



PERFORMER RPM™ CNC MACHINED CYLINDER HEADS
For 1984 & Later Harley-Davidson®
Evolution® “Big Twin” Engines
Catalog #1604, 1606, 1607, 1624, 16041 & 16061

INSTALLATION INSTRUCTIONS

PLEASE study these instructions carefully before beginning this installation. Most installations can be accomplished with common tools and procedures. However, you should be familiar with and comfortable working on your vehicle. If you do not feel comfortable performing this installation, it is recommended to have the installation completed by a qualified mechanic. If you have any questions, please call our **Technical Hotline at: 1-800-416-8628**, 7:00 am - 5:00 pm, Pacific Standard Time, Monday through Friday or e-mail us at Edelbrock@Edelbrock.com. If your question is motorcycle carburetor-related, please call our **Edelbrock Motorcycle Carburetor division at 1-877-888-7504, Ext. 2.**

IMPORTANT NOTE: Proper installation is the responsibility of the installer. Improper installation will void your warranty and may result in poor performance and engine or vehicle damage.

DESCRIPTION: The Edelbrock Performer RPM™ Cylinder Heads are designed to provide increased performance in the idle to 6000+ RPM range, in 1984 and later, 80-inch and larger, Evo Big Twin engines. They feature a CNC-machined, rectangular intake port to provide a noticeable increase in air flow. The intake port is also raised .125" to help increase the velocity of the incoming air for more power. **Edelbrock intake manifolds must be used with these heads** due to the unique port shape (see application chart below). The dual-quench combustion chamber features a revolutionary new design that promotes a better mix and more efficient combustion. The CNC-machined, “D” shaped exhaust port provides a larger area for increased flow, and is designed to create a mis-match between the exhaust pipe and the exit to reduce power-robbing exhaust reversion. Performer RPM™ heads #1604, 1606, 1607, 1624, 16041, & 16061 fit 1984 and later Evolution® "Big Twin" engines. Performer RPM™ cylinder heads are assembled with stainless steel valves (1.940" intake and 1.625" exhaust), ductile iron valve seats and guides, 1.460" O.D. heavy-duty valve springs, teflon valve stem seals, and machined valve spring retainers and locks. The increased valve sizes require the use of aftermarket or modified pistons. In 80-inch Evo engines, we recommend using Edelbrock/JE Sportsman Pistons, which match the uniquely shaped combustion chambers of the Performer RPM cylinder heads. Other engine sizes require modified stock, or other aftermarket pistons.

INTAKE MANIFOLD APPLICATION CHART - Performer™ Cylinder Heads				
<i>Cyl. Length</i>	<i>S&S Kit</i>	<i>3-Piece Flange Intake</i>	<i>3-Piece Spigot Intake</i>	<i>3-Piece S&S “G” Intake</i>
stock (80")	--	#1671	#1670	#1669
stock	89"	#1671	#1670	#1669
-0.050"	93"	#1676	#1677	#1683
-.175"	88"	#3031	#3030	#3032
+0.015"	96"	#1671	#1670	#1669
+0.075"	98"	#1674	#1675	#1684

IMPORTANT NOTES BEFORE BEGINNING INSTALLATION

- It is recommended that the installation of Performer RPM cylinder heads be performed by a qualified engine builder with experience in high performance or racing modifications to Harley-Davidson® engines.
- **If you are using any cam other Edelbrock Performer RPM cam #1740, it is mandatory that valve-to-valve clearance is checked to determine if these heads are compatible with the camshaft you intend to run. See Page 2.**

REPLACEMENT ITEMS	
The following replacement items are available separately:	
Exhaust Seat	#1643
Intake Seat	#1644
Exhaust Valve	#1645
Intake Valve	#1646
Exhaust Guide	#1647
Intake Guide	#1648

