



# BlackBox®

Electrical Energy Management Device

**Compact Design  
Fits Around Most  
Electrical Panels**



## Dimensions:

L: 8" x W: 6" x D: 4"

## Dimensions:

L: 203mm x W: 152mm x D: 101mm



# INSTALLATION MANUAL

## **MAIN RATING SUPPLY MONITORED**

240-208V / 120V, Single Phase – 60 - 200 Amp \*Depending on Device Model

## **MAX RATING OF GENERAL USE DEVICE CONTROLLED**

240-208V or 120/240V Single Phase – 50 Amp Resistive Load

240-208V or 120/240V Single Phase – 40 FLA, 240 LRA @ 240/277V

## **EV CHARGER TO BE CONTROLLED**

240-208V or 120/240V Single Phase 25 Amp up to 60 Amp *Breaker for*

240-208V or 120/240V Single Phase 20 Amp up to 48 Amp *Charger*

## **MODEL NUMBERS BY TYPE**

EVEMS240-100 for 60 - 100 Amp Electrical Service

EVEMS240-200 for 125, 150, 200 Amp Electrical Service

## **READ AND SAVE THESE INSTRUCTIONS**



**CAUTION: DO NOT STORE THIS MANUAL OR OTHER COMBUSTIBLE MATERIALS INSIDE THE EVEMS OR OTHER ELECTRICAL PANELS**

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## INTRODUCTION

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## IMPORTANT SAFETY INSTRUCTIONS

### WARNING – INSTRUCTIONS PERTAINING TO A RISK OF FIRE OR ELECTRIC SHOCK

When using electric products, basic electrical shock and fire prevention precautions should always be followed including, but not limited to, arc-flash protection, pre-energizing electrical resistance checks, availability of fire prevention equipment, and the use of appropriate installation and testing tools. Read all instructions before using this product. Do not use this device if parts are broken, cracked, or defective, instead please contact the manufacturer. Installation and servicing must be carried out by a qualified professional. Use appropriate caution when connecting and disconnecting the device from any power source. Always make sure the device is disconnected from the power source before beginning installation or maintenance service. Installation must be completed to relevant local codes.



**PROHIBITING - No access for unauthorized persons**



**CAUTION - Warning of a danger or a dangerous situation**



**ELECTRICAL HAZARD - Warning of a potential electrical hazard that could result in injury and/or fire**

# SPECIFICATIONS

This device has a monitoring system that can protect an electrical distribution circuit by switching a load on or off based on its main breaker size and on what the system usage is. It will act to prevent systems connected to it from overloading the electrical distribution circuit. It does so by turning off the power to the load connected to it for the duration that the computational algorithm determines it is necessary as it relates to the main breaker sizing.

<b>Voltage</b>	240/208V or 120/240V AC single phase
<b>Main Lug Wire Size &amp; Torque</b>	14 - 4 AWG ( <i>Cu only</i> ) <b><i>Torque for Cu 75°C: 40-44 in-lbs (5 Nm)</i></b>
<b>Contactor Insulation System</b>	120°C, Class B
<b>Frequency</b>	50 or 60 Hz
<b>Operation ambient temp.</b>	34°F to 104°F (1°C to 40°C)

<b>Dimensions*</b>	<b>Weight*</b>
8"(H) x 6"(W) x 4"(D)	5 lb
203mm(H) x 152mm(W) x 101mm(D)	(2.27kg)

\*Dimensions and weight are approximate figures and are subject to change without notice.

## Applicable Model Naming Convention

Device Name, Voltage – Max Main Service Breaker Size

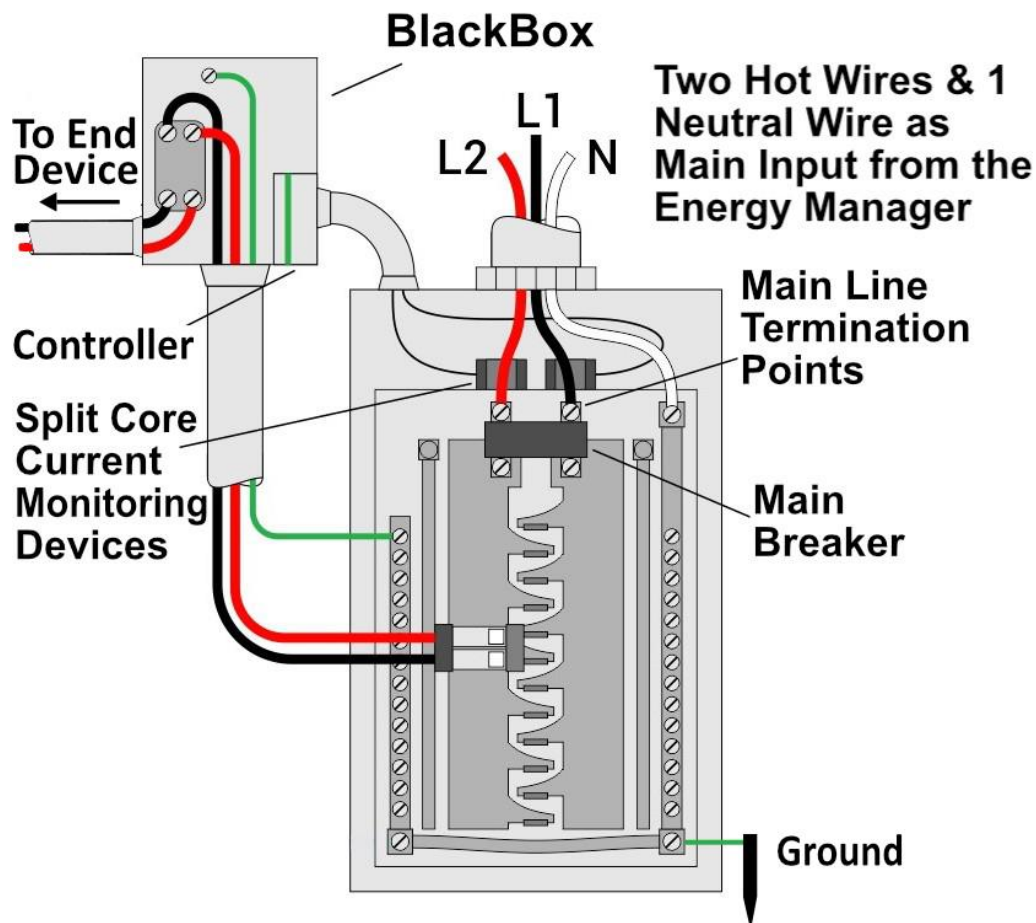
EVEMS240 – 100

EVEMS240 – 200

## Operation After Power Outage

In the event of a power outage, the device automatically restores the power supply to the vehicle charging station or receptacle when power returns and the algorithm determines that the current draw and other factors are under the setpoint for the determined period set by the installer.

