

banks

with Installation Instructions

Owner's Manual

Banks Brake® **Exhaust Brake System**

Late 2004-2007 Dodge Cummins ISB Pickup Trucks with Manual Transmissions

THIS MANUAL IS FOR USE WITH EXHAUST BRAKE SYSTEMS 55227 & 55228

Gale Banks Engineering
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Customer Support: (888) 839-5600
Installation Support: (888) 839-2700

bankspower.com

banks

Products available from Banks Power for the '03-07 Dodge 5.9L



Banks iQ System (P/N 61148-61149)

- 5" touchscreen interface that can control the Banks Diesel Tuner on the fly.
- Interchangeable gauge display, read and clear codes, monitor engine diagnostics, log data, time your vehicles runs and much more.

Banks Monster® Exhaust System

Single (P/N 48640-48643, 48700, 48701, 48708)

Duals (P/N 48702-48707, 48709)

Sport (P/N 48777-48780)

- Increases exhaust flow, cuts backpressure, lowers exhaust gas temperatures (EGTs) and increases power.

Banks Ram-Air Intake System (P/N 42145)

- Increases your airflow over stock.
- Adds power, improves fuel economy, lowers EGTs and reduces smoke.

Banks Ram-Air Intake Super-Scoop (P/N 42190-42191)

- Adds cooler denser air to the Ram-Air Intake housing, further increasing fuel economy, reducing smoke and lowers EGTs.

Banks Monster-Ram (P/N 42765-42766)

- Increased flow from intercooler
- Raises boost without increasing backpressure at the turbine

Big Hoss Intake Manifold System (P/N 42747)

- Increases flow and provides more uniform air distribution to the engine for more available power at a given boost level.

Banks Techni-Cooler® System (P/N 25980-25981)

- Provides increased air flow to the engine by increasing air density for more increased power, lower EGTs and improved fuel economy.

Banks SmartLock (P/N 55270)

- Reduces wear on transmission
- Locks Torque Converter and raises trans-line pressure
- Works with Banks Exhaust Brake

Boost and Pyro Gauges (P/N 64507)

- Keep your engine safe by monitoring vital engine parameters.

**Banks Billet Torque Converter
(P/N 72515)**

- Higher torque capacity over stock
- Lockup clutch is slip-resistant so transmission fluids stay cooler and transmission life is prolonged.

**Banks Bullet
(P/N 66522-66523)**

- Adds power safely to your vehicle
- Displays critical engine functions
- Engine safeguards
- Change power levels on-the-fly

Banks Diesel Tuner

**EconoMind w/switch (P/N 63725,
63793, 63795, 64507)**

**EconoMind w/iQ (P/N 63807, 63808,
63817, 63818)**

Six-Gun w/switch (P/N 61022, 63797)

Six-Gun w/iQ (P/N 63809, 63819)

- Adds power safely to your vehicle
- Engine and transmission safeguards
- Change power levels on-the-fly

Thermocouple

- Add a temperature limiting function to your Diesel Tuner.

**Banks Speed-Loader
(P/N 62981)**

- Furthers the power output of the Banks Six-Gun and provides EGT limiting safety.

**Banks BigHead® Actuator
(P/N 24331)**

- Achieves a higher peak boost over stock and gives you precise boost control that gives you crisp acceleration and more mid-range pulling power.

**Banks Stinger Systems
(P/N 49692-49699, 49708-49711,
49716-49721)**

Contains:

- Ram-Air Intake system
- Monster Exhaust (single or dual)
- EconoMind Tuner w/ Banks iQ
- Big Head Wastegate Actuator

**Banks PowerPack Systems
(P/N 49700-49707, 49712-49715,
49722-49727)**

Contains:

- Ram-Air Intake system
- Monster Exhaust (single or dual)
- EconoMind Tuner w/ Banks iQ
- Big Head Wastegate Actuator
- Monster-Ram
- Techni-Cooler System

**Banks Six-Gun Bundle
(P/N 49728-49735, 49744-49747,
49752-49757)**

Contains:

- Ram-Air Intake system
- Monster Exhaust (single or dual)
- Six-Gun Tuner w/ Banks iQ
- Big Head Wastegate Actuator

**Banks Big Hoss Bundle
(P/N 49736-49743, 49748-49751,
49758-49763)**

Contains:

- Ram-Air Intake system
- Monster Exhaust (single or dual)
- Six-Gun Tuner w/ Banks iQ
- Big Head Wastegate Actuator
- Monster-Ram
- Techni-Cooler System

**For More Information please call (888) 635-4565
or Visit us online @ www.bankspower.com**

Limitation of Warranty

Gale Banks Engineering Inc. (hereafter "**SELLER**"), gives Limited Warranty as to description, quality, merchantability, fitness for any particular purpose, productiveness, or any other matter of **SELLER**'s product sold herewith. The **SELLER** shall be in no way responsible for the product's open use and service and the **BUYER** hereby waives all rights except those expressly written herein. This Warranty shall not be extended or varied except by written instrument signed by **SELLER** and **BUYER**.

Please see enclosed warranty information card, or go to www.bankspower.com/warranty, for warranty information regarding your product. Parts or devices outside the products kit are not covered under Gale Banks Engineering warranty. All products that are in question of Warranty must be returned shipping prepaid to the **SELLER** and must be accompanied by a dated proof of purchase receipt. All Warranty claims are subject to approval by Gale Banks Engineering Inc.

Under no circumstance shall the **SELLER** be liable for any labor charged or travel time incurred in diagnosis for defects, removal, or reinstallation of this product, or any other contingent expense.

Under no circumstances will the **SELLER** be liable for any damage or expenses incurred by reason of the use or sale of any such equipment.

WARNING! The Vacuum Pump must never be run open to the atmosphere, as this will damage the Pump diaphragm. The Pump must always be connected to the Vacuum Solenoid or it's vacuum nipple must be plugged. The warranty on the Pump will be voided if the Pump is allowed to run open to the atmosphere.

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, less shipping and/or restocking fee.

The installation of this product indicates that the buyer has read and understands this agreement and accepts its terms and conditions.

General Installation Practices

Dear Customer,

Your new Banks Brake is a uniquely designed exhaust brake with electronic controls, designed to achieve the optimum level of braking from your vehicle's engine.

If you have any questions concerning the installation and operation of the Banks Exhaust Brake, please call our Technical Service Hotline at (888) 839-2700 between 7:00 am and 4:00 PM (PST). IF YOU HAVE ANY QUESTIONS RELATING TO SHIPPING OR BILLING, PLEASE CONTACT OUR CUSTOMER SERVICE DEPARTMENT AT (888) 839-5600.

Thank you.

- 1.** For ease of installation of your Banks Brake Exhaust Brake System, familiarize yourself with the procedure by reading the entire manual before starting work.
- 2.** Inspect all components supplied for any foreign material that may have entered during shipping and handling.
- 3.** The installation should be performed at a time when the vehicle has been allowed to completely cool. This installation requires the installer to work near surfaces that may remain hot after the vehicle has been run. Failure to allow the vehicle to cool may result in personal injury.

4. Throughout this manual, the left side of the vehicle refers to the driver's side, and the right side refers to the passenger's side of the vehicle.

5. Throughout this manual, major components of the Banks products are capitalized to make it easier to identify them.

6. Pay particular attention to the routing of wires. Keep them away from exhaust heat, moving parts and sharp edges that may cause damage. Route or tie away from critical areas as required. Keep all wires a minimum of 6" from hot exhaust parts, 8" or more is recommended whenever possible.

7. During installation, keep the work area clean. If foreign debris is transferred to any Banks system component, clean it thoroughly before installing.

WARNING! Never work under any vehicle supported only by a jack of any kind. DO NOT USE concrete blocks or other masonry items that may collapse under the vehicle weight.

WARNING! The Vacuum Pump must never be run open to the atmosphere, as this will damage the Pump diaphragm. The Pump must always be connected to the Vacuum Solenoid or it's vacuum nipple must be plugged. The warranty on the Pump will be voided if the Pump is allowed to run open to the atmosphere.

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Tools Required:

- 1/2" and 3/4" drive ratchets with inch and metric sockets and 1/2" and 3/8" drive extension
- 1/2" drive breaker bar or belt tool
- Inch and metric combination or open-end wrenches
- Standard screwdriver
- Clean shop towels or rags
- Pliers
- Needle nose pliers
- Hex wrench
- Utility knife
- Electric drill
- 1/2" Uni-bit or drill bit
- Inch-pound and foot-pound torque ratchets
- Penetrating oil or light lubricant spray

NOTE for 2006-07 trucks: Before starting, it may be necessary to have an extra bottle of coolant on hand to top off the radiator when finished installing the Banks Exhaust Brake System. Follow the manufacture's air bleeding procedures.

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Replacement belt numbers:

| | |
|-----------|------------|
| Banks | 65120 |
| Gatorback | 4081295 |
| Napa | 25081298 |
| Dayco | 5081300 |
| Mopar | 53041270AA |
| Cummins | 3947077 |

NOTE: If you cannot find the above part numbers, ask for a belt that fits 2004- 07 Ford E350-450 Econoline van with 6.0L Diesel engine and single alternator

Bill of Materials

| Description | Part # | Kit 55227 | Kit 55228 |
|---|--------|-----------|-----------|
| Assembly, Brake Housing | 55045 | 1 | 1 |
| Vacuum Pump | 55176 | 1 | 1 |
| Bracket, Vacuum Pump | 55177 | 1 | 1 |
| Hex Bolt, Washer Head, Black, M8 x 1.25 x 25mm | 91809 | 3 | 3 |
| Hex Bolt, Washer Head, Black, M8 x 1.25 x 40mm | 91815 | 4 | 4 |
| Vacuum Solenoid | 55138 | 1 | 1 |
| Relay | 55136 | 1 | 1 |
| Switch, Banks Brake | 62130 | 1 | 1 |
| Washer, #10 External Tooth, Zinc | 91832 | 1 | 1 |
| Machine Nut, #10-32, Zinc | 91833 | 1 | 1 |
| Machine Screw, Pan Head, Phillips #10-32 x 1/2" | 91834 | 1 | 1 |
| Washer, #10 SAE | 91835 | 1 | 1 |
| Hex Bolt, Zinc, M6 x 1.00 x 25mm | 91742 | 2 | 2 |
| Washer, SAE, Flat, Zinc, 1/4" | 91102 | 2 | 2 |
| Nut, Nylock, Hex, Zinc, M6 x 1.0 | 91771 | 2 | 2 |
| Wiring Harness | 55408 | 1 | 1 |
| Heater Core Tube, 2006+, manual | 25571 | | 1 |
| Hose, 7/32" 1.5 ft | 94128 | 1 | 1 |
| Hose, 5/16" 5 ft | 94129 | 1 | 1 |
| Belt, Serpentine, Vacuum Pump | 65120 | 1 | 1 |
| Urocal, Banks Power, Small | 96009 | 2 | 2 |
| Product Registration Card | 96412 | 1 | 1 |
| Owners Manual | 97232 | 1 | 1 |
| Warranty Statement | 96503 | 1 | 1 |
| Cable Ties, 8" | 62010 | 25 | 25 |

