PERRY JOHNSON LABORATORY ACCREDITATION, INC.

Certificate of Accreditation

Perry Johnson Laboratory Accreditation, Inc. has assessed the Laboratory of:

Automated Control Systems

122 S. Woodburn Drive, Dothan, AL 36305

(Hereinafter called the Organization) and hereby declares that Organization is accredited in accordance with the recognized International Standard:

ISO/IEC 17025:2005

This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system
(as outlined by the joint ISO-ILAC-IAF Communiqué dated April 2017):

Dimensional, Electrical, Mechanical, Thermodynamic, and Mass, Force, and Weighing Devices

(As detailed in the supplement)

Accreditation claims for such testing and/or calibration services shall only be made from addresses referenced within this certificate. This Accreditation is granted subject to the system rules governing the Accreditation referred to above, and the Organization hereby covenants with the Accreditation body's duty to observe and comply with the said rules.

For PJLA:

Tracy Szerszen
President/Operations Manager

Perry Johnson Laboratory Accreditation, Inc. (PJLA)
755 W. Big Beaver, Suite 1325
Troy, Michigan 48084

Initial Accreditation Date:	*Issue Date:*	*Expiration Date:*
February 22, 2018	February 22, 2018	June 30, 2020
Revision Date:	*Accreditation No.:*	*Certificate No.:*
March 6, 2018	98908	L18-91-R1

The validity of this certificate is maintained through ongoing assessments based on a continuous accreditation cycle. The validity of this certificate should be confirmed through the PJLA website: www.pjlabs.com

Certificate of Accreditation: Supplement

Automated Control Systems
122 S. Woodburn Drive, Dothan, AL 36305
Contact Name: Gary McGowan Phone: 334-792-0113

Accreditation is granted to the facility to perform the following calibrations:

Dimensional

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Calipers FO	0.5 in to 9 in	(33 + 5.7L) µin	Grade 0 Gage Blocks
Height Gages FO	0.05 in to 8 in	(47 + 4.3L) µin	
Micrometer FO	0.05 in to 6 in	(42 + 5.2L) µin	
Indicators FO	0.05 in to 4 in	(1.3 + 30L) µin	

Electrical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Equipment to Measure DC Current FO	0.01 µA to 100 µA	25 nA + 0.061 % of reading	Fluke 8846A
	100 µA to 1 mA	0.05 µA + 0.059 % of reading	
	1 mA to 10 mA	2 µA + 0.061 % of reading	
	10 mA to 100 mA	5 µA + 0.06 % of reading	
	100 mA to 1 A	0.2 mA + 0.062 % of reading	
	1 A to 3 A	0.6 mA + 0.12 % of reading	
	3 A to 10 A	0.8 mA + 0.18 % of reading	
Equipment to Measure Resistance FO	0.1 Ω to 10 Ω	3 mΩ + 0.13 % of reading	
	10 Ω to 100 Ω	4 mΩ + 0.012 % of reading	
	100 Ω to 1 kΩ	10 mΩ + 0.012 % of reading	
	1 kΩ to 10 kΩ	0.1 Ω + 0.12 % of reading	
	10 kΩ to 100 kΩ	1 Ω + 0.012 % of reading	
	100 kΩ to 1 MΩ	10 Ω + 0.012 % of reading	
	1 MΩ to 10 MΩ	0.1 kΩ + 0.047 % of reading	
	10 MΩ to 100 MΩ	10 kΩ + 0.95 % of reading	
Equipment to Measure Capacitance FO	0.1 nF to 1 nF	25 nF + 2.7 % of reading	
	1 nF to 10 nF	0.05 nF + 1.3 % of reading	
	10 nF to 100 nF	0.5 nF + 1.2 % of reading	
	0.1 µF to 1 µF	5 nF + 1.2 % of reading	
	1 µF to 10 µF	0.05 µF + 1.2 % of reading	
	10 µF to 100 µF	0.5 µF + 1.2 % of reading	
	100 µF to 1 mF	5 µF + 1.2 % of reading	
	1 mF to 10 mF	0.05 mF + 1.3 % reading	
	10 mF to 100 mF	0.2 mF + 4.8 % of reading	

