

## T4031A,B,P; T6031A,B Refrigeration Temperature Controllers

### PRODUCT DATA



### GENERAL

The T4031A,B,P and T6031A,B are temperature controllers used in a variety of cooling applications where remote mounting of the sensing element in the controlled medium is required.

### FEATURES

- Wide control temperature range is suitable for controlling ducts, tanks, freezers, coolers, display cases, and defrost termination.
- Universal mounting bracket is available for easy replacement of other controllers.
- Models are available with various control ranges.
- Control setpoint is dial-knob adjustable.
- Models are available with fixed or adjustable temperature differentials.
- Capillary lengths are 5, 8, or 20 ft (1.5, 2.4, 6.1m) depending on model.
- Reliable snap-acting spst or spdt switch.
- Ambient temperature compensated.
- Insert supplied with TRADELINE® models replaces setpoint knob to discourage tampering.

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## SPECIFICATIONS

### IMPORTANT

The specifications given in this publication do not include normal manufacturing tolerances. Therefore, this unit may not exactly match the specifications listed. Also, this product is tested and calibrated under closely controlled conditions, and some minor differences in performance can be expected if those conditions are changed.

### TRADELINE® Models

TRADELINE® models are selected and packaged to provide ease of stocking, ease of handling, and maximum replacement value. TRADELINE® model specifications are the same as those of standard models except as noted below.

### TRADELINE® Model Available:

T6031A Refrigeration Temperature Controller-spdt switch, adjustable temperature differential, tamper-resistant insert.

### Capillary Length:

8 ft (2.4m)

### Additional Features:

TRADELINE® pack with cross reference label and special instructions

### Standard Models

T4031A Refrigeration Temperature Controller-spst switch makes on temperature rise; fixed differential  
 T4031B Refrigeration Temperature Controller—same as T4031A but less case  
 T4031P Refrigeration Temperature Controller—same as T4031A but uses screw, not knob, to adjust setpoint  
 T6031A Refrigeration Temperature Controller-spdt switch, fixed or adjustable temperature differential  
 T6031B Refrigeration Temperature Controller—same as T6031A but less case

### Switch Action:

T4031A,B,P spst switch makes R to W on temperature rise  
 T6031A,B spdt switch makes R to W on temperature rise, R to B on temperature fall

### Capillary Lengths and Temperature Ranges:

Model	Copper Capillary Tube Length		Setting Range <sup>a</sup>		Differential	
	ft	m	°F	°C	°F	°C
T4031A,B	5	1.5	-30 to 50	-34 to 10	Fixed at 3.5	Fixed at 1.6
	20	6.1				
T4031P	8	2.4	-30 to +90	-34 to +32	3.5 to 16	1.6 to 9
T6031A,B	5	1.5	-15 to +90	-9 to +32	Fixed at 3.5 or Adjust. from 3.5 to 12	Fixed at 1.6 or Adjust. from 1.6 to 7
	20	6.1				
	5	1.5	-30 to +50	-34 to +10		
	20	6.1				
	8	2.4	-30 to +90	-34 to +32		

<sup>a</sup> Dial scale markings in degrees Fahrenheit

## ORDERING INFORMATION

When purchasing replacement and modernization products from your TRADELINE® wholesaler or your distributor, refer to the TRADELINE® catalog or price sheets for complete ordering number, or specify:

1. Order number.
2. Setting range.
3. Fixed or adjustable differential (T6031).
4. Length of copper capillary tube.
5. Accessories, if desired.

If you have additional questions, need further information, or would like to comment on our products or services, please write or phone:

1. Your local Honeywell Home and Building Control Sales office (check white pages of your phone directory).
2. Home and Building Control Customer Relations  
 Honeywell, 1885 Douglas Drive North  
 Minneapolis, Minnesota 55422-4386

In Canada—Honeywell Limited/Honeywell Limitée, 35 Dynamic Drive, Scarborough, Ontario M1V 4Z9. International Sales and Service Offices in all principal cities of the world.

