



PERRY JOHNSON LABORATORY ACCREDITATION, INC.

Certificate of Accreditation

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

Accuserve, Inc.

16415 Northcross Drive, Suite A, Huntersville, NC 28078

(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 April 2017):

***Electrical, Dimensional, Frequency, Humidity,
Mass, Pressure, Sound, Temperature, Time,
Test Instruments, Torque Instruments, and Vacuum Calibration
(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

Initial Accreditation Date:

April 03, 2001

Issue Date:

September 26, 2023

Expiration Date:

November 30, 2025

Accreditation No.:

59060

Certificate No.:

L23-717

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

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.pjllabs.com



Certificate of Accreditation: Supplement

Accuserve, Inc.

16415 Northcross Drive, Suite A, Huntersville, NC 28078
 Contact Name: Michael Griffith Phone: (704) 535-0100

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

Acoustic

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Sound Level Meter ^{FO}	94 dB	0.38 dB	Bruel & Kjaer 4231 GIDEP
	114 dB	0.38 dB	

Dimensional

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Micrometers ^{FO} (50 μ in resolution)	1.27 mm to 101.6 mm (0.05 in to 4 in)	(1.47 + 0.001L) μ m [(58 + 1L) μ in]	Gage Blocks GIDEP
Micrometers ^{FO} (0.000 1 in resolution)	101.6 mm to 254 mm (4 in to 10 in)	(2.85 + 0.001L) μ m [(112 + 1L) μ in]	
	Calipers ^{FO} (0.000 5 in resolution)	254 mm to 304.8 mm (10 in to 12 in)	(5.87 + 0L) μ m [(231 + 0L) μ in]
1.27 mm to 254 mm (0.05 in to 10 in)		(14.66 + 0.001L) μ m [(577 + 1L) μ in]	
Indicators ^{FO} (50 μ in resolution)	2.5 μ m to 38.1 mm (0.000 1 in to 1.5 in)	(1.47 + 0.001L) μ m [(58 + 1L) μ in]	Gage Blocks GIDEP
Height Gages ^{FO} (0.000 1 in resolution)	1.27 mm to 609.6 mm (0.05 in to 24 in)	(2.9 + 0.009L) μ m [(115 + 9L) μ in]	
Calipers ^{FO} (0.001 in resolution)	1.27 mm to 609.6 mm (0.05 in to 24 in)	(29.31 + 0.002L) μ m [(1 154 + 2L) μ in]	Mitutoyo 515-565, Starrett 234A GIDEP

Electrical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Equipment to Output DC Voltage ^{FO}	2.4 mV to 100 mV	1 μ V + 0.000 7 % of Reading	Hewlett Packard 3458A Opt 002 GIDEP
	100 mV to 1 V	1 μ V + 0.000 6 % of Reading	
	1 V to 10 V	2 μ V + 0.000 6 % of Reading	
	10 V to 100 V	32 μ V + 0.000 8 % of Reading	
	100 V to 1 000 V	10.1 mV + 0.000 8 % of Reading	
Equipment to Measure DC Voltage ^{FO}	72 μ V to 330 mV	4.3 μ V + 0.006 % of Reading	Fluke 5500A GIDEP
	330 mV to 3.3 V	18 μ V + 0.005 % of Reading	
	3.3 V to 33 V	200 μ V + 0.005 % of Reading	
	30 V to 330 V	2 mV + 0.005 5 % of Reading	
	100 V to 1 020 V	1.5 mV + 0.005 5 % of Reading	



