

**Instruction 51-1199
8-28-06**

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Installation Instructions: S&S® High Performance Clutch for 1991-Up Big Twin

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 breathed. 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 authorized H-D service manual 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 breathed. 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 v-twin motorcycles. S&S shall have no warranty or liability obligation if an S&S part is used in any other application.

⚠ WARNING

Disconnect the negative battery cable before performing any clutch work on your motorcycle to prevent personal injury.

⚠ CAUTION

The use of specialized installation and removal tools are required for this procedure. Do not attempt to install the S&S® clutch without the proper specialty tools.

SPECIAL TOOL REQUIREMENTS

- Dial Indicator
- Inner Race Puller, S&S PN 56-5141
- Primary Locking Tool
- Micrometer
- Inner Race Installer, S&S PN 56-5145

The S&S® clutch is designed with 11 plates to offer better grip and performance. Additionally, it has six (6) pressure plate springs that can be exchanged to adjust clamping and lever pressure.

- 6 Light Duty Blue Springs (optional) = 334 lbs, S&S PN 56-5109
- 6 Heavy Duty White Springs (optional) = 468 lbs, S&S PN 56-5106
- 6 Standard Springs = 370 lbs, S&S PN 56-5105
- 3 Stock & 3 Heavy Duty = 419 lbs, (requires purchasing both set of springs)

CLUTCH KIT CONTENTS (PICTURED BELOW)

- Clutch Assembly
- Shim Kit
- Clutch Hub Nut & Washer
- Red Threadlock (Not Shown)
- Inner Bearing Race
- Epoxy Mixing Cup
- Clutch Adjuster & Nut
- .207" Washer



Manual Clutch Kit

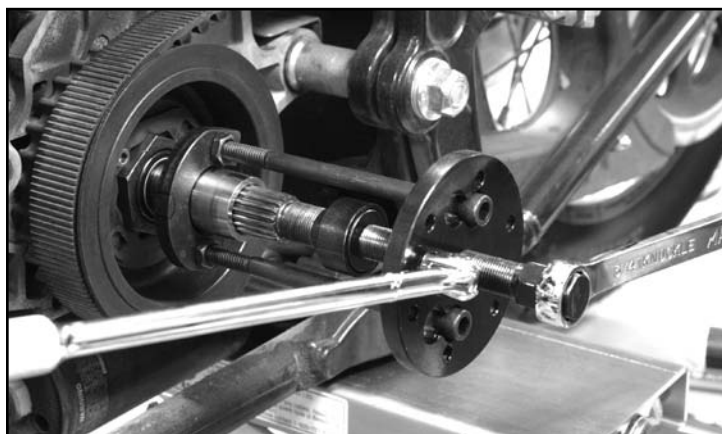


Hydraulic Clutch Kit:

For use with Harley-Davidson® Screamin' Eagle® hydraulic clutch system.

INSTALLATION

- 1- Disconnect the negative battery cable and route it away from any metal parts in the area.
- 2- Loosen all the tension in the clutch cable—or refer to your factory service manual for instructions on how to remove your hydraulic clutch.
- 3- Remove the entire primary and clutch assembly by following the instructions in your factory service manual. It is also required that the clutch actuator pushrod be removed from the mainshaft.
- 4- Use an inner primary race removal tool to take the stock Harley-Davidson® race off of the mainshaft and discard. S&S PN 56-5141 inner bearing race puller shown in **Picture 1**.



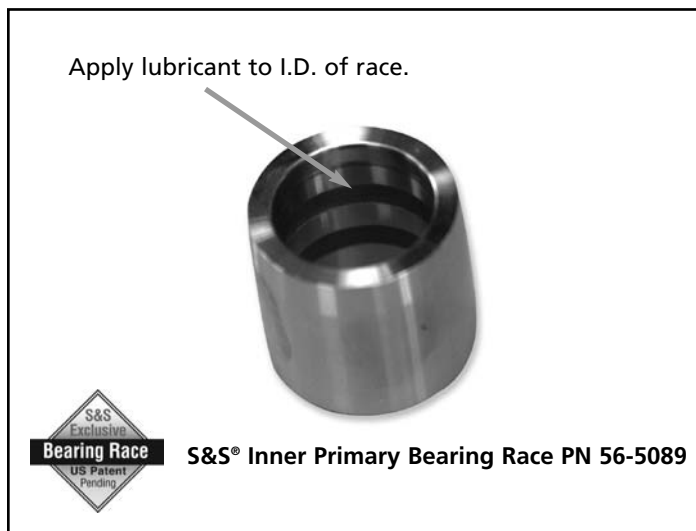
Picture 1

WARNING

Do not use stock Harley-Davidson® inner primary bearing race with the S&S® clutch. If the stock inner bearing race is used with the S&S clutch, damage to primary components and the clutch will occur. The S&S clutch requires a step on the main shaft to prevent the clutch from moving inward, this step is created by the S&S inner bearing race PN 56-5089.

