Installation, Operation, and Maintenance
Wireless Zone Sensors

Models WTS, WZS, AND WDS

⚠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.

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TECHNOLOGIES

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.

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.

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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Revision History

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

Table of Contents

General Information

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

Product Description

Trane® wireless sensor sets are compatible with any Trane unit controller that uses a standard 10 kΩ temperature input. The sets include sensor, receiver, wiring harness, and two AA lithium batteries. No further software or hardware is necessary for site evaluation, installation, or maintenance. Zone temperature is standard on all models.

Notes:

- *The information in this manual applies to both factory and field installed versions of the Trane wireless sensor sets.*

- *A service tool cannot be connected to a Trane wireless sensor.*

Trane wireless sensors include the following models:

Model WDS

This configurable sensor has an LCD display. It provides the same functions as many currently available Trane wired sensors. Configurable features include:

- 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

- Dead band (heat/cool setpoint offset for dual setpoint systems)

- Fan settings: high, medium, low, auto, off

- Timed override request function

- Lockable settings to protect against unauthorized use

- Service pin request

Model WTS

This sensor measures and transmits the zone temperature only.

Model WZS

This sensor set transmits the zone temperature, all zone temperature setpoint functions, temporary occupancy (timed override), and unoccupied (cancel) information to the receiver. The receiver electrically reproduces the zone temperature resistance, all zone temperature setpoint function resistances, and temporary occupancy/unoccupied information as sent by the sensor.
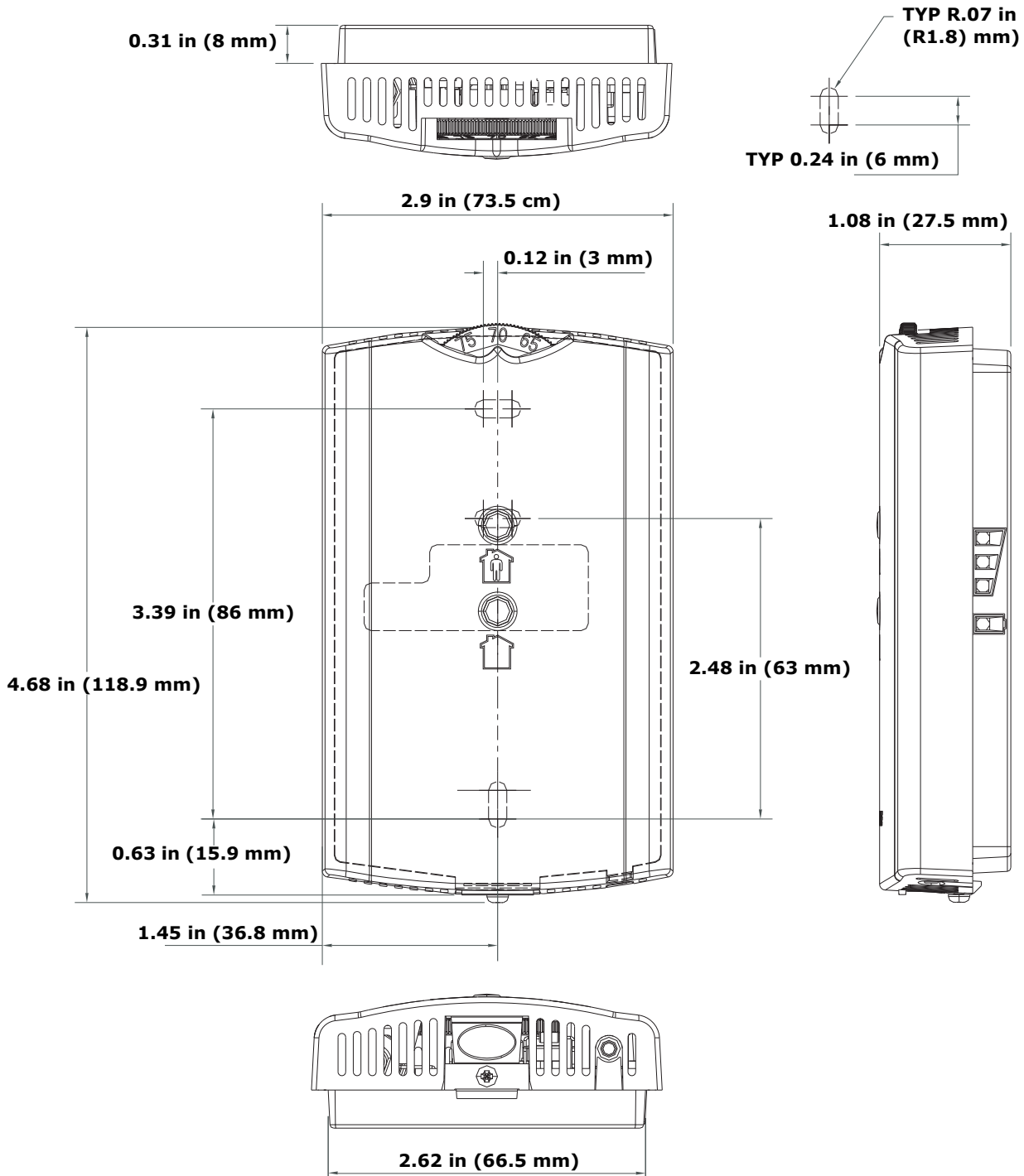
Part Numbers

The following table lists available models by part number:

Part number	Description
X1379082101	Model WTS sensor only
X1379082201	Model WDS sensor only
X1379082301	Model WTS sensor set
X1379082401	Model WDS sensor set
X13790492	Model WZS, sensor only, Fahrenheit
X13790494	Model WZS, sensor only, Celsius
X13790496	Model WZS sensor set, Fahrenheit
X13790498	Model WZS sensor set, Celsius
X13790854	Receiver only, all models other than flush-mount
X13790490	Receiver only, for flush-mount applications
X1905211201	Wire harness, seven conductor, for wireless receiver

Dimensions

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

TYP R.07 in (R1.8) mm)

0.31 in (8 mm)

TYP 0.24 in (6 mm)

2.9 in (73.5 cm)

1.08 in (27.5 mm)

0.12 in (3 mm)

3.39 in (86 mm)

2.48 in (63 mm)

4.68 in (118.9 mm)

0.63 in (15.9 mm)

1.45 in (36.8 mm)

2.62 in (66.5 mm)

Pre-Installation

This section provides the following pre-installation information:

- Location considerations
- Height requirements
- Mounting surfaces
- Address settings

Location Considerations

Placement of the sensor and the receiver is critical to proper operation. For most installations, barriers limit proper radio signal strength more than distance. For best radio transmission range and reliability, mount the receiver and sensor in line of sight. Where this is not possible, try to minimize the number of barriers between the pair of devices. In general, sheet rock walls and ceiling tiles offer little restriction to the transmission of the radio signal throughout the building.

The transmission range for the sensor is as follows:

- Open range: 2,500 ft (762 m) (packet error rate = 2%)
- Usable range: 200 ft (61 m)
- Typical range: 75 ft (23 m)

Receiver

When selecting a receiver location, avoid the following:

- Locations that are outside the operating temperature and humidity range (refer to "Specifications," p. 45)
- Metal barriers between the receiver and the sensor (for example, plastered walls with metal lathe or metal roof decks)
- Thick, solid concrete walls between the receiver and the sensor
- Placing the receiver inside metal enclosures
- Mounting on rooftop without a careful site evaluation and confirmation

Sensor

When selecting a sensor location, avoid the following:

- Areas of direct sunlight
- Areas in the direct air stream 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)
- Metal barriers between the receiver and the sensor (for example, plastered walls with metal lathe or metal roof decks)
- Thick, solid concrete walls between the receiver and the sensor
- Placing the sensor inside metal enclosures

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 of the receiver and the sensor to a flat surface such as sheet rock 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.

- Receivers: Use the included hardware.
- Sensors:
  - If mounting onto sheet rock 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.

Address Setting

The process of establishing communication between a receiver and sensor is referred to as *association*. The following limitations apply:

- Each associated receiver/sensor set that communicates within the reception range of the wireless system must have a unique address.
- It is not possible to associate more than one sensor to a receiver, nor is it possible to associate more than one receiver to a sensor.

To associate a receiver and sensor, the two devices must have their rotary address switches set to the same address.

Important: *Set the addresses before applying power to the receiver and before removing the insulation strip (Figure 1, p. 11) from the sensor.*

To set the receiver and sensor addresses:

1. Using a small screwdriver, set the three rotary address switches (locations S1, S2, S3) on the receiver to an address between 001 and 999 (see Figure 1). (You do not have to remove the covers to access the rotary address switches.)

   Note: *Do not use 000 as an address. An address of 000 returns the receiver outputs to their factory defaults (zone temperature and setpoint outputs: 72.5°F [22.5°C]), removes all association knowledge, and prevents association with a sensor.*

Figure 1. **Setting the rotary address switches on the receiver and the sensor**
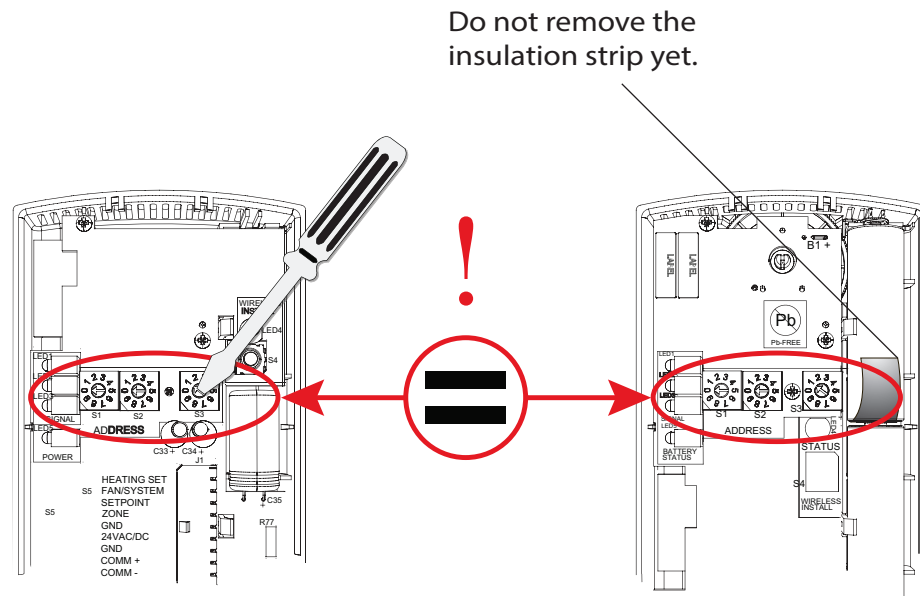
Do not remove the insulation strip yet.

