

Installation Manual

PACBRAKE®

www.pacbrake.com 800.663.0096



C40007 & C40010 KITS

**PR
XB**

*Ford F250, F350, F450 and F550 Model Trucks
Equipped with 6.0L engines*



GETTING STARTED

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

Before starting the installation, please read the entire installation manual carefully and be sure you have a full understanding of the installation. Check that your Pacbrake kit is correct for the application and contains all the necessary parts shown in the photo below.

C40010 - Manual Shift Transmissions

C40007 - Automatic Shift Transmissions

Note: The kits listed above are for vehicles with stock exhaust. If you have aftermarket 4" exhaust you will need to order two exhaust adapter part # C11342

KIT CONTENTS (C40010)

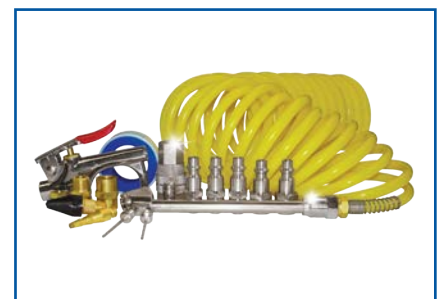


KIT CONTENTS (C40007)



A ½ gallon air tank is supplied to speed up the actuation of your Pacbrake and provide an air source for limited accessory use. Also provided is a 5 in 1 inline inflation/ deflation kit with a 25' coil hose with zippered storage bag.

Please note: The air compressor has a 33% duty cycle, this is well above the exhaust brakes requirement. Caution must be exercised when using the compressor and inflation kit for other uses. Please consider the air compressor's duty cycle when continually in use for more then 3 minutes, failure to do so may allow the air compressor or hoses to overheat causing failure.



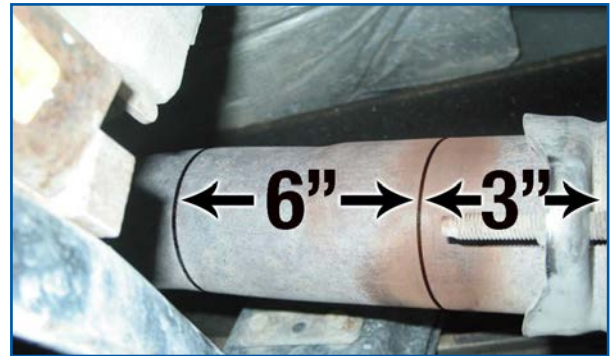
- 1 Disconnect the negative battery terminals on BOTH batteries and then both positive battery terminals. This is to protect the vehicles ECU from being damaged during the installation.



EXHAUST BRAKE INSTALLATION

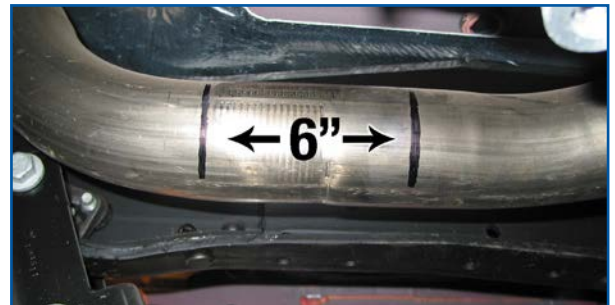
- 2 **2003 Model Year Vehicles**

Early production Ford trucks have a pre-cat installed in the forward section of exhaust pipe. An alternate location for exhaust brake installation is in the straight section of pipe before the header pipe flange. Measure 3" forward from the front side of the header pipe flange and mark the pipe, then measure 6" forward from the first mark and mark the pipe. Remove the header pipe to cut at the two marks. The transmission cross member will need to be removed to allow the removal of the header pipe for welding. Proceed to step 5.



- 3 **2004 M/Y and Newer Vehicles**

A 6" section of exhaust pipe must be removed to accommodate the exhaust brake and adapters. From below the vehicle, measure from the front side of the header pipe flange forward 23" and mark the pipe. Then measure and mark the pipe 6" back from the first mark. See photo.



- 4 **2004 M/Y and Newer Vehicles**

Cut the exhaust pipe at the two marks. Cutting the pipe in the vehicle will eliminate removing the transmission cross member.



5 Using the “V” clamps and adapters provided, loosely install the adapters onto the Pacbrake - making sure they are centered on the flanges and tight enough that they can not move prior to being welded. Please note the direction of exhaust flow through the exhaust brake as shown in the photo and the sticker on the exhaust brake. Tack weld the flanges to the exhaust system to secure, then remove the “V” clamps and exhaust brake for final welding of the flanges. Welding can be done on the inside or the outside of the pipe, they must be leak free welds. Install the 90 degree fitting into the air cylinder using thread sealant.



