

ActuLink

Standalone ABS Models

ABS-SA-1000: for Hydraulic Drum Brakes

ABS-SA-1600: for Hydraulic Disc Brakes

Installation and Owner's Manual



Tuson RV Brakes, LLC

475 Bunker Court

Vernon Hills, IL 60061

www.TusonRVBrakes.com

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Introduction

Congratulations on purchasing the Tuson RV Brakes' ActuLink Standalone Anti-Lock Braking System (ABS). Tuson RV Brakes is the leader in towable safety technology and is the first to offer a patented ABS for electric-hydraulic trailer brake systems. Our innovative products are designed specifically to help prevent and reduce some of the leading causes of trailer accidents. With the ActuLink Standalone ABS, you can now enjoy trailer ABS with any integrated or aftermarket brake controller.

Read and Save This Manual

- Before beginning installation, read and become familiar with these instructions.
- Save this manual and store it in your tow vehicle for future reference.
- Improper installation and operation could cause serious or fatal injuries and/or property damage.

Please Note:

The ActuLink Bluetooth & Status Module is designed for trailers with hydraulic brakes using the ActuLink Standalone Anti-Lock Braking System (ABS). It automatically detects your ABS system and configures itself accordingly.

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1 Standalone ABS Components

1.1 Inside the Box

ABS-SASTAT-MOD.....	#1
Trailer Status Module	
ACT-1000/1600-ABSSAMOD	#2
ActuLink Electric-Hydraulic Brake Actuator 1,000/1,600 psi for Standalone	
ABS-SAMOD	#3
ActuLink ABS Control Module for Standalone	
ABS-HARN	#4
ABS Control Module Harness	
ACTABS-HARN	#5
Actuator-to-ABS Control Module Harness	
ABS-SAEXT-XX	#6
ABS Standalone Extension Harness (comes in various lengths)	
ABS-SA-BT	#7
Bluetooth Status Module (Optional Add-On)	
ABS Module Mounting Kit	Not Shown
Actuator Mounting Kit	Not Shown

1.2 Standalone ABS Installation Diagram for Tandem Axle Trailers



WARNING: PRIOR TO WELDING OR ELECTROSTATIC PAINTING ON THE TRAILER, DISCONNECT THE WIRING HARNESS AND HYDRAULIC LINES FROM THE ACTUATOR AND ABS MODULE. FAILURE TO DO SO MAY CAUSE DAMAGE TO THE ACTUATOR AND/OR THE ABS MODULE'S ELECTRONICS WHICH WILL VOID THE WARRANTY.

STAND-ALONE ABS INSTALLATION DIAGRAM FOR TANDEM AXLE TRAILERS

NOTE: FOR TRIPLE AXLE TRAILERS, THE CENTER WHEELS DO NOT HAVE WHEEL SPEED SENSORS AND THE CENTER WHEEL BRAKES ARE CONNECTED WITH A TEE TO THE FRONT WHEEL HYDRAULIC LINES FOR SPRING SUSPENSION TRAILERS OR TO THE REAR WHEEL HYDRAULIC LINES FOR TORSION SUSPENSION TRAILERS.

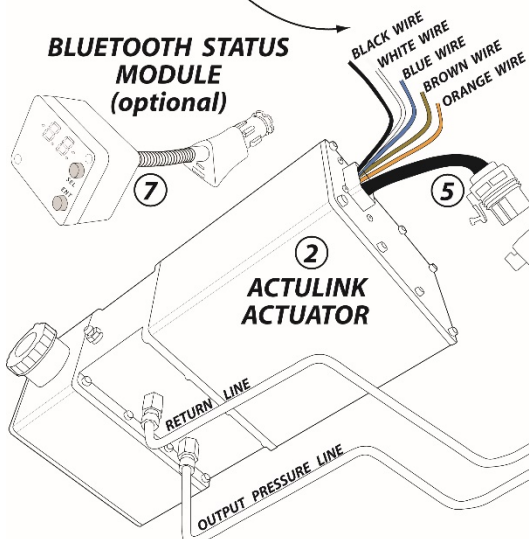
ACTULINK ACTUATOR WIRE FUNCTIONS

BLACK WIRE:	+12v ON TRAILER BATTERY AND +12v WIRE FROM TOW-VEHICLE
WHITE WIRE:	NEG. TERMINAL ON TRAILER BATTERY, NEG. (GROUND) WIRE FROM TOW-VEHICLE AND GROUND LUG ON TRAILER FRAME
BLUE WIRE:	DIRECLINK BRAKE CONTROLLER BLUE WIRE FROM TOW-VEHICLE
BROWN WIRE:	+12v ON TRAILER BATTERY
ORANGE WIRE:	COLD SIDE OF BREAKAWAY SWITCH

OUTPUT HYDRAULIC PORTS 1 - 4

PORT #1	DRIVER SIDE FRONT WHEEL
PORT #2	DRIVER SIDE REAR WHEEL
PORT #3	PASSENGER SIDE REAR WHEEL
PORT #4	PASSENGER SIDE FRONT WHEEL

BLUETOOTH STATUS MODULE (optional)



ACTULINK ACTUATOR

TRAILER STATUS MODULE

PASSENGER SIDE FRONT WHEEL

PASSENGER SIDE REAR WHEEL

DRIVER SIDE REAR WHEEL

DRIVER SIDE FRONT WHEEL

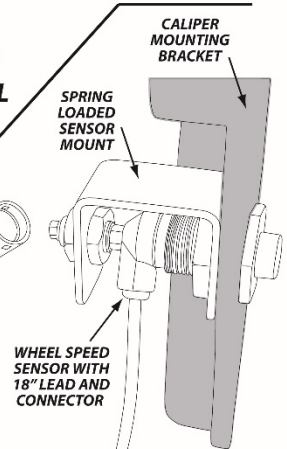
ABS MODULE

WHEEL SPEED SENSOR CABLES

CABLE #1	PURPLE	DRIVER SIDE FRONT WHEEL
CABLE #2	GRAY	DRIVER SIDE REAR WHEEL
CABLE #3	TAN	PASSENGER SIDE REAR WHEEL
CABLE #4	PINK	PASSENGER SIDE FRONT WHEEL

USE SELF-TAPPING SCREWS AND TUBE CLAMPS TO SECURE EACH BRAKE LINE TO THE TRAILER FRAME SPACED EVERY TWO (2) FEET (WHERE SPACE PERMITS) TO PREVENT VIBRATION.

USE TIE-STRAPS (AS REQUIRED) TO ROUTE AND SECURE WHEEL SPEED SENSOR CABLES TO EACH HYDRAULIC BRAKE LINE GOING TO THE ABS MODULE.



2 ABS Control Module Installation Instructions

2.1 Mounting the ActuLink ABS Module

The mounting guidelines listed below should be followed to ensure proper installation and operation:

- Ensure the selected location is accessible for service and for brake line and wiring installation.
- The ActuLink ABS Control Module must be mounted in a location where it will be protected from damage from trailer load and road debris.
- The ActuLink ABS Control Module is weather sealed and water resistant but should not be mounted in a location that will be submerged in water.
- The ActuLink ABS Control Module should be mounted in proximity to the towable axles.



DO NOT SPRAY HIGH PRESSURE WATER ON THE ActuLink ABS Control Module.

The ActuLink ABS Control Module is a weather sealed, water resistant unit. But it is not designed to withstand direct, high pressure spray from a power washer.

Warning!

The ActuLink ABS Control Module should be mounted using the two existing mounting holes with two 3/8" bolts. The mounting holes in the ActuLink ABS Module are 1" deep and the template below can be used to properly position and drill the holes in the surface to be used for mounting. It is recommended that lock washers be used and you must securely tighten the mounting bolts to prevent damage to the module or to the attached brake lines from excessive vibration. The ActuLink ABS Control Module comes with an ABS Module Mounting Kit for your convenience.



You can NOT drill holes in the ActuLink ABS Control Module for any reason.

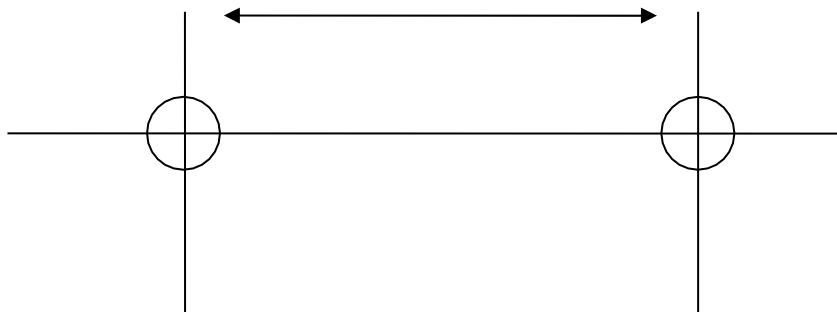
Drilling holes or puncturing the unit VOIDS YOUR WARRANTY.

Warning!

ABS Control Module Bottom Mounting Holes Drill Template

(screws: 3/8" - 24 x 1")

2 holes, 3/8" dia, 68mm (2.677") apart



2 ABS Control Module Installation Instructions

2.2 Installation of Hydraulic Lines

The ActuLink ABS Control Module has 6 brass 1/8" NPTF male fittings with #3 (3/16") female inverted flare tube seat adapters (for 1/8" brake line). These fittings are all clearly labeled, and it is critical that the proper hydraulic line is connected to the proper location on the ActuLink ABS Control Module.

On one side of the ActuLink ABS Control Module, there are two fittings: one is labeled PIN (pressure input) and the other is labeled RET (return line). This side of the ActuLink ABS Control Module should be positioned to face toward the ActuLink ABS Brake Actuator. It is critical that the following hydraulic line connections are made:

- Connect the **PIN** of the ActuLink ABS Control Module to the **Pout** (pressure output) of the ActuLink ABS Brake Actuator
- Connect the **RET** of the ActuLink ABS Control Module to the **Ret** (return line) of the ActuLink ABS Brake Actuator

On the opposite side the ActuLink ABS Control Module, there are four fittings: Each is labeled with a number (1,2,3,4). These numbers correspond with a specific brake caliper with which it must be connected. These connections are as follows:

Fitting 1: Driver's side front brake caliper
Fitting 2: Driver's side rear brake caliper

Fitting 3: Passenger's side rear brake caliper
Fitting 4: Passenger's side front brake caliper



It is critical that each of these lines be properly connected as outlined above.
If any line is improperly connected, the ABS system will NOT work properly.

Warning!

DO NOT use Teflon pipe tape or other type of thread dope when connecting brake tubing or hose. **You must hold the ActuLink brass fitting securely in place with the appropriate size wrench when tightening the brake line fitting to the ActuLink ABS Module. Failure to secure the brass fitting may cause damage to the brake line fitting.** When installing steel tubing, use care to avoid sharp kinks or bends, which can restrict brake fluid flow causing poor brake response. Double flare the ends of the steel tubing to ensure tight leakproof connections. All steel hydraulic lines should be anchored at two-foot intervals to prevent vibration and chafing. Rubber hydraulic hose should be used at points where flexing may occur. Be sure hydraulic hose is positioned so it does not rub against any surface during trailering. Anchor ends of tubing to minimize stress. Follow the instructions of your brake manufacturer when connecting the brake lines to the brake caliper.

2.3 Connecting ABS Control Module to Wheel Speed Sensors

The ActuLink ABS Control Module wire harness has four (4) connectors for ABS Wheel Speed Sensors. These connectors are color coded and the proper color must be attached to the proper wheel speed sensor as outlined below:

Cable #1 Purple: Driver Side Front Wheel
Cable #2 Gray: Driver Side Rear Wheel

Cable #3 Tan: Passenger Side Rear Wheel
Cable #4 Pink: Passenger Side Front Wheel



It is critical that the wheel speed sensor cables are connected as outlined above or the entire towable ABS system will not function properly.

Warning!

2 ABS Control Module Installation Instructions

Note: For triple axle trailers, the center wheels do not have wheel speed sensors and the center wheel brakes are connected with a tee to the front wheel hydraulic lines for spring suspension trailers or to the rear wheel hydraulic lines for torsion suspension trailers.



Prior to welding or electrostatic painting on the trailer, disconnect the wiring harness and hydraulic lines from the ActuLink ABS Brake Actuator and ABS Control Module. Failure to do so may cause damage to the Brake Actuator and/or the ABS Control Module's electronics which will VOID YOUR WARRANTY.

