

OWNERS MANUAL

**WITH INSTALLATION
INSTRUCTIONS**

banks[®] QUICK-TURBO[®] SYSTEM

**BANKS QUICK-TURBO
1989-1993 DODGE/CUMMINS DIESEL PICKUPS**

THIS MANUAL IS FOR USE WITH SYSTEM PART NUMBERS **24050** and **24051**

banks[®]

GALE BANKS ENGINEERING

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GALE BANKS ENGINEERING DODGE/CUMMINS DIESEL PICKUP QUICK-TURBO®

Dear Customer:

The Banks Quick-Turbo upgrade package is designed to greatly improve the response of the Dodge/Cummins 5.9BT 6-cylinder diesel pickup. The addition of a wastegate controlled turbine housing on the existing factory turbocharger allows the engine to achieve its rated power level in a much shorter time interval. The Quick-Turbo is not intended to increase the maximum power level, only to allow the engine to reach it in a much quicker manner. This equates to a far more drivable vehicle and maximized use of the engine's full potential while retaining existing engine durability.

The Banks Quick-Turbo will work well with either the factory or Banks intercooling, and the Banks PowerPack® intake and exhaust systems. Please refer to page 3 for installation tips if other Banks products are being installed with the Quick-Turbo.

If you have any questions or need assistance in installing your Quick-Turbo, please call our Service Department between 8:00am-5:00pm, PT at (626) 969-9600.

Thank You.

GENERAL INSTALLATION PRACTICES

1. For ease of installation and trouble-free operation of your BANKS Quick-Turbo System, PLEASE READ THIS ENTIRE 12-PAGE INSTRUCTION PACKAGE BEFORE STARTING ANY WORK. If any pages are missing from this package, please call GALE BANKS ENGINEERING immediately for a replacement. Become thoroughly familiar with all components and phases of the installation before starting any work.

2. Inspect all components supplied for any foreign material that may have entered during shipping and handling. Inspect all castings for damage resulting from shipping. Check all machined surfaces for nicks or other damage.

3. Any time the vehicle is raised off its wheels, it should be supported by jack stands, ramps, or a hoist of adequate capacity for the vehicle's weight. **NEVER PERFORM ANY WORK UNDER A VEHICLE SUPPORTED ONLY BY IT'S SERVICE JACK OR A HYDRAULIC JACK.**

4. Pay particular attention to the routing of all hoses and wiring. Keep them away from exhaust heat, moving parts and sharp edges that may cause cuts or other damage. Route or tie away from critical areas as required.

5. Right-hand and left-hand designations refer to the driver's right or left, as seated in the vehicle, (i.e.: Right-hand refers to the passenger side of the vehicle, unless noted otherwise.)

6. All BANKS components are designed, tested and manufactured to standards far exceeding factory OEM specifications. However due to normal variations in production vehicles, it may be necessary to slightly modify some exhaust components for proper fit.

7. The turbo boost level calibration is pre-set at our factory. Any increase of the boost level calibration may cause engine damage, and evidence of tampering will be grounds for warranty denial.

8. Torque values for fasteners are given in instruction steps. If torque wrenches are available, use them where applicable, however some fasteners may be in places inaccessible for torquing. In these instances and when no torque wrenches are available, reasonable tightening for the fastener size should be employed.

NOTE: Torque values are given in metric values (Newton-meters), foot-pounds, and inch-pounds.

INSTALLATION PROCEDURE WHEN COMBINED WITH OTHER BANKS PRODUCTS

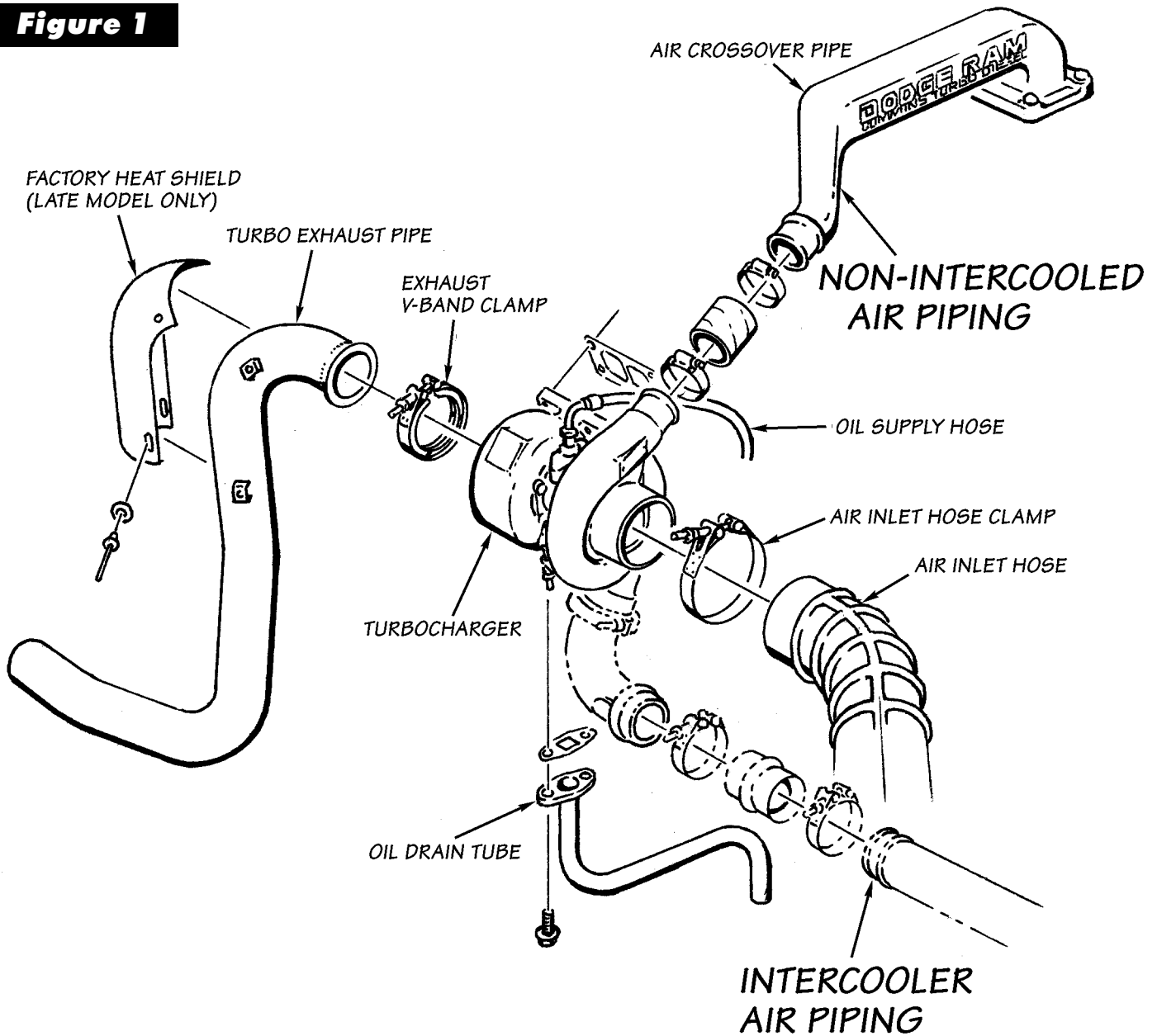
When the Banks Quick-Turbo is to be installed simultaneously with other Banks power products, the following suggestions will assist in a savings of time and effort during the overall installation.

