



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005
& ANSI/NCSL Z540-1-1994

ENDRESS+HAUSER, INC.
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CALIBRATION

Valid To: September 30, 2020

Certificate Number: 3041.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations^{1,6}:

I. Electrical – DC/Low Frequency³

Parameter/Equipment	Range	CMC ^{2, 4, 7} (±)	Comments
DC Current – Measure	(0 to 100) μ A 100 μ A to 1 mA (1 to 10) mA (10 to 100) mA 100 mA to 1 A (1 to 3) A	0.058 % + 0.025 % of rng 0.058 % + 0.006 % of rng 0.058 % + 0.020 % of rng 0.058 % + 0.005 % of rng 0.12 % + 0.010 % of rng 0.17 % + 0.020 % of rng	Agilent 34410A
	(0 to 50) mA	0.012 % + 1 μ A	Martel 3001
DC Current – Generate	(0 to 100) mA	0.0059 % + 1 μ A	Martel 3001
DC Voltage – Measure	(0 to 100) mV	0.0059 % + 0.0035 % of rng	Agilent 34410A
	(0 to 1) V	0.004 % + 0.0007 % of rng	
	(0 to 10) V	0.0035 % + 0.0005 % of rng	
	(0 to 100) V	0.0047 % + 0.0006 % of rng	
	(100 to 1000) V	0.0047 % + 0.0006 % of rng	
DC Voltage – Generate	(0 to 100) mV	0.0039 % + 3 μ V	Martel 3001
	(0 to 1) V	0.0038 % + 10 μ V	
	(0 to 10) V	0.0038 % + 100 μ V	
	(0 to 100) V	0.0039 % + 1 mV	

Parameter/Equipment	Range	CMC ^{2,4,7} (±)	Comments
Thermocouple Output– (Electrical Simulation of Thermocouples)	(-10 to 75) mV	0.0038 % + 3 μV	Martel 3001
Type E	(-250 to 1000) °C	0.3 °C	Martel 3001
Type J	(-210 to 1200) °C	0.5 °C	
Type K	(-200 to 1372) °C	0.6 °C	
Type T	(-250 to 400) °C	0.7 °C	
Thermocouple Input	(-10 to 75) mV	0.0038 % + 3 μV	Martel 3001
Resistance – Measure	(0 to 400) Ω 0 Ω to 4 kΩ	0.0041 % + 0.004 Ω 0.0041 % + 0.04 Ω	Martel 3001
Resistance – 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	Martel 3001

II. Fluid Quantities

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Flowrate – Liquids			
Flowrig FCP8.2US			
Mass	(0.02 to 10) kg/s	0.043 %	Gravimetric flow rig
Volumetric	(0.02 to 10) l/s	0.045 %	
Mass	(0.02 to 27.8) kg/s	0.047 %	Gravimetric flow rig with Coriolis reference standards
Volumetric	(0.02 to 27.8) l/s	0.049 %	



III. Mechanical

Parameter/Equipment	Range	CMC ² (±)	Comments
Pressure – Gauges and Transducers			
Gauge, Pneumatic	(0.13 to 165) psia (0.13 to 315) psia (0.13 to 765) psia (atm to 7.5) psig (atm to 15) psig (atm to 30) psig (atm to 60) psig (atm to 165) psig	0.013 % FS (Full Scale) 0.013 % FS 0.013 % FS 0.013 % FS 0.013 % FS 0.013 % FS 0.013 % FS 0.013 % FS	Mensor CPC6000
Differential	(-14.7 to 500) psid	0.013 % FS	

IV. Thermodynamic

Parameter/Equipment	Range	CMC ^{2, 5, 7} (±)	Comments
Temperature – Measuring Equipment	(-40 to 100) °C (100 to 300) °C	0.025 °C 0.040 °C	Liquid bath w/SPRT and thermometer

V. Time & Frequency

Parameter/Equipment	Range	CMC ^{2, 4, 7} (±)	Comments
Frequency – Measure	10 Hz to 10 kHz	0.0015 %	Agilent 53131A
	(3 to 5) Hz (5 to 10) Hz (10 to 40) Hz 40 Hz to 300 kHz	0.081 % 0.047 % 0.023 % 0.0082 %	Agilent 34410A
Frequency – Measuring Equipment	10 Hz to 20 MHz	0.0023 % + 3 pHz	Agilent 33220A



¹ This laboratory offers commercial 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 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.

⁴ In the statement of CMC, percentages are to be read as percentage of reading, unless otherwise indicated.

⁵ 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. CMC's are expressed as either a specific value that covers the full range or as a percent or fraction of the reading plus a fixed floor specification.

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

⁷ The type of instrument or material being calibrated is defined by the parameter. This indicates the laboratory is capable of calibrating instruments that measure or generate the values in the ranges indicated for the listed measurement parameter.



Accredited Laboratory

A2LA has accredited

ENDRESS+HAUSER, INC.

LaPorte, TX

for technical competence in the field of

Calibration

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General requirements for the competence of testing and calibration laboratories*. This laboratory also meets the requirements of ANSI/NCSL Z540-1-1994 and A2LA 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 22nd day of October 2018.

A handwritten signature in black ink, written over a horizontal line.

President and CEO
For the Accreditation Council
Certificate Number 3041.01
Valid to September 30, 2020

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