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Equipment to Output AC Voltage (at the listed frequencies) ^{FO}			Hewlett Packard 3458A Opt 002 GIDEP
1 Hz to 40 Hz	18 μ V to 10 mV	3 μ V + 0.03 % of Reading	
40 Hz to 1 kHz	9.3 μ V to 10 mV	1.1 μ V + 0.02 % of Reading	
1 kHz to 20 kHz	12.3 μ V to 10 mV	1.1 μ V + 0.03 % of Reading	
20 kHz to 50 kHz	33.3 μ V to 10 mV	1.1 μ V + 0.1 % of Reading	
50 kHz to 100 kHz	153.3 μ V to 10 mV	1.1 μ V + 0.5 % of Reading	
100 kHz to 300 kHz	1.2 mV to 10 mV	2 μ V + 4 % of Reading	
Equipment to Output AC Voltage (at the listed frequencies) ^{FO}			
1 Hz to 40 Hz	10 mV to 100 mV	4 μ V + 0.007 % of Reading	
40 Hz to 1 kHz	10 mV to 100 mV	2 μ V + 0.007 % of Reading	
1 kHz to 20 kHz	10 mV to 100 mV	2 μ V + 0.014 % of Reading	
20 kHz to 50 kHz	10 mV to 100 mV	2 μ V + 0.03 % of Reading	
50 kHz to 100 kHz	10 mV to 100 mV	2 μ V + 0.08 % of Reading	
100 kHz to 300 kHz	10 mV to 100 mV	10 μ V + 0.3 % of Reading	
300 kHz to 1 MHz	10 mV to 100 mV	10 μ V + 1 % of Reading	
1 MHz to 2 MHz	10 mV to 100 mV	10 μ V + 1.5 % of Reading	
Equipment to Output AC Voltage (at the listed frequencies) ^{FO}			
1 Hz to 40 Hz	100 mV to 1 V	40 μ V + 0.007 % of Reading	
40 Hz to 1 kHz	100 mV to 1 V	20 μ V + 0.007 % of Reading	
1 kHz to 20 kHz	100 mV to 1 V	20 μ V + 0.014 % of Reading	
20 kHz to 50 kHz	100 mV to 1 V	20 μ V + 0.03 % of Reading	
50 kHz to 100 kHz	100 mV to 1 V	20 μ V + 0.08 % of Reading	
100 kHz to 300 kHz	100 mV to 1 V	100 μ V + 0.3 % of Reading	
300 kHz to 1 MHz	100 mV to 1 V	100 μ V + 1 % of Reading	
1 MHz to 2 MHz	100 mV to 1 V	100 μ V + 1.5 % of Reading	



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Equipment to Output AC Voltage (at the listed frequencies) ^{FO}			Hewlett Packard 3458A Opt 002 GIDEP
1 Hz to 40 Hz	1 V to 10 V	400 μ V + 0.007 % of Reading	
40 Hz to 1 kHz	1 V to 10 V	200 μ V + 0.007 % of Reading	
1 kHz to 20 kHz	1 V to 10 V	200 μ V + 0.014 % of Reading	
20 kHz to 50 kHz	1 V to 10 V	200 μ V + 0.03 % of Reading	
50 kHz to 100 kHz	1 V to 10 V	200 μ V + 0.08 % of Reading	
100 kHz to 300 kHz	1 V to 10 V	1 mV + 0.3 % of Reading	
300 kHz to 1 MHz	1 V to 10 V	1 mV + 1 % of Reading	
1 MHz to 2 MHz	1 V to 10 V	1 mV + 1.5 % of Reading	
Equipment to Output AC Voltage (at the listed frequencies) ^{FO}			
1 Hz to 40 Hz	10 V to 100 V	4 mV + 0.02 % of Reading	
40 Hz to 1 kHz	10 V to 100 V	2 mV + 0.02 % of Reading	
1 kHz to 20 kHz	10 V to 100 V	2 mV + 0.02 % of Reading	
20 kHz to 50 kHz	10 V to 100 V	2 mV + 0.035 % of Reading	
50 kHz to 100 kHz	10 V to 100 V	2 mV + 0.12 % of Reading	
100 kHz to 300 kHz	10 V to 100 V	10 mV + 0.4 % of Reading	
300 kHz to 1 MHz	10 V to 100 V	10 mV + 1.5 % of Reading	
Equipment to Output AC Voltage (at the listed frequencies) ^{FO}			
1 Hz to 40 Hz	100 V to 1 000 V	40 mV + 0.04 % of Reading	
40 Hz to 1 kHz	100 V to 1 000 V	20 mV + 0.04 % of Reading	
1 kHz to 20 kHz	100 V to 1 000 V	20 mV + 0.06 % of Reading	
20 kHz to 50 kHz	100 V to 1 000 V	20 mV + 0.12 % of Reading	
50 kHz to 100 kHz	100 V to 1 000 V	20 mV + 0.3 % of Reading	
Equipment to Measure AC Voltage (at the listed frequencies) ^{FO}			Fluke 5500A GIDEP
10 Hz to 45 Hz	1 mV to 33 mV	22.6 μ V + 0.35 % of Reading	
45 Hz to 10 kHz	1 mV to 33 mV	22.7 μ V + 0.15 % of Reading	
10 kHz to 20 kHz	1 mV to 33 mV	22.7 μ V + 0.2 % of Reading	
20 kHz to 50 kHz	1 mV to 33 mV	23.4 μ V + 0.25 % of Reading	
50 kHz to 100 kHz	1 mV to 33 mV	39.5 μ V + 0.35 % of Reading	
100 kHz to 500 kHz	1 mV to 33 mV	170 μ V + 1 % of Reading	