→ EXHAUST FLOW →

6 Re-install the exhaust system. Loosely install the factory turbocharger “V” clamp, but do not fully tighten the turbocharger “V” clamp at this time (if the exhaust system was removed for welding). Install the front “V” clamp onto the exhaust brake flange and adapter with the PRXB regulator spring located inside the frame rail, make sure the exhaust brake is centered on the adapter. Torque the “V” clamp to 10 ft-lbs, (14 N•m). Then, loosely install the rear “V” clamp onto the exhaust brake flange and adapter. (If the header pipe was removed for welding) center the header pipe flange to the turbocharger flange, torque the factory “V” clamp to 72 in-lbs, 6 ft-lbs, (8 N•m). Ensure the exhaust system is aligned correctly (flange centered) and that adequate clearance exists around the exhaust brake. Then, torque the rear “V” clamp to 10 ft-lbs, (14 N•m).



COMPRESSOR/SOLENOID MOUNTING

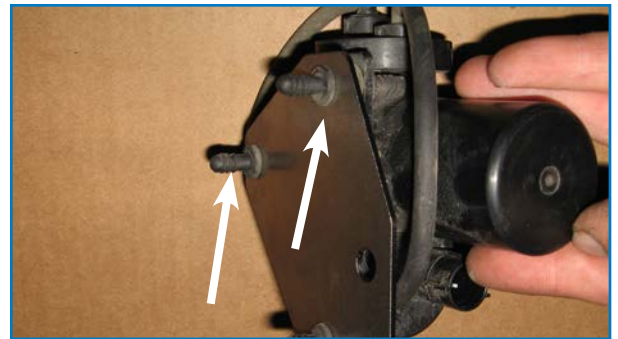
7 On the passenger side inner fender, locate and disconnect the short vacuum hose routed from the vacuum pump to the vacuum reservoir. Disconnect the electrical connector of the vacuum pump. Using a 13mm socket, remove the two bolts attaching the pump and bracket to the inside fender. Remove the pump from the vehicle.



- 8** Remove the two factory radiator support capscrews on the passenger side and discard (see photo). The two capscrews will be replaced with longer ones complete with spacers.

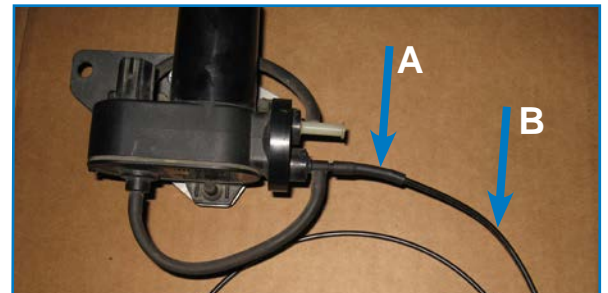


- 9** Remove the vacuum pump from the factory bracket, leaving the rubber isolators attached to the vacuum pump. Install the vacuum pump on to the Pacbrake supplied bracket, as show in photo.

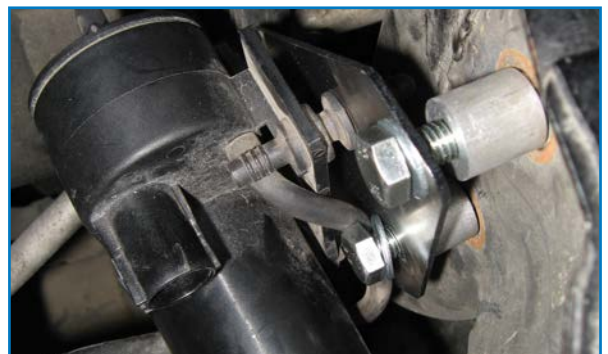


- 10** Install the supplied short piece of rubber vacuum hose onto the vacuum pump. Insert one end of the supplied 1/8" nylon hose into the rubber hose, as shown in photo.

Rubber hose marked "A"
Nylon hose marked "B"



- 11** Insert the two supplied M8x40 capscrews and washers through the bracket and then the two spacers. Carefully insert the vacuum pump assembly onto the radiator support brace, making sure to not kink the vacuum hose. Torque the two capscrews into the threaded holes to 13 ft-lbs (18 N•m). Route the 1/8" nylon hose back to the port on the vacuum reservoir. Cut off the excess hose and install it into the other port on the reservoir. Using the supplied tie straps, secure the hose away from moving parts and heat sources.



- 12** Locate the vacuum pump electrical connector disconnected in step 7. Cut the two wires 4" back from the connector. Using the lengths of black and green wire and the butt connectors provided, extend the harness to enable the connector to reach the new vacuum pump location. Once the butt connectors are crimped, heat the connectors to provide a moisture tight seal. Protect the harness with the conduit provided and secure with tie-straps.



- 13** The Pacbrake air compressor mounting bracket mounts in the same location the vacuum pump was removed from. Insert the two supplied M8x40 capscrews and washers through the bracket and then the two spacers. Shown in the photo is the air compressor bracket, it needs to be installed UNDER the foot for the vacuum reservoir. This requires the nuts in the wheel well to be loosened enough to lift the reservoir so the notch in the compressor bracket can be inserted under the reservoir foot. Once the compressor bracket is under the reservoir foot, loosely thread the M8x40 capscrews into the inner fender. Tighten the vacuum reservoir nuts and then torque the M8x40 capscrews to 13 ft-lbs (18 N•m).

