



CERTIFICATE OF ACCREDITATION

The ANSI National Accreditation Board

Hereby attests that

Accutech Rentals, Ltd.
9730-32 Avenue NW
Edmonton, AB T6N 1L9 Canada

Fulfills the requirements of

ISO/IEC 17025:2017

In the field of

CALIBRATION

This certificate is valid only when accompanied by a current scope of accreditation document.
The current scope of accreditation can be verified at www.anab.org.

A handwritten signature in black ink, appearing to read 'R. Douglas Leonard Jr.', is positioned above a horizontal line.

R. Douglas Leonard Jr., VP, PILR SBU

Expiry Date: 05 July 2021

Certificate Number: AC-2166



This laboratory 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 (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

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CALIBRATION

Valid to: **July 5, 2021**

Certificate Number: **AC-2166**

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Voltage - Measure	Up to 100 mV 100 mV to 1V (1 to 10) V (10 to 100) V (100 to 1000) V	0.49 $\mu\text{V/V}$ + 1.23 μV 1.14 $\mu\text{V/V}$ + 2.8 μV 2.36 $\mu\text{V/V}$ + 16.61 μV 4.09 $\mu\text{V/V}$ + 0.12 mV 1.89 $\mu\text{V/V}$ + 0.31 mV	3458A-002 Multimeter
DC Current – Measure ¹	Up to 100 nA 100 nA to 1 μA (1 to 10) μA (10 to 100) μA 100 μA to 1 mA (1 to 10) mA (10 to 100) mA 100 mA to 1 A	42.7 nA/A + 0.52 nA 0.12 $\mu\text{A/A}$ + 0.82 nA 1.26 $\mu\text{A/A}$ + 0.78 nA 7.37 $\mu\text{A/A}$ + 0.9 nA 8.42 $\mu\text{A/A}$ + 6.77 nA 8.78 $\mu\text{A/A}$ + 60.83 nA 18.69 $\mu\text{A/A}$ + 0.54 μA 55.92 $\mu\text{A/A}$ + 20.93 μA	3458A Multimeter
AC Voltage - Measure	Up to 10 mV (1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz	88.74 $\mu\text{V/V}$ + 1.98 μV 74.35 $\mu\text{V/V}$ + 0.89 μV 0.12 mV/V + 1.19 μV 0.59 mV/V + 0.8 μV 3.29 mV/V + 0.45 μV 26.63 mV/V + 0.33 μV	3458A Multimeter



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AC Voltage - Measure	(10 to 100) mV		3458A Multimeter
	(1 to 40) Hz	24.88 $\mu\text{V/V} + 3.39 \mu\text{V}$	
	40 Hz to 1 kHz	28.66 $\mu\text{V/V} + 2.53 \mu\text{V}$	
	(1 to 20) kHz	72.01 $\mu\text{V/V} + 2.54 \mu\text{V}$	
	(20 to 50) kHz	0.18 mV/V + 1.84 μV	
	(50 to 100) kHz	0.5 mV/V + 3.33 μV	
	(100 to 300) kHz	1.96 mV/V + 4.20 μV	
	300 kHz to 1 MHz	6.50 mV/V + 16.84 μV	
	100 mV to 1 V		
	(1 to 40) Hz	27.28 $\mu\text{V/V} + 28.21 \mu\text{V}$	
	40 Hz to 1 kHz	33.00 $\mu\text{V/V} + 17.35 \mu\text{V}$	
	(1 to 20) kHz	75.55 $\mu\text{V/V} + 20.46 \mu\text{V}$	
	(20 to 50) kHz	0.18 mV/V + 17.18 μV	
	(50 to 100) kHz	0.52 mV/V + 8.29 μV	
	(100 to 300) kHz	1.98 mV/V + 21.50 μV	
	300 kHz to 1 MHz	6.65 mV/V + 17.65 μV	
	(1 to 10) V		
	(1 to 40) Hz	25.41 $\mu\text{V/V} + 0.33 \text{ mV}$	
	40 Hz to 1 kHz	32.99 $\mu\text{V/V} + 0.17 \text{ mV}$	
	(1 to 20) kHz	71.04 $\mu\text{V/V} + 0.27 \text{ mV}$	
(20 to 50) kHz	0.18 mV/V + 0.25 mV		
(50 to 100) kHz	0.51 mV/V + 0.22 mV		
(10 to 100) V			
40 Hz to 1 kHz	0.12 mV/V + 1.26 mV		
(1 to 20) kHz	0.11 mV/V + 2.04 mV		
(20 to 50) kHz	0.21 mV/V + 2.19 mV		
(50 to 100) kHz	0.78 mV/V + 2.16 mV		
(100 to 700) V			
40 Hz to 1 kHz	0.25 mV/V + 10.07 mV		
(1 to 20) kHz	0.39 mV/V + 10.26 mV		
AC Current – Measure ¹	Up to 100 μA		3458A Multimeter
	(10 to 20) Hz	2.60 mA/A + 7.26 nA	
	(20 to 45) Hz	0.88 mA/A + 13.46 nA	
	(45 to 100) Hz	0.27 mA/A + 18.28 nA	
	100 Hz to 1 kHz	0.27 mA/A + 18.29 nA	



