



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

SERVO INNOVATIONS, LLC
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Wayland, MI 49348
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CALIBRATION

Valid To: February 28, 2019

Certificate Number: 2444.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations¹:

I. Dimensional

Parameter/Equipment	Range	CMC ^{2,5} (±)	Comments
Calipers	Up to 12 in	(120 + 49L) μin	Gage blocks
Micrometers	Up to 1 in	120 μin	Gage blocks
Height Gage	Up to 12 in	(740 + 24L) μin	Height master

II. Electrical – DC & Low Frequency

Parameter/Equipment	Range	CMC ^{2,6} (±)	Comments
DC Voltage – Generate ³	(0 to 35) VDC	0.019 V	BK Precision 1770
DC Voltage – Measure	(0 to 30) VDC	0.009 V	Fluke 45

III. Mechanical

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Hydraulic Actuators ³ –			
Force – Compression	(0.0010 to 20) lbf	0.0012 lbs	ASTM Class F weights Interface SMT2-112 PCB 1203-01A HBM S9-10KN Lebow 3132-5K Interface 9840 Interface 1210ACK-10K PCB 1204-02B, PCB 8159-0012A Interface 1620AJH-50K, Interface 9840 PCB 1208-02A, PCB 8159-0012A Interface 1250EAJ Strainsense SSTMINI604C
	(0 to 112) lbf	0.053 %	
	(0 to 500) lbf	0.018 %	
	(0 to 2000) lbf	0.044 %	
	(0 to 5000) lbf	0.071 %	
	(5000 to 10 000) lbf	0.065 %	
	(10 000 to 20 000) lbf	0.098 %	
	(20 000 to 50 000) lbf	0.023 %	
	(50 000 to 100 000) lbf	0.052 %	
	(100 000 to 200 000) lbf	0.10 %	
	(200 000 to 400 000) lbf	0.13 %	
	(200 000 to 600 000) lbf	0.22 %	
Force – Tension	(0 to 110) lbf	0.049 %	Interface SMT2-112 PCB 1203-01A HBM S9-10KN Lebow 3132-5K Interface 1210ACK-10K PCB 1204-02B, PCB 8159-0012A Interface 1620AJH-50K, Interface 9840 PCB 1208-02A, PCB 8159-0012A Interface 1250EAJ
	(0 to 500) lbf	0.074 %	
	(0 to 2000) lbf	0.062 %	
	(0 to 5000) lbf	0.080 %	
	(5000 to 10 000) lbf	0.073 %	
	(5000 to 20 000) lbf	0.17 %	
	(20 000 to 50 000) lbf	0.019 %	
	(50 000 to 100 000) lbf	0.082 %	
	(100 000 to 200 000) lbf	0.13 %	
	(200 000 to 400 000) lbf	0.21 %	

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Hydraulic Actuators ³ – (Cont.)			
Torque	(0 to 500) in·lb	0.11 %	Clockwise CCW
	(0 to 1000) in·lb	0.099 %	CW & CCW (arm-weight)
	(500 to 20 000) in·lb	0.089 %	PCB 2303-02, PCB 8159-0013A
	(20 000 to 100 000) in·lb (100 000 to 300 000) in·lb (300 000 to 1 200 000) in·lb	0.14 % 0.048 % 0.072 %	PCB 1540-01A, PCB 8159-0012A, PCB 1204-02B, PCB 8159- 0012A, and torque arm
Displacement	(0 to 40) in	0.003 in	Newall DSA 1100
Angle	(0 to 360)°	0.33°	Trans-tek 0607-0001
Speed	(6 to 8299) rpm	2.6 rpm	Shimpo DT-205L tachometer
	(8299 to 24 999) rpm	2.8 rpm	
	(25 000 to 99 000) rpm	7.1 rpm	
Velocity	(0 to 2) in/s	0.035 in/s	Stop Watch & Newal DATAQ & LVDT
	(2 to 600) in/s	0.035 in/s	
Pressure	(0 to 300) psi	0.011 %	Druck PV 622, pressure Druck PV 623
	(0 to 1500) psi	0.088 %	

IV. Thermodynamics

Parameter/Equipment	Range	CMC ² (±)	Comments
Temperature ³ – Thermocouple Simulation			
J, K, T, E, R, S, B, N	(-10 to 122) °C	0.62 °F	Omega CL543
Temperature Probe	(-10 to 122) °C	0.46 °C	Fluke 9102S
Pyrometer ³	(20 to 752) °F	4.6 °F	Omega BB703

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 and this laboratory meets A2LA *RI04 – General Requirements: Accreditation of Field Testing and Field Calibration Laboratories* for these calibrations. 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 In the statement of CMC, % is defined as the percentage of full scale unless otherwise noted.

⁵ In the statement of CMC, L is the numerical value of the nominal length of the device measured in inches.

⁶ 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.



Accredited Laboratory

A2LA has accredited

SERVO INNOVATIONS, LLC

Wayland, MI

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 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 21st day of June 2017.

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

President and CEO
For the Accreditation Council
Certificate Number 2444.01
Valid to February 28, 2019

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