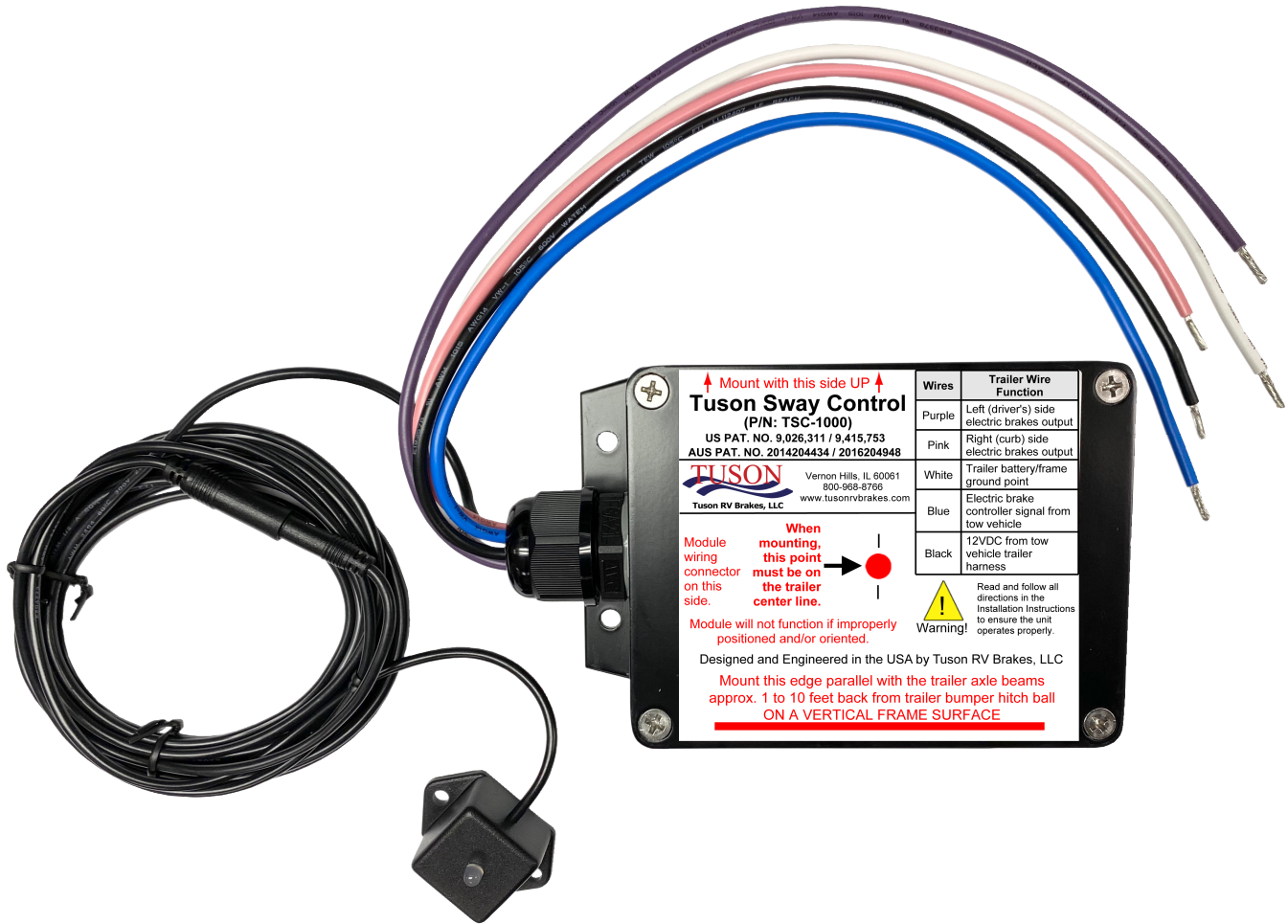


Installation Instructions

Tuson Sway Control TSC-1000



US PAT. NO. 9,026,311 / 9,415,753
AUS PAT. NO. 2014204434 / 2016204948



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Tuson Sway Control (TSC) Installation Instructions

Section One: Trailer TSC Mounting

1.0 TSC Mounting Location:

Select a location on the trailer to mount the TSC. The suggested location is on the first trailer frame crossmember approx. 1 to 10 feet behind the trailer bumper hitch ball and shielded from road debris. **The TSC can be mounted on either the "leading" or "trailing" edge of the crossmember as long as the correct side is in the UP direction (as indicated on the label).** The "trailing" edge is preferred since it provides the best protection from road debris. The TSC must be securely fastened onto a vertical surface of a steel trailer frame member to operate correctly. It must not be fastened to any other trailer surface that flexes or moves from wind such as plastic covers or plastic walls. The center of the TSC (marked by a red dot on the TSC label – SEE BELOW) must be positioned on the "center line" of the trailer. The longest edge of the TSC (as indicated by a red line on the label) must be mounted parallel to the trailer axle beam(s). SEE Figure 1 on page 2.


TSC Label

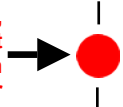
It is essential that the TSC be oriented in the proper direction when it is installed.



Warning!

Ensure the electric brakes are adjusted and maintained in accordance with the manufacturer's recommendations in your owner's manual for proper operation of the sway control module.

↑ Mount with this side UP ↑		Wires	Trailer Wire Function
Tuson Sway Control (P/N: TSC-1000) US PAT. NO. 9,026,311 / 9,415,753 AUS PAT. NO. 2014204434 / 2016204948  Vernon Hills, IL 60061 800-968-8766 www.tusonrvbrakes.com Tuson RV Brakes, LLC		Purple	Left (driver's) side electric brakes output
		Pink	Right (curb) side electric brakes output
		White	Trailer battery/frame ground point
		Blue	Electric brake controller signal from tow vehicle
		Black	12VDC from tow vehicle trailer harness


When mounting, this point must be on the trailer center line.


Module wiring connector on this side.

Module will not function if improperly positioned and/or oriented.

