

# OWNERS MANUAL

WITH INSTALLATION  
INSTRUCTIONS

# **banks**<sup>®</sup>

## POWERPACK

S Y S T E M <sup>®</sup>

INCLUDING STINGER™ & STINGER-PLUS™

WITH OTTOMIND™ ENGINE CALIBRATION MODULE  
1994–1998 FORD POWER STROKE 7.3L TURBO DIESEL

THIS MANUAL IS FOR USE WITH STINGER SYSTEMS 48501-48528  
THIS MANUAL IS FOR USE WITH STINGER-PLUS SYSTEMS 48451-48478  
THIS MANUAL IS FOR USE WITH POWERPACK SYSTEMS 48401-48528

# **banks**

## Also Available from Banks Power for '94-98 Ford 7.3L



### **Banks Monster® Exhaust System Single (P/N 46296-46299)**

- Increases exhaust flow, cuts backpressure, lowers exhaust gas temperatures (EGTs) and increases power.

### **Banks Techni-Cooler® System (P/N 25970)**

- Provides increased air flow to the engine by increasing air density for more increased power, lower EGTs and improved fuel economy.

### **Banks Billet Torque Converter 94-03 (P/N 72521)**

- Higher torque capacity over stock
- Lockup clutch is slip-resistant so transmission fluids stay cooler and transmission life is prolonged.

### **Banks Diesel Tuner 94-03 Big Hoss (P/N 66505)**

- Adds power safely to your vehicle
- Engine and transmission safeguards
- Change power levels on-the-fly

### **Thermocouple**

- Add a temperature limiting function to your Diesel Tuner

### **Banks QuickTurbo (P/N 24450)**

- More boost through the powerband
- Does not over-boost
- Turbo-diesel efficiency

### **Banks TransCommand (P/N 62560)**

- Produces smooth, firm, light throttle shifts and solid, decisive heavy-load shifts.
- Eliminates excessive clutch slippage

### **Banks Git-Kit Systems (P/N 48550)**

#### **Contains:**

- Monster Exhaust
- Big Hoss Module

**Banks Stinger Systems**

**Contains:**

- Ram-Air Intake Filter
- Monster Exhaust
- Big Hoss Module
- TransCommand

**Banks Stinger-Plus Systems**

**(P/N 48553-48554, 48559-48560)**

**Contains:**

- Ram-Air Intake Filter
- Monster Exhaust
- Big Hoss Module
- TransCommand
- Quick Turbo Assembly

**Banks PowerPack Systems**

**Contains:**

- Ram-Air Intake Filter
- Monster Exhaust
- Big Hoss Module
- TransCommand
- Quick Turbo Assembly
- Techni-Cooler

# GENERAL INSTALLATION PRACTICES

1. For ease of installation of your Banks Stinger™, Stinger-Plus™ or PowerPack® system, familiarize yourself with the procedure by reading the entire manual before starting work.
2. The exploded views provide only general guidance. Refer to each step and section diagram in this manual for proper instruction.
3. Throughout this manual, the left side of the vehicle refers to the driver's side, and the right side to the passenger's side.
4. Disconnect the ground cables from the battery (or batteries, if there are two) before beginning work.
5. 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.
6. 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.
7. During installation, keep the work area clean. If foreign debris is transferred to any Banks component, clean it thoroughly before installing.

## Notification

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

# INSTALLATION INSTRUCTIONS

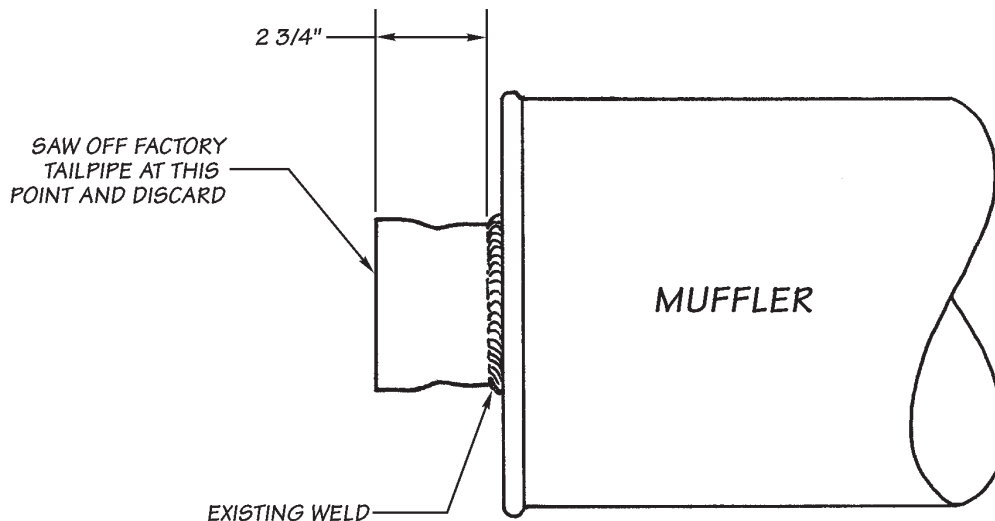
8. Replace the stock air filter element with the Banks Ram-Air filter.

9. Raise vehicle on a hoist or safety stands to provide access to the exhaust system. Mark a point  $2\frac{3}{4}$ -inches from the rear-most edge of the weld joining the tailpipe to the muffler. At the mark, cut through the tailpipe square to the muffler. Remove the tailpipe from the vehicle by prying the pin from the hanger and pulling the pipe rearward over the axle. De-burr the cut on the tubing which remains attached to the muffler.

See Figure 1.

10. Loosen the clamp at the outlet of the catalytic converter. Unbolt the catalytic converter from the turbine outlet pipe and remove the converter from the vehicle. Heat from a torch will most likely be required to separate the converter slip joint. NOTE: It is very important to inspect the catalytic converter. Diesel catalysts may become plugged with soot and can cause a restriction to exhaust flow. Performance may be impeded if this is the case. Shine a powerful flashlight into the slip joint end of the converter. Observe the light through the other end of the converter. The full circle of the flashlight should be visible without any blockage in the grid work of the catalyst. If excessive soot is observed, the catalyst may need to be cleaned. TAKE PRECAUTIONS to avoid blowing soot toward the work area or where it could be inhaled. ALWAYS use breathing protection. Also inspect the catalyst for damage (i.e. chips, bent corners, etc.) to the gridwork. If your catalytic converter is damaged, it may be covered under your vehicles emissions warranty.

FIGURE 1



11. Remove the decorative black cover directly over the engine. Remove the engine lifting hook at the rear of the right cylinder head.

12. **AUTOMATIC TRANSMISSION ONLY** Remove the transmission dipstick and unbolt the dipstick tube and engine ground wire from the rear of the passenger-side cylinder head. Pull the dipstick tube up out of the transmission. Cover the dipstick tube opening with a rag or paper towel to prevent contaminants from entering the transmission. For additional clearance, remove the transmission-fluid cooler line that runs to the passenger-side of the transmission, nearest the dipstick tube. DO NOT start the vehicle while this line is disconnected, as transmission fluid will quickly pump out of the line.

13. Remove the V-clamp that secures the factory turbine outlet pipe to the turbocharger outlet. Pull the pipe up as far as possible and cut the pipe as close to the engine as possible. Discard the top section then remove the bottom portion of the pipe from under the vehicle.

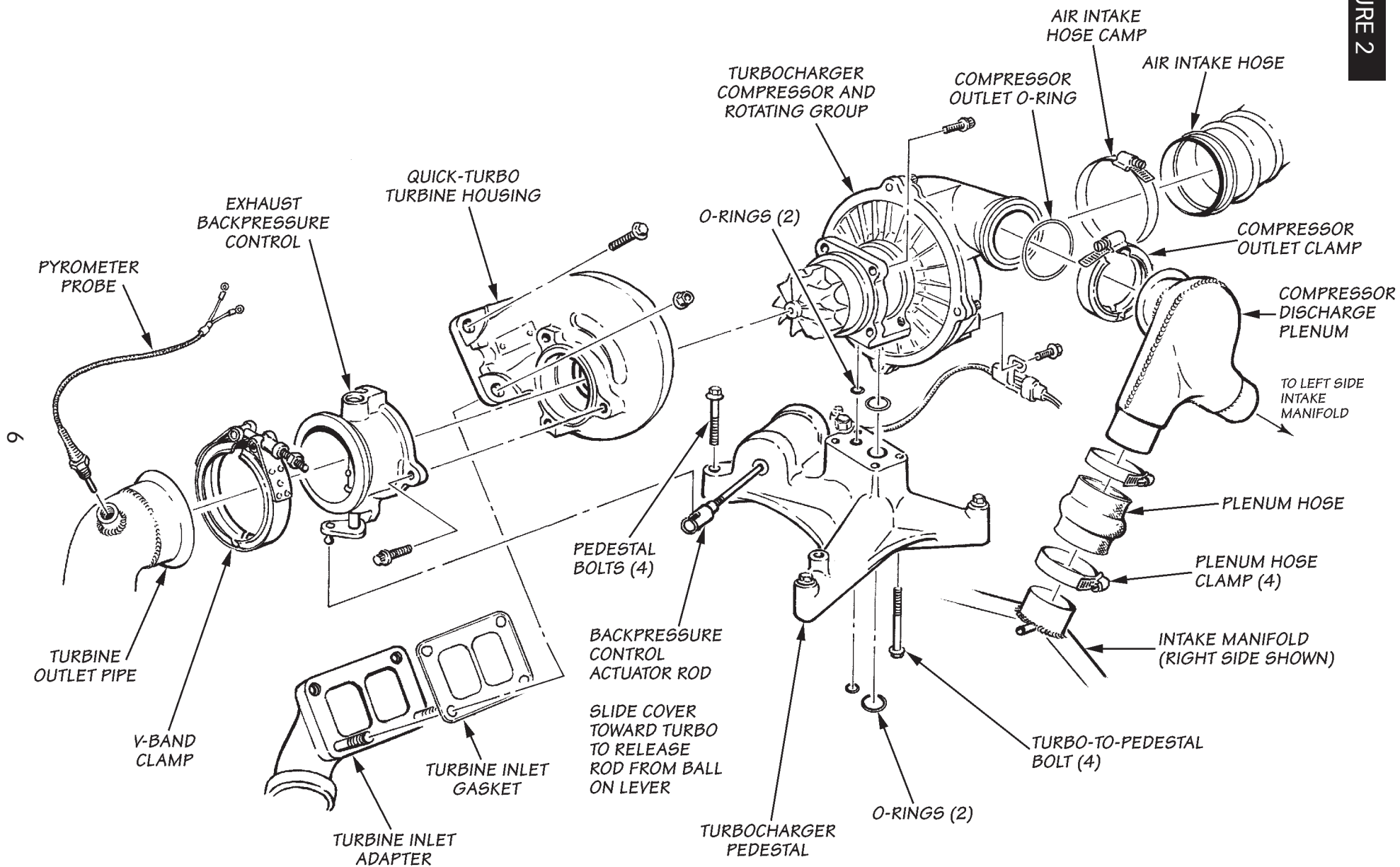
For Stinger installations, proceed to Step 26.

## TURBOCHARGER REMOVAL

14. Loosen the clamps holding the air intake hose to the turbocharger compressor inlet and the aluminum air intake casting. Remove the hose. See Figure 2.

15. Disengage the exhaust backpressure control actuator rod by sliding the cover on the end of the rod back toward the turbocharger and pulling the rod downward.

FIGURE 2





16. Loosen the four clamps on the compressor discharge plenum hoses and the clamp attaching the plenum to the compressor. Pull the compressor discharge plenum up off the engine. Remove the O-ring that seals the compressor outlet to the plenum.

17. At the rear of the turbine housing, remove the two bolts at the top and the two nuts at the bottom attaching the turbine housing to the turbine inlet adapter. **See Figure 2.** Save the turbine inlet gasket for reuse.

18. Unplug the electrical connector at the driver-side of the compressor housing.

19. The turbocharger pedestal mount must be removed with the turbocharger. Remove the four bolts attaching the pedestal mount to the engine block. The front two are easily accessible. The rear two will require the use of a swivel socket or a universal joint-socket combination. After these bolts have been removed, lift the assembly off of the engine towards the front. Remove the two O-rings located on the engine or under the pedestal mount.

20. Clamp the turbocharger assembly in a vise. Do not use the compressor inlet or outlet to clamp the turbocharger. The compressor housing is aluminum and could be damaged. Observe and mark the relationship of the exhaust backpressure control valve to the turbine housing and the turbine housing to the center section of the turbo assembly.

21. Remove the exhaust backpressure control valve from the turbine housing, and install it onto the new turbine housing with the original hardware. Duplicate the orientation of the original assembly. Use anti-seize on the bolts.

22. Remove the four bolts securing the turbine housing to the turbocharger center section. If the turbocharger is more than a few months old, it may be necessary to spray some Liquid Wrench (or similar rust penetrating lubricant) into the joint between the turbine housing and the center section. Work the housing loose from the center

section by tapping with a hammer and brass drift or a soft face hammer. Work from side to side and use plenty of lubricant until the housing is loose from the center section. Pull the housing straight off of the center section to avoid damaging the turbine blades.

