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Installation Instructions for TÜV Long Block Assembly

Safe Installation and Operation Rules:

Before installing your new S&S engine it is your responsibility to read and follow the installation 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 compressed air is used during installation, be particularly careful. Compressed air and particles dislodged by compressed air are harmful to eyes and body. Wear protective goggles, and always direct air stream away from body parts such as hands and eyes and other people near you.
- When using solvents, degreasers and other chemicals during cleaning and installation, read manufacturer's instruction label for proper use. Exposure of some chemicals to skin, eyes and/or other body parts may be harmful. Many items are flammable and present a fire hazard. Use in well ventilated area and wear protective clothing when using them to avoid personal injury.
- 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 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.
- Consult an appropriate authorized H-D service manual for correct disassembly and reassembly procedures for any parts other than those outlined in these instructions.
- 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.
- Be sure all fuel lines, supply and overflow, are routed correctly and fuel line clamps are in place and tightened. Lines must not contact exhaust pipes or other extremely hot surfaces where they could melt or leak and catch fire.
- Before starting engine and riding motorcycle, be sure throttle opens and closes smoothly. Turn handlebars to left and test throttle. Then, turn bars to right and test throttle. To avoid possible loss of control of motorcycle and potential personal injury to yourself or others due to throttle sticking in open position, throttle must work smoothly and return to a fully closed position when hand is removed from throttle grip.
- 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 engine or motorcycle.

NOTE

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

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

IMPORTANT NOTE: Read Carefully

S&S engines are designed for high-performance applications. The installation of an S&S engine may void or adversely affect your vehicle warranty.

This kit, comprised of compatible S&S high-performance engine parts has been approved by Technischer Überwachungs Verein (TÜV) for sale in the European Union (EU). The TÜV approved V² Style Long Blocks have been certified to meet all current emissions standards for exhaust, noise, and electronic interference. In order to be compliant with TÜV standards, Long Blocks are furnished complete and assembled by S&S engine builders. As a result, this kit can be legally installed as a stock replacement for all applicable used and new Harley-Davidson motorcycles. Any deviation, substitution of other S&S parts or parts from another manufacturer for an S&S part included in the certified kit, or unauthorized modification of a part or parts included in the certified kit may void the engine warranty or violate pollution laws.

It is the sole and exclusive responsibility of the user to determine the suitability of the product for his or her use. Be advised that the user shall assume all legal responsibility for personal liability and liability for others, as well as all other obligations, duties and risks associated with the installation and use of high-performance parts.

The words Harley, Harley-Davidson, H-D, Big twin, 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.

PRESENT S&S CRANKCASES AND FLYWHEELS ARE NOT COMPATIBLE WITH HARLEY-DAVIDSON ELECTRONIC FUEL INJECTION (EFI) MODELS.

S&S TÜV Long Block Instruction Guidelines

- I. S&S Long Blocks include instruction sheets for individual components. Most instructions apply to all S&S Long Blocks. In the following instances, however, components or procedures supplied with and described for TÜV Long Blocks are different from those for other S&S Long Blocks.
 - A. Some S&S Long Blocks may be configured to allow crankcase pressure to exit via the crankcase and/or cylinder head vents. TÜV Long blocks must utilize cylinder head venting only.
 - B. The special carbon air cleaner element supplied with TÜV Long Blocks was designed for superior flow and efficiency. The element reduces intake noise emissions, as well as prevents fuel vapors from entering the atmosphere while the engine is shut off, and therefore, must be used. Filter service requirements are described in the TÜV Engine Owner's Manual.
 - C. The camshaft supplied in TÜV Long Blocks is of proprietary S&S design and reduces exhaust emissions. Substitution of a cam with different specifications is not permitted under TÜV standards.
 - D. The carburetor supplied with TÜV Long Blocks is not to be adjusted. For service requirements, contact S&S Cycle Technical Services, 608-627-1497. The tuning instructions described in S&S Carburetor Instruction Sheet No. 400 do not apply to carburetors supplied with TÜV Long Blocks. Refer to the S&S TÜV Long Block Owner's Manual for proper setting of idle speed.
 - E. The OEM Harley-Davidson ignition system is to be replaced with one of the following aftermarket ignition systems: Compu-Fire Elite 1, Dualfire (Complete Kit P/N: 10880, Module P/N: 21832-5); Crane Hi-4, Dualfire (Module P/N 8-1100); or Dyna "S" Single-fire (Complete Kit P/N: DSK6-2, Module P/N: DS6-2). Ignition system should be adjusted as per manufacturer's instructions. VOES switch is not to be used.
 - F. The OEM Harley-Davidson exhaust system must be used.
 - G. On all models, rear wheel drive pulley must be replaced with a 61-tooth pulley. Stock Harley-Davidson 32-tooth transmission pulley must be used for a 1:1.90625 ratio.
 - H. TÜV Long blocks are equipped with special intake restrictor devices for the purpose of emissions compliance. To maintain compliance with TÜV regulations, these devices must not be removed.

