



# ***PRODUCT CATALOG 2020***





## ADDITEL CORPORATION

Additel Corporation is one of the leading worldwide providers of process calibration tools. We are dedicated to designing, manufacturing, and delivering the highest quality handheld test tools and portable calibrators for process and calibration industries. For many years Additel has successfully developed automated pressure calibrators, digital pressure test gauges, digital pressure calibrators, pressure test and calibration pumps, and multifunction process calibrators. In recent years, we have expanded our product offering with temperature calibration tools that are helping to make metrology simple. Coupled with our accredited calibration laboratory in Brea, CA, our products, calibration services and customer support are second to none. Additel products are currently used in over 100 countries worldwide, with a worldwide sales and support channel in place to assist you.

Product quality and customer service along with innovative engineering have been our top priorities and will continue to be our guiding principles going forward. We are committed to customer satisfaction through quality products, competitive pricing, unmatched services/technical support and continued introduction of new and innovative products.

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## A Message From Additel's President

Dear Additel Customer,

I grew up in a small town outside of Denver, Colorado where my grandfather started an insurance agency located on our main street. Later, my father took over the business and it continued to flourish until he sold the business just a few years ago. I marvel that our family business, not only survived, but grew over the last 50 years. Despite the industry switching from traditional agencies to direct internet sales, the family business continued to do well. As I look back at this, I believe I know why my father and grandfather did so well.

When Grandpa started Sanders Insurance Agency, he confirmed his business deals with a handshake. There were no lengthy written contracts, price lists, or complex agreements. Just his word and a handshake were all that was needed because he was known as a man of integrity who put his customer first. My father continued to grow the business on the same foundational principles.

I joined Additel in 2013 and saw an organization founded on values of integrity and customer service. And when I saw the amazing high-quality, innovative products and I knew this was the start of something special.

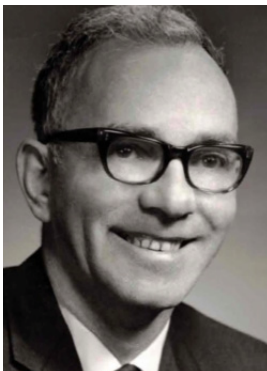
Over the years, we've outgrown buildings and continue to add more people. But we don't just hire anyone. To have the best products and services, you need to have the best people behind them! Quality and customer service go far beyond a well-designed product—it reaches into the very fabric of the company culture. We look for people that enjoy serving you and will not compromise quality.



*Jon Sanders - Additel President*



*Denver, CO USA*



*Guy Sanders*

Year over year, we continue to introduce new products which are industry firsts. Look on page 2 and you will see we've done it again with our new ADT761A—the only portable, automated calibrator up to 1000 psi (70 bar) on the market. We invest a tremendous amount of time and effort into research and development to regularly introduce breakthrough products that address some of the test and measurement challenges you see on a day-to-day basis.

As we've grown, so has our gratitude and appreciation for you. I know customers just like you are the key to our success. We are not perfect and occasionally we will make mistakes, but I can promise you if we do mess up, we will do all in our power to make it right. And that is something we can shake on! Thank you for your business!

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# Additel 761A

## Series Automated Pressure Calibrators



### Selection Guide

<i>Model Features</i>	<i>761A-LLP</i>	<i>761A-D</i>	<i>761A-500</i>	<i>761A-1K</i>	<i>761A-APXR</i>	<i>761A-BP</i>
Pressure Range	-75 to 75 mbar (-30 to 30 inH <sub>2</sub> O)	-0.95 to 2.5 bar.g (-13.5 to 35 psig)	-0.90 to 35 bar.g (-13 to 500 psig)	-0.90 to 70 bar.g (-13 to 1000 psig)	-0.90 to 70 bar.g (-13 to 1000 psig)	100 to 1,200 hPa
Control Stability	<0.005%FS or 0.05 Pa	<0.005%FS	<0.005%FS	<0.005%FS	<0.003%FS	<0.02 hPa
Number of Internal Modules	2	2	2	2	1	1
Removable Internal Modules	•	•	•	•		
Differential Pressure	•	•				
Gauge Pressure	•	•	•	•	•	
Absolute Pressure			•	•	•	•
Barometric Pressure			•	•	•	•
Two External Pressure Modules	•	•	•	•	•	•
Built-in Electric Pump	•	•	•	•	•	•
Source/Simulate mA	•	•	•	•	•	•
Measure mA or V	•	•	•	•	•	•
24V Loop Power	•	•	•	•	•	•
Pressure Switch Test	•	•	•	•	•	•
HART/Profibus Communication	•	•	•	•	•	•
Task Documentation	•	•	•	•	•	•
Data Logging	•	•	•	•	•	•

# Additel 761A

## Series Automated Pressure Calibrators



- Automated and self-contained pressure generation and control to 1,000 psi ( 70 bar)
- Standard accuracy to 0.02%FS
- Optional precision accuracy models to 0.01%FS
- Two removable internal pressure modules for multi-range selection
- Control stability to 0.003%FS
- Portable, designed for use in the field and in the lab
- Ability to measure two external pressure modules
- Wi-Fi, Bluetooth, USB and Ethernet communication
- Full HART field communicator
- HART and profibus communication
- Data logging and task management
- Patented electric pump technology and improved speed



### OVERVIEW

At Additel, innovation and continuous improvement are part of our company's culture and the products we introduce. When we set out to deliver the Additel 761A series calibrators, we knew we needed to provide breakthrough improvements and additional value to the existing line of calibrators (Additel 761 series). The ADT761A has many improvements: increased pressure range to 1,000 psi (70 bar), removable internal pressure modules, optional precision models to 0.01%FS, increased speed to pressure, ability to read two external pressure modules, touch screen display, Wi-Fi, Bluetooth, and Ethernet communications and a fully functional HART communicator to help with all your transmitter needs.

Just like the first generation, this second generation product is completely self-contained and automated with a built-in pump for pressure generation and precision control technology. Simply set the desired pressure and watch the calibrator do the work.

### ADT761A-LLP

The Additel 761A-LLP is designed for low pressure calibration and comes with a  $\pm 30$  inH<sub>2</sub>O ( $\pm 75$  mbar) high range module and a low range module of your choice ranging from  $\pm 20$  inH<sub>2</sub>O to as low as  $\pm 0.25$  inH<sub>2</sub>O ( $\pm 50$  to  $\pm 0.62$  mbar). This unit has an accuracy of 0.05%FS with control stability better than 0.005%FS. All measurements can be made in differential or gauge pressures.



### ADT761A-D

The Additel 761A-D also provides differential and gauge measurement which covers the range of -13.5 to 35 psi (-0.95 to 2.5 bar). This unit comes with a CP35 module (-13.5 to 35 psi) and one low range module of your choice ranging as low as  $\pm 10$  inH<sub>2</sub>O (25 mbar). Each ADT761A-D can be preconfigured with the modules that fit your need to give you the best precision at the pressures you perform calibrations.

### ADT761A-500

The Additel 761A-500 will generate and control from vacuum pressures up to 500 psig (35 bar.g). Both gauge and absolute pressures can be realized due to a built-in barometer. Each unit comes with a CP500 module (-13 to 500 psig) for the high range and the low range can be preconfigured based on the variety of modules available down to 10 psig (0.7 bar.g).



### ADT761A-1K

The Additel 761A-1K will generate and control from vacuum pressures up to 1,000 psig (70 bar.g). This unit can typically achieve 1,000 psi in less than 45 seconds. Like the ADT761A-500, both gauge and absolute pressures can be realized due to a built-in barometer. Each unit comes with a CP1K module (-13 to 1,000 psig) for the high range and the low range can be preconfigured based on the variety of modules available down to 30 psig (2 bar.g).

### ADT761A-APXR Precision Accuracy Options

The Additel 761A series includes a precision accuracy option which provides an accuracy of 0.01%FS. This calibrator option includes a single non-removable sensor and can measure absolute and gauge pressures. Model configurations are available from 15 to 1,000 psig (1 to 70 bar.g).

### ADT761A-BP

The Additel 761A-BP is designed for calibration of barometer sensors. With a range of 100 to 1200 hPa and an accuracy of 0.01%FS, this unit is ideal for calibration on the bench or in the field.



## Pressure Specifications

Model Specification	761A-LLP	761A-D	761A-500	761A-1K	761A-APXR	761A-BP
Max Pressure Range	30 inH <sub>2</sub> O (75 mbar)	35 psi (2.5 bar)	500 psig (35 bar.g)	1,000 psig (70 bar.g)	Dependent on APXR sensor	1,200 hPa
Min Pressure Range	-30 inH <sub>2</sub> O (-75 mbar)	-13.5 psi (-0.95 bar)	-13 psi (-0.9 bar)	-13 psi (-0.9 bar)	Dependent on APXR sensor	100 hPa
Accuracy <sup>(1)</sup>	0.05%FS	0.02%FS	0.02%FS <sup>(2)</sup>	0.02%FS <sup>(2)</sup>	0.01%FS	0.01%FS
Stability	0.003%FS or 0.03 Pa	0.003%FS	0.003%FS	0.003%FS	0.003%FS	0.02 hPa
Pressure Type	Differential, Gauge	Differential, Gauge	Gauge, Absolute	Gauge, Absolute	Gauge, Absolute	Absolute
Over Range Indication	120%					
Resolution	6 digits					
Measurement Units	Pa, hPa, kPa, mPa, bar, mbar, psi, mmHg@0°C, cmHg@0°C, mHg@0°C, inHg@0°C, inH <sub>2</sub> O@4°C, mmH <sub>2</sub> O@4°C, cmH <sub>2</sub> O@4°C, mH <sub>2</sub> O@4°C, mmH <sub>2</sub> O@20°C, cmH <sub>2</sub> O@20°C, mH <sub>2</sub> O@20°C, inH <sub>2</sub> O@20°C, inH <sub>2</sub> O@68°F, kgf/cm <sup>2</sup> , mtorr, torr, lb/ft <sup>2</sup> , tsi, custom					
Barometric Accuracy	N/A	N/A	60 Pa	60 Pa	60 Pa	N/A

[1] One year accuracy (including 1 year stability). FS specification applies to the span of the module range.

[2] Specification based on gauge measurement. An additional 60 pa uncertainty will need to be included when measuring in absolute mode. Applicable only for use with the ADT761A-500 and ADT761A-1K

\* Additel 761A calibrators support 160A series intelligent digital pressure modules that are available for gauge, vacuum and absolute pressure from -15 psi to 60,000 psi (-1 bar to 4200 bar). For detailed specifications refer to the 160A series pressure modules data sheet.

## Electrical Specifications

Model Specification	Range	Resolution	Accuracy	Note
mA Measure	Auto-ranging ±25 or ±50 mA	0.1 µA	0.008%RD+0.004%FS	Impedance <10Ω
V Measure	±300 mV	1 µV	0.008%RD+0.002%FS	Impedance >1 GΩ
	Auto-ranging ±5, ±12 or ±30 V	±5 V:20 µV ±12 V:100 µV ±30 V:100 µV	0.008%RD+0.002%FS	Impedance >1 MΩ
Loop Power Source	24 V	N/A	±0.24 V	50 mA (Max Loading)
mA Source	0 to 2.5 mA or 2.5 to 25 mA	0-2.5 mA: 0.05µA 0-25 mA:0.5µA	0-2.5 mA: 0.008%RD+0.1 µA 0-25 mA: 0.008%RD+1.0 µA	20 mA @ 1 KΩ
Power Source	16 to 30 V	1 V	±1 V(24 V: ±0.24 V)	70 mA (Max Loading)
V Source	0 to 16 V	250 µV	0.008%RD+0.002%FS	
Pressure Switch	Mechanical Switch, Live Mechanical Switch, NPN Switch, PNP Switch	N/A	N/A	Response time<10 ms. If the switch is live, voltage range will be (3-30) V
Temperature Compensation	5°C to 35°C			
Temperature Coefficient	Outside of 5°C to 35°C: <±0.0005%RD+0.0001%FS/°C			
Misuse Protection	Up to 30 V on any two sockets			



Metrology Made Simple

## Internal Module Specification and Compatibility

Model Range	inH <sub>2</sub> O <sup>[6]</sup>	mbar <sup>[6]</sup>	Media	Accuracy (%FS) <sup>[1]</sup>	Burst Pressure	761A-LLP	761A-D	761A-500	761A-1K
ADT155-20-DP025	±0.25	±0.62	G	0.2 <sup>(2)</sup>	100x	●			
ADT155-10-DP050	±0.5	±1.25	G	0.1 <sup>(3)</sup>	100x	●			
ADT155-05-DP1	±1	±2.5	G	0.05 <sup>(4)</sup>	100x	●			
ADT155-05-DP2	±2	±5	G	0.05 <sup>(4)</sup>	100x	●			
ADT155-05-DP5	±5	±10	G	0.05 <sup>(4)</sup>	50x	●			
ADT155-05-DP10	±10	±25	G	0.05 <sup>(4)</sup>	20x	●	●		
ADT155-05-DP20	±20	±50	G	0.05	20x	●	●		
ADT155-05-DP30	±30	±75	G	0.05	20x	●	●		
ADT155-05-DP50	±50	±125	G	0.05	3x		●		
ADT155-02-DP100	±100	±250	G	0.02	3x		●		
ADT155-02-DP150	±150	±350	G	0.02	3x		●		
ADT155-02-DP300	±300	±700	G	0.02	3x		●		
ADT155-02-DP400	-380 to 400	-950 to 1K	G	0.02	3x		●		
ADT155-02-DP800	-380 to 800	-950 to 2K	G	0.02	3x		●		
ADT155-02-DP1K	-380 to 1K	-950 to 2.5K	G	0.02	3x		●		
<b>Gauge Pressure</b>	<b>psig</b>	<b>bar.g</b>							
ADT155-02-CP10	±10	±0.7	G	0.02 <sup>(5)</sup>	3x		●	●	
ADT155-02-CP15	-13.5 to 15	-0.95 to 1	G	0.02 <sup>(5)</sup>	3x		●	●	
ADT155-02-CP30	-13.5 to 30	-0.95 to 2	G	0.02 <sup>(5)</sup>	3x		●	●	●
ADT155-02-CP35	-13.5 to 35	-0.95 to 2.5	G	0.02 <sup>(5)</sup>	3x		●	●	●
ADT155-02-CP50	-13.5 to 50	-0.95 to 3.5	G	0.02 <sup>(5)</sup>	3x			●	●
ADT155-02-CP100	-13.5 to 100	-0.95 to 7	G	0.02 <sup>(5)</sup>	3x			●	●
ADT155-02-CP150	-13.5 to 150	-0.95 to 10	G	0.02 <sup>(5)</sup>	3x			●	●
ADT155-02-CP200	-13.5 to 200	-0.95 to 14	G	0.02 <sup>(5)</sup>	3x			●	●
ADT155-02-CP300	-13.5 to 300	-0.95 to 20	G	0.02 <sup>(5)</sup>	3x			●	●
ADT155-02-CP500	-13.5 to 500	-0.95 to 35	G	0.02 <sup>(5)</sup>	3x			●	●
ADT155-02-CP600	-13.5 to 600	-0.95 to 40	G	0.02 <sup>(5)</sup>	3x				●
ADT155-02-CP1K	-13.5 to 1K	-0.95 to 70	G	0.02 <sup>(5)</sup>	3x				●

[1] FS specification applies to the span of the module range. Accuracy includes one-year stability, except for DP025 to DP10 modules.

[2] Accuracy is a 6 months spec, 1-year long-term drift is 0.2%FS.

[3] Accuracy is a 6 months spec, 1-year long-term drift is 0.1%FS.

[4] Accuracy is a 6 months spec, 1-year long-term drift is 0.05%FS.

[5] Specification based on gauge measurement. An additional 60 Pa uncertainty will need to be included when measuring in absolute mode.

[6] The low module pressure range may be outside the pressure range of the calibrator

Applicable only for use with the ADT761A-500 and ADT761A-1K

\* ADT155 Pressure modules are calibrated in psi & inH<sub>2</sub>O

## General Specifications

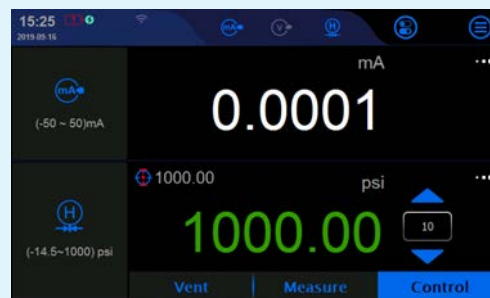
Specification	Description
User Interface	Color touch screen and/or keypad operation
Channels	Four total: one electrical, high or low internal pressure module, two external pressure modules
Enclosure IP Rating	IP31
Battery	Rechargeable Li-Ion battery, typically 12 hours of operation, recharges in less than 5 hours.
Power	Rechargeable Li-Ion battery, external power 110/220 V power adapter 27 V
Display	7" TFT touch screen 800 x 480 color
Communications	USB, LAN, Bluetooth, Wi-Fi
Weight	<17.52 lb (7.95 KG)
Size	11.77 x 7.60 x 7.56 in (299 x 193 x 192 mm)
Certification	ISO 17025 accredited certificate of calibration with NIST-traceable data
Data Storage	6 GB
Data Logging	Up to 1,000,000 readings (data and time stamped)
HART Communicator	Read, configure and calibrate HART devices - DD files updated periodically
Task documentation	Up to 1000 tasks can be stored with data
Automation Functions	Switch test, auto step, leak test
User Interface Localization	English, German, French, Italian, Spanish, Portuguese, Chinese, Japanese, and Russian
Pump life	>1,000,000 cycles
Environmental Specifications	Operating temperature: 32°F to 122°F ( 0°C to 50°C)
	Compensated temperature: 32°F to 122°F ( 0°C to 50°C)
	Storage temperature: -20°C to 60°C ( -4°F to 120°F)
	Humidity: <90%, non-condensing
Vibration and Shock	Vibration: 4 g (20 to 2,000 Hz) Shock: 8 g, 1 meter drop test
Compliance	CE
Software Compatibility	ACal, Additel Land and Additel Link for access via mobile application
Warranty	1 year



Pressure gauge / transmitter / switch calibration



Task Menu



High Pressure Automated Calibration

## Pressure Range

Type	Model	Pressure Range	High-Range Pressure Module		Low-Range Pressure Module	
			Range	Accuracy	Range	Accuracy
Low/Differential Pressure	ADT761A-LLP-DPX	-75 to 75 mbar (-30 to 30 inH2O)	DP30: -75 to 75 mbar (-30 to 30 inH2O)	0.05%FS	User selectable from DP20 to DP025	See Internal Module Table
	ADT761A-D-DPXX-X	-0.95 to 2.5 bar (-13.5 to 35 psi)	CP35: -0.95 to 2.5 bar (-13.5 to 35 psi)	0.02%FS	User selectable from DP10 to CP30	See Internal Module Table
Standard Accuracy Gauge/Absolute Pressure	ADT761A-500-CPXX-X	-0.9 to 35 bar (-13 to 500 psi)	CP500: -0.9 to 35 bar (-13 to 500 psi)	0.02%FS	User selectable from CP10 to CP300	See Internal Module Table
	ADT761A-1K-CPXX-X	-0.9 to 70 bar (-13 to 1000 psi)	CP1K: -0.9 to 70 bar (-13 to 1000 psi)	0.02%FS	User selectable from CP30 to CP600	See Internal Module Table

## Pressure Range

Type	Model	Pressure Range	High-Range Pressure Module		Low-Range Pressure Module	
			Range	Accuracy	Range	Accuracy
Precision Accuracy Gauge/Absolute Pressure	ADT761A-AP30R-X	-0.95 to 1 bar (-13.5 to 15 psi)	AP30R: -0.95 to 1 bar (-13.5 to 15 psi)	0.01%FS	Single sensor only	
	ADT761A-AP50R-X	-0.95 to 2.5 bar (-13.5 to 35 psi)	AP50R: -0.95 to 2.5 bar (-13.5 to 35 psi)	0.01%FS	Single sensor only	
	ADT761A-AP100R-X	-0.95 to 7 bar (-13.5 to 100 psi)	AP100R: -0.95 to 7 bar (-13.5 to 100 psi)	0.01%FS	Single sensor only	
	ADT761A-AP300R-X	-0.9 to 21 bar (-13 to 300 psi)	AP300R: -0.9 to 21 bar (-13 to 300 psi)	0.01%FS	Single sensor only	
	ADT761A-AP500R-X	-0.9 to 35 bar (-13 to 500 psi)	AP500R: -0.9 to 35 bar (-13 to 500 psi)	0.01%FS	Single sensor only	
	ADT761A-AP1KR-X	-0.9 to 70 bar (-13 to 1000 psi)	AP1KR: -0.9 to 70 bar (-13 to 1000 psi)	0.01%FS	Single sensor only	

## ORDERING INFORMATION


### Model Number








ADT761A — LLP — DP1 — N






Pressure range:  
See pressure range  
table.

Module Range:  
See internal module  
table

Pressure port type on External  
Pressure Manifold:  
N - 1/4NPT female  
N2 - 1/2NPT female  
B - 1/4BSP female  
B2 - 1/2BSP female  
M - M20X1.5 female

Accessories (included)		
ADT106A-X External Pressure Manifold (Excl ADT761A-LLP)	1 pc	
9818 110V/220V external Power adapter	1 pc	
9725 Chargeable Li-ion battery	1 pc	
9240 DP gauge holder, rubber (Only for ADT761A-LLP)	1 pc	
9060 (Pressure module connection cable)	1 pc	
ADT100-761A-X Hose Test Kit, 5 feet flexible hose (excl ADT761A-LLP)	1 pc + 1 pc adapter	
1220211206 Adapter, quick female to barb (Only for ADT761A-D)	1 pc	

Accessories (included)		
9022 Test Leads for calibrator	2 sets (4 pcs)	
9907 Carrying case for 761A calibrator and accessory	1 pc	
O-rings	20 pcs	
Manual	1 pc	
Pressure Hose	1 pc for the ADT761A-D 1 pc for the ADT761A-BP	
ISO17025 accredited calibration certificate	1 pc	
Threaded plug (Excl ADT761A-LLP)	1 pc	
USB Cable	1 pc	
Barb Fitting (Only for ADT761A-D and ADT761A-BP)	1 pc	
Silicone Tube	1 Meter each 2 pcs for the ADT761A-LLP 1 pc for the ADT761A-D	

Optional Accessories		
ADT160A	See pg. 27 for more info; connection cable sold separately	
9060	Pressure module connection cable	
9530	Additel/ACal Automated Calibration Software	
ADT100-761Hose	ADT761 hose, 5 feet (polyamide, 2,390 psi burst)	
ADT106A-X	External Pressure Manifold (Excl ADT761A-LLP)	
ADT100-761A-X	Hose Test Kit, 5 feet flexible hose	



## Introducing the New Additel 286 Multifunction Reference Thermometer Readout



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# Additel 761

## Automated Pressure Calibrators



### Selection Guide

Model Features	761-LLP	761-D	761-L	761-M	761-H
Pressure Range	-25 to 25 mbar (-10 to 10 inH <sub>2</sub> O)	-0.95 to 1 bar (-13.5 to 15 psi)	-0.95 to 7 bar (-13.5 to 100 psi)	-0.90 to 25 bar (-13 to 375 psi)	-0.90 to 40 bar (-13 to 600 psi)
Pressure Module 1	-2.5 to 2.5 mbar (-1 to 1 inH <sub>2</sub> O)	-25 to 25 mbar (-10 to 10 inH <sub>2</sub> O)	-0.95 to 2.5 bar (-13.5 to 35 psi)	-0.9 to 2.5 bar (-13 to 35 psi)	-0.9 to 2.5 bar (-13 to 35 psi)
Pressure Module 2	-25 to 25 mbar (-10 to 10 inH <sub>2</sub> O)	-0.95 to 1 bar (-13.5 to 15 psi)	0 to 7 bar (0 to 100 psi)	0 to 25 bar (0 to 375 psi)	0 to 40 bar (0 to 600 psi)
Differential Pressure	●	●			
Gauge Pressure	●	●	●	●	●
Absolute Pressure					
Barometric Pressure					
Temperature Compensated	●	●	●	●	●
Built-in Electrical Pump	●	●	●	●	●
Built-in Filter	●	●	●	●	●
Built-in Liquid Trap	●	●	●	●	●
Source 0 to 22mA	●	●	●	●	●
Measure mA or V	●	●	●	●	●
Measure external pressure module	●	●	●	●	●
24V Loop power	●	●	●	●	●
Pressure switch test	●	●	●	●	●
HART Communication	●	●	●	●	●
Documenting	●	●	●	●	●

# Additel 761

## Automated Pressure Calibrators



- Fully automated pressure calibrator with built-in pressure generator / controller to as high as 600 psi (40 bar) or as low as 0.01 Pa (0.00004 inH<sub>2</sub>O)
- 0.02%FS accuracy
- Dual pressure modules
- Built-in filter and liquid trap with venting system prevents contamination of the calibrator
- Portable (12.4 lb)

### OVERVIEW

With a built-in high performance electronic pump and precision pressure controller, the 761 series portable automated pressure calibrators provide a turnkey solution for calibration of gauges, transmitters, and switches both in the field and in the laboratory. In a portable package, this calibrator can automatically generate pressures from 90% vacuum to 600 psi (40 bar) with 0.005% FS pressure control stability and 0.02% FS accuracy. To improve the calibrator accuracy, two pressure modules with differing ranges are built-in and integrated with the internal pump and controller.

The 761-LLP is specially designed for low pressure calibration, and pressures can be set to as low as 0.01 Pa (0.00004 inH<sub>2</sub>O) with a control stability better than 0.05 Pa (0.0002 inH<sub>2</sub>O).

With optional external pressure modules (160A series), the 761 can measure pressures up to 10,000 psi (700 bar) with 0.02%FS accuracy. In addition to the pressure generation, control, and measurement capabilities, the 761 also features HART communication capability, supplies 24V loop power, and reads the current or voltage produced by the pressure transducers. The 761 is a state of the art automated pressure calibrator which brings automated pressure calibration to the field.

## FEATURES

<b>Pressure Range</b>	Pressure generated by built-in pump and controlled automatically from 90% vacuum to 600 psi (40 bar) Pressure measured with external pressure modules (160A series) to 10,000 psi (700 bar)
<b>Accuracy</b>	0.02%FS 0.05%FS (ADT761-LLP)
<b>Control Stability</b>	<0.005%FS ADT761-LLP: < 0.05 Pa (0.0002 inH <sub>2</sub> O)
<b>Contamination Prevention System</b>	Built-in filter and liquid trap with venting system prevent contamination of the calibrator. Solid particles can be blocked by built-in filter A small amount of liquid can be collected by the built-in liquid trap. Both solid particles and liquid can be blown out through the venting system.
<b>Automation and Test Program</b>	Fully Automated pressure calibration Task preset and auto run Auto step
<b>Easy to Use</b>	User friendly interface Intuitive icon driven menu structure
<b>Source and Measuring Electrical Signals</b>	Measure mA with 0.01% RD + 1.5 $\mu$ A accuracy Measure V with 0.01% RD + 1.5 mV accuracy Source/sink 0 to 22 mA current 24 VDC loop power supplied to pressure transmitter during test Automated switch test
<b>Misuse Protection</b>	Up to 30 V misuse protection on any two sockets
<b>Display</b>	7" LCD color screen (800 X 480)
<b>Documenting and On-demand Logging</b>	Task management capability Internal memory stores 200 tasks Download tasks and upload results 900 snapshots
<b>HART Communication Capability</b>	Support HART instrumentation
<b>Pressure Output Rate</b>	2.4 liters/minute
<b>Rechargeable Battery</b>	Rechargeable battery with up to 8 hours operation between charges

<b>Leak Testing</b>	Apply leak test to an external pressure system to determine the magnitude of pressure variations due to leaks
<b>Pipeline Protection</b>	Special design the pipeline layout to avoid possible blockage and leakage
<b>Portable</b>	Only 12.4 lb
<b>Multi Lingual Interface</b>	English, German, French, Italian, Spanish, Portuguese, Simplified Chinese (Traditional Chinese, Japanese and Russian are available per request)
<b>ISO17025</b>	ISO 17025 accredited calibration with data (included)



## SPECIFICATIONS

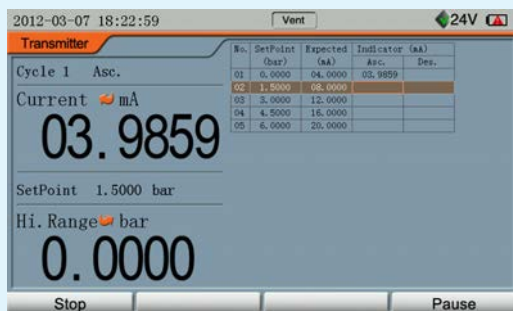
Control Stability	<0.005%FS, FS specification applies to the span of the range <b>ADT761-LLP:</b> < 0.05 Pa (0.0002 inH <sub>2</sub> O)
Pressure Connections	<b>ADT761-L/M/H</b> 1. One ADT100-761 Hose Test Kit with quick connector 1/8 BSP Female on calibrator 2. Two 1/4NPT(or 1/2NPT, 1/4BSP, 1/2BSP, M20x1.5) female hand-tight connectors on the external pressure manifold <b>ADT761-LLP:</b> Stainless steel hose barb fitting
External Pressure Module Connection	Accepts Intelligent Pressure Module
Electrical Connection	0.156 inch (Ø4mm) banana sockets
Documenting and On-demand Logging	Task management capability Internal memory stores 200 tasks Download tasks and upload results
Display	7" LCD color screen (800 × 480) Display rate: 5 readings per second Resolution: 4, 5 or 6 digit, user selectable
Pressure Units	Pa, kPa, MPa, psi, bar, mbar, inH <sub>2</sub> O@4°C, mmH <sub>2</sub> O@4°C, inH <sub>2</sub> O@20°C, mmH <sub>2</sub> O@20°C, inHg@0°C, mmHg@0°C, kgf/cm <sup>2</sup>
Pump Life	>100,000 cycles
Power	Battery: Rechargeable Li-ion Polymer battery (included) Li-Battery working time: ~8 hours Recharge time: ~3 hours External Power: 110/220V Power adapter (DC 27 V) (Included)
Environmental Specification	Operating temperature: 32°F to 122°F (0°C to 50°C) Compensated Temperature: 32°F to 122°F (0°C to 50°C) Storage temperature: -20°C to 60°C (-4°F to 120°F) Humidity: <90%, non-condensing
European Compliance	CE Marked
Communication	RS232 (DB9/F, environmentally sealed) Baud rate: 2400, 4800, 9600, 19200, 38400, 57600, 115200 Data length: 7 Bits, 8 Bits Stop bit: 1 Bit, 2 Bits Address: from 1 to 121
Dimension	11.65 X 7.32 X 7.09 in (296 X186 X180 mm)
Weight	12.4 to 16.3 lb (5.6 to 7.4 kg)
Warranty	18 months



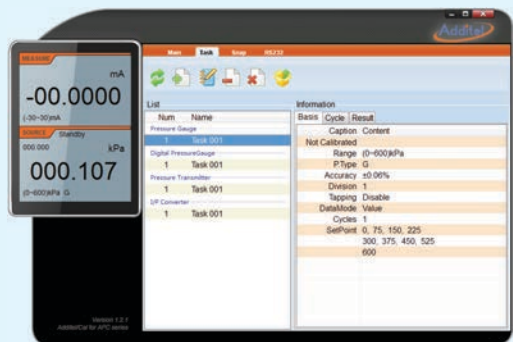
Task Manual



Built-in User's Manual



Pressure gauge / transmitter / switch calibration



Documenting

## Additel 761 Automated Pressure Calibrators



### SPECIFICATIONS

#### ■ Pressure Ranges

Type	Model	Pressure Range	Pressure Module 1		Pressure Module 2	
			Range	Accuracy <sup>[1]</sup>	Range	Accuracy <sup>[1]</sup>
Low/Differential Pressure	ADT761-LLP	-25 to 25 mbar (-10 to 10 inH <sub>2</sub> O)	-2.5 to 2.5 mbar (-1 to 1 inH <sub>2</sub> O)	0.05%FS <sup>[2]</sup>	-25 to 25 mbar (-10 to 10 inH <sub>2</sub> O)	0.05%FS <sup>[2]</sup>
	ADT761-D	-0.95 to 1 bar (-13.5 to 15 psi)	-25 to 25 mbar (-10 to 10 inH <sub>2</sub> O)	0.05%FS <sup>[2]</sup>	-0.95 to 1 bar (-13.5 to 15 psi)	0.02%FS
Gauge Pressure	ADT761-L	-0.95 to 7 bar (-13.5 to 100 psi)	-0.95 to 2.5 bar (-13.5 to 35 psi)	0.02%FS	0 to 7 bar (0 to 100 psi)	0.02%FS
	ADT761-M	-0.90 to 25 bar (-13 to 375 psi)	-0.9 to 2.5 bar (-13 to 35 psi)	0.02%FS	0 to 25 bar (0 to 375 psi)	0.02%FS
	ADT761-H	-0.90 to 40 bar (-13 to 600 psi)	-0.9 to 2.5 bar (-13 to 35 psi)	0.02%FS	0 to 40 bar (0 to 600 psi)	0.02%FS

[1] One year accuracy (including 1 year stability). FS specification applies to the span of the module range.

[2] 0.05% FS accuracy (including 6 months stability). One year accuracy is 0.05% FS calibration accuracy combined with 0.05% FS one year stability.

\* Additel 761 calibrators support 160A series intelligent digital pressure modules that are available for gauge, vacuum and absolute pressure from -15 psi to 10,000 psi (-1 bar to 700 bar). Accuracy from 0.02%FS includes operation over 14°F to 122°F (-10°C to 50°C), one year stability and calibration uncertainty. For detailed specification refer to 160A series pressure modules datasheet.

#### ■ Electrical Measurement and Source Accuracy

	Range	Resolution	Accuracy
Voltage Measurement	±30.0000V	0.1 mV	±(0.01%RD + 1.5 mV)
Current Measurement	±30.0000mA	0.1 µA	±(0.01%RD + 1.5 µA)
Current Source	0.000 to 22.000mA	1 µA	±(0.02%RD + 2.2 µA)
Switch Test	If the switch has detective Voltage, the range is from 3 V to 24 V		
DC 24V output	24 V ± 0.5 V, max: 50 mA		

### ORDERING INFORMATION

#### ■ Model Number

ADT761 — L — N

Pressure range:  
See pressure range  
table.

Pressure port type on External  
Pressure Manifold:

N - 1/4NPT female  
N2 - 1/2NPT female  
B - 1/4BSP female  
B2 - 1/2BSP female  
M - M20X1.5 female











## Additel 761










### Automated Pressure Calibrators



#### ORDERING INFORMATION

Accessories (included)		
External Pressure Manifold (ADT106) (Except 761-LLP)	1 pc	
9818 110 V/220 V external Power adapter	1 pc	
9723 Chargeable Li-ion battery	1 pc	
9022 Test Leads for calibrator	2 sets (4 pcs)	
9020 Short circuit cable	1 set (2 pcs)	
9907 Carrying case for 761 calibrator and accessory	1 pc	
9060 Pressure module connection cable	1 pc	
9240 DP gauge holder, rubber (Only for ADT761-LLP)	1 pc	
ADT100-761 (Except 761-LLP)	1 pc + 3 pcs adapters	
O-rings(Except 761-LLP)	20 pcs	
Manual	1 pc	
Allen wrench	1 set	
ADT100-761Hose (Except 761-LLP: 2 pcs)	1 pcs	
ISO 17025 accredited calibration certificate	1 pc	

\* Additel/Land software could be downloaded for free at [www.additel.com](http://www.additel.com)

Optional Accessories		
Model Number	Description	Picture
ADT100-761-N4	Hose Test Kit, 5 feet flexible hose, 0.156" (Ø4mm) tube to 1/4NPT hand-tight quick connector	
ADT100-761-B4	Hose Test Kit, 5 feet flexible hose, 0.156" (Ø4mm) tube to 1/4BSP hand-tight quick connector	
ADT106-N	External Pressure Manifold (with two 1/4NPT hand-tight quick connectors)	
ADT106-B	External Pressure Manifold (with two 1/4BSP hand-tight quick connectors)	
ADT106-M	External Pressure Manifold (with two M20X1.5 hand-tight quick connectors)	
ADT160A	See pg. 27 for more info; connection cable sold separately	
9050	USB to RS232 (DB9/M) Adapter	
9060	Pressure module connection cable	
9510	Additel/Cal task management software	
ADT100-761Hose	ADT761 hose, 5 feet (polyamide, 2,390 psi burst)	

# Additel 760

## Automatic Handheld Pressure Calibrators

### Selection Guide

Model Features	760-LLP	760-LLP-DL	760-D	760-D-DL	760-MA	760-MA-DL
Pressure Range <sup>[1]</sup>	±30 in H <sub>2</sub> O (±75 mbar)	±30 in H <sub>2</sub> O (±75 mbar)	-12.5 to 35 psi (-0.86 to 2.5 bar)	-12.5 to 35 psi (-0.86 to 2.5 bar)	-12.5 to 300 psig (-0.86 to 20 bar)	-12.5 to 300 psig (-0.86 to 20 bar)
Accuracy (%FS)	0.05 <sup>[1]</sup>	0.05 <sup>[1]</sup>	0.02 <sup>[1]</sup>	0.02 <sup>[1]</sup>	0.02 <sup>[1][3]</sup>	0.02 <sup>[1][3]</sup>
Stability (%FS)	<0.005 <sup>[2]</sup>	<0.005 <sup>[2]</sup>	<0.005 <sup>[2]</sup>	<0.005 <sup>[2]</sup>	<0.005 <sup>[2]</sup>	<0.005 <sup>[2]</sup>
Gauge Pressure	●	●	●	●	●	●
Differential Pressure	●	●	●	●		
Absolute Pressure					●	●
Barometric Pressure					●	●
Removable Internal Module	●	●	●	●	●	●
External Pressure Module	●	●	●	●	●	●
Temperature Compensated	●	●	●	●	●	●
Built-in Electrical Pump	●	●	●	●	●	●
Built-in Filter	●	●	●	●	●	●
Built-in Liquid Trap	●	●	●	●	●	●
Source/Simulate 24 mA	●	●	●	●	●	●
Measure mA or V	●	●	●	●	●	●
24V Loop power	●	●	●	●	●	●
Pressure switch test	●	●	●	●	●	●
HART Communication		●		●		●
Task Documentation		●		●		●
Data Logging		●		●		●
Channels	4	4	4	4	4	4
USB and Wi-Fi	●	●	●	●	●	●

[1] FS specification applies to the span of the module range.

[2] Stability based on FS of the internal pressure module. Internal module is switchable.

[3] Specification based on gauge measurement. An additional 60 pa uncertainty will need to be included when measuring in absolute mode.

# Additel 760

## Automatic Handheld Pressure Calibrators



- Fully automatic calibrator with built-in pump and controller
- Switchable internal pressure modules for expandable ranges
- Accuracy (1 year) of 0.02%FS
- External pressure modules available (measure only)
- Less than 4 lbs (1.8 kg) for handheld operation
- Source pressure, measure pressure and electrical
- 4 channels
- Optional HART communications
- Optional data logging and task documenting
- USB and Wi-Fi communications

### OVERVIEW

A portable automated pressure calibrator in the palm of your hand—this could be our most exciting product yet! The Additel 760 series Automatic Handheld Pressure Calibrator takes portable pressure calibration to new levels. Weighing less than 4 lbs (1.8 kg), the ADT760's innovative design contains a built-in pump, precision pressure sensor, internal controller and a large touch-screen color display. To generate pressure, simply key in the desired pressure and the Additel 760 will do the rest. Each unit has four channels: one internal pressure channel for source and measure pressures, two external pressure measurement channels, and one electronic measure and source channel. This series of calibrator has three standard models with the option of adding HART communications, documentation and data logging.



**Metrology Made Simple**

## FEATURES

### ADT760-LLP

The 760-LLP is designed for low pressure calibration and comes with a build-in pressure module of your choice. The maximum range module compatible with the ADT760-LLP is to  $\pm 30$  inH<sub>2</sub>O ( $\pm 75$  mbar) and provides an accuracy to 0.05%FS (see ordering information for configurations with the option of the ADT760 and a module of your choice). Additional internal pressure modules (ADT155 series) are available and provide a variety of ranges down to  $\pm 0.25$  inH<sub>2</sub>O ( $\pm 0.62$  mbar). The accuracy of 0.05%FS and control stability 0.005%FS is based on the internal module's span. Measurements can be made in gauge or differential mode.

### ADT760-D

The 760-D gives you differential and gauge pressure but at a higher pressure range than the ADT760-LLP. Covering the range of -12.5 to 35 psi (-0.86 to 2.5 bar) and with an accuracy of 0.02%FS, the ADT760-D is an ideal solution to cover very common gauge and differential pressure measurements. The Additel 760-D comes with an internal module of your choice. The maximum range module compatible with the ADT760-D is to 35 psi. Lower pressure configurations down to  $\pm 10$  inH<sub>2</sub>O differential can be purchased to improve accuracy at lower pressures.

### ADT760-MA

The 760-MA generates and controls pressure from vacuum pressures up to 300 psig (20 bar.g) with an accuracy of 0.02%FS. Equipped with a built-in barometric reference, each unit can switch between gauge and absolute pressure types. A variety of internal sensors are available which offer lower pressure ranges for improved performance.



### Documenting Process Functionality

Each model of the Additel 760 series has an option incorporating documentation and communication functions turning your 760 into a multifunction documenting process calibrator. This feature provides HART communication, task documentation and data logging.

### Pressure Specifications

Specification	760-LLP	760-D	760-MA
Max Pressure Range	$\pm 30$ inH <sub>2</sub> O (75 mbar)	-12.5 to 35 psi (-0.86 to 2.5 bar)	-12.5 to 300 psig (-0.86 to 20 bar.g)
Accuracy	0.05%FS <sup>[1]</sup>	0.02%FS <sup>[1]</sup>	0.02%FS <sup>[1][3]</sup>
Stability	<0.005%FS <sup>[2]</sup>	<0.005%FS <sup>[2]</sup>	<0.005%FS <sup>[2]</sup>
Pressure Type	Differential, Gauge	Differential, Gauge	Gauge, Absolute
Over Range Indication	120%		
Resolution	6 digits		
Measurement Units	Pa, hPa, kPa, mPa, bar, mbar, psi, mmHg@0°C, cmHg@0°C, mHg@0°C, inHg@0°C, inH <sub>2</sub> O@4°C, mmH <sub>2</sub> O@4°C, cmH <sub>2</sub> O@4°C, mH <sub>2</sub> O@4°C, mmH <sub>2</sub> O@20°C, cmH <sub>2</sub> O@20°C, mH <sub>2</sub> O@20°C, mH <sub>2</sub> O@68°F, inH <sub>2</sub> O@20°C, kgf/cm <sup>2</sup> , mtorr, torr, lb/ft <sup>2</sup> , tsi, custom		
Barometric Accuracy	N/A	N/A	60 Pa <sup>[4]</sup>
Connection	Barb fitting	Hose, 5 ft (1.5 m), with built-in filter to 1/4BSPF, 1/4NPTF, and M20F adapters	Hose, 5 ft (1.5 m), with built-in filter to 1/4BSPF, 1/4NPTF, and M20F adapters
Pressure Output Rate	<30 Seconds (30 inH <sub>2</sub> O/100 ml)	<10 Seconds (35 psi/5 ml)	<90 Seconds (300 psi/5 ml)

[1] FS specification applies to the span of the module range.

[2] Stability based on FS of the internal pressure module. Stability is 0.005%FS or 0.05 pa whichever is greater. Internal module is switchable.

[3] Specification based on gauge measurement. An additional 60 pa uncertainty will need to be included when measuring in absolute mode.

[4] 60 Pa uncertainty (k=2) includes calibration uncertainty, linearity, and long-term stability (<30 Pa per year). Barometer range of 60 to 110 kPa.

### Electrical Specifications

Specification	Range	Resolution	Accuracy	Note
mA Measure	$\pm 30$ mA	0.0001 mA	0.01%RD+0.005%FS	Impedance <10 $\Omega$
V Measure	$\pm 30$ V	0.0001 V	0.01%RD+0.005%FS	Impedance >1 M $\Omega$
mA Source	24 mA	0.001 mA	0.01%RD+0.005%FS	20 mA @ 1 K
Loop Power Source	24 V	N/A	$\pm 1$ V	50 mA (Max Loading)
Pressure Switch	Open, close. Support for mechanical switches and NPN/PNP digital switches.			
Temperature Compensation	41°F to 95°F (5°C to 35°C)			
Temperature Coefficient	$< \pm (0.001\%RD + 0.001\%FS) / ^\circ C$ outside of 5°C to 35°C			

Module	Module Range <sup>[6]</sup>		Media	Accuracy (%FS) <sup>[1]</sup>	Burst Pressure	760-LLP	760-D	760-MA
	inH <sub>2</sub> O	mbar						
DP025	±0.25	±0.62	G	0.2 <sup>[2]</sup>	100x	●		
DP050	±0.5	±1.25	G	0.1 <sup>[3]</sup>	100x	●		
DP1	±1	±2.5	G	0.05 <sup>[4]</sup>	100x	●		
DP2	±2	±5	G	0.05 <sup>[4]</sup>	100x	●		
DP5	±5	±10	G	0.05 <sup>[4]</sup>	50x	●		
DP10	±10	±25	G	0.05 <sup>[4]</sup>	20x	●	●	
DP20	±20	±50	G	0.05	20x	●	●	
DP30	±30	±75	G	0.05	20x	●	●	
DP50	±50	±125	G	0.05	3x		●	
DP100	±100	±250	G	0.02	3x		●	
DP150	±150	±350	G	0.02	3x		●	
DP300	±300	±700	G	0.02	3x		●	
DP400	-380 to 400	-950 to 1K	G	0.02	3x		●	
DP800	-380 to 800	-950 to 2K	G	0.02	3x		●	
DP1K	-380 to 1K	-950 to 2.5K	G	0.02	3x		●	
Gauge Pressure	psi	bar						
CP10	±10	±0.7	G	0.02 <sup>[5]</sup>	3x		●	●
CP15	-13.5 to 15	-0.95 to 1	G	0.02 <sup>[5]</sup>	3x		●	●
CP30	-13.5 to 30	-0.95 to 2	G	0.02 <sup>[5]</sup>	3x		●	●
CP35	-13.5 to 35	-0.95 to 2.5	G	0.02 <sup>[5]</sup>	3x		●	●
CP50	-13.5 to 50	-0.95 to 3.5	G	0.02 <sup>[5]</sup>	3x			●
CP100	-13.5 to 100	-0.95 to 7	G	0.02 <sup>[5]</sup>	3x			●
CP150	-13.5 to 150	-0.95 to 10	G	0.02 <sup>[5]</sup>	3x			●
CP200	-13.5 to 200	-0.95 to 14	G	0.02 <sup>[5]</sup>	3x			●
CP300	-13.5 to 300	-0.95 to 20	G	0.02 <sup>[5]</sup>	3x			●

[1] FS specification applies to the span of the module range. Accuracy includes one-year stability, except for DP025 to DP10 modules.

[2] Accuracy is a 6 months spec, 1-year long-term drift is 0.2%FS.

[3] Accuracy is a 6 months spec, 1-year long-term drift is 0.1%FS.

[4] Accuracy is a 6 months spec, 1-year long-term drift is 0.05%FS.

