



La Marche Manufacturing Company

www.lamarchemfg.com

Hybrid Supercapacitor Module



Installation and Operation Manual

This manual is subject to change without notice. You may obtain the newest version of the manual at www.lamarchemfg.com

Important Safety Instructions

Before using this equipment, read all manuals and other documents related to this module and other equipment connected to this module. **SAVE THESE INSTRUCTIONS** – This manual contains important safety and operating instructions for the Supercapacitor module. If a replacement or the latest copy of a manual is needed, it can be found at www.lamarchemfg.com.

This manual offers important information and suggestions with respect to installation, use etc. Please take the time to read this operator's manual and become familiar with the Hybrid Supercapacitor Module. This will help you to make full use of the module. This manual contains important safety, installation and operating instructions. The following symbols are used throughout this manual to indicate potentially dangerous conditions or mark important safety instruction.



WARNING: Indicates a potentially dangerous condition extreme caution when performing this task.



CAUTION: Indicates a critical procedure for safe and proper operation.



CAUTION:

The handling, installation & maintenance of the battery associated with this equipment must be done in accordance with the instructions & safety precautions given by the battery manufacturer.



CAUTION:

Installation, maintenance & repair of the equipment should be undertaken by trained, experienced and authorized service personnel or electrical personnel.

Electrical Safety



WARNING: Hazardous Voltages are present at the input of power systems. The output from chargers and from supercapacitors may be low in voltage, but can have a very high current capacity that may cause severe, or even fatal, injury.

When working with any live supercapacitor or power system, follow these precautions:

- Never work alone on any live power system; someone should always be close enough to come to your aid.
- Remove personal metal items such as rings, bracelets, necklaces, and watches.
- Wear complete eye protection (with side shields) and clothing protection.
- Always wear gloves and use insulated hand tools.

Mechanical Safety

- Do not expose equipment to rain or snow. Always install in a clean, dry location.
- Do not operate equipment if it has received a sharp blow, been dropped, or otherwise damaged in any way.
- Do not disassemble this module. Incorrect re-assembly may result in a risk of electric shock or fire.

Supercapacitor Safety



WARNING: Follow all of the manufacturer's safety recommendations when working with or around supercapacitors.

- To reduce risk of arc, connect and disconnect the supercapacitor only when the charger is off.
- If it is necessary to remove supercapacitor connections, always remove the grounded terminal from the supercapacitor first.
- Remove personal metal items such as rings, bracelets, necklaces, and watches.
- Always wear rubber gloves, safety glasses, and a rubber lined vest/apron when working near a battery.
- Have plenty of fresh water and soap nearby in case the supercapacitor electrolyte contacts skin, clothing, or eyes.
- If the supercapacitor electrolyte contacts skin or clothing, wash immediately with soap and water.
- If the electrolyte enters the eye, immediately flood the eye with running cold water for at least ten (10) minutes and seek medical attention immediately.
- Do not drop or place any materials on a supercapacitor.
- Do not touch terminals with conductors. Serious burns or shocks may occur.
- Always ensure to use correct charger for supercapacitor.
- Do not subject supercapacitor to adverse conditions such as extreme temperatures.
- Do not reverse polarity, always ensure positive (+) and negative (-) connections are not reversed.
- Do not touch terminals with conductors. Serious burns or shocks may occur.
- Do not put supercapacitor into water or let it be exposed to water.
- Do not put the supercapacitor near fire sources, stoves or high temperature objects.
- Avoid touching terminals and always assume supercapacitor terminals to be live.

Check for Damages

Prior to unpacking the product, note any damage to the shipping container and take pictures. Unpack the product and inspect the exterior and interior of product for damage. If any damage is observed, take pictures and contact the carrier immediately to file a damage claim. Contact La Marche for a Return Material Authorization number to have the module sent back for evaluation and repair.



CAUTION: Failure to properly file a claim for shipping damages, or provide a copy of the claim to La Marche, may void warranty service for any physical damages reported for repair.

