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CERTIFICATE OF ACCREDITATION

This is to attest

CSA GROUP TESTING & CERTIFICATION INC.

178 REXDALE BOULEVARD
TORONTO, ONTARIO M9W 1R3, CANADA

Calibration Laboratory CL-227

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.

Expiry Date September 1, 2026

Effective Date January 21, 2025



International Accreditation Service
Issued under the authority of IAS management

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CSA GROUP TESTING & CERTIFICATION INC.

www.csagroup.org

Contact Name John Sena

Contact Phone +1-216 5244990

Accredited to ISO/IEC 17025:2017

Effective Date January 21, 2025

CALIBRATION AND MEASUREMENT CAPABILITY (CMC)*

MEASURED QUANTITY or DEVICE TYPE CALIBRATED	RANGE	UNCERTAINTY ^{1,2} (±)	CALIBRATION METHOD OR PROCEDURE, STANDARD EQUIPMENT (OPTIONAL)
Dimensional			
Outside Micrometers	Up to 25 mm Up to 1 inch	0.58 µm 30 µinch	Direct measurement method using gauge blocks
Calipers	Up to 300 mm 300 mm to 1000 mm Up to 12 inch 12 inch to 40 inch	0.0063 mm 0.015 mm 0.0003 inch 0.0007 inch	Direct measurement method using gauge blocks
Tape Measures	Up to 2000 mm Up to 84 inches	0.29 mm 0.018 inch	Direct measurement method using: Tape measure, calibration tool, gauge blocks
Dial Indicator	Up to 0.5 inch Up to 20 mm 20 mm to 50 mm	0.00019 inch 0.9 µm 1.6 µm	Direct measurement method using gauge blocks
1 Dimension - Length	Up to 150 mm 150 mm to 300 mm 300 mm to 2000 mm	0.0038 mm 0.048 mm 0.63 mm	Direct measurement method using: Measuring Microscope Micrometer, Caliper, Tape Measure
2 Dimensional – Length (radius measurement)	0.5 mm to 50 mm	0.0076 mm	
Angle Measurement	0° to 359°	0.11°	
Digital Protractors / Levels	0° to 90°	0.07°	Direct measurement method using Sine Bar and Gauge Blocks
Mechanical			
Brittleness Tester (Linear Speed)	2000 mm/s	12 mm/s	Indirect measurement method using: Tachometer

* 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.

CL-227

CSA GROUP TESTING & CERTIFICATION INC.

Effective Date January 21, 2025

Page 2 of 15

IAS/CL/100-3



SCOPE OF ACCREDITATION

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MEASURED QUANTITY or DEVICE TYPE CALIBRATED	RANGE	UNCERTAINTY ^{1,2} (±)	CALIBRATION METHOD OR PROCEDURE, STANDARD EQUIPMENT (OPTIONAL)
			for rotational speed measurement Caliper and Measuring Microscope for radius measurement
Density – Measure (Calibration of Hardwood Test Floor)	700 kg/m ³	14 kg/m ³	Indirect measurement method using: Caliper & Tape Measure for dimensional volume, weigh scale for weight
Pressure Hydraulic (Pressure Gauges, Pressure Transducer, Pressure Transmitter)	100 psi to 500 psi 500 psi to 1000 psi 1000 psi to 5000 psi 5000 psi to 15000 psi	0.009 % + 0.14 psi 0.0075 % + 0.35 psi 0.0056 % + 2.0 psi 0.0077 % + 4.5 psi	Direct measurement method using Electronic DWT
Pressure Pneumatic (Pressure Gauges, Pressure Transducer, Pressure Transmitter)	0 psi to 15 psi 15 psi to 100 psi	0.01 psi 0.03 psi	Comparison measurement method using Pressure Test Gauges
Vacuum Gauge	-14.5 psi to 0 psi	0.010 psi	Comparison measurement method using Vacuum Test Gauges
Pressure Ramp	Up to 50 mbar @ 60 mbar/min	3.3 mbar/min	Indirect measurement method using Pressure Test Gauges with time logging capability
Slack Tube Manometer	0 in·H ₂ O to 48 in·H ₂ O	0.059 in·H ₂ O	Indirect measurement method using: Digital Manometer
Weights	10 mg to 220 g 41 g to 4.1 kg 4 kg to 24 kg 24 kg to 300 kg	0.00065 g 0.068 g 0.0025 kg 0.27 kg	Direct measurement method using: Weighing Scale
Torque (Dynamometer)	10 ozf in to 440 ozf in 10 lbf in to 100 lbf in 5 N m to 60 N m	0.052 % + 0.023 ozf in 0.13 % + 0.018 lbf in 0.053 % + 0.038 N m	Direct measurement method using: Weights, Weigh Scale Protractor, Torque Beam
Thermal			
Temperature - Generate ³	0 °C to 90 °C	0.16 °C	Direct measurement method using: Temperature Bath, Temp Indicator & SPRT
	-30 °C to 50 °C 50 °C to 150 °C	0.14 °C 0.22 °C	Direct measurement method using: Field Metrology Well and SPRT

