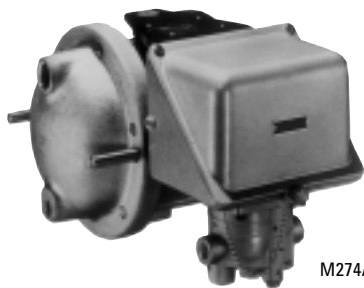


Barton®

Pneumatic Transmitters & Controllers

Models 274A, 285B, 335A, 335P, 335T, 338E, 340E, and 341E



M274A



M335A



M338E

Overview

The Barton pneumatic instrument product line consists of Pneumatic Transmitters and Indicating or Recording Controllers. All are designed to meet the most stringent and demanding requirements for Oil & Gas Production, U.S. Navy Shipboard, and Process Plant applications.

The heart of the DP-driven instruments is the rugged Barton Differential Pressure Unit (DPU) — featuring a time-proven liquid-filled bellows and torque tube design. Recording and Controlling models are also available with Pressure or Temperature actuators.

Pneumatic Transmitters Standard DP and Linear-with-Flow

Models 274A - DP Transmitters

- Actuated by Barton's M199
- Rugged, Weatherproof, Non-corrosive Case
- Continuous Purging (pilot valve and nozzle exhaust inside)
- Operation Span Continuously Adjustable (100 - 20%)
- Adjustable Suppression (up to 80% of range)
- Large Valve Relays (no need for secondary booster)
- Span Continuously Adjustable (down to 20% of range)
- Air Consumption (at balance condition) 0.05 scfm max.



Models 285B - Linear-with-Flow Transmitters

- Actuated by Barton's M199 (285B)
- Extracts the Square Root of DP and provides Pneumatic Signal Output proportional to Rate-of-Flow
- No External Regulator or Relay needed
- Continuous/smooth response over entire range from 3-15 PSI (207 mbar to 1 bar)
- Exceptionally low air consumption



Actuating Units

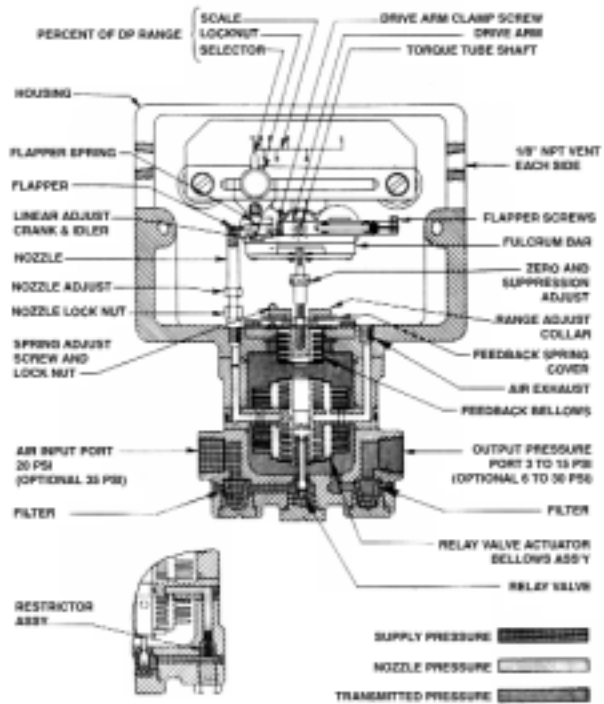
Barton Pneumatic Transmitters are actuated by the M199 Differential Pressure Unit (DPU) which is also available in a NACE certified version.

Cases

Barton Pneumatic Transmitters are housed in a rugged, weatherproof case especially suited for use in corrosive fume environments. Since the pilot valve and nozzle exhaust inside the case, continuous purging is achieved.

Transmitting Unit

Changes in DP are transmitted mechanically to the flapper, which covers a small constant-feed nozzle. Any change in the position of the flapper will instantly change the nozzle pressure, which in turn controls the action of the 2-valve balanced relay to increase or decrease the output air pressure. A calibrated bellows assembly



actuated by the output pressure serves to reposition the flapper mechanism and restore a state of equilibrium - in this manner, output air pressure varies in direct relation to the differential pressure applied to the instrument, or in direct proportion to the flow-rate. The relay is not affected by changes in output pressure and this makes it possible to maintain practically constant nozzle pressure at any output pressure.

