PERRY JOHNSON LABORATORY ACCREDITATION, INC.

Certificate of Accreditation

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

Sole Source For Operation And Maintenance Est.

Building No.7965, King AbdulAziz Street, Jubail 35514

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

ISO/IEC 17025:2017

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 8/24/2020):

Calibration of Measuring Instruments

(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

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

Initial Accreditation Date:	*Issue Date:*	*Expiration Date:*
August 18, 2020	August 18, 2020	November30, 2022

Accreditation No.:	*Certificate No.:*
109875	L20-489

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

Sole Source for Operations and Maintenance Est.
Building No.7965, King AbdulAziz Street, Jubail 35514
Contact Name: Bijoy N. Murali Phone: 0572690703

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

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
DC Voltage – Measure[F]	Up to 200 mV	0.0 038 mV	Time Electronics 5075 Multimeter SS-CA-PRO-12
	Up to 2 V	0.000 039 V	
	Up to to 20 V	0.0 048 V	
	Up to to 200 V	0.0 048 V	
	200 V to 1050 V	0.0 061 V	
DC Voltage – Generate[F]	Up to 3 mV	0.0 038 mV	Time Electronics 5025C MFC SS-CA-PRO-12
	Up to 10 mV	0.0 038 mV	
	Up to 30 mV	0.0 038 mV	
	30 mV to 300 mV	0.0 039 mV	
	Up to 1 V	0.000 039 V	
	Up to 3 V	0.000 039 V	
	3 V to 10 V	0.00 039 V	
	10V to 30 V	0.00 040 V	
	30 V to 100 V	0.0 048 V	
	100 V to 300 V	0.0 039 V	
	Up to 1 KV	0.0 060 KV	
DC Current – Measure[F]	Up to 200 µA	0.0 039 µA	Time Electronics 5075 Mustimeter SS-CA-PRO-12
	Up to 2 mA	0.00 042 mA	
	2 mA to 20 mA	0.00 043 mA	
	20 mA to 200 mA	0.0 081 mA	
	200 mA to 2 A	0.00 041 A	
	2 A to 20 A	0.015 A	
DC Current – Generate Clamp-on Meters[F]	Up to 300 µA	0.0 039 µA	Time Electronics 5025C and Time Electronics 9780 SS-CA-PRO-09
	300 µA to 1 mA	0.000 042 mA	
	Up to 3 mA	0.000 043 mA	
	3.01 mA to 10 mA	0.00 042 mA	
	10.01 mA to 30 mA	0.0 081 mA	
	30.01 mA to 100 mA	0.0 081 mA	
	100.01 mA to 300 mA	0. 095 mA	
	Up to to 1 A	0.00 028 A	
	Up to to 3 A	0.0 023 A	
	3 A to 30 A	0.0 060 A	
	Up to to 100 A	0.0 060 A	
	100 A to 1100 A	0.0 072 A	

