

TA/TB170 THERMOSTAT

⚠ WARNING

- READ THESE INSTRUCTIONS CAREFULLY BEFORE ATTEMPTING TO INSTALL, OPERATE OR SERVICE THIS THERMOSTAT.
- Failure to observe safety information and comply with instructions could result in PERSONAL INJURY, DEATH AND/OR PROPERTY DAMAGE.
- To avoid electrical shock or damage to equipment, disconnect power before installing or servicing and use only wiring with insulation rated for full thermostat operating voltage.
- Before installing this control, the Voltage Selection Switch must be placed in the correct position. See instructions.
- To avoid potential fire and/or explosion do not use in potentially flammable or explosive atmospheres.
- Retain these instructions for future reference. This product, when installed, will be part of an engineered system whose specifications and performance characteristics are not designed or controlled by PECO. You must review your application and national and local codes to assure that your installation will be functional and safe.

⚠ CAUTION

- Use copper wire only, insulate or wire nut all unused leads.
- Care should be used to avoid electrostatic discharge to the T170 thermostat.
- This unit has configuration jumpers. You may need to reconfigure this thermostat for your application.

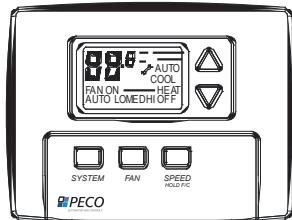
APPLICATIONS AND FEATURES

For 2 or 4 Pipe Fan Coil and On/Off Control Applications

- System Selection: Off-Heat-Cool-Auto-Setback
- 6 Outputs: 1H, 1C, Up to 3 Fan, OA Damper
- Fan Control: 1-3 Speeds
Cycling (Auto) or Continuous (On)
Automatic Fan Speed Staging (*TB170 models only*)

Connections for:

- Fan Coil Pipe Sensor
- Remote Temperature Probe
- Occupancy Control
- Door Switch or Setback
- Condensate Overflow



SPECIFICATIONS

Temperature Set Point Range
Differential
Memory – Back-Up

50 to 90°F / 10 to 32°C
1°
EEPROM, No batteries required,
Stores settings for unlimited
time.
Installs on standard 4" x 4"
device box with a 2" x 4"
horizontal mud ring

Mounting

Physical Dimensions 4.4"H x 5.8"W x 1.1"D
Agency Approvals UL, UL Canada
Electrical Ratings (see table below)

Voltage Rating	Switching			
	Inductive		Resistive Amps	Pilot Duty
	FLA	LRA		
24 VAC	NA	NA	NA	24 VA
120 VAC	5.8	34.8	6.0	125 VA
240 VAC	2.9	17.4	5.0	125 VA
277 VAC	2.4	14.4	4.2	125 VA

COMBINED LOAD CURRENT NOT TO EXCEED 20 AMPS
MOUNT ONLY TO A GROUNDED METALLIC BOX
LOW VOLTAGE WIRING IS CLASS 2

INSTALLATION

New Installations

The thermostat should be used indoors only. It should be mounted on an inner wall in a location with freely circulating air, and where it will be responsive to changes in room temperature. Avoid mounting near heat generating appliances (i.e. TV, heater, refrigerator), or in direct sunlight.

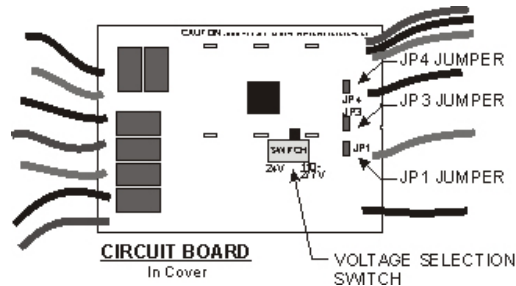
Remove Old Thermostat

1. Turn off power to thermostat at main fuse or circuit breaker box. Ensure that ALL power is disconnected. **To prevent electrical shock and /or equipment damage, disconnect electrical power to the system at the main fuse or circuit breaker until installation is complete.**
2. Remove the front cover of old thermostat. With wires still attached, remove wall plate from the wall. If the old thermostat has a wall mounting plate, remove the thermostat and the wall mounting plate as an assembly.
3. **Before removing wires from old thermostat, label each wire with the terminal designation from which it was attached.**
4. Disconnect the wires from the old thermostat one at a time. **Do not let wires fall back into the wall.**

Jumper and Circuit Board Selections

Voltage Selection Switch: This switch must be placed in the appropriate position prior to application of power.

