ThunderJet

S&S E/B Installation and Tuning Instructions

These products are legal for sale in the State of California only for racing vehicles which may never be used upon a highway.

READ INSTRUCTIONS FIRST!

AIR FILTER

This is the first issue to talk about because when making changes here, it can change jetting requirements. The foam filter restricts airflow. We have found the best alternative is a high flow K&N filter. It will give you the performance you demand while doing a better job of filtering incoming air than a foam filter can. We stock these for all S&S applications and also manufacture alternative systems.

WE STRONGLY RECOMMEND THIS!

ACCELERATOR PUMP

We recommend turning off the accelerator pump when tuning the intermediate circuit. It doesn't supply fuel at steady speeds and can mask problems of a lean condition. This is evident with plug readings that look good or even rich and the next week you may have two burnt pistons. To disable the pump when tuning a high performance engine, turn the adjusting screw clockwise until it contacts the pump arm. *CAUTION: DO NOT OVERTIGHTEN.* When tuning is complete you can increase pump travel to aid cold starts. For best results, keep the volume low on this circuit. Clearance should be .020" to .030" @ adjustment screw

OFF IDLE RESPONSE & LOW TO MID-RANGE POWER

INTERMEDIATE (LOW SPEED) JET

After years of development on S&S carburetors, we have noticed that this circuit is the most misunderstood in the overall picture of the fuel curve. When engine efficiency has been increased via improved airflow, compression, larger displacement, etc., the volume of fuel in this circuit must be raised. You increase fuel to increase power but also to prevent engine damage. With a wide variety of engine sizes, components and exhaust systems, we can only offer a broad recommendation of two sizes larger than stock setting, some engines will require substantially more. Call us for special jets if you need them. This is truly a hidden treasure. *TUNE IT CORRECTLY!*

IDLE MIXTURE

This is the next step after increasing the intermediate jet. Disregard the factory setting on this circuit. When you drastically increase the intermediate jet, this mixture will be rich. In some cases, we find the correct setting may be only 1/2 turn out from the seat. NOTE: Never richen this circuit to compensate for lean conditions on the intermediate circuit.

MID-RANGE TUNING

THE AIR BLEED

The Air Bleed is an air passage connected to the Main Jet emulsion tube that allows air to mix with fuel before it is pulled into the carb throat. You may find now that you've increased the Low Speed jet size, the engine responds better off idle, but now has a stutter or hesitation (flat spot) as the rpm rises to a level that recognizes the carb's Main Jet. With the stock sized (.042) Air Bleed, fuel starts being pulled through the Main Jet at a relatively low rpm, causing this rich condition. By increasing the Air Bleed size, you are in effect raising the rpm level needed to draw more fuel from the Main Jet. Simply, it allows for increased

THE AIR BLEED CONT'D

rpm before fuel is drawn from the Main Jet, in order to correct a rich fuel overlap from the Low Speed to Main Jet circuit transition.

Now you can tune the Main Jet in at a higher rpm level, when the engine will want (and need) more fuel. This circuit can also help you manipulate problems you may be experiencing with certain hydraulic lifter camshafts, exhaust systems and other components. These components might not allow the engine to carburet very well in the middle of the scale. The air bleed allows you to remove some of the fuel volume when the requirement is low. Other circuits are used to compensate for any demand. Keep a good selection of these on hand to tune for best power

MID-RANGE AND TOP END

MAIN JET

Now that you have a handle on the air bleed and intermediate circuits, you can use the main jet to increase the power in the mid-range and top-end. When you're changing jets, keep in mind the relationship of the air bleed to the main jet. Chances are that if you had good power at peak rpm before you installed the ThunderJet, you will probably drop two sizes on the main jet after installation.

Check chart for starting point.

TOP END

THUNDERJET

This circuit is doing a lot of demand work. Because of its built in air bleed system, it becomes active at approximately 4000-4200 rpms, while the engine is under a controlled load. Use ThunderJet to tune (with the main jet) for maximum power increases at high rpm. If you are tuning on a dyno, make small jet changes to see the difference it makes. You will be surprised at the power increases.

Jetting instructions continued on the back of this page!

