

**PAC BRAKE**®

# Installation Manual



Fixed  
Orifice &  
**PR  
XB**™

# DirectMount

**EXHAUST BRAKES**

APPLICATION:

2003-2007 Dodge Trucks equipped with 5.9L Cummins diesel engines and manual transmissions  
2006 & 2007 Dodge trucks equipped with 5.9L Cummins diesel engines and automatic transmissions

## Getting Started

Thank you and congratulations on your purchase of a Pacbrake Direct Mount exhaust retarder.

Do not install the kits listed below on 2003 model year Dodge trucks built up to June 27th, 2005 with automatic transmissions without a transmission lock-up controller.

**Contact Pacbrake Customer Service @ 800.663.0096 for more information.**

Pacbrake kit information and applications covered in this manual:

C14030 Pacbrake kit is a **fixed orifice** design for 2003 Dodge diesel trucks built up to January 4<sup>th</sup>, 2004 with a Cummins 5.9L engine and a manual shift transmission only.

C44030 Pacbrake kit is a PRXB design for 2003 Dodge diesel trucks built up to January 4<sup>th</sup>, 2004 with a Cummins 5.9L engine and a manual shift transmission only.

C14045 Pacbrake kit is a **fixed orifice** design for 2003 Dodge diesel trucks built after January 5<sup>th</sup>, 2004 with a Cummins 5.9L engine and a manual shift transmission only.

C44045 Pacbrake kit is a PRXB design for 2003 Dodge diesel trucks built after January 5<sup>th</sup>, 2004 with a Cummins 5.9L engine and a manual shift transmission only. This kit also fits on Dodge trucks built after July 26<sup>th</sup>, 2005 with Cummins 5.9L 610 ft-lbs of torque and automatic transmissions.

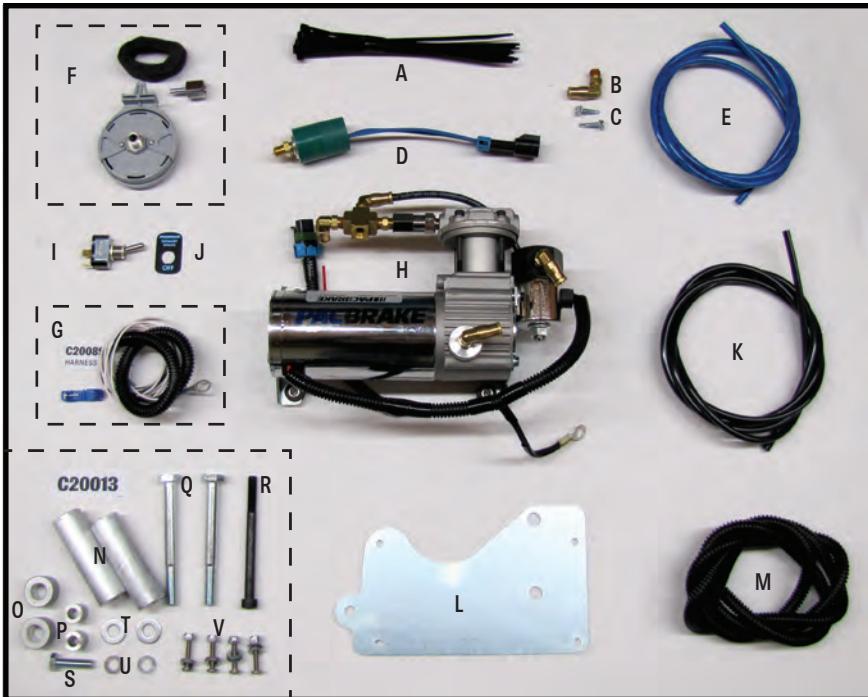
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**1** Before starting the installation, please read the entire installation manual carefully.

Check that your Pacbrake kit contains all the necessary parts. See page 3 for the kit contents list.

Pacbrake offers three optional accessories to enhance your exhaust brake system that you may want to consider before starting the installation (see page 4).

