PERFORMER RPM TWIN CAM® CNC-MACHINED CYLINDER HEADS FOR FUEL-INJECTED & CARBURETED TWIN CAM® ENGINES

Catalog #1694, #1697 (88cc)
Catalog #3020, #3024, #3049, #3080, 3187, 3188 (72cc)

INSTALLATION INSTRUCTIONS

PLEASE study these instructions carefully before beginning this installation. If you have any questions or problems, do not hesitate to call our **Technical Hotline at: 1-800-416-8628**, or e-mail us at **Edelbrock@Edelbrock.com**.

- **DESCRIPTION:** Performer RPM Twin Cam CNC-ported aluminum heads are the ultimate heads for high performance power in 88-inch and larger Twin Cam 88 engines. They provide superior flow for maximum horsepower and torque. These heads are completely CNC-ported in all critical areas…combustion chamber, intake port and exhaust port. The patented design of Edelbrock cylinder heads (U.S. Patent #5,671,709 and #5,598,820), along with this CNC-porting, work together to provide more efficient combustion and awesome horsepower. Performer RPM Twin Cam CNC-ported heads come with high-grade, stainless steel, swirl-polished valves (1.940" intake and 1.625" exhaust); ductile iron seats and guides, 1.460" O.D. valve springs, teflon valve stem seals, titanium retainers, locks, and a three-angle valve job. They accept up to .650" max valve lift. They are cast out of 356 aluminum and heat treated to T-6 specs. Performer RPM Twin Cam CNC-ported heads have a 72cc combustion chamber. This chamber size will produce a 9.5:1 compression ratio with 88 cid and 10.25:1 compression ratio with a 95 cid with flat top piston. Matching Edelbrock/JE forged pistons are recommended for higher performance applications.
- These heads feature a rectangular shaped intake port for a noticeable increase in air flow. This .125" raised rectangular intake port also helps to increase the velocity of the incoming air for more power. Edelbrock intake manifolds must be used with these heads because of the unique port shape (see application chart below). The dual-quench combustion chamber features a revolutionary new design that directs the air/fuel mixture into a tumbling and swirling motion for a better mix and more efficient combustion. When used with the listed engine sizes and head gasket thickness recommended (.045"), nominal compression is raised to 9.5:1 on the stock bore 88 cid engine and 10.25:1 on "big-bore" 95 cid engine. The "D" shaped exhaust port provides a larger area for increased flow. It was designed to create a mismatch between the exhaust pipe and the exit which reduces power robbing exhaust gas reversion.

INTAKE MANIFOLD APPLICATION CHART - PERFORMER RPM TWIN CAM HEADS

Carbureted Applications

Cyl. Length	*Flange Mount*	*Spigot Mount*	*S & S "G", 48mm Mikuni*	*S & S "D"*	*45mm Mikuni, 44mm CV*
Stock Using 72cc Heads	*#3120*	*#3121*	*#3122*	*#3128*	*#3123*
Stock Using 88cc Heads	*#1780*	*#1781*	*#1782*	*#1783*	*#1784*

Electronic Fuel Injection Applications

NOTE: *All Edelbrock 95" Twin Cam ® Electronic Fuel Injection Power Packages Use Intake Manifold #1768*

- **IMPORTANT NOTES BEFORE BEGINNING INSTALLATION**

1. It is highly recommended that the installation of Performer RPM Twin Cam cylinder heads be performed by a qualified engine builder with experience in high performance or racing modifications to Harley-Davidson® engines.
2. Prior to installation, it is mandatory that valve-to-piston clearances are checked and corrected to minimum specs, if necessary. These heads have larger-than-stock valve sizes and will not work with the valve pockets in stock pistons. The use of aftermarket pistons (such as Edelbrock/JE pistons) and/or custom machining to your pistons is required. Actual valve-to-piston clearance should be specified by your camshaft manufacturer.
3. Prior to installation, it is mandatory that valve-to-valve clearance is checked to determine if these heads are compatible with the camshaft you intend to run. This procedure is outlined on the following page.
4. Due to a higher rocker arm mounting pad dimension, the use of adjustable pushrods is required. Stock pushrods will not work, even with mild camshaft profiles.
5. Check valve spring/retainer-to-rocker box clearance before installation. It is frequently necessary to machine or grind the rocker box to achieve the recommended .050" clearance.
6. If additional milling of the heads is desired, remove approximately .0065" for each 1cc reduction. This is only an approximate number; you must stop and measure the chamber size before the final cut to be sure your rate of removal is correct.

