

III PAC BRAKE®



Installation MANUAL

InlineMount EXHAUST BRAKES

C40019

**1999-2003 FORD F250 / F350 7.3L POWERSTROKE DIESEL WITH
AUTOMATIC TRANSMISSIONS ONLY**

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 your kit contains all the necessary parts shown in the photo below.

NOTE: The adapters provided in the kit are for vehicles with stock exhaust pipe diameter. If the vehicle has an aftermarket exhaust, consult Pacbrake factory for replacement adapters.

C40019 - Automatic Transmissions ONLY



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 that includes a 25' coiled air hose and accessories within a zippered storage bag (zippered storage bag not shown in photo). 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 compressors 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** Prior to starting the installation, check both exhaust manifolds and exhaust bellows for exhaust leaks. If exhaust leaks exist they should be repaired prior to installing the exhaust brake.

Disconnect both negative battery terminals first. Then disconnect both positive battery leads.

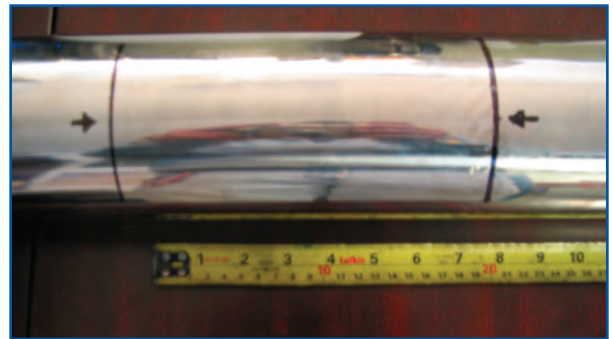


EXHAUST BRAKE INSTALLATION

- 2** With the exhaust brake on the bench, loosely attach the exhaust pipe adapters provided, then make a measurement to determine the length of vehicle exhaust pipe to be removed. The adapters are expanded to slide over the existing exhaust pipe. Consider this in your measurement.



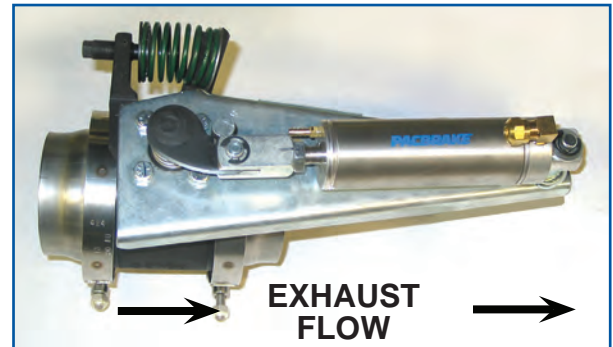
- 3** Select a location in the exhaust system that has sufficient clearance for installation and servicing of the exhaust brake. This location should be as close to the turbocharger as possible and away from dirt and road spray. Transfer the brake/adaptor measurement, attained in step 2, to this location and mark the exhaust pipe. Remove the exhaust pipe and cut out the pre-marked section.
NOTE: In some cases, the cutting and welding of exhaust systems can be done without removing the pipe sections from the vehicle.



- 4** Loosely re-install the exhaust system into the chassis to fit the exhaust brake assembly. Make sure the header pipe flange is aligned correctly with the turbocharger outlet flange in order to ensure a leak free connection. Install the 90 degree fitting provided into the air cylinder with the inlet port pointing forward. Apply thread sealant to prevent air leaks.



- 5** Using the 2 “V” clamps provided, install the exhaust adapters onto the exhaust brake - making sure they are centered on the flanges. Insert the exhaust brake assembly into the exhaust system noting the direction of exhaust flow as shown in the photo. Rotate the exhaust brake to attain sufficient clearance around the PRXB mechanism and the frame rail. Tack weld the two adapters to the exhaust system, while being careful to maintain the correct length and any angles that exist. Remove the 2 “V” clamps and exhaust brake to facilitate welding of the adapters to the exhaust. Welding can be done on the inside or outside of the pipe and must be leak free.