## KIT CONTENTS:

**C14013 - Control Group**

A	14 x C11618	Tywraps
B	1 x HP1019	Brass Fitting
C	2 x P60100	Self Drill & Tap Screws
D	1 x C11609	Pressure Switch
E	72" M8685	Nylon Tube (blue)
F	1 x C241	Remote Inlet Air Filter
G	1 x C20089	Harness
H	1 x C11628	Compressor, 12 Volt
I	1 x P01304	Toggle Switch
J	1 x C10315	Switch Plate
K	72" M8280	Nylon Air Brake Tube
L	1 x C20507	Compressor Bracket
M	51" M8014	Conduit

**C20013 Mounting Group**

N	2 x C3003	Spacer Long, M10
O	2 x C3004	Spacer
P	2 x C3002	Spacer, M8
Q	2 x C10468	M10 x 1.5
R	1 x C10444	Screw
S	1 x C789	Capscrew
T	2 x C653	3/8" Flat Washer
U	2 x C10473	Flat Washer
V	8 x C10406	#10 Flat Washer
	4 x C3470	Screw
	4 x C10843	Nyloc Nut

**C11592 - Air Hose Kit****C11614 - Air Tank Group**

AA	1 x C11940	1/2 Gallon Air Tank
BB	192" M8280	Nylon Air Brake Tube
CC	1 x C11737	Brass Fitting
DD	2 x HP1019	Brass Fitting
EE	1 x C11996	Fitting
FF	2 x P60100	Self Drill & Tap Screws
GG	1 x C11815	Quick Release Bracket
HH	1 x M8677	1/4" Brass Coupler
II	1 x HP1153	1/4" NPT Close Nipple
JJ	1 x HP1152	Bulk Head Fitting
KK	1 x C11848	1/4" NPT Hex Plug
LL	C18018 (Bolt) + C3004 (Spacer) + C18007 (Lock Washer) + C653 (Flat Washers) + C11572 (Nut)	

**C20173 - Harness****C40110 PRXB Exhaust Brake (C44030 kits)****C40111 PRXB Exhaust Brake (C44045 kits)****C20405 Fixed Orifice Exhaust Brake (C14030 kits)****C20406 Fixed Orifice Exhaust Brake (C14045 kits)**

## Optional Accessories

### 2

#### SWITCH-PAC GEAR SHIFT LEVER SWITCH

Part Number C18042

*(for manual transmissions only)*

An optional gear shifter switch is available for manual transmission vehicles through Pacbrake distribution system. Pacbrake part number C18042 for shifter diameter of  $\frac{5}{8}$ ".



#### MECHANICAL THROTTLE SWITCH GROUPS

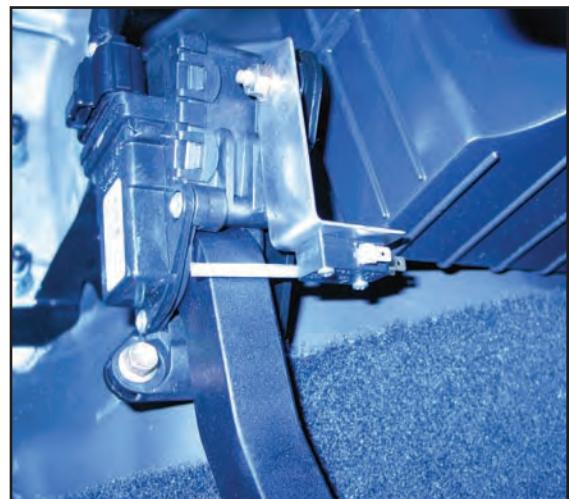
Pacbrake offers mechanical throttle switch groups to speed up the activation of the exhaust brake.

