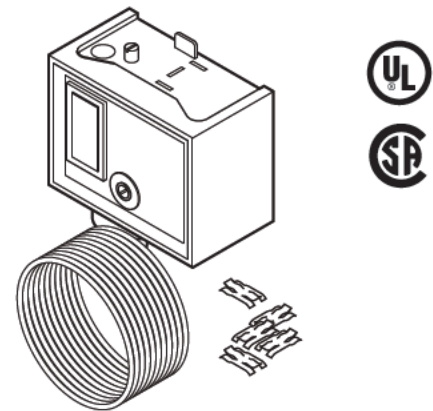


Application

The TC-5231, TC-5232, and TC-5241 low temperature thermostats are used to control temperature in air conditioning or refrigeration systems. The low temperature thermostat measures the coldest one-foot section along the entire 20-foot sensing element.

The low temperature thermostats are applicable to various applications such as: low temperature control of steam coils; frost indication in storehouses or orchards; temperature control of freezer cabinets, display cases, beverage coolers, milk cooling tanks, and air conditioners.



Features

- 20 ft. (6.1 m) element senses temperature over a large area. Control responds to coldest one-foot section of the sensor.
- Adjustable setpoint from 35 to 60°F (1.7 to 15.5°C) with 5°F (3°C) fixed differential.
- SPDT and DPST versions.
- Rated for use at 17 full load amps (120/208/240 Vac), 24 non-inductive amps (120/208/240 Vac), and 16 non-inductive amps (24 Vac). Capable of controlling refrigeration equipment directly.
- UL and CSA approved.
- Capillary clips provided.

Applicable Literature

- Electric/Electronic Products Catalog, F-27382
- Environmental Controls Application Manual, F-21335

SPECIFICATIONS

Setpoint Dial Range: Dual marked 35 to 60°F (1.7 to 15.5°C).

Sensing Element: Vapor pressure type, copper construction.

Response: To lowest temperature sensed by any one-foot section of its element. Altitude causes the control to operate approximately 1°F colder per 1000 ft. of elevation.

Differential: 5°F (3°C) fixed.

Electrical Switch: Snap action SPDT or DPST. Refer to Table-1.

Ratings, Refer to Table-1 and Table-2.

Connections:

TC-52xx, Screw terminals.

Mounting: In any position on any surface not subject to excessive vibration.

Housing: Molded gray PVC plastic cover with a zinc-plated steel main enclosure with a 1/2 in. conduit opening.

Ambient Temperature Limits:

Shipping and Storage, -40 to 150°F (-40 to 66°C).

Operating, Must be 5°F (3°C) above setpoint to a maximum of 150°F (66°C) at case.

Thermal Sensing Element, 300°F (149°C).

Humidity:

Enclosure, 5 to 95% RH, non-condensing.

Thermal Sensing Element, 0 to 100% RH.

Enclosure Rating: NEMA Type 1.

Dimensions:

Case, 2.7 H x 3.44 W x 1.97 D in. (69 x 87 x 50 mm).

Element, 3/32 in. O.D. x 20 ft. length (2.4 mm x 6.1 m).

Agency Approvals: UL 873 Temperature-Indicating and -Regulating Equipment and CSA Certified.

Table-1 Model Chart.

| Model Number | Device Type | Electrical Switch | Voltage Vac | Full Load Amps | Locked Rotor Amps | Pilot Duty (VA) | Non-Inductive Amps |
|--------------|------------------------------------|-------------------|------------------|----------------|-------------------|-----------------|--------------------|
| TC-5231 | Low temp auto reset | SPDT ^e | 24 ^a | — | — | 100 | 16 |
| | | | 120 | 17 | 102 | 720 | 24 |
| | | | 208 | | | | |
| | | | 240 ^c | | | | |
| | | | 277 | — | — | — | 7.2 |
| TC-5232 | Low temp auto reset | DPST ^d | 24 ^a | — | — | 100 | 16 |
| | | | 120 ^c | 24 | 144 | 125 | 24 |
| | | | 208 ^c | | | | |
| | | | 240 ^c | | | | |
| | | | 277 | — | — | — | 7.2 |
| TC-5241 | Low temp manual reset ^b | SPDT ^e | 24 ^a | — | — | 100 | 16 |
| | | | 120 | 17 | 102 | 720 | 24 |
| | | | 208 | | | | |
| | | | 240 ^c | | | | |
| | | | 277 | — | — | — | 7.2 |

^a Less than 0.5 Amp is not recommended.

