

T4398A,B Precision Electric Heating Thermostat

PRODUCT DATA



APPLICATION

The T4398 Electric Heating Thermostat provides precise, accurate line voltage control of electric heating equipment. A snap action switch makes the heating circuit on temperature fall. B models feature double-line break in the Off position.

FEATURES

- Controls both fan-forced and baseboard electric heaters.
- Vapor-filled dual diaphragm sensing element provides high-temperature sensitivity with minimum droop.
- Canadian Standards Association (CSA) Performance Certified up to 20A.
- CSA Certified, UL Listed up to 5 kW at 277 Vac.
- Long-life, industrial-grade Micro Switch™ mechanism.
- Rugged-engineered, plastic mounting base with captive mounting screw.
- Color-coded flyleads compatible with aluminum wire for quick installation.
- Replaces any standard wall-mounted electric heat thermostat.
- Contemporary white styling.
- Operating temperature range of 50°F to 80°F (10° C to 30° C).
- Celsius and fahrenheit models available.
- Optional thermometer.
- Altitude compensation feature.
- Frost protection setting (A models only).
- Optional locking cover and range stops available.



SPECIFICATIONS

Models:

T4398A: Makes heating circuit on temperature fall. With setting knob at far left (counterclockwise) position, provides calibration-free frost protection setting of 40°F (4°C). See Fig. 2.

T4398B: Makes heating circuit on temperature fall. With setting knob at Off position, provides double line break for fuse-protected 240V heating circuits. (See Fig. 3.)

Both models feature optional thermometer, located in the cover, to indicate the actual room temperature.

Accessories (Not Included):

272804A Range Stop and Cover Locking Assembly: Allows field-selection of minimum and maximum temperature settings. Includes range stop assembly, cover locking-screws and wrench.

Setting Range:

Fahrenheit Models: Indicates range of 50°F to 80°F with marking indications in 5°F increments.

Celsius Models: Indicates range of 10°C to 25°C with marking indications in 1°C increments.

Differential:

Approximately 2°F (1°C) mechanical and thermal, non-adjustable.

Switch Type:

Enclosed industrial-grade Micro Switch™ snap switch.

T4398A: Single-line break (single-pole, single-throw).

T4398B: Double-pole, single-throw with double-line break (double-pole, single-throw) in Off position.

Wiring Connections:

Six-inch (150 mm) stranded copper leadwires suitable for connecting to aluminum wiring if approved special service CO/ALR connectors are used.

Electrical Rating:

22A non-inductive at 120/208/240 Vac.

19A non-inductive at 277 Vac.

Canadian Standards Association Performance Rating:

20A at 120/208/240 Vac.

Approval Ratings:

Underwriters Laboratories Inc: Listed; file no. E47434, guide no. XAPX.

Canadian Standards Association: File no. LR1322.

Mounting:

Direct mounting on NEMA standard vertical 2 in. x 4 in. switch box, or 4 in. x 4 in. box using 6-32 slot Robertson™ screws.

Sensing Element:

Vapor-filled, hermetically-sealed, stainless steel, dual diaphragm.

Thermometer (Optional):

Coil bimetal 50°F to 90°F (10°C to 30°C).

Barometric Sensitivity:

1°F/500 ft (0.3°C/kPa).

Dimensions:

See Fig. 1.

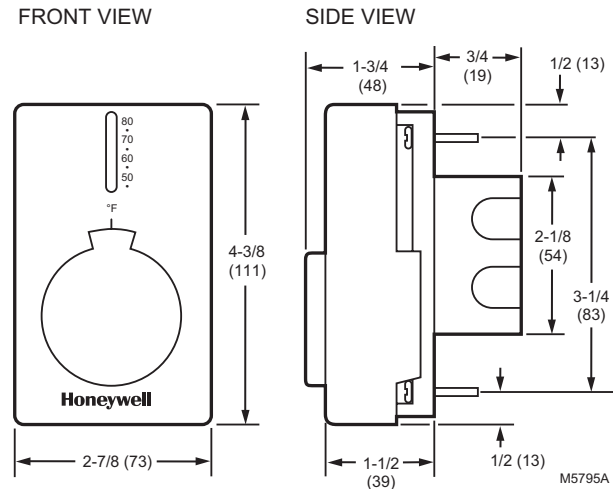


Fig. 1. T4398A,B dimensions in in. (mm).