23. Place Banks Quick-Turbo® turbine housing onto the center section, again paying careful attention to the turbine blades. Apply some anti-seize to the four bolts and reinstall them. Check the orientation of the assembly, then tighten the bolts.

24. Make sure the gasket is on the turbine inlet adapter on the engine. Place the new O-rings provided into the recesses on the engine block and make sure that the sealing area of the pedestal bottom is clean.

25. Reinstall the turbocharger and pedestal assembly. Make sure the O-rings are in place before installing any bolts. Put a small amount of anti-seize on the turbine inlet bolts and nuts and start them. Install and tighten the pedestal mounting bolts then tighten the turbine inlet bolts and nuts. Plug the electrical connector back together.

26. Bend the firewall lip seam as far back as possible, on the right side corner of the transmission tunnel, to allow for installation of Banks two-piece turbine outlet pipe. A 3-4 foot piece of pipe or heavy metal bar may be used as a lever and extended hammer to fold and flatten the seam against the floorpan. **NOTE:** If access to a Sawzall or an air chisel is available, a series of cuts in the seam will ease the bending operation. It may also be necessary to somewhat compress and reshape the floorpan heatshield behind the firewall lip seam using a pipe or heavy prybar. **See Figure 3.**

27. Reinstall the dipstick tube, dipstick and cooler line if removed. Be sure to connect the electrical ground between the cylinder head and dipstick mount on the passenger-side.

**FIGURE 3**

CUT LIP IN SEVERAL PLACES IN CORNER OF TRANSMISSION TUNNEL, THEN BEND LIP HERE

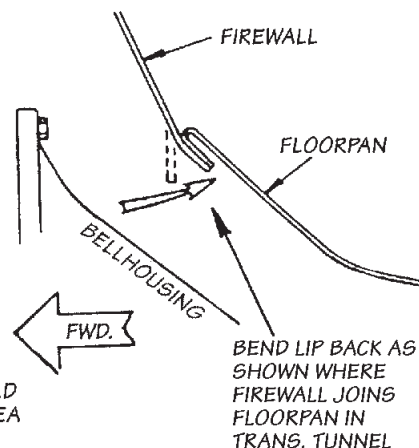
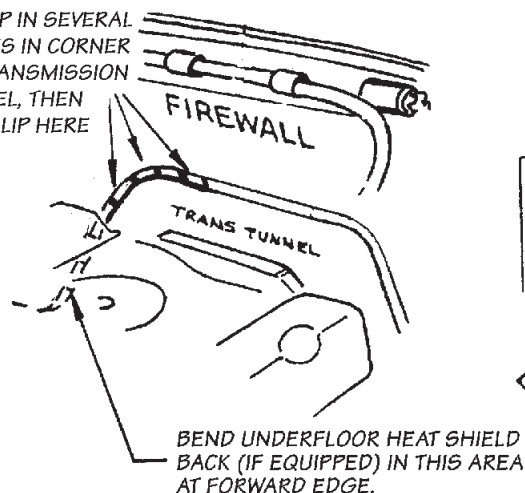


FIGURE 4

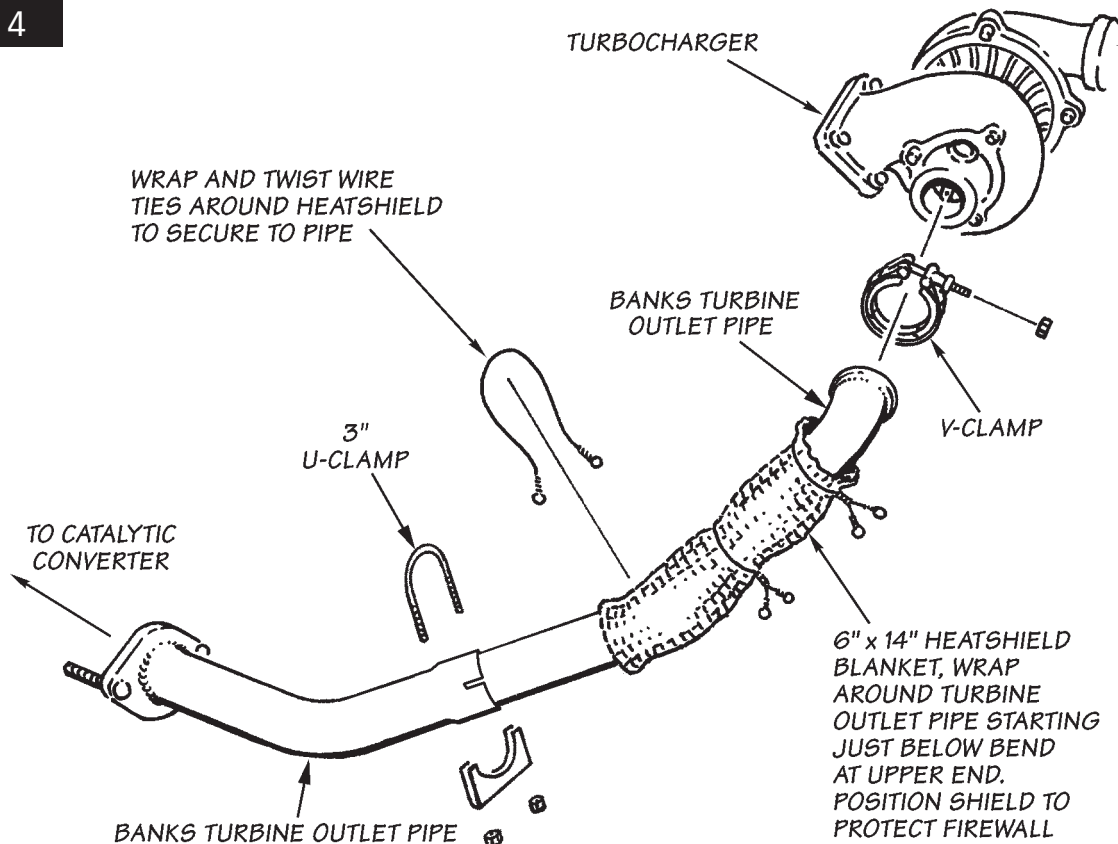
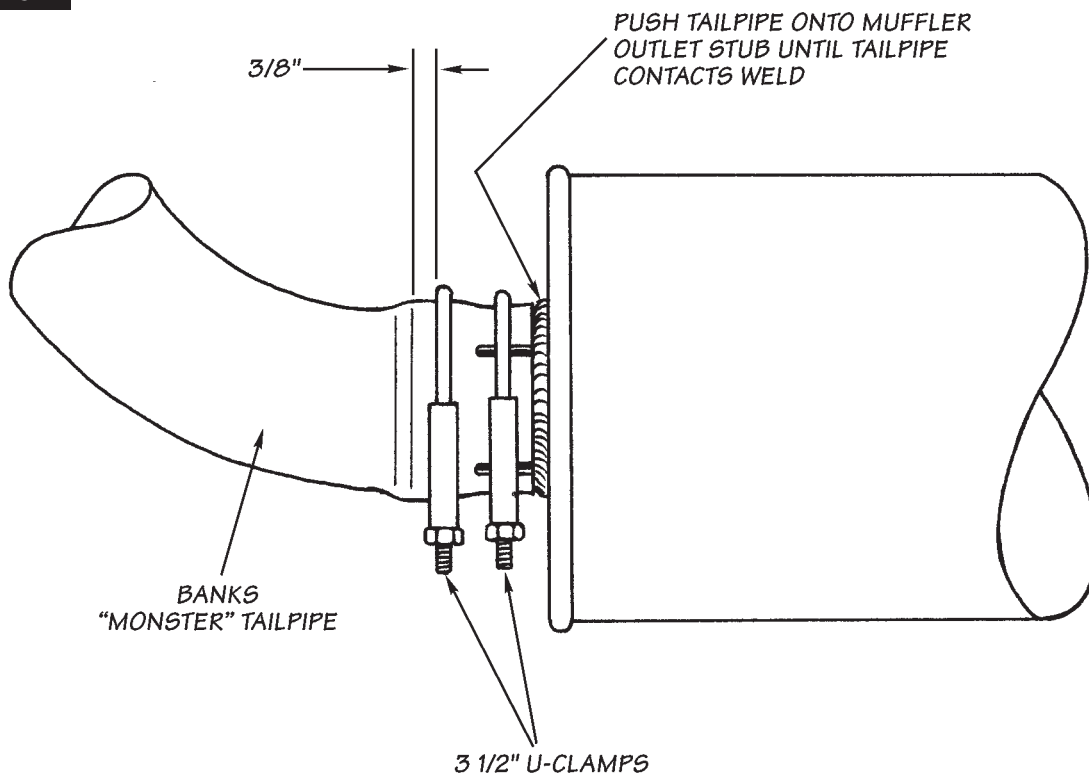


FIGURE 5





**28.** Secure the heatshield blanket provided to the Banks turbine outlet pipe with the wire ties provided, as shown in **Figure 4**. Loosely clamp the upper portion of the turbine outlet pipe to the exhaust backpressure control valve on the turbocharger. Slide the 3-inch clamp over the end of the lower turbine outlet pipe. Reinstall the catalytic converter in its original position and install the lower portion of the turbine outlet pipe between the upper pipe and catalytic converter from underneath the vehicle. Adjust the position of the turbine outlet pipe to allow the maximum amount of clearance between the pipe and the firewall. Tighten the 3-inch clamp at the pipe joint under the vehicle and the V-band clamp at the turbine outlet.

**29.** Slide Banks Monster™ tailpipe over the muffler outlet and install it into the original rubber hanger. Install two 3½-inch U-clamps over the tailpipe at the muffler outlet connection, as shown in **Figure 5**. Note the positions of the clamps in relation to the expanded section of the tubing. Lightly tighten the clamps to allow adjustment for ¾- to 1-inch of clearance between the tailpipe tip and the bottom edge of the fender. With the tailpipe and muffler/catalytic converter assembly properly positioned, tighten the U-clamps at the muffler outlet and catalytic converter inlet flange bolts. Reinstall the engine lifting hook on the passenger-side of the engine.

**For Stinger installations, proceed to Step 70.**

**30.** To reconnect the exhaust backpressure control valve, hold the cover on the end of the rod back and have someone start the engine. When the rod extends after a few seconds, push it up onto the valve linkage and allow the cover to snap back into position.

**WARNING!** Stay clear of moving parts such as the engine cooling fan and belts. Do not drive the vehicle until the remainder of the installation is complete. Any airborne objects entering the turbocharger may cause damage.

**31.** While the engine is running, check for oil leaks around the base of the turbocharger center section or the pedestal mount. Repair any leaks before continuing. NOTE: The most likely cause of an oil leak in this installation is a pinched O-ring at the base of the turbocharger.

**32.** Cover the compressor inlet and discharge with clean rags so that no foreign material will enter the turbo during the remainder of the installation.

**For Stinger-Plus installations, proceed to Step 70.**

## **BANKS TECHNI-COOLER INTERCOOLER INSTALLATION**

**33.** Remove the grille. There are four Phillips-head screws across the top and two in the center of the grille that secure it to the grille support.

**34.** Remove the headlight bezels. These are secured to the grille support with two screws across the top and two nuts behind the radiator core support. The two nuts are accessed by reaching down between the battery and the radiator core support. The batteries may be removed for easier access to the hardware. When each bezel is loose, pull it gently away from the front of the truck. Label and remove the signal and running light bulbs from the rear of the bezel.

**35.** Remove the narrow front valance. It is attached to the front of the truck by four small bolts which may be reached through the front of each wheelwell and three small bolts across the front. Remove the two front bolts attaching the inner wheelwell to the fender and pull it back towards the rear of the vehicle. The bolts can then be reached with a socket and extension. The plastic filler panel is attached to the fenders at the front with plastic clips that must be pried out of the holes in the fenders. A door-panel-clip removal tool works well for this.

**36.** The plastic grille support must now be removed. Push the dangling parking and signal light bulbs through the holes into the engine compartment to get them out of the way. Remove the headlight bulbs with sockets from the rear of the headlight reflectors. Do not remove the headlight reflectors from the plastic grille support. Avoid touching the headlight bulbs themselves. If necessary, wipe bulbs clean with alcohol.

**37.** Remove the eight bolts attaching the plastic grille opening panel to the radiator core support. There are two on each side at the extreme outer edge of the panel and two on each of the brackets inside the radiator opening. Do not remove the sheet-metal brackets from the vehicle.

**38.** On automatic transmission-equipped models, unbolt the transmission-fluid cooler from the passenger-side of the radiator opening. Remove the mounting brackets and clamps from the cooler. It is not necessary to disconnect the hoses.

**39.** Remove the template pages from this manual. Line up the templates with the bolt-holes and edges of the radiator core support. Mark the core support and cut away the areas of sheet-metal shown in **Figures 6 and 7** at the back of this manual. A reciprocating saw such as a Sawzall with a fine tooth blade works best for this, however a hole saw in a drill motor may be used to make a set of overlapping holes that may be ground or filed to make the final shape.

De-burr the cut edges once cutting is complete. It is suggested that the raw edges be painted with a rust-preventative primer or paint.

**40.** Pry out and remove the four plastic buttons holding the outer corners of the rubber air-dam to the radiator core support as shown in **Figure 8**. Remove the buttons from the air-dam.