Warning!

2.4 Installing Wheel Speed Sensors

It is critical that the gap between the end of the wheel speed sensor and the teeth of the tone ring are in very close proximity (no greater than 0.040" / 1 mm).

There are two types of mounting hardware available for mounting wheel speed sensors (sold separately):

- 1) Tuson's Patented Spring-loaded Sensor Mount
- 2) Sensor Block Mount (which may be an integral part of the hydraulic disc brake caliper mounting bracket /hydraulic drum brake backing plate or may be a separate bolt that is installed in an opening in the brake caliper mounting bracket/ drum brake backing plate) with a spring clip.

When using **Tuson's Patent Spring-loaded Sensor Mount**, each mount comes with two types of shims: 0.040" / 1 mm and 0.02" / 0.5mm thick. Without the shims, the sensor will come into contact with the teeth of the tone ring. Therefore, the shims should be added, one at a time, until the sensor is no longer in contact with the teeth on the tone ring when the rotor is fully installed (with the spindle nut properly installed and pinned with a cotter pin). At that point, rotate the rotor completely to ensure the sensor does not come into contact with the tone ring and that the gap between the sensor and tone ring is no greater than 0.040" / 1 mm.

When using the **Sensor Block Mount** with spring clip to mount the wheel speed sensors, the sensors should not slide easily within the hollow bolt as the spring clip must hold it very firmly in place. It should take significant force to move the sensor inward toward the teeth. A 0.040" / 1mm feeler gauge should be used to obtain the proper gap. Place the feeler gauge between the teeth of the tone ring and the sensor and slide the sensor toward the teeth until it makes contact with the feeler gauge. When the feeler gauge is removed, the barrel spring clip in the sensor mount will hold the sensor in place.



If the sensor moves easily, that is an indication to replace the spring clip with a new one. If this is not done, the sensor will eventually move from the tone ring teeth and will stop capturing data which will diminish the performance or disable the ABS system.

Warning!

3 Brake Actuator Installation Instructions

3.1 Mounting the ActuLink Brake Actuator

The mounting location is at the vehicle owner's discretion, but the guidelines listed below should be followed to ensure proper installation and operation:

- Ensure the selected location is accessible for service and for brake line and wiring installation.
- The ActuLink Brake Actuator must be mounted upright in a location where it will be protected from damage from trailer load and road debris.
- Be aware that electric-hydraulic actuators get hot when operating and should be mounted in a well-ventilated location away from flammable materials and a location where it will not come into contact with skin.
- The ActuLink Brake Actuator is weather sealed and water resistant but should not be mounted in a location that will be submerged in water.
- The ActuLink Brake Actuator should be mounted toward the front of the trailer to avoid the effects of voltage drop due to long spans of wire, wire splices, junction boxes, etc.



DO NOT SPRAY HIGH PRESSURE WATER ON THE ActuLink Brake Actuator.

The ActuLink Brake Actuator is a weather sealed, water resistant unit. But it is not designed to withstand direct, high pressure spray from a power washer.

Warning!

The ActuLink Brake Actuator should be mounted using either the bottom mounting brackets or side mounting brackets which are included with the unit. To use the mounting brackets, remove the corresponding cap screws which secure the end plates of the ActuLink Brake Actuator, position the mounting brackets over the corresponding holes and securely replace the cap screws. The customer is responsible for supplying the mounting bolts. Use four 1/4" threaded fasteners to mount the ActuLink Brake Actuator to the trailer. It is recommended that lock washers be used and you must securely tighten the mounting bolts to prevent damage to the mounting brackets from vibration.



You can NOT drill holes in the ActuLink ABS Control Module for any reason.

Drilling holes or puncturing the unit VOIDS YOUR WARRANTY.

Warning!

3.2 Installation of Hydraulic Lines

The ActuLink Brake Actuator has 2 brass 1/8" NPTF male fittings with #3 (3/16") female inverted flare tube seat adapters (for 1/8" brake line). The lower fitting is labeled POUT (pressure output) and the upper fitting is labeled RET (return line). Refer to **Section 3.2** for instructions on the hydraulic line connections on the ActuLink Brake Actuator. Improper installation of these lines will result in complete failure of the brake system.

3 Brake Actuator Installation Instructions

3.3 Filling the ActuLink Brake Actuator's Reservoir

After all brake lines have been installed, connected, and properly tightened, fill the reservoir with NEW, CLEAN, "DOT 3" or "DOT 4" Brake Fluid. Never re-use brake fluid that has been salvaged or removed from another unit. Contaminated or dirty fluid can cause system failure and/or premature wear on the system components. DO NOT OVERFILL the reservoir. The fluid level should be approximately 3/4 inch from the top of the filler tube opening.



Use only new, clean DOT 3 or DOT 4 brake fluid from a sealed container.

Do not fill with previously used fluid. Used brake fluid may absorb water or other impurities which may cause corrosion, system malfunction and/or poor brake performance. This may result in serious or fatal injuries and/or property damage!

3.4 Electrical Installation

There are 6 Steps Within the Electrical Installation Section.

The wiring instructions are very detailed. We advise you to review these thoroughly before you begin the electrical installation.

ActuLink Brake Actuator Wiring Harness

The ActuLink Brake Actuator wire harness has five wires. The function of each of these wires is explained clearly on the following pages. The ActuLink harness connector plugs into the ActuLink Brake Actuator and has a bolt to securely attach it to the unit. Tighten the harness connector using a 1/4 inch socket. Do NOT over-tighten.

The wires of the ActuLink Brake Actuator wiring harness are approximately 18 inches long to allow for flexibility when mounting the unit. However, extensions may be required to connect 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" heat-shrink connector, using the manufacturer's recommended crimping tools in accordance with their crimping instructions. Only weather sealed splices should be used.

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 ActuLink Brake Actuator wiring harness, you must use the correct gauge wire. These gauge sizes are outlined on **Section 3.5** of this manual. **To avoid significant voltage drop to the ActuLink Brake Actuator, the total length of the wire extensions from the 7-way trailer vehicle connector to the ActuLink Brake Actuator should NOT exceed 20 feet.**

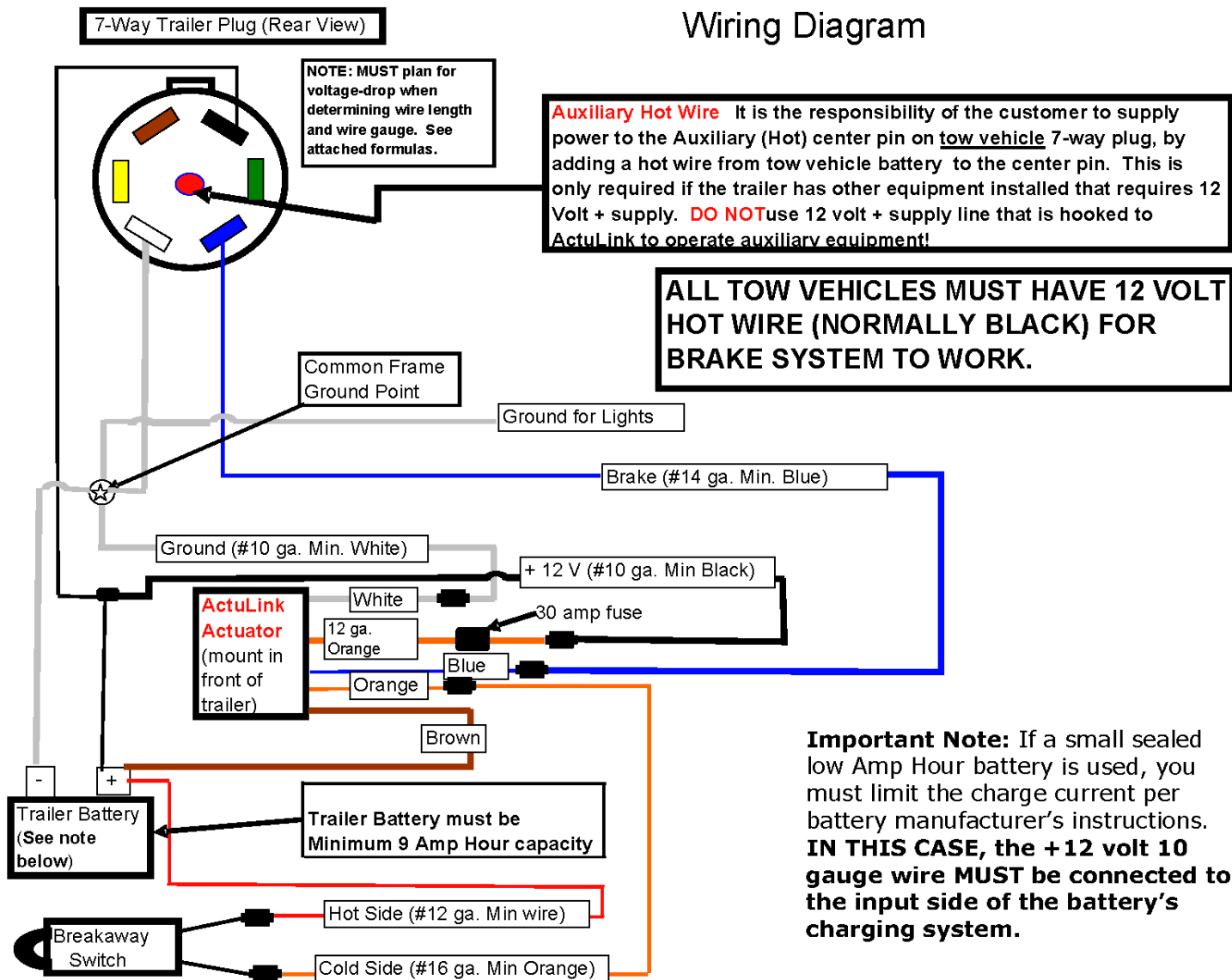


Failure to use the correct gauge wire may result in poor braking performance or brake failure. Improper wire gauge may also result in significant damage to your trailer or its components, or cause a fire, which may result in serious or fatal injury and/or property damage. **Warning!** Undersized wire 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.

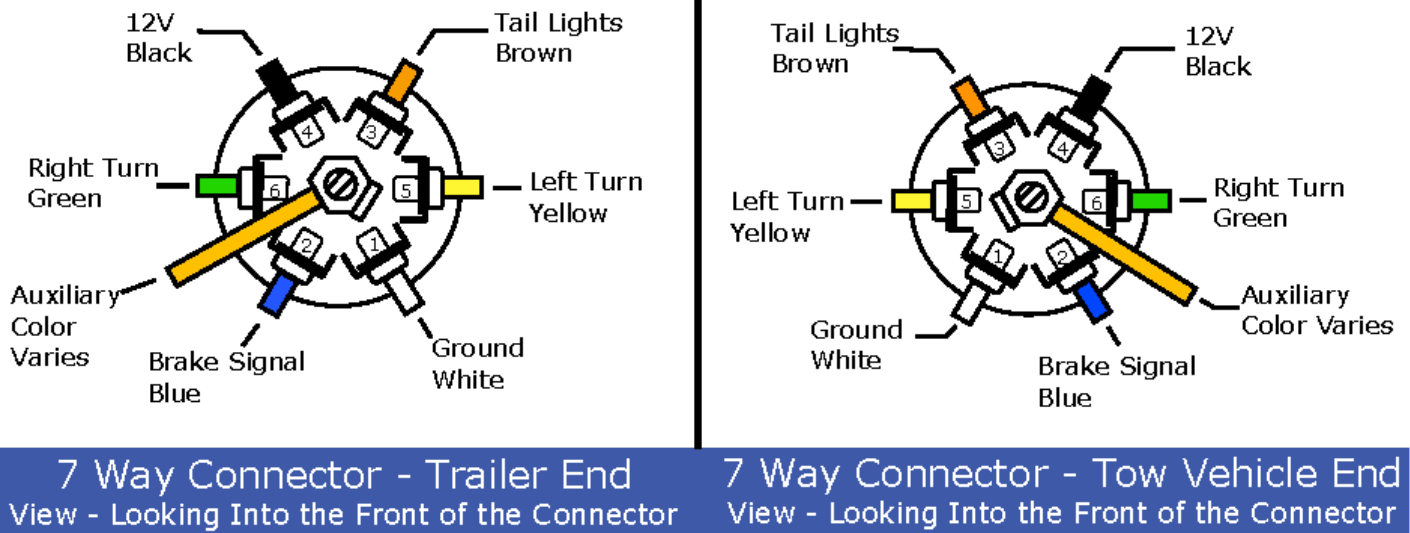
3.5 ActuLink Brake Actuator Wiring Overview Diagram

ActuLink Wires

- **12 ga. Orange** – With 30 amp fuse – connect to “Charge Wire” from tow vehicle
- **10 ga. White** – Attach to common frame grounding point
- **10 ga. Brown** – Attach directly to Positive terminal of trailer battery in installations with low Amp Hour batteries. (DO NOT SPLICE TO 12 GA. Black WIRE WITH 30 AMP FUSE.) In installations with deep cycle batteries, cap-off the Brown wire securely.
- **14 ga. Blue** - Connect to Blue (brake signal) from tow vehicle.
- **16 ga. Orange** – Connect to “Cold Side” of breakaway switch



3 Brake Actuator Installation Instructions



3.6 ActuLink Brake Actuator Wiring Instructions

IMPORTANT: What type of breakaway battery do you have installed on your trailer? There are wiring variations for low Amp Hour rated batteries (Option #1) and deep cycle, high Amp Hour rated batteries (Option #2). Please take note of the differences in STEP 3 & 4 and follow the correct instructions for the type of breakaway battery you have installed. The wiring differences are clearly outlined in the wiring instructions for both types.