INSTALLATION

⚠ WARNING

120-277 Volt Line Voltage Hazard.
Can cause serious injury or death.
 Do not install thermostat unless you are a trained, experienced electrical service technician.

⚠ CAUTION

Electrical Shock Hazard.
Can cause personal injury and equipment damage.
 Disconnect power supply before connecting wiring.
 Use a limit control when wiring the thermostat.



MERCURY NOTICE

If this control is replacing a control that contains mercury in a sealed tube, do not place your old control in the trash. Dispose of properly.

Contact your local waste management authority for instructions regarding recycling and the proper disposal of an old control.

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 rating 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.
5. Follow local codes for installation and application.

Selecting Location

- Mount the thermostat on an approved electrical junction box.
- Locate the thermostat 4 to 5 ft (1.5m) above the floor on an inside wall where the thermostat can be exposed to average room temperature.
- Locate the thermostat away from concealed warm or cold water pipes, light switches and dimmers, and refrigerators.
- Locate the thermostat away from drafts of hallways, fireplaces, stairways, and fans.

Mounting

- When replacing an old line voltage thermostat:
- Carefully remove the old thermostat to avoid damaging the wiring insulation.
 - Check the old insulation for cracks, chips, or fraying and apply approved electrical tape, where necessary, to ensure adequate insulation.

NOTE: Make line voltage wiring connections directly to the leadwires installed on the thermostat, using wire connectors approved for the number and size of conductors.

IMPORTANT

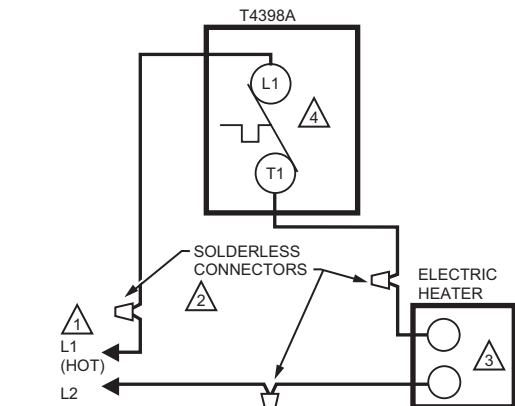
When using aluminum conductors, all wiring connections to the thermostat must be made to the factory-installed lead wire, using approved CO/ALR solderless connectors.

1. Connect all wires with the thermostat cover in place. Be sure that all wire connectors are tight. Install any security features. See Fig. 2 and 3.
2. Pre-bend the solid conductors and push them into the electrical box.
3. Remove the thermostat cover by grasping both the top and bottom of the cover and pulling out..

IMPORTANT

Carefully handle the thermostat. Excessive pressure can damage the control knob or sensing element.

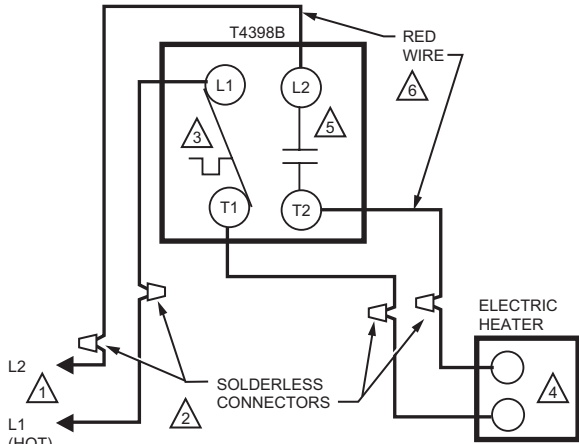
4. Turn the dial so the setpoint indicator is at the 12 o'clock position. (This prevents accidental damage to the dial-stop during mounting.)
5. Using the screwdriver, secure the thermostat to the electrical box by tightening the two mounting screws. See Fig. 4.
6. Level the thermostat only for appearance.
7. Tighten the screws and replace the cover.



