DELTA FORCE

OPERATOR MANUAL

Demco Delta Force
Supplemental Braking System

Thank you for purchasing Delta Force: the most advanced portable braking solution available. When installed correctly, this system will provide years of maintenance free service. These installation instructions are designed to guide you through the installation of your new braking system. The installation is vitally important to the proper operation and safety of both the end user, and those on the road. It is imperative that these instructions be read in their entirety before any part of the installation is attempted. This will allow for a proper understanding of the system as a whole, and will also result in a much neater, professional installation. We have compiled these instructions based on the feedback from our technicians, installers, and individual customers. If at any time you do not feel 100% comfortable and confident throughout the installation, you must contact the Demco toll-free tech support line immediately to obtain the location of the nearest qualified technician for assistance.

TABLE OF CONTENTS

6250 BRAKE PEDAL BRACKET

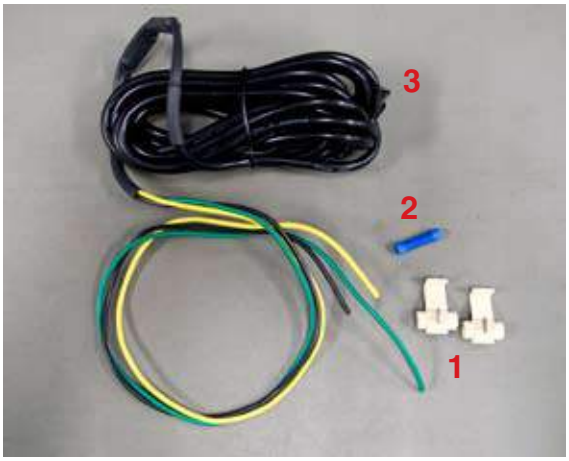
ITEM	PART #	QTY	DESCRIPTION
1	**16041**	1	SET SCREW 10-24 X .50
2	**16167**	1	BRAKE PEDAL BRACKET
3	**16230**	1	FLAT WASHER #10
4	**16231**	1	BRASS KNOB
5	**16232**	1	TAPE ANTI SLIP
Please order replacement parts by PART NO. and DESCRIPTION			

6251 TETHER KIT

ITEM	PART #	QTY	DESCRIPTION
1	**16038**	1	ALUMINUM SLEEVE
2	**16051**	1	CARABINER
3	**16127**	1	TETHER ANCHOR
4	**16151**	1	SCREW DRILL & TAP HW 1 X 14
5	**16049**	3	NYLON CABLE (NOT SHOWN)
Please order replacement parts by PART NO. and DESCRIPTION			

6253 TOW WIRE CONNECTION KIT

ITEM	PART #	QTY	DESCRIPTION
1	**01883**	2	WIRE SPLICER
2	**07378**	1	BUTT CONNECTOR
3	**16007**	1	TOW WIRING & B/A HARNESS
Please order replacement parts by PART NO. and DESCRIPTION			



6252 CHARGE WIRE KIT

ITEM	PART #	QTY	DESCRIPTION
1	**01883**	1	WIRE SPLICER
2	**05744**	1	TERMINAL RING
3	**07378**	2	BUTT CONNECTOR
4	**16017**	1	10 AMP FUSE
5	**16021**	1	FUSE HOLDER
6	**16022**	1	10 AMP DIODE
7	**16025**	1	3-WAY CONNECTOR
8	**16165**	5	BROWN WIRE (SOLD PER FOOT, 5' REQUIRED)
Please order replacement parts by PART NO. and DESCRIPTION			

ITEM	PART #	QTY	DESCRIPTION
1	**16030**	1	BREAKAWAY DEAD PLUG
2	**16032**	1	BREAKAWAY SWITCH
3	**6211**	1	BREAKAWAY CABLE KIT
Please order replacement parts by PART NO. and DESCRIPTION			

Things To Know Before You Get Started

Delta Force delivers proportional braking based on deceleration. The necessary harness and instructions are included to also tie into the tow wiring, allowing Delta to also monitor the brake lights of the coach. This makes Delta a "Dual-Signal Proportional" system. Delta automatically detects the presence of the connection and switches to dual-signal mode. Use of this feature is highly recommended.

Proper setup of the tether system is imperative to operation. If overtightened the cable could break. If under-tightened, the cable could slip. If too loose, the operating unit will have excessive movement. If too tight, the brake pedal may not fully release. These instructions will walk you through the simple, proper procedures to ensure none of these issues occur.

The operating unit must be in place, secured to the tether and have the Tow Wire/Breakaway plug connected before the power cord is plugged in. Allow the initialize circuit to complete before changing any parameters. Allow the shutdown circuit to complete before unplugging the power cord.