Returns for Service

Save the original shipping container. If the product needs to be returned for service, it should be packaged in its original shipping container. If the original container is damaged/unavailable, make sure the product is packed with at least three inches of shock-absorbing material to prevent shipping damage. *La Marche is not responsible for damage caused by improper packaging of returned products.*

Inspection Checklist

- Enclosure exterior is not marred or dented.
- There is no visible damage.
- All hardware and connections are tight.
- All items on packing list have been included.

Handling

Until the equipment is securely mounted, care must be used to prevent equipment from being accidentally tipped over or dropped.

- Do not stack modules.
- Do not drop modules.
- Do not touch or short terminals. Always assume supercapacitor terminals to be live while handling.
- Do not step on modules or expose modules to impact.

Mounting

Always mount supercapacitor in location where it's not exposed to harsh conditions such as heat, water, fire and humidity. **Do not over torque the module; torque to 12-16 ft. lbs.** Cables should be installed so they are not exposed to bending or twisting on the terminals. Use an appropriate method to hold down the supercapacitor. Do not over-tighten the hold down strap.

Storage

- Do not store supercapacitor in environment with toxic gas.
- Store supercapacitor in environment within -40 to +70°C temperature and relative humidity less than 95RH.
- Store supercapacitor in a dry place in original packaging. Discharge a used module prior to stocking or shipment.

Disposal

Do not dispose of module in trash and always follow local regulations.

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1. General Description

Graphene supercapacitors are an emerging technology that will take a key role in the future of energy systems. This high-capacity hybrid supercapacitor (HCAP) can replace lead batteries and offer a more reliable, cost saving solution for many demanding systems. Graphene based supercapacitors offer superior energy density, lower ESR and lower leakage current than other solutions.

HCAP is an environmentally friendly power source which does not contain heavy metals (RoHS Compliant), is non-flammable, and poses no risk of explosion or thermal run away.

2. Charging/Discharging

2.1 Charging

2.1.1 Charging Current

Charging current should be less than the maximum continuous charge current specified below. Charging with higher current than is recommended may cause damage to cell performance in electrical and mechanical characteristics and can lead to heat generation or leakage.

HCAP Model	Max Continuous Charging Current
HCAP-13.5V-17-200	15 Amps
HCAP-13.5V-10-600	10 Amps
HCAP-13.5V-25-900	30 Amps
HCAP-27V-10-600	10 Amps
HCAP-27V-25-900	30 Amps

Table 1 - Maximum Charging Current

2.1.2 Charging Voltage

Charging voltage should be less than specified in the product specification. Charging with a higher voltage than recommended may cause damage to cell performance in electrical and mechanical characteristics and can lead to heat generation or leakage.

HCAP Rated Voltage	Maximum Charging Voltage
12V	13.2 Vdc
24V	26.4 Vdc

Table 2 - Maximum Charging Voltage

2.1.3 Charging Temperature

The supercapacitor should be charged within the operating temperature range of -40°C to +65°C.

2.2 Discharging

2.2.1 Reverse Polarity

Positive and negative poles of the module should be connected correctly and reverse charging is prohibited. Reverse charging may cause damage to the module, leading to degradation of module performance.

2.2.2 Discharging Current

The module should be discharged at less than the maximum continuous discharge current specified in the product specification. High discharging current may reduce discharging capacity rapidly and cause over-heating.

HCAP Model	Max Continuous Discharging Current
HCAP-13.5V-17-200	15 Amps
HCAP-13.5V-10-600	10 Amps
HCAP-13.5V-25-900	30 Amps
HCAP-27V-10-600	10 Amps
HCAP-27V-25-900	30 Amps

Table 3 - Maximum Discharging Current

2.2.3 Discharging Temperature

The module should be discharged within the operating temperature range of -40°C to +65°C.

