#9690 Incremental 1500-Watt Energy Center

#9691 500W Battery Pack

OPERATING INSTRUCTIONS

Shown with one #9691 500W Battery Pack
IMPORTANT WARNINGS & SAFEGUARDS

Sierra Wave® 1500-Watt Incremental Energy Center comes equipped with a 500Wh capacity and can be expanded to 1500Wh capacity incrementally, and increasable as energy needs increase. Start with the #9690 unit, which includes a 500Wh internal battery and add up to two more 500Wh battery packs (#9691 sold separately) as needed. The Energy Center features a pure sine wave AC inverter and a lightweight LiFePO4 (lithium iron phosphate) battery. This power storage and distribution center features a battery management system that handles all battery charging, power demand, and battery switching automatically. Charge the Energy Center from any 120V AC electrical outlet or from an auxiliary solar collector and operate a variety of appliances and tools from multiple 120V, 12V, or USB power outputs. Energy peace of mind for the home, farm, cabin, or work site.

IMPORTANT WARNINGS & SAFEGUARDS

Read all instructions thoroughly before operating this unit to avoid injury to self or property and to avoid damaging the unit. Keep instructions handy for reference during use.

ENERGIZED EQUIPMENT - ELECTRICAL SHOCK & EXPLOSION HAZARDS

GENDERS LETHAL VOLTAGES

- Do not submerge in liquid or operate in wet environments. Device is not waterproof or water resistant. Operate in dry environments only. Failure to do so could cause injury and damage the unit.
- Do not operate in flammable or explosive environments
- Do not operate if the unit is damaged in any way including loose electronics or if charging cords are frayed and wires are exposed.
- Do not plug inverter 120V AC outlets into external 120V AC outlets of any kind
- Do not place foreign objects inside the power outlets
- Do not disassemble. There are no user serviceable parts. Contact the manufacturer for all repairs.
- Do not use any AC powered devices over 1200W for risk of damage to the batteries or inverter
- Monitor battery regularly during charging
- Do not use to operate any medical life support equipment
- Consult your physician before using with CPAP devices or other non-life support medical equipment
- Do not block the air inlets or vents
- Do not replace fuses with larger amperage values. Use only specified fuses.
- Not recommended for use or storage below 14° (-10°C) or above 120°F (49°C). Place out of direct sunlight to prevent overheating.
- Administer close supervision when operating around children or persons with disabilities
- Check dangerous goods shipping regulations before shipping

DANGER: Contains lithium high-energy batteries. Follow all precautions to prevent injury, property damage and fire at all times during storage and operation.
- Never store or use in temperatures above 120°F (49°C)
- Keep away from sparks, open flames and heat sources
- Do not drop, puncture or incinerate
- Stop use immediately if you notice a leak or damage to the battery or unit. If it malfunctions contact Customer Service at 800-227-0196.
- Follow your local battery disposal regulations
WARNING: The #9690 Incremental 1500-Watt Energy Center and #9691 500-Watt Battery Pack are only serviceable by Aervoe Industries, Inc. or an authorized repair facility. Do not dismantle. Warranty is void if the device is opened by any unauthorized personnel. Call Aervoe Industries, Inc. at 800-227-0196 for repair information.

Battery SDS is available online at www.aervoe.com.

**FCC REQUIREMENTS**

Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment.

The following covers the 10A AC charger only.

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 the 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

Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
PARTS IDENTIFICATION

- AC Power Switch
- DC Power Switch
- Main Power Key
- USB Power Ports
- Main Battery Meter
- Aux Battery #1 Meter
- Aux Battery #2 Meter
- 12V Fuses
- 12V DC Outputs
- 120V AC Outputs
CHARGING & STORAGE See instructions below for installing additional 500-Watt Battery Packs
For maximum efficiency and battery life, fully charge before first use and after each use. Charge every 3 months during storage. With routine discharge (use) and recharge cycles the batteries will maintain proper conditioning. Failure to do so can affect battery performance and life cycle.

