



Certificate of Calibration



Model:	ADT227-HART	Report Number:	N23061307
Description:	Documenting Multifunction Process Calibrator	Calibration Date:	6/13/2023
Serial Number:	410230060040	Due Date:	6/12/2024
Temperature:	23.6°C	Humidity:	54% RH
Status:	New	Certificate Date:	6/13/2023
Procedure:	ADT32X;ADT9000 1.0.5.2;ADT32XV1.0.0.7	Data Type:	As-Left
		Data Results:	In Tolerance

Customer:	Location of Calibration:
	Additel Corporation
	2900 Saturn Street #B
	Brea CA 92821
	United States

Reference Standards used in this calibration are traceable to the SI Units through National Institute of Standards and Technology (NIST) or other recognized National Metrology Institutes (NMI's). This calibration is compliant to ISO/IEC 17025:2017 and ANSI/NCSL Z540-1:R2002.

By default, Additel reports the measurement result and its associated measurement uncertainty. When the measurement result is outside Additel's published specifications, it is indicated by a fail condition without taking the associated measurement uncertainty into consideration. Alternatively, if a compliance decision is desired taking the measurement uncertainty into account, Additel utilizes the ANSI Z540.3 Handbook Method 6 to make statements of conformity to specifications.

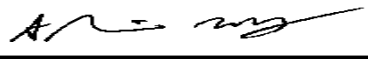
The results on this calibration report apply only to the item (s) calibrated or tested. Uncertainties of the measurements are based upon a coverage factor of $k=2$ providing an approximate 95% confidence level. The recommended calibration due date is included in the report only if it is specified by the customer.

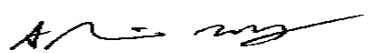
This report shall not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. government. This report shall not be reproduced, except in full without written approval of Additel Corporation.

Standards Used

Model	Description	Serial Number	Cal Date	Due Date
ADT761-BP	Additel Automated Pressure Calibrator	81113070002	4/28/2023	8/3/2023
53220A	Keysight Universal Frequency Counter/Timer	MY62310266	11/10/2022	11/10/2023
ADT286	Additel Reference Thermometer Readout	685019T10039	4/28/2023	8/8/2023
33512B	Keysight Waveform Generator	MY59003854	11/10/2022	11/10/2023
ADT280-RS-SET	Additel Reference Resistor Set	ADT280RRS0123	1/24/2023	1/24/2024
5720A	Fluke Multifunction Calibrator	2016203	2/1/2023	2/1/2024
ADT875PC-155	Dry Well Temperature Calibrator	660TL19000033	4/3/2023	4/2/2024
AM1762-20	AccuMac SPRT	1620645	11/18/2022	11/18/2024

Comments:

Performed By: 
Alvin Wong

Approved By: 
Alvin Wong

Test Results

DC Voltage Source

Accuracy: $\pm(0.005\%RDG + 0.01\%FS)$

Range	DUT	Reference	Difference	Specification	Uncertainty	Condition
(mV)	(mV)	(mV)	(mV)	(mV)	(mV)	
-150 to 150	-150.000	-150.0014	-0.001	± 0.023	1.3E-03	pass
	0.000	-0.0015	-0.001	± 0.015	5.8E-04	pass
	150.000	149.9996	0.000	± 0.023	1.3E-03	pass

DC Voltage Source

Accuracy: $\pm(0.005\%RDG + 0.01\%FS)$

Range	DUT	Reference	Difference	Specification	Uncertainty	Condition
(V)	(V)	(V)	(V)	(V)	(V)	
-1.5 to 1.5	-1.50000	-1.499971	0.00003	± 0.00023	1.4E-05	pass
	0.00000	-0.000012	-0.00001	± 0.00015	5.8E-06	pass
	1.50000	1.500009	0.00001	± 0.00023	1.4E-05	pass

DC Voltage Source

Accuracy: $\pm(0.005\%RDG + 0.01\%FS)$

Range	DUT	Reference	Difference	Specification	Uncertainty	Condition
(V)	(V)	(V)	(V)	(V)	(V)	
-15 to 15	-15.0000	-15.00029	-0.0003	± 0.0023	5.3E-04	pass
	0.0000	-0.00028	-0.0003	± 0.0015	5.8E-05	pass
	15.0000	14.99984	-0.0002	± 0.0023	5.3E-04	pass

Frequency Source Square

Accuracy: $\pm(0.002\%RDG + 2 \text{ digits})$

Range	DUT	Reference	Difference	Specification	Uncertainty	Condition
(Hz)	(Hz)	(Hz)	(Hz)	(Hz)	(Hz)	
0.01 to 50000	100.000	100.001	0.001	± 0.004	1.2E-04	pass
	1000.00	1000.012	0.012	± 0.040	1.0E-03	pass
	50000.0	50000.051	0.051	± 1.200	5.0E-02	pass

