2003-04 Dodge Cummins

BD Turbo Mount Exhaust Brake

Serial Number: _____

Date Purchased: _____

Purchased From: _____

Installed By: _____

OWNER'S MANUAL – LEAVE IN GLOVE BOX

Instruction Manual Part # I2023138
Printed in Canada

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.

Please fill out and mail registration card as soon as possible.

Special Tools Required

Drill with 1/8", 3/16" bits and Unibit
Crimping pliers
Test light
¼" Drive socket set
Small bladed flat tip screwdriver

Accessories

Description	Part Number
Manual Transmission Shifter Switch Kit	**1300210**
X-Monitor Digital Gauge Package	**1085220**
Brake Pressure Gauge Kit	**1030550**
Boost Pressure Gauge Kit	**1030575**
Transmission Gauge Kit (Automatic Transmission)	**CALL**
TowLoc Transmission & Converter Package	**CALL**

Before installation can begin, we must take a look at any other requirements or options for your particular application.

If the driver likes gauges, another handy option is the Brake Pressure Gauge Kit. This gauge will allow you to monitor the pressures being developed by the exhaust brake.

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.

AIR COMPRESSOR INSTALLATION

Pump Relocation (Automatic Transmissions Only)

If your truck is equipped with an automatic transmission, then the stock vacuum pump must be relocated in order to make room for the air compressor. Trucks equipped with a manual transmission can skip to page 5.

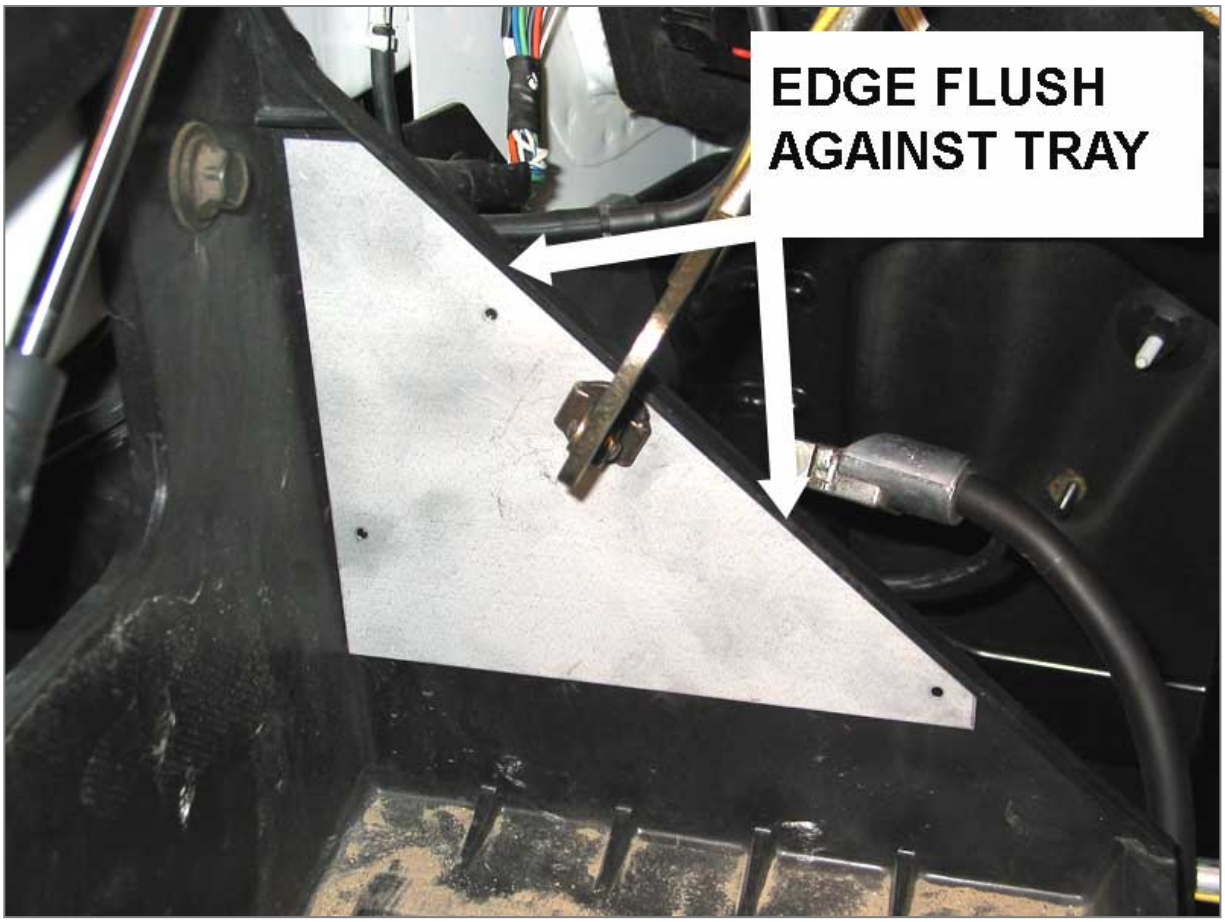
Remove the air cleaner and the passenger side battery.

Located just behind the battery tray is the vehicle's vacuum pump. This pump has to be relocated to another position in order to install the air compressor. The vacuum pump will later be reinstalled to the rear of the battery tray.

Remove the three (3) screws holding the vehicle vacuum pump to the inner fender and retain the screws for later.

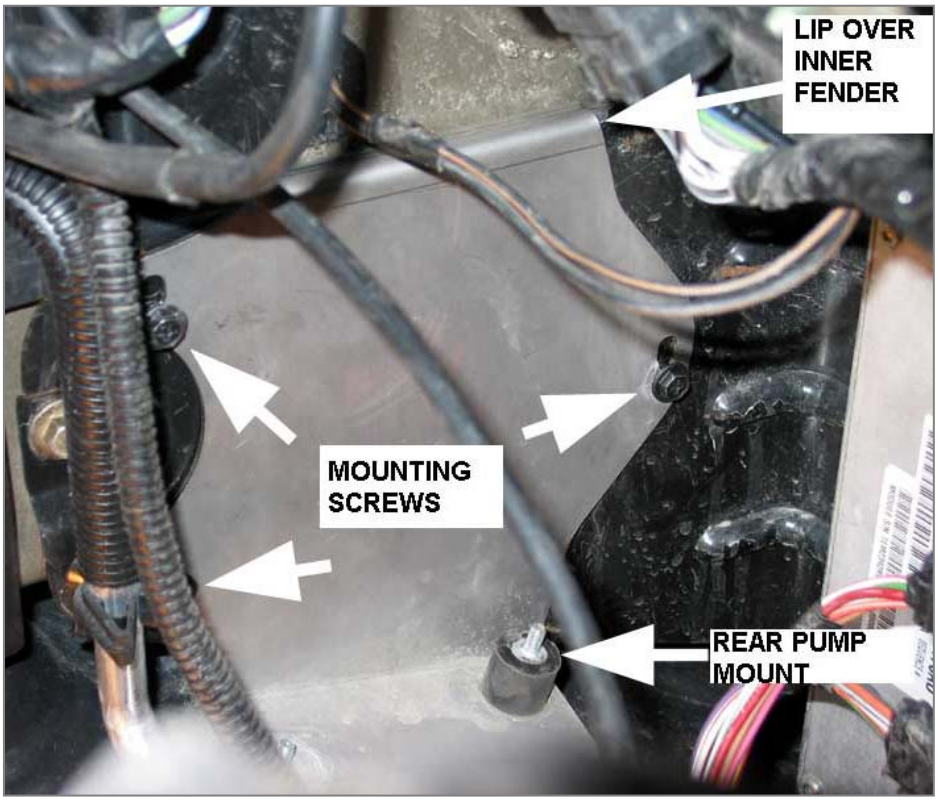
With the battery removed, place the drilling template up against the inside of the battery tray with the angled edge flush against the inner lip of the tray, as seen in the photo below.

