

To: BOB.NUCKOLLS@AEROELECTRIC.COM

Subject: Re: AeroElectric-List: Re: Relay for Critical Power Feed

At 08:18 AM 10/20/2013, you wrote:

--> AeroElectric-List message posted by: "Eric M. Jones" <emjones@charter.net>

Don't use Type-70 Stancore-White-Rodgers-Emerson-Tyco contactors in your aircraft. The reasons are plentiful: They have a 122 deg F maximum ambient. They are not water or fuel proof, they won't open against high currents or voltages. They are position sensitive and have low G-withstands. Disregard the fact that they have been used and failing for many years. There are better ways to go. Bob N. and I have argued this for years. Here are some excerpts from the archives:

"Better" is non quantitative. Just a few weeks ago I received a failed, 70-series contactor removed from a 70's model Cessna. The owner believed that it was the original contactor. We did a tear down and discovered that indeed, the contacts had become intermittent due to corrosion on contacts exacerbated by ingress of moisture. Mechanically the device was intact and functional . . . after 30+ years of service.



Here's the mating set of contacts . . .



For a device that has been operated for 30+ years "outside the spec sheet" envelope of limits it looks pretty good to me. Would this Cessna owner be well advised to install something "better"?

If "better" means that some other device will not succumb to moisture (sealed contact chamber) and it has higher ambient temperature ratings, then yes, this carry-over from the 1940's has some peers with improvements that have evolved over time . . . often crafted to meet the needs of a more antagonistic environment.

But when cherry-picking of features that are "better" becomes a driving force in our decision making processes, then other authors on this List could opine that one should avoid the IO-360 in favor of some newer technology. Or perhaps we are well advised to abandon panel mounted switches . . .

We gave up these switches



in favor of these . . .



For reasons that are fairly obvious. But consider the constellation of simple-ideas that come with the use of this part in your airplane:





Every owner of a Baron or Bonanza has a new item on his/her worry-list due to an un-foreseen deficiency in the design . . . a deficiency that took decades of field service before it bubbled up and people-paid-to-worry took notice.

Even people-paid-to-worry have not banned the humble ol' workhorse that is the 70-series contactor from flying aboard airplanes. We can sing the ballad of dueling specsheets but the bottom line is that this product has a SERVICE HISTORY that demonstrates it to be good value. I.e. performance traded against cost of ownership while being attentive to increased risks.

Since we're ALL building failure tolerant electrical systems I can confidently suggest that consideration of "better" contactors is driven more by our desire to own and drive a Benz as opposed to a Ford . . . in spite of the fact that both vehicles have high order probability of getting us from point A to point B over 15 years and 200,000 miles at low risk . . . but with markedly different costs of ownership.

Everything Eric has offered is true. The point of this discussion . . . indeed the point of this List is to sift the simple-ideas of any recipe for success and make decisions based on cost of ownership weighed against risk while sprinkling in some personal preferences for V-Power or EXP-Bus in with the gaggle of fuses and toggle switches. Just as S-K vs. Harbor Freight tools are judged in the marketplace, the value of a recipe-for success in our airplanes is demonstrated in the air.

It's not WHAT we choose to use but the UNDERSTANDING we bring to airplane to keep OPERABILITY high, RISKS low while fitting COST of ownership to our own bank accounts. The 70-series contactor has demonstrated itself not to be a black hat lurking behind a rock awaiting the opportunity to give you a bad day in the cockpit. In 50 years of hammering on airplanes I can confidently assert that the greatest risks for failure to perform are human factors issues of installation, maintenance or operation. Failure to perform based inattention to specifications is VERY low on the list things cause pilots to break a sweat while airborne. Failure tolerant design strives to make any failure a MAINTENANCE and COST OF OWNERSHIP issue as opposed

to a reason for breaking a sweat.

Bob . . .