SENSOR TEST WITH NO DOWELL
October 22 2015

Set heater to 5.0 volts.
The 25mm SGEX sensor is used in this example.
In this test the sensor is open, not on a dowel.
Dowell test are similar and take longer.

You may not touch the sensor with your thumb until only in a certain place, ie do not hold sensor in your hand! Do not TOUCH the outer THERMOPILE. With your other hand you may touch or hold the sensor by the lead wire only

1.) ONE degree C is +.0040 mv or 40 uV
Start Heater on SapIP with "AVRS 5000" command.

```
$avrs 5000
OK
$avrs
ON        - 5000 mV - 5036 mV - 0102 mA
$test
OK
```

The heater voltage AVRS must read 5 Volts +/- 2 %
The voltage is less than the voltage on the SapIP output.
If it reads negative – the sensors are switched. If it reads open or ½ - the sensors is missing a wire.

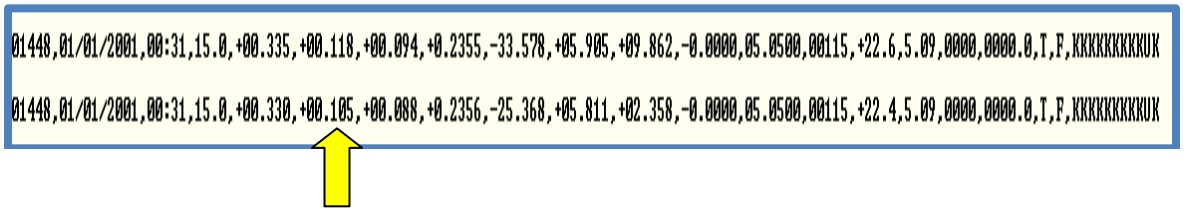
On the EXO skin sensors:
Ch, THERMOPILE, should read at least + .100 after 1 minute, indicating a large amount of heat in the + radial direction.

1a.) the valid range is + from .100 to .250 on larger sensors
1b.) The Ah starts at zero, and may go negative, -.040 is OK.
1c) The Bh may go + around 0.001 to + .040.

No other signals may move more than CH.
Orange: CH
Yellow: AH
Green: BH.

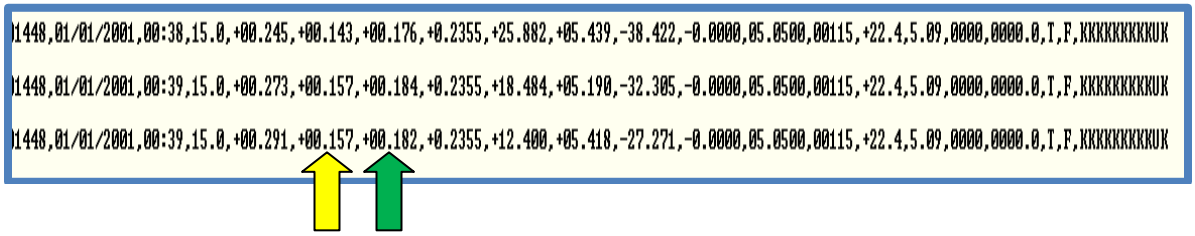
```
01448,01/01/2001,00:10,15.0,+00.295,-00.001,+00.006,+0.2347,+00.276,-00.005,+00.002,+0.2349,05.0430,00226,+22.4,5.09,0000,0000.0,T,F,KKKKKKKKKUK
01448,01/01/2001,00:11,15.0,+00.298,-00.001,+00.015,+0.2347,+00.259,-00.006,+00.007,+0.2349,05.0430,00226,+22.4,5.09,0000,0000.0,T,F,KKKKKKKKKUK
```

1.C.) On sensor 1 touch the upper Ah (top TC only), and do NOT touch the Bh next to it.
Ah will be positive 2-3 C. **Only Only the upper Ah1 (.100 to + .120) changes quickly,**