Part Number C14037

2003 model year trucks with manual transmissions

Part Number C20135

2004 model year trucks with manual transmissions

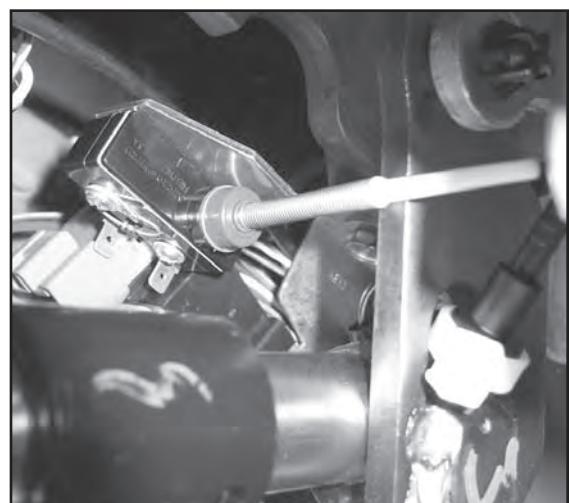


#### OPTIONAL CLUTCH SWITCH INSTALLATION KIT

Part Number C20097

*(for manual transmissions only)*

Provides disengagement of the Pacbrake during clutching. Locate the two capscrews at the clutch lever. Remove the screw closest to the rear of the vehicle. Install the Pacbrake switch on this capscrew as shown. Tighten the capscrew. Adjust the switch on the bracket so when the clutch is fully released the clutch arm contacts the switch arm causing the switch to click. Check the adjustment by moving the clutch pedal. The switch should click in the freeplay movement of the clutch pedal. If not, readjust. After performing Step 25 cut the white wire at the clutch switch. Using the 2 push-on terminals supplied, crimp and connect to the terminals on either terminal of the clutch switch.



### 3 Dash Switch Installation

Consult with the owner or operator of the vehicle for their preference of the dash switch location. The location shown in the photo is our recommendation for a vehicle equipped with an automatic transmission. For vehicles with manual transmissions, we recommend an optional shift lever mounted on/off switch (C18042).

Once the switch location has been chosen, if a dash switch is being installed, drill a  $\frac{1}{2}$ " hole to accommodate the toggle switch. Connect the white wire to the top terminal and the black wire to the bottom terminal. Connect the other end to a good chassis ground. The white wire is connected later. If installing a shift lever mounted on/off switch, follow the instructions provided within the C18042 kit.

**NOTE: It is advised to disconnect both negative battery terminals**

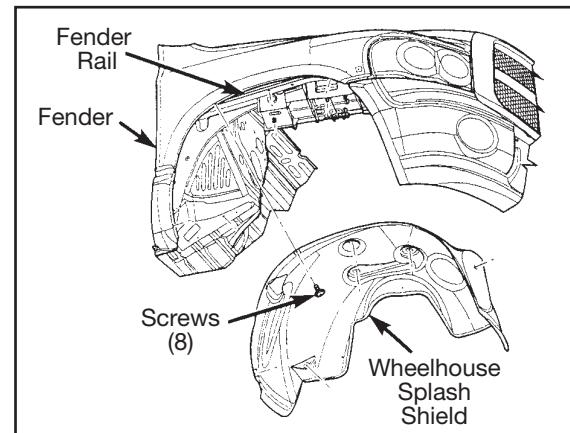


### 4 Exhaust Brake Installation

#### INSTALLER OPTION (not mandatory)

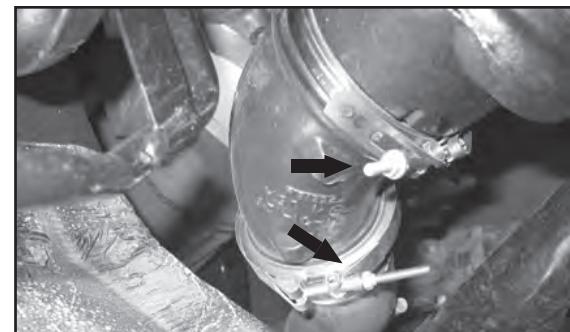
Some installers remove the front wheels and 8 screws which secure the wheelhouse splash shields. Doing this allows for easier access to the exhaust elbow and the engine ECU on the drivers side of the vehicle. To remove the wheelhouse splash shield completely, the ABS cable will need to be disconnected from the splash shield.

