



INSTRUMENTS

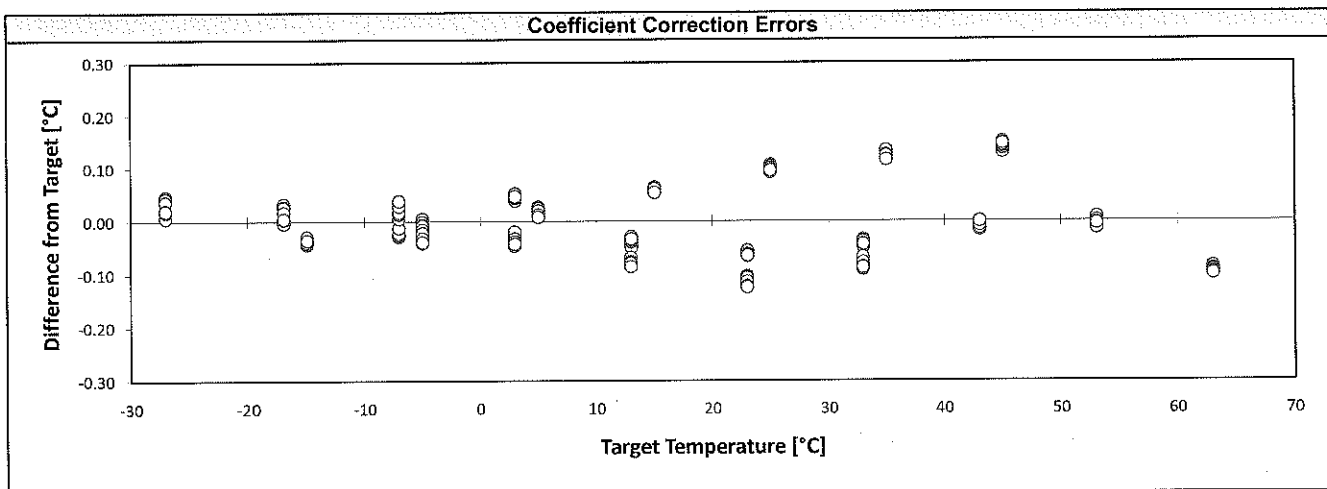
721 West 1800 North
Logan, UT 84321

Certificate of Calibration Apogee Instruments Infrared Radiometer SI-100 Series

*Received
11-22-2015
Soek*

Calibration Overview	
Model/Serial Number	SI-121_1965
Calibration Date	29-Oct-2014
Recommended Recalibration Date	28-Oct-2016
Mean of Differences from Target	-0.003 °C
Target Temperature Uncertainty (95% confidence) from -30 to 65°C	0.137 °C
Maximum Difference from Target	0.150 °C
Minimum Difference from Target	-0.124 °C
Maximum Detector Response	0.998 mV
Minimum Detector Response	-0.584 mV
Average Output Sensitivity	48.708 µV / °C

Custom Calibration Coefficients			
CRBasic			
	C2	C1	C0
m	108768	10548700	1829390000
b	2633.46	175985	-4943960
See the SI-100 series manual for how to apply these coefficients in determining target temperatures.			
Edlog			
	C2	C1	C0
m(SB)	1.08769	105.48805	18294.08294
b(SB)	0.02633	1.75987	-49.44009
Use these coefficients in Edlog programs for older Campbell Scientific dataloggers.			



Calibration Procedure

An Infrared Radiometer (IRR) combines a thermopile detector and a National Institute of Standards and Technology (NIST) traceable thermistor to measure a mV response proportional to the thermal radiation balance between the target temperature and the thermopile temperature (sensor body temperature). IRRs are placed in a temperature controlled housing, which is thermally insulated from a blackbody cone. The housing, pointed at a blackbody cone, is temperature cycled through various sensor body set-points. The blackbody cone temperature (measured with NIST traceable thermistors) is likewise cycled through multiple temperature set-points relative to each sensor body temperature set-point. A linear fit is used to model each sensor body set-point with the respective blackbody cone set-points versus the thermopile signal at those set-points. The slopes and y-intercepts of all linear fits corresponding to each sensor body temperature are then fit to a second order polynomial in order to adequately interpolate between the calibrated set-points. These two sets of second order polynomial coefficients represent the custom calibration coefficients as given above.

Traceability

All thermistors are measured for accuracy in a constant temperature bath that is directly traceable to the NIST. The overall measurement system uncertainty for all the bath and measurement allowances combined for error is typically less than 0.1°C and completely traceable to National Standards.

Technical Manager : *Jacob Bingham*

Date : 29-Oct-2014

Please keep this document for your records