Jacobs Exhaust Brake®

For 2003 through 2006 Dodge Ram Trucks Equipped with the Cummins ISB 5.9 Engine

Installation Manual

Please see Web Site for latest instructions

www.jakebrake.com

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Introduction

The procedures for installing the brake system are organized into twelve main sections, with each section detailing the installation of related components. We strongly recommend that you perform the procedures in the order in which they are presented. The last section lists troubleshooting procedures, in case you are experiencing problems with the Jacobs Exhaust Brake®.

For additional information or technical support, contact Cummins Customer Assistance Center by calling 1-800-DIESELS (1-800-343-7357).

Application Notes

The Jacobs Exhaust Brake kit has been specifically engineered to fit your Dodge Ram truck equipped with the Cummins ISB engine All parts are included in the kit, allowing installation without requiring any fabrication.

Application Guide

Model Year	Transmission	Mopar Part Number	Cummins Part Number
2003	Manual	N/A	4089427
2003	Automatic	N/A	N/A
2004	Manual	N/A	4089427
2004	Automatic	N/A	N/A
2004.5	Manual	822008835AB	4089924
2004.5	Automatic	N/A	N/A
2005	Manual	822008835AB	4089924
2005	Automatic	N/A	N/A
2006	Manual	822009823	4089924
2006	Automatic	822009823	4089924

Safety Precautions

The following symbols in this manual signal conditions potentially dangerous to the mechanic or equipment. Read this manual carefully. Know when these conditions can exist. Then take necessary steps to protect personnel as well as equipment.

WARNING THIS SYMBOL WARNS OF POSSIBLE PERSONAL INJURY.

CAUTION THIS SYMBOL REFERS TO POSSIBLE EQUIPMENT DAMAGE.

NOTE: INDICATES AN OPERATION, PROCEDURE OR INSTRUCTION THAT IS IMPORTANT FOR CORRECT SERVICE.

Fuels, electrical equipment, exhaust gases and moving engine parts present potential hazards that could result in personal injury. Take care when installing equipment or parts. Always wear safety glasses. Always use correct tools and follow proper procedures as outlined in this manual.

Special Tools and Materials Required

You should have the following tools and materials before you begin this installation:

- Rust penetrant, such as Liquid Wrench®
- Battery terminal puller
- Common hand tools such as metric wrenches, screwdrivers and pliers.
- Torque wrenches
- Drill with a ¼" bit and a #27 drill bit
- #56 (3/64") Drill bit or back probe tool (mopar), or paper clip to remove ECM sealing plugs
- Knife or other tool for cutting the rubber vacuum hose
- Clean shop towels
- Teflon® pipe sealant
- Loctite® 242 or equivalent
- Volt/Ohm Meter or test light
- 4 mm Ball End Hex Driver or Hex Wrench
- Electrical Tape
- Heat Gun
- Dielectric Grease
- Miller Connector Tool #6680 (or very small thin bladed screwdriver)

NOTE: IF YOU HAVE A VEHICLE WITHOUT AIR CONDITIONING, YOU WILL NEED TO PURCHASE A DIFFERENT ACCESSORY DRIVE BELT CUMMINS PART NUMBER 4025090 (LENGTH WILL BE 2,892 MM/113.9 IN).

Section 1: Preparation

NOTE: WITH THE BATTERIES CONNECTED, DISCONNECTING THE VEHICLE POWER CONNECTOR CONTAINING KEY SWITCHED POWER WILL RESULT IN FAULT CODES BEING RECORDED IN THE VEHICLE ECM AND ABS MODULE. TO PREVENT THIS, SWITCHED 12 VOLT POWER NEEDS TO BE FOUND WITHOUT DISCONNECTING THE VISTRONIC FAN CONNECTORS.

1. Locating key switched power.

For MY2003 vehicles

a. Locate the Vistronic fan connector, located on the top side of the dash panel in the passenger side corner. (see figure 3a)

b. Locate the Solid Dark Blue wire in the right side connector pin 13. This should be 12 volt key switched power. Check this pin with a volt/ohm meter or test light with a hard point test lead, back probe tool or paper clip. (see figure 3b)

c. It should read 12 Volts with the key in the on position and no voltage when the key is off. If pin 13 does not have key switched power, test the other pins. When you have found the key switch power use this pin and wire in place of the Solid Dark Blue wire. (see figure 3c)

d. Record the color of the wire and the pin number that you have found to have 12 volt switched power.

Wire Color: _____

Pin Number: _____

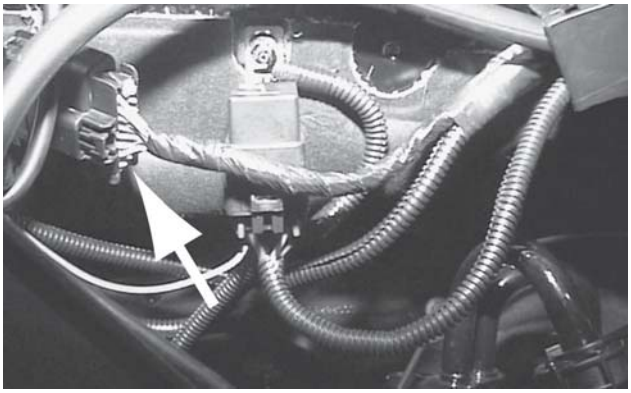


Fig. 3a

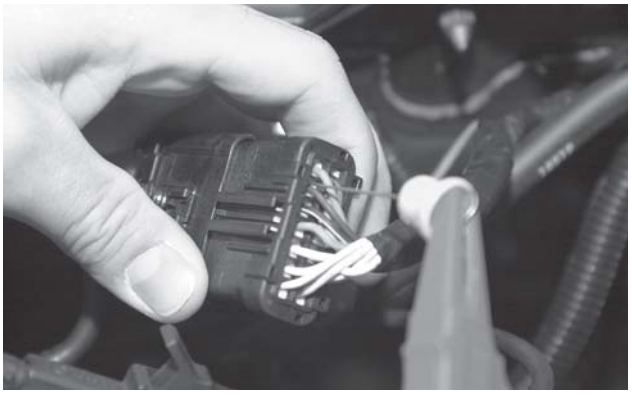


Fig. 3b

Fig. 3c

NOTE: WITH THE BATTERIES CONNECTED, DISCONNECTING THE VEHICLE POWER CONNECTOR CONTAINING KEY SWITCHED POWER WILL RESULT IN FAULT CODES BEING RECORDED IN THE VEHICLE ECM AND ABS MODULE. TO PREVENT THIS, SWITCHED 12 VOLT POWER NEEDS TO BE FOUND WITHOUT DISCONNECTING THE VISTRONIC FAN CONNECTORS.

For MY2004 and MY2004.5 vehicles

a. Locate the two 24-pin connectors. They are located on the top side of the dash panel on the driver's side. The left connector is gray, the right connector black. Key switched power is in the black connector (see figure 4a)

b. Locate the Pink w/Gray Stripe wire in the black connector, pin location B4. This should be 12 volt key switched power. Check this pin with a volt/ohm meter or test light with a hard point test lead, back probe tool or paper clip. (see figure 4b)

c. It should read 12 Volts with the key in the on position and no voltage when the key is off. If pin B4 does not have key switched power, test the other pins. When you have found the key switch power use this pin and wire in place of the Pink with gray stripe wire. (see figure 4d)

d. Record the color of the wire and the pin number that you have found to have 12 volt switched power.

Wire Color: _____

Pin Number: _____

For MY2005 vehicles

a. Locate the two 34-pin connectors located on the top side of the dash panel on the driver's side. The left connector is gray, the right connector black. Key switched power is in the black connector (see figure 4c)

b. Locate the Pink w/Gray Stripe wire in the black connector, pin location (MY2005 pin 13). This should be 12 volt key switched power. Check this pin with a volt/ohm meter or test light with a hard point test lead, back probe tool or paper clip. (see figure 5B)

c. It should read 12 Volts with the key in the on position and no voltage when the key is off. If the pin (MY2005 pin 13) does not have key switched power, test the other pins. When you have found the key switch power use this pin and wire in place of the Pink with gray stripe wire. (see figure 4d)

d. Record the color of the wire and the pin number that you have found to have 12 volt switched power.

Wire Color: _____

Pin Number: _____

Fig. 4a

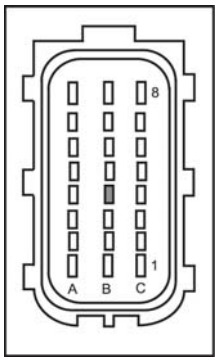


Fig. 4b

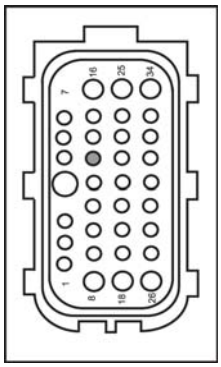


Fig. 4c

Fig. 4d

For MY2006 vehicles

a. Power will be take from the TIPM module which is locate in front of the drivers side battery (see figure 5a)

b. Release the mounting tabs located on each side of the TIPM to release the whole assembly allowing it to be lifted/tilted up exposing the wire harness's (see figures 5b and 5c)

c. Locate connector "G". Locate the Grey wire with pink stripe in cavity 14.(see figure 5d)

d. The pin should read 12 Volts with the key in the on position and no voltage when the key is off. If the pin does not have key switched power, test the other pins. When you have found the key switch power use this pin and wire in place of the Grey with pink stripe wire.

e. Record the color of the wire and the pin number that you have found to have 12 volt switched power.