CHECKING VALVE-TO-VALVE CLEARANCE

1. Before installing heads on engine, remove valve springs, retainers and locks from one head. Leave the valve seals on to hold the valves in position during the clearance check.
2. Use a 6" caliper to measure valve tip height from the valve spring pocket.
3. Find the cam manufacturer's "Valve lift at Top Dead Center" specs and subtract this dimension from the valve tip height you measured in step 2.
4. Using the calipers to check the new valve tip height, open the valve by the amount calculated in step 3.
5. Repeat this process for the other valve. Note that intake and exhaust "Valve lift at Top Dead Center" dimensions are usually different.
6. With both intake and exhaust valves open to the correct specifications, use a .060" feeler gage to check clearance between the valve heads. If less than .060" clearance exists, you run the risk of valves hitting during engine operation, voiding any warranty on these cylinder heads. If there is less than .060" clearance, select another cam for your engine.

DISASSEMBLY

WARNING

To avoid accidental start-up of vehicle and possible personal injury, disconnect the battery cables (negative cable first) before performing any of the following procedures.

1. Remove seat.
2. Remove instrument cover (FX/Softtail and Dyna Glide models).
3. Drain fuel tank. Disconnect fuel line and plug end of fuel line with 5/16" bolt. For split tanks use a 1/4" bolt and rubber cap to plug fuel line and opening. Disconnect any wires from tank. Remove fuel tank.

WARNING

Gasoline is flammable and fumes are explosive. To avoid possible personal injury, drain gasoline in well ventilated area away from fire or flame. Drain gasoline into approved gasoline container only.

NOTE: FX/Softtail Models

An access hole has been provided through the frame to remove the left rear rocker box bolt. A rolled up paper tube should be inserted through the hole in the frame and around the bolt head during removal, to prevent accidentally dropping the bolt into the frame opening.

4. Remove upper cylinder head stabilizer from frame and cylinder head bracket. Do not loosen stabilizer jam nuts.
5. On FXR model remove ignition switch.
6. Remove spark plugs.
7. On FLT models remove lower attaching bolts from right side footboard.
8. Remove exhaust system.
9. Remove air cleaner cover, filter element and back plate.
10. Remove fuel and V.O.E.S. (Vacuum Operated Electric Switch) hoses from carburetor.
11. Remove carburetor.
12. Remove intake manifold flange screws and remove intake manifold.
13. Support engine with small jack and piece of wood, then remove large center bolt from front engine mount. On some bikes, it may be necessary to remove ignition module first.
14. Remove bolt from outer end of front stabilizer.
15. Remove both front engine mount bolts and remove front engine mounting plate with stabilizers.
16. Use the jack to raise and lower engine as needed for clearance.

