

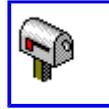
The Zenith Stromberg Water Choke

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When my last Midget project ran poorly after an engine rebuild due to an over rich mixture, I decided it was finally time to find out what makes the water choke mechanism so mysterious and widely despised by many owners of later model MGs. I scoured the MG archives (<http://www.mgcars.org.uk>), got my manuals together and ripped into it. After studying for a short time, I thought some pictures would help and grabbed my digital camera. By the time I was done, I had a pile of pictures and notes, and maybe even a rudimentary understanding of how this thing was supposed to work. And to top it off, my Midget ran great.

I didn't start out planning to write this "tech article", but as long as I had the photos and notes, I put them together in some semblance of organization in the hopes other may benefit.

I have a disclaimer:

All of the following is only my understanding. It's not necessarily correct. It only covers the choke mechanism. I tried to use the right terminology, but I also made up some names. There are enough pictures so there should be no confusion of what I'm talking about. I'm not a carb/choke specialist...not even a mechanic. I just like MGs and this choke was getting in the way of enjoying them even more. So, consider what you are paying for this information, and take it for what it's worth.

The carb and choke shown are off a 78 Midget and has a water choke, as original. However, everything should apply to the ZS on the MGB.

I would appreciate any comments/suggestions/corrections. Send them to the email address above

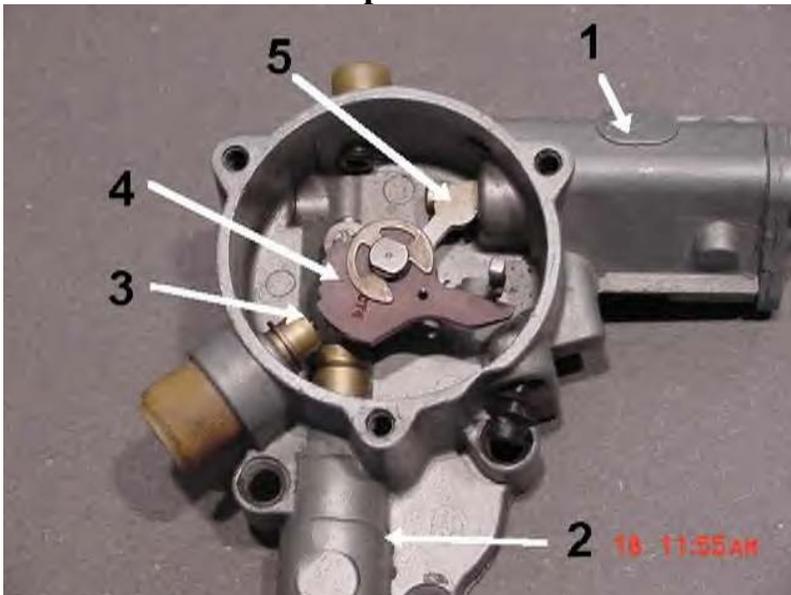
Main Parts of the Choke:

Picture 1 - Main parts



- 1) Heat Mass (Water Jacket)
- 2) Bimetallic Spring
- 3) Insulator

Picture 2 - More main parts



- 1) Kick Piston Mechanism
- 2) Enrichment Needle Mechanism
- 3) Fast Idle Pin

- 4) Fast Idle Cam
 - 5) Lever
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Disassembly:

- Take the E clip off the center peg, lift off the fast idle cam, spring and lever.
- Take out the three screws from the top of the kick piston mechanism.

Picture 3 – Kick piston screws



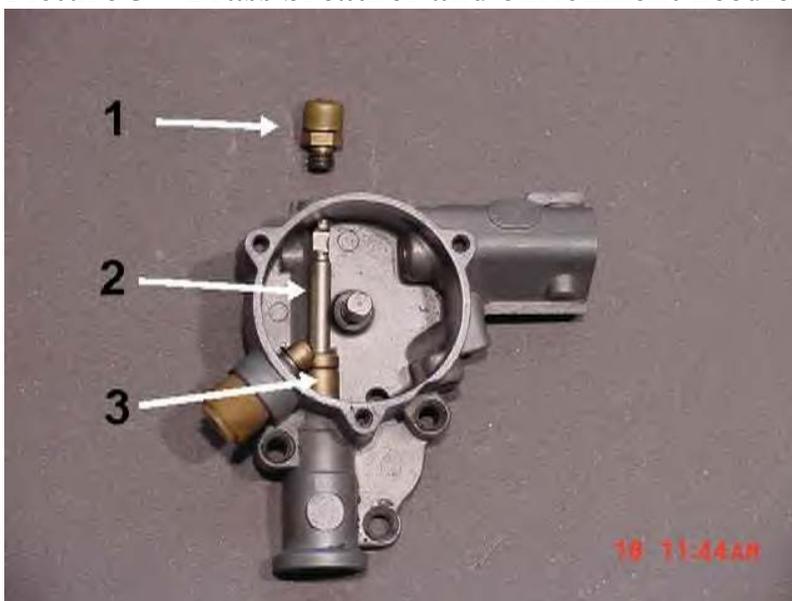
- Remove the top, gasket, plunger and rod, and spring.

