



Installation Guide

502-017

TS300 Series Sensors

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TS300 SERIES SENSORS

iWorX® TS300 Series Sensors are a family of wall-mounted digital temperature and humidity sensors for use with iWorX® HVAC Controllers. These sensors feature a Sensor Link (S-Link) communication protocol which provides a simple two-wire interface for power and exchange of sensor and control information. Control information includes occupancy override selection, heat/cool status, temperature setpoints, and fan mode.

Overview

Available in six models, these iWorX® TS300 Series Sensors provide integral analog to digital conversion for elimination of noise effects and wire resistance offset between sensor and controller.

Using the digital wall sensor, the operator can monitor performance and edit operational settings.

iWorX® TS300 Series Sensors are suitable for direct-wall, 2 x 4 electrical box, 1/4 DIN electrical box, or surface box mounting.

The TS300 series sensor measures room conditions and transmits the information to the controller via the S-Link. A single sensor is connected directly to an application-specific iWorX® Series controller via low-cost, unshielded, twisted pair cable. The connection between the sensor and controller is not polarity-sensitive.

Features

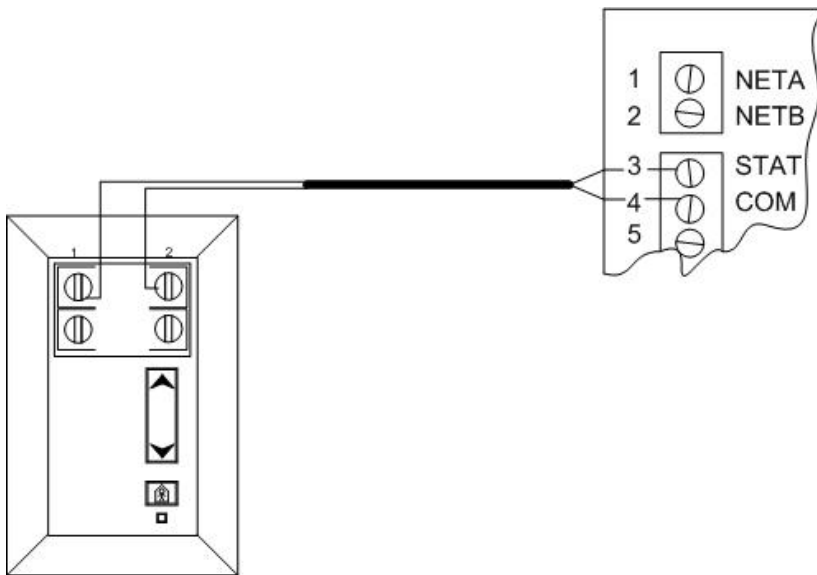
- Contemporary, low-profile packaging.
- Digital zone temperature indication (selectable for 0.1 or 1 degree display resolution of °F or °C).
- Self-compensating temperature conversions remove the need to calibrate over time.
- Digital zone humidity indication (selectable for 0.1 or 1% RH display resolution).
- Long-life humidity sensing element with excellent resistance to contamination and condensation.
- Pushbutton override capabilities allow occupants to switch to timed occupied mode for after hours operation.
- Displays selected system values such as setpoints, and operating mode.
- Directly connects to selected iWorX® controllers via low-cost, unshielded, twisted-pair cable, which provides both power and communication.
- Separate wiring subbase and electronics.

Applicable Documentation

Description	Audience	Purpose
<i>iWorX® TS300 Series Sensors Installation Guide</i> , Document No. 502-017 (this document)	<ul style="list-style-type: none"> – Application Engineers – Wholesalers – Contractors 	Provides specific application information about the sensors, including mounting, wiring, and operating instructions.
<i>iWorX® Sensor Compatibility</i> , Document No. 509-001	<ul style="list-style-type: none"> – Application Engineers – Wholesalers – Contractors 	Shows operational compatibility among the various iWorX® sensors and controllers.
<i>iWorX® LCI2 Application Guide</i> , Document No. 505-002	<ul style="list-style-type: none"> – Application Engineers – Installers, End users – Service Personnel – Start-up Technicians 	Provides instructions for setting up and using the iWorX® Local Control Interface.
http://iWorxWizard.taco-hvac.com	<ul style="list-style-type: none"> – Application Engineers – Wholesalers – Contractors 	An on-line configuration and submittal package generator based on user input. Automatically generates bill of materials, sequence of operations, flow diagrams, wiring diagrams, points and specifications.
Additional Documentation	<i>LonWorks FTT-10A Free Topology Transceiver User's Guide</i> , published by Echelon Corporation. It provides specifications and user instructions for the FTT-10A Free Topology Transceiver. Information is also available at the following web site: www.echelon.com/support/documentation/manuals/transceivers .	

Typical Use

Figure 1: Typical use diagram for an iWorX® TS300 Series Sensor.



REPRESENTATIONS AND WARRANTIES

This Document is subject to change from time to time at the sole discretion of Taco Electronic Solutions, Inc. All updates to the Document are available at www.taco-hvac.com. When installing this product, it is the reader's responsibility to ensure that the latest version of the Document is being used.