CL-227

CSA GROUP TESTING & CERTIFICATION INC.

Effective Date January 21, 2025

Page 3 of 15

IAS/CL/100-3



SCOPE OF ACCREDITATION

International Accreditation Service, Inc.

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Simulated Temperature - Generate ³			Direct measurement method using Multifunction Calibrator
Thermocouple Type J	-210 °C to -100 °C -100 °C to 30 °C 30 °C to 150 °C 150 °C to 760 °C 760 °C to 1200 °C	0.22 °C 0.12 °C 0.11 °C 0.14 °C 0.15 °C	
Thermocouple Type K	-200 °C to -100 °C -100 °C to -25 °C -25 °C to 120 °C 120 °C to 1000 °C 1000 °C to 1372 °C	0.26 °C 0.15 °C 0.14 °C 0.21 °C 0.21 °C	
Thermocouple Type T	-250 °C to -150 °C -150 °C to 0 °C 0 °C to 120 °C 120 °C to 400 °C	0.49 °C 0.20 °C 0.14 °C 0.12 °C	
Temperature - Measure ⁴	-50 °C to 90 °C 90 °C to 150 °C	0.30 °C 0.49 °C	Direct measurement method using humidity & Temperature meter
Relative Humidity - Measure ⁴	10 %RH to 90 %RH (15 °C to 25 °C) 90 %RH to 95 %RH (15 °C to 25 °C) 10 %RH to 95 %RH (25 °C to 40 °C) 10 %RH to 95 %RH (40 °C to 95 °C)	1.3 %RH 2.3 %RH 1.5 %RH 2.0 %RH	Direct measurement method using humidity & Temperature meter
Electrical – DC/LF			
DC Voltage - Measure ⁴	20 mV to 200 mV 200 mV to 2 V 2 V to 20 V 20 V to 200 V 200 V to 1050 V 10 kV to 150 kV 1 kV to 10 kV	5.6 µV/V 3.7 µV/V 3.7 µV/V 5.3 µV/V 6.4 µV/V 0.40 % 0.70 %	Direct measurement method using: DMM Direct measurement method using: HV divider and DMM Direct measurement method using: HV divider and DMM

CL-227

CSA GROUP TESTING & CERTIFICATION INC.

Effective Date January 21, 2025

Page 4 of 15

IAS/CL/100-3



SCOPE OF ACCREDITATION

International Accreditation Service, Inc.

