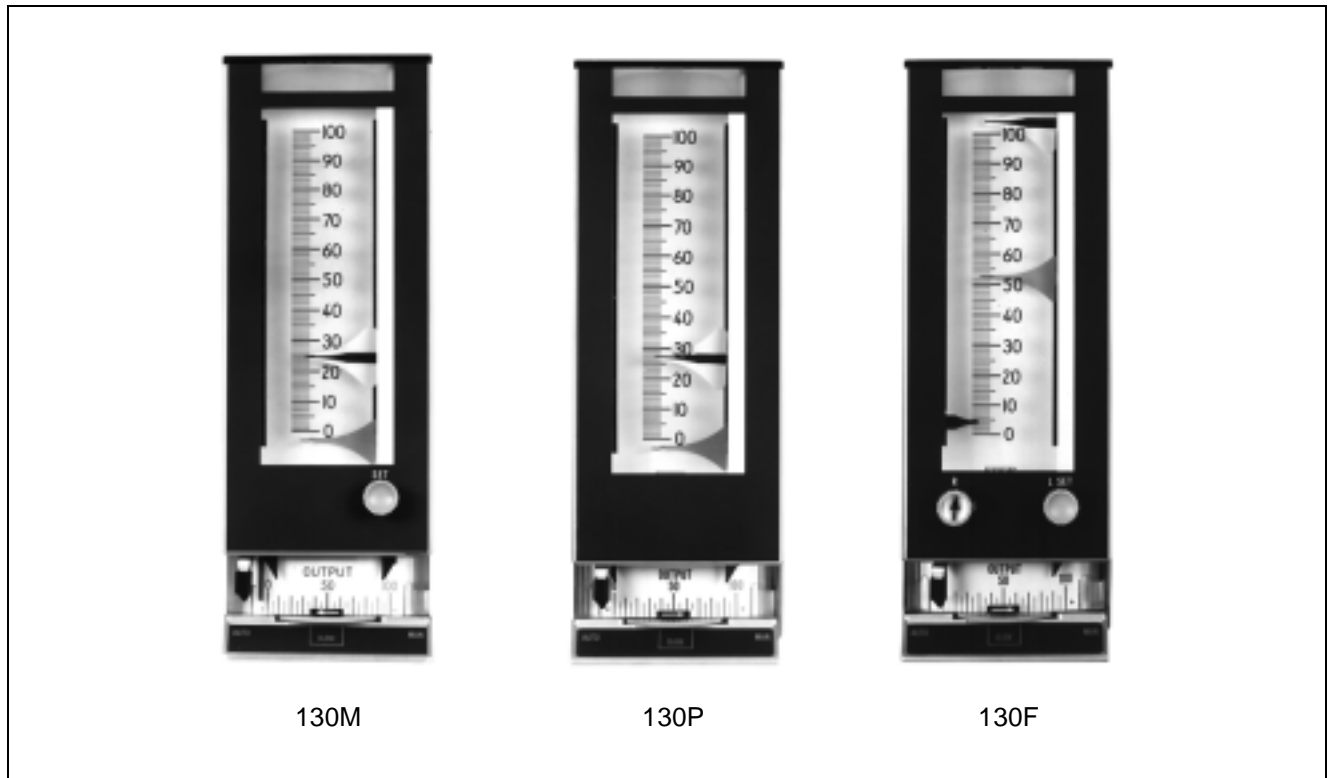


## 130 Series Pneumatic Indicating Controllers



These controllers are designed for high-density control room mounting and are used wherever precise control is required for efficient process management.

The basic controller is the 130M Series featuring manual set point adjustment. The 130P Series is similar to the 130M except that the set point is pneumatically adjusted by a remote signal. The 130F Series is similar to the 130M except that it includes a Remote/Local switch which allows either manual or pneumatic adjustment of the set point.

### HIGHLY VISIBLE AND BOLD DISPLAY

The large, brightly colored pointers, located directly behind the transparent vertical scale, provide a level of visibility and ease of reading which has become a benchmark for judging other display concepts. This system provides continuous full scale display of all variables, effective display of controller deviation, and easy scale changing without tools.

