



# Installation, Operation, and Maintenance

## Wired Temperature Sensors



### SAFETY WARNING

Only qualified personnel should install and service the equipment. The installation, starting up, and servicing of heating, ventilating, and air-conditioning equipment can be hazardous and requires specific knowledge and training. Improperly installed, adjusted or altered equipment by an unqualified person could result in death or serious injury. When working on the equipment, observe all precautions in the literature and on the tags, stickers, and labels that are attached to the equipment.



# Introduction

## Warnings, Cautions, and Notices

Safety advisories appear throughout this manual as required. Your personal safety and the proper operation of this machine depend upon the strict observance of these precautions.

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The three types of advisories are defined as follows:

**⚠ WARNING** Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

**⚠ CAUTION** Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It could also be used to alert against unsafe practices.

**NOTICE** Indicates a situation that could result in equipment or property-damage only accidents.

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## Important Environmental Concerns

Scientific research has shown that certain man-made chemicals can affect the earth's naturally occurring stratospheric ozone layer when released to the atmosphere. In particular, several of the identified chemicals that may affect the ozone layer are refrigerants that contain Chlorine, Fluorine and Carbon (CFCs) and those containing Hydrogen, Chlorine, Fluorine and Carbon (HCFCs). Not all refrigerants containing these compounds have the same potential impact to the environment. Trane advocates the responsible handling of all refrigerants-including industry replacements for CFCs and HCFCs such as saturated or unsaturated HFCs and HCFCs.

## Important Responsible Refrigerant Practices

Trane believes that responsible refrigerant practices are important to the environment, our customers, and the air conditioning industry. All technicians who handle refrigerants must be certified according to local rules. For the USA, the Federal Clean Air Act (Section 608) sets forth the requirements for handling, reclaiming, recovering and recycling of certain refrigerants and the equipment that is used in these service procedures. In addition, some states or municipalities may have additional requirements that must also be adhered to for responsible management of refrigerants. Know the applicable laws and follow them.

### **⚠ WARNING**

#### **Proper Field Wiring and Grounding Required!**

**Failure to follow code could result in death or serious injury. All field wiring MUST be performed by qualified personnel. Improperly installed and grounded field wiring poses FIRE and ELECTROCUTION hazards. To avoid these hazards, you MUST follow requirements for field wiring installation and grounding as described in NEC and your local/state electrical codes. Failure to follow code could result in death or serious injury.**

**⚠ WARNING****Personal Protective Equipment (PPE) Required!**

Failure to wear proper PPE for the job being undertaken could result in death or serious injury. Technicians, in order to protect themselves from potential electrical, mechanical, and chemical hazards, **MUST** follow precautions in this manual and on the tags, stickers, and labels, as well as the instructions below:

- Before installing/servicing this unit, technicians **MUST** put on all PPE required for the work being undertaken (Examples; cut resistant gloves/sleeves, butyl gloves, safety glasses, hard hat/bump cap, fall protection, electrical PPE and arc flash clothing). **ALWAYS** refer to appropriate Safety Data Sheets (SDS) and OSHA guidelines for proper PPE.
- When working with or around hazardous chemicals, **ALWAYS** refer to the appropriate SDS and OSHA/GHS (Global Harmonized System of Classification and Labeling of Chemicals) guidelines for information on allowable personal exposure levels, proper respiratory protection and handling instructions.
- If there is a risk of energized electrical contact, arc, or flash, technicians **MUST** put on all PPE in accordance with OSHA, NFPA 70E, or other country-specific requirements for arc flash protection, **PRIOR** to servicing the unit. **NEVER PERFORM ANY SWITCHING, DISCONNECTING, OR VOLTAGE TESTING WITHOUT PROPER ELECTRICAL PPE AND ARC FLASH CLOTHING. ENSURE ELECTRICAL METERS AND EQUIPMENT ARE PROPERLY RATED FOR INTENDED VOLTAGE.**

**⚠ WARNING****Follow EHS Policies!**

Failure to follow instructions below could result in death or serious injury.

- All Trane personnel must follow the company's Environmental, Health and Safety (EHS) policies when performing work such as hot work, electrical, fall protection, lockout/tagout, refrigerant handling, etc. Where local regulations are more stringent than these policies, those regulations supersede these policies.
- Non-Trane personnel should always follow local regulations.

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## Trademarks

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## Revision History

- Revised instructions on how to change the fan speed control.



# Table of Contents

General Information .....	6
Product Description .....	6
Part Numbers .....	7
Dimensions .....	8
Pre-Installation .....	9
Location Considerations .....	9
Height Requirements .....	9
Mounting Surfaces .....	9
Installation and Configuration: Display Sensor .....	10
Mounting the Back Plate .....	10
Wiring the Sensor .....	12
Configuring the Display Sensor .....	13
Configuration Procedure .....	13
Optional Configuration Features .....	17
Replacing the Cover .....	18
Installation: All Models Other Than the Display Sensor .....	20
Mounting the Back Plate .....	20
Installing the COMM Module (optional) .....	23
Changing the Setpoint Thumb Wheel (optional) .....	24
Wiring the Sensor .....	24
Replacing the Cover .....	25
Operation .....	26
Changing Temperature Settings .....	26
Changing System Settings .....	26
Changing Fan Settings .....	26
Selecting Temporary Occupancy (Timed Override) .....	27
Service Pin Request .....	28
Sensors with Occupied/Unoccupied Buttons .....	28
Display Sensor .....	28
Star(*)/Double Star(**) Function .....	29
Sensors with Thumb Wheels .....	29
Display Sensor .....	29
Display Sensor Operation .....	30
Changing Temperature Settings .....	30
Changing Heating and Cooling Temperature Settings (dual setpoint systems only) .....	30
Changing System Settings .....	31
Changing Fan Settings .....	31

Requesting Temporary Occupancy .....	31
Error codes .....	31
Lock Symbol .....	31
Maintenance and Troubleshooting .....	32
LEDs .....	32
Error Codes (Display Sensor) .....	32
Display Sensor: Output Values—Failure and Default Modes of Operation	32
Measuring Output Resistance .....	33
Display Sensors .....	33
All Models Other Than the Display Sensor .....	33
Cleaning the Sensor .....	35
Replacing the Thumb Wheel .....	35
Wiring Diagrams .....	36
Temperature sensors with fan control .....	37
Temperature sensors with fan and system control .....	40
Optional COMM module .....	43
Specifications and Agency Compliance .....	44
Specifications .....	44
Agency Compliance .....	44
CE Declaration of Conformity .....	45



## General Information

This section provides a description of the wired temperature sensors, as well as part numbers and dimensions.

### Product Description

**Note:** *The information in this manual applies to both factory and field installed versions of Trane wired temperature sensors.*

Trane® wired temperature sensors are compatible with any Trane unit controller that uses a standard 10 kW temperature input. Temperature monitoring is standard on all models. Additional features are available on some models:

- Fan control
- System control
- Dual or single temperature setpoint control
- Occupancy (timed override) request function
- COMM module—Optional accessory that provides an RJ22 connection for a Trane service tool for system communication. Must be ordered separately.
- Hot/cold setpoint thumb wheel—Optional accessory allows selecting a temperature setpoint by color (red/blue for hot/cold) on thumbwheel, rather than by a number. Must be ordered separately.

The display sensor (p/n X13790886) has an LCD display and includes an RJ11 (RJ22 compatible) connection for a Trane service tool for system communication. The following features on this sensor are configurable:

- Temperature units: Fahrenheit (°F) or Celsius (°C)
- Temperature resolution: 1.0, 0.5, or 0.1 degrees
- Ability to display setpoint only (zone temperature does not display)
- Single, dual, or no setpoint
- System settings: auto, off, cool, heat, emergency heat
- Deadband (heat/cool setpoint offset for dual setpoint systems)
- Fan settings: high, medium, low, auto, off
- Occupancy (timed override request) function
- Lockable settings to protect against unauthorized use
- Service pin request

## Part Numbers

The following table lists part numbers for each sensor type.

Sensor type	Features					Part number	BAYSENS	Global parts
	Setpoint	Fan control	System	Occupancy	LEDs			
Temperature sensors	Single	No	No	Yes	No	X1351152701	BAYSENS074A	SEN01447
	No			No		X1351152801	BAYSENS077A	SEN01448
	Single			No		X1351152901	BAYSENS075A	SEN01449
	No			Yes		X1351153001	BAYSENS073A	SEN01450
Temperature sensors with fan control	Single	Off/Auto	No	Yes	No	X1379084501	NA	SEN01521
	Single	Off/Run		Yes		X1379085101		SEN01527
	Single	Off/Auto/Low/High		Yes		X1379084801		SEN01524
	Single	Off/Auto/Low/Med/High		No		X1379084101		SEN01517
	Single	Off/Auto/Low/Med/High		Yes		X1379084201		SEN01518
Temperature sensors with fan and system control	Dual	Auto/High	Cool/Off/Auto/Heat/Em Heat	No	Yes (4)	X1379084701	BAYSENS109A	SEN01523
	Single	Auto/High	Cool/Off/Heat/Em Heat	No	Yes (1)	X1379085201	BAYSENS107A	SEN01528
	Dual	Auto/High	Cool/Off/Auto/Heat	No	No	X1379083701	BAYSENS108A	SEN01513
	Dual	Auto/High	Cool/Off/Auto/Heat	No	Yes (4)	X1379084601	BAYSENS110A	SEN01522
	Single	Auto/High	Cool/Off/Heat	No	No	X1379083901	BAYSENS106A	SEN01515
	Single	Low/High	Cool/Off/Heat/Fan	No	No	X1379085001	NA	SEN01526
Temperature sensor with LCD display <sup>(a)(b)</sup>	Single	No	No	Yes	No	X1379088601	NA	SEN02076
	Single	Off/On/Auto/Low/Med/High	No	No		X1379088604	NA	NA
	Dual	Auto/On	Cool/Off/Auto/Heat/Em Heat	No		X1379088605	BAYSENS135A	NA

(a) These sensors can be field configured to match the applicable unit controller options.