DC Current Source

Accuracy: $\pm(0.01\%RDG + 0.005\%FS)$

Range	DUT	Reference	Difference	Specification	Uncertainty	Condition
(mA)	(mA)	(mA)	(mA)	(mA)	(mA)	
0 to 25	0.0000	0.0000	0.0000	± 0.0013	5.8E-05	pass
	10.0000	9.9999	-0.0001	± 0.0023	7.5E-04	pass
	25.0000	24.9997	-0.0003	± 0.0038	1.9E-03	pass

Test Results

Resistances Source

Accuracy: $\pm(0.005\%RDG + 0.005\%FS)$

Range	DUT	Reference	Difference	Specification	Uncertainty	Condition
(Ω)	(Ω)	(Ω)	(Ω)	(Ω)	(Ω)	
0 to 400	25.000	25.000	0.000	± 0.021	7.5E-04	pass
	100.000	100.002	0.002	± 0.025	1.6E-03	pass
	200.000	199.997	-0.003	± 0.030	2.8E-03	pass
	400.000	399.996	-0.004	± 0.040	5.1E-03	pass

Resistances Source

Accuracy: $\pm(0.01\%RDG + 0.005\%FS)$

Range	DUT	Reference	Difference	Specification	Uncertainty	Condition
(Ω)	(Ω)	(Ω)	(Ω)	(Ω)	(Ω)	
0 to 4000	25.00	24.969	-0.03	± 0.20	6.7E-03	pass
	400.00	399.975	-0.03	± 0.24	8.9E-03	pass
	1000.00	1000.052	0.05	± 0.30	1.4E-02	pass
	2000.00	1999.982	-0.02	± 0.40	3.0E-02	pass
	4000.00	3999.954	-0.05	± 0.60	5.4E-02	pass

Voltage mV(TC) Source

Accuracy: $\pm(0.008\%RDG + 0.004\%FS)$

Range	DUT	Reference	Difference	Specification	Uncertainty	Condition
(mV)	(mV)	(mV)	(mV)	(mV)	(mV)	
-10 to 75	-10.0000	-10.0003	-0.0003	± 0.0038	5.9E-04	pass
	0.0000	-0.0001	-0.0001	± 0.0030	5.8E-04	pass
	75.0000	75.0000	0.0000	± 0.0090	9.5E-04	pass

Type K TC (internal reference) Source

DUT	Reference	Difference	Specification	Uncertainty	Condition
($^{\circ}C$)	($^{\circ}C$)	($^{\circ}C$)	($^{\circ}C$)	($^{\circ}C$)	
-150.00	-149.99	0.01	± 0.23	1.2E-01	pass
0.00	0.00	0.00	± 0.12	8.0E-02	pass
1300.00	1299.97	-0.03	± 0.22	1.0E-01	pass

Loop power Output

Accuracy: $\pm 1V$

Range	DUT	Reference	Difference	Specification	Uncertainty	Condition
(V)	(V)	(V)	(V)	(V)	(V)	
24	24.00	24.0987	0.10	± 1.00	8.0E-04	pass

DC Voltage Measurement

Accuracy: $\pm(0.005\%RDG + 0.005\%FS)$

Range	Reference	DUT	Difference	Specification	Uncertainty	Condition
(V)	(V)	(V)	(V)	(V)	(V)	
-30 to 30	-30.00000	-30.0000	0.0000	± 0.0030	2.1E-04	pass
	0.00000	0.0000	0.0000	± 0.0015	5.8E-05	pass
	30.00000	30.0000	0.0000	± 0.0030	2.0E-04	pass

Test Results

DC Voltage Measurement

Accuracy: $\pm(0.005\%RDG + 0.005\%FS)$

Range (mV)	Reference (mV)	DUT (mV)	Difference (mV)	Specification (mV)	Uncertainty (mV)	Condition
-300 to 300	-300.0000	-300.000	0.000	± 0.030	2.6E-03	pass
	0.0000	0.000	0.000	± 0.015	5.6E-04	pass
	300.0000	300.001	0.001	± 0.030	2.6E-03	pass

DC Current Measurement

Accuracy: $\pm(0.01\%RDG + 0.005\%FS)$

Range (mA)	Reference (mA)	DUT (mA)	Difference (mA)	Specification (mA)	Uncertainty (mA)	Condition
-30 to 30	-30.0000	-30.0000	0.0000	± 0.0045	2.1E-03	pass
	0.0000	0.0000	0.0000	± 0.0015	7.0E-05	pass
	30.0000	30.0000	0.0000	± 0.0045	2.1E-03	pass