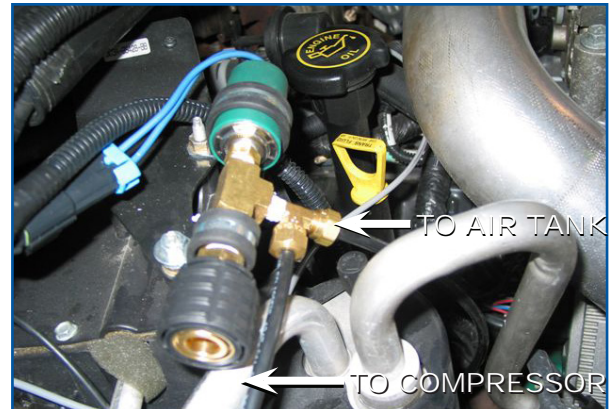


Note: The notch in the compressor bracket must be UNDER the vacuum reservoir foot.

- 14** Install the compressor on to the 3 mounting studs of the bracket, secure the compressor using the supplied washers and nyloc nuts, torque to 35 in-lbs, (4 N•m). Connect the hose from the tee fitting of the pressure switch to the compressor.



15 Locate the three studs of the MAP sensor bracket on the heater box. Remove the nut on the forward drivers side stud only. Place one of the washers supplied on the top of the forward passengers side nut as a spacer. Locate the pressure switch assembly and the two clamps provided. Install the larger clamp around the pressure switch and the smaller clamp around the fitting for the air chuck, then using the washers and nut supplied (with the factory nut removed earlier), secure the pressure switch assembly. Using the nylon air line provided, connect the nylon airline from the tee fitting at the pressure switch. The other end will be connected in step 17 to the compressor. Connect the nylon airline to the remaining fitting at the pressure switch assembly and route it to the air tank location.



16 Install the compressor's air intake filter on the passenger side inner fender in a pre-existing hole. The air intake ports of the filter must point down. Connect the supplied blue nylon hose to the barbed fitting on the filter and the other end to the 90 degree fitting on the side of the compressor. The air intake hose must not be restricted or poor compressor performance will result.



NOTE: The remainder of the blue nylon hose will be used in step 19.

17 Install the fittings in the top of the air tank using thread sealant, as shown in the photo. Install the 1/4" NPT plug supplied, which will act as a drain valve, in the bottom of the tank. Choose a location on the outside of the frame to mount the air tank with the supplied fasteners.



NOTE: Step 18 suggests using one of the air tank fasteners as a good mounting location to mount the solenoid. Consider this when choosing the air tank mounting location. Use existing holes in the frame if possible. Connect the airline from the pressure switch and air chuck assembly installed in step 9, to either of the two fittings at the tank.

- 18** Mount the solenoid valve inside the frame on the passenger side using one of the air tank fasteners. Drill a 1/4" hole to secure the other side of the solenoid bracket. Install the 1/4" bolt, nut and washers supplied. Connect the nylon airline from the air tank to the port on the solenoid marked "IN". Connect the remaining piece of nylon airline to the solenoid port marked "CYL". Now route the other end to the 90 degree fitting installed in the Pacbrake air cylinder and connect. Secure the airlines with the tie-straps provided.

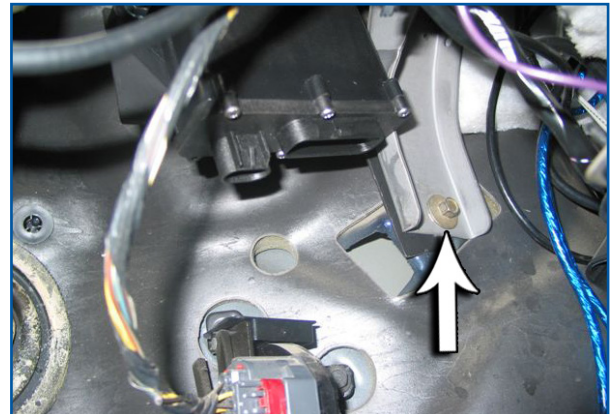


- 19** Connect the air cylinder remote breather hose (blue nylon) to the barbed fitting on the rod end of the air cylinder. Secure with a tie-strap. Route the breather end to a clean dry location in the engine compartment. Secure the hose with the tie-straps provided.



