 **TRANE**
TRANE
Symbio 800
BACnet and
Modbus



TRANE Symbio 800 BACnet and Modbus Integration User Guide

[Home](#) » [Trane](#) » TRANE Symbio 800 BACnet and Modbus Integration User Guide 

Contents

- [1 TRANE Symbio 800 BACnet and Modbus](#)
- [2 Product Usage Instructions](#)
- [3 Introduction](#)
- [4 Overview](#)
- [5 BACnet® Protocol Configuration](#)
- [6 BACnet Points List](#)
- [7 Recycled Points](#)
- [8 Modbus Protocol Configuration](#)
- [9 Modbus Points List](#)
- [10 Appendix A. Arbitration](#)
- [11 Appendix B. Symbio™ 800 Controller Layout](#)
- [12 Documents / Resources](#)
 - [12.1 References](#)
- [13 Related Posts](#)



TRANE Symbio 800 BACnet and Modbus



Specifications

- Product Name: Symbio™ 800
- Model Number: BAS-SVP083B-EN
- Release Date: November 2024

Product Description

The Symbio™ 800 is a sophisticated heating, ventilating, and air-conditioning equipment designed for optimal performance and safety.

Key Features

- Advanced communication setup and configuration
- Web interface for easy monitoring and control
- Compliance with safety standards for optimal user protection

Product Usage Instructions

Installation and Setup

Only qualified personnel should install the Symbio™ 800. Improper installation can result in hazards. Refer to the installation manual for detailed instructions.

Operation

Before operating the unit, read the user manual thoroughly to understand the safety precautions and operational guidelines.

Maintenance

Regular maintenance is essential for the proper functioning of the Symbio™ 800. Follow the maintenance schedule provided in the manual.

Troubleshooting

If you encounter any issues with the equipment, refer to the troubleshooting section of the manual or contact customer support for assistance.

Frequently Asked Questions (FAQ)

- **Q: Who should install the Symbio™ 800?**

A: Only qualified personnel should install and service the equipment to ensure safety and proper functioning.

- **Q: What should I do if I encounter an error code?**

A: Refer to the user manual for error code definitions and troubleshooting steps. If the issue persists, contact customer support.

SAFETY WARNING

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

Introduction

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.
- **WARNING** 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.
- **WARNING** 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

This document and the information in it are the property of Trane, and may not be used or reproduced in whole or in part without written permission. Trane reserves the right to revise this publication at any time, and to make changes to its content without obligation to notify any person of such revision or change.

Trademarks

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

Revision History

Removed non-standard content.

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 the integration guides specific to those applications.

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.

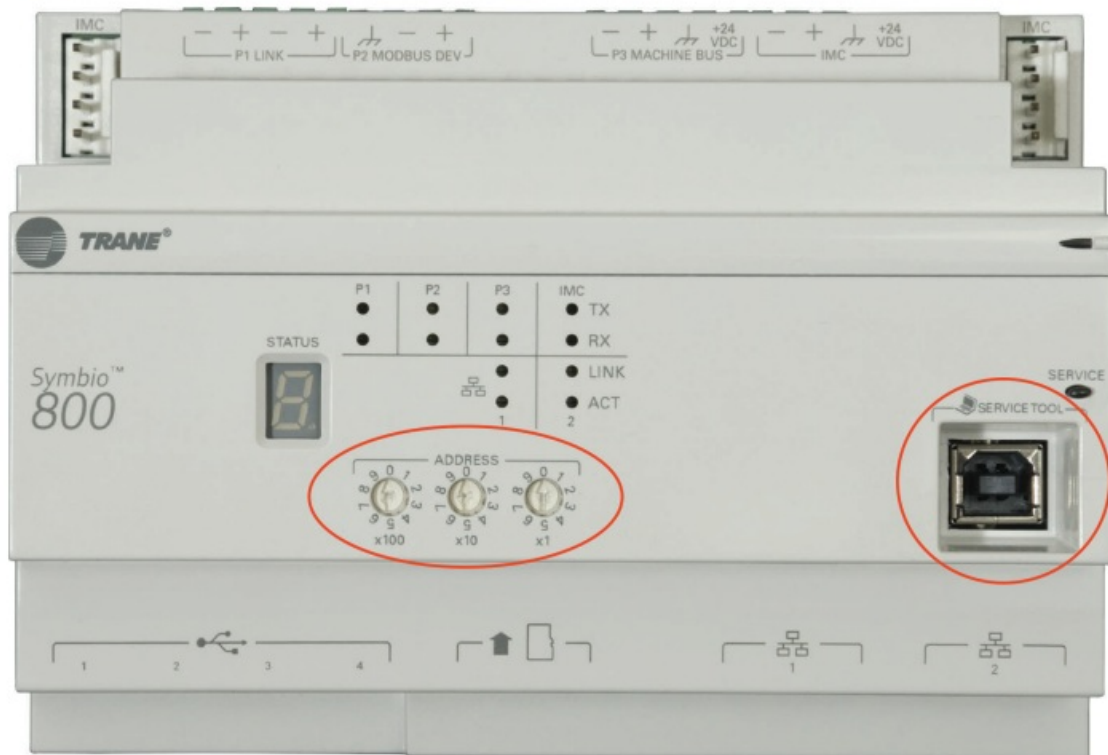
The Symbio™ 800 controller provides a browser-based user interface for USB connection to the controller. One of the tools provided with that interface allows the user to change and customize the Data Display Units Preferences.

