

Certificate of Calibration

Certificate Number: EW2396179

Date of Issue: 4/4/2023

Customer Information:

Reclaim Filters & Systems
1129 Hidden Hills Dr
Wake Forest, North Carolina 27587

9192352562

Equipment Information:

Manufacturer: KEYSIGHT
Model: 34470A
Serial Number: MY54701205
Asset Number:
cclD: 154441
Description: Multimeter DMM

Calibration Statistics:

Cal Type: Standard Cal with Data	Recommended Interval: 12 Months
Cal Date: 4/4/2023	Temperature: 23 ± 5 C
Recommended Due: 4/4/2024	Humidity: 20 to 80% RH
Received Condition: No Problem Found	Cal. Procedure: OEM Performance Procedure
Calibration Result: Passed	Applied Specification: Manufacturer's Specifications

Memo: UUT calibrated with initial note of voltage compliance exceeding tolerance in mind, but no value was observed exceeding tolerance for its input range. This includes each power line option.

Measurement Assurance

This instrument has been processed and calibrated in accordance with the Custom Calibration Solutions, LLC Quality Assurance Policies and is traceable to the National Institute of Standards and Technology (NIST). The Custom Calibration Solutions Quality Policies are in conformance with ISO 9001:2015 and ISO 17025:2017 and compliant with ISO 10012-1 and MIL-STD-45662A. This report may not be reproduced, except in full, without written approval of Custom Calibration Solutions. Unless stated otherwise, the expanded measurement uncertainty of the measurement process does not exceed 25% of the tolerance allowed for the individual characteristics measured, uncertainties of measurements for this calibration are based upon 95% (2-sigma) confidence limits, no sampling plan or other process was used for this calibration, the results reported herein apply only to the calibration of the item described above, and no limitations of use apply to the calibrated item. Although the item calibrated meets the specifications and performance at the time of calibration, due to any number of factors, the recommended due date of the item calibrated does not imply continuing conformance to specifications during the recommended interval.

Standards Used to Calibrate Equipment:

Trace ID	Manufacturer:	Model:	Last Cal.	Cal. Due Date	Traceability Number
105939	FLUKE	5520A	3/16/2021	9/16/2023	1324675

Approved: 

Performed By: Michael Priestley



Calibration Report

Keysight Technologies 34470A Digital Multimeter

Customer: Reclaim Filters & Systems
 ID Number: 154441
 Serial Number: MY54701205
 Procedure: KST34470A_REV3
 Work Order: _____

Technician: Michael Priestley
 Calibration Date: 4/3/2023
 Calibration Due Date: 4/3/2024
 Temperature: 25
 Humidity: 25

