**Instruction 510-0378**
**08-04-15**


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# Installation and Tuning Instructions For S&S® Super D Carburetor Kit #110-0119 For S&S T143 Engines For 1999-2006 Harley-Davidson® Big Twins

**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**

The Super D carburetor was designed for racing applications and should be considered a custom installation. A certain amount of fabrication and engineering will be required to adapt this performance carburetor to your motorcycle. It is delivered in a state of basic tune to help you start the motorcycle after installation, but final tuning to match your bike will be required. If you do not feel comfortable with the steps required in this installation, please visit www.sscycle.com or call the S&S® Tech Line at (608) 627-TECH for a recommended shop in your area.

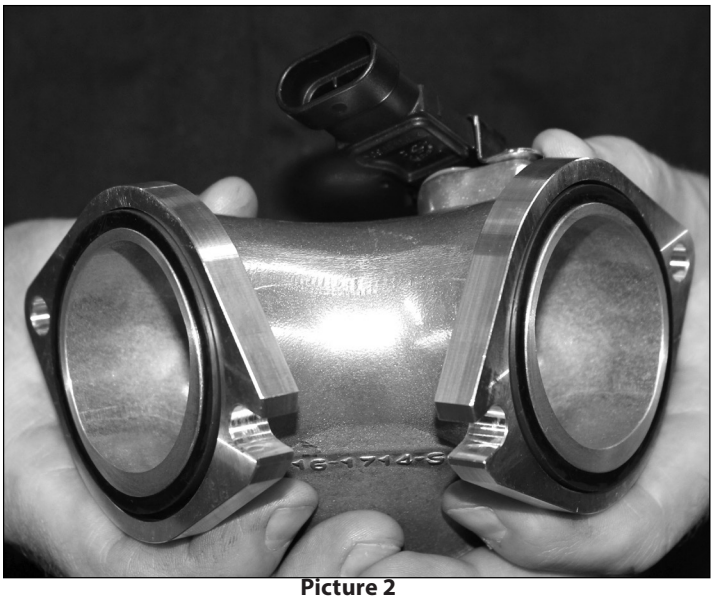
Your S&S Super D carburetor is designed exclusively for large displacement big twin engines. It is a butterfly carb with a fully djustable idle mixture screw with replaceable mid range and high speed jets. Additionally, it has a tuneable air bleed circuit. It doesn't have an accelerator pump or a conventional choke, instead it utilizes a mixture enrichment device for starting.

**Manifold Installation**

1. Install MAP sensor on manifold

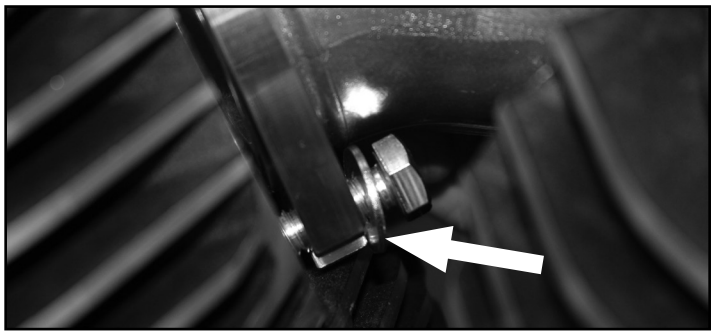
**Picture 1**

2. Secure MAP sensor with the hold down bracket and screw. Use blue thread locker and torque to 18 in-lb. See **Picture 1.**



**Picture 2**

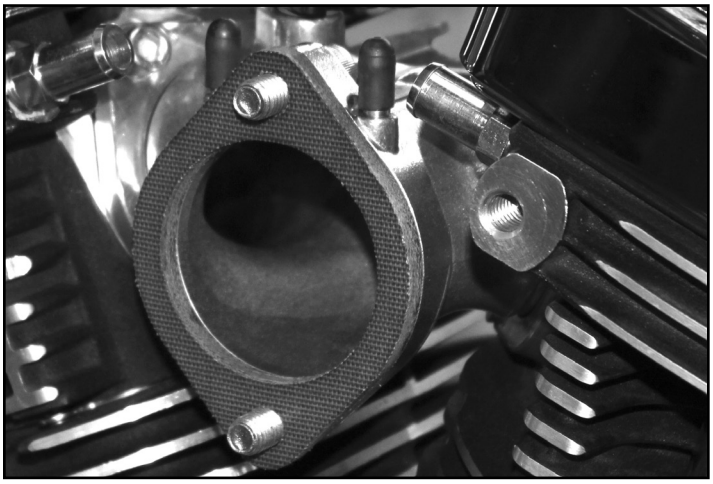
3. Install 5⁄16-18 x 1" Hex head bolts and washers into the lower manifold bolt holes in front and rear cylinder heads.
4. Install flanges and seals on manifold. The flange goes on the manifold first followed by the seal. The slotted ends of the flanges go towards the bottom of the manifold. Flanges are marked front and rear. See **Picture 2**.



