Part Three: SU Carburettor Trouble Shooting

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Assuming that you have followed the instructions on the preceding two pages you should now be enjoying the renewed performance and economy of your new S.U carbs. You are reading this page, so maybe things have not gone as planned.

Below I have listed some of the most common problems, and how to correct them. If these do not cure your problem, please do not hesitate to call me. Even if you did not purchase a set of carburettors from me, I am an enthusiast and hope to help you get your MG or Triumph (or Jaguar or Sunbeam or Austin Healey etc) running to its highest potential.

Fuel flows out the vent pipe or pours out the jet

If fuel flows out the jet but not the vent pipes, make sure the vent pipes are clear. Clogged vent pipes prevent venting above the fuel level in the float bowls. As fuel fills the bowls the air above the fuel is compressed, the pressure on the fuel causes it to be ‘injected' out the jet. This is an uncommon problem but it does happen.

Fuel flowing out the vent pipes and trickling out the jet indicate a malfunction in the float/float valve assy. The most common cause is debris becoming lodged in the float valve (needle and seat) – this is in turn most generally caused by debris in the fuel line and/or fuel tank. Install a fuel filter as close to the carburettors as possible, use new fuel line after the filter. If you feel comfortable doing so, remove the float bowl lid, pull the float hinge pin, shake the float to see if it has fuel inside – if so you need a replacement float – now remove the needle from the float valve and wipe the vitron tip with a towel – being sure to remove any debris. Blow compressed air or spray carburettor cleaner into the float valve seat and out the fuel inlet. Repeat until you are certain all debris is removed. Reassemble.

The brass floats used in the H and HD series carbs were prone to stress cracks along their sides. If they have sat for an extended time they can also become stuck on the centre bolt in the float chamber. Best practice is to remove the old brass floats and replace them with the modern nytril ‘Stay-Up' floats now being offered by SU.

HIF floats that were originally installed are pure junk. The floats were later redesigned with a more resilient nylon material. If you have the early hard plastic floats replace them immediately. Chances are they have already failed.

Many of the parts of SU carburettors are interchangeable between sets. The vast majority of HS sets used the AUC 1310 float bowl. These were intended for applications where the carburettor mounts at an angle. The Triumph Spitfire, TR6 conversions, MGC and several Jaguar applications had carburettors which mounted horizontally without any upward angle. Horizontal applications require the use of the AUD 2140 float bowl which has a mounting boss located higher on the bowl. The higher mounting boss effectively lowers the float level to keep the fuel level below the top of the jet. 1310 float bowls cannot be adjusted low enough to keep fuel from flowing out of the top of the jet. A related problem occurs when a float bowl extension is used between the bowl and the lid. The intent was to increase bowl capacity, unfortunately raising the lid also raises the float level to a point that fuel over tops the jet.

Idles too fast – even with screws backed completely out

The accelerator linkage may be holding the carburettors open. Disconnect the carburettors from the accelerator linkage or cable. If you are now able to set the idle to the proper speed you know that something in the accelerator linkage is the problem. On the TR3 and TR4 linkage there are several points of articulation and bearing. Very often it is necessary to add a separate return spring just to overcome the resistance in the TR3 accelerator linkage.

One carburettor can easily hold the other carburettor open. Loosen the screws on the inter connecting linkage. With the linkage loose press down on each idle screw to make sure it is completely home. Readjust the link as directed in the tuning section and tighten the links.

The fast idle screws may be engaged against the fast idle cam. Press the choke cable in completely. Insure that the jet is resting against the mixture nut. Loosen the cable stop on the choke cable, add just a slight amount of slack to the cable and retighten cable stop. There should now be a clear air gap between the end of the fast idle screw and the fast idle cam. If not, back out the fast idle screw until clear and readjust as specified in the previous section on tuning.

The most common cause of fast idle is vacuum leaks. Spray all joints and connections in the intake manifold with carb cleaner. If you notice a decrease in RPM you have located a vacuum leak which must be repaired. Also check all vacuum hoses and the vacuum canister on the distributor.

Infrequently the new shafts may be stiff in rotating. The use of the PTFE bushings and the harder composition of the new genuine SU throttle shafts have all but eliminated this problem. If you do happen to find this problem the solution is to re-machine the bodies and refit the bushing. If the problem is not significant it is possible to simply fit an additional or stronger return spring until the shafts wear into their new positions. The springs on the H series may be tightened by loosening the retaining screw and rotating the collar.

