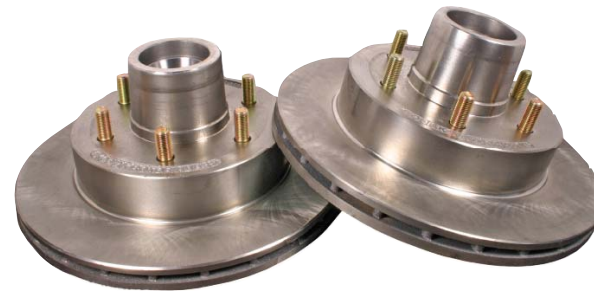


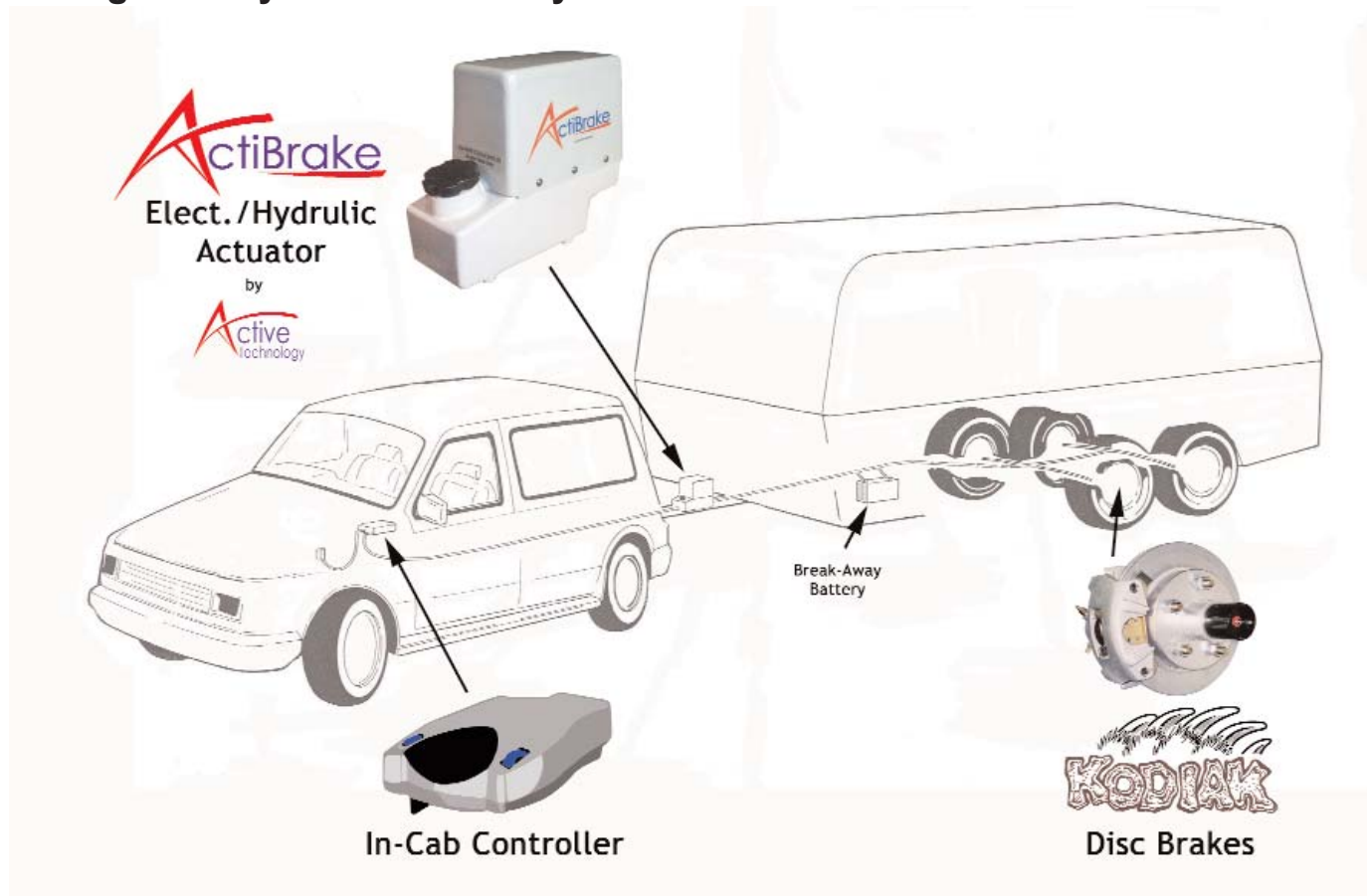
Installation of Hydraulic Disc Brake System with the ActiBrake Actuator



7600 Sand Drive
Fort Worth, Texas 76118

800-756-3425

The Integrated Hydraulic Brake System



ActiBrake - Part of a System

ActiBrake is part of a trailer braking system. For this system to be complete, you also need the following components:

- In-cab brake controller
- A reliable, fully charged 12 volt breakaway battery
- Breakaway switch
- Trailer connector - wiring harness paired with a matching tow vehicle connector, properly wired to the tow vehicle
- A reliable, fully charged 12 volt vehicle battery in your tow vehicle
- Properly rated wires and wire connectors
- Properly sized hydraulic lines free from obstructions or pinch-points
- Quality hydraulic disc or drum trailer brakes

Disc Brakes

A disc brake axle set is comprised of 2 rotors (or integral hub rotors), 2 calipers and 2 mounting brackets. Brake sets are rated from 3,500 lbs. through 10,000 lbs.