Designed and Engineered in the USA by Tuson RV Brakes, LLC

Mount this edge parallel with the trailer axle beams approx, 1 to 10 feet back from trailer bumper hitch ball ON A VERTICAL FRAME SURFACE


 Warning! Read and follow all directions in the Installation Instructions to ensure the unit operates properly.

1.1 Mounting Hardware:

The TSC should be mounted using the mounting flanges which are located on the bottom of the unit. The customer is responsible for supplying the mounting bolts. Use four #10 self tapping screws with star lock washers to mount the TSC to the trailer. It is recommended that star lock washers be used and you must securely tighten the mounting bolts to hold the TSC firmly in position and to avoid becoming loose from vibration.

You can **NOT** drill holes in the TSC for any reason. Drilling holes or puncturing the unit **VOIDS YOUR WARRANTY.**

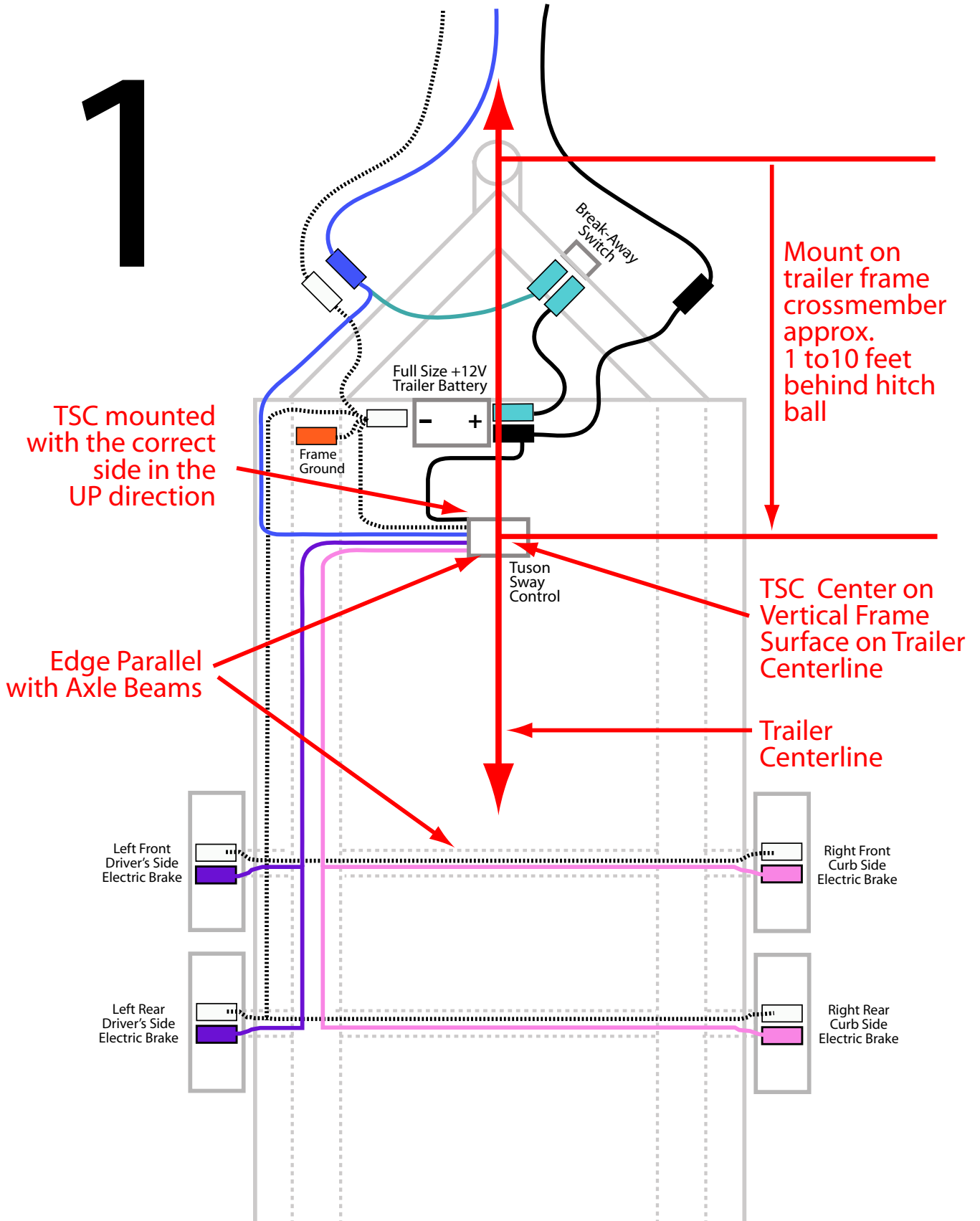


Warning!

DO NOT SPRAY HIGH PRESSURE WATER ON THE TSC. The TSC is a weather sealed, water resistant unit but it is not designed to withstand direct, high pressure spray from a power washer.

