

A70, A72 Series Temperature Controls for Refrigeration and Heating

Application

The A70 single-pole and A72 two-pole controls are supplied in a wide selection of ranges to meet most application needs. See "Temperature Ranges."

Models may be supplied to open a circuit on temperature increase or close a circuit on temperature increase as required. An A70 single-pole control may optionally include a separate reverse-acting auxiliary contact. Models are available with a SPDT enclosed Pennswitch.

All Series A70, A72 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

- Long life contact structure with high contact force right up to break -- no bounce on make.
- Make reset models are "trip-free".
- Ranges available to cover most applications.
- Auxiliary contact can be used to actuate an alarm circuit when the main contact opens.
- Two-pole construction provides a number of application advantages (see "General Description").
- Heavy gauge "low profile" stainless steel element cup to protect against mechanical damage.



Fig. 1 -- Single function temperature control, Style 1.

General Description

The A70 controls provide dependability and quality at attractive prices. The A72 DPST controls provide a number of application advantages such as:

- Control of polyphase motors without use of magnetic starters where protection against overloading and single phasing is otherwise provided.
- Provides two separate control circuits necessary for the control of multiple systems.
- One set of contacts breaks the "hot" line when wired as a two-pole switch in single-phase circuits.
- Permits control of two separate load circuits.
- Automatic control of heavy electrical loads.
- All A70, A72 controls have a single calibrated scale which shows directly both cut-in and cutout settings. Adjustments can be made readily without removing the cover.

Specifications

| | | |
|----------------------------------|-----------------------|---|
| Series | A70 | Single Pole, See Table for Type Number Selection |
| | A72 | Two Pole, See Table for Type Number Selection |
| Adjusting | | Screwdriver Slot, Adjusting Knob On Differential or Range Screw, When Required |
| Capillary | | 6' (1.8 m) Long Standard. Longer Capillary Tube Up to 10' (3 m) in 2' (0.6 m) Increments. Over 10' in 5' (1.5 m) Increments |
| Contact Action | | Open On Rise, Close On Rise, SPDT, As Required |
| Contact Unit | | Snap-Acting High Contact Force Right Up to Contact Break Point, No Bounce, Beryllium Copper Conductor Leaves with Silver-Cadmium Oxide Contacts |
| Finish | | Gray Baked Enamel |
| Material | Case | 0.062" (1.6 mm) Cold Rolled Steel |
| | Cover | 0.028" (0.7 mm) Cold Rolled Steel |
| Mounting | | Holes in Back of Case or with Part No. 271-350 Mounting Bracket. Controls Supplied Less Bracket Unless Specified |
| Shipping Weights Approx.* | Less Knob | 2.4 lb (1.1 kg) |
| | With Knob | 2.5 lb (1.1 kg) |
| | Overpack of 20 | 49 lb (22.2 kg) |

*Weights will vary somewhat depending on construction features supplied, type of element, etc.

Optional Constructions

Adjusting Knobs

May be supplied on differential or range adjusting screw for limited adjustment within specified limits.

Adjustment Cutout Stops

Cutout stops, factory set as specified.

Bulb and Capillary

Standard bulb and capillary are copper. Stainless steel, monel and steel bulbs are available, if required. Bulb and capillary with neoprene coating to military specifications MIL-R-3065, Grade SB-515-ABFF may be supplied at additional cost. Capillary length 6 ft (1.8 m) only.

Bulb Wells

Supplied at extra cost, when specified.

Capillary Tubing

Standard temperature elements supplied with 6 ft (1.8 m) capillary. Extra length tube available at additional cost. Longer capillary tube supplied up to 10 feet (3 m) in 2 foot (0.6 m) increments; over 10 feet (3 m) in 5 foot (1.5 m) increments.

Contact Action

Open on rise or close on rise as specified.

Covers

Standard finish is gray enamel. Stainless steel covers available at slight additional cost for exposed installations.

Fungus Proofing

Supplied at extra cost, when specified. Conforms to government specifications MIL-V-173A.

Manual Reset

Provides lockout which requires manual reset before a restart is possible. Manual reset is "trip-free" and cannot be blocked or tied down. Button must be pressed and released before operation will resume.

Metric Scale Plates

Temperature models are available with Celsius plates.

Mounting Brackets

Controls are supplied less bracket unless specified. Controls may be supplied with mounting brackets at additional cost. Part No. 271-350 is standard.