1. If a Banks Intercooler is being installed on a non-intercooled truck, complete the Intercooler installation first. This will provide a reference for lining up the turbo ducting when the turbo upgrade is installed.

2. If the factory Intercooler is being replaced with a Banks Intercooler, complete the Intercooler installation first.

3. If a Banks PowerPack® exhaust system is being installed, complete the Quick-Turbo installation before installing the exhaust system.

Figure 1



INSTALLATION INSTRUCTIONS

TURBOCHARGER REMOVAL

See Figure 1 for component identification

- 1.** Position vehicle on a hoist. If no hoist is available, position vehicle on a flat level surface.
- 2.** Disconnect the battery cables from the battery.
- 3.** Disconnect the air inlet hose from air cleaner and exhaust pipe from the turbocharger.
- 4.** Remove the two oil drain tube bolts from the turbocharger.
- 5.** Disconnect the oil supply hose at the turbocharger.
- 6.** Loosen the two hose clamps that connect the turbocharger to the air crossover pipe (or intercooler pipe on intercooled models).
- 7.** Slide the connecting hose onto the turbocharger far enough to expose the gap between the turbocharger and the crossover pipe (or intercooler pipe).
- 8.** Remove the turbocharger mounting nuts 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 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. If the vehicle is intercooled, cover the open end of the intercooler pipe with a rag, as this pipe is very susceptible to foreign object entry.

9. Clean and inspect the exhaust flange mounting surfaces on the exhaust manifold. Remove any remaining gasket material from the turbocharger oil drain flange surface. Make sure surface is clean and dry.

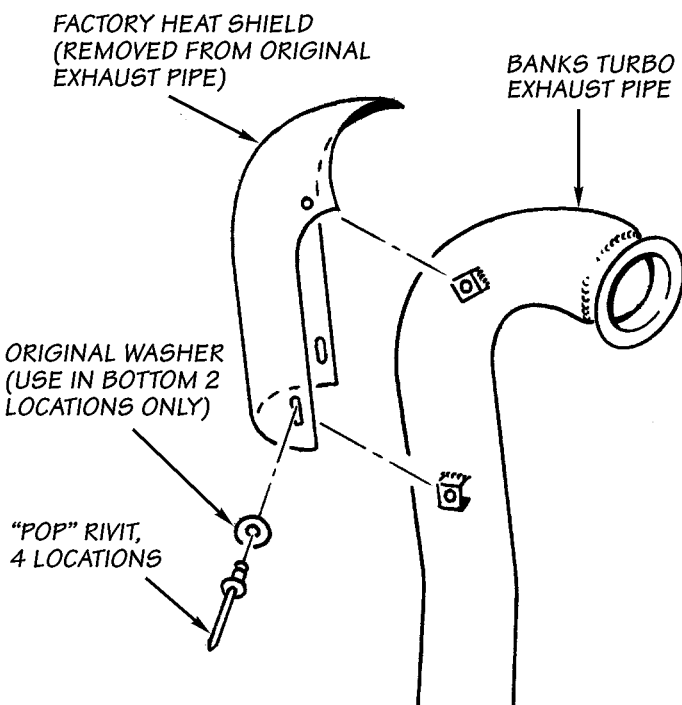
10. If an exhaust gas pyrometer gauge is to be installed, refer to pyrometer installation instructions and install the pyrometer probe in the exhaust manifold at this time (see separate section on pyrometer installation).

11. Raise front of vehicle and remove exhaust pipe support strap attached to engine.

12. Remove the U-clamp and separate the turbo exhaust pipe from the extension pipe. Heat from a torch may be required on the extension pipe slip joint to allow turbo exhaust pipe to be pulled free.

