



INSTRUCTIONS

J02802

2007-08-01



FORGED BILLET ROCKER BOX COVER KIT

GENERAL

Kit Number

17658-03

Models

For model fitment information, please see the P&A Retail Catalog or the Parts and Accessories section of www.harley-davidson.com (English only).

When installing this kit on an engine having Screamin' Eagle components, refer to the instructions included with those components.

Does not fit with Oil Pressure Gauge Kit (Part Number 75133-99).

Additional Parts Required

See Figure 6.

Table 1. These Additional Parts Required

Item	Description (Quantity)	Part Number
11	O-ring, breather baffle (2)	11270
And, for 2002 and 2003 models equipped with a plastic breather cover assembly 17907-01 (6):		
5	Breather cover assembly (metal)	17650-02

Purchase of the following items **may** be necessary, depending on the condition of the existing O-rings:

Table 2. These Parts May Be Required

Item	Description (Quantity)	Part Number
15	O-ring, Push rod cover lower (4)	11145
18	O-ring, Push rod cover mid (4)	11132
21	O-ring, Push rod cover upper (4)	11293

The above items are available separately from a Harley-Davidson dealer.

Tools and Supplies Required

Loctite® 243 (Blue) Threadlocker and Sealant (H-D Part Number 99642-97) is required for the proper installation of this kit.

A 1/2 inch flank drive "dog bone" torque adapter (Snap-On FRDH161 or equivalent) for a 3/8 inch drive torque wrench will also be needed.

⚠ WARNING

Rider and passenger safety depend upon the correct installation of this kit. Use the appropriate service manual procedures. If the procedure is not within your capabilities or you do not have the correct tools, have a Harley-Davidson dealer perform the installation. Improper installation of this kit could result in death or serious injury. (00333b)

NOTE

This instruction sheet references Service Manual information. A Service Manual for your model motorcycle is required for this installation and is available from a Harley-Davidson Dealer.

Kit Contents

See Figure 12 and Table 4.

INSTALLATION

Preparation

⚠ WARNING

To prevent accidental vehicle start-up, which could cause death or serious injury, disconnect battery cables (negative (-) cable first) before proceeding. (00307a)

1. Refer to the Service Manual and follow the instructions given to remove the seat and disconnect the battery cables, negative cable first. Retain all seat mounting hardware.
2. Refer to the Service Manual and perform the STRIPPING MOTORCYCLE FOR SERVICE procedures for your engine type (carbureted or fuel injected). The engine may remain in the chassis for this installation.

Engine Top End, Partial Disassembly

Use a low pressure spray to thoroughly clean the exterior surfaces of the engine before disassembly. Dirt caked on cooling fins and other areas can fall into the crankcase bore or stick to subassemblies as parts are removed. Abrasive particles can damage machined surfaces or plug oil passageways.

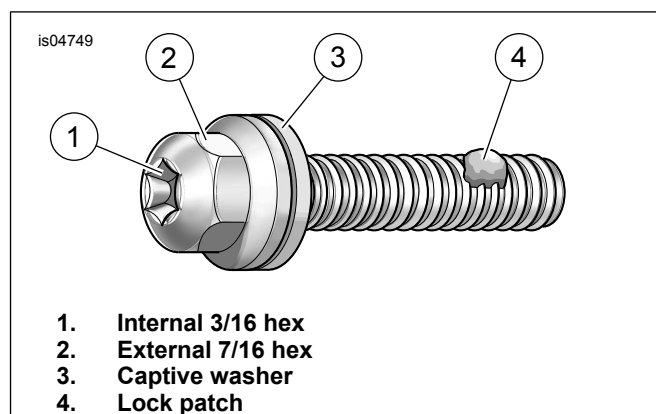


Figure 1. Rocker Cover or Rocker Housing Bolt

NOTE

Rocker cover and rocker housing bolts have both an internal and external hex, which allows the bolts to be removed with either a short 3/16 inch allen wrench (tight spaces), or a 7/16 inch socket or open end/ box wrench (open spaces). See Figure



1. The internal hex is necessary when the engine is left in the chassis for service, as in this installation.

In these cases, the short 3/16 inch allen wrench is indispensable when removing the rocker cover and rocker housing bolts on the left side of the engine (particularly the rear) where there is close proximity to the frame.

On some models, a dimple or cavity cast into the left side of the upper frame crossmember also aids in removing the rocker arm support plate assembly.

