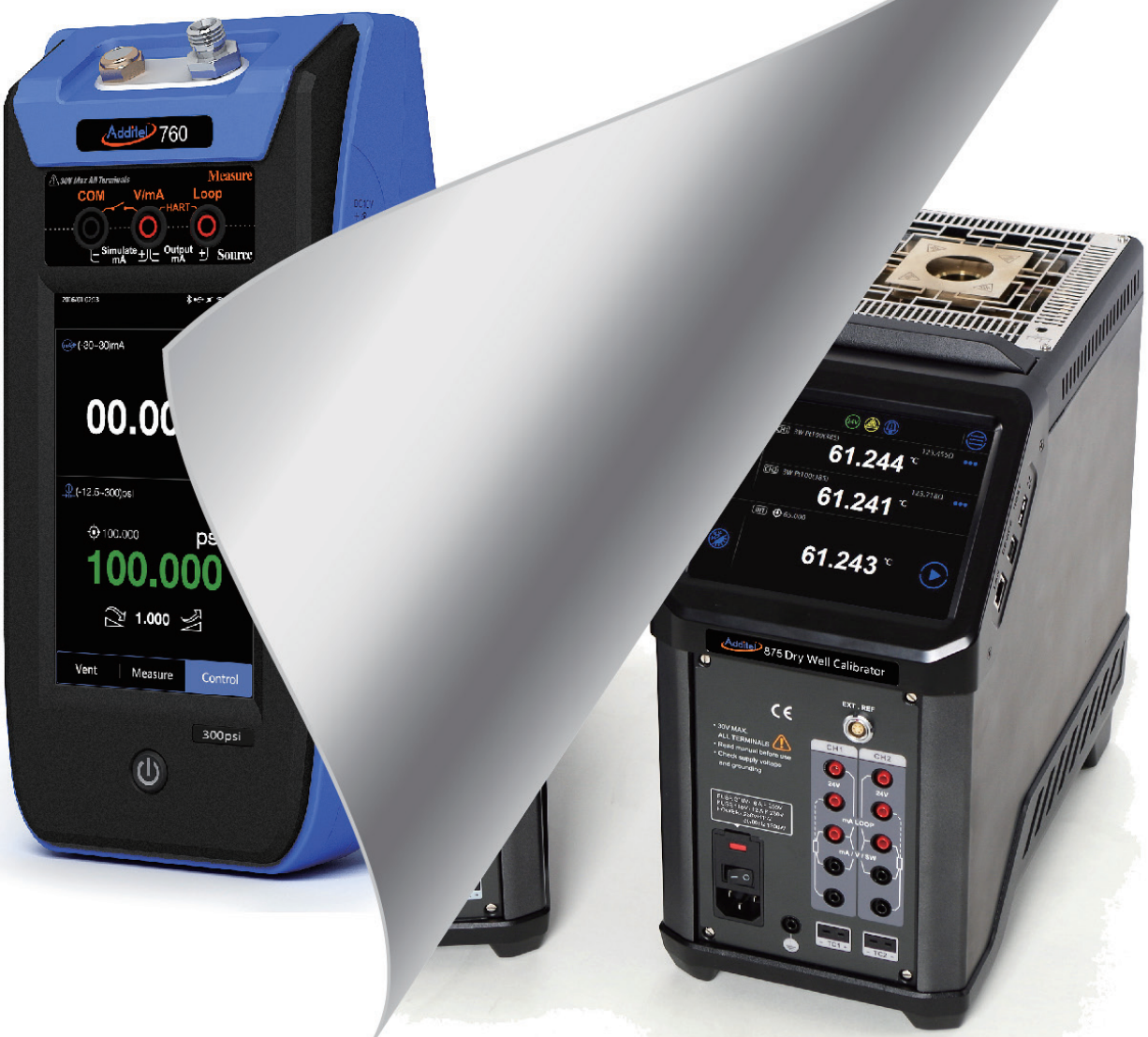
Pressure & Temperature Calibration Equipment

Catalog 2018-2019



ADDITEL CORPORATION

Additel Corporation is one of the leading worldwide providers of pressure calibration tools. We are dedicated to designing, manufacturing, and delivering the highest quality test tools and portable calibrators for the process and calibration industries. For many years Additel has successfully developed pressure controlers, automated pressure calibrators, digital pressure test gauges, digital pressure calibrators, pressure test and calibration pumps, and multifunction process calibrators. Additel products are currently used in over 80 countries worldwide.

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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Additel 875
Series Dry Well Calibrators

- Three models ranging from -40℃ to 660℃
- 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

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!

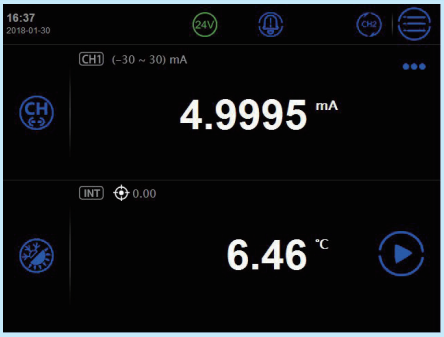
Process Calibrator Option

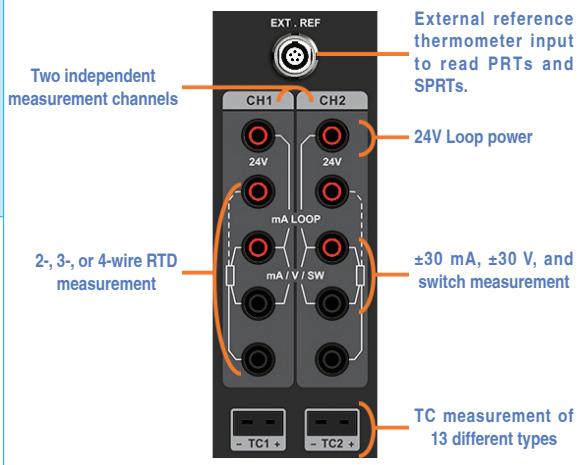
Each model offer has a Process Calibrator (PC) option. This process calibrator option combines the many features found in a HART documenting process calibrator with the temperature dry well. This option includes the ability to measure a reference PRT and two device under test channels which can measure, 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, and HART communication. The snap shot feature allows you to capture all information displayed on the screen with the push of a button. This unit also allow 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.

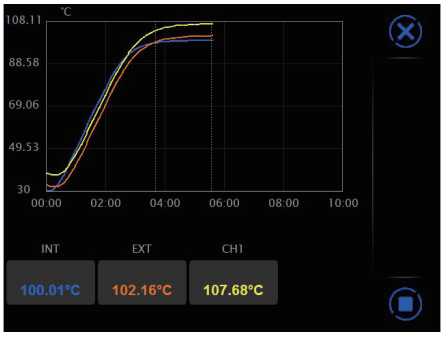
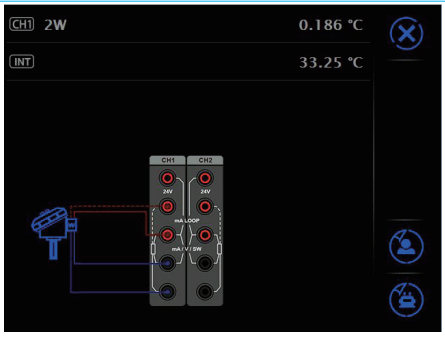
FEATURES

Specification	*Display*
Task	
mA Measurement	
V Measurement	

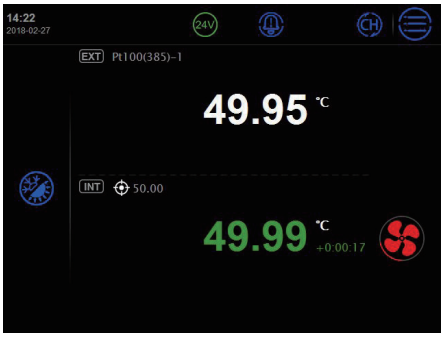
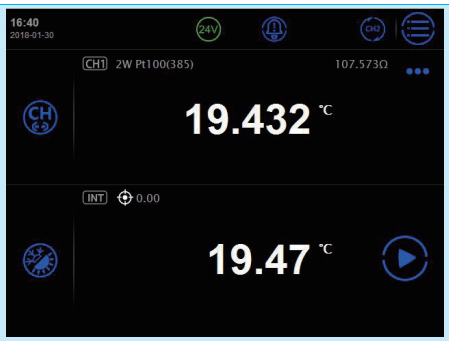
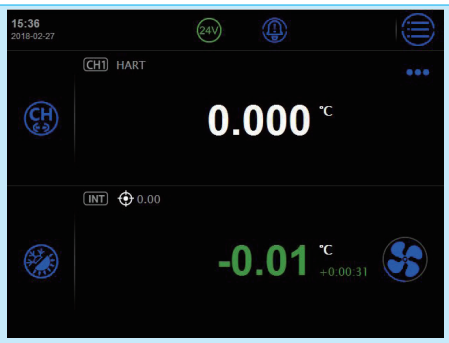
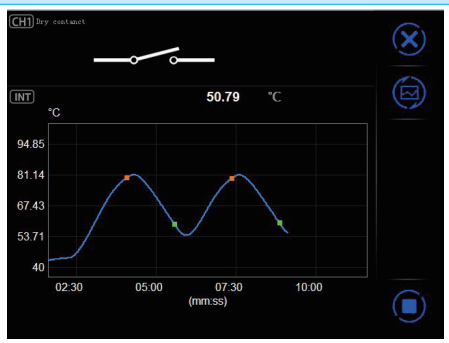


Process Calibrator Optional Electronics

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)	±0.025°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	150 mm (5.9 in)		
Insert OD	25.8 mm (1.02 in)	24.8 mm (0.98 in)	
Heating Time	13 min: -40°C to 155°C	5 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		

Input Specifications (Process Calibrator [PC] Option)

Specification	Description
Readout Accuracy for 100 ohm PRT (Probe Accuracy Not Included)	±0.009°C at -40°C
	±0.010°C at 0°C
	±0.012°C at 50°C
	±0.017°C at 155°C
	±0.019°C at 200°C
	±0.026°C at 350°C
	±0.030°C at 420°C
	±0.042°C at 660°C
Readout Resolution	1 mΩ
Reference Resistance Range	0 Ω to 400 Ω
Reference Resistance Accuracy	0 Ω to 50 Ω: 0.002 Ω
	50 Ω to 400 Ω: 0.004% 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 Ω to 25 Ω: 0.002 Ω
	25 Ω to 400 Ω: 0.008% RD
	400 Ω to 4K Ω: 0.004% RD
RTD Measurement Resolution	0 Ω to 400 Ω: 1 mΩ
	400 Ω to 4K Ω: 0.01 Ω
RTD Measurement Resistance Range	0 Ω to 4K Ω
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: ±0.13°C at 0°C ±0.15°C at 155°C ±0.18°C at 350°C ±0.24°C at 660°C
TC Range	–100 mV to 100 mV
TC Resolution	0.001 mV, Input Impedance <1 MΩ
TC Voltage Accuracy	0.02% RD + 5 µV
Internal CJC Accuracy	±0.35°C (ambient from 0 °C to 50 °C)
Current Range	–30 mA to 30 mA
Current Accuracy	0.02% RD + 2 µA
Current Resolution	0.001 mA, Input Impedance: < 10Ω

Specification	Description
Voltage Range	–30 V to 30 V
Voltage Accuracy	±0.02% RD + 2 mV
Voltage Resolution	0.001V; Input impedance: < 1MΩ
Switch Test	Mechanical or Electrical
DC 24V Output	24 V ±1 V, MAX60 mA
Hart Communication	Optional (ADT875PC Model)
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 8°C and 38°C to 50°C	ADT875(PC)-155: ±0.005 °C/°C
	ADT875(PC)-350/660: ±0.01 °C/°C
	Ref Readout: ±1 ppm FS/°C
	RTD Readouts: ±2 ppm FS/°C
	TC Readouts: ±5 ppm FS/°C
	Current: ±10 ppm FS/°C
	Voltage: ±10 ppm FS/°C

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

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

[1] Excluding cold junction compensation errors.

Ordering Information

Model Number

ADT875 — 155 — A — 110V

Model:
ADT875
ADT875PC

Temperature Range (at 23℃):
155: -40°C to 155°C
350: 33°C to 350°C
660: 33°C to 660°C

Insert Model:
A, B, C, D,
E, F, G, H

Power Option:
110V
220V

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 adapter	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 (6 pcs.)	
Certificate of calibration	1 pc.	
CD Manual	1 pc.	