The iWorX® Sensor shall only be used for the applications identified in the product specifications and for no other purposes. For example, the iWorX® Sensor is not intended for use to support fire suppression systems, life support systems, critical care applications, commercial aviation, nuclear facilities or any other applications where product failure could lead to injury to person, loss of life, or catastrophic property damage and should not be used for such purposes.

Taco Electronic Solutions, Inc. will not be responsible for any product or part not installed or operated in conformity with the Document and instructions or which has been subject to accident, disaster, neglect, misuse, misapplication, inadequate operating environment, repair, attempted repair, modification or alteration, or other abuse. For further information, please refer to the last page of this Document for the company's Limited Warranty Statement, which is also issued with the product or available at www.taco-hvac.com.

INSTALLATION INSTRUCTIONS

PRECAUTIONS

General



This symbol is intended to alert the user to the presence of important installation and maintenance (servicing) instructions in the literature accompanying the equipment.



WARNING: Electrical shock hazard. Disconnect **ALL** power sources when installing or servicing this equipment to prevent electrical shock or equipment damage.

Make all wiring connections in accordance with these instructions and in accordance with pertinent national and local electrical codes.

Static Electricity

Static charges produce voltages that can damage this equipment. Follow these static electricity precautions when handling this equipment.

- Work in a static free area.
- Touch a known, securely grounded object to discharge any charge you may have accumulated.
- Use a wrist strap when handling printed circuit boards. The strap must be secured to earth ground.

Location

Avoid locations where corrosive fumes, excessive moisture, vibration or explosive vapors are present.

Avoid electrical noise interference. Do not install near large contactors, electrical machinery, or welding equipment.

This equipment is suitable for indoor use only. Operate where ambient temperatures do not exceed 122 °F (50 °C) or fall below 32 °F (0 °C) and relative humidity does not fall below 5% or exceed 95%, non-condensing.

The humidity sensing element of TS302, TS304 and TS306 models will recover from short term exposure to liquid water or condensation. Repeated exposure will degrade the performance of the sensor.

Locate the sensor on an inside wall where the sensor is exposed to at least 30 feet (9 meters) per minute of unrestricted air circulation. The location should represent the average temperature in the room or space. Make certain sensor is located out of direct sunlight, away from sources of heat or cold, and away from concealed ducts or pipes.

FCC Compliance

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference. This equipment can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment to a power source different from that to which the receiver is connected.
- Consult the equipment supplier or an experienced radio/TV technician for help.

You are cautioned that any changes or modifications to this equipment not expressly approved in these instructions could void your authority to operate this equipment in the United States.

Canadian Department of Communications

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

BEFORE INSTALLING

About this Document

The instructions in this manual are for the TS300 series sensor, which provides temperature and (optional) humidity sensing capabilities to an iWorX® system.

Inspecting the Equipment

Inspect the shipping carton for damage. If damaged, notify the carrier immediately. Inspect the equipment for damage. Return damaged equipment to the supplier.

The TS300 Series sensor is packaged disassembled in one box and consists of three major parts:

- A pre-wirable base plate for wiring to the controller S-Link connections
- An electronic assembly containing the sensors and associated circuitry
- A removable cover

What is Not Included with this Equipment

- Job wiring diagrams
- Tools:
 - Drill and bits for mounting screws
 - Level
 - Static protection wrist strap
- Two mounting screws (dry-wall anchors for direct-wall mount)
- Accessories

INSTALLATION



Warning: Electrical shock hazard. To prevent electrical shock or equipment damage, disconnect **ALL** power sources to controllers and loads before installing or servicing this equipment or modifying any wiring.

Mounting the Device

iWorX® TS300 Series sensors can be direct-wall, 2 x 4 electrical box, 1/4 DIN electrical box, or surface box mounted. See Figure 2 and Figure 3 for appropriate mounting dimensions.

Figure 2: LEFT: Mounting Dimensions for Direct-wall, 2 x 4 Electrical Box, and Surface Box Mounting.