Picture 4 – Kick piston assembly



· Unscrew the brass breather plug from the housing. The enrichment needle can be removed through this hole.

Picture 5 – Brass breather and enrichment needle



- 1) Brass breather
- 2) Enrichment needle
- 3) Enrichment tube

· You probably don't have to remove the enrichment tube, but if you really want to, put something on top of the enrichment needle tube, like a plastic pan head screw, so you don't damage the brass. With a punch, lightly tap out the tube. The plug on the end will also come out.

Picture 6 – Removing enrichment tube



This is the plug that will pop out when you tap out the enrichment tube
Picture 7 - Plug



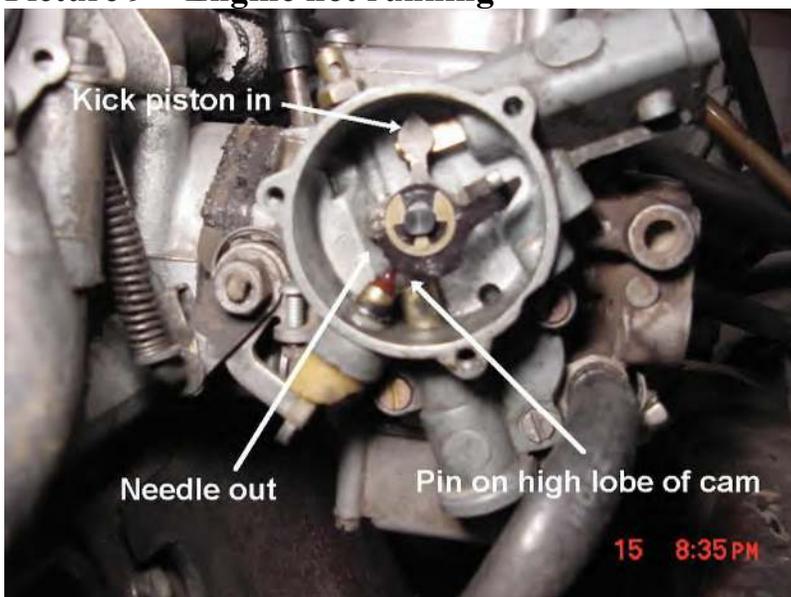
Enrichment Assembly. (Thanks to Scott for fixing this photo...)
Picture 8 – Enrichment assembly



How the choke works as I understand it:

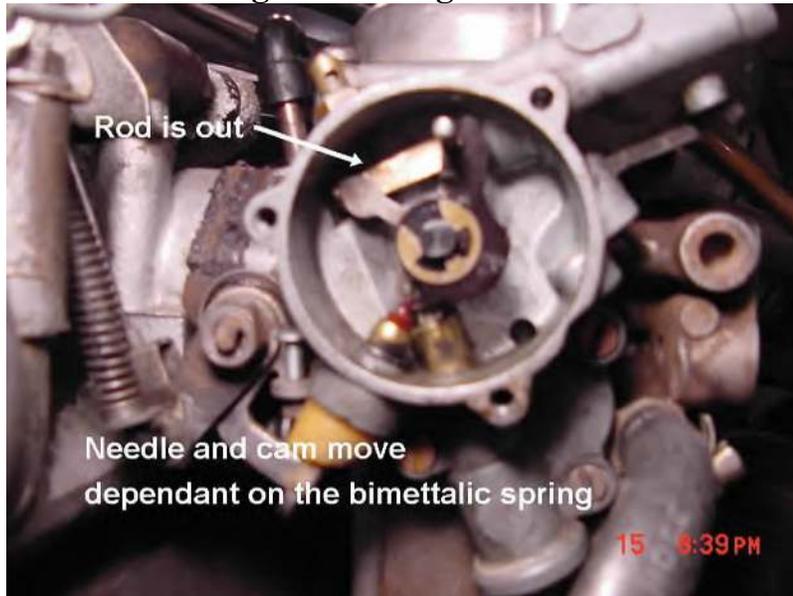
With a cold engine, before you start the car, the kick piston spring is pulling the kick piston rod in. (Picture 9). The rod is hooked to the lever, and the other side of the lever is hooked to the enrichment needle, which is pulled out. In this mode, the path is open from the carb float bowl to the carb throat. I'll show that later. The fast idle cam is also in position to engage the fast idle pin.

