Users Guide & Testing Instructions

Free Standing Hardwire Series
MHCS – V Series

MEDI PRODUCTS
BACK-UP POWER SYSTEMS

Questions? 800-765-3237 or visit www.mediproducts.net

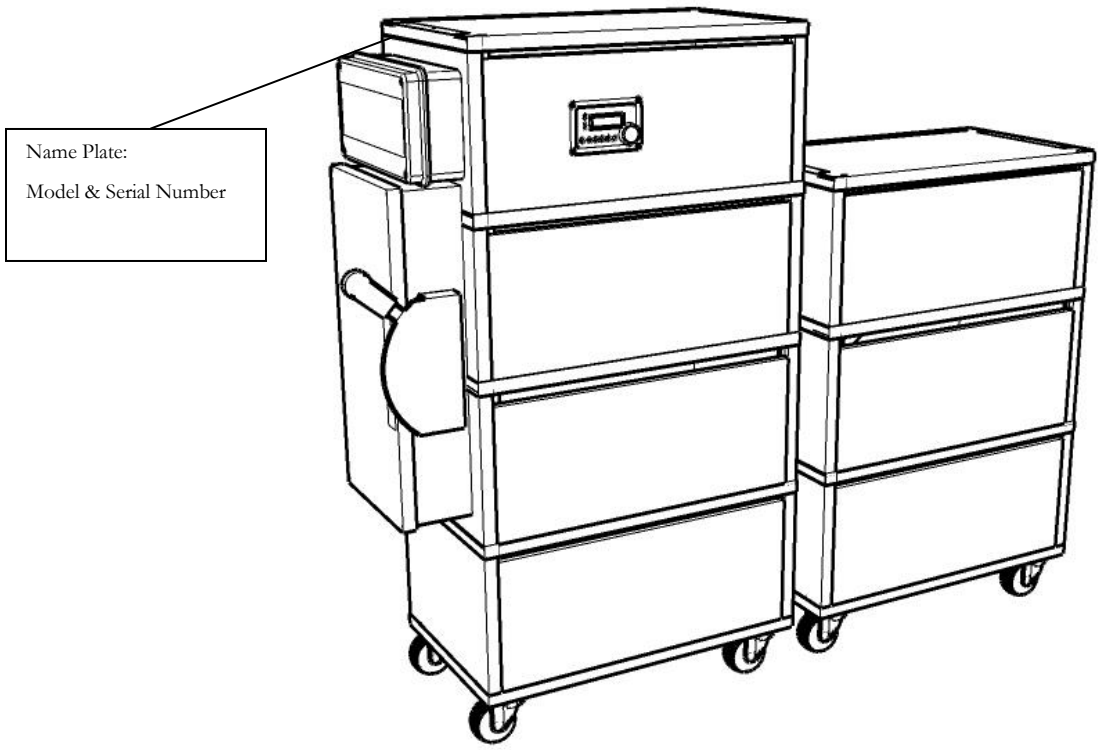
Product Information

(Required information when calling for service)

Date of Purchase:

Serial Number:

Facility Information:



Safety & Disclaimer

Intended Use and Equipment & Wiring Connections:

- This UPS system stores energy. Output battery terminals and possibly output breakers or outlets may be live when the system is turned off or after the input power has been disconnected.
- Please be sure to turn off the electricity in the location where the UPS will be installed prior to working on the unit.
- Please be sure that the power supplied to this unit is the proper phase, voltage and amperage specified.
- All hardwired power units should be installed by licensed, professional personnel in accordance with local and national codes.
- Although the system is supplied with sealed VRLA batteries, they are not *leakproof.* We recommend the unit should not be located near explosive medical gas storage or open flame heaters or electric spark-inducing equipment.