^b Reset cannot be accomplished until the sensed temperature is at least 5°F above setpoint.

^c Full load and locked rotor ratings are suitable for hermetic compressors only.

^d Limit two separate circuit loads with common return to < 5885 VA. Only one load may be a motor load.

^e Do not exceed pilot duty rating on one side of switch.

Table-2 DC Ratings for TC-5232 Only.

| Volts | FLA | LRA | NIA | PD VA |
|-------|-----|-----|-----|-------|
| 120 | 4.6 | 46 | 3 | 57.5 |
| 240 | 2.3 | 23 | 0.5 | 57.5 |
| 600 | — | — | — | 57.5 |

TYPICAL APPLICATIONS (wiring diagrams)

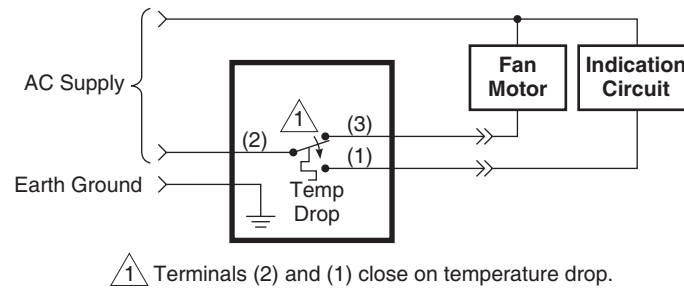
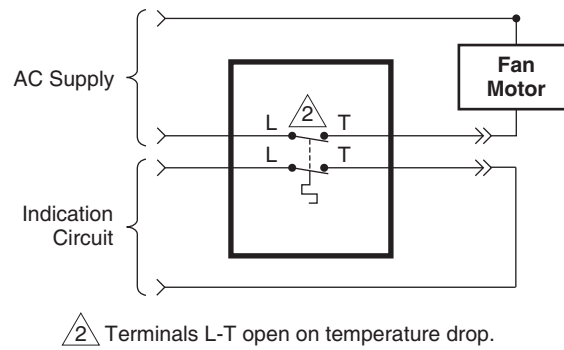


Figure-1 TC-5231 and TC-5241 Typical Application.



Note: Contacts are not rated for dry circuit applications.
Less than 1 Amp is not recommended.

Figure-2 TC-5232 Typical Application.

INSTALLATION

Inspection

Inspect the package for damage. If damaged, notify the appropriate carrier immediately. If undamaged, open the package and inspect the device for obvious damage. Return damaged products.

Requirements

- Job wiring diagrams
- Tools (not provided):
 - Voltage meter/indicator
 - Appropriate drill and drill bit for mounting screws
 - Appropriate screwdrivers and wrenches
- Mounting screws, two (2) #10 maximum (not provided)
- Capillary mounting clips (5 provided)
- Training: Installer must be a qualified, experienced technician



▼ **WARNING**

- The TC-5231 series, TC-5232, and TC-5241 series devices are designed for use *only* as operating controls. Where an operating control failure would result in personal injury and/or loss of property, it is the responsibility of the installer to add devices (safety, limit controls) that protect against, or systems (alarm, supervisory systems) that warn, of control failure.
- Disconnect the power supply (line power) before and during installation to prevent possible electrical shock and equipment damage.
- Make all connections in accordance with the wiring diagram and in accordance with the National and Local Electrical Code. *Use copper conductors only.*
- Do not restore electrical power until installation is complete.

