

REBUILDING THE BRITISH S.U. "SIDEDRAUGHT"

THINGS YOU'LL NEED:

Carburetor cleaner
Soft brass wire brush
Screwdrivers (small Phillips and small slot head)
1/4" drive socket set
Reamer (may be required)
Needle nose pliers
Muffin tin
Hack saw
Plastic gloves
Rags



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Have you ever wondered how those cool looking S.U. side-draft carburetors they put in all the classic British cars work? I have, and I finally found out. You see, I own a little 1967 Morris Minor convertible down in new Zealand where my wife and I go on an annual basis, and I like to tinker with it when I'm there. And as it turns out the car's old, single-barrel 1 1/4" S.U. H2 was dirty and sticky and in need of an overhaul.



Even though these carbs are the essence of simplicity, get a Haynes manual or referencebook that shows your particular model and read it before tearing into your example.

or shop manual before tearing into your carb.

After studying the diagrams and reading a little bit, I discovered that these carbs are utterly simple. In fact they only have two moving parts in normal operation -- those being the throttle butterfly and the piston assembly. You have to handle the components with care, but the carb couldn't be easier to work on. Never the less, it would still be a good idea to pick up a diagram

The original S.U. carburetor design dates from around 1905 when George H. Skinner patented the design. and it is truly ingenious. In fact the S.U. is such a good design that it has

appeared on just about every British vehicle imaginable in various forms, including Rolls Royce, Jaguar, Triumph and MG, as well as my little Morris Minor. S.U. carbs have done very well in past years in performance and racing applications too, and when set up right they approach fuel injection for efficiency and economy.

The way they work is this: When the engine is running at idle the throttle butterfly is almost closed, so the vacuum in the suction chamber is low because very little air is moving past the suction orifice just behind the piston in the throttle body. Then as the throttle body is opened, more air rushes past the orifice, causing a greater vacuum in the suction chamber.

This lifts the suction piston and needle, allowing more air and fuel into the engine. It is an absolutely brilliant design. In fact it is such a simple and efficient set up that the British -- rather than going to two or four barrel carbs on multi-cylinder engines, just added more S.U.s in many cases. And as long as you keep them in sync with each other they do a wonderful job together.

REBUILD RUN THROUGH

I sent away for a carb kit to a British parts supplier. When I got the kit I was utterly amazed. It consisted only of a needle valve and seat assembly, a jet assembly, an oversize throttle valve spindle and three gaskets! For a fellow who is used to stripping down Rochester four barrels, this was a revelation. I had my customary muffin tin at the ready to hold all the various pieces and assemblies, but I felt a little silly. After all, it's hard to get confused with just seven items to keep track of. In any case, here's how to redo an S.U. Carb:

PULL IT APART

Start by unscrewing the oil dashpot plunger from the top of the dashpot. (That's the bell-shaped thing with the black plastic knob on top.) Take out the two screws holding the dash pot cover to the carburetor body and lift off the cover. In it you will find a long spring and the dashpot piston with the needle attached. Be very careful not to bump or bend the needle out of center at its tip.



1. Begin disassembly by removing the piston damper assembly from the suction chamber body.



2. Remove the two screws holding the suction chamber body to the throttle body and lift it off.



3. Under the suction chamber cover you'll find a long spring and the piston and needle assembly.

Unscrew the needle from the suction piston by removing the recessed set screw in the side of the piston. Next, take the float chamber loose from the throttle body by removing its retaining bolt. Finally, remove the fuel line from the float chamber.

Loosen and remove the three screws that secure the top of float chamber, and lift it off. Pull out the float hinge pin using needle nose pliers. Look the float over carefully to make sure it has no cracks or leaks. Hold it next to your ear and shake it gently. If you hear a rattle, you'll need to repair or replace the float. Lift out the needle valve, then loosen and remove the needle valve seat using a small socket.

Remove the lever holding the jet assembly in place, then slide the jet assembly out. Under most circumstances, this is as far as you need to go to dismantle the carb. but if you do detach and disassemble the jet adjusting assembly you will need to recenter the jet, which is no big deal.

Dump everything into a tin of carburetor cleaner and let it stew overnight. If you can't find a suitable carburetor cleaner, you can use lacquer thinner, although it is highly flammable and will pollute the environment if not disposed of properly. The new carb cleaners are supposed to be environmentally friendly, although they don't smell particularly inviting.

PUTTING IT ALL TOGETHER

Clean all the old grease, varnish and rust off of, and out of your carb's components. You can use a soft brass bristle brush and lacquer thinner for this. Don't do anything aggressive to the needle, the suction chamber or piston surfaces though. They are machined precisely for their job and if you change the tolerances of them by using something as abrasive as emery paper or stiff metal brush the carb may never be right again.