Wire Color:_____

Pin Number:_____

Fig. 5a

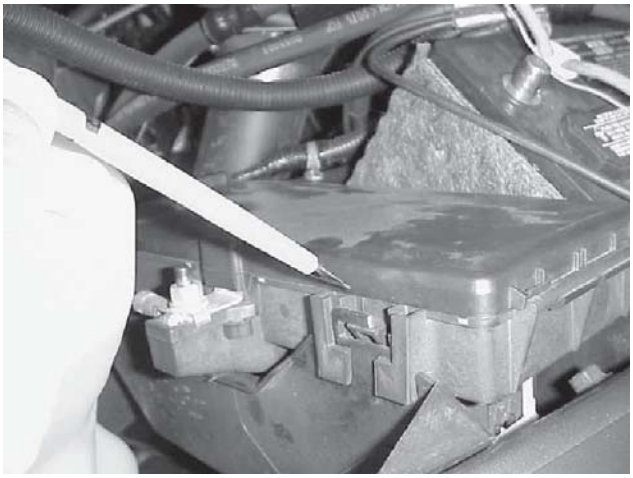


Fig. 5b

Fig. 5c

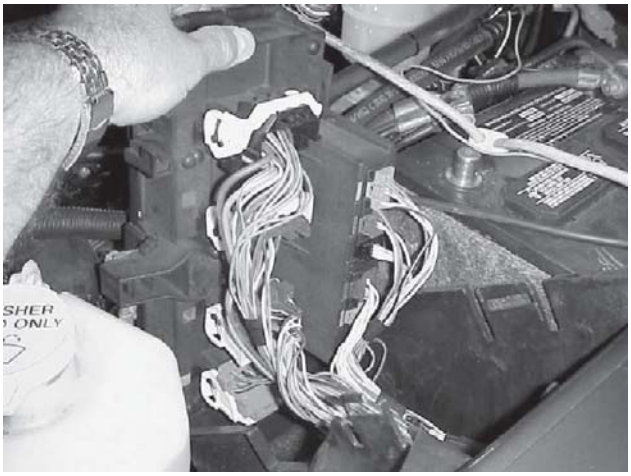


Fig. 5d

2. Disconnecting Batteries.

NOTE: WHEN YOU DISCONNECT THE BATTERIES, THE MEMORY OF THE CLOCK WILL BE LOST.

a. Use a battery terminal puller to disconnect the negative (-) leads from both batteries. (see figure 6a)

b. Use a battery terminal puller to disconnect the positive (+) leads from both batteries. (see figure 6a)

c. Loosen and remove the clamps that hold the batteries firmly in the battery trays. (see figure 6a)

d. Remove the batteries from both sides of the vehicle.

3. Removing front wheel wells.

NOTE: To allow for ease in installation of the exhaust brake assembly and gain access to ECM it is required that both front wheel wells be removed to gain access.

a. To facilitate removal of the front tires and wheel wells, use a floor jack or lift to elevate the front axle.

WARNING MAKE SURE TO SUPPORT THE VEHICLE PROPERLY (JACK STANDS) AS YOU WILL BE WORKING UNDER IT.

b. Remove both front tires. (see figure 6b)

c. Remove the front wheel wells by loosening and removing the eight (8) capscrews attaching the well to the truck fender. Pull the wheel well down to expose the ABS cable. Remove the ABS cable from the wheel wells and set the wheel wells aside. (see figure 6c and 6d)

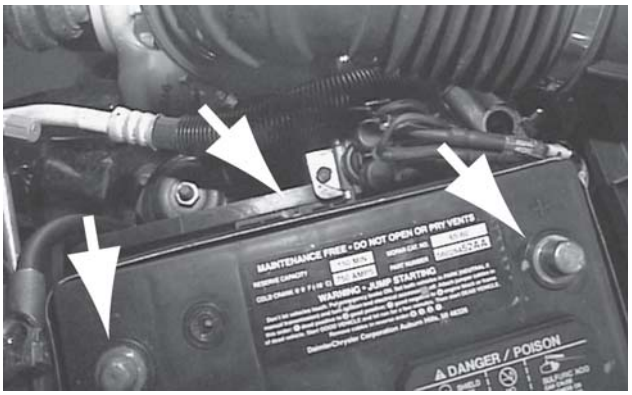


Fig. 6a

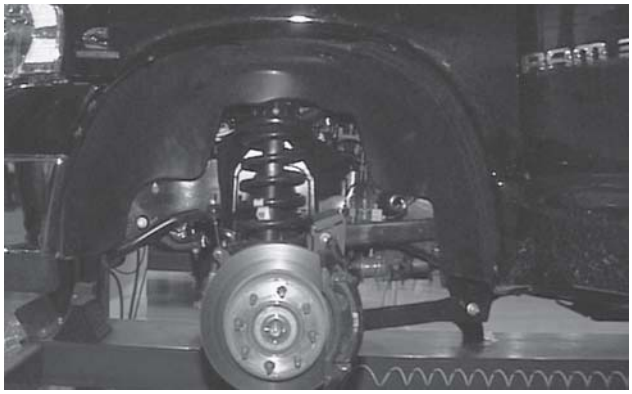


Fig. 6b

Fig. 6c

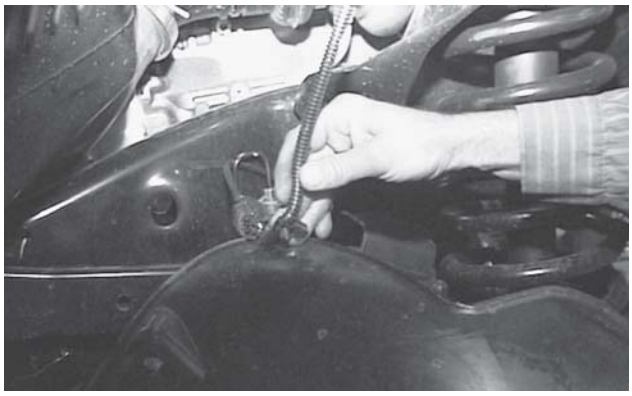


Fig. 6d

Section 2: Installing the Exhaust Brake

1. **Remove the existing Exhaust Elbow that mounts to the rear of the Turbocharger. (see figure 7a and 7b)**

   a. Loosen (11 mm socket) the “V” clamp that attaches the exhaust pipe to the exit side of the elbow. Slide the “V” clamp over the exhaust pipe away from the elbow. A new clamp is provided in the kit. (See figure 7b)

   b. Loosen (10 mm socket) and remove the “V” clamp that attaches the elbow to the exhaust side of the turbocharger. A new clamp is provided in the kit. (See figure 7b)

   c. Push the exhuast pipe backwards away from the turbo outlet; Do not loosen the bolts holding the exhaust pipe to the transmission housing. This bracket will help support the brake during installation. Slide the elbow toward the rear of the vehicle. This will allow the two pins in the turbo to come free. Remove the elbow from the vehicle. This elbow can be reused if the exhaust brake is removed.

2. **Attach the Exhaust Brake Assembly to the Turbocharger.**

   CAUTION The brake needs to be oriented in a certain way to fit easily in place.

   a. Clean the gasket surfaces of the turbo outlet and the exhaust brake assembly, making sure the surfaces are free of dirt, grease and oil.

   b. **Mark** the location of the holes on the turbo outlet flange on the edge of the flange Using a grease pencil. **Mark** the location of the pins on the edge of the exhaust brake. This will aid in aligning the brake later in the install.

   c. **Place the entire outlet flange of the brake into the exhaust pipe. Reference pictures on page 8.**

   d. Push the brake back toward engine until actuator clears the air conditioning condensor.

   e. Rotate brake upwards. Then lift the brake and slide outlet pilot into exhaust pipe.

   f. Slide the "V" clamp Part number 4920021 onto the brake’s exhaust inlet flange. Push the clamp up onto the exhaust brake inlet flange so it is out of the way.

   g. Remove the wax paper from the back of the gasket. Attach it to the exhaust brake flange side, sliding the gasket over the pins and firmly pressing it in place.

   CAUTION BE CAREFUL NOT TO DAMAGE THE GASKET BY HITTING IT WHEN INSTALLING THE EXHAUST BRAKE.

   h. Have someone push on exhaust tail pipe until brake is close to the turbo. Line up lines on the turbo outlet and brake inlet. The pins should slide into the holes in the turbo.

   i. Slide the "V" clamp into place. Tighten the clamp enough to hold the brake flush with the turbocharger outlet.

Fig. 7a

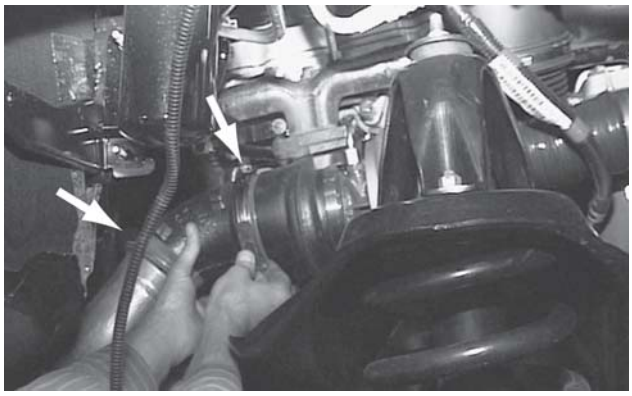


Fig. 7b

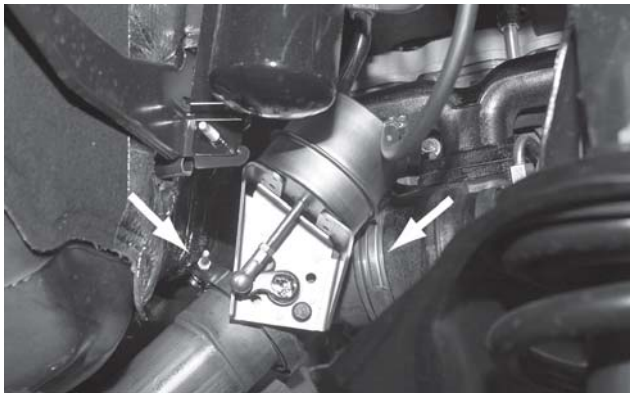


Fig. 7c

   Torque (10mm socket) the “V” clamp.