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MEASURED QUANTITY or DEVICE TYPE CALIBRATED	RANGE	UNCERTAINTY ^{1,2} (±)	CALIBRATION METHOD OR PROCEDURE, STANDARD EQUIPMENT (OPTIONAL)
DC Current - Measure ⁴	2 µA to 200 µA 200 µA to 2 mA 2 mA to 20 mA 20 mA to 200 mA 200 mA to 2 A 2 A to 20 A	12 µA/A + 0.0002 µA 12 µA/A + 0.003 µA 12 µA/A + 0.035 µA 36 µA/A + 0.4 µA 160 µA/A + 13 µA 370 µA/A + 160 µA	Direct measurement method using: DMM
DC Resistance - Measure ⁴	Normal Mode (4-wire) 0 Ω to 2 Ω 2 Ω to 20 Ω 20 Ω to 200 Ω 200 Ω to 2 kΩ 2 kΩ to 20 kΩ 20 kΩ to 100 kΩ Normal Mode (2-wire) 20 kΩ to 200 kΩ 200 kΩ to 2 MΩ 2 MΩ to 20 MΩ 20 MΩ to 200 MΩ 200 MΩ to 1 GΩ	35 µΩ/Ω 11 µΩ/Ω 8.8 µΩ/Ω 9.3 µΩ/Ω 8.8 µΩ/Ω 9.4 µΩ/Ω 9.6 µΩ/Ω 12 µΩ/Ω 41 µΩ/Ω 0.18 % 0.16 %	Direct measurement method using: DMM
AC Voltage - Measure ⁴	2 mV to 200 mV (10 Hz to 40 Hz) (40 Hz to 2 kHz) (2 kHz to 10 kHz) (10 kHz to 30 kHz) 200 mV to 2 V (10 Hz to 40 Hz) (40 Hz to 100 Hz) (100 Hz to 2 kHz) (2 kHz to 10 kHz) (10 kHz to 30 kHz) (30 kHz to 100 kHz) (100 kHz to 300 kHz) (300 kHz to 1 MHz)	150 µV/V 120 µV/V 120 µV/V 130 µV/V 92 µV/V 77 µV/V 77 µV/V 92 µV/V 230 µV/V 620 µV/V 2.6 % 2.6 %	Direct measurement method using: DMM
AC Voltage - Measure ⁴ (continued)	2 V to 20 V (10 Hz to 40 Hz) (40 Hz to 100 Hz) (100 Hz to 2 kHz) (2 kHz to 10 kHz) (10 kHz to 30 kHz) (30 kHz to 100 kHz) (100 kHz to 300 kHz) (300 kHz to 1 MHz)	110 µV/V 77 µV/V 77 µV/V 77 µV/V 92 µV/V 230 µV/V 610 µV/V 0.42 %	Direct measurement method using: DMM

CL-227

CSA GROUP TESTING & CERTIFICATION INC.

Effective Date January 21, 2025

Page 5 of 15

IAS/CL/100-3



SCOPE OF ACCREDITATION

International Accreditation Service, Inc.

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	20 V to 200 V (10 Hz to 40 Hz) (40 Hz to 100 Hz) (100 Hz to 2 kHz) (2 kHz to 10 kHz) (10 kHz to 30 kHz) (30 kHz to 100 kHz) (100 kHz to 300 kHz) (300 kHz to 0.5 MHz) (0.5 MHz to 1 MHz)	110 μ V/V 77 μ V/V 77 μ V/V 77 μ V/V 92 μ V/V 230 μ V/V 620 μ V/V 0.49 % 4.9 %	
	200 V to 1000 V (40 Hz to 10 kHz) (10 kHz to 30 kHz) (30 kHz to 100 kHz)	120 μ V/V 120 μ V/V 430 μ V/V	
	1 kV to 7 kV (60 Hz)	0.70 %	
	7 kV to 70 kV (60 Hz)	0.36 %	
AC Current -Measure ⁴	2 μ A to 200 μ A (20 Hz to 10 kHz) 200 μ A to 20 mA (20 Hz to 10 kHz) 20 mA to 200 mA (20 Hz to 10 kHz) 200 mA to 2 A (20 Hz to 1 kHz) (1 kHz to 10 kHz) 2 A to 20 A (20 Hz to 1 kHz) (1 kHz to 5 kHz)	650 μ A/A 450 μ A/A 420 μ A/A 730 μ A/A 730 μ A/A 800 μ A/A 800 μ A/A	Direct measurement method using: DMM
AC High Current - Measure ⁴ at 60 Hz	20 A to 200 A	0.40 mA/A +0.18 A	Indirect measurement method using: Resistive Shunt and DMM
	200 A to 600 A 600 A to 2000 A	0.63 mA/A + 1.5 A 0.45 mA/A + 3.0 A	Indirect measurement method using: Step-down current transformer and DMM
DC Voltage - Generate ³	0 mV to 329.9999 mV 0 V to 3.299999 V 0 V to 32.99999 V	15 μ V/V + 0.80 μ V 8.7 μ V/V + 1.6 μ V 9.5 μ V/V + 15 μ V	Direct measurement method using: Multifunction Calibrator

CL-227

CSA GROUP TESTING & CERTIFICATION INC.

