

# BB3S MODION® Battery Backup

## Instruction Manual

www.modionvacuum.com

- For Further Support Please call or email
- 724.523.9610
- support@modionvacuum.com
- 115 Railroad Street  
Irwin, PA 15642

### MODION® Battery Backup / Uninterrupted Power Supply

The MODION® Battery Backup is available for use with our modular ion pump systems for those needing portability or battery backup. This compact unit can run our small modular ion pumps for up to 2 days with the LED pressure graph operating, or up to 3 days when the LED pressure graph is disabled with the simple flip of a switch.

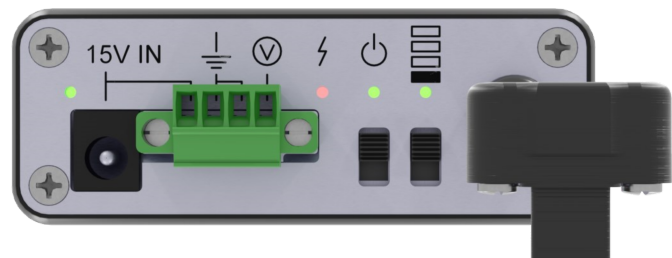
The small size of this unit makes it a good choice for those with space constraints on their vacuum systems

The MODION® Battery Backup is perfect for sample transfer, suitcase, and other portable systems, or where uninterrupted pumping is desired in case of a power failure.



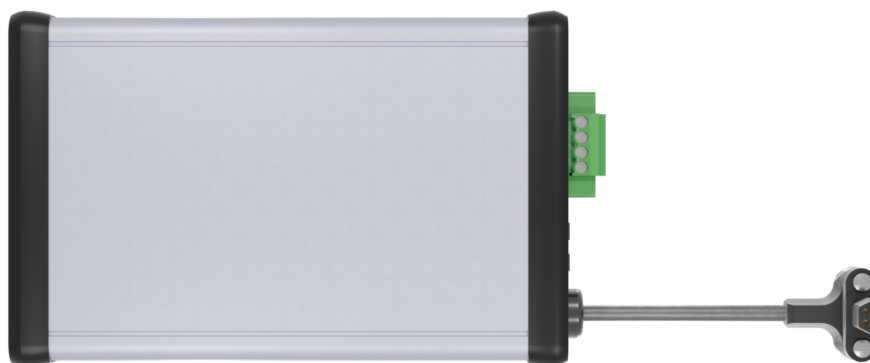
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## BB3S Battery Backup

*This Battery Backup/ Uninterrupted Power Supply is designed to control MODION® .5l/s through 3l/s MODION® ion pumps manufactured by MODION® Inc . Please read and understand the instruction manual completely prior to using this device.*



**Compatible Controller\*:** --- C-1766Q

*\*sold separately*

**Compatible Pumping Speeds:** —  $\leq 3$  l/s  
(modular packages only)

**Battery Pack Mass:** ——— 420gm

## SPECIFICATIONS

Input Voltage:	15VDC (14.5VDC to 15.5VDC)
Input Current:	1A
Input Connection:	2.1mm x 5.5mm Barrel Jack or 16-28 AWG Wire Screw Terminal - via Phoenix Contact #1847071 (Included)
Included Wall Adapter Input:	100-240VAC 0.5A 50-60Hz
Mass:	420g
Operating temperature:	-20°C to 60°C
Charging Temperature:	0°C to 40°C
Storage Temperature:	-20°C to 60°C
Humidity:	0 - 80% RH noncondensing
Ion Pump Output:	5 pin Connector for MODION® PN: C-1766Q
Telemetry:	Voltage Monitor pass-through from ion pump power supply
Telemetry Connection:	16-28 AWG Wire Screw Terminal - via Phoenix Contact #1847071 (Included)
Charge Profile:	CC/CV with Automatic Topping Charge
Full Charge Time:	4.5h
Input Protection:	Reverse Polarity Over Voltage Over Current
Battery Protection:	Over Charge Over Discharge Over Current Short Circuit Reverse Polarity
Charge Protection:	Battery Over Temperature Safety Timer Battery Over Discharge Over Voltage

## MODION® BATTERY BACKUP OPERATION

NOTE: The MODION® battery backup unit is shipped partially discharged and should be charged immediately upon receipt.

**WARNING : The return connections on the battery backup unit and the case of battery backup unit are not appropriate safety ground connections for any connected ion pump.**

### Charging the battery backup unit from included 15VDC wall adapter without connecting to a MODION® ion pump

1. Connect wall adapter to an appropriate outlet.
2. Connect DC barrel plug to the jack on the battery backup unit.  
The Input power led (LED-1), and charging status led (LED-2) will illuminate.
3. When the charging status led (LED-2) changes from red to green the unit is charged, input power may be

It is acceptable to leave the input power connected continuously, the internal charger will periodically apply a topping charge to keep the battery fully charged.

### Charging the battery backup unit from alternate 15VDC power input without connecting to a MODION® ion pump

1. Make connections to the appropriate terminals of the included Phoenix Contact #1847071 terminal block.  
(See I/O Description drawing)
2. Apply 15VDC to the connections.  
The Input power LED (LED-1), and charging status led (LED-2) will illuminate .
4. When the charging status LED (LED-2) changes from red to green, the unit is charged, input power may be removed.

It is acceptable to leave the input power connected continuously, the internal charger will periodically apply a topping charge to keep the battery fully charged.