The following steps describe the procedure performed on one cylinder. The steps will be repeated for the second cylinder.

Complete all disassembly and re-assembly steps on the first cylinder before starting on the second.

1. See the Figure 6 exploded view for all **key numbers** referenced in Steps 3 through 15. Reference Figure 2 through Figure 5 for removal details as indicated. Alternately loosen the six rocker cover bolts (1) following the sequence shown in Figure 2. Remove and discard the rocker cover bolts.

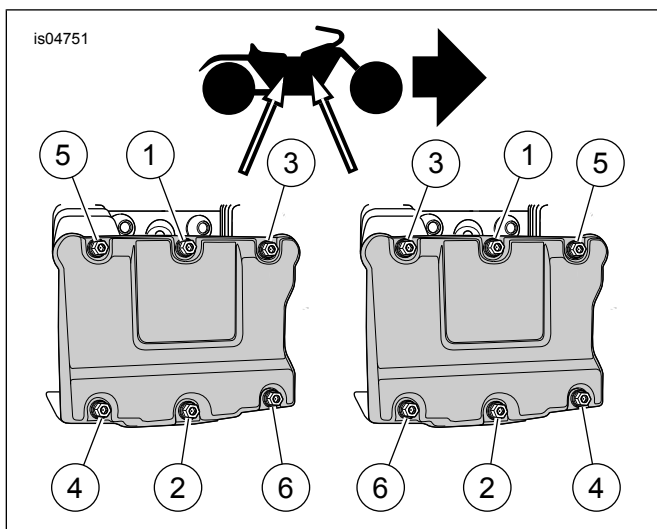


Figure 2. Loosen Six Rocker COVER Bolts in Sequence Shown

2. Remove the rocker cover (2) and gasket (3). Discard the gasket.
3. See Figure 3. Insert the blade of a small screwdriver into the cast loop of the spring cap retainer (19) for the upper push rod cover (20). While pushing down on the spring cap, rotate the bottom of the screwdriver toward the outboard side to remove. Repeat for the second cover retainer.

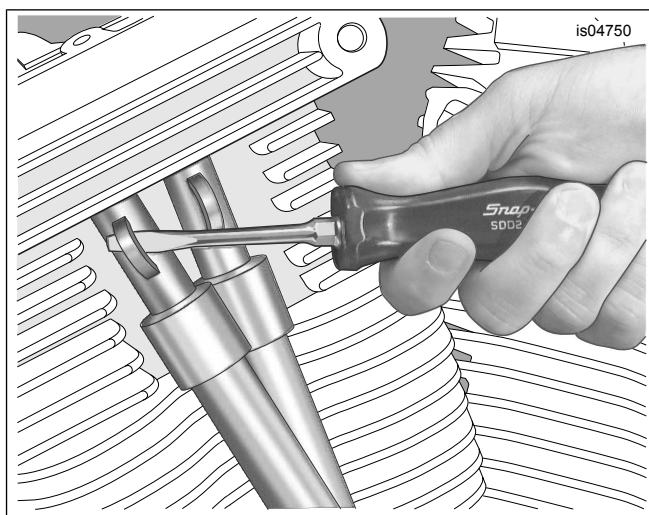


Figure 3. Remove Spring Cap Retainer

4. Collapse the upper (20) and lower (16) push rod covers.

NOTE

To remove the rocker arm support plate (12), both lifters of the cylinder being serviced must be on the base circle (or lowest position) of the cam

Removing the rocker arms with the valve train loaded can result in bent push rods (17), damaged bushings (13) or a warped support plate (12).

5. To find the base circle, it is first necessary to rotate the engine. **NOTE: Do not attempt to rotate the engine by removing the cam cover and placing a socket on the crank or primary cam sprocket flange bolt. The head of the flange bolt can break off, possibly resulting in damage to the flywheel or camshaft.** **Finding the base circle:**
 - a. Remove the spark plugs from both cylinders.
 - b. With the vehicle on a center stand, place the transmission in 5th gear and rotate the rear wheel in a clockwise direction (as viewed from the right side of the vehicle) until the base circle is found.
 - c. Rotate the engine until the piston is at Top Dead Center (TDC) of the compression stroke. To accomplish this, first raise the lower push rod cover to access the **intake** hydraulic lifter (14, inside the hole of the lifter cover).
 - d. Place an index finger on top of the intake lifter. While rotating the engine, feel the lifter rise (valve open) and fall (valve closed). Now, place your finger tightly over the spark plug hole and rotate the engine again. In the compression stroke, air will be forced out against your finger until the piston reaches the TDC position.
 - e. Stop engine rotation when the flow of air through the spark plug hole stops. Direct the beam of a small flashlight into the spark plug hole to verify that the piston is at TDC. Both intake and exhaust valves are now closed and the push rods (17) are in the unloaded position (and should turn freely).