Instead, use a fine metal polish to clean up the needle and the suction chamber if necessary. Be sure to thoroughly clean out the float chamber bowl too. (The one from my car was full of muck and rust to the point where I am surprised it worked at all.) Brush and scrape any



4. Lift out the suction chamber piston being careful not to knock or bend the metering needle out of center.



5. A flush mounted set screw holds the metering needle in place. Be careful not to cause any damage to the needle when removing it.



6. Disconnect the metal link to the jet assembly and gently push it aside.

residue out of the float bowl before reassembly.

Inspect the working of the throttle valve spindle. If the throttle spindle is sloppy in its mounts in the throttle body your carb will run too lean because air will be pulled in around the spindle due to suction from the engine. In that case you will need to install an oversized spindle as I did, and you will need to carefully ream the holes in the throttle body just enough so that the new spindle has a close fit without binding.

This is a good time to cut the new oversize spindle to length too. They come one-size-fits all, and unless you need a bit extra on the end for a dual carb setup, you can cut the new spindle to the length of the old one using a hacksaw with a fine tooth blade. Dress the end of the spindle with a fine file and chamfer the edges slightly to eliminate burrs.

Once you have the throttle spindle cut to length, locate it in the throttle body and install the throttle butterfly flap. Use a little Loctite to secure the screws, or install new ones and swage their ends to prevent them coming loose and getting sucked into the engine. Next, mount the needle back in the suction piston, then install this assembly in the suction chamber along with the long piston spring. Place a new gasket in the proper groove on the throttle body and attach the suction chamber assembly.

CENTERING THE JET

With S.U. carburetors you use the metering needle as a pilot for centering the jet. The piston should be in place and the dashpot attached at this point. Take off the lower adjusting nut and spring, then, with the spring removed, take the adjusting nut up to its highest position. Slide the jet in as far as it will go with the jet head against the underside of the adjusting screw.

The larger, upper nut should now be unscrewed two turns, at which point you will find that you can move the jet and lower adjusting nut laterally very slightly by gripping the jet assembly and adjusting nut. Move the jet until the needle will enter it freely and completely. You can poke a pencil down the dashpot and gently push the piston down all the way.



7. Remove the large bolt holding the float bowl onto the throttle body, then remove its top. Remove the float by pulling out its pin.



8. Here's why my little Morris's carb needed work. It was full of filth and scale from having sat idle for so long.



9. I like to use a muffin tin to keep parts straight, but with a simple little S.U. it isn't as important as with more complex carbs.

To check that the jet is centered, lift the suction piston in its chamber all the way up. When released it should fall all the way back down to the throttle bridge with a metallic click without hanging up. If it meets any resistance, recenter the jet again. Top up the piston with a little fresh light weight motor oil. Then, using a new fiber washer, install the dashpot piston damper.

FINISHING UP

Install a new needle valve seat in the top of the float chamber and drop in a new needle valve. Attach the float using a new pivot pin, and adjust the float to its correct height if required by carefully bending its hinge tab with needle nose pliers. In the case of our later H2 model S.U. the dimension is 3/16" from the raised lip of the float bowl top to the center of the float at its fully raised position. I discovered that the shank of my screwdriver was exactly 3/16" in diameter so I just used it as my gauge.

Reassemble the float chamber and top using a new gasket and the three set screws that came with the carb. Attach the float bowl to the carb using the large bolt using a new lock washer. Reattach the throttle bell cranks, springs and linkage and your done. Of course it is a good idea to check the piston travel one more time before reinstalling the carb.



10. Lift out the needle valve and remove the old needle valve seat using a small socket.



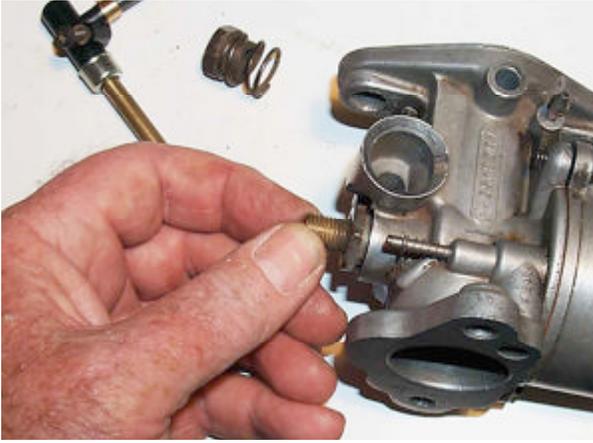
11. I like to install a new needle valve and seat every time I do a carb so it won't leak or flood.



12. If you need to install a new over-size throttle valve spindle, ream the bearing surfaces to allow for a tight fit that permits the spindle to rotate freely.



13. Put the piston and long damper spring in place, then, using a new gasket, attach the suction chamber housing.



15. Make sure you center the jet so the metering needle can move freely through its range.



14. The float needs to be set to close the needle valve at a specific height. On my H2 model the dimension was 5/16" which was the exact diameter of my screwdriver shank.



After a couple of hours of easy effort we have a renewed S.U. ready for another 35 years service.