

/// PAC BRAKE®

Installation MANUAL



MAXIMUM EXHAUST FLOW DESIGN

PRXB EXHAUST BRAKE

C44072/C44073/C44074/C44075/C44076

APPLICATION:

1994-2002 DODGE RAM TRUCKS W/5.9L CUMMINS
DIESEL ENGINES WITH MANUAL & AUTOMATIC TRANSMISSIONS
STOCK DODGE CUMMINS HX & HY SERIES TURBO

Thank you and congratulations on the purchase of a Pacbrake retarder. Before starting the installation, please read the entire installation manual carefully to ensure you can complete the installation once started. Check that your Pacbrake kit is correct for the application and contains all the necessary parts.

NOTE: C44072, C44073, C44074, C44075 & C44076 kits will only work on vehicles using Stock Dodge Cummins HX & HY Series Turbos. For vehicles using an aftermarket turbo please consult Pacbrake for other kit options.

APPLICATION NOTES: Pacbrake **C44072** is a High Performance PRXB Exhaust Brake kit designed to provide maximum retarding throughout the RPM range of your 1994-1998 Dodge 12 valve Cummins with a manual shift transmission.

Pacbrake **C44073** is a High Performance PRXB Exhaust Brake kit designed to provide maximum retarding throughout the RPM range of your 1994-1995 Dodge 12 valve Cummins with an automatic 47RH transmission.

Pacbrake **C44076** is a High Performance PRXB Exhaust Brake kit designed to provide maximum retarding throughout the RPM range of your 1996-1998 Dodge 12 valve Cummins with an automatic 47RE transmission.

IMPORTANT: Heavy Duty Exhaust Valve Springs ARE MANDATORY for all 12 valve engines, Pacbrake C14010 Spring Kit is included in the kit. Failure to install H.D. Exhaust Valve Springs WILL result in engine Damage!

APPLICATION NOTES: Pacbrake **C44074** is a High Performance PRXB Exhaust Brake kit designed to provide maximum retarding throughout the RPM range of your 1998½-2002 Dodge 24 valve Cummins with a manual shift transmission.

Pacbrake **C44075** is a High Performance PRXB Exhaust Brake kit designed to provide maximum retarding throughout the RPM range of your 1998½-2002 Dodge 24 valve Cummins with an automatic 47RE transmission.

IMPORTANT: 1998-1998½ 24 valve engine vehicles only, as the exhaust brake signal from the ECM is not activated, Pacbrake Part #C14004 ECM Bypass is required.

IMPORTANT: Trucks with aftermarket exhaust systems larger than stock 3" O.D. require a different exhaust adapter. (4" aftermarket exhaust systems require Pacbrake Part #C11342).

C44072



C44074



C44075



C44073



C44076



OPTIONAL ACCESSORIES:

- Shifter Switches (Manual Tran) -
- C18041 for M/Y 1999-2002
- C18040 for M/Y 1994-1998
- ECM Bypass Kit -
- C12015 for M/Y 1999-2002
- C14004 for M/Y 1998-1998½

C44072/C44074 Electrical Installation (Manual Transmission Vehicles) (for C44075/C44073/C44076, Auto Transmission Vehicles, proceed to step 7)

- 1** Locate the main wiring harness supplied in the kit. Using the self tapping screws provided, mount the harness relays on the driver side inner fender between the ABS brake controller and the fuse panel. Install both relays. Route the orange wire of the harness through the firewall grommet to the inside of the cab.



- 2 ON/OFF Switch Installation:**
Provided on the last pages of this manual are 2 templates for dash switch locations. The 2 switch locations are suggestions. Consult with the customer for their preference before drilling a ½" hole to accommodate the switch. Vehicles equipped with manual transmissions can use a shift lever mounted switch for the driver's convenience. 1994-1998½ vehicles require the orange wire to be connected to the control switch before installing. Connect the wires to the control switch as shown in the schematic pertaining to your kit #, found on page 12 -16.



- 3** Remove the dash panel below the steering column. At the base of the steering column, locate an ignition power supply.
1994-1997 models use a medium blue 14 gage wire, blue "T" tap
1998-2002 models use a black with orange tracer 18 gage wire, red "T" tap

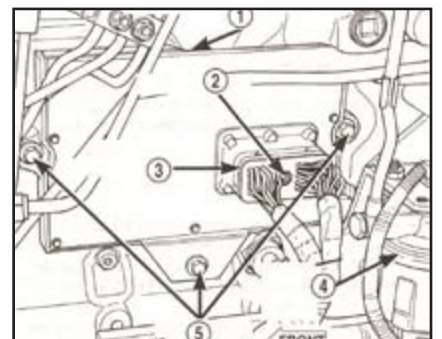


Check the wire with a voltmeter to ensure it is 12 volts and an ignition power source. Attach the supplied "T" tap to this wire and insert the supplied 16 gage fused wire to this "T" tap. With the additional harness provided, connect the switch as shown in the wiring diagram pertaining to your kit #, found on page 12 -16. Install the control switch and plate.

- 4 ECM Connection for 1999-2002 Trucks using C44074 Kit Only:**

If using C12015 ECM bypass, disregard this step and follow the instructions provided in the C12015 kit.

Disconnect both positive battery leads. Remove the two cap-screws that attach the fuel filter head to the intake manifold. This should allow for enough clearance to access the 50 pin ECM connector. Locate pin 20 and remove the sealing plug. Be careful not to push the sealing pin into the connector. If this happens, use an Allen key to remove the ECM connector from the ECM, and use a small pick to push the sealing pin out from the backside. Route the black wire with special ECM pin to the ECM. Insert the black wire of the harness into pin 20 until it stops. Pull gently to make sure it is locked into the ECM connector.

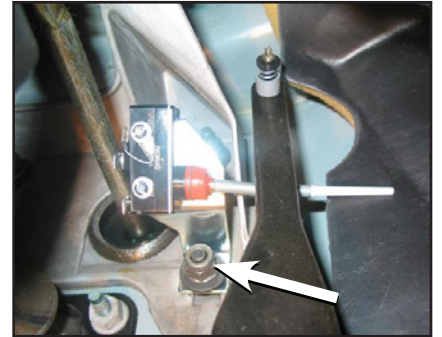


5 Throttle Switch Installation: C44072 Kit and 1998½ Trucks (manual trans) using the C14004 Kit Only:**1999-2002 Vehicles using ECM Connection, disregard this step**

Locate the stud shown in the photo (shown with arrow). Remove the nut and install the switch assembly with the switch arm horizontal. Reinstall the stud nut and tighten, making sure the switch arm is behind the accelerator lever.

Adjust the switch by loosening the screws and positioning it to “click” just as the throttle returns to its released position. Cycle the throttle and listen for the “click” each time the throttle returns to idle. Tighten the screws when adjustment is complete.