With the template in place, drill three 1/8" pilot holes as per the template, then position the vacuum pump on the outside of the battery box and secure with screws.



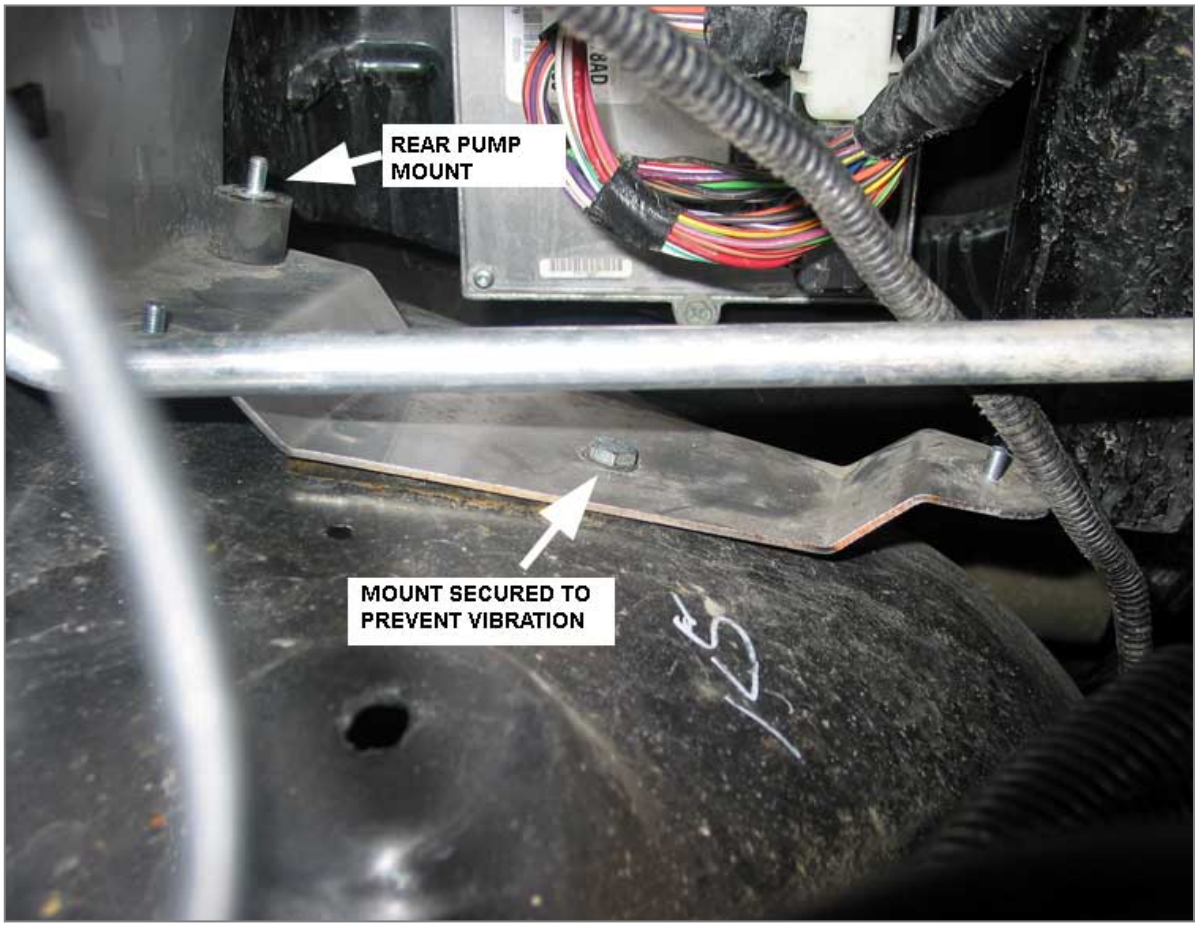
Mounting Bracket Installation

With the vehicle's vacuum pump removed from its original position, there will now be a space on the inner fender to mount the air compressor.



Position the air compressors mounting bracket by inserting the lip of the bracket over the edge of the fender and secure it place with the original screws.

To prevent the bracket from vibrating on the fender, drill a ¼" hole through the wheel well, using the bracket as a guide and secure using the hardware provided.



NOTE: This picture shows the battery tray removed for better clarity.

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Pump Installation

To install the pump on the bracket, first install the flat washer and nut onto the rear-mounting pin.