**CAUTION: If removing the front wheels for easier access, make sure the vehicle is supported properly.**



### 5 REMOVE FACTORY ELBOW

At the turbocharger, locate the 2 "V" clamp fastening the exhaust elbow to the turbo and header pipe. To prevent damage to the threads when removing, apply a drop of oil as close to the nut as possible, then remove both. Save both "V" clamps for reuse. The factory elbow is indexed with two roll pins. These pins should remain in the elbow and if not, they MUST be removed from the turbo outlet flange. These are for alignment of the elbow at the truck assembly plant and are not required. Inspect the sealing face of the turbo for carbon or other imperfections. If necessary, clean or repair to assure a good seal will be made as no gaskets are used.



**6**

**CAUTION: Use care if installing a PRXB exhaust brake. When handling the brake assembly be sure not to damage the regulator spring and lever arm.**

With the original turbocharger to elbow "V" clamp placed loosely over the turbocharger outlet, insert the Pacbrake housing into the exhaust system and rotate the housing until the turbo flange and the exhaust brake's pressure flange are parallel. Install the turbo clamp loosely first and rotate the Pacbrake until the outlet flange aligns with the header pipe. Once proper alignment is achieved, torque the turbo side clamp to 75 in-lbs (8.5 N•m). Now, loosely install the outlet side clamp and then torque the outlet clamp to 100 in-lbs (11.3 N•m).

**7**

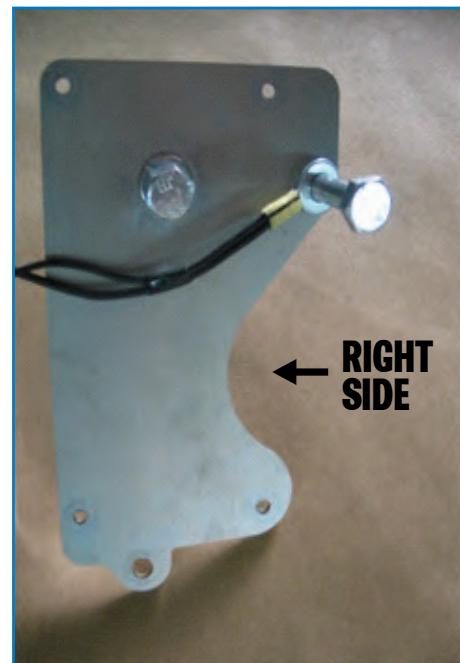
#### AIR COMPRESSOR SUB-ASSEMBLY:

Locate the poly bag containing the air compressor mounting bracket, fasteners and mounting hardware.

Place one M10 flat washer on each of the two M10 capscrews. Insert one capscrew into the ring terminal (air compressor/solenoid ground) of the air compressor electrical harness.

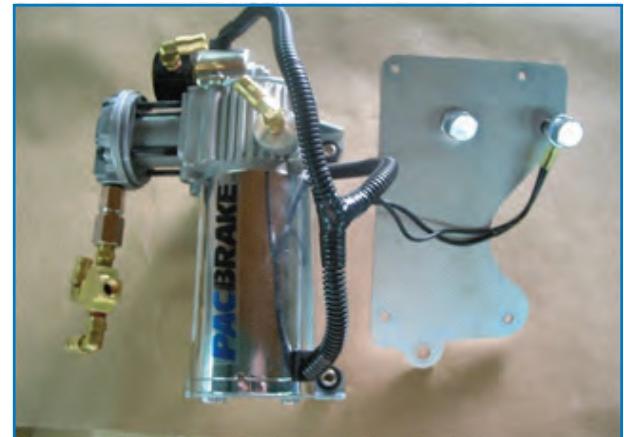
**8**

Install the two capscrews into the bracket assembly as shown. Make note of the mounting bracket cut out, as it MUST be to the right side.



**9** Using the four 10/32 x1" machine screws, eight #10 flat washers and four Nyloc nuts LOOSLEY attach the compressor to the bracket as shown, Compressor head must face the opposite side from the cut out on the bracket, machine screw must be installed as shown in the photo for STEP 10 (threaded ends pointing upwards).

