Instruction 51-1024
6-14-07

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Installation Instructions: S&S® High Performance Valve Spring Kits 90-2079, 90-2080 and 90-2081

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 effect 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.

SPECIFICATIONS					
Part Number	**Maximum Lift**	**Installed Height**	**Seat Force**	**Force @ Maximum Lift**	**Coil Bind Height**
90-2079	.660"	1.900"	210 lbs.	520 lbs.	1.130"
90-2080	.720"	1.975"	250 lbs.	625 lbs.	1.175"
90-2081	.800"	2.000"	285 lbs.	790 lbs.	1.140"

S&S® valve spring and collar kits 90-2079, 90-2080 and 90-2081 are designed for street and race applications that utilize camshafts with extremely high lifts requiring higher than normal spring pressures. These kits are intended primarily for use on S&S Special Application heads. .660-lift kit 90-2079 can also be used on S&S Street Heads normally supplied on S&S engines, or any other head which can accept a 1.650" outer spring O.D.

NOTE - Kit 90-2079 is a "bolt-in" installation for earlier S&S street heads equipped with .630" high-lift option that utilizes .085" longer valves. See following paragraph for part numbers. It remains the engine builder's responsibility to confirm all measurements and clearances during installation.

Kits are designed for "no shoulder" valve guides. Keepers fit stock 5/16" diameter valves and supplied titanium collars or exact replacement only. In S&S street heads, .660-lift kit requires use of .085" longer valves 90-2004 (intake) and 90-2005 (exhaust). All kits are compatible with S&S 90-2013 (intake) and 90-2012 (exhaust) valves supplied with Special Application heads.

Because of special assembly procedures required with high-lift camshafts and related parts, S&S recommends that these parts be installed by a professional mechanic having considerable experience with parts of this nature.

⚠ CAUTION

- **Improper assembly including failure to establish proper measurements and clearances can cause extensive engine damage which is solely the responsibility of the installer.**
- **Mixing valves, springs, collars, keepers or other parts from different valve spring kits can cause extensive engine damage which is also the responsibility of the installer.**

NOTE - S&S valve spring kits 90-2079, 90-2080 and 90-2081 feature triple valve springs. 90-2079 and 90-2080 utilize flat middle spring. 90-2081 has round middle spring.

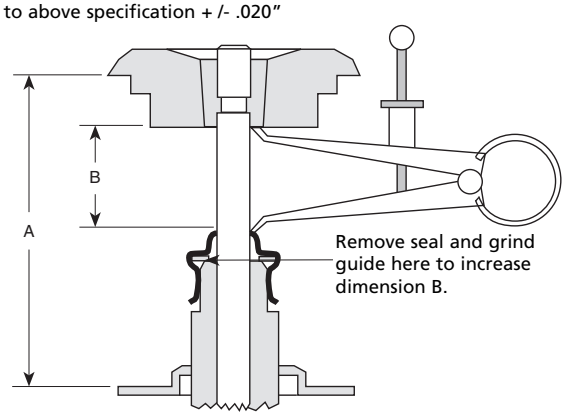
Spring Installation Procedure

1. If applicable, remove cylinder heads from engine and disassemble. If cylinder heads/valves are to be reconditioned, proceed according to standard procedure at this time. Refer to appropriate service manual or consult professional mechanic as needed.

2. Place lower spring collar in valve spring pocket in head. Place outer spring on collar. Collar must rest flat on head and spring coils must not contact sides of spring pocket in head. If necessary, machine lower collar and/or spring pocket to obtain minimum clearance of .030". Do not modify spring in any way.

3. Using following procedure, determine installed spring height and clearance between top collar and valve guide.

Dimension A: Installed spring height must be adjusted to above specification + /- .020"



Dimension B: Must be .060" greater than valve lift for camshaft to be used.

Figure A

   A. Lubricate valve stem and install valve in guide.

   B. Install bottom collar, valve guide seal, top collar and valve keepers. Pull top collar tightly against keepers to seat keepers in collar.

   C. While holding valve firmly against seat in closed position, measure installed spring height (distance between lower valve spring seating surface and outside step of top collar). **See Figure A, Dimension A.** Record measurement.

   D. Measure distance between top collar keepers and top of valve guide or seal (if applicable). **See Figure A, Dimension B.** Distance must be at least .060" greater than valve lift of cam to be used. If distance is less, valve guide must be shortened to obtain required clearance.

   E. Repeat Steps A-D for remaining valves and record all measurements. Label and keep track of all parts during assembly to insure they are installed in same location and with same valves that measurements were obtained with.

