

SIRIUS CAPACITOR MODULE

User Manual

Model Number: 60-12-C-5C-X-SD-X-X-X-G

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Introduction

The Sirius Capacitor Module (“Sirius”) is supercapacitor-based storage that uses supercapacitors as storage cells instead of chemical cells. Kilowatt Labs’ proprietary balancing, control and charge retention algorithms control the operation of the supercapacitor-based modules, making Sirius a safe, efficient and effective alternative to chemical batteries wherever chemical batteries are deployed.

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1. Safety Instructions:

This manual contains instructions for unpacking, mounting, installation and operation of a Sirius Module. Please read this manual carefully before operating the system and follow all warnings and safety instructions to prevent accidents. The Sirius Module must be installed by trained personnel.

1.1 Symbols Convention:

Safety instructions and general information that appears in this manual are described below.



Caution!

“Caution” indicates hazardous situation which, if not avoided could result in minor or moderate injury.



Warning!

“Warning” indicates hazardous situation which, if not avoided could result in major injury or death.



Danger!

“Danger” indicates hazardous situation which, if not avoided could result in serious injury or death.



Note!

“Note” provides tip that are valuable for optimal operation of your product.

1.2 Safety Precautions:

The Sirius Modules are designed to provide years of trouble-free operation. Proper handling is required to avoid damage to the Module. In particular the following precautions should be observed.

- **Personal Safety:**

- Always wear proper personal protective equipment (eyes protection, gloves and safety shoes).
- Always make sure charger is set as recommended.
- Always make sure chargers are disconnected while working on Modules.

- **Module Safety:**

- Do not subject the Module to strong impact.
- Do not crush or puncture the Module.
- Do not dispose the Module in a fire.
- Do not charge the Module when the temperature is below -30°C.
- Do not charge the Module when temperature is above 80°C.
- Do not operate the Module above the specified voltage.
- Under no circumstances charge/discharge the Module at more than 35A.
- Under no circumstance must the charging voltage exceed 13.5 V_{dc} for more than 60 seconds.
- Do not expose the Module to temperatures in excess of 80°C.
- Do not place the Module near a heat source, such as a fireplace.
- Do not disassemble the Module under any circumstances.
- Do not touch the Module with wet hands.
- Do not expose the Module to moisture or liquids.
- Keep the Module away from children and animals.
- Ensure precautions to prevent short-circuit under all circumstances.
- Do not connect or disconnect terminals from the Module without first disconnecting the load.
- Do not touch the terminals with conductors while the Module is charged. Serious burns, shock, or material fusing may occur.
- Protect surrounding electrical components from incidental contact.
- When connecting to external devices ensure that galvanic isolation does not exceed 1000V.
- Do not use the Module in an open environment, or in a place exposed to water and other liquids (e.g. rain)
- Do not subject the Module to high pressure.
- It is not recommended to stack more than 3 Modules.
- Do not step on the Module.
- Do not drop the Module. Internal damage may occur that will not be visible.

- Do not stack Modules once they have been removed from the packaging, instead the Modules should be placed on shelving.
- In case the Module is physically damaged due to any event, do not install and energize the Module under any circumstances and immediately contact your Reseller.

1.3 Modules Connection Safety Precautions:

- All Modules must be at 100% SOC before connecting in series or in parallel.
- The maximum number of Modules that can be connected in series is six (6).
- Do not connect more than six (6) Modules in series.
- Modules cannot be connected in series-parallel combination under any circumstances.



Note!

If you want to connect more than six (6) Modules in series, please contact your Reseller.

1.4 Shipping:

Sirius Capacitor Modules are shipped out via Air and Sea.

- If the Modules are shipped via Air, please follow the instructions given below:
 - Carefully remove the nails from all the four sides of the wooden box and open it.
 - Remove the foam and shrink wrap and open the carton box and lift the Module manually.
- If the Modules are shipped via Sea, please follow the instructions below:
 - Carefully remove the Module from the pallets after cutting the packing strips that holds the Modules to the shipping pallets.
 - Open the carton box and lift the Module manually.