## INSTALLATION DIAGRAM



Alternate locations for device installation are acceptable.

# INSTALLATION INSTRUCTIONS



## STEP 1: CHECK THE CONTENTS OF THE PACKAGE

Model#: DEVICEXXX-XXX

1 x Controller & enclosure, 2 x Current monitoring devices, 1 x Bag including miscellaneous pieces, 1 x Installation instructions, 1 x Black Box device controlled label, 1x Single circuit load sharing label

## STEP 2: PREPARING FOR THE INSTALLATION

### WARNING – INSTRUCTIONS PERTAINING TO A RISK OF FIRE OR ELECTRIC SHOCK

1. Disconnect power to all devices being worked on or within an unsafe distance to the working area.
2. Select the device installation location.

- The recommended place for the device to be installed is directly above the main panel and with adequate air circulation. See Installation Diagram for suggested locations.

*NOTE: The device controller must be mounted so that the nameplate remains visible at all times. It must not be installed in the orientation with the cover facing the ground.*

### **DO NOT install the device:**

- Outdoors
- In a location with a high level of risk as defined by local electrical codes or in a hazardous location.

For example, nearby flammable materials, explosives or fuels, chemical products, and hazardous vapors.

## STEP 3: INSTALLATION OF THE DEVICE

*Ensure no dust or metal particles enter the contactor as all contactors can be affected negatively by particles entering the active surfaces. Do not blow out particles when completing the installation. Instead, use a vacuum to clean out the enclosure.*

1. Loosen the two cover screws and remove the enclosure cover.
2. Attach the device securely to the desired location. There are multiple acceptable orientations. Do not mount with the cover plate facing down.
3. Remove the internal control partition by unscrewing the two screws inside the enclosure.

**\*If using the "Single Circuit Load Sharing" option please refer to page 12-13 of this manual for instructions\***

4. Install current monitoring devices on the main service wires to be monitored by clipping them onto each main line paying attention to the arrow inside the window and labeling that indicates the

direction of current flow and orientation of connection. Current monitoring devices should be installed so that no part of them will directly conduct electricity from exposed live parts. Ensure the closing clip is secured shut and fastened with a cable tie. Fasten the current monitoring devices in place with the cable ties. *Review and observe all local safety procedures when installing and working near live parts.*

5. Ensure main line lugs have not come loose with the installation of current monitoring devices.
6. Install the current monitoring device wire leads from the service area to the device control partition. If connectors are disconnected the factory-installed polarity must be maintained. *(DO NOT coil wires near or install them parallel to any other 120/240V wires as this may cause improper operation. DO NOT short wire leads together or to ground at any time. Install leads with mechanical protection from damage.)*
7. Insert the **two blue current monitoring device connectors into the corresponding two blue receptacles on the control board. Trim wires as needed but maintain wire polarity in the blue connectors and ensure wires and connectors are seated well in each receptacle.** (The correct polarity should have the red wire closest to the wall of the partition while the connector is plugged into the socket, see “**Figure B**” on pages 10 & 11 of this manual).
8. **Set up switches and observation time dial located on the on control board as indicated in the chart and diagram on pages 10 & 11 of this manual or the back of the cover of the enclosure. The switches will tell the computer both the service size and the controlled device’s current rating. The dial will provide the time element for the algorithm to turn the end device being controlled back on between 0-15 minutes (clockwise is greater). The manufacturer suggests the time dial be set to the centre of travel (halfway), or about 7 minutes. The installer may choose to set a different time based on the installation needs. These switches and dial are located on the control board.**
9. Re-install the control partition inside the enclosure by reinstalling the screws removed previously and tightening them until snug. Do not over-tighten. Be sure not to pinch any wires or strip the screws.
10. Install electrical lines from the supply breaker for the controlled device to the marked **LINE SIDE (L1 & L2)** of the contactor and bonding/ground attachment.  
**\*\*\* WARNING: Contactor electrical connections MUST be torqued to 40-44 in-lb (5 Nm) to avoid objectionable operational noise, overheating issues, and premature failure. \*\*\***
11. Install electrical wires from the end device to be controlled (i.e. EV charger) to **LOAD SIDE (T1 & T2)** of contactor and bonding/ground as required by local electrical codes. Ensure wire terminals are torqued to 40-44 in-lb (5 Nm). If the neutral or identified conductor is used for the end device



it can be spliced in the enclosure with the wire nut provided for the following copper wire combinations - 2 #6, 2 #8, or 2 #10.

12. When safe, energize the device and check the control board for the red LED to be on, indicating power (refer to Figure A on pages 10 & 11 of this manual). The 3<sup>rd</sup> Green output LED should correspond to the state of the contactor. If this green light is flashing continuously, it indicates that there is little to no current being read by one or both current monitoring devices. Most operating installations should have some current flow on both monitored main electrical lines so a flashing green LED may indicate improper installation of one or both current monitoring devices. The green LED will stop flashing when it senses some current on both main lines. Although it will still operate with one current monitoring device not reading current, the installation should be verified. To do this, turn on a high-current 240V device in the electrical system and the LED should stop flashing. If it does not, recheck the current monitoring device installation from step 3 ensuring that the polarity of the current monitoring devices is correct, and all connections are secure. If this is all correct, contact the manufacturer.
13. Install included “BlackBox Device Controlled Label” on the end device being controlled to indicate it is a controlled device and occasional off times are normal. Then record the values of the electrical service and the end device that is connected to it in the indicated areas on the EVEMS label. Finally, label the electrical panel schedule to indicate the breaker numbers that connect the controlled device and indicate that it is controlled by the Black Box energy manager.
14. Install the enclosure cover and when safe to do so, energize the system.  
(Note: The contactor may not close until a computational observation time of between 0 - 15 minutes. The algorithm must be satisfied that the system will remain below 80% of the rated main breaker and other values included in it. This is partially dependent on the setting of the timer adjustment screw (blue & white) on the control board. If this observation time is too long, it can be adjusted by turning this dial setting counter-clockwise but this should not be set below 1 minute to avoid undesired operation.)

