

SMARTBOX™ BRAKING CONTROL



Installation Instructions



12/13/2006
Rev 4

What you have:

Towed Vehicle Installation Bag-

- 1 Length of white wire
- 1 Length of green wire
- 1 Towed Harness/Air Bracket (with dust cap)
- 1 Bundle of wire ties
- 1 Breakaway Switch Cable
- 1 Breakaway Switch
- 1 Small Parts Bag-
 - 1 Fuse holder
 - 1 Vacuum barb tee (nylon)
 - 2 Vacuum hose adapters (nylon)
 - 1 Check Valve (green/black)
 - 2 Hose clamps
 - 1 15 amp fuse
 - 5 Blue scotch-lock tap-in connectors
 - 5 Blue Butt Connectors
 - 3 Ring terminals
 - 1 Extra Plug for Breakaway Switch
- 1 Breakaway Hardware Bag-
 - 1 1/4"-20 locking nut
 - 1 1/4"-20 bolt
 - 1 Washer

Cylinder Bag

- 1 SMI Vacuum Cylinder
- 1 Floor anchor for cable
- 1 Self-drilling screw for floor anchor

Coach Install Bag

- 1 Combination jumper
- 1 Coach Box
- 1 Air Can Tee Assembly
- 1 Bundle of Wire Ties

- 1 Wire Connection Bag
 - 1 Fuse holder
 - 1 15 amp fuse
 - 2 Blue butt connectors
 - 2 Blue scotch-lock tap-in connectors
- 1 Coach Notification Connection Bag
 - _____ 1 Red Flip-over Connector
 - 1 Red Light
 - 2 Female Spade
 - 1 Male Spade
 - 2 Blue Butt Connectors

Unit Bag

- _____ 1 40' Length of DOT 1/4 Hose
- _____ 1 AFO operating unit
- _____ 1 50' Length of Green Wire

Breakaway Reserve Tank Bag

Things you need to know:

- 1) Air Force One is designed to provide proportionate braking effort in the towed vehicle by applying the air from the coach's braking system to the Air Force One braking system.
- 2) Air Force One is the only air brake system that provides coach protection in the event of a breakaway. Should the towed vehicle ever separate from the coach, the coach air supply to the unit is automatically closed off. No other braking system has taken this step to assure that the coach operates within the DOT regulations and is 100% safe in the event of a failure.
- 3) In the event of a breakaway, the breakaway reserve tank is used to apply the towed vehicle's brakes. The towed vehicle's brakes remain applied until the breakaway pin is replaced.
- 4) To be sure that the breakaway tank is full, you should apply the coach's brake pedal about ½ way before beginning to tow. This will ensure that the breakaway is full and will have the air necessary to apply the towed vehicle's brakes in the event of a breakaway.
- 5) Be sure to replace the provided dust cap the vehicle air connection on the "L" bracket. Failure to do so **WILL** result in improper functioning of the braking unit.

The Coach Install:

- 1) Make the air connection.
 - A) Locate the air can on the rear axle. Either side's air can will work, just be sure that you remove the correct line. One line services the emergency brake and the other services the service brakes.
 - B) Follow the lines on the two rear air cans (both driver's and passenger's side of rear axle). One from each should go to a common manifold. This is the parking brake line. The other line on each can will go to a separate manifold. This is the service brake line. Disconnect this line.
 - C) Insert the supplied tee with the close nipple into the can. The original air line and fitting is inserted in the tee and tightened. Be sure to use sealant on the threads.



Take note that the original air can nipple is actually a gas line fitting and must be installed back to the original brake line. The other part of the tee has the 1/4 inch DOT air line connection for Air Force One.

- D) Route the air line from the rear of the coach to the air can. Be sure to avoid sharp bends, moving parts, and any heat source. Secure the line with ties.
 - E) Insert the 1/4 inch air line into the push lock fitting on the tee that was installed on the motor home air can. Be sure to cut the line straight. Air leaks can exist if the air line is not cut straight. Also, be sure to push the air line in all the way. These are very tight fittings and will almost snap into place. Should you find it necessary to remove an air line, push the air line in with one hand and push on the outside ring of the push lock connector with the other, then pull the air line out. The ring will release the air line.
- 2) Mount the black coach box on the back of the coach near the center.
- A) Insert the 1/4 inch airline into the push lock fitting on the back.
 - B) Locate **KEYED** 12 volt power in the engine compartment and attach the fuse holder/Brown wire. The brake light wire may be substituted as a power source. The connection must be before any tow wiring connections of the back of the coach. After the connection is made, verify that the power source does not pulsate with either of the turn signals activated.
 - C) Attach the WHITE wire to a good frame ground.