20 Vehicles without Power Adjustable Pedals

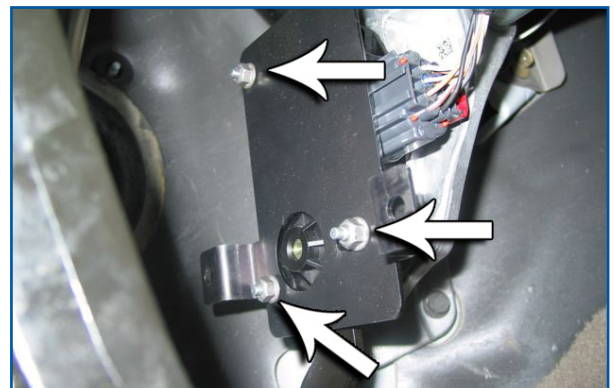
Choose the correct control unit mounting bracket for your application. Using the 1/4" fasteners provided, secure the control unit to the mounting bracket with the connector end pointing down. Loosen the capscrew shown in the photo for mounting the Pacbrake control unit bracket. Insert the Pacbrake bracket between the two factory brackets, then rotate the Pacbrake control unit to attain clearance and tighten the capscrew. Insert the two connectors of the Pacbrake harness into the control unit.



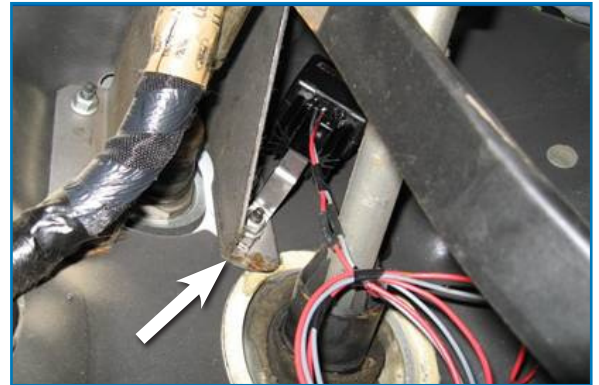
21 Vehicles with Power Adjustable Pedals

Choose the correct control unit mounting bracket for your application. Locate the 3 studs shown in the photo by arrows. Remove all three nuts and install the Pacbrake control unit mounting bracket over the studs. Re-install the nuts and tighten.

Insert the two connectors of the Pacbrake harness into the control unit. Using the 1/4" fasteners provided, secure the control unit to the mounting bracket with the connector end pointing up.



- 22** Locate and remove the 10mm nut on the lower right side of the steering column support bracket. Install the bracket attached to the heat sink of the wiring harness. Re-install the nut and tighten.



23 ELECTRICAL INSTALLATION

a) For Manual Transmissions ONLY

Below the steering column locate the lower dash panel and remove. Provided in the kit is a control switch assembly that mounts on the transmission shift lever. Install the Pacbrake ON/OFF control switch and bracket, as shown. Route the wires down the shift lever to the lower dash panel. Apply the Pacbrake decal provided to the switch bracket. Refer to the schematic on page 14



b) For Automatic Transmissions ONLY

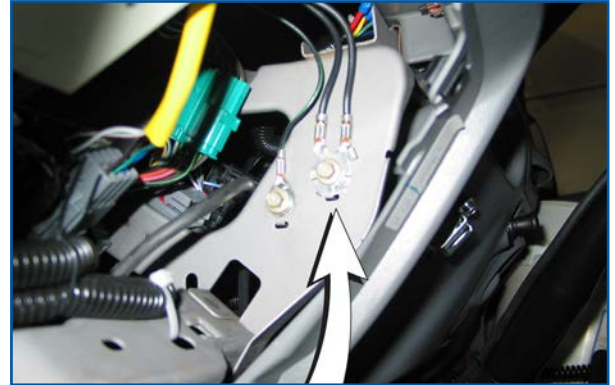
The photo shown is of the Pacbrake dash switch installed in the panel below the steering column. This location is a suggestion. Consult with the vehicle owner for their preference of switch location. Drill a 1/2" hole to accommodate the dash switch. The red wire is connected to the center terminal, the white wire is connected to the lower terminal and the black (ground) wire is connected to the upper terminal. Refer to the schematic on page 15



NOTE: Before connecting the wires, determine the switch orientation by installing the switch plate.

24 For Manual Transmissions ONLY

Connect the wires from the shifter switch to the control unit using the butt connectors provided. Locate the white wire of the shifter switch harness and connect it to the Pacbrake red fused harness using the heat shrinkable butt connector supplied. Locate the black wire of the shifter switch harness and connect it to the white wire of the Pacbrake control unit harness using the heat shrinkable butt connector supplied. Connect the green wire of the shifter switch harness to one of the factory ground locations shown in the photo.

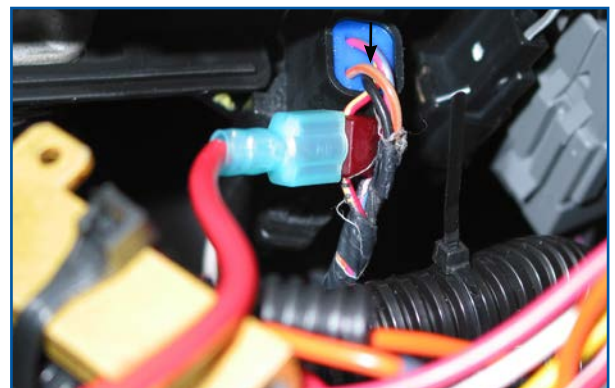


STEP 21 - 31 For Automatic & Manual Transmissions

25 Remove the two capscrews securing the diagnostic connector to the lower dash. Locate the male/female diagnostic connectors of the Pacbrake harness. Connect the Pacbrake connector to the factory Ford connector. Using the two capscrews removed secure the Pacbrake diagnostic connector to the dash. Secure the harness with the tie-straps provided.



