SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

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CALIBRATION

Valid to: **April 17, 2023** Certificate Number: **AC-2671**

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Current – Measure [1] (50/60 Hz)	Up to 0.5 A (0.5 to 4) A (4 to 40) A (40 to 100) A (100 to 200) A (200 to 400) A	17 mA 73 mA 0.73 A 2.1 A 5.5 A 19 A	Extech 380947 AC/DC Clamp Meter
DC Current – Measure [1]	(0 to 5) A (5 to 20) A (20 to 40) A (40 to 100) A (100 to 150) A (150 to 200) A (200 to 400) A	82 mA 0.26 A 0.49 A 1.4 A 2 A 5.4 A 19 A	Extech 380947 AC/DC Clamp Meter
AC Voltage – Measure [1] (50/60 Hz)	Up to 50 mV (50 to 500) mV (0.5 to 5) V (5 to 50) V (50 to 500) V (500 to 1 000) V	0.34 mV 2.8 mV 0.045 V 0.63 V 2.9 V 9.3 V	Fluke 187 True RMS Multimeter
DC Voltage – Measure [1]	(0 to 50) mV (50 to 500) mV (0.5 to 5) V (5 to 50) V (50 to 500) V (500 to 1 000) V	0.42 mV 0.46 mV 2.7 mV 23 mV 0.61 V 1.4 V	Fluke 187 True RMS Multimeter

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Resistance – Measure [1]	Up to 10 Ω (10 to 50) Ω (50 to 100) Ω (100 to 200) Ω (200 to 400) Ω (0.4 to 4) kΩ (4 to 500) kΩ (0.5 to 5) MΩ (5 to 32) MΩ (32 to 50) MΩ (50 to 100) MΩ (100 to 500) MΩ	0.13 Ω 0.13 Ω 0.14 Ω 0.17 Ω 2.6 Ω 4.7 Ω 0.33 kΩ 4.4 kΩ 0.38 MΩ 2 MΩ 3.8 MΩ 58 MΩ	Fluke 187 True RMS Multimeter
Electrical Simulation of RTD Indicating Devices [1]	Pt 385, 100 Ω (-200 to -150) °C (-150 to 360) °C (360 to 740) °C (740 to 850) °C Pt 385, 1 000 Ω (-200 to 170) °C (170 to 470) °C (470 to 730) °C (730 to 850) °C	 0.045 °C 0.072 °C 0.14 °C 0.16 °C 0.047 °C 0.089 °C 0.14 °C 0.16 °C	PIE 525B RTD and Thermocouple Calibrator
Electrical Simulation of Thermocouple Indicating Devices [1]	Type E (-225 to -11) °C (-11 to 750) °C (750 to 1 000) °C Type J (-200 to -150) °C (-150 to -50) °C (-50 to 300) °C (300 to 850) °C (850 to 1 200) °C Type K (-230 to -100) °C (-100 to 600) °C (600 to 1 000) °C (1 000 to 1 371) °C Type R (-18 to 250) °C (250 to 750) °C (750 to 1 600) °C (1 600 to 1 767) °C	 0.28 °C 0.28 °C 0.34 °C 0.21 °C 0.22 °C 0.25 °C 0.3 °C 0.36 °C 0.26 °C 0.32 °C 0.35 °C 0.4 °C 1.7 °C 1.8 °C 2 °C 2 °C	PIE 525B RTD and Thermocouple Calibrator

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Electrical Simulation of Thermocouple Indicating Devices [1]	Type S (-18 to 150) °C (150 to 500) °C (500 to 1 650) °C (1 650 to 1 767) °C Type T (-260 to -240) °C (-240 to -210) °C (-210 to -100) °C (-100 to 50) °C (50 to 100) °C	 1.7 °C 1.7 °C 1.9 °C 2 °C 0.26 °C 0.27 °C 0.26 °C 0.27 °C 0.32 °C	PIE 525B RTD and Thermocouple Calibrator

Length – Dimensional Metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Calipers [1]	Up to 6 in (6 to 12) in (12 to 18) in (18 to 24) in	300 µin 310 µin 320 µin 340 µin	Direct comparison to Gage Blocks
Depth Gauges [1]	Up to 2 in (2 to 6) in (6 to 12) in	33 µin 51 µin 91 µin	Direct comparison to Gage Blocks
Dial and Test Indicators [1]	Up to 2 in (2 to 6) in (6 to 12) in	160 µin 160 µin 180 µin	Direct comparison to Gage Blocks
Pin Gauges [1] (Diameter)	Up to 1 in (1 to 2) in	25 µin 46 µin	Laser Micrometer
Laser Micrometers [1]	Up to 1 in (1 to 2) in	36 µin 43 µin	Comparison to Master Pin Gauges
Height Gauges [1]	Up to 6 in (6 to 12) in (12 to 18) in (18 to 24) in	51 µin 91 µin 140 µin 180 µin	Direct comparison to Gage Blocks
Length Standards and Rods [1]	(0.1 to 40) in	990 µin	Comparison to Standard Rule
Micrometers [1]	Up to 2 in (2 to 6) in (6 to 12) in	34 µin 51 µin 140 µin	Direct comparison to Gage Blocks