## SETTINGS CHARTS

**WARNING: TESTING, MAINTENANCE, AND TROUBLESHOOTING SHOULD ALWAYS BE CARRIED OUT BY QUALIFIED PERSONNEL. REASONABLE SAFETY PRECAUTIONS SHOULD ALWAYS BE TAKEN AROUND ELECTRICAL DEVICES AND OUTLETS TO PREVENT FIRE, ELECTRIC SHOCK, AND INJURY TO PERSON.**

***See the setting diagram chart on the inside cover and on the next page as well as continued installation instructions.***

Only use the setting appropriate for the model of the device. For example, the blue settings for an EVEMS240-100 are for electrical service sizes of 100A and under. While the green settings for EVEMS240-200 are for service sizes of 125A and over.

**All settings are applicable for EV chargers or other loads that tolerate switching their power off when required. For other loads that are not specifically listed in the chart use the next higher setting compared to the rating of the load.**

# EVEMS240-100 Settings Chart For Main Breakers sized 60A – 100A

Figure A

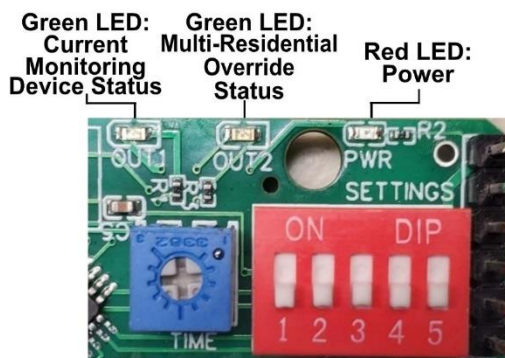
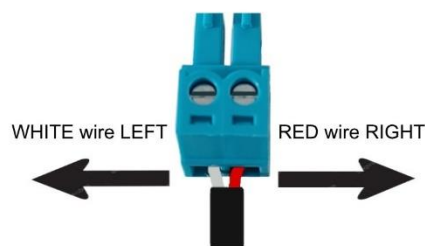


Figure B

Always be sure to maintain current monitoring device's wire polarity



Main Electrical Service Monitored Breaker Size	End Device Controlled Max Current Draw	EV Charger Suggested Breaker Size For 80% Load	DIP Switch 1	DIP Switch 2	DIP Switch 3	DIP Switch 4	DIP Switch 5
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**Settings Below are for Main Breakers Rated at 80% Continuous Load Only**

60	16	20	OFF	OFF	OFF	OFF	OFF
60	20	25	OFF	OFF	OFF	OFF	ON
60	24	30	OFF	OFF	OFF	ON	OFF
70	16	20	OFF	OFF	OFF	ON	ON
70	24	30	OFF	OFF	ON	OFF	OFF
70	30/32	40	OFF	OFF	ON	OFF	ON
80	16	20	OFF	OFF	ON	ON	OFF
80	24	30	OFF	OFF	ON	ON	ON
80	30-32	40	OFF	ON	OFF	OFF	OFF
80	40	50	OFF	ON	OFF	OFF	ON
90	24	30	OFF	ON	OFF	ON	OFF
90	30/32	40	OFF	ON	OFF	ON	ON
90	40	50	OFF	ON	ON	OFF	OFF
90	48/50	60	OFF	ON	ON	OFF	ON
100	16	20	OFF	ON	ON	ON	OFF
100	20	25	OFF	ON	ON	ON	ON
100	24	30	ON	OFF	OFF	OFF	OFF
100	30/32	40	ON	OFF	OFF	OFF	ON
100	40	50	ON	OFF	OFF	ON	OFF
100	48/50	60	ON	OFF	OFF	ON	ON

**Settings Below are for Main Breakers Rated at 100% Continuous Load Only**

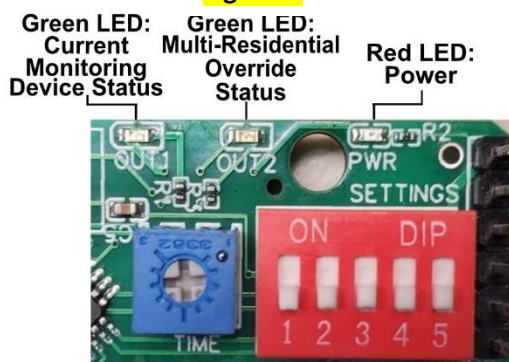
60	16	20	ON	OFF	ON	OFF	OFF
60	20	25	ON	OFF	ON	OFF	ON
60	24	30	ON	OFF	ON	ON	OFF
70	30/32	40	ON	OFF	ON	ON	ON
80	40	50	ON	ON	OFF	OFF	OFF
100	16	20	ON	ON	OFF	OFF	ON
100	20	25	ON	ON	OFF	ON	OFF
100	24	30	ON	ON	OFF	ON	ON
100	30/32	40	ON	ON	ON	OFF	OFF
100	40	50	ON	ON	ON	OFF	ON
100	48/50	60	ON	ON	ON	ON	OFF

Single Circuit Load Sharing Operation	ON	ON	ON	ON	ON
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Allows a controlled device to operate only when another is not drawing power.

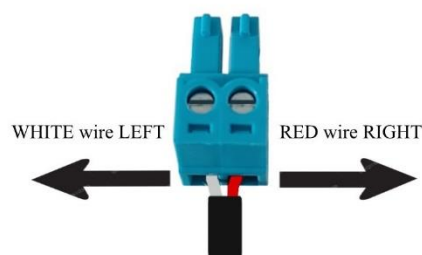
# EVEMS240-200 Settings Chart For Main Breakers sized 125A – 200A

**Figure A**



**Figure B**

Always be sure to maintain current monitoring device's wire polarity.