6. Remove the two breather bolts (4) to release the breather assembly (5 or 6) from the rocker arm support plate (12). See SUBASSEMBLY SERVICE AND REPAIR, BREATHER ASSEMBLY in the Service Manual.
7. Alternately loosen each of the four rocker arm support plate bolts (7) **just 1/4 turn**, following the sequence shown in Figure 4. Continue turning the bolts in 1/4 turn increments, following the same alternating sequence until the bolts are loose.

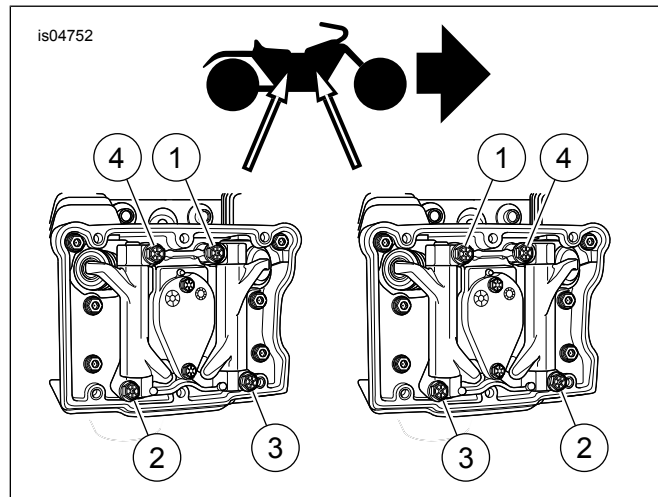


Figure 4. Loosen Four Rocker ARM Bolts 1/4 Turn in Sequence Shown

8. When the rocker arm support plate bolts are free of the cylinder head, lift the support plate assembly from the rocker housing (10). Refer to SUBASSEMBLY SERVICE AND REPAIR, ROCKER ARM ASSEMBLY in the Service Manual.

NOTE

Complete all disassembly and re-assembly steps on the first cylinder before starting on the second. Cylinders must be serviced separately.

After the first cylinder is serviced the engine must be rotated to find the base circle on the second cam.

9. Remove the intake and exhaust push rods (17). Tag the push rods as they are removed, and note the top and bottom so that they can be re-installed in their original locations and orientation.

NOTE

O-rings that are missing, distorted, pinched or otherwise damaged will result in either oil leakage or low oil pressure. O-rings in the incorrect position will have the same results.

These O-rings are similar in size and appearance. If O-rings ARE NOT being replaced, make sure they remain in the correct position. If using NEW O-rings, keep them packaged until use to avoid misidentification.

*ALWAYS replace the breather baffle O-ring with a **new** O-ring (purchased separately).*

10. Remove the push rod covers (16 and 20) from the cylinder head and lifter cover bores. Check the condition of the O-rings (15, 18 and 21) on the push rod cover assemblies, and replace if worn. Refer to SUBASSEMBLY SERVICE AND REPAIR, PUSH RODS/LIFTERS/COVERS in the Service Manual. If an O-ring is missing from an upper push rod cover, be sure to dislodge it from the cylinder head bore.

11. Remove and **discard** the O-ring (11) from the groove around the breather baffle hole in the rocker housing.

12. Alternately loosen the six rocker housing bolts following the sequence shown in Figure 5. Remove the rocker housing bolts, and save for re-installation.