Operating Span/Suppression

(Linear-with-DP units only)

The operating span is continuously adjustable from 100-20% of the DP range. Thus a unit with a differential pressure range of 0-100" w.c. can be adjusted to provide a 3-15 PSI (207 mbar-1 bar) output signal (direct or reverse) for any span from 0-20" w.c. to 0-100" w.c. (0-50 mbar to 0-248 mbar) range. The operating span can be shifted anywhere within the range of the differential pressure unit, to introduce suppression up to 80% of the range.

Specifications

Model 274A

Sensitivity	0.05% of DP range
Operating Span	Continuously adjustable down to 20% of standard DP range
Max. Suppression	Continuously adjustable up to 80% of full DP range
Air Consumption	0.05 scfm maximum
Linearity of output signal to input differential:	
DP span to 150 PSI (10.3 bar) (15 PSI/1 bar for M274A)	±0.5% of full range output pressure
DP span above 150 PSI (10.3 bar) (15 PSI/1 bar for M274A)	±0.75% of full range output pressure

Model 285B

Accuracy:	
30 to 100% Flow (9 to 100% DP)	0.5% of full range output
20 to 30% Flow (4 to 9% DP)	1.0% of full range output pressure
10 to 20% Flow (1 to 4% DP)	2.5% of full range output pressure
Air Consumption at balance condition (20 PSI/1.4 bar supply)	
Sensitivity	0.05 scfm maximum
Operating Span	Calibrated to DP range

Pneumatic Controllers

Indicating and Recording

Barton Pneumatic Controllers are available in indicating or recording models for control of DP, pressure, or temperature variables.

Cases

Barton Pneumatic Controllers are housed in a rugged, weatherproof case, finished with a black epoxy resin paint — designed for hostile outdoor environments. Optional stainless steel case and door versions are available for recorder models.

Indicating Controllers

Models 335A - Indicating DP

Barton Pneumatic Indicating Controllers are actuated by the Barton M199 DPU. They can measure, indicate, and control DP flow, or liquid level.

Models 335P/335T - Indicating Pressure/Temperature

Barton Pressure and Temperature Indicating Controllers are actuated by a wide selection of capsular bellows or helical bourdon tube static pressure elements, and liquid or mercury-filled temperature systems to indicate, measure, and control a variety of pressure or temperature processes.

Recording Controllers

Models 338E - Recording DP

Barton Pneumatic Recording Controllers measure, record, and control DP, flow, and liquid level. The controlled variable is recorded on a standard 12-inch circular chart. The setpoint is indicated by a red pointer on the chart. An additional pen may be added to record two additional pressures or temperatures. These instruments are actuated by the Barton M199 (338E) DPU.

Models 340E/341E - Recording Temperature/Pressure

These recording controllers are designed for general pressure applications and are actuated by a precision-wound, helical element. Units available in ranges from 0-50 to 0-30,000 PSI (0-3.4 bar to 0-2,068 bar).

Control Actions (All Controllers)

- Gain (proportional) from 1 to 400% (direct or reverse) (P)
- Gain (proportional) plus Integral, adjustable from 0.02 to 70 repeats per minute (P+I)
- Gain (proportional) plus Integral plus Derivative, adjustable from 0 to 20 minutes (P+I+D)
- Differential Gap (direct or inverse), adjustable from 2 to 80%

Control Modes (All Controllers)

Gain Control (proportional) increases or decreases the output air pressure in proportion to the deviation of the measured value from the control point.

Integral Control continuously adjusts the output air pressure to eliminate "offset" and maintain the process at the desired control point.

Derivative Control acts to augment corrective action at a rate proportional to the speed with which the measured value is moving away from the control point. This type of action is used to minimize the magnitude of "offsets" as quickly as possible.

Differential Gap Snap-Acting causes the air output pressure to change from 0 to 20 PSI (0 to 1.4 bar) or vice versa, at the edges of a span (differential gap). Within the span the output air pressure does not change until the other edge of the differential gap is reached.

Direct or Reverse Controller Action may be selected for any mode of control. Direct-acting controllers increase output pressure for an increase in the controlled variable. Reverse-acting controllers decrease output pressure for an increase in the controlled variable.

