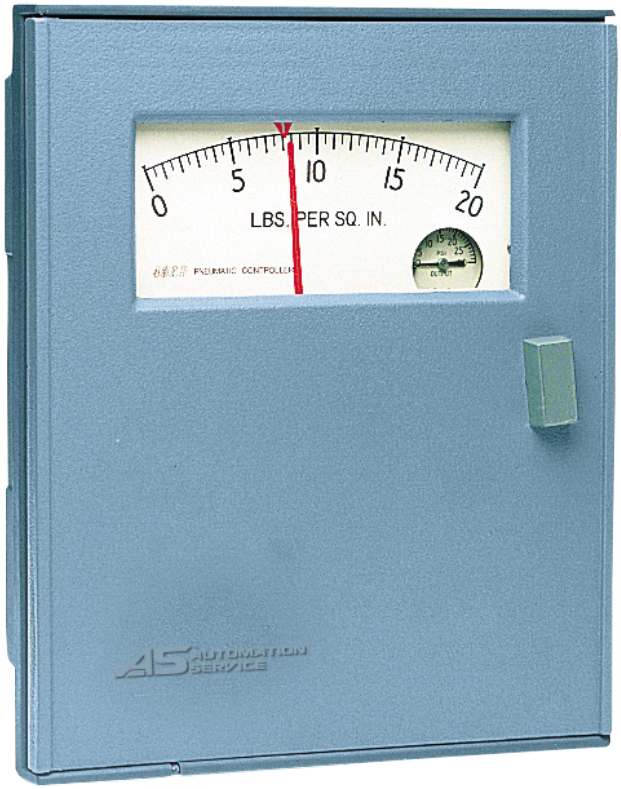
43AP Pneumatic Indicating Controllers

Product Specifications



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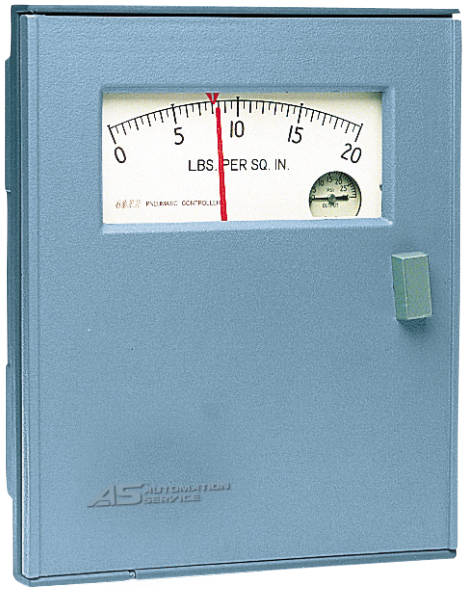


THESE INSTRUMENTS INDICATE AND CONTROL PRESSURE, TEMPERATURE, VACUUM AND DIFFERENTIAL PRESSURE. THEY PROVIDE PROCESS INDUSTRIES WITH A HIGHLY DEPENDABLE AND VERSATILE GROUP OF INSTRUMENTS.

WIDE SELECTION OF MEASURING ELEMENTS

Automation Service products offer a variety of element constructions. This versatility enables the 43AP Series Pneumatic Indicating Controllers to be applied to virtually any process.

WIDE CHOICE OF CONTROL MODES

On-off, proportional, proportional plus derivative, proportional plus integral (reset), proportional plus integral plus derivative, and differential gap actions are available.

BROAD RANGE OF INTEGRAL (RESET) AND DERIVATIVE ADJUSTMENTS

The integral unit has the complete range from 0.01 to 50 minutes, and the derivative unit from 0.05 to 50 minutes.

VARIETY OF OPTIONS

These controllers are available with an extensive list of optional features. Among these are internal bumpless automatic-manual transfer stations (two types), "batch" function, and remote pneumatic set point.

ACCURACY UNAFFECTED BY MOUNTING STRESSES

Both the control unit and the measurement element are mounted on a rigid steel plate. Thus, these components are isolated from case stresses due to mounting, and dependable accuracy is ensured.