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Resistance – Generate[F]	Up to 300 mΩ	0.00 082 mΩ	Time Electronics 5025C SS-CA-PRO-09
	1 Ω to 100 Ω	0.00 017 Ω	
	Up to 300 Ω	0.0 083 Ω	
	1 kΩ to 3 kΩ	0. 000 012 KΩ	
	3 kΩ to 300 kΩ	0.0 015 KΩ	
	1 MΩ to 3 MΩ	0. 000 016 MΩ	
	3 MΩ to 300 MΩ	0. 015 MΩ	
	Up to 1 GΩ	0.00 076 GΩ	
Resistance – Measure[F]	Up to Ω to 1 Ω	0.11 Ω	Time Electronics 5075 SS-CA-PRO-09
	1 Ω to 10 Ω	1.13 Ω	
	10 Ω to 100 Ω	11.3 Ω	
	100 Ω to 1000 Ω	0.11 kΩ	
	1 kΩ to 10 kΩ	1.13 kΩ	
	10 kΩ to 100 kΩ	11.3 kΩ	
	100.1 kΩ to 1 000 kΩ	0.11 MΩ	
	1 MΩ to 10 MΩ	1.13 MΩ	
	10 MΩ to 100 MΩ	11.3 MΩ	
Earth Resistance Measuring Instruments[F]	Up to Ω to 1 Ω	0.11 Ω	Resistance Box 1051 SS-CA-PRO-11
	1 Ω to 10 Ω	1.13 Ω	
	10 Ω to 100 Ω	11.3 Ω	
	100 Ω to 1 000 Ω	0.11 kΩ	
	1 kΩ to 10 kΩ	1.13 kΩ	
	10 kΩ to 1 000 kΩ	11.3 kΩ	
	Up to 1 Mohm	0.11 MΩ	
Insulation Resistance Measuring Instruments[F]	10 kΩ to 100 kΩ	0.11 Ω	Resistance Box 1040 SS-CA-PRO-11
	100 kΩ to 1 000 kΩ	1.13 Ω	
	1 MΩ to 10 MΩ	11.3 Ω	
	10 MΩ to 100 MΩ	0.11 kΩ	
	100 MΩ to 1 000 MΩ	1.13 kΩ	
	1 GΩ to 10 GΩ	11.3 kΩ	
	10 GΩ to 100 GΩ	0.11 MΩ	
	100 GΩ to 1 000 GΩ	1.13 MΩ	

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AC Voltage – Measure 60 Hz"[F]	1 mV to 20 mV	0. 036 mV	Time Electronics 5075 SS-CA-PRO-10
	Up to 200 mV	0. 036 mV	
	1 V to 2 V	0.0 027 V	
	1 V to 20 V	0. 026 V	
	1 V to 200 V	0. 026 V	
	1 V to 1050 V	0.17 V	
AC Voltage – Generate 60 Hz[F]	1 mV to 30 mV	0. 048 mV	Time Electronics 5025C SS-CA-PRO-10
	30.01 mV to 300 mV	0. 048 mV	
	0.1 V to 3 V	0.0 027 V	
	3.01 V to 30 V	0.26 V	
	30.01 V to 30 V	0.26 V	
	0.1 V to 3 000 V	0.00 018 KV	
AC Current – Measure 60Hz[F]	10 µA to 200 µA	0. 030 µA / SS-CA-PRO-10	Time Electronics 5075 SS-CA-PRO-10
	0.1 mA to 2 mA	0.0. 018 mA / SS-CA-PRO-10	
	0.1 mA to 20 mA	0. 018 mA / SS-CA-PRO-10	
	Up to to 200 mA	0.18 mA / SS-CA-PRO-10	
	0.1 A to 2 A	0.00 041 A / SS-CA-PRO-10	
	0.1 A to 20 A	0. 015 A / SS-CA-PRO-10	

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AC Current – Generate 60 Hz[F] Clamp-on meters 60 Hz[F]	0.1 µA to 300 µA	0. 027 µA	Time Electronics 5025C and Time Electronics 9780 SS-CA-PRO-09
	0.1 mA to 3 mA	0.0 019 mA	
	0.1 mA to 30 mA	0. 018 mA	
	30.01 mA to 300 mA	0. 042 mA	
	0.3 A to 3 A	0.00 041 A	
	3.01 A to 30 A	0.15 A	
	10 A to 100 A	0.20 A	
	100.01 A to 1 100 A	0.33 A	
Capacitance Measure[F]	Up to 200 nF	0.0 098 nF	Time Electronics 5075 SS-CA-PRO-12
	Up to 500 nF	0.13 nF	
	Up to 10 µF	0. 042 µF	
	Up to 100 µF	0. 058 µF	
Inductance[F]	Up to 1 kHz	0. 014 KHz	Time Electronics 5025C MFC +9701 EPP SS-CA-PRO-12
	1 mH to 10 H (in steps of 1,2,5,10)	0.00 059 MHz	
Frequency@ 3V[F]	0.1 Hz to 1 000 Hz	0. 013 Hz	Time Electronics 5075 SS-CA-PRO-09
	1.01 KHz to 100 KHz	0.14 kHz	
	Up to 1 MHz	0.00 059 MHz	
Frequency @ 3V[F] Magnitude	5 Hz to 100 KHz	0.16 kHz	Time Electronics 5025C SS-CA-PRO-22
RTD Pt100 @ 385[F]	Up to 850 °C	0. 087 °C	Time Electronics 5075 SS-CA-PRO-22
RTD Simulation Devices[F]	-200 °C to 600 °C	0. 087 °C	Time Electronics 5025C SS-CA-PRO-22

