

Certificate of Calibration Fluke Park Laboratory

Description:	Precision Multimeter	Certificate Number:	F7555043
Manufacturer:	Fluke	Date of Calibration:	31 May 2018
Model:	8846A	Date Due:	
Serial Number:	4256002	Temperature:	20.0 to 26.0 °C
Status:	As-Left	Relative Humidity:	15 to 70 %RH
		Pressure:	95 to 103 kPa
Calibration:	Full	Issue Date:	31 May 2018
Procedure:	E0X Rev 1.4.0		
Customer:	NEW PRODUCT	RMA/SO Number:	11017
PO Number:	11017		

This calibration is traceable to the SI through recognized national measurement institutes (NIST, PTB, NPL, NIM, NRC, etc.), radiometric techniques, or natural physical constants and is in compliance with ISO/IEC 17025:2005 and ANSI/NCSL Z540.1. The calibration has been completed in accordance with the Fluke Corporate Quality System document QSD 111.0. Calibration certificates without identification of the authorizing person are not valid. This certificate applies to only the item identified and shall not be reproduced other than in full, without the specific written approval by Fluke Corporation.

This calibration certificate may contain data that is not covered by the Scope of Accreditation. The unaccredited test points, where applicable, are indicated by an asterisk (*), or confined to clearly marked sections. This certificate shall not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

Measurement uncertainties at the time of test are given where applicable. They are calculated in accordance with the method described in the ISO Guide to the Expression of Uncertainty in Measurement. The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k such that the coverage probability corresponds to approximately 95 %.

Comments:



FLUKE
Calibration

Cert # : F7555043
Date Cal: 31 May 2018
Date Due:
S/N : 4256002
877-355-3225 www.flukecal.com

Cert: F7555043
Due:
S/N: 4256002

APROVADO	
Responsável:	RENATO
Padrão:	6001 A03 MV
Data:	13/06/2018
Validade:	31/05/2020
Electronically signed by	
Approved Signatory	
Nicholas Mason	
Metrologist	

Standards Used

Fluke 5720A: 12102
 Fluke 5725A: C11957
 Fluke 5520A: C11966

Quality Manuals

This calibration has been completed in accordance with:

The Fluke Corporate Quality Manual, QSD 111.00, Revision 121, Dated July, 2017 and/or

The Fluke 17025 Quality Manual, QSD 111.41, Revision 005, Dated Sept. 2014

APROVADO	
Responsável:	RENATO
Padrão:	GOO1A03 MV
Data:	13/06/2018
Validade:	31/05/2020

The calibration stations listed above are used to calibrate the device listed on page 1. These stations are treated as single devices even though the stations contain multiple instruments. Traceability and uncertainty of the stations is achieved through weekly calibration of the stations using the Fluke Process Metrology Process. A detailed description of the Process Metrology process is available in the paper titled "Maintaining In-Situ Traceability on the Factory Floor with Process Metrology". This paper may be downloaded from www.flukecal.com.

Measurement result deviations 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 %, or as a ratio of the units (mA/A, μ V/V, etc.).

No statement of compliance with specifications is made or implied on this certificate.