TWIN CAM 88 "B" MOTOR LIMITATIONS

The Twin Cam 88 B motor, used in 2000 and later Softail models, has a pair of balance shafts that are chain driven from the pinion shaft. This engine has a design operating limit of 6,000 RPM. Operating a "B" engine above 6,000 RPM can result in severe engine damage.

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 manufacturers "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 gauge 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.

EDELBROCK/JE SPORTSMAN PISTONS

- Edelbrock/JE Sportsman forged aluminum big-bore pistons (3-7/8") increase the displacement to 95 cubic inches. These pistons have a 10.25:1 compression ratio with the Performer RPM Twin Cam heads. Edelbrock/JE Sportsman forged pistons are the best pistons to use for high performance applications. Available in big-bore (3-7/8"), +.005", +.010", and +.020" bore sizes.

ADJUSTABLE PUSHRODS

- Adjustable pushrods must be used with Edelbrock Performer RPM Twin Cam cylinder heads. We recommend the Harley-Davidson Screamin' Eagle Quick-Install Pushrod Kit P. N. 17997-99A. This kit includes special pushrod tube assemblies, which the adjustment procedure easier.

DISASSEMBLY

NOTE: BEFORE STARTING DISASSEMBLY

Due to the diversity of models that the Twin Cam 88 engine is used in, there may be additional steps needed to remove and/or disassemble parts from the chassis and engine. You should obtain the factory service manual for the specific model bike that the these heads are to be installed on and follow the instructions in the "stripping motorcycle for service" and "top end overhaul" headings in section #3.

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.

STRIPPING ENGINE

1. Using a suitable motorcycle lift, raise the motorcycle until the rear wheel is off the ground.
2. Remove seat.
3. Remove instrument cover (Softail and Dyna Glide models).
4. Drain fuel tank. Disconnect fuel line and plug end of fuel line with 5/16" bolt. Use a 1/4" bolt and rubber cap to plug fuel line crossover. Disconnect any wires and vacuum lines 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.

5. Remove upper cylinder head motor mount or stabilizer assembly from cylinder heads. Do not loosen stabilizer jam nuts.
6. Remove spark plugs.
7. Remove exhaust system.
8. Remove air cleaner cover, filter element and back plate.
9. Remove fuel hose from carburetor.
10. Loosen throttle cable adjusters, remove carburetor from manifold and disengage throttle cables from carburetor.
11. Unplug MAP sensor wire harness at intake manifold.
12. Remove intake manifold flange bolts and remove manifold.

REMOVING CYLINDER HEADS

1. See Figure #1. Remove two spring cap retainers on pushrod covers and collapse upper and lower pushrod covers.

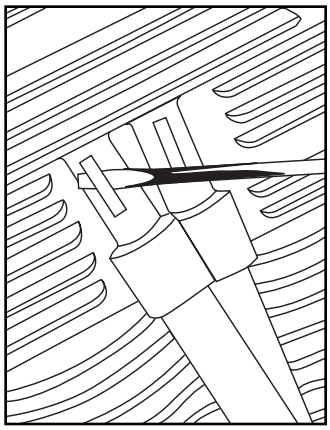

Figure #1 Pushrod Tube Spring Clip

2. Following the pattern shown in Figure #2, loosen and remove the six rocker cover bolts, ("A through F").

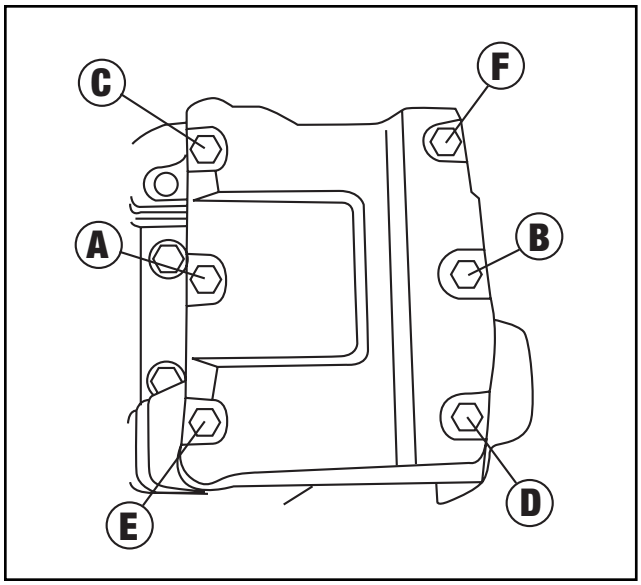

Figure 2 - Rocker Cover Bolts

3. Remove the rocker cover and gasket.
4. Rotate the engine so both valves are closed on the head being removed.
5. See Figure #3. Remove the two breather cover bolts, ("G & H"), remove breather assembly and place in a plastic bag.
6. Following the pattern shown in Figure #3, loosen and remove the four rocker arm support plate bolts, ("I through L").