Fig. 2 -- Standard mounting bracket

Temperature Elements

Standard temperature element styles are shown on Page 5. For styles other than shown, please check with the nearest Johnson Controls district office or Customer Service.

Type Number Selection

| Type Number | Main Contact Action | No. of Poles | Lockout with Manual Reset | Knob | Conduit Opening | Misc. |
|--------------------|---------------------|--------------|---------------------------|------|-----------------|-----------------------------|
| Single-Pole | | | | | | |
| A70AA | Open Low | 1 | No | No | 1/2 in. | |
| A70AQ | Open Low | 1 | No | Yes | 1/2 in. | Manual Start |
| A70BA | Open Low | 1 | Yes | No | 1/2 in. | |
| A70DA | Open High | 1 | Yes | No | 1/2 in. | |
| A70GA | Open Low | 1 | No | No | 1/2 in. | Reverse Acting Aux. Contact |
| A70HA | Open Low | 1 | Yes | No | 1/2 in. | Reverse Acting Aux. Contact |
| A70JA | Open High | 1 | No | No | 1/2 in. | Reverse Acting Aux. Contact |
| A70KA | Open High | 1 | Yes | No | 1/2 in. | Reverse Acting Aux. Contact |
| Two-Pole | | | | | | |
| A72AA | Open Low | 2 | No | No | 3/4 in. | |
| A72AC | Open Low | 2 | No | No | 3/4 in. | No Cover |
| A72AE | Open Low | 2 | No | No | 3/4 in. | Outdoor Case |
| A72AP | Open Low | 2 | No | No | 3/4 in. | Manual Start |
| A72CA | Open High | 2 | No | No | 3/4 in. | |
| A72CE | Open High | 2 | No | No | 3/4 in. | Outdoor Case |

Repairs and Replacements

Field repairs must not be made except for replacement of the cover or knob. For a replacement control, cover or knob contact the nearest Johnson Controls wholesaler.

Ordering Information

When ordering, please specify:

1. Quantity on order.
2. Product Number if available.
3. If Product Number is not available, specify Type Number and the following specifications:
 - a. Temperature range.
 - b. Style of element. Indicate whether *standard* or *cross ambient* element -- bulb material and tubing (copper, steel, stainless or model).
4. Setting -- switch contacts to close at ___ and open at ___.
5. If accessories are desired -- mounting bracket, manual reset, external knob or bulb well.
6. If external adjusting knob is required, specify if on differential or range screw.

Temperature Ranges*

| Range (°F) (Min. to Max.)† | Nominal Differential (F°) | | | | Maximum Allowable Temp. (°F) |
|-------------------------------|---------------------------|-----------------|--------------|-----------------|------------------------------|
| | Minimum | | Maximum | | |
| | Top of Range | Bottom of Range | Top of Range | Bottom of Range | |
| -30 to +30 | 4 | 7 | 30 | 45 | 200 |
| -10 to +65 | 4 | 10 | 30 | 40 | 200 130 (cross ambient) |
| 15 to 55 | 3 | 6 | 25 | 30 | 170 |
| 25 to 90 | 5 | 12 | 45 | 55 | 200†† |
| 35 to 80 | 3 | 6 | 25 | 30 | 130 |
| 50 to 90 | 3 | 5 | 25 | 30 | 135 |
| 70 to 120 | 3 | 7 | 25 | 30 | 170 |
| 100 to 170 | 6 | 10 | 45 | 55 | 250 |
| 115 to 190 | 6 | 10 | 45 | 55 | 250 |
| 140 to 220 | 6 | 10 | 45 | 60 | 250 |
| 165 to 230 | 6 | 11 | 55 | 60 | 250 |
| 190 to 255 | 4 | 10 | 45 | 55 | 275 |
| 240 to 320 | 5 | 13 | 50 | 60 | 350 |
| 255 to 340 | 7 | 15 | 80 | 80 | 400 |
| 310 to 400 | 8 | 15 | 85 | 85 | 425 |

* For other ranges check Customer Service.

† For controls which open on temperature increase the ranges are minimum cut-in to maximum cutout. For controls which open on temperature decrease the ranges are minimum cutout to maximum cut-in.

†† Style 9 low temperature cutout controls have a maximum allowable bulb temperature of 400°F.