- 24V = 24 VAC
- 110-277 V = 120, 240 or 277 VAC



JP1 Jumper Selection – Remote Temperature Sensor:

- Local Sensing – Install JP1
- Remote Sensing – Remove JP1 – Accessory sensors are available in standard 60" lengths but can be extended to meet application requirements.



JP3 Jumper Selection – HVAC Setback Systems: The JP3 jumper allows the T170 to be configured for Setback, Occupancy Detection or Door Switch Only Occupancy Operations. For further descriptions of these conditions please see the Technical/Application Section.

- Setback Operation - Remove JP3
- Occupancy Detection - Install JP3
- Door Switch Only - Install JP3

JP4 Jumper Selection – 2 or 4 Pipe Operation: Connection of a pipe sensor will change the operation of the outputs as shown in the table below. (See Technical Notes for further information on Pipe Sensor Operation)

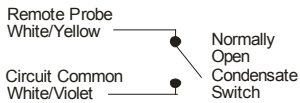
- 2-Pipe Operation - Install JP4 - The thermostat will permanently disable the Secondary Output and disables system and fan invalid modes.
- 4-Pipe Operation - Remove JP4 - Both the Main Output (COOL) and Secondary Output (HEAT) will be available.

JP4 Selection	Pipe Sensor Water Temp	Aqua Stat	Main Output (Blue Wire)	Secondary Output (Red Wire)
2-Pipe JP4-ON	COLD	Open	Cooling ONLY	Disabled
	HOT	Closed	Heating ONLY	Disabled
4-Pipe JP4-OFF	COLD	Open	Cooling	Heating
	HOT	Closed	Heating ONLY	Disabled

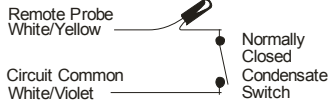
* Fan will not cycle on for disabled modes.

Condensate Overflow Interrupt - The remote probe input can be used with a condensate overflow interrupt switch (CO), either in conjunction with a remote probe (normally closed CO switch) or with local sensing (normally open CO switch). When the condensate switch activates, the T170 will display the service wrench and disable all outputs