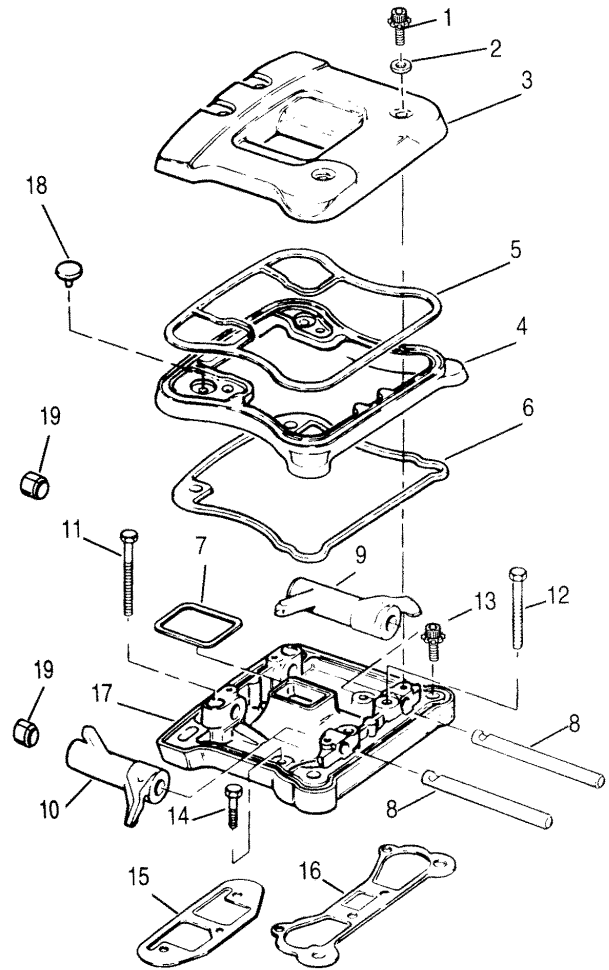
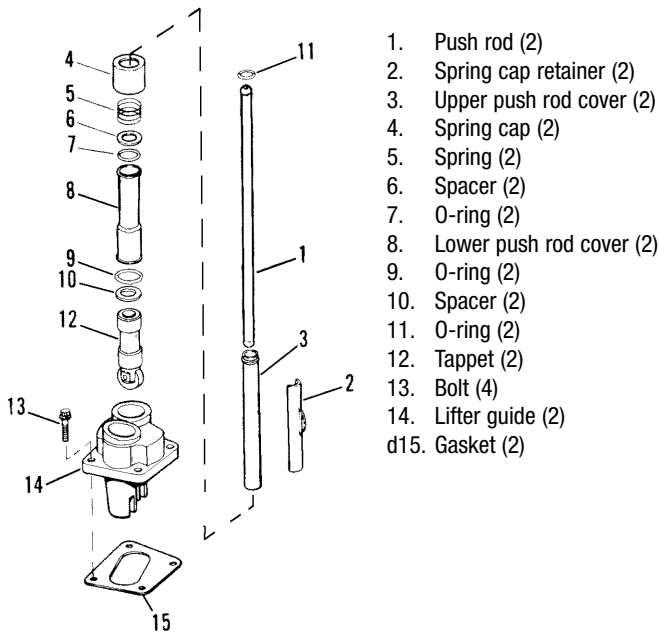


Figure 1 - Rocker Arm Cover Assembly.

- | | |
|----------------------------|----------------------------|
| 1. Bolt (4) | 11. Bolt and washer (2) |
| 2. Seal (4) | 12. Bolt and washer (2) |
| 3. Upper rocker arm cover | 13. Bolt and washer (3) |
| 4. Middle rocker arm cover | 14. Bolt and washer (3) |
| 5. Gasket | 15. Gasket |
| 6. Gasket | 16. Gasket |
| 7. Gasket | 17. Lower rocker arm cover |
| 8. Rocker arm shaft (2) | 18. Umbrella valve |
| 9. Rocker arm | 19. Rocker arm bushing (4) |
| 10. Rocker arm | |



1. Push rod (2)
2. Spring cap retainer (2)
3. Upper push rod cover (2)
4. Spring cap (2)
5. Spring (2)
6. Spacer (2)
7. O-ring (2)
8. Lower push rod cover (2)
9. O-ring (2)
10. Spacer (2)
11. O-ring (2)
12. Tappet (2)
13. Bolt (4)
14. Lifter guide (2)
15. Gasket (2)

Figure 2 - Pushrod and Cover Assembly

REMOVE ROCKER ARM COVERS

1. Remove bolts (1) and seals (2) (**See Figure 1**). Use a shortened 3/16" allen wrench.
2. Remove top (3) and middle (4) sections of rocker box. Remove gaskets (5, 6, and 7) and discard.
3. Rotate the engine so both valves are closed on the head being removed.
4. Remove the rocker arm retaining bolts (11) and washers nearest the rocker arm shafts at the push rod end.

NOTE: Remove lower rocker boxes as an assembly then disassemble if necessary.