**Picture 3**

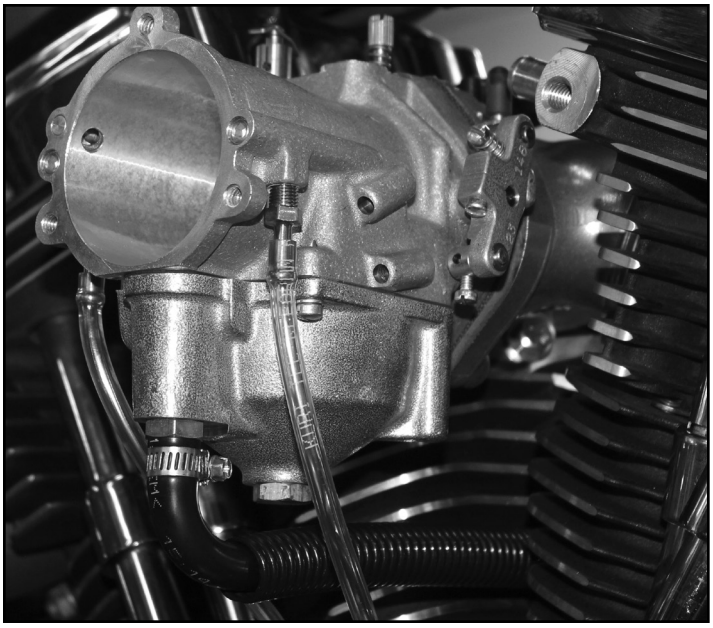
5. Slide the manifold and flanges into place ensuring that the slotted end of the manifold goes onto the bolts behind the washers. See **Picture 3**.
6. Install the two 5⁄16-18 x 1" SHC screws into the upper manifold flange holes. Do not tighten the manifold bolts at this time. The bolts should be left loose enough that the manifold can be moved up and down slightly.

**Carburetor Installation**



**Picture 4**

1. Install the two 3⁄8-16x 1 1⁄4" SHC screws through the manifold and insulator block. The o-ring in the insulator block goes toward the manifold See **Picture 4**
2. Using a long 3⁄8" Allen driver, install the carb to the manifold. Torque to 10-12 ft-lb.
3. Install fuel line and fuel line protective cover with the supplied hose clamps. **See Picture** 5.
4. Bowl Vents
   a. If S&S air cleaner is to be used, place bowl vent plugs in external threaded holes in bottom of carb body.
   b. If air horn or non S&S air cleaner is to be used, place the bowl vent plugs in the threaded holes in the air cleaner mounting surface of the carburetor, and leave the bottom vent holes open.



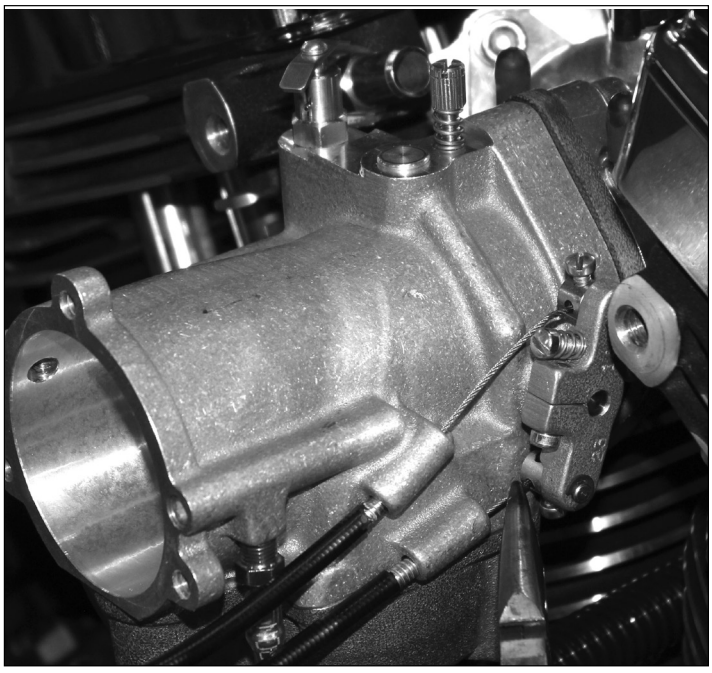
**Picture 5**

c. Optional – when using bottom bowl vent holes, install hose barb fittings in bottom bowl vent holes, attached clear hose supplied, and route the hose to a dead air space. See **Picture 5**.