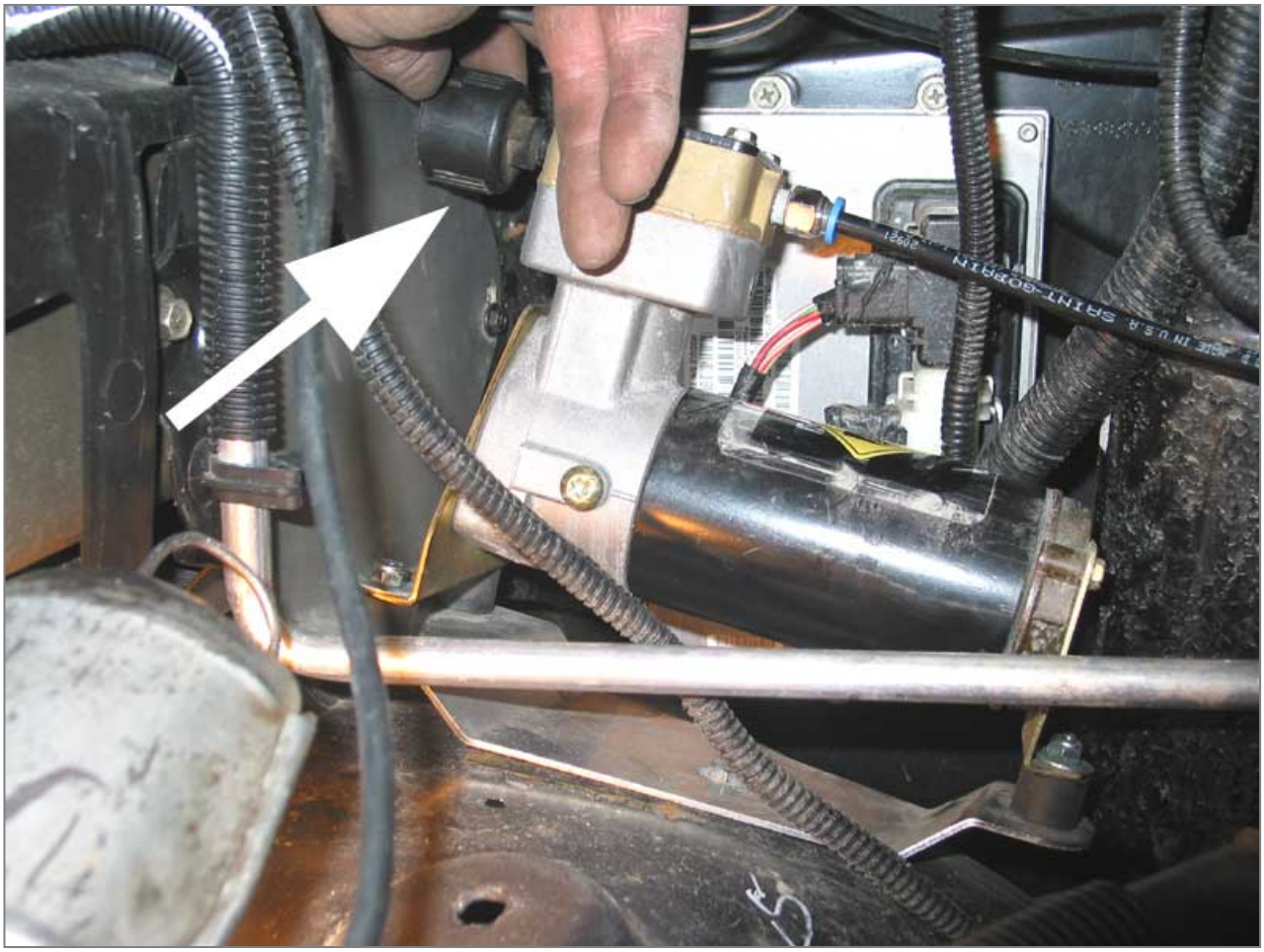
Position the pump to ensure that the back rear mount is in place under the washer (leg must be between the washer and the rubber mount) and lower the pump onto the remaining mounts.

NOTE: If grommets are attached to the feet of the compressor, they should be removed before installing them onto the rubber mounts.

Install the flat washers on the remaining mounts and secure with the nuts provided.

** DO NOT OVER-TIGHTEN THE NUTS OR THE MOUNT WILL BREAK. **

Install the air compressor pump filter into the open port of the compressor head.

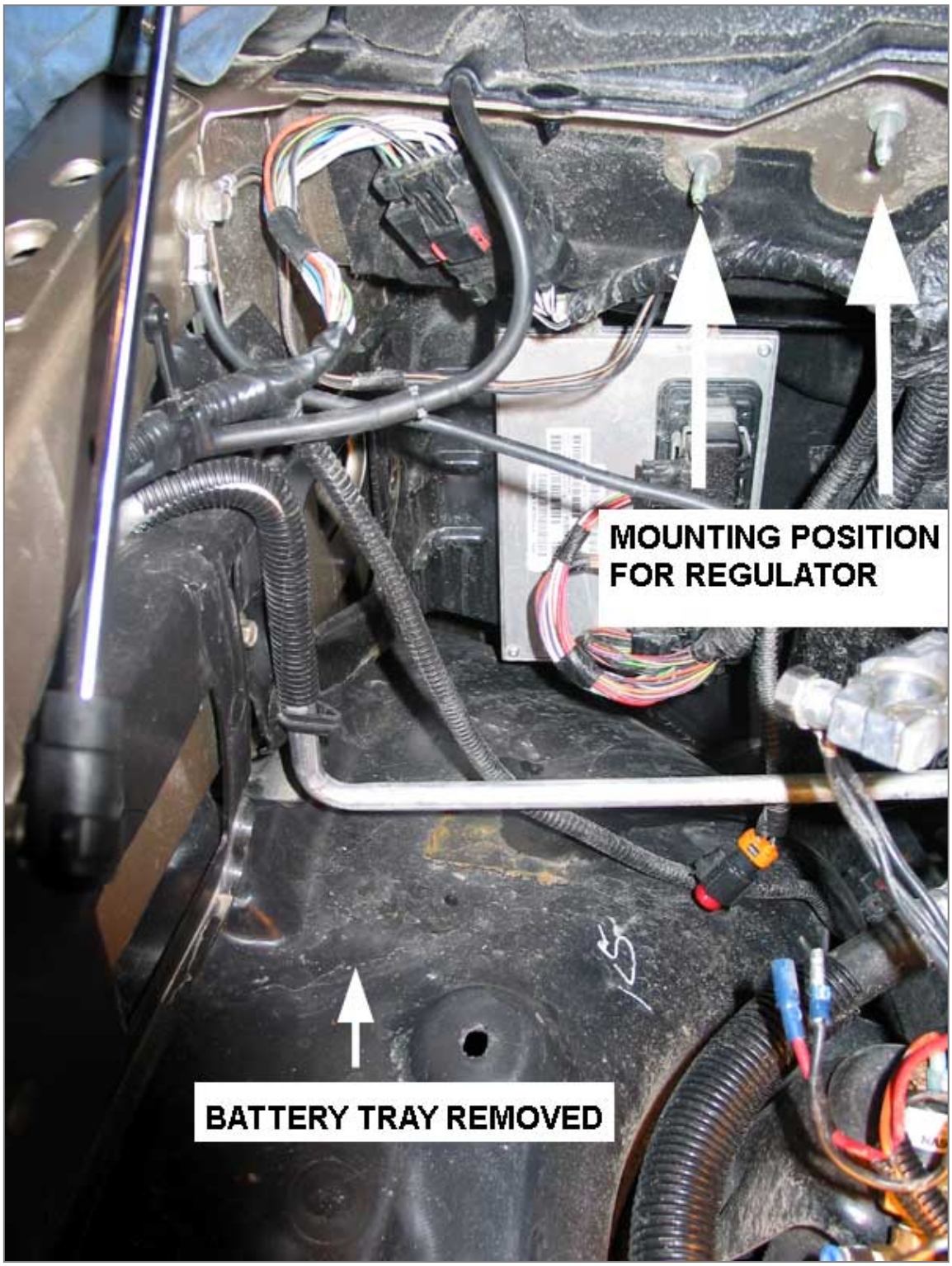


REGULATOR ASSEMBLY INSTALLATION

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.