For More Information Visit
www.kodiaktrailer.com



2/RCM-12



2/HRCM-12



ROTOR-12
for 3,500 lb. axle



ROTOR/HUB-12
for 6,000 lb. axle

Two types of rotors are offered:

Rotors Only:

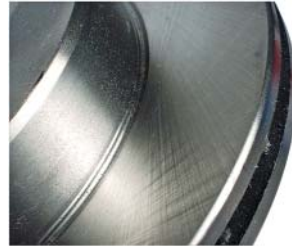
This type of rotor typically fits over a standard idler hub. Wheel studs are pressed into the hub only. The rotor is frequently wheel bolt piloted and is a loose fit on the hub. It is held in place by the wheel and wheel nuts.

Integral (one piece) Hub and Rotor:

In this type, the rotor and hub are cast as a single unit. Wheel studs are pressed into the rotor/hub. Bearing races are furnished.

Corrosion Protection Options

Corrosion resistance is important on all types of trailers and is a major consideration in salt water or other corrosive environments.



Automotive Finish



E-Coating



Silver Cadmium Plating



Stainless Steel

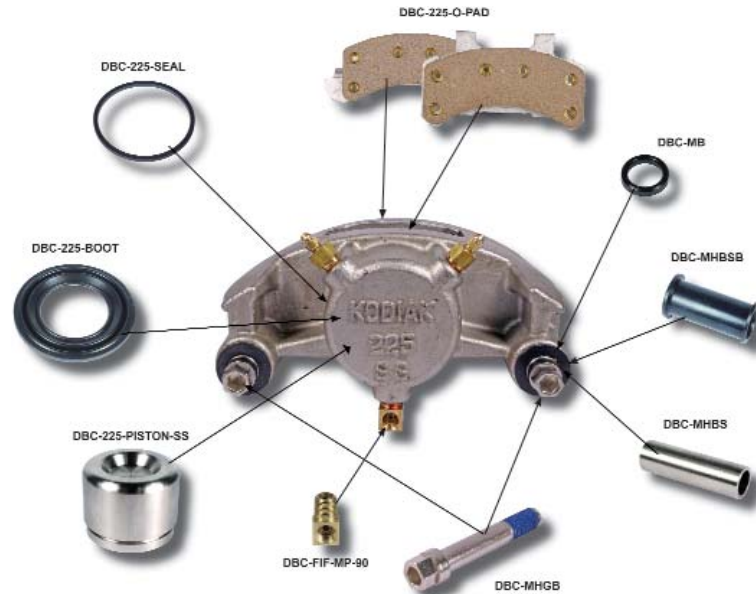
Automotive Finish: The standard automotive finish offers the least protection (i.e. during a standard salt spray test, rust will begin forming in less than 10 hours)

E-Coating: Offers the best value of protection for over the road use and for fresh water marine (or limited salt water) applications (i.e. during a standard salt spray test, rust will begin forming between 250 and 350 hours)

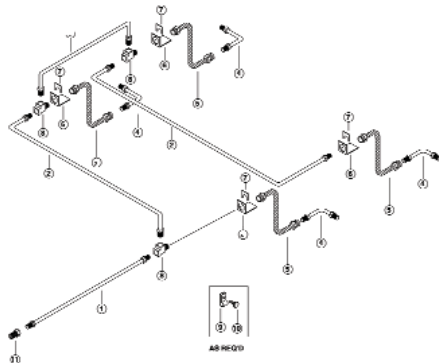
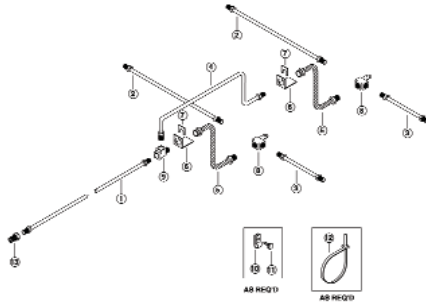
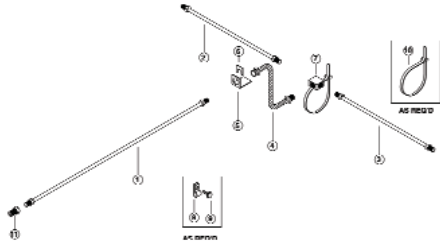
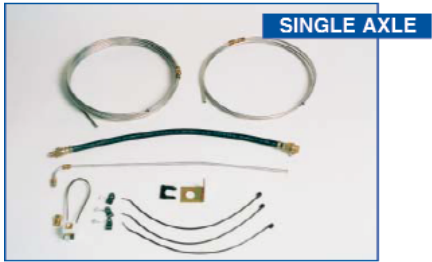
Silver Cadmium Plating: Offers the best value of protection for salt water applications (i.e. during a standard salt spray test, rust will begin forming between 400 and 600 hours).

Stainless Steel: Offers the ultimate corrosion protection in salt water marine applications (i.e. negligible rust will form during a 1000 hour standard salt spray test).