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Equipment to Measure DC Voltage [FO]	1 µV to 100 mV	3.5 µV + 0.005 1 % of reading	Fluke 8846A
	100 mV to 1 V	7 µV + 0.003 % of reading	
	1 V to 10 V	0.05 mV + 0.002 8 % of reading	
	10 V to 100 V	0.6 mV + 0.004 6 % of reading	
	100 V to 1 000 V	10 mV + 0.005 % of reading	
Equipment to Measure Frequency (at the listed frequencies) [FO]			
3 Hz to 5 Hz	100 mV to 1 000 V	0.12 % of reading	
5 Hz to 10 Hz	100 mV to 1 000 V	0.06 % of reading	
10 Hz to 40 Hz	100 mV to 1 000 V	0.035 % of reading	
40 Hz to 300 kHz	100 mV to 1 000 V	0.012 % of reading	
300 kHz to 1 MHz	100 mV to 1 000 V	0.012 % of reading	
Equipment to Measure AC Current (at the listed frequencies) [FO]			
5 Hz to 10 Hz	0.1 µA to 100 µA	0.4 µA + 0.36 % of reading	
10 Hz to 5 kHz	0.1 µA to 100 µA	0.4 µA + 0.12 % of reading	
5 kHz to 10 kHz	0.1 µA to 100 µA	0.25 µA + 0.24 % of reading	
Equipment to Measure AC Current (at the listed frequencies) [FO]			
5 Hz to 10 Hz	100 µA to 1 mA	0.4 µA + 0.36 % of reading	
10 Hz to 5 kHz	100 µA to 1 mA	0.4 µA + 0.12 % of reading	
5 kHz to 10 kHz	100 µA to 1 mA	2.5 µA + 0.24 % of reading	
Equipment to Measure AC Current (at the listed frequencies) [FO]			
5 Hz to 10 Hz	1 mA to 10 mA	4 µA + 0.36 % of reading	
10 Hz to 5 kHz	1 mA to 10 mA	4 µA + 0.12 % of reading	
5 kHz to 10 kHz	1 mA to 10 mA	23 µA + 0.24 % of reading	
Equipment to Measure AC Current (at the listed frequencies) [FO]			
5 Hz to 10 Hz	10 mA to 100 mA	0.04 mA + 0.36 % of reading	
10 Hz to 5 kHz	10 mA to 100 mA	0.04 mA + 0.12 % of reading	
5 kHz to 10 kHz	10 mA to 100 mA	0.25 mA + 0.24 % of reading	
Equipment to Measure AC Current (at the listed frequencies) [FO]			
10 Hz to 5 kHz	100 mA to 1 A	0.4 mA + 0.12 % of reading	
5 kHz to 10 kHz	100 mA to 1 A	7 mA + 0.42 % of reading	

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Equipment to Measure AC Current (at the listed frequencies) FO			Fluke 8846A
10 Hz to 5 kHz	3 A to 10 A	4 mA + 0.18 % of reading	
Equipment to Measure AC Voltage (at the listed frequencies) FO			
5 Hz to 10 Hz	0.1 mV to 100 mV	0.04 mV + 0.42 % of reading	
10 Hz to 20 kHz	0.1 mV to 100 mV	0.04 mV + 0.07 % of reading	
20 kHz to 50 kHz	0.1 mV to 100 mV	0.05 mV + 0.14 % of reading	
50 kHz to 100 kHz	0.1 mV to 100 mV	0.08 mV + 0.71 % of reading	
Equipment to Measure AC Voltage (at the listed frequencies) FO			
5 Hz to 10 Hz	0.1 V to 1 V	0.3 mV + 0.42 % of reading	
10 Hz to 20 kHz	0.1 V to 1 V	0.3 mV + 0.071 % of reading	
20 kHz to 50 kHz	0.1 V to 1 V	0.5 mV + 0.14 % of reading	
50 kHz to 100 kHz	0.1 V to 1 V	0.8 mV + 0.71 % of reading	
Equipment to Measure AC Voltage (at the listed frequencies) FO			
5 Hz to 10 Hz	1 V to 10 V	3 mV + 0.42 % of reading	
10 Hz to 20 kHz	1 V to 10 V	3 mV + 0.071 % of reading	
20 kHz to 50 kHz	1 V to 10 V	5 mV + 0.14 % of reading	
50 kHz to 100 kHz	1 V to 10 V	8 mV + 0.71 % of reading	
Equipment to Measure AC Voltage (at the listed frequencies) FO			
10 Hz to 20 kHz	10 V to 100 V	0.03 V + 0.071 % of reading	
20 kHz to 50 kHz	10 V to 100 V	0.05 V + 0.14 % of reading	
50 kHz to 100 kHz	10 V to 100 V	0.08 V + 0.71 % of reading	
Equipment to Measure AC Voltage (at the listed frequencies) FO			
10 Hz to 20 kHz	100 V to 1 000 V	0.3 V + 0.071 % of reading	
20 kHz to 50 kHz	100 V to 1 000 V	0.5 V + 0.14 % of reading	
50 kHz to 100 kHz	100 V to 1 000 V	0.8 V + 0.71 % of reading	

