Teledyne Temperature Control Board Troubleshooting Guide

Test Points and Possible Failures

The Temperature Control Board for the Teledyne T200 NOx Analyzer is fairly easy to diagnose and repair, but will require swapping out parts inside the analyzer itself. We recommend sending it in if you are unfamiliar or uncomfortable with attempting to perform the repair duties on site. We are available to help coach through the process or answer some questions with a phone call or email.

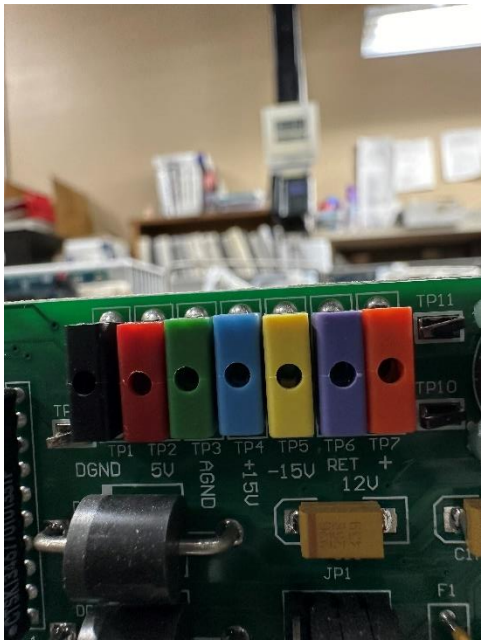
To start the troubleshooting process, make sure that your analyzer is turned on and has gone through the ~1hr warm up process, make sure that it is up and running and that there are no additional error messages popping up beside the PMT Temp Issue.

You will then need to open up the top of the analyzer so that you can reach the test points/parts inside the analyzer itself. First thing first, make sure that both fans inside the analyzer are functioning:

- There is one below the Heat Sink on the end of the PMT Chamber, it should be running at all times.
- The other is located on the rear of the analyzer, a small black fan that is blowing air out the back of the analyzer. This can cause temp issues inside the analyzer if left unrepaired.

Next, as a precautionary measure, we want to check the test points on the Relay Board, which will be the card right in front of the rear box fan that you checked. Grab your Multimeter, you will see the Relay Board on the left side of a metal plate and two power supply units on the right side of the plate.

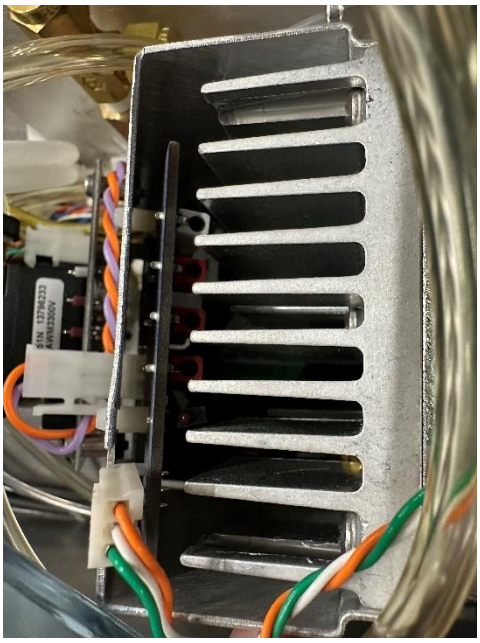
You will see the test points on the side of the card closest to the front of the analyzer, as displayed below. Also as you can see from the picture the test points are labeled to what voltage they should be reading and if they are a Ground or not.



From Left to Right, TP1 (BLACK, DGND) will be your ground for TP2 (5V, RED) that should be reading. Next in line will be your new ground TP3 (GREEN, AGND), Which you will use to test the next two following test points TP4 (BLUE, +15V) and TP5 (YELLOW, -15V). Next will be TP6 (PURPLE, RET), which will be your ground for TP7 (ORANGE, +12V).

If these are all reading according to their labels, you should be able to move on to the final two checks. If not and they're not adding up, check which test points were not functioning correctly and attempt to replace the Power Supply on the back that matches with the voltage.

Now, we will be checking the test points on the actual Temp Control Board, this is located against the Heat Sink on the back of the PMT Chamber, you will see a slanted covering with the Pressure Control Board on top of it, as well as a green and yellow wire that goes out of the Temp Board and onto the HVPS Board, refer to the picture below.



While it is hard to see in the picture, you can see the board and the test points as well. On the farthest left hand side of the board, you should also see a light that indicates that the board is receiving power. With your multimeter, check the test points that are displayed in the picture above. White, will be your ground for all of the test points on the board. You should be reading roughly around:

- .5v For the Farthest Left Test Point
- 7v for the Middle Test Point
- 3v for the Farthest Right Test Point
- Please Note that these voltages will change based on how long the analyzer has been running and what temperature the analyzer PMT is reading to be at.

If you are not reading similar voltages or nothing at all, it likely means either the Temp Control Board has died or the Diode inside of the Heat Sink has failed as well. Most likely, the Heat Sink Diodes have failed, and you will need to check that.

To check the Diodes, you will first have to turn off the analyzer, then remove the slanted covering from the Heat Sink. Being careful of the boards and disconnecting all the wiring before continuing. You do not need to remove the tubing from the Pressure Control Board on top of the housing.

With that, on the backside of the Temperature Control Board, you will see a Red/Black Wired Connector, remove that from the back of the board and check the connections with a multimeter, you will be looking at the Resistance. The picture below will display what wiring you should be connecting to, as well as how many Ohms you should be reading at Room Temperature. This will change based on the temperature reading but should not be Overloaded.

If this test point has Overloaded, then the Diodes have failed. However, it may be worthwhile to check the inside of the Heat Sink for any degradation or corrosion around the diodes themselves or if there is condensation on the interior side of the Heat Sink to the PMT Chamber. If there is any moisture, it may be indications of a larger problem that could influence analyzer readings as well. To access this, you will need to remove the six screws that are visible between the fins of the Heat Sink.

If for any reason you believe that the Diodes have failed, replace the entire Heat Sink Component and reapply the thermal pads to both sides of the Diode, these thermal pads and thermal paste should be included in your new Heat Sink Package. You can use the Thermal Paste as an adhesive for the pads against the metal sides of the Heat Sink and the PMT Chamber.

If there are any questions or concerns, please contact Cisco Analyzer Department or contact Teledyne themselves.