2003-04 Dodge Cummins

BD Turbo Mount Exhaust Brake

BD P/N#	Application
2023138	2003-04 Dodge 5.9L Cummins

Serial # _____

Date Purchased _____

Purchased from _____

Installed by _____

OWNER'S MANUAL – LEAVE IN GLOVE BOX

Instruction Manual Part # I2023138

BD Engine Brake, Ltd.
Plant Address: Unit A10, 33733 King Rd., Abbotsford, BC, Canada V2S 7M9
USA Shipping Address: #88-446 Harrison St., Sumas, WA 98295 | USA Mailing Address: PO Box 231, Sumas, WA 98295
Phone: (604) 853-6096 | Fax: (604) 853-8749 | Internet: www.bd-power.com

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Welcome

Thank you for purchasing a BD Exhaust Brake. This manual is divided into different areas to assist you with your installation and operation of your braking unit. We strongly suggest that you write down the kit and serial numbers of your unit in the spaces provided and retain this manual for any future reference.

Special Tools Required

- Measuring tape or ruler
- Drill with 1/8", 3/16" bits and Unibit
- Sawsall or hacksaw
- Crimping Pliers
- Test light
- ¼" Drive Socket Set
- Small bladed flat tip screwdriver
- Welder

Kit Contents

2023138	
2003-04 Dodge Cummins	
1030129-C	Air Pump Kit
1220136-B	Regulator & Control Kit
1321039	DFIV Install Kit
2123038	Valve Assembly

Accessories

Description	Part Number
Manual Transmission Shifter Switch Kit	**1300210**
TowLoc Transmission & Converter Package	**CALL**
X-Monitor Digital Gauge Package	**1085220**
Brake Pressure Gauge Kit	**1030550**
Boost Pressure Gauge Kit (30lbs.)	**1030570**
Transmission Gauge Kit (Automatic Transmission)	**1030583**
Exhaust Temperature Gauge (Pyrometer)	**1030512-I**

Pre-Installation

To prevent damage to electronic components, it is recommended that you disconnect both negative battery terminals before starting. **Please read this manual thoroughly before installing this exhaust brake.**

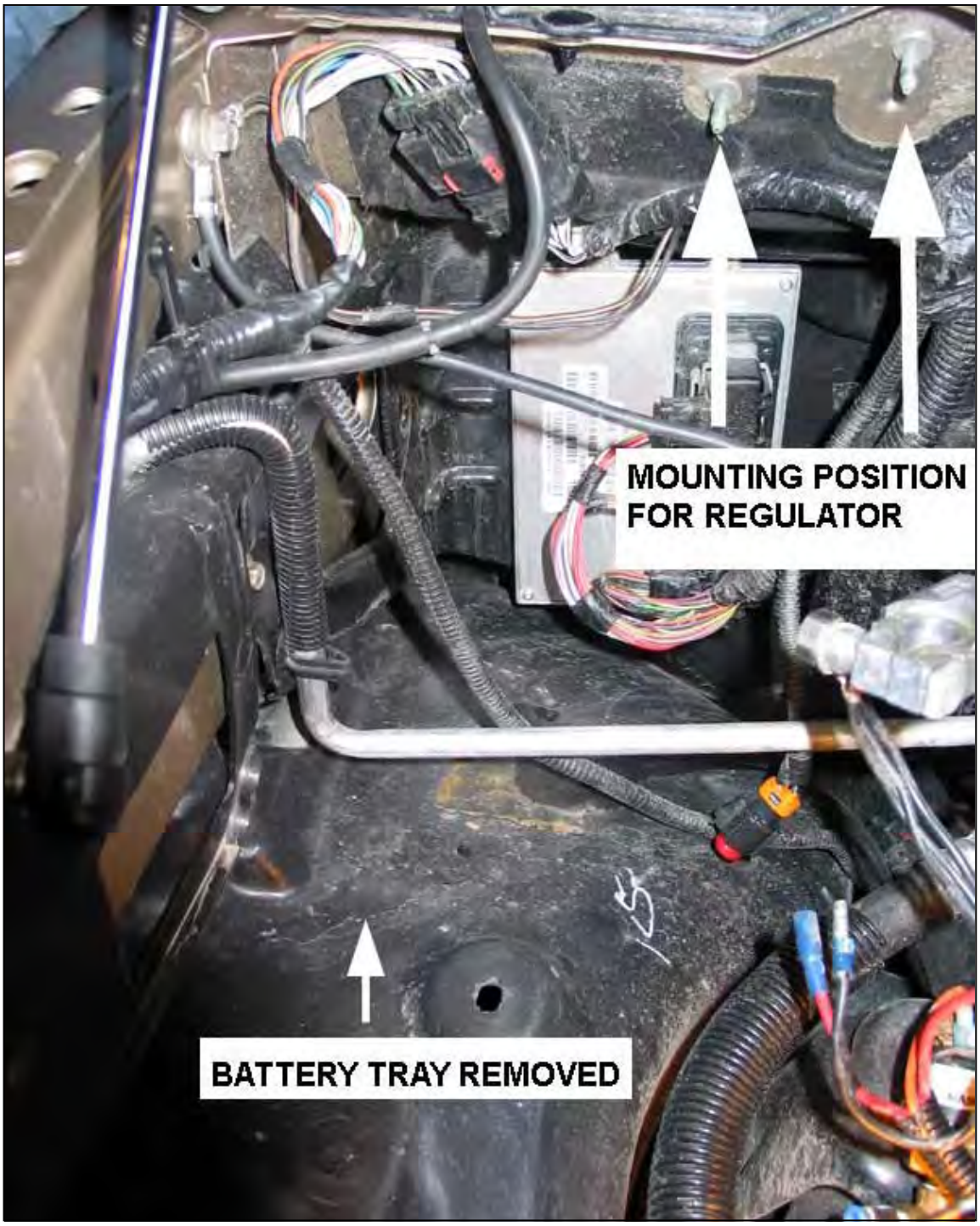
Installation

REGULATOR INSTALLATION

Locate the two studs with nuts on the passenger side firewall, just below the upper cowling.