Locate the black wire of the Pacbrake harness with the Cummins ECM pin, cut off this pin and attach the supplied black wire with a heat shrinkable butt connector. Route this wire in the cab through the firewall to the throttle switch. Crimp on the supplied spade terminal and connect this wire to the throttle switch terminal with the diode. Attach the leg of the orange wire (connected to the control switch in step 2) to the remaining terminal on the throttle switch. Consult the wiring schematic pertaining to your kit #, found on page 12 -16.

**6 C44072 and C44074 Kits**

Route the remaining harness along the firewall to the passenger side and then route it forward along the fender to the passenger side Battery. Make sure it is secured away from heat sources and moving parts using the supplied tie-straps.

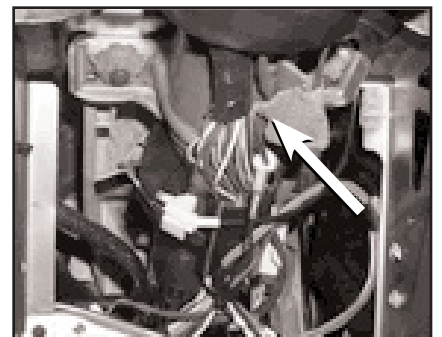
Proceed to step 18.

**C44073, C44075, C44076 ELECTRICAL INSTALLATION (C44072, C44074 kits, proceed to step 18)****7 Remove the lower dash panel and locate an ignition power supply at the base of the steering column.**

1994-1997 models use a medium blue 14 gage wire, blue “T” tap

1998-2002 models use a black with orange tracer 18 gage wire, red “T” tap

Check the wire with a voltmeter to ensure it is 12 volts and an ignition power source. Attach the supplied “T” tap to this wire and insert the red 16 gage 3 amp fused wire to this “T” tap.



- 8** Mount the Pacbrake control unit to the provided bracket on the inside of the firewall (under the dash - as shown in photo) using the factory stud and nut for the steering column. Once the Pacbrake control unit is fastened to the stud. Connect the grey and black connectors of the harness to the Pacbrake control unit. Secure the harness with the provided tie-straps.



8

- 9** Locate the plastic plate in the drivers side of the firewall. Drill a hole large enough to feed the Pacbrake harness through. Then, feed the harness into the engine compartment from the cab side. Apply silicon sealant around the loom to provide a seal.

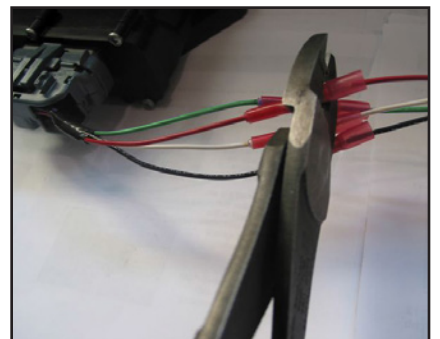


9

- 10a ON/OFF Switch Installation: C44073, C44075 & C44076 Kits Only**
 Provided on the last pages of this manual are 2 templates for dash switch locations. The 2 switch locations are suggestions only for specific years. Consult the customer for their preference before drilling a 1/4" hole to accommodate the dash switch.

10
a

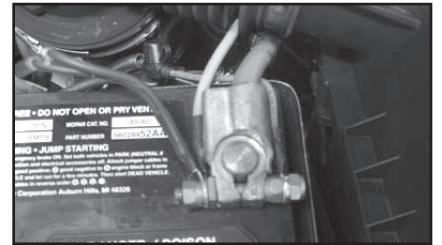
- 10b** Install the dash switch and route the wires to the control unit. Secure the wires with the supplied tie-straps. At the control unit, locate the matching wire colors and connect using the supplied heat shrinkable red butt connectors. Once crimped, heat the connector to provide a water tight seal.
 Re-install the lower dash panel.

10
b

- 11** Connect the black wire with the eye terminal to the negative battery terminal or a good chassis ground. Secure with the supplied tie-straps.

Remove both the positive battery terminals. Route the red fused wire with the eye terminal to the positive battery terminal (leaving the positive lead disconnected).

*The battery leads are connected in step 26.



11

- 12** Route the remaining harness along the firewall to the passenger side and then route it forward along the fender to the passenger side battery. Make sure it is secured away from heat sources and moving parts using the supplied tie-straps.

C44075 kits, proceed to step 14.



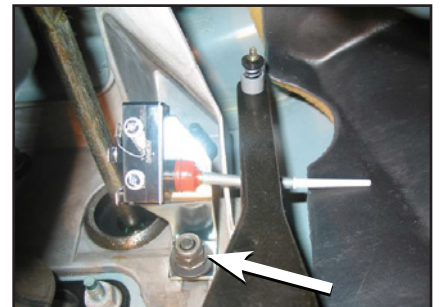
12

- 13 Throttle Switch Installation: C44073, C44076 Kits Only**

Locate the stud shown in the photo and remove the nut. Install the switch assembly with the switch arm horizontal. Re-install the stud nut and tighten, making sure the switch arm is behind the accelerator lever.

Adjust the switch by loosening the screws and positioning it to “click” just as the throttle returns to its released position. Cycle the throttle and listen for the “click” each time the throttle returns to idle. Tighten the screws when adjustment is complete.

Locate the black wire and white wire of the Pacbrake harness, coming from the control unit. Attach the black wire to the terminal connected to the diode on the throttle switch. Connect the white wire to the other terminal on the throttle switch. Make sure it is secured away from heat and moving parts using the supplied tie-straps. Consult the wiring schematic pertaining to your kit #, found on page 12 -16



13

- 14 C44075 Kit Only:**

Under the hood, between the injection pump and the vacuum pump, locate the factory 3 pin Weather-Pac connector on the driver side of the engine (shown by the arrow). Remove the protective cap and install the mating connector in the Pacbrake harness. Install the removed protective cap on the unused connector on the Pacbrake harness - unless you have a performance module connected to it. If so, it connects to the Pacbrake connector.

NOTE: Some 1999 model year trucks and all 1998½ will require the use of a 3 pin triangular jumper harness to connect to the data link connector. See schematic pertaining to your kit #, found on page 12 -16. C44075 kits proceed to step 16.



14

15 C44076 Kit Only:

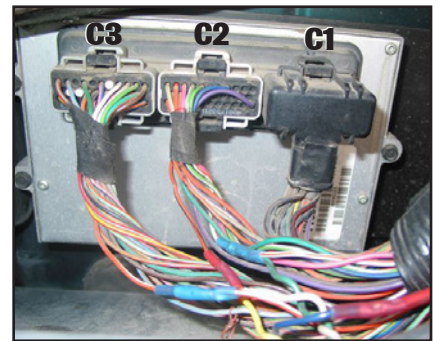
Locate the diagnostic connector under the dash on the drivers side. Connect the male plug of the Pacbrake harness to the factory diagnostic connector. Secure the Pacbrake connector to the diagnostic connector using the supplied tie straps.