Picture 9 – Engine not running



When you start the car, the carb creates a vacuum in the kick piston and the rod is pulled out. (Picture 10). Since the kick piston rod has a long notch, the enrichment needle and the fast idle cam are now controlled by the lever, which is hooked to the bimetallic spring on the heat mass. The lever and spring are not necessarily in the correct position in the pictures because the heat mass and bimetallic spring are not attached.

Picture 10 – Engine running



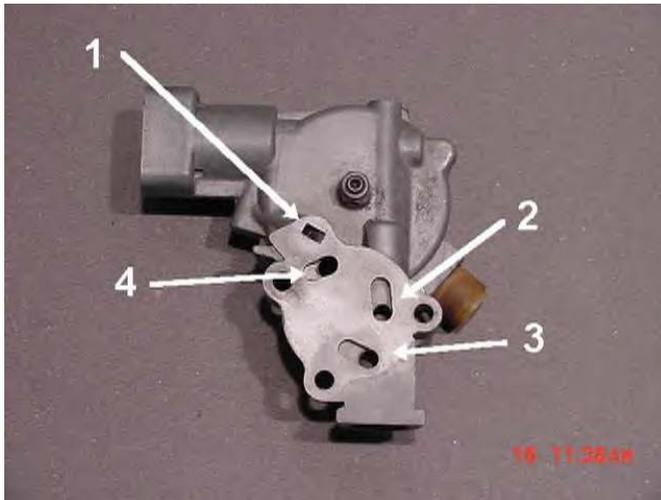
As the engine warms, it warms the heat mass, which in turn heats the bimetallic spring. The bimetallic spring will then rotate counter clockwise. Since the spring is connected to the lever, the counter clockwise motion closes the enrichment needle and steps down the idle. When the engine is fully warm, the enrichment needle is pushed all the way in and seated in the tube, closing the gas flow between the carb float bowl and the carb throat. The fast idle cam is also rotated fully counter clockwise until the fast idle pin no longer engages high lobe of the fast idle cam.

I've read that the kick piston/enrichment needle also acts as an accelerator pump. The claim is that when you accelerate hard, the enrichment needle is opened, increasing the gas flow to the carb. My observations do not support this claim. It's my opinion when the engine is fully warmed up, the choke no longer has anything to do with the cars performance.

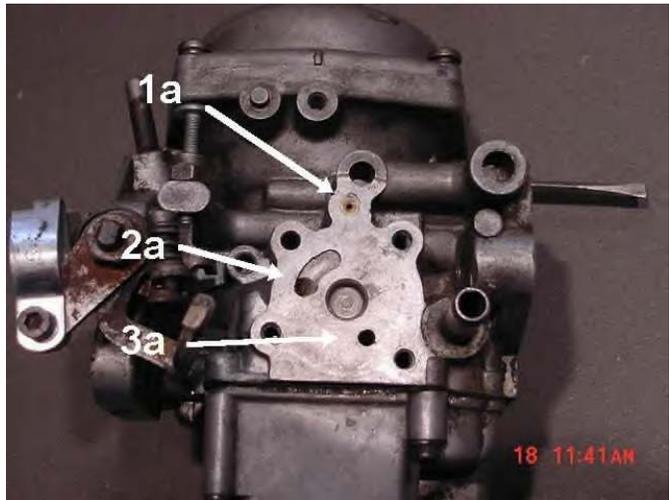
Where do all those holes go??

Here's some pictures to help understand the workings a little more:

Picture 11

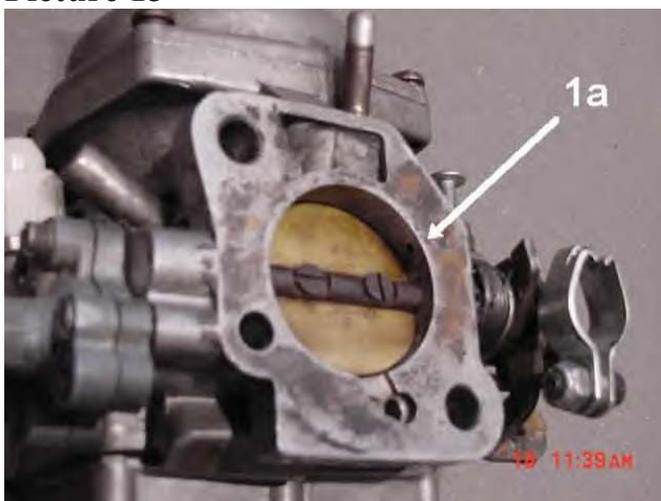


Picture 12



#1 goes to the kick piston. #1a is the port that creates the vacuum to work the kick piston. It ends up here:

Picture 13



#2 is the top of the enrichment tube. It matches with #2a on the carb which ends up here:

Picture 14



#3 is the bottom of the enrichment tube. #3a is a port to the float bowl. I didn't get a picture where that ends up.