DC Voltage Function

Nominal Value Input/Range	Measurement Result	Measurement Error	Expanded Uncertainty	Specification 90 Day
0 V, 100.0 mV	0.0001 mV	0.0001 mV	1.9E-03 mV	0.0035 mV
100.0 mV, 100.0 mV	99.9994 mV	-0.0006 mV	3.2E-03 mV	0.0060 mV
-100.0 mV, 100.0 mV	-99.9988 mV	0.0012 mV	2.8E-03 mV	0.0060 mV
0 V, 1.0 V	0.000002 V	0.000002 V	2.3E-06 V	0.000007 V
1.0 V, 1.0 V	1.000004 V	0.000004 V	3.5E-06 V	0.000025 V
-1.0 V, 1.0 V	-1.000002 V	-0.000002 V	2.9E-06 V	0.000025 V
0.0 V, 10.0 V	0.00000 V	0.00000 V	1.1E-05 V	0.00005 V
5.0 V, 10.0 V	5.00002 V	0.00002 V	1.6E-05 V	0.00014 V
-5.0 V, 10.0 V	-5.00003 V	-0.00003 V	1.3E-05 V	0.00014 V
10.0 V, 10.0 V	10.00003 V	0.00003 V	1.6E-05 V	0.00023 V
-10.0 V, 10.0 V	-10.00005 V	-0.00005 V	1.7E-05 V	0.00023 V
0.0 V, 100.0 V	-0.0001 V	-0.0001 V	2.0E-04 V	0.0006 V
100.0 V, 100.0 V	99.9999 V	-0.0001 V	1.2E-03 V	0.0033 V
-100.0 V, 100.0 V	-100.0003 V	-0.0003 V	1.2E-03 V	0.0033 V
0.0 V, 1.0 kV	-0.001 V	-0.001 V	1.1E-03 V	0.010 V
1000 V, 1000 V	999.994 V	-0.006 V	1.1E-02 V	0.041 V
-1000 V, -1000 V	-1000.002 V	-0.002 V	1.1E-02 V	0.041 V

Ratio Function

Nominal Value Input/Ref. Input	Measurement Result	Measurement Error	Expanded Uncertainty	Specification 90 Day
100.0 mV, 100.0 mV	0.999996	-0.000004	3.6E-05	0.000120
1.0 V, 1.0 V	1.000003	0.000003	3.9E-06	0.000050
-10.0 V, -10.0 V	0.999999	-0.000001	1.2E-05	0.000046

AC Voltage Function

Nominal Value Input/Frequency	Measurement Result	Measurement Error	Expanded Uncertainty	Specification 90 Day
100.0 mV, 10.0 Hz	99.9986 mV	-0.0014 mV	3.5E-02 mV	0.0900 mV
100.0 mV, 20.0 kHz	99.9779 mV	-0.0221 mV	6.8E-03 mV	0.0900 mV
100.0 mV, 50.0 kHz	99.9752 mV	-0.0248 mV	7.1E-03 mV	0.1600 mV

100.0 mV, 100.0 kHz	100.0910 mV	0.0910 mV	1.1E-02 mV	0.6800 mV
100.0 mV, 300.0 kHz	100.5445 mV	0.5445 mV	3.1E-02 mV	4.5000 mV
1.00 V, 10.0 Hz	1.000013 V	0.000013 V	2.9E-04 V	0.000800 V
1.00 V, 20.0 kHz	0.999884 V	-0.000116 V	4.7E-05 V	0.000800 V
1.00 V, 50.0 kHz	0.999896 V	-0.000104 V	5.1E-05 V	0.001600 V
1.00 V, 100.0 kHz	1.001133 V	0.001133 V	8.5E-05 V	0.006800 V
1.00 V, 300.0 kHz	1.007716 V	0.007716 V	6.9E-04 V	0.045000 V
10.0 V, 10.0 Hz	9.99991 V	-0.00009 V	1.0E-03 V	0.00800 V
10.0 V, 20.0 kHz	10.00074 V	0.00074 V	5.6E-04 V	0.00800 V
10.0 V, 50.0 kHz	10.00237 V	0.00237 V	8.9E-04 V	0.01600 V
10.0 V, 100.0 kHz	10.01117 V	0.01117 V	2.7E-03 V	0.06800 V
3.00 V, 300.0 kHz	3.05413 V	0.05413 V	3.6E-03 V	0.17000 V
100.0 V, 45.0 Hz	99.9923 V	-0.0077 V	1.1E-02 V	0.0800 V
100.0 V, 20.0 kHz	100.0102 V	0.0102 V	5.4E-03 V	0.0800 V
100.0 V, 50.0 kHz	100.0312 V	0.0312 V	9.6E-03 V	0.1600 V
100.0 V, 100.0 kHz	100.1418 V	0.1418 V	2.5E-02 V	0.6800 V
1000 V, 45.0 Hz	999.957 V	-0.043 V	1.1E-01 V	0.725 V
1000 V, 1.0 kHz	1000.075 V	0.075 V	7.5E-02 V	0.725 V
1000 V, 10.0 kHz	1000.102 V	0.102 V	4.3E-02 V	0.725 V
320.0 V, 20.0 kHz	319.999 V	-0.001 V	4.6E-02 V	0.385 V
320.0 V, 50.0 kHz	319.910 V	-0.090 V	1.0E-01 V	0.727 V
320.0 V, 100.0 kHz	319.827 V	-0.173 V	3.9E-01 V	2.520 V

