FLUKE ® Everett Service Center

ISO 9001

1420 75th St. SW
Everett, Washington 98203
USA

Calibration Certificate

Description:	DUAL DISPLAY MULTIMETER	**Certificate Number:**	**827543-7733010:1097844694**
Manufacturer:	FLUKE	**Date of Calibration:**	15 October 2004
Model:	45	**Date of Certificate:**	15 October 2004
Serial Number:	7733010	**Date Due:**	15 October 2005
Customer Name:		**Procedure Name:**	
STATE OF SOUTH CAROLINA		FLUKE 45: (1 YEAR) RS-232C CAL VER/ALT FLUKE 5520A	
City, State:	COLUMBIA, SC	**Procedure Revision:**	1.1
		Temperature:	23.00 °Celsius
Customer Item ID:	7733010	**Relative Humidity:**	40 %
PO Number:	50625	**Data Type:**	FOUND-LEFT
RMA Number:	3073434	**Test Result:**	PASS

In the attached measurement results, deviation may be expressed with units, *Measured Value (MV) - Nominal Value (NV)* or as a proportion of the nominal value (*(MV-NV)/NV*), expressed without units with a scalar multiplier such as % (0.01), or as a ratio of the units (mW/W, mA/A,mV/V, etc.) Descriptions such as mW/W, mV/V, and others, where used to annotate results or measurement uncertainties, are the preferred replacements for what was historically labeled as "ppm" or parts-per-million and describe the results in that column, unless otherwise noted by units symbols.

The Data type that could be found in this certificate must be interpreted as:

- As Found - Calibration data collected before the unit is adjusted and/or repaired.
- As Left - Calibration data collected after the unit is adjusted and/or repaired.
- As Found/ As Left - Calibration data collected without any adjustment and/or repair performed.

Unless otherwise stated the TUR (Test Uncertainty Ratio) of this calibration is 4:1 or greater.

This Calibration conforms to MIL-STD-45662A and ANSI/NCSL Z540-1-1994(R2002)

Results are reviewed to establish where any measurement results exceeded the manufacturer's specifications.
Measured values greater than the Manufacturer's specification are indicated by "I".

This certificate applies only to the item identified and shall not be reproduced other than in full, without the specific written approval by Fluke Corporation. The user is obliged to have the object recalibrated at appropriate intervals. Calibration certificates without signature are not valid.

Comments:

Long Le
Metrology Technician

Jorge Martins
Technical Manager

Traceability Information

DC Voltage
This calibration was conducted using an unbroken chain of standards to the Voltage Reference standard group, traceable to the Fluke Primary Standards Laboratory, which is traceable to the U.S. representation of the volt, through the internationally accepted value of the Josephson constant Kj=483597.9 GHz/V and a 10 Volt Josephson Array Voltage Standard.

Frequency
This calibration was conducted using an unbroken chain of standards to the GPS-Rubidium Disciplined oscillator frequency standard, traceable to the United States Naval Observatory (USNO), which is traceable to the National Institute of Standards and Technology.

AC Voltage, Resistance, DC Current, AC Current, Capacitance, Inductance, Phase and Temperature
This calibration was conducted using an unbroken chain of standards to the Fluke Primary Standards Laboratory, which is traceable to the National Institute of Standards and Technology.

Humidity
This calibration was conducted using an unbroken chain of standards, traceable to Vaisala Measurement Standards Laboratory Primary Salt calibration bath, which traceability is based on the physical phenomena in which the equilibrium relative humidity values associated with certain saturated salt solutions are known.

Standards Used

Asset #	Instrument Model	Cal Date	Cal Due
10419	FLUKE 5520A CALIBRATOR	30 April 2004	30 October 2004

Calibration Results

Function/Range	Nominal Value	Measured Value	Test Uncertainty Ratio	Manufacturer's Specifications Lower Limit	Manufacturer's Specifications Upper Limit
DIRECT VOLTAGE PERFORMANCE VERIFICATION					
100mV Range					
0.000 mV	0.0000 mV	0.001 mV		-0.006 mV	0.006 mV
90.000 mV	90.0000 mV	90.003 mV		89.971 mV	90.029 mV
1000mV Range					
900.00 mV	900.000 mV	900.02 mV		899.71 mV	900.29 mV
300mV Range					
0.00 mV	0.000 mV	0.00 mV		-0.02 mV	0.02 mV
300.00 mV	300.000 mV	300.01 mV		299.90 mV	300.10 mV
3V Range					
-3.0000 V	-3.00000 V	-3.0000 V		-3.0010 V	-2.9990 V
30V Range					
-30.000 V	-30.0000 V	-30.001 V		-30.010 V	-29.990 V
30.000 V	30.0000 V	30.000 V		29.990 V	30.010 V
300V Range					
-300.00 V	-300.000 V	-300.00 V		-300.10 V	-299.90 V
300.00 V	300.000 V	300.00 V		299.90 V	300.10 V
1000V Range					
-1000.0 V	-1000.00 V	-999.9 V		-1000.5 V	-999.5 V
1000.0 V	1000.00 V	999.9 V		999.5 V	1000.5 V
ALTERNATING VOLTAGE PERFORMANCE VERIFICATION					