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Equipment to Measure AC Voltage (at the listed frequencies) ^{FO}			Fluke 5500A GIDEP
10 Hz to 45 Hz	33 mV to 330 mV	73 μ V + 0.25 % of Reading	
45 Hz to 10 kHz	33 mV to 330 mV	43 μ V + 0.05 % of Reading	
10 kHz to 20 kHz	33 mV to 330 mV	44 μ V + 0.1 % of Reading	
20 kHz to 50 kHz	33 mV to 330 mV	71 μ V + 0.16 % of Reading	
50 kHz to 100 kHz	33 mV to 330 mV	229 μ V + 0.24 % of Reading	
100 kHz to 500 kHz	33 mV to 330 mV	1.33 mV + 0.7 % of Reading	
Equipment to Measure AC Voltage (at the listed frequencies) ^{FO}			
10 Hz to 45 Hz	0.33 V to 3.3 V	480 μ V + 0.15 % of Reading	
45 Hz to 10 kHz	0.33 V to 3.3 V	290 μ V + 0.03 % of Reading	
10 kHz to 20 kHz	0.33 V to 3.3 V	290 μ V + 0.08 % of Reading	
20 kHz to 50 kHz	0.33 V to 3.3 V	610 μ V + 0.14 % of Reading	
50 kHz to 100 kHz	0.33 V to 3.3 V	2.3 mV + 0.24 % of Reading	
100 kHz to 500 kHz	0.33 V to 3.3 V	13.3 mV + 0.5 % of Reading	
Equipment to Measure AC Voltage (at the listed frequencies) ^{FO}			
10 Hz to 45 Hz	3.3 V to 33 V	7 mV + 0.15 % of Reading	
45 Hz to 10 kHz	3.3 V to 33 V	3.6 mV + 0.04 % of Reading	
10 kHz to 20 kHz	3.3 V to 33 V	5.6 mV + 0.08 % of Reading	
20 kHz to 50 kHz	3.3 V to 33 V	9.2 mV + 0.19 % of Reading	
50 kHz to 100 kHz	3.3 V to 33 V	21.5 mV + 0.24 % of Reading	
Equipment to Measure AC Voltage (at the listed frequencies) ^{FO}			
45 Hz to 1 kHz	33 V to 330 V	39.6 mV + 0.05 % of Reading	
1 kHz to 10 kHz	33 V to 330 V	30 mV + 0.08 % of Reading	
10 kHz to 20 kHz	33 V to 330 V	30 mV + 0.09 % of Reading	
Equipment to Measure AC Voltage (at the listed frequencies) ^{FO}			
45 Hz to 1 kHz	330 V to 1 020 V	130 mV + 0.05 % of Reading	
1 kHz to 5 kHz	330 V to 1 020 V	100 mV + 0.2 % of Reading	
5 kHz to 10 kHz	330 V to 1 020 V	500 mV + 0.2 % of Reading	



