SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017
& ANSI/NCSL Z540-1-1994

ENDRESS+HAUSER, INC.
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CALIBRATION

Valid To: January 31, 2027 Certificate Number: 3041.02

In recognition of the successful completion of the A2LA evaluation process (including an assessment of the organization's compliance with A2LA's Calibration Program Requirements), accreditation is granted to this laboratory to perform the following calibrations[1, 6]:

I. Electrical – DC/Low Frequency[4]

Parameter/Equipment	Range	CMC[2, 7] (±)	Comments
DC Current – Measure[3]	(0 to 100) µA 100 µA to 1 mA (1 to 10) mA (10 to 100) mA 100 mA to 1 A (1 to 3) A (0 to 50) mA	0.058 % of rdg + 0.025 % of rng 0.058 % of rdg + 0.006 % of rng 0.058 % of rdg + 0.020 % of rng 0.058 % of rdg + 0.005 % of rng 0.12 % of rdg + 0.010 % of rng 0.17 % of rdg + 0.020 % of rng 0.012 % of rdg + 1 µA	Agilent 34410A/34465A Martel 3001
DC Current – Generate[3]	(0 to 100) mA	0.0059 % of rdg + 1 µA	Martel 3001
DC Voltage – Measure[3]	(0 to 100) mV (0 to 1) V (0 to 10) V (0 to 100) V (100 to 1000) V	0.0059 % of rdg + 0.0035 % of rng 0.004 % of rdg + 0.0007 % of rng 0.0035 % of rdg + 0.0005 % of rng 0.0047 % of rdg + 0.0006 % of rng 0.0047 % of rdg + 0.0006 % of rng	Agilent 34410A/34465A
DC Voltage – Generate[3]	(0 to 100) mV (0 to 1) V (0 to 10) V (0 to 100) V	0.0039 % of rdg + 3 µV 0.0038 % of rdg + 10 µV 0.0038 % of rdg + 100 µV 0.0039 % of rdg + 1 mV	Martel 3001

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Parameter/Equipment	Range	CMC[2, 5, 7] (±)	Comments
Thermocouple Output (Electrical Simulation of Thermocouples) [3]	(-10 to 75) mV	0.0038 % of rdg + 3 µV	Martel 3001
Type E	(-250 to 1000) °C	0.6 °C	
Type J	(-210 to 1200) °C	0.3 °C	
Type K	(-200 to 1372) °C	0.5 °C	
Type T	(-250 to 400) °C	0.7 °C	
Thermocouple Input[3]	(-10 to 75) mV	0.0038 % of rdg + 3 µV	Martel 3001
Resistance[3] – Measure	(5 to 400) Ω 5 Ω to 4 kΩ	0.0041 % of rdg + 0.004 Ω 0.0041 % of rdg + 0.04 Ω	Martel 3001
Resistance[3] – Generate (Electrical Simulation of RTD)	(5 to 400) Ω 5 Ω to 4 kΩ	0.026 Ω 0.40 Ω	Martel 3001
Pt 385, 100 Ω	(-200 to -80) °C (-80 to 0) °C (0 to 100) °C (100 to 300) °C (300 to 400) °C (400 to 630) °C (630 to 800) °C	0.06 °C 0.07 °C 0.07 °C 0.07 °C 0.07 °C 0.08 °C 0.08 °C	