POWER FAILURES DO NOT INFLUENCE PROCESS-DRIVEN INDICATION

A power failure and the likely subsequent loss of supply pressure do not influence the process-driven indication.

WEATHERPROOF CONSTRUCTION

A glass fiber reinforced case and a gasketed door with a shatterproof polycarbonate window meet IEC IP53 and provide the environmental protection of NEMA® Type 3.

VERSATILE MOUNTING

Instruments may be mounted in a panel, on a flat surface, on a continuous vertical pipe, or on a vertical pipe stub.

INTERNAL BUMPLESS AUTOMATIC-MANUAL TRANSFER STATION

This option provides bumpless-balanceable transfer between automatic and manual control by simple 2-step procedure. Accidental transfer is avoided because the door must be opened to gain access to the transfer station.

OPERATING CONDITIONS

Influence	Reference Operating Conditions	Normal Operating Condition Limits	Operative Limits
Ambient Temperature	24 ±2°C (75 ±3°F)	–30 and +80°C (–20 and +180°F)	–40 and +80°C (–40 and +180°F)
Relative Humidity	50% ± 10%	No Limit	No Limit
Supply Pressure	140 ± 1.4 kPa (20 ± 0.2 psi)	115 and 155 kPa (17 and 23 psi)	210 kPa (30 psi)

PERFORMANCE SPECIFICATIONS *(Under Reference Operating Conditions unless specified)*

Accuracy

INPUT TO POINTER
±0.5% of span for qualified elements.
INPUT TO OUTPUT
Depends on measuring element used.

Repeatability
0.2% of span.

Deadband
0.1% of span.

Ambient Temperature Effect
Maximum control point shift at midspan per 55°C (100°F) change within normal operating conditions is 1% of input span.

Supply Pressure Effect
Maximum control point shift at midspan per 7 kPa (1 psi) change within normal operating conditions is 0.2% of input span.

FUNCTIONAL SPECIFICATIONS

ELEMENTS

Refer to "Measuring Element Specifications" on page 5 for types, materials, and ranges

CONTROLLER ACTION

Output signal either increases or decreases with increasing measurement, as specified; action is reversible in the field.

OUTPUT SIGNAL

20 to 100 kPa, 3 to 15 psi, or 0.2 to 1.0 bar or kg/cm^2, as specified.

AIR CONSUMPTION (UNDER NORMAL OPERATION)

0.5 m^3/h (0.3 cfm) at standard conditions

OUTPUT GAUGE

0 to 200 kPa, 0 to 30 psi, or 0 to 2 bar or kg/cm^2, as specified.

SET POINT ADJUSTMENT

By means of a knob mounted inside the case

POINTERS

Set point and measurement pointers are fluorescent red.

SCALE

Black markings on white background; sector-shaped with nominal effective length of 150 mm (6 in).

CONNECTIONS

(Located in Bottom of Case)

PRESSURE AND VACUUM

- For upper range-values up to 14 MPa (2000 psi, or 140 bar or kg/cm^2): Connections tapped for R1/4 or 1/4 NPT, as specified.
- For upper range-values from 14 MPa (2000 psi, or 140 bar or kg/cm^2) up to 70 MPa (10,000 psi, or 700 bar or kg/cm^2): Connections threaded for R1/2 or 1/2 NPT, as specified.
- For upper range-values above 70 MPa (10 000 psi, or 700 bar or kg/cm^2): 9/16-18 Aminco® fitting used.

PNEUMATIC

- Supply and output connections tapped for 1/4 NPT.

MOUNTING

PANEL

- Flush in a panel up to 16 mm (0.6 in) thick.

SURFACE

- Suitable for all controllers having internally mounted elements.

PIPE

- A kit of parts to fit a DN 50 or 2 in vertical pipe.