Effective Date January 21, 2025

Page 6 of 15

IAS/CL/100-3



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SCOPE OF ACCREDITATION

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	30 V to 329.9999 V 100 V to 1020.000 V	14 μ V/V + 110 μ V 14 μ V/V + 1100 μ V	
DC Current - Generate ³	0 A to 10.00 A 10.00 A to 500.00 A 500.00 A to 999.9 A	79 mA 2.3 A 3.9 A	Direct measurement method using: Multifunction Calibrator & 50-turn current coil
	-329.9999 μ A to 329.9999 μ A 0 mA to 3.29999 mA 0 mA to 32.9999 mA 0 mA to 329.999 mA 0 A to 1.09999 A 1.1 A to 2.99999 A 0 A to 10.9999 A -20.5 A to 20.5 A	110 μ A/A + 0.017 μ A 77 μ A/A + 0.039 μ A 77 μ A/A + 0.020 μ A 77 μ A/A + 0.020 μ A 155 μ A/A + 31 μ A 290 μ A/A + 32 μ A 380 μ A/A + 410 μ A 770 μ A/A + 590 μ A	Direct measurement method using: Multifunction Calibrator
	0.2000 A to 2.0000 A 2.0000 A to 20.000 A 20 A to 32.99999 A 33 A to 120 A	0.02 % 0.03 % 0.03 % 0.26 %	Direct measurement method using: Multifunction Calibrator
DC Resistance -Generate ³	(4-wire method) 0 Ω to 10.9999 Ω 11 Ω to 32.9999 Ω 33 Ω to 109.9999 Ω 110 Ω to 329.9999 Ω 330 Ω to 1.099999 k Ω 1.1 k Ω to 3.299999 k Ω 3.3 k Ω to 10.99999 k Ω 11 k Ω to 32.99999 k Ω 33 k Ω to 109.9999 k Ω	31 $\mu\Omega/\Omega$ + 0.77 m Ω 25 $\mu\Omega/\Omega$ + 1.1 m Ω 22 $\mu\Omega/\Omega$ + 1.0 m Ω 21 $\mu\Omega/\Omega$ + 1.6 m Ω 21 $\mu\Omega/\Omega$ + 1.8 m Ω 21 $\mu\Omega/\Omega$ + 16 m Ω 21 $\mu\Omega/\Omega$ + 18 m Ω 21 $\mu\Omega/\Omega$ + 160 m Ω 21 $\mu\Omega/\Omega$ + 160 m Ω	Direct measurement method using: Multifunction Calibrator
DC Resistance -Generate ³ (continued)	(2-wire method) 110 k Ω to 329.99999 k Ω 330 k Ω to 1.099999 M Ω 1.1 M Ω to 3.299999 M Ω 3.3 M Ω to 10.99999 M Ω 11 M Ω to 32.99999 M Ω 33 M Ω to 109.9999 M Ω 110 M Ω to 329.9999 M Ω 330 M Ω to 1100 M Ω	24 $\mu\Omega/\Omega$ + 1.6 m Ω 24 $\mu\Omega/\Omega$ + 1.8 m Ω 46 $\mu\Omega/\Omega$ + 23 m Ω 100 $\mu\Omega/\Omega$ + 38 m Ω 190 $\mu\Omega/\Omega$ + 1.9 Ω 380 $\mu\Omega/\Omega$ + 2.5 Ω 2.3 m Ω/Ω + 77 Ω 11 m Ω/Ω + 670 Ω	Direct measurement method using: Multifunction Calibrator
	1 m Ω 10 m Ω 100 m Ω 1 Ω 10 Ω	0.47 $\mu\Omega$ 3.4 $\mu\Omega$ 11 $\mu\Omega$ 90 $\mu\Omega$ 1.8 m Ω	Direct measurement method using: Standard Resistors

CL-227

CSA GROUP TESTING & CERTIFICATION INC.

