

**OWNERS MANUAL**

...with installation instructions

# **Banks Stinger<sup>®</sup> System**

**INCLUDING GIT-KIT™**

**1998-2002 Dodge 5.9L Cummins  
(24-valve) ISB Pickup Trucks**

THIS MANUAL IS FOR USE WITH SYSTEMS 49357 TO 49374

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**BANKS**

Dear Customer,

If you have any questions concerning the installation of your Banks Power system, please call our Technical Service Hotline at (888) 839-2700 between 7:00 am and 4:00 pm (PT). If you have any questions relating to shipping or billing, please contact our Customer Service Department at (888) 839-5600.

## General Installation Practices

- 1.** For ease of installation of your Banks Git-Kit or Stinger familiarize yourself with the procedure by reading the entire manual before starting work. This instruction manual contains **20** pages of text, illustrations and parts listing.
- 2.** Throughout this manual, the left side of the vehicle refers to the driver's side, and the right side to the passenger's side.
- 3.** Disconnect the ground cable from the battery before beginning work. If there are two batteries, disconnect both.
- 4.** Route and tie wires and hoses a minimum of 6 inches away from exhaust heat, moving parts and sharp edges. Clearance of 8 inches or more is recommended where possible.
- 5.** When raising the vehicle, support it on properly weight-rated safety stands, ramps or a commercial hoist. Follow the manufacturer's safety precautions. Take care to balance the vehicle to prevent it from slipping or falling. When using ramps, be sure the front wheels are centered squarely on the topsides; put the transmission in park; set the hand brake; and place blocks behind the rear wheels.

**Caution! Do not use floor jacks to support the vehicle while working under it. Do not raise the vehicle onto concrete blocks, masonry or any other item not intended specifically for this use.**

- 6.** The installation should be performed at a time when the vehicle has been allowed to completely cool. This installation requires the installer to work near surfaces that may remain hot after the vehicle has been run. Failure to allow the vehicle to cool may result in personal injury.
- 7.** During installation, keep your work area and components clean to avoid possible dirt entry into the engine.
- 8.** Save this owners manual as a reference for system maintenance and service.

### Notification

**The Banks Ram-Air Filter comes pre-oiled and no oiling is necessary for initial installation. Service the filter as specified in the Cleaning and Oiling the Ram-Air Filter Section of this manual.**

## Tools Required:

These tools are necessary for all levels of installation unless otherwise specified.

- 1/4" and 3/8" drive ratchets with inch and metric sockets including 5/16", 7/16" deep 1/4" drive sockets and a 1/4" drive extension
- Inch and metric combination or open-end wrenches
- Standard and Phillips head screwdrivers
- Standard and needle-nose pliers
- Pocket or X-Acto knife
- Clean shop towels or rags
- Drill motor\*
- Tap handle\*
- 3/16" and 7/16" drill bits\*
- 1/4" NPT tap\*
- Heat gun (suggested) or cigarette lighter
- Pry bar or large groove-joint (water pump) pliers
- Wire crimping/stripping tool
- Oxy-acetylene torch or reciprocating saw
- Anti-seize compound

Highly recommended tools and supplies (not applicable to all system levels):

- Inch-pound and foot-pound torque wrenches
- Compressed air source and hose\*
  - Air pressure regulator\*
- Rubber tipped air blow gun\*
- Multimeter or 12-volt test light
- Penetrating oil or light lubricant spray

\* Stinger installation only

# System Installation Procedure

## EXHAUST REMOVAL

**1.** Under vehicle, remove the entire factory exhaust system. Starting at the rear of the vehicle, remove each component by either cutting through the pipe near the clamps or by removing the clamps and heating the joints to a red-orange color to allow the crimped pipes to separate. Remove the pin-type hangers from the rubber frame mounts by prying with a pry-bar or by pressing the pin out of the rubber with large water pump pliers. A soapy water solution or a penetrating lubricant will ease the removal of pin-type hangers from the rubber frame mounts. Remove the two bolts that attach the turbine outlet pipe to the turbine outlet elbow and remove the turbine outlet pipe from the vehicle. Keep these bolts for later use. To remove the turbine outlet pipe, it may be necessary to cut the pipe just to the rear of the pin hanger that slides into the hanger bracket on the transmission mount.

*For Git-Kit installation, proceed to Exhaust Installation (Step 25)*

## TURBOCHARGER REMOVAL

- 2.** Loosen the clamps that attach the air inlet tube to the air filter housing and to the turbocharger, and remove the air inlet tube from the vehicle. Remove the air filter housing from the vehicle. This will allow easier access to the turbocharger.
- 3.** Loosen the upper hose clamp on the turbocharger oil drain-tube hose that located between the two sections of the oil drain tube.
- 4.** Disconnect the oil supply hose at the turbocharger.
- 5.** Remove the turbocharger mounting nuts/bolts and the turbocharger from the exhaust manifold.

**CAUTION:** Anytime the turbocharger is removed from the engine, take care that no foreign objects enter any of the

turbocharger connections on the engine or the turbocharger. Foreign objects entering air, exhaust, or oil connections may cause major damage to the engine and/or turbocharger and is not covered under any warranty. Cover the open end of the intercooler pipe with a clean rag, as this pipe is very susceptible to foreign object entry.

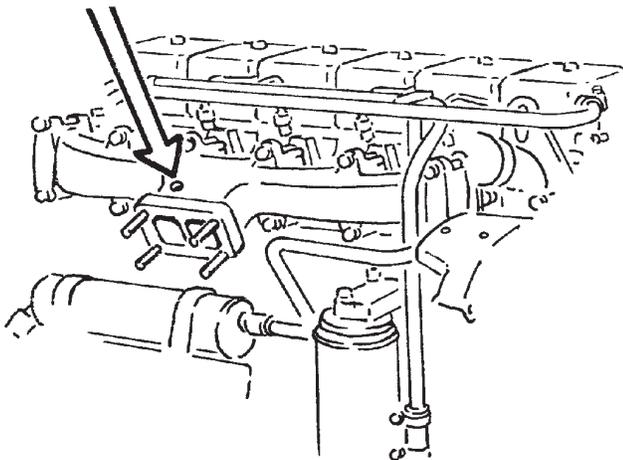
**6.** Clean and inspect the exhaust flange mounting surfaces on the exhaust manifold. Make sure the surface is clean and dry.

## THERMOCOUPLE INSTALLATION

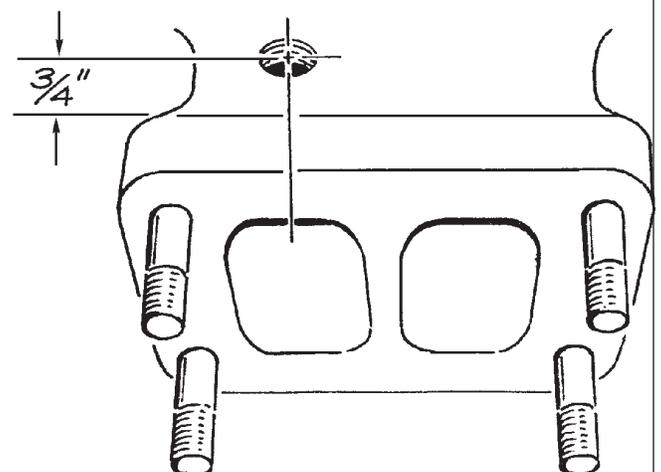
**7.** The thermocouple monitors the temperature of the exhaust gases entering the turbocharger at the turbine housing. Installation requires that the exhaust manifold be drilled near the outlet of the manifold adjacent to the turbine housing. For this reason it is essential that the turbocharger be removed from the engine in order to clean out any metal chips from drilling that could

**Figure 1**

DRILL AND TAP 1/4 NPT PORT IN REAR PASSAGE OF EXHAUST MANIFOLD OUTLET



LOCATE PORT 3/4 INCH BEHIND FLANGE, CENTERED OVER REAR EXHAUST MANIFOLD PASSAGE



cause turbine blade damage. The Cummins ISB engine uses a divided exhaust manifold and turbocharger. The thermocouple may be installed to sample exhaust temperature in either exhaust passage. We recommend the rear passage (toward the firewall).

**8.** Stuff a small clean shop towel or rag 4 to 5 inches into the rear exhaust manifold passage through the turbocharger mounting flange. This is to prevent chips from entering the manifold while drilling and tapping.

**9.** Drill through the exhaust manifold into the rear passage at the location shown in Figure 1. Use a  $\frac{7}{16}$ " drill, keeping the drill perpendicular to the manifold surface.

**10.** Tap the drilled hole with a  $\frac{1}{8}$ " NPT pipe tap. Check the thread depth as you tap by periodically removing the tap and screwing the thermocouple into the tapped hole. The thermocouple should thread in 3 to  $3\frac{1}{2}$  turns hand tight. Do not install the probe in place at this time.

