Integration Guide

BACnet® and Modbus™ Integration

to Agility™ Water-Cooled Chillers with Symbio™ Controls

X13641502002

⚠ 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.

September 2023 **BAS-SVP047B-EN**

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.**

Copyright

Trademarks

All trademarks referenced in this document are the trademarks of their respective owners.

Revision History

- Updated Object Data Points and Diagnostic Data Points table values in BACnet Points List section.
- Added Binary Input Diagnostics table to BACnet Points List section.
- Added Object Format table and Binary Input Diagnostics table to ModbusPoints List section.
- Updated Object Data Points and Diagnostic Data Points table values in ModbusPoints List section.

Table of Contents

Overview

Purpose

The purpose of this document is to provide instructions for integrating the Symbio™ 800 controller into building automation systems. This document is targeted to system integrators and controls contractors.

Symbio™ 800 Controller Overview

The Trane Chiller includes the Symbio™ 800 controller. The controller has been installed, programmed, wired, commissioned, and tested in the factory prior to shipment. While some sensors and end devices are normally wired in the field, nearly all other wiring is factory-provided. Power for the controller is provided and connected from within the chiller control panel.

The chiller and associated controller can be applied as standalone or as part of a building automation system.

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

Communication Options

The Symbio™ 800 controller supports the following communication protocol options for integration to either Trane or Non-Trane control systems:

- BACnet® MS/TP
- BACnet Zigbee® (Air-Fi)®
- BACnet IP
  - Ethernet
  - Wi-Fi
- Modbus® RTU
- Modbus TCP
- LonTalk®

For information pertaining to the integration of the Symbio 800 controller using LonTalk communication, refer to BAS-SVP065*-EN (LonTalk).

Units of Measure

The communicated data of the Symbio™ 800 controller will be passed in the factory-configured units of measure, either inch-pound (I-P) or the International System of Units (SI). The units of measure are selected as part of the unit order (the default selection is normally I-P). Should the units of measure need to be changed in the field, contact your local Trane representative.

The Symbio™ 800 controller provides a browser-based user interface for USB connection to the controller. One of the tools provided with that interface allows the user to change and customize the Data Display Units Preferences.

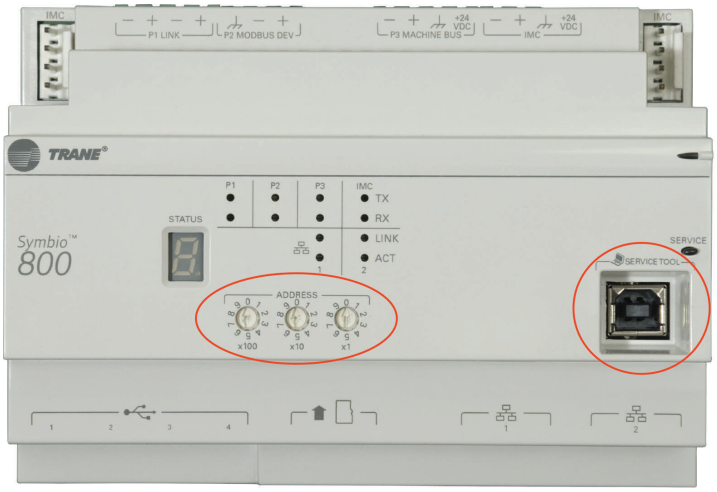
Important: *These adjustable settings are applied only to the units of measured displayed in the web interface, not the communicated interface.*

Regardless of the communicated (system) units of measure, the user may change the displayed units of measure on their smart device. These user preference units of measure are independent of the communicated units.

Communication Setup and Configuration

The Symbio™ 800 controller can be factory ordered with a specific protocol configuration and rotary address setting. If communication options were not specified, the Symbio 800 controller will be setup for BACnet® MS/TP communications at 76,800 bps with a rotary address setting of 000.

Figure 1. Symbio 800 rotary address and service tool port



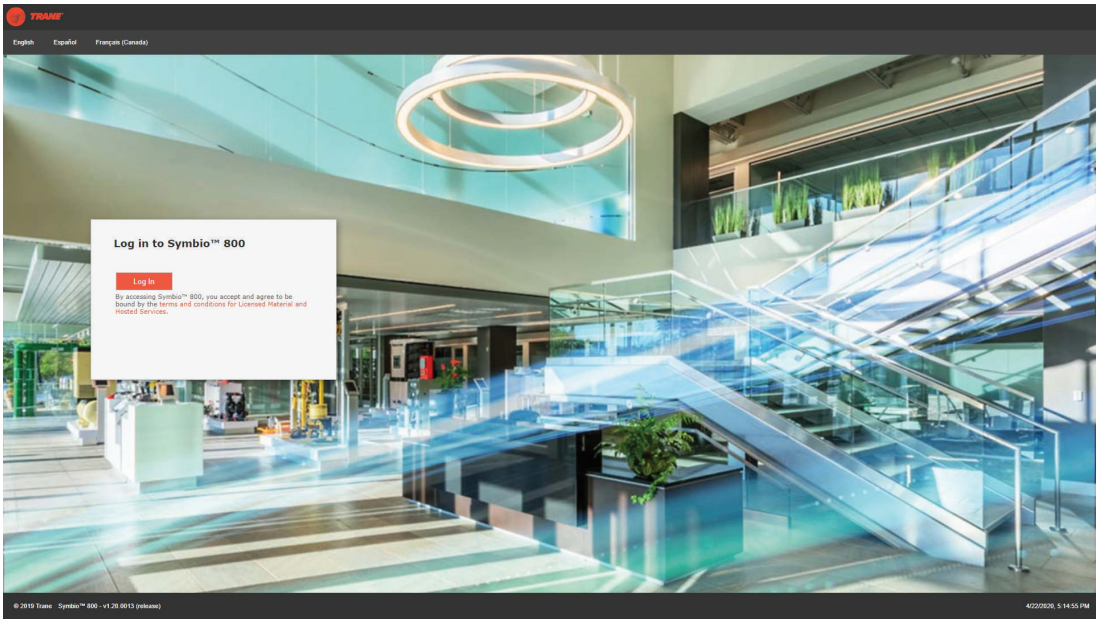
Service Tool for Symbio™ 800 Configuration

The service tool used to modify the Symbio™ 800 controller is a standard web browser. The Symbio 800 webpage is accessed by using a standard USB type A/B cable. Connect the USB cable between a laptop and the service tool port on the Symbio 800 controller (shown in Figure 1, p. 6).

Connecting to the Symbio™ 800 Web Interface

1. Connect a laptop to the Symbio™ 800 controller using a USB cable.
2. On the laptop, open a web browser to http://198.80.18.1/
3. When the Symbio 800 page displays, click **Log In**.

Figure 2. Symbio 800 log in screen



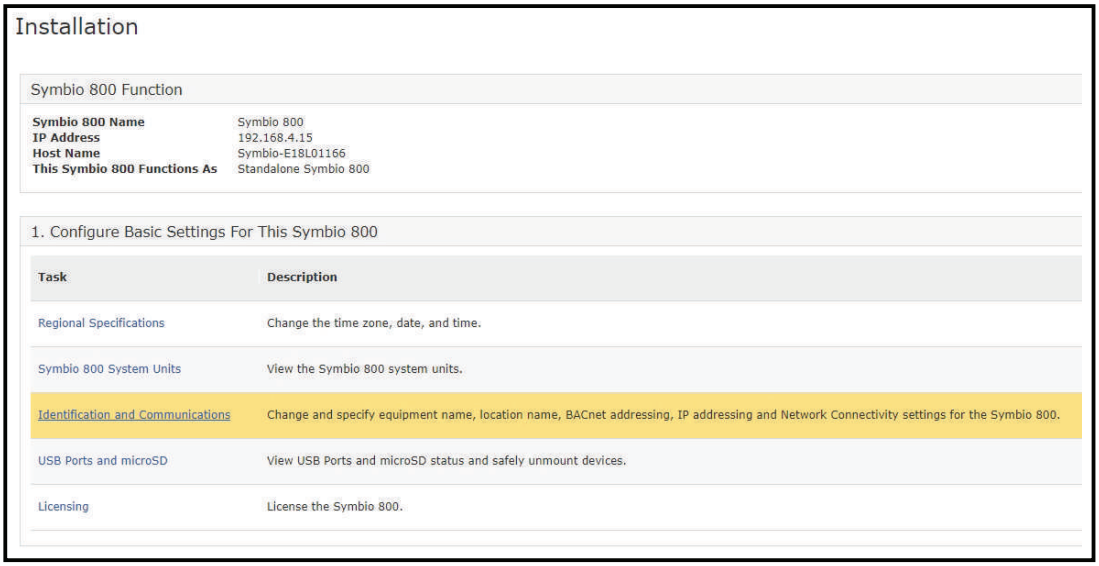
Note: *The Symbio 800 web interface can only be viewed using the USB connection. Ethernet port 1 and Ethernet port 2 will not allow access to the Symbio web server to meet IT security requirements.*

BACnet® Protocol Configuration

To access the Symbio™ 800 Protocol Configuration page:

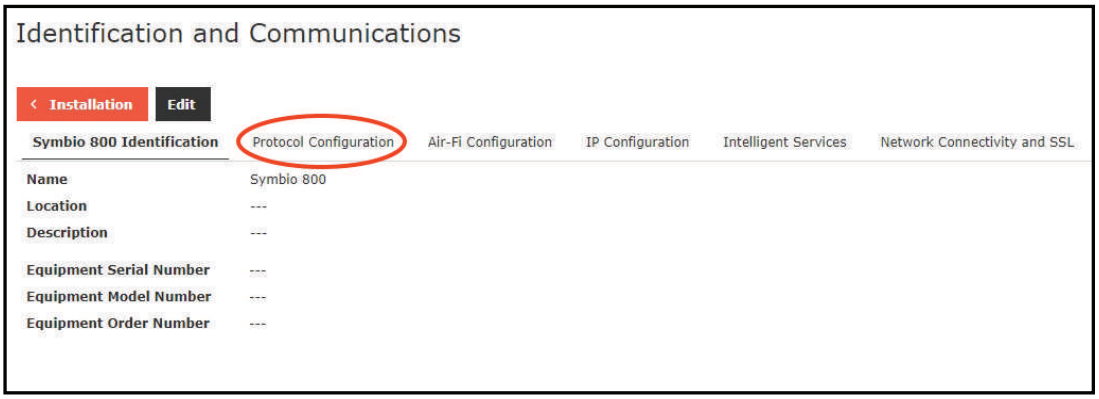
1. Connect to the Symbio 800 web interface.
2. On the left-hand navigation, click **Installation**.
3. Click **Identification and Communications**.

Figure 3. Identification and Communications



4. Click the **Protocol Configuration** tab.

Figure 4. Protocol Configuration



5. Click **Edit** to change the Protocol Configuration settings. See the sections below for details on editing BACnet MS/TP, BACnet IP, and BACnet Air-Fi® protocols.

BACnet MS/TP Protocol Settings

The rotary address on the Symbio 800 controller sets the BACnet MS/TP MAC address. Each BACnet MS/TP device on the same TP link must have a unique MAC address. The valid range of BACnet MS/TP MAC addresses for the Symbio 800 is: **001–127**.

Important: *The Symbio 800 controller will disable BACnet MS/TP communications if the rotary address is 000!*

Changing the rotary address will immediately take affect and does NOT require a power cycle to the

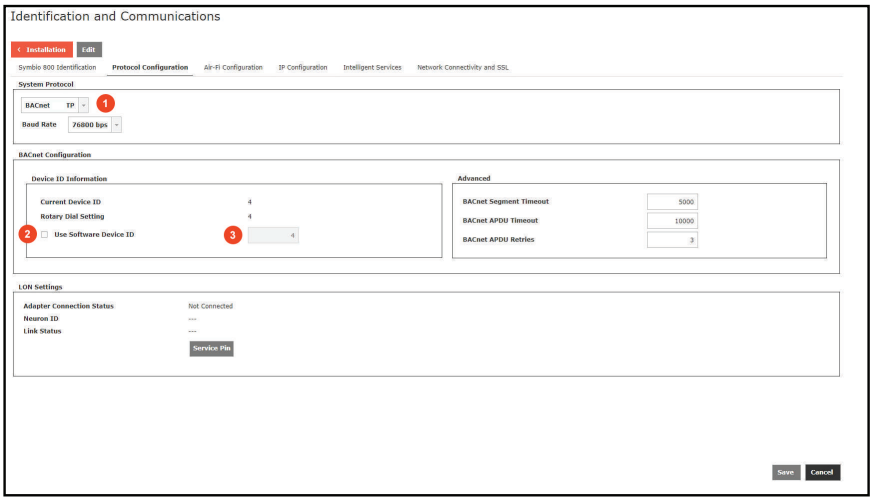
Symbio 800 controller.

The rotary address also sets the BACnet Device ID which gives a range of **1-127.** All BACnet devices must have a unique BACnet Device ID. The Symbio 800 BACnet Device ID can also be manually changed using a web browser, the Tracer® SC+ system controller, or Tracer TU.

To configure the Symbio 800 for BACnet MS/TP protocol: (See the following figure for user interface locations for each step.).

1. Set the System Protocol drop-down to **BACnet MS/TP**.
2. Verify the **Baud Rate** (default is 76,800 bps). All BACnet MS/TP devices on an TP link must communicate at the same baud rate.
3. Verify the **Current Device ID**. To change the device ID, click **Use Software Device ID** and enter the desired device ID. The valid device ID range using a software device ID is 1–4194302 as defined by the BACnet standard.

Figure 5. BACnet® MS/TP protocol settings



The BACnet MS/TP communication wire is connected to the P1 Link. Observe wire polarity when connecting to the + and – terminals. The + terminals and the – terminals are internally connected. The second set of + and – terminals on the P1 Link are used to make it easier to wire the next BACnet MS/TP device in the daisy chain.

Refer to the BACnet standard or BACnet MS/TP Wiring and Link Performance Best Practices and Troubleshooting guide BAS-SVX51*–EN for detailed information on TP wiring.

BACnet® IP (Ethernet or Wi-Fi connectivity)

The Symbio™ 800 controller can communicate BACnet IP using a standard Ethernet cable or using Wi-Fi (with the optional USB to Wi-Fi adapter).

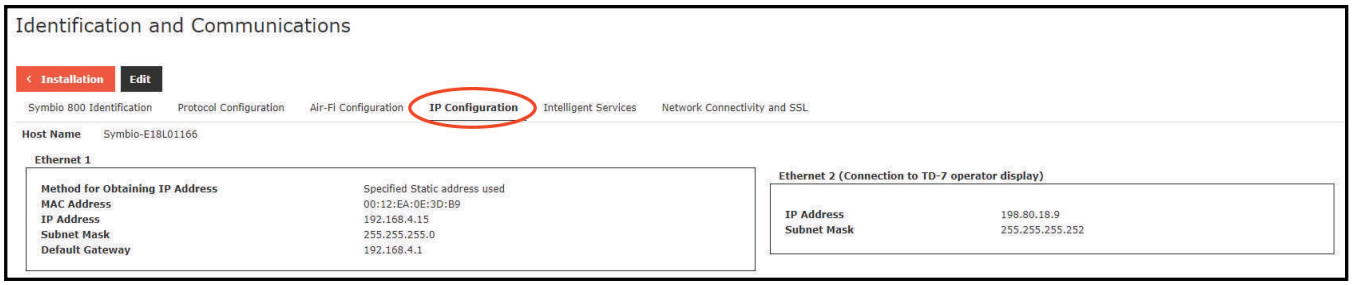
If using BACnet IP using a standard Ethernet cable, connect the Ethernet cable with RJ-45 connectors to Ethernet port 1 and the BACnet network. If using BACnet IP communication using Wi-Fi, the optional USB to Wi-Fi adapter should be connected to one of the USB ports.

Note: *Use only Ethernet 1 connection or Wi-Fi adapter.*

Set up the IP address of the Symbio 800 controller before changing other BACnet IP configuration parameters.

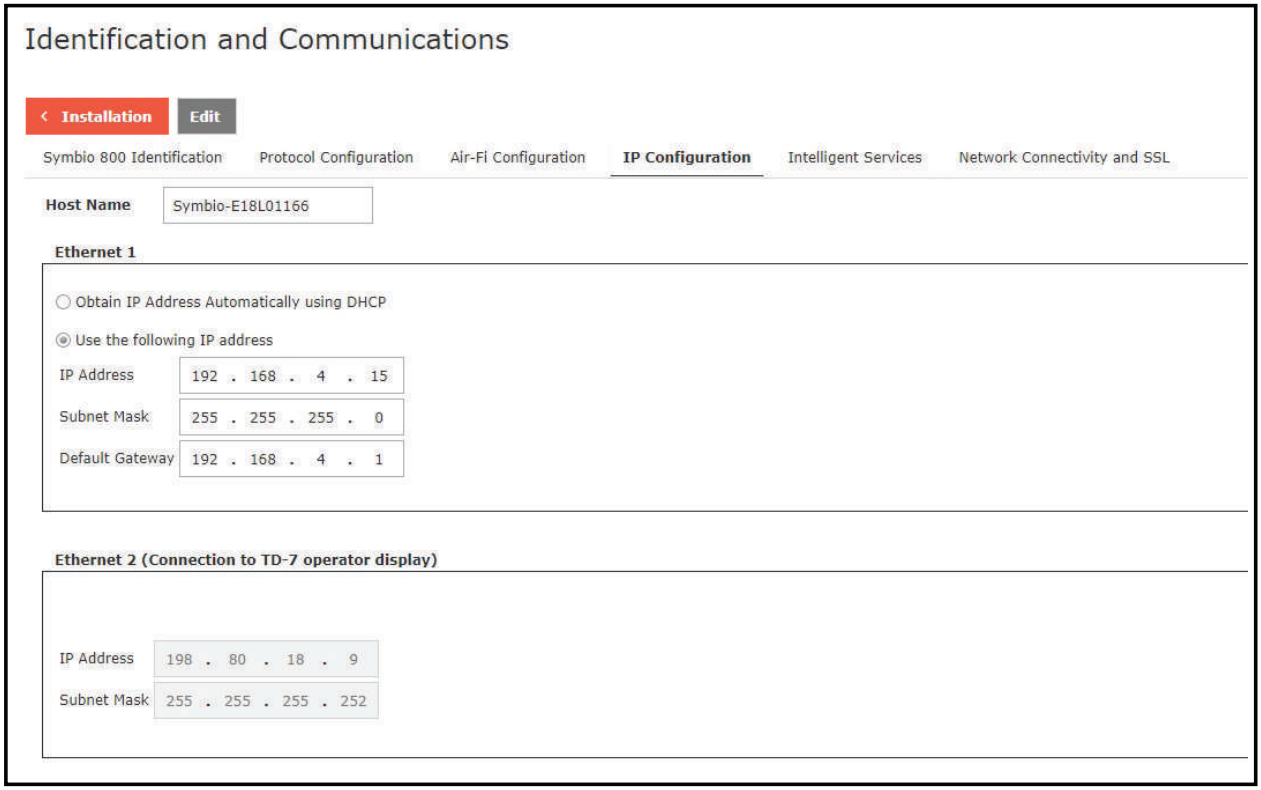
1. On the Identification and Communications page, click the **IP Configuration** tab.