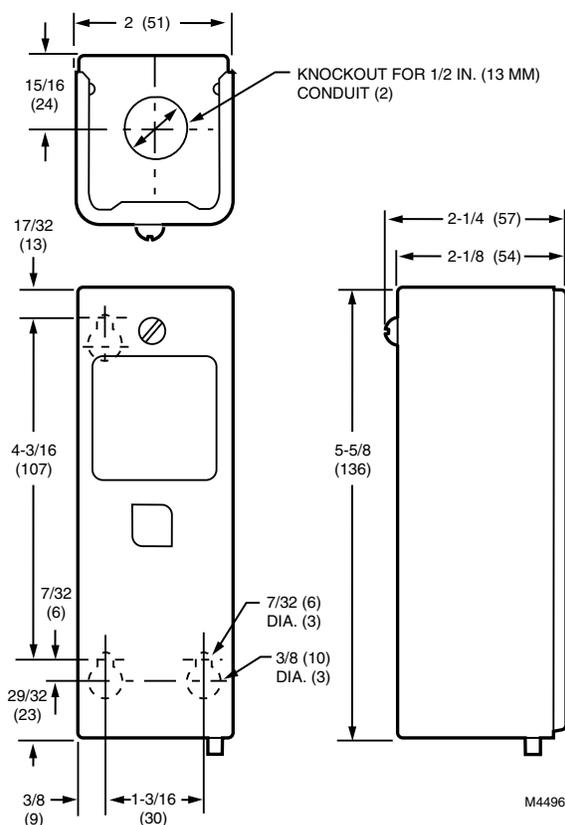
**Electrical Ratings:**

	120 Vac		240 Vac	
	Normally Closed	Normally Open <sup>a</sup>	Normally Closed	Normally Open <sup>a</sup>
Full Load Amp	8	16	5.1	8
Locked Rotor Amp	48	80	30.6	40

<sup>a</sup> Makes on temperature rise.

**Pilot Duty:**  
125 VA

**Dimensions:**  
See Fig. 1



**Fig. 1. Dimensions of T4031, T6031 in in. (mm).**

**Underwriters Laboratories Inc.:**  
Listed

**Maximum Ambient Operating Temperature:**  
125°F (52°C)

**Accessories:**

- 112622AA Immersion Well—short-necked, 1/2 in. NPT, copper
- 7617ABY Compression Fitting—50 psi water, 15 psi air
- 107324A Bulb Holder—for duct installation
- 105900 T-strap—for strapping bulb to pipe

- 7617ABZ Bag Assembly—for mounting controller to fan coil units
- 801534 Calibration Wrench
- 7640HY Standoff Bracket Bag Assembly—to mount controller to an insulated duct
- 130883 Universal Mounting Bracket
- 194899 Tamper-resisting Insert Button
- Celsius Scaleplates:
  - 194486 D: -15°C to +35°C replaces (0°F to 100°F) scaleplate
  - 194486H: 15°C to 75°C replaces (55°F to 175°F)
  - 194486F: 75°C to 125°C replaces (160°F to 260°F)

**INSTALLATION**

**When Installing this Product...**

1. Read these instructions carefully. Failure to follow them could damage the product or cause a hazardous condition.
2. Check the ratings given in the instructions and on the product to make sure the product is suitable for your application.
3. Installer must be a trained, experienced service technician.
4. After installation is complete, check out product operation as provided in these instructions.

**CAUTION**

- Disconnect power supply before installation to prevent electrical shock and equipment damage.
- Do not damage or change shape of capsule. Deformed capsule will cause calibration offset.

**Mounting**

Install controller in any convenient location. Make sure that the sensing bulb reaches the system to be controlled. The ambient temperature must not exceed 125°F (52°C) in the area where the controller is installed.

Install the sensing element where it can sense the average temperature. Avoid sharp bends or kinks in the capillary tubing that can affect the accuracy of the controller. Carefully coil the excess capillary tubing and leave it directly beneath the controller.

The 130883 Mounting Plate furnished with TRADELINE® models allows the control to be mounted in existing mounting holes.

**Duct Installation**

Position the sensing bulb in the duct to sense the average air temperature. Avoid mounting the bulb close to hot pipes, cooling coils, etc.

The 107324A Bulb Holder is available for suspending the bulb in a duct. See Fig. 2.

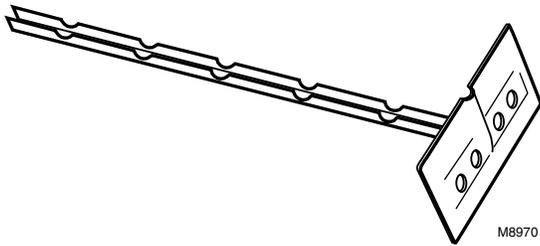


Fig. 2. 107324A bulb holder.