- 5- The S&S® inner primary race has an internal taper that will engage on the tapered portion of the mainshaft to assure that it mounts to the proper depth. Use an inner primary race installation tool and assembly lube for this procedure. Be sure to install the bearing race with the taper facing out. Be sure race is seated on the taper by tightening tool to 35 ft-lbs. as shown in **Picture 3**.

NOTE: Lubricating the race will make the installation easier.

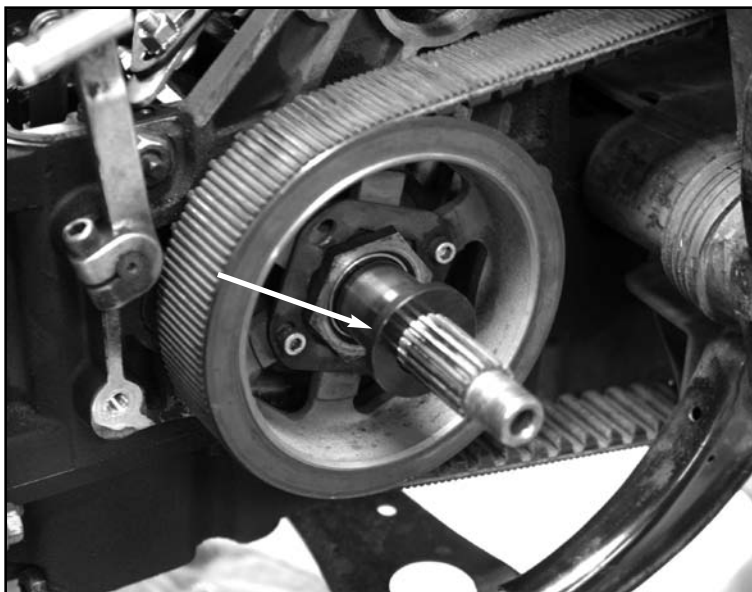


Picture 2



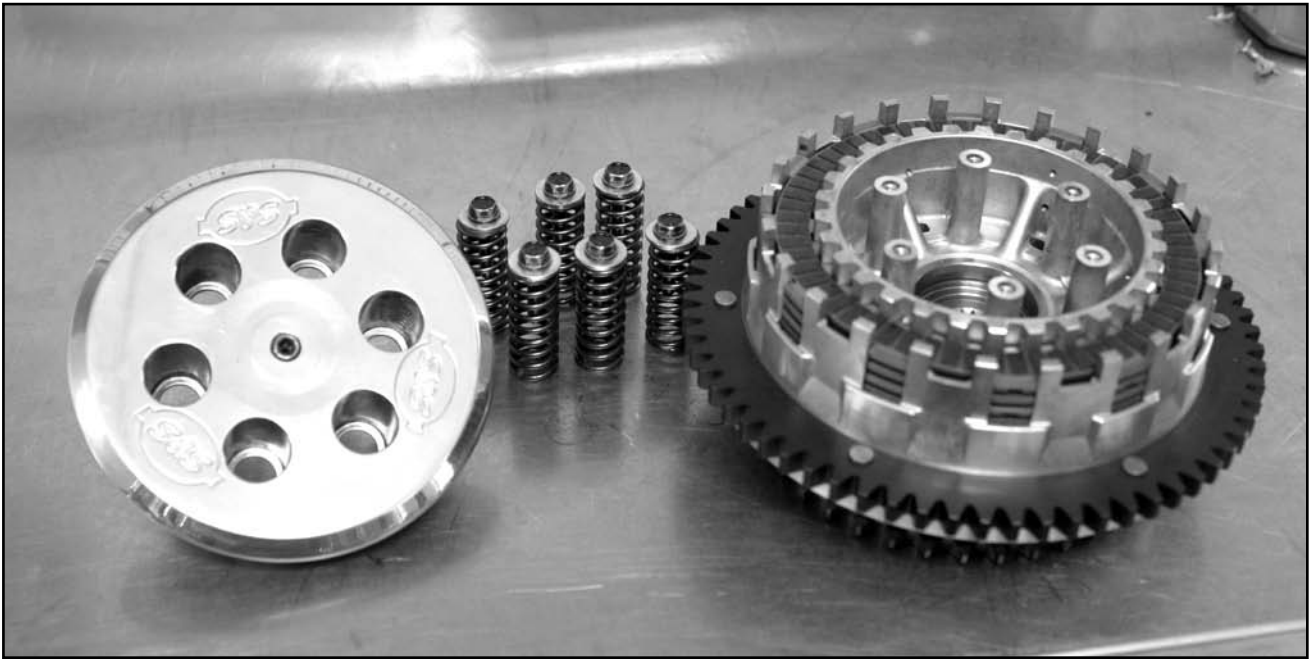
Picture 3

- 6- Install the included .207" thick washer on the mainshaft as shown below.



Picture 4

