

## TH 188 Unit Mounted Thermostats

### Product Description

The TH 188 Unit Mounted Thermostat is a remote bulb, gradual acting pneumatic instrument that maintains a preselected room temperature by positioning pneumatic devices that control heating or cooling medium. This thermostat has a liquid filled thermal system.

### Product Numbers

TH 188R Reverse Acting (RA) 20 scim (5.5 ml/s) restrictor	188-0024
TH 188HC Heating (direct)/Cooling (reverse) 40 scim (11 ml/s) restrictor	188-0030
TH 188D Direct Acting (DA) 40 scim (11 ml/s) restrictor	188-0031
Replacement for Honeywell models LP916BXXXX Heating (direct)/Cooling (reverse) 40 scim (11 ml/s) restrictor	188-0033
Replacement for Johnson Controls T-3300-2 Heating (direct)/Cooling (reverse) 40 scim (11 ml/s) restrictor	188-0034

### Required Tools

- Medium flat-blade screwdriver
- Small drill

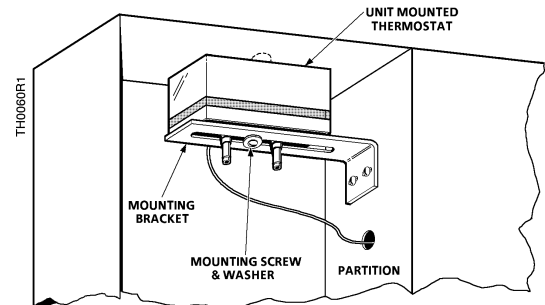
### Expected Installation Time

90 minutes (1 hour and 30 minutes)

### Installation

A mounting bracket is included for mounting the thermostat in various units.

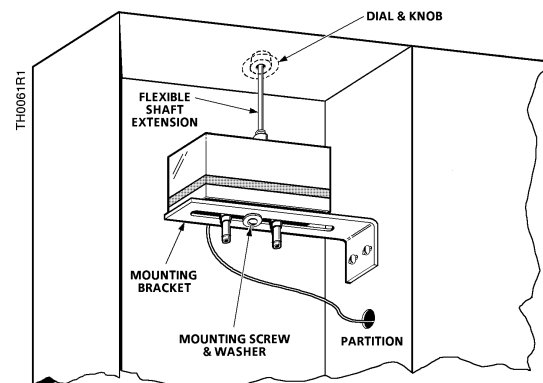
1. Fasten the mounting bracket to the partition with two sheet metal screws included with the thermostat. *Figure 1* shows a typical installation.



**Figure 1. Thermostat and Mounting Bracket.**

**NOTE:** If there is not enough room to mount the thermostat in a convenient location, or if the set point dial must be in the same compartment as the fan switch, order an extension shaft kit (Part Number 188-101). See *Figure 2*.

Using the extension shaft, mount the thermostat in any convenient location within eight inches of the control compartment.



**Figure 2. Use of Shaft Extension.**

2. Mount the remote sensing bulb in the air stream of the return air (near the inlet of the fan).

Avoid metal to metal contact between the bulb and the unit to prevent damage to the soft copper sensing bulb from unit vibration.

## Installation, Continued

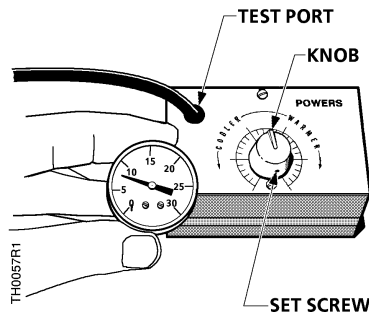
- Fasten the capillary and/or bulb in the return air stream using the adhesive backed cable clip included in the kit.
- Make air connections to the "S" (supply) Port and "R" (return) Port. Thermostats have a barbed fitting for 1/4-inch (6.4 mm) O.D. poly tubing.

## Calibration

The thermostats are factory calibrated at 72°F (22°C) and 7-1/2 psi (52 kPa) control pressure.

## General

- Determine the temperature at the remote bulb.
- Set knob pointer to the temperature found. Dial increments are approximately 5 degrees on the major divisions with 1 degree subdivisions, beginning at 60°F clockwise to 85°F.
- Loosen (do not remove) return line test port screw. Slip rubber line over test port and connect to a test gauge (*Figure 3*).



**Figure 3. Test Port and Gauge Used for Calibration.**

- With the knob pointer set at the temperature of the remote bulb, the output (return line) pressure should be 7 to 8 psi (48 & 55 kPa) for all models. If the output pressure is not 7 to 8 psi (48 to 55 kPa), remove knob after loosening its set screw. Then, rotate the set point adjustment post until output pressure is 7 to 8 psi.
- Replace knob and set pointer to temperature of the bulb, lock, and then turn to desired setting. The thermostat is now in calibration.

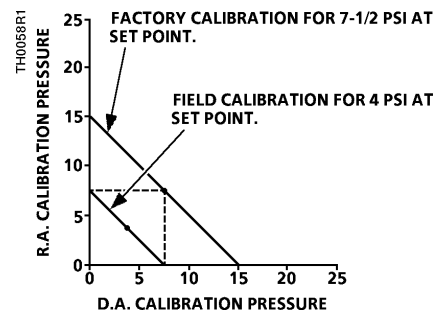
## Single action

The direct acting or reverse acting thermostat may be calibrated at any pressure. It is suggested that 7-1/2 psi (52 kPa) be used.