Figure 6. IP configuration tab



2. Click **Edit**.

Figure 7. Edit IP configuration

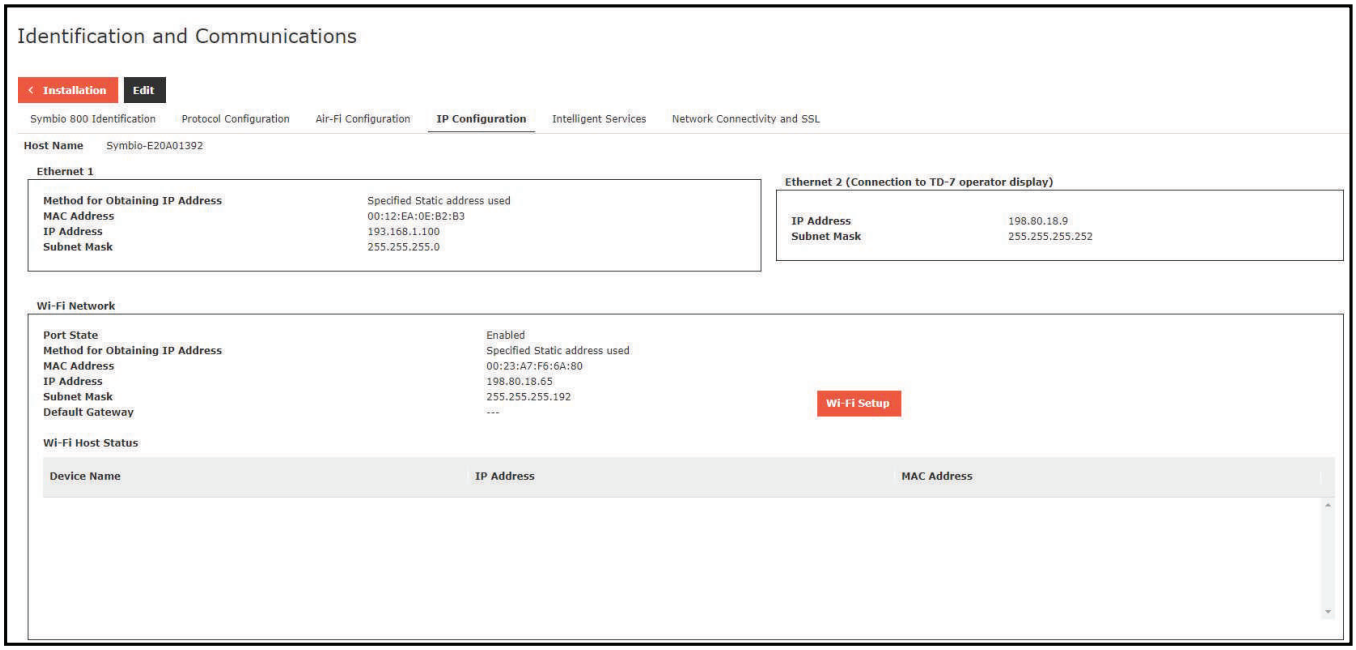


3. For BACnet IP using Ethernet cable connection only:
   a. Setup the Ethernet 1 port to either **Obtain an IP Address Automatically using DHCP** or use a static IP address by manually entering the IP address, subnet mask, and default.
   b. Set the Preferred IP Interface to **Ethernet 1**.
   c. Setup the DNS section if using a Domain Name System server to identify the Symbio 800 controller by host name.
4. For BACnet IP using the Wi-Fi connection only:
   a. Check **Enable the Wi-Fi network connection** and click **Save**.

Figure 8. Enable Wi-Fi network connection

b. Click **Wi-Fi Setup**.

Figure 9. Wi-Fi setup



c. Click **Client Mode (Station)** to join an existing Wi-Fi access point. Click **Next**.

d. Select the Wi-Fi network or type the SSID of the hidden access point. Click **Next**.

e. Enter the security parameters for the chosen access point. Contact the local IT administrator of

the chosen access point for security parameters.

f. Click **Finish** and verify connectivity to the access point.

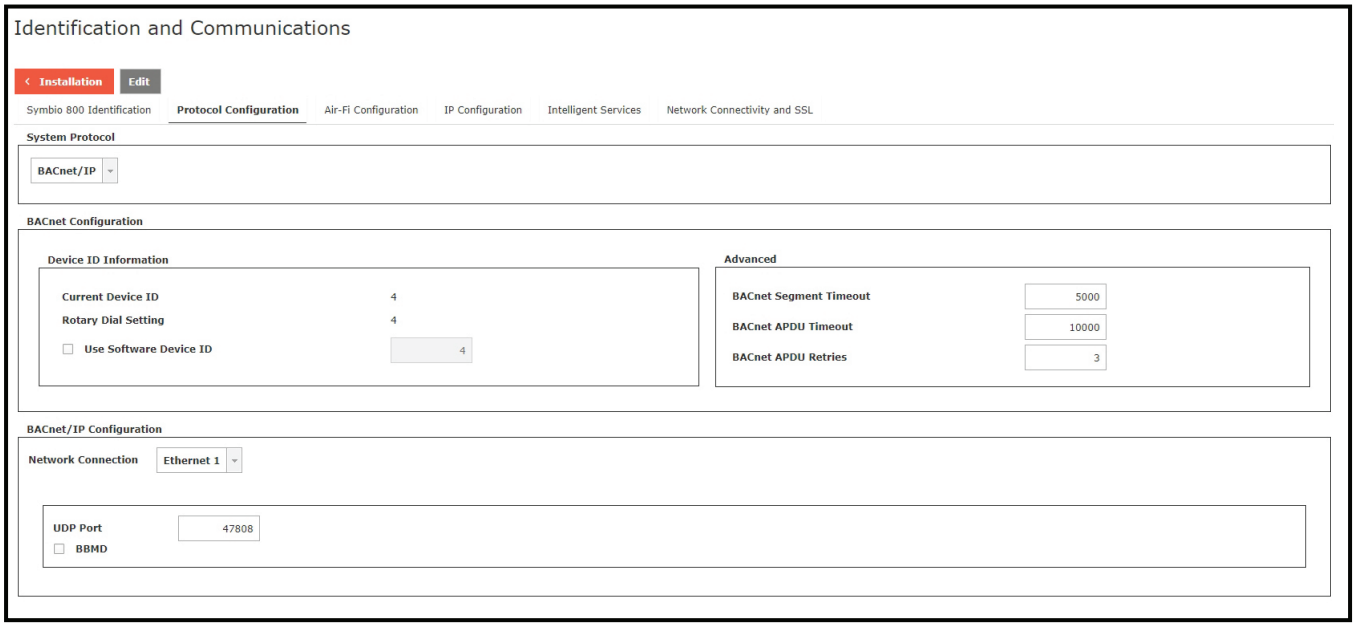
g. Set the Preferred IP Interface to **Wi-Fi Network**.

h. Setup the DNS section if using a Domain Name System server to identify the Symbio 800 controller by host name.

Manually Change Symbio™ 800 BACnet® Device ID

The rotary address on the Symbio 800 controller sets the BACnet Device ID which gives a range of **1-999.** All BACnet devices must have a unique BACnet Device ID. The Symbio 800 BACnet Device ID can also be manually changed using a web browser or the Tracer® SC+ system controller.

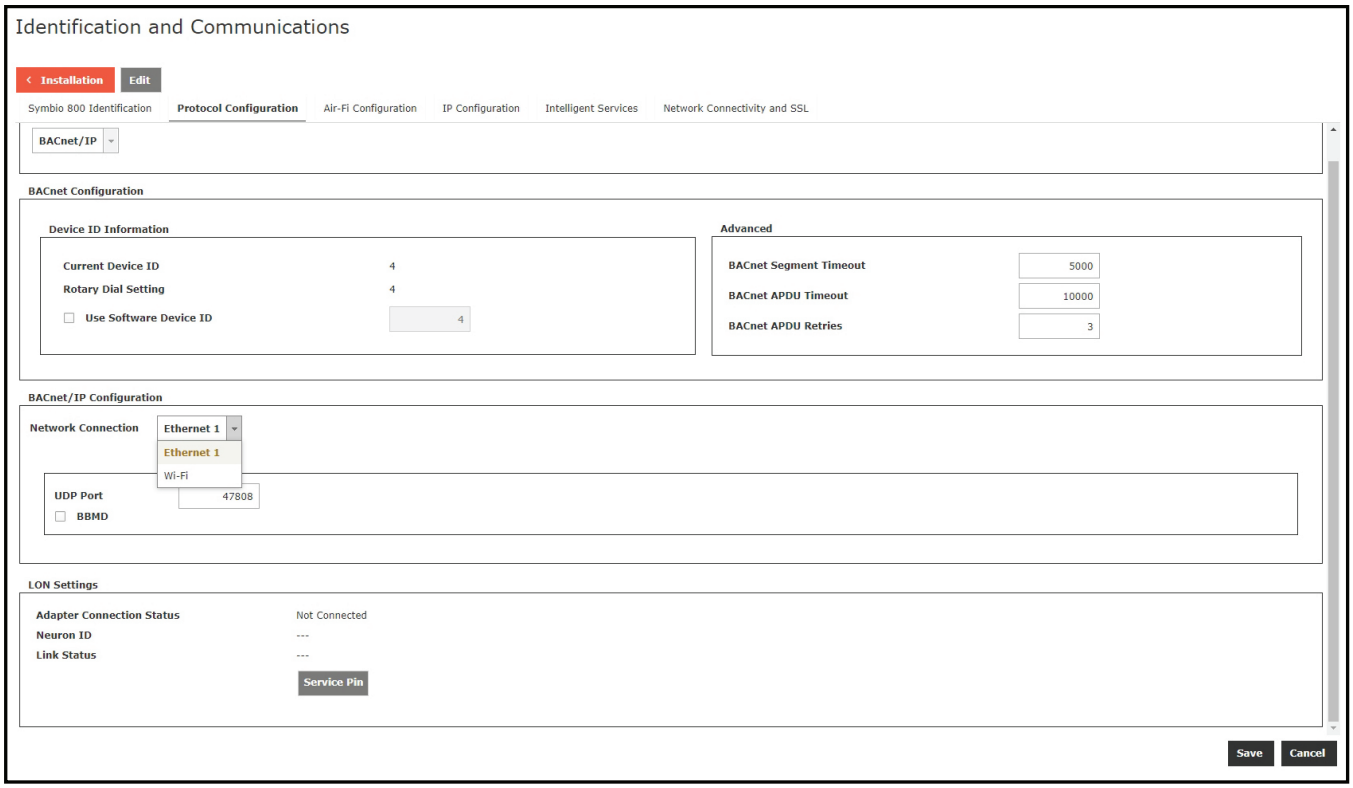
Figure 10. Protocol configuration



1. Set the System Protocol drop down to **BACnet IP**.
2. Verify the current Device ID. To change the Device ID, click **Use Software Device ID** and enter the desired Device ID. Most installations will not need to manually change the BACnet Device ID.

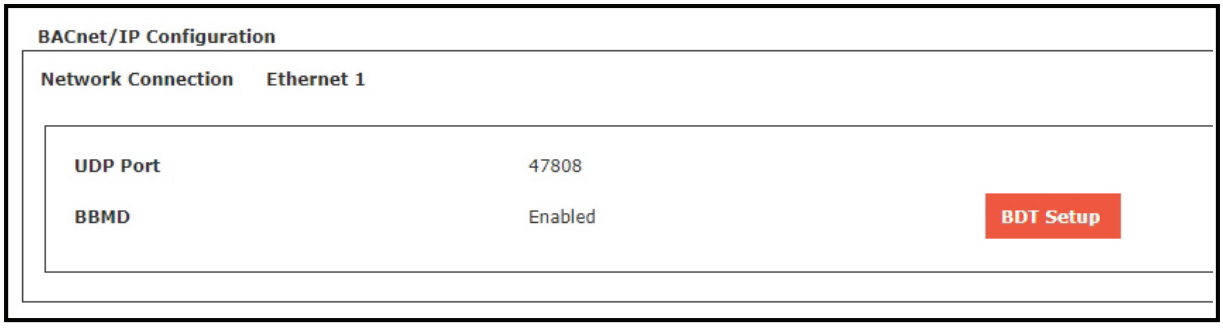
   Note: *The valid Device ID range using a software Device ID is 1 – 4194302 as defined by the BACnet standard.*
3. If using an Ethernet cable, set the Network Connection to **Ethernet 1**. If using the USB to Wi-Fi adapter, set the Network Connection to **Wi-Fi**.

Figure 11. Network connection



4. Set the UDP Port to match the port number used by the BACnet IP network. The default is 47808.
5. Check the BBMD checkbox only if the Symbio 800 controller is the only BACnet IP device on the IP subnet.
   a. If a change to the BBMD checkbox was made, click **Save** and refresh the web browser. If BBMD functionality is enabled, the BDT setup button displays.

Figure 12. BDT setup



   b. If BBMD functionality is enabled, click **BDT Setup** to set up the BACnet Distribution Table (BDT). The IP addresses of all BBMDs in the BACnet intranetwork should be in the BDT. and all BBMDs should have the same BDT entries.

   Important: *A strong knowledge of BACnet networking is needed to properly setup BBMD and BDT functionality.*

   For additional information on BBMDs and BDTs, refer to the BACnet specification or your local Trane office.

Air-Fi® Wireless

Air-Fi® Wireless – Conforms to ANSI/ASHRAE Standard 135-2016 (BACnet®/ZigBee®[1]). Air-Fi Wireless provides reliable and secure, and location-flexible communication between equipment controls, sensors, and service tools to the system controller.

Air-Fi networks will be setup by a Trane technician. Integration to a Symbio™ 800 controller setup for Air-Fi communications uses BACnet IP communication through a Tracer® SC+ system controller. Contact your local Trane office for additional information if the Symbio 800 controller is setup for Air-Fi Wireless.

1. *ZigBee is a registered trademark of the ZigBee Alliance.*

BACnet Points List

Object Naming Conventions

The communicated points for the Symbio™ controllers are generally named according to their function. While many of the points are read-only, others include both read and write capability. The established naming convention helps to identify the capabilities of each point. For most points, the suffix identifies the capability according to the following definition.

While there are some exceptions, the majority of the points have been defined according to these guidelines.

Suffix	Description
Status	Points with the Status suffix are defined as read-only. The status point reports the value being used by the controller.
Local	Points with the Local suffix are defined as read-only. The local point reports values associated with controller sensors, both wired and wireless. The local value may or may not be actively used by the controller, depending on the presence or absence of a communicated value (BAS). When both a local and communicated value exist, the communicated value is used.
Active	Points with the Active suffix are defined as read-only. Points designated as active are normally the result of the arbitration between a communicated value(BAS) and at least one value local to the equipment, such as a sensor or default setpoint. The active point reports the value being input to the controller.
Setpoint	Points with the Setpoint suffix are defined as either read-only or read/write. For BACnet®, the binary input, analog input and multi-state input points are all read-only. These setpoints report the value currently in use by the controller. The analog value, binary value and multi-state value points are all read/write. These points are provided for use by the building automation system (BAS). When used, these points are written internally to arbitration logic. This defines the interaction with hardwired points, editable software configuration points and the relinquish default value/state. Refer to the Appendix for additional information.
Input	Points with the Input suffix are defined as read-only. These points normally reflect the status of a sensor input, either hardwired or communicating wirelessly (Air-Fi®). However, the input point reflects the arbitrated result of the controller sensor input and a communicated value, if present. When both a controller sensor and communicated value exist, the controller will use and report the communicated value.
Arbitrator	Points with the “Arbitrator” suffix are to be used as read-only. The arbitrator prioritizes inputs from communicating points, hardwired points and stored defaults points. The priority array of the arbitration point displays each of the values provided, including the active status, indicating which of the input sources is being used. Refer to the Appendix for additional information.
BAS	Points with the BAS suffix are defined as read/write. These points are provided for use by the building automation system (BAS). When used, these points are written to arbitration logic. This defines the interaction with hardwired points, editable software configuration points and the relinquished default value/state. Refer to the Appendix for additional information.
Command	Points with the Command suffix are defined as read/write. These points are written to change the default behavior of the controller. Once written, these point values may be persisted.
Request	Points with the Request suffix are defined as read/write. These points are written to request a change the operating behavior of the controller.

Object Data Points and Diagnostic Data Points

The following tables are sorted as follows:

- Tables are listed by input/output type and sorted by object identifier. These tables provide the user with the units type for each object type.
- Tables are sorted by object name and provide a complete list of object names, types, values/ ranges, and descriptions.