5. Remove the push rods (1) and mark their location and orientation, top and bottom (**See Figure 2**).
6. Remove spring cap retainers (2) on push rod covers and remove push rod covers and associated parts (3 through 11) (**See Figures 2 & 3**).

CAUTION

All valve train components must be reinstalled in their original positions. Remove Spring Cap Retainers.

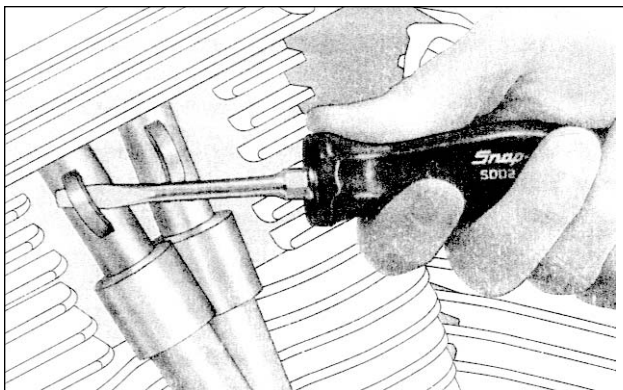


Figure 3 - Removing Spring Cap Retainers

7. Remove the remaining fasteners (12, 13 and 14) holding the lower rocker arm cover (17) to the cylinder head (**See Figure 1**).
8. Remove the lower rocker cover and gaskets (15 and 16).
9. **See Figure 4.** Loosen each head bolt (1, 2) 1/8 turn following the cross pattern sequence shown in **Figure 9**

CAUTION

Loosen head bolts gradually, in a cross pattern, to prevent distorting the head, cylinder and crankcase studs.

10. Continue loosening in 1/8 turn increments until bolts are loose.
11. Remove bolts.
12. Remove cylinder head and head gasket.
13. Repeat steps 1 through 14 for the other head.

NOTE: It may be necessary to raise or lower engine in frame for clearance. Use small jack under engine.