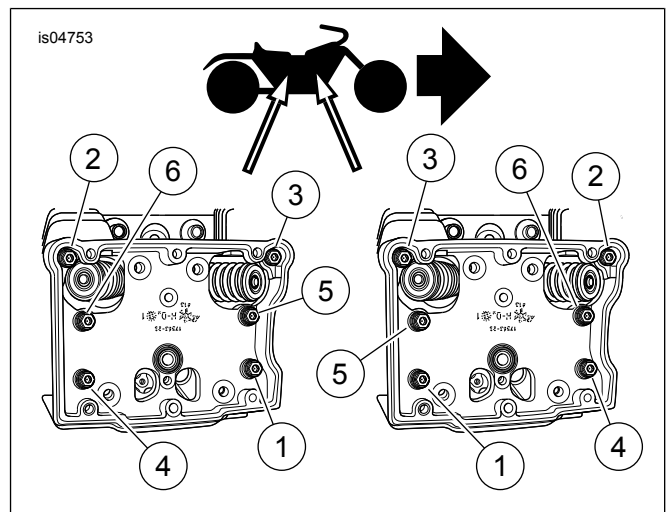


Figure 5. Loosen Six Rocker HOUSING Bolts in Sequence Show

13. Remove and discard the rocker housing and gasket.

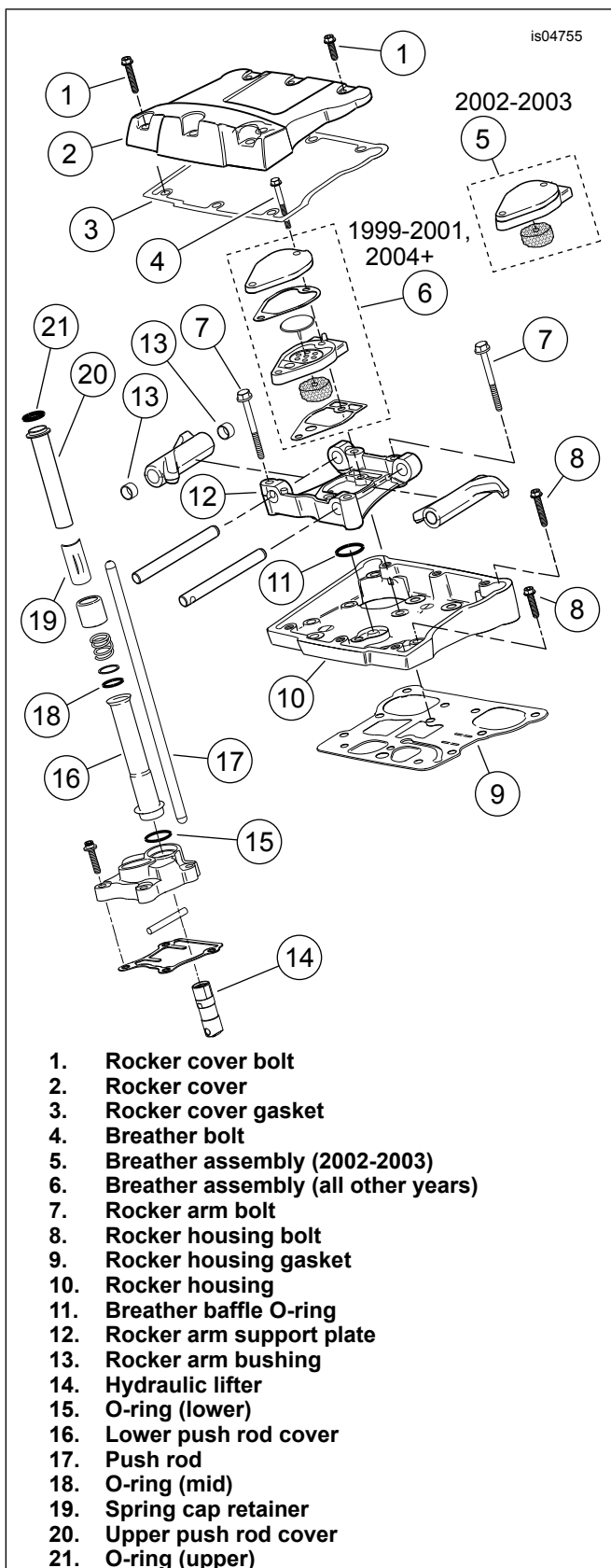


Figure 6. Rocker Arm, Breather and Lifter Assembly

Billet Rocker Box Installation and Re-assembly

Even though all bolt holes (rocker housing, rocker arm support plate and breather assembly) may appear to be in alignment, the rocker housing gasket may be installed upside-down. An upside-down gasket will result in an open breather channel causing an oil leak when the vehicle is started, possibly resulting in engine and/or property damage.

1. See Figure 12. Install the **new** rocker housing gasket (2) from the kit onto the cylinder head flange. The gaskets are identical, but are marked to indicate proper installation orientation for the front or rear cylinder. Verify that the rocker housing gasket is installed correctly by ensuring that the breather channel is concealed. See Figure 7.

