



CERTIFICATE OF ACCREDITATION

This is to attest that

CALIBRATION EXPERTS CO.

UNIT 64, BLOCK 115, BUILDING 2126, ROAD 1529, HIDD – BAHRAIN INVESTMENT WHARF, PO BOX 21102
MANAMA, KINGDOM OF BAHRAIN

Calibration Laboratory CL-181

has met the requirements of AC204, *IAS Accreditation Criteria for Calibration Laboratories*, and has demonstrated compliance with ISO/IEC Standard 17025:2017, *General requirements for the competence of testing and calibration laboratories*. This organization is accredited to provide the services specified in the scope of accreditation.

Effective Date February 6, 2023

Expiration Date June 1, 2024



A handwritten signature in black ink, reading 'Raj Nathan'.

President

SCOPE OF ACCREDITATION

International Accreditation Service, Inc.

3060 Saturn Street, Suite 100, Brea, California 92821, U.S.A. | www.iasonline.org

CALIBRATION EXPERTS CO.

www.cec.bh

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Accredited to ISO/IEC 17025:2017

Effective Date February 6, 2023

CALIBRATION AND MEASUREMENT CAPABILITY (CMC)*

MEASURED QUANTITY or DEVICE TYPE CALIBRATED	RANGE	UNCERTAINTY ^{1,2} (±)	CALIBRATION METHOD OR PROCEDURE, STANDARD EQUIPMENT (OPTIONAL)
Dimensional			
External Micrometer	Up to 150 mm	1.5 µm	Direct method by using Slip Gauge Set, Optical Parallel and Optical Flat
Vernier Caliper	Up to 300 mm	11 µm	Direct method by using Slip Gauge Set & Caliper Checker
Height Gauge	Up to 600 mm	10 µm	Direct method by Using Slip Gauge Set, Caliper checker
Thickness Gauge	Up to 5 mm 5 mm to 25 mm	0.95 µm 10 µm	Direct method by Using Slip Gauge Set
Feeler Gauges/ Standard Foils	0.01 mm to 2 mm	2.4 µm	Direct method by Using Digital Micrometer
Mechanical			
Torque Wrench / Torque Meter	20 lbf·in to 1000 lbf·in 1000 lbf·in to 7200 lbf·in	0.39 % 0.50 %	Direct method by Using Precision Torque Transducers and CDI Torque Calibrator
Pneumatic Pressure (Pressure Gauge, Vacuum Gauge, Pressure Recorder, Pressure transducer) ⁵	-1 bar to -0.001 bar 0.001 bar to 70 bar	0.04 % 0.04 %	Comparison method by Using Test Pressure Gauge/ Pressure Modules
Hydraulic Pressure (Pressure Gauge, Pressure Recorder, Pressure Transducer) ⁵	0.001 kPa to 100040 kPa	0.04 %	Direct Method by Using Dead Weight Tester
Rotational speed - Contact Tachometer ⁵	100 rpm to 500 rpm 500 rpm to 11500 rpm	0.99 rpm 3.16 rpm	Direct Method by using RPM Tachometer Calibrator
Thermal			

* If information in this CMC is presented in non-SI units, the conversion factors stated in NIST Special Publication 811 "Guide for the Use of the International System of Units (SI)" apply.

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Temperature Controller/ Indicator / Recorder with Sensor, Thermometer, Temperature Gauge, Temperature Transmitter ⁵	-45 °C to 140 °C	0.07 °C	Comparison Method by using Reference sensor and Temperature bath
	100 °C to 650 °C	0.01 °C	
Infrared Thermometer / Pyrometer ⁵	-25 °C to 140 °C	0.31 °C	Direct Method by using IR Calibrator
Oven / Incubator / Freezer / Furnaces ⁵	-45 °C to 150 °C	0.17 °C	Direct method by using Reference Temperature Sensor (single sensor method)
	150 °C to 400 °C	0.49 °C	
Electrical – DC/LF			
DC Voltage Generate ^{3,5}	10 µV to 300 mV	0.36 %	Direct Method by Using Multi-function Calibrator
	300 mV to 30 V	0.33 %	
	30 V to 1000 V	0.21 %	
DC Current Generate ^{3,5}	1 µA to 10 µA	0.078 %	Direct Method by Using Multi-function Calibrator
	10 µA to 2 mA	0.055 %	
	2 mA to 20 mA	0.0057 %	
	20 mA to 3 mA	0.0068 %	
	3 A to 20 A	0.081 %	
	20 A to 1000 A	0.19 %	Direct Method by Using Multi-function Calibrator & 50-Turn Current Coil
AC Voltage Generate ^{3,5}	1 mV to 32.9999 V (10 Hz to 100 kHz)	0.19 %	Direct Method by Using Multi-function Calibrator
	33 V to 329.999 V (45 Hz to 100 kHz)	0.29 %	
	330 V to 1000 V (45 Hz to 10 kHz)	0.037 %	
AC Current Generate ^{3,5}	100 µA to 0.32999 A (10 Hz to 30 kHz)	0.24 %	Direct Method by Using Multi-function Calibrator
	0.33 A to 2.99999 A (10 Hz to 10 kHz)	0.26 %	
	3 A to 20 A (45 Hz to 5 kHz)	0.2 %	
	20 A to 1000 A (45 Hz to 400 Hz)	1.3 %	Direct Method by Using Multi-function Calibrator and 50-Turn Current Coil
DC Resistance Generate ^{3,5}	1 mΩ to 10 mΩ	0.21 %	Direct method using Multi-function Calibrator and Decade Resistance Box
	10 mΩ to 1 MΩ	0.03 %	
	1 MΩ to 1.1 GΩ	1.7 %	

