



# CERTIFICATE OF ACCREDITATION

## ANSI-ASQ National Accreditation Board

500 Montgomery Street, Suite 625, Alexandria, VA 22314, 877-344-3044

This is to certify that

**Bravo Technical Services, Inc.**

**130 Johnson Drive**

**Terre Haute, IN 47802**

has been assessed by ANAB  
and meets the requirements of international standard

**ISO/IEC 17025:2005**

and national standard

**ANSI/NCSL Z540-1-1994 (R2002)**

while demonstrating technical competence in the field of

**CALIBRATION**

Refer to the accompanying Scope of Accreditation for information regarding the types of calibrations to which this accreditation applies.

AC-1300

Certificate Number

  
ANAB Approval

Certificate Valid: 11/28/2018-01/04/2020  
Version No. 005 Issued: 11/28/2018



This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. 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 17025:2005  
AND ANSI/NCSL Z540-1-1994 (R2002)**

**Bravo Technical Services, Inc.**

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Terre Haute, IN 47802

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**CALIBRATION**

Valid to: **January 4, 2020**

Certificate Number: **AC-1300**

**Electrical – DC/Low Frequency**

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Voltage - Source	Up to 330 mV 330 mV to 3.3 V (3.3 to 33) V (33 to 330) V 330 V to 1 kV	17 $\mu$ V 0.2 mV 2.3 mV 24 mV 52 mV	Fluke 5520A Multi Product Calibrator
DC Current - Source	Up to 330 $\mu$ A 330 $\mu$ A to 3.3 mA (3.3 to 33) mA 33 mA to 1.1 A (1.1 to 3) A	0.19 $\mu$ A 2.2 $\mu$ A 25 $\mu$ A 0.4 mA 1.3 mA	Fluke 5520A Product Calibrator
AC Voltage - Source	(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	71 $\mu$ V 68 $\mu$ V 69 $\mu$ V 76 $\mu$ V 0.42 mV 1.2 mV 1.3 mV 40 mV 0.55 mV 0.56 mV 1.5 mV 9.9 mV	Fluke 5520A Product Calibrator



Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage - Source	330 mV to 3.3 V		Fluke 5520A Product Calibrator
	(10 to 45) Hz	13 mV	
	45 Hz to 10 kHz	9 mV	
	(10 to 20) kHz	8.9 mV	
	(20 to 50) kHz	9.9 mV	
	(50 to 100) kHz	17 mV	
	(100 to 500) kHz	99 mV	
	(3.3 to 33) V		
	(10 to 45) Hz	0.15 V	
	45 Hz to 10 kHz	80 mV	
	(10 to 20) kHz	90 mV	
	(20 to 50) kHz	90 mV	
	(50 to 100) kHz	0.14 V	
	(33 to 330) V		
	10 Hz to 1 kHz	0.54 V	
	(1 to 10) kHz	0.64 V	
	(10 to 20) kHz	0.78 V	
	(20 to 50) kHz	0.93 V	
(50 to 100) kHz	2 V		
330 V to 1.02 kV			
(10 to 45) Hz	2.5 V		
45 Hz to 1 kHz	1.1 V		
(1 to 5) kHz	1.3 V		
(5 to 8) kHz	1.3 V		
AC Current - Source	(33 to 330) $\mu$ A		Fluke 5520A Product Calibrator
	(10 to 20) Hz	1.9 $\mu$ A	
	(20 to 45) Hz	1.5 $\mu$ A	
	45 Hz to 1 kHz	1.2 $\mu$ A	
	(1 to 5) kHz	2.7 $\mu$ A	
	(5 to 10) kHz	3.4 $\mu$ A	
	(10 to 30) kHz	13 $\mu$ A	
	330 $\mu$ A to 3.3 mA		
	(10 to 20) Hz	20 $\mu$ A	
	(20 to 45) Hz	15 $\mu$ A	
	45 Hz to 1 kHz	8.8 $\mu$ A	
	(1 to 5) kHz	9.5 $\mu$ A	
(5 to 10) kHz	23 $\mu$ A		
(10 to 30) kHz	29 $\mu$ A		



Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Current - Source	(3.3 to 33) mA		Fluke 5520A Product Calibrator
	(10 to 20) Hz	0.18 mA	
	(20 to 45) Hz	0.16 mA	
	45 Hz to 1 kHz	86 $\mu$ A	
	(1 to 5) kHz	0.21 $\mu$ A	
	(5 to 10) kHz	0.21 mA	
	(10 to 30) kHz	0.23 mA	
	(33 to 330) mA		
	(10 to 20) Hz	1.9 mA	
	(20 to 45) Hz	1.9 mA	
	45 Hz to 1 kHz	1.3 mA	
	(1 to 5) kHz	1.3 mA	
	(5 to 10) kHz	17 mA	
	(10 to 30) kHz	14 mA	
	330 mA to 3 A		
(10 to 45) Hz	5.1 mA		
45 Hz to 1 kHz	4.2 mA		
(1 to 5) kHz	10 mA		
(5 to 10) kHz	27 mA		
Resistance - Source	Up to 11 $\Omega$	8.2 m $\Omega$	Fluke 5520A Product Calibrator
	(11 to 33) $\Omega$	14 m $\Omega$	
	(33 to 110) $\Omega$	18 m $\Omega$	
	(110 to 330) $\Omega$	38 m $\Omega$	
	330 $\Omega$ to 1.1 k $\Omega$	84 m $\Omega$	
	(1.1 to 3.3) k $\Omega$	0.38 $\Omega$	
	(3.3 to 11) k $\Omega$	1.1 $\Omega$	
	(11 to 33) k $\Omega$	5 $\Omega$	
	(33 to 110) k $\Omega$	13 $\Omega$	
	(3.3 to 11) k $\Omega$	76 $\Omega$	
	330 k $\Omega$ to 1.1 M $\Omega$	0.22 k $\Omega$	
	(1.1 to 3.3) M $\Omega$	3.8 k $\Omega$	
	(3.3 to 11) M $\Omega$	13 k $\Omega$	
	(11 to 33) M $\Omega$	0.73 M $\Omega$	
	(33 to 110) M $\Omega$	2.6 M $\Omega$	
DC Voltage - Measure	Up to 200 mV	11 $\mu$ V	Keithley 2001 Multimeter
	200 mV to 2 V	64 $\mu$ V	
	(2 to 20) V	0.67 mV	
	(20 to 200) V	9.5 mV	
	200 V to 1 kV	57 mV	



Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Current - Measure	Up to 200 $\mu$ A	0.13 $\mu$ A	Keithley 2001 Multimeter
	200 $\mu$ A to 2 mA	0.12 $\mu$ A	
	(2 to 20) mA	9.4 $\mu$ A	
	(20 to 200) mA	0.12 mA	
	200 mA to 2 A	2.2 mA	
AC Voltage - Measure	Up to 200 mV		Keithley 2001 Multimeter
	(20 to 50) Hz	0.59 mV	
	(50 to 100) Hz	0.6 mV	
	100 Hz to 2 kHz	0.15 mV	
	(2 to 10) kHz	0.15 mV	
	(10 to 30) kHz	0.16 mV	
	(30 to 50) kHz	0.18 mV	
	(50 to 100) kHz	0.73 mV	
	(100 to 200) kHz	1.8 mV	
	200 mV to 2 V		
	(20 to 50) Hz	5.9 mV	
	(50 to 100) Hz	1.8 mV	
	100 Hz to 2 kHz	1.5 mV	
	(2 to 10) kHz	1.5 mV	
	(10 to 30) kHz	1.6 mV	
	(30 to 50) kHz	1.8 mV	
	(50 to 100) kHz	7.1 mV	
	(100 to 200) kHz	18 mV	
	(2 to 20) V		
	(20 to 50) Hz	59 mV	
	(50 to 100) Hz	22 mV	
	100 Hz to 2 kHz	17 mV	
	(2 to 10) kHz	23 mV	
	(10 to 30) kHz	31 mV	
	(30 to 50) kHz	40 mV	
	(50 to 100) kHz	71 $\mu$ V	
(20 to 200) V			
(20 to 50) Hz	0.59 V		
50 Hz to 2 kHz	0.17 V		
(2 to 10) kHz	0.26 V		
(10 to 30) kHz	0.31 V		
(30 to 50) kHz	0.33 V		
(50 to 100) kHz	0.77 V		

**Electrical – DC/Low Frequency**

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage - Measure	(200 to 750) V (50 to 100) Hz 100 Hz to 2 kHz (2 to 10) kHz	2.5 V 1.1 V 2.1 V	Keithley 2001 Multimeter
AC Current - Measure	Up to 200 $\mu$ A (20 to 50) Hz (50 to 200) Hz 200 Hz to 1 kHz (1 to 10) kHz 200 $\mu$ A to 2 mA (20 to 50) Hz (50 to 200) Hz 200 Hz to 1 kHz (1 to 10) kHz (2 to 20) mA (20 to 50) Hz (50 to 200) Hz 200 Hz to 1 kHz (1 to 10) kHz (20 to 200) mA (20 to 50) Hz (50 to 200) Hz 200 Hz to 1 kHz (1 to 10) kHz 200 mA to 2 A (20 to 50) Hz (50 to 200) Hz 200 Hz to 1 kHz (1 to 10) kHz	0.87 $\mu$ A 0.56 $\mu$ A 0.96 $\mu$ A 1.8 $\mu$ A 7.2 $\mu$ A 4 $\mu$ A 3.6 $\mu$ A 8.2 $\mu$ A 71 $\mu$ A 0.35 $\mu$ A 31 $\mu$ A 44 $\mu$ A 0.71 mA 0.38 mA 0.33 mA 0.53 mA 8.6 mA 5 mA 7.2 mA 43 mA	Keithley 2001 Multimeter
DC Resistance – Measure	Up to 20 $\Omega$ (20 to 200) $\Omega$ 200 $\Omega$ to 2 k $\Omega$ (2 to 20) k $\Omega$ (20 to 200) k $\Omega$ 200 k $\Omega$ to 2 M $\Omega$ (2 to 20) M $\Omega$ (20 to 200) M $\Omega$	12 m $\Omega$ 8.2 m $\Omega$ 74 m $\Omega$ 1.3 $\Omega$ 16 $\Omega$ 0.28 k $\Omega$ 12 k $\Omega$ 2.5 M $\Omega$	Keithley 2001 Multimeter

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 all parameters, 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-1300.



Vice President

