Instruction Sheet #00-3886
9-15-99

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Installation Instructions for S&S Rocker Cover Assemblies for H-D Twin Cam 88 Engines

Safe Installation and Operation Rules:

Before beginning the installation, it is your responsibility to read and understand these instructions. Reading the appropriate section of a Harley-Davidson service manual is strongly recommended. The following information and guidelines are for your personal safety and must be kept in mind at all times.

- Gasoline is extremely flammable, explosive under certain conditions, and toxic when the fumes are inhaled. Do not smoke around gasoline. Perform this installation in a well-ventilated area away from sparks or open flame.
- Before beginning the installation, disconnect and remove the battery to eliminate potential sparks and possible inadvertent engagement of the electric starter while working on the motorcycle.
- S&S provides Loctite 243 for fastener hardware. Prepare threads and apply compound exactly according to instructions on container.
- After completing the installation, be sure all fuel lines are routed correctly with clamps in place and tightened securely. Even with protective cover, gas lines must not contact extremely hot surfaces where they could melt, leak and catch fire.
- Compressed air and particles dislodged by compressed air are potentially harmful. Wear protective goggles when using compressed air and always direct the air stream away from yourself and others nearby.
- Solvents, degreasers and many other chemicals are harmful, especially to skin and eyes. Many chemical compounds such as lacquer thinner are also flammable and present a fire hazard. Read the manufacturerís instruction label for precautions and proper use. Use in a well-ventilated area and wear protective clothing to avoid injury.
- If the motorcycle has been running, wait until the engine and exhaust pipes have cooled before performing any mechanical work.
- Read these instructions carefully and thoroughly before beginning the installation. Contact S&S if you have questions, if any steps are unclear, or if any abnormalities occur during installation, final assembly or operation.
- Consult an authorized H-D service manual for correct disassembly, reassembly, and installation procedures for any parts that need to be removed or disassembled to perform this installation.
- Use good judgment during assembly and when operating the motorcycle. Good judgment begins with a clear head. Donít let alcohol, drugs, or fatigue impair judgment. Perform the installation when you are fresh and alert.
- For optimum performance and safety and to minimize potential damage to the cylinder heads or other components, use correct hardware and follow procedures outlined in S&S instructions and H-D service manual.
- Motorcycle exhaust fumes are toxic and must not be inhaled. Run motorcycle only in a well ventilated area where fumes can dissipate.

WARRANTY:

All S&S parts are guaranteed to the original purchaser to be free of manufacturing defects in materials and workmanship for a period of six (6) months from the date of purchase. Merchandise that fails to conform to these conditions will be repaired or replaced at S&Sís option if the parts are returned to S&S by the purchaser within the 6 month warranty period or within 10 days thereafter.

In the event warranty service is required, the original purchaser must notify S&S of the problem immediately. Some problems can be rectified by a telephone call and need no further action. A part that is suspected of being defective must not be replaced without prior authorization from S&S. If it is deemed necessary for S&S to make an evaluation to determine whether the part was defective, it must be packaged properly to avoid further damage, and be returned prepaid to S&S with a copy of the original invoice of purchase and a detailed letter outlining the nature of the problem, how the part was used, and the circumstances at the time of failure. If after an evaluation was made by S&S and the part was found to be defective, repair, replacement, or refund will be granted.

ADDITIONAL WARRANTY PROVISIONS:

(1) No part shall be returned to S&S without first contacting the company and obtaining a Return Authorization (RA) number.
(2) S&S shall have no obligation in the event an S&S part is modified by any other person or organization, or if another manufacturerís part is substituted for one provided by S&S.
(3) S&S shall have no obligation if an S&S part becomes defective in whole or in part as a result of improper installation, improper break-in or maintenance, improper use, abnormal operation, or any other misuse or mistreatment.
(4) S&S shall not be liable for any consequential or incidental damages resulting from the failure of an S&S part, the breech of any warranties, the failure to deliver, delay in delivery, delivery in non-conforming condition, or for any other breach of contract or duty between S&S and a customer.
(5) S&S parts are designed exclusively for use on Harley-Davidson motorcycles. S&S shall have no warranty or liability obligation if an S&S part is used in any other application.

Important Notice:

Statements in this instruction sheet preceded by the following words are of special significance:

WARNING
Means there is the possibility of injury to yourself or others.

CAUTION
Means there is the possibility of damage to the motorcycle or a component.