   Torque Value: 8.5 N·m (75 in-lb)

   j. Tighten the Jam nut on "V" Clamp holding the first nut with a wrench.

   Jam Nut Torque: 11.3 N·m (100 in-lb)

3. **Attach the exhaust pipe to the exhaust brake assembly. (see figure 7c)**

   a. Have someone push on the exhaust pipe tip at the back of the vehicle. They may have to rotate the pipe slightly to align the pipe with the brake. Once the pipe is aligned properly to the brake slide the "V"clamp into place.

b. Tighten the clamp enough to hold the exhaust pipe flush with the brake outlet.

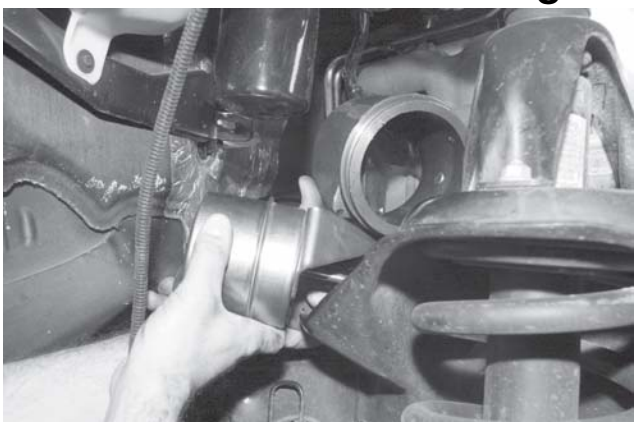
c. Torque (11 mm socket) the “V” clamp between the brake and exhaust pipe.

Torque Value: 11.3 N·m (100 in-lb)

d. Tighten the Jam nut on "V" Clamp holding the first nut with a wrench.

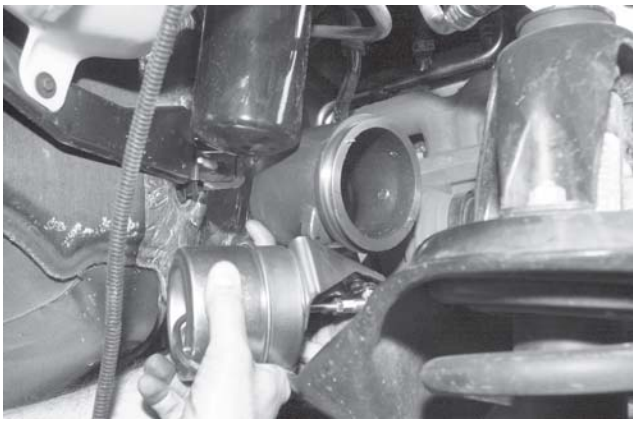
Jam Nut Torque: 11.3 N·m (100 in-lb)

Pictures showing how to get brake into place



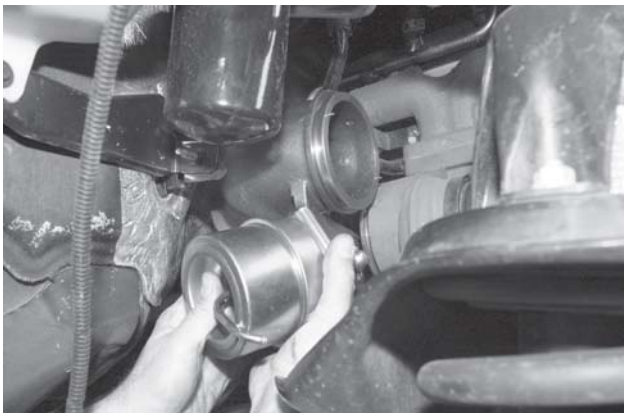
1

Place entire outlet flange into exhuast pipe



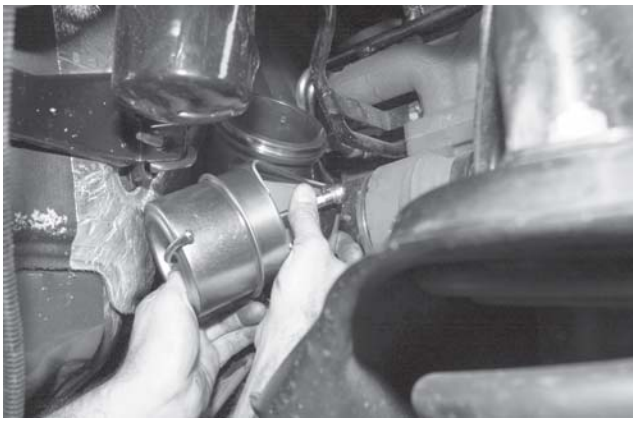
2

Push brake toward the engine



3

Rotate Brake upwards



4

Rotate Brake upwards sliding end into exhaust pipe

5

Rotate Actuator Canister upward

6

Move brake into alignment

Section 3: Installing the Pneumatic Group

1. Drill Vacuum Solenoid Mounting Holes.

NOTE: THE VACUUM SOLENOID WILL MOUNT ON THE BACK (REAR FACE) OF THE PASSENGER SIDE BATTERY TRAY.

a. Take the brass inserts out of the isolators. Install the isolators into the bracket as shown in figure 9a.

b. Reinstall the inserts as shown in figure 9a.

c. Using the solenoid mounting bracket as a template, lay the bracket on the inside rear face of the battery tray and mark the two (2) drill holes. For location see figure's 9b & 9c.

d. Using a ¼" drill bit, drill the two mounting holes through the battery tray.

2. Using the ¼" drill bit, drill the hole to be used for mounting the P-clip. For location see figures 9b and 9c.

3. Prepare the Solenoid/Bracket for Mounting.

NOTE: USE PIPE SEALANT ON ALL NPT (PIPE THREAD) CONNECTIONS.

a. Attach the 90° hose fitting to the solenoid's #1 port. Be sure to orient the outlet of the 90° fitting pointing away from the solenoid's coil.

b. Attach the straight hose fitting to the solenoid's #2 port.

c. Using Loctite® on the screw threads, attach the solenoid to the mounting bracket with the two #8-20 screws and lock washers supplied in the kit.

4. Mount the Solenoid/Bracket Assembly.

a. Place a flat washer on each of the two M6 x 32 mm capscrews. Slide the capscrews through the holes in the battery box so the threads are outside the battery box.

NOTE: THE HEADS OF THE CAPSCREWS SHOULD BE INSIDE THE BATTERY BOX TO PREVENT DAMAGE TO THE BATTERY AND/OR BATTERY BLANKET.

b. Place the solenoid and bracket onto the capscrews so that the black coil is down. (See figure 9d)

c. Place two additional flat washers on the capscrews and install locking nuts.