Statement of Liability for Medical Environments

- When used within a surgical environment, do not use in the presence of flammable anesthetic mixtures with air oxygen or nitrous oxide.
- This battery backup power system is not intended to support life but rather to power surgical appliances needed in superficial surgical procedures or medical cold storage appliances. Its use is intended for the supply of emergency power to appliances which may be employed in non-life-threatening medical procedures.
- The wellbeing of the patient is entirely the responsibility of the physician administering the anesthesia and surgical procedure. It is imperative that it is understood that at no time should a patient remain unattended. At this writing the FDA has no classification for a general-purpose medical emergency power supply. This system is not a medical device.
- If life-supporting equipment is to be powered, such as anesthesia equipment, life-signs monitors, gas monitors etc., it is Medi-Products expectation that such devices also have their own built-in FDA approved appliance-specific independent power supply source and is maintained correctly. General room lighting and exit signs are also expected to have multiple independent energy sources.
- Appliances such as refrigerators and freezers and the contents being stored within them are the responsibility of the owner/operator to see that they are monitored, maintained, and tested. Consequential damages and loss of perishable merchandise are not the liability of Medi-Products/Medicanix.
- It is the sole responsibility of the end user or equipment owner to ensure that the battery backup power system has been tested, maintained, and testing records have been kept and filed.

Unit Start Up Procedure:

Upon completing each step of the Installation Guide, keep the unit powered off, then follow these steps to start using the system:

1) Power Up: Switch the Unit to "On" - the Inverter On light should illuminate.
2) Supply power to an appliance(s) that is supported by the backup system to ensure that the appliance will run on battery power.
   Note: If you are powering a refrigerator or freezer, make sure to test it long enough to see that the appliance's compressor turns on, you can speed up this process by opening the door of the appliance.
3) Now apply line power to the Power System's Input side by switching on the circuit breaker that feeds the unit's input power.
4) Make sure the Mains on LED light illuminates. One of the charging LED lights should also illuminate, either "bulk", "absorption" or "float".

Maintenance Procedures

The Medi-Products power system contains virtually no moving or lubricated components and, therefore, requires almost no user maintenance except testing and recordkeeping and periodically replacing the batteries (every 4 years).

The user should be aware that by their nature, battery life is negatively affected by some usage patterns. Of course, batteries are intended to be used, but minimizing deep discharges, and frequent charge / discharge cycles will extend overall life. Their life expectancy will be generally in the range of four to five years. Please refer to the section on Battery Testing for more on this subject

The system has a battery voltage alarm which will sound for below normal battery voltages. Battery voltage indicators should be checked if the alarm sounds. Often a low battery alarm will result from a tripped input supply breaker in the main building electric panel. If this is not the cause, please contact Medi-Products promptly.

BY-PASS SWITCH

Whenever the emergency power system is being serviced or not operational, move the bypass switch to "utility" mode to bypass the battery backup system.

Operation:

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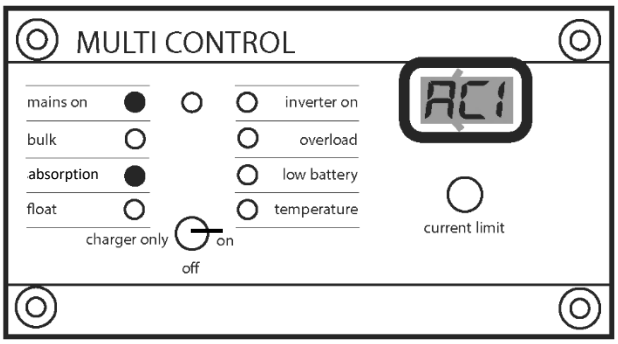
During normal operation while the unit's input is supplied with utility power, the mains LED light will be lit as well as the state of charge. If the unit is fully charged, float charge should be lit. The unit's settings are all preset so the knob that sets the unit's current limit is bypassed. The LCD display should indicate "AC1" this is normal. If your unit's display is not displaying this, please contact support.

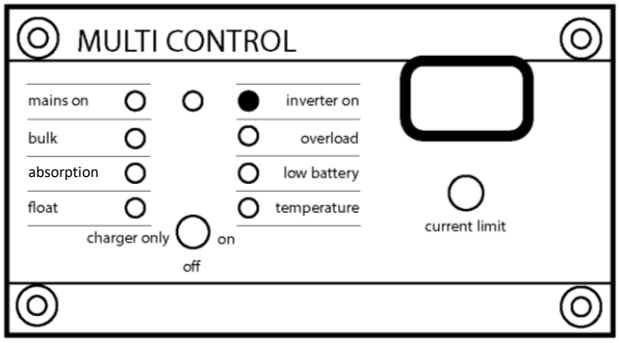


When the unit is supplied power and switched to "on" it is ready to use. The unit will switch over to battery power "Inverting" whenever power is lost. When power is restored the unit's charger will automatically recharge its batteries and continue to pass power through to the appliances it is supporting.