**41.** Install the left and right lower intercooler mounting brackets and nut plate assemblies using four  $\frac{1}{4}$  x  $\frac{3}{4}$ -inch hex bolts and washers through the holes in the core support as shown in **Figure 8**. Leave the bolts just loose enough to slide the brackets for adjustment.

**42.** On all models install the two transmission-fluid cooler mounting brackets provided, as shown in **Figure 9**. These brackets mount over the factory studs in the core support between the air-conditioning condenser brackets and the core support. If the vehicle does not have air-conditioning, install two 8 mm x 1.25 mm nuts provided over the studs with two  $\frac{5}{16}$  flat washers.

**43.** On automatic transmission models only, install two rubber lined loop clamps onto the transmission-fluid cooler as shown in **Figure 9**. Mount the cooler to the brackets using the two  $\frac{1}{4}$  x  $\frac{3}{4}$ -inch bolts, two washers, and two Nylock nuts. Route the hoses as shown in **Figure 9**.

**44.** On vehicles with a front sway-bar crossing under and just ahead of the radiator area, unbolt the two sway-bar bushings from the bottom of the frame rails. Reinstall the bar and bushings using the 2-inch square spacers, four  $\frac{3}{8}$  x  $3\frac{1}{2}$ -inch hex bolts, washers, and Nylock nuts provided. **See Figure 10**.

**45.** Cut a slit in each side of the factory rubber air-dam as shown in **Figure 9**. Slide the slit over the edge of each lower intercooler mounting bracket as shown. Mark through the two holes on the forward facing tabs on the transmission-fluid cooler mounting brackets onto the rubber air-dam. Drill a  $\frac{1}{4}$ -inch hole through the rubber at these two locations. Bolt the factory air-dam to the transmission-fluid cooler brackets using two  $\frac{1}{4}$  x  $\frac{3}{4}$ -inch hex bolts, washers, and Nylock nuts provided.

**46.** Install two rubber air-dams provided onto the drilled tabs on the intercooler end tanks. Use four #10-32 screws, washers, and Nylock nuts to attach each air-dam. **See Figure 11**.

**47.** Install two  $\frac{5}{16}$ -inch studs into the lower front threaded holes in the end tanks. Slide a rubber isolator bushing onto each of the studs. **See Figure 8**.

**48.** Lower Banks Techni-Cooler™ intercooler into position behind the bumper brackets on the frame. Make sure the plastic bumper stud assemblies are in place with the studs pointing forward. **See Figure 12**. One end of the intercooler may have to be tilted down to guide the hose connections through the holes cut in the radiator core support. It may also be necessary to back out one or more radiator mounting bolts as these can get hung up while lowering the intercooler into position. Guide the studs with the rubber isolators into the slots on the lower mounting brackets. If the vehicle has an automatic transmission, route the transmission-fluid lines above the intercooler hose connection rather than below it to position the lines away from sharp edges. Tuck the air-dam flaps inside the radiator opening in the core support. Check the clearance of the cut edges to the sides of the intercooler end tanks. Remove the Techni-Cooler and trim the sheet-metal again if necessary.

**49.** Adjust the Techni-Cooler side-to-side position to provide an identical distance between the intercooler hose connections and the sides of the radiator. Once this location has been established, push each lower mounting bracket away from the center of the vehicle and tighten the upper two bracket bolts, then the lower two bolts.

**50.** Install two rubber isolator stud mounts through the existing holes in the radiator core support. **See Figure 8**. Secure the mounts using the  $\frac{5}{16}$ -inch Nylock nuts and washers as shown. Note that a washer is placed between each mount and the core support as well as under the nuts. Leave the nuts just loose enough to allow positioning of the mounts.

**51.** Install left and right upper intercooler mounting brackets between the rubber stud mounts and the intercooler end tanks. Thread four  $\frac{5}{16}$  x  $\frac{3}{4}$ -inch hex bolts and washers through the bracket and into the threaded holes in the end tank finger tight. Install and tighten a  $\frac{5}{16}$ -inch Nylock nut and washer onto each stud mount to secure the brackets.

**52.** Again check the side to side position of the intercooler hose connections with respect to the radiator, then remove and reinstall each of the  $\frac{5}{16}$ -inch hex bolts one at a time with a drop of thread-locker, supplied, on the threads. Tighten the two  $\frac{5}{16}$ -inch Nylock nuts on the rubber stud mounts behind the core support.

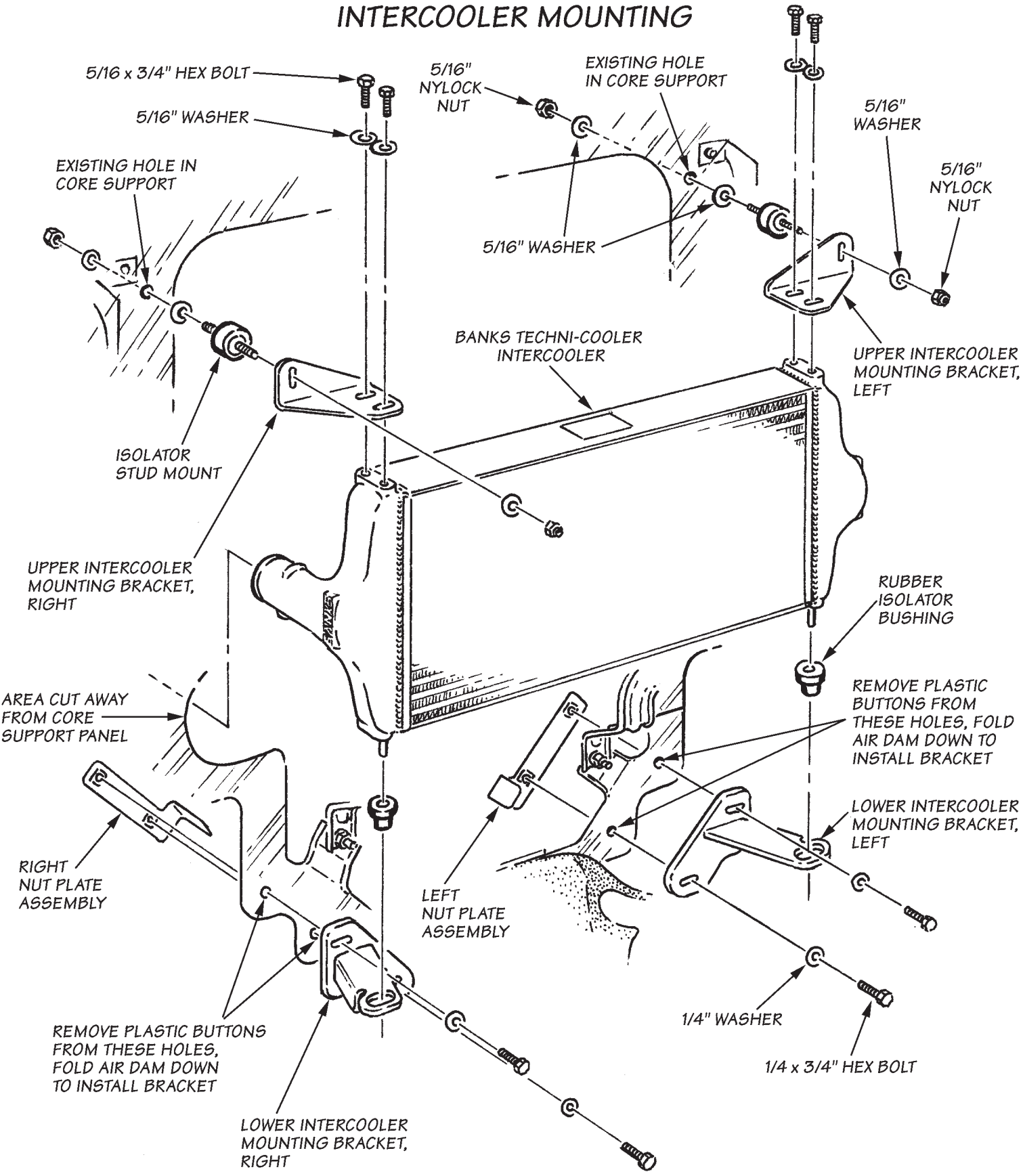
**53.** Check to see that the rubber air-dam flaps rest flush against the sheet-metal without preventing the intercooler from resting in its proper location. Due to factory tolerances, it may be necessary to trim the air-dam flaps for proper fit.

**54.** Check the clearance between the intercooler hose connections and the surrounding sheet-metal below and on the outer sides of the

