

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 | | | 1/4 in. Male Flare Connector | |
| P170AA-118C | SPST Open-low | | | | |
| 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 | | | | 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 | | | | | |
| 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 | | | | | |
| Models for High Pressure Non-Corrosive Refrigerants² | | | | | |
| 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 | | | | | |
| P170AA-400C | 1/4 in. Male Flare Connector | 690 psig (4757 kPa) | | | |
| 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 | | | | |

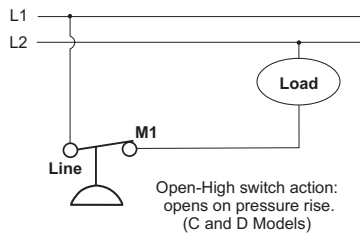
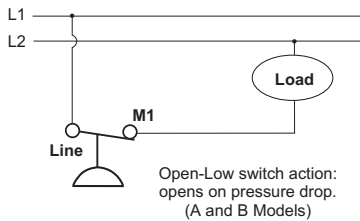
- UL Listed as refrigeration pressure limiting controls
- Compatible with R410A refrigerant.

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

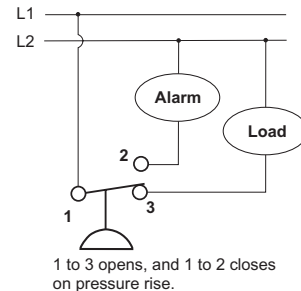
Technical Specifications

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

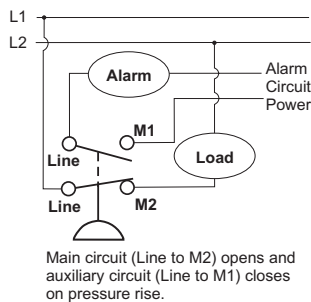
| Switch and Action | Low Event | High Event | Models |
|---|---|---|--------------------------|
| Single-Pole Single-Throw (SPST) Open-low | Cut Out (Opens Line to M1) | Cut In (Closes Line to M1) | P70A, P70B, P170A |
| Single-Pole Single-Throw (SPST) Open-high | Cut In (Closes Line to M1) | Cut Out (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 |



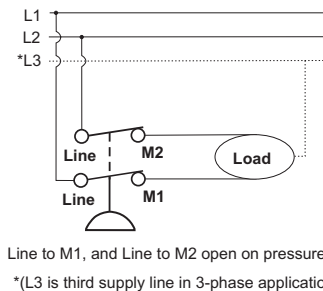
**Typical Wiring for SPST
(P70A, B, C, D, and P170A, C, D, Models)**



Typical Wiring for SPDT Switch (P70E, F Models)



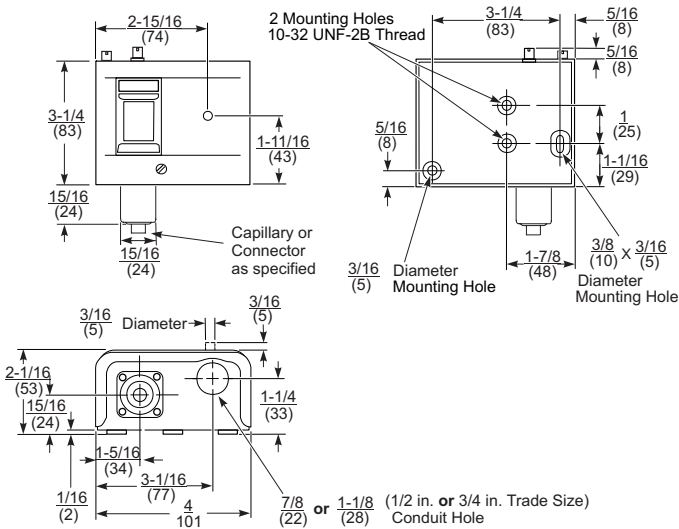
**Typical Wiring for 4-wire 2-circuit Switch used for a
High Pressure Cutout Application with an Alarm Circuit
(P70J, K, and P170K Models)**



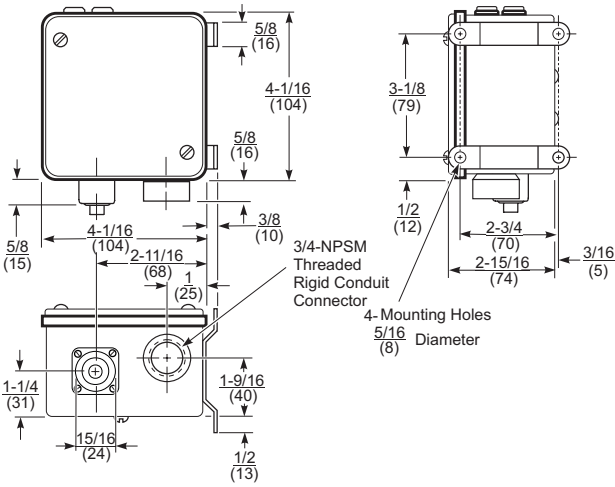
Typical Wiring for DPST Switch (P72C, and D Models)

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 | | | | | | |