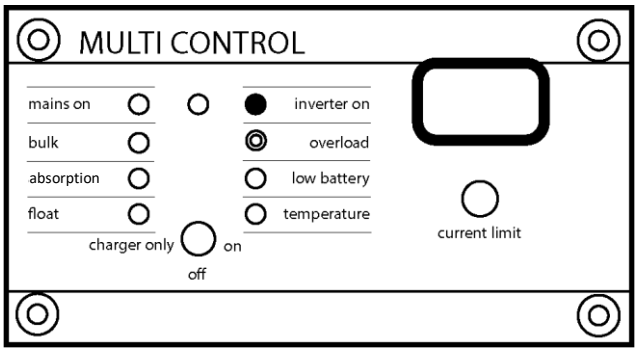
The following sequences are LED indications of how the system is operating:

Output Indicators:

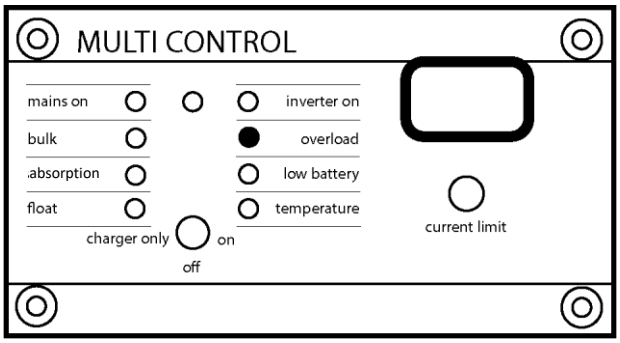
Inverting: This indicates there is no input power present, and the inverter is drawing from its batteries:



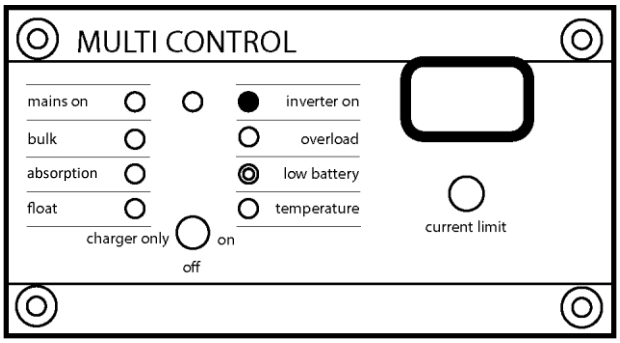
Excess Overload: The equipment load is exceeding the unit's regular output, reduce the equipment load:



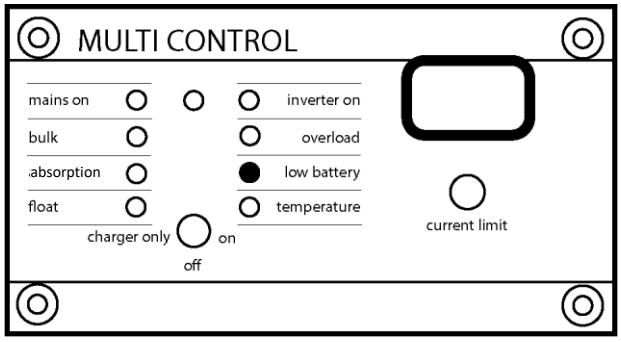
Overload: This indicates that the unit is overloaded due to either a short circuit on the output or the equipment load is too large for the system to support:



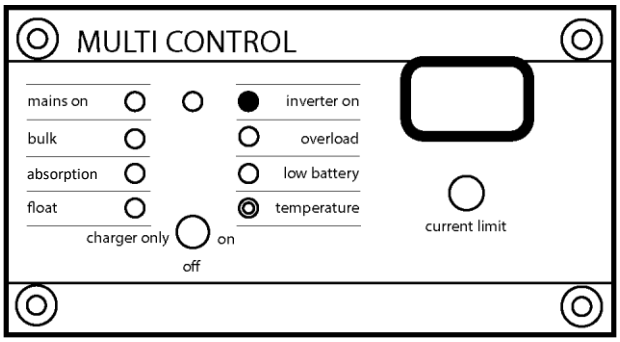
Batteries are low: This indicates that the system batteries are low. If the unit is supporting a load, it will not be long before the batteries go dead:



Batteries are dead: This indicates that the battery voltage had gone too low, and the inverter has switched off.