- 7- Now remove the six screws and springs that hold the pressure plate on the S&S® clutch. Put them aside and then turn the clutch upside down to remove the clutch pack. **NOTE:** Be sure to remove the complete jutter assembly (See **Picture 16**). It has a tendency to stay seated on the clutch hub.



Picture 5

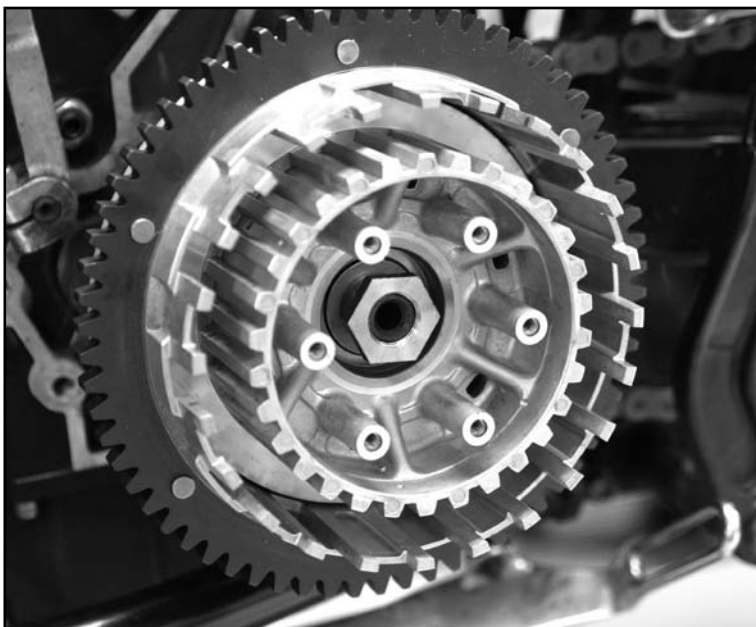
- 8- Slide the clutch basket in place against the .207" washer as shown in **Picture 6**.



Picture 6

- 9- Put the large washer into the recess in the clutch basket and follow it with the LEFT HAND THREAD nut. Tighten the nut to 70-80 ft-lbs. of torque as illustrated in **Picture 7**.

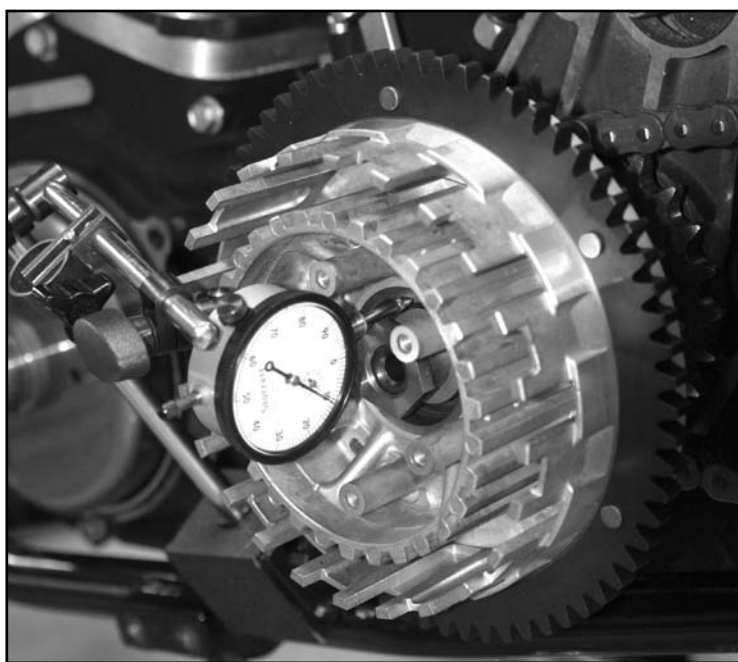
NOTE: Do not use threadlock at this time.



