

# Backup Battery and Charge Controller

The 12VDC backup battery (part #7900-128) and DC-to-DC charge controller (part #7900-127) are add-ons to existing LI-COR biomet stations. The retrofit kit includes a vented enclosure, datalogger risers, assembly hardware, and the backup battery kit.

## Backup Battery/Charge Controller

The DC-to-DC charge controller provides several additional functions:

- Charges the 12VDC backup battery.
- Switches to backup battery power to keep the Sutron 9210 system running if the system power supply fails.
- Converts a 9-30VDC input to 12VDC output to power the Sutron datalogger.
- The backup battery should provide 1 to 3 days of continuous operation for a basic biomet system.

**Note:** The backup battery is designed to power only the Sutron 9210B datalogger. Do not attempt to power the gas analyzer, sonic anemometer, or other components with the backup battery. Doing so may damage the battery.

## Operation Summary

The charge controller will switch to battery backup power if the main power input falls below 7.8V or if it rises above 31.4V. The datalogger will turn off when the backup battery input drops below 10.6V or rises above 15.8V.

	Low (falling) turn OFF threshold	Low (rising) turn ON threshold	High (rising) turn OFF threshold	High (falling) turn ON threshold
Main	7.8V (battery backed)	8.1V (on main)	31.4V (battery backed)	30.5V (on main)
Battery	10.6V (Sutron off)	10.9V (Sutron on)	15.8V (Sutron off)	15.4V (Sutron on)

If the main input voltage is falling, once it drops below 7.8V, the system will switch to the backup battery and turn off the high-draw sensors, such as the heater for the self-calibrating heat flux plates and CNF4 heater/ventilator. In order for the system to switch from battery backup to the main power, the main power must go above 8.1V. The charge controller signals the datalogger with a 1 to indicate main power and 0 to indicate backup battery power.

## Components

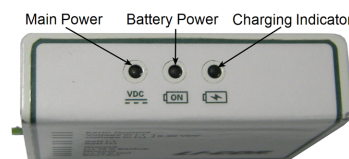
The backup battery/charge controller includes the following components:

- **Vented Enclosure (retrofit kit only):** The vented enclosure allows hydrogen gas to dissipate. Hydrogen gas may be emitted if the backup battery is damaged.
- **Battery:** A 12VDC lead acid battery (part #7900-128), 7.2 Ah with 2-pin terminal strip connector. Powers the datalogger and biomet sensors in the event that the main power supply fails.
- **Charge Controller:** A DC-to-DC charge controller (part #7900-127) that provides a regulated 12VDC power supply to the Sutron datalogger and other sensors that have an upper limit near 12VDC.
- **Terminal Strips:** Includes a 2-pin terminal strip on the battery power cable. A 3-pin terminal strip with a green/yellow lead connects to the Biomet system ground lug; and a 5-pin terminal strip with one blue, two red, and two black leads. The red/black leads are for the power supply. The blue lead signals the datalogger of the power status using the B9 (I/O 6) terminal.
- **Thermistor:** An external thermistor measures the ambient air temperature while the battery is charging. The charge controller uses this measurement to optimize the charging voltage provided to the battery.

Component	Quantity	LI-COR Part #
Backup Battery Kit		
12VDC Lead Acid Battery	1	7900-128
DC to DC Charge Controller	1	7900-127
2-pin Terminal Strip	1	
3-pin Terminal Strip	1	
5-pin Terminal Strip	1	

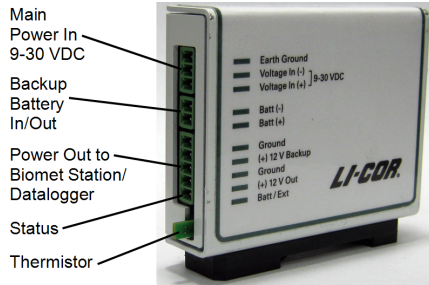
## Indicator LEDs

The charge controller has 3 LEDs:



- **Main Power:** On when the device is powered from the main power supply.
- **Battery Power:** On when the device is operating from battery power.
- **Charging Indicator:** On when the battery is charging.