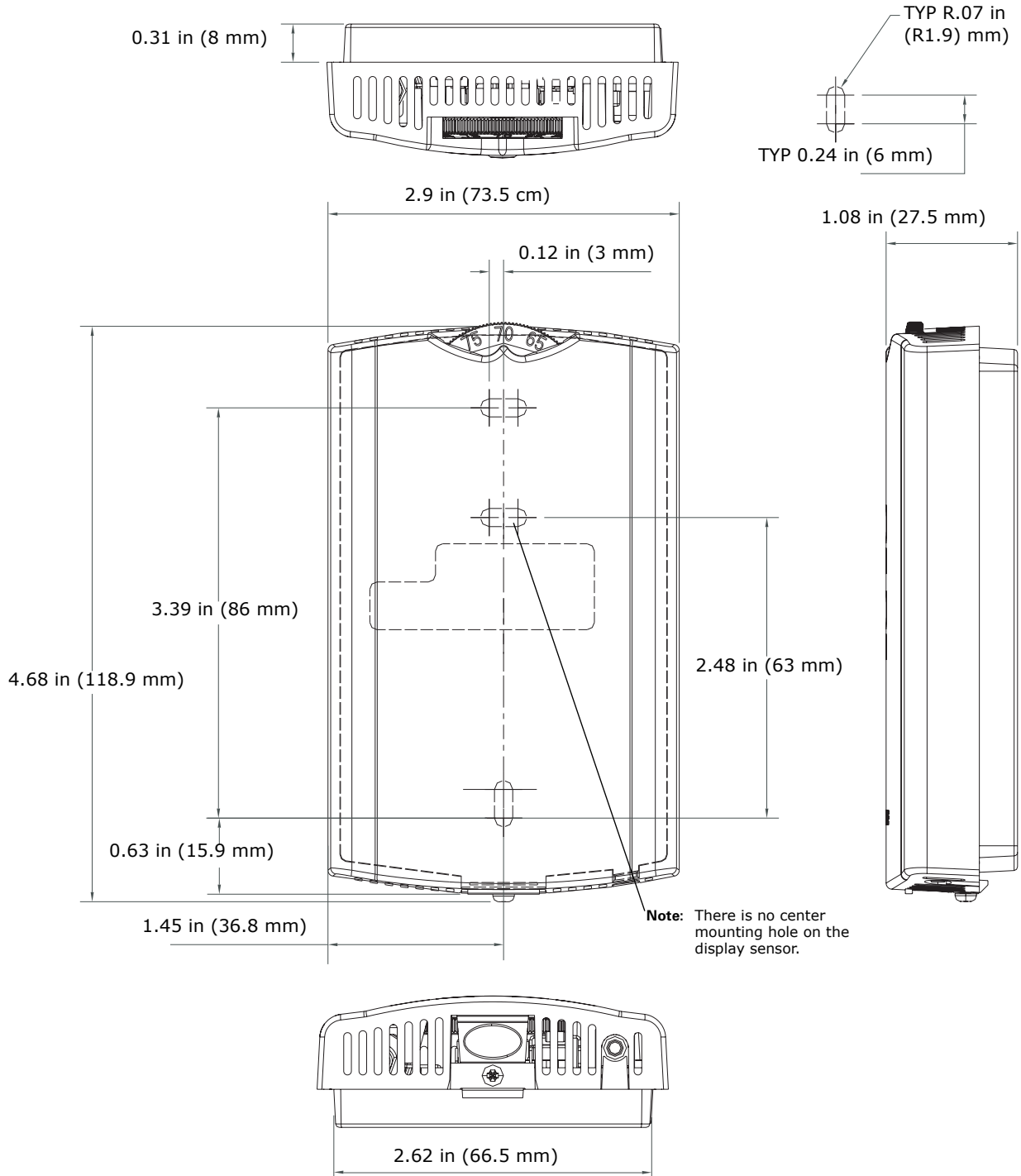
(b) Unit controller inputs for system status, fan status, and service required are not available on this sensor. If replacing a BAYSENS031A or a BAYSENS035A sensor, and status indicators are required, replace with non-display sensor BAYSENS109A or BAYSENS110A.

The following table lists part numbers for optional accessories.

Accessory	Available for . . .	Part number	BAYSENS	Global parts
COMM module (box of 12)	All sensors other than the display sensor	X1365146702	BAYCOMM005A	CON01313
Setpoint thumb wheel: Hot/cold (box of 12)	Sensors with thumb wheels	X1316105702	NA	KNB00182

## Dimensions

The following illustration provides specific dimension details. The dimensions are the same for all models.





## Pre-Installation

This section provides the following pre-installation information:

- Location considerations
- Height requirements
- Mounting surfaces

### Location Considerations

Placement of the sensor is critical to proper operation. When selecting a location, avoid the following:

- Areas of direct sunlight
- Areas in the direct airstream of air diffusers
- Exterior walls and other walls that have a temperature differential between the two sides
- Areas that are close to heat sources such as sunlight, appliances, concealed pipes, chimneys, or other heat-generating equipment
- Drafty areas
- Dead spots behind doors, projection screens, or corners
- Walls that are subject to high vibration
- Areas with high humidity
- High traffic areas (to reduce accidental damage or tampering)

### Height Requirements

The recommended maximum mounting height is 54 inches from the bottom of the back plate to the floor. If a parallel approach by a person in a wheelchair is required, reduce the maximum height to 48 inches.

**Note:** Consult section 4.27.3 of the 2002 ADA (Americans with Disability Act) guideline, and local building codes, for further details regarding wheelchair requirements.

### Mounting Surfaces

Using the hardware provided, mount the back plate to a flat surface such as sheetrock or plaster, or an electrical junction box. The sensor must be mounted plumb for accurate temperature control and to ensure proper air movement through the sensor.

- If mounting onto sheetrock or plaster, use the plastic threaded anchors (pre-drilling holes is not usually necessary) and the two M3.5 x 20 mm mounting screws.
- For mounting onto an electrical junction box, use the two 6-32 x 3/4 in. screws.

# Installation and Configuration: Display Sensor

This section provides step-by-step installation instructions for the display sensor (see applicable part numbers for the temperature sensor with LCD display on p. 7). For installation of all other sensor models, see p. 20.

Read through the pre-installation information (p. 9) before proceeding with the installation.

**Note:** Before installing a wired sensor, ensure that a wire access hole is available at the sensor location and the wire is accessible through the hole. The technician should assume that the wires are attached to the appropriate unit controller, that there is continuity between the sensor location and the controller, and that the wires are accurately labeled or identified by color.

## Mounting the Back Plate

### ⚠ WARNING

#### Hazardous Voltage!

Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power can not be inadvertently energized. Failure to disconnect power before servicing could result in death or serious injury.

### NOTICE:

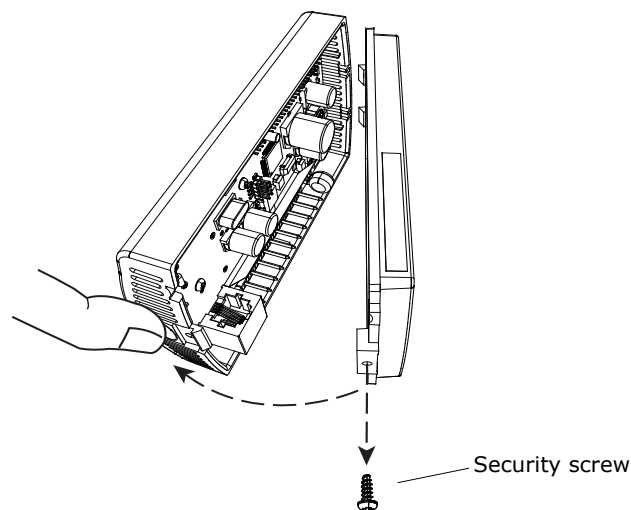
#### Equipment damage!

Applying excessive voltage to the sensor will permanently damage it.

**Note:** Refer to the illustration below when installing the sensor.

1. Shut off power to the unit controller.
2. Remove the cover by firmly pressing the thumb tab at the bottom of the cover and pulling the cover away from the back plate.

**Note:** If present, remove the security screw before removing the cover.



## Installation and Configuration: Display Sensor

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3. Feed the wires through the opening in the back plate.



## Installation and Configuration: Display Sensor

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4. Hold the back plate against the mounting surface and mark the screw locations.
5. Secure the back plate to the mounting surface using the included hardware.

## Wiring the Sensor

### **⚠ WARNING**

#### **Hazardous Voltage!**

Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power can not be inadvertently energized. Failure to disconnect power before servicing could result in death or serious injury.

### **NOTICE:**

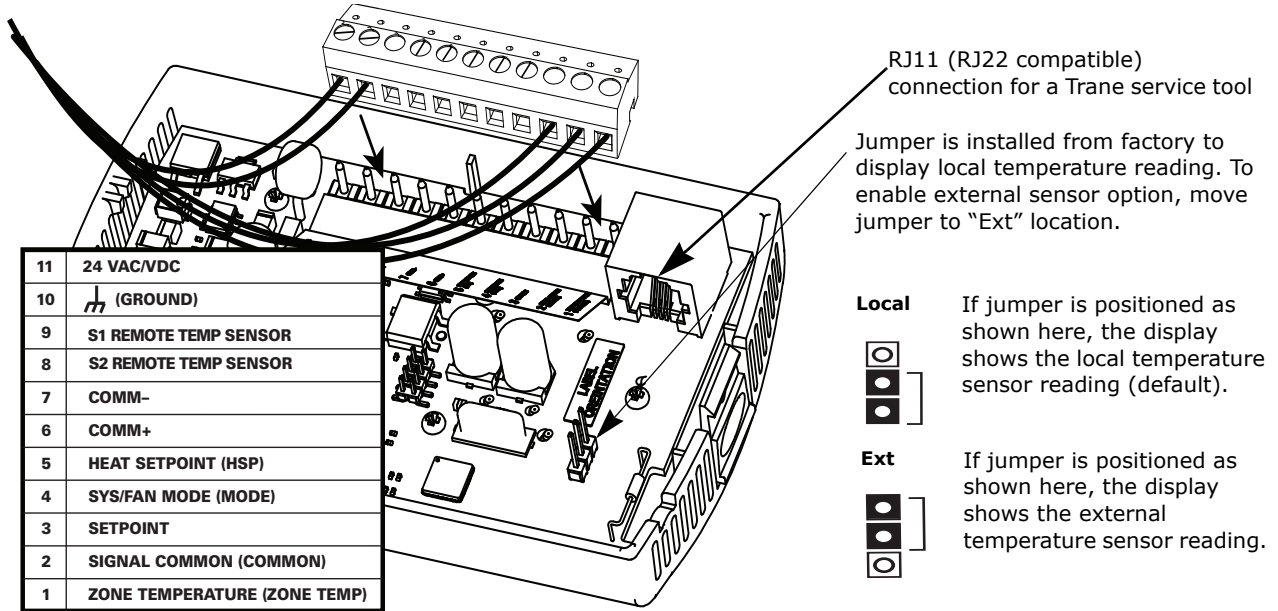
#### **Equipment damage!**

Applying excessive voltage to the sensor will permanently damage it.

To wire the sensor to the unit controller:

1. Ensure that the wires are connected to the appropriate terminals at the unit controller.  
**Note:** Ensure that the GROUND (terminal 10) and the SIGNAL COMMON (terminal 2) wires share a common ground with the transformer
2. Insert each wire into the appropriate location in the terminal block (see the table in [Figure 1, p. 13](#)). Tighten the terminal screw.  
**Note:** *The wire connections can be made while the terminal block is either on the circuit board, or removed from it.*
3. Perform a pull test to ensure that the wires are properly connected.
4. If you want the sensor to read an external thermistor, reset the jumper to the external position as shown in [Figure 1, p. 13](#).
5. If the terminal block was removed from the circuit board, attach it to the pins inside the sensor cover ([Figure 1, p. 13](#)).

**Figure 1. Attaching the terminal block to the pins on the circuit board**



6. Push the excess wire into the wall cavity and plug it with nonflammable insulation to prevent drafts from affecting the sensor.