#4 is just a hole in the housing. It doesn't have a purpose as far as I can tell.

Putting it back together:

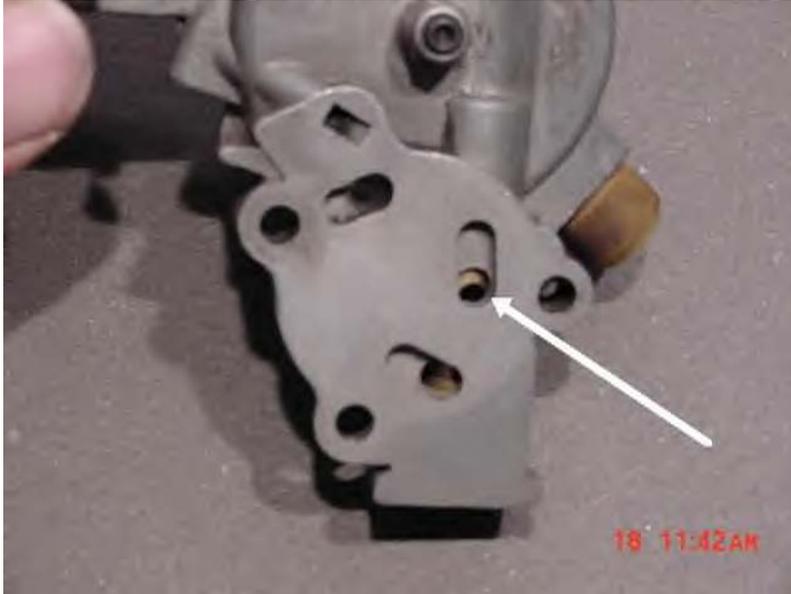
- Clean everything.
- Check/renew the o-rings on the enrichment tube:

Picture 15 – Enrichment tube



- Make sure the brass screw is in the bottom of the enrichment tube and push the tube back into the housing. Notice that the bottom holes on the tube is in a groove around the circumference of the tube. This hole does not have to align exactly with the hole in the housing. However, the top hole should align with the housing, as shown below. The tube goes in until it comes up against the rise inside the casing.

Picture 16 – Top hole of enrichment tube lined up with housing



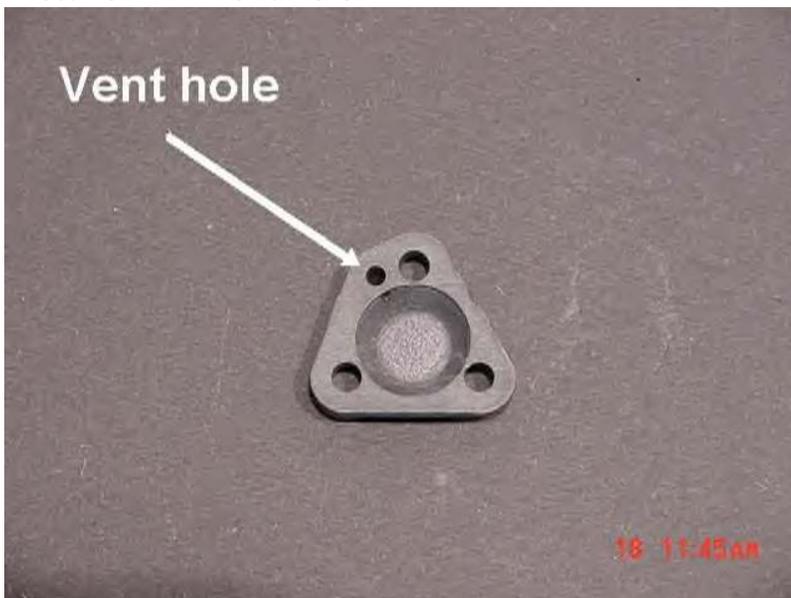
- Tap the bottom plug back in. (Picture 7)
- Check/renew the tiny o-ring on the enrichment needle. Lubricate it with some light oil and slide it through the breather hole back into the tube. Face the notch at the end of the needle up.