The Green wire is for the dash light indicator. Drill a 1/2" hole in the dash to accommodate the light and attach the green wire to one side of the light and ground the other side. Anytime the brakes are applied in the car the light will turn on. The towed vehicle connection will be addressed later on in the instructions.

THE TOWED VEHICLE INSTALL:

- 1) Locate a suitable location for operating unit in the engine compartment.
 - A) Try to keep it away from any extreme heat source.
 - B) The breakaway reserve tank can be located anywhere in the engine compartment provided the required two air lines can be routed and attached.
- 2) Mount the "L" bracket near the center of the car.
 - A) If you had to offset the coach black box then be sure to offset the "L" bracket the same way if you cannot be in the center of the towed vehicle.
 - B) Route the airline down from the top of the engine compartment to the bracket and insert the air line in the push lock fitting. The other end of this hose will connect to the push-lock fitting on the operating unit labeled "IN." Route the wires from the "L" Bracket to the operating unit and connect the wires color for color. The Blue wire is discussed in step 3 and the Green in step 4.
 - C) Using the provided length of white wire and blue tap-in connector, run a lead from the white wire running between the unit and the "L" bracket to a good frame

ground in the towed.

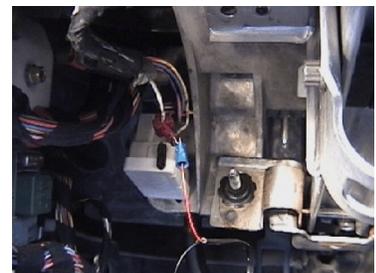
3) Mount the Breakaway switch.

- A) Mount as close to the center of the front of the towed vehicle as possible.
- B) Insert the dead plug, (plug with the short cable) into the switch. This will prevent dirt and water from getting into the switch while driving the towed vehicle.
- C) The Orange Black wire is attached to the fuse holder and to a continuous 12 volt power source in the towed vehicle.
- D) The Blue wire is attached to the Blue wire in the operating unit harness.



4) Go through the firewall.

- A) Locate the main wire harness grommet of the car or another suitable place and route the 1/4 inch air line and green wire into the passenger compartment. One end of this hose will go to the activation cylinder, and the other end will go to the operating unit under the hood (marked Cyl.).
- B) If you are going to use the Red Coach Light indicator you will need to attach the length of green wire to the cold side of the brake switch. This is the wire that is normally cold, and has voltage when the brake pedal is depressed. Route the wire to the Green wire on the “L” bracket.

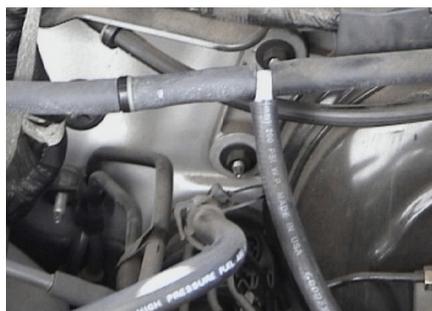


5) Mount the operating box and breakaway tank.

- A) Use the previously determined location. Keep in mind that they should be away from direct heat sources and positioned to allow the air hoses to be connected without being in a bind.
- B) Secure them by either using screws or wire ties through the mounting flanges.

6) Make the vacuum connection.

- First, locate the vacuum line coming from the brake booster and determine its size. Then, select from one of the following options.