13. If the factory turbo exhaust pipe *does not* have a heat shield (near firewall) attached, go to step 16 and continue installation. If heat shield is present, continue with step 14.

Figure 2 EXHAUST PIPE HEAT SHIELD (LATE MODEL ONLY)



14. Locate the rivets that attach the heat shield to the exhaust pipe. Use a small power drill with a 3/16 inch drill bit to drill out the rivets and remove the shield.

15. Reinstall the heat shield on the new Banks turbo exhaust pipe. Four 3/16 inch "POP" rivets are provided. See Fig. 2.

16. Install the Banks turbo exhaust pipe in the existing extension pipe. A light lubricant and/or heat may be required to allow full engagement of the exhaust pipe into the slip joint. Do not clamp at this time. Reconnect the support strap.

NOTE: If the vehicle is a four wheel drive model and a Banks PowerPack® exhaust system is to be installed at this time, skip over this step and install the Banks turbo exhaust pipe when the PowerPack® exhaust components are installed. The 4WD Banks PowerPack® system includes a new exhaust extension pipe.

TURBOCHARGER DISASSEMBLY AND REASSEMBLY

17. Clamp the exhaust inlet flange of the turbocharger in a bench vise. Loosen the four bolts, attaching the turbine housing to the center bearing section of the turbocharger. See Figure 3.

Figure 3

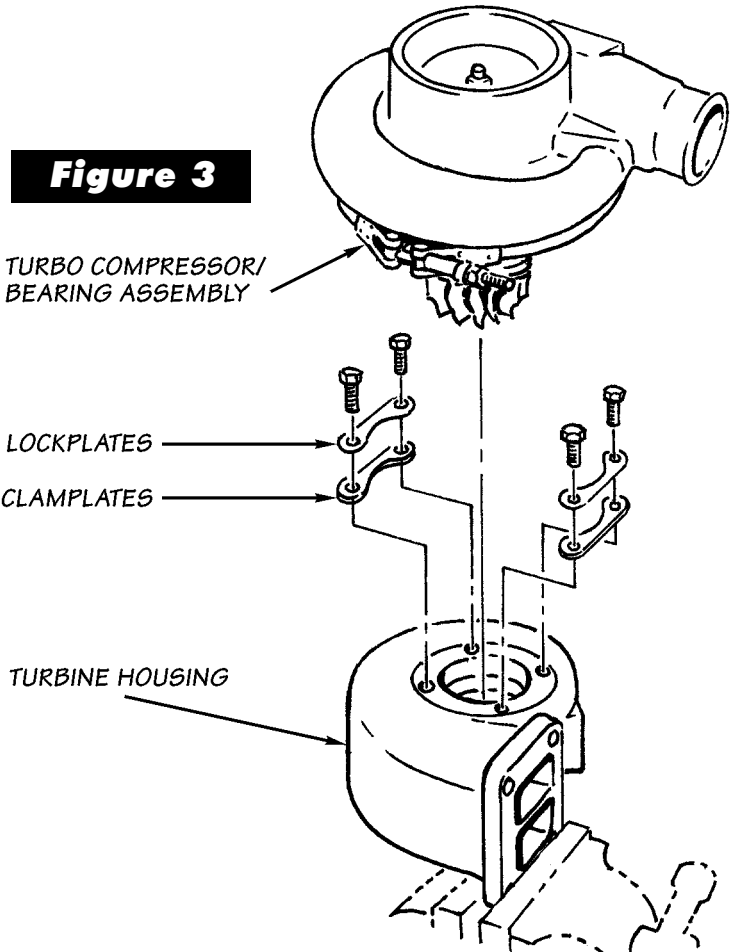
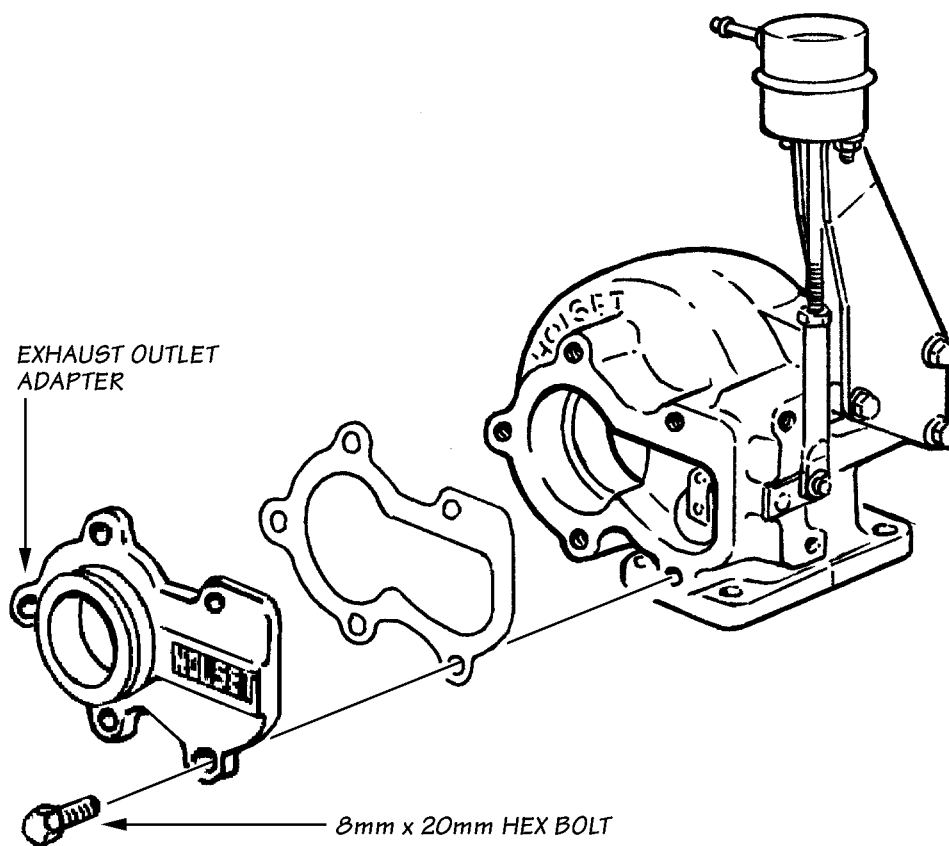