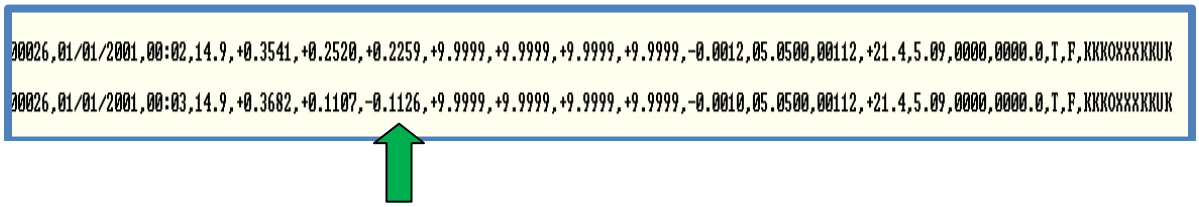
1.D.) Then touch + Ah and + Bh, - Both top TC.

Then both Ah and Bh will change to a much higher temperature :
Both are at +.160
Bh should catch the Ah to be very nearly equal.



1. E.) Now touch the lower – Bh, lowest TC (not - Ah next to the Heater.

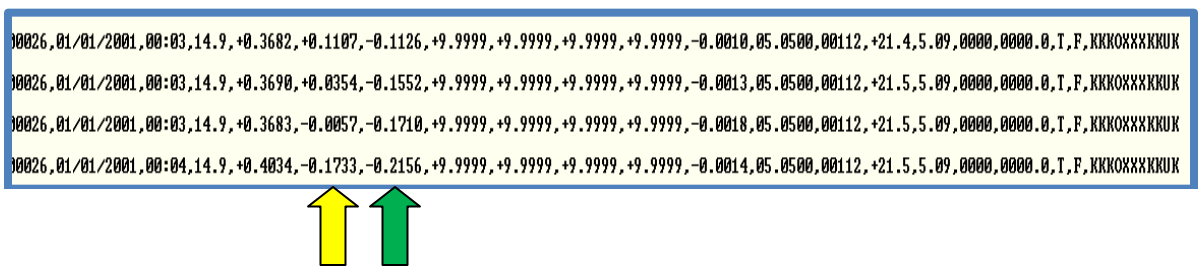
The TC are offset, Ah is upper TC on both sides of the heater.
-Bh will go negative for -2 to 3 C, or to -.080 to -.0120 mV



1. D.) Now touch the -bH and the – aH, and then

Bothe Bh and Ah will go negative.
Both are negative - .260 mV

<u>H are the negative thermocouple on the bottom, the (-) side of the temp sensor.</u>



Screen captures used below are not from SapIP and used for CSI Logger illustration

Here the Bh2 is negative -INF and on sapip it will read 99.999+ for an open sensors, no connection.
CH is active and connected. This sensor needs to be repaired, since there is a break in Bh.
Note this sensor is a 16 mm on sensor #2, and note the Ch2 signal is bigger than the 10 mm on #1.

Ch1	0.1654
Ah1	-0.1458
Bh1	-0.1360
Vin1	5.0468
Ch2	0.2562
Ah2	-0.0881
Bh2	-INF
Vin2	5.1044

Sensor has a switched wire: FAULT in BH and CH wiring.
With No touching, this sensor has the Ch wire switched with the Bh wire. The wires need to be switched.

Ch1	-0.0044
Ah1	-0.0071
Bh1	0.1424
Vin1	5.0490
Ch2	-INF
Ah2	-INF
Bh2	-INF
Vin2	0.0000

On this sensor, the heat is applied, however it is disconnected at the Black wire, there is no heat on the TCV or any other signals. These signal will be zero or very close. THIS IS A FAULT.
Vin is zero, and Ch is zero.

Ch1	-0.0010
Ah1	0.0000
Bh1	-0.0003
Vin1	0.0000
Ch2	-INF
Ah2	-INF
Bh2	-INF
Vin2	0.0000

You can try to touch the heater with your thumb, and the Ch will read the heat +.167
All the signals are good, the heater wire was pushed out and needs to be fixed. THE HEATER WIRING is in FAULT.

Ch1	0.1657		
Ah1	-0.0115		
Bh1	0.0084		
Vin1	0.0000		
Ch2	-INF		
Ah2	-INF		
Bh2	-INF		
Vin2	-0.0014		

Sensor test, completed.