### Charging the battery backup unit from included 15VDC wall adapter while connecting to a MODION® ion pump

1. Connect the 5-pin connector on the cable to a properly installed and under vacuum MODION® ion pump/power supply unit.
2. If desired, connections can be made to the voltage monitor terminals of the included Phoenix Contact #1847071 terminal block. (See I/O Description drawing)
3. Connect wall adapter to an appropriate outlet.
4. Connect DC barrel plug to the jack on the battery backup unit.  
The ion pump power supply will be fully powered from 15VDC (H.V. supply, bargraph display, and voltage monitor).  
The Input power LED (LED-1), and charging status LED (LED-2) will illuminate.
5. If it is desired to use the battery backup unit to operate as an uninterruptible power supply for the MODION® ion pump, set the main battery power switch (SWITCH-1) to the on position. The unit will then immediately switch to battery power if 15VDC input is lost.
6. If it is desired for the bargraph display and voltage monitor to remain powered when operating from battery power, set the bargraph and monitor battery power switch (SWITCH-2) to the on position. Note that the battery run time will be reduced in this configuration. (See run time chart)

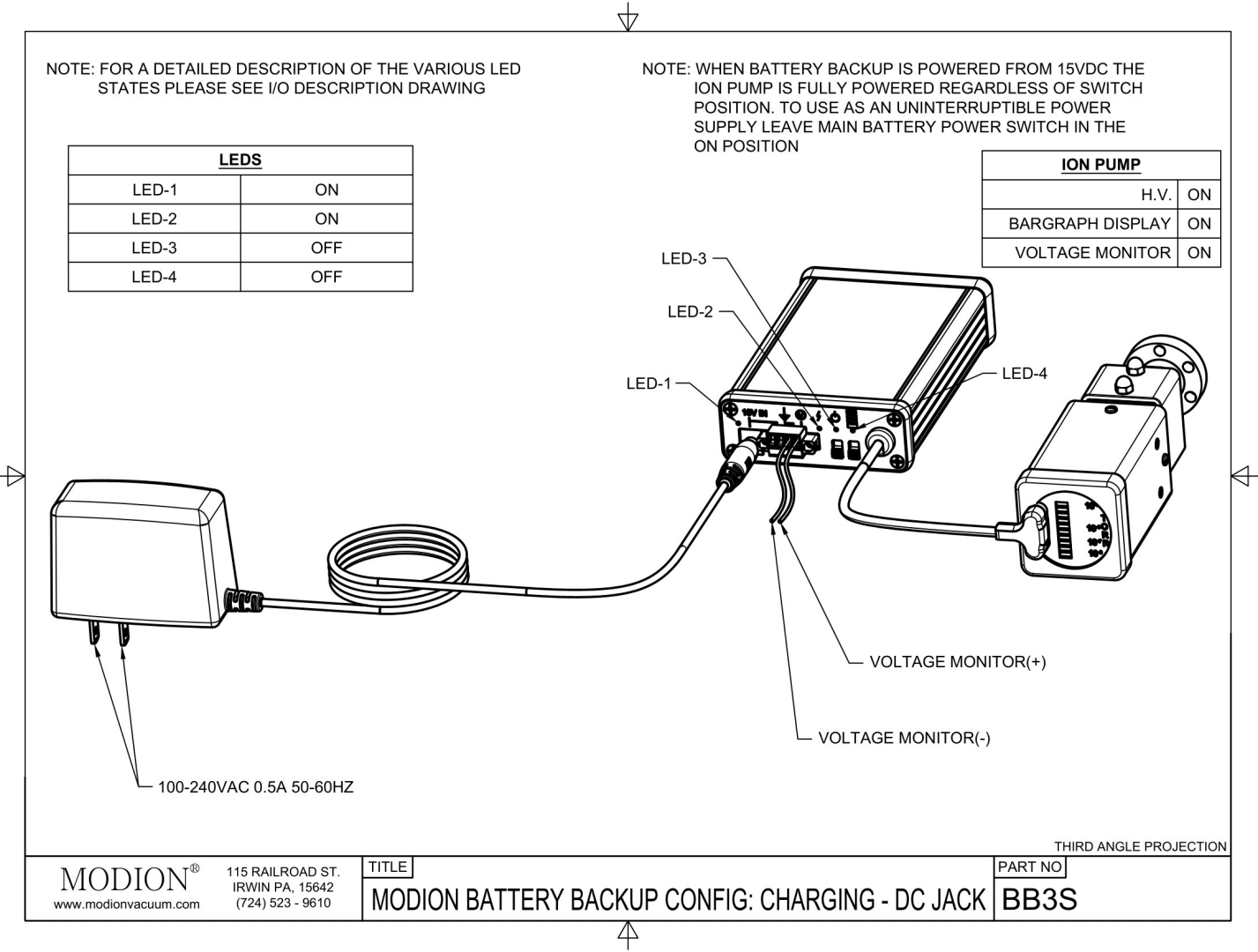
### Charging the battery backup unit from alternate 15VDC power input while connecting to MODION® ion pump

1. Connect the 5-pin connector on the cable to a properly installed and under vacuum MODION® ion pump/power
2. If desired, connections can be made to the voltage monitor terminals of the included Phoenix Contact #1847071 terminal block. (See I/O Description drawing)
3. Make connections to the appropriate terminals of the included Phoenix Contact #1847071 terminal block. (See I/O Description drawing)
4. Apply 15VDC to the connections.  
The ion pump power supply will be fully powered from 15VDC (H.V. supply, bargraph display, and voltage monitor).  
The Input power LED (LED-1), and charging status LED (LED-2) will illuminate .
5. If it is desired to use the battery backup unit to operate as an uninterruptible power supply for the MODION® ion pump, set the main battery power switch (SWITCH-1) to the on position. The unit will then immediately switch to battery power if 15VDC input is lost.
6. If it is desired for the bargraph display and voltage monitor to remain powered when operating from battery power, set the bargraph and monitor battery power switch (SWITCH-2) to the on position. Note that the battery run time will be reduced in this configuration. (See run time chart)