Figure 4



18. Remove the bolts, lockplates, and clampplates. Carefully remove the center bearing and compressor assembly from the cast iron turbine housing. If the turbocharger has been in service for some time, rust and carbon may prevent the center bearing and compressor assembly from easily separating from the turbine housing. If light hammer blows, penetrating oil, or heat will not free the compressor assembly from the turbine, the clamp bolt adjacent to the turbo oil inlet connection may be backed out so as to push against the bearing casting and separate the two components. Remove any loose rust or carbon from the bearing housing that might prevent proper engagement into the new turbine housing.

19. Install the center bearing and compressor assembly into the new turbine housing supplied in the Banks upgrade kit. Apply a dab of anti-seize compound to the bolts, then install bolts, clamp plates, and lock plates finger tight to allow for final positioning.

20. Clamp the exhaust inlet flange of the new turbine housing in a bench vise. Install the turbo exhaust outlet adapter casting and gasket to the turbine housing with five 8mm x 20mm metric hex bolts. Apply a dab of anti-seize compound to the bolts, then torque bolts to 11.3N-m (100 in.-lbs.). Make sure turbine inlet flange does not rotate in the vise while torquing. See Figure 4.

IMPORTANT: On 1989-91 non-intercooled models, go to step 28. Drill and tap wastegate boost connection as noted, then continue with step 21.

TURBOCHARGER INSTALLATION

21. Use a new gasket provided between the turbo oil drain flange and the oil drain. Make sure the turbocharger oil drain flange is clean and free of any old gasket material. Tighten the drain flange bolts to 24N-m (18 ft.-lbs.) torque.

NOTE: If bolts encounter excessive resistance prior to seating against the flange, check for paint build up in the threads of the turbo bearing housing. The threads may have to be chased with an 8mm x 1.25 metric tap.

22. Install a new turbo exhaust inlet gasket provided and apply a dab of anti-seize compound to the four turbo mounting studs. Make sure the turbo compressor hose is in place on the turbo, so it can be slid onto the crossover pipe or intercooler pipe. Install the turbocharger on the exhaust manifold. Slide the turbo oil drain tube into the hose on the engine. Tighten the turbocharger mounting nuts to 32N-m (24 ft.-lbs.) torque.

23. Now tighten the turbine housing clamp plate bolts to 11.3N-m (100 in.-lbs.) torque.

24. Spin the turbocharger shaft to make sure it turns freely. If not, loosen the turbine clamp plate bolts and check for misalignment between the turbine housing and turbocharger center section. Retighten bolts and check again.

25. Reconnect and tighten the turbo oil supply hose. Tighten the oil drain tube hose clamps.

26. Slide the turbo compressor hose onto the air crossover pipe or intercooler pipe. Center the hose over the gap between the turbocharger and the pipe, then position the clamps so they are behind (not over) the hose bead section of the turbo and pipe. Tighten the clamps to 5N-m (44 in.-lbs.) torque.

27. Install the air inlet tube (from air cleaner) and the turbo exhaust pipe onto the turbocharger. Tighten each of these clamps to 8N-m (72 in.-lbs.) torque. Make sure exhaust pipe is centered over V-band flange on turbocharger.

NOTE: If the vehicle is a 4WD model and a Banks PowerPack® exhaust system is being installed at this time, do not install and clamp the turbo exhaust pipe. It should be installed when installing the PowerPack®.

28. The wastegate in the turbine housing is operated by boost pressure fed to the actuator through a hose from the intake system. This hose connection location to the intake boost pressure will vary with vehicle model year and intercooled/non-intercooled applications. Figure 5 shows three methods of connecting the wastegate actuator hose, choose the one that applies to your vehicle.

NOTE: Non-intercooled '89-91 engines require that the intake crossover pipe be drilled and tapped for a boost pressure source. When tapping the air crossover pipe, push a rag into the open end of the crossover pipe past the point to be drilled and tapped. This will prevent chips from entering the engine. Drill through the back side of the crossover pipe using a letter "R" drill, just above the turbo compressor hose joint. Tap this hole with a 1/8 N.P.T. pipe tap to accept the tee fitting supplied. Use grease on the drill and tap to allow a minimum of chips to fall into the crossover pipe.

CAUTION! Make sure the rag is removed from the crossover pipe prior to reassembly and engine start up. Use a hooked tool (hook-screib or welding rod) to pull the rag from the crossover pipe. Inspect for and remove any remaining chips by placing a finger into the pipe opening and manually removing loose material.

29. Install a 1/8" N.P.T. tee fitting in the boost pressure source determined in step 28. See Figure 5. Install a 1/8" N.P.T. x 1/4" hose adapter fitting in one end of the tee fitting as shown in Figure 6. Use Teflon tape or pipe sealant on the fitting threads.

