

P10 Series Low Range Pressure Controls

Application

The P10 Series low pressure controls are for applications in which a pneumatic air signal is used to operate an electric or electronic device. Typical applications include: pressure-electric switches in pneumatic systems, control of pumps or small air compressors, and pressure-electric interlock of fluid flow systems. The P10BJ models are available for electric heating applications.

All P10 Series low pressure controls are designed for use only as operating controls.

Where an operating control failure would result in personal injury and/or loss of property, it is the responsibility of the installer to add devices (safety, limit controls) or systems (alarm, supervisory systems) that protect against, or warn of, control failure.

Features

- Screw terminals are easily accessible for field wiring.
- Snap-acting contacts in a dust protected enclosure.
- Field adjustment can be made with cover on or removed.

- Visible calibration scale.
- Oil resistant Nylon reinforced Buna-N diaphragm.



Fig. 1 -- The P10 Single Stage Pressure Control with barbed fitting and mounting bracket attached.

Specifications

Type Number	P10BC	Single Function, One SPDT Switch
	P10BG	Single Function, One SPDT Switch, Low Range Pressure, Narrow Differential
	P10BJ	Single Function, One SPDT Switch, Electric Heating
	P10FC	Single Function, Two SPDT Switches
	P10PA	Dual Function, Three Normally Closed SPST Switches
Range	Standard	3 to 20 PSIG (20 to 140 kPa)
	Optional	5 to 50 PSIG (34 to 345 kPa)
		10 to 80 PSIG (70 to 550 kPa)
	Narrow Differential (P10BG)	2 to 20 PSIG (14 to 140 kPa)
Differential	See Tables	
Maximum Overrun Pressure	See Range Specifications Table	
Ambient Temperature	Minimum	32°F (0°C)
	Maximum	140°F (60°C)
Electrical Rating	See Tables	
Switch Unit(s)	Snap-Acting Contacts In Dust Protected Enclosure	
Diaphragm	Preformed Nylon Reinforced Buna-N	
Enclosure Type	NEMA Type 1	
Material	Case	.063" (1.6 mm) Cold Rolled Steel
	Cover	.025" (0.6 mm) Cold Rolled Steel
Finish	Gray Enamel	
Conduit Opening	P10BC, P10BG	One 7/8" (22 mm) Diameter Hole For 1/2" Conduit
	P10BJ	One 1 3/32" (28 mm) Diameter Hole For 3/4" Conduit
	P10FC	Two 7/8" (22 mm) Diameter Holes For 1/2" Conduit
	P10PA	Two 7/8" (22 mm) Diameter Holes For 1/2" Conduit
Wiring Connections	Screw Type Terminals	
Shipping Weight	See Table	

General Description

A change in operating pressure positions a preformed Buna-N diaphragm which actuates an electrical switch. Controls with SPDT contacts have color coded terminals; the common terminal is red; the red to yellow terminals close an electrical circuit on a rise in pressure; the red to blue terminals close a circuit on a drop in pressure. (See Fig. 7.)

A visible calibration scale on SPDT controls indicates the pressure at which the red to yellow contacts close.

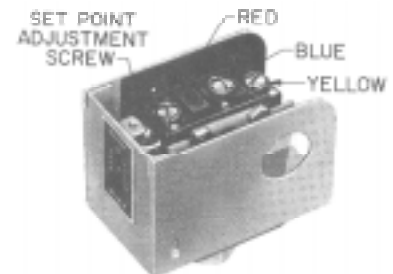


Fig. 2 -- Interior view of P10BG with terminals identified.



Fig. 3 -- P10 Two-Stage Pressure Control.

The scale on the two-stage controls indicates the red to yellow closing point of the high stage.

The scales on the three switch models indicate the pressure at which the single switch (LO) and the two ganged (HI) switches open upon respective pressure increases.

The set point adjustment screw is accessible from the bottom of the control with the cover on, and from the top with the cover removed for convenient field adjustment. When the range is adjusted, the differential will change by a small amount. (See Range and Differential Specifications.)

The standard pressure connection, which is screwed into the control's

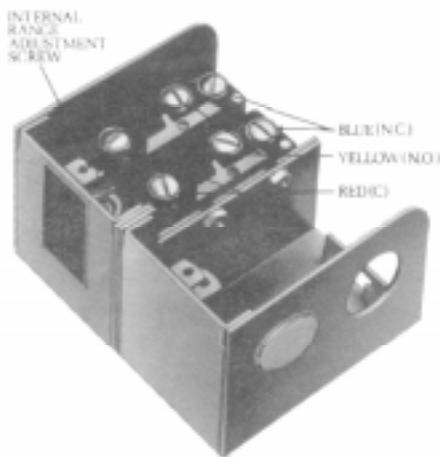


Fig. 4 -- Two-Stage P10FC with set point adjustment screw and terminals identified.