Although optional, it is highly recommended that the breakaway and tow wiring connections be utilized.

When connection is established, the "Link" light on the CoachLink receiver will be illuminated. Note: System link will only occur after initialization has completed.

Be sure to have your towed-vehicle's brakes inspected for wear before towing. In most cases towed vehicles do no accrue mileage on the odometer while in tow, resulting in the brakes needing to be serviced before the odometer would dictate. For most vehicles, it is recommended to have the brakes inspected/replaced every 20,000-30,000 miles. **You must combine towing and driving mileage when determining the interval.**

Initial Installation

Step 1: Set-It-Once Pedal Clamp

1. Loosen knob so the top and bottom brackets move freely and place Set-It-Once Pedal Clamp on brake pedal (Fig. 1-1).
2. Slide the upper and lower brackets together so that the pedal is securely gripped.
3. Firmly tighten the knob and then remove bracket from pedal by swinging the bottom back.
4. Secure the clamp to the actuator using the provided clevis pin (Fig. 1-2).


Fig. 1-1


Fig. 1-2

Step 2: Install Actuator Tether

Note: Usually the carpet will slip out from under the toe-kick panel, but if resistance is felt remove the panel first.

1. Pull back the carpet under the dash below the brake pedal to reveal the firewall insulation (Fig 2-1)
2. Place the operating unit on floor board and place the Set-It-Once Pedal Clamp on the brake pedal by allowing the top of bracket to rest on the top of the pedal (Fig 2-2) and pressing down on the actuator (Fig 2-3).


Fig. 2-1


Fig. 2-2


Fig. 2-3

1. Adjust the feet so the operating unit is level and low as possible (Fig. 2-4). Be sure there's is at least 1/8" clearance between actuator and the front lip of the operating unit. It may be necessary to raise all the feet. Once adjusted, tighten feet jam-nuts against the enclosure to finger tight plus 1/8 turn.
2. Center the pedal clamp and align the operating unit so that the actuator is as perpendicular as possible to the front of the unit. Delta Force will tolerate offset if necessary.
3. Hold the cable clamp to the firewall so that it is straight in-line with and as level as possible to the tether bracket on the bottom of the actuator. If operating unit is offset be sure to offset bracket. Orient the anchor so that the mounting tab is away from the operating unit (Fig. 2-5a). Mark this location through the mounting tab (Fig. 2-5b).
4. Trim a section of insulation approximately 2"x2" around the mark and visually verify the area behind the firewall is clear from obstruction.(The operating unit can be removed to make access easier) As an additional precaution, carefully drill an 1/8" pilot hole on the mark using light pressure and low speed to prevent the bit from going through too quickly. Then insert the blunt end of bit by hand to feel for obstructions (this does not take the place of visually verifying the backside of the firewall).
5. Use a drill with a 3/8" socket to secure the self-drilling screw to the firewall. Then remove the screw (Fig. 2-6).
6. Clip the cable carabiner to the tether mount on the actuator and make sure the operating unit is set in place and completely rearward by pushing on the front and observing the brake pedal (Fig. 2-7).


Fig. 2-4

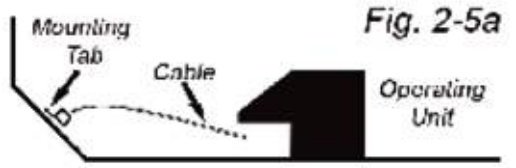


Fig. 2-5a


Fig. 2-6


Fig. 2-7

7. Hold the anchor to the firewall using the pilot hole and pull the slack out leaving enough slack so that cable can move side to side 1/4”-1/2” in either direction (make sure the cable is still inserted from the top side of the anchor) (Fig. 2-8).


Fig. 2-8

1. Hold the cable in position in the clamp and bring the anchor out. Loop the cable back through the anchor (Fig. 2-9). Pull the slack by positioning the loop to the outside and pressing it in while pulling out the slack (Fig. 2-10) and tighten set screw with a 4mm allen wrench to contact plus 1/4 turn to hold setting (Fig 2-11).