**11.** Remove all loose chips from the exhaust manifold. A shop vacuum or small brush will help. Now remove the rag using a welding rod or coat hanger bent into a hook.

**Caution! Make sure rags are removed from exhaust manifold prior to reinstalling turbocharger!**

**12.** Install the thermocouple in the manifold using anti-seize on the

threads.

## ACTUATOR INSTALLATION/ MODIFICATION

*Note: At this point in the installation process, it is necessary to determine which model turbocharger your vehicle is equipped with. A turbocharger identification tag is located on the front of the compressor housing of the turbo or on the actuator. If your turbocharger is an HY35W, follow Steps 13-17. If your turbocharger is an HX35W, follow Steps 18-21.*

**13.** Remove the E-clip from the wastegate arm, allowing the actuator rod to be released. Save the E-clip for reinstallation. Remove the two nuts holding the actuator to the compressor housing and remove the actuator.

**14.** Tap the end of the boost reference tube on the stock actuator with the supplied  $\frac{1}{8}$ -28 UNF tap. Tap the tube just deep enough so that the end of the jet is recessed approximately  $\frac{1}{32}$ " to  $\frac{1}{16}$ " when threaded into the end of the boost reference tube and tightened until snug.

**15.** Install the jet into the end of the boost reference tube thenpeen the edge of the tube so that the jet cannot back out. DO NOT use a thread locking compound as a substitute for peening the end of the tube. Thread locking compounds will become ineffective due to temperature.

**16.** Using the supplied #55 bit,

drill a hole in the side of the boost reference tube close to the area where the tube is attached to the actuator can.

**17.** Reinstall the actuator on the compressor housing. Be careful not to damage the O-ring that seals the boost reference tube to the compressor housing. Next, reinstall the actuator rod end on to the wastegate arm. This will be difficult since considerable force is required to extend the rod far enough. Re-install the E-clip. Proceed to Step 22.

**18.** There are two possible wastegate actuator configurations for HX35W turbos. The early style actuator, found on 1998 and some 1999 model year vehicles, is attached to a bracket that is bolted to the turbine housing. Later style actuators are mounted to a flange on the compressor housing. Remove the e-clip from the wastegate arm, allowing the actuator rod to be released. Save the e-clip for reinstallation. If the actuator is an early style, unbolt the 3 actuator bracket bolts from the turbine housing. Note the location of all 5 spacers and retain the spacers and bolts for reinstallation. Remove the 2 nuts holding the actuator to the bracket and remove the actuator. If the actuator is a later style, remove the two nuts holding the actuator to the compressor housing and remove the actuator.