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Electrical Simulation of Thermocouples – TC (Type J)[F]	-50 °C to 1 200 °C	0.05 °C	Time Electronics 5025 C SS-CA-PRO-21
Electrical Simulation of Thermocouples – TC (Type K)[F]	-200 °C to -100 °C	0.05 °C	Time Electronics 5025 C Time Electronics 5075 SS-CA-PRO-21
	-100 °C to 480 °C	0.06 °C	Time Electronics 5025 C Time Electronics 5075 SS-CA-PRO-21
	480.01 °C to 1372 °C	0.06 °C	
Electrical Simulation of Thermocouples – TC (Type T)[F]	-200 °C to -100 °C	0.05 °C	Time Electronics 5025 C Time Electronics 5075 SS-CA-PRO-21
	-100.01 °C to 400 °C	0.05 °C	
Electrical Simulation of Thermocouples TC (Type R)[F]	-50 °C to 20 °C	0.05 °C	Time Electronics 5025 C Time Electronics 5075 SS-CA-PRO-21
	20.01 °C to 250 °C	0.05 °C	
	250.01 °C to 1768 °C	0.04 °C	
Electrical Simulation of Thermocouples TC (Type S)[F]	-50 °C to 100 °C	0.05 °C	Time Electronics 5025 C Time Electronics 5075 SS-CA-PRO-21
	100.01 °C to 500 °C	0.06 °C	Time Electronics 5025 C Time Electronics 5075 SS-CA-PRO-21
	500.01 °C to 1 768 °C	0.06 °C	Time Electronics 5025 C Time Electronics 5075 SS-CA-PRO-21
Electrical Simulation of Thermocouples TC (Type B)[F]	Up to 1372 °C	0.13 °C	Time Electronics 5025 C Time Electronics 5075 SS-CA-PRO-21

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

Mechanical

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Pressure Measuring Equipment – Hydraulic (Oil) Pressure Gauges[F]	Up to 700 bar	0.15psi	DWT Akvalo SS-CA-PRO-17
	Up to 1 400 bar (0-20 000 psi)		
Torque Wrenches[F]	Up to 5 N·m	0.23 % of reading	Norbar Torque Loader SS-CA-PRO-15
	10 N.m to 30 N.m	0.22 % of reading	
	40 N.m	0.21 % of reading	
	50 N.m	0.22 % of reading	
	50 N.m to 100 N.m	0.21 % of reading	
	200 N.m	0.19 % of reading	
	300 N.m	0.18 % of reading	
	400.0 N.m	0.17 % of reading	
	500.0 N.m	0.17 % / SS-CA-PRO-15	
	300.0 N.m	0. 087 % / SS-CA-PRO-15	
	600.0 N.m	0.074 % / SS-CA-PRO-15	
	1 200 N.m to 3 000 N.m	0. 066 % / SS-CA-PRO-15	