NOTE: Monitor regularly during charging.

Two methods of charging are available:
1. Use the included 120V/220V – 10A AC Charger
2. Use a compatible solar panel (Sierra Wave #9590 Solar Collector recommended)

IMPORTANT: All power outlets are automatically disabled while charging. Once charging is complete and the power source has been removed, the outlets will become functional again. By keeping additional Battery Packs charged and ready to go you can avoid disruption in service.

AC Charging: (included)
The optimum method of charging the #9690 Energy Center and any installed #9691 Battery Packs.

1. Turn the MAIN POWER KEY counter-clockwise to OFF.
2. Turn the AC POWER SWITCH OFF.
3. Plug the red/black Anderson DC end of the 120V AC Charger into the DC IN socket.
4. Find a suitable grounded 120V AC outlet rated for 15A or higher and plug in the power cord.
5. The LED indicator on the charger will be RED when charging is in progress and will turn GREEN when a complete battery charge is reached. While charging, the BATTERY METERS will cycle from low to high.
6. When unplugged from the power source, the MAIN BATTERY METER will indicate the strength of the internal battery – All 10 LEDs means the unit is fully charged. AUX BATTERY #1 and #2 METERS will indicate the strength of additional installed batteries in the same manner.
7. The internal cooling fan will cycle on and off to maintain proper internal temperature during operation.
8. Disconnect the charger once charging is complete.

Solar Charging: (solar panel not included)
The Energy Center can be charged using solar power. Aervoe recommends the Sierra Wave #9590 120-Watt Solar Collector. Contact Aervoe Industries if other solar collectors are being considered to ensure compatibility.

1. Read the instructions provided with the solar collector for set-up instructions and cautions prior to use.
2. Place the solar collector and the Energy Center outdoors, on a level surface, in a bright sunny location. The Energy Center can be placed behind the solar collector, or indoors, to keep it out of direct sunlight and temperatures over 140°F. A 30-ft. Extension Cable #9503 is sold separately to allow it to be set up further away.
3. Connect a recommended solar panel to the DC IN socket on the Energy Center. The MC4 cable on the solar panel will connect to the MC4 end of the included MC4 TO ANDERSON ADAPTER CABLE. The Anderson plugs on the cable will connect to the DC IN socket.
4. When solar voltage is present, the CHARGING LED will glow RED and the BATTERY METERS will cycle from low to high.
5. When charging is complete the CHARGE COMPLETE LED will glow GREEN.
6. When unplugged from the power source, the MAIN BATTERY METER will indicate the strength of the internal battery – All 10 LEDs means the unit is fully charged. AUX BATTERY #1 and #2 METERS will indicate the strength of additional installed batteries in the same manner.
7. Disconnect the solar collector once charging is complete.
**Battery Meters**
The Energy Center has three battery meters and each is associated with an individual battery (one for the included 500Wh battery and one for each auxiliary batteries, if installed). They provide a visual reference of the battery's level when charging and discharging within +/- 10%. If battery level becomes too low, the battery meter will display the last two red bars on the meter. Once the battery level drops to 1 red bar it will shut down completely to prevent damage to the battery. It will need to be recharged before using again.

**ADDING ADDITIONAL #9691 BATTERY PACKS (sold separately)**
To increase battery capacity, additional 500Wh battery packs are available and up to two may be installed into the #9690 Incremental 1500-Watt Energy Center. This increases capacity from 500Wh to 1000Wh or a maximum 1500Wh. An unlimited number of Battery Packs may be kept charged and ready to replace Battery Packs that have discharged.

