



SPECIFICATION DATA

T678B TEMPERATURE CONTROLLER (Dual-bulb two-stage)

application: The T678 is used to control the temperatures in ducts, tanks, boilers, etc. where it is desirable to reset the control point automatically with the changes in outdoor air temperatures. This controller provides Series 60 spdt switching on two switches which have an adjustable inter-stage differential between them.

The T678B can be mounted in any position; and as far from the controlled area as the capillary will allow or as near the controlled area as is desired. One of the sensing bulbs is mounted in the medium to be controlled and the other where it will sense the outdoor air temperature.

construction: The T678B consists of a diaphragm power head; an adjustable, ambient compensated loading mechanism; a temperature calibrated scale plate; a lever arrangement and two spdt MICRO SWITCH* precision switches; the powerhead is connected to sensing bulbs by means of 5/64 O.D. copper capillary. All integral components are enclosed in a sturdy metal case with a wrap around cover. The cover is so constructed that the scale setting can be read and adjusted with the cover in place. This controller is mounted by means of three screws through key-hole slots in the back of the case.

specifications:

MODEL: T678B.

RANGES AND RESET RATIOS:

All the controls have a temperature range of 70 to 140F (calibrated with both the outdoor bulb and the indoor bulb at 70F). In the following Reset Ratios, the first number is the outdoor temperature change required to reset the control point the amount of the second number in the ratio.

Table 1

Reset Ratio	Maximum Storage ^a Temperature	Maximum Operating Ambient	Remarks
1:1 ^b	132 F	125 F	Indoor bulb temperature plus the outdoor bulb temperature must not exceed 265 F.
1:1½	125 F	125 F	Indoor bulb temperature plus 1½ times the outdoor bulb temperature must not exceed 312 F.
1½:1	145 F	125 F	Indoor bulb temperature plus ½ of the outdoor bulb temperature must not exceed 242 F.

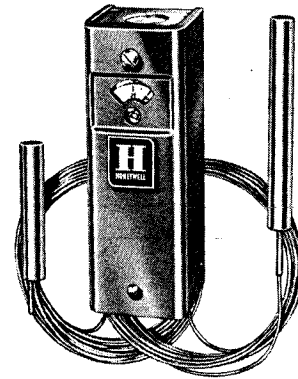
*The device is not harmed by exposure to - 30 F during shipment or storage.

^bAvailable in the Special Model also.

SWITCH ACTION: See Fig. 2.

ELECTRICAL RATING (in amperes, each switch):

	120v ac	240v ac
Full Load	8.0	5.1
Locked Rotor	48.0	30.6
Resistive	17.0	17.0
Pilot Duty	125va at 120 to 240v ac .25 amp at 1/4 to 12v dc	



NOTE: At full motor or resistive load, the differential of each switch may occasionally increase 1 or 2 F.

DIFFERENTIAL: Switch—Fixed at 6F, ±1½F.
Interstage—Adj 3 to 10 F.

SETTING RANGE: 70 to 140F (referenced to 70F outdoor temperature).

MAXIMUM BULB PRESSURES: Direct immersion with fittings Part No. 7617ABY or 7617ACF—150 psi. Well Mounting—See well pressure ratings in Form No. 90-0559.

DIMENSIONS: See Fig. 1.

CAPILLARY LENGTH AND O.D.: See Fig. 1.

NOTE: Both bulbs and connecting capillary tubing are made of copper.

SPECIAL MODEL: T678B with a 1:1 reset ratio having an averaging element for the indoor sensor. The indoor bulb dia is 1/8 in. and 12 ft. long. The outdoor bulb dia is 1/2 in. and 4 3/16 in. long. Capillary length—outdoor bulb, 20 ft.; indoor bulb, 6 ft. plus 12 ft. bulb. The between stage differential is non-adjustable, factory set at 3 F.

ACCESSORIES:

