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
- ISO17025 accredited calibration with data (Included)

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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

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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×

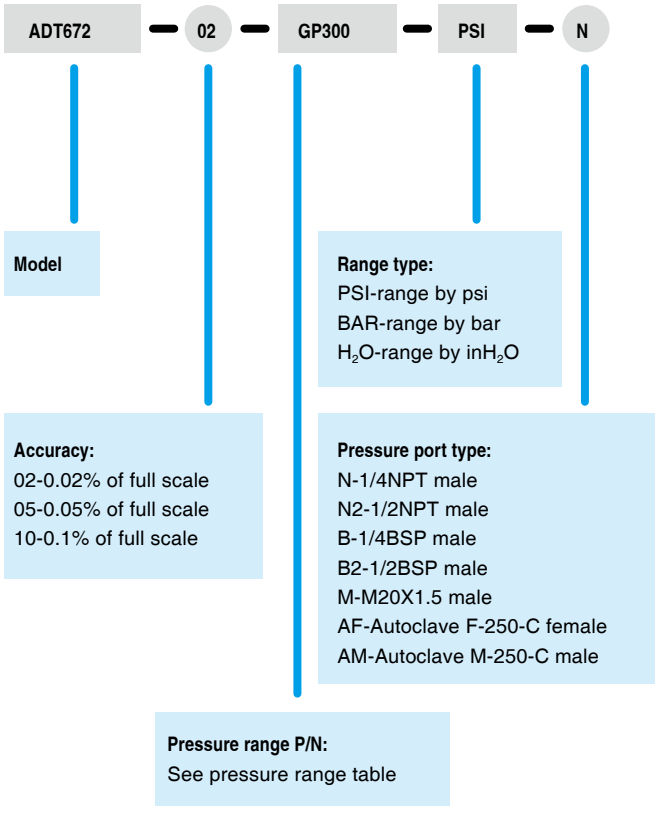
Differential Pressure						
P/N	Pressure Range		Media	Accuracy (%FS)[1]	Burst Pressure	Static Pressure Range
	(inH_2O)	(mbar)				
DP1	±1	±2.5	G	0.05[2]	100×	±10 psi
DP2	±2	±5.0	G	0.05[2]	100×	±10 psi
DP5	±5	±10	G	0.05[2]	50×	±10 psi
DP10	±10	±25	G	0.05[2]	20×	±10 psi
DP20	±20	±50	G	0.05	20×	±10 psi
DP30	±30	±75	G	0.05	20×	±10 psi
DP50	±50	±160	G	0.05	3×	±10 psi
DP100	±100	±250	G	0.02	3×	±15 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



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
ISO 17025 accredited 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

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Application Note

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

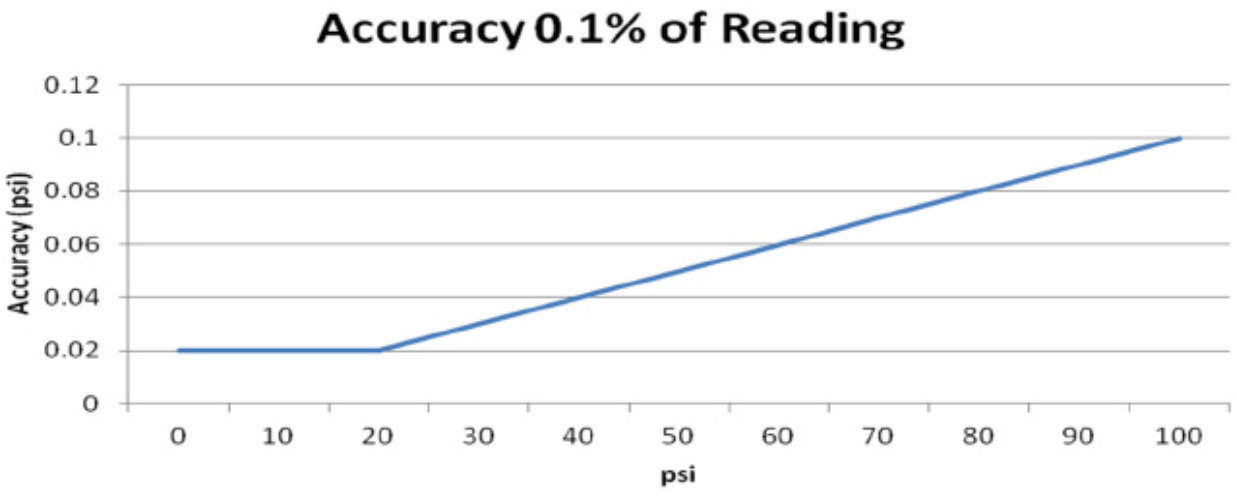
Figure 1 - Percent reading accuracy example
Full scale: 0 to 100 psi
Accuracy: 20 to 100% FS: 0.1% of reading
0 to 20% FS: 0.02% of FS

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

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

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

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



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Percentage of Full Scale Accuracy

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

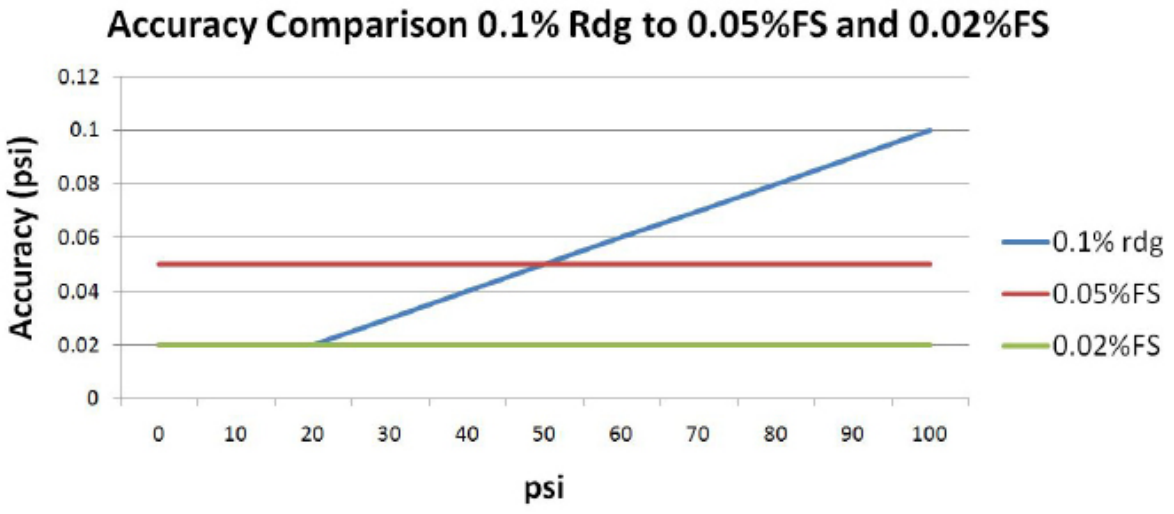
Accuracy as a percentage of full scale is calculated by multiplying the accuracy percentage by the full scale pressure of the gauge. This is obviously a more simple method of specification and is most commonly used in industry because it is easy to calculate and interpret. Denoting the accuracy as percent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

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

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

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

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



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