

ATE-100 Handheld Pressure Calibrator



FEATURES

- Interchangeable pressure and temperature modules
- Pressure measurement accuracies of $\pm 0.025, 0.05$ and 0.10% , or $.06/.07\%$
- Pressure ranges from 0.25 in.H₂O to $10,000$ psi
- Supports most standard RTD probe and thermocouples
- Min/max, tare, flow, leak, programmable damping, percent function, trip detect, all standard
- High static DP measurement capability
- Optional: FM Approval for Class I, Div. 1, Groups A, B, C & D hazardous areas Datalogging, Hi/low alarm relays

The Quick-Select Pressure Module

Quick-Select pressure modules are available in full-scale ranges from 0.25 inches H₂O through $10,000$ psi. Gauge, vacuum, absolute, differential or compound pressure ranges are available.

Each base unit can accommodate two pressure sensor modules simultaneously. Select from multiple modules which can be interchanged in seconds without the use of tools. When installed in the base unit, a pressure module becomes an integral part of the measurement system, thereby protecting the sensor from damage. Any combination of Quick-Select pressure modules may be used or interchanged as needed in the lab or field.

The AQS-1 Module

The AQS-1 Quick-Select low pressure module is based on a proprietary, Dresser engineered, variable-capacitance sensor. This sensor is available in ranges from $0/0.25$ to $0/200$ inches H₂O. AQS-1 Quick-Select pressure modules are available in accuracies from $\pm 0.1\%$ to $\pm 0.06\%$ of span. These Quick-Select pressure modules are available for gauge, differential and compound measurement requirements.

The variable-capacitance sensing element in the AQS-1 incorporates a micromachined silicon diaphragm. Silicon provides optimum repeatability with minimal hysteresis. The sensor is extremely stable, since the sputtered metal capacitance plates are molecularly bonded to the silicon. This design allows for the elimination of epoxies and other types of bonding and adhesive agents from the sensor assembly.

PRODUCT SPECIFICATIONS

Ashcroft®		
Model No.:	ATE-100	
Dimensions:	7.88 in. (L) x 4.24 in. (W) x 3.25 in. (H)	
Weight:	Max. 2.2 lbs. w/2 pressure modules installed	
Case Material:	High impact ABS	
Sensor Module Capacity:	2 bays for Ashcroft AQS "Quick Select®" sensor modules	
Display:	2 line LCD, 0.037 in. height per line. Can display simultaneous readings from 2 modules	
Electrical Connection:	Miniature recessed banana jacks (one set of test leads provided with each ATE-100)	
Operating Temp. Range:	Standard: 32° to 120°F Optional: -4 to 120°F	
Storage Temperature:	-4° to 158°F	
Update Rate:	130 ms (nominal) with one sensor installed	
Resolution:	$\pm 0.002\%$ of span, 60,000 count (max)	
Warm-Up:	5 minutes for rated accuracy	
Electrical Measurements:	0-50mA or 0-30 Vdc	
Input:	(volts)	Accuracy
	0/10 Vdc	$\pm 0.025\%$ fs
	0/30 Vdc	$\pm 0.10\%$ fs
	0-20mA	$\pm 0.03\%$ fs
	0-50mA	$\pm 0.05\%$ fs
	Auto-ranging 10/30Vdc and 20-50mA	
Temperature Effect Electrical Measurement:	$\pm 0.001\%$ of span per $^{\circ}\text{F}$ over compensated range	
Serial Interface:	Type: RS-232 Baud Rate: 300, 1200, 2400, 9600	
Serial Interface:	Both Quick-Select pressure modules and base unit electronics can be calibrated in the field.	

OPTIONAL FEATURES

- **Datalogging with Hi-Lo Relay Feature** – Datalogging manually or automatically stores up to 715 measured values for upload to PC. Includes upload utility software. Hi-Lo relay feature allows programming of setpoints for activation of alarms or control valves. (Hi-Lo not available with FM approval.)
- **Enhanced LCD**
For -4 to 120°F operating range
FM Approval – Class 1, Div. 1, Groups A,B,C & D (Not available with CE Mark)
- **CE Mark**
EMI/RFI immunity rating (not available with FM approval)

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The AQS-1 sensor is also extremely rugged. It can withstand extreme overpressure without significant error or calibration offset. In addition, the sensor is capable of withstanding significant shock and vibration without damage or loss of measurement output integrity.