Optional Accessories		
Model	*Description*	*Picture*
9918-875	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	CJC Cable Kit (includes TC to Plug, TC to TC, TC to Banana, and B,E,J,K,N,R,S,T,U cables)	

Insert Information

Insert Information			
Model	*Specification*	*Model*	*Specification*
A	High Temp: 1/4 in, 3/8 in, A, 1/4 in, 3/16 in, 1/8 in — Low Temp	F	High Temp: 6.5 mm, 10 mm, F, 8 mm, 6.5 mm — Low Temp
B	High Temp: 1/4 in, 1/8 in, 1/4 in, B, 3/8 in, 3/16 in, 3/16 in — Low Temp	G	High Temp: 8 mm, G, 8 mm — Low Temp
C	High Temp: 1/4 in, 1/4 in, C, 1/4 in, 1/4 in — Low Temp	H	High Temp: 1/4 in, 4 mm, 8 mm, H, 8 mm, 4 mm, 6 mm — Low Temp
D	High Temp: 1/4 in, D, 1/4 in — Low Temp	Z	High Temp: Z — Low Temp
E	High Temp: 1/4 in, 10 mm, E, 8 mm, 4 mm, 6 mm — Low Temp		

* Updated insert information at www.additel.com

Insert Ordering Information

ADT110 — 875 — L — INSERT — A

Temperature Range:
L - Low Temp
H - High Temp

Insert Model:
A, B, C, D,
E, F, G, H

Secondary PRT Ordering Information

AM1710 — 12 — ADT

Secondary PRT Model:
AM1710
AM1730
AM1751

PRT Exterior:
12 - 12 inch straight
BEND - 90° bend

AM17XX-12-ADT

AM17XX-BEND-ADT

Secondary PRT Information

Specification	*AM1710 Series*	*AM1730 Series*	*AM1751 Series*
Temperature Range	-60°C to 160°C	-200°C to 420°C	-200°C to 670°C
Resistance at 0°C	Nominal 100 Ω		
Temperature Coefficient	0.003925 Ω / Ω / °C		
Accuracy	±0.025°C at -40°C ±0.015°C at 0.01°C ±0.025°C at 160°C	±0.025°C at -196°C ±0.015°C at 0.01°C ±0.035°C at 420°C	±0.025°C at -196°C ±0.015°C at 0.01°C ±0.035°C at 420°C ±0.05°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
Short Term Stability	±0.007°C		
Thermal Shock	±0.005°C after 10 times 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		
Sensor Location	5 mm from tip		
Insulation Resistance	>1000 MΩ at room temperature		
Sheath Material	Stainless Steel	Inconel™	
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)
	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
External Leads	Teflon™ –insulated copper wire, 4 leads, 2.5 meters		
Handle Dimension	15 mm (OD) x 65 mm (L)		
Handle Temperature Range[1]	-50°C to 160°C	-50°C to 180°C	
Optional Calibration	NIST traceable calibration and data available per request		

[1] Handle temperature outside this range will cause damage to the probe.
* PRT Information from www.accumac.com

Look us up on www.additel.com or call today (1)714-998-6899

Additel 760
Automatic Handheld Pressure Calibrator

Selection Guide

Features \ Model	760-LLP	760-LLP-DL	760-D	760-D-DL	760-MA	760-MA-DL
Pressure Range[1]	±30 in H_2O (±75 mbar)	±30 in H_2O (±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[1]	0.05[1]	0.02[1]	0.02[1]	0.02[1][3]	0.02[1][3]
Stability (%FS)	<0.005[2]	<0.005[2]	<0.005[2]	<0.005[2]	<0.005[2]	<0.005[2]
Gauge Pressure	●	●	●	●	●	●
Differential Pressure	●	●	●	●		
Absolute Pressure					●	●
Barometric Pressure					●	●
Removable Internal Module	●	●	●	●	●	●
External Pressure Module	●	●	●	●	●	●
Temperature Compensated	●	●	●	●	●	●
Built-in Electrial 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, Wi-Fi, and Bluetooth	●	●	●	●	●	●

[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 Calibrator

- 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, Wi-Fi, and Bluetooth 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.

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 ±30 inH2O (±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 ±0.25 inH_2O (±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 ±10 inH_2O 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	±30 inH_2O (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[1]	0.02%FS[1]	0.02%FS[1][3]
Stability	<0.005%FS[2]	<0.005%FS[2]	<0.005%FS[2]
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_2O@4°C, mmH_2O@4°C, cmH_2O@4°C, mH_2O@4°C, mmH_2O@20°C, cmH_2O@20°C, mH_2O@20°C, inH_2O@20°C, kg/m2, mtorr, torr, lb/ft2, tsi, custom		
Barometric Accuracy	N/A	N/A	60 Pa[4]
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_2O/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	±30 mA	0.0001 mA	0.01%RD+0.005%FS	Impedance <10Ω
V Measure	±30 V	0.0001 V	0.01%RD+0.005%FS	Impedance >1MΩ
mA Source	24 mA	0.001 mA	0.01%RD+0.005%FS	20 mA @ 1K
Loop Power Source	24 V	N/A	±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	< ± (0.001%RD + 0.001%FS) / °C outside of 5°C to 35°C			

Internal Modules Specifications and Compatibility

Module	Module Range		Media	Accuracy (%FS)[1]	Burst Pressure	760-LLP	760-D	760-MA
	inH_2O	mbar						
DP025	±0.25	±0.62	G	0.2[2]	100x	●		
DP050	±0.5	±1.25	G	0.1[3]	100x	●		
DP1	±1	±2.5	G	0.05[4]	100x	●		
DP2	±2	±5	G	0.05[4]	100x	●		
DP5	±5	±10	G	0.05[4]	50x	●		
DP10	±10	±25	G	0.05[4]	20x	●	●	
DP20	±20	±50	G	0.05	20x	●	●	
DP30	±30	±75	G	0.05	20x	●	●	
DP50	±50	±160	G	0.05	3x		●	
DP150	±150	±350	G	0.02	3x		●	
DP300	±300	±700	G	0.02	3x		●	
DP400	-350 to 400 (-12.5 to 15 psi)	-860 to 1K (-0.86 to 1 bar)	G	0.02	3x		●	
DP800	-350 to 800 (-12.5 to 30 psi)	-860 to 2K (-0.86 to 2 bar)	G	0.02	3x		●	
DP1K	-350 to 1K (-12.5 to 35 psi)	-860 to 2.5K (-0.86 to 2.5 bar)	G	0.02	3x		●	
Gauge Pressure	psi	bar						
CP10	±10	±0.7	G	0.02[5]	3x		●	●
CP15	-12.5 to 15	-0.86 to 1	G	0.02[5]	3x		●	●
CP30	-12.5 to 30	-0.86 to 2	G	0.02[5]	3x		●	●
CP35	-12.5 to 35	-0.86 to 2.5	G	0.02[5]	3x		●	●
CP50	-12.5 to 50	-0.86 to 3.5	G	0.02[5]	3x			●
CP100	-12.5 to 100	-0.86 to 7	G	0.02[5]	3x			●
CP150	-12.5 to 150	-0.86 to 10	G	0.02[5]	3x			●
CP200	-12.5 to 200	-0.86 to 14	G	0.02[5]	3x			●
CP300	-12.5 to 300	-0.86 to 20	G	0.02[5]	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

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, WiFi, Bluetooth
Weight	<4 lbs (<1.8 kg)
Size	9.3 x 4.3 x 2.8 in (235 x 110 x 70 mm)
Certification	NIST-traceable 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 250 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: 4g (20 to 2,000 Hz) Shock: 8g, 1 meter drop test
Compliance	CE
Software	ACal, PCal, Land, LogII
Warranty	1 year

Optional Internal Pressure Modules	
Module Number	Description
ADT155-DP025-760	Pressure module for ADT760-LLP, ±0.25 inH_2O, ±0.2%FS
ADT155-DP050-760	Pressure module for ADT760-LLP, ±0.5 inH_2O, ±0.1%FS
ADT155-DP1-760	Pressure module for ADT760-LLP, ±1 inH_2O, ±0.05%FS
ADT155-DP2-760	Pressure module for ADT760-LLP, ±2 inH_2O, ±0.05%FS
ADT155-DP5-760	Pressure module for ADT760-LLP, ±5 inH_2O, ±0.05%FS
ADT155-DP10-760	Pressure module for ADT760-LLP & -D ±10 inH_2O, ±0.05%FS
ADT155-DP20-760	Pressure module for ADT760-LLP & -D, ±20 inH_2O, ±0.05%FS
ADT155-DP30-760	Pressure module for ADT760-LLP & -D, ±30 inH_2O, ±0.05%FS
ADT155-DP50-760	Pressure module for ADT760-D, ±50 inH_2O, ±0.05%FS
ADT155-DP150-760	Pressure module for ADT760-D, ±150 inH_2O, ±0.02%FS
ADT155-DP300-760	Pressure module for ADT760-D, ±300 inH_2O, ±0.02%FS
ADT155-DP400-760	Pressure module for ADT760-D, -350 to 400 inH_2O (-12.5 to 15 psi), ±0.02%FS
ADT155-DP800-760	Pressure module for ADT760-D, -350 to 800 inH_2O (-12.5 to 30 psi), ±0.02%FS
ADT155-DP1K-760	Pressure module for ADT760-D, -350 to 1K inH_2O (-12.5 to 35 psi), ±0.02%FS
ADT155-CP10-760	Pressure module for ADT760-D & -MA, ±10 psi, ±0.02%FS
ADT155-CP15-760	Pressure module for ADT760-D & -MA, -12.5 to 15 psi, ±0.02%FS
ADT155-CP30-760	Pressure module for ADT760-D & -MA, -12.5 to 30 psi, ±0.02%FS
ADT155-CP35-760	Pressure module for ADT760-D & -MA, -12.5 to 35 psi, ±0.02%FS
ADT155-CP50-760	Pressure module for ADT760-D & -MA, -12.5 to 50 psi, ±0.02%FS
ADT155-CP100-760	Pressure module for ADT760-MA, -12.5 to 100 psi, ±0.02%FS
ADT155-CP150-760	Pressure module for ADT760-MA, -12.5 to 150 psi, ±0.02%FS
ADT155-CP200-760	Pressure module for ADT760-MA, -12.5 to 200 psi, ±0.02%FS
ADT155-CP300-760	Pressure module for ADT760-MA, -12.5 to 300 psi, ±0.02%FS

Ordering Information

Model Number

ADT760 — LLP — DP2 • • DL

Pressure range:
See Model Type table.

Internal Pressure Module Range:
See Optional Internal Pressure Model table.

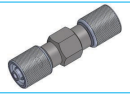
DL: Data logging

Model Type	
Model Number	***Description***
ADT760-LLP	Automatic Handheld Pressure Calibrator, ±30 inH_2O
ADT760-LLP-DL	Automatic Handheld Pressure Calibrator, ±30 inH_2O 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)	
ADT100-760 Hose (excl ADT760-LLP)	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)	
USB to USB cable (ADT760-X-DL only)	1 pc	
CD Manual	1 pc	
NIST-traceable certificate	1 pc	

* Additel/Land software available for free download at www.additel.com

Optional Accessories		
Model	***Description***	***Picture***
ADT160A	See pg. 52 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 to1/2BSP 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 2 pcs	
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 761
Automated Pressure Calibrators

Selection Guide

Model / Features	761-LLP	761-D	761-L	761-LA	761-M	761-MA	761-H	761-HA	761-BP
Pressure Range	-25 to 25 mbar (-10 to 10 inH_2O)	-0.95 to 1 bar (-13.5 to 15 psi)	-0.95 to 7 bar (-13.5 to 100 psi)	0.05 to 8 bar.a (1.2 to 115 psi.a)	-0.90 to 25 bar (-13 to 375 psi)	0.1 to 26 bar.a (1.7 to 390 psi.a)	-0.90 to 40 bar (-13 to 600 psi)	0.1 to 41 bar.a (1.7 to 615 psi.a)	100 to 1200 hPa
Pressure Module 1	-2.5 to 2.5 mbar (-1 to 1 inH_2O)	-25 to 25 mbar (-10 to 10 inH_2O)	-0.95 to 2.5 bar (-13.5 to 35 psi)	0.05 to 3.5 bar.a (1.2 to 50 psi.a)	-0.9 to 2.5 bar (-13 to 35 psi)	0.1 to 3.5 bar.a (1.7 to 50 psi.a)	-0.9 to 2.5 bar (-13 to 35 psi)	0.1 to 3.5 bar.a (1.7 to 50 psi.a)	100 to 1200 hPa
Pressure Module 2	-25 to 25 mbar (-10 to 10 inH_2O)	-0.95 to 1 bar (-13.5 to 15 psi)	0 to 7 bar (0 to 100 psi)	0.05 to 8 bar.a (1.2 to 115 psi.a)	0 to 25 bar (0 to 375 psi)	0.1 to 26 bar.a (1.7 to 390 psi.a)	0 to 40 bar (0 to 600 psi)	0.1 to 41 bar.a (1.7 to 615 psi.a)	NA
Differential Pressure	●	●							
Gauge Pressure	●	●	●	●	●	●	●	●	
Absolute Pressure				●		●		●	●
Barometric Pressure				●		●		●	●
Temperature Compensated	●	●	●	●	●	●	●	●	●
Built-in Electrial 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_2O)**
- **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_2O) with a control stability better than 0.05 Pa (0.0002 inH_2O).