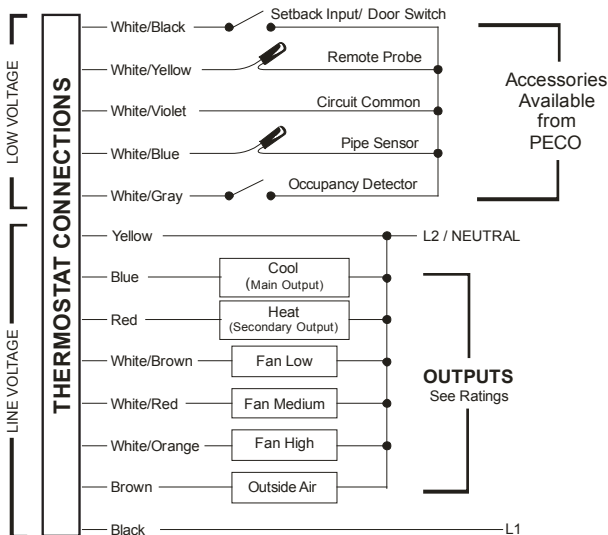
Local Sensor Installation



Remote Probe Installation



WIRING DIAGRAM

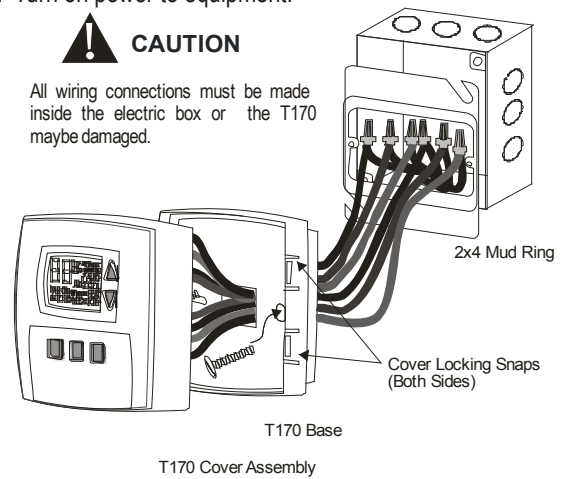


Mounting Thermostat

1. Thermostat mounts to a 4" x 4" box with a 2" x 4" mud ring. Adapter wall plates are available if needed.
2. Pull wires through the hole of the thermostat base.
3. Mount thermostat base to the wall using the enclosed mounting screws. Tighten screws evenly but do not over tighten.
4. Verify that the circuit board is firmly snapped into the cover and has not been dislodged during handling.
5. Match and connect equipment wire thermostat using the appropriate wiring schematic as shown at the bottom of the page on the left-hand side.
6. Wire nut all unused wires or terminate properly according to local building codes.
7. Mount the base to the mud ring and install the cover assembly. Firmly press cover to engage the cover locking snaps. Should the cover need to be removed in the future, use a flat edged tool to put pressure on the base sides. This will release the four side latches.
8. Turn on power to equipment.



CAUTION
All wiring connections must be made inside the electric box or the T170 maybe damaged.



System Check-out

1. After wiring and installation is complete, energize the system.
2. Set fan to ON. Select each fan speed (TA170 Models) to verify operation.
3. Set the System button to AUTO, or available selection.
4. Using the UP arrow, adjust temperature more than 5°F above the room temperature to cycle on heating.
5. Using the DOWN arrow adjust the temperature to 5°F below room temperature to cycle on cooling.

Note: If the thermostat is set to utilize a time-based purge cycle (Service menu 16), the thermostat will conduct a 3-min purge on initial start-up if a pipe sensor is connected.

THERMOSTAT CONFIGURATION / SERVICE MENU

To enter the Service Menu press the UP and DOWN arrows simultaneously for five (5) seconds. The current display icon will be turned off. Service menu numbers 1 through 17 are available. Push the SYSTEM button to move to the next Service Menu number. The UP and DOWN arrow keys will scroll through your range of options for each feature. The selection that is flashing is the one you are selecting. All changes to the Service Menu are automatically saved when the system times out. Please refer to the service menu table on page three.