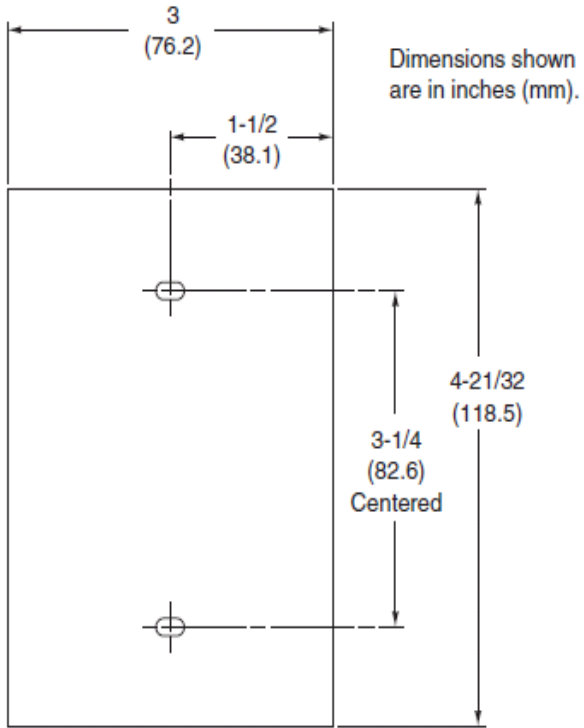
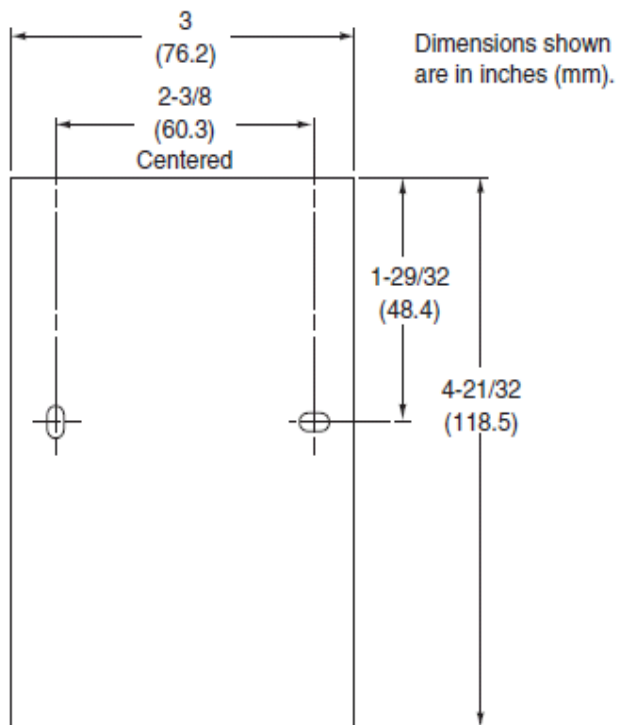
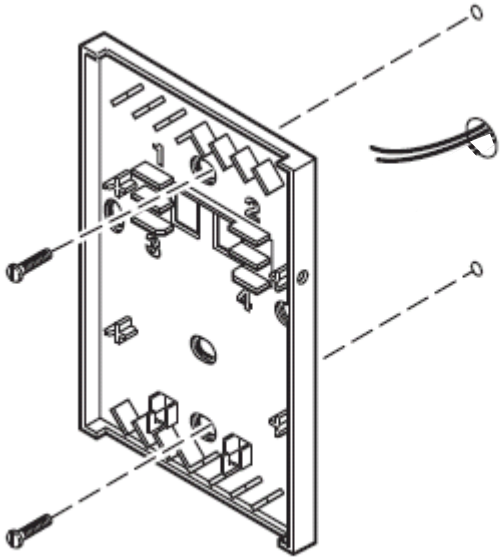


Figure 3: Mounting Dimensions for 1/4 DIN Electrical Box Mounting.

Direct-wall Mount

1. Use mounting dimensions shown in Figure 2.
2. Feed S-Link wires through base plate.
3. Using two appropriate screws (use drywall anchors as necessary), mount base plate to wall (shown below).

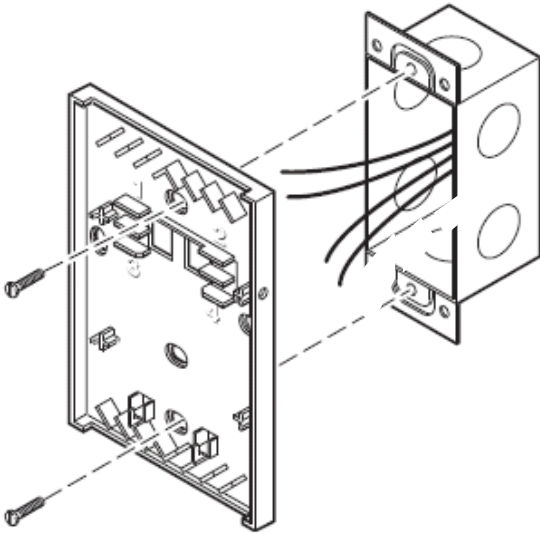
Figure 4: Direct Wall Mount.



2 x 4 Electrical Box Mount

1. Use mounting dimensions shown in Figure 2.
2. Feed S-Link wires from electrical box through base plate.
3. Using two 6-32 x 5/8 in. flat head screws (not provided), mount base plate to electrical box (shown below).

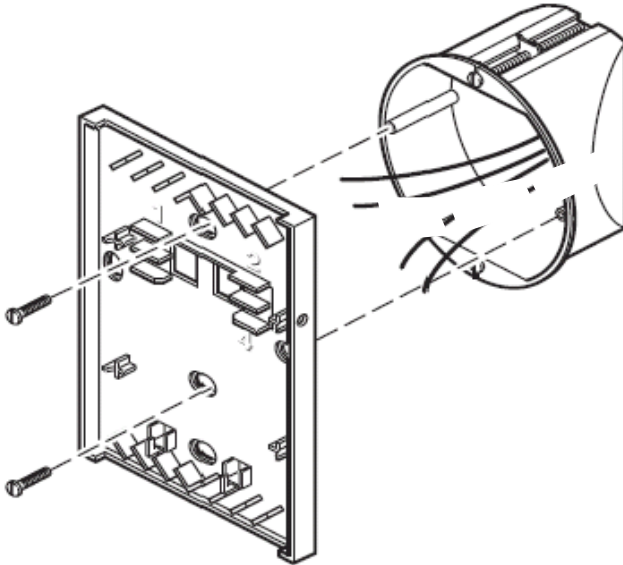
Figure 5: 2 x 4 Electrical Box Mount.