**19.** Install the Banks BigHead actuator in place of the factory actuator. If a mounting bracket is

Figure 2

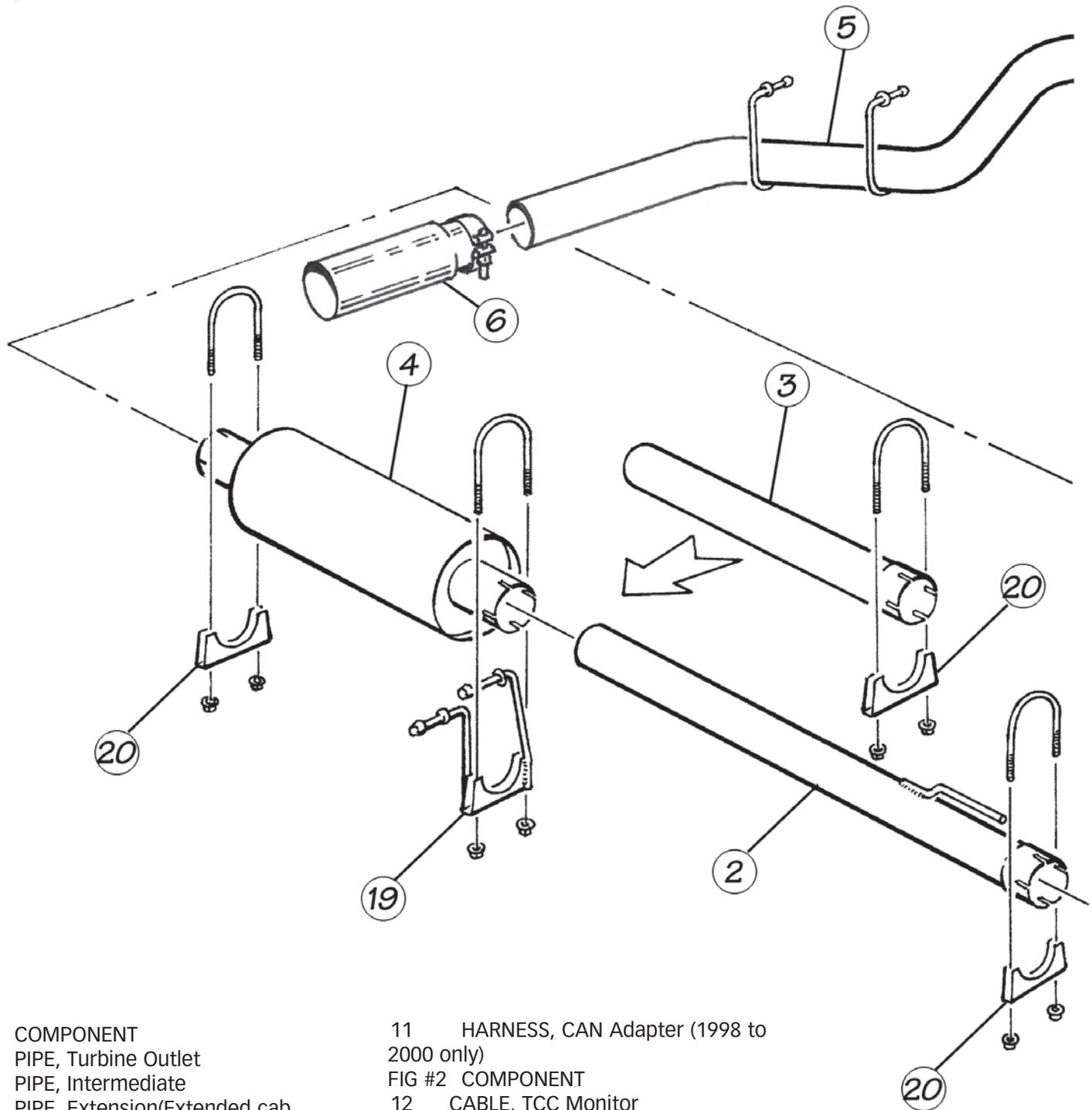


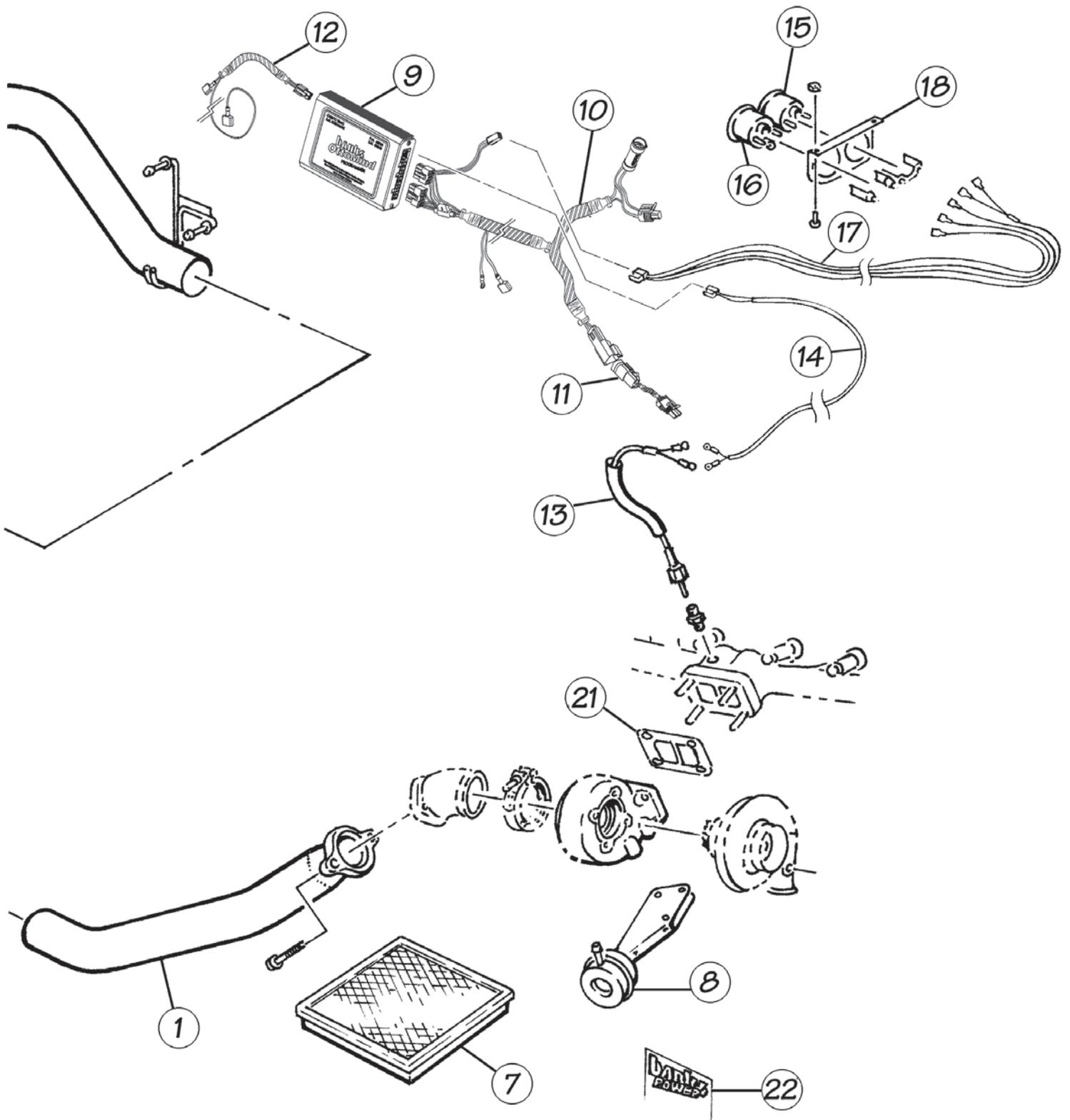
FIG #2 COMPONENT

- 1 PIPE, Turbine Outlet
- 2 PIPE, Intermediate
- 3 PIPE, Extension(Extended cab only)
- 4 MUFFLER, Banks Dynaflow®
- 5 PIPE, Monster® Tailpipe
- 6 Tailpipe Tip
- 7 FILTER, Banks Ram-Air™
- 8 ACTUATOR, BigHead™
- 9 OTTOMIND®, Engine Calibration Module
- 10 HARNESS, Wire (1998 model year shown)

- 11 HARNESS, CAN Adapter (1998 to 2000 only)

FIG #2 COMPONENT

- 12 CABLE, TCC Monitor
- 13 THERMOCOUPLE
- 14 LEADWIRE, Thermocouple
- 15 GAUGE, Boost
- 16 GAUGE, Pyrometer
- 17 HARNESS, Gauge Wiring
- 18 PANEL, Two-gauge Mounting
- 19 CLAMP, Hanger
- 20 (2) CLAMP, 4" Exhaust (Std. Cab)
- 20 (3) CLAMP, 4" Exhaust (Ext. Cab)
- 21 GASKET, Turbine Inlet
- 22 (3) UROCAL, Banks Power



used, loosely bolt the bracket into place on the turbine housing with the actuator bolted to the bracket using the original locknuts.

**20.** Turn the rod end link on the threads of the actuator rod until the hole lines up with the pin on the wastegate arm. Turn the rod end clockwise an additional six full turns, such that it will add preload to the wastegate.

**21.** Apply a regulated supply of air pressure to the nipple of the actuator until the rod extends enough to slip over the wastegate arm. Reinstall the E-clip on the wastegate arm. Tighten all bolts and nuts that remain loose.

#### TURBOCHARGER INSTALLATION

*Note: Some turbos are mounted with four studs protruding from the exhaust manifold while others have two studs*

*in the manifold and two in the factory turbine housing.*

**22.** Install the new turbine inlet gasket provided and apply a dab of anti-seize compound to the four turbo mounting studs. Install the turbocharger on the exhaust manifold. As the turbocharger is reinstalled, slip the oil drain tube into the drain hose. Tighten the turbocharger mounting nuts to 24 ft-lbs. Tighten the oil drain hose clamp.

**23.** Reconnect and tighten the turbo oil supply hose.

**24.** Re-install the air filter housing that was previously removed.

#### EXHAUST INSTALLATION

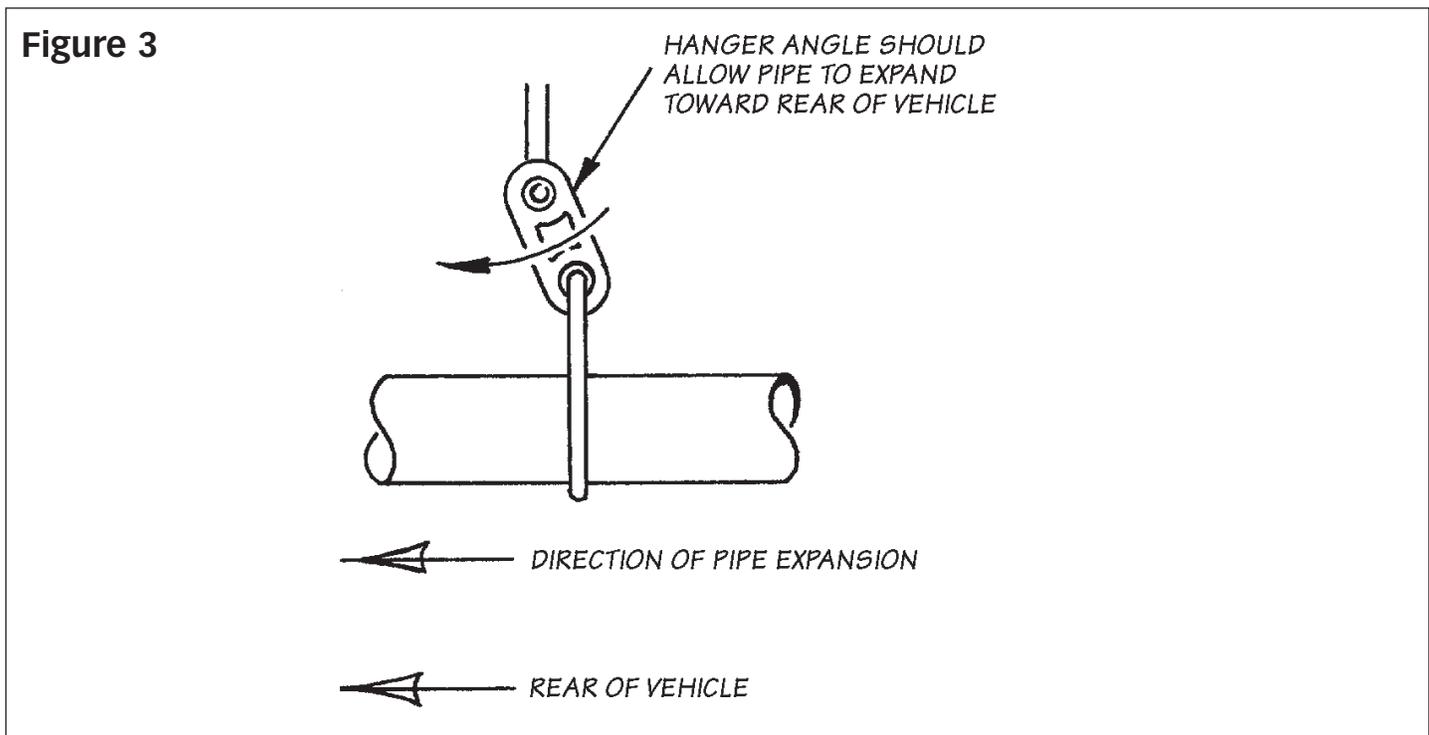
**25.** Position the new Banks Monster T.O.P. (turbine outlet pipe) onto the turbine outlet elbow.

See Figure 2. Install the attaching bolts to hold it in place, but do not tighten them yet.

**26.** Place a 4" muffler clamp onto the outlet of the turbine outlet pipe, and then slide the intermediate pipe into the hanger at the transmission mount, and onto the turbine outlet pipe. *Note: on extended cab short bed models, it may be necessary to shorten the intermediate pipe. Install the muffler and tailpipe without clamps and determine how much to trim based on the hanger position.*

**27.** On extended cab/quad-cab long bed models only, position another 4" clamp onto the outlet end of the intermediate pipe, and install the extension pipe onto the intermediate pipe.

**28.** Install the muffler assembly onto the end of the extension or



intermediate pipe. Temporarily support the muffler and install the hanger clamp at the front of the muffler. Snug the nuts, but do not fully tighten them.

