ANSI-ASQ National Accreditation Board

ANAB

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005,

Aozora Ventures, LLC dba MD Instruments

1129 S. Mill Iron Road
Muskegon, MI 49442
Glen Fillion 231-773-4739

CALIBRATION

Valid to: **July 10, 2019** Certificate Number: **L2161**

Electrical – DC/Low Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
DC Current [1] Source and Measure	(0 to 20) mA	0.02 mA	Precision DMM Power Supply
DC Current – Measure	(0 to 100) mA	0.08 mA+ 0.01 % of reading	Precision DMM
	(0.1 to 3) A	3.6 mA + 0.03 % of reading	
DC Current – Source	(0 to 100) mA	0.08 mA + 0.01 % of reading	Precision DMM Power Supply
	(0.1 to 2) A	3.6 mA + 0.03 % of reading	
AC Current – Measure (5 Hz to 5 kHz)	(0 to 3) A	0.06 A + 0.07 % of reading	Precision DMM Power Supply
AC Current – Source	(0 to 2) A	0.06 A + 0.07 % of reading	
Resistance – Measure	(0 to 1) MΩ	25 mΩ + 0.05 % of reading	Precision DMM, 4-wire configuration
	(1 to 10) MΩ	2 kΩ + 0.05 % of reading	Precision DMM, 2-wire configuration
DC Voltage [1] Source and Measure	(0 to 11) V	0.13 V	Precision DMM Power Supply
DC Voltage – Measure	(0 to 100) mV	0.1 mV + 0.01 % of reading	Precision DMM
	(0.1 to 1 000) V	0.08 V + 0.01 % of reading	
AC Voltage - Measure (10 Hz to 20 kHz)	(0 to 750) V	0.8 V + 0.04 % of reading	

Electrical – DC/Low Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Resistance RTD Simulation			Precision DMM, Process Calibrator
100 Ω Pt (385)	(-328 to 752) °F	0.8 °F	
100 Ω Pt (3926)	(-328 to 1 166) °F	1 °F	
100 Ω Pt (3916)	(-328 to 1 166) °F	1 °F	
200 Ω Pt (385)	(-328 to 1 166) °F	1 °F	
500 Ω Pt (385)	(-328 to 1 166) °F	0.9 °F	
1 000 Ω Pt (385)	(-328 to 1 166) °F	1 °F	
120 Ω Ni (672)	(-112 to 500) °F	0.5 °F	
10 Ω Cu	(-148 to 500) °F	1.8 °F	
Millivolt Thermocouple Simulation			Precision DMM, Process Calibrator
Type B	(1 472 to 3 300) °F	2.5 °F	
Type R	(212 to 3 212) °F	2.5 °F	
Type S	(392 to 3 212) °F	2.4 °F	
Type C	(32 to 3 272) °F	1.7 °F	
Type L	(-148 to 1 660) °F	0.8 °F	
Type E	(-148 to 1 832) °F	1 °F	
Type N	(-148 to 2 372) °F	1.1 °F	
Type J	(-346 to 2 190) °F	0.85 °F	
Type K	(-328 to 2 501) °F	1.4 °F	
Type T	(-328 to 752) °F	0.85 °F	
Type U	(-328 to 1 112) °F	0.85 °F	

Mass

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Pressure	(0.1 to 5) psi	0.18 psi	Process Calibrator, Pressure Modules
	(5 to 100) psi	0.3 psi	
	(100 to 1 000) psi	0.8 psi	
	(1 000 to 10 000) psi	12 psi	
Vacuum	(-1 000 to 0) mbar	3.4 torr	MKS Baratron
	(-1 000 to 0) micron	1.5 micron	MKS Vacuum Sensor

Thermodynamic

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Humidity – Measure & Generate	(11 to 90) %RH	2.5 %RH	Humidity Probe & Saturated Salt Solutions
Temperature - Measure	(32 to 450) °F	0.2 °F	RTD / Display System
	(450 to 2 200) °F	5 °F	Thermocouple / Display
Temperature System Accuracy Tests [1] Type K, N	 (0 to 1 000) ˚F (1 000 to 2 372) ˚F	 2.1 ˚F 3.7 ˚F	Reference Thermocouple with Field Test Instrument AMS 2750E
Temperature Uniformity Surveys [1] Type J Type K Type N Type S	 (-320 to 1 000) ˚F (1 000 to 1 400) ˚F (-320 to 1 000) ˚F (1 000 to 2 450) ˚F (-148 to 1 000) ˚F (1 000 to 2 372) ˚F (392 to 1 000) ˚F (1 000 to 2 650) ˚F	 2.1 ˚F 2.3 ˚F 2.4 ˚F 4.4 ˚F 2.2 ˚F 4.3 ˚F 3.2 ˚F 4.9 ˚F	Reference Thermocouples with Data Recorder AMS 2750E
Resistance Temperature Devices and Thermocouples	(32 to 450) °F	0.2 °F	RTD / Display System
	(450 to 2 200) °F	5 °F	Thermocouple / Display

Time and Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Frequency – Measure	3 Hz to 40 kHz	0.05 Hz	Precision DMM
	(40 to 300) kHz	0.04 kHz	

Time and Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Stop Watch	Up to 24 hr	2 S	Comparison with a Radio-Controlled Clock
Timers [1]	Up to 24 hr	1.9 S	Comparison with a Stopwatch

Calibration and Measurement Capability (CMC) is expressed in terms of the measurement parameter, measurement range, expanded uncertainty of measurement and reference standard, method, and/or equipment. The expanded uncertainty of measurement is expressed as the standard uncertainty of the measurement multiplied by a coverage factor of 2 (k=2), corresponding to a confidence level of approximately 95%.

Notes:

1. On-site calibration service is available for this parameter, since on-site conditions are typically more variable than those in the laboratory, larger measurement uncertainties are expected on-site than what is reported on the accredited scope
2. This scope is formatted as part of a single document including Certificate of Accreditation No. L2161.