Picture 7

- 10- The next step is crucial to proper installation. Mount a dial gauge with its pointer as close to the center of the clutch basket as possible (as shown in **Picture 8**). It is very important that you measure as close to center as you can—we recommend the lip that surrounds the washer and nut on the mainshaft. If you measure the basket on its outer edge, any play or variance in the splines of your mainshaft could cause an incorrect measurement.

Once the dial gauge is in place, gently apply in and out pressure on the basket to get an endplay measurement between the basket and inner primary race. Take the measurement, confirm it by doing it a second time, and write it down.

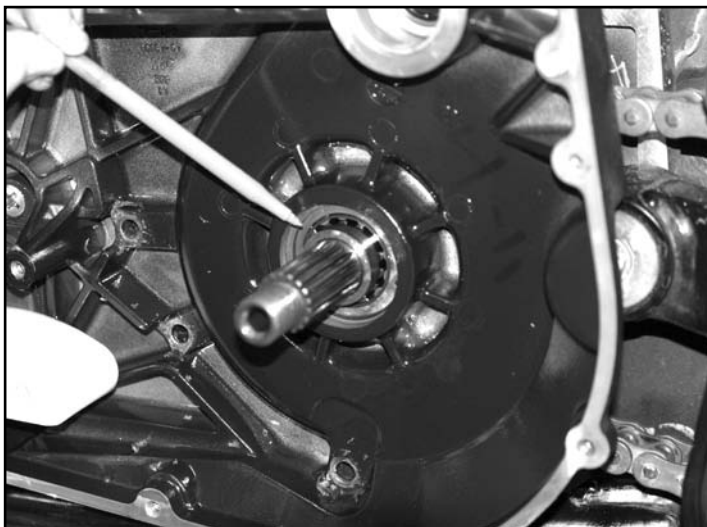


Picture 8

- 11- Remove the nut, washer and basket from the mainshaft. Now select shims to create .001-.010" of endplay between the .207" washer and inner primary bearing race. Repeat Step 10 to achieve .001-.010" endplay with shims. After the inner primary is installed, the shims will be positioned between the .207" washer and the inner primary race as shown in **Picture 9**. Install the inner primary following the factory service manual for your motorcycle. S&S® recommends that you replace the inner primary bearing and seal at this time. See **Picture 10**.



Picture 9



Picture 10

NOTE: If you are having problems getting endplay measurement (or your endplay is zero) with the above method, the race may not be installed far enough onto the shaft. Be sure that bearing race was installed to 35 ft-lbs torque. The S&S clutch assembly is sold with a package of four shims (.0075", .015", .024" and .047"). When multiple shims are required to achieve desired endplay, install narrow shims next to .207" washer. Likewise, install widest shims next to bearing race.

CAUTION

Zero endplay will cause mainshaft to be axially loaded and force inner bearing race or mainshaft to fail.

- 12- Assemble the starter pinion shaft components using the optional S&S pinion gear PN 56-1037 (required on 1994 and up models) as illustrated in **Picture 11**. Be sure that the coupler is oriented so it sits flush with the pinion shaft splines as shown in **Picture 12**. If it is installed the other way, you will not have proper starter engagement. Now install the pinion shaft assembly and use a new locking tab to hold the bolt in place.



Picture 11



Picture 12

NOTE: The S&S® High Performance Clutch basket and splines are machined to exacting specifications. Through our extensive testing with engines producing over 150 horsepower, we have seen even the slightest of variances between the I.D. of the basket splines and the O.D. of the shaft splines can allow movement which leads to premature wear on the mainshaft. By utilizing an epoxy—specifically designed for this application—between the basket and shaft splines, we can ensure the clutch basket and shaft will offer their maximum performance, with no relative movement (friction) between the splines, for the life of the installation.