Overly advanced ignition timing can cause fast idle as well, check and correct as needed.

One carburettor draws far more air than the other

The most common cause is improper adjustment of the interconnecting linkage. One carburettor is holding the other carburettor open to a greater degree. Adjust linkage as directed in the tuning section and as above.

One piston may be stuck. Remove the dampers from each carburettor. Lift and drop each piston. Each should drop freely and result in a distinctive ‘clank' when it hits the bridge. If the piston does not fall freely repeat the cleaning and jet centring instructions given in the tuning section. If the pistons fall freely with the chambers off the carburettor, try swapping the piston/camber units between carburettors (keep same pistons in the same chambers). Tolerances and dimensions have changed over the years. Some pistons are too large in the small diameter for some bodies. In theory this should never happen, but trust me, it does. If the piston is fouling inside the carburettor body, first check to make sure there is no dirt or debris on the machined surfaces where the body and chamber meet. Any debris here will cause the chamber to sit at an angle. If the small diameter is fouling in the carb body, you may try to sand out the body at the area of contact. You would be better advised to send your carburettor out to a fully equipped SU carburettor shop for detailed diagnosis and the precision machining required for proper repair.

If the pistons drop cleanly with the dampers removed but stick with dampers installed, it is likely that a sludge has formed in the dashpot well. Remove the offending piston and chamber. With the piston inverted spray carburettor cleaner into the dashpot until it runs clean. Occasionally hard deposits form in the dashpot well. These can generally be removed by using a twist drill bit by hand to break up and remove the solid material. Start with a 1/4 inch drill bit and increase the size until you match the ID of the well which is approximately 11/32 inches.

You may have an internal engine problem. Recheck valve adjustments, a valve not opening or not closing will effectively eliminate air flow through that cylinder. Check compression, very low compression will significantly reduce the air flow for that cylinder. Observe, and if possible

measure, valve lift – a worn cam lobe will prevent the valve form opening completely and cause significant or complete reduction in air flow.

Jets do not return completely when choke is released

For HS series Carburettors: Insure that the problem is not caused by an off centre jet or bent needle. Raise the pistons to full height and release the choke. If the jet returns to its full up position with the piston raised, repeat the process given for centering the needle.
Remove the choke cable from the interconnecting link. Loosen the end connectors and slide free from the choke mechanism. The choke inter-connecting link should now rotate freely inside the choke locating bolt. A bind indicates that the link is too long or the carburettors are incorrectly mounted (sitting at an angle to each other - very unlikely). The diameter of link may be to large, it should be smaller in OD than the ID of the mounting bolt.

With the link still loose, carefully remove the screw that connects the jet rod to the jet (original design without waxstat only). On HS2 carburettors the screw fits into a small brass bushing which will drop out immediately once the screw is removed, exercise caution to be sure you do not lose this bushing. Manually operate the choke mechanism by turning the fast idle cam through its entire range. You should notice two separate motions, each resisted by a spring, the movement should otherwise be smooth, and immediately return to its home position once released. If the movement is not smooth attempt to clean it by spraying with WD40 while rotating the mechanism back and forth. The WD40 will clean, lubricate and provide some measure of corrosion resistance. If WD40 fails to restore smooth operation the carburettors will likely need to be removed and the assembly of the choke mechanism checked and corrected.

With the jet link still disconnected, slide the jet up and down inside the jet bearing. There should be about 1/4 inch if free travel with only slight frictional resistance. If the jet moves, but under significant resistance, use WD40 to clean out any accumulated varnish between the jet and bearing. If the jet is completely seized the jet and bearing assembly will need to be removed for disassembly and proper cleaning. This can be done without removing the carburettors. Reassembly will require a new compression washer at the end of the jet hose, a new jet assembly may be required in some cases.

Misalignment of the jet link can introduce a bind at the connection to the jet. It is very common for the jet links to be abused and distorted. The individual angles are not critical, but the link should run roughly straight down until it transitions behind the jet at about a 25 to 30 degree downward angle. The end of the link should be bent so that it is parallel to the mounting surface of the jet. If this final segment of the link is not parallel to the jet the screw can cause a bind between the link, the head of the screw, and the final bushing. HS2 carburettors use a small brass bushing as noted above. Larger HS carburettors use a barrel bushing that is approximately 1/4" long. With the screw tightened into the jet, these bushing should allow free articulation. To correct the bend use a pair of needle nose plyers to straighten bent sections and then to apply the correct angles until the final segment is parallel to the jet surface.

