Integration Guide

Touch Screen Programmable Zone Sensor

For Tracer® UC400–B, Symbio 400–B/500/700/800, and ReliaTel™ Controls

⚠ 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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BAS-SVP080A-EN

TRANE TECHNOLOGIES

Introduction

Read this manual thoroughly before operating or servicing this unit.

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.

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/national electrical codes.

⚠ 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 Labelling 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

New

Table of Contents

Overview

Purpose

The purpose of this document is to provide instructions for integrating the Trane Commercial Touch Screen Programmable Zone Sensor into building automation systems. The intended audience of this document is system integrators and controls contractors.

About the Programmable Zone Sensor

The Trane Commercial and Residential Touch Screen Programmable Zone Sensors are primarily designed to operate in a one-to-one capacity with Trane Water Source Heat Pumps, Blower Coils, Fan Coils and Space Comfort Controller (SCC) Packaged Units. The Sensor allows these units to run independent of a full building automation system and still be controlled by a user-adjustable schedule and to meet title 24 specifications.

The following models are available:

- Commercial Symbio™ 400–B/500 or UC400–B factory programmed units: X13790993001 (SEN02587)
- Residential Symbio™ 400–B/500 or UC400–B factory programmed units: X13790992001
- Commercial Reliatel™ units: X13790994001 (BAYSENS924)
- Commercial Symbio™ 700/800 units: X13791009001 (BAYSENS800) ReliaTel™

For information on setup and configuration refer to the following documents:

- Trane Commercial Touch Screen Programmable Zone Sensor for Tracer UC400, ReliaTel and Symbio 400/700/800 Controls / User Guide *(BAS-SVU040)*
- Trane Commercial Touch Screen Programmable Zone Sensor for Tracer UC400, ReliaTel and Symbio Controls / Installation Guide *(BAS-SVN028)*
- Trane Residential Touch Screen Programmable Zone Sensor for Tracer UC400 Controls / Installation Guide *(BAS-SVN026)*
- Trane Residential Touch Screen Programmable Zone Sensor for Symbio 400 and Tracer UC400 Controls *(BAS-SVU038)*

With the release of models mentioned above, the communicating zone sensor and associated controller can be applied as standalone or as part of a building automation system. The primary function of installing the sensor on a building automation system is to provide monitoring and alarming from the unit controller and sensor. The sensor will still need to maintain control over the unit that it is configured to control. The sensor is not designed to work with custom programmed units, nor will it work with non-Trane devices or unit controllers. The sensor utilizes specific BACnet points on the designated units mentioned above to determine how the unit is configured and applies BACnet overrides to those points to affect change based on the user input at the local sensor level.

Note: *For communication with third-party control systems, network communication wiring must be provided by others.*

Supported Equipment and Software

The four zone sensor models are compatible with the following HVAC equipment and control systems. The communicating sensor is designed for use with space comfort control equipment only. It can be used in a building automation system for the purposes of monitoring and data logging.

ReliaTel™

The programmable zone sensor supports Precedent™, Voyager™ 2, Voyager™ 3, and Odyssey™ Constant Volume (CV)/Single Zone VAV (SZVAV)/Multi-speed indoor fan equipment that uses the ReliaTel control system. For proper operation, the ReliaTel RTRM board must be installed in the equipment with software version 19.2 or later. In addition, the BCI-R board must be installed with software version 6.0 or later. Multiple-zone systems are not supported. In the field, multiple-zone HVAC equipment can be identified by the presence of the ReliaTel RTAM board installed in the equipment.

Symbio™ 400–B/500, UC400–B

The programmable zone sensor supports factory-programmed fan coil, blower coil, and both staged and variable speed water source heat pump equipment that uses the Symbio 400–B/500 or UC400–B control system. Field-programmed Symbio 400–B/500, UC400–B controlled equipment is not supported.

Symbio™ 700

The programmable zone sensor supports all equipment that uses the Symbio 700 control system with the exception of multiple-zone systems.

Symbio™ 800

The programmable zone sensor controls IntelliPak® equipment that uses the Symbio 800 control system.

Communication Options

The Programmable Zone Sensors only support the BACnet MS/TP communication protocol for integration to either Trane or non-Trane control systems.

Communication Wire

Use the correct communication wire to ensure reliable communication between the zone sensor and the HVAC equipment.
Recommended supplier: Windy City Wire.

- Plenum rated P/N: 043005AL
- Non-plenum rated P/N: 108760

Other wire may be used if it conforms with the following physical characteristics:

- Twisted pair (2-conductor) plus shield
- Characteristic Impedance: 100 and 130 ohms
- Distributed capacitance between conductors: <100 pF/m
- Distributed capacitance between conductor and shield: <200 pF/m
- Foil or braided shield is acceptable
- Maximum Length (end to end) —4000 feet with 18 AWG conductor wires
- Maximum Length (end to end) —2000 feet with 22 AWG conductor wires

Communication Setup and Configuration

Network Layout

When using the Trane Commercial and Residential Touch Screen Programmable Zone Sensor with a full building automation system it is no longer necessary to wire together the sensor and the unit controller with a communications wire. Instead, both devices only require the capability to communicate on the overall BACnet network.