[5] Specification based on gauge measurement. An additional 60 pa uncertainty will need to be included when measuring in absolute mode. Applicable only for use with the ADT760-MA

[6] The low module pressure range may be outside the pressure range of the calibrator

\* ADT155 Pressure Modules are calibrated in psi & inH<sub>2</sub>O

## General Specifications

Specification	Description
Channels	Four total: one electrical, one internal pressure, two external pressure (measure only)
Enclosure IP Rating	IP52 water and dust proof
Battery	Rechargeable Li-Ion battery, typically 10 hours of operation, recharges in less than 4 hours
Display	Color 800 x 480 TFT 5-inch touch screen
Communications	USB and WiFi
Weight	<4 lbs (<1.8 kg)
Size	9.3 x 4.3 x 2.8 in (235 x 110 x 70 mm)
Certification	ISO 17025 accredited certificate with data included
HART Communications	Optional (ADT760-X-DL model)
Data Logging	Optional (ADT760-X-DL model), up to 1,000,000 readings (date and time stamped)
Task Documentation	Optional (ADT760-X-DL model) up to 1000 tasks
Automation Functions	Switch test, auto step, leak test
Misuse Protection	Up to 30 V on any two sockets
Multi Lingual Interface	English, German, French, Italian, Spanish, Portuguese, Chinese, Japanese, and Russian
Pump Life	>500,000 cycles
Power	Rechargeable Li-Ion battery, external power: 110/220 V power adapter 10 V
Environment Specifications	Operation: 32°F to 122°F (0°C to 50°C), 0-90% RH, less than 3,000 meters Compensated temperature: 32°F to 122°F (0°C to 50°C) Storage temperature: -4°F to 158°F (-20°C to 70°C)
Vibration and Shock	Vibration: 4 g (20 to 2,000 Hz) Shock: 8 g, 1 meter drop test
Compliance	CE
Software	ACal, PCal, Land, LogII
Warranty	1 year



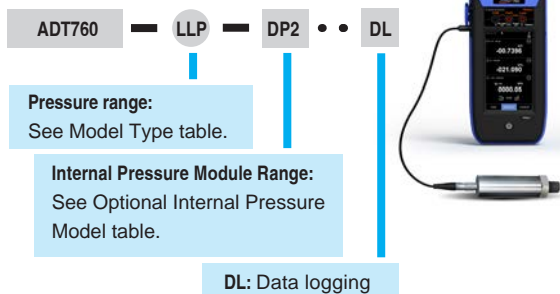
### Optional Internal Pressure Modules

Module Number	Description
ADT155-20-DP025	Pressure module for ADT760-LLP, $\pm 0.25$ inH <sub>2</sub> O, $\pm 0.2\%$ FS
ADT155-10-DP050	Pressure module for ADT760-LLP, $\pm 0.5$ inH <sub>2</sub> O, $\pm 0.1\%$ FS
ADT155-05-DP1	Pressure module for ADT760-LLP, $\pm 1$ inH <sub>2</sub> O, $\pm 0.05\%$ FS
ADT155-05-DP2	Pressure module for ADT760-LLP, $\pm 2$ inH <sub>2</sub> O, $\pm 0.05\%$ FS
ADT155-05-DP5	Pressure module for ADT760-LLP, $\pm 5$ inH <sub>2</sub> O, $\pm 0.05\%$ FS
ADT155-05-DP10	Pressure module for ADT760-LLP & -D $\pm 10$ inH <sub>2</sub> O, $\pm 0.05\%$ FS
ADT155-05-DP20	Pressure module for ADT760-LLP & -D, $\pm 20$ inH <sub>2</sub> O, $\pm 0.05\%$ FS
ADT155-05-DP30	Pressure module for ADT760-LLP & -D, $\pm 30$ inH <sub>2</sub> O, $\pm 0.05\%$ FS
ADT155-05-DP50	Pressure module for ADT760-D, $\pm 50$ inH <sub>2</sub> O, $\pm 0.05\%$ FS
ADT155-02-DP100	Pressure module for ADT760-D, $\pm 100$ inH <sub>2</sub> O, $\pm 0.02\%$ FS
ADT155-02-DP150	Pressure module for ADT760-D, $\pm 150$ inH <sub>2</sub> O, $\pm 0.02\%$ FS
ADT155-02-DP300	Pressure module for ADT760-D, $\pm 300$ inH <sub>2</sub> O, $\pm 0.02\%$ FS
ADT155-02-DP400	Pressure module for ADT760-D, -380 to 400 inH <sub>2</sub> O (-13.5 to 15 psi), $\pm 0.02\%$ FS
ADT155-02-DP800	Pressure module for ADT760-D, -380 to 800 inH <sub>2</sub> O (-13.5 to 30 psi), $\pm 0.02\%$ FS
ADT155-02-DP1K	Pressure module for ADT760-D, -380 to 1K inH <sub>2</sub> O (-13.5 to 35 psi), $\pm 0.02\%$ FS
ADT155-02-CP10	Pressure module for ADT760-D & -MA, $\pm 10$ psi, $\pm 0.02\%$ FS
ADT155-02-CP15	Pressure module for ADT760-D & -MA, -13.5 to 15 psi, $\pm 0.02\%$ FS
ADT155-02-CP30	Pressure module for ADT760-D & -MA, -13.5 to 30 psi, $\pm 0.02\%$ FS
ADT155-02-CP35	Pressure module for ADT760-D & -MA, -13.5 to 35 psi, $\pm 0.02\%$ FS
ADT155-02-CP50	Pressure module for ADT760-D & -MA, -13.5 to 50 psi, $\pm 0.02\%$ FS
ADT155-02-CP100	Pressure module for ADT760-MA, -13.5 to 100 psi, $\pm 0.02\%$ FS
ADT155-02-CP150	Pressure module for ADT760-MA, -13.5 to 150 psi, $\pm 0.02\%$ FS
ADT155-02-CP200	Pressure module for ADT760-MA, -13.5 to 200 psi, $\pm 0.02\%$ FS
ADT155-02-CP300	Pressure module for ADT760-MA, -13.5 to 300 psi, $\pm 0.02\%$ FS

\* ADT155 Pressure modules are calibrated in psi & inH<sub>2</sub>O

## Ordering Information

### Model Number



Model Type	
Model Number	Description
ADT760-LLP	Automatic Handheld Pressure Calibrator, $\pm 30$ inH <sub>2</sub> O
ADT760-LLP-DL	Automatic Handheld Pressure Calibrator, $\pm 30$ inH <sub>2</sub> O w/HART and data logging
ADT760-D	Automatic Handheld Pressure Calibrator, -12.5 to 35 psi
ADT760-D-DL	Automatic Handheld Pressure Calibrator, -12.5 to 35 psi w/HART and data logging
ADT760-MA	Automatic Handheld Pressure Calibrator, -12.5 to 300 psi
ADT760-MA-DL	Automatic Handheld Pressure Calibrator, -12.5 to 300 psi w/HART and data logging

\* Configurations available for ADT760 units with different internal pressure sensor range

Accessories (Included)		
Model	Quantity	Picture
ADT100-760-KIT adapter set (excl ADT760-LLP)	1 set (to 1/4BSPF, to 1/4NPTF, to M20F)	
USB to USB cable (ADT760-X-DL only)	1 pc	
9816-X 110V/220V external power adapter	1 pc	
9724 chargeable Li-ion battery	1 pc	
9025 test leads for calibrator	1 sets (3 pcs)	
ADT100-760 Hose	1 pc for the ADT760-MA	
Pressure Hose	1 pc for the ADT760-D	
Silicone Tube	1 Meter each 2 pcs for the ADT760-LLP 1 pc for the ADT760-D	
1220211206 Adapter, quick female to barb (Only for ADT760-D)	1 pc	
CD Manual	1 pc	
ISO17025 accredited certificate	1 pc	



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### Optional Accessories

Model	Description	Picture
ADT160A	See pg. 27 for more info; connection cable sold separately	
9060	Pressure module connection cable	
ADT100-760-N	Special Connector to 1/4NPT quick connector	
ADT100-760-B	Special Connector to 1/4BSP quick connector	
ADT100-760-M	Special Connector to M20x1.5 quick connector	
ADT100-760-N2	Special Connector to 1/2NPT quick connector	
ADT100-760-B2	Special Connector to 1/2BSP quick connector	
ADT128-B	Pneumatic Pressure Manifold for ADT760, -15 to 3000 psi, single port, 1/4 BSP F	
ADT128-B2	Pneumatic Pressure Manifold for ADT760, -15 to 3000 psi, single port, 1/2 BSP F	
ADT128-N	Pneumatic Pressure Manifold for ADT760, -15 to 3000 psi, single port, 1/4 NPT F	
ADT128-N2	Pneumatic Pressure Manifold for ADT760, -15 to 3000 psi, single port, 1/2 NPT F	
ADT128-M	Pneumatic Pressure Manifold for ADT760, -15 to 3000 psi, single port, M20x1.5	
9240	DP gauge holder, rubber	
1220211087	Filter, set of 1 pc	
9913-760-SC	Soft carrying case for ADT760, test leads, and many accessories	
9914-760	Carry case for ADT760 and various accessories	
ADT100-760-CNT	Special connector (to be used to adapt from the ADT760 to ADT100-760-KIT adapters)	

\* Additel/Land software available for free download at [www.additel.com](http://www.additel.com)

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## Additel 780 Series Pressure Controller



*New Precision Accuracy Models with  
1-Year Uncertainty to 0.01% of Reading*



- Pressure ranges from vacuum to 3,000 psi (200 bar)
- Removable interchangeable intelligent sensors
- Precision accuracy models to 0.01% of reading
- Standalone solution to 1,000 psi (70 bar), no gas bottle required when used with the Electric Pump
- Standard model accuracy of 0.02% of full scale
- External pressure modules to 3,000 psi (200 bar)
- WiFi enabled communications
- Fully temperature compensated accuracy over 0°C to 50°C
- HART Communication and Profibus PA
- Large 7" color touch screen display
- Control stability of 0.003%FS
- Built-in barometer
- Easy-to-use icon based user interface

### OVERVIEW

For years, we've provided the most durable, accurate, quality pressure calibration products for field applications. The Additel 780 series controller incorporates the same durability, accuracy, and quality into a new bench top controller packed with features and functionality that is remarkably easy to use. The Additel 780 series offers two base ranges: to 1,000 psi (70 bar) and to 3,000 psi (200 bar). The base range establishes the maximum controlling range of the controller. Each configuration includes a control sensor which is preselected to the sensor range best suited for your application. External and internal sensors can be used which allows for expanded range and accuracy capability in the future.

There are also two controller types that can be selected: the Additel 780S is the standard controller option without any measurement capability. The Additel 780 has expanded functionality including electrical measurement and HART and Profibus PA communication.

## MODULAR DESIGN

Each unit comes with one Intelligent Pressure Module configured to the many range offerings provided. Standard accuracy sensors (ADT160A-CPXXX) are silicone pressure sensors with a 1 year accuracy of 0.02% FS. The precision accuracy models improve the 1 year accuracy specification to 0.01% of reading from 100% to 30% of range. Each sensor has been specially aged, tested and screened before assembly. After assembly each sensor is temperature compensated over the range of 0°C to 50°C. The Additel 780 series allows for one internal pressure sensor and one external pressure sensor. The modular design of this unit provides for interchangeability of both the internal and external sensors with other Intelligent Pressure Modules.



In addition to the Intelligent Pressure Modules, the Additel 780 series has a built in barometric sensor. This allows for switching between gauge pressures to absolute pressures.

## STANDALONE SOLUTION

Typical pressure controllers will require a nitrogen bottle for the gas supply which make it difficult to move the controller around without having to move or connect to another bottle. The Additel 780 series is unique in that with the optional electric pump, you can generate pressures to 1,000 psi (70 bar) without the need of a gas bottle.



## PROCESS FUNCTIONALITY (excl ADT780S versions)

The 780 Series Pressure Controller is considered to handle a very wide range of applications which may normally require a pressure calibrator. Built-in capability, includes current and voltage measurement capability, 24 volt loop power, HART® and Profibus PA communication, switch measurement capability, and much more.

## MEASUREMENT SPECIFICATIONS

Specification	ADT780-1K	ADT780-3K
Pressure range	-14.5 to 1,000 psi (-0.95 to 70 bar)	-14.5 to 3,000 psi (-0.95 to 200 bar) <sup>[1]</sup>
Control stability	0.003% FS (stability based on % FS of control sensor range)	
Precision (includes 1 year stability)	See pressure range table	
Media	Clean gas	
Over-range indication	103% to 120% (based on sensor)	
Resolution	4, 5, 6, or 7 digits (user selectable) <sup>[2]</sup>	
Pressure type	Gauge, Absolute	
Warm up time	15 minutes	
Measurement units	Pa, hPa, kPa, MPa, bar, mbar, psi, mmHg@0°C, cmHg@0°C, mHg@0°C, inHg@0°C, inH <sub>2</sub> O@4°C, mmH <sub>2</sub> O@4°C, cmH <sub>2</sub> O@4°C, mH <sub>2</sub> O@4°C, mmH <sub>2</sub> O@20°C, cmH <sub>2</sub> O@20°C, mH <sub>2</sub> O@20°C, kg/m <sup>2</sup> , kg/cm <sup>2</sup> , mtorr, torr, atm, lb/ft <sup>2</sup> , tsi, user selectable	
Minimum control pressure <sup>[3]</sup>	0.0001 psi	0.001 psi

[1] HP gas supply required to reach 3,000 psi (200 bar).

[2] 7 digit resolution for precision model only.

[3] Dependent on pressure module.

## BAROMETRIC MEASUREMENT SPECIFICATION

Sensor	Gauge	Absolute
Standard Sensors	N/A	40 Pa <sup>[1]</sup>
Precision Sensors	3 Pa <sup>[2]</sup>	N/A

Barometer range (60–110)kPa, the accuracy is 40 Pa (11 Pa is optional)

[1] 40 Pa uncertainty (k=2) includes calibration uncertainty, linearity, and long term stability (<30 Pa per year). Barometer range of 60 to 120 kPa.

[2] Combined linearity, hysteresis, and repeatability. Add 3 Pa when used in gauge mode. When using the precision sensors with the ADT780 controller in gauge mode, regular zeroing will realign the barometric reading to provide the most accurate result.

## ELECTRICAL MEASURE SPECIFICATIONS<sup>[1]</sup>

Specification	Range	Resolution	Accuracy
Volts DC	-30 to 30 V	0.1 mV	±0.01% rdg + 1.5 mV
	-300 to 300 mV	1 µV	±0.01% rdg + 15 µV
Current DC	-30 to 30 mA	0.1 µA	±0.01% rdg + 1.5 µA
Switch test	If the switch has detected voltage, the range is from 3 – 24 V		
DC 24V output	24 V ± 0.24 V, max 30 mA		

[1] Not available in ADT780S versions








## PHYSICAL SPECIFICATIONS

Specification	ADT780-1K & ADT780-3K
Power	100 to 240 V, 50/60 Hz
Pressure ports	G1/8 F
Storage temperature	-20°C to 70°C
Operating environment	0-90% RH non-condensing
Display	7 inch (17.8 cm) color, touch screen display
Weight	33 lbs (15 kg)
Dimensions (DWH)	16.5 x 17.3 x 5.2 inch (419 x 440 x 132 mm)
Mounting	Standard desktop, optional rack mount kit
Shock	4G
Vibration	1G 10Hz–500Hz







## OTHER SPECIFICATIONS

WiFi specifications	802.11 b, g, and n
Vent	Front panel vent and safety release button (only for 780S)
Communications	RS232, USB, LAN, WIFI
Stability indicator	User selectable
Operating modes	Control, measure, and vent
Display modes	Controller – show pressure indication and control
	Calibrator – shows pressure indication, control, and electrical measurement (excl ADT780S)
Localization	English, Chinese (simplified), German, Spanish, French, Italian, Portuguese, Russian, Japanese
Conformity	CE
Calibration certification	ISO 17025 accredited certificate of calibration with data included
Warranty	1 year

## STANDARD ACCESSORIES

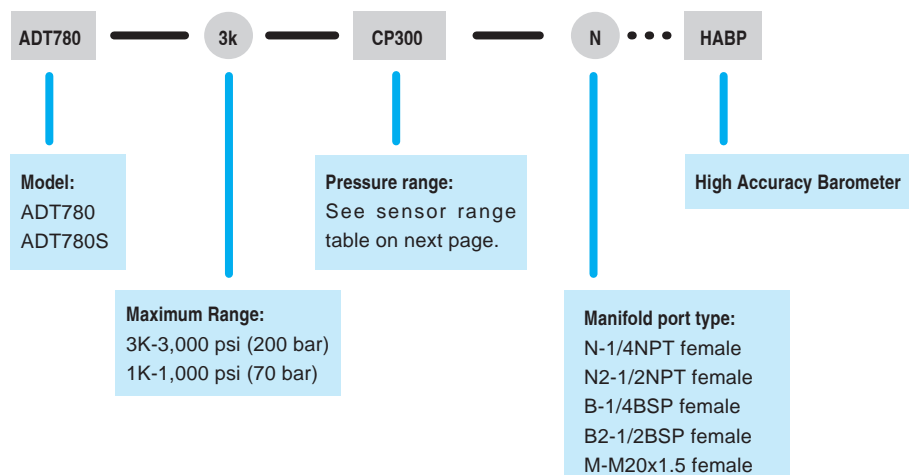
ADT127-X External Manifold	1 pc	
Manifold connection hose	1 pc	
Power adapter	1 pc	
9022 Test leads (except 780S)	2 sets (4 pc)	
9020 Short circuit cable (except 780S)	1 set (2 pc)	
9060 Pressure module connection cable	1 pc	
Adapter set (adapters to fit the ADT78X port to male fittings)	1 set (2 pcs G1/8M to G1/4M, 2 pcs G1/8M to Festo, release valve)	
CD Manual	1 pc	
ISO 17025 accredited certificate	1 pc	
O-rings	2 types	
Vacuum/Vent tubing	2 pc	

## OPTIONAL ACCESSORIES

ADT160A	See pg. 27 for more info; connection cable sold separately	
ADT121-X	External pneumatic pressure manifold, 3,000 psi (200 bar), four hand-tight quick connectors	
ADT780-1K-EPUMP	1,000 psi (70 bar) electrical pump	
9050	RS232 to USB adapter	
9050-EXT	RS 232 (DB9/M) extension cable, 9 feet	
ADT100-FLT-600	Liquid trap	
9912-780	Shipment case for the ADT780 and ADT780S Controller	
9506 Additel/PCal	Manual calibration software	
9530 Additel/ACal	Automated calibration software, Task and asset management	
9245-780	Rack mount kit	
9245-EPUMP	Rack mount kit	

## ADT780 ORDERING INFORMATION (Controller without E-pump)

### Model Number



## Specifications for ADT780 Internal/External Sensors

P/N	Pressure Range		Media	Accuracy <sup>[2]</sup>	Pressure Rating		Suggested Controller Compatibility	Internal/ External Use
	psia	bar.a			Burst	Over Pressure		
Precision Sensors <sup>[1]</sup>								
AP15R	0 to 15	0 to 1	G	0.01% FS	2x	1.2x	ADT780-1K only	Both
AP30R	0 to 30	0 to 2	G	0.01% rdg or 0.003% FS whichever is greater	2x	1.2x	ADT780-1K only	Both
AP50R	0 to 50	0 to 3.5	G	0.01% rdg or 0.003% FS whichever is greater	2x	1.2x	ADT780-1K only	Both
AP100R	0 to 115	0 to 8	G,L	0.01% rdg or 0.003% FS whichever is greater	2x	1.2x	ADT780-1K only	Both
AP300R	0 to 315	0 to 21	G,L	0.01% rdg or 0.003% FS whichever is greater	2x	1.2x	Both	Both
AP500R	0 to 515	0 to 36	G,L	0.01% rdg or 0.003% FS whichever is greater	2x	1.2x	Both	Both
AP1KR	0 to 1,015	0 to 71	G,L	0.01% rdg or 0.003% FS whichever is greater	2x	1.2x	Both	Both
AP2KQ	0 to 2,015	0 to 141	G	0.005% rdg + 0.005% FS	3x	1.1x	ADT780-3K only	Both
AP3KQ	0 to 3,015	0 to 201	G	0.005% rdg + 0.005% FS	3x	1.1x	ADT780-3K only	Both

P/N	Pressure Range		Media	Accuracy	Pressure Rating		Suggested Controller Compatibility	Internal/ External Use
	psig	bar.g			Burst	Over Pressure		
Standard Pressure Sensors								
CP10	±10	±0.7	G	0.02% FS	3x	1.2x	ADT780-1K only	Both
CP15	±15	±1.0	G	0.02% FS	3x	1.2x	ADT780-1K only	Both
CP30	-15 to 30	-1 to 2.0	G	0.02% FS	3x	1.2x	ADT780-1K only	Both
CP50	-15 to 50	-1 to 3.5	G	0.02% FS	3x	1.2x	ADT780-1K only	Both
CP100	-15 to 100	-1 to 7.0	G,L	0.02% FS	3x	1.2x	ADT780-1K only	Both
CP300	-15 to 300	-1 to 20	G,L	0.02% FS	3x	1.2x	Both	Both
CP500	-15 to 500	-1 to 35	G,L	0.02% FS	3x	1.2x	Both	Both
CP600	-15 to 600	-1 to 40	G,L	0.02% FS	3x	1.2x	Both	Both
CP1K	-15 to 1,000	-1 to 70	G,L	0.02% FS	3x	1.2x	Both	Both
CP2K	-15 to 2,000	-1 to 140	G,L	0.02% FS	3x	1.2x	ADT780-3K only	Both
CP3K	-15 to 3,000	-1 to 200	G,L	0.02% FS	3x	1.2x	ADT780-3K only	Both
CP5K	-15 to 5,000	-1 to 350	G,L	0.02% FS	3x	1.2x	N/A	External
CP10K	-15 to 10,000	-1 to 700	G,L	0.02% FS	2x	1.2x	N/A	External

[1] Contact Additel for other range options.

[2] Accuracy includes calibration uncertainty, linearity and long-term stability.

\*\*Low pressure sensors (ADT160A-XX-DPX) available for low pressure and differential pressure measurement. Also available for low pressure control (gauge mode only). Ranges from ±1 inH<sub>2</sub>O (2.5 mbar) to 300 inH<sub>2</sub>O (700 mbar).

# Electric Pump

## Additel 780-1K-EPUMP

- Generates Vacuum to 1,000 psi (70 bar)
- Built-in filter and liquid trap



### ■ 1,000 psi (70 bar) Electric Pump Specifications

Pressure range	-13.5 to 1,080 psi (-0.95 to 75 bar)
Weight	69.6 lbs (31.6 kg)
Size(WHD)	17.3 X 9.3 X 21.7 inch (440 X 235X 550 mm)
Power	100 to 240 V
Media	Air
Volume	150 mL
Outlet port	G1/8 F
Storage temperature	-20°C to 70°C
Operating environment	0-90% RH non-condensing
Mounting	Standard desktop, optional rack mount
Control operation	2 LED displays with pressure limit settings
Typical max pressure time	Approx 2 min with ADT780 Controller

# Additel 160A

## Intelligent Digital Pressure Modules



- Pressure ranges to 60,000 psi (4,200 bar)
- Precision accuracy to 0.01% RD
- Pressure measurement accuracy of 0.02% FS
- Fully temperature compensated accuracy



Gauge pressure      Differential pressure

### OVERVIEW

With advanced microprocessor technology and state-of-the-art silicon pressure sensors, the Additel 160A series Intelligent Digital Pressure Module (IDPM) provides an accurate, reliable, and economic solution for wide range of pressure applications. It is loaded with functionality and remarkably easy to use. In order to reach the best performance, every silicon pressure sensor in the module has been specially aged, tested and screened before assembly. Designed as external pressure module for Additel 760 automatic handheld pressure calibrator, Additel 761 automated pressure calibrator and Additel 222A, Additel 223A and Additel 780 calibrators, the Additel 160A IDPM is unmatched in performance and reliability.

### FEATURES

- Precision sensor measurement accuracy to 0.01% RD
- Gauge pressure measurement accuracy of 0.02% FS
- Absolute Pressure measurement accuracy of 0.1% FS
- Pressure ranges to 60,000 psi (4,200 bar)
- Advanced temperature compensation
- ISO 17025 accredited calibration and data included

### PRESSURE RANGE

Differential Pressure						
P/N	Pressure Range <sup>[1]</sup>		Media	Accuracy (%FS)	Burst Pressure	Static Pressure Range
	(inH <sub>2</sub> O)	(mbar)				
DP1	±1	±2.5	G	0.05 <sup>[2]</sup>	100x	±10 psi
DP2	±2	±5.0	G	0.05 <sup>[2]</sup>	100x	±10 psi
DP5	±5	±10	G	0.05 <sup>[2]</sup>	50x	±10 psi
DP10	±10	±25	G	0.05 <sup>[2]</sup>	20x	±10 psi
DP20	±20	±50	G	0.05	20x	±10 psi
DP30	±30	±75	G	0.05	20x	±10 psi
DP50	±50	±160	G	0.05	3x	±10 psi
DP100	±100	±250	G	0.02	3x	±15 psi
DP150	±150	±350	G	0.02	3x	50 psi
DP300	±300	±700	G	0.02	3x	50 psi

[1] FS specification applies to the span of the range. Accuracy includes 1 year stability.

[2] 0.05%FS accuracy (incl 6 months stability). One year accuracy is 0.05%FS calibration accuracy combined with 0.05%FS one year stability.

Gauge Pressure <sup>[1]</sup>					
P/N	Pressure Range		Media <sup>[2]</sup>	Accuracy(%FS)	Burst Pressure
	(psi)	(bar)			
V15	-15	-1.0	G	0.02	3x
GP2	2	0.16	G	0.05	3x
GP5	5	0.35	G	0.05	3x
GP10	10	0.7	G	0.02	3x
GP15	15	1.0	G	0.02	3x
GP30	30	2.0	G	0.02	3x
GP50	50	3.5	G , L	0.02	3x
GP100	100	7.0	G , L	0.02	3x
GP150	150	10	G , L	0.02	3x
GP300	300	20	G , L	0.02	3x
GP500	500	35	G , L	0.02	3x
GP600	600	40	G , L	0.02	3x
GP1K	1,000	70	G , L	0.02	3x
GP2K	2,000	140	G , L	0.02	3x
GP3K	3,000	200	G , L	0.02	3x
GP5K	5,000	350	G , L	0.02	3x
GP10K	10,000	700	G , L	0.02	2x
GP15K	15,000	1,000	G , L	0.05	2x
GP20K	20,000	1,400	G , L	0.05	1.5x
GP25K	25,000	1,600	G , L	0.1	1.5x
GP30K	30,000	2,000	G , L	0.1	1.5x
GP36K	36,000	2,500	G , L	0.1	1.5x
GP40K	40,000	2,800	G , L	0.1	1.35x
GP50K	50,000	3,500	G , L	0.1	1.2x
GP60K	60,000	4,200	G , L	0.1	1.1x

[1]. Sealed gauge pressure for above 1000 psi

[2]. G=Gas, L=Liquid

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## SPECIFICATIONS

Precision Sensors <sup>[1]</sup> - Absolute Pressure						
P/N	Pressure Range		Media	Accuracy <sup>[2]</sup>	Pressure Rating	
	psia	bar.a			Burst	Over Pressure
AP15R	0 to 15	0 to 1	G	0.01% FS	2x	1.2x
AP30R	0 to 30	0 to 2	G	0.01% rdg or 0.003% FS whichever is greater	2x	1.2x
AP50R	0 to 50	0 to 3.5	G	0.01% rdg or 0.003% FS whichever is greater	2x	1.2x
AP100R	0 to 115	0 to 8	G,L	0.01% rdg or 0.003% FS whichever is greater	2x	1.2x
AP300R	0 to 315	0 to 21	G,L	0.01% rdg or 0.003% FS whichever is greater	2x	1.2x
AP500R	0 to 515	0 to 36	G,L	0.01% rdg or 0.003% FS whichever is greater	2x	1.2x
AP1KR	0 to 1,015	0 to 71	G,L	0.01% rdg or 0.003% FS whichever is greater	2x	1.2x
AP2KQ	0 to 2,015	0 to 141	G	0.005% rdg + 0.005% FS	3x	1.1x
AP3KQ	0 to 3,015	0 to 201	G	0.005% rdg + 0.005% FS	3x	1.1x
AP6KQ	0 to 6,000	0 to 400	G,L	0.01% FS	3x	1.2x
AP10KQ	0 to 10,000	0 to 700	G,L	0.01% FS	2x	1.2x
AP15KQ	0 to 15,000	0 to 1,000	G,L	0.01% FS	2x	1.2x
AP20KQ	0 to 20,000	0 to 1,400	G,L	0.01% FS	2x	1.2x
AP30KQ	0 to 30,000	0 to 2,000	G,L	0.02% FS	1.5x	1.1x
AP40KQ	0 to 40,000	0 to 2,800	G,L	0.02% FS	1.5x	1.1x

[1] Contact Additel for other range options.

[2] Accuracy includes calibration uncertainty, linearity and long-term stability.

Compound Pressure						
P/N	Pressure Range		Media	Accuracy	Pressure Rating	
	psig	bar.g			Burst	Over Pressure
CP2	±2	±0.16	G	0.05% FS	3x	1.2x
CP5	±5	±0.35	G	0.02% FS	3x	1.2x
CP10	±10	±0.7	G	0.02% FS	3x	1.2x
CP15	±15	±1.0	G	0.02% FS	3x	1.2x
CP30	-15 to 30	-1 to 2.0	G	0.02% FS	3x	1.2x
CP50	-15 to 50	-1 to 3.5	G	0.02% FS	3x	1.2x
CP100	-15 to 100	-1 to 7.0	G,L	0.02% FS	3x	1.2x
CP300	-15 to 300	-1 to 20	G,L	0.02% FS	3x	1.2x
CP500	-15 to 500	-1 to 35	G,L	0.02% FS	3x	1.2x
CP600	-15 to 600	-1 to 40	G,L	0.02% FS	3x	1.2x
CP1K	-15 to 1,000	-1 to 70	G,L	0.02% FS	3x	1.2x
CP2K	-15 to 2,000	-1 to 140	G,L	0.02% FS	3x	1.2x
CP3K	-15 to 3,000	-1 to 200	G,L	0.02% FS	3x	1.2x
CP5K	-15 to 5,000	-1 to 350	G,L	0.02% FS	3x	1.2x
CP10K	-15 to 10,000	-1 to 700	G,L	0.02% FS	2x	1.2x

Absolute Pressure					
P/N	Pressure Range		Media	Accuracy(%FS)	Burst Pressure
	(psi)	(bar)			
AP5	5	0.35	G	0.1	3x
AP10	10	0.7	G	0.1	3x
AP15	15	1.0	G	0.1	3x
AP30	30	2.0	G	0.1	3x
AP50	50	3.5	G	0.1	3x
AP100	100	7.0	G , L	0.05 (0.1)	3x
AP300	300	20	G , L	0.05 (0.1)	3x
AP500	500	35	G , L	0.05 (0.1)	3x
AP1K	1,000	70	G , L	0.05 (0.1)	3x
AP3K	3,000	200	G , L	0.05 (0.1)	3x
AP5K	5,000	350	G , L	0.05 (0.1)	3x

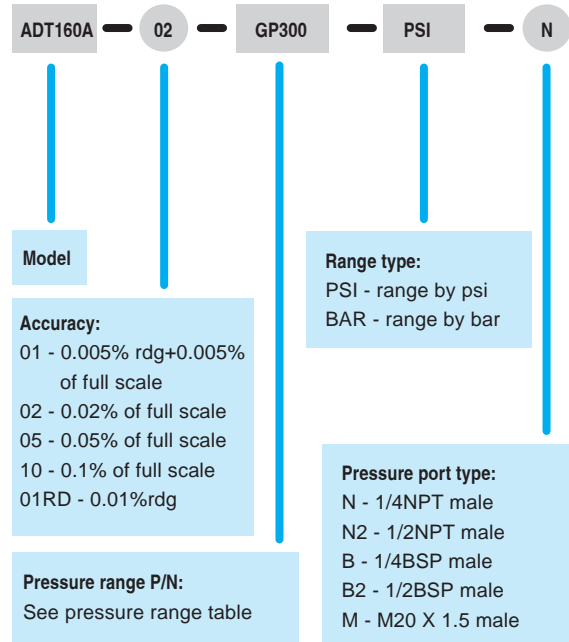
Barometric Pressure					
P/N	Pressure Range		Media	Accuracy	Burst Pressure
	Low	High			
BP	60 kPa	110 kPa	G	40 Pa	3x



Additel 223A with ADT160A Pressure Module

## ORDERING INFORMATION


## Model Number



## Accessories included

ISO 17025 accredited Calibration Certificate

## Optional Accessories

Model number	Description	Picture
9060	Pressure module connection cable	

## SPECIFICATIONS

	Standard Accuracy			Precision Accuracy	
	CPXXX	DPXXX	GPXXX	APXXQ	APXXR
Operating temperature	-10°C to 50°C (14°F to 122°F)			15°C to 25°C (59°F to 77°F)	10°C to 30°C (50°F to 86°F)
Storage temperature	-20°C to 70°C (-4°F to 158°F)			-20°C to 70°C (-4°F to 158°F)	
Relative humidity	95% RH			90% RH	
Pressure connections (for external use only)	1/4NPT, 1/2NPT, 1/4BSP, 1/2BSP, M20x15			1/4NPT, 1/2NPT, 1/4BSP, 1/2BSP, M20x15	
Enclosure (for external use only)	SS enclosure			SS enclosure	
Dimensions (Dia x H)	33 mm x 123 mm (1.3" x 4.84")			Depends on the model	44 mm x 195 mm (1.7" x 7.7")
Weight	0.4 kg (0.99 lb)			Depends on the model	0.7 kg (1.5 lb)
Warranty	1 Year			1 Year	1 Year

# Additel Pressure Gauge Selection Guide



Metrology Made Simple

Series Feature	ADT672 Series Digital Pressure Calibrator		ADT681 Series Digital Pressure Gauge		ADT680 Series Digital Pressure Gauge	
Gauge Pressure	•		•		•	
Compound Pressure	•		•		•	
Absolute Pressure	•		•			
Differential Pressure	•		•			
Accuracy Classes	0.02% & 0.05%FS 15K & 20K psi: 0.05%FS > 20K psi: 0.1%FS		0.02%, 0.05%, 0.1%, & 0.2%FS & 0.1%RD 15K & 20K psi: 0.05%, 0.1%, 0.2%FS & 0.1%RD >20K psi: 0.1% & 0.2%FS		0.05%, 0.1%, & 0.25%FS > 20K psi: 0.1% & 0.25%FS	
Digital Display	•		•		•	
Analog Display (Fan-Shaped Indication)			•			
Fully Temperature Compensation from -10 C to 50 C	•		•		•	
Resolution						
6-Digit Resolution	•					
5-Digit Resolution	•		•		•	
Selectable Pressure Units	11		11		19	
Backlight	•		•		•	
Over Pressure Indication	•		•		•	
IS Certification (optional – not available for panel mount)			ADT681IS only (≥GP15)			
IP67 Certification					•	
Panel Mount (optional)			•			
Wireless					680W only	
Data Logging	•		Optional		680W only	
Min/Max	•		•		•	
Built-in Leak Test	•				•	
HART Communication	•					
Measure mA and V	•					
24V Loop Power	•					
Switch Test	•					
ISO17025 accredited Certificate of Calibration	•		•		•	
Power		Rechargeable battery	9 V battery (120/220 V adapter is optional)		2AA batteries	
Series Pressure	Pressure Range		Media	ADT672 Series Digital Pressure Calibrator	ADT681 Series Digital Pressure Gauge	ADT680 Series Digital Pressure Gauge
	psi	bar				
Gauge						
V15	-15 to 0	-1 to 0	G	•	•	•
GP5	0 to 5	0 to 0.35	G, L	•	•	
GP10	0 to 10	0 to 0.7	G, L	•	•	
GP15	0 to 15	0 to 1	G, L	•	•	•
GP30	0 to 30	0 to 2	G, L	•	•	•
GP50	0 to 50	0 to 3.5	G, L	•	•	
GP100	0 to 100	0 to 7	G, L	•	•	•
GP150	0 to 150	0 to 10	G, L	•	•	•
GP300	0 to 300	0 to 20	G, L	•	•	•
GP500	0 to 500	0 to 35	G, L	•	•	•

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Series Pressure	Pressure Range		Media	ADT672 Series Digital Pressure Calibrator	ADT681 Series Digital Pressure Gauge	ADT680 Series Digital Pressure Gauge
	psi	bar				
GP600	0 to 600	0 to 40	G, L	•	•	
GP1K	0 to 1K	0 to 70	G, L	•	•	•
GP2K	0 to 2K	0 to 140	G, L	•	•	
GP3K	0 to 3K	0 to 200	G, L	•	•	•
GP5K	0 to 5K	0 to 350	G, L	•	•	•
GP10K	0 to 10K	0 to 700	G, L	•	•	•
GP15K	0 to 15K	0 to 1K	G, L	•	•	•
GP20K	0 to 20K	0 to 1.4K	G, L	•	•	•
GP25K	0 to 25K	0 to 1.6K	G, L	•	•	•
GP30K	0 to 30K	0 to 2K	G, L	•	•	•
GP36K	0 to 36K	0 to 2.5K	G, L	•	•	•
GP40K	0 to 40K	0 to 2.8K	G, L	•	•	•
GP50K	0 to 50K	0 to 3.5K	G, L	•	•	•
GP60K	0 to 60K	0 to 4.2K	G, L	•	•	•
Compound						
CP2	±2	±0.16	G	•	•	
CP5	±5	±0.35	G	•	•	
CP10	±10	±0.7	G	•	•	
CP15	±15	±1	G	•	•	•
CP30	-15 to 30	-1 to 2	G	•	•	•
CP100	-15 to 100	-1 to 7	G, L	•	•	
CP300	-15 to 300	-1 to 20	G, L	•	•	
Absolute						
AP5	5	0.35	G	•	•	
AP10	10	0.7	G	•	•	
AP15	15	1	G	•	•	
AP30	30	2	G	•	•	
AP50	50	3.5	G	•	•	
AP100	100	7	G, L	•	•	
AP300	300	20	G, L	•	•	
AP500	500	35	G, L	•	•	
AP1K	1K	70	G, L	•	•	
AP3K	3K	200	G, L	•	•	
AP5K	5K	350	G, L	•	•	
Differential						
	inH <sub>2</sub> O	mbar				
DP1	±1	±2.5	G	•	•	
DP2	±2	±5	G	•	•	
DP5	±5	±10	G	•	•	
DP10	±10	±25	G	•	•	
DP20	±20	±50	G	•	•	
DP30	±30	±75	G	•	•	
DP50	±50	±160	G	•	•	
DP100	±100	±250	G	•	•	
DP150	±150	±350	G	•	•	
DP300	±300	±700	G	•	•	

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# Additel 672

## Digital Pressure Calibrators



- Pressure ranges to 60,000 psi (4,200 bar)
- HART Communication capability
- Measure mA or V, and with 24V loop power
- Easy-to-use, inexpensive pressure calibrator with uncertainty better than 0.02%FS



Gauge pressure

Differential pressure

### OVERVIEW

At first glance, the 672 series precision pressure calibrators look like an ordinary pressure gauge. But this series is much more than ordinary, and definitely more than just a pressure gauge—it's a pressure calibrator! With advanced microprocessor technology and state-of-the-art silicon pressure sensors, the 672 series precision pressure calibrators provide a pressure calibration solution for gauges, transmitters, and switches over a wide pressure range. The 672 is the size of a pressure gauge but with the functionality of a calibrator: It measures pressure precisely with a built-in pressure sensor, as well as reads the current or mV produced by a transducer. It can even supply an excitation voltage to power sensors or transmitters during calibration. In order to reach 0.02%FS accuracy up to 10,000 psi (700 bar) and 0.1%FS accuracy up to 60,000 psi (4,200 bar), every silicon pressure sensor has been specially aged, tested, and screened before assembly. The 672 series precision pressure calibrators are unmatched in performance and reliability.

### FEATURES

- Pressure ranges to 60,000 psi (4,200 bar)
- Measure mA with 0.01% RD + 1.5  $\mu$ A accuracy
- Measure V with 0.01% RD + 1.5 mV accuracy
- Power transmitters during test using 24V loop supply
- Pressure switch test
- HART Communication capability
- Advanced temperature compensation
- Dual readout
- Min/Max/Hold to capture changing measurements
- Data logging
- Large, easy to read display with 6-digit resolution
- Backlit display
- Rechargeable battery or AC adapter
- ISO 17025 accredited calibration with data (Included)



## SPECIFICATIONS

Accuracy	ADT672-02: 0.02% of full span
	ADT672-05: 0.05% of full span
	>20,000 (1,400 bar): 0.1% FS
Gauge Types	Gauge pressure, compound pressure, absolute pressure, differential pressure
Display	Description: Dual-line 6 full digit FSTN LCD with LED Backlight
	Display rate: 3.5 readings per second (Default setting).
	Numeral display height: 16.5 mm (0.65")
Pressure Units	Pa, kPa, MPa, psi, bar, mbar, kgf/cm <sup>2</sup> , inH <sub>2</sub> O@4°C, mmH <sub>2</sub> O@4°C, inHg@0°C, mmHg@0°C
Environmental	Compensated Temperature: 14°F to 122°F (-10°C to 50°C)
	Operating Temperature: 14°F to 122°F (-10°C to 50°C)
	Storage Temperature: -4°F to 158°F (-20°C to 70°C)
Pressure Port	Humidity: <95%
	≤15,000 psi: 1/4NPT male, 1/2NPT male, 1/4BSP male, 1/2BSP male, M20x1.5 male
	>15,000 psi: 1/4HP female or 1/4HP male
	*1/4HP female: Autoclave F-250-C, 9/16" - 18 UNF-2B
	*1/4HP male: Autoclave M-250-C, 9/16" - 18 UNF-2A
Over Pressure Warning	Differential Pressure: 0.236 inch (Ø6 mm) test hose
	Other connections available per request
Electrical Connection	120%
Electrical Measurement Accuracy	0.156 inch (Ø4 mm) sockets
	Voltage DC: ±30.0000 V, ± (0.01%RD + 1.5 mV)
	Current DC: ±30.0000 mA, ± (0.01%RD + 1.5 µA)
	DC 24 V: 24 V±0.5 V, MAX:50 mA, Protect at: 120 mA
Power	Switch <sup>[1]</sup> : Status OPEN/CLOSED
	Battery: Rechargeable Li-ion polymer battery
	Li-Battery working time: 40 hours
	Recharge time: 4 hours
	External power: 110 V/220 V power adapter (DC10 V)
Enclosure	Case material: Aluminum alloy
	Wetted parts: 316L SS
	Dimension: Ø120 mm X 46 mm depth X 184 mm height
	Weight: 0.7 kg
Data Logging	Protection Level: IP30
	Storage capacity: 30 files, 40 records per file
	Mode: manual and automatic
	Hourly-record: record the data every hour
Compliance	Interval-record: set by user
	CE Marked
Communication	RS232 (DB9/F, environmentally sealed)
	Baud rate: 1200, 2400, 4800, 9600
	Data length: 8 bits
	Stop bit: 2 bits
Warranty	Address: from 1 to 112
	1 year

[1] 1V~12V if switch has detective voltage



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## PRESSURE RANGE

Gauge Pressure <sup>[1]</sup>					
P/N	Pressure Range		Media <sup>[2]</sup>	Accuracy(%FS)	Burst Pressure
	(psi)	(bar)			
V15	-15	-1.0	G	0.02 (0.05)	3x
GP2	2	0.16	G	0.05	3x
GP5	5	0.35	G, L	0.05	3x
GP10	10	0.7	G, L <sup>[3]</sup>	0.02 (0.05)	3x
GP15	15	1.0	G, L <sup>[3]</sup>	0.02 (0.05)	3x
GP30	30	2.0	G, L <sup>[3]</sup>	0.02 (0.05)	3x
GP50	50	3.5	G, L	0.02 (0.05)	3x
GP100	100	7.0	G, L	0.02 (0.05)	3x
GP150	150	10	G, L	0.02 (0.05)	3x
GP300	300	20	G, L	0.02 (0.05)	3x
GP500	500	35	G, L	0.02 (0.05)	3x
GP600	600	40	G, L	0.02 (0.05)	3x
GP1K	1,000	70	G, L	0.02 (0.05)	3x
GP2K	2,000	140	G, L	0.02 (0.05)	3x
GP3K	3,000	200	G, L	0.02 (0.05)	3x
GP5K	5,000	350	G, L	0.02 (0.05)	3x
GP10K	10,000	700	G, L	0.02 (0.05)	3x
GP15K	15,000	1,000	G, L	0.05 (0.1)	2x
GP20K	20,000	1,400	G, L	0.05 (0.1)	1.5x
GP25K	25,000	1,600	G, L	0.1	1.5x
GP30K	30,000	2,000	G, L	0.1	1.5x
GP36K	36,000	2,500	G, L	0.1	1.5x
GP40K	40,000	2,800	G, L	0.1	1.35x
GP50K	50,000	3,500	G, L	0.1	1.2x
GP60K	60,000	4,200	G, L	0.1	1.1x

[1] Sealed gauge pressure for above 1,000 psi

[2] G=Gas, L=Liquid

[3] 0.02% FS for gas media only

Compound Pressure					
P/N	Pressure Range		Media	Accuracy(%FS) <sup>[1]</sup>	Burst Pressure
	(psi)	(bar)			
CP2	±2	±0.16	G	0.05	3x
CP5	±5	±0.35	G	0.02 (0.05)	3x
CP10	±10	±0.7	G	0.02 (0.05)	3x
CP15	±15	±1	G	0.02 (0.05)	3x
CP30	-15 to 30	-1 to 2	G	0.02 (0.05)	3x
CP100	-15 to 100	-1 to 7	G, L	0.02 (0.05)	3x
CP300	-15 to 300	-1 to 20	G, L	0.02 (0.05)	3x

[1] FS specification applies to the span of the range

Absolute Pressure					
P/N	Pressure Range		Media	Accuracy(%FS)	Burst Pressure
	(psi)	(bar)			
AP5	5	0.35	G	0.1	3x
AP10	10	0.7	G	0.1	3x
AP15	15	1.0	G	0.1	3x
AP30	30	2.0	G	0.1	3x
AP50	50	3.5	G	0.1	3x
AP100	100	7.0	G , L	0.05 (0.1)	3x
AP300	300	20	G , L	0.05 (0.1)	3x
AP500	500	35	G , L	0.05 (0.1)	3x
AP1K	1,000	70	G , L	0.05 (0.1)	3x
AP3K	3,000	200	G , L	0.05 (0.1)	3x
AP5K	5,000	350	G , L	0.05 (0.1)	3x

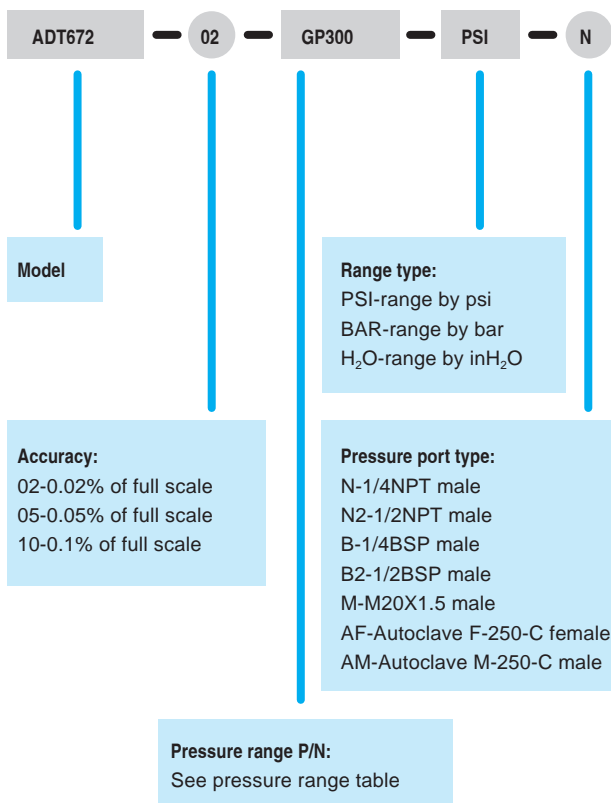
Differential Pressure						
P/N	Pressure Range		Media	Accuracy (%FS) <sup>[1]</sup>	Burst Pressure	Static Pressure Range
	(inH <sub>2</sub> O)	(mbar)				
DP1	±1	±2.5	G	0.05 <sup>[2]</sup>	100x	±10 psi
DP2	±2	±5.0	G	0.05 <sup>[2]</sup>	100x	±10 psi
DP5	±5	±10	G	0.05 <sup>[2]</sup>	50x	±10 psi
DP10	±10	±25	G	0.05 <sup>[2]</sup>	20x	±10 psi
DP20	±20	±50	G	0.05	20x	±10 psi
DP30	±30	±75	G	0.05	20x	±10 psi
DP50	±50	±160	G	0.05	3x	±10 psi
DP100	±100	±250	G	0.02	3x	±15 psi
DP150	±150	±350	G	0.02	3x	50 psi
DP300	±300	±700	G	0.02	3x	50 psi

[1] FS specification applies to the span of the range. Accuracy includes one year stability.