1.5 Qualified Installer:

Selling and installation of this Module is only through the Company's Resellers who are trained on installation, operation and maintenance of the Sirius Modules.

2. Product Introduction:

2.1 Product Part Number:

60-12-C-5C-X-SD-X-X-X-G

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

- 1) Capacity of Module in Wh
- 2) Nominal Voltage of the Module
- 3) Terminals are on the Top Side
- 4) Maximum Charge Rate of the Module
- 5) Not Available
- 6) With Safety
- 7) Not Available
- 8) Not Available
- 9) Not Available
- 10) General Module

2.2 Product Overview:

2.2.1 Appearance:

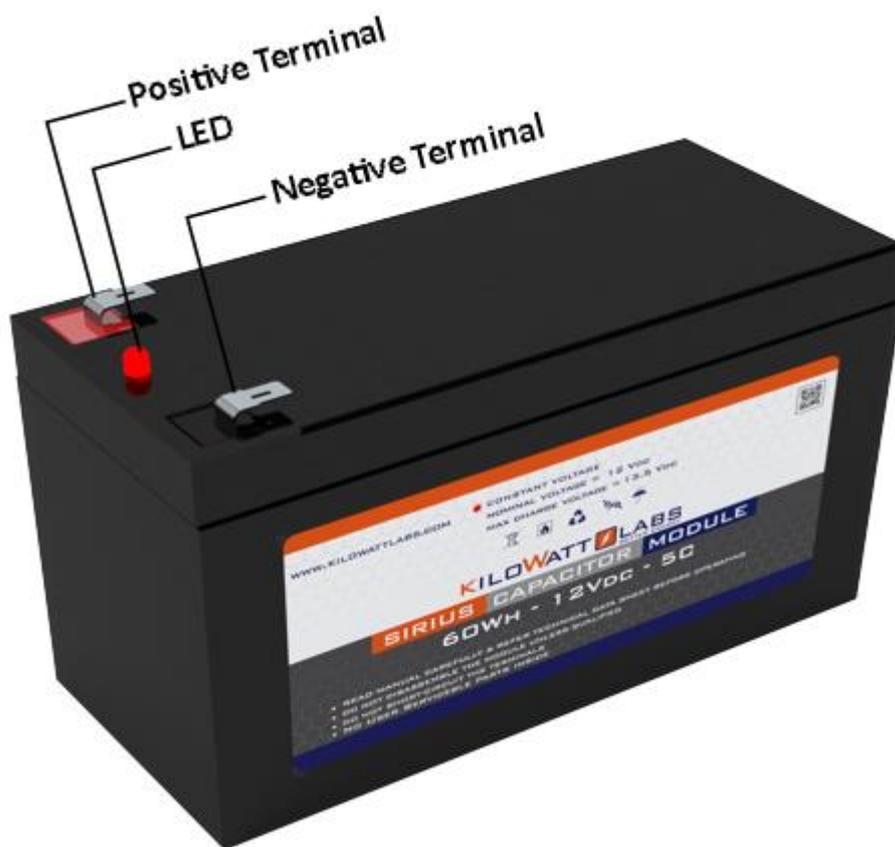
The appearance of the Sirius Module is shown below:



2.2.3 Dimensions and Weight:

Width	313 mm
Depth	183 mm
Height	204 mm
Weight	11 kg

2.3 Product Description:



- **LED** – Red LED indicator will be turned ON when the power supply reaches 13.5V while charging the Sirius Module. It will turn OFF automatically when the terminal voltage is lower than 13.5V. LED indicates constant voltage state during charging and not on a full charge state.
- **Positive and Negative Terminals** - F2 (Faston tab 250) terminals are used to connect power supply or load to Sirius Module for charging and discharging operation.

3. Module Installation:

3.1 Inspection:

Inspect the shipping carton for visible damage including cracks, dents, deformation and other visible abnormalities prior to unpacking the Module. Document (e.g., photo/photos) any damage and report this to your Reseller as well as to the shipping agent immediately. Remove the Module from the shipping carton and retain the shipping materials until the unit has been inspected and is determined to be operational.

