

## A19BAC, A28AA Single and Two-Stage Space Thermostats For Farm and General Purpose Applications

### Application

The single-stage A19BAC and the two-stage A28AA thermostats incorporate single-pole double-throw (SPDT) switches for controlling automatic ventilation or heating in livestock barns, poultry houses, milk houses, brooder houses and other buildings. The 30 to 110°F (0 to 43°C) and 0 to 140°F (-15 to 60°C) temperature ranges permit use for many space applications.

**IMPORTANT:** The single-stage A19 and A28 thermostats are intended to control equipment under normal operating conditions. Where failure or malfunction of an A19 or A28 thermostat could lead to an abnormal operating condition that could cause personal injury or damage to the equipment or other property, other devices (limit or safety controls) or systems (alarm or supervisory) intended to warn of or protect against failure or malfunction of the A19 or A28 thermostat must be incorporated into and maintained as part of the control system.

**CAUTION: Risk of Property Damage.** Do not install A19 or A28 space thermostats with general purpose enclosures in any type of agricultural environment defined in NEC Art. 547 where dust or dust with water may accumulate or where corrosive atmospheres exist. Doing so may cause the A19 or A28 thermostat to fail and result in the loss of temperature regulation and damage to other property.

### Operation

Figs. 4 and 5 illustrate the operation of the A19. On a temperature increase, the circuit between R and Y closes. Simultaneously the R and B circuit opens.

Figure 6 illustrates the operation of the A28AA. On a temperature increase, the circuit between R and Y of the low stage switch (RY<sub>L</sub>) closes. Simultaneously, the circuit between R and B (RB<sub>L</sub>) opens.

On a further increase in temperature, the high stage switch operates and closes RY<sub>H</sub> while simultaneously opening RB<sub>H</sub>.

The reverse sequencing takes place on a temperature fall.

### Installation

#### Mounting

Mount control to a flat surface with screws through holes provided in back of frame.

**IMPORTANT:** 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 thermostat's calibration and operation.

Mount the control where it is exposed to the average temperature of the controlled space. Do not mount where it will be affected by unusual heat or cold, such as directly over an animal stall, in sunlight, or on an outside wall. Avoid locations near a door, window or hay chute.



Fig. 1 -- Exterior view of Space Thermostat

**IMPORTANT:** Do not dent or deform the sensitive bulb of this thermostat. A dent or deformation will change the calibration and cause the thermostat to cycle at a temperature lower than the dial setting.

### Adjustment

Knob adjustment or screwdriver slot is supplied on the range screw. Dial pointer is located on adjustment stop bracket on knob and screwdriver adjustment models.

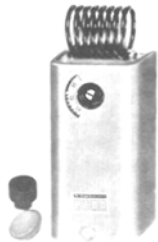
Before removing the cover, verify that all power to the thermostat and associated equipment is turned off.

**WARNING: Risk of Electrical Shock.** Disconnect the power supply before mounting and wiring to prevent possible electrical shock. On multiple circuit units, more than one circuit may have to be disconnected.

Solid cover models are adjusted by removing cover and moving dial so that the setpoint is in line with the dial pointer on the stop bracket. (See Fig. 3.)

Convertible adjustment models can be field converted from 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 external screwdriver slot adjustment remove the snap-in plug.

The A28AA switch is stamped to indicate the HI-TEMP switch and the LO-TEMP switch.



**Fig. 2 -- The Space Thermostats with convertible adjustment have a snap-in plug in the cover, built-in screwdriver slot and a knob for field installation.**

A high temperature adjustment stop is supplied on the thermostats. (See Fig. 3.) If adjustment stop is required:

1. Set dial to temperature at which stop is desired.
2. Remove cover from thermostat.
3. Loosen the adjustment stop screw, slide the screw to the front of the thermostat against the plastic stop cam behind the dial and tighten the screw. (See Fig. 3.)

Sometimes an exact stop setting is not possible and stop must be set to the closest step corresponding to dial setting required.

4. Turn dial to setpoint desired.
5. Replace cover.

## Wiring

**WARNING: Risk of Electrical Shock.** Disconnect the power supply before mounting and wiring to prevent possible electrical shock. On multiple circuit units, more than one circuit may have to be disconnected.