IN-CAB EXHAUST BRAKE WIRING (2003 MODELS)

***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 page 17 and continue with the brake valve installation.*

CRUISE CONTROL WIRING INSTALLATION

Manual Transmission (w/PCM)

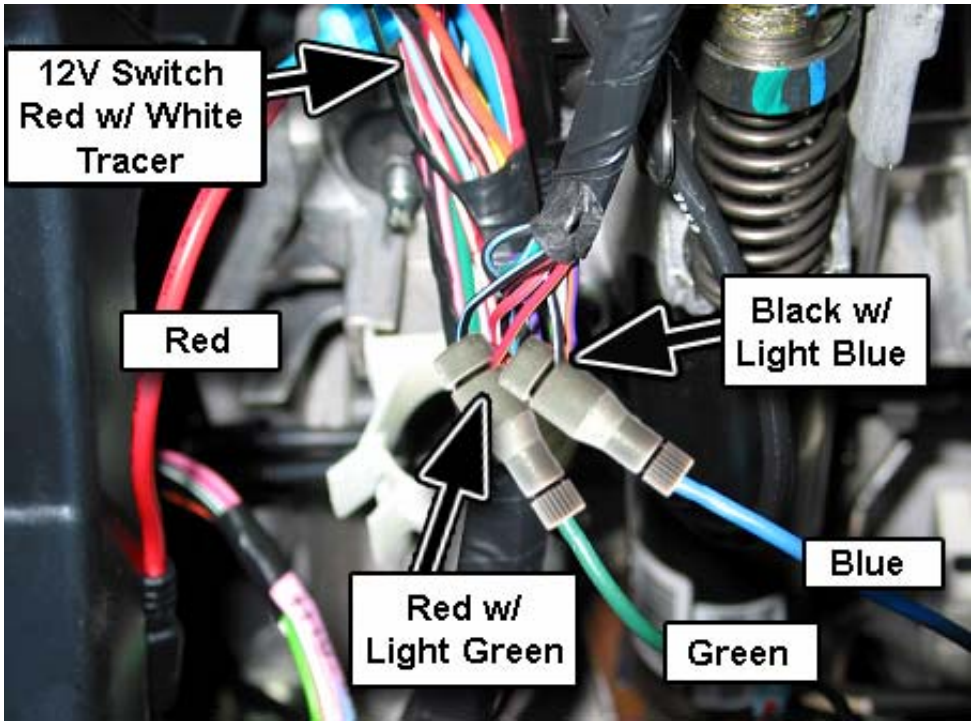
To obtain access to the cruise control wiring harness, remove the lower steering column panel by removing the mounting screws and unsnapping the panel from the instrument panel.

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

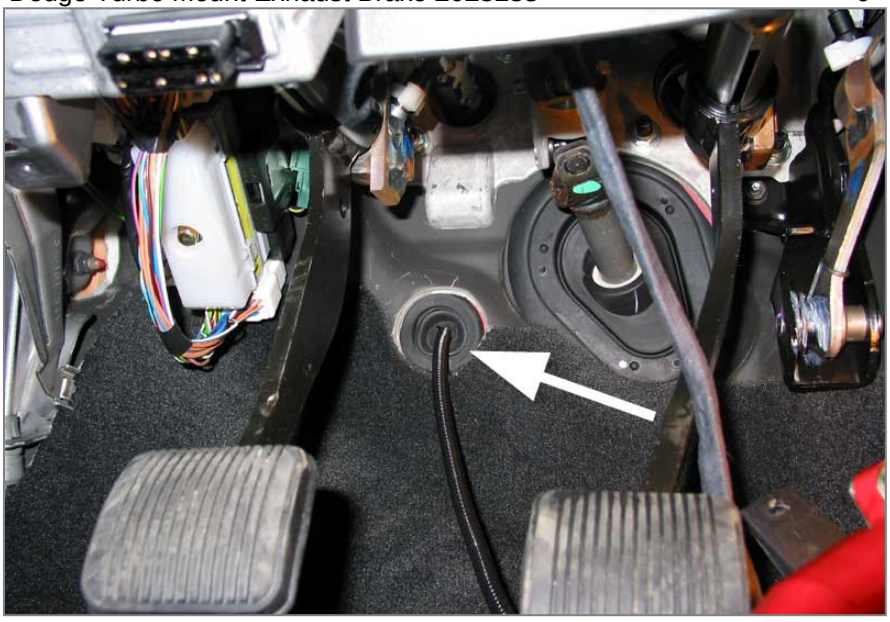
THERE IS A BLACK WIRE WITH A TWISTED LIGHT BLUE/GREEN TRACER. DO NOT CONNECT OR TEST THIS WIRE AS IT IS CONNECTED TO THE AIR BAG SYSTEM AND THE BAG MAY DEPLOY CAUSING DAMAGE AND/OR INJURY!

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 with the **red wire/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.

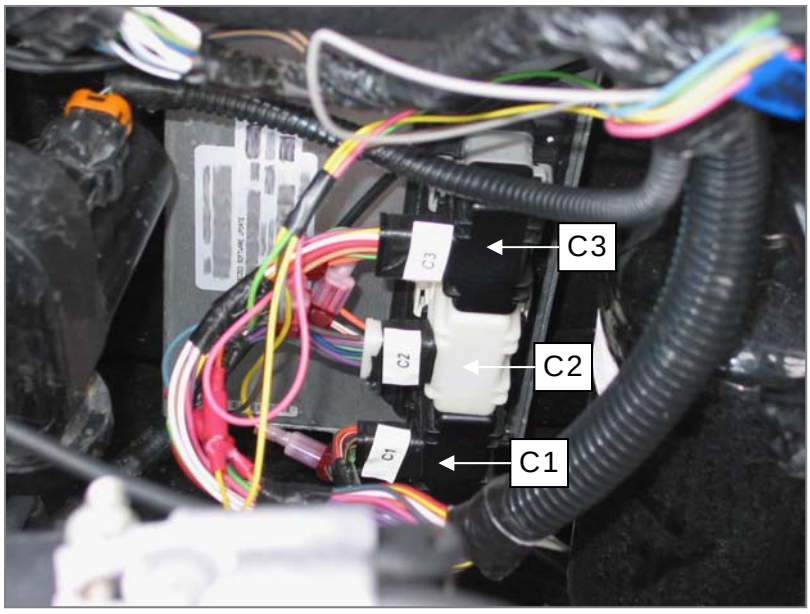


ACCELERATOR PEDAL POSITION SENSOR (APPS)

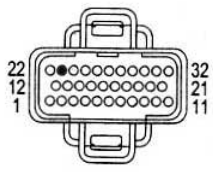
Automatic Transmission (w/PCM)

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.



