

**OWNERS
MANUAL
WITH INSTALLATION
INSTRUCTIONS**

**banks[®]
POWERPACK[®]
SYSTEM**

**GM 454 VORTEC
1996 & LATER CLASS-A MOTORHOMES**

THIS MANUAL IS FOR USE WITH SYSTEMS **49070 & 49071**



GALE BANKS ENGINEERING

546 DUGGAN AVENUE • AZUSA, CA 91702

(626) 969-9600 • FAX (626) 334-1743

www.bankspower.com

PREPARATION AND PRECAUTIONS

- 1.** For ease of installation of your Banks PowerPack[®] system, familiarize yourself with the procedure by reading the entire manual before starting work. This manual contains 11 pages of copy, illustrations and parts listing. If any pages are missing from this manual please call Gale Banks Engineering immediately for a replacement.
- 2.** The exploded view of the PowerPack assembly provides 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.** Banks PowerPack is designed to fit Chevy 454 Vortec Class-A motorhome chassis. Due to differences in coach layouts, it may be necessary to relocate or modify some coach or Banks PowerPack components to accommodate installation of the Banks PowerPack.
- 5.** Disconnect the ground cable from the battery before beginning work. If there are two batteries, disconnect both.
- 6.** 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.
- 7.** The front of your motorhome should be raised a minimum of 5-6 inches to allow the installation of Banks TorqueTube[®] exhaust manifolds. If you have access to a hoist, the vehicle can be elevated and the front wheels removed for easiest access.
- 8.** 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 motorhome 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.**
- 9.** During installation, keep the work area clean. If foreign debris is transferred to any Banks PowerPack component, clean it thoroughly before installing.

INSTALLATION PROCEDURE — EXHAUST SYSTEM:

- 10.** With the vehicle safely raised, ground wire(s) disconnected, and other precautions in place, the factory exhaust system can be removed.
- 11.** Locate the oxygen sensors in the exhaust headpipes on each side of the engine, forward of the catalytic converters. Unplug the connectors and unscrew the oxygen sensors, keeping track of the left and right sensors.
- 12.** Disconnect from the headpipes the oval 4-bolt flange at the front of the catalytic converters. Disconnect the headpipes from the exhaust manifolds and remove the headpipe assembly.
- 13.** If the vehicle is equipped with inner front fender shields, remove them. Unscrew the EGR tube at the rear of the left-side exhaust manifold.
- 14.** Remove the spark-plug wires and the spark plugs from both sides of the engine. Note their original locations so they can be properly reinstalled.
- 15.** Remove the nuts holding the spark-plug wire heatshields to the exhaust manifold studs. Remove the heatshields.
- 16.** On the right side of the engine, remove the retaining clip from the oil pan dipstick socket. Unbolt the brackets from the radiator support and manifold stud. Remove the dipstick and dipstick tube by pulling and twisting upward. If the dipstick tube o-ring is stuck inside the tube on the oil pan, place it back onto the dipstick tube.
- 17.** With a wrench or socket, back the exhaust manifold nuts at least one turn away from the manifolds. Use a 1/4-inch 12-point socket to unscrew each stud from the head. Take out the studs so the exhaust manifolds can be removed.
NOTE: Whenever possible, it is recommended that the catalytic converters be inspected. Restricted or damaged catalytic converters can impede performance of your Banks PowerPack.
- 18.** To install the transmission pan heatshield, remove three bolts from the transmission pan. Position the heatshield under the pan, aligning the mounting holes, then reinstall and tighten the original bolts. (Figure 1)
- 19.** Remove the large EGR adapter fitting from the rear of the left-side factory manifold. Coat the EGR fitting