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



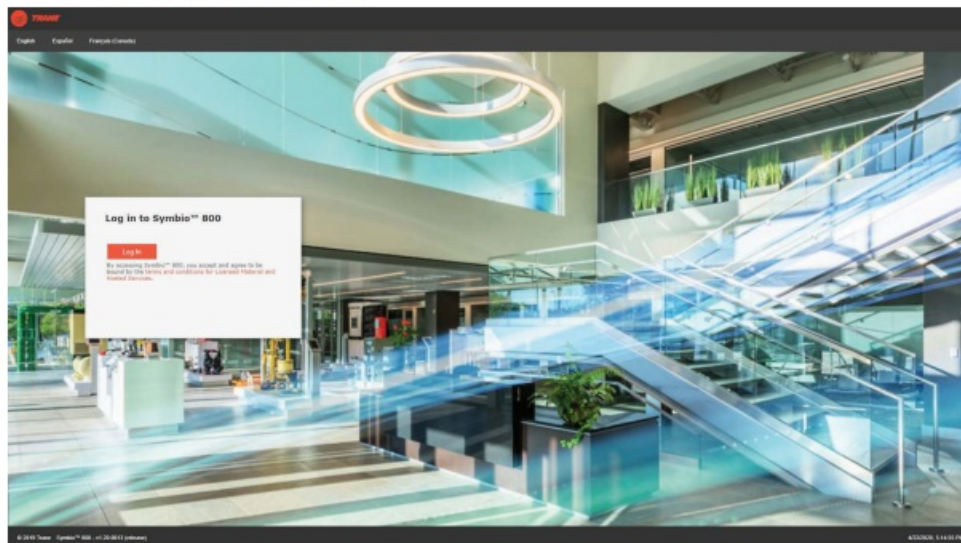
Service Tool for Symbio™ 800 Configuration

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



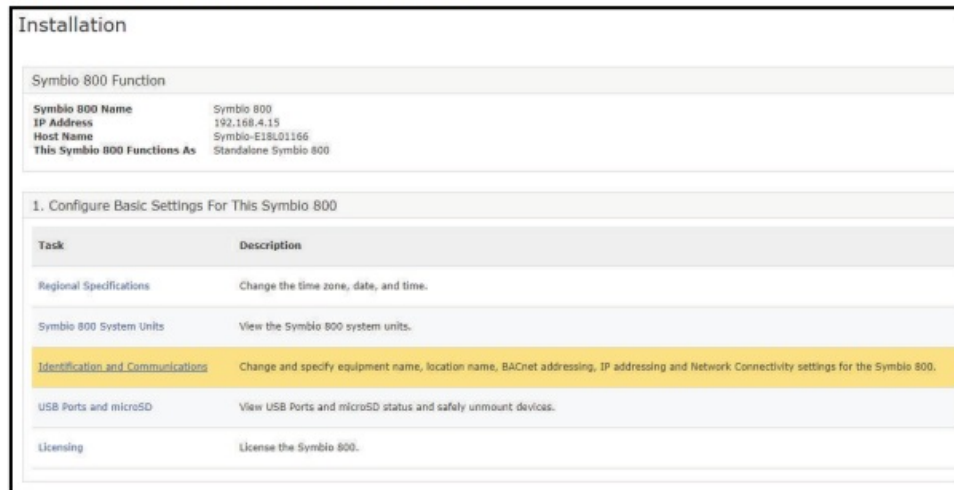
Note: The Symbio 800 web interface can only be viewed using the USB connection. Ethernet port 1 and Ethernet port 2 will not allow access to the Symbio web server to meet IT security requirements.

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 screenshot shows the 'Identification and Communications' configuration page for the Symbio 800. The page has a top navigation bar with tabs: '1. Identification', 'Edit', 'Protocol Configuration', 'Air-Fl Configuration', 'IP Configuration', 'Intelligent Services', and 'Network Connectivity and SSL'. The 'Protocol Configuration' tab is active. The 'System Protocol' section shows 'BACnet' selected in a dropdown menu (marked with a red circle 1) and 'TP' selected in another dropdown. The 'Baud Rate' is set to '76800 bps'. The 'BACnet Configuration' section has two sub-sections: 'Device ID Information' and 'Advanced'. In 'Device ID Information', 'Current Device ID' is '4', 'Rotary Dial Setting' is '4', and the 'Use Software Device ID' checkbox is checked (marked with a red circle 2). The 'Software Device ID' field is empty (marked with a red circle 3). The 'Advanced' section shows 'BACnet Segment Timeout' as '5000', 'BACnet APDU Timeout' as '10000', and 'BACnet APDU Retries' as '3'. The 'LON Settings' section shows 'Adapter Connection Status' as 'Not Connected', 'Resource ID' as '---', and 'Link Status' as '---'. There is a 'Service IP' button. At the bottom right are 'Save' and 'Cancel' buttons.

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

Identification and Communications

< Installation Edit

Symbio 800 Identification Protocol Configuration Air-Fi Configuration **IP Configuration** Intelligent Services Network Connectivity and SSL

Host Name Symbio-E18L01166

Ethernet 1

Method for Obtaining IP Address	Specified Static address used
MAC Address	00:12:EA:0E:3D:89
IP Address	192.168.4.15
Subnet Mask	255.255.255.0
Default Gateway	192.168.4.1

Ethernet 2 (Connection to TD-7 operator display)

IP Address	198.80.18.9
Subnet Mask	255.255.255.252

Figure 7. Edit IP configuration

Identification and Communications

< Installation Edit

Symbio 800 Identification Protocol Configuration Air-Fi Configuration **IP Configuration** Intelligent Services Network Connectivity and SSL

Host Name Symbio-E18L01166

Ethernet 1

☐ Obtain IP Address Automatically using DHCP

☒ Use the following IP address

IP Address	192 . 168 . 4 . 15
Subnet Mask	255 . 255 . 255 . 0
Default Gateway	192 . 168 . 4 . 1

Ethernet 2 (Connection to TD-7 operator display)

IP Address	198 . 80 . 18 . 9
Subnet Mask	255 . 255 . 255 . 252

2. For BACnet IP using Ethernet cable connection only:
 - 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.
 - Set the Preferred IP Interface to Ethernet 1.
 - Setup the DNS section if using a Domain Name System server to identify the Symbio 800 controller by host name.
3. For BACnet IP using the Wi-Fi connection only:
 - Check Enable the Wi-Fi network connection and click Save.

