

**Instruction 51-1027
4-25-06**

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Because every industry has a leader

Installation Instructions: S&S® Spring Kit 90-2053 (Fits all Panhead and Shovelhead Engines)

DISCLAIMER:

S&S parts are designed for high performance, off road, racing applications and are intended for the very experienced rider only. The installation of S&S parts may void or adversely affect your factory warranty. In addition such installation and use may violate certain federal, state, and local laws, rules and ordinances as well as other laws when used on motor vehicles used on public highways, especially in states where pollution laws may apply. Always check federal, state, and local laws before modifying your motorcycle. It is the sole and exclusive responsibility of the user to determine the suitability of the product for his or her use, and the user shall assume all legal, personal injury risk and liability and all other obligations, duties, and risks associated therewith.

The words Harley®, Harley-Davidson®, H-D®, Sportster®, Evolution®, and all H-D part numbers and model designations are used in reference only. S&S Cycle is not associated with Harley-Davidson, Inc.

SAFE INSTALLATION AND OPERATION RULES:

Before installing your new S&S part it is your responsibility to read and follow the installation and maintenance procedures in these instructions and follow the basic rules below for your personal safety.

- Gasoline is extremely flammable and explosive under certain conditions and toxic when inhaled. Do not smoke. Perform installation in a well ventilated area away from open flames or sparks.
- If motorcycle has been running, wait until engine and exhaust pipes have cooled down to avoid getting burned before performing any installation steps.
- Before performing any installation steps disconnect battery to eliminate potential sparks and inadvertent engagement of starter while working on electrical components.
- Read instructions thoroughly and carefully so all procedures are completely understood before performing any installation steps. Contact S&S with any questions you may have if any steps are unclear or any abnormalities occur during installation or operation of motorcycle with a S&S part on it.
- Consult an appropriate service manual for your motorcycle for correct disassembly and reassembly procedures for any parts that need to be removed to facilitate installation.
- Use good judgement when performing installation and operating motorcycle. Good judgement begins with a clear head. Don't let alcohol, drugs or fatigue impair your judgement. Start installation when you are fresh.
- Be sure all federal, state and local laws are obeyed with the installation.
- For optimum performance and safety and to minimize potential damage to carb or other components, use all mounting hardware that is provided and follow all installation instructions.
- Motorcycle exhaust fumes are toxic and poisonous and must not be inhaled. Run motorcycle in a well ventilated area where fumes can dissipate.

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 part or motorcycle.

NOTE

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

S&S recommends you take special notice of these items.

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 twelve (12) months from the date of purchase. Merchandise that fails to conform to these conditions will be repaired or replaced at S&S's option if the parts are returned to us by the purchaser within the 12 month warranty period or within 10 days thereafter.

In the event warranty service is required, the original purchaser must call or write S&S immediately with the problem. Some problems can be rectified by a telephone call and need no further course of action.

A part that is suspect of being defective must not be replaced by a Dealer 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, a return authorization number must be obtained from S&S. The parts must be packaged properly so as to not cause 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 has been made by S&S and the part was found to be defective, repair, replacement or refund will be granted.

ADDITIONAL WARRANTY PROVISIONS:

- (1) S&S shall have no obligation in the event an S&S part is modified by any other person or organization.
- (2) 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 maintenance, improper use, abnormal operation, or any other misuse or mistreatment of the S&S part.
- (3) S&S shall not be liable for any consequential or incidental damages resulting from the failure of an S&S part, the breach 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.
- (4) S&S parts are designed exclusively for use in Harley-Davidson® and other American v-twin motorcycles. S&S shall have no warranty or liability obligation if an S&S part is used in any other application.

The components of this kit are designed to be used together and must not be mated with stock springs or retainers or springs or retainers of another brand. The reasons are:

1. S&S® springs are wound in a different direction than stock springs.
2. S&S inner springs are larger in diameter and longer than stock springs.
3. S&S outer springs are longer than stock springs.
4. S&S aluminum top retainers are designed to correctly accommodate the larger diameter of the inner springs and longer length of both S&S springs.