**To install duct:**

1. Make a hole in duct wall to admit sensing bulb into holder.
2. Using holder as template, mark and drill mounting holes.
3. Break off bulb holder to required length. (Be sure holder is long enough to hold sensing bulb away from duct wall and in freely circulating air.)
4. Place capillary tubing in bulb holder channel, with bulb at inner end of holder. Pinch together top edges of channel segments.
5. Insert assembled bulb and holder into duct, and fasten to duct wall with screws supplied.

**Tank Installation**

The sensing bulb can be inserted directly into a tank using a compression fitting; or the bulb can be inserted into an immersion well (order separately), which is screwed into a tank or boiler.

Select a location where liquid of average temperature can circulate freely around the sensing bulb.

**Using Compression Fitting (Fig. 3)**

1. Drain system. Screw boiler plug into properly sized and threaded boiler or pipe tapping.
2. Place packing nut on capillary tubing.
3. Slide sensing bulb completely through boiler plug.
4. Place composition disc and the four slotted brass washers on capillary tubing.
5. Slide assembly into boiler plug and tighten packing nut.
6. Refill system and check for leaks. Neatly coil excess capillary tubing.

**Using Immersion Well (Fig. 4)**

1. Drain system. Screw the well into threaded fitting.
2. Refill system and check for leaks.
3. Insert sensing bulb into well until it bottoms.
4. Fit bulb retaining clamp over immersion well flange and capillary tubing, and tighten screw.

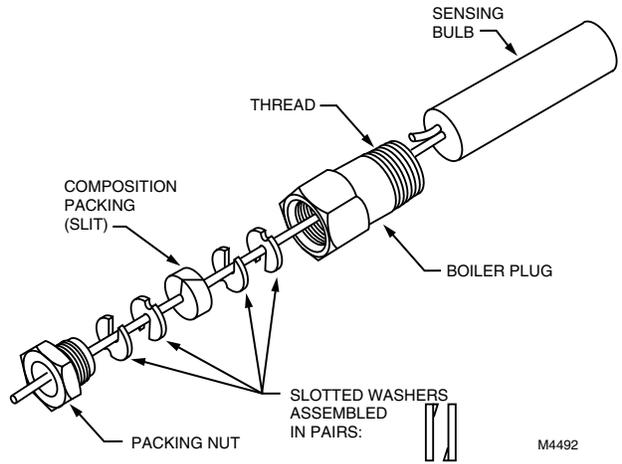


Fig. 3. Compression fitting installation.

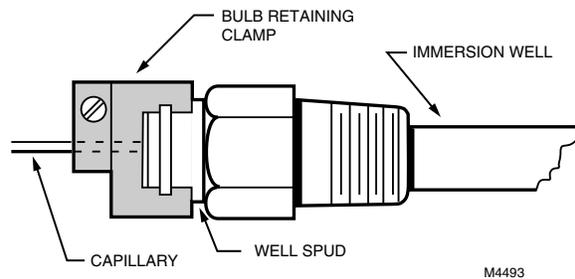


Fig. 4. Immersion well installation.

**Cold Room Installation**

Locate the bulb in freely circulating air in the controlled area or on the suction side of a refrigerant line, and secure the bulb in position.

**Wiring (Fig. 5)**

All wiring must comply with local electrical codes and ordinances.

Two knockouts are provided, one at the top and one at the bottom of the case for 1/2 in. conduit. Follow the wiring instructions furnished with the heating or cooling system. For replacement, make sure the new control is wired into the system to operate the same as the old control.

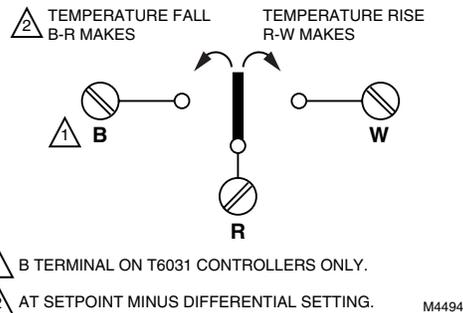


Fig. 5. Wiring terminals on T4031 and T6031 temperature controllers.

## OPERATION AND CHECKOUT

When the temperature at the sensing bulb rises above the controller setpoint, a circuit is made between the R-W terminals. During a temperature fall, the R-W circuit breaks at the setpoint temperature *minus* the switch differential. Controllers with a B terminal break the B-R terminal circuit on a temperature rise to the setpoint. B-R makes again when R-W breaks on a temperature drop. See Fig. 6.

