

Scope of Accreditation For Furnace Parts, LLC

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In recognition of a successful assessment to ISO/IEC 17025:2005, accreditation is granted to **Furnace Parts, LLC** to perform the following **Calibrations**:

Accreditation granted through: **September 8, 2012**

Calibration

Electricity and Magnetism – Voltage

Calibration Parameter/Equipment ²	Range	Calibration and Measurement Capability(+/-) ¹	Remarks
DC Volts Source	(0 to 100) mV (0 to 1) V (1 to 10) V (10 to 100) V	4.1 μ V + 3 μ V/V 37.5 μ V + 10 μ V/V 377 μ V + 100 μ V/V 3.8 mV + 1 mV/V	Calibration by comparison to Martel M3001 Calibrator
DC Volts Measure	(0 to 100) mV (0 to 1) V (1 to 10) V (10 to 100) V	4.7 μ V + 0.9 μ V/V 29.9 μ V + 2 μ V/V 288 μ V + 40 μ V/V 4.1 mV + 0.5 mV/V	Calibration by comparison to Keithley 2010 DMM

Electricity and Magnetism – Current

Calibration Parameter/Equipment	Range	Calibration and Measurement Capability(+/-) ¹	Remarks
DC Current Source	(0 to 100) mA	7.5 μ A + 1 μ A/A	Calibration by comparison to Martel M3001 Calibrator
DC Current Measure	(0 to 50) mA	6.4 μ A + 1 μ A/A	

Electricity and Magnetism – Thermocouple Simulation

Calibration Parameter/Equipment	Range	Calibration and Measurement Capability(+/-) ¹	Remarks
Type B Thermocouple Source	(1 112 to 1 472) °F (1 472 to 1 832) °F (1 832 to 2 822) °F (2 822 to 3 308) °F	1.06 °F 0.92 °F 0.94 °F 1.03 °F	Calibration by comparison to Martel M3001 Calibrator
Type B Thermocouple Measure	(1 112 to 1 472) °F (1 472 to 1 832) °F (1 832 to 2 822) °F (2 822 to 3 308) °F	1.05 °F 0.92 °F 0.93 °F 1.02 °F	
Type C Thermocouple Source	(32 to 302) °F (302 to 1 202) °F (1 202 to 1 832) °F (1 832 to 3 272) °F (3 272 to 4 201) °F	0.77 °F 0.70 °F 0.78 °F 1.13 °F 1.80 °F	
Type C Thermocouple Measure	(32 to 302) °F (302 to 1 202) °F (1 202 to 1 832) °F (1 832 to 3 272) °F (3 272 to 4 201) °F	0.76 °F 0.69 °F 0.78 °F 1.12 °F 1.80 °F	
Type E Thermocouple Source	(-418 to -148) °F (-148 to -13) °F (-13 to 662) °F (662 to 1 202) °F (1 202 to 1 832) °F	1.13 °F 0.57 °F 0.54 °F 0.55 °F 0.63 °F	
Type E Thermocouple Measure	(-418 to -148) °F (-148 to -13) °F (-13 to 662) °F (662 to 1 202) °F (1 202 to 1 832) °F	1.13 °F 0.56 °F 0.53 °F 0.54 °F 0.61 °F	
Type J Thermocouple Source	(-346 to -148) °F (-148 to -22) °F (-22 to 302) °F (302 to 1 400) °F (1 400 to 2 192) °F	0.72 °F 0.60 °F 0.56 °F 0.57 °F 0.65 °F	
Type J Thermocouple Measure	(-346 to -148) °F (-148 to -22) °F (-22 to 302) °F (302 to 1 400) °F (1 400 to 2 192) °F	0.71 °F 0.59 °F 0.54 °F 0.55 °F 0.64 °F	