Ensure the leg of the Pacbrake harness is between the air compressor and the mounting bracket.



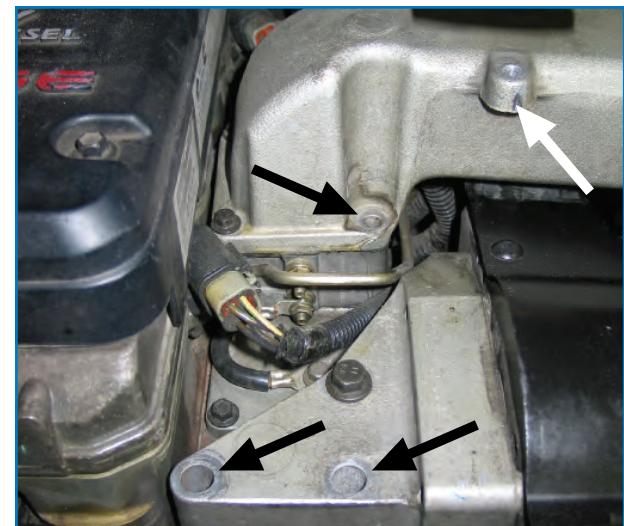
**10** Tighten the four mounting screws and nuts until the washers first contact the isolator and then tighten TWO additional turns. Do not over tighten.



## **11 COMPRESSOR INSTALLATION**

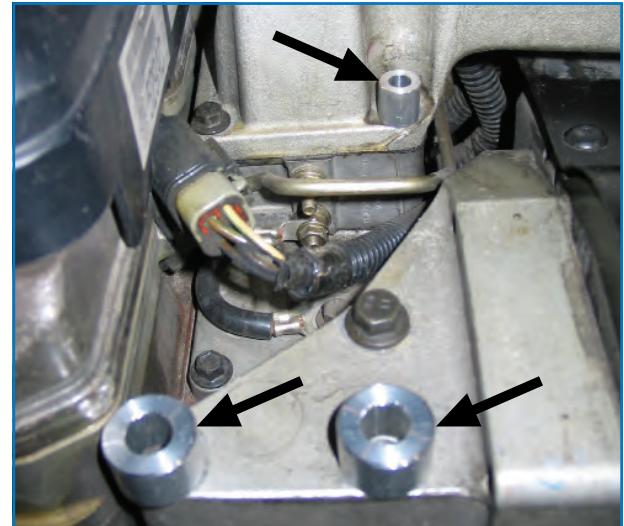
Remove the four capscrews indicated in the photo with arrows (three with BLACK arrows and the one with a WHITE arrow). Not all vehicles will have the three forward capscrews shown in the photo; therefore the removal will not be necessary. Vehicles without the forward capscrews require two long spacer tubes and those with the capscrews will require two short spacers, both lengths are provided.

Remove the capscrew holding the oil dip stick tube down (shown with the WHITE arrow), discard this bolt, a new fastener and spacer will be installed in STEP 13.



**12** Position the correct length spacers in the locations shown in the photo (with arrows). All installations require the small O.D. spacer on the air intake horn.

**NOTE: An engine with the forward capscrews is shown in the photo**



**13** Install the compressor assembly over the 3 spacers. Obtain the best clearance of the compressor to coolant hose and compressor to intake horn as possible. Torque the 2 large capscrews (shown with the arrow, under the compressor) to approximately 32ft-lbs, (43 N•m). Torque the allen head capscrew to 18 ft-lbs (24 N•m). Place the spacer provided over top of the mounting hole for the oil dip stick. Using the longer M8-1.25x30mm bolt, spacer and flat washer, secure the dip stick tube to the intake horn, torque to 15ft-lbs, (20 N•m). Install the pressure switch using thread sealant, into the open port on the compressor assembly as show in the photo.