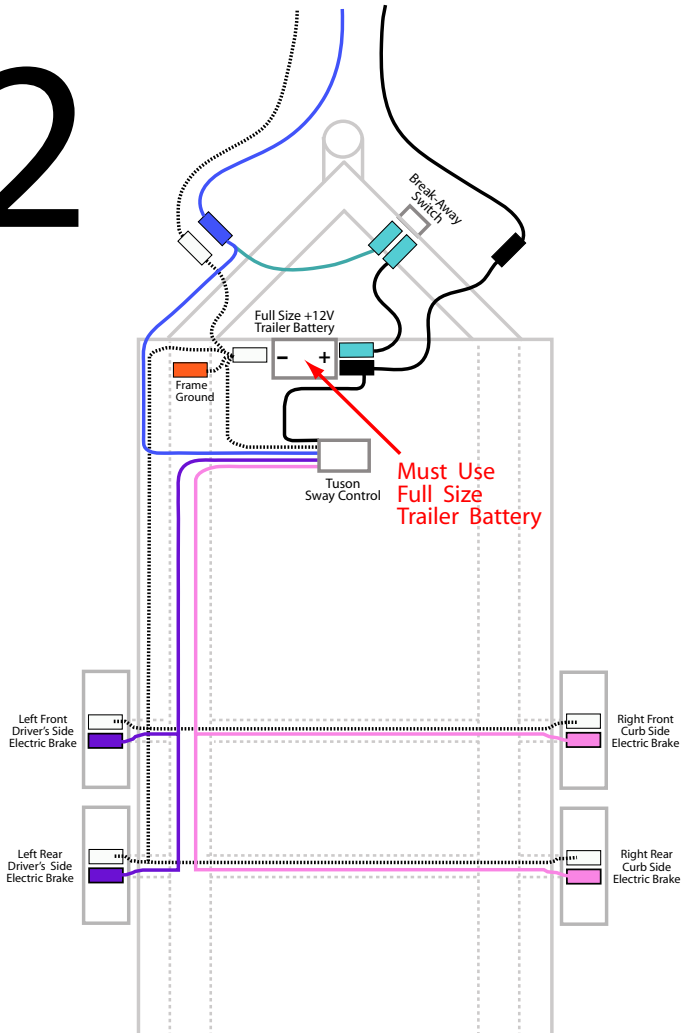
Section One: TSC Mounting, continued

1

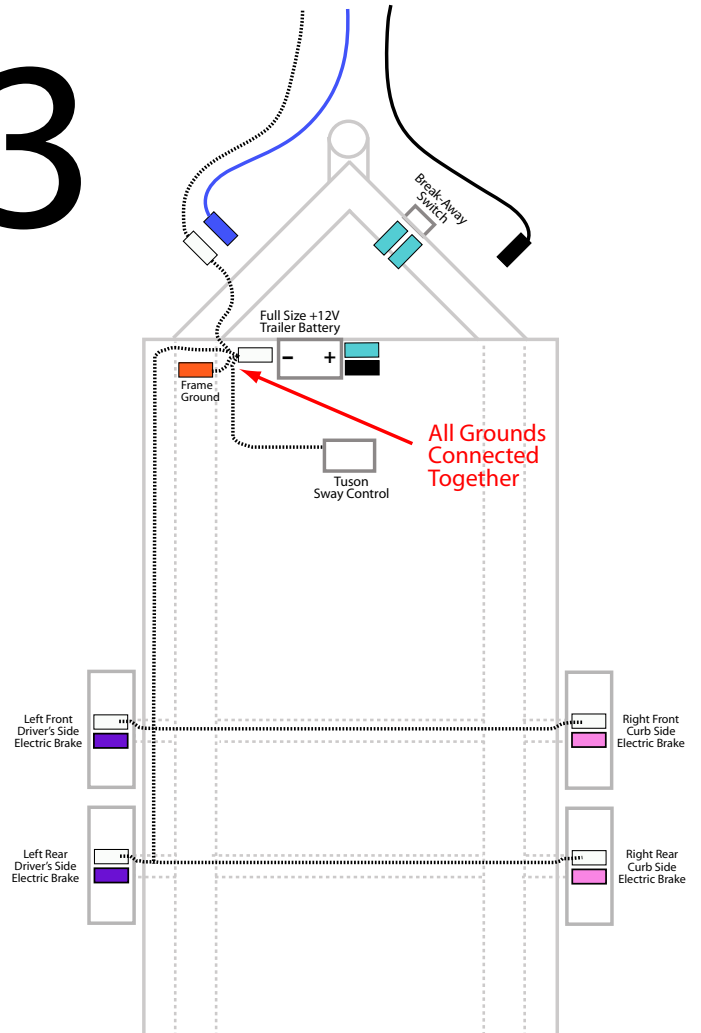


Section Two: TSC Wiring

2



3



2.2 Trailer Battery:

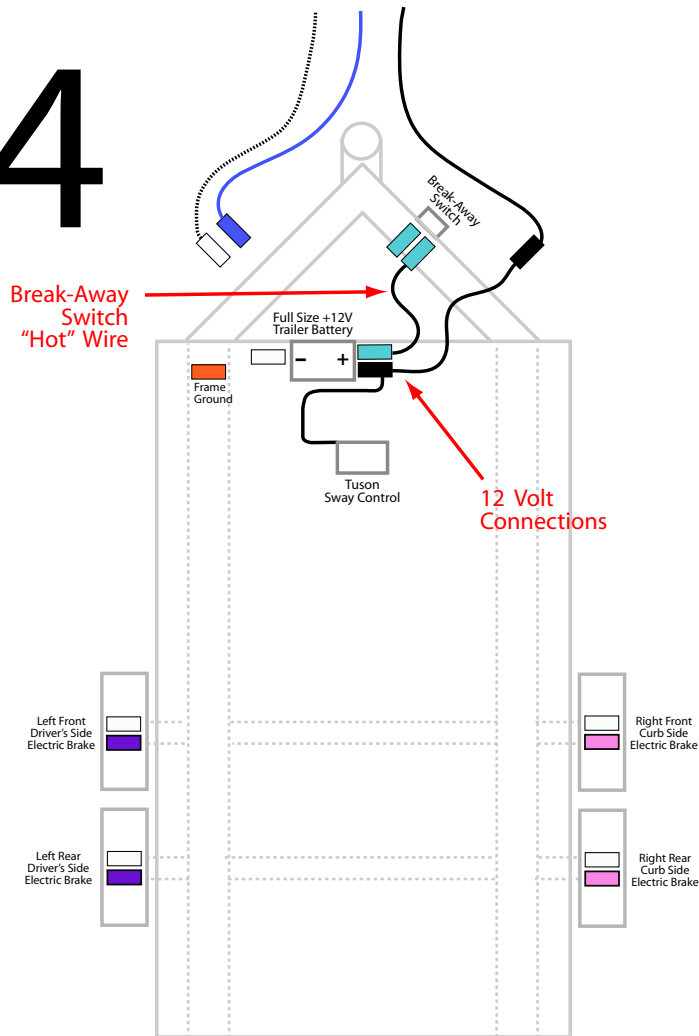
The trailer must be equipped with a full size 12 volt battery. **Small, gel-cell type batteries must not be used with the TSC.**