[2] 0.05%FS accuracy (incl 6 months stability). One year accuracy is 0.05%FS calibration accuracy combined with 0.05%FS one year stability.

## ORDERING INFORMATION

### Model Number



### Accessories Included

110 V/220 V external power adapter (DC 10 V)
2 pieces test leads (1.5-meter) and 2 pieces alligator clips
2 pieces 0.236 inch (Ø6 mm) test hose (for differential pressure gauge only)
Additel/Land software (free download at <a href="http://www.additel.com">www.additel.com</a> )
Manual
ISO 17025 accredited calibration certificate

### Optional Accessories

Model number	Description
9702	Spare rechargeable Li-ion polymer battery for 672
9816	Spare 110 V/220 V external power adapter (DC 10 V) for ADT22X and ADT672 calibrator
9502	Additel/Log II real time data logging and graphical software for 681 and 672
9530-BASIC	Additel/Acal Automated calibration software with asset management, basic version
9530-NET	Additel/Acal Automated calibration software with asset management, network version, Includes server installation and 1 user license
9050	USB to RS232 (DB9/M) Adapter
9050-EXT	RS 232 (DB9/M) extension cable, 9 feet
9900-672	Carrying Case for one 672 digital pressure gauge
9022	Spare 2 pieces test leads (1.5-meter) and 2 pieces alligator clips

## Application Note



### Understanding Accuracy Specifications for Digital Pressure Sensors – Percentage of Full Span Versus Percentage of Reading

Specifications for digital pressure gauges can sometimes seem confusing or overwhelming, especially, if you are unfamiliar with the terminology. Some pressure sensors will specify accuracy as a percent of full span (FS) while others provide the specification as a percent of reading. So why are there different ways of specifying the accuracy of pressure sensors and is percent of reading more accurate than percent of full span or vice versa? This brief technical note will discuss the two differences and answer these questions.

#### Percentage of Reading Accuracy

**Figure 1 - Percent reading accuracy example**  
 Full scale: 0 to 100 psi  
 Accuracy: 20 to 100% FS: 0.1% of reading  
 0 to 20% FS: 0.02% of FS

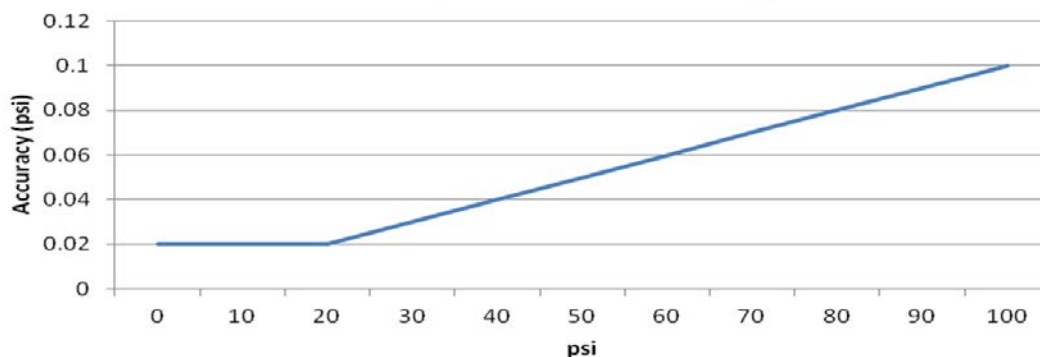
psi	Accuracy (psi)
0	0.02
10	0.02
20	0.02
30	0.03
40	0.04
50	0.05
60	0.06
70	0.07
80	0.08
90	0.09
100	0.10

Accuracy as a percentage of reading is accomplished by multiplying the accuracy percentage by the pressure reading. Thus, the lower the pressure measurement, the better the accuracy. Instruments that have a percent reading specification are accompanied with a floor specification. The floor specification takes into account uncertainties such as resolution and measurement noise which may be negligible at higher pressures but are of much more significance at lower pressures.

For example, an accuracy specification may read 0.1% of reading for 20 to 100% of range and 0.02% of full scale below 20% of the range. The 0.02% of full scale specification is considered the floor specification. To understand the accuracy of the sensor, the user is then required to know where the floor spec is applicable and the full scale of the sensor.

This method of specification is often used because it aligns well with the typical performance of pressure gauges. Typically, the closer you measure to barometric pressure the better the performance of the gauge. Figures 1 and the graph below show an example specification for a 100 psi gauge and its accuracy in psi.

#### Accuracy 0.1% of Reading



## Percentage of Full Scale Accuracy

psi	Accuracy (psi)	0.05%FS
0	0.05	
10	0.05	
20	0.05	
30	0.05	
40	0.05	
50	0.05	
60	0.05	
70	0.05	
80	0.05	
90	0.05	
100	0.05	

Accuracy as a percentage of full scale is calculated by multiplying the accuracy percentage by the full scale pressure of the gauge. This is obviously a more simple method of specification and is most commonly used in industry because it is easy to calculate and interpret. Denoting the accuracy as percent full scale is a more conservative way of specifying the pressure sensor because typically the sensor doesn't perform the same over its full range. It usually will perform more accurately as you approach barometric pressure. This type of specification is most common for industrial gauges which make it easier to compare one gauge versus another. Figure 2 is an example specification for a 100 psi gauge and its accuracy in psi.

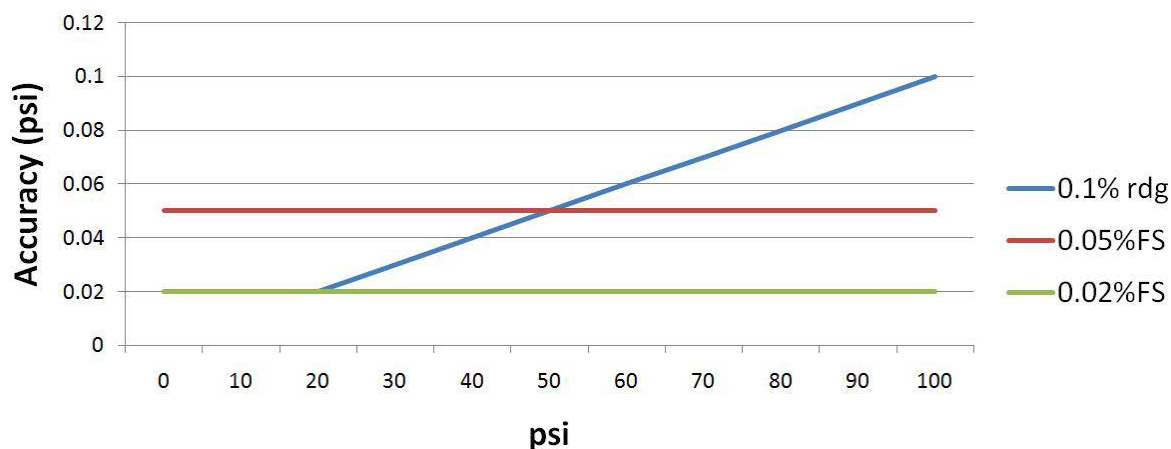
## A Comparison of Percent of Full Scale and Percent of Reading Accuracies

psi	Accuracy (psi)		
	0.1% of Reading	0.05% of FS	0.02% of FS
0	0.02	0.05	0.02
10	0.02	0.05	0.02
20	0.02	0.05	0.02
30	0.03	0.05	0.02
40	0.04	0.05	0.02
50	0.05	0.05	0.02
60	0.06	0.05	0.02
70	0.07	0.05	0.02
80	0.08	0.05	0.02
90	0.09	0.05	0.02
100	0.10	0.05	0.02

So you may ask, "Which is more accurate?" The answer is that it depends on the pressure being measured. In the two examples given, the gauge specified at 0.1% of reading is more accurate as you measure lower pressures in its range. However, as you move above 50% of the range, the gauge specified at 0.05% of full scale becomes more accurate than the 0.1% of reading gauge. This can be seen clearly in the chart (left) and graph (below) where the two gauges are compared in terms of psi accuracy. To properly compare these, two gauges you should convert the accuracy to pressure units, such as psi or bar. Then they can be properly matched one against another in like units of measure.

In conclusion, one method of specification is not better than another, it is just different. Given this difference it becomes important to know how to interpret the different specifications types and be able to compare one versus another.

## Accuracy Comparison 0.1% Rdg to 0.05%FS and 0.02%FS



# Additel 681

## Digital Pressure Gauges



- Pressure ranges to 60,000 psi (4,200 bar)
- 0.02%, 0.05%, 0.1%, 0.2% FS or 0.1%RD accuracy
- % pressure indication with fan-shaped graph scale for visual reference
- Fully temperature compensated accuracy
- Panel mount gauges are available
- Intrinsically safe version (681IS)
- Data logging option
- IP67 rated (681IS)



### OVERVIEW

With advanced microprocessor technology and state-of-the-art silicon pressure sensors, the 681 series digital pressure gauges provide an accurate, reliable, and economic solution for a wide range of pressure applications. They are loaded with functionality and remarkably easy to use. To reach the best performance, every silicon pressure sensor in our gauges is specially aged, tested and screened before assembly. At Additel, fully temperature compensated accuracy means every sensor is pressure tested at several environmental temperatures from -10°C to 50°C. With this test data individual coefficients are generated and stored in the gauge characterizing its performance over the full temperature compensated range. And now the ADT681IS comes with an IP67 rating meaning it is dust resistant and water proof, submersible in 1 meter of water.

### Designed to fit your need

Additel pressure gauges give you the widest variety of sensor choices on the market. Whether you require low inches of water measurement or very high pressure measurement, we have a gauge that will meet your need. We offer sensors which are  $\pm 1$  inH<sub>2</sub>O ( $\pm 2.5$  mbar) to 60K psi (4,200 bar) and everything in between.

Do your applications require you to measure both positive and vacuum pressure? Our compound gauges do not compromise accuracy and provides you with the same high accuracy specification on both positive and vacuum pressures. We offer a wide variety up to 300 psi (20 bar). If you need a higher range, just contact us and we can likely customize one to meet your need. We also offer absolute pressure sensors to 5K psi (350 bar) and a full range of differential pressure sensors from  $\pm 1$  inH<sub>2</sub>O ( $\pm 2.5$  mbar) to  $\pm 300$  inH<sub>2</sub>O ( $\pm 700$  mbar). Are you looking for a pressure gauge to use in hazardous areas? Our certified (ATEX, CSA US & IECEx) intrinsically safe models (681IS) are designed for pressure measurement in hazardous areas.

If you need to panel mount our sensors, we offer the option (see ordering information) for a back-mounted pressure port and gauge housing designed to fit in a panel. And most recently, we've added the option to do stand-alone data logging with the 681. Now you can record more than 21,000 records internal to the 681 series. Each record includes date, time, pressure and temperature readings. Download the logged data with our free Additel/Land software or you can purchase our Additel/Log II for real-time logging and data analysis. The 681 series digital pressure gauges are unmatched in performance and reliability. Best of all, they are very affordable.

### FEATURES

- |   |  |
|---|--|
| ■ Pressure ranges to 60,000 psi (4,200 bar)                                 | ■ Backlit display  |
| ■ 0.02% full span accuracy (681-02)   | ■ % pressure indication with fan-shaped graph scale for visual reference         |
| ■ 0.05% full span accuracy (681-05)   | ■ Display flash warning when pressure over 120% of FS                            |
| ■ 0.1% full span accuracy (681-10)  | ■ Bottom mount or panel mount  |
| ■ 0.2% full span accuracy (681-20)  | ■ ATEX certified intrinsically safe (Model 681IS)                                |
| ■ 0.1% reading span accuracy (681-RD)                                       | ■ ISO 17025 accredited calibration with data(included)                           |
| ■ IP67 rated: Submersible in 1 meter of water(681IS)                        | ■ 9V battery power or AC adapter (optional)                                      |
| ■ Fully temperature compensated accuracy from 14°F to 122°F (-10°C to 50°C) | ■ Data logging to 21,843 records (includes date, time, pressure and temperature) |
| ■ Up to eleven selectable pressure units                                    |  |
| ■ Large, easy to read display with 5-digit resolution                       |  |

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## SPECIFICATIONS



**Metrology Made Simple**

Model	ADT681	ADT681IS
Description	Digital Pressure Gauge	Intrinsically Safe Digital Pressure Gauge
Intrinsic Safety & European Compliance	CE marked	CE marked ATEX certified intrinsically safe II 1G EX ia IIC T4 Ga IECEx TUR 16.0023X
Accuracy (For detailed accuracy, please see pressure range table)	681(IS)-02 : 0.02% of full span	
	681(IS)-05 : 0.05% of full span	
	681(IS)-10 : 0.1% of full span	
	681(IS)-20 : 0.2% of full span	
	681(IS)-RD: 0% to 20% of Range: 0.02% of full span 20% to 110% of Range: 0.1% of reading Vacuum: 0.25% of full span <sup>[1][2]</sup>	
Gauge Types	Gauge pressure, compound pressure, absolute pressure, differential pressure and barometric pressure	
Fan-shaped Graph Scale	Similar to analog dials, including pressure swing, % indication with fan-shaped graph scale for visual reference, low/high alarm.	
Display	Description: 5 full digit FSTN LCD	
	Display rate: 3 readings per second (Default setting).	
	Adjustable from 10 readings per second to 1 reading every ten seconds	
	Numeral display height: 16.5 mm (0.65")	
Pressure Units	Pa, kPa, MPa, psi, bar, mbar, kgf/cm <sup>2</sup> , inH <sub>2</sub> O@4°C mmH <sub>2</sub> O@4°C, inHg@0°C, mmHg@0°C	
Environmental	Compensated Temperature: 14°F to 122°F (-10°C to 50°C)	
	Operating Temperature: 14°F to 122°F (-10°C to 50°C)	
	Storage Temperature: -4°F to 158°F (-20°C to 70°C)	
	Humidity: <95%	
Pressure Port	≤ 15,000 psi: 1/4NPT male, 1/2NPT male, 1/4BSP male, 1/2BSP male, M20×1.5 male	
	>15,000 psi: 1/4HP female or 1/4HP male	
	*1/4HP female: Autoclave F-250-C, 9/16" - 18 UNF-2B	
	*1/4HP male: Autoclave M-250-C, 9/16" - 18 UNF-2A	
	Differential Pressure: 0.236 inch (Ø6 mm) test hose	
Power	Battery: One 9 V alkaline battery (included)	
	Battery life:	
	1. High power mode: 320 hours	
	2. Low power mode: 300 hours (10 readings/s), 600 hours (3 reading/s), or 4000 hours (1 reading/10s)	
	Power auto-off: 120, 90, 60, 45, 30, 15, 10, 5 and 1 minute auto-off options	
Enclosure	External power: 110/220 V external power adapter (optional)	
	Case material: Aluminum alloy	
	Wetted parts: 316L SS	
	Dimension: Ø110 mm X 35 mm depth X 176 mm height (panel mount gauge: Ø140 mm X 86 mm depth)	
	Weight: 0.6 kg	
Compliance	Protection Level: IP67(available for 681IS GP15-60K)	
	Vibration: 5 g (20-2000 Hz)	
	Shock Resistance: 100 g/11 ms	
Data Logging (Available on with data logging option ADT681-...-DL)	Data storage: 21,843 records (each record includes date, time, pressure and temperature)	
	Rate: user-selectable from 1 to 99,999 second intervals	
Communication	RS232 *(Do not use the RS-232 connector in a hazardous atmosphere)	
Warranty	1 year	

[1] FS = -14.5 psi

[2] Applicable ADT681-RD-CPX

## PRESSURE RANGE

Gauge Pressure <sup>[1]</sup>						
P/N	Pressure Range		Media <sup>[2]</sup>	Accuracy		Burst Pressure
	(psi)	(bar)		%FS	%RD	
V15	-15	-1.0	G	0.02 (0.05, 0.1, 0.2)	N/A	3x
GP2	2	0.16	G	0.05 (0.1, 0.2)	N/A	3x
GP5	5	0.35	G, L	0.05 (0.1, 0.2)	0.1	3x
GP10	10	0.7	G, L <sup>[3]</sup>	0.02 (0.05, 0.1, 0.2)	0.1	3x
GP15	15	1.0	G, L <sup>[3]</sup>	0.02 (0.05, 0.1, 0.2)	0.1	3x
GP30	30	2.0	G, L <sup>[3]</sup>	0.02 (0.05, 0.1, 0.2)	0.1	3x
GP50	50	3.5	G, L	0.02 (0.05, 0.1, 0.2)	0.1	3x
GP100	100	7.0	G, L	0.02 (0.05, 0.1, 0.2)	0.1	3x
GP150	150	10	G, L	0.02 (0.05, 0.1, 0.2)	0.1	3x
GP300	300	20	G, L	0.02 (0.05, 0.1, 0.2)	0.1	3x
GP500	500	35	G, L	0.02 (0.05, 0.1, 0.2)	0.1	3x
GP600	600	40	G, L	0.02 (0.05, 0.1, 0.2)	0.1	3x
GP1K	1,000	70	G, L	0.02 (0.05, 0.1, 0.2)	0.1	3x
GP2K	2,000	140	G, L	0.02 (0.05, 0.1, 0.2)	0.1	3x
GP3K	3,000	200	G, L	0.02 (0.05, 0.1, 0.2)	0.1	3x
GP5K	5,000	350	G, L	0.02 (0.05, 0.1, 0.2)	0.1	3x
GP10K	10,000	700	G, L	0.02 (0.05, 0.1, 0.2)	0.1	3x
GP15K	15,000	1,000	G, L	0.05 (0.1, 0.2)	0.1	2x
GP20K	20,000	1,400	G, L	0.05 (0.1, 0.2)	N/A	1.5x
GP25K	25,000	1,600	G, L	0.1 (0.2)	N/A	1.5x
GP30K	30,000	2,000	G, L	0.1 (0.2)	N/A	1.5x
GP36K	36,000	2,500	G, L	0.1 (0.2)	N/A	1.5x
GP40K	40,000	2,800	G, L	0.1 (0.2)	N/A	1.35x
GP50K	50,000	3,500	G, L	0.1 (0.2)	N/A	1.2x
GP60K	60,000	4,200	G, L	0.1 (0.2)	N/A	1.1x

[1] Sealed gauge pressure for above 1,000 psi

[2] G=Gas, L=Liquid

[3] 0.02% FS for gas media only

Barometric Pressure					
P/N	Pressure Range		Media	Accuracy	Burst Pressure
	Low	High			
BP	60 kPa	110 kPa	G	40 Pa	3x



Absolute Pressure					
P/N	Pressure Range		Media [1]	Accuracy(%FS)	Burst Pressure
	(psi)	(bar)			
AP5	5	0.35	G	0.1 (0.2)	3x
AP10	10	0.7	G	0.1 (0.2)	3x
AP15	15	1.0	G	0.1 (0.2)	3x
AP30	30	2.0	G	0.1 (0.2)	3x
AP50	50	3.5	G	0.1 (0.2)	3x
AP100	100	7.0	G, L	0.05 (0.1, 0.2)	3x
AP300	300	20	G, L	0.05 (0.1, 0.2)	3x
AP500	500	35	G, L	0.05 (0.1, 0.2)	3x
AP1K	1,000	70	G, L	0.05 (0.1, 0.2)	3x
AP3K	3,000	200	G, L	0.05 (0.1, 0.2)	3x
AP5K	5,000	350	G, L	0.05 (0.1, 0.2)	3x

[1] G=Gas, L=Liquid

Differential Pressure						
P/N	Pressure Range		Media	Accuracy (%FS) <sup>[1]</sup>	Burst Pressure	Static Pressure Range
	(inH <sub>2</sub> O)	(mbar)				
DP1	±1	±2.5	G	0.05 <sup>[2]</sup>	100x	±10 psi
DP2	±2	±5.0	G	0.05 <sup>[2]</sup>	100x	±10 psi
DP5	±5	±10	G	0.05 <sup>[2]</sup>	50x	±10 psi
DP10	±10	±25	G	0.05 <sup>[2]</sup>	20x	±10 psi
DP20	±20	±50	G	0.05	20x	±10 psi
DP30	±30	±75	G	0.05	20x	±10 psi
DP50	±50	±160	G	0.05	3x	±10 psi
DP100	±100	±250	G	0.02	3x	±15 psi
DP150	±150	±350	G	0.02 (0.05)	3x	50 psi
DP300	±300	±700	G	0.02 (0.05)	3x	50 psi

[1] FS specification applies to the span of the range. Accuracy includes one year stability.

[2] 0.05%FS accuracy (incl 6 months stability). One year accuracy is 0.05%FS calibration accuracy combined with 0.05%FS one year stability.

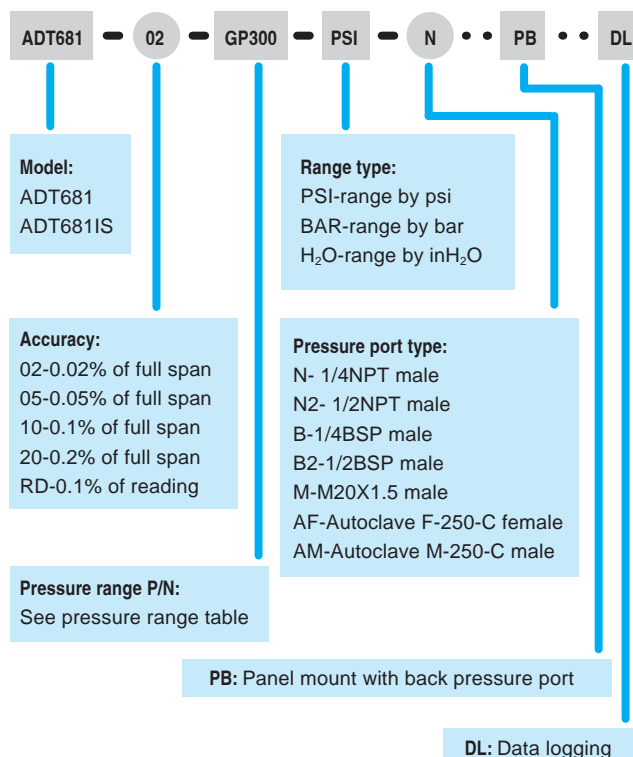
Compound Pressure						
P/N	Pressure Range		Media <sup>[1]</sup>	Accuracy		Burst Pressure
	(psi)	(bar)		%FS <sup>[2]</sup>	%RD	
CP2	±2	±0.16	G	0.05 (0.1,0.2)	N/A	3x
CP5	±5	±0.35	G	0.02 (0.05,0.1,0.2)	0.1	3x
CP10	±10	±0.7	G	0.02 (0.05,0.1,0.2)	0.1	3x
CP15	±15	±1	G	0.02 (0.05,0.1,0.2)	0.1	3x
CP30	-15 to 30	-1 to 2	G	0.02 (0.05,0.1,0.2)	0.1	3x
CP100	-15 to 100	-1 to 7	G, L	0.02 (0.05,0.1,0.2)	0.1	3x
CP300	-15 to 300	-1 to 20	G, L	0.02 (0.05,0.1,0.2)	0.1	3x

[1] G=Gas, L=Liquid

[2] FS specification applies to the span of the range.

## ORDERING INFORMATION

### Model Number



### Accessories Included

Rubber boot (Except panel mount)
9 V alkaline battery (1 pc)
Manual
ISO 17025 accredited calibration certificate

### Optional Accessories

Model number	Description
9812	110V/220V external power adapter (DC 9 V) for 681 digital pressure gauge.
9502	Additel/Log II real time data logging and graphical software for 681 and 672.
9530-BASIC	Additel/Acal Automated calibration software with asset management, basic version
9530-NET	Additel/Acal Automated calibration software with asset management, network version, Includes server installation and 1 user license
9050	USB to RS232 (DB9/M) Adapter
9050-EXT	RS 232 (DB9/M) extension cable, 9 feet
9900-681	Carrying Case for one 681 digital pressure gauge
9902	Carrying case for 4 gauges
9251	Rubber boot for ADT681
9200-681	Certified O <sub>2</sub> Cleaning for ADT681 gauges (some limitations apply)

Note: For oil-free applications contact Additel.

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## Additel 680 Series Digital Pressure Gauges



- Pressure ranges to 60,000 psi (4,200 bar)
- 0.05%, 0.1% or 0.25%FS accuracy
- Fully temperature compensated accuracy
- IP67
- Data logging and wireless (680W)



680 with data logging and wireless (optional)

### OVERVIEW

We designed the 680 series digital pressure gauges with two main objectives in mind. First, to provide an affordable digital gauge to replace mechanical gauges. If you're looking to move from dial gauges to a digital gauge, you'll find the 680 standard version gauge to be of high quality and suited for your need in terms of price and performance. With advanced microprocessor technology and state-of-the-art silicon pressure sensors, the 680 series digital pressure gauges provide an accurate, reliable, and economic solution for a wide range of pressure applications. They are loaded with functionality and remarkably easy to use. To reach the best performance, every silicon pressure sensor is specially aged, tested and screened before assembly.

The second objective was to provide a high-precision pressure gauge capable of wireless communication and data logging. Our 680W series provides just this along with several accuracy and pressure range options to meet your need. This wireless unit is compatible with the Additel/Land Wireless software, which is available for a free download from our website. Data can be recorded standalone with the 680W and then downloaded wirelessly to Additel/Land Wireless. For more advanced logging and data analysis, Additel/Log II Wireless is specially designed to communicate with the 680W. Each unit can store up to 140,000 readings which consist of date, time, pressure, and internal temperature. The 680 series digital pressure gauges are unmatched in performance and reliability. Best of all they are very affordable.

### FEATURES

- Pressure ranges to 60,000 psi (4,200 bar)
- 0.05%, 0.1% or 0.25% full span accuracy
- Fully temperature compensated accuracy from 14°F to 122°F (-10°C to 50°C)
- Up to 13 user-selectable pressure units, 6 selectable engineering units
- Large, easy to read display with 5-digit resolution
- Backlit display
- Icon-based menu
- Display flash warning when pressure exceeds 120% of FS
- Stainless wetted surface construction
- IP67 (submersible in 1 meter of water)
- Drop-tested from 1 meter
- 2 AA alkaline batteries
- CE R&TTE, FCC ID, IC ID Certificates
- ISO 17025 accredited calibration with data(included)

### SPECIFICATIONS

Model	ADT680	ADT680W
Description	Digital Pressure Gauge	Wireless Digital Pressure Gauge with Data Logging
Pressure Type	Gauge Pressure, compound Pressure	
Accuracy	0.05%, 0.1% or 0.25%FS	
Update Rate	10 times/Sec ,3 times /Sec (default), 1 time /Sec ,1 time/15 Sec	
Operating Temperature	14°F to 122°F (-10°C to 50°C)	
Compensated Temperature	14°F to 122°F (-10°C to 50°C), accuracy guaranteed	
Storage Temperature	-4°F to 158°F (-20°C to 70°C)	
Overload Pressure	1.2X	
Dimensions	100mm x 40mm, total height:157mm	
Weight	500g	

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## SPECIFICATIONS

Model	ADT680	ADT680W
Wireless Communication (ADT680W only)	N/A	Wireless Frequency: 2.4 G ISM Bands, 20 meter range
		Number of wireless Channels : Chanel 1-15
		Software: Wireless network demo software included read up to 20 gauges.
Data Logging (ADT680W only)	N/A	Storage Capacity: 140,000 readings (time, pressure, and temperature)
		Storage Interval: Adjustable from 1-9999 Sec
		Single-button-press data logging enabled
		Key Lockout: When the gauge is in auto-storing mode, the front panel buttons will be automatically locked.
Filtering	Averaging (3 to 10 samples) or low-pass first-order filter.	
Max/Min data capture	Saves Max and Min data during pressure measurement.	
Pressure units	Pa, kPa, MPa, bar, mba, psi, kgf/cm <sup>2</sup> , mmH <sub>2</sub> O, mmHg, inH <sub>2</sub> O, inHg, ozf/in, %, °C, °F Engineering units: inH <sub>2</sub> O(20°C), inH <sub>2</sub> O(60°F), mmH <sub>2</sub> O(20°C), mmH <sub>2</sub> O(15°C), ftH <sub>2</sub> O(60°F), or ftH <sub>2</sub> O(4°C)	
Display	LCD Specification: FSTN-LCD, Visual scope 36x61 mm	
	Full 5 digits, 15.2 mm High	
	7 segment analog bar graph scaled from 0-100% of FS	
	Backlight: White	
Auto off	Backlight Duration: Not auto off, 15, 30, 45, 60 seconds optional	
	Disabled, 15, 30, 45, 60, 90, or 120 Minutes	
Compliance	Certificates: CE R&TTE, FCC ID, IC ID	
	Protection Level: IP67	
	Vibration: 5 g (20-2000Hz)	
	Shock resistance: 100 g/11 ms	
Pressure Port	≤ 15,000 PSI: 1/4NPT male, 1/2NPT male, 1/4BSP male, 1/2BSP male, M20×1.5 male	
	>15,000 PSI: 1/4HP female or 1/4HP male	
	*1/4HP female: Autoclave F-250-C, 9/16" - 18 UNF-2B	
	*1/4HP male: Autoclave M-250-C, 9/16" - 18 UNF-2A	
Overpressure Alarm	Other connections available per request.	
	Display will flash over 120%FS	
Battery voltage Indicator	Displays the battery life remaining. When the battery voltage is too low, the gauge will power-off automatically.	
Battery Life	1500 hours (10 readings/sec), 3000 hours (3 readings/sec), 6000 hours (1 readings/sec), 12000 hours (1 readings/15 s) (100 hours when wireless communication is on)	
Overpressure Record	Gauge will record max pressure data when the gauge is over pressured by 120% of FS.	
Leakage test	In leak test mode, the gauge will record beginning pressure, ending pressure, and show the difference ΔP.	
Factory Reset	Resets all settings back to factory default, except the calibration parameters.	
Warranty	1 year	

## PRESSURE RANGE

Compound Pressure					
P/N	Pressure Range		Accuracy(FS%) <sup>[2]</sup>	Media <sup>[3]</sup>	Burst Pressure
	(psi) <sup>[1]</sup>	(bar)			
CP15	±15	±1	0.05(0.1, 0.25)	G,L	3×
CP30	-15 to 30	-1 to 2	0.05(0.1, 0.25)	G,L	3×

[1] Sealed gauge pressure for above 1,000 psi.

[2] FS specification applies to the span of the range.

[3] G=Gas, L=Liquid

## SPECIFICATIONS



Metrology Made Simple

Gauge Pressure					
P/N	Pressure Range		Accuracy(FS%)	Media <sup>[3]</sup>	Burst Pressure
	(psi) <sup>[1]</sup>	(bar)			
V15	-15	-1.0	0.05 (0.1, 0.25)	G	3x
GP15	15	1.0	0.05 (0.1, 0.25)	G,L	3x
GP30	30	2.0	0.05 (0.1, 0.25)	G,L	3x
GP100	100	7.0	0.05 (0.1, 0.25)	G,L	3x
GP150	150	10	0.05 (0.1, 0.25)	G,L	3x
GP300	300	20	0.05 (0.1, 0.25)	G,L	3x
GP500	500	35	0.05 (0.1, 0.25)	G,L	3x
GP1K	1,000	70	0.05 (0.1, 0.25)	G,L	3x
GP3K	3,000	200	0.05 (0.1, 0.25)	G,L	3x
GP5K	5,000	350	0.05 (0.1, 0.25)	G,L	3x
GP10K	10,000	700	0.05 (0.1, 0.25)	G,L	3x
GP15K	15,000	1,000	0.05 (0.1, 0.25)	G,L	2x
GP20K	20,000	1,400	0.05 (0.1, 0.25)	G,L	1.5x
GP25K	25,000	1,600	0.1 (0.25)	G,L	1.5x
GP30K	30,000	2,000	0.1 (0.25)	G,L	1.5x
GP36K	36,000	2,500	0.1 (0.25)	G,L	1.5x
GP40K	40,000	2,800	0.1 (0.25)	G,L	1.35x
GP50K	50,000	3,500	0.1 (0.25)	G,L	1.2x
GP60K	60,000	4,200	0.1 (0.25)	G,L	1.1x

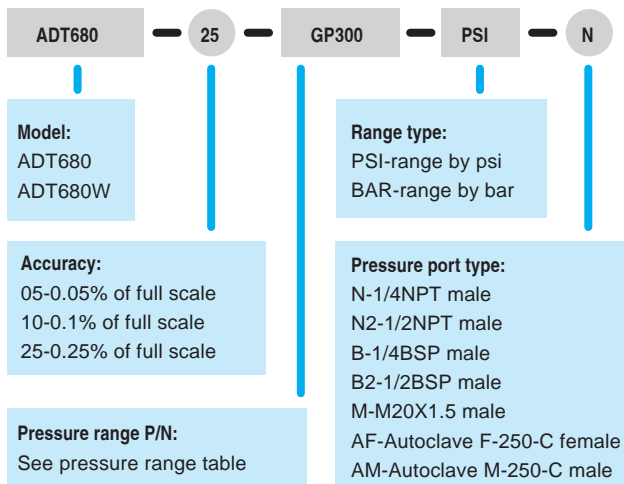
[1] Sealed gauge pressure for above 1,000 psi.

[2] FS specification applies to the span of the range.

[3] G=Gas, L=Liquid

## ORDERING INFORMATION

## Model Number



## Accessories Included

AA battery (2 pcs)
Rubber boot for Additel 680 gauge;
Additel/Land Wireless software for 680W - includes USB dongle (free download at <a href="http://www.additel.com">www.additel.com</a> )
Manual
ISO 17025 accredited calibration certificate

## Optional Accessories

Model number	Description
9502	Additel/Log II real time data logging and graphical software for 680W
9030	Spare wireless master device (USB dongle) for ADT680W gauge.
9900-681	Carrying case (1 gauge)
9253	Rubber boot
9902	Carrying case (4 gauges)
9200-680	Certified O2 cleaning

Note: For O<sub>2</sub> applications contact Additel.



Metrology Made Simple

## ADT875 Series Dry Well Calibrator

*More than just a stable heat source!*



- Three models ranging from -49°C to 660 °C
- Portable, rugged, and quick to temperature
- Metrology-level performance in stability, uniformity, accuracy and loading effect
- Dual-zone control
- Process calibrator option provides a multi-channel readout for a reference thermometer, RTDs and TCs, task documentation, and HART communication
- Color touch screen display
- Choose your own range option
- Set point control by reference
- Self-calibration feature

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## Application Note



### Why Temperature Compensation Really Matters for Pressure Measurement

Have you ever wondered how much impact environmental temperature has on your pressure sensors? Nearly every pressure sensor has some sort of environmental temperature specification on its data sheet. This technical note explains the environmental temperature effects on pressure sensors, quantifying the impact, and ways to minimize the impact.

#### Why pressure sensors are impacted by environmental temperature changes

Much like anything else in the physical measurement world, pressure sensors are subject to changes in environmental conditions. Temperature effects tend to have the largest impact on pressure measurement accuracy. Temperature effects directly influence the pressure sensor and the circuitry used to measure the sensor. Digital pressure sensors use electronic circuits which provide an analog output proportional to the inlet pressure. There are three factors of a sensor's circuitry that are affected by environmental temperature changes: zero pressure output voltage, pressure sensitivity span and bridge resistance. Temperature-compensated sensors employ some techniques to correct for and minimize the impact of temperature changes on these factors.

To understand the environmental temperature effect on your sensor, it is helpful to first understand some common terms you may see on a pressure sensor specification sheet.

**Operating Temperature Range:** This is the temperature range over which the sensor can be used without causing damage.

**Temperature Compensated Accuracy Range:** This refers to the environmental temperature range over which the accuracy of the sensor is applicable.

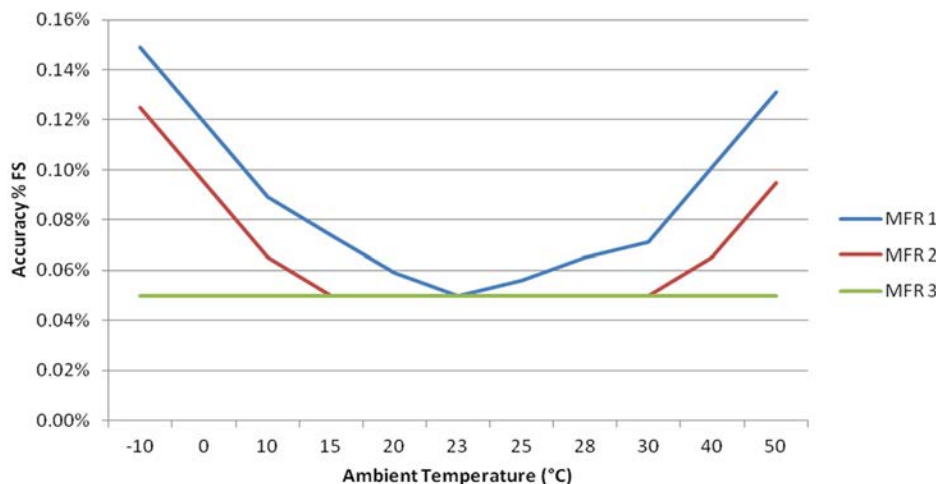
**Temperature Coefficient:** An additional error that needs to be considered when used outside of the temperature compensated accuracy range. Many sensors are only tested and calibrated at laboratory temperatures. In this case, the temperature coefficient will need to be considered in the measurement accuracy when using the sensor outside of laboratory temperatures.

#### Quantifying the environmental temperature effect

So how much will the ambient temperature impact your measurement accuracy? Well, this will depend on the temperature compensated accuracy range and the temperature coefficient. To demonstrate this, let's consider three different gauges. As you can see from the specifications below (figure 1), they all have the same accuracy specification of 0.05% FS. However, as you consider the temperature compensated accuracy range and the temperature coefficient you'll see a fairly large variation between the three gauges.

Figure 1	Manufacturer 1	Manufacturer 2	Manufacturer 3
Accuracy	0.05% FS	0.05% FS	0.05% FS
Temperature Compensated Accuracy Range	N/A	15°C to 35°C	-10°C to 50°C
Temperature Coefficient	Add 0.003% FS/°C from 23°C	Add 0.003% FS/°C: -10°C to 15°C, 35°C to 50°C	N/A

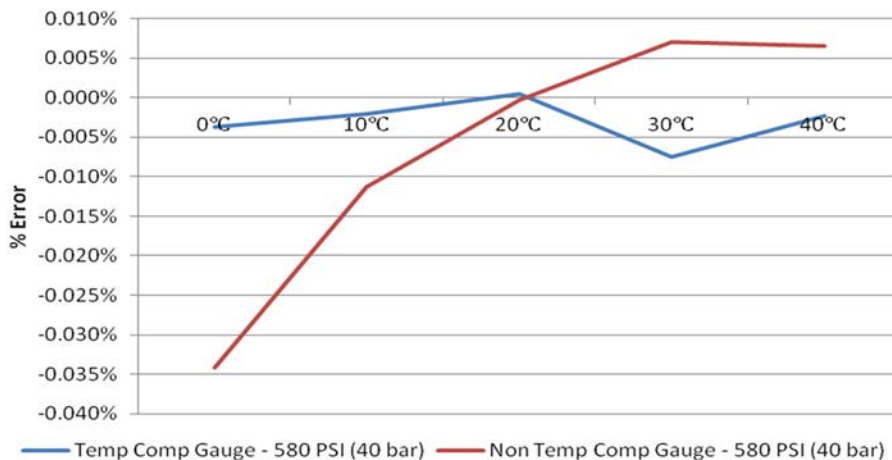
The graph below shows the total specified accuracy when considering the temperature effects on the pressure gauges. As you can see in one case here, the lack of temperature compensation and inclusion of the temperature coefficient specification more than triple the 0.05% FS accuracy specification



### Temperature compensation test results

To further show temperature compensation has real effect, we placed a non-temperature compensated pressure gauge in a temperature chamber and pressure tested it from 0 to 580 psi (0 to 40 bar) and over the environmental temperature range of 0°C to 40°C. We then performed the same test on a temperature compensated gauge. As you may expect—the higher the pressure, the larger the impact from the environmental temperature. Below is a chart comparing the non-temperature compensated gauge with the temperature compensated gauge.

### Temperature Compensation Effect



### Minimizing environmental temperature error

The temperature effect on a pressure sensor will be negligible when used at the same laboratory temperature in which it was calibrated. This, however, is often not practical for your measurements.

With sensor technology advances, we have found a variety of ways to minimize the temperature effect on pressure sensors and with confidence define a large temperature compensated accuracy range. First, regularly zero your digital pressure gauges. By zeroing the pressure gauge, you are aligning the zero pressure output voltage to the current environmental conditions. You should only zero the pressure gauge when you do not have any inlet pressure on the gauge.

Because each sensor is unique and performs differently due to environmental temperature changes, at Additel, we pressure test every sensor in a thermal chamber at different temperatures so we understand its pressure performance relative to environmental changes. Each sensor contains a temperature-compensated circuit which we load coefficients representing the temperature testing of the gauge. This allows for you to confidently use our sensors over the range -10°C to 50°C without having to add a temperature coefficient error to the accuracy.

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# Pressure Test / Calibration Pumps

## Selection Guide



Metrology Made Simple

Model	Photo	Type	Range in psi	Range in bar	Media	Adjustment Resolution	Weight	See Page
Additel 901B		Pneumatic	(-6 to 6) psi	(-0.4 to 0.4) bar	Air	0.001 mbar	3.5 lb	P48
Additel 912A		Pneumatic	(-14 to 60) psi	(-0.95 to 4) bar	Air	0.001 mbar	6.2 lb	P49
Additel 914A		Pneumatic	(-14 to 375) psi	(-0.95 to 25) bar	Air	0.1 mbar	3.3 lb	P50
Additel 916A		Pneumatic	(-14 to 600) psi	(-0.95 to 40) bar	Air	0.1 mbar	5.9 lb	P51
Additel 917		Pneumatic	(-14 to 1,000) psi	(-0.95 to 70) bar	Air	0.1 mbar	5.7 lb	P52
Additel 918		Pneumatic	(-14 to 1,500) psi	(-0.95 to 100) bar	Air	0.1 mbar	5.7 lb	P53
Additel 919A		Pneumatic	(-14 to 2,000) psi	(-0.95 to 140) bar	Air	0.1 mbar	14.3 lb	P54
Additel 920, 920HV		Pneumatic	(-14 to 3,000) psi	(-0.95 to 200) bar	Air	0.1 mbar	14.3 lb	P56
Additel 925		Hydraulic	(-12.5 to 6,000) psi	(-0.85 to 400) bar	Oil/ Water <sup>[1]</sup>	1 mbar	3.7 lb	P57
Additel 927		Hydraulic	(-12.5 to 10,000) psi	(-0.85 to 700) bar	Oil/ Water <sup>[1]</sup>	1 mbar	7 lb	P59
Additel 928		Hydraulic	(0 to 15,000) psi	(0 to 1,000) bar	Oil/ Water <sup>[1]</sup>	1 mbar	8.6 lb	P60
Additel 936		Hydraulic	(-12.5 to 15,000) psi	(-0.85 to 1,000) bar	Oil	1 mbar	35.2 lb	P61
Additel 937					Oil <sup>[2]</sup>			P62
Additel 938					Water			P63
Additel 946A		Hydraulic	(0 to 15,000) psi	(0 to 1,000) bar	Oil	1 mbar	28.7 lb	P64
Additel 949		Hydraulic	(-12.5 to 40,000) psi	(-0.85 to 2,800) bar	Oil	1 mbar	35.2 lb	P65
Additel 959A		Hydraulic	(0 to 40,000) psi	(0 to 2,800) bar	Oil	1 mbar	28.7 lb	P66
Additel 960		Hydraulic	(0 to 60,000) psi	(0 to 4,200) bar	Oil	1 mbar	28.7 lb	P67

[1] Oil is default media liquid. Pump with water as media to be ordered optionally (ADT9XXW).

[2] Oil, compatible to phosphoric acid fluid or skydrol oil.

# Additel 901B

## Low Pressure Test Pump



- Generate 6 psi (0.4 bar) vacuum to 6 psi (0.4 bar) pressure
- Portable, only 3.5 lb
- Great stability and high resolution
- Minimal maintenance
- Hand-tight quick connectors



### OVERVIEW

The 901B Low Pressure Test Pump is a hand operated pressure pump designed to generate pressures from -6 psi (-0.4 bar) to 6 psi (0.4 bar). A high-quality screw press is designed for fine pressure adjustment, with an adjustment resolution up to 0.1 Pa (0.001 mbar). The 901B is a very stable low pressure calibrator. It makes use of an isothermal bellows chamber which is designed for reducing the possible effects of environmental temperature change. Most pumps make use of a check valve (non-returning valve) and are not well insulated which will cause large fluctuations in pressure with a change in ambient temperature or when the unit is touched. The 901B does not use a check valve and is remarkably stable. Two hand-tight connectors installed on the pump allow easy connecting and disconnecting to the test pump without the need for PTFE tape or wrenches. The 901B is an ideal comparison test pump for low pressure applications.

### FEATURES

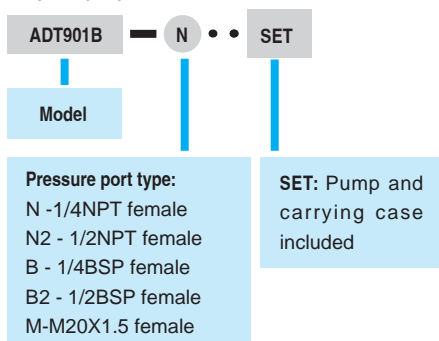
- **Portable:** Only 3.5 lb (1.6 kg)
- **Adjustment Resolution**  
0.1Pa (0.001 mbar); Specially designed screw press for fine pressure adjustment.
- **Great Stability**  
Isothermal chamber: the pressure chamber is insulated to reduce the influence from environmental temperature changes.  
Specially designed bellows minimize leakage to guarantee excellent stability.
- **Durable and Minimal Maintenance**  
Without non-returning valve that is usually used on troublesome hand pump.
- **Easy-to-use**  
Pressure could be set and adjusted precisely and quickly through a simple turn of the handle.
- **Hand-tight Quick Connectors**  
Allows easy connecting and disconnecting to the test pump without the need for PTFE tape or wrenches.

### SPECIFICATIONS

- **Media:** Air.
- **Generated Pressure Range**  
6 psi (0.4 bar) vacuum to 6 psi (0.4 bar) positive pressure.
- **Adjustment Resolution:** 0.1 Pa (0.001 mbar).
- **Material:**  
Ram/adapters: SS  
Body: SS, aluminum  
Seals: Buna-N, PTFE, Copper Alloy
- **Connection**  
Hand-tight connectors for both test gauge and reference gauge.  
1/4NPT female, 1/2NPT female, 1/4BSP female, 1/2BSP female, or M20X1.5 female
- **Dimensions:** Height: 5.7" (145mm)  
Base: 9.65" (245 mm) x 6.50" (165mm)
- **Weight:** 3.5 lb (1.6 kg).
- **Warranty:** 1 year.