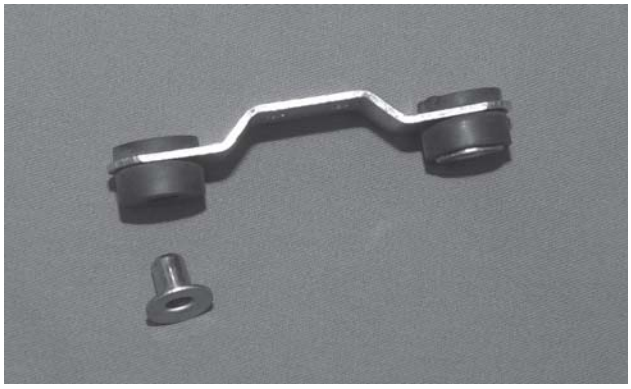


Fig. 9a

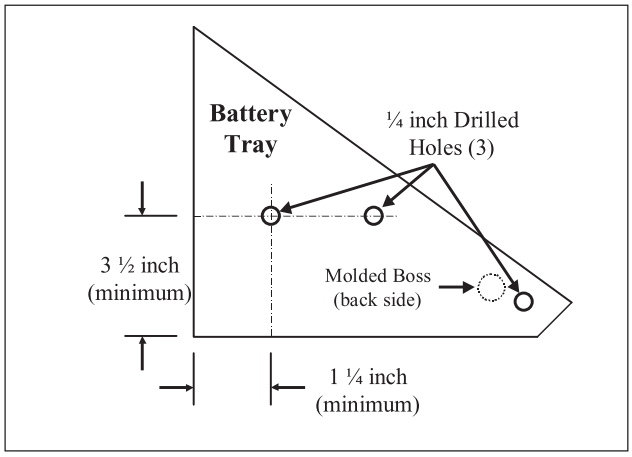


Fig. 9b

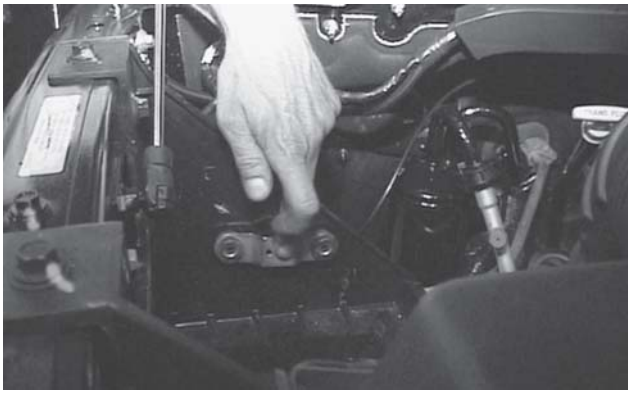


Fig. 9c

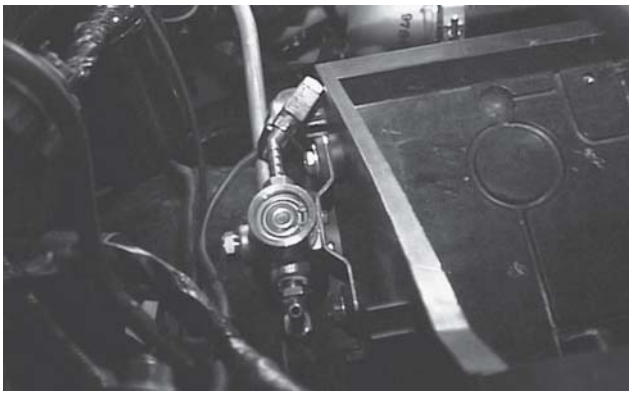


Fig. 9d

5. Connect the Exhaust Brake Vacuum Actuator to the Solenoid

a. Using a hose clamp and ¼ inch I.D. hose supplied in the kit, connect one end of the hose to the vacuum tube on the exhaust brake's vacuum actuator. Tighten the hose clamp.

b. Install p-clip supplied in the kit onto the hose. Route the end of the hose from the actuator to the end of the battery tray. Loosely mount the p-clip to the battery tray using the M6 X 19 mm capscrew, flat washer and lock nut provided in the kit. (see figures 10a and 10b). The head of the capscrew should be inside battery tray as shown in figure 10b.

c. Route the end of the hose to the solenoid's #2 port (straight fitting) as shown in figure 10b.

d. Trim the hose to length and attach the hose to the solenoid's #2 port fitting. No clamp is required for this end. (see figure 10b)

e. Tighten p-clip capscrew and nut.

Fig. 10a

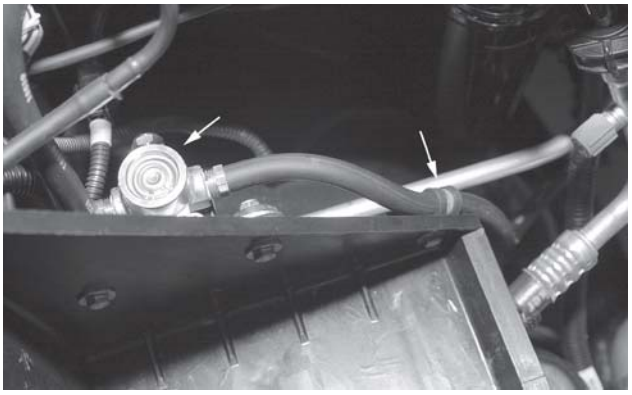


Fig. 10b

Section 4: Installing the Vacuum System

WARNING THE VACUUM PUMP MUST NEVER BE RUN WITHOUT A VACUUM LOAD (I.E. OPEN TO ATMOSPHERE). IF THE PUMP IS RUN WITH NO LOAD, THE PUMP DIAPHRAGM WILL FAIL. IF THE VEHICLE MUST BE DRIVEN AFTER INSTALLING THE VACUUM PUMP BUT BEFORE INSTALLING THE EXHAUST BRAKE ASSEMBLY, CONNECT THE PUMP TO THE VACUUM SOLENOID BEFORE RUNNING THE ENGINE (AS SHOWN IN THE INSTALLATION MANUAL). THE SOLENOID MUST REMAIN OFF (DE-ENERGIZED) UNTIL THE SOLENOID IS CONNECTED TO THE EXHAUST BRAKE. AN ALTERNATIVE METHOD IS TO SECURELY (RE)INSTALL THE RED PLASTIC VACUUM OUTLET CAP SHIPPED ON THE PUMP. THIS CAP IS DESIGNED TO PROVIDE SUFFICIENT VACUUM LOAD.

VACUUM PUMP FAILURE DUE TO PARTIAL SYSTEM INSTALLS AND RUNNING THE PUMP WITHOUT VACUUM LOAD IS NOT COVERED BY BRAKE WARRANTY.

1. Gaining access to gear housing.

For 2003 model vehicles, unfasten the three capscrews on top of the Throttle Position Sensor assembly. Relocate the Throttle Position Sensor assembly to gain access to the top of the gear housing. (see figure 11a)

2. Prepare the Vacuum Pump/Bracket for mounting.

a. Attach the vacuum pump to the mounting bracket using the three M8 x 30 mm capscrews supplied in the vacuum kit. (See figure 11b)

Torque to 25 N.m (18 ft-lb).

b. Install 3/8" I.D. hose onto the vacuum pump and secure with the hose clamp provided.

3. Mount the Vacuum Pump/Bracket Assembly.

a. Attach the vacuum pump/bracket assembly to the rear of the gear housing using the four M8 x 45mm capscrews supplied in the vacuum kit. Reference gear housing holes in figure 11c and installed vacuum pump in figure 11d.

Torque to 25 N.m (18 ft-lb).

b. Insure no wiring harnesses are taut against the vacuum pump bracket. This is to avoid harness chafing.

NOTE: IT MAY BE NECESSARY TO REMOVE THE ACCESSORY DRIVE BELT TO EASE INSTALLATION

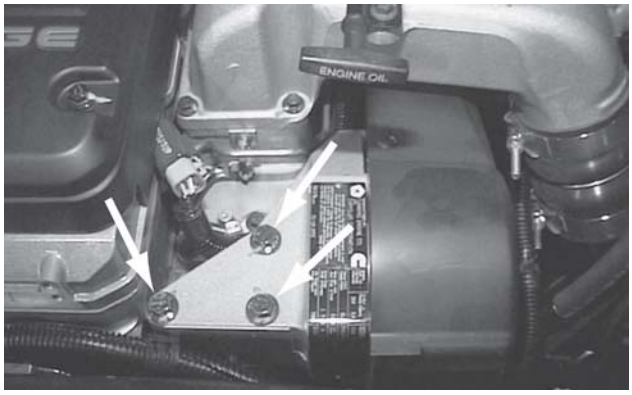


Fig. 11a

Fig. 11b

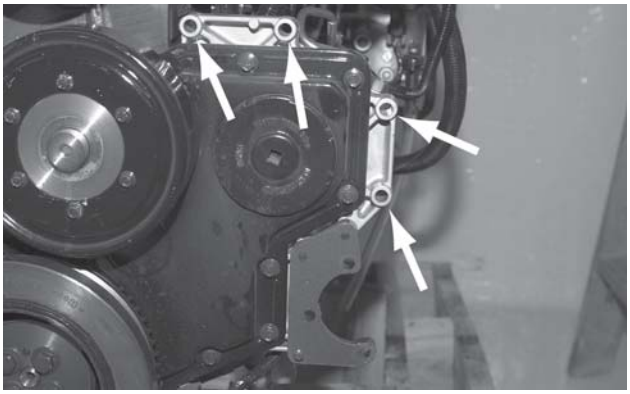


Fig. 11c

Fig. 11d

4. Change the Alternator/Fan/Vacuum Pump Drive Belt.

a. Remove the current drive belt. Use a 1/2 socket wrench on the tensioner pulley to create slack in the belt. This belt can be reused if either the exhaust brake is removed or should there be a problem with the vacuum pump. The vacuum pump does not need to be removed if installing the original belt for any reason.

b. To install the new drive belt supplied in the vacuum kit, route the new belt as shown in figure 12a. Create slack in the belt by using a 1/2 socket wrench on the tensioner pulley (8) and slide belt into place.

NOTE: IF YOU HAVE A VEHICLE WITHOUT AIR CONDITIONING PULLEY NUMBER 9 WILL NOT BE PRESENT, YOU WILL NEED TO PURCHASE A DIFFERENT ACCESSORY DRIVE BELT CUMMINS PART NUMBER 4025090 (LENGTH WILL BE 2,892 MM/113.9 IN).

5. Reinstall the throttle position sensor assembly

a. Reinstall the Throttle Position Sensor assembly. See figure 12b.

b. Torque the three (3) cap screws to 48 N.m (35 ft lbs).

NOTE: THE 3/8" VACUUM PUMP HOSE INSTALLATION WILL BE COMPLETED IN SECTION 5 AFTER THE INSTALLATION OF THE WIRE HARNESS IN SECTION 4.