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AC Current – Measure ¹	100 μ A to 1 mA		3458A Multimeter
	(10 to 20) Hz	2.63 mA/A + 34.68 nA	
	(20 to 45) Hz	0.94 mA/A + 66.42 nA	
	(45 to 100) Hz	0.32 mA/A + 0.10 μ A	
	100 Hz to 5 kHz	0.13 mA/A + 0.12 μ A	
	(5 to 20) kHz	0.32 mA/A + 0.1 μ A	
	(20 to 50) kHz	2.56 mA/A + 0.11 μ A	
	(1 to 10) mA		
	(10 to 20) Hz	2.64 mA/A + 0.31 μ A	
	(20 to 45) Hz	0.94 mA/A + 0.66 μ A	
	(45 to 100) Hz	0.32 mA/A + 1.03 μ A	
	100 Hz to 5 kHz	0.13 mA/A + 1.21 μ A	
	(5 to 20) kHz	0.32 mA/A + 1.03 μ A	
	(20 to 50) kHz	2.56 mA/A + 1.08 μ A	
	(10 to 100) mA		
	(10 to 20) Hz	2.64 mA/A + 3.08 μ A	
	(20 to 45) Hz	0.94 mA/A + 6.62 μ A	
	(45 to 100) Hz	0.32 mA/A + 10.19 μ A	
	100 Hz to 5 kHz	0.13 mA/A + 12.14 μ A	
	(5 to 20) kHz	0.32 mA/A + 10.28 μ A	
(20 to 50) kHz	2.56 mA/A + 10.68 μ A		
Resistance - Measure	100 mA to 1 A		3458A Multimeter
	(10 to 20) Hz	2.63 mA/A + 36.42 μ A	
	(20 to 45) Hz	1.01 mA/A + 64.76 μ A	
	(45 to 100) Hz	0.46 mA/A + 96.59 μ A	
	100 Hz to 5 kHz	0.60 mA/A + 84.76 μ A	
	(5 to 20) kHz	1.96 mA/A + 4.45 μ A	
	11 m Ω to 10 Ω	5.53 $\mu\Omega/\Omega$ + 68.58 $\mu\Omega$	
	(10 to 100) Ω	3.61 $\mu\Omega/\Omega$ + 0.8 m Ω	
100 Ω to 1 k Ω	6.03 $\mu\Omega/\Omega$ + 0.71 m Ω		
(1 to 10) k Ω	4.99 $\mu\Omega/\Omega$ + 20.65 m Ω		
(10 to 100) k Ω	6.06 $\mu\Omega/\Omega$ + 73.69 m Ω		
100 k Ω to 1 M Ω	9.61 $\mu\Omega/\Omega$ + 1.04 Ω		
(1 to 10) M Ω	28.65 $\mu\Omega/\Omega$ + 79.66 Ω		
(10 to 100) M Ω	0.3 m Ω/Ω + 4.17 k Ω		
100 M Ω to 1 G Ω	2.75 m Ω/Ω + 0.67 M Ω		
DC Voltage - Generate	Up to 330 mV	14.27 μ V/V + 0.42 μ V	5520A Multi Product Calibrator
	(0.33 to 3.3) V	8.33 μ V/V + 0.68 μ V	
	(3.3 to 33) V	9.12 μ V/V + 6.11 μ V	
	(33 to 330) V	13.8 μ V/V + 55.37 μ V	
	(330 to 1 000) V	12.76 μ V/V + 1.28 mV	



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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Current - Generate	Up to 330) μ A (0.33 to 3.3) mA (3.3 to 33) mA (33 to 330) mA (0.33 to 1.1) A	85.18 μ A/A + 12.31 nA 71.55 μ A/A + 20.23 nA 75.6 μ A/A + 64.61 nA 75.59 μ A/A + 0.65 μ A 0.14 mA/A + 19.42 μ A	5520A Multi Product Calibrator
AC Voltage - Generate	(1 to 33) mV (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz (33 to 330) mV (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz 330 mV to 3.3 V (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz (3.3 to 33) V (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (33 to 330) V 45 Hz to 1 kHz (1 to 10) kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz	0.54 mV/V + 2.98 μ V 44.86 μ V/V + 4.46 μ V 74.05 μ V/V + 4.33 μ V 0.70 mV/V + 2.65 μ V 2.61 mV/V + 3.62 μ V 5.57 mV/V + 22.12 μ V 0.23 mV/V + 1.99 μ V 0.1 mV/V + 3.32 μ V 0.11 mV/V + 3.12 μ V 0.27 mV/V + 1.79 μ V 0.59 mV/V + 10.87 μ V 1.49 mV/V + 22.1 μ V 0.23 mV/V + 8.69 μ V 0.11 mV/V + 21.2 μ V 0.14 mV/V + 19.26 μ V 0.23 mV/V + 10.52 μ V 0.54 mV/V + 23.74 μ V 1.82 mV/V + 0.14 mV 0.23 mV/V + 0.14 mV 0.11 mV/V + 0.21 mV 0.18 mV/V + 0.15 mV 0.27 mV/V + 0.11 mV 0.69 mV/V + 0.31 mV 0.15 mV/V + 0.31 mV 0.15 mV/V + 1.71 mV 0.19 mV/V + 1.56 mV 0.23 mV/V + 1.32 mV 1.52 mV/V + 11.87 mV	5520A Multi Product Calibrator