Remove the two nuts from the studs and fit the bracket and regulator assembly onto these studs.

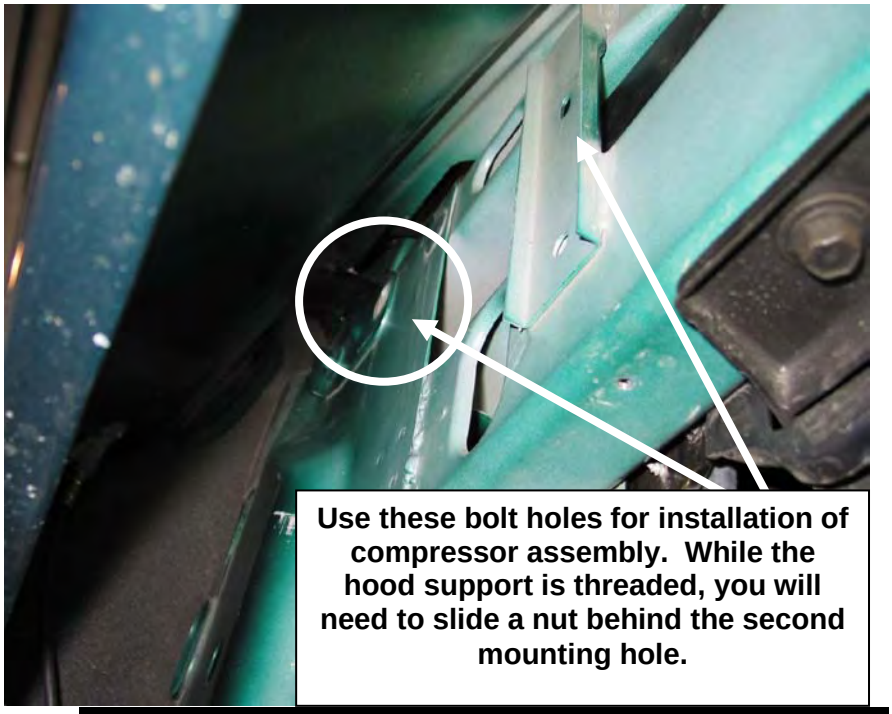
Secure by reinstalling and tightening the nuts.



AIR COMPRESSOR MOUNTING INSTALLATION

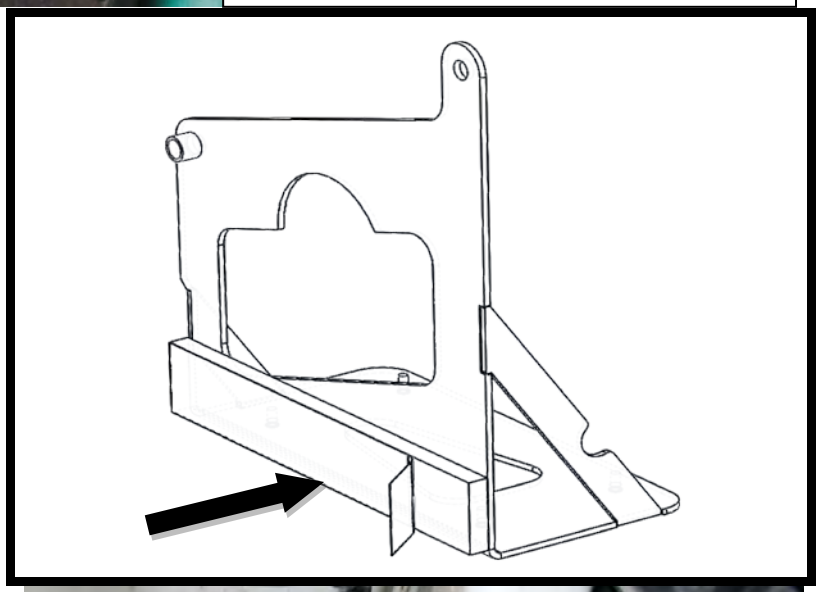
You will need to remove the inner front fender well on the passenger side of the vehicle. There are eight bolts holding the lining in place. If you can put the vehicle on a hoist about 3 feet above the ground it will ease this installation.

Locate the hood support bolt up inside of the fender well; it is very close to the bottom of the radio antenna. Remove the bolt closest to the battery tray or closest to the front of the vehicle.



Use these bolt holes for installation of compressor assembly. While the hood support is threaded, you will need to slide a nut behind the second mounting hole.

