P74 Series Differential Pressure Controls

Product Bulletin

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Application

These differential pressure controls are for use as operating controls or indicating system functions through display lights or panels. They measure the difference in pressure exerted upon its two sensing elements.

The controls are available for applications sensing air, oil, or liquid. Typical applications are proof of flow across a chiller or water cooled condenser, proof of flow in a heating or cooling coil and lube oil pressure sensing on refrigeration compressors. On a proof of flow application the control measures pressure drop across two different points in either a closed water circulating system or a city water to supply system.

Figure. 1: P74 differential pressure control with Style 13 elements.

On a proof of flow application in a water chiller system the control activates a light or signal to indicate a loss of water.

The control may also be applied as a lube oil pressure sensing control on refrigeration compressors. They may be used in combination with P28 and/or P45 oil pressure cutout controls on two compressor, single motor units to reduce the oil system cost (See Fig. 4). Special low pressure models are available for variable speed and screw compressor oil pressure applications.

Important: All P74 series differential 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 safety and limit controls or alarms and supervisory systems that protect against or warn of control failure.

Features

- Heavy duty, low profile elements withstand unduly high overrun pressures that may be encountered in shipment or in some machine rooms.
- Lockout models have a “trip-free” manual reset.
- Long life contact structure with high contact force and no contact bounce.
- Single unit mounting and wiring saves installation time and material.

General description

Single and double pole models are available with contacts that open on a pressure differential increase or close on a pressure differential increase. Also available are models with single-pole, double-throw enclosed contacts or with main and separate reverse-acting auxiliary contacts. Controls with lockout feature require manual reset to reclose circuit after lockout. The “trip-free” reset will not permit restart until reset button is pushed and released.

The operation point of the control is readily adjusted by rotating the adjusting disk. The control set points are easily read on a calibrated scale.

Optional constructions

Regularly supplied for non-corrosive refrigerants (fluorinated hydrocarbons). Available for ammonia service with 1/4 in. - 18 FNPT connector (See Style Chart, Fig. 2)

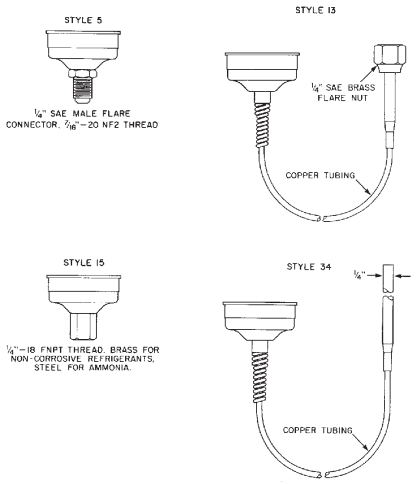


Figure 2: Pressure element styles available on the P74. Style 13 is standard. Other styles in this diagram can be supplied on quantity orders.

Pressure connectors

Standard controls supplied with 36 in. capillary tubing with 1/4 in. flare nut (Style 13). Controls with 1/4 in. SAE male flare connector (no capillary tubing, Style 5), 36 in. capillary tubing with 1/4 in. sweat section (Style 34), or 1/4 in. FNPT connector (Style 15) may be supplied on quantity orders (see Pressure Element Styles).

Ordering information

To order, specify:

1. Quantity required
2. Complete product number, if available, or product number
3. Refrigerant: Non-corrosive or ammonia
4. style of pressure connector
5. Optional constructions
6. Setting: contacts close ____ and open ____

Repairs and replacement

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

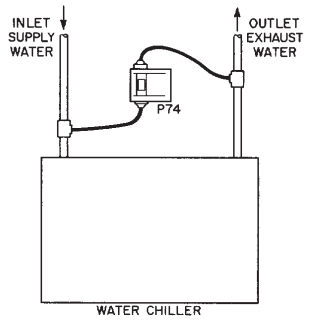


Figure 3: Typical proof of flow hookup.

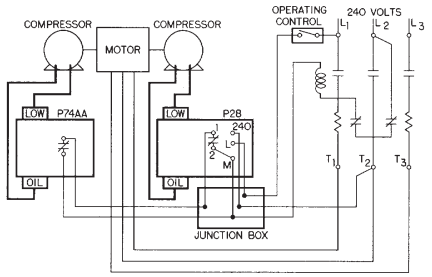
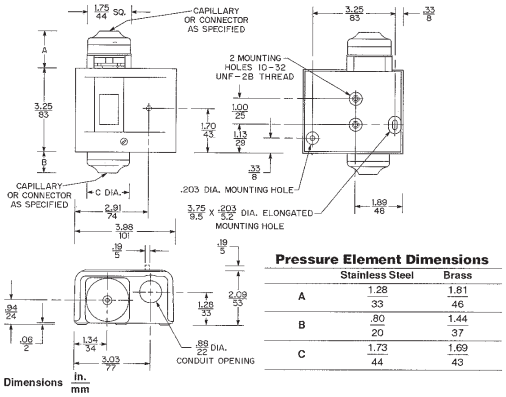


Figure 4: Typical wiring diagram showing the P74AA and a P28 on a motor operating two compressors.