Continued on page 15

**FIGURE 8**

### INTERCOOLER MOUNTING



**FIGURE 9**

NOTE: ALL INSTALLATIONS USE TRANSMISSION FLUID COOLER BRACKETS TO MOUNT FACTORY AIR DAM

### FACTORY AIR DAM AND TRANSMISSION FLUID COOLER MOUNTING

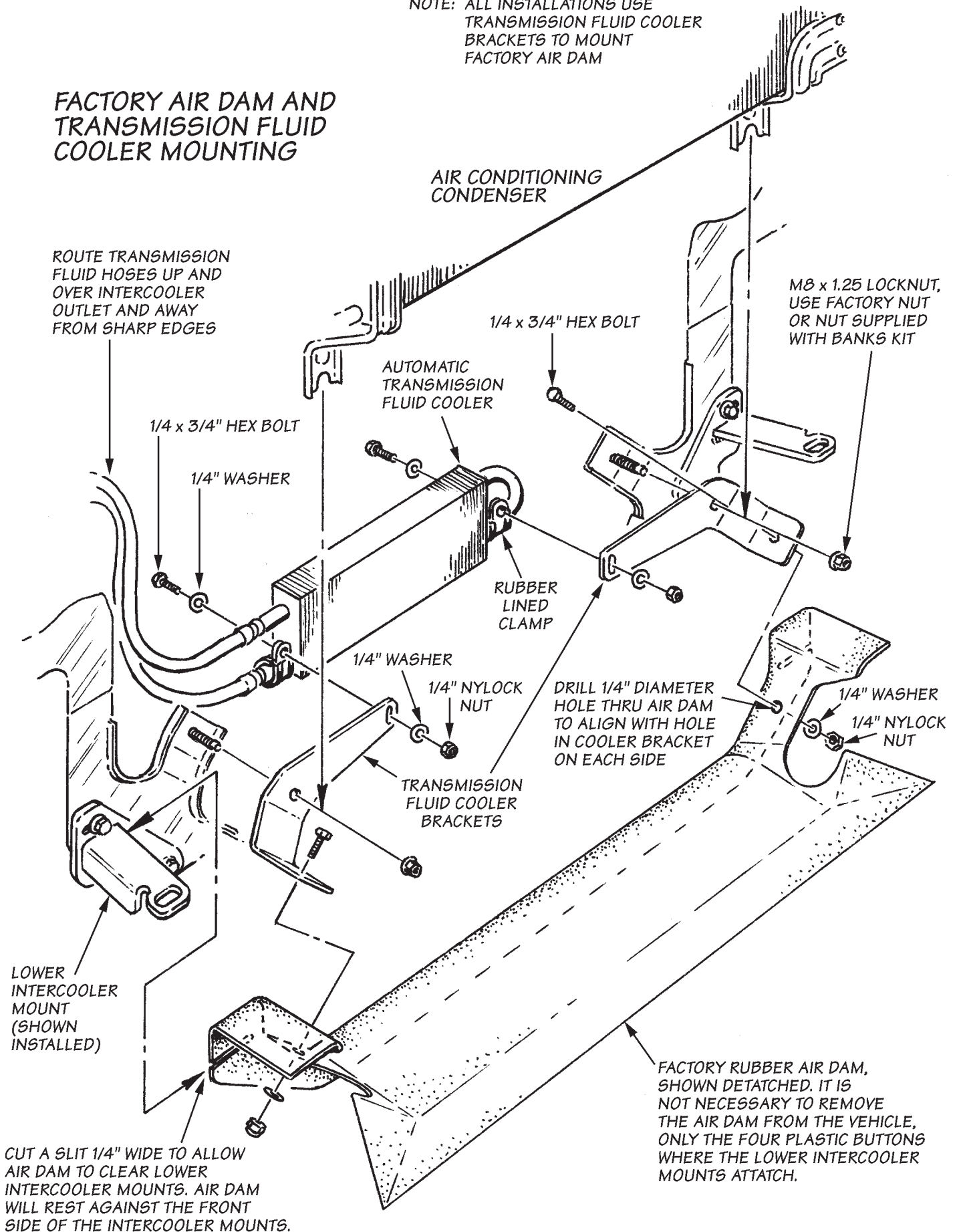




FIGURE 10

### SWAY BAR MOUNTING

NOTE: NOT REQUIRED ON VEHICLES WITH LEAF SPRING FRONT SUSPENSION

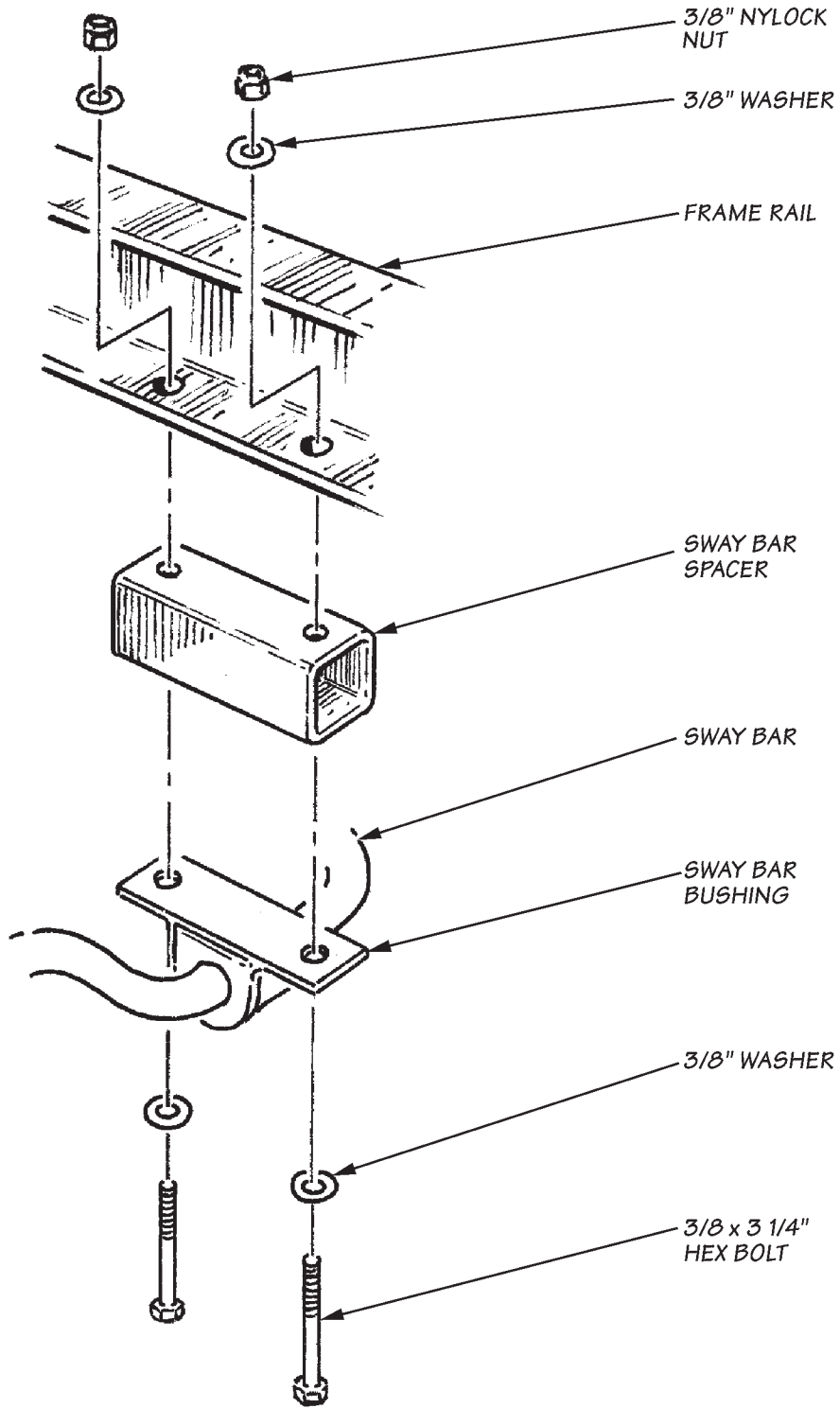


FIGURE 11

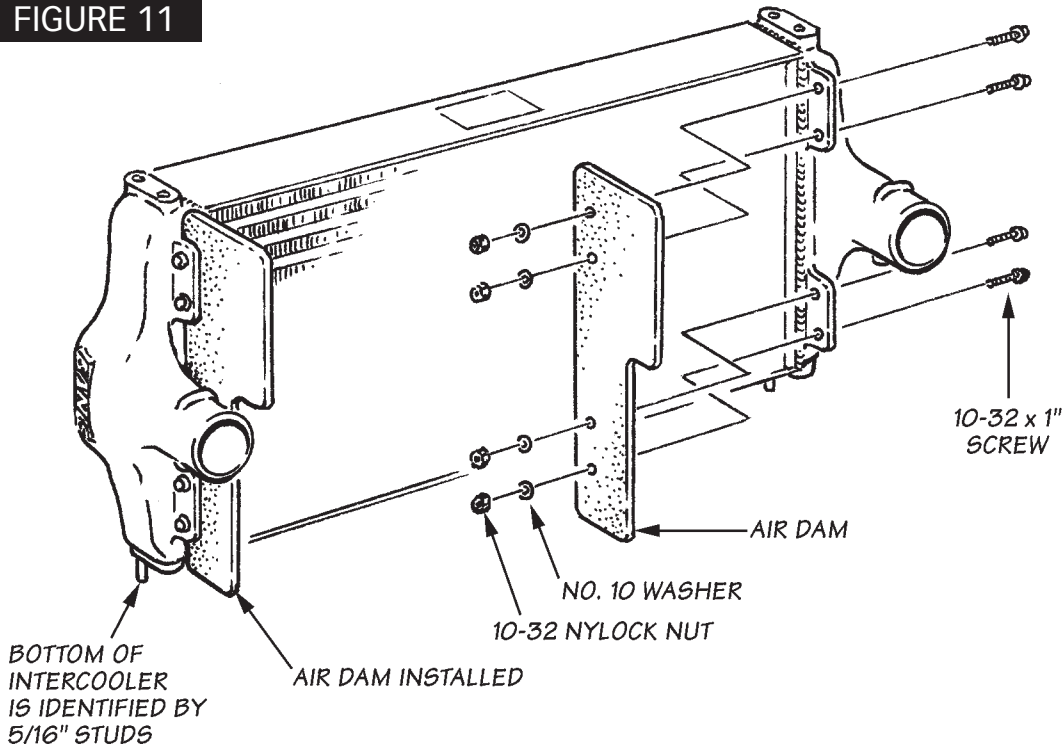
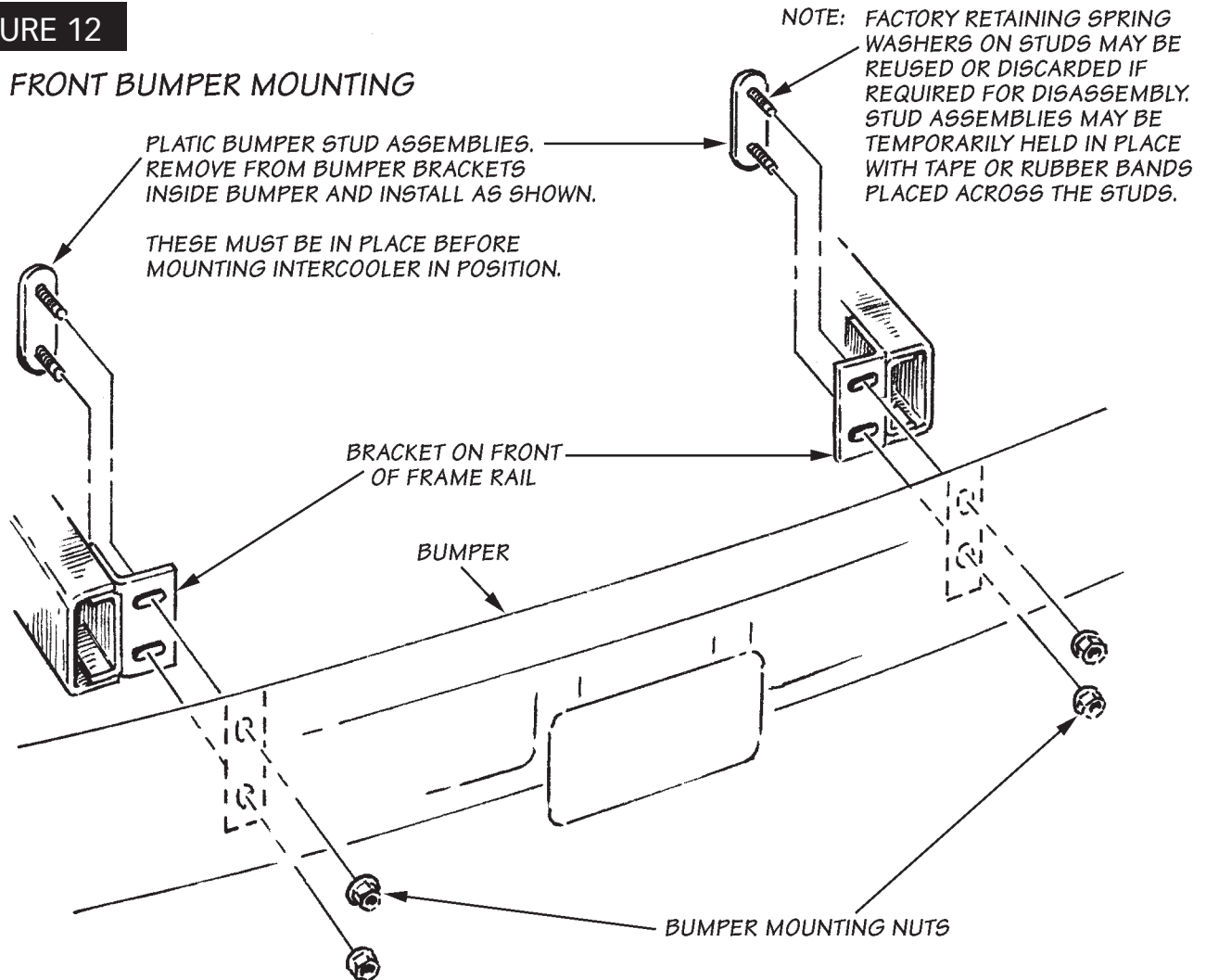


FIGURE 12

FRONT BUMPER MOUNTING



hose connections. There should be a minimum of  $\frac{5}{16}$ -inch clearance around the connection to accommodate the thickness of the hose and clamp. If additional trimming to the sheet-metal is necessary, remove the intercooler by removing the upper brackets from the rubber isolator studs. Remember to have the bumper stud plates and the transmission-fluid cooler lines in the proper places when reinstalling the intercooler. NOTE: Before slipping any boost tubes and the corresponding hoses, into position, ensure that all connection ends are clean and free of any oil residue and contaminants. Clean compressor outlet and all connection points with a non-oil based solvent such as Acetone, Mineral Spirits, Denatured Alcohol or Lacquer Thinner. Read and follow the manufactures operation instruction for non-oil based solvent cleaner.

**55.** With the intercooler bolted in place, push a 3 x 3-inch silicone hose onto each intercooler hose connection until the hose bottoms against the stop on the connection. Slide a pair of #313 T-bolt clamps onto each hose. Position the clamps so that they can be tightened from above.

**56.** Loosen the clamps and remove the flexible engine air intake hose from between the plastic air filter housing duct and the aluminum elbow. Unbolt and remove the aluminum elbow and its mounting bracket from the engine.

**57.** Push the lower end of the intercooler inlet tube into the silicone hose on the driver's side of the intercooler. The tube will have to be maneuvered under the A/C hose on air-conditioned models. Push the inlet tube into the hose until the tube touches the intercooler connection, then pull it out approximately  $\frac{1}{4}$  inch.

**58.** Install a 3-inch diameter silicone hump hose and two #313 T-bolt clamps onto the upper end of the intercooler inlet tube. Insert the turbocharger compressor outlet elbow into the hump hose. Place a new compressor outlet O-ring in the groove on the compressor, then attach the elbow to the compressor with the original clamp. Leave the clamp loose enough to rotate the elbow for adjustment.

**59.** Reinstall the aluminum air intake elbow and flexible air inlet hose onto the engine. Tighten the clamps on the air inlet and elbow, and any other clamps loosened or removed from the elbow.

**60.** Adjust the position of the intercooler inlet tube to provide the maximum clearance to adjacent parts. Make sure that nothing can chafe or cut through the hump hose from engine vibration. Position the hump hose so that it is centered on the junction of the inlet tube and the compressor outlet elbow. There should be approximately  $\frac{1}{4}$ -inch separation between the tube and elbow inside the hump hose, they should not rub together within

the joint. When all tubes are positioned for best clearance, tighten the clamps on the hump hose, the intercooler inlet, and the compressor outlet.

**61.** Disconnect the hose between the radiator and the coolant recovery tank at the recovery tank end. Insert the lower end of the intercooler outlet tube into the silicone hose on the intercooler outlet. The bracket supporting the battery cable will need to be bent slightly to provide enough clearance for the tube. Push the tube all the way in and then pull it out approximately  $\frac{1}{4}$ -inch. Install a 3-inch diameter hump hose and two #313 T-bolt clamps onto the upper end of the intercooler outlet tube.

**62.** Remove the two center bolts from the upper edge of the passenger-side rocker cover. Install the two hoses removed from the factory discharge plenum onto Banks TwinRam™ intake assembly. Push them all the way on until the tube just begins to come through the hose. Slide two original clamps onto each hose.

**63.** Slide the 3-inch end of the TwinRam into the hump hose on the intercooler outlet tube and position the legs of the TwinRam over the openings on the engine intake manifolds. Slide the hoses down the legs of the TwinRam until they are bottomed on the intake manifolds. Attach the bracket to the rocker cover using the 8 mm x 30 mm metric bolts and spacers provided. See [Figure 13](#).