Special Concerns:

1. *Special care must be given to installing the check valve in the proper orientation. **(Motor, Check Valve, Tee, Booster).***
2. *Exercise care in routing the hose so that no kinks, sharp edges, heat, etc., will effect the operation of the system.*
3. *Lubricate the check valve and tee with dish soap; this will help them slide easily into the vacuum hose.*

11/32-3/8 I.D. HOSE SIZE

- A. Locate the existing vacuum hose and determine where the check valve and the tee will be inserted into the hose.
- B. Route the hose coming from the operating unit to the location where the tee will be installed. **(Stay away from sharp edges, heat sources and kinks).**
- C. Cut the existing hose where the check valve will be inserted and install the check valve. Make note not to cut too close to a bend in the hose that will not allow the check valve to be inserted fully into the hose. **(Black end toward the motor).**
- D. Cut the hose where the tee will be inserted and install the tee. Make note not to cut too close to a bend in the hose that will not allow the tee to be inserted fully into the hose.
- E. Cut the hose coming from the SMI unit to the proper length and slide onto the tee. Make sure enough excess is left to avoid kinks.

HARD PLASTIC VACUUM LINES

- A. Using the length of hose provided in the installation kit, cut a length of hose and slide one end onto the green end of the check valve. Insert the tee into the other end.
- B. Cut another length of hose and insert the open end of the tee into it. (The open end of the hose will slip over the smaller hard plastic tubing). Cut another length of hose and insert the open (black end) of the check valve.
- C. Cut out a portion of the existing hard plastic tubing and slip the open ends of the hose over the plastic tubing. **Make sure the black end of the check valve is toward the motor.**
- D. Put the enclosed clamps on the hose that the hard plastic tubing is inserted into.
- E. Cut the hose coming from the SMI unit to the proper length and slide onto the tee. Make sure enough excess is left to avoid kinks.

5/8 I.D. VACUUM LINES

- A. Using the length of hose provided in the installation kit, cut a length of hose and

slide one end onto the green end of the check valve. Insert the tee into the other end.

- B. Cut another length of hose and insert the open (black) end of the tee. Slide the hose adaptor into the other end.
- C. Cut another length of hose and insert the open end of the tee into it. Slide the other hose adaptor into the other end.
- D. Cut out a portion of the existing larger vacuum hose and slip adaptor into the open ends of the hose. **Make sure the black end of the check valve is toward the motor.**
- E. Cut the hose coming from the SMI unit to the proper length and slide onto the tee. Make sure enough excess is left to avoid kinks.

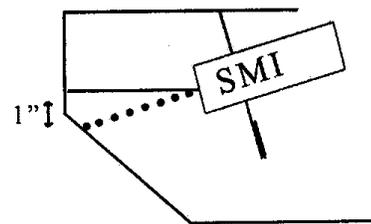
8) Attach the air lines to the operating unit.

- A) Attach the line coming from the front “L” bracket into the bulkhead on the operating unit labeled “IN” using the same procedure as before for connecting the push-lock fittings
- B) Attach the line going to the cylinder inside the towed to the bulkhead on the operating unit labeled “Cyl.”
- C) Route and attach the two lengths of air line from the breakaway tank to the bulkheads on the operating unit labeled “B/W.” When attaching the air lines, either bulkhead may be used for either hose, just as long as they are both connected to a bulkhead labeled “B/W.”

9) Mount the cylinder on the brake arm.

** Special attention must be given to vehicles with moveable pedals. Check for proper clearance in all positions. When adjusting the cable, be sure that the pedals are positioned closest to the driver’s seat.*

- A) Determine a location on the brake arm that will position cylinder as low as possible but not to interfere with normal driving.
- B) Hold the cylinder in place and mark the fire wall location. The cylinder should be mounted so that when the brake pedal is depressed about 2 inches the cylinder is in line with the floor pan and the cable is pulling straight to the fire wall. Cut any sound deadening material before attempting the mount the clamp.
- C) Use the provided self tapping screw to mount the clamp to the fire wall. Visually verify from the engine side that the chosen location is acceptable for the self tapping screw. Mount the clamp.
- D) Mount the cylinder. Be sure to “double loop” the cable through the clamp by putting the cable through, pulling the slack out, and then looping it back through. Tighten but do not over tighten.