16 a

16 C44075 & C44076:

Remove the air filter housing to access the passenger side fire-wall, locate the PCM (shown in fig 16b). Remove the C2 and C3 connectors. Remove the plastic cover to access the wires. Pull back the conduit to give access for attaching wires into the factory harness. Use fig 16bb as a guide to the pin locations.



16 b

C2 Connections

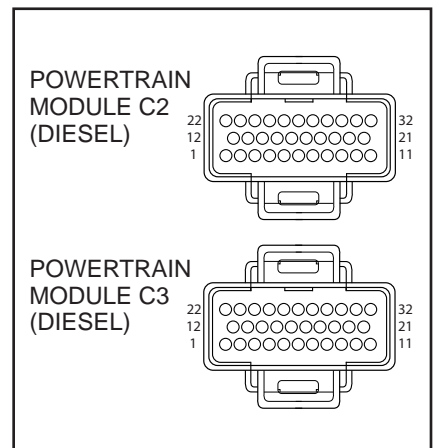
Locate the orange/black wire in pin 11 of the C2 connector. Cut this wire. Attach the brown wire of the Pacbrake harness to the PCM side. Attach the orange wire to the harness side of the orange/black wire. These connections are done using the supplied red heat shrinkable butt connectors.

Locate the brown wire in pin 21 of the C2 connector. Cut this wire and splice the blue wire of the Pacbrake harness into it using the supplied red heat shrinkable butt connectors.

C3 Connections

Locate the orange/white wire in pin 13 of the C3 connector. Cut this wire and splice the yellow wire of the Pacbrake harness into it using the supplied red heat shrinkable butt connectors.

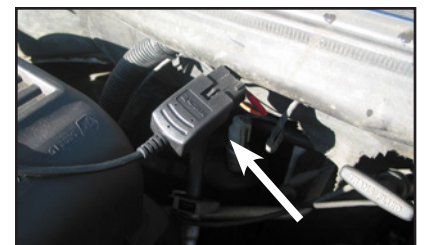
Using a heat gun, heat the connectors to provide a water tight seal on all heat shrinkable butt connectors. See the wiring diagram pertaining to your kit #, found on page 12 -16.



16 bb

17a C44073 Kit Only:

Route the brown, orange, blue, yellow and the OBD1 connector of the Pacbrake harness along the firewall to the passenger side firewall. Locate the factory OBD1 connector, connect it to the Pacbrake mating connector and apply electrical tape to secure them together. Remove the air filter housing to gain access to the PCM.



17 a

17b C44073 Kit Only:

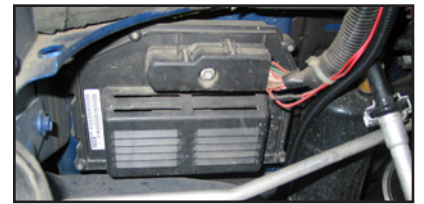
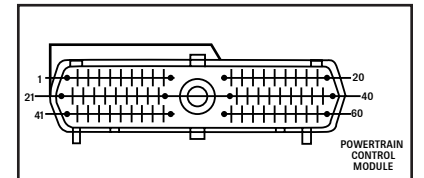
On the passenger side firewall, locate the PCM (shown in fig 17b). Remove the connector by loosening the bolt in the center. Remove the plastic cover to access the wires. Pull back the conduit to give access for attaching wires into the factory harness. Use fig 17bb as a guide to the pin locations.

Locate the orange/black wire in pin 54 of the PCM connector. Cut this wire. Attach the brown wire of the Pacbrake harness to the PCM side. Attach the orange wire to the harness side of the orange/black wire. These connections are done using the supplied red heat shrinkable butt connectors.

Locate the brown wire in pin 55. Cut this wire and splice the blue wire of the Pacbrake harness into it using the supplied red heat shrinkable butt connectors.

Locate the orange/white wire in pin 10. Cut this wire and splice the yellow wire of the Pacbrake harness into it using the supplied red heat shrinkable butt connectors.

See wiring diagram pertaining to your kit #, found on page 12-16.

17
b17
bb

Connector view shown is of the PCM side, connector removed.

- 18** Consult with the customer for their preferred location to mount the quick disconnect for the airline. The mounting location should be in a clean, dry area with easy access to the operator. See photo in step 19 for suggested location.

Using the two self tapping screws, mount the "L" bracket. Insert the bulkhead airline fitting into the "L" bracket and tighten the jam nut to secure it. Follow the airline installation procedures in the next step.

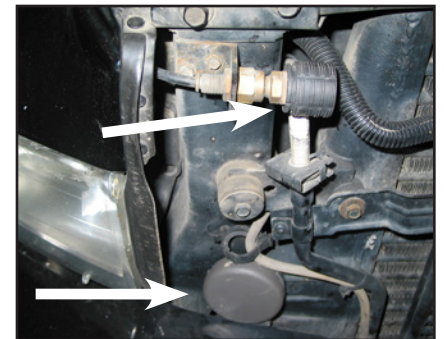
Make sure the nylon is cut square on each end and is pushed into the fittings until it clicks.



18

19

Shown in the photo is a suggested location marked "A". Connect one end of the remaining air line into the quick connect assembly, route this to the remaining fitting at the compressor. Mount the air inlet filter in a cool dry location. Suggested location is shown in photo, marked with "B". Locate the blue nylon airline provided, to the filter housing, route the other end to the compressor inlet fitting located on the compressor body. (compressor is installed in step 20)



Make sure the nylon hose is cut square on each end and is pushed into the fittings until it clicks.

20 ALL KITS

Remove the passenger side battery.
Place compressor and bracket assembly into the battery box as shown in the photo. Place and secure the battery on top of the compressor bracket. Reinstall the hold down assembly.

Connect the corresponding weather pac connectors of the Pacbrakeharness to the compressor.

Do not connect the battery cables at this time.

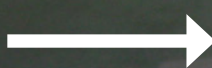
- 21** Install the 90 deg. fitting in the top of the tank, and the hex plug provided, or drain valve if desired into the bottom as shown in the photo. Use thread sealant on all fittings to prevent air leaks. The air tank requires 2 - $\frac{5}{16}$ " holes on a $3\frac{1}{4}$ " center. For fastening to the frame, use one of the pre-existing holes in the frame and drill the second hole. Using the fasteners provided, mount the air tank on the outside of the frame. Connect the nylon airline to the air tank and route the other end to the fitting at the solenoid, shown in the photo below and connect.