Caliper Parts Breakdown



Hydraulic Brake Line Kits



Features

All kits are supplied complete with hydraulic brake lines, brake hoses, hydraulic fittings and mounting hardware

Manufactured using double wall brazed low carbon steel tubing in accordance with SAE J527

Inverted flare tube nuts conform to SAE J512 and the flares fabricated per SAE J533B

All brake fluid carrying components meet the applicable SAE standard

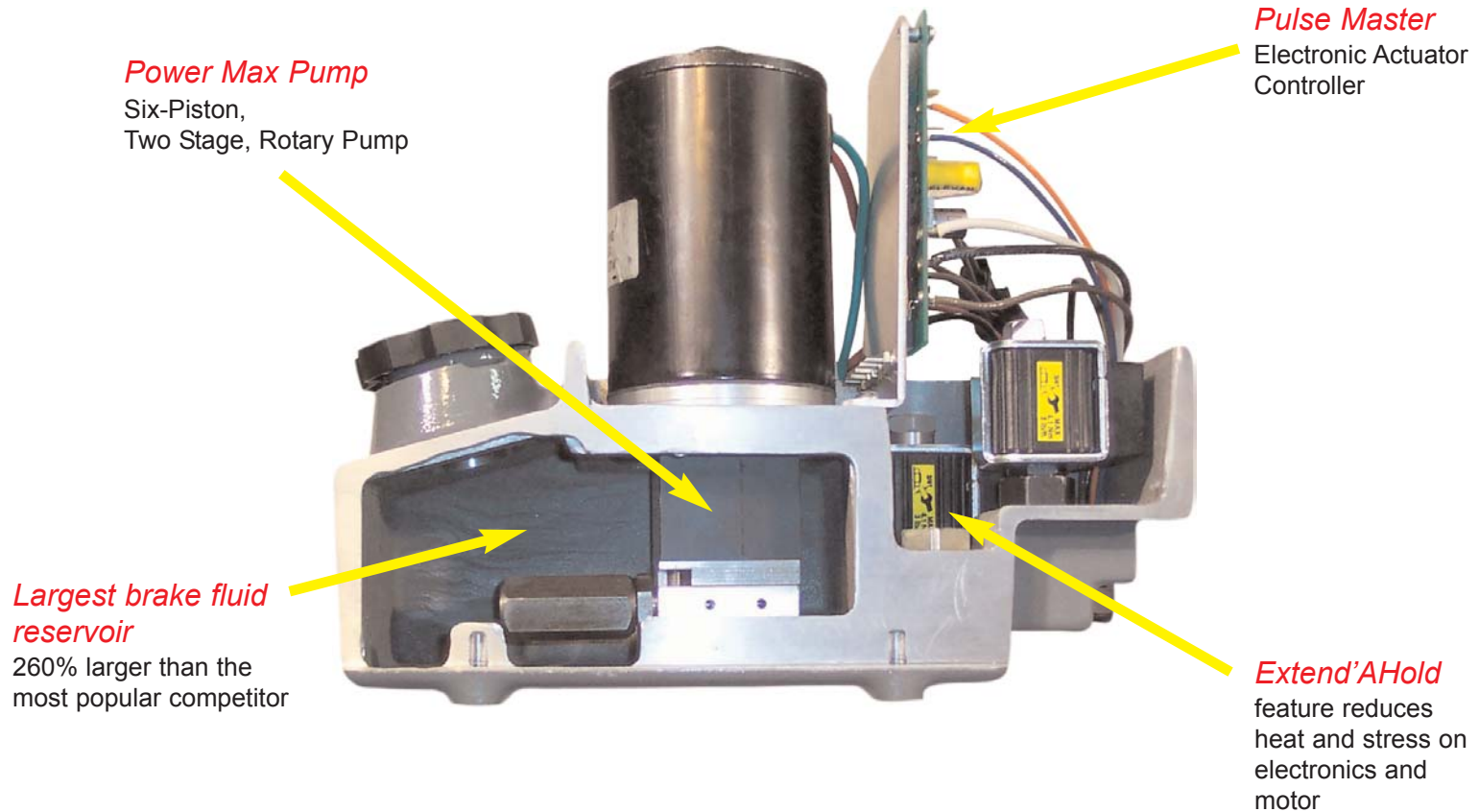
Drum or disc brake brake setup

Customized to your trailer design

Brake Actuator

The ActiBrake electric-hydraulic actuator receives "blue wire" signals from the in-cab brake controller and processes this information to determine a proportional level of hydraulic pressure to generate for the trailer brake system. It creates this pressure through an electric motor and pump that together can create a wide range of brake system pressures.

What's Inside ActiBrake...



Installing and Testing ActiBrake

There are 8 Major Steps

Step #1

Mounting the ActiBrake on the trailer.

Step #2

Installing the hydraulic brake lines and mounting the disc or drum brakes on the trailer.

Step #3

Connecting the hydraulic brake line to the ActiBrake and filling the reservoir.

Step #4

Bleeding the brake lines.

Step #5

Checking the breakaway system.

Step #6

Final and complete electrical wiring of the ActiBrake.

Step #7

Complete system test to ensure everything is functioning properly.

Step #8

Setting the in-cab controller to establish the correct level of trailer braking.

Important!

Adhere completely to the following instructions.

