



CALIBRATION LABORATORIES

NVLAP LAB CODE 200958-0

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

<p>J&J Calibration Service 460 Main Avenue P.O. Box 63 Walcott, ND 58077 Mr. Jeremy Alm Phone: (701) 469-2340 Fax: 701-469-2342 E-mail: jeremy.alm@jjcalibration.com URL: www.jjcalibration.com</p>	<p>Parameter(s) of Accreditation Dimensional DC/ Low Frequency Time & Frequency Mechanical</p> <p>This laboratory is compliant to ANSI/NCCL Z540-1-1994; Part 1. (NVLAP Code: 20/A01)</p>
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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) ^{Notes 1,2}

Measured Parameter or Device Calibrated	Range	Uncertainty ($k=2$) ^{Note 3,5}	Remarks
DIMENSIONAL			
NVLAP Code: 20/D05 LENGTH & DIAMETER; STEP GAGES		(Where L is measured value in inches.)	
Micrometers, Outside, Inside, Depth Field Calibrations Available ^{Note 4}	0 in to 36 in	56 $\mu\text{in} + 1L \mu\text{in}$	Comparison to Gage Blocks
Calipers Field Calibrations Available ^{Note 4}	0 in to 60 in	120 $\mu\text{in} + 0.7L \mu\text{in}$	Comparison to Gage Blocks
Indicators Field Calibrations Available ^{Note 4}	0 in to 2 in 0 in to 0.060 in	130 μin 20 μin	Comparison to Gage Blocks
Height Gages Field Calibrations Available ^{Note 4}	0 in to 40 in	160 $\mu\text{in} + 1.3L \mu\text{in}$	Comparison to Gage Blocks
Single Axis, Inner Dimension (Comparative) Field Calibrations Available ^{Note 4}	0.100 in to 10 in	14 $\mu\text{in} + 3L \mu\text{in}$	Horizontal Comparator
Single Axis, Outer Dimension Field Calibrations Available ^{Note 4}	0.050 in to 9 in	13 $\mu\text{in} + 3L \mu\text{in}$	Super Micrometer

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Measured Parameter or Device Calibrated	Range	Uncertainty ($k=2$) ^{Note 3,5}	Remarks
NVLAP Code: 20/D07 MEASURING WIRES Field Calibrations Available ^{Note 4}	4 TPI to 80 TPI	20 μ in	Super Micrometer
NVLAP Code: 20/D12 SURFACE TEXTURE Surface Plates Field Calibrations Available ^{Note 4}	Up to 225 in on diagonal	27 μ in	Digital Levels
NVLAP Code: 20/D14 THREADED PLUG & RING GAGES Thread Ring Gages Field Calibrations Available ^{Note 4} Thread Plug Gages Field Calibrations Available ^{Note 4}	>0 in to 9 in	500 μ in	Setting Plug Gages
	>0 in to 9 in pitch diameter	47 μ in	Super Micrometer

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) ^{Notes 1,2}

Measured Parameter or Device Calibrated	Range	Frequency Range	Uncertainty ($k=2$) ^{Note 3,5}	Remarks
ELECTROMAGNETICS – DC/LOW FREQUENCY				
NVLAP Code: 20/E02 AC RESISTANCE AND CURRENT AC Current - Generate Field Calibrations Available ^{Note 4}	20 μ A to 202 μ A	10 Hz to 44 Hz	0.21 % + 0.25 μ A	Transmille 3010A
		45 Hz to 999 Hz	0.11 % + 0.15 μ A	
		1 kHz to 10 kHz	0.80 % + 0.25 μ A	
	200 μ A to 2.02 mA	10 Hz to 44 Hz	0.20 % + 0.25 μ A	
		45 Hz to 999 Hz	0.090 % + 0.20 μ A	
		1 kHz to 10 kHz	0.50 % + 0.30 μ A	
2 mA to 20.2 mA	10 Hz to 44 Hz	0.20 % + 3 μ A		
	45 Hz to 999 Hz	0.090 % + 2 μ A		