This can be done using the same physical link or within the same network. For example, on a Trane job site the unit being controlled could reside on an Air-Fi network while the sensor resides on MST/P link 1 (Fig. 1). Best practice is that both devices must be on the same physical link to reduce the potential for communication loss (Fig. 2).

In some cases, it may be necessary to split Trane and non-Trane devices onto separate links (Fig. 3). The Symbio 500 is shown below, but the layouts are applicable to any Trane BACnet unit controllers.

Figure 1. Zone sensor controlling a unit communicating on an Air-Fi link

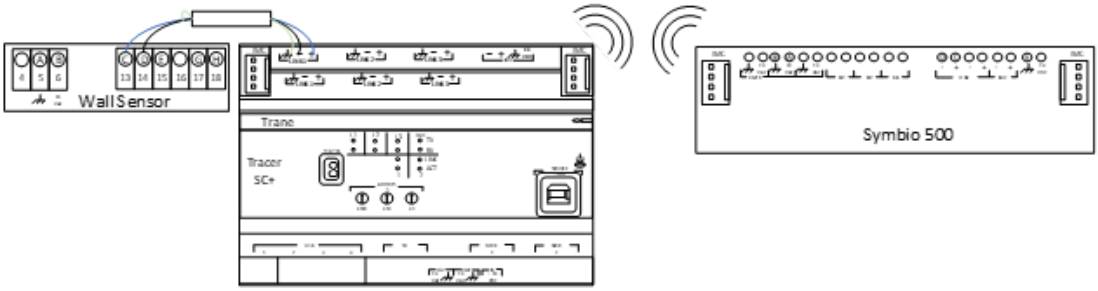


Figure 2. Zone sensor wired to same MS/TP link as unit controller

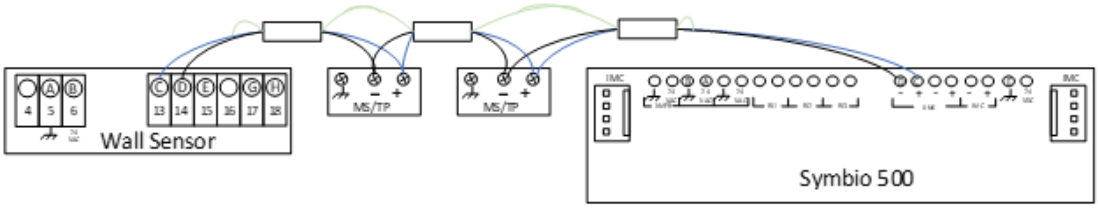
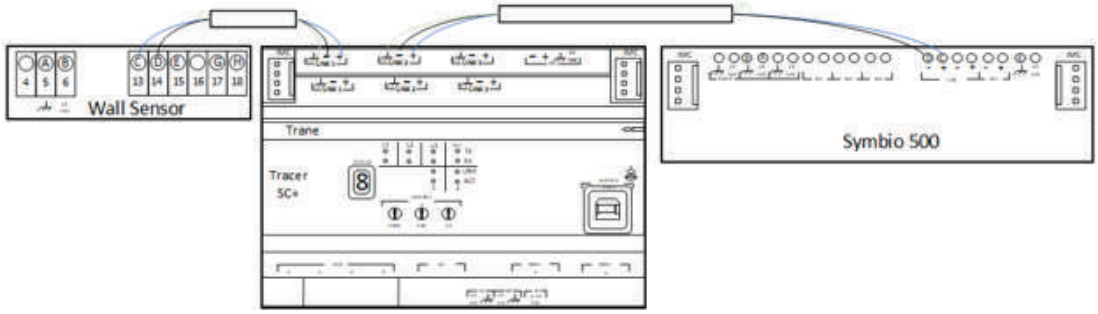


Figure 3. Zone sensor wired to different MS/TP link than unit controller



Device Addressing

To configure BACnet settings:

1. Set the unit controller (Symbio/UC400/UC400-B) to the appropriate MAC address for the BACnet link to which it will be connected.
2. Connect to the unit controller with the Tracer TU, Symbio web UI (supported Symbio controllers only), or the Tracer BACnet Setup Tool. Set the device ID based on network design. For Trane networks, best practice is to use the following device ID assignment:

- BACnet network number of the connected MS/TP link + unit device rotary = device ID
- Example: SC+ with a rotary address of 001 will (by default) use network 11 for link 1. If the MAC address of the sensor is 001, the device ID will be 11001.