Main Electrical Service Monitored Breaker Size	End Device Controlled Max Current Draw	EV Charger Suggested Breaker Size For 80% Load	DIP Switch 1	DIP Switch 2	DIP Switch 3	DIP Switch 4	DIP Switch 5
--	--	--	--------------	--------------	--------------	--------------	--------------

**Settings Below are for Main Breakers Rated at 80% Continuous Load Only**

125	16	20	OFF	OFF	OFF	OFF	OFF
125	20	25	OFF	OFF	OFF	OFF	ON
125	24	30	OFF	OFF	OFF	ON	OFF
125	30/32	40	OFF	OFF	OFF	ON	ON
125	40	50	OFF	OFF	ON	OFF	OFF
125	48/50	60	OFF	OFF	ON	OFF	ON
150	16	20	OFF	OFF	ON	ON	OFF
150	20	25	OFF	OFF	ON	ON	ON
150	24	30	OFF	ON	OFF	OFF	OFF
150	30/32	40	OFF	ON	OFF	OFF	ON
150	40	50	OFF	ON	OFF	ON	OFF
150	48/50	60	OFF	ON	OFF	ON	ON
200	16	20	OFF	ON	ON	OFF	OFF
200	20	25	OFF	ON	ON	OFF	ON
200	24	30	OFF	ON	ON	ON	OFF
200	30/32	40	OFF	ON	ON	ON	ON
200	40	50	ON	OFF	OFF	OFF	OFF
200	48/50	60	ON	OFF	OFF	OFF	ON

**Settings Below are for Main Breakers Rated at 100% Continuous Load Only**

125	16	20	ON	OFF	OFF	ON	OFF
125	20	25	ON	OFF	OFF	ON	ON
125	24	30	ON	OFF	ON	OFF	OFF
125	30/32	40	ON	OFF	ON	OFF	ON
125	40	50	ON	OFF	ON	ON	OFF
125	48/50	60	ON	OFF	ON	ON	ON
150	48/50	60	ON	ON	OFF	OFF	OFF
200	16	20	ON	ON	OFF	OFF	ON
200	20	25	ON	ON	OFF	ON	OFF
200	24	30	ON	ON	OFF	ON	ON
200	30/32	40	ON	ON	ON	OFF	OFF
200	40	50	ON	ON	ON	OFF	ON
200	48/50	60	ON	ON	ON	ON	OFF

Single Circuit Load Sharing Operation	ON	ON	ON	ON	ON
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Allows a controlled device to operate only when another is not drawing power.

# SETUP FOR SINGLE CIRCUIT LOAD SHARING

Black Box Innovations single circuit load sharing can be used to allow a “Secondary” device (device being controlled ) to operate only when the “Primary” device is not drawing power.

If using Black Box’s single circuit load sharing option, ensure that the dip switches are set to the correct setting. This is indicated on the settings chart located on pages 10-11 of this manual and can also be found on the back of the Energy Manager’s cover plate.

Install the current monitoring devices around the desired priority device’s feed lines. Ensure that they are installed in the correct orientation as shown on the label and with the arrow shown inside the current monitoring device’s eye (window opening) pointing in the direction of the current flow.

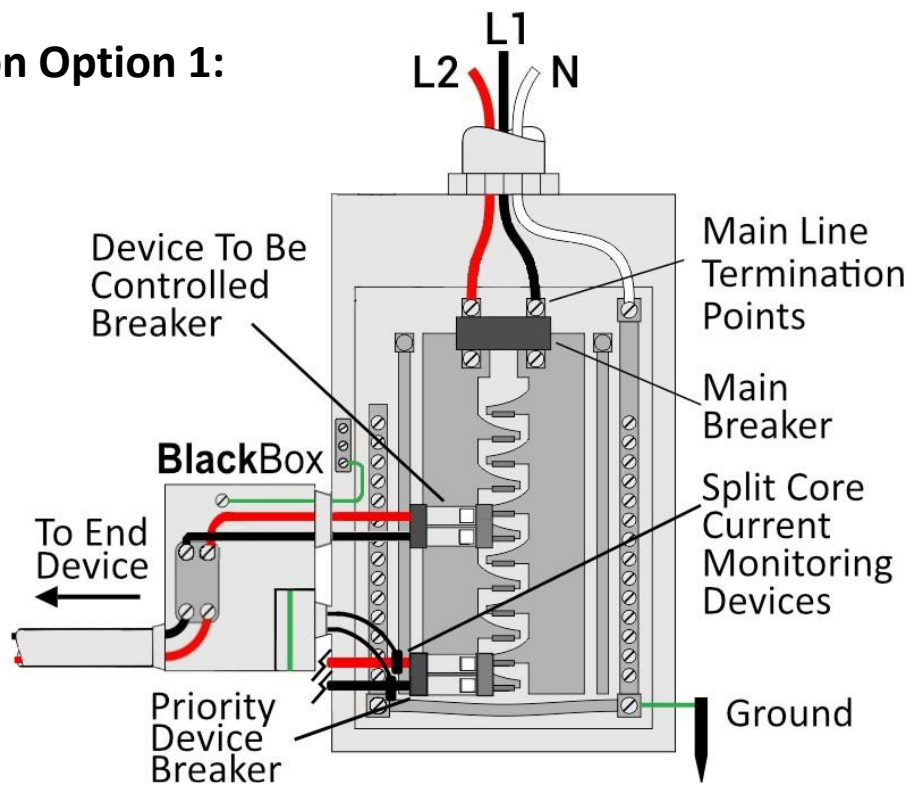
Next, adjust the timing dial found on the control board to the desired monitoring time. The dial will provide the time element for the algorithm to turn the end device being controlled back on between 0-15 minutes (clockwise is greater). **The manufacturer recommended setting for Single Circuit Load Sharing**

**Operation is 0 minutes or fully counterclockwise.** If the current monitoring devices sense a small amount of current being drawn from these lines it will automatically switch power off to the secondary device, and will only energize the secondary device once current flow stops to the primary device and the time element is satisfied. Please note, if at any point within the time setting, the current monitoring devices sense that the priority device is drawing power again, the timer will restart.

Once completed adhere the auxiliary single circuit load sharing label to the front cover of the Energy Manager, or indicate on the cover label that this is a single circuit load sharing installation.

Please refer back to installation step 9 on page 8 of this manual to complete your installation.