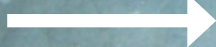
20

**22**

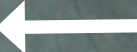
Connect to
quick connect



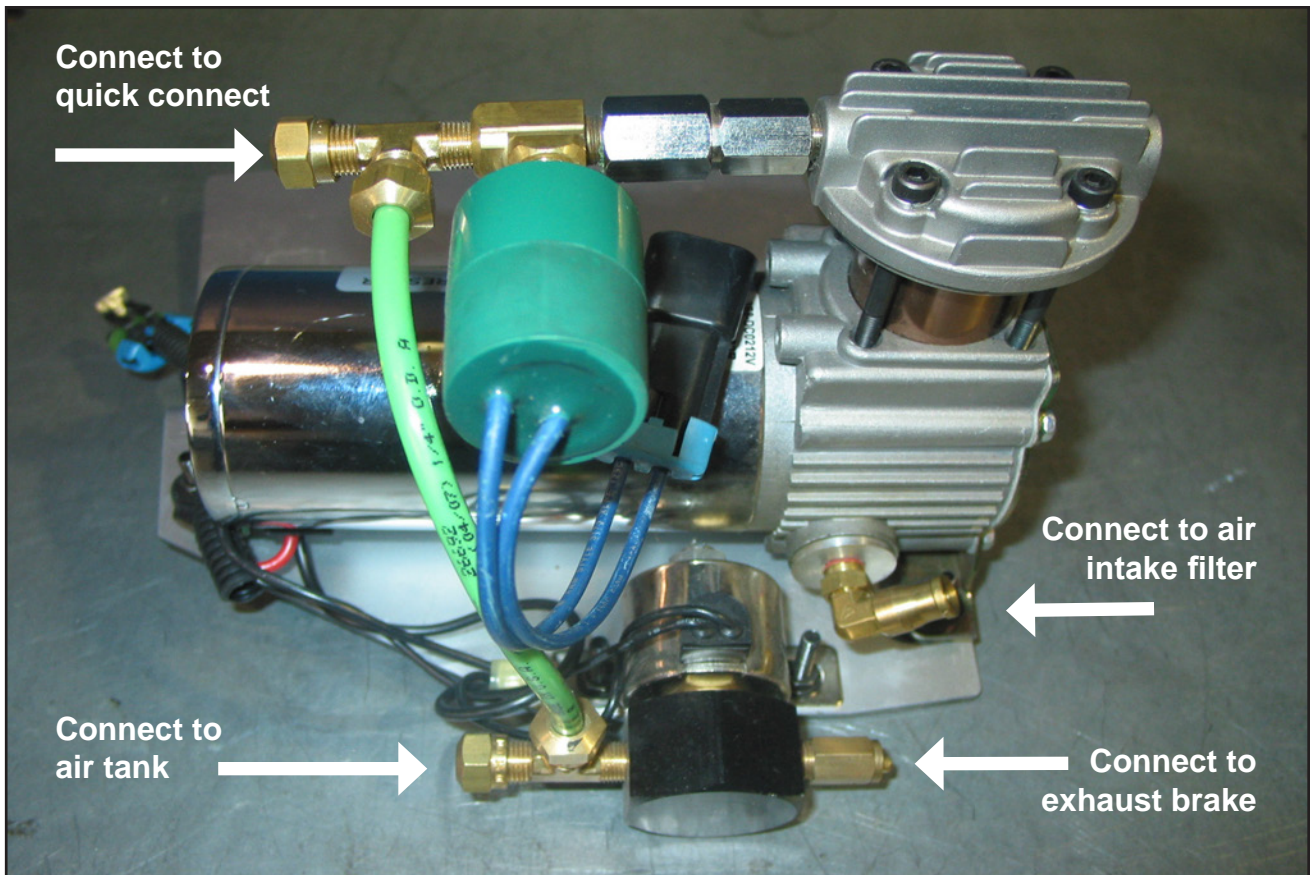
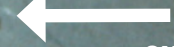
Connect to
air tank



Connect to air
intake filter



Connect to
exhaust brake



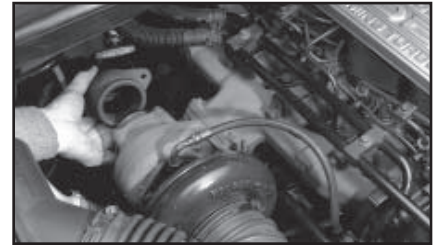
24 Exhaust Brake Installation:

All vehicles, remove the two capscrews that fastens the cast elbow to the header pipe.

1994-1998 vehicles, remove the V clamp between the elbow and the turbo charger. Remove the cast elbow. Removal of the 5 bolt flange is required. (5 new fasteners are supplied.)

NOTE: 12 valve engines REQUIRE H.D. exhaust valve springs to be installed.

1999-2002 vehicles, remove the 5 capscrews securing the elbow to the turbo charger. Remove the cast elbow.



24

- 25** From below the vehicle, remove the header pipe by removing the exhaust clamp at the header pipe connection to the intermediate pipe. Once the header pipe is removed from the vehicle, loosely install the factory elbow back onto the header pipe. Loosely assemble the Pacbrake at the adapter for measuring purposes. Lay the two assemblies side by side to determine the correct location to cut the header pipe. The Pacbrake adapter is expanded to fit over the header pipe, consider this in your measurement. Cut the header pipe to length.



25

- 26** Install the 90 deg. fitting provided into the 1/8th NPT port of the air cylinder using thread sealant. At the turbo charger check the gasket surface for imperfections. If okay, install the new gasket and exhaust brake provided. Replace the 5 capscrews removed earlier with the supplied 12 point fasteners. Torque the capscrews to 110 in-lbs in a star pattern, then re-torque to 220 in-lbs in a star pattern.

After a road test, re-torque to all 5 capscrews 220 in-lbs.



26

- 27** Install the shortened header pipe into the rear Pacbrake flange and intermediate exhaust pipe. Adjust the assembly to attain maximum clearance and a good pipe fit. Trim the firewall insulation to attain a minimum clearance of 6" to the exhaust brake and header pipe. Tack weld the Pacbrake adapter to the header pipe, remove the V clamp and then the header pipe for welding. Re-install the header pipe and torque the "V" clamp to 10 ft-lbs. Re-install the original exhaust clamp at the connection between the header to the intermediate pipe.



27

- 28** Using the nylon airline provided connect the solenoid valve port marked "CYL" to the air cylinder. (Fitting installed in step 26) Reconnect both positive battery terminals with the positive lead of the Pacbrake harness. Reconnect both negative battery terminals. Connect the black wire (Pacbrake ground) to the negative battery terminal. Secure all electrical harnesses and nylon airlines with the supplied tie-straps.



28

TESTING THE SYSTEM - C44072, C44074

Turn the ignition to ON and the Pacbrake switch ON. Do not start the vehicle yet. The compressor should start pumping air for approximately 2 minutes (this will fill the air tank from empty). Once maximum pressure is achieved, the compressor should shut off. Wait 2 minutes, listening for the compressor to start up. If the compressor cycles then an air leak is present and must be repaired.