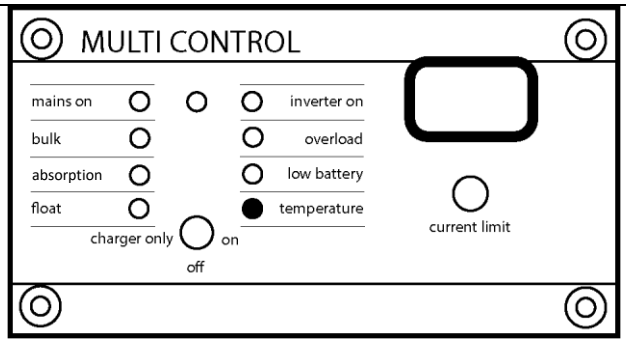


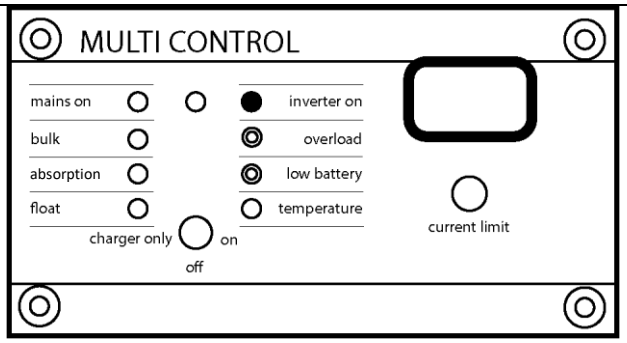
Temperature warning: The unit's internal temperature is reaching a critical level.



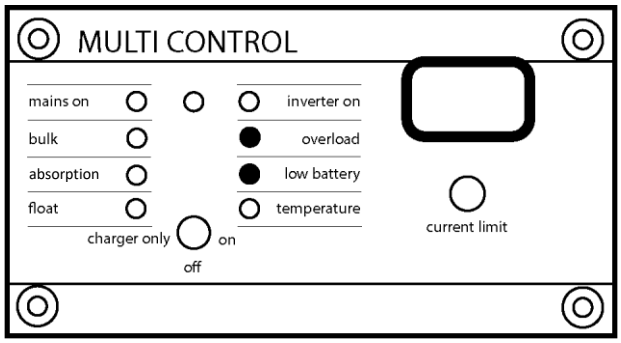
Temperature overload: The unit has reached an internal temperature level that is too high, and the unit shut off:

Battery voltage too high: The unit's battery voltage is too high; be sure the correct batteries are being used and they are installed correctly.



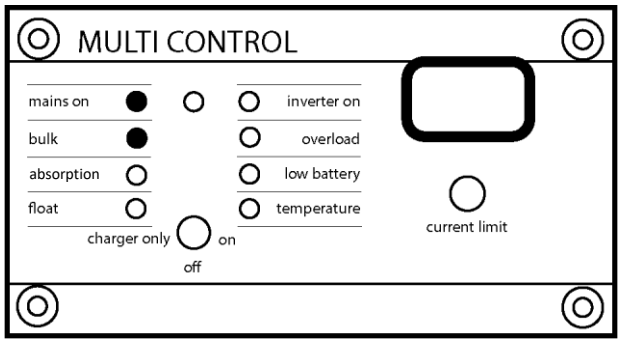


Erratic battery voltage: The unit shut down due to excess ripple voltages out of the battery.