### INDEPENDENT AUTOMATIC AND MANUAL CONTROL UNITS

Either the automatic control unit or the manual unit can be removed without disturbing the process. This design feature avoids costly shutdowns for controller servicing.

### FULLY BALANCELESS AND BUMPLESS TRANSFER

The 130 Series Controllers feature the “integral balancing” method for bumpless transfer. After transfer, the controller simply responds at the integral (reset) rate to eliminate any error between set point and measurement. In addition to providing easy, balanceless and bumpless transfer, this scheme preserves the set point.

**SIMPLE, LOW-COST MOUNTING**

One multiple unit shelf can accommodate up to 10 instruments. All air connections are made when the controllers are installed in the shelf. Piping costs are minimized because each shelf has its own integral air supply header with individual air shutoff valves.

**EASY TO SERVICE**

The introduction of the 130 series dramatically advanced the state-of-the-art of pneumatic control systems with a unique pneumatic circuit board. This circuit board eliminates much of the tubing and many of the connections found in other controllers. All the components are located on one side of this board and are easily accessible by sliding back one side cover.

**FORCE BALANCE CONTROL MODULE**

The time-proven force balance control module ensures long life and dependability. The use of metal bellows with virtually no motion of the flexure-suspended mechanism provides the user with a clearly superior controller.

**SPECIALIZED CONTROLLERS FOR EVERY APPLICATION**

Foxboro offers the widest selection of optional accessories and unusual control functions in the industry. Among these, in addition to the normal control modes, are single station ratio, single station computer-set, auto selector, differential gap, and "batch".

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

**Accuracy**

MEASUREMENT AND SET-POINT INDICATORS  
±0.5% of span  
OUTPUT INDICATOR  
±2% of span

**Dead Band**

AUTOMATIC CONTROL UNIT  
Less than 0.1% of span  
MEASUREMENT AND SET-POINT INDICATORS  
Less than 0.1% of span

**Repeatability (Measurement and Set-Point Indicators)**

Better than 0.25% of span

**Supply Pressure Effect**

A 5% change in supply pressure, within the normal operating limits, will cause the output to change less than 0.1% of span in automatic at 100% proportional band; 0.2% of span in manual.

**Alignment Error (Automatic Control Unit)**

Less than 0.5% of span

**FUNCTIONAL SPECIFICATIONS**

**MODEL CODE**

Controller with Manually Positioned Set Point	130M-N
Controller with Pneumatically Positioned Set Point	130P-N
Controller with Remote/Local Set Point	130F-N
<b>Control Function</b>	
On-Off	1
Proportional	2
Proportional plus Derivative	3
Proportional plus Integral (Reset)	4
Proportional plus Integral (Reset) plus Derivative	5

**Mode Adjustment Limits**

PROPORTIONAL BAND  
5 to 500%  
INTEGRAL (RESET) ACTION  
0.01 to 50 minutes per repeat  
DERIVATIVE ACTION  
0.01 to 50 minutes

**Ambient Temperature Limits**

-20 and +65°C (0 and 150°F).

**Supply Pressure**

140 to 150 kPa (20 to 22 psi or 1.4 to 1.5 bar or kg/cm<sup>2</sup>).

## FUNCTIONAL SPECIFICATIONS (Cont.)

### Input, Output Signal

20 to 100 kPa, 3 to 15 psi, or 0.2 to 1.0 bar or kg/cm<sup>2</sup>, as specified

### Air Consumption under Normal Operation

0.5 m<sup>3</sup>/h at standard conditions (0.3 scfm) in automatic; 1.0 m<sup>3</sup>/h at standard conditions (0.6 scfm) in manual. Add 0.08 m<sup>3</sup>/h at standard conditions (0.05 scfm) for units with derivative action.

### Control Action Reversal

The control action is reversed by a 90° rotation of the reversing switch.

### Auto-Manual Transfer Unit

A two-position switch lever located on the front of the manual unit is used to switch directly from automatic to manual or, on controllers with integral (reset), from manual to automatic without bumping the process.

## PHYSICAL SPECIFICATIONS

### Mounting

These controllers are designed for flush mounting in vertical panels 3 to 25 mm (0.13 to 1 in) thick using 101 or 102 Series Shelves. Each controller requires one unit of shelf capacity. They may be calibrated for mounting in a panel inclined up to 75° from vertical with the rear of the instrument lower than the front. Specify mounting angle.