II. Fluid Quantities

Parameter/Equipment	Range	CMC[2, 5] (±)	Comments
Flow Rate – Liquids			
Flowrig FCP1.0US:			
Mass	(8 to 100) g/min	0.048 % of rdg	Gravimetric flow rig
Volumetric	(8 to 100) ml/min	0.049 % of rdg	
Flowrig FCP7.1.6US:			
Mass	(0.1 to 190) kg/s	0.043 % of rdg	Gravimetric flow method used in accordance with ASME/ANSI MFC-M9-1988 & ISO 4185
Volumetric	(0.1 to 190) l/s	0.045 % of rdg	
Flowrig FCP7.1.6US:			
Mass	(0.1 to 190) kg/s	0.047 % of rdg	Gravimetric flow rig w/ Coriolis reference standards
Volumetric	(0.1 to 190) l/s	0.049 % of rdg	
Flow Rate[3] – Liquids			
Mass	(0.001 to 0.125) kg/s	0.12 %	Inline Coriolis master meter 83A02, 83A04
Volumetric	(0.001 to 0.125) l/s	0.3 %	
Mass	(0.02 to 18) kg/s	0.12 %	Portable flow calibration rig or inline with Coriolis master meters 83F08, 83F25, 83F50
Volumetric	(0.02 to 18) l/s	0.17 %	
Mass	(17 to 50) kg/s	0.12 %	Inline Coriolis master meter 83F80
Volumetric	(17 to 50) l/s	0.17 %	
Volumetric	(2 to 40) l/s	0.32 %	Inline electromagnetic master meter 53H50, 53H80

Parameter/Equipment	Range	CMC[2, 5] (±)	Comments
Flow Rate – Liquids			
Flowrig FCP2.15US:			
Mass	(100 to 15 000) g/min	0.048 % of rdg	Gravimetric flow rig
Volumetric	(100 to 15 000) ml/min	0.049 % of rdg	

III. Mechanical

Parameter/Equipment	Range	CMC[2, 5] (±)	Comments
Pressure – Gauges & Transducers			
Gauge, Pneumatic	(1.6 to 315) psia (5 to 1515) psia (0 to 0.75) psig (0 to 1.5) psig (0 to 7.5) psig (0 to 15) psig	0.013 % FS 0.013 % FS 0.031 % FS 0.031 % FS 0.013 % FS 0.013 % FS	Mensor CPC6000
Differential	(-0.75 to 0.75) psid (-1.5 to 1.5) psid (-7.5 to 7.5) psid (-15 to 15) psid	0.031 % FS 0.031 % FS 0.013 % FS 0.013 % FS	Mensor CPC6000
Gauge, Pneumatic/ Hydraulic	(600 to 10 000) psig	0.013 % FS	Mensor CPG2500
Pressure[3] – Gauges & Transducers			Fluke 74x/75x series:
Differential	(0 to 1) inH_2O (0 to 10) inH_2O (0 to 5) psid	0.32 % FS 0.25 % FS 0.072 % FS	w/ 700P00 w/ 700P01 w/ 700P23
Gauge	(-15 to 100) psig (0 to 30) psig (0 to 500) psig	0.044 % FS 0.044 % FS 0.044 % FS	w/ 700PD6 w/ 700P05 w/ 700P07

Parameter/Equipment	Range	CMC[2, 5] (±)	Comments
Pressure[3] – Gauges & Transducers (cont)			Fluke 74x/75x series:
Gauge, Hydraulic	(0 to 1000) psig (0 to 5000) psig	0.044 % FS 0.1 % FS	w/ 700P08 w/ 700P30
Absolute	(0.75 to 100) psia	0.084 % FS	w/ 700PA6
Gauge, Pneumatic	(1.7 to 50) psia (-13 to 35) psig (1.7 to 615) psia (-13 to 600) psig	0.033 % FS 0.024 % FS 0.028 % FS 0.024 % FS	Additel ADT761-HA
	(1.2 to 50) psia (13.5 to 35) psig (1.2 to 515) psia (13.5 to 500) psig	0.024 % FS 0.024 % FS 0.024 % FS 0.024 % FS	Additel ADT761A-500-CP35
	(1.2 to 615) psia (13.5 to 600) psig (1.2 to 1015) psia (13.5 to 1000) psig	0.024 % FS 0.024 % FS 0.024 % FS 0.024 % FS	Additel ADT761A-1K-CP600