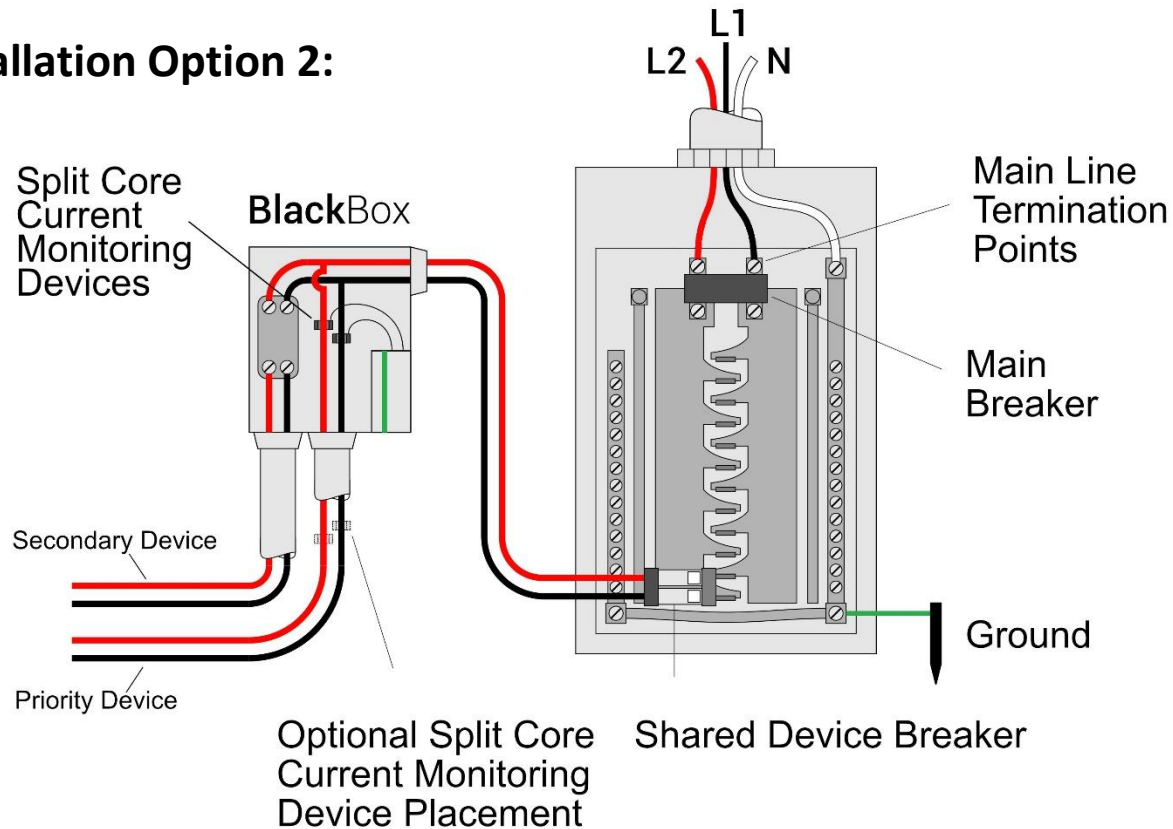
## Installation Option 1:



Alternate locations for device installation are acceptable.



## Installation Option 2:



Alternate locations for device installation are acceptable.

## STEP 4: TEST FOR OPERATION

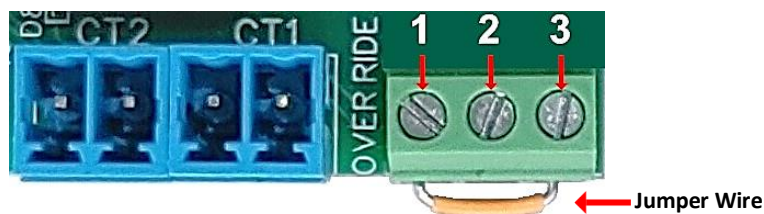


**WARNING: TESTING, MAINTENANCE, AND TROUBLESHOOTING SHOULD ALWAYS BE CARRIED OUT BY QUALIFIED PERSONNEL. REASONABLE SAFETY PRECAUTIONS SHOULD ALWAYS BE TAKEN AROUND ELECTRICAL DEVICES AND OUTLETS TO PREVENT FIRE, ELECTRIC SHOCK, AND INJURY TO PERSON.**

Testing for correct installation and device operation can be done by switching the Energy Manager into “test mode”. This can be done by turning the time dial located on the control board all the way counter-clockwise to 0 minutes. Black Box Innovations' optional Operational Testing Device can be used to simulate load percentages of the main service. This optional Operational Tester can be purchased on our website at [www.blackboxinnovations.com/collections/all](http://www.blackboxinnovations.com/collections/all). While the test device is installed into one current monitoring port the other current monitor should be plugged into the second port. It should be reading 0A to ensure accurate testing. This can be done by unclipping it from all wires if needed. This will cause the control board LED to flash but the device operation will be maintained for testing. To perform the test turn the dial until the simulated service load is over 80% or 100% of its rating depending on settings and verify that the controlled device is switched off. Then turn the tester to 0% for it to switch back on again. Once testing is complete be sure to turn the timing dial located on the control board back to the desired observation time setting.

Warning: Warranty VOID if any devices are installed incorrectly

Figure C



## MULTI-RESIDENTIAL HUB CONNECTION & REMOTE SHUTDOWN OVERRIDE

This is the interface with the BlackBox Multi-Residential Energy Management Hub that provides additional protection for the main feeder in multi-residential applications. When the “Multi-Residential Override Status” LED (See **“Figure A”** on pages 10 & 11 of this installation manual) is solid green this indicates that the Hub has authorized the BlackBox Energy Manager to operate. When the LED is flashing fast this indicates that the Hub’s intelligent algorithm has not authorized the Energy Manager to operate. If the LED is flashing slowly this means the Energy Manager has been disconnected from the Hub and may need to be reconnected. The required wiring to be used for this application is at minimum a shielded 3-wire 18 AWG cabling with a maximum of 200 ft (61m). Please see the installation instructions for the Black Box Multi-Residential Hub for more information.

This connection point can also be used as a remote shutdown override by connecting a dry contact from a separate control system to the green terminals 1 & 3 on the control board as shown above. When the controller detects the opening of this dry contact it will de-energize the device it is controlling and keep it that way as long as this remains in this “open” state. Once the dry contact closes, the device will resume normal computer-controlled operation. When the “Multi-Residential Override Status” LED is solid green (See **“Figure A”** on pages 10 & 11 of this installation manual) this indicates that the dry contact is closed and the Energy Manager should be operating. When the LED is flashing slowly this indicates the dry contact is open or the “Jumper Wire” is removed (See **“Figure C”** above).

This can interface with many types of dry contact systems such as building control systems, rotational scheduled timers, fire alarm overrides, or similar dry contact systems. Wiring for this connection must be at minimum a shielded 2-wire 18 AWG cable with a maximum length of 200 ft (61 m).

If no auxiliary connection devices are needed, the supplied jumper can be installed across terminals 1 & 3 to maintain normal operation.