It has three terminal strip connections and a thermistor:

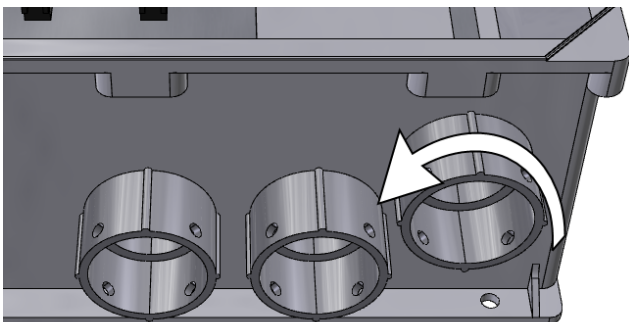


**Note:** Use caution when installing the terminal strip - plugging the power in or backup battery into the power out terminal may damage the charge controller.

## Install the Vented Enclosure

**Important:** You must use the vented enclosure that is provided with this kit because the battery may emit hydrogen gas if it is damaged or overcharged. This could result in an explosion hazard if the battery is installed in an un-vented enclosure.

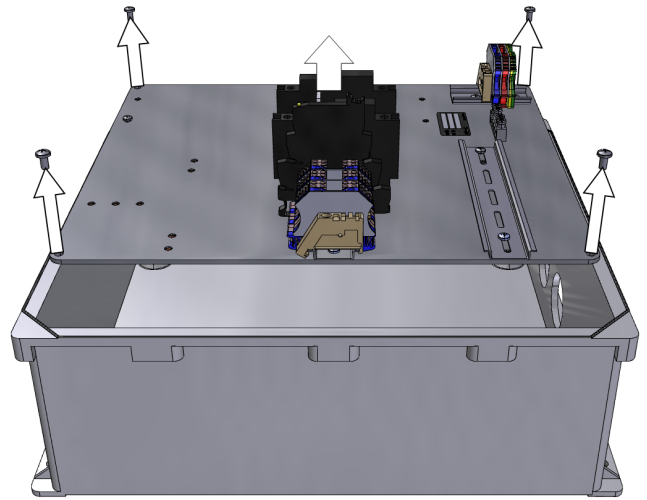
1. Place the biomet station enclosure on a workbench or other flat, stable surface.
2. Remove the sensor and power cables that pass through the openings in the enclosure. You do not need to remove the assembled DIN rail components from the mounting plate.
3. Remove the Sutron 9210B Datalogger.
4. Remove the three strain-relief fittings. Grasp the fitting and turn it counter-clockwise to loosen, then remove the locknut.



5. Remove the four screws that secure the large metal plate in the enclosure and lift the plate assembly out.



**Note:** Wear gloves to protect your hands from sharp edges.



6. Install the strain relief fittings in the vented enclosure.

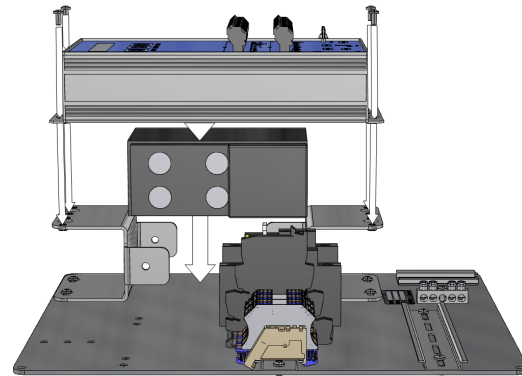
## Installing the Backup Battery

1. Remove the main power supply terminals.

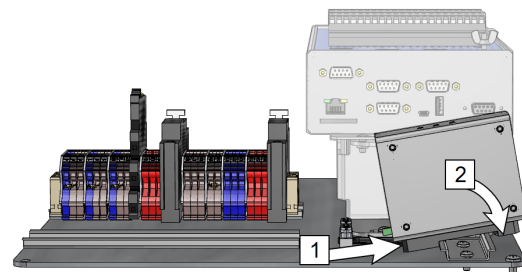
Loosen the screws that secure the DIN end caps and slide them off of the DIN rail. Loosen the screw in the center of the ground (yellow/green) DIN terminal. Remove the DIN terminals and keep them in the spares kit.

2. Install the battery.

Secure the battery by installing the Sutron 9210B Datalogger on the risers.