**Important:** Do not coil excess wire inside the back plate.

## Configuring the Display Sensor

The configuration of the display sensor determines which system features can be accessed and changes can be made by the tenant (for example, changes to cooling/heating mode, setpoint, or fan speed. Verify system and associated unit features before configuring the sensor.

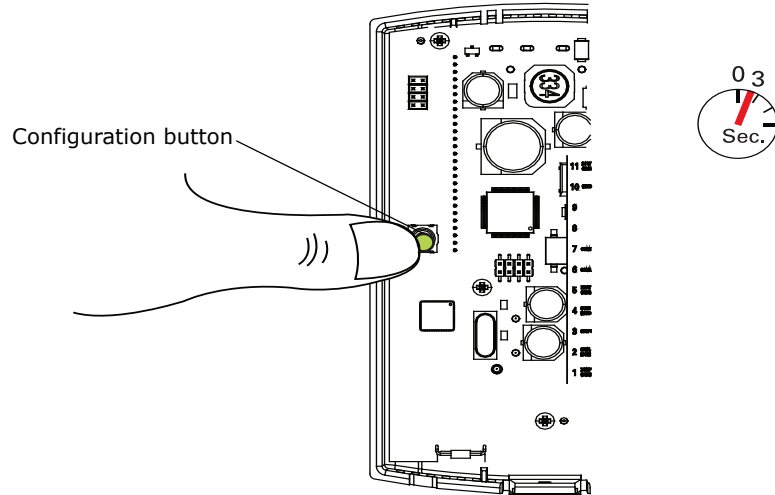
The building owner or operator may choose to limit tenant access to certain features. This can be done through configuration. Or, if a sensor is configured to match all controllable features of the associated equipment, the locking feature can be used to restrict the tenant from making changes.

## Configuration Procedure

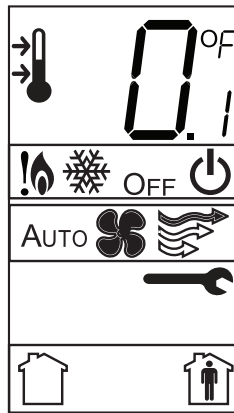
To configure settings on the sensor, follow this procedure in the order presented.

## Installation and Configuration: Display Sensor

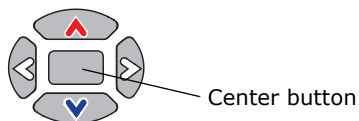
1. Press the configuration button for 3 seconds.



The display will change to configuration mode. When the sensor is in configuration mode, a wrench symbol appears on the display and the menus are separated by lines, as illustrated below.



1. Press the center button on the keypad to begin the configuration process.



2. Configure the sensor options in the order shown in the table.
  - Press or to scroll to the next selection (as illustrated).

## Installation and Configuration: Display Sensor

- Press or to move to the next menu (as illustrated).

Setting	Configuration options
<b>Temperature</b> <ul style="list-style-type: none"> <li>Choose Fahrenheit or Celsius</li> <li>Choose the degree resolution (whole degrees, half degrees, or tenths of degrees)</li> </ul>	
<b>Setpoint</b>	
<b>Deadband</b> (available for dual setpoint system only)  <b>Note:</b> Deadband refers to the minimum difference between the heating and cooling setpoints.	<p>heat/cool setpoint offset 2°F – 10.8°F, 1.1°C – 6°C</p>
<b>System</b> <b>a) Single setpoint</b>	
<b>System (continued)</b> <b>b) Dual setpoint</b>	
<b>c) No setpoint</b>	

## Installation and Configuration: Display Sensor

Setting	Configuration options
<b>Fan</b> <b>Note:</b> Not all fan options are available for all systems.	
<b>Occupancy (timed override)</b>	

1. Review the display to ensure that you have selected the correct configuration options.

The example shows a display that has been configured for:

- Dual setpoint
- Temperature units (Fahrenheit)
- Temperature resolution to tenths of a degree
- System settings: Emergency Heat, Heat, Cool, Off
- Fan settings: Auto or On
- Occupied/unoccupied option enabled



2. To return the display to operating mode, press the configuration button (see step 1, p. 14).

**Note:** The sensor will revert to operating mode if no buttons are pressed for 10 minutes.



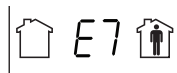
The following example shows a configured display in operating mode.



Display shows the following:

- Temperature units (Fahrenheit)
- Temperature resolution to tenths of a degree
- System setting: Cooling
- Fan setting: Auto
- Occupied/unoccupied option enabled

If an error code exists, it appears at the bottom of the display between the occupancy symbols, as shown below. See ["Error codes," p. 31](#), for error code definitions.

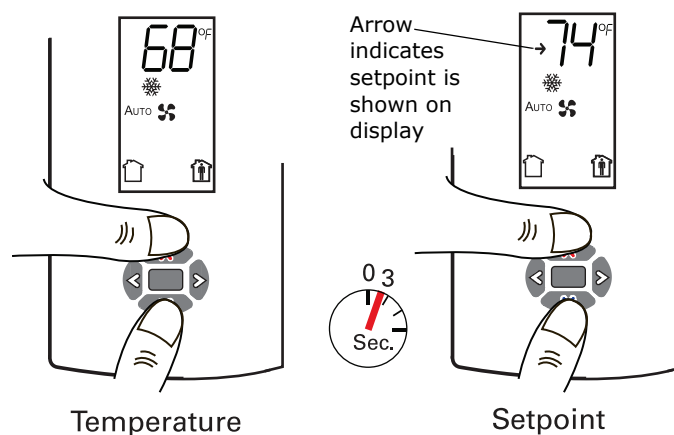


### Optional Configuration Features

#### Displaying Setpoint or Temperature

You can configure the sensor to display either the temperature (default) or setpoint. To select either option:

1. Verify that the sensor is in operating mode and at the home screen.
2. Press the up and down arrows for 3 seconds. The arrow indicates setpoint display, as shown in the illustration.



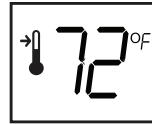
#### Locking or Unlocking Settings

You can lock or unlock the setpoint, system, or fan setting to prevent changes.

To lock or unlock a setting:

## Installation and Configuration: Display Sensor

1. Verify that the sensor is in operating mode and at the home screen.
2. Choose a setting to lock or unlock:
  - Select the setpoint by pressing the up or down arrow.



Setpoint

- Select the system menu by pressing the center button. Use the left or right arrow to choose the setting.




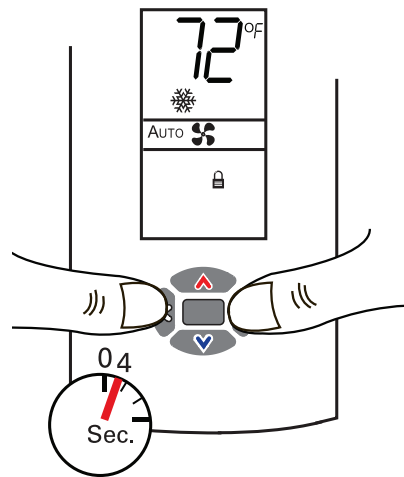
System menu


- From the system menu press the down arrow to select the fan menu. Use the left or right arrow to choose the setting.



Fan menu

3. Press the left and right arrows for 4 seconds. The lock symbol  will appear on the display to indicate that the setting has been locked.



**Note:** If you try to access a feature that is locked, the locked symbol  appears on the display. If you press a keypad button to try change a locked setting, the locked symbol flashes.

## Replacing the Cover

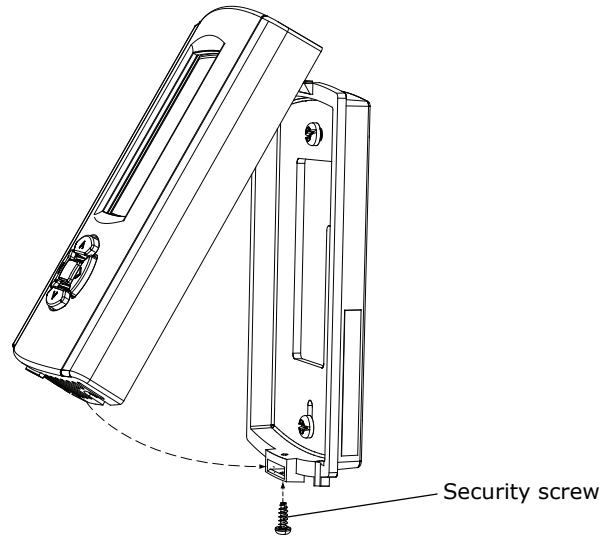
To replace the cover:

1. Hook the cover over the top of the back plate. Apply light pressure to the bottom of the cover until it snaps in place.

## Installation and Configuration: Display Sensor

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2. Secure the cover by installing the security screw into the bottom of the cover.



## Installation: All Models Other Than the Display Sensor

This section provides step-by-step installation instructions for all sensor models other than the display sensor. (For installation of the display sensor, see p. 10.) Read through the pre-installation information before proceeding with the installation.

**Note:** Before installing a wired sensor, ensure that a wire access hole is available at the sensor location and the wire is accessible through the hole. The technician should assume that the wires are attached to the appropriate unit controller, that there is continuity between the location and the controller, and that the wires are accurately labeled or identified by color.

### Mounting the Back Plate

#### **⚠ WARNING**

##### **Hazardous Voltage!**

**Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power can not be inadvertently energized. Failure to disconnect power before servicing could result in death or serious injury.**

#### **NOTICE:**

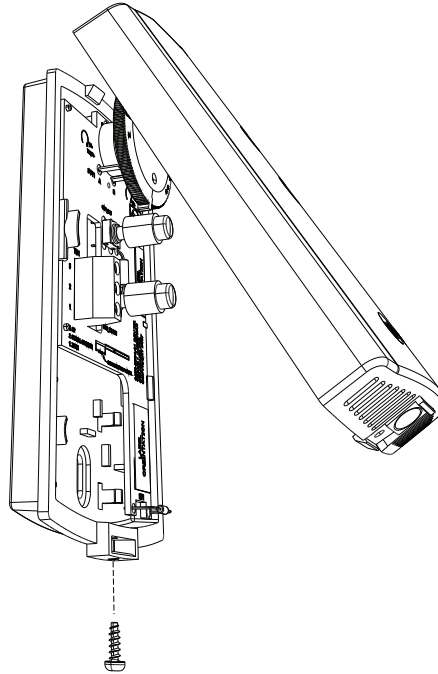
##### **Equipment damage!**

**Applying excessive voltage to the sensor will permanently damage it.**

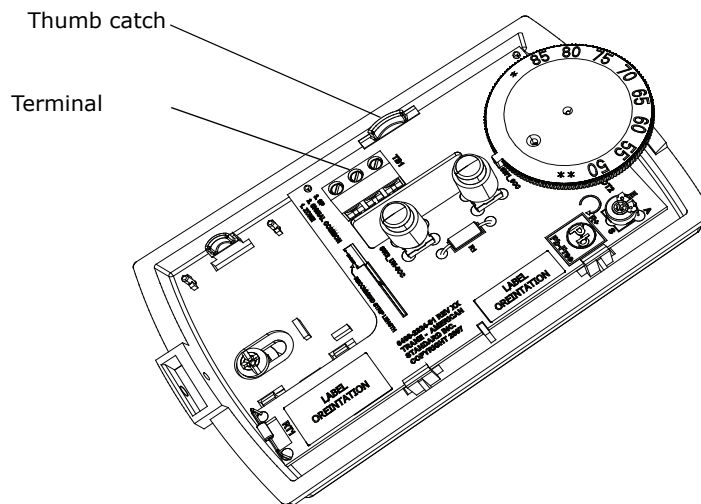
1. Shut off power to the unit controller.
2. Remove the cover by firmly pressing the thumb tab at the bottom of the cover and pulling the cover away from the back plate.