Frequency Measurement

Accuracy: $\pm(0.002\%RDG + 2 \text{ digits})$

Range (Hz)	Reference (Hz)	DUT (Hz)	Difference (Hz)	Specification (Hz)	Uncertainty (Hz)	Condition
0.01 to 50000	100.000	100.000	0.000	± 0.004	1.2E-04	pass
	1000.000	1000.00	0.000	± 0.040	1.0E-03	pass
	50000.000	50000.0	0.000	± 1.200	6.3E-02	pass

Resistances Measurement

Accuracy: $\pm(0.005\%RDG + 0.005\%FS)$

Range (Ω)	Reference (Ω)	DUT (Ω)	Difference (Ω)	Specification (Ω)	Uncertainty (Ω)	Condition
1 to 400 4-wire	25.0000	25.000	0.000	± 0.021	8.0E-04	pass
	100.0003	100.001	0.001	± 0.025	7.6E-04	pass
	199.9962	199.997	0.001	± 0.030	1.3E-03	pass
	400.0005	400.001	0.000	± 0.040	2.2E-03	pass

Resistances Measurement

Accuracy: $\pm(0.01\%RDG + 0.005\%FS)$

Range (Ω)	Reference (Ω)	DUT (Ω)	Difference (Ω)	Specification (Ω)	Uncertainty (Ω)	Condition
1 to 4000 4-wire	25.0000	25.01	0.01	± 0.20	8.4E-03	pass
	400.0005	400.00	0.00	± 0.24	6.1E-03	pass
	999.9635	999.97	0.01	± 0.30	7.6E-03	pass
	2000.0679	2000.07	0.00	± 0.40	1.3E-02	pass
	4000.5425	4000.53	-0.01	± 0.60	2.1E-02	pass

Test Results

Voltage mV(TC) Measurement

Accuracy: $\pm(0.008\%RDG + 0.004\%FS)$

Range	Reference	DUT	Difference	Specification	Uncertainty	Condition
(mV)	(mV)	(mV)	(mV)	(mV)	(mV)	
-10 to 75	-10.00000	-10.0003	-0.0003	± 0.0038	6.1E-04	pass
	0.00000	0.0000	0.0000	± 0.0030	4.1E-04	pass
	75.00000	75.0001	0.0001	± 0.0090	1.2E-03	pass

Type K TC (internal reference) Measurement

Reference	DUT	Difference	Specification	Uncertainty	Condition
(°C)	(°C)	(°C)	(°C)	(°C)	
-150.00	-149.99	0.01	± 0.23	1.2E-01	pass
0.00	0.00	0.00	± 0.12	8.0E-02	pass
1300.00	1299.97	-0.03	± 0.22	1.0E-01	pass

DC High Voltage Measurement

Accuracy: $\pm(0.05\%RDG + 0.01\%FS)$

Range	Reference	DUT	Difference	Specification	Uncertainty	Condition
(V)	(V)	(V)	(V)	(V)	(V)	
0 to 300	0.0000	0.00	0.00	± 0.03	1.0E-04	pass
	200.0000	200.00	0.00	± 0.13	1.0E-03	pass

AC High Voltage(60Hz) Measurement

Accuracy: $\pm(0.5\%RDG + 0.05\%FS)$

Range	Reference	DUT	Difference	Specification	Uncertainty	Condition
(V)	(V)	(V)	(V)	(V)	(V)	
0 to 300	200.0000	200.00	0.00	± 1.15	1.8E-02	pass

AC High Voltage(400Hz) Measurement

Accuracy: $\pm(0.5\%RDG + 0.05\%FS)$

Range	Reference	DUT	Difference	Specification	Uncertainty	Condition
(V)	(V)	(V)	(V)	(V)	(V)	
0 to 300	200.0000	200.03	0.03	± 1.15	1.5E-02	pass

Test Results

Barometric Pressure Sensor

Range: (60 to 110)kPa.a		Accuracy: ± 55 Pa.a			S/N: BMP220726104220	
TestPoint (kPa.a)	Reference (kPa.a)	DUT (kPa.a)	Difference (kPa.a)	Specification (kPa.a)	Uncertainty (kPa.a)	Condition
60.000	60.000	60.004	0.004	± 0.055	1.0E-02	
80.000	80.000	80.003	0.003	± 0.055	1.0E-02	pass
100.000	100.000	100.002	0.002	± 0.055	1.0E-02	pass
110.000	110.000	109.999	-0.001	± 0.055	1.0E-02	pass