Fig. 2-9

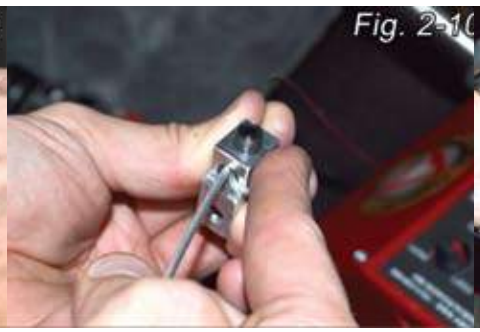


Fig. 2-10

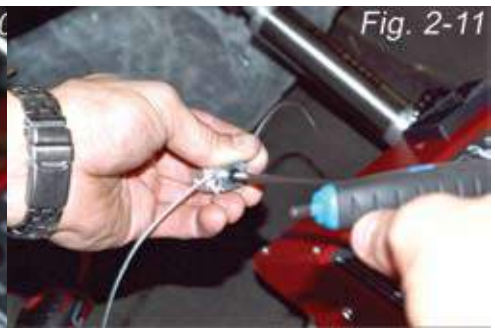


Fig. 2-11

2. Hold anchor back to firewall and verify tension. If still correct, use a wrench to hold the anchor and tighten the set screw to 25 in. lb. which is approximately 2 total turns after contact (don’t forget to count the previous 1/4 turn) . Disconnect carabiner and remove operating unit. Secure the anchor into the predrilled hole using a ratchet and 3/8” socket (Fig. 2-12). Tighten to 25 in. lb. which is approximately contact plus 1/4 turn (Fig. 2-13). In rare occasions where the firewall it too thin a 1/4”x20 bolt can be used to hold the anchor in place.


Fig. 2-12


Fig. 2-13


Fig. 2-14

3. Slowly roll carpet back until the bend is resting over the cable. Pinch carpet and make a small slit from the back side of the carpet. Fold the carpet back and confirm that the slit is resting over the anchor. Cut a 1” slit downward. Pull the carpet back down and pass the carabiner through the slit.
4. Trim or tuck in excess cable and fold carpet back and reattach carabiner to the actuator and secure pedal clamp to brake pedal.

5. Pull slack from cable by pushing the front of the operating unit back towards the driver's seat. Confirm that the brake pedal is fully retracted and there is a small amount of slack in the cable (1/4" to 1/2" of movement in either direction). **If the cable is too tight the brake pedal will not fully retract resulting in damage to the towed vehicle.**

Step 3: Install the Charge Wire

Note: Delta Force requires a **reliable power source** to operate properly. Turn the **coach's running lights on** to activate the **charging circuit**. **Do not start the towed vehicle with the tow wiring connected**.

1. Connect the coach's tow wiring to the towed vehicle and turn on coach's running lights. Do NOT connect the tow bar or safety cables.
2. Verify the coach has illuminated the towed's running lights through the tow wiring connection. (Note: The coach key may need to be on) If they are not, now is the time to repair the connection.
3. Find the tow-wire-running-light wire under the hood by testing for voltage (industry standard is brown). Use the vehicle chassis for ground.
4. Once located, start the coach's engine. Recheck the wire. If the reading is below 12v there is a connection issue and the charging system will not operate properly until it is remedied. See the troubleshooting guide for assistance.
5. Shut off the coach's engine and the running lights.
6. Connect the provided brown wire to the running light wire using the provided flip-over connector. This wire will be routed to the battery or input terminal of the fuse box (Fig. 3-1).
7. Cut the provided fuse holder approximately in the middle of the wire loop. Crimp a ring terminal to one end and either a butt connector (if the breakaway will not be installed) or the three-way connector (if the breakaway will be installed).
8. Open the fuse holder cap to verify there is no fuse present. Using the ring terminal connect the fuse holder to either the positive side of the battery or the input wire for the fuse box. (The fuse box is often preferred to prevent accidental removal during future battery replacement.) (Fig. 3-2)