## MAINTENANCE

**WARNING: TESTING, MAINTENANCE, AND TROUBLESHOOTING SHOULD ALWAYS BE CARRIED OUT BY QUALIFIED PERSONNEL. REASONABLE SAFETY PRECAUTIONS SHOULD ALWAYS BE TAKEN AROUND ELECTRICAL DEVICES AND OUTLETS TO PREVENT FIRE, ELECTRIC SHOCK, AND INJURY TO PERSON.**

Do not use any cleaning solvents or other combustibles on the devices, as this can cause risk of fire, improper device operation, or risk of electric shock and/or injury.

Electrical connections should be maintained to the standard set by CSA Z463 and inspected, maintained, and re-torqued annually. The interval between maintenance cycles may need to be reduced in areas with high ambient temperature variance or dusty environments.

For contactor disassembly and maintenance instructions please see pages 19-20 of this document.

**\*\*\* WARNING: Contactor electrical connections MUST be torqued to 40-44 in-lb (5 Nm) to avoid objectionable operational noise, overheating issues, and premature failure. \*\*\***

## TROUBLESHOOTING

**WARNING: TESTING, MAINTENANCE, AND TROUBLESHOOTING SHOULD ALWAYS BE CARRIED OUT BY QUALIFIED PERSONNEL. REASONABLE SAFETY PRECAUTIONS SHOULD ALWAYS BE TAKEN AROUND ELECTRICAL DEVICES AND OUTLETS TO PREVENT FIRE, ELECTRIC SHOCK, AND INJURY TO PERSON.**

### ***Contactor does not close when the initial device is powered on:***

There is an initial delay when the device is powered on while the computer algorithm is checking the electrical service. The contactor will not close until a computational observation time elapses. During this time the current draw on the main electrical service wires must remain below threshold current values of 80% or 100% depending on the control board switch settings of the main breaker size. This is also dependent on the setting of the timer adjustment screw (blue & white) on the control board referred to under installation instructions #8 and the chart in the instructions and other algorithmic values. If this observation time is too long, it can be adjusted by turning this screw counter-clockwise. (To test the device operation please follow the procedure for testing in this manual)

First, check that both the red wire with a connector (stake-on) is connected to L1 and two blue wires with connectors (stake-ons) are connected to L2 and these are secure. Once this is confirmed, check that the black and blue wires with connectors on either side of the contactor coil are connected and secure. Next check the field-installed wires in the contactor lugs on both the Line Side (L1 & L2) and Load Side (T1 & T2) are properly installed. Then re-energize the device and check for 240V at L1 and L2. Then check to see if the red LED on the control board is on indicating power to the control board.

Next, ensure the current monitoring device wires are trimmed to the size needed for the installation and are not coiled up anywhere or run along other electrical lines as this can cause improper operation. Check that the current monitoring devices are secured shut and the wire connections are the correct polarity as shown in “**Figure B**” on pages 10 & 11 of this manual. Also, ensure the current monitoring device wires and connectors are fully seated in the respective blue ports and re-energize. Once the appropriate control board red and green LEDs are on, check for 240V across the two sides of the contactor coil connections are located. If this is correct, check that the contactor is closed and passing power to the end device by checking for 240V across the Load Side of the contactor or T1 and T2. If this is verified check that there is 240V at the end device being controlled. If this is verified it would indicate that the contactor is closed and the problem may be with the end device being controlled.

If the issue is not resolved, please de-energize the device and contact the manufacturer.

### ***Improper operation of devices contactor:***

Check if the length of the current monitoring device lead wires are coiled close to, or run parallel to other 120/240V lines and if so, move them away from the area, as this can cause improper operation. Next, check if the current monitoring devices are closed and secured shut with the provided cable ties. If they are, check if the current monitoring devices are installed in the correct orientation as shown on the label and with the arrow shown inside the current monitoring device’s eye (window opening) pointing in the direction of the current flow. If the orientation is correct, then verify that both service wires are consistently well below the operational current specifications for up to 15 minutes (depending on the setting of timer adjustment) with an amp meter. Ensure the current monitoring device connections are the correct polarity (while plugged into the control board the red wire should be closest to the partition side wall on each plug). Ensure the current monitoring device wires and connectors are fully seated in the respective connectors and receptacles.

If the green LED is flashing it indicates there has been no current recorded on one or both current monitoring devices for some time. If this is the case, please check the procedure in installation instructions #12. If these instructions are followed and improper operation still exists, please de-energize the device and contact the manufacturer.

### ***Contactor chatters on and off or makes a loud humming noise:***

Some Operational sound is normal in all devices that have an electrical coil or contactor but if this is objectionable check the following: Verify approximately 240V (or 208V depending on the service voltage) between the contactor coil terminals when the contactor is closed. If this is below 200V check the voltage on the line side of the contactor to ensure rated supply system voltage is available. (It should be above 200V). Check for the same steady voltage on the load side of the contactor when the contacts are closed. If the voltage is below 200V then it is below specifications and it will need to



be addressed with the utility provider or via voltage drop calculation and adjustment. If the voltage is between 200 – 260V at all specified locations, then the most common cause of an abnormally noisy contactor that is still operating normally is dust or other particles in the active part of the contactor. The contactors can be disassembled, and the core surfaces can be cleaned to remedy this. For contactor disassembly and maintenance instructions please see pages 19-20 of this document. Do not allow installation particles or dust particles to be blown around the enclosure at installation and operate in a clean environment.

If the contactor is chattering on and off and the voltage at the load side of the contactor is **not** steady, then verify that the timer adjustment screw (blue & white) on the control board is set approximately ½ way between the left and right rotation. If adjustment is needed, insert a screwdriver and adjust accordingly. Then reset the power to the device and check for proper operation. The farther this dial is turned clockwise the more time the computer algorithm will watch the service loading before allowing the load side (i.e.: EV charger) to energize. Ensure the current monitoring device connections are the correct polarity (red wire closest to the plastic partition when it is plugged into the socket). Ensure the current monitoring device wires and connectors are fully seated in the respective connector and socket.

The device is built with noise isolators between the contactor and the enclosure as all contactor coils will make some slight humming sound when in operation. If the screws that attach the contactor to the enclosure are overtightened or the rubber acoustic isolators are removed any sound may be amplified. These screws can be adjusted to allow for acoustic separation while maintaining the connection between the enclosure and contactor chassis. These screws should be tightened to 5.5 in-lb (0.6Nm).