Section 1

General Assembly

Figure 1

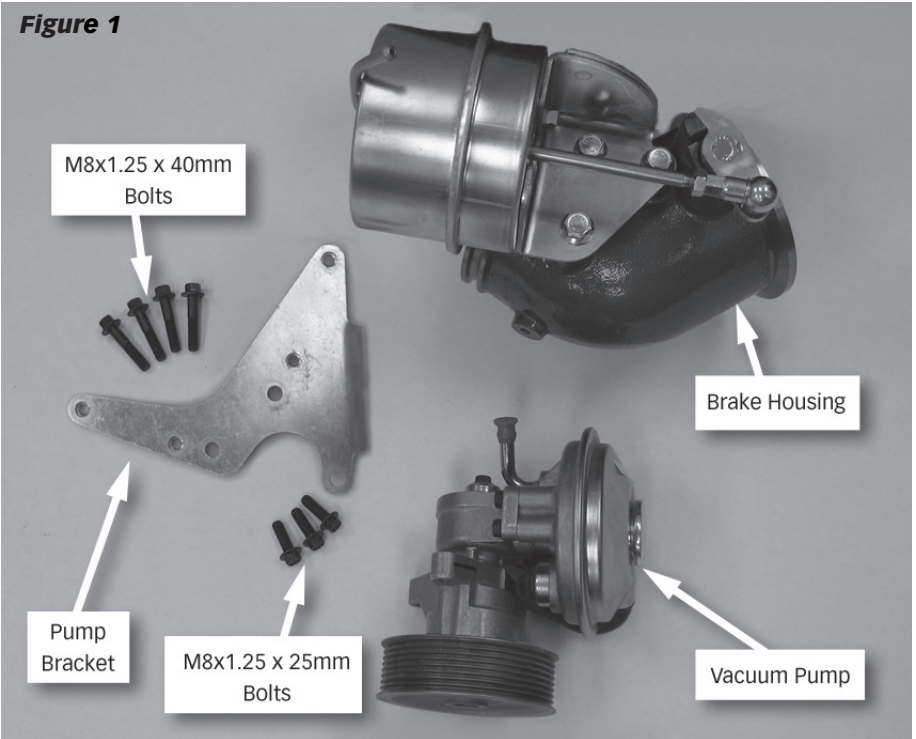


Figure 2

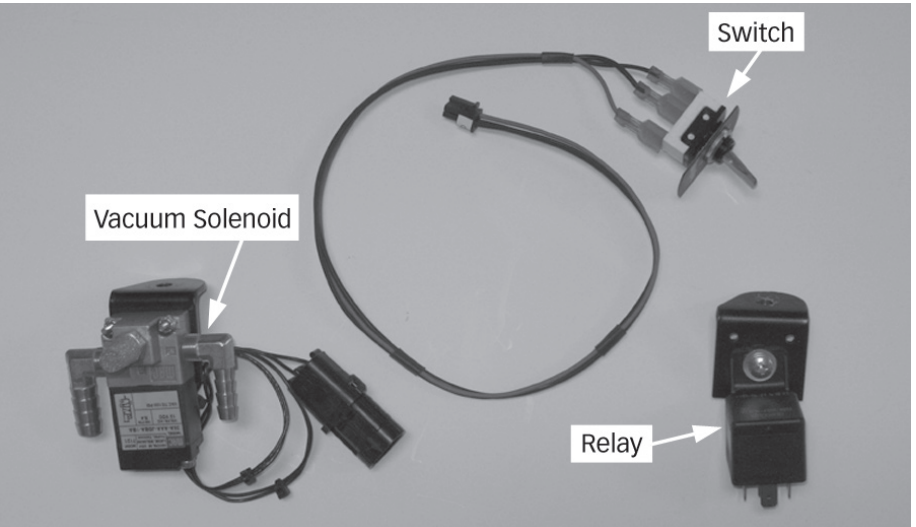
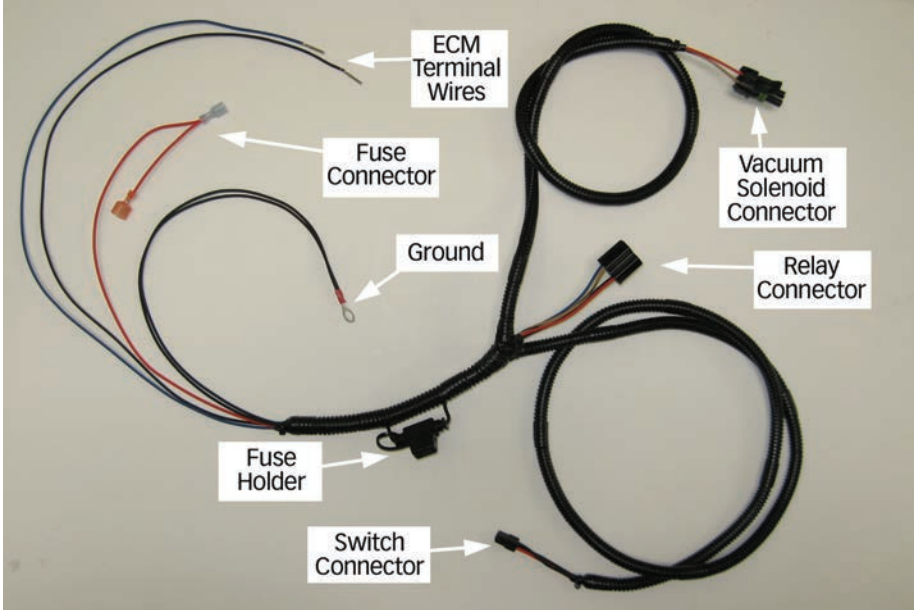


Figure 3



Section 2

Banks Exhaust Brake Installation

1. As a precaution, disconnect the ground of the battery (if there is more than one battery, disconnect both grounds).

2. Raise the front of the vehicle and support it with properly weight rated safety stands or a commercial hoist. Follow the manufacturer's safety precautions. Take care to support the vehicle to prevent it from slipping or falling. Place the transmission in park; set the parking brake and place blocks behind the rear wheels.

3. Remove the front passenger side wheel and the wheel well splash shield.

If equipped, detach the ABS wire that is clipped on the passenger side splash shield before completely removing the shield to avoid damage to the wire.

4. Remove the exhaust elbow that is attached to the turbo outlet by loosening the V-clamps and slide them off the lip. Spray with penetrating lubricant to ease removal (**Figure 4**).

NOTE: It may be necessary to loosen or remove the exhaust support from the transmission to provide extra clearance.

Push the exhaust pipe to the rear of the vehicle slightly to allow the elbow to be removed. Slide the elbow towards the rear of the vehicle to allow the alignment pins in the turbo to come free.

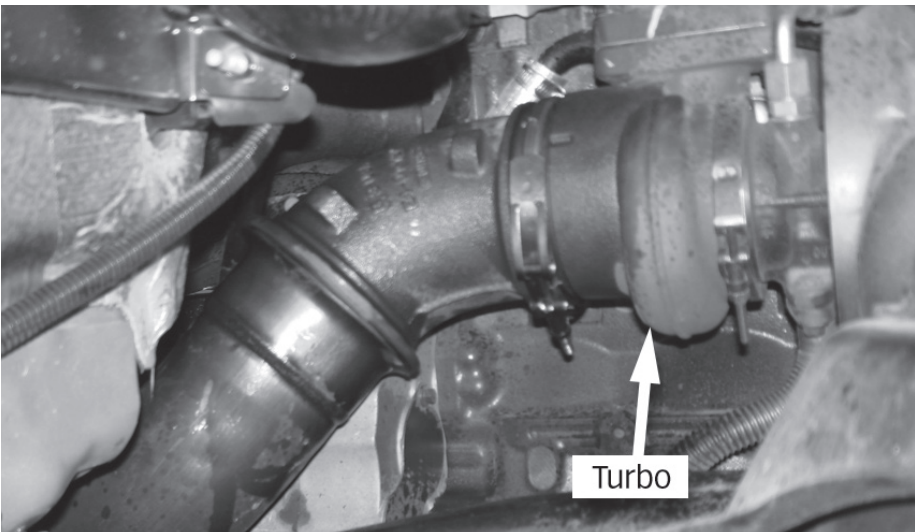
If the elbow doesn't come loose, then it may be necessary to break it loose from the alignment pins. Wear appropriate eye protection and firmly strike the elbow with a hammer or light sledge hammer.

NOTE: Retain the factory V-clamps for use later. The alignment pins will have to be removed or broken loose from the turbo's outlet flange. Make sure the turbo's outlet flange surface is flat so that it doesn't interfere with proper exhaust sealing.

2006+ trucks, proceed to Step 5.

All other years, proceed to Step 8.

Figure 4



5. For 2006+ trucks, the heater core tube that is above the exhaust pipe will have to be replaced with the Banks Heater Core Tube to provide additional clearance for the Brake.

6. Drain the radiator fluid into a suitable container to be re-used. Loosen the hose clamps and remove the heater hoses from the heater core tube. Remove the two (2) nuts that attach the coolant line to the engine. See **Figure 5** for the passenger side nut and bolt.

7. Replace the factory heater core tube with the Banks Heater Core Tube. Install and tighten the nuts. Re-install the heater hoses making sure that they are properly inserted on the pipe. Slide hose clamps back into place. Refill the radiator and follow manufacture's air bleeding procedures.

8. The transmission dip stick tube needs to be adjusted to allow for added clearance for the lower exhaust brake V-clamp. Loosen or remove the bolt(s) that hold it in place and adjust as needed after the Banks Brake is in.

9. Slide the larger sized factory V-clamp on the exhaust pipe.

10. Locate the supplied Banks Exhaust Brake assembly and slide the factory V-clamp over the inlet of the brake. Orientate your brake as shown in **Figure 6**.