IV. Thermodynamic

Parameter/Equipment	Range	CMC[2, 7] (±)	Comments
Temperature – Measuring Equipment	(-30 to 200) °C (35 to 200) °C	0.030 °C 0.053 °C	Liquid bath w/SPRT & thermometer
	(-10 to 125) °C	0.07 °C	Dry block w/SPRT & thermometer
Temperature[3] – Measuring Equipment	(-5 to 125) °C	0.087 °C	Liquid bath w/SPRT & thermometer
	(35 to 200) °C	0.097 °C	
	(50 to 100) °C	0.30 °C	Dry block w/SPRT & thermometer
	(100 to 375) °C	0.60 °C	

V. Time & Frequency

Parameter/Equipment	Range	CMC[2, 7] (±)	Comments
Frequency – Measure	1 Hz to 110 kHz (3 to 5) Hz (5 to 10) Hz (10 to 40) Hz 40 Hz to 300 kHz	0.0013 % of rdg 0.081 % of rdg 0.047 % of rdg 0.023 % of rdg 0.0082 % of rdg	Philips PM6671 Agilent 34410A
Frequency – Measuring Equipment	10 Hz to 10 MHz	0.0026 % of rdg + 3 pHz	Agilent 33210A

[1] This laboratory offers commercial calibration service and field calibration service.

[2] Calibration and Measurement Capability Uncertainty (CMC) is the smallest uncertainty of measurement that a laboratory can achieve within its scope of accreditation when performing more or less routine calibrations of nearly ideal measurement standards or nearly ideal measuring equipment. CMCs represent expanded uncertainties expressed at approximately the 95 % level of confidence, usually using a coverage factor of $k = 2$. The actual measurement uncertainty of a specific calibration performed by the laboratory may be greater than the CMC due to the behavior of the customer's device and to influences from the circumstances of the specific calibration.

[3] Field calibration service is available for this calibration. Please note the actual measurement uncertainties achievable on a customer's site can normally be expected to be larger than the CMC found on the A2LA Scope. Allowance must be made for aspects such as the environment at the place of calibration and for other possible adverse effects such as those caused by transportation of the calibration equipment. The usual allowance for the actual uncertainty introduced by the item being calibrated, (e.g. resolution) must also be considered and this, on its own, could result in the actual measurement uncertainty achievable on a customer's site being larger than the CMC.

[4] It is common practice for the laboratory to perform calibration of electrical parameters associated with one of the above calibration methods as it is related to the process instrument. In many cases, the calibration of electrical parameters (i.e. voltage, current, frequency, etc.) is required to determine the value of a flow, pressure, or temperature variable in a system where a transmitter or remote indicating device is one component in the whole system being calibrated. It is not the practice of the laboratory to perform calibration of electrical parameters on electrical equipment (i.e. digital multi-meters, oscilloscopes, etc.) for customers and is not intended to be perceived that way in the scope of accreditation.

[5] In the statement of CMC, percentages are percentage of reading, unless otherwise indicated. FS represents "Full Scale".

[6] This scope meets A2LA's *P112 Flexible Scope Policy*.

[7] The stated measured values are determined using the indicated instrument (see Comments). This capability is suitable for the calibration of the devices intended to measure or generate the measured value in the ranges indicated. CMCs are expressed as either a specific value that covers the full range (Rng) or as a percent or fraction of the reading (Rdg) plus a fixed floor specification.

Accredited Laboratory

A2LA has accredited

ENDRESS+HAUSER, INC.

Greenwood, IN

for technical competence in the field of

Calibration

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*. This laboratory also meets the requirements of ANSI/NCSL Z540-1-1994 and R205 – Specific Requirements: Calibration Laboratory Accreditation Program. 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*).

Presented this 5th day of December 2024.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 3041.02
Valid to January 31, 2027

For the calibrations to which this accreditation applies, please refer to the laboratory's Calibration Scope of Accreditation.