FIGURE 1

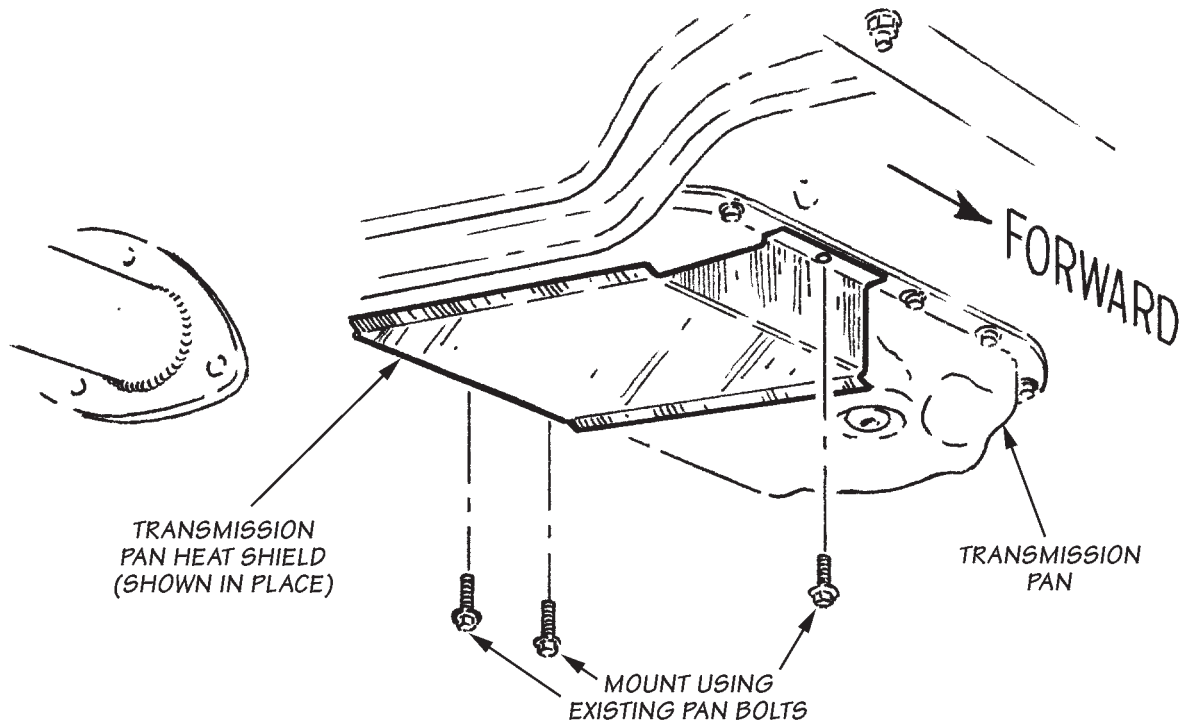
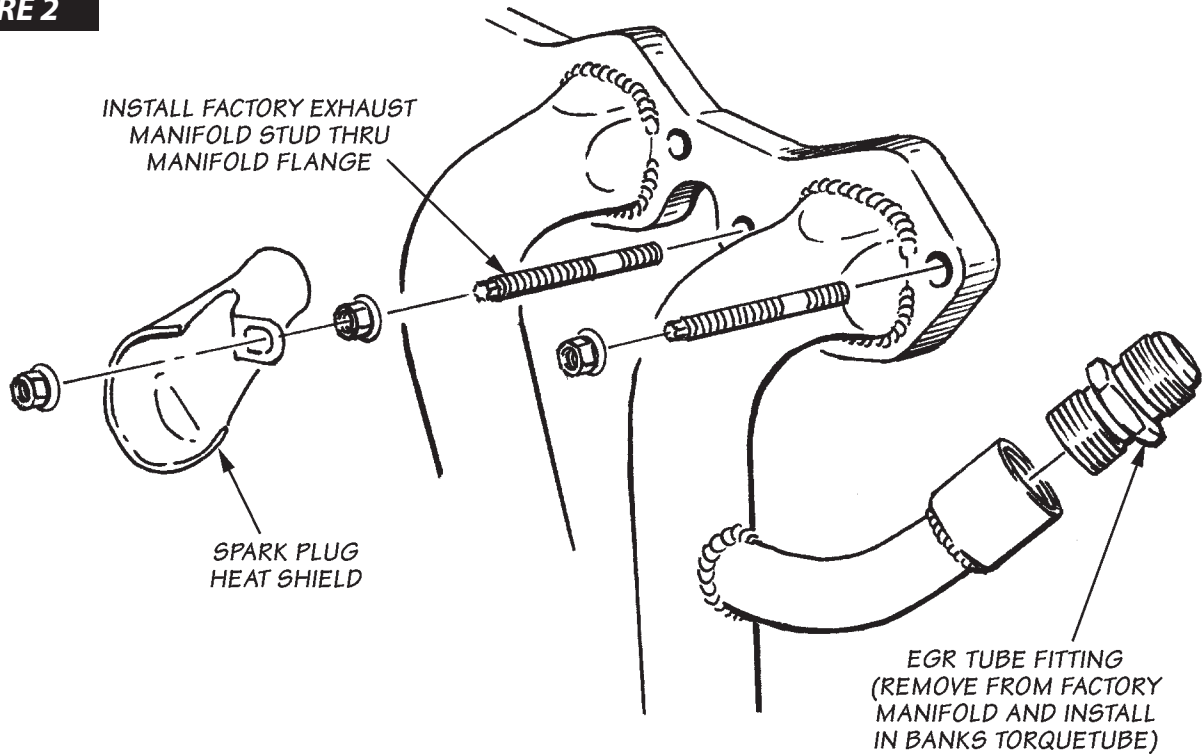


FIGURE 2



threads with anti-seize compound to prevent galling and install it onto the left TorqueTube manifold. (Figure 2)

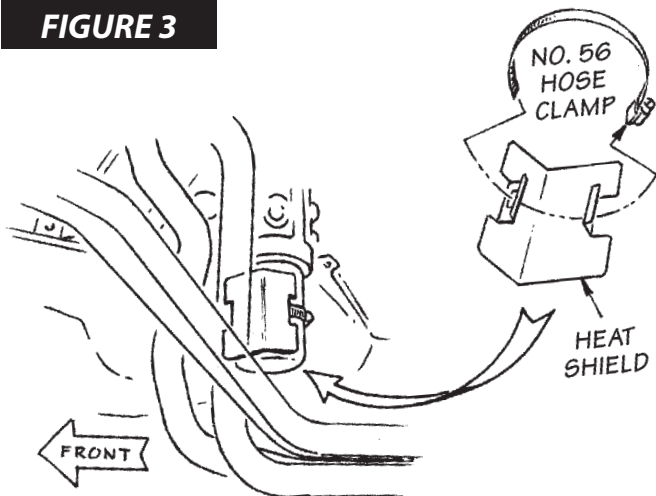
20. Inspect the exhaust mounting surfaces of the cylinder heads and remove rust or carbon, which would prevent the TorqueTube manifolds from sealing.

NOTE: Do not use the factory exhaust manifold gaskets upon reinstallation. Banks torque tubes are machine surfaced and are designed to seal without gaskets.

21. Apply a small amount of anti-seize on the threads at the cylinder head end of each exhaust manifold stud. Lift the TorqueTube manifolds into place and install one or two studs to position them. Apply a small amount of anti-seize on the threads of the EGR fitting. On the left manifold, install the EGR tube onto the adapter fitting and tighten. Reinstall the remaining studs into the heads, and tighten the nuts.

22. Replace the spark plugs, spark plug wire heatshields, and spark plug wires. Reinstall the dipstick tube and o-ring into the oil pan. Replace the retaining clip and reinstall the dipstick.

FIGURE 3



23. Open a number 56 hose clamp and thread it through the slots on the oil filter heat shield. See Figure 3. Position the heat shield on the oil filter to provide protection from the closest manifold pipe, then tighten clamp.

24. Place a conical seal in the flare on the headpipe extension provided. Attach the extension to the right-side TorqueTube manifold with two $\frac{3}{8}$ -1 $\frac{3}{4}$ " bolts and $\frac{3}{8}$ -inch washers provided. Tighten the bolts just enough to hold the extension. Slide a 3-inch muffler clamp onto the extension pipe. Slide the new Banks headpipe assembly onto the headpipe extension. Make a mark with the slip joint fully seated, to verify the joint is fully seated when the clamp is tightened. (See Figure 4)

25. Apply a small amount of anti-seize to the threads of the oxygen sensor bungs in the headpipes. Without

getting any anti-seize on the sensors themselves, install them into the headpipe bungs.