For H series SU Carburettors: Easiest solution first: jet return springs have been produced for 60 or 70 years by an unknown number of companies with vastly differing specifications. Change the return spring with a new Genuine SU return spring and see if the problem goes away.
As with the HS series, insure that an off centre jet or bent needle is not the cause.

Isolate the carburettors by removing any choke connecting links. Test each choke individually. If all return satisfactorily the problem most likely lies in the connection between choke levers. This is particularly common with the MGA. The coupler used to tie the levers together tends to wear the holes in the ends of the choke levers until the coupler no longer runs true and begins to bind. The wear at the ends of MGA choke links will eventually extend until it finally creates an open slot and no longer contains the coupler. The best remedy is to replace the choke levers. Levers which are in relatively early stages of wear can be bushed and redrilled.

With a few exceptions, the pivot point hole on the choke levers is about 5/16 inch in diameter. The clevis which it pivots on is only 3/16 inch. The intent is to allow the lever to actuate the fast

idle cam before moving the jet. It is not unusual for some well-meaning mechanic to bush this pivot hole to fit the 3/16" clevis pin. The result is almost always a bind in the jet.

A typical H series choke lever has three clevis pins that control the jet. There may be additional clevis pins that connect jet levers together. Each of these are a necessary articulation point. Each clevis should be able to rotate completely when in place. If any are seized or not able to rotate freely remove the clevis and replace with a new one, clean any 3/16 diameter holes with a hand held twist drill bit.

The jet in H series carburettors are sealed with two compressed cork glands. Movement of the jet will be somewhat stiffer than with the HS carburettors but should still be smooth and consistent. If the jet is not moving smoothly it will be necessary to remove the jet bearing assembly for complete cleaning. It is generally advisable to purchase a Genuine SU gasket kit for proper reassembly.

For HD series SU Carburettors: Off centre jets should be ruled out as with the H and HS series. Access to the jet bearing nut requires disassembly of the lower end of the carburettor which is best done with the carburettors off of the vehicle.
Manual choke HD carburettors have an external lever which pivots on a 5/16 inch shaft to move a jet control fork. Frequently the shaft will seize inside of the housing. Cleaning with WD40 and a great deal of patience will generally allow you to work the shaft free and restore operation. In a worst case scenario, the choke housing will have to be disassembled, bushed (similar to a throttle shaft bore), have a new shaft made and then reassembled. This is beyond the scope of most home mechanics.

Fuel leaks from the bottom of the carburettor

Before attempting to diagnose the problem, make sure you have properly defined the problem. Very often fuel will leak out of the vents of the float bowl or out the top of the jet and then flow to the lowest point of the carburettor before being detected. Clean and dry the exterior of the carburettor. Use an absorbent paper towel to check for any signs of fuel leakage above the jet bearing before looking at the lower end for fuel leaks.

For HS series SU Carburettors: The end of the jet fuel hose is sealed into the float bowl by a nut, washer, and rubber compression washer. The compression washer can become very hard and relatively thin. Washers less than 10 to 15 years old seldom fail, older washers are likely to be incompatible with modern fuels and will fail readily. The washer gets compressed into the extreme inner area of the float bowl discharge port. Failure to completely remove the old washer is a very common mistake of novice and professional mechanics alike. Using an inspection mirror and good pick, make sure that all previous washers are completely removed and the end of the port is exposed aluminium. Never reuse a compression washer.
Genuine SU jets have a steel wrap that protects the actual fuel line. The fuel line is sensitive to crimping and will readily develop a link if kinked at any point (thus the steel spring protective sleeve). A wet or sticky spring sleeve generally indicates a hole in the protected fuel line. If you have eliminated leaks from above, the solution is to replace the jet assembly. Some aftermarket kits provided a universal jet with a plastic nut and exposed rubber fuel line, discard these on sight and replace with Genuine SU jets.

For H series SU carburettors: There are two chronic areas of lower end leakage: the float bowl mounting stud or bolt, and the jet.
The float bowl is mounted to the body with one of three systems: a stud threaded into the body with an upper and lower sealing grommet and two flat washers and final nut, a bolt threaded into the body with a lower cupped washer and an upper and lower sealing grommet, and a bolt threaded into the body with an upper and lower fibre washer.