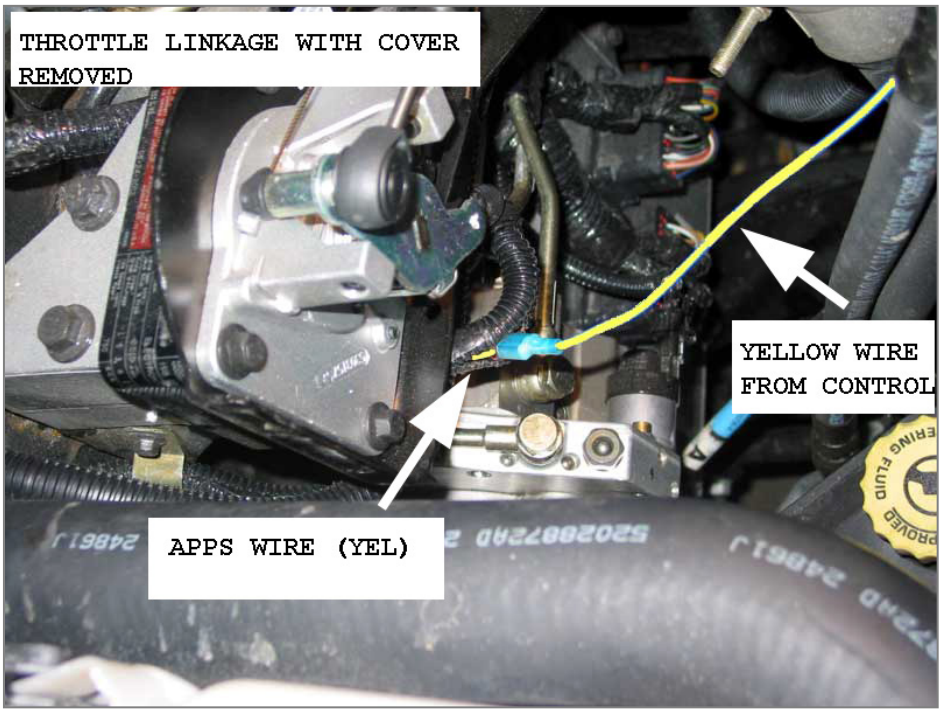
POWERTRAIN CONTROL MODULE - C1 (DIESEL)

12	-	-
13	-	-
14	-	-
15	-	-
16	-	-
17	-	-
18	-	-
19	-	-
20	-	-
21	-	-
22	A14 14RD/WT	FUSED B(+)
23	K22 18OR/DB	ACCELERATOR PEDAL POSITION SENSOR SIGNAL

ACCELERATOR PEDAL POSITION SENSOR (APPS)

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.

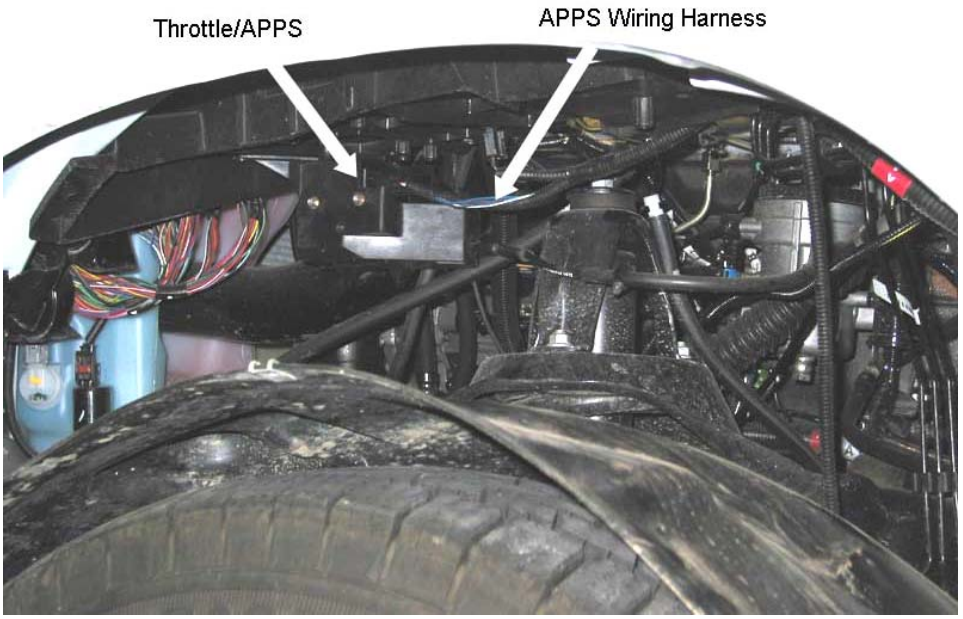
Connect the yellow wire from the DFIV module to this Posi-Tap and reconnect the APPS connector. Reinstall the throttle linkage cover.

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.



- Route the orange wire from the DFIV module over the engine and along the firewall cowling to the air compressor and connect the blue connectors.

IN-CAB EXHAUST BRAKE WIRING (2004 MODELS)

CRUISE CONTROL WIRING INSTALLATION

Manual Transmission

AUTOMATIC TRANSMISSIONS DO NOT REQUIRE CRUISE CONTROL WIRING!

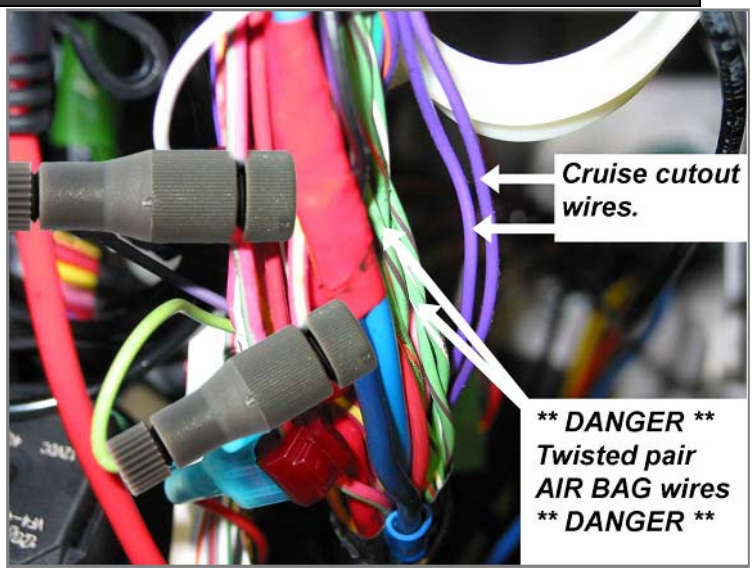
To obtain access to the cruise control wiring harness, remove the lower steering column panel by removing the mounting screws and unsnapping the panel from the instrument panel.

Locate the smaller wiring harness that runs out of the main harness, under the dash, running vertically by the left of the steering column. Remove some of the black electrical tape to gain access to the smaller wire bundle.

DANGER

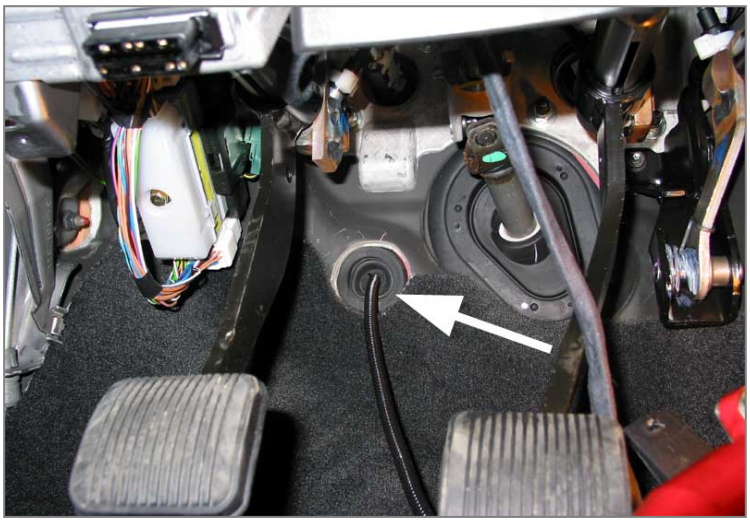
THERE IS A BLACK WIRE WITH A TWISTED LIGHT BLUE/GREEN TRACER. DO NOT CONNECT OR TEST THIS WIRE AS IT IS CONNECTED TO THE AIR BAG SYSTEM AND THE BAG MAY DEPLOY CAUSING DAMAGE AND/OR INJURY!

