

P70, P72, and P170 Series

Controls for High Pressure Applications

Description

The P70, P72, and P170 controls for high pressure applications are designed primarily for high pressure cut-out control, head-pressure control, and condenser fan cycling control on commercial refrigeration and air conditioning applications.

Controls are available in several pressure ranges and are compatible with most common refrigerants. They may also be used on other non-corrosive fluid applications. Ammonia compatible models are also available.

Several different electrical ratings and switch configurations are available. The P72 models provide direct control of 208-240 volt single-phase motors up to 3 horsepower, and 208-220 volt 3-phase motors up to 5 horsepower.

Features

- all-steel case and cover provides long lasting, rugged protection for internal components
- "Sight-Set" calibrated pressure adjustment displays a visible pressure scale, fully adjustable through the range without removing the cover (on NEMA 1 enclosure models)

- manual reset lockout option provides "trip-free" lockout that cannot be overridden or reset until pressure returns to specified level
- variety of available pressure connection styles allows greater flexibility when mounting control and adapting pressure connections to field application requirements

Applications

- P70C, P70D P170C and P170D models** with Single-Pole Single-Throw (SPST) Open-high switch action are the most popular models, and are typically used for high-pressure cutout. The **C models** are automatic reset. The **D models** have a manual reset lockout mechanism. Some **P70C, P70D P170C and P170D models** are UL Listed as refrigeration pressure limiting controls.
- P70A and P170A models** are available with SPST Open-low switch action, and typically are used for condenser fan cycling control.
- P70 and P170 models** with Single-Pole Double-Throw (SPDT), or 4-wire, 2-circuit switch action allow users to install alarm devices or other control circuits.



P70CA-3 High Pressure Cutout Control

- P72 models** have a Double-Pole Single-Throw (DPST) switch with load-carrying contacts that can provide direct control of 208-240 V single-phase motors up to 3 horsepower, and 208-220 V 3-phase motors up to 5 horsepower. Refer to DPST Electrical Ratings (P72A, B, C, and D Models) on page 3.

NEMA 1 enclosures are standard on most models.

Selection Chart for Standard P70, P72, and P170 Controls for High Pressure Applications (Part 1 of 2)

Code Number	Switch Action	Range psig (kPa)	Differential psi (kPa)	Pressure Connection	Max. Working Pressure
Condenser Fan Cycling Controls (for Non-Corrosive Refrigerants)					
P70AA-118C	SPST Open-low	100 to 400 (690 to 2758)	Minimum 35 (241) Maximum 200 (1379)	36 in. Capillary with 1/4 in. Flare Nut	475 psig (3275 kPa)
P72AA-27C	DPST Open-low				
P170AA-118C	SPST Open-low			1/4 in. Male Flare Connector	
All Range Controls (for Non-Corrosive Refrigerants)					
P70CA-2C ¹	SPST Open-high	50 to 500 (345 to 3448)	Minimum 60 (414); Maximum 150 (1034)	1/4 in. Male Flare Connector	525 psig (3620 kPa)
P70CA-3C ¹			Manual Reset Lockout	36 in. Capillary with 1/4 in. Flare Nut	
P70DA-1C ¹					
P70KA-1C	4-wire, 2-circuit Line-M1 Close-high Line-M2 Open-high				
P72CA-2C ¹			DPST Open-high	Minimum 60 (414); Maximum 150 (1034)	
P72DA-1C ¹				Manual Reset Lockout	
P170CA-3C ¹	SPST Open-high		Minimum 60 (414); Maximum 150 (1034)	1/4 in. Male Flare Connector	
P170DA-1C			Manual Reset Lockout		
P170KA-1C	4-wire, 2-circuit Line-M1 Close-high Line-M2 Open-high				
Models for High Pressure Non-Corrosive Refrigerants ²					
P70AA-2C	SPST Open Low	0 to 150 (0 to 1034)	Minimum 10 (69); Maximum 70 (483)	36 in. Cap. with 1/4 in. Flare Nut	325 psig (2241 kPa)
P170AA-2C				1/4 in. Male Flare Connector	
P70AA-400C			100 to 470 (689 to 3241)	Minimum 35 (241); Maximum 200 (1379)	36 in. Cap. with 1/4 in. Flare Nut
P170AA-400C				1/4 in. Male Flare Connector	
P70CA-400C ¹	SPST Open High	200 to 610 (1379 to 4206)	Minimum 60 (414); Maximum 150 (1034)	36 in. Cap. with 1/4 in. Flare Nut	
P170CA-400C ¹					1/4 in. Male Flare Connector
P70DA-400C ¹				Manual Reset Lockout	36 in. Cap. with 1/4 in. Flare Nut
P170DA-400C ¹					1/4 in. Male Flare Connector

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 2009 Johnson Controls, Inc. www.johnsoncontrols.com

Controls for High Pressure Applications (Continued)

Selection Chart for Standard P70, P72, and P170 Controls for High Pressure Applications (Part 2 of 2)