Specifications

Performance:

Pilot Capacity (non-bleed relay)	3.0 SCFM with less than 0.1 SCFM bleed rate @ 9 PSI output
Air Output	3-15 PSIG (207 mbar - 1 bar) 6-30 PSIG optional (414 mbar - 2.1 bar)

Temperature Limits:

(Ambient)	-40°F/°C to +180°F (+82°C)
Accuracy of Indication (335A/335P/335T/336C):	±1.0%
Accuracy of DP Recording (M338E):	
0-20" w.c. to 0-349" w.c. (0-50 mbar to 0-867 mbar)	±0.5% of full scale DP
0-350" w.c. to 0-50 PSI (0-869 mbar to 0-3.4 bar)	±0.75% of full scale DP
Accuracy of Temp. Recording (M341E):	
up to +300°F (+150°C)	±1.0% of full scale
Accuracy of Pressure Recording (M340E) (typical w/Ni-Span-C):	
Helical & Bellows Elements	±1.0% of full scale

Actuator

Model 335A (Indicating)	M199 DPU
Model 335P (Indicating)	Pressure Elements
Model 335T (Indicating)	Thermal Elements
Model 338E (Recording)	M199 DPU
Model 341E (Temperature Recording)	Thermal Elements
Model 340E (Pressure Recording)	Pressure Elements

Temperature Elements

Type	Precision wound spiral, mercury-filled, case-compensated
Bulb	Stainless Steel, flexible neck
Capillary	Stainless Steel, stainless armor
Socket	4 to 6 inches
Ranges	0-100°F (40°C) 0-120°F (50°C) 0-150°F (65°C) 0-200°F (95°C) 0-300°F (150°C)

Pressure Elements

Type	Precision wound helical or capsular bellows
Ranges	0-30" Hg vacuum to 0-30,000 PSI (0-14.7 PSI/1 bar to 0-2,068 bar)
Receiver Element	3-15 PSI (207 mbar to 1 bar)

Materials:

Helical	Ni-Span-C, SST, or Monel (6,000 PSI/414 bar maximum)
Bellows	Stainless Steel

Optional Accessories

The **2-Way Auto-Manual Bypass** (indicating or recording controllers) provides the operator with a convenient means for shutting off controller air to a valve and for manually positioning the valve. The two positions offered in the bypass are: MANUAL and AUTOMATIC. Bumpless transfer can be achieved.

The **4-Way Auto-Manual Bypass** (recording controllers only) is a separately mounted sub-panel used for shutting off the controllers and for manually positioning the valve. The four positions offered are: SERVICE, TEST, MANUAL, and AUTOMATIC.

Weights

MODEL	APPROXIMATE GROSS WEIGHT in lbs (kg)						
	Material/Safe Working Pressure (PSI)						
	Aluminum		Forged Steel			Forged SST	
	1000	2500	4500	6000	1000	3000	6000
TRANSMITTERS							
274A/285B	30 (14)	51 (23)	52 (24)	54 (24)	42 (19)	52 (24)	54 (24)
CONTROLLERS							
335A	30 (14)	51 (23)	52 (24)	54 (24)	42 (19)	52 (24)	54 (24)
338E	47 (21)	68 (31)	69 (31)	71 (32)	59 (27)	69 (31)	71 (32)

Ordering

When ordering, please specify the following items:

Transmitters

All Models:

- Model Number
- Air Supply 20 PSI (1.4 bar) output 3-15 PSI (207 mbar - 1 bar)
- Air Connections — 1/4" NPT
- Mounting — Pipe or Wall

DPU Models:

- Housing Pressure Rating (SWP)
- Housing and Bellows Materials
- Process Material Contacting Bellows
- Differential Pressure Range

Controllers

All Models:

- Model Number
- Controller Action: Gain (direct or reverse), Gain+Integral, Gain+Integral+Derivative, Differential Gap (direct or reverse)
- Mounting (pipe or wall)
- Options (Remote Set Chassis, 2-way auto/manual bypass, and 4-way auto/manual bypass)

DPU Models:

- Housing Pressure Rating (SWP)
- Housing and Bellows Materials
- Process Material Contacting Bellows
- Differential Pressure Range

Indicator Models:

- Scale (Type: square root, uniform, etc.; graduations)

Recorder Models:

- Pressure Elements (Range, Material)
- Pens (disposable or bucket)
- Chart Drive (type and rotation)
- Thermal Systems (range, capillary length, Class, Socket [length below threads])
- Charts (in-stock std.: 0-100/-150/-200/-250/-300/-500, marked for 24 hr. rotation.; special order available, with min. quantity of 5 boxes)



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