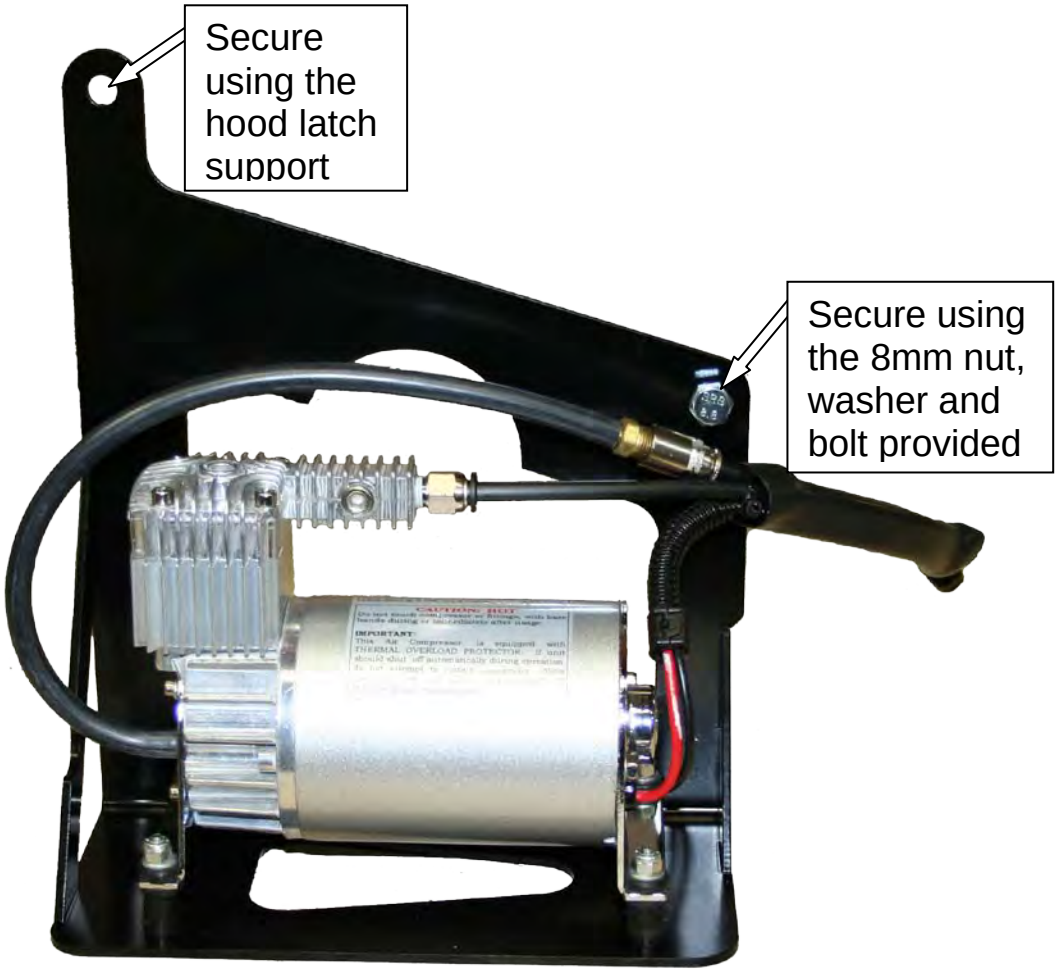
Attach the foam tape to the bottom backside of the bracket.



Slide the compressor assembly up into this space and re-install the hood support bolt. Now raise the compressor assembly so that you can install the provided bolt through the bracket and frame hole into the nut. Note that you can use a magnet to assist in holding this nut into place will you slide the bolt through.

Tighten all bolts to secure the assembly. Route the compressor hose & wiring harness up through the frame opening at the rear of the battery, then route the harness towards the regulator.

Use the wiring diagram on page 12 as a reference for the wiring of the air hoses and the electrical wiring. NOTE: Be sure to keep all hoses and wiring harnesses away from any moving parts or heat sources.



IN-CAB EXHAUST BRAKE WIRING

NOTE: *IF A BD TOWLOC IS TO BE INSTALLED WITH THIS BRAKE YOU MUST SKIP THE WIRING SECTION IN THIS MANUAL AND FOLLOW THE TOWLOC INSTRUCTIONS FOR CORRECT WIRING INSTALLATION. IF INSTALLING A TOWLOC GO DIRECTLY TO 13 AND CONTINUE WITH BRAKE VALVE INSTALLATION.*

CRUISE CONTROL WIRING

Manual Transmission

To obtain access to the cruise control wiring harness, remove the lower steering column panel by removing the mounting screws and unsnapping the panel from the instrument panel.

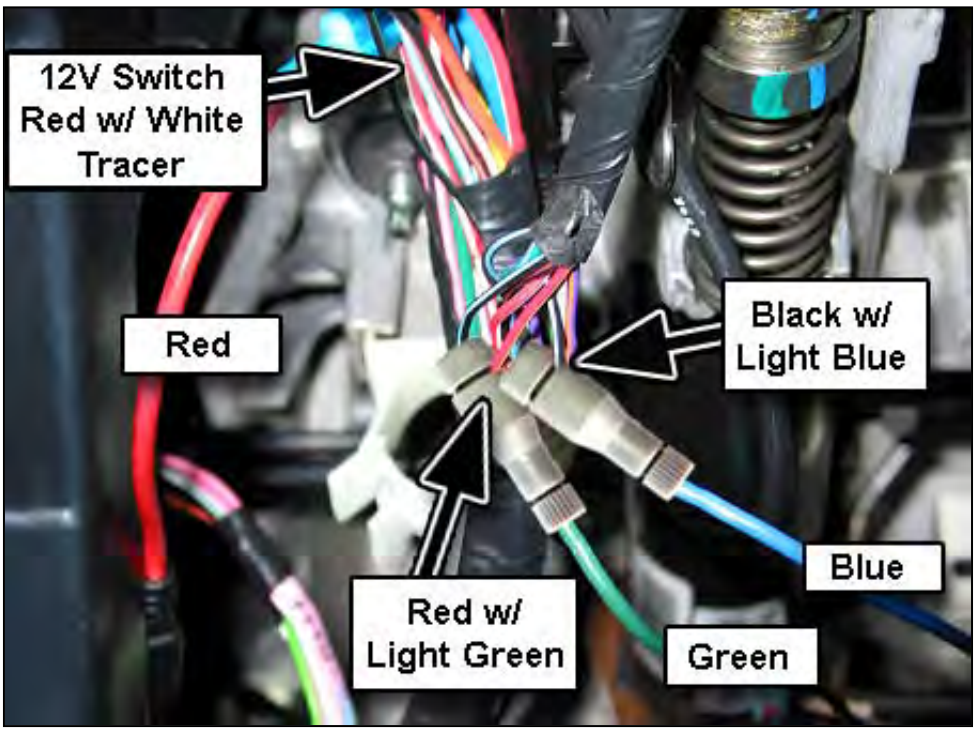
Locate the small wiring harness that runs out of the main harness, located under the dash, running vertically by the left of the steering column.