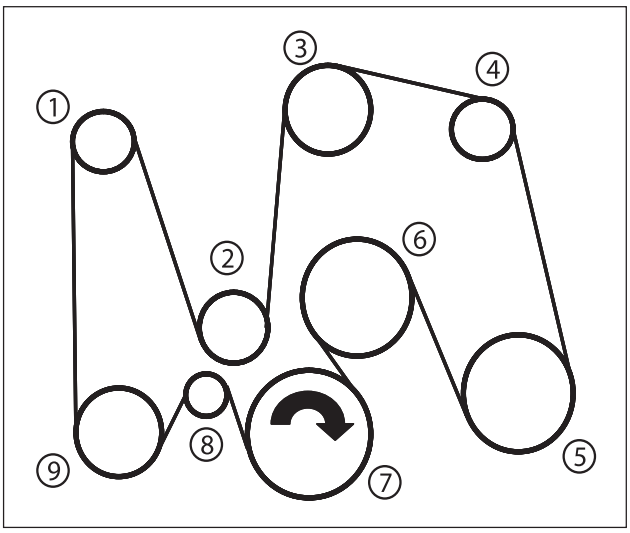


Fig. 12a

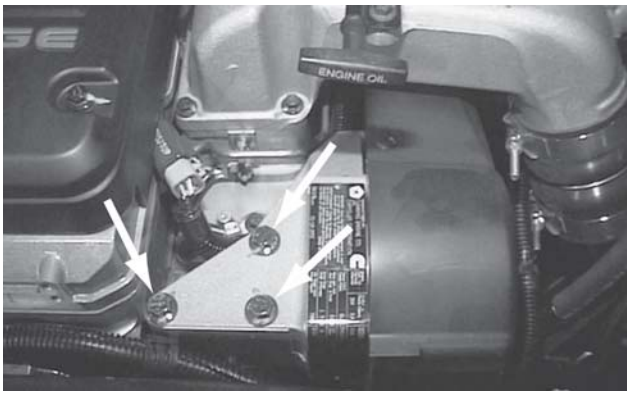


Fig. 12b

Section 5: Installing the Wiring Harness

Harness Installation for MY2003 through MY2006 Vehicles.

1. Route the Harness.

For MY2003 (for 2004-2006 go to step e)

a. Remove wire harness from the convolute.

b. Open the vehicle's wiring "trough" located along the top of the engine compartment plenum.

c. Route the harness through the trough.

d. Skip to step f.

e. Lay the exhaust brake harness near the top of the dash panel in the engine compartment over the engine.

f. The harness should be oriented so that the end with the relay is located on the passenger side of the engine compartment and the end with the fuse-holder is located on the driver side of the engine compartment. (See figure 13a)

g. If needed, reroute the brake harness under the vehicle harness running along the top of the dash panel. It is recommended that the driver's end of the harness be routed behind the two 24-pin connectors and the master brake cylinder. (see figure 13b)

h. Using provided tie-wraps, secure the harness under the vehicle harness running along the top of the dash panel. To allow for minor adjustments to the location of the harness, it is recommended the tie-wraps loosely secure the brake harness until all hookups are completed.

2. Mount the Harness Relay.

Remove the nut from the dash panel stud (see figure 28). Put the relay bracket over the stud. Put the harness black and green/yellow ground wire eyelet onto the stud and replace the nut on the dash panel stud. Tighten nut.

For 2005 and 2006 vehicles a sheet metal screw should be used to attact the relay braket and the ground wire lug. Use a #27 Drill to drill a hole where the stud is pictured in figure 13c. Use the sheet metal screw provided to attach the solenoid and ground lug.

3. Attach the Solenoid Connector.

Attach the male connector with the purple (or blue) and black wires from the harness to the female connector with the two black wires on the exhaust brake solenoid.

Fig. 13a

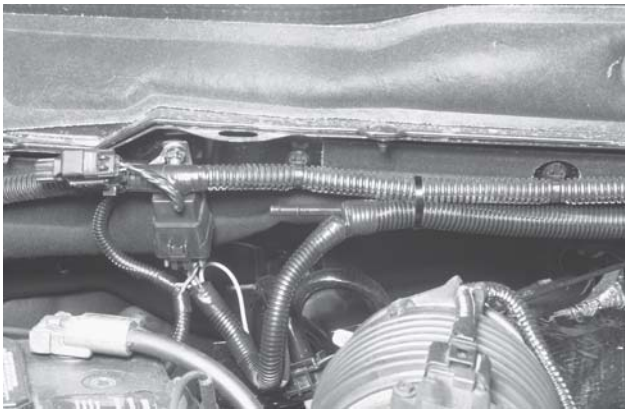


Fig. 13b

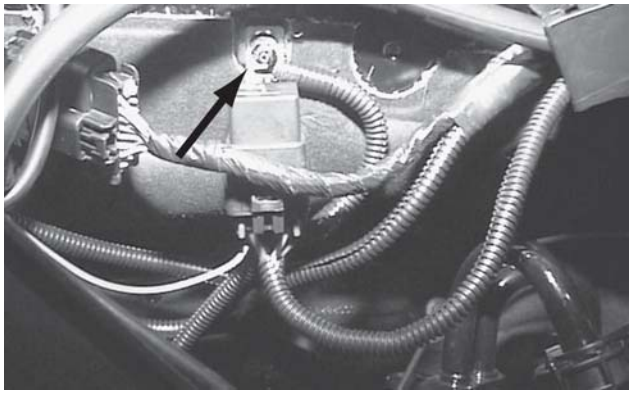


Fig. 13c

Center splicing procedure:

1. Strip ½ inch of insulation from the wire to be spliced. Be careful not to damage the strands of the wire.
2. Separate the strands into two sections as ahown in the figure 14a.
3. Insert the second wire into the opening and wrap the wire around to join the two wires together.
4. Solder the joint using a non-acid core solder.
5. Seal the joint by wrapping it with electrical tape.

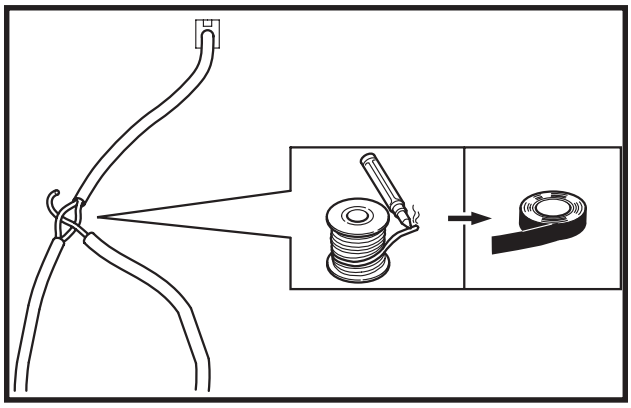


Fig. 14a

4. Connect the Harness to the Switched 12 volt power supply.

<u>For Model Years 2003 - 2005</u>

a. Route the exposed solid grey wire on the driver's side from behind the 24-pin (34-pin for MY 2005) connectors to the black connector on the right. (see figure 14a)

b. Disconnect the black 24-pin (34-pin for MY 2005) connector.

c. Locate the switched 12 volt power wire called out on page 4, step 1d.

NOTE: IT IS RECOMMENDED THAT THE SWITCHED POWER LEAD NOT BE CUT. THE SPLICE SHOULD BE SOLDERED TO THE EXISTING UNCUT WIRE.

d. Strip electrical tape from the connector's harness as needed. Approximately 3 inches from the end of the pin, strip ½ inch of insulation from the switched 12 volt wire to prepare the wire for splicing. Take care to not damage the wire strands. (see figure 14c)

e. Center splice the solid grey wire from the exhaust brake harness to the switched 12 volt connector wire. (see figure 14c)

f. Tape the exposed wire with electrical tape.

Fig. 14b

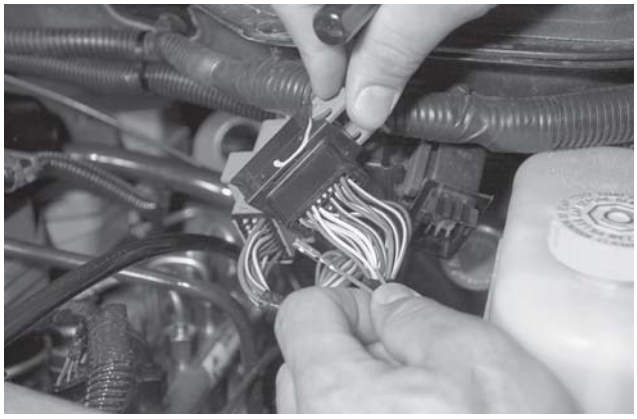


Fig. 14c

For Model Year 2006

a. Route the exhaust brake harness's Grey wire with the convolute around the battery and over to TIPM module. (see figure 15a)

NOTE: IT IS RECOMMENDED THAT THE SWITCHED POWER LEAD NOT BE CUT. THE SPLICE SHOULD BE SOLDERED TO THE EXISTING UNCUT WIRE.

b. Center splice the exhaust brake harness's grey wire to the Grey wire with pink stripe in the G connector, cavity 14 or where 12 volt switch power was found on page 5. (see figure 14c)

NOTE: IF THE BRAKE HARNESS GREY WIRE IS NOT LONG ENOUGH, SOLDER A 16-GAUGE EXTENSION WIRE ONTO THE HARNESS AND COVER THE EXTENSION WITH 1/4" DIAMETER PLASTIC CONVOLUTE AND ELECTRICAL TAPE.

c. Tape and secure the exhaust brake harness's grey wire to the G connectors wiring bundle with electrical tape and a tie wrap.(see figures 15b, 15c, 15d, and 15e)

d. Secure the convolute tubing containing the grey wire to the exisiting hosing to prevent movement.