Menu #	Feature	Range	Std. Model Default	Increment	Description / Comments
1	F / C	°F or °C	°F	°F	Determines temperature displays in Fahrenheit or Celsius.
2	Default Display	Zone Temp Set Point	Zone Temp	-	Choose if you want the Set-Point or Zone (room) temperature to be the primary display on the thermostat.
3	Fan Off Delay	0 – 255 Seconds	0	1 Second	The amount of time (in seconds) the lowest available fan speed will run after the thermostat outputs are disabled.
4	Range Low	50 - 90°F, 10 - 32°C	50°F	1°F, .5°C	The lowest selectable temperature Set-Point value.
5	Range High	50 - 90°F, 10 - 32°C	90°F	1°F, .5°C	The highest selectable temperature Set-Point value.
6	Setback Low	OFF 50 - 82°F, 11- 27°C	55°F	1°F, .5°C	The temperature Set-Point value you want the thermostat to Heat to when the T170 is in the Setback mode.
7	Setback High	OFF 58 - 90°F, 15 - 31°C	90°F	1°F, .5°C	The temperature Set-Point value you want the thermostat to Cool to when the T170 is in the Setback mode.
8	Zone Temp Offset	+/- 9°F, +/- 4.5°C	0°F	1°F, .5°C	Zone Temperature offset adjusts the sensed Zone Temperature reading from the A to D converter, allowing calibration in the field.
9	Keypad Lock	ON 1 ON 2 OFF	OFF	-	Allows you to choose what the occupant can access. The Service Menu is still available if Key Pad Lock Out is ON. ON1 = Disables Sys/FAN/Status ON 2 = Disables all buttons OFF = No keypad lock out.
10	Fan Mode	FAN ON FAN AUTO FAN ON or AUTO	ON or AUTO	-	ON = Fan is always on, regardless of demand. AUTO = Fan is only on with heating or cooling demand. ON or AUTO = User can choose either selection.
11	Fan Speeds	1 - High 2 - Low and High 3 - Low, Med, High	3	-	1 Speed = Fan High 2 Speed = Fan Low and Fan High 3 Speeds = Fan Low, Medium, and High
12	System Mode	Off, Auto Off, Heat, Cool, Auto Off, Heat, Cool Heat, Cool, Auto	Off, Heat, Cool, Auto	-	Allows you to determine what system modes the occupant can select.
13	Controlled Off or Off Override	ON - Enable OFF - Disable	OFF	-	When ON, the unit will control to the Setback Set-Points and override the user mode setting of OFF if the room temperature is equal to or above the Cool Setback Set-Point or equal to or below the Heat Setback Set-Point.
14	Front Panel Setback Control	ON - Enable OFF - Disable	OFF	-	When enabled / ON, SETBACK is shown as an available System mode selection. If SETBACK mode is selected, the thermostat will control to the current Setback Heat and Setback Cool Set Points.
15	Cycled Outside Air (OA) Damper	ON - Continuous OFF - Cycles	OFF Cycles with Demand	-	OFF - Cycled = OA output cycles with active heat or cool demand. ON - Continuous = OA output is active anytime the thermostat is out of the OFF mode.
16	Temp Based Purge Cycle	ON = Temp. Based OFF = Time Based	OFF Time Based	-	Determines if the Purge Cycle will be Temperature or Time based.
17	Dead Band Adjustment	3 to 10°F, 1.5 to 5°C	3°F	1°F, .5°C	A changeover deadband value prevents short cycling between Heating and Cooling modes. The value is adjustable to meet various HVAC system requirements.

USER OPERATION

- All changes are saved when the thermostat times out.
- Fan and System user selectable options are determined in the Service Menu.

Room Temp. and Adjustable Set Point (desired) Temp.: Unless adjusted in the Service Menu, the thermostat displays the current room (Zone) temperature. To adjust the desired room temperature (set point value), press either the UP or DOWN arrow key.

System Button Operation: Continue to press the System button to change the current (flashing) system mode.

- OFF: All thermostat outputs are disabled.
- HEAT: The thermostat operates as a Heating only thermostat.
- COOL: The thermostat operates as a Cooling only thermostat.
- AUTO: The thermostat automatically selects the appropriate Heat or Cool mode depending upon the Set Point (Desired Temp) and Zone Temperature (Actual Temp).
- SETBACK: If enabled in Service Menu 14, SETBACK will display as an available mode selection. This mode is an energy saving feature that minimizes heating and cooling when the room is not occupied. The thermostat will control to the SETBACK Heat

and Cool Set Points, rather than the standard Set Points. When a demand for heating and cooling exists, the fan will run at the lowest speed. When in SETBACK, the display will show the room temperature along with the SETBACK icon. Key presses will have no effect on the Setback operation except for the System Switch Selection button, which allows the user to exit this mode.

Fan Button Operation: Continue to press the Fan button to change the current (flashing) fan mode.

- ON: Fan is on continuously, even if no demand for heating or cooling exists.
- AUTO: Fan cycles with active demand for heating and cooling.

Speed or F/C Operation:

- SPEED: For units with a speed button (TA170 Models), the user can choose the desired fan speed by pressing the speed button. If you are operating a TA170 configured with only 1 speed fan, this button is disabled.
- F/C HOLD: On units with F/C HOLD below the SPEED icon (TA170 Models), hold button for 5 seconds to toggle the display between Fahrenheit and Celsius readings.
- F/C: Push button to toggle between Fahrenheit and Celsius scale

TECHNICAL / APPLICATION NOTES

Pipe Sensor Operation: A pipe sensor can be connected when the thermostat is configured for either 2-pipe or 4-pipe fan coil operation (see JP4 jumper configuration). The Pipe sensor is used to determine the water temperature in the Main Coil. The Pipe Sensor should be mounted on the Main Coil supply and wrapped with insulating material.