13- CLUTCH INSTALLATION STEPS

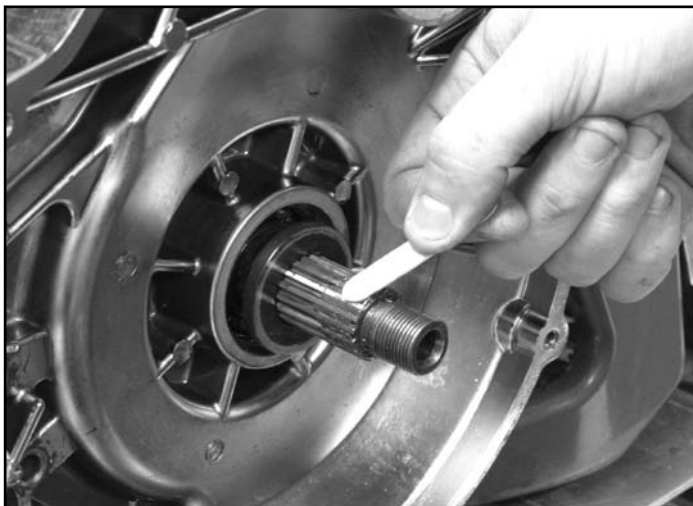
- Be sure that the shims and .207" washer are in place on the mainshaft as shown in **Picture 9**.
- Read epoxy mixing instructions.
- Epoxy is applied to the last ½" of the mainshaft, in a level that fills in the splines, but does not exceed the depth of the splines. See **Picture 14**.
- Apply a ½" thick band of epoxy to the back side of the clutch hub—again ensuring the application is spline depth only. Do not exceed the spline thickness with epoxy layer. See **Picture 15**.
- Place the primary chain over the clutch sprocket and slide it onto the mainshaft. Carefully wipe any excess epoxy off of the mainshaft end.

⚠ CAUTION

- Once S&S epoxy is mixed, you will have approximately *five minutes* to apply the epoxy to the clutch hub and mainshaft before it hardens. Be sure starter pinion shaft and shims are in place before mixing epoxy.
- If epoxy is not used on spline, the spline will deteriorate and fail. This type of failure will not be covered by warranty!
- If too much epoxy is used on the mainshaft, epoxy will build up behind clutch.