### Operating ion pump from battery power

1. Connect the 5-pin connector on the cable to a properly installed and under vacuum MODION® ion
2. If desired, connections can be made to the voltage monitor terminals of the included Phoenix Contact #1847071 terminal block (See I/O Description drawing). Note that the voltage monitor is only operational when the bargraph and voltage monitor battery power switch (SWITCH-2) is in the on position.
3. Set the main battery power switch (SWITCH-1) to the on position. This will power the MODION® ion pump H.V. power supply only. Note that the power on LED on the ion pump will not illuminate. The main battery power LED (LED-3) will blink to show that battery power is being applied to the ion pump H.V. supply. This LED also serves as a low battery indication; if it is blinking green the battery capacity is greater than 25%, if it is
4. If it is desired for the bargraph display and voltage monitor to be operational, set the bargraph and monitor battery power switch (SWITCH-2) to the on position. Note that the battery run time will be reduced in this configuration. (See run time chart) The bargraph and monitor battery power LED (LED-3) will blink to show that battery power is being applied to the bargraph display and voltage monitor. This LED also serves as a low battery indication; if it is blinking green the battery capacity is greater than 25%, if it is blinking red the battery

**MODION® BATTERY BACKUP  
CONFIG: CHARGING - DC JACK**



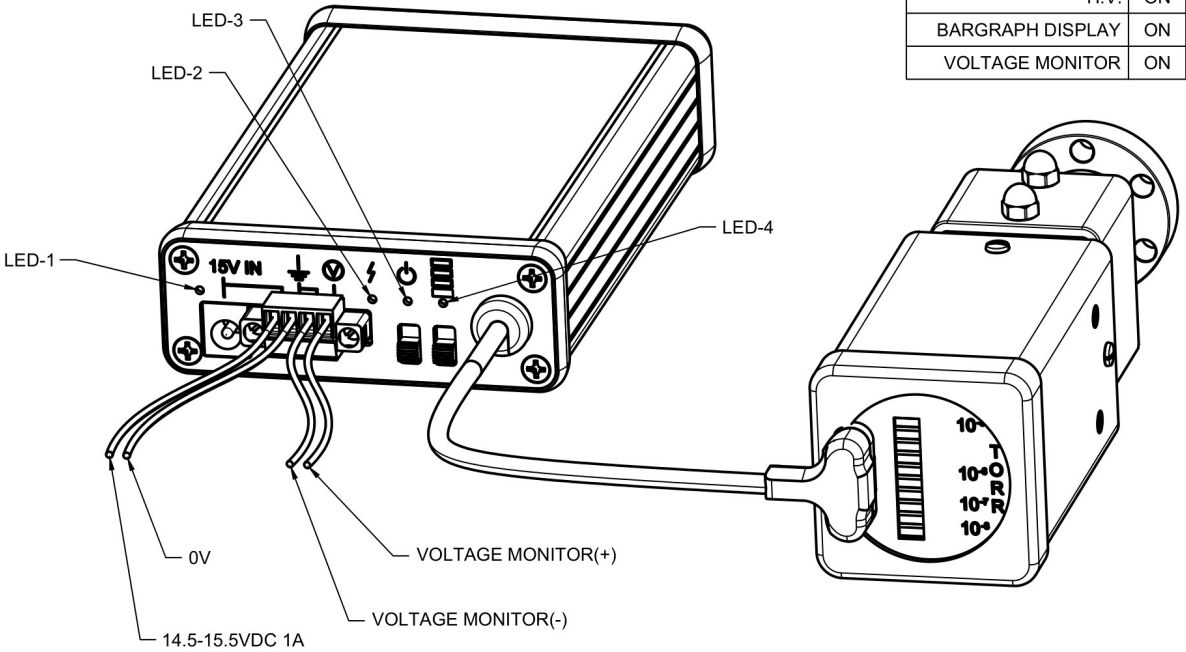
**MODION® BATTERY BACKUP**  
**CONFIG: CHARGING - ALT. 15VDC INPUT**

NOTE: FOR A DETAILED DESCRIPTION OF THE VARIOUS LED STATES PLEASE SEE I/O DESCRIPTION DRAWING

LEDS	
LED-1	ON
LED-2	ON
LED-3	OFF
LED-4	OFF

NOTE: WHEN BATTERY BACKUP IS POWERED FROM 15VDC THE ION PUMP IS FULLY POWERED REGARDLESS OF SWITCH POSITION. TO USE AS AN UNINTERRUPTIBLE POWER SUPPLY LEAVE MAIN BATTERY POWER SWITCH IN THE ON POSITION