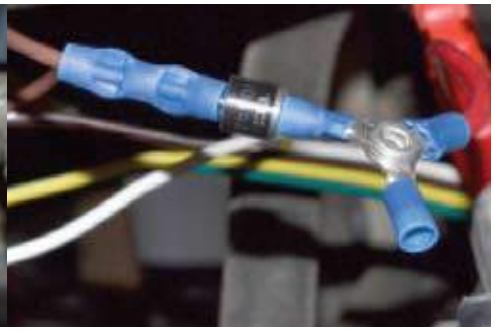

Fig. 3-1


Fig. 3-2

Fig. 3-3

Fig. 3-4

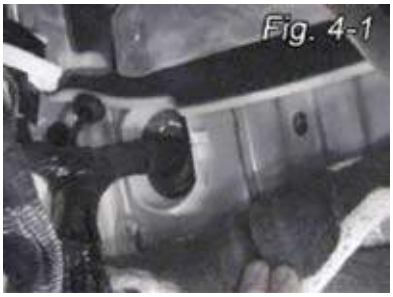
Fig. 3-5

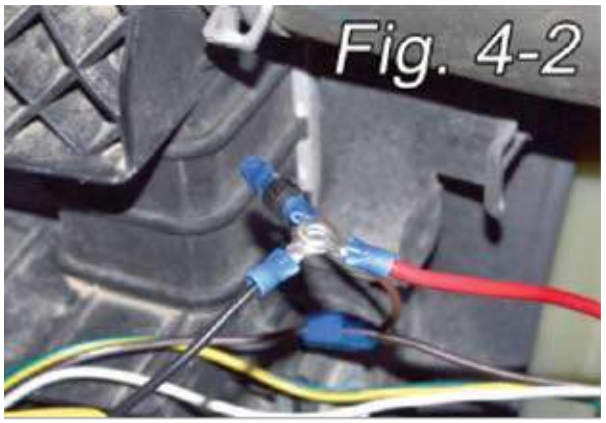


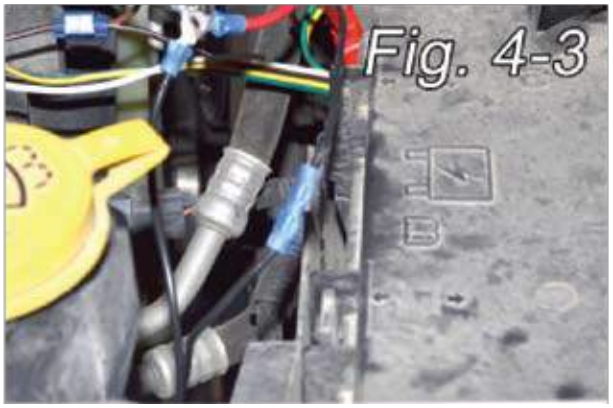
9. Crimp the provided diode (You may trim the diode if desired Fig 3-3) into the connector used on the other end of the fuse holder with the silver stripe facing toward the fuse holder (Fig 3-4).
10. Connect a butt connector to the other side of the diode. Route the brown wire and connect it to the other end of the butt connector (Fig 3-5).
11. Turn the running lights on in the coach.
12. Check the female spade in the fuse holder nearest the diode for power using the vehicle's chassis for ground. The fuse must not be in or it will simply display the towed vehicle's battery. If no or low voltage is displayed check your connections and the diode orientation.
13. Turn off the running lights.
14. If the breakaway will be installed (highly recommended) continue to the next step. If not, tape all connections with a high-grade electrical tape and place the provided 10 Amp fuse in the fuse holder only if the breakaway will not be installed.

Step 4: Install the Breakaway Switch

1. Mount the breakaway switch to the front of the towed vehicle as close to the center of the towed vehicle as possible using the provided hardware. In many cases it can be mounted to the front facia in a manner that allows it to turn 90° when not in tow.
2. Insert the plug into the switch. This will prevent dirt and water from getting into the switch.
3. Route the wires up to the top of the engine compartment.
4. From under the dash on the driver's side of the tow vehicle, locate the main-wire-harness grommet, the hood-cable grommet, or another suitable place and route the breakaway/tow wiring harness keeping the plug end in the passenger compartment. **Do NOT pull on the loose wire leads as it may damage the connections within the heat shrink**. The plug will go to the top of the operating unit so leave plenty of slack in the vehicle. (Note: Once the location is established, it is often helpful to make a small slit in the grommet using a hobby knife or other small, controllable blade. Cut as far away from the wires as possible. Also take into consideration that the wires may bend drastically on the other side of the firewall. (Many new vehicles have a double grommet requiring a slit be cut on both sides.) Carefully using a fish tape or a straightened coat hanger may assist in routing (Fig. 4-1).
5. Connect black/orange wire on breakaway switch to the unused terminal on the three-way connector in Step 3-7 (Fig. 4-2).
6. Connect the blue wire on the breakaway switch to the black wire in the Tow Wire/Breakaway harness (Fig. 4-3).
7. Tape all connections using a high-grade electrical tape and insert the 10 Amp fuse in the fuse holder.