******DANGER******

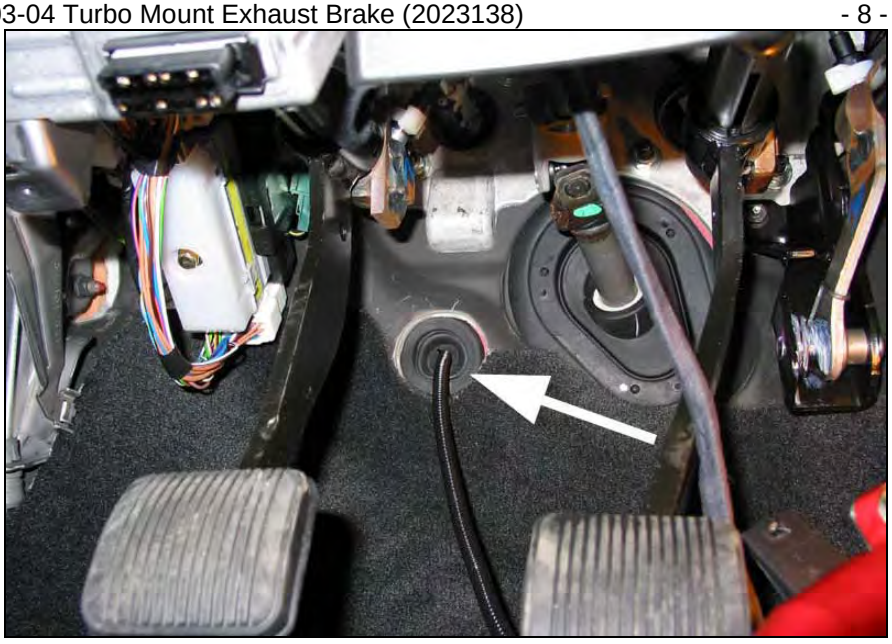
THERE IS A BLACK WIRE WITH A TWISTED LIGHT BLUE/GREEN TRACER. DO NOT CONNECT OR TEST THIS WIRE AS IT IS CONNECTED TO THE AIR BAG SYSTEM AND THE BAG MAY DEPLOY CAUSING DAMAGE AND/OR INJURY!

Remove some of the black electrical tape from the small harness to gain access to the small **black wire/light blue tracer** and install a gray Posi-tap onto it. Insert the blue wire from the DFIV module into this connector.

Locate the **red wire w/green tracer** and install another gray Posi-Tap. Insert the green wire from the DFIV module into this connector.



Locate a grommet on the firewall and cut an opening in it to run the loom covered wiring through the firewall.

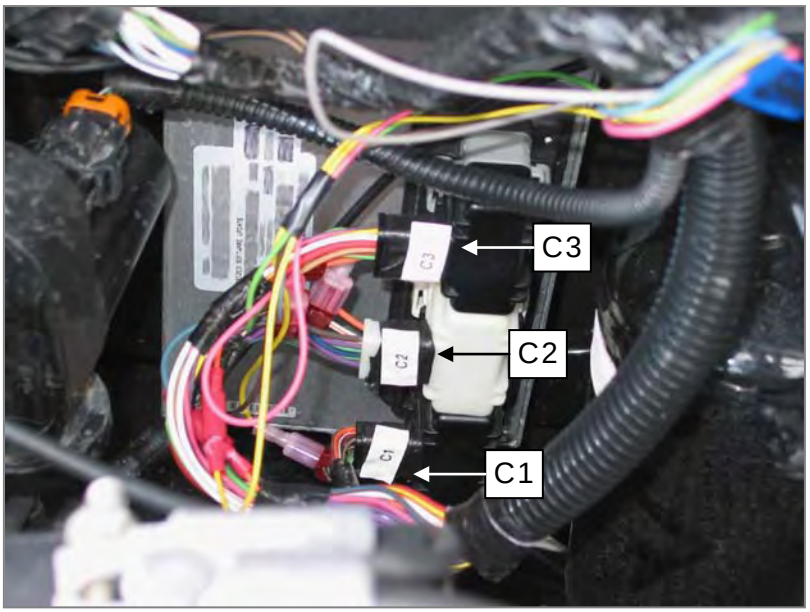


ACCELERATOR PEDAL POSITION SENSOR

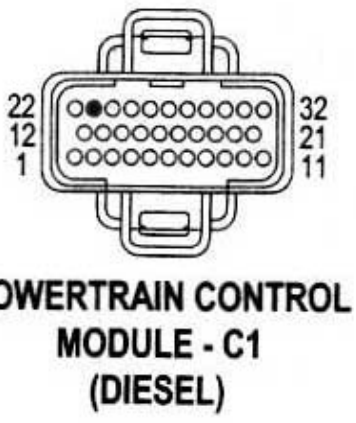
Automatic Transmission (w/PCM)

Route the yellow wire from the DFIV module along the firewall to the PCM. On 2003 Dodge's, the PCM is mounted vertically on the firewall so that the connectors will be (from top to bottom):

C3 – Top
C2 – Middle
C1 – Bottom



On connector C1, locate pin 23 (The **orange wire/dark blue tracer** and install a gray Posi-Tap to this wire. Plug the yellow DFIV wire onto the Posi-Tap.