*NOTE: Do not worry if the Brake actuator arm touches the fire wall insulation. This will not effect the action of the Brake. Make sure that the Brake lever is fully seated against it's stop. See **Figure 7**.*

Figure 5- Passenger's side

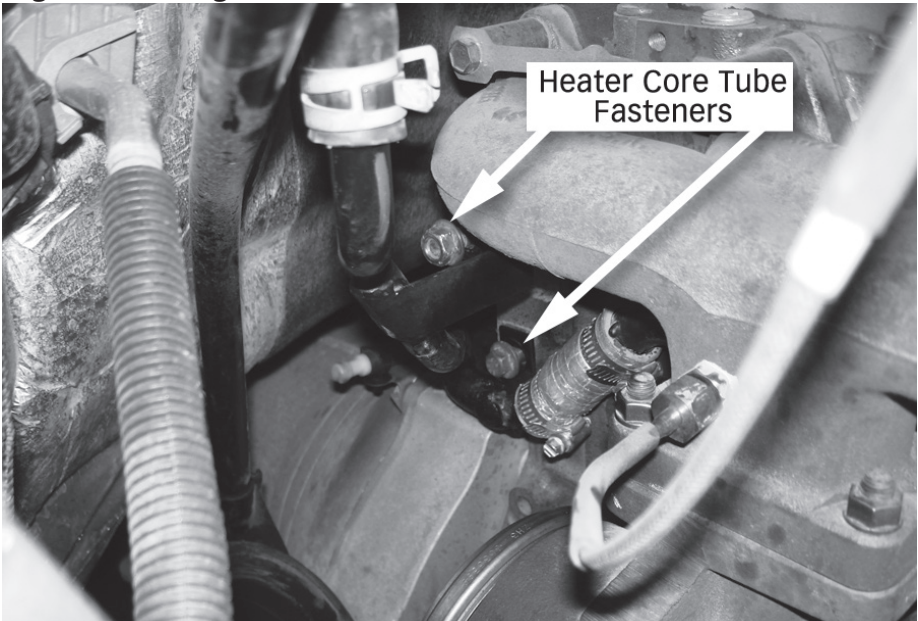


Figure 6

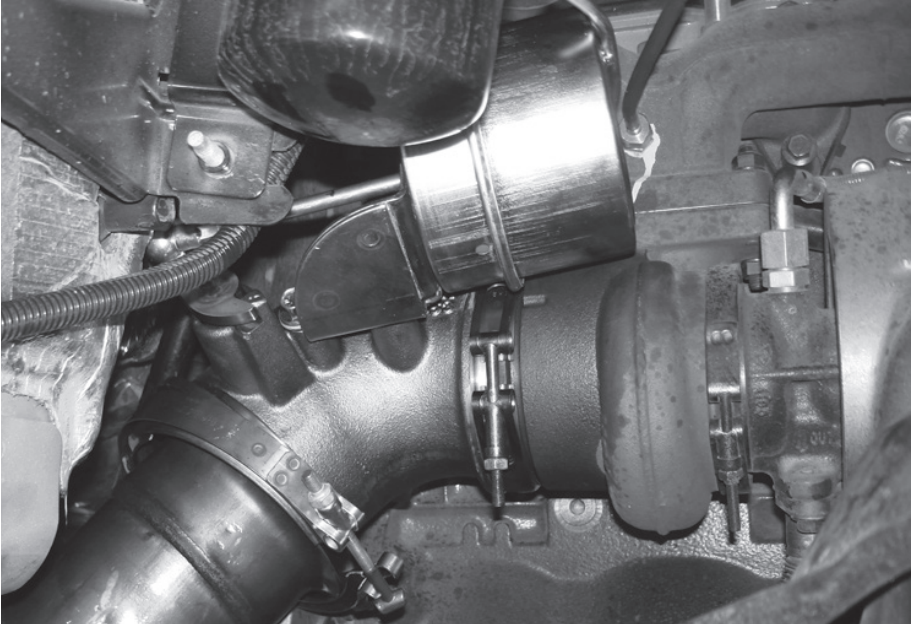
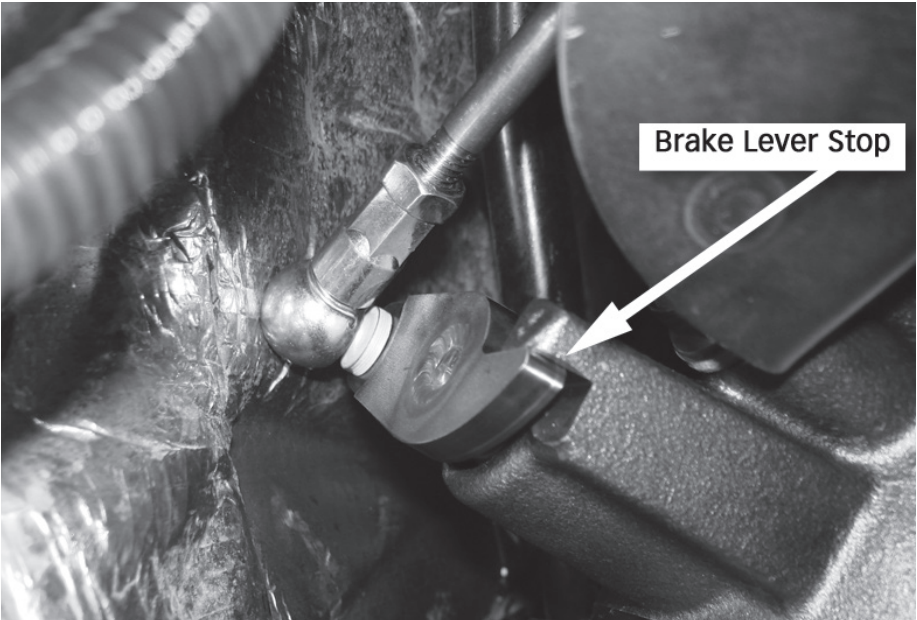


Figure 7



11. Slide the V-clamp that is on the Brake assembly onto the turbo outlet. Make sure that the flanges on the Banks Brake and the turbo's outlet are centered in the V-clamp. Loosely tighten the clamp.

12. Clamp the Brake and exhaust pipe together with the V-clamp that was placed over the exhaust.

NOTE: If the exhaust support was removed, a block of wood on a jack or a friend may help in lining up the exhaust pipe to the Banks Brake easier.

13. Tighten the V-clamps.

14. If the exhaust support was removed, re-attach it to the transmission.

15. Reinstall the wheel wells, tires and lower the truck to the ground.

-END SECTION 2-

Section 3

Vacuum Solenoid and Relay Installation

1. Locate the rail along the top rear of the engine compartment. Remove the push-in retainer that is closest over the exhaust brake with an upholstery tool or screw driver.

2. Locate the supplied Banks Vacuum Solenoid along with its 1/4" flat washer, M6 x 1.0mm x 25mm bolt, and M6 x 1.0 Nylock nut. Place the Vacuum Solenoid over the hole where the previously removed push-in retainer was removed. Install the bolt through the Solenoid bolt hole and the rail on the truck. Slide the 1/4" flat washer onto the bolt, thread the 1/4" Nylock nut onto the bolt, and tighten. See **Figure 8**.

3. Using the supplied 7/32" hose for the Exhaust Brake, slip one end onto the Banks Exhaust Brake Actuator nipple. See **Figure 9**. Make sure it is secured properly. Run the tubing up

to the Solenoid along the transmission dipstick tubing to the right side nipple of the Solenoid (Port 2). Cut the tubing to length and slide fully onto Port 2 of the Solenoid. Secure the hose away from sharp, hot and/or moving parts with a cable tie.

4. Insert the supplied 5/16" hose onto the left side nipple of the Solenoid (Port 1). Run the hose along the wiring harness to the intake on the driver's side of the engine.

NOTE: Don't secure the vacuum tubing yet. It will be secured in a later step.

5. On the rail along the top rear of the engine compartment, remove the push-in retainer that is near the brake fluid reservoir with an upholstery tool or screw driver. Install the Relay in the same manner as the Vacuum Solenoid (**Figure 10**).