AC Frequency Function

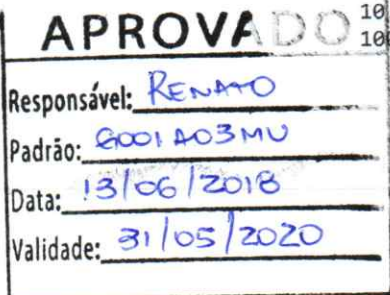
Nominal Value	Measurement	Measurement	Expanded	Specification
Input/Frequency	Result	Error	Uncertainty	90 Day
1.0 V, 10.010 Hz	10.00994 Hz	-0.00006 Hz	2.0E-04 Hz	0.00300 Hz
1.0 V, 40.0 Hz	40.0001 Hz	0.0001 Hz	4.9E-04 Hz	0.0040 Hz
100.0 mV, 300.0 kHz	300.001 kHz	0.001 kHz	9.6E-04 kHz	0.030 kHz
100.0 mV, 1.00 MHz	1000.000 kHz	0.003 kHz	5.1E-03 kHz	0.100 kHz

Resistance Function

Nominal Value	Measurement	Measurement	Expanded	Specification
Input/Range	Result	Error	Uncertainty	90 Day
0 Ω , 10.0 Ω	-0.00005 Ω	-0.00005 Ω	4.2E-04 Ω	0.00300 Ω
10.0 Ω , 10.0 Ω	9.99960 Ω	-0.00040 Ω	4.2E-04 Ω	0.00380 Ω
0 Ω , 100.0 Ω	-0.0008 Ω	-0.0008 Ω	2.4E-03 Ω	0.0040 Ω
100.0 Ω , 100.0 Ω	99.9980 Ω	-0.0020 Ω	2.5E-03 Ω	0.0120 Ω
0 Ω , 1.0 k Ω	-0.000003 k Ω	-0.000003 k Ω	2.6E-06 k Ω	0.000010 k Ω
1.00 k Ω , 1.0 k Ω	0.999991 k Ω	-0.000009 k Ω	1.3E-05 k Ω	0.000090 k Ω
0 Ω , 10.0 k Ω	-0.00003 k Ω	-0.00003 k Ω	2.5E-05 k Ω	0.00010 k Ω
10.0 k Ω , 10.0 k Ω	9.99978 k Ω	-0.00022 k Ω	1.4E-04 k Ω	0.00090 k Ω
0 Ω , 100.0 k Ω	-0.0003 k Ω	-0.0003 k Ω	2.5E-04 k Ω	0.0010 k Ω
100.0 k Ω , 100.0 k Ω	99.9987 k Ω	-0.0013 k Ω	1.4E-03 k Ω	0.0090 k Ω
0 Ω , 1.0 M Ω	0.000000 M Ω	0.000000 M Ω	1.5E-06 M Ω	0.000010 M Ω
1.0 M Ω , 1.0 M Ω	0.999996 M Ω	-0.000004 M Ω	1.2E-05 M Ω	0.000090 M Ω
0 Ω , 10.0 M Ω	0.00000 M Ω	0.00000 M Ω	9.3E-06 M Ω	0.00010 M Ω
10.0 M Ω , 10.0 M Ω	10.00002 M Ω	0.00002 M Ω	2.2E-04 M Ω	0.00210 M Ω
0 Ω , 100.0 M Ω	0.0000 M Ω	0.0000 M Ω	5.9E-05 M Ω	0.0100 M Ω
100.0 M Ω , 100.0 M Ω	99.9666 M Ω	-0.0334 M Ω	4.3E-02 M Ω	0.8100 M Ω
0 Ω , 1.0 G Ω	0.000000 G Ω	0.000000 G Ω	5.8E-07 G Ω	0.000100 G Ω
1.00 G Ω , 1.0 G Ω	0.994808 G Ω	-0.005192 G Ω	4.7E-03 G Ω	0.015100 G Ω