26 Locate the factory 4 pin connector below the steering column, as shown in the photo. The wire in the upper right corner should be red with a yellow trace. Check this wire with a volt meter for 12 volts + ignition power. Install the "T" tap connector supplied to the ignition power source, then connect to the red fused wire of the Pacbrake harness.



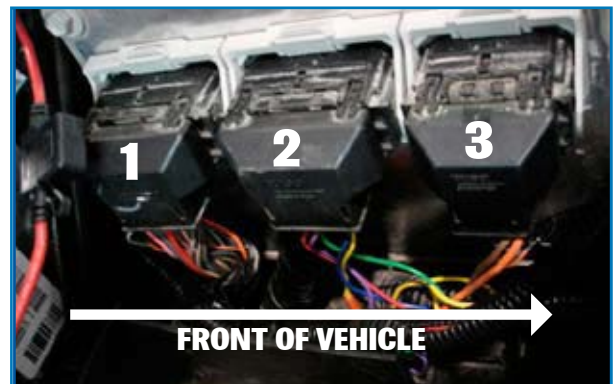
NOTE: The batteries will need to be temporarily reconnected to locate ignition power.

27 Locate the grommet on the driver's side of the firewall and remove. Feed all the remaining unconnected wires through the firewall into the engine compartment. Secure the Pacbrake harness neatly under the dash using the tie-straps provided. Using the loom provided, protect the wires passing through the firewall. Re-install the firewall grommet making sure a good seal is achieved.

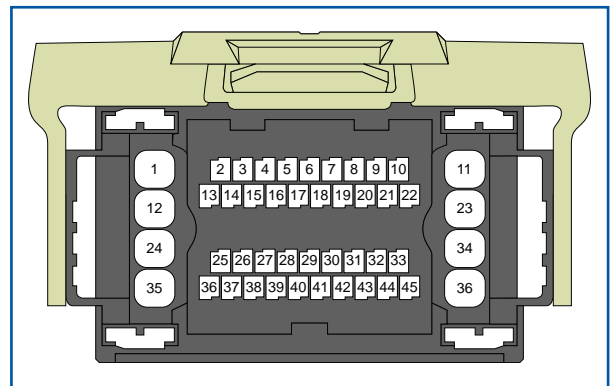


28 Locate the PCM (powertrain control module) on the drivers side inner fender. The drivers side battery will need to be removed to gain access to the PCM connectors.

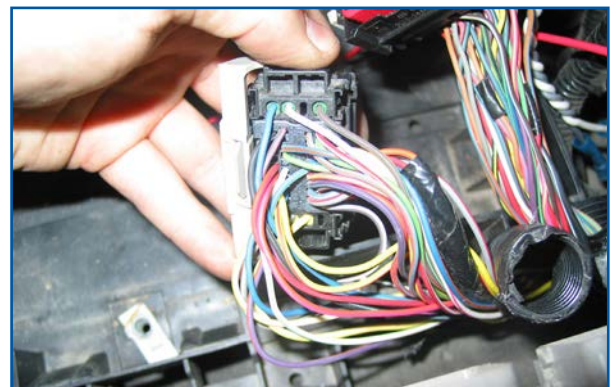
NOTE: The PCM shown is of a vehicle equipped with an automatic transmission. Vehicles equipped with a manual transmission will only have two connectors.



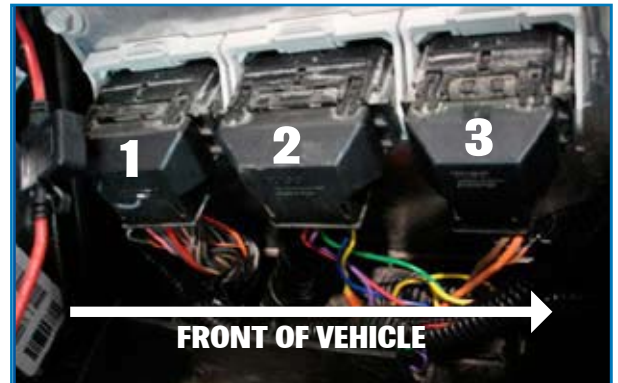
29 At the center PCM connector #2, locate pin 27. It should be a violet wire with a light blue tracer. Cut this wire in a convenient location, leaving enough room to butt connect to each wire end. Connect the Yellow wire of the Pacbrake harness to the PCM side of the violet with light blue tracer wire, connect the Red wire of the Pacbrake harness to the remaining end of the violet with light blue tracer wire of the Ford harness. Using the connectors provided, crimp the wire into the connector, then heat shrink the connector enough to provide a water tight seal.