## Installation: All Models Other Than the Display Sensor

**Note:** If present, remove the security screw before removing the cover.



3. Remove the circuit board by pressing the thumb catch on the left side of the board. Use the terminal block to lift the circuit board from the back plate.

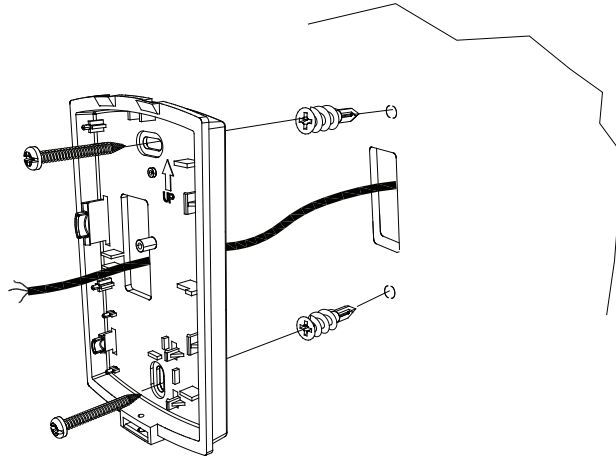


4. Feed the wires through the opening in the back plate.
5. Hold the back plate against the mounting surface and mark the screw locations.

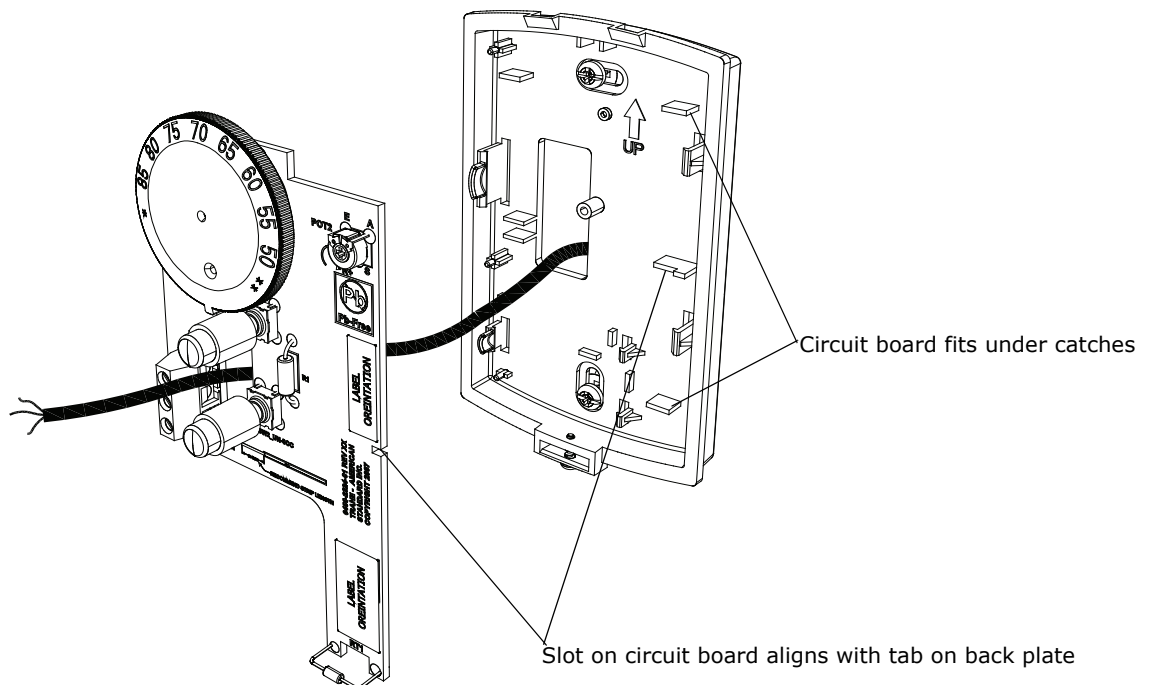
## Installation: All Models Other Than the Display Sensor

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- Secure the back plate to the mounting surface using the included hardware.



- Feed the wires through the opening in the circuit board.
- Replace the circuit board by sliding the right side of the board under the two catches on the right side of the back plate, while aligning slot on board with tab on back plate. Press firmly on the left side of the circuit board to snap it into place.

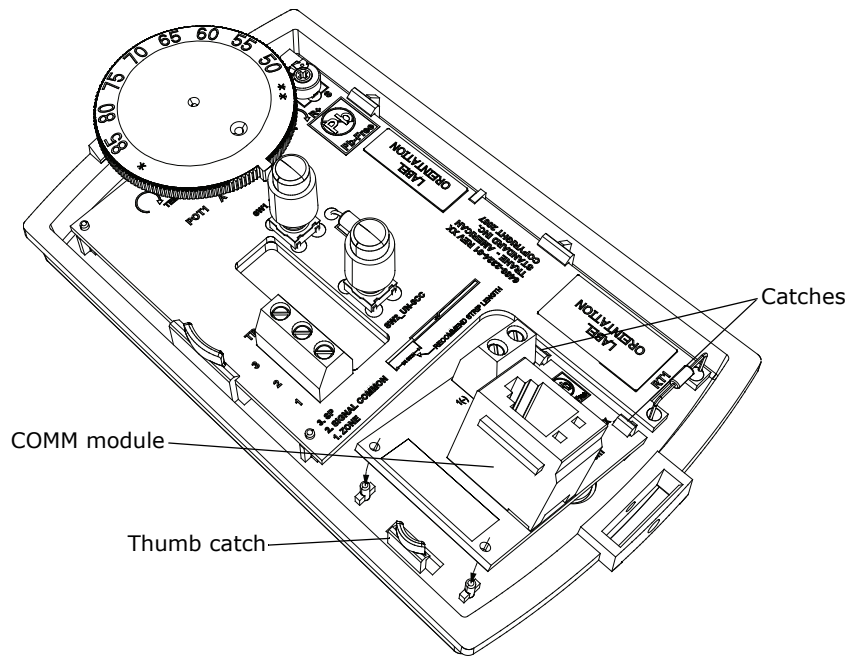


## Installing the COMM Module (optional)

An optional COMM module is available that provides a local RJ22 connection to a Trane service tool for maintenance use. It must be ordered separately.

Install the COMM module before wiring the sensor:

1. Slide the two cutouts on the right side of the COMM module into the two keys on the back plate.
2. Press firmly on the left side of the COMM module board until it snaps into place.



## Changing the Setpoint Thumb Wheel (optional)

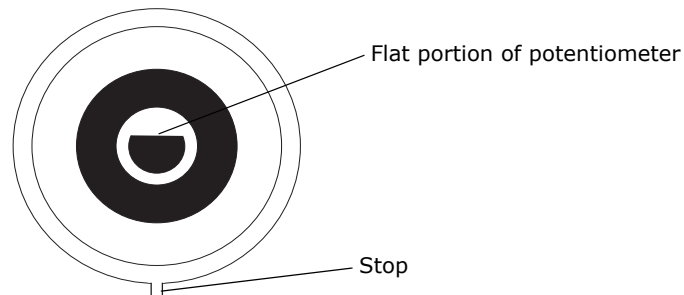
Sensors with temperature setpoint control have pre-installed Fahrenheit setpoint thumb wheels. A Celsius setpoint thumb wheel is included with these sensors. An optional hot/cold setpoint thumbwheel can be ordered separately.

To change the thumb wheel:

1. Remove the cover by firmly pressing the thumb tab at the bottom of the cover and pulling the cover away from the back plate.

**Note:** *If present, remove the security screw before removing the cover.*

2. Remove the existing thumb wheel by pulling it straight out while holding the circuit board securely onto the back plate.
3. Rotate the replacement thumb wheel until the stop is opposite the flat portion of the potentiometer. Push down on the thumb wheel until the ribs touch the potentiometer. After it is inserted, the thumb wheel should turn freely.



## Wiring the Sensor

### **⚠ WARNING**

#### **Hazardous Voltage!**

**Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power can not be inadvertently energized. Failure to disconnect power before servicing could result in death or serious injury.**

### **NOTICE:**

#### **Equipment damage!**

**Applying excessive voltage to the sensor will permanently damage it.**

To wire the sensor, use the appropriate diagram illustrated in [“Wiring Diagrams,” p. 35.](#)

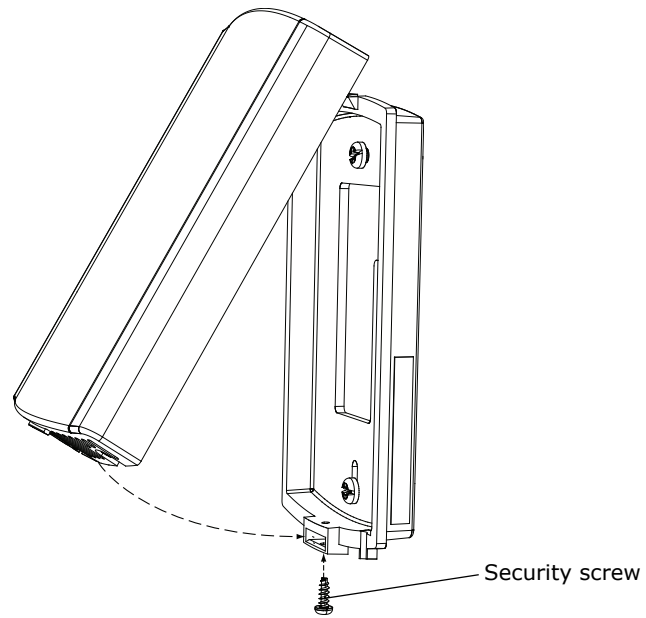
**Note:** *Strip 1/4 inch of insulation from wires before connecting them to the terminal block.*



## Replacing the Cover

To replace the cover:

1. Hook the cover over the top of the back plate. Apply light pressure to the bottom of the cover until it snaps in place.
2. Secure the cover by installing the security screw into the bottom of the cover.



# Operation

This section describes sensor operations.

## Changing Temperature Settings

To change temperature settings:

- For sensors with temperature setpoint thumb wheels (located on top of the sensor), rotate the thumb wheel to the desired temperature setting.  
**Note:** *If you need to change or replace a thumb wheel, see “Changing the Setpoint Thumb Wheel (optional),” p. 24.*
- For sensors with dual temperature sliders (located on the right front of the sensor): Slide the blue (*cool*) slider to the desired maximum temperature setting. Slide the red (*heat*) slider to the desired minimum temperature setting.
- For the display sensor, see “Changing Temperature Settings,” p. 30 and “Changing Heating and Cooling Temperature Settings (dual setpoint systems only),” p. 30.

