

Indiana Standards Laboratory

2919 SHELBY STREET
INDIANAPOLIS, INDIANA 46203-5236

REPORT of CALIBRATION

REISSUED

DATE : 01/12/18 TEST NUMBER : 171025
MANUFACTURER : Agilent Technologies, Inc. MODEL NUMBER : 34410A
NOMENCLATURE : Multimeter SERIAL NUMBER : MY45002507
TOLERANCE : Refer to data

MACHINE NUMBER : 01276
SUBMITTED BY : 7 ca dUbrmBUa Y P.O. NUMBER : 122389
5 XXfYgg
7]Im GtUHY NjdVtXY 7 ci blfm
PROCEDURE : MAN Agilent 3441XA 6th 03-2014 TEMPERATURE : 23 °C
CAL INTERVAL : 12 EOM HUMIDITY : 28 %RH
PREVIOUS TEST NO. : 159856 NEXT CAL DUE : 01/31/19
TECHNICIAN : JWB
RCV'D CONDITION : In-tolerance
RETURNED CONDITION : In-tolerance, no adjustments required.
COMMENTS :

CALIBRATION SOURCE(S) : 157257 161460 168400

UNCERTAINTY: Refer to data

The customer should consider the uncertainty of the measurement in determining compliance.

The reported uncertainty is based on the standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.
Uncertainty is not taken into account in pass / fail function checks.

**TEST UNCERTAINTY
is included at a cost of
\$10 per certificate**

CERTIFICATION

After careful inspection of the above-described instrument, tests were performed in-laboratory to establish calibration accuracy. All equipment utilized in the testing is maintained by this laboratory and checked frequently against standards that have been certified traceable to SI Units through National Institute of Standards and Technology (NIST) or another National Metrology Institute (NMI).

It is hereby certified that the test instrument meets all the original manufacturer's performance specifications for the ranges and functions tested, unless otherwise noted above.

The calibration results indicate the status of the device at the time of calibration. Any number of factors may influence the performance of this device during its calibration interval. It is the responsibility of the user to maintain an adequate calibration interval for this device.

Test documentation is on file and may be viewed in our office. Testing was completed per ISL Quality Manual: Doc-001-Rev18 dated 07-31-16, and ISO/IEC 17025:2005, ANAB Accredited Certificate Number L-2222.

Richard F. Chance



A handwritten signature in black ink that reads 'Richard F. Chance'.

Chief, Metrology

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DATE : 01/12/18

TEST NUMBER : 171025

MANUFACTURER : Agilent Technologies, Inc.

MODEL NUMBER : 34410A

NOMENCLATURE : Multimeter

SERIAL NUMBER : MY45002507

TOLERANCE : Refer to data

TRACE (list of standards used) is included at a cost of \$10 per certificate

CALIBRATION SOURCES

Source	Manufacturer	Nomenclature	Model	Serial	Cal Due
161460	Agilent Technologies, Inc.	Generator, Function	33220A	SG44001544	4/30/2018
157257	Wavetek	Calibrator, Multifunction	4800A	40591	2/28/2018
168400	General Radio Company	Decade, Capacitance	1423-A	466	12/31/2018