### Connections

Separate electric and pneumatic connectors are located on the rear of the chassis in accordance with the standard arrangement for 100 Line Shelves.

### Pointers

#### MEASUREMENT

Red

#### MANUAL SET (130M SERIES) AND REMOTE SET (130P AND 130F SERIES)

Black on white

#### LOCAL SET (130F SERIES)

Black

#### OUTPUT

Black

### Scales

#### VERTICAL SCALE

Removable, transparent plastic with black markings; 100 divisions, scaled as specified.

#### OUTPUT

Black markings on a white background, 20 divisions from 0 to 100% output signal. The black pointer continuously indicates automatic or manual output.

### Nameplate

White translucent plastic with 2.5 mm (0.1 in) high black letters. There can be a maximum of 2 lines with 17 characters or spaces per line.

### Construction

The front and rear panels are die-cast aluminum secured between extruded aluminum top and bottom rails which retain sheet steel side covers.

### Finish

The finish is gray acrylic enamel or equivalent.

### Nominal Dimensions (Including manual unit)

205 mm high x 70 mm wide x 555 mm deep (8.2 in high x 2.8 in wide x 21.8 in deep).

### Mass (Approximate)

5 kg (11 lb)

### OPTIONAL FEATURES

#### Output Gauge

A plug-in output gauge may be supplied in place of the manual unit to provide continuous indication of the output signal. Specify by substituting 131 for 130 in the model number.

#### Controller Less Manual Unit

A plug-in blank base plate is supplied in place of the manual unit. Specify by substituting 132 for 130 in the model number.

#### “Batch” Modification

Prevents integral (reset) circuit saturation during shutdown or other periods of sustained set point and measurement deviation. Includes internal adjustment for preload.

##### HIGH “BATCH”

Operates when controller output signal exceeds 100 kPa, 15 psi, or 1.0 bar or kg/cm<sup>2</sup>. Specify by substituting 130FB, 130MB, or 130PB for 130F, 130M, or 130P in the model number.

##### LOW “BATCH”

Operates when controller output signal falls below 20 kPa, 3 psi, or 0.2 bar or kg/cm<sup>2</sup>. Specify by substituting 130FB, 130MB, or 130PB for 130F, 130M, or 130P in the model number and adding AS Reference BSL.

#### Alarm Actuators and Alarm Lights

Refer to GS 2B-12C1 A.

#### External Connection to Integral (Reset) Bellows

Used when an external feedback signal must be applied to prevent integral circuit saturation. Not available with the ESPC option or “Batch” modification. Specify AS Reference ECRB.

#### External Set Point Connection

The 130F Series is available with a connection providing access to the set point signal. The maximum transmission distance is 1.5 metres (5 feet) and all external connections must be leak-tight due to low air delivery of the aspirating relay. Use a 1:1 repeating relay for longer transmission distances. Not available with the ECRB option or “Batch” modification. Specify AS Reference ESPC.

#### Opaque Nameplates

Nameplates in several colors may be substituted for the standard nameplate at no extra charge.

Description		AS Reference
Characters	Background	
White	Blue	N/P-B
	Green	N/P-G
	Orange	N/P-O
	Red	N/P-R
Black	Yellow	N/P-Y

### ORDERING INSTRUCTIONS

1. Model Number
2. Input, Output Signal
3. Set Point and Measurement Scale Range
4. Mounting Angle
5. Nameplate Data
6. Optional Features
7. Tag and Application

NOTE: Refer to GS 2B-12B1 A to Select and Specify 102 Series Shelf-Mounting Equipment.  
 Refer to GS 2B-12B1 B to Select and Specify 101 Series Shelf-Mounting Equipment.

**The Foxboro Company**  
 33 Commercial Street  
 Foxboro, MA 02035-2099  
 United States of America  
<http://www.foxboro.com>  
 Inside U.S.: 1-888-FOXBORO  
 (1-888-369-2676)  
 Outside U.S.: Contact your local  
 Foxboro representative.  
 Facsimile (508) 549-4492

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