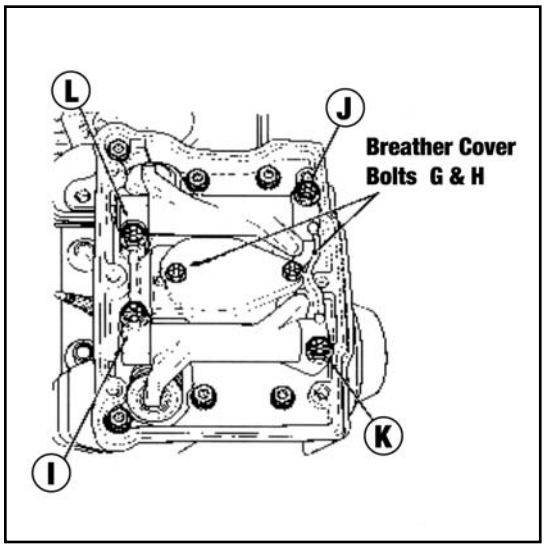

Figure 3 - Breather Cover & Rocker Support

7. Remove the rocker arm support plate assembly from the rocker housing and place in plastic bag.
8. Remove the two pushrods and discard. These must be replaced with adjustable pushrods. Remove pushrod cover assemblies.

CAUTION

The upper cylinder dowel o-ring, H-D, P. N. 11273, is only used on stock bore 88 cid cylinders. If your motor has been bored to 95 cid, do not install this o-ring on the upper cylinder dowel. Use gasket kit P. N. 3155 on big-bore 95 cid cylinders.

9. See Figure #4. Remove the six bolts ("M through R") holding the rocker housing to the cylinder head.

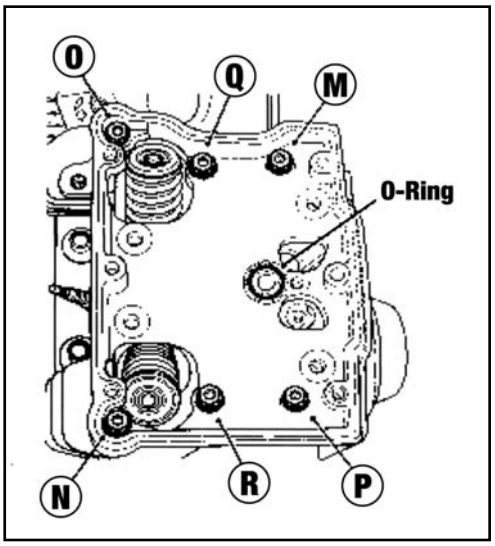

Figure 4 - Rocker Housing

10. Remove the rocker housing and gasket.

CAUTION

Loosen head bolts gradually, in the pattern shown in Figure #5, to prevent distorting the head, cylinder and crankcase studs.

11. See Figure #5. Loosen each head bolt ("S thru V") 1/8 turn.

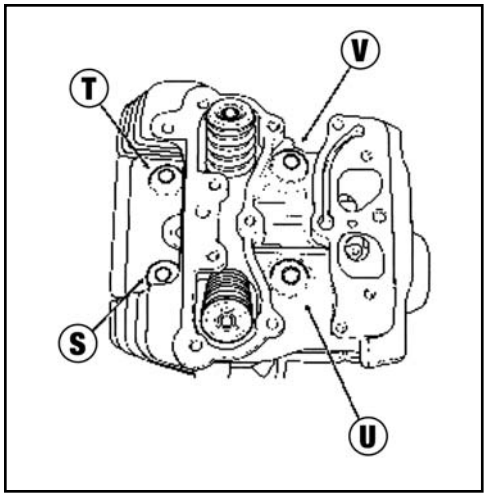

Figure 5 - Head Bolts

12. Continue loosening in 1/8 turn increments until bolts are loose.
13. Remove head bolts.
14. Remove cylinder head.
15. Remove cylinder head gasket.
16. Remove the two o-rings from the cylinder head dowels. Note: big-bore engines (95 cid) do not use these o-rings
17. Repeat steps 1 through 16 for the other head.