**IMPORTANT:** Remove Battery Packs from the Energy Center if they will be stored for more than 7 days.

**Installing**
1. Turn off the MAIN POWER KEY.
2. Remove the battery compartment cover in either AUX BATTERY #1 OR #2 SLOT by sliding the latches toward the middle of the unit. Keep the battery compartment cover because it will be replaced when the battery is removed.
3. Slide a #9691 Battery Pack into the opening with the Sierra Wave logo facing up and the power connectors going in first. Full connection will be made when the latches click into place.
4. Turn on the MAIN POWER KEY and turn the AC or DC POWER SWITCH on. The Battery Meter associated with the installed battery should turn on and show the status of the charge (1-10 bars). If it does not register try reinstalling for a better connection.

**Charging**
1. Additional installed Battery Packs #9691 will be charged when charging power is supplied to the #9690 Energy Center as described prior.
2. Battery Packs may also be charged outside of the #9690 Energy Center using the 120V AC Charger supplied with the #9690 Energy Center or sold separately as #9692 Battery Charger.
   a. Place the Battery Pack on a level, non-metal surface and out of direct sunlight.
   b. Plug the red/black Anderson DC end of the 120V AC Charger into the input on the back of the Battery Pack.
   c. Find a suitable grounded 120V AC outlet rated for 15A or higher and plug in the power cord.
   d. The LED indicator on the AC charger will be RED when charging is in progress and will turn GREEN when a complete battery charge is reached.
   e. Disconnect the charger once charging is complete.
3. **WARNING:** The solar charge controller that is included with the #9580 and #9590 Solar Collectors or other non-specified lithium battery solar charge controller should not be used when charging Battery Packs. Contact Aervoe Industries, Inc. for information on the proper charge controller to use and installation instructions.
OPERATING INSTRUCTIONS

Once charged, the Energy Center is ready to use. All power outputs may be used simultaneously as long as the total power draw of all devices plugged in does not exceed the maximum power rating of the installed batteries. For optimum battery life avoid draining the batteries below 1 bar on the Battery Meter. If possible, recharge before capacity drops that low and the unit shuts down.

System On and Off

1. Turn the MAIN POWER KEY clockwise to ON.
2. Turn the AC or DC POWER SWITCH to ON depending on the devices you will be operating.
3. The MAIN BATTERY METER should illuminate and indicate the status of the internal 500W battery. If auxiliary #9691 Battery Packs are installed, the AUX BATTERY #1 & #2 METERS will also illuminate.
4. To shut the system off when not in use including long-term storage, turn all POWER SWITCHES OFF, and turn OFF the MAIN POWER KEY and remove it from the Energy Center.
5. Disconnect all devices.

120V AC Power Operation (Pure Sine Wave Inverter)

Pure Sine Wave Inverter Information: Pure sine wave power is suitable for most AC devices and power supplies used in electronic equipment, transformers, and motors. Aervoe assumes no liability if used with medical equipment. DO NOT use with any life support system. The 120V AC Outlets cannot be used while charging. Any attempt to do so will cause the system to safely shut down.

CAUTION: The 120V AC operation can safely power common AC appliances and devices with a maximum power output of 120V AC/10A or 1200 watt continuous power (based on #9690 Energy center with 2-#9691 Battery Packs = 1500Wh capacity). It is the user's responsibility to verify that the device you wish to operate does not exceed the power specifications listed below to prevent inverter overload and damage to the Energy Center or your device.

<table>
<thead>
<tr>
<th>#</th>
<th>Description</th>
<th>Power Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>#9690 Energy Center (500Wh capacity)</td>
<td>400W (3.5-4A) max</td>
</tr>
<tr>
<td>2</td>
<td>#9690 Energy Center + 1 #9691 Battery Pack (1000Wh capacity)</td>
<td>800W (6.5-7A) max</td>
</tr>
<tr>
<td>3</td>
<td>#9690 Energy Center + 2 #9691 Battery Packs (1500Wh capacity)</td>
<td>1200W (10A) max</td>
</tr>
</tbody>
</table>

1. Turn the MAIN POWER KEY and AC POWER SWITCH on.
2. Plug in your 120V AC device to either of the 120V AC OUTPUTS and operate as normal.
3. Disconnect the device when not in use.
4. If overload occurs, the inverter will automatically shut-down. Disconnect all devices and retry.