The 761-BP is designed for barometric gauge calibration. With a quartz pressure sensor, the accuracy of 761-BP can achieve 0.01%FS accuracy.

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.

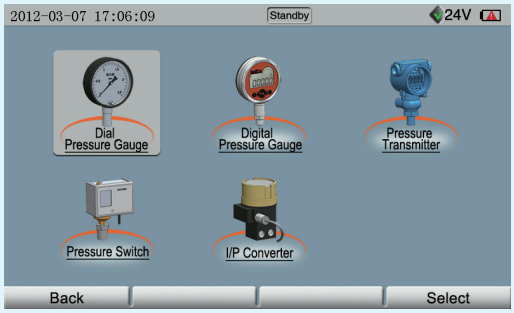
FEATURES

Pressure Range	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)
Accuracy	0.02%FS
	0.05%FS (ADT761-LLP)
	0.01%FS (ADT761-BP)
Control Stability	<0.005%FS
	ADT761-LLP: < 0.05 Pa (0.0002 inH_2O)
Contamination Prevention System	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.
Automation and Test Program	Fully Automated pressure calibration
	Task preset and auto run
	Auto step
Easy to Use	User friendly interface
	Intuitive icon driven menu structure
Source and Measuring Electrical Signals	Measure mA with 0.01% RD + 1.5μA accuracy
	Measure V with 0.01% RD + 1.5mV accuracy
	Source/sink 0 to 22mA current
	24 VDC loop power supplied to pressure transmitter during test
	Automated switch test
Misuse Protection	Up to 30V misuse protection on any two sockets
Display	7" LCD color screen (800X480)
Documenting and On-demand Logging	Task management capability
	Internal memory stores 200 tasks
	Download tasks and upload results
	900 snapshots
HART Communication Capability	Support HART instrumentation
Pressure Output Rate	2.4 liters/minute
Rechargeable Battery	Rechargeable battery with up to 8 hours operation between charges

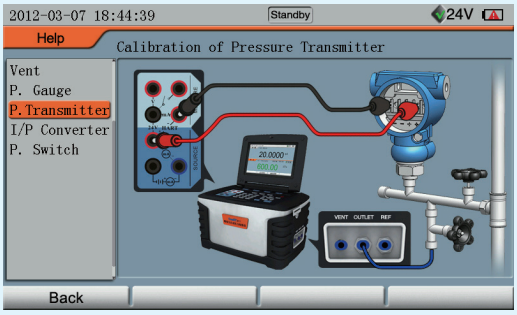
Leak Testing	Apply leak test to an external pressure system to determine the magnitude of pressure variations due to leaks
Pipeline Protection	Special design the pipeline layout to avoid possible blockage and leakage
Portable	Only 12.4 lb
Multi Lingual Interface	English, German, French, Italian, Spanish,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

SPECIFICATIONS

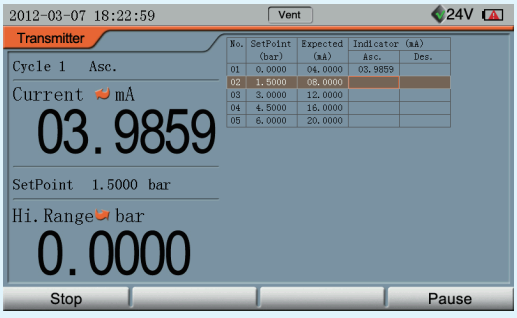
Control Stability	<0.005%FS, FS specification applies to the span of the range
	ADT761-LLP: < 0.05 Pa (0.0002 inH_2O)
Pressure Connections	**ADT761-L/M/H/LA/MA/HA:** 1. One ADT100-761 Hose Test Kit with quick connector 1/8 BSP Female on calibrator 2. Two 1/4NPT(or 1/2NPT, 1/4BSP, 1/2BSP, M20×1.5) female hand-tight connectors on the external pressure manifold
	ADT761-LLP/BP: 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_2O@4°C, mmH_2O@4°C, inH_2O@20°C, mmH_2O@20°C, inHg@0°C, mmHg@0°C, kgf/cm^2, and hPa (ADT761-BP)
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



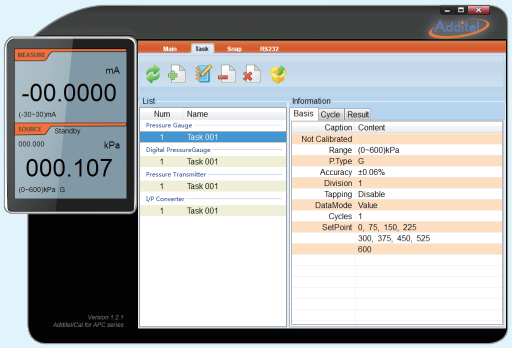
Task Manual



Built-in User's Manual



Pressure gauge / transmitter / switch calibration



Documenting

SPECIFICATIONS

Pressure Ranges

Type	Model	Pressure Range	Pressure Module 1		Pressure Module 2	
			Range	Accuracy[1]	Range	Accuracy[1]
Low/Differential Pressure	ADT761-LLP	-25 to 25 mbar (-10 to 10 inH_2O)	-2.5 to 2.5 mbar (-1 to 1 inH_2O)	0.05%FS[2]	-25 to 25 mbar (-10 to 10 inH_2O)	0.05%FS[2]
	ADT761-D	-0.95 to 1 bar (-13.5 to 15 psi)	-25 to 25 mbar (-10 to 10 inH_2O)	0.05%FS[2]	-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
Gauge/Absolute Pressure	ADT761-LA	-0.95 to 7 bar (-13.5 to 100 psi)	-0.95 to 2.5 bar (-13.5 to 35 psi)	0.02%FS	-0.95 to 7 bar (-13.5 to 100 psi)	0.02%FS
		0.05 to 8 bar.a (1.2 to 115 psi.a)	0.05 to 3.5 bar.a (1.2 to 50 psi.a)	0.03%FS	0.05 to 8 bar.a (1.2 to 115 psi.a)	0.025%FS
	ADT761-MA	-0.90 to 25 bar (-13 to 375 psi)	-0.9 to 2.5 bar (-13 to 35 psi)	0.02%FS	-0.9 to 25 bar (-13 to 375 psi)	0.02%FS
		0.1 to 26 bar.a (1.7 to 390 psi.a)	0.1 to 3.5 bar.a (1.7 to 50 psi.a)	0.03%FS	0.1 to 26 bar.a (1.7 to 390 psi.a)	0.025%FS
	ADT761-HA	-0.90 to 40 bar (-13 to 600 psi)	-0.9 to 2.5 bar (-13 to 35 psi)	0.02%FS	-0.9 to 40 bar (-13 to 600 psi)	0.02%FS
		0.1 to 41 bar.a (1.7 to 615 psi.a)	0.1 to 3.5 bar.a (1.7 to 50 psi.a)	0.03%FS	0.1 to 41 bar.a (1.7 to 615 psi.a)	0.025%FS
Barometric pressure	ADT761-BP	100 to 1,200 hPa	100 to 1,200 hPa	0.01%FS	NA	NA

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

Additel 761

Automated Pressure Calibrators

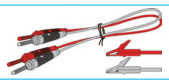
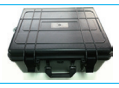
ORDERING INFORMATION

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

Accessories (included)		
External Pressure Manifold (ADT106) ***(Except 761-LLP)***	1 pc	
9818 110V/220V 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	
NIST traceable calibration certificate	1 pc	

* Additel/Land software could be downloaded for free at 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. 52 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	

Additel 780
Series Pressure Controller

- Pressure ranges from vacuum to 3,000 psi (200 bar)
- Removable interchangeable intelligent sensors
- Precision accuracy of 0.005% of reading plus 0.005% of full scale
- 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 quartz based sensors improve the 1 year accuracy specification to 0.005% of reading + 0.005% FS. 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)[1]
Control stability	0.003% FS (stability based on % FS of control sensor range)	
Precision (includes 1 year stability)	See pressure range table	
1 Year stability	0.01% FS standard accuracy sensors 0.005% FS precision accuracy sensors	
Media	Clean gas	
Over-range indication	103% to 120% (based on sensor)	
Resolution	4, 5, 6, or 7 digits (user selectable)[2]	
Pressure type	Gauge, Absolute	
Warm up time	15 minutes	
Typical pressure settling time (within 0.003%FS)	20 seconds (10%FS pressure change assuming 50 mL test volume)	
Measurement units	Pa, hPa, kPa, MPa, bar, mbar, psi, mmHg@0°C,cmHg@0°C, mHg@0°C, inHg@0°C, inH_2O@4°C, mmH_2O@4°C, cmH_2O@4°C, mH_2O@4°C, mmH_2O@20°C, cmH_2O@20°C, mH_2O@20°C, kg/m^2, kg/cm^2, mtorr, torr, atm, lb/ft^2, tsi, user selectable	
Minimum control pressure[3]	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/Mode	Gauge	Absolute
ADT160-02-CPXX	N/A	40 Pa[1]
ADT160-01-APXXQ	3 Pa[2]	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 ADT160-01-APXXQ sensors with the ADT780 controller in gauge mode, regular zeroing will realign the barometric reading to provide the most accurate result.

ELECTRICAL MEASURE SPECIFICATIONS[1]

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	24V ± 0.24V, max 30 mA		

[1] Not available in ADT780S versions

PHYSICAL SPECIFICATIONS

Specification	ADT780-1K & ADT780-3K
Power	100 to 240V, 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
Typical pressure control time	Typically 20 seconds
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	NIST-traceable 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	
NIST traceable certificate	1 pc	
O-rings	2 types	
Vacuum/Vent tubing	2 pc	

OPTIONAL ACCESSORIES

ADT160A	Pressure modules (see module information)	
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

ADT780 — **3k** — **CP300** — **N** • • • **HABP**

Model:
ADT780
ADT780S

Maxmum Range:
3K-3,000 psi (200 bar)
1K-1,000 psi (70 bar)

Pressure range:
See ADT160A range table on page 27

Manifold port type:
N-1/4NPT female
N2-1/2NPT female
B-1/4BSP female
B2-1/2BSP female
M-M20x1.5 female

High Accuracy Barometer

ADT160A Intelligent Digital Pressure Modules

Gauge pressure Differential pressure

SPECIFICATIONS

P/N	Pressure Range		Media	Accuracy	Pressure Rating		Suggested Controller Compatibility	Internal/ External Use
	psia	bar.a			Burst	Over Pressure		
Precision Quartz Sensors[1]								
AP45Q	0 to 45	3.0	G	0.005% rdg + 0.005% FS	3x	1.2x	ADT780-1K only	Both
AP100Q	0 to 100	7.0	G	0.005% rdg + 0.005% FS	3x	1.2x	ADT780-1K only	Both
AP300Q	0 to 300	20	G	0.005% rdg + 0.005% FS	3x	1.2x	Both	Both
AP400Q	0 to 400	28	G	0.005% rdg + 0.005% FS	3x	1.2x	Both	Both
AP500Q	0 to 500	35	G	0.005% rdg + 0.005% FS	3x	1.03x	Both	Both
AP1KQ	0 to 1,000	70	G	0.005% rdg + 0.005% FS	3x	1.1x	Both	Both
AP2KQ	0 to 2,000	140	G	0.005% rdg + 0.005% FS	3x	1.1x	ADT780-3K only	Both
AP3KQ	0 to 3,000	200	G	0.005% rdg + 0.005% FS	3x	1.1x	ADT780-3K only	Both
Standard Pressure Sensors								
P/N	**Pressure Range**		**Media**	**Accuracy**	**Pressure Rating**		**Suggested Controller Compatibility**	**Internal/ External Use**
	psig	**bar.g**			**Burst**	**Over Pressure**		
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.