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Tuning Instructions
Continued from Front Page

SUPER 'G' CARBS AND TODAY'S LARGER ENGINES

We have found there is a need for enlarging the throat size in the Super 'G' Carb in certain big inch applications. At mid-range rpm's, air speed is simply to high at the nozzle, resulting in a big surge of fuel and its related stumble, or sooty looking plugs. Lowering the main jet size helps the problem but dangerously leans out the mixture for high rpm running (result-burnt pistons). Boring the carb throat will lower the air speed at the main discharge tube. This smoothes out the fuel curve and allows you to run adequate main jet sizes for these big engines. If you choose to do this modification yourself, be careful; there is very little room for error here.

MANIFOLD SPACER BLOCKS

When tuning a long stroke engine, increasing runner (manifold) length may help control fuel stand-off and improve low- and mid-range carburetion. Different cams, exhausts, strokes and other changes will affect this area dramatically. If you are a serious tuner, we suggest you purchase spacers and insulator blocks and experiment with them in your applications.

VACUUM PETCOCKS

We recommend replacing any late model vacuum petcock with a Pingel High-Flow Petcock in performance applications.

MOUNTING

Tests on the Dyno and the track have shown properly mounted carbs work superior to units that move and shake due to inadequate mounting. Make sure the carb is properly and securely mounted. *DON'T OVERLOOK THIS AREA!*

REMEMBER...

Check mixture after any Low Speed jet change. At maximum rpm, all three circuits are supplying fuel. If you add fuel to one circuit, you may have to take away from another as you have now enriched the entire mixture throughout.

REMEMBER:
TUNING IS EVERYTHING!

Use of This Product is Intended for Racing Purposes Only.

Replacement Parts & Services

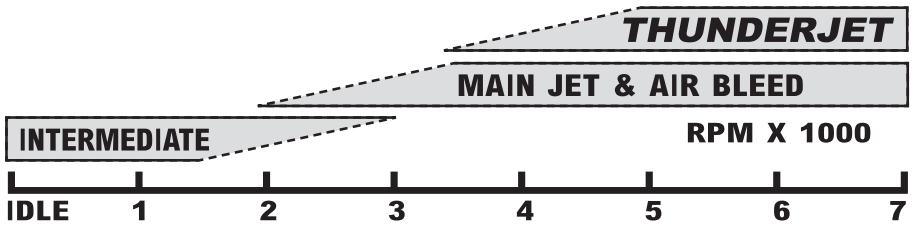
- ThunderJet kits and jets sizes 80-200
- Special S&S jets--air bleed jets
- Spacers and Insulator blocks
- Velocity stacks (racing only)
- High flow air filters
- Replacement parts and mounting hardware
- Complete application-specific carbs with ThunderJets
- Professional installation for these parts
- Special application carbs
- Installation Fixtures

Jetting Range Guide For ThunderJet Tuning

Note: The suggested starting points are based at sea level. When looking at the scale, consider that cam, compression, head flow and especially exhaust type can greatly affect each circuit. Open exhaust systems such as drag pipes will rely heavily on the ThunderJet circuit and less on the main jet for mid-range to high RPM power; tune accordingly. Performance systems will generally tune to the middle of the suggested jet range. Install baseline jetting and tune from there. Refer to circuit instructions above for help with fine tuning specific RPM ranges. Each engine has different requirements; time spent tuning will yield the best results.

Engine	Carb Type	Intermediate Jet	Main Jet	Air Bleed	ThunderJet
XL 1200	"E"	.029 - .033	.064 - .068	140 - 175	100 - 135
80" EV	"E"	.031 - .035	.066 - .074	140 - 175	100 - 135
88" TC	"E"	.031 - .035	.064 - .074	140 - 175	100 - 135
95" TC	"G"	.031 - .033	.074 - .082	180 - 200	100 - 135
Big Engines	"G1/G2"	.032 - .036	.078 - .088	180 - 200	120 - 140
Big Engines	"D1/D2"	.036 - .040	.088 - Up	.074 - .082	124 - 145

RECOMMENDED RPM TUNING RANGE OF CIRCUITS



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ThunderJet

For S&S 'E' Carburetors

READ INSTRUCTIONS FIRST!