Note: any clamped exhaust connections between the brake and the engine must be welded at this time to ensure the joint can not separate or leak under pressure

- 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, making 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).

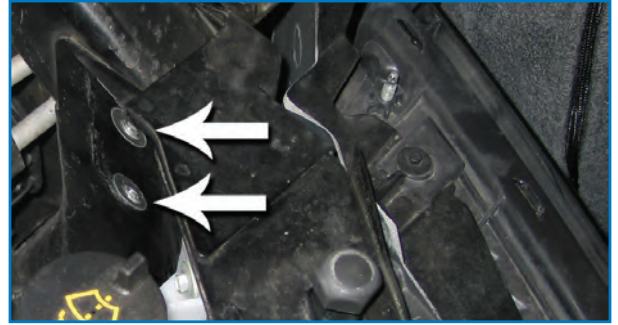


COMPRESSOR MOUNTING

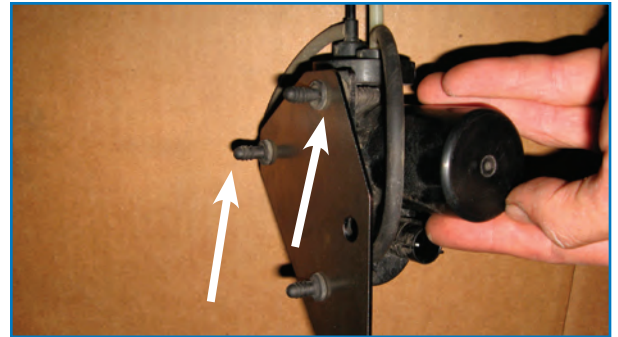
- 7** On the passenger’s side inner fender, locate and disconnect the short vacuum hose routed from the vacuum pump to the vacuum reservoir. Disconnect the electrical connector of the vacuum pump. Using a 13mm socket, remove the two bolts attaching the pump and bracket to the inside fender. Remove pump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



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

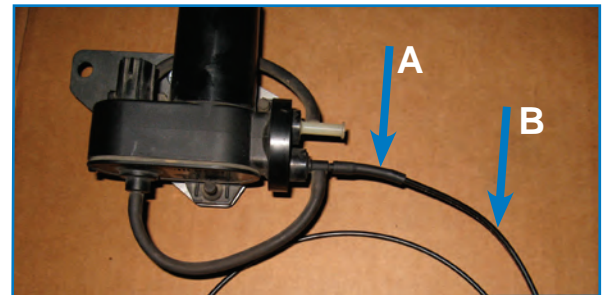


- 9** Remove the vacuum pump from the factory bracket, leaving the rubber isolators attached to the vacuum pump. Install the vacuum pump on to the Pacbrake supplied bracket as show in photo.



- 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 excess hose and install 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 cap-screws 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, 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 supplied washers on 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. Connect the nylon airline from the compressor to the fitting on the pressure switch assembly. Connect the nylon airline to the remaining fitting at the pressure switch assembly and route it to the air tank location in step 17.



- 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 rubber hose supplied to the barbed fitting on the filter and the other end to the barbed fitting on top of the compressor. The air intake hose must not be restricted or poor compressor performance will result.



- 17** Install the fittings provided in the top of the air tank using thread sealant, as shown in the photo. Install the supplied 1/4 NPT plug in the bottom of the tank. Choose a location on the outside of the frame to mount the air tank with the fasteners supplied (use existing holes in the frame if possible). Connect the airline from the pressure switch and air chuck assembly installed in step 15 to either of the two fittings at the top of the air tank.