▼ **CAUTION**

- Do not exceed the electrical ratings indicated on the label inside the cover of the device.
- Avoid locations where excessive moisture, corrosive fumes, or vibration are present. Use only in locations suitable for NEMA Type 1 rated devices.

Mounting

▼ **CAUTION**

- Do not kink the capillary or the thermostat will be damaged.
- To achieve optimum performance, do not mount the thermal element in a vertical pattern.

1. Select a location that permits proper capillary routing. It is important not to twist or strain the control body or shifting of the calibration may result.

NOTE

- Use only the mounting holes provided in the control frame. Make sure the mounting surface is flat. Mounting the device to an uneven surface may cause improper control operation.
 - Do not let any part of the capillary touch any surface that is colder than the desired sensing area.
 - Do not crush or deform the sensing element when clamping.
 - Do not cut the capillary or bulb. Avoid sharp bends, kinks, strains, or pinch marks in the capillary. Never allow the capillary to rest against sharp edges or rub against metal surfaces.
-

2. Provide a drip loop in the capillary if the body is mounted in any position other than upright. The thermal element is usually located on the downstream side of the coil.
3. Allow slack so that the capillary is not taut. Install the thermal element securely in the controlled media for maximum sensing capability and minimum vibration damage.
4. Serpentine the element in a horizontal pattern so that it is exposed to all areas where low temperatures are possible. See Figure-3.
5. Secure the element into place using the five capillary clips provided.
6. Remove the cover. See Figure-4.
7. Mount the case with two screws (#10 maximum) in the screw slots in the back of the case. See Figure-6.
8. Connect the appropriate wiring. Follow the wiring instructions in the Wiring section.

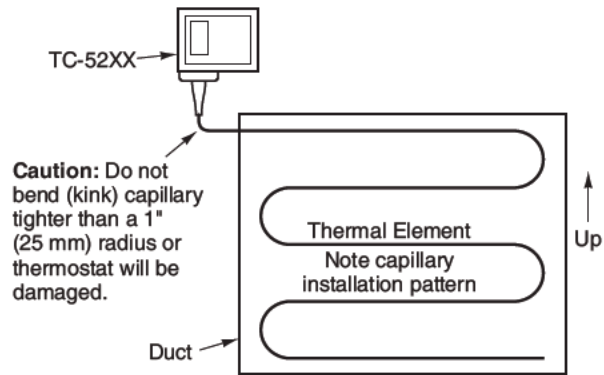


Figure-3 Thermal Element Location.

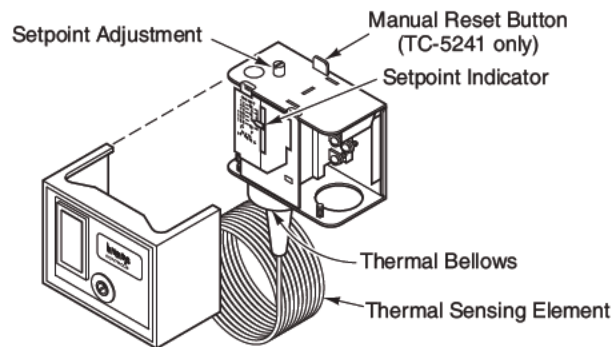


Figure-4 TC-52xx with Cover Removed.

Wiring

NOTE

Do not adjust the pointer beyond the highest and lowest marks on the scaleplate. The scaleplate is only for reference, and the final settings should be verified with a thermometer.

▼ CAUTION

The terminals must not be bent, cut off, drilled, or retapped.