Note: *Not all points are available to the user. The available data points are defined during self-configuration and are dependent on the type of equipment.*

Table 1. Analog inputs

Object Identifier	Object Name	Units	Configuration Dependency
AI-10100	Active Chilled Water Setpoint	Temperature	Standard
AI-10101	Active Base Loading Setpoint	Percentage	Base Loading
AI-10102	Active Cool/Heat Setpoint Temperature	Temperature	Standard
AI-10103	Active Hot Water Setpoint	Temperature	Hot Water Control
AI-10104	Active Demand Limit Setpoint	Percentage	Ice Building Not Installed
AI-10104	Active Demand Limit Setpoint	Percentage	Ice Building
AI-10105	Demand Limit Setpoint Status	Percentage	Ice Building
AI-10106	Chilled Water Setpoint Status	Temperature	Standard
AI-10107	Drive Motor Average Current RLA Circuit 1	Percentage	Standard
AI-10108	Drive Motor Voltage	Voltage	Standard
AI-10109	Drive DC Bus Voltage Circuit 1	Voltage	Standard
AI-10110	AFD Frequency Circuit 1	None	Standard
AI-10111	AFD Transistor Temperature Circuit 1	Temperature	Standard
AI-10112	Drive Motor Current U Circuit 1	Current	Standard
AI-10113	Drive Motor Current U RLA Circuit 1	Percentage	Standard
AI-10114	Drive Motor Current V Circuit 1	Current	Standard
AI-10115	Drive Motor Current V RLA Circuit 1	Percentage	Standard
AI-10116	Drive Motor Current W Circuit 1	Current	Standard
AI-10117	Drive Motor Current W RLA Circuit 1	Percentage	Standard
AI-10118	Drive Output Power Circuit 1	Power, Electrical	Standard
AI-10119	Drive Speed Status Percent	Percentage	Standard
AI-10120	Condenser Water Flow Rate	Flow, Fluidic	Cond Water Flow Measurement
AI-10121	Evaporator Water Flow Rate	Flow, Fluidic	Evap Water Flow Measurement
AI-10122	Calculated Chiller Capacity	Power, Cooling	Evap Water Flow Measurement
AI-10123	Compressor Bearing Temperature 1 - Compressor 1A	Temperature	Standard
AI-10124	Compressor Bearing Temperature 2 - Compressor 1A	Temperature	Standard
AI-10125	Refrigerant Discharge Temperature - Compressor 1A	Temperature	Standard
AI-10126	Run Time - Compressor 1A (in seconds)	None	Standard
AI-10127	Starts - Compressor 1A	None	Standard
AI-10128	Condenser Differential Water Pressure	Pressure, Fluidic	Cond Water Flow Measurement Differential Pressure or Dual Pressure Sensors
AI-10129	Condenser Entering Water Temperature	Temperature	Standard
AI-10130	Condenser Leaving Water Temperature	Temperature	Standard
AI-10131	Condenser Refrigerant Pressure Circuit 1	Pressure, Fluidic	Standard
AI-10132	Condenser Saturated Refrigerant Temperature Circuit 1	Temperature	Standard
AI-10133	Differential Refrigerant Pressure Circuit 1	Pressure, Fluidic	Standard
AI-10134	Evaporator Differential Water Pressure	Pressure, Fluidic	Evap Water Flow Measurement Differential Pressure or Dual Pressure Sensors
AI-10135	Evaporator Entering Water Temperature	Temperature	Standard
AI-10136	Evaporator Leaving Water Temperature	Temperature	Standard
AI-10137	Evaporator Refrigerant Pressure Circuit 1	Pressure, Fluidic	Standard

Table 1. Analog inputs (continued)

Object Identifier	Object Name	Units	Configuration Dependency
AI-10138	Evaporator Saturated Refrigerant Temperature Circuit 1	Temperature	Standard
AI-10139	Entering Condenser Water Pressure	Pressure, Fluidic	Cond Water Flow Measurement Differential Pressure or Dual Pressure Sensors
AI-10140	Leaving Condenser Water Pressure	Pressure, Fluidic	Cond Water Flow Measurement Differential Pressure or Dual Pressure Sensors
AI-10141	Entering Evaporator Water Pressure	Pressure, Fluidic	Evap Water Flow Measurement Differential Pressure or Dual Pressure Sensors
AI-10142	Leaving Evaporator Water Pressure	Pressure, Fluidic	Evap Water Flow Measurement Differential Pressure or Dual Pressure Sensors
AI-10143	Inlet Guide Vane 1 Percent Open Circuit 1	Percentage	Standard
AI-10144	Motor Winding Temperature 1 Circuit 1	Temperature	Standard
AI-10145	Motor Winding Temperature 2 Circuit 1	Temperature	Standard
AI-10146	Motor Winding Temperature 3 Circuit 1	Temperature	Standard
AI-10147	Number of Circuits	None	Standard
AI-10148	Number of Compressors Circuit 1	None	Standard
AI-10149	Number of Compressors Circuit 2	None	Standard
AI-10150	Refrigerant Monitor	PPM	Refrigerant Monitor
AI-10151	Unit Power Consumption	Power, Electrical	Standard
AI-10152	Drive Input Voltage Calculated	Voltage	Standard
AI-10153	Actual Running Capacity	Percentage	Standard
AI-10154	Unit Source ID	None	Standard
AI-10155	Chiller Design Capacity	Power, Cooling	Standard
AI-10156	Outdoor Air Temperature	Temperature	Outdoor Air Temp
AI-10157	Energy Consumption Lifetime	Energy, Electrical	Standard
AI-10158	Energy Consumption	Energy, Electrical	Standard
AI-10159	Unit Power Demand	Power, Electrical	Standard
AI-10160	Voltage L1-L2	Voltage	Energy Meter
AI-10161	Voltage L2-L3	Voltage	Energy Meter
AI-10162	Voltage L1-L3	Voltage	Energy Meter
AI-10163	Current L1	Current	Energy Meter
AI-10164	Current L2	Current	Energy Meter
AI-10165	Current L3	Current	Energy Meter
AI-10166	Line Frequency	None	Energy Meter
AI-10167	Power Factor	None	Energy Meter
AI-10168	Condenser Control Output	Percentage	Condenser Control Output
AI-10169	Average Voltage L-L	Voltage	Energy Meter
AI-10170	Average Current	Current	Energy Meter
AI-10171	Condenser Approach Temperature Circuit 1	Temperature, Delta	Standard
AI-10172	Evaporator Approach Temperature Circuit 1	Temperature, Delta	Standard

Table 2. Analog values

Object Identifier	Object Name	Units	Configuration Dependency
AV-10100	Chilled Water Setpoint	Temperature	Standard
AV-10101	Demand Limit Setpoint	Percentage	Standard
AV-10102	Hot Water Setpoint	Temperature	Hot Water Control
AV-10103	Base Loading Setpoint	Percentage	Base Loading

Table 3. Binary inputs

Object Name	Object Type	Object States	Configuration Dependency
BI-10100	Diagnostic Present	0 = Normal 1 = In Alarm	Standard
BI-10101	Diagnostic Shutdown Present	0 = Normal 1 = In Alarm	Standard
BI-10102	Diagnostic: Manual Reset Required	0 = Normal 1 = In Alarm	Standard
BI-10103	Diagnostic: Local Manual Reset Required	0 = Normal 1 = In Alarm	Standard
BI-10104	Diagnostic Present: Information	0 = Normal 1 = In Alarm	Standard
BI-10105	Diagnostic Present: Advisory	0 = Normal 1 = In Alarm	Standard
BI-10106	Diagnostic Present: Critical	0 = Normal 1 = In Alarm	Standard
BI-10107	Diagnostic Present: Service Required	0 = Normal 1 = In Alarm	Standard
BI-10108	Base Loading Active	0 = Inactive 1 = Active	Base Loading
BI-10109	Chiller Running State	0 = Off 1 = On	Standard
BI-10110	Condenser Water Flow Status	0 = No Flow 1 = Flow	Standard
BI-10111	Condenser Water Pump Request	0 = Off 1 = On	Standard
BI-10112	Emergency Stop	0 = Auto 1 = Emergency Stop - Manual Reset Required	Standard
BI-10113	Evaporator Water Flow Status	0 = No Flow 1 = Flow	Standard
BI-10114	Evaporator Water Pump Request	0 = Off 1 = On	Standard
BI-10115	Base Loading Request Active	0 = Off 1 = On	Base Loading
BI-10116	Head Relief Request	0 = Off 1 = On	Standard
BI-10117	Limit Mode Relay Status	0 = Off 1 = On	Standard
BI-10118	Local Setpoint Control	0 = Remote Control 1 = Local Control	Standard
BI-10119	Manual Override Exists	0 = Off 1 = On	Standard
BI-10120	Maximum Capacity	0 = Off 1 = On	Standard
BI-10121	Run Enabled	0 = Run Not Enabled 1 = Run Enabled	Standard
BI-10122	Compressor 1A Status	0 = Off 1 = Running	Standard
BI-10123	Front Panel Auto Stop	0 = Stop 1 = Auto	Standard
BI-10124	External Auto Stop Input Status	0 = Stop 1 = Auto	Standard

Table 4. Binary input diagnostics

Object Identifier	Object Name	Object States
BI-11000	Comm Loss: Ext Base Loading Command	0 = Normal 1 = In Alarm
BI-11001	Comm Loss: Ext Base Loading Setpoint	0 = Normal 1 = In Alarm
BI-11002	Diagnostic: External Base Loading Setpoint	0 = Normal 1 = In Alarm
BI-11003	Comm Loss: Energy Meter	0 = Normal 1 = In Alarm
BI-11004	Comm Loss: Outdoor Air Temperature	0 = Normal 1 = In Alarm
BI-11005	Diagnostic: Energy Meter Write Command Failure	0 = Normal 1 = In Alarm
BI-11006	Diagnostic: Outdoor Air Temperature Sensor	0 = Normal 1 = In Alarm
BI-11007	Diagnostic: Software Error 1001: Call Trane Service	0 = Normal 1 = In Alarm
BI-11008	Diagnostic: Software Error 1002: Call Trane Service	0 = Normal 1 = In Alarm
BI-11009	Diagnostic: Software Error 1003: Call Trane Service	0 = Normal 1 = In Alarm
BI-11010	Comm Loss: Condenser Liquid Level Sensor Circuit 1	0 = Normal 1 = In Alarm
BI-11011	Comm Loss: Condenser Rfgt Pressure Circuit 1	0 = Normal 1 = In Alarm
BI-11012	Comm Loss: Drive Cooling Supply Temperature Circuit 1	0 = Normal 1 = In Alarm
BI-11013	Comm Loss: Drive Cooling Valve Circuit 1	0 = Normal 1 = In Alarm
BI-11014	Comm Loss: Evaporator Refrigerant Pressure Circuit 1	0 = Normal 1 = In Alarm
BI-11015	Diagnostic: Condenser Liquid Level Sensor Circuit 1	0 = Normal 1 = In Alarm
BI-11016	Diagnostic: Condenser Refrigerant Pressure Sensor Circuit 1	0 = Normal 1 = In Alarm
BI-11017	Diagnostic: Drive Cooling Supply Temperature Sensor Circuit 1	0 = Normal 1 = In Alarm
BI-11018	Diagnostic: Evaporator Refrigerant Pressure Sensor Circuit 1	0 = Normal 1 = In Alarm
BI-11019	Diagnostic: High Condenser Liquid Level Circuit 1	0 = Normal 1 = In Alarm
BI-11020	Diagnostic: Low Condenser Liquid Level Circuit 1	0 = Normal 1 = In Alarm
BI-11021	Diagnostic: Inverted Condenser Approach Temperature	0 = Normal 1 = In Alarm
BI-11022	Diagnostic: Inverted Evaporator Approach Temperature	0 = Normal 1 = In Alarm
BI-11023	Diagnostic: Loss of Drive Cooling Control Circuit 1	0 = Normal 1 = In Alarm
BI-11024	Diagnostic: Loss of Evaporator EXV Control Circuit 1	0 = Normal 1 = In Alarm
BI-11025	Diagnostic: Low Evaporator Refrigerant Temperature Circuit 1	0 = Normal 1 = In Alarm
BI-11026	Comm Loss: Cprsr Discharge Rfgt Temp Circuit 1	0 = Normal 1 = In Alarm
BI-11027	Comm Loss: Economizer Valve Circuit 1	0 = Normal 1 = In Alarm
BI-11028	Comm Loss: Economizer Pressure Circuit 1	0 = Normal 1 = In Alarm
BI-11029	Comm Loss: Economizer Temperature Circuit 1	0 = Normal 1 = In Alarm
BI-11030	Comm Loss: IGV First Stage Actuator Circuit 1	0 = Normal 1 = In Alarm
BI-11031	Comm Loss: Interstage Bypass Valve Circuit 1	0 = Normal 1 = In Alarm
BI-11032	Diagnostic: Compressor Refrigerant Discharge Temperature Sensor Circuit 1	0 = Normal 1 = In Alarm
BI-11033	Diagnostic: Economizer Pressure Sensor Circuit 1	0 = Normal 1 = In Alarm

Table 4. Binary input diagnostics (continued)

Object Identifier	Object Name	Object States
BI-11034	Diagnostic: Economizer Temperature Sensor Circuit 1	0 = Normal 1 = In Alarm
BI-11035	Diagnostic: Extended Compressor Surge Circuit 1	0 = Normal 1 = In Alarm
BI-11036	Diagnostic: Condenser Water Flow Lost	0 = Normal 1 = In Alarm
BI-11037	Diagnostic: Condenser Water Flow Overdue	0 = Normal 1 = In Alarm
BI-11038	Diagnostic: High Condenser Pressure Circuit 1	0 = Normal 1 = In Alarm
BI-11039	Comm Loss: Condenser Entering Water Pressure	0 = Normal 1 = In Alarm
BI-11040	Comm Loss: Condenser Entering Water Temp	0 = Normal 1 = In Alarm
BI-11041	Comm Loss: Condenser Leaving Water Pressure	0 = Normal 1 = In Alarm
BI-11042	Comm Loss: Condenser Leaving Water Temp	0 = Normal 1 = In Alarm
BI-11043	Comm Loss: Condenser Water Flow Measurement Sensor	0 = Normal 1 = In Alarm
BI-11044	Comm Loss: Condenser Water Flow Switch	0 = Normal 1 = In Alarm
BI-11045	Comm Loss: Condenser Water Pump Relay	0 = Normal 1 = In Alarm
BI-11046	Diagnostic: Condenser Entering Water Pressure	0 = Normal 1 = In Alarm
BI-11047	Diagnostic: Condenser Entering Water Temp Sensor	0 = Normal 1 = In Alarm
BI-11048	Diagnostic: Condenser Leaving Water Pressure	0 = Normal 1 = In Alarm
BI-11049	Diagnostic: Condenser Leaving Water Temp Sensor	0 = Normal 1 = In Alarm
BI-11050	Diagnostic: Condenser Water Flow Measurement Sensor	0 = Normal 1 = In Alarm
BI-11051	Diagnostic: Inverted Condenser Water Temperature	0 = Normal 1 = In Alarm
BI-11052	Diagnostic: Evaporator Water Flow Lost	0 = Normal 1 = In Alarm
BI-11053	Diagnostic: Evaporator Water Flow Overdue	0 = Normal 1 = In Alarm
BI-11054	Diagnostic: High Evaporator Refrigerant Pressure	0 = Normal 1 = In Alarm
BI-11055	Diagnostic: High Evaporator Water Temperature	0 = Normal 1 = In Alarm
BI-11056	Diagnostic: Low Evaporator Water Flow	0 = Normal 1 = In Alarm
BI-11057	Comm Loss: Evap Entering Water Temp	0 = Normal 1 = In Alarm
BI-11058	Comm Loss: Evap Leaving Water Temp	0 = Normal 1 = In Alarm
BI-11059	Comm Loss: Evaporator Entering Water Pressure	0 = Normal 1 = In Alarm
BI-11060	Comm Loss: Evaporator Leaving Water Pressure	0 = Normal 1 = In Alarm
BI-11061	Comm Loss: Evaporator Water Flow Measurement Sensor	0 = Normal 1 = In Alarm
BI-11062	Comm Loss: Evaporator Water Flow Switch	0 = Normal 1 = In Alarm
BI-11063	Comm Loss: Evaporator Water Pump Relay	0 = Normal 1 = In Alarm
BI-11064	Diagnostic: Evaporator Entering Water Pressure	0 = Normal 1 = In Alarm
BI-11065	Diagnostic: Evaporator Entering Water Temp Sensor	0 = Normal 1 = In Alarm
BI-11066	Diagnostic: Evaporator Leaving Water Pressure	0 = Normal 1 = In Alarm
BI-11067	Diagnostic: Evaporator Leaving Water Temp Sensor	0 = Normal 1 = In Alarm

Table 4. Binary input diagnostics (continued)