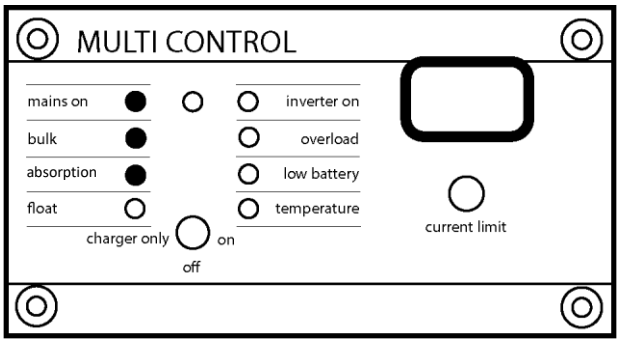


Charging Indicators:

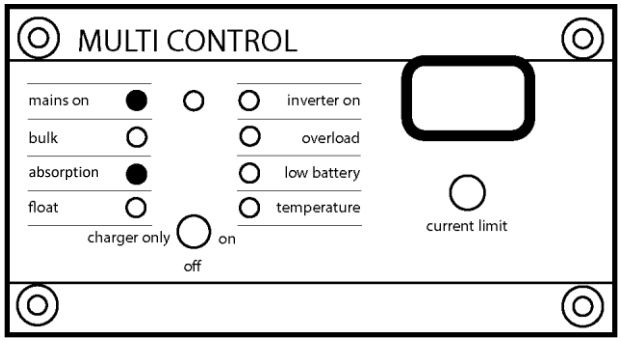
Bulk Charge: The unit has AC input voltage and is bulk charging the battery bank while passing the power through to the equipment load:



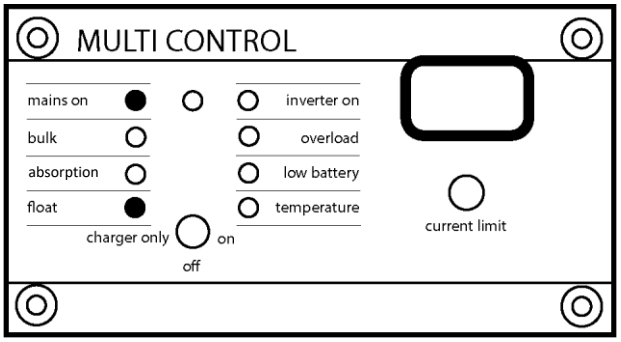
Bulk/Absorption Charge: The unit has AC input voltage and is bulk charging but not yet reached absorption voltage yet.



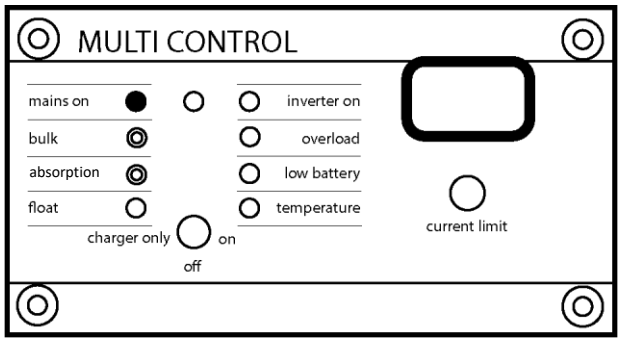
Absorption Charge: The unit has AC input voltage and is absorb charging the battery bank while passing the power through to the equipment load:



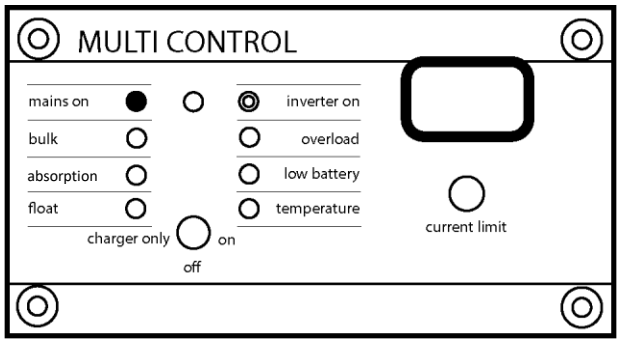
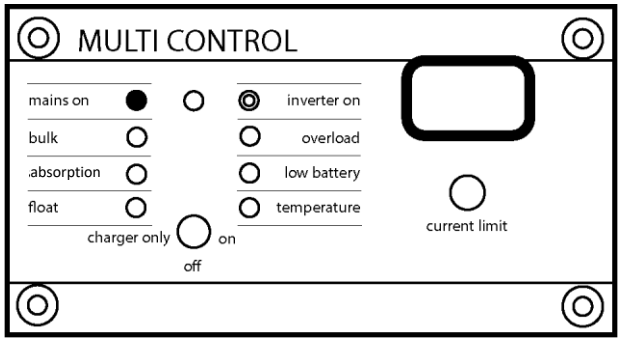
Float Charge: The unit has AC input voltage and is float charging the battery bank while passing the power through to the equipment load:



Equalize Mode: The unit has AC input voltage and is equalizing battery bank while passing the power through to the equipment load:



Special Indications:

AC Input Max: While the unit is supplying input power, but the output has reached max input setting.	**Power Assist:** While the unit is supplying input power, but the output has exceeded the max input setting causing the inverter to assist the support of the load from the batteries.
	

Troubleshooting & Fault Codes:

V – Series Troubleshooting:

Problem	Cause	Solution
Inverter will not turn on.	The battery voltage is too high or too low for the inverter to start or it is not connected. If your unit has a DC switch be sure it is switched to on.	Check the battery voltage is in the correct range. If the DC voltage is good, check the internal ANL fuse.
Low Battery LED is flashing.	The battery voltage is low	Charge the battery by connecting the input power.
Low Battery LED is illuminated.	The unit has switched off because the battery voltage is too low.	Charge the battery by connecting the input power.
Overload LED is flashing.	The unit's load is higher than its nominal output load size.	Reduce the amount of equipment that the power system is supporting.
Overload LED is illuminated.	The unit switched off because the supported load is too high.	Reduce the amount of equipment that the power system is supporting.

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Problem:	Cause:	Solution:
Low battery and overload LED lights are flashing intermittently	Battery voltage is low due to a high load	Reduce the load and recharge the batteries.
Low battery and overload LED lights are flashing simultaneously.	Ripple voltage from the batteries exceeds 1,5Vrms	Check the battery cables and connections. Ensure that all connections are tight.
The low battery and overload LED lights are lit up	The unit switched off due to a high battery ripple voltage	Check the battery cables and connections. Ensure that all connections are tight.
Battery Charger will not operate	AC input voltage is not present.	Check to be sure that the unit is supplied power, or the input circuit is not tripped. Restore input power to the unit if input power has been lost.
	The internal battery fuse is blown	Check the Internal ANL Battery fuse, replace it if necessary.
	Battery voltage is too low for the inverter to recognize it.	Recharge the batteries with an external charger.
The Charger will not operate but the mains LED and the Bulk LED are lit.	The unit has been in bulk charge too long (over 10 hours)	Check the batteries and all the battery connections. Replace the batteries if they will not charge or will not hold a charge.

Qualified Technical Support & Procedures:

Adjustments can be made to the inverter module. Please consult with technical service prior to making any adjustments, as unit should arrive with adjustments preset.

A large amount of energy is stored in the batteries which can cause injury to unqualified persons attempting to effect repairs. Also, no one untrained regarding electrical energy should attempt any service task or remove any of the front covers as live circuits will be exposed in all cases.

Eye protection should be worn by any person connecting or disconnecting batteries and battery cables.

Hand & Eye Protection is recommended for any person handling batteries.

Operational Inspection and Testing Procedure for Emergency Power Systems in Surgery Centers:

Objective: To conduct routine operational inspections, function tests, and load testing of emergency power systems in accordance with NFPA standards, ensuring reliable performance during critical situations in surgery centers.

Frequency: Operational inspections and testing should be conducted as follows:

- Monthly function tests.
- Quarterly inspections and function tests.
- Annual load testing.

Procedures:

Monthly Operational Function Test:

1. **Function Test:**
    - Simulate a power outage by switching off the line power:
        I. If your system is equipped with a bypass switch, cut the utility power by moving the switch lever to the middle position.
        II. If your system lacks a bypass switch, turn off the designated line circuit breaker in your building's utility circuit panel.
    - Verify that the Automatic Transfer Switch (ATS) automatically switches the load to the battery power source, confirming a seamless transition to backup power.
2. **Record Keeping:**
    - Document the successful completion of the function test.
    - Maintain written records of all test activities.