PHYSICAL SPECIFICATIONS

ENCLOSURE

The case is a glass fiber reinforced polyester molding, compounded for superior corrosion resistance. The door is glass fiber reinforced phenylene oxide, and has a shatterproof polycarbonate window, ultraviolet resistant. The overall construction is weatherproof, meets IEC IP53, and provides the environmental protection of NEMA Type 3.

FINISH

Case, gray polyester; door, blue textured polyurethane.

DATA LABEL

Data Label adhered to inside of door with pressure sensitive adhesive. Includes space for Customer Tag data up to a maximum of 72 characters and spaces. For additional space, see optional Customer Tag.

APPROXIMATE MASS

4.8 kg (10.6 lb), excluding element

MEASURING ELEMENT SPECIFICATIONS *(To achieve stated Performance Specifications)*

TEMPERATURE ELEMENTS - Filled Thermal Systems

Element Code	System Class	Range Limits		Spans Available Between	
		°C	°F	°C	°F
TA-1A	IA	-130 and +315	-200 and +600	25 and 330	40 and 600

PRESSURE ELEMENTS (Refer to PSS 3-2A1 A-AS)

Element Code	Element Type	Element Material	Spans Available Between [a]	
			kPa or MPa [b]	psi [c]
PB-AA	Helical	316 ss	1.4 and 40 MPa	200 and 6000 psi
PB-BA	Spiral	316 ss	82 and 1400 kPa	12 and 200 psi
PC 3 to 15 PC 3 to 27	Receiver (Bellows)	Brass	20 to 100 kPa Range ---	3 to 15 psi Range 3 to 27 psi Range

[a] All elements except Code PC have zero-based ranges. Therefore, the lower range values are zero and the upper range values are as listed.

[b] To convert kPa to bar or kg/cm^2, divide kPa value by 100. To convert MPa to bar or kg/cm^2, multiply MPa value by 10.

[c] To convert psi to inH_2O, multiply psi value by 27.73. To convert psi to inHg, multiply psi value by 2.036.

MODEL CODE

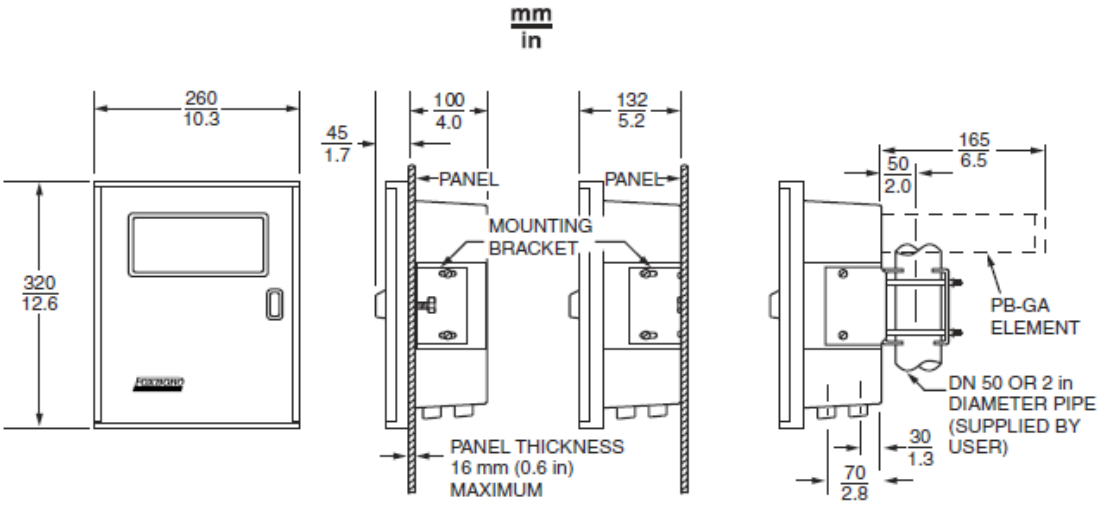
Description	Model
Indicating Controller	43AP
Mounting	
Field	-F
Panel or Surface	-P
Control	
On-Off	A1
Proportional 4 to 400%	A2
Proportional plus Derivative 0.05 to 50 minutes	A3
Proportional plus Integral (Reset) 0.01 to 50 minutes per repeat	A4
Proportional plus Integral plus Derivative	A5
Differential Gap 1 to 100%	A7
Output Signal and Gauge	
20 to 100 kPa signal; 200 kPa gauge	5
3 to 15 psi signal; 30 psi gauge	2
0.2 to 1.0 bar signal; 2 bar gauge	6
0.2 to 1.0 kg/cm^2 signal; 2 kg/cm^2 gauge	4
Automatic Manual Internal Transfer Switching	
None	N
Bumpless with 2-position switch, balance gauge, regulator	C
2-position nozzle seal switch for manual control	D
Optional Suffix	
Remote Pneumatic Set Point (Not available with AS Reference "BATCH-H")	-P
Elements Available (Refer to element specifications tables)	
Pressure, helical	/PB-AA
Pressure, spiral	/PB-BA
Pressure receiver, bellows	/PC
Temperature, Filled Thermal System	/TA-1A
Examples: 43AP-PA12N-P/PB-AA or 43AP-FA25C/-PC	