If these things are checked and the contactor is still chattering or making a loud noise, please de-energize the device and contact the manufacturer.

**\*\*\* WARNING: Contactor electrical connections MUST be torqued to 40-44 in-lb (5 Nm) to avoid objectionable operational noise, overheating issues, and premature failure. \*\*\***

## FAQ's

### **Can BlackBox EVEMS be used to manage other loads besides EV chargers?**

Our devices are approved for general use as clearly indicated on the labelling for easy reference by inspections. Our EVEMS devices are rated for loads up to 50A resistive and 40 FLA and where the end device can tolerate the power being shut off when necessary.

### **Can I trim the current monitoring device's low voltage wiring?**

It is recommended to trim the wires as needed but maintain wire polarity in the blue connectors and ensure wires and connectors are seated well in each receptacle. (The correct polarity should have the red wire closest to the wall of the partition while the connector is plugged into the socket. Please refer to “**Figure A**” on pages 10 & 11 of this installation manual). Be sure not to coil the wires up or to run them along other electrical lines as this can result in improper operation of the Energy Management device.

### **What should the timing dial on the control board be set to?**

The dial will provide the time element for the algorithm to turn the end device being controlled back on between 0-15 minutes (clockwise is greater). The manufacturer suggests the time dial be set to the centre of travel (halfway), or about 7 minutes. The installer may choose to set a different time based on the installation needs. You may set the Energy Manager into “test mode” by turning the time dial all the way counterclockwise. This will take the timing element out of the equation, and the Energy Manager will respond immediately to input from the current monitoring devices or Operational Testing device. This setting is useful for testing the Energy Manager’s operation after installation and during maintenance cycles. It is recommended not to leave the Energy Manager in test mode for normal operation.

### **How can I test the operation of my Energy Manager?**

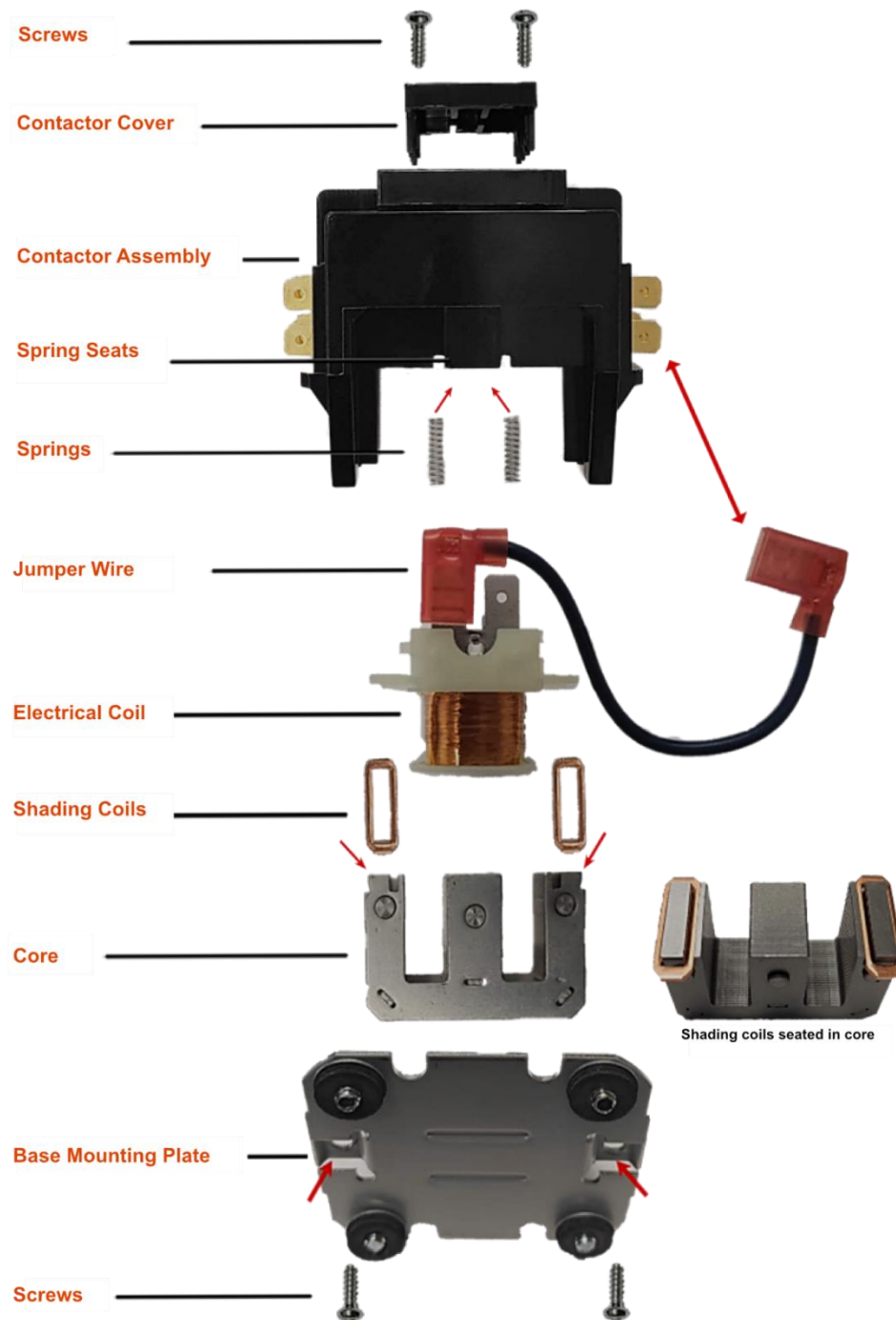
BlackBox Energy Managers can be tested by turning the Energy Manager into “Test Mode”. To do this turn the timing dial fully counterclockwise, then loading the electrical service to 80% or 100% depending on the settings used.

This can also be done using our handheld “Operational Testing Device”. This will allow the user to plug into one of the current monitoring device slots and simulate the electrical service being loaded from 0 -100%. One can then test and demonstrate the operation of the device to clients and others. It also allows for troubleshooting and to perform a full maintenance cycle on the system as needed.

This device can be purchased directly from our website catalog at

[www.blackboxinnovations.com/products/hand-held-operational-testing-device](http://www.blackboxinnovations.com/products/hand-held-operational-testing-device) or from an approved distribution partner.