30 At the center PCM connector #2, locate pin 10. Cut this wire in a convenient location, leaving enough wire to butt connect to each wire end. Connect the Purple wire of the Pacbrake harness to the PCM side of the wire and connect the Green wire of the Pacbrake harness to the harness side of the wire. Using the connectors provided, crimp the wire into the connector and then heat shrink the connector enough to provide a water tight seal.

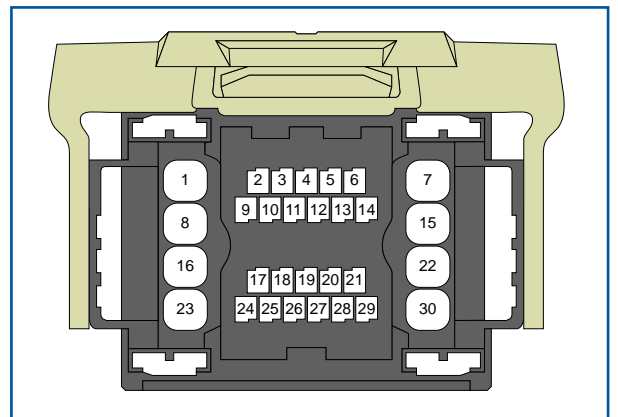


- 31** At the center PCM connector #2, locate pin 11. Cut this wire in a convenient location, leaving enough wire to butt connect to each wire end. Splice the blue wire of the Pacbrake harness into one end of the pin 11 wire. Then reconnect the remaining wire end using the connector provided, Once the wire is crimped into the connector heat this connection to provide a water tight seal.



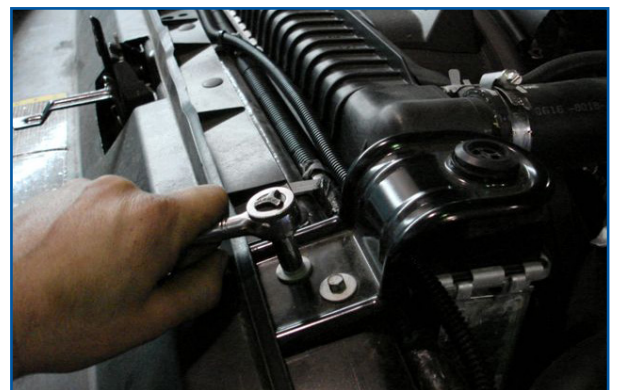
32 For Automatic Transmissions ONLY

At the front PCM connector #3, locate pin 14. It should be a brown wire with an orange tracer. Cut this wire in a convenient location leaving enough wire to butt connect to each wire end. Connect the brown wire of the Pacbrake harness to the PCM side of the brown with orange tracer wire and connect the orange wire of the Pacbrake harness to the harness side of the brown with orange tracer wire. Using the connectors provided, crimp the wire into the connector and then heat shrink the connector enough to provide a water tight seal.



STEP 33 - 36 For Automatic & Manual Transmissions

- 33** Route the 14 gauge red and black wires of the Pacbrake harness in front of the radiator and then under the supports to the air compressor location. Connect the red wire of the Pacbrake harness with the red wire of the Pacbrake compressor and the black wire of the Pacbrake harness to the black wire of the compressor.





Testing The System

Before starting the vehicle, ensure the Pacbrake ON/OFF switch is in the OFF position. Start the engine and allow to idle. The Pacbrake air compressor should start to pump air and will pump for approximately 2 minutes until maximum air pressure is achieved within the tank. The Pacbrake Control Unit will cycle the exhaust brake ON and then OFF 3 times to prevent carbon build-up within the exhaust brake. The Pacbrake Control Unit monitors the following vehicle systems status and the exhaust brake will not apply unless these parameters are met:

Activation Parameters For Manual Transmission Vehicles:

- engine RPM must be above 1200
- accelerator position must be at zero throttle
- vehicle speed must be above 19 MPH (30 KM/H)
- exhaust brake switch must be in the ON position

Road test the vehicle ensuring all the activation parameters are met. With the Pacbrake switch ON, the exhaust brake should apply then release when either the minimum road speed of 16 MPH (25 KM/H) is achieved or the engine RPM goes below 900 RPM or the accelerator is depressed.

Activation Parameters For Automatic Transmission Vehicles:

There are two options for torque converter engagement based upon vehicle speed. The controller is pre-programmed with both speed options, and comes defaulted to the low speed setting. To change the mode, the Pacbrake switch and ignition must be in the OFF position. Then, turn the ignition to ON, wait for the compressor to turn OFF, then the exhaust brake should cycle 3 times performing its anti-foul cycle. Next, cycle the Pacbrake ON/OFF switch to ON, OFF, ON, OFF, ON and OFF with no pauses longer than 1 second. This will change the mode. The exhaust brake should now cycle either 4 or 5 times. Count the number of times - this will confirm the mode that has been selected (see below). Once the Pacbrake module has cycled the brake to confirm the torque converter engagement setting, it will then cycle 3 times at startup to perform the anti-foul cycle.