ION PUMP	
H.V.	ON
BARGRAPH DISPLAY	ON
VOLTAGE MONITOR	ON



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TITLE

MODION BATTERY BACKUP CONFIG: CHARGING - ALT. 15VDC INPUT

PART NO

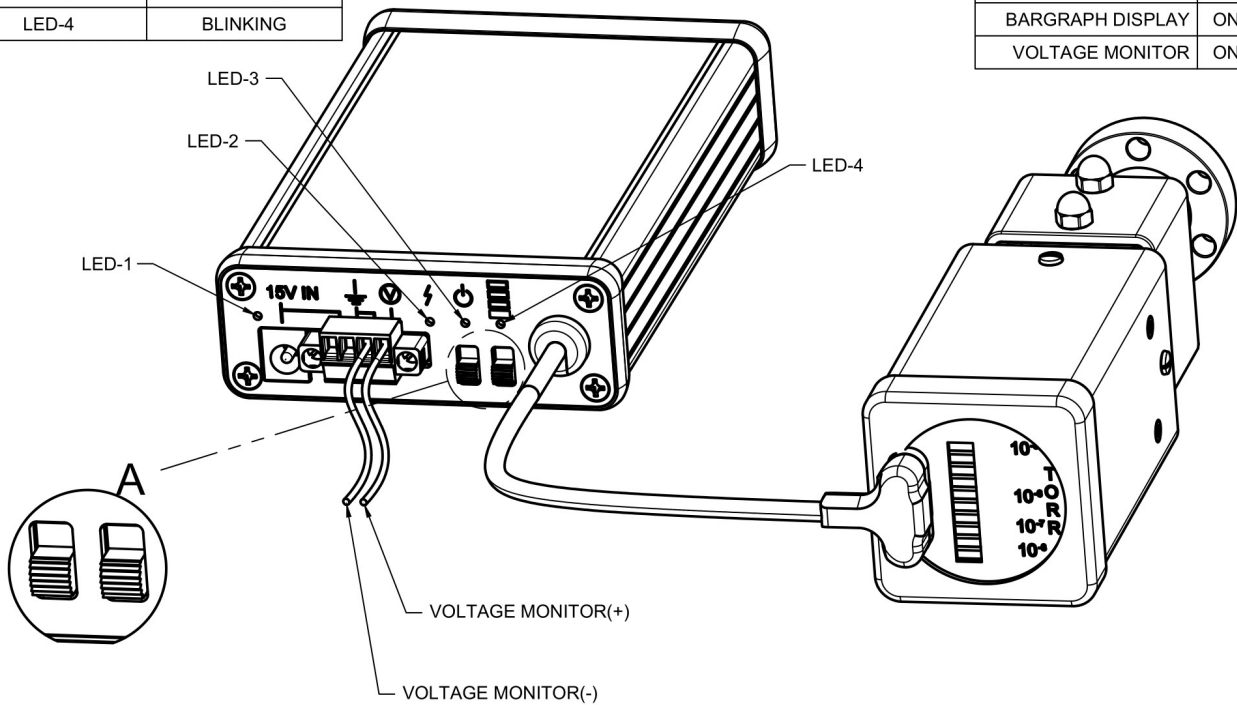
BB3S

**MODION® BATTERY BACKUP**  
**CONFIG: BATTERY OPERATION - PUMP AND DISPLAY**

NOTE: FOR A DETAILED DESCRIPTION OF THE VARIOUS LED STATES PLEASE SEE I/O DESCRIPTION DRAWINGS

LEDS	
LED-1	OFF
LED-2	OFF
LED-3	BLINKING
LED-4	BLINKING

ION PUMP	
H.V.	ON
BARGRAPH DISPLAY	ON
VOLTAGE MONITOR	ON



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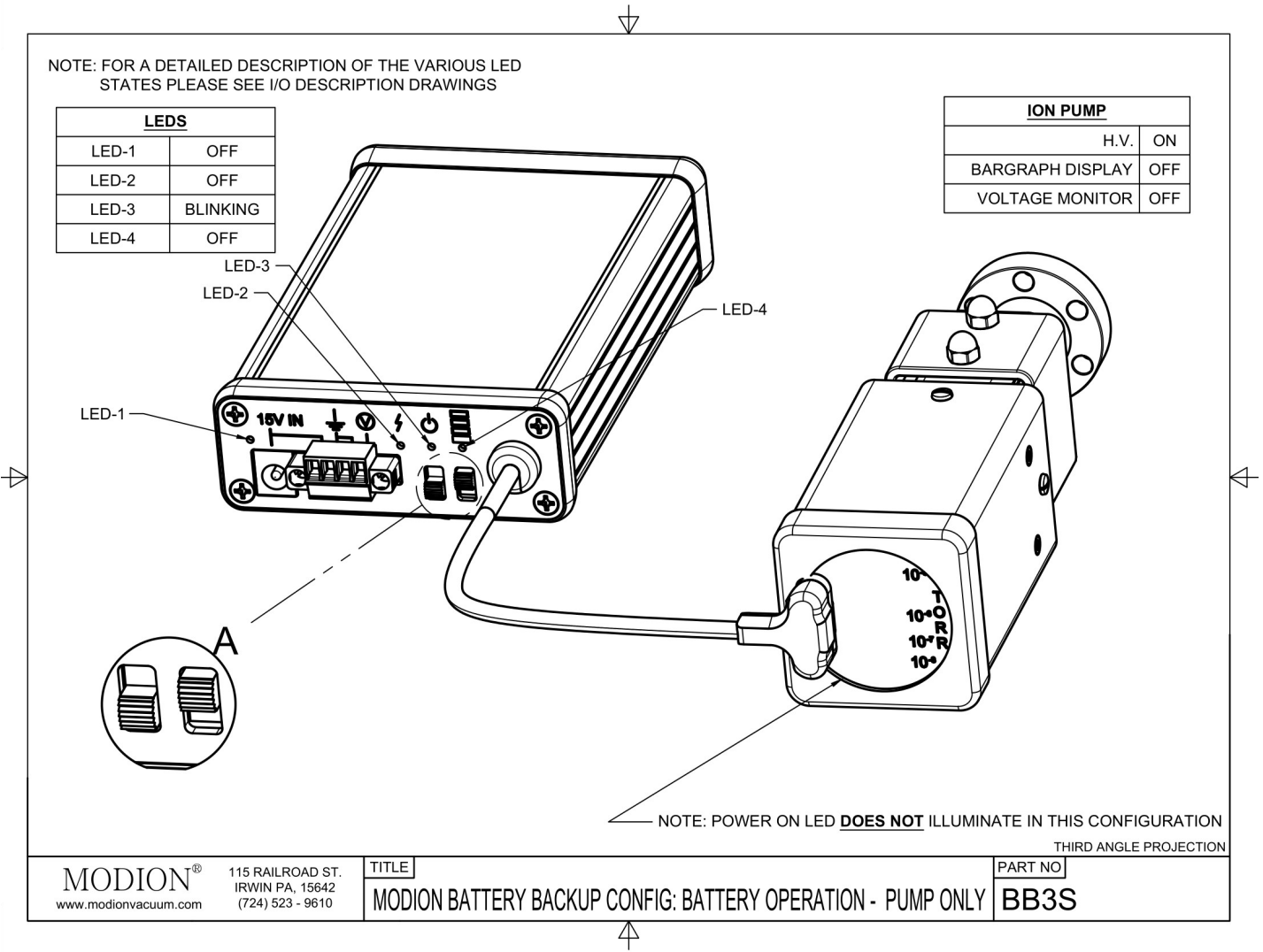
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TITLE  
MODION BATTERY BACKUP CONFIG: BATTERY OPERATION - PUMP AND DISPLAY