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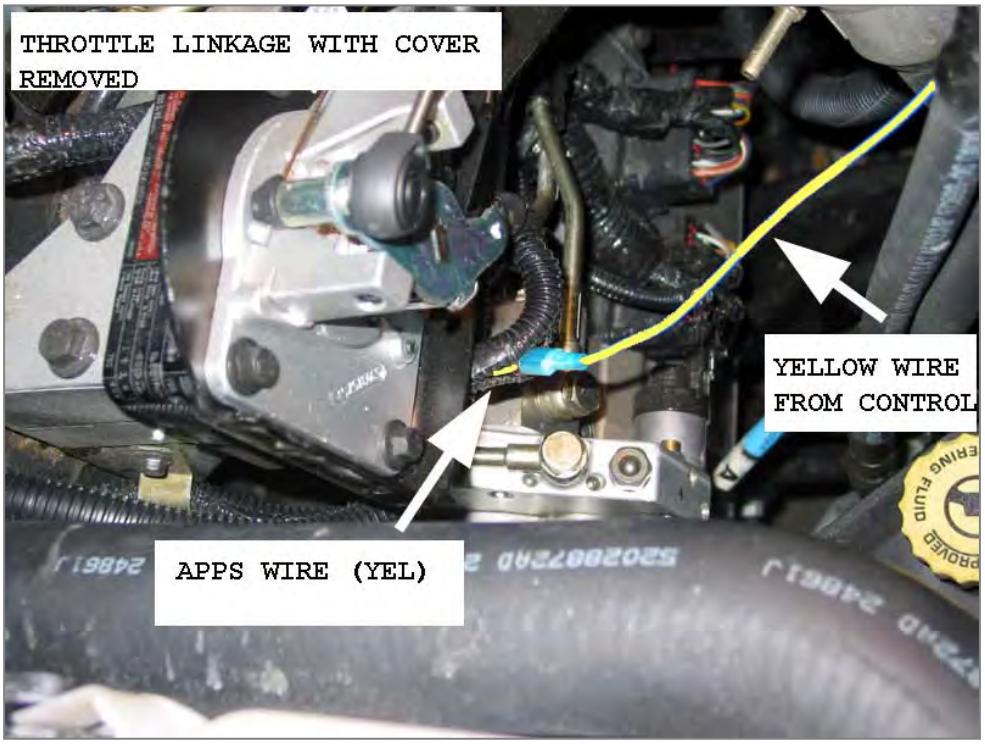
Manual Transmission (w/o PCM)

Route the yellow wire from the DFIV module along the driver's side of the engine to the throttle linkage and APPS sensor.



Remove the cover of the throttle linkage, then locate and disconnect the wiring connector for the APPS.

Open the loom and locate the yellow wire. Install a gray Posi-Tap.

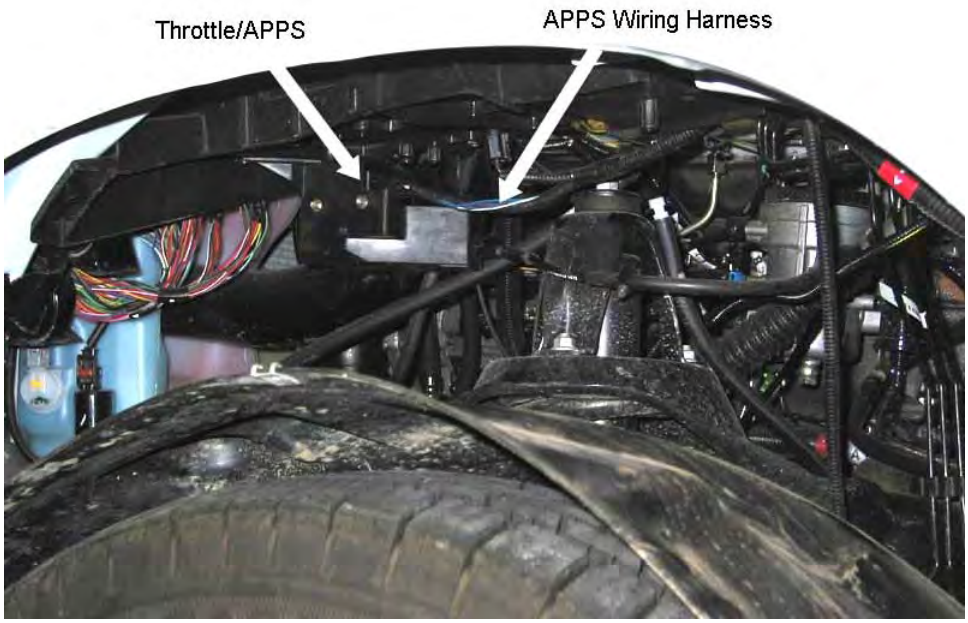
Connect the yellow wire from the DFIV module to this Posi-Tap and reconnect the APPS connector. Reinstall the throttle linkage cover.

2003 DODGE RAM 3500

NOTE:

On some truck configurations (i.e. 2003 RAM 3500) the throttle cable/APPS will be located UNDER the driver side battery tray and is accessible by removing the inner fender skirt.

Once the fender skirt is removed, the APPS wiring harness can be accessed. Locate the white with green tracer wire and install the gray Posi-Tap to it.



MAIN SWITCH INSTALL (Required If Using Toggle Switch)

Remove the fastening screws of the dashboard bezel and remove the covering trim by pulling back on the corners of the trim panels.

Note: Placing the transmission all the way into 1st/low gear and ensuring the tilt steering is all the way down will allow for easier removal.