Step 1: It is essential that the ActuLink Brake Actuator is properly grounded.

- The white wire from the ActuLink Brake Actuator must be connected to the same common grounding point as the trailer battery ground wire, using minimum 10-gauge wire.
- The tow vehicle ground (via the trailer harness), must be connected to the same common grounding point as the ActuLink Brake Actuator AND the trailer battery. NO EXCEPTIONS!
- This common grounding point should include: 1) the main connection to the trailer battery negative terminal, 2) the ground to the ActuLink, and 3) the tow vehicle ground wire, via the trailer harness (trailer plug). All three of these wires should be joined together (preferably soldered) and attached to a ground lug on the trailer frame. (The grounding lug must be attached to bare metal on the trailer frame.) By soldering all three of these wire connections securely together, when galvanic corrosion or rusting of the steel occurs between the ground lug and the trailer chassis, the ground path from the trailer battery, the ActuLink Brake Actuator, and the tow vehicle will not be compromised.
- The wire gauge from the trailer battery to the common ground point must be sized to handle all of the current required by the trailer systems and for maximum battery charging current. If you don't know the correct gauge to use, ask a qualified trailer service center for assistance.
- All wire terminations and splices should be weather tight whether they are in an enclosure or not.

Step 2: Connect Breakaway Switch to ActuLink/Battery

Connect the 16-gauge orange wire from the ActuLink Brake Actuator to the cold side of the breakaway switch. The hot side of the breakaway switch should be connected directly to the trailer battery positive (the hot side of the breakaway switch is whichever side that is connected to the positive terminal of the trailer battery as the switch itself has no polarity.) Use a weather tight wire termination at the battery connection due to the corrosive gases and liquids associated with batteries.

3 Brake Actuator Installation Instructions

Option #1: When using a low Amp Hour trailer battery (see Wiring Diagram #1 on following page)

Step 3: For low Amp Hour trailer battery Wiring Diagram #1– Part 1

Connect the brown wire from the ActuLink Brake Actuator wiring harness to the positive terminal of the low Amp Hour trailer battery. When using a low Amp Hour battery (9 Amp Hour minimum), you must attach the brown wire from the ActuLink Brake Actuator harness directly to the positive terminal of the trailer battery. The brown wire of the ActuLink Brake Actuator wiring harness is required to supply power to operate the ActuLink Brake Actuator in a breakaway condition and is also used for monitoring the condition of the battery when using the Trailer Status Module or the Bluetooth Status Module option (see **Section 4** of this manual for more information on the ABS Status and Bluetooth Status Modules.) DO NOT attach the brown wire to the trailer harness charge wire. The limiting device in the low Amp Hour battery's charging system (the ESCO WHPS100 battery charger is the only approved device) limits the amperage into and out of the battery, which would NOT allow sufficient amperage to power the ActuLink during a breakaway.

Step 4: For low Amp Hour trailer battery Wiring Diagram #1– Part 2

Low Amp Hour batteries require the ESCO WHPS100 battery charger so that they are not damaged during charging. The 12-gauge black (positive) wire with 30 amp fuse from the ActuLink Brake Actuator should be connected to the charge line of the trailer harness ahead of this current limiting device so that the ESCO WHPS100 battery charger does NOT limit current to the ActuLink Brake Actuator.

NOTE: The ActuLink Brake Actuator is powered from the electrical system on the tow vehicle via the charge line (normally black).

CONTINUE TO STEP 5 ONCE STEP 3 & 4 FOR OPTION #1 HAVE BEEN COMPLETED

Option #2: When using a Deep Cycle, High Amp Hour Battery (see Wiring Diagram #2 on following page)

Step 3: For Deep Cycle, High Amp Hour Battery Wiring Diagram #2– Part 1

Cap the brown wire from the ActuLink Brake Actuator harness when using a deep cycle trailer battery. The brown wire from the ActuLink Brake Actuator wiring harness must be capped with a weather sealed cap to prevent corrosion and to prevent an accidental short circuit.

Step 4: For Deep Cycle, High Amp Hour Battery Wiring Diagram #2– Part 2

The 12-gauge black (positive) wire with 30 amp fuse from the ActuLink Brake Actuator should be connected to the trailer battery positive terminal through a 30 amp circuit breaker using minimum 12-gauge wire. The tow vehicle charge wire should be connected to the battery side of the breaker. **NOTHING ELSE ON THE TRAILER SHOULD BE SPLICED INTO THE ACTULINK BRAKE ACTUATOR CIRCUIT OR SHARE THIS BREAKER.**

NOTE: The ActuLink Brake Actuator is powered from the electrical system on the tow vehicle via the charge line (normally black).

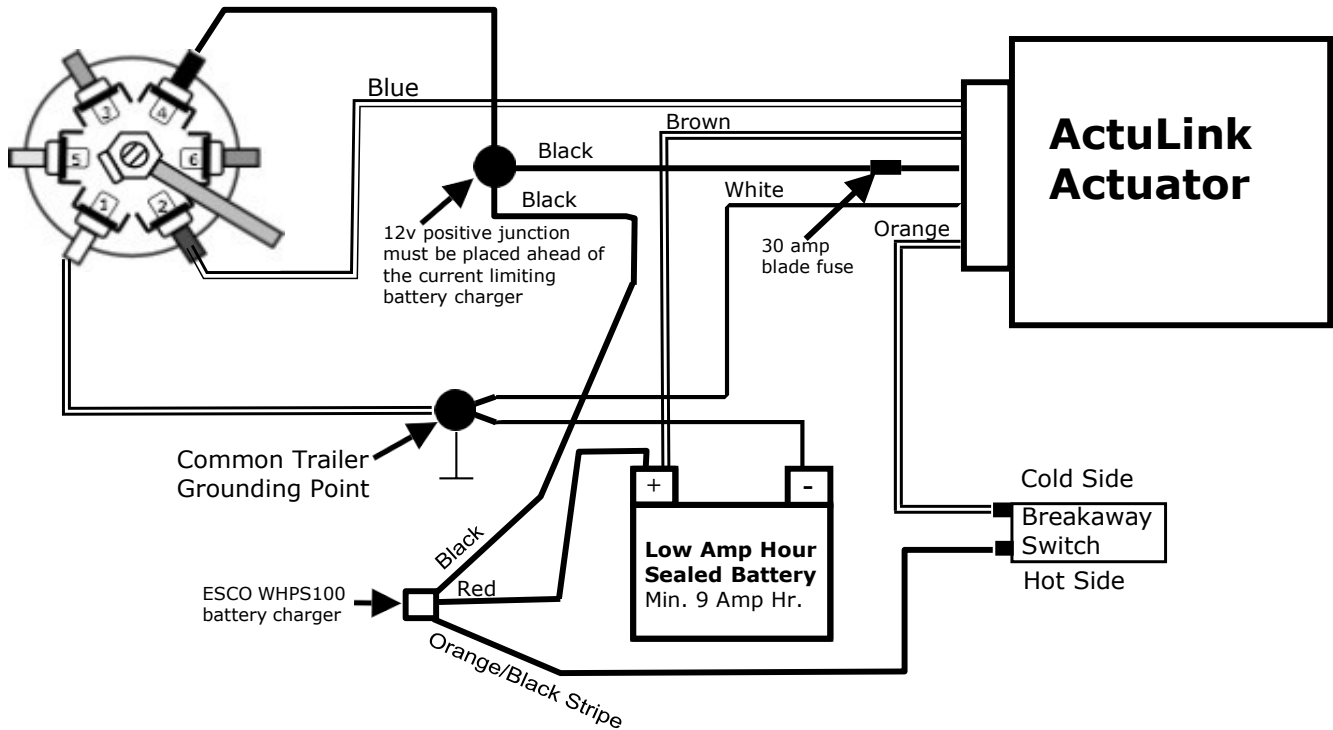
CONTINUE TO STEP 5 ONCE STEP 3 & 4 FOR OPTION #2 HAVE BEEN COMPLETED

Step 5: Connect the Blue Wire Input from the Brake Controller (via the trailer connector) to the Blue Wire of the ActuLink Brake Actuator.

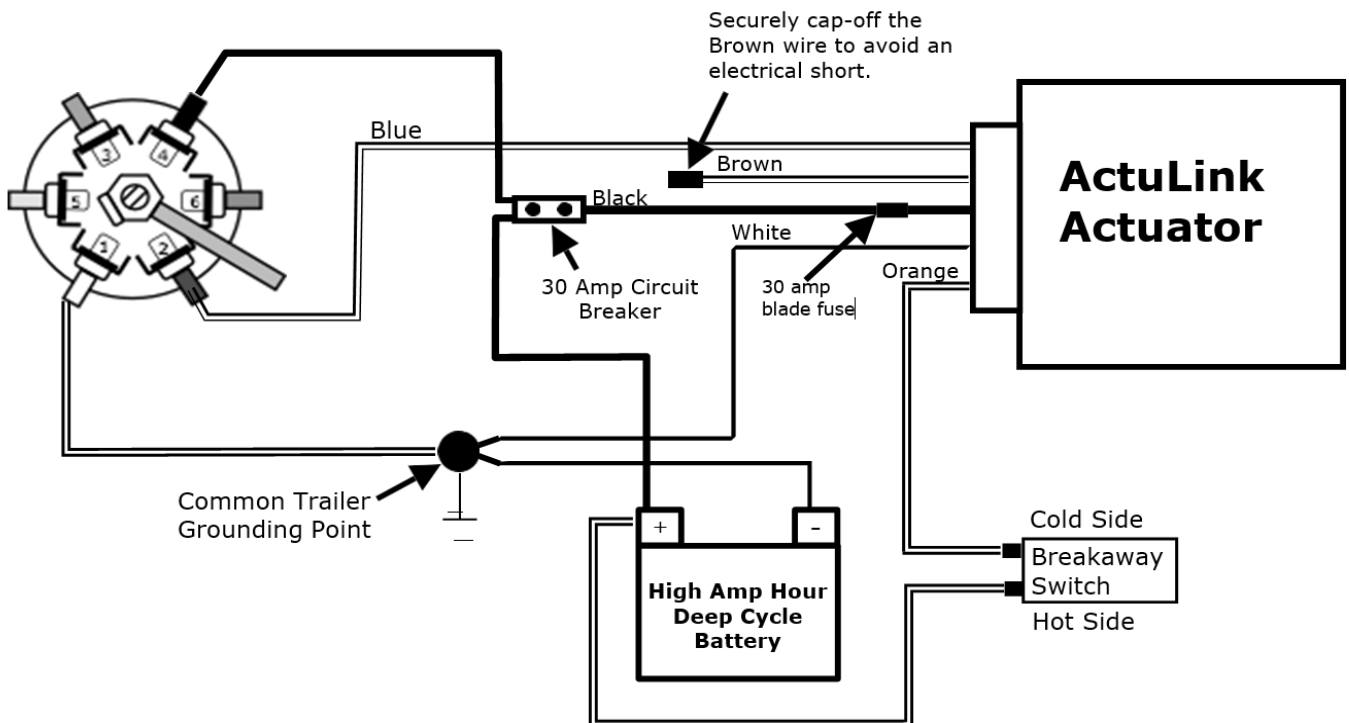
Unlike electric drum brakes, the ActuLink Brake Actuator does not draw current from the blue wire to obtain its power. The ActuLink Brake Actuator uses the PWM signal of the Blue Wire to set the level of trailer brake pressure. The Blue wire is a low current, voltage sensitive signal. Avoid running the Blue wire near inverters and/or chargers or any AC wires which can generate high levels of electrical noise.

