“PlugAndPlay”
Model PP0701

Note to the installer:

You must give the customer the attached warranty card, and encourage its use. SMI occasionally needs to contact its customers for a variety of reasons, including updates to the system.

Tow car braking is a serious business, and should there be important information, SMI would be unable to contact the customer unless the customer returns the warranty card.

Special attention must be given to a coach equipped with an exhaust brake. The PlugAndPlay unit you are installing operates from the brake lights of the RV in combination with the “G-Force Controller”. The “G-Force Controller” should be adjusted to tune out activations from the exhaust brake.

Please review the Operating Manual with the consumer.

We are concerned about the overall safety of our customers and are sure you are too. **Please be sure to pass this set of instructions, the postage paid Warranty card, and the Operating Manual to your customer.**
INSTALLATION INSTRUCTIONS
TOWED VEHICLE BRAKING SYSTEM

SMARTBOX™ BRAKING CONTROL
Vacuum-Assisted Braking

PlugAndPlay

SMI Manufacturing, Inc.
101 North Governor Street
Evansville, IN 47711
1-800-893-3763
www.smibrake.com
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What you should have:

Large Parts Bag-
1 Brake Bracket Assembly
1 Breakaway Switch with Cable
1 24" Elastic Cord
1 5' of Vacuum Hose w/ Vacuum Connector
1 Length of wire
1 Bundle of wire ties
1 Small Parts Bag
1 5 Wire Harness
1 1' Black Hose to be used with Vacuum hose reducers as needed

Package - Radio Transmitter, Radio Receiver and Plug in Antenna

Small Parts Bag-
5 Tap-in Connectors
2 Hose Clamps
1 Extra Plug for Breakaway Switch
1 Check Valve
1 Barb Tee
1 Brass Dead Plug For Vacuum Connector
1 Pin with Spring Clip for Connecting Piston to Brake Bracket
1 20 amp. Fuse in Fuse Holder
2 vacuum hose reducers
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**Overall Safety Issues**

*Under no circumstances should the SMI system be left connected in the towed vehicle if the towed vehicle brake pedal does not return smoothly, quickly, and completely when using the “test” button or when the RV brake pedal is released. No supplemental assistance should ever be used to retract the towed vehicle brake pedal. If the towed vehicle brake pedal does not return without assistance, SOMETHING IS WRONG!*

Keep the red monitor light on the radio receiver in your line of sight. If it illuminates when not needed, or fails to extinguish when appropriate, stop immediately. It indicates the towed vehicle brakes are engaged, and could cause serious damage!

**Other Important Safety Issues**

1. The operating unit will apply the towed vehicle brakes whenever the RV brake lights are activated, AND stopping G-forces are present. It is extremely important to monitor the red light in the radio receiver. **If it is illuminated, the towed vehicle brakes are applied.**

2. The SMI systems use vacuum power to retract the brake pedal, thereby assuring there is no drag on the towed vehicle brakes. When setting up the towed vehicle for towing, the piston rod must be left extended no less than 1" from the cylinder. **The operating unit MUST be secured to the driver seat to prevent forward movement. An elastic strap is provided for this purpose.**

3. The wiring installation utilizes the brake lights of the RV to activate the SMI system in combination with “G-Forces”. If the coach is equipped with an exhaust brake AND it turns the brake lights on, close attention must be given to the activation light. On steep grades the G-Force Sensor will need to be adjusted closer to the “less sensitive” position. This has very little effect in the activation of the SMI on level terrain because of the difference in g-forces with two wheels braking (as in an exhaust brake) and with four (or more) with the brakes applied. The G-Force Sensor will likely not need to be “re-adjusted.”

4. A “dead” plug for the female end of the vacuum hose and a plastic cover for the male end of the vacuum connection on the top of the SMI unit is provided to keep the SMI free of dirt. Do not remove these protectors until you are ready to make the connection.

5. In using the provided crimp and tap in connectors for the electrical connections, pull on each wire after the connector is applied to be certain it is secure.
6. This installation assumes your tow wiring is based on a standard 4 wire connection from the motorhome. If you have a separate wire for the brake signal from the motorhome (amber turns on the toad and coach) that is the wire you attach the SMI YELLOW wire. In this case the GREEN wire is not used.
Installing The SMI System

Typical Engine Compartment

Concerns:

-- Exercise extreme care if you need to drill a hole in the firewall. Most towable vehicles have an available opening for the wire and hose.
-- Stay clear of any existing wiring, heat source, sharp edges, etc.
-- Any openings made in the firewall must be plugged with an appropriate sealer to insure no gas or exhaust fumes can enter the passenger area of the towed vehicle.
-- Proper care must be given to installing the check valve in the proper orientation.
-- Exercise care in routing the wire and hose so that no kinks, sharp edges, heat, etc., will effect the operation of the system.