2. Set the three rotary address switches (locations S1, S2, S3) on the sensor to the same address as the receiver (see Figure 1).

   Note: *Do not use 000 as an address. An address of 000 removes all association knowledge, reverts the sensor to a low-power hibernation mode, and sends a disassociation request to the receiver.*

3. Record the address and location of the receiver and sensor pair.

Installation

This section provides step-by-step installation instructions. Read through the pre-installation information before proceeding with installation.
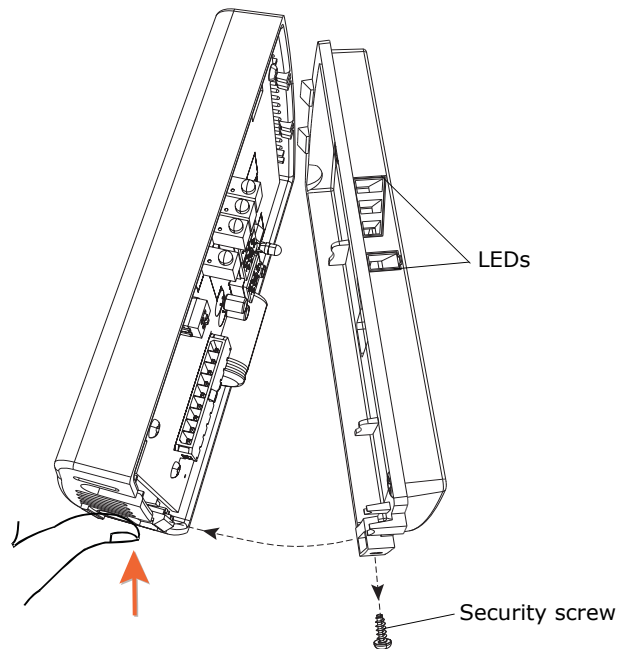
Important: *It is recommended that you install the sensor set in the order presented in this section.*

Mounting the Receiver Back Plate

To mount the receiver back plate:

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. Hold the back plate against the mounting surface and mark the screw locations.

   Note: *Locate the receiver to ensure that the LEDs are easy to view.*

3. Secure the back plate of the mounting surface using the included hardware.

Wiring the Receiver to the Unit Controller

Power requirements and wiring instructions for the receiver are described in this section.

Power Requirements

The required power for the receiver is 24 Vac or 24 Vdc and less than 1 VA. The receiver is designed to be powered by the host unit controller. A dedicated transformer to power the receiver is seldom necessary and is not recommended. It should be used only when the host transformer does not have enough volt-ampere (VA) capacity to power the receiver (see "Specifications," p. 45 for receiver power consumption).

Wiring diagrams for single transformer wiring and multiple transformer wiring are located in "Appendix A: Wiring Diagrams," p. 46.

Wiring Procedure

⚠️**WARNING**

Hazardous Voltage!

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

NOTICE:

Equipment Damage!

Applying excessive voltage to the receiver module will permanently damage it.

To wire the receiver to the unit controller:

1. Shut off power to the unit controller to which you are wiring the receiver.

2. Connect the wiring harness (provided) to the receiver (Figure 2, p. 14).

3. Route the wires from the receiver to the unit controller through either:

   a. The opening at the back of the back plate (see Figure 3, p. 15 for an example).

   b. The hole in the bottom of the cover (see Figure 4, p. 15 for an example).

4. Terminate wires at the unit controller. Refer to Table 1, p. 14 and Figure 2, p. 14 to determine which wires to use and where to terminate them on the controller.

   Notes:
   - *To maintain agency compliance, ensure that length of the wiring harness is no more than 3 m.*
   - *Adapters are provided, which allow connecting multiple wires to the power terminals of the host unit controller (see Figure 3 and Figure 4, p. 15.*
   - *An anti-short bushing is provided; use it to prevent the wire from shorting out if the steel penetrates the wiring harness (see Figure 4, p. 15).*
   - *If spade connectors are not needed, remove them and strip 1/4 inch of insulation from wire.*

5. Trim off any unused terminals. Insulate exposed wire with tape or a wire nut.

Table 1.   Wiring harness: Wire identification

Wire label	Color	Function
HEATING SET	Brown	Space temperature heating setpoint (WDS only)
FAN SYSTEM	Green	Fan and system control (WDS only)
SETPOINT	Red	Space temperature setpoint (WDS and WZS only)
ZONE	White	Zone temperature
GND-SIGNAL	Black	Ground for setpoint and zone signal
24VAC/DC	Blue	24 Vac/Vdc power
GND-POWER	Yellow	Ground for 24 Vac/dc

Figure 2.   Wiring harness
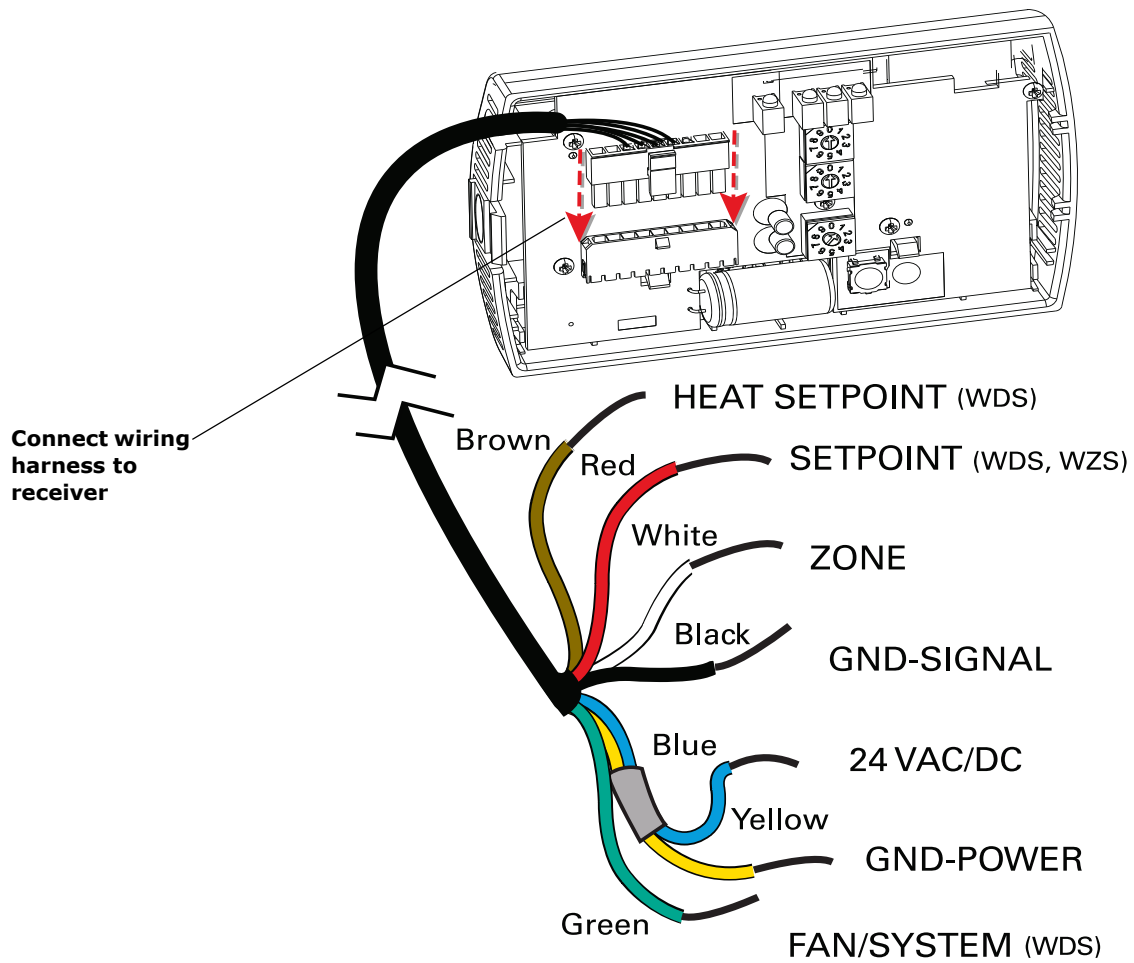
Figure 3. Wiring a receiver to a unit controller through the opening in the back of the receiver back plate
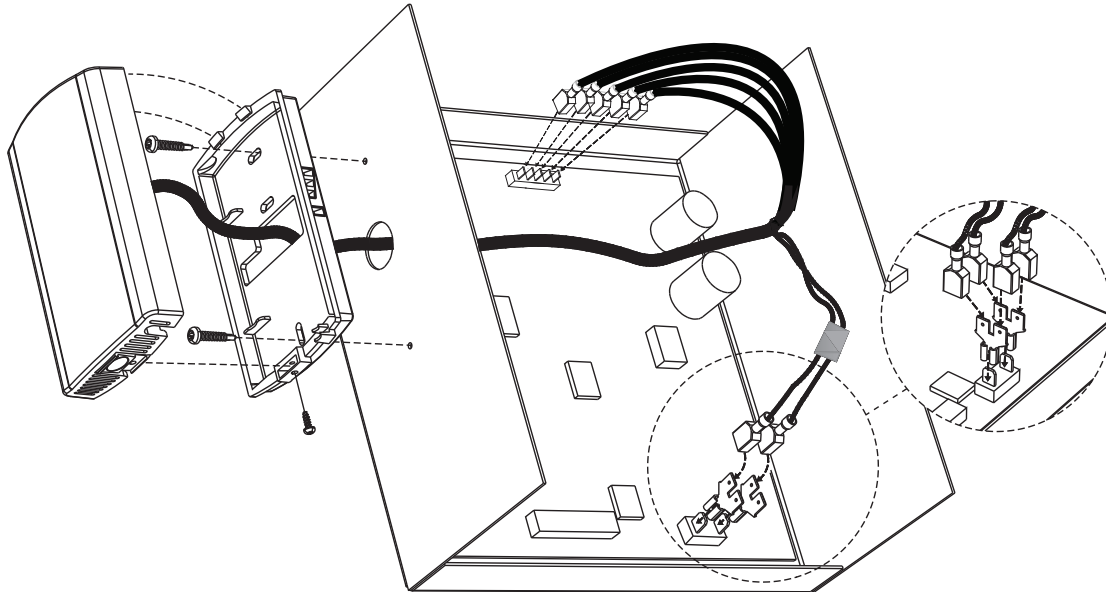
Figure 4. Wiring a receiver to a unit controller through the bottom slot in receiver cover
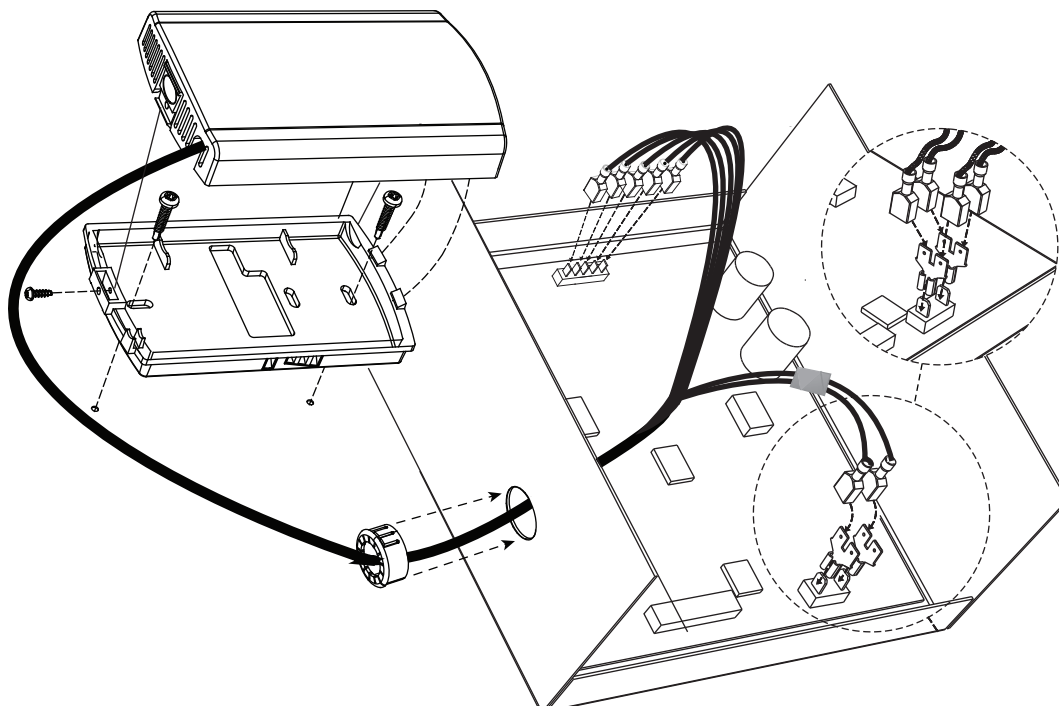
Replacing the Receiver Cover