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Measured Parameter or Device Calibrated	Range	Frequency Range	Uncertainty (k=2) ^{Note 3,5}	Remarks
AC Current - Generate Field Calibrations Available ^{Note 4}	2 mA to 20.2 mA	1 kHz to 10 kHz	0.25 % + 3 μA	Transmille 3010A
	20 mA to 202 mA	10 Hz to 44 Hz	0.20 % + 30 μA	
		45 Hz to 999 Hz	0.09 % + 20 μA	
		1 kHz to 10 kHz	0.50 % + 40 μA	
200 mA to 2.02 A	10 Hz to 44 Hz	0.20 % + 300 μA		
	45 Hz to 999 Hz	0.09 % + 200 μA		
	1 kHz to 10 kHz	0.50 % + 400 μA		
2 A to 30 A	30 Hz to 44 Hz	0.20 % + 3 mA		
	45 Hz to 99 Hz	0.06 % + 2 mA		
	100 Hz to 1 kHz	0.30 % + 4 mA		
AC Current - Measure Field Calibrations Available ^{Note 4}	1 μA to 100 mA	10 Hz to 40 Hz	0.09 % + 15 μA	Transmille 8081
		40 Hz to 1 kHz	0.05 % + 15 μA	
		1 kHz to 10 kHz	0.12 % + 30 μA	
101 mA to 1 A	10 Hz to 40 Hz	0.11 % + 0.15 mA		
	41 Hz to 1 kHz	0.070 % + 0.15 mA		
	1 kHz to 10 kHz	0.13 % + 0.5 mA		
1.001 A to 30 A	10 Hz to 40 Hz	0.16 % + 12 mA		
	40 Hz to 1 kHz	0.12 % + 9 mA		

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Measured Parameter or Device Calibrated	Range	Uncertainty ($k=2$) ^{Note 3,5}	Remarks		
NVLAP Code: 20/E05 DC RESISTANCE AND CURRENT DC Current - Generate Field Calibrations Available ^{Note 4}	1 μ A to 202 μ A	0.012 % + 0.01 μ A	Transmille 3010A		
	200 μ A to 2.02 mA	50 μ A/A + 0.03 μ A			
	2 mA to 20.2 mA	50 μ A/A + 0.2 μ A			
	20 mA to 202 mA	50 μ A/A + 2 μ A			
	200 mA to 2.02 A	0.013 % + 30 μ A			
	2 A to 20.2 A	0.030 % + 300 μ A			
	20.2 A to 30 A	0.050 % + 450 μ A			
	DC Current - Measure Field Calibrations Available ^{Note 4}	0.1 nA to 10 nA		1.5 % + 0.8 pA	Transmille 8081
		10 nA to 100 nA		0.31 % + 3.4 pA	
		100 nA to 1 μ A		0.03 % + 17 pA	
		1 μ A to 10 μ A		50 μ A/A + 100 pA	
		10 μ A to 100 μ A		14 μ A/A + 0.4 nA	
100 μ A to 1 mA		14 μ A/A + 4 nA			
1 mA to 10 mA		16 μ A/A + 40 nA			
10 mA to 100 mA		47 μ A/A + 0.6 μ A			
100 mA to 1 A		0.024 % + 13 μ A			
1 A to 10 A		0.057 % + 350 μ A			
Resistance - Generate Field Calibrations Available ^{Note 4}	100 m Ω 4 wire	0.015 %	Transmille 3010A		
	1 Ω 4 wire	0.010 % + 0.005 Ω			
	10 Ω 4 wire	0.010 % + 0.005 Ω			
	100 Ω 4 wire	50 $\mu\Omega/\Omega$ + 0.005 Ω			
	1 k Ω 4 wire	40 $\mu\Omega/\Omega$ + 0.040 Ω			
	10 k Ω 4 wire	40 $\mu\Omega/\Omega$ + 0.040 Ω			
	100 k Ω 2 wire	40 $\mu\Omega/\Omega$ + 4 Ω			

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Measured Parameter or Device Calibrated	Range	Uncertainty ($k=2$) ^{Note 3,5}	Remarks
Resistance - Generate Field Calibrations Available ^{Note 4}	1 MΩ 2 wire 10 MΩ 2 wire 100 MΩ 2 wire 1 GΩ 2 wire	0.010 % + 40 Ω 0.035 % + 400 Ω 0.50 % + 4 kΩ 1.0 % + 40 kΩ	Transmille 3010A
Resistance - Measure Field Calibrations Available ^{Note 4}	0.001 Ω to 1 Ω 1.001 Ω to 10 Ω 10.001 Ω to 100 Ω 100.001 Ω to 1 kΩ 1.001 Ω to 10 kΩ 10.001 kΩ to 100 kΩ 101 kΩ to 1 MΩ 1.001 MΩ to 10 MΩ	33 μΩ/Ω + 6 μΩ 28 μΩ/Ω + 30 μΩ 14 μΩ/Ω + 0.1 mΩ 12 μΩ/Ω + 80 mΩ 15 μΩ/Ω + 800 mΩ 16 μΩ/Ω + 8 Ω 18 μΩ/Ω + 200 Ω 24 μΩ/Ω + 8 kΩ	Transmille 8081
NVLAP Code: 20/E06 DC VOLTAGE DC Voltage - Generate Field Calibrations Available ^{Note 4}	1 μV to 202 mV 200 mV to 2.02 V 2 V to 20.2 V 20 V to 202 V 200 V to 1025 V	16 μV/V + 2 μV 9 μV/V + 2.5 μV 8 μV/V + 24 μV 12 μV/V + 240 μV 12 μV/V + 2.4 mV	Transmille 3010A
DC Voltage - Measure Field Calibrations Available ^{Note 4}	1 nV to 100 mV 101 mV to 1 V 1.001 V to 10 V 10.001 V to 100 V 101 V to 1 kV	9.0 μV/V + 0.17 μV 8.7 μV/V + 0.6 μV 7.1 μV/V + 6 μV 9.5 μV/V + 80 μV 9.8 μV/V + 1.2 mV	Transmille 8081

