FTA Air Conditioning Systems: The Real Reason Your Condenser Fan Relay Keeps Failing

By Kevin Crozier

Ever sit on the ramp with your FTA / AC Systems air conditioner running and wonder if it's really doing its job? Perhaps the cabin doesn't feel as cool as it used to, or the compressor seems to cycle on and off more frequently than usual. You might even notice the AC works well in cruise but struggles to keep up on the ground. This could mean the condenser fan isn't running.

Photo 1: The relay module connector with the damaged pin 15 and the populated pin 14

If your FTA air conditioning system condenser fan has stopped working, and you've replaced the relay, and it happens again a few flights later, you're not alone. You can keep replacing the relay, but it's not the real problem. The real trouble lies in the connector between the relay module harness (a harness FTA buys from a supplier) and the main FTA harness (designed and developed by FTA).

Here's the root cause: On the relay module harness side, the relay fan output is wired to two pins, pin 14 and pin 15, in the connector (**Photo 1**). The current load is designed to be split. However, on the FTA main harness side, FTA only populated one of those pins, pin 15, in the connector. That forces all the condenser fan's current through a single contact that was never meant to handle upwards of 15 amps alone (the connector pins are rated for 10 amps).

Over time, that single pin gets hot. The pin gets damaged, and it starts arcing. The connection weakens, eventually the relay burns up—taking the condenser fan out of service.

Swapping relays repeatedly won't fix it. The damaged connector pin will continue to cause the relay to fail (and may even cause damage in the ECU, the electronic control unit). Before replacing the relay, open the connector and look for discoloration, pitting, or melting around pin 15 – it will be obvious (**Photo 2**).

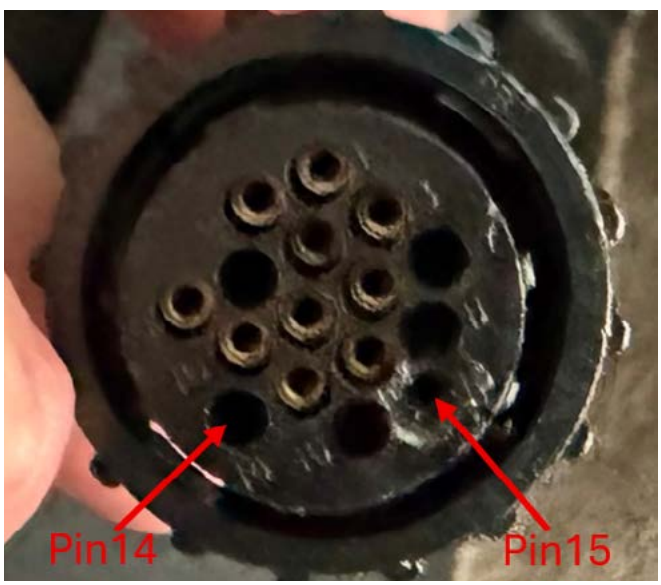

Photo 2: The relay module connector with the damaged pin 15 and the populated pin 14

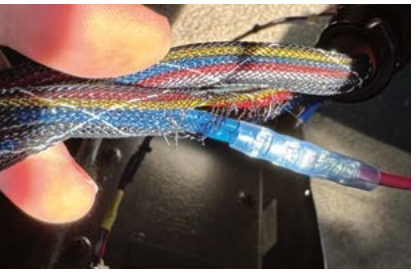

Photo 3: The splice in the relay module harness, bypassing pins 14 and 15

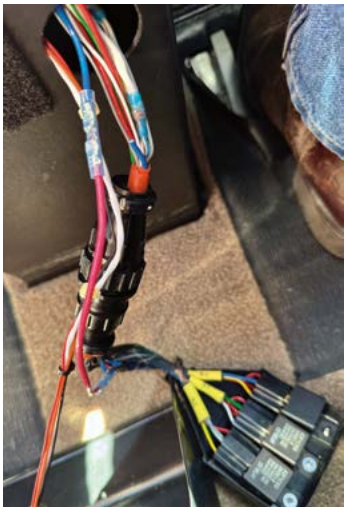

Photo 4: The splice on the FTA harness, bypassing pin 15

The simplest solution is to bypass the connector for the condenser fan circuit. Under the supervision of a qualified A&P, splice a wire from the relay module harness, specifically the two blue wires connected to pins 14 and 15 (**Photo 3**) to the condenser fan feed wire in the main harness, which is a thicker blue wire connected to pin 15 (**Photo 4**). The other solution would be to replace the damaged pin in the connector, add the missing second pin to the main harness, and splice it into the condenser fan wire so the load is properly shared.

In many FTA AC systems, the problem isn't the relay or the fan at all, but the connector between the relay and the fan. Once you know where to look, the fix is straightforward: bypass the bad connection or add the missing pin, and the problem stays gone. Solve it once, and you'll keep the cabin cool without further trouble.

POSTSCRIPT – After circulating this information with other Bonanza owners with FTA AC systems, I have learned that the 14V systems have a different connector configuration than the one shown in this article. It appears that the condenser fan connector is in the rear of the aircraft near the evaporator (not near the relay module). Additionally, another owner with a 28V system has spoken with FTA recently, and they indicated that they now bypass the connector when installing new systems. My 28V system was installed in 2019, so my specific configuration may not exactly match yours. Always consult with your A&P and FTA before performing any repairs to your system.

Kevin Crozier is the caretaker of a 1981 turbonormalized A36 now with ice-cold air conditioning. He's an ABS Recognized Instructor (CFI / CFII / MEI), and an FAA-designated software Designated Engineering Representative. Kevin is the owner of KTronics Aero Services, located near Austin, Texas.