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. Install the security screw into the bottom of the cover.

Security screw
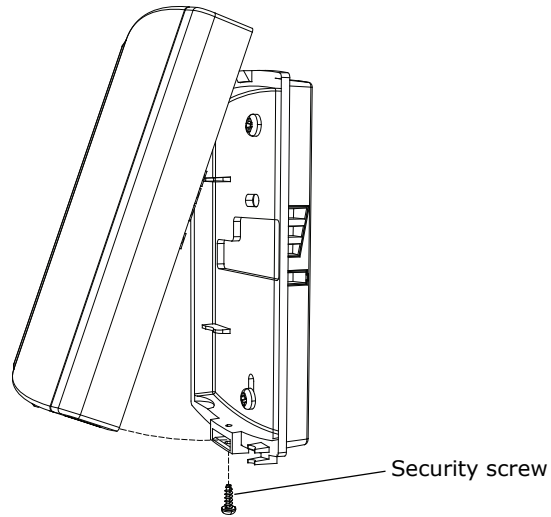
Applying Power to the Receiver

Restore power to the UCM. Observe LED5 on the receiver; it will light and stay constantly On when 24 V power is normal.

LED5

LED5 stays constantly On after applying power to the receiver
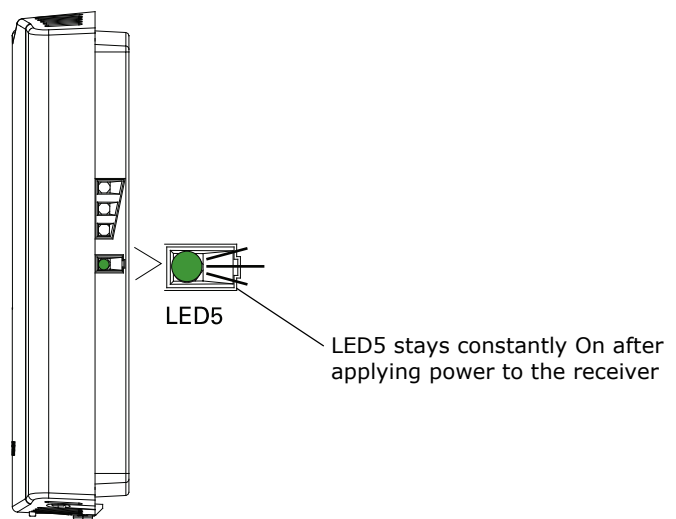
Observing the Receiver for Readiness to Associate

After initial power up, the receiver conducts a channel scan for 20 seconds. During this time, the receiver selects from 16 available channels the clearest channel on which to operate. LED1, LED2, and LED3 flash rapidly in succession (round-robin style) while the channel scan is in progress, as shown in part 1 of the illustration.

*Important:* *Do not attempt association (leave the insulation strip in place) until the channel scan is finished.*

After the channel scan is finished, LED3 begins blinking (one-blink pattern) to show that the receiver is ready to be associated with a sensor. See part 2 of the illustration.
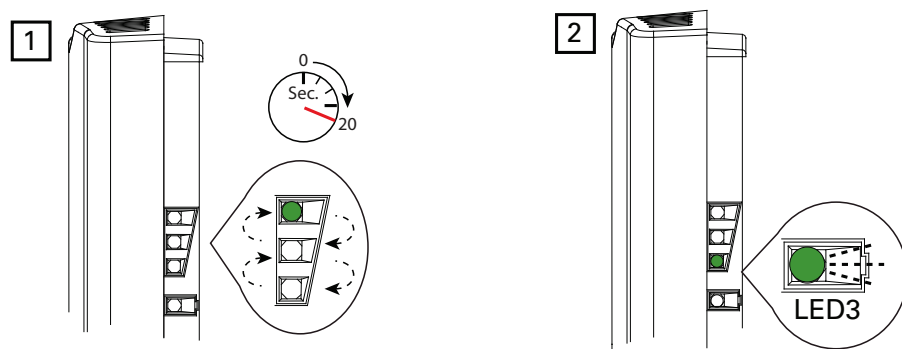
Associating the Sensor to the Receiver

To associate the sensor to the receiver:

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

2. Verify that the sensor is set to the same address as the receiver it is to be associated with.

3. Power the sensor by removing the insulation strip from between the two batteries.
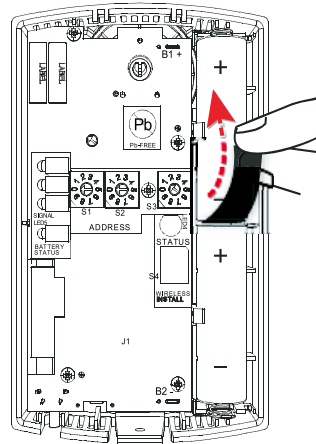
Association is automatically initiated between the sensor and the receiver. When LED3 on the receiver stops blinking, association has been established.

The receiver will retain its address information through a power loss. Address information is lost only if the receiver is manually disassociated or if its rotary switch setting is changed after it has been associated.

If the first association attempt is unsuccessful, the sensor automatically re-attempts association with the receiver every 10 minutes.

An associated sensor that has lost communication with the receiver will transmit an association request every 50 minutes. You can manually initiate association (see "Manual Association," p. 39").

Testing Signal Strength and Battery Status

To verify that the association process was successful and that the batteries have adequate charge:

1. Firmly press and release the Test button on the bottom of the sensor (as illustrated below).

2. For models WTS and WZS, view LED1, LED2, and LED3 to determine the signal strength. View LED5 to determine the battery status. (See the illustration for model WTS and WZS sensors.)

   Note: *The LEDs will turn Off after 5 seconds to conserve battery strength.*

   For model WDS, determine the signal strength and battery status by viewing the symbols on the sensor display. (See the illustration for model WDS sensors.)

3. Record the results in your commissioning statement.

Note: *For more information, see "Testing Signal Strength," p. 35 and "Testing Battery Status," p. 36.*
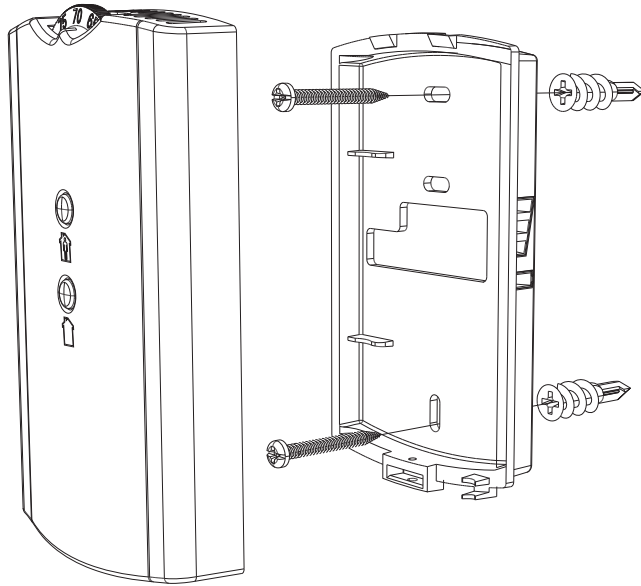
Model WTS and WZS sensors
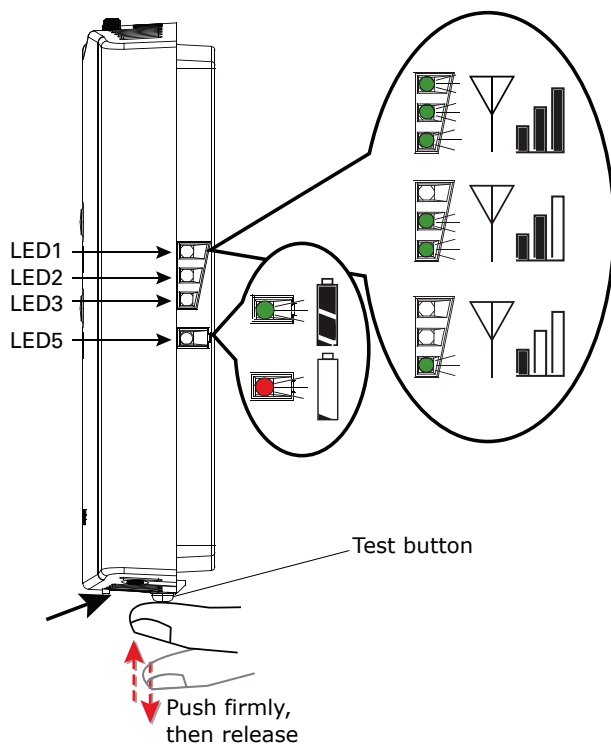
Model WDS sensors
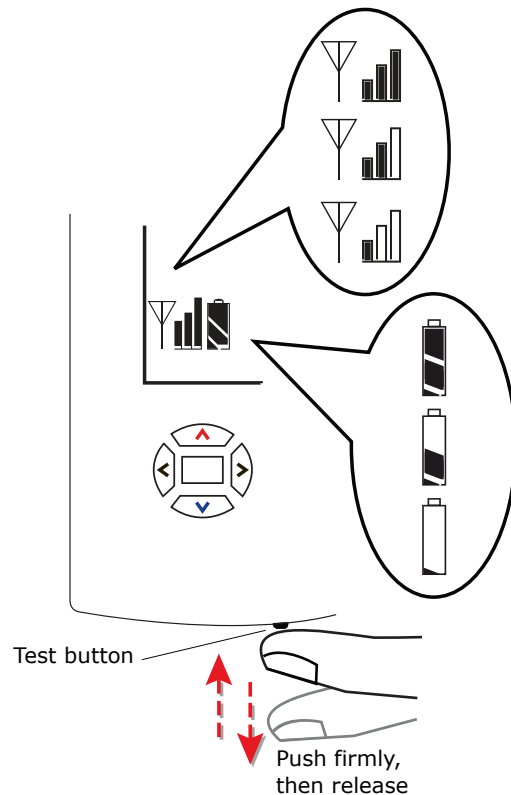
Mounting the Sensor Back Plate