30. Install a spring-band hose clamp onto one end of the 1/4" I.D. silicone hose (squeeze clamp with pliers and slide onto hose). Push this end of hose onto the hose nipple adapter fitting installed in step 29. Route the hose over the engine to the hose nipple on the wastegate actuator. Maintain 3 to 4 inches of clearance between the hose and exhaust manifold. Cable ties are provided to secure tubing to existing engine plumbing (see Fig. 5).

CAUTION! Do not pull cable ties too tight as the hose may be pinched shut!

31. Trim hose as required to reach the wastegate actuator hose nipple. Slide a spring-band clamp onto the hose and attach hose to nipple. Make sure both hose clamps are positioned over the hose nipples. See Figure 7.

32. Choose a suitable location under the lower edge of the dash panel for mounting the gauge panel, provided, where it can be conveniently viewed by the driver. This will typically be above the transmission hump near the ash tray.

NOTE: Molded instrument consoles for top-of-dash mounting and additional gauges are available through Gale Banks Engineering.

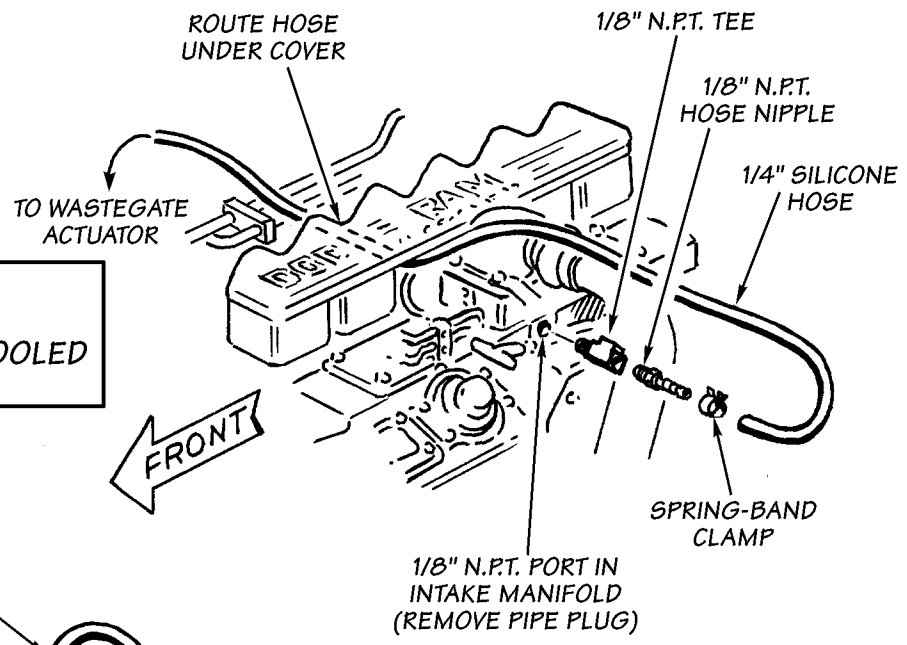
Using the panel as a template, drill two 3/16" diameter holes in the dash and mount the panel with two No. 10 x 1/2" machine screws, nuts, and star washers provided.

- A.** Locate and remove the 1/8" NPT pipe plug on the driver's side of the intake manifold. Install the 1/8" NPT male x 1/8" compression tube adapter at this location, use Teflon tape or sealant on the pipe thread end of the adapter fitting. See Figure 6.
- B.** Install one end of the 1/8" diameter plastic tube provided in the nut and ferrule on the adapter fitting and tighten nut. Check that plastic tube cannot be pulled out of ferrule, but do not over-tighten nut. Route plastic tube toward the firewall, then up and over the brake vacuum booster diaphragm.
- C.** Locate the large rubber plug in the firewall near the steering column. Drill a 3/8" diameter hole through the plug for the boost gauge tube and pyrometer cable. If the rubber plug is not present as on some models, locate a clear area on the firewall, near the steering column, where the firewall may be drilled through without contacting any under-dash components. Remove any burrs or sharp edges from the hole that could cut the tube or cable.