**29.** At the rear of the muffler, slip a 4" clamp over the outlet of the muffler. Install the tailpipe up over the axle, and into the muffler outlet. Place the hanger pins into the rubber frame mounts behind the axle. Slip the 5" Monster tailpipe tip on. Keep the wrapping on until installation is complete. The tip should be rotated so the clamp nut is pointing down. Install the 5" tip so that it hangs past the end

of the tailpipe by 1" for fleet-side trucks and 2½" for duallies or where aesthetically pleasing.

**30.** Starting from the front of the vehicle, tighten all exhaust system attaching bolts and clamps. Make sure each slip joint is fully inserted, and that all frame mount hangers are hanging in a forward position. See Figure 3.

#### OTTOMIND INSTALLATION

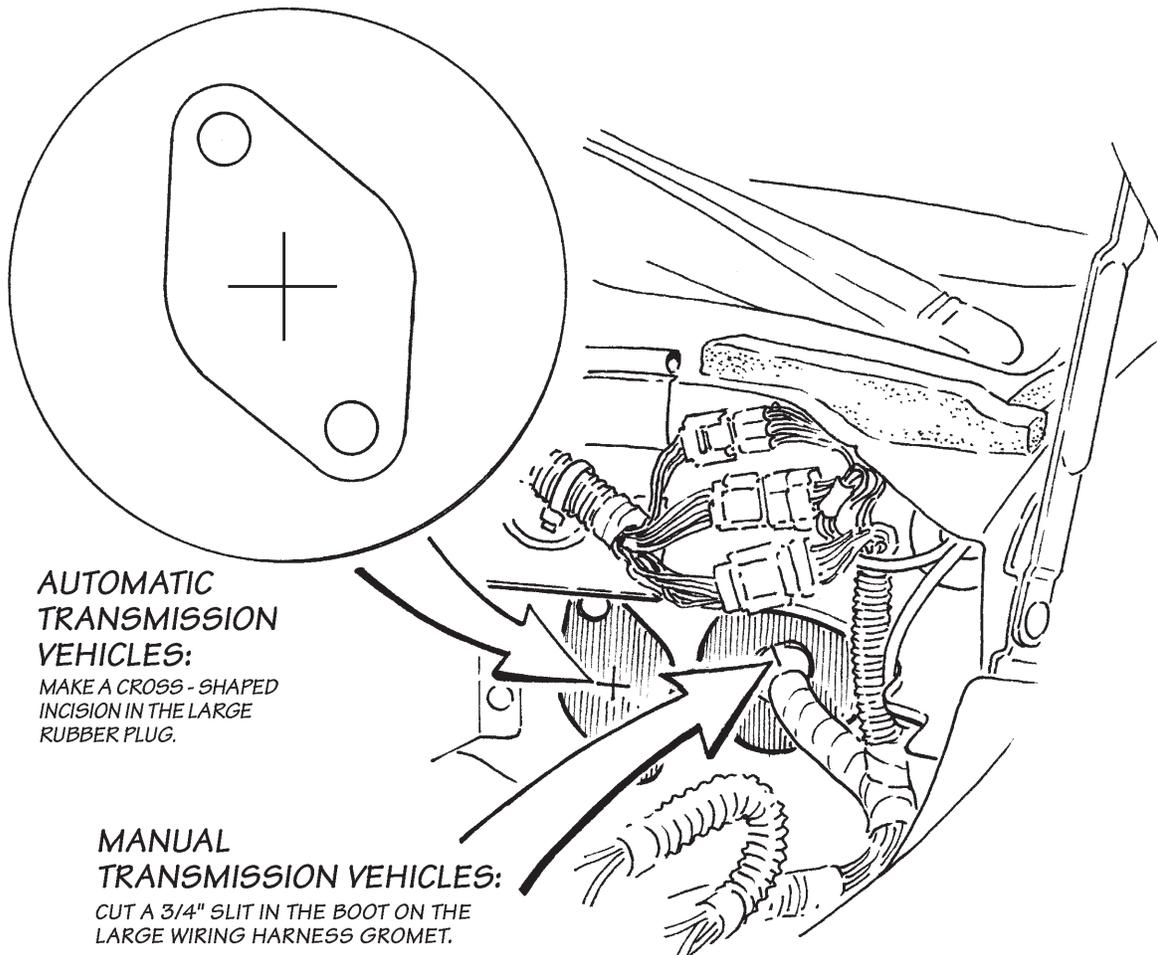
**31.** For automatic transmission models, locate and remove the rubber plug mounted in the firewall slightly above and to the right of the steering shaft, as viewed facing

the firewall through the engine compartment. Make a cross-shaped incision in the plug and reinstall it in the firewall. See Figure 4.

For manual transmission models, make an incision in the main wiring loom grommet above the wire bundle. Take care to not cut any wiring. See Figure 4.

**32.** Remove three Phillips-head screws from the trim panel below the steering column and remove panel by pulling directly toward the rear of the vehicle. Retain the screws for re-installation. Use caution to avoid damaging the panel during removal.

Figure 4



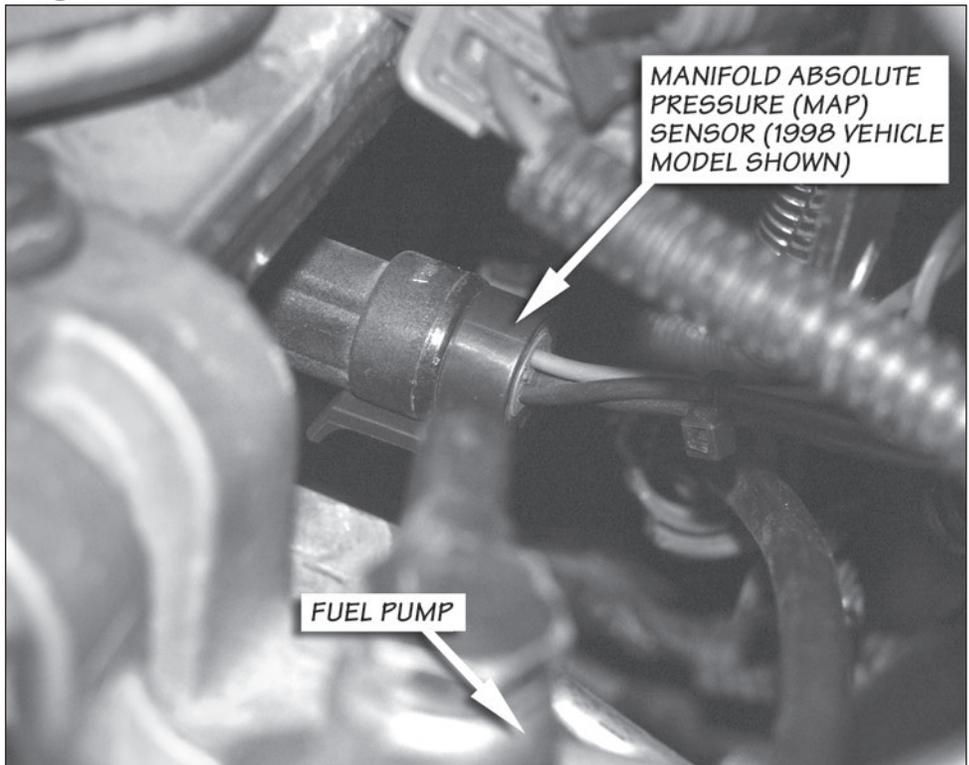
**Figure 5**

**33.** Insert the end of the provided OttoMind wire loom with the 8- and 10-pin connectors through the grommet from the engine compartment. Pull the Ottomind wire loom from inside the cab until approximately 18" of the wire loom is inside the cab.