Object Identifier	Object Name	Object States
BI-11068	Diagnostic: Evaporator Water Flow Measurement Sensor	0 = Normal 1 = In Alarm
BI-11069	Diagnostic: Inverted Evaporator Water Temperature	0 = Normal 1 = In Alarm
BI-11070	Diagnostic: Low Evap Leaving Water Temp: Unit Off	0 = Normal 1 = In Alarm
BI-11071	Diagnostic: Low Evap Leaving Water Temp: Unit On	0 = Normal 1 = In Alarm
BI-11072	Comm Loss: Evaporator EXV Circuit 1	0 = Normal 1 = In Alarm
BI-11073	Comm Loss: Chiller % Capacity Output	0 = Normal 1 = In Alarm
BI-11074	Comm Loss: Condenser Rfgt Pressure Output	0 = Normal 1 = In Alarm
BI-11075	Comm Loss: Emergency Stop	0 = Normal 1 = In Alarm
BI-11076	Comm Loss: Ext Chilled/Hot Water Setpoint	0 = Normal 1 = In Alarm
BI-11077	Comm Loss: Ext Demand Limit Setpoint	0 = Normal 1 = In Alarm
BI-11078	Comm Loss: External Auto/Stop	0 = Normal 1 = In Alarm
BI-11079	Comm Loss: External Hot Water Command	0 = Normal 1 = In Alarm
BI-11080	Comm Loss: Programmable Relay Board 1	0 = Normal 1 = In Alarm
BI-11081	Comm Loss: Programmable Relay Board 2	0 = Normal 1 = In Alarm
BI-11082	Diagnostic: Emergency Stop	0 = Normal 1 = In Alarm
BI-11083	Diagnostic: External Chilled/Hot Water Setpoint	0 = Normal 1 = In Alarm
BI-11084	Diagnostic: External Demand Limit Setpoint	0 = Normal 1 = In Alarm
BI-11085	Comm Loss: Refrigerant Monitor Input	0 = Normal 1 = In Alarm
BI-11086	Diagnostic: Refrigerant Monitor Input	0 = Normal 1 = In Alarm
BI-11087	Comm Loss: External Ice Building Command	0 = Normal 1 = In Alarm
BI-11088	Comm Loss: Ice Building Status Relay	0 = Normal 1 = In Alarm
BI-11089	Diagnostic: MBC Bearing Temperature 1 Circuit 1	0 = Normal 1 = In Alarm
BI-11090	Diagnostic: MBC Bearing Temperature 2 Circuit 1	0 = Normal 1 = In Alarm
BI-11091	Diagnostic: MBC Failed Centering Circuit 1	0 = Normal 1 = In Alarm
BI-11092	Comm Loss: MBC Cooling Valve Circuit 1	0 = Normal 1 = In Alarm
BI-11093	Comm Loss: Magnetic Bearing Controller Circuit 1	0 = Normal 1 = In Alarm
BI-11094	Comm Loss: UPS Fault Circuit 1	0 = Normal 1 = In Alarm
BI-11095	Diagnostic: Loss of MBC Cooling Control Circuit 1	0 = Normal 1 = In Alarm
BI-11096	Diagnostic: MBC Not Centered Circuit 1	0 = Normal 1 = In Alarm
BI-11097	Diagnostic: MBC Not Ready To Rotate Circuit 1	0 = Normal 1 = In Alarm
BI-11098	Diagnostic: MBC Over Voltage Circuit 1	0 = Normal 1 = In Alarm
BI-11099	Diagnostic: MBC Parameter Table Not Set Circuit 1	0 = Normal 1 = In Alarm
BI-11100	Diagnostic: MBC Rotor Elongation Circuit 1	0 = Normal 1 = In Alarm
BI-11101	Diagnostic: MBC Rotor Unbalance Alarm Circuit 1	0 = Normal 1 = In Alarm

Table 4. Binary input diagnostics (continued)

Object Identifier	Object Name	Object States
BI-11102	Diagnostic: MBC: Shutdown Request Circuit 1	0 = Normal 1 = In Alarm
BI-11103	Diagnostic: MBC Under Voltage Circuit 1	0 = Normal 1 = In Alarm
BI-11104	Diagnostic: MBC Overspeed Circuit 1	0 = Normal 1 = In Alarm
BI-11105	Diagnostic: MBC PCB Temperature Circuit 1	0 = Normal 1 = In Alarm
BI-11106	Diagnostic: MBC Rotation Detected Without Levitation Circuit 1	0 = Normal 1 = In Alarm
BI-11107	Diagnostic: MBC Speed Sensor Circuit 1	0 = Normal 1 = In Alarm
BI-11108	Diagnostic: UPS Fault Circuit 1	0 = Normal 1 = In Alarm
BI-11109	Comm Loss: Motor Cooling Valve Circuit 1	0 = Normal 1 = In Alarm
BI-11110	Comm Loss: Motor Winding Temperature 1 Circuit 1	0 = Normal 1 = In Alarm
BI-11111	Comm Loss: Motor Winding Temperature 2 Circuit 1	0 = Normal 1 = In Alarm
BI-11112	Comm Loss: Motor Winding Temperature 3 Circuit 1	0 = Normal 1 = In Alarm
BI-11113	Diagnostic: High Compressor Refrigerant Discharge Temperature Circuit 1	0 = Normal 1 = In Alarm
BI-11114	Diagnostic: High Motor Winding Temperature 1 Circuit 1	0 = Normal 1 = In Alarm
BI-11115	Diagnostic: High Motor Winding Temperature 2 Circuit 1	0 = Normal 1 = In Alarm
BI-11116	Diagnostic: High Motor Winding Temperature 3 Circuit 1	0 = Normal 1 = In Alarm
BI-11117	Diagnostic: High Vacuum Lockout Circuit 1	0 = Normal 1 = In Alarm
BI-11118	Diagnostic: Loss of Motor Cooling Control Circuit 1	0 = Normal 1 = In Alarm
BI-11119	Diagnostic: Motor Winding Temperature 1 Sensor Circuit 1	0 = Normal 1 = In Alarm
BI-11120	Diagnostic: Motor Winding Temperature 2 Sensor Circuit 1	0 = Normal 1 = In Alarm
BI-11121	Diagnostic: Motor Winding Temperature 3 Sensor Circuit 1	0 = Normal 1 = In Alarm
BI-11122	Diagnostic: MP: Invalid Configuration	0 = Normal 1 = In Alarm
BI-11123	Diagnostic: MP: Reset Has Occurred	0 = Normal 1 = In Alarm
BI-11124	Diagnostic: AFD Comm Loss: Main Processor Circuit 1	0 = Normal 1 = In Alarm
BI-11125	Diagnostic: AFD Failure to Arm or Start Circuit 1	0 = Normal 1 = In Alarm
BI-11126	Diagnostic: AFD Fault Circuit 1	0 = Normal 1 = In Alarm
BI-11127	Diagnostic: AFD Ground Fault Circuit 1	0 = Normal 1 = In Alarm
BI-11128	Diagnostic: AFD Interrupt Failure Circuit 1	0 = Normal 1 = In Alarm
BI-11129	Diagnostic: AFD Mains Failure Circuit 1	0 = Normal 1 = In Alarm
BI-11130	Diagnostic: AFD Motor Current Overload Circuit 1	0 = Normal 1 = In Alarm
BI-11131	Diagnostic: AFD Safe Stop Circuit 1	0 = Normal 1 = In Alarm
BI-11132	Diagnostic: AFD Short Circuit Circuit 1	0 = Normal 1 = In Alarm
BI-11133	Diagnostic: AFD Speed Configuration Mismatch Circuit 1	0 = Normal 1 = In Alarm
BI-11134	Comm Loss: Adaptive Frequency Drive Circuit 1	0 = Normal 1 = In Alarm
BI-11135	Diagnostic: Unexpected Starter Shutdown Circuit 1	0 = Normal 1 = In Alarm

Table 4. Binary input diagnostics (continued)

Object Identifier	Object Name	Object States
BI-11136	Diagnostic: Software Error 1005: Call Trane Service	0 = Normal 1 = In Alarm
BI-11137	Comm Loss: Starter Panel High Temp Limit Compressor 1A	0 = Normal 1 = In Alarm
BI-11138	Diagnostic: Starter Panel High Temp Limit Compressor 1A	0 = Normal 1 = In Alarm
BI-11139	Comm Loss: Subcooled Liquid Temp Circuit 1	0 = Normal 1 = In Alarm
BI-11140	Comm Loss: External Ckt Lockout Circuit 1	0 = Normal 1 = In Alarm
BI-11141	Diagnostic: Subcooled Liquid Temperature Sensor Circuit 1	0 = Normal 1 = In Alarm
BI-11142	Diagnostic: Evaporator Saturated Refrigerant Temp Sensor Circuit 1	0 = Normal 1 = In Alarm
BI-11143	Comm Loss: Evap Saturated Rfgt Temp Circuit 1	0 = Normal 1 = In Alarm
BI-11144	Diagnostic: Low Suction Refrigerant Pressure Circuit 1	0 = Normal 1 = In Alarm
BI-11145	Diagnostic: High Differential Refrigerant Pressure Circuit 1	0 = Normal 1 = In Alarm
BI-11146	Diagnostic: High Refrigerant Pressure Ratio Circuit 1	0 = Normal 1 = In Alarm
BI-11147	Diagnostic: Starts/Hours Modified Compressor 1A	0 = Normal 1 = In Alarm
BI-11148	Diagnostic: Starts/Hours Modified Compressor 2A	0 = Normal 1 = In Alarm
BI-11149	Diagnostic: High Evaporator Refrigerant Temperature Circuit 1	0 = Normal 1 = In Alarm
BI-11150	Comm Loss: Off-cycle Freeze Protection Relay Circuit 1	0 = Normal 1 = In Alarm
BI-11151	Comm Loss: Condenser Head Pressure Cntrl Output Circuit 1	0 = Normal 1 = In Alarm
BI-11152	Comm Loss: Ext Noise Reduction Request Circuit 1	0 = Normal 1 = In Alarm
BI-11153	Diagnostic: MBC Failed Clearance Check Circuit 1	0 = Normal 1 = In Alarm
BI-11154	Diagnostic: Check Clock	0 = Normal 1 = In Alarm
BI-11155	Diagnostic: MP: Non-Volatile Block Test Error	0 = Normal 1 = In Alarm
BI-11156	Diagnostic: Under Voltage Circuit 1	0 = Normal 1 = In Alarm
BI-11157	Diagnostic: Over Voltage Circuit 1	0 = Normal 1 = In Alarm

Table 5. Binary values

Object Identifier	Object Name	Object States	Configuration Dependency
BV-10100	Base Loading Request	0 = Off 1 = On	Base Loading
BV-10101	Reset Diagnostic	0 = Normal 1 = Reset	Standard
BV-10102	Chiller Auto Stop Command BAS	0 = Stop 1 = Auto	Standard
BV-10103	Energy Consumption Reset	0 = Accumulating 1 = Reset	Standard

Table 6. Multi-state inputs

Object Identifier	Object Name	Object States	Configuration Dependency
MI-10100	Operating Mode	1 = Cool 2 = Heat 3 = Ice Making 4 = Free Cooling	Standard
MI-10101	Running Mode	1 = Chiller Off 2 = Chiller In Start Mode 3 = Chiller In Run Mode 4 = Chiller In Pre-Shutdown Mode 5 = Chiller In Service Mode	Standard
MI-10102	Manufacturing Location	1 = Field Applied 2 = La Crosse 3 = Pueblo 4 = Charmes 5 = Rushville 6 = Macon 7 = Waco 8 = Lexington 9 = Forsyth 10 = Clarksville 11 = Ft. Smith 12 = Penang 13 = Colchester 14 = Curitiba 15 = Taicang 16 = Taiwan 17 = Epinal 18 = Golbey	Standard
MI-10103	Chiller Setpoint Source	1 = BAS 2 = External 3 = Front Panel	Standard
MI-10104	Refrigerant Type	1 = R-11 2 = R-12 3 = R-22 4 = R-123 5 = R-134a 6 = R-407C 7 = R-410A 8 = R-113 9 = R-114 10 = R-500 11 = R-502 12 = R-404A 13 = R-513A 14 = R-1233zd(E) 15 = R-514A 16 = R-1234ze€	Standard

Table 6. Multi-state inputs (continued)

Object Identifier	Object Name	Object States	Configuration Dependency
MI-10105	Cooling Type	1 =Water Cooled 2 = Air Cooled	Standard
MI-10106	Model Information [GEN2]	1 = CVHF 2 = CVGF 3 = CVHS 4 = RTAE 5 = RTAF 6= RTHA 7 = RTHB 8 = RTHC 9 = RTHD 10 = RTWE 11 = CTVD 12 = CVR 13 = CVHH 14 = CDHH 15 = VMAX 16 = GVAF 17 = RTWF 18 = RTHF 19 = RTAC 20 = CVHM 21 = RTAG 22 = CGAF 23 = RTXG 24 = GVWF 25 = HDWA 26 = CMAC 27 = IPAK 28 = CXAF 29 = ACSA 30 = RTSF 31 = HSWA 32 = ACRA 33 = RTEG 34 = ACXA 35 = CMAF 36 = ACRB Large 37 = ACRB Small 38 = CVHE 39 = CVHG 40 = CVHL	Standard

Table 7. Multi-state values

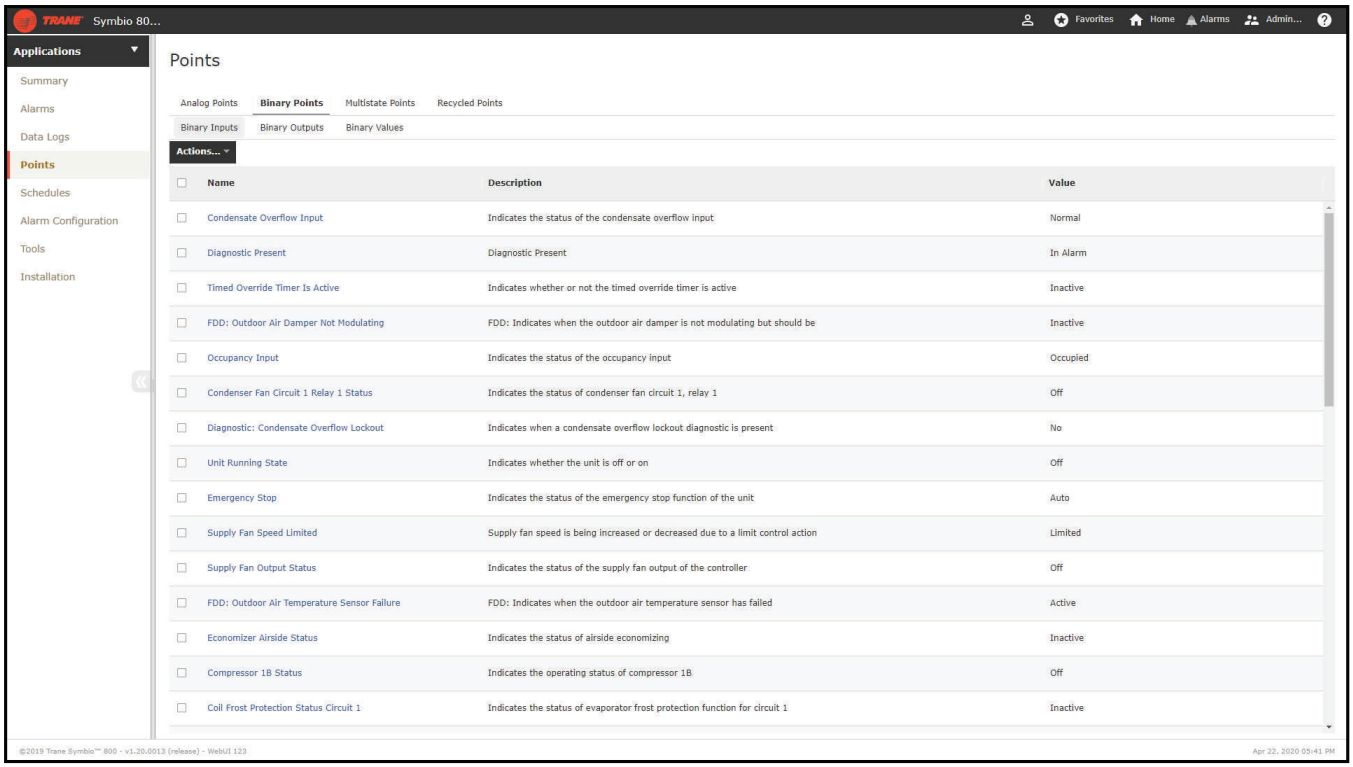
Object Identifier	Object Name	Object States	Configuration Dependency
MV-10100	Chiller Mode Command BAS	1 = Cool 2 = Heat 3 = Ice Making 4 = Free Cooling	Standard

Recycled Points

The Symbio™ 800 controller ships from the factory pre-configured for the specific unit application. The points of the communicated interface (BACnet®, Modbus®, or LonTalk®) vary based on the unit configuration. Only those points pertinent to that configuration are included in the interface.

Example: When the unit is configured for only two compressors, any points associated with compressors three and four are not be displayed on the Touch Screen interface or browser-based Web user interface. When configuration changes are made in the field, the points in the communication interface change accordingly to align with those features or user-added points.

Figure 13. Points

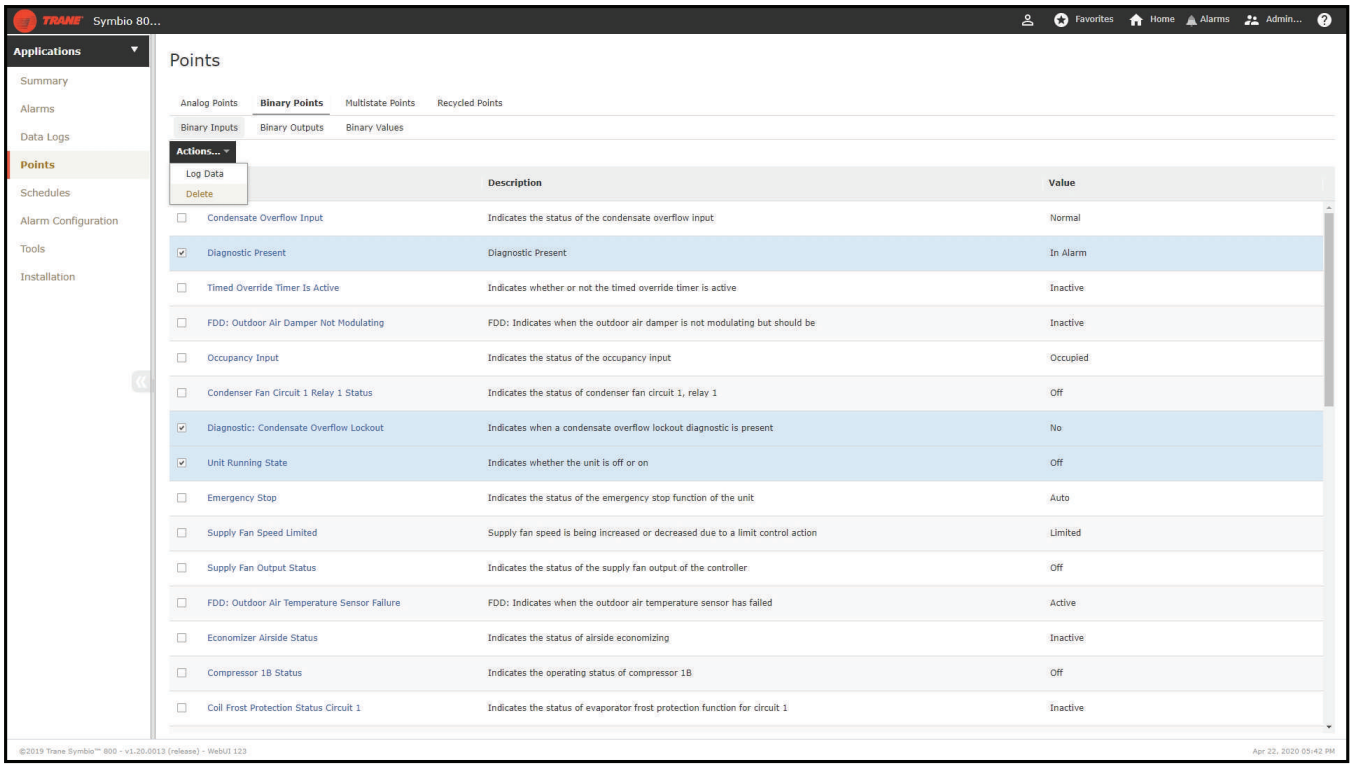


Any of the factory-provided points can be removed from the communication interface through a feature known as recycling. When the user selects and deletes a factory point, that point is moved to Recycled Points and is removed from the interface. This feature offers technicians the ability to strategically provide only those interface points desired for a specific project or installation.