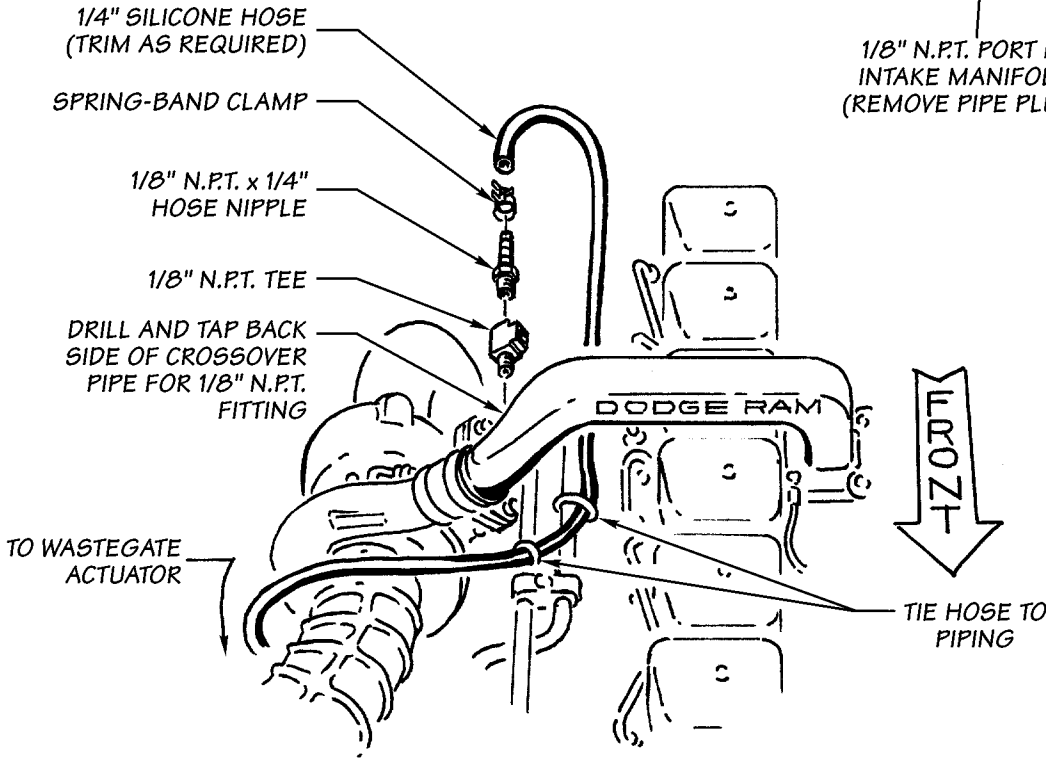
Figure 5

WASTEGATE ACTUATOR HOSE HOOK-UP

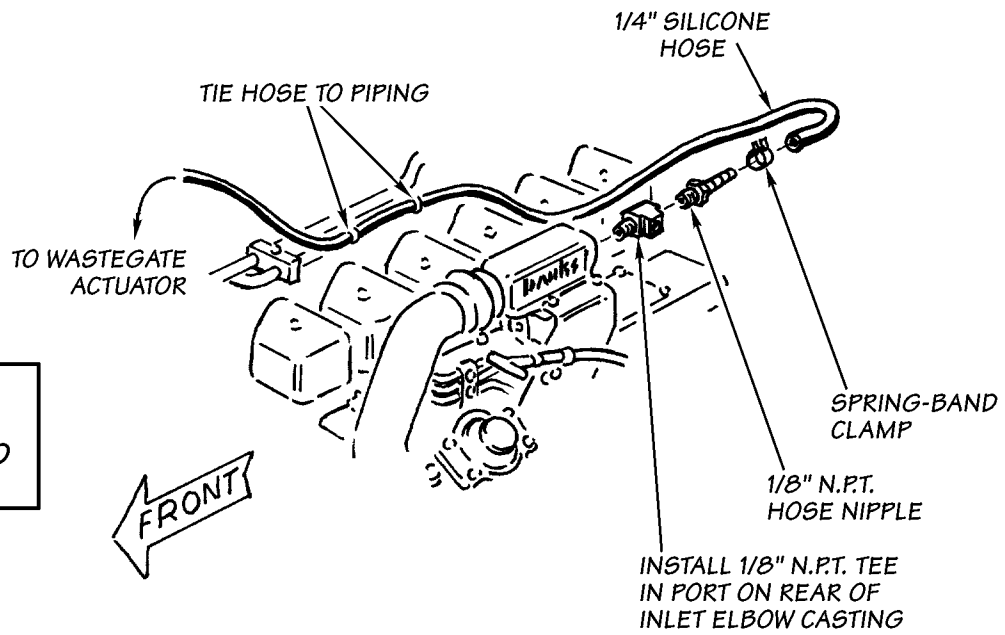
1991-1993
FACTORY INTERCOOLED



1989-1991
NON-INTERCOOLED



1989-1991
BANKS INTERCOOLED



- D. Feed the plastic tube through the hole drilled in the plug or firewall toward the instrument panel. If the tube and cable pass through a hole drilled in the firewall, wrap the tube and cable with several layers of electrical tape as additional protection from abrasion where they pass through the hole.
- E. Install the boost gauge in the gauge panel using the clamps and thumb nuts provided. Install the 1/8" NPT female x 1/8" compression tube adapter fitting onto the connection at the back of the gauge. Use Teflon tape or sealant on the male threads of the gauge nipple. Use sealant sparingly, and do not allow any sealant to cover the small pin-sized hole in the end of the gauge nipple.
- F. Route the plastic tube to the gauge, then cut the tube to length. Insert the tube into the nut and ferrule on the adapter fitting at the gauge, then tighten the nut against the tube and ferrule. Do not over-tighten.

33. If an exhaust gas pyrometer (temperature gauge) is to be installed, complete the wiring from the probe and install the gauge at this time.

34. Raise vehicle and tighten U-clamp at slip joint between turbo exhaust pipe and extension pipe.

NOTE: If the vehicle is a 4WD model and a Banks PowerPack® exhaust system is being installed at this time, skip this step as the PowerPack includes a new extension pipe. This step will be completed as part of the PowerPack assembly sequence. Reinstall turbo exhaust pipe when installing PowerPack system, torque V-band clamp to 8N-m (72 in.-lbs.).

35. Installation of the Quick-Turbo® upgrade package is now complete. If a Banks PowerPack exhaust system is to be installed at this time, that assembly may be commenced. Reconnect battery cables. Start vehicle and allow engine to warm up. Test drive vehicle and listen for any intake or exhaust leaks, correct as necessary.