4 cycles = higher speed torque converter engagement setting is loaded

5 cycles = lower speed torque converter engagement setting is loaded

Road test the vehicle, ensuring all the activation parameters are met. With the Pacbrake switched to ON, the exhaust brake should apply and then release when either the minimum road speed of 16 MPH (25 KM/H) is achieved or the engine RPM goes below 750 RPM or the accelerator is depressed.

Low Speed Mode:

- engine RPM must be above 1200
- accelerator position must be at zero throttle
- in "tow/haul" mode the vehicle speed must be above 22 MPH (35 KM/H)
- in "overdrive" mode the vehicle speed must be above 22 MPH (35 KM/H)
- exhaust brake switch must be in the ON position

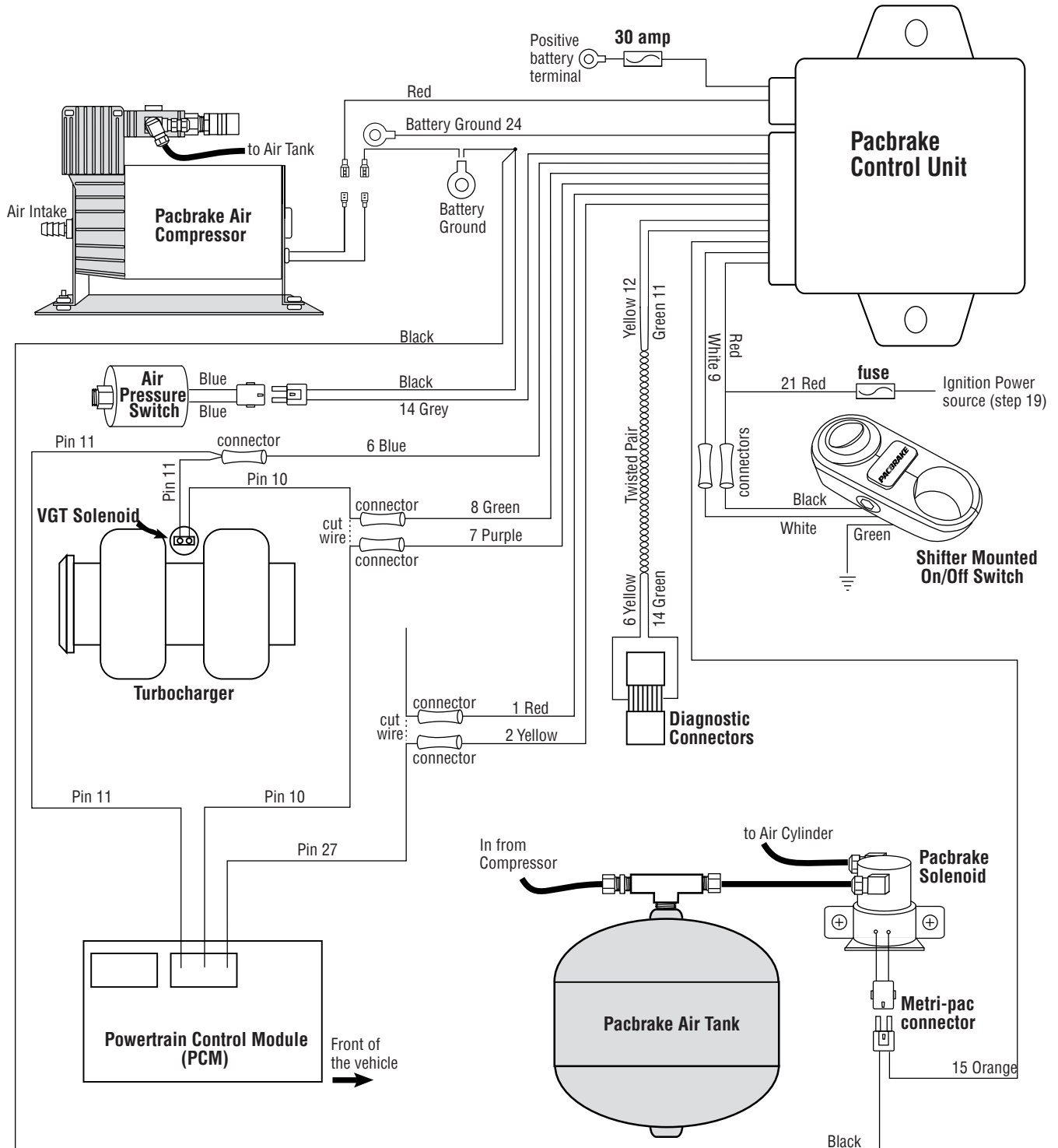
Higher Speed Mode:

- engine RPM must be above 1200
- accelerator position must be at zero throttle
- in "tow/haul" mode the vehicle speed must be above 31 MPH (50 KM/H)
- in "overdrive" mode the vehicle speed must be above 31 MPH (50 KM/H)
- exhaust brake switch must be in the ON position