3.2 Safety Gear:

Installation must strictly follow the national safety regulations in compliance with the enclosure, installation, creepage, clearance, casualty, markings and segregation requirements of the end-use application. Installation must be performed by professional installers only. Switch OFF the system and check for hazardous voltages before altering any connection! Sirius Modules must be handled only by qualified and trained personnel. Installation should not exert bending or twisting torque to the Module enclosure.



Note!

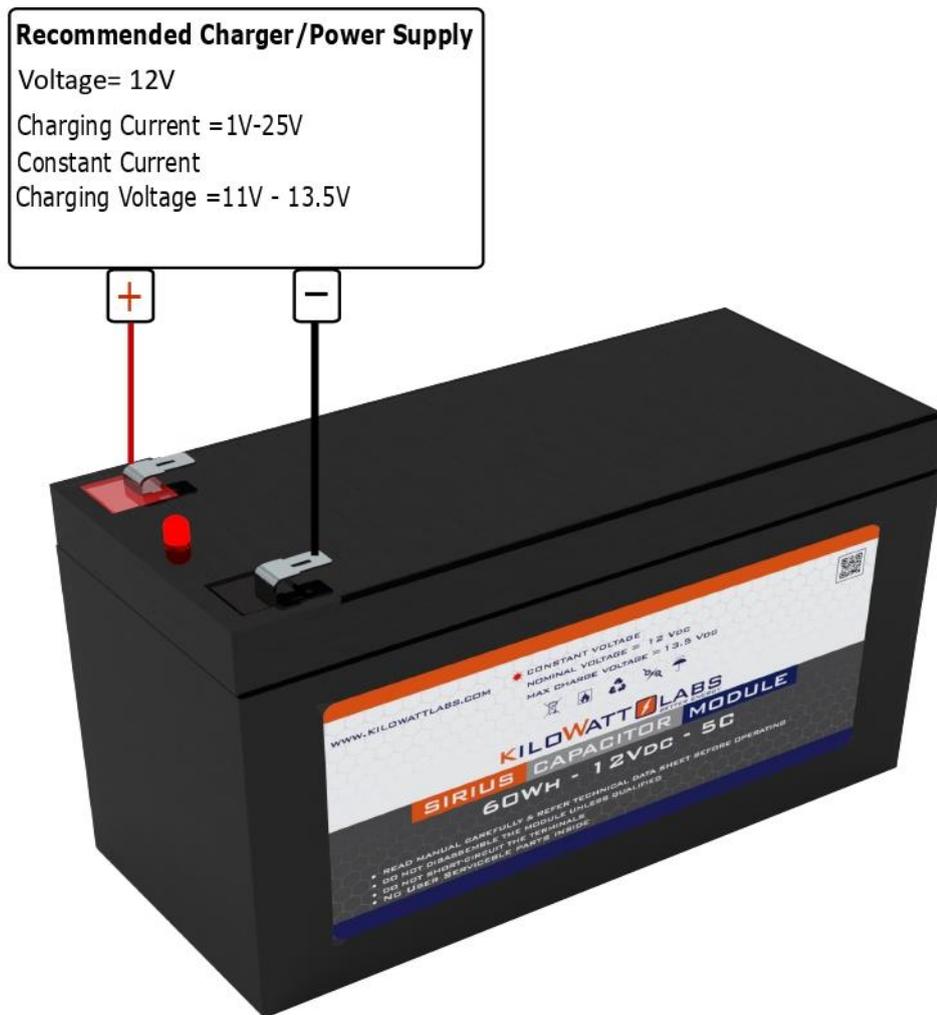
Read the safety instruction section before installation.