1/4 DIN Electrical Box Mount

1. Use mounting dimensions shown in Figure 3.
2. Feed S-Link wires from electrical box through base plate.
3. Using two appropriate screws (not provided), mount base plate to electrical box using vertical mounting holes indicated in the figure below.

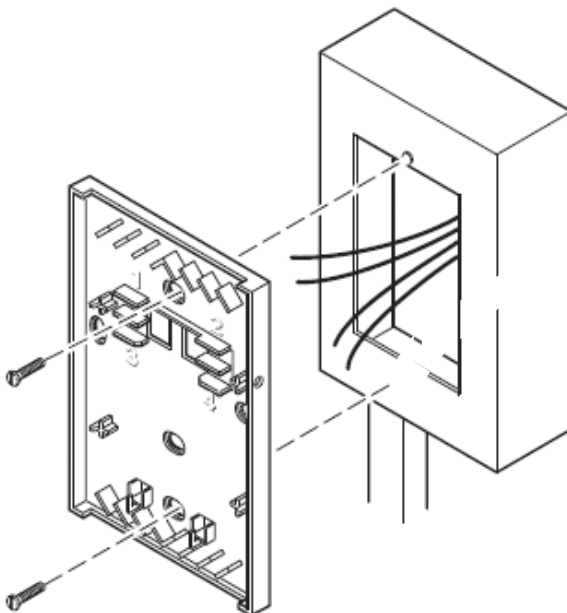
Figure 6: 1/4 DIN Electrical Box Mount.



Surface Box Mount

1. Use mounting dimensions shown in Figure 2.
2. Feed S-Link wires from electrical box through base plate.
3. Using two 6-32 x 5/8 in. flat head screws (not provided), mount base plate to surface box (see figure below).

Figure 7: Surface Box Mount.



WIRING INFORMATION

The following electrical connection can be made to the iWorX® TS300 series sensors:

- Sensor Link (S-Link) Wiring



CAUTION: Do not connect any power wiring to the sensor. Failure to observe this precaution will damage the sensor.

Communications Wiring

Communications wiring includes a connection between an iWorX® controller and an iWorX®TS300 Series sensor via the S-Link.

Sensor Link (S-Link) Wiring

S-Link wiring powers and enables the TS300 sensor. The S-Link needs at least 24 gauge (0.205 mm²), twisted pair, voice grade telephone wire. The capacitance between conductors cannot be more than 32 pF per foot (0.3 m). If shielded cable is used, the capacitance between any one conductor and the others, connected to the shield, cannot be more than 60 pF per foot (0.3m). Maximum wire length is 200 ft. (61 m).

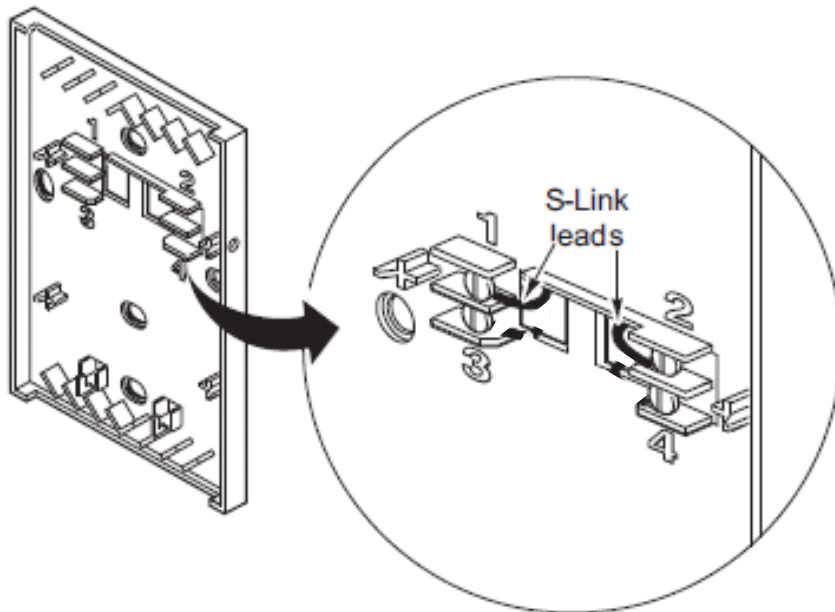
Note:

- S-Link wiring is polarity insensitive.
- Shielded cable is not required for S-Link wiring.
- S-Link wiring can be in the same conduit with UI, AO, and DI Wiring.
- S-Link wiring must be dedicated to S-Link communications. It cannot be part of an active, bundled telephone trunk.
- If the cable is installed in areas of high RIF/EMI, the cable must be in conduit.

Connect the iWorX® TS300 Series Sensor

- 1.Strip 1/4 in. (6mm) of insulation from S-Link wires.
- 2.Connect wires to screw terminals 1 and 2 (Figure 8). The S-Link terminals are polarity insensitive.
- 3.Push excess wire back through the base plate to minimize air flow restriction.

Figure 8: S-Link Connections.



Wiring Checkout

Verify wiring between TS300 sensor base plate and the iWorX® Controller is installed according to job wiring diagram, national and local wiring codes.