**64.** Tighten the lower clamp on each of the intake manifold hoses. Attach the tabs on the TwinRam and the compressor outlet elbow with a  $\frac{5}{16}$  x 1-inch bolt with two washers and a Nylock nut. Leave this bolt loose enough for adjustment. Check all bolts, hoses and wires around the intercooler outlet tube for clearance. Make any adjustments necessary, then tighten all clamps and the  $\frac{5}{16}$ -inch nut and bolt.

**65.** Mark the plastic grille support as shown in Figure 14 for cutting. Use a hacksaw to cut out the areas indicated for intercooler clearance. Hold the grille support up to the front of the vehicle and check that the outside corners of the intercooler end tanks clear the support. Trim additional material if required to provide  $\frac{1}{8}$ -inch minimum clearance on each end tank.

**66.** Reinstall the grille opening support panel onto the front of the truck using the original hardware. Place the turn signal and marker light bulbs through the proper holes.

**67.** Reinstall the valance panel onto the front of the vehicle with the plastic clips and the original bolts. CAUTION: When reinstalling the screw that attaches the bottom of the grille support to the center of the valance panel, make sure that the end of the screw does not protrude through the assembly to the extent that it could come into contact with



**FIGURE 13**

**INTERCOOLER PLUMBING**

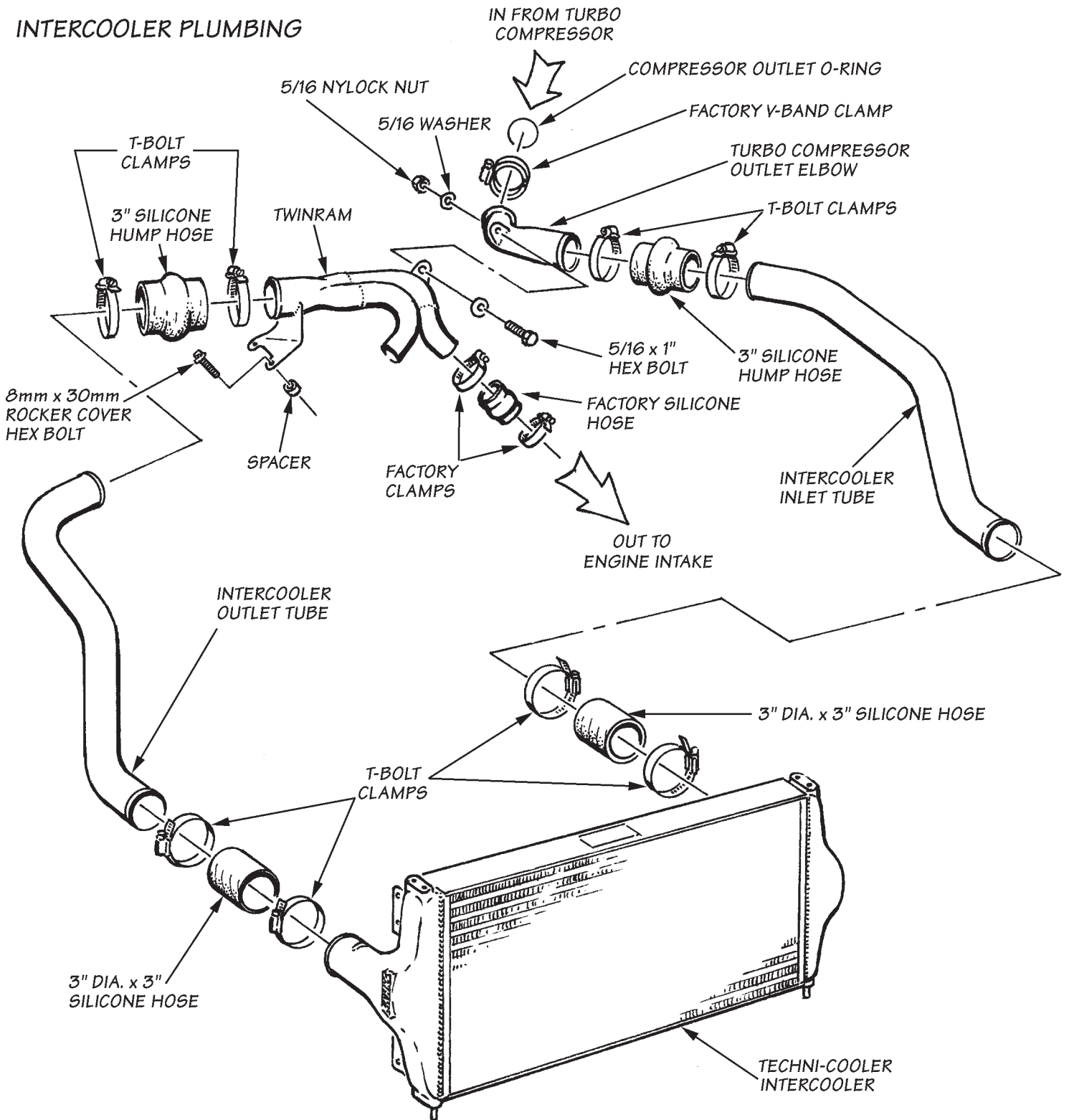
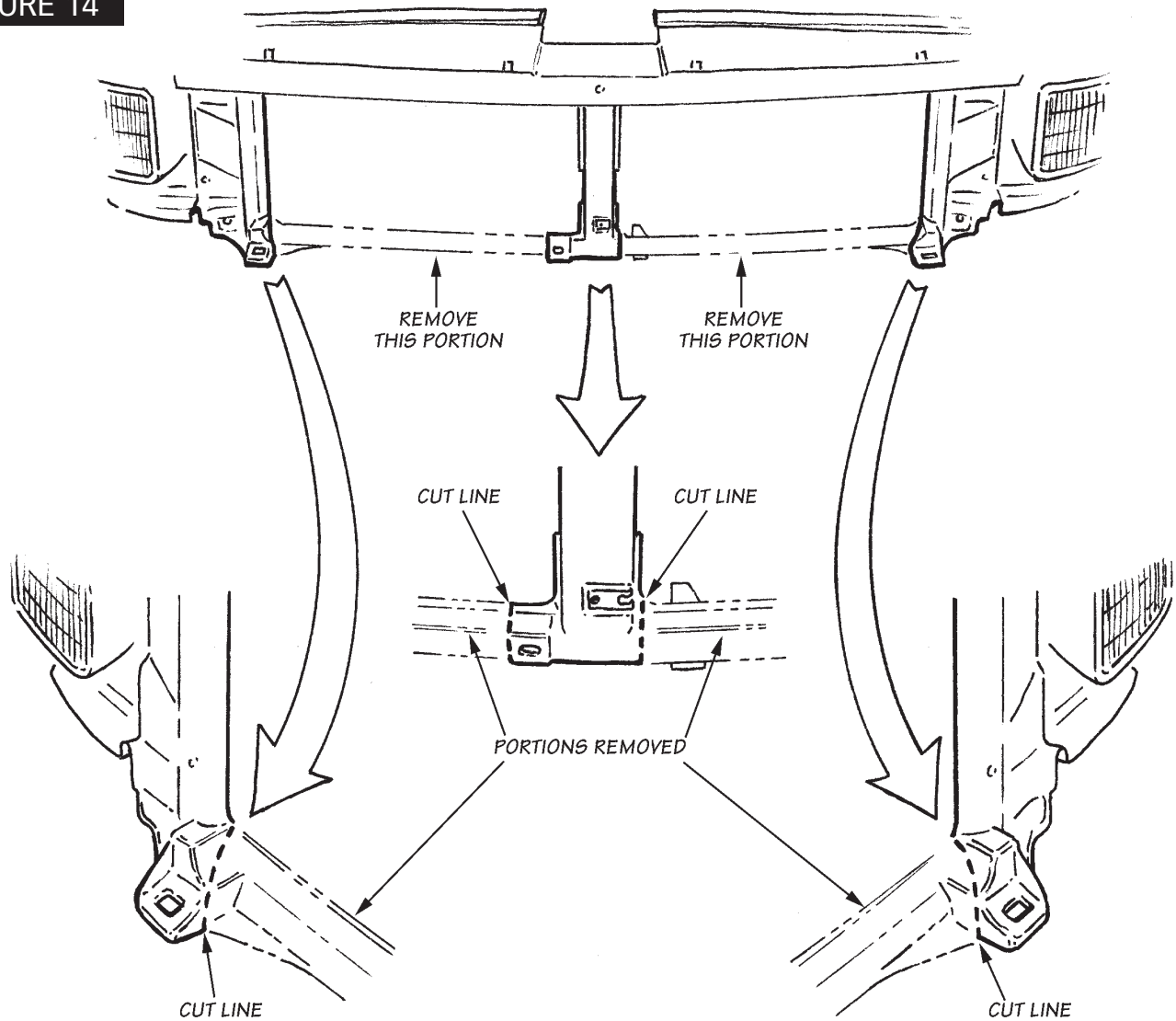


FIGURE 14



and puncture a tube in the intercooler core. There should be a minimum of  $\frac{1}{4}$ -inch clearance between the end of the screw and the intercooler core. If necessary, shorten the screw.

**68.** Reinstall the headlight bezels. Be sure that the lights are in the correct locations. If in doubt, turn on the hazard flashers. The turn signals will be the flashing ones.

**69.** Reinstall the grille against the grille support with the original hardware. Reinstall the front bumper onto the stud plates and tighten the nuts. Once again, check the tightness of all hose clamps to ensure the integrity of the hose connections at high boost levels.

**70.** Clean an area that is easily visible on the upper radiator core support with a non-oil based solvent, such as Acetone, Mineral Spirits, Denatured Alcohol or Lacquer Thinner. Allow to dry and then attach the Banks E.O. sticker to the upper radiator core support.

## DYNAFACT INSTRUMENTATION INSTALLATION

### GAUGE PANEL

**71.** If the gauges are being installed into an existing gauge panel, this step may be skipped. If gauges and a gauge panel are being installed, choose a location where the gauges can be easily viewed by the driver. This will typically be to the right of the accelerator pedal, under the lower edge of the dash panel. Mount the gauge panel with the machine screws, washers, and nuts provided. NOTE: Molded instrument panels for top of dash mounting are available from Gale Banks Engineering.

### DYNAFACT PYROMETER

**72.** Install the DynaFact® pyrometer probe (supplied in the pyrometer kit) in the  $\frac{1}{4}$ -inch NPT bung located at the top of the turbine outlet pipe. Use anti-seize compound on the threads. Connect the lead-wire to the sensor with the supplied screws. The wires are different lengths to prevent cross connecting. Make sure that the screws are tight. Slip the heat shrink tubing provided over the wire ends.

**73.** Supply moderate heat to the heat shrink tubing to seal the connections. A heat-gun or lighter works well.

**74.** When passing through the firewall either make a hole in a factory grommet or drill a hole and use a new grommet. If a hole needs to be drilled, drill a  $\frac{5}{16}$ -inch hole and debur it on both sides, so that the wiring or tubing does not get cut as it passes through the hole. For added protection, wrap the wiring with several layers of electrical tape in the area where it passes through the hole. When drilling, check the backside to make sure that there are no components blocking the backside of the hole that would be damaged by drilling.

**75.** Route the pyrometer lead-wire up and across the top of the firewall then down and through the hole in the firewall. Inside the vehicle, route the wire to the gauge location. If routing the lead-wire under the carpet, avoid placing it where the driver's feet will rest on the wire. Tie the wire to existing wire looms and hoses with the cable ties provided.

**76.** Position the gauge through the console or gauge panel. Slip the plastic U-clamp, provided with the pyrometer, over the studs on the rear of the gauge and tighten the nuts, provided.

**IMPORTANT:** Remove the bare shorting wire from between the gauge terminals before connecting the lead-wire to the pyrometer. Attach the spade connectors to the back of the gauge. Connect the yellow wire to the (+) terminal and the red wire to the (-) terminal. If the lead-wires are accidentally reversed, the gauge will read backwards.

**77.** Pull any excess wire through the firewall, coil it and secure it up under the dash, out of the way. Do not shorten the lead-wire. Note: If it is necessary to replace one of the terminal ends, use a crimp tool only. Do not solder to the wires.

## DYNAFACT BOOST GAUGE

For PowerPack installation, proceed to Step 80.

**78.** Locate the rubber hose connecting the intake manifold on the passenger-side of the engine to the manifold pressure sensor mounted on the firewall. Cut through this hose at a point 3 inches below the sensor. Install the  $\frac{1}{8}$ -inch hose by  $\frac{1}{8}$ -inch NPT tee fitting and the spring band clamps, provided, between the cut ends of the hose as shown in **Figure 15**.

**79.** Install one  $\frac{1}{8}$ -inch NPT female by  $\frac{1}{8}$ -inch compression 90-degree fitting onto the threaded end of the tee. Sparingly apply pipe sealant tape or paste on the male pipe threads, and adjust the 90-degree fitting to point back toward the firewall, as shown in **Figure 15**. Do not allow any sealant to

cover the small hole in the fitting. Do not over-tighten the plastic fitting.