26. Place the other conical seal onto the left-side of the Banks headpipe assembly. Attach the assembly to the left-side TorqueTube with two more $\frac{3}{8}$ -1 $\frac{3}{4}$ " bolts and $\frac{3}{8}$ -inch washers provided. Slip the new gasket between the catalytic converter inlet flanges. Install four $\frac{3}{8}$ -1 $\frac{1}{2}$ " bolts with washers and locking nuts into the oval-flange. Tighten the bolts.

27. Tighten the bolts that attach the TorqueTube manifolds to the headpipe assembly. Tighten the 3-inch exhaust clamp on the slip joint, making sure the slip joint fully seats.

28. On each side of the transmission install a manifold-to-headpipe heatshield. Place the oxygen sensor connector through the oblong hole in the heatshield. Using the $\frac{1}{4}$ -20 x $\frac{3}{4}$ " bolts, washers and crimp-lock nuts provided, attach the heatshield to the tabs on the manifold and headpipe.

29. Plug the oxygen sensor extension leads provided into the wiring harness, where each sensor was originally located. Plug the sensor lead into the headpipe extension. Secure the leads away from pipes and moving linkages with the cable ties provided.

30. Disconnect the factory muffler and tailpipe from the rear of the intermediate pipes. Starting from the rear, first remove the tailpipe and then the muffler. If the slip joints will not come apart, heat the connections with a torch until they separate. Save all hardware and hangers, as some items will be reused.

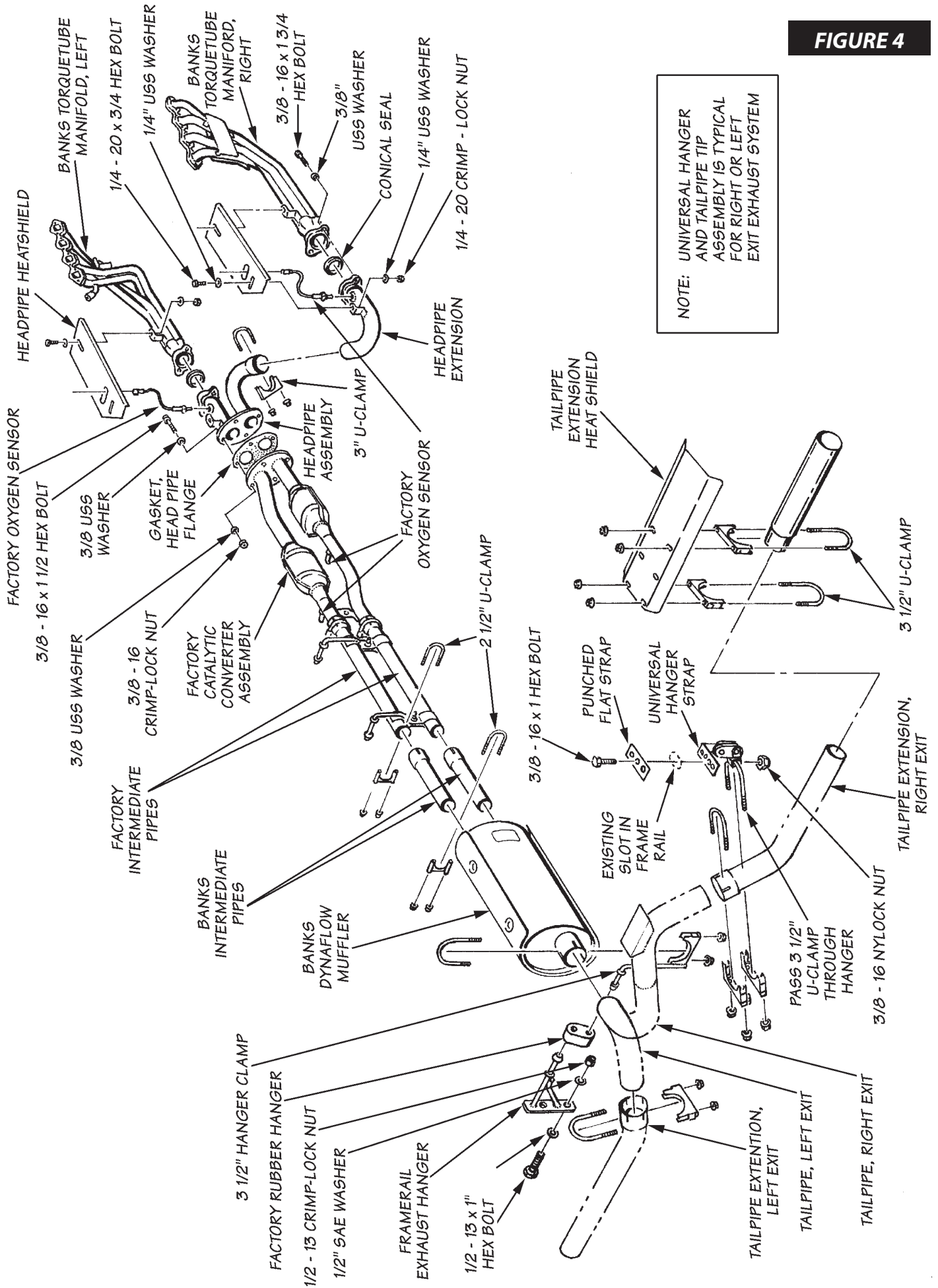
31. Install the two short intermediate pipe extensions onto the ends of the catalytic converter outlet pipes. Slide two 2 $\frac{1}{2}$ -inch exhaust clamps over each of the intermediate extension pipes.