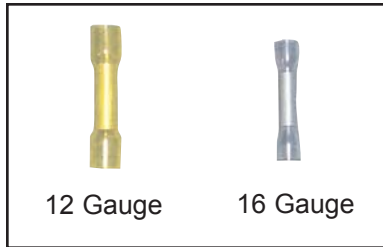
Before You Mount the ActiBrake!

Ensure it is accessible for service and for brake line and wiring installation. Also, mount ActiBrake in a position on the trailer where it will not be submerged in water.

Mounting the ActiBrake to the Trailer

The ActiBrake unit must be horizontally mounted upright in any location you desire, considering accessibility for service, brake line and wiring installation and protection of the unit from damage. The unit should be mounted using four 5/16 - 18 UNC bolts (not furnished) into the 4 female threaded holes in the bottom of the ActiBrake. The maximum bolt penetration depth is 5/8" so check for proper length to prevent the bolt from bottoming out. The maximum torque should be 100 inch pounds. A lock washer should always be used with the mounting bolt. A mounting hole template is included in the ActiBrake shipping box to facilitate fabrication of a mounting platform. The ActiBrake can also be mounted using a factory formed bracket (sold separately). This bracket may be bolted or welded to any suitable vertical metal surface.

Proper Wire Connections

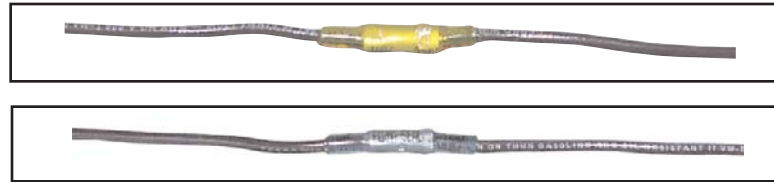


These crimp-type, heat shrink connectors are enclosed in your ActiBrake shipping box.

One Loose Wire Can Disable Your Entire Brake System

Taking shortcuts when connecting any wires on your trailer only increases the likelihood that some part of your electrical system will fail. Whatever type of connector you decide to use, make sure it is durable and is sealed against exposure to water and corrosive elements.

This is the **Right** way of making wire connections.



Use a standard crimp tool to crimp the wires in the connector, then use a heat gun to shrink the plastic ends of the connector to seal them.

This is the **Wrong** way of making wire connections.



Twist type connectors may vibrate loose which may create a short in the wiring system.

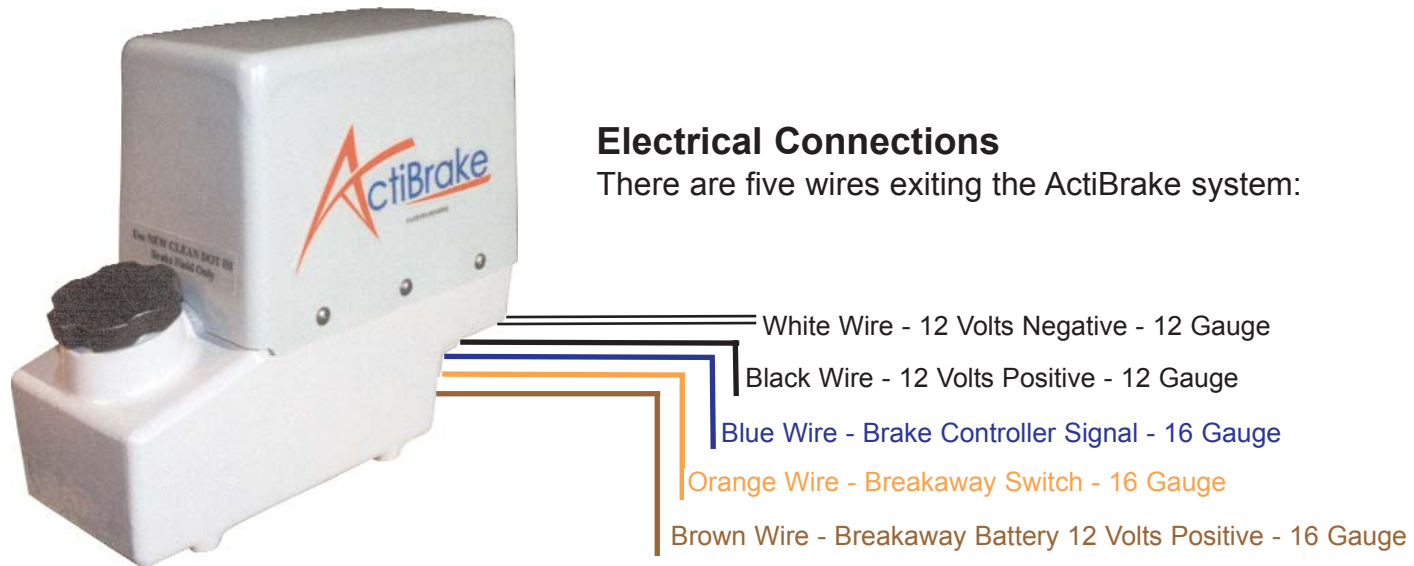


Using just electrical tape is not sufficient. The wires may become corroded or vibrate loose creating a short.

Electrical Installation and System Tests



It is essential that you follow all set-up, wiring and test procedures to ensure that your ActiBrake is properly installed and tested. Failure to follow these procedures may damage the ActiBrake, result in physical injury and/or property damage.