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Equipment to Output DC Current ^{FO}	0.13 nA to 100 nA	0.04 nA + 0.003 5 % of Reading	Hewlett Packard 3458A Opt 002 GIDEP
	100 nA to 1 μ A	0.04 nA + 0.002 5 % of Reading	
	1 μ A to 10 μ A	0.1 nA + 0.002 5 % of Reading	
	10 μ A to 100 μ A	0.8 nA + 0.002 5 % of Reading	
	100 μ A to 1 mA	5 nA + 0.002 5 % of Reading	
	1 mA to 10 mA	50 nA + 0.002 5 % of Reading	
	10 mA to 100 mA	0.5 μ A + 0.004 % of Reading	
	100 mA to 1 A	10 μ A + 0.012 % of Reading	
Equipment to Measure DC Current ^{FO}	1.44 mA to 3.3 mA	0.05 μ A + 0.013 % of Reading	Fluke 5500A GIDEP
	3.3 mA to 33 mA	0.25 μ A + 0.01 % of Reading	
	33 mA to 330 mA	3.3 μ A + 0.01 % of Reading	
	0.33 A to 2.2 A	44 μ A + 0.03 % of Reading	
	2.2 A to 11 A	330 μ A + 0.06 % of Reading	Fluke 5500A Coil GIDEP
	11 A to 16.5 A	0.002 A + 0.25 % of Reading	
	16.5 A to 150 A	0.015 A + 0.25 % of Reading	
	150 A to 550 A	0.05 A + 0.25 % of Reading	
Equipment to Output AC Current (at the listed frequencies) ^{FO}			Hewlett Packard 3458A Opt 002 GIDEP
10 Hz to 20 Hz	1.3 μ A to 100 μ A	0.03 μ A + 0.4 % of Reading	
20 Hz to 45 Hz	0.51 μ A to 100 μ A	0.03 μ A + 0.15 % of Reading	
45 Hz to 5 kHz	0.24 μ A to 100 μ A	0.03 μ A + 0.06 % of Reading	
Equipment to Output AC Current (at the listed frequencies) ^{FO}			
10 Hz to 20 Hz	100 μ A to 1 mA	0.2 μ A + 0.4 % of Reading	
20 Hz to 45 Hz	100 μ A to 1 mA	0.2 μ A + 0.15 % of Reading	
45 Hz to 100 Hz	100 μ A to 1 mA	0.2 μ A + 0.06 % of Reading	
100 Hz to 5 kHz	100 μ A to 1 mA	0.2 μ A + 0.03 % of Reading	
5 kHz to 20 kHz	100 μ A to 1 mA	0.2 μ A + 0.06 % of Reading	
20 kHz to 50 kHz	100 μ A to 1 mA	0.4 μ A + 0.4 % of Reading	
50 kHz to 100 kHz	100 μ A to 1 mA	1.5 μ A + 0.55 % of Reading	