3 Brake Actuator Installation Instructions

Wiring Diagram #1: Applications that use a low Amp Hour battery require the use of the ESCO WHPS 100 Battery Charger.



Wiring Diagram 2: Applications that use a high Amp Hour battery that does not require a current limiting "trickle charger".



3 Brake Actuator Installation Instructions

Step 6: Verify the Operation of the ActuLink Brake Actuator

When the installation is complete, pull the pin from the breakaway switch which will activate the ActuLink Brake Actuator. After the ActuLink Brake Actuator activates, replace the pin into the breakaway switch. Next, plug the trailer connector into the tow vehicle. With the tow vehicle ignition switch on, operate the ActuLink Brake Actuator using the MANUAL OVERRIDE on the brake controller. The ActuLink Brake Actuator's operation should follow that of the controller's manual override.

3.7 ActuLink Brake Actuator Battery Charging

For safety and braking performance, the trailer battery must be kept fully charged. The proper wire size from the tow vehicle battery (via trailer connector) (+ and -) to the trailer battery must be used to ensure adequate battery charging. Failure to supply enough current to the trailer under normal operating conditions will result in depleting the trailer battery's charge. This will cause poor braking performance or brake failure. Under normal operating conditions during towing, the voltage supplied to the trailer battery should not fall below 13.5V. Normal operating conditions include braking, use of trailer lights, and/or running appliances.

NOTE: The breakaway battery should be no less than a **9 Amp Hour battery**. If a gel cell or other type of small low Amp Hour breakaway battery is used, the charging current must be limited per the battery manufacturer's instructions. Do not store your trailer without some type of device to keep the battery charged. This will ensure long battery life and improve your trailer brake performance.

3.8 Voltage Transients

"Voltage transients" can occur when switches are used on inductive loads. Pressure switches driving compressor motors, manual switches driving pump motors, or relay coils can create voltage transients. These voltage spikes can exceed several hundred volts when the switch is opened (turned off). These transients can damage sensitive electronic devices that are connected to the same trailer power. Transient Voltage Suppression devices should be used when switching inductive loads on the trailer. Contact your compressor supplier, pump motor supplier, or supplier of any appliance or trailer component for the appropriate transient protection device.



When you are installing the ActuLink Brake Actuator, it is essential that you follow all set-up, wiring and test procedures to ensure that your ActuLink is properly installed and tested. Failure to follow these procedures may damage the ActuLink Brake Actuator and may result in serious **Warning!** or fatal injury and/or property damage.



Do not connect the wires of the ActuLink by color but by their function! Failure to follow these instructions may damage the ActuLink and will void your warranty. **Warning!**



Alternating Current (AC) and Direct Current (DC) wires must not come into contact with or run closer than 6 inches of each other. AC wiring within close proximity to DC wiring can induce energy onto the DC circuits, which may result in damage or cause electronic devices to malfunction. **Warning!**



Prior to welding or electrostatic painting on the trailer, the ActuLink Brake Actuator wiring harness connector must be completely disconnected from the brake actuator and you must remove the brake line from the ActuLink Brake Actuator fitting. Failure to remove the harness connector and brake line fitting prior to welding may cause damage to the ActuLink's electronics, which will void your warranty. **Warning!**

3 Brake Actuator Installation Instructions



It is critical that you verify that your breakaway system functions properly. Failure to maintain a properly functioning trailer breakaway system can result in serious or fatal injury and/or property damage in the case of a trailer breakaway condition.

Warning!

3.9 Breakaway Protection

A breakaway system (sold separately) is required to supply power to the ActuLink Brake Actuator system in the event the trailer becomes uncoupled from the towing vehicle. A breakaway kit consists of a switch, battery and battery case. A cable attached to the breakaway switch must be securely attached to the towing vehicle during use. (Refer to instructions provided by the Breakaway Kit Manufacturer.) In the event of unplanned uncoupling, the breakaway cable must cause the breakaway switch to close, thus activating the trailer's brakes and holding the brakes on for a minimum of 15 minutes.



Failure to maintain adequate charge in the breakaway battery will result in the breakaway system not functioning properly. This may result in serious or fatal injury, and/or property damage in the event of a breakaway!

Warning!

3.10 Breakaway System Test

1. Ensure the ActuLink Brake Actuator reservoir is filled with brake fluid according to the instructions on **Section 3.3** of this manual.
2. Ensure that the trailer is NOT connected to the towing vehicle via the trailer electrical connector.
3. Pull the pin from the breakaway system. The ActuLink Brake Actuator should turn full-on immediately and run at full pressure for 20 seconds. After 20 seconds, the ActuLink Brake Actuator should continue to operate but at a lower pressure (approximately 300 psi) that will hold and lock the trailer brakes.
4. Once you have verified that the breakaway system functions, replace the pin into the breakaway switch.

3.11 Bleeding Air from The Brake System

It is essential to bleed all air from your trailer brake system for it to operate optimally. You must bleed the system prior to towing your trailer. For best results, two people should perform these procedures.



Eye protection should be worn at all times when bleeding the ActuLink Brake Actuator and brake lines. When activated, the ActuLink Brake Actuator will generate high brake fluid pressure, so take care of protecting yourself and your trailer and ensure the plastic tubing is securely held in place during bleeding.

Warning!

IMPORTANT ISSUES TO CONSIDER WHEN BLEEDING THE BRAKES

- Please be aware that the ActuLink Brake Actuator will pump a large volume of brake fluid in a short period of time. Therefore, it is important to closely monitor the brake fluid level and re-fill the reservoir as needed. **IF THE BRAKE FLUID FALLS BELOW THE PUMP INLET (which is located at approximately 3/4 inch from the bottom of the tank): THE PUMP WILL CREATE A BUBBLY FROTH WHICH WILL ENTER THE BRAKE LINES. IF THIS HAPPENS, IT MAY TAKE UP TO 8 HOURS BEFORE THE BRAKE LINES CAN BE SUCCESSFULLY RE-BLED.**
- Do not bleed the brakes with the ActuLink Brake Actuator's brake fluid reservoir cap on the unit. The bladder on this cap may be damaged if the cap remains on the unit during bleeding.

3 Brake Actuator Installation Instructions

- Brake fluid can cause damage to painted surfaces. Clean up any spills on painted surfaces immediately.
- It is recommended that the entire brake system be re-bled after the first 100 miles of road travel. It is not uncommon for air pockets to remain in the system after the brake system has been bled. This air will normally work its way to the brakes during a short period of use. Re-bleeding the brakes should completely resolve this issue.

Bleeding the ActuLink Brake Actuator

1. Remove the dust cap from the bleed screw on the top of the ActuLink Brake Actuator unit and place plastic tubing onto the bleeder.
2. Immerse the opposite end of the tubing in a clean clear container partially filled with brake fluid.
3. Activate the ActuLink Brake Actuator by either pulling the breakaway switch, or if you have the trailer plugged into the tow vehicle and the ignition switch turned on, you can use the manual control of the brake controller - always use full pressure when bleeding the brake system. As the ActuLink Brake Actuator is running, open the bleeder screw one half turn and brake fluid will be expelled through the plastic tubing into the container.
4. Watch the free end of the plastic tube for air bubbles emerging into the container of brake fluid.
5. Continue bleeding the ActuLink until the fluid is clear and free of air bubbles.
6. Tighten the bleeder screw and THEN turn off the ActuLink. Remove the plastic tubing and replace the dust cap. The ActuLink is fully bled.

Bleeding the ActuLink ABS Control Module

1. After bleeding the ActuLink Brake Actuator, as outlined above, use the same method to bleed the ABS Control Module.

Bleeding the Brake Lines

Note: Since each brake line is an independent channel originating at the ABS Control Module, the brake lines can be bled in any order.

1. Place plastic tubing on the first wheel cylinder bleeder screw (drum brakes) or caliper bleeder screw (disc brakes) to be bled.
2. Place the loose end of the plastic tubing into a clean clear container so that the end of the tubing is completely submerged in brake fluid to observe air bubbles being removed from the system during the bleeding process.
3. Activate the ActuLink Brake Actuator by either pulling the breakaway switch, or if you have the trailer plugged into the tow vehicle and the ignition switch turned on, you can use the manual control of the brake controller - always use full pressure when bleeding the brake system.
4. As the ActuLink Brake Actuator is running, loosen the bleeder screw located on the selected wheel cylinder (drum brakes) or the caliper (disc brakes) one half turn and brake fluid will be expelled through the plastic tubing into the container.
5. Bleeding is complete when bubbles are no longer observed. At that point, while the ActuLink Brake Actuator still pumping fluid, close the bleeder screw securely.
6. Repeat this bleeding process for all wheel cylinders or calipers.
7. **Periodically check and re-fill the ActuLink Brake Actuator reservoir as needed during the bleeding process so that air does not enter the system. See "IMPORTANT ISSUES TO CONSIDER WHEN BLEEDING THE BRAKES" section for more information.**

3 Brake Actuator Installation Instructions



Failure to properly bleed the air from the ActuLink Brake Actuator, brake lines and calipers (or wheel cylinders) will significantly diminish the performance of your trailer brake system which may result in serious or fatal injuries and/or property damage!

Warning!



Warning!

You must monitor the level of brake fluid in the ActuLink Brake Actuator. If a brake line fitting becomes loose, or the brake line is broken, the brake system can lose brake fluid rapidly. Before towing your trailer, verify that your ActuLink Brake Actuator's brake fluid reservoir is full and that the system pressurizes without leaking at any point. If your brake system has a leak, repair it before towing your trailer. Failure to follow these instructions may result in serious or fatal injuries and/or property damage.

3.12 Brake Fluid Level Sensor

ActuLink Brake Actuators have a built-in brake fluid sensor which automatically monitors the amount of brake fluid in the ActuLink Brake Actuator reservoir. The data will display on the Trailer Status Module and Bluetooth Status Module (optional). The ActuLink Brake Controller's fluid level sensor automatically monitors the brake fluid level and sends the data to the Trailer Status Module and Bluetooth Status Module. This system has three levels: OK, low and empty.

The Trailer Status Module and Bluetooth Status Module will automatically warn the operator when brake fluid is low or empty. It is also important to note that if the brake fluid reservoir is empty, the ActuLink Brake Actuator disables itself so the hydraulic pump is not destroyed by running without fluid.

We encourage you to use the ActuLink Brake Actuator in combination with the Bluetooth Status Module option to make it more accessible to the operator to view any diagnostics on the trailer braking system.

3.13 Complex Brake System Bleeding

Bleeding a triple axle, Tuson Standalone ABS System with Dexter Disc Brakes*

* Because of their dual piston design and bleed screw arrangement, Dexter disc brakes have special bleeding requirements - see below.

1. Fill the Actuator reservoir to the bottom of the filler cap neck with new DOT 3 or DOT 4 brake fluid from a sealed container.
2. Attach a clear plastic tube to the bleed screw on the Actuator (① in **Figure #1** in this section).
3. Apply the manual override 100% and wait for the pressure to build in the system by listening for a load on the Actuator motor or viewing the pressure on the Trailer Status Module and Bluetooth Status Module (above 1000 psi).
4. Crack the bleed screw on the Actuator and observe the fluid as it passes through the clear tubing. With the pressure at maximum, leave the bleed screw open for 2 seconds, then close it for 1 second, and repeat this process until the fluid stream is free of bubbles and foam.

IMPORTANT: Be sure that the Actuator pressure is at maximum and fluid is flowing out when the bleed screw is tightened. Do not remove pressure from the system prior to closing the bleed screw since that will allow air back into the system.

IMPORTANT: Be sure to watch the fluid level in the Actuator or view the Trailer Status Module and Bluetooth Status Module to see when the two-digit low level warning comes on and add brake fluid to the Actuator as needed before continuing.