Code Number	Switch Action	Range psig (kPa)	Differential psi (kPa)	Pressure Connection	Max. Working Pressure
Ammonia Compatible Models					
P70AA-119C	SPST Open Low	50 to 300 (345 to 2068)	Minimum 20 (138); Maximum 120 (827)	1/4 in. SS Female NPT	400 psig (2758 kPa)
P70CA-5C ¹	SPST Open-High	50 to 500 (345 to 3448)	Minimum 60 (414); Maximum 150 (1034)		525 psig (3620 kPa)
P70DA-2C ¹			Manual Reset Lockout		
P70KA-7C	4-wire, 2-circuit Line-M1 Close-high Line-M2 Open-high				

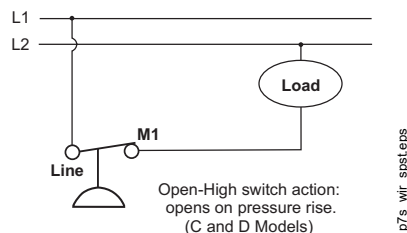
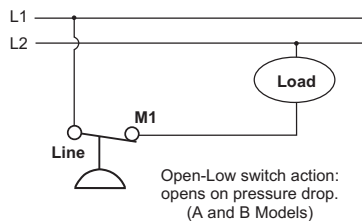
1. UL Listed as refrigeration pressure limiting controls
2. Compatible with R410A refrigerant.

Note: To order models not listed in the selection chart, please contact Johnson Controls/Penn Refrigeration Application Engineering at 1-800-275-5676.

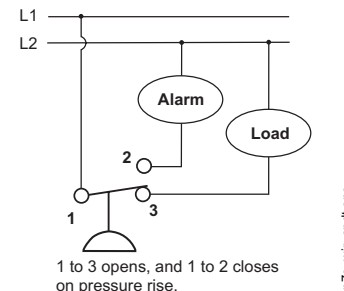
Technical Specifications

Single Pressure Controls Switch Action, Low Event, High Event, and Models

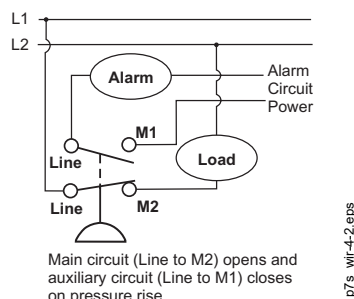
Switch and Action	Low Event	High Event	Models
Single-Pole Single-Throw (SPST) Open-low	Cut Out (Opens Line to M1)	Cut In (Closes Line to M1)	P70A, P70B, P170A
Single-Pole Single-Throw (SPST) Open-high	Cut In (Closes Line to M1)	Cut Out (Opens Line to M1)	P70C, P70D, P170C, P170D
Single-Pole Double-Throw (SPDT)	Opens 1 to 2 and closes 1 to 3	Closes 1 to 2 and Opens 1 to 3	P70E, P70F
4-wire, 2-circuits, 1 N.O., 1 N.C. Open-low	Cut Out (Opens M2 to Line and Closes M1 to Line)	Cut In (Closes M2 to Line and Opens M1 to Line)	P70G, P70H
4-wire, 2-circuits, 1 N.O., 1 N.C. Open-high	Cut In (Closes M2 to Line and Opens M1 to Line)	Cut Out (Opens M2 to Line and Closes M1 to Line)	P70J, P70K, P170K
Double-Pole Single-Throw (DPST) Open-low	Cut Out (Opens M1 to Line and M2 to Line)	Cut In (Closes M1 to Line and M2 to Line)	P72A, P72B
Double-Pole Single-Throw (DPST) Open-high	Cut In (Closes M1 to Line and M2 to Line)	Cut Out (Opens M1 to Line and M2 to Line)	P72C, P72D



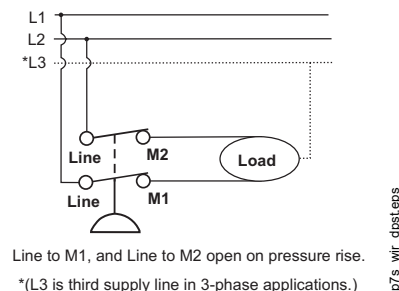
Typical Wiring for SPST (P70A, B, C, D, and P170A, C, D, Models)



Typical Wiring for SPDT Switch (P70E, F Models)



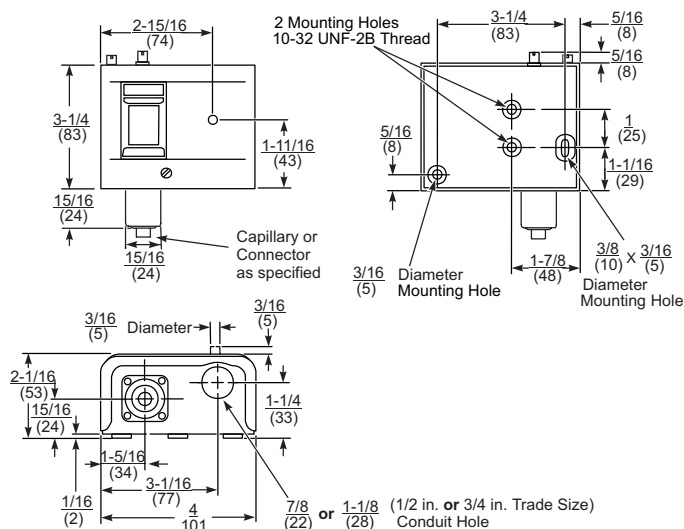
Typical Wiring for 4-wire 2-circuit Switch used for a High Pressure Cutout Application with an Alarm Circuit (P70J, K, and P170K Models)