Vehicular wire colors may vary. Do Not connect the wires by color but by function! Failure to follow these instructions may damage the ActiBrake unit and will void your warranty.

ActiBrake Wires and Wire Connections

The wires exiting the ActiBrake actuator are approximately 8 inches long to allow for flexibility when mounting the unit, however, extensions will 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. It is **EXTREMELY IMPORTANT** to connect the wires from the ActiBrake to the appropriate wire in the trailer's wiring harness, which corresponds directly with their designated function.

Filling Reservoir

After all brake lines have been installed, connected, and properly tightened, fill the reservoir with **NEW "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 OVER FILL** the reservoir. Fill within 3/8-inch of the filler opening.



Use only new, clean, DOT 3 or DOT 4 brake fluid from a sealed container. Do not fill with previously used fluid. Used fluid may absorb water or other impurities which may cause corrosion and/or poor brake performance. This may result in physical injury and/or property damage!

Bleeding the brake lines is essential to the operation of your brake system...it must be done properly!

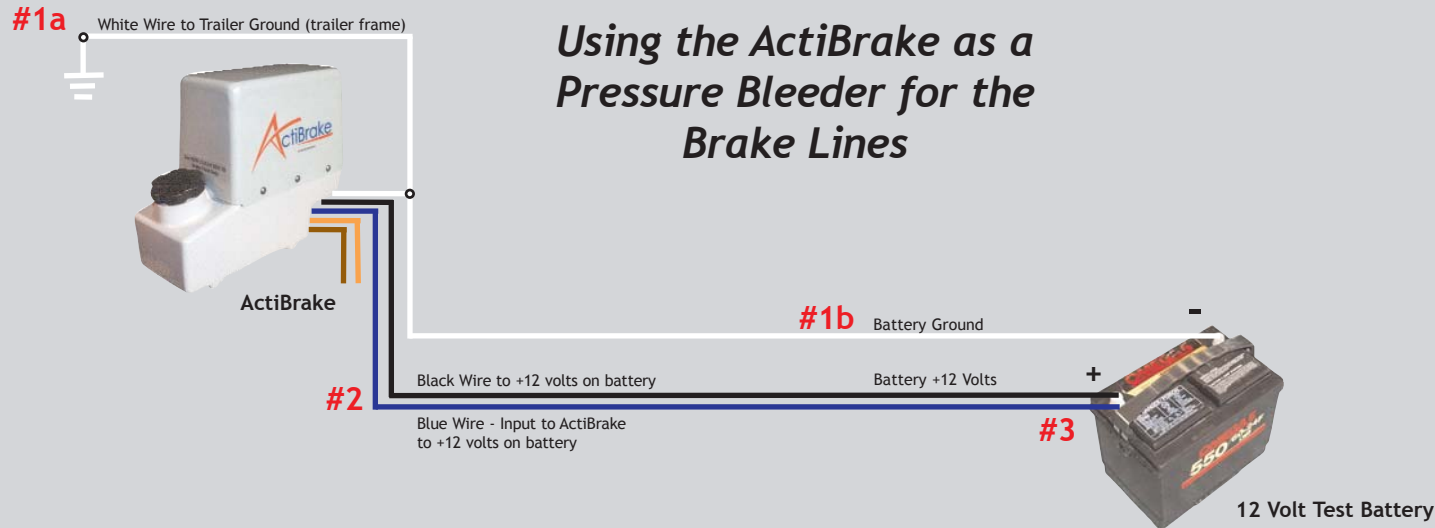
Bleeding the Brake Lines

It is essential to bleed all air from the brake lines prior to operation of the system. First, install a length of clear bleeder hose (1/4" clear polyethylene tubing) on the first wheel cylinder or caliper to be bled. If you have a multiple axle trailer, bleed the rear axle first. Place the loose end of the bleeder hose into a clear container so that the end of the tube is completely submerged in brake fluid to observe air bubbles being removed from the system during the bleeding process. Loosen the bleeder screw located in the wheel cylinder (drum brakes) or the caliper (disc brakes) one full turn, opening the system to the atmosphere through the passage in the screw. **Follow the instructions outlined in Procedure #1 (on the next page) to power the ActiBrake during the bleeding process.** Bleeding is complete when bubbles no longer are observed. At that point, with the ActiBrake still pumping fluid, close the bleeder screw securely. Repeat bleeding process for all wheel cylinders or disc brake calipers. Re-fill the ActiBrake reservoir as needed during the bleeding process.



Failure to properly fill and bleed the ActiBrake may result in poor braking performance or braking failure, which may result in physical injury and/or property damage!

PROCEDURE #1



Using the ActiBrake as a Pressure Bleeder for the Brake Lines

ACTIBRAKE PRESSURE BLEEDER PROCEDURE

After installing the brakes, and connecting the brake lines to the brakes and to the ActiBrake, fill the reservoir with NEW DOT 3 brake fluid and perform the following steps:

- Step 1:** a) Connect the *white wire* from the ActiBrake to the trailer frame for ground. When grounding the ActiBrake, use either the preinstalled grounding buss or use a steel bolt through the frame with a star washer or star ring terminal to ensure definitive ground as well as a firm and lasting wire connection. b) Connect the *white wire* from ActiBrake to the negative terminal of the test battery.
- Step 2:** Connect the *blue wire* and the *black wire* together.
- Step 3:** Apply 12 volts positive from a 12 volt test battery to the *blue wire* and the *black wire* which will operate the ActiBrake at full pressure. The ActiBrake will operate for approximately 2 (two) minutes and 20 seconds before entering the Extend-A-Hold mode. Disconnect the *blue wire* and the *black wire* from 12 volts positive and re-connect them to re-start the ActiBrake to continue the bleeding process. After the bleeding process is complete, disconnect the *blue wire* and the *black wire* from the 12 volts positive, and disconnect the *white wire* from the negative terminal of the test battery and proceed to Procedure #2, Breakaway Test Procedure.