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Thermodynamic

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Temperature-Measuring Equipment – RTD[F]	-25 °C to 150 °C	0.05 °C/	Fluke SSPRT Probe with Indicator and 9142-A-256 / TC Furnace 9150-D-256 SS-CA-PRO-22
	50 °C to 1 200 °C	0.06 °C	
Temperature – Thermocouples[F]	150 °C to 1 200 °C	0.05 °C	Fluke 9150-D-256 Thermocouple Furnace SS-CA-PRO-21
	302 °F to 2 192 °F	0.05 °C	
Temperature – Generating Equipment Dry Heat Sources, Furnaces, Stirred Liquid Baths[F]	150 °C to 1 200 °C	0.05 °C	Fluke 9150-D-256 Thermocouple Furnace SS-CA-PRO-20
	302 °F to 2 192 °F	0.05 °C	

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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[F]	0 mm to 300 mm 0 mm to 600 mm 600 mm to 1 500 mm	0.06 mm	Mitutoyo CERA 515-556-2 Aditya Gauge Blocks, C1606000113,116,122, C1608000200,400,800 SS-CA-PRO-01
Micrometers[F]	Up to 25 mm Up to 1 500 mm	0.06 mm	Mitutoyo 516-101-26 Mitutoyo 516-439-10 ADITYA GAUGE SS-CA-PRO-02
Depth Micro Checker[F]	Up to 300 mm	0.06 mm	Mitutoyo 515-571 SS-CA-PRO-06
Dial Indicators[F]	Up to 25 mm	0.03 mm	Mitutoyo 170-102-12 SS-CA-PRO-03
Angle-Measuring[F] Instruments	Up to 90°	5 min of arc	Mitutoyo ,981-102 Mitutoyo Angle Block Set SS-CA-PRO-08
Height Master[F]	Up to 600 mm 600 mm to 1 600 mm	0.06 mm	Mitutoyo 515-378 Mitutoyo 515-113/114/115 SS-CA-PRO-04
Bore Gauge[F]	Up to 1 600 mm	0.06 mm	Mitutoyo 516-439-10, Gauge Block Set Mitutoyo 515-110, Auxiliary Block Kit Mitutoyo 515-378 (Digital Height Master) Mitutoyo 515-113/114/115 (Riser Blocks) /SS-CA-PRO-05
Feeler Gauges[F]	0.01 mm to 10 mm	0.010 µm	Digital Micrometer SS-CA-PRO-02

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

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.

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

4. The presence of a superscript O means that the laboratory performs calibration of the indicated parameter onsite at customer locations. Example: Outside Micrometer^{O} would mean that the laboratory performs this calibration onsite at the customer's location.

5. 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.

6. 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.

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

7. The term D represents diameter in inches or millimeters as appropriate to the uncertainty statement.

8. The term DL represents diagonal length in inches or millimeters as appropriate to the uncertainty statement.

Note that Diameter and Diagonal both use the same designation "D". This is not a problem unless a laboratory is accredited for both however the usage is common and should be retained when possible and modified in the few cases where a laboratory is accredited for both. In those cases continue to use D for diameter and use DL for Diagonal Length. This note is intended for internal office use only and is to be removed during preparation of draft documents.

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

10. The term P represents pressure in units appropriate to the uncertainty statement.

11. The term R represents radius in inches or millimeters as appropriate to the uncertainty statement.

12. The term T represents temperature in ºC or ºF as appropriate to the uncertainty statement.

13. The term T represents torque in N•m (including SI multiple and submultiple units) for the international system of units (the SI) or ozf•in, lbf•in and lbf•ft for the USC system of units.

Note that temperature and torque both use the same designation "T". This is not a problem unless a laboratory is accredited for both however the usage is common and should be retained when possible and modified in the few cases where a laboratory is accredited for both. In those cases continue to use T for temperature and use Tr for torque. This note is intended for internal office use only and is to be removed during preparation of draft documents.

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

15. The term "X" proceeded by a number represents the number of times a lense system magnifies an image relative to its actual size. CMC stated as "% of magnification" represents the CMC of magnification expressed as a percentage of the total magnification.