## Dual action

On the HC thermostat, calibration should be at 7-1/2 psi (52 kPa) for both DA and RA. The unit has one thermal system with a reversing relay to give the action desired. If calibrated at 7-1/2 psi (52 kPa) for winter, the summer calibration will be 7-1/2 psi (52 kPa). If 9 psi (62 kPa) is used for winter, 6 psi (41 kPa) will be summer's calibrated pressure.

*Figure 4* shows the relationship of the DA and RA calibration points. If the same pressure is desired for both seasons, the RA section of the thermostat needs to be recalibrated (follow the RA calibration procedures).



**Figure 4. Dual Action Calibration Points.**

## Reverse acting stage

See *Table 1* for air pressure and changeover pressure.

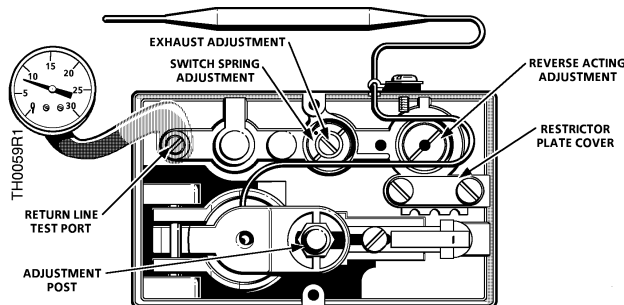
**Table 1. Air Supply Pressure and Changeover.**

Type and Model No.	Heating (Da)	Cooling (Ra)	Changeover
Powers HC (TH188HC)	25 psi (172 kPa)	18 psi (124 kPa)	21 psi (145 kPa)
Honeywell HC (LP916B)	18 psi (124 kPa)	13 psi (124 kPa)	15 psi (103 kPa)
Johnson HC (T-3300-2)	20 psi (138 kPa)	15 psi (103 kPa)	17psi (117 kPa)

The reverse acting stage is factory adjusted and does not require field adjustment. If the adjustment is disturbed, re-adjust as follows:

- With the main air supply set for 25 psi (172 kPa), connect a Pressure Reducing Valve (PRV) with gauge to the supply side of thermostat and set at 25 psi (172 kPa).
- Remove knob and cover from thermostat, as shown in *Figure 3*.
- Open bleed screw on test port and connect gauge (*Figure 5*).

## Installation, Continued



**Figure 5. Heating/Cooling Changeover.**

4. Rotate adjustment post to give an output within 1/2 psi (3.4 kPa) of calibration pressure.
5. Adjust PRV for 18 psi (124 kPa) air supply; observe the control pressure. If not within 1/2 psi (3.4 kPa) of calibration pressure, adjust the reverse acting adjustment until it is. Apply ambroid to the screw setting.
6. Remove test port gauge; close bleed screw.
7. Replace cover and knob.
8. Lock knob in place with pointer at bulb temperature.
9. Set knob at desired temperature setting.

## Heat-cool thermostat changeover

See *Table 1* for air pressure and changeover pressure.

The changeover is a factory adjustment; it is sealed with ambroid and does not require field adjustment. If, for some reason, this adjustment is disturbed, re-adjust as follows (See *Figure 5*):

1. Supply the thermostat with an air supply pressure equal to the appropriate changeover pressure (*Table 1*).
2. With the exhaust adjustment (center screw) backed out several turns, turn the switch spring adjustment (outer screw) down snug, and then back off until air can be heard bleeding out.
3. Turn the exhaust adjustment down snug and back off approximately 1/8 turn.
4. Seal both screws with ambroid to prevent further movement.

The installation is now complete.

## Reference

Technical Instructions

TH 188-2

155-064P25

**Table 2. Troubleshooting.**

Complaint	Check		Possible Cause	Corrective Action
Return line pressure 0 psi (0 kPa)	<b>Supply Air</b>		<b>No Air</b>	<b>As Required</b>
	*Heating 25 psi (172 kPa)	Calibration	Out of calibration	Recalibrate
		Restrictor	Clogged or dirty	Clean or replace
		Sensing element	Loss of charge	Replace sensing element
		Direct acting stage	Internal binding or leaking	Replace thermostat
	*Cooling 18 psi (124 kPa)	Calibration	Out of calibration	Recalibrate
		Throttling pin	Dirt built up around pin	Clean or replace nozzle assembly
		Reverse acting stage	Internal binding or leaking	Replace thermostat
Return line pressure 18 psi (124 kPa) or greater	<b>Supply Air</b>		<b>Pressure Too High</b>	<b>As Required</b>
	*Heating 25 psi (172 kPa)	Calibration	Out of calibration	Recalibrate
		Throttling Pin	Dirt built up around pin	Clean or replace nozzle assembly
		Direct acting stage	Internal binding	Replace thermostat
	*Cooling 18 psi (124 kPa)	Calibration	Out of calibration	Recalibrate
		Restrictor	Clogged or dirty	Clean or replace
		Sensing element	Loss of charge	Replace sensing element
		Reverse acting stage	Improperly adjusted	Re-adjust
		Reverse acting stage	Internal leaks or binding	Replace thermostat
Excessive cycling	Lever assembly		Sticking or binding of levers	As required

\* See *Table 1* for Honeywell and Johnson Controls pressures.

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