-END OF SECTION 3-

Figure 8

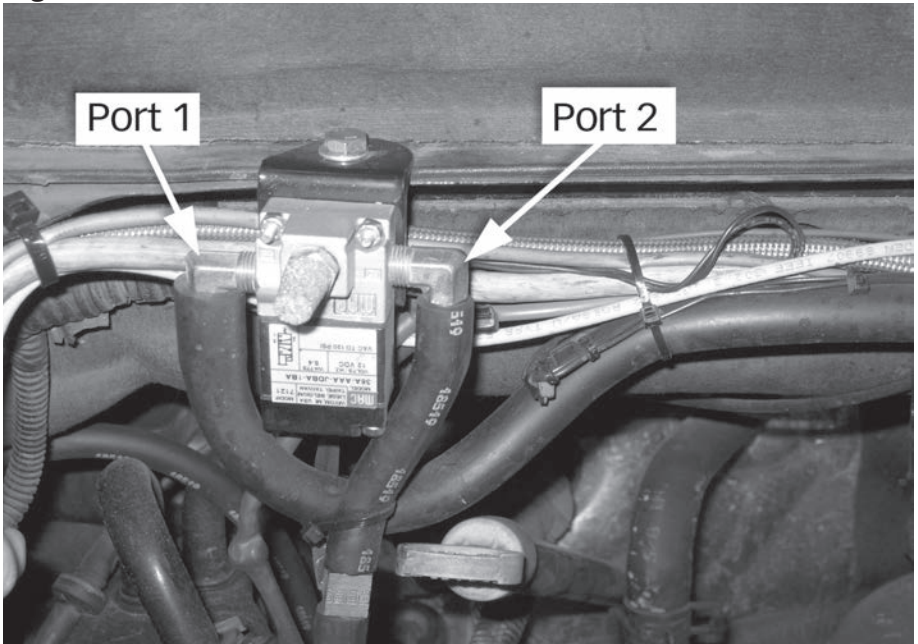


Figure 9

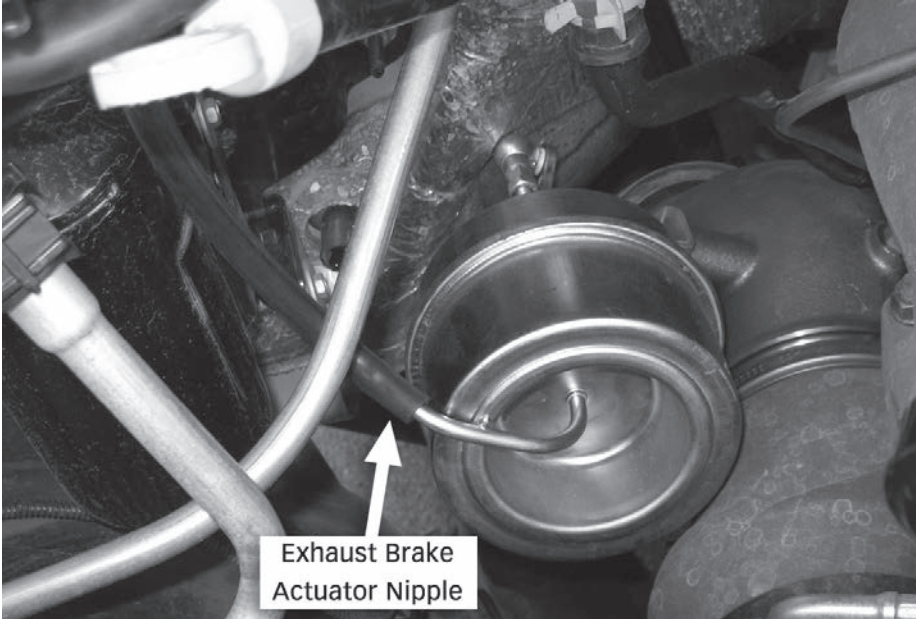
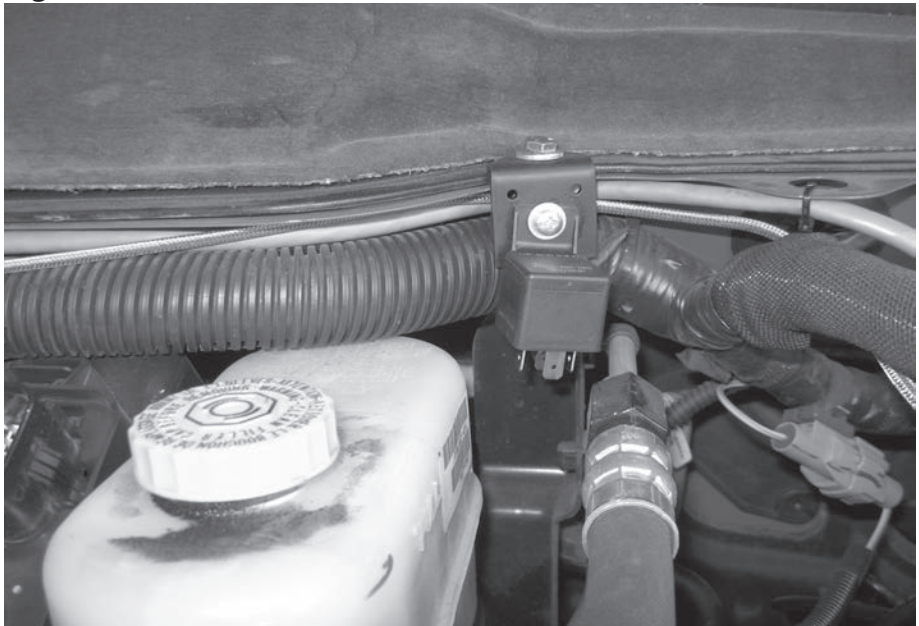


Figure 10



Section 4

Vacuum Pump Installation

1. Use a 1/2" drive ratchet or breaker bar to loosen the tensioner pulley to create slack on the drive belt. Remove the factory drive belt.
 2. Locate the Banks Vacuum Pump and attach it to the supplied Vacuum Pump Bracket using the three M8x1.25x25mm supplied bolts (**Figure 11**). Torque them to 18 ft-lbs (25 N*m).
 3. With the four supplied M8x1.25x40mm bolts, mount the Vacuum Pump assembly to the rear of the gear housing (**Figure 12**). Torque the bolts to 18 ft-lbs (25 N*m).
- NOTE: To provide additional clearance when attaching the vacuum pump to the gear housing, you may need to remove the radiator support bracket. This will allow the fan shroud some freedom to move.*
4. Route the 5/16" hose from the Vacuum Solenoid under the intake and

to the Vacuum Pump nipple. Cut the hose to length. Attach the hose to the Pump. Secure the hose to the factory wiring harness making sure it is away from any heat source, sharp edges, and/or moving parts. Make sure not to crimp or pinch the hose closed.

5. With the supplied Drive Belt, route the Belt as shown in **Figure 13**. Use the 1/2" drive ratchet or breaker bar on the belt tensioner to allow the new Belt to slide into place.

NOTE: If your vehicle does not have an air conditioning pulley, you may have to purchase a different accessory drive belt. Its length will need to be 113.9" (2,892mm).

6. Make sure the Belt is properly aligned around all the pulleys and release the tensioner. See Vacuum Pump warning on page 3.

-END SECTION 5-

Figure 11

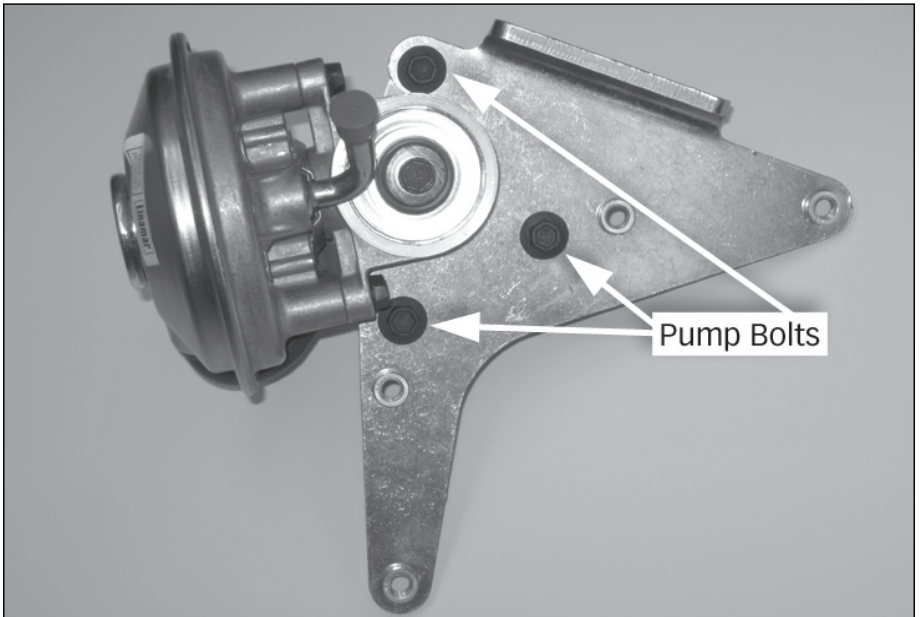


Figure 12

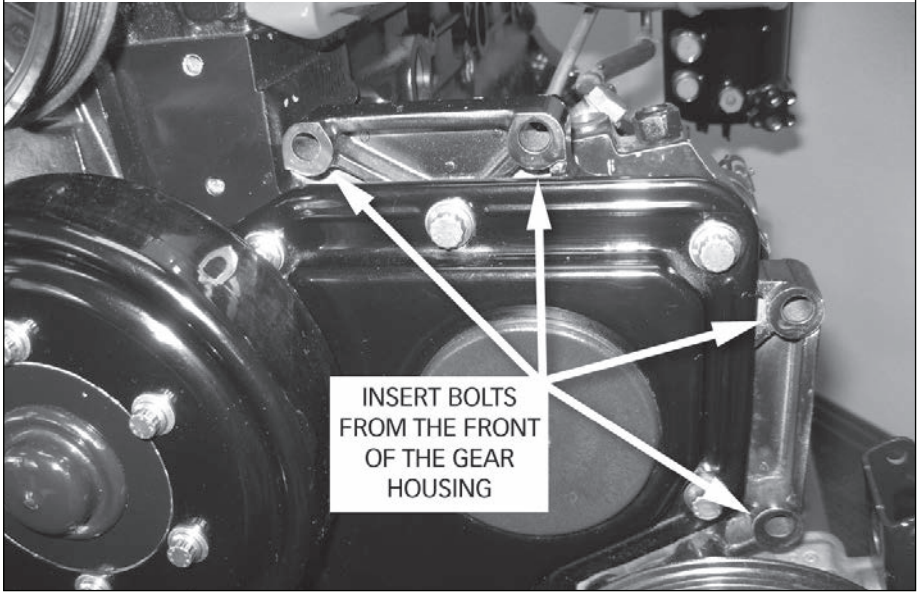
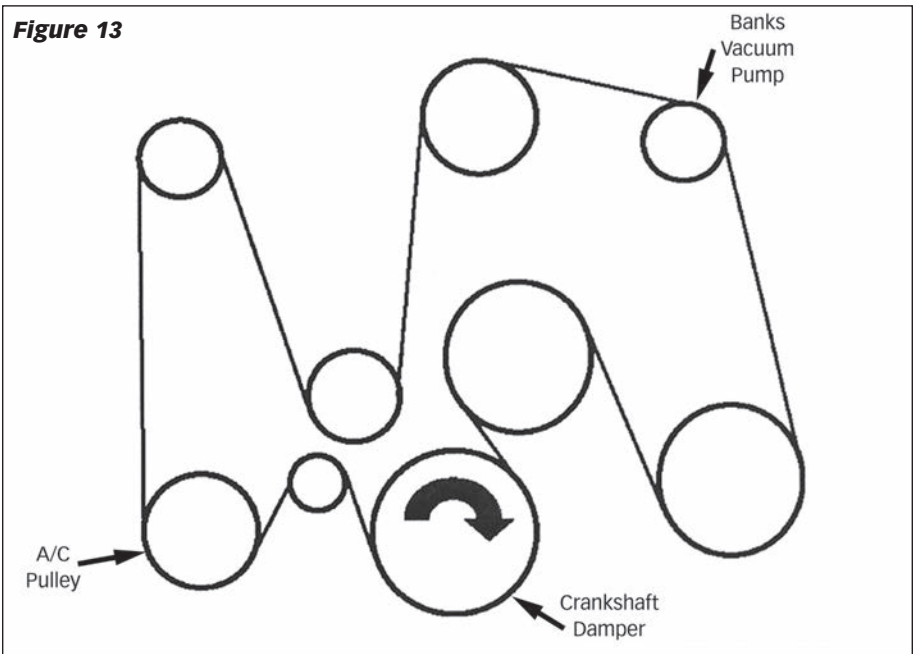


Figure 13



Section 5

Banks Brake Wiring Harness Installation

1. Locate the engine control module (ECM) on the driver's side of the engine (**Figure 14**). Remove the ECM's 50 pin connector with a 4mm hex wrench.

2. The factory seals in locations #39 and #42 will have to be removed from the 50 pin connector (**Figure 15**).

Figure 15 is viewed from the wire side. Bend a paper clip so that part of it is straight. On the side opposite the wires, push the paper clip through pins #39 and #42 to remove the factory seals. You can use needle nose pliers to help with the removal. See **Figure 16**.

3. Locate the loose BLACK/BLUE and BLUE terminal wires on the Banks Wiring Harness. Insert the BLACK/BLUE terminal wire into pin location #39. Insert BLUE terminal wire into pin location #42. Push in both terminals until they snap into place and are locked. Re-connect the ECM's 50 pin connector.

NOTE: Routing the wires between the intake and the brake fluid reservoir, down to the ECM's connector will provide the cleanest install.

