TRIDENT CALIBRATION LABS

ANAB ACCREDITED ISO/IEC 17025 CALIBRATION LABORATORY AC-1986

Calibration Certificate

Certificate #: 169494
Date Printed: 10/28/2021

Customer Information

Customer:
CUSTOMER NAME
CUSTOMER ADDRESS
CITY, STATE, ZIP

Purchase Order : OCT 2021 ONSITE

Equipment Information

Asset :	**MY47068277**	Serial Number:	MY47068277
Description:	DIGITAL MULTIMETER	Model Number:	34401A
Manufacturer:	HEWLETT PACKARD	Cal. Interval:	12 MONTHS
Accuracy:	Manufacturer Specifications		

Event Information

Service Requested:	ACCREDITED 17025	Cal Date:	10/28/2021
Condition Received:	IN TOLERANCE	Cal Due Date:	10/28/2022
Condition Returned:	LEFT AS FOUND	Temp./RH:	24 C / 35 %
Cal Procedure:	KEYSIGHT 34401A SERVICE GUIDE	Technician:	L WILCOX
		QA Approval:	Craig Fink, QA Manager

Calibration Notes:

See attached data readings.

This instrument has been processed and calibrated in accordance with the Trident Calibration Labs Quality Assurance Manual and is traceable to SI units through the National Institute of Standards and Technology (NIST), or other NMI's. The Trident Calibration Labs quality system is ANAB accredited to ISO/IEC 17025:2017 & ANSI/NCSL Z540-1-1994.

ISO/IEC 17025:2017 accredited calibrations are per ANAB certificate # AC-1986 and are within the scope for which the lab is accredited. This report may not be reproduced, except in full, without the written approval of Trident Calibration Labs.

Unless stated otherwise; the expanded measurement uncertainty of the measurement process does not exceed 25% of the tolerance allowed for the individual characteristics measured, the measurement uncertainties for this calibration are based upon approximately 95% (k=2) 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 unit.

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

I.D.	Mfg	Model #	Description	Cal. Due Date	NIST Traceability #
10-0179	HEWLETT PACKARD	3325B	SYNTHESIZED/FUNCTION GEN	3/31/2022	122545
10-0485	KEYSIGHT	3458A OPT 002	DIGITAL MULTIMETER	1/19/2023	1-13871170867-1
10-0495	FLUKE	5700A	CALIBRATOR	7/15/2022	160408

TRIDENT CALIBRATION LABS

HP/Agilent 34401A Digital Multimeter

Procedure: Keysight 34401A

Work Order: Oct 2021 Onsite

ID Number: MY47068277

Date Calibrated: 10/28/2021

All calculations and data transfers have been reviewed for accuracy and completeness