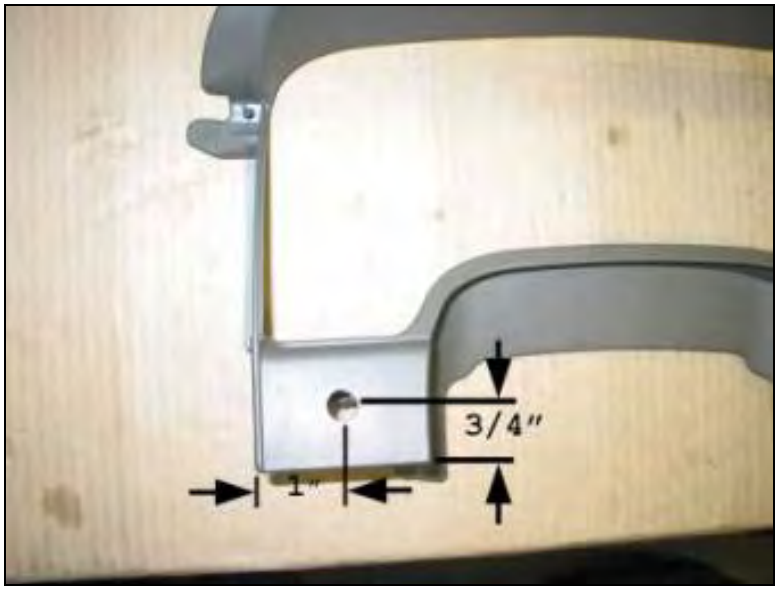
Pull the left hand and right hand dash panels away from their secured positions and let them hang.

Once the dash trim has been removed, place it on a large working surface such as a table or workbench.

Measure and mark a spot for the toggle switch 3/4” up from the bottom edge of the dash panel and 1” in from the left edge of the accessory panel as shown in the photo.

Drill a pilot hole with a 1/8” bit and finish by enlarging the hole with a Unibit to exactly ½”.

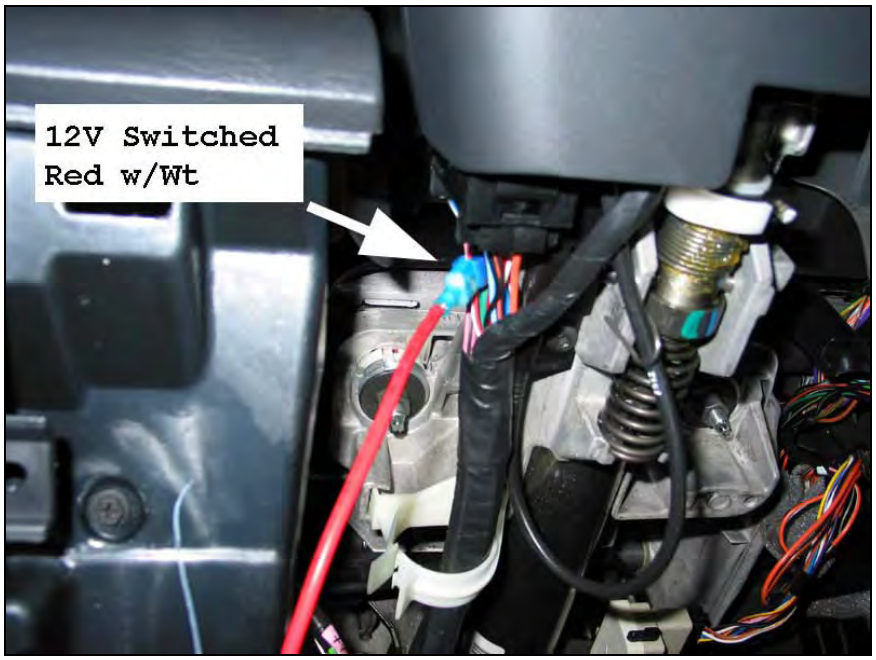
YOU MAY HAVE TO GRIND DOWN PART OF THE SUPPORT RIB ON THE BACK OF THE TRIM PANEL TO ACCOMMODATE THE SWITCH BODY.



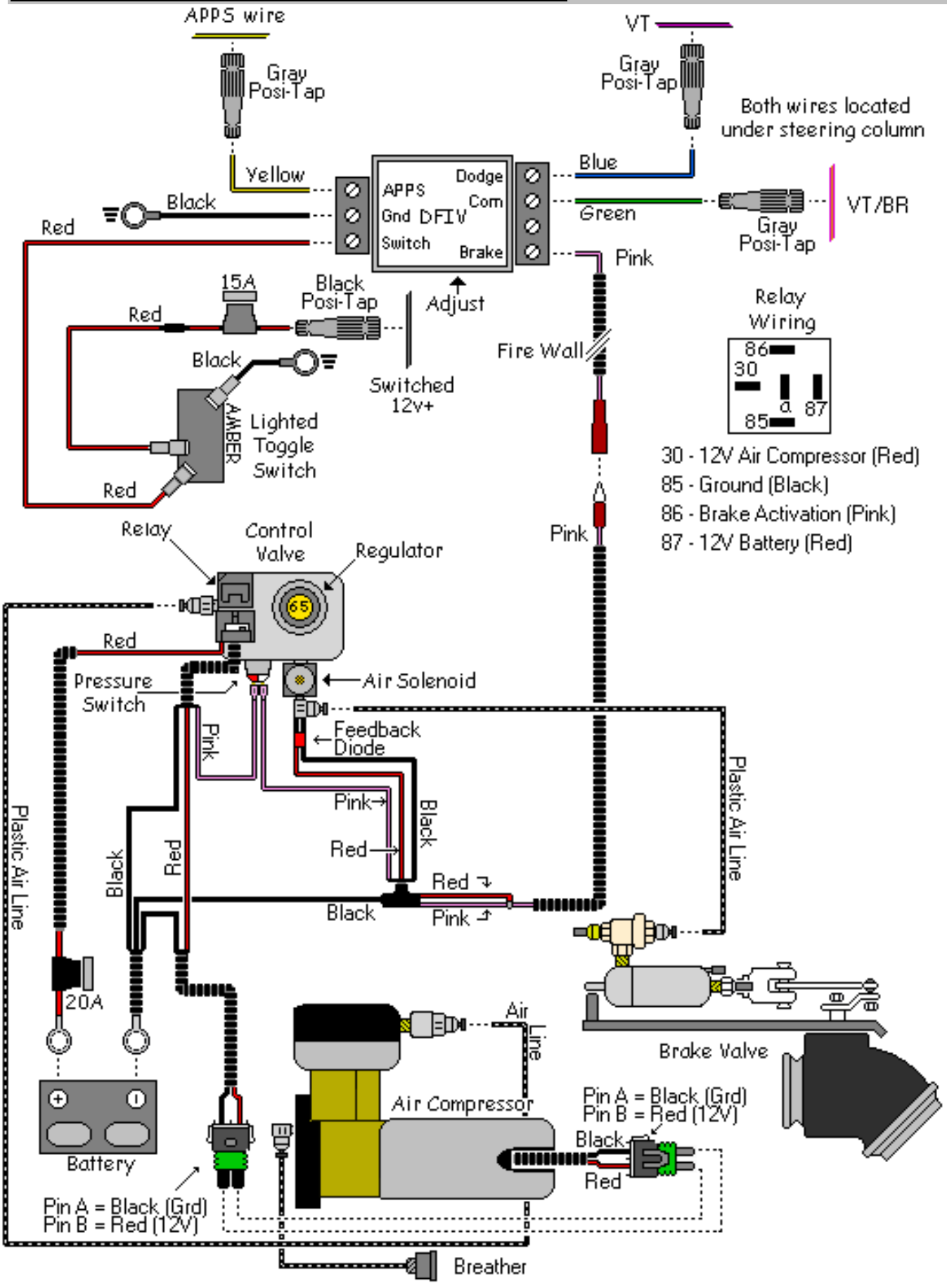
Install the switch into the newly drilled hole and secure it with a lock ring, then re-install the dash trim panels by reversing the removal procedure.

