

Replacing front lower spark plugs inside Beechcraft Bonanza cowl

(Or how in the heck do you get a torque wrench in there)!

The task of removing and replacing the lower front spark plugs from the cylinders of most older Beechcraft and some newer models has always been a bit difficult. My personal experience was gleaned by the need one day to remove for inspection the two front left spark plugs number #6 & #4 from the Continental 0470-K engine in my 1962 Debonair.

Removing the plugs was not that difficult, just use the 7/8 deep socket I purchased from Aircraft tool supply and my craftsman 3/8 drive ratchet. The Spark plug socket from ATS is unique in that it has a magnet that keeps it in place on the sparkplug even when it is hanging down in position on the lower cylinders.

In my case I had a rough running engine during the run-up check, and my EDM-800 from JPI showed a serious noticeable difference in the indications of the vertical segmented scale, of the #6 & #4 Egt readings. A pretty good indication of a plug or plug(s) misfiring, both the JPI and the Electronics international systems are good for this information.

I pulled the two front plugs and looking into the business end of the #4 plug there was a visible chunk of carbon, between the center electrode in the gap. Albeit I missed it at the first look, but then I remembered my age, actually my wife was helping me and she is considerably younger than I and she saw it and handed it back to me saying, "There is too something in there"!

Not being one to refuse the help of a second pair of eyes, and after putting on my reading glasses, (younger owner/mechanics probably won't understand how a person could miss seeing a tiny carbon speck, but give yourself some time you will understand).

It was a simple process of cleaning the plugs and (blowing compressed air into the cylinders too to help clear any other loose carbon etc). I used the recommended Champion anti-seize and replaced the plugs, screwing them in finger tight and snapping in place the Aircraft tool supply 7/8 deep spark plug socket. Then I snugged it up on #6 with my craftsman 3/8" drive ratchet and reached for the 10" 7 to 50 ft pound torque wrench set at the recommended 25 ft pounds.

"Huh"! that's odd the torque wrench ratchet head would not go into place, there was something in the way? What was in the way was the exhaust manifold tubing. I tried a short extension but there was no room? It hit on the inside metal rib of the cowling just adjacent the spark plug socket end. Since the ATS deep socket had a 7/8 hex end on it I tried using my Belknap preset torque t-100 tool with a 7/8 open end.

I was able to set the spark plug torque with it that way, and I should have been satisfied. But ever the perfectionist, I thought about it and wondered if the original builders & mechanics who had previously service my aircraft had a secret I did not know about?

Checking online I was not able to find a great deal about the removing and replacing of 0470 spark plugs from the lower cylinder positions. There was a lot of information about Torque,, anti-seize, finger tightening the end caps and such, but nothing about how to get into that tight area with a torque wrench to set the recommended 25 ft pounds of torque.

Now some may laugh at my pondering and others may scoff, but we all learn by experience and a good experienced mechanic as a teacher is a priceless thing. But when there is not one around to ask or the ones you do ask just shrug it off, look at you and smile or just make an open blank statement like, "I just tighten it by FEEL"! That philosophy may work great on your average Buick or go cart, but that type of statement makes me cringe! The thought that I just paid somebody to "FEEL" my aircraft engine together just does not seem the right way to do aircraft maintenance.

Some of us learn from others that way, some of us learn from common sense and deductive reasoning. A few of us learn by bad experiences. I have never wanted to be one of the latter group. I mulled it over and then it came to me, if the ATS deep spark plug socket was just $\frac{1}{4}$ to $\frac{3}{8}$ " longer, the end of the $\frac{3}{8}$ " drive of the torque wrench ratchet would clear the exhaust header tubing and I could apply the proper pressure on my click type torque wrench and finish the job to my satisfaction and in my mind "properly by the book"!

Remembering the $\frac{7}{8}$ " hex fitting at the end of the ATS deep spark plug socket, I looked in my tool box for a short $\frac{3}{8}$ drive $\frac{7}{8}$ " socket. And there it was. I had never used that short stubby little thing, Model# 34463 $\frac{7}{8}$ ". Sliding it over the end of the ATS spark plug socket six point end it gave me just the distance of extension I needed and "CLICK" 25 ft pounds set mission accomplished.

I repeated that same action on all the bottom spark plugs and when it came time for run-up I had Six smooth running properly torque spark plugs and that I would have a good night's sleep knowing the job was done right.