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Equipment to Output AC Current (at the listed frequencies) ^{FO}			Hewlett Packard 3458A Opt 002 GIDEP
10 Hz to 20 Hz	1 mA to 10 mA	2 μ A + 0.4 % of Reading	
20 Hz to 45 Hz	1 mA to 10 mA	2 μ A + 0.15 % of Reading	
45 Hz to 100 Hz	1 mA to 10 mA	2 μ A + 0.06 % of Reading	
100 Hz to 5 kHz	1 mA to 10 mA	2 μ A + 0.03 % of Reading	
5 kHz to 20 kHz	1 mA to 10 mA	2 μ A + 0.06 % of Reading	
20 kHz to 50 kHz	1 mA to 10 mA	4 μ A + 0.4 % of Reading	
50 kHz to 100 kHz	1 mA to 10 mA	15 μ A + 0.55 % of Reading	
Equipment to Output AC Current (at the listed frequencies) ^{FO}			Hewlett Packard 3458A Opt 002 GIDEP
10 Hz to 20 Hz	10 mA to 100 mA	20 μ A + 0.4 % of Reading	
20 Hz to 45 Hz	10 mA to 100 mA	20 μ A + 0.15 % of Reading	
45 Hz to 100 Hz	10 mA to 100 mA	20 μ A + 0.06 % of Reading	
100 Hz to 5 kHz	10 mA to 100 mA	20 μ A + 0.03 % of Reading	
5 kHz to 20 kHz	10 mA to 100 mA	20 μ A + 0.06 % of Reading	
20 kHz to 50 kHz	10 mA to 100 mA	40 μ A + 0.4 % of Reading	
50 kHz to 100 kHz	10 mA to 100 mA	150 μ A + 0.55 % of Reading	
Equipment to Output AC Current (at the listed frequencies) ^{FO}			Hewlett Packard 3458A Opt 002 GIDEP
10 Hz to 20 Hz	100 mA to 1 A	0.2 mA + 0.4 % of Reading	
20 Hz to 45 Hz	100 mA to 1 A	0.2 mA + 0.16 % of Reading	
45 Hz to 100 Hz	100 mA to 1 A	0.2 mA + 0.08 % of Reading	
100 Hz to 5 kHz	100 mA to 1 A	0.2 mA + 0.1 % of Reading	
5 kHz to 20 kHz	100 mA to 1 A	0.2 mA + 0.3 % of Reading	
20 kHz to 50 kHz	100 mA to 1 A	0.4 mA + 1 % of Reading	
Equipment to Measure AC Current (at the listed frequencies) ^{FO}			Fluke 5500A GIDEP
10 Hz to 20 Hz	0.029 mA to 0.329 99 mA	0.23 μ A + 0.25 % of Reading	
20 Hz to 45 Hz	0.029 mA to 0.329 99 mA	0.49 μ A + 0.13 % of Reading	
45 Hz to 1 kHz	0.029 mA to 0.329 99 mA	0.58 μ A + 0.13 % of Reading	
1 kHz to 5 kHz	0.029 mA to 0.329 99 mA	0.64 μ A + 0.4 % of Reading	
5 kHz to 10 kHz	0.029 mA to 0.329 99 mA	1.35 μ A + 1.25 % of Reading	



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Equipment to Measure AC Current (at the listed frequencies) ^{FO}			Fluke 5500A GIDEP
10 Hz to 20 Hz	0.33 mA to 3.3 mA	0.76 μ A + 0.2 % of Reading	
20 Hz to 45 Hz	0.33 mA to 3.3 mA	0.8 μ A + 0.1 % of Reading	
45 Hz to 1 kHz	0.33 mA to 3.3 mA	0.72 μ A + 0.1 % of Reading	
1 kHz to 5 kHz	0.33 mA to 3.3 mA	0.79 μ A + 0.2 % of Reading	
5 kHz to 10 kHz	0.33 mA to 3.3 mA	0.79 μ A + 0.6 % of Reading	
Equipment to Measure AC Current (at the listed frequencies) ^{FO}			
10 Hz to 20 Hz	3.3 mA to 33 mA	3 μ A + 0.2 % of Reading	
20 Hz to 45 Hz	3.3 mA to 33 mA	3 μ A + 0.1 % of Reading	
45 Hz to 1 kHz	3.3 mA to 33 mA	3 μ A + 0.09 % of Reading	
1 kHz to 5 kHz	3.3 mA to 33 mA	3 μ A + 0.2 % of Reading	
5 kHz to 10 kHz	3.3 mA to 33 mA	3 μ A + 0.6 % of Reading	
Equipment to Measure AC Current (at the listed frequencies) ^{FO}			
10 Hz to 20 Hz	33 mA to 330 mA	30 μ A + 0.2 % of Reading	
20 Hz to 45 Hz	33 mA to 330 mA	30 μ A + 0.1 % of Reading	
45 Hz to 1 kHz	33 mA to 330 mA	30 μ A + 0.09 % of Reading	
1 kHz to 5 kHz	33 mA to 330 mA	30 μ A + 0.2 % of Reading	
5 kHz to 10 kHz	33 mA to 330 mA	30 μ A + 0.6 % of Reading	
Equipment to Measure AC Current (at the listed frequencies) ^{FO}			
10 Hz to 45 Hz	0.33 A to 2.2 A	300 μ A + 0.2 % of Reading	
45 Hz to 1 kHz	0.33 A to 2.2 A	300 μ A + 0.1 % of Reading	
1 kHz to 5 kHz	0.33 A to 2.2 A	300 μ A + 0.75 % of Reading	
Equipment to Measure AC Current (at the listed frequencies) ^{FO}			
45 Hz to 65 Hz	2.2 A to 11 A	2 000 μ A + 0.06 % of Reading	
65 Hz to 500 Hz	2.2 A to 11 A	2 000 μ A + 0.1 % of Reading	
500 Hz to 1 kHz	2.2 A to 11 A	2 000 μ A + 0.33 % of Reading	
Equipment to Measure AC Current (at the listed frequencies) ^{FO}			Fluke 5500A/Coil GIDEP
45 Hz to 65 Hz	10 A to 16.5 A	0.003 A + 0.28 % of Reading	
65 Hz to 440 Hz	10 A to 16.5 A	0.003 A + 0.79 % of Reading	