- Important:** During the process of bleeding the brake lines, DO NOT allow the level of brake fluid inside the ActiBrake reservoir to fall below 1 (one) inch from the bottom to ensure the pump intake valve remains immersed. Add new DOT 3 brake fluid as required.
- Important:** Refer to your brake manufacturer's manual or the ActiBrake Owners Manual for the proper procedure to bleed your brake lines.

Breakaway Protection

A breakaway system (sold separately), is required to supply power to the ActiBrake 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 attached to the towing vehicle during use. (See Breakaway Kit Manufacturer's instructions) In the event of unplanned uncoupling, the Breakaway cable must cause the breakaway switch to close, thus activating the trailer's brakes. **Follow the steps outlined in Procedure #2 to verify that your breakaway system is functioning properly.**

It is critical that you verify that your breakaway system functions properly!



Warning!

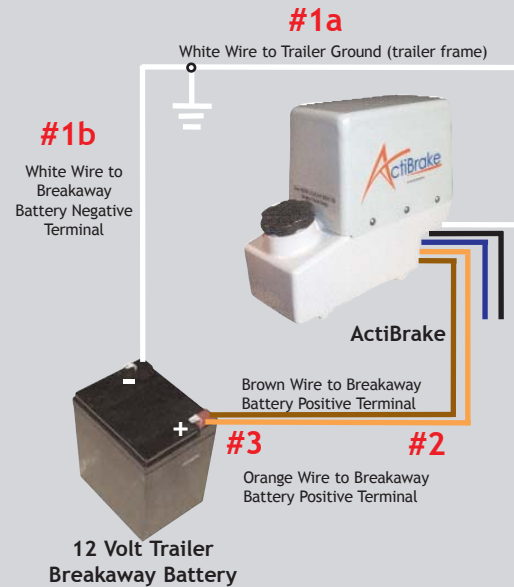
Failure to maintain adequate charge in the breakaway battery will result in the breakaway system not functioning properly. This may result in physical injury and/or property damage in the event of a breakaway!

Breakaway Battery - Surge Protection

The ActiBrake unit is equipped with a surge protection circuit, which prevents a surge charge from damaging the breakaway battery. A blocking diode has been included in the ActiBrake circuit to prevent the towing vehicle from drawing power from the breakaway battery.

PROCEDURE #2

ActiBrake Breakaway Test



ACTIBRAKE BREAKAWAY TEST PROCEDURE

After the bleeding operation is complete, re-fill the reservoir with new DOT 3 brake fluid to within 3/8 of an inch of the filler opening. Perform the breakaway test as follows:

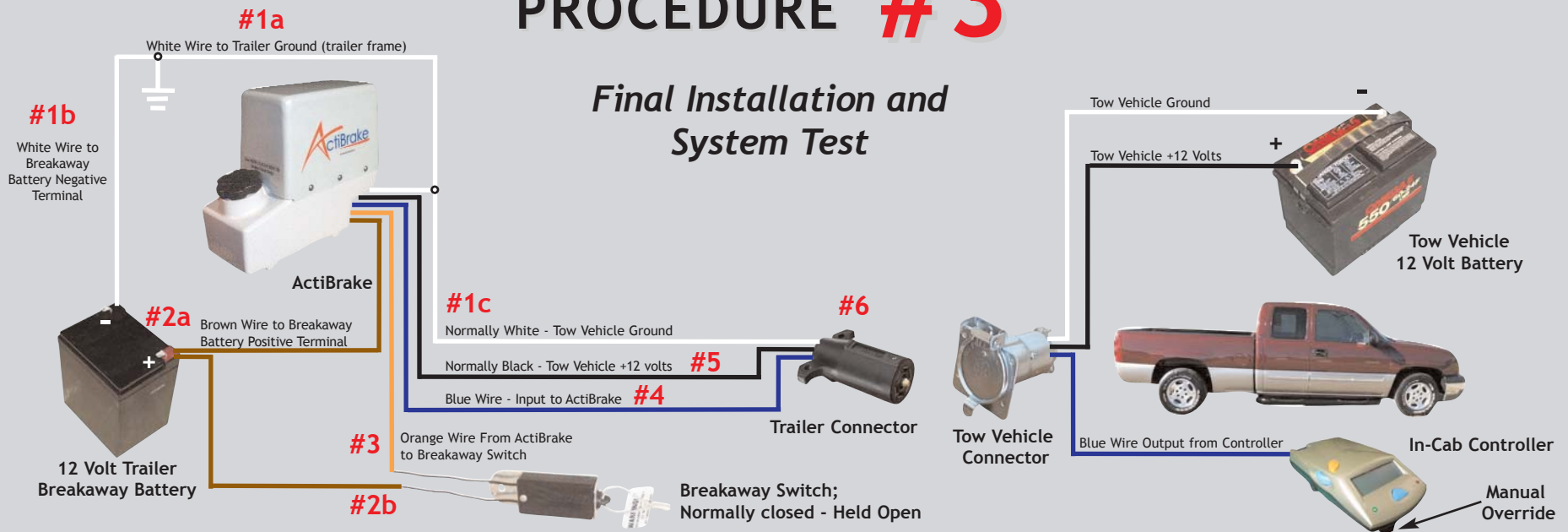
Step 1: a) Ensure that the *white wire* of the ActiBrake is connected to bare metal on the trailer frame. b) Ensure that the *white wire* from the ActiBrake is connected to the negative terminal of the breakaway battery.