Electronic Assembly and Cover Installation

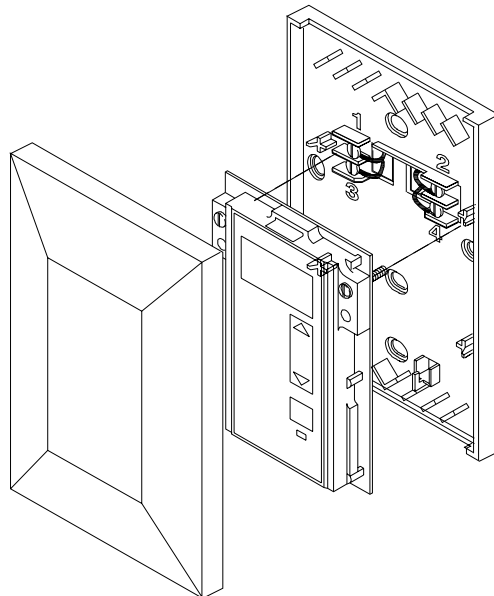
1. Set electronic assembly onto bottom hooks of base plate.
2. Secure electronic assembly to base plate by tightening two screws at top of assembly (Figure 9).



CAUTION:

- Observe static precautions when handling electronic assemblies.
 - Handle electronic assemblies with care to prevent damage to the temperature and humidity sensing elements.
 - Do not touch humidity sensing element on the TS302, TS304, and TS306 models. The element is located beneath a small plastic housing on the back of the electronic assembly.
 - Failure to observe these precautions can damage the sensor.
3. Insert bottom tabs of cover and then snap top into place.

Figure 9: Electronic Assembly Installation.



Note: To remove sensor cover, place thumb in middle of sensor, grasp top edge of cover with fingers and pull firmly.

FEATURES

Table 1: Model and Feature Comparison

iWorX® Sensor Model	Description	Features						
		Zone Temp Sensing	Zone Humidity Sensing	Override Key and LED	Setpoint Adjustment	Fan Operation	Mode (Heat/Cool Auto/Off)	Display Screen
TS301	The TS301 provides zone temperature to the controller via the S-Link and features an Override Key, with LED indicator, which forces the controller into timed occupied mode. In addition, the TS301 has a digital liquid crystal display and allows controller setpoint adjustment. Offers one setpoint and one default display screen.	X		X	X			X
TS302	TS302 adds humidity sensing functionality to the TS301.	X	X	X	X			X
TS303	The TS303 provides the same functionality and features as the TS301. In addition, the TS303 includes a Fan Key and a Setpoint Key. The keypad allows you to select fan modes and fan speeds. The TS303 offers four setpoints and four display screens.	X		X	X	X	X	X
TS304	TS304 adds humidity sensing functionality to the TS303.	X	X	X	X	X	X	X
TS305	The TS305 has a digital liquid crystal display and allows adjustment of one controller setpoint and display of one controller value. In addition, the keypad includes a Fan Key for On/Off/Auto settings and three Fan Speed keys for Low, Medium, High adjustment.	X			X	X		X
TS306	TS306 adds humidity sensing functionality to the TS305.	X	X		X	X		X

Sensor Operation Diagnostics

In the Diagnostics Mode, the sensor times out and returns to the default screen if left idle for forty seconds. Subnet Address, Node Address, Alarms, and Errors are view-only frames. Values displayed in the Temperature Offset and Relative Humidity Offset frames are adjustable.

The iWorX®TS300 Series sensors provide the following types of diagnostic data.

- Subnet Address (that the LCI2 has assigned to the attached controller)
- Node Address (that the LCI2 has assigned to the attached controller)
- Errors
- Alarms
- Temperature Offset
- Relative Humidity Offset

To access view-only diagnostics:

View the Subnet Address, Node Address, Errors, and Alarms in this mode.

1. Press and hold both ends of Up/Down Key for four seconds. The Subnet Address frame appears.
2. Press Up/Down Key to scroll through Node Address frame, Errors frame, and Alarms frame.

To access adjustable diagnostic data:

Access Temperature Offset frame and Relative Humidity Offset frame in this mode. Skip step 1 if you are already in the Diagnostics Mode.

1. Press and hold Up/Down Key for four seconds. The Subnet Address frame appears.
2. Press Override Key. (Press On/Off/Auto key on TS305 or TS306.) The Temperature Offset frame appears.
3. Use Up/Down Key to adjust value.
4. To access Relative Humidity Offset frame, press Override Key (On/Off/Auto key on TS305 or TS306) again and use Up/Down Key to adjust value.
5. To return to the Subnet Address frame, Node Address frame, Errors frame, and Alarms frame, press Override Key (On/Off/Auto key on TS305 or TS306).

Subnet Address and Node Address: Subnet Address frames and Node Address frames display subnet and node addresses of the connected iWorX® Controller. The LCD alternates between Subnet Address frame, numerical value of subnet address, Node Address frame, and numerical value of node address. The values displayed reflect the subnet/node address assigned to domain table index 0.

Alarms: The Alarm frames display the last four alarms of the connected iWorX® Series Controller. The LCD alternates between Alarm frame and numerical alarm value.

If the controller is sending more than one alarm, the numerical alarm value will update every four to five seconds. Alarms are defined by controller application. For information regarding specific alarm definitions, consult the controller application documentation.