32. Bolt the supplied frame-rail hanger mount into the holes in the frame adjacent to the muffler outlet using two $\frac{1}{2}$ -13x1" hex bolts, washers and crimplock nuts. Install one original rubber hanger onto the pin on the new Banks hanger mount.

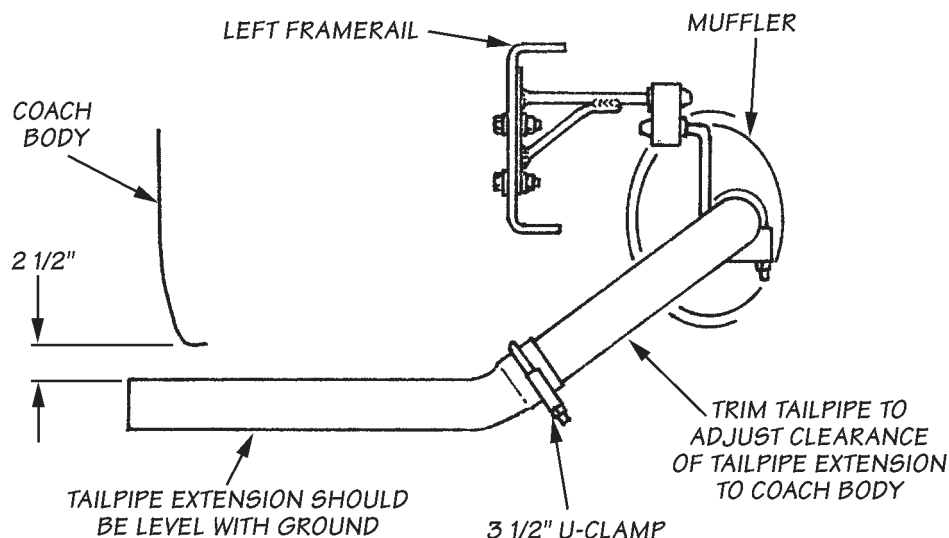
NOTE: Due to differences in coach configuration, some manufactures may eliminate the factory rubber tailpipe hangers. The appropriate rubber hanger is available from Gale Banks Engineering.

33. Install Banks Dynaflow[®] muffler onto the intermediate extension pipes, with the unshielded portion of the muffler facing the driveshaft. Place the 3 $\frac{1}{2}$ "-inch hanger clamp over the muffler outlet and insert the pin into the rubber hanger.

FIGURE 4



NOTE: UNIVERSAL HANGER AND TAILPIPE TIP ASSEMBLY IS TYPICAL FOR RIGHT OR LEFT EXIT EXHAUST SYSTEM

FIGURE 5

34. Holding the muffler square and level to the vehicle frame, tighten the clamps on the intermediate extension pipes and the muffler inlets.

35. Two tailpipe options are available to provide either a right-exit or left-exit tailpipe. For a left-exit tailpipe: Insert the shorter leg of the tailpipe into the outlet of the muffler. Right-exit tailpipe: Place the tailpipe up and over the driveshaft and slide it into the outlet of the muffler.

36. Slide the tailpipe extension onto the tailpipe, without installing clamps yet. Level the tailpipe extension to the vehicle. Adjust the tailpipe extension height to $2\frac{1}{4}$ to $2\frac{1}{2}$ -inches below the bottom of the vehicle body. This will place the heatshield about $1\frac{1}{2}$ -inches below the body after it is installed. If the pipe is more than $2\frac{1}{2}$ -inches below the body, trim the tailpipe at the slip joint. (Figure 5)

37. With the proper height established, slide the polished tip over the end of the tailpipe extension. In most cases the tailpipe extension will have to be shortened when the polished tip is positioned for best appearance in relation to the coach bodywork. Once a position is determined, mark the tailpipe extension to locate the inside edge of the polished tip. Remove the tip, then measure and make a second mark $10\frac{1}{2}$ inches out from the first mark. This will allow for $1\frac{1}{2}$ inset from the end of the tailpipe extension to the end of the polished tip. Remove the tailpipe extension and cut it at the second mark. Reinstall the tailpipe extension and clamp it into place. Make sure the pipe is square with the vehicle or pointing slightly to the rear. Slide the tip on and secure it with a $3\frac{1}{2}$ -inch clamp. (Figure 6a)

38. Level the pipe with the vehicle and place the universal clamp onto the pipe with a $3\frac{1}{2}$ -inch clamp. For proper alignment with the tailpipe, some minor adjustment to the angle of the hanger head may be necessary. (Figure 6b) Secure the hanger to the vehicle frame with the $\frac{3}{8}$ -16x1 bolt thru the oblong hole in the bottom of the framerail. Use the segment of flat strap as a washer on the upper side of the frame-rail. This will allow the pipe to remain level when the clamp is tightened. Place the heatshield over the clamp that is holding the tip in place and secure it with the clamp-nuts. Place another clamp at the opposite end of the heatshield and secure it to the pipe. On some narrow-body vehicles it may be necessary to trim the heatshield.

39. Lower the vehicle and reconnect the battery cables. Start the engine and listen for any exhaust leaks. Tighten bolts or clamps to correct any leaks or improper adjustments. Whenever possible, tack-welding slip connections to prevent disengagement is recommended.

Note: It is normal for the vehicle exhaust to smoke upon initial start-up. This indicates the lubricant applied during the tube-bending process is burning off the pipes.