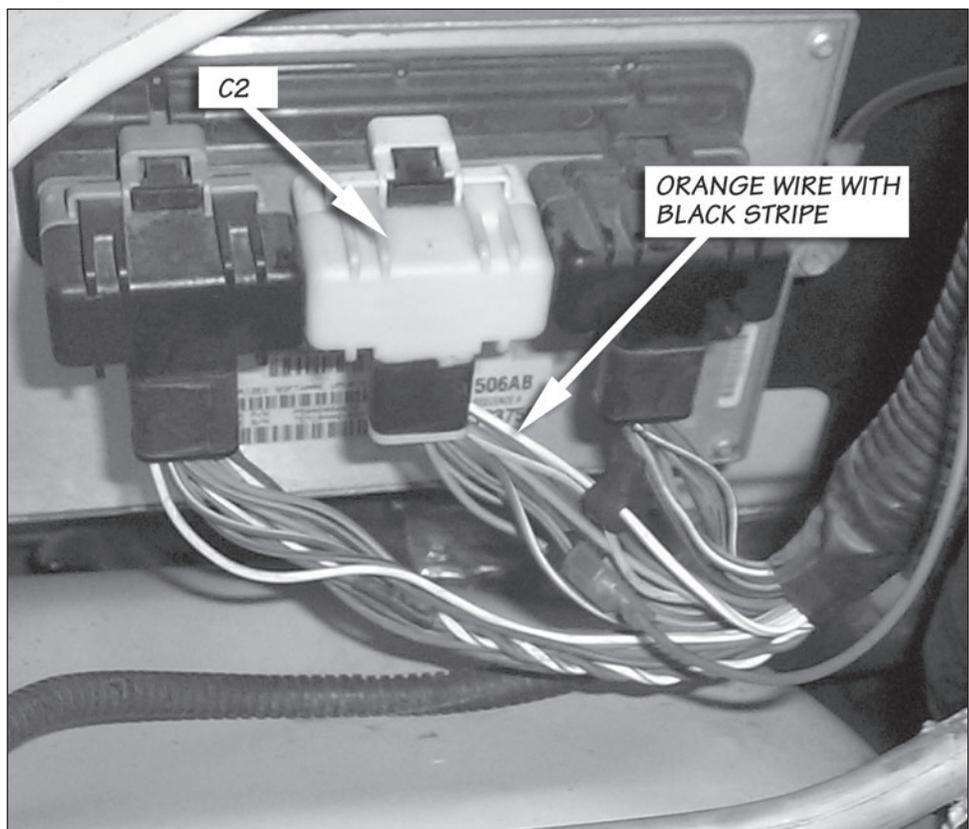
**34.** For automatic transmission only: Insert the end of the provided TCC wire harness with the 4-pin connector through the grommet from the engine compartment side using the same hole. Pull the TCC wire harness from inside the cab until approximately 18" of the harness is inside. Note that the TCC wire harness is not applicable on vehicles with a manual transmission.

*NOTE: Taping the end of the harness to a piece of stiff wire (i.e. coat hanger) may make routing the harness through the firewall a simpler task. The stiff wire should be pushed through the slit in the grommet and then the wires can be attached to the stiff wire and pulled through the hole in the firewall.*

**35.** In the engine compartment, locate the CAN BUS connector on the left hand's side of the engine: FOR 1998.5 TO 2000 VEHICLES: The CAN BUS connector is triangular shaped and near the power steering pump. Remove the weather seal plug. Insert the Ottomind wire harness CAN BUS connector into this connector. However for some 1999 and 2000 vehicles, the CAN BUS connector could be a flat 3-pin connector. Use the provided CAN BUS adapter wire and plug it into



**Figure 6**



the triangular connector on the OttoMind wire harness, then follow 2001-2002 CAN BUS installation procedure.

FOR 2001 TO 2002 VEHICLES: The CAN BUS connector is a flat 3-pin connector locates on top of the fuel lift pump below the Manifold

Absolute Pressure (MAP) sensor. Remove the weather seal plug and insert OttoMind CAN BUS connector into this connector.

**36.** Locate the Manifold Absolute Pressure (MAP) sensor on the left-hand side of the intake manifold next to the fuel pump. Unplug the factory connection, and plug the corresponding connectors on the OttoMind wire loom into the sensor and the factory wire loom. See Figure 5.

*For trucks equipped with a manual transmission, skip to Step 43.*

**37.** On automatic transmission models, locate the PCM (rectangular metal box with three connectors mounted on the passenger's side of the firewall) in the engine compartment. See Figure 6.

**38.** Make sure that the ignition is off, then disconnect all three connectors from the PCM for easier accessibility to the wires.

**39.** Select the center (usually white) connector and locate the wire in the No.11 connector pin cavity. This will typically be an orange wire with a black tracer stripe. Install a red T-Tap connector on this wire approximately 2-3 inches from the white connector body.

**40.** Plug the three cable connectors back into the PCM. The connector bodies are indexed so they cannot be installed in the wrong location.

Figure 7

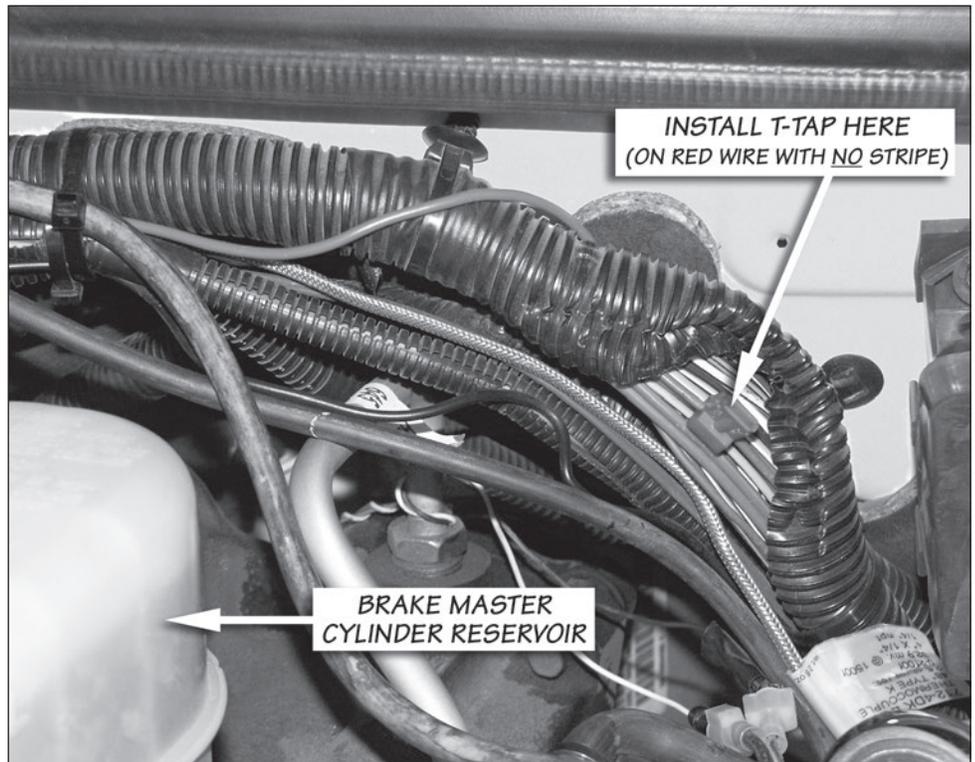
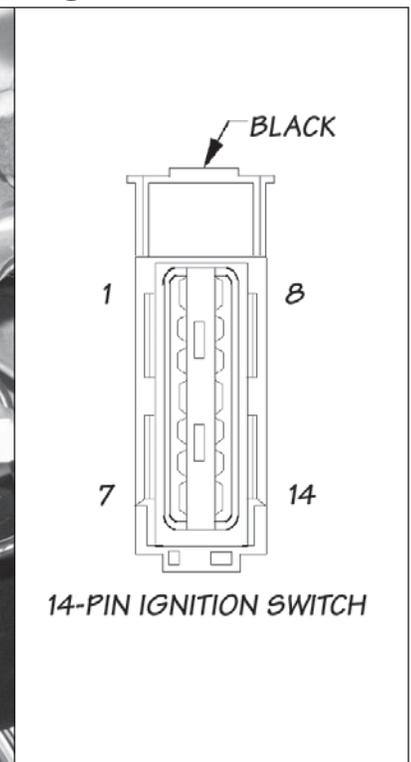


Figure 8a



Figure 8b



**41.** Locate the long gray wire on the Banks TCC wire harness. Route this wire with the factory wire loom across the base of the cowl and over to the PCM. Plug the wire into

the T-Tap installed on the No.11 pin wire at the center PCM connector. See Figure 6.

**42.** Find the solid red wire located

in the wiring harness in the engine compartment on the driver side as shown in Figure 7, and install a red T-tap. Plug the blue TCC wire into the T-tap.

**43.** Inside the cab, plug the main 8- and 10-pin connectors from the wire loom into the OttoMind box. On vehicle with automatic transmission, plug the TCC wire harness into the OttoMind.

For Git-Kit installation, proceed to Step 45.

**44.** Route the thermocouple leadwire through the grommet in the firewall. Connect the yellow and red wires of the leadwire to the corresponding connectors on the thermocouple. Plug the remaining end into the proper port on the OttoMind.