Records of DATA collected are included at a cost of \$15 per certificate

CALIBRATION DATA

Test Description						Test Limits			Test Result *		Compliance	
Function / Test	Range	Applied / Nominal	Range Units	Frequency	Setup	Standard Actual	Low Limit	High Limit	As Found / UUT indicated	U _{exp} (k=2)	As Found (Result A)	As Left (Result B)
											10	10
Front Terminals												
DCI	100	open	µA	dc	100 plc	0	-0.0250	0.0250	0.0009	3.7E-04 µA	Pass	Pass
DCI	1.0	open	mA	dc	100 plc	0	-0.000060	0.000060	0.000002	3.7E-06 mA	Pass	Pass
DCI	10	open	mA	dc	100 plc	0	-0.00200	0.00200	0.00012	3.7E-05 mA	Pass	Pass
DCI	100	open	mA	dc	100 plc	0	-0.0050	0.0050	0.0000	3.7E-04 mA	Pass	Pass
DCI	1.0	open	A	dc	100 plc	0	-0.000100	0.000100	0.000001	3.7E-06 A	Pass	Pass
DCI	3.0	open	A	dc	100 plc	0	-0.00060	0.00060	0.00001	3.7E-05 A	Pass	Pass
DCV	100	short	mV	dc	100 plc; AZ on	0	-0.0035	0.0035	-0.0014	5.9E-04 mV	Pass	Pass
DCV	1.0	short	V	dc	100 plc; AZ on	0	-0.000007	0.000007	-0.000002	1.3E-06 V	Pass	Pass
DCV	10	short	V	dc	100 plc; AZ on	0	-0.00005	0.00005	0.00000	1.2E-05 V	Pass	Pass
DCV	100	short	V	dc	100 plc; AZ on	0	-0.0006	0.0006	-0.0001	1.2E-04 V	Pass	Pass
DCV	1000	short	V	dc	100 plc; AZ on	0	-0.006	0.006	0.000	1.2E-03 V	Pass	Pass
4W Ω	100	short	Ω		100 plc	0	-0.0040	0.0040	0.0001	1.6E-04 Ω	Pass	Pass
4W Ω	1.0	short	kΩ		100 plc	0	-0.000010	0.000010	0.000000	1.6E-06 kΩ	Pass	Pass
4W Ω	10	short	kΩ		100 plc	0	-0.00010	0.00010	0.00001	1.6E-05 kΩ	Pass	Pass
4W Ω	100	short	kΩ		100 plc	0	-0.0010	0.0010	0.0001	1.6E-04 kΩ	Pass	Pass
4W Ω	1.0	short	MΩ		100 plc	0	-0.000010	0.000010	0.000000	1.6E-06 MΩ	Pass	Pass
4W Ω	10	short	MΩ		100 plc	0	-0.00010	0.00010	0.00000	1.6E-05 MΩ	Pass	Pass
2W Ω	100	short	MΩ		100 plc	0	-0.0010	0.0010	0.0000	1.6E-04 MΩ	Pass	Pass
Rear Terminals												
DCI	100	open	mA	dc	100 plc; AZ on	0	-0.0050	0.0050	0.0002	1.2E-04 mA	Pass	Pass
DCV	100	short	mV	dc	100 plc; AZ on	0	-0.0035	0.0035	-0.0008	5.9E-04 mV	Pass	Pass
4W Ω	10	short	kΩ		100 plc	0	-0.00010	0.00010	0.00001	1.2E-05 kΩ	Pass	Pass
Notes:	* Unless otherwise noted, results for digital indicating instruments are the UUT indicated value with the nominal stimulus value applied. In cases where the actual standard value deviates from the nominal value, test limits are calculated relative to the actual standard value.											
											171025	

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DATE : 01/12/18

TEST NUMBER : 171025

MANUFACTURER : Agilent Technologies, Inc.