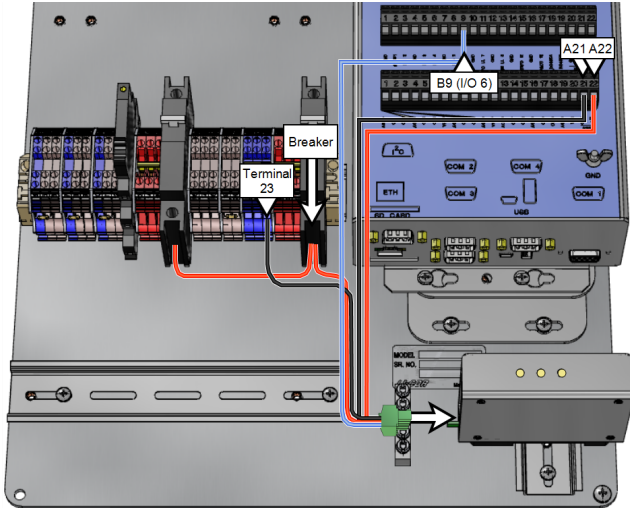
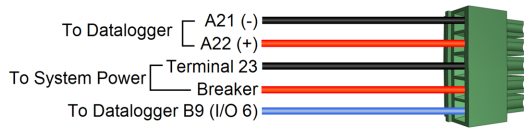
3. Install the charge controller on the DIN rail.



4. Install the Biomet system power wire terminal.

The power supply harness consists of a 5-pin terminal block with one blue, two black, and two red leads. The terminal plugs into the Power Out terminal.

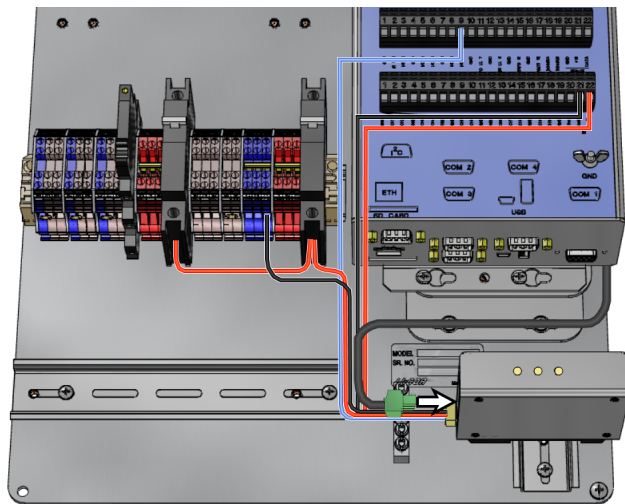
One red/black pair connect directly to the Biomet system power distribution module. The blue lead goes to terminal B9 (I/O 6) on the Sutron 9210B. The second red/black pair goes to the datalogger.



The blue lead is a status indicator for the charger/battery that indicates whether power is coming from the main supply or backup battery. Be sure the Sutron 9210B ground terminal is connected to the enclosure ground lug.

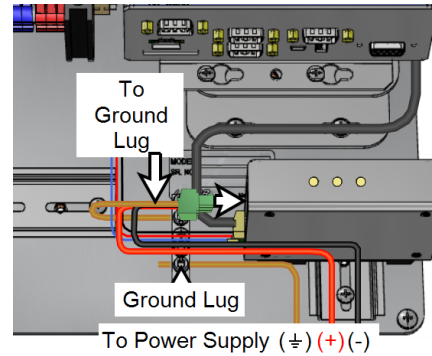
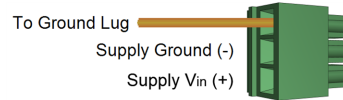
**Note:** The DIN rail terminal blocks are not powered when the system runs on backup power.

5. Connect the battery wire terminal to the charge controller.  
Loop the power cable around the right side of the datalogger and plug the 2-pin terminal strip into the battery terminal.