## For Stinger and Stinger-Plus installation, proceed to Step 81.

**80.** Locate the  $\frac{1}{8}$ -inch NPT bung on the Banks compressor outlet elbow and install the adapter fitting. Sparingly apply pipe sealant tape or paste on the pipe threads. If you are upgrading from Stinger or Stinger-Plus, replace the cut segments of hose between the intake manifold and the manifold pressure sensor with the single piece of hose provided.

**81.** Install one end of the  $\frac{1}{8}$ -inch diameter plastic tube provided into the fitting and tighten the nut. Be sure the plastic tube cannot be pulled out of the ferrule, but do not over-tighten the nut.

**82.** Route the free end of the tube up and along the top of the firewall toward the brake master cylinder assembly. Tie the tube to existing wires and hoses with the cable ties provided. Follow the routing of the pyrometer lead-wire through the firewall.

**83.** Route the plastic tube to the DynaFact boost gauge and cut the tube to the proper length. Follow the instructions supplied with the gauge for mounting, lighting and tubing connections.

**84.** Connect one wire from each gauge light to a good ground location under the dash, such as a metal support bracket where other wires may already be grounded. Connect the remaining light wires together and to an 18-gauge or larger wire, connected to either the headlight circuit or the dash lighting circuit. The dash lighting circuit is located on fuse #10 on the fuse panel at the left side of the dashboard. (Wiring and terminals for gauge lighting are not supplied with the PowerPack system.) NOTE: On vehicles with an automatic transmission, complete the TransCommand installation before proceeding.

## BANKS OTTOMIND ENGINE CALIBRATION MODULE INSTALLATION

**85.** Be certain battery ground cables have been disconnected.

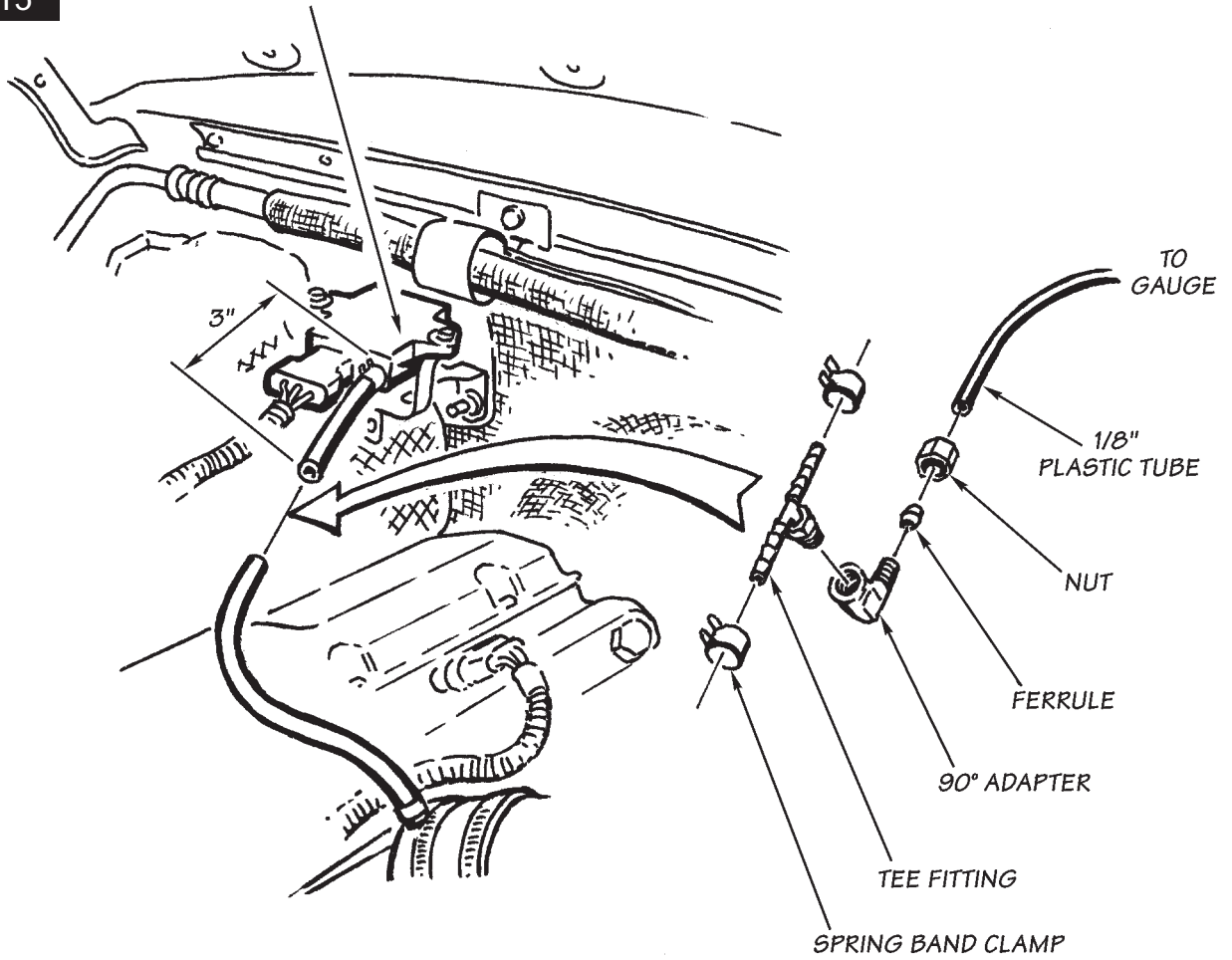
**86.** Locate the engine control unit (ECU) in a recess in the firewall on the engine side, between the steering column and the left front fender. All that will be visible is an elongated electrical connector and wire loom, surrounded by a retainer plate attached with two nuts. See **Figure 16**.

**87.** Remove the bolt attaching the electrical connector to the ECU, unplug the connector, and swing it out of the way.

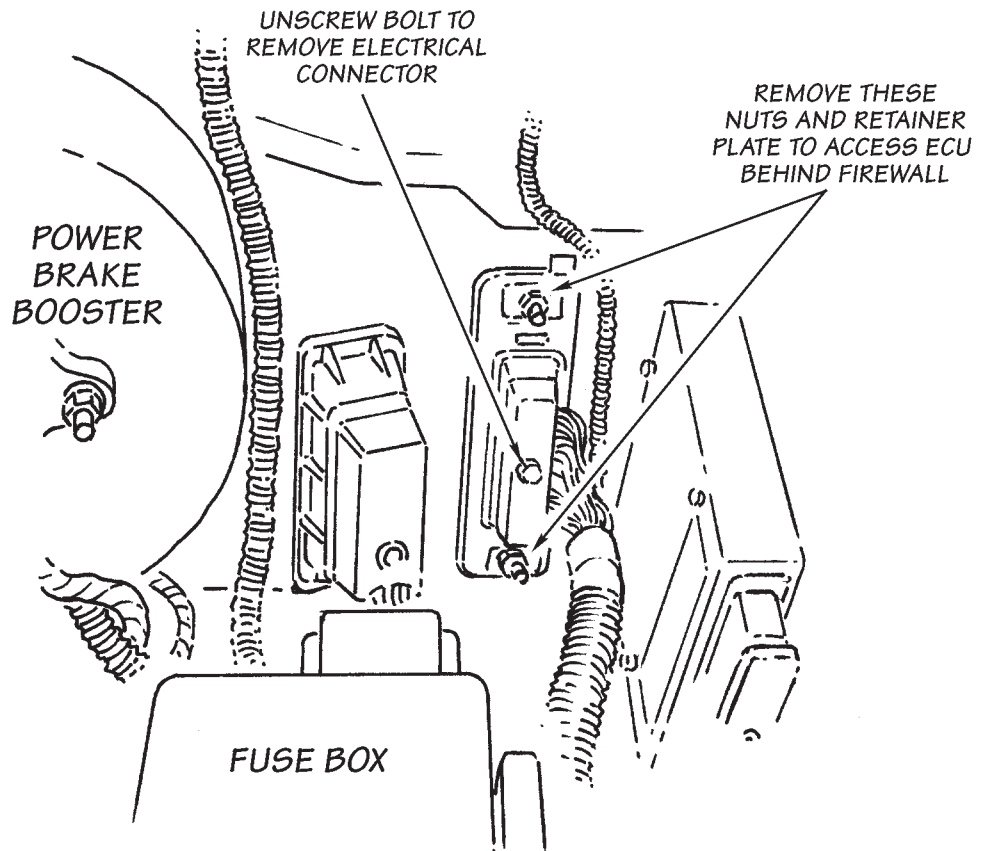
**88.** Remove the two nuts and retaining plate

**FIGURE 15**

MANIFOLD PRESSURE SENSOR



**FIGURE 16**



from against the firewall. Pull the ECU out of the firewall toward the front of the vehicle. It may be necessary to remove the rearmost bolts attaching the flexible inner fenderwell to the body to provide clearance to remove the ECU.

**89.** Note the code printed on the plastic cap on the back of the ECU. This code should compare to the code printed on the Banks OttoMind™ box label. Pry the plastic cap from the rear of the ECU using a small screwdriver, exposing the printed circuit board edge connector inside. Retain the plastic cap. The connector will be coated with grease and a clear silicone type coating which must be completely removed before installing the Banks OttoMind engine calibration module.

**90.** Clean BOTH sides of the connector. First, clean the white grease off with a tissue. Next, scrape the clear silicone type coating from the connector fingers with the abrasive square provided. It is very important to clean both sides of the board in order to have a good connection between the ECU and the Banks OttoMind module. It is only necessary to clean the connector fingers. Be careful not to damage any circuit traces on the board further inside the ECU.

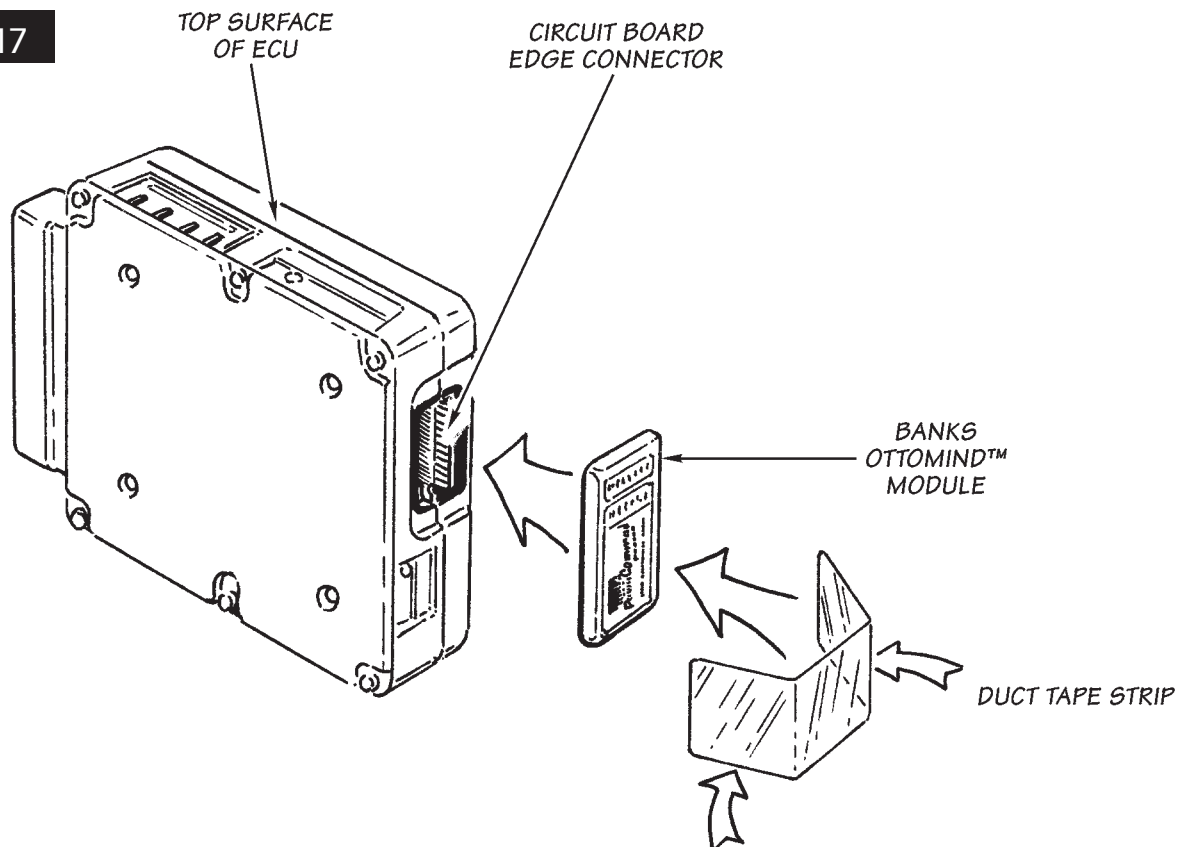
**91.** Orient the module so that its edges line up with the edges of the ECU. If the edges do not line up, or it looks as if the ECU will not fit back into the hole in the firewall, the module

is rotated 180 degrees off. Place the OttoMind module over the connector, and press firmly to seat the connection. DO NOT FORCE the OttoMind onto the connector, as damage may result to either the ECU or the module. If the module does not install with firm pressure, check the orientation and try again. Place a piece of duct tape over the module, fastening it firmly to the ECU. **See Figure 17.**

**92.** Before returning the ECU to the recess in the firewall, it is a good idea to reconnect the wire harness and the batteries and start the vehicle. The vehicle may not start if the coating on the ECU connector is not completely removed or if there is a mismatch of codes. A quick indication of module connections that are not cleaned properly is that the "Wait to start" indicator will fail to light and the "Check engine" warning indicator will stay lit after the key is switched on. If the engine fails to start, re-clean the ECU connector, reinstall the module and try again. After the engine has started, shut it off, disconnect the batteries and the ECU wire harness, and complete the installation.