Figure 8. Enable Wi-Fi network connection

Identification and Communications

< Installation Edit

Symbio 800 Identification Protocol Configuration Air-Fi Configuration IP Configuration Intelligent Services Network Connectivity and SSL

Host Name Symbio-E18D1196

Ethernet 1

☐ Obtain IP Address Automatically using DHCP

☒ Use the following IP address

IP Address 192 . 168 . 4 . 35

Subnet Mask 255 . 255 . 255 . 0

Default Gateway 192 . 168 . 4 . 1

Ethernet 2 (Connection to TD-7 operator display)

IP Address 198 . 80 . 18 . 9

Subnet Mask 255 . 255 . 255 . 252

Wi-Fi Network

☐ Enable the Wi-Fi network connection

Preferred IP Interface

☒ Ethernet 1

☐ Wi-Fi Network

Save Cancel

- Click Wi-Fi Setup.

•

Figure 9. Wi-Fi setup

Identification and Communications

< Installation Edit

Symbio 800 Identification Protocol Configuration Air-Fi Configuration IP Configuration Intelligent Services Network Connectivity and SSL

Host Name Symbio-E20A01392

Ethernet 1

Method for Obtaining IP Address	Specified Static address used
MAC Address	00:12:EA:0E:B2:B3
IP Address	193.168.1.100
Subnet Mask	255.255.255.0

Ethernet 2 (Connection to TD-7 operator display)

IP Address	198.80.18.9
Subnet Mask	255.255.255.252

Wi-Fi Network

Port State	Enabled
Method for Obtaining IP Address	Specified Static address used
MAC Address	00:23:A7:F8:6A:80
IP Address	198.80.18.65
Subnet Mask	255.255.255.192
Default Gateway	---

Wi-Fi Host Status

Device Name	IP Address	MAC Address

Wi-Fi Setup

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

- Select the Wi-Fi network or type the SSID of the hidden access point. Click Next.
- Enter the security parameters for the chosen access point. Contact the local IT administrator of the chosen access point for security parameters.
- Click Finish and verify connectivity to the access point.
- Set the Preferred IP Interface to Wi-Fi Network.
- 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.
 - 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

The screenshot shows a 'BACnet/IP Configuration' window. Under the 'Network Connection' tab, 'Ethernet 1' is selected. Below this, there are two fields: 'UDP Port' with the value '47808' and 'BBMD' with the value 'Enabled'. A red button labeled 'BDT Setup' is located to the right of the 'BBMD' field.

- 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.

BACnet Points List

Download

Equipment-specific BACnet® points lists are available on trane.com product page.

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	<p>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.</p> <p>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.</p>
Input	<p>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's sensor input and a communicated value, if present. When both a controller sensor and a communicated value exist, the</p> <p>controller will use and report the communicated value.</p>
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.

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.

BACnet Points List

Example: When the unit is configured for only two compressors, any points associated with compressors three and four are not 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

Category	Point Name	Description	Value
Binary Inputs	<input type="checkbox"/> Candidate Overflow Input	Indicates the status of the condensate overflow input.	Normal
	<input type="checkbox"/> Diagnostic Present	Diagnostic Present	In Alarm
	<input type="checkbox"/> Timed Override Timer Is Active	Indicates whether or not the timed override timer is active	Inactive
Binary Outputs	<input type="checkbox"/> FOD: Outdoor Air Damper Not Modulating	FOD: Indicates when the outdoor air damper is not modulating but should be	Inactive
	<input type="checkbox"/> Occupancy Input	Indicates the status of the occupancy input	Occupied
	<input type="checkbox"/> Condenser Fan Circuit 1 Relay 1 Status	Indicates the status of condenser fan circuit 1, relay 1	Off
Binary Values	<input type="checkbox"/> Diagnostic: Condensate Overflow Lockout	Indicates when a condensate overflow lockout diagnostic is present	No
	<input type="checkbox"/> Unit Running State	Indicates whether the unit is off or on	Off
	<input type="checkbox"/> Emergency Stop	Indicates the status of the emergency stop function of the unit	Auto
Multi-State Points	<input type="checkbox"/> Supply Fan Speed Limited	Supply fan speed is being increased or decreased due to a limit control action	Limited
	<input type="checkbox"/> Supply Fan Output Status	Indicates the status of the supply fan output of the controller	Off
	<input type="checkbox"/> FOD: Outdoor Air Temperature Sensor Failure	FOD: Indicates when the outdoor air temperature sensor has failed	Active
Recycled Points	<input type="checkbox"/> Economizer Airside Status	Indicates the status of airside economizing	Inactive
	<input type="checkbox"/> Compressor 1B Status	Indicates the operating status of compressor 1B	Off
	<input type="checkbox"/> Call Frost Protection Status Circuit 1	Indicates the status of evaporator frost protection function for circuit 1	Inactive