- ⚠ POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.
- ⚠ USE SPECIAL SERVICE CO/ALR SOLDERLESS CONNECTORS WHEN CONNECTING ALUMINUM CONDUCTORS OR A FIRE HAZARD MAY RESULT.
- ⚠ USE A SEPARATE LIMIT CONTROL IN THE HEATING APPLIANCE.
- ⚠ BREAKS AND REMAKES BELOW -31 F (-35 C); NORMALLY THERMAL ACTIVATED. BREAKS ON TEMPERATURE RISE; MAKES ON TEMPERATURE FALL.

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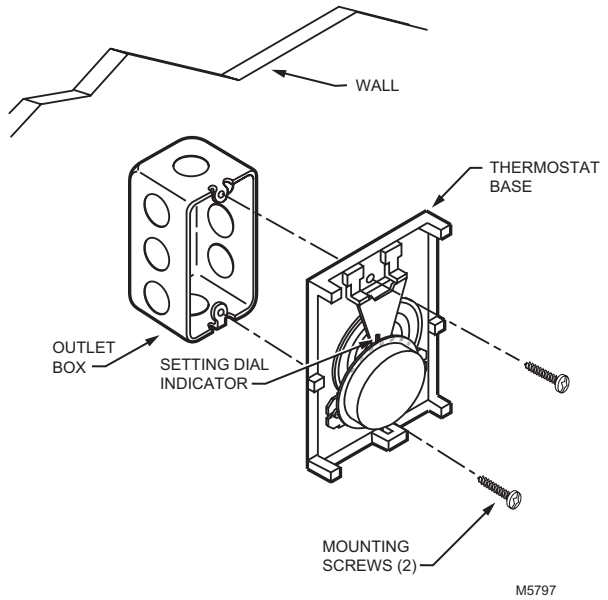
Fig. 2. T4398A typical hookup.



- 1 POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.
- 2 USE SPECIAL SERVICE CO/ALR SOLDERLESS CONNECTORS WHEN CONNECTING ALUMINUM CONDUCTORS OR A FIRE HAZARD MAY RESULT.
- 3 BREAKS AT POSITIVE OFF AND REMAKES UNDER $-31\text{ F } (-35\text{ C})$; NORMALLY THERMALLY ACTIVATED. BREAKS ON TEMPERATURE RISE; MAKES ON TEMPERATURE FALL.
- 4 USE A SEPARATE LIMIT CONTROL IN THE HEATING APPLIANCE.
- 5 BREAKS AT POSITIVE OFF ONLY; NOT THERMALLY ACTIVATED.
- 6 DO NOT CONNECT GROUNDED CONDUCTOR (NEUTRAL) ON 120 OR 227V CIRCUITS. INSULATE AND TAPE OR CUT OFF RED WIRES IF UNUSED.

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Fig. 3. T4398B typical hookup.



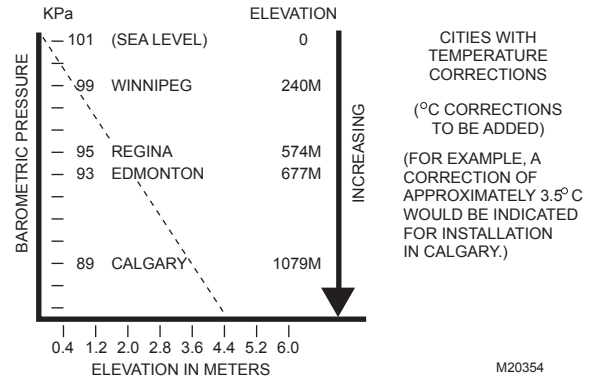
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Fig. 4. Mounting thermostat to outlet box.