Effective Date January 21, 2025

Page 7 of 15

IAS/CL/100-3



SCOPE OF ACCREDITATION

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	100 Ω	8.4 mΩ	
AC Voltage -Generate ³	1 mV to 32.99999 mV (10 Hz to 45 Hz) (45 Hz to 10 kHz) (10 kHz to 20 kHz) (20 kHz to 50 kHz) (50 kHz to 100 kHz) (100 kHz to 500 kHz) 33 mV to 329.999 mV (10 Hz to 45 Hz) (45 Hz to 10 kHz) (10 kHz to 20 kHz) (20 kHz to 50 kHz) (50 kHz to 100 kHz) (100 kHz to 500 kHz) 0.33 V to 3.29999 V (10 Hz to 45 Hz) (45 Hz to 10 kHz) (10 kHz to 20 kHz) (20 kHz to 50 kHz) (50 kHz to 100 kHz) (100 kHz to 500 kHz) 3.3 V to 32.9999 V (10 Hz to 45 Hz) (45 Hz to 10 kHz) (10 kHz to 20 kHz) (20 kHz to 50 kHz) (50 kHz to 100 kHz)	620 μV/V + 4.6 μV 120 μV/V + 4.6 μV 160 μV/V + 4.6 μV 780 μV/V + 4.5 μV 2700 μV/V + 9.4 μV 6500 μV/V + 44 μV 230 μV/V + 6.3 μV 110 μV/V + 6.3 μV 120 μV/V + 6.5 μV 270 μV/V + 6.2 μV 620 μV/V + 24 μV 1500 μV/V + 58 μV 230 μV/V + 39 μV 120 μV/V + 42 μV 140 μV/V + 53 μV 230 μV/V + 39 μV 540 μV/V + 95 μV 1800 μV/V + 500 μV 230 μV/V + 0.53 mV 110 μV/V + 0.52 mV 180 μV/V + 0.51 mV 270 μV/V + 0.46 mV 700 μV/V + 1.2 mV	Direct measurement method using: Multifunction Calibrator (sine wave)
AC Voltage -Generate ³ (continued)	33 V to 329.999 V (45 Hz to 1 kHz) (1 kHz to 10 kHz) (10 kHz to 20 kHz) 33 V to 329.999 V (20 kHz to 50 kHz) 50 kHz to 100 kHz) 330 V to 1020 V (45 Hz to 1 kHz) (1 kHz to 5 kHz) (5 kHz to 10 kHz)	150 μV/V + 1.2 mV 140 μV/V + 2.2 mV 190 μV/V + 4.9 mV 230 μV/V + 4.7 mV 1500 μV/V + 42 mV 230 μV/V + 8.0 mV 190 μV/V + 9.7 mV 230 μV/V + 8.0 mV	Direct measurement method using: Multifunction Calibrator (sine wave)

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AC Current -Generate ³	29 µA to 329.9999 µA (10 Hz to 20 Hz) (20 Hz to 45 Hz) (45 Hz to 1 kHz) (1 kHz to 5 kHz) (5 kHz to 10 kHz) (10 kHz to 30 kHz) 0.33 mA to 3.29999 mA (10 Hz to 20 Hz) (20 Hz to 45 Hz) (45 Hz to 1 kHz) (1 kHz to 5 kHz) (5 kHz to 10 kHz) (10 kHz to 30 kHz) 3.3 mA to 32.99999 mA (10 Hz to 20 Hz) (20 Hz to 45 Hz) (45 Hz to 1 kHz) (1 kHz to 5 kHz) (5 kHz to 10 kHz) (10 kHz to 30 kHz) 33.00 mA to 329.9999 mA (10 Hz to 20 Hz) (20 Hz to 45 Hz) (45 Hz to 1 kHz) (1 kHz to 5 kHz) (5 kHz to 10 kHz) (10 kHz to 30 kHz) 0.33 A to 1.099999 A (10 Hz to 45 Hz) (45 Hz to 1 kHz) (1 kHz to 5 kHz) (5 kHz to 10 kHz)	0.15 % + 0.081 µA 0.11 % + 0.083 µA 0.09 % + 0.083 µA 0.23 % + 0.11 µA 0.62 % + 0.15 µA 1.2 % + 0.34 µA 0.15 % + 0.15 µA 0.095 % + 0.12 µA 0.076 % + 0.12 µA 0.15 % + 0.19 µA 0.38 % + 0.27 µA 0.77 % + 0.48 µA 0.14 % + 1.4 µA 0.069 % + 1.5 µA 0.030 % + 1.6 µA 0.060 % + 1.7 µA 0.15 % + 2.7 µA 0.31 % + 3 µA 0.14 % + 14 µA 0.070 % + 14 µA 0.031 % + 15 µA 0.078 % + 38 µA 0.15 % + 81 µA 0.31 % + 150 µA 0.14 % + 70 µA 0.038 % + 80 µA 0.046 % + 770 µA 1.9 % + 4.0 mA	Direct measurement method using: Multifunction Calibrator
AC Current -Generate ³ (continued)	1.1 A to 2.999999 A (10 Hz to 45 Hz) (45 Hz to 1 kHz) (1 kHz to 5 kHz) (5 kHz to 10 kHz) 3.0 A to 10.99999 A (45 Hz to 100 Hz) (100 Hz to 1 kHz)	0.14 % + 60 µA 0.046 % + 78 µA 0.046 % + 780 µA 1.9 % + 4.2 mA 0.047 % + 1.4 mA 0.078 % + 1.4 mA	Direct measurement method using: Multifunction Calibrator

CL-227

CSA GROUP TESTING & CERTIFICATION INC.