Figure 6

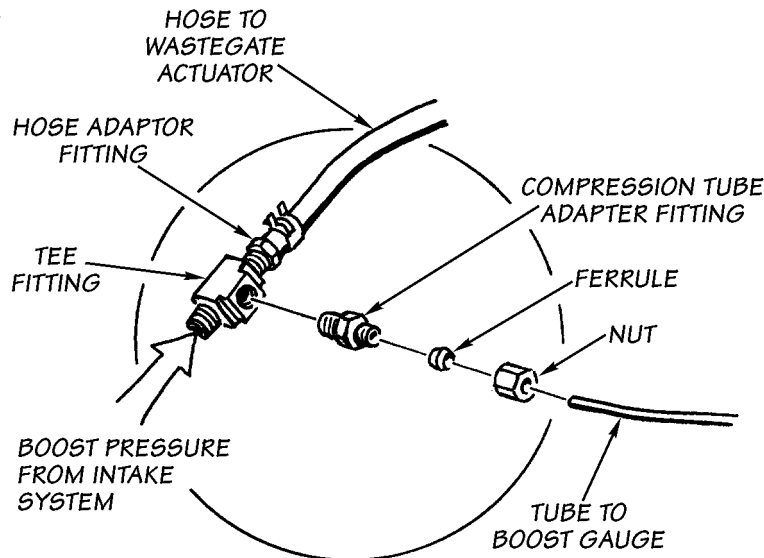
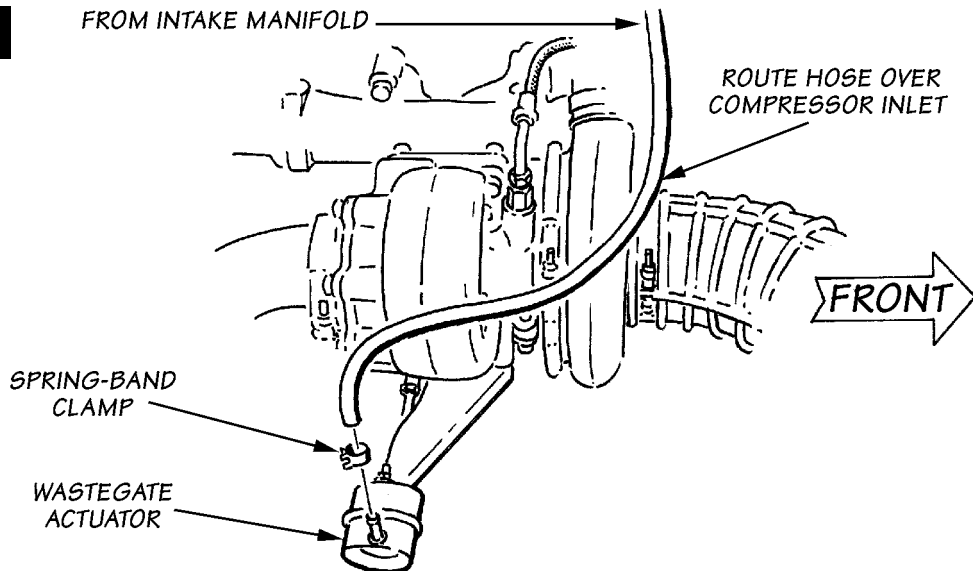


Figure 7



PYROMETER PROBE INSTALLATION

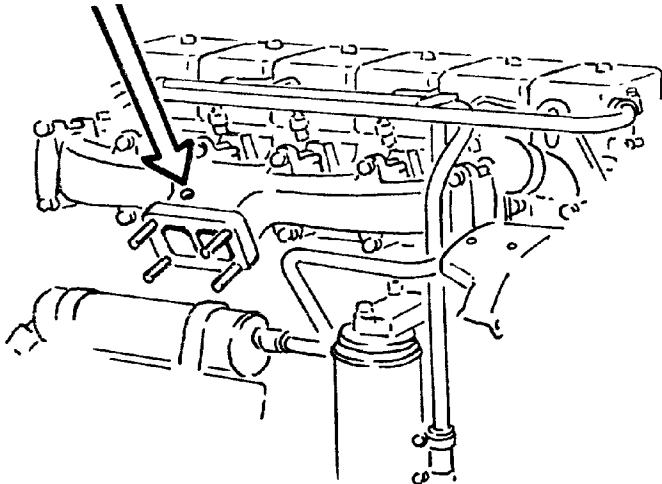
The optional exhaust gas pyrometer monitors the temperature of the exhaust entering the turbocharger turbine housing. Installation requires that the exhaust manifold be drilled adjacent to the temperature probe near the outlet of the manifold adjacent to the turbine housing. For this reason it is essential that the turbocharger be removed from the engine in order to clean out any metal chips from drilling that could cause turbine blade damage.

The Cummins 6BT engine uses a divided exhaust manifold and turbocharger. The pyrometer probe must be installed to sample exhaust temperature in one of the two exhaust passages. Typically the exhaust temperature will not differ appreciably between the two passages. We recommend installing the probe in the rear manifold passage to simplify routing the probe wiring.

1. Stuff a small 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.

2. Drill through the exhaust manifold into the rear passage at the location shown in figure below. Use a $\frac{7}{16}$ inch drill, keep the drill perpendicular to the manifold surface.