DC Power Operation

The DC power operation includes a DC POWER SWITCH that when switched on provides power to the USB ports and the 12V DC sockets. NOTE: These outputs cannot be used during charging. Any attempt to do so will cause the system to safely shut down.

12V DC Output

The 12V DC operation can operate 12V devices rated at 15A (180W) per outlet. Do not operate devices higher than 15A. Overload and short-circuit protection fuses are located next to each 12V DC receptacle. If these need to be replaced, make sure the DC POWER SWITCH and MAIN POWER KEY are off. Replace with the specified fuse.

1. Turn the MAIN POWER KEY and DC POWER SWITCH on.
2. Plug in your 12V DC device (15A OR LESS) to either of the 12V DC OUTPUTS and operate as normal.
3. Disconnect the device and turn off the DC POWER SWITCH when not in use.
USB 5V/2A DC Output
The USB operation can operate devices using a standard USB connection and up to 5V/2.5A per port.

1. Turn the MAIN POWER KEY and DC POWER SWITCH on.
2. Plug in your USB device to either of the USB POWER PORTS and operate as normal.
3. Disconnect the device and turn off the DC POWER SWITCH when not in use.

TROUBLESHOOTING
CAUTION: This unit and its accessories are not user serviceable. If you experience any trouble with your Energy Center contact Aervoe Industries, Inc. and speak with a Product Specialist at 800-227-0196. To avoid damage to the unit and avoid injury do not dismantle.

Common Remedies
- Make sure the MAIN POWER KEY is on
- Ensure all power cords are connected securely
- Check each BATTERY METER to ensure there is adequate power storage. If not, recharge as described above.
- Check the charging indicator on the AC Charger to make sure they are illuminating correctly
- If using a solar collector, make sure it is connected properly, in adequate sunlight, and the CHARGING indicator is illuminated on the Energy Center

120V AC Output Failure
- Make sure the AC POWER SWITCH is on and the AC POWER LED illuminated
- Make sure your device meets the power specifications listed on page 8
- Check the 120V AC Outlet for damage or obstruction
- Verify the 120V device being used is working and not damaged

12V DC Output Failure
- Make sure the MAIN POWER KEY and DC POWER SWITCH is on
- Check the 12V DC fuse associated with the suspect 12V DC output. If it has blown replace with the same specified fuse. Follow fuse replacement instructions above.
- Check the 12V DC Outlet for damage or obstruction
- Verify the 12V device being used is working and not damaged

USB Output Failure
- Make sure the MAIN POWER KEY and DC POWER SWITCH is on
- Check the USB Outlet for damage or obstruction
- Verify the device being used is working and not damaged

Fault Mode
When the system senses a fault condition (explained below) it will automatically shut down all power outputs and reset the system after 15-seconds. If the fault is not cleared, the system will go back into the fault mode until the cause of the fault is cleared or the system is powered off.

System Faults and Remedies
Current Draw is Over the Maximum Allowable Limit
- The system automatically senses the number of added 500-watt batteries installed and adjusts the maximum allowable current draw set point.
- If the set-point is exceeded, reduce the current draw to clear the fault.

Battery Level Too Low
- If the battery level falls below 10.0V because the batteries are discharged or the system wattage load has been exceeded for the number of installed batteries, the system will enter fault mode. Recharge the batteries to clear the fault.