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

Category	Point Name	Description	Value
Binary Inputs	<input type="checkbox"/> Candidate Overflow Input	Indicates the status of the condensate overflow input.	Normal
	<input checked="" type="checkbox"/> Diagnostic Present	Diagnostic Present	In Alarm
	<input type="checkbox"/> Timed Override Timer Is Active	Indicates whether or not the timed override timer is active	Inactive
Binary Outputs	<input type="checkbox"/> FOD: Outdoor Air Damper Not Modulating	FOD: Indicates when the outdoor air damper is not modulating but should be	Inactive
	<input type="checkbox"/> Occupancy Input	Indicates the status of the occupancy input	Occupied
	<input type="checkbox"/> Condenser Fan Circuit 1 Relay 1 Status	Indicates the status of condenser fan circuit 1, relay 1	Off
Binary Values	<input checked="" type="checkbox"/> Diagnostic: Condensate Overflow Lockout	Indicates when a condensate overflow lockout diagnostic is present	No
	<input checked="" type="checkbox"/> Unit Running State	Indicates whether the unit is off or on	Off
	<input type="checkbox"/> Emergency Stop	Indicates the status of the emergency stop function of the unit	Auto
Multi-State Points	<input type="checkbox"/> Supply Fan Speed Limited	Supply fan speed is being increased or decreased due to a limit control action	Limited
	<input type="checkbox"/> Supply Fan Output Status	Indicates the status of the supply fan output of the controller	Off
	<input type="checkbox"/> FOD: Outdoor Air Temperature Sensor Failure	FOD: Indicates when the outdoor air temperature sensor has failed	Active
Recycled Points	<input type="checkbox"/> Economizer Airside Status	Indicates the status of airside economizing	Inactive
	<input type="checkbox"/> Compressor 1B Status	Indicates the operating status of compressor 1B	Off
	<input type="checkbox"/> Call Frost Protection Status Circuit 1	Indicates the status of evaporator frost protection function for circuit 1	Inactive

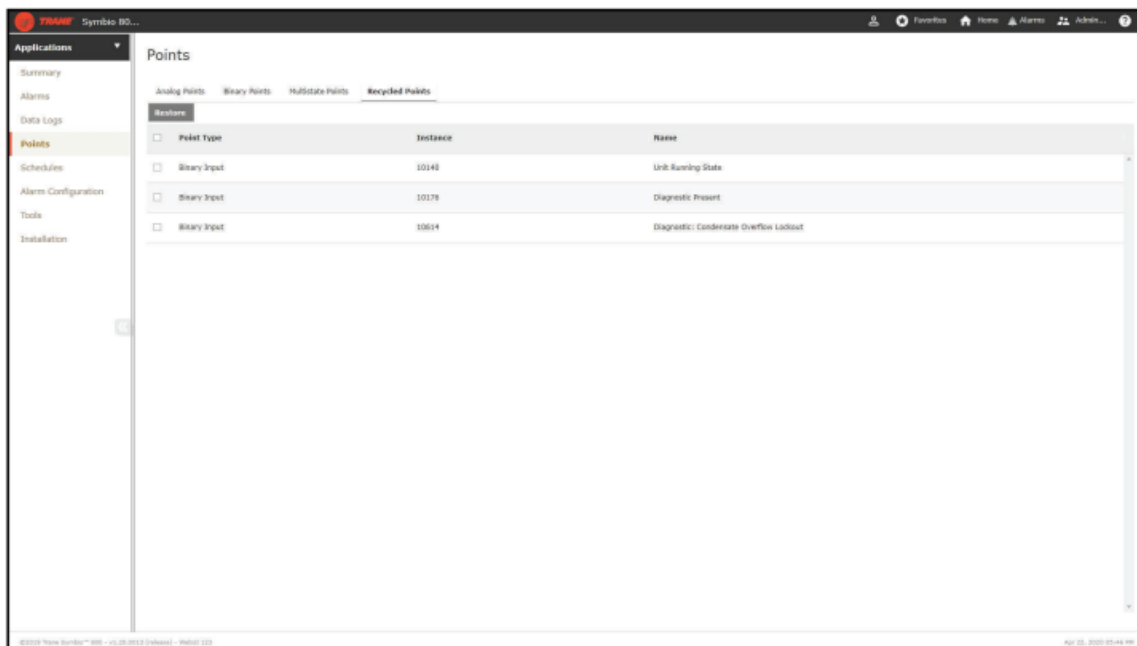
Note: User-created points cannot be recycled. Instead, when the user selects and deletes user-created points,

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

Installation

Symbio 800 Function

Symbio 800 Name

Symbio 800

IP Address

192.168.4.15

Host Name

Symbio-E18L01166

This Symbio 800 Functions As

Standalone Symbio 800

1. Configure Basic Settings For This Symbio 800

Task	Description
Regional Specifications	Change the time zone, date, and time.
Symbio 800 System Units	View the Symbio 800 system units.
Identification and Communications	Change and specify equipment name, location name, BACnet addressing, IP addressing and Network Connectivity settings for the Symbio 800.
USB Ports and microSD	View USB Ports and microSD status and safely unmount devices.
Licensing	License the Symbio 800.

4. Click the Protocol Configuration tab.

Figure 17. Protocol Configuration

Identification and Communications

< Installation

Edit

Symbio 800 Identification

Protocol Configuration

Air-Fi Configuration

IP Configuration

Intelligent Services

Network Connectivity and SSL

Name

Symbio 800

Location

Description

Equipment Serial Number

Equipment Model Number

Equipment Order Number

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

Identification and Communications

< Installation

Edit

Symbio 800 Identification

Protocol Configuration

Air-Fi Configuration

IP Configuration

Intelligent Services

Network Connectivity and SSL

System Protocol

Modbus RTU

Address

Address

-1

Rotary Dial Setting

-1

☐ Use Software Address

-1

Read Rate

19200 bps

Parity

Even

Stop Bits

2

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

The screenshot shows the 'Identification and Communications' configuration page. At the top, there are tabs for 'Installation' (selected) and 'Edit'. Below the tabs, there are sub-tabs: 'Symbio 800 Identification', 'Protocol Configuration' (selected), 'Air-Fi Configuration', 'IP Configuration', 'Intelligent Services', and 'Network Connectivity and SSL'. Under the 'Protocol Configuration' sub-tab, there is a 'System Protocol' dropdown menu. The dropdown is open, showing 'Communication Protocol' and 'Modbus TCP' as the selected option.