Section 1 - Zero Offset Verification

Front panel input terminals *1 year specifications*

Function/Range	Nominal	Lower Limit	As Found	As Left	Upper Limit	Result	UCTY
DCV/100mV	0.0000000 V	-0.0000035 V	-0.0000017 V	-0.0000017 V	0.0000035 V	PASS	NA
DCV/1V	0.000000 V	-0.000007 V	-0.000001 V	-0.000001 V	0.000007 V	PASS	NA
DCV/10V	0.00000 V	-0.00005 V	0.00000 V	0.00000 V	0.00005 V	PASS	NA
DCV/100V	0.0000 V	-0.0006 V	0.0001 V	0.0001 V	0.0006 V	PASS	NA
DCV/1000V	0.000 V	-0.010 V	0.001 V	0.001 V	0.010 V	PASS	NA
DCI/10mA	0.00000000 A	-0.00000200 A	0.00000045 A	0.00000045 A	0.00000200 A	PASS	NA
DCI/100mA	0.0000000 A	-0.0000050 A	0.0000005 A	0.0000005 A	0.0000050 A	PASS	NA
DCI/1A	0.000000 A	-0.000100 A	0.000022 A	0.000022 A	0.000100 A	PASS	NA
DCI/3A	0.000000 A	-0.000600 A	0.000027 A	0.000027 A	0.000600 A	PASS	NA
OHM4/100Ω	0.0000 Ω	-0.0040 Ω	-0.0005 Ω	-0.0005 Ω	0.0040 Ω	PASS	NA
OHM4/1kΩ	0.000 Ω	-0.010 Ω	0.000 Ω	0.000 Ω	0.010 Ω	PASS	NA
OHM4/10kΩ	0.00 Ω	-0.10 Ω	0.00 Ω	0.00 Ω	0.10 Ω	PASS	NA
OHM4/100kΩ	0.0 Ω	-1.0 Ω	0.0 Ω	0.0 Ω	1.0 Ω	PASS	NA
OHM4/1MΩ	0.0 Ω	-10.0 Ω	0.7 Ω	0.7 Ω	10.0 Ω	PASS	NA
OHM4/10MΩ	0.0 Ω	-100.0 Ω	18.5 Ω	18.5 Ω	100.0 Ω	PASS	NA
OHM4/100MΩ	0.0 Ω	-10000.0 Ω	4.0 Ω	4.0 Ω	10000.0 Ω	PASS	NA
OHM2/100Ω	0.0000 Ω	-0.0040 Ω	0.0001 Ω	0.0001 Ω	0.0040 Ω	PASS	NA
OHM2/1kΩ	0.000 Ω	-0.010 Ω	0.000 Ω	0.000 Ω	0.010 Ω	PASS	NA
OHM2/10kΩ	0.00 Ω	-0.10 Ω	-0.01 Ω	-0.01 Ω	0.10 Ω	PASS	NA
OHM2/100kΩ	0.0 Ω	-1.0 Ω	-0.1 Ω	-0.1 Ω	1.0 Ω	PASS	NA
OHM2/1MΩ	0.0 Ω	-10.0 Ω	0.5 Ω	0.5 Ω	10.0 Ω	PASS	NA
OHM2/10MΩ	0.0 Ω	-100.0 Ω	1.9 Ω	1.9 Ω	100.0 Ω	PASS	NA
OHM2/100MΩ	0.0 Ω	-10000.0 Ω	0.0 Ω	0.0 Ω	10000.0 Ω	PASS	NA

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Section 1 - Zero Offset Verification (continued)

Rear panel input terminals *1 year specifications*

Function/Range	Nominal	Lower Limit	As Found	As Left	Upper Limit	Result	UCTY
DCV/100mV	0.0000000 V	-0.0000035 V	-0.0000007 V	-0.0000007 V	0.0000035 V	PASS	NA
DCV/1V	0.000000 V	-0.000007 V	-0.000001 V	-0.000001 V	0.000007 V	PASS	NA
DCV/10V	0.00000 V	-0.00005 V	0.00000 V	0.00000 V	0.00005 V	PASS	NA
DCV/100V	0.0000 V	-0.0006 V	0.0000 V	0.0000 V	0.0006 V	PASS	NA
DCV/1000V	0.000 V	-0.010 V	0.000 V	0.000 V	0.010 V	PASS	NA
DCI/10mA	0.00000000 A	-0.00000200 A	0.00000015 A	0.00000015 A	0.00000200 A	PASS	NA
DCI/100mA	0.0000000 A	-0.0000050 A	0.0000002 A	0.0000002 A	0.0000050 A	PASS	NA
DCI/1A	0.000000 A	-0.000100 A	0.000007 A	0.000007 A	0.000100 A	PASS	NA
DCI/3A	0.000000 A	-0.000600 A	0.000011 A	0.000011 A	0.000600 A	PASS	NA
OHM4/100Ω	0.0000 Ω	-0.0040 Ω	-0.0006 Ω	-0.0006 Ω	0.0040 Ω	PASS	NA
OHM4/1kΩ	0.000 Ω	-0.010 Ω	0.000 Ω	0.000 Ω	0.010 Ω	PASS	NA
OHM4/10kΩ	0.00 Ω	-0.10 Ω	-0.01 Ω	-0.01 Ω	0.10 Ω	PASS	NA
OHM4/100kΩ	0.0 Ω	-1.0 Ω	0.0 Ω	0.0 Ω	1.0 Ω	PASS	NA
OHM4/1MΩ	0.0 Ω	-10.0 Ω	0.4 Ω	0.4 Ω	10.0 Ω	PASS	NA
OHM4/10MΩ	0.0 Ω	-100.0 Ω	4.2 Ω	4.2 Ω	100.0 Ω	PASS	NA
OHM4/100MΩ	0.0 Ω	-10000.0 Ω	-158.0 Ω	-158.0 Ω	10000.0 Ω	PASS	NA
OHM2/100Ω	0.0000 Ω	-0.0040 Ω	0.0003 Ω	0.0003 Ω	0.0040 Ω	PASS	NA
OHM2/1kΩ	0.000 Ω	-0.010 Ω	0.000 Ω	0.000 Ω	0.010 Ω	PASS	NA
OHM2/10kΩ	0.00 Ω	-0.10 Ω	0.00 Ω	0.00 Ω	0.10 Ω	PASS	NA
OHM2/100kΩ	0.0 Ω	-1.0 Ω	0.0 Ω	0.0 Ω	1.0 Ω	PASS	NA
OHM2/1MΩ	0.0 Ω	-10.0 Ω	0.3 Ω	0.3 Ω	10.0 Ω	PASS	NA
OHM2/10MΩ	0.0 Ω	-100.0 Ω	6.9 Ω	6.9 Ω	100.0 Ω	PASS	NA
OHM2/100MΩ	0.0 Ω	-10000.0 Ω	-157.0 Ω	-157.0 Ω	10000.0 Ω	PASS	NA