NOTE
Other information of particular importance has been placed in italic type.

S&S urges you to take special notice of these advisories.

Kit Contents:

Base, rocker cover, S&S
- Chrome billet (2 ea.) ..... #90-4068
- Polished billet (2 ea.) ..... #90-4074
- Plain Billet (2 ea.) ..... #90-4066

Cover, top rocker, S&S
- Chrome billet (2 ea.) ..... #90-4069
- Polished billet (2 ea.) ..... #90-4076
- Plain billet (2 ea.) ..... #90-4067

Capscrew, socket head,
- ¼-20 x ¾"(12 ea.) H-D#4069A) ..... #50-0067

Capscrew, socket head w/flatwasher
- 5/16-18 x ¾" (12 ea.) ..... #50-0099

Washer, flat ¼" x 7/16" x 1/16" (12 ea.)
- (HD#6099) ..... #50-7017

Gasket set, rocker cover billet
- (1 ea.) ..... #90-4073

Loctite 243, 0.5 ml. tube
- (1 ea.) ..... #51-9003

Introduction

S&S rocker covers for H-D Twin Cam 88 engines utilize OEM H-D rocker arm support plates and breather assemblies. Otherwise this kit includes all hardware and gaskets required for installation.

S&S rocker covers can be installed with engine in frame. S&S Rocker Cover Wrench Set #53-0040 is helpful in areas where motorcycle frame prevents use of conventional tools. S&S strongly recommends use of torque wrench and Loctite 243 (S&S #51-9003, included in kit) on all fasteners.

S&S also recommends the installer become familiar with Twin Cam 88 "Top End Overhaul Procedure" section in Harley-Davidson Service Manual before beginning installation. Refer to Harley-Davidson Service Manual for additional information as needed.
S&S rocker covers are designed to accept valve springs up to 1.660" O.D. with no modification. In most instances, they will accept valve lifts to .710" without modification.

NOTES

- *Threads should be cleaned with Loctite primer or equivalent prior to applying Loctite.*
- *It remains engine builder's responsibility to check operating clearances. Clearances should be checked between valve spring/collar and rocker housing base as well as between rocker arm and top rocker cover. S&S recommends minimum of .060 between rocker arm and top collar .025" is sufficient between valve spring/top collar and rocker housing base. Cylinder head must also be set up for correct lift.*

CAUTIONS

- **Failure to establish correct operating clearances can result in extensive engine damage not covered under warranty.**
- **It is installer's responsibility to use Loctite and tighten fasteners to correct torque values. Failure to install fastener correctly may result in fastener vibrating loose and causing extensive engine damage not covered under warranty.**

WARNING - Sparks from motorcycle electrical system can ignite gasoline fumes. To prevent sparks as well as prevent electric starter from becoming engaged inadvertently and causing personal injury, disconnect battery and remove from motorcycle before proceeding.

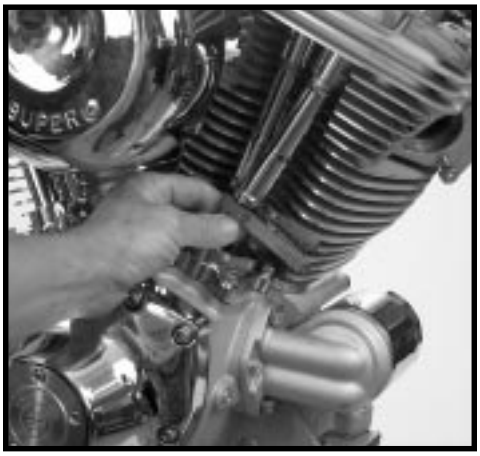
1. Wash motorcycle, taking care to remove dirt from engine and surrounding area of motorcycle. Remove gas tank and clean engine and surrounding area with compressed air.

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

WARNING - High pressure air is potentially hazardous. Wear eye protection during use and direct air stream away from face and others nearby.

2. Remove OEM top rocker covers. Remove pushrod cover retainers from front cylinder pushrods and collapse pushrod covers.