**Install throttle cables.**

*NOTE - Custom throttle cables are required to install the Super D carburetor. One option is to modify S&S throttle cables 19-0464 and 19-0465 as outlined below.*

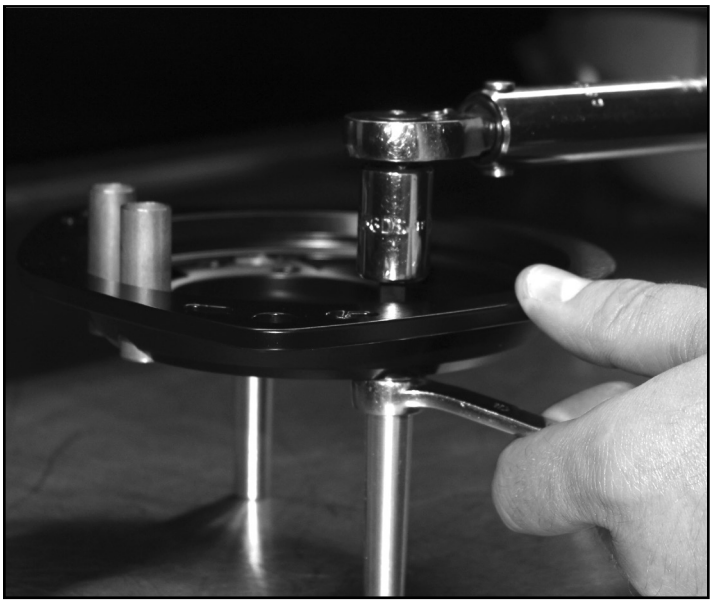
1. Cut the ball ends off of S&S Throttle cables 19-0464 and 19-0465.
2. Remove the brass ends from both outer cable housings. You may have to grind them to release them from the housing
3. Cut .700" from the end of both cable housings.
4. Shorten the opening side cable #19-0464 by .750"
5. Solder both cable ends to prevent fraying.
6. Grind the ends of the cable housings from .190" to .180" for .700", to allow them to slide into cable guide on carburetor.
7. Install cables in the throttle control.
8. Insert opening side cable through top cable guide and secure to the throttle arm with the attached cable clamp.
9. Insert the closing side cable through the bottom cable guide and secure the cable to the throttle arm with the attached cable clamp. See **Picture 6**.
10. Adjust throttle cables to remove excess free play. Make sure there is enough slack in the cables that there is no binding and the throttle snaps back to the closed position when the throttle is released.



**Picture 6**

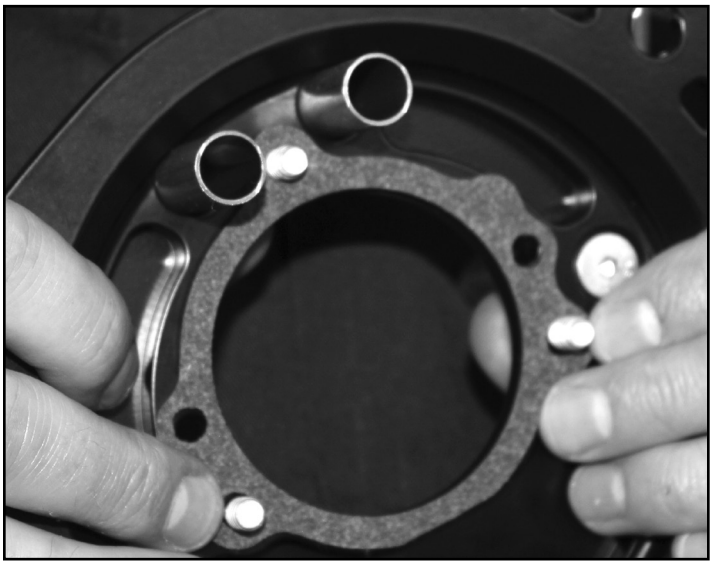
**Install Air Cleaner**

1. Mount the air filter stand offs to the air cleaner back plate with the two ¼"-20 x ¾" screws. Hex end goes toward the back plate. See **Picture 7**. Use blue Loctite and torque to 72 in-lb.



**Picture 7**

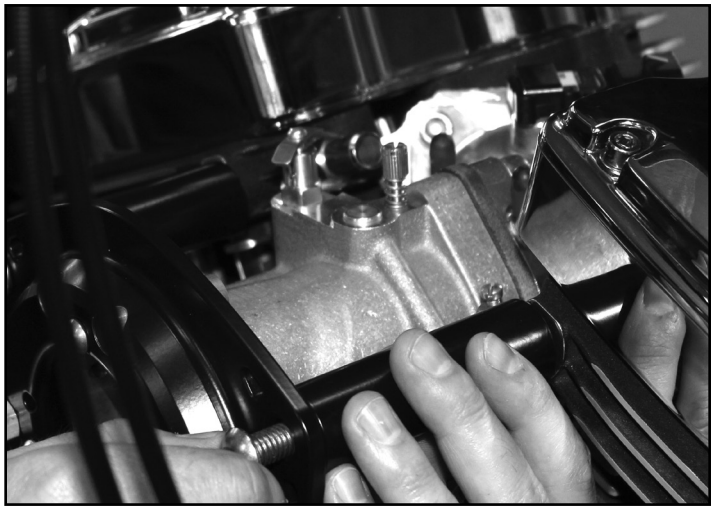
2. Thread the three ¼"-20 x .825" backplate screws through the back plate.
3. Place the intake gasket over the screws and apply blue thread locker to the screw threads. See **Picture 8**



**Picture 8**

4. Install the back plate onto the carb. Leave the three screws slightly loose at this time

5. Place the spacers between the back plate and cylinder head and install the ⅜-16 x 4" button head cap screws through the back plate and spacer into the cylinder head. Use blue thread locker and torque to 10-12 ft-lb. See **Picture 9**.