Picture 13

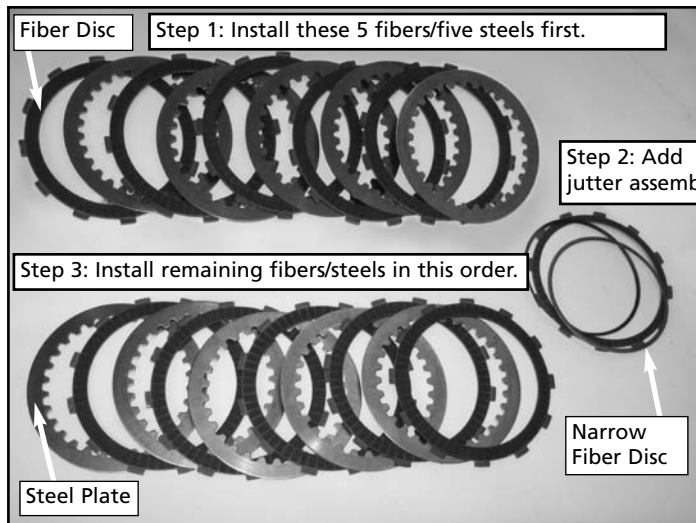


Picture 14

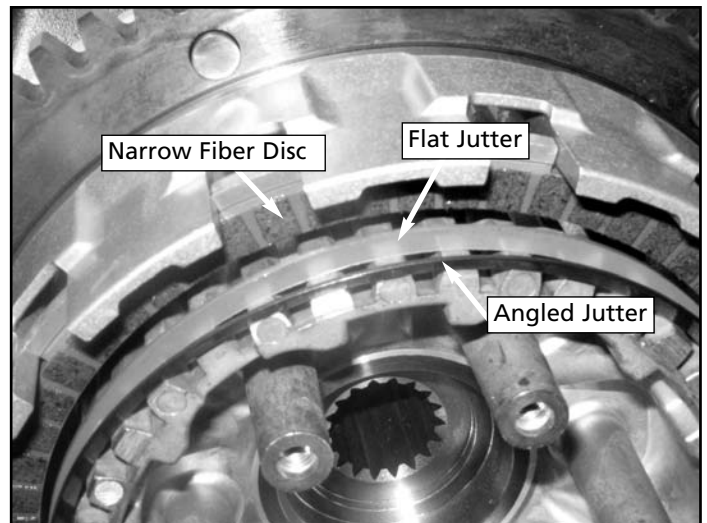


Picture 15

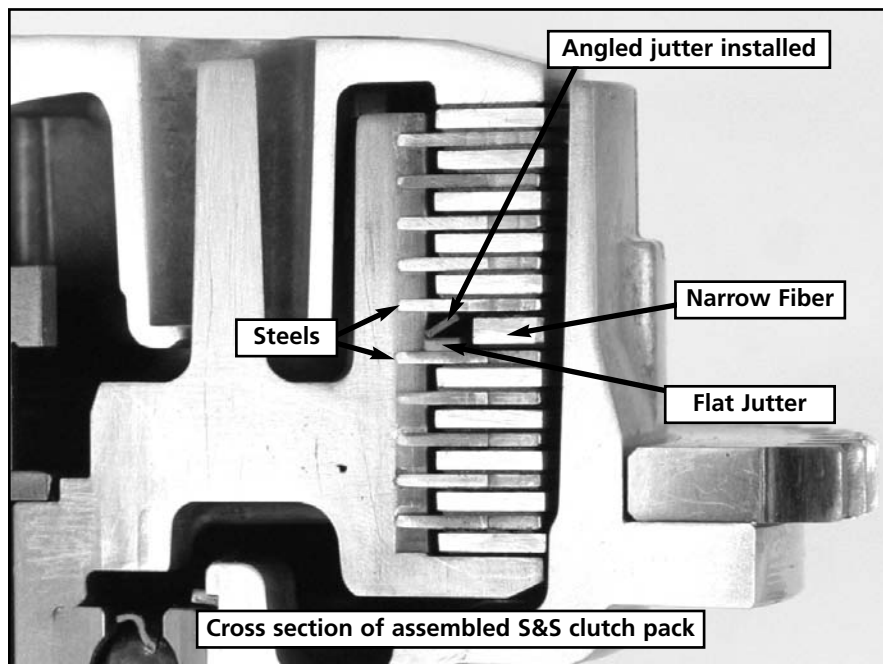
- 14- Now install the washer and LEFT HAND THREAD nut and torque to 70-80 ft-lbs of torque using Loctite® 262 or equivalent.
- 15- Soak fiber discs in primary oil for a minimum of five minutes prior to installation. S&S® recommends ATF or equivalent fluid.
- 16- Install the first 5 fiber discs and steel plates by sliding a fiber disc in, followed by a steel plate (**Step 1, Picture 16**). When 10 are in place (5 fiber discs, 5 steel plates), slide the narrow fiber disc in, followed by the flat jutter and then the out-facing angled jutter (**Step 2, Picture 16**). A detailed view of the assembly is in **Picture 17 and 18**. Finally install the remaining 10 plates by installing a steel plate, followed by a fiber disc until all 10 are in place (**Step 3, Picture 16**).



Picture 16



Picture 17



Picture 18

17- Refer to the appropriate steps below to install a manual or hydraulic clutch pressure plate:

A. Manual pressure plate installation

- 1) Confirm that the adjustment rod is threaded all the way in the pressure plate as illustrated in **Picture 19**. NOTE: The rod can only be installed from the back of the pressure plate so make sure it is in place before you move on.



Picture 19

- 2) Confirm the clutch actuator pushrod is inserted into the mainshaft.
- 3) Put the pressure plate in place, install the springs and torque the screws to 72-96 in-lbs.

NOTE: S&S® offers three different capacity spring kits. The S&S clutch is sold with standard springs (PN 56-5105). We recommend the standard spring for up to 150 HP. You can decide which combination of springs to use. Six of the light springs (PN 56-5109, blue) will yield the easiest clutch pull (recommended for 90 HP or less). Using six of the heavy springs (PN 56-5106, white) will give the hardest lever pull and most clutch capacity. You can use three of each to create a mid-pressure lever feel.

- 4) Run the adjustment rod in until it lightly bottoms out. Back it off between $\frac{1}{2}$ and $\frac{3}{4}$ of a turn and lock it in place by installing and tightening the retaining nut as shown in **Picture 20**.



Picture 20

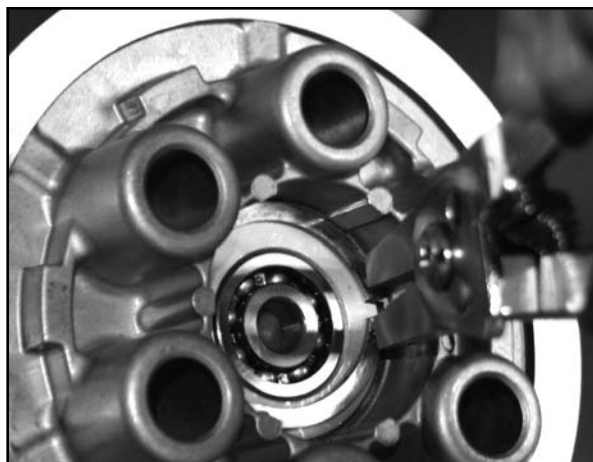
- 5) Finally, adjust the clutch cable to provide $\frac{1}{8}$ " to $\frac{3}{16}$ " of free play at the handlebar clutch lever.