To mount the sensor back plate:

1. Hold the back plate against the mounting surface and mark the screw locations.
2. Secure the back plate against the mounting surface using included hardware.

   The figure shows an example of mounting the back plate of the sensor into sheetrock or plaster.

Configuring the Wireless Sensor (Model WDS only)

The configuration of the 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 model WDS sensor, follow this procedure in the order presented.

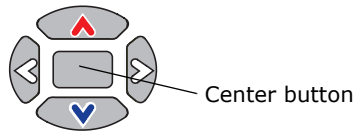1. Press the configuration button for 3 seconds.
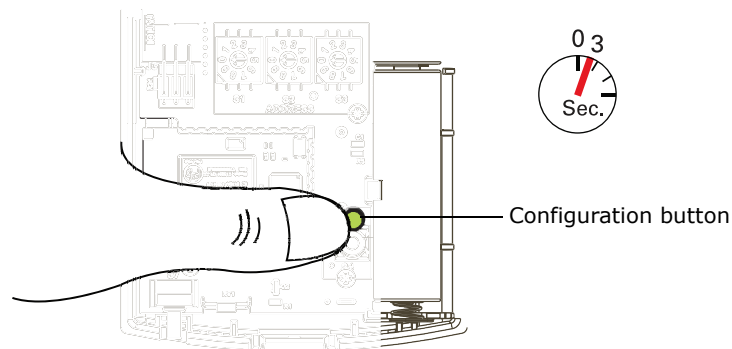
The display will change to configuration mode. When the sensor is in configuration mode, a wrench symbol appears on the display and the menus are separated by lines, as illustrated below.
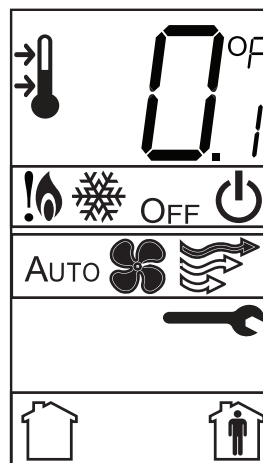
2. Press the center button on the keypad to begin the configuration process.

Center button

3. Configure the sensor options in the order shown in the table.
   - Press ◁ or ▷ to scroll to the next selection (as illustrated).
   - Press ▭ or ⌄ to move to the next menu (as illustrated).

| Setting	Configuration options
Temperature • Choose Fahrenheit or Celsius • Choose the degree resolution (whole degrees, half degrees, or tenths of degrees).	
Setpoint	 no setpoint single setpoint dual setpoint
Deadband (available for dual setpoint system only) **Note:** Deadband refers to the minimum difference between the heating and cooling setpoints.	 heat/cool setpoint offset (1.8°F – 10.8°F, 1°C – 6°C)
System **a) Single setpoint**	 emergency heat/ heat/cool/off heat/cool/ auto/off heat/cool/off auto/off no system options enabled

Setting	Configuration options
System (continued) **b) Dual setpoint**	emergency heat/ heat/cool/auto/off heat/cool/ auto/off emergency heat/ heat/cool/off
c) No setpoint	no system options enabled
Fan **Note:** Not all fan options are available for all systems.	auto/off auto/off/ low/high auto/off/low med/high auto/high (on) off/high (on) off/low/high off/low/ med/high no fan options enabled
Occupancy (timed override)	occupancy enabled occupancy disabled

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

Figure 5.

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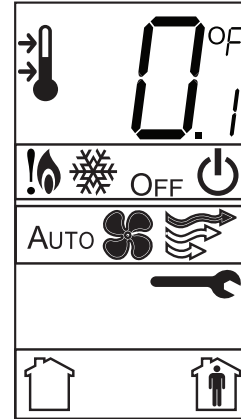
5. To return the display to operating mode, press the configuration button (see step 1,).

   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 , for error code definitions.
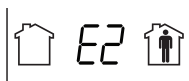
Optional Features

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.

Arrow indicates setpoint is shown on display

Temperature   Setpoint
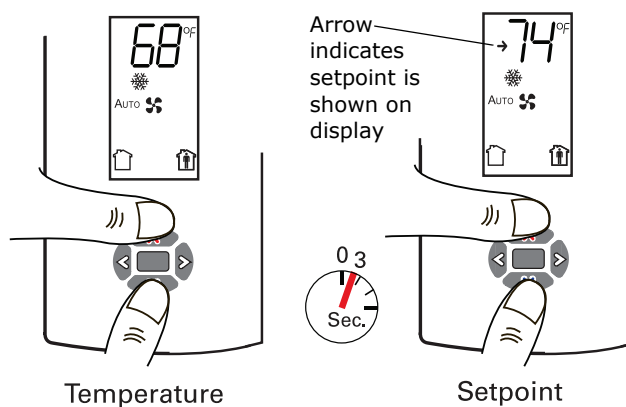
Locking or Unlocking Settings

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

To lock or unlock a setting:

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.

Table 2.
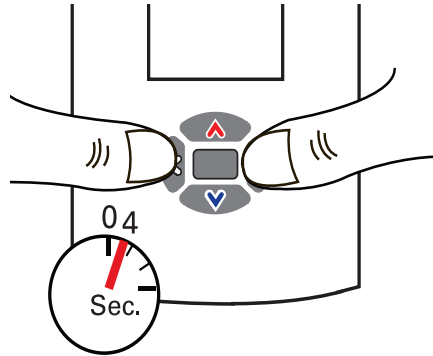
Note: *If you try to access a feature that is locked, the locked symbol* 🔒 *will appear on the display. If you press a keypad button to try change a locked setting, the locked symbol will flash.*

Replacing the Sensor 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. Install the security screw into the bottom of the cover (if desired).

Security screw
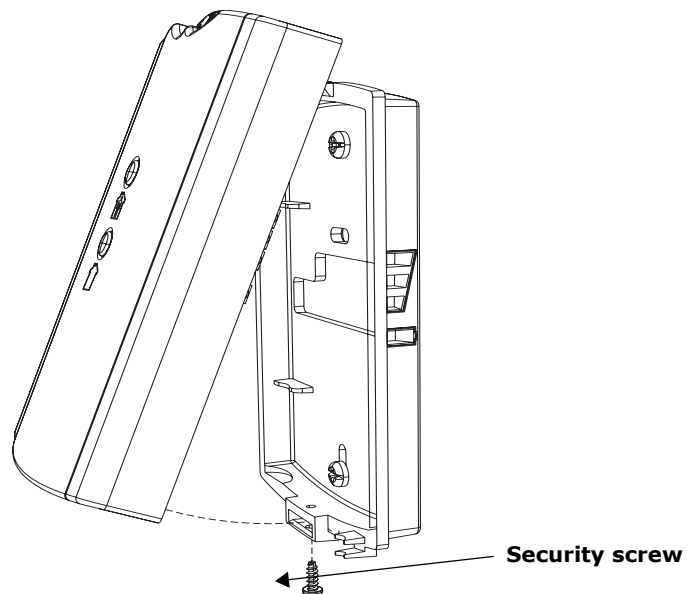
Operation

This section describes sensor operations.

Temporary Occupancy (Timed Override)

Temporary occupancy (timed override) is available on models WDS and WZS. 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.*

Model WZS Sensor

The model WZS sensor has Occupied and Unoccupied buttons for selecting and canceling temporary occupancy.

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

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

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

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

Figure 6.   WZS sensor: Locations of Occupied button and Unoccupied buttons
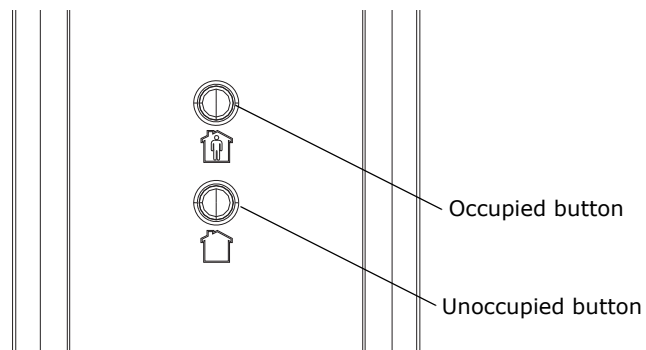
Model WDS Sensor

To select and cancel temporary occupancy on a model WDS sensor, see "Requesting Temporary Occupancy" p. 33.