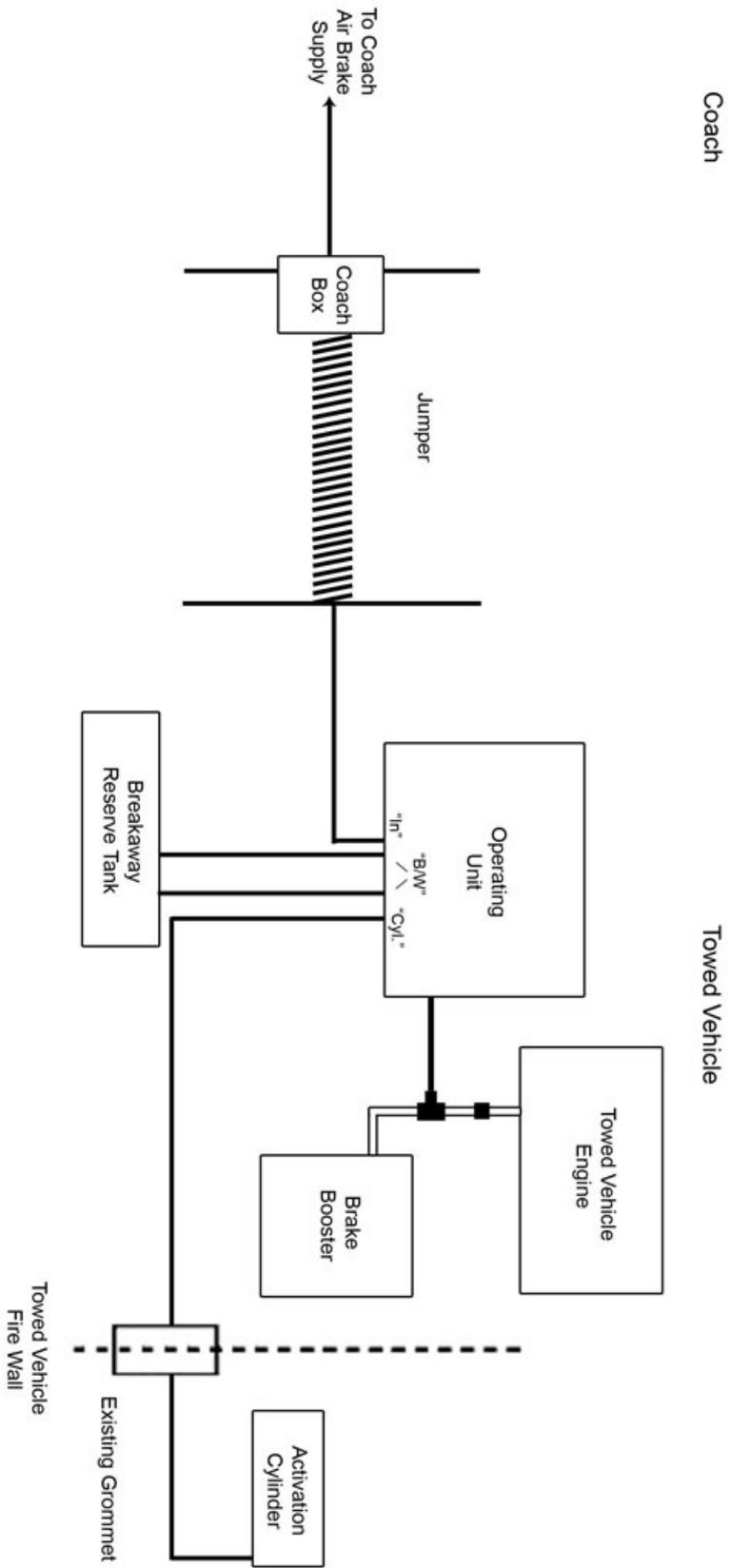


Testing the Install:

- 1) Install the air line coiled hose and the 4 wire jumper. Turn the key on in the coach, it may be necessary to build air in the air brake system.
- 2) Apply the coach brake at about 1/4 pedal. Have an assistant verify the brakes are being applied. And verify the coach indicator RED light is on in the coach. If not, and the brakes are applied in the towed vehicle, verify the connections.
- 3) Apply increasing pressure to about 1/2 pedal and verify that the brakes are applied in the towed vehicle by an increasing amount.
- 4) While in a safe location, release the parking brake without depressing the service brake. Verify the towed brake is not active. If it is, the wrong air line was selected for the tee. Change to other line on the air can.
- 5) Unplug the electrical and airline jumpers (after charging the breakaway tank). Pull the breakaway pin and verify that the brakes are applied in the towed vehicle.