Temperature Ranges — Metric*

| Range (°C) (Min. to Max.)† | Nominal Differential (C°) | | | | Maximum Allowable Temp. (°C) |
|-------------------------------|---------------------------|-----------------|--------------|-----------------|------------------------------|
| | Minimum | | Maximum | | |
| | Top of Range | Bottom of Range | Top of Range | Bottom of Range | |
| -34.4 to -1.11 | 2.2 | 4.0 | 16.7 | 25.0 | 93 |
| -23.3 to 18.3 | 2.2 | 5.6 | 16.7 | 22.2 | 93 54 (cross ambient) |
| -9.44 to 12.8 | 1.7 | 3.3 | 13.9 | 16.7 | 93†† |
| -3.89 to 32.2 | 2.8 | 6.7 | 25.0 | 30.6 | 77 |
| 1.67 to 26.7 | 1.7 | 3.3 | 13.9 | 16.7 | 54 |
| 10.0 to 32.2 | 1.7 | 2.8 | 13.9 | 16.7 | 57 |
| 21.1 to 49.0 | 1.7 | 4.0 | 13.9 | 16.7 | 77 |
| 37.8 to 77.0 | 3.3 | 5.6 | 25.0 | 30.6 | 121 |
| 46.0 to 88.0 | 3.3 | 5.6 | 25.0 | 30.6 | 121 |
| 60.0 to 104.0 | 3.3 | 5.6 | 25.0 | 33.3 | 121 |
| 74.0 to 110.0 | 3.3 | 6.1 | 30.6 | 33.3 | 121 |
| 88.0 to 124.0 | 2.2 | 5.6 | 25.0 | 30.6 | 134 |
| 116.0 to 160.0 | 2.8 | 7.2 | 27.8 | 33.3 | 177 |
| 124.0 to 171.0 | 4.0 | 8.3 | 44.4 | 44.4 | 204 |
| 154.0 to 204.0 | 4.4 | 8.3 | 47.2 | 47.2 | 218 |

* For other ranges check Customer Service.

† For controls which open on temperature increase the ranges are minimum cut-in to maximum cutout. For controls which open on temperature decrease the ranges are minimum cutout to maximum cut-in.

†† Style 9 low temperature cutout controls have a maximum allowable bulb temperature of 204°C.

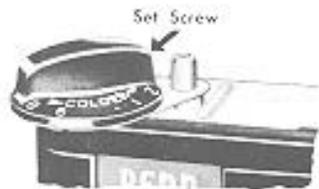


Fig. 3 -- Where it is desirable for the user to increase or decrease the DIFFERENTIAL ONLY, external adjusting knob is supplied on differential screw as shown. Knob is provided with stops and factory assembled to permit change only within specified limits.



Fig. 4 -- External adjusting knob may be placed on range screw, as shown where it is necessary for the user to raise or lower both CUT-IN and CUTOFF points (differential remains constant). Knob is provided with stops and factory assembled to permit adjustments within specified limits.

Note: Knob is usually factory assembled in either position as shown in Figs. 3 and 4, depending upon specifications of original buyer. However, knob may be changed in the field from the differential to the range screw or vice versa by loosening set screw and removing knob and indicator plate and reversing their positions. Assuming that knob is factory assembled on range screw (Fig. 4) and set to limit adjustment to 10°F (12°C), this adjustment will become approximately 5°F (-15°C) if knob is placed on differential screw (Fig. 3).

Electrical Ratings

A70, Single Pole

| Motor Ratings | 120 V | 208/240 V | 240 V* |
|---------------------|---|-----------|--------|
| AC Full Load Amp | 20.0 | 17.0 | 20.0 |
| AC Locked Rotor Amp | 120.0 | 102.0 | 102.0 |
| Non-Inductive Amp | 22.0 | 22.0 | 22.0 |
| Pilot Duty | 125 VA, 120 to 600 VAC 57.5 VA, 120 to 300 VAC | | |

*Ratings apply to hermetic compressors.