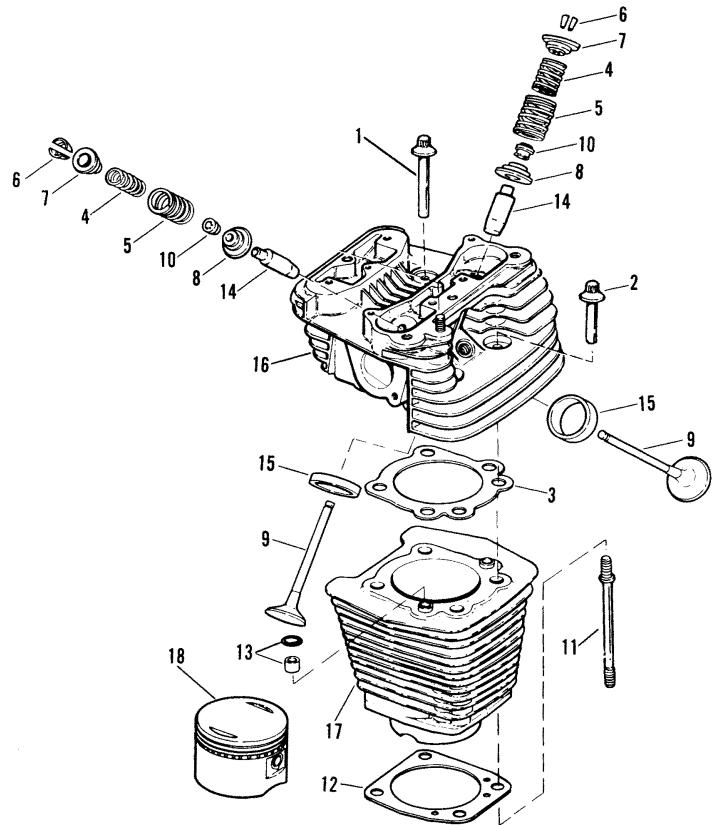


Figure 4 - Cylinder Head and Cylinder

- | | |
|----------------------------------|---------------------------|
| 1. Head bolt, long (2) | 10. Valve stem seal (2) |
| 2. Head bolt, short (2) | 11. Cylinder stud (4) |
| 3. Cylinder head gasket | 12. Cylinder base gasket |
| 4. Inner valve spring (2) | 13. O-ring and insert (2) |
| 5. Outer valve spring (2) | 14. Valve guide (2) |
| 6. Valve keeper (4) | 15. Valve seat (2) |
| 7. Upper collar (2) | 16. Cylinder head (2) |
| 8. Lower collar (2) | 17. Cylinder (2) |
| 9. Valve (1) intake, (1) exhaust | 18. Piston |

HEAD GASKETS

You must use the correct head gaskets to achieve a 9.5:1 compression ratio for best power. Thicker gaskets will lower compression and power, and thinner gaskets will raise compression higher than advisable for use with today's unleaded pump gasoline.

1. Use Edelbrock gasket set #1640 for 1984-91 or #1641 for 1992 and later engines. This set includes the proper thickness head gaskets (.045") and the special intake manifold gaskets required for these cylinder heads.
2. You may use standard Harley-Davidson® head gaskets, if desired. They vary in thickness, so it is advisable to measure your gasket before use (See Figure 5). Recommended thickness is .045".

CAUTION

If you use copper head gaskets, be aware that they must be properly annealed prior to installation. Even if gaskets were annealed when new, copper can re-harden during storage. Failure to anneal before installation may lead to head gasket failure.

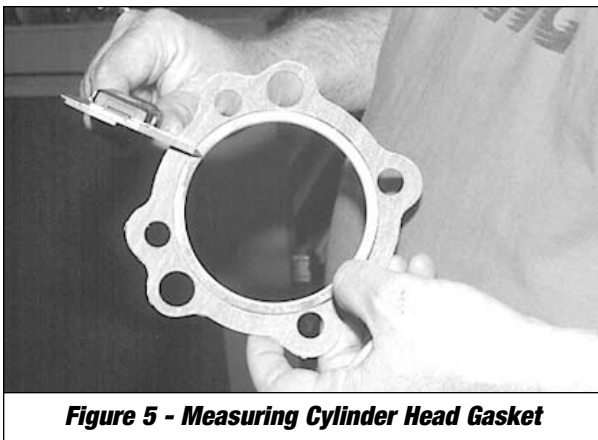


Figure 5 - Measuring Cylinder Head Gasket

CYLINDER HEAD INSTALLATION

CAUTION

Install new O-rings over the cylinder dowels before installing the head gasket. Install the O-rings first to ensure alignment of the head gasket and prevent gasket leaks.

CAUTION

Use only original equipment specification head bolts and other hardware. All original hardware is hardened grade 8 material, which is required for proper performance of these parts.

1. Be sure the gasket surfaces and stud holes are clean and dry (See Figure 6). Place new O-rings (13) on the cylinders and position the head gaskets on the inserts (13) (See Figure 7).
2. Dip the head bolt threads and bottom face of bolt head in oil; then wipe off any excess. Install the head bolts (1 and 2, Figure 4) finger tight.