### ORDERING INFORMATION

#### Model Number



#### Accessories included

- O-ring: 20 pcs
- Manual: 1 pc
- Carrying case (901B-X-SETmodels only)

#### Optional Accessories

Model number	Description
ADT901B-X-kit	Test kit for ADT901B (barb fitting, connection hoses, and adapters). X=connection type e.g. N-1/4NPTM, N2-1/2NPTM, B-1/4BSPM, B2-1/2BSPM, M-M20X1.5M.
ADT102	Adapters and fittings, 1/4NPT male to various male and female connection (25 pcs). More information shown on page 69
ADT103	Adapters and fittings, 1/4NPT (1/2NPT, 1/4BSP, 1/2BSP, or M20X1.5) male to various female hand-tight quick connectors (10 pcs). More information shown on page 70
9901-901	Carrying Case for one ADT901B pump and two ADT681 gauges or ADT672 calibrators
ADT901B-MK	Maintenance kit for Additel 901B pump
9240	Differential pressure gauge holder

Note: For oil free applications contact Additel.

# Additel 912A

## Low Pressure Test Pump

- **Generate 95% vacuum to 60 psi (4 bar) pressure**
- **Portable**
- **Great stability and high resolution**
- **Minimal maintenance**
- **Hand-tight quick connectors**



### OVERVIEW

The 912A Pneumatic Pressure Test Pump is a hand operated pressure pump designed to generate pressure from 95% vacuum to 60 psi (4 bar). A high-quality screw press is designed for fine pressure adjustment, with an adjustment resolution up to 0.1 Pa (0.001 mbar). The 912A is a very stable low pressure calibrator. It makes use of an isothermal bellows chamber which is designed for reducing the possible effects of environmental temperature change. Most pumps make use of a check valve (non-returning valve) and are not well insulated which will cause large fluctuations in pressure with a change in ambient temperature or when the unit is touched. The 912A does not use a check valve and is remarkably stable. Two hand-tight connectors installed on the pump allow easy connecting and disconnecting to the test pump without the need for PTFE tape or wrenches. The 912A is an ideal comparison test pump for low pressure application.

### FEATURES

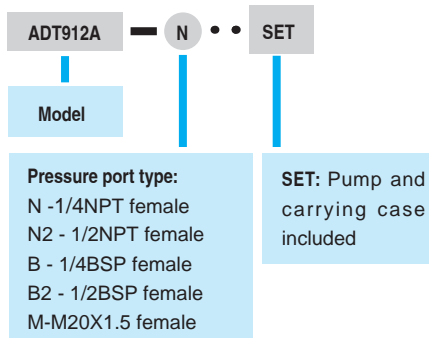
- **Portable:** Only 6.2 lb (2.8 kg)
- **Adjustment Resolution**  
0.1 Pa (0.001 mbar)  
High-quality screw press for fine pressure adjustment
- **Great Stability**  
Isothermal chamber: the pressure chamber is insulated to reduce the influence from environmental temperature changes  
Specially designed bellows minimize leakage to guarantee excellent stability  
Shut-off valve closes the air in the isothermal chamber during calibration
- **Durable and Minimal Maintenance**  
Built-in gas-liquid isolator protects the pump from moisture and dirt
- **Easy-to-use**
- **Hand-tight Quick Connectors**  
Allows easy connecting and disconnecting to the test pump without the need for PTFE tape or wrenches

### SPECIFICATIONS

- **Media:** Air.
- **Generated Pressure Range**  
95% vacuum to 60 psi (4 bar) positive pressure
- **Adjustment Resolution:** 0.1 Pa (0.001 mbar).
- **Material:** Ram/adapters: SS  
Body: SS, aluminum  
Seals: Buna-N, PTFE, Copper Alloy
- **Piston volume:** 21 ml (1.3 in<sup>3</sup>)
- **Connection**  
Hand-tight connectors for both test gauge and reference gauge.  
1/4NPT female, 1/2NPT female, 1/4BSP female, 1/2BSP female, or M20X1.5 female
- **Dimensions**  
Height: 5.51" (140 mm)  
Base: 10.75" (273 mm) x 10.16" (258 mm)
- **Weight:** 6.2 lb (2.8 kg).
- **Warranty:** 1 year

### ORDERING INFORMATION

#### Model Number



#### Accessories included

- O-ring: 20 pcs
- Manual: 1 pc
- Carrying case (912A-X-SETmodels only)

#### Optional Accessories

Model number	Description
ADT912A-X-kit	Test kit for ADT912A (barb fitting, connection hoses, and adapters). X=connection type e.g. N-1/4NPTM, N2-1/2NPTM, B-1/4BSPM, B2-1/2BSPM, M-M20X1.5M.
ADT102	Adapters and fittings, 1/4NPT male to various male and female connection (25 pcs). More information shown on page 70.
ADT103	Adapters and fittings, 1/4NPT (1/2NPT, 1/4BSP, 1/2BSP, or M20X1.5) male to various female hand-tight quick connectors (10 pcs). More information shown on page 71.
ADT100-HTK-8K	Hose test kit, 5 feet flexible hose, 8,000 psi, user selectable male (1/4NPT, 1/2NPT, 1/4BSP, 1/2BSP, M20) to user selectable female hand tight quick connector.
9904-912	Carrying Case for one 912A pump and two 681 gauges or 672 calibrators.
ADT912A-MK	Maintenance kit for Additel 912A pump
9240	Differential pressure gauge holder

Note: For oil free applications contact Additel.

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# Additel 914A

## Handheld Pneumatic Pressure Test Pump



- **Generate 95% vacuum to 375 psi (25 bar) pressure**
- **Portable, only 3.3 lb**
- **Great stability and high resolution**
- **Minimal maintenance**
- **Hand-tight quick connectors**



### OVERVIEW

The 914A Pneumatic Pressure Test Pump is a hand operated pressure pump designed to generate pressure from 95% vacuum to 375 psi (25 bar). A high-quality screw press is designed for fine pressure adjustment, with an adjustment resolution up to 10 Pa (0.1 mbar). A specially designed shut-off valve makes the pressure as stable as possible during calibration. A built-in gas-liquid isolator protects the pump from moisture and dirt to reduce the need for maintenance. Two hand-tight quick connectors installed on the pump allow easy connecting and disconnecting to the test pump without the need for PTFE tape or wrenches. The 914A is an ideal comparison test pump for pressure instruments calibration.

### FEATURES

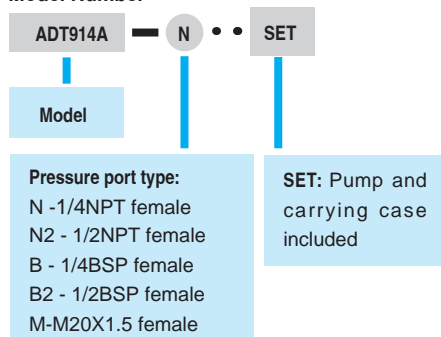
- **Portable:**  
Only 3.3 lb (1.5 kg)
- **Adjustment Resolution**  
10 Pa (0.1 mbar)  
High-quality screw press for fine pressure adjustment
- **Great Stability**  
A specially designed shut-off valve makes the pressure as stable as possible during calibration
- **Durable and Minimal Maintenance**  
Built-in gas-liquid isolator protects the pump from moisture and dirt
- **Easy-to-use**
- **Hand-tight Quick Connectors**  
Allows easy connecting and disconnecting to the test pump without the need for PTFE tape or wrenches

### SPECIFICATIONS

- **Media:** Air.
- **Generated Pressure Range:** 95% vacuum to 375 psi (25 bar) positive pressure
- **Adjustment Resolution:** 10 Pa (0.1 mbar).
- **Material:** Ram/adapters: SS  
Body: SS, aluminum  
Seals: Buna-N, PTFE, Copper Alloy
- **Piston volume:** 21 ml (1.3 in<sup>3</sup>)
- **Connection**  
Hand-tight connectors for both test gauge and reference gauge.  
1/4NPT female, 1/2NPT female, 1/4BSP female, 1/2BSP female, or M20X1.5 female
- **Dimensions**  
Height: 5.12" (130 mm)  
Base: 9.45" (240 mm) x 4.72" (120 mm)
- **Weight:** 3.3 lb (1.5 kg).
- **Warranty:** 1 year

### ORDERING INFORMATION

#### Model Number



#### Accessories included

O-ring: 20 pcs  
Manual: 1 pc  
Carrying case (914A-X-SET models only)

#### Optional Accessories

Model number	Description
ADT102	Adapters and fittings, 1/4NPT male to various male and female connection (25 pcs). More information shown on page 70.
ADT103	Adapters and fittings, 1/4NPT (1/2NPT, 1/4BSP, 1/2BSP, or M20X1.5) male to various female hand-tight quick connectors (10 pcs). More information shown on page 71.
ADT100-HTK-8K	Hose test kit, 5 feet flexible hose, 8,000 psi, user selectable male (1/4NPT, 1/2NPT, 1/4BSP, 1/2BSP, M20) to user selectable female hand tight quick connector.
9901-914	Carrying Case for one 914A pump and two 681 gauges or 672 calibrators
ADT914A-MK	Maintenance kit for Additel 914A pump

Note: For oil free applications contact Additel.

# Additel 916A

## Pneumatic Pressure Test Pump



- **Generate 95% vacuum to 600 psi (40 bar) pressure**
- **Portable, only 5.9 lb**
- **Great stability and high resolution**
- **Minimal maintenance**
- **Hand-tight quick connectors**



### OVERVIEW

The 916A Pneumatic Pressure Test Pump is a hand operated pressure pump designed to generate pressure from 95% vacuum to 600 psi (40 bar). A high-quality screw press is designed for fine pressure adjustment, with an adjustment resolution up to 10 Pa (0.1 mbar). A specially designed shut-off valve makes the pressure as stable as possible during calibration. A built-in gas-liquid isolator protects the pump from moisture and dirt to reduce the need for maintenance. Two hand-tight quick connectors installed on the pump allow easy connecting and disconnecting to the test pump without the need for PTFE tape or wrenches. The 916A is an ideal comparison test pump for pressure instruments calibration.

### FEATURES

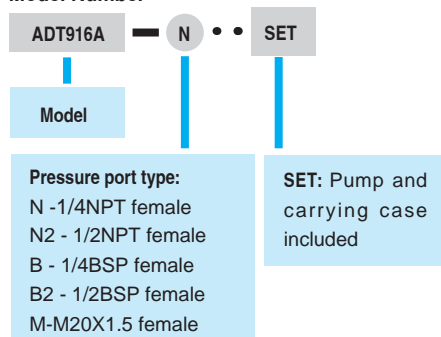
- **Portable**  
Only 5.9 lb (2.7 kg)
- **Adjustment Resolution**  
10 Pa (0.1 mbar)  
High-quality screw press for fine pressure adjustment
- **Great Stability**  
A specially designed shut-off valve makes the pressure as stable as possible during calibration.
- **Durable and Minimal Maintenance**  
Built-in gas-liquid isolator protects the pump from moisture and dirt.
- **Easy-to-use**
- **Hand-tight Quick Connectors**  
Allows easy connecting and disconnecting to the test pump without the need for PTFE tape or wrenches.

### SPECIFICATIONS

- **Media:** Air.
- **Generated Pressure Range**  
95% vacuum to 600 psi (40 bar) positive pressure
- **Pressure Resolution:** 10 Pa (0.1 mbar).
- **Material**  
Ram/adapters: SS  
Body: SS, aluminum  
Seals: Buna-N, PTFE, Copper Alloy
- **Piston volume:** 21 ml (1.3 in<sup>3</sup>)
- **Connection**  
Hand-tight connectors for both test gauge and reference gauge.  
1/4NPT female, 1/2NPT female, 1/4BSP female, 1/2BSP female, or M20X1.5 female
- **Dimensions**  
Height: 5.5" (140 mm)  
Base: 12.4" (315 mm) x 7.8" (198 mm)
- **Weight:** 5.9 lb (2.7 kg).
- **Warranty:** 1 year

### ORDERING INFORMATION

#### Model Number



#### Accessories included

- O-ring: 20 pcs
- Manual: 1 pc
- Carrying case (916A-X-SET models only)

#### Optional Accessories

Model number	Description
ADT102	Adapters and fittings, 1/4NPT male to various male and female connection (25 pcs). More information shown on page 70.
ADT103	Adapters and fittings, 1/4NPT (1/2NPT, 1/4BSP, 1/2BSP, or M20X1.5) male to various female hand-tight quick connectors (10 pcs). More information shown on page 71.
ADT100-HTK-8K	Hose test kit, 5 feet flexible hose, 8,000 psi, user selectable male (1/4NPT, 1/2NPT, 1/4BSP, 1/2BSP, M20) to user selectable female hand tight quick connector.
9904-916	Carrying Case for one ADT916A pump and two ADT681 gauges or ADT672 calibrators
ADT916A-MK	Maintenance kit for Additel 916A pump

Note: For oil free applications contact Additel.

# Additel 917

## Pneumatic Pressure Test Pump



- Generate 95% vacuum to 1,000 psi (70 bar) pressure
- Portable, only 5.7 lb
- Great stability and high resolution
- Minimal maintenance
- Hand-tight quick connectors



### OVERVIEW

The 917 Pneumatic Pressure Test Pump is a hand operated pressure pump designed to generate pressure from 95% vacuum to 1,000 psi (70 bar). A high-quality screw press is designed for fine pressure adjustment, with an adjustment resolution up to 10 Pa (0.1 mbar). A specially designed shut-off valve makes the pressure as stable as possible during calibration. A built-in gas-liquid isolator protects the pump from moisture and dirt to reduce the need for maintenance. The 917 can be special ordered to comply with oxygen free applications. Two hand-tight quick connectors installed on the pump allow easy connecting and disconnecting to the test pump without the need for PTFE tape or wrenches. The 917 is an ideal comparison test pump for pressure instruments calibration.

### FEATURES

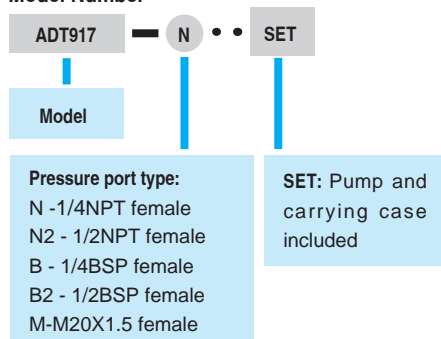
- **Portable**  
Only 5.7 lb (2.6 kg)
- **High Resolution**  
10 Pa (0.1 mbar)  
High-quality screw press for fine pressure adjustment
- **Great Stability**  
A specially designed shut-off valve makes the pressure as stable as possible during calibration.
- **Durable and Minimal Maintenance**  
Built-in gas-liquid isolator protects the pump from moisture and dirt.
- **Easy-to-use**  
Pressurized to desired pressure by the lever directly and make fine adjustment. No high-pressurized valve needed.
- **Hand-tight Quick Connectors**  
Allows easy connecting and disconnecting to the test pump without the need for PTFE tape or wrenches.

### SPECIFICATIONS

- **Media:** Air.
- **Generated Pressure Range**  
95% vacuum to 1,000 psi (70 bar) positive pressure
- **Adjustment Resolution:** 10 Pa (0.1 mbar).
- **Material:** Ram/adapters: SS  
Body: SS, aluminum  
Seals: Buna-N, PTFE, Copper Alloy
- **Piston volume:** 27 ml (1.6 in<sup>3</sup>)
- **Connection:**  
Hand-tight connectors for both test gauge and reference gauge.  
1/4NPT female, 1/2NPT female, 1/4BSP female, 1/2BSP female, or M20X1.5 female
- **Dimensions:**  
Height: 5.5" (140 mm)  
Base: 12.4" (315 mm) x 7.8" (198 mm)
- **Weight:** 5.7 lb (2.6 kg).
- **Warranty:** 1 year

### ORDERING INFORMATION

#### Model Number



#### Accessories included

O-ring: 20 pcs  
Manual: 1 pc  
Carrying case (917-X-SET models only)

#### Optional Accessories

Model number	Description
ADT102	Adapters and fittings, 1/4NPT male to various male and female connection (25 pcs). More information shown on page 70.
ADT103	Adapters and fittings, 1/4NPT (1/2NPT, 1/4BSP, 1/2BSP, or M20X1.5) male to various female hand-tight quick connectors (10 pcs). More information shown on page 71.
ADT100-HTK-8K	Hose test kit, 5 feet flexible hose, 8,000 psi, user selectable male (1/4NPT, 1/2NPT, 1/4BSP, 1/2BSP, M20) to user selectable female hand tight quick connector.
9904-917	Carrying Case for one 917 pump and two 681 gauges or 672 calibrators
ADT917-MK	Maintenance kit for Additel 917 pump

Note: For oil free applications contact Additel.

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# Additel 918

## Pneumatic Pressure Test Pump



- **Generate 95% vacuum to 1,500 psi (100 bar) pressure**
- **Portable, only 5.7 lb**
- **Great stability and high resolution**
- **Minimal maintenance**
- **Hand-tight quick connectors**



### OVERVIEW

The 918 Pneumatic Pressure Test Pump is a hand operated pressure pump designed to generate pressure from 95% vacuum to 1,500 psi (100 bar). A high-quality screw press is designed for fine pressure adjustment, with an adjustment resolution up to 10 Pa (0.1 mbar). A specially designed shut-off valve makes the pressure as stable as possible during calibration. A built-in gas-liquid isolator protects the pump from moisture and dirt to reduce the need for maintenance. The 918 can be special ordered to comply with oxygen free applications. Two hand-tight quick connectors installed on the pump allow easy connecting and disconnecting to the test pump without the need for PTFE tape or wrenches. The 918 is an ideal comparison test pump for pressure instruments calibration.

### FEATURES

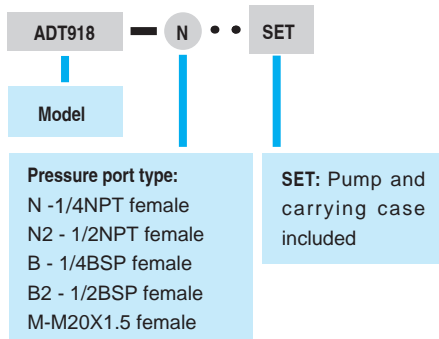
- **Portable**  
Only 5.7 lb (2.6 kg)
- **High Resolution**  
0.001psi (10 Pa , 0.1 mbar)  
High-quality screw press for fine pressure adjustment
- **Great Stability**  
A specially designed shut-off valve makes the pressure as stable as possible during calibration.
- **Durable and Minimal Maintenance**  
Built-in gas-liquid isolator protects the pump from moisture and dirt.
- **Easy-to-use**  
Pressurize to desired pressure by the pump lever directly, and then make fine adjustment. No high-pressure valve needed.
- **Hand-tight Quick Connectors**  
Allows easy connection and disconnection to the test pump without the need for PTFE tape or wrenches.

### SPECIFICATIONS

- **Media:** Air.
- **Generated Pressure Range**  
95% vacuum to 1,500 psi (100 bar) positive pressure
- **Adjustment Resolution:** 0.001 psi (10 Pa , 0.1 mbar).
- **Material:** Ram/adapters: SS  
Body: SS, aluminum  
Seals: Buna-N, FTM, PTFE, Copper Alloy
- **Piston volume:** 27 ml (1.6 in<sup>3</sup>)
- **Connection:** Hand-tight connectors for both test gauge and reference gauge.  
1/4NPT female, 1/2NPT female, 1/4BSP female, 1/2BSP female, or M20X1.5 female
- **Dimensions:**  
Height: 5.5" (140 mm)  
Base: 12.4" (315 mm) x 7.8" (198 mm)
- **Weight:** 5.7 lb (2.6 kg).
- **Warranty:** 1 year

### ORDERING INFORMATION

#### Model Number



#### Accessories included

- O-ring: 20 pcs
- Manual: 1 pc
- Carrying case (918-X-SET models only)

#### Optional Accessories

Model number	Description
ADT102	Adapters and fittings, 1/4NPT male to various male and female connection (25 pcs). More information shown on page 70.
ADT103	Adapters and fittings, 1/4NPT (1/2NPT, 1/4BSP, 1/2BSP, or M20X1.5) male to various female hand-tight quick connectors (10 pcs). More information shown on page 71.
ADT100-HTK-8K	Hose test kit, 5 feet flexible hose, 8,000 psi, user selectable male (1/4NPT, 1/2NPT, 1/4BSP, 1/2BSP, M20) to user selectable female hand tight quick connector.
9904-918	Carrying Case for one 918 pump and two 681 gauges or 672 calibrators
ADT918-MK	Maintenance kit for Additel 918 pump

Note: For oil free applications contact Additel.

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# Additel 919A

## High Pressure Test Pump



- Generate 95% vacuum to 2,000 psi (140 bar) pressure
- Generate 2,000 psi (140 bar) in 30 seconds
- Minimal maintenance
- Hand-tight quick connectors
- First one in the world



### OVERVIEW

The 919A High Pressure Test Pump is a hand operated pressure pump designed to generate pressure from 95% vacuum to 2,000 psi (140 bar). With a long lever, it just takes 30 seconds to reach 2,000 psi (140 bar). A high-quality screw press is designed for fine pressure adjustment, with an adjustment resolution up to 0.001 psi (10 Pa , 0.1 mbar). A specially designed shut-off valve makes the pressure as stable as possible during calibration. A built-in gas-liquid isolator protects the pump from moisture and dirt to reduce the need for maintenance. The residual liquid in the pump introduced from the devices under test will be collected and then pushed out during pressure release. Two hand-tight quick connectors installed on the pump allow easy connecting and disconnecting to the test pump without the need for PTFE tape or wrenches. The 919A is an ideal comparison test pump for pressure instruments calibration.

### FEATURES

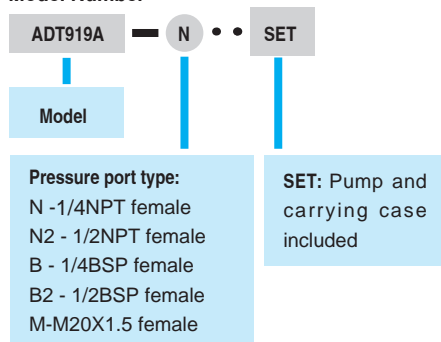
- **High Efficiency**  
Generate 2,000 psi (140 bar) in 30 seconds.
- **Adjustment Resolution**  
0.001 psi (10 Pa , 0.1 mbar).  
High-quality screw press for fine pressure adjustment.
- **Great Stability**  
A specially designed shut-off valve makes the pressure as stable as possible during calibration.
- **Durable and Minimal Maintenance**  
Built-in gas-liquid isolator protects the pump from moisture and dirt.  
The residual liquid in the pump introduced from devices under test will be collected and then pushed out and collected during pressure release.  
Anticorrosive and wear resistant material are used to improve the reliability further.
- **Hand-tight Quick Connectors**  
Allows easy connecting and disconnecting to the test pump without the need for PTFE tape or wrenches.

### SPECIFICATIONS

- **Media:** Air.
- **Generated Pressure Range:** 95% vacuum to 2,000 psi (140 bar) positive pressure
- **Adjustment Resolution:** 10 Pa (0.1 mbar/0.0015 psi)
- **Material:** Ram/adapters: SS  
Body: SS, aluminum  
Seals: Buna-N, PTFE, Copper Alloy
- **Piston volume:** 60 ml (3.7 in<sup>3</sup>)
- **Connection**  
Hand-tight connectors for both test gauge and reference gauge.  
1/4NPT female, 1/2NPT female, 1/4BSP female, 1/2BSP female, or M20X1.5 female
- **Dimensions:**  
Height: 7.00" (178 mm);  
Base: 21.26" (540 mm) x 10.63" (270 mm).
- **Weight:** 14.3 lb (6.5 kg).
- **Warranty:** 1 year

### ORDERING INFORMATION

#### Model Number



#### Accessories included

O-ring: 20 pcs  
Manual: 1 pc  
Carrying case (919A-X-SET models only)

#### Optional Accessories

Model number	Description
ADT102	Adapters and fittings, 1/4NPT male to various male and female connection (25 pcs). More information shown on page 70.
ADT103	Adapters and fittings, 1/4NPT (1/2NPT, 1/4BSP, 1/2BSP, or M20X1.5) male to various female hand-tight quick connectors (10 pcs). More information shown on page 71.
ADT100-HTK-8K	Hose test kit, 5 feet flexible hose, 8,000 psi, user selectable male (1/4NPT, 1/2NPT, 1/4BSP, 1/2BSP, M20) to user selectable female hand tight quick connector.
9909-919	Carrying Case for one 919A pump and two 681 gauges or 672 calibrators
ADT919A-MK	Maintenance kit for Additel 919A pump

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## Application Note



Metrology Made Simple

### Improved Methods for High Pressure Pneumatic Calibrations in the Field

Are you tired of dragging a nitrogen bottle and dead weight tester out to the field to perform pneumatic high pressure calibrations? Does it trouble you to use a hydraulic pump or dead weight tester for your gas gauges every time you have to go above 600 psi? This application note details the limitations to traditional methods and provides a solution to calibration of gas gauges up to 3,000 psi (200 bar) with a field-ready calibration tool.

#### Limitations with Traditional Methods

Traditional methods for performing high pressure gas gauge calibrations in the field require the use of a controller or comparison systems and a nitrogen bottle. This solution typically provides the performance needed to do the job but adds a considerable inconvenience in having to transport several pieces of heavy equipment to the calibration site. Not to mention the time and effort in setting up the system. Dead weight testers and hydraulic pumps have also been used as a solution. Hydraulic pumps are problematic for this application as the liquid can damage the gas gauge you are attempting to calibrate. It is common that these hydraulic comparison pumps also lack the stability and resolution required to calibrate many gas gauges. Dead weight testers typically have the accuracy required but will require a gas supply for high pressure pneumatic applications. If the dead weight tester uses hydraulic fluid as the medium it will achieve much higher pressures but has similar drawbacks as hydraulic pumps.

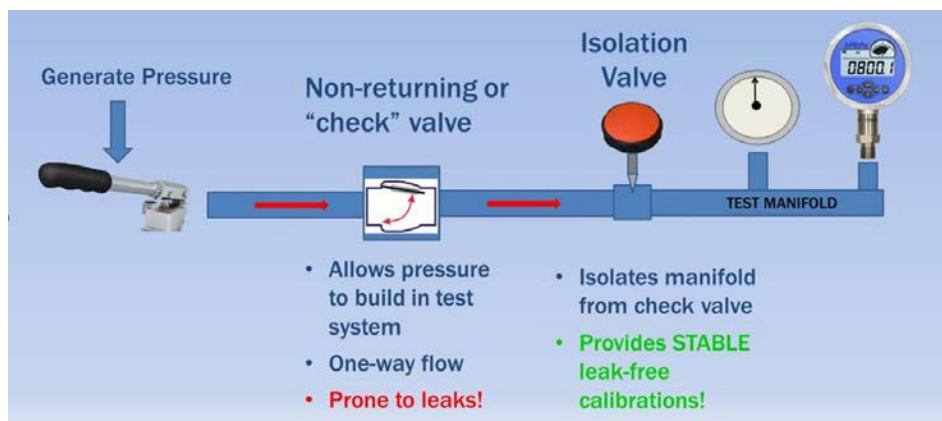
#### A More Practical Solution

Additel developed their high pressure pneumatic pumps specifically to address high pressure gas calibrations in the field. The Additel 919A goes to 2,000 psi (140 bar) and the 920 goes to 3,000 psi (200 bar) without the use of hydraulic fluids or the need for a gas supply. Each pump can also generate to 95% of vacuum. The ADT920 will generate 3,000 psi (200 bar) in 40 seconds and the pump weighs about 14 lbs (6.5 kg) which makes it easy to take to the field.



The high pressure range, portability, and speed to pressure are not the only things that make this series of pumps unique. The Additel pneumatic pump design allows for high stability and resolution to 0.001 psi (0.1 mbar). Like many pumps on the market, the ADT919A and the ADT920 use a check valve, also referred to as a non-returning valve, to protect the pump from contaminants that could cause damage. However, we've seen with most pumps on the market that the check valve tends to lose its seal over time which causes unstable measurements. The Additel design incorporates a high-quality isolation valve and screw press which allows for you to isolate the calibration volume from the check valve and achieve very stable measurements and resolution to 0.001 psi (0.1 mbar).

The diagram below illustrates the pump construction.



The method of operation is as follows: To generate pressure, use the pump handle on top of the unit. When you've generated 70% - 80% of the desired pressure with the pump handle, then close the isolation valve (this isolates the calibration volume from the pump handle and check valve). Next, use the fine-adjust screw press to generate the remaining pressure. Each pump comes with two hand-tight, quick-connect pressure ports that do not require the use of PTFE tape or wrenches. Combine this pump with any of our digital pressure gauges and you have an accurate, portable and practical field calibration solution for gas calibrations up to 3,000 psi (200 bar).

#### Conclusion

Traditional solutions for high pressure gas calibrations are not convenient or practical for field applications or they require the use of hydraulic fluids which could damage the sensor being tested. The Additel 919A and 920 pneumatic pressure pumps solve many of the problems that exist with traditional solutions and provide a reliable, field-ready, accurate and affordable solution to meet your needs!

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# Additel 920, 920HV Series High Pressure Test Pump

- Generate 95% vacuum to 3,000 psi (200 bar) pressure
- Generate 3,000 psi (200 bar) in 40 seconds
- Minimal maintenance
- Hand-tight quick connectors
- High volume model available



## OVERVIEW

The 920 and 920HV High Pressure Test Pump are hand operated pressure pumps designed to generate pressure from 95% vacuum to 3,000 psi (200 bar). With a long lever, it takes just 40 seconds to reach 3,000 psi (200 bar). The high volume (HV) model has been outfitted with a higher volume pump to provide added capacity. A quality screw press is designed for fine pressure adjustment, with an adjustment resolution up to 10 Pa (0.1 mbar).

A specially designed shut-off valve makes the pressure as stable as possible during calibration. A built-in gas-liquid isolator protects the pump from moisture and dirt to reduce the need for maintenance. The residual liquid in the pump introduced from devices under test will be pushed out and collected during pressure release. Two hand-tight quick connectors installed on the pump allow easy connecting and disconnecting to the test pump without the need for PTFE tape or wrenches. The 920 is an ideal comparison test pump for pressure instruments calibration.

## FEATURES

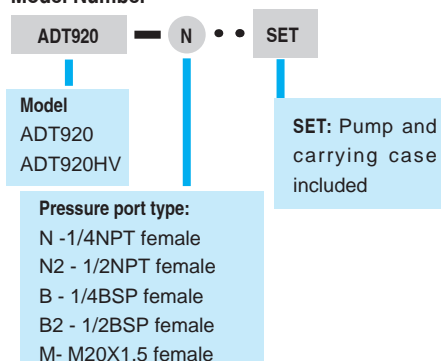
- **High Efficiency**  
Generate 3,000 psi (200 bar) in 40 seconds.
- **Adjustment Resolution**  
0.001 psi (10 Pa, 0.1 mbar).  
High-quality screw press for fine pressure adjustment.
- **Great Stability**  
A specially designed shut-off valve makes the pressure as stable as possible during calibration.
- **Durable and Minimal Maintenance**  
Built-in gas-liquid isolator protects the pump from moisture and dirt.  
The residual liquid in the pump introduced from devices under test will be collected and then pushed out and collected during pressure release.  
Anticorrosive and wear resistant material are used to improve the reliability further.
- **Hand-tight Quick Connectors**  
Allows easy connecting and disconnecting to the test pump without the need for PTFE tape or wrenches.

## SPECIFICATIONS

- **Media:** Air.
- **Generated Pressure Range**  
95% vacuum to 3,000 psi (200 bar) positive pressure
- **Adjustment Resolution:** 10 Pa (0.1 mbar/0.0015 psi)
- **Material:** Ram/adapters: SS  
Body: SS, aluminum  
Seals: Buna-N, F357, PTFE, Copper Alloy
- **Piston volume:** 60 ml (3.7 in<sup>3</sup>) for 920,  
115 ml (7.02 in<sup>3</sup>) for 920 HV
- **Connection**  
Hand-tight connectors for both test gauge and reference gauge.  
1/4NPT female, 1/2NPT female, 1/4BSP female, 1/2BSP female, or M20X1.5 female
- **Dimensions:**  
Height: 7.00" (178 mm);  
Base: 21.26" (540 mm) x 10.63" (270 mm).
- **Weight:** 14.3 lb (6.5 kg) for 920,  
15.9 lb (7.2 kg) for 920HV
- **Warranty:** 1 year

## ORDERING INFORMATION

### Model Number



### Accessories included

O-ring: 20 pcs  
Manual: 1 pc  
Carrying case (920-X-SET models only)

### Optional Accessories

Model number	Description
ADT102	Adapters and fittings, 1/4NPT male to various male and female connection (25 pcs).
ADT103	Adapters and fittings, 1/4NPT (1/2NPT, 1/4BSP, 1/2BSP, or M20X1.5) male to various female hand-tight quick connectors (10 pcs).
ADT100-HTK-8K	Hose test kit, 5 feet flexible hose, 8,000 psi, user selectable male (1/4NPT, 1/2NPT, 1/4BSP, 1/2BSP, M20) to user selectable female hand tight quick connector.
9909-920	Carrying Case for one 920 pump and two 681 gauges or 672 calibrators
9909-920HV	Carrying Case for one 920HV pump and two 681 gauges or 672 calibrators
ADT920-MK	Maintenance kit for Additel 920 pump
ADT920HV-MK	Maintenance kit for Additel 920HV pump

Note: For oil free applications contact Additel.

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# Additel 925

## Handheld Hydraulic Pressure Test Pump

- Generate 85% vacuum to 6,000 psi (400 bar) pressure
- Portable, only 3.7 lb
- Minimal maintenance
- Increase and decrease pressure smoothly
- Hand-tight quick connectors



### OVERVIEW

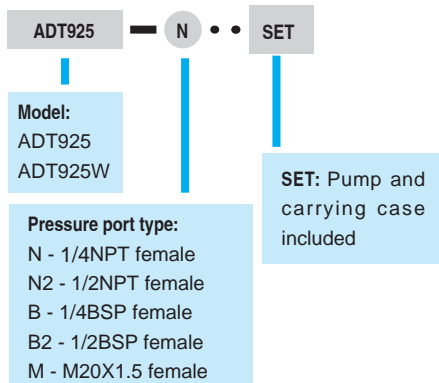
The 925 Hydraulic Pressure Test Pump is a hand operated pressure pump designed to generate pressure from 85% vacuum to 6,000 psi (400 bar). With the patented screw press technology, the high pressure can be easily generated, as well as increased and decreased smoothly. With no check valve (non-returning valve), the 925 avoids the troublesome leakage issues that is usually experienced with most hand pumps and allows for minimal maintenance. Two hand-tight quick connectors installed on the pump allow easy connecting and disconnecting to the test pump without the need for PTFE tape or wrenches. The 925 is an ideal comparison test pump for calibrating pressure measuring instruments such as test gauges, indicators or transducers in the field or laboratory.

### FEATURES

- **Portable**  
Only 3.7 lb (1.7 kg)
- **Durable and Minimal Maintenance**  
Patented screw press technology, without non-returning valve inside that is usually used on troublesome hand pumps.
- **Easy-to-use**  
The high pressure can be generated easily, as well as increased and decreased smoothly.
- **Extremely Low Leakage**  
Patented screw press technology, replaces troublesome check valves (non-returning valve) used in most hand pumps which practically eliminates leakage.
- **Hand-tight Quick Connectors**  
Allows easy connecting and disconnecting to the test pump without the need for PTFE tape or wrenches.

### ORDERING INFORMATION

#### Model Number



#### Accessories included

- Mineral oil, 1 bottle (250 ml)\*
- O-ring: 20 pcs
- Manual: 1 pc
- Carrying case (925-X-SET models only)

\* When water media is not requested

### SPECIFICATIONS

- **Media:** Oil or deionized water.  
(Oil is default media liquid. Pump with water as media to be ordered as ADT925W. Pump stability is best when used with oil. Performance may decrease when used with water as the media.)
- **Reservoir capacity:** 200 ml (12.2 in<sup>3</sup>)
- **Pressure Range**  
85% vacuum to 6,000 psi (400 bar) positive pressure.
- **Material:** Ram/adapters: SS  
Body: SS, aluminum  
Seals: Buna-N, PTFE, Copper Alloy
- **Connection**  
Hand-tight connectors for both test gauge and reference gauge.  
1/4NPT female, 1/2NPT female, 1/4BSP female, 1/2BSP female, or M20X1.5 female
- **Dimensions:** Height: 4.72" (120 mm)  
Base: 9.84" (250 mm) x 5.51" (140 mm)
- **Weight:** 3.7 lb (1.7 kg).
- **Warranty:** 1 year
- **Piston volume**  
Low pressure piston: 18 ml (1.1 in<sup>3</sup>)  
High pressure piston: 0.9 ml (0.05 in<sup>3</sup>)

#### Optional Accessories

Model number	Description
9201	Oil, Diethylhexyl Sebacate, 1 liter (1 quart)
9202	Oil, Mineral Oil, 1 liter (1 quart)
ADT102	Adapters and fittings, 1/4NPT male to various male and female connection (25 pcs). More information shown on page 70.
ADT103	Adapters and fittings, 1/4NPT (1/2NPT, 1/4BSP, 1/2BSP, or M20X1.5) male to various female hand-tight quick connectors (10 pcs). More information shown on page 71.
ADT100-HTK-8K	Hose test kit, 5 feet flexible hose, 8,000 psi, user selectable male (1/4NPT, 1/2NPT, 1/4BSP, 1/2BSP, M20) to user selectable female hand tight quick connector.
9901-925	Carrying Case for one 925 pump and two 681 gauges or 672 calibrators
ADT925-MK	Maintenance kit for Additel 925 pump

# Application Note

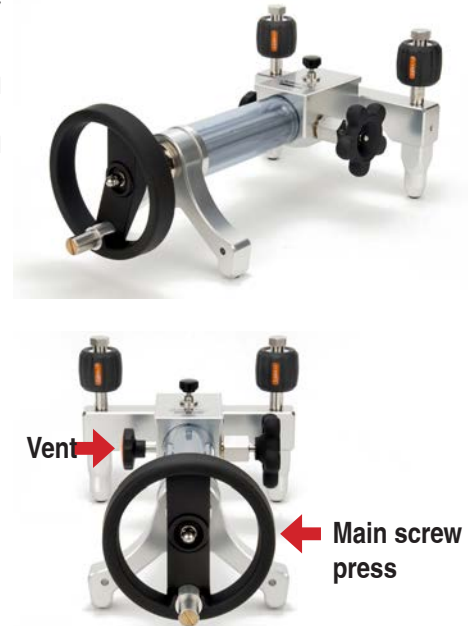
## Considerations for Hydraulic High Pressure Calibrations

If you are doing high pressure, hydraulic calibrations there are a few things that you'll need to consider which will make your life a little easier and help you produce stable measurements. This application note focuses on considerations for pressure calibrations using a high pressure hydraulic pump to generate the pressure.

### Getting Started

To produce stable and high pressure measurements using a hydraulic calibration pump, the gas within the calibration system needs to be removed. Hydraulic test pumps use various types of fluids to generate high pressures. Because gas is much more compressible than liquid, purging most if not all the gas out of the system will allow for maximum pressures to be generated. The following steps describe the procedure to purge the gas from an Additel test pump:

1. Ensure the pump, reference standard, and device under test (DUT) are securely connected to the calibration pump.
2. Close the vent valve and screw out the main screw press. You should see a vacuum being pulled on your reference and DUT (assuming the reference and the DUT are able to be used for vacuum measurement).
3. Open the vent valve, wait for the pressure to settle to zero, and screw in the main screw press. As you do this, you may see bubbles emerge in the medium reservoir which is a good indication that gas is being pushed out of the system.
4. Close the vent valve and repeat steps 2 and 3 one or two more times.
5. Close the vent valve and unscrew the main screw press half way out. Then open the vent valve to zero the measurement.
6. Now, you are ready to close the vent valve and generate pressure.



### Stable Measurements

As pressures are generated to the desired test point it is common to initially observe a fairly rapid decrease in pressure. Initially, you may conclude that this is a pressure leak but what you are likely observing is called the adiabatic effect. This effect is defined as a gain or loss of heat within a system and its environment. When a gas is compressed under adiabatic conditions, its pressure increases and its temperature rises without the gain or loss of any heat. This happens when the screw press of a pump compresses the fluid volume, thus resulting in an increase in pressure but also an increase in the temperature. As the increase in pressure stops the temperature generated from the screw press dissipates. If the volume is held constant and the temperature decreases so also will the pressure decrease. So this initial decrease of pressure is in fact a result of the temperature settling from the adiabatic heating effect generated from the screw press of the pump.

Other sources of instability that also impact the pressure measurement are instabilities in room temperature and changes in volume. Because temperature is a factor of pressure as the entire pressure system changes temperature due to the room temperature changing the true pressure value will also change. The same can also be said of the pressure volume. With an increase or decrease of pressure volume the true pressure value will see a correlated change. Volume changes with pressure systems are usually not very noticeable except at high pressures. At high pressures, the materials where the pressurized volume is contained will slightly expand causing the volume to expand and the pressure will decrease. This is particularly evident when using flexible hoses at high pressures.

### Conclusion

So we can't change the laws of physics—so what can be done? As pressures are generated, time must be given to allow for the adiabatic effects to settle. In other words, you need to let the measurement stabilize for a few minutes. As you allow this stabilization period to happen, you'll find the measurement stability of the pump to be very reliable for your calibration applications. Room temperature will also have an impact on the measurement and it is best if calibrations are performed in a controlled, stable environment. Lastly, careful consideration of hoses, manifolds, and tubing will help produce stable results at high pressures. Using metal tubing as opposed to flexible hoses will yield higher stability as metal is less likely to allow for the volume to expand when under high pressure.

# Additel 927

## Hydraulic Pressure Test Pump

- **Generate 85% vacuum to 10,000 psi (700 bar) pressure**
- **Portable, only 7 lb**
- **Minimal maintenance**
- **Increase and decrease pressure smoothly**
- **Hand-tight quick connectors**



### OVERVIEW

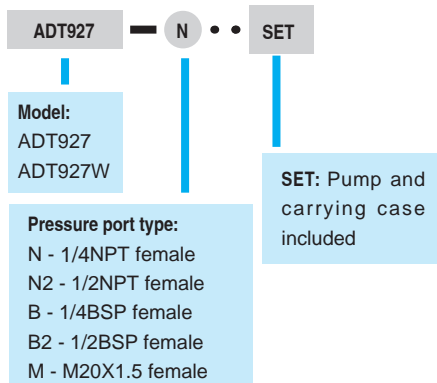
The 927 Hydraulic Pressure Test Pump is a hand operated pressure pump designed to generate pressure from 85% vacuum to 10,000 psi (700 bar). With the patented screw press technology, high pressures can be easily generated, as well as increased and decreased smoothly. With no check valve (non-returning valve), the 927 avoids the troublesome leakage issues that is usually experienced with most hand pumps and allows for minimal maintenance. Two hand-tight quick connectors installed on the pump allow easy connecting and disconnecting to the test pump without the need for PTFE tape or wrenches. The 927 is an ideal comparison test pump for calibrating pressure measuring instruments such as test gauges, indicators or transducers in the field or laboratory.

### FEATURES

- **Portable**  
Only 7 lb
- **Durable and Minimal Maintenance**  
Patented screw press technology, without non-returning valve inside that is usually used on troublesome hand pumps.
- **Easy-to-use**  
The high pressure can be generated easily, as well as increased and decreased smoothly.
- **Extremely Low Leakage**  
Patented screw press technology, replaces troublesome check valves (non-returning valve) used in most hand pumps which practically eliminates leakage.
- **Hand-tight Quick Connectors**  
Allows easy connecting and disconnecting to the test pump without the need for PTFE tape or wrenches.

### ORDERING INFORMATION

#### Model Number



#### Accessories included

- Mineral oil, 1 bottle (250 ml)\*
- O-ring: 20 pcs
- Manual: 1 pc
- Carrying case (927-X-SET models only)

\* When water media is not requested

### SPECIFICATIONS

- **Media:** Oil or deionized water.  
(Oil is default media liquid. Pump with water as media to be ordered as 927W. Pump stability is best when used with oil. Performance may decrease when used with water as the media.)
- **Reservoir capacity:** 245 ml (15 in<sup>3</sup>)
- **Generated Pressure Range**  
85% vacuum to 10,000 psi (700 bar) positive pressure.
- **Material:** Ram/adapters: SS  
Body: SS, aluminum  
Seals: Buna-N, PTFE, Copper Alloy
- **Connection**  
Hand-tight connectors for both test gauge and reference gauge.  
1/4NPT female, 1/2NPT female, 1/4BSP female, 1/2BSP female, or M20X1.5 female
- **Dimensions:** Height: 5.31" (135 mm)  
Base: 11.42" (290 mm) x 7.80" (198 mm).
- **Weight:** 7 lb (3.2 kg).
- **Warranty:** 1 year
- **Piston volume**  
Low pressure piston: 19 ml (1.2 in<sup>3</sup>)  
High pressure piston: 0.9 ml (0.05 in<sup>3</sup>)

#### Optional Accessories

Model number	Description
9201	Oil, Diethylhexyl Sebacate, 1 liter (1 quart)
9202	Oil, Mineral Oil, 1 liter (1 quart)
ADT102	Adapters and fittings, 1/4NPT male to various male and female connection (25 pcs). More information shown on page 70.
ADT103	Adapters and fittings, 1/4NPT (1/2NPT, 1/4BSP, 1/2BSP, or M20X1.5) male to various female hand-tight quick connectors (10 pcs). More information shown on page 71.
ADT100-HTK-15K	Hose test kit, 5 feet flexible hose, 15,000 psi, 1/4NPT male to 1/4NPT (1/8NPT, 1/2NPT, 1/4BSP, 1/2BSP, or M20X1.5) female hand-tight quick connector.
9904-927	Carrying Case for one 927 pump and two 681 gauges or 672 calibrators
ADT927-MK	Maintenance kit for Additel 927 pump



- 

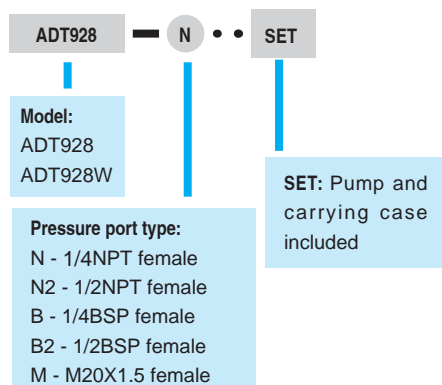
The Additel 928 Hydraulic Pressure Test Pump is a hand operated pressure pump designed to generate pressure to 15,000 psi (1,000 bar). This pump incorporates a dual-piston system which is ideal for filling large volume workload with the hand pump and providing smooth increase and decrease of pressure with the fine adjustment. The 928 Test Pump incorporates an isolation valve which isolates the calibration volume from the check valve associated with the hand pump. Because the check valve can often be a source of leaks and maintenance, the isolation valve provides more stable measurements and reduces potential maintenance of the pump. Two hand-tight quick connectors installed on the pump allow easy connecting and disconnecting to the test pump without the need for PTFE tape or wrenches. The Additel 928 is an ideal comparison test pump for calibrating pressure measuring instruments such as test gauges, indicators or transducers in the field or laboratory.