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Equipment to Measure AC Current (at the listed frequencies) ^{FO}			Fluke 5500A/Coil GIDEP
45 Hz to 65 Hz	16.5 A to 150 A	0.025 A + 0.28 % of Reading	
65 Hz to 440 Hz	16.5 A to 150 A	0.027 A + 0.79 % of Reading	
Equipment to Measure AC Current (at the listed frequencies) ^{FO}			
45 Hz to 65 Hz	150 A to 550 A	0.09 A + 0.28 % of Reading	
65 Hz to 440 Hz	150 A to 550 A	0.1 A + 0.79 % of Reading	
Equipment to Output Resistance ^{FO}	0.005 Ω to 10 Ω	0.000 05 Ω + 0.001 8 % of Reading	Hewlett Packard 3458A Opt 002 GIDEP
	10 Ω to 100 Ω	0.000 05 Ω + 0.001 5 % of Reading	
	100 Ω to 1 k Ω	0.000 05 Ω + 0.001 3 % of Reading	
	1 k Ω to 10 k Ω	0.005 Ω + 0.001 3 % of Reading	
	10 k Ω to 100 k Ω	0.05 Ω + 0.001 3 % of Reading	
	100 k Ω to 1 M Ω	2 Ω + 0.001 8 % of Reading	
	1 M Ω to 10 M Ω	100 Ω + 0.005 3 % of Reading	
	10 M Ω to 100 M Ω	1 k Ω + 0.051 % of Reading	
	100 M Ω to 1 G Ω	10 k Ω + 0.51 % of Reading	
Equipment to Measure Resistance ^{FO}	50 m Ω to 11 Ω	0.008 Ω + 0.012 % of Reading	Fluke 5500A GIDEP
	11 Ω to 33 Ω	0.015 Ω + 0.012 % of Reading	
	33 Ω to 110 Ω	0.015 Ω + 0.009 % of Reading	
	110 Ω to 330 Ω	0.015 Ω + 0.009 % of Reading	
	330 Ω to 1.1 k Ω	0.061 Ω + 0.009 % of Reading	
	1.1 k Ω to 3.3 k Ω	0.078 Ω + 0.009 % of Reading	
	3.3 k Ω to 11 k Ω	0.66 Ω + 0.009 % of Reading	
	11 k Ω to 33 k Ω	0.81 Ω + 0.009 % of Reading	
	33 k Ω to 110 k Ω	0.011 % of reading + 6.7 Ω	
	110 k Ω to 330 k Ω	0.012 % of reading + 8.7 Ω	
	330 k Ω to 1.5 M Ω	0.015 % of reading + 65 Ω	
	1.1 M Ω to 3.3 M Ω	0.015 % of reading + 107 Ω	
	3.3 M Ω to 11 M Ω	0.06 % of reading + 740 Ω	
	11 M Ω to 33 M Ω	0.1 % of reading + 6 550 Ω	
	33 M Ω to 110 M Ω	0.5 % of reading + 25.5 k Ω	
110 M Ω to 330 M Ω	0.5 % of reading + 87.5 k Ω		