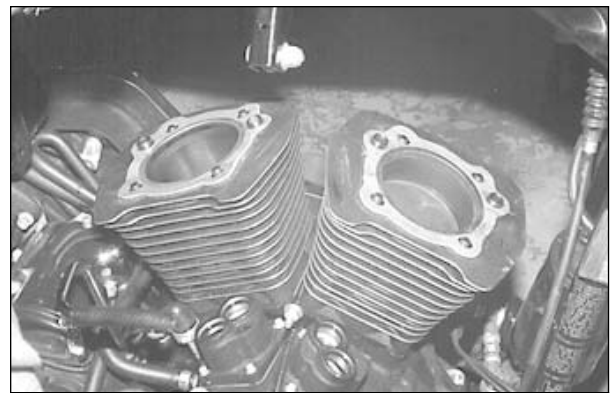


Figure 6 - Cleaning Gasket Surfaces

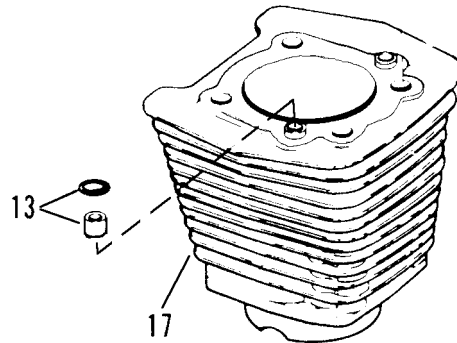


Figure 7 - Cylinder O-Rings and Inserts

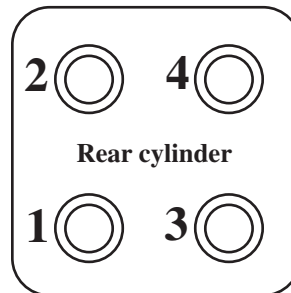
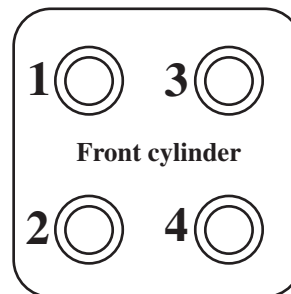


Figure 8 - Cylinder Head Bolt Torque Sequence

3. **Cylinder Head bolt torque sequence (See Figure 8):**
The procedure for tightening the head bolts is extremely critical; not only to prevent gasket leaks, but to prevent stud failure and heads and cylinders distortion.

CAUTION

Be sure you thoroughly clean and lubricate the cylinder head bolts before tightening to the correct torque. Friction because of dirt or grime will cause the torque wrench readings to be incorrect. Clean and lubricate the threads with engine oil and screw the bolts onto the crankcase studs by hand to be sure there is no friction.

A. Cylinder Head Torque Sequence for 1984-85 Models

CAUTION

Use only original equipment head bolts and studs for your year vehicle to ensure proper torque and head gasket life.

1. **See Figure 8.** With a torque wrench, start at the cylinder head bolt numbered "1" and tighten to 7-9 ft./lbs. Then tighten "2", "3", and "4" in order to 7-9 ft./lbs.
2. Following the torque sequence, tighten each bolt to 15-17 ft./lbs.
3. Following the torque sequence, tighten each bolt to 24-26 ft./lbs.

CAUTION

The cylinder head bolts are not to be checked for tightness after final torquing at reassembly is completed. Retightening the bolts to specified torque at regular intervals will place undue stress on bolts and bolt anchoring threads.

B. Cylinder Head Torque Sequence for 1986-95 Models

CAUTION

Use only original equipment head bolts and studs for your year vehicle to ensure proper torque and head gasket life.

1. **See Figure 8.** With a torque wrench, start at the cylinder head bolt numbered "1" and tighten to 7-9 ft./lbs. Then tighten "2", "3", and "4" in order to 7-9 ft./lbs.
2. Following the torque sequence, tighten each bolt to 12-14 ft./lbs.
3. **See Figure 9.** Mark a line on the cylinder head and a corresponding line on the head of the cylinder head bolt as shown in View A. Following the same sequence 1, 2, 3, then 4, turn each bolt, one at a time one quarter turn (90°) using the marks as a guide. When marks are all positioned, as in View B, the procedure is completed.