Table 2: TS300 Series Numerical Alarm Codes

Code	Alarm Type
001	Smoke Detected
002	Fan Failed
003	Mixed Air Low Limit
004	Thermostat Failed
005	Filter Dirty
006	Unit Maintenance
007	Space Temperature High Limit
008	Space Temperature Low Limit
009	Space Temperature Return to Normal
010	Equipment Failed
031	Starved Box
044	Indoor Air Quality

Temperature Offset

1. Press and hold both Setpoint Adjust buttons (+ and -).
2. When the address and node information is displayed, release the button and press the Occupancy Override button.
3. When the current offset is displayed, use the Setpoint Adjust buttons to increase or decrease the offset.
4. When you are finished adjusting the offset, release all buttons.

After approximately 30 seconds the iWorX® TS300 Series sensor will revert to normal function, and the offset you programmed will be added or subtracted from the actual room reading.

Humidity Offset. The Humidity Offset frame displays the connected iWorX® Series sensor's humidity offset value. Adjust the value using the Up/Down Key.

Display Screen Functions

The TS301, TS302, TS305, and TS306 models have one display screen slot. The TS303 and TS304 models have four display screen slots. The connected controller's application defines what is visible in each slot. The first display screen slot always shows the sensor's default display.

To scroll through display screens (TS303 and TS304):

1. Press either end of the Up/Down Key to change from the first display screen slot to the second display screen slot. Before the second display screen slot appears, "-2-" will appear to indicate you are about to view the second slot.
2. Press either end of the Up/Down Key to scroll through the four display screen slots. Before the third display screen slot appears, "-3-" will appear to indicate you are about to view the third slot. Before the fourth display screen slot appears, "-4-" will appear to indicate you are about to view the fourth slot.

Fan Functions

To display and adjust the fan (TS303 and TS304):

1. Press the Fan Key to change from the current display to the first fan display screen slot. The sensor displays the first fan and "-1-".

Note:

- There are two fan display screen slots. The fan assigned to each slot depends on the controller application and sensor configuration.
 - If the sensor displays three dashes when pressing the Fan Key, all fan slots are unassigned or not active.
2. Continue to press Fan Key to scroll through the fan slots. Before the second fan appears, "-2-" will appear to indicate you are about to view the second fan.
 3. Press Up/Down Key as necessary to change fan setting.
 4. To enter new selection, press any key besides the Up/Down Key or wait for 5 seconds.

To display and adjust the fan (TS305 and TS306):

1. Press the On/Off/Auto Key to select On, Off, or Automatic fan control. (Auto is optional and must be activated using WP Tech.)

General Functions

Sensor time-out

The iWorX® TS300 Series sensor times out and returns to the default display if left idle for 30 seconds. If sensor is in diagnostics mode, then time out is 40 seconds.

To enter a selection or setpoint:

Press any key besides the Up/Down Key or wait five seconds for the change to be accepted automatically.

To fast scroll toggle for increasing or decreasing values:

Press and hold either end of the Up/Down Key and tap and release Override Key. To terminate fast scroll, release Up/Down Key.

Mode Functions

Note: The controller connected to this sensor may not support the Mode function.

To display and adjust modes (TS303 and TS304):

1. Press Mode Key to change from current display to first mode slot. The sensor displays the first mode, corresponding icon (Table 3). and “-1-”.

Note:

- There are two mode slots. The mode assigned to each slot depends on the controller application and sensor configuration.
 - If the sensor displays three dashes when pressing the Mode Key, all mode slots are unassigned or not active.
2. Continue to press Mode Key to scroll through mode slots. Before the second mode appears, “-2-” will appear to indicate you are about to view the second mode.
 3. Press Up/Down Key as necessary to change mode.
 4. To enter new mode selection, press any key besides the Up/Down Key or wait for five seconds.

Override Functions

The Override Key allows override of unoccupied mode setting within the controller in applications equipped with this feature.

- The override LED indicator is lit if the iWorX® controller is overridden to the occupied mode from the unoccupied mode.
- The override LED indicator flashes when timed override has less than 5 minutes remaining.
- If the override time is left to expire, the controller returns to the unoccupied mode.

To override the unoccupied mode:

Press (for not more than four seconds) and release Override Key. The controller goes into the occupied mode for override time specified by controller.

To Re-initialize override time:

If override time has not expired, press (for not more than four seconds) and release Override key. Override time resets to override time specified by controller.

To cancel override:

Press and hold Override Key for four seconds. Override is cancelled and controller returns to unoccupied mode.

Service Pin

To command controller to send controller service pin to the LONWORKS Network:

Press and hold Override key (On/Off/Auto Key on TS305 or TS306) for eight seconds. The service pin of the connected controller is sent out on the LONWORKS Network.

Setpoint Functions

To display and adjust setpoints:

1. Press Setpoint Key to change from current display value to first setpoint slot. (Press Up/Down key on TS301, TS302, TS305, or TS306. Key must be released and pressed again to change setpoint.) The sensor displays first setpoint and corresponding icon (heat or cool). TS301 or TS302 will not display icon.

Note:













The TS301, TS302, TS305, and TS306 models have one setpoint slot, and the TS303 and TS304 models have four setpoint slots.