Start the vehicle and allow to idle with the Pacbrake applied. Lightly depress the accelerator pedal and the exhaust brake should release. If not, adjust the throttle switch so the exhaust brake is disabled with light throttle pressure. To check for exhaust leaks, idle the vehicle with the exhaust brake applied and before the engine gets hot, feel around all the exhaust connections for leaks. Repair as necessary. Road test the vehicle attaining high engine RPM and apply the exhaust brake several times to ensure that it applies and releases quickly. Please note that the exhaust brake will activate, whenever the Pacbrake switch is ON and the engine is at idle. This feature can be used to aid in shortening the warm-up time by half.

The C44072 and C44074 kits will operate for a engine warm-up feature, but do not disengage at 170°F or 75°C. Coolant temps may rise higher, until the thermostat opens.

TESTING THE SYSTEM - C44073, C44075, C44076

Turn the ignition to ON and the Pacbrake switch ON. Do not start the vehicle yet. The compressor should start pumping air for approximately 2 minutes (this will fill the air tank from empty). Once maximum pressure is achieved, the compressor should shut off. Wait 2 minutes, listening for the compressor to start up. If the compressor cycles then an air leak is present and must be repaired.

With the Pacbrake switch in the OFF position, start the engine and allow to idle. The Pacbrake compressor may pump air if the tank pressure is low. Once the Pacbrake control unit confirms the air tank has reached maximum air pressure, the control unit will perform a Self Test Cycle which will activate and release the exhaust brake two times with the vehicle stationary.

Vehicles with 47RH/RE transmissions which have aftermarket valve bodies and aftermarket lock-up torque converters which are able to hold lock-up during exhaust braking in 1st and 2nd gears can use the later 48RE programming. To change the existing program within the Pacbrake control unit, simply locate the orange wire with a spade connection approximately 6 inches from the control unit. Disconnect this connection. Turn the ignition ON. The exhaust brake should cycle 3 times confirming the 48RE program has been loaded. The difference between the two programs is that the 48RE transmission will allow exhaust braking in 2nd and 1st gears, where the factory 47RH/RE transmission will not. Test drive the vehicle. If lock-up will not hold during exhaust braking in 2nd or 1st gear, reconnect the orange wire.

LED SWITCH OPERATION (C44073, C44075 AND C44076 KITS ONLY)

RED - Brake enabled and ready for activation

GREEN - Parameters are achieved, and the Pacbrake controller is now commanding torque converter lock-up

ORANGE - Brake currently active

No Illumination - Brake disabled/OFF

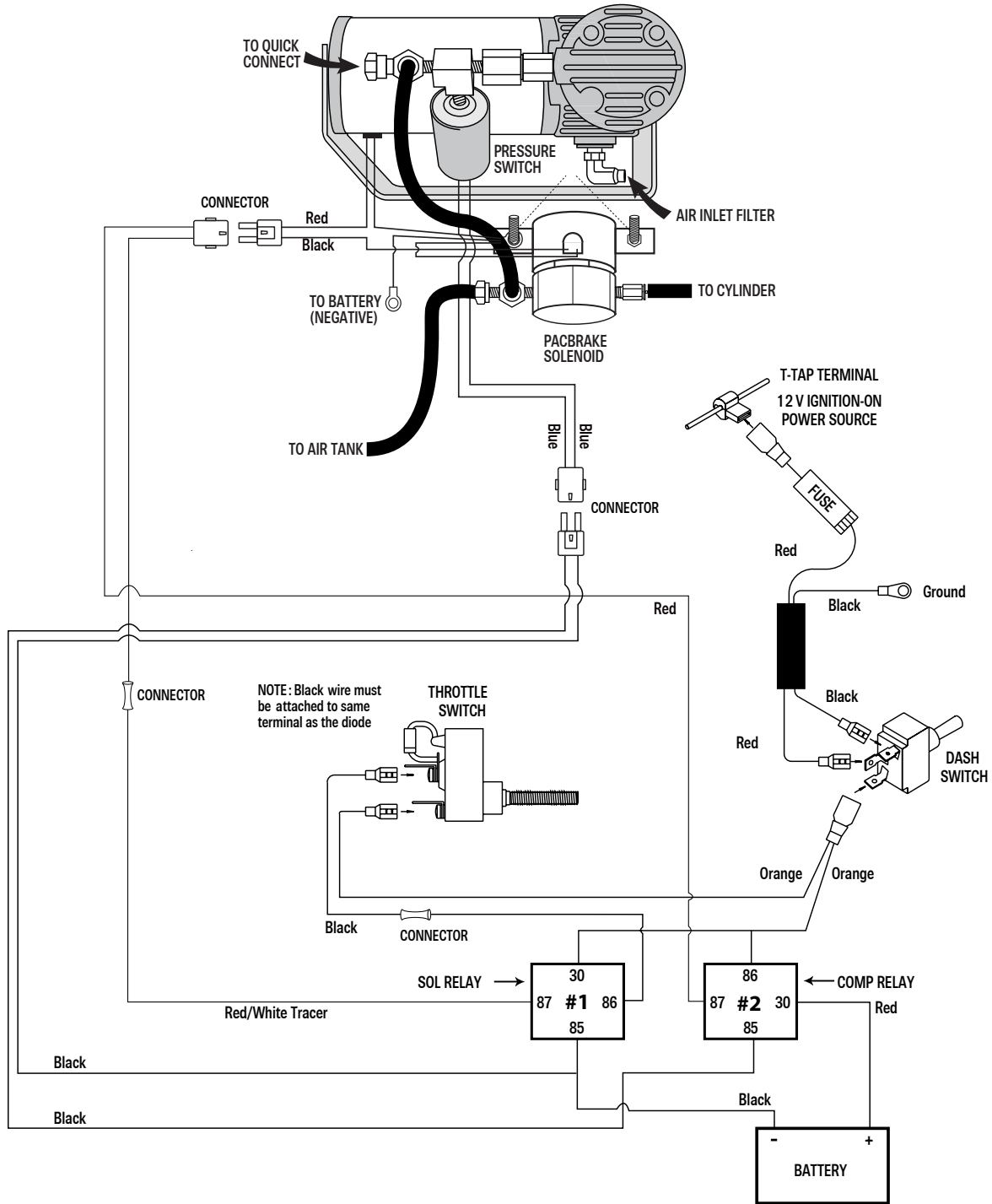
FEATURES - C44073, C44075, C44076

The Pacbrake control unit has a built in engine warm-up feature. This feature will activate the exhaust brake at idle with the vehicle stationary when the Pacbrake switch is turned ON, until the coolant temperature reaches 170°F or 75°C, then the control unit will disable the warm-up feature at idle. When performing a road test, the O.D. (overdrive) switch must be in the OFF position and the Pacbrake switch in the ON position. Attain road speed above 40 MPH or 65 km/h and release the accelerator pedal. The exhaust brake should apply, slowing the vehicle. Once the exhaust brake has brought the vehicle's engine speed below 900 RPM, the exhaust brake will disengage. When using the auxiliary coil hose for inflation, the Pacbrake switch must be turned ON with the engine running.