Pressure Element Dimensions

	Stainless Steel	Brass
A	1.28 33	1.81 46
B	.80 20	1.44 37
C	1.73 44	1.69 43

Figure 5: Pressure element dimensions.

Specifications

Type number	**P74AA**	SPST, Contacts open on differential pressure increase
	P74AB	SPST, Contacts open on differential pressure increase, manual reset
	P74BA	SPST, Contacts close on differential pressure increase
	P74DA	DPST, Contacts close on differential pressure increase
	P74EA	SPDT, Standard switch differential
	P74FA	SPDT, Narrow switch differential
	P74HA	Main contacts close on differential increase, separate auxiliary contacts open
Ambient temperature	**Minimum**	32°F (0°C)
	Maximum	104°F (40°C)
Conduit opening		7/8 in. (22 mm) diameter hole for 1/2" conduit
Contact unit	**P74A, P74B, P74C, P74D, P74G, P74H**	Large copper backed silver contacts and Beryllium copper conductor leaves
	P74E, P74F	SPDT, Snap-acting contacts in dust protected enclosure
Differential		See table
Finish		Grey baked
Material	**Case**	.062 in. (1.6 mm) cold rolled steel
	Cover	.028 in. (0.7 mm) cold rolled steel
Maximum pressure		See table
Mounting bracket		Universal mounting bracket, Part No. 271-51, supplied as standard
Range		See table
Shipping weight	**Individual pack**	2.4 lb (1.1 kg)
	Overpack of 20	50.5 lb (22.9 kg)
	Bulk pack of 25	57 lb (25.9 kg)

Electrical ratings

P74AA, P74AB, P74BA

Motor ratings	1 Phase			
	120 V	208 V	240 V	277 V
AC full load amp	20.0	18.7	17.0	–
AC locked rotor amp	120.0	112.2	102.0	–
AC non-inductive amp	22.0	22.0	22.0	–
Pilot duty: 125 VA, 120 to 600 VAC, 57.5 VA, 120 to 300 VDC				

P74EA

Motor ratings	1 Phase			
	120 V	208 V	240 V	277 V
AC full load amp	16.0	9.2	8.0	–
AC locked rotor amp	96.0	55.2	48.0	–
AC non-inductive amp	16.0	16.0	16.0	–
Pilot duty: 125 VA, 120 to 600 VAC				

P74DA

Motor ratings	1 Phase				Polyphase	
	120 V	208 V	240 V	277 V	208 V	240 V
Horsepower	2	3	3	–	5	5
AC full load amp	24.0	18.7	17.0	–	16.5	15.0
AC locked rotor amp	144.0	112.2	102.0	–	99.0	99.0
AC non-inductive amp	24.0	24.0	24.0	22.0	–	–
Pilot duty: 125 VA, 120 to 600 VAC, 57.5 VA, 120 to 300 VDC						

P74HA

Pole number	Line-M2 (Main)				Line-M1 (Auxiliary)			
Motor rating	120 V	208 V	240 V	277 V	120 V	208 V	240 V	277 V
AC full load amp	16.0	9.2	8.0	–	6.0	3.3	3.0	–
AC locked rotor amp	96.0	55.2	48.0	–	36.0	19.6	18.0	–
AC non-inductive amp	16.0	9.2	8.0	7.2	6.0	6.0	6.0	6.0
Pilot duty, both poles: 125 VA, 120 to 600 VAC, 57.5 VA, 120 to 300 VDC								

Range and differential specifications

Differential pressure range PSI (kPa)	Switch differential PSI (kPa)			Maximum differential pressure between bellows PSI (kPa)	Maximum low pressure bellows overrun PSI (kPa)	Bellows material
	P74A, P74B, P74D, P74H	P74E	P74F			
2 - 26 (14-180)	–	3.5 fixed (24)	1.2 fixed (8)	120 (830)	180 (1241)	Brass
8 - 60 (50-400)	6-20 adj (41-138)	3.8 fixed (26)	1.5 fixed (10)	120 (830)	180 (1241)	Brass
2 - 30 (14-207)	–	5.0 fixed (34)	2.0 fixed (14)	200 (1379)	180 (1241)	Stainless steel
8 - 70 (50-450)	8-30 adj (55-207)	5.5 fixed (38)	2.5 fixed (17)	200 (1379)	180 (1241)	Stainless steel

P74FA

Motor ratings	1 Phase			
	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	–
AC non-inductive amp	10.0	10.0	10.0	10.0
Pilot duty: 125 VA, 120 to 277 VAC				