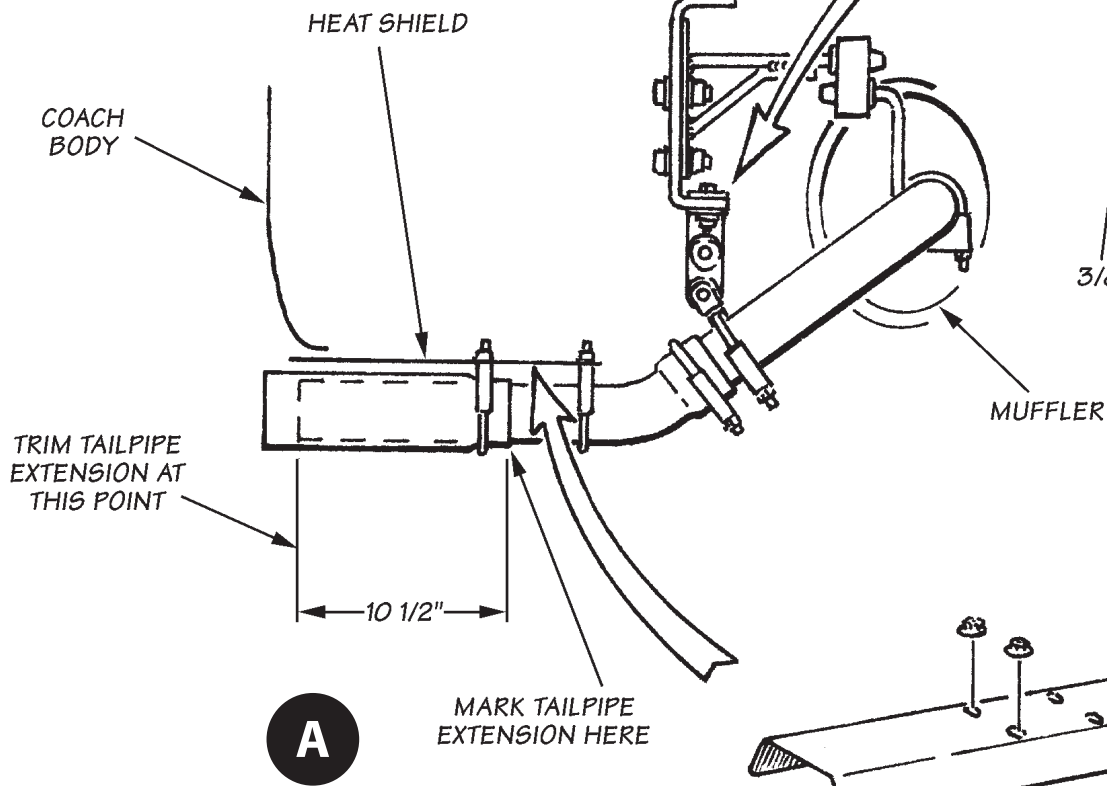
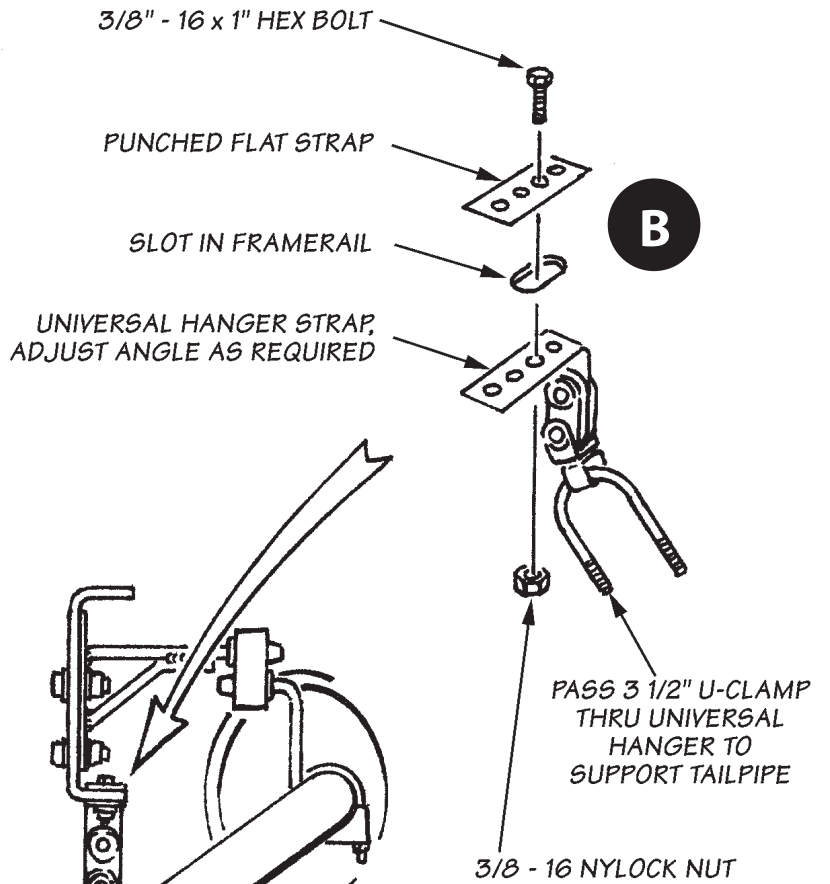
BANKS RAM-AIR™ INTAKE:

40. Locate the factory air filter housing and access it from inside the right-side wheel-well. Replace the factory air filter element with Banks Ram Air element. Place the "STOP!" decal on the air filter housing so that it is clearly visible to service personnel.

41. Open the front engine cover. Locate and remove the air silencer assembly attached to the front of the air filter housing. Remove the two bolts retaining the silencer bracket, remove the bracket, then replace the two bolts. (Figure 7)