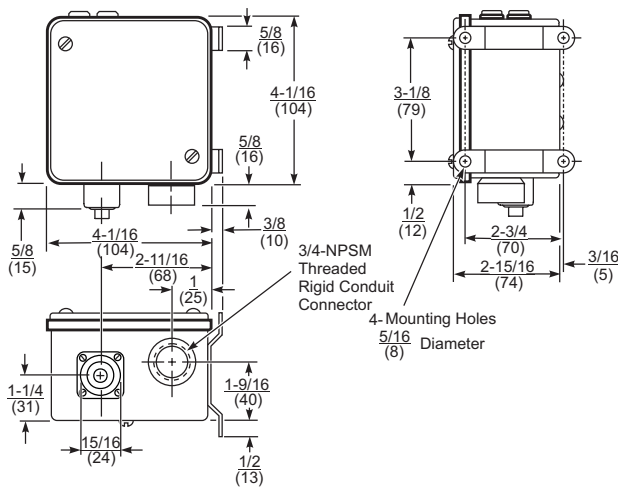
Typical Wiring for DPST Switch (P72C, and D Models)

Controls for High Pressure Applications (Continued)

Technical Specifications (Continued)



Dimensions for High Pressure Controls with NEMA 1 Enclosure, in. (mm) *



Dimensions for High Pressure Controls with NEMA 3R Enclosure, in. (mm) *

* These dimensions are nominal and are subject to accepted manufacturing tolerances and application variables.

SPST Electrical Ratings (P70A, B, C, and D, and P170A, C, and D Models)

	Single-Phase Ratings			
	Standard			Hermetic Compressor
	120 VAC	208 VAC	240 VAC	208/240 VAC
Motor Horsepower	2	3	3	--
Motor Full-Load A	24	18.7	17	24
Motor Locked-Rotor A	144	112.2	102	144
Non-Inductive A	22	22	22	--
Pilot Duty - 125 VA at 120 to 600 VAC; 57.5 VA at 120 to 300 VDC				

SPDT Electrical Ratings 1hp Switch (P70E Models)

	Standard Single-Phase Ratings			
	120 VAC	208 VAC	240 VAC	277 VAC ¹
Motor Full Load A	16.0	9.2	8.0	7.0
Motor Locked Rotor A	96.0	55.2	48.0	42.0
Non-Inductive A	16.0	9.2	8.0	-
Pilot Duty	125 VA at 120 to 600 VAC			125 VA at 24 to 600 VAC

1. Rating for P70EC models only

SPDT Electrical Ratings 1/4 hp Switch (P70F Models)

	Standard Single-Phase Ratings		
	120 VAC	208 VAC	240 VAC
Motor Full Load A	6.0	3.3	3.0
Motor Locked Rotor A	36.0	19.8	18.0
Non-Inductive A	6.0	6.0	6.0
Pilot Duty	125 VA at 24 to 240 VAC		

4-wire, 2-circuit Electrical Ratings (P70G, H, J, and K, and P170K Models)

	Standard Single-Phase Ratings							
	Line-M2 (Main Contacts)				Line-M1 (Auxiliary Contacts)			
	120 VAC	208 VAC	240 VAC	277 VAC	120 VAC	208 VAC	240 VAC	277 VAC
Motor Full Load A	16.0	9.2	8.0	--	6.0	3.3	3.0	--
Motor Locked Rotor A	96.0	55.2	48.0	--	36.0	19.8	18.0	--
Non-Inductive A	16.0	9.2	8.0	7.2	6.0	6.0	6.0	6.0
Pilot Duty for both sets of contacts	125 VA at 24 to 600 VAC; 57.5 VA at 120 to 300 VDC							

DPST Electrical Ratings (P72A, B, C, and D Models)

	Standard Ratings					Hermetic Compressor Ratings	
	120 VAC, 1Ø	208 VAC, 1Ø	240 VAC, 1Ø	208 VAC, 3Ø	220 VAC, 3Ø	208 VAC, 1Ø	240 VAC, 1Ø
Motor Horsepower	2	3	3	5	5	--	--
Motor Full-Load A	24	18.7	17	15.9	15	24	24
Motor Locked-Rotor A	144	112.2	102	95.4	90	144	144
AC Non-Inductive A	24	24	24	24	24	--	--
DC Non-Inductive A	3	0.5	0.5	0.5	0.5	--	--
Pilot Duty	125 VA at 120 to 600 VAC; 57.5 VA at 120 to 300 VDC						