PART NO  
BB3S



**MODION® BATTERY BACKUP**  
**CONFIG: BATTERY OPERATION - PUMP ONLY**

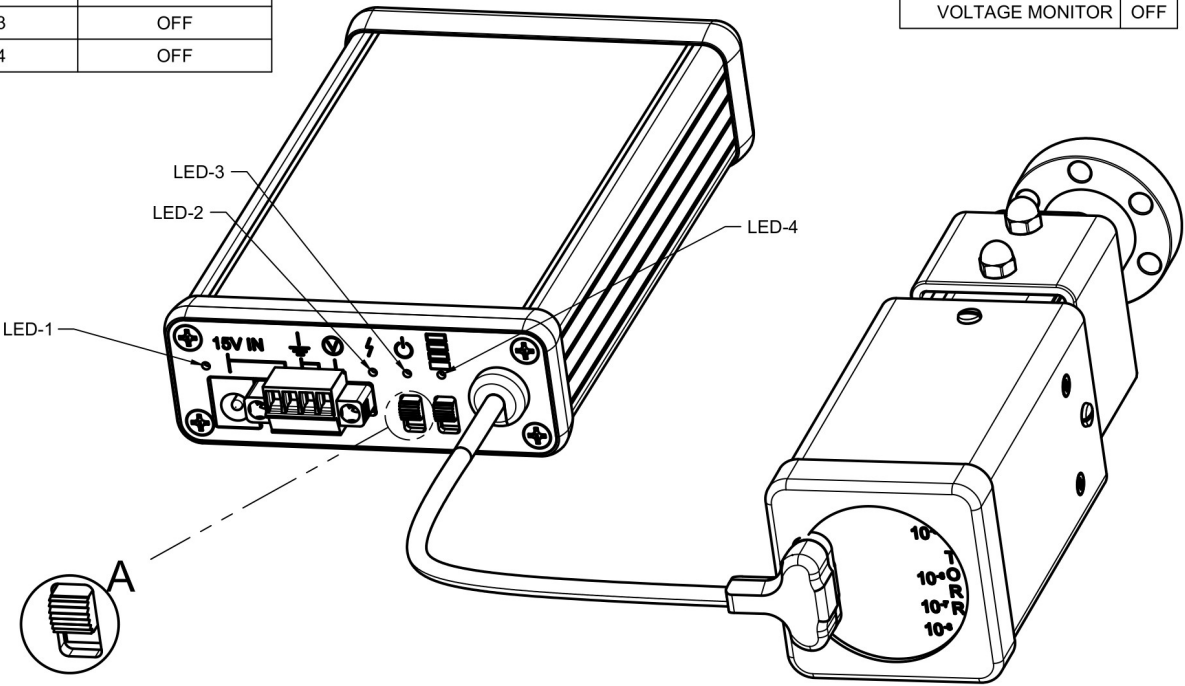


MODION® BATTERY BACKUP  
CONFIG: OFF

NOTE: FOR A DETAILED DESCRIPTION OF THE VARIOUS LED  
STATES PLEASE SEE I/O DESCRIPTION DRAWINGS

LEDS	
LED-1	OFF
LED-2	OFF
LED-3	OFF
LED-4	OFF

ION PUMP	
H.V.	OFF
BARGRAPH DISPLAY	OFF
VOLTAGE MONITOR	OFF



THIRD ANGLE PROJECTION

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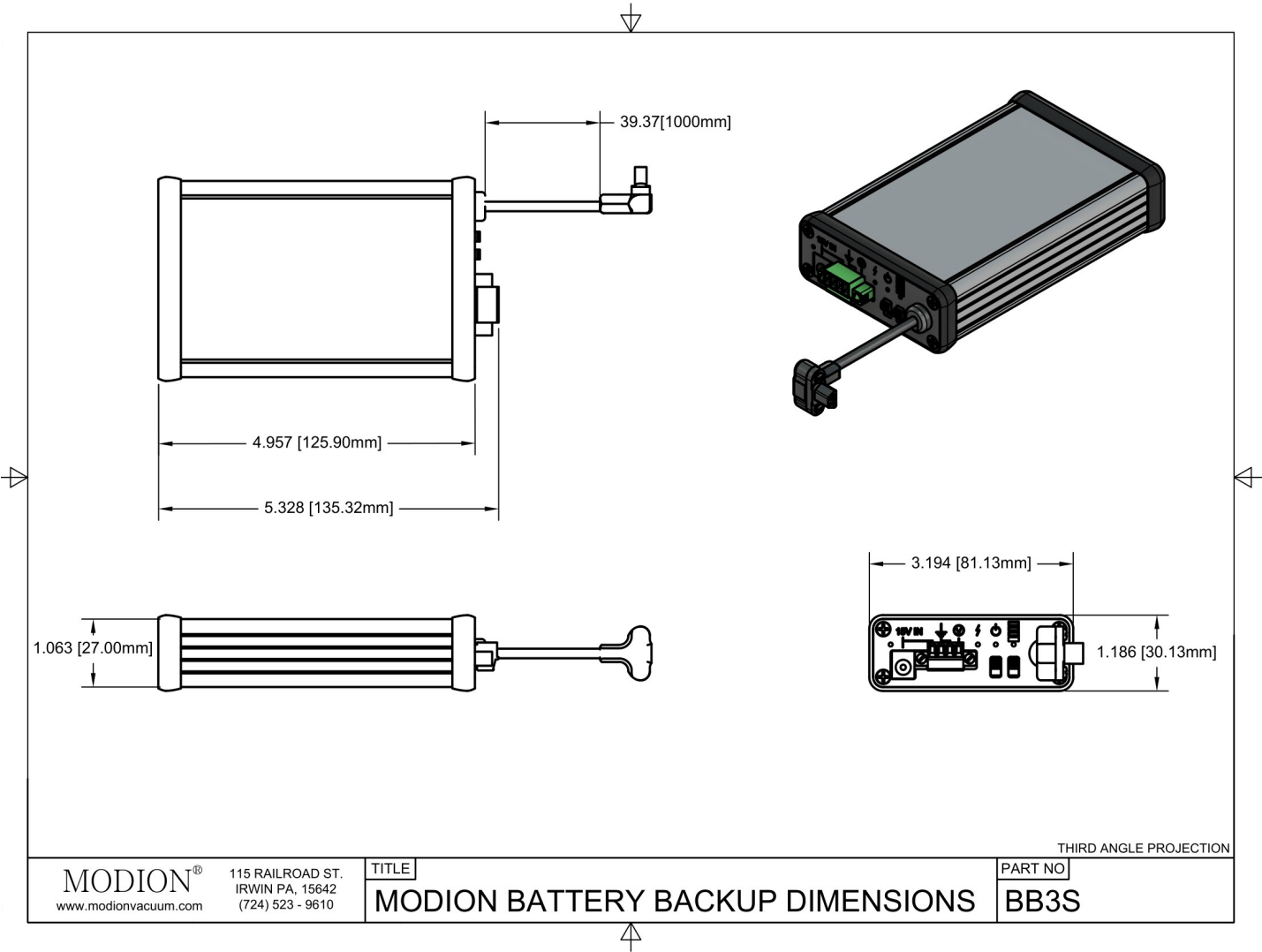
TITLE

MODION BATTERY BACKUP CONFIG: OFF

PART NO

BB3S

MODION® BATTERY BACKUP DIMENSIONS



## MODION® BATTERY BACKUP I/O TABLES

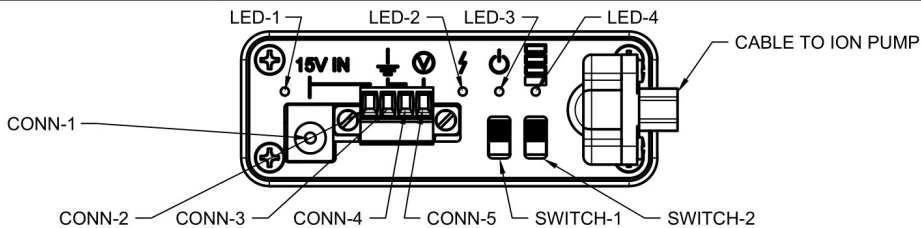
n/c = No Connection  
x = Don't Care

Function	Item	INPUTS					OUTPUTS							
		CONN-1	CONN-2	CONN-3	SWITCH-1	SWITCH-2	CONN-4	CONN-5	LED-1	LED-2	LED-3	LED-4	Ion Pump	
		15V Power Input Jack	Alt. 15V Power Input	Return for Alt. 15V Power Input	Main Battery Power Switch	Bargraph and Voltage Monitor Battery Power Switch	Return for Voltage Monitor	Voltage Monitor Pass-through from Ion Pump Power Supply	Input Power	Charging Status	Main Battery Power	Bargraph and Monitor Battery Power	High Voltage	Voltage Monitor
<b>CONFIG:</b>														
Charging - DC Jack		+15V via DC Jack	n/c	x	x	x	Voltage Monitor (-)	Voltage Monitor (+)	ON	ON	OFF	OFF	ON	ON
Charging - Alt. 15VDC Input		n/c	+15V	0V	x	x	Voltage Monitor (-)	Voltage Monitor (+)	ON	ON	OFF	OFF	ON	ON
Off		n/c	n/c	x	OFF	x	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
On Battery - Pump Only		n/c	n/c	x	ON	OFF	OFF	OFF	OFF	OFF	Blinking	OFF	ON	OFF
On Battery - Pump and Display		n/c	n/c	x	ON	ON	Voltage Monitor (-)	Voltage Monitor (+)	OFF	OFF	Blinking	Blinking	ON	ON