Remove some of the black electrical tape from the small bundle to gain access to the small **violet wire** and install a gray Posi-Tap to it. Insert the blue wire from the DFIV module into this connector.



In the same harness, locate the **violet wire/brown 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.

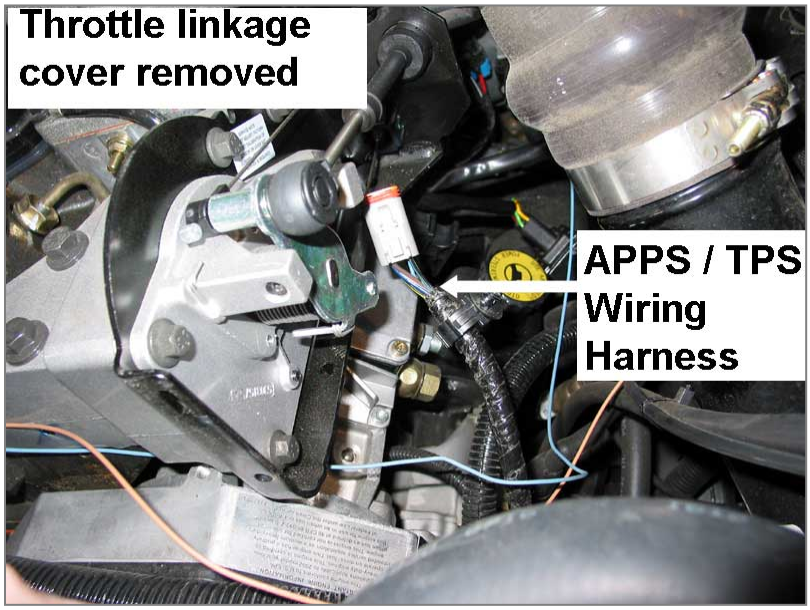


ACCELERATOR PEDAL POSITION SENSOR (APPS)

NOTE: 2004 model vehicles do not have a separate PCM. The PCM is incorporated into the ECM mounted on the driver's side of the engine.

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

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



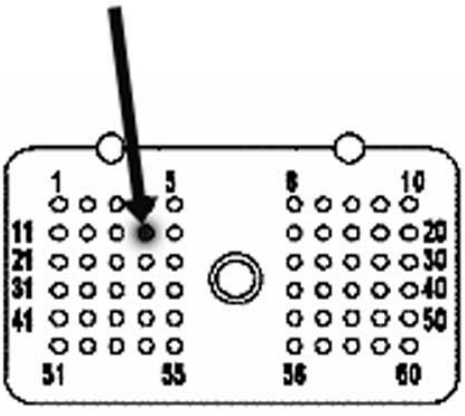
Automatic Transmissions

Open the loom and locate the **brown/white tracer** wire and install a gray Posi-Tap onto it. Connect the yellow wire from the DFIV module to this Posi-Tap and reconnect the APPS connector. Reinstall the throttle linkage cover.

Manual Transmissions

Open the loom and locate the **dark blue/white tracer** wire and install a gray Posi-Tap onto it. Connect the yellow wire from the DFIV module to this Posi-Tap and reconnect the APPS connector. Reinstall the throttle linkage cover.

NOTE: On both styles of transmissions, the APPS wiring can be connected to the wire on Pin 14 of the 60-pin ECM C1 module, which is on the driver's side of the engine.



ENGINE CONTROL MODULE C1 (DIESEL)

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MAIN SWITCH INSTALL (Required if using toggle switch)

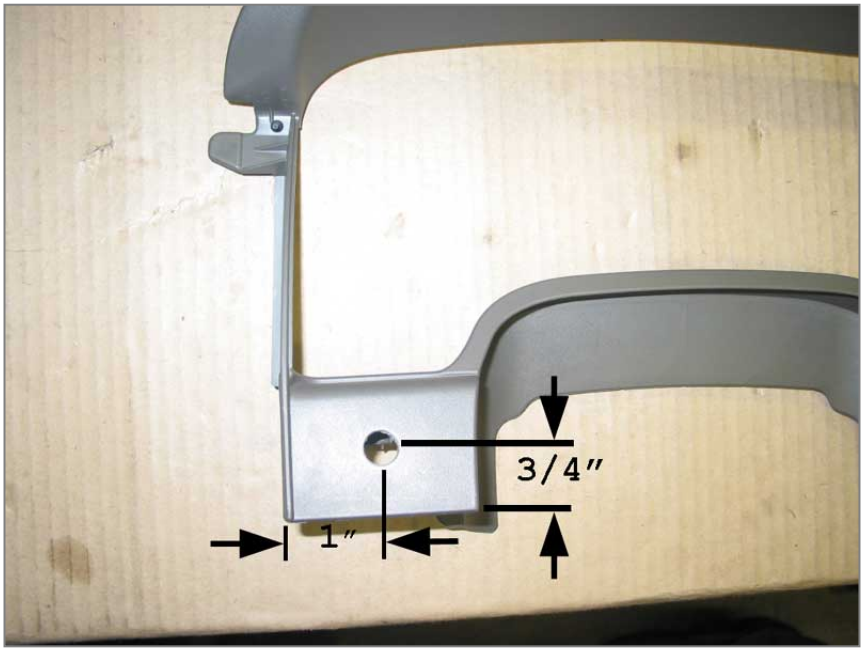
Remove the screws attaching the dashboard bezel and remove the covering trim by pulling rearward on the corners of the trim panels.

Placing the transmission all the way into 1st/low gear and ensuring the tilt steering is all the way down will allow for easy 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 like a table or a workbench.