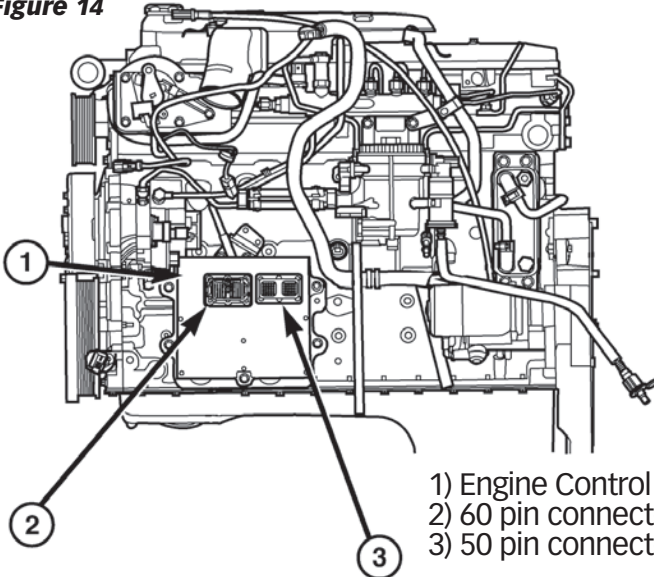
4. Remove the fuse box cover, located in the front driver's side of the engine compartment. Locate mini-fuse #50 for 2004-05 trucks (**Figure 17**) or #28 for 2006-07 trucks (**Figure 18**) and remove it.

5. Install the mini-blade fuse tap onto the removed mini fuse as shown in **Figure 19**. Re-install the mini fuse with the attached blade tap into the fuse box.

For 2004-05 trucks, install the fuse tap in the #50 spot closest to the firewall as seen in **Figure 17**.

For 2006-07 trucks, install the mini-auto blade tap in the #28 spot closest to the engine. This is the "hot" side of the circuit.

Figure 14



- 1) Engine Control Module (ECM)
- 2) 60 pin connector
- 3) 50 pin connector

Figure 15- Viewed from the wire side

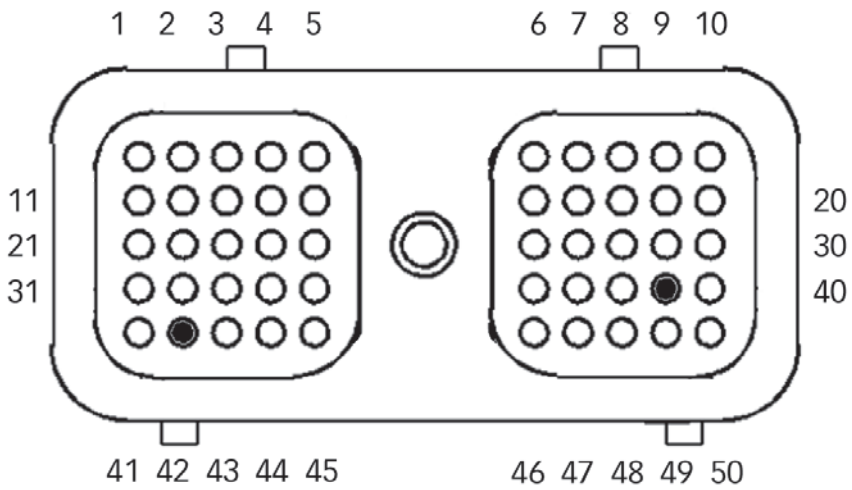


Figure 16

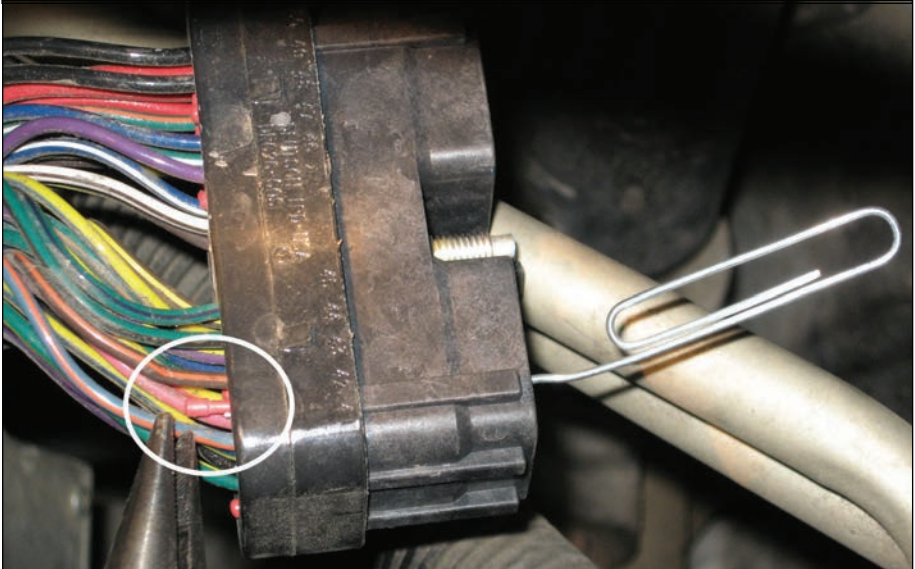


Figure 17

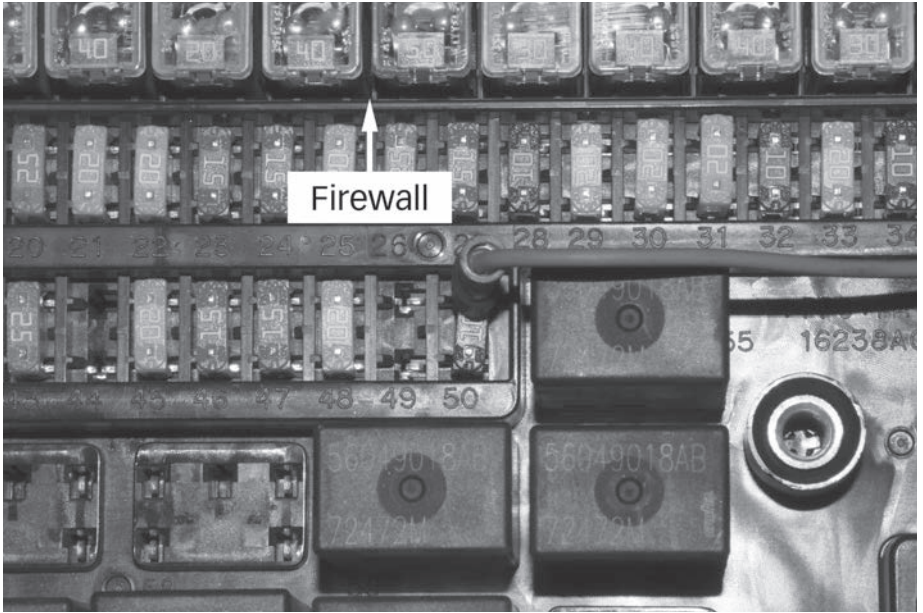


Figure 18

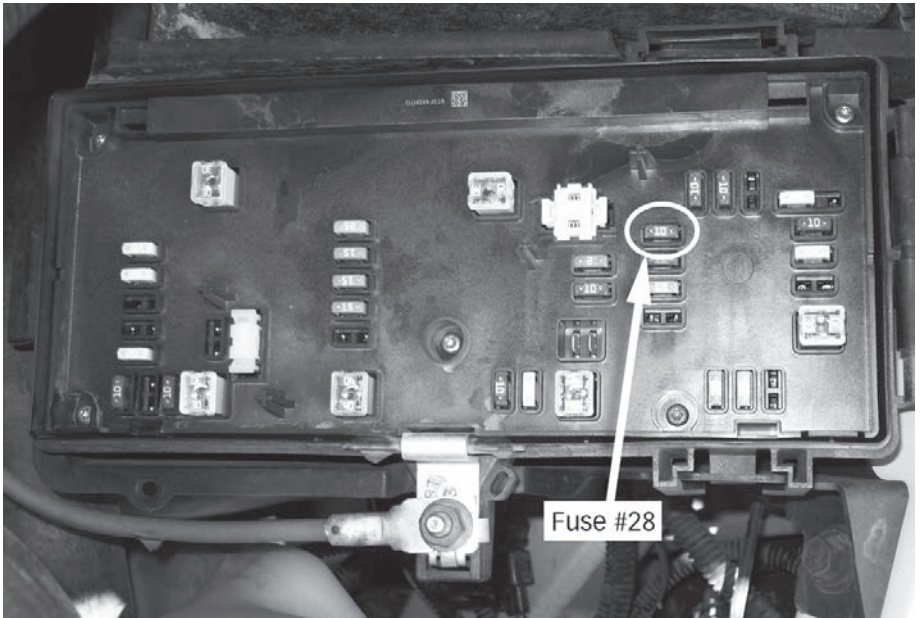
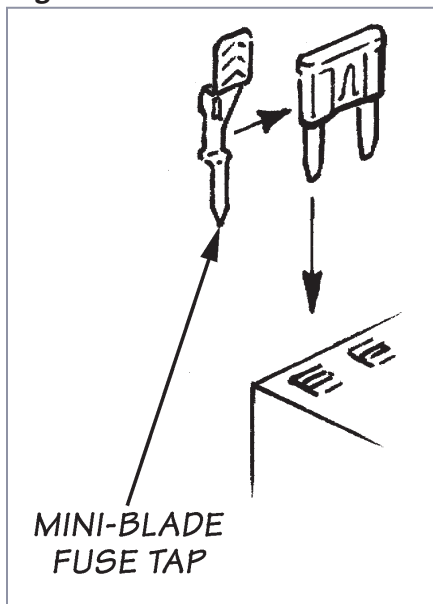


Figure 19



6. Cut a small notch in the fuse box cover and base, on the edge closest to the engine (**Figure 20**), to avoid a pinched or stressed wire. Locate the Fuse Connector wire on the Banks Wiring Harness and connect it to the mini-blade fuse tap. Replace the fuse cover and make sure not to pinch the Fuse Connector wire.

NOTE: If a Banks Six-Gun or OttoMind Diesel Tuner has been installed in the vehicle, disconnect the Tuner's RED Power Terminal wire from the fuse tap and connect the Banks Brake's RED Fuse Connector wire from the Banks Exhaust Brake Harness. Connect the Tuner's Power Terminal wire to the RED Tuner Power wire from the Exhaust Brake Harness.

7. Attach the Ground wire (Black wire with ring terminal) to an existing bolt by removing the existing bolt and sliding the ring terminal over the bolt. Re-install the bolt. Use **Figure 21** as an example location on the driver's side fender.

NOTE: Make sure your ground location is clean from dirt, grease and corrosion or the Banks Brake may not function properly.

8. Route the Wiring Harness along the A.C. hose. Secure it later with cable ties after you have confirmed there is enough Harness to reach all the needed connectors.

9. Locate the connector for the Vacuum Solenoid on the Banks Wiring Harness. Route the wire to Vacuum Solenoid along the hose connected to the Solenoid and plug in the connector to the Solenoid as seen in **Figure 22**. Secure the wire and vacuum hose to the factory wiring harness with cable ties.