This S&S replacement engine has been manufactured, assembled, and calibrated by S&S Cycle, Inc. Before proceeding further, verify that this engine has the exact set of options required for your motorcycle. Installing an S&S replacement engine into a Harley-Davidson motorcycle requires specialized knowledge, skills, and tools. For this reason installation should be left to a professional mechanic.

WARNING - Improper installation of engine or related components could result in injury or death to the operator and/or passenger and damage to the motorcycle.

Installation

1. Remove the original engine according to the applicable Harley-Davidson (H-D) Service Manual.
2. Install the S&S engine into the motorcycle chassis according to the H-D Service Manual, but do not install the fuel tank until last.
3. Install the ignition module, ignition coil, and wiring according to the H-D Service Manual and applicable Ignition Installation Instructions.

4. Install Oil Lines
 - A. First flush the oil tank and lines and install a new oil filter.
 - B. Clamp off one end of the oil feed line and connect the opposite end to the oil tank.
 - C. Fill the oil tank with oil of the type and grade recommended in the S&S TÜV Engine Owner's Manual.
 - D. Unclamp the feed line to allow the line to fill with oil, then quickly attach it to the correct fitting (marked "S") on the oil pump. The oil pump was primed at the factory so no further priming should be necessary. It is imperative, however, to confirm that oil is circulating properly prior to operating the motorcycle.

CAUTION - Lack of oil circulation through the engine will cause damage to the internal engine components.

5. Remove both spark plugs.
6. Remove the oil return line from the oil tank and place the end in a container.
7. Using the starter, turn the engine several rotations. Oil should come out the return line. If not, repeat the procedure as needed.
8. Reconnect the return line to the oil tank and install the spark plugs.

Throttle Requirements

S&S Super E & G carburetors are designed exclusively for Harley-Davidson Big Twin and Sportster engines. The carburetors included with TÜV Long Blocks are butterfly type carbs with a preset idle mixture screw and preset midrange and high speed jets. The carbs also feature an accelerator pump and a variable fast idle device for improved throttle response, engine starting and warm ups. The Super E has a 1½" (47.6mm) bore at the butterfly and a 1⅞" (39.6mm) venturi. The Super G has a 2⅞" (52.3mm) bore at the butterfly and a 1¼" (44.5mm) venturi.

NOTE - S&S Super E & G carburetors require the use of a two cable, pull open - pull closed throttle assembly. All 1980 and earlier stock H-D models equipped with a single cable throttle mechanism must be converted to the two cable, pull open - pull closed type. S&S offers these throttle assemblies but does not include them because of the multitude of chassis designs and installation requirements.

WARNING - Single, braided wire cable throttle mechanisms cannot mechanically close throttle. If throttle inadvertently sticks in open position, loss of control of motorcycle and personal injury to you or others may result.

All stock chassis 1980 and earlier and any other motorcycle equipped with single cable throttle system must be converted to a two cable system. Kits with 36" (91cm), 39" (99cm), 42" (107cm), 48" (122cm), or 52" (132cm) length cables are available. Throttle assembly kits may be ordered separately. See descriptions below.