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

Figure 20. Set IP address

The screenshot shows the 'Identification and Communications' configuration page. At the top, there are tabs for 'Installation' (selected) and 'Edit'. Below the tabs, there are sub-tabs: 'Symbio 800 Identification', 'Protocol Configuration', 'Air-Fi Configuration', 'IP Configuration' (selected and circled in red), 'Intelligent Services', and 'Network Connectivity and SSL'. Under the 'IP Configuration' sub-tab, there is a 'Host Name' field with the value 'Symbio-E18L01166'. Below the 'Host Name' field, there are two sections: 'Ethernet 1' and 'Ethernet 2 (Connection to TD-7 operator display)'. The 'Ethernet 1' section has a table with the following data:

Ethernet 1	
Method for Obtaining IP Address	Specified Static address used
MAC Address	00:12:EA:0E:3D:B9
IP Address	192.168.4.15
Subnet Mask	255.255.255.0
Default Gateway	192.168.4.1

The 'Ethernet 2' section has a table with the following data:

Ethernet 2 (Connection to TD-7 operator display)	
IP Address	198.80.18.9
Subnet Mask	255.255.255.252

3. Click Edit.

Figure 21. Edit IP configuration

Identification and Communications

< Installation Edit

Symbio 800 Identification Protocol Configuration Air-Fi Configuration IP Configuration Intelligent Services Network Connectivity and SSL

Host Name Symbio-E18L01166

Ethernet 1

☐ Obtain IP Address Automatically using DHCP

☒ Use the following IP address

IP Address 192 . 168 . 4 . 15

Subnet Mask 255 . 255 . 255 . 0

Default Gateway 192 . 168 . 4 . 1

Ethernet 2 (Connection to TD-7 operator display)

IP Address 198 . 80 . 18 . 9

Subnet Mask 255 . 255 . 255 . 252

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.

Modbus Points List

Download

Equipment-specific Modbus™ points lists are available on the trane.com product page.

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 t he 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	<p>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.</p> <p>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.</p>
Input	<p>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</p> <p>controller will use and report the communicated value.</p>
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.
---------	--

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

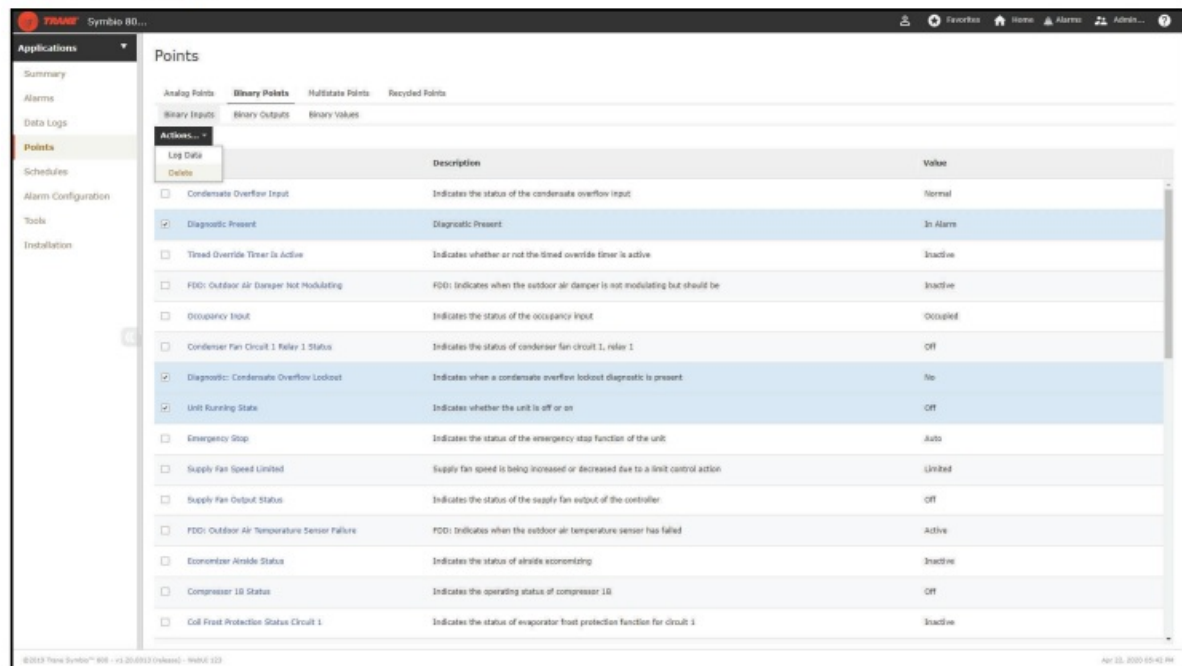
Points		
Analog Points Binary Points Multistate Points Recycled Points		
Binary Inputs Binary Outputs Binary Values		
Actions...		
Name	Description	Status
Condensate Overflow Input	Indicates the status of the condensate overflow input.	Normal
Diagnostic Present	Diagnostic Present	In Alarm
Thermostat Override Thermostat In Alarm	Indicates whether or not the thermostat override thermostat is active.	Inactive
FDD: Outdoor Air Damper Not Modulating	FDD: Indicates when the outdoor air damper is not modulating but should be.	Inactive
Occupancy Input	Indicates the status of the occupancy input.	Occupied
Condenser Fan Circuit 1, Relay 1, Status	Indicates the status of condenser fan circuit 1, relay 1.	Off
Diagnostic: Condensate Overflow Lockout	Indicates when a condensate overflow lockout diagnostic is present.	No
Unit Running State	Indicates whether the unit is off or on.	Off
Emergency Stop	Indicates the status of the emergency stop function of the unit.	Auto
Supply Fan Speed Limited	Supply fan speed is being increased or decreased due to a limit control action.	Limited
Supply Fan Output Status	Indicates the status of the supply fan output of the condenser.	Off
FDD: Outdoor Air Temperature Sensor Failure	FDD: Indicates when the outdoor air temperature sensor has failed.	Active
Economizer Valve Status	Indicates the status of valve economizing.	Inactive
Compressor 3B Status	Indicates the operating status of compressor 3B.	Off
Coil Frost Protection Status Circuit 1	Indicates the status of evaporator frost protection function for circuit 1.	Inactive