**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_20 (2.5 mbar) to 300 inH_2O (700 mbar).

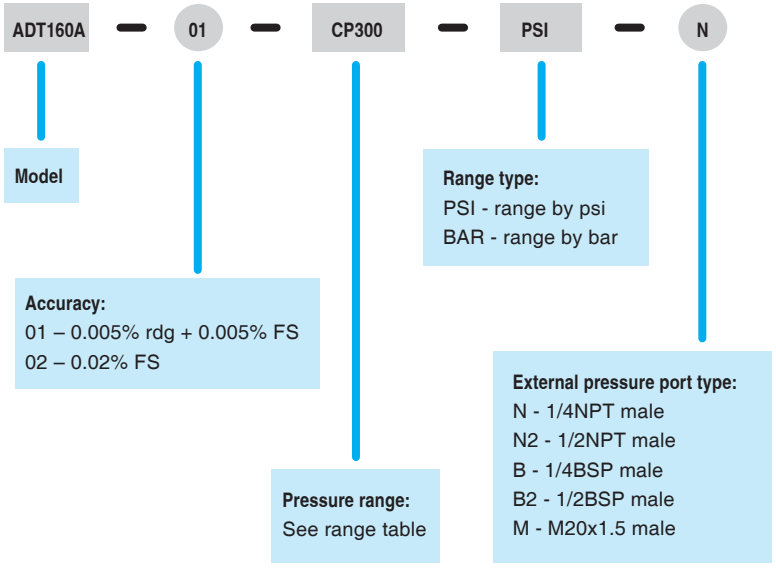
SENSOR SPECIFICATIONS

	Standard Accuracy	Precision Accuracy	
	CPXXX	AP3KQ AP1KQ	AP100Q
Temperature compensation	-10°C to 50°C (14°F to 122°F)	0°C to 50°C (32°F to 122°F)	
Operating temperature	-10°C to 50°C (14°F to 122°F)	0°C to 50°C (32°F to 122°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	95% RH	
Pressure connections (for external use only)	1/4NPT, 1/4BSP, 1/2BSP, M20x15	1/4NPT, 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")	44 mm x 220mm (1.7" x 8.7")	60 mm x 190 mm (2.4" x7.5")
Weight	0.4 kg (0.99 lb)	0.8 kg (1.8 lb)	1.2 kg (2.6 lb)

[1] Internal sensors used to go inside the ADT780 need to have a M20 connection and connection kit.

ORDERING INFORMATION

Model Number



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 240V
Media	Air
Volume	150 mL
Outlet port	G1/8F
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 Pressure Gauge Selection Guide

Feature \ Series	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	•		
NIST-Traceable Certificate of Calibration	•	•	•
Power	Rechargeable battery	9V battery (120/220V adapter is optional)	2AA batteries

Pressure \ Series	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	•	•	•

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_2O	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	•	•	
DP150	±150	±350	G	•	•	
DP300	±300	±700	G	•	•	

Additel 672
Digital Pressure Calibrators

New Ranges to 60,000 psi (4,200 bar)

- **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 μA 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
- NIST traceable calibration with data (Included)

SPECIFICATIONS

Accuracy	ADT672-02: 0.02% of full scale
	ADT672-05: 0.05% of full scale
	>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: 16.5mm (0.65")
Pressure Units	Pa, kPa, MPa, psi, bar, mbar, kgf/cm^2, inH_2O@4°C mmH_2O@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
	Other connections available per request
Over Pressure Warning	120%
Electrical Connection	0.156 inch (Ø4mm) sockets
Electrical Measurement Accuracy	Voltage DC: ±30.0000V, ± (0.01%RD + 1.5 mV)
	Current DC: ±30.0000mA, ± (0.01%RD + 1.5 μA)
	DC 24V: 24V±0.5V, MAX:50mA, Protect at: 120mA
	Switch[1]: Status OPEN/CLOSED
Power	Battery: Rechargeable Li-ion polymer battery
	Li-Battery working time: 40 hours
	Recharge time: 4 hours
	External power: 110V/220V power adapter (DC10V)
Enclosure	Case material: Aluminum alloy
	Wetted parts: 316L SS
	Dimension: Ø120mm X 46mm depth X 184mm height
	Weight: 0.7kg
	Protection Level: IP30
Data Logging	Storage capacity: 30 files, 40 records per file
	Mode: manual and automatic
	Hourly-record: record the data every hour
	Interval-record: set by user
Compliance	CE Marked
Communication	RS232 (DB9/F, environmentally sealed)
	Baud rate: 1200, 2400, 4800, 9600
	Data length: 8 bits
	Stop bit: 2 bits
	Address: from 1 to 112
Warranty	1 year

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

PRESSURE RANGE

Gauge Pressure [1]

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

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

[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	3×
AP10	10	0.7	G	0.1	3×
AP15	15	1.0	G	0.1	3×
AP30	30	2.0	G	0.1	3×
AP50	50	3.5	G	0.1	3×
AP100	100	7.0	G , L	0.05 (0.1)	3×
AP300	300	20	G , L	0.05 (0.1)	3×
AP500	500	35	G , L	0.05 (0.1)	3×
AP1K	1,000	70	G , L	0.05 (0.1)	3×
AP3K	3,000	200	G , L	0.05 (0.1)	3×
AP5K	5,000	350	G , L	0.05 (0.1)	3×

Differential Pressure						
P/N	Pressure Range		Media	Accuracy (%FS)[1]	Burst Pressure	Static Pressure Range
	(inH_2O)	(mbar)				
DP1	±1	±2.5	G	0.05[2]	100×	±10 psi
DP2	±2	±5.0	G	0.05[2]	100×	±10 psi
DP5	±5	±10	G	0.05[2]	50×	±10 psi
DP10	±10	±25	G	0.05[2]	20×	±10 psi
DP20	±20	±50	G	0.05	20×	±10 psi
DP30	±30	±75	G	0.05	20×	±10 psi
DP50	±50	±160	G	0.05	3×	±10 psi
DP150	±150	±350	G	0.02	3×	50 psi
DP300	±300	±700	G	0.02	3×	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

ADT672 — 02 — GP300 — PSI — N

Model

Accuracy:
02-0.02% of full scale
05-0.05% of full scale
10-0.1% of full scale

Range type:
PSI-range by psi
BAR-range by bar
H_2O-range by inH_2O

Pressure port type:
N-1/4NPT male
N2-1/2NPT male
B-1/4BSP male
B2-1/2BSP male
M-M20X1.5 male
AF-Autoclave F-250-C female
AM-Autoclave M-250-C male

Pressure range P/N:
See pressure range table

Accessories Included

110V/220V external power adapter (DC 10V)
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 www.additel.com)
Manual
NIST traceable calibration certificate

Optional Accessories

Model number	Description
9702	Spare rechargeable Li-ion polymer battery for 672
9816	Spare 110V/220V external power adapter (DC 10V) 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

Understanding Accuracy Specifications for Digital Pressure Sensors – Percentage of Full Scale 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 scale (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 scale or vise 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

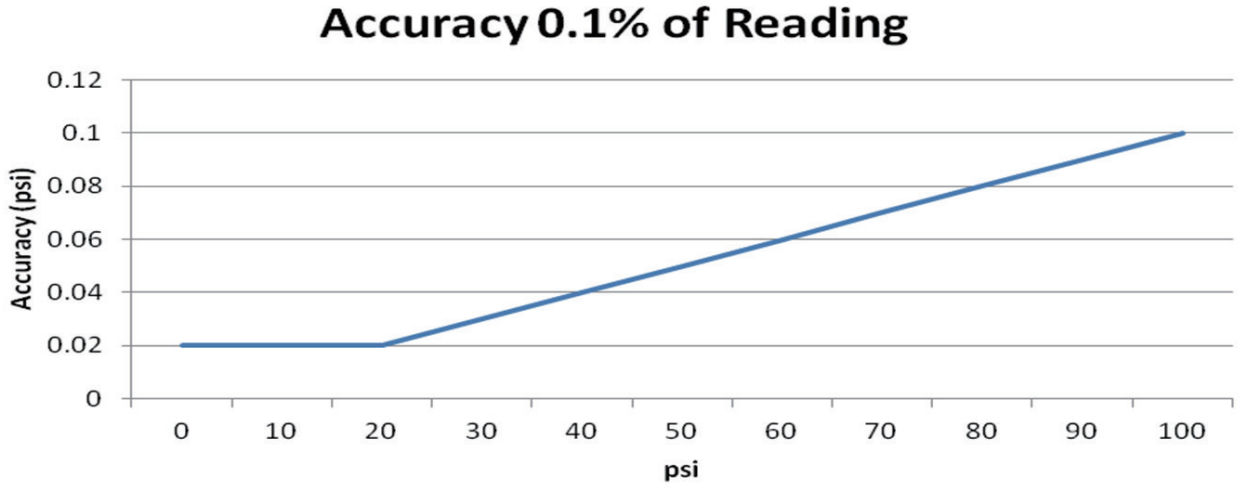
0.02%FS

0.1% of Reading

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.



Percentage of Full Scale Accuracy

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

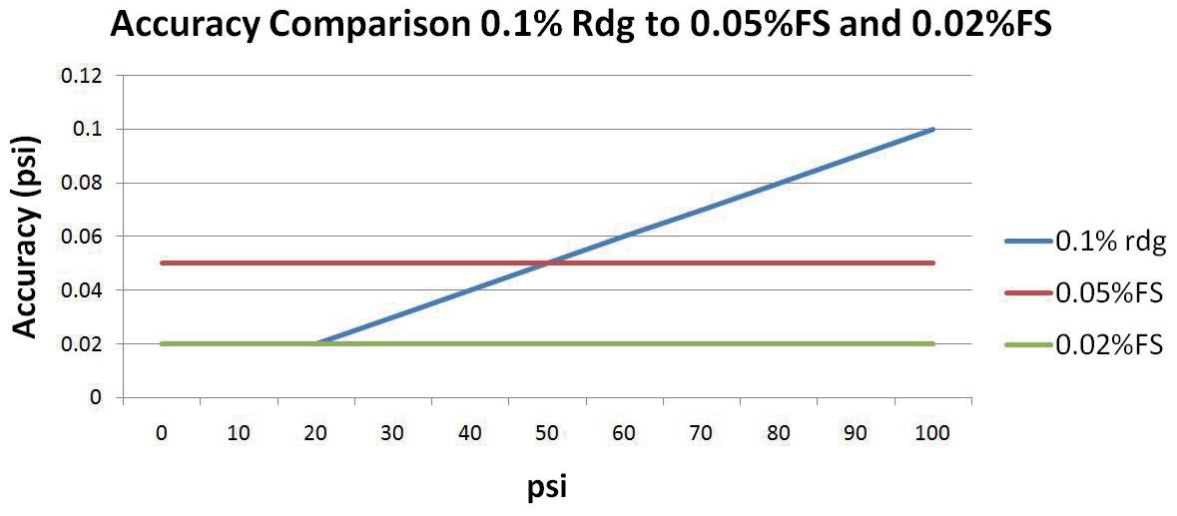
Accuracy as a percentage of full scale is calculated by multiplying the accuracy percentage by the full scale pressure of the gauge. This is obviously a more simple method of specification and is most commonly used in industry because it is easy to calculate and interpret. Denoting the accuracy as percent 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.



Additel 681
Digital Pressure Gauges

New Ranges to 60,000 psi (4,200 bar)

- **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)**

Gauge pressure Differential pressure

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 ±1 inH_2O (±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 ±1 inH_2O (±2.5 mbar) to ±300 inH_2O (±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)
- 0.02% full scale accuracy (681-02)
  0.05% full scale accuracy (681-05)
  0.1% full scale accuracy (681-10)
  0.2% full scale accuracy (681-20)
  0.1% reading scale accuracy (681-RD)
- IP67 rated: Submersible in 1 meter of water(681IS)
- Fully temperature compensated accuracy from 14°F to 122°F (-10°C to 50°C)
- Up to eleven selectable pressure units
- Large, easy to read display with 5-digit resolution
- Backlit display
- % pressure indication with fan-shaped graph scale for visual reference
- Display flash warning when pressure over 120% of FS
- Bottom mount or panel mount
- ATEX certified intrinsically safe (Model 681IS)
- NIST traceable calibration with data(included)
- 9V battery power or AC adapter (optional)
- Data logging to 21,843 records (includes date, time, pressure and temperature)