## Changing System Settings

To change system settings:

- For sensors with system thumb wheels (located on the upper left side), rotate the thumb wheel to the desired setting.
- For the display sensor, see “Changing System Settings,” p. 31.

**Notes:**

- *Not all sensor models have all system setting options.*
- *The effect of setting changes are dependent on the unit controller. See specific unit controller manual for details.*

## Changing Fan Settings

To change fan settings:

- For sensors with fan thumb wheels (located on the lower left side), rotate the thumb wheel to the desired setting.
- For the display sensor, see “Changing Fan Settings,” p. 31.

**Notes:**

- *Not all sensor models have all fan setting options.*
- *The effect of setting changes are dependent on the unit controller. See specific unit controller manual for details.*

## Selecting Temporary Occupancy (Timed Override)

Temporary occupancy (timed override) is available on some sensors. Temporary occupancy can be selected to adjust temperature, fan, or heat/cool settings after the system has changed to unoccupied mode. System control will revert to unoccupied after a pre-determined time period.

**Note:** *Not all systems support the occupancy function.*

### Sensors with Occupied/Unoccupied buttons

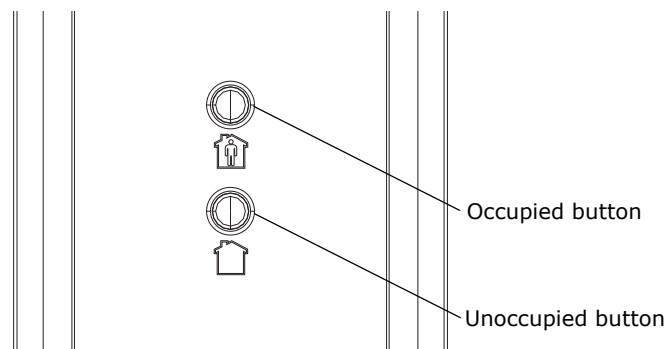
To select temporary occupancy, press the Occupied button (Figure 2) for 0.2–6 seconds. The following occurs:

- Space temperature output is driven to 10  $\Omega$  (nominal).
- The output generates for 4 seconds.

To cancel temporary occupancy, press the Unoccupied button (Figure 2) for 0.2–6 seconds. The following occurs:

- Space temperature output is driven to 1330  $\Omega$  (nominal).
- The output generates for 4 seconds.

**Figure 2. Locations of Occupied button and Unoccupied buttons**



### Display Sensors

To select and cancel temporary occupancy, see [“Requesting Temporary Occupancy,”](#) p. 31.

## Service Pin Request

Some sensor models can communicate a service pin request to their connected unit controller.

### Sensors with Occupied/Unoccupied Buttons


To initiate a service pin request, press the Occupied button (Figure 2, p. 27) for 10–25 seconds. The following occurs:

- Space temperature output is driven to 10  $\Omega$  (nominal).
- The output generates for 15 seconds.

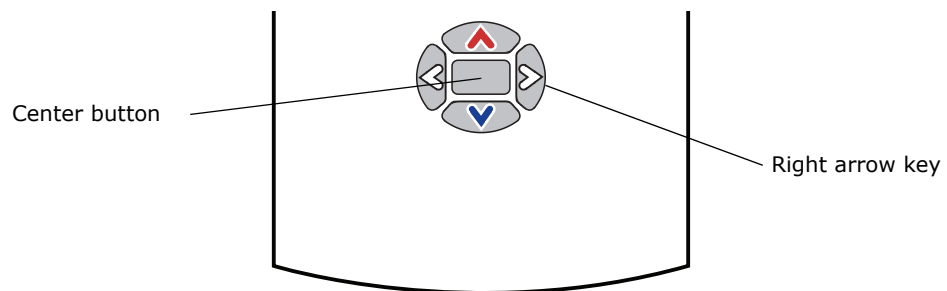
### Display Sensor

To initiate a service pin request, the sensor must be configured to support occupancy and must be in operating mode (see “Configuring the Display Sensor,” p. 13).

To initiate a service pin request:

1. With the sensor in operating mode, navigate to the occupancy menu.
2. Press the right arrow on the keypad (Figure 3). The occupied symbol remains on the screen; the unoccupied symbol leaves the screen.
3. Press and hold the center button for 10 seconds. The following occurs:
  - The wrench symbol  appears.
  - A service pin request is initiated.
  - Space temperature output is driven to 10  $\Omega$  (nominal).
  - The output generates for 15 seconds.
  - After 15 seconds, the wrench symbol disappears.

**Figure 3. Location of keys for service pin request**



## Star(\*)/Double Star(\*\*) Function

The star/double star function is available on sensor models with thumb wheels and on the display sensor.

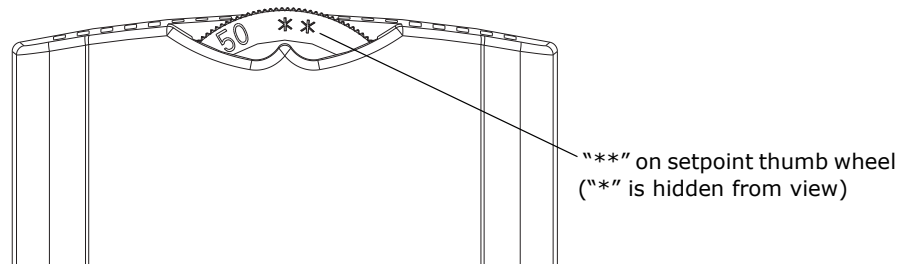
**Note:** Consult the appropriate unit controller documentation for information about this function.

### Sensors with Thumb Wheels

Turning the thumb wheel clockwise makes the star (\*) visible; turning it counter-clockwise makes the double star (\*\*) visible (see Figure 4).

- Star (\*): A value of 95°F (35°C) is communicated.
- Double star (\*\*): A value of 44.6°F (7°C) is communicated.

**Figure 4. Star/Double star on thumb wheel**



### Display Sensor

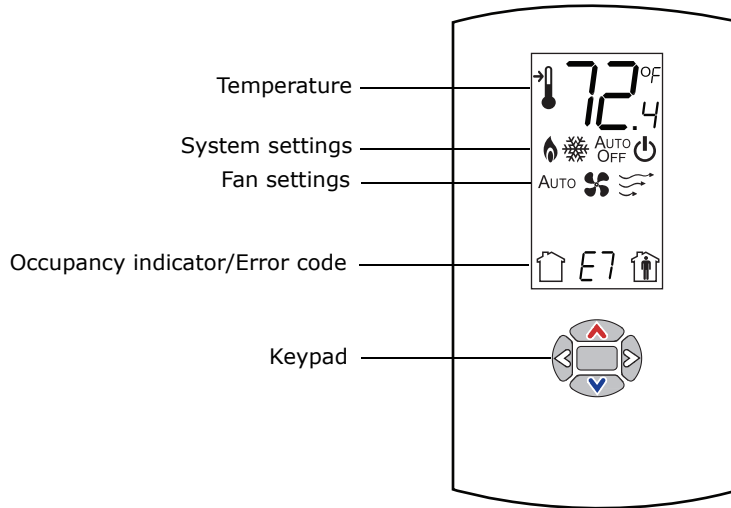
The display sensor supports the star (\*) and double star (\*\*) functions if the sensor is configured for single setpoint operation. Press the up or down arrow on the keypad to display the star (\*) or double star (\*\*), respectively, on the sensor display.

- If the setpoint is increased one increment above 89.6°F (32°C), the star (\*) appears. A value of 95°F (35°C) is communicated.
- If the setpoint is decreased one increment below 50°F (10°C), the double star (\*\*) appears. A value of 44.6°F (7°C) is communicated.

## Display Sensor Operation

This section describes display sensor operation. [Figure 5](#) shows an example of a display sensor that has been configured and is in operating mode.

Figure 5. Display sensor in operating mode



### Changing Temperature Settings

	This symbol shows the current room temperature, or your temperature setting, while you are making an adjustment.	1. To increase the room temperature, press . To decrease the room temperature, press .
	When you select a setpoint, this symbol appears.	2. To confirm, press  or wait 5 seconds. The display will return to the home screen.

### Changing Heating and Cooling Temperature Settings (dual setpoint systems only)

	Some systems allow you to select both heating and cooling room temperature settings. If your system has this option, this symbol appears when you adjust the temperature setting.	1. Press  or  to select the heating/cooling setting.
	When you adjust the cooling setting, the top arrow and snowflake flash.	2. If in cooling mode, press  to change to heating mode. If in heating mode, press  to change to cooling mode.
	When you adjust the heating setting, the bottom arrow and flame flash.	3. Press  or  to select the heating/cooling setting. 4. To confirm, press  or wait 5 seconds. The home screen will appear. <b>Note:</b> The heat/cool setpoint offset (deadband) chosen during configuration will apply.

## Changing System Settings

	Indicates that the system is in cooling mode.	<ol style="list-style-type: none"> <li>From the home screen, press . The system setting menu appears.</li> <li>Press  or  to choose the desired system setting.</li> <li>When the symbol for the desired setting appears, confirm your choice by <ul style="list-style-type: none"> <li>Pressing  (the home screen will appear), or</li> <li>Pressing  or  (the next menu will appear), or</li> <li>Waiting 5 seconds.</li> </ul> </li> </ol>
	Indicates that the system is in heating mode.	
	Indicates emergency heat. It is used by facility operators or service technicians only.	
AUTO	Indicates that the system automatically switches between heating and cooling as needed.	
OFF	Indicates that the system is Off.	

## Changing Fan Settings

AUTO	Indicates that the fan will operate as needed to reach the selected temperature.	<ol style="list-style-type: none"> <li>From the home screen, activate the fan setting menu by pressing  and then .</li> <li>Press  or  to choose the desired fan setting.</li> <li>When the symbol for the desired setting appears, confirm your choice by pressing  (the home screen will appear).</li> </ol>
	Indicates that the fan setting is On. The number of arrows indicates fan speed (3: high, 2: medium, 1: low). The example shown indicates a fan on high speed. Not all systems offer all three speeds.	
	Indicates fan is Off.	

## Requesting Temporary Occupancy

	Select to request occupancy	<ul style="list-style-type: none"> <li>If you need heating or cooling after normal business hours, you can “request” temporary occupancy by pressing  and holding it for 2 seconds. The occupied symbol remains on the screen and the unoccupied symbol disappears. After 30 seconds, the unoccupied symbol will re-appear. The system will remain in occupied mode for a pre-determined period.</li> <li>To cancel temporary occupancy, press  and hold for 2 seconds. The unoccupied symbol will remain on the screen and the occupied symbol will disappear. After 30 seconds the occupied symbol will re-appear. (Cancellation can be made at any time during the temporary occupancy period.)</li> </ul>
	Select to cancel occupancy	

## Error codes

E0	Main processor error	Replace sensor.
E6	Software version conflict	Replace sensor.
E7	Communication error	Replace sensor.
E8	Temperature input outside valid operating range (32°F–122°F [0°C–50°C])	Replace sensor if space temperature is within valid range.