**Picture 9**

6. Torque the three back plate screws to 72 in-lb

7. Tighten the four manifold flange bolts to 10-12 ft-lb.

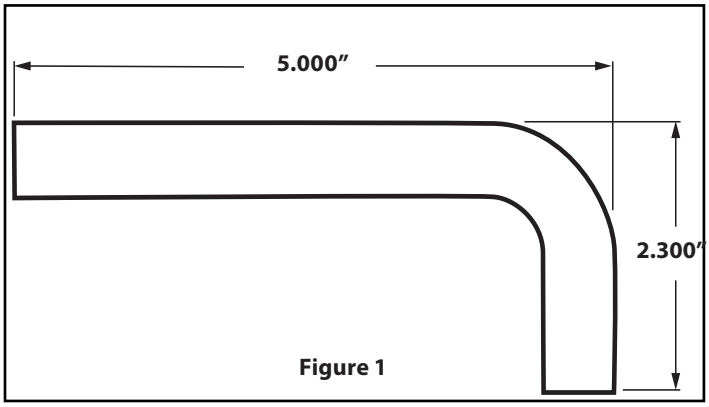
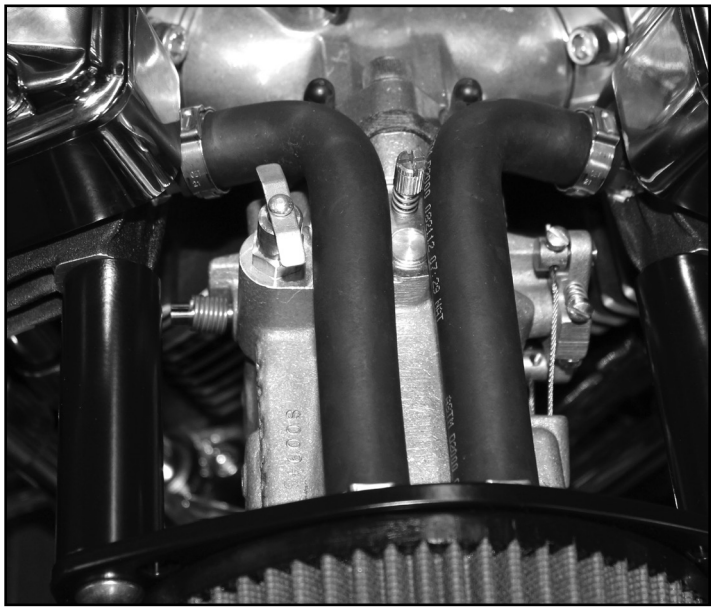



**Figure 1**



**Picture 10**

8. Cut the two breather hoses to length. See **Figure 1**.

9. Install the front and rear breather hoses with the supplied hose clamps. Use crimping tool to tighten clamps when correctly positioned. See **Picture 10**.

10. Locate the filter, plastic filter top plate and the two ¼" X 20 flanged head fasteners..

11. Apply a drop of blue thread locker to the threads of each ¼" X 20 flanged head screw and set aside.

12. Hold the filter on the backplate and put the filter top plate on top of the filter making sure that the word "Down" is facing down and sitting flat on the filter and locked into the groove.

13. Pass the ¼" X 20 flanged head screws through the plastic top filter plate, thread in and tighten down evenly until snug.

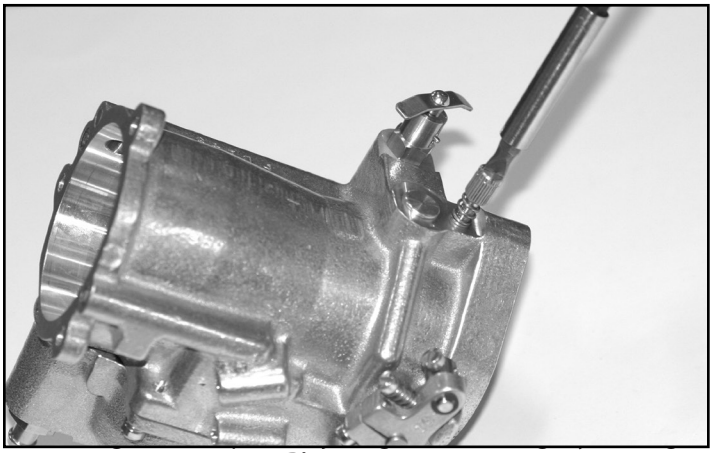
14. Finish torque to 72 in.-lbs.

15. Air filter can be run as is, or a stock or S&S air cleaner cover may be installed using the 5⁄16" button head cap screw in the center of the top cover.

**Idle Speed And Mixture Settings For Start Up**

1. Set idle mixture screw setting by turning it clockwise until it is fully closed. Now open the screw (turn counter-clockwise) 1½ turns. See **Picture 12**.