To remove a point from the interface:

1. On the left-hand navigation, select **Points**.
2. Each of the points are grouped by their native type (analog, binary or multi-state), and input, output, or value. Select the appropriate group at the top of the page.
3. Select one or more points from the list and select **Actions... | Delete**.

Figure 14. Delete points

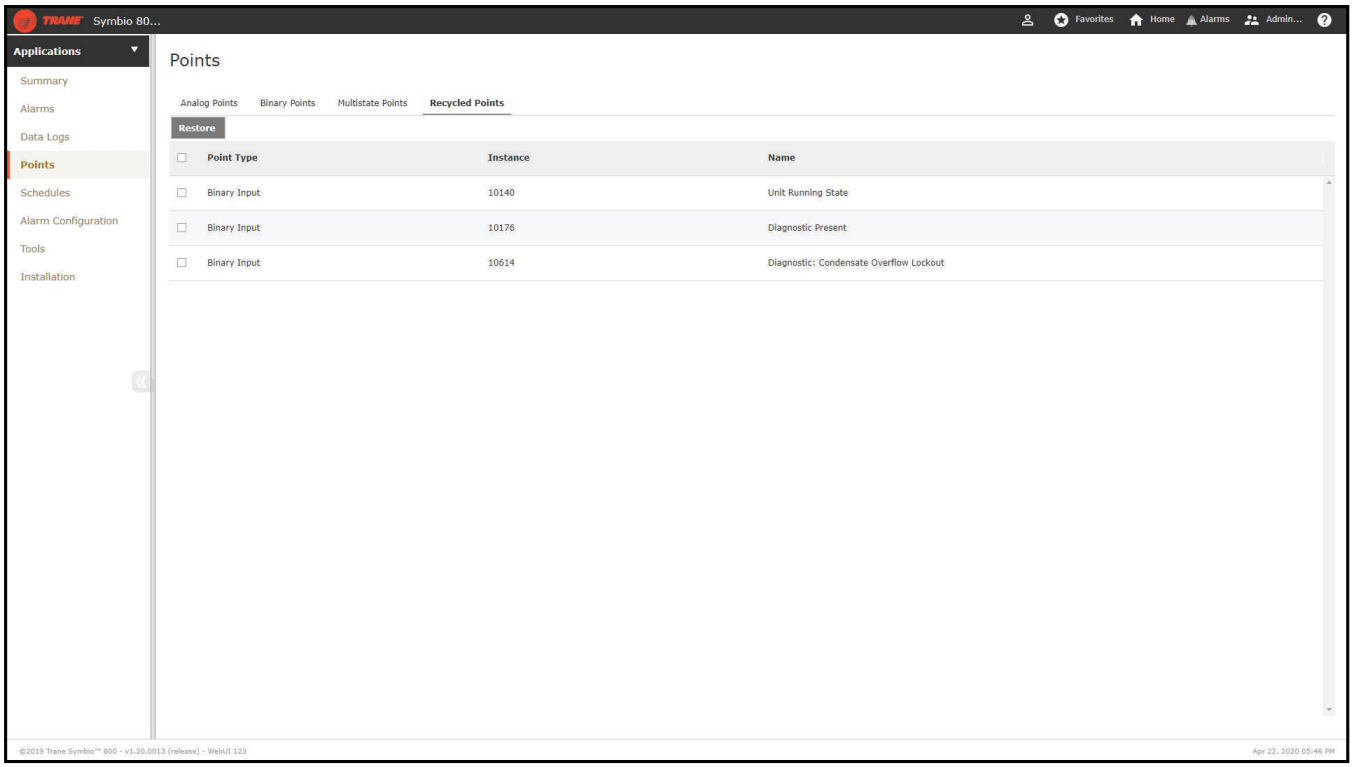


Note: *User-created points cannot be recycled. Instead, when the user selects and deletes user-created points, those points are permanently removed from the controller. Should the user decide later that one or more of the deleted user points are needed, they will need to be recreated.*

To restore recycled points:

1. Navigate to the **Recycled Points** tab on the Points page.
2. Select one or more points to be restored, then click **Restore**.
3. Once the restore process is complete, the restored points are moved back to the appropriate tab depending on point type. The recycled points also appear in the communicated interface once they are restored.

Figure 15. Recycled points tab

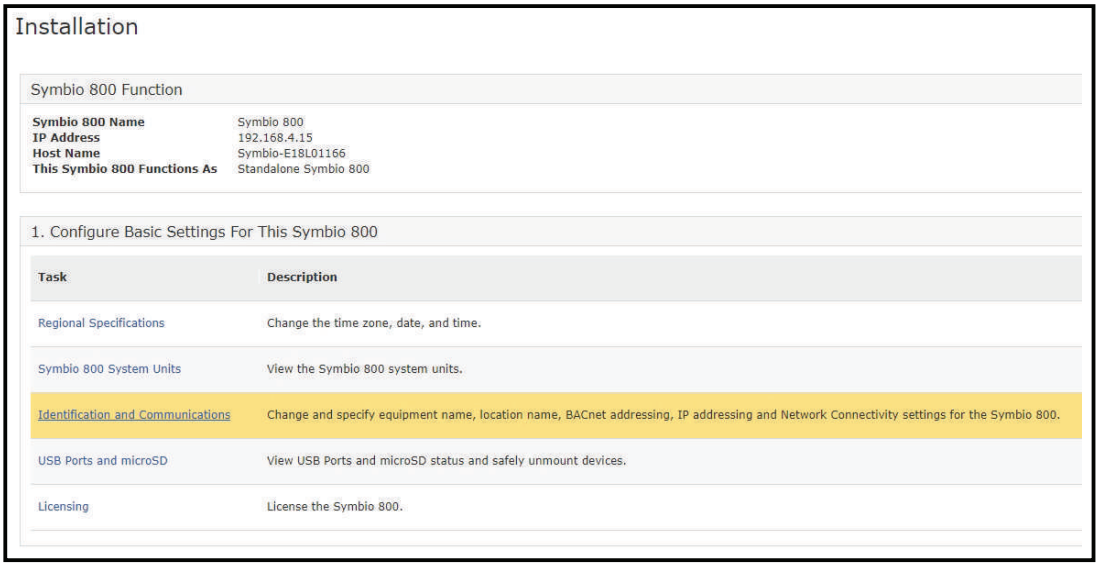


Modbus Protocol Configuration

To access the Symbio™ 800 Protocol Configuration page:

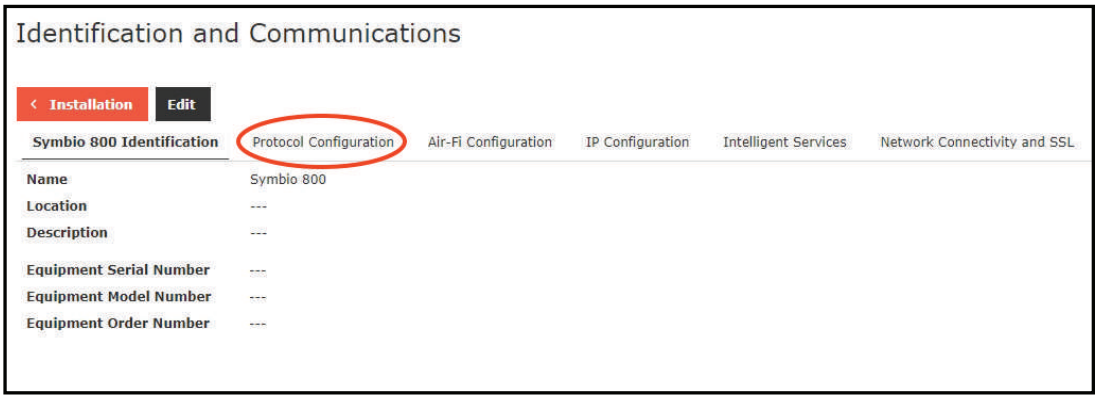
1. Connect to the Symbio™ 800 web interface.
2. On the left-hand navigation, click **Installation**.
3. Click **Identification and Communications**.

Figure 16. Identification and Communications



4. Click the **Protocol Configuration** tab.

Figure 17. Protocol Configuration



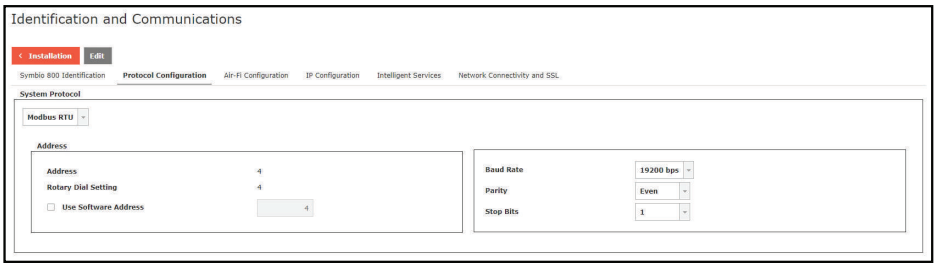
5. View the existing Protocol Configuration settings.

Modbus Protocol Settings

The rotary address on the Symbio™ 800 controller sets the Modbus address, sometimes called a device ID. Each Modbus server controller on the same Modbus RTU link must have a unique address. The valid range of Modbus RTU server addresses for the Symbio™ 800 is: **001 – 247**.

Important: *Symbio™ 800 controller will disable Modbus RTU communications if the rotary address is 000! Changing the rotary address will immediately take affect and does NOT require a power cycle to the Symbio™ 800 controller.*

Figure 18. Modbus protocol settings



1. Set the Communication Protocol drop down to **Modbus RTU**.
2. The rotary dial setting field shows the physical setting of the rotary dials on the Symbio™ 800. The address field shows the Modbus RTU address. The Modbus RTU address will match the rotary dial setting unless the Use Software address option is used. The recommendation is to change the Modbus address using the physical rotary dials on the Symbio™ 800 controller.
3. Verify the baud rate (default is 19200 bps), parity (default is Even), and stop bits (default is 1).All Modbus RTU devices on a link must communicate using the same communication parameters.

Modbus Wiring

The Modbus RTU communication wire is connected to the P1 Link. Observe wire polarity when connecting to the + and – terminals. The + terminals and the – terminals are internally connected. The second set of + and – terminals on the P1 Link are used to make it easier to wire the next Modbus RTU device in the daisy chain.

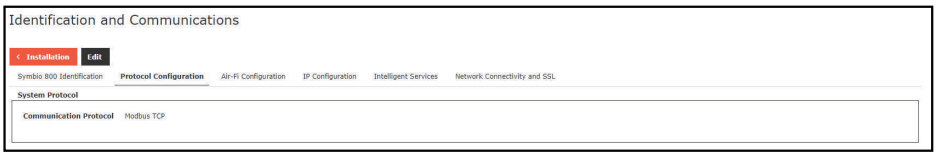
Refer to the TIA/EIA 485 standard for detailed information on Modbus RTU wiring.

Modbus TCP (Ethernet)

The Symbio™ 800 controller can communicate Modbus TCP using a standard Ethernet cable. Connect an Ethernet cable with RJ-45 connectors to Ethernet port 1 and the IP network. The Symbio™ 800 controller does not support the optional Wi-Fi module with Modbus TCP communications. The rotary address on the Symbio 800 controller is not used with Modbus TCP communications. Ethernet Port 2 is reserved for the optional touch screen display.

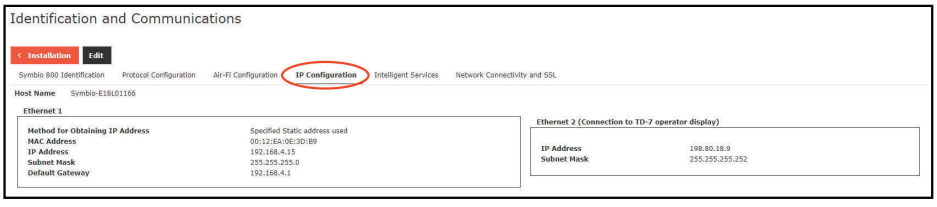
1. Set the System Protocol drop down to **Modbus TCP**.

Figure 19. Set system protocol



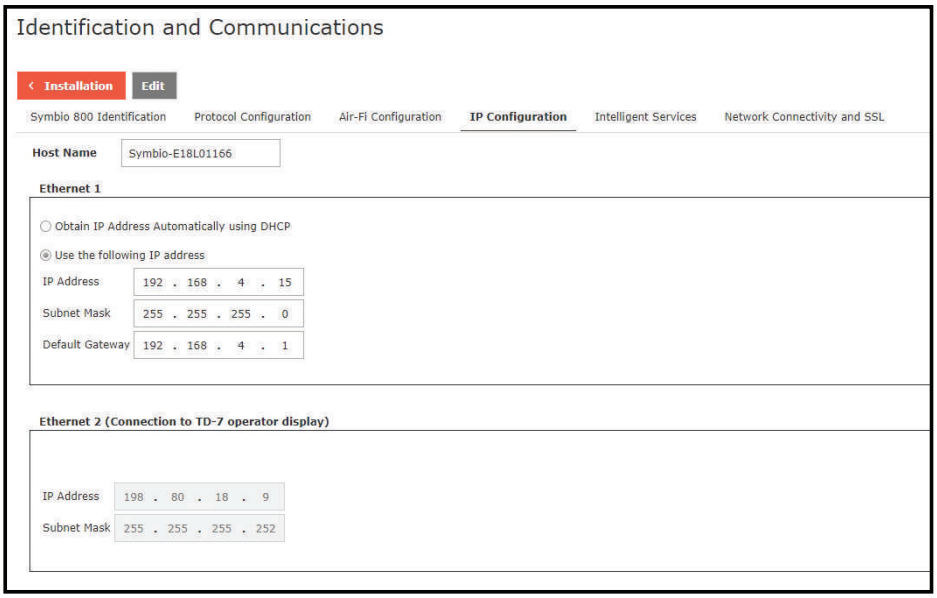
2. Click the **IP Configuration** tab to set the IP address of the Symbio™ 800 controller.

Figure 20. Set IP address



3. Click **Edit**.

Figure 21. Edit IP configuration



4. Setup the Ethernet 1 port to either ‘Obtain an IP addresss Automatically using DHCP’ or use a static IP address by manually entering the IP address, subnet mask, and default gateway. The IP address information is typically provided by the local IT administrator.
5. Set the Preferred IP Interface to **Ethernet 1**.
6. Set up the DNS section if using a Domain Name System server to identify the Symbio™ 800 controller by host name.

ModbusPoints List

Object Naming Conventions

The communicated points for the Symbio™ controllers are generally named according to their function. While many of the points are read-only, others include both read and write capability. The established naming convention helps to identify the capabilities of each point. For most points, the suffix identifies the capability according to the following definition.

While there are some exceptions, the majority of the points have been defined according to these guidelines.

Suffix	Description
Status	Points with the Status suffix are defined as read-only. The status point reports the value being used by the controller.
Local	Points with the Local suffix are defined as read-only. The local point reports values associated with controller sensors, both wired and wireless. The local value may or may not be actively used by the controller, depending on the presence or absence of a communicated value (BAS). When both a local and communicated value exist, the communicated value is used.
Active	Points with the Active suffix are defined as read-only. Points designated as active are normally the result of the arbitration between a communicated value(BAS) and at least one value local to the equipment, such as a sensor or default setpoint. The active point reports the value being input to the controller.
Setpoint	Points with the Setpoint suffix are defined as either read-only or read/write. For BACnet®, the binary input, analog input and multi-state input points are all read-only. These setpoints report the value currently in use by the controller. The analog value, binary value and multi-state value points are all read/write. These points are provided for use by the building automation system (BAS). When used, these points are written internally to arbitration logic. This defines the interaction with hardwired points, editable software configuration points and the relinquish default value/state. Refer to the Appendix for additional information.
Input	Points with the Input suffix are defined as read-only. These points normally reflect the status of a sensor input, either hardwired or communicating wirelessly (Air-Fi®). However, the input point reflects the arbitrated result of the controller sensor input and a communicated value, if present. When both a controller sensor and communicated value exist, the controller will use and report the communicated value.
Arbitrator	Points with the “Arbitrator” suffix are to be used as read-only. The arbitrator prioritizes inputs from communicating points, hardwired points and stored defaults points. The priority array of the arbitration point displays each of the values provided, including the active status, indicating which of the input sources is being used. Refer to the Appendix for additional information.
BAS	Points with the BAS suffix are defined as read/write. These points are provided for use by the building automation system (BAS). When used, these points are written to arbitration logic. This defines the interaction with hardwired points, editable software configuration points and the relinquished default value/state. Refer to the Appendix for additional information.
Command	Points with the Command suffix are defined as read/write. These points are written to change the default behavior of the controller. Once written, these point values may be persisted.
Request	Points with the Request suffix are defined as read/write. These points are written to request a change the operating behavior of the controller.