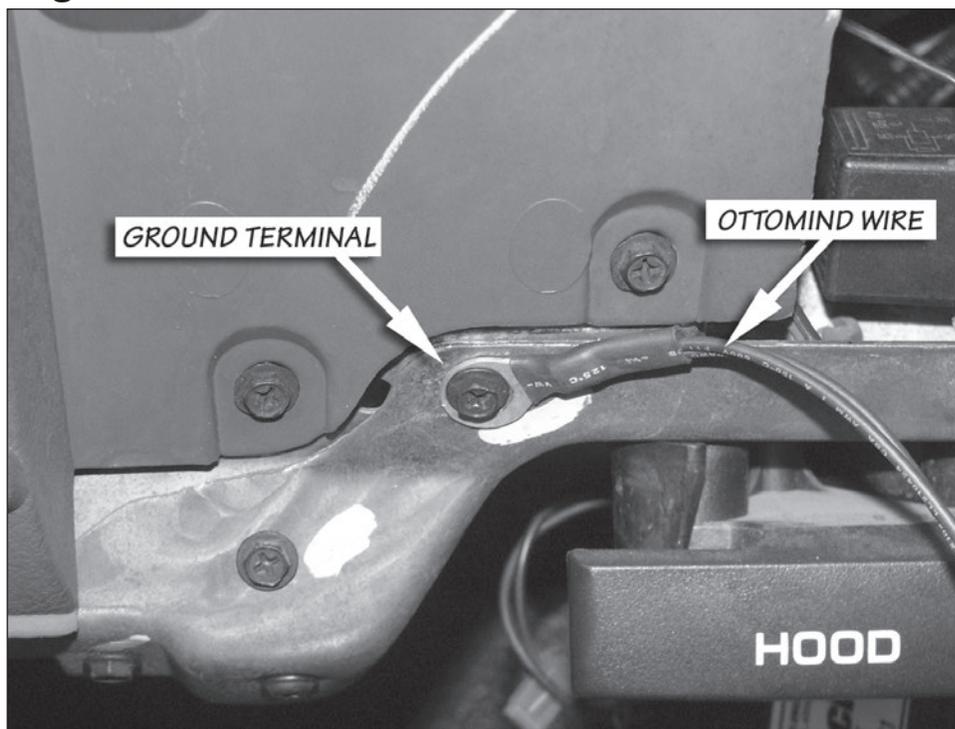
*If you have a 1998-2001 vehicle, proceed to Step 45a. If you have a 2002 vehicle, proceed to Step 45b.*

**45a. For 1998-2001 vehicles,** locate the 10 gauge dark blue wire on the wire harness running along the right side of the steering column. Install a yellow T-tap on this wire. Plug the red OttoMind wire into this T-tap. See Figure 8a. Proceed to Step 46.

**45b. For 2002 vehicles only,** remove the steering column lower shroud by removing the 4 torx bolts. Check the ignition switch to see if it has a 7-pin or 14-pin connector. Refer to Figure 8b for the 14-pin ignition switch.

If your vehicle has a 7-pin ignition switch, locate the 10 gauge dark

**Figure 9**



blue wire at the switch. Trace this wire and install a yellow T-tap at the location as shown in Figure 8a. Plug the red OttoMind wire into this T-tap. Re-install the steering column lower shroud. Proceed to Step 46. If your vehicle has a 14-pin ignition switch, locate the 16 gauge dark blue wire on the switch at Pin #3 See Figure 8b.

**DO NOT use the 10 gauge dark blue wire.** Trace this 16 gauge dark blue wire and install a red T-tap at the location as shown in Figure 8a. Plug the red OttoMind wire into this T-tap. Re-install the steering column lower shroud.

**46.** Find the small bolt located at the lower left hand corner as shown in Figure 9. Remove it and install the Ottomind wire ring terminal at this location. Reinstall the bolt to secure the ring terminal.

**47.** Reconnect battery terminals for the remaining installation and

test. For Git-Kit installation, proceed to CHECKING ENGINE PERFORMANCE and complete Steps 56 through 58 at the end. For Stinger installation, continue to Step 48.

#### **DYNAFACT INSTRUMENTATION INSTALLATION**

**48.** Choose a suitable location under the lower edge of the dash for the mounting of the instrument panel provided where the driver can conveniently view it.

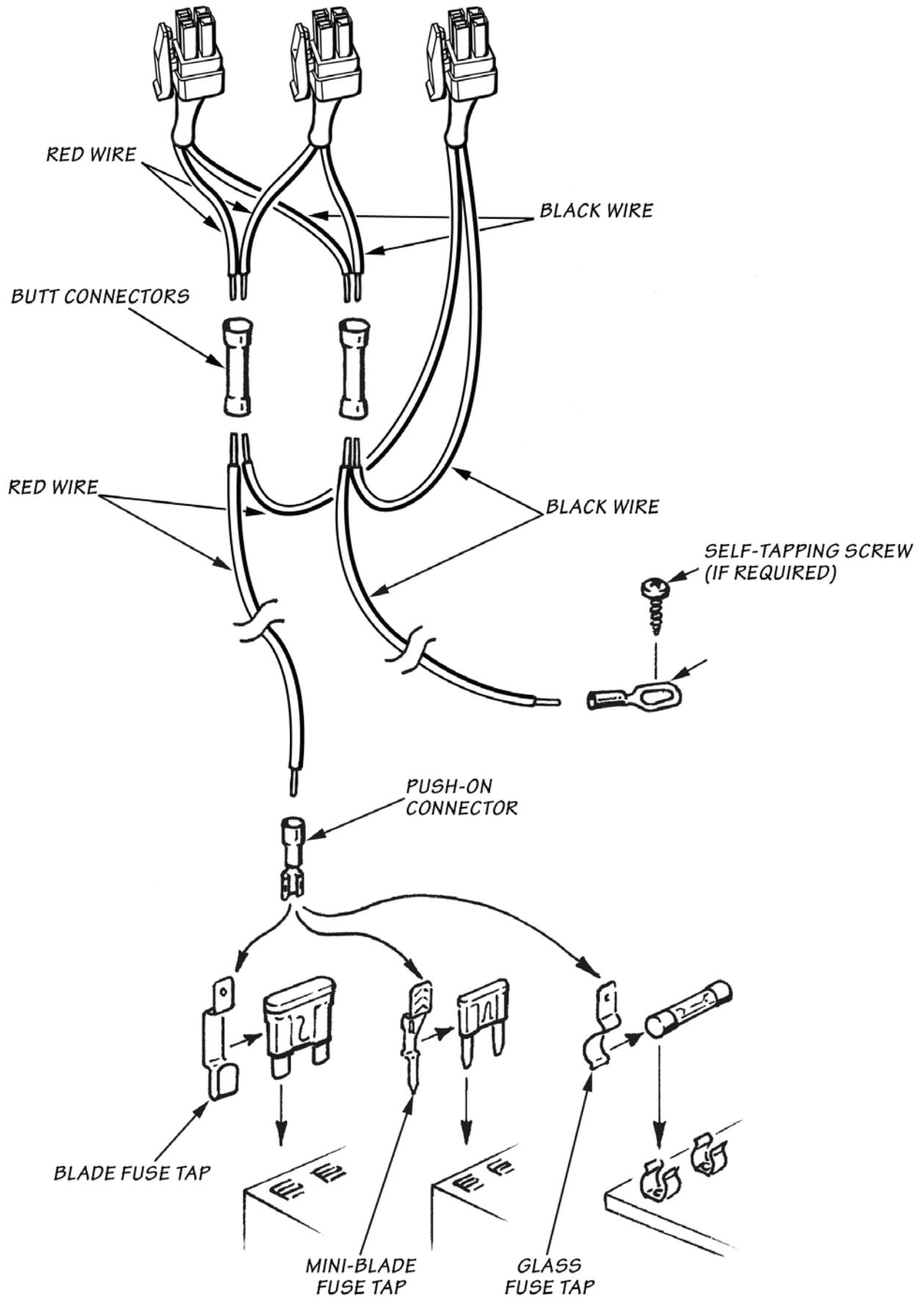
*Note: Molded pillar mount and additional gauges are available through Gale Banks Engineering.*

**49.** Using the panel as a template, drill two 3/16" diameter holes in the dash and mount the panel with the supplied machine screws, nuts and star washers provided.

**50.** Locate the supplied gauge wire loom with the 4-pin connector. Plug the 4-pin connector into the corresponding 4-pin receptacle from

Figure 10

4-PIN CONNECTORS TO GAUGE LED



the EconoMind wire harness. see Figure 2.

**51.** Install the DynaFact boost and pyrometer gauges in the mounting panel using the clamps and thumbnuts provided. Plug the BLACK wire lead to the male spade terminal on the BLACK wire of each gauge wire harness. Plug the YELLOW wire into the Yellow wire of the boost gauge wire harness and the RED wire into the RED wire of the pyrometer gauge wire harness. The ORANGE wire remains unused.