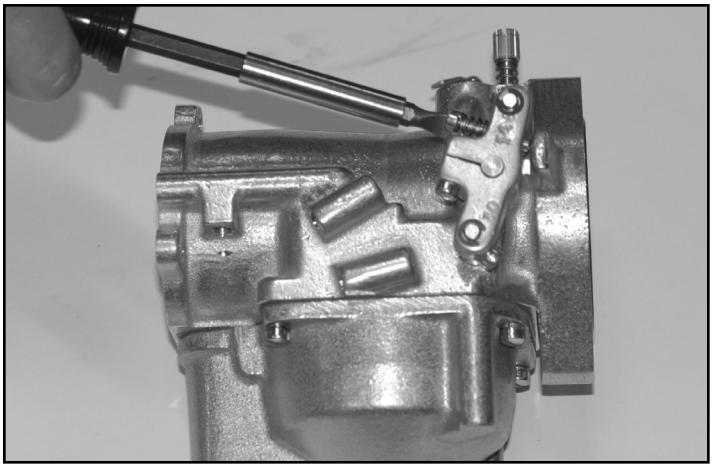
Use caution closing the idle mixture screw; using too much force can cause permanent damage to the carburetor body.



**Picture 12**

**⚠ CAUTION ⚠**

counterclockwise until there is no contact with carburetor body. Next, turn it clockwise until it makes contact again, and turn an additional ½ turn to open throttle plate slightly. See **Picture 13.**

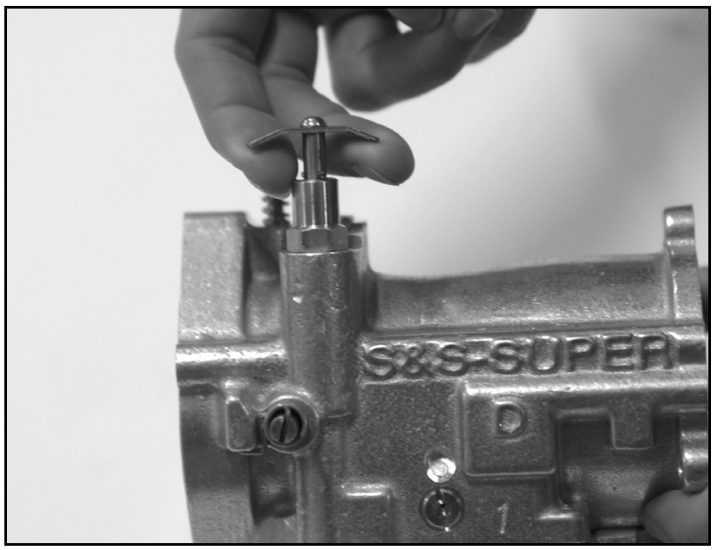


**Picture 13**

**Carb Operation**

This carburetor does not have a conventional choke. Instead, a mixture enrichment device that uses utilizes separate air and fuel pickup passageways aides in starting.

This device is engaged by raising the lever on top left side of carburetor




**Picture 14**

and rotating it to position. See **Picture 14**.

*NOTE: The enrichment pickup tube that is located directly below the fast idle plunger is pressed into carburetor body and must not be removed.*

**⚠ CAUTION ⚠**

**Removal of enrichment/fast idle pickup tube from the carburetor body may alter its hole size in the main body and cause irreversible damage to carburetor.**

**Cold Start**

1. Open fuel supply valve.
2. Pull enrichment device handle up.
3. Turn on ignition.
4. With throttle closed or just slightly open, press starter button, cranking for no more than 5 seconds at a time.
5. If engine fails to start immediately, slowly open throttle enough to slightly open the butterfly and crank starter until engine fires.
6. Once the engine starts leave the enrichment device on until engine has warmed. If you feel it is necessary, open throttle slightly to keep the engine running.

**Hot Start**

1. Open fuel petcock.
2. Turn on ignition.
3. With throttle closed engage electric starter.
4. If engine fails to start immediately, open throttle slightly and continue to engage starter until the engine fires.

**Adjusting The Idle Circuit**

The idle mixture screw regulates the air/fuel mixture at idle speeds and works in conjunction with the throttle stop/engine rpm adjustment screw that is located on the throttle arm. Your Super D carb is delivered with settings that should work for initial start-up, but will require adjustment and tuning specific to your motorcycle.

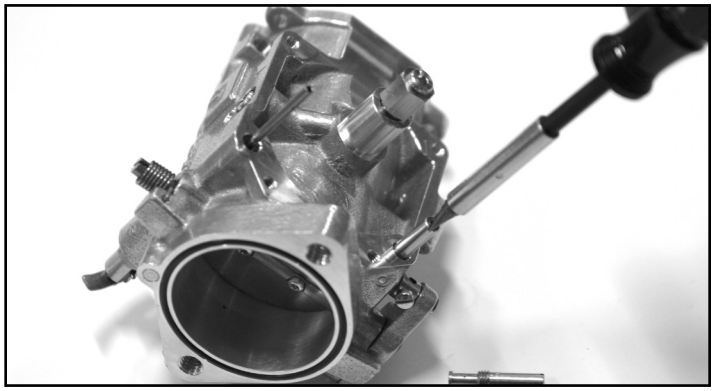
1. Start engine and let it run for a few minutes until it is at operating temperature.
2. Initially adjust engine rpm to idle to approximately 950-1000 rpm.
3. Turn the idle mixture screw clockwise--to lean the mixture--until the engine starts to die. Now turn the screw counterclockwise--richening the mixture--until the engine starts to die. Keep track of the difference in position between the two points and turn it back to the mid-point.