3. Using the sensor display, set the Sens. Address field to the appropriate MAC address for the BACnet network per the job documentation.
4. Using the sensor display, set the Sens. Device ID field to the value for the BACnet network per the job documentation, or calculation shown above.
5. Using the sensor display, set the unit device ID field to the same value as the unit controller device ID the sensor is controlling

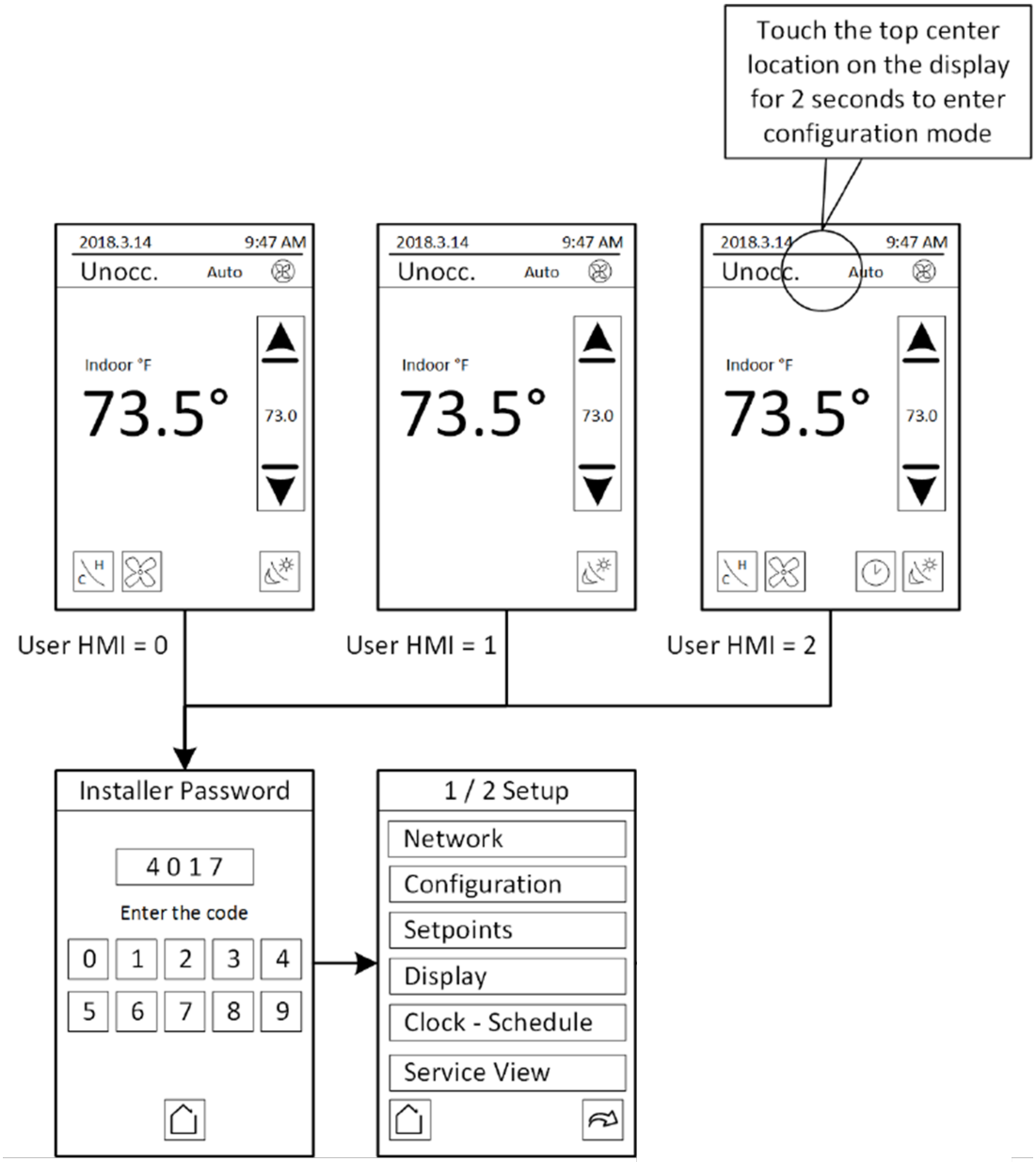
Table 1. Touch screen addressing functions

Sens. Address	Sets the sensor BACnet MAC address. (Range of 0-127)
Baud rate	Sets the baud rate. Default is 76800 (leave default value unless directed by Trane Technical Support).
Status	This setting is not configurable. It indicates that BACnet communication is occurring between the UC/Symbio controller and the sensor.
2/3 Sensor Device ID	Use the number pad to set the BACnet Device ID of the sensor. Touch to Confirm and Save the value. (Range 0 - 4194302). Touching R on this screen copies the sensor MAC address number to the BACnet Device ID field. For example, if the MAC address = 7, touching R sets the Device ID number to 7.
3/3 Unit Device ID	BACnet address of the Unit Controller (Range 0 - 4194302).