All wiring should conform to local, national, and regional codes. Use copper conductors only. Do not use on applications where electrical ratings exceed ratings shown on the thermostat's cover label.

See Figs. 4 through 11 for typical wiring applications.

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

## Checkout Procedure

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

Check for correct operation in the following manner.

1. *A19BAC -- Ventilating or Cooling:* Turn dial clockwise to a setting above space temperature. Fan or cooling system should be off. When you turn the dial counterclockwise, the fan or cooling system should turn on approximately at the dial setting.

*A19BAC -- Heating:* Turn dial clockwise above the space temperature; the heating unit should be on. When you turn the dial counterclockwise, the heating unit should turn off approximately at the dial setting.

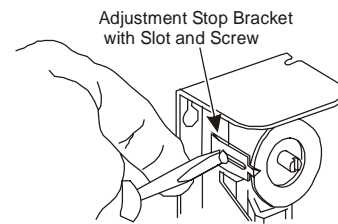
2. *A28AA --* If wiring is similar to Fig. 8, fan should start at approximately space temperature and should change to high speed as the dial is turned counterclockwise to a lower temperature setting.

If similar to Fig. 9, the damper should open as the dial is turned counterclockwise. The devices should act in reverse sequence when the dial is turned clockwise to a higher setting.

3. If control devices do not operate in the manner described above, check all wiring for short circuits and tightness of wiring connections. If controlled devices operate in reverse (start in high or fully open position), check wiring.

## Repairs and Replacement

Field repairs must not be made. For replacement thermostat contact the nearest Johnson Controls distributor.

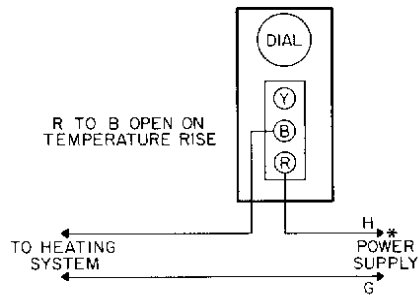


**Fig. 3 -- All models have a screw type adjustment stop. Loosen and move stop screw to the stop setting desired. Tighten screw after setting is made.**

## Electrical Ratings

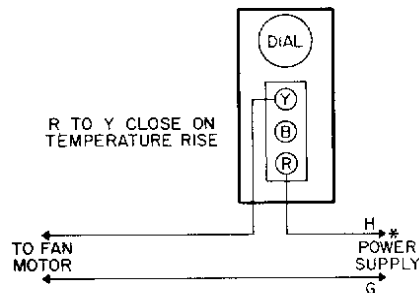
	A28AA*				A19BAC			
	120	208	240	277	120	208	240	277
<b>Volts, AC</b>								
<b>Full Load Amp</b>	16.0	9.2	8.0	--	16.0	9.2	8.0	--
<b>Locked Rotor Amp</b>	96.0	55.2	48.0	--	96.0	55.2	48.0	--
<b>Non-Inductive Amp</b>								
<b>SPDT</b>	16.0	9.2	8.0	7.2	16.0	16.0	16.0	16.0
<b>SPST</b>	16.0	9.2	8.0	7.2	22.0	22.0	22.0	22.0
<b>Pilot Duty</b>	125 VA, 24 to 277 VAC				125VA, 24 to 600 VAC			

\* Max connected load not to exceed 2000 VA.



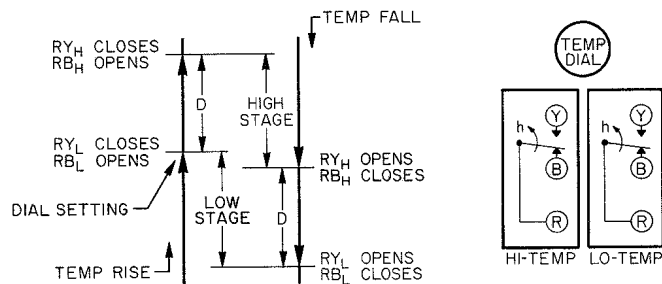
\*Disconnecting means and overload protection as required.

