

OWNERS MANUAL

WITH INSTALLATION
INSTRUCTIONS

banks[®]
POWERPACK

S Y S T E M

**GM 454 VORTEC
1996 & LATER CLASS-A MOTORHOMES P-12 CHASSIS**

THIS MANUAL IS FOR USE WITH SYSTEMS 49043, 49045, 49072 AND 49074

banks

GALE BANKS ENGINEERING

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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.** This Banks system is designed to fit GM P-12 chassis with a Vortec 454. 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:

For Stinger installation proceed to step 24.

10. With the vehicle safely raised, ground wire(s) disconnected, and other precautions in place, the factory exhaust system can be removed. To ease bolt removal, a penetrating lubricant may be sprayed on all fasteners as well as the EGR fitting on the left manifold.

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. Remove the nuts on each 3 bolt flange at the front of the catalytic converters. Disconnect the headpipes from the exhaust manifolds and remove each headpipe from the vehicle.

13. Unscrew the EGR tube at the rear of the left-side exhaust manifold. Remove the dipstick retaining clip from the oil pan.

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. Unbolt the dipstick tube screw from the mounting bracket. Separate the two sections of the tube and remove the lower portion from the vehicle.

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 the location of one bolt rather than a stud. This bolt will be reinstalled in this location on reassembly.

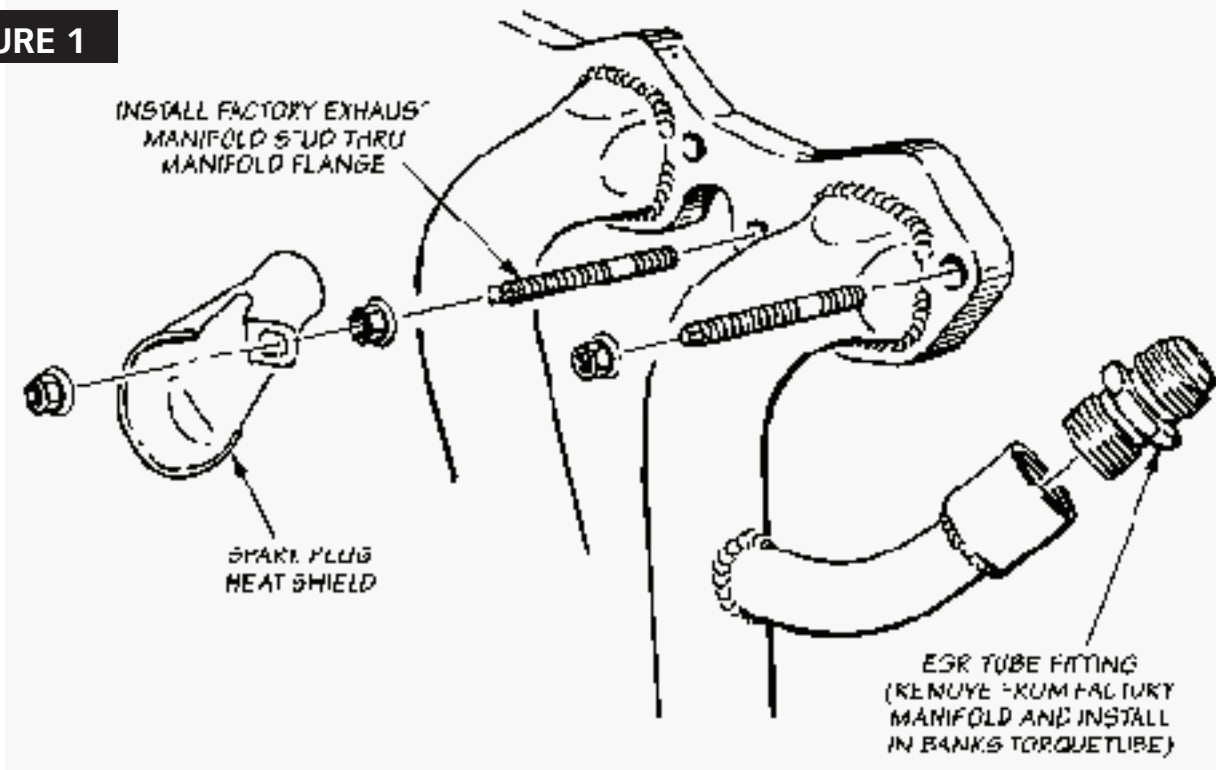
NOTE: Whenever possible, it is recommended that the catalytic converters be inspected. Restricted or damaged catalytic converters can impede performance of your Banks PowerPack.