2.3 Ground Connections:

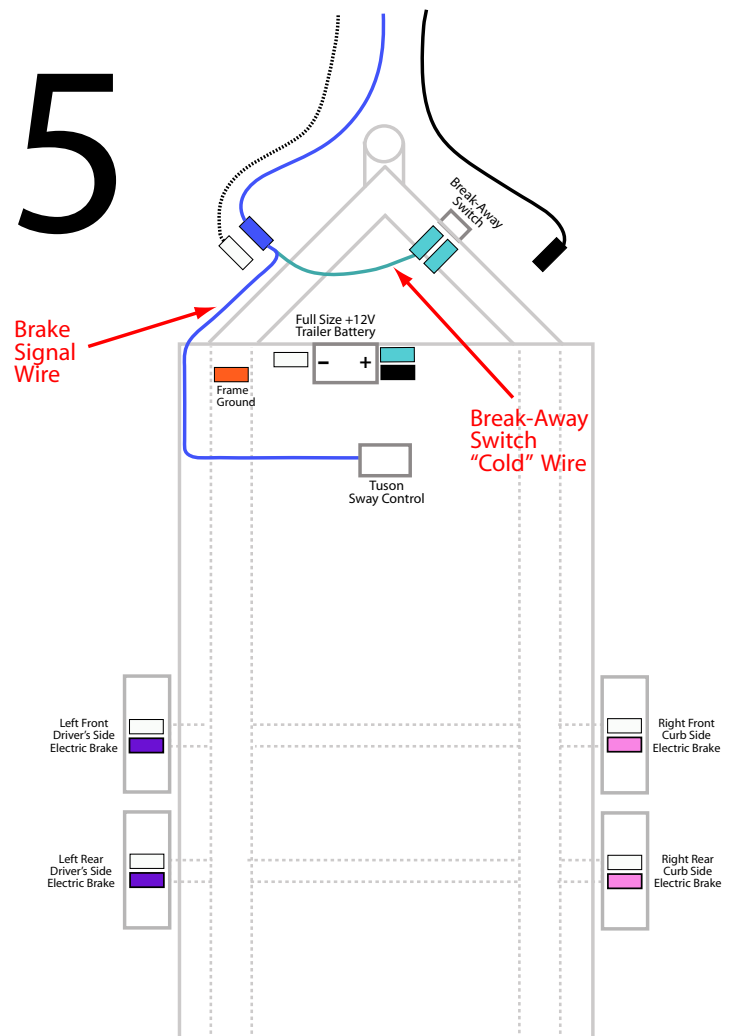
The tow vehicle ground, trailer battery ground, trailer frame ground, TSC ground (white) wire and the electric brake ground wires (on both sides of the trailer) must all be securely connected together with 14 gauge wire (min.) in order for the TSC to function properly.

Section Two: TSC Wiring, continued

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5



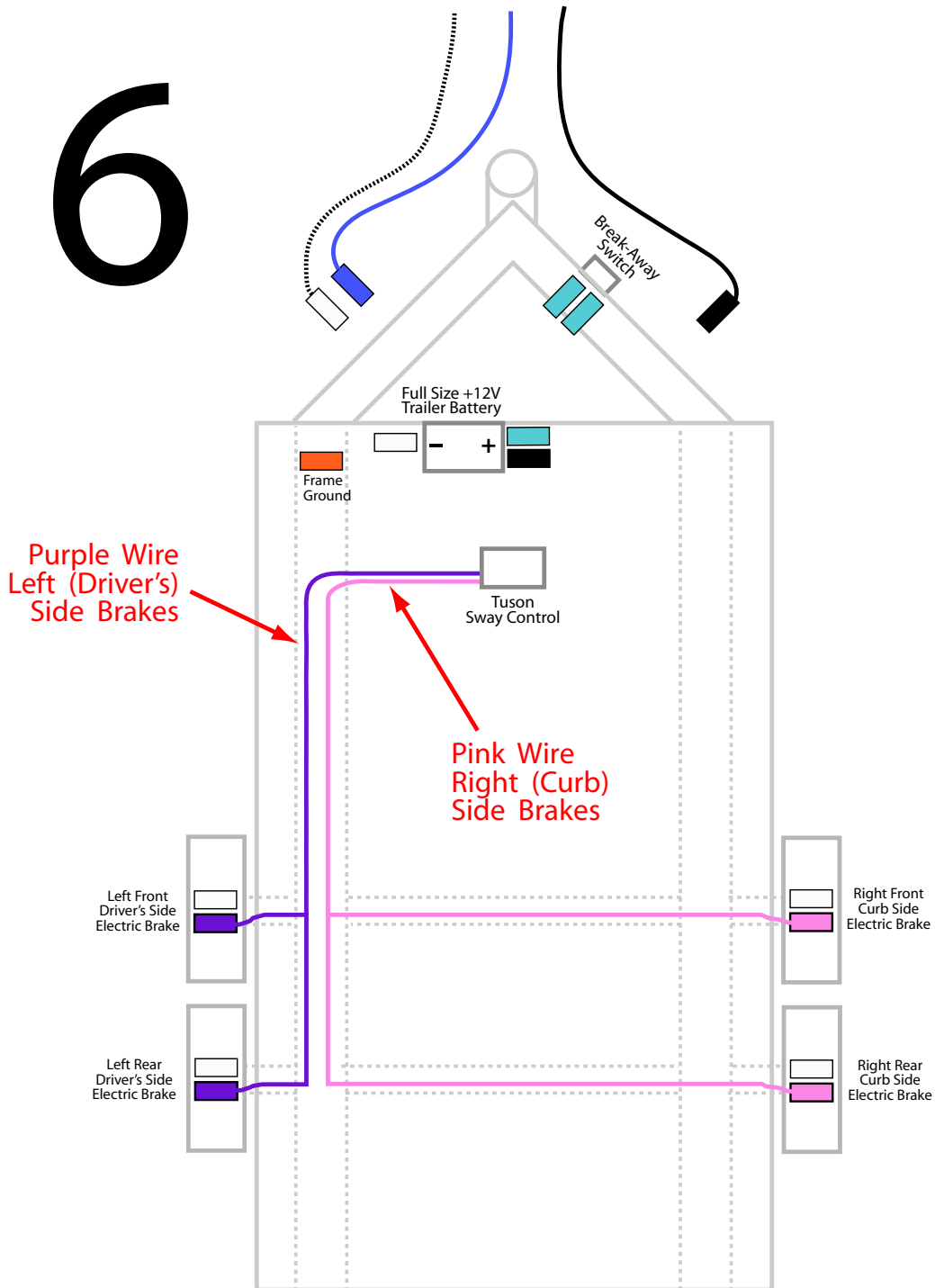
2.4 12 Volt Connections:

The tow vehicle 12 volt charge line, the 12 volt trailer battery terminal and the TSC 12 volt (black) wire must be securely connected together with 14 gauge wire (min.) in order for the TSC to function properly. The "hot" wire from the breakaway switch must be connected to the +12V terminal of the trailer battery.

2.5 Electric Brake (Blue Wire) Connections:

The tow vehicle brake signal (blue) wire must be securely connected to the TSC brake signal (blue) wire as well as to the "cold" wire from the breakaway switch as shown in the wiring diagram.

Section Two: TSC Wiring, continued



2.6 Left (driver's side) and Right (curb side) Brake Wires:

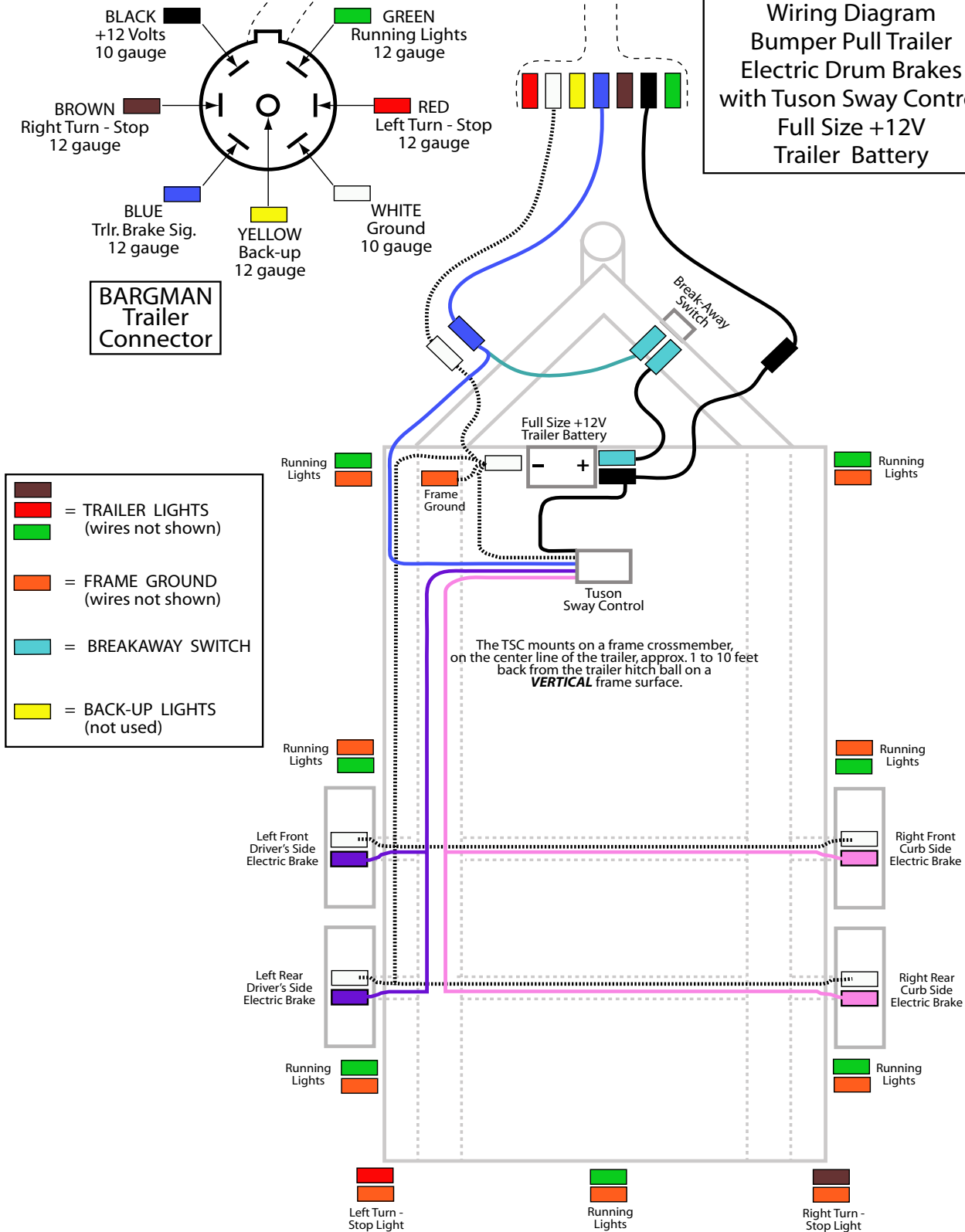
The TSC operates the left (driver's side) and right (curb side) trailer brakes independently in order to control trailer sway and therefore it is very important that the correct TSC wires are connected to the correct side brakes. The TSC purple wire must be connected to the left (driver's side) electric brakes with a 14 gauge (min.) wire. The TSC pink wire must be connected to the right (curb side) electric brakes. Failure to properly connect these wires will prevent the TSC from controlling trailer sway.