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.

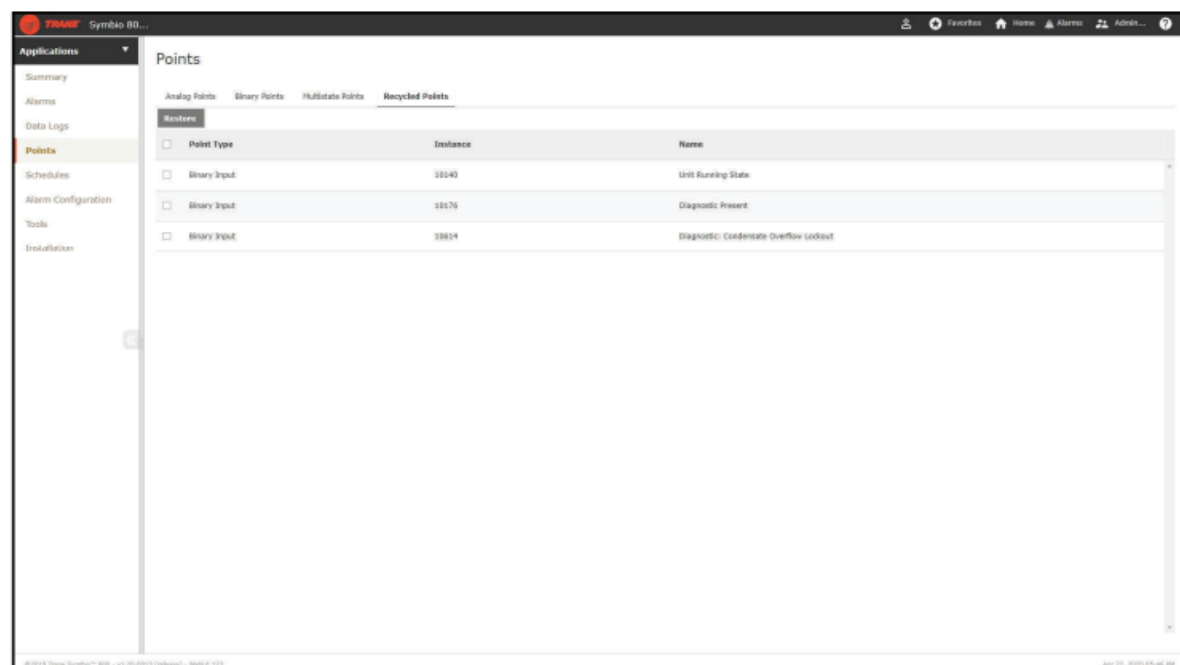
Figure 23. Delete points



Note: User-created points cannot be recycled. Instead, when the user selects and deletes user-created

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 24. Recycled points tab



Appendix A. Arbitration

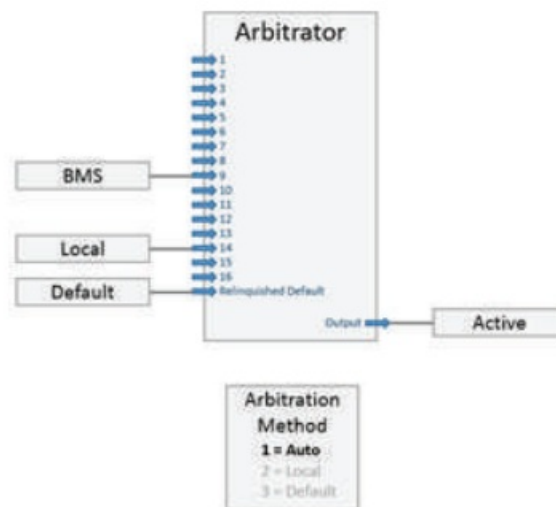
The Symbio™ 800 controller includes arbitration logic for several points. For each read/write point designated as

“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.

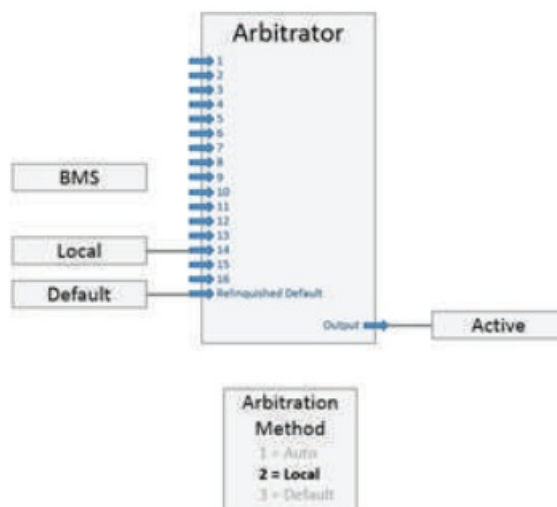
The point designator with the arbitrator suffix includes the full priority array, allowing the user to see the value associated with all potential sources considered in the logic. The active point reflects the result of the arbitration logic. Because the arbitrated points are normally associated with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