A70, Main and Auxiliary Contact

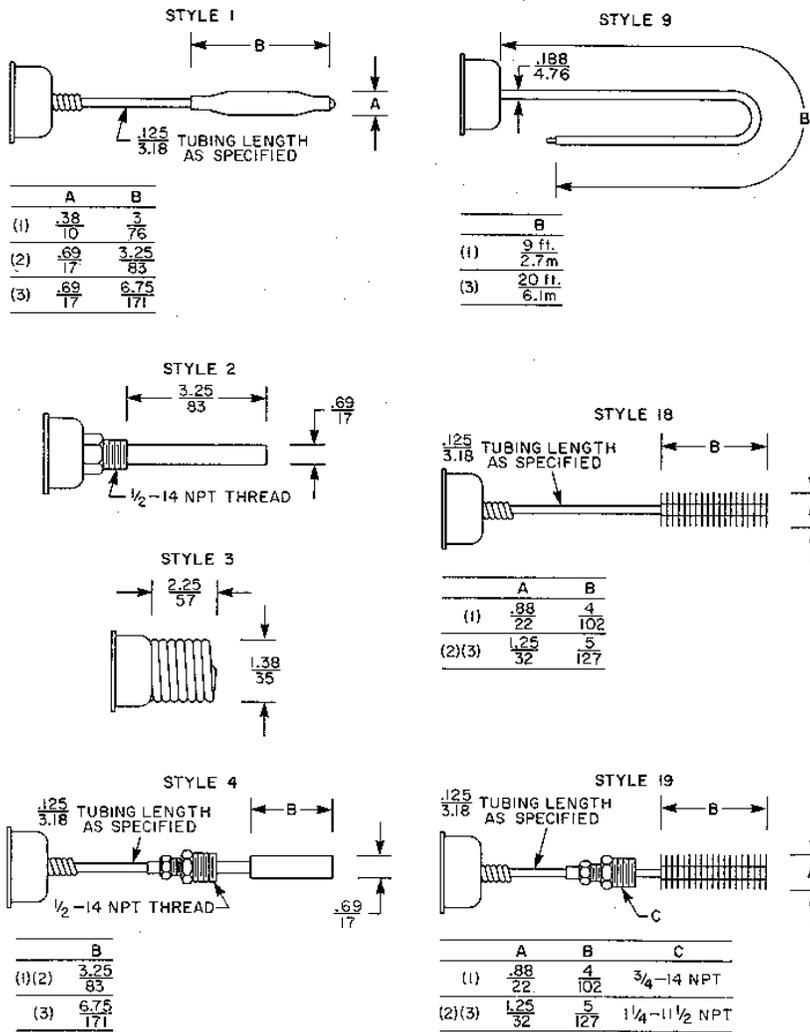
| Pole Number | LINE-M2 (Main) | | | | LINE-M1 (Auxiliary) | | | |
|----------------------|---|-------|-------|-------|---------------------|-------|-------|-------|
| | 120 V | 208 V | 240 V | 277 V | 120 V | 208 V | 240 V | 277 V |
| AC Full Load Amp | 16.0 | 9.2 | 8.0 | — | 6.0 | 3.3 | 3.0 | — |
| AC Locked Rotor Amp | 96.0 | 55.2 | 48.0 | — | 36.0 | 19.8 | 18.0 | — |
| AC Non-Inductive Amp | 16.0 | 9.2 | 8.0 | 7.2 | 6.0 | 6.0 | 6.0 | 6.0 |
| Pilot Duty | 125 VA, 120 to 600 VAC 57.5 VA, 120 to 300 VDC | | | | | | | |

A72, Two Pole

| Motor Ratings | 120 V 1 Ph. | 208 V* 1 Ph. | 240 V* 1 Ph. | 220 V* 2 Ph. | 208 V 3 Ph. | 220 V 3 Ph. |
|----------------------|---|-----------------|-----------------|-----------------|----------------|----------------|
| Horsepower | 2 | 3 | 3 | 5 | 5 | 5 |
| AC Full Load Amp | 24.0 | 24.0 | 24.0 | 15.0 | 15.9 | 15.0 |
| AC Locked Rotor Amp | 144.0 | 144.0 | 144.0 | 90.0 | 95.4 | 90.0 |
| AC Non-Inductive Amp | 24.0 | 24.0 | 24.0 | — | — | — |
| DC Non-Inductive Amp | 3.0 | — | 0.5 | — | — | — |
| Pilot Duty | 125 VA, 120 to 600 VAC 57.5 VA, 120 to 300 VDC | | | | | |

*The full load and locked rotor ampere (not horsepower) ratings apply to hermetic compressors only.

Element Styles



Dimensions shown above with number in parentheses refer to the following elements:

- (1) For temperature ranges below ambient.
- (2) For temperature ranges above ambient.
- (3) For cross ambient temperatures. Dimensions of bulbs shown for 6' (1.8 m) capillary length only.

Dimensions $\frac{\text{in.}}{\text{mm}}$

Notes

Notes



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