Section Two: TSC Wiring, continued

Wire Connections to Trailer Plug and system overview



Wiring Diagram
Bumper Pull Trailer
Electric Drum Brakes
with Tuson Sway Control
Full Size +12V
Trailer Battery



Section Two: TSC Wiring, continued

TSC Wiring Harness

The TSC wire harness has five wires requiring electrical connection and one wire for the status LED light. The function of each of these wires is outlined in the table below:

TSC Wires	Trailer Wire Function	Wire Gauge Required
Purple Wire	Left (driver's) side electric brake output (all driver's side brakes)	14 Ga. Minimum
Pink Wire	Right (curb) side electric brake output (all curb side brakes)	14 Ga. Minimum
White Wire	Trailer battery/frame ground point	14 Ga. Minimum
Blue Wire	Electric brake controller signal from tow vehicle	14 Ga. Minimum
Black Wire	12VDC from tow vehicle trailer harness	14 Ga. Minimum
Black Wire	10 foot wire with a two pin connector on the end that plugs into the LED status light	included in kit

The 14 ga. wires of the TSC wiring harness are approximately 12 inches long to allow for flexibility when mounting the unit. Extensions will be required to connect the unit to the trailer's electrical wiring. When making connections to the trailer's wiring harness, the desired termination is a solder joint. If the connection is not soldered, use the appropriate size and type of "crimp-type" weather sealed heat-shrink connectors, using the manufacturer's recommended crimping tools in accordance with their crimping instructions. Once the 14 ga. wires are connected, route the Status Light wire to a location on the front of the trailer and mount the Status Light Module onto a flat surface using self-tapping screws. Select a location that makes it easy to see the Status Light when looking at the front of the trailer.

Taking shortcuts when connecting any wires on your trailer only increases the likelihood that some part of your electrical system will fail. Make sure your splice connections are durable and sealed against exposure to water and corrosive elements. One loose wire connection can disable your entire trailer brake system.

When adding extension wires to the TSC wiring harness, you must use the correct gauge wire. These gauge sizes are outlined in the table above.





Warning!

Failure to use the correct gauge wire may result in poor braking performance or brake failure. Improper wire gauge may also result in significant damage to your trailer or its components, cause a fire, which may result in serious or fatal injury and/or property damage. Undersized wire will prevent electrical circuit protection devices such as fuses or circuit breakers from functioning properly. Undersized wire may melt or burn before these safety devices can be activated.

Section Three: Final Brake Wiring Check and Start-up

Final check for correct brake wiring:

- 1) Refer to Figure 1 on page 9 to verify correct wiring on the left side of the trailer. Ensure that ONLY the PURPLE and WHITE wires are connected to the left side trailer brakes wired in parallel and not in series.

Warning! ***It is very important that the trailer brake controller wire from the tow vehicle (blue wire) is ONLY connected to the BLUE wire on the TSC and NOT connected directly to the trailer brakes.***
- 2) Refer to Figure 2 on page 9 to verify correct wiring on the right side of the trailer. Ensure that ONLY the PINK and WHITE wires are connected to the right side trailer brakes wired in parallel and not in series.

Warning! ***It is very important that the trailer brake controller wire from the tow vehicle (blue wire) is ONLY connected to the BLUE wire on the TSC and NOT connected directly to the trailer brakes.***
- 3) After performing the final brake wiring check, the TSC is ready for start-up. The operational status of the TSC is indicated by the LED status light. The TSC is in SLEEP MODE if the LED light is off (dark). The TSC will start-up (wake-up) when voltage is applied to the BLUE WIRE. Once the trailer is connected to the tow vehicle, apply the manual override on the trailer brake controller in the truck. The LED status light should begin flickering GREEN if the system is installed correctly. If the LED status light does not come on when applying the manual override on the brake controller, refer to the troubleshooting table on page 10.

The TSC Self Diagnostics:

The TSC performs a self-diagnostic test every time it “wakes-up” by receiving a signal from a brake controller in the truck. The light may flash RED and GREEN approximately 6 times on startup and then go to GREEN. The TSC also continually monitors system parameters during operation. If the system is operating properly and no faults are detected, the GREEN light will remain ON and flicker or pulse. If a problem is detected, a RED light will flash a specific number of times to indicate the specific problem. The table on page 10 contains the meaning of the different RED and GREEN light flashes along with troubleshooting suggestions to correct the problem(s). The TSC continues checking the fault status and keeps the RED light flashing until the fault is corrected. Once corrected, the GREEN light returns. NOTE: When the trailer is not moving, every 60 seconds the GREEN light will turn off for 2 seconds and back on. This is normal and indicates proper operation of the TSC. If you do not notice the GREEN light turning off and on every 60 seconds while the trailer is not moving, have the TSC checked by your local service center.

Section Three: Final Brake Wiring Check and Start-up (cont.)