SPECIFICATIONS

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 TUR 16.0023X
Accuracy (For detailed accuracy, please see pressure range table)	681(IS)-02 : 0.02% of full scale	
	681(IS)-05 : 0.05% of full scale	
	681(IS)-10 : 0.1% of full scale	
	681(IS)-20 : 0.2% of full scale	
	681(IS)-RD: 0% to 20% of Range: 0.02% of full scale 20% to 110% of Range: 0.1% of reading Vacuum: 0.25% of full scale[1][2]	
Gauge Types	Gauge pressure, compound pressure, absolute pressure, differential pressure, 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: 16.5mm (0.65")	
Pressure Units	Pa, kPa, MPa, psi, bar, mbar, kgf/cm^2, inH_2O@4°C mmH_2O@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	
	Other connections available per request	
Power	Battery: One 9V 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: 60 minutes power auto-off. Auto-off may be disable	
	External power: 110/220V external power adapter (optional)	
Enclosure	Case material: Aluminum alloy	
	Wetted parts: 316L SS	
	Dimension: Ø110mm X 35mm depth X 176mm height (panel mount gauge: Ø140mm X 86mm depth)	
	Weight: 0.6kg	
Compliance	Protection Level: IP67(available for 681IS GP15-60K)	
	Vibration: 5g (20-2000 Hz)	
	Shock Resistance: 100g/11ms	
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 [1]						
P/N	Pressure Range		Media[2]	Accuracy		Burst Pressure
	(psi)	(bar)		%FS	%RD	
V15	-15	-1.0	G	0.02 (0.05, 0.1, 0.2)	N/A	3×
GP2	2	0.16	G	0.05 (0.1, 0.2)	N/A	3×
GP5	5	0.35	G, L	0.05 (0.1, 0.2)	0.1	3×
GP10	10	0.7	G, L[3]	0.02 (0.05, 0.1, 0.2)	0.1	3×
GP15	15	1.0	G, L[3]	0.02 (0.05, 0.1, 0.2)	0.1	3×
GP30	30	2.0	G, L[3]	0.02 (0.05, 0.1, 0.2)	0.1	3×
GP50	50	3.5	G, L	0.02 (0.05, 0.1, 0.2)	0.1	3×
GP100	100	7.0	G, L	0.02 (0.05, 0.1, 0.2)	0.1	3×
GP150	150	10	G, L	0.02 (0.05, 0.1, 0.2)	0.1	3×
GP300	300	20	G, L	0.02 (0.05, 0.1, 0.2)	0.1	3×
GP500	500	35	G, L	0.02 (0.05, 0.1, 0.2)	0.1	3×
GP600	600	40	G, L	0.02 (0.05, 0.1, 0.2)	0.1	3×
GP1K	1,000	70	G, L	0.02 (0.05, 0.1, 0.2)	0.1	3×
GP2K	2,000	140	G, L	0.02 (0.05, 0.1, 0.2)	0.1	3×
GP3K	3,000	200	G, L	0.02 (0.05, 0.1, 0.2)	0.1	3×
GP5K	5,000	350	G, L	0.02 (0.05, 0.1, 0.2)	0.1	3×
GP10K	10,000	700	G, L	0.02 (0.05, 0.1, 0.2)	0.1	3×
GP15K	15,000	1,000	G, L	0.05 (0.1,0.2)	0.1	2×
GP20K	20,000	1,400	G, L	0.05 (0.1,0.2)	N/A	1.5×
GP25K	25,000	1,600	G, L	0.1 (0.2)	N/A	1.5×
GP30K	30,000	2,000	G, L	0.1 (0.2)	N/A	1.5×
GP36K	36,000	2,500	G, L	0.1 (0.2)	N/A	1.5×
GP40K	40,000	2,800	G, L	0.1 (0.2)	N/A	1.35×
GP50K	50,000	3,500	G, L	0.1 (0.2)	N/A	1.2×
GP60K	60,000	4,200	G, L	0.1 (0.2)	N/A	1.1×

[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	3×

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

[1] G=Gas, L=Liquid

Differential Pressure						
P/N	Pressure Range		Media	Accuracy (%FS)[1]	Burst Pressure	Static Pressure Range
	(inH_2O)	(mbar)				
DP1	±1	±2.5	G	0.05[2]	100×	±10 psi
DP2	±2	±5.0	G	0.05[2]	100×	±10 psi
DP5	±5	±10	G	0.05[2]	50×	±10 psi
DP10	±10	±25	G	0.05[2]	20×	±10 psi
DP20	±20	±50	G	0.05	20×	±10 psi
DP30	±30	±75	G	0.05	20×	±10 psi
DP50	±50	±160	G	0.05	3×	±10 psi
DP150	±150	±350	G	0.02 (0.05)	3×	50 psi
DP300	±300	±700	G	0.02 (0.05)	3×	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.

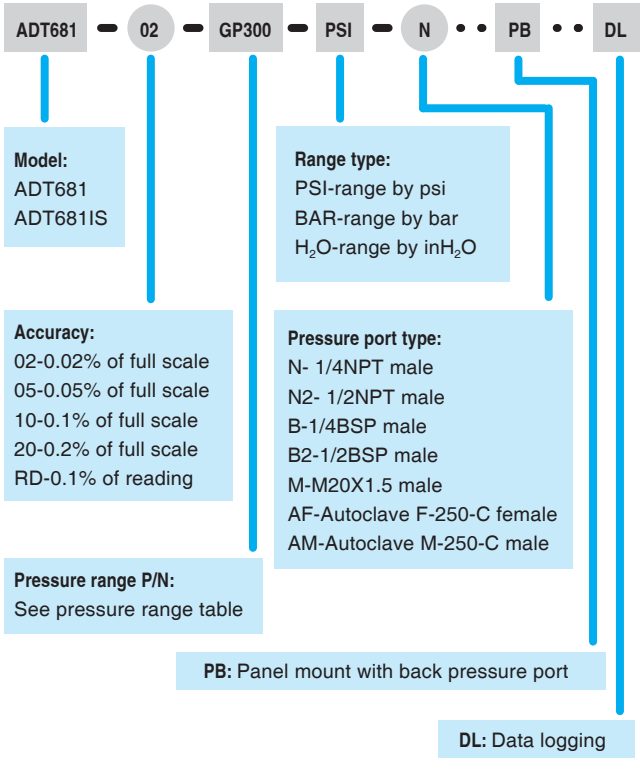
Compound Pressure						
P/N	Pressure Range		Media [1]	Accuracy		Burst Pressure
	(psi)	(bar)		%FS[2]	%RD	
CP2	±2	±0.16	G	0.05 (0.1,0.2)	N/A	3×
CP5	±5	±0.35	G	0.02 (0.05,0.1,0.2)	0.1	3×
CP10	±10	±0.7	G	0.02 (0.05,0.1,0.2)	0.1	3×
CP15	±15	±1	G	0.02 (0.05,0.1,0.2)	0.1	3×
CP30	-15 to 30	-1 to 2	G	0.02 (0.05,0.1,0.2)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

[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)
9V alkaline battery (1 pc)
Manual
NIST traceable calibration certificate

Optional Accessories

Model number	Description
9812	110V/220V external power adapter (DC 9V) 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_2 Cleaning for ADT681 gauges (some limitations apply)

Note: For oil-free applications contact Additel.

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)

New Ranges to 60,000 psi (4,200 bar)

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 scale 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
- NIST traceable 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	

SPECIFICATIONS

Model	ADT680	ADT680W
Wireless Communication (ADT680W only)	N/A	Wireless Frequency: 2.4G ISM Bands, 20 meter range
		Number of wireless Channels : Chanel 1-15
		Software: Wireless network demo software included read upto 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^2, mmH_2O, mmHg, inH_2O, inHg, ozf/in, %, °C, °F Engineering units: inH_2O(20°C), inH_2O(60°F), mmH_2O(20°C), mmH_2O(15°C), ftH_2O(60°F), or ftH_2O(4°C)	
Display	LCD Specification: FSTN-LCD,Visual scope 36x61mm	
	Full 5 digits,15.2mm High	
	7 segment analog bar graph scaled from 0-100% of FS	
	Backlight: White	
	Backlight Duration: Not auto off,15,30,45,60 seconds optional	
Auto off	Disabled,15, 30, 45, 60, 90, or 120 Minutes	
Compliance	Certificates: CE R&TTE, FCC ID, IC ID	
	Protection Level: IP67	
	Vibration: 5g(20-2000Hz)	
	Shock resistance: 100g/11ms	
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	
	Other connections available per request.	
Overpressure Alarm	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 communcation 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%)[2]	Media[3]	Burst Pressure
	(psi)[1]	(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

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

[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

ADT680 — 25 — GP300 — PSI — N

Model:
ADT680
ADT680W

Accuracy:
05-0.05% of full scale
10-0.1% of full scale
25-0.25% of full scale

Pressure range P/N:
See pressure range table

Range type:
PSI-range by psi
BAR-range by bar

Pressure port type:
N-1/4NPT male
N2-1/2NPT male
B-1/4BSP male
B2-1/2BSP male
M-M20X1.5 male
AF-Autoclave F-250-C female
AM-Autoclave M-250-C male

Accessories Included

AA battery (2 pcs)
Rubber boot for Additel 680 gauge;
Additel/Land Wireless software for 680W (free download at www.additel.com)
Manual
NIST traceable calibration certificate

Optional Accessories

Model number	Description
9503	Additel/Log II Wireless real time data logging and graphical software for 680W
9030	Spare wireless master device (USB dongle) for ADT680W gauge.

Note: For O_2 applications contact Additel.

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 employee some techniques to correct for and minimize the impact of temperature changes on these factors.

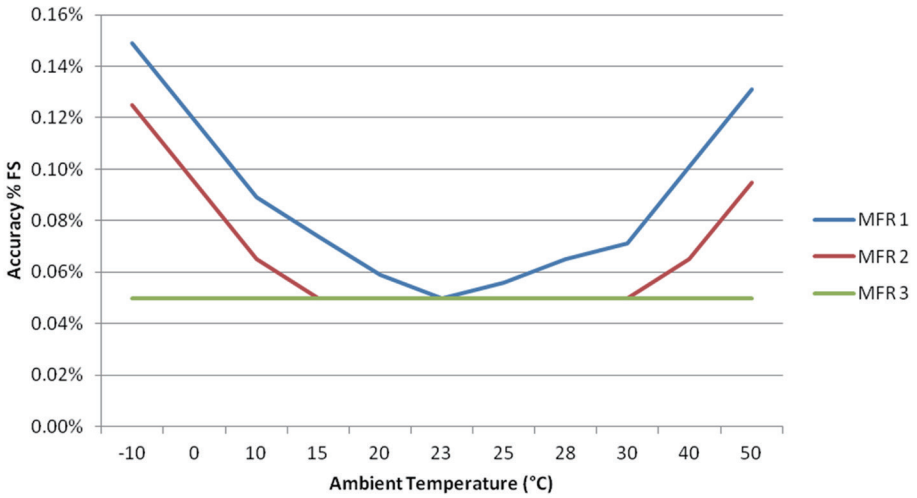
To understand the environmental temperature effect on your sensor, it is helpful to first understand some common terms you may see on a pressure sensor specification sheet.
Operating Temperature Range: This is the temperature range over which the sensor can be used without causing damage.
Temperature 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.

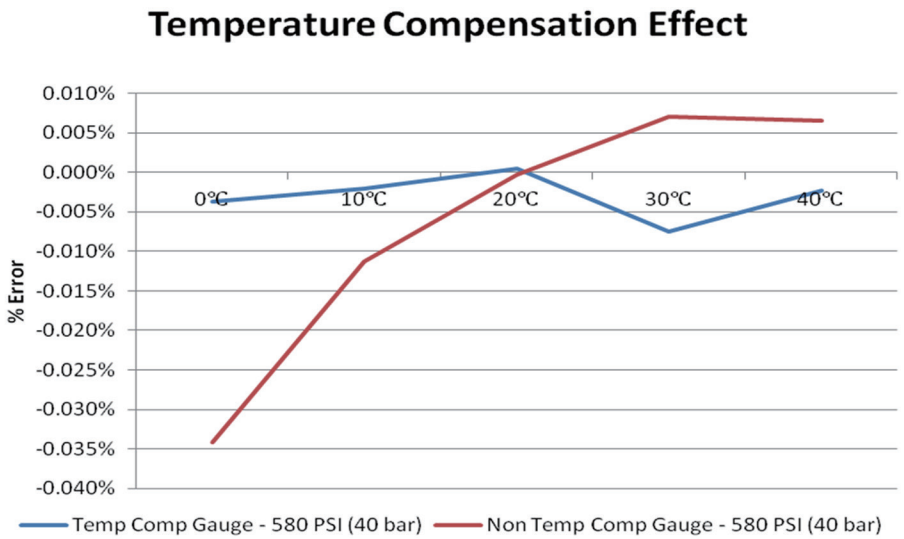
Figure 1	*Manufacturer 1*	*Manufacturer 2*	*Manufacturer 3*
Accuracy	0.05% FS	0.05% FS	0.05% FS
Temperature Compensated Accuracy Range	N/A	15°C to 35°C	-10°C to 50°C
Temperature Coefficient	Add 0.003% FS/°C from 23°C	Add 0.003% FS/°C: -10°C to 15°C, 35°C to 50°C	N/A

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.



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.