The AQS-2 Module

The AQS-2 Quick-Select pressure module incorporates a piezoresistive, micromachined silicon sensor. These sensors are available in ranges from 0/100 inches H₂O through 0/10,000 psi and are also offered in absolute, vacuum and compound variants.

AQS-2 sensors are available for gauge and absolute pressure or vacuum measurement. 316 SS sensor isolation is provided on most ranges for applications involving fluids or corrosive gases.

AQS-2 Quick-Select pressure modules are available in a variety of accuracies from $\pm 0.1\%$ of span through $\pm 0.025\%$ of span.

Also Measure Temperature

The AQS-RT1, AQS-RT2 and AQS-TC1 interface modules allow the ATE-100 to measure temperature with common RTD or thermocouple temperature measurement devices.

The Base Units

The base unit provides access to the complete capabilities of the ATE-100 calibration system. These capabilities extend far beyond those of precision pressure measurement. The base unit contains a wide variety of application-specific firmware as well as the ability to measure both current and voltage inputs. In addition, this unit has the ability to interface the system with a computer, data acquisition system or dumb terminal via the standard RS-232 interface.

Each base unit can accommodate two Quick-Select pressure modules simultaneously. In addition, the modules can be interchanged quickly and easily for on-the-fly system configuration as application requirements change.



BASE UNIT PHYSICAL SPECIFICATIONS

Dimensions

7.88 in. (L) x 4.24 in. (W) x 3.25 in. (H)

Weight

Max. 2.2 lbs. w/2 pressure modules installed

Case Material

High impact ABS

Sensor Module Capacity

2 bays for Ashcroft AQS "Quick Select®" sensor modules

Display

2 line LCD, 0.037 in. height per line. Can display simultaneous readings from 2 modules

Electrical Connection

Miniature recessed banana jacks (one set of test leads provided with each ATE-100)

BASE UNIT OPERATING SPECIFICATIONS

Operating Temperature Range

Standard: 32° to 120°F

Optional: -4 to 120°F

Storage Temperature

-4° to 158°F

Update Rate

130 ms (nominal) with one sensor installed

Resolution

$\pm 0.002\%$ of span, 60,000 count (max)

Warm-Up

5 minutes for rated accuracy

Electrical Measurements

0-50mA or 0-30 Vdc

Input (volts)

0/10 Vdc $\pm 0.025\%$ fs

0/30 Vdc $\pm 0.10\%$ fs

0-20mA $\pm 0.03\%$ fs

0-50mA $\pm 0.05\%$ fs

Auto-ranging 10/30Vdc and 20-50mA

Temperature Effect Electrical Measurement:

$\pm 0.001\%$ of span per °F over compensated range

Serial Interface

Type: RS-232

Baud Rate: 300, 1200, 2400, 9600

Serial Interface

Both Quick-Select pressure modules and base unit electronics can be calibrated in the field.

Options

Datalogging with Hi-Lo Relay Feature – Datalogging manually or automatically stores up to 715 measured values for upload to PC. Includes upload utility software. Hi-Lo relay feature allows programming of setpoints for activation of alarms or control valves. (Hi-Lo not available with FM approval.)

Enhanced LCD – For -4 to 120°F operating range

FM Approval – Class 1, Div. 1, Groups A,B,C & D

(Not available with CE Mark)

CE Mark – EMI/RFI immunity rating (not available with FM approval)

Power Requirements

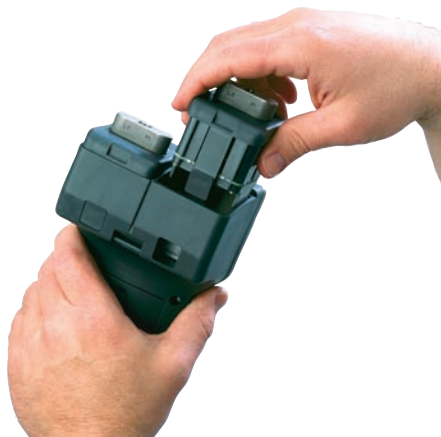
Standard: (2) 9 Vdc Alkaline Batteries (provides up to 30 hours operation per set)