Service Pin Request

Model WZS and WDS sensors can communicate a service pin request to their corresponding unit controllers using the following methods.
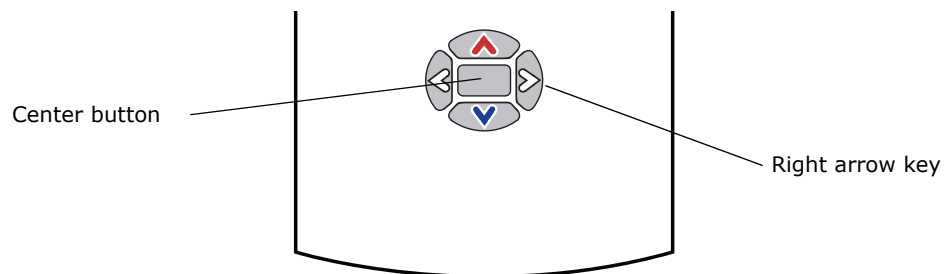
Model WZS Sensor

To initiate a service pin request, press the Occupied button (Figure 6, p. 27) for 10–25 seconds. The following occurs:

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

Model WDS Sensor

To initiate a service pin request, the sensor must be configured to support occupancy and must be in operating mode (see "Configuring the Wireless Sensor (Model WDS only)" p. 21).

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 7). 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 Ω (nominal).
   - The output generates for 15 seconds.
   - After 15 seconds, the wrench symbol disappears.

**Figure 7.   WDS sensor: Location of keys for service pin request**

Center button

Right arrow key

Star(*)/Double Star(**) Function

The star/double star function is available on models WDS and WZS. Consult the appropriate unit controller documentation for information about this function.

The WZS sensor set supports star(*) and double star(**) on the sensor thumb wheel (Figure 8).

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

Figure 8. **WZS sensor: Thumb wheel**

** on thumb wheel
(* is hidden from view)
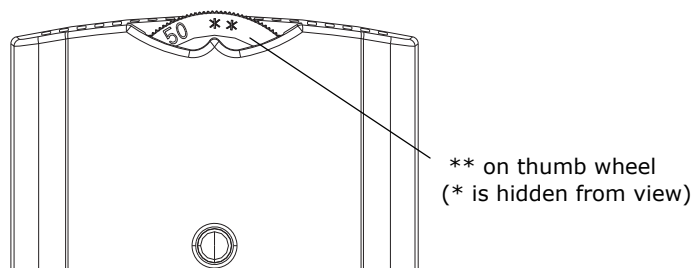
The WDS sensor set supports star(*) and double star(**) functions if the sensor is configured for single setpoint operation. Press the up or down arrow on the keypad to display the star(*) or double star(**), respectively, on the sensor display.

- 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 it is decreased one increment below 50°F (10°C), the double star(**) appears. A value of 44.6°F (7°C) is communicated.

End-of-Range Temperature Values

Receiver: The end-of-range temperature limits of the receiver for *all models* are 32°F to 122°F (0°C to 50°C). The receiver cannot replicate temperature values outside this range. If the sensor transmits a temperature value to the receiver that is out of the receiver replication range, the receiver will "freeze" the output at the end-of-range values. This value will remain frozen until the transmitted temperature moves to between the end-of-range temperature limits.

Sensor: The end-of-range temperature setpoint limits for the *model WDS sensor* is 50°F (10°C) to 89.6°F (32°C). The end-of-range temperature setpoint limits for the *model WZS sensor* is 45°F (7.22°C) to 95°F (35°C).

Receiver Power-up Sequence

When power is applied to the receiver, one of the following sequences occurs. The sequence is dependent on the address setting and the association status of the receiver.

Address set to 000 and receiver is not associated with a sensor

- LED5 is constantly On, indicating power is applied and the receiver is functional.
- All models: Zone temperature and cooling setpoint default to 72.5°F (22.5°C).
  WDS only: The heating setpoint defaults to 70.5°F (21.4°C) and the fan/system output will be 2230 Ω (see "Output Values—Failure and Default Modes of Operation" p. 42).
- Status LED3 will display a 2-blink pattern diagnostic (Table 2, p. 35).

Address set from 001 to 999 and receiver is not associated with a sensor

- LED5 is constantly On, indicating power is applied and the receiver is functional.
- All models: Zone temperature and cooling setpoint default to 72.5°F (22.5°C).
  WDS only: The heating setpoint defaults to 70.5°F (21.4°C) and the fan/system output will be 2230 Ω (see "Output Values—Failure and Default Modes of Operation" p. 42).
- The receiver conducts an energy scan for 20 seconds to determine the clearest channel on which to operate.
- LED3 flashes On every 2 seconds when it is ready to accept a sensor association request. When an association request is made by a sensor, the receiver instructs the sensor on which power level to operate. Then the receiver and sensor begin operation at the appropriate channel and power level (see "Observing the Receiver for Readiness to Associate" p. 17).

Address set from 001 to 999 (and not changed since most recent power-up) and receiver is associated with a sensor

- LED5 is constantly On, indicating power is applied and the receiver is functional.
- Zone temperature and setpoint default to 72.5°F (22.5°C). WDS only: Heating setpoint defaults to 70.5°F (21.4°C), Fan = Auto, System = Off.
- The receiver waits for a broadcast transmission from its associated sensor. When a transmission is received, the receiver positions its zone temperature and setpoint outputs appropriately.
- If the receiver does not receive a communicated signal from its associated sensor within 35 minutes, zone temperature and setpoint outputs fail, generating a unit controller alarm (see "Output Values—Failure and Default Modes of Operation" p. 42).

Note: Once a receiver communicates to a WTS sensor, the receiver disables (opens) its zone setpoint output indefinitely.

Sensor Transmission Time and Temperature Variables

Sensor transition time variables are as follows:

- The maximum time between sensor temperature transmissions is 15 minutes.
- The minimum time between sensor temperature transmissions is 30 seconds.
- The minimum time for transmitting temperature setpoint changes is 10 seconds.

Note: If a sensor transmits a message to the receiver and the receiver does not reply, the sensor will retransmit the message to the receiver every 30 seconds until communication to the receiver is re-established.

Sensor temperature time variables are as follows:

- The minimum change in zone temperature required to force a sensor transmission is:
  - 0.2°F (0.11°C) when the temperature range is between 60°F (15.6°C) and 80°F (26.7°C)
  - 0.5°F (0.28°C) when the temperature range is between 32°F (0°C) and 60°F (15.6°C) or between 80°F (26.7°C) and 122°F (50°C))
- The minimum change in temperature setpoint required to force a sensor transmission is:
  - 1°F (0.56°C) for a model WZS sensor
  - 0.1°F for model WZS sensor
  - 0.1°C for a model WDS sensor

Operating Mode (Model WDS)

This section describes the Trane model WDS wireless sensor operation. Figure 9 shows an example of a model WDS that has been configured and is in operating mode.

Figure 9. Wireless sensor (model WDS) in operating mode

Temperature

System settings

Fan settings

Test symbols (appear only when Test button is pushed

Occupancy indicator/Error code

Keypad
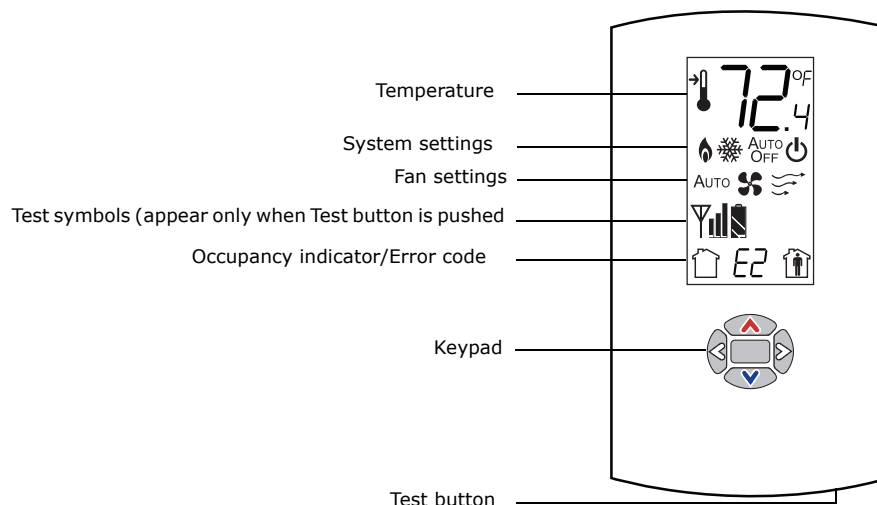
Test button

Changing Temperature Settings

72.4 °F	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 Room 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. *Note: The heat/cool setpoint offset (deadband) chosen during configuration will apply.*

Changing System Settings

❄	Indicates that the system is in cooling mode.	1. From the home screen, press ▭. The system setting menu appears.
🔥	Indicates that the system is in heating mode.	2. Press ◁ or ▷ to choose the desired system setting.
!🔥	Indicates emergency heat. It is used by facility operators or service technicians only.	3. When the symbol for the desired setting appears, confirm your choice by
AUTO	Indicates that the system automatically switches between heating and cooling as needed.	• Pressing ▭ (the home screen will appear), or
OFF ⏻	Indicates that the system is Off.	• Pressing ⌃ or ⌄ (the next menu will appear), or • Waiting five seconds.

Changing Fan Settings

AUTO 💨	Indicates that the fan will operate as needed to reach the selected temperature.	1. From the home screen, activate the fan setting menu by pressing ▭ and then ⌄.
💨➤	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.	2. Press ◁ or ▷ to choose the desired fan setting. 3. When the symbol for the desired setting appears, confirm your choice by pressing ▭ (the home screen will appear).
💨	Indicates that the fan setting is Off.	

Requesting Temporary Occupancy

[icon]	Select to request occupancy	• 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.
[icon]	Select to cancel occupancy	• 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.)

Error codes

E0	Main processor error	Replace sensor.
E1	Disassociated	Re-associate sensor with receiver. (See "Manual Association" and "Disassociation" p. 39.)
E2	Address set to 000	Set address to between 001–999.
E3	Software version conflict	Replace sensor.
E4	Input voltage too high	No RF transmission is permitted with an input battery voltage greater than 3.9 V.
E5	Sensor failure	Replace sensor.
E7	Communication error	Replace sensor.

Lock Symbol

[lock icon]	Indicates that the keypad is locked	The lock symbol appears if you try to adjust a setting that cannot be changed.

Testing Signal Strength

Indicates excellent signal strength	[signal icon]	Indicates satisfactory signal strength	[signal icon]	Indicates poor signal strength	[signal icon]	Press the Test button to display the signal strength symbols.	

Testing Battery Status

Indicates full battery power	[battery icon]	Indicates 50% of battery life left.	[battery icon]	Indicates 25% of battery life left. Replace batteries. Flashing symbol indicates that approximately 14 days of operation remain.	[battery icon]

Press the Test button to display the battery status symbols.

Use only UL-listed non-rechargeable 1.5 V lithium AA batteries (Trane p/n X13770035010 or equivalent).