# Contactor Maintenance & Assembly



**WARNING**-When using electric products, basic precautions should always be followed



Servicing and maintenance should always be carried out by qualified personnel



**CAUTION**- Disconnect the device from any power source before servicing and maintenance

Scan the QR code for Black Box Innovations Contactor Assembly & Maintenance Instructional Video



## Disassembly

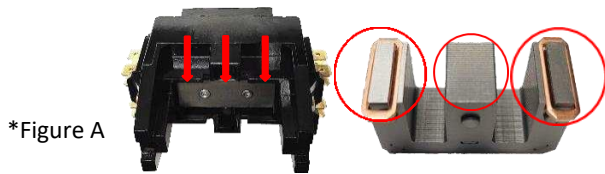
**Step 1:** Remove contactor from EVEMS enclosure and disconnect from all power sources before performing service or maintenance.

**Step 2:** Disconnect blue **Jumper Wire** from both points on contactor.

**Step 3:** Flip contactor over to access the **Base mounting plate** located on bottom of contactor.

**Step 4:** Remove two **Screws** found on top and bottom of **Base mounting plate**. Be careful not to misplace any small pieces.

**Step 5:** Look for debris inside **Contactor**. Lightly sand where **Core** and **Contactor** surfaces meet (as shown in Figure “A”) with fine-grit sandpaper. Ensure there is a clean and flat mating surface. Once done remove all dust and other particles from the area. It is recommended not to blow into assembly, rather use a vacuum to remove debris and dust.



**Step 6:** Carefully inspect contactor assembly pieces for wear or defect before reassembly.

## Reassembly

**Step 1:** Install both **Springs** onto **Spring seats**. Springs should be seated properly on both **contactor assembly** and **Electrical coil** mating surfaces.

**Step 2:** Install **Electrical coil** into contactor and spring assembly, ensuring springs do not shift out of seated position.

**Step 3:** Install both copper **Shading coils** back onto **Core** seats

**Step 4:** While holding assembly together install **Core** with **Shading coils** into contactor and coil assembly.

**Step 5:** While holding assembly together, install **Base mounting plate** onto contactor assembly.

**Step 6:** Install two **Screws** to top and bottom of the **Base mounting plate** to torque specifications 5.5 in-lbs (0.6 Nm).

**Step 7:** Install blue **Jumper Wire** as shown in diagram.

**Step 8:** Reinstall contactor to the enclosure with provided screws and acoustic isolator assembly to torque specifications 5.5 in-lbs (0.6 Nm)

**Step 9:** Verify operation with Hand-Held operational testing device available for purchase at [www.blackboxinnovations.com](http://www.blackboxinnovations.com)

**WARNING:** Contactor connections **MUST** be torqued to 40-44 in-lb (5 Nm) to avoid objectionable noise, overheating issues, and premature failure. Fixed torquing tool available for order on our website at [www.blackboxinnovations.com](http://www.blackboxinnovations.com)  
Do not allow installation or dust particles to be blown around the enclosure and operate in a clean environment.

# INFORMATION

This document contains important instructions which must be followed during the installation, and maintenance of this device.

## Notes

After installation verify that the device is securely attached to an adequate structure in a well-ventilated location.

It is the installer's responsibility to verify that the electric power source is adequate for the use of the device.

Do not use any solvents to clean this device.

Do not paint or apply exterior finishing to this device.

Do not use this energy management system with end devices that require constant power.

## CAUTIONS

The installation of the device must be done to the latest electrical code requirements and with the consultation of, and according to the manufacturer's specification and guidelines of both the Electrical Vehicle (EV) and the Charging Station. This device will shut off and re-energize electricity to both the Electric Vehicle, its Charging Station, or other load-side devices without notice.

## WARNING

Read all documentation provided by the device manufacturer before using this product and follow the installation and setup procedures. Always disconnect any and all sources of power before starting work.

Do not modify, repair, or dismantle the device.

Never introduce water or any other liquids to the area around or on this device.

Do not install the device near flammable materials, explosives or fuels, chemical products, and vapors.

Do not install this device in a hazardous or wet environment or location.

Disconnect this device immediately if defective or damaged in any way and contact the manufacturer.

Any improper use of the device could result in serious injuries, death, or damage to property.

Any improper use of the device can cause damage which will void the warranty.

Never use the device above or below the temperature range of 34°F to 104°F (1°C to 40°C). The devices must be always kept free of frost and water vapor.

## Feedback

We are always happy to hear your feedback and we look forward to hearing from you. Please email all comments to [customerservice@blackboxinnovations.com](mailto:customerservice@blackboxinnovations.com).

You can also contact us by clicking on the Message Us button on our website at [www.blackboxinnovations.com](http://www.blackboxinnovations.com) or by calling us at our toll-free number 1 (833) 325-5269.

**Limited warranty**

- 1.** Black Box Innovations Inc. warrants this device against any defects for a period of one year from the date of shipping. The warranty is limited to the components and equipment supplied by Black Box Innovations Inc.
- 2.** Black Box Innovations Inc. may undertake repair or replacement, at the site or the manufacturing location, at its option, of the defective material only after an evaluation has been made by its representative.
- 3.** If, in the opinion of Black Box Innovations Inc. installation has been done incorrectly, or the device is used inappropriately, or repairs have been done by unauthorized personnel other than representatives of Black Box Innovations Inc., the warranty will be automatically void.
- 4.** Black Box Innovations Inc. will not be held liable for damages or delays and will not be required to pay the transport cost of the charge controller claimed to be defective.
- 5.** Prior written consent must be made by Black Box Innovations Inc. before repairs, replacement, modifications, or compensation is to be made.
- 6.** Black Box Innovations Inc. shall not be liable for any indirect damages or delays caused by inadequate workmanship, or materials on devices installed. This also applies if the installations are not made in accordance with the manufacturer's instruction, local electrical codes, as well as specifications of devices powered through this device.
- 7.** Black Box Innovations Inc. shall not be liable for any direct or indirect damages or delays for any devices that are connected to this device that can not tolerate having supplied power switched off for any time period specified by the device or when the device is in need of repair or maintenance.
- 8.** Any device or accessory supplied with this device to be installed or connected remotely from the charge controller will be guaranteed by the manufacturer only under the conditions mentioned in paragraphs 6 & 7 and in accordance with the rest of this document.
- 9.** Any repairs made at the Black Box Innovations Inc. factory are warrantied for 30 days from the date of repairs.
- 10.** Any components supplied for repairs are warrantied for the remaining of the warranty on the original product or 90 days whichever is longer.