

**From:** Pete Rawson <[REDACTED]>  
**To:** jeffrey E. <jeevacation@gmail.com>, [REDACTED] <[REDACTED]>  
**Subject:** Re:  
**Date:** Sat, 09 Apr 2016 23:02:09 +0000

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Hello Jeffrey,

Larry knows that I am long winded with my responses,  
Here is my brief-

Feel free to read all at your leisure-  
They are mostly my thoughts so far-

I suspect that the right precoolers (fan air) modulating valve is bad.  
They are both original.

From the last video and Photo's;

The readings show that the left side is being given a voltage to the Torque motor sending a pressure to command the valve to be partially closed.  
Zero volts, zero pressure is for full open, ie: cold air into the precooler and lowering the temperature into the supply system.  
The signals show a steady state condition; 3 Volts, 3 PSI.  
The valve has been sent signals, and has responded correctly, and therefore is in the proper position to maintain 400 degrees in the supply system.  
This is being monitored, and controlled by the controller, and the sensor inputs.  
There is no signal from the valve, the temperature monitoring circuit controls the changes required.

The right side shows that it is being commanded to close due to the high voltage, and pressures.  
( 9 volts, 9 PSI)  
It seems that the signals are not being followed, or that the valve cannot respond to them.  
Since the control system does not see the temperature change from the sensors, it continues to increase the pressure to the valve.

Brief complete-

As for the full version-  
This was done as a draft, please excuse any duplication for items noted in the brief, these were my original thoughts.

I agree with all that you stated-  
The guidelines are for what the electrical system does.  
We have found a bad controller- the sweeping voltage and pressures, and replaced it-  
There was also a bad sensor that was replaced-  
We have swapped the pressure regulator/torque motors.  
Latest swap was the Anticipators.

There seem to be multiple issues, and we are narrowing them down.  
I believe that the electrical and control systems are now operating normally.  
Now on to the air side of it.

From the last video, and photo's-  
I believe that the left side is operating properly.  
The Temp is being controlled by sending a regulated pressure to the valve, and it responding.  
The pressure supplied is closing the valve, and maintaining the 400 Degrees requested.  
No voltage equals no pressure, Valve open, lowering the Temperature.

The right side shows giving a close signal to the precooler (fan air) valve.  
High Voltage, and pressure supplied to the Valve on that side to close, and increase the temperature.  
That side doesn't seem to respond.  
The valve has a 4 inch input/output side.  
The control line is about 1/4 inch.  
That is one of the lines that we found collapsed, and started us on this direction.

Is it possible that the supply air is not being able to overcome the pressure at the valve?  
The pressure read at the panel is a control pressure, also known as "Muscle air".  
Maybe the input air at the 4 inch diameter inlet, can overcome the control air.  
I again suspect an issue with the LP valve-

There is no valve position, or feedback signal from the valve-  
The electrical signal is showing to close the valve,  
The pressure is also showing to close the valve.

One way to check is to select Wing heat on-  
The system causes the applicable side to remove the signals, and allow the valves to go full open.  
Wing heat is not normally used at altitude-  
When the aircraft is in below 0 degrees temps, there is no reason, since any precip won't stick.  
Ask Larry if there any issues with selecting the wing heat on at altitude-  
I don't believe that there are any limits to the altitude, but the fuel burn will be increased.

Just a quick check-

The ground checks for the precooler system are limited,  
Engines running, there should be no air flowing from the lower pylon heat exchanger at idle-  
Increase power, and there should be airflow noticed.  
My training manual shows that the valve should start to open at about 74% HP on the ground,  
Wing heat on, there should be airflow.

Regards,  
Pete

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**From:** jeffrey E. <jeevacation@gmail.com>  
**Sent:** Saturday, April 9, 2016 10:13 AM  
**To:** [REDACTED] Pete Rawson  
**Subject:**

The precooler fan air modulating valve (installed in the engine pylon) controls fan air airflow to the precooler in order to maintain a nominal 400° F (204° C) bleed air temperature. Precooler outlet air temperature is continuously monitored by a precooler outlet temperature sensor and a precooler temperature control anticipator sensor. Outputs from these sensors are transmitted to the precooler temperature controller. The controller, in turn, will change the output voltage to the servo air pressure regulator and torque motor. The servo air pressure regulator and torque motor then changes the electrical signal to a filtered pneumatic signal, positioning the precooler fan air modulating valve accordingly

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please note

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