Menu Navigation

Interface Flowchart Part 1

Note: *The installer password is 4017 and cannot be changed.*

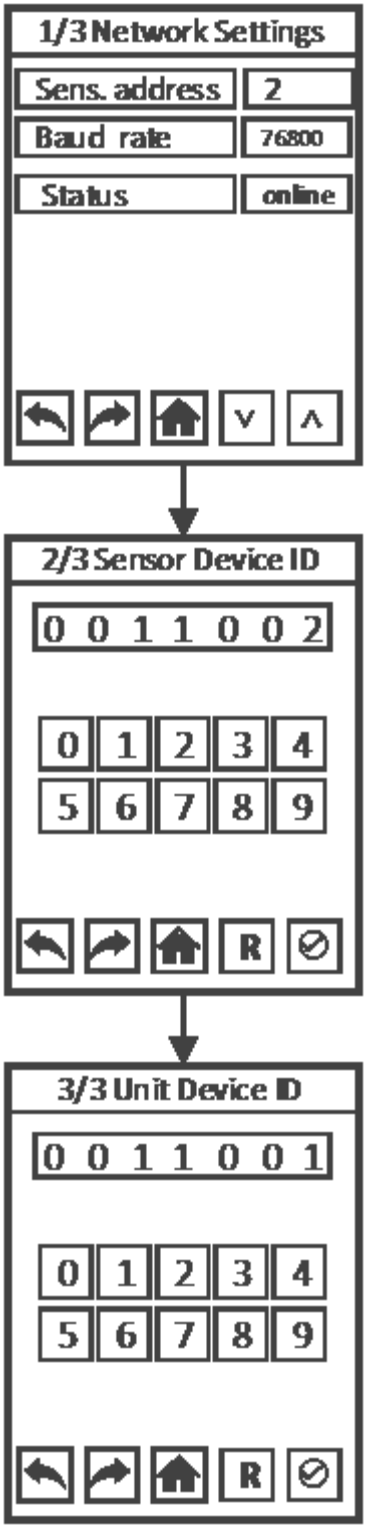


Interface Flowchart Part 2

Tap on Network selection on the 1/2 Setup page to set the BACnet network parameters for the devices

Note: *In previous versions of the sensor, the network setup was slightly different and referred to the Units Device ID as the Unit Address.*

Figure 4. Network from 1 / 2 setup screen



BACnet Points

When using the Trane Commercial and Residential Touch Screen Programmable Zone Sensors with a full building automation system, it is important to determine how the overall system will interact. Below are the points that interact between the communicating sensor and the unit controller for each unit type. Depending on the desired outcome some points may require the sensor to control, while others can be controlled by either the sensor or the BAS. All commands from the communicating sensor to the Trane unit controller will be at priority level 7. The primary use for placing the devices on a full BAS should be for monitoring, data logging, and alarming. Ideally, control should done by the communicating sensor.

The points in Table 2, p. 11 are specifically utilized between the two devices. For a complete list of BACnet points on the sensor see the Viconics VT8000 BACnet integration guide.

Table 2. General BACnet points and description

Control Object/Trane Object Name	Description
UC400 Equipment Type	Determine if equipment is VS WSHP or FC/BC/UV/ Staged WSHP. If MV5 is not present the unit is determined to be a VS WSHP. Otherwise, the unit is a FC/BC/UV/Staged WSHP. (It is important to not add MV5 to a VS WSHP for any reason)
Network Units (communicating sensor use only)	Communicating sensor determines the temperature units (C or F) being used by the equipment by reading the Units of Measure property of the Space Temperature BAS object.
Space Temperature BAS	Space temperature reading from wall sensor. If desired BAS can control at a priority 5 or higher. (Priority 6 cannot be used for control, as it is reserved for minimum On/Off)
Space Temperature Setpoint BAS	Space temperature setpoint from the wall sensor.
Space Temperature Local	Space temperature reading from sensor hardwired to equipment. Used for ReliaTel w/ remote space sensor.
Heat Cool Mode Request	The desired control mode for the equipment, controlled by sensor
Heat Cool Mode Status	The actual control mode of the equipment
Occupied Offset	The occupied offset value is added or subtracted from the occupied setpoint value to calculate the heating and cooling temperature setpoints. • ReliaTel only • AO30 max value is 10°F • AO30 (standby offset) = AO29 (Occupied offset) + (Shed offset) The standby offset (AO30) is used because the BCI-R Occupied Offset object is limited to max 5°F. This range is too small to accommodate the load shed offset.
Standby Offset	Symbio and Reliatel only
Unoccupied Cooling Setpoint	Unoccupied cooling setpoint
Unoccupied Heating Setpoint	Unoccupied heating setpoint
Occupancy Request Command	The desired occupancy state for the equipment, controlled by sensor
Supply Fan Configuration Command	Defines how the equipment fan should operate
Supply Fan Speed Status	The current speed of the equipment fan as a percent of full speed
Economizing Temp Enable	The value the OA temperature must be less than before economizing is allowed (Optional)
Economizing Enthalpy Enable	The value the OA enthalpy must be less than before economizing is allowed (optional)
Outdoor Air Temperature	Outdoor Air Temperature (optional)
Discharge Air Temperature	Discharge Air Temperature
Return Air Temperature	Return Air Temperature (Optional)
Mixed Air Temperature	Mixed Air Temperature (Optional)
Space Humidity	Space Humidity, Object is always present, but may be configured as not used by placing the object Out of Service

