VT No. 11-2700 and 11-2701 Rocker Covers for 1984-99 and 1999-14 Big Twin Engines

Introduction

Rocker cover kits for Harley-Davidson® Evolution® engines and Twin Cam 88®, 96 , 103 are similar not identical. Mounting holes are larger in bases for Twin Cam 88® engines and in slightly different locations. Because of the different vent systems and mounting-bolt patterns, different rocker housing bases and rocker housing base gaskets are required for the two engines.

Removal of existing rocker covers and installation of die-cast covers is similar for 1984-99 and 1999-2014 engines. Steps 4, 7, and 9 involve procedures or components that apply only to one model or the other; where applicable, procedures and illustrations are clearly designated 1999-up or 1984-99 engines. Otherwise, engine installations are identical.

NOTES

- Threads should be cleaned with Loctite® primer or an equivalent before applying Loctite®.
- The installer must check clearances between the valve spring/top collar and rocker cover housing as well as between the rocker arm and top cover. These procedures are described in Steps 10 and 16.
- The cylinder head must be correctly prepared for higher than stock lifts according to the cam manufacturer's instructions.

⚠ CAUTION

Failure to establish correct clearances can result in extensive engine damage not covered under warranty.

It is the installer's responsibility to use Loctite according to directions printed on the container, and to tighten fasteners to correct torque values. Failure to install fasteners correctly may result in the fastener vibrating loose and causing extensive engine damage not covered under warranty.

Installation

1. Disconnect battery, ground cable first, and remove gas tamls from motorcycle.

⚠ CAUTION

Dirt and other contaminants can cause extensive damage if allowed to fall into engine.

⚠ WARNING

Sparks from motorcycle electrical system can ignite gasoline fumes, resulting in an explosion. Removing battery eliminates the possibilities of explosion and injury arising from inadvertent activation of the electric starter.

2. Remove original top rocker cover. Remove pushrod cover retainers from front cylinder pushrods and collapse pushrod covers.
3. Remove sparkplugs, place motorcycle in fifth gear, and turn wheel to rotate engine and place intake and exhaust pushrods/lifters for front cylinder at lowest point on cam; front piston will be at TDC on Compression stroke with pushrods/lifters at lowest point. Confirm that both pushrods can be rotated with light finger pressure.

⚠ CAUTION

Failure to confirm correct pushrod position can result in damage to rocker arm support plates and other parts.

4. Remove existing components

   A- 1999-up big twin only:

   1. Remove breather and baffle assembly.
   2. Gradually loosen rocker arm support bolts in sequence shown. **See Figure 1.** Loosen rocker support bolts in ¼-turn increments for first ¾ turn, then remove.

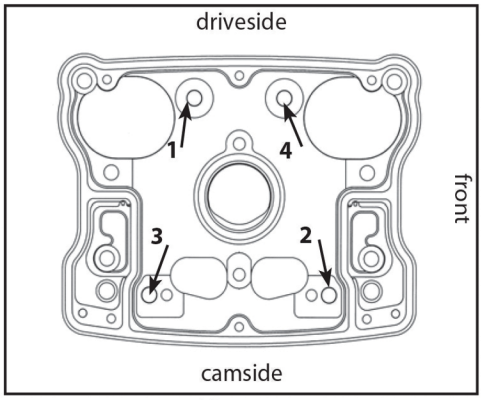

Figure 1

3. Remove rocker arms/support assembly from cylinder head. Loosen bolts in ¼-turn increments for first ¾ turn, then remove bolts and remove rocker housing from cylinder head.

B- 1984-99 big twin engine:

1. Gradually loosen and remove five rocker housing screws. Loosen screws in ¼-turn increments for first ¾ turn, then remove.
2. Remove rocker housing with rocker arms and shafts from cylinder head.

5. Taking care to keep parts in same order as removed, remove rocker shafts and arms from support (Twin Cam 88® engine) or lower rocker housing (Evolution® engine). Mark components according to location: "front intake," etc., so they can be returned to their original locations.
6. Remove oil and any remaining gasket material from cylinder head gasket surface. Clean gasket surface.
7. Place lower rocker housing gasket(s) supplied in kit on cylinder head.

A- Harley-Davidson® Twin Cam 88® engine: One gasket required. Gasket must be positioned to cover breather channel in cylinder head. If necessary, use a small amount of gasket adhesive or sealant to hold gasket in place. Otherwise, gasket should be installed dry.

NOTE: *It is possible to install gasket incorrectly. Before proceeding, confirm that gasket is placed correctly and covers breather channel.*

B- Harley-Davidson® Evolution® engine: Two gaskets required. Factory-applied silicone beads should face up. If necessary, use a small amount of gasket adhesive or sealant to hold gaskets in place. Otherwise, gaskets should be installed dry.

8. Prepare lower rocker housing screws according to instructions on Loctite® container and apply thin film of Loctite® to threads.