For example, if a controller with a 3°F (1.7°C) differential is set at 39°F (3.9°C), R-W makes when the bulb temperature rises to 39°F. Then during a temperature fall, R-W breaks when the temperature drops to 35°F (1.7°C) (39°F minus the 3°F differential [3.9°C minus the 1.7°C differential]).

On models with a B terminal, B-R makes when R-W breaks. Then the temperature has to climb past the control differential to the set point of 39°F (3.9°C) before the B-R circuit breaks and the R-W circuit makes.

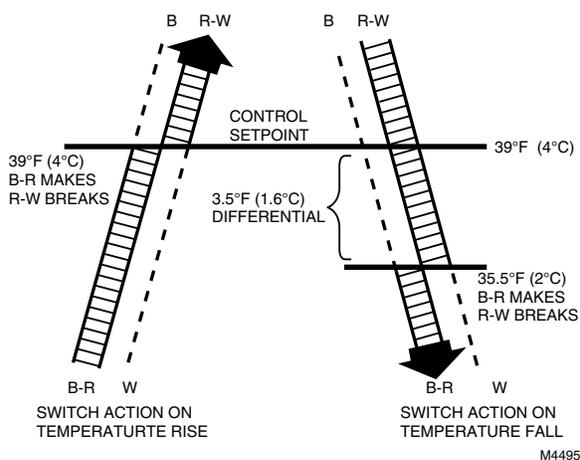


Fig. 6. Operation of switch on temperature rise and fall.

## SETTING

Set the controller to the system manufacturer's recommended settings, if available.

**Temperature Setpoint Knob**—Turn the knob on the front of the case until the pointer indicates the temperature to be maintained in the controlled medium.

**Screw**—Insert a flatheaded screwdriver into the slot on the shaft, which is located in the center of the scaleplate. Turn the screwdriver clockwise  to increase the temperature control point. Turn the screwdriver counterclockwise  to decrease the temperature control point.

**Adjustable Differential**—With the cover off, turn the differential adjustment wheel (marked 3-6-9-12°F) until the desired differential is aligned with the notch in the frame. See Fig. 7.

Fixed differential models are 3.5°F at midscale.

## Calibration

All controllers are carefully tested and calibrated at the factory under controlled conditions. If the controller is not operating at a temperature corresponding to the scale and differential setting, verify that the bulb senses the average temperature of the medium. If the temperature of the controlled medium is changing rapidly, the differential will appear wider than its setting.

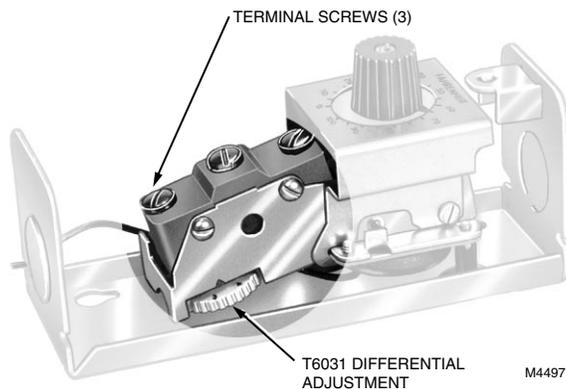


Fig. 7. Internal view showing differential adjustment wheel (applicable models).

For calibration, take an accurate temperature reading of the controlled medium. Place an accurate thermometer near the bulb of the controller, or refer to a thermometer installed as part of the system. If the bulb of the controller is installed in an inaccessible area, or if the controlled medium is unstable, remove the bulb and place in a controlled bath for accurate calibration.

These controllers are calibrated so the dial setting is the point at which the R-W switch contacts make (B-R contacts break) on a temperature rise. Measure the temperature at the bulb. Rotate the dial counterclockwise  from the top of the scale, simulating a temperature rise, until the R-W switch contacts make. Note the dial reading. If it differs from the setpoint, calibrate the dial as follows:

1. Determine the number of degrees difference between the set point and the point at which the contacts make.
2. Remove the dial knob and slip the fingers of the calibration wrench into the slots of the dial. Rotate the dial until the fingers of the wrench drop into the slots of the calibration nut under the dial. Note the dial indication at this point. Turn the dial and the calibration nut up or down scale the number of degrees that the set point differs from the point at which the contacts make (determined in step 1). For example, move the dial from 45 to 65 degrees for a 20 degree change in calibration.
3. Check the calibration adjustment by moving the dial up and down the scale while watching the contacts make and break. If dial is still out of calibration, repeat calibration procedure.
4. To install tamper-resisting insert on TRADELINE® model, remove screw from adjustment knob, remove knob, and install insert.





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