**52.** Connect the 4-pin connector of each gauge into the back of its corresponding gauge.

a. Crimp the remaining Black and RED wires from each 4-pin connector gauge harness to the butt connectors as shown in Figure 10.

b. Strip one end of the RED wire and crimp to one of the butt connectors attached to the gauge harnesses in step 'a'.

c. Strip one end of the BLACK wire and crimp to the other butt connector attached to the gauge harnesses in step 'a'.

d. Route the RED wire to the fuse box. Locate the appropriate fuse for instrument lighting in the owner's manual. Cut the RED wire as required and strip the end. Crimp the push on connector to the RED wire and connect to the fuse as shown in Figure 10. Alternatively, locate power wire to dimmer switch and

install T-tap. Cut the RED wire as required and strip the end. Crimp the push on T-tap connector to the RED wire and connect to T-tap on dimmer power wire.

e. Locate a metal surface that will serve as an acceptable chassis ground. Cut the BLACK wire to a sufficient length that will allow it to reach the chassis ground and strip the end. Crimp the ring terminal to the BLACK wire as shown in Figure 10.

f. Drill a 1/8" hole, if required, to attach the ring terminal to the chassis ground. Caution: If drilling, check the backside to make sure there are no components that may be damaged by drilling.

g. Use the supplied self-tapping screw to secure the ring terminal to the chassis ground

#### AIR FILTER INSTALLATION

**53.** Locate the engine air cleaner box on the passenger's side of the vehicle. Remove the cleaner box cover by releasing the four (4) clips on the side of the box and slide the cover toward the firewall.

**54.** Remove the old air filter element from the filter housing and replace it with the Banks Ram-Air filter element. Place the Banks filter element in the correct orientation and verify the filter seal is seating properly around the box to ensure no leakage.

For proper maintenance and service on the Banks Ram-Air Filter, refer to CLEANING AND OILING THE BANKS

RAM-AIR FILTER on page 16.

**55.** To install the air filter cover, slide the tabs on the cover into the slots on the air filter housing. Press the cover down gently and re-attach the four (4) clips on the side to securely clamp the cover. Proceed to CHECKING ENGINE PERFORMANCE and complete Steps 56 thru 58 at the end.

## Checking Engine Performance

Note: This verification of proper performance should be performed prior to permanent mounting of the OttoMind as illustrated in Steps 56-58.

Go over the entire installation as a precautionary check to ensure that all clamps are tight, wiring and hoses are properly routed, and connections are tight. Make sure that the wire harness is not laying in the way of the brake and gas pedals. Start the engine and allow it to warm up. Drive the vehicle under light load (normal around-town driving) for 20 to 30 minutes, and listen for any exhaust leaks or rattles, or intake boost leaks. Shut off the engine and re-tighten all intercooler and turbocharger boost clamps. These connections may have loosened with time, and if leaking, will cause a drop in boost pressure with a loss in performance. Check that clamps are properly positioned on hoses, and periodically check tightness of hose clamps at regular maintenance intervals, such as when the oil is

changed.

Observe the operation of the boost and pyrometer gauges (if equipped) while driving under varying conditions. Turbocharger boost pressure will increase as a function of load and engine RPM, thus the engine will produce little boost while cruising at light throttle, with maximum boost while climbing hills heavily loaded during acceleration. Note the boost level seen during hard acceleration with a given load. If performance seems to have deteriorated sometime in the future, the maximum boost figures may be compared to see if boost has dropped off. Lower boost may be caused by turbo ducting leaks, a malfunctioning wastegate or fuel injection pump, or dirty air filter. Typical maximum boost pressure settings for the Dodge/Cummins diesel will vary considerably with stick or automatic transmission options, year model of vehicle and altitude.

Use your pyrometer gauge (if equipped) to monitor exhaust gas temperature (EGT) in the engine. At idle, exhaust gas temperature will be very low, perhaps only 300°F. As the engine is accelerated for higher speeds with greater loads, the EGT will rise. The highest EGT will be seen under maximum load at full throttle, such as climbing a steep grade with a heavily laden vehicle. Your pyrometer is color coded to assist in your reading of the gauge. The red zone indicates a dangerous level of temperature. Your engine should not operate in this range

for more than a few seconds. The blue zone indicates when it is safe to shut the engine off. To avoid heat damage to various engine components it is recommended that the exhaust gases cool below 400° before the engine is shut down.

Your OttoMind is calibrated to maintain a maximum EGT of 1300°F. You may experience brief excursions slightly above 1300°F under acceleration. This is normal and EGT should return to at or below 1300° within a few seconds. If you find that EGT remains high for any length of time, check for boost leaks or a dirty air filter.

and display certain errors. Remove the OttoMind from its mounting location while keeping all three connectors plugged in. Turn vehicle key to ON position. Observe the two LEDs mounted on the upper corners of the black connector on the end of the OttoMind. If all wire connections are correct, a steady green light is illuminated.

If a connection is incorrect or if there is a problem with the system, when the key is on the LEDs will flash in sequence to identify a diagnostic code. An OttoMind's diagnostic code is comprised of 2 digits. Each code is expressed

**Table 1: Banks OttoMind Diagnostic Codes**

Diagnostic Code	Code Description	Course of Action
<b>1-2</b>	Faulty MAP signal	Check MAP connection
<b>2-2</b>	Faulty MAP signal	Check MAP connection and call <b>Banks Technical Service</b>
<b>2-3</b>	Open EGT thermocouple	Check EGT thermocouple connection
<b>2-4</b>	Transmission torque converter	Check torque converter connection
<b>3-3</b>	OttoMind internal error	Call Banks Technical Service
<b>3-4</b>	Communication Error	Check CAN Bus connection

If you feel that your OttoMind is not functioning properly, some diagnostics can be performed. Your OttoMind is equipped with diagnostic features that will detect

in a sequence of 2 sets of the flashing red LED separated by a brief flashing of the green LED in between. Each set of a number of red LED flashes represents a digit.

A longer flashing of the green LED separates the sequences. The LEDs will continue to flash to display all the errors, and then repeat. Table 1 lists some common diagnostic codes.

For example, if an open EGT thermocouple is detected (code 2-3) by the OttoMind, the following red and green LED flashing sequence is observed when the key is on:

- (1) Two times flashing RED LED
- (2) One time quick flashing GREEN LED
- (3) Three times flashing RED LED
- (4) One time longer flashing GREEN LED

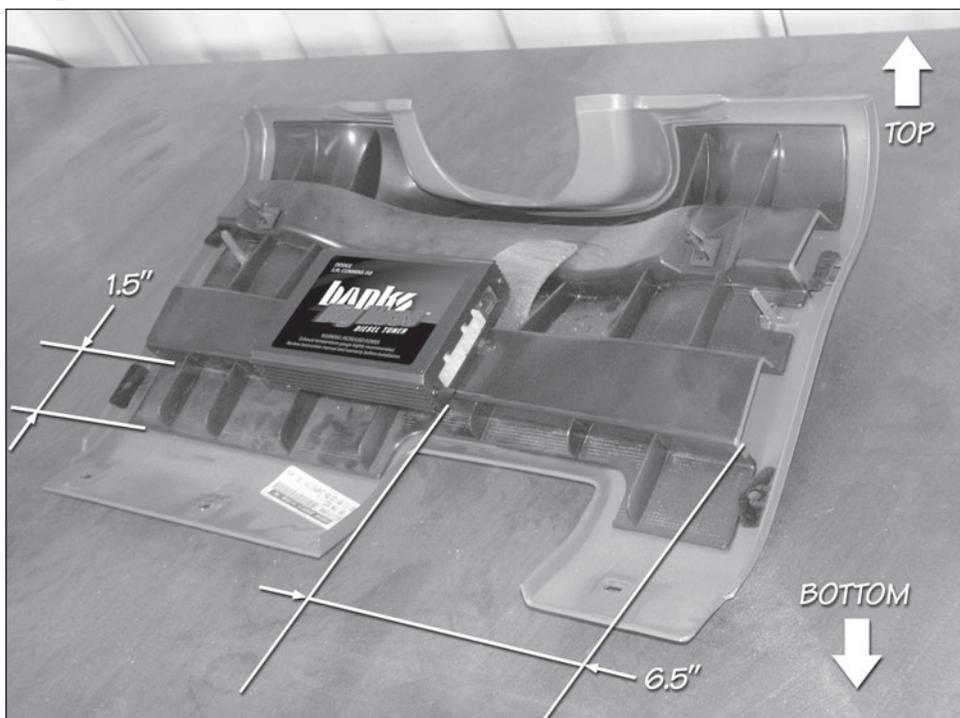
The above flashing sequence will repeat continuously. When the problem is corrected, the diagnostic code will be eliminated and replaced by a steady green light. If problem persists, contact Banks Technical Service.

#### OTTOMIND MOUNTING

**56.** After confirming the functionality of the system, make sure all the mounting surface is clean and free of dirt and oil before mounting the OttoMind. Clean and dry as required using a cloth dampened with rubbing alcohol or similar cleaning solution.