Section 1 - Front Panel Zero Offset Verification

Front panel input terminals 1 year specifications

Function/Range	Nominal	Lower Limit	As Found	As Left	Upper Limit	Result
DCV / 100.0mV	0.000 uV	-3.500 uV	1.200 uV		3.500 uV	PASS
DCV / 1.000V	0.000 uV	-4.000 uV	0.000 uV		4.000 uV	PASS
DCV / 10.00V	0.000 uV	-40.000 uV	0.000 uV		40.000 uV	PASS
DCV / 100.0V	0.000 uV	-600.000 uV	0.000 uV		600.000 uV	PASS
DCV / 1000V	0.000 mV	-6.000 mV	0.000 mV		6.000 mV	PASS
DCI / 1.00uA	0.000 pA	-50.000 pA	0.000 pA		50.000 pA	PASS
DCI / 10.0uA	0.000 pA	-200.000 pA	0.000 pA		200.000 pA	PASS
DCI / 100.0uA	0.00000 uA	-0.00100 uA	0.00100 uA		0.00100 uA	PASS
DCI / 1.000mA	0.000 uA	-0.050 uA	0.000 uA		0.050 uA	PASS
DCI / 10.00mA	0.000 uA	-2.000 uA	0.000 uA		2.000 uA	PASS
DCI / 100.0mA	0.000 uA	-5.000 uA	0.000 uA		5.000 uA	PASS
DCI / 1.000A	0.000 uA	-100.0 uA	0.0 uA		100.0 uA	PASS
DCI / 3.000A	0.000 uA	-600.0 uA	0.0 uA		600.0 uA	PASS
DCI / 10.000A	0.000 mA	-1.000 mA	0.000 mA		1.000 mA	PASS
OHM4 / 100.0Ω	0.000 mΩ	-4.000 mΩ	0.000 mΩ		4.000 mΩ	PASS
OHM4 / 1.000kΩ	0.000 mΩ	-5.00 mΩ	0.00 mΩ		5.00 mΩ	PASS
OHM4 / 10.00kΩ	0.000 mΩ	-50.0 mΩ	0.0 mΩ		50.0 mΩ	PASS
OHM4 / 100.0kΩ	0.000 mΩ	-500.0 mΩ	0.0 mΩ		500.0 mΩ	PASS
OHM4 / 1.000MΩ	0.000 Ω	-5.000 Ω	0.000 Ω		5.000 Ω	PASS
OHM4 / 10.00MΩ	0.000 Ω	-100.0 Ω	0.0 Ω		100.0 Ω	PASS
OHM2 / 100.0MΩ	0.000 Ω	-1000.0 Ω	0.0 Ω		1000.0 Ω	PASS

Section 2 - Rear Panel Zero Offset Verification

Rear panel input terminals 1 year specifications

Function/Range	Nominal	Lower Limit	As Found	As Left	Upper Limit	Result
DCV / 100.0mV	0.000 uV	-3.500 uV	0.000 uV		3.500 uV	PASS
DCV / 1.000V	0.000 uV	-4.000 uV	0.000 uV		4.000 uV	PASS
DCV / 10.00V	0.000 uV	-40.000 uV	0.000 uV		40.000 uV	PASS

DCV / 100.0V	0.000 uV	-600.000 uV	0.000 uV		600.000 uV	PASS
DCV / 1000V	0.000 mV	-6.000 mV	0.000 mV		6.000 mV	PASS
DCI / 1.0uA	0.000 pA	-50.000 pA	0.000 pA		50.000 pA	PASS
DCI / 10.0uA	0.000 pA	-200.000 pA	0.000 pA		200.000 pA	PASS
DCI / 100.0uA	0.00000 uA	-0.00100 uA	0.00000 uA		0.00100 uA	PASS
DCI / 1.000mA	0.000 uA	-0.050 uA	0.000 uA		0.050 uA	PASS
DCI / 10.00mA	0.000 uA	-2.000 uA	0.000 uA		2.000 uA	PASS
DCI / 100.0mA	0.000 uA	-5.000 uA	0.000 uA		5.000 uA	PASS
DCI / 1.000A	0.000 uA	-100.0 uA	0.0 uA		100.0 uA	PASS
DCI / 3.000A	0.000 uA	-600.0 uA	0.0 uA		600.0 uA	PASS
DCI / 10.000A	0.000 mA	-1.000 mA	0.000 mA		1.000 mA	PASS
OHM4 / 100.0Ω	0.000 mΩ	-4.000 mΩ	0.000 mΩ		4.000 mΩ	PASS
OHM4 / 1.000kΩ	0.000 mΩ	-5.00 mΩ	0.00 mΩ		5.00 mΩ	PASS
OHM4 / 10.00kΩ	0.000 mΩ	-50.0 mΩ	0.0 mΩ		50.0 mΩ	PASS
OHM4 / 100.0kΩ	0.000 mΩ	-500.0 mΩ	0.0 mΩ		500.0 mΩ	PASS
OHM4 / 1.000MΩ	0.000 Ω	-5.000 Ω	0.000 Ω		5.000 Ω	PASS
OHM4 / 10.00MΩ	0.000 Ω	-100.0 Ω	0.0 Ω		100.0 Ω	PASS
OHM2 / 100.0MΩ	0.000 Ω	-1000.0 Ω	0.0 Ω		1000.0 Ω	PASS

