



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, 2018

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 calibrations¹:

I. Electrical – DC Low Frequency³

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
DC Current – Measure	(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	0.058 % + 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 µA	Martel 3001
DC Current – Generate	(0 to 100) mA	0.0059 % + 1 µA	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 µV	Martel 3001
	(0 to 1) V	0.0038 % + 10 µV	
	(0 to 10) V	0.0038 % + 100 µV	
	(0 to 100) V	0.0039 % + 1 mV	

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Thermocouple Output (Electrical Simulation of Thermocouples)	(-10 to 75) mV	0.0038 % + 3 μV	Martel 3001
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

II. Fluid Quantities

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

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 % Full Scale (FS) 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 (±)	Comments
Temperature – Measuring Equipment	(-40 to 100) °C (100 to 300) °C	0.021 °C 0.036 °C	Liquid bath w/SPRT and thermometer

V. Time & Frequency

Parameter/Equipment	Range	CMC ^{2,4} (±)	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.



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/NCSLI 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 8 January 2009).



Presented this 6th day of September 2016.

A handwritten signature in blue ink, appearing to read "J. C. Bunt".

Senior Director of Quality and Communications
For the Accreditation Council
Certificate Number 3041.01
Valid to September 30, 2018

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