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Measured Parameter or Device Calibrated	Range	Frequency Range	Uncertainty (k=2) ^{Note 3,5}	Remarks
NVLAP Code 20/E09 LF AC VOLTAGE LF AC Voltage – Generate Field Calibrations Available ^{Note 4}	0 mV to 202 mV	10 Hz to 44 Hz	0.080 % + 15 μV	Transmille 3010A
		45 Hz to 999 Hz	0.016 % + 15 μV	
		1 kHz to 19.999 kHz	0.020 % + 28 μV	
		20 kHz to 99.999 kHz	0.10 % + 40 μV	
		100 kHz to 500 kHz	0.46 % + 100 μV	
	200 mV to 2.02 V	10 Hz to 44 Hz	0.050 % + 180 μV	
		45 Hz to 999 Hz	0.016 % + 120 μV	
		1 kHz to 19.999 kHz	0.021 % + 180 μV	
		20 kHz to 99.999 kHz	0.065 % + 300 μV	
		100 kHz to 500 kHz	0.30 % + 450 μV	
	2 V to 20.2 V	10 Hz to 44 Hz	0.050 % + 1.6 mV	
		45 Hz to 999 Hz	0.016 % + 1.0 mV	
1 kHz to 19.999 kHz		0.021 % + 1.6 mV		
20 kHz to 99.999 kHz		0.060 % + 3.0 mV		
20 V to 202 V	30 Hz to 44 Hz	0.050 % + 20 mV		
	45 Hz to 999 Hz	0.015 % + 12 mV		
	1 kHz to 9.999 kHz	0.020 % + 16 mV		
	10 kHz to 40 kHz	0.030 % + 30 mV		
200 V to 1020 V	30 Hz to 44 Hz	0.055 % + 200 mV	Limited Frequency and Voltage Combinations	
	45 Hz to 999 Hz	0.020 % + 60 mV		
	1 kHz to 10 kHz	0.025 % + 120 mV		
LF AC Voltage – Measure Field Calibrations Available ^{Note 4}	100 nV to 100 mV	10 Hz to 40 Hz	0.08 % + 15 μV	Transmille 8081
		41 Hz to 200 Hz	0.03 % + 9 μV	

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Measured Parameter or Device Calibrated	Range	Frequency Range	Uncertainty (k=2) ^{Note 3,5}	Remarks
LF AC Voltage – Measure Field Calibrations Available ^{Note 4}	100 nV to 100 mV	201 Hz to 2 kHz	0.03 % + 8 μV	Transmille 8081
		5 kHz to 20 kHz	0.04 % + 10 μV	
		20 kHz to 100 kHz	0.09 % + 50 μV	
	101 mV to 1 V	10 Hz to 40 Hz	0.06 % + 150 μV	
		40 Hz to 200 Hz	0.03 % + 60 μV	
		200 Hz to 2 kHz	0.02 % + 60 μV	
		2 kHz to 20 kHz	0.04 % + 100 μV	
		20 kHz to 100 kHz	0.09 % + 500 μV	
		100 kHz to 1 MHz	1.6 % + 25 mV	
	1.001 V to 10 V	40 Hz to 200 Hz	0.03 % + 0.6 mV	
		200 Hz to 2 kHz	0.02 % + 0.6 mV	
		2 kHz to 20 kHz	0.04 % + 1 mV	
		20 kHz to 100 kHz	0.09 % + 5 mV	
		100 kHz to 200 kHz	1.6 % + 250 mV	
	10.001 V to 100 V	10 Hz to 40Hz	0.08 % + 15 mV	
		40 Hz to 200Hz	0.03 % + 9 mV	
		200 Hz to 2kHz	0.03 % + 7 mV	
		2 kHz to 20 kHz	0.05 % + 10 mV	
		20 kHz to 50 kHz	0.12 % + 50 mV	
	101 V to 1 kV	40 Hz to 200 Hz	0.03 % + 90 mV	
200 Hz to 2 kHz		0.03 % + 70 mV		
2 kHz to 20 kHz		0.05 % + 100 mV		