Object Format

Table 8. Register format

Register Type	Register Value	Byte Order	Invalid Values
Analog	Float, 32-bit	High Word/High Byte First	NaN
Binary	Int, 16-bit, unsigned	High Byte first	0xFFFF
Multi-state	Int, 16-bit, unsigned	High Byte first	0xFFFF

Object Data Points and Diagnostic Data Points

The following tables are sorted as follows:

- Tables are listed by input/output type and sorted by object identifier. These tables provide the user with the units type for each object type.
- Tables are sorted by object name and provide a complete list of object names, types, values/ ranges, and descriptions.

Note: *Not all points are available to the user. The available data points are defined during self-configuration and are dependent on the type of equipment.*

Table 9. Analog inputs

Modbus Register	Object Name	Units	Configuration Dependency
30011	Active Chilled Water Setpoint	Temperature	Standard
30013	Active Base Loading Setpoint	Percentage	Base Loading
30015	Active Cool/Heat Setpoint Temperature	Temperature	Standard
30017	Active Hot Water Setpoint	Temperature	Hot Water Control
30019	Active Demand Limit Setpoint	Percentage	Ice Building Not Installed
30019	Active Demand Limit Setpoint	Percentage	Ice Building
30021	Demand Limit Setpoint Status	Percentage	Ice Building
30023	Chilled Water Setpoint Status	Temperature	Standard
30025	Drive Motor Average Current RLA Circuit 1	Percentage	Standard
30027	Drive Motor Voltage	Voltage	Standard
30029	Drive DC Bus Voltage Circuit 1	Voltage	Standard
30031	AFD Frequency Circuit 1	None	Standard
30033	AFD Transistor Temperature Circuit 1	Temperature	Standard
30035	Drive Motor Current U Circuit 1	Current	Standard
30037	Drive Motor Current U RLA Circuit 1	Percentage	Standard
30039	Drive Motor Current V Circuit 1	Current	Standard
30041	Drive Motor Current V RLA Circuit 1	Percentage	Standard
30043	Drive Motor Current W Circuit 1	Current	Standard
30045	Drive Motor Current W RLA Circuit 1	Percentage	Standard
30047	Drive Output Power Circuit 1	Power, Electrical	Standard
30049	Drive Speed Status Percent	Percentage	Standard
30051	Condenser Water Flow Rate	Flow, Fluidic	Cond Water Flow Measurement
30053	Evaporator Water Flow Rate	Flow, Fluidic	Evap Water Flow Measurement
30055	Calculated Chiller Capacity	Power, Cooling	Evap Water Flow Measurement
30057	Compressor Bearing Temperature 1 - Compressor 1A	Temperature	Standard
30059	Compressor Bearing Temperature 2 - Compressor 1A	Temperature	Standard
30061	Refrigerant Discharge Temperature - Compressor 1A	Temperature	Standard
30063	Run Time - Compressor 1A (in seconds)	None	Standard
30065	Starts - Compressor 1A	None	Standard

Table 9. Analog inputs (continued)

Modbus Register	Object Name	Units	Configuration Dependency
30067	Condenser Differential Water Pressure	Pressure, Fluidic	Cond Water Flow Measurement Differential Pressure or Dual Pressure Sensors
30069	Condenser Entering Water Temperature	Temperature	Standard
30071	Condenser Leaving Water Temperature	Temperature	Standard
30073	Condenser Refrigerant Pressure Circuit 1	Pressure, Fluidic	Standard
30075	Condenser Saturated Refrigerant Temperature Circuit 1	Temperature	Standard
30077	Differential Refrigerant Pressure Circuit 1	Pressure, Fluidic	Standard
30079	Evaporator Differential Water Pressure	Pressure, Fluidic	Evap Water Flow Measurement Differential Pressure or Dual Pressure Sensors
30081	Evaporator Entering Water Temperature	Temperature	Standard
30083	Evaporator Leaving Water Temperature	Temperature	Standard
30085	Evaporator Refrigerant Pressure Circuit 1	Pressure, Fluidic	Standard
30087	Evaporator Saturated Refrigerant Temperature Circuit 1	Temperature	Standard
30089	Entering Condenser Water Pressure	Pressure, Fluidic	Cond Water Flow Measurement Differential Pressure or Dual Pressure Sensors
30091	Leaving Condenser Water Pressure	Pressure, Fluidic	Cond Water Flow Measurement Differential Pressure or Dual Pressure Sensors
30093	Entering Evaporator Water Pressure	Pressure, Fluidic	Evap Water Flow Measurement Differential Pressure or Dual Pressure Sensors
30095	Leaving Evaporator Water Pressure	Pressure, Fluidic	Evap Water Flow Measurement Differential Pressure or Dual Pressure Sensors
30097	Inlet Guide Vane 1 Percent Open Circuit 1	Percentage	Standard
30099	Motor Winding Temperature 1 Circuit 1	Temperature	Standard
30101	Motor Winding Temperature 2 Circuit 1	Temperature	Standard
30103	Motor Winding Temperature 3 Circuit 1	Temperature	Standard
30105	Number of Circuits	None	Standard
30107	Number of Compressors Circuit 1	None	Standard
30109	Number of Compressors Circuit 2	None	Standard
30111	Refrigerant Monitor	PPM	Refrigerant Monitor
30113	Unit Power Consumption	Power, Electrical	Standard
30115	Drive Input Voltage Calculated	Voltage	Standard
30117	Actual Running Capacity	Percentage	Standard
30119	Unit Source ID	None	Standard
30121	Chiller Design Capacity	Power, Cooling	Standard
30123	Outdoor Air Temperature	Temperature	Outdoor Air Temp

Table 9. Analog inputs (continued)

Modbus Register	Object Name	Units	Configuration Dependency
30125	Energy Consumption Lifetime	Energy, Electrical	Standard
30127	Energy Consumption	Energy, Electrical	Standard
30129	Unit Power Demand	Power, Electrical	Standard
30131	Voltage L1-L2	Voltage	Energy Meter
30133	Voltage L2-L3	Voltage	Energy Meter
30135	Voltage L1-L3	Voltage	Energy Meter
30137	Current L1	Current	Energy Meter
30139	Current L2	Current	Energy Meter
30141	Current L3	Current	Energy Meter
30143	Line Frequency	None	Energy Meter
30145	Power Factor	None	Energy Meter
30147	Condenser Control Output	Percentage	Condenser Control Output
30149	Average Voltage L-L	Voltage	Energy Meter
30151	Average Current	Current	Energy Meter
30153	Condenser Approach Temperature Circuit 1	Temperature, Delta	Standard
30155	Evaporator Approach Temperature Circuit 1	Temperature, Delta	Standard

Table 10. Analog values

Modbus Register	Object Name	Units	Configuration Dependency
40011	Chilled Water Setpoint	Temperature	Standard
40013	Demand Limit Setpoint	Percentage	Standard
40015	Hot Water Setpoint	Temperature	Hot Water Control
40017	Base Loading Setpoint	Percentage	Base Loading

Table 11. Binary inputs

Modbus Register	Object Name	Object States	Configuration Dependency
33011	Diagnostic Present	0 = Normal 1 = In Alarm	Standard
33012	Diagnostic Shutdown Present	0 = Normal 1 = In Alarm	Standard
33013	Diagnostic: Manual Reset Required	0 = Normal 1 = In Alarm	Standard
33014	Diagnostic: Local Manual Reset Required	0 = Normal 1 = In Alarm	Standard
33015	Diagnostic Present: Information	0 = Normal 1 = In Alarm	Standard
33016	Diagnostic Present: Advisory	0 = Normal 1 = In Alarm	Standard
33017	Diagnostic Present: Critical	0 = Normal 1 = In Alarm	Standard

Table 11. Binary inputs (continued)

Modbus Register	Object Name	Object States	Configuration Dependency
33018	Diagnostic Present: Service Required	0 = Normal 1 = In Alarm	Standard
33019	Base Loading Active	0 = Inactive 1 = Active	Base Loading
33020	Chiller Running State	0 = Off 1 = On	Standard
33021	Condenser Water Flow Status	0 = No Flow 1 = Flow	Standard
33022	Condenser Water Pump Request	0 = Off 1 = On	Standard
33023	Emergency Stop	0 = Auto 1 = Emergency Stop - Manual Reset Required	Standard
33024	Evaporator Water Flow Status	0 = No Flow 1 = Flow	Standard
33025	Evaporator Water Pump Request	0 = Off 1 = On	Standard
33026	Base Loading Request Active	0 = Off 1 = On	Base Loading
33027	Head Relief Request	0 = Off 1 = On	Standard
33028	Limit Mode Relay Status	0 = Off 1 = On	Standard
33029	Local Setpoint Control	0 = Remote Control 1 = Local Control	Standard
33030	Manual Override Exists	0 = Off 1 = On	Standard
33031	Maximum Capacity	0 = Off 1 = On	Standard
33032	Run Enabled	0 = Run Not Enabled 1 = Run Enabled	Standard
33033	Compressor 1A Status	0 = Off 1 = Running	Standard
33034	Front Panel Auto Stop	0 = Stop 1 = Auto	Standard
33035	External Auto Stop Input Status	0 = Stop 1 = Auto	Standard

Table 12. Binary input diagnostics

Object Identifier	Object Name	Object States
34001	Comm Loss: Ext Base Loading Command	0 = Normal 1 = In Alarm
34002	Comm Loss: Ext Base Loading Setpoint	0 = Normal 1 = In Alarm
34003	Diagnostic: External Base Loading Setpoint	0 = Normal 1 = In Alarm

Table 12. Binary input diagnostics (continued)

Object Identifier	Object Name	Object States
34004	Comm Loss: Energy Meter	0 = Normal 1 = In Alarm
34005	Comm Loss: Outdoor Air Temperature	0 = Normal 1 = In Alarm
34006	Diagnostic: Energy Meter Write Command Failure	0 = Normal 1 = In Alarm
34007	Diagnostic: Outdoor Air Temperature Sensor	0 = Normal 1 = In Alarm
34008	Diagnostic: Software Error 1001: Call Trane Service	0 = Normal 1 = In Alarm
34009	Diagnostic: Software Error 1002: Call Trane Service	0 = Normal 1 = In Alarm
34010	Diagnostic: Software Error 1003: Call Trane Service	0 = Normal 1 = In Alarm
34011	Comm Loss: Condenser Liquid Level Sensor Circuit 1	0 = Normal 1 = In Alarm
34012	Comm Loss: Condenser Rfgt Pressure Circuit 1	0 = Normal 1 = In Alarm
34013	Comm Loss: Drive Cooling Supply Temperature Circuit 1	0 = Normal 1 = In Alarm
34014	Comm Loss: Drive Cooling Valve Circuit 1	0 = Normal 1 = In Alarm
34015	Comm Loss: Evaporator Refrigerant Pressure Circuit 1	0 = Normal 1 = In Alarm
34016	Diagnostic: Condenser Liquid Level Sensor Circuit 1	0 = Normal 1 = In Alarm
34017	Diagnostic: Condenser Refrigerant Pressure Sensor Circuit 1	0 = Normal 1 = In Alarm
34018	Diagnostic: Drive Cooling Supply Temperature Sensor Circuit 1	0 = Normal 1 = In Alarm
34019	Diagnostic: Evaporator Refrigerant Pressure Sensor Circuit 1	0 = Normal 1 = In Alarm
34020	Diagnostic: High Condenser Liquid Level Circuit 1	0 = Normal 1 = In Alarm
34021	Diagnostic: Low Condenser Liquid Level Circuit 1	0 = Normal 1 = In Alarm
34022	Diagnostic: Inverted Condenser Approach Temperature	0 = Normal 1 = In Alarm
34023	Diagnostic: Inverted Evaporator Approach Temperature	0 = Normal 1 = In Alarm
34024	Diagnostic: Loss of Drive Cooling Control Circuit 1	0 = Normal 1 = In Alarm
34025	Diagnostic: Loss of Evaporator EXV Control Circuit 1	0 = Normal 1 = In Alarm
34026	Diagnostic: Low Evaporator Refrigerant Temperature Circuit 1	0 = Normal 1 = In Alarm
34027	Comm Loss: Cprsr Discharge Rfgt Temp Circuit 1	0 = Normal 1 = In Alarm
34028	Comm Loss: Economizer Valve Circuit 1	0 = Normal 1 = In Alarm
34029	Comm Loss: Economizer Pressure Circuit 1	0 = Normal 1 = In Alarm
34030	Comm Loss: Economizer Temperature Circuit 1	0 = Normal 1 = In Alarm
34031	Comm Loss: IGV First Stage Actuator Circuit 1	0 = Normal 1 = In Alarm
34032	Comm Loss: Interstage Bypass Valve Circuit 1	0 = Normal 1 = In Alarm
34033	Diagnostic: Compressor Refrigerant Discharge Temperature Sensor Circuit 1	0 = Normal 1 = In Alarm
34034	Diagnostic: Economizer Pressure Sensor Circuit 1	0 = Normal 1 = In Alarm
34035	Diagnostic: Economizer Temperature Sensor Circuit 1	0 = Normal 1 = In Alarm

Table 12. Binary input diagnostics (continued)

Object Identifier	Object Name	Object States
34036	Diagnostic: Extended Compressor Surge Circuit 1	0 = Normal 1 = In Alarm
34037	Diagnostic: Condenser Water Flow Lost	0 = Normal 1 = In Alarm
34038	Diagnostic: Condenser Water Flow Overdue	0 = Normal 1 = In Alarm
34039	Diagnostic: High Condenser Pressure Circuit 1	0 = Normal 1 = In Alarm
34040	Comm Loss: Condenser Entering Water Pressure	0 = Normal 1 = In Alarm
34041	Comm Loss: Condenser Entering Water Temp	0 = Normal 1 = In Alarm
34042	Comm Loss: Condenser Leaving Water Pressure	0 = Normal 1 = In Alarm
34043	Comm Loss: Condenser Leaving Water Temp	0 = Normal 1 = In Alarm
34044	Comm Loss: Condenser Water Flow Measurement Sensor	0 = Normal 1 = In Alarm
34045	Comm Loss: Condenser Water Flow Switch	0 = Normal 1 = In Alarm
34046	Comm Loss: Condenser Water Pump Relay	0 = Normal 1 = In Alarm
34047	Diagnostic: Condenser Entering Water Pressure	0 = Normal 1 = In Alarm
34048	Diagnostic: Condenser Entering Water Temp Sensor	0 = Normal 1 = In Alarm
34049	Diagnostic: Condenser Leaving Water Pressure	0 = Normal 1 = In Alarm
34050	Diagnostic: Condenser Leaving Water Temp Sensor	0 = Normal 1 = In Alarm
34051	Diagnostic: Condenser Water Flow Measurement Sensor	0 = Normal 1 = In Alarm
34052	Diagnostic: Inverted Condenser Water Temperature	0 = Normal 1 = In Alarm
34053	Diagnostic: Evaporator Water Flow Lost	0 = Normal 1 = In Alarm
34054	Diagnostic: Evaporator Water Flow Overdue	0 = Normal 1 = In Alarm
34055	Diagnostic: High Evaporator Refrigerant Pressure	0 = Normal 1 = In Alarm
34056	Diagnostic: High Evaporator Water Temperature	0 = Normal 1 = In Alarm
34057	Diagnostic: Low Evaporator Water Flow	0 = Normal 1 = In Alarm
34058	Comm Loss: Evap Entering Water Temp	0 = Normal 1 = In Alarm
34059	Comm Loss: Evap Leaving Water Temp	0 = Normal 1 = In Alarm
34060	Comm Loss: Evaporator Entering Water Pressure	0 = Normal 1 = In Alarm
34061	Comm Loss: Evaporator Leaving Water Pressure	0 = Normal 1 = In Alarm
34062	Comm Loss: Evaporator Water Flow Measurement Sensor	0 = Normal 1 = In Alarm
34063	Comm Loss: Evaporator Water Flow Switch	0 = Normal 1 = In Alarm
34064	Comm Loss: Evaporator Water Pump Relay	0 = Normal 1 = In Alarm
34065	Diagnostic: Evaporator Entering Water Pressure	0 = Normal 1 = In Alarm
34066	Diagnostic: Evaporator Entering Water Temp Sensor	0 = Normal 1 = In Alarm
34067	Diagnostic: Evaporator Leaving Water Pressure	0 = Normal 1 = In Alarm

Table 12. Binary input diagnostics (continued)

Object Identifier	Object Name	Object States
34068	Diagnostic: Evaporator Leaving Water Temp Sensor	0 = Normal 1 = In Alarm
34069	Diagnostic: Evaporator Water Flow Measurement Sensor	0 = Normal 1 = In Alarm
34070	Diagnostic: Inverted Evaporator Water Temperature	0 = Normal 1 = In Alarm
34071	Diagnostic: Low Evap Leaving Water Temp: Unit Off	0 = Normal 1 = In Alarm
34072	Diagnostic: Low Evap Leaving Water Temp: Unit On	0 = Normal 1 = In Alarm
34073	Comm Loss: Evaporator EXV Circuit 1	0 = Normal 1 = In Alarm
34074	Comm Loss: Chiller % Capacity Output	0 = Normal 1 = In Alarm
34075	Comm Loss: Condenser Rfgt Pressure Output	0 = Normal 1 = In Alarm
34076	Comm Loss: Emergency Stop	0 = Normal 1 = In Alarm
34077	Comm Loss: Ext Chilled/Hot Water Setpoint	0 = Normal 1 = In Alarm
34078	Comm Loss: Ext Demand Limit Setpoint	0 = Normal 1 = In Alarm
34079	Comm Loss: External Auto/Stop	0 = Normal 1 = In Alarm
34080	Comm Loss: External Hot Water Command	0 = Normal 1 = In Alarm
34081	Comm Loss: Programmable Relay Board 1	0 = Normal 1 = In Alarm
34082	Comm Loss: Programmable Relay Board 2	0 = Normal 1 = In Alarm
34083	Diagnostic: Emergency Stop	0 = Normal 1 = In Alarm
34084	Diagnostic: External Chilled/Hot Water Setpoint	0 = Normal 1 = In Alarm
34085	Diagnostic: External Demand Limit Setpoint	0 = Normal 1 = In Alarm
34086	Comm Loss: Refrigerant Monitor Input	0 = Normal 1 = In Alarm
34087	Diagnostic: Refrigerant Monitor Input	0 = Normal 1 = In Alarm
34088	Comm Loss: External Ice Building Command	0 = Normal 1 = In Alarm
34089	Comm Loss: Ice Building Status Relay	0 = Normal 1 = In Alarm
34090	Diagnostic: MBC Bearing Temperature 1 Circuit 1	0 = Normal 1 = In Alarm
34091	Diagnostic: MBC Bearing Temperature 2 Circuit 1	0 = Normal 1 = In Alarm
34092	Diagnostic: MBC Failed Centering Circuit 1	0 = Normal 1 = In Alarm
34093	Comm Loss: MBC Cooling Valve Circuit 1	0 = Normal 1 = In Alarm
34094	Comm Loss: Magnetic Bearing Controller Circuit 1	0 = Normal 1 = In Alarm
34095	Comm Loss: UPS Fault Circuit 1	0 = Normal 1 = In Alarm
34096	Diagnostic: Loss of MBC Cooling Control Circuit 1	0 = Normal 1 = In Alarm
34097	Diagnostic: MBC Not Centered Circuit 1	0 = Normal 1 = In Alarm
34098	Diagnostic: MBC Not Ready To Rotate Circuit 1	0 = Normal 1 = In Alarm
34099	Diagnostic: MBC Over Voltage Circuit 1	0 = Normal 1 = In Alarm