18. Remove the large EGR adapter fitting from the rear of the left-side factory manifold. Coat the EGR fitting threads with anti-seize compound to prevent galling and install it onto the left TorqueTube manifold. (Figure 1)

19. 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.

FIGURE 1



20. 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. Make sure that the single bolt reinstalls in the same location that it came from.

21. 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.

22. Place a conical seal in the flare on each headpipe and attach the headpipes to the manifolds using the $\frac{3}{8}$ " x $1\frac{3}{4}$ " bolts and $\frac{3}{8}$ " washers provided. Position a new headpipe flange gasket between each of the 3-bolt flanges and attach the headpipes to the converter inlet pipes with two $\frac{7}{16}$ " x $1\frac{1}{4}$ " bolts and washers and one $\frac{3}{8}$ " x $\frac{1}{4}$ " bolt and washer. Tighten all the fasteners evenly.

23. 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. Plug the sensors into their original locations. It will be necessary to pull the wire loom out of the frame connector on both sides of the vehicle to allow adequate length.

24. 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.

25. 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.

26. Remove the factory frame hanger located at the back of the muffler. 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 or any GM parts dealer. (P.N. 15641364)

27. 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.

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

Note: Two tailpipe options are available to provide either a right-exit or left-exit tailpipe. For left exit tailpipes follow steps 29-34. For right exit tailpipes follow steps 34-40.

29. Loosen but do not remove the 2 farthest forward nuts on the left spring hanger mount. Slip the frame hanger bracket behind the nuts with the tab turning towards the center of the vehicle, and retighten the nuts.

30. Place the tailpipe into the muffler outlet and position a stand under the tailpipe to support it level with the vehicle. The end of the tailpipe extension should be even with the outside edge of the lower body of the vehicle.

31. Place the universal hanger supplied onto a 3.5" muffler clamp and slide the clamp over the tailpipe to a point directly below the frame hanger bracket. Either measure or mark the strap on the hanger even with the bottom of the frame bracket previously installed. Remove the clamp and hanger from the pipe and make a 90 degree bend in the strap at the measurement or mark.

32. Place the clamp and hanger back onto the tailpipe and attach the hanger to the frame bracket with the $\frac{3}{8}$ x 1" bolt washers and nut provided. Make sure that the tailpipe is level with the vehicle and tighten the 3.5" clamp. Tighten the clamp on the muffler outlet.

33. Place the polished tip over the end of the tailpipe so that the end of the tailpipe is approximately 1" inside the tip. Clamp the tip to the pipe with a 3.5" U-clamp.

34. If it is needed, a clamp-on tailpipe heatshield has been provided. It is clamped with the remaining 3.5" U-clamps to the tailpipe and may be trimmed to length if necessary.

35. Loosen but do not remove the 2 farthest forward nuts on the right spring hanger mount. Slip the frame hanger bracket behind the nuts with the tab turning towards the center of the vehicle, and retighten the nuts.

36. Place the tailpipe into the muffler. Position it so that the heatshield is level with the floor of the vehicle and tighten the clamp on the muffler outlet enough to hold the pipe from falling onto the driveshaft.

37. Slide a 3.5" U-clamp onto the tailpipe extension and slip the extension onto the tailpipe. Place a stand under the extension to support it level with the vehicle. The end of the tailpipe extension should be even with the outside edge of the lower body of the vehicle. If the pipe is too low on the vehicle, it can be raised by trimming the tailpipe where the 2 parts slip together.

38. Place the universal hanger supplied onto a 3.5" muffler clamp and slide the clamp over the tailpipe to a point just below the frame hanger bracket. Either measure or mark the strap on the hanger even with the bottom of the frame bracket previously installed. Remove the clamp and hanger from the pipe and make a 90 degree bend in the strap at the measurement or mark.