The setpoint assigned to each slot depends on controller application and sensor's configuration.

If sensor does not respond when you press the Setpoint Key, all setpoints slots are unassigned or not active.

2. Continue to press Setpoint Key to scroll through the setpoint slots. Before the next setpoint appears, “-2-” will appear to indicate you are about to view the second setpoint (“-3-” indicates the third setpoint, “-4-” indicates the fourth setpoint).
3. Press Up/Down Key as necessary to adjust any setpoint. (On TS301, TS302, TS305, and TS306, Key must be released and pressed again to change setpoint.)
4. To enter new setpoint, press any key besides Up/Down Key or wait five seconds. (On TS305 and TS306 do not press any keys. Simply wait five seconds and the setpoint will be entered.)

Table 3: LCD Icon Descriptions

Icon	Name	Description	Icon	Name	Description
°F	Degrees Fahrenheit	Units are displayed in °F.		Heat	The Heat Icon indicates that the controller is in heat mode, or the heating setpoint is being displayed.
°C	Degrees Celsius	Units are displayed in °C.		Cool	The Cool Icon indicates that the controller is in cool mode, or the cooling setpoint is being displayed.
% 	Relative Humidity	Units are displayed in % of relative humidity.		Fan	The Fan Icon, along with the appropriate Fan Speed Icon, indicates that the fan is on.
	Outdoor Air	The Outdoor Air Icon indicates that outdoor air temperature is displayed.		Fan Speed (1-Speed Fan)	The Fan Speed Icons indicate the speed of the fan. If the fan has one speed, the appearance of three wavy lines indicates that the fan is on.
	Unoccupied	The Unoccupied Icon indicates that the unoccupied mode is active, or unoccupied setpoints are displayed. This icon is not displayed in the occupied mode.		Fan Speed (2-Speed Fan)	The Fan Speed Icons indicate the speed of the fan. If the fan has a two speed selection, the appearance of three wavy lines indicates high speed. The bottom wavy line indicates low speed.
AUTO	Auto	The Auto Icon indicates that the controller is in the auto mode.			
	Off	The Off Icon indicates OFF for a mode or fan selection.		Fan Speed (3-Speed Fan)	The Fan Speed Icons indicate the speed of the fan. If the fan has a three speed selection, the appearance of three wavy lines indicates high speed. The middle and lower wavy lines indicates medium speed, and the bottom wavy line indicates low speed.
	On	The On Icon indicates ON. For example, the On Icon may indicate that a connected device is operating manually or that room lights are on. The On Icon may represent auxiliary heat during normal heat pump operation or a possible selection in the fan selection list.			

Note: LCD icons and icon definition vary depending on connected iWorX® Controller and its application. Refer to application documentation for more information.

SPECIFICATIONS

Sensors

Temperature Sensor (TS301, TS303, TS305)

- Type: Precision thermistor
- Accuracy: ± 3 °F (1.7 °C)
- Range: 32 to 122°F (0 to 50 °C)

Temperature Sensor (TS302, TS304, TS306)

- Type: Band gap semiconductor
- Accuracy: ± 1.3 °F (0.7 °C)
- Range: 32 to 122 °F (0 to 50 °C)

Humidity Sensor (TS302, TS304, TS306)

- Type: Thermoset polymer capacitive sensor
- Accuracy: $\pm 2\%$ RH at 77 °F (25 °C)
- Range: 5% to 95% non-condensing
- Hysteresis: $\pm 1.2\%$ RH maximum
- Immersion: Extended exposure to equal to or greater than 90% RH causes a reversible 3% shift. Sensor will recover from short term exposure to liquid water or condensation. Repeated exposure will degrade the performance of the sensor.

General

Enclosure

- Dimensions: 4-21/32 H x 3 W x 1 D in (118.5 x 76.2 x 24 mm)
- Conforms to NEMA-1 requirements

Weight

- Controller Weight: 0.2 pounds (0.09 kilograms)
- Shipping Weight: 0.35 pounds (0.16 kilograms)

Wiring Terminals

- Four (4) screw terminals. AWG #18 to #24 (0.823 mm² maximum) wire

Wire Length

- 200 feet max. (61 meters) between sensor and controller

Electrical Rating

- 16 Volt DC max. Class 2

Display

- Setpoints, input spans, and units vary with the controller application

Range

- -99 to 999 or -9.9 to 99.9

Units

- °F, °C, or %

System Mode

- Heat/Cool/Off/Auto (except TS305, TS306)

Fan Mode

- Off/On/Auto

Override

- Occupied/Unoccupied (except TS305, TS306)

Ambient Limits

- Operating temperature: 32 to 122 °F (0 to 50 °C).
- Shipping and storage temperature: -40 to 160 °F
- Humidity: 5 to 95% RH, non-condensing

Agency Listings

- UL-916 (Category PAZX)
- UL Listed to Canadian Safety Standards (CAN/CSA C22.2)

Agency Compliances

- FCC Part 15 Class B
- European Community - EMC Directive 89/336/EEC: Emissions and Immunity EN61326
- Surge immunity: IEEE C62.41 (IEEE-587, Category A & B)

Software

Digital Display

- Custom field-configurable sensor displays
- Auto-ranging of displayed values
- Occupant command capabilities
- Adjustable minimum/maximum limit setpoint values
- Controller driven, automatically configured, customized display/command values

Table 4: Typical TS300 Series Display/Change Values

Model	Value	Display	Change
TS301-TS306	Zone Temperature	Yes	No
TS303-TS306	Outdoor Air Temperature	Yes	No
TS303-TS306	Percent Humidity	Yes	No
TS301-TS306 ^a	Heating Setpoint, Cooling Setpoint, Unoccupied with Override	Yes	Yes
TS303-TS304	Mode Heating/Cooling/Auto/Off	Yes	Yes
TS303-TS306	Fan (Off/On/Auto)	Yes	Yes

^a TS301, TS302, TS305, and TS306 models have a single setpoint.