Quarterly Operational Inspection and Testing:

3. **Follow the steps outlined in the Monthly Operational Function Test and perform a Visual Inspection.**
4. **Visual Inspection:**
    - Inspect batteries, cables, and associated charger/control equipment for cleanliness and overall condition.
    - Check for exceptional environmental conditions that could potentially damage or affect the equipment's performance.

- Ensure all connections and terminals are clean and free from any signs of decay or overcharging.
- Verify that all indicator lamps, meters, and controls function correctly.

Annual Load Testing:

5. **Follow the steps outlined in the Monthly Operational Function Test and perform a Visual Inspection.**
6. **Load Testing:**
    - Perform a load test on the emergency power system using a fully rated load bank or actual load.
    - Record the output voltage, battery voltage, and test duration at the beginning and end of the test for each battery set.
    - Check the amperage of the battery cable between the battery bank and the inverters.
    - Check the amperage of the high voltage cables on the load side of the emergency power system.
7. **Record Keeping:**
    - Document load test results, including recorded voltages, duration, and any deviations from the baseline or acceptable range.
    - Update maintenance and testing records to reflect load testing.

Documentation:

8. Maintain a dedicated log or electronic record for each inspection, function test, and load test conducted. Ensure the documentation includes:
    - Date of inspection/testing.
    - Details of visual inspections, function tests, and any identified issues.
    - Results of load testing, including voltages, duration, and any deviations.
    - Signature of personnel conducting the inspection/testing.
    - Accessibility of records to the authority having jurisdiction.

Reference the following table for example testing documentation:

MAINTENANCE SCHEDULE CHECKLIST

Component/Task Description	Frequency	Yes	No	N/A	Date Completed
Transfer Switch:					
Verify load transferred to battery source:	M	☐	☐	☐	
Verify load returned to utility source:	M	☐	☐	☐	
Visual Inspection:					
Battery Terminals & Cables in Clean Condition:	Q	☐	☐	☐	
Batteries free of visual defect:	Q	☐	☐	☐	
Environmental conditions of all the equipment's contents:	Q	☐	☐	☐	
All indicator lamps, meters, and controls functioning:	Q	☐	☐	☐	
Load Testing:					
Check float charging voltage:	A	☐	☐	☐	
Test Recharging charging current:	A	☐	☐	☐	
Check all cable & terminal temperatures:	A	☐	☐	☐	
Inspect all circuit breakers/replace all fuses:	A	☐	☐	☐	
Check Battery terminal voltage (while under load):	A	☐	☐	☐	
Check high-volt output voltages (while under load):	A	☐	☐	☐	
Check high-volt load current:	A	☐	☐	☐	
Check Line power voltage:	A	☐	☐	☐	
Visually inspect panels & meters:	A	☐	☐	☐	

Measure and Record Values

Visually Inspect Contacts: _____

Verify Test Switch: _____

Measure and Record Values: _____

Output AC Volts

Load in Amperes: _____

DC Voltage

Prior to AC Failure: _____

1 minute after AC Failure: _____

5 minutes after restoring AC Input: _____

Charge Current

Prior to AC Failure: _____

5 Minutes after Failure: _____

M: Monthly. Q: Quarterly. A: Annually.

Test performed by: _____ **Date:**_____/_____/_____

Battery Replacement:

Eye protection should be worn by any person connecting or disconnecting batteries and battery cables.

The Batteries are to be replaced every 48 months. To order replacement batteries contact Medi-Products 800-765-3237

It is better to have someone that is comfortable working with electrical appliances and/or batteries replace them. Often your Bio-Medical team, building maintenance or someone of that caliber is best suited to the job. Have them follow the following instructions for battery replacement:

1) Disconnect the line power by switching off the input circuit breaker.
2) 1200/2000watt systems: switch it to "Line Charge Only" 4000/4400/8800watt system: Turn the Red DC disconnect knob to the "off" position.
3) Remove the front battery box covers to access the batteries – Take a photo of the battery connections or special note of how your batteries cables are configured so you can refer to it when reinstalling.
4) Remove the battery cables:
   12 Volt Systems: Remove the entire positive cable set before removing any negative connections.
   24- or 48-Volt Systems: Start by removing one of the jumper cables between the batteries.