Stock models from 1981 to 1989 have a two cable throttle system designed for a butterfly type carburetor. Existing cable fittings on these models can simply be "plugged in" to the S&S Super E or G throttle linkage.

Throttle cables on 1990 and later models or any motorcycle fitted with a constant velocity (CV) carb will not work with S&S Super E or G carbs. The braided wire inner cables of throttle cables designed for constant velocity carbs are about 1-1/2" (38mm) longer than those designed for butterfly carbs, resulting in excessive free play. Throttle cables on these models must be changed to throttle cables designed for butterfly carbs. Throttle cables on 1981 to 1989 models will directly

replace cables in stock 1990 to 1995 throttle grips. Throttle grips for 1996 and later require a different style cable available from S&S. (See Step 1 - Throttle Preparations). Throttle cables may be ordered separately if needed. See S&S Throttle Cable Application Chart below.

Optional S&S Two Cable Throttle Conversion Kits for Chassis Not Equipped with Two Cable Throttle

Kits fit 1" (25.4mm) O.D. handlebars and can be used on most chassis. An adapter sleeve is available for use with earlier handlebars having 7/8" (22.2mm) ends. Fittings on provided cables readily "plug in" to S&S Super E, G, or stock H-D 1981 and later butterfly type carburetors. Kits include one opening and one closing side cable, left and right handlebar grips, and handlebar clamps.

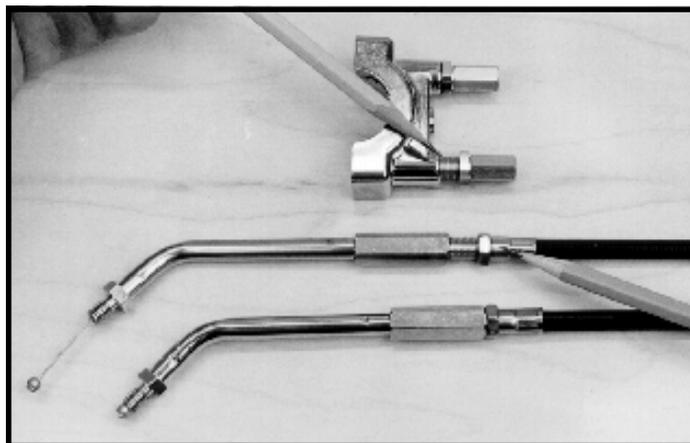
- Throttle kit with 36" (91cm) cables Part #19-0450
- Throttle kit with 39" (99cm) cables Part #19-0448
- Throttle kit with 42" (107cm) cables Part #19-0482
- Throttle kit with 48" (122cm) cables Part #19-0449
- Throttle kit with 52" (132cm) cables Part #19-0483
- 7/8" to 1" (22.2 to 25.4mm) Adapter sleeve Part #19-0235

NOTE - 1981 to 1990 OEM style cables are also replacement cables for throttle kits above.

WARNINGS - Gasoline is extremely flammable and explosive under certain conditions. Do not smoke or expose gasoline to sparks or open flame. Gasoline fumes are toxic when breathed. Perform installation in a well ventilated area away from open flames or sparks. Unwarranted sparks and inadvertent engagement of starter while working on electrical components can cause personal injury.

Throttle Installation

5. Throttle/cables
 - A. Install new throttle assembly (motorcycles not equipped with two cable pull open - pull closed type throttle assembly).
 1. Remove existing throttle cables and throttle grip assembly. Note routing of stock cables.
 2. Install new throttle assembly and cables. Position grip and cables similar to stock position so cables can be angled towards carb for easy adjustment and free operation.
 3. Apply light coat of clean cable lubricant to cables and fittings.