Calibration Parameter/Equipment	Range	Calibration and Measurement Capability(+/-) ¹	Remarks
Type K Thermocouple Source	(-328 to -148) °F (-148 to -13) °F (-13 to 248) °F (248 to 1 832) °F (1 832 to 2 502) °F	0.81 °F 0.64 °F 0.56 °F 0.70 °F 0.94 °F	Calibration by comparison to Martel M3001 Calibrator
Type K Thermocouple Measure	(-328 to -148) °F (-148 to -13) °F (-13 to 248) °F (248 to 1 832) °F (1 832 to 2 502) °F	0.81 °F 0.63 °F 0.54 °F 0.69 °F 0.94 °F	
Type N Thermocouple Source	(-328 to -148) °F (-148 to -13) °F (-13 to 248) °F (248 to 770) °F (770 to 2 372) °F	0.94 °F 0.66 °F 0.59 °F 0.57 °F 0.72 °F	
Type N Thermocouple Measure	(-328 to -148) °F (-148 to -13) °F (-13 to 248) °F (248 to 770) °F (770 to 2 372) °F	0.94 °F 0.65 °F 0.58 °F 0.56 °F 0.71 °F	
Type R Thermocouple Source	(32 to 482) °F (482 to 752) °F (752 to 1 832) °F (1 832 to 3 182) °F	1.28 °F 0.85 °F 0.81 °F 0.94 °F	
Type R Thermocouple Measure	(32 to 482) °F (482 to 752) °F (752 to 1 832) °F (1 832 to 3 182) °F	1.28 °F 0.84 °F 0.80 °F 0.93 °F	
Type S Thermocouple Source	(32 to 482) °F (482 to 1 832) °F (1 832 to 2 552) °F (2 552 to 3 182) °F	1.25 °F 0.87 °F 0.89 °F 1.05 °F	
Type S Thermocouple Measure	(32 to 482) °F (482 to 1 832) °F (1 832 to 2 552) °F (2 552 to 3 182) °F	1.24 °F 0.86 °F 0.88 °F 1.05 °F	

Calibration Parameter/Equipment	Range	Calibration and Measurement Capability(+/-) ¹	Remarks
Type T Thermocouple Source	(-418 to -238) °F (-238 to 32) °F (32 to 248) °F (248 to 752) °F	1.38 °F 0.66 °F 0.56 °F 0.53 °F	Calibration by comparison to Martel M3001 Calibrator
Type T Thermocouple Measure	(-418 to -238) °F (-238 to 32) °F (32 to 248) °F (248 to 752) °F	1.37 °F 0.65 °F 0.54 °F 0.51 °F	

Electricity and Magnetism – RTD Simulation

Calibration Parameter/Equipment	Range	Calibration and Measurement Capability(+/-) ¹	Remarks
Pt 385 100 Ω Source	(-328 to 1 472) °F	0.16 °F	Calibration by comparison to Martel M3001 Calibrator
Pt 385 100 Ω Measure	(-328 to -112) °F (-112 to 212) °F (212 to 752) °F (752 to 1 116) °F (1 116 to 1 472) °F	0.028 °F 0.043 °F 0.064 °F 0.100 °F 0.121 °F	

Thermodynamic – Thermocouples

Calibration Parameter/Equipment ²	Range	Calibration and Measurement Capability(+/-) ¹	Remarks
Type B Thermocouple	(1 100 to 2 000) °F (2 000 to 2 700) °F	1.8 °F 0.13 % of reading	Calibrated by comparison per ASTM E220
Type C Thermocouple	(32 to 1 000) °F (1 000 to 2 000) °F (2 000 to 2 700) °F	1.6 °F 1.8 °F 0.13 % of reading	
Type E Thermocouple	-110 °F 32 °F (100 to 1 000) °F (1 000 to 1 600) °F	0.9 °F 0.8 °F 1.7 °F 1.8 °F	
Type J Thermocouple	-110 °F 32 °F (100 to 1 000) °F (1 000 to 1 400) °F	0.9 °F 0.8 °F 1.7 °F 1.8 °F	

Calibration Parameter/Equipment ²	Range	Calibration and Measurement Capability(+/-) ¹	Remarks
Type K Thermocouple	-110 °F 32 °F (100 to 1 000) °F (1 000 to 2 000) °F (2 000 to 2 300) °F	0.9 °F 0.8 °F 1.7 °F 1.9 °F 0.11 % of reading	Calibrated by comparison per ASTM E220
Type N Thermocouple	-110 °F 32 °F (100 to 1 000) °F (1 000 to 2 000) °F (2 000 to 2 300) °F	0.9 °F 0.8 °F 1.7 °F 1.9 °F 0.11 % of reading	
Type R Thermocouple	(32 to 1 000) °F (1 000 to 2 000) °F (2 000 to 2 700) °F	1.6 °F 1.8 °F 0.13 % of reading	
Type S Thermocouple	(32 to 1 000) °F (1 000 to 2 000) °F (2 000 to 2 700) °F	1.6 °F 1.8 °F 0.13 % of reading	
Type T Thermocouple	-110 °F 32 °F (100 to 752) °F	0.9 °F 0.8 °F 1.7 °F	

Notes:

- 1) Calibration and Measurement Capability represents expanded uncertainties at approximately a 95% confidence level using a coverage factor of k=2.
- 2) Voltage ranges are for both positive and negative values.
- 3) Calibrated thermocouples meet the requirements of AMS 2750 and ASTM E230.

Approved by:



 Date: September 7, 2010

 R. Douglas Leonard Jr.
Chief Technical Officer

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