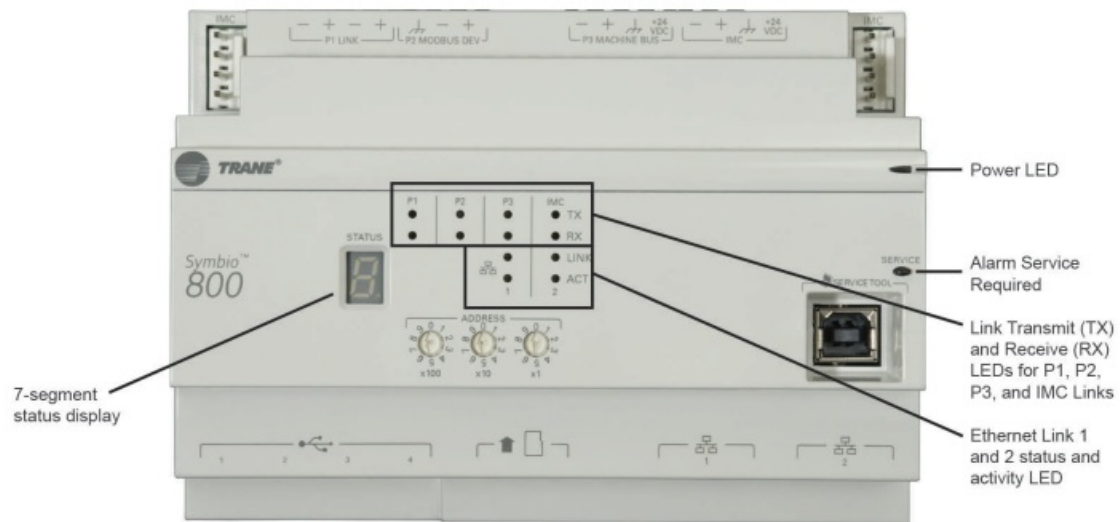
When the Arbitration Method is selected as local, the BMS value is ignored and local value is used instead. Though the arbitration logic still considers all inputs, any values sent by the BMS are effectively ignored.

Figure 26. Arbitration method - local



Appendix B. Symbio™ 800 Controller Layout

Figure 27. Symbio 800 controller display and LEDs



7-Segment status display

Table 1. 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.

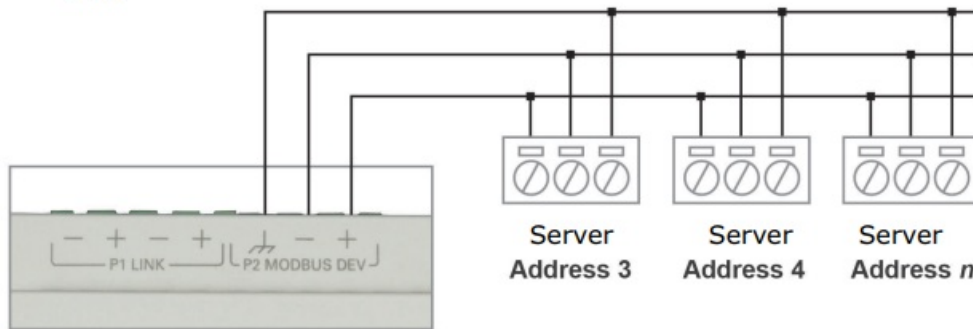


Figure 29. P3 machine bus (global bus — internal communication bus)

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

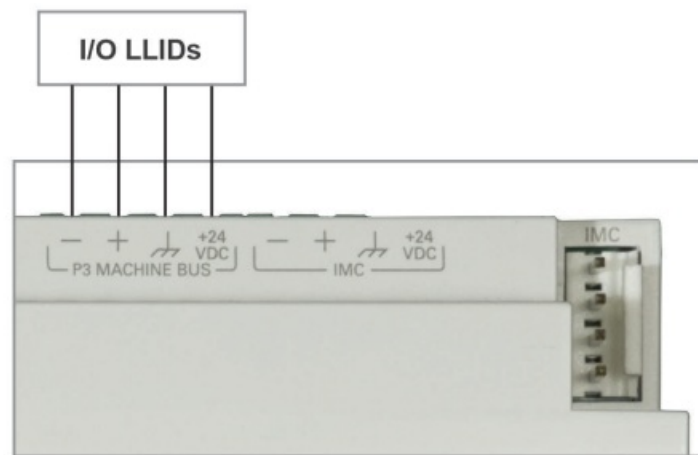
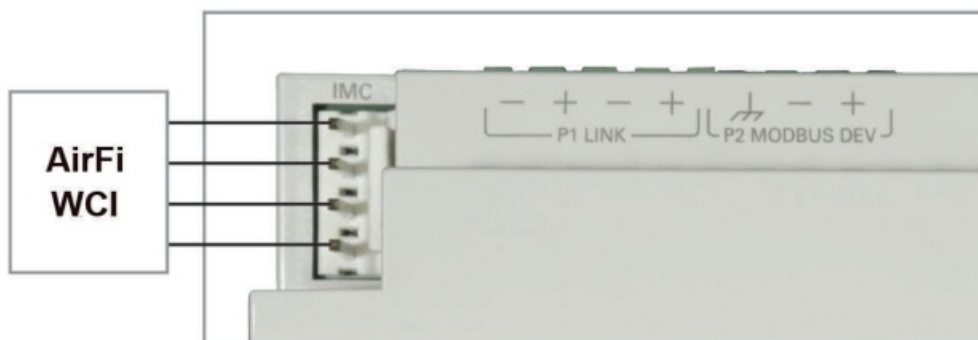
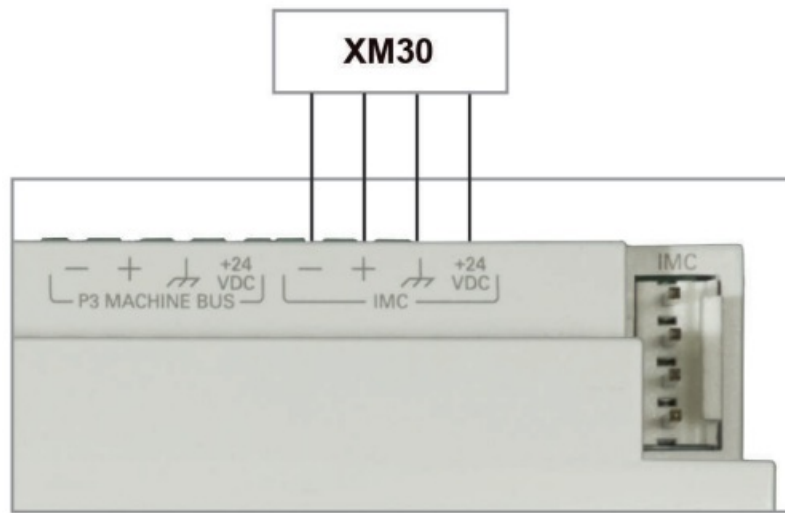