**CAUTION: This kit includes “push to connect” airline fittings. They require the end of the airline to be round, square and cleanly cut to ensure the internal seal will not leak. The airline must only be cut with a sharp razor knife or hose cutter**

**NOTE: The blind threaded port on the compressor head facing the front of the vehicle remains open.**

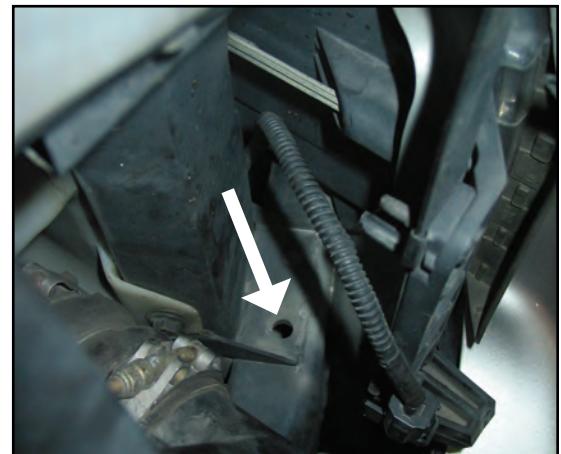


**14** Install the Black nylon airline provided to the solenoid port marked "CYL". Route this airline around the front of the engine to the exhaust brake air cylinder, keeping it away from heat sources and moving parts. Install the 90° fitting supplied into the air cylinder using thread sealant and connect the airline. Cut the airline to length with a sharp razor knife. Secure the airline with the tie-straps provided.

**CAUTION: This kit includes "push to connect" airline fittings. They require the end of the airline to be round, square and cleanly cut to ensure the internal seal will not leak. The airline must only be cut with a sharp razor knife or hose cutter**



**15** Install the 1/4"NPT-1/4" push on barbed hose fitting on to the plastic filter housing. Locate the Blue nylon hose and connect one end to the barbed fitting on the intake filter. Install the compressor air intake filter into the hole located in the radiator support bracket behind the driver side headlight as shown in the photo. Route this line up to the compressor, and connect the other end to the push to connect fitting on the bottom side of the compressor.



**16** Install the 1/4" NPT to 1/8" NPT nipple into the air tank. Install the two push to connect airline fittings into the ends of the Tee fitting. Install the Tee fitting on to the top of the nipple, as shown in the photo. Install the 1/4" NPT plug fitting or drain valve (optional) into the bottom of the tank. Apply thread sealant to all fittings installed. Air leaks will cause the compressor to cycle more often reducing its life expectancy.



**17** Choose a location to mount the air tank such as on the driver's side bumper support brace shown in the photo. Drill two  $\frac{3}{8}$ " holes on  $3\frac{1}{4}$ " center to accommodate the tank mounting holes. Provided are two spacers and fasteners for mounting. If you prefer another location to mount the air tank, the airline provided may need to be substituted for a long piece.



**18** Connect the Black nylon airline to the remaining fitting at the compressor. Route it to the top of the air tank. Cut the airline to length with a sharp razor knife. Connect the  $\frac{1}{4}$ " airline to either fitting in the tank. Secure the airline away from moving parts and heat sources using the tie-straps provided.

Using the remaining length of airline, connect one end to the remaining fitting in the air tank, consult the customer for a preferred location for the quick connect airline coupler. Route this air line to this location and connect to the coupler.



## **19** Wiring Harness Installation

**ALL MODELS:**

**LOCATE THE PACBRAKE HARNESS PROVIDED**

Using the self tapping screw provided, secure the two relay receptacles to the inner fender on the driver's side of the vehicle. Install both relays.



**20** Under the hood, route the leg of the Pacbrake wiring harness with the two Weather-Pac connectors to the air compressor. Connect the female connector to the male connector at the compressor and connect the male connector to the female connector at the pressure switch. Secure the harness with the tie-straps provided.

