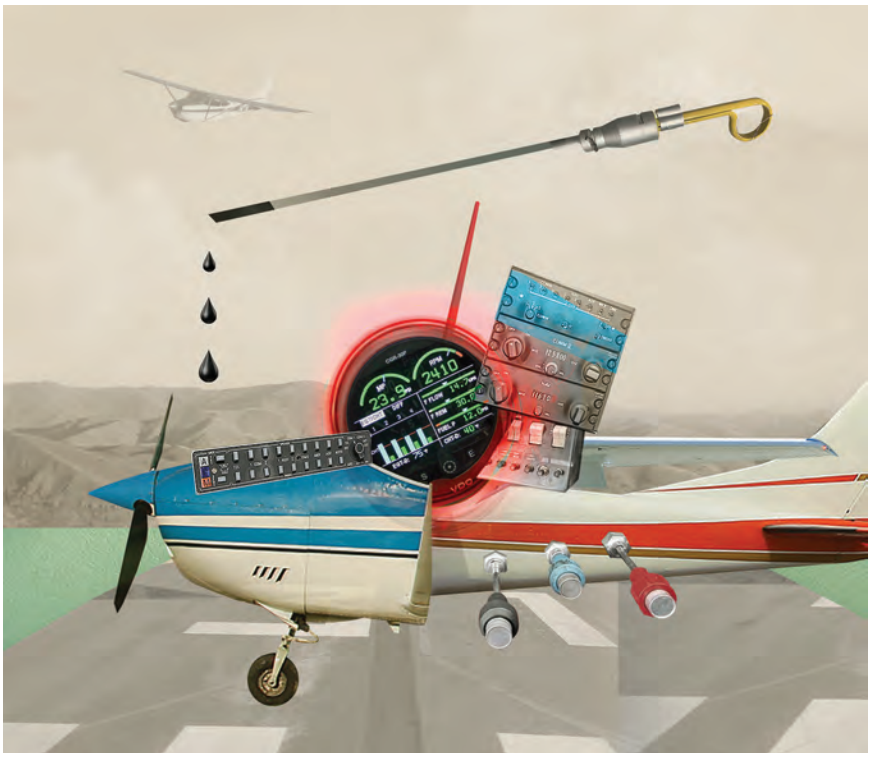


SAVVY MAINTENANCE / OPINION

Temps gone wild

When his Skylane's engine monitor readings went crazy-high, Frank asked for help

BY MIKE BUSCH

"I JUST FLEW my Cessna 182 from Kansas City to St. Louis to drop off a passenger there," Frank Annecchini told the operator who answered his call to the 24/7 breakdown assistance hotline operated by my company, Savvy Aviation. "Everything was normal. But after I dropped off my passenger and taxied back out for takeoff, my oil temperature was above 390 degrees Fahrenheit and all my CHTs were above 440 degrees F. I taxied back to the parking area, shut down the engine, and checked the dipstick. The oil level and color look normal. But even with the engine shut down, the oil temperature is 330 degrees and the CHTs are around 420 degrees. I'm not sure what to do."

The operator dutifully transcribed this onto a breakdown ticket on the Savvy platform and asked Annecchini for additional information. She learned the airplane was a 1963 Cessna 182F that was AOG at Spirit of St. Louis airport (SUS), and obtained Annecchini's cellphone number. She transcribed this info to the ticket, too.

DANA SMITH

"Expect a callback within 15 minutes," the operator told Annecchini.

About 10 minutes later, Savvy's on-call account manager, A&P/IA Tom Cooper, called Annecchini back, but the call rolled to voicemail so Cooper left a message.

While waiting for Annecchini to call him back, Cooper brought another Savvy account manager, A&P/IA James Watson, onto Annecchini's ticket. Watson owns and operates Watson Aero LLC in Louisville, Georgia, a superb aircraft engine overhaul shop, and serves as one of several engine specialists on Savvy's technical team.

Watson reached Annecchini via cellphone. He went over all the information on Annecchini's ticket, asked some questions, and learned that Annecchini's 61-year-old airplane was equipped with a very modern and capable digital engine monitor, an Electronics International CGR-30P.

Differential diagnosis

Watson knew that modern digital engine monitors like the CGR-30P are usually extremely accurate. Yet the oil temperature readings that Annecchini was reporting were highly suspect. If the oil was at 330 degrees or 340 degrees, it would be caramelized and look dark and smell awful. But Annecchini had checked the dipstick and found the oil looked and smelled normal.

The cylinder head temperatures Annecchini was reporting in the 420 degree and 440 degree range would have been abnormally high but possible had the airplane been at full takeoff power—CHT redline for the Continental O-470-R is 460 degrees—but 440 degrees was clearly impossible with the engine at taxi power, and 420 degrees was even more impossible with the engine shut down.

When an instrument reading violates the laws of physics, it has to be wrong. Clearly, Annecchini's fancy digital engine monitor was lying to him. But why?

If the engine monitor was displaying just one or two temperatures that were crazy, the problem might have been a bad oil temperature or CHT probe, although the thermocouple probes used by most modern engine monitors almost always fail in the low direction, not the high direction. But Annecchini was quite certain that all six CHTs were showing 420 degrees or higher, and he was pretty sure that all the exhaust gas temperatures looked higher than normal, too, although he really hadn't focused on them.