Maintenance and Troubleshooting

This section describes features of the receiver and sensor that are to be used for maintenance and troubleshooting.

Locations of LEDs, Test button, Test Symbols, and Error Codes

The receiver for all models has four LEDs: LED1, LED2, LED3, and LED5. Figure 10 shows their locations.

Figure 10. LED locations on the receiver
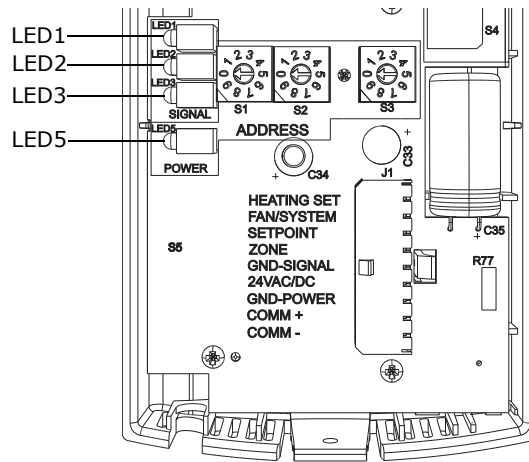
The sensor for models WTS and WZS have four LEDs: LED1, LED2, LED3, and LED5. The sensor for model WDS has test symbols and error codes that appear on the display. All three sensor models have a Test button. Figure 11 shows their locations.

Figure 11. LED, Test button, and symbol locations on the sensor

WTZ, WZS sensor

WDS sensor
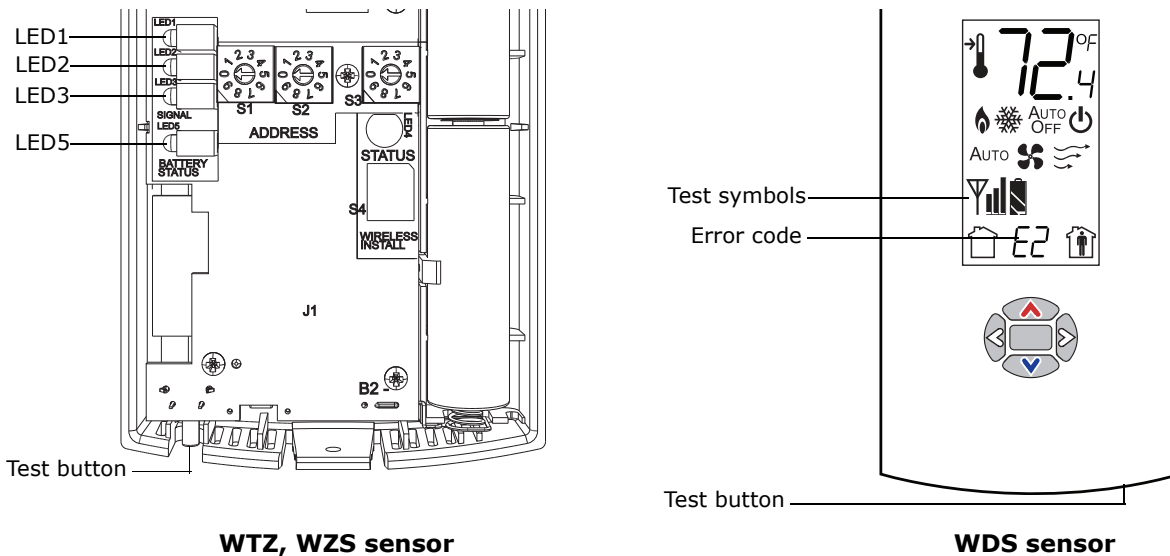
Diagnostics

LED1, LED2, and LED3, located on the sensor of models WTS and WZS, respond to diagnostics by exhibiting specific blinking patterns. View their response by pressing the Test button. (See Table 3.)

Error codes appear on the display of the model WDS sensor when diagnostics occur. (See Table 3.)

Table 3.   Diagnostics on the sensor

LED state when Test button is pressed (WTS, WZS sensors)	Error code (WDS sensor display)	Indicates...
N/A	E0, E5, E7	Sensor failure • Replace sensor
LED1: Off LED2: Off LED3[a]: 1-blink pattern repeated 3 times	E1	Disassociated • Sensor is not associated with a receiver.
LED1: Off LED2: Off LED3[a]: 2-blink pattern repeated 3 times	E2	Address set to 000 • Address not set to between 001–999.
LED1: Off LED2: Off LED3[a]: 3-blink pattern repeated 3 times	E3	Software error • Replace sensor
LED1: Off LED2: Off LED3[a]: 4-blink pattern repeated 3 times	E4	Input voltage too high • No RF transmission is permitted with an input battery voltage greater than 3.9 V.

(a) Blink pattern is On for 1/4 s, Off for 1/4 s, with 2 s Off between repetitions.

LED1, LED2, and LED3, located on the receiver of all models, respond to diagnostics by exhibiting specific blinking patterns. They respond independently of any user action. (See Table 4.)

Table 4.   Diagnostics on the receiver

LED state	Indicates...
LED1: Off LED2: Off LED3: 1-blink pattern repeated continuously[a]	Disassociated • Receiver is not associated, waiting for a sensor. • Receiver lost communication with sensor. • Receiver has no devices on its wireless personal area network. • Association with a device has been manually removed.
LED1: Off LED2: Off LED3: 2-blink pattern repeated continuously[a]	Address set to 000 • Address not set to between 001–999.
LED1: Off LED2: Off LED3: 3-blink pattern repeated continuously[a]	Not configured • Receiver configuration properties not properly set (defective receiver).

(a) Blink pattern is On for 1/4 s, Off for 1/4 s, with 2 s Off between repetitions.

Testing Signal Strength

To initiate a signal strength test, push the Test button on the sensor (see location of Test button in Figure 11, p. 34).

- **Models WTS, WZS:** LED1, LED2, and LED3 respond by indicating signal strength. You can view them on the sensor (Table 5) and the receiver (Table 6, p. 36).

- **Model WDS:** Test symbols on the sensor display indicate signal strength (Table 5). LED1, LED2, and LED3, on the receiver, respond by indicating signal strength (Table 6, p. 36).

Table 5.   Observing signal strength on the sensor

User action	LED state (WTS, WZS sensors)	Symbol (WDS sensor display)	Indicates...
None	LED1: Off LED2: Off LED3: Off	No Test symbols appear	Normal state • No Test button press.
Press Test button on the sensor	LED1: Off LED2: Off LED3: Off		Associated; no communication with receiver • Associated, but no signal from the receiver after pressing Test button.
	LED1: On LED2: On LED3: On Displays for 5 seconds, then constantly Off		Excellent signal strength • Good signal margin for reliable communication.
	LED1: Off LED2: On LED3: On Displays for 5 seconds, then constantly Off		Satisfactory signal strength • Adequate signal strength for reliable communication. • Moving sensor or receiver may improve signal strength. • Increased channel switching may reduce battery life.
	LED1: Off LED2: Off LED3: On Displays for 5 seconds, then constantly Off		Poor signal strength • Unreliable communication. • Strongly recommend moving the sensor or receiver to a better location.

Table 6.   Observing signal strength on the receiver

User action	LED state (receiver, all models)	Indicates...
None	LED1: Off LED2: Off LED3: Off	Normal state • No Test button press.
Press Test button on the sensor	LED1: On LED2: On LED3: On Displays for 5 seconds, then constantly Off	Excellent signal strength • Good signal margin for reliable communication.
	LED1: Off LED2: On LED3: On Displays for 5 seconds, then constantly Off	Satisfactory signal strength • Adequate signal strength for reliable communication. • Moving sensor or receiver may improve signal strength. • Increased channel switching may reduce battery life.
	LED1: Off LED2: Off LED3: On Displays for 5 seconds, then constantly Off	Poor signal strength • Unreliable communication • Strongly recommend moving the sensor or receiver to a better location

Testing Battery Status

Initiate a battery status test as follows:

- On models WTS and WZS, push the Test button on the sensor (see location on Figure 11, p. 34). LED5 on the sensor responds by indicating the level of battery strength, as shown in Table 7.

- On model WDS, push the Test button on the sensor (see location on Figure 11, p. 34). In response, a battery test symbol appears on the display. The symbol shown indicates battery life expectancy (see Table 8, p. 37).

Table 7. Battery status: LED5 on model WTS and WZS sensors

User action	LED state (WTS, WZS)	Indicates...
Press Test button	Solid green for 5 seconds	Battery is adequate for proper operation.
	Solid red for 5 seconds	25% battery life left. Batteries should be replaced.
	No light	Batteries life expired or not installed properly, or sensor is defective.
None	Blinking red: 1-blink pattern[a] repeated 5 times. Cycle repeats every 15 minutes.	Approximately 14 days of operation remain before the battery is too weak to power the sensor.

(a) Blink pattern is On for 1/4 s, Off for 3/4 s, with 2 s Off between repetitions.

Table 8. Battery status: Battery symbol on model WDS sensor display

User action		Indicates...
Press Test button	(full battery symbol)	Full battery power.
	(half battery symbol)	50% battery life left.
	(low battery symbol)	25% battery life left. Replace batteries. Flashing symbol indicates that approximately 14 days of operation remain before the battery is too weak to power the sensor.

24 V Power Status Indicator

LED5 on the receiver of all models (Figure 10, p. 34) lights and stays constantly On when 24 V power is normal.

Using the Wireless Sensor System to Check Signal Strength on a Site

Follow these steps to check the signal strength on a site:

1. Power up a receiver with a 24 V transformer (user supplied)

2. Associate the sensor to a receiver of the same model intended for the job

3. Place the receiver at the desired location

4. Place or hold the sensor at the desired location

5. Press the Test button (S5) on the sensor and observe the signal strength as indicated by LED1, LED2, and LED3 on models WTS and WZS, and on the display on model WDS (Figure 11, p. 34).

For more information on interpreting the LEDs and the display symbols that indicate signal strength, see "Testing Signal Strength," p. 35.

Replacing Sensor Batteries

Sensor battery type, length of life, and installation are addressed in this section.

Battery Type

NOTICE:

Equipment Damage!

The batteries are manufactured in a ready-to-use state. They are not designed for recharging. Recharging can cause battery leakage or, in some cases, can cause the safety release vent to open.

NOTICE:

Equipment Damage!

Do not attempt to hook up the sensor to a power supply. Equipment damage may result.

Use two non-rechargeable 1.5 V lithium AA batteries in the sensor. To maintain UL rating, use only UL-listed lithium batteries. The sensor ships with Energizer™ L91 batteries already installed. Replacement batteries are available at Trane Service Parts Centers (p/n X13770035010) or other local suppliers.