4. Adjust installed spring heights to dimension shown in specifications table above. If installed height is too high, place shims under lower collar to achieve correct height. Shims are available from S&S and local sources such as automotive parts houses. If spring height is too low, grind valve or valve seat or machine spring floor in cylinder head to achieve correct height.

NOTES

- *Installed height is same as outer valve spring length when valve, spring, and related parts are installed and valve is in closed position. Correct spring heights are noted in table.*
- *Experienced engine builders may elect to shim valve spring assembly to installed height less than recommended height for racing and other special applications. In such cases, installed height must equal at least Coil Bind Ht. + valve lift + .060". For example, installed height of .660-lift spring kit 90-2079 to be used with .650-lift cam must be at least 1.130" + .650 + .060, or 1.840". Engine-builder bears all responsibility for utilizing spring height other than those specified by S&S® Cycle.*
- *Titanium top collars supplied with Kits 90-2079, 90-2080 and 90-2081 do not require steel wear plate used with some earlier S&S titanium collars.*

⚠ CAUTION

- **Installing springs at height less than recommended dimension will cause rapid spring fatigue. In such cases, engine should be frequently disassembled for measurement of spring tension. Decrease in spring tension can cause extensive engine damage not covered under warranty.**
- **Installing springs at height greater than recommended dimension will decrease spring tension possibly resulting in valve float and extensive engine damage.**
- **Failure to establish required dimensions and clearances may cause valve seal failure and other, more extensive engine damage not covered under warranty.**

⚠ WARNING

Valve spring assembly is under considerable tension when compressed and is potentially harmful. Wear eye protection and take due caution when working with valve springs, especially when checking for coil bind and during installation. After assembly, carefully strike tip of valve stem with plastic hammer to insure that keepers are seated. Direct spring assembly away from face and body during this procedure.

5. Observing previous warning, check for coil bind as follows:

   A. Place outer spring in vise or spring checking device and carefully compress to figure equal to Installed Height (+.020") - valve lift - .060". Spring coils must not bind/contact each other with spring compressed to measurement obtained by this formula. For example, compress .660-lift spring kit 90-2079 to be used with .650-lift cam to 1.900" (+ .020") - .650" - .060", or 1.190". If adjacent spring coils contact each other with spring compressed, a different spring pack or cam with less lift must be used.

   B. Repeat procedure for middle and inner spring for each spring assembly.

NOTE - Because of steps machined in top collar, middle and inner springs will have installed heights different than that of outer spring. To determine correct installed height of middle spring, subtract Dimension A from installed height of outer spring. **See Figure B, Dimension A**. *To determine correct installed height of inner spring, subtract Dimension B from installed height of outer spring.* **See Figure B, Dimension B**.

6. Install valves, lower collars, valve seals, and valve springs in head.

NOTES

- *Springs in Kits 90-2079, 90-2080 and 90-2081 can be installed with either end up.*
- *Installed height should be the same for each spring assembly.*

7. Confirm that rocker arm does not contact top collar. Contact is most likely to occur when valve is closed. Recommended clearance is .040".
8. Confirm rocker arm to rocker cover clearance.
   A. Install pushrods and rocker assemblies. Adjust pushrods per manufacturer's instructions.
   B. Place thin deposit of clay or putty on inside of top rocker cover directly above pushrod and valve spring areas.
   C. Install top cover and rotate flywheels two complete revolutions (720°).

NOTE - If resistance is encountered, remove top cover and determine cause. Never attempt to force engine past resistance.

   D. Remove top cover and examine clay for possible indentation caused by rocker arms. Thickness of clay beneath indentation must be at least .060". Carefully remove metal from cover or rocker arm to obtain required clearance.

NOTE - Remove minimum amount of metal needed to obtain correct clearance. Care must be taken not to break through rocker covers or alter rocker arm heat treatment by overheating while grinding. Oil is supplied to top end through pushrods and rocker arms, so it also important not to disturb oil passages in same.

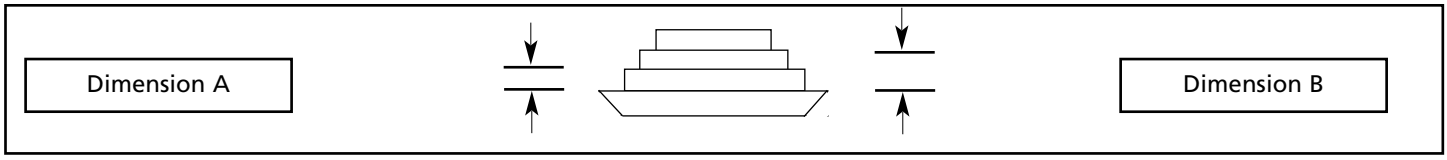


Figure A

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