

ISO/IEC 17025 Calibration Certificate



201 Wolf Drive • P.O. Box 87 • Thorofare, NJ 08086-0087 • Phone: 856-686-1600 • Fax: 856-686-1601 • www.troemner.com • e-mail: troemner@troemner.com

SECTION 1: CUSTOMER INFORMATION

End User
Troemner
201 Wolf Drive
Thorofare, NJ 08086

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Electrical Calibration
Certificate Number: 12345-ELEC
Date of Calibration: 07-Feb-2017
Next Due Date: 28-Feb-2018

SECTION 2: CERTIFICATE INFORMATION

Description of Device: Fluke 189 DMM
Serial Number: 93900835
Instrument ID:

Date Received: 07-Feb-2017
Date of Issue: 08-Feb-2017
Order Number: 12345

SECTION 3: ENVIRONMENTAL CONDITIONS DURING TEST

Temperature: 21.6 °C Humidity: 44 %RH

SECTION 4: STANDARD INFORMATION

<u>Asset #</u>	<u>Description</u>	<u>Due Date</u>
TR5520A-01	Fluke 5520A Multi-Product Calibrator	01-Dec-2017

SECTION 5: GENERAL INFORMATION

This calibration was performed in Troemner's Certification Laboratory at 201 Wolf Drive, Thorofare, NJ 08086. The calibration certificate documents traceability to national standards for the realization of the units of Measurement according to the International System of Units (SI). The certificate of calibration only applies to the device identified. The device has been calibrated in accordance with Troemner calibration procedures (ECP-CAL). This calibration also meets specifications as outlined in ISO/IEC 17025 and ANSI/NCSL Z540-1-1994. **UNCERTAINTY**- The error in assignment of the actual electrical value due to the measurement process. Uncertainty is calculated per NIST Technical note 1297 using a coverage factor of k = 2 (k = 2 defines a interval having a level of confidence of approximately 95 percent).

APPROVED SIGNATORY

Lynn Dickerson 

PERSON PERFORMING WORK

Dave Peacock

SECTION 6: AS FOUND/AS LEFT CALIBRATION RESULTS

<u>Test Description</u>	<u>Test Result</u>	<u>Lower Limit</u>	<u>Upper Limit</u>	<u>Units</u>	<u>Result</u>	<u>Uncertainty</u>
Current Time is: 10:33:52						
Serial Number: 0093900835						
Firmware Level: V2.02						
DISPLAY TEST						
Result of Operator Evaluation					Pass	
BACKLIGHT TEST						
					Pass	
CURRENT JACK SENSING TEST						
Beeper Silent: Non-Current Functions					Pass	
Beeper Audible: Current Function					Pass	
KEYPAD PUSHBUTTON TESTS						
					Pass	

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AC VOLTS TEST						
5 V Range						
0.2500 V @ 100 kHz	0.2493	0.2260	0.2740	V	Pass	2.8e-004 V
5.0000 V @ 20 kHz	4.9986	4.9210	5.0790	V	Pass	1.4e-003 V
5.0000 V @ 100 kHz	5.0100	4.5960	5.4040	V	Pass	4.8e-003 V
50 V Range						
50.000 V @ 700 Hz	50.000	49.760	50.240	V	Pass	9.2e-003 V
50.000 V @ 20 kHz	50.374	49.210	50.790	V	Pass	1.4e-002 V
50.000 V @ 100 kHz	51.067	45.960	54.040	V	Pass	1.2e-001 V
500 V Range						
500.00 V @ 65 Hz	499.49	497.60	502.40	V	Pass	1.2e-001 V
1000 V Range						
500.0 V @ 65 Hz	499.3	494.0	506.0	V	Pass	1.8e-001 V
AC MILLIVOLTS TEST						
50 mV Range						
2.500 mV @ 100 kHz	2.298	2.085	2.915	mV	Pass	1.6e-005 V
50.000 mV @ 20 kHz	48.303	47.210	52.790	mV	Pass	1.8e-005 V
50.000 mV @ 100 kHz	46.209	42.460	57.540	mV	Pass	5.6e-005 V
500 mV Range						
500.00 mV @ 10 kHz	483.14	474.60	525.40	mV	Pass	1.1e-004 V
3000 mV Range						
3000.0 mV @ 20 kHz	2998.7	2951.0	3049.0	mV	Pass	83e-004 V
3000.0 mV @ 100 kHz	3122.5	2756.0	3244.0	mV	Pass	1.7e-003 V
FREQUENCY TEST						
50 kHz Range						
20.000 kHz @ 1 V	20.000	19.998	20.002	kHz	Pass	5.8e-001 Hz
DUTY CYCLE TEST						
30.00 %	30.02	21.82	38.18	%	Pass	1.7e-002 %