Step 2: Connect the *orange wire* and the *brown wire* together.

Step 3: Apply 12 volts positive from the breakaway battery to the *orange wire* and the *brown wire* to simulate a breakaway condition. This will operate the ActiBrake at maximum pressure for 20 seconds, then the ActiBrake will engage the Extend-A-Hold feature *. This also confirms that the breakaway function is operating properly. If the ActiBrake operates properly, disconnect the *orange wire* from the *brown wire* and proceed to Procedure #3, Final Installation and System Test.

* In Extend-A-Hold mode the motor will turn off and remain off for 30 seconds and turn on for 5 seconds and will repeat this process continuously until the +12 volts is disconnected or until the breakaway battery requires recharge. Be aware, during the Extend-A-Hold mode, the ActiBrake maintains brake line pressure by closing a hydraulic valve when the motor is turned off.

PROCEDURE #3



FINAL INSTALLATION AND SYSTEM TEST PROCEDURE

After confirming the ActiBrake is functioning properly as described in procedures #1 and #2, complete the installation as shown above (be sure the reservoir is filled to within 3/8 of an inch of the filler opening with new DOT 3 brake fluid).

- Step 1:** a) Ensure that the *white wire* of the ActiBrake is connected to bare metal on the trailer frame. b) Ensure that the *white wire* from the ActiBrake is connected to the negative terminal of the breakaway battery. c) Finally, connect the *white wire* of the ActiBrake to the (normally white) tow vehicle ground wire (via the trailer connector). All three ground connections are essential for the ActiBrake to function properly.
- Step 2:** a) Connect the *brown wire* from the ActiBrake to 12 volts positive on the breakaway battery. b) Connect 12 volts positive from the breakaway battery to one side of the breakaway switch.
- Step 3:** Connect the *orange wire* from ActiBrake to the opposite side of the breakaway switch.
- Step 4:** Connect the *blue wire* output from the in-cab controller (via the trailer connector) to the *blue wire* input on the ActiBrake.
- Step 5:** Connect 12 volts positive from the tow vehicle (via the trailer connector) to the *black wire* on the ActiBrake.
- Step 6:** Connect the trailer connector to the tow vehicle connector.

When the installation is complete, with the towing vehicle ignition switch on, operate the unit from the tow vehicle using the **MANUAL OVERRIDE** on the in-cab brake controller. The ActiBrake's operation should follow that of the controller's manual override. This will conclude the ActiBrake's static operational tests. Set the in-cab controller gain settings per the controller manufacturer's specification. Before towing the trailer make sure that it is properly coupled to the tow vehicle per trailer manufacturer's specifications.

Trailer Connector - Vehicle Connector

A towing vehicle equipped with an in-cab controller can be electrically connected to the ActiBrake installed on a trailer using a conventional six or 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 ActiBrake will not operate. It is **IMPERATIVE** that these connections are correct.

See procedure #3 on the previous page for complete details.

After properly coupling the trailer to the towing vehicle, plug-in the trailer connector from the trailer to the mating vehicle connector of the towing vehicle.

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

(The first time the ActiBrake is connected to a brake controller, it is necessary to engage the manual over-ride lever of the brake controller for a period of up to 10 seconds. During this time, ActiBrake's active synchronization system syncs-up with your brake controller. ActiBrake stores this information in its memory so the synchronization is necessary only at initial set-up AND whenever the trailer gets disconnected and re-connected to the tow vehicle.)

The **first check** is visual, as many in-cab brake controllers have an indicator light. This light will illuminate green if the electrical connection is correct. If the light does not illuminate, there is a problem with the connection. SEE your in-cab brake controller manual for complete details on verification of wiring continuity.

The **second check** requires using the manual override lever on the in-cab controller. Position a second person near the ActiBrake. With the ignition switch turned on, keeping the vehicle in Park (or not in gear with the parking brake engaged) and stationary, move the manual override lever of the brake controller. The person near the ActiBrake will hear the motor engage if the tow vehicle and trailer are properly connected. If the ActiBrake does not function, immediately discontinue operation and verify the installation.

Important:

See the Trouble Shooting Section at the back of this manual if the ActiBrake does not operate.

Brake Controller Signal Determines Trailer Brake Pressure

Trailer braking pressure is controlled by the use of an in-cab brake controller. This allows the driver to select the desired brake performance for the trailer, from the driver's position in the towing vehicle. Increasing or decreasing the "gain" setting of the in-cab brake controller, will increase or decrease the level of brake force generated by the ActiBrake unit.