**93.** Reinstall the ECU in the firewall. Reinstall the retaining plate against the firewall. Reattach the wire harness to the ECU. Reinstall the inner wheel well bolts, if removed. Reconnect the batteries.

**FIGURE 17**





Start the engine and allow it to warm up. Drive the vehicle, listening for any exhaust leaks or rattles. Adjust and tighten clamps or reposition the piping if required. When positioning of piping is finalized, it is a good practice to place tack welds at any slip joints in the exhaust system to prevent slippage. NOTE: The exhaust may smoke slightly after initial startup. This is normal and will go away shortly as the grease used in the bending process burns off the inside of the piping.

### CHECKING ENGINE PERFORMANCE

Observe operation of the boost and pyrometer gauges while driving under varying conditions. Turbocharger boost pressure fluctuates as a function of load and rpm. The engine produces lower boost while cruising at light throttle. Maximum boost occurs while climbing hills and heavily loaded during acceleration. Note the boost level during hard acceleration with a given load. If future performance declines, the maximum boost figures may be compared to see if boost has decreased. Lower boost can be caused by turbo ducting leaks, a malfunctioning fuel injection system, or dirty air filter. Maximum boost pressure settings for the Power Stroke turbo-diesel vary considerably, due to manual or automatic transmission options, vehicle year and model, and altitude. Boost readings may vary between 15 and 22 psi. NOTE: Vehicle performance may be erratic and improper if the module connections are not properly cleaned.

Use your pyrometer gauge to monitor exhaust gas temperature (EGT) in the engine. At idle, EGT will be very low, perhaps only 300°F. As the engine accelerates and is under load, the EGT rises. The safe maximum for the EGT is 1050°F. The highest EGT occurs under maximum load at full throttle, such as climbing a steep grade with a heavily laden vehicle. If the vehicle reaches maximum EGT during these conditions, downshift to reduce the load, or back off the throttle. **CAUTION: Exceeding 1100°F can cause engine damage.**

We recommend that engine oil temperature not exceed 250°F. Optimum oil temperature is around 230°F.

*NOTE: An optional oil temperature gauge is available from Gale Banks Engineering.*

### SERVICE TIPS

If the need should arise for you to have your vehicle serviced, the Banks OttoMind should be removed from the engine control unit (ECU). It is common for the service provider to connect a

computer diagnostic link to the vehicle regardless of the type of service being performed. When the OttoMind is installed, the computer will return a code that indicates a memory fault with the vehicle ECU. The suggested repair for a fault of this type is replacement of the ECU.

The operation of the OttoMind is such that the computer is directed to reference certain information in the OttoMind rather than the ECU. Therefore, the memory fault that occurs is not an ECU failure, but rather the presence of an electronic device that the diagnostic computer cannot identify.

To avoid confusion about whether or not an ECU is properly functioning, simply remove the OttoMind from the ECU before having the vehicle serviced, and reinsert the plastic cap in the ECU access port. The OttoMind can be easily accessed from inside the truck by removing three 13 mm hex nuts from the emergency brake assembly and pulling the assembly away from the side panel of the vehicle. The OttoMind may be reinstalled after the service is complete. Be sure to reinstall with duct tape to firmly retain the OttoMind.

It is also not uncommon for a service provider to update the program in the vehicle ECU. If this occurs, it is possible that the programming in the OttoMind will no longer match the ECU program. If you experience any difficulty with the operation of the Banks OttoMind after service, check with the service provider to determine if an update was performed. Then contact customer service at Gale Banks Engineering for an updated OttoMind, if necessary.

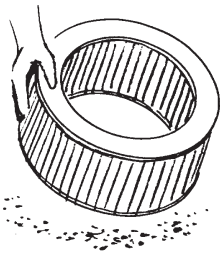
# CLEANING AND OILING THE BANKS RAM-AIR FILTER

## Notification

The Banks Ram-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 Banks Ram-Air Filter.

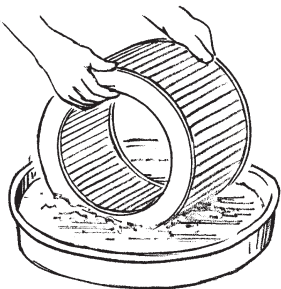
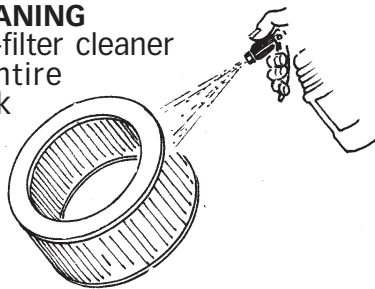
### 1. PRE-CLEANING

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

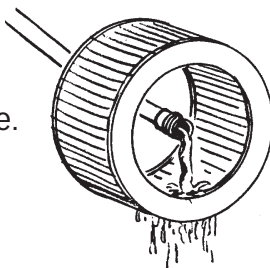
Large air-filter elements can be rolled or soaked in a shallow pan of Banks air-filter cleaner. Remove immediately and let soak for approximately 10 minutes.

### 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.

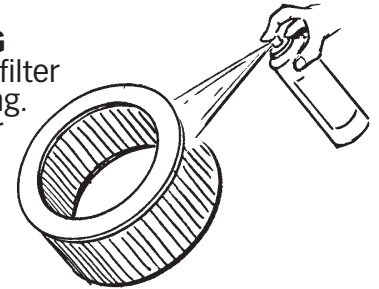


### 5. DRYING HINTS

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"/H<sub>2</sub>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 Banks air-filter cleaner and Banks air-filter oil.