DC VOLTS TEST

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5 V Range						
0.0000 V	-0.0001	-0.0010	0.0010	V	Pass	5.8e-005 V
5.0000 V	4.9999	4.9977	5.0023	V	Pass	8.5e-005 V
-5.0000 V	-4.9998	-5.0023	-4.9977	V	Pass	1.2e-004 V
50 V Range						
-50.000 V	-49.997	-50.018	-49.982	V	Pass	1.0e-003 V
500 V Range						
-500.00 V	-499.96	-500.52	-499.48	V	Pass	1.3e-002 V
1000 V Range						
-500.0 V	-500.0	-500.7	-499.3	V	Pass	1.2e-001 V
AC+DC VOLTS TEST						
50 V Range						
50.000 V @ 20 kHz	50.368	48.960	51.040	V	Pass	1.4e-002 V
DC MILLIVOLTS TEST						
50 mV Range						
0.000 mV	-0.001	-0.020	0.020	mV	Pass	1.7e-006 V
50.000 mV	50.001	49.930	50.070	mV	Pass	2.2e-006 V
-50.000 mV	-49.993	-50.070	-49.930	mV	Pass	2.2e-006 V
500 mV Range						
0.00 mV	0.00	-0.02	0.02	mV	Pass	6.0e-006 V
500.00 mV	499.98	499.83	500.17	mV	Pass	8.2e-006 V
3000 mV Range						
2000.0 mV	1999.8	1999.0	2001.0	mV	Pass	6.1e-005 V
-3000.0 mV	-2999.5	-3001.3	-2998.7	mV	Pass	1.3e-004 V
AC+DC MILLIVOLTS TEST						
3000 mV Range						
1000.0 mV @ 20 kHz	998.6	976.0	1024.0	mV	Pass	2.8e-004 V
RESISTANCE TEST						

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Test Description	Test Result	Lower Limit	Upper Limit	Units	Result	Uncertainty
500 Ohm Range						
0.00 Ohm	0.00	-0.10	0.10	Ω	Pass	5.8e-003 Ohm
500.00 Ohm	499.97	499.65	500.35	Ω	Pass	1.8e-002 Ohm
5 kOhm Range						
5.0000 kOhm	4.9998	4.9973	5.0027	k Ω	Pass	1.6e-001 Ohm
50 kOhm Range						
50.0000 kOhm	49.998	49.973	50.027	k Ω	Pass	1.6e+000 Ohm
500 kOhm Range						
500.00 kOhm	499.94	499.73	500.27	k Ω	Pass	1.8e+001 Ohm
5 MOhm Range						
5.0000 MOhm	4.9994	4.9921	5.0079	M Ω	Pass	7.1e+002 Ohm
30 MOhm Range						
30.0000 MOhm	30.001	29.696	30.304	M Ω	Pass	1.1e+004 Ohm
500 MOhm Range						
100.0 MOhm	99.3	89.8	110.2	M Ω	Pass	1.8e+005 Ohm

CONDUCTANCE TEST

50 nS Range						
0.00 nS	0.01	0.00	0.10	nS	Pass	
10.00 nS	10.06	9.80	10.20	nS	Pass	7.1e-012 S

CAPACITANCE TEST

1.1 nF Range						
0.000 nF	0.063	-0.070	0.070	nF	Pass	
110 nF Range						
100.0 nF	100.2	98.5	101.5	nF	Pass	2.8e-010 F
11 μ F Range						
5.00 μ F	5.01	4.90	5.10	μ F	Pass	2.1e-008 F

DIODE TEST

Reading: 1.0100V, Limit: 0.6000V to 1.1000V Pass

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AC MILLIAMPS TEST						
50 mA Range						
2.500 mA @ 1 kHz	2.498	2.461	2.539	mA	Pass	2.5e-006 A
500 mA Range						
329.00 mA @ 10 kHz	328.72	323.96	334.04	mA	Pass	5.9e-004 A
AC MICROAMPS TEST						
500 µA Range						
500.00 µA @ 1 kHz	499.90	496.05	503.95	µA	Pass	5.0e-007 A
5000 µA Range						
1500.0 µA @ 1 kHz	1500.1	1488.2	1511.8	µA	Pass	2.2e-006 A
DC MILLIAMPS TEST						
50 mA Range						
0.000 mA	-0.003	-0.010	0.010	mA	Pass	9.9e-007 A
50.000 mA	49.957	49.915	50.085	mA	Pass	6.2e-006 A
-50.000 mA	-49.957	-50.085	-49.915	mA	Pass	5.8e-006 A
400 mA Range						
-329.00 mA	-328.69	-329.51	-328.49	mA	Pass	6.0e-005 A
DC MICROAMPS TEST						
5000 µA Range						
-5000.0 µA	-5000.0	-5012.7	-4987.3	µA	Pass	5.9e-007 A
500 µA Range						
500.00 µA	500.06	498.55	501.45	µA	Pass	7.8e-008 A
-500.00 µA	-499.85	-501.45	-498.55	µA	Pass	7.8e-008 A
0.00 µA	-0.03	-0.20	0.20	µA	Pass	7.0e-009 A
AC CURRENT TEST						
5 A Range						
0.2500 A @ 1 kHz	0.2501	0.2442	0.2558	A	Pass	3.5e-004 A
0.2500 A @ 20 kHz	0.2605	0.2310	0.2690	A	Pass	9.3e-004 A

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DC CURRENT TEST						
5 A Range						
0.0000 A	-0.0004	-0.0010	0.0010	A	Pass	4.2e-004 A
5.0000 A	4.9996	4.9740	5.0260	A	Pass	2.3e-003 A
-5.0000 A	-4.9998	-5.0260	-4.9740	A	Pass	2.3e-003 A
10 A Range						
-6.000 A	-6.000	-6.032	-5.968	A	Pass	2.8e-003 A
AC CURRENT TEST						
10 A Range						
6.000 A @ 1 kHz	5.994	5.905	6.095	A	Pass	6.3e-003 A
TEMPERATURE: Degrees C						
-10.0 °C	-9.8	-11.1	-8.9	°C	Pass	2.0e-001 °C
0.0 °C	0.0	-1.0	1.0	°C	Pass	1.7e-001 °C
350.0 °C	350.2	345.0	355.0	°C	Pass	2.7e-001 °C

SECTION 7: ADDENDUM

Conductance, capacitance and zero (amps, volts and ohms) are not within our scope of accreditation.

END OF CERTIFICATE