10. Plug the Relay Connector, on the Banks Wiring Harness, into the Relay.

11. Locate the rubber grommet located on the driver's side firewall. Using a utility knife, cut a 1" slit around the outer edge of the grommet to allow the Brake Switch Connector and Harness to slide through. See **Figure 23**.

*NOTE: It may be easier, or necessary, to cut the grommet from inside the truck (**Figure 24**).*

CAUTION: Do not cut or damage the factory wiring harness.

Figure 20

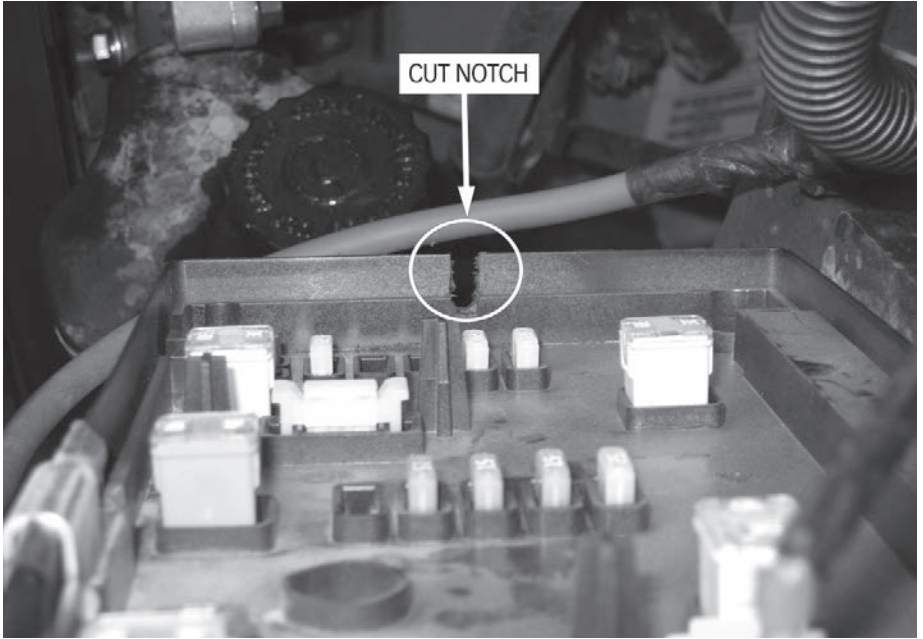


Figure 21

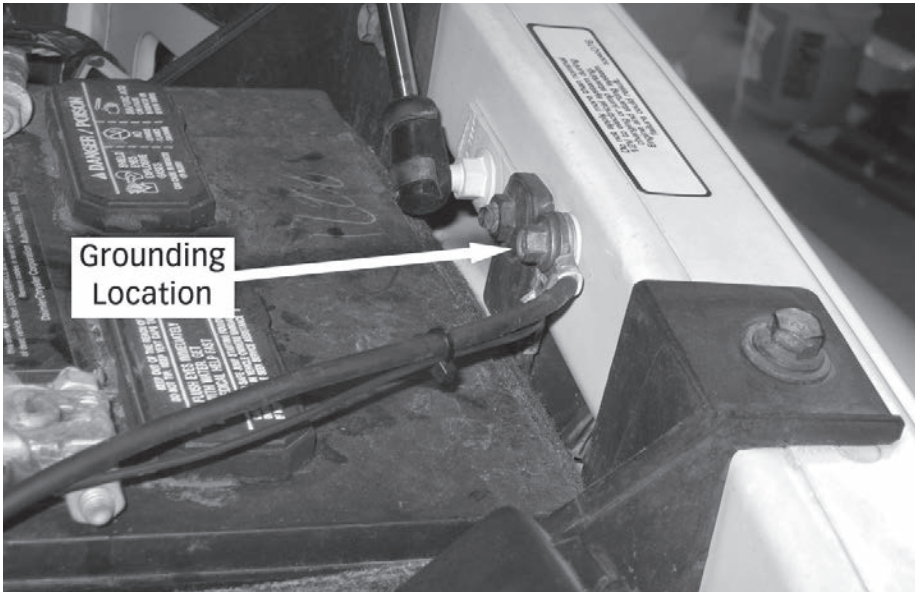


Figure 22

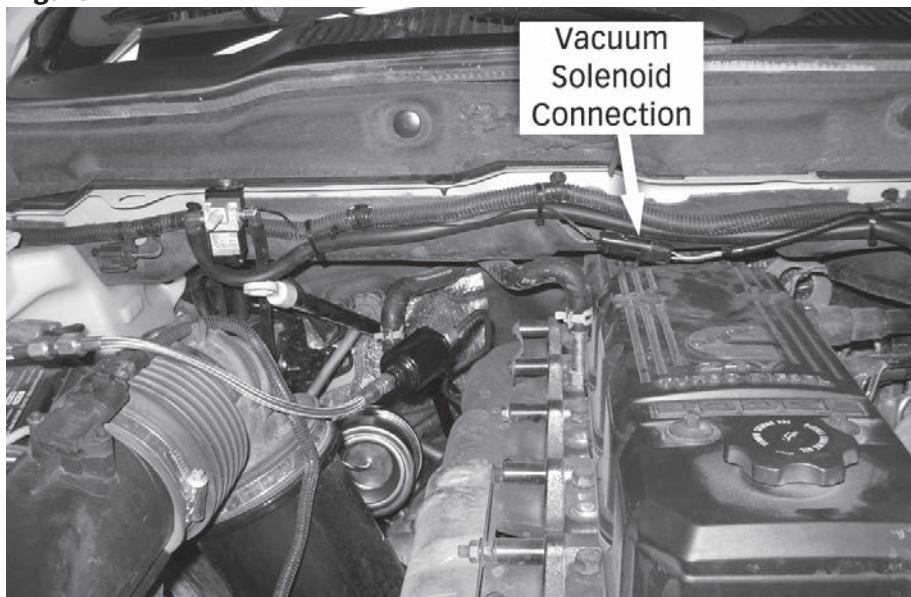


Figure 23

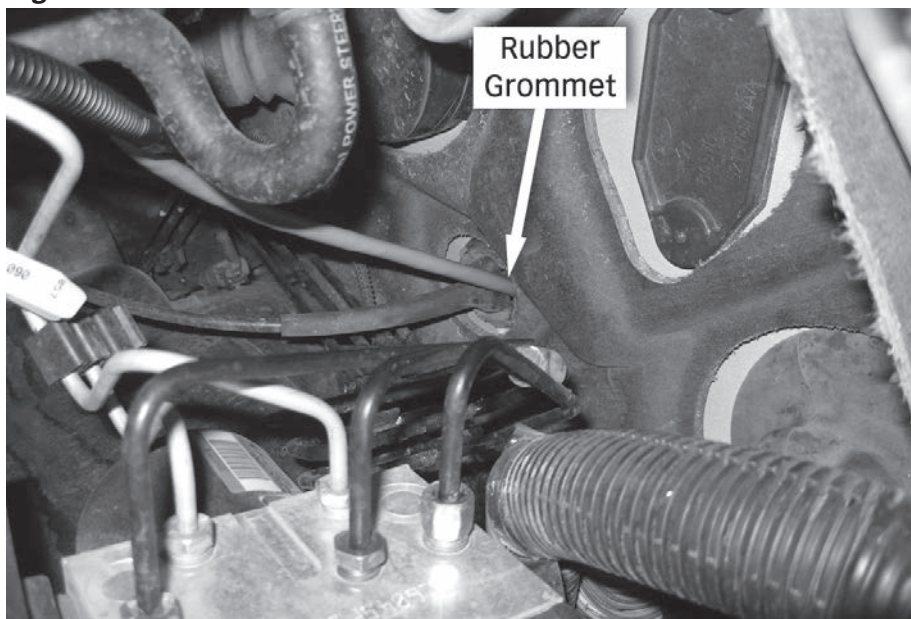
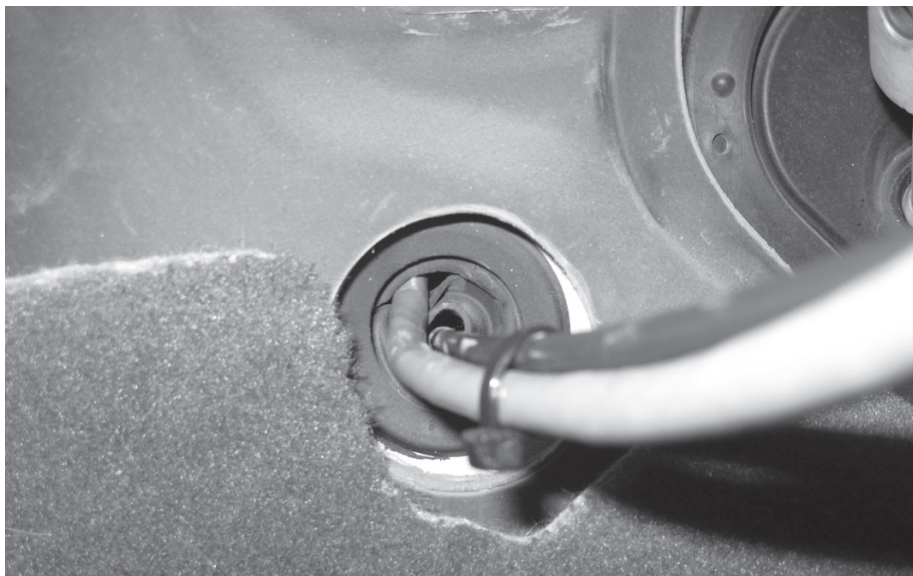


Figure 24



12. From the engine compartment, push the Brake Switch Connector through the hole cut in the grommet.

13. From inside the vehicle, continue to pull the Harness through the firewall until 18" of the Wiring Harness comes through.

CAUTION: Pull gently to avoid damage to the Wiring Harness Connector or wires. Always pull on the Wiring Harness housing rather than the wires themselves.

-END SECTION 5-

Section 6

Brake Enable Switch Installation.

CAUTION: Do not use force when working on plastic parts. Permanent damage to the part might result.

NOTE: Before drilling, confirm that there is adequate room for the Brake Enable Switch and wires behind the dash. Make sure wires or obstructions are cleared from the drilling area.

From where the Brake Enable Switch will be located, make sure there is enough wire on the Banks Wiring Harness to reach the Switch.

These are just suggested locations. It is possible to locate the Brake Enable Switch where it is more comfortable. Please confirm space behind dash before drilling.

2004-2005 Brake Switch install

1. The Banks Brake Enable Switch can be installed in one of two places. #1, on the drivers side of the instrument panel (IP) next to the steering column (**Figure 25**) or #2, on the knee panel above the brake release (**Figure 26**).

2. Location #1: Remove the headlamp switch bezel on the driver's side by gently pulling on it. Disconnect the electrical connector once the bezel is removed.