The fibre washer system is not prone to leakage. If leakage does occur simply replace the washers after making sure there is no debris or damage to the sealing surfaces.

The grommet systems are more problematic. Aftermarket grommets are significantly different in compound and shape compared to the Genuine SU grommets. Ether type of grommet can be used successfully, the Genuine SU grommets are easier to get to seal and less prone to leakage.

To insure your chances of a successful seal, coat the threads and all sealing surfaces with a thin coat of non-hardening Hylomar sealant. Care must be taken to avoid over application. Excess sealant can be squeezed into the fuel passage. I use an old needle to lightly paint the surfaces. The cupped washer used with the bolt tends to be too extreme in its curvature and will distort the grommet and result in leaks. Using a hammer and solid surface, flatten the washer until it has only about half of the original curvature. This will allow the washer to apply a more uniform compression on the sealing grommet while still giving added pressure to the parameter.

The jet assembly is composed of an upper and lower jet bearing, two cork glands, two gland compression washers, and a tension spring. The whole thing is held into the body with a large gland nut, large gland washer and large gland cork seal. Fuel flows through the body of the carburettor from the float bowl mounting. It enters the jet bearing between the upper and lower jet bearings. The jet has holes in the side which allow the fuel to inter the jet. The jet is sealed with an upper and lower cork gland seal - this is where most leaks occur. The cure is to remove the jet bearing assembly and replace the cork seals. Again, I find the Genuine SU parts to be superior to the available aftermarket parts. The aftermarket parts are serviceable and can provide good sealing but may require some additional work to get the jets to return when the choke is released. If you are purchasing a Genuine SU kit, be sure to order a new jet bearing internal spring as it is not provided in the kit. Soak the small corks in a light oil for at least 24 hours before attempting installation. If you rip or break a cork seal it cannot be used, never attempt to reuse the small corks. The large cork gland does not provide any critical sealing so it can be reused if in good condition.

The jet itself can leak. The saddle which accepts the clevis pin is threaded into the jet tube. If the machining or fit are not correct gasoline can seep past the treads. Solution is to either replace the jet or coat the threads with Hylomar.

For HD series SU Carburettors: A lower end leak is generally caused by a dried or cracked jet diaphragm. Replacement is best accomplished with the carburettors removed. The four screws which hold the float bowl and choke housing to the body often seize inside the threads. When seized, the screws will tend to shear at the body line and often crack the thin casting at that point. If the screws do not come out easily, do not force them. Send them to a well experienced professional SU rebuilder. HD8 carburettors are becoming rare and very expensive, don't lose a valuable body to a broken screw.
For HIF/KIF series SU Carburettors: A lower end leak is very rare. Any leak would be the result of a failure of the cover or its sealing ring. The sealing ring can generally be replaced with the carburettors still installed.

Backfire

Recheck mixture. An excessive lean or excessively rich mixture can cause back fire through the intake or exhaust.

Check for vacuum leaks. A vacuum leak can cause an excessive lean mixture and will disrupt ignition advance.

If most pronounced on acceleration check the level of the dashpot oil – use 20w oil or specific SU dashpot oil. The piston rising without restriction prevents enrichment necessary for acceleration and results in an overly lean mixture during acceleration.

The ignition timing may be too far advanced or retarded – ignition occurs while valve a is still open. Confirm the firing order and that all plugs are firing. A non-firing plug, or a plug that fires with no combustible mixture, can pump a flammable fuel charge into the exhaust where it is ignited by the burning exhaust gasses from other cylinders.

Recheck compression, use a bleed-down tester if available, a burnt or non-closing valve will allow burning fuels to ignite fuel in the intake stream.

Too rich mixture even with jet all the way to the top

On the H series, some after-market kits include jet bearing washers which are too thick, preventing the jet from reaching its full height. The jet bearing gland nut may not be tightened sufficiently, again preventing the jet from reaching full height.

The shoulder of the needle should be even with the face of the piston – placed too deep into the piston will cause rich running.

Wrong or missing piston spring will allow the piston to rise farther than intended. Too little clearance in the piston to dashpot will raise the piston farther than intended.

Float level too high. SU carburettors are generally not very sensitive to float level. Only significant errors in float level, as mentioned above, will cause a rich run situation.

Worn needle or jet – incorrect needle or jet.

Choke stuck open on HIF carbs – internal choke seal leaking. Remove the carburettors and replace the seal.

Tags:

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