B. Hydraulic pressure plate installation (for use with Harley Davidson® Screamin' Eagle® hydraulic clutch system only)

- 1) Install the thrust bearing and bearing housing into the S&S hydraulic pressure plate so the bearing housing is flush with the outside of the pressure plate. **See Picture 21.**
- 2) Install retaining ring as shown in **Picture 22.**

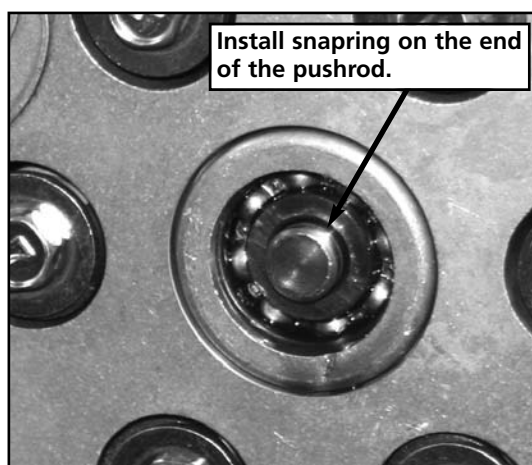


Picture 21



Picture 22

- 3) Confirm the clutch actuator pushrod is inserted into the mainshaft.
- 4) Put the pressure plate in place, install the springs and torque the screws to 72-96 in-lbs.
- 5) Install the clutch actuator pushrod retaining clip on the end of the pushrod. **See Picture 23.**



Picture 23

- 6) Pump the clutch lever to achieve proper actuation. Pressure plate should move between .040" and .110".

NOTE: S&S® offers three different capacity spring kits. The S&S clutch is sold with standard springs (PN 56-5105). We recommend the standard spring for up to 150 HP. You can decide which combination of springs to use. Six of the light springs (PN 56-5109, blue) will yield the easiest clutch pull (recommended for 90 HP or less). Using six of the heavy springs (PN 56-5106, white) will give the hardest lever pull and most clutch capacity. You can use three of each to create a mid-pressure lever feel.

- 18- Mock-up your outer primary cover with a gasket and a few lightly tightened bolts. Some models will require clearance on the inside of the primary cover. To determine if clearance is required, remove derby cover, pull the clutch lever and confirm .050" clearance between the clutch pressure plate and the outer cover. Remove any interference material from the inside of the outer cover with a die grinder and recheck to confirm appropriate clearance.
- 19- Once proper clutch to primary cover clearance has been confirmed, finish installing the outer primary cover according to the recommended procedures in your factory service manual.
- 20- Fill the primary as suggested in your factory service manual with ATF or equivalent.

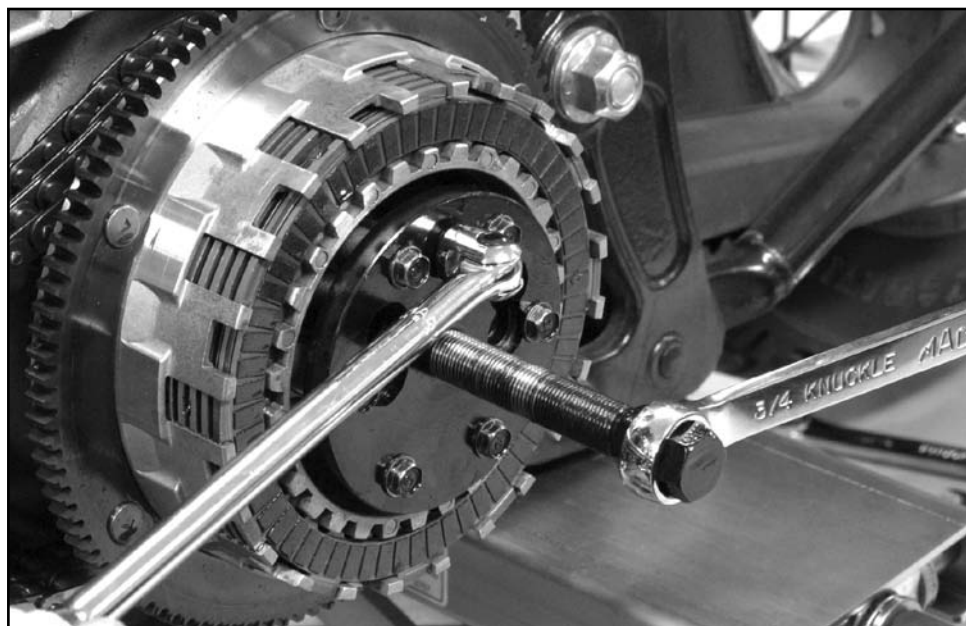
CLUTCH SERVICE

Primary Fluid

- 1- Primary fluid should be changed after the first 500 miles and every 5,000 miles thereafter.
- 2- S&S® recommends the use of ATF or equivalent fluid.
- 3- Fill primary with approximately 32 ounces of fluid.