3. To remove the center bezel, open the ashtray and cup holder and remove the retaining screw. Gently pull on the center bezel to disengage all the clips that attach the bezel to the dash. Disconnect the four (4) electrical connections after the bezel is removed. Keep the screw for reinstallation.

Figure 25 Location #1



Figure 26 Location #2



4. Remove the cluster bezel by first removing the two (2) screws at the top. Gently pull on it and disengage all the clips that attach the bezel to the dash. Retain the screws for reinstallation.

5. Cut out the supplied template (**Figure 32**) and align the template onto the front of the cluster bezel by placing its left edge against the cluster rib, and its bottom edge against the cluster bottom edge. Use masking tape to securely hold down the template.

NOTE: Do not tape over the markings on the template.

It may be necessary to trim some of the cluster's ribs for the Switch to fit.

Skip to Step 12.

6. Location #2: Remove the dash side panel (**Figure 27**). Remove the 2 screws inside.

7. Remove the 2 screws at the bottom of the center knee panel. Pull at the top to disengage the clips that hold the knee panel.

8. Pull at top of the left brake panel to disengage its clips. If applicable, disconnect any switch wires. Remove the panel from the truck.

9. Cut out the supplied template (**Figure 33**) and align the template onto the rear of the brake panel by placing its upper edge against the upper edge of the panel. Refer to **Figure 28**. Use masking tape to securely hold down the template.

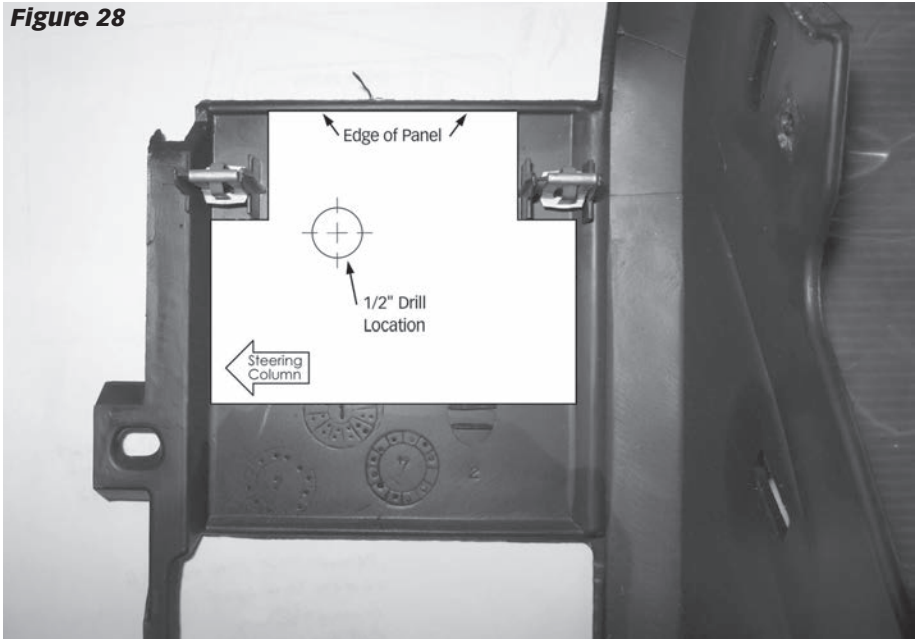
NOTE: Do not tape over the markings on the template.

Skip to Step 12.

Figure 27



Figure 28



2006-2007 Switch install

10. Remove the lower dash knee panel from the vehicle by removing the two (2) screws at the bottom corners of the panel (retain for re-installation). There are also two (2) retaining clips located at the top corners of the panel, which hold the panel in place. These clips can be released by gently pulling on the corners of the panel. Use caution to avoid damaging the panel during removal.

NOTE: If your vehicle is equipped with power adjustable pedals, remove the power adjustable pedal switch wiring connector from the rear of the panel and move the panel aside.

On vehicles with a center console, it may be necessary to remove the console to ease removal of the lower dash panel.

11. Cut out one of the supplied templates (**Figures 34, 35**) and align the template above the brake release lever (**Figure 29**). If applicable, align the template next to the power adjustable pedal switch (**Figure 30**). Place the template's bottom edge against the top edge of the brake release trim. Use masking tape to securely hold down the template.

NOTE: Do not tape over the markings on the template.

12. Before drilling, double check to make sure there is enough room behind where the Banks Brake Enable Switch will be located. It may be necessary to make minor adjustments to the switch's location, as needed. Choose one of the hole locations that you would like to drill. Using a 1/2" Uni-bit, center the bit onto the 1/2" drill location on the template and slowly

Figure 29

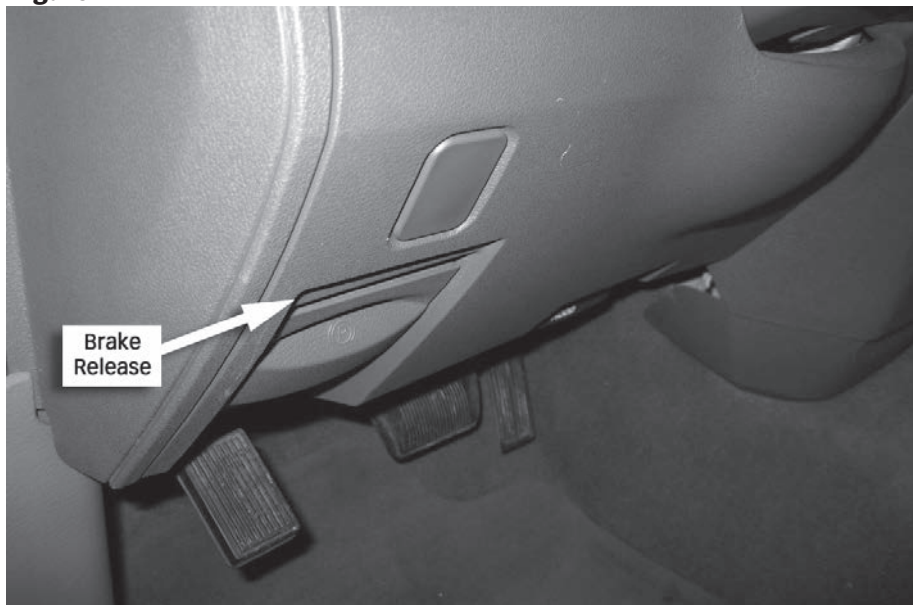


Figure 30



drill through the panel. Remove and discard the template and any plastic shavings.

NOTE: It is important that the hole is drilled as close as possible to the recommended location. The switch may not clear the instrument panel structure if the hole is shifted to another location.

A pilot hole may be drilled first if a Uni-bit is unavailable. Use a drill bit smaller than 1/2".

13. Align the Banks Brake Enable Switch label over the previously drilled hole. Make sure the entire mounting surface is clean and free of dirt and oil before mounting the label. Clean and dry as required using a cloth dampened with rubbing alcohol or similar cleaning solution.

CAUTION: Do not get any fluid directly onto/into any electrical equipment or equipment damage may result.

14. Mount the Banks Brake Enable Switch label onto the panel by peeling off the protective backing from the adhesive tape on the back of the switch label. Hold the label against the panel for approximately 20 seconds while applying pressure to allow the adhesive to properly adhere to the surface.

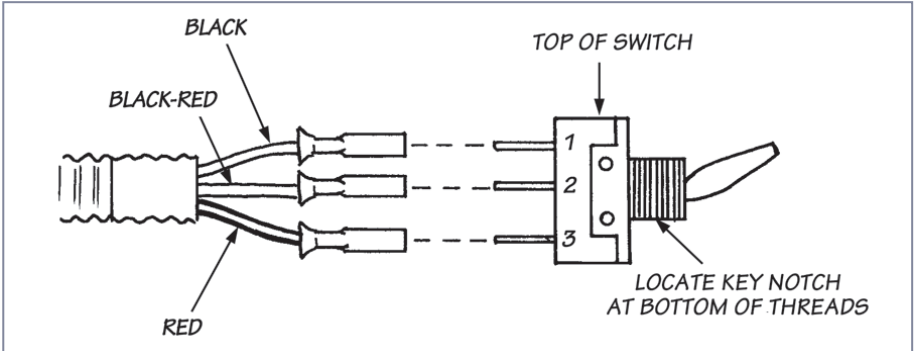
15. Attach the Brake Enable Switch wires to the Switch (BLACK to 1, BLACK-RED to 2, RED to 3) as shown in **Figure 31**.

16. Remove the chrome bezel nut from the Switch shaft. Insert the Switch shaft into the hole that was drilled in the dash panel. Re-install the chrome bezel nut.

17. Reconnect any electrical connectors and re-install the instrument panel(s).

18. Plug the Switch's Connector into the Banks Brake Wiring Harness Switch Connector.

Figure 31-Brake Enable Switch



19. Route all wiring away from any pedals or other moving components. Using the supplied cable ties, secure the wiring under the dash. Secure all wiring under the hood away from heat sources, moving parts, or sharp edges.

20. Re-install the battery ground cable(s).

-END SECTION 6-

Section 7

Functional Testing

The Banks Brake has been designed for your truck. It features:

- Quicker engine warm-ups.
- Compatible with cruise control.
- Compatible with Banks Diesel Tuners.

NOTE: The following testing should be performed only after the vehicle has been allowed to COMPLETELY COOL. This test verifies the performance of the warm-up feature of the Brake System and must be performed with a cold vehicle.

- 1.** Verify that the Banks Brake Enable Switch is in the "ON" position. The Switch will light up.
- 2.** Ensure that the accelerator pedal is NOT depressed.
- 3.** Start the engine and let it idle. The Brake valve will close and can be verified by the increased noise or muffled sound of a restricted exhaust pipe or by observing the Brake actuator lever closing.
- 4.** Slowly press the accelerator pedal. The Brake valve will open. Release the accelerator pedal and the Brake valve will close.

NOTE: The engine speed (RPM) should not exceed 1200 RPM prior to Brake disengagement.

5. Allow the vehicle to reach normal operating temperature. The Brake will remain active until the vehicle reaches approximately 175°F (79°C) engine coolant temperature. Once the vehicle warms up, the Brake will turn off.

6. Obtain a vehicle speed of approximately 40 MPH (64 KPH) in an area where speeds of this nature are safe and traffic is light. Confirm that the Banks Brake Enable Switch is in the "ON" position. The Switch will be lit up. Release the throttle. The brake should activate and the vehicle will begin to slow. Bring the vehicle to a safe stop (using the vehicle's hydraulic brakes). Turn the Banks Brake Enable Switch to the "OFF" position.

Once the vehicle has passed all of the tests outlined in Steps 1-6, the installation of the Banks Brake system is complete and ready for years of reliable service.