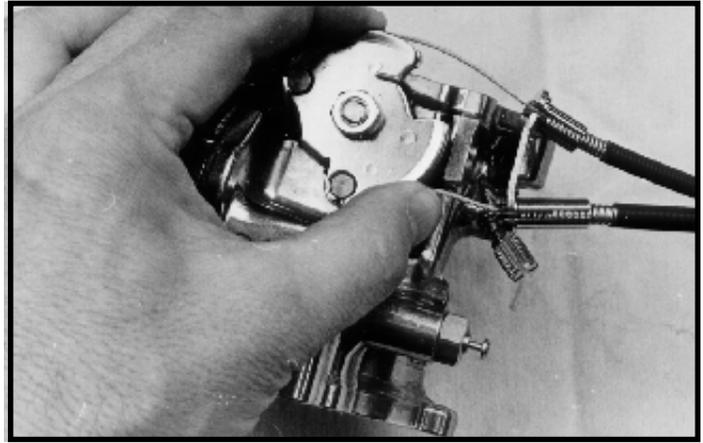


Picture 1

4. Loosen cable adjustment locknuts and turn adjusting screw so half of threads are exposed. See **Picture 1**.
- B. Prepare existing throttle assembly (1981-1989 chassis equipped with butterfly type carb and two cable pull open - pull closed type throttle assembly).
 1. Loosen cable freeplay adjustment locknuts and turn adjusting screw so half of threads are exposed. See **Picture 1**.
 2. Clean grease and dirt off cables, cable housings and cable fittings
 3. Apply light coat of clean cable lubricant to cables and fittings.
- C. Replace throttle cables (all models equipped with constant velocity (CV) type carb)
 1. Remove existing cables noting how they are routed.
 2. Install replacement cables using same routing as stock cables.
 3. Loosen cable freeplay adjustment locknuts and turn adjusting screw so half of threads are exposed. See **Picture 1**.
 4. Apply light coat of clean cable lubricant to cables and fittings.
6. Throttle/Cable Assembly
 - A. Install throttle cables on carburetor.
 1. Remove throttle cable housing bracket, part #11-2339, from carb body.

S&S THROTTLE CABLE APPLICATION CHART				
Length Total Housing	Length Vinyl Housing	Part Number Open Side	Part Number Close Side	Fitment
36" (91cm)	32" (81cm)	#19-0430	#19-0431	For Buell with 7/8" (22.2mm) handlebars
36" (91cm)	32" (81cm)	#19-0432	#19-0433	To '95 '81-'85 FX and FL; All '81-'85 XL (Also pre-'81 w/2-cable throttle housing replaced.)
36" (91cm)	32" (81cm)	#19-0436	#19-0437	For Buell with 1" (25.4mm) diameter handlebar '96-Up 883-1200 XL
39" (99cm)	35" (89cm)	#19-0434	#19-0435	To '95 Softail (FXSTC, FXST, FLSTC, FLSTF) '86-'94 FXR, '93-'95 Dyna
39" (99cm)	35" (89cm)	#19-0438	#19-0439	'96-Up Softail (FXSTS, FXSTC, FLSTC, FLSTF) '96-Up Dyna
42" (107cm)	38" (97cm)	#19-0446	#19-0447	To '95 custom application
42" (107cm)	38" (97cm)	#19-0440	#19-0441	'96-Up custom application
48" (122cm)	44" (112cm)	#19-0462	#19-0463	To '95 All FLT Models
48" (122cm)	44" (112cm)	#19-0464	#19-0465	'96-Up All FLT Models
52" (132cm)	48" (122cm)	#19-0444	#19-0445	To '95 custom application
52" (132cm)	48" (122cm)	#19-0442	#19-0443	'96-Up custom application

2. Install opening side throttle cable barrel fitting and throttle cable in throttle linkage and appropriate side of throttle cable housing bracket. Opening side cable housing outside diameter is smaller and measures .190" (4.826mm).
 3. Repeat step 2 for closing side throttle cable. Closing side cable has a spring around inner cable wire. **See Picture 2.**
 4. Reinstall throttle cable housing bracket on carburetor.
- B. Turn throttle cable adjusters to remove excessive freeplay. Test throttle to be sure it opens and closes freely; throttle should snap shut when released. Turn handlebars to extreme left and open and close throttle, then turn bars to extreme right and repeat. If throttle binds, loosen cable adjusters to put more freeplay in cables. Tighten adjusting screw locknuts after final adjustments are made.