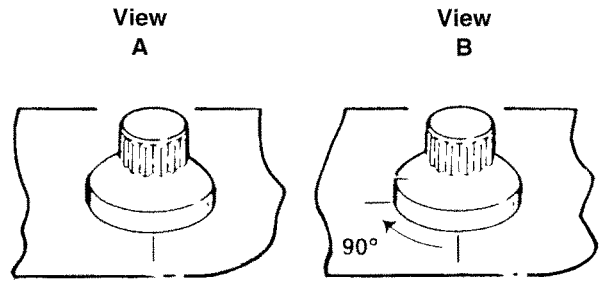


Figure 9 - Tightening 1986-1995 Head Bolts

PUSH ROD INSTALLATION

1. Rotate the engine so that both lifters of the cylinder being serviced are on the base circle (lowest position) of the camshaft.

NOTE: When using an aftermarket performance camshaft, such as Performer RPM, which is dyno matched and recommended for use with Performer RPM Cylinder Heads, you must use an adjustable pushrod kit such as Edelbrock #1737. Refer to the instructions provided with your pushrod kit for the proper valve adjustment procedure. Complete this adjustment procedure BEFORE performing the final pushrod installation.

2. Refer to **Figure 1**. Install push rod covers and associated parts, using new O-rings. Install push rods.

NOTE: Be sure to use new O-rings on push rod tubes to prevent leaks. Also check carefully to be certain old O-rings were removed from push rod tubes and lifter bores.

3. Install gaskets (15 and 16). Place lower rocker box assemblies (17; with rocker arms and shafts) in position.

NOTE: Rocker arm shafts are notched to accept the rocker arm retaining bolts. Align the notches with the bolt holes before installing the bolts (**See Figure 10**).

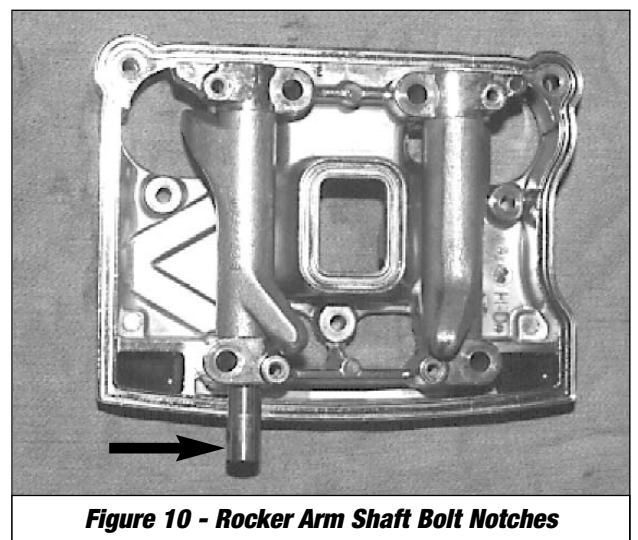


Figure 10 - Rocker Arm Shaft Bolt Notches

4. Install bolts and washers (11 and 12, 13 and 14). Slowly snug lower rocker box fasteners in small increment (one at a time) in a cross pattern. This will bleed the lifters. Check carefully as you go to be certain push rods are still in their proper position in the rocker arm. Tighten the 5/16" bolts (11, 12) to 15-18 ft./lbs. and tighten the 1/4" bolts (13, 14) to 10-13 ft./lbs.
5. Install the intake manifold according to the instructions provided with the intake manifold.
6. Install the carburetor, V.O.E.S. and ignition components.
7. Reassemble all components removed during disassembly, connect battery cables, and re-fuel gasoline tank.

CAUTION

***Do not turn engine over until push rods spin freely.
Damage could occur to valves.***

4. Install the middle (4) and top (3) rocker arm covers, using new gaskets and new fiber seals. The fiber seals must be under the steel washers. Be sure the middle cover section is spaced evenly on all sides before tightening the cover screws. Tighten the screws to 10-13 ft./lbs. following a crisscross pattern. If a torque wrench cannot be used, tighten securely by hand.
8. To prevent discoloration when the engine reaches operating temperature, carefully wipe off grease, fingerprints, stains, etc., from all chrome and polished surfaces with a lint-free cloth and alcohol, Windex, etc., before starting engine.



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