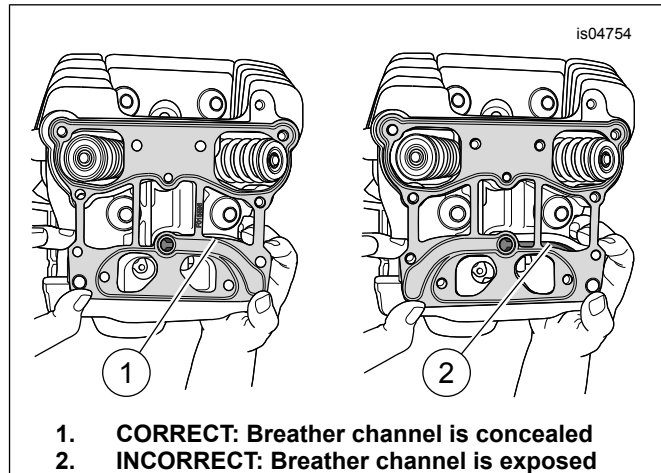


Figure 7. Rocker Housing Gasket Installation (Rear Cylinder Shown)

2. With the indent facing forward, place the **new** chrome rocker housing (1) into position aligning the holes in the housing with those in the gasket.

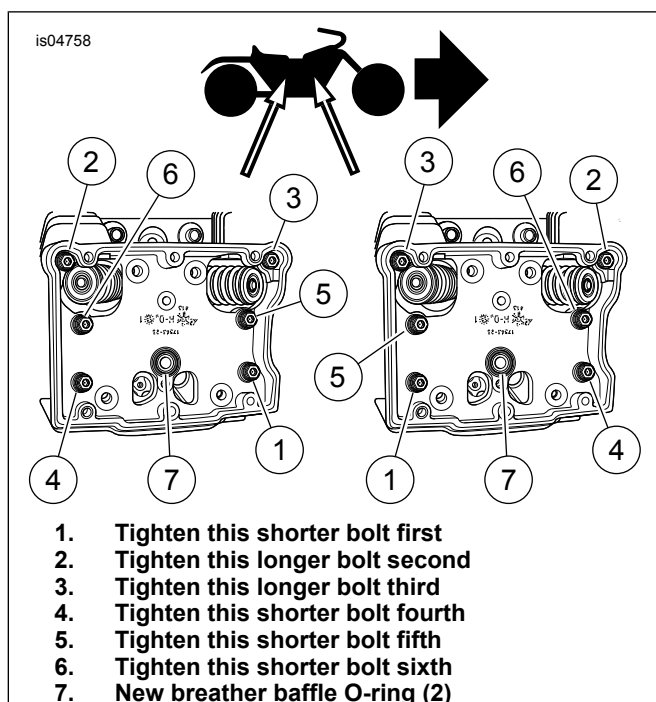


Figure 8. Rocker HOUSING Bolt Lengths and Tightening Sequence

3. Apply a small dab of Loctite® 243 (blue) to the threads of the six rocker housing bolts removed in Step 14. See Figure 8. **Start**, but do not fully tighten the two 1-3/4 inch (44 mm) long bolts on the left side of the engine. **Start**, but do not fully tighten the four 1-1/4 inch (32 mm) long bolts in the center and right side of the engine.

NOTE

Since the engine was left in the chassis for this installation, the **left rear** rocker housing bolt (on the **rear** cylinder only) should be final tightened using a torque wrench with a 1/4 inch drive. Tighten the bolts as indicated in the following Step.

4. Alternately tighten the bolts to 13.6–18.9 N·m (120–168 in-lbs), in the sequence indicated by the circled numbers **for the front or rear cylinder** in Figure 8.

NOTE

O-rings that are missing, distorted, pinched or otherwise damaged will result in either oil leakage or low oil pressure. O-rings in the incorrect position will have the same results.

The upper, mid and lower pushrod cover O-rings are similar in size and appearance. If O-rings ARE NOT being replaced, make sure they have remained in the correct position. If using NEW O-rings, keep them packaged until use to avoid misidentification.

ALWAYS replace the breather baffle O-ring with a **new** O-ring (purchased separately).

5. Install a **new** O-ring (H-D Part Number 11270, purchased separately) in the groove around the breather baffle hole in the rocker housing. Apply a thin film of clean H-D 20W50 engine oil to the O-ring before installation.

NOTE

For engines equipped with Screamin' Eagle components, refer to the instructions included with those components.