Optional: 110 or 220 Vac transformer to power calibrator from line power

Certification

N.I.S.T. Traceable certification document provided for base display unit and sensor modules

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PRESSURE SENSOR MODULE SPECIFICATIONS

AQS-1 MODULE

Pressure Types

Gauge, differential & compound

Available Ranges

(See Chart)

Available Accuracies

± 0.06 (0/2-0/200 in. H₂O), ± 0.07 (0/0.25-0/1 in. H₂O) or 0.1% of Span

Compensated Temperature Range

20°F to 120°F

Temperature Effect

$\pm 0.004\%$ of Span per °F over compensated range (from reference temperature range of 70° $\pm 3^\circ$)

Repeatability

$\pm 0.01\%$ of span (range 0/1 in. H₂O or higher)

$\pm 0.02\%$ of span (ranges below 0/1 in. H₂O)

Sensitivity

$\pm 0.002\%$ of span (typical)

Media Compatibility

Clean, dry, non-conductive, non-corrosive gas

Under/Overpressure Capability

-15 to 50 psi

Maximum Static (line) Pressure

100 psi

Process Connection

Standard: $\frac{1}{8}$ NPT female

Optional: G $\frac{1}{8}$ British standard

Other Options

FM Approved (for use with FM approved base unit)

CE Mark (for use with CE Mark rated base unit)

AQS-2 MODULE

Pressure Types

Gauge, absolute, compound & vacuum

Available Ranges

(See Chart)

Available Accuracies

± 0.025 , 0.05 or 0.1 % of Span (± 0.025 & 0.05% not available on 0/10,000 psi range)

Compensated Temperature Range

20°F to 120°F

Temperature Effect

Standard: $\pm 0.004\%$ of Span per °F over the compensated range (from reference temperature range of 70° $\pm 3^\circ$)

Optional: No additional error due to temperature over the compensated range

Repeatability

$\pm 0.01\%$ of span

Sensitivity

$\pm 0.002\%$ of span (typical)



Media Compatibility

0/5 psi range only: Clean, dry, non-conductive, non-corrosive gas

0/10-0/10,000 psi ranges: Any medium compatible with 316 SS isolation.

Optional: Cleaned for Oxygen Service (0/10-0/10,000 psi ranges only)

Overpressure Capability

200% for ranges up to 1000 psi

150% for ranges over 1000 psi

Process Connection

Standard: $\frac{1}{8}$ NPT female

Optional: $\frac{1}{8}$ NPT female with flush port (ranges 10 psi and over)

G $\frac{1}{8}$ British standard

G $\frac{1}{8}$ British standard with flush port (ranges 10 psi and over)

Welded VCR fitting with standard finish

Other Options

FM Approved (for use with FM approved base unit)

CE Mark (for use with CE Mark rated base unit)

TEMPERATURE SENSOR MODULE SPECIFICATIONS

AQS-RT MODULE (RTD)

AQS-RT1 and AQS-RT2 interface modules allow the ATE-100 to measure temperature with an RTD:

AQS-RT1: Accommodates Pt100, Ni120, Cu120 and other common 2, 3 or 4 wire probes with resistance outputs of 400 ohms or less.

AQS-RT2: Accommodates Pt1000 and other common 2, 3 or 4 wire probes with resistance outputs of 4000 ohms or less.

Selectable Units of Measure

°C, °F, °K, °R and ohms

Input Receptacle

Accepts TA4F type RTD connector

RTD Probes Available

Pt-100 probes, 6" or 12" length, with or without handle. DIN Class A accuracy. Includes mating TA4F connector. Consult factory for details and availability.

Options

FM Approved (for use with FM approved base unit)

(CE Mark not available)

AQS-TC1 MODULE (Thermocouple)

The AQS-TC1 interface module allows the ATE-100 to measure temperature with a thermocouple:

Compatibility

Programmed to provide direct temperature readout from types J, K, T, E, R, S, B & N thermocouples or direct millivolt readout from any thermocouple.