Picture 2

NOTE - Throttle grip assembly must be assembled correctly and work freely to prevent possible sticking during operation. Cable routing must be free of tight bends to minimize cable to cable housing friction. Throttle must not bind and must snap shut to fully closed position when released.

WARNING - Incorrect cable adjustment may cause throttle to stick open, causing loss of control of motorcycle, serious injury or death.

- C. Slip hose clamp over end of fuel line with 90° bend. Apply thin coating of oil to fuel inlet fitting on carburetor and slip end of fuel line with 90° bend over fitting. Position fuel line in such a way as to avoid contact with hot cylinders or other engine parts. Tighten hose clamp. Slip protective fuel line covering over fuel line and position to prevent direct contact between fuel line and cylinders or other engine parts. Connect fuel line to gas tank petcock using hose clamp provided.

CAUTION - Engines vented through heads must not have breather bosses plugged as oil leakage and damage may occur.

WARNING - Fuel line must be clamped securely and not contact any hot surfaces such as exhaust pipes where it could melt or catch fire, causing serious injury or death.

7. Final assembly and checks.
 - A. Connect vacuum petcock hose if equipped.
 - B. Check fuel line routing and connections.
 - C. Test throttle to be sure it opens and closes freely. Turn handlebars to extreme left and open and close throttle, then turn bars to extreme right. Throttle must snap closed in all positions.
 - D. Reassemble any remaining components.
 - E. Check fuel inlet fitting and fuel line connections for leaks.

NOTE - Fuel needle and seat assembly must completely shut off fuel supply entering bowl. Fuel inlet fittings and fuel line connections must not leak.

CAUTION - Gasoline leaking past inlet needle may flood engine causing fire hazard or damage to components.

WARNING - Gasoline leaks at inlet o-rings, fuel line connections, or inlet needle may flood engine and overflow into surrounding area creating fire hazard.

- F. Fill gas tank.

- G. See S&S TÜV Long Block Owner's Manual for engine starting instructions.

8. Troubleshooting Tips

- A. Engine will not start:
1. Fuel tank empty or petcock in closed position.
 2. Weak or no spark - discharged battery, damaged ignition module or coil.
 3. Spark plug gap too wide.
 4. Improper ignition timing.
- B. Engine will not run at steady speed or rpm:
1. Restriction in fuel supply system - gas tank vent plugged, needle and seat not working properly.
 2. Faulty ignition system - fouled plugs, defective coil or electronic module, improper ignition timing.

NOTE - Bowl vent hole passageway leads to cavity above fuel in bowl and is designed to equalize bowl pressure and atmospheric pressure. If high or low bowl pressure relative to atmospheric pressure develops, engine may run erratically.

GENERAL INFORMATION NOTES:

- Carburetor body has six drilled passages that are permanently sealed with drive plugs.

CAUTION - Removal of these plugs may cause irreversible damage to carburetor not covered under warranty.

- When motorcycle is not running, the petcock should always be turned off to prevent possible fuel leakage past needle and seat.
- Throttle plate, part #11-2055 or #11-2355, and throttle shaft, part #11-2383 or #11-2483, should be checked annually for signs of wear and replaced if necessary. If carb body throttle shaft bushings are worn, carb must be returned to S&S for repair. If throttle plate is removed, be sure to reinstall it correctly. Beveled edges of plate must fit flat against inside of carb bore.
- If accelerator pump cap is removed, lift cap slowly so small spring, part #11-2374, checkballs, part #11-2272, and o-rings part #11-2371 are not lost.

CONCLUSION

Complete remainder of installation according to the applicable H-D Service Manual. Refer to the S&S TÜV Long Block Owner's Manual for important information on breaking in the engine.

CAUTION - Failure to break in engine according to correct procedure may result in serious damage to engine not repairable under warranty.