Clutch Removal

- 1- Due to the application of epoxy on the main shaft and the clutch hub, it will be necessary to utilize S&S® clutch removal tool P/N 56-5141 to remove the hub from the mainshaft. See **Picture 24**.



Picture 24

Inspect Clutch Pack As Follows:

- 1- Measure clutch pack wear by placing entire clutch pack on a precision flat surface (frictions and steels only). Use a caliper or depth micrometer to measure the overall clutch pack height. A new clutch pack will measure 1.900 +/- .020 inch. Replace the clutch pack if the overall height is less than 1.825 inch.
- 2- Steel Plates:
 - Steel plates that are blued should be replaced as they are likely warped and distorted.
 - Plates that are grooved or worn excessively should be replaced.
 - Straw-colored and browned steel plates are still within the range of normal operation.
 - Check each steel plate for distortion by laying plates on a precision flat surface and inserting a feeler gauge between the surface and the plate in several places. Replace the clutch pack if any plates are warped more than .006 inch.
- 3- Friction Discs:
 - Clean and visually inspect both sides for worn, cracked, or damaged friction material.
 - Measure the thickness of each disc with a caliper or micrometer. If the thickness of any disc is less than .107 inch, replace the clutch pack, S&S P/N 56-5085.
- 4- Clutch Basket Inspection:
 - Rotate clutch hub in basket to check bearing for smoothness. Replace bearing if it turns rough or binds.
 - Check slots which engage the discs and plates on both the basket and hub. Replace clutch basket or hub if slots are worn or damaged.
 - Inspect primary chain sprocket and starter ring gear for damage. Replace clutch basket if either part is severely worn or damaged.
- 5- Inspect pressure plate for excessive wear, grooving, or damage at the friction surface. Replace pressure plate if cracking, grooving or excessive damage exists.

REPLACEMENT PARTS FOR S&S® HIGH PERFORMANCE CLUTCH

1. Race, Inner Bearing, 5/6 Speed Main Shaft (pkg)	56-5089	10. Nut, Flange, M10 x 1.25	50-8411
2. Washer, 1.750" OD. x .960" ID. x .207" thick	56-5099	11. Screw, Clutch Adjuster, M10 x 1.25	50-8414
3. Basket, Clutch, 36-tooth	56-5081	12. Bolt, Special, M6 x 30, w/Washer (6 Pack)	50-8413
Clutch, 37-tooth	56-5082	13. Jutter Spring with Seat	56-5110
4. Bearing, Clutch Basket to Hub	56-5102	14. Clutch Pack, 11 Fibers, 10 Steels	56-5085
5. Hub, Clutch	56-5075	15. Kit, Shim, Clutch Inner Race	56-5090
6. Washer, Thrust, 19.5 mm ID. x 35.6 mm OD.	50-8412	Shim, 5/6 Speed Main Shaft	
7. Nut, Main Shaft, Clutch Hub, 3/4-18 UNS-2B	50-8410	1.300" OD. x .960" ID. x .0075" (36 ga) thick (5 Pack)	56-5092
8. Plate, Clutch Pressure	56-5076	1.300" OD. x .960" ID. x .0150" (28 ga) thick (5 Pack)	56-5093
Hydraulic Clutch Pressure	56-5144	1.300" OD. x .960" ID. x .0240" (24 ga) thick (5 Pack)	56-5094
9. Spring, Pressure Plate, Clutch		1.300" OD. x .960" ID. x .0470" (18 ga) thick (5 Pack)	56-5095
Light Duty, 334 lbs. (6 Pack) (blue)	56-5109	16. Pinion Gear, 1994-later BT, Optional	56-1037
Standard, 370 lbs. (6 Pack)	56-5105	17. Epoxy, Fast-Cure (Not Shown)	51-9007
Heavy Duty, 468 lbs. (6 Pack) (white)	56-5106	18. Clutch Kit, (Not Shown)	
		36 tooth standard	56-5150
		37 tooth standard	56-5151
		36 tooth hydraulic	56-5152
		37 tooth hydraulic	56-5153