1. Provide a drip loop in the wiring to prevent water from reaching the thermostat.
2. Loosen the green grounding screw provided on the TC-52xx case to connect the unit to earth ground.
3. Loosen the terminal screws and make the appropriate power wiring connections to the numbered terminals. The TC-52xx case has an opening for a 1/2 in. conduit fitting. See Figure-1 and Figure-2 for TC-52xx models.
4. Replace the cover.
5. Adjust the setpoint by turning the setpoint screw until the scale pointer is properly positioned.
6. Check for proper operation of the device. Follow the instructions in the Checkout section.
7. At initial start-up of the equipment, observe the capillary for excessive vibration and make corrections as required.

CHECKOUT

▼ CAUTION

The unit includes a mechanical stop to prevent adjustment below 35°F (2°C). Do not attempt to set below 35°F (2°C), or the device may be damaged.

1. If the ambient temperature at the thermal element is within the 35 to 55°F (2 to 13°C) setpoint range, turn the adjustment screw located in the top of the case until the setpoint exceeds the ambient temperature. Confirm that the snap acting switch has operated.
2. Turn the setpoint adjustment screw until the indicating pointer is at the desired setpoint temperature.
3. On the TC-5241 model, push the manual reset button to put the thermostat into service.

Manual Operation of Switch

▼ CAUTION

- When the sensed temperature is below setpoint, the switch is open (terminals 2–3 on TC-52x1 and terminals L–T on TC-5232), and the tab at the end of the bellows lever is down. The switch can be momentarily closed by lifting the tab with a screwdriver. See Figure-5.
- Do not attempt to manually operate the thermostat in any other way as this can damage equipment and void the warranty.

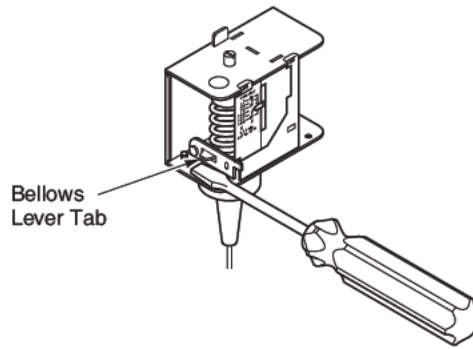


Figure-5 Manual Operation of Switch on TC-5231 and TC-5241.

CALIBRATION

All thermostats are precision calibrated at the factory.

REPAIR

This thermostat is not field repairable. Replace the device if necessary.

DIMENSIONAL DATA

Dimensions are shown in inches (millimeters).

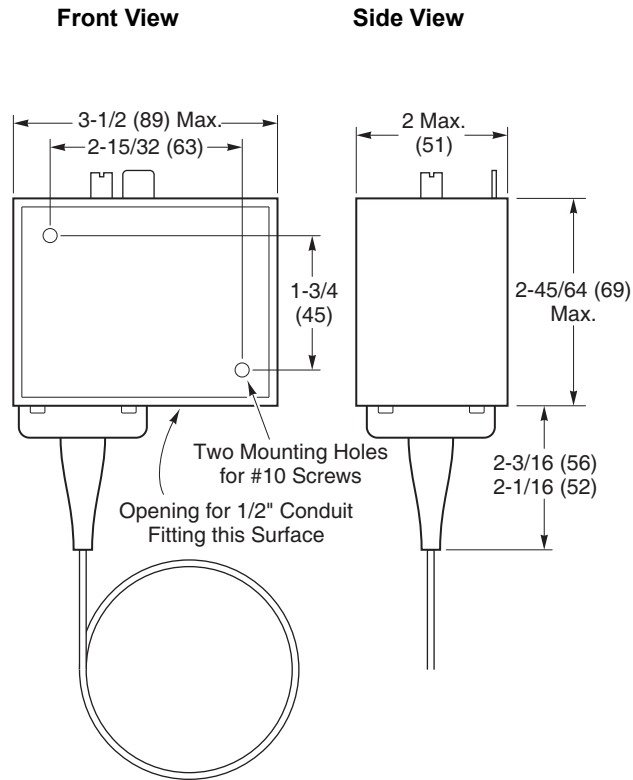


Figure-6 TC-52xx Mounting Dimensions.

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