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
Measure						
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 24V	3 to 24V	3 to 24V
Pressure					●[1]	●[1]
Source / Simulate						
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 4,000 Ω	1 to 4,000 Ω	1 to 4,000 Ω
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	●	●	●	●	●	●
Record						
Scaling			●	●	●	●
Min/Max/Avg/Tare			●			
Hold			●			
As found/ As left			●	●	●	●
On-demand logging			●	●	●	●
Upload data to PC				●	●	●
Features						
24V loop supply			●	●	●	●
Ramp/ Step			●	●	●	●
Simulate Transmitter				●	●	●
RTD				11 types[2]	11 types[2]	11 types[2]
Thermocouple				13 types[3]	13 types[3]	13 types[3]
HART communication			●[4]			●
Documenting				●	●	●
Warranty	3 years	3 years	3 years	3 years	3 years	3 years
NIST traceable calibration	●	●	●	●	●	●
See Page	P45	P45	P47	P49	P49	P49

[1] Additel 160A External Pressure Module required

[2] RTD Includes Pt10(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[1]	0 to 30 V	1 mV	0.03%RD + 2mV	0.01%RD + 2mV
Current DC[2]	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 + 2µA	0.01%RD + 2µA
Source mode	700Ω/20 mA maximum			
Sink mode	External loop voltage nominal 24V, maximum 30V, minimum 12V			

GENERAL SPECIFICATIONS

Voltage limit	30V 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	24V
Over-voltage protection	30V DC (240V 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 500Hz 1 meter drop
Power	One 9V alkaline battery (ANSI/NEDA 1604A or IEC) DC9V 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	NIST-traceable certificate of calibration with data
Compliance Certification	ADT209: CSA, CE, DNV ADT210: CSA, CE, DNV
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 30mA with 0.1μA resolution
  Measures voltage signals up to 60 V, and mV signals up to 300 mV
  Sources/sink loop current, mV and V
  24V 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" (100mm x 192mm x 52mm), 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 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.
  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 24V is applied.
  The rechargeable battery is replaceable.
- **NIST Traceable 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 24V 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	1μV	0.01%RD+15μV
	-60.0000 to 60.0000 V	0.1mV	0.01%RD+3mV
Current DC	-30.0000 to 30.0000 mA	0.1μA	0.01%RD+1.5μA
Loop Continuity	0 to 2000.0 ohm	0.1Ω	0.02%RD+0.2Ω
Switch Test	For the contact with potential, the voltage within the range 3V to 24V.		

Source Accuracy			
Voltage DC	-10.00 to 200.00 mV	0.01mV	0.02%RD+10.5μV
	0 to 12.000 V	1mV	0.02%RD+0.6mV
Current DC	0 to 22.000 mA	1μA	0.02%RD+1.1μA
DC24V	N/A	N/A	0.5V

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 adaptor
Battery	Rechargeable Li-ion battery (included)
Battery Life	15 hours uninterrupted use Battery life will be reduced when 24V is applied
Battery Charge	110V/220V external power adapter (included)

ORDERING INFORMATION

Model Number

ADT220

Accessories (included)		
9816-X	110V/220V 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
	NIST traceable calibration certificate	1 pc

* Additel/Land software could be downloaded for free at 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	110V/220V 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 the 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 it's 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.
- **NIST traceble calibration with data**

- **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 400.000 Ω	1mΩ	0.02%RD + 0.02 Ω
	Three-wire	0 to 400.000 Ω	1mΩ	0.02%RD + 0.02 Ω
	Four-wire	0 to 400.000 Ω	1mΩ	0.01%RD + 0.02 Ω
	Two-wire	0 to 4000.00 Ω	10mΩ	0.02%RD + 0.2 Ω
	Three-wire	0 to 4000.00 Ω	10mΩ	0.02%RD + 0.2 Ω
	Four-wire	0 to 4000.00 Ω	10mΩ	0.01%RD + 0.2 Ω
Frequency		1 to 50000.0 Hz	0.1Hz	0.005%RD + 1 Hz
Pulse		0 to 999999	1	N/A
Limit Switch		For the contact with potential, the voltage within the range 3V to 24V.		

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

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" (100mm x 192mm x 52mm)
Weight	1.6 lb (0.7 kg)
Power Supply	Polymer Li-ion rechargeable battery,or 10V DC adaptor
Battery	Rechargeable Li-ion battery (included)
Battery Life	15 hours uninterrupted use Battery life will be reduced when 24V is applied
Battery Charge	110V/220V 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 24V 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 to400	1.0	1.1
			400 to 1000	0.6	0.6
			1000 to1768	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
			600 to 1372	0.4	0.5
N	IEC 584	-270 to 1300	-250 to -200	1.5	1.6
			-200 to -100	0.5	0.6
			-100 to 1300	0.4	0.5
E	IEC 584	-270 to 1000	-250 to -200	0.6	0.7
			-200 to -100	0.3	0.3
			-100 to 0	0.2	0.2
			0 to 700	0.2	0.3
			700 to 1000	0.2	0.4
J	IEC 584	-270 to 1200	-210 to -100	0.3	0.3
			-100 to 1200	0.3	0.4
T	IEC 584	-270 to 400	-250 to -200	0.8	0.9
			-200 to 0	0.4	0.4
			0 to 400	0.2	0.2
C	ASTM E988	0 to 2315	0 to 1000	0.5	0.5
			1000 to 1800	0.7	0.9
			1800 to 2315	1.0	1.4
D	ASTM E988	0 to 2320	0 to 100	0.5	0.5
			100 to 1100	0.4	0.5
			1100 to 2000	0.6	0.9
			2000 to 2320	0.9	1.3
G	ASTM E1751	0 to 2315	0 to 200	2.4	2.4
			200 to 400	0.5	0.5
			400 to 1400	0.4	0.5
			1400 to 2315	0.7	1.0
L	DIN43710	-200 to 900	-200 to -100	0.2	0.3
			-100 to 400	0.2	0.2
			400 to 900	0.2	0.3
U	DIN43710	-200 to 600	-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	2 sets(4 pcs)
9020	Short circuit cable	1 sets(2 pcs)
9060	Pressure module connection cable (only for 222A & 223A)	1 pc
	Manual	1 pc
	NIST traceable calibration certificate	1 pc

* Additel/Land software can be downloaded for free at www.additel.com

Optional Accessories	
Model number	Description
ADT160A (only for 222A & 223A)	Intelligent Digital Pressure Modules, see page 52
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	110V/220V external power adapter for ADT22X and ADT672 calibrator
9906	Carrying case for multifunction calibrator
9510	Additel/Cal Task management software for multifunction calibrator

Additel 160A
Intelligent Digital Pressure Modules

New Ranges to 60,000 psi (4,200 bar)

- **Pressure ranges to 60,000 psi (4,200 bar)**
- **Precision accuracy to 0.005%RD + 0.005%FS**
- **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 0.005%RD + 0.005%FS
- 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
- NIST traceable calibration and data included

PRESSURE RANGE

Differential Pressure						
P/N	Pressure Range[1]		Media	Accuracy (%FS)	Burst Pressure	Static Pressure Range
	(inH_20)	(mbar)				
DP1	±1	±2.5	G	0.05[2]	100×	±10 psi
DP2	±2	±5.0	G	0.05[2]	100×	±10 psi
DP5	±5	±10	G	0.05[2]	50×	±10 psi
DP10	±10	±25	G	0.05[2]	20×	±10 psi
DP20	±20	±50	G	0.05	20×	±10 psi
DP30	±30	±75	G	0.05	20×	±10 psi
DP50	±50	±160	G	0.05	3×	±10 psi
DP150	±150	±350	G	0.02	3×	50 psi
DP300	±300	±700	G	0.02	3×	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[1]					
P/N	Pressure Range		Media [2]	Accuracy(%FS)	Burst Pressure
	(psi)	(bar)			
V15	-15	-1.0	G	0.02	3×
GP2	2	0.16	G	0.05	3×
GP5	5	0.35	G	0.05	3×
GP10	10	0.7	G	0.02	3×
GP15	15	1.0	G	0.02	3×
GP30	30	2.0	G	0.02	3×
GP50	50	3.5	G , L	0.02	3×
GP100	100	7.0	G , L	0.02	3×
GP150	150	10	G , L	0.02	3×
GP300	300	20	G , L	0.02	3×
GP500	500	35	G , L	0.02	3×
GP600	600	40	G , L	0.02	3×
GP1K	1,000	70	G , L	0.02	3×
GP2K	2,000	140	G , L	0.02	3×
GP3K	3,000	200	G , L	0.02	3×
GP5K	5,000	350	G , L	0.02	3×
GP10K	10,000	700	G , L	0.02	2×
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

SPECIFICATIONS

Precision Quartz Sensors[1] - Absolute Pressure						
P/N	Pressure Range		Media	Accuracy	Pressure Rating	
	psia	bar.a			Burst	Over Pressure
AP45Q	0 to 45	3.0	G	0.005% rdg + 0.005% FS	3x	1.2x
AP100Q	0 to 100	7.0	G	0.005% rdg + 0.005% FS	3x	1.2x
AP300Q	0 to 300	20	G	0.005% rdg + 0.005% FS	3x	1.2x
AP400Q	0 to 400	28	G	0.005% rdg + 0.005% FS	3x	1.2x
AP500Q	0 to 500	35	G	0.005% rdg + 0.005% FS	3x	1.03x
AP1KQ	0 to 1,000	70	G	0.005% rdg + 0.005% FS	3x	1.1x
AP2KQ	0 to 2,000	140	G	0.005% rdg + 0.005% FS	3x	1.1x
AP3KQ	0 to 3,000	200	G	0.005% rdg + 0.005% FS	3x	1.1x
AP6KQ	0 to 6,000	400	G,L	0.01% FS	3x	1.2x
AP10KQ	0 to 10,000	700	G,L	0.01% FS	2x	1.2x
AP15KQ	0 to 15,000	1,000	G,L	0.01% FS	2x	1.2x
AP20KQ	0 to 20,000	1,400	G,L	0.01% FS	2x	1.2x
AP30KQ	0 to 30,000	2,000	G,L	0.02% FS	1.5x	1.1x
AP40KQ	0 to 40,000	2,800	G,L	0.02% FS	1.5x	1.1x

[1] Contact Additel for other range options.

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

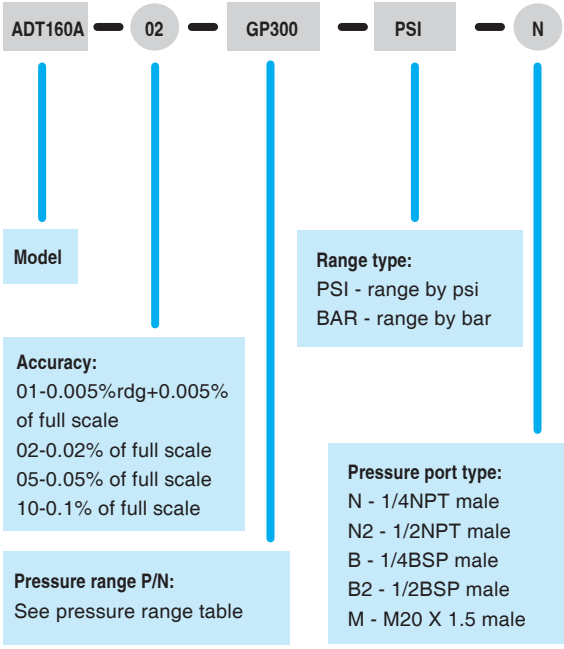
Absolute Pressure					
P/N	Pressure Range		Media	Accuracy(%FS)	Burst Pressure
	(psi)	(bar)			
AP5	5	0.35	G	0.1	3x
AP10	10	0.7	G	0.1	3x
AP15	15	1.0	G	0.1	3x
AP30	30	2.0	G	0.1	3x
AP50	50	3.5	G	0.1	3x
AP100	100	7.0	G , L	0.05 (0.1)	3x
AP300	300	20	G , L	0.05 (0.1)	3x
AP500	500	35	G , L	0.05 (0.1)	3x
AP1K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

NIST Traceable Calibration Certificate

Optional Accessories

Model number	Description	Picture
9060	Pressure module connection cable	

SPECIFICATIONS

	Standard Accuracy			Precision Accuracy	
	CPXXX	DPXXX	GPXXX	AP3KQ AP1KQ	AP100Q
Temperature compensation	-10°C to 50°C (14°F to 122°F)			0°C to 50°C (32°F to 122°F)	
Operating temperature	-10°C to 50°C (14°F to 122°F)			0°C to 50°C (32°F to 122°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			95% RH	
Pressure connections (for external use only)	1/4NPT, 1/2NPT, 1/4BSP, 1/2BPS, 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")			44 mm x 220mm (1.7" x 8.7")	60 mm x 190 mm (2.4" x7.5")
Weight	0.4 kg (0.99 lb)			0.8 kg (1.8 lb)	1.2 kg (2.6 lb)
Warranty	1 Year			1 Year	1 Year