2.2.4 Connection Diagram

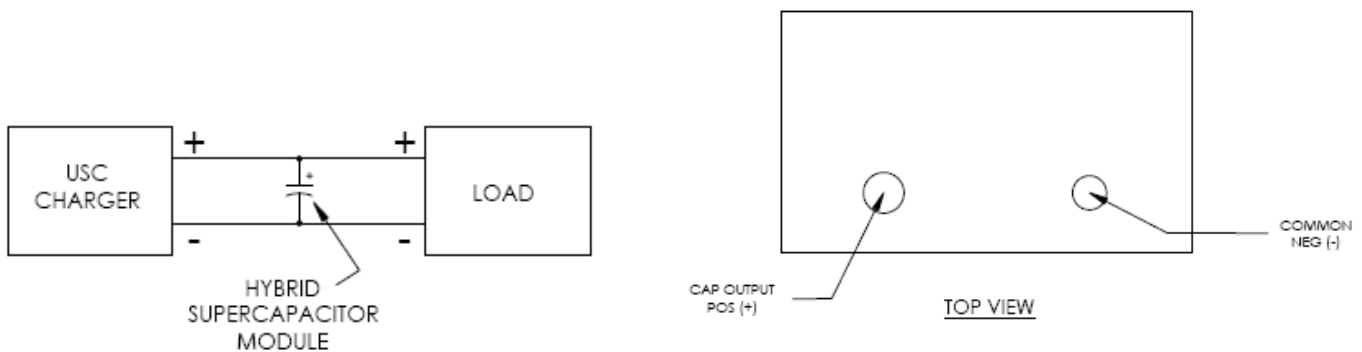


Figure 1 - Electrical Diagram

3. Dimensions

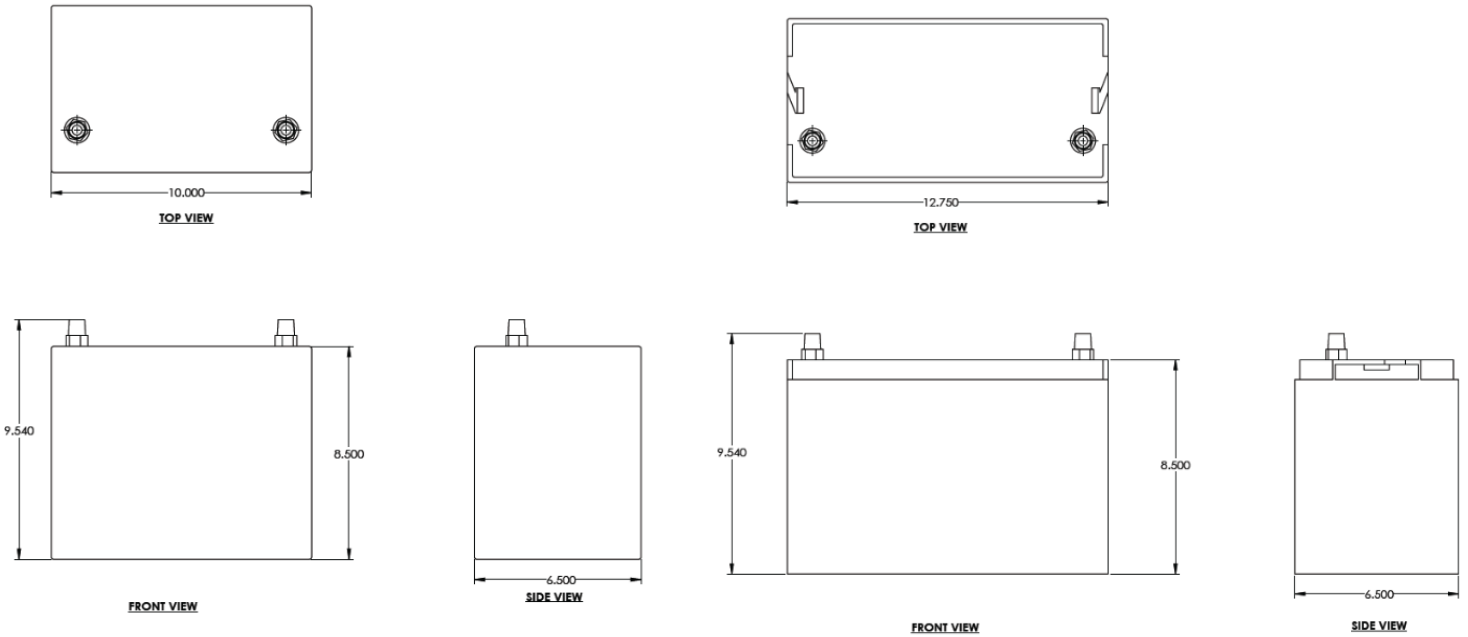


Figure 2 - General Dimensions for HCAP-13.5V

Figure 3 - General Dimensions for HCAP-27V

L	254 mm	10.0 in
W	165 mm	6.5 in
H	216 mm	8.5 in

L	324 mm	12.75 in
W	165 mm	6.5 in
H	216 mm	8.5 in

4. Disposal and Recycling

This item is not a battery and should not be treated as such. Do not recycle with lead-acid batteries and dispose in accordance with local regulations for electronic waste. Do not crush or incinerate at any point during the lifetime of the product, not even at the time of disposal.

5. Service

All work inside the HCAP should be performed by a qualified electrician. La Marche is not responsible for any damages caused by an unqualified technician.

5.1 Performing Routing Maintenance

Ensure that the energy storage module is completely discharged prior to removal from the system or any other handling. Maintenance should only be performed by qualified personnel on discharged modules.

The following routine checks are recommended to ensure optimum system performance.

Annually

1. Confirm that the HCAP is located in a well-ventilated area.
2. The module should always be kept free of dust and debris. Remove any that may be present using a damp cloth.
3. Make sure all connections are tight.
4. Make sure to inspect the housing for signs of internal damage.

Appendix A – Manufacturer’s Warranty

All La Marche Manufacturing Co. equipment has been thoroughly tested and found to be in proper operating condition upon shipment from the factory, and is warranted to be free from any defect in workmanship and material that may develop within one year from date of purchase.

Any part or parts of the equipment (except fuses, DC connectors and other wear-related items) that prove defective within a five (5) year period shall be replaced without charge providing such defect, in our opinion, is due to faulty material or workmanship and not caused by tampering, abuse, misapplication or improper installation.

Should a piece of equipment require major component replacement or repair during the first year of the warranty period, this can be handled in one of two ways:

1. The equipment can be returned to the La Marche factory to have the inspections, parts replacements and testing performed by factory personnel. Should it be necessary to return a piece of equipment or parts to the factory, the customer or sales representative must obtain authorization from the factory. If upon inspection at the factory, the defect was due to faulty material or workmanship, all repairs will be made at no cost to the customer during the first year. Transportation charges or duties shall be borne by purchaser.

