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Service Note

05-028C
12 December 2007

HOW TO TROUBLESHOOT PMT TEMP PROBLEMS IN M100EX/M200EX

I. PURPOSE:

The purpose of this service note is to give information on how to troubleshoot PMT temperature problems in M100EX / M200EX model analyzers. This procedure is for the "new" style preamp, with three wires going from the preamp to the TEC drive board.

II. TOOLS:

Philips head screwdriver
Digital voltmeter.

III. PARTS:

N/A

IV. PROCEDURE:

1. Take the cover off. Check if the LED is lit on the TEC control card. If the LED is not lit, check the purple and orange connector on the back of the fan shroud for +12Vdc. Refer to FIGURE 1 for location. If the +12Vdc is good at the connector, go to step 2. If this test fails, measure for +12V on the relay board. Refer to FIGURE 2. Take your meter and measure across the black test point and the orange test point. This should be +12V. Then measure across the purple and the orange test points. This should also be +12V. If not, the 12V power supply will need to be replaced. If the voltage is correct then the problem lies in the cable going to the TEC driver board.
2. Under the PMT cooler heat sink assembly there is a fan that blows air up across the heat sink. Put your hand on top of the heat sink assembly and check to see if the fan is blowing and that there is air coming out. If you feel air, go to step 3. If you can not feel the air coming out, use a flashlight and look down into the hole and look to see if the fan has stopped. If the fan has stopped, this is likely your problem. Put a meter into the connector that goes to the fan & ensure that there is +12 Vdc going to the fan. If the 12V is good replace the fan and then check to ensure that the PMT temp goes down to the proper 8°C. It is possible that if the fan was broken for a long period of time that the TEC cooler might have burned out, so that you have two problems now.
3. Measure the voltage at TP-3 on the preamp board to the black test point on the relay board. This voltage should be approximately 14 volts with the PMT temp @ 15°C on the front panel. If the TP-3 voltage is low, unplug the cable going to the cooler drive board (orange, green and white wires, with a white three pin connector at cooler drive board) refer to Figure 1, and recheck the voltage at TP-3. If the voltage at TP-3 is not 14 volts, go to step 6. If the voltage at TP-3 is 14 volts, go to step 4.
4. If the voltage at TP-3 is correct then the cooler drive board or the cooler it-self is bad. Measure the voltage at TP-1 to TP-4 on the TEC driver board. Refer to FIGURE 3. You should have approximately 12.75 $\pm$ .5 Vdc. If this voltage is incorrect, replace the TEC driver board. If this voltage is correct, power down the instrument and reconnect the orange, green and white cable back on to the TEC driver board.

5. Turn the instrument back on and measure the voltage from TP-1 to TP-2 on the TEC driver board. If this voltage is not approximately 350 ± 50 mVdc, then the cooler is bad. Replace the cooler and restart the unit ensuring that the temp reads correctly after an hour warm up period.
6. Turn off the analyzer.
7. Unplug the seven wire connector at J3 of the preamp board.
8. Measure the resistance across the two yellow wires on the cable.
9. If the PMT Temp was reading 15°C and the resistance is between 8KΩ and 45KΩ then the thermistor is good and the preamp should be replaced.
10. If the thermistor resistance is less than 8KΩ replace the thermistor.

Should you have questions, please do not hesitate to contact Teledyne API Customer Service.

FIGURE 1

PMT PREAMP/DRIVER BOARD LOCATIONS

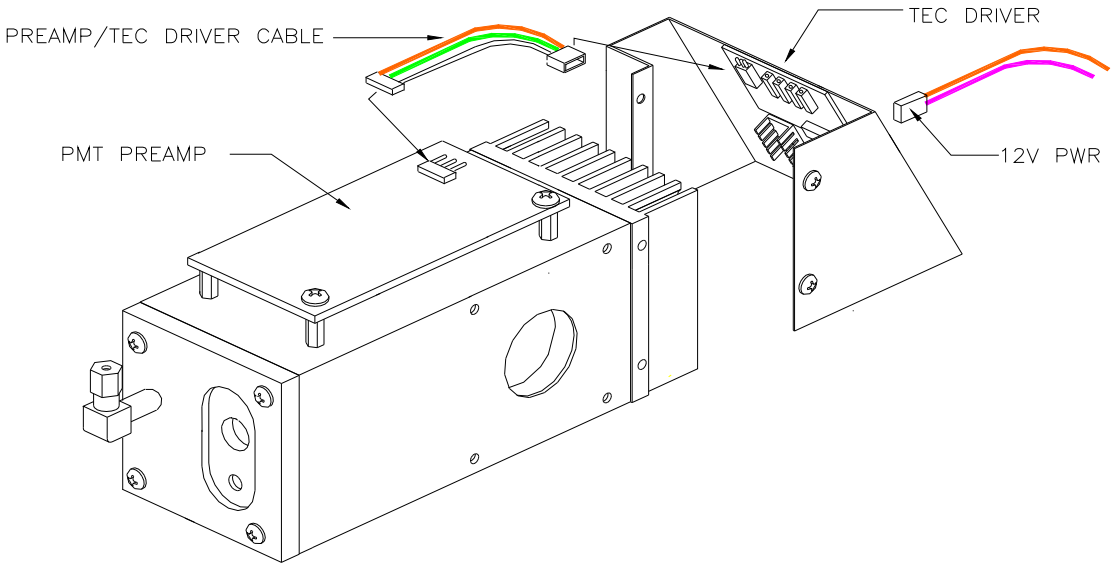

FIGURE 2

RELAY BOARD LAYOUT

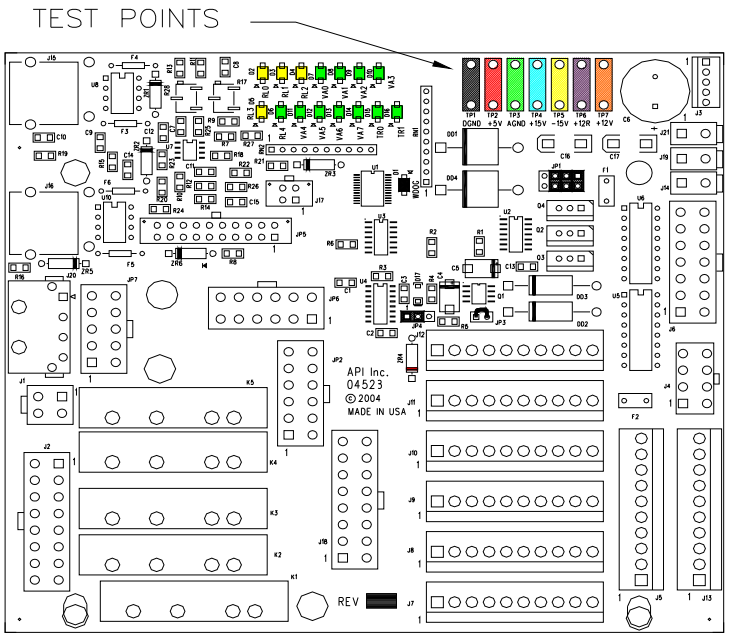

FIGURE 3

TEC DRIVER TEST POINTS