Capacitance Function

Nominal Value	Measurement	Measurement	Expanded	Specification
Input	Result	Error	Uncertainty	90 Day
0 F	0.006 nF	0.006 nF	3.4E-03 nF	0.025 nF
1.00 nF	1.021 nF	0.021 nF	1.7E-02 nF	0.045 nF
10.0 nF	10.03 nF	0.03 nF	2.7E-02 nF	0.15 nF
100.0 nF	100.0 nF	0.0 nF	2.4E-01 nF	1.5 nF
1.00 μ F	1.000 μ F	0.000 μ F	2.3E-03 μ F	0.015 μ F
10.0 μ F	10.00 μ F	0.00 μ F	2.4E-02 μ F	0.15 μ F
100.0 μ F	100.0 μ F	0.0 μ F	3.5E-01 μ F	1.5 μ F
1.00 mF	1.000 mF	0.000 mF	3.7E-03 mF	0.015 mF
10.0 mF	10.03 mF	0.03 mF	3.9E-02 mF	0.15 mF
100.0 mF	100.8 mF	0.8 mF	1.1 mF	4.2 mF



DC Current Function

Nominal Value Input/Range	Measurement Result	Measurement Error	Expanded Uncertainty	Specification 90 Day
0 A, 100.0 μ A	-0.0050 μ A	-0.0050 μ A	1.3E-02 μ A	0.0250 μ A
100.0 μ A, 100.0 μ A	99.9750 μ A	-0.0250 μ A	1.2E-02 μ A	0.0650 μ A
-100.0 μ A, 100.0 μ A	-100.0231 μ A	-0.0231 μ A	1.4E-02 μ A	0.0650 μ A
0 A, 1.0 mA	-0.000015 mA	-0.000015 mA	1.7E-05 mA	0.000050 mA
1.00 mA, 1.0 mA	1.000013 mA	0.000013 mA	2.5E-05 mA	0.000350 mA
-1.00 mA, 1.0 mA	-1.000021 mA	-0.000021 mA	3.2E-05 mA	0.000350 mA
0 A, 10.0 mA	-0.00061 mA	-0.00061 mA	1.0E-03 mA	0.00200 mA
10.0 mA, 10.0 mA	10.00008 mA	0.00008 mA	1.3E-03 mA	0.00500 mA
-10.0 mA, 10.0 mA	-9.99924 mA	0.00076 mA	1.4E-03 mA	0.00500 mA
0 A, 100.0 mA	-0.0002 mA	-0.0002 mA	1.7E-03 mA	0.0050 mA
100.0 mA, 100.0 mA	100.0021 mA	0.0021 mA	4.2E-03 mA	0.0350 mA
-100.0 mA, 100.0 mA	-100.0033 mA	-0.0033 mA	4.0E-03 mA	0.0350 mA
0 A, 400.0 mA	0.000 mA	0.000 mA	2.7E-03 mA	0.020 mA
400.0 mA, 400.0 mA	399.998 mA	-0.002 mA	4.4E-02 mA	0.180 mA
-400.0 mA, 400.0 mA	-399.986 mA	0.014 mA	4.2E-02 mA	0.180 mA
0 A, 1.0 A	-0.000061 A	-0.000061 A	1.3E-04 A	0.000200 A
1.0 A, 1.0 A	0.999936 A	-0.000064 A	1.3E-04 A	0.000600 A
-1.0 A, 1.0 A	-1.000093 A	-0.000093 A	1.8E-04 A	0.000600 A
0 A, 3.0 A	-0.00008 A	-0.00008 A	1.7E-04 A	0.00060 A
1.9000 A, 3.0 A	1.90010 A	0.00010 A	2.9E-04 A	0.00212 A
-1.9000 A, 3.0 A	-1.90002 A	-0.00002 A	2.8E-04 A	0.00212 A
0.0000 A, 10.0 A	-0.00009 A	-0.00009 A	1.9E-04 A	0.00080 A
10.0000 A, 10.0 A	9.99999 A	-0.00001 A	1.0E-03 A	0.01280 A
-10.0000 A, 10.0 A	-10.00062 A	-0.00062 A	1.8E-03 A	0.01280 A