FIGURE 6

NOTE: LEFT EXIT TAILPIPE INSTALLATION IS SHOWN. RIGHT EXIT INSTALLATION IS SIMILAR



HEAT SHIELD ASSEMBLY DETAIL

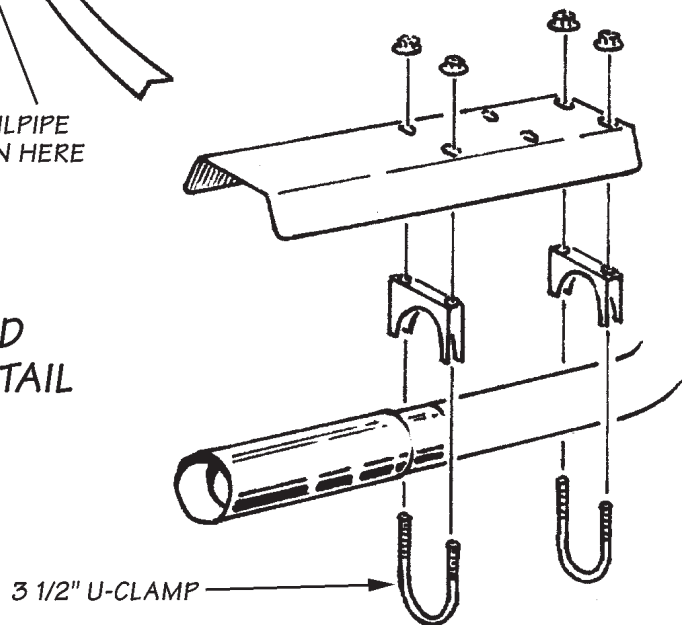


FIGURE 7

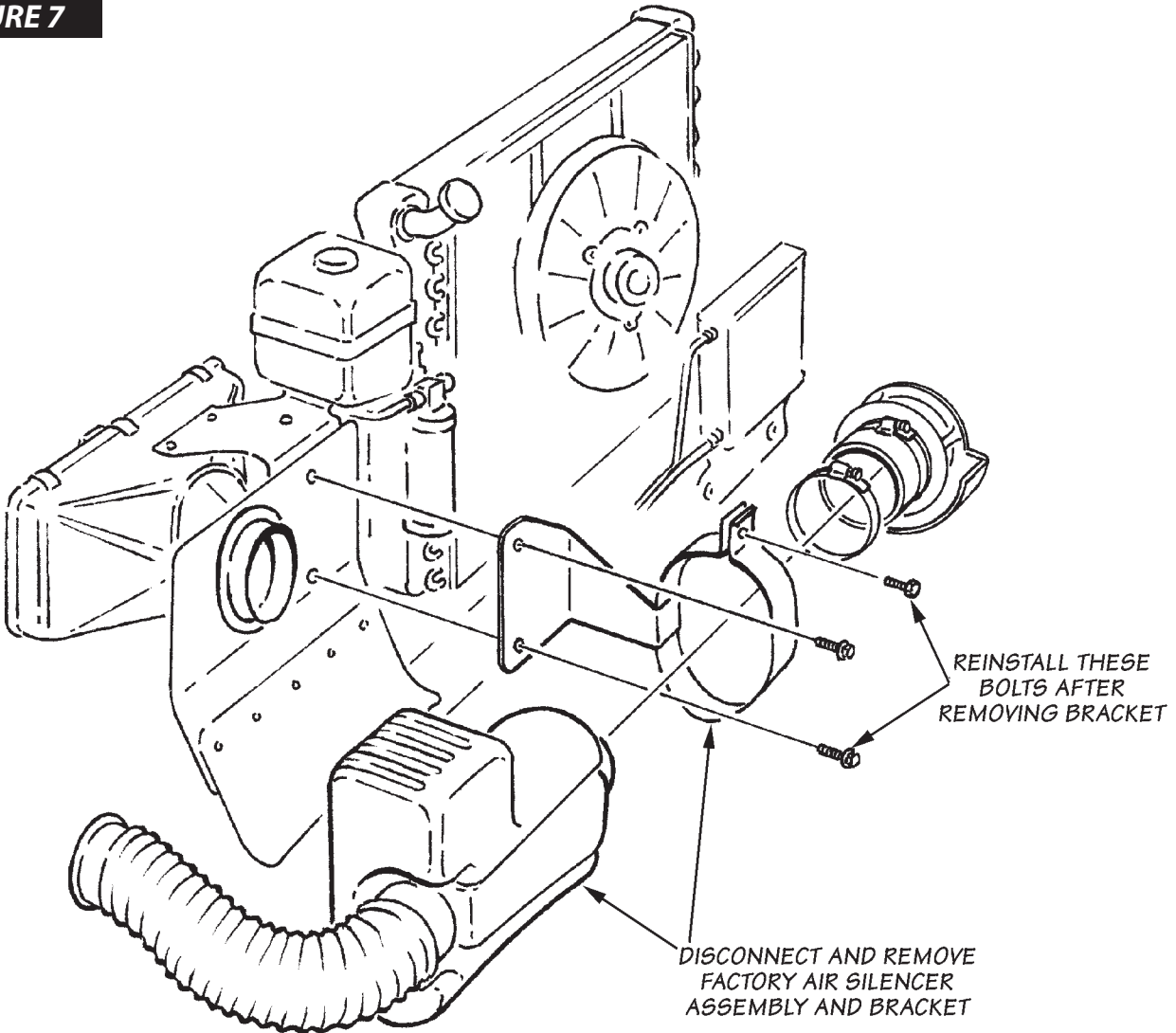


FIGURE 8

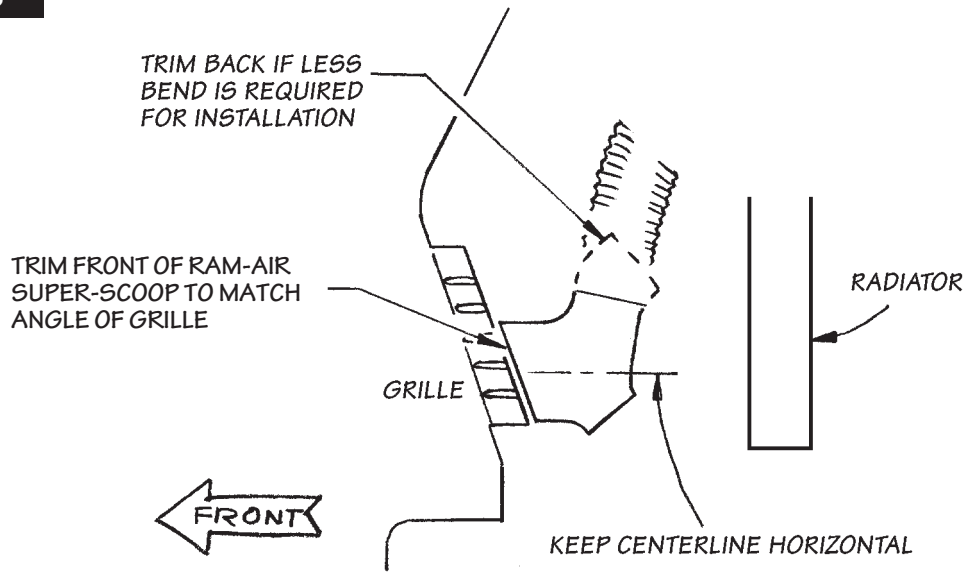
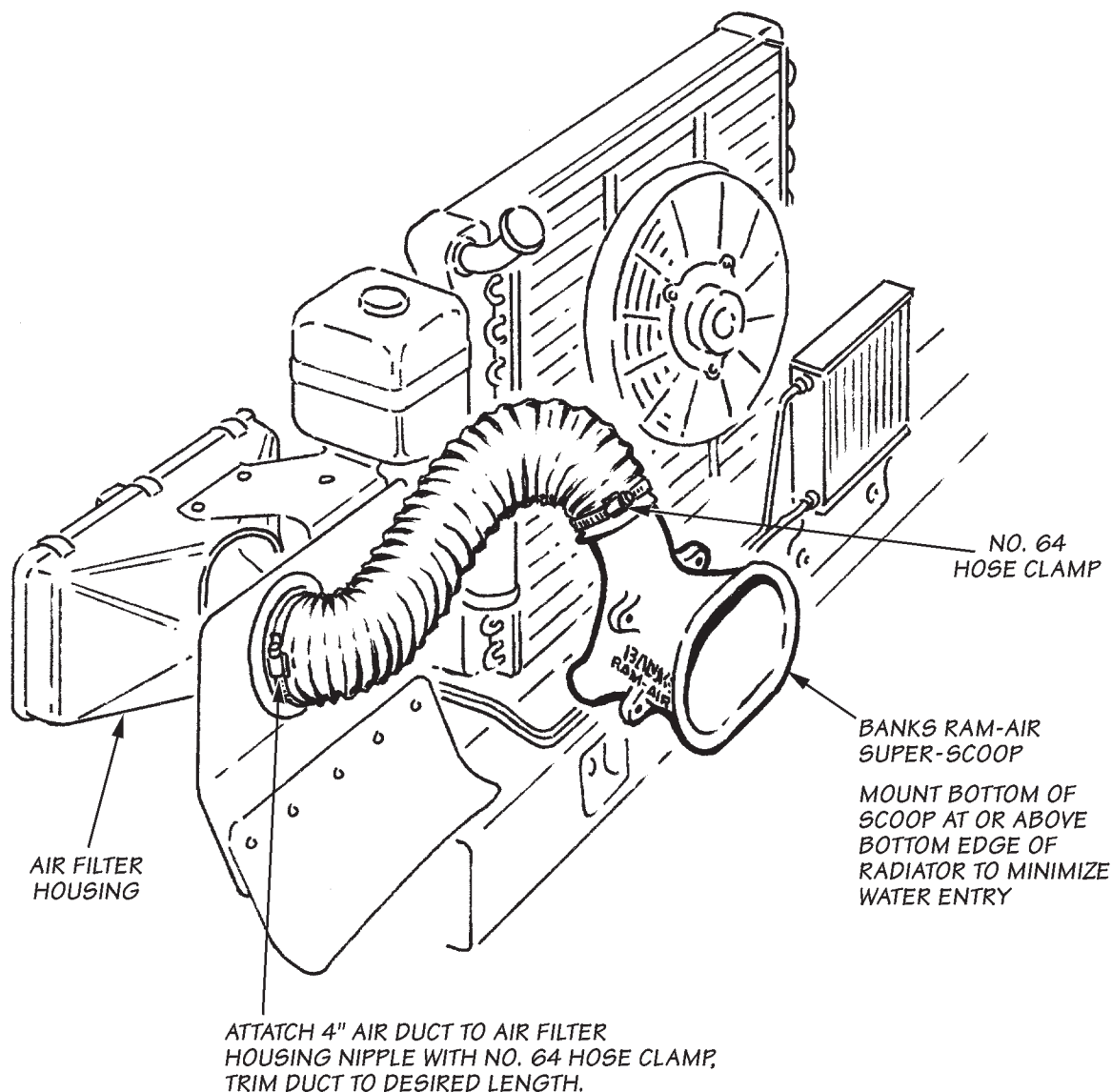


FIGURE 9



42. Determine a location for the Ram-Air Super-Scoop™. It should be placed directly behind the grille as low as possible, but not lower than the bottom edge of the radiator with the air inlet opening pointing straight ahead. (Figures 8, 9)

43. If the grille is angled, trim the scoop with heavy snips or a hacksaw so the air inlet opening fits against the backside of the grille and the scoop is level to the ground.

44. The height difference between the scoop and the filter airbox inlet should be as much as possible, to prevent excess rainwater from entering the airbox. Trim back the curved outlet section of the scoop if less curvature makes a more streamlined hose routing.