Table 2. General BACnet points and description (continued)

Control Object/Trane Object Name	Description
Outdoor Humidity	Outdoor Humidity (Optional)
Economizer System Status	Economizer System Status (optional)
Outdoor Air Damper Position Status	Outdoor Air Damper Position Status (optional)
Economizer Active	Is the unit actively economizing for cooling. (optional)
Cooling Capacity Status	Percent of mechanical cooling
	(0 to 100 %) (optional)
Heat Primary Capacity Status	Percent of mechanical primary heating. (0 to 100 %) (optional)
Heat Secondary Capacity Status	Percent of mechanical secondary heating. (0 to 100 %) (optional)

Table 3. UC400FC/BC/UV/staged WSHP/VS-WSHP, Symbio 500 points

Object name	UC400 WSHP Object	UC400 VS-WSHP Object	Communicating sensor Object Residential	Communicating sensor Object Commercial	Write Out of Service property at power-up	Value written to Out of Service Property	Present Value Range and Default Value	Default Value	Units of Measure	Point Always Available
Space Temperature BAS	AV 14	AV 14	AV 100	AV 100	Yes	0	-40 °F – 150 °F	N/A	Temperature (°F or °C)	Yes
Space Temperature Local (TempRemSrc)	AI 1	AI 1	N/A	N/A	No	1	-40 – 200 °F	N/A	Temperature (°F or °C)	Yes
Unoccupied Cooling Setpoint	AV 23	AV 23	N/A	AV 44	Yes	0	50 °F – 90 °F	85 °F	Temperature (°F or °C)	Yes
Unoccupied Heating Setpoint	AV 24	AV 24	N/A	AV 43	Yes	0	50 °F – 90 °F	60 °F	Temperature (°F or °C)	Yes
Space Temperature Setpoint BAS	AV 27	AV 27	(AV222+AV223)/2	(AV40 + AV39) / 2	Yes	0	50 °F – 90 °F	72.5 °F	Temperature (°F or °C)	Yes
Occupied Offset (See Note 4)	AV 30	AV 30	(AV222-AV223)/2	(AV40 - AV39) / 2	Yes	0	1 °F – 5 °F	1.5 °F	Temperature (°F or °C)	Yes
Supply Fan Speed Status	AI 73	AV 6	MV 140	MV 140	No	N/A	0 – 100%	N/A	Percent	Yes
Heat Cool Mode Request BAS	MV4	MV 3	MV 16	MV 16	Yes	0	See Note 3	Auto	N/A	Yes
Heat Cool Mode Status BAS	MV5	MV4	MV 112	MV 112	No	N/A	See Note 3	N/A	N/A	Yes
Occupancy Request	MV 6	MV 1	MI 33	MI 33	Yes	0	1 = Occupied 2 = Unoccupied 3 = Occupied Bypass 4 = Occupied Standby	Occupied	N/A	Yes
Supply Fan Configuration Command	BV 1	BV 2	MV 17	MV 17	Yes	0	Inactive = Auto Active = On	Auto	N/A	Yes
Cooling Capacity Status	AV 76	AV 12	N/A	MV 172			0 – 100%		ON/OFF	
Heat Primary Capacity Status	AV 74	AV 13	N/A	MV 173			0 – 100%		ON/OFF	
Heat Secondary Capacity Status	AV 75	NA	N/A	MV 174			0 – 100%		ON/OFF	
Economizing Temperature Enable Setpoint	NA	NA	N/A	AV 260	NA	NA	NA	NA	NA	NA
Economizing Enthalpy Enable Setpoint	NA	NA	N/A	AV 261	NA	NA	NA	NA	NA	NA

Fault Detection and Diagnostics

The Communicating Sensor will display the following information either at the controller user interface or via BACnet MS/TP. To view the diagnostics and fault information, navigate to the zone sensor Service View Menu screen beginning at page 1 / 7.