## SPECIFICATIONS

- **Hand pump to fill large volume systems**
- **Portable at 8.6 lbs (3.9 kg)**
- **Durable and minimal maintenance**  
Isolation valve provides stable pressures while reducing maintenance on the hand pump check valve
- **Easy to use**  
15,000 psi (1,000 bar) can be generated easily with the dual-piston system
- **Hand-tight quick connectors**  
Allows easy connection and disconnection to the test pump without the need for PTFE tape or wrenches

- **Media:** Mineral oil or deionized water.  
(Oil is default media liquid. Pump with water as media to be ordered as 928W. Pump stability is best when used with oil. Performance may decrease when used with water as the media.)
- **Generated Pressure Range**  
0 to 15,000 psi (1,000 bar) gauge pressure
- **Material:**  
Ram/adapters: 304 SS                      Body: 304 SS, aluminum  
Seals: Buna-N, PTFE, Copper Alloy    Reservoir: UPVC
- **Connection**  
Hand-tight connectors for both test gauge and reference gauge.  
1/4NPT female, 1/2NPT female, 1/4BSP female, 1/2BSP female, or M20X1.5 female
- **Dimensions:** Height: 6.38" (162 mm)  
Base: 13.58" (345 mm) x 8.46" (215 mm)
- **Weight:** 8.6 lb (3.9 kg)
- **Piston Volume:** Fine adjust piston: 0.9 ml (0.05 in<sup>3</sup>)
- **Volume Per Stroke:** 3.72 ml
- **Reservoir Volume:** 150 ml (9.15 in<sup>3</sup>)
- **Warranty:** 1 year

- **Model Number**



- Accessories included**
- Mineral oil, 1 bottle (250 ml)\*
  - O-ring: 20 pcs
  - Manual: 1 pc
  - Carrying case (928-X-SET models only)
- \* When water media is not requested

### ■ Optional Accessories

<i>Model number</i>	<i>Description</i>
9201	Oil, Diethylhexyl Sebacate, 1 liter (1 quart)
9202	Oil, Mineral oil, 1 liter (1 quart)
ADT102	Adapters and fittings, 1/4NPT male to various male and female connection (25 pcs). More information shown on page 70.
ADT103	Adapters and fittings, 1/4NPT (1/2NPT, 1/4BSP, 1/2BSP, or M20X1.5) male to various female hand-tight quick connectors (10 pcs). More information shown on page 71.
ADT100-HTK-15K	Hose test kit, 5 feet flexible hose, 15,000 psi, 1/4NPT male to 1/4NPT (1/8NPT, 1/2NPT, 1/4BSP, 1/2BSP, or M20X1.5) female hand-tight quick connector.
9904-928	Carrying Case for one 928 pump and two pressure test gauges
ADT928-MK	Maintenance kit for Additel 928 pump
ADT100-928-HK	Hose Kit, External Reservoir Expansion Hose Kit for ADT928

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# Additel 936

## Hydraulic High Pressure Calibration Pump



- **Generate 85% vacuum to 15,000 psi (1,000 bar) pressure**
- **Minimal maintenance**
- **Increase and decrease pressure smoothly**
- **Three pressure ports**
- **Hand-tight quick connectors**



### OVERVIEW

The 936 Hydraulic High Pressure Test Pump is a hand operated pressure pump designed to generate pressure from 85% vacuum to 15,000 psi (1,000 bar). With the patented screw press technology, high pressures can be easily generated, as well as increased and decreased smoothly. A specially designed shut-off valve makes the pressure as stable as possible during calibration. With no check valve (non-returning valve), the 936 avoids the troublesome leakage issues that is usually experienced with hand pumps and allows for minimal maintenance. Three hand-tight quick connectors installed on the pump allow easy connecting and disconnecting to the test pump without the need for PTFE tape or wrenches. The 936 is an ideal comparison test pump for calibrating pressure measuring instruments such as test gauges, indicators or transducers in the laboratory.

### FEATURES

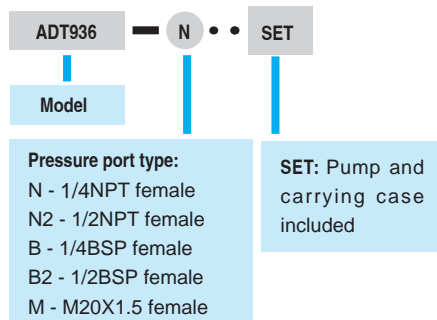
- **High Pressure**  
Generates pressure up to 15,000 psi (1000 bar)
- **Durable and Minimal Maintenance**  
Patented screw press technology, without non-returning valve inside that is usually used on troublesome hand pumps.
- **Easy-to-use**  
High pressures can be generated easily, as well as increased and decreased smoothly.
- **Extremely Low Leakage**  
Patented screw press technology replaces troublesome check valves (non-returning valve) in most hand pumps which practically eliminates leakage.
- **Hand-tight Quick Connectors**  
Allows easy connecting and disconnecting to the test pump without the need for PTFE tape or wrenches.

### SPECIFICATIONS

- **Media:** Oil
- **Reservoir capacity:** 420 ml (25.6 in<sup>3</sup>)
- **Pressure Range**  
85% vacuum to 15,000 psi (1,000 bar) positive.
- **Material**  
Ram/adapters: SS  
Body: SS/aluminum  
Seals: Buna-N, PTFE, Copper Alloy, SS
- **Connection**  
Hand-tight connectors for both test gauge and reference gauge(s).  
1/4NPT female, 1/2NPT female, 1/4BSP female, 1/2BSP female, or M20X1.5 female
- **Dimensions**  
Height: 9.1" (230 mm)  
Base: 20.5" (520 mm) x 14.2" (360 mm)
- **Weight:** 35.2 lb (16 kg).
- **Warranty:** 1 year
- **Piston volume**  
Low pressure piston: 30 ml (1.8 in<sup>3</sup>)  
High pressure piston: 2.5 ml (0.15 in<sup>3</sup>)

### ORDERING INFORMATION

#### Model Number



#### Accessories included

Mineral oil, 1 bottle (250 ml)  
O-ring: 20 pcs      Manual: 1 pc  
Carrying case (936-X-SET models only)

#### Optional Accessories

Model number	Description
9201	Oil, Diethylhexyl Sebacate, 1 liter (1 quart)
9202	Oil, Mineral Oil, 1 liter (1 quart)
ADT102	Adapters and fittings, 1/4NPT male to various male and female connection (25 pcs). More information shown on page 70.
ADT103	Adapters and fittings, 1/4NPT (1/2NPT, 1/4BSP, 1/2BSP, or M20X1.5) male to various female hand-tight quick connectors (10 pcs). More information shown on page 71.
9908	Carrying case for 936, 937, 938 or 949.
ADT936-MK	Maintenance kit for Additel 936 pump

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# Additel 937

## Hydraulic High Pressure Calibration Pump



- Generate 85% vacuum to 15,000 psi (1,000 bar) pressure
- Compatible to phosphoric acid ester fluid and Skydrol Oil
- Increase and decrease pressure smoothly
- Three pressure ports
- Hand-tight quick connectors



### OVERVIEW

The 937 Hydraulic High Pressure Calibration Pump is a hand operated pressure pump designed for calibrating pressure measuring instruments with phosphoric acid ester fluid and Skydrol oil in the range from 85% vacuum to 15,000 psi (1000 bar). With the patented screw press technology, high pressures can be easily generated, increased and decreased smoothly. A specially designed shut-off valve makes the pressure as stable as possible during calibration. With no check valve (non-returning valve), the 937 avoids the troublesome leakage issues that is usually experienced with hand pumps and allows for minimal maintenance. Three hand-tight quick connectors installed on the pump allow easy connecting and disconnecting to the test pump without the need for PTFE tape or wrenches. The 937 is an ideal comparison test pump for calibrating pressure measuring instruments such as test gauges, indicators or transducers in the laboratory.

### FEATURES

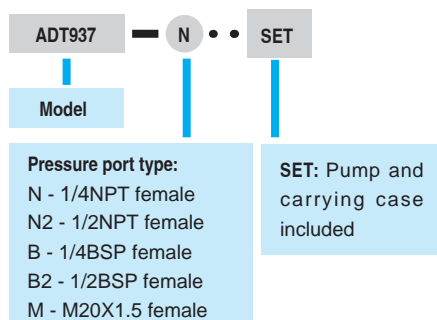
- **High Pressure**  
Generates pressure up to 15,000 psi (1,000 bar)
- **Durable and Minimal Maintenance**  
Patented screw press technology, with no check valve (non-returning valve) inside that is usually used on troublesome hand pumps causing leakage.
- **Easy-to-use**  
High pressures can be generated easily, as well as increased and decreased smoothly.
- **Hand-tight Quick Connectors**  
Allows easy connecting and disconnecting to the test pump without the need for PTFE tape or wrenches.

### SPECIFICATIONS

- **Media:** Compatible to phosphoric acid ester fluid and Skydrol Oil (should not be used for mineral oil)
- **Reservoir capacity:** 420 ml (25.6 in<sup>3</sup>)
- **Pressure Range**  
85% vacuum to 15,000 psi (1,000 bar) positive.
- **Material:** Ram/adapters: SS  
Body: SS, aluminum  
Seals: EPDM, PTFE, Copper Alloy
- **Connection**  
Hand-tight connectors for both test gauge and reference gauge(s).  
1/4NPT female, 1/2NPT female, 1/4BSP female, 1/2BSP female, or M20X1.5 female
- **Dimensions**  
Height: 9.1" (230 mm)  
Base: 20.5" (520 mm) x 14.2" (360 mm)
- **Weight:** 35.2 lb (16 kg).
- **Warranty:** 1 year
- **Piston volume**  
Low pressure piston: 30 ml (1.8 in<sup>3</sup>)  
High pressure piston: 2.5 ml (0.15 in<sup>3</sup>)

### ORDERING INFORMATION

#### Model Number



#### Accessories included

O-ring: 20 pcs      Manual: 1 pc  
Carrying case (937-X-SET models only)

#### Optional Accessories

Model number	Description
ADT102	Adapters and fittings, 1/4NPT male to various male and female connection (25 pcs). More information shown on page 70.
ADT103	Adapters and fittings, 1/4NPT (1/2NPT, 1/4BSP, 1/2BSP, or M20X1.5) male to various female hand-tight quick connectors (10 pcs). More information shown on page 71.
9908	Carrying case for 936, 937, 938 or 949.
ADT937-MK	Maintenance kit for Additel 937 pump

# Additel 938

## Hydraulic High Pressure Calibration Pump



- Generate 85% vacuum to 15,000 psi (1,000 bar) pressure
- Oil-free pressure instruments
- Minimal maintenance
- Easy-to-use
- Three pressure ports
- Hand-tight quick connectors



### OVERVIEW

The 938 Hydraulic High Pressure Test Pump is specially designed for calibrating oil-free pressure measuring instruments in the range of 85% vacuum to 15,000 psi (1,000 bar). All parts used in the pump have been carefully cleaned to remove oil. The pump uses water as the media. With the patented screw press technology, high pressures can be easily generated, as well as increased and decreased smoothly. A specially designed shut-off valve makes the pressure as stable as possible during calibration. With no check valve (non-returning valve), the 938 avoids the troublesome leakage issues that is usually experienced with hand pumps and allows for minimal maintenance. Three hand-tight connectors installed on the pump allow easy connecting and disconnecting to the test pump without the need for PTFE tape or wrenches. The 938 is an ideal comparison test pump for calibrating oil-free pressure measuring instruments such as test gauges, indicators or transducers in the laboratory.

### FEATURES

- **High Pressure**  
Generates pressure up to 15,000 psi (1,000 bar)
- **Durable and Minimal Maintenance**  
Patented screw press technology, without non-returning valve inside that is usually used on troublesome hand pumps.
- **Easy-to-use**  
With the patented screw press technology, high pressures can be generated easily, as well as increased and decreased smoothly
- **Extremely Low Leakage**  
Patented screw press technology replaces troublesome check valves (non-returning valve) in most hand pumps which practically eliminates leakage.
- **Hand-tight Quick Connectors**  
Allows easy connecting and disconnecting to the test pump without the need for PTFE tape or wrenches.

### SPECIFICATIONS

- **Media:** Deionized water
- **Reservoir capacity:** 420 ml (25.6 in<sup>3</sup>)
- **Pressure Range**  
85% vacuum to 15,000 psi (1,000 bar) positive pressure.
- **Material**  
Ram/adapters: SS  
Body: SS, aluminum  
Seals: Buna-N, PTFE, Copper Alloy
- **Reservoir capacity:** 420 ml (25.6 in<sup>3</sup>)
- **Connection**  
Hand-tight connectors for both test gauge and reference gauge.  
1/4NPT female, 1/2NPT female, 1/4BSP female, 1/2BSP female, or M20X1.5 female
- **Dimensions**  
Height: 9.1" (230 mm)  
Base: 20.5" (520 mm) x 14.2" (360 mm)
- **Weight:** 35.2 lb (16 kg).
- **Warranty:** 1 year
- **Piston volume**  
Low pressure piston: 30 ml (1.8 in<sup>3</sup>)  
High pressure piston: 2.5 ml (0.15 in<sup>3</sup>)

### ORDERING INFORMATION

#### Model Number

ADT938 — N • • SET

Model

**Pressure port type:**  
N - 1/4NPT female  
N2 - 1/2NPT female  
B - 1/4BSP female  
B2 - 1/2BSP female  
M - M20X1.5 female

**SET:** Pump and carrying case included

#### Optional Accessories

#### Accessories included

O-ring: 20 pcs      Manual: 1 pc  
Carrying case (938-X-SET models only)

Model number	Description
ADT102	Adapters and fittings, 1/4NPT male to various male and female connection (25 pcs). More information shown on page 70.
ADT103	Adapters and fittings, 1/4NPT (1/2NPT, 1/4BSP, 1/2BSP, or M20X1.5) male to various female hand-tight quick connectors (10 pcs). More information shown on page 71.
9908	Carrying case for 936, 937, 938 or 949.
ADT938-MK	Maintenance kit for Additel 938 pump

# Additel 946A

## Hydraulic High Pressure Calibration Pump



- Pressurize large-volume workload
- Generate pressure to 15,000 psi (1,000 bar)
- Increase and decrease pressure smoothly
- Three pressure ports
- Hand-tight quick connectors



### OVERVIEW

The new Additel 946A Hydraulic Pressure Test Pump is a benchtop pressure pump designed to generate pressure to 15,000 psi (1,000 bar). This pump incorporates a dual-piston system which is ideal for filling large volume workload with the hand pump and providing smooth increase and decrease of pressure with the high pressure, fine adjust screw press. The 946A test pump incorporates an isolation valve which isolates the calibration volume from the check valve associated with the hand pump. Because the check valve can often be a source of leaks and maintenance, the isolation valve provides more stable measurements and reduces potential maintenance of the pump. Three hand-tight quick connectors installed on the pump allow easy connecting and disconnecting to the test pump without the need for PTFE tape or wrenches. The Additel 946A is an ideal comparison test pump for calibrating pressure measuring instruments such as test gauges, indicators or transducers.

### FEATURES

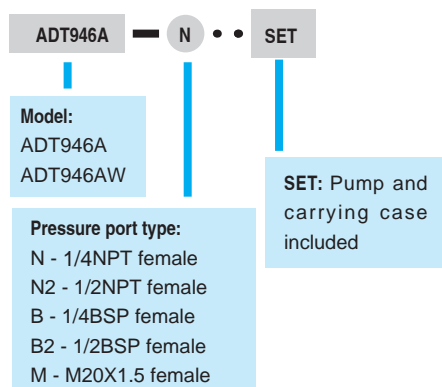
- **Hand pump to fill large volume systems**
- **Durable and Minimal Maintenance**  
Isolation valve provides stable pressures while reducing maintenance on the hand pump check valve.
- **Easy-to-use**  
15,000 psi (1,000 bar) can be generated easily with the dual-piston system.
- **Three hand-tight quick connectors**  
Allows easy connection and disconnection to the test pump without the need for PTFE tape or wrenches.

### SPECIFICATIONS

- **Media:** Mineral oil or deionized water. (Oil is default media liquid. Pump with water as media to be ordered as ADT946W. Pump stability is best when used with oil. Performance may decrease when used with water as the media.)
- **Reservoir capacity:** 420 ml (25.6 in<sup>3</sup>)
- **Generated Pressure Range**  
0 to 15,000 psi (1,000bar) gauge pressure
- **Material:** Ram/adapters: SS  
Body: SS, aluminum, Copper  
Seals: Buna-N
- **Connection**  
Hand-tight connectors for both test gauge and reference gauge(s)  
1/4NPT female, 1/2NPT female, 1/4BSP female, 1/2BSP female, or M20X1.5 female
- **Dimensions:** Height: 7.8" (200 mm)  
Base: 18.1" (460 mm) x 14.3" (365 mm)
- **Weight:** 26.5 lb (12 kg).
- **Piston volume:** Fine adjust piston: 1.5ml (0.09 in<sup>3</sup>)
- **Volume Per Stroke:** 3.72 ml
- **Warranty:** 1 year

### ORDERING INFORMATION

#### Model Number



#### Accessories included

Mineral oil, 1 bottle (250 ml)\*  
O-ring: 20 pcs  
Manual: 1 pc  
Carrying case (946-X-SET models only)

\* When water media is not requested

#### Optional Accessories

Model number	Description
9201	Oil, Diethylhexyl Sebacate, 1 liter (1 quart)
9202	Oil, Mineral oil, 1 liter (1 quart)
ADT102	Adapters and fittings, 1/4HP male to various male and female connectors (25 pcs). More information shown on page 70.
ADT103	Adapters and fittings, 1/4NPT (1/4BSP, or M20X1.5) male to various female hand-tight quick connectors (10 pcs). More information shown on page 71.
ADT-HTK	Hose test kit, 5 feet flexible hose, 15,000 psi, 1/4NPT male to 1/4NPT (1/8NPT, 1/2NPT, 1/4BSP, or M20X1.5) female hand-tight quick connector.
ADT946A-MK	Maintenance kit for Additel 946 pump
ADT100-946-HK	Hose Kit, External Reservoir Expansion Hose Kit for ADT946A
9910	Carrying case for Additel 946A, Additel 959A or Additel 960

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# Additel 949

## Hydraulic Ultra-high Pressure Test Pump



- Generate 85% vacuum to 40,000 psi (2,800 bar) pressure
- Minimal maintenance
- Easy-to-use
- Three pressure ports



### OVERVIEW

The 949 Hydraulic Ultra-high Pressure Test Pump is a hand operated pressure pump designed to generate pressure up to 40,000 psi (2800 bar). With the patented screw press technology, high pressures can be easily generated, increased and decreased smoothly. A specially designed shut-off valve makes the pressure as stable as possible during calibration. With no non-returning valve, the 949 avoids the troublesome leakage issues that is usually experienced with hand pumps and allows for minimal maintenance. The 949 is an ideal comparison test pump for calibrating ultra-high pressure measuring instruments such as test gauges, indicators or transducers in the laboratory.

### FEATURES

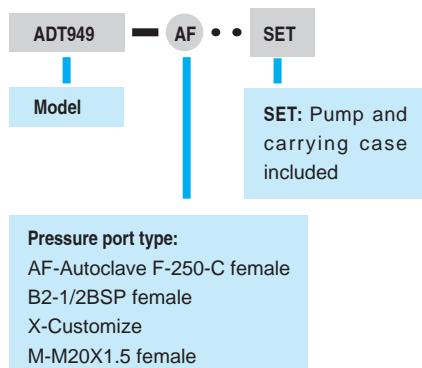
- **Generate Ultra-high Pressure**  
Generate pressure up to 40,000 psi (2,800 bar)
- **Durable and Minimal Maintenance**  
Patented screw press technology, without non-returning valve inside that is usually used on troublesome hand pumps.
- **Easy-to-use**  
With the patented screw press technology, high pressures can be generated easily, as well as increased and decreased smoothly.
- **Extremely Low Leakage**  
Patented screw press technology replaces troublesome, check valves (non-returning valve) found in most hand pumps which practically eliminates leakage.

### SPECIFICATIONS

- **Media:** Diethylhexyl Sebacate
- **Pressure Range**  
85% vacuum to 40,000psi (2,800bar) positive pressure.
- **Material**  
Ram/adapters: SS  
Body: SS, aluminum  
Seals: Buna-N, PTFE, Copper Alloy
- **Reservoir capacity:** 420 ml (25.6 in<sup>3</sup>)
- **Connection**  
Test Gauge Connection: Positional Autoclave F-250-C, 9/16" - 18 UNF female  
Reference Gauge Connection: Positional Autoclave F-250-C, 9/16" - 18 UNF female  
1/2BSP female and M20X1.5 female connections are available upon request.
- **Dimensions:** Height: 9.1" (230 mm)  
Base: 20.5" (520 mm) x 14.2" (360 mm)
- **Weight:** 35.2 lb (16 kg).
- **Warranty:** 1 year
- **Piston volume**  
Low pressure piston: 30 ml (1.8 in<sup>3</sup>)  
High pressure piston: 2.5 ml (0.15 in<sup>3</sup>)

### ORDERING INFORMATION

#### Model Number



#### Accessories included

Diethylhexyl Sebacate: 1 bottle (250 ml)  
Manual: 1 pc  
Carrying case (949-X-SET models only)

#### Optional Accessories

Model number	Description
9201	Diethylhexyl Sebacate, 1 liter (1 quart)
ADT104	Adapters and fittings, 1/4HP male to various male and female connectors (17 pcs). More information shown on page 72.
9908	Carrying case for 936, 937, 938 or 949.
ADT949-MK	Maintenance kit for Additel 949 pump

# Additel 959A

## Hydraulic Ultra-high Pressure Test Pump



- Pressurize large-volume workload
- Generate pressure to 40,000 psi (2,800 bar)
- Increase and decrease pressure smoothly
- Three pressure ports



### OVERVIEW

The new Additel 959A Hydraulic Pressure Test Pump is a benchtop pressure pump designed to generate pressure to 40,000 psi (2,800 bar). This pump incorporates a dual-piston system which is ideal for filling large volume workload with the hand pump and providing smooth increase and decrease of pressure with the high pressure, fine adjust screw press. The 959A test pump incorporates an isolation valve which isolates the calibration volume from the check valve associated with the hand pump. Because the check valve can often be a source of leaks and maintenance, the isolation valve provides more stable measurements and reduces potential maintenance of the pump. The Additel 959A is an ideal comparison test pump for calibrating pressure measuring instruments such as test gauges, indicators or transducers.

### FEATURES

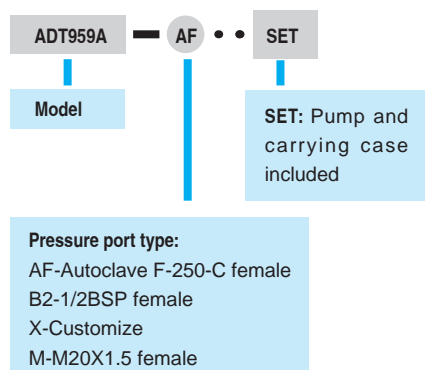
- **Generate Ultra-high Pressure**  
Generate pressure up to 40,000 psi (2,800 bar)
- **Hand pump to fill large volume systems**
- **Durable and Minimal Maintenance**  
Isolation valve provides stable pressures while reducing maintenance on the hand pump check valve
- **Easy-to-use**  
40,000 psi (2,800 bar) can be generated easily with the dual-piston system

### SPECIFICATIONS

- **Media:** Diethylhexyl Sebacate
- **Pressure Range**  
0 to 40,000 psi (2,800 bar) gauge pressure.
- **Material**  
Ram/adapters: SS  
Body: SS, aluminum, Copper  
Seals: Buna-N, PTFE, Copper Alloy, Aluminum Alloy
- **Reservoir capacity:** 420 ml (25.6 in<sup>3</sup>)
- **Connection**  
Test Gauge Connection: Autoclave F-250-C, 9/16" - 18 UNF female  
Reference Gauge Connection: Autoclave F-250-C, 9/16" - 18 UNF female  
1/2BSP female and M20X1.5 female connections are available upon request
- **Dimensions:** Height: 6.9" (175 mm)  
Base: 17.9" (455 mm) x 15.0" (380 mm)
- **Weight:** 28.7 lb (13 kg).
- **Volume Per Stroke:** 3.72 ml
- **Piston volume:** Fine adjust piston: 1.5 ml (0.09 in<sup>3</sup>)
- **Warranty:** 1 year

### ORDERING INFORMATION

#### Model Number



#### Accessories included

Diethylhexyl Sebacate: 1 bottle (250 ml)  
Manual: 1 pc  
Carrying case (959-X-SET models only)

#### Optional Accessories

Model number	Description
9201	Diethylhexyl Sebacate, 1 liter (1 quart)
ADT104	Adapters and fittings, 1/4HP male to various male and female connectors (17 pcs). More information shown on page 72.
ADT959A-MK	Maintenance kit for Additel 959A pump
ADT100-959-HK	Hose Kit, External Reservoir Expansion Hose Kit for ADT959
9910	Carrying case for Additel 946A, Additel 959A or Additel 960

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# Additel 960

## Hydraulic Ultra-high Pressure Test Pump



- **Pressurize large-volume workload**
- **Generate pressure to 60,000 psi (4,200 bar)**
- **Increase and decrease pressure smoothly**
- **Two pressure ports**



### OVERVIEW

The new Additel 960 Hydraulic Pressure Test Pump is a benchtop pressure pump designed to generate pressure to 60,000 psi (4,200 bar). This pump incorporates a dual-piston system which is ideal for filling large volume workload with the hand pump and providing smooth increase and decrease of pressure with the high pressure, fine adjust screw press. The 960 test pump incorporates an isolation valve which isolates the calibration volume from the check valve associated with the hand pump. Because the check valve can often be a source of leaks and maintenance, the isolation valve provides more stable measurements and reduces potential maintenance of the pump. The Additel 960 is an ideal comparison test pump for calibrating pressure measuring instruments such as test gauges, indicators or transducers.

### FEATURES

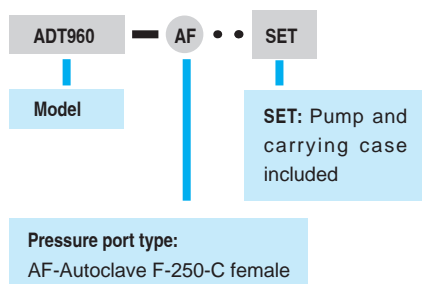
- **Generate Ultra-high Pressure**  
Generate pressure up to 60,000 psi (4,200 bar)
- **Hand pump to fill large volume systems**
- **Durable and Minimal Maintenance**  
Isolation valve provides stable pressures while reducing maintenance on the hand pump check valve
- **Easy-to-use**  
60,000 psi (4,200 bar) can be generated easily with the dual-piston system

### SPECIFICATIONS

- **Media:** Diethylhexyl Sebacate
- **Pressure Range**  
0 to 60,000psi (4,200 bar) gauge pressure.
- **Material**  
Ram/adapters: SS  
Body: SS, aluminum, Copper  
Seals: Buna-N, PTFE, Copper Alloy, Aluminum Alloy
- **Reservoir capacity:** 420 ml (25.6 in<sup>3</sup>)
- **Connection**  
Test Gauge Connection: Autoclave F-250-C female  
Reference Gauge Connection: Autoclave F-250-C female
- **Dimensions:** Height: 6.9" (175 mm)  
Base: 17.9" (455 mm) x 15.0" (380 mm)
- **Weight:** 33.1 lb (15 kg).
- **Volume Per Stroke:** 3.72 ml
- **Piston volume:** Fine adjust piston: 1.5 ml (0.09 in<sup>3</sup>)
- **Warranty:** 1 year

### ORDERING INFORMATION

#### Model Number



#### Accessories included

Diethylhexyl Sebacate: 1 bottle (250 ml)  
Manual: 1 pc  
Carrying case (960-X-SET models only)

#### Optional Accessories

Model number	Description
9201	Diethylhexyl Sebacate, 1 liter (1 quart)
ADT960-MK	Maintenance kit for Additel 960 pump
ADT100-960-HK	Hose Kit, External Reservoir Expansion Hose Kit for ADT960
9910	Carrying case for Additel 946A, Additel 959A or Additel 960

# Pressure Manifolds

## Additel 12X Series



The 12X series pressure manifolds are designed for expanding pressure test ports during pressure calibration. The Additel 121 pressure manifold is used for pneumatic pressure calibration up to 3,000 psi (200 bar), while the Additel 123 manifold is compatible to hydraulic pressure applications up to 15,000 psi (1,000 bar). A filter is built-in with the 121 pneumatic pressure manifold to prevent contamination introduced by devices under test. There are four hand-tight quick connectors pre-installed on each manifold. Additel 12X series pressure manifolds allow you to connect without the use of wrenches or Teflon tape which increases your productivity when using calibration pumps, pressure controllers, dead weight testers, or piston gauges.

### 121 series Pressure Manifolds Pneumatic, -15 psi to 3,000 psi (-1 to 200 bar)



Model	Description
ADT121-N	1/4NPT male hose to four 1/4NPT female hand-tight quick connectors
ADT121-N2	1/2NPT male hose to four 1/2NPT female hand-tight quick connectors
ADT121-M	M20x1.5 male hose to four M20x1.5 female hand-tight quick connectors
ADT121-B	1/4BSP male hose to four 1/4BSP female hand-tight quick connectors
ADT121-B2	1/2BSP male hose to four 1/2BSP female hand-tight quick connectors

### 123 series Pressure Manifolds Hydraulic, -15 to 15,000 psi (-1 to 1,000 bar)



Model	Description
ADT123-N	1/4NPT male hose to four 1/4NPT female hand-tight quick connectors
ADT123-N2	1/2NPT male hose to four 1/2NPT female hand-tight quick connectors
ADT123-M	M20x1.5 male hose to four M20x1.5 female hand-tight quick connectors
ADT123-B	1/4BSP male hose to four 1/4BSP female hand-tight quick connectors
ADT123-B2	1/2BSP male hose to four 1/2BSP female hand-tight quick connectors

### 127 series Pressure Manifolds Pneumatic, -15 to 3,500 psi (-1 to 250 bar)



Model	Description
ADT127-N	1/4NPT male hose to three 1/4NPT female hand-tight quick connectors
ADT127-N2	1/2NPT male hose to three 1/2NPT female hand-tight quick connectors
ADT127-M	M20x1.5 male hose to three M20x1.5 female hand-tight quick connectors
ADT127-B	1/4BSP male hose to three 1/4BSP female hand-tight quick connectors
ADT127-B2	1/2BSP male hose to three 1/2BSP female hand-tight quick connectors

*Note: A test hose is included with every Additel 12X pressure manifold.*

# Filters

## Additel 100 Series Filters



### ADT100-FLT-1000

1000 psi (70 bar) Pneumatic Filter Specifications

Pressure range	-15 to 1000 psi (-1.0 to 70 bar)
Filtering resolution	0.04 mm
Operation temperature	-10°C to 50°C
Safety pressure	<1500 psi (100 bar)
Size	1.18 dia x 5 in (30 dia x 127 mm) (size will vary based on adapters)
Outlet/Inlet port	See ordering information
Storage temperature	-20°C to 70°C
Material	304 SS



### ADT100-FLT-10K

10,000 psi (700 bar) Hydraulic Filter Specifications

Pressure range	-15 to 10,000 psi (-1.0 to 700 bar)
Filtering resolution	0.07 mm
Operation temperature	-10°C to 50°C
Safety pressure	<12,000 psi (827 bar)
Size	0.87 x 0.98 x 4 in (22 x 25 x 100 mm) (size will vary based on adapters)
Outlet/Inlet port	Comes with removable male and removable female adapter
Storage temperature	-20°C to 70°C
Material	304 SS



## ORDERING INFORMATION

ADT100

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600

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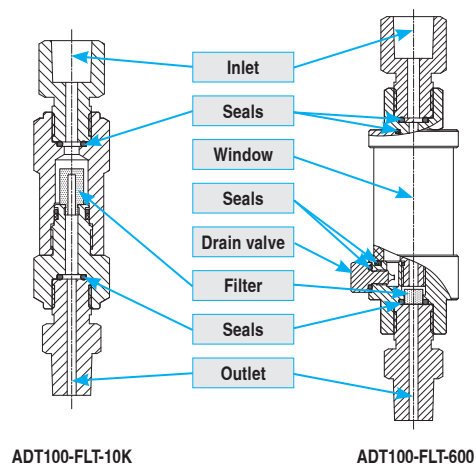
N

### Range:

600 -600 psi (40 bar)  
10K-10,000 psi (700 bar)

### Port type:

N-1/4NPT male and 1/4NPT female  
N2-1/2NPT male and 1/2NPT female  
B-1/4BSP male and 1/4BSP female  
B2-1/2BSP male and 1/2BSP female  
M-M20x1.5 male and M20x1.5 female



ADT100-FLT-10K

ADT100-FLT-600

# Pressure Hoses, Adapters and Fittings

■ **Additel 102** (Designed for all pumps except Additel 949 pump)



Additel 102

## ADT102

1/4NPT male to various connectors as follows (25 pcs, case included)

*\*1/2NPT male, 1/4BSP male, 1/2BSP male, M20X1.5 male are available per request.*

Model	Description	Max Pressure	Picture
ADT100-NPTM4-BSPM8	Adapter, 1/4NPT male to 1/8BSP male	15,000 psi	
ADT100-NPTM4-BSPM4	Adapter, 1/4NPT male to 1/4BSP male	15,000 psi	
ADT100-NPTM4-BSPM2	Adapter, 1/4NPT male to 1/2BSP male	15,000 psi	
ADT100-NPTM4-BSPM3	Adapter, 1/4NPT male to 3/8BSP male	15,000 psi	
ADT100-NPTM4-M10M	Adapter, 1/4NPT male to M10X1.0 male	15,000 psi	
ADT100-NPTM4-M14M	Adapter, 1/4NPT male to M14X1.5 male	15,000 psi	
ADT100-NPTM4-M20M	Adapter, 1/4NPT male to M20X1.5 male	15,000 psi	
ADT100-NPTM4-NPTM8	Adapter, 1/4NPT male to 1/8NPT male	15,000 psi	
ADT100-NPTM4-NPTM4	Adapter, 1/4NPT male to 1/4NPT male	15,000 psi	
ADT100-NPTM4-NPTM2	Adapter, 1/4NPT male to 1/2NPT male	15,000 psi	
ADT100-NPTM4-NPTM3	Adapter, 1/4NPT male to 3/8NPT male	15,000 psi	
ADT100-NPTM4-BSPF8	Adapter, 1/4NPT male to 1/8BSP female	15,000 psi	
ADT100-NPTM4-BSPF4	Adapter, 1/4NPT male to 1/4BSP female	15,000 psi	
ADT100-NPTM4-BSPF2	Adapter, 1/4NPT male to 1/2BSP female	15,000 psi	
ADT100-NPTM4-BSPF3	Adapter, 1/4NPT male to 3/8BSP female	15,000 psi	
ADT100-NPTM4-M10F	Adapter, 1/4NPT male to M10X1.0 female	15,000 psi	
ADT100-NPTM4-M14F	Adapter, 1/4NPT male to M14X1.5 female	15,000 psi	
ADT100-NPTM4-M20F	Adapter, 1/4NPT male to M20X1.5 female	15,000 psi	
ADT100-NPTM4-NPTF8	Adapter, 1/4NPT male to 1/8NPT female	15,000 psi	
ADT100-NPTM4-NPTF4	Adapter, 1/4NPT male to 1/4NPT female	15,000 psi	
ADT100-NPTM4-NPTF2	Adapter, 1/4NPT male to 1/2NPT female	15,000 psi	
ADT100-NPTM4-NPTF3	Adapter, 1/4NPT male to 3/8NPT female	15,000 psi	
ADT100-HTK-15K-NPTM4-NPTF4Q	Hose Test Kit, 5 feet flexible hose, 15,000 psi, 1/4NPT male to 1/4NPT female hand tight quick connector	15,000 psi	
ADT100-NPTM4-NPTF4RQ	Adapter, 1/4NPT male to right angle 1/4NPT female hand-tight quick connector	15,000 psi	
ADT100-NPTM4-BARB	Adapter, 1/4NPT male to hose barb	150 psi	

*Don't need the entire kit? Order individual adapters with the above part numbers.*

# Pressure Hoses, Adapters and Fittings

**Additel 103 Series** (Designed for all pumps except Additel 949 pump)



## ADT103-NPT (Hand-tight quick connectors)

1/4NPT male to various hand-tight quick connectors (10pcs, case included)



Additel 103-NPT

Model	Description	Max Pressure	Picture
ADT100-NPTM4-NPTF8Q	Adapters, 1/4NPT male to 1/8NPT female	15,000 psi	
ADT100-NPTM4-NPTF4Q	Adapters, 1/4NPT male to 1/4NPT female	15,000 psi	
ADT100-NPTM4-NPTF2Q	Adapters, 1/4NPT male to 1/2NPT female	15,000 psi	
ADT100-NPTM4-BSPF8Q	Adapters, 1/4NPT male to 1/8BSP female	15,000 psi	
ADT100-NPTM4-BSPF4Q	Adapters, 1/4NPT male to 1/4BSP female	15,000 psi	
ADT100-NPTM4-BSPF3Q	Adapters, 1/4NPT male to 3/8BSP female	15,000 psi	
ADT100-NPTM4-BSPF2Q	Adapters, 1/4NPT male to 1/2BSP female	15,000 psi	
ADT100-NPTM4-M10FQ	Adapters, 1/4NPT male to M10x1.0 female	15,000 psi	
ADT100-NPTM4-M14FQ	Adapters, 1/4NPT male to M14x1.5 female	15,000 psi	
ADT100-NPTM4-M20FQ	Adapters, 1/4NPT male to M20x1.5 female	15,000 psi	

## ADT103-BSP (Hand-tight quick connectors)

1/4BSP male to various hand-tight quick connectors (10 pcs, case included)



Additel 103-BSP

Model	Description	Max Pressure	Picture
ADT100-BSPM4-NPTF8Q	Adapter, 1/4BSP male to 1/8NPT female	15,000 psi	
ADT100-BSPM4-NPTF4Q	Adapter, 1/4BSP male to 1/4NPT female	15,000 psi	
ADT100-BSPM4-NPTF2Q	Adapter, 1/4BSP male to 1/2NPT female	15,000 psi	
ADT100-BSPM4-BSPF8Q	Adapters, 1/4BSP male to 1/8BSP female	15,000 psi	
ADT100-BSPM4-BSPF4Q	Adapters, 1/4BSP male to 1/4BSP female	15,000 psi	
ADT100-BSPM4-BSPF3Q	Adapters, 1/4BSP male to 3/8BSP female	15,000 psi	
ADT100-BSPM4-BSPF2Q	Adapters, 1/4BSP male to 1/2BSP female	15,000 psi	
ADT100-BSPM4-M10FQ	Adapters, 1/4BSP male to M10x1.0 female	15,000 psi	
ADT100-BSPM4-M14FQ	Adapters, 1/4BSP male to M14x1.5 female	15,000 psi	
ADT100-BSPM4-M20FQ	Adapters, 1/4BSP male to M20x1.5 female	15,000 psi	

## ADT103-M20 (Hand-tight quick connectors)

M20x1.5 Male to various hand-tight quick connectors (10pcs, case included)



Additel 103-M20

Model	Description	Max Pressure	Picture
ADT100-M20M-NPTF8Q	Adapters, M20x1.5 Male to 1/8NPT female	15,000 psi	
ADT100-M20M-NPTF4Q	Adapters, M20x1.5 Male to 1/4NPT female	15,000 psi	
ADT100-M20M-NPTF2Q	Adapters, M20x1.5 Male to 1/2NPT female	15,000 psi	
ADT100-M20M-BSPF8Q	Adapters, M20x1.5 Male to 1/8BSP female	15,000 psi	
ADT100-M20M-BSPF4Q	Adapters, M20x1.5 Male to 1/4BSP female	15,000 psi	
ADT100-M20M-BSPF3Q	Adapters, M20x1.5 Male to 3/8BSP female	15,000 psi	
ADT100-M20M-BSPF2Q	Adapters, M20x1.5 Male to 1/2BSP female	15,000 psi	
ADT100-M20M-M10FQ	Adapters, M20x1.5 Male to M10x1.0 female	15,000 psi	
ADT100-M20M-M14FQ	Adapters, M20x1.5 Male to M14x1.5 female	15,000 psi	
ADT100-M20M-M20FQ	Adapters, M20x1.5 Male to M20x1.5 female	15,000 psi	

*Don't need the entire kit? Order individual adapters with the above part numbers.*

# Pressure Hoses, Adapters and Fittings

■ Additel 104 ■ Hose Test Kits



## ADT104-HP

1/4HP male (Autoclave M-250-C) to various connectors as follows (17pcs, case included);  
(Designed for Additel 949 and Additel 959 pumps)

Model	Description	Max Pressure	Picture
ADT100-HPM-M14F	Adapter, 1/4HP male to M14X1.5 female	15,000 psi	
ADT100-HPM-M20F	Adapter, 1/4HP male to M20X1.5 female	15,000 psi	
ADT100-HPM-BSPF4	Adapter, 1/4HP male to 1/4BSP female	15,000 psi	
ADT100-HPM-BSPF3	Adapter, 1/4HP male to 3/8BSP female	15,000 psi	
ADT100-HPM-BSPF2	Adapter, 1/4HP male to 1/2BSP female	15,000 psi	
ADT100-HPM-NPTF4	Adapter, 1/4HP male to 1/4NPT female	15,000 psi	
ADT100-HPM-NPTF2	Adapter, 1/4HP male to 1/2NPT female	15,000 psi	
ADT100-HPM-M14M	Adapter, 1/4HP male to M14X1.5 male	40,000 psi	
ADT100-HPM-M20M	Adapter, 1/4HP male to M20X1.5 male	40,000 psi	
ADT100-HPM-BSPM4	Adapter, 1/4HP male to 1/4BSP male	15,000 psi	
ADT100-HPM-BSPM3	Adapter, 1/4HP male to 3/8BSP male	40,000 psi	
ADT100-HPM-BSPM2	Adapter, 1/4HP male to 1/2BSP male	40,000 psi	
ADT100-HPM-NPTM4	Adapter, 1/4HP male to 1/4NPT male	15,000 psi	
ADT100-HPM-NPTM2	Adapter, 1/4HP male to 1/2NPT male	15,000 psi	
ADT100-HPM-HPM	Adapter, 1/4HP male to 1/4HP male (3 pcs)	60,000 psi	



Additel 104

## Additel Hose Test Kits

### Low Pressure Hose Test Kits

The Additel 100 series Low Pressure Hose Test Kits are designed to extend your pressure calibrations to a convenient location to adapt from one pressure connection to another. Each test kit has 5 feet of flexible hose rated to 1,000 psi (70 bar) which connects a male NPT, BSP, or Metric connector to a variety of female quick connectors. Additel's specially designed quick connectors allow for hand-tight connection without the need for wrenches or Teflon tape. The Additel 100 series Hose Test Kits are a great accessory to any pressure pump or controller.

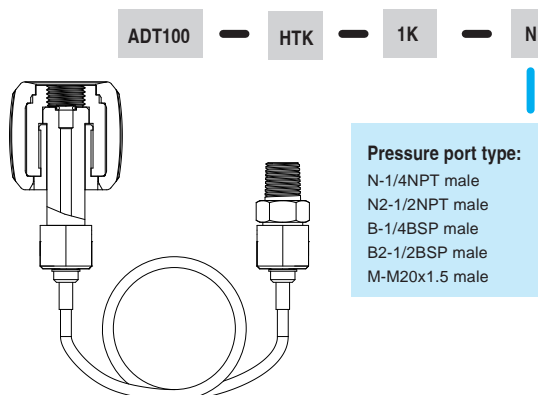
### SPECIFICATIONS

- Max pressure: 1,000 psi (70 bar)
- Hose length: 5 ft (1.5 m)
- Connection: Each hose test kit is fitted with a female quick connect adapter on one end and a corresponding male adapter on the other. (e.g. ADT100-HTK-1K-N has a 1/4 NPT female quick connect on one end and a 1/4 NPT male adapter on the other).

Note: Custom lengths available by request.

### ORDERING INFORMATION

#### ■ Model Number



Don't need the entire kit? Order individual adapters with the above part numbers.

# Additel Hose Test Kits



## Additel 100-HTK Series

- Hand-tight quick connectors
- Conveniently extend pressure calibrations
- 5 ft hose length

### OVERVIEW

The Additel 100 series High Pressure Hose Test Kits are designed to extend your pressure calibrations to a convenient location to adapt from one pressure connection to another. Each test kit has 5 feet of flexible hose rated to 8,000 psi (550 bar) or 15,000 psi (1,000 bar) which connects a male NPT, BSP, or Metric connector to a variety of female quick connectors. Additel's specially designed quick connectors allow for hand-tight connection without the need for wrenches or Teflon tape. The Additel 100 series Hose Test Kits are a great accessory to any pressure pump or controller.

#### ADT100-HTK-8K

- Maximum pressure: 8,000 psi (550 bar)
- Hose length: 5 ft (1.5 m)
- Burst pressure: 15,900 psi
- Internal hose material: Polyamide



#### ADT100-HTK-15K

- Maximum pressure: 15,000 psi (1,000 bar)
- Hose length: 5 ft (1.5 m)
- Burst pressure: 43,500 psi
- Internal hose material: Polyoxymethylene



### ORDERING INFORMATION

#### Model Number

ADT100 — HTK — 8K — NPTM4 — NPTF4Q

#### Pressure Range:

8K - 8,000 psi (550 bar)  
15K - 15,000 psi (1,000 bar)

#### Pressure Port Type:

NPTM4 - 1/4NPT male  
NPTM2 - 1/2NPT male  
BSPM4 - 1/4BSP male  
BSPM2 - 1/2BSP male  
M20M - M20x1.5 male

#### Pressure Port Type:

NPTF2Q - 1/2NPT female quick connect  
NPTF3Q - 3/8NPT female quick connect  
NPTF4Q - 1/4NPT female quick connect  
NPTF8Q - 1/8NPT female quick connect  
BSPF2Q - 1/2BSP female quick connect  
BSPF3Q - 3/8BSP female quick connect  
BSPF4Q - 1/4BSP female quick connect  
BSPF8Q - 1/8BSP female quick connect  
M20FQ - M20x1.5 female quick connect

# Additel 286

## Multifunction Reference Thermometer Readout



- Measure and calibrate SPRTs, RTDs, thermistors and thermocouples
- 1 PPM resistance ratio accuracy (channel 1)
- 8 1/2-digit DC multimeter
- Measure up to 82 channels
- Sample rates up to 10 channels per second
- Bluetooth, WIFI, USB& Ethernet (RJ-45) capable
- Auto temperature control of Additel and other manufacture's heat sources
- Built-in automatic temperature control, data collection, and coefficient generation
- Support for creating custom control of heat sources with RS-232
- Auto - zero power feature (self heating compensation)
- 10.1 in. touch screen display
- Supports fully automated temperature calibrations with data collection and report generation (no software required)

### OVERVIEW

The Additel 286 Multifunction Reference Thermometer Readout is an industry first! We have combined the capabilities of a high-end reference thermometer with a highly capable data acquisition system and 8.5 digit multimeter. The ADT286 is capable of scanning and recording up to 82 channels at 10 channels per second. Users can easily configure the ADT286 to perform field calibrations and uniformity studies as well as use the unit in the lab as a precision thermometer and 8.5 digit multimeter. Get more for less with this newest game changer from Additel!

### ADT286 Multifunction Reference Thermometer Readout Scanner Modules

If you're in need of a precision reference thermometer for your laboratory, then look no further than the Additel 286. The base unit comes with two precision readout channels that can be used to measure your SPRT. Need to calibrate RTDs, PRTs, thermistors or thermocouples? Add a scanner module and you now have the ability to measure 10 RTDs, PRTs, or thermistors and 20 thermocouples. Expand up to 82 channels with our unique easy to use scanner modules. Each 20 channel module is outfitted with our proprietary universal terminals with an industries best cold junction capability second to none. Utilize the module docked atop the ADT286, or connect remotely with cables to suit nearly any unique setup/configuration. Additel also has a process module specifically designed to measure process instrumentation like transmitters and switches. This scanner will also supply loop power for the transmitters.