6. With the engine mounted in the frame, it may not be possible to install the push rods from above. In this case, install the push rods and push rod covers from below as an assembly. **Installation from above:** To ensure proper installation, refer to Table 3, below. **Installation from below:** To ensure proper installation, refer to Table 3, below.

- a. Hand compress a push rod cover assembly and fit the O-ring end of the lower push rod cover into a lifter cover bore.
- b. Expanding the assembly, fit the O-ring end of the upper push rod cover into the correct cylinder head bore per the table.
- c. Repeat for the second push rod cover assembly. Do not install the spring cap retainers at this time.
- d. Install the push rods, from the top, into the correct rocker housing and cylinder head bore as indicated in the table, in their original orientation. Be sure to remove any tags that may have been used for marking location and orientation.
- e. Install a push rod, in its original orientation, into a push rod cover assembly. Be sure to remove any tags that may have been used for marking location and orientation.
- f. Hand compress the push rod cover assembly and carefully fit the top of the push rod and the O-ring end of the upper push rod cover into the correct cylinder head bore per the table.
- g. Raise the bottom end of the push rod above the height of the lifter cover. Expanding the push rod cover assembly, fit the O-ring end of the lower push rod cover into the correct lifter cover bore per the table. Lower the push rod into the lifter cover bore.
- h. Repeat for the second push rod and push rod cover assembly. Do not install the spring cap retainers at this time.

NOTE

To install the rocker arm support plate, both lifters of the cylinder being serviced must be on the base circle (or lowest position) of the cam.

Installing the rocker arms and rotating the engine with the valve train loaded can result in bent push rods and valve damage.

7. The lifters were positioned on the base circle during the disassembly procedure. If there is any chance that the engine has been rotated since that time, it will be necessary to find the base circle once again before continuing the re-assembly. Refer to Step 7 for the proper procedure.
8. With both intake and exhaust valves closed, place the rocker arm support plate assembly into the rocker housing. Start the four rocker arm support plate bolts into the cylinder head.

9. Place the **metal** Breather Cover Assembly (Part Number 17650-02) at the top of the rocker arm support plate. Apply a small dab of Loctite 243 (blue) to the threads of the two breather assembly bolts. Start the bolts into the cylinder head.

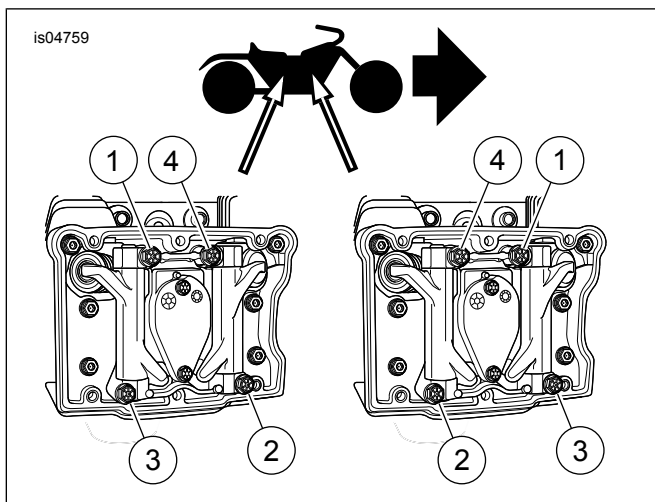


Figure 9. Tighten Four Rocker ARM Bolts 1/4 Turn in Sequence Shown

10. Alternately tighten each of the four rocker arm support plate bolts **just 1/4 turn**, following the sequence shown for the **front or rear cylinder** in Figure 9. *NOTE: Since the engine was left in the chassis for this installation, the left rear rocker arm support plate bolt (on the rear cylinder only) should be final tightened using a 3/8 inch drive torque wrench with a 1/2 inch flank drive "dog bone" torque adapter (Snap-On FRDH161 or equivalent). Since any extension can act as a torque multiplier, the torque wrench must be perpendicular to the torque adapter when the bolt is tightened. The 90 degree orientation between the tools cancels the multiplier effect and prevents the bolt from being over-tightened. If the adapter is kept in line with the torque wrench, the multiplier effect will cause distortion of the rocker housing. Continue turning the bolts in 1/4 turn increments, following the same alternating sequence until the bolts are tightened to 24.4–29.8 N·m (18–22 ft-lbs).*
11. Alternately tighten the two breather assembly bolts to 10.2–13.6 N·m (90–120 in-lbs).
12. Lift up the lower push rod covers and verify that both push rods spin freely.

