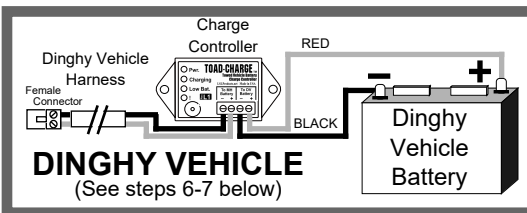
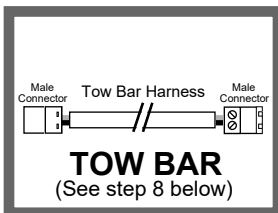
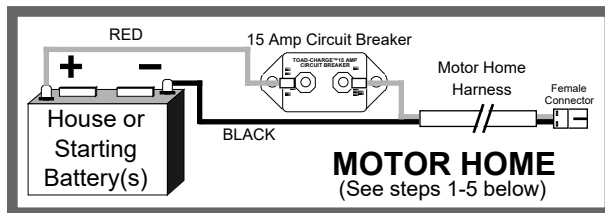


# TOAD-CHARGE™

Rev. **L1**

# Towed Vehicle Battery Charger

**GENERAL INFORMATION** — TOAD-CHARGE™ keeps the battery in your towed vehicle (or "Toad") charged while it is being towed behind your motorhome. The kit connects between your motorhome's starting or house batteries and the towed vehicle's battery, using the motorhome's engine to supply up to 10 amps of current to the towed vehicle's battery. The kit consists of a Charge Controller installed in the towed (or "Dinghy") vehicle's engine compartment, a 15 Amp Circuit Breaker installed near the motorhome starting battery, and a cut-to-length 40 or 60 foot wire harnesses with user-installed connectors.



## Step-By-Step Installation Instructions



**USE CARE AROUND BATTERIES — SPARKS CAN IGNITE HYDROGEN GAS. SHORT CIRCUITS CAN CAUSE BURNS OR FIRE. CORROSIVE ACID CAN CAUSE SKIN BURNS OR BLINDNESS. USE CARE IN DRILLING HOLES NOT TO CONTACT ANY ELECTRICAL WIRING — HAZARD OF SHOCK, FIRE, BURNS.**

**STEP 1 - DETERMINE WHERE TO MAKE THE MOTORHOME CONNECTIONS:** Disable your motorhome's house battery charger and solar panels before disconnecting the battery cable from the Negative post on the motorhome starting and house batteries. Next, identify a suitable point for connecting the kit's wire harness to the Positive and Negative/Chassis Ground sides of the motorhome starting or house batteries (either at the motorhome's battery isolator or directly to the battery posts), (NOTE: Connecting to the house batteries has the advantage of allowing the dinghy vehicle to be recharged overnight when parked with AC hookups. However, connecting to the starting battery(s) instead may be more convenient on some motorhomes.)

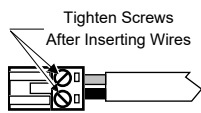
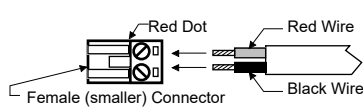
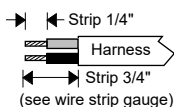
**STEP 2 - MOUNT THE CIRCUIT BREAKER:** Mount the 15 Amp Circuit Breaker next to your chosen motorhome battery connection point, either using **large** nylon zip-ties or 2 sheet metal screws in 1/8" drilled holes. **WARNING: DO NOT OMIT THE CIRCUIT BREAKER, OR A FIRE HAZARD WILL RESULT!**

**STEP 3 - INSTALL THE MOTORHOME WIRE HARNESS:** Starting next to the circuit breaker, route the wire harness rearward to your motorhome's receiver hitch, attaching it every several feet with large zip-ties. Leave enough extra harness wire next to the circuit breaker for making a connection to it, and to the chassis ground you identified in STEP 1 above. Leave about a foot of harness dangling beyond the hitch, cutting off the rest.