- 18** Mount the solenoid valve inside the frame on the passenger side with the exhaust port pointing down, using one of the air tank fasteners. Drill a 1/4" hole to secure the other side of the solenoid bracket. Install the supplied 1/4" bolt, nut and washers. 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° 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 to the barbed fitting on the rod end of the air cylinder. Secure with a tie-strap. Route the other end to the compressor's air intake filter, installed in step 15. A few inches from the compressor's air intake filter, cut the hose and install the supplied barbed tee fitting. Attach all three hoses to the fitting.



ELECTRICAL INSTALLATION

- 20** Using the supplied nyloc nut and flat washer, secure the Pacbrake control unit bracket to the factory stud under the dash as shown.
- Attach the Pacbrake control unit to the bracket with the two bolts, flat and lock washers supplied. Insert the two Pacbrake harness connectors into the control unit.

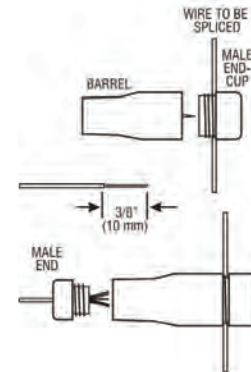


- 21** Consult with the owner or operator for their preferred location of the ON/OFF switch. The location shown in the photo is a suggestion.
- Once the switch location has been chosen, drill a 1/4" hole to accommodate the dash switch. Install the switch and face plate. Route the harness wires down to the Pacbrake controller, installed in step 20. Secure with the supplied tie-straps and make sure it is not compromised by moving parts.



- 22** Locate the Ford 10 gauge grey with yellow tracer wire at the base of the steering column. Check this wire with a volt meter for 12 volts + ignition power. Install the supplied yellow Posi-Tap, then install the red fuse (3 amp) wire into the Posi-Tap (as shown in the drawing).

NOTE: The batteries will need to be temporarily reconnected to confirm ignition power on the grey with yellow tracer wire.



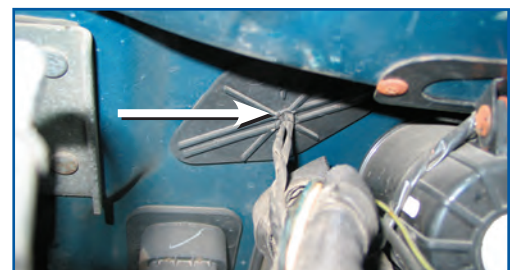
- 23** Connect the grey and black connectors to the Pacbrake control unit. Connect the green, white, black and red wires of the dash switch (installed in step 21) to the corresponding coloured wires at the grey connector at the controller, as shown in the schematic on page 14. Once crimped, heat the connector to provide a water tight seal.



- 24** Locate the plastic cover plate on the drivers side of the firewall and remove. Drill a hole large enough to facilitate feeding the Pacbrake harness through. Feed all the remaining unconnected wires through the firewall into the engine compartment. Secure the Pacbrake harness neatly under the dash using the provided tie-straps. Re-install the firewall cover plate making sure it is clipped back into place.



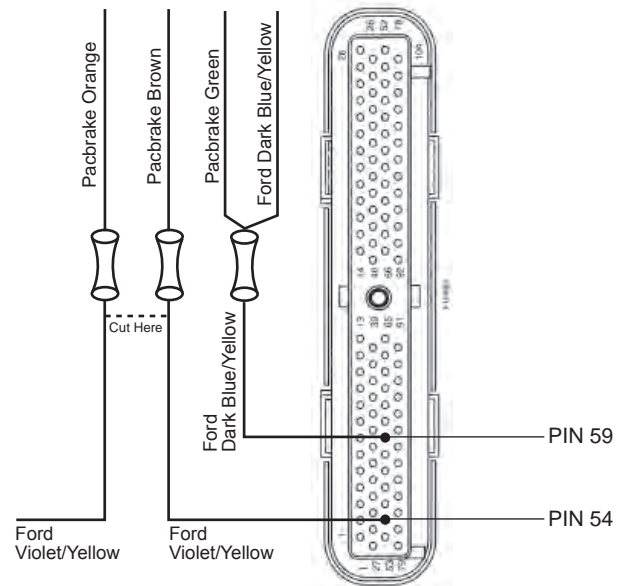
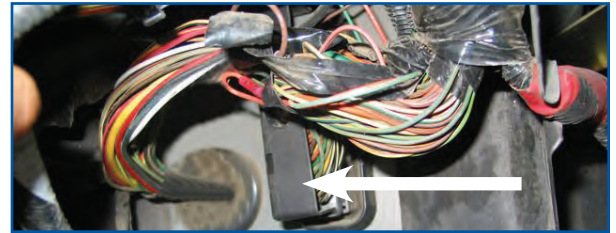
- 25** Locate the PCM (powertrain control module) harness connector on the driver's side firewall. The driver's side front inner wheel well will need to be removed to gain access to the PCM connector.