AC Current Function

Nominal Value Input/Frequency	Measurement Result	Measurement Error	Expanded Uncertainty	Specification 90 Day
100.0 μ A, 10 Hz	99.9948 μ A	-0.0052 μ A	4.1E-02 μ A	0.1400 μ A
100.0 μ A, 5000 Hz	99.9856 μ A	-0.0144 μ A	1.3E-02 μ A	0.1400 μ A
100.0 μ A, 10.00 kHz	99.9409 μ A	-0.0591 μ A	1.5E-02 μ A	0.4500 μ A
1.00 mA, 10 Hz	1.000014 mA	0.000014 mA	2.9E-04 mA	0.001400 mA
1.00 mA, 5000 Hz	0.999883 mA	-0.000117 mA	8.7E-05 mA	0.001400 mA
1.00 mA, 10.00 kHz	0.999784 mA	-0.000216 mA	9.6E-05 mA	0.004500 mA
10.0 mA, 10 Hz	10.00061 mA	0.00061 mA	3.0E-03 mA	0.01400 mA
10.0 mA, 5000 Hz	9.99774 mA	-0.00226 mA	9.7E-04 mA	0.01400 mA
10.0 mA, 10.00 kHz	9.99412 mA	-0.00588 mA	1.0E-03 mA	0.04500 mA
100.0 mA, 10 Hz	100.0118 mA	0.0118 mA	3.0E-02 mA	0.1400 mA
100.0 mA, 5000 Hz	100.0131 mA	0.0131 mA	1.4E-02 mA	0.1400 mA
100.0 mA, 10.00 kHz	100.0695 mA	0.0695 mA	2.8E-02 mA	0.4500 mA
329.0 mA, 10 Hz	328.664 mA	-0.336 mA	3.8E-01 mA	0.729 mA
329.0 mA, 1000 Hz	328.926 mA	-0.074 mA	1.2E-01 mA	0.729 mA
329.0 mA, 5000 Hz	328.823 mA	-0.177 mA	3.6E-01 mA	3.458 mA
329.0 mA, 10.00 kHz	328.670 mA	-0.330 mA	1.0 mA	3.458 mA
1.0 A, 45 Hz	0.999973 A	-0.000027 A	2.9E-04 A	0.001400 A
1.0 A, 5000 Hz	0.999701 A	-0.000299 A	1.4E-04 A	0.001400 A
1.0 A, 10.00 kHz	1.000557 A	0.000557 A	3.7E-04 A	0.010500 A
1.90 A, 45 Hz	1.89978 A	-0.00022 A	6.4E-04 A	0.00465 A
1.90 A, 1000 Hz	1.89968 A	-0.00032 A	5.5E-04 A	0.00465 A
1.90 A, 10.00 kHz	1.89983 A	-0.00017 A	1.2E-02 A	0.02765 A
10.0 A, 45 Hz	10.00227 A	0.00227 A	5.1E-03 A	0.02100 A
10.0 A, 1000 Hz	10.00037 A	0.00037 A	3.3E-03 A	0.02100 A

APROVADO

Responsável: RENATO

Padrão: 9001.003 MU

Data: 13/06/2018

Validade: 31/05/2020