NOTE

Complete all disassembly and re-assembly steps on the first cylinder before starting on the second. Cylinders must be serviced separately. After the first cylinder is serviced the engine must be rotated to find the base circle on the second cam.

13. Complete installation of the push rod covers as follows:
 - a. Verify that the O-ring ends of the upper and lower push rod covers fit snugly into the cylinder head and lifter cover bores.
 - b. Lodge the upper edge of the spring cap retainer into the cylinder head bore, leaving the bottom edge free.

- c. Insert the blade of a small screwdriver between the bottom edge of the spring cap retainer and the top of the spring cap. *NOTE: For best results, be sure that screwdriver, spring cap and spring cap retainer are free of grease and oil.*
- d. While simultaneously depressing the spring cap with the tip of the screwdriver, use your forefinger to slide the bottom edge of the spring cap retainer down the shaft towards the tip of the screwdriver blade. As the spring cap reaches its full length of travel, the spring cap retainer should be in approximate final position against the upper push rod cover. See Figure 10.
- e. Verify that the spring cap retainer is seated tightly against the upper push rod cover.

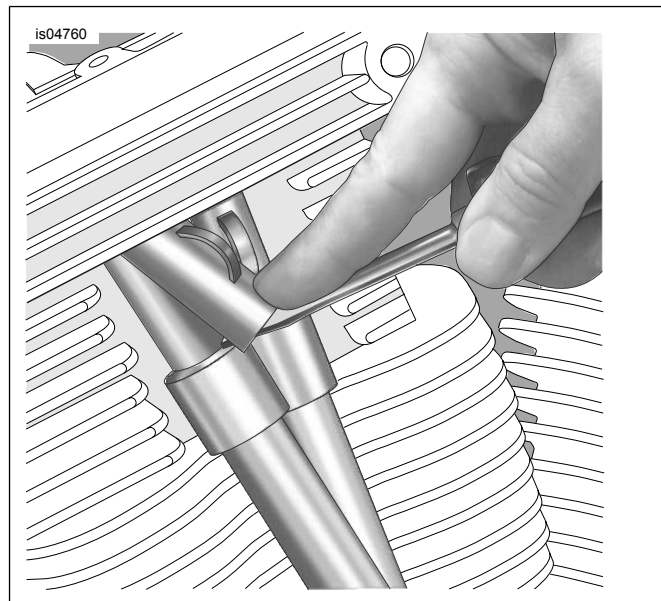
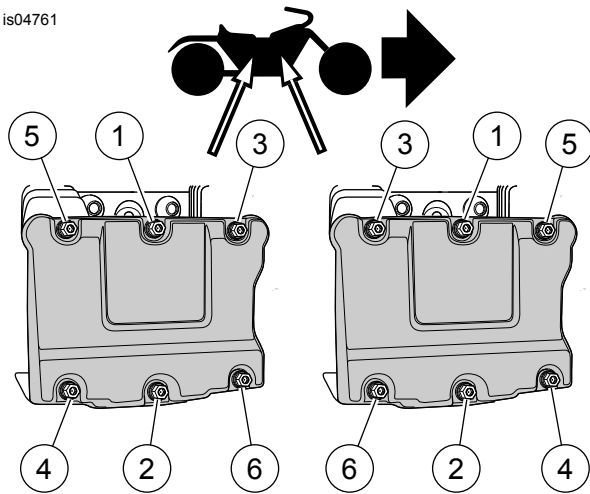


Figure 10. Install Spring Cap Retainer

14. See Figure 12. Install a new rocker cover gasket (3) from the kit onto the cylinder head flange. Place the rocker box cover (4) into position. Match the indent in the rocker cover with the indent in the gasket, and align the holes in the cover with those in the gasket.
15. Place a chrome flat washer (8) onto the threads of three short (5) screws, two medium-length (6) screws, and one long (7) screw from the kit. Apply a small dab of Loctite 243 (blue) to the threads of each screw. Start the three short rocker cover screws on the left side of the engine, one long screw in the right-side center position, and two medium-length screws in the right-side end positions. Tighten the screws to 20.3–24.4 N·m (15–18 ft-lbs) in the sequence shown in Figure 11.