4. Electrical Installation:

4.1 Cable Size:

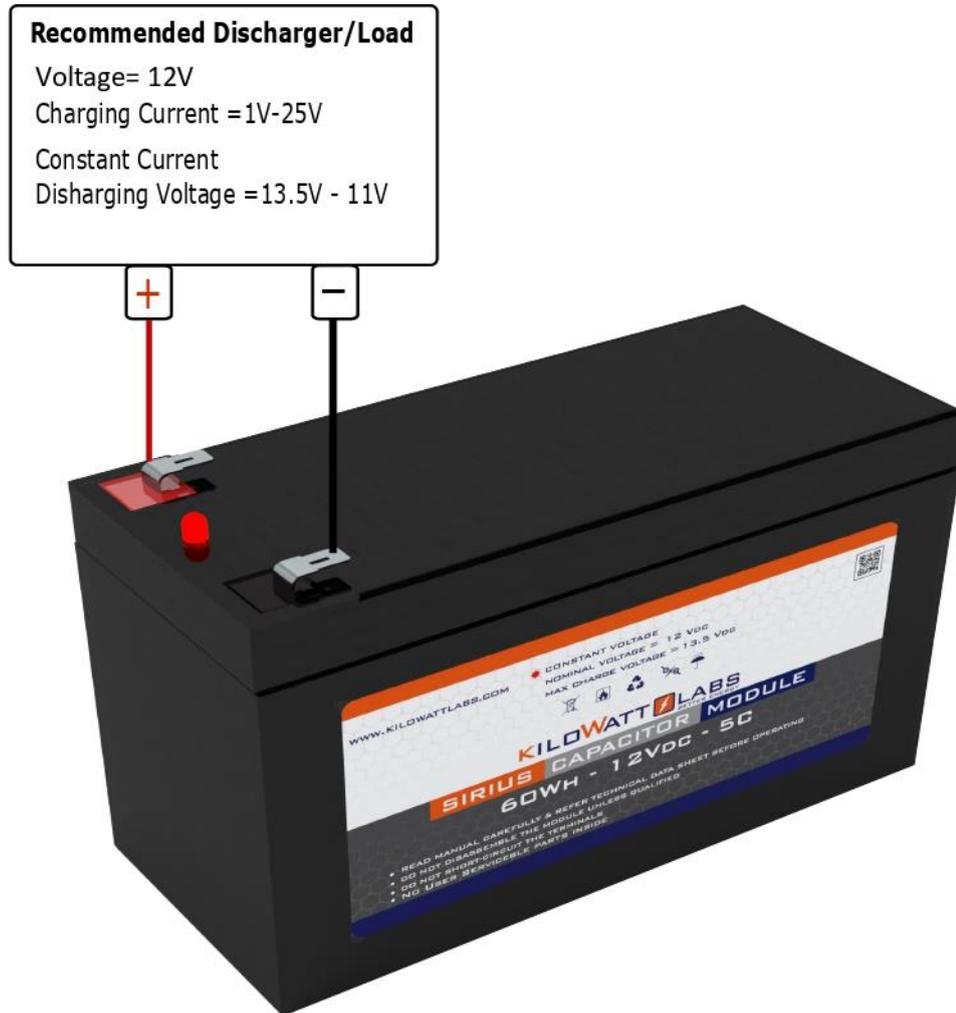
We recommend a cable size of 10mm² thick and 1m length to hold current up to 25A. Please use thick cable size for lengths longer than 1m.

4.2 Connecting Module to Power Supply:



1. Connect the positive and negative terminals of the 12V charger to the positive and negative terminals of the Sirius Module respectively.
2. Set the Charger Voltage to 13.5V (if variable).
3. Turn ON the charger.