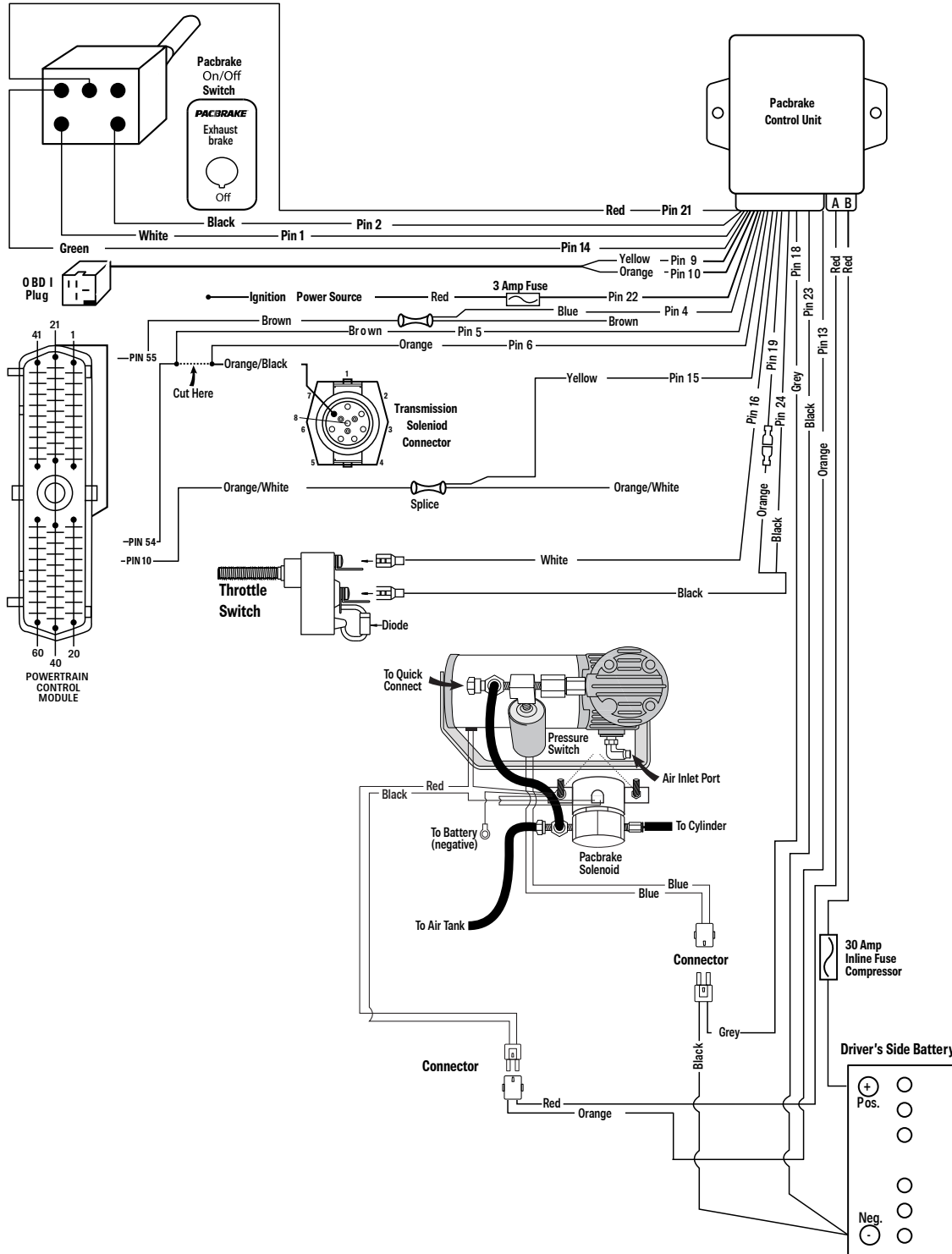
ELECTRICAL SCHEMATIC:

C44072 1994-1998 12 VALVE ENGINES, MANUAL TRANSMISSION ONLY

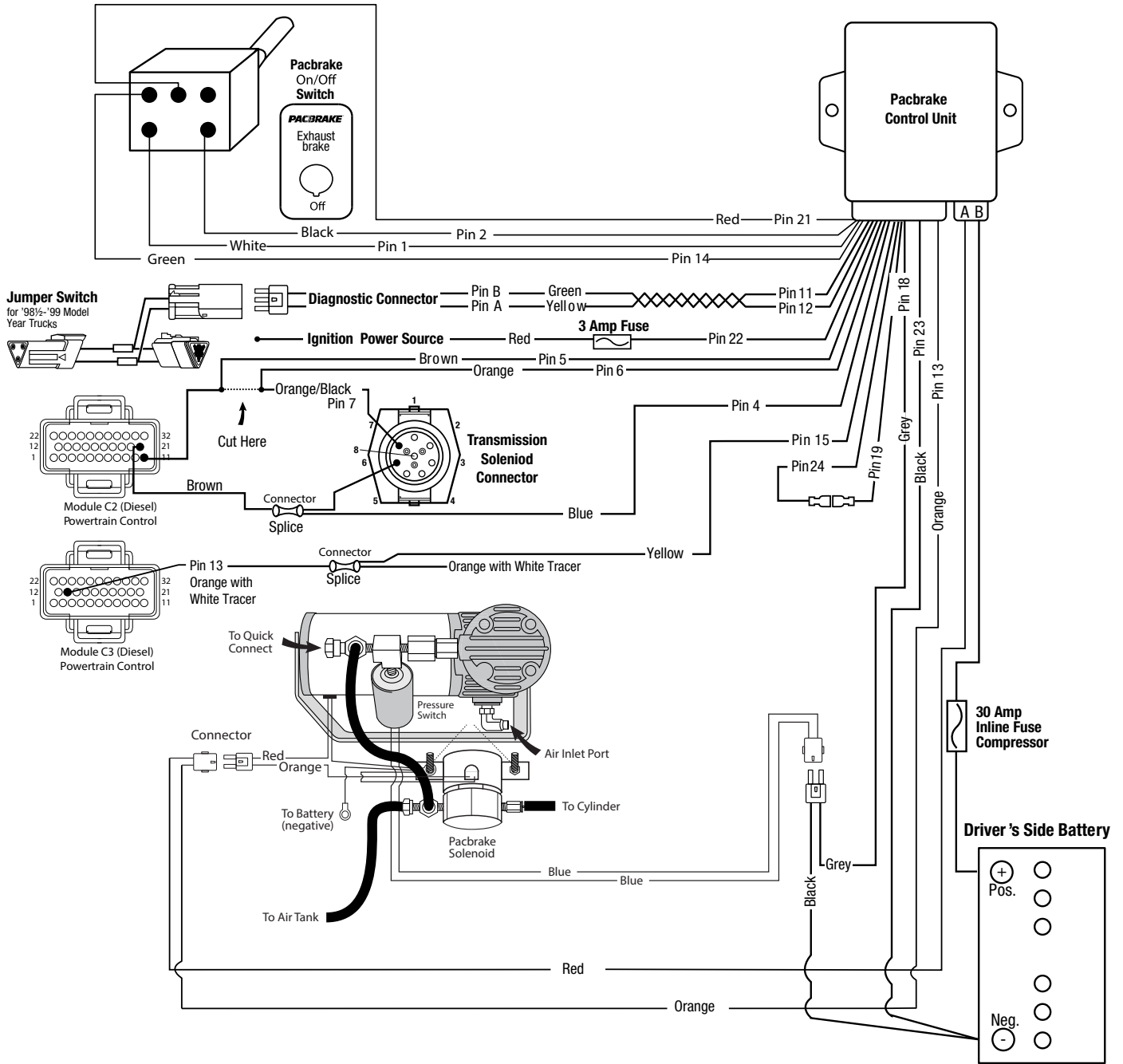
ALL 1998½ 24 VALVE ENGINES (MANUAL TRANS) USING C44074 MUST FOLLOW THIS SCHEMATIC