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Mechanical

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Pressure Gage [FO]	-14 psi to 30 psi	0.018 psi	Ametek IPI030
	30 psi to 100 psi	0.062 psi	Ametek IPIMKII100
	100 psi to 500 psi	0.31 psi	Ametek IPIMKII500
	500 psi to 2 000 psi	1.2 psi	Ametek IPIMKII2000

Thermodynamic

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Thermometers [FO]	-196 °C to 0 °C	0.075 °C	Fluke 5627A with Fluke 8846A
	0 °C to 200 °C	0.13 °C	
	200 °C to 420 °C	0.17 °C	

Mass, Force, and Weighing Devices

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Analytical Balances [FO]	1 g to 200 g	(0.16 + 0.003Wt) mg	ASTM Class 1 Weights
Precision Balances [FO]	1 g to 600 g	(0.5 + 0.004Wt) mg	
Bench Scales [FO]	1 lb to 2 lb	0.000 1 lb	Class F Weights
	2 lb to 5 lb	$(2 \times 10^{-6} + 7.4 \times 10^{-5}\text{Wt})$ lb	
	5 lb to 10 lb	$(2.4 \times 10^{-4} + 4.3 \times 10^{-5}\text{Wt})$ lb	
	10 lb to 17 lb	0.005 7 % of reading	

1. The CMC (Calibration and Measurement Capability) stated for calibrations included on this scope of accreditation represents the smallest measurement uncertainty attainable by the laboratory when performing a more or less routine calibration of a nearly ideal device under nearly ideal conditions. It is typically expressed at a confidence level of 95 % using a coverage factor *k* (usually equal to 2). The actual measurement uncertainty associated with a specific calibration performed by the laboratory will typically be larger than the CMC for the same calibration since capability and performance of the device being calibrated and the conditions related to the calibration may reasonably be expected to deviate from ideal to some degree.

2. The laboratories range of calibration capability for all disciplines for which they are accredited is the interval from the smallest calibrated standard to the largest calibrated standard used in performing the calibration. The low end of this range must be an attainable value for which the laboratory has or has access to the standard referenced. Verification of an indicated value of zero in the absence of a standard is common practice in the procedure for many calibrations but by its definition it does not constitute calibration of zero capacity.

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3. The presence of a superscript FO means that the laboratory performs calibration of the indicated parameter both at its fixed location and onsite at customer locations. Example: Outside Micrometer^{FO} would mean that the laboratory performs this calibration at its fixed location and onsite at customer locations.

4. Measurement uncertainties obtained for calibrations performed at customer sites can be expected to be larger than the measurement uncertainties obtained at the laboratories fixed location for similar calibrations. This is due to the effects of transportation of the standards and equipment and upon environmental conditions at the customer site which are typically not controlled as closely as at the laboratories fixed location.

5. The term L represents length in inches or millimeters as appropriate to the uncertainty statement.

6. The term Wt represents weight in pounds or grams (including SI multiple and submultiple units) appropriate to the uncertainty statement.