MODEL NUMBER : 34410A

NOMENCLATURE : Multimeter

SERIAL NUMBER : MY45002507

Test Description						Test Limits			Test Result *		Compliance	
Function / Test	Range	Applied / Nominal	Range Units	Frequency	Setup	Standard Actual	Low Limit	High Limit	As Found / UUT indicated	U _{exp} (k=2)	As Found (Result A)	As Left (Result B)
											10	10
DCV	100	100	mV	dc	100 plc; AZ on	100	99.9915	100.0085	99.9972	1.1E-03 mV	Pass	Pass
DCV	100	-100	mV	dc	100 plc; AZ on	-100	-100.0085	-99.9915	-100.0046	1.1E-03 mV	Pass	Pass
DCV	1.0	1	V	dc	100 plc; AZ on	1	0.999958	1.000042	1.000004	8.2E-06 V	Pass	Pass
DCV	10	10	V	dc	100 plc; AZ on	10	9.99965	10.00035	10.00015	7.6E-05 V	Pass	Pass
DCV	10	-10	V	dc	100 plc; AZ on	-10	-10.00035	-9.99965	-10.00016	7.6E-05 V	Pass	Pass
DCV	100	100	V	dc	100 plc; AZ on	100	99.9954	100.0046	100.0007	9.3E-04 V	Pass	Pass
DCV	1000	1000	V	dc	100 plc; AZ on	1000	999.954	1000.046	1000.009	1.1E-02 V	Pass	Pass
DCI	100	100	µA	dc	100 plc	100	99.9250	100.0750	100.0031	1.3E-02 µA	Pass	Pass
DCI	1.0	1	mA	dc	100 plc	1	0.999440	1.000560	1.000054	7.1E-05 mA	Pass	Pass
DCI	10	10	mA	dc	100 plc	10	9.99300	10.00700	10.00062	7.6E-04 mA	Pass	Pass
DCI	100	100	mA	dc	100 plc	100	99.9450	100.0550	100.0047	6.5E-03 mA	Pass	Pass
DCI	1.0	1	A	dc	100 plc	1	0.998900	1.001100	1.000075	1.5E-04 A	Pass	Pass
DCI	3.0	2	A	dc	100 plc	1.999	1.99541	2.00259	1.99919	2.9E-04 A	Pass	Pass
4W Ω	100	100	Ω		100 plc	100.00236	99.9884	100.0164	100.0010	1.8E-03 Ω	Pass	Pass
4W Ω	1.0	1	kΩ		100 plc	1.0000167	0.999907	1.000127	1.000009	1.7E-05 kΩ	Pass	Pass
4W Ω	10	10	kΩ		100 plc	10.000236	9.99914	10.00134	10.00007	1.7E-04 kΩ	Pass	Pass
4W Ω	100	100	kΩ		100 plc	100.00125	99.9903	100.0123	100.0015	1.7E-03 kΩ	Pass	Pass
4W Ω	1.0	1	MΩ		100 plc	1.0000473	0.999917	1.000177	1.000074	4.4E-05 MΩ	Pass	Pass
4W Ω	10	10	MΩ		100 plc	10.000426	9.99633	10.00453	10.00022	9.1E-04 MΩ	Pass	Pass
4W Ω	100	100	MΩ		100 plc	100.01853	99.2174	100.8196	100.0132	1.8E-02 MΩ	Pass	Pass
Freq	100	10 mV	Hz	40 Hz		40	39.72	40.28	40.00	5.8E-03 Hz	Pass	Pass
Freq	10	10 mV	kHz	10 kHz		10	9.9993	10.0007	10.0000	2.4E-04 kHz	Pass	Pass
Capacitance	1.0	1	µF			1	0.9950	1.0050	0.9997	5.9E-04 µF	Pass	Pass
Notes:	* Unless otherwise noted, results for digital indicating instruments are the UUT indicated value with the nominal stimulus value applied. In cases where the actual standard value deviates from the nominal value, test limits are calculated relative to the actual standard value.										171025	