3. Remove spark plugs, place motorcycle in gear, and rotate engine to place intake and exhaust pushrods for front cylinder at lowest point on cam. Confirm that both pushrods can be rotated with light finger pressure. **See Picture 1.**



Picture 1

Picture 2

Picture 3

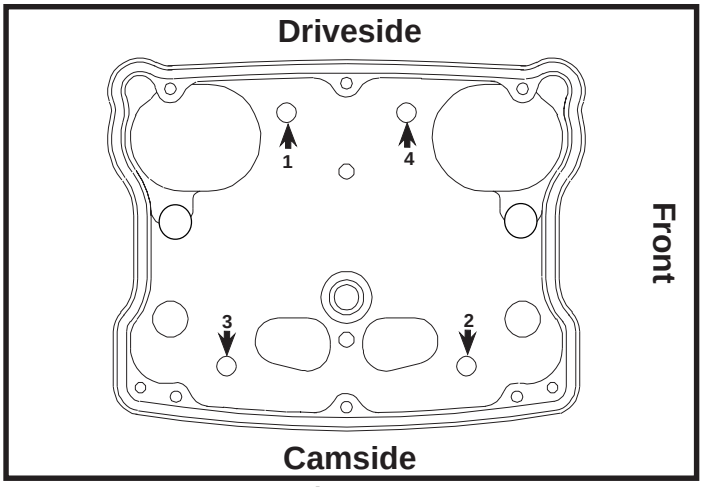


Figure 1

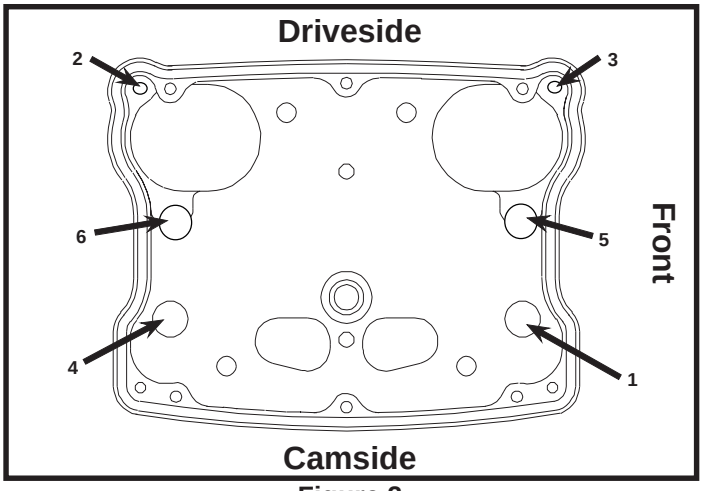


Figure 2

CAUTION - Failure to confirm pushrod/lifter placement before proceeding with installation can result in damage to rocker arm support plates and other parts. With pushrods at lowest point, front piston will be at TDC on Compression stroke.

4. Remove breather cover and baffle assembly. **See Picture 2.**

5. Remove rocker arm/rocker support plate. **See Picture 3.**

*NOTE - Gradually loosen rocker arm support bolts in following sequence **(See Figure A):***

1. Left (driveside) rear
2. Right (camside) front
3. Right (camside) rear
4. Left (driveside) front

Loosen bolts in sequence and in ¼-turn increments for first ¾ turn. Bolts can then be removed according to normal procedure.

6. Remove lower rocker housing bolts.

*NOTE - Gradually loosen lower rocker housing bolts in following sequence **(See Figure B):***

1. Right (camside) front
2. Left (driveside) rear
3. Left (driveside) front
4. Right (camside) rear
5. Center front
6. Center rear

Loosen bolts in sequence and in ¼-turn increments for first ¾ turn. Bolts can then be removed according to normal procedure.

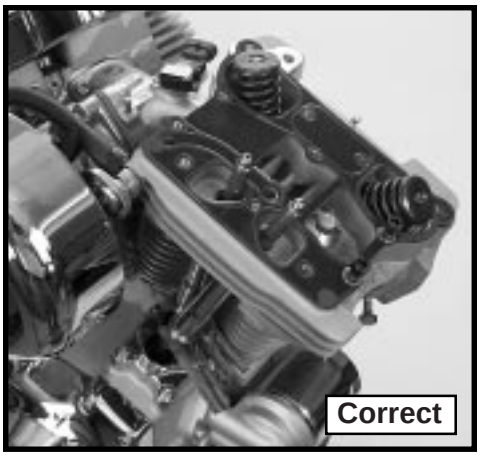
7. Remove lower rocker housing and gasket from head. Remove oil and any remaining gasket material from cylinder head gasket surface and clean gasket surface with lacquer thinner.