3 Brake Actuator Installation Instructions

5. Repeat steps 1-4 for the ABS Control Module and the disc brakes following the sequence outlined in **Figure #1** in this section. Use the bleed screw on the disc brakes as shown in **Figure #2** in this section. When loosening the bleed screw on the disc brakes, be sure that the fitting is not loosening with the bleed screw. You may need to tighten the fitting into the caliper prior to loosening the bleed screw.
6. Locate the input line, tube nut and fitting on the inside of the disc brakes (see **Figure #2** in this section). Perform the following additional bleed process on the brakes in the sequence of ③ thru ⑧ in **Figure #1**:

Apply full manual override and allow the system to get to max pressure. Loosen the tube nut on the ③ disc brake slowly until a stream of fluid is allowed to squirt out on the floor (or into a pan). Use the same method of opening for 2 seconds and closing for 1 second as described in step 4. Continue loosening and tightening the tube nut until the fluid stream is free of bubbles and foam. Repeat this same process for disc brakes ④ to ⑧.
7. Repeat the bleeding process once again using the bleed screws (see **Figure #2**) and clear plastic tubing for brakes ③ thru ⑧ (in that sequence).

SEE FIGURE #1 AND #2 ON THE FOLLOWING PAGE

3 Brake Actuator Installation Instructions

Hydraulic System Bleeding Sequence for Tuson Trailer ABS System on a Triple Axle Trailer

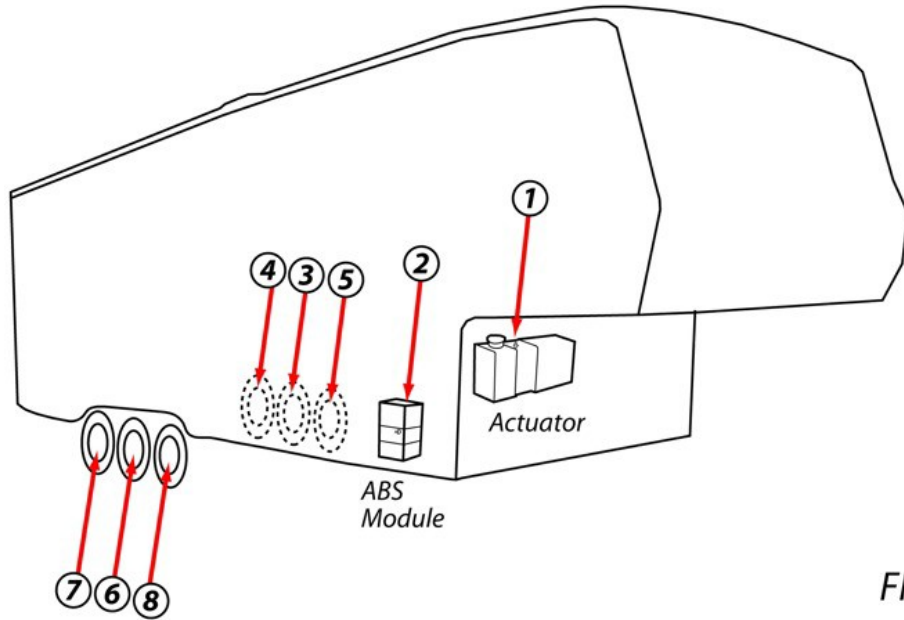


FIGURE #1

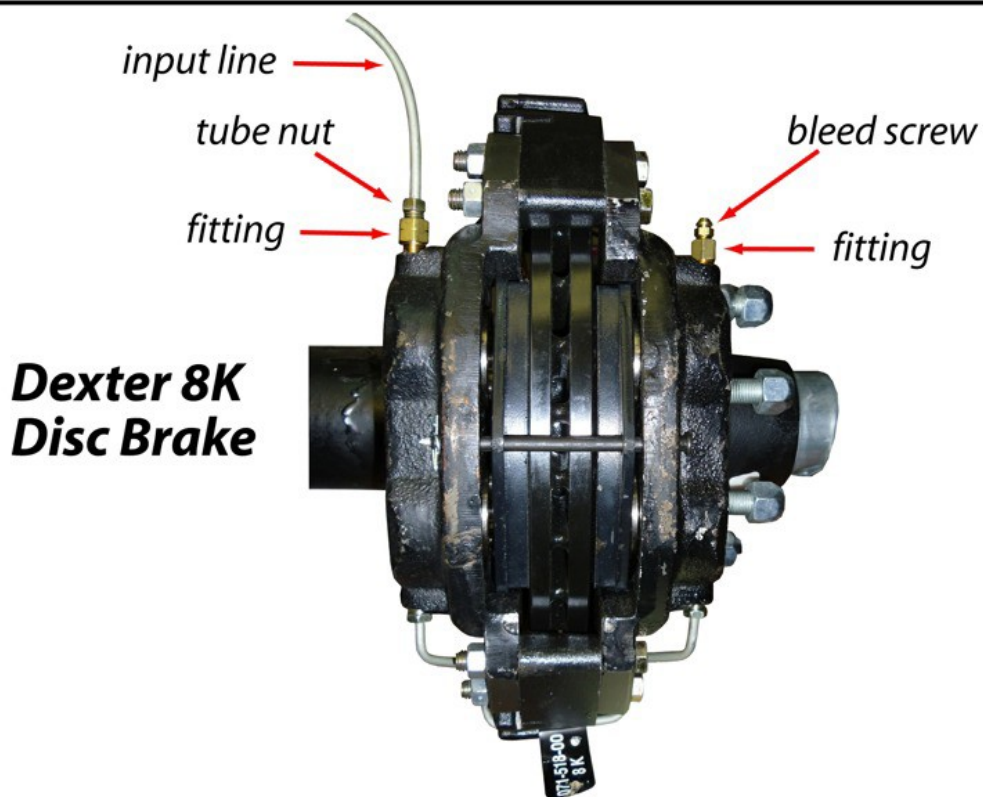


FIGURE #2

4 General Operation

4.1 Load Capacity and Use of Trailer Brakes

The brakes installed on the trailer determine the brake capacity of the trailer, not the ActuLink Brake Actuator. Refer to the owner's manual from the trailer manufacturer and the towing vehicle owner's manual to determine maximum towing capacity. It is the sole responsibility of the installer to ensure that the actuator is properly sized with the brake system on the trailer so that the time to build brake line pressure in the trailer brake system is not excessive.



The ActuLink System is also not intended to be used as a parking brake.

The trailer brakes are not to be used at any time as the primary source of braking for the towing vehicle.

Warning!

4.2 Coupling

When coupling the trailer to the towing vehicle, always ensure the two vehicles are properly coupled and latched, including the safety chains and breakaway switch cable, in accordance with the vehicle manufacturer's instructions and trailer manufacturer's instructions. All coupling devices and procedures must conform to State and Federal regulations.

4.3 Trailer Connector - Vehicle Connector

A towing vehicle equipped with a brake controller can be electrically connected to the ActuLink Brake Actuator installed on a trailer using a conventional seven pin trailer connector-vehicle connector. However, the pins of the vehicle connector and the pins of the trailer connector must be wired exactly the same according to the function of each wire -- NOT JUST BY WIRE COLOR. If the functionality of the mating pins in the trailer connector and the vehicle connector do not correspond by the function of the attached wires, the ActuLink will not operate. It is IMPERATIVE that these connections are correct. See **Sections 3.5 & 3.6** of this manual for complete details.

After properly coupling the trailer to the towing vehicle, plug the trailer connector into the mating connector of the towing vehicle.

There are two checks to ensure proper connection has been made.

The first check is visual, as many brake controllers have a lighted display, refer to the controller manufacturer's instructions for details. If there is a problem with the connection, refer to your brake controller manual for complete details on verification of wiring continuity.

The second check requires using the manual override lever on the brake controller. Position a second person near the ActuLink Brake Actuator. With the ignition switch turned on, the vehicle stationary and in Park, move the manual over-ride lever of the brake controller. The person near the ActuLink Brake Actuator will hear the motor engage if the tow vehicle and trailer are properly connected. If the Actuator does not function, immediately discontinue operation and correct the condition that is causing the Actuator not to function.

Important: See the Troubleshooting section of this manual, **Section 7**, if the ActuLink Brake Actuator does not operate.

5 Determining & Setting Proper Trailer Braking Force

Brake Controller Signal Determines Trailer Brake Pressure.

Trailer braking pressure is controlled by the use of a brake controller. This allows the driver to select the level of trailer braking for the trailer, from the driver's position in the towing vehicle. Increasing or decreasing the "gain" or "scale" setting of the brake controller, will increase or decrease the level of brake force generated by the ActoLink Brake Actuator unit. The ActoLink only applies the level of braking indicated by the brake controller's "blue wire" signal. Therefore, we urge you not to economize on a brake controller because it will only diminish the overall performance of ActoLink and your trailer braking system in general. Refer to brake controller manufacturer's manual for instructions to properly adjust the controller settings.

5.1 Settings and Use of Brake Controllers

The settings of the brake controller are set by the driver. When properly set, the braking force of the trailer will provide sufficient braking so the brakes of the towing vehicle are not required to provide any braking force for the trailer. Variations in the controller settings may be required for different road conditions and for changes in trailer load. It is essential to maintain sufficient braking on the trailer on wet or slippery road surfaces. More braking with the trailer may help prevent the possibility of a jack-knife situation or prevent the trailer from pushing the towing vehicle. The brake controller allows for manual activation of the trailer brakes independent of the tow vehicle, by using the manual override feature of the controller.

Become Familiar with Braking of the Coupled Tow Vehicle and Trailer.

After the system installation has been verified, the operator should take the trailer to an empty parking lot to become familiar with the operation of the braking action of the combined tow vehicle-trailer. Each driver has different driving habits, and each vehicle has unique braking characteristics. Each potential driver of the coupled tow vehicle and trailer should take some time to familiarize themselves with the response and handling of the trailer using various settings on the brake controller. Each driver must be familiar with the operation of the in-cab brake controller and understand how to make adjustments to achieve the most desirable braking force (see brake controller manufacturer's instructions).

5.2 Approved Brake Controllers



DireLink Brake Controller (DL-100): The Brake Controller We Recommend

Tuson's DireLink Brake Controllers provide the most reliable and accurate aftermarket trailer braking experience by constantly monitoring vehicle/trailer status by connecting directly and auto-configuring to the source, the tow vehicle network. Below are some highlights of the DireLink Brake Controller:

- **The DireLink is a network computer providing network-based proportional trailer braking.** There is simply nothing else like it. But you don't have to be a computer nerd to know how to use it.
- **DireLink automatically configures to your vehicle network.** By simply plugging right into the OBDII or diagnostic connector under your dashboard, the DireLink automatically determines what vehicle and network type you have.

5 Determining & Setting Proper Trailer Braking Force

- The DirecLink only observes the data on your tow vehicle and **follows all industry standards in connecting to this network.**
- Once installed it constantly monitors the computer network of your tow vehicle. When you apply the brakes, DirecLink already has a **complete picture of what is happening** from all the data available on your tow vehicle's network.
- When you install DirecLink you can **fine tune the braking level to match your preference.** When controlling the trailer brakes, DirecLink takes your settings and the data from the tow vehicle to determine the proper level of trailer braking.
- DirecLink monitors 10+ parameters to **ensure the integrity of your trailer braking system.** The DirecLink constantly monitors the following parameters:
 - Trailer Connection
 - Tow Vehicle Battery Voltage
 - OBDII Network Connection Integrity
 - Brake controller ground connection
 - Brake controller power connection
 - Engine RPM
 - Blue wire current output
 - Blue wire voltage output
 - Blue wire short
 - Brake switch voltage
 - Low Speed Brake Adjustment
 - Transmission Temperature (Ford & GM vehicles using VPW/PWM Network Protocols)
 - HD Truck Network compatibility

If any faults occur with the above parameters, a message is immediately displayed in the color display of the DirecLink. This pinpoints your problem and eliminates any guessing on your part as to the root cause. This provides peace of mind knowing that your trailer brake system is monitoring many crucial electrical connections. It also provides a powerful diagnostics tool to check out your system before departing on a trip.