4.3 Connecting Module to Load:



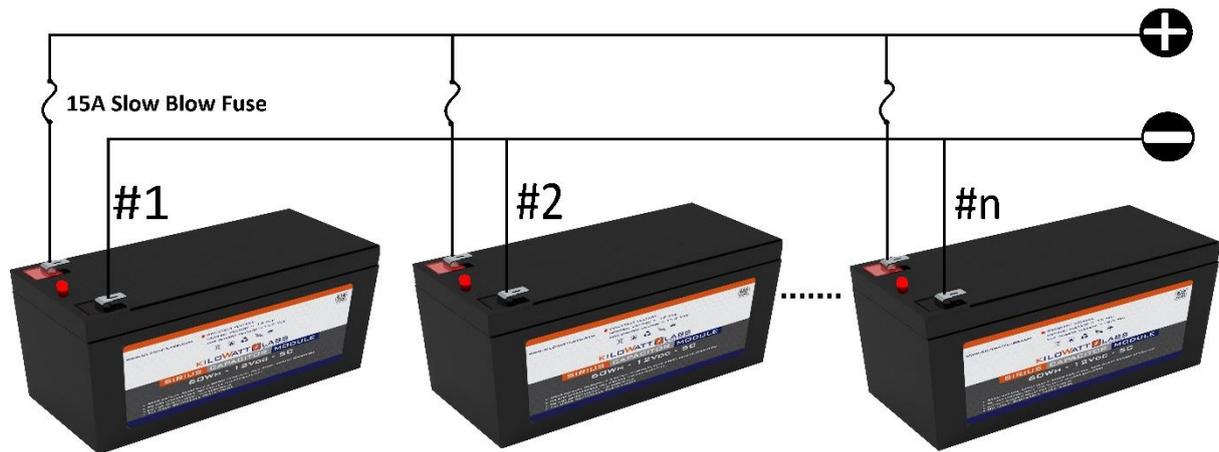
- Connect the positive and negative terminals of the 12V discharger to the positive and negative terminals of the Sirius Module respectively.
- Turn ON the discharger.

4.4 Connecting Modules in Parallel:

Any number of Modules can be connected in parallel.

- **Steps to Connect Modules in Parallel:**

Refer to the parallel combination of the Sirius Modules as shown below and make your connection accordingly.



- Connect the positive (+) terminal of all the Modules.
- Connect the negative (-) terminal of all the Modules.
- Take out the output positive terminal and output negative terminal from the respective common point.



Caution!

Charge all the Modules to 100% SOC or same voltage level before connecting them in parallel.



Note!

Make sure that all cables are of the same length and diameter.



Note!

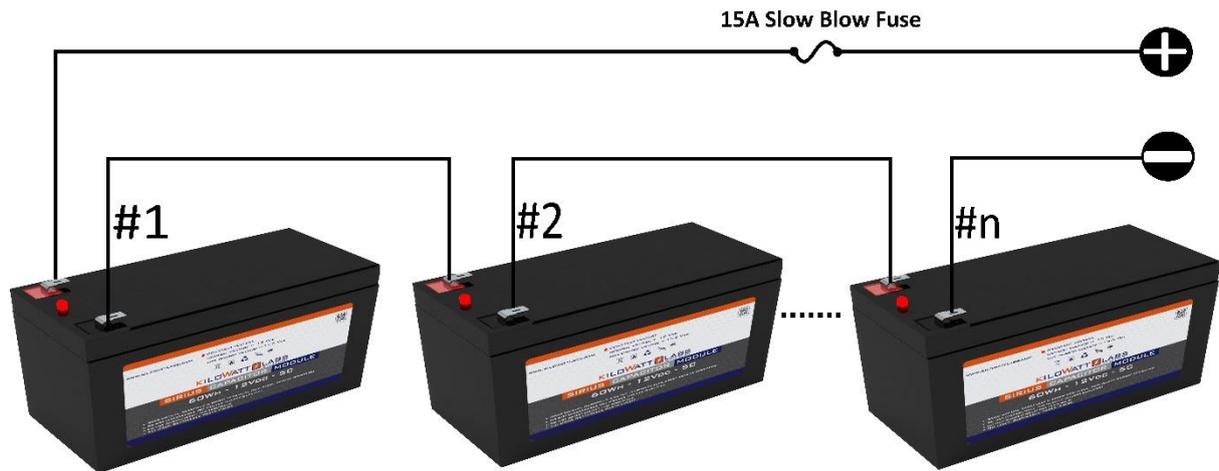
Modules cannot be connected in series parallel combination under any circumstance.

4.5 Connecting Modules in Series:

A maximum of six (6) Modules can be connected in series.

- **Steps to Connect Modules in Series:**

Refer to the series combination of the Sirius Modules as shown below and make your connection accordingly.



- Connect the positive (+) terminal of the first Module with the negative (-) terminal of the next Module.
- Take the output negative from first Module and output positive from the last Module.



Note!

Use 15A slow blow fuse while connecting Modules in series.



Note!

Modules cannot be connected in series parallel combination under any circumstances.