39. Place the clamp and hanger back onto the tailpipe extension and attach the hanger to the frame bracket with the $\frac{3}{8}$ x 1" bolt washers and nut provided. Make sure that the extension is level with the vehicle and tighten the 3.5" clamp. Tighten the clamp on the muffler outlet and the clamp that holds the extension to the tailpipe.

40. Place the polished tip over the end of the tailpipe so that the end of the tailpipe is approximately 1" inside the tip. Clamp the tip to the pipe with a 3.5" U-clamp.

41. If it is needed to protect a side box, a clamp-on tailpipe heatshield has been provided. It is clamped with the remaining 3.5" U-clamps to the tailpipe.

42. 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)

43. 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 $\frac{3}{8}$ -16 x 1 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.

44. 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.

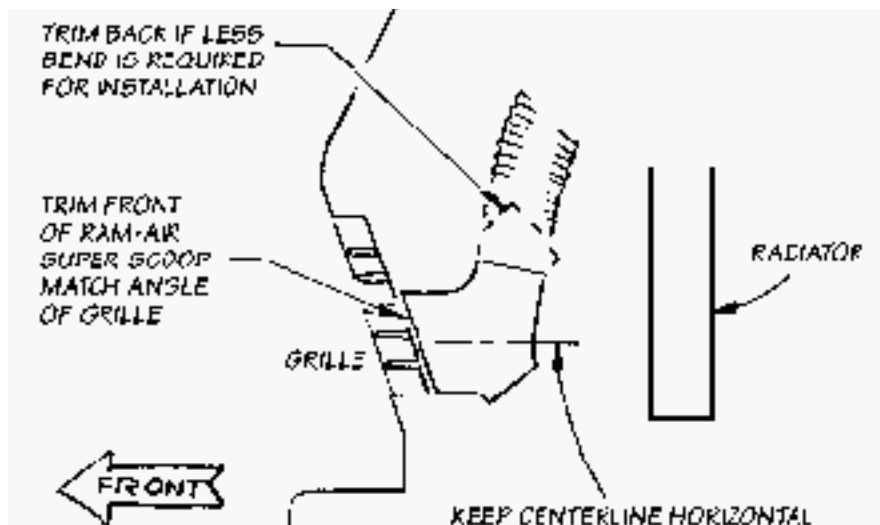
Note: It is normal for the vehicle exhaust to smoke upon initial start-up. This indicates the lubricant applied during the tube-bending process is burning off the pipes.

BANKS RAM-AIR™ INTAKE:

45. 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.

46. Open the front engine cover. Locate and remove the air silencer assembly attached to the front of the air

FIGURE 2



filter housing. Remove the rubber elbow behind the silencer and cut as shown in figure XX. Reinstall the elbow in the vehicle.

47. 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 2, 3)

48. 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.

49. 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.

50. 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 1/4-20 x 1 1/4" bolts, nylock nuts and 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 x 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 4)

51. Connect the Super-Scoop outlet to the cut end of the rubber elbow with the 4-inch flexible hose provided. Shorten the hose if required. Secure it with two #64 hose-clamps.