Battery Life

Battery life is five years under normal conditions. If the sensor is not used for an extended period of time, do one of the following:

• Set the sensor address to 000 to place the sensor into a low-power hibernation mode.

• Remove the batteries

Note:

• *If lithium batteries are temporarily unavailable, alkaline batteries can be used. However, alkaline battery life is very short by comparison.*

• *The battery life for a model WDS may decrease with extended LCD display activity.*

Battery Installation

⚠WARNING

Prevent Injury!

Batteries can explode or leak and cause burns if installed backwards, disassembled, charged, or exposed to water, fire, or high temperature.

⚠WARNING

Prevent Injury!

Keep batteries away from small children. If swallowed, contact your local poison control center immediately.

1. Observe the polarity indicators that are molded into the cover.

2. Install two batteries (of the type specified in "Battery Type," p. 38) in the battery-holding slot that is molded into the sensor cover.

The sensor has been designed to prevent damage if the batteries are installed backwards, to reduce the potential for injury.

Manual Association

At any time, the manual association method can be used to associate the receiver with the sensor. If an association was previously established between a receiver and a sensor and needs to be re-established, the manual association process may be used. If an association has not yet been established, the automatic association process is recommended (see "Associating the Sensor to the Receiver," p. 18).

1. Using a small screwdriver, set the three rotary address switches (Figure 1, p. 11, locations S1, S2, S3) on the receiver to an address between 001 and 999.

   Notes:

   • *An address can be changed without powering down the receiver or sensor.*

   • *An address can be changed at any time after initial association has been established.*

2. Set the three rotary address switches (Figure 1, p. 11, locations S1, S2, S3) on the sensor to the same address as the receiver.

3. Record the address and location of the receiver and sensor pair.

Note: *A receiver will retain its address information through a power loss. Address information is lost only if the receiver is manually disassociated or if its rotary switch setting is changed after it has been associated.*

Disassociation

The receiver disassociates from the sensor (by removing all stored association information), conducts a channel scan, and restarts itself, if any of the following are true:

• The receiver address is changed from its current setting (001–999).

• The receiver receives a disassociation notification from its associated sensor.

• The receiver does not receive a communication from its associated sensor within 50 minutes.

• The sensor and receiver are associated and communicating at the time the sensor is set to 000 and the Test button is pressed.

Note: *A disassociated sensor will transit an association request every 10 minutes.*

Sensor/Receiver Compatibility

Version 1.5 (p/n X13790854 and X13790855) and higher receivers are compatible with all sensors models and support all functions. Receivers released prior to version 1.5 are compatible with only models WTS and WZS.

Replacing a Failed Sensor or Receiver

To replace a failed sensor or receiver:

1. Confirm that the device is disassociated (see Table 3 and Table 4, p. 35).

2. Set the rotary address switch of the new device to match the address of the remaining sensor or receiver.

   Note: There is no need to remove power from the remaining device.

3. Apply power to the new device. Association between the new and the remaining devices will automatically occur.

Note: When replacing a WDS sensor, the receiver (version 1.5 or higher) will automatically configure the sensor to match the last stored configuration, if the sensor has not been placed into configuration mode and the factory default configuration is still valid. If the sensor configuration does not match the desired system features, it can be manually configured (see "Manual Association," p. 39).

Servicing and Testing

If the wireless sensor system is not working as expected, use the tools and procedure described in this section.

Servicing and Testing Tools

No special tools or software are necessary to service and test the wireless sensor system. Test the system by using:

• The LEDs on the receiver, LEDs on the model WTS and WZS sensor, and the display on the model WDS sensor

• The Test button on the sensor

• The address test mode on the receiver

• A common volt-ohm meter

Procedure for Testing the Wireless Sensor System

If the wireless sensor system is not working as expected:

1. Observe LED5 on the receiver. LED5 is On solid green whenever the receiver is powered.

2. Verify that the receiver is properly grounded. Both the GND-SIGNAL (black) wire and the GND-POWER (yellow) wire must be grounded (see Figure 2, p. 15 or Figure 3, p. 15 for wiring diagrams).

3. Press the Test button on the sensor.

   • Models WTS, WZS: LED5 should turn On solid green, indicating proper battery strength. LED1, LED2, and LED3 will indicate signal strength.

     Note: When checking signal strength, both LED1 and LED3 on the receiver and sensor illuminate in unison if the sensor and receiver are associated. Use this feature to confirm association.

- Model WDS: Battery life ("Testing Battery Status," p. 33) and signal strength ("Testing Signal Strength," p. 33) are indicated on the display.

Procedure for Testing the Receiver

If the receiver is not working as expected:

1. Verify that the receiver is powered.

2. Set the receiver address to 000 to force the zone temperature output and zone temperature setpoint output to their default mode values (see "Output Values—Failure and Default Modes of Operation," p. 42).

3. Measure the receiver output resistance (see "Measuring Output Resistance," p. 42).

4. When the test is complete, reset the receiver address to its previous setting.

5. Press the Test button on the sensor to force re-association.

6. Confirm association and communication by noting LED1, LED2, and LED3 as described in "Testing Signal Strength," p. 35.

Forcing a Sensor to Transmit

To force a wireless sensor to transmit during servicing, press the Test button on the sensor.

Output Power Level

The maximum output power level of a wireless sensor set is controlled by software and restricted by channel of operation and agency requirements per country or region. The sensor has a default maximum power level of 10 mW, but the receiver determines the ultimate output power level of the 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
Receiver address = 000	11.17 kΩ, 72.5°F (22.5°C), indefinitely	451 Ω, 72.5°F (22.5°C), indefinitely	501 Ω, 70.5°F (21.4°C), indefinitely	2320 Ω Fan = Auto System = Off
Receiver address = 001 to 999 and: • Receiver is powered up, but not is associated, or • Receiver has received a disassociation request from the associated sensor.	11.17 kΩ, 72.5°F (22.5°C) Hold for 15 minutes, then open	451 Ω, 72.5°F (22.5°C), Hold for 15 minutes, then open	501 Ω, 70.5°F (21.4°C), indefinitely	2320 Ω Fan = Auto System = Off
Receiver address = 001 to 999 and receiver has not received a communication within 35 minutes from the associated sensor.	Open	Open	Open	Open
Receiver has no power.	Open	Open	Open	Open
Thermistor in sensor has failed to either open or close.	Open	Normal value	Normal value	N/A
Setpoint potentiometer has failed to either open or close.	Normal value	Open	Open	N/A

Measuring Output Resistance

To measure the resistance of receiver outputs for zone temperature and setpoints for all models, and heating setpoint and fan/system for the WDS:

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

1. Ensure that the GND-SIGNAL (black) wire and GND-POWER (yellow) wire share a common ground with the transformer (see Figure 2 or Figure 3, p. 15 for wiring diagrams).

2. Disconnect the ZONE (white) and the SETPOINT (RED) wires from the controller. Disconnect the HEAT SETPOINT (brown) and FAN/SYSTEM (green) wires from the controller, if applicable.

3. Measure resistance as follows:

   a. All models: Measure between the GND-SIGNAL (black) wire and the SETPOINT (red) or the ZONE (white) wire. Compare resistance measurements to those in Table 9.

   b. WDS only: Measure between the GND-SIGNAL (black) wire and the FAN/SYSTEM (green) wire or the HEAT SETPOINT (brown) wire. Compare resistance measurements to those in Table 9.

Table 9. 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 Ω
55°F (12.8°C)	17.47 kΩ	792 Ω
60°F (15.6°C)	15.3 kΩ	695 Ω
65°F (18.3°C)	13.5 kΩ	597 Ω
70°F (21.1°C)	11.9 kΩ	500 Ω
75°F (23.9°C)	10.5 kΩ	403 Ω
80°F (26.7°C	9.3 kΩ	305 Ω
85°F (29.4°C)	8.25 kΩ	208 Ω
*	NA	49 Ω

Notes:
1. Sensors are calibrated at 70°F (21.1°C).
2. Single setpoint systems: Varies ±28 Ω at 70°F (21.1°C); varies ±128 Ω at endpoints of scale 55°F (12.8°C) and 85°F (29.4°C). Dual setpoint systems: Cooling setpoint varies ±10 Ω at 70°F (21.1°C); varies at ±110 Ω at endpoints of scale. Heating setpoint varies ±20 Ω at 70°F (21.1°C); varies at ±120 Ω at endpoints of scale.

Table 10. Resistance measurements for fan and system modes

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

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 of the Occupied/Unoccupied buttons on the model WZS sensor or the keypad on the WDS sensor, as this may result in an unwanted timed override or settings change.

Specifications

The following table provides specifications for all models of the wireless sensor sets.

Sensor operating temperature	32 to 122ºF (0 to 50ºC)
Receiver operating temperature	-40 to 158ºF (-40 to 70ºC)
Storage temperature	-40 to 185ºF (-40 to 85ºC)
Storage and operating humidity range	5% to 95%, non-condensing
Accuracy	0.5 °F over a range of 55 to 85°F (12.8 to 29.4°C)
Resolution	0.125ºF over a range of 60 to 80ºF (15.56 to 26.67°C) 0.25ºF when outside this range
Setpoint functional range (WZS only)	45ºF to 95ºF (7.2ºC to 35ºC)
Setpoint functional range (WDS only)	Single setpoint: 50ºF to 89.6ºF (10ºC to 32ºC) Dual setpoint: 56ºF to 89.6ºF (13.3ºC to 32ºC)
Setpoint thumb wheel markings (WZS only)	50 to 85ºF (stamped every 5ºF) and *, ** 11 to 29ºC (stamped every 3ºC) and *, **
Receiver voltage	24 V nominal ac/dc ± 10%
Receiver power consumption	<1 VA
Housing	Polycarbonate/ABS blend, UV protected, UL 94-5VA flammability rating, suitable for application in a plenum
Mounting	3.24 in (8.26 cm) for 2 mounting screws (supplied)
Sensor battery	(2) AA, 1.5 V, 2800 mAh, lithium, 5-year life, UL listed
Range[a]	Open range: 2,500 ft (762 m) (packet error rate = 2%) Usable: 200 ft (61 m) Typical: 75 ft (23 m)
Output power	100 mW
Radio frequency	2.4 GHz (IEEE Std 802.15.4-2003 compliant) (2405–2480 MHz, 5 MHz spacing)
Radio channels	16
Address range	000–999
Minimum time between transmissions	30 seconds
Maximum time between transmissions	15 minutes