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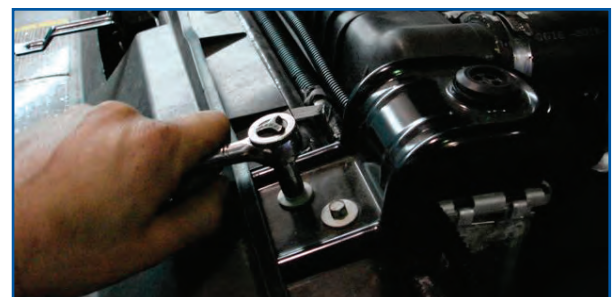
At the PCM connector, locate pin #54. It should be a violet wire with yellow tracer. Cut this wire in a convenient location, leaving enough wire to butt connect to each wire end. Connect the brown wire of the Pacbrake harness to the PCM side of the violet with yellow tracer wire and connect the orange wire of the Pacbrake harness to the harness side of the violet with yellow tracer wire. Locate pin #59. It should be a dark blue wire with yellow tracer. Cut this wire in a convenient location, leaving enough wire to splice the green wire into the dark blue wire with yellow tracer. Using the connectors provided, crimp the wire into the connector and heat shrink the connector enough to provide a water tight seal.

Replace the inner wheel well.



27

Route the remaining unconnected wires of the Pacbrake harness in front of the radiator and under the radiator supports to the Pacbrake air compressor. Connect the 14 gage red to the red wire of the compressor and connect the 14 gage black to the black wire of the compressor.

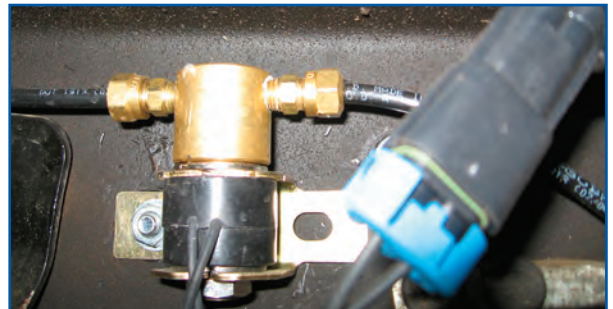


- 28** Route the Pacbrake connector with a grey and black wire to the pressure switch assembly and connect. Secure the harness with the provided tie-straps.



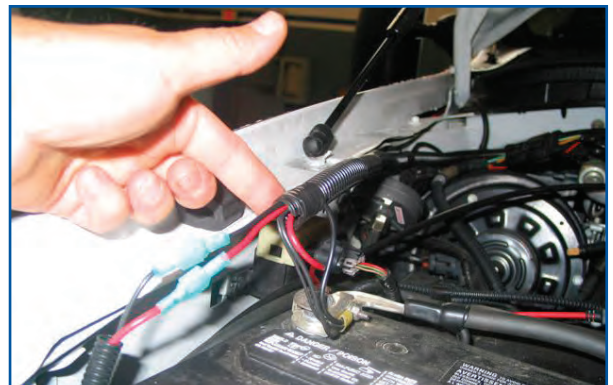
- 29** Route the Pacbrake connector with an orange and black wire to the solenoid valve mounted in the frame and connect.