Watson mulled this over and then told Annecchini that he could think of only one possible explanation for what Annecchini was seeing on his CGR-30P.

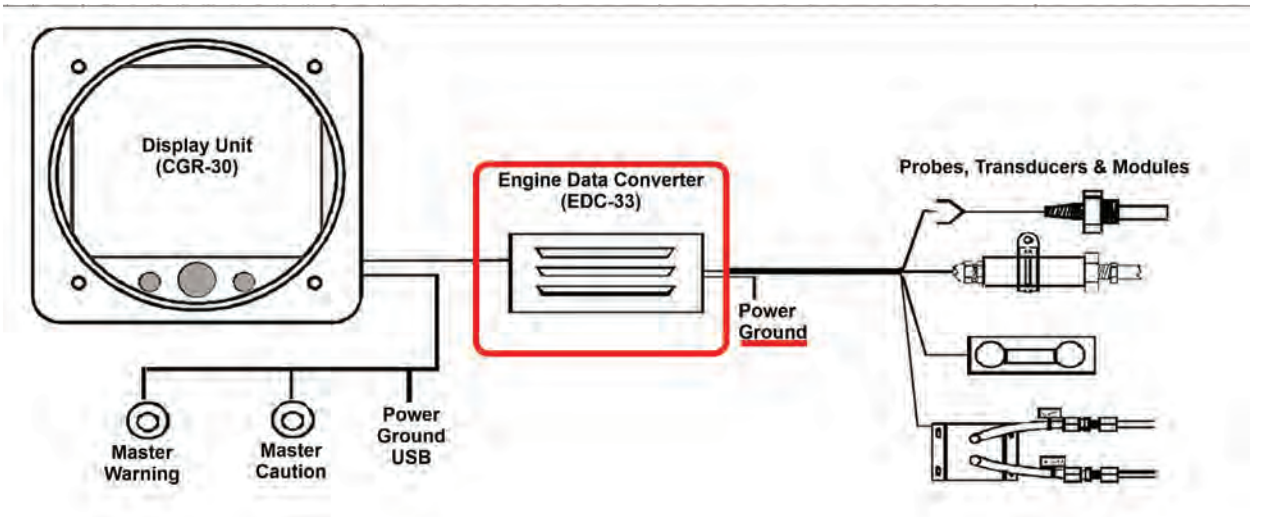
Prime suspect: the EDC

Watson knew that the CGR-30P uses a remote-mounted module called the Engine Data Converter (EDC) to take the millivolt analog signals from the thermocouple temperature sensors and convert them to digital temperatures that are then sent via a serial datalink to the panel-mounted CGR-30P display.

Watson was confident the reason the CGR-30P was lying about all those temperatures had to be an analog problem and therefore something related to the EDC. Although it could have been an internal EDC failure, Watson suspected that a bad (high-resistance) ground connection between the EDC and the airframe was the most likely explanation.

Watson asked Annecchini if he could locate the EDC, explaining that it was a small 4-by-6-inch metal box that is usually mounted somewhere on the cockpit side of the firewall and has several thick bundles of wires connected to it.

Annecchini stuck his head under the instrument panel and looked around. "I'm pretty sure I found it!" he told Watson. "Try wiggling the plugs that connect



The CGR-30P uses a remote-mounted EDC module to convert analog sensor data to digital data that it sends to the cockpit display.

to the EDC and make sure they're all securely attached. Also, check the mounting screws and make sure the EDC is firmly attached to the firewall." Annecchini proceeded to poke, prod, and wiggle everything in the vicinity of the EDC.

The smoke test

"OK, now turn on the master switch let the CGR-30P boot up, and then let me know what temperature indications you see."

Annecchini followed these instructions and lo and behold the oil temperature and CHTs were nice and cool.

Watson suggested that Annecchini should start the engine, taxi out, perform a normal preflight runup, and if the temperature readings still looked normal, take off and fly home to Kansas City. "If the temperatures are still wonky, taxi to parking and call me back."

The temps remained normal. Annecchini had an uneventful flight home, and reported this to Watson on the ticket. Watson suggested that Annecchini have his regular mechanic or avionics technician double-check the EDC connections just to be on the safe side.

Epilogue

Annecchini's experience is not unusual. About 50 percent of the time an aircraft owner calls us on the breakdown assistance hotline with an AOG issue, we are able to diagnose and resolve or work around the problem and get the caller back in the air quickly and safely without involving a local shop or mechanic. The other 50 percent of the time, we provide a pinpoint diagnosis and then work with a local mechanic to get the problem resolved as soon as possible.

Savvy's breakdown assistance hotline is the aeronautical equivalent of roadside assistance—we refer to it as "AAA for GA." The biggest difference is that we can't just call a tow truck to haul the airplane to a repair station—we have to deal with the problem wherever the airplane is stuck. That can sometimes get tricky, especially if the AOG occurs at an airport with no maintenance services. (I recall one call we got from the owner of a Cirrus SR22 that suffered a prop strike on an island airstrip that could be reached only by ferry boat; that one was fun.)

But we do whatever it takes to get the caller back in the air. And often all it takes is a phone call from a subject matter expert who really knows his stuff. ■

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