## Lock Symbol





	Indicates that the keypad is locked	The lock symbol appears if you try to adjust a setting that cannot be changed.
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# Maintenance and Troubleshooting

This section describes sensor features that can be used for maintenance and troubleshooting.

## LEDs

Some sensor models have LEDs. They are located on the front cover and convey the following information:

	Service LED (red)	The red service LED indicates that service is needed. <ul style="list-style-type: none"> <li>The LED may blink or stay on solid, depending on the unit controller</li> </ul>
	Cool LED (green)	The green cool LED indicates that the system is in cooling mode. <ul style="list-style-type: none"> <li>Stays on solid during normal cooling operation</li> <li>Blinks to indicate a cooling system failure</li> </ul>
	Heat LED (green)	The green heat LED indicates that the system is in heating mode. <ul style="list-style-type: none"> <li>Stays on solid during normal heating operation</li> <li>Blinks to indicate a heating system failure</li> </ul>
	System LED (green)	The green system LED indicates the state of the system. <ul style="list-style-type: none"> <li>Stays on solid to during normal operation</li> <li>Blinks to indicate that the system is in Test mode</li> </ul>

## Error Codes (Display Sensor)

For an explanation of error codes that can appear on the display, see [“Error codes,” p. 31.](#)

## Display Sensor: Output Values—Failure and Default Modes of Operation

The following table provides output values for failure and default modes of operation, which can be used for troubleshooting.

Situation	Zone temperature output	Zone setpoint output		Fan/System output
Sensor has no power.	Open	Open	Open	Open
Thermistor in sensor has failed to either open or close.	Open	Normal value (See <a href="#">Table 1</a> )	Normal value (See <a href="#">Table 1</a> )	N/A
Setpoint potentiometer has failed to either open or close.	Normal value (See <a href="#">Table 1</a> )	Open	Open	N/A



## Measuring Output Resistance

Measure output resistance as follows, according to sensor type.

### Display Sensors

For display sensors, measure the outputs for zone temperature, setpoints, heat setpoint, and system/fan mode as described:

1. Ensure that the GROUND (terminal 10) and the SIGNAL COMMON (terminal 2) wires share a common ground with the transformer.
2. To measure zone temperature resistance, disconnect the ZONE TEMP (terminal 1) wire from the sensor. Measure between the ZONE TEMP (terminal 1) and SIGNAL COMMON (terminal 2). Compare resistance measurements to those in [Table 1, p. 34](#).
3. To measure setpoint resistance:
  - For single setpoint systems, disconnect the SETPOINT (terminal 3) wire from the sensor. Measure between the SETPOINT (terminal 3) and the SIGNAL COMMON (terminal 2). Compare resistance measurements to those in [Table 1, p. 34](#).
  - For dual setpoints systems, disconnect the HEAT SETPOINT (terminal 5) wire from the sensor. Measure between the HEAT SETPOINT (terminal 5) and the SIGNAL COMMON (terminal 2). Compare resistance measurements to those in [Table 1, p. 34](#).
4. To measure the system/fan mode resistance, disconnect the SYS/FAN MODE (terminal 4) wire from the sensor. Measure between the SYS/FAN MODE (terminal 4) and the SIGNAL COMMON (terminal 2). Compare resistance measurements to those in [Table 2, p. 34](#).

### **NOTICE:**

#### **Potential Equipment Damage!**

**Because the output circuits are not electrically powered, resistance can be measured without risk of damage to the volt-ohm meter. However, damage to the volt-ohm meter could potentially result if terminal 11 (24 VAC/VDC) is inadvertently contacted.**

### All Models Other Than the Display Sensor

For all other wired sensors, measure the outputs for temperature and setpoints and, if applicable, the system/fan mode and heat setpoint:

1. To measure zone temperature resistance, measure between SIGNAL COMMON (terminal 2) and ZONE TEMP (terminal 1). Compare resistance measurements to those in [Table 1, p. 34](#).
2. To measure setpoint resistance:
  - For single setpoint systems, measure between SIGNAL COMMON (terminal 2) and SETPOINT (terminal 3).
  - For dual setpoint system, measure between SIGNAL COMMON (terminal 2) and CSP (terminal 3), and between SIGNAL COMMON (terminal 2) and HSP (terminal 5).Compare resistance measurements to those in [Table 1, p. 34](#).
3. To measure the system/fan mode resistance, measure between SIGNAL COMMON (terminal 2) and MODE (SYS/FAN SWITCH) (terminal 4). Compare resistance measurements to those in [Table 2, p. 34](#).

**Note:** *The output circuits are not electrically powered; consequently, resistance can be measured without risk of damage to the volt-ohm meter.*

## Maintenance and Troubleshooting

**Table 1. Resistance measurements for zone temperature and setpoints**

Zone or setpoint temperature	Nominal zone temperature output resistance	Nominal setpoint and heating setpoint output resistance
**	NA	938 $\Omega$
55°F (12.8°C)	17.47 k $\Omega$	792 $\Omega$
60°F (15.6°C)	15.3 k $\Omega$	695 $\Omega$
65°F (18.3°C)	13.5 k $\Omega$	597 $\Omega$
70°F (21.1°C)	11.9 k $\Omega$	500 $\Omega$
75°F (23.9°C)	10.5 k $\Omega$	403 $\Omega$
80°F (26.7°C)	9.3 k $\Omega$	305 $\Omega$
85°F (29.4°C)	8.25 k $\Omega$	208 $\Omega$
*	NA	49 $\Omega$
<b>Notes:</b> 1. Sensors are calibrated at 70°F (21.1°C). 2. Single setpoint systems: Varies $\pm 28 \Omega$ at 70°F (21.1°C); varies $\pm 128 \Omega$ at endpoints of scale 55°F (12.8°C) and 85°F (29.4°C). Dual setpoint systems: Cooling setpoint varies $\pm 10 \Omega$ at 70°F (21.1°C); varies at $\pm 110 \Omega$ at endpoints of scale. Heating setpoint varies $\pm 20 \Omega$ at 70°F (21.1°C); varies at $\pm 120 \Omega$ at endpoints of scale.		

**Table 2. Resistance measurements for fan and system modes**

Fan mode	System mode	Nominal output resistance
Auto or invalid	Emergency heat	35,000 $\Omega$
Auto or invalid	Heat	19,480 $\Omega$
Auto or invalid	Auto	7680 $\Omega$
Auto or invalid	Off	2320 $\Omega$
Auto or invalid	Cool	4870 $\Omega$
On	Emergency heat	43,450 $\Omega$
On	Heat	27,930 $\Omega$
On	Auto	16,130 $\Omega$
On	Off	10,770 $\Omega$
On	Cool	13,320 $\Omega$
High	Invalid (fan control only)	16,130 $\Omega$
Med	Invalid (fan control only)	13,320 $\Omega$
Low	Invalid (fan control only)	10,770 $\Omega$
Auto	Invalid (fan control only)	2320 $\Omega$
Off	Invalid (fan control only)	4870 $\Omega$

## Cleaning the Sensor

**NOTICE:****Equipment damage!**

**Spraying glass cleaner or any other solution directly on the sensor may damage it.**

You can clean the sensor by applying glass cleaner to a soft, non-abrasive cloth, and gently wiping the face, including the buttons and LCD display. Use of a pre-moistened towelette designed for lens or screen cleaning is also acceptable.

Avoid inadvertent pressing buttons on sensors that have them or the keypad on the display sensor, as this may result in an unwanted timed override or settings change.

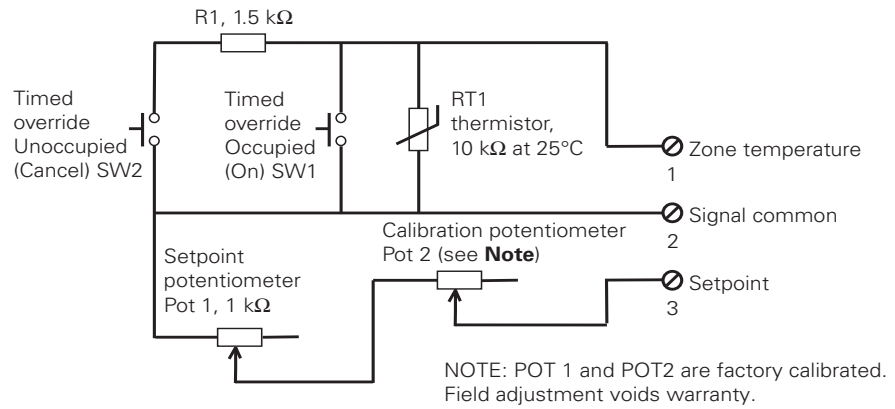
## Replacing the Thumb Wheel

If you need to replace a setpoint thumb wheel, see [“Changing the Setpoint Thumb Wheel \(optional\),” p. 24.](#)

# Wiring Diagrams

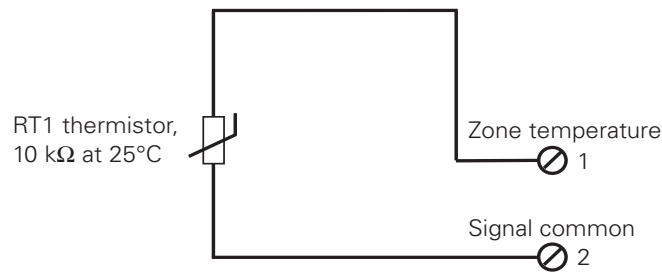
Each wiring diagram is identified by sensor part number (see "Part Numbers," p. 7 for reference.)  
 For wiring information for the display sensor, see Figure 1, p. 12.