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



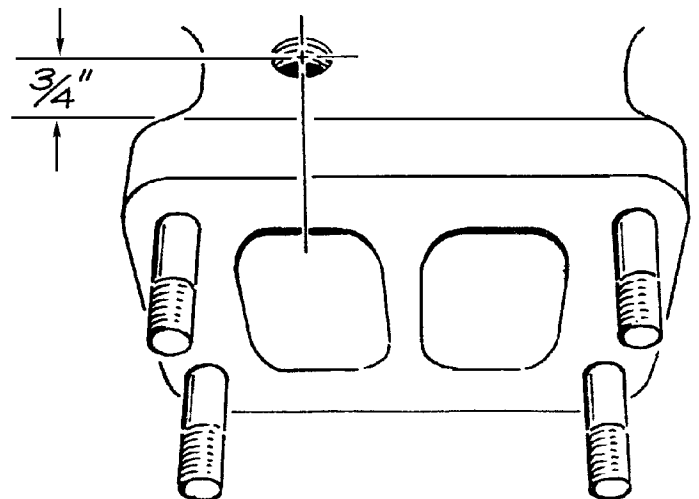
3. Tap the drilled hole with a $\frac{1}{4}$ NPT pipe tap. Check the thread depth as you tap by periodically removing the tap and screwing the probe fitting (supplied in pyrometer kit) into the tapped hole. The probe should thread in 3 to $3\frac{1}{2}$ turns hand tight. Do not install the probe in place at this time.

4. Remove as many loose chips as possible from the exhaust manifold. A shop vacuum, small brush, or fingers 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 turbine housing!

5. Install the probe in the manifold (anti-seize on threads is recommended) and continue the pyrometer assembly as outlined in the instructions supplied with the pyrometer.

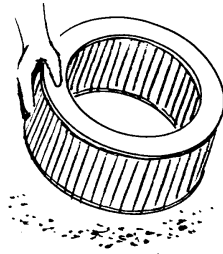
LOCATE PORT 3/4 INCH BEHIND FLANGE, CENTERED OVER REAR EXHAUST MANIFOLD PASSAGE



CLEANING AND OILING THE BANKS RAM-AIR FILTER

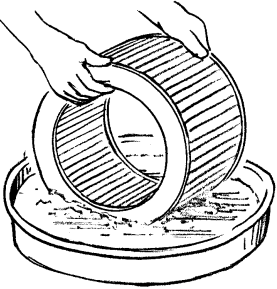
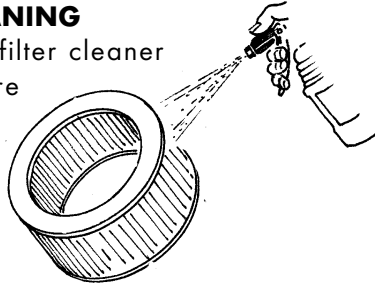
1. PRE-CLEANING

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



PAN CLEANING

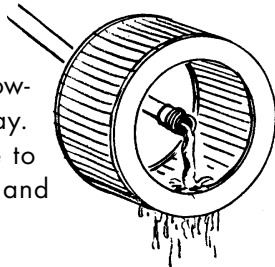
Large air-filter elements can be rolled or soaked in a shallow pan of Banks air-filter cleaner. Remove immediately and let soak for approximately 10 minutes.

3. CLEANING HINTS

Use only Banks air-filter cleaner. NO gasoline cleaning, NO steam cleaning, NO caustic cleaning solutions, NO strong detergents, NO high-pressure car wash, NO parts cleaning solvents. Any of these NOs can cause harm to the cotton filter media plus SHRINK and HARDEN the rubber end caps.

4. RINSE OFF

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.

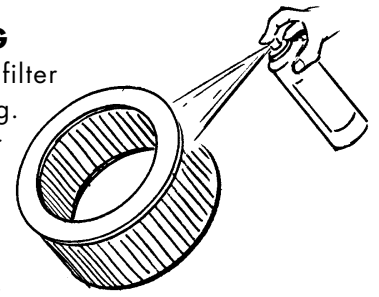


5. DRYING HINTS

Always dry naturally. After rinsing, shake off all excess water and let the element dry naturally. DO NOT USE COMPRESSED AIR - DO NOT USE OPEN FLAME - DO NOT USE HEAT DRYERS!
EXCESS HEAT WILL SHRINK THE COTTON FILTER MEDIA.
COMPRESSED AIR WILL BLOW HOLES IN THE ELEMENT.

6. AEROSOL OILING

After cleaning air filter always reoil before using. Spray Banks Ram-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 Banks Ram-Air filter oil. Banks 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"/H₂O.

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 Banks air-filter cleaner and Banks air-filter oil.

BILL OF MATERIALS

Banks Quick-Turbo System Dodge/Cummins 5.9 Diesel Pickups

DESCRIPTION	24050	24051
	PART#	PART#
ASSEMBLY, Turbine Housing p/n 24310	✓	✓
PIPE, Turbine Outlet p/n 52109	✓	✓
(2) CLAMP, Spring Band p/n 92875	✓	✓
FITTING, 1/8" Brass ST Tee p/n 92253	✓	✓
FITTING, Hose Barb 1/4" p/n 92244	✓	✓
GASKET, Oil Drain, T04 p/n 93040	✓	✓
GAUGE, Boost p/n 63025	•	✓
HOSE, Silicone, 1/4" x 3.34' p/n 94121	✓	✓
KIT, Installation, Boost Gauge p/n 63032	•	✓
(2) NUT, Machine Screw p/n 91833	•	✓
PANEL, One-Gauge Mounting p/n 63001-01	•	✓
(4) RIVIT, Pop p/n 91998	✓	✓
(2) SCREW, Machine p/n 91834	•	✓
(4) TIE, Cable, 8" Black p/n 62010	✓	✓
(2) WASHER p/n 91832	•	✓
(2) UROCAL, Banks Turbocharged p/n 96009	✓	✓
DECAL, Carb E.O. -D161-29 p/n 96028	✓	✓
OWNERS MANUAL p/n 96382	✓	✓
WARRANTY STATEMENT p/n 96364	✓	✓
CARD, Product Registration p/n 96392	✓	✓