FIGURE 3

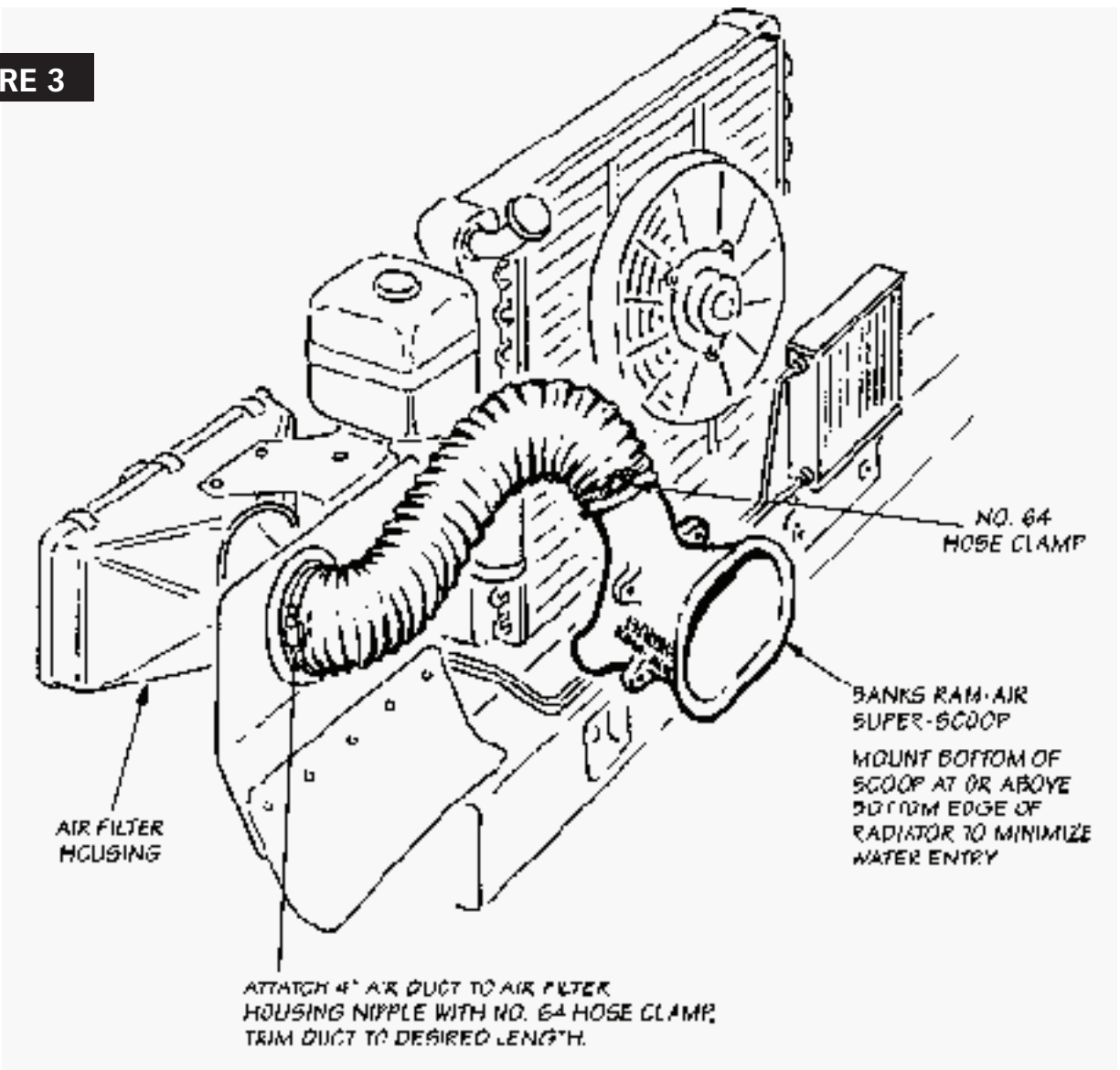
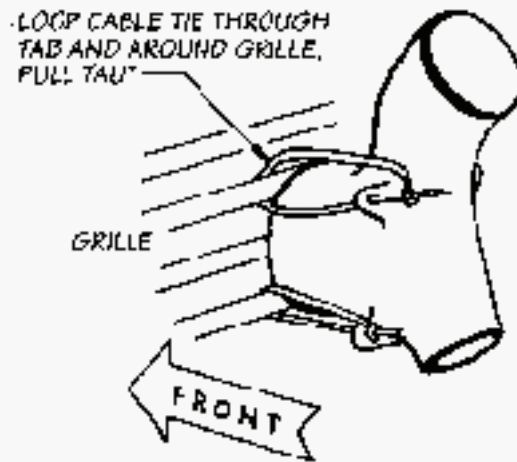