Section 3 - DC Voltage Verification**DC Voltage****1 year specifications**

Range	Nominal	Lower Limit	As Found	As Left	Upper Limit	Result
DCV / 100.0mV	100.0000 mV	99.9925 mV	99.9990 mV		100.0075 mV	PASS
DCV / 100.0mV	-100.0000 mV	-100.0075 mV	-99.9950 mV		-99.9925 mV	PASS
DCV / 1.000V	1.000000 V	.999976 V	.999988 V		1.000024 V	PASS
DCV / 1.000V	-1.000000 V	-1.000024 V	-.999990 V		-.999976 V	PASS
DCV / 10.00V	4.00000 V	3.999916 V	3.999980 V		4.000084 V	PASS
DCV / 10.00V	10.00000 V	9.99982 V	9.99996 V		10.00018 V	PASS
DCV / 10.00V	-10.00000 V	-10.00018 V	-10.00000 V		-9.99982 V	PASS
DCV / 100.0V	100.0000 V	99.9956 V	100.0002 V		100.0044 V	PASS
DCV / 100.0V	-100.0000 V	-100.0044 V	-100.0006 V		-99.9956 V	PASS
DCV / 1000V	1000.0000 V	999.9460 V	1000.0074 V		1000.0540 V	PASS
DCV / 1000V	-500.0000 V	-500.0250 V	-500.0050 V		-499.9750 V	PASS

Section 4 - DC Current Verification**DC Current****1 year specifications**

Range	Nominal	Lower Limit	As Found	As Left	Upper Limit	Result
1.000mA	1.000 mA	0.99945 mA	1.00003 mA		1.00055 mA	PASS
10.00mA	10.00000 mA	9.9930 mA	9.9950 mA		10.0070 mA	PASS
100.0mA	100.0000 mA	99.9450 mA	99.9800 mA		100.0550 mA	PASS
1.000A	1.00000 A	.99910 A	.99997 A		1.00090 A	PASS
3.000A	2.00000 A	1.99540 A	2.00002 A		2.00460 A	PASS

High DC Current

10.000A	5.00000 A	4.99300 A	4.99990 A		5.00700 A	PASS
10.000A	10.00000 A	9.97700 A	10.00100 A		10.02300 A	PASS

Section 5 - AC Current Verification**AC Current** **1 year specifications**

Range	Nominal	Lower Limit	As Found	As Left	Upper Limit	Result
100uA @ 1kHz	100.000 uA	99.870 uA	100.025 uA		100.130 uA	PASS
100uA @ 5kHz	100.000 uA	99.870 uA	100.089 uA		100.130 uA	PASS
1.00mA @ 1kHz	1.0000 mA	0.99870 mA	1.00002 mA		1.00130 mA	PASS
1.00mA @ 5kHz	1.0000 mA	0.99870 mA	0.99996 mA		1.00130 mA	PASS
10.0mA @ 1kHz	0.1000 mA	0.0959 mA	0.1000 mA		0.1041 mA	PASS
10.0mA @ 1kHz	1.0000 mA	0.9951 mA	1.0002 mA		1.0049 mA	PASS
10.0mA @ 1kHz	10.0000 mA	9.9870 mA	10.0004 mA		10.0130 mA	PASS
10.0mA @ 5kHz	10.0000 mA	9.9870 mA	9.9998 mA		10.0130 mA	PASS
100mA @ 10 Hz	100.000 mA	99.870 mA	99.977 mA		100.130 mA	PASS
100mA @ 1kHz	100.000 mA	99.870 mA	100.000 mA		100.130 mA	PASS
100mA @ 5kHz	100.000 mA	99.870 mA	99.992 mA		100.130 mA	PASS
1.00A @ 1kHz	1.00000 A	.99870 A	1.00007 A		1.00130 A	PASS
1.00A @ 5kHz	1.00000 A	.99870 A	1.00056 A		1.00130 A	PASS
3.00A @ 1kHz	2.00000 A	1.99420 A	1.99963 A		2.00580 A	PASS
3.00A @ 5kHz	2.00000 A	1.99420 A	2.00000 A		2.00580 A	PASS