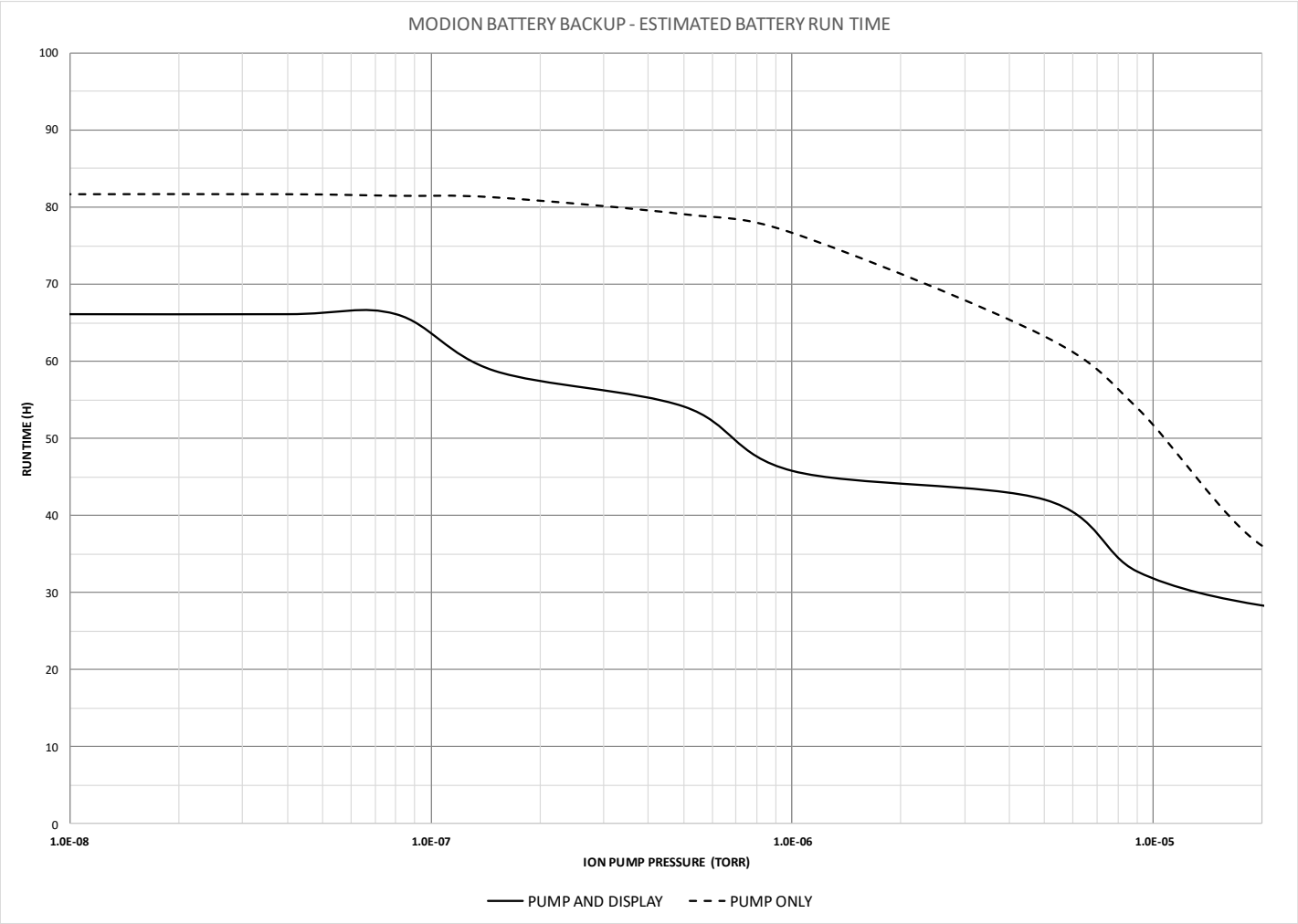
Charging - DC Jack:	In this configuration, 15V is being applied via the DC barrel jack. This will power the battery charger inside the unit and fully powers the ion pump power supply (H.V. supply, bargraph display, and voltage monitor) by passing 15VDC to it. The ion pump power supply will be powered regardless of the position of the switches on the battery backup. If it is desired to use the battery backup as an uninterruptible power supply the main battery power switch will need to be set in the on position so that the unit can immediately switch to battery power on the loss of 15VDC. Note that the positive pin of the barrel jack and the alternate power input are connected internally, and should not be used simultaneously.
Charging - Alt. 15VDC Input:	In this configuration, 15V is being applied via the alternate power input. This will power the battery charger inside the unit and fully powers the ion pump power supply (H.V. supply, bargraph display, and voltage monitor) by passing 15VDC to it. The ion pump power supply will be powered regardless of the position of the switches on the battery backup. If it is desired to use the battery backup as an uninterruptible power supply the main battery power switch will need to be set in the on position so that the unit can immediately switch to battery power on loss of 15VDC. Note that the positive pin of the barrel jack and the alternate power input are connected internally, and should not be used simultaneously.
Off:	To completely power down both the battery backup unit and any connected ion pump power supply remove 15VDC input power and set the main battery power switch to the off position.
On Battery - Pump Only:	In this configuration 15VDC is not being applied to the battery backup unit, the main battery power switch is in the on position, and the bargraph and voltage monitor battery power switch is in the off position. This will power the ion pump H.V. supply <u>only</u> , and is the configuration with the longest battery run time (see run time charts). In this configuration the bargraph display, voltage monitor, and power on led on the ion pump power supply are <u>not</u> powered and will not function.
On Battery - Pump and Display:	In this configuration 15VDC is not being applied to the battery backup unit, and both the main battery power switch and the bargraph and voltage monitor switch are in the on position. This will power the H.V. supply, bargraph display, and voltage monitor.