Table 12. Binary input diagnostics (continued)

Object Identifier	Object Name	Object States
34100	Diagnostic: MBC Parameter Table Not Set Circuit 1	0 = Normal 1 = In Alarm
34101	Diagnostic: MBC Rotor Elongation Circuit 1	0 = Normal 1 = In Alarm
34102	Diagnostic: MBC Rotor Unbalance Alarm Circuit 1	0 = Normal 1 = In Alarm
34103	Diagnostic: MBC: Shutdown Request Circuit 1	0 = Normal 1 = In Alarm
34104	Diagnostic: MBC Under Voltage Circuit 1	0 = Normal 1 = In Alarm
34105	Diagnostic: MBC Overspeed Circuit 1	0 = Normal 1 = In Alarm
34106	Diagnostic: MBC PCB Temperature Circuit 1	0 = Normal 1 = In Alarm
34107	Diagnostic: MBC Rotation Detected Without Levitation Circuit 1	0 = Normal 1 = In Alarm
34108	Diagnostic: MBC Speed Sensor Circuit 1	0 = Normal 1 = In Alarm
34109	Diagnostic: UPS Fault Circuit 1	0 = Normal 1 = In Alarm
34110	Comm Loss: Motor Cooling Valve Circuit 1	0 = Normal 1 = In Alarm
34111	Comm Loss: Motor Winding Temperature 1 Circuit 1	0 = Normal 1 = In Alarm
34112	Comm Loss: Motor Winding Temperature 2 Circuit 1	0 = Normal 1 = In Alarm
34113	Comm Loss: Motor Winding Temperature 3 Circuit 1	0 = Normal 1 = In Alarm
34114	Diagnostic: High Compressor Refrigerant Discharge Temperature Circuit 1	0 = Normal 1 = In Alarm
34115	Diagnostic: High Motor Winding Temperature 1 Circuit 1	0 = Normal 1 = In Alarm
34116	Diagnostic: High Motor Winding Temperature 2 Circuit 1	0 = Normal 1 = In Alarm
34117	Diagnostic: High Motor Winding Temperature 3 Circuit 1	0 = Normal 1 = In Alarm
34118	Diagnostic: High Vacuum Lockout Circuit 1	0 = Normal 1 = In Alarm
34119	Diagnostic: Loss of Motor Cooling Control Circuit 1	0 = Normal 1 = In Alarm
34120	Diagnostic: Motor Winding Temperature 1 Sensor Circuit 1	0 = Normal 1 = In Alarm
34121	Diagnostic: Motor Winding Temperature 2 Sensor Circuit 1	0 = Normal 1 = In Alarm
34122	Diagnostic: Motor Winding Temperature 3 Sensor Circuit 1	0 = Normal 1 = In Alarm
34123	Diagnostic: MP: Invalid Configuration	0 = Normal 1 = In Alarm
34124	Diagnostic: MP: Reset Has Occurred	0 = Normal 1 = In Alarm
34125	Diagnostic: AFD Comm Loss: Main Processor Circuit 1	0 = Normal 1 = In Alarm
34126	Diagnostic: AFD Failure to Arm or Start Circuit 1	0 = Normal 1 = In Alarm
34127	Diagnostic: AFD Fault Circuit 1	0 = Normal 1 = In Alarm
34128	Diagnostic: AFD Ground Fault Circuit 1	0 = Normal 1 = In Alarm
34129	Diagnostic: AFD Interrupt Failure Circuit 1	0 = Normal 1 = In Alarm
34130	Diagnostic: AFD Mains Failure Circuit 1	0 = Normal 1 = In Alarm
34131	Diagnostic: AFD Motor Current Overload Circuit 1	0 = Normal 1 = In Alarm

Table 12. Binary input diagnostics (continued)

Object Identifier	Object Name	Object States
34132	Diagnostic: AFD Safe Stop Circuit 1	0 = Normal 1 = In Alarm
34133	Diagnostic: AFD Short Circuit Circuit 1	0 = Normal 1 = In Alarm
34134	Diagnostic: AFD Speed Configuration Mismatch Circuit 1	0 = Normal 1 = In Alarm
34135	Comm Loss: Adaptive Frequency Drive Circuit 1	0 = Normal 1 = In Alarm
34136	Diagnostic: Unexpected Starter Shutdown Circuit 1	0 = Normal 1 = In Alarm
34137	Diagnostic: Software Error 1005: Call Trane Service	0 = Normal 1 = In Alarm
34138	Comm Loss: Starter Panel High Temp Limit Compressor 1A	0 = Normal 1 = In Alarm
34139	Diagnostic: Starter Panel High Temp Limit Compressor 1A	0 = Normal 1 = In Alarm
34140	Comm Loss: Subcooled Liquid Temp Circuit 1	0 = Normal 1 = In Alarm
34141	Comm Loss: External Ckt Lockout Circuit 1	0 = Normal 1 = In Alarm
34142	Diagnostic: Subcooled Liquid Temperature Sensor Circuit 1	0 = Normal 1 = In Alarm
34143	Diagnostic: Evaporator Saturated Refrigerant Temp Sensor Circuit 1	0 = Normal 1 = In Alarm
34144	Comm Loss: Evap Saturated Rfgt Temp Circuit 1	0 = Normal 1 = In Alarm
34145	Diagnostic: Low Suction Refrigerant Pressure Circuit 1	0 = Normal 1 = In Alarm
34146	Diagnostic: High Differential Refrigerant Pressure Circuit 1	0 = Normal 1 = In Alarm
34147	Diagnostic: High Refrigerant Pressure Ratio Circuit 1	0 = Normal 1 = In Alarm
34148	Diagnostic: Starts/Hours Modified Compressor 1A	0 = Normal 1 = In Alarm
34149	Diagnostic: Starts/Hours Modified Compressor 2A	0 = Normal 1 = In Alarm
34150	Diagnostic: High Evaporator Refrigerant Temperature Circuit 1	0 = Normal 1 = In Alarm
34151	Comm Loss: Off-cycle Freeze Protection Relay Circuit 1	0 = Normal 1 = In Alarm
34152	Comm Loss: Condenser Head Pressure Cntrl Output Circuit 1	0 = Normal 1 = In Alarm
34153	Comm Loss: Ext Noise Reduction Request Circuit 1	0 = Normal 1 = In Alarm
34154	Diagnostic: MBC Failed Clearance Check Circuit 1	0 = Normal 1 = In Alarm
34155	Diagnostic: Check Clock	0 = Normal 1 = In Alarm
34156	Diagnostic: MP: Non-Volatile Block Test Error	0 = Normal 1 = In Alarm
34157	Diagnostic: Under Voltage Circuit 1	0 = Normal 1 = In Alarm
34158	Diagnostic: Over Voltage Circuit 1	0 = Normal 1 = In Alarm

Table 13. Binary values

Modbus Register	Object Name	Object States	Configuration Dependency
43011	Base Loading Request	0 = Off 1 = On	Base Loading
43012	Reset Diagnostic	0 = Normal 1 = Reset	Standard

Table 13. Binary values (continued)

Modbus Register	Object Name	Object States	Configuration Dependency
43013	Chiller Auto Stop Command BAS	0 = Stop 1 = Auto	Standard
43014	Energy Consumption Reset	0 = Accumulating 1 = Reset	Standard

Table 14. Multi-state inputs

Modbus Register	Object Name	Object States	Configuration Dependency
32011	Operating Mode	1 = Cool 2 = Heat 3 = Ice Making 4 = Free Cooling	Standard
32012	Running Mode	1 = Chiller Off 2 = Chiller In Start Mode 3 = Chiller In Run Mode 4 = Chiller In Pre-Shutdown Mode 5 = Chiller In Service Mode	Standard
32013	Manufacturing Location	1 = Field Applied 2 = La Crosse 3 = Pueblo 4 = Charmes 5 = Rushville 6 = Macon 7 = Waco 8 = Lexington 9 = Forsyth 10 = Clarksville 11 = Ft. Smith 12 = Penang 13 = Colchester 14 = Curitiba 15 = Taicang 16 = Taiwan 17 = Epinal 18 = Golbey	Standard
32014	Chiller Setpoint Source	1 = BAS 2 = External 3 = Front Panel	Standard
32015	Refrigerant Type	1 = R-11 2 = R-12 3 = R-22 4 = R-123 5 = R-134a 6 = R-407C 7 = R-410A 8 = R-113 9 = R-114 10 = R-500 11 = R-502 12 = R-404A 13 = R-513A 14 = R-1233zd(E) 15 = R-514A 16 = R-1234ze€	Standard

Table 14. Multi-state inputs (continued)

Modbus Register	Object Name	Object States	Configuration Dependency
32016	Cooling Type	1 =Water Cooled 2 = Air Cooled	Standard
32017	Model Information [GEN2]	1 = CVHF 2 = CVGF 3 = CVHS 4 = RTAE 5 = RTAF 6= RTHA 7 = RTHB 8 = RTHC 9 = RTHD 10 = RTWE 11 = CTVD 12 = CVR 13 = CVHH 14 = CDHH 15 = VMAX 16 = GVAF 17 = RTWF 18 = RTHF 19 = RTAC 20 = CVHM 21 = RTAG 22 = CGAF 23 = RTXG 24 = GVWF 25 = HDWA 26 = CMAC 27 = IPAK 28 = CXAF 29 = ACSA 30 = RTSF 31 = HSWA 32 = ACRA 33 = RTEG 34 = ACXA 35 = CMAF 36 = ACRB Large 37 = ACRB Small 38 = CVHE 39 = CVHG 40 = CVHL	Standard

Table 15. Multi-state values

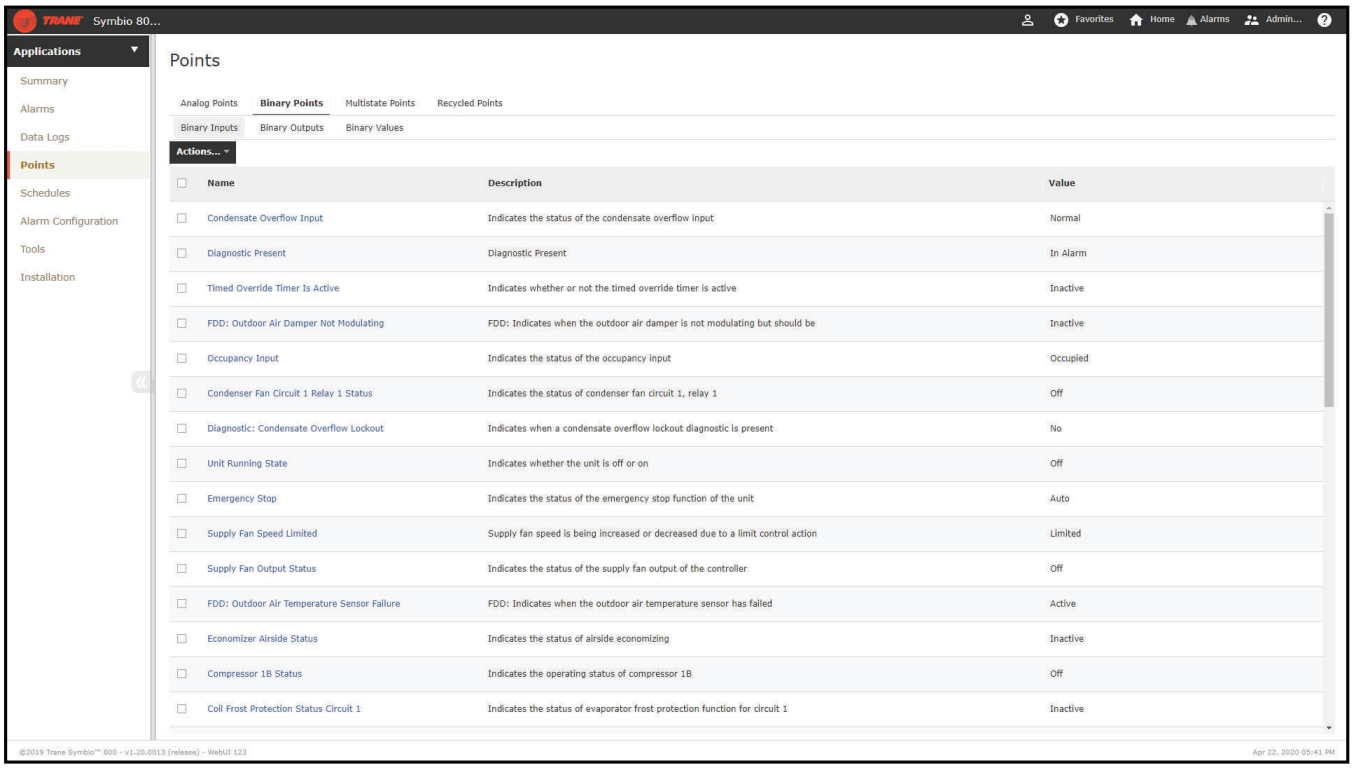
Modbus Register	Object Name	Object States	Configuration Dependency
42011	Chiller Mode Command BAS	1 = Cool 2 = Heat 3 = Ice Making 4 = Free Cooling	Standard

Recycled Points

The Symbio™ 800 controller ships from the factory pre-configured for the specific unit application. The points of the communicated interface (BACnet®, Modbus®, or LonTalk®) vary based on the unit configuration. Only those points pertinent to that configuration are included in the interface.

Example: When the unit is configured for only two compressors, any points associated with compressors three and four are not be displayed on the Touch Screen interface or browser-based Web user interface. When configuration changes are made in the field, the points in the communication interface change accordingly to align with those features or user-added points.

Figure 22. Points

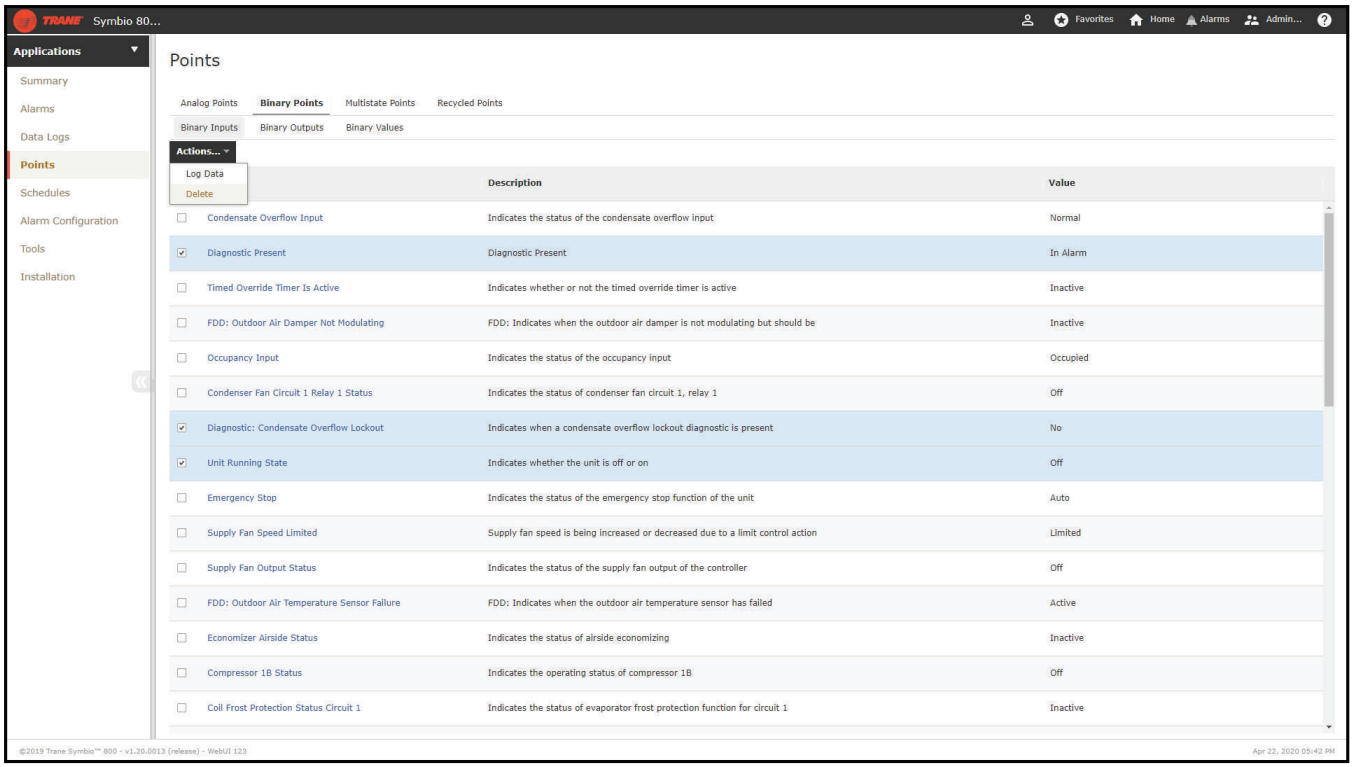


Any of the factory-provided points can be removed from the communication interface through a feature known as recycling. When the user selects and deletes a factory point, that point is moved to Recycled Points and is removed from the interface. This feature offers technicians the ability to strategically provide only those interface points desired for a specific project or installation.