**Fig. 4 – A19BAC typical heating control circuit.**

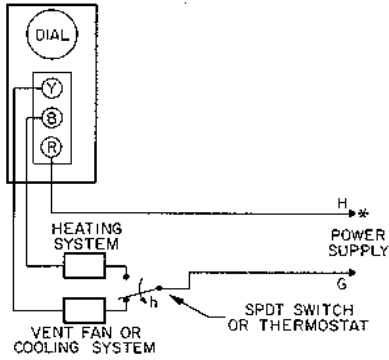


\*Disconnecting means and overload protection as required.

**Fig. 5 – A19BAC typical ventilating or cooling control circuit.**

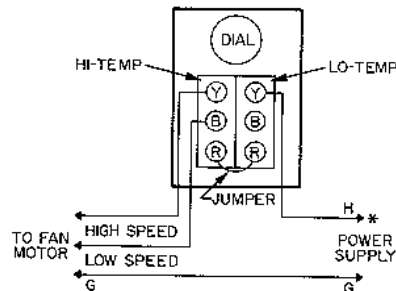


**Fig. 6 – Switch action of the A28AA two-stage control.**  
**RB<sub>H</sub>, RY<sub>H</sub> indicate HI-TEMP. RB<sub>L</sub>, RY<sub>L</sub> indicate LO-TEMP. D**  
**is the differential between stages.**



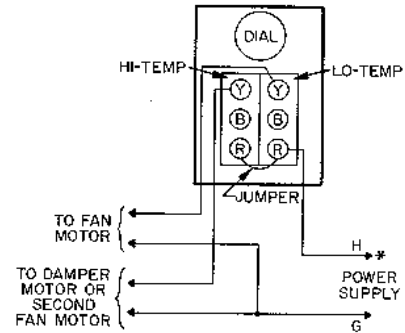
\*Disconnecting means and overload protection as required.

**Fig. 7 — An A19BAC in control of heating and ventilating systems.**



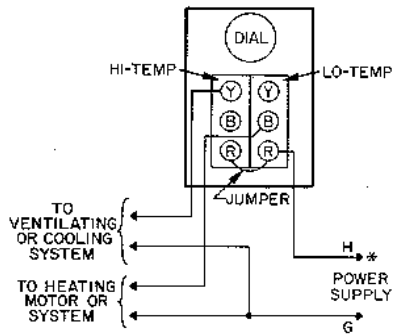
\*Disconnecting means and overload protection as required.

**Fig. 8 — An A28AA shows typical wiring for the control of a two speed ventilating fan. When control temperature reaches the dial setting, the low temperature switch starts the fan on low speed. If the space temperature continues to rise, the high temperature switch supplies power to the high speed motor winding while disconnecting the low speed winding.**



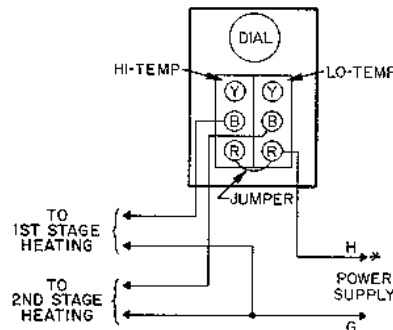
\*Disconnecting means and overload protection as required.

**Fig. 9 — Typical hookup for a two speed volume fan application. Fan starts when the temperature reaches the dial setting. If the temperature continues to rise, the damper motor is energized by the high temperature switch.**



\*Disconnecting means and overload protection as required.

**Fig. 10 — Typical wiring for a combination heating and cooling system automatic changeover. A temperature increase to dial setting turns off the heating system when the R-B low temperature switch contacts open. An increase of approximately 3F' (1.7C') turns on the fan or cooling system through the R-Y contacts of the high temperature switch.**



\*Disconnecting means and overload protection as required.

**Fig. 11 — Typical hookup for two stage heating. On a temperature drop to dial setting the first stage heating turns on. If the temperature continues to drop about 3F' (1.7C') the second heating stage turns on.**

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

Published in U.S.A.  
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