Once the switch is installed, attach the ground wire to a good metal ground under the dash.

With a test light, locate a switched 12 Volt power source and install the supplied black Posi-Tap to it then attach the red, fused wire, from the switch to this Posi-Tap.



EXHAUST BRAKE WIRING DIAGRAM



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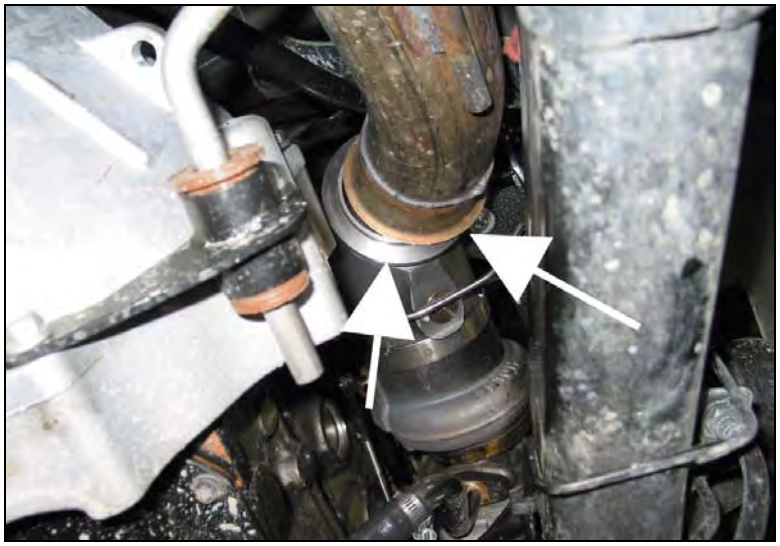
BRAKE VALVE INSTALLATION

TO PREVENT INJURY OR DAMAGE, RAISE THE VEHICLE TO A GOOD WORKING HEIGHT AND SUPPORT IT WITH JACK STANDS OR AXLE STANDS.

From underneath the vehicle, remove the down pipe-to-turbo elbow band clamp using a **10mm** socket. Support the down pipe as it may drop down once the clamp is removed.



Disconnect the Mass Air Flow sensor harness and remove the plastic turbo air inlet tube. Loosen the band clamp that holds the factory exhaust elbow to the turbocharger.

Remove the exhaust elbow.

Insert the exhaust brake valve assembly in place of the factory elbow and reinstall the turbo band clamp.

Tighten all clamps that secure the brake to the flanges.

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AIR HOSE INSTALLATION

Now that the brake, pump and regulator assemblies are installed in their correct positions, we can now install the two air hoses.

Install one end of the first ¼" plastic hose into the quick-connect coupler on the brake's air cylinder and route it to the air solenoid.

One end of the second hose should already be installed into the 90° quick-connect coupler on the air compressor. Install the other end into the coupler attached to the tee fitting which connects to the pressure switch.

Included in the kit is a snorkel relocation kit, which includes a section of plastic hose and a breather filter. This filter should be routed to a clean dry location in the engine compartment. Reference the installation diagram for any instructions.

CARE MUST BE TAKEN NOT TO KINK THE PLASTIC HOSE AND TO POSITION IT WHERE IT WILL NOT MELT, RUB OR CONTACT ANY MOVING PARTS.

NOTE: Removal of the plastic hose from the quick coupler can be accomplished by pushing the colored ring towards the fitting and pulling the hose out.

CAUTION: REFER TO THE WIRING DIAGRAM ON PAGE 12 FOR CORRECT HOOK UP OF HOSES AND WIRING.

DFIV ADJUSTMENT & TESTING

Ensure the connections of the corresponding wires to the DFIV Control Module are correct as shown in the wiring diagram.

To achieve the correct setting for the activation of the exhaust brake in relation to the throttle pedal the DFIV Module must be calibrated for your vehicle.

With the throttle at idle, start the engine and turn on brake switch. Using a small flat bladed screwdriver, turn the small adjusting screw in the DFIV Module counterclockwise or clockwise until the pump/brake JUST turns on.

<u>CAUTION:</u> THE ADJUSTING SCREW IS A MICRO-SWITCH THAT IS VERY DELICATE, SO TURN USING SMALL ADJUSTMENTS.

Test by revving up the engine to approximately 1200 RPM and releasing the throttle. As the accelerator pedal is applied the brake should disengage just before then engine starts to rev, indicating proper calibration of the DFIV Module with the APPS.

