



Installation Instructions: S&S® Head Bolts **for 1984-'12 Harley-Davidson® Big Twin & 1986-'12 Sportster® Models**

DISCLAIMER:

S&S parts are designed for high performance, closed course, 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 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 service manual for your motorcycle for correct disassembly and reassembly procedures for any parts that need to be removed to facilitate installation.
- Use good judgment when performing installation and operating motorcycle. Good judgment begins with a clear head. Don't let alcohol, drugs or fatigue impair your judgment. 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.

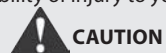
IMPORTANT NOTICE:

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 American v-twin motorcycles. S&S shall have no warranty or liability obligation if an S&S part is used in any other application.

Introduction

High performance engines often use cylinders which are longer or in some cases shorter than stock. In order to accommodate engines of different cylinder lengths without using special cylinder studs, S&S® offers different length head bolts and two different thickness head bolt washers. The combination of bolt lengths and washer thicknesses allows engine builders to compensate for different cylinder lengths as well as the difference in head thickness in 1985–'90 and 1991–later Harley-Davidson® big twin and Sportster® models. Because of smaller bolt head diameter and size of counterbore in head, S&S head bolts of correct length must be used with S&S four inch bore Super Sidewinder® engines and four inch bore street cylinder heads.



CAUTION

Using incorrect head bolts may result in head gasket failure with possible damage to cylinder head, piston, or other engine parts.



WARNING

Head gasket failure may cause substantial oil losses. Oil on tires or brakes can result in loss of control of motorcycle with serious injury to operator and others.

Procedure

1. Before installing head bolts, verify that bolt kit is correct for engine. Consult the appropriate head bolt selection chart on page 4. To use chart, find description of engine in column marked "Engine Displacement." Chart will show part # of head bolt kit to be used with most common engines if available. Chart will also show part number and length of long and short head bolts and part number and thickness of washer to be used with each head bolt.

NOTE: S&S head bolt kits may include extra washers. Only one washer should be used per head bolt.

2. S&S recommends head bolt kit 93-3013 for custom engines and cylinder lengths not included in chart. Head bolts in kit 93-3013 are longest available and can be cut to desired length because of full length internal threads.

S&S® recommends that thread engagement be .563", which is usually 1½ times stud diameter—stock studs are 7/8". See **Figure 1**. If you are uncertain about sufficient engagement, you can calculate the engagement using the formula shown below.

Add:

- A** Cylinder Length
(Gasket surface to gasket surface measurement)
- +B** Base Gasket Thickness
- +C** Head Gasket Thickness
- +D or E** Cylinder Head Thickness
(Gasket surface to head bolt washer pad measurement)
 - D** Short Side
All S&S® = 1.207"
Late 1985–'90 stock = 1.207"
1991–up = 1.405"
 - E** Long Side
All S&S = 2.700"
All Stock = 2.700"
- +F** Desired thread engagement— .563"
(Usually 1½ times stud diameter—stock studs are 7/8")

SUBTRACT:

- G** Cylinder Stud Installed Height
(Crankcase deck to top of stud measurement)

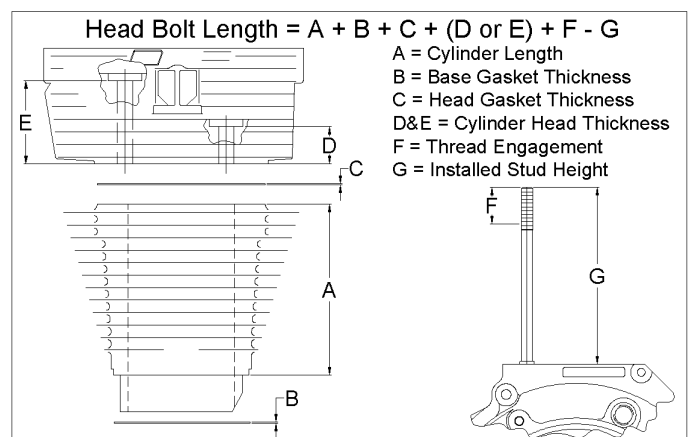


Figure 1

NOTE: Other S&S head bolt kits do not have full length threads. If these bolts are cut shorter remaining threads may be insufficient to tighten head bolt on cylinder stud.

CAUTION

In sufficient thread depth inside head bolt may result in base or head gasket failure and possible engine damage.

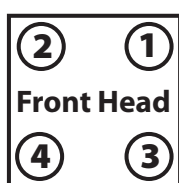
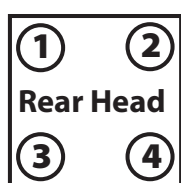
- Before final installation visually inspect studs and bolts, then carefully turn each head bolt down on its respective stud to be sure threads are clean.
- Remove head bolts and place a light film of 20W50 motor oil on head bolt threads and contact faces of head bolts and washers. Confirm that washers are correct for each head bolt according to chart.

NOTE: Proper lubrication minimizes friction to insure accurate torque values.

