

A28 Series Two-Stage Temperature Controls With NEMA 1 Enclosure

Application

These two-stage controls are designed to cover a broad range of general purpose operating temperature control applications in the refrigeration, air conditioning and heating fields.

Two SPDT switches permit independent control circuits. Each switch may be wired for "open high" or "close high" action, as required, providing automatic changeover on heating-cooling or similar requirements. Models are available with close differential on each switch. A jumper across the "common" terminals is supplied as a standard feature. Models are available for fixed or adjustable between stage differential.

All Series A28 temperature 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.

Operation

Figure 8 illustrates the operation of the A28AA. On a temperature increase to the dial setting, the circuit between R and Y of the low stage switch (RY_L) closes. Simultaneously the circuit between R and B (RB_L) opens. On a further increase in temperature the high stage switch operates and closes RY_H while simultaneously opening RB_H . The reverse sequencing takes place on a temperature fall.

Installation

Follow equipment manufacturer's instructions if provided. If instructions are not provided, proceed as follows:

Mounting

Controls are normally mounted to a surface through holes in back of case.

CAUTION: On rough mounting surfaces use the top two mounting holes only. When these controls are mounted on an uneven surface using screws in all four holes, the case can be twisted enough to affect the control's calibration and operation.

For closed tank applications without well assembly, Part FTG 13A-600R packing nut assembly may be supplied. See Fig. 4 for sequence of installation. Place parts over support tube section of the element, placing bulb into tank (be sure tank is drained so liquid level is below tank opening). Tighten the 1/2 in. NPT adapter. Screw packing nut into adapter with the retaining washers and packing in place as shown.

To install models supplied with a bulb well, first install the bulb well into the tank opening. Remove bushing from the bulb well and slide the bushing over capillary. Place the bulb and bushing into the well. Push bulb into position in bottom of the well. Tighten set screw in end of the adapter to hold bulb in position. See Fig. 5 for bulb well installation.

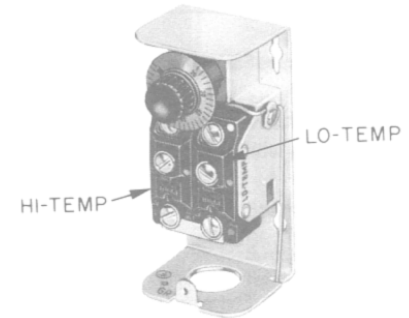


Fig. 1 -- Interior view showing high stage and low stage switches.

CAUTION: Do not dent or deform the sensing bulb of this control. A dent or deformation will change the calibration and cause the control to cycle at a temperature lower than the dial setting. When the bulb mounting clip is used to mount the bulb near the refrigerant tubing, be sure the sheet metal screw does not pierce the tubing.

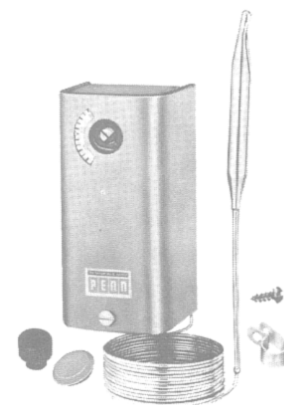


Fig. 2 -- The A28 with remote bulb and convertible adjustment has a snap-in plug in the cover, a knob for field installation, and a bulb mounting clip with sheet metal screw.

Wiring

CAUTION: Disconnect power supply before wiring connections are made to avoid possible electrical shock or damage to equipment.

Follow equipment manufacturer's diagrams if provided. Wiring should conform to local codes and the National Electrical Code. Wiring terminals of each

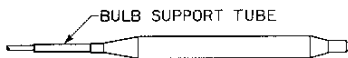


Fig. 3 — Style 1 swaged bulb with support tube for clamp-on or closed tank applications.

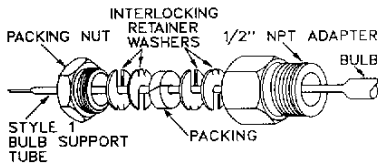


Fig. 4 — Part Number FTG13A-600R packing nut assembly. (Use with Style 1 bulb with support tube for direct immersion applications.)

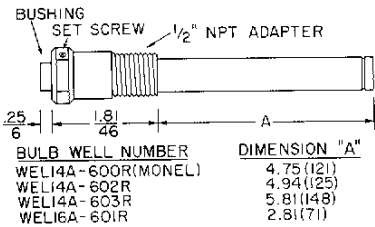


Fig. 5 — Bulb well for liquid immersion applications where a temperature bulb may be removed without draining tank.

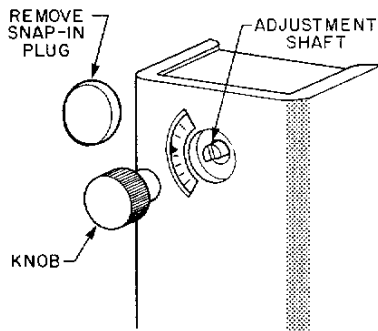


Fig. 6 — Drawing showing snap-in plug removed and the knob in line to assemble. Press the knob onto the slotted shaft.