45. Mount the Super-Scoop using one of the following methods: If the grille consists of horizontal bars or a rigid perforated screen, the Super-Scoop can be secured with four 14-inch cable ties, provided, slipped through its "ears" and the grille. Alternately, mount the Super Scoop with the four perforated metal straps, provided. Bend and attach them to the Super-Scoop "ears" with the $\frac{1}{4}$ -20 x $1\frac{1}{4}$ " bolts, nylock nuts and $\frac{1}{4}$ -inch flat washers provided. Attach the other ends of the brackets to a convenient mounting surface, such as the gravel pan or grille brackets, with $10 \times \frac{3}{4}$ sheet metal screws provided. A combination of cable ties and straps can also be used. The Super-Scoop may also be mounted to the grille by screws placed through holes drilled in the lip flange of the scoop. (Figure 10)

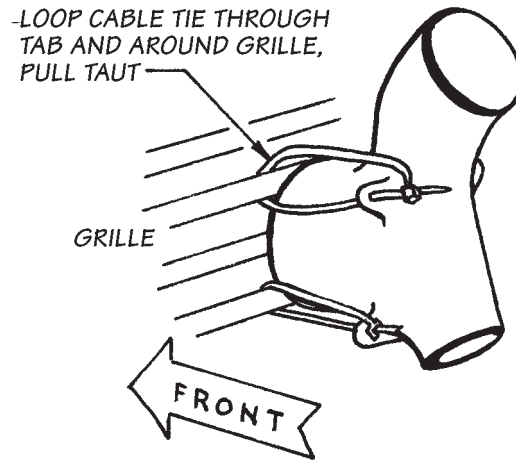
45. Connect the airbox inlet to the scoop with the 4-inch flexible hose provided. Shorten the hose if required. Secure it with two #64 hose-clamps.