*NOTE: Whenever intermediate jet change is made, idle mixture screw must be readjusted.*

**Intermediate Circuit**

The intermediate range is used in most normal riding conditions, beginning right off idle and going up until 3000-3500 rpm depending on the gearing in your motorcycle. For that reason, you must pay close attention to jetting your intermediate circuit to achieve optimum performance and best gas mileage. You can access the intermediate jet by removing the float bowl assembly. See **Picture 15**.

The actual intermediate jet size installed in your carburetor is indicated on a tag attached or labeled on the box. Keep this information handy for future reference.



**Picture 15**

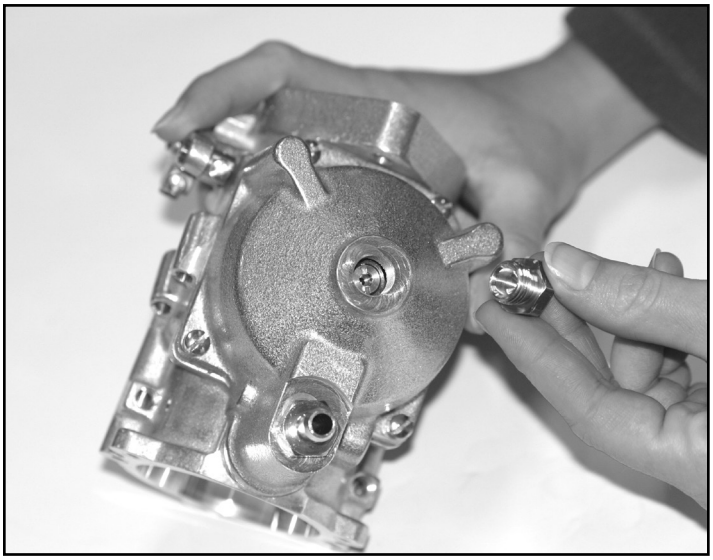
1. Run the bike long enough for the engine and oil to reach normal operating temperature.
2. Verify idle mixture settings again.
3. Go on a road test to check carburetion characteristics. Maintain a steady speed of 30-, 40- and 50-mph. Once you set your speed, if you feel or hear popping or backfiring in the aircleaner, the bike is

too lean. Correct this by installing the next larger jet size in the kit.

4. If the bike accelerates sluggishly or you notice black smoke from the exhaust, the jetting is too rich. Correct this by installing the next smaller size jet in the kit.
5. Repeat the road test procedure. The smallest intermediate jet that eliminates the popping and provides the best throttle response should also provide the best fuel economy.
6. Readjust idle circuit as necessary.

**Main Jet/High Speed Circuit**

The high speed circuit—controlled by the main jet--begins around 3000-3500 rpm or 55-60 mph and runs to your motorcycle's maximum speed. You can access the main jet by removing the float bowl plug. See **Picture 16**.



**Picture 16**

The actual main jet size installed in your carburetor is indicated on a tag attached or labeled on the box. Keep this information handy for future reference.

Optimum main jet size is best determined at a drag strip because maximum miles per hour and rpm are the best indicators of the actual horsepower your engine is developing. A dyno will help you get a good baseline, but the drag strip will assure you the best performance of your racing carburetor.

*NOTE: S&S® has a special main jet tool, PN 53-0452, which is perfect for this operation.*

**Dragstrip Procedure**

1. Warm up engine enough to make a pass.
2. Make a run noting engine rpm and top speed.
3. Richen main jet size .004 larger and make a second run. Again, note rpm and final speed.
4. Continue procedure until top speed starts to fall off.
5. Lean main jet size by .002 to gain the best performance from the last pass. When you are making runs, do not be concerned with elapsed time, rather with consistent miles per hour.

**Street Procedure**

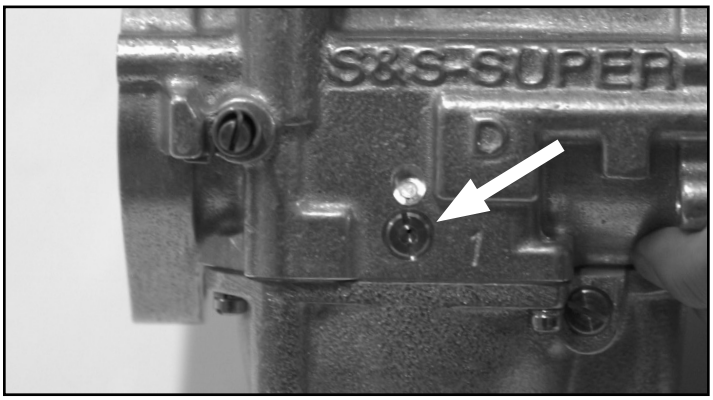
S&S uses what we call the RPMing method to determine your correct main jet size on the street. By performing hard acceleration tests, noting rpm at which power starts to fall off and a gear change is necessary, you will determine what jet offers the best performance.