STEPS:

1. Mount the breakaway switch as close to the center of the front of the towed vehicle as possible. The location of the breakaway switch must be such that the pin will not be pulled out on hills, curves and bumps, activating the towed vehicle brakes. Route the ORANGE/BLACK wire to the battery and connect it using the provided 20 amp fuse and fuse holder. (Note, you will later be attaching the BROWN wire from the 5-wire harness to this fused connection by means of one of the tap in connectors.) Install the Breakaway dead plug with the short cable loop into the breakaway switch. Route the BLUE wire to the area you plan to come through the fire wall.

2. Locate an existing access of sufficient size through the firewall to accommodate the vacuum hose and the 5- wire harness. Almost all towable vehicles will have such an
access, but if not, you will need to drill a hole. Regardless of the availability, be sure there are no heat sources or sharp protrusions in the area of the hose and wire, and that you do not drill into any tubing, wires, etc.

3. Insert the cut ends of the 5-wire harness through the firewall with the vacuum hose. Leave sufficient wire and hose inside the towed vehicle for easy connection to the operating unit. Make the following wire connections:

   A. The BROWN wire attaches to the ORANGE/BLACK wire from breakaway switch.
   B. The GREEN wire attaches to the GREEN wire of the tow wiring (Unless you have separate wire for the brake signal. (See #6 Other Important Safety Issues
   C. The YELLOW wire attaches to the YELLOW wire of the tow wiring (Unless you have separate wire for the brake signal. (See #6 Other Important Safety Issues
   D. The BLUE wire attaches to the BLUE wire from the breakaway switch.
   E. The WHITE wire attaches to the WHITE wire of the tow wiring AND to a suitable ground, not the battery. **PROPER GROUNDING IS ESSENTIAL FOR PROPER OPERATION OF THE SMI.**

4. Locate the existing hose or hard plastic tubing between the brake booster tank and the engine. Be sure to trim off excess hose but leave enough to connect to the unit.

   A. If it is a hose, it may be larger than the vacuum hose provided by SMI. In such cases, hose adaptors are included to adapt to a larger hose.
      1) Cut the hose in a convenient place and insert the check valve into the engine end. The BLACK end points towards the engine.
      2) Install a short length of the provided hose onto the other end of the check valve, and insert one end of the provided “tee” into the other end of the hose.
      3) Insert the other end of the “tee” into the hose that is still connected to the brake booster. Here, again, you may need to use one of the hose clamps.
   B. If it is a hard plastic tubing, the provided vacuum hose will fit OVER the tubing.
      1). Cut the tubing in a convenient place and apply a short length of the provided hose over the tubing. Use one of the provided hose clamps to secure it.
      2). Insert the check valve and “tee” as set forth above, and finish with another short piece of hose and a hose clamp.
5. Insert the third leg of the tee into the hose coming through the firewall. Be sure to leave enough slack in the hose to connect to the SMI operating unit but not too much to make it difficult to “hide” when not in use.

6. Attach the brake bracket to the piston in the operating unit using the provided pin and spring clip.

7. Move the driver seat back as far as possible and place the operating unit on the floor of the towed vehicle. Remove the dust cap from the vacuum connector and attach the brake bracket to the brake pedal by tightening the wing nuts. (Note, if you have the “Hook and Arm” style brake bracket follow the instructions in the package for mounting the bracket) Move the seat forward so the piston is extended only about 1” with the brake pedal fully retracted. Secure the operating unit to the driver seat by means of the elastic cord.

8. Connect the vacuum hose quick disconnect and the electrical harness. The vacuum pump will run for 30-45 seconds and stop at 15-16.

9. Remove the pin from the breakaway switch. The vacuum pump will run continuously, and the piston will extend. Replace the breakaway pin and the piston will retract by itself. DO NOT ATTEMPT TO SET THE VACUUM LEVEL WITH THE BREAKAWAY PIN PULLED OR BY HOLDING THE TEST BUTTON.

10. When satisfied with your installation, be sure to seal the hole in the fire wall.

11. Tape all connections with a high quality electrical tape, and use the small cable ties to secure the wires.

12. Please note, if you do not have diodes in your tow wiring you will most likely have a feed back to the SMI unit because we are pushing the brake pedal. When the SMI activates from the brake signal in the coach, it will not release. See the section on trouble shooting the SMI.

13. Locate the cold side of the towed vehicle brake light switch, and connect the red wire from the “key fob” radio transmitter to it. Connect the black wire to a ground. Leave sufficient wire that the transmitter can be routed to the rear view mirror when plugged in and set up for towing. We normally route the female jack up the steering column and wire tie it to the turn signal lever or tilt arm. This makes it easy to plug in when setting up for towing. You may use velcro to attach the transmitter to the mirror or simply drape it over the mirror. It is not necessary to remove the transmitter while not towing. When not towing simply coil the wire and place it out of the way.

14. Plug the transmitter in and push the brake pedal. Note the green light on the transmitter. The green light should “flutter”. If not check the 12 volts from the brake light switch
connection. Next, plug the radio receiver in the power point of the toad and apply the brakes. The “Red” light should come on as the brakes are applied.