The Communicating Sensor displays the following information () either at the screen interface of the control or through BACnet MS/TP. Fault detection for the UC400–B/Symbio 400–B and Symbio500 units is limited to the Space Temperature Sensor.

If the temperature source is wired or remote and there is a temperature sensor failure, a message will be displayed on the communicating sensor (Temperature sensor failure). In the event of a temperature sensor failure, the source for temperature will fail-over to the internal or on-board 10k sensor element of the communicating sensor.

The effective temperature (Service View – 1/7) becomes internal temperature and is sent to space temperature BAS. When the wired sensor is restored, the effective temperature reverts to the wired source.

Table 4. ReliaTel BCI-R

Object name	ReliaTel Object	Communicating sensor Object	Write Out of Service property at power-up	Value written to Out of Service Property	Present Value Range and Default Value	Default Value	Units of Measure	Point Always Available
Space Temperature BAS	AO 11	AV100	Yes	0	-40 °F – 150 °F	N/A	Temperature (°F or °C)	Yes
Space Temperature Local (TempRemSrc)	AI87	N/A	No	1	-40 – 200 °F	N/A	Temperature (°F or °C)	Yes
Unoccupied Cooling Setpoint	AO 31	AV44	Yes	0	50 °F – 90 °F	85 °F	Temperature (°F or °C)	Yes
Unoccupied Heating Setpoint	AO 32	AV43	Yes	0	50 °F – 90 °F	60 °F	Temperature (°F or °C)	Yes
Space Temperature Setpoint BAS	AO 2	(AV39 + AV40)/2	Yes	0	50 °F – 90 °F	72.5 °F	Temperature (°F or °C)	Yes
Occupied Offset (See Note 4)	AO 30	(spCool - spHeat) / 2 (AV40 - AV39) / 2	Yes	0	1 °F – 5 °F	1.5 °F	Temperature (°F or °C)	Yes
Supply Fan Speed Status	AI 7	MV140	No	N/A	0 – 100%	N/A	Percent	Yes
Heat Cool Mode Request BAS	MO 8	MV16	Yes	0	See Note 3	Auto	N/A	Yes
Heat Cool Mode Status BAS	MI 19	MV112	No	N/A	See Note 3	N/A	N/A	Yes
Occupancy Request	MO 7	MI33	Yes	0	1 = Occupied 2 = Unoccupied 3 = Occupied Bypass 4 = Occupied Standby	Occupied	N/A	Yes
Supply Fan Configuration Command	BO 8	MV17	Yes	0	Inactive = Auto Active = On	Auto	N/A	Yes
Economizing Temperature Enable Setpoint	AO 41	AV260	Yes	See Note 1	50.0 °F - 140.0 °F	Disabled and 63 °F	Temperature (°F or °C)	No
Economizing Enthalpy Enable Setpoint	AO 42	AV261	Yes	See Note 1	19.0 to 28.0	Disabled and 22 BTU/LB	BTU per LB	No
System Control Command	BO 1	N/A	No	N/A	FALSE = Standalone Control TRUE = BAS Control	N/A	See NOTE 2	Yes

Table 5. ReliaTel BCI-R fault detection and diagnostics

	BACnet points / Diagnostics messages	Display name / value	Range
Sensor Values	AI-18 (Outdoor Air Temperature Active)	OA Temp	-40 to 158°F
	AI-24 (Discharge Air Temperature Active)	DA Temp	-40 to 158°F
	AI-26 (Return Air Temperature)	RA Temp	32 to 209 °F
	AI-25 (Mixed Air Temperature) AI-16 Space Humidity Active AI-20 Outdoor Air Humidity Active	MA Temp RH OA RH	-40 to 150 °F 0 to 100% 0 to 100%
Economizer	Economizer Available: MSI-44 (Economizer System Status)	Econ Available	Yes/No
	Economizer Active: MSI-44 =2 (Enabled) AND AI-11 (Outdoor Air Damper Position Status) is above Minimum Position/Opening (AI-86) AND MSI-19 (Application Mode Status) is [4] Cooling	Econ Active	On/Off
Compressor (Cooling)	AI-1 (Cooling Capacity Status) > 0 = Cooling ON	Cooling On / Off	On/Off
Heating (HP and Auxiliary)	AI-2 (Heat Primary Capacity Status) > 0 = Primary Heat ON	Primary heat On / Off	On/Off
	AI-3 (Heat Secondary Capacity Status) > 0 = Secondary Heat ON	Secondary heat On / Off	On/Off
Diagnostics	BI-310 (Diagnostic: Mixed Air Temp Low Limit Cycle Active)	The technician needs a way to see the active error messages. Any of these active diagnostic BI (except BI-310) will trig to display bottom of main user screen Contact service	On/Off
	BI-30 (Diagnostic: Supply Air Temp Sensor Fail)		
	BI-32 (Diagnostic: Outdoor Air Temperature Sensor Failed)		
	BI-57 (Diagnostic: Return Air Temp Sensor Fail)		
	BI-95 (Diagnostic: Mixed Air Temp Sensor Failure)		
	BI-306 (Diagnostic: Unit Not Economizing When it Should Be)		
	BI-305 (Diagnostic: Unit Economizing When It Should Not		
	BI-308 (Diagnostic: Outdoor Air Damper Not Modulating)		
	BI-307 (Diagnostic: Excessive Outdoor Air)		