1. Warm engine to operating temperature.
2. Accelerate rapidly through the gears noting how quickly--and smoothly—your engine reaches an rpm level where power starts to fall off and a gear change becomes necessary.
3. If the engine backfires in carburetor, breaks up or dies during acceleration, richen the main jet size .004 larger and road test it again.
4. If engine runs sluggish or will not take throttle, lean the main jet size by .004 smaller and road test again.
5. Note your engine's smoothness and how easily it accelerates to shift points.
6. Determine the best jet size by matching up acceleration feel to an rpm level that continues to produce power as you change into the next gear.

**Adjustable Air Bleed**

The main air bleed passage in an S&S Super D carburetor is equipped with a .040" jet. See **Picture 17**. By changing the jet size you can fine tune the transition from intermediate circuit to the main jet to compensate for the midrange problems with certain exhaust systems.

Changing the air bleed jet should only be done after you are absolutely sure that you cannot tune a rideability problem out by changing the intermediate and main jets.




**Picture 17**

**Typical Jetting**

Although your final jetting will depend an a number of factors, such as exhaust and altitude, the chart below shows a typical starting point for jetting the T143.

| Engine | Intermediate | Main | Air Bleed |
|---|---|---|---|
| T143 | .033" | .098" | .060 |
| *NOTE: A number of racing combinations have required the use of up to a .120" Air Bleed.* | | | |

***NOTES: General Information***

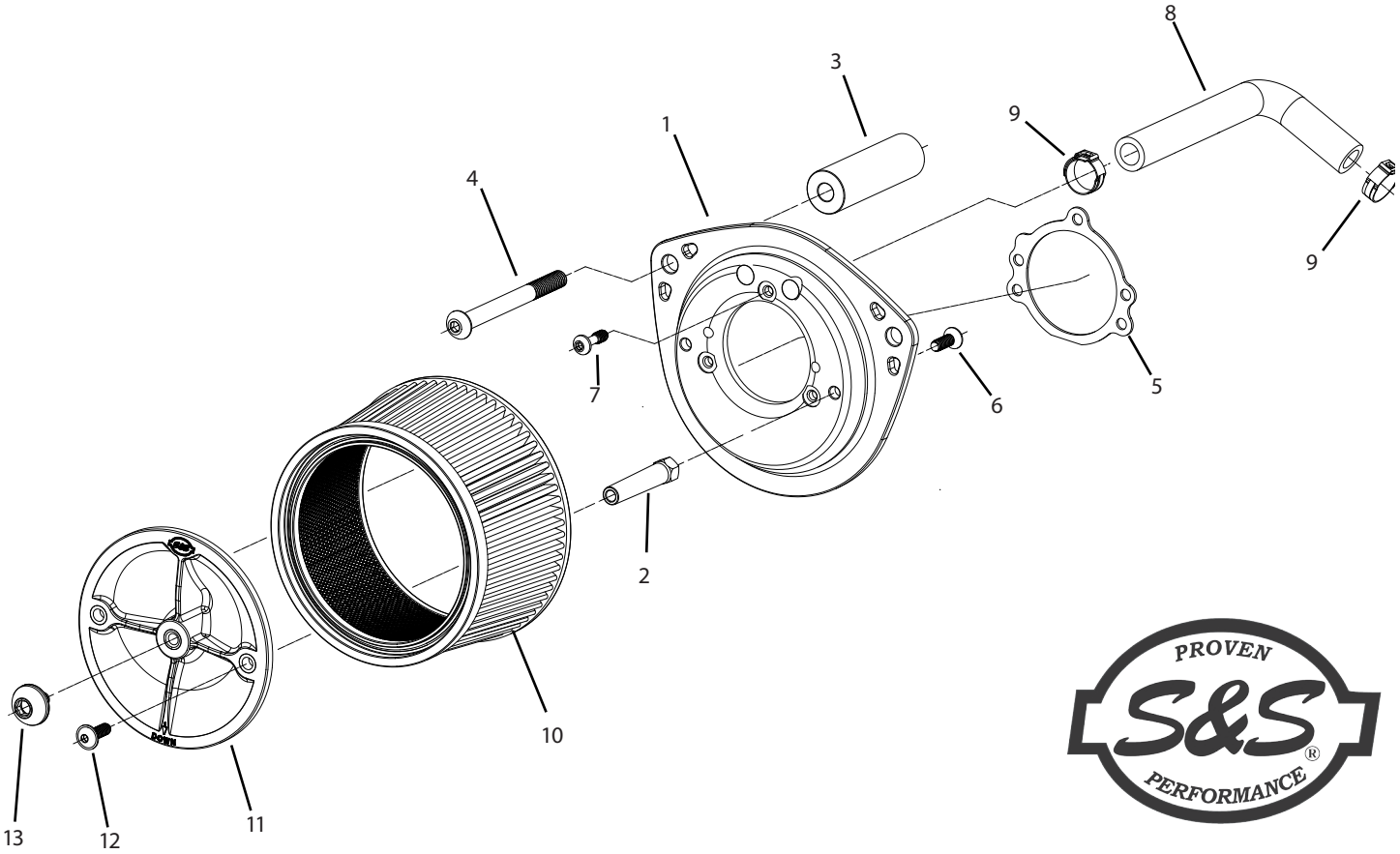
- *Carburetor body has seven drilled passages that are permanently sealed with drive plugs. Do not attempt to remove these plugs as irreversible damage to carburetor may result.*
- *If the throttle arm is removed from it's shaft, it must be reinstalled in wide open position with throttle plate at 90° to the fully closed position.*
- *The throttle plate should be checked annually for signs of wear. Replace if necessary.*
- *To insure proper seal in needle and seat assembly, float hinge, needle lift and needle must work freely and must not bind. If problem is suspected, remove bowl and check float movement. If obvious misalignment, binding or sticking occurs, remove and straighten and reinstall to attain free movement. Reset float level and double check for free movement. Float must not contact bowl gasket.*
- *Float setting should be measured at end of float opposite needle and seat assembly when fuel inlet needle is fully closed and spring in needle is compressed. See Figure 1. To check, remove bowl and raise float until needle is in closed position and spring in top of needle is compressed. Highest part of float should be slightly (approximately 1/32") below bowl gasket surface. Float must not contact bowl gasket.*