Length – Dimensional Metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Rules [1]	Up to 1 000 mm	12 µm	Direct Comparison to Standard Rule
	Up to 40 in	990 µin	
Thickness Gauges [1]	Up to 6 in (6 to 12) in (12 to 18) in (18 to 24) in	90 µin 81 µin 130 µin 170 µin	Direct comparison to Gage Blocks

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Scales and Balances [1,2]	(0.001 to 120) g (120 to 220) g (220 to 5 000) g	1.3 mg 1.4 mg 2.3 mg	ASTM E617 Class 1 Weights and internal procedure CM-WHT01 utilized in the calibration of the weighing system.
Scales and Balances [1,2]	(1 to 50) lb (50 to 100) lb (100 to 300) lb (300 to 500) lb	0.005 8 lb 0.012 lb 0.035 lb 0.066 lb	NIST Class F Weights and internal procedure CM-WHT01 utilized in the calibration of the weighing system.
Force Device [1]	Up to 100 lbf (100 to 200) lbf	0.21 lbf 0.4 lbf	Direct Comparison to Load Cell
Torque Measuring Devices [1]	Up to 90 lbf·in	0.58 lbf·in	HIOS HP100 Digital Torque Meter
Pressure Devices [1]	Up to 15 psig (15 to 30) psig (30 to 100) psig (100 to 300) psig (300 to 500) psig (500 to 10 000) psig	0.018 psi 0.023 psi 0.072 psi 0.22 psi 0.36 psi 7.2 psi	Direct Comparison to Master Pressure Gauges
Vacuum Devices [1]	(-15 to 0) psiv	0.053 psi	Direct Comparison to Master Vacuum Gauges

Thermodynamic

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Temperature – Measure [1]	(-100 to 200) °C	0.19 °C	4132 Platinum RTD Thermometer
	(200 to 500) °C (500 to 1 000) °C	2.4 °C 4.7 °C	Type K Thermocouple Probe w/ Indicator
Relative Humidity – Measure [1]	(10 to 95) %RH	2.7 %RH	Extech RH390 Precision Psychrometer

Time and Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
RPM Measure – Contact [1]	(0.5 to 500) rpm (500 to 1 000) rpm (1 000 to 2 000) rpm (2 000 to 3 000) rpm (3 000 to 4 000) rpm	0.42 rpm 0.96 rpm 2 rpm 2.7 rpm 3.1 rpm	Extech 461995 Contact/Photo Tachometer
RPM Measure – Non-Contact [1]	(1 to 60) rpm (60 to 1 000) rpm (1 000 to 2 000) rpm (2 000 to 3 000) rpm (3 000 to 4 000) rpm (4 000 to 5 000) rpm (5 000 to 10 000) rpm (10 000 to 20 000) rpm (20 000 to 50 000) rpm (50 000 to 99 999) rpm	0.58 rpm 1.6 rpm 2.1 rpm 2.5 rpm 3.2 rpm 4.3 rpm 6.7 rpm 13 rpm 42 rpm 65 rpm	Extech 461995 Contact/Photo Tachometer
Linear Distance Speed – Contact [1]	(5 to 50) ft/min (50 to 100) ft/min (100 to 200) ft/min (200 to 500) ft/min (500 to 1 000) ft/min (1 000 to 2 000) ft/min (2 000 to 3 000) ft/min (3 000 to 4 000) ft/min	0.74 ft/min 1.3 ft/min 2.5 ft/min 5.9 ft/min 12 ft/min 24 ft/min 35 ft/min 47 ft/min	Extech 461995 Contact/Photo Tachometer
Timers and Stopwatches	60 s to 24 hr	0.42 s/hr	Comparison to Control Company 1042 Digital 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. The CMC for scales and balances is highly dependent upon the resolution of the unit under test. The CMC presented here does not include the resolution of the unit under test. The resolution will be included in the reported measurement uncertainty at the time of calibration.
3. This scope is formatted as part of a single document including Certificate of Accreditation No. AC-2671.

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