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Equipment to Measure Capacitance ^{FO}	0.33 nF to 11 nF	0.01 nF + 0.5 % of Reading	Fluke 5500A GIDEP
	11 nF to 110 nF	0.01 nF + 0.25 % of Reading	
	110 nF to 330 nF	0.3 nF + 0.25 % of Reading	
	0.33 μ F to 1.1 μ F	1 nF + 0.25 % of Reading	
	1.1 μ F to 3.3 μ F	3 nF + 0.35 % of Reading	
	3.3 μ F to 11 μ F	10 nF + 0.35 % of Reading	
	11 μ F to 33 μ F	30 nF + 0.4 % of Reading	
	33 μ F to 110 μ F	100 nF + 0.5 % of Reading	
	110 μ F to 330 μ F	300 nF + 0.7 % of Reading	
330 μ F to 1.1 mF	300 nF + 1 % of Reading		
Equipment to Measure Inductance: Fixed Points (at the listed frequencies) ^{FO}			General Radio 1482-L GIDEP
100 Hz	100 mH	0.12 mH	
200 Hz	100 mH	0.12 mH	
400 Hz	100 mH	0.12 mH	
1 000 Hz	100 mH	0.12 mH	
10 kHz	100 mH	0.13 mH	
Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type B ^{FO}	250 °C to 350 °C	0.95 °C	Ectron 1140A GIDEP
	350 °C to 445 °C	0.74 °C	
	445 °C to 580 °C	0.58 °C	
	580 °C to 750 °C	0.45 °C	
	750 °C to 1 000 °C	0.37 °C	
	1 000 °C to 1 820 °C	0.17 °C	
Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type E ^{FO}	-270 °C to -245 °C	1.2 °C	
	-245 °C to -195 °C	0.18 °C	
	-195 °C to -155 °C	0.1 °C	
	-155 °C to -90 °C	0.08 °C	
	-90 °C to 15 °C	0.07 °C	
	15 °C to 890 °C	0.06 °C	
	890 °C to 1 000 °C	0.07 °C	
Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type J ^{FO}	-210 °C to -180 °C	0.12 °C	
	-180 °C to -120 °C	0.1 °C	
	-120 °C to -50 °C	0.08 °C	
	990 °C to 1 200 °C	0.07 °C	



Certificate of Accreditation: Supplement

Accuserve, Inc.

16415 Northcross Drive, Suite A, Huntersville, NC 28078
 Contact Name: Michael Griffith Phone: (704) 535-0100

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

Electrical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type K ^{FO}	-270 °C to -255 °C	2.2 °C	Ectron 1140A GIDEP
	-225 °C to -195 °C	0.7 °C	
	-195 °C to 115 °C	0.12 °C	
	-115 °C to -55 °C	0.09 °C	
	-55 °C to 1 000 °C	0.07 °C	
	1 000 °C to 1 372 °C	0.08 °C	
Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type N ^{FO}	-270 °C to -260 °C	5 °C	
	-260 °C to -200 °C	1 °C	
	-200 °C to -140 °C	0.23 °C	
	-140 °C to -70 °C	0.15 °C	
	-70 °C to 25 °C	0.12 °C	
	25 °C to 160 °C	0.1 °C	
	160 °C to 1 300 °C	0.09 °C	
Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type R ^{FO}	-50 °C to -30 °C	0.65 °C	
	-30 °C to 45 °C	0.55 °C	
	45 °C to 160 °C	0.4 °C	
	160 °C to 380 °C	0.3 °C	
	380 °C to 775 °C	0.26 °C	
	775 °C to 1 768.1 °C	0.22 °C	
Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type S ^{FO}	-50 °C to -30 °C	0.62 °C	
	-30 °C to 45 °C	0.56 °C	
	45 °C to 105 °C	0.4 °C	
	105 °C to 310 °C	0.33 °C	
	310 °C to 615 °C	0.29 °C	
	615 °C to 1 768.1 °C	0.26 °C	
Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type T ^{FO}	-270 °C to -255 °C	1.8 °C	
	-255 °C to -240 °C	0.49 °C	
	-240 °C to -210 °C	0.3 °C	
	-210 °C to -150 °C	0.18 °C	
	-150 °C to -40 °C	0.12 °C	
	-40 °C to 100 °C	0.08 °C	
	100 °C to 400 °C	0.07 °C	