FLUKE ®

Certificate Number:
827543-7733010:1097844694

Calibration Date:
15-Oct-04

Calibration Results

Function/Range	Nominal Value	Measured Value	Test Uncertainty Ratio	Manufacturer's Specifications Lower Limit	Manufacturer's Specifications Upper Limit
300mV Range					
0.00 mV	0.000 mV	0.24 mV		-0.75 mV	0.75 mV
15.00 mV @ 1 kHz	15.000 mV	15.09 mV		14.87 mV	15.13 mV
15.00 mV @ 100 kHz	15.000 mV	14.01 mV		13.75 mV	16.25 mV
300.00 mV @ 1 kHz	300.000 mV	300.09 mV		299.30 mV	300.70 mV
300.00 mV @ 100 kHz	300.000 mV	290.02 mV		284.50 mV	315.50 mV
3V Range					
3.0000 V @ 1 kHz	3.00000 V	3.0012 V		2.9930 V	3.0070 V
30V Range					
30.000 V @ 1 kHz	30.0000 V	30.011 V		29.930 V	30.070 V
300V Range					
300.00 V @ 1 kHz	300.000 V	300.08 V		299.30 V	300.70 V
750V Range					
750.0 V @ 1 kHz	750.00 V	750.2 V		747.5 V	752.5 V
DIODE TEST PERFORMANCE VERIFICATION					
0.0000 Ohm	0.00000 V	0.0000 V		-0.0008 V	0.0008 V
0 Ohm	1000000000.0 Ohm	1000000000 Ohms		999999999 Ohms	1000000001 Ohms
RESISTANCE PERFORMANCE VERIFICATION					
300Ohm Range					
0.00 Ohm	0.000 Ohms	0.00 Ohms		0.00 Ohms	0.04 Ohms
190.00 Ohm	190.000 Ohms	190.00 Ohms		189.88 Ohms	190.14 Ohms
3kOhm Range					
0.0000 kOhm	0.00000 kOhms	0.0000 kOhms		0.0000 kOhms	0.0002 kOhms
1.9000 kOhm	1.90000 kOhms	1.9000 kOhms		1.8988 kOhms	1.9012 kOhms
30kOhm Range					
19.000 kOhm	19.0000 kOhms	19.000 kOhms		18.988 kOhms	19.012 kOhms
300kOhm Range					
190.00 kOhm	190.000 kOhms	190.00 kOhms		189.88 kOhms	190.12 kOhms
3MOhm Range					
1.9000 MOhm	1.90000 MOhms	1.9009 MOhms		1.8987 MOhms	1.9013 MOhms
30MOhm Range					
19.000 MOhm	19.0000 MOhms	18.998 MOhms		18.949 MOhms	19.051 MOhms
300MOhm Range					
100.0 MOhm	100.00 MOhms	100.1 MOhms		98.0 MOhms	102.0 MOhms

Calibration Results

Function/Range	Nominal Value	Measured Value	Test Uncertainty Ratio	Manufacturer's Specifications Lower Limit	Manufacturer's Specifications Upper Limit
FREQUENCY PERFORMANCE VERIFICATION					
9.000 kHz @ 1 V	9.0000 kHz	9.000 kHz		8.994 kHz	9.006 kHz
LOW CURRENT PERFORMANCE VERIFICATION					
30mA Range					
30.000 mA	30.0000 mA	30.000 mA		29.982 mA	30.018 mA
30.000 mA @ 1 kHz	30.0000 mA	30.010 mA		29.840 mA	30.160 mA
100mA Range					
100.00 mA	100.000 mA	100.00 mA		99.93 mA	100.07 mA
100.00 mA @ 1 kHz	100.000 mA	100.07 mA		99.40 mA	100.60 mA
HIGH CURRENT PERFORMANCE VERIFICATION					
10A Range					
10.000 A	10.0000 A	10.003 A		9.975 A	10.025 A
10.000 A @ 1 kHz	10.0000 A	10.018 A		9.890 A	10.110 A

End of Report