- When you apply the brakes, DirecLink **uses multiple data points in a proprietary way** to determine the proportional level of trailer braking.
- There are **differences in the braking performance between drum brakes and disc brakes** and these are accounted for when DirecLink detects your brake type and allows you to further adjust for these differences with the low speed brake adjustment.
- Taking everything above into consideration, DirecLink creates an entire, non-linear braking curve resulting in **extremely smooth, responsive trailer braking.**

Additional Approved Brake Controllers

The aftermarket brake controllers that have been tested and approved for use with the ActuLink Standalone ABS are:

Hayes:

- Genesis
- Energize XPC
- Endeavor
- Energize III

Tekonsha:

- Prodigy
- P3

REDARC

Aftermarket brake controllers that were tested and **NOT** approved for use with the ActuLink Standalone ABS and may damage the ActuLink Brake Controller are:

- GSL Brake Controllers
- Voyager by Tekonsha (LED type controller)

IMPORTANT: If some aftermarket and integrated trailer brake controllers do not show "connected" when connected to the ActuLink Brake Actuator, a separate controller adapter module (HBA-CAM) made by Cargo Towing Solutions will be required to resolve the problem. Contact Tuson RV Brakes, LLC for more information.

The ActuLink Brake Actuator may work with other controllers, but the operation of the Actuator and trailer braking performance may NOT be optimized. (A brake system's operational quality can be no better than the operational quality of the brake controller!)

5 Determining & Setting Proper Trailer Braking Force



Warning!

If a brake controller is used that has not been tested or approved by Tuson, it is the sole responsibility of the end user to ensure that the brake controller they have installed is compatible with the ActuLink Brake Actuator. Tuson attempts to provide compatibility with most brake controllers but is not able to anticipate design and functionality changes introduced by the manufacturers of brake controllers.

NOTE: Tuson does not endorse the use of time-based brake controllers. The output of a time-based controller is not proportional to the deceleration of the towing vehicle. Therefore, when linked to a time-based brake controller, the ActuLink will not generate brake pressure proportional to that of the tow vehicle deceleration.

NOTE: Unlike electric drum brakes, the ActuLink does not receive its power through the "blue wire". The power to the ActuLink is provided through a +12 volt (normally black) wire from the tow vehicle connector.



Warning!

It is essential that each driver read and fully understand the brake controller operating manual provided by the manufacturer of the brake controller. Failure to fully understand the use and operation of the brake controller by each driver may cause loss of vehicle control. This may result in serious or fatal injury and/or property damage!

Do Not Ride You Brake Pedal

This will cause constant pressure from the ActuLink unit to the trailer brakes, resulting in premature wear and overheating. This may also cause damage to the ActuLink unit or cause damage to the internal components of the system, as well as damage to your hydraulic brakes.

In the event you are required to be stopped with the tow vehicle brake pedal depressed for an extended period (and if the brake controller installed in your tow vehicle continues to send a signal when your vehicle has stopped), the ActuLink unit's pressure relief feature is activated. This pressure relief feature reduces brake line pressure after 20 seconds of constant, and unchanging braking signal from the brake controller (and thereby reduces the wear on your actuator) and keeps your brake lines pressurized until the brake pedal in the towing vehicle is released.

Trailer braking pressure is controlled by the use of a brake controller. This allows the driver to select the level of trailer braking for the trailer, from the driver's position in the towing vehicle. Increasing or decreasing the "gain" or "scale" setting of the in-cab brake controller, will increase or decrease the level of brake force generated by the ActuLink unit. The ActuLink only applies the level of braking indicated by the brake controller's "blue wire" signal. Therefore, we urge you not to economize on a brake controller because it will only diminish the overall performance of ActuLink and your trailer braking system in general. Refer to brake controller manufacturer's manual for instructions to properly adjust the controller settings.

6 Service and Maintenance

For optimum trailer braking, everything in the brake system must be in good working order. Periodically check the complete braking system, including the brakes lines and hoses, wiring and vehicle-trailer connector plugs for damage, corrosion or leaks. Ensure brake lines and wires are secured so they do not hang down, drag or get caught when the trailer is in motion. Inspect friction pads or linings for excessive wear according to the directions of the brake manufacturer.

Every 3,000 miles or annually, it is best to perform (or have a certified trailer service center perform) a complete inspection of the brake pads or linings, wheel bearings, races and seals, as well as the trailer battery.

Always Work Safely

Caution: Before removing any tires/wheels to work on the trailer brakes, certain safety procedures must be followed. The trailer needs to be parked on a hard, flat level surface. The tires on the opposite side you plan to work on must be chocked to prevent any possible movement forward or backward. The trailer must be jacked up according to the manufacturer's instructions and properly rated jack stands installed to support the trailer's weight while the work is being performed.

If you don't feel comfortable performing this type of maintenance yourself, you should have an authorized service center do it for you.

Make Sure the Breakaway Battery is Fully Charged

Always check the breakaway battery to verify it is fully charged when coupling your trailer for use. There is only one sure way to verify that your breakaway battery is fully charged: Use a voltmeter to check the voltage of your breakaway battery during current draw. To do this, pull the breakaway switch pin out of the breakaway switch assembly to activate the ActuLink unit, while simultaneously placing the positive probe of voltmeter to the positive terminal of the breakaway battery and the negative probe of the voltmeter to the negative terminal of the breakaway battery. If the reading of the voltmeter is less than 12 volts, charge the battery per the manufacturer's recommendation. See the operation manual of your voltmeter to ensure proper setup and usage of your voltmeter.



Failure to maintain proper charge on the breakaway battery will result in the breakaway system not functioning properly. This may result in serious or fatal injury and/or property damage in the event of a breakaway!

Warning!



Failure to use the proper size battery and to maintain proper charge on the breakaway battery will result in the breakaway system not functioning properly. This may result in serious or fatal injury and/or property damage in the event of a breakaway! Use no less than a **9 Amp Hour**

Warning! rated battery.

Charge Battery When Necessary

If the battery's charge is low, or if the trailer has been parked for a prolonged period without a device to keep it charged, charge the battery per the manufacturer's recommendation. Use the procedure outlined above to determine if the breakaway battery is fully charged. Always follow battery manufacturer's maintenance instructions.

Testing the battery in the manner outlined above confirms that the battery is charged. However, it does NOT confirm the brakes are functioning properly. **Regular inspection, adjustment, and maintenance of the braking system is necessary to ensure proper brake operation.** You should have a comprehensive brake system inspection every 3000 miles and annually.

Check Brake Fluid Level

Verify brake fluid level before each use. The fluid level should be approximately 3/4 inch from the top of the filler tube opening. Use care to prevent contamination of the fluid with dirt, water, or other foreign material when removing

6 Service and Maintenance

the filler cap, checking the fluid level, or when adding fluid to the reservoir.



The use of contaminated brake fluid may cause the ActuLink system to malfunction, which may result in serious or fatal injury and/or property damage!

Warning!

If the battery's charge is low, or if the trailer has been parked for a prolonged period without a device to keep it charged, charge the battery per the manufacturer's recommendation. Use the procedure outlined above to determine if the breakaway battery is fully charged. Always follow battery manufacturer's maintenance instructions.

Built-In Brake Fluid Level Sensor

The Actuator has a built-in brake fluid sensor which automatically monitors the amount of brake fluid in the Actuator reservoir. For complete information about this sensor and how it works, please see the Brake Fluid Level Sensor section on **Section 3.12** of this manual.

7 Troubleshooting for ActuLink Brake Actuator

Problem	Diagnostic Procedure(s)
Brake controller display does NOT light when brake pedal is applied.	<ol style="list-style-type: none"> 1. "Open circuit" indicated between the trailer and the tow vehicle - inspect circuit connections per instructions outlined in this manual. 2. Brake controller not programmed / set for electric-hydraulic mode.
Brake controller shows "open circuit" or does not show connection to trailer.	Verify tow vehicle charge line has at least 13.5 volts (alternator voltage) at connector when tow vehicle is running. If you don't have at least 13.5 volts, check the fuse for the charge line and inspect wires for possible damage. Note: The ActuLink will not operate using a brake controller without an active tow vehicle charge line.
ActuLink does not run when breakaway switch is pulled.	<ol style="list-style-type: none"> 1. Verify ALL electrical connections are correct and complete, especially ground to trailer frame AND the breakaway battery ground. 2. Make sure the correct gauge wire has been used for installation (See electrical connections on Section 3.5 for gauge sizes.) 3. Charge breakaway battery and retest. See Section 6. 4. Connect white wire from ActuLink to a test battery ground. Connect the 16 ga. Orange and the 12 ga. Black wires directly to +12VDC test battery. If the ActuLink runs, replace the breakaway switch and/or breakaway battery as needed. 5. Breakaway battery is undersized. (use minimum 9 Amp Hour capacity battery.)
ActuLink does not operate using the manual over-ride lever of the brake controller.	<ol style="list-style-type: none"> 1. Verify that ALL electrical connections are correct and complete on the trailer AND the towing vehicle. The ground wire from the controller MUST be attached to the same ground point as the tow vehicle battery and the tow vehicle connector. 2. Make sure the correct wire gauge has been used for installation (See electrical connections on Section 3.5 for gauge sizes.) 3. Inspect the trailer and tow vehicle connectors. Replace corroded or damaged connectors. Ensure all wires inside the connector are secure. 4. Verify trailer connector is securely attached to the tow vehicle connector. 5. Ensure that the brake controller is an approved controller (See Section 5.2) and installed correctly per manufacturer's instructions. 6. Run "blue wire" from brake controller directly to ActuLink. If the ActuLink operates when the manual over-ride lever is depressed, check wiring between the brake controller and the ActuLink. 7. Connect voltmeter to blue wire and ground. With proper brake controller gain adjustment, the voltage should vary from zero to near full battery voltage when manual over-ride lever is depressed. If voltage is low, contact your brake control supplier. The Prodigy controller requires the trailer to be connected to the tow vehicle in order to obtain near full battery voltage when the manual lever is moved.
ActuLink takes too long to reach full pressure.	<ul style="list-style-type: none"> • Bleed the brake lines. • Check brake fluid level and check all electrical connections. • Check voltage at ActuLink connections WHILE the ActuLink is running (a minimum of +12 volts is required for the ActuLink to function properly). • Make sure the tow vehicle is delivering AT LEAST +12 volts. • Full pressure is only achieved if a 100% signal from the blue wire is applied.
ActuLink operates, but the pressure relief feature does not activate after 20 seconds.	<ol style="list-style-type: none"> 1. Verify that the blue wire of ActuLink is NOT connected to 12 volts positive. It should be connected to the blue wire of the brake controller. 2. ActuLink is sensing erratic blue wire signal from the in- cab controller. Verify the functionality of the brake controller and, if necessary, replace it. It is best to use a top-quality inertia-based controller.

7 Troubleshooting for ActuLink Brake Actuator

Problem	Diagnostic Procedure(s)
Excessive trailer braking.	<ol style="list-style-type: none">1. Reduce gain setting on brake controller.2. Blue wire to ActuLink is connected to brake light circuit3. Poor Ground - verify controller ground and tow vehicle ground are connected at the same grounding point as the negative terminal of the tow vehicle battery.4. Verify proper ground through tow vehicle and trailer connector5. Wrong ActuLink model number installed for trailer configuration6. Brake controller not properly leveled and/or oriented in the tow vehicle.
Insufficient trailer braking.	<ol style="list-style-type: none">1. Increase gain setting on brake controller.2. Verify that brake lines have been properly bled and each brake is properly adjusted.3. Verify the functionality of the brake controller according to the manufacturer's instructions. DO NOT use a time-based brake controller or LED type controllers (See Section 5.2).4. Make certain the brake controller generates approximately 12VDC from the blue wire to ground when the manual over-ride lever is fully engaged.5. Replace the brake controller if it is not functioning properly.6. Poor Ground - verify controller ground and tow vehicle ground are connected at the same grounding point as the negative terminal of the tow vehicle battery.7. Wrong ActuLink model number installed for trailer configuration8. Make sure the tow vehicle is delivering AT LEAST +12 volts when the ActuLink is running.9. Brake controller not properly leveled and/or oriented in the tow vehicle.
ActuLink abruptly applies full braking force.	<ol style="list-style-type: none">1. Inspect the breakaway switch to make certain the circuit remains held open when the pin is in place.2. Check electrical connections to the breakaway switch and breakaway battery to make certain there are no exposed wires in contact with one another.3. Replace the breakaway switch if there is any doubt about its reliability or if you have any question that it is functioning properly.4. Blue wire to ActuLink is connected to brake light circuit5. Poor Ground - verify controller ground and tow vehicle ground are connected at the same grounding point as the negative terminal of the tow vehicle battery.6. Pendulum type brake controller is not properly leveled. Adjust leveling per controller manufacturer recommendations.