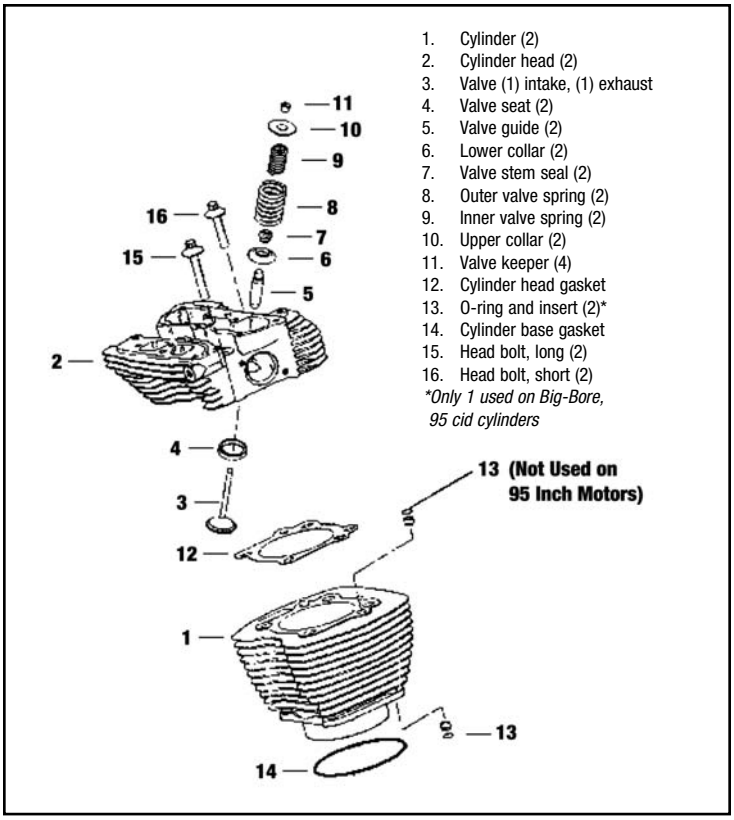

Figure 6 - Cylinder Head Parts and Cylinder

HEAD GASKETS

- You must use the correct head gaskets to achieve the correct 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 #3155. 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, P. N. 16787-99, if desired. They vary in thickness, so it is advisable to measure your gasket before use. Recommended thickness is .045".

CYLINDER HEAD INSTALLATION

CAUTION

See Figure #7. On 88 cid cylinders, 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. On 95 cid cylinders install the new head gasket directly over the cylinder dowels.

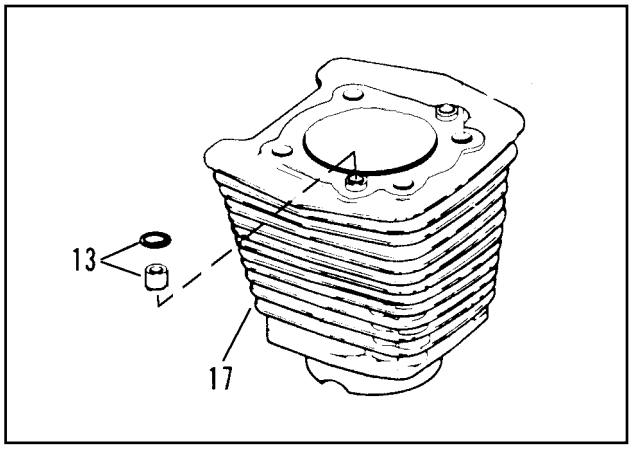

Figure 7 - 88 cid Cylinder O-Rings and Inserts

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. Put a few drops oil on head bolt threads and bottom face of bolt head; then wipe off any excess. Install the head bolts (15 & 16, Figure 6) finder tight.
2. See Figures 8 & 9. 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.

CYLINDER HEAD BOLT TORQUE SEQUENCE

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. Screw the bolts onto the crankcase studs by hand to be sure there is no friction.

CAUTION

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

a. 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.
b. Following the torque sequence, tighten each bolt to 12-14 ft./lbs.
c. 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.

