



CERTIFICATE OF ACCREDITATION

ANSI National Accreditation Board
11617 Coldwater Road, Fort Wayne, IN 46845 USA

This is to certify that

Nationwide Gage Calibration, Inc.
159 Covington Drive
Bloomindale, IL 60108

has been assessed by ANAB and meets the requirements of international standard

ISO/IEC 17025:2017

and national standard

ANSI/NCSL Z540-1-1994 (R2002)

while demonstrating technical competence in the field of

CALIBRATION

Refer to the accompanying Scope of Accreditation for information regarding the types of activities to which this accreditation applies

AC-1160
Certificate Number


ANAB Approval

Certificate Valid Through: 03/28/2021
Version No. 005 Issued: 03/12/2019



This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).



**SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017
AND ANSI/NCSL Z540-1-1994 (R2002)**

Nationwide Gage Calibration, Inc.

159 Covington Drive
Bloomington, IL 60108
Richard Parish 630-529-4959

CALIBRATION

Valid to: **March 28, 2021**

Certificate Number: **AC-1160**

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Voltage – Source	Up to 330 mV 330 mV to 3.3V (3.3 to 33) V (33 to 330) V 330 V to 1.02 kV	7.8 μ V 43 μ V 470 μ V 6.1 mV 22 mV	Multi-Product Calibrator
DC Current – Source	Up to 330 μ A 330 μ A to 3.3 mA (3.3 to 33) mA (33 to 330) mA 330 mA to 1.1 A (1.1 to 3) A (3 to 11) A (11 to 20.5) A	100 nA 390 nA 3.9 μ A 39 μ A 240 μ A 1.4 mA 6.4 mA 24 mA	Multi-Product Calibrator
Resistance – Source	Up to 11 Ω (11 to 33) Ω (33 to 110) Ω (110 to 330) Ω 330 Ω to 1.1 k Ω (1.1 to 3.3) k Ω (3.3 to 11) k Ω (11 to 33) k Ω (33 to 110) k Ω (110 to 330) k Ω 330 k Ω to 1.1M Ω (1.1 to 3.3) M Ω	0.97 m Ω 1.5 m Ω 3.7 m Ω 14 m Ω 37 m Ω 110 m Ω 370 m Ω 1.1 Ω 3.7 Ω 13 Ω 38 Ω 240 Ω	Multi-Product Calibrator



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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Resistance – Source	(3.3 to 11) MΩ	1.7 kΩ	Multi-Product Calibrator
	(11 to 33) MΩ	9.8 kΩ	
	(33 to 110) MΩ	65 kΩ	
	(110 to 330) MΩ	1.2 MΩ	
	(330 to 1 100) MΩ	2.4 MΩ	
AC Voltage – Source	(1 to 33) mV		Multi-Product Calibrator
	(10 to 45) Hz	31 μV	
	45 Hz to 10 kHz	6.6 μV	
	(10 to 20) kHz	8.3 μV	
	(20 to 50) kHz	39 μV	
	(50 to 100) kHz	140 μV	
	(100 to 500) kHz	310 μV	
	(33 to 330) mV		
	(10 to 45) Hz	130 μV	
	45 Hz to 10 kHz	57 μV	
	(10 to 20) kHz	62 μV	
	(20 to 50) kHz	140 μV	
	(50 to 100) kHz	310 μV	
	(100 to 500) kHz	770 μV	
	330 mV to 3.3 V		
	(10 to 45) Hz	1.2 mV	
	45 Hz to 10 kHz	580 μV	
	(10 to 20) kHz	730 μV	
	(20 to 50) kHz	1.2 mV	
	(50 to 100) kHz	2.7 mV	
	(100 to 500) kHz	9.2 mV	
	(3.3 to 33) V		
	(10 to 45) Hz	12 mV	
	45 Hz to 10 kHz	5.8 mV	
(10 to 20) kHz	9.2 mV		
(20 to 50) kHz	14 mV		
(50 to 100) kHz	35 mV		
(33 to 330) V			
(10 to 45) Hz	74 mV		
45 Hz to 10 kHz	78 mV		
(10 to 20) kHz	97 mV		
(20 to 50) kHz	120 mV		
(50 to 100) kHz	770 mV		