To remove a point from the interface:

1. On the left-hand navigation, select **Points**.
2. Each of the points are grouped by their native type (analog, binary or multi-state), and input, output, or value. Select the appropriate group at the top of the page.
3. Select one or more points from the list and select **Actions... | Delete**.

Figure 23. Delete points

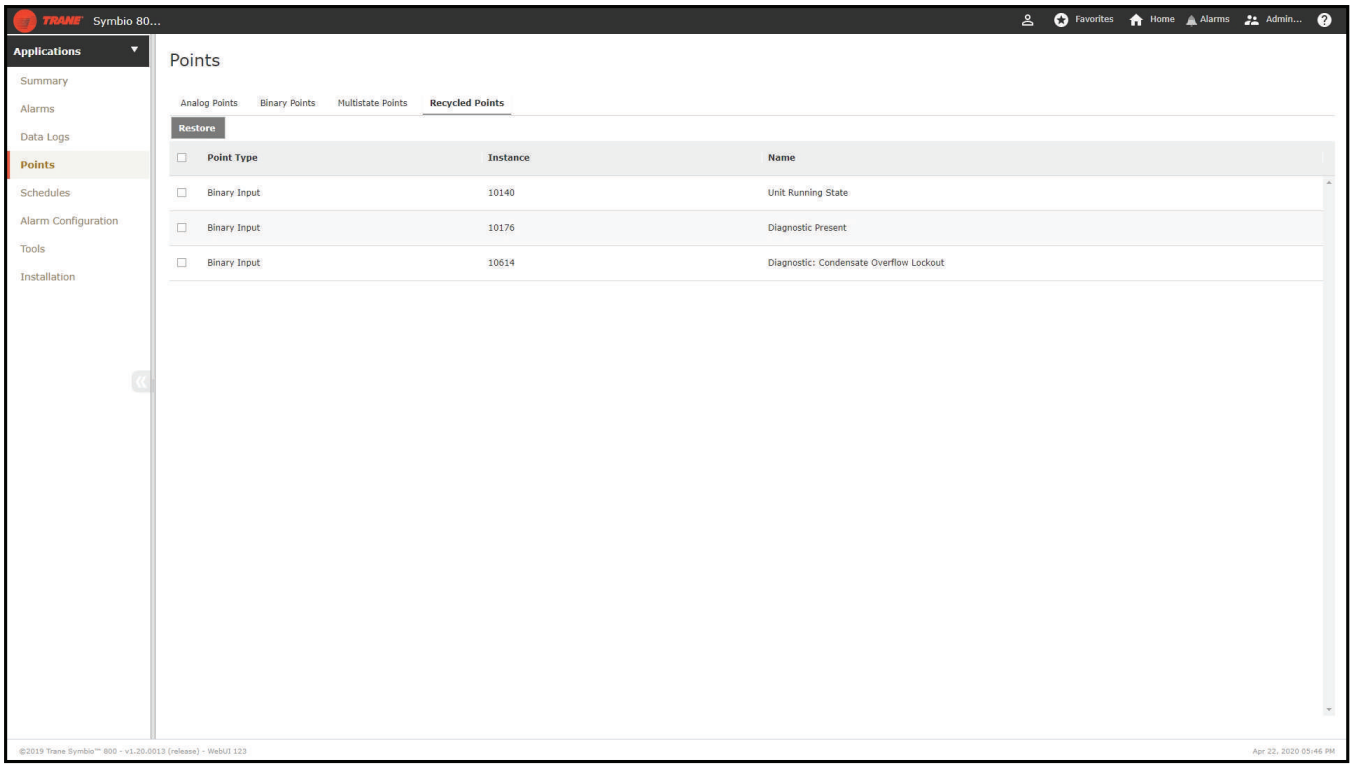


Note: *User-created points cannot be recycled. Instead, when the user selects and deletes user-created points, those points are permanently removed from the controller. Should the user decide later that one or more of the deleted user points are needed, they will need to be recreated.*

To restore recycled points:

1. Navigate to the **Recycled Points** tab on the Points page.
2. Select one or more points to be restored, then click **Restore**.
3. Once the restore process is complete, the restored points are moved back to the appropriate tab depending on point type. The recycled points also appear in the communicated interface once they are restored.

Figure 24. Recycled points tab



Appendix A. Arbitration

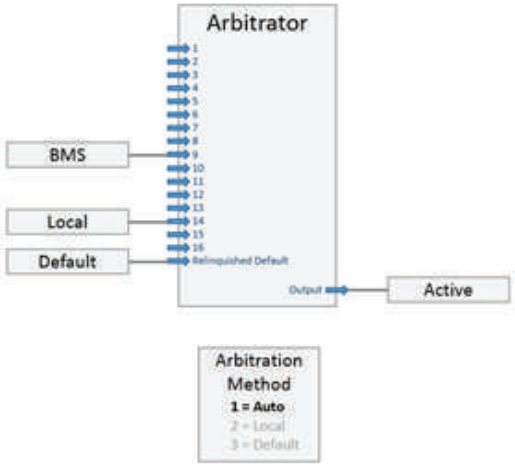
The Symbio™ 800 controller includes arbitration logic for several points. For each read/write point designated as “BAS”, an associated “Arbitration” point determines the behavior of that communicated data compared to the local hardwired (or wireless) sensor and a default value.

As shown in Figure 25, p. A–1, the arbitrator considers all possible sources of the provided data, including Building Management Systems (BMS), local, and default. Each potential source is defined at a pre-determined, fixed priority. When the arbitration method is selected as full/auto, the BMS value is used instead of the local or default values.

The point designator with the arbitrator suffix includes the full priority array, allowing the user to see the value associated with all potential sources considered in the logic. The active point reflects the result of the arbitration logic.

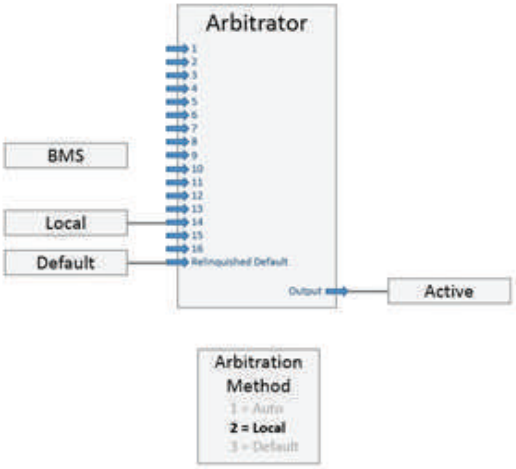
Because the arbitrated points are normally associated with sensors, the default value is invalid, meaning the value must be provided either by the BMS or the local sensor.

Figure 25. Arbitration method - full/auto



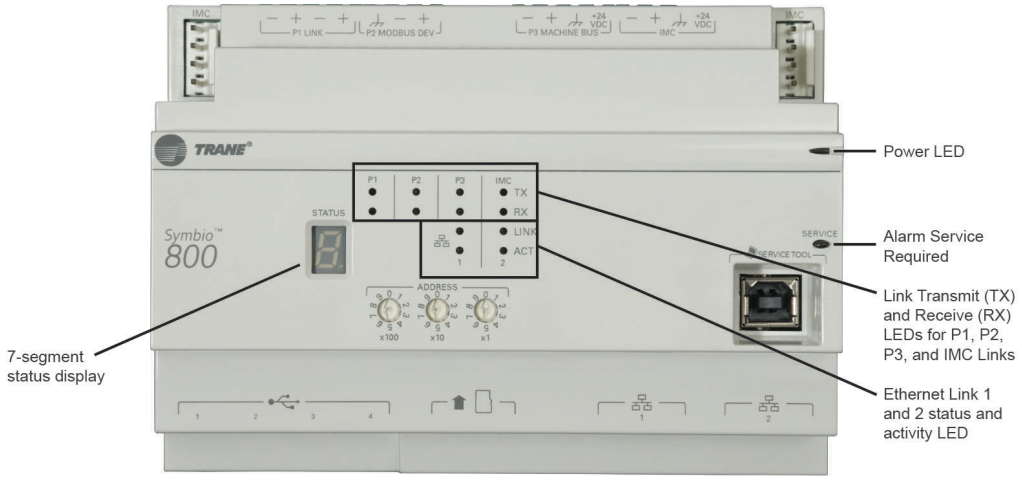
When the Arbitration Method is selected as local, the BMS value is ignored and local value is used instead. Though the arbitration logic still considers all inputs, any values sent by the BMS are effectively ignored.

Figure 26. Arbitration method - local



Appendix B. Symbio™ 800 Controller Layout

Figure 27. Symbio 800 controller display and LEDs



7–Segment status display

Table 16. Codes for 7–segment display segment

Code	Description
U0.	Waiting for USB drives to mount
U2.	Checking signature on the .scfw file
U3.	Checking software maintenance plan
U4.	Reformatting main filesystem (clearing database)
U5.	Beginning update
U12.	Searching for .scfw files on USB drive(s)
U51.	Updating main firmware
U54.	Updating FPGA image
U55.	Updating U-boot image
U57.	Updating recovery partition

Note: *A code starting with an "F" indicates a failure, and requires Trane Service to resolve the issue.*

P1 Link — BACnet® MS/TP or Modbus® RTU

- RS-485 daisy chain
- Used for connection to a manager controller

Figure 28. P2 Modbus device (factory installed Modbus server devices)

Note: *The P2 link is intended for factory devices only and should not have any other devices added this link.*

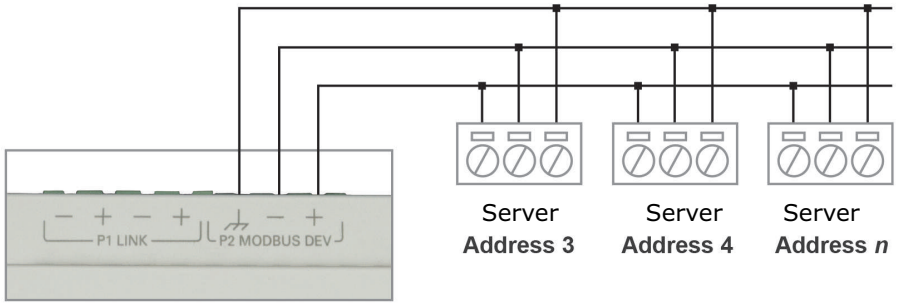


Figure 29. P3 machine bus (global bus — internal communication bus)

Note: *The P3 link is intended for factory devices only and should not have any other devices added this link.*

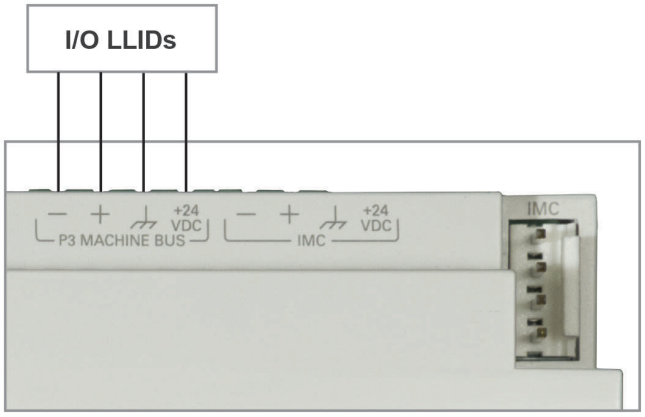
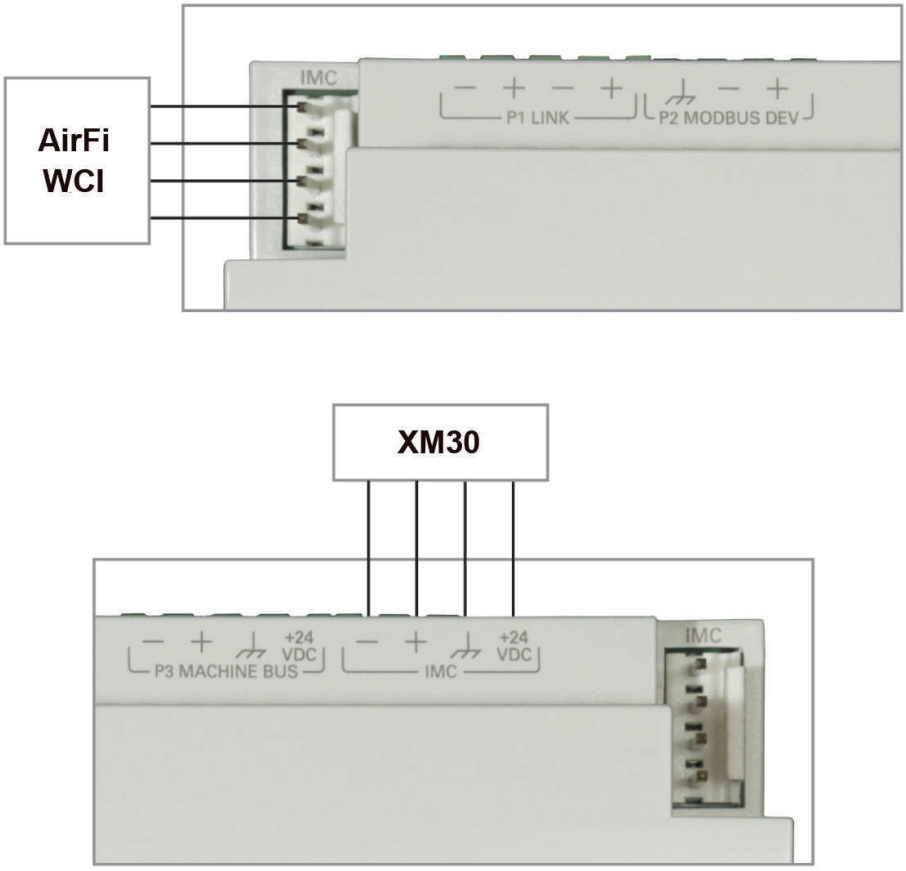
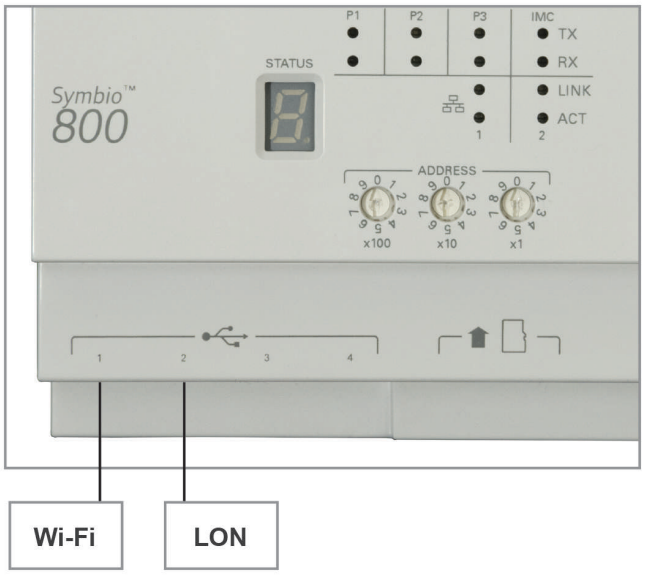


Figure 30. IMC link terminations for optional Air-Fi® and expansion module (XM30)



For more information on Expansion Module wiring reference BAS-SVX46 – Expansion Module Installation Operation and Maintenance Manual.*

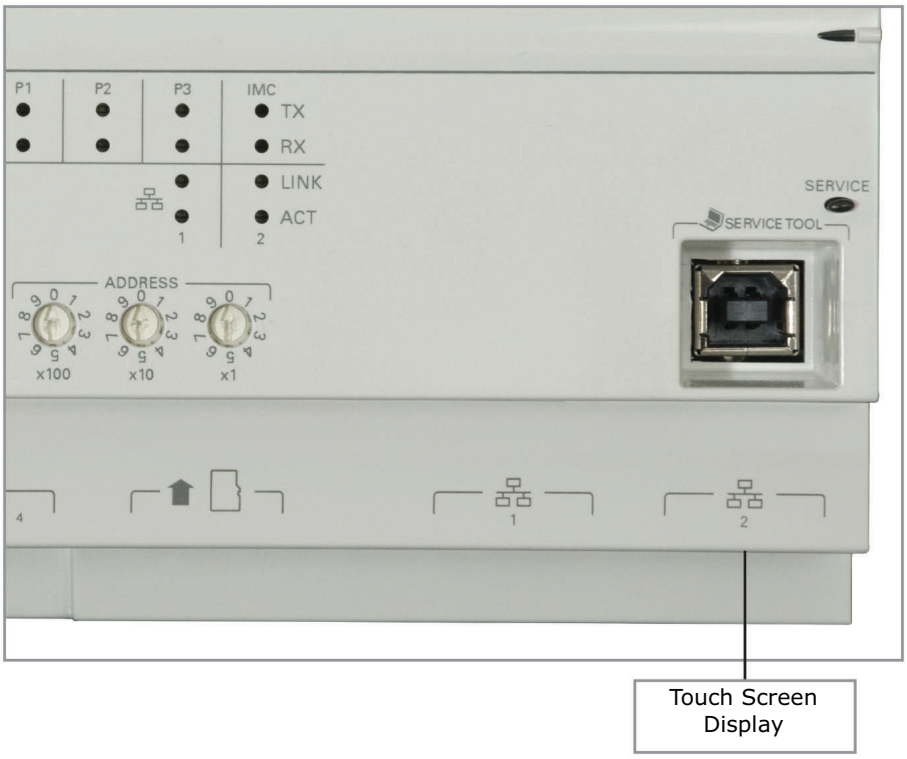
Figure 31. (4) USB connectors



The controller automatically detects devices on any of the ports (not port specific). The controller ships with all ports enabled, but they can be disabled via the Web interface.

Note: *The USB ports are not to be used for any devices that are not Trane approved, such as cellular phones.*

Figure 32. Ethernet port 2



Note: *Ethernet Port 2 is for use with the Touch Screen display only. Communication to other devices is not supported.*

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