Fig. 15a

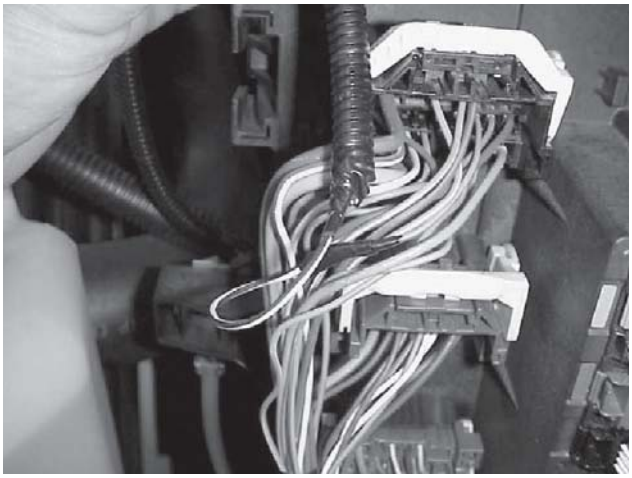


Fig. 15b

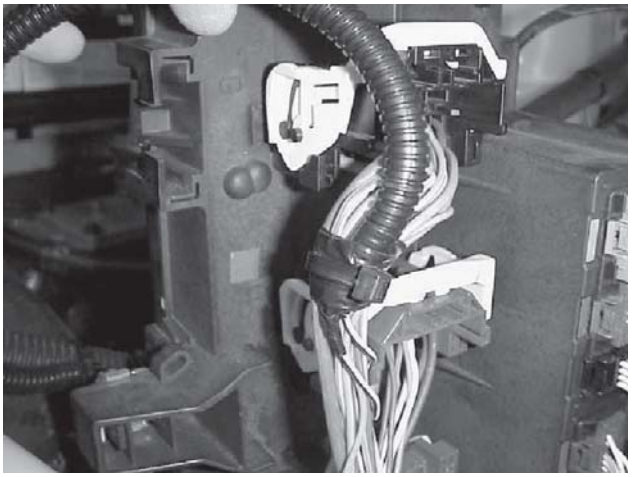


Fig. 15c

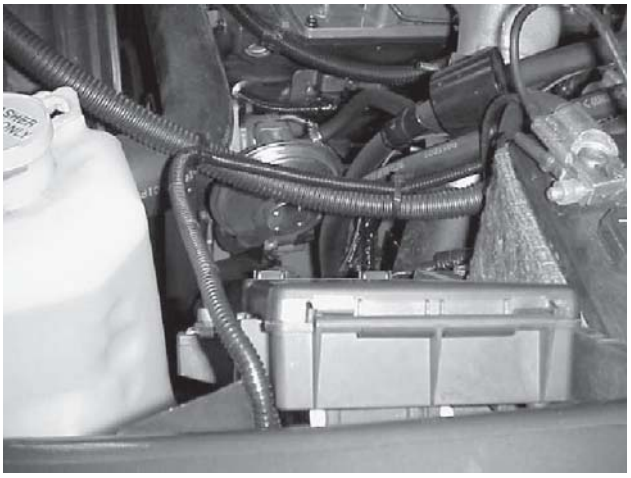


Fig. 15d

Fig. 15e

6. Secure the Brake Harness

a. Ensure that the brake harness is properly aligned with the vehicle harness and that the 90 degree end of the polytube is to the right of the master brake cylinder (see figures 16a, 16b, and 16c). Secure the harness by tightening the harness tie-wraps. Do not over-tighten the wraps thereby crushing the vehicle or brake harness convolute.

b. Using a provided tie-wrap, secure the brake harness' switched 12 volt grey wire to the wire bundle of the 24-pin (34-pin for MY 2005) black connector.

7. Install Vacuum Supply Hose to the Straight End of the Polytube.

Connect one end of the ¼ inch I.D. hose provided in the kit to the straight end of the polytube then proceed to Section 6: Installing the Vacuum Supply Hose.

Fig. 16a

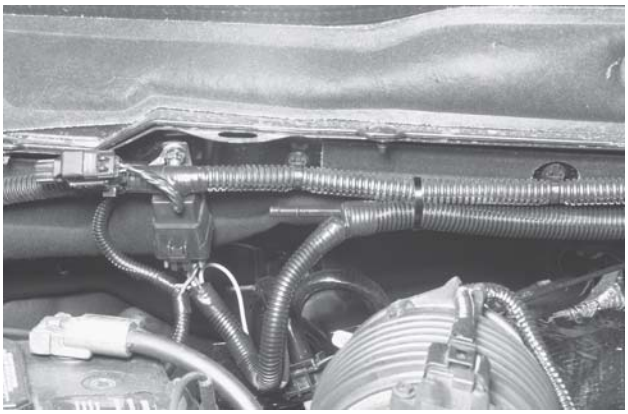


Fig. 16b

Fig. 16c

Section 6: Installing the Vacuum Supply Hose

1. Install vacuum tube to exhaust brake solenoid

a. Route the ¼ inch I.D hose to the 90° elbow on solenoid port #1. (see figure 17a)

b. Trim the hose to size and attach the hose to the solenoid's #1 port fitting. No hose clamp is required.

c. Using provided tie-wraps, secure the hose from chafing and heat sources taking care to not crimp or pinch the hose closed.

2. Attach the Vacuum Pump to the poly tubing.

a. Route the 3/8 inch I.D. hose from the vacuum pump to the 90° polytube fitting on the drivers side. (see figure 17b)

b. Cut the hose to length and connect the 3/8 inch I.D. hose to the 90° polytube fitting.

c. Using provided tie-wraps, secure the hose from chafing and heat sources taking care to not crimp or pinch the hose closed.

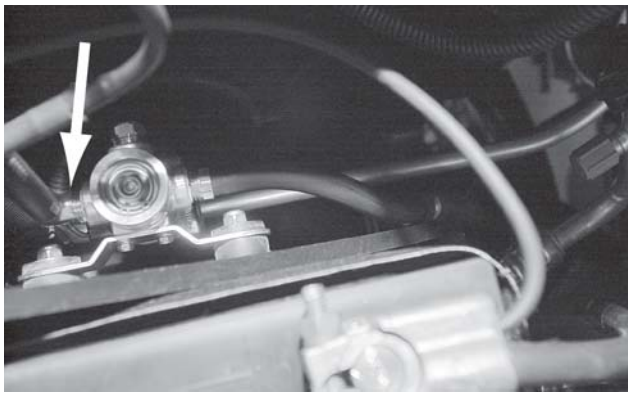


Fig. 17a

Fig. 17b

Section 7: Installing the Brake Switch

For MY2003 through MY2006 Manual Transmission Vehicles

1. Run the wires under the dash panel then towards the driver side as shown in figure 18a.
2. Locate the grommet in the floor panel behind the pedals as shown in figure 18b. With a small screwdriver make a hole in the grommet to slide the wiring harness through.
3. Slide the wires through the grommet. Pull back the carpet on the drivers side and route the harness just under the top of the carpet. Restore the carpet to its original position. (see figure 18c)
4. Attach the stalk switch to the shifter stalk and install the four (4) clamping screws through the attachment piece. Two bushings provided with the switch will not be used in this installation and may be discarded. (see figure 18d)
5. Using tie wraps provided in the kit, secure the switch wires to the shifter stalk.
6. In the engine compartment route the three wires along the vehicle harness, from the grommet to the brake harness on the drivers side. (see figure 18e)

Fig. 18a

Fig. 18b

Fig. 18c

Fig. 18d

Fig. 18e

For MY2006 Automatic Transmission Vehicles

1. Remove the dash cover just below the steer column as shown in figure 19a.
2. Run the wires though the space between the dash panel and the steering column as shown in figures 19b & 19c.
3. Locate the grommet in the floor panel behind the pedals as shown in figure 19e. For automatic transmissions there is a cable going through the gromment. With a small screwdriver make a hole in the grommet to the slide of the existing cable to slide the wiring harness through.
4. Slide the wires through the grommet. (see figure 19e)
5. Install the two bushings into the switch housing and attachment piece. Attach the stalk switch to the shifter stalk and install the four (4) clamping screws through the attachment piece. (see figure 19d)
6. Using tie wraps provided in the kit, secure the switch wires to the shifter stalk and to the automatic transmission cable (see figure 19e).
7. Replace the dash cover.
8. In the engine compartment route the three wires along the vehicle harness, from the grommet to the brake harness on the drivers side. (see figure 19f)

Fig. 19a

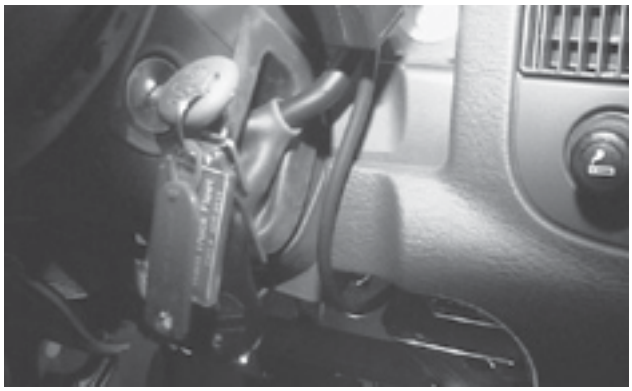


Fig. 19b

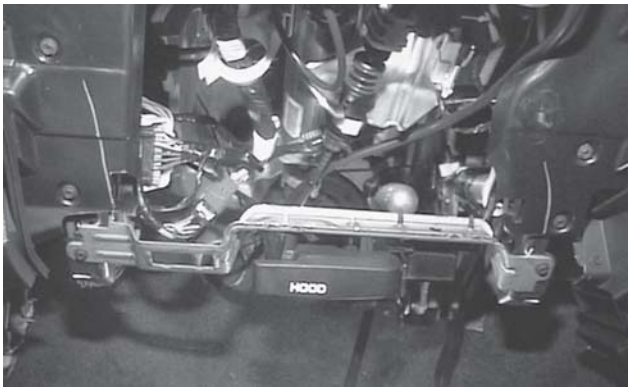


Fig. 19c

Fig. 19d

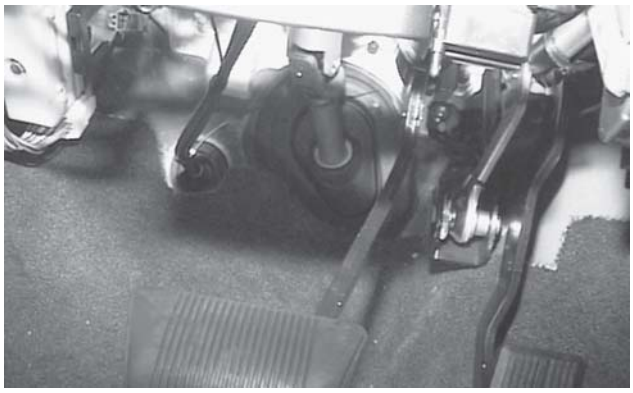


Fig. 19e

Fig. 19f

Section 8: Installing the ECM Connections

1. Connecting to the ECM.

a. Insert the light green wire from the Exhaust Brake Harness and yellow wire from the Stalk Switch into the ¼ inch convolute supplied in the kit. Tape as necessary to secure the convolute to the wires.