Congratulations, you have completed the installation

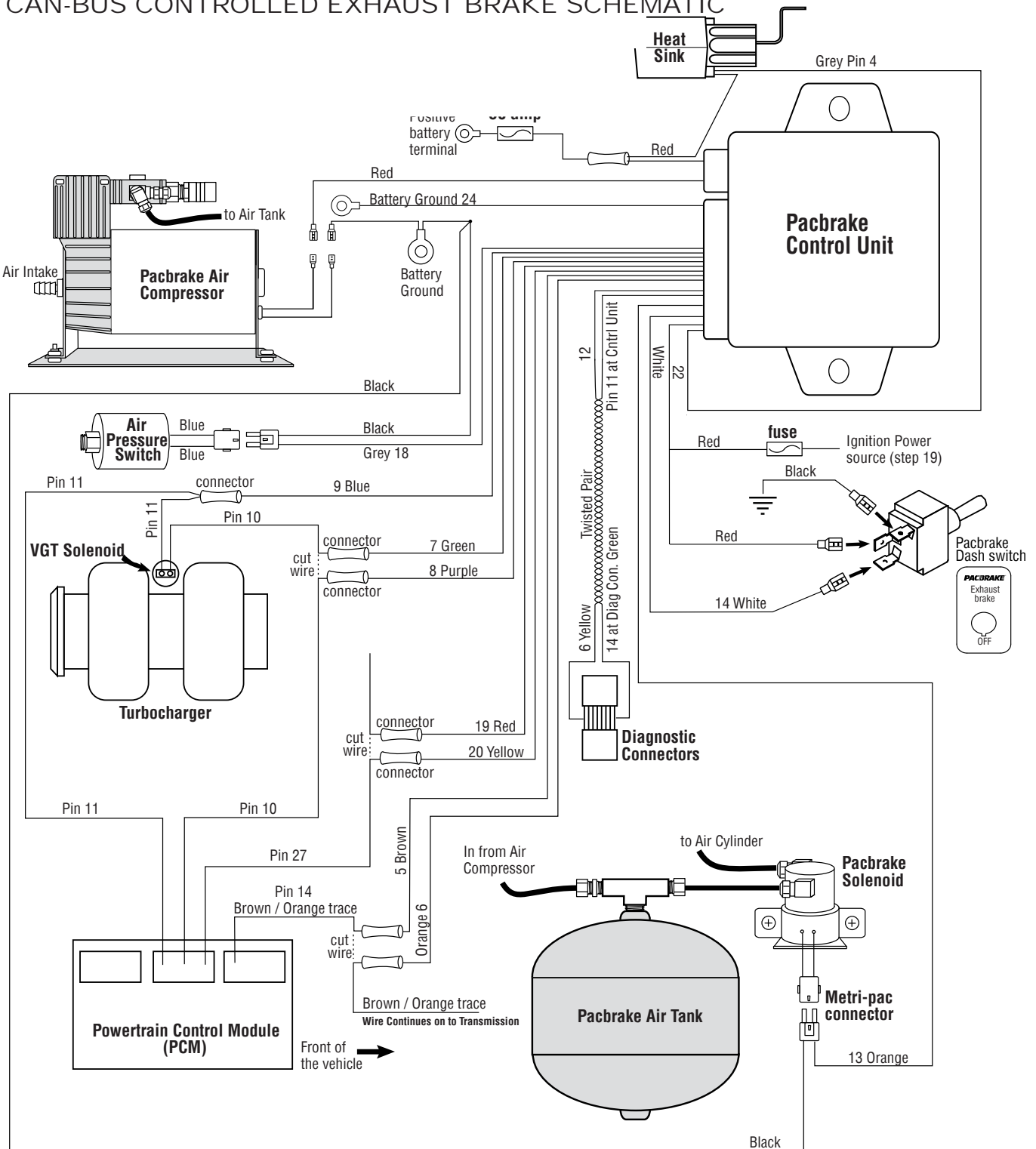
WARNING - Do not operate the vehicle with the Pacbrake control unit removed or disconnected. If it is necessary, jumper wires must be installed. Vehicles equipped with manual shift transmissions ADD jumper wires between Pins 1 & 2 and Pins 7 & 8. Vehicles with automatic transmissions ADD jumper wires between Pin 19 & 20, Pins 5 & 6, and Pins 7 & 8.

FORD 6.0 LITER - Manual Transmissions Only
CAN-BUS CONTROLLED EXHAUST BRAKE SCHEMATIC



WARNING - Do not operate the vehicle with the Pacbrake control unit disconnected.
SEE NOTES ON PAGE 14

FORD 6.0 LITER - Automatic Transmissions Only
CAN-BUS CONTROLLED EXHAUST BRAKE SCHEMATIC



WARNING - Do not operate the vehicle with the Pacbrake control unit disconnected.
SEE NOTES ON PAGE 14