1/8 in. NPSF threads, is a barbed fitting for 1/4 in. polytubing. The P10 can be mounted in any position using bracket BKT16A-600 (See Fig. 5), which is standard on models with barbed fitting.

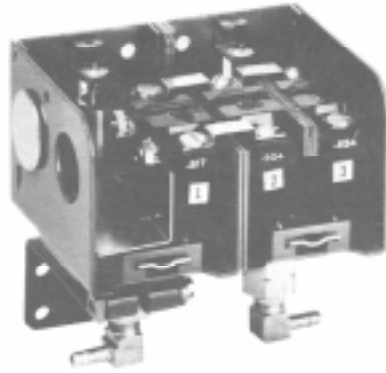


Fig. 5 -- Interior view of P10PA with barbed fitting and mounting bracket attached.

Setting and Operating Specifications

Unless otherwise specified, controls are shipped calibrated to one of the standard settings shown in the tables below. When a setting other than a standard one is required, specify the differential and setting.

The between stage differential and the switching unit differentials are factory set. Therefore, the high and low operating points and the switch differential must be specified if other than the standard settings shown in the table are required.

Standard Factory Settings

P10FC Two-Stage — PSIG (kPa)

Range	High Stage (A) Red to Yellow Contacts Close	Low Stage (B) Red to Yellow Contacts Open	Differential Both Stages
3 to 20 (20 to 140)	12 (83)	8 (55)	3 (21)
5 to 50* (34 to 345)	30 (207)	20 (138)	5 (34)
10 to 80* (70 to 550)	45 (31)	29 (200)	8 (55)

*Optional ranges.

P10PA Three Switch PSIG (kPa)

Range	Switch 1 "LO"		Switches 2 and 3 "HI"	
	Open	Close	Open	Close
3 to 20 (20 to 140)	6 (41)	3 (21)	17.4 (120)	17.0 (117)

Range and Differential Specifications

Range PSIG (kPa)	Differential PSI(kPa)						Maximum Allowable Pressure PSIG (kPa)
	At Min. Range		At Mid Range		At Max. Range		
	Min.	Max.	Min.	Max.	Min.	Max.	
2 to 20* (14 to 140)	.15 Fixed (1.0)		.20 Fixed (1.4)		.25 Fixed (1.7)		60 (414)
3 to 20 (20 to 140)	1.5 (10)	4.5 (31)	2.0 (14)	6.0 (41)	2.5 (17)	7.5 (52)	
5 to 50** (34 to 345)	4.0 (28)	11.25 (78)	5.0 (34)	15.0 (103)	6.25 (43)	18.75 (129)	150 (1034)
10 to 80** (70 to 550)	6.5 (45)	18.0 (124)	8.0 (55)	24.0 (165)	10.0 (69)	30.0 (207)	

*Narrow Differential Range (P10BG only.)

**Optional range.

The limits on the settings and staging are:

Example (See Fig. 6.)

When the high operating point "A" on a control with 3/20 PSIG (20/140 kPa) range is 18 PSIG (124 kPa), the low operating point "B" cannot be lower than 12 PSIG (83 kPa). If the switch differential "C" is 4 PSI (28 kPa), the between stage differential "D" and the maximum difference between high operating points "E" will be 2 PSI (14 kPa) or less.

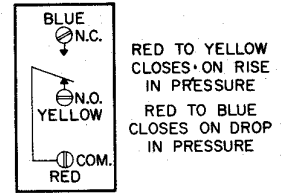
Standard Factory Settings

P10BC, P10BG, P10BJ Single Stage — PSIG (kPa)

Range	Red to Yellow Contacts Close	Differential
2 to 20* (14 to 140)	12 (83)	0.25 (1.7)
3 to 20 (20 to 140)	12 (83)	3 (21)
5 to 50** (34 to 345)	30 (207)	5 (34)
10 to 80** (70 to 550)	45 (310)	8 (55)

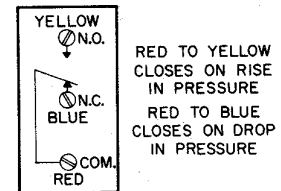
*P10BG range and settings.