FIGURE 1

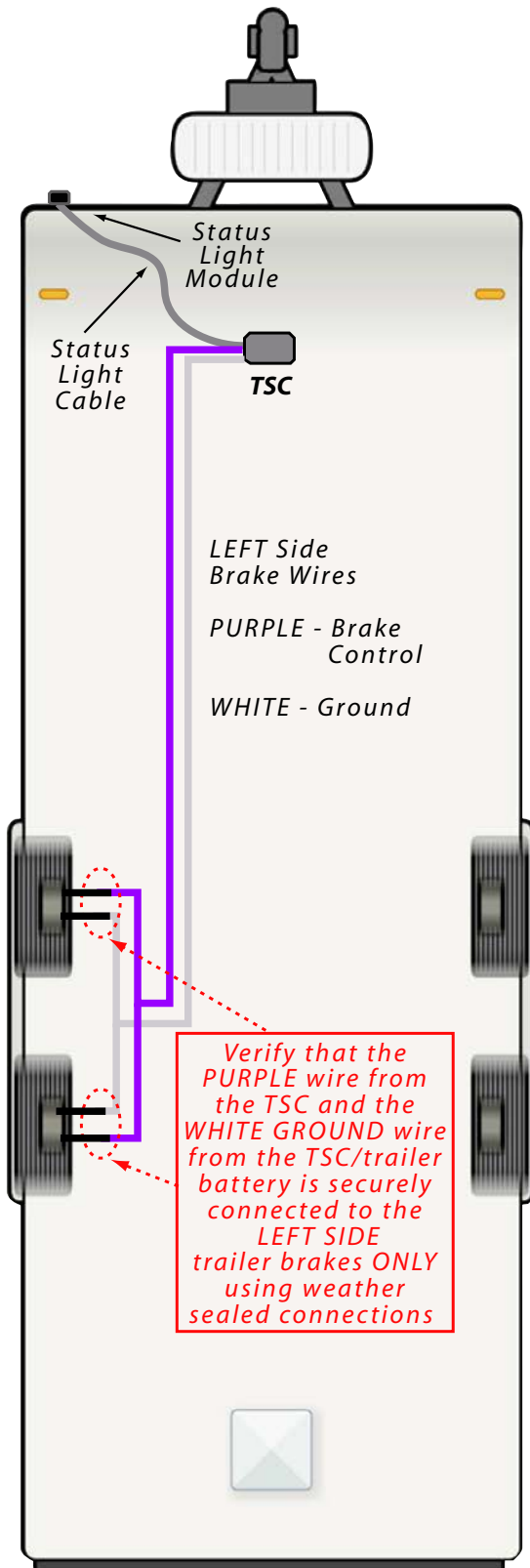
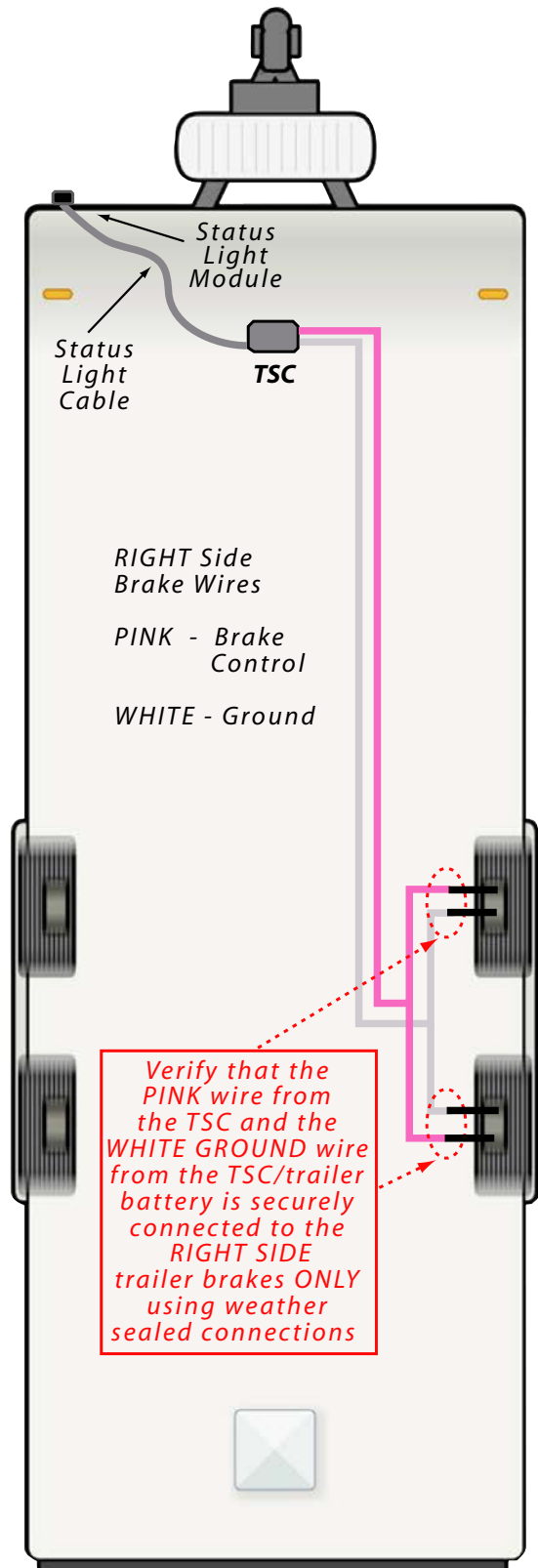