A- 1999-up engines: Lower rocker housing screws are 5/16-18 x 3/4 (6 ea.) *(Screws for remaining holes in bottom of rocker housing base for Twin Cam 88® engine will be installed in Step 14-A.)*

B- 1984-99 engines: Lower rocker housing screws are 1/4-20 x 3/4 (4 ea.) *(Screw for center right bolt hole in Evolution® engine will be installed in Step 14-B.)*

9. Install rocker housing on cylinder head.

A- 1999-up engine:

1. Place rocker housing screws in front and rear left (drive side) holes of rocker housing and place housing on cylinder head. Tighten screws two turns to hold rocker housing and gasket in place.
2. Install four remaining rocker housing screws. Gradually tighten six screws to 15-18 ft-lbs. using sequence illustrated in **Figure 2.**

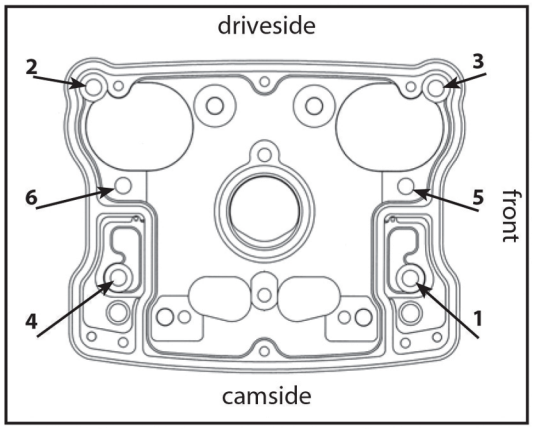

Figure 2-

3. Measure clearance between rocker housing and valve spring. Minimum is .025". If necessary, loosen screws and reposition housing to increase clearance, then retighten screws.
4. Place new o-ring in center of rocker housing.

B- 1984-99 engines:

1. Place two rocker housing screws in left (drive side) holes of rocker housing and place housing on cylinder head.
2. Start two 5/16-18 x 2½ hex head bolts in right (cam side) rocker support holes to temporarily hold cam-side rocker housing gasket in position. Install two remaining rocker housing screws. Gradually tighten four ¼-20 x ¾ screws to 10-13 ft.-lbs. Remove hex head bolts.
3. Measure clearance between rocker housing and valve spring. Minimum is .025". If necessary, loosen screws and reposition housing to increase clearance, then retighten screws.
4. Place new o-ring in center of rocker housing.

10. Inspect rocker shafts for burrs and excessive wear; deburr or replace as necessary. Lubricate rocker shafts with assembly lube, place rocker arms in support, and slide shafts through supports and rocker arms. Reliefs in shafts must face away from center of engine and align with right (camside) bolt holes.

11. Check rocker arm endplay by sliding rocker arm as far to one side as possible and measuring gap between rocker arm and support on opposite end. Acceptable endplay is .001" to .012". If endplay is insufficient, carefully remove material from end of rocker arm to achieve correct endplay. Leave a smooth, nonabrasive surface.
12. Prepare rocker support bolts according to instructions on Loctite® container and apply thin film of Loctite® to threads. Insert two 5⁄16-18 x 2¼" socket head bolts and washers in holes in left (drive) side of support and two 5⁄16-18 x 2½" hex head bolts in holes in right (cam) side of support.
13. Place rocker arm support assembly with rockers in rocker housing. Align pushrod ends with sockets in rockers and gradually tighten four support bolts to 15-18 ft-lbs. according to sequence shown.
14. Install remaining rocker support bolt(s).
    A- 1999-up engine: Prepare one 1⁄4-20 x 1 socket head bolt and one 1⁄4-20 x 2 socket head bolt for Loctite® and apply thin film of Loctite® to threads. Install washers on both bolts. Insert ¼-20 x 1 bolt with washer in center left side of support and ¼-20 x 2 bolt with washer in center right side of support. Tighten both to 10-13 ft-lbs.
    B- 1984-99 engine: Prepare one 1⁄4-20 x 2 socket head bolt for Loctite® and apply thin film of Loctite® to threads. Install washer on bolt and insert bolt with washer in center right hole of support. Tighten to 10-13 ft.-lbs.

NOTE: *Hydraulic lifters may take 5-10 minutes to bleed down after rocker assembly is installed. Do not rotate engine until pushrods can be turned with light finger pressure.*

⚠ CAUTION

Rotating engine before lifters have bled down can cause extensive engine damage.

15. Confirm clearance between rocker arm and top rocker cover by applying layer of clay at least .060" thick to areas of cover that rocker arms will come closest to at maximum lift. Temporarily install covers with four screws and rotate engine through two complete revolutions. Carefully remove covers and examine clay. Layer of clay above rocker arm must remain at least .060" thick. If dented, indentation must leave at least .060" of clay between rocker arm and cover. Remove clay and thoroughly clean rocker and cover with clean, lint-free cloth.
16. Place rocker cover seal and o-ring in position on rocker housing.
17. Install one flat and one fiber washer on each of six ¼-20 x ¾ rocker cover screws.

NOTE: *Install flat washer on screw first. Fiber washer goes between flat washer and rocker cover.*

18. Install rocker cover and gradually tighten screws to 90-100 in-lbs. in sequence shown. **See Figure 3.**

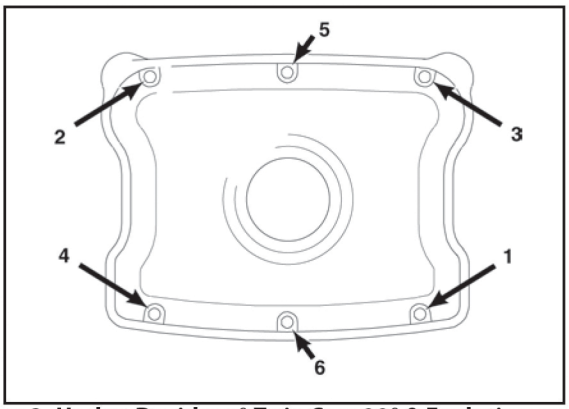

Figure 3- Harley-Davidson® Twin Cam 88® & Evolution engines

19. After confirming that pushrods turn with light finger pressure, extend pushrod tubes and replace retainer clips.
20. Remove retainers and collapse covers of rear cylinder pushrods. Rotate engine to place pushrods at lowest point on cam with rear piston at TDC on compression stroke. Repeat rocker cover removal and installation procedure for rear cylinder.
21. Replace any parts removed for rocker cover installation, start motorcycle and inspect for gas and oil leaks.