If you do not have facilities available to properly install this module, professional installation is available from Zipper's. High volume shops may want to invest in our ThunderJet installation fixture (shown in the photos, p/n 713-910).

This securely holds the Carb body and float bowl at the correct positions for machining. For use with a mill when installing ThunderJets in all S&S model E/G/B/D carbs.

Please read all instructions fully and carefully before proceeding.

1. Loosen the drain nut and remove your float bowl from the Carb. Remove emulsion tube with main jet from Carb body and remove the accelerator pump rod, rubber bellows and discharge o-ring. Looking into Carb throat, turn Carb counter-clockwise at approximately an 11 degree angle and clamp in vice.

Drilled, tapped and spot faced for fuel delivery tube.

2. The location for drilling, tapping and spot facing the fuel tube hole is .950" from the air cleaner mounting surface; use the upper left corner of the "T" in the word "SHORTY" for locating the other axis. Drill a #3 hole, tap 1/4-28. Using 1/2" end mill, counterbore hole until you maintain a 3/16" (.187) wall thickness (photo 1).

3. Install the fuel delivery tube from the inside of the Carb throat out (photo 2). Using (2) ¼"-28 jam nuts, double-nut the fuel delivery tube outside of the Carb throat and carefully lock tube into Carb throat until all or most of the air bleed segment is exposed.

Fuel delivery tube installed.

3. Remove jam nuts (no longer needed). Install the air correction spacer (small opening out), o-ring and ThunderJet body on to Carb. Fuel line nipple should point to front of bike and slightly toward the air filter for hose routing. Trim small opening side of air correction spacer, if needed, to achieve a hand tight location 1/6 of a turn from permanent location and finish tightening with wrench. (.006" trim = 1/6 turn). DO NOT OVERTIGHTEN BODY OR FUEL TUBE BREAKAGE WILL RESULT!!

Body and the air correction spacer installed, nipple facing front of bike.

Do not overtighten body or fuel tube breakage will result!

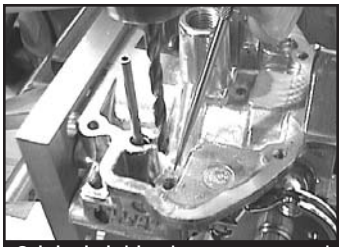
Adjustable Air Bleed

4. Locate air bleed passage plug above S&S nameplate on throttle spool side of Carb. Clamp Carb body at approximately a 45 degree angle. Center a 5/16" end mill over the plug and spot face lightly to flatten and align. Use a center drill to start and then drill the plug with a #19 drill bit and tap 5mm x .8mm for air bleed (photo 4). Install air bleed jet (same type jet used in ThunderJet). Jet sizes range from 130-170 for most applications (see chart).

Drilled, tapped, spot faced for adjustable air bleed jet.

Original Air Bleed Blocking

5. Clamp Carb in vise upside down. Locate original internal air bleed hole (photo 5) to be blocked off. ('04 and earlier) Carefully drill this passage with a #21 (.159") drill bit until you break into cross passage in Carb body. Tap hole with a 10-32 tap, blow passage out with compressed air, then plug with supplied 10-32 slotted screw. ('05 and later) These carbs come with a main jet style air bleed jet; remove the jet and plug the hole with the supplied 5/16-24 set screw.



Original air bleed passage tapped for block-off screw.

(Optional) Bowl Vent Relocation

6. We have found additional performance and increased fuel pressure stability in the float bowl by relocating and modifying the float bowl vent passage. Clamp body upside down at a 45 degree angle. Remove the existing 5/16" bowl vent plug (photo 6). Using a small center drill or wiggler, locate the center of the hole where plug was removed. Mark a spot 7/16" from the casting surface where vent plug was removed, toward top of Carb. Using a small center drill, break through to existing vent passage. Finish hole using a 5/16" 2-flute end mill at this angle. *Cut only deep enough to enter existing vent cross drill!*

External bowl vent machined in body.