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	Fixed values 10 MΩ 100 MΩ 1 GΩ 10 GΩ	2.3 % 2.3 % 2.3 % 2.3 %	Direct Method by Using Insulation Tester Calibration Box (Megger, CB101)
Capacitance Generate ^{3,5}	220 pF to 400 pF (10 Hz to 10 kHz) 0.6 nF to 330 nF (10 Hz to 10 kHz) 0.33 μF to 330 μF (10 Hz to 150 Hz) 0.33 mF to 110 mF (0 Hz to 0.2 Hz)	6.9 % 3.9 % 2.0 % 1.4 %	Direct Method by Using Multi-function Calibrator
Temperature Simulation (Temperature Indicator / Controller / Recorder / Test Kit / Universal Calibrator / Calibrators) ^{3,5}			Direct method by Using Multi-function Calibrator
RTD Pt-100	-200 °C to 800 °C	0.07 °C	
Thermocouple			
Type B	600 °C to 1820 °C	0.51 °C	
Type C	0 °C to 2316 °C	0.99 °C	
Type E	-250 °C to 1000 °C	0.58 °C	
Type J	-210 °C to 1200 °C	0.31 °C	
Type K	-200 °C to 1372 °C	0.48 °C	
Type L	-200 °C to 900 °C	0.43 °C	
Type N	-200 °C to 1300 °C	0.46 °C	
Type R	0 °C to 1767 °C	0.66 °C	
Type S	0 °C to 1767 °C	0.56 °C	
Type T	-250 °C to 400 °C	0.73 °C	
Type U	-200 °C to 600 °C	0.65 °C	
DC Voltage Measure ^{4,5}	1 mV to 10 mV 10 mV to 100 mV 100 mV to 1000 V	0.47 % 0.05 % 0.02 %	Direct method by using 6.5 Digit Multimeter
	1000 V to 200 kV	0.01 %	Direct method High Voltage Divider and 4.5 Dight Multimeter
AC Voltage Measure ^{4,5} @ 50/60 Hz	1 mV to 10 mV 10 mV to 100 mV 100 mV to 750 V	0.56 % 0.11 % 0.12 %	Direct method by using 6.5 Digit Multimeter

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	750 V to 200 kV	1.2 %	Direct method High Voltage Divider and 4.5 Digit Multimeter
DC Current Measure ^{4,5}	10 mA to 100 mA 100 mA to 3 A	0.08 % 0.16 %	Direct method by using 6.5 Digit Multimeter
	3 A to 600 A 0 A to 2000 A	0.58 % 2.3 %	Direct method by using Current Shunt, AC/DC Clamp meter
AC Current Measure ^{4,5} @ 50/60 Hz	10 mA to 100 mA	0.18 %	Direct method by using 6.5 Digit Multimeter & AC/DC Clamp Meter
	100 mA to 3 A	0.25 %	
	3 A to 600 A	0.58 %	
	600 A to 2000 A	2.3 %	
DC Resistance Measure ^{4,5}	1 Ω to 1 kΩ	0.58 %	Direct Method by Using 6.5 Digit Multimeter
	1 kΩ to 10 MΩ	0.049 %	
	10 MΩ to 100 MΩ	0.94 %	
<i>Time and Frequency</i>			
Frequency Generate ^{3,5}	0.3 Hz to 2 MHz	0.009 %	Direct method by Using Multi-function Calibrator
Frequency Measure ^{4,5}	5 Hz to 1 MHz	0.12 %	Direct Method by Using 6.5 Digit Multimeter

¹The uncertainty covered by the Calibration and Measurement Capability (CMC) is expressed as the expanded uncertainty having a coverage probability of approximately 95 %. It is the smallest measurement uncertainty that a laboratory can achieve within its scope of accreditation when performing calibrations of a best existing device. The measurement uncertainty reported on a calibration certificate may be greater than that provided in the CMC due to the behavior of the calibration item and other factors that may contribute to the uncertainty of a specific calibration.

²When uncertainty is stated in relative terms (such as percent, a multiplier expressed as a decimal fraction or in scientific notation), it is in relation to instrument reading or instrument output, as appropriate, unless otherwise indicated.

³Capability is suitable for the calibration of measuring devices in the stated ranges.

⁴Capability is suitable for the calibration of devices intended to generate the indicated quantity in the stated ranges.

⁵Calibration for this parameter/calibration item is available at the laboratory or at customer site. The actual measurement uncertainties achievable at customer sites may be higher than those reflected in the CMC