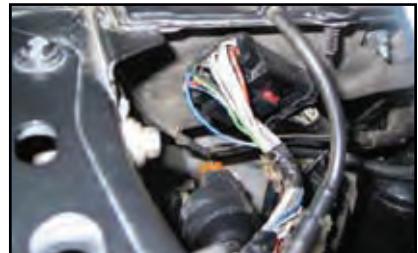


## Locating an Ignition Power Source

**NOTE: Both negative battery terminals will need to be temporarily reconnected to ensure 12 volts DC exists.**

## 21 2003 MODEL YEAR VEHICLES:

Locate the 14 pin connector on the passenger side firewall. Pin 13 will be a dark blue wire which should be a 12 volt positive ignition power source. Using the T-tap provided, connect the 10 amp red fused link of the Pacbrake harness to this wire.



## 22 2004 &amp; 2005 MODEL YEAR VEHICLES:

Locate the two 24 pin connectors on the driver's side of the firewall. One connector is grey and the other is black. In the black connector, pin B4 will be a pink wire with a grey tracer. This wire should be a 12 volt positive ignition power source. Using the T-tap provided, connect the 10 amp red fused link of the Pacbrake harness to this wire.



## 23 2006 AND NEWER MODEL YEAR VEHICLES:

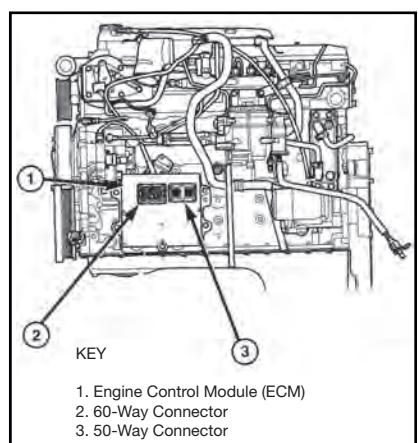
Locate the TIMP module in front of the driver's side battery. Release the lock tabs on the side of the TIMP. This will allow the TIMP to be removed as an assembly. Under the unit, locate connector "G". Cavity 14 will be a grey wire with pink tracer. This wire should be a 12 volt positive ignition power. Using the T-tap provided, connect the 10 amp red fused link of the Pacbrake harness to this wire.



## 24 Route the black wire with the special ECM pin of the harness to the engine's ECM (driver's side of the engine) if you are installing an ECM bypass system (see note below).

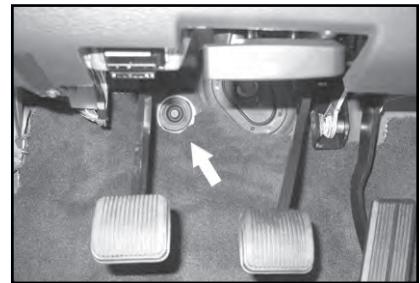
The Engine Control Module (ECM) is bolted to the left side of the engine below the intake manifold. At the engine ECM, locate the two connectors. The front connector is a 60 pin and the rear is a 50 pin.

**NOTE: If installing the ECM bypass system, now would be a convenient time to install. Follow the instructions provided in that kit.**



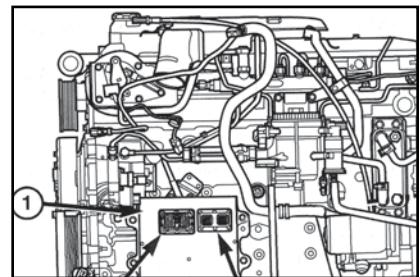
**25** From inside the cab, locate the grommet in the floor. Make a small hole in the grommet for the white wire only. Insert the end with the special ECM pin into the hole.

**NOTE: If installing the optional clutch switch (C20097), now would be a convenient time to install. Follow the instructions provided in that kit.**



**26** Recover this wire and route it to the engine ECM. At the 50 pin (rear) connector, locate pin #39. Remove the sealing plug. Be careful not to push it in.

