Stick Proof Your Fuel Valve

Al Coha (AZ) - Certain tapered plug type fuel selector valves have been reported to stick in use so that fuel supply is compromised or becomes unavailable in flight. The Vari-Eze and Long-EZ remote tapered plug type fuel valves have stuck, resulting in one or more fatal accidents. Fuel selector valves must operate reliably and the plug type can easily be modified to be 100% reliable.

I have been using a modified tapered plug fuel selector valve (Imperial 108HD-04) on my Vari-Eze for 18 years with never a sticking problem. The modification was to shorten the tapered plug spring to reduce the contact galling pressure between the valve plug and barrel when the plug was turned to a selected position. The valve can now be turned with one or two fingers.

The modification procedure follows:

1. Remove the valve from the plane and remove all fittings. Place the valve on a vise gripping the body at the in-line ports. If the valve is not installed and cannot be turned (frozen) use some LIQUID WRENCH or WD-40 on the plug in the ports. Place a wedge (small cold chisel) on each side of the shaft between the handle and the body nut and gently free the shaft using the wedges. Remove the handle from the shaft.

2. Unscrew the plug cap nut from the plug body and remove the cap, washer and O-ring.

3. Remove the spring and measure the length. (Mine was 0.495").

4. Measure and calculate the spring cavity length in the body. (Mine was 0.325").

5. I then measured the force necessary to compress the spring to 0.325" and found this value to be 15.5 lbs. This pressure is too great and causes galling and sticking. The solution is to reduce the pressure by shortening the spring.

6. I then pushed a 11/32" diameter drill shank into the center of the spring and, using the drill as a handle, shortened the spring with a grinding wheel to 0.025" to 0.030" longer than the cavity depth. (In my case the spring length was reduced to 0.350").

7. Before reassembly, I cleaned all parts and lubricated plug and body cavity with molybdenum disulfide grease.

8. Test the fuel valve's operation. If the stem is first pulled to loosen the plug before turning you will never have a stuck or frozen valve.

If you have any questions on the above procedure, please call me at (602) - 546-6646 or by e-mail alcoha@juno.com

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Alpine Aviation, Great FBO

David Orr (CA) - The Provo, UT FBO was helpful and gave good service. Owner, Tim, said he loved EZs and would hangar them overnight free.

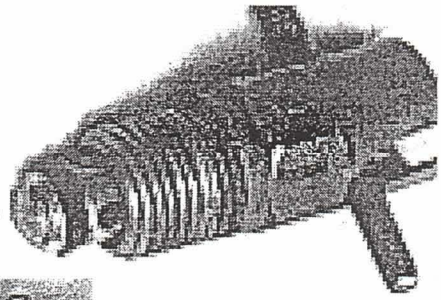
Fuel Drain Valve Caution

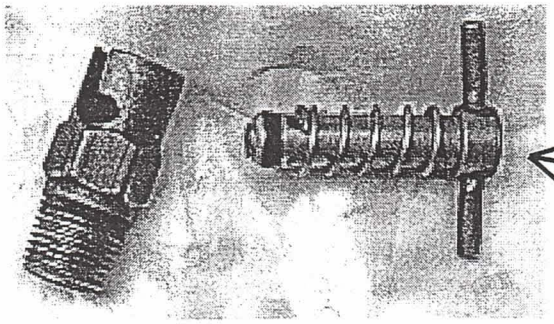
I recently received a broken Curtis type fuel drain valve from Ken Clunis. He indicated the valve was on an Aircraft Spruce gascolator. The valve is commonly used and certainly not restricted to parts sold by AS, however. Ken was inspecting parts prior to firewall installation and noted the valve center was protruding from the valve body farther than normal. Closer examination revealed the brass retaining material had failed and allowed a washer to fall off which then allowed the valve to come apart. If this had happened in flight, rapid loss of fuel would have been assured.

The valve's design calls for a small brass shaft to stick through a washer and then be peened over to hold the washer in place. Work hardening of the brass may occur and allow cracks to form. The domed rivet head, formed by the peening action, then falls off and the washer can no longer hold the valve in the valve body. A rubber O-ring provides friction in the valve body and tends to hold the assembly together. It looks OK but is on the verge of coming apart.

I had this happen on my Long-EZ, also, so it is not an unheard of problem. It is wise to look at the end of the valve each time you drain fuel on pre-flight and inspect the peened end when the gascolator is removed for inspection each 25 hours. I suppose "snapping" the gascolator drain valve shut might put a higher shock load on the peened end and might contribute to premature failure but I would hope the design allowed for such treatment.

The Curtis valve has a washer riveted on the end to keep the assembly locked within the valve body. The washer is larger than the O-ring assembly.





The washer is missing from this unit and the valve has fallen out of the body.