High AC Current

10.0A @ 5kHz	10.00000 A	9.97100 A	10.00000 A		10.02900 A	PASS
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Section 6 - AC Voltage Verification**AC Voltage** **1 year specifications**

Range / Freq	Nominal	Lower Limit	As Found	As Left	Upper Limit	Result
100mV / 1.0 kHz	100.0000 mV	99.9300 mV	99.9930 mV		100.0700 mV	PASS
100mV / 50 kHz	100.0000 mV	99.9000 mV	99.9970 mV		100.1000 mV	PASS
100mV / 300 kHz	100.0000 mV	98.9000 mV	99.9390 mV		101.1000 mV	PASS
1V / 1.000 kHz	1.000000 V	.999300 V	1.000000 V		1.000700 V	PASS
1V / 50.00 kHz	1.000000 V	.999000 V	1.000142 V		1.001000 V	PASS
1V / 300.0 kHz	1.000000 V	.989000 V	1.000457 V		1.011000 V	PASS
10V / 1.000 kHz	.030000 V	.028000 V	.02987 V		.03200 V	PASS
10V / 1.000 kHz	1.000000 V	.997500 V	1.00001 V		1.00250 V	PASS
10V / 10.00 Hz	10.00000 V	9.99300 V	9.99939 V		10.00700 V	PASS
10V / 100.0 Hz	10.00000 V	9.99300 V	9.99958 V		10.00700 V	PASS
10V / 20.00 kHz	10.00000 V	9.99300 V	9.99933 V		10.00700 V	PASS
10V / 50.00 kHz	10.00000 V	9.99000 V	9.99935 V		10.01000 V	PASS
10V / 100.0 kHz	10.00000 V	9.98000 V	10.00050 V		10.02000 V	PASS
10V / 300.0 kHz	10.00000 V	9.89000 V	9.99948 V		10.11000 V	PASS
100V / 1.000 kHz	100.0000 V	99.9300 V	99.9957 V		100.0700 V	PASS
100V / 50.00 kHz	100.0000 V	99.9000 V	100.0071 V		100.1000 V	PASS
100V / 300.0 kHz	70.0000 V	69.2000 V	70.0000 V		70.8000 V	PASS
750V / 1.000 kHz	750.000 V	749.025 V	749.983 V		750.975 V	PASS
750V / 50.00 kHz	210.000 V	209.628 V	210.038 V		210.372 V	PASS
750V / 300.0 kHz	70.000 V	68.500 V	69.995 V		71.500 V	PASS

Section 7 - Frequency Verification*Frequency* *1 year specifications*

Input Voltage	Nominal	Lower Limit	As Found	As Left	Upper Limit	Result
100.00 mV	10.0000 Hz	9.9970 Hz	10.0010 Hz		10.0030 Hz	PASS
10.00 mV	300.0000 khz	299.7900 kHz	300.0030 kHz		300.2100 kHz	PASS

Section 8 - 2 Wire Resistance Verification*Two Wire Ohms using Math Null* *1 year specifications*

Range	Nominal	Lower Limit	As Found	As Left	Upper Limit	Result
10.0 M Ω	10.00000	9.99740	10.00060		10.00260	PASS
100.0 M Ω	100.0000	99.6990	100.0300		100.3010	PASS

Section 9 - 4 Wire Resistance Verification*Four Wire Ohms* *1 year specifications*

Range	Nominal	Lower Limit	As Found	As Left	Upper Limit	Result
100.0 Ω	100.0000	99.9900	100.0100		100.0100	PASS
1.000 k Ω	1.000000	.999955	.999996		1.000045	PASS
10.00 k Ω	10.00000	9.99955	9.99985		10.00045	PASS
100.0 k Ω	100.0000	99.9955	100.0000		100.0045	PASS
1.000 M Ω	1.000000	.999925	.999970		1.000075	PASS
10.00 M Ω	10.00000	9.99740	9.99800		10.00260	PASS