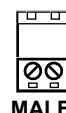
**STEP 4 - CONNECT THE MOTORHOME WIRE HARNESS:** Next to the circuit breaker, remove some white plastic covering on the wire harness to expose the Red and Black wires inside. Cut these wires just long enough to reach the Circuit Breaker (for the Red wire) and your chosen Negative/Chassis Ground (for the Black wire). Strip approx. 3/8" of insulation off the Red wire, crimp a small yellow ring terminal to it, and connect it to the HARNESS terminal on the circuit breaker. Crimp a ring terminal (small, medium or large size) to the harness Black wire before connecting it to your chosen Negative/Chassis Ground connection point. Next, split some of the white plastic covering off the surplus cable left over from STEP 3 to expose the red wire inside, and cut this wire long enough to connect between the Circuit Breaker and your previously-chosen Positive connection point. Crimp a small yellow ring terminal to one end before attaching it to the BATTERY terminal on the Circuit Breaker. Crimp a small, medium or large yellow ring terminal to the other wire end before attaching it to your chosen Positive connection point.

**STEP 5 - INSTALL THE MOTORHOME HITCH CONNECTOR:** On the motorhome hitch end of the harness, remove 3/4" of the white plastic outer covering. Strip 1/4" of insulation off the exposed red and black wires, twisting any frayed small copper wires back together. Next, fully insert these bare wires into one of the green FEMALE (smaller) connectors included in the kit before tightening the connector screws to captivate the wires. (TIP: For easier wire insertion, hold the the connector with its screw heads facing up while inserting the wires.) **The Red wire goes to the connector pin marked with a red dot.**

Wire Strip Gauge: 2" 3/4" 3/8" 1/4"

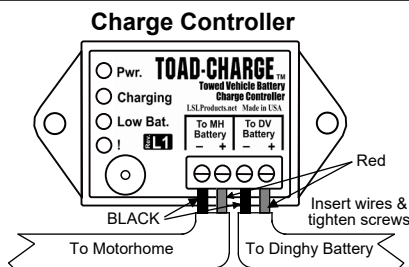


**IMPORTANT:**  
Take care to install  
the correct  
connector gender!



**STEP 6 - MOUNT THE CHARGE CONTROLLER:** Inside your dinghy vehicle's engine compartment, Use 2 sheet metal screws or large zip-ties to mount the Charge Controller near the vehicle's battery posts or jump start terminals. Disconnect the vehicle's battery cable from the Negative post on the battery before proceeding.

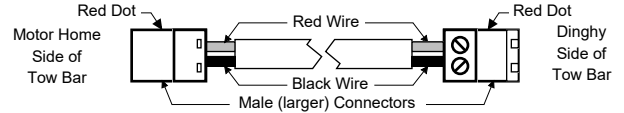
**STEP 7 - INSTALL THE DINGHY HARNESS:** Take one end the surplus harness wire left over from STEP 3 above, strip 1/4" off its red and black wires before connecting them to the MH terminals on the Charge Controller (Red wire to [+], Black wire to [-]). Route the other end of this harness from the Charge Controller to the dinghy vehicle's front grille near a tow bar attachment point. Cut off any excess length, leaving about a foot of harness hanging next to the towbar.



Attach a FEMALE connector to it, just like in STEP 5 above. Use another piece of surplus red and black wire to connect the Charge Controller to the dinghy battery, using ring terminals to connect the wires to the dinghy battery cable clamp bolts or jump start terminals (Red wire to [+], Black wire to [-]).

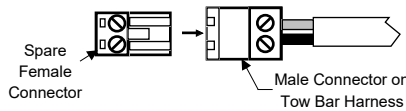
☐ **STEP 8 - INSTALL THE TOW BAR WIRE HARNESS:** With your tow bar attached and extended in the same manner as it would be when towing your dinghy vehicle, take the surplus harness left over from STEP 5 and use **LARGE** zip-ties to attach it from one end of the tow bar to the other (i.e., from dinghy vehicle to motor home). Cut off any excess harness, making sure to leave enough of it dangling at both ends to reach the connectors on the motor home and dinghy vehicle under **ALL** driving and stowage conditions. If your tow bar folds sideways or telescopes, make sure that it doesn't pinch the harness when folded or retracted.

Next, attach **MALE** (larger) connectors to both ends of this tow bar harness, taking care to match the red wires with their corresponding red dots on the connectors:

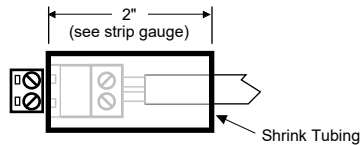


☐ **STEP 9 - TEST THE SYSTEM FOR PROPER OPERATION:** Re-connect the motorhome and dinghy negative battery cables to their battery posts, mate the tow bar harness with its corresponding connectors on the dinghy vehicle and motorhome hitch, start the motorhome engine, and confirm that the yellow **CHARGING** light on the Charge Regulator glows steady - If not, refer to the **TROUBLESHOOTING** section below. Next, unplug all the connectors to allow installation of the shrink tubing.