1. Tighten this shorter bolt first
2. Tighten this longer bolt second
3. Tighten this shorter bolt third
4. Tighten this mid-length bolt fourth
5. Tighten this shorter bolt fifth
6. Tighten this mid-length bolt sixth

Figure 11. Rocker COVER Bolt Lengths and Tightening Sequence

16. Repeat Steps 3 through 30 for the second cylinder.
17. Perform the ASSEMBLING MOTORCYCLE AFTER STRIPPING procedures found in the Service Manual for your engine type (carbureted or fuel injected).

⚠ WARNING

Connect positive (+) battery cable first. If positive (+) cable should contact ground with negative (-) cable connected, the resulting sparks can cause a battery explosion, which could result in death or serious injury. (00068a)

18. Refer to the Service Manual and follow the instructions given to re-attach the battery cables (positive cable first) and install the seat.

Table 3. Push Rod and Cover Positioning

For this engine cylinder:	Install this cover and push rod*:	Into this lifter cover bore (bottom end):	And into this rocker housing and cylinder head bore (top end):
Front	Intake	Inside	Rear
Front	Exhaust	Outside	Front
Rear	Intake	Inside	Front
Rear	Exhaust	Outside	Rear

Push rod covers are all identical.
 * Push rods are color coded:

- Intake push rods are silver
- Exhaust push rods are black

⚠ WARNING

After installing seat, pull upward on seat to be sure it is locked in position. While riding, a loose seat can shift causing loss of control, which could result in death or serious injury. (00070b)

SERVICE PARTS

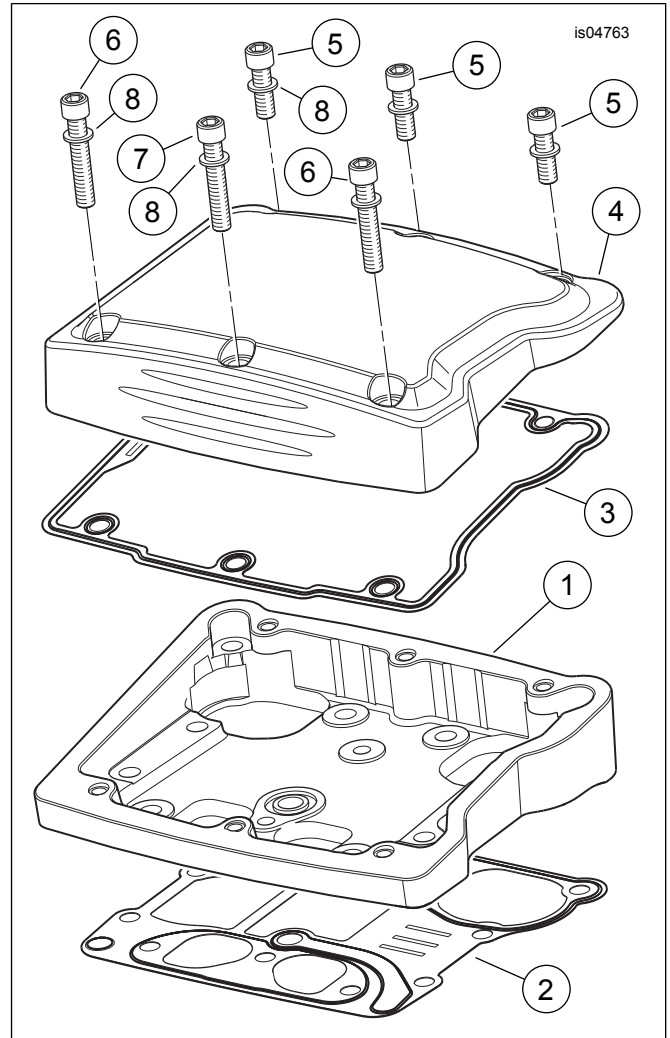


Figure 12. Service Parts, Forged Billet Rocker Box Cover Kit

Table 4. Service Parts

Item	Description (Quantity)	Part Number
1	Rocker housing, chrome (2)	17681-03
2	Gasket, rocker housing (2)	16719-99
3	Gasket, rocker cover (2)	17386-99
4	Rocker box cover, chrome (2)	17659-03
5	Cap screw, hex socket, chrome, 5/16-18 x 1 inch (6)	94334-91TS
6	Cap screw, hex socket, chrome, 5/16-18 x 1-3/4 inch (4)	94337-91TS
7	Cap screw, hex socket, chrome, 5/16-18 x 2 inch (2)	94338-91TS
8	Flat washer, chrome (12)	6396