Communications

S-Link

Sensor Link (S-Link) communications wiring provides power and communication interface to the iWorX® TS300 series sensors. It uses two-wire, unshielded cable and is not polarity sensitive. From these sensor models, the user can view and adjust application parameters. Maximum wire length allowed between a controller and the iWorX® TS300 series sensor is 200 ft. (61 m).

Table 5: Models

Model		Description	Keypad	Display
Temperature Sensor	Temperature and Humidity Sensor			
TS301	TS302	Sensor with setpoint adjustment and override	Three button	Digital LCD ^{a,b} and LED Override Status Indication
TS303	TS304	Sensor with setpoint adjustment, override, and heat/cool/auto/off.	Six button	Digital LCD ^{b,c} and LED Override Status Indication
TS305	TS306	Sensor with adjustable setpoint, fan on/off/auto	Six button	Digital LCD ^{b,c} and LED Fan Status Indication

a LCD displays value and setpoint.

b Allows viewing of alarms and diagnostics.

c LCD displays values and setpoints.

TROUBLESHOOTING

This section provides useful tips on troubleshooting the iWorX® TS300 Series Sensors.

Table 6: Troubleshooting Tips

Problem	Solution
LCD Remains Blank	<p>Check sensor and controller wiring and correct, if necessary.</p> <p>If wiring is okay, check to see if power is being applied to the sensor by pushing the Override Key for less than four seconds. If the Override LED lights up, the sensor is powered. If the Override LED does not light up, the sensor may not be receiving power. Check controller power to verify presence.</p> <p>If the above measures do not address the problem, download a new application to the controller.</p>
Sensor Displays "Abn" Indefinitely	<p>Check the documentation to make sure the sensor model is compatible with the controller application and then choose one of the following options.</p> <p>If the sensor and application are compatible, download a new application to the controller.</p> <p>If the sensor and application are incompatible, download an application that is compatible with the sensor. Or, install a sensor that is compatible with the controller application.</p>
All LCDIcons Light Up and Remain Lit	<p>Check to see if the controller is constantly resetting and correct, if necessary.</p> <p>Check sensor and controller wiring and correct, if necessary.</p> <p>If reset and wiring are okay, download a new application to the controller.</p> <p>If the above measures do not address the problem, the controller may need to be configured. For configuration instructions, consult documentation associated with the network management tool.</p>

Getting Help

Components within iWorX® TS300 controller cannot be field repaired. If there is a problem with a controller, follow the steps below before contacting your local TES representative or TES technical service.

1. Make sure controllers are connected and communicating to desired devices.
2. Record precise hardware setup indicating the following:
 - Version numbers of applications software.
 - Controller firmware version number.
 - A complete description of difficulties encountered.

Notes:

LIMITED WARRANTY STATEMENT

Taco Electronic Solutions, Inc. (TES) will repair or replace without charge (at the company's option) any product or part which is proven defective under normal use within one (1) year from the date of start-up or one (1) year and six (6) months from date of shipment (whichever occurs first).

In order to obtain service under this warranty, it is the responsibility of the purchaser to promptly notify the local TES stocking distributor or TES in writing and promptly deliver the subject product or part, delivery prepaid, to the stocking distributor. For assistance on warranty returns, the purchaser may either contact the local TES stocking distributor or TES. If the subject product or part contains no defect as covered in this warranty, the purchaser will be billed for parts and labor charges in effect at time of factory examination and repair.

Any TES product or part not installed or operated in conformity with TES instructions or which has been subject to accident, disaster, neglect, misuse, misapplication, inadequate operating environment, repair, attempted repair, modification or alteration, or other abuse, will not be covered by this warranty.

TES products are not intended for use to support fire suppression systems, life support systems, critical care applications, commercial aviation, nuclear facilities or any other applications where product failure could lead to injury to person, loss of life, or catastrophic property damage and should not be sold for such purposes.

If in doubt as to whether a particular product is suitable for use with a TES product or part, or for any application restrictions, consult the applicable TES instruction sheets or in the U.S. contact TES at 401-942-8000 and in Canada contact Taco (Canada) Limited at 905-564-9422.

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Taco Electronic Solutions, Inc., 1160 Cranston Street, Cranston, RI 02920
Telephone: (401) 942-8000 FAX: (401) 942-2360.

Taco (Canada), Ltd., 8450 Lawson Road, Unit #3, Milton, Ontario L9T 0J8.
Telephone: 905/564-9422. FAX: 905/564-9436.

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