OPERATION AND CHECKOUT

After the thermostat is installed and wired, check out normal operation as follows:

1. Turn setting dial fully clockwise until the switch clicks and the electric heater starts to heat.
2. Turn the dial fully counterclockwise; the power circuit breaks and the electric heater starts to cool.
3. The T4398 is a more accurate thermostat, allowing users to be more comfortable at lower setpoint settings (saving energy and lowering heating costs). To determine final setting:
 - a. Begin with setting the dial indicator at 68°F (20°C).
 - b. After two operating hours, if not comfortable, adjust setpoint to raise or lower the temperature, adjusting temperature only a few degrees each time.



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Fig. 6. T4398 altitude correction in (m).

Calibration

IMPORTANT

Do not assume the thermostat is out of calibration until it is installed and allowed to operate for several hours.

The T4398 is accurately calibrated at the factory under controlled conditions. The snap switch turns on heat when the setpoint is raised to room temperature.

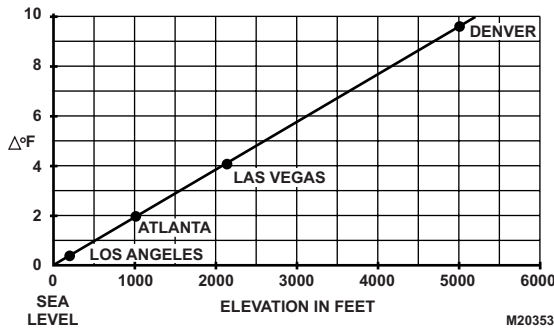
The vapor-filled diaphragm sensor is affected by barometric pressure and altitude. Deviations up to 1°F (±1/2°C) are within normal operation. The control point drops 2°F every 1000 ft (1°C/300m) above sea level. See Fig. 5 and 6.

To calibrate (see Fig. 7):

1. Remove cover and place it in a location that allows it to sense the room temperature.

NOTE: Allow several minutes for the thermometer to stop being affected by the heat from your hand.

2. Rotate the setpoint knob counterclockwise until you hear the switch click.
3. Hold the setpoint knob firmly and rotate the setpoint scale ring counterclockwise until 12 o'clock on the ring is aligned with the thermometer cover.
4. The heat from your hand will affect the diaphragm sensor so wait five minutes and verify the calibration.



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Fig. 5. T4398 altitude correction in (ft).

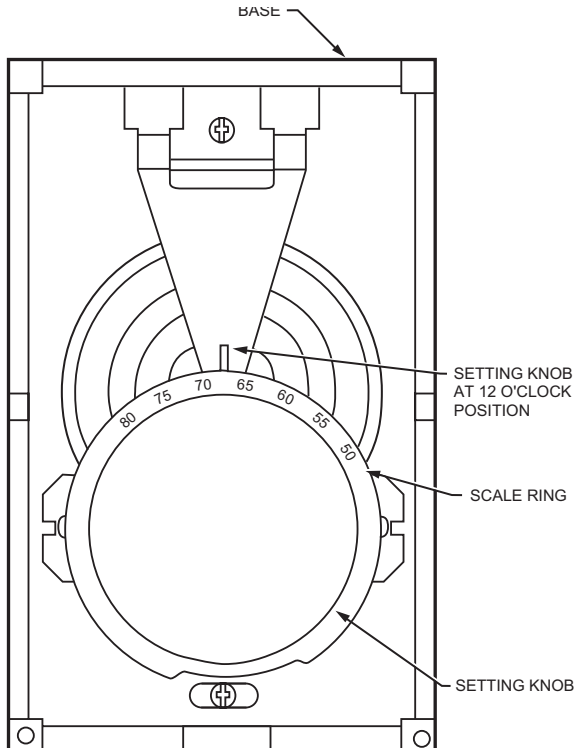


Fig. 7. Calibrating the thermostat.