Pressure Test / Calibration Pumps

Selection Guide

Model	Photo	Type	Range in psi	Range in bar	Media	Adjustment Resolution	Weight	See Page
Additel 901A		Pneumatic	(-6 to 6) psi	(-0.4 to 0.4) bar	Air	0.001 mbar	3.5 lb	P56
Additel 912A		Pneumatic	(-14 to 60) psi	(-0.95 to 4) bar	Air	0.001 mbar	6.2 lb	P57
Additel 914A		Pneumatic	(-14 to 375) psi	(-0.95 to 25) bar	Air	0.1 mbar	3.3 lb	P58
Additel 916		Pneumatic	(-14 to 600) psi	(-0.95 to 40) bar	Air	0.1 mbar	5.9 lb	P59
Additel 917		Pneumatic	(-14 to 1,000) psi	(-0.95 to 70) bar	Air	0.1 mbar	5.7 lb	P60
Additel 918		Pneumatic	(-14 to 1,500) psi	(-0.95 to 100) bar	Air	0.1 mbar	5.7 lb	P61
Additel 919A		Pneumatic	(-14 to 2,000) psi	(-0.95 to 140) bar	Air	0.1 mbar	14.3 lb	P62
Additel 920		Pneumatic	(-14 to 3,000) psi	(-0.95 to 200) bar	Air	0.1 mbar	14.3 lb	P64
Additel 925		Hydraulic	(-12.5 to 6,000) psi	(-0.85 to 400) bar	Oil/ Water[1]	1 mbar	3.7 lb	P65
Additel 927		Hydraulic	(-12.5 to 10,000) psi	(-0.85 to 700) bar	Oil/ Water[1]	1 mbar	7 lb	P67
Additel 928		Hydraulic	(0 to 15,000) psi	(0 to 1,000) bar	Oil/ Water[1]	1 mbar	8.6 lb	P68
Additel 936		Hydraulic	(-12.5 to 15,000 psi	(-0.85 to 1,000) bar	Oil	1 mbar	35.2 lb	P69
Additel 937					Oil[2]			P70
Additel 938					Water			P71
Additel 946		Hydraulic	(0 to 15,000) psi	(0 to 1,000) bar	Oil	1 mbar	28.7 lb	P72
Additel 949		Hydraulic	(-12.5 to 40,000) psi	(-0.85 to 2,800) bar	Oil	1 mbar	35.2 lb	P73
Additel 959		Hydraulic	(0 to 40,000) psi	(0 to 2,800) bar	Oil	1 mbar	28.7 lb	P74
Additel 960		Hydraulic	(0 to 60,000) psi	(0 to 4,200) bar	Oil	1 mbar	28.7 lb	P75

[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 901A
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 901A 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 901A 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 901A 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 901A is an ideal comparison test pump for low pressure applications.

FEATURES

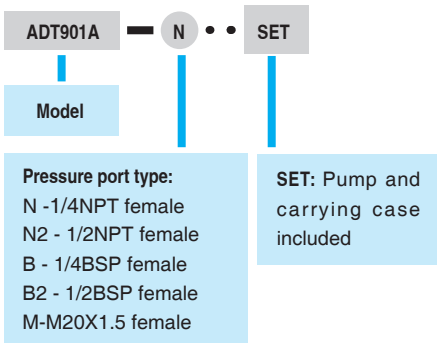
- **Portable:** Only 3.5 lb (1.6 kg)
- **Adjustment Resolution**
  0.1Pa (0.001 mbar); Specially designed screw press for fine pressure adjustment.
- **Great Stability**
  Isothermal chamber: the pressure chamber is insulated to reduce the influence from environmental temperature changes.
  Specially 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 (901A-X-SETmodels only)

- **Optional Accessories**

Model number	*Description*
ADT901A-X-kit	Test kit for ADT901A (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 78.
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 79.
9901-901	Carrying Case for one ADT901A pump and two ADT681 gauges or ADT672 calibrators
ADT901A-MK	Maintenance kit for Additel 901A pump
9240	Differential pressure gauge holder

Note: For oil free applications contact Additel.

Look us up on www.additel.com or call today (1)714-998-6899

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

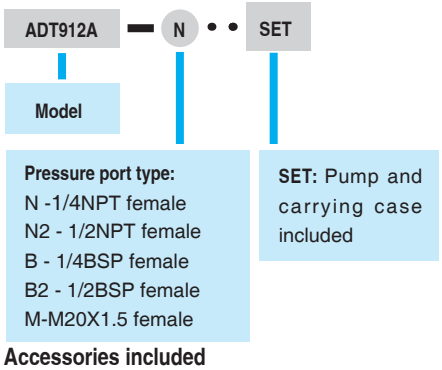
- **Portable:** Only 6.2 lb (2.8 kg)
- **Adjustment Resolution**
  0.1 Pa (0.001 mbar)
  High-quality screw press for fine pressure adjustment
- **Great Stability**
  Isothermal chamber: the pressure chamber is insulated to reduce the influence from environmental temperature changes
  Specially designed 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^3)
- **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 78.
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 79.
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.

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 to10 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

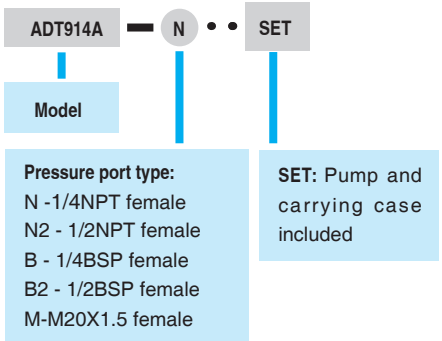
- **Portable:**
  Only 3.3 lb (1.5 kg)
- **Adjustment Resolution**
  10 Pa (0.1 mbar)
  High-quality screw press for fine pressure adjustment
- **Great Stability**
  A specially designed shut-off valve makes the pressure as stable as possible during calibration
- **Durable and Minimal Maintenance**
  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^3)
- **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 78.
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 79.
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 916
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 916 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 916 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^3)
- **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**

ADT916 — 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

- **Accessories included**
  O-ring: 20 pcs
  Manual: 1 pc
  Carrying case (916-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 78.
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 79.
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 ADT916 pump and two ADT681 gauges or ADT672 calibrators
ADT916-MK	Maintenance kit for Additel 916 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

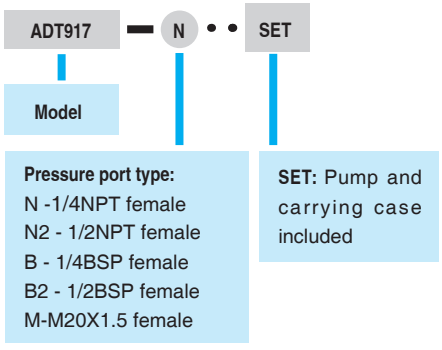
- **Portable**
  Only 5.7 lb (2.6 kg)
- **High Resolution**
  10 Pa (0.1 mbar)
  High-quality screw press for fine pressure adjustment
- **Great Stability**
  A specially designed shut-off valve makes the pressure as stable as possible during calibration.
- **Durable and Minimal Maintenance**
  Built-in 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^3)
- **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 78.
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 79.
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.

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^3)
- **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**

ADT918 — 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

- **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 78.
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 79.
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.

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

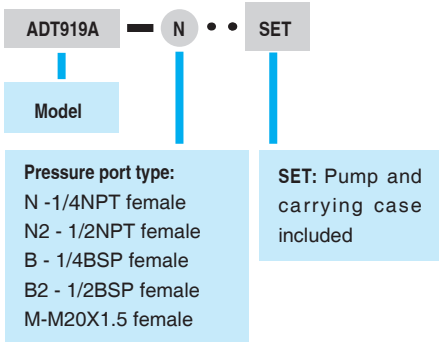
- **High Efficiency**
  Generate 2,000 psi (140 bar) in 30 seconds.
- **Adjustment Resolution**
  0.001 psi (10 Pa , 0.1 mbar).
  High-quality screw press for fine pressure adjustment.
- **Great Stability**
  A specially designed shut-off valve makes the pressure as stable as possible during calibration.
- **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^3)
- **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 78.
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 79.
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.
9909-919A	Carrying Case for one 919A pump and two 681 gauges or 672 calibrators
ADT919A-MK	Maintenance kit for Additel 919A pump

Note: For oil free applications contact Additel.

Application Note

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.

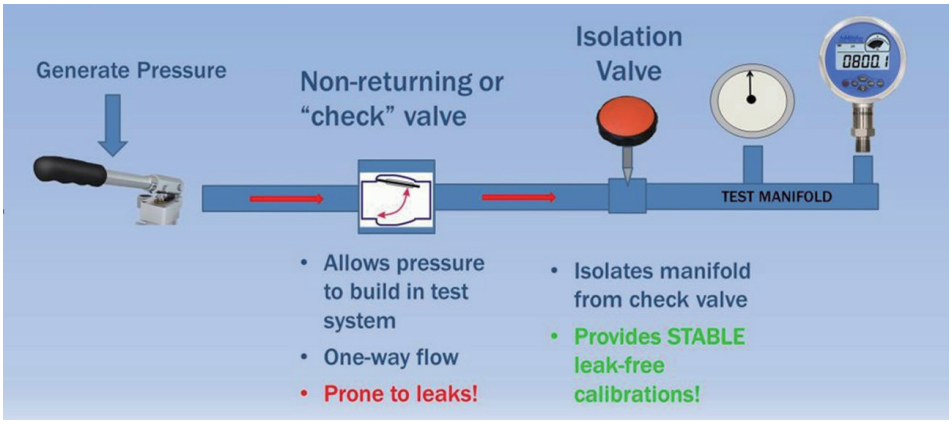
Limitations with Traditional Methods

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!

Additel 920
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
- First one in the world

OVERVIEW

The 920 High Pressure Test Pump is a hand operated pressure pump designed to generate pressure from 95% vacuum to 3,000 psi (200 bar). With a long lever, it just takes 40 seconds to reach 3,000 psi (200 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 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^3)
- **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 (6.5kg).
- **Warranty:** 1 year

ORDERING INFORMATION

- **Model Number**

ADT920 — 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

- **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). More information shown on page 78.
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 79.
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
ADT920-MK	Maintenance kit for Additel 920 pump

Note: For oil free applications contact Additel.

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.

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^3)
- **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^3)
  High pressure piston: 0.9 ml (0.05 in^3)

ORDERING INFORMATION

- **Model Number**

ADT925 — N • • SET

Model:
ADT925
ADT925W

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

- **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

- **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 78.
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 79.
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

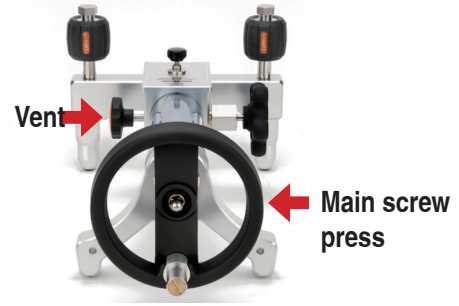
Considerations for Hydraulic High Pressure Calibrations

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 degrease of pressure is in fact a result of the temperature settling from the adiabatic heating effect generated from the screw press of the pump.

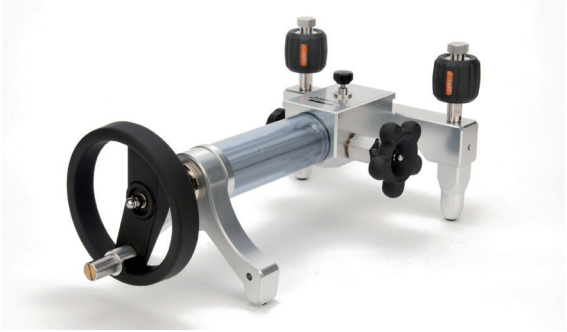
Other sources of instability that also impact the pressure measurement are instabilities in room temperature and changes in volume. Because temperature is a factor of pressure as the entire pressure system changes temperature due to the room temperature changing the true pressure value will also change. 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**

ADT927 — N • • SET

Model:
ADT927
ADT927W

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

- **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^3)
- **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^3)
  High pressure piston: 0.9 ml (0.05 in^3)

- **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 78.
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 79.
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

Additel 928
Hydraulic Pressure Test Pump

- Pressurize large-volume workload
- Generate to 15,000 psi (1,000 bar) pressure
- Portable only 8.6 lbs (3.9 kg)
- Increase and decrease pressure smoothly
- Hand-tight quick connectors

OVERVIEW

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.