WARNING - Lacquer thinner is extremely flammable, potentially explosive, and the fumes toxic when inhaled. Read manufacturer's cautions on container and use only in a well-ventilated area away from sparks and open flame.

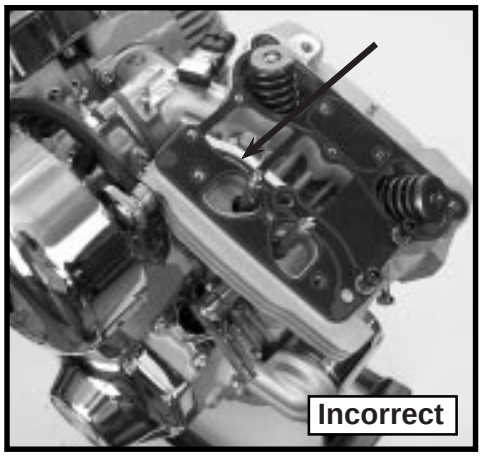
8. Place S&S lower rocker housing gasket on cylinder head. Gasket must cover breather channel in cylinder head.

NOTE - It is possible to install gasket incorrectly. Before proceeding, confirm that gasket is correctly placed and covers breather channel in cylinder head. See Pictures 4A and 4B.

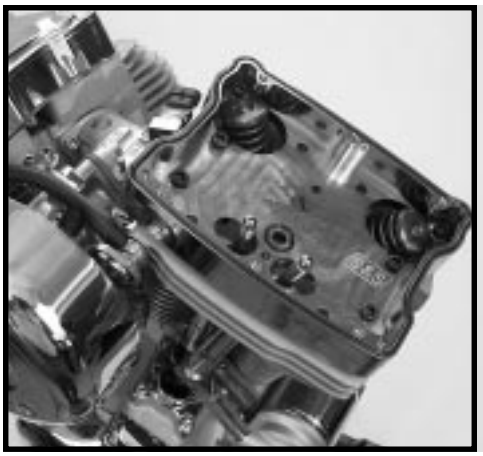
9. Prepare threads of six 5/16-18 x ¾ S&S rocker housing screws according to Loctite instructions and apply Loctite 243 supplied with kit.
10. Install screws in front and rear driveside holes of lower rocker housing and install housing on cylinder head.



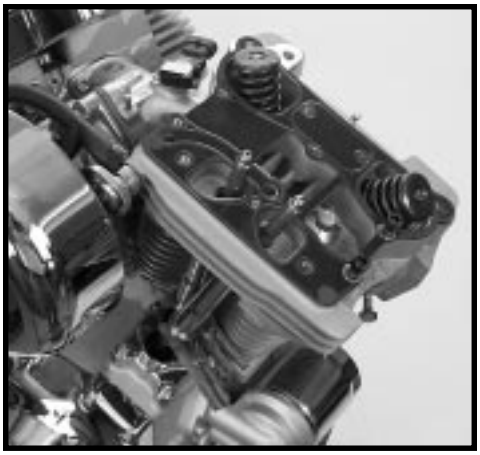
Picture 4A



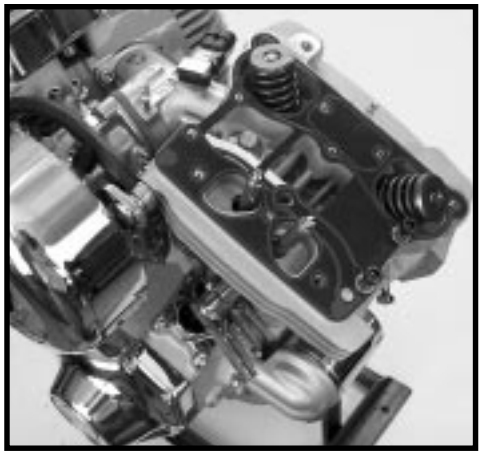
Picture 4B



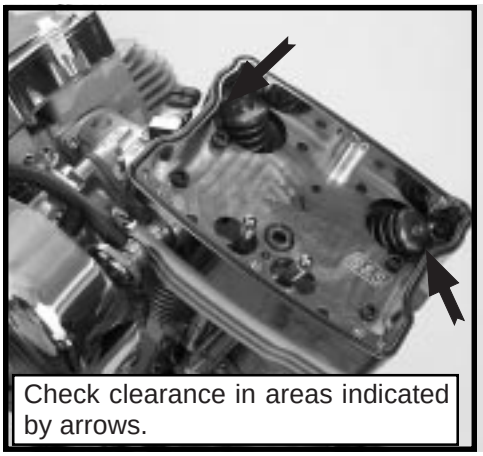
Picture 5



Picture 4A



Picture 4B



Picture 5

Screws will hold gasket in correct position as remaining screws are installed.