b. Route the convolute containing the light green and yellow wires along existing vehicle wiring to the 50 pin "B" connector of Engine Control Module (ECM). (see figures 20a and 20c)

c. Route the two remaining brake switch wires (red and green) toward the wire trough. They will connect with wires of the brake harness (red to red, green to yellow (green with yellow stripe)). Trim the switch wires to meet with the butt splices in the brake harness. Strip the ends and crimp to the similar color wires on the brake harness. (See figures 20c and 20d)

d. Using a 4 mm hex wrench, loosen and remove the ECM's 50 pin "B" connector (rear connector).

e. Locate the #39 terminal sealing plug on the connector. Insert a #56 (3/64") drill bit, back probe tool or similar small diameter rod into cavity #39 to push out the sealing plug. Pull the sealing plug out of the cavity with needle nose pliers. (see figure 20b)

f. Locate the #42 terminal sealing plug on the connector. Insert a #56 (3/64") drill bit, back probe tool or similar small diameter rod into cavity #42 to push out the sealing plug. Pull the sealing plug out of the cavity with needle nose pliers. (see figure 20b)

⚠ WARNING Make sure the driver side battery is removed from the vehicle. sparks, flames or smoking near The battery can cause an explosion or fire leading to personal injury.

g. Using a heat gun, heat shrink the butt splice connectors to seal the wires.

NOTE: BE SURE TO FOLLOW INSTALLATION PROCEDURES AS WRITTEN. ONCE THE TERMINALS ARE SEATED IN THE CAVTIES, THEY CAN ONLY BE REMOVED WITH A SPECIAL TOOL.

h. Insert the terminal on the yellow wire from the switch harness into the #39 cavity of the ECM 50 pin "B" connector. Push the terminal straight into the cavity until a positive stop is felt. Lightly pull on the terminal to ensure that it is properly locked in place.

i. Insert the terminal on the light green wire from the brake harness into the #42 cavity of the ECM 50 pin "B" connector. Push the terminal straight into the cavity until a positive stop is felt. Lightly pull on the terminal to ensure that it is properly locked in place.

j. Reinstall the 50 pin "B" connector to the ECM using a 4 mm hex wrench.

Fig. 20a

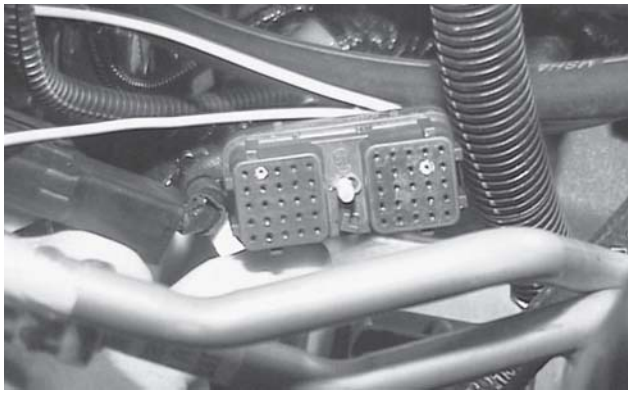


Fig. 20b

Fig. 20c

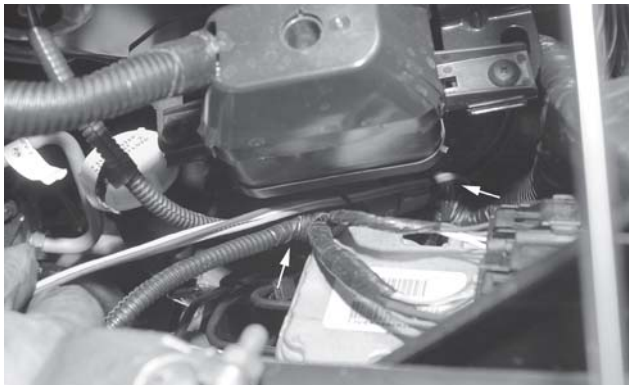


Fig. 20d

Section 9: Completing the Installation

1. Reinstall the driver side battery

a. Reinstall the driver side battery into the tray and secure with the battery clamp. (see figure 21a)

b. Make sure the negative leads for both batteries are not grounded and place the positive lead onto the positive battery post.

c. Remove nut from the clamp and install the fused black brake harness wire with eyelet onto the bolt. Replace the nut and tighten onto the positive battery post. (see figure 21b)

d. Install the negative battery lead onto the negative battery post and tighten.

2. Secure the Wiring Harness.

a. Using remaining ¼ inch convolute, tape and secure with tie-wraps to protect the brake wiring harness from sources of heat and chafing.

b.Tighten the tie wraps holding the wire harness. (see figure 21c)

3. Reinstall the wheel wells.

Attach the ABS cable to the wheel well. Slide the wheel well into place. Install Eight (8) cap screws to secure the wheel well to the fender. Repeat for otherside wheel well. (see figure 21d)

4. Reinstall both front tires.

a. Follow proper procedure from your owners manual to install the front tires.

b. Lower vehicle.

5. Reinstall the passenger side battery.

a. Reinstall the passenger side battery into the tray and secure with the battery clamp. (see figure 21b)

b. Install positive lead onto the positive battery post and tighten.

c. Install negative lead onto the negative battery post and tighten.

6. Reprogram Clock.

Once you have completed the installation, the final step before the test drive is to check the operation of the brake.

Fig. 21a

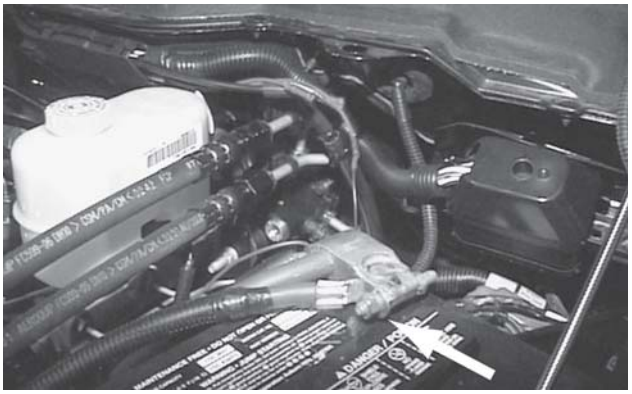


Fig. 21b

Fig. 21c

Fig. 21d

Section 10: Operational Check

WARNING KEEP HANDS, TOOLS AND ELECTRICAL CORDS AWAY FROM THE COOLING FAN AND OTHER MOVING PARTS. INJURY COULD RESULT.

1. **Open the vehicle hood so that you can observe the movement of the vacuum actuator. Make sure the brake is operating correctly with the engine running at idle.**

   a. Verify that the accessory drive belt is tracking properly.

   NOTE: THE BRAKE WILL TURN ITSELF OFF AT IDLE CONDITIONS WHENEVER COOLANT TEMPERATURE IS GREATER THAN 170-175 DEGREES F.

   b. Turn the brake switch to the on position (pull the switch up). The red light on the switch should illuminate and the brake will activate. You can tell the brake is activated by a change in the engine sound or by observing the actuator arm moving the brake to the closed position.

2. **Carefully operate the throttle pedal to bring the engine off idle. The brake should shut off. Watch the movement of the brake to tell if the brake moved to the open position.**

3. **Close the hood and proceed to road test.**

   If the brake does not operate as described above, turn the switch to the "OFF" position and check the troubleshooting section for details on how to proceed.

Section 11: Exhaust Brake Features

Cruise Control

Your exhaust brake will function during cruise control when the cruise is set and the exhaust switch is in the on position. When coasting and gaining speed, the cruise control will turn the brake on and off to maintain the set speed.

Warm up device

You can use your exhaust brake to help warm up your engine. Start your vehicle and turn the stalk switch to the on position. The brake will come on and reduce the time it takes to get your engine to operating temperature. When coolant temperature reaches 170-175 degrees F, the brake will be automatically turned-off by the Engine Control Module at idle conditions.

⚠ CAUTION IT IS NOT RECOMMENDED TO IDLE YOUR VEHICLE FOR LONG PERIODS OF TIME.

Section 12: Troubleshooting

Brake will not turn on

NOTE: THE BRAKE WILL TURN ITSELF OFF AT IDLE CONDITIONS WHENEVER COOLANT TEMPERATURE IS GREATER THAT 170-175 DEGREES F.