\*For a detailed description of the various LED states and the location of other items please see *I/O Description* drawing

## MODION® BATTERY BACKUP I/O DESCRIPTION

ITEM	FUNCTION	DESCRIPTION
LED-1	INPUT POWER	ON: 15V APPLIED OFF: NO INPUT POWER
LED-2	CHARGING STATUS	RED: CHARGE IN PROGRESS GREEN: CHARGE COMPLETE OFF: -WITH LED-1 OFF: NO INPUT POWER -WITH LED-1 ON: CHARGE ERROR, PLEASE SEE DOCUMENTATION
LED-3	MAIN BATTERY POWER	BLINKING: BATTERY POWER IS BEING APPLIED TO ION PUMP POWER SUPPLY(H.V.) -GREEN: GREATER THAN 25% BATTERY CAPACITY REMAINING -RED: LESS THAN 25% BATTERY CAPACITY REMAINING OFF: BATTERY POWER IS NOT BEING APPLIED TO ION PUMP POWER SUPPLY(H.V.)
LED-4	BARGRPH AND MONITOR BATTERY POWER	BLINKING: BATTERY POWER IS BEING APPLIED TO BARGRAPH DISPLAY AND VOLTAGE MONITOR -GREEN: GREATER THAN 25% BATTERY CAPACITY REMAINING -RED: LESS THAN 25% BATTERY CAPACITY REMAINING OFF: BATTERY POWER IS NOT BEING APPLIED TO BARGRAPH DISPLAY AND VOLTAGE MONITOR
CONN-1	15V POWER INPUT JACK	POWERS BATTERY CHARGER, ION PUMP POWER SUPPLY(H.V.), BARGRAPH DISPLAY, AND VOLTAGE MONITOR
CONN-2	ALTERNATE 15V POWER INPUT	ALLOWS HARD WIRE CONNECTION TO POWER BATTERY CHARGER, ION PUMP POWER SUPPLY(H.V.), BARGRAPH DISPLAY, AND VOLTAGE MONITOR
CONN-3	RETURN FOR ALTERNATE 15V POWER INPUT	CONNECTED INTERNALLY(GROUND CONNECTION FOR CONN-2)
CONN-4	RETURN FOR VOLTAGE MONITOR	CONNECTED INTERNALLY(GROUND CONNECTION FOR CONN-5)
CONN-5	VOLTAGE MONITOR PASS-THROUGH FROM ION PUMP POWER SUPPLY	NOTE: VOLTAGE MONITOR IS ONLY OPERATIONAL WHEN BARGRAPH DISPLAY IS POWERED
SWITCH-1	MAIN BATTERY POWER SWITCH	ALLOWS BATTERY TO BE APPLIED TO PUMP POWER SUPPLY(H.V.) WHEN 15V IS NOT APPLIED TO BATTERY BACKUP
SWITCH-2	BARGRAPH AND VOLTAGE MONITOR BATTERY POWER SWITCH	ALLOWS BATTERY POWER TO BE APPLIED TO BARGRAPH DISPLAY AND VOLTAGE MONITOR WHEN 15V IS NOT APPLIED TO BATTERY BACKUP AND MAIN BATTERY POWER SWITCH IS IN THE ON POSITION
		
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		PART NO <b>BB3S</b>

MODION® BATTERY BACKUP ESTIMATED RUN TIME



## TROUBLESHOOTING

Problem	Possible Solution
Input power applied, input power LED (LED-1) does not illuminate:	Check that input voltage is in the range of 14.5VDC to 15.5VDC. The input overvoltage protection will activate if the input voltage is slightly over 15.5VDC, disconnecting the unit from input power.
Input power LED (LED-1) is illuminated, charging status led (LED-2) does not illuminate:	This indicates a charging error. Ensure the unit is within the specified charging temperature range (0°C to 40°C), remove 15VDC input power, wait approximately 10 seconds, and reapply 15VDC input power.
The power on LED on the ion pump power supply does not illuminate:	The power on LED on the MODION® ion pump power supply will only illuminate when the bargraph and voltage monitor is powered.
The unit does not automatically switch over to battery power upon removal of 15VDC:	Ensure that the main battery power switch is in the on position.

## Warranty Information

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MODION® Inc. warrants all commercial MODION® systems and accessories to be free from defects in materials and workmanship for a period of twelve (12) months from date of shipment to customer when used in accordance with the accompanying instructions. All obligations of MODION® Inc. under this warranty shall cease in the event of abuse, alteration, misuse, improper installation or neglect of equipment. Reasonable care must be used to avoid hazards. MODION® Inc. expressly disclaims responsibility for loss or damage caused by use of the MODION® system or accessory other than in accordance with proper operating procedures and conditions.

MODION® Inc.'s obligation under this warranty is limited to repair or replacement of the MODION® system or accessory MODION® Inc.'s option. In no event shall MODION® Inc. be liable for any special, indirect, incidental or consequential damages.

MODION® Inc. makes no warranty of merchantability or fitness for any purpose, and no other warranty, oral or written, express or implied, except as specifically set forth in this limited warranty. No MODION® Inc. representative or distributor has any authority of power to alter or extend this limited warranty.

If the customer believes that a defect covered by this limited warranty exists, the customer must return the MODION® system or accessory to MODION® Inc., postage prepaid, along with a description of the problem and proof of purchase, and contact information.