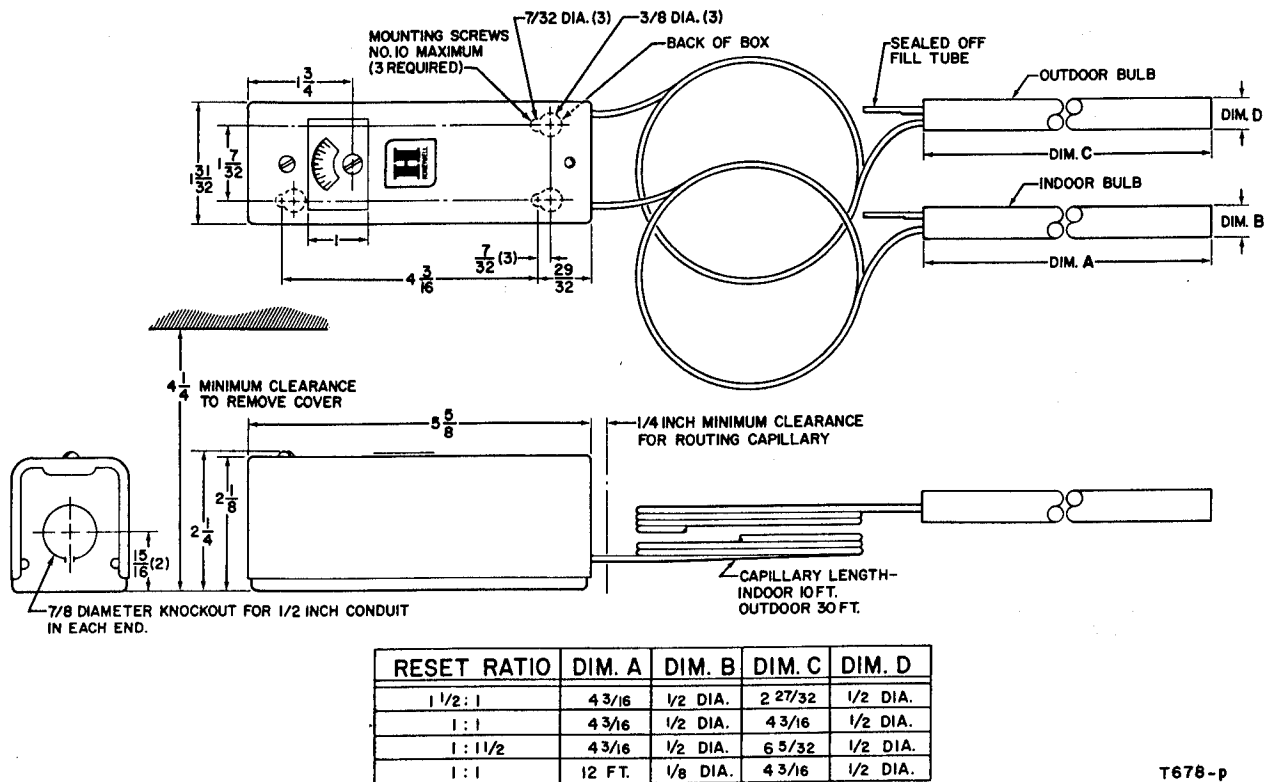
1. Protective wells for bulb insertion, see Form No. 90-0559 for detailed information.
2. Pressure fittings for direct bulb immersion, Part Nos. 7617ACF for 3/4 in. NPT tapping or 7617ABY for 1/2 in. NPT tapping.
3. Calibration wrench Part No. 801534.
4. Bulb holder—Part No. 107324A; supports bulb when mounted in a duct.
5. Outdoor bulb shield—Part No. 34886A; this shield protects the outdoor bulb from direct sun.

WHEN SPECIFYING, INDICATE:

1. Model Number (averaging element if desired).
2. Reset Ratio Required.
3. Accessories If Needed.

*Trademark
Rev. 8-68
R.F.L.

Form Number **74-3272**
Commercial Div.



T678-p

Fig. 1—Approximate Dimensions in Inches.

typical operation: The temperature changes at the sensing bulbs are transferred to mechanical motion of the diaphragm by the expansion and contraction of the liquid fill. This diaphragm action operates the switches through a lever arrangement such that the R-B (norm. open) contacts make on a temperature fall.

The T678B is calibrated to the R-B break point of the right hand switch on a temperature rise. To obtain the R-B make point of the right hand switch, the differential is subtracted from the scale setting.

If the temperature sensed by the outdoor bulb falls, the fluid in the outdoor bulb contracts causing the diaphragm to change position. The T678B then calls for an increase in temperature at the indoor bulb to return the diaphragm to its original position. The changes are determined by the reset ratio of the device and is not adjustable.

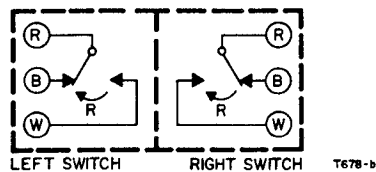


Fig. 2—Switch Action.

T678-b

A typical operational example: The setpoint is the control point when the outdoor bulb is at 70F. A T678B with 1:1 ratio is set at 80F. The outdoor temperature is 70F and the T678B controls at 80F. If the outdoor air temperature drops to 50F, the T678B compensates for this drop by raising the control point of 100F (80 plus the 20F drop). However, the scale plate reading remains on the original setting of 80F.