**Replacement Parts For S&S Air Cleaner Kit #170-0281 For Super D Carburetor - S&S T143 Engine 1999-2006**

1. Backplate, Assembly, Air Cleaner, Super D, T143, Goth Black Billet, Assembly 1999-'06 bt ..... **NA**
2. Standoff, Hex, ½" x 2.33", Aluminum, 6061 ..... **NA**
3. Spacer, Powdercoated, 1" x .438" x 3.177, Goth Black ..... **NA**
4. Screw, BHC, 3/8-16 x 4.00", Polished, Stainless Steel ..... **NA**
5. Gasket, Backplate, Super D, .062" Thick ..... **170-0271**
6. Screw,SHCB,¼-20 UNC X .825" ..... **500-0059**
7. Screw,FHSC,¼-20 x ¾",Zinc Plated ..... **50-0491**
8. Hose, Breather, Formed, Duro 75A ..... **41-0012A**
9. Clamp,Hose,Pinch Style ..... **50-0378-S**
10. Filter,Air,Tapered,StdPlt,5.500" x 6.000" ..... **170-0081**
11. Plate,Top,Air Filter,Molded,Plastic ..... **170-0026**
12. Screw, SHC, Flanged Button, ¼-20 UNC x .750" ..... **500-0060**
13. Screw,SHCB,5/16-18 x .500",Pol,Stainless ..... **500-0051**

Not Shown

14. Sealant;Loctite®;#243;5ml ..... **51-9003**



**Super D Gas Carburetor replacement parts**

1. Carb body assembly
   21/4" Super D gas (1.937" Venturi)..... 11-2181
   21/4" Super D gas (2.150" Venturi)..... 11-2198
2. Throttle shaft (includes throttle plate screws) ..... 11-2184
3. Throttle plate screw
   (each).....50-0055-S
   10 pack..... 50-0064
4. Throttle shaft bushing (for repair only)..... 11-2134
5. Throttle plate all - 21/4" D carbs ..... 11-2150
6. Throttle return spring ..... 11-2082
7. Throttle arm assembly 21/4" Super D gas/alcohol ..... 11-2148
8. Idle mixture screw
   (each).....11-2354
   5 pack.....11-2378
9. Idle mixture screw spring
   (each).....11-2052
   10 pack.....11-2060
10. Manifold o-ring
    (each).....50-8014
    10 pack..... 50-1042
11. Insulator block 21/4" x 1/4" (includes o-rings).....16-0499
12. Spacer,Kit, with o-ring - 21/4" x 1" ..... 16-0157
13. Enrichment device .....11-2084
14. Bowl vent plug
    (each).....50-0105
    10 pack..... 50-0151
15. Main discharge tube..... 11-2185
16. Main Jet – See S&S Catalog for part numbers
17. Intermediate Jet – See S&S Catalog for part numbers
18. Bowl gasket..... 11-2153
19. Float - All carbs with wire mechanism..... 11-2187
20. Float retaining pin .....11-2069
21. Bowl screw 10-24 x 3/4"
    (each)..... 50-0034
    10 pack..... 50-0063
22. Carb bowl assembly ..... 11-2188
23. Bowl plug
    (each).....11-2090
    5 pack.....11-2092
24. Needle - 21/4" Super D gas, .238" O.D. ..... 11-2197
25. Seat - 21/4" Super D gas - .238" I.D. ..... 11-2165

Not Shown:

26. Air horn 41/4" long.....17-0141
27. Fuel line 1/4" I.D. with 90° bend,19" ..... 19-0475A