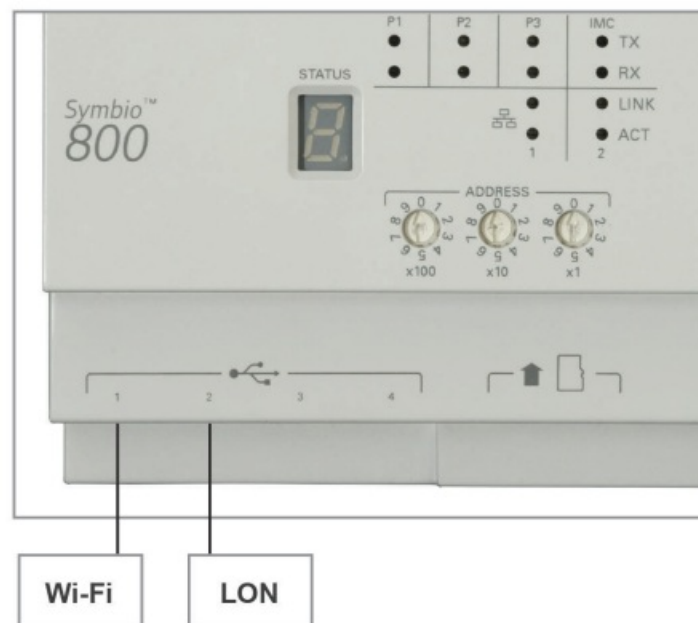
Figure 30. IMC link terminations for optional Air-Fi® and expansion module (XM30)





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

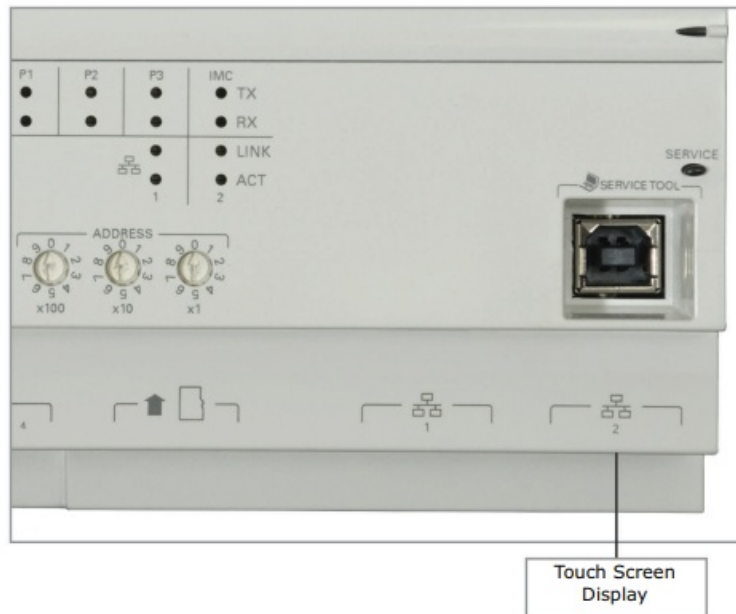
Figure 31. (4) USB connectors



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.

Trane – by Trane Technologies (NYSE: TT), a global innovator – creates comfortable, energy efficient indoor environments for commercial and residential applications. For more information, please visit trane.com or tranetechnologies.com. Trane has a policy of continuous product and product data improvements and reserves the right to change design and specifications without notice. We are committed to using environmentally conscious print practices.

BAS-SVP083B-EN 15 Nov 2024 Supersedes BAS-SVP083A-EN (August 2024)

Documents / Resources

	<p>TRANE Symbio 800 BACnet and Modbus Integration [pdf] User Guide</p> <p>Symbio 800 BACnet and Modbus Integration, Symbio 800, BACnet and Modbus Integration, Modbus Integration</p>
---	--

References

- [Trane Heating & Air Conditioning](#)
- [User Manual](#)

[Manuals+](#), [Privacy Policy](#)

This website is an independent publication and is neither affiliated with nor endorsed by any of the trademark owners. The "Bluetooth®" word mark and logos are registered trademarks owned by Bluetooth SIG, Inc. The "Wi-Fi®" word mark and logos are registered trademarks owned by the Wi-Fi Alliance. Any use of these marks on this website does not imply any affiliation with or endorsement.