Settings and Use of In-Cab Controllers

The settings of the in-cab 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 will help prevent the possibility of a jack-knife situation or prevent the trailer from swaying or pushing the towing vehicle. The in-cab brake controller also allows for manual activation of the trailer brakes independent of the tow vehicle, by using the manual override feature of the controller.



Warning!

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

Service and Maintenance

Visual System Check

Periodically check the complete braking system, including the brake 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.

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 ActiBrake 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 in the breakaway battery will result in the breakaway system not functioning properly. This may result in physical injury and/or property damage in the event of a breakaway!

Service and Maintenance (continued)

Charge Battery When Necessary

If battery's charge is low, or if the trailer has been parked for a prolonged period, 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.

Check Brake Fluid Level

Verify brake fluid level before each use. Fluid level should be between three eighths and one half inch from the top of the filler tube. Use care to prevent contamination of the fluid with dirt, water, or other foreign material when removing the filler cap, checking the fluid level, or when adding fluid to the reservoir.

Brake Fluid Contamination

The ActiBrake reservoir is sealed to prevent contamination of the fluid during normal operation. Should the fluid in the reservoir become contaminated, the ActiBrake and brake system should be flushed. This procedure should ONLY be performed by a qualified mechanic or technician. After the system has been flushed, the reservoir must be re-filled with new "DOT 3" or "DOT 4" brake fluid and the brake lines bled as outlined of Page 8 of this manual.



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

Trouble Shooting

| <i>Problem</i> | <i>Diagnostic Procedure(s)</i> |
|---|--|
| LED on brake controller does NOT light when brake pedal is applied. | "Open Circuit" indicated between the trailer and the tow vehicle. Verify the connector connection between the trailer and tow vehicle, inspect circuit connections per instructions outlined in this manual and verify the controller wiring per the controller manufacturers instructions. |
| ActiBrake takes too long to reach full pressure. | Bleed the brake lines, check brake fluid level and check all electrical connections. Check voltage at ActiBrake connections WHILE the ActiBrake is running. Full pressure is only achieved if a 100% blue wire signal is applied. |
| ActiBrake 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. 2) Make sure the correct gauge wire has been used for installation (SEE electrical connections on Page 5 for gauge sizes.) 3) Charge breakaway battery and retest. See Page 12. 4) Connect brown and orange wires directly to 12VDC test battery. If the ActiBrake runs, replace the brake away switch and/or breakaway battery as needed. |

Trouble Shooting (continued)

| <i>Problem</i> | <i>Diagnostic Procedure(s)</i> |
|--|---|
| <p>ActiBrake does not operate using the manual over-ride lever of the in-cab brake controller.</p> | <ol style="list-style-type: none">1) Verify that ALL electrical connections are correct and complete on the trailer AND the towing vehicle.2) Make sure the correct wire gauge has been used for installation (SEE electrical connections on Page 5 for gauge sizes.)3) Inspect the trailer and tow vehicle connectors. Replace corroded or damaged connectors.4) Verify trailer connector is securely attached to the tow vehicle connector.5) Ensure that brake controller is installed correctly per manufacturer's instructions.6) Run "blue wire" from brake controller directly to ActiBrake. If the ActiBrake operates when the manual over-ride lever is depressed, check wiring between the brake controller and ActiBrake.7) Connect voltmeter to blue wire and ground. With full brake controller gain adjustment, the voltage should vary from zero to near full battery voltage when manual lever is moved. If voltage is low, contact your brake controller supplier. |

Trouble Shooting (continued)

| <i>Problem</i> | <i>Diagnostic Procedure(s)</i> |
|---|--|
| ActiBrake operates, but the Extend'A Hold feature does not activate after 20 seconds. | <p>1) Verify that the blue wire of ActiBrake is NOT connected to 12 volts positive. It should be connected to the blue wire of the brake controller. Correct wiring according to Procedure #3 of the Wiring Procedures Poster.</p> <p>2) ActiBrake is sensing erratic blue wire signal from the in-cab controller. Verify the functionality of the in-cab controller and, if necessary replace it. It is best to use a top quality inertia based controller.</p> |
| Excessive trailer braking. | Reduce gain setting on in-cab controller. |
| Insufficient trailer braking. | <p>1) Increase gain setting on in-cab controller.</p> <p>2) Verify that brake lines have been properly bled and each brake is properly adjusted.</p> <p>3) Verify the functionality of the in-cab controller according the manufacturer's instructions.</p> <p>4) Make certain the in-cab controller generates approximately 12VDC from the blue wire to ground when the manual over-ride level is fully depressed.</p> <p>5) Replace the in-cab controller if it is not functioning properly.</p> |

Trouble Shooting (continued)

| <i>Problem</i> | <i>Diagnostic Procedure(s)</i> |
|--|--|
| ActiBrake abruptly applies full braking force. | <ol style="list-style-type: none"><li data-bbox="1092 341 1782 406">1) Inspect the breakaway switch to make certain the circuit remains held open when the pin is in place.<li data-bbox="1092 438 1782 552">2) Check electrical connections to the breakaway switch and breakaway battery to make certain there are no exposed in contact with one another.<li data-bbox="1092 584 1782 763">3) Some inexpensive breakaway switches may intermittently transmit a voltage signal. Replace the breakaway switch if there is any doubt about its reliability or if you have any any question that it is functioning properly. |