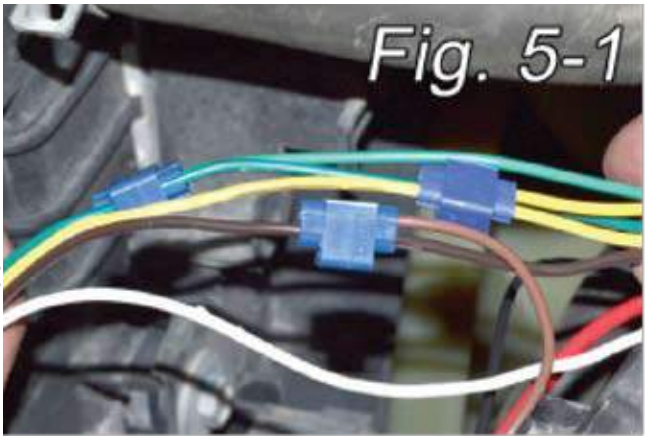






Step 5: Connect the Tow Wire Harness

1. With the tow wiring still connected, have an assistant step on the brake pedal in coach. Confirm that the brake lights are on in both vehicles. (Note: The key may need to be on in the coach)
2. Locate the tow-wire brake light wire(s). In most cases the brake light and turn signals are combined (4 wires from coach) so there will be two wires - generally yellow and green. In cases where the brake lights are separate (5 wires from coach), the wire is generally a single red wire. If you have located a single wire continue testing with left turn signal and then the right. If the voltage pulsates there is a second wire for brake lights. If not, it is a single wire setup. (Note: It is possible for the coach to have separate brake lights and the tow to have combined turn and brake lights).
3. Once the wire(s) have been located, start the coach and retest the voltage levels. If below 10v there is a wiring connection problem and Delta Force will not perform consistently. See the troubleshooting guide.
4. Connect the yellow and green wires from the Delta Force breakaway/tow wire harness to the tow-wire brake light wire(s) using the provided flip over connectors (Fig 5-1). (If a single wire system, connect both Demco wires to the single tow wire).
5. Tape all connections using a high-grade electrical tape.



Step 6: Initial Tow Setup

1. Place Delta Force on the floorboard in front of the driver's seat (Fig 6-1).

2. Rotate the actuator 90° and allow the tether brackets to rotate downward (Fig 6-2).

3. Attach the carabiner to the tether bracket (Fig 6-3). Grab the actuator allowing the pedal clamp to rest forward and position the top hooks over the top of the brake pedal (Fig 6-4). Press down to lock clamp in place (Fig 6-5).

4. Confirm system is level, as low as possible and there is sufficient clearance between the actuator on the front of the operating unit.
5. Check cable tension. If cable does not move 1/4" in either direction freely the cable needs to be loosened. If it moves more than 1" in either direction it needs to be tightened. (Cable adjustment shouldn't need to be changed after initial setup).
6. Plug in the Tow Wire/Breakaway Harness (if used).
7. Plug in power cord and press "Initialize". Allow testing/positioning to complete.
8. Recheck the tension and ensure pedal is fully retracted.
9. Press the manual activation button 1-2 times to ensure proper positioning.
10. Select the desired profile by pressing "Select" (Fig 6-6). Now you are ready to go! **Important: Turn on coach's running light to active charging circuit. Do not start the towed vehicle with the tow wiring connected or it could blow the charging fuse.**


Fig. 6-6

Step 7: Install the CoachLink Receiver

1. Position the coach in an open location such as a parking lot. (Large structures can reflect the radio waves which could affect proper positioning.)
2. Connect the towed vehicle to the coach and extend the tow bar.
3. Position Delta Force in the towed vehicle as prescribed in Step 6.
4. Position CoachLink in the driver's area of the coach where it will be in the driver's line of sight. Secure with the provided velcro.
5. Plug in the power cord and start the coach's engine. Also be sure to power up all accessories such GPS, TPMS, Sat Radio, etc.

Testing the Installation

1. Set Delta Force in the towed vehicle as outlined in Step 6.
2. Select the desired braking profile by pressing the “Select” button to toggle the setting.
3. Press and hold the “Manual Activation” for 3 seconds. Ensure actuator extends and returns completely by pulling backwards on the brake pedal after the actuator retracts. Recheck cable tension as prescribed in Step 6-5
4. Raise the sensitivity knob towards More Sensitive to activate system. Lower the sensitivity knob towards Less Sensitive to deactivate system

If breakaway is installed:

1. Pull breakaway pin from the switch using a sharp, jerking motion. Confirm system has activated.
2. Replace pin in the correct orientation (pin makes an “I” shape when switch is parallel to ground). Confirm system has fully released.

If tow-wire connection is installed:

1. Making sure there is plenty of clearance between the back of the operating unit and the seat, gently lift and tilt the box in one smooth motion until activation occurs.
2. With the tow wiring connected, press the brake pedal in the coach for 3 seconds to engage Dual-Signal mode.
3. Gently lift and tilt the box in one smooth motion. Activation should not occur.
4. With the brake lights of the coach on, gently lift and tilt the box in one smooth motion until activation occurs.
5. Set the operating unit back down and confirm the pedal has fully returned by pulling backwards on the brake pedal. Recheck cable tension as prescribed in Step 6-5.

If tow-wire connection is NOT installed:

1. Making sure there is plenty of clearance between the back of the operating unit and the seat, gently lift and tilt the box in one smooth motion until activation occurs.
2. Set the operating unit back down and confirm the pedal fully returned by pulling backwards on the brake pedal. Recheck cable tension as prescribed in Step 6-5.