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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage - Generate	(330 to 1 020) V 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.23 mV/V + 2.68 mV 0.19 mV/V + 4.04 mV 0.22 mV/V + 20.21 mV	5520A Multi Product Calibrator
AC Current - Generate	(29 to 330) μ A (10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz	1.44 mA/A + 38.92 nA 1.03 mA/A + 45.85 nA 0.83 mA/A + 50.09 nA	5520A Multi Product Calibrator
AC Current - Generate	330 μ A to 3.3 mA (10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz (3.3 to 33) mA (10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz (33 to 330) mA (10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz 330 mA to 1.1 A (10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	1.55 mA/A + 12.1 nA 0.96 mA/A + 19.05 nA 0.77 mA/A + 23.29 nA 1.55 mA/A + 20.94 nA 3.88 mA/A + 18.84 nA 7.75 mA/A + 37.34 nA 1.39 mA/A + 0.23 μ A 0.69 mA/A + 0.43 μ A 0.29 mA/A + 0.82 μ A 0.61 mA/A + 0.48 μ A 1.54 mA/A + 0.45 μ A 3.09 mA/A + 0.41 μ A 1.39 mA/A + 2.33 μ A 0.69 mA/A + 4.34 μ A 0.29 mA/A + 7.89 μ A 0.72 mA/A + 19.48 μ A 1.44 mA/A + 38.9 μ A 2.87 mA/A + 77.76 μ A 1.39 mA/A + 8.9 μ A 0.37 mA/A + 29.7 μ A 4.48 mA/A + 0.24 mA 18.37 mA/A + 1.37 mA	5520A Multi Product Calibrator



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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Resistance - Generate	Up to 11 Ω	7.92 $\mu\Omega/\Omega$ + 0.76 m Ω	5520A Multi Product Calibrator
	(11 to 33) Ω	8.04 $\mu\Omega/\Omega$ + 1.22 m Ω	
	(33 to 110) Ω	8.77 $\mu\Omega/\Omega$ + 2.98 m Ω	
	(110 to 330) Ω	20.11 $\mu\Omega/\Omega$ + 0.68 m Ω	
	330 Ω to 1.1 k Ω	21.51 $\mu\Omega/\Omega$ + 0.3 m Ω	
	(1.1 to 3.3) k Ω	20.26 $\mu\Omega/\Omega$ + 6.11 m Ω	
	(3.3 to 11) k Ω	21.52 $\mu\Omega/\Omega$ + 2.84 m Ω	
	(11 to 33) k Ω	19.93 $\mu\Omega/\Omega$ + 75.48 m Ω	
	(33 to 110) k Ω	21.5 $\mu\Omega/\Omega$ + 30.24 m Ω	
	(110 to 330) k Ω	16.49 $\mu\Omega/\Omega$ + 4.25 Ω	
	330 k Ω to 1.1 M Ω	23.26 $\mu\Omega/\Omega$ + 2.1 Ω	
	(1.1 to 3.3) M Ω	41.59 $\mu\Omega/\Omega$ + 21.16 Ω	
	(3.3 to 11) M Ω	99.78 $\mu\Omega/\Omega$ + 14.77 Ω	
	(11 to 33) M Ω	0.17 m Ω/Ω + 1.14 k Ω	
(33 to 110) M Ω	0.37 m Ω/Ω + 2.38 k Ω		
(110 to 330) M Ω	2.27 m Ω/Ω + 21.86 k Ω		
(330 to 1 100) M Ω	11.51 m Ω/Ω + 0.17 M Ω		
DC High Voltage – Measure ¹	(>0 to 120) kV	0.02 % of reading	VD120 Voltage Divider and 34465A Multimeter
AC High Voltage – Measure ¹	(>0 to 85) kV @ 60 Hz	0.3 % of reading	

Calibration and Measurement Capability (CMC) is expressed in terms of the measurement parameter, measurement range, expanded uncertainty of measurement and reference standard, method, and/or equipment. The expanded uncertainty of measurement is expressed as the standard uncertainty of the measurement multiplied by a coverage factor of 2 ($k=2$), corresponding to a confidence level of approximately 95%.

Notes:

1. On-site calibration service is available for this parameter, since on-site conditions are typically more variable than those in the laboratory, larger measurement uncertainties are expected on-site than what is reported on the accredited scope
2. This scope is formatted as part of a single document including Certificate of Accreditation No. AC-2166.

R. Douglas Leonard Jr., VP, PILR SBU