Picture 16 A– Tiny O-ring on the enrichment needle



· With a thin wire, make sure the vent hole from the kick piston cylinder to the back of the housing is clear (#1 in Picture 11). There is also a vent hole in the cap....make sure that's clear, too.

Picture 17 – Vent hole



· Clean and lubricate the kick piston cylinder, but don't get carried away sanding or honing. If you enlarge the cylinder or reduce the diameter of plunger, it may not provide enough seal to produce the vacuum necessary to suck the rod out. Been there, done that!

· Reinstall the spring, rod and plunger, gasket and top. Put the three screws

back in. Make sure the notch in the rod faces up.

You can check the operation of the kick piston by proper lip placement over hole #1 (Picture 11). Sucking on this hole should cause the kick piston to activate, forcing the kick piston rod out.

- Drop the lever back onto the center peg. One side of the lever fits into the kick piston rod, and the other side fits into the enrichment needle.
- Drop the spring back onto the center peg with the bottom bend between the arm that engages the kick piston and the upright that will engage the bimetallic spring.

Picture 18 – Spring placement



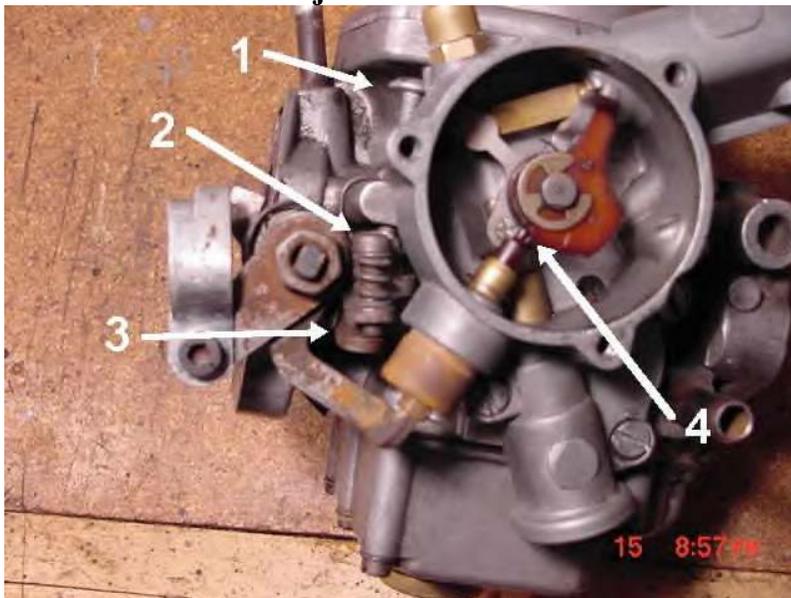
- The next part can be a little tricky. You have to get the top bend of the spring into the small hole of the fast idle cam, and place the cam back onto the center peg as shown:

Picture 19 – Spring, lever and high idle cam



- Put the e-clip back on the center peg.
- Make sure everything works freely with no binding.
- Reinstall the choke back onto the carb, using a new gasket. Put a little thread sealer on the three screws that hold the choke to the carb.
- Set the idle screws:

Picture 20 – Idle adjustment



- 1) Fast idle screw (not a factory screw shown)
- 2) Idle screw
- 3) Space should be about 3/32 inch

4) .035 (.025 for MGB, 175 carb) between fast idle pin and the cam at slow idle location.

You can reinstall the carb onto the car anytime now. I prefer to do it before I put the insulator and heat mass on. It gives just a little more room to work to get the mounting nuts started, especially on a Midget.

· Put the insulator in position, and then the heat mass, making sure the loop in the bimetallic spring engages the lever:

Picture 21 – Bimetallic spring and lever



· Reinstall the three screws that hold the heat mass, but do not tighten yet.

· Rotate the heat mass until the index marks on the heat mass and the choke body align, then tighten the three screws. (Not too tight...they strip easily)

Picture 22 – Index marks



· Reconnect the hoses to the heat mass, making sure you don't rotate the heat mass while doing so.

It should be ready to go.

Picture 23 – Carb and choke installed



You will probably have to fool with the fast idle and the slow idle screws to get them set correctly. Also, you may find that lining up the index marks may result in a mixture too lean or too rich for starting and cold running. To adjust, loosen the three screws that hold the heat mass, and rotate the heat mass counter clockwise to lean the mixture, and clockwise to richen it. Don't turn too much....a little goes a long way. If everything is working right, the

mixture should lean as the car warms. The idle should also drop in steps as it warms, but you have to tap the accelerator to move the high idle pin off the high idle cam, allowing the cam to rotate counter clockwise.

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