Designed to make your job easier, the ADT286 has a large sensor library supporting 15 TC types, both standard and special limits, 18 different thermal resistors, CVD, ITS-90, and a large variety of standard curves for RTDs and thermistors. The ADT286 is loaded with special applications such as probe calibration, SPRT calibration, chamber mapping and more. And we continue to add applications on a regular basis!



### Automatic Temperature Control and Probe Calibration

The Additel 286 Multifunction Reference Thermometer Readout has preinstalled drivers to control Additel and other manufacturer's heat sources. Simply connect to one or more heat sources via a communication cable, Ethernet or wireless and now it will automatically control to the set point and desired stability. If your heat source is not on the list, you can easily add the driver yourself so you can run automated calibrations with any heat source.

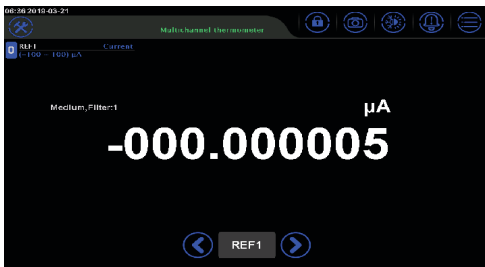
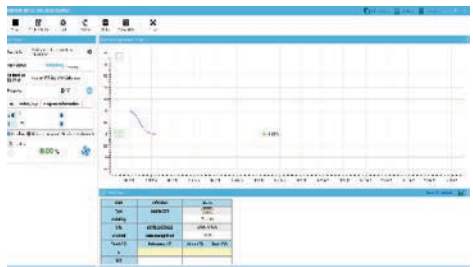
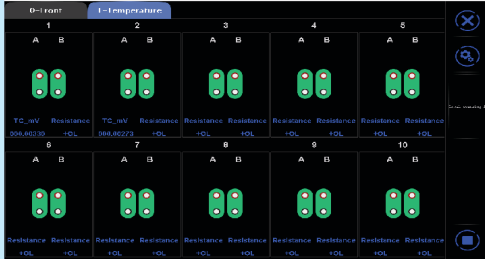






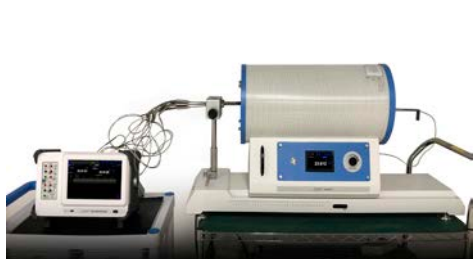
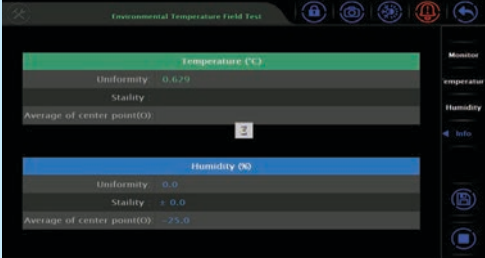

Now combine the heat source control feature with our probe calibration application and you have a very powerful automatic calibration solution. The probe calibration app allows you to automatically setup and run calibration routines with multiple set points and multiple heat sources, collect data, and develop calibration coefficients — all with one device and without the need of software! Simply place a batch of sensors of any mix and type into your heat source, connect it to the ADT286, run the probe calibration app and come back to a completed test. All that is left to do is generate and export all the calibration data. There's no need to work with complicated software for communication, set up or coefficient generation. There is no reason to have a calibration technician manually monitor the process and record the data. This Multifunction Reference Thermometer Readout will do all the work for you.

### ADT280-RS Resistance Standards

Available in 25 & 100 Ohm values, users can enjoy improved resistance ratio performance by easily plugging one of our reference resistors into channel 2 on the new ADT286. Perfect for calibrating your SPRT's and high end PRT's. Each ADT280-RS resistor comes with adaptive binding posts to help facilitate utilization of the resistor in other applications as needed.



## FEATURES

Specification	Display	Application
Multi-Channel		
Smart Connection		
DAQ Mode		
Temperature Mapping Mode		
Probe Calibration		
Environmental Temperature Field Test		

## APPLICATIONS

Specification	Display	Application
SPRT Mode		
Switch Testing		
Thermostatic Source Test		
DMM		
Heat Source Control		
Snapshot		

## SPECIFICATIONS

### General Specifications

Specification	Description
<b>Voltage</b>	100V Setting 90V to 110V 120V Setting 108V to 132V 220V Setting 198V to 242V 240V Setting 216V to 264V
<b>Frequency</b>	47Hz to 440Hz. Automatically sensed at power-on
<b>Power Consumption</b>	40VA peak (30Watt average)
<b>Temperature</b>	Operating : 0°C to 50°C Full accuracy : 18°C to 28°C Storage : -20°C to 70°C
<b>Warm-up</b>	60 mins for full uncertainty specifications
<b>Relative Humidity (non-condensing)</b>	Operating : 0°C to 28°C < 90% 28°C to 40°C < 75% 40°C to 50°C < 50% Storage : -20°C to 70°C < 95%
<b>Altitude</b>	Operating : 2000 m Storage : 12000 m
<b>Vibration and Shock</b>	Complies with MIL-28800F Class 3
<b>Input Protection</b>	50V all functions, ranges and terminals
<b>Communication</b>	USB-A , USB-B , RJ45 , WiFi , Bluetooth
<b>Memory</b>	10G - All data stored with time stamps
<b>Localization</b>	English , Chinese
<b>Display</b>	10.1 in (256 mm) TFT color display
<b>Size (H x W x D)</b>	9.8 in (250 mm) x 16.5 in (420 mm) x 7.9 in (200 mm)
<b>Weight</b>	18.5 lb ( 8.39 kg)
<b>Other Conformities</b>	CE
<b>Warranty</b>	1 Year

### Measurement Specifications

Specification Conditions: 60 mins Warm-Up Time / Environment Temperature (18 - 28) °C.

The following specifications apply for front panel, after at least 60 minutes warm-up.

24-hour specifications are relative to calibration standards and assume a controlled electromagnetic environment per EN 61326.

### Resistance Ratio Accuracy (Rx/Rs) using External Rs

Range	Reference Resistance	Ratio (Rx/Rs)	1 Year (23 ± 5) °C ppm of Reading
100 Ω	25 Ω	2.00-4.00	1.5
		1.10-2.00	0.85
		0.90-1.10	0.6
		0.50-0.90	1.5
		0.25-0.50	2.5
400 Ω	100 Ω	2.00-4.00	2
		1.10-2.00	0.81
		0.90-1.10	0.26
		0.50-0.90	0.95
		0.25-0.50	1.2



## SPRT/PRT Measurement Accuracy using External Rs

SPRT/PRT Type	External Reference Resistance	Temperature (°C)	Resistance Ratio (Rx/Rs)	1 Year(23 ± 5) °C ppm of reading	Equivalent to Temperature (mK)
PT25	25 Ω	-189.3442	0.22	2.5	0.13
		-38.8344	0.84	1.5	0.32
		0.01	1	0.6	0.15
		231.928	1.89	0.85	0.44
		419.527	2.57	1.5	1.11
		660.323	3.37	1.5	1.58
PT100	100 Ω	-189.3442	0.22	1.2	0.07
		-38.8344	0.84	0.95	0.20
		0.01	1	0.26	0.07
		231.928	1.89	0.81	0.42
		419.527	2.57	2	1.47
		660.323	3.37	2	2.11

[1] The PT25 indicator is based on a nominal resistance of 25 Ω for Rx.

[2] The PT100 indicator is based on a nominal resistance of 100 Ω for Rx.

[3] The uncertainty of external Rs is not included. The user may choose the ADT280-RS-25/100 standard resistor as external Rs, which has an accuracy of 5 ppm at (23±2) °C.

## Resistance Accuracy using Internal Rs

Measurement Range	Scanning Speed	Resolution	24 Hour (23 ± 1) °C	90 Days (23 ± 5) °C	1 year (23 ± 5) °C	Excitation Current	Temperature Coefficient
(0~100) Ω	Slow Speed	0.01 mΩ	3 ppm or 0.2 mΩ	12 ppm or 0.35 mΩ	15 ppm or 0.35 mΩ	±1 mA/±12 V	3 ppm + 0.01 mΩ
	Medium Speed	0.01 mΩ	3 ppm or 0.55 mΩ	12 ppm or 0.7 mΩ	15 ppm or 0.7 mΩ		
	Fast Speed	0.1 mΩ	3.6 ppm or 1.7 mΩ	12.6 ppm or 1.85 mΩ	15.6 ppm or 1.85 mΩ		
(0~400) Ω	Slow Speed	0.01 mΩ	3 ppm or 0.3 mΩ	12 ppm or 0.4 mΩ	15 ppm or 0.4 mΩ	±1 mA/±12 V	3 ppm + 0.02 mΩ
	Medium Speed	0.01 mΩ	3 ppm or 0.7 mΩ	12 ppm or 0.8 mΩ	15 ppm or 0.8 mΩ		
	Fast Speed	0.1 mΩ	3.6 ppm or 1.9 mΩ	12.6 ppm or 2 mΩ	15.6 ppm or 2 mΩ		
(0~4000) Ω	Slow Speed	0.1 mΩ	3 ppm or 4 mΩ	12 ppm or 5 mΩ	15 ppm or 5 mΩ	±0.1 mA/±12 V	3 ppm + 0.2 mΩ
	Medium Speed	0.1 mΩ	3 ppm or 8 mΩ	12 ppm or 9 mΩ	15 ppm or 9 mΩ		
	Fast Speed	1 mΩ	3.6 ppm or 20 mΩ	12.6 ppm or 21 mΩ	15.6 ppm or 21 mΩ		

[1] Accuracy Index: ± (ppm of reading or xxmΩ, whichever is greater).

[2] Temperature coefficient index: exceeds (18-28) °C range, increase per degree (ppm reading +xxmΩ).

[3] Specifications are for 4-wire function. For 3-wire, add 0.005 Ω for internal resistance mismatch. For 2-wire, add 0.005 Ω for internal resistance.

[4] Automatic current reversal.

## PRT Measurement Accuracy using Internal Rs

Scanning Speed	Temperature	24 Hour / °C (23 ± 1) °C	90 Days / °C (23 ± 5) °C	1 year / °C (23 ± 5) °C	Temperature Coefficient °C/°C
Slow Speed	-200 °C	0.0005	0.0008	0.0008	0.0002
	0 °C	0.0008	0.0031	0.0038	0.0008
	300 °C	0.0018	0.0089	0.0089	0.0018
	600 °C	0.0029	0.0146	0.0146	0.0030
Medium Speed	-200 °C	0.0013	0.0016	0.0016	0.0002
	0 °C	0.0014	0.0031	0.0038	0.0008
	300 °C	0.0020	0.0089	0.0089	0.0018
	600 °C	0.0029	0.0146	0.0146	0.0030
Fast Speed	-200 °C	0.0039	0.0043	0.0043	0.0006
	0 °C	0.0044	0.0047	0.0047	0.0013
	300 °C	0.0053	0.0093	0.0093	0.0024
	600 °C	0.0059	0.0152	0.0152	0.0036

[1] The indicator is based on the electrical accuracy of the 4-wire PT100 PRT and does not include the accuracy of the PRT itself.

[2] Temperature maximum Resolution is 0.0001 °C.

## Thermocouple Voltage Accuracy

Test Range	Scanning Speed	Resolution	24 hours (23 ±1) °C	90 days (23 ±5) °C	1 year (23 ±5) °C	Input Resistance	Temperature Coefficient
(-100-100) mV	Slow Speed	0.01 µV	5 ppm + 2 ppm	10 ppm + 4 ppm	14 ppm + 4 ppm	10 MΩ or >10 GΩ	1 ppm + 0.1 µV
	Medium Speed	0.01 µV	5 ppm + 6 ppm	10 ppm + 8 ppm	14 ppm + 8 ppm		
	Fast Speed	0.1 µV	5 ppm + 22 ppm	10 ppm + 24 ppm	14 ppm + 24 ppm		

[1] Accuracy Index: ± (ppm of reading + ppm of FS).

[2] Temperature coefficient index: Exceed the range of (18-28) °C, increase (ppm of reading + xxµV)/ °C.

## Thermocouple Cold Junction Accuracy

CJC Accuracy	±0.1 °C , 1 year, 23 °C ± 5°C
Environmental Coefficient	Beyond (18 ~ 28) °C, add 0.02 °C / °C
Other	Each signal scanner has 10 cold Junction temperature sensors

## Thermocouple Temperature Accuracy

Type	Temperature	24 Hour/°C (23 ±1) °C			90 days/°C (23 ± 5) °C			1 year /°C (23 ±5) °C		
		Fast Speed	Medium Speed	Slow Speed	Fast Speed	Medium Speed	Slow Speed	Fast Speed	Medium Speed	Slow Speed
E	-200	0.089	0.038	0.022	0.099	0.047	0.031	0.100	0.049	0.033
	-100	0.049	0.021	0.012	0.054	0.026	0.017	0.055	0.026	0.017
	-40	0.041	0.017	0.009	0.045	0.021	0.013	0.045	0.021	0.014
	0	0.038	0.015	0.009	0.041	0.019	0.012	0.041	0.019	0.012
	155	0.031	0.013	0.008	0.035	0.017	0.011	0.036	0.017	0.012
	350	0.029	0.013	0.008	0.033	0.017	0.012	0.035	0.018	0.013
	660	0.031	0.014	0.009	0.036	0.020	0.015	0.039	0.022	0.017
	1000	0.034	0.017	0.012	0.042	0.025	0.019	0.046	0.029	0.024
J	-200	0.102	0.043	0.025	0.113	0.054	0.036	0.115	0.055	0.037
	-100	0.054	0.022	0.013	0.060	0.028	0.018	0.060	0.028	0.019
	-40	0.047	0.019	0.011	0.051	0.024	0.015	0.051	0.024	0.015
	0	0.044	0.018	0.010	0.048	0.022	0.014	0.048	0.022	0.014
	155	0.041	0.017	0.010	0.045	0.021	0.014	0.046	0.022	0.015
	350	0.042	0.018	0.011	0.047	0.023	0.016	0.048	0.025	0.018
	660	0.039	0.018	0.011	0.046	0.024	0.018	0.048	0.027	0.020
	1200	0.044	0.022	0.015	0.054	0.031	0.024	0.059	0.036	0.029
K	-200	0.146	0.061	0.035	0.161	0.076	0.050	0.163	0.077	0.051
	-100	0.073	0.030	0.017	0.080	0.037	0.024	0.080	0.038	0.025
	-40	0.060	0.025	0.014	0.066	0.030	0.020	0.066	0.031	0.020
	0	0.056	0.023	0.013	0.061	0.028	0.018	0.061	0.028	0.018
	155	0.056	0.023	0.013	0.061	0.029	0.019	0.062	0.030	0.020
	350	0.054	0.023	0.014	0.061	0.030	0.020	0.062	0.031	0.021
	660	0.055	0.025	0.015	0.063	0.033	0.023	0.066	0.035	0.026
	1372	0.073	0.035	0.023	0.087	0.049	0.037	0.093	0.055	0.043

## Thermocouple Temperature Accuracy



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Type	Temperature	24 Hour/°C (23 ± 1) °C			90 days/°C (23 ± 5) °C			1 year / °C (23 ± 5) °C		
		Fast Speed	Medium Speed	Slow Speed	Fast Speed	Medium Speed	Slow Speed	Fast Speed	Medium Speed	Slow Speed
T	-200	0.142	0.059	0.034	0.156	0.073	0.048	0.157	0.075	0.049
	-100	0.078	0.032	0.018	0.086	0.040	0.026	0.086	0.040	0.026
	-40	0.063	0.026	0.015	0.069	0.032	0.020	0.069	0.032	0.021
	0	0.057	0.023	0.013	0.062	0.028	0.018	0.062	0.028	0.018
	155	0.044	0.019	0.011	0.049	0.023	0.015	0.049	0.024	0.016
	350	0.038	0.016	0.010	0.043	0.021	0.015	0.044	0.022	0.016
R	400	0.037	0.016	0.010	0.042	0.021	0.015	0.044	0.023	0.016
	-40	0.543	0.222	0.124	0.593	0.272	0.173	0.593	0.272	0.173
	0	0.416	0.170	0.095	0.454	0.208	0.132	0.454	0.208	0.132
	155	0.266	0.109	0.061	0.290	0.134	0.086	0.291	0.134	0.086
	350	0.220	0.091	0.051	0.241	0.112	0.072	0.242	0.113	0.073
	660	0.192	0.080	0.046	0.212	0.100	0.066	0.214	0.102	0.068
S	1768	0.188	0.082	0.049	0.213	0.107	0.074	0.219	0.114	0.081
	-40	0.515	0.211	0.117	0.562	0.258	0.164	0.562	0.258	0.164
	0	0.407	0.167	0.093	0.444	0.204	0.130	0.444	0.204	0.130
	155	0.275	0.113	0.063	0.300	0.138	0.089	0.301	0.139	0.089
	350	0.236	0.098	0.055	0.259	0.120	0.078	0.260	0.122	0.079
	660	0.214	0.089	0.051	0.236	0.111	0.073	0.239	0.114	0.075
B	1768	0.222	0.096	0.057	0.250	0.124	0.086	0.257	0.132	0.093
	250	0.872	0.357	0.199	0.952	0.437	0.278	0.952	0.437	0.279
	350	0.619	0.254	0.141	0.676	0.311	0.198	0.676	0.311	0.199
	660	0.342	0.141	0.079	0.374	0.173	0.111	0.375	0.175	0.113
N	1820	0.199	0.085	0.050	0.222	0.108	0.073	0.227	0.113	0.078
	-200	0.224	0.093	0.052	0.246	0.115	0.075	0.247	0.116	0.076
	-100	0.106	0.044	0.024	0.116	0.054	0.035	0.116	0.054	0.035
	-40	0.089	0.036	0.020	0.097	0.045	0.029	0.097	0.045	0.029
	0	0.084	0.035	0.019	0.092	0.042	0.027	0.092	0.042	0.027
	155	0.070	0.029	0.017	0.077	0.036	0.024	0.078	0.037	0.024
	350	0.062	0.026	0.015	0.069	0.033	0.022	0.070	0.035	0.024
	660	0.059	0.026	0.016	0.067	0.034	0.024	0.069	0.036	0.026
	800	0.060	0.027	0.016	0.068	0.035	0.025	0.071	0.038	0.028
	1000	0.062	0.028	0.018	0.072	0.038	0.028	0.075	0.042	0.031
L	1200	0.065	0.030	0.019	0.076	0.041	0.031	0.081	0.046	0.035
	1300	0.068	0.032	0.020	0.080	0.044	0.033	0.085	0.049	0.038
	-200	0.069	0.029	0.017	0.076	0.036	0.024	0.077	0.037	0.025
	-100	0.053	0.022	0.013	0.059	0.028	0.018	0.059	0.028	0.018
	-40	0.045	0.019	0.010	0.049	0.023	0.015	0.050	0.023	0.015
	0	0.043	0.018	0.010	0.047	0.021	0.014	0.047	0.021	0.014
	155	0.040	0.017	0.010	0.044	0.021	0.014	0.045	0.022	0.015
	350	0.041	0.018	0.011	0.046	0.023	0.016	0.047	0.024	0.017
U	660	0.039	0.018	0.011	0.046	0.024	0.018	0.048	0.027	0.020
	900	0.035	0.017	0.011	0.042	0.023	0.017	0.045	0.026	0.021
	-80	0.072	0.030	0.017	0.079	0.037	0.024	0.079	0.037	0.024
	-40	0.062	0.026	0.014	0.068	0.031	0.020	0.068	0.032	0.020
	0	0.056	0.023	0.013	0.061	0.028	0.018	0.061	0.028	0.018
	155	0.045	0.019	0.011	0.049	0.023	0.015	0.050	0.024	0.016
	350	0.037	0.016	0.010	0.042	0.021	0.014	0.043	0.022	0.016
	600	0.034	0.015	0.010	0.039	0.021	0.015	0.041	0.023	0.017

[1] The index is based on the accuracy of the thermocouple electrical measurement of temperature scanner module, does not include the accuracy of the thermocouple itself and the fixed cold junction compensation at 0 °C.

[2] The highest temperature resolution is 0.0001 °C.

## Thermistor Accuracy

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Measurement Range	Scanning Speed	Resolution	24 Hour (23 ± 1) °C	90 Days (23 ± 5) °C	1 year (23 ± 5) °C	Excitation Current	Temperature Coefficient
(0~12) kΩ	Slow Speed	1 mΩ	10 ppm or 60 mΩ	30 ppm or 80 mΩ	40 ppm or 80 mΩ	10 μA	5 ppm + 10 mΩ
	Medium Speed	1 mΩ	10 ppm or 110 mΩ	30 ppm or 130 mΩ	40 ppm or 130 mΩ		
	Fast Speed	10 mΩ	10 ppm or 210 mΩ	30 ppm or 230 mΩ	40 ppm or 230 mΩ		
(10~120) kΩ	Slow Speed	10 mΩ	10 ppm	30 ppm	40 ppm	10 μA	5 ppm + 20 mΩ
	Medium Speed	10 mΩ	10 ppm + 80 mΩ	30 ppm + 80 mΩ	40 ppm + 80 mΩ		
	Fast Speed	100 mΩ	10.6 ppm + 200 mΩ	30.6 ppm + 200 mΩ	40.6 ppm + 200 mΩ		
(100~1000) kΩ	Slow Speed	0.1 Ω	50 ppm	80 ppm	100 ppm	1 μA	5 ppm + 1 Ω
	Medium Speed	0.1 Ω	50 ppm + 1 Ω	80 ppm + 1 Ω	100 ppm + 1 Ω		
	Fast Speed	1 Ω	51 ppm + 2 Ω	81 ppm + 2 Ω	101 ppm + 2 Ω		

[1] Accuracy Index: ± (ppm of reading or xxmΩ, whichever is greater).

[2] Temperature coefficient index: exceeds (18-28) °C range, increase (ppm reading + xxmΩ) / °C.

[3] Specifications are for 4-wire function.

## Thermistor Temperature Accuracy

Type	Scanning Speed	Temperature	24 Hour / °C (23 ± 1) °C	90 Days / °C (23 ± 5) °C	1 year / °C (23 ± 5) °C
10 kΩ	Slow Speed	-40 °C	0.0007	0.0011	0.0014
		0 °C	0.0002	0.0006	0.0008
		50 °C	0.0004	0.0008	0.0011
		100 °C	0.0030	0.0039	0.0039
		150 °C	0.0130	0.0174	0.0174
	Medium Speed	-40 °C	0.0007	0.0011	0.0014
		0 °C	0.0002	0.0006	0.0008
		50 °C	0.0008	0.0010	0.0011
		100 °C	0.0054	0.0064	0.0064
		150 °C	0.0239	0.0282	0.0282
	Fast Speed	-40 °C	0.0007	0.0011	0.0014
		0 °C	0.0002	0.0006	0.0008
		50 °C	0.0016	0.0016	0.0016
		100 °C	0.0104	0.0104	0.0104
		150 °C	0.0456	0.0456	0.0456

[1] The indicator is based on the electrical accuracy of the 4-wire thermistor and does not include the accuracy of the thermistor itself.

[2] Temperature maximum Resolution is 0.0001 °C.

## DC Voltage Accuracy

Test Range	Scanning Speed	Resolution	24 hours (23 ± 1) °C	90 days (23 ± 5) °C	1 year (23 ± 5) °C	Input Resistance	Temperature Coefficient
(-100~100) mV	Slow Speed	0.01 μV	5 ppm + 2 ppm	10 ppm + 4 ppm	14 ppm + 4 ppm	>10 GΩ or 10 MΩ	1 ppm + 0.1 μV
	Medium Speed	0.01 μV	5 ppm + 6 ppm	10 ppm + 8 ppm	14 ppm + 8 ppm		
	Fast Speed	0.1 μV	5 ppm + 22 ppm	10 ppm + 24 ppm	14 ppm + 24 ppm		
(-1~1) V	Slow Speed	0.1 μV	2 ppm + 0.3 ppm	8 ppm + 0.6 ppm	14 ppm + 0.6 ppm	>10 GΩ or 10 MΩ	1 ppm + 0.2 μV
	Medium Speed	0.1 μV	2 ppm + 1.3 ppm	8 ppm + 1.6 ppm	14 ppm + 1.6 ppm		
	Fast Speed	1 μV	2.6 ppm + 3.3 ppm	8.6 ppm + 3.6 ppm	14.6 ppm + 3.6 ppm		
(-10~10) V	Slow Speed	1 μV	2 ppm + 0.05 ppm	8 ppm + 0.08 ppm	14 ppm + 0.08 ppm	>10 GΩ or 10 MΩ	1 ppm + 0.3 μV
	Medium Speed	1 μV	2 ppm + 0.35 ppm	8 ppm + 0.38 ppm	14 ppm + 0.38 ppm		
	Fast Speed	10 μV	2.6 ppm + 1.05 ppm	8.6 ppm + 1.08 ppm	14.6 ppm + 1.08 ppm		
(-50~50) V	Slow Speed	10 μV	8 ppm + 1 ppm	32 ppm + 1 ppm	38 ppm + 1 ppm	10 MΩ	5 ppm + 5 μV
	Medium Speed	10 μV	8 ppm + 2 ppm	32 ppm + 2 ppm	38 ppm + 2 ppm		
	Fast Speed	100 μV	8.6 ppm + 7 ppm	32.6 ppm + 7 ppm	38.6 ppm + 7 ppm		

[1] Accuracy Index: ± (ppm of reading + ppm of FS).

[2] Temperature Coefficient index: Exceed the range of (18-28) °C, increase (ppm reading + xxμV) / °C.

[3] Any range, the maximum input voltage is 50 V.

## DC Current Accuracy



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Test Range	Scanning Speed	Resolution	24 hours (23 ±1) °C	90 days (23 ±5) °C	1 year (23 ±5) °C	Burden Voltage	Temperature Coefficient
(-100-100) µA	Slow Speed	0.01 nA	15 ppm + 3 ppm	50 ppm + 6 ppm	60 ppm + 6 ppm	<1 mV	8 ppm + 0.1 nA
	Medium Speed	0.01 nA	15 ppm + 7 ppm	50 ppm + 10 ppm	60 ppm + 10 ppm		
	Fast Speed	0.1 nA	15 ppm + 23 ppm	50 ppm + 26 ppm	60 ppm + 26 ppm		
(-1-1) mA	Slow Speed	0.1 nA	15 ppm + 0.6 ppm	50 ppm + 1 ppm	60 ppm + 1 ppm	<1 mV	8 ppm + 0.5 nA
	Medium Speed	0.1 nA	15 ppm + 1.6 ppm	50 ppm + 2 ppm	60 ppm + 2 ppm		
	Fast Speed	1 nA	15.6 ppm + 3.6 ppm	50.6 ppm + 4 ppm	60.6 ppm + 4 ppm		
(-10-10) mA	Slow Speed	1 nA	30 ppm + 3 ppm	75 ppm + 6 ppm	80 ppm + 6 ppm	<1 mV	8 ppm + 10 nA
	Medium Speed	1 nA	30 ppm + 7 ppm	75 ppm + 10 ppm	80 ppm + 10 ppm		
	Fast Speed	10 nA	30 ppm + 23 ppm	75 ppm + 26 ppm	80 ppm + 26 ppm		
(-100-100) mA	Slow Speed	10 nA	40 ppm + 0.6 ppm	75 ppm + 1 ppm	80 ppm + 1 ppm	<1 mV	8 ppm + 50 nA
	Medium Speed	10 nA	40 ppm + 1.6 ppm	75 ppm + 2 ppm	80 ppm + 2 ppm		
	Fast Speed	100 nA	40.6 ppm + 3.6 ppm	75.6 ppm + 4 ppm	80.6 ppm + 4 ppm		

[1] Accuracy Index: ± (ppm of reading + ppm of FS).

[2] Temperature Coefficient index: Exceed the range of range of (18-28) °C, increase (ppm reading + xx nA)/ °C.

[3] Input Protection 0.3A/600V Resettable PTC.

## DC Resistance Accuracy

Test Range	Scanning Speed	Resolution	24 hours (23 ±1) °C	90 days (23 ±5) °C	1 year (23 ±5) °C	Excitation Current	Temperature Coefficient
(0-100) Ω	Slow Speed	0.01 mΩ	3 ppm + 1 ppm	13 ppm + 1.5 ppm	16 ppm + 1.5 ppm	1 mA	3 ppm + 0.01 mΩ
	Medium Speed	0.01 mΩ	3 ppm + 5 ppm	13 ppm + 5.5 ppm	16 ppm + 5.5 ppm		
	Fast Speed	0.1 mΩ	3 ppm + 21 ppm	13 ppm + 21.5 ppm	16 ppm + 21.5 ppm		
(0-1) kΩ	Slow Speed	0.1 mΩ	3 ppm + 0.2 ppm	12 ppm + 0.3 ppm	15 ppm + 0.3 ppm	1 mA	3 ppm + 0.02 mΩ
	Medium Speed	0.1 mΩ	3 ppm + 1.2 ppm	12 ppm + 1.3 ppm	15 ppm + 1.3 ppm		
	Fast Speed	1 mΩ	3.6 ppm + 3.2 ppm	12.6 ppm + 3.3 ppm	15.6 ppm + 3.3 ppm		
(0-10) kΩ	Slow Speed	1 mΩ	3 ppm + 0.3 ppm	12 ppm + 0.4 ppm	15 ppm + 0.4 ppm	0.1 mA	3 ppm + 0.2 mΩ
	Medium Speed	1 mΩ	3 ppm + 1.3 ppm	12.6 ppm + 1.3 ppm	15 ppm + 1.3 ppm		
	Fast Speed	10 mΩ	3.6 ppm + 3.3 ppm	12.6 ppm + 3.4 ppm	15.6 ppm + 3.4 ppm		
(0-100) kΩ	Slow Speed	10 mΩ	3 ppm + 0.2 ppm	12 ppm + 0.3 ppm	15 ppm + 0.3 ppm	0.1 mA	3 ppm + 20 mΩ
	Medium Speed	10 mΩ	3 ppm + 0.5 ppm	12 ppm + 0.6 ppm	15 ppm + 0.6 ppm		
	Fast Speed	100 mΩ	3.6 ppm + 1.3 ppm	12.6 ppm + 1.3 ppm	30.6 ppm + 1.3 ppm		
(0-1) MΩ	Slow Speed	0.1 Ω	10 ppm + 0.6 ppm	30 ppm + 1 ppm	40 ppm + 1 ppm	10 µA	5 ppm + 0.2 Ω
	Medium Speed	0.1 Ω	10 ppm + 1.2 ppm	30 ppm + 0.6 ppm	40 ppm + 0.6 ppm		
	Fast Speed	1 Ω	10 ppm + 2.6 ppm	30 ppm + 3 ppm	40 ppm + 3 ppm		
(0-10) MΩ	Slow Speed	1 Ω	50 ppm + 0.4 ppm	80 ppm + 1 ppm	100 ppm + 1 ppm	1 µA	10 ppm + 1 Ω
	Medium Speed	1 Ω	50 ppm + 1.4 ppm	80 ppm + 2 ppm	100 ppm + 2 ppm		
	Fast Speed	10 Ω	50 ppm + 4.4 ppm	80 ppm + 5 ppm	100 ppm + 5 ppm		
(0-100) MΩ	Slow Speed	10 Ω	150 ppm + 1 ppm	400 ppm + 4 ppm	500 ppm + 4 ppm	0.1 µA	50 ppm + 50 Ω
	Medium Speed	10 Ω	150 ppm + 6 ppm	400 ppm + 9 ppm	500 ppm + 9 ppm		
	Fast Speed	100 Ω	150 ppm + 11 ppm	400 ppm + 14 ppm	500 ppm + 14 ppm		

[1] Accuracy Index: ± (ppm of reading + ppm of FS).




[2] Temperature Coefficient index: Exceed the range of range of (18-28) °C, increase (ppm reading + xx Ω)/ °C.

[3] The above is a 4-wire measurement index.






[4] When the range is less than or equal to 10 kΩ, the default is automatic current reversal.










[5] Max Lead Resistance(4-wire ohms): 10 Ω per lead for 100 Ω & 1 kΩ ranges; 100 Ω per lead for 10 kΩ & 100 kΩ ranges; 1 kΩ per lead on all other ranges.

## Ordering Information

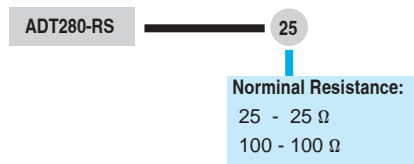
Model Number		
Model	Description	Picture
ADT286-110V ADT286-220V	Multifunction Reference Thermometer Readout base unit only	
ADT286-TS-PKG-110V ADT286-TS-PKG-220V	Multifunction Reference Thermometer Readout base unit with (1) Temperature Scanner Module (9051 cable not included)	
ADT286-PS-PKG-110V ADT286-PS-PKG-220V	Multifunction Reference Thermometer Readout base unit with (1) Process Scanner Module (9051 cable not included)	

## Accessories

Accessories (Included)		
Standard Accessories	Quantity	Picture
Shorting Block (1210103531)	1 pc.	
USB Cable (UK-415) (1210200243)	1 pc.	
Test leads	4 sets (8 pcs)	
9026 2-Wire Test Leads (Only w/ ADT286-TS-PKG & ADT286-PS-PKG)	20 pcs	
Fuse (50T-0315H)	2 pcs	
Calibration Certificate	1 pc.	
CD Manual	1 pc.	

Optional Accessories		
Model	Optional Accessories	Picture
9026	2-wire test leads(20-Pack)	
9051-10	Dsub Comm Cable=10 ft	
9051-33	Dsub Comm Cable=33 ft	
9050 USB to RS232 (DB9/M) Adapter	1 pc.	
9916-286	Carrying Case for ADT286,(2) scanner modules and reference probe w/wheels	
ADT286-DOCK	Remote Module Docking Station w/AC Adapter	
ADT286-TS	ADT286 Temperature Scanner Module	
ADT286-PS	ADT286 Process Scanner Module	
ADT280-RS-25	25 Ω Standard Reference Resistor	
ADT280-RS-100	100 Ω Standard Reference Resistor	

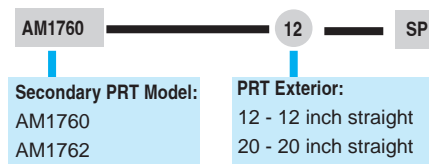
## Standard Reference Resistor Ordering Information



ADT280-RS-X

Resistance Standards		
Specification	ADT280-RS-25	ADT280-RS-100
Nominal Resistance	25 Ω	100 Ω
Stability	5 ppm/year	5 ppm/year
Operating Temperature	23 °C±2 °C	23 °C±2 °C
Temperature Coefficient	0.5 ppm/°C	0.5 ppm/°C
Size	57 mm x 57 mm x 45 mm	57 mm x 57 mm x 45 mm
Weight	0.35 lb (160 g)	0.35 lb (160 g)
Excitation Current	1 mA	1 mA

## Secondary Standard PRT Ordering Information



AM17XX-X-SP

## ■ Secondary Standard PRT Information

Specification	AM1760 Series	AM1762 Series
Temperature Range	-200 °C to 670 °C	-200 °C to 670 °C
Resistance at 0°C	Nominal 100 Ω	Nominal 25 Ω
Temperature Coefficient	0.003925 Ω / Ω / °C	
Accuracy	± 0.007 °C at -196 °C ± 0.006 °C at 0.01 °C ± 0.015 °C at 420 °C ± 0.025 °C at 660 °C	± 0.007 °C at -196 °C ± 0.006 °C at 0.01 °C ± 0.015 °C at 420 °C ± 0.025 °C at 660 °C
Drift	± 0.004 °C at TPW after 100 hours at 661 °C	
Short Term Stability	± 0.002 °C	
Thermal Shock	± 0.002 °C after 10 times thermal cycles from minimum to maximum temperatures	
Hysteresis	N/A	
Self-heating	0.0015 °C at 1 mA current	
Response Time	9 seconds for 63% response to step change in water moving at 3 feet per second	
Measurement Current	0.5 mA or 1 mA	
Sensor Length	42 mm	
Sensor Location	5 mm from tip	
Insulation Resistance	>1000 MΩ at room temperature	
Sheath Material	Inconel <sup>™</sup>	
Dimension	<b>AM1760-12-SP</b> 0.25 in dia X 12 in (6.35 mm X 305 mm) <b>AM1760-20-SP</b> 0.25 in dia X 20 in (6.35 mm X 500 mm)	<b>AM1762-12-SP</b> 0.25 in dia X 12 in (6.35 mm X 305 mm) <b>AM1762-20-SP</b> 0.25 in dia X 20 in (6.35 mm X 500 mm)
External Leads	Teflon <sup>™</sup> – insulated copper wire, 4 leads, 2.5 meters	
Handle Dimension	15 mm (OD) x 65 mm (L)	
Handle Temperature Range <sup>[1]</sup>	-50 °C to 160 °C	-50 °C to 180° C
Calibration	NIST traceable calibration w/ data included	

[1] Handle temperatures outside the usable will cause damage to the probe.

\* PRT Information from [www.accumac.com](http://www.accumac.com).

# Additel 878

## Reference Dry Well Calibrators



- Three models ranging from -40°C to 700°C
- Reference level performance in accuracy, stability and uniformity
- Quick to temperature
- Two-channel readout measures RTDs and TCs, and provides task documentation
- Full HART communicator
- Optional external temperature control
- Wi-Fi and Bluetooth capable
- Color touch screen display
- Quick-Push connectors (PC Option)
- Set point control by reference
- Self-calibration feature
- Optional TPW kit for built-in automatic realization (ADT878-160 only)
- Built-in automatic PRT annealing feature (ADT878-700 only)

### OVERVIEW

We are taking temperature calibration to the next level with the Additel 878 Reference Dry Well Calibrators. If you are looking for the best dry well on the market, then look no further! Additel's commitment to continuous improvement, quality and time saving features are on full display in the ADT878 series. With three models to choose from, ranging from -40 to 700°C, you will find the perfect fit for your calibration needs. The Process Calibrator option adds an external reference input, a two-channel readout for UUT's and a full complement of capabilities to help with everything from measuring temperature sensors, to calibrating thermocouples, self-calibrating the Reference Well and configuring HART transmitters. Each unit comes standard with a large touchscreen display, dual-zone control and Additel's commitment to the best customer service in the industry. We are certain that you will be blown away by the outstanding performance of these game-changing Reference Dry Wells!



**Metrology Made Simple**

## Process Calibrator Option

Each model can be purchased with our Process Calibrator (PC) option. This option combines the many features found in a fully functional HART documenting process calibrator with the reference grade dry well. This option includes the ability to measure a reference PRT, with virtually any connection type, and two device under test channels which can measure, mA, voltage, switch, RTD or thermocouple. In addition to these measurement functions, this calibrator has full documenting capability of creating tasks, saving as found and as left results, as well as communication with HART-smart transmitters. The process calibrator option also has an on board full HART communicator which allows users to read, configure and calibrate HART transmitters. The snap shot feature allows you to capture all information displayed on the screen with the push of a button. This optional add-on allows for data logging of all channels on an auto step function. By utilizing the reference PRT, you can select to control to the dry well set point using the internal sensor or the external reference PRT.

## Self-Calibration

We believe using an external reference probe as your standard is the best way to perform your temperature calibration. But we also recognize this method is not always necessary or convenient and depending on the application, using the internal control sensor would be preferred. Traditionally, the internal control sensor has a wide accuracy which can largely be contributed to its long-term drift. We've built-in a self-calibration feature allowing you to run an automated calibration of the internal control sensor using your external reference. With literally a few selections the calibration will run automatically giving you a fresh, traceable calibration of the control sensor which will improve its accuracy as you will not have to account for its long term drift when used as the reference.

## Automation Features

Traditionally, dry wells were simply a stable heat source. To enhance the usability of our Reference Dry Wells, we've added automation features enabling you to utilize these amazing devices as a highly stable heat source, triple point of water maintenance apparatus, and annealing furnace.

Combined with the ADT878-TPW-KIT, the ADT878-160 Reference Dry Well can be used to automatically realize and maintain a triple point of water cell. Traditional methods take time and practice to realize the triple point of water. Additel has now simplified this process with an automatic TPW realization feature. Simply insert the cell and PRT into the Reference Dry Well and run the procedure. The automation in the firmware will alert when the cell is super cooled. Remove the cell and give it a shake and now you can maintain the triple point in the reference well. This is very useful to check the drift of your PRT. For more information, please see our ADT878-TPW-KIT data sheet.

When you purchase our 700°C Reference Dry Well, you will find our automatic annealing feature used to anneal PRTs. We have preconfigured annealing procedures that set the temperature annealing time and cool down rate. This feature, also lets you create your own annealing procedures.

## FEATURES

Specification	Display
Task	<div> <div>Set point °C</div> <div>Standard °C</div> <div>Indication °C</div> <div>Error °C</div> </div> <div>Repeat 1</div> <div>20.0 19.968 22.019 2.051</div> <div>40.0 39.875 39.497 -0.378</div> <div>60.0 60.015 60.067 0.052</div> <div>80.0 80.081 81.070 0.989</div> <div>100.0 100.040 101.223 1.197</div>
mA Measurement	<div>19:54 2000-03-04</div> <div>CH1 (-30 ~ 30) mA</div> <div>5.0006 mA</div> <div>INT 10.000</div> <div>10.005 °C</div>



Non-PC version      PC version



Process Calibrator  
Optional Electronics

Quick-Push connectors for reference and UUT channels easily accept banana, large and small spade lugs and bare wire connections

## FEATURES

Specification	Display 1	Display 2
Auto Step		
Remote Control		
Data Logging		
HART Communicator		
TPW Cell Realization		

## SPECIFICATIONS



## Reference Dry Well Specifications

Specification	878-160	878-425	878-700
Temperature Range at 23°C	-40°C to 160°C	33°C to 425°C	33°C to 700°C
Display Accuracy	±0.1°C at Full Range	±0.2°C at Full Range	±0.20°C at 33°C
			±0.20°C at 425°C
			±0.25°C at 660°C
Stability (30 min)	±0.005°C at Full Range	±0.005°C at 100°C	±0.005°C at 100°C
		±0.010°C at 225°C	±0.015°C at 425°C
		±0.015°C at 425°C	±0.030°C at 700°C
Axial Uniformity at 60 mm (2.4 in)	±0.025°C at -40°C	±0.10°C at 100°C	±0.10°C at 100°C
	±0.020°C at 0°C	±0.15°C at 225°C	±0.25°C at 425°C
	±0.050°C at 160°C	±0.25°C at 425°C	±0.40°C at 700°C
Axial Uniformity at 80 mm (3.15 in)	±0.050°C at -40°C	±0.15°C at 100°C	±0.15°C at 100°C
	±0.040°C at 0°C	±0.20°C at 225°C	±0.30°C at 425°C
	±0.050°C at 160°C	±0.30°C at 425°C	±0.60°C at 700°C
Radial Uniformity	±0.01°C at Full Range	±0.025°C at 100°C	±0.025°C at 100°C
		±0.030°C at 225°C	±0.040°C at 425°C
		±0.040°C at 425°C	±0.060°C at 700°C
Loading Effect	±0.08°C (Display Sensor)	±0.05°C (Display Sensor)	±0.02°C at 100°C
			±0.05°C at 425°C
			±0.15°C at 700°C
	±0.010°C (External Sensor)	±0.01°C (External Sensor)	±0.01°C at 100°C
			±0.02°C at 425°C
			±0.03°C at 700°C
Hysteresis (Display Sensor)	0.025°C	0.04°C	0.07°C
Environmental Conditions	8°C to 38°C guaranteed accuracy		
	0°C to 50°C, 0% to 90% RH non-condensing		
Storage Conditions	-20°C to 60°C		
IP Rating	IP20		
Immersion Depth	160 mm (6.30 in)	193 mm (7.60 in)	
Insert OD	31.9 mm (1.26 in)	30.8 mm (1.21 in)	
Heating Time	4 min: -40°C to 23°C	15 min: 23°C to 425°C	25 min: 23°C to 700°C
	10 min: 23°C to 160°C		
Cooling Time	8 min: 160°C to 23°C	24 min: 425°C to 100°C	30 min: 700°C to 100°C
	15 min: 23°C to -40°C	15 min: 100°C to 50°C	15 min: 100°C to 50°C
Typical Time to Stability	10 min		
Resolution	0.001°C		
Units	°C, °F, and K		
Display	6.5 in (165 mm) color touch screen		
Size (H x W x D)	170 x 345 x 330 mm (6.69 x 13.58 x 13.0 in)		
Weight	11.2 kg (24.7 lbs)	9.7 kg (21.4 lbs)	
Power Requirements	90-254 VAC, 45-65 Hz, 580 W	90-254 VAC, 45-65 Hz, 1400 W	
Communication	USB A, USB B, RJ45, WiFi, Bluetooth		
Localization	English, Chinese, Japanese, Russian, German, French, Italian, and Spanish		
Warranty	1 year		

## Input Specifications (Process Calibrator [PC] Option)

Specification	Description
Readout Accuracy for 100 ohm PRT (Probe Accuracy Not Included)	± 0.005°C at -40°C
	± 0.006°C at 0°C
	± 0.008°C at 50°C
	± 0.009°C at 100°C
	± 0.011°C at 160°C
	± 0.015°C at 300°C
	± 0.019°C at 425°C
	± 0.026°C at 660°C
	± 0.028°C at 700°C
Readout Resolution	0.1 mΩ
Reference Resistance Temperature Measurement Range	-200°C to 962°C
Reference Resistance Accuracy	0Ω to 50Ω: ± 1.25mΩ
	50Ω to 400Ω: ± 0.0025% RD
Reference Characterizations	ITS-90, CVD, IEC-751
Reference Measurement Capability	4-wire PRT
Reference Probe Connection	6-pin lemo smart connector and Quick-Push connectors to accept banana, mini-banana, large & small spade lug and bare wire connections
RTD Channels	2 channels. Both accept 2, 3, or 4-wire RTDs
RTD Measurement Accuracy (excl sensor)	0Ω - 25Ω: ±0.002Ω
	25Ω - 400Ω: 0.004% RD
	400Ω - 4kΩ: 0.005% RD
RTD Measurement Resolution	0.1mΩ
RTD Measurement Resistance Range	0Ω to 4KΩ
RTD Characterizations	PT10, PT25, PT50, PT100, PT200, PT500, PT1000, CU10, CU50, CU100, NI100, NI120
RTD Connection	Quick-Push connectors accept banana, mini-banana, large & small spade lug and bare wire connections
TC Channel	2
TC Measurement Channels	Accepting S, R, K, B, N, E, J, T, C, D, G, L, and U
TC Range	-75 mV to 75 mV
TC Resolution	0.1 μV
TC Voltage Accuracy	0.01% RD + 5 μV
Internal CJC Accuracy	±0.2°C (ambient from 0°C to 50°C)
Current Range	-30 mA to 30 mA
Current Accuracy	0.01% RD + 2 μA
Current Resolution	0.1 μA, Input Impedance: < 10Ω



Specification	Description
Voltage Ranges	-12 V to 12 V and -30 V to 30 V
Voltage Accuracy	±0.01% RD + 0.6 mV
Voltage Resolution	0.1 mV; Input impedance: >1MΩ
Switch Test	Mechanical or Electrical
DC 24V Output	24 V ±0.5 V, MAX 60 mA
Hart Communicator	Read, configure and calibrate HART devices - DD files updated periodically Optional - (order ADT875PC)
Documentation	Up to 1,000 tasks which store up to 10 results each containing as found and as left data. Snap shot feature allows for screen captures. Records auto step and ramp functions.
Temperature Coefficient 0°C to 13°C and 33°C to 50°C	ADT878 (PC)-160: ±0.005°C/°C
	ADT878 (PC)-425/700: ±0.005°C/°C
	Ref Readout: ±1 ppm FS/°C
	RTD Readouts: ±1 ppm FS/°C
	TC Readouts: ±5 ppm FS/°C
	Current: ±5 ppm FS/°C
	Voltage: ±5 ppm FS/°C

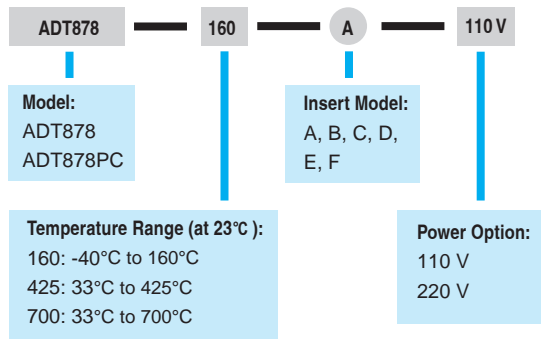
## TC Measurement Specification and Calculation (Process Calibrator [PC] Option)

TC Type	Temperature (°C)	Error (°C) <sup>[1]</sup>	TC Type	Temperature (°C)	Error (°C) <sup>[1]</sup>
B	250	±1.99	T	-200	±0.28
	300	±1.65		-40	±0.14
	425	±1.18		0	±0.13
	660	±0.81		160	±0.11
	700	±0.77		300	±0.11
	1768	±0.56		400	±0.11
K	-200	±0.29	N	-200	±0.46
	-40	±0.13		-40	±0.20
	0	±0.13		0	±0.19
	160	±0.14		160	±0.17
	300	±0.15		300	±0.17
	425	±0.16		425	±0.17
	660	±0.18		660	±0.19
	700	±0.19		700	±0.19
	1000	±0.31		1000	±0.27
E	-200	±0.16	S	-50	±1.25
	-40	±0.09		-40	±1.17
	0	±0.09		0	±0.93
	160	±0.08		160	±0.63
	300	±0.09		300	±0.57
	425	±0.10		425	±0.55
	660	±0.12		660	±0.54
	700	±0.13		700	±0.53
J	1000	±0.17	R	1768	±0.66
	-210	±0.22		-50	±1.33
	-40	±0.10		-40	±1.23
	0	±0.10		0	±0.95
	160	±0.11		160	±0.61
	300	±0.12		300	±0.54
	425	±0.13		425	±0.51
	660	±0.14		660	±0.48
	700	±0.14		700	±0.48
	1000	±0.21		1768	±0.58

[1] Excluding cold junction compensation errors.