11. Install four remaining lower rocker housing screws and gradually tighten six screws to 15-18 ft-lbs. using sequence described in Step 6. Measure clearance between valve spring and rocker cover with feeler gauge. Minimum is .025". **See Picture 5.**
12. Place OEM rocker support plate assembly in rocker arm housing. Prepare OEM bolts for Loctite according to manufacturer's instructions and apply Loctite to threads. Insert two short rocker support plate bolts in holes in left (driveside) of plate and two long support plate bolts in right (camside) holes. Gradually tighten support plate bolts to 15-18 ft-lbs. according to sequence described in Step 5.

NOTE - Hydraulic lifters may require a few minutes to "bleed down" after rocker assembly is installed. Do not rotate engine until pushrods can be turned with light finger pressure.

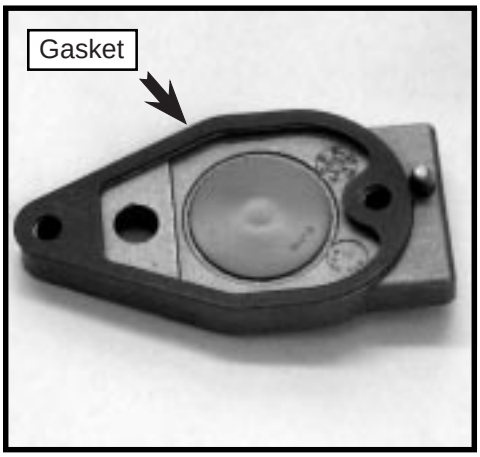
13. Prepare breather cover/baffle assembly bolts for Loctite and apply Loctite according to manufacturer's instructions.
14. Separate top and bottom halves of breather cover/baffle assembly, clean gasket surfaces, and install center gasket supplied with S&S rocker housing kit. **See Picture 6.** Place other gasket supplied with kit on lower rocker housing and install breather cover and baffle assembly. **See Picture 7.** Tighten bolts evenly to 90-120 in-lbs.
15. Confirm clearance between rocker arm and top rocker cover by applying layer of clay at least .060" thick inside areas of cover that will come closest to rocker arm at maximum lift. Temporarily install cover with four screws and rotate engine through two complete revolutions. Remove cover 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 all traces of clay and thoroughly clean rocker and cover with clean, lint-free cloth.
16. Install one flat and one fiber washer on each of six $\frac{5}{16}$ -18 x $\frac{3}{4}$ rocker cover screws.

Note - Install flat washer on screw first. Fiber washer goes between flat washer and rocker cover.

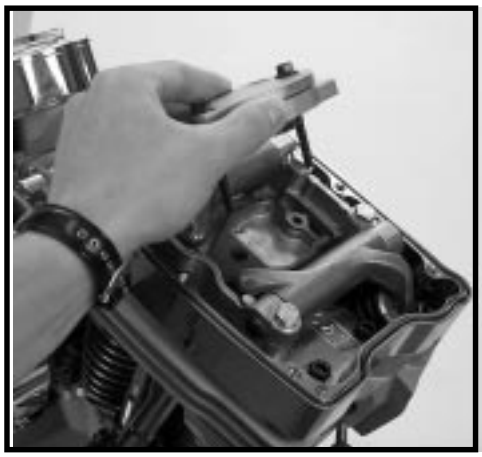
Prepare rocker cover screws for Loctite and apply Loctite to threads. Install rocker cover and gradually tighten screws to 9-12 ft-lbs. in following sequence **(See Picture 8):**

1. Right (camside) front
2. Left (driveside) rear
3. Left (driveside) front
4. Right (camside) rear
5. Left (driveside) center
6. Right (camside) center

17. Extend pushrod covers and replace retainer clips.
18. Remove covers from rear cylinder pushrods. Rotate engine to place pushrods at lowest point on cam with rear piston at TDC. Repeat procedure.
19. Replace parts removed for installation, start motorcycle and inspect for gas and oil leaks.



Picture 6



Picture 7

Picture 8