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Measured Parameter or Device Calibrated	Range	Uncertainty (k=2) <small>Note 3</small>	Remarks
NVLAP Code: 20/E10 LF CAPACITANCE LF Capacitance - Generate Field Calibrations Available <small>Note 4</small>	10 nF 20 nF 50 nF 100 nF 1 μF 10 μF	0.25 % 0.25 % 0.25 % 0.25 % 0.40 % 0.60 %	Transmille 3010A
NVLAP Code: 20/E11 LF INDUCTANCE LF Inductance - Generate Field Calibrations Available <small>Note 4</small>	1 mH to 10 H	0.50 %	Transmille 3010A
TIME AND FREQUENCY			
NVLAP Code: 20/F01 FREQUENCY DISSEMINATION Frequency Generate Field Calibrations Available <small>Note 4</small> Frequency Measure Field Calibrations Available <small>Note 4</small>	1 Hz to 10 MHz 1 Hz to 1 MHz	1 μHz/Hz 5 μHz/Hz + 2 digits	Transmille 3010A Transmille 8081
MECHANICAL			
NVLAP Code: 20/M15 TORQUE Torque Wrenches Field Calibrations Available <small>Note 4</small>	4 lbf-in to 50 lbf-in 30 lbf-in to 400 lbf-in 80 lbf-in to 1000 lbf-in 20 lbf-ft to 250 lbf-ft 60 lbf-ft to 600 lbf-ft	0.60 % 0.28 % 0.24 % 0.30 % 0.31 %	Torque Transducers

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Measured Parameter or Device Calibrated	Range	Uncertainty ($k=2$) <small>Note 3</small>	Remarks
Torque Transducers Field Calibrations Available <small>Note 4</small>	4 lbf-in to 50 lbf-in 30 lbf-in to 400 lbf-in 80 lbf-in to 1000 lbf-in 20 lbf-ft to 250 lbf-ft 60 lbf-ft to 600 lbf-ft	0.19 % 0.10 % 0.10 % 0.12 % 0.12 %	Arm and Weights
END			

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Notes

Note 1: A Calibration and Measurement Capability (CMC) is a description of the best result of a calibration or measurement (result with the smallest uncertainty of measurement) that is available to the laboratory's customers under normal conditions, when performing more or less routine calibrations of nearly ideal measurement standards or instruments. The CMC is described in the laboratory's scope of accreditation by: the measurement parameter/device being calibrated, the measurement range, the uncertainty associated with that range (see note 3), and remarks on additional parameters, if applicable.

Note 2: Calibration and Measurement Capabilities are traceable to the national measurement standards of the U.S. or to the national measurement standards of other countries and are thus traceable to the internationally accepted representation of the appropriate SI (Système International) unit.

Note 3: The uncertainty associated with a measurement in a CMC is an expanded uncertainty using a coverage factor, $k = 2$, with a level of confidence of approximately 95 %. Units for the measurand and its uncertainty are to match. Exceptions to this occur when marketplace practice employs mixed units, such as when the artifact to be measured is labeled in non-SI units and the uncertainty is given in SI units (Example: 5 lb weight with uncertainty given in mg).

Note 3a: The uncertainty of a specific calibration by the laboratory may be greater than the uncertainty in the CMC due to the condition and behavior of the customer's device and specific circumstances of the calibration. The uncertainties quoted do not include possible effects on the calibrated device of transportation, long term stability, or intended use.

Note 3b: As the CMC represents the best measurement results achievable under normal conditions, the accredited calibration laboratory shall not report smaller uncertainty of measurement than that given in a CMC for calibrations or measurements covered by that CMC.

Note 3c: As described in Note 1, CMCs cover calibrations and measurements that are available to the laboratory's customers under *normal conditions*. However, the laboratory may have the capability to offer special tests, employing special conditions, which yield calibration or measurement results with lower uncertainties. Such special tests are not covered by the CMCs and are outside the laboratory's scope of accreditation. In this case, NVLAP requirements for the labeling, on calibration reports, of results outside the laboratory's scope of accreditation apply. These requirements are set out in Annex A.1.h. of NIST Handbook 150, Procedures and General Requirements.

Note 4: Uncertainties associated with field service calibration may be greater as they incorporate on-site environmental contributions, transportation effects, or other factors that affect the measurements. (This note applies only if marked in the body of the scope.)

Note 5: Values listed with percent (%) are percent of reading or generated value unless otherwise noted.

Note 6: NVLAP accreditation is the formal recognition of specific calibration capabilities. Neither NVLAP nor NIST guarantee the accuracy of individual calibrations made by accredited laboratories.

Note 7: See [NIST Handbook 150](#) for further explanation of these notes.

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