7.1 Trouble Shooting Did Not Resolve the Problem

Follow these four steps to isolate the troubleshooting to the ActuLink Brake Actuator:

1. Disconnect all five wires of the ActuLink wire harness, leaving 17 inches of wire length on the original ActuLink wire harness.
2. Using a fully charged 12V battery, connect the ActuLink White wire to the negative (-) terminal of the battery. Then, connect the 12 ga. Black and 14 ga. Blue wires together to the positive (+) terminal of the battery. The ActuLink should run and should pressurize to maximum pressure. (Using a battery charger is NOT acceptable for this test as they do not generate enough amperage to operate the ActuLink.)
3. Leave the White wire connected to the negative (-) terminal of the battery and connect only the 12 ga. Black

7 Troubleshooting for ActuLink Brake Actuator

wire to the positive (+) terminal of the battery. The ActuLink should NOT run.

4. Leave the White wire connected to the negative (-) terminal of the battery and connect the 16 ga. Orange wire and the Brown wire together on the positive (+) terminal of the battery. The ActuLink should run and pressurize to maximum pressure.

If the ActuLink passes all these tests, verify that components such as the brake controller, 30 amp breaker, and trailer battery are in good working order. Also inspect the trailer wiring to make sure all connections are clear of corrosion and that all splice connections are securely connected.

If the ActuLink fails any of these tests, contact Tuson Customer Service to determine if the unit can be repaired or if it needs to be returned to Tuson for inspection.

You must follow the procedure outlined on **Section 7.1** of this manual if the ActuLink needs to be returned.

Breaking the Tamper-Proof Seal Without Prior Written Authorization from Tuson Voids Your Warranty.

The ActuLink has a tamper-proof seal on the end plate with the wire harness connector. If written authorization has been given by Tuson to perform field service and thereby break this seal, Tuson's customer service will record this information in customer files by serial number. Your warranty is voided if you return an ActuLink to Tuson with the seal broken, without documentation of that serial numbered unit being authorized to have its seal broken and service performed by someone other than Tuson. The ActuLink contains an electronic control panel with sensitive component parts. The only access to the electronic control panel is by removing this sealed end plate. This requires special instructions to be followed to properly remove the end plate and the tamper proof seal in order to prevent damage to the electronic panel. If the electronic panel or any of the internal components of the ActuLink are damaged in any way, by the customer or any third party, even if authorization has been given by Tuson to break the tamper-proof seal, the warranty is voided.

(See the **Limited Warranty** of this manual for return authorization instructions.)

If you have performed the troubleshooting and the problem persists, you should contact Tuson Customer Service: (M-F, 8:00 a.m. - 5:00 p.m. Central time) at 1-800-968-8766 (toll free) or inforvbrakes@tuson.com.

8 Trailer Status Module Installation and Setup

8.1 Trailer Status Module Connection

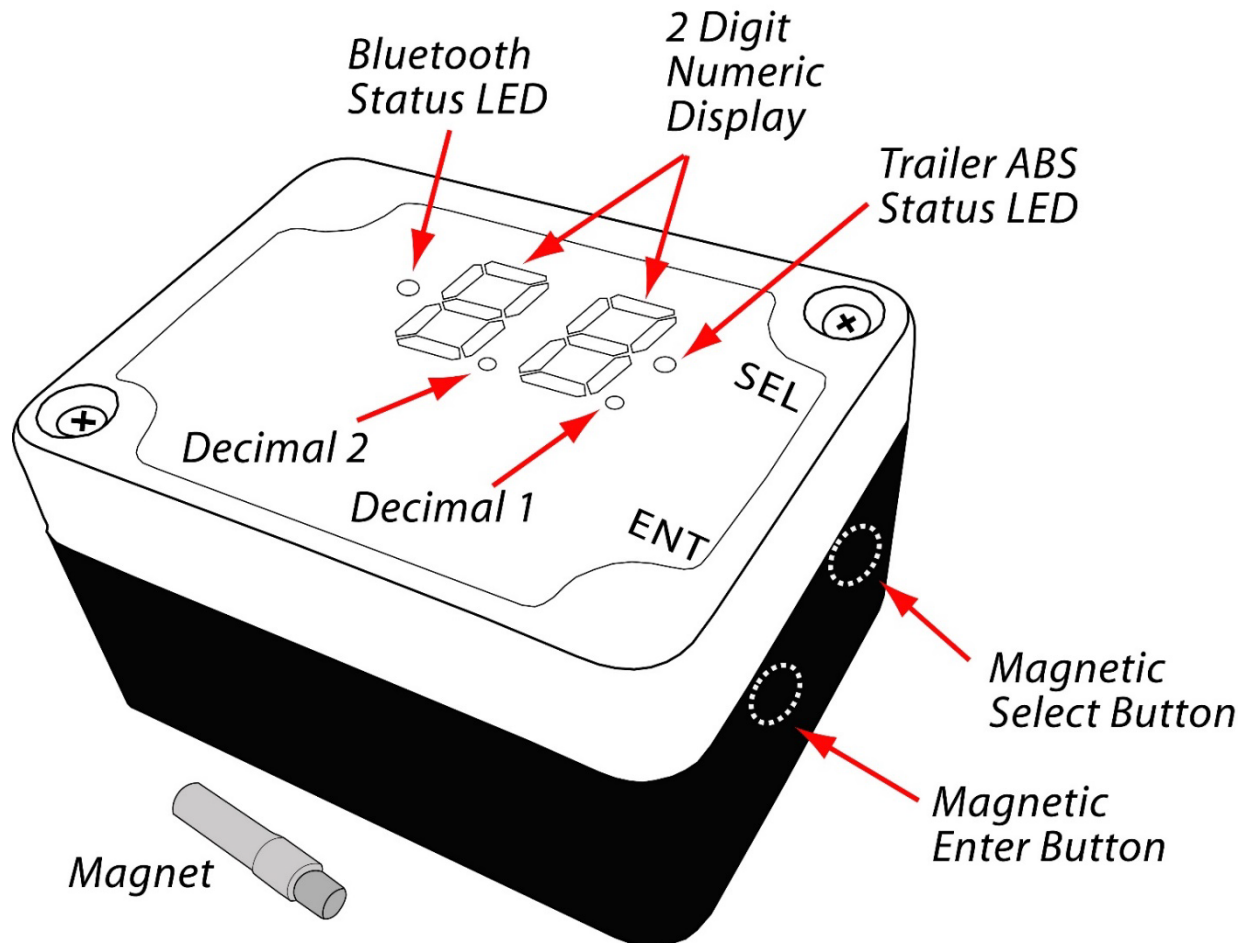
The Trailer Status Module has a cable with a male 5-pin connector that plugs directly into the female 5-pin connector on the ABS Extension Harness (see the diagram on **Section 1.2**). The ABS Extension Harness connects the Trailer Status Module to the ActuLink Brake Actuator and ABS Module.

8.2 Trailer Status Module Mounting

The Trailer Status Module comes with 3M double-sided tape on the back of the housing to be used for mounting the module on the trailer.

1. Select a place to mount the Trailer Status Module in a location on the front of the trailer where the light is easily seen by the driver. The location should be high enough on the trailer to avoid being hit by rocks or road spray created by the tow vehicle.
2. Clean the dust, dirt or debris from the surface where you plan to mount the Trailer Status Module.
3. Remove the adhesive backing from the double-sided tape on the back of the Trailer Status Module.
4. Press the Trailer Status Module firmly into place on the selected location. Ensure that the cable is secured to the trailer and not routed in a manner that could be caught on something or come loose in the wind.

8.3 Trailer Status Module Screen and Button Functions



8 Trailer Status Module Installation and Setup

8.4 Configuration Options

The Trailer Status Module is designed to allow the operator to adjust the system settings and view system performance data. The "configuration options" function contains four (4) different menus that are accessed by activating the magnetic buttons on the side of the enclosure as shown in **Section 8.3**. The magnetic buttons are activated using a "magnet key" that comes with the Trailer Status Module. There are two (2) magnetic buttons on the module; ENT (for Enter) and SEL (for Select). The buttons are located directly below the ENT and SEL text on the right side of the enclosure just below the lid sealing line on the black part of the enclosure.

To access the configuration options menu, place the magnet on the ENT button. When you have the magnet located correctly, the "Decimal 1" indicator will light up. Hold the magnet on the ENT button for 3 seconds until "c0" is displayed. You have now entered the first menu within configuration options.

The four (4) menus within configuration options are:

c0 = ABS Gain Adjust (00,01,02,03,04)

c1 = ABS enable/disable (00,01)

c2 = ABS pressure monitor (if optional pressure transducer is installed in the ABS Module) (01-25 pressure reading)

c3 = Clear Bluetooth pairing (if needing to "pair" the Trailer Status Module with a different Bluetooth Status Module) (00,01)

Once "c0" is displayed, the other three (3) menus can be selected by moving the magnet to the SEL button. When you have the magnet in the correct position on the SEL button, the "decimal 2" indicator will light up and the display will switch to "c1". As you remove the magnet from the SEL button and "decimal 2" goes dark then reapply the magnet, the display will switch to "c2". Continuing to remove and reapply the magnet will cycle through "c0 - c3". When you have selected the menu (c0, c1, c2, c3) that you wish to access, place the magnet on the ENT button for 3 seconds and the display will change to the current setting within that menu.

For example: If the "c0" menu is displayed and you apply the magnet to the ENT button for 3 seconds, you will see the display change to the current value of "c0" either 00,01,02,03 or 04. When that value is displayed, you can use the SEL button to change the value. Once you have selected the new value with the SEL button, apply the magnet to the ENT button for 5 seconds and the new value will be saved when the display goes blank.

If you are in the configuration options menus and you do not activate the ENT or SEL buttons for 60 seconds, the unit will exit the configuration options menu.

The following describes the meaning of the adjustment settings and monitor data values within the configuration options menus:

8.4.1 – ABS Gain Adjust ("c0") settings: 00, 01, 02, 03, 04

The ABS Gain Adjustment changes the trailer brake pulse rate for how quickly the brakes are released and re-applied when ABS is active. The best overall ABS Gain setting for all trailers is "00" which is the default setting from the factory. This setting has the fastest ABS pulse rate and has the smoothest feel to the driver. The other settings slow down the pulse rate as the numbers increase resulting in more aggressive braking action and a harder braking feel to the driver. The higher number settings are mainly for heavier trailers (15,000 lbs. and up) however, the "00" setting will work fine for heavy trailers. Regardless of the size of trailer you have, if you want a more aggressive feel to the ABS braking, you can adjust the ABS Gain to your desired level.

8 Trailer Status Module Installation and Setup

8.4.2 – ABS Enable/Disable (c1) settings: 00 (disable), 01 (enable)

There may be driving scenarios or conditions where the driver may choose to “disable” the trailer ABS functionality and control the brakes utilizing traditional means. The “c1” menu provides the ability to disable trailer ABS. Select “00” to disable ABS, select “01” to enable ABS. The default setting from the factory is “01”.

8.4.3 – ABS Pressure Monitor (c2) settings (optional): 01 - 25

If the ABS Module is equipped with the optional pressure transducer, the “c2” menu allows for the monitoring of system brake pressure during brake application. This is a good method to verify the condition of the braking system by running the manual override while stopped and viewing the maximum pressure that is being generated. If there are issues with the hydraulic lines or power and ground connections, the maximum pressure will not be achieved. The system pressure can also be displayed while driving however, when system pressure is being displayed, detected system faults are disabled. The following 2-digit numbers indicate the associated system pressure values:

- “00” = 0 → 99 psi
- “01” = 100 → 199 psi
- “02” = 200 → 299 psi
-
- “15” = 1500 → 1599 psi
- “16” = 1600 → 1699 psi
- “17” = 1700 → 1799 psi
-
- “25” = 2500 → and up

The maximum range of the pressure transducer is 2500 psi where the maximum range of the ActuLink Brake Actuator is limited to approx. 1,000 psi for hydraulic drum brakes and approx. 1,600 psi, for hydraulic disc brakes to avoid damage to the seals in the brake solenoids and calipers.