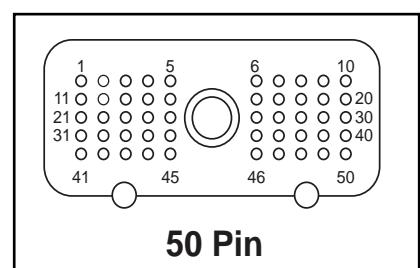
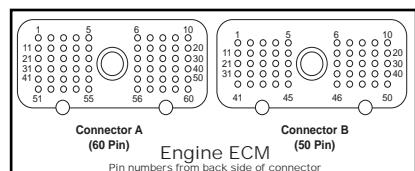
Once the sealing plug is removed, insert the white wire with the special ECM "PIN" into cavity #39. Push in until seated. Gently pull on the wire to ensure the pin is locked in place. Use the 51" piece of conduit supplied to protect the white wire.



**27** At the 50 pin (rear) connector, locate pin #42 and remove the sealing plug. Be careful not to push it in. Once the sealing plug is removed, insert the black wire with the special ECM pin from the compressor harness into cavity #42. Push in until seated. Gently pull on the wire to ensure the pin is locked in place.

Secure both ECM wires with the tie-straps provided.

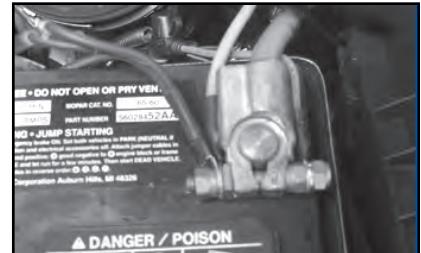
**NOTE: If the sealing plug is in too deep to remove, or you cannot push the two ECM pins in far enough to lock in place, use a 4mm hex wrench to remove the center capscrew of the 50 pin connector from the ECM. If it is necessary to remove the plug from the ECM, both the batteries must be disconnected first to prevent damage to the ECM. Once the connector is removed from the ECM, push the sealing plug out from the ECM side with a small probe. Install both pins into the correct cavities, re-install the 50 pin connector and tighten. Reconnect the batteries.**



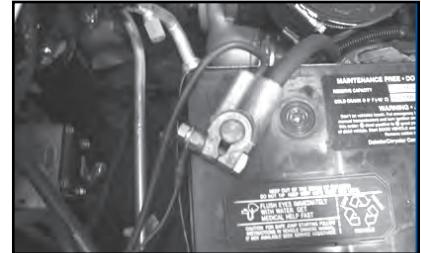
**28** **CAUTION:** The white wire goes in to the ECM pin# 39. This is a ground input and under no circumstances should 12 volts positive be applied to this circuit. Damage to the ECM will result.

If the wheelhouse splash guards were removed, they may be reinstalled now by following the reverse procedure of Step 4.

**29** Route the red fused wire with the eye terminal to the positive battery terminal and connect.



**30** Connect the black wire with the eye terminal to the negative battery terminal or a good chassis ground. Reconnect both battery terminals. Secure the Pacbrake harness with the tie-straps provided.



## 31 Check Operation

Start the vehicle and allow it to idle.

**NOTE:** The compressor will pump for approximately 2 minutes to fill the air tank.

Once the maximum system air pressure is achieved the air compressor will shut off. Wait a few minutes to see if the air compressor cycles. If it does, an air leak exists. Use a 50/50 mixture of liquid dish soap and water, apply to all the fittings looking for bubbles, repair as necessary. Turn the Pacbrake switch to the ON position, and the exhaust brake should activate. Slowly raise the engine's RPM. The Pacbrake should shut off above 900 RPM (if it was on at an idle). Late 2003 and newer vehicles will disable the exhaust brake at idle when the coolant temperature is above 170°F. With a 12 volt test light, power one side to the negative battery terminal. Place the probe end on relay terminal 85 which connects to pin 42 of the engine ECM. Increase engine RPM and release the throttle quickly. The test light should illuminate when the engine is decelerating. Keep in mind the ECM has a slight delay activating the exhaust brake. Road test the vehicle. Re-torque clamps after the first 100 miles of driving. NOTE: If the exhaust brake fails to operate, check for a good connection at the ECM pins #39 and #42. See note in step 24. It may be necessary to remove the 50 pin connector from the ECM if the wires don't lock in the connector.