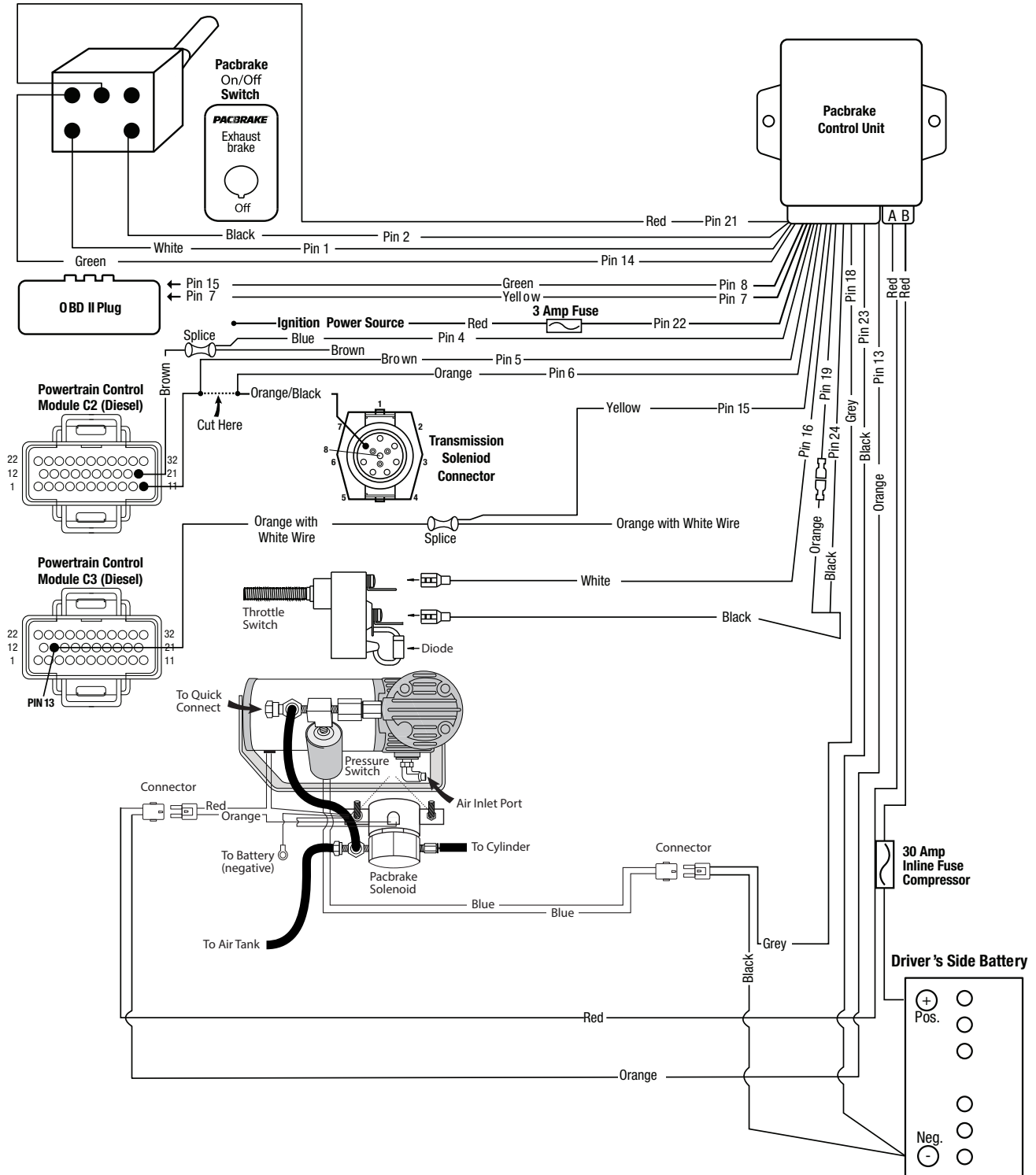
**ELECTRICAL SCHEMATIC:
C44073 1994-1995 12 VALVE ENGINES, AUTOMATIC TRANSMISSION ONLY**