The brake should then activate again when the throttle pedal returns to the idle position. If it does not activate, re-adjust the DFIV Module so that it does.

Check for any exhaust leaks and recheck all connections and hoses for security and interference from moving or heated items. After about 100 miles (160 km), re-torque the flange bolts.

IDLE PRESSURE ADJUSTMENT

Exhaust Brake pressure is preset at the factory but if more holdback performance is required with the vehicle loaded, adjust the regulator using small increments to give 50 – 55psi under load.

Test the exhaust brake pressure by installing a pressure gauge into the test port on the bottom of the brake valve. If the brake pressure is not 15 - 17psi at idle, then the pressure will have to be adjusted.

The maximum REGULATED pressure is adjusted with the pressure regulator under the hood and under driving conditions.

Turning the regulator **clockwise** will increase pressure.

Turning the regulator **counter clockwise** will decrease pressure.

*****DO NOT EXCEED 65 LBS. OF EXHAUST BACK PRESSURE*****

Always test pressure using the backpressure port running on the stainless steel line off of the brake's valve assembly, **NOT** at the regulator itself.

Maintenance & Troubleshooting

To extend the life of the valve assembly, do not operate your vehicle for extended periods of time without activating the brake. We suggest activating the exhaust brake at least a couple times a day while operating the vehicle to prevent any carbon or rust build-up on internal parts of the valve assembly.

The hoses, wires, fittings and clamps should be inspected on a regular basis for any deterioration, damage or leaks. Periodically clean the filter on the Air Compressor, and, when cleaning the engine, cover the filter on the compressor to prevent moisture from entering the filter.

To increase the life of your exhaust brake we recommend daily operation. By simply switching the brake on and off a couple times a day, it will prevent the butterfly from sticking due to carbon build-up.

Following the diagrams in this manual, tracing hoses and wiring, checking continuity through electric components or checking for any lines that are disconnected, should solve any problems that may arise. If you have any problems or need replacement parts, call us at 1-800-887-5030, between 8:30am and 4:30pm Pacific Time.

Operating Guidelines

Thank you for taking interest in the BD Engine Exhaust Brake. As a driver, you probably already know the need for extra braking power that your vehicle requires on the hills and long grades. With loads being towed behind you, the extra push when slowing down or maintaining speed on downward grades can prove to be a great strain on your vehicles hydraulic braking system, even to the point of "burn-up". These guidelines were designed to offer you a better understanding of the benefits of exhaust brakes and are partly based upon material developed by the U.S. Department of Transportation National Highway Traffic Safety Administration.

The emphasis on today's vehicles is to give the consumer a product that can give them usable power with fuel efficiency. But, in the transition, the vehicles have lost their natural braking power, making it more easy for the vehicle to continue to roll and harder to stop. Of course, this gets more noticeable with the increase of weight, on or behind the vehicle. This is where an exhaust brake becomes a useful tool in increasing the driveline drag of the vehicle without the use of the hydraulic brakes; a tool that with maximum use or even occasional use can reduce wear on hydraulic braking parts and at the same time increase safety.

The BD Exhaust Brake can be used to help maintain a controlled vehicle speed on a downward grade, as well as slowing the vehicle down for such times as turns or exit ramps, without you using your hydraulic brakes. **But, the exhaust brake cannot be used as a parking brake or will not bring your vehicle to a complete stop.** By using a BD Exhaust Brake, the life and effectiveness of your hydraulic brakes will increase.

This is because of the decreased use of the hydraulic brakes in situations like hills, the wear factor is reduced and there is less opportunity for your hydraulic brakes to heat up which would reduce the efficiency. When you ride your hydraulic brakes, make hard stops or have poorly adjusted brakes, this creates high temperatures and as your brakes get hotter, the more chance there is for fade or failure.

With terrain that is a series of up and down grades, the BD Exhaust Brake will aid in reducing exhaust valve warping. Because of the power needed to pull your vehicle and load up a hill, this generates a lot of heat. When you have reached the crest of the hill and are now coasting down the other side, the heated valves are too quickly cooled. With the exhaust brake engaged, the heat loss to the valves will be reduced, which can prevent valve warping.

When the toggle switch is turned to the "On" position, the valve is activated every time the driver takes his foot off of the throttle pedal. When the driver puts pressure back on the throttle pedal, the throttle switch is deactivated and the valve opens again.

Exhaust brakes are designed to operate with the throttle at idle, not to be used in conjunction with cruise controls, and not designed to aid in gear shifting.

Such cases may cause damage to engine and/or exhaust brake. Incorporated with the BD Exhaust Brake, there is a pressure regulating system that will control the created backpressure. If the backpressure reaches the set limit of 55 psi while under engine braking, the exhaust valve will open slightly to relieve the excess pressure.

The best scenario for exhaust braking is when going down hill, select a gear that lets you maintain a constant speed with little or no use of the hydraulic brakes, or the same gear that would be used to go up the same grade of hill. This also depends on the weight, load or road conditions that the vehicle will come upon. So, in summary, by using the BD Exhaust Brake, you reduce the need for use of your hydraulic brakes in situations where you need to slow down or maintain (i.e. hills, off ramps, corners, approaching speed changes or traffic lights). Reducing the use of your hydraulic brakes in these situations will reduce the heat build up, as well as wear and damage to linings and drums. And, when you reduce these factors, you save your hydraulic brakes for when you really need them (for stopping or emergencies).

The BD Exhaust Brake is not a substitute for your hydraulic brakes and, cannot correct or compensate for poorly maintained or misadjusted brakes. But, when you need to slow down or maintain a constant speed, the BD Exhaust Brake will be a valuable and effective tool. Exhaust Brakes are more efficient at preventing rather than correcting an over speed condition.

Thank you and happy motoring.
BD Engine Brake, Inc.