In extreme high velocity applications, we recommend plugging the original vent passage at the air cleaner backing plate surface (tap opening 5/16-24). Use the 5/16"-24 plug removed from the vent passage to plug the original opening, as extreme airflow can create a vacuum that may draw fuel through the vent and uncontrollably richen the mixture. Install the plug just deep enough to be slightly below the air filter mounting surface, and use Loctite. If you choose not to do this modification, at least remove the vent plug and discard it.

Remove bowl vent passage plug.

Float Bowl

7. Remove float from bowl. Set bowl at a 20 degree angle on sine plate. Drill a #3 hole between bowl drain plug and accelerator pump housing and tap with ¼"-28 tap. Spot face hole center (kiss) just enough to give a flat surface for o-ring to seal against (photo 8). Install fuel nipple and o-ring, secure inside bowl with lock washer and nut provided (photo 9). Make sure this device does not interfere with float action.

Bowl drilled, tapped and spot **faced for bowl fitting**

8. Thoroughly clean Carb, check low speed and main jet sizes for engine compatibility (see tuning tips), re-assemble Carb and install fuel line with clamps provided. Fuel hose is routed to front of bike. See tuning instruction page for jetting instructions.

Bowl fitting installed

9. READ TUNING INSTRUCTIONS

ThunderJet

For S&S 'B' Carburetors

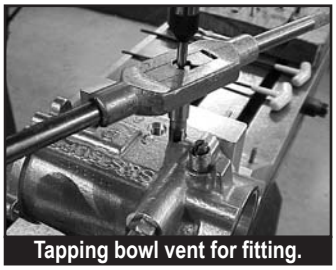
GENERAL INSTRUCTIONS

If you do not have the facilities to properly install this fuel module, professional installation is available from Zipper's. High volume shops may want to invest in our ThunderJet installation fixture (shown in the photos p/n 713-910) which securely holds the carb body and float bowl at the correct positions for machining. Use with a mill when installing ThunderJets in all S&S model E/G/B/D carbs. Read all instructions fully and carefully before proceeding any further.

Loosen drain plug and remove float bowl and manifold. Install two (2) studs in carb manifold bosses; use these to center carb in milling machine vise. Be careful not to over tighten carb in vise. The first two steps are recommended to further enhance your carb's performance along with the installation of your ThunderJet.

EXTERNAL FLOAT BOWL VENT

1. Pressure in the float bowl is stabilized with the addition of this external bowl vent. Locate the new vent hole in the rear of the carb wall .438" above bowl gasket surface and 1.906" from the manifold flange of the carb. Open hole with a small center drill then plunge a 5/16" end mill to a depth of .562" below the raised surface. Use a ½" countersink to chamfer the raised surface to help start the tapping process. Chamfer only slightly not touching the lower level surface. Tap with 1/8" NPT tap. Install 1/8" NPT street elbow and 1/8" NPT x 3/8" hose nipple using a suitable thread sealer. The hose nipple should be positioned pointing up.



Tapping bowl vent for fitting.

ADJUSTABLE AIR BLEED CIRCUIT

2. All "B" model carbs are manufactured with a fixed size air bleed passage. This modification will allow the tuner to adjust the main jet air bleed size for more control over the main jet circuit signal timing and fuel volume. Locate the fixed air bleed hole and bore with 1/4" drill until you reach the cross drill in carb *(DO NOT GO PAST CROSS DRILL!!)*. Spot face the area with 1/2" end mill for mating surface of jet. Use 5/16-24 starter tap in hole and remove to use a 5/16" bottom tap to finish job. Original air bleed size is .042"; suggested range is .054-.072". Use S&S main jets for this application.

Air bleed passage drilled & tapped for jet.

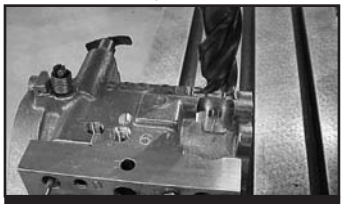
THUNDERJET INSTALLATION

NOTE: On "B" applications using only (1) ThunderJet, the ThunderJet mounts on the side of the carb facing the rear of the bike (9:00 position). If using (2) ThunderJets follow all instructions below and mount one each in the 9:00 and 3:00 positions.