**Optional ranges.



SET POINT
ADJUSTMENT
SCREW

P10BC, P10BJ



SET POINT
ADJUSTMENT
SCREW

P10BG

Fig. 7 — Terminal arrangement and cutout action.

Range PSIG (kPa)	3/20 (20/140)	5/50 (34/345)	10/80 (70/550)
Maximum high operating point of high stage "A"	20 (140)	50 (345)	80 (550)
Minimum low operating point of low stage "B"	2 (14)	3.5 (24)	7 (48)
Maximum setting difference between high operating point "A" of high stage and low operating point "B" of low stage.	6 (41)	15 (103)	24 (165)
"D" "E" Maximum difference between high operating points of two switches. (Between stage differential.)	2 (14)	5 (34)	8 (55)
Switch Differential "C" at Mid Range	Minimum	2 (14)	5 (34)
	Maximum	6 (41)	15 (103)

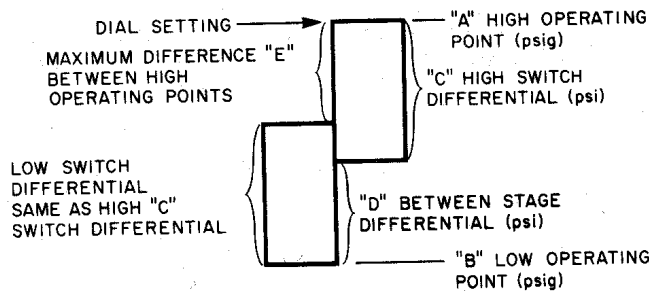


Fig. 6 — Switch program.

Optional Constructions

Contact Action

SPDT, open low or open high, is available as specified.

Differential

Extra close differential models at reduced electrical ratings are available at additional cost. Consult Customer Service.

Mounting Bracket

Part Number BKT16A-600 is available, with an additional cost on models with barbed fitting.

Open Construction

Models without covers are available on quantity orders.

Pressure Connections

On quantity orders, 1/8 in. or 1/4 in. NPTF Dryseal threads are available.

Repairs and Replacement

Field repairs must not be made. For a replacement control, contact the nearest Johnson Controls wholesaler.

Order Information

To order, specify:

1. Type Number
2. Range
3. Control setting and differential, if other than standard. If two-stage model is required, specify the following:
 - a. High Stage operating point "A".
 - b. Low Stage operating point "B".
 - c. Switch differential "C".
 - d. Between stage differential "D".
4. Optional constructions, if required.

Electrical Ratings — For each Pennswitch

P10BC and P10FC

Motor Rating	120 V	208 V	240 V	277 V
AC Full Load Amp	16.0	9.2	8.0	7.0
AC Locked Rotor Amp	96.0	55.2	48.0	42.0
Non-Inductive Amp	16.0	9.2	8.0	7.2
Pilot Duty — 125 VA at 24 to 277 VAC				

NOTE: On 2-stage models, the maximum connected load shall not exceed 2000 VA.

P10BJ

Motor Rating	120 V	208 V	240 V	277 V	600 V	
AC Full Load Amp	16.0	9.2	8.0	7.0	—	
AC Locked Rotor Amp	96.0	55.2	48.0	42.0	—	
Non-Inductive Amp	Double Throw	16.0	16.0	16.0	16.0	16.0
	Single Throw	24.0	24.0	24.0	24.0	24.0
Pilot Duty — 125 VA at 24 to 600 VAC						

P10BG and P10PA

Motor Rating	120 V	208 V	240 V	277 V
AC Full Load Amp	6.0	3.4	3.0	—
AC Locked Rotor Amp	36.0	20.4	18.0	—
Non-Inductive Amp	6.0	3.4	3.0	2.6
Pilot Duty — 125 VA at 24 to 277 VAC				

NOTE: On P10PA models, the maximum connected load shall not exceed 2000 VA.

Shipping Weights — Lb (kg)

Kind of Pack	P10BC, P10BG P10BJ		P10FC		P10PA	
	Less Bracket	With Bracket	Less Bracket	With Bracket	Less Bracket	With Bracket
Individual	1.0 (.45)	1.2 (.54)	1.5 (.68)	1.7 (.77)	1.6 (.73)	1.8 (.82)
Overpack of 50	52.0 (24)	62.0 (28)	—	—	—	—
Overpack of 20	—	—	32.0 (15)	36.0 (16)	34.0 (15)	38.0 (17)
Bulk Pack of 20	42.0 (19)	52.0 (24)	—	—	—	—
Bulk Pack of 30	—	—	41.0 (19)	47.0 (21)	44.0 (20)	50.0 (23)