X1351152701



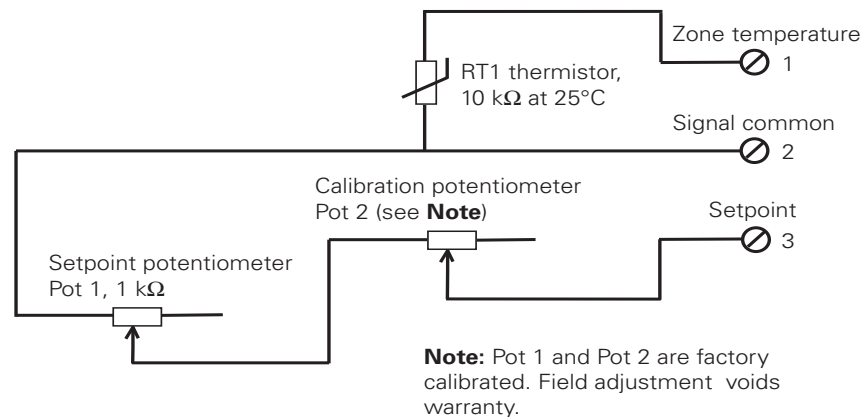
Dwg. source: 3270 3435 B

X1351152801



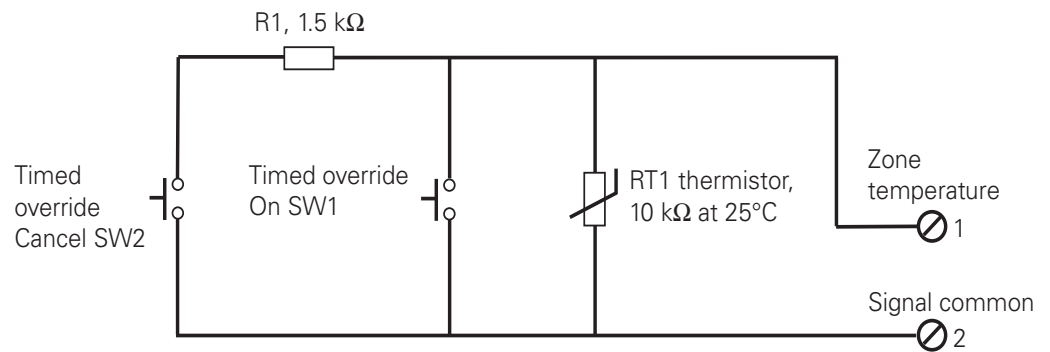
Dwg source: 3270 3436

X1351152901



Dwg source: 3270 3437

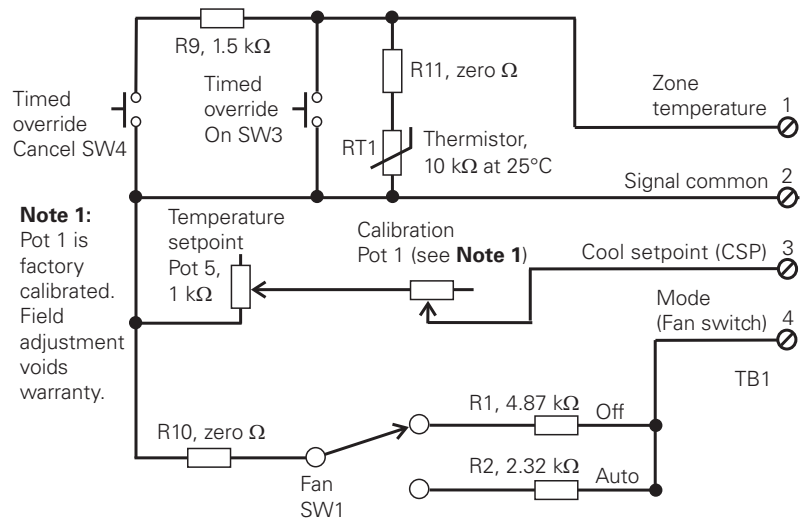
X1351153001



Dwg source: 3270 3438

## Temperature sensors with fan control

X1379084501

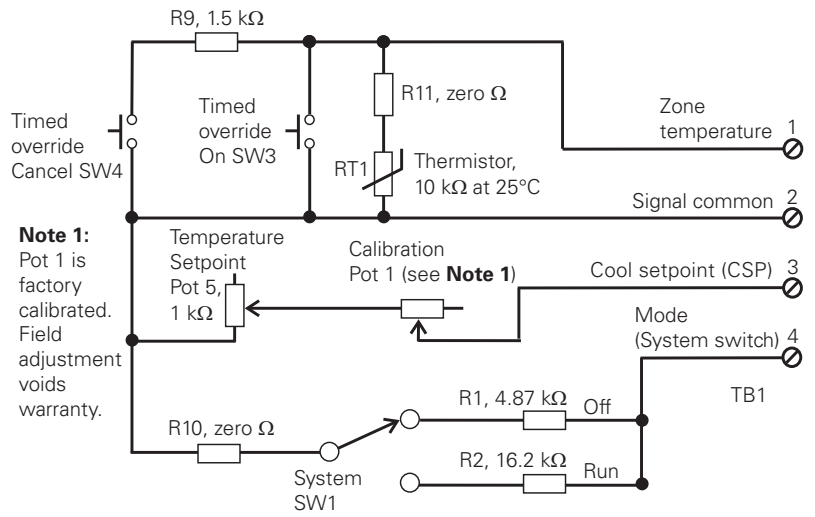


**Note 1:**  
Pot 1 is factory calibrated. Field adjustment voids warranty.

Dwg source: X39641092-01

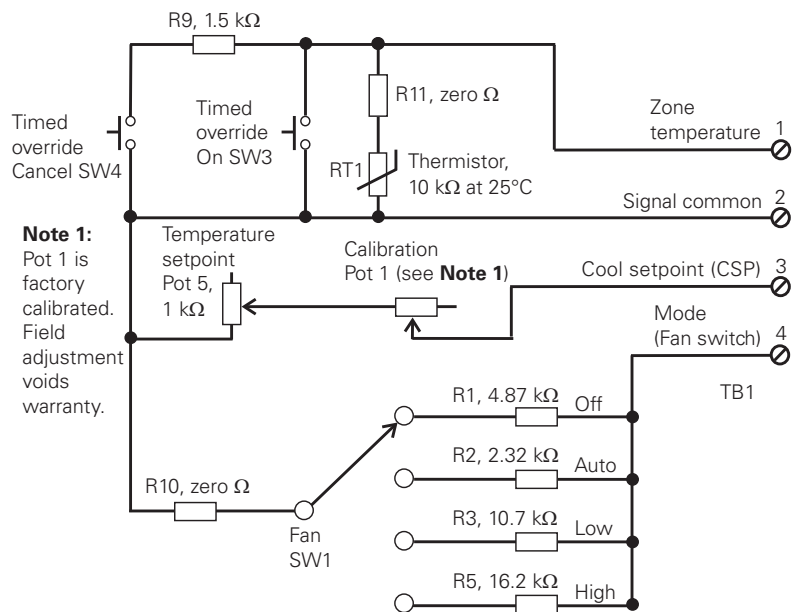
# Wiring Diagrams

X1379085101



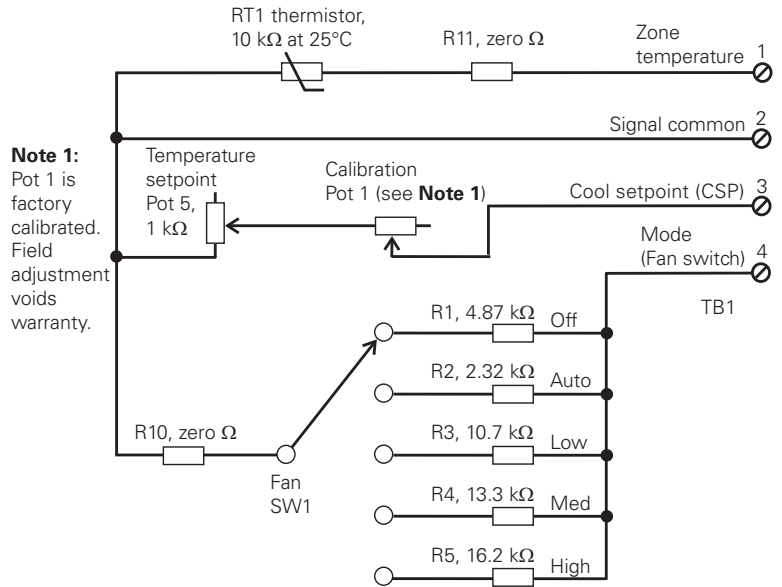
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X1379084801