## Ordering Information

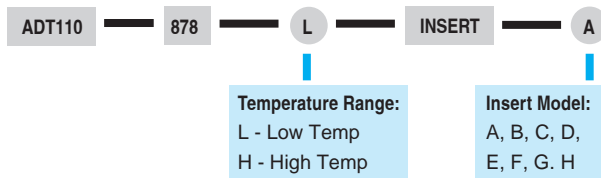
### Model Number



### Accessories

Standard Accessories		
Model	Quantity	Picture
Reference Dry Well and selected insert	1 pc.	
Power cable	1 pc.	
USB Cable	1 pc.	
Insert removal tool	1 pc.	
Thermal Shield (ADT878/PC-425/700 only)	1 pc.	
Silica gel plugs (ADT878/PC-160 only)	1 set (3 pcs.)	
Insulation plug (ADT878/PC-160 only)	1 pc.	
Test leads (ADT878PC only)	2 sets (4 pcs.)	
ISO 17025 Accredited calibration	1 pc.	
CD Manual	1 pc.	

### Insert Ordering Information



### Optional Accessories

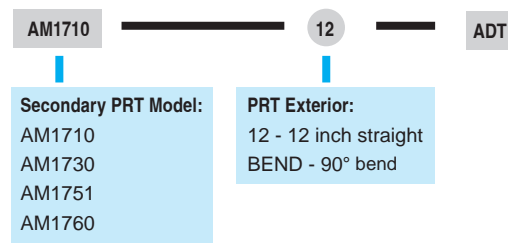
Model	Description	Picture
9915-875	Carry case for ADT878 with wheels	
ADT110-878-X-INSERT-X	Insert for ADT878, see insert ordering information on the next page	
AM17XX-12-ADT	Secondary PRT with dry well connector, see PRT information on the next page	
AM17XX-BEND-ADT	Bend Secondary PRT with dry well connector, see PRT information on the next page	
9070	Smart connector for reference PRT used with ADT878 Dry Well Calibrator	
9071	Connector Adapter from smart connector to 4-wire with gold-plated spades for ADT878 Dry Well Calibrator	
9072	Smart connector with clamps for reference PRT used with ADT878 Dry Well Calibrator	
9080	Cable Kit (includes TC plug, compensation cable, S,R,B,K,J,T,E,N)	
ADT878-TPW-KIT	Triple point of water cell kit (see ADT878-TPW-KIT for details)	

### Insert Information

Insert Information			
Model	Specification	Model	Specification
A	High Temp 	E	High Temp 
	Low Temp		Low Temp
B	High Temp 	F	High Temp 
	Low Temp		Low Temp
C	High Temp 	G	High Temp 
	Low Temp		Low Temp
D	High Temp 	H	High Temp 
	Low Temp		Low Temp

\* Updated insert information at [www.additel.com](http://www.additel.com)

## Secondary PRT Ordering Information



**AM17XX-12-ADT**

## Secondary PRT Information

				AM17XX-BEND-ADT
Specification	AM1710 Series	AM1730 Series	AM1751 Series	AM1760 Series
Temperature Range <sup>[3]</sup>	-60°C to 160°C	-200°C to 420°C	-200°C to 670°C	-200°C to 670°C
Resistance at 0°C	Nominal 100Ω			
Temperature Coefficient	0.003925 Ω / Ω / °C			
Calibrated Accuracy (k=2) <sup>[2][3]</sup>	± 0.025°C at -40°C ± 0.015°C at 0.01°C ± 0.025°C at 160°C	± 0.025°C at -40°C ± 0.015°C at 0.01°C ± 0.035°C at 420°C	± 0.025°C at -40°C ± 0.015°C at 0.01°C ± 0.035°C at 420°C ± 0.05°C at 661°C	±0.010°C at -196°C ±0.006°C at 0.01°C ±0.015°C at 420°C ±0.025°C at 661°C
Drift	± 0.01°C at TPW after 100 hours at 160°C	± 0.01°C at TPW after 100 hours at 420°C	± 0.01°C at TPW after 100 hours at 661°C	± 0.004°C at TPW after 100 hours at 661°C
Short Term Stability	± 0.007°C			
Thermal Shock	± 0.005°C after (10) thermal cycles from minimum to maximum temperatures			
Hysteresis	<=0.005°C			
Self-heating	50 mW/°C			
Response Time	9 seconds for 63% response to step change in water moving at 3 feet per second			
Measurement Current	0.5 mA or 1 mA			
Sensor Length	32 mm			42 mm
Sensor Location	5 mm from tip			
Insulation Resistance	>1000 MΩ at room temperature			
Sheath Material	Stainless Steel	Inconel <sup>tm</sup>		
Dimension	AM1710-12-ADT 0.25 in dia X 12 in (6.35 mm X 305 mm)	AM1730-12-ADT 0.25 in dia X 12 in (6.35 mm X 305 mm)	AM1751-12-ADT 0.25 in dia X 12 in (6.35 mm X 305 mm)	AM1760-12-ADT 0.25 in dia X 12 in (6.35 mm X 305 mm)
	AM1710-BEND-ADT 0.25 in dia X 12 in (6.35 mm X 305 mm), 90° bend at 7.4 inch (190 mm) from probe end	AM1730-BEND-ADT 0.25 in dia X 12 in (6.35 mm X 305 mm), 90° bend at 9.6 inch (245 mm) from probe end	AM1751-BEND-ADT 0.25 in dia X 12 in (6.35 mm X 305 mm), 90° bend at 9.6 inch (245 mm) from probe end	AM1760-BEND-ADT 0.25 in dia X 12 in (6.35 mm X 305 mm), 90° bend at 9.6 inch (245 mm) from probe end
External Leads	Teflon <sup>tm</sup> –insulated copper wire, 4 leads, 0.8 meters			
Handle Dimension	15 mm (OD) x 65 mm (L)			
Handle Temperature Range <sup>[1]</sup>	-50°C to 160°C	-50°C to 180°C		
Calibration	NIST traceable calibration with data included. Accredited calibration available per request.			

[1] Handle temperatures outside this range will cause damage to the probe.

[2] Includes calibration and 100 hour drift.

[3] Probe calibration ranges may differ from probe temperature ranges (see Calibrated Accuracy for calibration ranges).

\* PRT Information from [www.accumac.com](http://www.accumac.com)

# ADT878-TPW-KIT

## Triple Point of Water Realization Kit



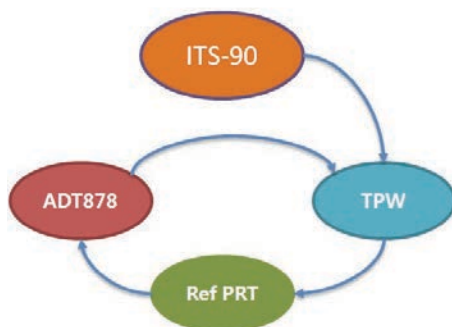
- One touch TPW cell realization
- Extremely affordable intrinsic standard
- Self-calibration feature
- Automatically update reference probe TPW values
- Easily maintain temperature working standards
- Fully self-contained

### OVERVIEW

The Additel 878 TPW Kit provides everything you need to utilize our model ADT878-160 Reference Dry Well as an intrinsic standard. The triple point value (0.01°C) is key to ITS-90 temperature probe calibration work. Traditional methods take time and practice to realize the triple point of water. Additel has now simplified this process with an automatic TPW realization feature. Simply insert the cell and PRT into the Reference Dry Well and run the preprogrammed procedure. The automation in the firmware will alert when the cell is super cooled. Remove the cell and give it a shake and now you can maintain the triple point in the reference well. With the help of this easy to use kit, users can quickly and easily realize and maintain our custom fit TPW cell, then record/update those ever critical TPW values for all your PRTs.

## Accuracy Verification Loop

The triple point of water (TPW) is a critical intrinsic standard and ITS-90 reference point that every owner of a reference PRT or SPRT should have. Using the TPW to check reference temperature probes is the most convenient and affordable way to ensure confidence in your measurements. By regularly checking the drift of your temperature sensor, you can know with certainty if your sensor is in tolerance or not. The International Temperature Scale of 1990 (ITS-90) supports the TPW to be a reliable standard to check your reference PRT. By using the ADT878-160 Reference Dry Well, you can maintain and realize the TPW cell, which in turn can verify your reference PRT. This helps to bring everything full circle, the reference PRT can be used in the self-calibration mode to validate the display accuracy of the ADT878.



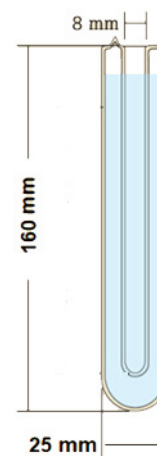
Accuracy Verification Loop



## SPECIFICATIONS

Specification	Display
Uncertainty	<0.0005°C <sup>[1]</sup>
Immersion depth/ID	115 mm X 8 mm
External Dimensions	160 mm X 25 mm
Cell material	Borosilicate Glass
Realization time	20 mins
Estimated working time	2 hours
Recommended thermal Fluid	Ethanol
Warranty	1 year

[1] Specification relates to the overall uncertainty when using the shake method of realizing the cell and maintaining it in the ADT878-160. Call for more info.



TPW Cell Size

## Ordering Information

### Model Number

ADT878

TPW

KIT

### Accessories

Included Accessories		
Model	Description	Picture
1520000292	TPW cell, 1 pc.	
1223000410	Cell basket, 1 pc.	
1223000411	Basket cover, 1 pc.	

Included Accessories		
Model	Description	Picture
1223000412	Basket cover with hole, 1 pc.	
1520000291	Support ring, 1 pc	
1810298212	Cell removal tool, 1 pc	
1520000290	Bottom cushion, 1 pc.	

## Additel 875 Series Dry Well Calibrators



- Three models ranging from -40°C to 660°C
- Portable, rugged, and quick to temperature
- Metrology-level performance in stability, uniformity, accuracy and loading effect
- Dual-zone control
- Full HART field communicator
- Process calibrator option provides a multi-channel readout for a reference thermometer, RTDs and TCs, task documentation, and HART communication
- Color touch screen display
- Choose your own range option
- Set point control by reference
- Self-calibration feature

### OVERVIEW

If you are serious about portable temperature calibration tools, then you know a good dry well calibrator is more than just a stable heat source. The Additel 875 Series Dry Well Calibrators combine excellent performance in stability, radial and axial uniformity, and loading with speed, ruggedness and portability. But we don't stop there! The Process Calibrator option adds the capabilities of a three-channel thermometer readout and a documenting process calibrator. We've also incorporated a unique option to select your own temperature range within the range of the model selected. We're calling this the CYOR option or Choose Your Own Range option. When you purchase the CYOR option, you pick the upper and lower temperature range needed and we calibrate and optimize the dry well's performance over your selected range. Each unit has a color touch screen display, dual-zone control, and much more. You are just going to love these new dry wells!

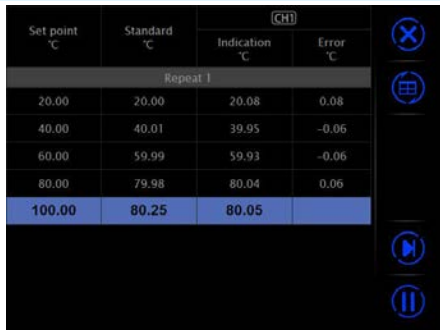
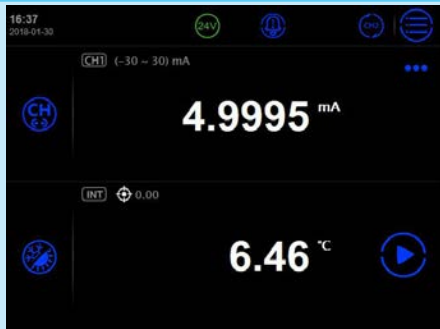

## Process Calibrator Option

Each model offer has a Process Calibrator (PC) option. This process calibrator option combines the many features found in a fully functional HART documenting process calibrator with the temperature dry well. This option includes the ability to measure a reference PRT and two devices under test channels which can measure, mA, voltage, switch, RTD or thermocouple. In addition to these measurement functions, this calibrator has full documenting capability of creating tasks, saving as found and as left results, as well as reading, configuring and calibrating HART capable transmitters. The snap shot feature allows you to capture all information displayed on the screen with the push of a button. This optional add-on allows for data logging of all channels on an auto step function and a ramp function. By utilizing the reference PRT, you can select to control to the dry well set point using the internal sensor or the external reference PRT.

## Self-Calibration

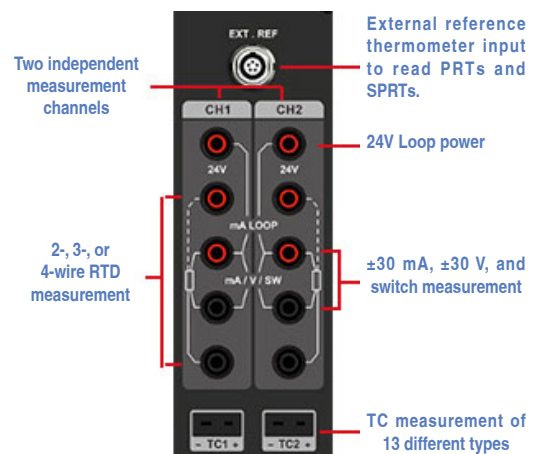
We believe using an external reference probe as your standard is the best way to perform your temperature calibration. But we also recognize this method is not always necessary or convenient and depending on the application, using the internal control sensor would be preferred. Traditionally, the internal control sensor has a wide accuracy which can largely be contributed to its long-term drift. We've built-in a self-calibration feature allowing you to run an automated calibration of the internal control sensor using your external reference. With literally a few selections the calibration will run automatically giving you a fresh, traceable calibration of the control sensor which will improve its accuracy as you will not have to account for its long term drift when used as the reference.

## FEATURES

Specification	Display																														
Task	 <table><thead><tr><th rowspan="2">Set point °C</th><th rowspan="2">Standard °C</th><th colspan="2">[CH1]</th></tr><tr><th>Indication °C</th><th>Error °C</th></tr></thead><tbody><tr><td colspan="4">Repeat 1</td></tr><tr><td>20.00</td><td>20.00</td><td>20.08</td><td>0.08</td></tr><tr><td>40.00</td><td>40.01</td><td>39.95</td><td>-0.06</td></tr><tr><td>60.00</td><td>59.99</td><td>59.93</td><td>-0.06</td></tr><tr><td>80.00</td><td>79.98</td><td>80.04</td><td>0.06</td></tr><tr><td>100.00</td><td>80.25</td><td>80.05</td><td></td></tr></tbody></table>	Set point °C	Standard °C	[CH1]		Indication °C	Error °C	Repeat 1				20.00	20.00	20.08	0.08	40.00	40.01	39.95	-0.06	60.00	59.99	59.93	-0.06	80.00	79.98	80.04	0.06	100.00	80.25	80.05	
Set point °C	Standard °C			[CH1]																											
		Indication °C	Error °C																												
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20.00	20.00	20.08	0.08																												
40.00	40.01	39.95	-0.06																												
60.00	59.99	59.93	-0.06																												
80.00	79.98	80.04	0.06																												
100.00	80.25	80.05																													
mA Measurement																															
V Measurement																															



Non-PC version      PC version

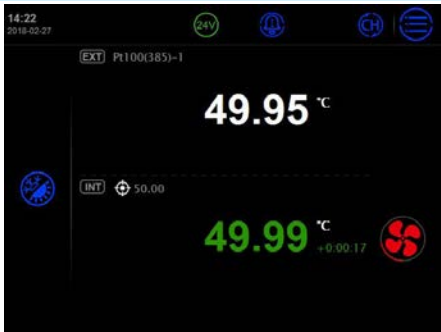

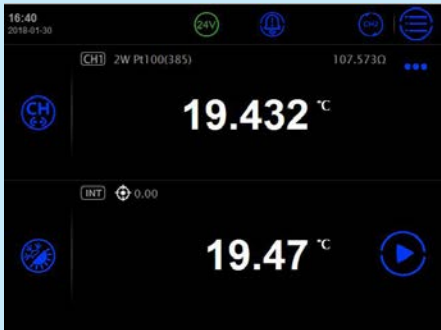



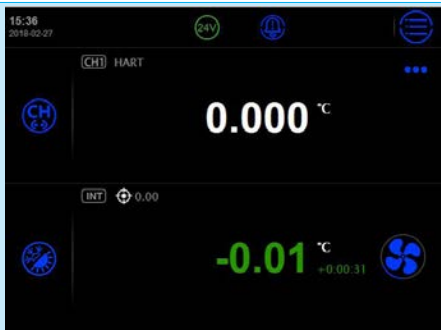

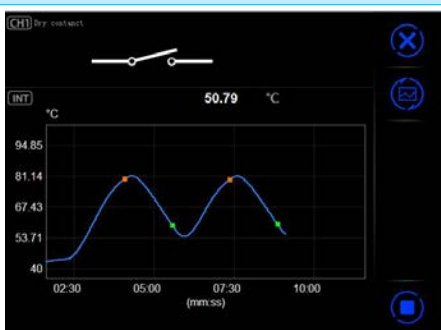



Process Calibrator  
Optional Electronics

## FEATURES

Specification	Display 1	Display 2
Auto Step		
Remote Control		
Data Logging		
Stability Indicator		
Connection Instruction		

## APPLICATIONS

Specification	Display	Application
PRT Test (External Reference)		
RTD Test		
TC Test		
Transmitter Test		
Switch Test		

## SPECIFICATIONS



## Base Unit Dry Well Specifications

Specification	875-155	875-350	875-660
Temperature Range at 23°C	-40°C to 155°C	33°C to 350°C	33°C to 660°C
Display Accuracy	± 0.18°C at Full Range	± 0.2°C at Full Range	± 0.3°C at 33°C
			± 0.3°C at 420°C
			± 0.5°C at 660°C
Stability (30 min)	± 0.01°C at Full Range	± 0.02°C at Full Range	± 0.02°C at 33°C
			± 0.03°C at 50°C
			± 0.04°C at 420°C
			± 0.04°C at 660°C
Axial Uniformity at 60 mm (2.4 in)	± 0.07°C at Full Range	± 0.04°C at 33°C	± 0.05°C at 33°C
		± 0.1°C at 200°C	± 0.3°C at 420°C
		± 0.2°C at 350°C	± 0.5°C at 660°C
Radial Uniformity	± 0.01°C at Full Range	± 0.01°C at 33°C	± 0.02°C at 33°C
		± 0.015°C at 200°C	± 0.05°C at 420°C
		± 0.02°C at 350°C	± 0.1°C at 660°C
Loading Effect	± 0.1°C (Display Sensor)	± 0.15°C (Display Sensor)	± 0.15°C (Display Sensor)
	± 0.02°C (External Sensor)	± 0.015°C (External Sensor)	± 0.035°C (External Sensor)
Hysteresis (Display Sensor)	0.025°C	0.03°C	0.1°C
Environmental Conditions	8°C to 38°C guaranteed accuracy		
	0°C to 50°C, 0% to 90% RH non-condensing, 3000 M altitude for normal operation		
Storage Conditions	-20°C to 60°C		
IP Rating	IP20		
Immersion Depth	145 mm (5.70 in)	150 mm(5.90 in)	
Insert OD	25.8 mm (1.02 in)	24.8 mm (0.98 in)	
Heating Time	13 min: -40°C to 155°C	10 min: 33°C to 350°C	15 min: 33°C to 660°C
	5 min: -40°C to 23°C		
	8 min: 23°C to 155°C		
Cooling Time	28 min: 155°C to -40°C	15 min: 350°C to 100°C	23 min: 660°C to 100°C
	8 min: 155°C to 23°C	10 min: 100°C to 50°C	12 min: 100°C to 50°C
	20 min: 23°C to -40°C	10 min: 50°C to 33°C	12 min: 50°C to 33°C
Typical Time to Stability	10 min		
Resolution	0.01°C		
Units	°C, °F, and K		
Display	6.5 in (165 mm) color touch screen		
Size (H x W x D)	320 x 170 x 330 mm (12.6 x 6.7 x 13.0 in)		
Weight	9.9 kg (21.8 lbs)	8.2 kg (18.1 lbs)	
Power Requirements	90-254 VAC, 45-65 Hz, 580 W	90-254 VAC, 45-65 Hz, 1200 W	
Mechanical Testing	Vibration: 2 g (10-500 Hz), 30 min for 2 sides		
	Impact: 4 g three times		
	Drop test: 500 mm (19.6 in)		
Communication	USB A, USB B, RJ45, WiFi, Bluetooth		
Localization	English, Chinese, Japanese, Russian, German, French, Italian, and Spanish		
Warranty	1 year		

## Input Specifications (Process Calibrator [PC] Option)

Specification	Description
Readout Accuracy for 100 ohm PRT (Probe Accuracy Not Included)	$\pm 0.009^{\circ}\text{C}$ at $-40^{\circ}\text{C}$
	$\pm 0.010^{\circ}\text{C}$ at $0^{\circ}\text{C}$
	$\pm 0.012^{\circ}\text{C}$ at $50^{\circ}\text{C}$
	$\pm 0.017^{\circ}\text{C}$ at $155^{\circ}\text{C}$
	$\pm 0.019^{\circ}\text{C}$ at $200^{\circ}\text{C}$
	$\pm 0.026^{\circ}\text{C}$ at $350^{\circ}\text{C}$
	$\pm 0.030^{\circ}\text{C}$ at $420^{\circ}\text{C}$
	$\pm 0.042^{\circ}\text{C}$ at $660^{\circ}\text{C}$
Readout Resolution	0.5 m $\Omega$
Reference Resistance Range	0 $\Omega$ to 400 $\Omega$
Reference Resistance Accuracy	0 $\Omega$ to 50 $\Omega$ : 0.002 $\Omega$
	50 $\Omega$ to 400 $\Omega$ : 0.008% RD
Reference Characterizations	ITS-90, CVD, IEC-751, Resistance
Reference Measurement Capability	4-wire PRT
Reference Probe Connection	6-pin lemo smart connector
RTD Channels	2
RTD Measurement Accuracy (excl sensor) Compliance	0 $\Omega$ to 25 $\Omega$ : 0.002 $\Omega$
	25 $\Omega$ to 400 $\Omega$ : 0.004% RD
	400 $\Omega$ to 4K $\Omega$ : 0.008% RD
RTD Measurement Resolution	0 $\Omega$ to 400 $\Omega$ : 1 m $\Omega$
	400 $\Omega$ to 4K $\Omega$ : 0.01 $\Omega$
RTD Measurement Resistance Range	0 $\Omega$ to 4K $\Omega$
RTD Characterizations	PT10, PT25, PT50, PT100, PT200, PT500, PT1000, CU10, CU50, CU100, NI100, NI120
RTD Connection	Four 4 mm input jacks
RTD Channels	2 channels. Both accept 2, 3, or 4-wire RTDs
TC Channel	2
TC Measurement Channels	Mini TC terminals: Accepting S, R, K, B, N, E, J, T, C, D, G, L, and U
TC Measurement Accuracy (excl sensor)	Type K: $\pm 0.13^{\circ}\text{C}$ at $0^{\circ}\text{C}$ $\pm 0.15^{\circ}\text{C}$ at $155^{\circ}\text{C}$ $\pm 0.18^{\circ}\text{C}$ at $350^{\circ}\text{C}$ $\pm 0.24^{\circ}\text{C}$ at $660^{\circ}\text{C}$
TC Range	$-75\text{ mV}$ to $75\text{ mV}$
TC Resolution	0.0001 mV, Input Impedance >100 M $\Omega$
TC Voltage Accuracy	0.02% RD + 5 $\mu\text{V}$
Internal CJC Accuracy	$\pm 0.35^{\circ}\text{C}$ (ambient from $0^{\circ}\text{C}$ to $50^{\circ}\text{C}$ )
Current Range	$-30\text{ mA}$ to $30\text{ mA}$
Current Accuracy	0.02% RD + 2 $\mu\text{A}$
Current Resolution	0.0001 mA, Input Impedance: < 10 $\Omega$

Specification	Description
Voltage Ranges	$-12\text{ V}$ to $12\text{ V}$ and $-30\text{ V}$ to $30\text{ V}$
Voltage Accuracy	$\pm 0.02\%$ RD + 2 mV
Voltage Resolution	0.001 V; Input impedance: > 1M $\Omega$
Switch Test	Mechanical or Electrical
DC 24V Output	24V $\pm 10\%$ , MAX60 mA
Hart Communicator	Read, configure and calibrate HART devices - DD files updated periodically Optional - (order ADT875PC)
Documentation	Up to 1,000 tasks which store up to 10 results each containing as found and as left data. Snap shot feature allows for screen captures. Records auto step and ramp functions.
Temperature Coefficient $0^{\circ}\text{C}$ to $8^{\circ}\text{C}$ and $38^{\circ}\text{C}$ to $50^{\circ}\text{C}$	ADT875 (PC)-155: $\pm 0.005^{\circ}\text{C}/^{\circ}\text{C}$
	ADT875 (PC)-350/660: $\pm 0.01^{\circ}\text{C}/^{\circ}\text{C}$
	Ref Readout: $\pm 5\text{ ppm FS}/^{\circ}\text{C}$
	RTD Readouts: $\pm 2\text{ ppm FS}/^{\circ}\text{C}$
	TC Readouts: $\pm 5\text{ ppm FS}/^{\circ}\text{C}$
	Current: $\pm 5\text{ ppm FS}/^{\circ}\text{C}$
	Voltage: $\pm 5\text{ ppm FS}/^{\circ}\text{C}$

## TC Measurement Specification and Calculation (Process Calibrator [PC] Option)

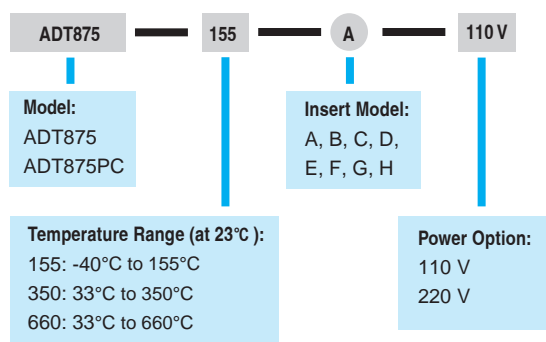
TC Type	Temperature ( $^{\circ}\text{C}$ )	Error ( $^{\circ}\text{C}$ ) <sup>[1]</sup>	TC Type	Temperature ( $^{\circ}\text{C}$ )	Error ( $^{\circ}\text{C}$ ) <sup>[1]</sup>
B	250	$\pm 2$	L	-40	$\pm 0.1$
	350	$\pm 1.44$		0	$\pm 0.1$
	660	$\pm 0.84$		155	$\pm 0.12$
C	0	$\pm 0.38$	N	350	$\pm 0.16$
	155	$\pm 0.34$		660	$\pm 0.21$
	350	$\pm 0.33$		-40	$\pm 0.2$
D	660	$\pm 0.38$	R	0	$\pm 0.2$
	0	$\pm 0.52$		155	$\pm 0.19$
	155	$\pm 0.37$		350	$\pm 0.2$
E	350	$\pm 0.33$	S	660	$\pm 0.24$
	660	$\pm 0.36$		-40	$\pm 1.23$
	-40	$\pm 0.09$		0	$\pm 0.95$
G	0	$\pm 0.09$	T	155	$\pm 0.63$
	155	$\pm 0.1$		350	$\pm 0.56$
	350	$\pm 0.13$		660	$\pm 0.54$
J	660	$\pm 0.19$	U	-40	$\pm 1.16$
	0	$\pm 3.85$		0	$\pm 0.93$
	155	$\pm 0.71$		155	$\pm 0.65$
K	350	$\pm 0.43$		350	$\pm 0.6$
	660	$\pm 0.36$		660	$\pm 0.6$
J	-40	$\pm 0.1$	T	-40	$\pm 0.14$
	0	$\pm 0.1$		0	$\pm 0.13$
	155	$\pm 0.12$		155	$\pm 0.13$
K	350	$\pm 0.16$	U	350	$\pm 0.15$
	660	$\pm 0.21$		400	$\pm 0.15$
	-40	$\pm 0.13$		-40	$\pm 0.14$
J	0	$\pm 0.13$	T	0	$\pm 0.13$
	155	$\pm 0.16$		155	$\pm 0.13$
	350	$\pm 0.19$		350	$\pm 0.14$
K	660	$\pm 0.25$	U	600	$\pm 0.17$

[1] Excluding cold junction compensation errors.

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## Ordering Information

### Model Number



### CYOR Option (Choose Your Own Range)

Optional Accessories		
Model	Description	Picture
9875-155-CYOR	Range selection for ADT875-155 Dry Well Calibrator, Customize Range	
9875-350-CYOR	Range selection for ADT875-350 Dry Well Calibrator, Customize Range	
9875-660-CYOR	Range selection for ADT875-660 Dry Well Calibrator, Customize Range	

### Accessories

Standard Accessories		
Model	Quantity	Picture
Dry well and selected insert	1 pc.	
Power cable	1 pc.	
USB Cable	1 pc.	
Insert removal tool	1 pc.	
Thermal Shield (ADT875/PC-350/660 only)	1 pc.	
Silica gel plug (ADT875/PC-155 only)	1 set (3 pcs.)	
Insulation plug (ADT875/PC-155 only)	1 pc.	
Test leads (ADT875PC only)	2 sets (4 pcs.)	
ISO 17025 Accredited calibration	1 pc.	
CD Manual	1 pc.	



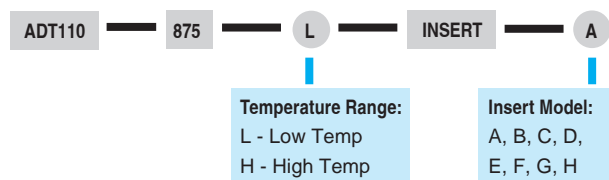
**Metrology Made Simple**

Optional Accessories		
Model	Description	Picture
9915-875	Carry case for ADT875 with wheels	
ADT110-875-X-INSERT-X	Insert for ADT875, see insert ordering information on the next page	
AM17XX-12-ADT	Secondary PRT with dry well connector, see PRT information on the next page	
AM17XX-BEND-ADT	Bend Secondary PRT with dry well connector, see PRT information on the next page	
9070	Smart connector for reference PRT used with ADT875 Dry Well Calibrator	
9071	Connector Adapter from smart connector to 4-wire with gold-plated spades for ADT875 Dry Well Calibrator	
9072	Smart connector with clamps for reference PRT used with ADT875 Dry Well Calibrator	
9080	Cable Kit (includes TC plug, compensation cable, S,R,B,K,J,T,E,N)	

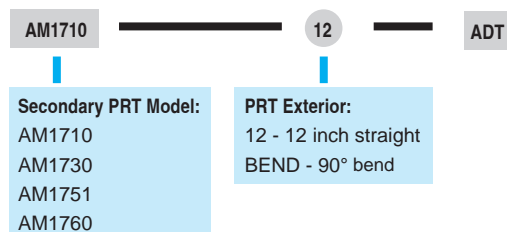
### Insert Information

Insert Information			
Model	Specification	Model	Specification
A	High Temp 	F	High Temp 
	Low Temp		Low Temp
B	High Temp 	G	High Temp 
	Low Temp		Low Temp
C	High Temp 	H	High Temp 
	Low Temp		Low Temp
D	High Temp 	Z	High Temp 
	Low Temp		Low Temp
E	High Temp 	* Updated insert information at <a href="http://www.additel.com">www.additel.com</a>	
	Low Temp		

## Insert Ordering Information



## Secondary PRT Ordering Information



AM17XX-12-ADT

AM17XX-BEND-ADT

## Secondary PRT Information

Specification	AM1710 Series	AM1730 Series	AM1751 Series	AM1760 Series
Temperature Range <sup>[3]</sup>	-60°C to 160°C	-200°C to 420°C	-200°C to 670°C	-200°C to 670°C
Resistance at 0°C	Nominal 100Ω			
Temperature Coefficient	0.003925 Ω / Ω / °C			
Calibrated Accuracy (k=2) <sup>[2][3]</sup>	± 0.025°C at -40°C ± 0.015°C at 0.01°C ± 0.025°C at 160°C	± 0.025°C at -40°C ± 0.015°C at 0.01°C ± 0.035°C at 420°C	± 0.025°C at -40°C ± 0.015°C at 0.01°C ± 0.035°C at 420°C ± 0.05°C at 661°C	±0.010°C at -196°C ±0.006°C at 0.01°C ±0.015°C at 420°C ±0.025°C at 661°C
Drift	± 0.01°C at TPW after 100 hours at 160°C	± 0.01°C at TPW after 100 hours at 420°C	± 0.01°C at TPW after 100 hours at 661°C	± 0.004°C at TPW after 100 hours at 661°C
Short Term Stability	± 0.007°C			± 0.002°C
Thermal Shock	± 0.005°C after (10) thermal cycles from minimum to maximum temperatures			±0.002°C after (10) thermal cycles from minimum to maximum temperatures
Hysteresis	<=0.005°C			<=0.001°C
Self-heating	50 mW/°C			0.0015°C at 0.5mA
Response Time	9 seconds for 63% response to step change in water moving at 3 feet per second			
Measurement Current	0.5 mA or 1 mA			
Sensor Length	32 mm			42 mm
Sensor Location	5 mm from tip			
Insulation Resistance	>1000 MΩ at room temperature			
Sheath Material	Stainless Steel	Inconel™		
Dimension	<b>AM1710-12-ADT</b> 0.25 in dia X 12 in (6.35 mm X 305 mm)	<b>AM1730-12-ADT</b> 0.25 in dia X 12 in (6.35 mm X 305 mm)	<b>AM1751-12-ADT</b> 0.25 in dia X 12 in (6.35 mm X 305 mm)	<b>AM1760-12-ADT</b> 0.25 in dia X 12 in (6.35 mm X 305 mm)
	<b>AM1710-BEND-ADT</b> 0.25 in dia X 12 in (6.35 mm X 305 mm), 90° bend at 7.4 inch (190 mm) from probe end	<b>AM1730-BEND-ADT</b> 0.25 in dia X 12 in (6.35 mm X 305 mm), 90° bend at 9.6 inch (245 mm) from probe end	<b>AM1751-BEND-ADT</b> 0.25 in dia X 12 in (6.35 mm X 305 mm), 90° bend at 9.6 inch (245 mm) from probe end	<b>AM1760-BEND-ADT</b> 0.25 in dia X 12 in (6.35 mm X 305 mm), 90° bend at 9.6 inch (245 mm) from probe end
External Leads	Teflon™ –insulated copper wire, 4 leads, 0.8 meters			
Handle Dimension	15 mm (OD) x 65 mm (L)			
Handle Temperature Range <sup>[1]</sup>	-50°C to 160°C	-50°C to 180°C		
Calibration	NIST traceable calibration with data included. Accredited calibration available per request.			

[1] Handle temperatures outside this range will cause damage to the probe.

[2] Includes calibration and 100 hour drift.

[3] Probe calibration ranges may differ from probe temperature ranges (see Calibrated Accuracy for calibration ranges).

\* PRT Information from www.accumac.com

# Short Probe Temperature Calibration Kit



- Reduce calibration uncertainties
- Avoid messy fluid baths
- Reduce calibration time
- Improved accuracy with custom control probe (included)
- Metric or Imperial kits available

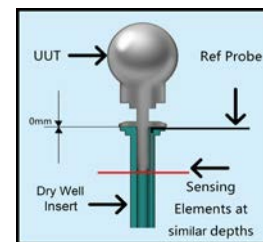


## OVERVIEW

The Additel 110 series short probe calibration kit is designed to help users of our ADT875-155 or ADT878-160 to calibrate temperature probes and transmitters with short probe lengths. This all-inclusive kit comes with everything needed to perform more accurate and reliable calibration for those challenging short probes. Choose between our metric or imperial kit to fit your needs. Each kit comes complete with (3) standard sized inserts and (1) blank insert, which can be modified by the end user to accommodate custom sized UUT's if needed. The small reference probe is included which fits snugly into the reference port of the specially machined inserts. Also, we include a small set of tools and supplies to help improve results by removing a couple of small parts on the top of the ADT875 or ADT878 calibrator. For more information, please watch our instructional short probe video found at [www.additel.com](http://www.additel.com)

## SPECIFICATIONS

AM1612-ADT Secondary PRT Specifications	
Temperature Range	-40°C to 160 °C
Resistance at 0 °C	Nominal 100 Ω
Temperature Coefficient	0.00385Ω/Ω /°C
Accuracy	±0.05°C at 0°C
Drift	±0.04°C at 0°C after 100 hours at 160°C
Short Term Stability	±0.02°C
Thermal Shock	±0.02°C after 10 times thermal cycles from minimum to maximum temperatures
Hysteresis	≤ 0.01°C
Self-heating	75 mW/°C
Response Time	4 seconds for 63% response to step change in water moving at 3 feet per second
Measurement Current	1 mA
Sensor Length	30 mm
Insulation Resistance	>1000 MΩ at room temperature
Sheath Material	Stainless Steel 316 L
Dimension	0.118 inch X 1.78 inch ( 3 mm X 45 mm )
External Leads	Enameled copper wire protected by high temperature heat shrink tubing, 4 leads, 0.8 meters
Calibration	NIST traceable calibration with data provided



Short Probe Kit Application

## Optional Accessories

Model number	Description	Picture
ADT110-875-L-SK-Z	Spare Blank Insert	
ADT110-878-L-SK-D	Spare Blank Insert	
AM1612-ADT	Spare Short Style Secondary Reference Probe	

## ORDERING INFORMATION

### Model Number

ADT110 — 875 — L — SHRT — IKIT

**Model:**  
875  
878

**Type:**  
IKIT includes Imperial 1/8", 3/16", 1/4" inserts, (1) blank insert, reference probe and carrying case  
MKIT includes Metric 3, 4, 6 mm inserts, (1) blank insert, reference probe and carrying case

**Note:** Kits include (1) blank insert for field modification if needed

3 mm dia.	4 mm dia.	6 mm dia.
1/8 in dia.	3/16 in dia.	1/4 in dia.

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# ADT875 and ADT878

## Thermocouple Calibration Furnaces



- Temperature control from 100°C to 1210°C
- Two models to choose from:  
Reference (ADT878) and Standard (ADT875)
- Display Accuracy of  $\pm 1.5^{\circ}\text{C}$  (ADT878)
- Stability of  $\pm 0.1^{\circ}\text{C}$
- 4 on-board measurement channels (PC option)
- Process calibrator option provides a multi-channel readout for TCs, switches and transmitters, including task documentation and HART communication
- Portable, rugged and quick to temperature
- Self-calibration feature (PC option)
- Multi-zone temperature control
- Internal and external sensor control (PC option)
- Metallic interchangeable inserts
- Wi-Fi and Bluetooth capable
- Color touch screen display
- ISO 17025-accredited calibration w/data included
- Patent pending technology



### OVERVIEW

We understand the many challenges associated with thermocouple calibration work. That is precisely why we decided to introduce the ADT875-1210 and ADT878-1210 Thermocouple Calibration Furnaces.

With an unmatched stability, uniformity and an optional on-board process calibrator, calibrating thermocouples has never been easier. With two separate units to choose from, the ADT875-1210 and ADT878-1210 furnaces include a patented multi-zone temperature control which provides a never before seen, highly stable and uniform heat source to ensure you get the best possible results from a modest investment. With metallic interchangeable inserts, users have the flexibility needed to service a wide variety of UUT's and the durability they have come to expect from Additel. The ADT875-1210 and ADT878-1210 can be purchased with or without our on-board process calibration electronics to provide flexibility for customers who are needing the best 1200°C heat source on the market.

If thermocouple calibration and/or verification work is part of your workload, you don't want to miss out on this opportunity to save valuable time and money with these best in class furnaces from Additel.

## Temperature Control

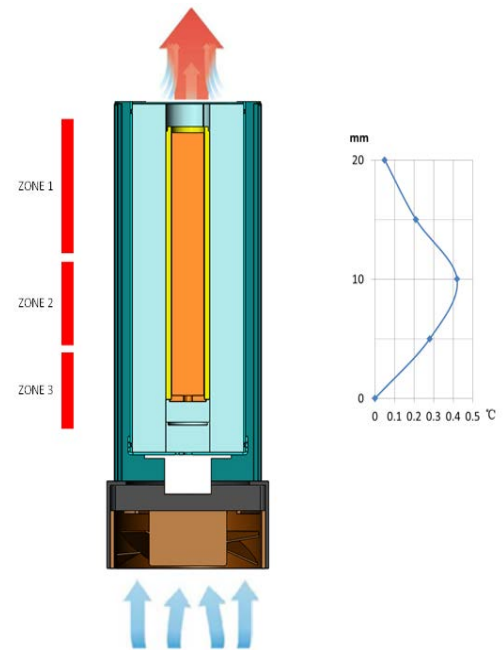
The Additel ADT875 & ADT878 Thermocouple Calibration Furnaces have been designed with a unique and innovative way of controlling temperature and temperature gradients. We like to call it "Advanced Adaptive Control". This exciting new design feature incorporates our patent pending wind tunnel control technology with Additel's impressive 3-zone temperature control to provide the very best uniformity and stability possible.

Each ADT875 & ADT878 is tested and calibrated in Additel's accredited laboratory (Brea, CA) to ensure that each unit is ready to go when the customer opens the package. The included accredited calibration certificate provides data relating to accuracy, stability and uniformity to help provide even more confidence in the testing and calibration of each and every ADT875 & ADT878 Thermocouple Calibration Furnace.

Specification	875-1210	878-1210 <sup>[1]</sup>
Temperature Range	100°C to 1210°C	
Display Accuracy	±1.2°C @ 100°C ±1.2°C @ 300°C ±1.2°C @ 600°C ±1.6°C @ 900°C ±2.0°C @ 1210°C	±1.0°C @ 100°C ±1.0°C @ 300°C ±1.0°C @ 600°C ±1.2°C @ 900°C ±1.5°C @ 1210°C
Stability	±0.1°C	
Axial Uniformity (20mm zone)	±0.6°C @ 100°C ±1.2°C @ 300°C ±1.5°C @ 600°C ±1.5°C @ 900°C ±1.5°C @ 1210°C	±0.4°C @ 100°C ±0.8°C @ 300°C ±1°C @ 600°C ±1°C @ 900°C ±1°C @ 1210°C
Radial Uniformity	±0.2°C @ 100°C ±0.3°C @ 300°C ±0.4°C @ 600°C ±0.8°C @ 900°C ±1°C @ 1210°C	±0.2°C @ 100°C ±0.3°C @ 300°C ±0.4°C @ 600°C ±0.6°C @ 900°C ±0.8°C @ 1210°C
Loading Effect	±0.5°C	
Environmental Conditions	8°C to 38°C guaranteed accuracy 0°C to 50°C, 0% to 90% RH non-condensing, 3000 M altitude for normal operation	
Storage Conditions	-20°C to 60°C	
Immersion Depth	XR style inserts = 138 mm (5.43") XS style inserts = 116 mm (4.57") (see insert ordering info for more details)	
Insert Size - OD	24.8 mm (0.98 inches)	
Heating Time	50 min: 23°C to 1210°C	
Cooling Time	50 mins: 1210°C to 300°C 50 mins: 300°C to 50°C	55 mins: 1210°C to 300°C 55 mins: 300°C to 50°C
Typical Time to Stability	15 min	
Resolution	0.01°C	
Units	°C, °F, and K	
Display	6.5 in (165 mm) color touch screen	
Size (H x W x D)	345 x 170 x 330 mm (13.6 x 6.7 x 13.0 in)	
Weight	10.6 kg (23.4 lbs)	

[1] 878-1210 specifications require the use of an "XR" style insert. Otherwise default to the 875-1210 specifications.

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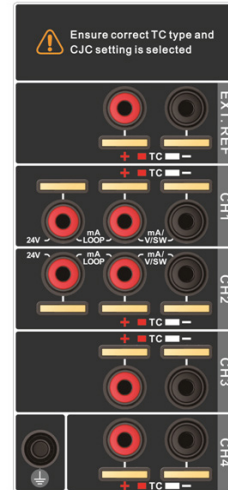


Specification	875-1210	878-1210
Power Requirements	90-254 VAC, 45-65 Hz, 580 W	
Mechanical Testing	Vibration: 2 g (10-500 Hz), 30 min for 2 sides Impact: 4 g three times Drop test: 500 mm (19.6 in)	
Communication	USB A, USB B, RJ45, WiFi, Bluetooth	
Localization	English, Chinese, Japanese, Russian, German	
Warranty	1 year	

## Process Electronics

Both the ADT875 & ADT878 can be ordered with Additel's Process Calibrator (PC) option. The Process Calibrator Option combines the many features found in a thermocouple readout device and process calibrator with the ADT875 & ADT878 Calibration Furnaces.

This unique option includes Additel's patented Quick-Push connectors which accommodate virtually all TC connection types. The process option also includes the ability to measure a reference grade thermocouple and up to (4) under test channels. Channels 1 and 2 can measure mA, voltage, perform switch testing and source 24V DC. In addition to these measurement functions, the process option provides full documenting capability of creating tasks, saving "as found" and "as left" results and HART communications for simplified transmitter work. The snapshot feature allows users to capture all information displayed on the screen with a touch of the screen. This optional add-on allows for data logging of all channels using our auto step and a ramp functions. By utilizing the external reference option users can select to control to the furnace set point using an external control probe, which helps to reduce uncertainties. The external control probe feature also facilitates the handy self-calibration feature!