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



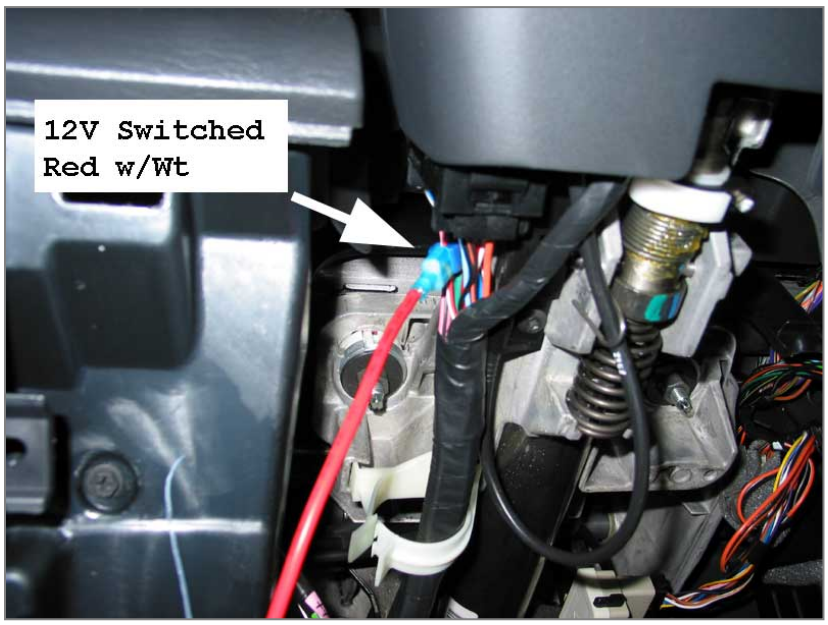
Drill a pilot hole with a 1/8” bit, and then enlarge the hole with a Unibit to exactly 1/2”.

NOTE: 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 drilled hole and secure it with a lock ring. Reinstall 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.

Locate a switch 12-volt power source with your test light and install a black Posi-Tap. Attach the red fused wire from the switch to the Posi-Tap.



MANUAL TRANS. SHIFTER SWITCH (Optional)

Mount the switch onto the shift lever using the clamp that was supplied with the switch kit.

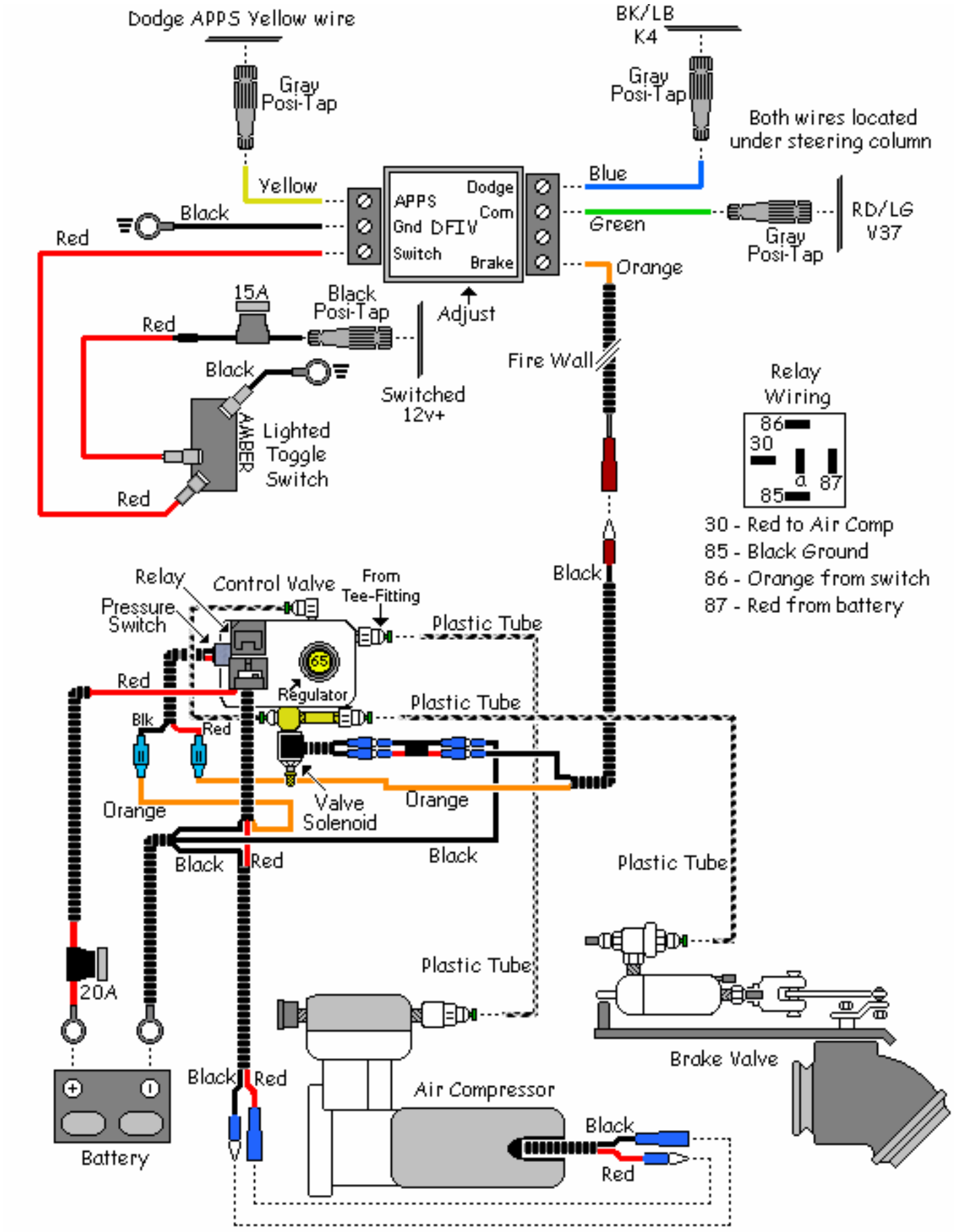
Run the cable down the shifter, securing the cable with zip-ties or electrical tape, and run it under the carpet to the firewall and under the dash to the relays. Leave enough slack for proper shifting of the transmission lever and to prevent rubbing of wire.

Connect the white (or green) wire to the “Switch” terminal on the DFIV module.

Attach a male blade connector to the black wire. Remove the fused red wire from the toggle switch (the toggle switch and remaining red and black wire attached to the switch will no longer be needed). Attach the black wire from the shifter switch to the female connector of the fused red wire.

Locate one of the ignition switched **red/black tracer** wires under the steering column (one is 10/12ga and the other is 14/16ga) and connect an appropriate Posi-Tap connector to it (yellow for 10/12ga and blue for 14/16ga). Connect the fused red wire to this Posi-Tap.

2003-04 WIRING AND PLUMBING DIAGRAM



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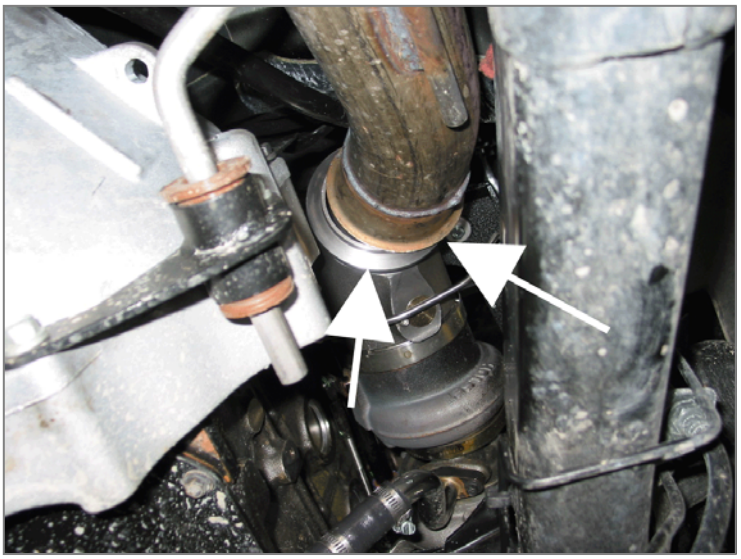
BRAKE VALVE INSTALLATION

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 slightly once the clamp is removed.