Effective Date January 21, 2025

Page 9 of 15

IAS/CL/100-3



SCOPE OF ACCREDITATION

International Accreditation Service, Inc.

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

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	(1 kHz to 5 kHz)	2.3 % + 5 mA	
	11 A to 20 A (45 Hz to 100 Hz) (100 Hz to 1 kHz) (1 kHz to 5 kHz)	0.093 % + 3.7 mA 0.11 % + 4.8 mA 2.3 % + 5.0 mA	
	(60 Hz) 20 A to 32.99999 A 33 A to 120 A	0.053 % 0.18 %	Direct measurement method using: Multifunction Calibrator and Transconductance Amplifier
5 A / 100 mV Current Shunt	20 mΩ	0.11 %	Direct measurement method using: Multifunction Calibrator
Clamp-on Current Meter	(50 Hz) 10 A to 100 A 100 A to 500 A 500 A to 900 A (440 Hz) 300 A (50 Hz) 900.0 A to 1000.0 A 1000.0 A to 2000.0 A 2000.0 A to 2500.0 A	0.15 % + 73 mA 0.67 % + 450 mA 0.43 % + 730 mA 3.0 A 0.68 A 0.80 A 0.85 A	Direct measurement method using: Multifunction Calibrator and 50-turn current Coil
DC Power - Generate ³	0 W to 60.000 W 60.000 W to 100.000 W 100.000 W to 600.000 W	5.9 mW 20 mW 0.11 W	Direct measurement method using: Multifunction Calibrator
AC Power - Generate ³	(60 Hz, PF = 1) 500 mW to 2 W 2 W to 300 W 300 W to 600 W	350 μW/W + 0.13 mW 500 μW/W - 0.2 mW 570 μW/W - 23 mW	Direct measurement method using: Multifunction Calibrator
AC Power - Generate ³ (continued)	600 W to 1000 W 1000 W to 2000 W 2000 W to 4800 W (1 kHz, PF = 1) 1.00000 W 100.00 W (10 kHz, PF = 1)	800 μW/W - 170 mW 1.6 mW/W - 970 mW 1.6 mW/W + 0.75 W 0.50 mW 50 mW	Direct measurement method using: Multifunction Calibrator

CL-227

CSA GROUP TESTING & CERTIFICATION INC.

Effective Date January 21, 2025

Page 10 of 15

IAS/CL/100-3



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	100.00 mW 2.0000 W (20 kHz) 2.0000 W (60Hz) 12 kW	0.51 mW 6.8 mW 24 mW 17 W	
Electrical AC Energy – Generate ³	0.01 W·h to 1000 W·h	8.8 µW·h	Direct measurement method using: Multifunction Calibrator
Ampere Hour	1 A·h	0.65 mA·h	
Time Integration	>= 24 h	0.59 s	
Power Factor PF=0, Range: 5 A, 15 V & 150 V @ 60 Hz Lead & Lag	50 VA to 500 VA	0.04 VA	Direct measurement method using: Multifunction Calibrator
Power Factor Test (Source) Range: 5 A, 150 V @ 60 Hz Lead	1.00000 0.80000 0.60000 0.40000 0.30000	0.0058 % 0.1 % 0.18 % 0.31 % 0.43 %	
Range: 5 A, 150 V @ 60 Hz Lag	0.80000 0.60000 0.40000 0.30000	0.1 % 0.18 % 0.31 % 0.43 %	
Phase Lead/Lag Test			Direct measurement method using: Multifunction Calibrator
90.0° Lead, 1 A, 150 V @ 1 kHz	90.00°	0.06°	
-90.0° Lead, 1 A, 150 V @ 1 kHz (9cont'd.)	-90.00°	0.06°	
Harmonics Measurement			Direct measurement method using: Multifunction Calibrator
Voltage Harmonics 1 st order to 15 th order @ 60 Hz	150.000 V	24 mV	
Current Harmonics	1.0000 A	0.74 mA	

CL-227

CSA GROUP TESTING & CERTIFICATION INC.

Effective Date January 21, 2025

Page 11 of 15

IAS/CL/100-3



SCOPE OF ACCREDITATION

International Accreditation Service, Inc.

