

Oil Temperature Solved After 8 Years

✓ *Terry Scherman & Ron White (IA)* - My Long-EZ, N38AR, and Terry Scherman's Long-EZ, N180TS, are powered with Lycoming O-290 engines with large 10 row oil coolers mounted on the rear lower baffling. Both installations exhibited excessively high oil temperatures.

Over the years, I've tried various suggestions from other EZ pilots to direct air to and through the cooler. **NOTHING WORKED!**

When the OAT was 50 degrees F or less my oil temperature would be 200 degrees F at 2,400 RPM. If the OAT was over 70 degrees F the oil temperature would run 210-215 degrees F at 2,300 RPM. At air temperatures above 70 degrees F I would lower the engine RPM to keep the oil temperature below 215 degrees F.

I installed a second oil temperature probe at the prop end of the main oil galley. It ran 5-10 degrees F higher than the first one which is located at the output of the oil pump.

Terry moved his cooler above the mags to draw air out of the top of the cowl through a NACA scoop. This helped, but not like we had hoped it would. There was only about a 10-15 degree F temperature drop. A drawback to this cooler location was that the oil from the oil cooler would drain back into the oil sump after engine shut down. That caused the oil pressure to be slow to come up during subsequent engine starts. The oil had to fill the cooler before oil pressure would be had at the bearings. This was a concern because no oil pressure means dry bearings, even if only 5-10 seconds longer every time the engine was started.

Terry was also testing different oil filters since he had the original oil screen on the engine. From this testing he learned that he was getting a large oil pressure drop through the filter, lines, and cooler - over 60 PSI!

The pressure output of the pump was running 130 PSI to get an engine operating pressure of 70 PSI. This pressure was being limited by the 50 PSI oil cooler-filter bypass valve he had built in to the adapter. This told him that if he would not have installed the bypass he could have blown up the filter which was only rated at 150 PSI and it also told him that the oil was by passing the cooler. With cold oil (100 degrees F) the bypass would open at only 1,600 RPM.

At this time a hydraulic flow chart was consulted and showed that the, Rutan specified, - 6 oil cooler hose caused a 50 PSI loss at the Lycoming's 6 GPM flow. The chart also showed that a - 8 hose would have only a 12 PSI pressure drop. I then realized my high oil temperature was caused by lack of oil flow through the cooler not by lack of air flow through the cooler. I next installed - 8 hoses and fittings on my cooler and after 120 hours this summer here are my new oil temperatures:

When OAT is up to 70 degrees F my oil temperature is 100 degrees F above OAT. When OAT is up to 85 degrees F my oil temperature is 105 degrees F above OAT.

When OAT is up to 95 degrees F my

oil temperature is 110 degrees F above OAT. When OAT is over 95 degrees F my oil temperature is 115 degrees F above OAT.

The fix for the high oil temperature problem caused a different problem which I'd not had in 8 years of flying. My oil temperature was too cold. The first day I flew with 50 degrees OAT and 6 miles visibility I got carb ice for the first time in over 900 hours of flying.

To correct this problem, I now have a device similar to a heat register louver for a forced air furnace. This was made by a local CSA member, Tom McGovern. I put the louver over the output of the oil cooler to control air flow through the cooler. I operate the louver with a 12 volt DC electric motor controlled with a simple reversing switch. Stops and limit switches were built in along with 2 LEDs in the cockpit to tell me when the louvers were all the way open or all the way closed.

Now, for the first time, I can maintain a 180 degree F oil temperature regardless of OAT up to 80 degrees air temperature. Terry has also solved his oil temperature problems by installing a large automotive cooler with - 8 hoses and fittings at the inlet of the lower NACA scoop.