**CAUTION: Do not spray fluid**

Figure 11



**directly onto any electrical equipment, or equipment damage may result.**

Mount the OttoMind on the back of the lower dash panel as shown in Figure 11 by peeling off the protective backing off the adhesive tape on the back of the OttoMind box. *Note: The OttoMind may not clear the steering structure if it mounted differently.*

**57.** Hold the module against the panel for approximately 1 minute

while applying pressure to allow the adhesive to properly adhere to the surface.

**58.** Re-install the lower dash panel with the original 3 bolts. Route all wiring away from any pedals or other moving components. Using the cable ties supplied, secure the wiring under the dash. Reinstall the trim panel. Secure all wiring under the hood away from heat sources or sharp edges. Your Banks product installation is complete.

# Cleaning and Oiling the Banks Ram-Air Filter

## OILED AIR FILTER ONLY

**NOTICE:** The Banks Ram-Air Oiled Air Filter comes pre-oiled and no oiling is necessary for initial installation. Use Banks Ram-Air Filter Cleaning System (part#90094), available from Gale Banks Engineering to service the Air Filter. Follow the instructions included with the cleaning system to clean and re-oil your Bank Ram-Air Oiled Air Filter.

### 1. PRE-CLEANING

Tap the element to dislodge any large embedded dirt, then gently brush with a soft bristle brush. *NOTE: If complete cleaning is not practical at this time, reoil the element and reinstall in your vehicle.*

### 2. SPRAY-ON CLEANING

Spray air-filter cleaner liberally onto the entire element and let soak for 10 minutes.

### 3. PAN CLEANING

Large air-filter elements can be rolled or soaked in a shallow pan of air-filter cleaner. Remove immediately and let soak for approximately 10 minutes.

**NOTICE:** NEVER use gasoline, steam, caustic solutions, strong detergents, high-pressure nozzles, or cleaning solvents to clean the filter element. All of these can cause harm to the filter media as well as SHRINK and HARDEN the rubber end caps.

### 4. RINSING

Rinse off the element with low-pressure water. Tap water is okay. Always flush from the clean side to dirty side. This removes the dirt and does not drive it into the filter.

### 5. DRYING

Always dry naturally. After rinsing, shake off all excess water and let the element dry naturally.

### 6. AEROSOL OILING

After cleaning air filter always reoil before using. Spray air filter oil down into each pleat with one pass per pleat. Wait 10 minutes and re-oil any white spots still showing.

### 7. OILING HINTS

Never use a Banks Ram-Air filter without oil (the filter will not stop the dirt without the oil). Use only air

filter oil. Air-filter oil is a compound of mineral and animal oil blended with special polymers to form a very efficient tack barrier. Red dye is added to show just where you have applied the oil. Eventually the red color will fade but the oil will remain and filter the air. NEVER USE Automatic Transmission Fluid. NEVER USE Motor Oil. NEVER USE Diesel Fuel. NEVER USE WD40, LPS, or other light-weight oils.

### 8. REINSTALL

Reinstall your Banks Ram-Air filter element with proper care. Make sure the element seats properly in the filter case. Install the cover making sure it's in the right position. Tighten all the nuts, bolts, screws or clips to factory specifications.

### 9. DO NOT DISCARD

Affix the "Do Not Discard" sticker to the filter case (included with every Banks replacement element). Make sure you put the sticker in a highly visible place to alert your mechanic not to discard.

### 10. PERFORMANCE HINTS

Service every 50-100,000 miles on street-driven applications. Service more often in offroad or heavy-dust conditions. If an air-filter restriction gauge is installed, then change the element when the air-filter restriction reaches 18"-H.O.

**CAUTION:** Extremely fine dust from agriculture or offroad use will pull the oil from the element. Frequent reoiling of the element's clean side might be required. Completely service when practicable. For extra protection use an air-filter sealing grease on rubber ends of the element. Service only with air-filter cleaner and air-filter oil.

## DRY FILTER CLEANING

Clean every 50-100,000 miles on street-driven applications. Clean more often in offroad or heavy-dust conditions. If an air-filter restriction gauge is installed, then change the element when the air-filter restriction reaches 18"-H.O.

### 1. PRE-CLEANING

Carefully tap the air filter element to dislodge any large embedded dirt or debris.

### 2. CLEANING

Spray an appropriate DRY AIR-FILTER CLEANER SOLUTION liberally onto both sides of the entire filter element with the majority applied to the dirty side. Soak for 10 minutes. Do not allow the DRY AIR-FILTER CLEANER SOLUTION to dry on the air filter.

**NOTICE:** NEVER use gasoline, steam, caustic solutions, strong detergents, high-pressure nozzles, or cleaning solvents to clean the filter element. All of these can cause harm to the filter media as well as SHRINK and HARDEN the rubber end caps.

### 3. RINSING

Rinse the filter element with cool or warm (not hot) water from the clean side out in order to flush the dirt out of the filter. It may be necessary to use your fingers on the hose to apply light water pressure. Repeat steps 2 and 3, until the water flowing through the media is completely clear of any dirt and debris.

### 5. DRYING

After rinsing, gently shake off excessive water and allow to dry naturally. Re-install the filter onto the intake system, airbox or custom assembly once it is dry or just slightly damp. Follow all original installation instructions.

### 6. REINSTALL

Reinstall your Banks Ram-Air filter element with proper care. Make sure the element seats properly in the filter case. Install the cover making sure it's in the right position. Tighten all the nuts, bolts, screws or clips to factory specifications.

### 7. DO NOT DISCARD

Affix the "Do Not Discard" sticker to the filter case (included with every Banks replacement element). Make sure you put the sticker in a highly visible place to alert your mechanic not to discard.

### 8. PERFORMANCE HINTS

Service every 50-100,000 miles on street-driven applications. Service more often in offroad or heavy-dust conditions. If an air-filter restriction gauge is installed, then change the element when the air-filter restriction reaches 18"-H.O.

-END, SECTION 8 -

# PARTS LIST, 1998-2002 DODGE/CUMMINS ISB PICKUP

FIG #2	COMPONENT	GIT-KIT	STINGER
1	PIPE, TURBINE OUTLET	✓	✓
2	PIPE, INTERMEDIATE	✓	✓
3	PIPE, EXTENSION(EXTENDED CAB ONLY)	✓	✓
4	MUFFLER, BANKS DYNAFLOW®	✓	✓
5	PIPE, MONSTER® TAILPIPE	✓	✓
6	TAILPIPE TIP	✓	✓
7	FILTER, BANKS RAM-AIR™	--	✓
8	ACTUATOR, BIGHEAD™	--	✓**
9	OTTOMIND®, ENGINE CAL. MODULE	✓	✓
10	HARNESS, WIRE	✓	✓
11	HARNESS, CAN ADAPTER	✓*	✓*
12	CABLE, TCC MONITOR	✓	✓
13	THERMOCOUPLE	--	✓
14	LEADWIRE, THERMOCOUPLE	--	✓
15	GAUGE, BOOST	--	✓
16	GAUGE, PYROMETER	--	✓
17	HARNESS, GAUGE WIRING	--	✓
18	PANEL, TWO-GAUGE MOUNTING	--	✓
	KIT, SERVICE, BANKS RAM-AIR FILTER	--	✓
19	CLAMP, HANGER	✓	✓
20	(2) CLAMP, 4" EXHAUST (STD. CAB)	✓	✓
20	(3) CLAMP, 4" EXHAUST (EXT. CAB)	✓	✓
	HOSE, SILICONE	--	✓**
	KIT, WIRING, GAUGE LIGHTING	--	✓
	CONNECTOR, WIRE TAP	✓	✓
	(2) CLAMP, SPRING BAND	--	✓**
21	GASKET, TURBINE INLET	✓	✓
	TAP, 1/4"-28 PLUG		
	(2001 235 HP MODEL ONLY)	✓	✓
	DRILL BIT, #55		
	(2001 235 HP MODEL ONLY)	✓	✓
	JET, ACTUATOR TUBE		
	(2001 235 HP MODEL ONLY)	✓	✓
	ANTI-SEIZE	✓	✓
	(15) TIES, 7" CABLE	✓	✓
	OWNERS MANUAL	✓	✓
	WARRANTY STATEMENT, 5 YEAR	✓	✓
	WARRANTY STATEMENT, 2 YEAR	✓	✓
	WARRANTY STATEMENT, 1 YEAR	✓	✓
22	(3) UROCAL, BANKS POWER	✓	✓
	DECAL, DO NOT DISCARD	--	✓
	CARD, PRODUCT REGISTRATION	✓	✓

\*Included in systems #49357, 49358, 49363, 49364, 49365, and 49366

\*\*Except systems #49369, 49370, 49373, and 49374

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