Disconnect the Intake Air Temperature (IAT) sensor harness and remove the 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.

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 the one end of the first ¼" plastic hose into the 90° quick-connect coupler on the brake cylinder and route it to the regulator assembly. Insert the other end of the hose into the straight fitting on the pressure regulator.

On the second hose, install one end into the quick-connect coupler on the air compressor, and the other end into the coupler attached to the tee fitting that is connected to the air solenoid.

CARE MUST BE TAKEN NOT TO KINK THE PLASTIC HOSE AND TO POSITION IT WHERE IT WILL NOT MELT OR RUB THROUGH.

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. Refer to the wiring diagram on page 16 for the correct hook-up of hoses and wiring if you are unsure.

DFIV ADJUSTMENT & TESTING

Disregard if installing TowLoc – follow TowLoc instructions

Ensure the connections of the corresponding wires to the DFIV control module are correct as shown in the wiring diagram found on page 16.

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

Start the engine. With the throttle at idle, turn on the brake switch. Using a small flat bladed screwdriver, turn the small adjusting screw in the DFIV module counter-clockwise or clockwise until the pump/brake JUST turns on.

CAUTION: The adjusting screw is a micro-switch that is very delicate, so turn using small adjustments.

Test by revving the engine to approximately 1200RPM and releasing the throttle. As the accelerator pedal is applied, the brake should disengage just before the engine starts to rev. This would indicate proper calibrating of the DFIV module with the APPS. The brake should then re-activate once the engine speed drops back to idle. Re-adjust if necessary.

Post-Installation

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

The brake pressure at idle is required to be checked and adjusted at the time of install, at least two weeks after install, and at regular twice a year intervals.

Pressure Adjustments

The 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 50-65psi of air apply pressure to the actuating cylinder.

Test the exhaust brake pressure by installing a pressure gauge into the end of the stainless steel line near the end of the cylinder bracket. The maximum pressure under load should be 65psi at higher RPMs with a fully loaded truck; 40psi with an empty truck is acceptable. If more pressure is evident, the pressure will need to be adjusted lower to the specs as stated above.

Cycle the brake ON and OFF at least once, and leave the brake ON to check for sufficient clearance around under-hood components.

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 65lbs. OF EXHAUST BACK PRESSURE **

Maintenance and Troubleshooting

To extend the life of the valve assembly, do not operate the vehicle for extended periods of time without activating the brake. Daily usage is recommended to help prevent any carbon or rust build-up of inner parts.

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 getting in.

Following the diagrams in this manual, tracing hoses and wiring, checking continuity through electric components and 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 Standard Time (PST).

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 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 easier for the vehicle to continue to roll and be 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. It is 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. **However, the exhaust brake cannot be used as a parking brake or will not bring your vehicle to a complete stop.** Using a BD Exhaust Brake will increase the life and effectiveness of your hydraulic brakes.
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. With the power needed to pull your vehicle and load up a hill, this generates a lot of heat. When you've reached the crest of the hill and are now coasting down the other side, the heated valves are cooled too quickly. With the exhaust brake engaged, the heat loss to the valves will be reduced, which prevents 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.

A pressure regulating system is included with the BD Exhaust Brake that will control the backpressure that is created. If the backpressure reaches the set limit of 65psi 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 heat build up, as well as reducing wear and damage to linings and drums. 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.

BD Engine Brake, Inc.
Limited Warranty Statement

THE INSTALLATION OF THIS PRODUCT INDICATES THAT THE BUYER HAS READ AND UNDERSTANDS THIS AGREEMENT AND ACCEPTS ITS TERMS AND CONDITIONS.

DISCLAIMER OF LIABILITY

BD Engine Brake Inc., its successors, distributors, jobbers, and dealers (hereafter "**BD"**) shall in no way be responsible for the product's proper use and service. THE **BUYER** HEREBY WAIVES ALL LIABILITY CLAIMS.

BD disclaims any warranty and expressly disclaims any liability for personal injury or damages. **BD** also disclaims any liability for incidental or consequential damages including, but not limited to, repair labor, rental vehicles, hotel costs, or any other inconvenience costs by reason of use or sale of any such equipment. The **BUYER** acknowledges and agrees that the disclaimer of any liability for personal injury is a material term for this agreement and the **BUYER** agrees to indemnify **BD** and to hold **BD** harmless from any claim related to the item of any equipment purchased.

This warranty shall not apply to any unit that has been improperly stored or installed, or to misapplication, improper operation conditions, accidents, neglect, or which has been improperly repaired or altered or otherwise mistreated by the **BUYER** or his agent. **BD** also assumes no liability regarding the improper installation or misapplication of its products. It is the installer's responsibility to check for proper installation and if in doubt, contact the manufacturer.

LIMITATION OF WARRANTY

BD Engine Brake Inc. (hereafter "**BD**") warrants to the **BUYER** that any parts purchased shall be free from defects in material workmanship. A defect is defined as a condition within the product that would render the product inoperable. **BD** gives Limited Warranty as to description, quality, merchantability, fitness for any product's purpose, productiveness, or any other matter of **BD's** product sold herewith. **BD** shall be in no way responsible for the product's open use and service and the **BUYER** hereby waives all rights other than those expressly written herein. This Warranty shall not be extended or varied except by a written instrument signed by **BD** and the **BUYER**.

The warranty is limited to two (2) years from the date of sale. Labor costs incurred by the removal and replacement of the BD product, while performing warranty work, will be covered for 1 (one) year, payable at BD rates, at authorized centers and with prior approval. Until BD has approved the claim, the consumer may be responsible for these costs.

A Return Materials Authorization (RMA) number, obtained in advance from **BD**, must accompany all products returned for warranty consideration. All products must be returned, shipping prepaid, to **BD** and must be accompanied by a dated proof of purchase receipt. All warranty claims are subject to approval by **BD** and repaired or replaced product will be returned to the customer freight collect. Accepted warranty units, which have been replaced, become the sole property of **BD**.

This warranty is in lieu of all other warranties or guaranties, either expressed or implied, and shall not extend to any consumer or to any person other than the original purchaser residing within the boundaries of the continental U.S. or Canada.

IN THE EVENT THAT THE BUYER DOES NOT AGREE WITH THIS AGREEMENT, THE BUYER MAY PROMPTLY RETURN THIS PRODUCT, IN A NEW AND UNUSED CONDITION, WITH A DATED PROOF OF PURCHASE, TO THE PLACE OF PURCHASE WITHIN THIRTY (30) DAYS FROM DATE OF PURCHASE FOR A FULL REFUND.