NOTE 1

For AO41 and AO42, users can enable/disable the use of these setpoints through the sensor display. For clarification, page 2/4 of the Configuration Menu – Econo Enable is the economizer enable/disable configuration item.

- To enable the use of the setpoint, set the value in the sensor display to In Use. This causes a BACnet value of FALSE to be written to the Out_of_Service property of the object. The Out_of_ Service property should only be written to Once on change and power-up. Periodic refresh is not recommended.
- To disable use of the setpoint, set the value in the sensor display to Not Used. This causes a BACnet value of TRUE to be written to the Out_of_Service property of the object. The Out_of_ Service property should only be written to Once. Periodic refresh is not recommended.

This functionality is in the setup/commissioning portion of the zone sensor user interface. End users do not have access to this configuration functionality.

NOTE 2

BO1, Present_Value from the factory defaults to Inactive. The sensor writes Active at VT8300 power-up. Periodic refresh is not recommended.

NOTE 3

The following table displays the enumerated state values for the Heat Cool Mode objects.

1 = Auto	9 = Emergency Heat
2 = Heat	10 = Fan Only
3 = Morning Warm-up	11 = Free Cool
4 = Cool	12 = Ice Making
5 = Night Purge	13 = Max Heat
6 = Precool	14 = Economy Mode
7 = Off	15 = Dehumidifying
8 = Test	16= Calibrate

NOTE 4

The occupied offset value is added or subtracted from the occupied setpoint value to calculate the heating and cooling temperature setpoints.

ReliaTel only

- AO30 max value is 10°F
- AO30 (standby offset) = AO29 (Occupied offset) + (Shed offset)
- The standby offset (AO30) is used because the BCI-R Occupied Offset object is limited to max 5°F; this range is too small to accommodate the load shed offset.

Symbio 800 (SCC IPak)/700

Table 6. Symbio 800 (SCC IPak)/700 points

Object name	Symbio Object	Communicating sensor Object	Write Out of Service property at power-up Note 2	Value written to Out of Service Property Note 2	Present Value Range and Default Value	Default Value	Units of Measure	Point Always Available
Space Temperature BAS	AV1014	AV 100	NA	NA	-40 °F – 150 °F	N/A	Temperature (°F or °C)	Yes
Space Temperature Local (TempRemSrc)	AI10218	N/A	NA	NA	-40 – 200 °F	N/A	Temperature (°F or °C)	Yes
Unoccupied Cooling Setpoint	AV10123	AV 44	NA	NA	50 °F – 90 °F	85 °F	Temperature (°F or °C)	Yes
Unoccupied Heating Setpoint	AV10124	AV 43	NA	NA	50 °F – 90 °F	60 °F	Temperature (°F or °C)	Yes
Space Temperature Setpoint BAS	AV10127	(AV39+AV40)/2	NA	NA	50 °F – 90 °F	72.5 °F	Temperature (°F or °C)	Yes
Occupied Offset	AV10130	(AV40 - AV39) / 2	NA	NA	1 °F – 5 °F	1.5 °F	Temperature (°F or °C)	Yes
Occupied Standby Offset	AV10142	NA	NA	NA	1 °F – 5 °F	1.5 °F	Temperature (°F or °C)	Yes
Supply Fan Speed Status	AI10173	MV 140	NA	NA	0 – 100%	N/A	Percent	Yes
Heat Cool Mode Request BAS	MV10104	MV 16	NA	NA	See Note 3	Auto	N/A	Yes
Heat Cool Mode Status BAS	MI10101	MV 112	NA	NA	See Note 3	N/A	N/A	Yes
Occupancy Request	MV10106	MI 33	NA	NA	1 = Occupied 2 = Unoccupied 3 = Occupied Bypass 4 = Occupied Standby	Occupied	N/A	Yes
Supply Fan Configuration Command	BV10104	MV 17	NA	NA	Inactive = Auto Active = On	Auto	N/A	Yes
Economizing Temperature Enable Setpoint	AV10150 Note 1	AV 260	NA	NA	50.0 °F - 140.0 °F	Disabled and 63 °F	Temperature (°F or °C)	No
Economizing Enthalpy Enable Setpoint	AV10170 Note 1	AV 261	NA	NA	19.0 to 36.0	Disabled and 22 BTU/LB	BTU per LB	No
System Control Command	N/A	N/A	NA	NA	N/A	N/A	N/A	N/A

Fault Detection and Diagnostics

The Communicating Sensor will display the following information () either at the controller user interface or through BACnet MS/TP. To view the diagnostics and fault information, navigate to the zone sensor Service View Menu screen beginning at page 1 / 7.