2. If the purchaser elects not to return the equipment to the factory and wishes a factory service representative to make adjustments and/or repairs at the equipment location, La Marche's travel and field service labor rates will apply. A purchase order to cover the labor and transportation cost is required prior to the deployment of the service representative.

In accepting delivery of the equipment, the purchaser assumes full responsibility for proper installation, installation adjustments and service arrangements. Should minor adjustments be required, the local La Marche sales representative should be contacted to provide this service only.

All sales are final. Only standard La Marche units will be considered for return. A 25% restocking fee is charged when return is factory authorized. Special units are not returnable.

In no event shall La Marche Manufacturing Co. have any liability for consequential damages, or loss, damage or expense directly or indirectly arising from the use of the products, or any inability to use them either separately or in combination with other equipment or materials, or from any other cause. In addition, any alterations of equipment made by anyone other than La Marche Manufacturing Co. renders this warranty null and void.

La Marche Manufacturing Co. reserves the right to make revisions in current production of equipment, and assumes no obligation to incorporate these revisions in earlier models.

The failure of La Marche Manufacturing Co. to object to provisions contained in customer's' purchase orders or other communications shall not be deemed a waiver of the terms or conditions hereof, nor acceptance of such provisions.

The above warranty is exclusive, supersedes and is in lieu of all other warranties, expressed or implied, including any implied warranty of merchantability or fitness. No person, agent or dealer is authorized to give any warranties on behalf of the Manufacturer, nor to assume for the Manufacturer any other liability in connection with any of its products unless made in writing and signed by an official of the manufacturer.

Appendix B – Document Control and Revision History

Part Number: 144117

Instruction Number: P25-LHCAP-1

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