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage – Source	330 V to 1.02 kV 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	350 mV 300 mV 360 mV	Multi-Product Calibrator
AC Current – Source	(29 to 330) μ A (10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz 330 μ A to 3.3 mA (10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz (3.3 to 33) mA (10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz (33 to 330) mA (10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz 330 mA to 1.1 A (10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	1.2 μ A 990 nA 940 nA 1.4 μ A 3.2 μ A 6.2 μ A 7.8 μ A 4.9 μ A 4 μ A 7.7 μ A 20 μ A 39 μ A 70 μ A 36 μ A 18 μ A 32 μ A 78 μ A 160 μ A 690 μ A 350 μ A 160 μ A 390 μ A 770 μ A 1.6 mA 2.1 mA 590 μ A 7 mA 29 mA	Multi-Product Calibrator

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Current – Source	(1.1 to 3) A (10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (3 to 11) A (45 to 100) Hz (100 Hz to 1 kHz (1 to 5) kHz (11 to 20.5) A (45 to 100) Hz (100 Hz to 1 kHz (1 to 5) kHz	6.3 mA 2.3 mA 21 mA 87 mA 8.1 mA 13 mA 390 mA 29 mA 35 mA 700 mA	Multi-Product Calibrator
Capacitance – Source	(190 to 400) pF 400 pF to 1.1 nF (1.1 to 3.3) nF (3.3 to 11) nF (11 to 33) nF (33 to 110) nF (110 to 330) nF 330 nF to 1.1 μF (1.1 to 3.3) μF (3.3 to 11) μF (11 to 33) μF (33 to 110) μF (110 to 330) μF 330 μF to 1.1 mF (1.1 to 3.3) mF (3.3 to 11) mF (11 to 33) mF (33 to 110) mF	6.3 pF 6.5 pF 20 pF 34 pF 130 pF 340 pF 1.3 nF 3.4 nF 13 nF 34 nF 210 nF 610 nF 2.3 uF 6.1 μF 18 μF 60μF 190 μF 970 μF	Multi-Product Calibrator
Electrical Simulation of Thermocouple indicating devices	Type B (600 to 800) °C (800 to 1 000) °C (1 000 to 1 550) °C (1 550 to 1 820) °C	0.46 °C 0.37 °C 0.33 °C 0.36 °C	Multi-Product Calibrator



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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Electrical Simulation of Thermocouple indicating devices	Type C		Multi-Product Calibrator
	(0 to 150) °C	0.33 °C	
	(150 to 650) °C	0.29 °C	
	(650 to 1 000) °C	0.34 °C	
	(1 000 to 1 800) °C	0.52 °C	
	(1 800 to 2 316) °C	0.85 °C	
	Type E		
	(-250 to -100) °C	0.52 °C	
	(-100 to -25) °C	0.21 °C	
	(-25 to 350) °C	0.19 °C	
	(350 to 650) °C	0.21 °C	
	(650 to 1 000) °C	0.25 °C	
	Type J		
	(-210 to -100) °C	0.3 °C	
	(-100 to -30) °C	0.21 °C	
	(-30 to 150) °C	0.19 °C	
	(150 to 760) °C	0.21 °C	
	(760 to 1 200) °C	0.27 °C	
	Type K		
	(-200 to -100) °C	0.36 °C	
	(-100 to -25) °C	0.22 °C	
	(-25 to 120) °C	0.21 °C	
	(120 to 1 000) °C	0.29 °C	
	(1 000 to 1 372) °C	0.42 °C	
	Type L		
	(-200 to -100) °C	0.39 °C	
	(-100 to 800) °C	0.29 °C	
	(800 to 900) °C	0.21 °C	
Type N			
(-200 to -100) °C	0.42 °C		
(-100 to -25) °C	0.26 °C		
(-25 to 120) °C	0.23 °C		
(120 to 410) °C	0.22 °C		
(410 to 1 300) °C	0.3 °C		
Type R			
(0 to 250) °C	0.59 °C		
(250 to 400) °C	0.38 °C		
(400 to 1 000) °C	0.36 °C		
(1 000 to 1 767) °C	0.42 °C		



Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Electrical Simulation of Thermocouple indicating devices	Type S (0 to 250) °C (250 to 1 000) °C (1 000 to 1 400) °C (1 400 to 1 767) °C Type T (-250 to -150) °C (-150 to 0) °C (0 to 120) °C (120 to 400) °C Type U (-200 to 0) °C (0 to 600) °C	0.49 °C 0.38 °C 0.39 °C 0.48 °C 0.65 °C 0.27 °C 0.21 °C 0.19 °C 0.58 °C 0.3 °C	Multi-Product Calibrator
Electrical Simulation of Thermocouple Indicators ¹	Type B (600 to 1 800) °C Type E (-200 to 950) °C Type J (-200 to 1 200) °C Type K (-200 to 1 370) °C Type L (-200 to 1 370) °C Type N (-200 to 1 370) °C Type R (-20 to 1 750) °C Type S (-20 to 1 750) °C Type T (-200 to 400) °C Type U (-200 to 400) °C	2.6 °C 1.1 °C 1.3 °C 1.5 °C 1.1 °C 1.8 °C 3 °C 3 °C 1.5 °C 1.4 °C	Precision Temperature Calibrator



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Electrical Simulation of RTD indicating devices	Pt 385, 100 Ω			
	(-200 to -80) °C		0.12 °C	
	(-80 to 0) °C		0.12 °C	
	(0 to 100) °C		0.13 °C	
	(100 to 300) °C		0.14 °C	
	(300 to 400) °C		0.15 °C	
	(400 to 630) °C		0.16 °C	
	(630 to 800) °C		0.26 °C	
	Pt 3926, 100 Ω			
	(-200 to -80) °C		0.12 °C	
	(-80 to 0) °C		0.12 °C	
	(0 to 100) °C		0.13 °C	
	(100 to 300) °C		0.14 °C	
	(300 to 400) °C		0.15 °C	
	(400 to 630) °C		0.16 °C	
	Pt 3916, 100 Ω			
	(-200 to -190) °C		0.27 °C	
	(-190 to -80) °C		0.11 °C	
	(-80 to 0) °C		0.12 °C	
	(0 to 100) °C		0.12 °C	
	(100 to 260) °C		0.13 °C	
	(260 to 300) °C		0.13 °C	
	(300 to 400) °C		0.14 °C	
	(400 to 600) °C		0.15 °C	
	(600 to 630) °C		0.26 °C	
Pt 385, 200 Ω				
(-200 to -80) °C		0.11 °C		
(-80 to 0) °C		0.11 °C		
(0 to 100) °C		0.11 °C		
(100 to 260) °C		0.12 °C		
(260 to 300) °C		0.16 °C		
(300 to 400) °C		0.17 °C		
(400 to 600) °C		0.18 °C		
(600 to 630) °C		0.19 °C		
Pt 385, 500 Ω				
(-200 to -80) °C		0.11 °C		
(-80 to 0) °C		0.12 °C		
(0 to 100) °C		0.12 °C		
(100 to 260) °C		0.12 °C		
(260 to 300) °C		0.13 °C		
(300 to 400) °C		0.13 °C		
(400 to 600) °C		0.14 °C		
(600 to 630) °C		0.15 °C		
Electrical Simulation of RTD indicating devices	Pt 385, 1 000 Ω			
	(-200 to -80) °C		0.11 °C	
	(-80 to 0) °C		0.11 °C	

Multi-Product Calibrator

Multi-Product Calibrator



Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
	(0 to 100) °C (100 to 260) °C (260 to 300) °C (300 to 400) °C (400 to 600) °C (600 to 630) °C Pt 385, 120 Ω (Ni 120) (-80 to 0) °C (0 to 100) °C (100 to 260) °C Cu 427, 10 Ω (-100 to 260) °C	0.11 °C 0.12 °C 0.12 °C 0.13 °C 0.13 °C 0.26 °C 0.13 °C 0.13 °C 0.18 °C 0.32 °C	
Electrical Simulation of RTD indicating devices ¹	PtNi 120 (100 Ω) (-80 to 260) °C Pt 385 (100 Ω) (-200 to 800) °C Pt 392 (100 Ω) (-200 to 630) °C Pt JIS (100 Ω) (-200 to 360) °C Pt 385 (200 Ω) (-200 to 250) °C (250 to 630) °C Pt 385 (500 Ω) (-200 to 500) °C (500 to 630) °C Pt 385 (1 000 Ω) (-200 to 100) °C (100 to 630) °C	0.26 °C 0.37 °C 0.34 °C 0.34 °C 0.26 °C 0.82 °C 0.34 °C 0.43 °C 0.26 °C 0.26 °C	Precision Temperature Calibrator