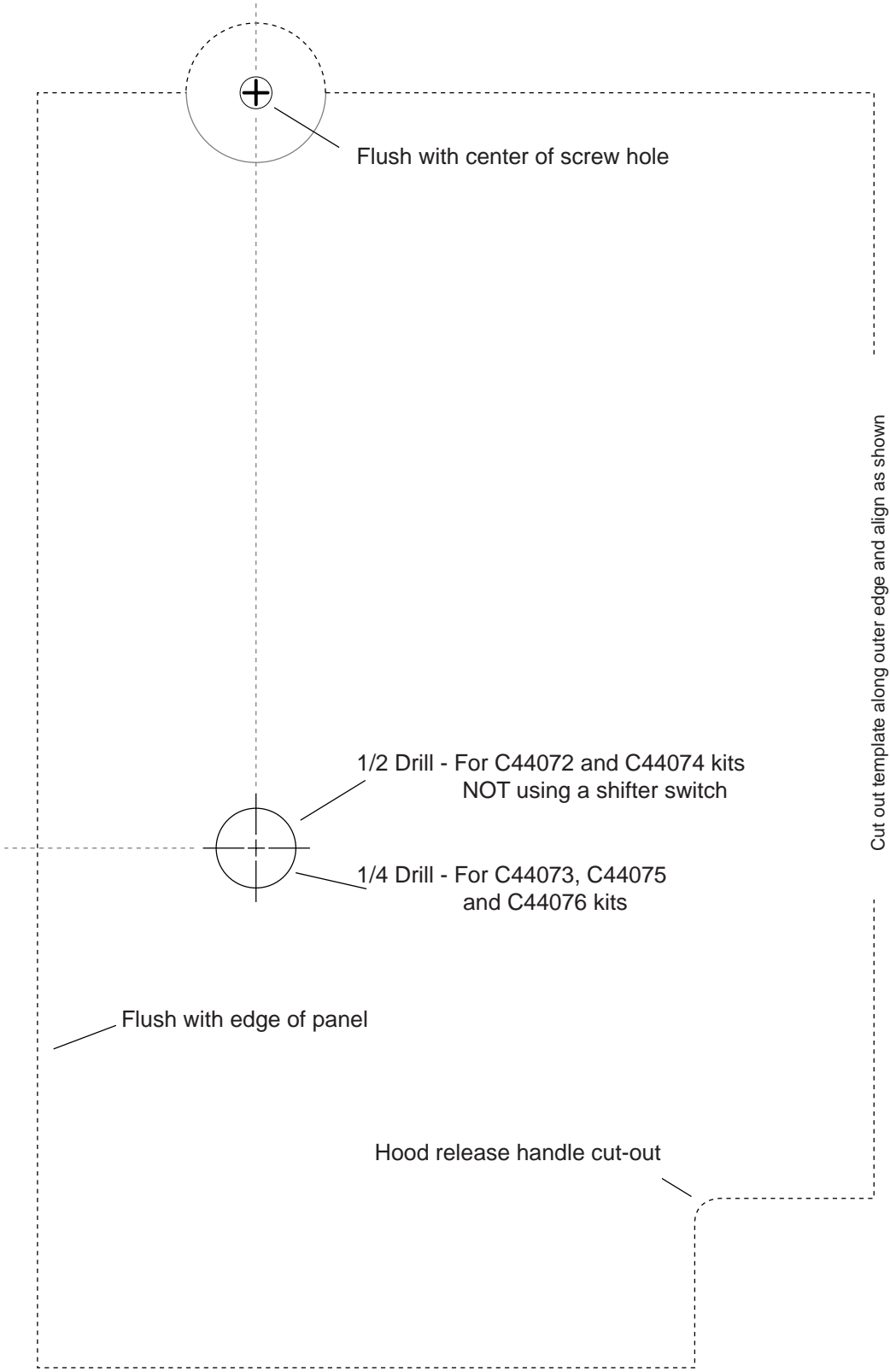
**ELECTRICAL SCHEMATIC:
C44075 1998½ - 2002 24 VALVE ENGINES, AUTOMATIC TRANSMISSION ONLY**



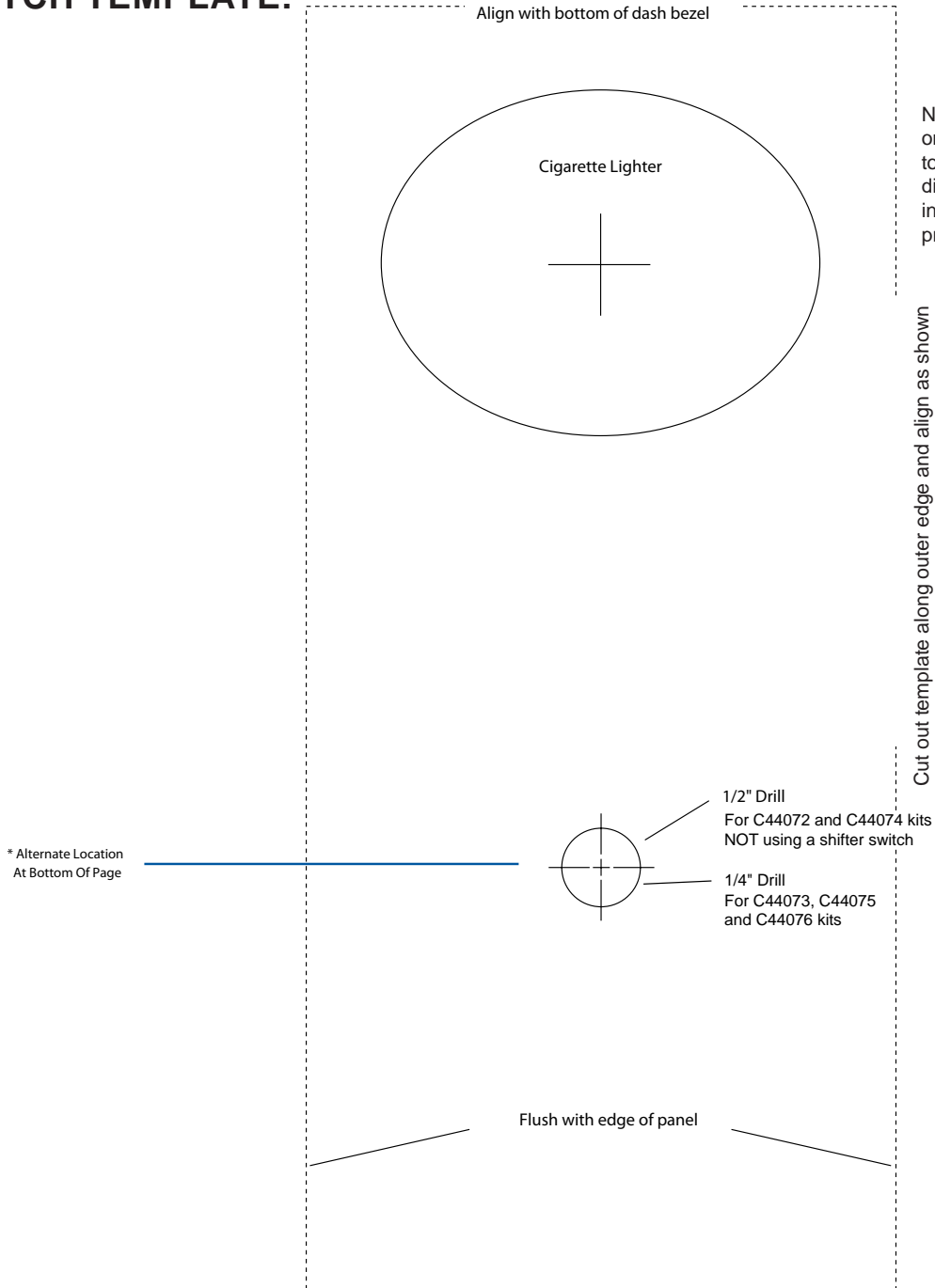
**ELECTRICAL SCHEMATIC:
C44076 1996-1998 12 VALVE ENGINES, AUTOMATIC TRANSMISSION ONLY**



**DASH SWITCH TEMPLATE:
1994-1998**



DASH SWITCH TEMPLATE: 1999-2002



NOTE: Template location is only a suggestion. Access to back of this location is difficult and wires must be installed on switch terminals prior to installation.