Table 7. Symbio 800 (SCC IPak)/700 fault detection and diagnostic

	BACnet points / Diagnostics messages	Sensor Point	Display name / value	Range
Sensor Values	AI-10118 (Outdoor Air Temperature Active)	AV 101	OA Temp	-40 to 158°F
	AI-10124 (Discharge Air Temperature Active)	AV 102	DA Temp	-40 to 158°F
	AI-10126 (Return Air Temperature)	AV 151	RA Temp	32 to 209 °F
	AI-10125 (Mixed Air Temperature) AI-10116 Space Humidity Active AI-10120 Outdoor Air Humidity Active	AV104 AV 103 AV 152	MA Temp RH OA RH	-40 to 150 °F 0 to 100% 0 to 100%
Economizer	Economizer Available: MSI-10144 (Economizer System Status)	MV 170	Econ Available	Yes/No
	BI-10219	MV 171	0 – Equipment Not Economizing - Inactive 1 – Equipment is Economizing - Active	Active / Inactive
Compressor (Cooling)	AI-10101 (Cooling Capacity Status) > 0 = Cooling ON	MV 172	Cooling On / Off	On/Off
Heating (HP and Auxiliary)	AI-10102 (Heat Primary Capacity Status) > 0 = Primary Heat ON	MV 173	Primary heat On / Off	On/Off
	AI-10103 (Heat Secondary Capacity Status) > 0 = Secondary Heat ON	MV 174	Secondary heat On / Off	On/Off
Diagnostic			Unit Status	Online / Offline
Diagnostics See Note 5	BI-10030 (Diagnostic: Supply Air Temp Sensor Fail)	BV 61	SAT sensor fail	On/Off
	BI-10032 (Diagnostic: Outdoor Air Temperature Sensor Failed)	BV 62	OAT sensor fail	On/Off
	BI-10057 (Diagnostic: Return Air Temp Sensor Fail)	BV 63	RAT sensor fail	On/Off
	BI-10095(Diagnostic: Mixed Air Temp Sensor Failure)	BV 64	MAT sensor fail	On/Off
Diagnostics	BI-10006 (Diagnostic: Unit Not Economizing When it Should Be)	BV 65	Econo fail close	On/Off
	BI-10005 (Diagnostic: Unit Economizing When It Should Not	BV 66	Econo fail open	On/Off
	BI-10008 (Diagnostic: Outdoor Air Damper Not Modulating)	BV 67	Block OA	On/Off
	BI-10007 (Diagnostic: Excessive Outdoor Air)	BV 68	Excessive OA	On/Off

NOTE 1

For AV10150 and AV10170, technicians should be able to enable/disable the use of these setpoints through the wall display. For clarification, page 2/4 of the Configuration Menu – Econo Enable is the economizer enable/disable configuration item.

- To enable the use of the setpoint, set the value in the wall display to In Use. This causes a BACnet value of FALSE to be written to the Out_of_Service property of the object. The Out_of_Service property should only be written to Once on change and power-up. Periodic refresh is not recommended.
- To disable use of the setpoint, set the value in the wall display to Not Used. This causes a BACnet value of TRUE to be written to the Out_of_Service property of the object. The Out_of_Service property should only be written to Once. Periodic refresh is not recommended.

This functionality is in the setup/commissioning portion of the zone sensor user interface. End users do not have access to this configuration functionality.

NOTE 2

Symbio uses a “last-in” arbitration. There is no requirement to manage the OutOfService (OOS) property from the Communicating Sensor.

NOTE 3

The following table displays the enumerated state values for the Heat Cool Mode objects.

1 = Auto	9 = Emergency Heat
2 = Heat	10 = Fan Only
3 = Morning Warm-up	11 = Free Cool
4 = Cool	12 = Ice Making
5 = Night Purge	13 = Max Heat
6 = Precool	14 = Economy Mode
7 = Off	15 = Dehumidifying
8 = Test	16= Calibrate

NOTE 4

The occupied offset value is added or subtracted from the occupied setpoint value to calculate the heating and cooling temperature setpoints.

NOTE 5

- The technician needs a way to see the active error messages. Any active diagnostic will trigger to display bottom of main user screen the message Contact service.
- The reliability property of the object of any input sensor will be evaluated by the Communicating display to determine if the sensor is in a fault state.

Notes

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