1. In the RV, plug the radio receiver into the power point, and it will be ready to receive signals from the transmitter in the towed vehicle. Remember, when ever the light is on, **THE BRAKES ON THE TOWED VEHICLE ARE ENGAGED!**

16. Test the operation of the receiver in the coach by removing the plug in the breakaway switch. This will activate the brakes in the towed vehicle and should turn the SMI Receiver light on in the coach. Be sure to reinstall the breakaway plug. The piston should retract. If not, see the section on Trouble Shooting the SMI # 5. Gas motorhomes create electrical interference when the engine is running. It is best to keep the radio receiver to the left of the driver. Test the location by pulling the breakaway pin and moving the receiver in the coach to get a reliable signal. Be sure to have the engine and generator running when preforming this test.

17. Hook the coach and the towed vehicle together as if you were getting ready to tow. When attaching the breakaway cable to the coach it is important that there is enough slack that it is will not pull out in a tight turn but not so much that road debris could catch it. Loosen the SENSITIVITY KNOB and lower it to bottom of the slot. With the coach brake pedal depressed raise the knob rapidly. The SMI should activate. The SMI should stay on as long as the coach brakes are on, regardless of where you place the SENSITIVITY KNOB. When the coach brakes are released the SMI should retract. If not see number 4 of Trouble Shooting the SMI.

18. You are now ready to road test your installation. Set the “sensitivity” knob to the highest point to begin the test. This will activate the SMI on most every stop. As you test you may begin to lower the “sensitivity” to set the SMI to your preference. When you get close to the activation level that works for you, **make very small (1/16 “) moves** in the controller and re-test. Small moves will dial the controller in to your satisfaction. Once you have determined the setting mark the unit so you can set it there when setting up for towing. The controller will generally not need to be readjusted.
Trouble Shooting

We exercise great care in building and packaging your unit. All operating units are thoroughly bench tested before being shipped. We encourage you to contact our Help Line any time you have questions about the installation or operation of your SMI Vacuum Assisted Brake.

VACUUM

Vacuum Pump will not shut off - - Check to see the breakaway pin is secure!

1. Depending on the size of the brake booster tank and the altitude, the vacuum pump may operate up to 45 seconds anytime the operating unit is being readied for use in the towed vehicle. Also, virtually every towed vehicle vacuum system leaks, some more than others, and it is not unusual for the pump to cycle occasionally. However, it should pump up and hold. No notable drop in pressure should be observed. If the vacuum does not hold. Remove the quick disconnect and moisten your thumb. Place it over the male connector on the unit. If it does not hold, call the Help Line. If it holds the leak is in the connection at the booster. Check the connections and use hose clamps if necessary.

2. Remember, due to the nature of vacuum and the rarified air in higher altitudes, it is common for the vacuum pump to run continuously while in mountains if the vacuum is set at 16" or more. Your SMI unit was shipped at a setting of 15. If you are going to spend an extended amount of time at higher altitudes adjust the vacuum accordingly.

3. If the pump continues to run call the Help Line.

WIRING

1. Unit Failed to operate when plugged in.
   
   A. Using a voltmeter or a test light, determine if there is 12VDC between the BROWN wire and the WHITE ground wire on the SMI plug. There should be 12VDC between these two wires at all times. Check the fuse and the holder at the battery and the WHITE wire connection.

2. Unit failed to operate when the RV brakes were applied.
   
   A. Check Continuity to ground from the WHITE wire at the PLUG. If not re-ground the WHITE wire to the frame of the towed vehicle.

   B. With the RV brakes applied check for 12 volts between the SMI YELLOW wire and SMI WHITE wire. Also check for 12 volts on the GREEN wire to the SMI
WHITE wire. If not, check the scotch lock connections to the towed vehicle tow wiring.

D. Plug the SMI unit back in and apply the RV brakes. Lower the SENSITIVITY KNOB the lowest setting and raise it rapidly. If you checked the voltage and the still does not operate, call the Help Line.

3. Breakaway Failed to operate the brakes

A. Remove the breakaway plug from the front of the towed vehicle, test for 12VDC between the BLUE wire and the WHITE ground wire. There should be 12VDC at that time, and ONLY then. If not check continuity to ground with the WHITE wire. Check the connection at the battery and the fuse. Check the connection of the BLUE wire

4. Unit operated but did not release the brakes.

A. This is commonly referred to as a “feedback”. To correct the problem you need to add diodes to the tow wiring. They must be placed between the rear of the towed vehicle and the SMI connection. Their location is not critical just so the SMI connection is “closest” to the motorhome. Diodes are available at most any towing center or by calling the Help Line (all you pay is the shipping).

5. Radio Receiver does not light up.

A. First verify the receiver works by testing it in the towed vehicle. Plug it in the cigarette adapter and push the towed vehicle brake pedal. The receiver light should come on. If not call the Help Line.

B. Plug the receiver into the coach power point and move it around to find the best location for your coach. Most likely there was interference that was causing the radio to drop the signal. If you still have trouble, call the Help Line.

6. What now

If the voltage is correct and the unit still does not operate properly, you will need technical assistance from SMI Manufacturing, Inc. Call us at 1-800-893-3763. e-mail -
info@smibrake.com
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