Tow Wire Voltage Reading Below Required Value:

1. Check the wire voltage using the tow wire ground. If voltage increases there is a bad connection between the tow wiring and the frame of the ground.
2. Check wire voltage at the back side tow wire plug on the coach using the ground wire in the plug for ground. **If voltage is still low** test using the frame as ground. If voltage then goes up reground the ground wire. If not there is a bad connection on the power wire, or possibly a faulty diode block. **If voltage increases** continue to the next step.
3. Check terminals on coach tow-wire plug. If voltage is low there is a poor connection in the plug.
4. Connect the jumper and check for voltage on the end of the plug. If the voltage is low there is a poor connection in the jumper.
5. Connect the jumper to the towed and test the wires on the back side of the towed's tow wire plug. If the voltage is low there is a bad connection in the plug.

CoachLink Not Connecting:

1. Be sure the operating unit is powered up and the initialization has completed. Connection will not occure before initialization has completed.
2. Relocate items that may be creating interference (GPS, Sat Radio, etc.) Note that electronics built in to the coach may also create interference (engine monitoring, digital gauges, etc.).

Dual-Signal Working Inconsistently:

1. Test voltage without tow bar connected. The tow bar can create an inconsistent ground bridge masking a ground issue.
2. Check connections (especially those in round-style plugs). We recommend using silicone sealant in tow wire plugs to prevent loosening and corrosion.

TX Fault - Low Voltage:

1. Be sure running lights are on while towing.
2. Check the Demco fuse under the towed's hood.
3. With the tow wiring connected (do NOT connect the tow bar) remove the Demco fuse, turn on the running lights, and check for 12v on the space inside the fuse holder away from the towed battery.

Delta Force is simple to use, requires no maintenance, and is utterly rugged. Be sure to follow these operating instructions and contact the Help Line with any questions.

Setup:

Step 1

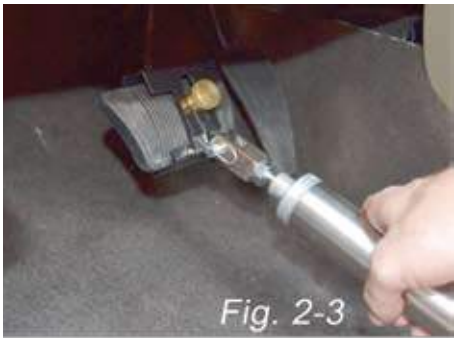
Step 2

1. Place Delta Force on the floorboard in front of the driver's seat.
2. Rotate the actuator 90° and allow the tether bracket to rotate downward.
3. Attach the carabiner to the tether bracket.
4. Grab the actuator allowing the pedal clamp to rest forward and position the top hooks over the top of the brake pedal. Press down to lock clamp in place.

Step 3

Step 4

Step 5

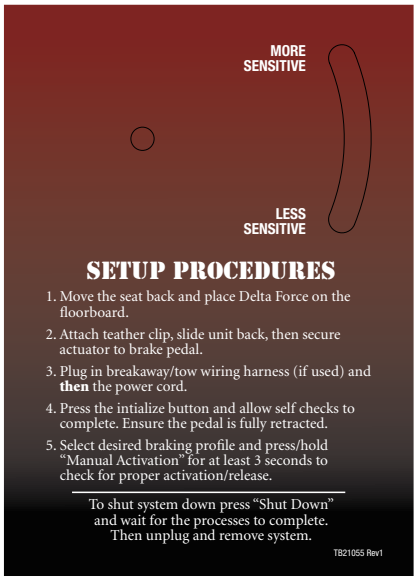


5. Check cable tension. If cable does not move 1/4" in either direction freely the cable needs to be loosened. If it moves more than 1" in either direct it needs to be tightened. (Cable adjustment shouldn't need to be changed after initial setup.)
6. Plug in the Tow Wire/Breakaway harness (if used).
7. Set sensitivity knob to LESS SENSITIVITY.
8. Plug in power cord and press "Initialize." Allow testing/positioning to complete.
9. Press manual activation button 1-2 times to ensure proper positioning.
10. Ensure pedal is fully retracted.
11. Select the desired profile by pressing "Select". Now you are ready to go!

Step 7

Delta Force provides proportional braking relative to deceleration. It should NOT activate while stationary. Adjustment is made using the following procedure.