OPTIONAL FEATURES

Optional Feature	Description	AS[(a)] Reference
Bumpless Automatic-Manual Transfer Station	Consists of precision balance tube, regulator, and 2-position switch located within enclosure. A simple 2-step procedure provides bumpless transfer between automatic and manual control. A shutoff valve is supplied to allow automatic controller and relay to be serviced while retaining manual control.	See Model Code
Nozzle Seal Switch for Manual Control	An internally mounted 2-position switch provides a simple and inexpensive method of achieving manual control. In the manual position, the switch seals the nozzle circuit and the output can be changed by varying the controller supply pressure with an external regulator.	See Model Code
Remote Pneumatic Set Point	Enables the set point to be positioned from a remote source using a standard pneumatic signal. Available over the full span or part of the span.	See Model Code
Integral Air Supply Set	Fixed or adjustable combination pressure regulator and filter with 50 mm (2 in) gauge mounted and piped to controllers. Fixed pressure regulator available without gauge. Maximum input 1 MPa, 150 psi, or 10 bar or kg/cm^2. NOTE: Not available with panel mounted controllers.	IAS
External Connection to Integral Bellows	Used when an external feedback signal must be applied to prevent integral circuit saturation.	ECRB
External Set Point	A knob is fitted on door and engages set point adjustment mechanism.	ESP
High "Batch" Modification	For processes involving discontinuous control, the integral (reset) function is modified to prevent overshoot and to initiate immediate corrective action when control is resumed.	BATCH-H
External Phenolic Nameplate	Laminated plastic nameplate 38 X 76 mm (1.5 X 3 in) with white characters on a black background. Maximum of 5 lines with 28 characters or spaces 3 mm (0.13 in) high, or 24 characters or spaces 4 mm (0.16 in) high per line.	N/P
Stainless Steel Data Plate	A stainless steel data plate 36 X 40 mm (1.4 X 1.6 in). Maximum of 4 lines with 11 characters or spaces per line.	SCT
Customer Tag	Stainless steel tag attached to instrument for customer tag data that doesn't fit on data plate. There can be a maximum of 10 lines of data with 40 characters per line.	MTS
Tamper-Proof Knob	The door knob is removed to prevent unauthorized access to control adjustments. The door is opened with a specially shaped knob.	TPK

[(a)]AS is Auxiliary Specification

DIMENSIONS - NOMINAL



NOTE: Refer to DP 011-476 for panel cutout and surface mounting information.

NOTES

NOTES

ORDERING INSTRUCTIONS

1. Model Number
2. Mounting
3. Element Type, Material and Range
4. Measurement Range
5. Measurement Connection
6. Scale Range
7. Supply Pressure and Output Signal
8. Controller Action
9. Optional Features
10. Tag and Application

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