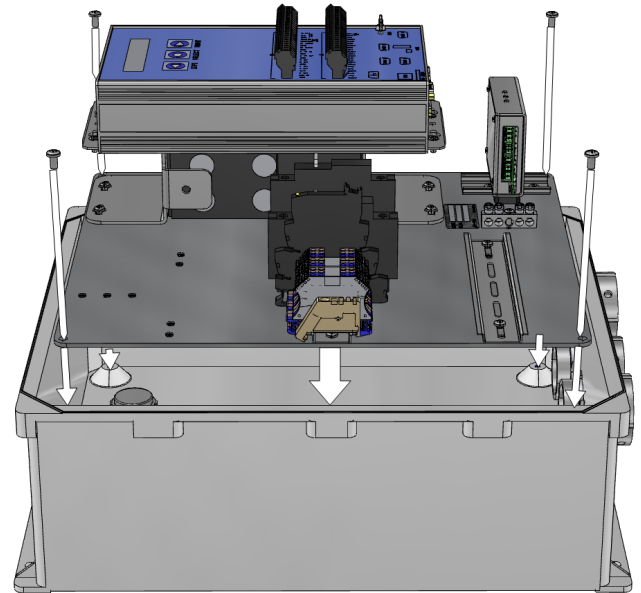


6. Install the "Power In" wire terminal.

The 3-pin terminal has a green/yellow lead installed - connect it to the enclosure ground lug. The power leads enter the Biomet enclosure and connect directly to the 3-pin terminal strip.



7. Install the plate in the enclosure (if applicable) and install the sensor leads.

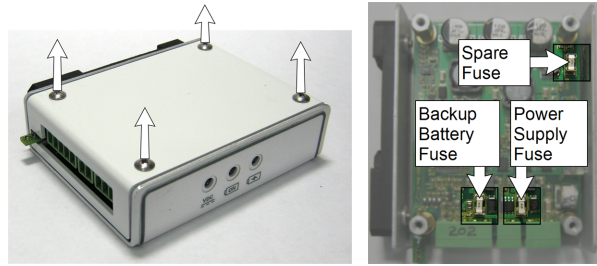


8. Install cable ties to relieve strain from the connectors.



## Battery Removal

To remove the backup battery, unplug the battery wire terminal from the charge controller, remove the datalogger from the riser plates, and lift out the battery. Follow local guidelines and restrictions if you need to dispose of the battery.



## Charge Controller Maintenance

The charge controller has two internal fuses to protect the circuitry. One spare fuse is included in the unit to replace a blown fuse. If the charge controller fails to function properly, check the fuses and replace the blown fuse with the spare.

## Fuse Indicators

A blown fuse will be indicated by the following:

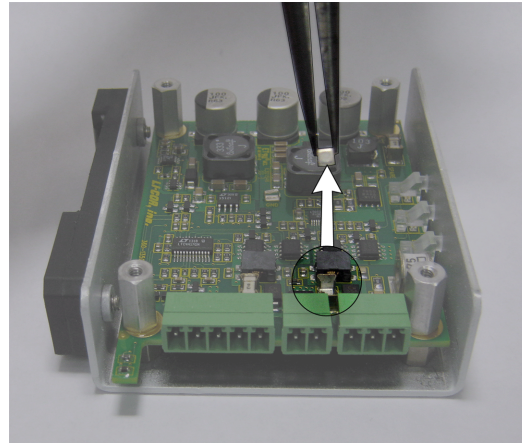
- Power supply fuse: If the Power LED will not light, check the system power supply to be sure it is adequate. If the charger has power but the LED is dark, the power supply fuse may be blown.
- Back-up battery fuse: If the Battery LED will not light, but the main power LED will, the battery fuse is probably blown or the battery has failed. Check the fuse with an ohm meter.

## Replacing the Fuses

**Note:** When removing the cover, wear an anti-static wrist strap to prevent accidental static discharge that may damage the circuitry.

1. Disassemble the charge controller.  
Remove the screws that secure the back plate and remove the plate to gain access to the fuses.

2. Check the fuse with an ohm meter.  
Resistance of  $<1\Omega$  (ohm) across the fuse indicates that it is OK.
3. Replace the fuse if necessary.  
To remove a fuse, grip it with a needle-nose pliers or tweezers and pull it out of the mount.



4. Install the spare fuse in place of the blown fuse.  
The fuse is a 4 amp Nano<sup>2</sup> SMF Fuse (Littelfuse part #0453004.MR). Contact Littelfuse, Inc. for replacements: <http://www.littelfuse.com/contact-us.aspx>.

## Specifications

- **Input Voltage:** 9-30VDC
- **Battery Input Voltage:** 10.6-15.8VDC
- **Output Voltage:** 12VDC; 2A max.
- **Operating Temperature Range:** -20 to 50 °C

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