FEATURES

- **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

SPECIFICATIONS

- **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 (1,000bar) 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^3)
- **Volume Per Stroke:** 3.72 ml
- **Reservoir Volume:** 150 ml (9.15 in^3)
- **Warranty:** 1 year

ORDERING INFORMATION

- **Model Number**

ADT928 — N • • SET

Model:
ADT928
ADT928W

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

- **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**

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 78.
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 79.
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

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^3)
- **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^3)
  High pressure piston: 2.5 ml (0.15 in^3)

ORDERING INFORMATION

- **Model Number**

ADT936 — 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

- **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 78.
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 79.
9908	Carrying case for 936, 937, 938 or 949.
ADT936-MK	Maintenance kit for Additel 936 pump

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

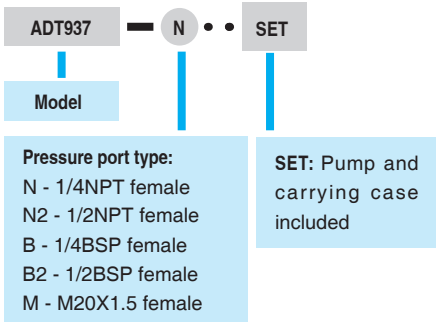
- **High Pressure**
  Generates pressure up to 15,000 psi (1,000 bar)
- **Durable and Minimal Maintenance**
  Patented screw press technology, with no check valve (non-returning valve) inside that is usually used on troublesome hand pumps causing leakage.
- **Easy-to-use**
  High pressures can be generated 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^3)
- **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^3)
  High pressure piston: 2.5 ml (0.15 in^3)

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 78.
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 79.
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^3)
- **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^3)
- **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^3)
  High pressure piston: 2.5 ml (0.15 in^3)

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

- **Accessories included**
  O-ring: 20 pcs Manual: 1 pc
  Carrying case (938-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 78.
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 79.
9908	Carrying case for 936, 937, 938 or 949.
ADT938-MK	Maintenance kit for Additel 938 pump

Additel 946
Hydraulic High Pressure Calibration Pump

- Pressureize 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 946 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 946 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 946 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^3)
- **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: 6.9" (175 mm)
  Base: 17.9" (455 mm) x 15.0" (380 mm)
- **Weight:** 28.7 lb (13 kg).
- **Piston volume:** Fine adjust piston: 1.5ml (0.09 in^3)
- **Volume Per Stroke:** 3.72 ml
- **Warranty:** 1 year

ORDERING INFORMATION

- **Model Number**

ADT946 — N • • SET

Model:
ADT946
ADT946W

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

- **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 78.
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 79.
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.
ADT946-MK	Maintenance kit for Additel 946 pump
ADT100-946-HK	Hose Kit, External Reservoir Expansion Hose Kit for ADT946
9910	Carrying case for Additel 946, Additel 959 or Additel 960

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^3)
- **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^3)
  High pressure piston: 2.5 ml (0.15 in^3)

ORDERING INFORMATION

- **Model Number**

ADT949 — AF • • SET

- ADT949: **Model**
- AF: **Pressure port type:**
  AF-Autoclave F-250-C female
  B2-1/2BSP female
  X-Customize
  M-M20X1.5 female
- SET: **SET:** Pump and carrying case included

- **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 80.
9908	Carrying case for 936, 937, 938 or 949.
ADT949-MK	Maintenance kit for Additel 949 pump

Additel 959
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 959 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 959 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 959 is an ideal comparison test pump for calibrating pressure measuring instruments such as test gauges, indicators or transducers.

FEATURES

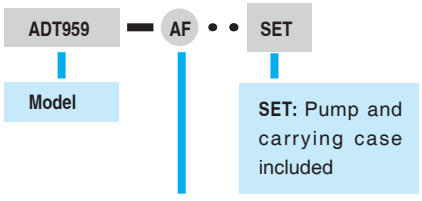
- **Generate Ultra-high Pressure**
  Generate pressure up to 40,000 psi (2,800 bar)
- **Hand pump to fill large volume systems**
- **Durable and Minimal Maintenance**
  Isolation valve provides stable pressures while reducing maintenance on the hand pump check valve
- **Easy-to-use**
  40,000 psi (2,800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

SPECIFICATIONS

- **Media:** Diethylhexyl Sebacate
- **Pressure Range**
  0 to 40,000psi (2,800bar) 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^3)
- **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^3)
- **Warranty:** 1 year

ORDERING INFORMATION

- **Model Number**



Pressure port type:
AF-Autoclave F-250-C female
B2-1/2BSP female
X-Customize
M-M20X1.5 female

- **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 80.
ADT959-MK	Maintenance kit for Additel 959 pump
ADT100-959-HK	Hose Kit, External Reservoir Expansion Hose Kit for ADT959
9910	Carrying case for Additel 946, Additel 959 or Additel 960

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
- Three 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

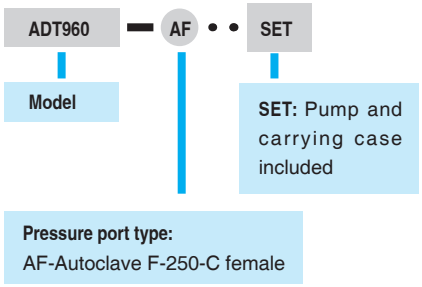
- **Generate Ultra-high Pressure**
  Generate pressure up to 60,000 psi (4,200 bar)
- **Hand pump to fill large volume systems**
- **Durable and Minimal Maintenance**
  Isolation valve provides stable pressures while reducing maintenance on the hand pump check valve
- **Easy-to-use**
  60,000 psi (4,200 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^3)
- **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^3)
- **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 946, Additel 959 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 (200bar), while the Additel 123 manifolds 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	M20×1.5 male hose to four M20×1.5 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	M20×1.5 male hose to four M20×1.5 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	M20×1.5 male hose to three M20×1.5 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-600

600 psi (40 bar) Pneumatic Filter Specifications

Pressure range	-15 to 600 psi (-1.0 to 40 bar)
Filtering resolution	0.04 mm
Operation temperature	-10°C to 50°C
Safety pressure	<720 psi (50 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	304SS / Polycarbonate

ADT100-FLT-10K

10,000 psi (700 bar) Hydraulic Filter Specifications

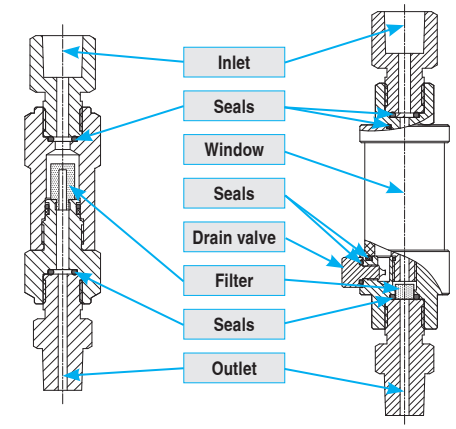
Pressure range	-15 to 10,00 psi (-1.0 to 700 bar)
Filtering resolution	0.07 mm
Operation temperature	-10°C to 50°C
Safety pressure	<12,000 psi (827 bar)
Size	0.87 x 0.98 x 4 in (22 x 25 x 100 mm) (size will vary based on adapters)
Outlet/Inlet port	Comes with removable male and removable female adapter
Storage temperature	-20°C to 70°C
Material	304 SS

ORDERING INFORMATION

ADT100 – 600 – 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

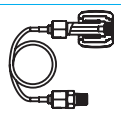
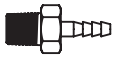
Additel 102 (Designed for all pumps except Additel 949 pump)

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.

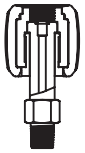
Pressure Hoses, Adapters and Fittings

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)

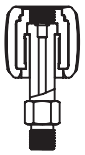
Additel 103-NPT

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 M10×1.0 female	15,000 psi	
ADT100-NPTM4-M14FQ	Adapters, 1/4NPT male to M14×1.5 female	15,000 psi	
ADT100-NPTM4-M20FQ	Adapters, 1/4NPT male to M20×1.5 female	15,000 psi	

ADT103-BSP (Hand-tight quick connectors)

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

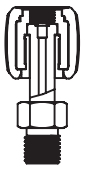
Additel 103-BSP

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 M10×1.0 female	15,000 psi	
ADT100-BSPM4-M14FQ	Adapters, 1/4BSP male to M14×1.5 female	15,000 psi	
ADT100-BSPM4-M20FQ	Adapters, 1/4BSP male to M20×1.5 female	15,000 psi	

ADT103-M20 (Hand-tight quick connectors)

M20×1.5 Male to various hand-tight quick connectors (10pcs, case included)

Additel 103-M20

Model	Description	Max Pressure	Picture
ADT100-M20M-NPTF8Q	Adapters, M20×1.5 Male to 1/8NPT female	15,000 psi	
ADT100-M20M-NPTF4Q	Adapters, M20×1.5 Male to 1/4NPT female	15,000 psi	
ADT100-M20M-NPTF2Q	Adapters, M20×1.5 Male to 1/2NPT female	15,000 psi	
ADT100-M20M-BSPF8Q	Adapters, M20×1.5 Male to 1/8BSP female	15,000 psi	
ADT100-M20M-BSPF4Q	Adapters, M20×1.5 Male to 1/4BSP female	15,000 psi	
ADT100-M20M-BSPF3Q	Adapters, M20×1.5 Male to 3/8BSP female	15,000 psi	
ADT100-M20M-BSPF2Q	Adapters, M20×1.5 Male to 1/2BSP female	15,000 psi	
ADT100-M20M-M10FQ	Adapters, M20×1.5 Male to M10×1.0 female	15,000 psi	
ADT100-M20M-M14FQ	Adapters, M20×1.5 Male to M14×1.5 female	15,000 psi	
ADT100-M20M-M20FQ	Adapters, M20×1.5 Male to M20×1.5 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	40,000 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).

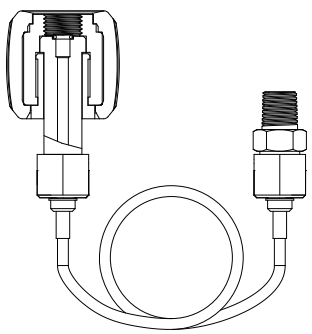
  Note: Custom lengths available by request.

ORDERING INFORMATION

- **Model Number**

ADT100 — HTK — 1K — N

Pressure port type:
N-1/4NPT male
N2-1/2NPT male
B-1/4BSP male
B2-1/2BSP male
M-M20x1.5 male



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)**

ADT100-HTK-15K

- **Maximum pressure: 15,000 psi (1,000 bar)**
- **Hose length: 5 ft (1.5 m)**

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

Software

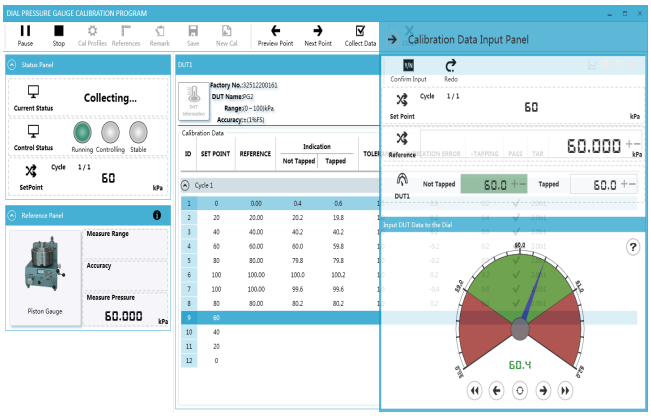
ACal

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

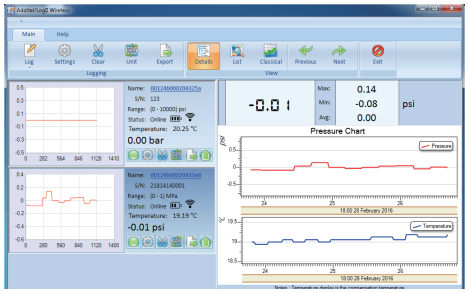
Specifications		*ACal Network*	*ACal Professional*	*ACal Basic*
Network feature	Data sharing	√		
	Multiple users	√		
Upgrade availability	Upgrade to ACal Professional	N/A	N/A	√
	Upgrade to ACal Network	N/A	√	√
DUT supported	Type	Dial gauge Digital gauge Pressure transmitter Pressure switch		
	Full automatic 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 & 9503 Additel/Log II Wireless

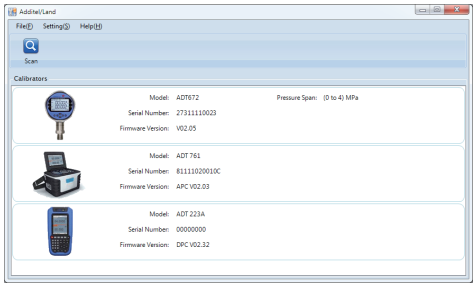


Additel/Log II is a real-time data logging and graphical software for the ADT681 series digital pressure gauges and the ADT672 series digital pressure calibrators. Data can be recorded in real-time and for the ADT681 data logging version, recorded results can be uploaded. After results are stored, they can be exported to a customizable report showing pressure and ambient temperature. Each real-time test can be tagged with a unique record name.

Additel/Log II Wireless is a real-time data logging and graphical software for the ADT680W series wireless digital pressure gauge. Data can be recorded in real-time and historical data in the gauge can be uploaded. After results are stored, they 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 lets you acquire data to your PC. You can choose to display the real-time or historical pressure measurement data in a table or in a graph.

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.

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