1. With setup complete, set the baseline by loosening the black sensitivity knob and raise the knob towards the more sensitive position until activation begins. Once activation begins, slowly move the knob towards less sensitive until the actuator releases. Then move the knob 1/4 - 3/8" more (towards less sensitive). Tighten the black sensitivity knob. The baseline is now set.
2. Tow the vehicle and drive NORMALLY. When in a safe, isolated location such as an empty parking lot, begin testing various braking scenarios while watching the CoachLink monitor, there are three LED lights in the braking force area of the CoachLink monitor, from left to right. You should only see the first and second LED lights come on in normal braking, the third light will come on under extreme braking situations (panic stops). Adjust and retest as needed only moving **the sensitivity knob approximately 1/16" each time. Activation must not occur downhill with the exhaust/grade brake only.**
3. This set up procedure must be done every time the Delta Force is placed in the towed vehicle.

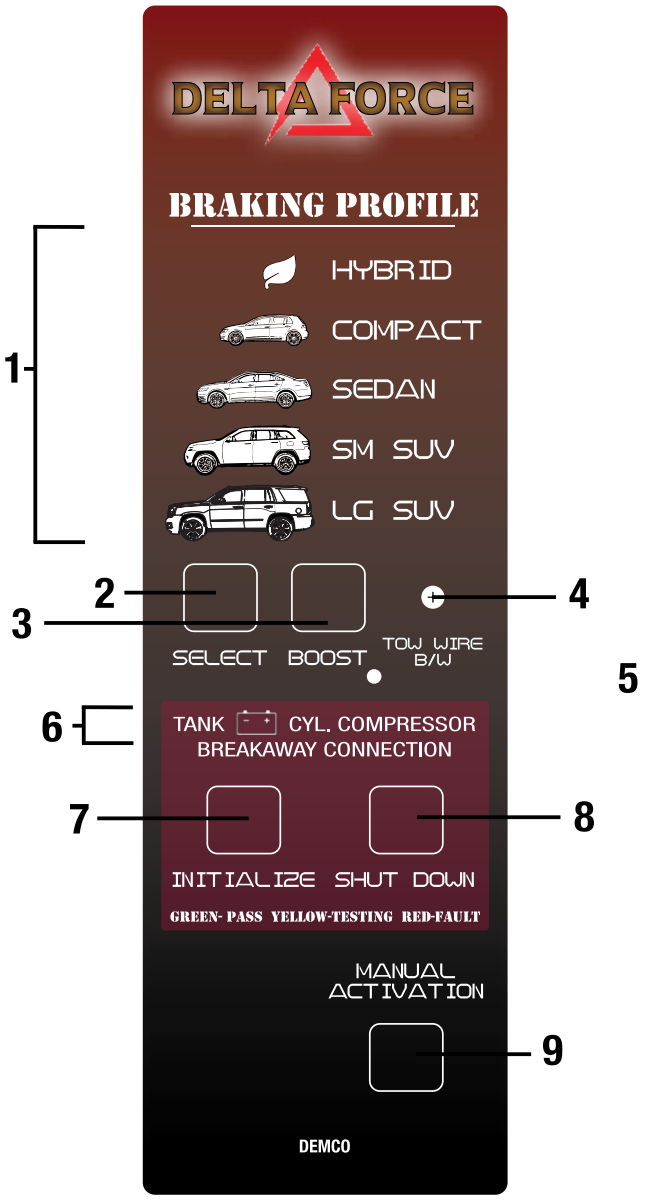


WARNING: The more sensitive this setting is, the more wear will occur to the towed vehicle's brakes.

1. The charging circuit uses the running lights of the coach to trickle charge the towed's battery. Be sure to turn on the coach's running lights are on while driving.
2. Take care to turn off the running lights and disconnect the tow wiring before starting the towed vehicle. If the charge wire is still active, it could cause the 10 Amp fuse to blow.

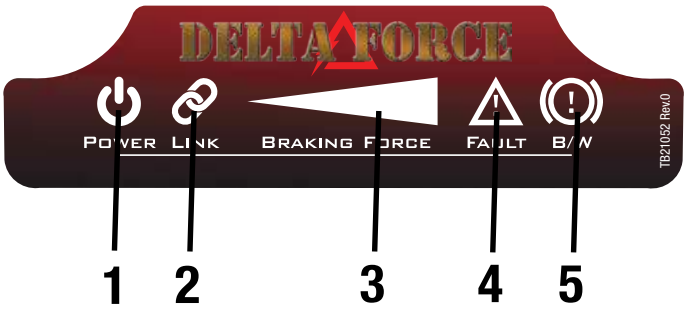
Shutdown/Removing From Towed:

1. Press the "Shutdown" button and allow the procedure to complete. The light will turn solid.
2. Follow the "Setup" procedures in reverse order starting with unplugging the power cord.