45. Affix the exhaust emissions EO-compliance decal in the engine compartment near the vehicle emissions control label, so service and inspection personnel can read it easily.

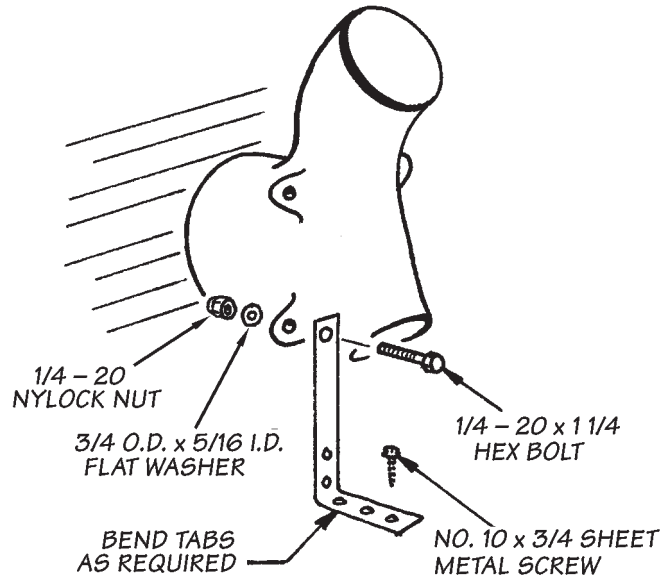
FIGURE 10

RAM-AIR SUPER-SCOOP MOUNTING METHODS

CABLE TIE MOUNTING



STRAP MOUNTING



PARTS LIST

GM 454 Vortec • 1996 & Later Class "A" Motorhomes

QTY	DESCRIPTION	49070 PART#	49071 PART#
1	BOLT, 3/8" 16 x 1" Hex.	91427	91427
4	BOLT, 3/8" 16 x 1 1/2" Hex.	91429	91429
4	BOLT, 3/8" 16 x 1 3/4" Hex.	91430	91430
4	BOLT, 1/4" 20 x 3/4" Hex.	91117	91117
4	BOLT, 1/4" 20 x 1 1/4" Hex.	91119	91119
2	BOLT, 1/2" 13 x 1" Grd. 5 Hex.	91930	91930
1	CARD, Product Registration.	96392	96392
4	CLAMP, Exhaust, 2 1/2", HD-G.	52461	52461
1	CLAMP, Exhaust, 3" HD.	52465	52465
4	CLAMP, Exhaust, 3 1/2" HD.	52467	52467
1	CLAMP, Hose, #56 w/Liner.	92857	92857
2	CLAMP, Hose, #64.	92864	92864
1	CLAMP, Hanger, 3 1/2".	52310	52310
2	EXTENSION, Wire, 02 Sensor.	62305	62305
1	FILTER, Ram-Air™ Filter Element, PowerPack.	41022	41022
1	GASKET, Inlet, Catalytic Converter.	93030	93030
1	HANGER, Muffler, Rear.	52311	52311
1	HANGER, Universal.	52172	52172
2	HEATSHIELD, Headpipe.	26063	26063
1	HEATSHIELD, Oil Filter.	26072	26072
1	HEATSHIELD, Tailpipe Extension.	26068	26068
1	HEATSHIELD, Transmission Pan.	26080	26080
1	HOSE, Air Duct, 4" x 5'.	94102	94102
1	KIT, Service, Ram-Air Filter.	90094	90094
1	LUBRICANT, Anti-seize, 1oz.	90045	90045
1	MANIFOLD, Exhaust, Left, Stainless Steel.	52224	52224
1	MANIFOLD, Exhaust, Right, Stainless Steel.	52225	52225
1	MUFFLER, 2 1/2 x 3 1/2", Stainless Steel.	52410	52410
1	NUT, 3/8" 16 Nylock.	91415	91415
4	NUT, 3/8" 16 Crimplock.	91416	91416
4	NUT, 1/4" 20 Nylock.	91110	91110
4	NUT, 1/4" 20 Crimplock.	91113	91113
2	NUT, 1/2", 13 Crimplock.	91823	91823
1	OWNERS MANUAL.	96373	96373
1	PIPE, Tail, 3 1/2", Stainless Steel.	52672	52680
1	PIPE, Tail, Extension, 3 1/2", Stainless Steel.	52698	52651
2	PIPE, Intermediate, 2 1/2", Stainless Steel.	52621	52621
1	PIPE, Tailpipe Tip, Polished, 3 1/2 x 4 x 12".	52281	52281
1	PIPE, "Y", Assembly, Stainless Steel.	51220	51220
1	PIPE, "Y", Extension, Stainless Steel.	51221	51221
3	PLAQUE, Banks PowerPack.	96008	96008
4	SCREW, Sheet Metal.	91840	91840
2	SEAL, Conical, Exhaust Outlet.	93161	93161
4	STRAP, Mounting.	42611	42611
1	SUPER-SCOOP™, Banks Ram-Air.	42602	42602
8	TIE, Cable, 8" Black.	62010	62010
12	WASHER, 3/8" USS.	91403	91403
12	WASHER, 1/4" USS.	91103	91103
4	WASHER, 1/2" SAE.	91902	91902
1	WARRANTY STATEMENT.	96363	96363

