amps for Ten (10) Minutes
  - 20 amps for Five (5) Minutes
- **Low Voltage Disconnect:** 10.2V DC
- **Battery:** Sealed Rechargeable Lead-Acid 5.0 AH, 3 - 5 Years
  - Typical Life - Replaceable (P/N 591-0412-0)
- **Filtering:** Audio Through 200 MHz
- **Voltage Spike Protection:** Transient Energy Capability: 100 Joules, 4,000 amps Max.
- **Operating Temperature:** 0-50° C
- **Size/Weight:**
  - 5.49” H x 6.0” W x 7.4” D; 5.2 Lbs.
  - 13.9 H x 15.2 W x 18.8 D (cm); 2.4 Kgs.