Internal Temperature Too High
- The system has multiple temperature sensors. If the internal temperature reaches a dangerous level or a cooling fan fails, the system will go into fault mode. Turn off the system and allow it to cool before restarting.
### CARE AND MAINTENANCE

- Charge and use routinely as described above
- Dust regularly with a clean dry cloth to prevent dust and dirt from building up on the vents and power inputs/outputs. Do not use water, detergents, or other chemicals to clean the unit
- Store in a clean, dry place when not in use
- Turn off all power switches and remove the MAIN POWER KEY when not in use or before long term storage

### TECHNICAL INFORMATION

<table>
<thead>
<tr>
<th>SPECIFICATIONS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BATTERY TYPE</strong></td>
<td>LiFePO4 (lithium iron phosphate) 12.8V/40Ah (500Wh)</td>
</tr>
<tr>
<td><strong>AUXILIARY BATTERY #9691</strong></td>
<td>Up to 2 may be added. 40Ah – 12.8V (500Wh per battery). Sold separately.</td>
</tr>
<tr>
<td><strong>BATTERY LIFESPAN</strong></td>
<td>1500+ cycles per battery (cycle = charge and discharge)</td>
</tr>
<tr>
<td><strong>INVERTER</strong></td>
<td>Wave form: pure sine wave</td>
</tr>
<tr>
<td></td>
<td>Voltage: 120V AC/60Hz</td>
</tr>
<tr>
<td></td>
<td>Amps: 12.5 max (total)</td>
</tr>
<tr>
<td></td>
<td>Maximum power output: 1500W</td>
</tr>
<tr>
<td></td>
<td>Continuous power output: 1200W (80% efficiency)</td>
</tr>
<tr>
<td></td>
<td>Peak surge rating: 3000W</td>
</tr>
<tr>
<td></td>
<td>DC input (battery): 12-15V DC, 10.5-15V DC</td>
</tr>
<tr>
<td></td>
<td>Resetable fuse (not replaceable)</td>
</tr>
<tr>
<td><strong>PROTECTION CIRCUIT</strong></td>
<td>Built-in overcharge, short circuit and low battery protection</td>
</tr>
<tr>
<td><strong>BATTERY PROTECTION FUSE</strong></td>
<td>(not user replaceable)</td>
</tr>
<tr>
<td></td>
<td>Main Battery: 58V/60A</td>
</tr>
<tr>
<td></td>
<td>Auxiliary Batteries: 58V/60A per battery</td>
</tr>
<tr>
<td><strong>REPLACEABLE FUSE</strong></td>
<td>2 - 15A 3AG fuses (for each 12V DC outlet)</td>
</tr>
<tr>
<td><strong>DC INPUT POWER</strong></td>
<td>14.8V/10A, 150W max</td>
</tr>
<tr>
<td><strong>SOLAR INPUT POWER</strong></td>
<td>17.5V-35V DC, 150W max</td>
</tr>
<tr>
<td><strong>120V AC WALL CHARGER</strong></td>
<td>Input: 120V AC, 100-230V, 50/60Hz, 100VA</td>
</tr>
<tr>
<td></td>
<td>Output: 14.8V/10A, UL &amp; FCC approved adapter</td>
</tr>
<tr>
<td><strong>RATED OUTPUT POWER</strong></td>
<td>2 outlets - 12V DC, 15A (180W) max per outlet</td>
</tr>
<tr>
<td></td>
<td>2 outlets - USB 3.0 (5V/2.5A), 10.5W per outlet</td>
</tr>
<tr>
<td></td>
<td>2 outlets - 120V AC, 60Hz, 10A total for both outlets</td>
</tr>
<tr>
<td></td>
<td>• 500Wh battery = 400 max. load</td>
</tr>
<tr>
<td></td>
<td>• 1000Wh battery = 800 max. load</td>
</tr>
<tr>
<td></td>
<td>• 1500Wh battery = 1200 max. load</td>
</tr>
<tr>
<td><strong>OPERATING TEMPERATURE</strong></td>
<td>14º - 120ºF (-10º - 49ºC)</td>
</tr>
<tr>
<td><strong>CHARGING &amp; STORAGE TEMPERATURE</strong></td>
<td>32º - 120ºF (0º - 49ºC)</td>
</tr>
<tr>
<td><strong>BASE UNIT WEIGHT</strong></td>
<td>32 lbs. (14.5Kg)</td>
</tr>
<tr>
<td><strong>#9691 AUXILIARY BATTERY WEIGHT</strong></td>
<td>16.25 lbs. (7.4Kg)</td>
</tr>
<tr>
<td><strong>DIMENSIONS</strong></td>
<td>12” x 19.25” x 15” (30.5 x 48.9 x 38cm)</td>
</tr>
</tbody>
</table>
### CHARGE TIME