(a) Range values are estimated transmission distances for satisfactory operation. Actual distance is job specific and must be determined during site evaluation.
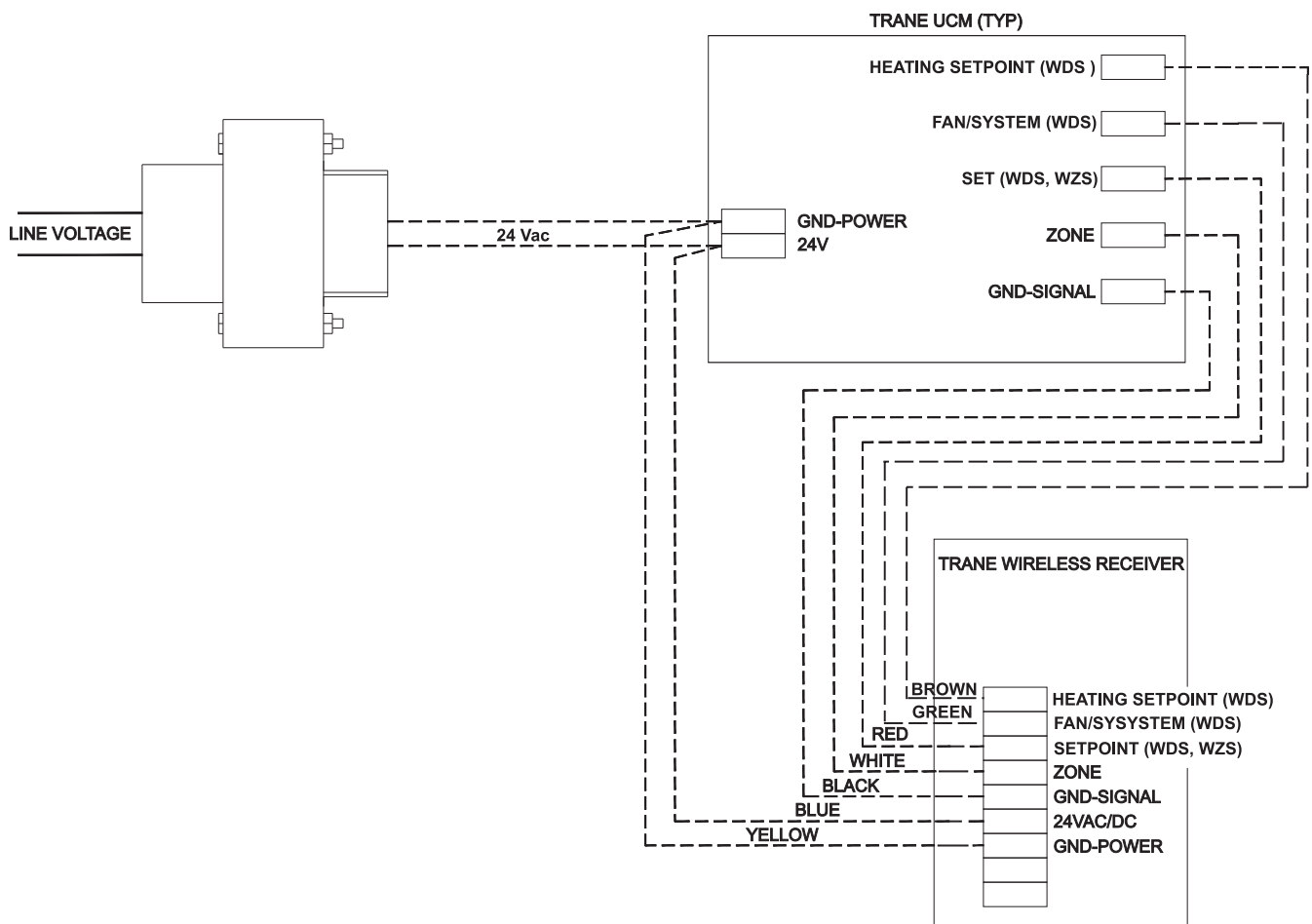
Appendix A: Wiring Diagrams

Single Transformer Wiring

Typically, a single transformer powers the unit controller, which provides power to the receiver. This is the recommended method of wiring.

⚠ WARNING

Risk of Fire and Electrical Shock!
To avoid the risk of fire or electrical shock, do not interconnect the multiple class 2 circuits.

TRANE UCM (TYP)

HEATING SETPOINT (WDS)
FAN/SYSTEM (WDS)
SET (WDS, WZS)
ZONE
GND-SIGNAL

LINE VOLTAGE
24 Vac
GND-POWER 24V

TRANE WIRELESS RECEIVER

BROWN
GREEN
RED
WHITE
BLACK
BLUE
YELLOW

HEATING SETPOINT (WDS)
FAN/SYSYSTEM (WDS)
SETPOINT (WDS, WZS)
ZONE
GND-SIGNAL
24VAC/DC
GND-POWER

Multiple Transformer Wiring

⚠️**WARNING**

Shock Hazard!

If the use of multiple transformers is necessary, locate them so that they do not allow simultaneous human contact. Touching both 24 Vac outputs simultaneously on two electrically connected transformers could result in death or serious injury.

Using a dedicated transformer to power the receiver is seldom necessary and is not advised. Use it only when the host transformer does not have enough volt-ampere (VA) capacity to power the receiver (see "Specifications," p. 45 for receiver power consumption).

If you are using a dedicated transformer to power the receiver, make sure the grounds (commons) of the multiple transformers are electrically connected to one another, as shown in the diagram.
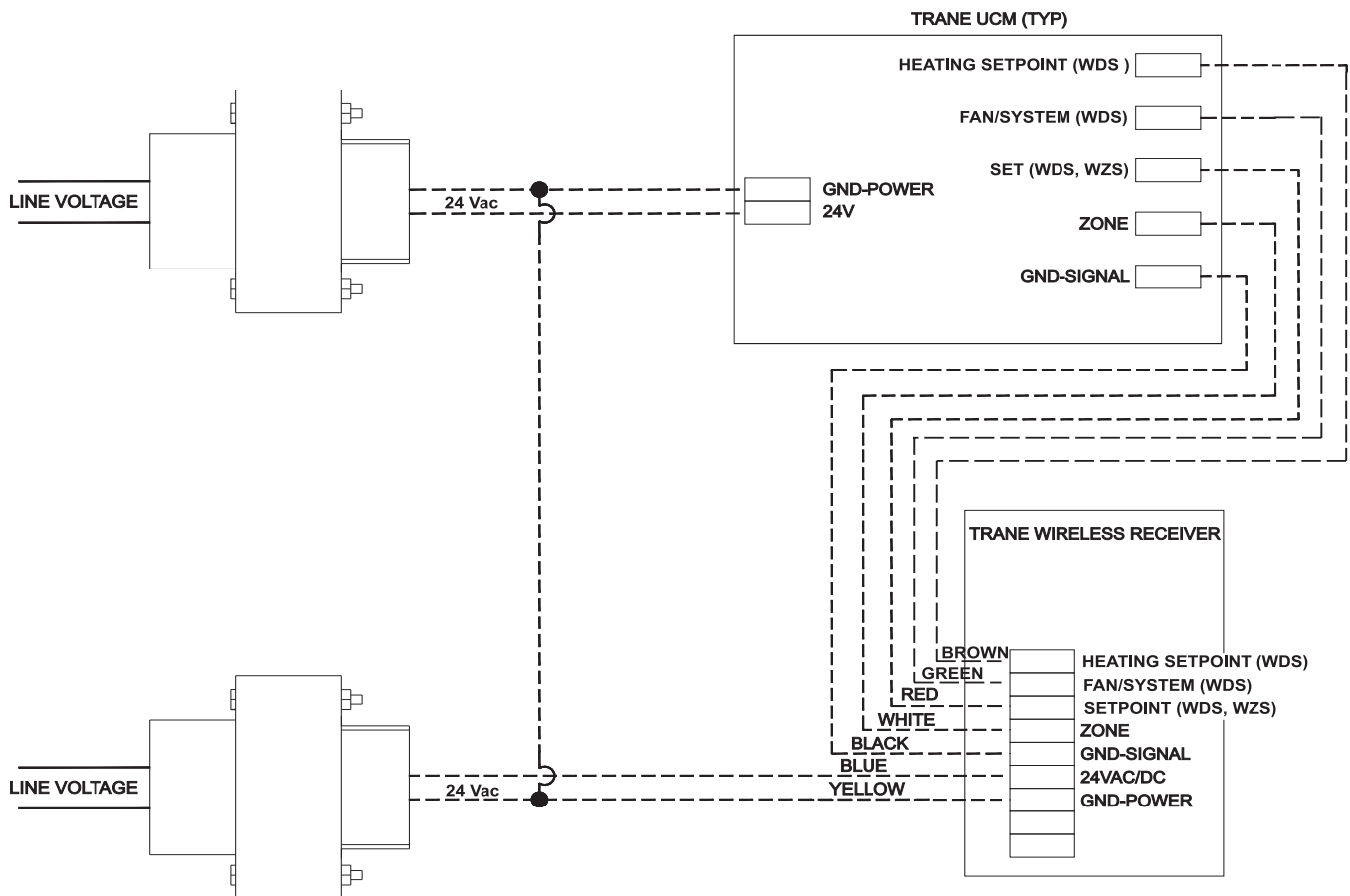
Appendix B: Agency Compliance

The following table presents agency compliance information for wireless sensor set models as shown.

United States compliance (all models)	UL listed:UL 94-5VA Flammability rating UL 916: Energy management equipment
	FCC CFR47, Section 15.247 & Subpart E Digital Modulation Transmission with no SAR (FCC Identification TFB-FREESTAR)
	This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: 1. This device may not cause harmful interference, and 2. This device must accept any interference received, including interference that may cause undesired operation.
	Warning: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
	20 cm separation distance: To comply with FCC's RF exposure limits for general population/uncontrolled exposure, the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.
Canada compliance (all models)	CSA22.2 No. 205-M1983 Signal Equipment
	Industry Canada (Certification no: IC: 5969A-FREESTAR)
	Industry Canada statement: the term "IC" before the certification/registration number signifies only that the Industry Canada technical specifications were met.
	Section 14 of RSS-210: The installer of this radio equipment must ensure that the antenna is located or pointed such that it does not emit RF field in excess of Health Canada limits for the general population.
IEEE compliance for radio frequency range (all models)	IEEE 802.15.4-2003, IEEE Standard for Information Technology—Telecommunications and information exchange between systems—Local and metropolitan area networks—Specific requirements, Part 15.4: Wireless Medium Access Control (MAC) and Physical Layer (PHY) Specifications for Low Rate Wireless Personal Area Networks (LR-WPANs)

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