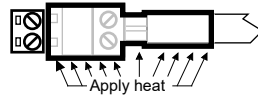
☐ **STEP 10 - INSTALL SHRINK TUBING:** Temporarily mate a spare Female connector with the Male connector on the motorhome end of the tow bar wire harness:



Cut a 2" piece of heat-shrink tubing, and slide it over the male connector:



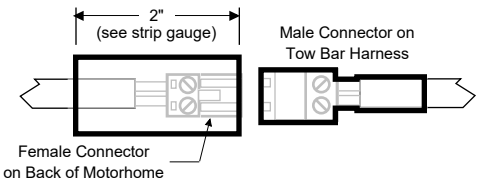
Use a heat gun\* to apply heat to all areas of the shrink tubing, so that it shrinks down to the shape of the Male connector and harness wire:



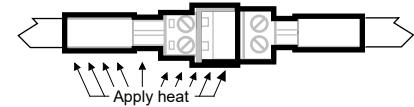
Remove the spare Female connector after the tubing cools.

**\*NOTE:** Use the **LOW** (750 watt) heat gun setting. If a heat gun is not available, use a butane lighter or torch to **GENTLY** heat the tubing - Work slowly, to avoid scorching it before it has time to shrink.

Slide another 2" piece of heat-shrink tubing over the Female connector on the back of the motorhome before mating it with the tow bar connector you previously shrunk tubing over:



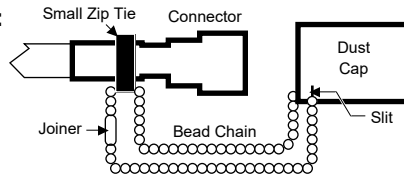
Apply heat to shrink the tubing:



Repeat STEP 10 for the other tow bar and dinghy connectors.

☐ **STEP 11 - INSTALL THE CONNECTOR DUST CAPS:**

Slide the open end of a bead chain through the slit in one of the red vinyl dust caps, and then use the joiner on the chain to connect both ends of the chain together. Next, use a **small** zip tie to secure the bead chain near one of the connectors at the end of a harness.



Repeat STEP 11 for the other 3 harness connectors, and you're done with the installation process.

## Operation & Maintenance

The green **POWER** light confirms that the Charge Controller is receiving DC power from the motorhome, and will turn off when the dinghy is unplugged from the motorhome. The Yellow **CHARGING** light confirms that the motor home is supplying sufficient voltage to charge the dinghy battery (13.25 volts or greater), and will turn off shortly after the motorhome engine is shut off.

Periodic maintenance consists of: (1.) cleaning the connectors (a spray can of WD-40® works well for this task), and (2.) inspecting the harness for cuts or nicks. Any connectors not in use should be covered by their protective dust caps.

## Troubleshooting - In Case Of Problems

**SYMPTOM** - Yellow **CHARGING** light randomly turns on and off when dinghy & motorhome are connected: Check for loose wire crimp connections on the ring terminals at the motor home battery and 15 Amp Circuit Breaker, and for loose wire screws on the Charge Controller, dinghy vehicle battery posts, and all plug-in connectors on the wire harness.

**SYMPTOM** - No yellow **CHARGING** light when motorhome engine is running: Check to see if motorhome starting and/or house batteries are heavily discharged - Since first priority is given to recharging these batteries, the voltage produced by the motorhome engine may not be high enough to turn on the Charge Controller until these other batteries have had a chance to accept some charge.

**SYMPTOM** - Yellow **CHARGING** and green **POWER** lights are alternately flashing: Indicates that the Charge Controller is not connected to the dinghy vehicle battery. Check for loose connections on the Charge Controller and dinghy battery cable bolts.

**SYMPTOM** - Red ! light is on: Indicates reverse polarity (incorrect installation). Check for reversed wire connections at the motor home battery posts, all 4 plug-in connectors, the Charge Controller terminals, and the dinghy battery posts.

**SYMPTOM** - Red **Low Bat.** light is on, and Charge Controller is beeping: Indicates that the dinghy battery voltage is dangerously low (less than 10 volts). Check for unplugged connectors or loose wires at all connectors between motorhome battery and Charge Regulator.

This product has a **ONE YEAR** warranty against defects. For service, repair parts or technical support, please email us at: [Support@LSLProducts.net](mailto:Support@LSLProducts.net)

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