Section 2 - Gain Verification

DC Voltage *1 year specifications*

Range	Nominal	Lower Limit	As Found	As Left	Upper Limit	Result	UCTY
DCV/100mV	100.0000 mV	99.9915 mV	99.9970 mV	99.9970 mV	100.0085 mV	PASS	1.3µV
DCV/1V	1.000000 V	0.999953 V	0.999997 V	0.999997 V	1.000047 V	PASS	1.6mV
DCV/10V	10.00000 V	9.99960 V	9.99997 V	9.99997 V	10.00040 V	PASS	13mV
DCV/10V	-10.00000 V	-10.00040 V	-9.99998 V	-9.99998 V	-9.99960 V	PASS	13mV
DCV/100V	100.0000 V	99.9949 V	100.0000 V	100.0000 V	100.0051 V	PASS	0.13V
DCV/1000V	1000.000 V	999.945 V	999.998 V	999.998 V	1000.055 V	PASS	1.3V

AC/DC Current *1 year specifications*

Function/Range	Nominal	Lower Limit	As Found	As Left	Upper Limit	Result	UCTY
DCI/10mA	10.00000 mA	9.99300 mA	9.99926 mA	9.99926 mA	10.00700 mA	PASS	26µA
DCI/100mA	100.0000 mA	99.9450 mA	99.9901 mA	99.9901 mA	100.0550 mA	PASS	240µA
DCI/1A	1.000000 A	0.998900 A	0.999776 A	0.999776 A	1.001100 A	PASS	11mA
DCI/3A	2.00000 A	1.99580 A	1.99955 A	1.99955 A	2.00420 A	PASS	17mA
ACI/1A at 1kHz	1.000000 A	0.998600 A	0.999623 A	0.999623 A	1.001400 A	PASS	19mA
ACI/3A at 1kHz	2.00000 A	1.99520 A	1.99825 A	1.99825 A	2.00480 A	PASS	71mA

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Section 2 - Gain Verification (continued)