Length – Dimensional metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Gage Blocks ²	Up to 4 in (4 to 20) in	(1.2 + 3.7L) μin (0.27 + 1.8L) μin	Gage Block Comparator, Gage Blocks
Gage Block Comparator	Up to 20 in	1.1 μin	Master Gage Blocks

Length – Dimensional metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Pin Gages ¹	Up to 2 in	28 μin	Laser Micrometer, Master Plug Gages
Plain Plug Gages ^{1,2}	Up to 10 in (10 to 36) in	(15 + 1.2L) μin (18 + 1.3L) μin	Bench Micrometer, Gage Blocks
Plain Ring Gages ²	(0.040 to 12) in	(15 + 1.8L) μin	I.D. Comparator, Gage Blocks
Thread Measuring Wires	Up to 0.5 in	17 μin	Bench Micrometer, Gage Blocks, Master Plug Gage
Thread Plug Gages ¹ Major Diameter Pitch Diameter	Up to 10 in	64 μin	Bench Micrometer, Thread Wires, Gage Blocks
Thread Plug Gages Tapered Pitch Diameter	Up to 10 in	72 μin	Bench Micrometer, Thread Wires, Gage Blocks
Thread Ring Gages ¹	Up to 10 in	72 μin	Thread Set Plugs
End Rod Standards ^{1,2}	Up to 60 in	(14 + 2.4L) μin	Precision Measuring Machine, Gage Blocks
Calipers ^{1,2}	Up to 40 in 40 to 72 in	(300 + 0.16L) μin (290 + 0.4L) μin	Caliper Master, Gage Blocks, Surface Plate
Caliper Master ¹	Up to 12 in	47 μin	Gage Blocks, Precision Indicator, Surface Plate
Height Gages ^{1,2}	Up to 40 in	(91 + 0.5L) μin	Gage Blocks, Precision Indicator, Surface Plate
Indicators ¹	Up to 6 in	42 μin	Bench Micrometer, Gage Blocks
LVDTs ¹	Up to 0.050 in	16 μin	Bench Micrometer, Gage Blocks
Depth Micrometers ¹	Up to 12 in	56 μin	Gage Blocks, Surface Plate
Outside Micrometers ^{1,2}	Up to 24 in (24 to 78) in	(27 + 1.8L) μin (580 + 0.2L) μin	Gage Blocks, Optical Flat



Length – Dimensional metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Inside Micrometers ^{1,2}	Up to 40 in (Rod Length)	$(56 + 0.8L) \mu\text{in}$	Precision Measuring Machine, Gage Blocks
Laser Micrometers ¹	Up to 2 in	18 μin	Precision Master Plain Plugs
Supermicrometers / Bench Micrometers ^{1,3}	Up to 1 in Travel Up to 2 in Travel	7.1 μin 7.5 μin	Gage Blocks
ID/OD Comparator (Comparative) ^{1,2}	Up to 12 in	$(3.5 + 1.3L) \mu\text{in}$	Gage Blocks
Radius Gages	Up to 1 in	220 μin	Precision Vision System
Scales / Rules / Tapes ²	Up to 12 ft	$(160 + 0.71L) \mu\text{in}$	Precision Vision System
Surface Plates ^{1,2} Local Area Flatness (Repeat Reading)	Up to (24 x 24) in Up to (120 x 120) in	42 μin 36 μin	Mahr Indicator Repeat-o-Meter, Precision Indicator
Overall Flatness	Up to (120 X 120) in	$(64 + 0.53D) \mu\text{in}$	Laser Optics System
Optical Comparators ¹ Angle Magnification Radius Squareness (X&Y axis) Travel	Up to 30 in screen Up to 30 in screen Up to 30 in screen Up to 30 in screen Up to 12 in	0.04 ° 470 μin 140 μin 160 μin 150 μin	Precision Balls, Glass Scales, Gage Blocks
Vision Systems ¹ Angle Radius Squareness (X&Y axis) Travel	Up to 12 in Up to 12 in Up to 12 in Up to 12 in	0.021 ° 61 μin 39 μin 63 μin	Precision Balls, Glass Scales, Gage Blocks

