



Calibration Certificate

Description: DUAL DISPLAY MULTIMETER
Manufacturer: FLUKE
Model: 45
Serial Number: 6351007
Customer Name:
 STATE OF SOUTH CAROLINA
City, State: COLUMBIA, SC
Customer Item ID: 10969
PO Number: 50526
RMA Number: 3062703

Certificate Number: 827543-6351007:1095758116
Date of Calibration: 21 September 2004
Date of Certificate: 21 September 2004
Date Due:
Procedure Name:
 FLUKE 45: (1 YEAR) RS-232C CAL VER/ALT FLUKE 5700A
Procedure Revision: 1.2
Temperature: 23.0°C
Relative Humidity: 45 %
Data Type : AS-FOUND
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:

Glenn Moore
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 $K_j=483597.9 \text{ GHz/V}$ 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
7872	FLUKE 5725A	07 July 2004	07 January 2005
8810	FLUKE 5720A	06 July 2004	06 January 2005

Calibration Results

PARAMETER	TRUE	TEST	ACCEPTANCE LIMITS		TUR
	VALUE	RESULT	LOW	HIGH	
DIRECT VOLTAGE PERFORMANCE VERIFICATION					
100mV Range					
0.000mV		0.000	-0.006	0.006	
90.000mV		90.012	89.971	90.029	
1000mV Range					
900.00mV		900.11	899.71	900.29	
300mV Range					
0.00mV		0.00	-0.02	0.02	
300.00mV		300.04	299.90	300.10	
3V Range					
3.0000V		3.0003	2.9990	3.0010	
-3.0000V		-3.0003	-3.0010	-2.9990	
30V Range					
30.000V		30.004	29.990	30.010	
-30.000V		-30.004	-30.010	-29.990	
300V Range					
300.00V		300.04	299.90	300.10	
-300.00V		-300.03	-300.10	-299.90	
1000V Range					
1000.0V		1000.1	999.5	1000.5	
-1000.0V		-1000.1	-1000.5	-999.5	

DIODE TEST PERFORMANCE VERIFICATION

0.0000V		0.0001	-0.0008	0.0008	
0 Ohm	1000000000.0	1000000000	999999999	1000000001	

ALTERNATING VOLTAGE PERFORMANCE VERIFICATION

Fluke Corporation	Telephone	Facsimile	Internet	Page 2 of 3
1420 75th Street SW, Everett WA 98203 USA	888.993.5853	425.446.6390	www.fluke.com	

Certificate Number:
827543-6351007:1095758116

Rev. 1.4 6/04/2004 (V6)

Calibration Date:
21 September 2004

PARAMETER	TRUE VALUE	TEST RESULT	ACCEPTANCE LIMITS		TUR
			LOW	HIGH	
300mV Range					
0.00mV		0.09	0.00	0.75	
15.00mV @ 1kHz		15.01	14.87	15.13	
15.00mV @ 100kHz		14.04	13.75	16.25	
300.00mV @ 1kHz		300.04	299.30	300.70	
300.00mV @ 100kHz		292.07	284.50	315.50	
3V Range					
3.0000V @ 1kHz		3.0004	2.9930	3.0070	
30V Range					
30.000V @ 1kHz		30.002	29.930	30.070	
300V Range					
300.00V @ 1kHz		300.03	299.30	300.70	
750V Range					
750.0V @ 1kHz		750.2	747.5	752.5	
RESISTANCE PERFORMANCE VERIFICATION					
300 Ω Range					
0.00 Ohm		0.00	0.00	0.04	
190.00 Ohm	189.993	190.12	189.86	190.13	
3k Ω Range					
0.0000K Ohm		0.0002	0.0000	0.0002	
1.9000 kOhm	1.89996	1.9001	1.8988	1.9012	
30k Ω Range					
19.000 kOhm	19.0001	18.999	18.988	19.012	
300k Ω Range					
190.00 kOhm	189.988	189.99	189.87	190.11	
3M Ω Range					
1.9000 MOhm	1.89993	1.8994	1.8986	1.9012	
30M Ω Range					
19.000 MOhm	18.9992	18.992	18.948	19.050	
300M Ω Range					
100.0 MOhm	99.99	100.1	98.0	102.0	
FREQUENCY PERFORMANCE VERIFICATION					
9.000kHz @ 1V		9.000	8.995	9.005	
LOW CURRENT PERFORMANCE VERIFICATION					
30mA Range					
30.000mA		30.005	29.982	30.018	
30.000mA @ 1kHz		30.006	29.840	30.160	
100mA Range					
100.00mA		100.02	99.93	100.07	
100.00mA @ 1kHz		100.01	99.40	100.60	
HIGH CURRENT PERFORMANCE VERIFICATION					
10A Range					
10.000A		9.998	9.975	10.025	
10.000A @ 1kHz		9.997	9.890	10.110	

End of Report

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