-END SECTION 7-

Section 8

Safety and Operation/ Driving Tips

CAUTION: Your Banks Brake is NOT a substitute for the hydraulic brakes on your truck. The device will not correct or compensate for improperly maintained hydraulic brakes. Also, please be aware that your Banks Brake is not designed to be used as a parking brake or to bring your vehicle to a complete stop. Your Banks Brake is a supplementary braking system designed to help you slow down or to assist you in maintaining a more constant speed when descending a grade. Remember that this Exhaust Brake is first and foremost a safety device and it is most efficient when used to prevent, rather than correct a runaway vehicle condition.

The use of a Banks Brake does not increase the load capacity of your vehicle. Gross Combined Weight Rating specifications should always be adhered to. The Banks Brake will allow you to slow your vehicle more effectively within your vehicle's weight specifications.

Use your Banks Brake to assist in slowing your vehicle while traveling down grades. To activate the Brake, flip the switch to the "ON" position. With the switch on, the Brake will be active anytime that your foot is not on the accelerator pedal. The

Brake will also work with your cruise control. When activated, the Brake will be on when coasting and off when accelerating.

When alternating between braking activity and acceleration, it is good practice to allow a minimum of one second to elapse after the Brake has been disabled or the throttle is applied before reaching full throttle acceleration. This allows enough time for the Brake valve to fully open and eliminates the possibility of excess exhaust back pressure being introduced into the engine.

The Banks Brake features a user selectable warm up mode. When activated and the engine is cold (below 175°F, 79°C), the Exhaust Brake will activate to reduce the amount of engine warm-up time required. There may be an increase in engine noise when the Brake is closed. Once the vehicle reaches operating temperature, the Brake will open. The Brake will also open when the accelerator pedal is depressed at temperatures below 175°F (79°C). This prevents soot build-up and keeps the shaft assembly from sticking. It eliminates the need for any additional maintenance.

To activate the warm-up mode, put the Enable Switch to the ON position.

-END SECTION 8-

Figure 32

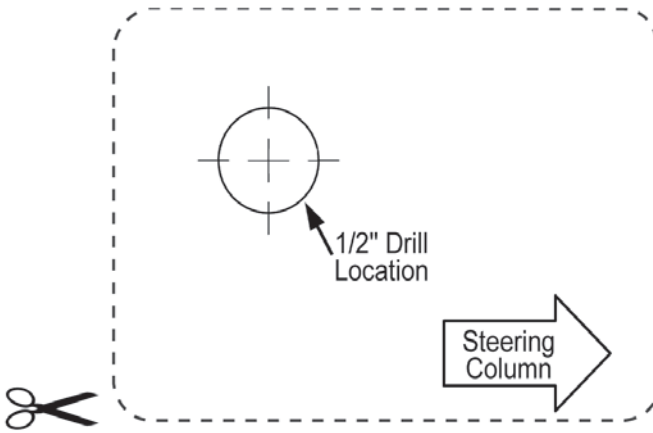
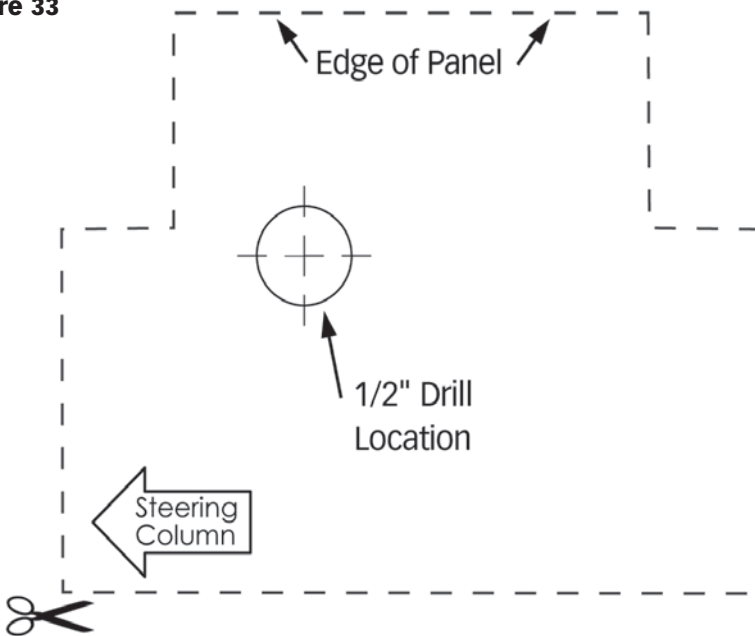


Figure 33



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Figure 34

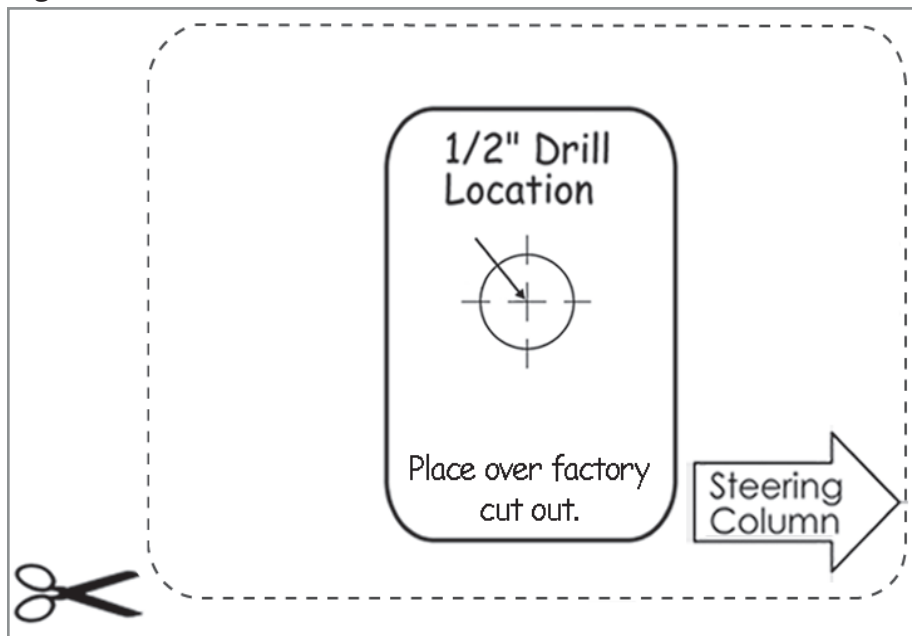
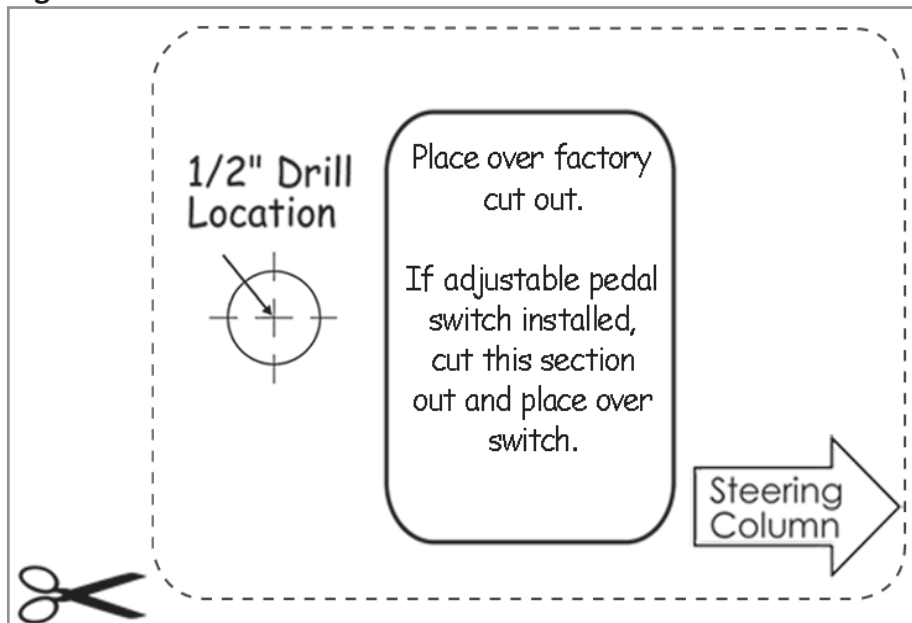


Figure 35



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Section 9

Troubleshooting

If the Banks Brake does not pass the FUNCTIONAL TESTING or ceases to function properly, re-check all the connections per the installation instructions. Make sure that electrical connections are tight and secure and that the vacuum hoses are not kinked or pinched.

If the Brake Enable Switch does not light up within a few seconds, the following diagnostic procedures can be carried out to identify and correct the problem:

1. With key on and the engine off, turn the Brake Enable Switch on. If the Switch does not light up, make sure the Switch is connected correctly and check the fuse.

2. If the Enable Switch is lit solidly, then inspect all the mechanical components in the System. With the engine cold and the hood up, have someone start the engine. Make sure the transmission is in neutral and the parking brake is set. Watch the actuator arm on the Brake housing. It should move forward (closed). Whenever the accelerator pedal is pressed, the Brake should open (actuator arm should move back towards the firewall).

Checking the performance of the vacuum pump:

WARNING: The Pump must never be run open to the atmosphere, as this will damage the Pump diaphragm. The Pump must always be connected to the Vacuum Solenoid or it's vacuum nipple must be plugged. The warranty on the Pump will be voided if the Pump is allowed to run open to the atmosphere.

With the vehicle safely in park and the engine off, disconnect the $\frac{5}{16}$ " hose from the Vacuum Solenoid (Port 1, **Figure 8**). Connect this hose to a vacuum gauge while keeping the other end connected to the Vacuum Pump. Make sure the truck is in park and start the engine. Measure the vacuum at 1900 RPM. The Pump should generate a minimum of 10 psi (20.4" Hg) of vacuum. Replace the Vacuum pump if necessary. After testing, turn off the engine and disconnect the vacuum gauge and reconnect the $\frac{5}{16}$ " hose to Port 1 on the Vacuum Solenoid.

Checking the operation of the Exhaust Brake:

With the vehicle safely in gear, the parking brake set, and the engine off, disconnect the $\frac{7}{32}$ " hose connection (Port 2, **Figure 8**) from the Vacuum Solenoid. Connect this hose to a vacuum tester and keep the other end of the $\frac{7}{32}$ " hose connected to the Exhaust Brake Actuator. As vacuum is generated with the tester, the Actuator should retract and rotate the lever arm off it's stop (as seen in **Figure 7**). The lever arm should travel 81.5 degrees without binding or sticking. After testing, disconnect the vacuum tester and reconnect the $\frac{7}{32}$ " hose to Port 2 on the Vacuum Solenoid.

If the Exhaust Brake is slow to open, check the Vacuum Solenoid's brass filter. If it is dirty, clean or replace it. Replacements can be purchased from Gale Banks Engineering or may be found at a hardware or automotive store.

-END SECTION 9-

NOTES

NOTES

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