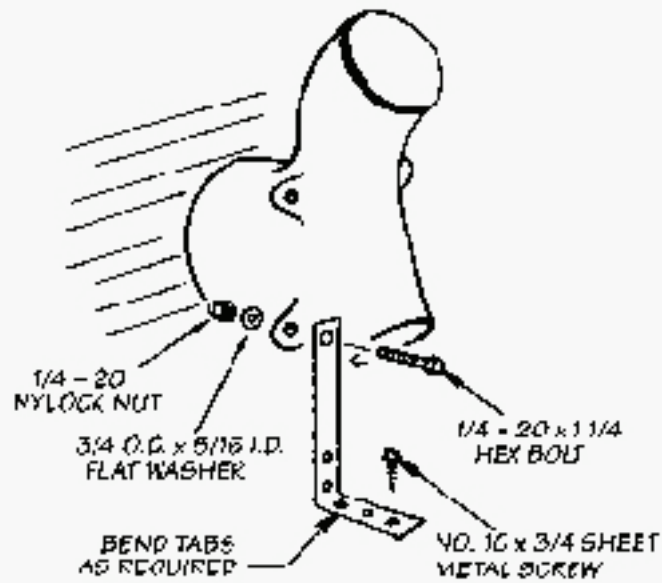
FIGURE 4

RAM-AIR SUPER-SCOOP MOUNTING METHODS

CABLE TIE MOUNTING



STRAP MOUNTING



BILL OF MATERIALS

GM 454 Vortec • 1996 & Later Class A Motorhomes P-12 Chassis

Part #	Description	System 49072	System 49074	System 49043	System 49045
52226	TorqueTube, Left	1	1	--	--
52227	TorqueTube, Right	1	1	--	--
51222	Headpipe, Left	1	1	--	--
51223	Headpipe, Right	1	1	--	--
52622	Intermediate Pipe, Upper	1	1	1	1
52621	Intermediate Pipe, Lower	1	1	1	1
52410	Dynaflow Muffler	1	1	1	1
52668	Monster Tailpipe, Left exit	1	--	1	--
52682	Monster Tailpipe, Right exit	--	1	--	1
52698	Tailpipe Extension, Left	1	--	1	--
52751	Tailpipe Extension, Right	--	1	--	1
52281	Tailpipe Tip	1	1	1	1
42602	Super-Scoop	1	1	1	1
94102	Hose, Air duct	1	1	1	1
41035	Air Filter Element	1	1	1	1
26068	Heat Shield, Tailpipe	1	1	1	1
52310	Hanger Clamp, 3/2"	1	1	1	1
52311	Hanger Assembly	1	1	1	1
52697	Hanger Bracket	1	1	1	1
52193	Universal Hanger	1	1	1	1
42611	4 Mounting Strap	4	4	4	4
52468	4 Clamp, Exhaust 3/2"	4	4	4	4
52461	4 Clamp, Exhaust 2/2"	4	4	4	4
92864	2 Hose Clamp, #64	2	2	2	2
93161	Conical Seal	1	1	1	1
93031	Gasket, Head Pipe	2	2	--	--
91930	Bolt, 1/2 - 13 x 1"	2	2	2	2
91628	Bolt, 7/16 - 20 x 1 1/4"	4	4	--	--
91430	Bolt, 3/8 - 16 x 1 3/4"	4	4	--	--
91428	Bolt, 3/8 - 16 x 1 1/2"	2	2	--	--
91427	Bolt, 3/8 - 16 x 1"	1	1	1	1
91119	Bolt, 1/4 - 20 x 1 1/4	4	4	4	4
91823	Nut, 1/2 - 13 Crimplock	2	2	2	2
91619	Nut, 7/16 - 20 Crimplock	4	4	--	--
91416	Nut, 3/8 - 16 Crimplock	3	3	1	1
91110	Nut, 1/4 - 20 Nylock	4	4	4	4
91602	Washer, 7/16 SAE	8	8	--	--
91402	Washer, 3/8 SAE	8	8	--	--
91403	Washer, 3/8 USS	2	2	2	2
91103	Washer, 1/4 USS	4	4	4	4

Continued on page 10

BILL OF MATERIALS

GM 454 Vortec • 1996 & Later Class A Motorhomes P-12 Chassis

91840	Screw, #10 x 3/4"	4	4	4	4
62010	Cable Ties	8	8	8	8
90094	Filter Service Kit	1	1	1	1
90045	Anti-Seize Kit	1	1	--	--
90020	Polish, Metal	1	1	1	1
96393	Owners Manual	1	1	1	1
96009	Urocal, "Banks Power"	3	3	3	3
96363	Warranty Statement	1	1	1	1
96392	Product Registration Card	1	1	1	1

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