Secure the harness with the tie-straps provided.



- 30** Connect the driver's side battery with the Pacbrake red fused wire with an eye terminal to the positive battery terminal and black wire with an eye terminal to the negative battery terminal. Then, reconnect the passenger's side battery. Secure the Pacbrake harness with the tie-straps provided. Re-install the lower dash panel.

NOTE: Connect both positive battery leads first, then both negative battery leads.



- 31** For vehicles WITHOUT cruise control, omit steps 31 & 32. The red cruise control disable wire of the Pacbrake harness will not be connected. Cap off this wire and insert it into the wire loom, to avoid grounding out this wire.

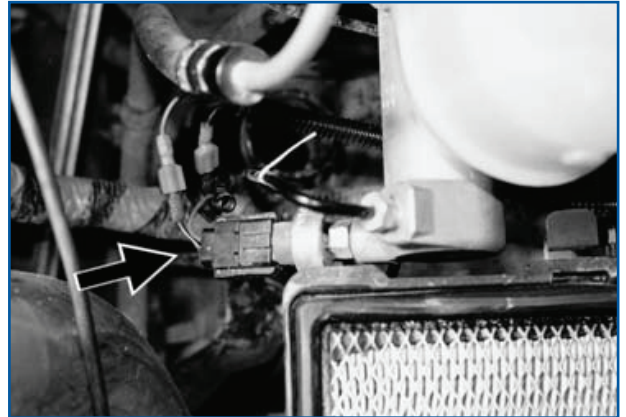
FOR VEHICLES WITH CRUISE CONTROL ONLY

Using the self tapping screw provided, mount the cruise control disable relay to the driver's side fire-wall. Place the green wire with ring terminal on the self tapping screw to provide a good ground. Connect the red wire of the relay receptacle to the red wire with the mating terminal of the Pacbrake harness. Install the relay provided.



32 FOR VEHICLES WITH CRUISE CONTROL ONLY

Ford installs a brake pressure applied switch on the front lower side of the master cylinder. Locate the black wire with a yellow stripe in the FORD harness. Cut this wire in a convenient location to crimp on the two red terminals provided. Connect these to the mating terminals of the two remaining blue wires coming from the relay harness. Neatly secure all wiring with the supplied plastic ties.



33 At the throttle pedal, locate the I.V.S (Idle Validation Switch)

NOTE: The I.V.S is critical and must be correct. We recommend using a 12 volt test light to verify the correct wire BEFORE splicing. Most common for vehicles built after 10/2000 is a red wire with green stripe - 2nd from the top of the connector. However, because of possible production changes, using a test light is the only way to be sure (do not use an LED test light). With the ignition ON, probe this wire with a test light first. It should be 12 volts positive with the accelerator pedal to the floor. Release the pedal and the light should go off. If this is correct, splice in the yellow wire of the Pacbrake harness using the supplied heat shrinkable butt connector.



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 parameters and the exhaust brake will not apply unless these are met:

ACTIVATION PARAMETERS FOR AUTOMATIC TRANSMISSION VEHICLES:

- Accelerator position must be at zero throttle
- Vehicle speed must be above 22 MPH (35 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 19 MPH (30 KM/H) is achieved or the accelerator is depressed.

