

PO #:

Calibration Report

Certificate Number: 59487



Standard Meter Lab
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**Instrument Identification****Customer:** Standard Meter Lab**Contact Name:** David Hallock**System ID:** 1000086**Model Number:** 189**Manufacturer:** Fluke Electronics**Serial Number:** 91500107**Description:** Multimeter, True RMS, Logging**Property Number:** SML-474**Range:** 4.5 Digit, 50,000 Count Display**Tool Number:** N/A**Certification Information****Calibration Date:** 04/01/2009 **Cycle:** 12 Months**Next Date Due:** 04/01/2010**Type of Service Performed:** Calibration**Instruction Used:** 1584337**Ambient Temperature:** 70.1 Deg F**As Found Condition:** In Tolerance**Relative Humidity:** 39.5 %**As Left Condition:** In Tolerance**Condition:**

Good condition.

Analysis:

Verified accuracy in accordance with the listed calibration procedures.

Technician: Robert S. Ehlers**NIST Traceable Standards Used**

ID#	Manufacturer	Model	Description	Due Date	NIST#
1000001	Fluke Electronics	5440A	Calibrator, Direct Voltage	10/09/2009	57221
1000007	Fluke Electronics	5220A	Amplifier, Transconductance	10/09/2009	57222
1000008	Rotek Instrument Corp.	650	Adapter, High Current	01/29/2010	58415
1000009	Rotek Instrument Corp.	610	Calibrator, Wide Band	01/29/2010	58377
1000020	Fluke Electronics	5450A	Calibrator, Resistance	02/01/2010	54534
1000002	Fluke Electronics	5100B	Calibrator, Multi-Function	04/25/2009	55797
1000024	Fluke Electronics	5200A	Calibrator, AC Voltage	03/30/2010	58714
1000116	Electro Scientific Industries	242D	Precision Resistance Measuring System	03/12/2011	54919
1000045	Arco Electronic	SS-504	Capacitor, Standard	08/02/2009	107253
1000048	Arco Electronic	SS-301	Capacitor, Standard	08/02/2009	107256
1000117	Hewlett Packard	3458A	Multimeter, Rack	01/13/2010	58419
1000078	Fluke Electronics	714	Calibrator, Thermocouple, Frm V1.0	11/04/2009	57856

Standard Meter Lab Inc. certifies that the above listed instrument meets or exceeds all published specifications unless otherwise stated and has been calibrated using standards with accuracies which are traceable to the National Institute of Standards and Technology (NIST). Alternatively, accuracies have been derived from accepted values of natural physical constants, or have been derived by the ratio type of self-calibration techniques. The calibration was performed in compliance with ANSI/NCSL Z540-1-1994 and unless stated otherwise, the expanded measurement uncertainty of the measurement process does not exceed 25% of the tolerance allowed for the individual characteristics measured. It is expressly forbidden for any customer/purchaser to copy a test report prepared by Standard Meter Lab unless the copy is a true and complete representation of the original.

Approval Person: Robert J. Smith - Quality Assurance

Signature:

Date: 04/02/2009

Measurement Information

Parameter	Unit	Setpoint	As Found	As Left	Lower Tol.	Upper Tol.	OT?
Display Test			PASS	PASS			PASS
Backlight Test			PASS	PASS			PASS
Current Terminal Sensing Test			PASS	PASS			PASS
Keypad Test			PASS	PASS			PASS
Temperature Testing (K T/C)	Deg C	-10.0	-10.5	-10.5	-11.1	-8.9	No
Temperature Testing (K T/C)	Deg C	0.0	-0.5	-0.5	-1.0	1.0	No
Temperature Testing (K T/C)	Deg C	350.0	349.9	349.9	345.0	355.0	No
5 V AC Range @ 100 kHz	V AC	0.2500	0.2494	0.2494	0.2260	0.2740	No
5 V AC Range @ 20 kHz	V AC	5.0000	5.0340	5.0340	4.9210	5.0790	No
5 V AC Range @ 100 kHz	V AC	5.0000	5.1230	5.1230	4.5960	5.4040	No
50 V AC Range @ 700 Hz	V AC	50.000	49.988	49.988	49.760	50.240	No
50 V AC Range @ 20 kHz	V AC	50.000	50.331	50.331	49.210	50.790	No
50 V AC Range @ 100 kHz	V AC	50.000	51.231	51.231	45.960	54.040	No
500 V AC Range @ 65 Hz	V AC	500.00	499.30	499.30	497.60	502.40	No
1000 V AC Range @ 65 Hz	V AC	500.0	499.2	499.2	494.0	506.0	No
50 mV AC Range @ 100 kHz	mV AC	2.500	2.290	2.290	2.085	2.915	No
50 mV AC Range @ 20 kHz	mV AC	50.000	48.135	48.135	47.210	52.790	No
50 mV AC Range @ 100 kHz	mV AC	50.000	46.050	46.050	42.460	57.540	No
500 mV AC Range @ 10 kHz	mV AC	500.00	481.56	481.56	474.60	525.40	No
3000 mV AC Range @ 20 kHz	mV AC	3000.0	2995.4	2995.4	2951.0	3049.0	No
3000 mV AC Range @ 100 kHz	mV AC	3000.0	3119.1	3119.1	2756.0	3244.0	No
50 kHz Range @ 1 V AC	KHz	20.000	20.001	20.001	19.998	20.002	No
Duty Cycle 2.2 Vp-p @ 50% SqQ			PASS	PASS			PASS
5 V DC Range (Short)	V DC	0.0000	0.0000	0.0000	-0.0010	0.0010	No
5 V DC Range	V DC	5.0000	4.9993	4.9993	4.9977	5.0023	No
5 V DC Range	V DC	-5.0000	-4.9990	-4.9990	-5.0023	-4.9977	No
50 V DC Range	V DC	-50.000	-49.992	-49.992	-50.018	-49.982	No
500 V DC Range	V DC	-500.00	-499.90	-499.90	-500.52	-499.48	No
1000 V DC Range	V DC	-500.0	-500.0	-500.0	-500.7	-499.3	No
50 V AC&DC Range @ 20 kHz	V AC	50.000	50.323	50.323	48.960	51.040	No
50 mV DC Range	mV DC	0.000	0.013	0.013	-0.020	0.020	No
50 mV DC Range	mV DC	50.000	50.006	50.006	49.930	50.070	No
50 mV DC Range	mV DC	-50.000	-49.984	-49.984	-50.070	-49.930	No
500 mV DC Range	mV DC	0.00	0.01	0.01	-0.02	0.02	No
500 mV DC Range	mV DC	500.00	499.92	499.92	499.83	500.17	No
3000 mV DC Range	mV DC	2000.0	1999.7	1999.7	1999.0	2001.0	No
3000 mV DC Range	mV DC	-3000.0	-2999.5	-2999.5	-3001.3	-2998.7	No
3000 mV AC+DC Rng @ 20 kHz	mV AC	1000.0	999.3	999.3	976.0	1024.0	No
500 Ohm Range (2 Wire Comp)	Ohms	0.00	0.05	0.05	-0.10	0.10	No
500 Ohm Range (2 Wire Comp)	Ohms	500.00	500.14	500.14	499.65	500.35	No
5 kOhm Range (2 Wire Comp)	KOhm	5.0000	5.0009	5.0009	4.9973	5.0027	No
50 kOhm Range (2 Wire Comp)	KOhm	50.000	50.008	50.008	49.973	50.027	No
500 kOhm Range (2 Wire Comp)	KOhm	500.00	500.05	500.05	499.73	500.27	No
5 MOhm Range (2 Wire Comp)	MOhm	1.0000	0.9994	0.9994	0.9921	1.0079	No
30 MOhm Range (2 Wire Comp)	MOhm	10.000	10.017	10.017	9.696	10.304	No
500 MOhm Range (2 Wire Comp)	MOhm	100.0	101.0	101.0	89.8	110.2	No
50 nS Range (Open)	nS	0.00	-0.02	-0.02	-0.10	0.10	No
50 nS Range @ 100 MOhm	nS	10.00	9.97	9.97	9.80	10.20	No
1.100 nF Range (open) <0.070			PASS	PASS			PASS
110.0 nF Range	nF	3.30	3.37	3.37	1.80	4.80	No
11.00 uF Range	uF	0.50	0.50	0.50	0.49	0.51	No
Diode Test, 3.1 V @ 1 kOhm	KOhm	1.0000	1.0031	1.0031	0.9000	1.1000	No
50 mA AC Range @ 1 kHz	mA AC	2.500	2.502	2.502	2.461	2.539	No
500 mA AC Range @ 10 kHz	mA AC	329.00	329.01	329.01	323.96	334.04	No
500 uA AC Range @ 1 kHz	uA AC	500.00	499.95	499.95	496.05	503.95	No
5000 uA AC Range @ 1 kHz	uA AC	1500.0	1501.7	1501.7	1488.2	1511.8	No
50 mA DC Range	mA DC	0.000	-0.007	-0.007	-0.010	0.010	No
50 mA DC Range	mA DC	-50.000	-49.998	-49.998	-50.085	-49.915	No
500 mA DC Range	mA DC	-329.00	-328.99	-328.99	-329.51	-328.49	No
500 uA DC Range	uA DC	500.00	500.05	500.05	498.55	501.45	No
-500 uA DC Range	uA DC	-500.00	-499.62	-499.62	-501.45	-498.55	No
5000 uA DC Range	uA DC	-5000.00	-4998.20	-4998.20	-5012.70	-4987.30	No
500 uA DC Range	uA DC	0.00	0.00	0.00	-0.20	0.20	No
5 A AC Range @ 1 kHz	A AC	0.2500	0.2510	0.2500	0.2442	0.2558	No
5 A AC Range @ 20 kHz	A AC	0.2500	0.2575	0.2575	0.2310	0.2690	No
5 A DC Range	A DC	0.0000	-0.0005	-0.0005	-0.0010	0.0010	No
5 A DC Range	A DC	5.0000	5.0034	5.0034	4.9740	5.0260	No

-5 A DC Range	A DC	-5.0000	-5.0029	-5.0029	-5.0260	-4.9740	No
10 A DC Range	A DC	-6.000	-6.003	-6.003	-6.032	-5.968	No
10 A AC Range @ 1 kHz	A AC	6.000	6.063	6.063	5.905	6.095	No

End of Report