Incorrect tightening procedure may result in damage to head bolts or cylinder base/head gasket failure.

- Install head gaskets, cylinders, and head bolts according to manufacturer's instructions.
- If using crankcases other than S&S®, tighten head bolts according to manufacturer's specifications. If using S&S crankcases, gradually tighten head bolts according to sequence in **Figure 2**.

**Top View
Driveside**



	S&S® Crankcases	Stock Crankcases
Stage 1	8 Ft. Lbs.	7-9 Ft. Lbs.
Stage 2	18 Ft. Lbs.	12-14 Ft. Lbs.
Stage 3	Turn additional 90° or ¼ turn	Turn additional 90°

**Camside
Figure 2**

CAUTION

- Incorrect torquing sequence or torque values may damage head bolts or cause cylinder base/head gasket failure.
- Exceeding recommended torque values may pull cylinder studs out of crankcases.

- Complete top end assembly according to normal procedure. Refer to Harley-Davidson® or S&S service manual as needed.
- Upon initial start-up, quickly confirm oil pressure and check for gas and oil leaks. With minimal load on engine, ride motorcycle at low speeds until engine reaches normal operating temperature. Do not crack throttle or subject engine to heavy load during this time.

NOTE: Heat build-up should be gradual for correct gasket seal.

CAUTION

Failure to follow recommended installation and break-in procedures may damage gaskets and other engine parts.

Engine Displacement		Cylinder Head Type	Cylinder Length	Short Head Bolt Assembly Part No.	Long Head Bolt Assembly Part No.	Head Bolt Kit Part No.
1999-'12 Harley-Davidson® Big Twin	Stock 88", 95", 96", 103" Engines S&S 97, 106 Stroker & 106 Big Bore Kits	Stock H-D®	4.937"	93-3031	93-3030	93-3014
		S&S®		NA	93-3030	93-3070
	S&S® 100" Sidewinder® Kit	Stock H-D	4.850"	93-3036	93-3030	93-3014
		S&S		NA	93-3029	NA
	S&S 107" Sidewinder Kit	Stock H-D	4.975"	93-3031	93-3037	93-3012
		S&S		NA	93-3030	93-3070
	S&S 116" Sidewinder Kit	Stock H-D	5.160"	93-3038	93-3037	93-3016
		S&S		NA	93-3037	93-3071
	S&S T111 Engine or 111" Big Bore Kit	Stock H-D	4.763"	93-3027	93-3030	93-3010
		S&S		NA	93-3029	NA
	S&S T117 Engine or 117" Big Bore Kit	Stock H-D	4.888"	93-3031	93-3030	93-3014
		S&S		NA	93-3030	93-3070
1984-'99 Harley-Davidson® Big Twin	Stock 80" Engine S&S 89" Stroker Kit	S&S + Late 1985-'90 H-D	5.550"	93-3027	93-3030	93-3010
		1991-Up H-D		93-3036	93-3030	93-3014
	S&S V88 Engine or 88" Sidewinder Kit	S&S + Late 1985-'90 H-D	5.375"	93-3028	93-3029	93-3011
		1991-Up H-D		93-3027	93-3030	93-3010
	S&S V96 Engine or 96" Sidewinder Kit	S&S + Late 1985-'90 H-D	5.565"	93-3027	93-3030	93-3010
		1991-Up H-D		93-3036	93-3030	93-3014
	S&S V98 Engine or 98" Sidewinder Kit	S&S + Late 1985-'90 H-D	5.625"	93-3027	93-3030	93-3010
		1991-Up H-D		93-3031	93-3030	93-3014
	S&S V103 Engine or 103" Sidewinder Kit	S&S + Late 1985-'90 H-D	5.750"	93-3036	93-3037	93-3015
		1991-Up H-D		93-3038	93-3037	93-3016
	S&S V100 Retro Engine	S&S	4.420"	93-3028	93-3029	93-3011
	S&S V100 engine	S&S	4.745"	93-3031	93-3037	93-3012
	S&S V107 Engine	S&S	4.870"	93-3038	93-3037	93-3016
	S&S V113 Engine	S&S	4.995"	93-3032	93-3033	93-3013
	S&S V111 Engine	S&S	4.763"	NA	93-3030	93-3070
	S&S V117 Engine	S&S	4.888"	NA	93-3030	93-3070
	S&S V124 Engine	S&S	5.013"	NA	93-3033	93-3072
Harley-Davidson® Sportster® Models	Stock 883, 1100, & 1200cc	S&S + 1986-'90 H-D	4.650"	93-3027	93-3030	93-3010
		S&S 79" 3½" Big Bore Kit		93-3027	93-3030	93-3010
	S&S 89" - 3½" Big Bore Stroker Kit	S&S + 1986-'90 H-D	5.087"	93-3038	93-3033	93-3013
		1991-Up H-D		93-3032	93-3033	93-3013
	S&S SB91" Engine	S&S	4.230"	93-3028	93-3029	93-3011
	S&S SB100 Engine	S&S	4.420"	93-3028	93-3029	93-3011