Remember, before pulling off to tow it is important to apply the brakes about 1/2 to be sure the breakaway is charged.

If you have any questions or require additional information please call 1-800-893-3763.



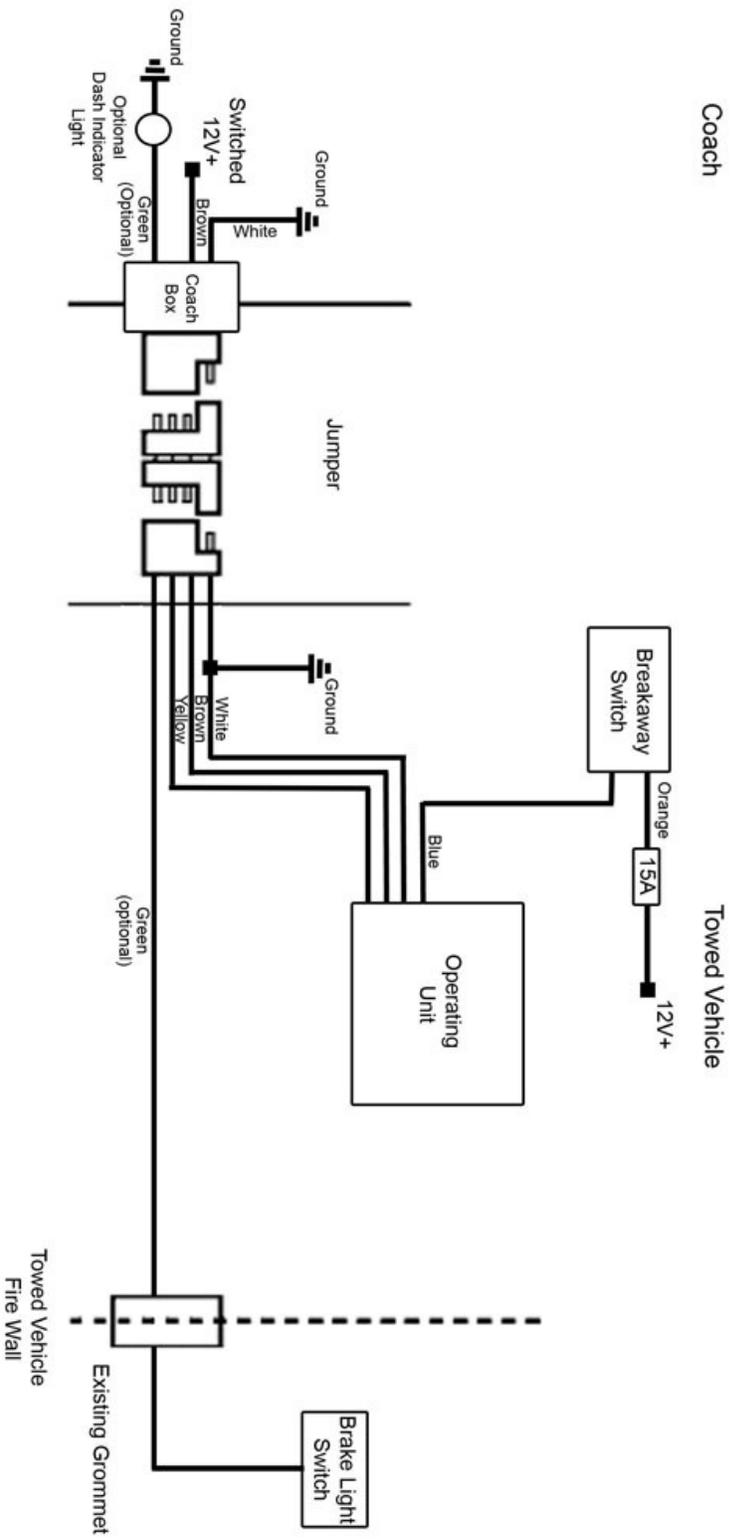


Diagram of Unit Connections