INSTALLATION INSTRUCTIONS

1. Assemble one valve at a time using stock bottom retainer, valve guide seal (if equipped with seal), S&S aluminum top retainer and stock Harley-Davidson® keepers as shown in **Figure 1**. Tap valve stem with soft hammer at top retainer to seat stem and keepers.
2. While pulling up on top retainer to hold valve closed, take measurements A and B and record them. Perform this step for each valve. Identify and separate collars and valves so they can be installed in same position from which you took measurements. On late heads with valve guide stem seals, take measurement B to top edge of seal.
3. Measurement A will normally fall in range shown in **Figure 1**. This range will provide enough clearance to run cams with lifts as high as .550".
 - A. If measurement A is less than 1.490" Material must be removed from underside of bottom spring retainer either from shoulder where retainer contacts guide or from flat where retainer contacts head. Up to .050" can be removed from retainer where it contacts shoulder of guide. If material is removed from this area, retainer must be installed on guide and checked for contact between flat of retainer and head. On these installations retainer must not contact head. Grind head at points of contact to obtain clearance. On installations where retainer rests on head instead of guide, up to .050" can be surface ground from flat of retainer to gain necessary clearance. Cam installations with lifts greater than .550" require measurement A to equal 1.505" plus cam lift minus .550". Example: Cam to be used has lift of .575". Measurement A = 1.505" + .575" - .550" or 1.530". Basic rule of thumb - Measurement A must equal length of coil bound spring + cam lift + .020" minimum.
 - B. If measurement A is more than 1.520" - Shims may be fabricated and placed between guide shoulder and retainer or retainer and head. Shimming is recommended particularly in racing applications. On most street engines where higher rpm usage is limited shimming is left to discretion of builder.
4. Measurement B will normally be less than .600" to .620" shown in **Figure 1**. This range will provide enough clearance to run cams with lifts as high as .550". Subtract measurement B recorded earlier from .610" for each valve and grind tops of valve guides. Remove only the difference in measurements. Carefully remove burr on inside diameter of guides before installing valves so as not to scratch valve stems. Just barely break corners on outside diameters of exhaust guides. Contour outside diameters of intake guides in engines equipped with valve guide seals to original shapes. Cam installations with lifts greater than .550" require measurement B to equal cam lift plus .050" to .070". Example: Cam to be used has lift of .575". Measurement B = .575" + (.050" to .070") or .625" to .645".

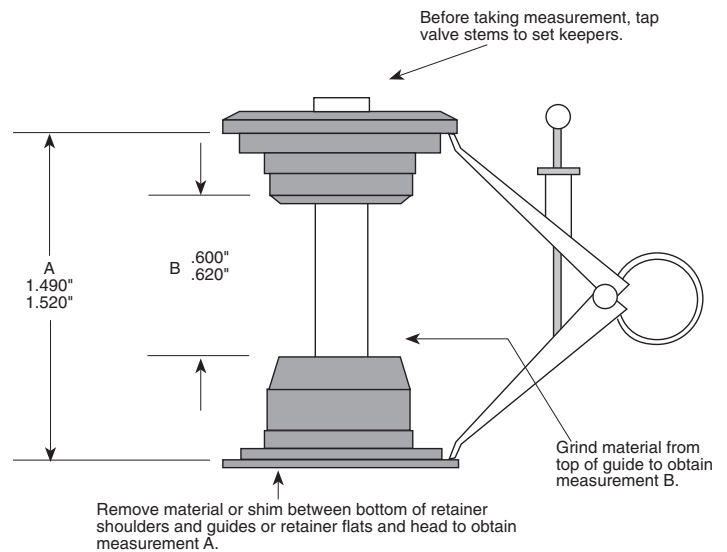


Figure 1

5. Perform steps 1 and 2 again and compare measurements with ones previously recorded. Cams with lifts as high as .550" may be used when A is 1.490" to 1.520" and B is .600" to .620".

NOTE: Valves sunk deep in seats cause rocker arms to contact valve stems at a different angle. In extreme instances edge of rocker arm may contact outside edge of top valve spring retainer at valve closed position. This causes top retainer to rock which may result in collar failure. If there is any doubt whether contact exists, we recommend that rocker arm to retainer clearance be checked.

⚠ CAUTION

Improper clearance between moving parts may cause contact and damage or destruction of parts. Failure of one or more parts can produce abrasive contaminants which may circulate in the engine oil causing damage to other engine components.

6. To check for contact between rocker arm and top spring retainer, perform the following steps:
 - A. Paint outside edge of top collar with machinist's blue and install heads on engine. Modeling clay may also be used.
 - B. Install rocker boxes and pushrods and rotate engine four revolutions in normal direction of travel.
 - C. Remove rocker boxes and examine collar edges for evidence of any contact with rocker arm.
 - D. If contact occurs, remove minimum material necessary from rocker arm at point of contact.

NOTES:

- On 1983 and '84 shovelhead engines, rocker cover casting to top retainer clearance is reduced. When installing S&S Spring Kit 90-2053 on these engines, be sure to check this clearance and remove material from rocker cover to assure .060 minimum clearance.
- S&S Spring Kit 90-2053 was designed primarily for Harley-Davidson® shovelhead engine. If kit is installed in Harley-Davidson® panhead, valve cover modification will be needed to provide sufficient clearance between top retainer and rocker cover. We recommend 1/8" minimum clearance. In most cases this can be accomplished by peening cover in area of contact with ballpeen hammer.