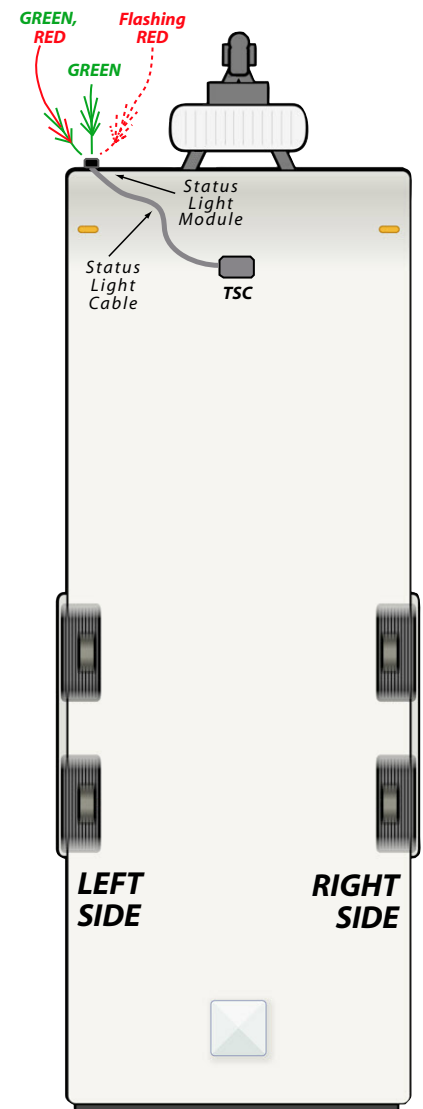
FIGURE 2



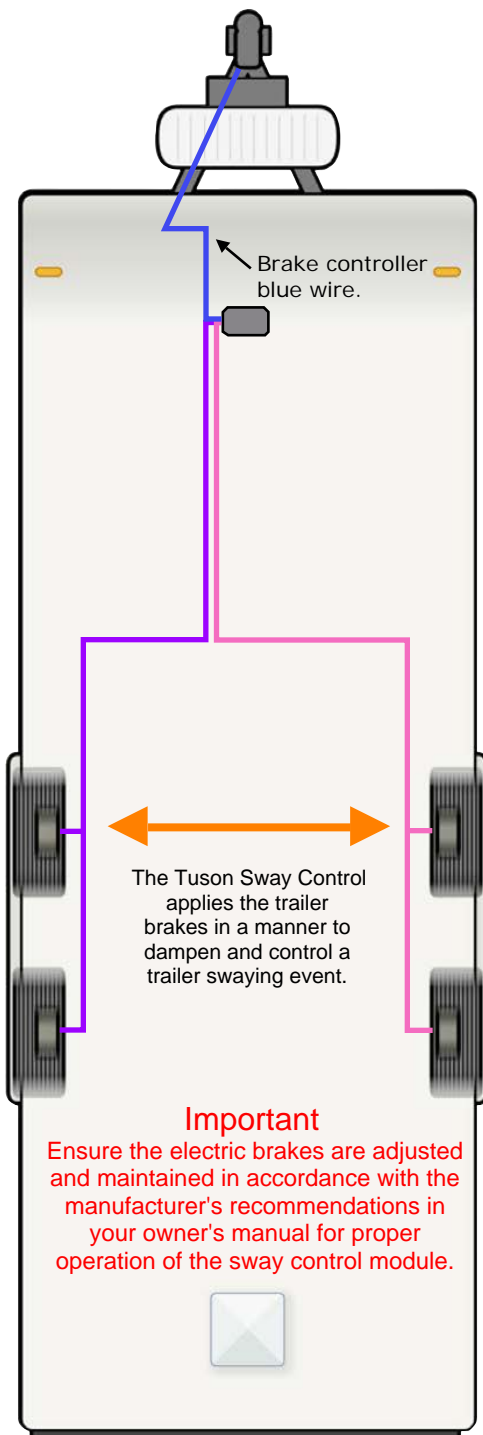
Section Three: Status Light and Troubleshooting

Mount the Status Light Module in a location on the front of the trailer where the light is easily seen.

LIGHT ACTION	CONDITION	CORRECTIVE ACTION
Solid GREEN pulsing	Normal operation - no system faults	No action - system OK
GREEN flash 2 times per second	Sway control braking is active	No action - system OK
1 GREEN flash every 2 seconds	Firmware checksum error. Keep trailer sitting still for minimum 60 seconds, then drive normally.	If module does not return to normal solid GREEN pulsing light, have the unit checked at a service center.
1 GREEN flash every 4 seconds	Module reset to mfg. default values. Keep trailer sitting still for minimum 60 seconds, then drive normally.	If module does not return to normal solid GREEN pulsing light after 3 system restarts, have the unit checked at a service center.
RED, GREEN, RED, GREEN, continuing...	Sway control automatically disabled due to rough terrain	Unit will return to normal green light when not on rough terrain
No light	Unit in "sleep" mode	Activate manual override on the brake controller to "wake up" unit
No light	No power after "wake up" from brake controller	Verify the unit has good quality power, ground and brake controller wire connections. Check for any blown fuses on the truck and trailer.
No light	Over voltage - over +20 volts	Check that power source is not exceeding 20 volts - correct voltage to 12-15 volts
No light	Low voltage - under 3 volts	Check that power source is 12-15 volts. Verify good power and ground connections
5 RED flashes	Ground wire intermittent or disconnected	Check ground wire connections to the trailer battery and tow vehicle
4 RED flashes	Brake short (right side)	Correct the short in right side brake wiring
3 RED flashes	Brake short (left side)	Correct the short in left side brake wiring
2 RED flashes	Sensor malfunction - no sway control	Service center repair required
1 RED flash	Blue Wire Short - System malfunction	Correct the blue wire short, Service center repair may be required.
Fast RED flashing	Low voltage - between 3 to 6 volts	Check the power and ground connections



Section Four: How The TSC Works



How it Works

- The Tuson Sway Control (TSC) continuously monitors trailer yaw.
- It has a proprietary algorithm which is used to determine the difference between quick steering to avoid a road obstacle (or other such circumstances) and the rapid onset of a trailer swaying event.
- It measures the angle, travel distance and speed of the lateral motion of the trailer (and other parameters) and uses this information to quickly intervene with the application of trailer brakes.
- The processing capability of the TSC is powerful and rapid. It captures all the critical elements of the swaying condition and uses this information to predict how the event will proceed without any driver intervention.
- It uses this data to get ahead of the event by applying the brakes on the correct side of the trailer, in a timely manner, with the proper braking level for the required duration.
- This quickly dampens and brings the trailer sway under control.

Tuson Sway Control is based on the same technology used in automotive vehicle stability systems.

Limited Warranty

Tuson RV Brakes, LLC (Tuson) warrants the Tuson Sway Control (TSC) to be free of defects in material and workmanship for a period not to exceed two years from the date of sale to the original consumer, or to the first retail purchaser of a trailer on which the TSC is installed. Original receipt(s) or other acceptable proof of purchase should be retained by the customer for verification of warranty date. THIS WARRANTY IS NOT TRANSFERABLE.

Tuson's obligations under this warranty shall be limited to crediting the account of a direct buying distributor or OEM trailer manufacturer, replacing or repairing the TSC products which are determined by Tuson to be defective in material or workmanship, within 60 days of receipt of such product by Tuson. Tuson reserves the right to request the product be returned intact, freight prepaid, PRIOR to processing any claim for warranty. Warranty claim must be received by Tuson within 30 days of the discovery of the alleged defect, or within 30 days of the expiration of the warranty, whichever is earlier. Covered repairs or replacements will be made at Tuson's expense. Shipment of replacement product or repaired product by Tuson will be via best available ground shipment carrier. Shipments other than by best available ground shipment carrier, must be requested in writing and must be paid for in advance by the customer. Returned product that is found not to be defective, will be returned at senders expense.

This Warranty shall not include any products which have been improperly installed, installed contrary to installation instructions provided with the product, altered, tampered with or changed in any way, or utilized in a manner not approved by Tuson. This Warranty shall not extend to any defects arising from abuse, misuse, accident, improper wiring, or negligence of the installer or the consumer. Refer to the Tuson Sway Control "Installation Instructions" that was shipped with the Tuson Sway Control.

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