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

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1 st order to 25 th order @ 50 Hz to 400 Hz			
Capacitance – Generate ^{3,5}	3.3 nF to 10.9999 nF 33 nF to 109.999 nF 0.33 µF to 1.09999 µF 1.1 µF to 3.29999 µF 3.3 µF to 10.9999 µF 33 µF to 109.999 µF 110 µF to 329.999 µF 0.33 mF to 1.09999 mF 3.3 mF to 10.9999 mF	18 pF 5.8 pF 2.3 nF 4.5 nF 18 nF 0.40 µF 1.1 µF 4.0 µF 43 µF	Direct measurement method using: Multifunction Calibrator
Duty Cycle Measurement	15 % @ 50 kHz 15.000 V @ 100 kHz	0.06 % 12 mV	Direct measurement method using: Multifunction Calibrator
Inductance – Measure ⁴	1 mH to 95 mH	0.4 µH	Direct measurement method using: Precision LCR Meter (at 1 Vrms, 1 kHz)
Conductance – Generate	Up to 50 nS	6.9 pS	Direct measurement method using: Multifunction Calibrator
Oscilloscope -Trigger Level or Threshold Accuracy	0 V to 10 V (@ 1 mV/div to 100 mV/div, Main Trigger Level, DC Coupled, Positive & Negative Slope)	3.9 mV	Direct measurement method using: Multifunction Calibrator with scope option
Oscilloscope - DC Voltage Gain Accuracy	(50 Ω, 20 MHz Bandwidth) 1 mV to 1.0 V 14.00 V	58 µV 7.0 mV	Direct measurement method using: Multifunction Calibrator with scope option
Oscilloscope - DC Voltage	0 V to ± 6.6 V into 50 Ω 0 V to ± 150 mV 150 mV to 300 mV 300 mV to 600 mV 600 mV to 3.00 V	34 µV 0.11 mV 0.27 mV 1.3 mV	Direct measurement method using: Multifunction Calibrator with scope option
Oscilloscope - DC Voltage (continued)	0 V to ± 130 V into 1 MΩ 0 mV to 6.00 mV 6.00 mV to 15 mV 15 mV to 30 mV 30 mV to 150 mV 150 mV to 300 mV 300 mV to 600 mV 600 mV to 3.00 V	100 µV 37 µV 43 µV 0.11 mV 0.16 mV 0.27 mV 1.3 mV	Direct measurement method using: Multifunction Calibrator with scope option

CL-227

CSA GROUP TESTING & CERTIFICATION INC.

Effective Date January 21, 2025

Page 12 of 15

IAS/CL/100-3



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MEASURED QUANTITY or DEVICE TYPE CALIBRATED	RANGE	UNCERTAINTY ^{1,2} (±)	CALIBRATION METHOD OR PROCEDURE, STANDARD EQUIPMENT (OPTIONAL)
	3.00 V to 10.00 V 18.0 V	3.9 mV 7.0 mV	
Oscilloscope - DC Gain Accuracy 1 MΩ, 20 MHz Bandwidth, Analogue	1 mV to 1.0 V 11.6 V, 10 V Offset 18.0 V, 10 V Offset 1.04 V, 1 V Offset	58 μV 4.5 mV 7.0 mV 0.44 mV	Direct measurement method using: Multifunction Calibrator with scope option
Oscilloscope- Sample Rate and Delay Time Accuracy	1.000000 ms	2.0 ns	Direct measurement method using: Multifunction Calibrator with scope option
Oscilloscope- Time Base Accuracy	10.000000 MHz	25 Hz	Direct measurement method using: Multifunction Calibrator with scope option
Oscilloscope - Delta Time Accuracy	4.0 ns/div to 400 μs/div (2.4 kHz to 240 MHz, 5 mV/div to 1.0 V/div)	0.58 ps	Direct measurement method using: Multifunction Calibrator with scope option
Oscilloscope - Input Impedance	50 Ω 1 MΩ 50 Ω 1 MΩ	39 mΩ 970 Ω 70 mΩ 5.8 kΩ	Direct measurement method using: Multifunction Calibrator with scope option
Oscilloscope - External Leakage Current Test	(DC, 50 Ω and 1 MΩ) -0.00997 mV	6.4 μV	Direct measurement method using: Multifunction Calibrator with scope option
Oscilloscope - Offset Accuracy 50 Ω 1 MΩ	1 mV/div 2 mV/div 10 mV/div 50 mV/div 100 mV/div 1 mV/div 2 mV/div 10 mV/div 50 mV/div 1.0 V/div	1.8 mV 1.0 mV 1.0 mV 0.33 mV 9.7 mV 0.38 mV 1.0 mV 1.0 mV 0.33 mV 69 mV	Direct measurement method using: Multifunction Calibrator with scope option
Oscilloscope Probes - Attenuation Test Input Resistance Test	 1.000 V @ 10 V & 100 V 10.00 MΩ 20.2 MΩ 100 MΩ	 16 μV 3.2 kΩ 130 kΩ 630 kΩ	Direct measurement method using: Multifunction Calibrator with scope option

CL-227

CSA GROUP TESTING & CERTIFICATION INC.