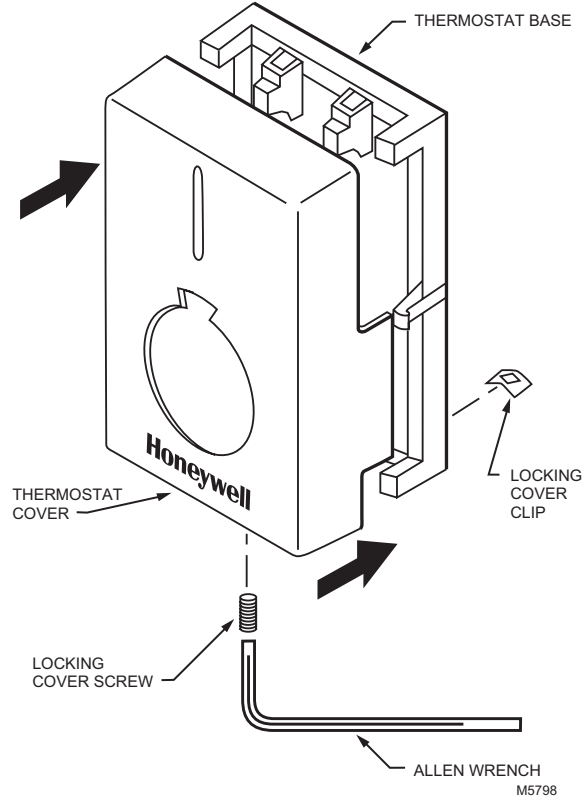


Fig. 8. Installing locking cover.

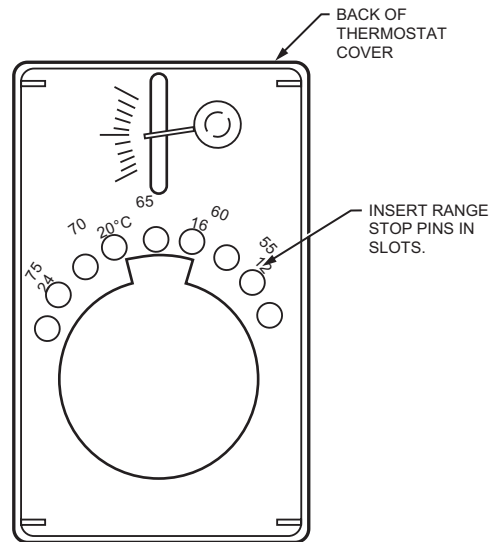
Security Features

To install the locking cover (select models (Fig. 8)):

1. Remove cover by swinging up from the bottom.
2. Insert the Tinnerman Speed Nut® (supplied) into the slot at the lower rear thermostat base.
3. Drive Allen screw into Speed Nut until head is flush with lower edge of thermostat base.
4. Reinstall cover and lock by backing out Allen screw until screw body protrudes through cover hole.
5. To unlock cover, drive Allen screw into thermostat base until screw body clears cover.

To install the range stops (select models) (Fig. 9):

1. Set thermostat to desired setpoint and remove the cover.
2. Install plastic dowels (supplied) into minimum and/or maximum range stop holes on the back of the cover.
3. Reinstall the cover and check range stop operation.



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Fig. 9. Installing range stops.

Frost Protection (T4398A)

When the ambient temperature falls to 40°F (4°C), the vapor in the diaphragm changes into liquid. The diaphragm collapse to a fraction its original thickness, turning on the heat, regardless of setpoint. This feature guarantees minimum, yet reliable, operation of heaters in spaces near freezing.

NOTE: To prevent heat from turning on below 40°F (4°C), turn off the circuit at the breaker panel, or install a T4398B.

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