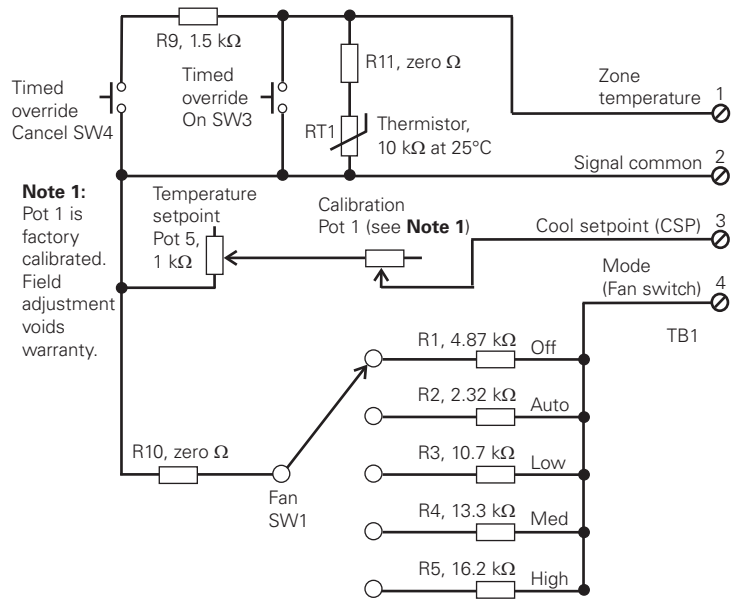
Dwg source: X39641095-01

X1379084101



Dwg source: X39641088-01

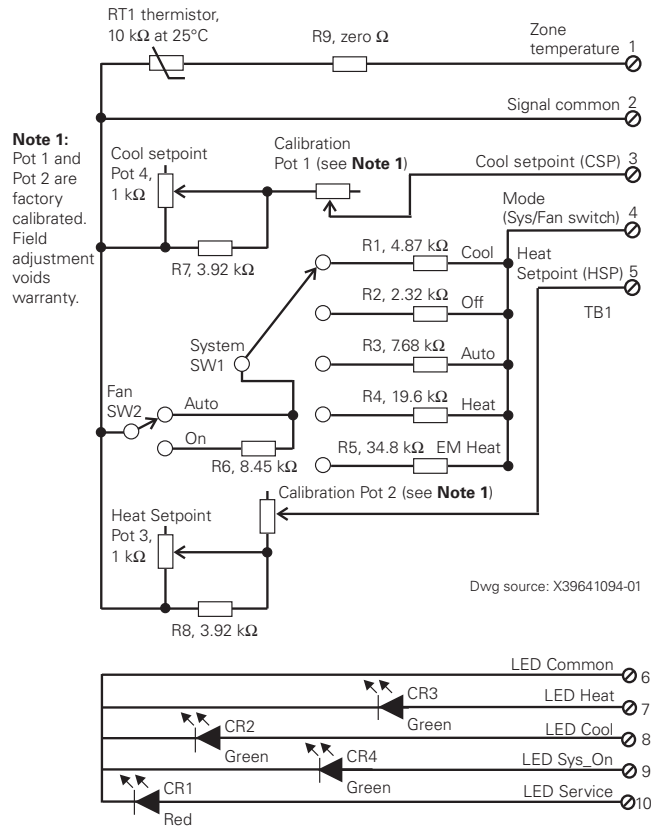
X1379084201



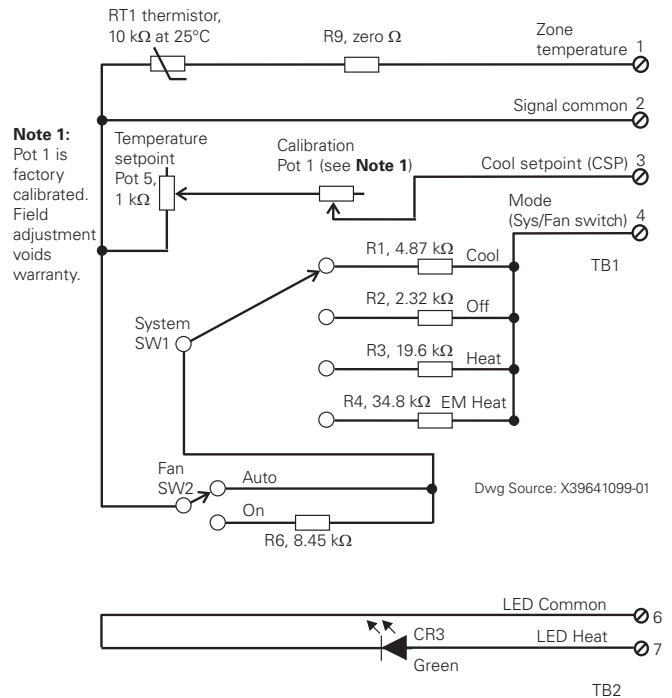
Dwg source: X39641089-01

## Temperature sensors with fan and system control

X1379084701



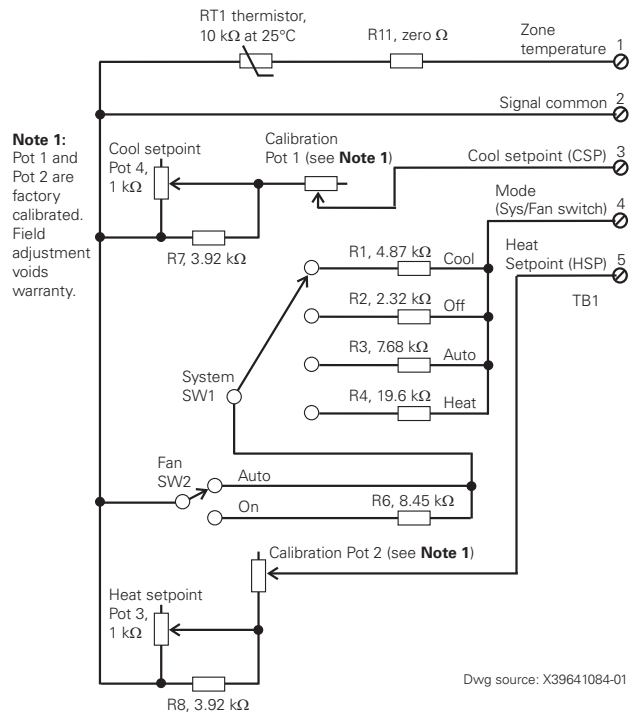
X1379085201



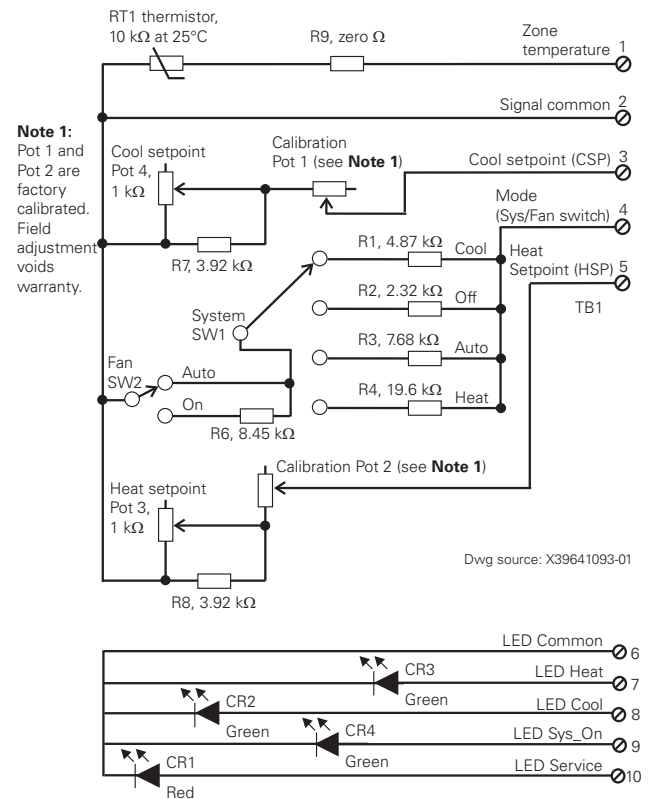


# Wiring Diagrams

X1379083701

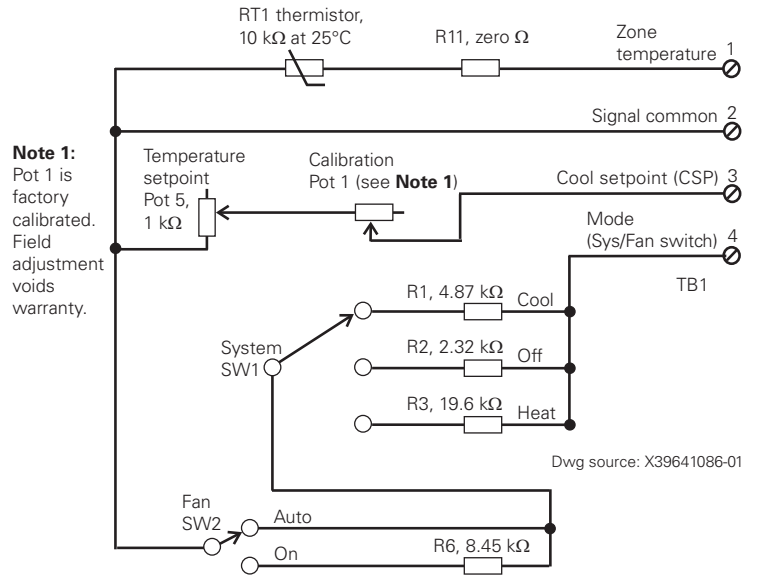


X1379084601

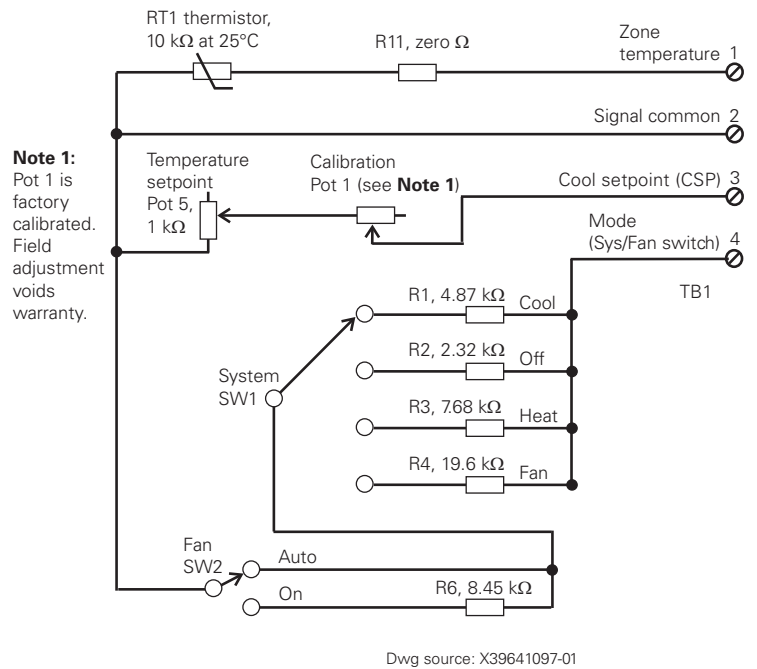


# Wiring Diagrams

X1379083901

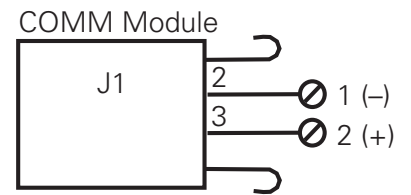


X1379085001



## Optional COMM module

X1365146702





# Specifications and Agency Compliance

## Specifications

Sensor operating temperature	From 32°F to 122°F (0°C to 50°C)
Storage temperature	From -40°F to 185°F (-40°C to 85°C)
Storage/operating humidity range	5% to 95% relative humidity (RH), noncondensing
Thermistor accuracy	0.2°C at 25°C, 1%
Setpoint functional range	Display sensor: 50°F to 89.6°F (10°C to 32°C) All other sensors: 45°F to 95°F (7.2°C to 35°C)
Setpoint markings	Setpoint thumb wheel: <ul style="list-style-type: none"> <li>• 50°F to 85°F (in 5°F increments) and *, **</li> <li>• 10°C to 29°C (in 3°C increments) and *, **</li> </ul> Dual setpoint slider: <ul style="list-style-type: none"> <li>• 50 to 85°F (stamped every 5°F)</li> <li>• 10 to 29°C (stamped every 3°C)</li> </ul>
Housing material	Polycarbonate/ABS blend, UV protected, UL 94-5VA flammability rating, suitable for application in a plenum
Mounting	Fits a standard 2 in. by 4 in. junction box (vertical mount only). Mounting holes are spaced 3.2 in. (83 mm) apart on vertical center line. Includes mounting screws for junction box and wall anchors for sheetrock walls. Overall dimensions: 2.9 in (74 mm) by 4.7 in. (119 mm)
Resolution (display sensor)	0.125°F over a range of 60 to 80°F (15.6 to 26.7°C); 0.25°F when outside this range
Accuracy (display sensor)	0.5°F over a range of 55 to 85°F (12.8 to 29.4°C)
Power consumption (display sensor)	<1 VA

## Agency Compliance

- United States:
  - UL listed: 94, 5 VA Flammability rating; 916, Energy management equipment
  - FCC Part 15, Subpart B
- Canada:
  - CUL listed: 916, Energy management equipment
- Europe:
  - CE marked

## CE Declaration of Conformity

**Manufacturer:** Trane, 4833 White Bear Parkway, Saint Paul, MN 55103, USA  
**Product:** Wired display sensor  
**Model number:** X1379088601, X1379088604, X1379088605

**The manufacturer hereby declares that the product conforms to the following:**

**Electromagnetic Emission:** Council Directive 89/336/EEC  
EN61326-1:2006, Class B limit  
Radiated EN55011:2006, Class B limit  
Conducted EN55011:2006, Class B limit  
Harmonic EN61000-3-2, Class A limit  
Flicker EN61000-3-3:1995+A1:2001+A2:2006

**Electromagnetic Immunity for Industrial** by Council Directive 89/336/EEC  
EN61326-1:2006  
EN61000-2:2006,  $\pm 4.0$  kV by contact,  $\pm 8.0$  kV by air  
EN61000-4-3:2006, 10.0 V/m  
EN61000-4-4:2006,  $\pm 1.0$  kV signal lines,  $\pm 2.0$  kV ac power lines  
EN61000-4-5:2006,  $\pm 1.0$  kV signal lines,  $\pm 2.0$  kV ac power lines  
EN61000-4-6:2006, 3 V  
EN61000-4-11:2006

**Date of issue:** October 14, 2008

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Robert Jacobs





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