AC Voltage *1 year specifications*

Range / Freq	Nominal	Lower Limit	As Found	As Left	Upper Limit	Result	UCTY
100mV/1kHz	10.0000 mV	9.9540 mV	9.9971 mV	9.9971 mV	10.0460 mV	PASS	0.85µV
100mV/1kHz	100.0000 mV	99.9000 mV	99.9660 mV	99.9660 mV	100.1000 mV	PASS	0.55µV
100mV/50kHz	100.0000 mV	99.8300 mV	99.9353 mV	99.9353 mV	100.1700 mV	PASS	2.2µV
1V/1kHz	1.000000 V	0.999100 V	0.999714 V	0.999714 V	1.000900 V	PASS	4.4µV
1V/50kHz	1.000000 V	0.998300 V	0.999202 V	0.999202 V	1.001700 V	PASS	0.31mV
10V/1kHz	10.00000 V	9.99100 V	9.99722 V	9.99722 V	10.00900 V	PASS	51mV
10V/50kHz	10.00000 V	9.98300 V	9.99413 V	9.99413 V	10.01700 V	PASS	0.44V
10V/10Hz	10.00000 V	9.99100 V	9.99725 V	9.99725 V	10.00900 V	PASS	0.56V
100V/1kHz	100.0000 V	99.9100 V	99.9628 V	99.9628 V	100.0900 V	PASS	1.3V
100V/50kHz	100.0000 V	99.8300 V	99.9100 V	99.9100 V	100.1700 V	PASS	0.83V
750V/1kHz	750.000 V	749.325 V	749.594 V	749.594 V	750.675 V	PASS	22V
750V/50kHz	210.000 V	209.373 V	209.607 V	209.607 V	210.627 V	PASS	1.6V

Frequency *1 year specifications*

Input Voltage	Nominal	Lower Limit	As Found	As Left	Upper Limit	Result	UCTY
10mV	100.00000 Hz	99.90000 Hz	99.99910 Hz	99.99910 Hz	100.10000 Hz	PASS	8.5mHz
1V	100.0000 kHz	99.99000 kHz	99.99960 kHz	99.99960 kHz	100.01000 kHz	PASS	0.26Hz

Two Wire Ohms using Math Null *1 year specifications*

Range	Nominal	Lower Limit	As Found	As Left	Upper Limit	Result	UCTY
100 Ω	100.0000 Ω	99.9860 Ω	99.9896 Ω	99.9896 Ω	100.0140 Ω	PASS	130mΩ
1 kΩ	1.000000 kΩ	0.999890 kΩ	1.000020 kΩ	1.000020 kΩ	1.000110 kΩ	PASS	16mΩ
10 kΩ	10.00000 kΩ	9.99890 kΩ	10.00033 kΩ	10.00033 kΩ	10.00110 kΩ	PASS	13mΩ
100 kΩ	100.0000 kΩ	99.9890 kΩ	100.0032 kΩ	100.0032 kΩ	100.0110 kΩ	PASS	0.24Ω
1 MΩ	1.000000 MΩ	0.999890 MΩ	1.000033 MΩ	1.000033 MΩ	1.000110 MΩ	PASS	7.4Ω
10 MΩ	10.00000 MΩ	9.99590 MΩ	9.99825 MΩ	9.99825 MΩ	10.00410 MΩ	PASS	0.20kΩ
100 MΩ	100.0000 MΩ	99.1900 MΩ	100.2371 MΩ	100.2371 MΩ	100.8100 MΩ	PASS	2.5kΩ

Four Wire Ohms *1 year specifications*

Range	Nominal	Lower Limit	As Found	As Left	Upper Limit	Result	UCTY
100 Ω	100.0000 Ω	99.9860 Ω	100.0081 Ω	100.0081 Ω	100.0140 Ω	PASS	130mΩ
1 kΩ	1.000000 kΩ	0.999890 kΩ	1.000049 kΩ	1.000049 kΩ	1.000110 kΩ	PASS	16mΩ
10 kΩ	10.00000 kΩ	9.99890 kΩ	10.00048 kΩ	10.00048 kΩ	10.00110 kΩ	PASS	13mΩ
100 kΩ	100.0000 kΩ	99.9890 kΩ	100.0035 kΩ	100.0035 kΩ	100.0110 kΩ	PASS	0.31Ω
1 MΩ	1.000000 MΩ	0.999890 MΩ	1.000009 MΩ	1.000009 MΩ	1.000110 MΩ	PASS	4.1Ω
10 MΩ	10.00000 MΩ	9.99590 MΩ	9.99867 MΩ	9.99867 MΩ	10.00410 MΩ	PASS	0.20kΩ