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MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Temperature Calibration, Equipment to Measure RTD Type Pt 385, 100 Ω ^{FO}	-200 °C to -80 °C	0.05 °C	Fluke 5500A GIDEP
	-80 °C to 0 °C	0.05 °C	
	Up to 100 °C	0.07 °C	
	100 °C to 300 °C	0.09 °C	
	300 °C to 400 °C	0.1 °C	
	400 °C to 630 °C	0.12 °C	
	630 °C to 800 °C	0.23 °C	
Oscilloscope – Amplitude Flatness ^{FO}	50 kHz to 350 MHz	1 dB at 0 dB	Transmille 3041A GIDEP
	350 Mhz to 990 Mhz	1 dB at 0 dB	HP 8656B GIDEP
Oscilloscope – Amplitude Vpp (1 Mohm output impedance) ^{FO}	2 mV to 50 V/div	0.01 % + 20 uV	Transmille 3041A GIDEP
Oscilloscope – time markers in a 1,2,5 sequence ^{FO}	2 ns to 5 s/div	0.01 % of reading	Transmille 3041A GIDEP

Mass, Force, and Weighing Devices

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Analytical Balances ^{FO}	50 g to 500 g	$(4.44 \times 10^{-4} + 3 \times 10^{-6}Wt)$ g	Class 1 Weights ASTM 898-88
Electronic Balances ^{FO}	50 g to 2 000 g	$(1.15 \times 10^{-2} + 1 \times 10^{-6}Wt)$ g	



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Mechanical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Pressure ^{FO} (Gage)	0 kPa to 6.89 kPa (0 psi to 1 psi)	0.024 kPa (0.003 5 psi)	Fluke 700P22 GIDEP
	0 kPa to 68.947 kPa (0 psi to 10 psi)	0.093 kPa (0.013 5 psi)	Druck DPI 610 w/ PDCR 2200-A145 GIDEP
	0 kPa to 2 068 kPa (0 psi to 300 psi)	0.56 kPa (0.081 psi)	Druck DPI 611 GIDEP
	0 kPa to 6 894 kPa (0 psi to 1 000 psi)	3.5 kPa (0.5 psi)	Fluke 700P08 GIDEP
	0 kPa to 34 473 kPa (0 psi to 5 000 psi)	28 kPa (4 psi)	Fluke 700P30 GIDEP
Vacuum ^{FO}	-755 mmHg to -2.5 mmHg (-29.72 inHg to -0.098 inHg)	4.1 mmHg (0.16 inHg)	Druck DPI 611 GIDEP
Torque Tools ^{FO}	2.825 N•m to 28.25 N•m (25 lbf•in to 250 lbf•in)	0.28 N•m 2.5 lbf•in	Mountz BMX250I GIDEP
	33.9 N•m to 339 N•m (25 lbf•ft to 250 lbf•ft)	3.5 N•m 2.6 lbf•ft	Mountz BMX250F GIDEP
Torque Tools ^{FO}	.28 Nm to 2.8 Nm	0.028 Nm	AWS QCI-25 GIDEP

Thermodynamic

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Equipment to Measure RH ^{FO} (Fixed points)	11.3 % RH	1.3 % RH	Vaisala 19729HM, GIDEP
	75 % RH	1.5 % RH	Vaisala 19731HM GIDEP
	97 % RH	2 % RH	Vaisala 19732HM GIDEP
Equipment to Output RH ^{FO}	10 % RH to 90 % RH	1.2 % RH	Vaisala HMI41 w/ HMP46 GIDEP
Temperature Infrared Thermometer ^{FO}	50 °C to 500 °C	2 °C	Fluke 9132 GIDEP
Equipment to measure temperature ^{FO}	-20 C to 0 C	0.026 C	Additel ADT282 w/ Accumac AM1751 GIDEP
	Up to 420 C	0.046 C	
	420 C to 670 C	0.067 C	



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Time & Frequency

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Stopwatches and Timers ^{FO}	5 min to 180 min	0.098 s	Hewlett Packard 53181A NIST-SP-960-12 GIDEP
Tachometers, Mechanical ^{FO}	575 rpm to 3 500 rpm	0.4 rpm	Automation Direct CCT-AN-A120 Counter GIDEP
Tachometers, Photo ^{FO}	60 rpm to 100 000 rpm	1.2 rpm	Fluke 5500A GIDEP

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