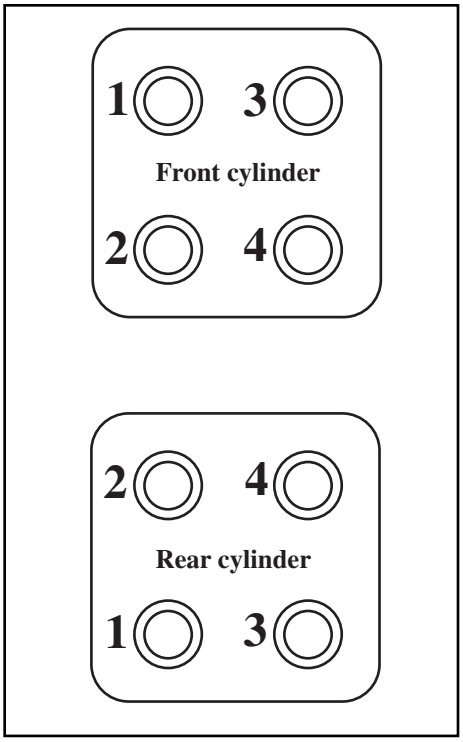

Figure 8 - Cylinder Head Bolt Torque Sequence

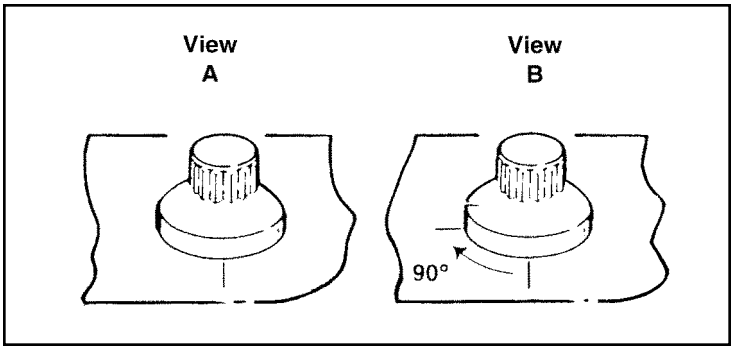

Figure 9– Tighten Head Bolts

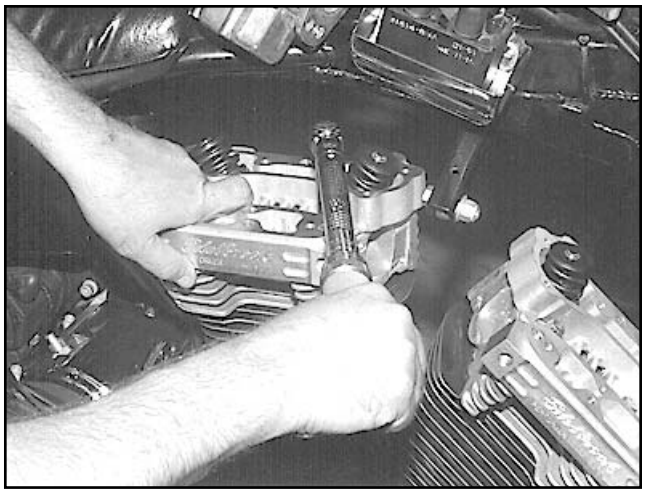

Figure 10 - Torque head bolts in sequence with a good quality torque wrench

PUSHROD INSTALLATION

NOTE

Adjustable length pushrods must be used. Follow manufacturer's recommendations for pushrod installation and adjustment.

1. Rotate the engine so that both lifters of the cylinder being serviced are on the base circle (lowest position) of the cam.
2. See Figure 1. Install pushrod covers and associated parts, using new O-rings. Install pushrods.

NOTE

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

3. Install cylinder head/rocker housing gasket, note position of breather channel and orientate gasket correctly. Place rocker housing in position.
4. Install the six bolts and washers that secure the housing. Slowly snug rocker housing fasteners in small increment (one at a time) in the alphabetical order, see Figure #4. Tighten the bolts to 10-14 ft./lbs. Install o-ring in groove around breather hole.
5. Install the rocker arm support plate, Figure #3. Tighten the four bolts, in 1/4 turn increments to 15-18 ft./lbs. following the alphabetical pattern.
6. Install the breather cover assembly, Figure #3. Tighten the two bolts to 90-120 in./lbs.
7. Install the rocker cover gasket and cover, Figure #2. Tighten the six bolts, in 1/4 turn increments to 9-12 ft./lbs. following the alphabetical pattern.
8. Install the Air-Temperature sensor and reconnect the sensor plug.
9. Install intake manifold per the instructions included with it. Tighten manifold bolts very carefully, using Locktite #242 non-permanent thread locker to prevent loosening.
10. Install the carburetor, air filter and exhaust components.
11. Re-assemble all components removed during disassembly, connect battery cables, and re-fuel gasoline tank.
12. 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.

REPLACEMENT ITEMS

Replacement Items		
Seats:	Intake	Exhaust
Standard O.D.	#9262	#9261
+.002" O.D.	#9269	#9287
+.003" O.D.	#9270	#9288
+.010" O.D.	#9280	#9268
Guides	Intake	Exhaust
Standard O.D.	#1628	#1633
+.001" O.D.	#1629	#1634
+.002" O.D.	#1630	#1635
+.003" O.D.	#1631	#1636
+.030" O.D.	#1632	#1637
Exhaust Valve		#9263
Intake Valve		#9264
Valve Seals - set of 4		#1649
Valve spring, retainer & lock kit		#1626

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