1. With the truck running, check to see if the stalk switch is in the on position and the switch light is illuminated. If the switch is in the on position and the light is not illuminated then go to the electrical troubleshooting section.
2. Make sure the throttle cable to the TPS is not kinked or out of position. A kink or out-of-position cable could give the TPS an incorrect throttle position reading. The ECM needs to read that the throttle is in the idle positon for the brake to function.
3. Next step is to go to the Vacuum Troubleshooting section. If this does not resolve the problem, go to the Electrical Troubleshooting section.

Brake will not shut off

1. Hose connections on the solenoid may be reversed. Hose from vacuum pump should be in solenoid connection 1. Hose to the brake should be in position 2. Numbers will be marked on the solenoid itself.
2. At the solenoid, remove the vacuum hose coming from the brake. If the brake does not shut off, the brake may need to be replaced. Go to Brake Troubleshooting section.
3. If the brake does shut off in step 2, reconnect the brake hose and disconnect the solenoid harness. If the brake shuts off then go to the Electrical Troubleshooting section. If the brake stays on, replace the solenoid.

Brake is slow to shut off

The filter on solenoid may be clogged. Remove the filter and clean with solvent and compressed air from the back side. If this does not fix the problem, go to the Brake Troubleshooting section.

Whistling sound from brake

NOTE: SOME SOUND IS NORMAL DURING THE OPERATION OF THE BRAKE. THE SOUND WILL BE MORE OF A WOOSHING SOUND THEN A WHISTLE.

1. Whistling sound is usually caused by an exhaust leak. Look at and around the brake for carbon tracks. Visible carbon will indicate where the exhaust is leaking.
2. Check the torque of the exhaust brake clamps.

   a. Torque the “V” clamp between the turbocharger and exhaust brake. Torque Value: 8.5 N·m [75 in-lb]

   b. Torque the “V” clamp between the brake and exhaust pipe. Torque Value: 11.3 N·m [100 in-lb]
3. If the clamps are tight, the gasket might be damaged or missing. Follow the instructions for installing the brake and replace the gasket.

Vacuum troubleshooting:

1. Check all vacuum hoses for kinks, leaks or damage.
2. With the engine running, disconnect the vacuum hose from both sides of the vacuum solenoid and hold the hoses together. The brake should come on and move to the closed position. If it does, reconnect the hoses and go to the Electrical Troubleshooting section. If testing the vacuum with a vacuum gage, your reading should be between 15 and 29 inches of mercury.
3. Check to see that the vacuum pump belt is in position and the vacuum pump pulley and shaft are rotating, spinning with the belt.
4. With the engine shut off, disconnect the vacuum hose from the vacuum pump. With the engine running, test for suction at the vacuum pump with your finger. If there is no suction, replace the vacuum pump.

Electrical troubleshooting:

1. Check 10 amp fuse in wiring harness (driver side battery, near positive terminal). If fuse is blown or damaged, replace the fuse.
2. Disconnect the solenoid connector from the brake harness. With a Volt/Ohm meter, check the resistance between the pins of the solenoid connector. If reading is zero (0) then the solenoid is shorted and should be replaced. If the reading is over 20 ohms then the solenoid has an open condition and should be replaced. The normal resistance reading should be between 10 ohms and 20 ohms.
3. With the solenoid connector disconnected and the brake switch on, turn the key to the on position and check the solenoid supply voltage with a Volt/Ohm meter. 12 Volts should be read between the pins of the connector on the brake harness. If there is 12 volts replace the solenoid.
4. Shut the key off and remove the relay base from the relay. Turn the key back on and check the pins in the relay base as follows:

Pin 30 - Battery 12 volts (12 volts)

Pin 85 - Key Switched 12 volts (12 Volts when the key is on)

Pin 86 - To Pin 42 ECM (check continuity between this pin and pin 42 on the ECM connector)

Pin 87 - to Solenoid (check continuity between this pin and solenoid connector)

5. Check wiring against figure 24a.

Brake troubleshooting:

NOTE: THE BRAKE IS NOT SERVICEABLE. THE BUTTERFLY AND SHAFTS ARE PRESSED TOGETHER AND CAN NOT BE DISASSEMBLED. THIS SECTION IS TO DETERMINE IF THE BRAKE IS FAULTY AND SHOULD BE REPLACED.

1. Disconnect the vacuum cylinder from the brake as follows:

   a. On ball socket end remove the safety clip.

   b. Using a screwdriver pry the socket off the ball.

2. Move the ball end to the closed position. No resistance should be felt. Be careful not to remove the high temperature grease on the ball. If it is difficult to move the brake, then the brake should be replaced.

3. Connect a vacuum source to the vacuum cylinder. The cylinder should open quickly and when vacuum is removed it should snap closed.

ECM troubleshooting:

NOTE: TROUBLESHOOTING THE ECM REQUIRES SPECIAL DIAGNOSTIC EQUIPMENT AND SHOULD ONLY BE ATTEMPTED BY QUALIFIED PERSONNEL.

The following are conditions or codes used by the ECM:

1. The brake will function only when the ECM reads the throttle as being in the idle position.

2. The brake will shut off when the engine's coolant temperature sensor reads above 170° - 175° and with zero vehicle speed. The brake will shut off to prevent excessive increase in engine water temperature.

3. Fault code 0477 (Low voltage - ECM pin B42). With the exhaust brake switch in the off position, no voltage is detected on Pin B42 (12 Volts is expected). Inspect Light Green wire on the brake harness.

4. Fault Code 0478 (High voltage engine brake driver - ECM pin B42). The ECM has detected greater than 12 volts at ECM pin B42. Troubleshoot the ECM. Refer to Chrysler service literature.

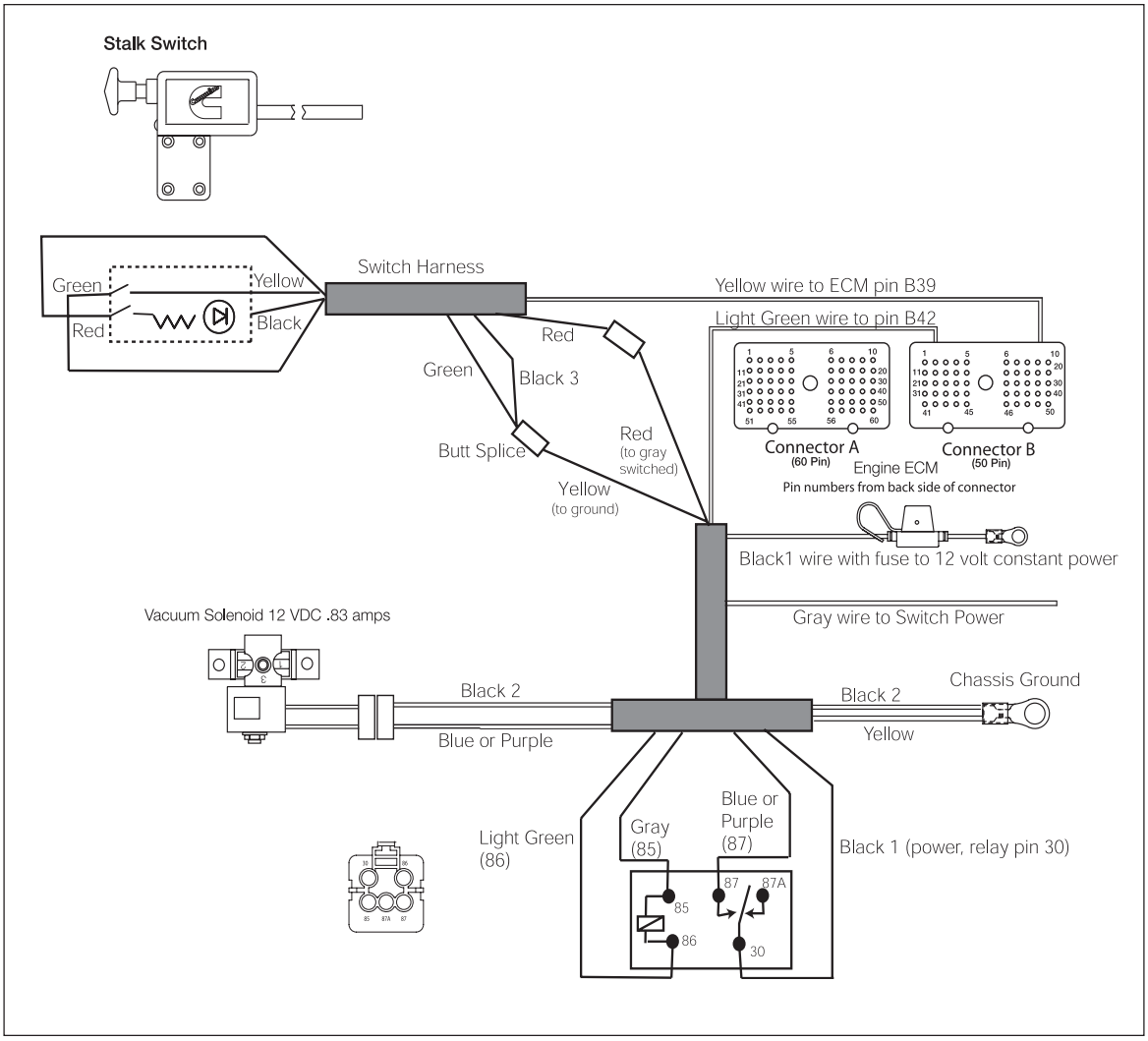


Fig. 24a

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