9:00 POSITION

3. Drill and tap hole .750" from the end of the carb throat, offset slightly above the throttle butterfly shaft. Use a #3 drill and tap 1/4-28 thread. You will be drilling through the middle of the original float bowl vent passage; this is OK, it will not affect performance or operation of the carb.

4. You then need to relieve the area around the hole you just threaded for air bleed spacer clearance. This is best accomplished on a vertical mill with a 3/4" end mill. With the cutter starting near the bowl area, mill toward the top of the carb, removing material at least ¼" above the centerline of the fuel tube hole. Use care not to break into the enrichener air passage located above the hole. Leave .170-.185" of carb wall for the short threaded portion of the fuel delivery tube.



Fuel tube hole drilled/tapped, area relieved for ThunderJet

5. Install the fuel delivery tube from the inside of the carburetor throat out. Double nut the delivery tube using (2) ¼"-28 jam nuts and carefully lock into carb throat (DO NOT OVERTIGHTEN). Remove jam nuts (not needed after this step).

Double-nut and tighten fuel tube in place

6. Install air correction spacer, o-ring, and ThunderJet with fuel nipple facing down towards float bowl. Trim small opening side of air correction spacer, if needed, to achieve a hand tight location 1/6 of a turn from permanent location and finish tightening with wrench. (.006" trim = 1/6 turn).

DO NOT OVERTIGHTEN BODY OR FUEL TUBE BREAKAGE WILL RESULT!

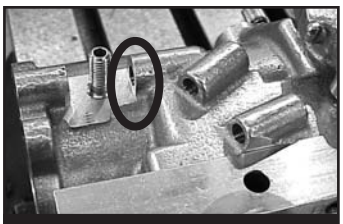
ThunderJet body (nipple down), bowl cent & air bleed jet in place.

3:00 POSITION

(Part 2 of twin T-Jet installation)

7. Drill and tap hole .950" from the end of the carb throat (#3 drill and 1/4-28 tap), offset slightly above the throttle butterfly shaft.

8. You then need to relieve the area around the hole you just threaded for air bleed spacer clearance. This is best accomplished on a vertical mill with a 3/4" end mill, on center of your threaded hole. Be certain to leave .170-.185" of carb wall for the short threaded portion of the fuel delivery tube. (On a "B" carb with twin ThunderJets, you will be cutting through the float bowl vent passage. This passage must then be plugged, as its location will subject the passage to positive air pressure at speed, resulting in fluctuating pressure in the float bowl, adversely affecting jetting. Drill the passage past the ThunderJet mounting area and tap it 5/16", 3/8" deep and plug it with a set screw. The external vent described in step 1 must be performed to replace this original vent.)

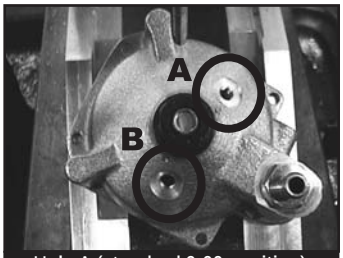


3 o'clock position, fuel tube hole drilled/tapped, area relieved for ThunderJet, fuel tube installed. Circled area shows where vent passage should be plugged

9. Follow steps 5, 6 & 7 from the 9:00 segment.

FOAT BOWL

10. Clamp bowl to mill table at 35 degree angle. See photo for bowl nipple location(s). At the bottom of float bowl, beside drain, drill a #3 hole and tap ¼"-28. Spot face the area around the hole to give a flat surface for the o-ring to seal against and reduce thickness enough to allow the nut to attach on the inside of the bowl. Install fuel nipple and o-ring then secure inside bowl with nut provided (no washer). Stake threads with a punch to lock nut in place (make sure this device does not interfere with float action or movement). Repeat for multiple bowl nipple locations.



Hole A (standard 9:00 position), B (3:00 position, if twin T-Jets are used)

12. Clean all carb parts; reassemble and install fuel line with clamps provided (trim fuel line if needed). Install on engine. Install fuel line, turn fuel valve on and check for leaks before starting engine!!

13. READ TUNING INSTRUCTIONS

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