Effective Date January 21, 2025

Page 13 of 15

IAS/CL/100-3



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	50 MΩ 67 MΩ	180 kΩ 13 kΩ	
DC Voltage Test	1.000 V	29 μV	
AC Voltage Test	1.0 V @ 60 Hz to 1 kHz	0.74 mV	
DC Amplitude	0.600 V @ 6 A 1.200 V @ 12 A 1.800 V @ 18 A 2.400 V @ 24 A 3.00 A @ 30 A 0.300 V @ 30 A 0.600 V @ 60 A 0.900 V @ 90 A 1.200 V @ 120 A 1.500 V @ 150 A	25 μV 31 μV 82 μV 89 μV 97 μV 39 μV 0.30 mV 0.33 mV 0.22 mV 0.17 mV	
AC Amplitude	0.600 V @ 6 A/45 Hz 1.200 V @ 12 A/50 Hz 1.800 V @ 18 A/55 Hz 2.400 V @ 24 A/60 Hz 3.00 V @ 30 A/65 Hz 0.300 V @ 30 A/45 Hz 0.600 V @ 60 A/50 Hz 0.900 V @ 90 A/55 Hz 1.200 V @ 120 A/60 Hz 1.500 V @ 150 A/65 Hz	0.51 mV 2.9 mV 3.2 mV 3.4 mV 3.7 mV 0.38 mV 0.54 mV 0.80 mV 2.9 mV 3.1 V	
DC Output 1/10	3.500 V @ 35 V 2.500 V @ 25 V 1.500 V @ 15 V 0.500 V @ 5 V -0.500 V @ 5 V -1.500 V @ 15 V -2.500 V @ 25 V -3.500 V @ 35 V	0.14 mV 91 μV 72 μV 43 μV 49 μV 90 μV 0.12 mV 0.16 mV	
AC Output 1/10	2.500 V @ 25 V/100 Hz	3.5 mV	
DC Output 1/100	3.500 V @ 350 V 2.500 V @ 250 V 1.500 V @ 150 V -1.500 V @ 150 V -2.500 V @ 250 V -3.500 V @ 250 V	0.12 mV 93 μV 71 μV 98 μV 0.10 mV 0.15 mV	

CL-227

CSA GROUP TESTING & CERTIFICATION INC.

Effective Date January 21, 2025

Page 14 of 15

IAS/CL/100-3



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MEASURED QUANTITY or DEVICE TYPE CALIBRATED	RANGE	UNCERTAINTY ^{1,2} (±)	CALIBRATION METHOD OR PROCEDURE, STANDARD EQUIPMENT (OPTIONAL)
1000x Gain 100x Gain	0.100 V @ 100 V/70 Hz 1.00 V @ 100 V/70 Hz	79 µV 0.72 mV	
Oscilloscope Probes – DC Gain Accuracy (Current pk-pk) – Generate	1 A pk-pk to 30 A pk-pk	2.6 mA pk-pk	Direct measurement method using: Multifunction Calibrator with scope option
Time and Frequency			
Frequency - Generate ³	1 Hz to 90.0000 kHz	0.58 mHz	Direct measurement method using: Multifunction Calibrator
Frequency - Measure ⁴ (Mechanical Rotation) (Non-contact)	200 rpm to 1000 rpm 1000 rpm to 8000 rpm	1.4 rpm 2.6 rpm	Direct measurement method using: Tachometer
Digital Stopwatches / Timers	10 s/day	58 ms/day	Direct measurement method using: Timometer
Sample Rate and Delay Time Accuracy	0 ms to 100.000000 ms	0.10 µs	Direct measurement method using: Function/ Arbitrary Waveform Generator
Dioptrimeter	10 m and 35 feet distance	0.0058 m ⁻¹	ANSI/SEA Z87.1 2015 Standard Chart, Tape measure

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.