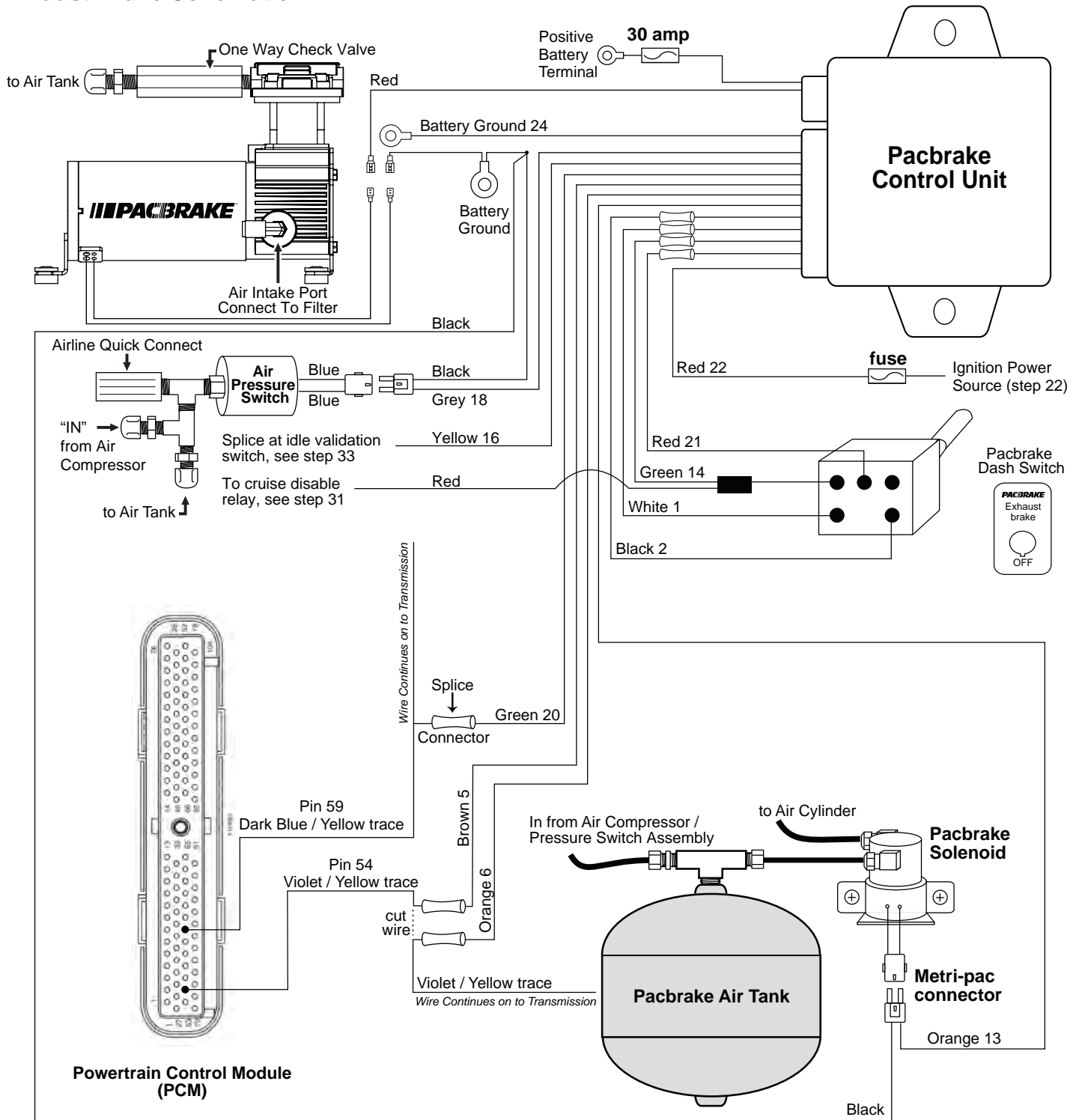
LED SWITCH OPERATION

- RED - Brake enabled and ready for activation
- GREEN – Is not used in this application but is visible during initialization of the controller after ignition power is ON
- ORANGE – Brake is currently active
- NO ILLUMINATION - Brake disabled/Dash switch OFF

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. ADD jumper wires between Pin 5 & 6.

FORD 7.3L - AUTOMATIC TRANSMISSIONS ONLY
Exhaust Brake Schematic



WARNING - Do not operate the vehicle with the Pacbrake control unit disconnected.