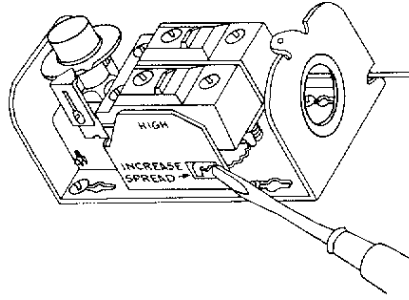


Fig. 7 — Between-stages differential can be increased by rotating adjusting cam counterclockwise as illustrated above.

Pennswitch are color coded for convenience and to simplify wiring. Red is the common terminal; red to yellow circuit closes on temperature increase, red to blue circuit opens on temperature increase. Use copper conductors only.

CAUTION: Use terminal screws furnished (8-32 x 1/4 in. binder head). Substitution of other screws may cause problems in making proper connections.

Adjustments

All models have fixed differential on each Pennswitch. To adjust between differential, rotate adjusting controls with between-stage differential, rotate adjusting wheel *counterclockwise* to widen the differential (increase spread). Use a small screwdriver and insert into serrated wheel. (See Fig. 7.)

Knob range adjustment or screwdriver slot adjustment supplied on range screw. Convertible adjustment models can be field converted from

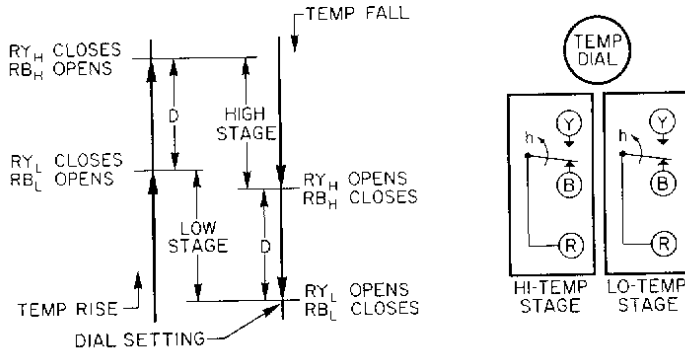


Fig. 8 — Switching action of the two-stage control is illustrated in the sketch above. RB_H, RY_H indicates HI-TEMP stage; RB_L, RY_L indicates LO-TEMP stage. "D" represents the differential between stages.

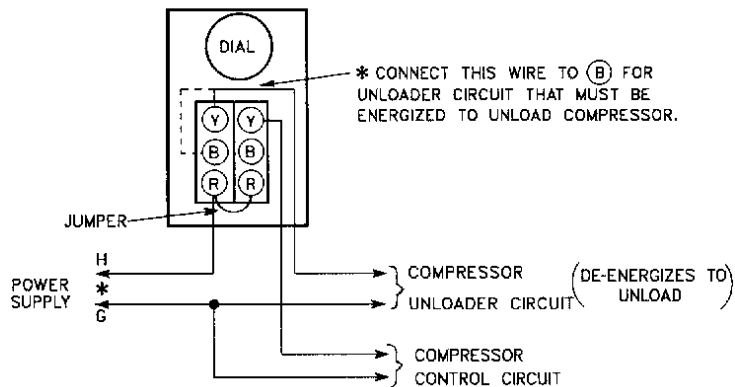


Fig. 9 — Typical wiring diagram of a refrigeration compressor with single stage unloader. Two compressor packages may be sequenced with same circuit.

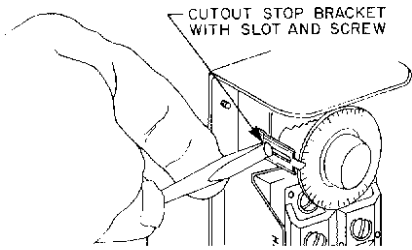


Fig. 10 — The controls have a screw type cutout stop. The stop screw must be loosened and moved to the stop setting desired. Tighten screw after setting is made.

concealed screwdriver slot adjustment to knob adjustment or external screwdriver slot adjustment. They are supplied with a snap-in plug in the cover to provide concealed screwdriver slot adjustment. For knob adjustment remove the snap-in plug and press the knob

onto the slotted shaft. For exposed screwdriver slot adjustment remove the snap-in plug. The convertible adjustment models with remote bulb include a bulb mounting clip.

Low cutout stop is an integral part of the control and can be adjusted by the sliding stop. To set low cutout stop proceed as follows:

1. Remove cover from the control.
2. Set dial to temperature at which stop is desired.
3. Loosen the cutout stop screw, slide the screw to the front of the temperature control against the plastic stop behind the dial and tighten the screw. (See Fig. 10.) Sometimes an exact stop setting is not possible and the stop must

be set to the closest step corresponding to the dial setting required.

4. Replace the cover.

Checkout Procedure

Before leaving the installation, observe at least three complete operating cycles to be sure that all components are functioning correctly.

Adjust dial to a lower or higher set point and check contact action of the switches to see that they are operating according to Fig. 7.

Repairs and Replacement

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

Notes



Controls Group
507 E. Michigan Street
P.O. Box 423
Milwaukee, WI 53202

Printed in U.S.A.