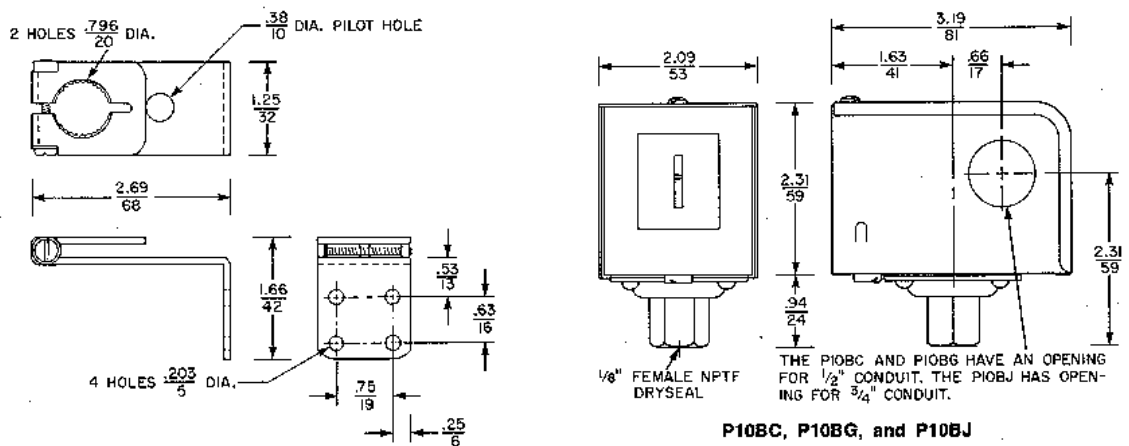
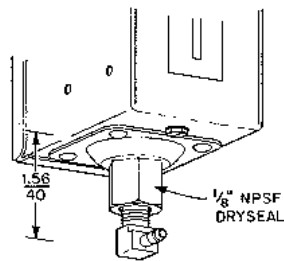
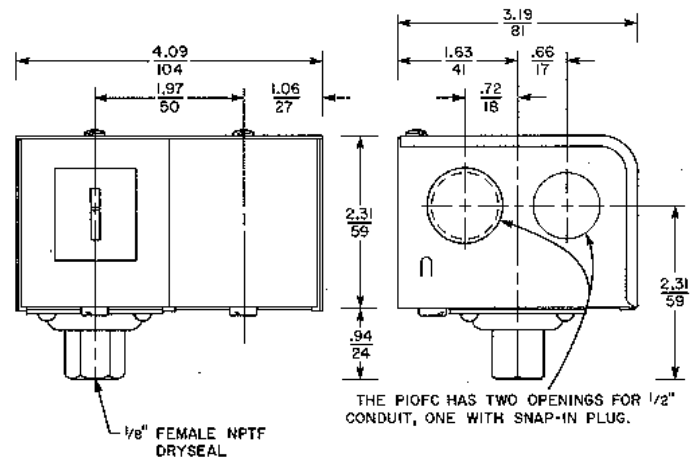


Fig. 8 — Dimension drawing of BKT16A-600 mounting bracket.

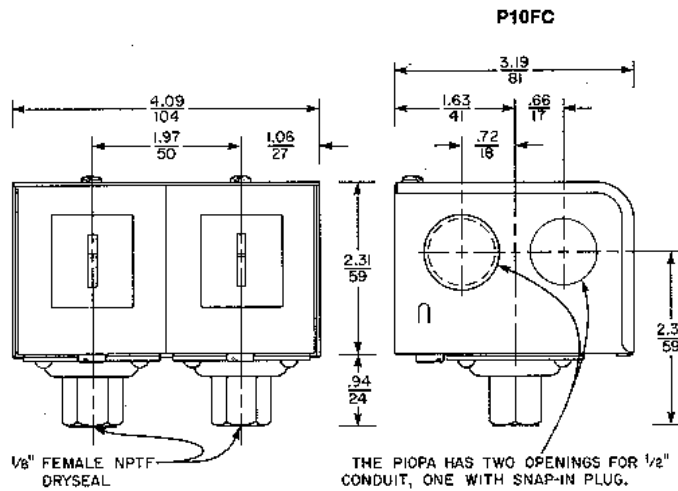


Typical view and dimension of barbed fitting.



P10BC, P10BG, and P10BJ

Dimensions $\frac{\text{In}}{\text{mm}}$



P10FC

P10PA

Performance specifications appearing herein are nominal and are subject to accepted manufacturing tolerances and application variables.

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File LR948

Notes

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