   This will help prevent the cables from accidentally shorting out against the cabinet or each other.

5) Remove the batteries from the cabinet and slide the new ones into place.
6) Re-Install the cables. – Refer to the diagram below:
7) Reinstall the Battery Box Covers.
8) Follow the Start Up and Testing Procedures within this manual.

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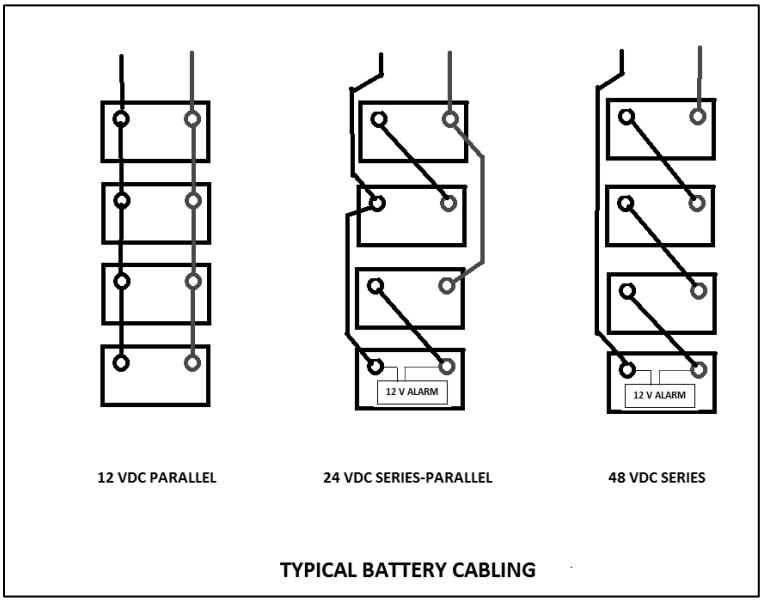

WARRANTY ACTIVATION FORM

MEDI-PRODUCTS warrants that your Emergency Power System is assembled using high quality components and workmanship and is free of defects in material and workmanship.

This warranty shall remain in effect for two (2) years from the date of original consumer purchase of the inverter. Warranty on the batteries is pro-rated over 30 months.

THIS WARRANTY DOES NOT COVER:

1) Replacement parts or labor furnished by anyone other than MEDI-PRODUCTS approved service agent. (All approved agents should be licensed electricians or bio-medical technicians or as specifically approved.)

2) Defects or damage caused by labor furnished by someone other than MEDI-PRODUCTS or approved service agent.

3) Any malfunction or failure of this product while it is in the possession of the owner during the warranty period if the malfunction or failure is not caused by a defect in material and workmanship of MEDI-PRODUCTS or if the malfunction or failure is caused by unreasonable use, including the failure to verify the equipment's utility and usefulness prior to emergency conditions.

4) Normal battery depletion.

ALSO:

1) This warranty is non-transferable to other owners of the product during the warranty period without the express written consent of MEDI-PRODUCTS.

2) MEDI-PRODUCTS reserves the right to repair, replace, or allow credit for any material returned under this warranty. Any damage caused by the customer will be charged or deducted from this allowance.

3) All warranty work will be performed at MEDI-PRODUCTS factory or using a valid Warranty Authorization Number (WAN) prior to repair. Products shall be delivered to MEDI-PRODUCTS factory freight prepaid and fully insured.

The inverter manufacturer's owner's manual is provided. The owner should become conversant with it and with this owner's manual. Before operating your power, system be sure to read these safety instructions.

TO INITIATE YOUR WARRANTY PLEASE COMPLETE THIS FORM AND RETURN WITHIN 30 DAYS

It is recommended that you keep a copy of this activation form for your own records.

Model Number: _____ Serial Number: _____

Date of installation: _____ Facility Name: _____

Contact Name: _____ Phone Number: _____

Fax Number: _____ Email Address: _____

Address where System is installed: _____