

From: Pete Rawson <pete.rawson@meridian.aero>

To: jeffrey E. <jeevacation@gmail.com>, Larry Visoski <[REDACTED]>

CC: Pete Rawson <pete.rawson@meridian.aero>

Subject: Re: GIV update

Date: Sun, 10 Apr 2016 23:27:19 +0000

Hi Again Jeffrey,
Questions from me-

The 25 minutes- Is that during the climb?
Did the voltages change on level out?
ie, power back, when reaching cruise flight-
I would expect reaching cruise altitude at around 25 minutes.

The voltage is showing the amount of pressure to close the valves-
They are spring loaded to open, the more pressure is to close them, and reduce the temperatures.

When anti-ice was selected, did the left show zero?
The issue of voltage being present on the right- 2 volts-could point to another electrical issue-
As you mentioned at the end, with the pulse issue.
Electrically, the system should lose all voltage when the Anti-ice is selected on.
The system is DC voltage, and should not be affected with fluctuations from other systems-

There are many variables, as you know.
The valves are spring loaded open, maybe the spring is weak and/or being stuck on the right valve?
I would still like to swap the LP "Fan air" valves next.

Since both showed a reading of 3, they were being commanded to close the valves slightly-
During climb, and a higher power setting, as far as I know from your message.

The right side going to 9 shows trying to close the valve- Stuck valve?
Again, both are original, with over 9,000 hours on them.

Regards,
Pete

From: jeffrey E. <jeevacation@gmail.com>

Sent: Sunday, April 10, 2016 4:31 PM

To: Pete Rawson

Subject: Re: GIV update

the right and left were both showing 3 , until 25 min in and then right side again went to 9 and stayed there,
we turned on wing ice and it came to 2. no lower. . ? is it possible that the pulse is the result of the voltage
maxing out. . ? thanks for your time.

On Sun, Apr 10, 2016 at 4:19 PM, Pete Rawson <pete.rawson@meridian.aero> wrote:

Hi Jeffrey,

I have added my comments to your questions-

From: jeffrey E. <jeevacation@gmail.com>

Sent: Sunday, April 10, 2016 7:46 AM

To: Larry Visoski; Pete Rawson

Subject: Re: GIV update

understood, ,

question , does the voltage max out at 9?

My training manuals show that the system is up to 14 VDC, it goes through a resistor and is a 10 VDC Maximum to the torque motor.

Remember that the box in the Radio Rack is an add-on, it is not normally installed, and there are no requirements for calibration-

The 9 volts seems to be appropriate for the full close signal to the valve-

The valves respond to Pressure, not voltage.

The voltage is then converted into a pressure that the valve responds to.

if not then the valve works at 9,?

The valve is normally open, the voltage shows sending a close signal, in this case, a full close signal to increase the Temperature to 400 Degrees-

The left side is showing a signal for that side valve to be placed in a slightly open position-

It seems to be modulating, as I suspect to be normal.

altitude seems to effect it. so your answer seems possible,

Both LP valves "Fan Air valves" are original, they are not a high fail item.

The valves are not sent warm air through them, so "Cold Soaking" could be an issue.

The valves are located in the pylons, just forward of the heat exchangers that are visible from below.

The maintenance checks for the system are basically-

Engines running, no airflow through the heat exchanger (guy on a ladder feeling for airflow)- high Tech.

Select Wing heat, and confirm airflow overboard.

Turn off wing heat-

Increase power, and confirm airflow, no numbers for power settings given-

the voltage is applied as a result of resistance and computer.

Correct, the inputs are the Temp sensor and Anticipator, being sent to the Controller (ie the Computer).

The valves are not electrically controlled-

The electric signals are sent to a Torque motor.

The panel show the pressures being sent, and matches the voltages.

The pressure is the most important part, as the valves respond to pressure.

The Torque motor converts the electrical signal into a pressure input to the valves to Open/Close them,

No Voltage, No pressure, valve is spring loaded to open-

High voltage, high pressure, valve is commanded to close.

There is no indication of the valve responding to the command.
The Torque motors/pressure regulators were swapped at Westfield-

the right engine tgt is higher does that mean that the fan valve is more closed than it should be? maybe a result of a bad resistor ?

The LP air does not go through the Engine, So I don't see it as an issue to account for any TGT split.
The HP air bleed off would account for TGT issues.

is it a big deal to change fan valve?

No, not a big issue. We need to remove Pylon Panels, top and bottom.
We can do it in a day.

could it have been damaged by the bent tube you found?

No, I can't see that-

The line supplies air in and out to control the valve position.
The valve only responds to the air pressure supplied.

the other mystery is why a pulse in the reading. ? valve? resistor , computer. , electrical bus?

I suspect that there is a fault in the ground for the strobe lights-

The pulse seems to be regular.

I don't think that the system could catch up with it.

I haven't seen the issue before-

Regards,
Pete

On Sun, Apr 10, 2016 at 7:17 AM, Larry Visoski <[REDACTED]> wrote:

Jeffrey

Message from Pete,.below:

Dave and I are at airport now in case you decide to depart earlier than 10am,,
Plane is fueled and ready,.

From Pete:

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 precooler (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 precoolers 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 precoolers (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

Sent from my iPhone

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