Mass and Mass-Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Torque Tools ^{1,2}	Up to 50 ozf·in Up to 1 000 lbf·in Up to 1 000 lbf·ft Up to 2 000 lbf·ft	0.5 ozf·in $(0.2 + 0.004 1X) \text{ lbf·in}$ $(0.3 + 0.003 1X) \text{ lbf·ft}$ 22 lbf·ft	Torque Tester

Mass and Mass-Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Torque Transducers ¹	(5 to 50) ozf·in (4 to 50) lbf·in (30 to 400) lbf·in (80 to 1 000) lbf·in (20 to 250) lbf·ft (60 to 600) lbf·ft (100 to 1 000) lbf·ft (200 to 2 000) lbf·ft	0.062 ozf·in 0.062 lbf·in 0.5 lbf·in 1.3 lbf·in 0.31 lbf·ft 0.74 lbf·ft 1.3 lbf·ft 2.5 lbf·ft	Weights & Torque Arms
Torque Arms	Up to 2.5 in (2.5 to 5) in (5 to 10) in (10 to 20) in	59 μin 88 μin 160 μin 300 μin	Gage Blocks, Master Plugs, Bench Micrometer
Durometer Calibrators A, B, O, C, D, DO	(0.55 to 45.45) N	0.016 N	Force Gage & Load Cell
Durometers, Types A, B, C, D, DO, O Spring Force	(0.55 to 8.05) N Up to 45.45 N	0.9 points 0.9 points	DuroCalibrator
Indenter Shape Indenter Length	(30 to 35) ° (0.096 to 0.1) in	0.03 ° 66 μin	Vision system
Rockwell Hardness Testers ¹	HRBW Low Medium High HRC Low Medium High	0.8 HRBW 0.81 HRBW 0.85 HRBW 0.86 HRC 0.83 HRC 0.82 HRC	Indirect Verification using Hardness Test Blocks
Rockwell Superficial Hardness Testers ¹	HR15N HR30N HR45N HR15TW HR30TW HR45TW	0.94 HR15N 0.91 HR30N 0.97 HR45N 0.93 HRTW 0.92 HRTW 0.94 HRTW	Indirect Verification using Hardness Test Blocks



Mass and Mass-Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Microhardness Testers ¹	Repeatability under forces P (gf) 500 ≤ P ≤ 1 000		Indirect Verification using Hardness Test Blocks
	557 < HK > 685 Error	1.3 μm 0.08 μm	
	571 < HV > 790 Error	2.9 μm 0.9 μm	
Force Gages ^{1,2}	Up to 500 lbf	(0.02 + 0.002X) lbf	Class F Weights Force Tester
	Up to 1 000 lbf	(0.12 + 0.004X) lbf	
Cable Tensiometers ²	Up to 1 000 lbf	(0.34 + 0.007 5X) lbf	Force Tester
Pressure Gages & Transducers ¹	Up to 5 psi	0.002 4 psi	Standard Pressure Gages
	Up to 200 psi	0.14 psi	
	Up to 1 000 psi	0.53 psi	
	Up to 3 000 psi	0.67 psi	
	Up to 7 000 psi	8.5 psi	
Up to 10 000 psi	16 psi		
Vacuum	Up to 30 in Hg	0.12 in Hg	Vacuum Test Gage
Scales / Balances ^{1,2}	Up to 120 g (120 to 220) g	0.093 mg 0.83 mg	Class 0 weights
	(220 to 510) g	1.2 mg	Class 4 Weights
	(510 to 3 000) g	13 mg	Class 1 weights
	Up to 1 000 lb	(0.26 + 0.001 7X) lb	Class F Weights

Thermodynamic

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Temperature / Thermometers ¹	(35 to 100) °C (100 to 250) °C (250 to 375) °C	0.32 °C 0.49 °C 0.67 °C	Thermal Dry Well
	(-200 to 1 200) °C	1.3 °C	Precision Temperature Calibrator w/ J thermocouple

Time and Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Stopwatch /Timers	Up to 24 hours	490 ms	N.I.S.T. Landline
Frequency - Source	Up to 100 Hz 100 Hz to 1 kHz (1 to 100) kHz (100 to 500) kHz	330 μ Hz 2.9 mHz 290 mHz 1.5 Hz	Multi-Product Calibrator

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. D = diagonal length in inches, L = length in inches, X = value of applied mass, force, or torque.
3. Uncertainty based on measurement over 1 inch lead screw
4. This scope is formatted as part of a single document including Certificate of Accreditation No. AC-1160.



Vice President

