TELEDYNE
INSTRUMENTS
Advanced Pollution Instrumentation

A Teledyne Technologies Company
9480 Carroll Park Drive, San Diego, CA 92121-5201
Phone (858) 657-9800 Fax: (858) 657-9818 Toll Free 1800 324-5190
E-mail: api-customerservice@teledyne.com http://www.teledyne-api.com

Service Note

97-001 Rev B
2 May, 2007

CHECKING & ADJUSTING TEMPERATURE ON MOLYS & MINI-HICONS

I. SCOPE:

There has been some confusion concerning the correct method of adjusting and troubleshooting the moly and mini-hicon temperature circuits. This service note will address these issues and give correct procedures for adjusting the temperature of theses converters.

II. TOOLS REQUIRED:

A. DVM
B. Potentiometer adjuster

III. TYPES

A. The moly and mini-hicon are operated from similar circuits. There are two circuit cards which provide control for them:

1. M101, M200, M200H, M202, M250, M252 and M501
   a. This so-called "old style" card is mounted on the converter chassis. This card provides temp. control on board. It reads the thermocouple Voltage and uses comparator to control an on-board solid state relay. It also provides a Voltage (proportional to temperature) which is sent to the CPU to be displayed on the front panel. (In the case of the M250, M251 and M252 the Voltage is wired to the rear panel). The CPU does not control the temperature of the converter, it simply converts the Voltage to temperature and displays it.
   b. The temperature adjustment pot, R3, on this board can be adjusted for a temperature that is incorrect, and the Voltage output pot, R5, can then be adjusted to send the correct Voltage to the CPU. This would cause the moly or hicon to fail without a temperature warning indication.
2. M101A, M200A, M200AH
   a. The Status/Temp card is used in the new analyzers. The Status/Temp card reads the thermocouple Voltage and sends the signal to the CPU. The CPU controls the temperature by turning on or off a relay in the power supply module.
   b. The Status/Temp card can be adjusted to read almost any thermocouple Voltage and display the correct temperature. This would allow the moly or hicon to run at a much lower or higher temperature without a temp warning indication.

IV. MEASURING THE THERMOCOUPLE CHIP VOLTAGE:

A. When the moly or mini-hicon exhibits low efficiency or a temperature warning the first step is to verify the correct temperature of the converter. This is done by measuring the Voltage coming out of the thermocouple converter I.C., (U1). U1 is the same IC for both the "old style" and Status/Temp style thermocouple circuits. U1 is a different I.C. part number for moly and mini-hicon options, but the Voltage is measured on the same pin for all configurations.

B. Allow the analyzer to warm up for 1 hour before continuing. Using a DVM set to Volts DC, measure the Voltage at U1 pin 9 on the Status/Temp or old style controller card.

1. For a moly, this Voltage should be 3.15 +-.05 VDC.
2. For a mini-hicon, this Voltage should be 7.00 +-.1 VDC.

C. The key to determining if the unit is broken or only out of adjustment is the LED which tells you if the heater is on or off. On the Status/Temp style converters, the LED is located on the Power Supply Module. With the on-card style converters, the LED is the small one located on the card, (DS1). If the U1-9 Voltage is wrong, but the LED is cycling, this means that your temperature is misadjusted and an adjustment will correct the problem. Go to Step V.

D. If the LED is always on or always off, and the U1-9 Voltage is wrong, then you have a failed circuit and adjusting the temperature will only cause trouble; for when the problem is fixed, the temperature will be wrong. Please contact an API service tech for assistance if you have determined that the moly or mini-hicon has failed.

V. ADJUST THE TEMPERATURE:

A. This step is for the on-board temp controller. If you have the status/temp card type, please go to step VI.

B. Measure the Voltage at E-4 on the temp. control PCB. For a moly, use R3 to set this Voltage to 3.15 ± .02v. For a hicon, use R3 to set this Voltage to 7.00 ± .01 VDC.

C. If you have a M250, M251 or M252 adjust R5 on the controller until the Voltage at the rear panel terminal board screw reads 3.15 VDC (4.00 VDC for a mini-hicon) and recalibrate the analyzer.

D. If you have a M200, use the test buttons on the front panel to scroll to the MOLY TEMP or CONV TEMP test feature. Adjust R5 on the controller until the front panel reads 315 +-1 deg. C. (for a mini-hicon adjust for 600 +-5 deg. C). Recalibrate the analyzer.

VI. ADJUSTING THE TEMPERATURE FOR THE STATUS/TEMP CARD:

A. Reconnect the thermocouple into the Status/temp card and attach the meter leads to the metal strips on the card that attach the connector to the card.
B. Use the TEST buttons on the front panel to scroll to the CONV TEMP test feature on the front panel.
C. If the U1-9 Voltage was too low, adjust R6 on the status/temp card until the front panel temperature drops and the heater LED comes on. Watch the U1-9 Voltage on the meter and keep adjusting R6 until the Voltage reaches 3.15 +-.05 VDC, (7.0 +-.1 VDC for a mini-hicon) then move the meter lead to TP1 of the status temp card and adjust R6 for 3.15 +-.05 Volts (3.50 +-.1 Volts for a mini-hicon). Recalibrate the analyzer.
D. If the U1-9 Voltage was too high, adjust R6 on the status/temp card until the front panel temperature increases and the heater LED turns off. Watch the U1-9 Voltage on the meter and keep adjusting R6 until the U1-9 Voltage reaches 3.15 +-.05 VDC, (7.0 +-.1 VDC for a mini-hicon) then move the meter lead to TP1 of the status temp card and adjust R6 for 3.15 +-.05 Volts (3.50 +-.1 Volts for a mini-hicon). Recalibrate the analyzer.