ADT875 & ADT878 Process Calibrator [PC] option electronics

## Input Specifications (Process Calibrator [PC] Option)

Specification	875-1210	878-1210
TC Measurement Channels	Patented TC terminals: Accepting S, R, K, B, N, E, J, T, L, and U	
TC Measurement Accuracy Type K Ch. 1-4 (excluding sensor)	±0.182°C @ 100°C ±0.266°C @ 300°C ±0.310°C @ 600°C ±0.397°C @ 900°C ±0.517°C @ 1210°C	±0.172°C @ 100°C ±0.236°C @ 300°C ±0.251°C @ 600°C ±0.304°C @ 900°C ±0.382°C @ 1210°C
TC Range	-75 mV to 75 mV (UUT Channels 1-4) -18 mV to 18 mV (Reference Channel)	
TC Resolution	0.0001 mV, Input Impedance < 10Ω	
TC Voltage Accuracy	0.02% RD + 8μV (ch. 1-4) 0.01% RD + 2μV (ref ch.)	0.01% RD + 8μV (ch. 1-4) 0.005% RD + 2μV (Ref ch.)
Internal CJC Accuracy	±0.35°C (ch. 1-4) ±0.25°C (ref ch.)	±0.30°C (ch. 1-4) ±0.20°C (ref ch.)
Current Range	-30 mA to 30 mA	
Current Accuracy	±(0.02% of rdg+ 2μA)	±(0.01% of rdg+ 2μA)
Current Resolution	0.0001 mA, Input Impedance < 10Ω	
Voltage Range	-30 V to 30 V	
Voltage Accuracy	±(0.02% of rdg+ 2mV)	±(0.01% of rdg+ 0.6mV)
Voltage Resolution	0.0001 V, Input Impedance >1MΩ	
DC 24V Output	24 V ± 10%, MAX 60 mA	
Hart Communication	Optional (ADT875PC and ADT878PC Models)	
Temperature Coefficient 0°C to 8°C and 38°C to 50°C	TC Readouts: ±5 ppm FS/°C Current: ±5 ppm FS/°C Voltage: ±5 ppm FS/°C	
Switch Test	Mechanical or Electrical - Channels 1 & 2 only	
Documentation	Up to 1,000 tasks which store up to 10 results each containing as found and as left data. Snap shot feature allows for screen captures. Records auto step and ramp functions	

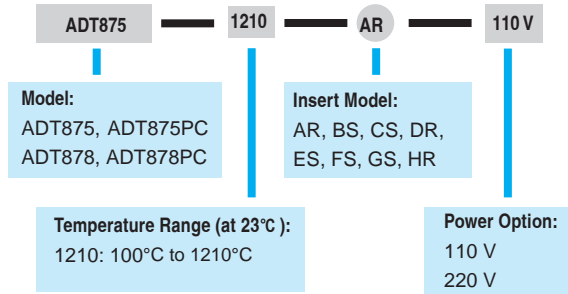
## TC Measurement Specifications and Calculations (Process Calibrator [PC] Option)

TC Type	TEMP (°C)	Error (°C) <sup>[1]</sup>		TC Type	TEMP (°C)	Error (°C) <sup>[1]</sup>	
		875	878			875	878
K (CH1-CH4)	100	±0.182	±0.172	S (CH1-CH4)	100	±1.102	±1.094
	300	±0.266	±0.236		300	±0.924	±0.899
	600	±0.310	±0.251		600	±0.888	±0.837
	900	±0.397	±0.304		900	±0.868	±0.793
	1210	±0.517	±0.382		1210	±0.865	±0.765
N (CH1-CH4)	100	±0.273	±0.264	R (CH1-CH4)	100	±1.080	±1.072
	300	±0.270	±0.243		300	±0.869	±0.844
	600	±0.309	±0.256		600	±0.804	±0.755
	900	±0.368	±0.285		900	±0.771	±0.699
	1210	±0.455	±0.335		1210	±0.766	±0.670
E (CH1-CH4)	100	±0.136	±0.126	B (CH1-CH4)	250	±3.182	±3.170
	300	±0.153	±0.130		300	±2.645	±2.631
	600	±0.210	±0.154		600	±1.409	±1.379
	900	±0.291	±0.202		900	±1.049	±1.003
	1000	±0.297	±0.196		1210	±0.905	±0.839
L (CH1-CH4)	100	±0.223	±0.214	T (CH1-CH4)	100	±0.194	±0.185
	300	±0.271	±0.241		300	±0.191	±0.166
	600	±0.308	±0.251		400	±0.217	±0.183
	900	±0.522	±0.448		100	±0.277	±0.273
U (CH1-CH4)	100	±0.270	±0.261	S (EXT. REF)	300	±0.242	±0.229
	300	±0.189	±0.164		600	±0.249	±0.224
	600	±0.227	±0.176		900	±0.258	±0.220
	100	±0.186	±0.177		1210	±0.266	±0.216
J (CH1-CH4)	300	±0.197	±0.168	R (EXT. REF)	100	±0.271	±0.266
	600	±0.256	±0.200		300	±0.228	±0.216
	900	±0.281	±0.197		600	±0.227	±0.202
	1200	±0.414	±0.294		900	±0.230	±0.194
					1210	±0.240	±0.192

[1] Excluding cold junction compensation errors.

## Ordering Information

### Model Number

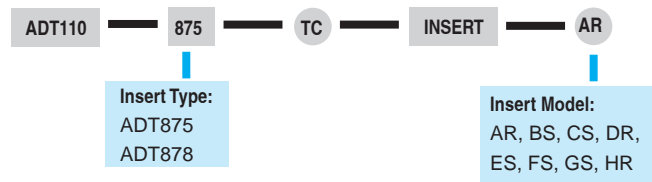


\* ADT878-1210 specifications require the use of an "XR" style insert

### Accessories

Standard Accessories		
Model	Quantity	Picture
Calibration Furnace and selected Insert & insulator	1 pc.	
Power cable	1 pc.	
USB Cable	1 pc.	
Insert removal tool	1 pc.	
Test leads (PC option only)	2 sets (6 pcs.)	
Accredited Calibration Certification	1 pc.	
Manual	1 pc.	

### Insert Ordering Information



\* ADT878-1210 specifications require the use of an "XR" style insert

### Insert Information

Reference Style inserts - 138 mm (5.43") hole depth - for use with both 878 and 875 models

Model	Specification	Model	Specification
AR		HR	
DR			

Short Style Insert - 116 mm (4.57") hole depth - Only for the ADT875 - 1210

Model	Specification	Model	Specification	Model	Specification
CS		GS		BS	
FS		ES			

[1] Insert models ending in the letter S have probe holes of shallower depths. Please call with questions.

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### Optional Accessories

Model	Description	Picture
9915-875	Carry case for ADT875-1210 or ADT878-1210 with wheels	
ADT110-87X-TC-INSERT-XX	Insert for ADT875-1210 or ADT878-1210 (see insert ordering information below)	
AM1210-12	Reference TC - Type S: Platinum/10% Rhodium vs. platinum - 12" length (see AM1210 specs below)	
9080	Cable Kit (includes TC plug, compensation cable, S,R,B,K,J,T,E,N)	

### AM1210-12 Type S Reference Standard Thermocouple

Temperature Range	0°C to 1300°C
Type	Type S: Platinum/10% Rhodium vs. platinum
Long Term Drift	±0.6°C at 1084.62°C after 1 year typical usage
Short Term stability	±0.2°C at 1084.62°C
Diameter of thermocouple wire	0.5 mm
Sheath Material	Alumina
Sheath Dimensions	OD: 6 mm (0.236"); Length: 305 mm (12.0")
Protective Carrying Case	Included
Documentation	Report of test with data

Note: ISO 17025 accredited probe calibration available, contact Additel for more information"

## ADT850

# Laboratory Thermocouple Calibration Furnace

- Temperature control from 300°C to 1200°C
- 3-in-1 furnace with 9 unique modes
- Stability of  $\pm 0.1^{\circ}\text{C}$
- Radial uniformity of  $\pm 0.2^{\circ}\text{C}$  @ 1200°C
- Axial uniformity of  $\pm 0.2^{\circ}\text{C}$  @ 1200°C
- Multi-zone temperature control
- Quick cool technology
- Sliding probe holder provides mechanical stability and precise probe depth control
- Pivoting color touchscreen display
- Internal and external probe control
- Alumina and metal inserts available
- Patent pending EMF shielding technology
- Advanced safety control
- Wi-Fi Communications



## OVERVIEW

Thermocouple calibration work can be challenging. Here at Additel, we understand the difficulties of this type of work. Traditional furnace designs require several individual devices to meet industry standards for various calibration applications. To address this costly reality, Additel has created a multi-purpose furnace to help save time, money and space in your calibration facility. Our new ADT850 Laboratory Thermocouple Calibration Furnace is like having three separate furnaces in one. Users can select optimized settings for shorter probes, longer probes and even annealing purposes. The ADT850 horizontal furnace can be used in (9) different modes/configurations to help meet even the most challenging calibration requirements and standards. Additel's 850 furnace is packed with many additional features and a performance you will not find anywhere else. The ADT850 is commonly used in a multitude of industries such as energy, calibration laboratories, aerospace and metallurgy to name a few. It is generally used by primary and secondary calibration laboratories to calibrate various length noble and base metal thermocouples with the lowest possible uncertainties. Additel's ADT850 is the most stable and versatile furnace available!

## Industrial Design

With our customer's needs in mind, we have designed our all new ADT850 Laboratory Thermocouple Calibration Furnace with a modern look and feel. Users will experience that same easy to use menu structure and touchscreen interface that they have become accustomed to when using genuine Additel products. The display pivots and tilts so users can customize the product to fit their needs.

The ADT850 also includes a sliding probe holder labeled with measurement gradients to help safely insert standard and UUT probes to correct depths. The advanced probe holder design includes a clamp to securely hold the test probe in place at all times.

With an unmatched flexibility, the ADT850 provides calibration and annealing support for a wide variety of thermocouple types and lengths. The unique selectable "mode of operation" integrated into the touchscreen interface allows users to select from (9) different modes, accounting for immersion depths from 200 mm to 370 mm. This coupled with the variety of insert types to accommodate reliable and repeatable measurements for both metal and ceramic style probes, gives users the flexibility to easily calibrate a wide variety of thermocouple sizes and quantities. These groundbreaking features make the ADT850 Laboratory Thermocouple Calibration furnace the most versatile and cost saving full sized thermocouple calibration furnace on the market.

## General Specifications

Specification	ADT850
Temperature Range	300°C to 1200°C
Heating Time	(23°C~1200°C) 40 mins, (empty well)
Cooling Time	(1200°C~300°C) 90 mins, (empty well)
Operating Conditions	0°C to 50°C, 0-90%RH (0°C~50°C), non-condensing, <2000 m altitude
Storage Temperature	-20°C to 70°C
Display Screen	7 in (178 mm) color touch screen
Display Resolution	0.01°C

## Performance Specifications

Mode	Long (Deep) Immersion		
	Long empty chamber mode	Long cup mode / Long insert mode	Long alumina tube mode
Application	Noble and base metal TC calibration	Base metal TC calibration	Noble metal TC calibration
Configuration (insert)	Empty chamber, without insert	Long cup insert or multi-hole insert	20 mm (ID) alumina tube
Insert Dimension	N/A	Cup insert: 36.5 X 28.5 X 80 mm Block insert: 36.5 X 80 mm	26 mm (OD) X 20 mm (ID) X 630 mm (L)
Immersion Depth	310 to 370 mm (geometrical center: 340 mm)	370 mm to the bottom of insert	310 to 370 mm (geometrical center: 340 mm)
Stability	±0.1°C full range	±0.1°C full range	±0.1°C full range
Axial Uniformity	±0.2°C full range (within ±30 mm axial length from geometrical center)	±0.2°C full range (within 60 mm from bottom of the insert)	±0.2°C full range (within ±30 mm axial length from geometrical center)
Radial Uniformity	±0.2°C @ 300°C ±0.2°C @ 700°C ±0.2°C @ 1200°C (within 14 mm from geometrical center)	±0.1°C @ 300°C ±0.15°C @ 700°C ±0.2°C @ 1200°C (within 14 mm from geometrical center)	N/A



Mode Selection



ADT110-850-ALUM  
Tube Style Furnace Insert (Alumina)



ADT110-850-CUP-LONG  
Cup Style Furnace Insert (Long version - Metal)

Specification	ADT850
Heater Power	4000 W (220 V AC)
System Power	20 A, 220 V ±10% 50/60Hz
Power Protection	30 A, 250 V resettable circuit breaker
SIZE (W x H x L)	342 x 424 x 680 mm (13.5 x 16.7 x 26.8 in)
Weight	45 kg (99.2 lbs) without insert
Communication	Wi-Fi, Bluetooth, USB, LAN
Warranty	1 year

## Performance Specifications

**Metrology Made Simple**

Mode	Short Immersion			Annealing furnace
	Short empty chamber mode	Short cup mode / Short insert mode	Short alumina tube mode	TC annealing mode
Application	Short noble and base metal TC Calibration	Short base Metal TC calibration	Short Noble Metal TC calibration	Nobel metal TC annealing
Configuration (insert)	Empty chamber, without insert	Short cup insert or multi-hole insert	16 mm (ID) alumina tube	Without insert
Insert Dimension	N/A	Cup insert: 36.5 X 28.5 X 80 mm Block insert: 36.5 X 80 mm	22 mm (OD) X 16 mm (ID) X 630 mm (L)	N/A
Immersion Depth	200 to 240 mm (geometrical center: 220 mm)	240 mm to the bottom of insert	200 to 240 mm (geometrical center: 220 mm)	100 mm to 500 mm
Stability	±0.1°C full range	±0.1°C full range	±0.1°C full range	±0.1°C full range
Axial Uniformity	±0.5°C in full range (within ±20 mm axial length from geometrical center)	±0.5°C in full range (within 40 mm from bottom of the insert)	±0.4°C full range (within ±20 mm axial length from geometrical center)	±20°C @ 1100°C within 400 mm range (from 100 to 500 mm)
Radial Uniformity	±0.3°C @ 300°C ±0.3°C @ 700°C ±0.3°C @ 1200°C (within 14 mm from geometrical center)	±0.25°C @ 300°C ±0.25°C @ 700°C ±0.25°C @ 1200°C (within 14 mm from geometrical center)	N/A	N/A

## Ordering Information

### Model Number

ADT850 — 1200 — ALUM









#### Insert Style:

ALUM = Alumina tube (noble metal)

CUPL = Long cup style (base metal)

NO = No insert

### Accessories









Standard Accessories		
Item / Model	Quantity	Picture
Power cord	1 pc.	
Network cable	1 pc.	
Type N Control TC-Left	1 pc.	
Type N Control TC-Middle	1 pc.	
Type N Control TC-Right	1 pc.	
Alumina tube (8 mm OD)	3 pcs	
Fuse, T12A 250V	3 pcs	
Nickle wire (Expt ADT850-1200-ALUM)	1 roll	
ADT110-850-ALUM (Only for ADT850-1200-ALUM)	1 set	
ADT110-850-CUP-LONG (Only for ADT850-1200-CUPL)	1 set	
Insulator set	2 sets	
Alumina tube 6 mm OD x 4 mm ID x 400 mm L	2 pcs	
Alumina tube 6 mm OD x 4 mm ID x 700 mm L	2 pcs	
Report of test with data	1 pc.	

### TC Calibration Kit Ordering Information

ADT110 — 850 — Style • • Insert Length

CUP  
INS  
ALUM

LONG  
SHORT

Optional Accessories		
Model	Description	Picture
AM1210-20-CJ or AM1210-20	Reference TC - Type S: Platinum/10% Rhodium vs. platinum - 20" length (available w/ or without cold junction)	
9085	Ice Point Dewar 120 mm OD x 95 mm ID x 300 mm H (4.75" OD x 3.75" ID x 11.8" H)	
9080	Cable Kit (includes TC plug, compensation cable, S,R,B,K,J,T,E,N)	
ADT110-850-CUP-LONG	TC calibration Kit, for base metal calibrations in the ADT850, includes: long cup insert and insulator set	
ADT110-850-CUP-SHORT	TC calibration Kit, for base metal calibrations in the ADT850, includes: short immersion cup insert and insulator set	
ADT110-850-INS-LONG	TC calibration Kit, for base metal calibrations in the ADT850, includes: multi-hole insert for deep immersion (7 x 8.5 mm ID holes) and insulator set	
ADT110-850-INS-SHORT	TC calibration Kit, for base metal calibrations in the ADT850, includes: multi-hole insert for short immersion (7 x 8.5 mm ID holes) and insulator set	
ADT110-850-ALUM	TC calibration Kit, for noble metal calibrations in the ADT850, includes 26 mm OD x 20 mm ID x 630 mm L alumina tube (1 pc), 20 mm OD insulator (2 pcs), 22 mm OD x 16 mm ID x 630 mm L alumina tube (1 pc), 16 mm OD insulator (2 pcs), 6 mm OD x 4 mm ID x 700 mm L alumina tube (2 pcs)	

AM1210-20-CJ Type S Reference Standard Thermocouple	
Temperature Range	0°C to 1300°C
Type	Type S: Platinum/10% Rhodium vs. platinum w/ cold junction
Long Term Drift	±0.5°C at 1084.62°C after 1 year typical usage
Short Term stability	±0.2°C at 1084.62°C
Diameter of thermocouple wire	0.5 mm
Sheath Material	Alumina
Sheath Dimensions	OD: 6 mm (0.236"); Length: 600 mm (23.6")
External Lead Wire	S type thermocouple wire 600 mm (23.6")
Protective Carrying Case	Included
Documentation	Report of test with data

Note: ISO 17025 accredited probe calibration available, contact Additel for more information  
Look us up on [www.additel.com](http://www.additel.com) or call today (1)714-998-6899

# Multifunction Process Calibrators

## Selection Guide



Models	Additel 209 Loop Calibrator	Additel 210 Loop Calibrator	Additel 220 Multifunction Loop Calibrator	Additel 221A Multifunction Temperature Calibrator	Additel 222A Multifunction Process Calibrator	Additel 223A Documenting Process Calibrator
<b>Measure</b>						
Voltage(mV)			±300 mV	±75 mV	±75 mV	±75 mV
Voltage(V)	0 to 30 V	0 to 30 V	±60 V	±30 V	±30 V	±30 V
Current (mA)	0 to 24 mA	0 to 24 mA	±30 mA	±30 mA	±30 mA	±30 mA
Resistance(ohm)			0 to 2,000 Ω	0 to 4,000 Ω	0 to 4,000 Ω	0 to 4,000 Ω
Frequency(Hz)				1 to 50,000 Hz	1 to 50,000 Hz	1 to 50,000 Hz
Pulse				0 to 999,999	0 to 999,999	0 to 999,999
Limit Switch			3 to 24V	3 to 24 V	3 to 24 V	3 to 24 V
Pressure					● <sup>[1]</sup>	● <sup>[1]</sup>
<b>Source / Simulate</b>						
Voltage(mV)			-10 to 200 mV	-10 to 75 mV	-10 to 75 mV	-10 to 75 mV
Voltage(V)			0 to 12 V	0 to 12 V	0 to 12 V	0 to 12 V
Current (mA)	0 to 24 mA	0 to 24 mA	0 to 22 mA	0 to 22 mA	0 to 22 mA	0 to 22 mA
Resistance(ohm)				1 to 4,000Ω	1 to 4,000Ω	1 to 4,000Ω
Frequency(Hz)				0 to 50,000 Hz	0 to 50,000 Hz	0 to 50,000 Hz
Pulse				0 to 999,999	0 to 999,999	0 to 999,999
DC 24 V	●	●	●	●	●	●
<b>Record</b>						
Scaling			●	●	●	●
Min/Max/Avg/Tare			●			
Hold			●			
As found/ As left			●	●	●	●
On-demand logging			●	●	●	●
Upload data to PC				●	●	●
<b>Features</b>						
24V loop supply			●	●	●	●
Ramp/ Step			●	●	●	●
Simulate Transmitter				●	●	●
RTD				11 types <sup>[2]</sup>	11 types <sup>[2]</sup>	11 types <sup>[2]</sup>
Thermocouple				13 types <sup>[3]</sup>	13 types <sup>[3]</sup>	13 types <sup>[3]</sup>
HART communication			● <sup>[4]</sup>			●
Documenting				●	●	●
Warranty	3 years	3 years	3 years	3 years	3 years	3 years
ISO17025 accredited calibration	●	●	●	●	●	●
See Page	P100	P100	P102	P104	P104	P104

[1] Additel 160A External Pressure Module required

[2] RTD Includes Pt100(385), Pt100(385), Pt100(3916), Pt100(3926), Pt500(385), Pt1000(385), Cu10(427), Cu50(428), Cu100(428), Ni100(617), Ni120(672), Ni1000 and customized

[3] Thermocouple Includes S, R, B, K, N, E, J, T, C, D, G, L, U

[4] Built-in 250Ω resistor for HART communications.

# Additel 209 and 210 Series Loop Calibrator

- Accuracy to 0.01% of reading
- Small and rugged handheld design
- Measure, source, or simulate loop current
- Measure DC volts
- Simultaneously mA and % span display
- Switch functionality
- Selectable ramp and step functions
- Easy to read display and user interface
- HART 250Ω resistor in series with 24V loop



## OVERVIEW

The new Additel 209 and 210 loop calibrator series combine ease of use and functionality, making them the ideal tools to troubleshoot your process loop. The ADT209 has an accuracy of 0.03% of reading whereas the ADT210 holds an accuracy of 0.01% of reading. If you want to source, simulate or simply measure, the Additel Loop calibrator series will fit your need. The ADT209 and ADT210 allow for measurement of current, voltage and a switch. You can also simulate or source mA or a process transmitter. With a push of a button, you can switch to zero and span values, auto ramp, and auto step throughout the range. Each loop calibrator has a large, easy to read screen which simultaneously displays the measurement with the % of span.

## ELECTRICAL MEASURE SPECIFICATIONS

	Range	Resolution	ADT209 Accuracy	ADT210 Accuracy
Voltage DC <sup>1</sup>	0 to 30 V	1 mV	0.03%RD + 2mV	0.01%RD + 2mV
Current DC <sup>2</sup>	0 to 24 mA	1 μA	0.03%RD + 2μA	0.01%RD + 2μA
Switch test	Input resistance more than 500 MΩ Trigger level: low level <0.3V; high level: >2V			

[1] 1MΩ input resistance

[2] Loop transmitter current measure: 700Ω maximum

## ELECTRICAL SOURCE SPECIFICATIONS

	Range	Resolution	ADT209 Accuracy	ADT210 Accuracy
Current DC	0 to 24 mA	1 μA	0.03%RD + 2 μA	0.01%RD + 2 μA
Source mode	700Ω/20 mA maximum			
Sink mode	External loop voltage nominal 24 V, maximum 30 V, minimum 12 V			

## GENERAL SPECIFICATIONS

Voltage limit	30 V between terminals or between terminals and ground
Measurement Functions	Auto step, auto ramp, span step
Display	VA LCD display. 2.04 x 2.04 in (52 x 52 mm)
Loop power	24 V
Over-voltage protection	30 V DC (240 V AC)
Overload current protection	33 mA DC
Storage temperature	-20°C to 70°C
Working Environment	-10 to 50°C, 95%RH
Working Altitude	<3,000 m
Vibration/shock	Random 2G 5 to 500 Hz 1 meter drop
Power	One 9 V alkaline battery (ANSI/NEDA 1604A or IEC) DC9 V optional adapter available
Battery life (typical)	Output mode: 18 hours (12 mA/500Ω) Measure mode: 50 hours
Size (LxWxH)	163 x 83 x 41 mm
Weight	350 g
Calibration Certification	ISO 17025 Accredited Calibration with data
Compliance Certification	ADT209: CE ADT210: CE
Warranty	3 years

## ORDERING INFORMATION

### ■ Model Number

ADT209

ADT210

### ■ Accessories included

9024	Test lead set	1 set
	Alligator clips	2 pcs
	User manual	1 pc
	9V Alkaline battery	1 pc

### ■ Optional Accessories

9812	110V/220V external power adapter (DC 9V)
------	--

# Additel 220

## Multifunction Loop Calibrator



- Measure and source loop current, mV, and V
- Measure and source simultaneously
- Loop Continuity Test capability
- 24V loop supply with simultaneous current measurement
- 3 year warranty



### OVERVIEW

The 220 is a highly integrated loop calibrator featuring several patented technologies. The calibrator is an ultra-compact, rugged, and best of all, easy to use hand-held device that will source, simulate and measure loop current, mV/V, Loop Continuity Test, and also perform switch testing. Its smart phone-like menu and interface makes it simple and easy to use. The 220 is ideal for calibrating, maintaining, and troubleshooting various loop devices in the field.

### FEATURES

- **Measuring and sourcing loop current, mV and V**  
Measures loop current up to 30 mA with 0.1  $\mu$ A resolution  
Measures voltage signals up to 60 V, and mV signals up to 300 mV  
Sources/sink loop current, mV and V  
24 V loop power supply with simultaneous current measurement  
Simultaneous dual reading capability  
Capture switch
- **Data statistics and analysis**  
Display max, min, peak-to-peak, average, and percentage simultaneously  
Convert data to a real physical value through re-scaling function
- **On-demand logging**  
High-capacity storage with up to twenty thousand records  
On-line view, index, analyze, auto-curve, and list the data
- **Various sources and converting mode**  
Support linear, flow, valve, and 25% stepping source  
Auto-source of ramping and stepping  
Gauge span examination
- **"As Cal" on-site calibration tools**  
Four on-site calibration tools preset: loop indicator, sensor/transmitter, signal isolator/converter, and limit alarm/switch
- **Support 2W transmitter connection**
- **Multi lingual interface**  
English, Simplified Chinese
- **Convenient tools**  
Calculator, thermocouple converter, HOLD screen lock
- **Display rate**  
4 readings/second
- **Easy to use**  
Smartphone-like menu and interface make the operation simpler and easier  
Ultra-compact, size 3.9" x 7.6" x 2.0" (100 mm x 192 mm x 52 mm), and weight 1.6 lb (0.7 kg)  
One hand operation
- **Snapshot**  
Save and manage up to 100 snapshots
- **Display**  
3.5 inch TFT color screen  
4, 5, or 6 digits adjustable display
- **Rugged**  
Rugged design for harsh environments.  
Passed a 1-meter drop test  
Three years warranty for the 220, and one year for the battery pack
- **Misuse protection and Electrical isolation**  
Up to 30 V voltage on any two sockets and up to 1A current on current sockets will not damage the calibrator. The calibrator will return to normal condition as soon as the voltage or current is removed.  
Measuring, sourcing and loop power circuits are electrically isolated each other.
- **Rechargeable battery**  
Rechargeable Li-ion battery for 15 hours uninterrupted use.  
Battery life will be reduced when 24 V is applied.  
The rechargeable battery is replaceable.
- **ISO 17025 Accredited Calibration with data**
- **Firmware upgrade**  
Support firmware upgrade when available
- **Warranty: 3 years**

## Additel 220

### Multifunction Loop Calibrator



#### APPLICATIONS

The 220 loop calibrator is a process tool for measuring, sourcing and simulating mA, mV and V, captures switch values and provides 24 V loop power. It is a high performance solution for calibration, repair and maintenance of various loops devices, Loop Continuity Test, and switch capture.

#### SPECIFICATIONS

##### Electrical Specifications

Measurement Accuracy			
	Range	Resolution	Accuracy
Voltage DC	-300.000 to 300.000 mV	1 $\mu$ V	0.01%RD+15 $\mu$ V
	-60.0000 to 60.0000 V	0.1 mV	0.01%RD+3 mV
Current DC	-30.0000 to 30.0000 mA	0.1 $\mu$ A	0.01%RD+1.5 $\mu$ A
Loop Continuity	0 to 2000.0 ohm	0.1 $\Omega$	0.02%RD+0.2 $\Omega$
Switch Test	For the contact with potential, the voltage within the range 3V to 24V.		

Source Accuracy			
	Range	Resolution	Accuracy
Voltage DC	-10.00 to 200.00 mV	0.01 mV	0.02%RD+10.5 $\mu$ V
	0 to 12.000 V	1 mV	0.02%RD+0.6 mV
Current DC	0 to 22.000 mA	1 $\mu$ A	0.02%RD+1.1 $\mu$ A
DC24 V (max 50 mA)	24 V	N/A	0.5 V

##### General Specifications

Environmental Specifications	
Operating Temperature	-10°C to 50°C
Storage Temperature	-20°C to 60°C
Humidity	<90%, non-condensing

Safety Specifications	
Compliance	CE Mark
Protection Level	IP30

Mechanical Specifications	
Display	3.5 inch TFT color screen
Electrical Connection	Ø4mm sockets and flat mini-jack thermocouple socket
RS232 Interface	Standard RS232-DB9 socket
Size	3.9" x 7.6" x 2.0" (100mm x 192mm x 52mm)
Weight	1.6 lb (0.7 kg)
Power Supply	Polymer Li-ion rechargeable battery, or 10V DC adapter
Battery	Rechargeable Li-ion battery (included)
Battery Life	15 hours uninterrupted use Battery life will be reduced when 24V is applied
Battery Charge	110 V/220 V external power adapter (included)

#### ORDERING INFORMATION

##### Model Number ADT220

Accessories (included)		
9816-X	110 V/220 V external power adapter	1 pc
9712	Chargeable Li-ion battery	1 pc
9022	Test leads	2 sets(4 pcs)
9020	Short circuit cable	1 sets(2 pcs)
	User Manual	1 pc
	ISO17025 accredited calibration certificate	1 pc

\* Additel/Land software could be downloaded for free at [www.additel.com](http://www.additel.com)

Optional Accessories	
Model number	Description
9050	USB to RS232 (DB-9 Male) Adapter
9050-EXT	RS 232 (DB9/M) extension cable, 9 feet
9712	Spare chargeable Li-ion battery for multifunction calibrator
9816	110 V/220 V external power adapter
9906	Carrying case for multifunction calibrator

# Additel 221A, 222A & 223A Multifunction Documenting Process Calibrators



- Sourcing, simulating and measuring pressure, temperature and electrical signals
- Smartphone-like menu and interface for simple operation
- HART Communication capability (223A)
- The internal cold junction compensation sensor can be re-calibrated at the ice point
- Ultra-compact, 3.9" x 7.6" x 2.0", and 1.6 lb (0.7 kg)



## OVERVIEW

This series of highly integrated multifunction calibrators feature several patented technologies. These are an ultra-compact, rugged, and easy to use hand-held device for sourcing, simulating and measuring pressure, temperature, and electrical signals. Their smartphone-like menu and interface make the operation simple. Automation and documentation capabilities make these calibrators a turnkey solution.

### Additel 221A

The Additel 221A is very unique to the multifunction temperature calibrator market. Not only does it provide you with the ability to source, simulate and measure temperature and electrical functions but it also incorporates full documenting capability and many other solutions other competitors do not provide. As a standalone device, you can create tasks, run tests and store the results. With the use of Additel/Land Software or Additel/Cal software, all saved tasks and data can be downloaded and managed. With its unique internal cold junction compensation sensor, cold junction compensation is very simple and easy.

### Additel 222A

The Additel 222A Multifunction Process Calibrator takes all the functionality of the 221A and adds the ability to measure and source pressure using the ADT160A Intelligent Pressure Modules. With calibration characteristics programmed directly into the ADT160A pressure modules, you can simply connect them to the 222A and it will automatically recognize and display the module as the source or measure pressure. For ultimate convenience, the 222A allows for modules to be "hot swapped" with a simple connection at the top of the module.

### Additel 223A

The 223A has all the capability of the 221A and 222A and HART Communication in one small, easy-to-use package. The 223A has a full HART library that allows for the reading of HART-smart devices and also the capability to write to devices. Combined with full task automation and documentation, the 223A is an ideal tool to accomplish many of your important calibration tasks.

## FEATURES

- **Sourcing, simulating and measuring temperature and electrical signals**  
Sources and measures mV, mA, ohms, RTDs, thermocouples, frequency, and pulses  
Simulates and measures 13 thermocouples and 11 RTDs to calibrate transmitters  
Measures and sources pressure using Additel 160A series Intelligent Digital Pressure Modules from -15 psi to 10,000 psi (-1 bar to 700 bar)  
24V loop power supply  
Simultaneous dual reading capability  
Automatic switch test  
Supports square root transmitter  
Pulse frequency output for the calibration of flow totalizer
- **Easy to use**  
Smartphone-like menu and interface make the operation simpler and easier  
Ultra-compact, size 3.9" x 7.6" x 2.0" (100mm x 192mm x 52mm), and weight 1.6 lb (0.7 kg)  
One handed operation
- **Calibrated cold junction compensation (Patented)**  
Cold junction equalizing block in the calibrator  
A calibrated PRT element with flexible leads is installed in the equalizing block for thermocouple cold junction compensation  
This PRT element can be pulled out from the calibrator and re-calibrated and corrected at the ice point
- **Documenting and automated procedure capability**  
Manage the information of the device under test.  
Set up automated calibration procedures, and 223A performs the test, calculates the errors, displays and/or stores the results in the memory, and highlights the out-of-tolerance points.  
As-found and As-left functions allow recording and documenting results for quality control.  
Download tasks and upload the results.  
Snapshots allow you to capture and save data.
- **ISO 17025 accredited calibration with data**  
Look us up on [www.additel.com](http://www.additel.com) or call today (1)714-998-6899



**Metrology Made Simple**

- **Built-in temperature readout**  
CVD coefficients of a calibrated PRT can be input into the calibrator for accurate temperature measurement.
- **Multi lingual interface**  
English, German, French, Italian, Spanish, Portuguese, Simplified Chinese  
(Traditional Chinese, Japanese and Russian are available per request)
- **Build-in unit conversion tool**  
Build-in converters for pressure units, temperature units, temperature vs. resistance (RTDs), and temperature vs millivolt (thermocouples)
- **Warranty: 3 years**

## SPECIFICATIONS

### Electrical Specifications

Measurement Accuracy			
	Range	Resolution	Accuracy
Voltage DC	±75.0000 mV	0.1µV	0.01%RD + 3.75 µV
	±30.0000 V	0.1 mV	0.01%RD + 1.5 mV
Current DC	± 30.0000 mA	0.1µA	0.01%RD + 1.5 µA
Resistance	Two-wire 0 to 400.000Ω	1 mΩ	0.02%RD + 0.02Ω
	Three-wire 0 to 400.000Ω	1 mΩ	0.02%RD + 0.02Ω
	Four-wire 0 to 400.000Ω	1 mΩ	0.01%RD + 0.02Ω
	Two-wire 0 to 4000.00Ω	10 mΩ	0.02%RD + 0.2Ω
	Three-wire 0 to 4000.00Ω	10 mΩ	0.02%RD + 0.2Ω
	Four-wire 0 to 4000.00Ω	10 mΩ	0.01%RD + 0.2Ω
Frequency	1 to 50000.0 Hz	0.1 Hz	0.005%RD + 1 Hz
Pulse	0 to 999999	1	N/A
Limit Switch	For the contact with potential, the voltage within the range 3 V to 24 V.		

Source Accuracy			
	Range	Resolution	Accuracy
Voltage DC	-10.000 to 75.000 mV	1 µV	0.02%RD + 4.25 µV
	0 to 12.0000 V	0.1 mV	0.02%RD + 0.6 mV
Current DC	0 to 22.000 mA	1 µA	0.02%RD + 1.1 µA
Resistance	1 to 400.00 Ω	10 mΩ	0.02%RD + 0.02Ω
	1 to 4000.0 Ω	100 mΩ	0.03%RD + 0.4Ω
Frequency	0 to 50000.0 Hz	0.1 Hz	0.005%RD + 1 Hz
Pulse	0 to 999999	1	N/A
DC24V (MAX 50mA)	24 V	N/A	0.5 V

### General Specifications

Environmental Specifications	
Operating Temperature	-10°C to 50°C
Storage Temperature	-20°C to 60°C
Humidity	<90%, non-condensing

Safety Specifications	
European Compliance	CE Mark

Mechanical Specifications	
Display	3.5 inch TFT color screen
Electrical Connection	Ø4mm sockets and flat mini-jack thermocouple socket
RS232 Interface	Standard RS232-DB9 socket
Size	3.9" x 7.6" x 2.0" (100 mm x 192 mm x 52 mm)
Weight	1.6 lb (0.7 kg)
Power Supply	Polymer Li-ion rechargeable battery, or 10 V DC adapter
Battery	Rechargeable Li-ion battery (included)
Battery Life	15 hours uninterrupted use Battery life will be reduced when 24 V is applied
Battery Charge	110 V/220 V external power adapter (included)

### Pressure Specification(222A & 223A)

The 160A series Intelligent Digital Pressure Modules are available for gauge, vacuum and absolute pressure from -15 psi to 10,000 psi (-1 bar to 700 bar). Accuracy from 0.02% FS includes operation over 14°F to 122°F (-10°C to 50°C), one year stability and calibration uncertainty. For detail specification refer to pressure modules datasheet.

- **HART Communication capability (223A)**  
Support HART® instrumentation
- **Display**  
3.5 inch TFT color screen
- **Misuse protection**  
Up to 30V voltage on any two sockets and up to 1A current on current sockets will not damage the calibrator. The calibrator will return to normal condition as soon as the voltage or current is removed.
- **Rechargeable battery**  
Rechargeable Li-ion battery for 15 hours uninterrupted use.  
Battery life will be reduced when 24 V is applied.  
The rechargeable battery is replaceable.

### Temperature Specification

Thermocouple Measurement and Source Accuracy					
Measure and Simulate	Standard	Temperature Range (°C)		Accuracy (°C)	
				Measure	Source
S	IEC 584	-50 to 1768	-50 to 400	1.0	1.1
			400 to 1000	0.6	0.6
			1000 to 1768	0.7	0.8
R	IEC 584	-50 to 1768	-50 to 200	1.4	1.4
			200 to 500	0.6	0.6
			500 to 1768	0.6	0.7
B	IEC 584	0 to 1820	50 to 450	3.8	3.8
			450 to 800	0.9	0.9
			800 to 1820	0.6	0.7
K	IEC 584	-270 to 1372	-250 to -200	1.0	1.1
			-200 to -100	0.4	0.5
			-100 to 600	0.3	0.3
N	IEC 584	-270 to 1300	600 to 1372	0.4	0.5
			-250 to -200	1.5	1.6
			-200 to -100	0.5	0.6
E	IEC 584	-270 to 1000	-100 to 1300	0.4	0.5
			-250 to -200	0.6	0.7
			-200 to -100	0.3	0.3
J	IEC 584	-270 to 1200	-100 to 0	0.2	0.2
			0 to 700	0.2	0.3
			700 to 1000	0.2	0.4
T	IEC 584	-270 to 400	-210 to -100	0.3	0.3
			-100 to 1200	0.3	0.4
			-250 to -200	0.8	0.9
C	ASTM E988	0 to 2315	-200 to 0	0.4	0.4
			0 to 400	0.2	0.2
			0 to 1000	0.5	0.5
D	ASTM E988	0 to 2320	1000 to 1800	0.7	0.9
			1800 to 2315	1.0	1.4
			0 to 100	0.5	0.5
G	ASTM E1751	0 to 2315	100 to 1100	0.4	0.5
			1100 to 2000	0.6	0.9
			2000 to 2320	0.9	1.3
L	DIN43710	-200 to 900	0 to 200	2.4	2.4
			200 to 400	0.5	0.5
			400 to 1400	0.4	0.5
U	DIN43710	-200 to 600	1400 to 2315	0.7	1.0
			-200 to -100	0.2	0.3
			-100 to 400	0.2	0.2
			400 to 900	0.2	0.3
			-200 to 0	0.4	0.4
			0 to 600	0.2	0.3

\*Accuracy with external cold junction; for internal cold junction add 0.1°C (k=2)

## SPECIFICATIONS

Measurement Accuracy						
Measure and Simulate	Standard	Temperature Range (°C)		Accuracy (°C)		
				Measure (2W/3W)	Measure (4W)	Source
Pt10(385)	IEC 751	-200 to 850	-100 to 200	0.65	0.60	0.65
			200 to 600	0.82	0.72	0.82
			600 to 850	0.96	0.82	0.96
Pt100(385)	IEC 751	-200 to 850	-100 to 200	0.15	0.1	0.15
			200 to 600	0.26	0.16	0.26
			600 to 850	0.34	0.20	0.34
Pt100(3916)	JIS 1604	-200 to 850	-100 to 200	0.15	0.1	0.15
			200 to 600	0.26	0.16	0.26
			600 to 850	0.33	0.20	0.33
Pt100(3926)	Minco Application Aid #18	-200 to 850	-100 to 200	0.15	0.1	0.15
			200 to 600	0.26	0.16	0.26
			600 to 850	0.33	0.20	0.33
Pt500(385)	IEC 751	-200 to 850	-100 to 200	0.20	0.16	0.36
			200 to 600	0.32	0.22	0.54
			600 to 850	0.40	0.27	0.67
Pt1000(385)	IEC 751	-200 to 850	-100 to 200	0.1	0.05	0.25
			200 to 600	0.2	0.10	0.42
			600 to 850	0.27	0.14	0.54
Cu10(427)	Minco Application Aid #18	-100 to 260	-100 to 260	0.61	0.56	0.61
Cu50(428)	GOST 6651-94	-50 to 150	-50 to 150	0.17	0.13	0.17
Cu100(428)	GOST 6651-94	-50 to 150	-50 to 150	0.12	0.09	0.12
Ni120(672)	Edison curve #7	-100 to 260	-100 to 260	0.07	0.05	0.07
Ni100(618)	DIN 43760	-100 to 260	-100 to 260	0.08	0.06	0.08

## ORDERING INFORMATION

### Model Number

ADT221A

ADT222A

ADT223A

Accessories (included)		
9816-X	110V/220V external power adapter	1 pc
9712	Chargeable Li-ion battery	1 pc
9022	Test leads	3 sets(6 pcs)
9020	Short circuit cable	1 sets(2 pcs)
9060	Pressure module connection cable (only for 222A & 223A)	1 pc
	Manual	1 pc
	ISO 17025 accredited calibration certificate	1 pc

Optional Accessories	
Model number	Description
ADT160A (only for 222A & 223A)	Intelligent Digital Pressure Modules, see page 27
9060 (only for 222A & 223A)	Pressure module connection cable
9050	USB to RS232 (DB-9 Male) Adapter
9050-EXT	RS 232 (DB9/M) extension cable, 9 feet
9080	Cable kit (including TC plug, compensation cable, S,R,B,K,J,T,E,N)
9712	Spare chargeable Li-ion battery for multifunction calibrator
9816	110 V/220 V external power adapter for ADT22X and ADT672 calibrator
9906	Carrying case for multifunction calibrator
9510	Additel/Cal Task management software for multifunction calibrator

\* Additel/Land software can be downloaded for free at [www.additel.com](http://www.additel.com)

## Software



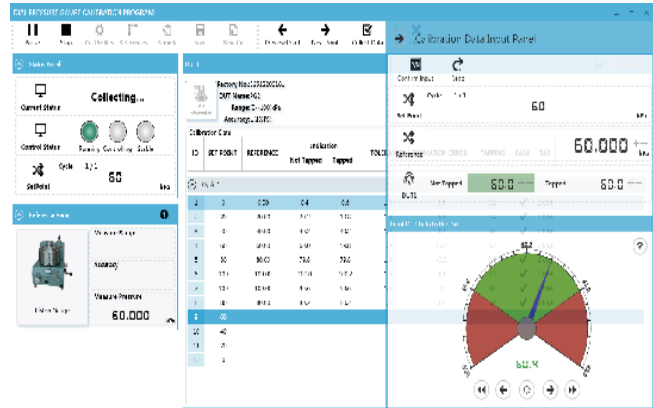
### ACal

Additel ACal is a powerful software package designed to automate or semi-automate pressure calibrations and manage your laboratory. ACal combines the pressure automation features with lab and asset management functions to help make your job easier and more productive. ACal comes in three versions: Basic, Professional, and Network.

ACal Basic supports asset management and task management features. ACal Professional is a single PC installation which combines all the features of Basic with automation functionality. And ACal Network puts the Professional version on a multi-user network platform.

### MAIN FEATURES

- Supports multi-users and network environments
- Calibration and asset management
- Simple user interface
- Scanning and printing of QR codes
- User definable permissions and access levels
- Preset test configurations
- Can calibrate variety pressure instruments
- Can calibrate several instruments at a time
- Calibration planning and scheduling
- Certificate management and creation
- Certificate customization



### SPECIFICATIONS

Specifications		ACal Network	ACal Professional	ACal Basic
Network feature	Data sharing	✓		
	Multiple users	✓		
Upgrade availability	Upgrade to ACal Professional	N/A	N/A	✓
	Upgrade to ACal Network	N/A	✓	✓
DUT supported	Type	Dial gauge Digital gauge Pressure transmitter Pressure switch		
	Full automatic calibration	✓	✓	
	Calibration management	✓	✓	✓
DUT management	DUT info management	✓	✓	✓
	Calibration due date reminder and scheduling	✓	✓	✓
Reference management	Reference info management	✓	✓	✓
	Calibration due date reminder and scheduling	✓	✓	✓
Calibrator Task Management	Task download	✓	✓	✓
	Task upload	✓	✓	✓
Bar coding	Bar code scanning	✓	✓	
	Bar code creation	✓	✓	

**Acal**

**ORDERING INFORMATION**

Model Number	Description
9530-BASIC	Additel/Acal Automated calibration software with asset management, basic version
9530-BASIC-L1	Additel/Acal Automated calibration software with asset management, basic version additional license (9530-BASIC must be purchased prior to any additional licenses)
9530-PRO	Additel/Acal Automated calibration software with asset management, professional version for single PC
9530-PRO-L1	Additel/Acal Automated calibration software with asset management, professional version for single PC additional license (9530-PRO must be purchased prior to any additional licenses)
9530-NET	Additel/Acal Automated calibration software with asset management, network version, Includes server installation and 1 user license
9530-NET-L1	Additel/Acal, Additional License, Automated calibration software with asset management, network version, Includes 1 user license (9530-NET must be purchased prior to any additional licenses)

**9502 Additel/Log II & Additel/Log II Wireless**

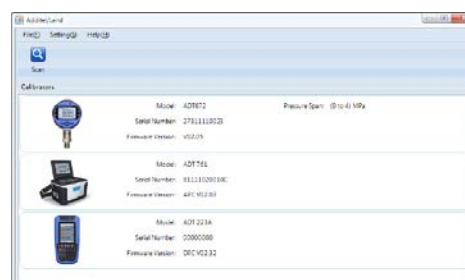
**Additel/Log II** is a real time data logging and graphical software for the ADT681/672/680/760/761A/780/875/878/286 models. Additel LogII software also supports wireless data logging when used with Additel products supporting wireless connectivity. Data can be recorded in real-time and recorded results can be uploaded. After results are stored, the data can be exported to a customizable report showing pressure and ambient temperature. Each real-time test can be tagged with a unique record name.



The software also allows you to acquire data to your PC. You can choose to display the data in real-time or historically, as well as in a graph or table format.

**9500 Additel/Land & Additel/Land Wireless**

With Additel/Land software, you may download test results stored in the internal memory of Additel calibrators to a PC, and export the results to an excel file. It is a free software package and can be downloaded at [www.additel.com](http://www.additel.com).



The screenshot displays the Additel/Land software interface. It shows a list of calibrated devices under the heading 'Calibrators'. Each device entry includes a small icon of the device, its Model number, Serial Number, and Pressure Span. The devices listed are:

Model	Serial Number	Pressure Span
ADT672	2731110020	0 to 41 MPa
ADT760	011110201000	0 to 41 MPa
ADT 203A	00000000	0 to 41 MPa



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**Additel 760 Series**  
Handheld Automatic Pressure Calibrators



**NEW Additel 761A Series**  
Automated Pressure Calibrators



**NEW Additel 286 Series**  
Multifunction Reference Thermometer  
Readout



**NEW Additel 875/878 Series**  
Thermocouple Calibration  
Furnace