Pipe Sensor Input: 10K PECO Remote Probe or a standard On-Off Aqua-stat can be used for summer /winter changeover. ON (closed) is winter heating mode and OFF (open) is summer cooling mode.

Purge Cycle Operation: With a pipe sensor connected, this thermostat will initiate a purge cycle if the sensed water temperature is ambiguous (not adequately hot or cold). The purge cycle algorithm can be either temperature or time based, depending on the configuration of Service Menu 16.

Temperature-Based Purge:

- When an Ambiguous mode is detected and a demand exists, a 3 minute purge timer begins and the Main Output is opened.
- After the 3 minute purge cycle, the thermostat checks again to see if the water temperature is more than 15°F from set point, or above 80°F or below 60°F.
- If Winter or Summer mode is determined, normal HVAC operation occurs. If still ambiguous, the thermostat checks to see if the COIL temperature is below 60°F or above 80°.
 - Coil < 60°F = Summer Mode.
 - Coil > 80°F = Winter mode.
- Purge Cycle is repeated until a non-ambiguous condition is sensed.

NOTE: If at any time the demand goes away, the thermostat will abort the purge cycle.

Time-Based Purge: (Default)

- The time-based purge cycle will start a 3-min purge cycle and enable the Main Output if any of the following conditions occur: transition from OFF to AUTO mode, Reset event, power cycle, and/or 1-hour timer expires.
- After the 3 min purge cycle, a pipe sensor reading says:
 - Pipe is 15°F+ below the zone temp = Summer mode
 - Pipe is 15°F+ above the zone temp = Winter mode
 - Pipe is within 15°F of zone temp = still Ambiguous
- If a Winter or Summer mode is determined, the appropriate heating/cooling occurs. The thermostat will purge and check pipe temperatures again after 1-hour.
- If step 2 is still ambiguous, all thermostat outputs are disabled for 1 hour.
- After 1 hour, the purge cycle resumes at step 1.

HVAC Setback Systems

Setback Operation - Remove JP3

This is a low level input that is normally open. When switch is closed, the T170 heating and cooling setback limits are used as temperature control points. Fan operation in setback is cycled with demand. Pressing any button will override setback for 1 hour. Setback will override any user setting unless control is turned to OFF.

Intelligent Occupancy Sensors like the SD200-001 and SD200-002 can be used with this input to set the HVAC system to control at setback limits.

Occupancy Operation – Install JP3

The T170 can be used with PECO S200 series occupancy detection equipment. The occupancy and switch inputs are designed to connect to the SB200 slave sensor and SE200 door switch.

- The Occupancy Sensor is a low-level switch that is open when there is occupancy and closed when unoccupied.
- The Door Switch is a low-level switch that is open when the door is open and closed when the door is closed. This system requires both an Occupancy Sensor and a Door Switch.

Operation From an Occupied Mode:

1. The T170 operates normally and looks for a door close. A door close signal initiates an occupancy status detection.
2. If occupancy is detected, the T170 will maintain normal HVAC control. It then waits for a door open signal before determining occupancy again.
3. If no occupancy signal is detected within 2 minutes, the T170 changes to unoccupied mode and controls at setback temperature values.

Operation From an Unoccupied Mode:

1. In an Unoccupied State, the T170 sets heating and cooling set points to setback values, as determined in the service menu. In this mode, the fan is automatically set to cycle with demand.
2. The T170 will continually monitor the room for occupancy.
3. Any occupancy detection, including door open, will set the operation to occupied mode.

In either mode, if the door is left open for more than 2 minutes the T170 will disable the HVAC system. A one-time ten minute override can be initiated by pressing any thermostat key pad.

Door Switch Only Operation - Install JP3. A stand alone door or window switch can be connected to the T170 to disable the HVAC system (outputs) if a door or window is left open for more than 2 minutes. A one-time ten minute override can be initiated by pressing any thermostat key pad.