# BILL OF MATERIALS

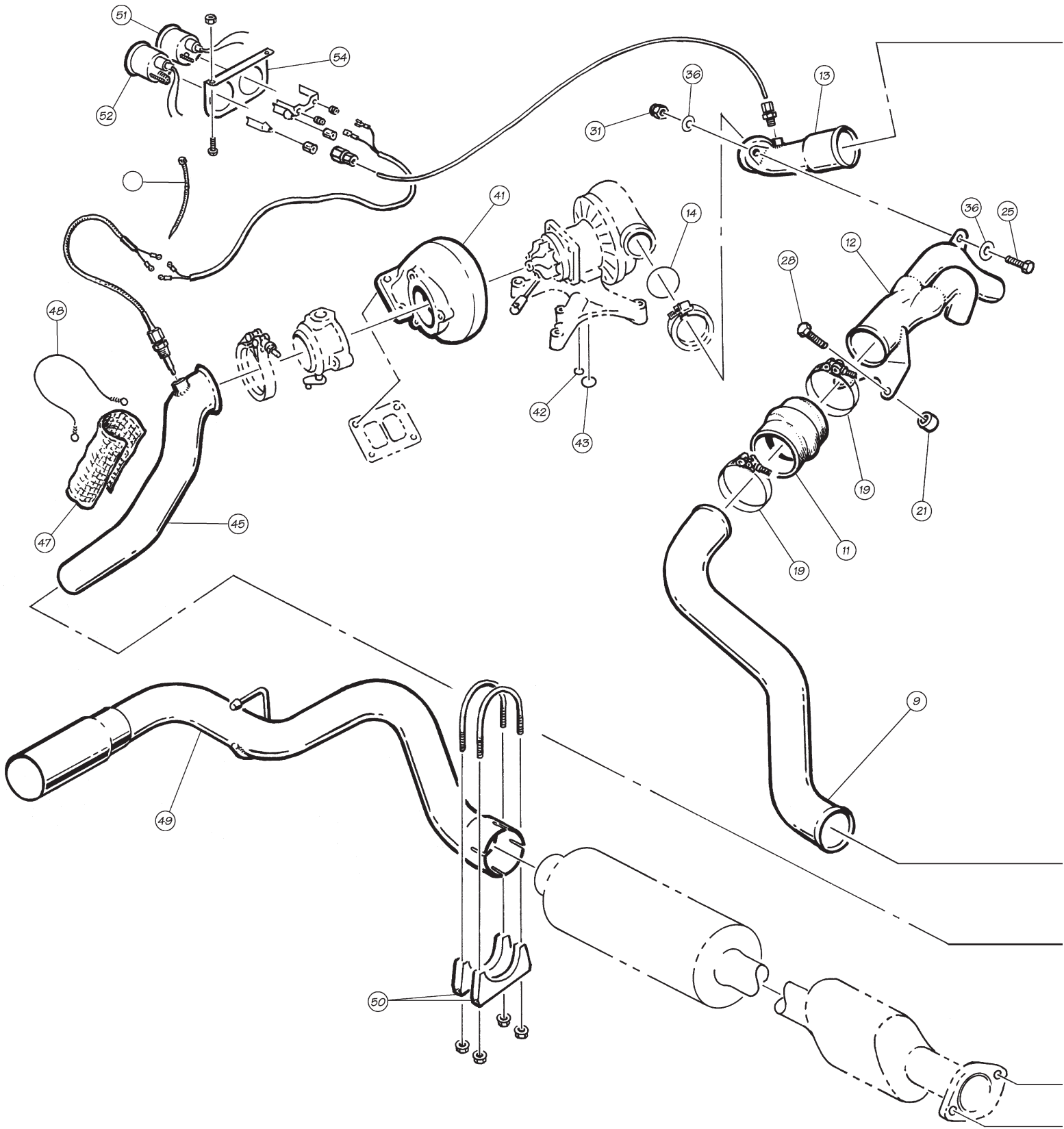
## Ford 7.3L Turbo Diesel • 1994–1998

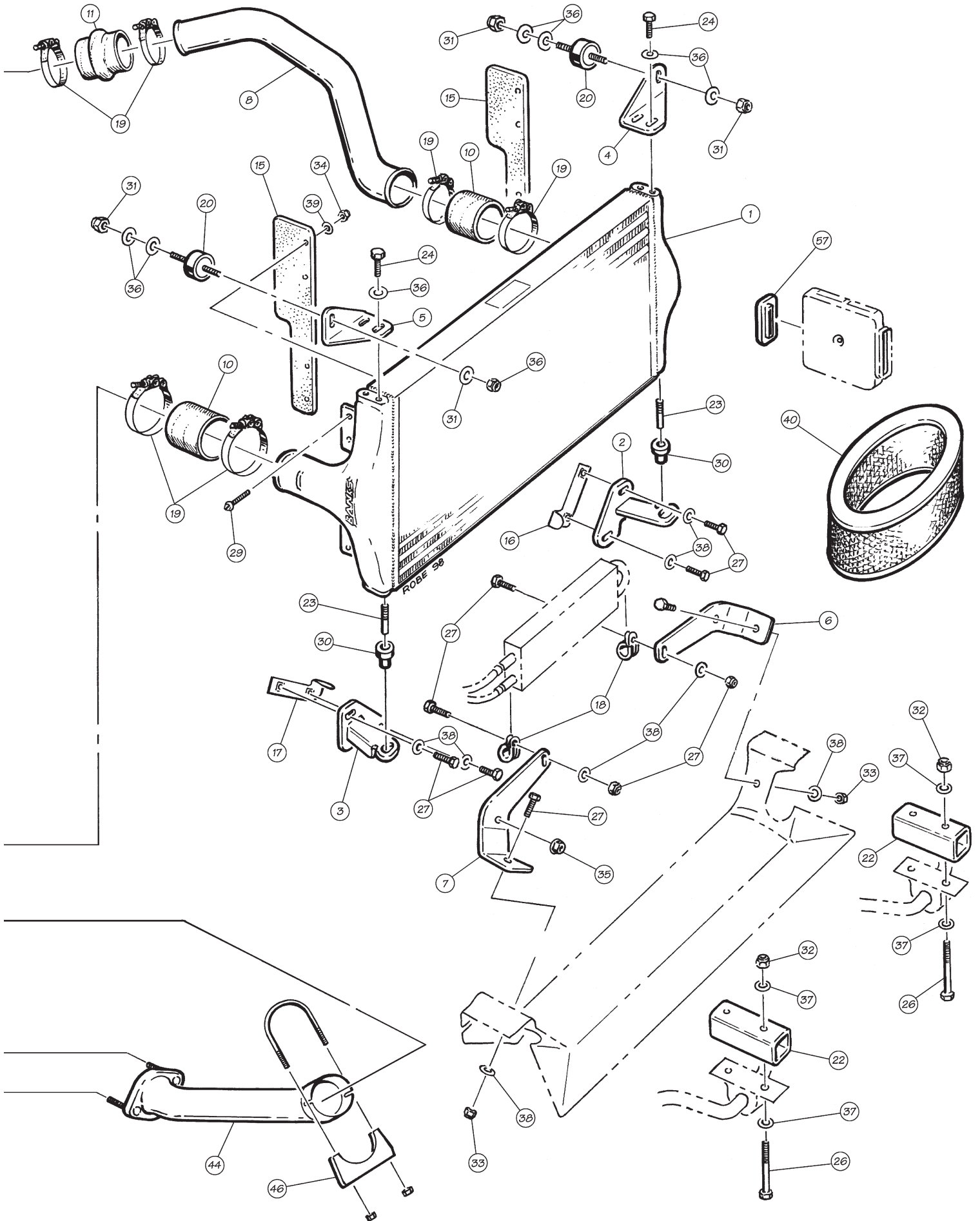
Banks PowerPack systems 48501–48528

Banks Stinger-Plus systems 48451–48478

Banks Stinger systems 48401–48428

| Item # | Part #  | Description                                     | PowerPack | Stinger-Plus | Stinger |
|--------|---------|---|-----------|--------------|---------|
| 1-23   | 25970   | BANKS TECHNI-COOLER SYSTEM                      | 1         | -            | -       |
| 1      | 25504   | TECHNI-COOLER INTERCOOLER                       | 1         | -            | -       |
| 2      | 25511   | INTERCOOLER MOUNTING BRACKET, Lower Left        | 1         | -            | -       |
| 3      | 25512   | INTERCOOLER MOUNTING BRACKET, Lower Right       | 1         | -            | -       |
| 4      | 25515   | INTERCOOLER MOUNTING BRACKET, Upper Left        | 1         | -            | -       |
| 5      | 25516   | INTERCOOLER MOUNTING BRACKET, Upper Right       | 1         | -            | -       |
| 6      | 25530   | TRANSMISSION-FLUID COOLER MOUNTING BRCKT, Left  | 1         | -            | -       |
| 7      | 25531   | TRANSMISSION-FLUID COOLER MOUNTING BRCKT, Right | 1         | -            | -       |
| 8      | 41304   | INTERCOOLER INLET TUBE                          | 1         | -            | -       |
| 9      | 41308   | INTERCOOLER OUTLET TUBE                         | 1         | -            | -       |
| 10     | 94285   | SILICONE HOSE, 3 x 3"                           | 2         | -            | -       |
| 11     | 94510   | SILICONE HUMP HOSE, 3 x 3"                      | 2         | -            | -       |
| 12     | 41312   | TWINRAM INTAKE ASSEMBLY                         | 1         | -            | -       |
| 13     | 41300   | COMPRESSOR OUTLET ELBOW                         | 1         | -            | -       |
| 14     | 93603   | O-RING, Compressor Outlet                       | 1         | -            | -       |
| 15     | 25510   | AIR DAM   | 2         | -            | -       |
| 16     | 25513   | NUT PLATE ASSEMBLY, Left                        | 1         | -            | -       |
| 17     | 25514   | NUT PLATE ASSEMBLY, Right                       | 1         | -            | -       |
| 18     | 62075   | LOOP CLAMP, 3/4 x 5/16"                         | 2         | -            | -       |
| 19     | 92860   | T-BOLT CLAMP                                    | 8         | -            | -       |
| 20     | 25900   | ISOLATOR STUD MOUNT                             | 2         | -            | -       |
| 21     | 41360   | SPACER, 5/8", Aluminum                          | 2         | -            | -       |
| 22     | 81100   | SPACER, Sway Bar                                | 2         | -            | -       |
| 23     | 91501   | STUD, 5/16 x 1 1/8"                             | 2         | -            | -       |
| 24-31  | 25970-5 | FASTENER KIT                                    | 1         | -            | -       |
| 24     | 91225   | BOLT, 5/16" 18 x 3/4" Hex                       | 4         | -            | -       |
| 25     | 91228   | BOLT, 5/16" 18 x 1" Hex                         | 1         | -            | -       |
| 26     | 91450   | BOLT, 3/8" 16 x 3 1/4" Hex                      | 4         | -            | -       |
| 27     | 91117   | BOLT, 1/4" 20 x 3/4" Hex                        | 8         | -            | -       |
| 28     | 91789   | BOLT, 8mm 1.25 x 30mm Hex                       | 2         | -            | -       |
| 29     | 91831   | BOLT, 10 32 x 1" Hex Washer Head                | 8         | -            | -       |
| 30     | 25930   | ISOLATOR BUSHING, Rubber                        | 2         | -            | -       |
| 31     | 91210   | NUT, 5/16" 18 Nylock                            | 5         | -            | -       |
| 32-39  | 25970-5 | FASTENER KIT                                    | 1         | -            | -       |
| 32     | 91415   | NUT, 3/8" 16 Nylock                             | 4         | -            | -       |
| 33     | 91110   | NUT, 1/4" 20 Nylock                             | 4         | -            | -       |
| 34     | 91910   | NUT, 10-32 Nylock                               | 8         | -            | -       |
| 35     | 91803   | LOCKNUT, 8mm 1.25 Hex with Washer               | 2         | -            | -       |
| 36     | 91202   | WASHER, 5/16" SAE                               | 12        | -            | -       |
| 37     | 91403   | WASHER, 3/8" USS                                | 8         | -            | -       |





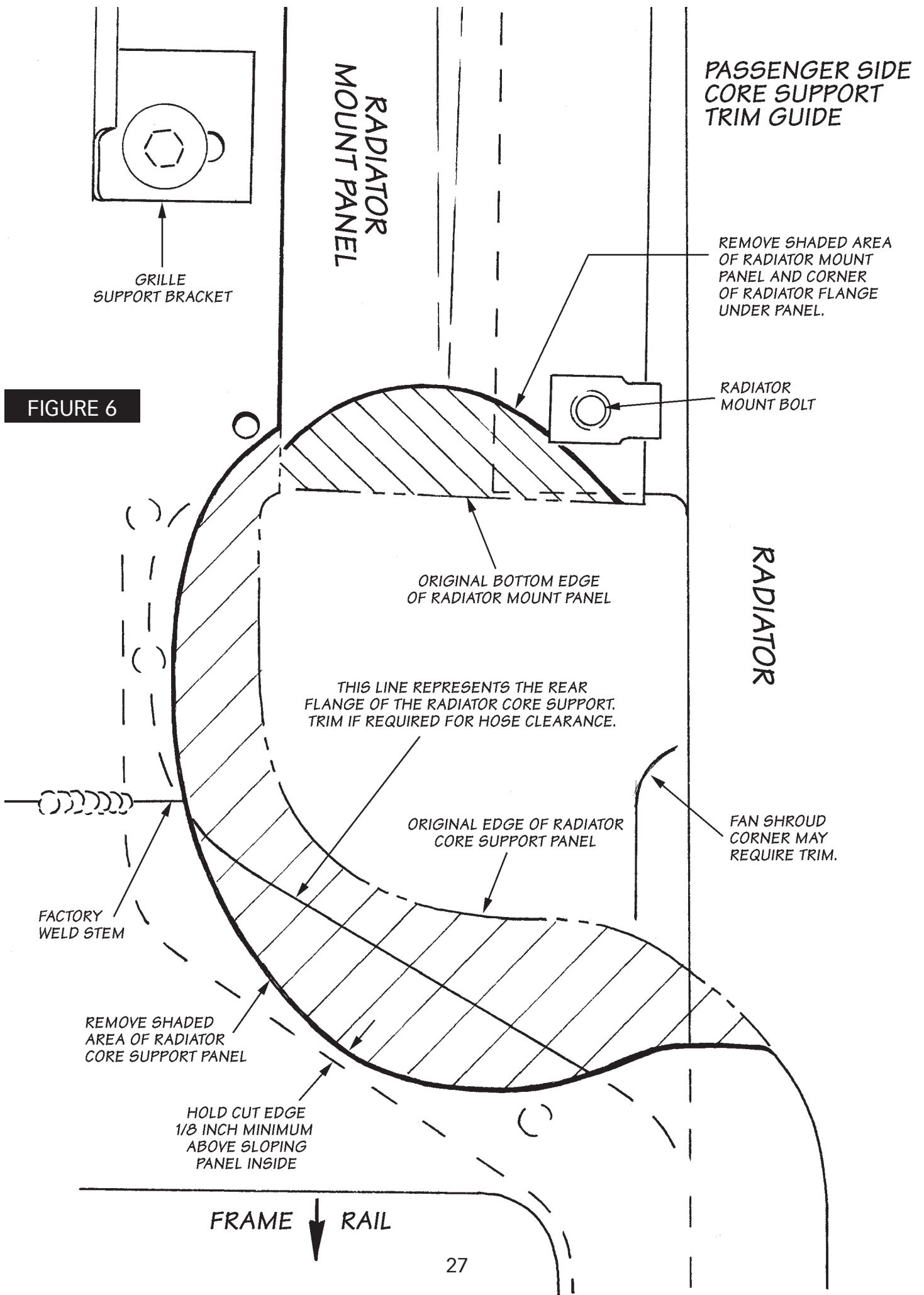
# BILL OF MATERIALS

| Item # | Part #      | Description                        | PowerPack | Stinger-Plus | Stinger |
|--------|-------------|------------------------------------|-----------|--------------|---------|
| 38     | 91102       | WASHER, 1/4" SAE                   | 8         | -            | -       |
| 39     | 91857       | WASHER, #10 SAE                    | 8         | -            | -       |
|        | 90001       | THREAD-LOCKER, 6 ml                | 1         | -            | -       |
| 40     | 41509       | BANKS RAM-AIR FILTER               | 1         | 1            | 1       |
|        | 90094       | FILTER SERVICE KIT                 | 1         | 1            | 1       |
| 41     | 24450       | QUICK-TURBO TURBINE HOUSING        | 1         | 1            | -       |
| 42     | 93604       | O-RING, Oil Feed                   | 1         | 1            | -       |
| 43     | 93605       | O-RING, Oil Drain                  | 1         | 1            | -       |
| 44     | 52124       | TURBINE OUTLET PIPE, Lower         | 1         | 1            | 1       |
| 45     | 52123       | TURBINE OUTLET PIPE, Upper         | 1         | 1            | 1       |
| 46     | 52465       | U-CLAMP, 3"                        | 1         | 1            | 1       |
| 47     | 26001       | HEATSHIELD BLANKET, 6 x 14"        | 1         | 1            | 1       |
| 48     | 26013       | WIRE TIE, Heatshield Blanket       | 4         | 4            | 4       |
| 49     | 52142       | MONSTER TAILPIPE*                  | 1         | 1            | 1       |
| 50     | 52467       | U-CLAMP, 3 1/2"                    | 2         | 2            | 2       |
| 51     | 64001       | DYNAFACT PYROMETER GAUGE KIT       | 1         | 1            | 1       |
| 52     | 63025       | DYNAFACT BOOST GAUGE, 30 PSI       | 1         | 1            | 1       |
| 53     | 63033       | BOOST GAUGE INSTALLATION KIT       | 1         | 1            | 1       |
| 54     | 63002       | TWO-GAUGE MOUNTING PANEL           | 1         | 1            | 1       |
| 55     | 62001       | CABLE TIE, 5"                      | 4         | 4            | 4       |
| 56     | 62010       | CABLE TIE, 8"                      | 4         | 4            | 4       |
| 57     | 62801-62825 | OTTOMIND ENGINE CALIBRATION MODULE | 1         | 1            | 1       |
|        | 96322       | OWNERS MANUAL                      | 1         | 1            | 1       |
|        | 96392       | PRODUCT REGISTRATION CARD          | 1         | 1            | 1       |
|        | 96363       | WARRANTY STATEMENT                 | 1         | 1            | 1       |
|        | 96009       | BANKS POWER DECAL, UroCal          | 2         | 2            | -       |
|        | 96004       | BANKS POWER DECAL, Large           | -         | -            | 2       |
|        | 96005       | BANKS POWER DECAL, Small           | -         | -            | 2       |

\*Stinger systems 48401, 48403 and 48405 use tailpipe p/n 52129

\*Stinger-Plus systems 48451, 48453 and 48455 use tailpipe p/n 52129

\*PowerPack systems 48501, 48503 and 48404 use tailpipe p/n 52129



**FIGURE 6**

**DRIVER SIDE  
CORE SUPPORT  
TRIM GUIDE**

REMOVE SHADED AREA  
OF RADIATOR MOUNT  
PANEL AND CORNER  
OF RADIATOR FLANGE  
UNDER PANEL

RADIATOR  
MOUNT BOLT

RADIATOR  
MOUNT PANEL

GRILLE  
SUPPORT  
BRACKET

**FIGURE 7**

RADIATOR

ORIGINAL BOTTOM EDGE  
OF RADIATOR MOUNT PANEL

THIS LINE REPRESENTS THE REAR  
FLANGE OF THE RADIATOR CORE SUPPORT.  
TRIM IF REQUIRED FOR HOSE CLEARANCE.

ORIGINAL EDGE OF  
RADIATOR CORE  
SUPPORT PANEL

FAN SHROUD  
CORNER MAY  
REQUIRE TRIM.

FACTORY  
WELD SEAM

REMOVE SHADED AREA OF  
RADIATOR CORE SUPPORT PANEL

HOLD CUT EDGE 1/8 INCH MINIMUM  
ABOVE SLOPING PANEL INSIDE

FRAME RAIL