8.4.4 – Bluetooth Re-Pair New Device (c3) settings: 00 (keep pair), 01 (re-pair)

If the Trailer ABS system includes the optional Bluetooth Status Module the “c3” menu can be used to change the “paired device” that connects with the Trailer Status Module. If the Bluetooth Status Module was purchased with the Trailer ABS System, it will come already “paired” with the Trailer Status Module. If the Bluetooth Status Module is purchased after the Trailer ABS System, or if there is a need to change Bluetooth Status Module, it will be necessary to “pair” it with the Trailer Status Module to enable communications. To change the “pairing” of the Trailer Status Module, be sure that the Bluetooth Status Module is powered and in the “pairing” mode by selecting “01” and holding the ENT button for 5 seconds. Then select “01” on the Trailer Status Module and hold the ENT button for 5 seconds. This will place both modules in the “searching” function to enable them to “pair” together. Once both units have “paired” the Bluetooth Status LED (see **Section 8.3**) will be flashing two times on both modules. If the Bluetooth Status LED is only flashing with one flash, the pairing process was not successful. Repeat selecting “01” on both modules to retry the “pairing” process.

8 Trailer Status Module Installation and Setup

8.5 – Displayed Fault Codes

The following table shows the system fault codes that will appear on the two-digit display if the fault exists. If multiple faults are present, they will cycle each number on the display. The decimal points (see **Section 8.3**) are used to indicate which module has the fault so pay special attention to BOTH the number being displayed AND the decimal points.

8.5.1 – No Faults

Fault Code	Problem	Action Required
No display	No detected faults exist.	None

8.5.2 – ABS Control Module Faults: No Decimal

Fault Code	Problem	Action Required
01,07,31,37	Left Front Wheel Speed Sensor Fault	Check the left front wheel speed sensor for proper adjustment to the tone ring, check that the sensor plug connectors are fully engaged at both locations 1) near the ABS module and 2) near the sensor at the wheel, check for a cut or damaged sensor cable that may require sensor replacement.
02,08,32,38	Left Rear Wheel Speed Sensor Fault	Check the left rear wheel speed sensor for proper adjustment to the tone ring, check that the sensor plug connectors are fully engaged at both locations 1) near the ABS module and 2) near the sensor at the wheel, check for a cut or damaged sensor cable that may require sensor replacement.
03,09,33,39	Right Front Wheel Speed Sensor Fault	Check the right front wheel speed sensor for proper adjustment to the tone ring, check that the sensor plug connectors are fully engaged at both locations 1) near the ABS module and 2) near the sensor at the wheel, check for a cut or damaged sensor cable that may require sensor replacement.
04,10,34,40	Right Rear Wheel Speed Sensor Fault	Check the right rear wheel speed sensor for proper adjustment to the tone ring, check that the sensor plug connectors are fully engaged at both locations 1) near the ABS module and 2) near the sensor at the wheel, check for a cut or damaged sensor cable that may require sensor replacement.
05	Low Trailer Battery Voltage	Check the trailer battery charge. Charge or replace battery
06	No Network Comm. With Actuator	Check the plugs and wiring between ABS Module and Actuator. Ensure the connectors are fully engaged and no pins are damaged.
11-20, 23-30, 35,42	ABS Module Internal Fault	Contact Tuson RV Brakes for assistance
22	Tone Ring Calibration Required	Drive the trailer to 40+ MPH to complete calibration
36	Valve Diagnostics Not Completed	Cycle power on actuator then apply the manual override on brake controller while not moving to allow the valve diagnostics to complete its process.
41	Trailer ABS Disabled	Trailer ABS is disabled due to other displayed faults, normal braking is active, trailer tires will lock during heavy braking.

8 Trailer Status Module Installation and Setup

8.5.3 – Brake Actuator Module Faults: Decimal 1 and 2

Fault Code	Problem	Action Required
0.1.	Actuator Module Internal Fault	Contact Tuson RV Brakes for assistance
0.2.	Trailer Break-Away Switch Active	If the break-away switch is activating when it should not be, check the condition of the break-away switch and replace it if necessary.
0.3.	No Network Comm. With ABS Mod	Check the plugs and wiring between ABS Module and Actuator. Ensure the connectors are fully engaged and no pins are damaged.
0.4.	Actuator Overheating	Inspect the actuator to determine possible cause of excess heat
0.5.	Fluid Reservoir Fluid Empty	Add fluid and determine if the system has a leak
0.6	Fluid Level Sensor Disconnected	Contact Tuson RV Brakes for assistance
0.7.	Fluid Level Sensor Short	Contact Tuson RV Brakes for assistance
0.8.	Fluid Reservoir Fluid Low	Add fluid and determine if the system has a leak
0.9.	Actuator Module Internal Fault	Contact Tuson RV Brakes for assistance
1.0.	Actuator Module Internal Fault	Contact Tuson RV Brakes for assistance
1.1.	Short on ABS Harness Red Wire	Check for short on ABS harness red wire
1.2.	+12V on ABS Harness Red Wire	Check for +12V on ABS harness red wire

8.5.4 – Trailer Status Module Faults: Decimal 2

Fault Code	Problem	Action Required
0.1	No Network Communication	Check plugs and wiring between the Trailer Status Module, ABS Module and Actuator, ensure the connectors are fully engaged and no pins are damaged.
0.2	Low Supply Voltage, below 7 volts	Check plugs and wiring between the Trailer Status Module, ABS Module and Actuator, ensure the connectors are fully engaged and no pins are damaged, check trailer battery charge and voltage on the charge line coming from the tow vehicle.
0.3 and 0.5	No Network Comm. With Actuator	Check plugs and wiring between the Trailer Status Module and the Actuator, ensure the connectors are fully engaged and no pins are damaged.
0.4	No Network Comm. With ABS Module	Check plugs and wiring between the Trailer Status Module and the ABS module, ensure the connectors are fully engaged and no pins are damaged.
0.6	Bluetooth interface malfunction	Contact Tuson RV Brakes for assistance
0.7	No Bluetooth connection	Verify that the Bluetooth Status Module is powered and in range of the Trailer Status Module. Cycle power on the Trailer Status Module and the Bluetooth Status Module to reestablish the Bluetooth connection.
0.8	Not paired with Bluetooth Status Module	Follow instructions in section 8.4.3 to pair the Trailer Status Module with the Bluetooth Status Module.

8 Trailer Status Module Installation and Setup

8.5.5 – Bluetooth Status Module Faults: Decimal 1

Fault Code	Problem	Action Required
01.	No Network Communication	Check plugs and wiring between the Trailer Status Module, ABS Module and Actuator, ensure the connectors are fully engaged and no pins are damaged.
02.	Low Supply Voltage, below 7 volts	Check the voltage output on the vehicles power adapter and verify that it is +12V.
03. and 05.	No Network Comm. With Actuator	Check plugs and wiring between the Trailer Status Module and the Actuator, ensure the connectors are fully engaged and no pins are damaged.
04.	No Network Comm. With ABS Module	Check plugs and wiring between the Trailer Status Module and the ABS module, ensure the connectors are fully engaged and no pins are damaged.
06.	Bluetooth interface malfunction	Contact Tuson RV Brakes for assistance
07.	No Bluetooth Connection	Verify that the Trailer Status Module is powered and in range of the Bluetooth Status Module. Cycle power on the Trailer Status Module and the Bluetooth Status Module to reestablish the Bluetooth connection.
08.	Not paired with Trailer Status Module	Follow instructions in section 8.4.3 to pair the Bluetooth Status Module with the Trailer Status Module.

Limited Warranty

Tuson RV Brakes, LLC (hereafter referred to as "Tuson") warrants to the original consumer purchaser ("You" or "Your") the ActuLink Standalone ABS System to be free of defects in material and workmanship, under normal use, for a period of TWO (2) years from the original consumer purchase date. Warranty applies only to the first consumer purchaser, is nontransferable, and is limited to Tuson components. The Warranty is valid only if (a) the system or Tuson components in question are returned to Tuson for inspection and testing; (b) Tuson's inspection discloses to Tuson's satisfaction that any alleged nonconformance are material and have not been caused by misuse, neglect, abuse, normal wear and tear, improper installation or use, external causes, unsuitable storage, unauthorized repair or attempted repair, alteration, modification, accident, or any other cause which does not relate to a product defect; (c) the products were installed, maintained and used in accordance with Tuson's instructions; and (d) original receipt(s) or other acceptable proof of purchase can be proven for verification of warranty date. THIS WARRANTY IS NOT TRANSFERABLE. THERE ARE NO OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING IMPLIED WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. ALL DISPUTES WILL BE HANDLED IN ACCORDANCE WITH ILLINOIS STATE LAWS

Obligation of Purchaser

To make a Warranty claim, contact Tuson, at our principal address of 475 Bunker Court, Vernon Hills, IL 60061, call toll free 1-800-968-8766 or local 1-847-816-8800, or email inforvbrakes@tuson.com, identify the product by model number, and follow the Return Merchandise Authorization (RMA) instructions that will be provided. Any returned product that is replaced by Tuson becomes Tuson's property. You will be responsible for return shipping costs. Please retain your purchase receipt to verify date of purchase and that You are the original consumer purchaser. If you did not register your product and Tuson is unable to verify your purchase details from your product serial number, then the product and a copy of your purchase receipt must be provided to Tuson in order to process your warranty claim.

Remedy Limits

Within 60 days of receipt of such ActuLink products, 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 ActuLink products which are determined by Tuson to be defective in material or workmanship.

After 60 days, original product repair or replacement by Tuson is your sole and exclusive remedy under this warranty. At Tuson's sole option, Tuson will repair or replace the defective product with a like product. Replacement product or parts may include remanufactured or refurbished parts or components. Under no conditions will Tuson be responsible for anything other than the repair or replacement of the original product. Tuson shall not be liable for service or labor charges incurred in removing or replacing a product. IN NO EVENT WILL TUSON BE RESPONSIBLE FOR ANY INCIDENTAL, INDIRECT, SPECIAL, CONSEQUENTIAL OR PUNITIVE CLAIMS, DAMAGES, OR LOSSES, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH, INCLUDING AGAINST THE CONSUMER BY ANY OTHER PARTY.

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. Warranty covered repairs or replacements of ActuLink Products 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 sender's expense.

Assumption of Risk

The purchase or use of the product constitutes acceptance of the conditions stated in this document. Tuson makes no guarantee, warranty, or representation regarding the suitability or legality of this product. It is the consumer's responsibility to ensure regulatory compliance before purchasing or using this product. The consumer agrees to operate this product in keeping with all laws governing its use. You acknowledge and agree that any use of the product for any purpose other than the specified use(s) stated in the product instructions is at Your own risk.

Some states do not allow the exclusion or limitation of implied warranties, incidental or consequential damages, so the above limitations or exclusions may not apply to you. This Warranty gives you specific rights. You may have other rights, which vary from state to state.

If you have a problem with your ActuLink Standalone ABS System, take the following steps:

1. Troubleshoot the system as described in this installation and owner's guide. If original copy is not readable or is lost, a digital version is available for on our website www.tusonrvbrakes.com.
2. If you are still having problems after troubleshooting, and you believe you have a valid warranty claim, contact the dealer or distributor where you purchased the product.
3. If it is deemed the ActuLink Standalone ABS should be returned to Tuson for inspection and warranty consideration, the dealer or distributor will make the claim through the ActuLink supplier. If you purchased the ActuLink directly from Tuson, contact customer service at 1-800-968-8766 to make a claim.

To Make a Warranty Claim

1. All claims must include proof of purchase information. The required information is: copy of receipt or itemized bill showing name and address of the purchaser, and date of purchase, product number, serial number.
2. All returns require a Returns Merchandise Authorization (RMA). An RMA number can be obtained by contacting Tuson Customer Service at 1-800-968-8766 or inforvbrakes@tuson.com. You will be asked to provide proof of purchase information per item #1 of this section.
3. The customer, direct account OEM or distributor will return the ActuLink prepaid, securely packed in appropriate packaging. The product must be free of mud, dirt, sand, grease, or other debris, with the brake fluid completely drained from the reservoir. The shipping box must be clearly marked with the RMA number when the unit is returned to Tuson for inspection.
4. If Tuson determines the claim is valid, the ActuLink will be repaired or replaced, or credit will be issued to a direct OEM account or direct distributor.
5. If a claim is deemed invalid (See previous page) or the ActuLink is found to work properly, the direct account OEM or direct distributor will be notified and no credit will be issued for the returned ActuLink. An ActuLink with an invalid warranty claim will be returned to the sender, freight collect, unless otherwise instructed in writing.

For assistance with your ActuLink Standalone ABS System, please call 800-968-8766 or email to inforvbrakes@tuson.com.

For more information about ActuLink Systems, visit our website at www.tusonrvbrakes.com.