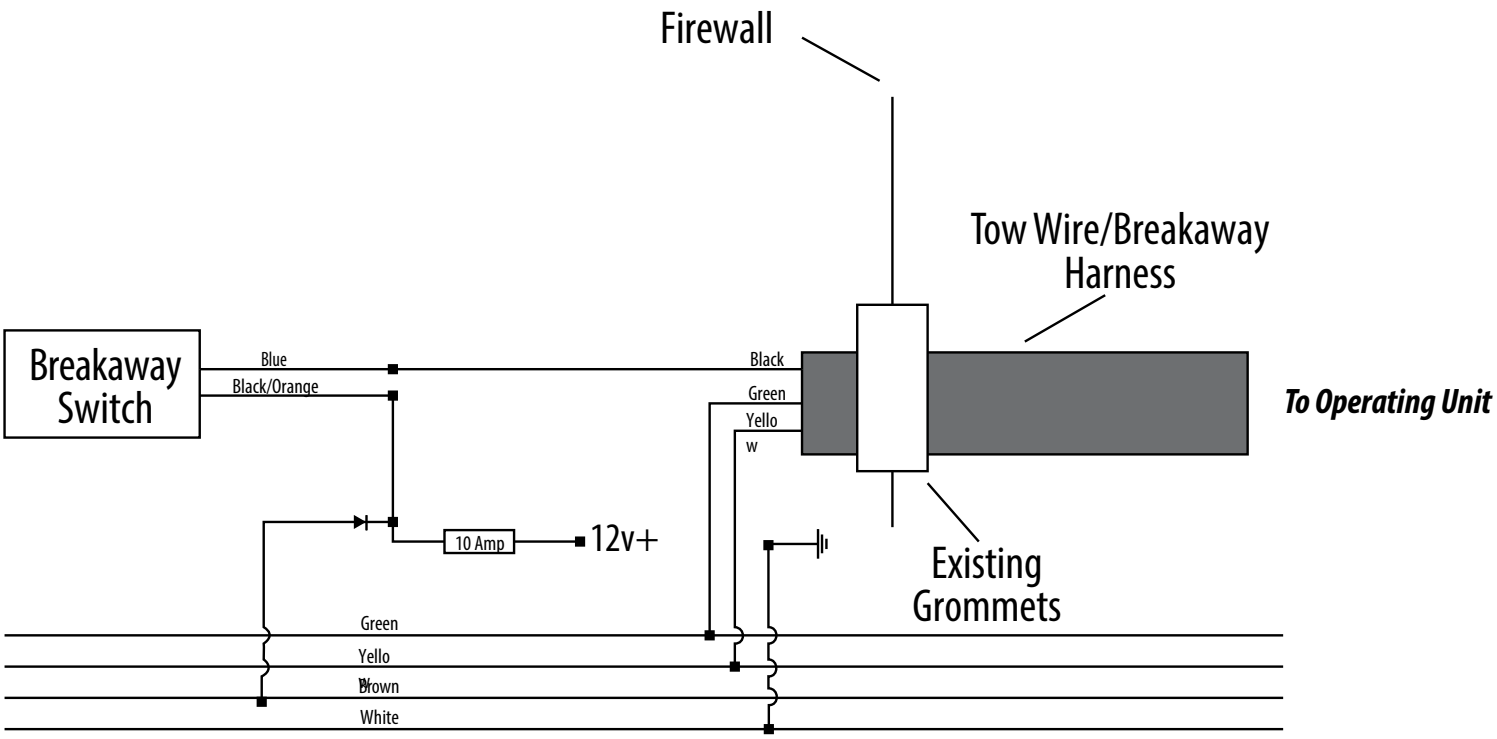


1. **Profile Indicator** - Displays active braking profile.
2. **Select Button** - Toggles braking profile.
3. **Boost Button** - Adds 15% to current profile.
4. **Tow Wire/Breakaway Harness Plug**
5. **Boost Indication Light** - Indicates boost status.
6. **Diagnostic Panel**
   - Tank - Monitors internal reserve tank for leaks.
   - TX - Monitors transmitter radio. Also displays low battery voltage.
   - Cyl - Monitors actuator for leaks
   - Compressor - Checks compressor efficiency. Automatically disables compressor if overheating is detected.
   - Pedal Connection - Monitors status of pedal connection. Also displays breakaway.
7. **Initialize Button**
8. **Shut Down Button**
9. **Manual Activation Button.**

CoachLink



1. **Power** - CoachLink power status.
2. **Link** - Displays connection link to towed vehicle.
3. **Braking Effort** - Displays current braking effort.
4. **Fault (+Buzzer)**- Indicates active fault code.
5. **B/W (+Buzzer)**- Indicates breakaway active.



Existing Tow Wiring