Reference Junction

Automatic internal or manual external

Resolution

Automatic or manually selectable, up to .01°

Units of Measure

Selectable; °C, °F, °K, °R and millivolts

Receptacle

Accepts "miniature thermocouple connector", Omega® type SMP

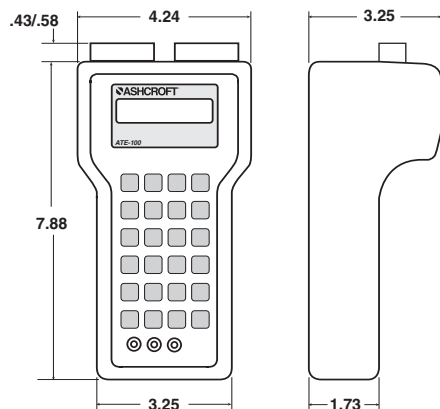
Options

FM Approved (for use with FM approved base unit)

(CE Mark not available)

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GENERAL DIMENSIONS



ACCESSORIES

POWER SUPPLIES

- 831X016-01 AC adapter to run system off line power (110 Vac, 60 Hz)
- 831X016-02 AC adapter to run system off line power (100 Vac, 50 Hz)
- 831X016-03 AC adapter to run system off line power (220 Vac, 50 Hz)
- 831X019-01 AC adapter to run system off line power (220 Vac, 50 Hz, for CE mark)

ELECTRICAL ACCESSORIES

- LPSIIa Loop Power Supply (powers 4-20mA current loops)
- SM-1 Voltage Adapter (Converts voltages of 10/250 Vac and 10/400 Vdc to levels acceptable to calibrator electronics; used to test "live" switches)

CARRYING, TRANSPORT & PROTECTIVE CASES

- 864X071-01 Contoured Form-Fitting Protective Instrument Case with Shoulder Strap
- 864X068-01 Heavy Duty, Watertight, Instrument Carrying/Transport Case*
- 864X069-01 Soft Carrying Case*

*Holds base unit, 5 sensors and tools

HOW TO ORDER

Base Display Unit

- 1) Specify Model: ATE-100
- 2) Specify Options: (Datalogging, Enhanced LCD, FM Approval, CE Mark)

Sensor Modules

- 3) Type (AQS-1 or AQS-2)
- 4) Pressure Range and Unit of Measure (see range chart)
- 5) Pressure Type (see specifications)
- 6) Accuracy (see specifications)
- 7) Specify Options
 - a) "zero temperature error over compensated range" (HQS-2 only)
 - b) Optional fitting (see specifications)
 - c) Clean for Oxygen Service (AQS-2, 0/10-0/10,000 psi only)
 - d) FM approval or CE Mark

Temperature Interface Module

- 8) Type (AQS-RT1, AQS-RT2 or AQS-TC1)
 - a) Specify FM approval if required
- 9) RTD Probe Type (when required. Consult factory for probe P/N)

Accessories

- 10) Specify required accessories

STANDARD RANGES

AQS-2 psi (gauge & absolute pressure)	AQS-1 H ₂ O (gauge/ differential pressure)	Other Engineering Units**
5 10 15 20 25 30 50 60 100 150 200 250 300 500 600 1000 1500 2000 2500 3000 5000 6000 7500 10,000	0.25 0.5* 1.0* 2.0* 3.0* 5.0* 10* 15* 25* 50* 100* 150* 200*	psi in. H ₂ O in. Hg ftSW Bar mBar kPa mPa mmHg cmH ₂ O mmH ₂ O kg/cm ² User Selectable
vacuum 5 10 15		
compound ±5 ±10 ±15 -15/+30 -15/+60	±0.125* ±0.25* ±0.5* ±1.0* ±1.5* ±2.5* ±5.0* ±7.5* ±12.5* ±25* ±50* ±75* ±100*	

* Non-isolated, for clean dry gas only

**Note: Engineering units identified above are accessible through the unit select feature. However, readout will default to the primary unit of measure on start-up. Sensor modules scaled in primary units other than in. H₂O (AQS-1) or psi (AQS-2) are also available. Consult factory.