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MODEL NUMBER : 34410A

NOMENCLATURE : Multimeter

SERIAL NUMBER : MY45002507

Test Description						Test Limits			Test Result *		Compliance		
Function / Test	Range	Applied / Nominal	Range Units	Frequency	Setup	Standard Actual	Low Limit	High Limit	As Found / UUT Indicated	U _{exp} (k=2)	As Found (Result A)	As Left (Result B)	
											10	10	
ACV	100	10	mVrms	1 kHz	Slow Filter	10	9.9640	10.0360	9.9987	1.2E-03 %	Pass	Pass	
ACV	100	100	mVrms	1 kHz	Slow Filter	100	99.9100	100.0900	99.9897	3.7E-02 %	Pass	Pass	
ACV	100	100	mVrms	50 kHz	Slow Filter	100	99.8500	100.1500	99.9934	8.9E-02 %	Pass	Pass	
ACV	1.0	1	Vrms	20 Hz	Slow Filter	1	0.999100	1.000900	0.999841	2.0E-04 %	Pass	Pass	
ACV	1.0	1	Vrms	1 kHz	Slow Filter	1	0.999100	1.000900	0.999893	1.0E-04 %	Pass	Pass	
ACV	1.0	1	Vrms	20 kHz	Slow Filter	1	0.999100	1.000900	0.999897	1.0E-04 %	Pass	Pass	
ACV	1.0	1	Vrms	50 kHz	Slow Filter	1	0.998500	1.001500	0.999996	1.8E-04 %	Pass	Pass	
ACV	1.0	1	Vrms	100 kHz	Slow Filter	1	0.995200	1.004800	1.000081	1.8E-04 %	Pass	Pass	
ACV	1.0	1	Vrms	300 kHz	Slow Filter	1	0.983000	1.017000	0.998892	5.3E-04 %	Pass	Pass	
ACV	10	0.1	Vrms	1 kHz	Slow Filter	0.1	0.09694	0.10306	0.09995	3.8E-05 %	Pass	Pass	
ACV	10	1	Vrms	1 kHz	Slow Filter	1	0.99640	1.00360	0.99984	1.0E-04 %	Pass	Pass	
ACV	10	10	Vrms	10 Hz	Slow Filter	10	9.99100	10.00900	9.99740	2.0E-03 %	Pass	Pass	
ACV	10	10	Vrms	1 kHz	Slow Filter	10	9.99100	10.00900	9.99907	1.0E-03 %	Pass	Pass	
ACV	10	10	Vrms	50 kHz	Slow Filter	10	9.98500	10.01500	10.00036	1.8E-03 %	Pass	Pass	
ACV	100	100	Vrms	1 kHz	Slow Filter	100	99.9100	100.0900	99.9903	9.8E-03 %	Pass	Pass	
ACV	100	100	Vrms	50 kHz	Slow Filter	100	99.8500	100.1500	100.0064	3.5E-02 %	Pass	Pass	
ACV	750	750	Vrms	1 kHz	Slow Filter	750	749.325	750.675	749.950	1.6E-01 %	Pass	Pass	
ACV	750	750	Vrms	30 kHz	Slow Filter	750	748.875	751.125	749.971	2.1E-01 %	Pass	Pass	
ACI	100	100	µA	1 kHz	Slow Filter	100	99.8600	100.1400	100.0246	2.2E-02 %	Pass	Pass	
ACI	100	100	µA	5 kHz	Slow Filter	100	99.8600	100.1400	100.0037	4.4E-02 %	Pass	Pass	
ACI	1.0	1	mA	1 kHz	Slow Filter	1	0.998600	1.001400	1.000216	1.8E-04 %	Pass	Pass	
ACI	1.0	1	mA	5 kHz	Slow Filter	1	0.998600	1.001400	1.000132	3.2E-04 %	Pass	Pass	
ACI	10	10	mA	1 kHz	Slow Filter	10	9.98600	10.01400	10.00109	1.8E-03 %	Pass	Pass	
ACI	10	10	mA	5 kHz	Slow Filter	10	9.98600	10.01400	9.99970	3.2E-03 %	Pass	Pass	
ACI	100	100	mA	1 kHz	Slow Filter	100	99.8600	100.1400	100.0176	1.8E-02 %	Pass	Pass	
ACI	100	100	mA	5 kHz	Slow Filter	100	99.8600	100.1400	100.0107	3.2E-02 %	Pass	Pass	
ACI	1.0	1	A	1 kHz	Slow Filter	1	0.998600	1.001400	0.999708	3.7E-04 %	Pass	Pass	
ACI	1.0	1	A	5 kHz	Slow Filter	1	0.998600	1.001400	0.999848	5.7E-04 %	Pass	Pass	
ACI	3.0	2	A	1 kHz	Slow Filter	1.999	1.99581	2.00219	1.99847	7.2E-04 %	Pass	Pass	
ACI	3.0	2	A	5 kHz	Slow Filter	1.999	1.99581	2.00219	1.99927	1.1E-03 %	Pass	Pass	
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