Times vary depending on battery state and available sunshine during solar charging

<table>
<thead>
<tr>
<th>Charger Type</th>
<th>#9690 Unit with 500Wh built-in battery</th>
<th>#9690 + 1 #9691 500Wh Battery Pack</th>
<th>#9690 + 2 #9691 500Wh Battery Packs</th>
</tr>
</thead>
<tbody>
<tr>
<td>120V AC/10A Charger</td>
<td>5 hours</td>
<td>10 hours</td>
<td>15 hours</td>
</tr>
<tr>
<td>120-Watt Solar Collector #9590 (7A max)</td>
<td>7-8 hours</td>
<td>14-15 hours</td>
<td>21-22 hours</td>
</tr>
</tbody>
</table>

### SAMPLE OPERATING TIMES

Example only based on full battery charge. Actual run times vary depending on the device being operated. To verify the device wattage multiply its volts x amps = watts.

<table>
<thead>
<tr>
<th>Device Description</th>
<th>#9690 Unit with 500Wh built-in battery</th>
<th>#9690 + 1 #9691 500Wh Battery Pack</th>
<th>#9690 + 2 #9691 500Wh Battery Packs</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-cu.ft. Refrigerator (400-600W)</td>
<td>Up to 6 hours</td>
<td>Up to 12 hours</td>
<td>Up to 18 hours</td>
</tr>
<tr>
<td>1000W AC Microwave</td>
<td>Exceeds AC power limit</td>
<td>Exceeds AC power limit</td>
<td>Up to 90 minutes</td>
</tr>
<tr>
<td>17” LCD TV (100W, 120V AC)</td>
<td>5 hours</td>
<td>10 hours</td>
<td>15 hours</td>
</tr>
<tr>
<td>Laptop with 60W battery</td>
<td>Up to 8 full recharges</td>
<td>Up to 16 full recharges</td>
<td>Up to 24 full recharges</td>
</tr>
<tr>
<td>250W AC Sump Pump (1/2 HP)</td>
<td>2 hours</td>
<td>4 hours</td>
<td>6 hours</td>
</tr>
<tr>
<td>250-500W AC small power tools</td>
<td>Up to 2 hours</td>
<td>Up to 4 hours</td>
<td>Up to 6 hours</td>
</tr>
<tr>
<td>Aervoe #8712 20-Watt LED Work Light (runs for 4 hours on a full charge)</td>
<td>Up to 5 recharges</td>
<td>Up to 10 recharges</td>
<td>Up to 15 recharges</td>
</tr>
<tr>
<td>Max Burton #6905 Digital Stove To Go® (130W max)</td>
<td>Up to 3.5 hours (at lowest temperature)</td>
<td>Up to 7 hours (at lowest temperature)</td>
<td>Up to 10.5 hours (at lowest temperature)</td>
</tr>
</tbody>
</table>

1-year warranty to the original registered owner on all products from date of purchase. User returns, exchanges and defective refunds must be made with the original place of purchase, for the first 30 days after purchase in accordance with the distributor/retailer's return policy. After 30 days of purchase and with a Warranty Registration card on file, the buyer can make a product warranty claim directly with Aervoe Industries, Inc. There is no warranty for buyer’s remorse. Because Aervoe cannot control Buyer’s handling or use of product, Aervoe makes no warranty expressed or implied when not used or stored in accordance with directions. Aervoe shall not be liable for cost of labor, incidental or consequential damages, and this warranty is limited to replacement or repair of product or credit of purchase.