

Integration Guide **BACnet® and Modbus Integration** Symbio[™] 800



A 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.



BAS-SVP083B-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:



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.

A 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.



A 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.

Follow EHS Policies!

Failure to follow instructions below could result in death or serious injury.

- All Trane personnel must follow the company's Environmental, Health and Safety (EHS) policies when performing work such as hot work, electrical, fall protection, lockout/ tagout, refrigerant handling, etc. Where local regulations are more stringent than these policies, those regulations supersede these policies.
- Non-Trane personnel should always follow local regulations.

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Revision History

Removed non-standard content.



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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 $^{\text{M}}$ 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

Symbio 800 Function	
Symbio 800 Name P Address Jost Name This Symbio 800 Functions As	Symbio 800 192.168.4.15 Symbio-E18L01166 Standalone Symbio 800
. 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 4. Protocol Configuration

dentification and	d Communicati	ons			
Installation Edit Symbio 800 Identification	Protocol Configuration	Air-Fi Configuration	IP Configuration	Intelligent Services	Network Connectivity and SSL
Name	Symbio 800				
Location	222				
Description	<u></u>				
Equipment Serial Number	555				
Equipment Model Number	0.00				
20 1020 00000000 000 02					

 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.
- 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

Identification a	nd Communicat	ions						
Installation Edit Symbio 800 Identification	Protocol Configuration	Air-Fi Configuration	IP Configuration	Intelligent Services	Network C	onnectivity and SSL		
System Protocol								
RACoat TR	1							
David Bate Troppe In								
bauu kate 76600 bj	pa v							
BACnet Configuration								
Device ID Informatic						Advanced		
Current Device ID		4				BACnet Segment Timeout	5000	
	Davice ID	0				BACnet APDU Timeout	10000	
Use software	Device 10	3	4			BACnet APDU Retries	3	
-								
LON Settings								
Adapter Connection Sta	itus No	t Connected						
Neuron ID								
Link Status		-						
	E C	iervice Pin						
								Seva Central
								Jore Cancer

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

dentification and Communic	ations			
Installation Edit Symbio 800 Identification Protocol Configuration	Air-Fi Configuration IP Configuration Intelligent Services	Network Connectivity and SSL		
tost Name Symbio-E18L01165				
		Effernet Z (Connection to)	D-7 operator display)	

2. Click Edit.



Installation Edit Symbio 800 Identification Protocol Configuration Alr-Fi Configuration Intelligent Services Network Connectivity and SSL. Host Name Symbio-E18L01166	dentificati	on and Communications
Symbio 800 Identification Protocol Configuration Air-FI Configuration IP Configuration Intelligent Services Network Connectivity and SSL Host Name Symbio-E18L01166 Ethernet 1 O Obtain IP Address Automatically using DHCP Ive the following IP address IP Address 192. 168. 4. 192. 168. 4. 192. 168. 4. 192. 168. 4. 192. 168. 4. 192. 168. 4. 192. 168. 4. 192. 168. 4. 192. 168. 4. 198. 80 198. 198. 198. 198. 198. 255. <t< td=""><td>< Installation</td><td>Edit</td></t<>	< Installation	Edit
Host Name Symbio-E18L01166 Ethernet 1 O Obtain IP Address Automatically using DHCP Image: Im	Symbio 800 Identi	fication Protocol Configuration Air-Fi Configuration IP Configuration Intelligent Services Network Connectivity and SSL
Ethernet 1 O Obtain IP Address Automatically using DHCP IP Address 192 . 168 . 4 . 15 Subnet Mask 255 . 255 . 255 . 0 Default Gateway 192 . 168 . 4 . 1	Host Name	Symbio-E18L01166
Obtain IP Address Automatically using DHCP We 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 . 255 Default Mask 255 . 255 . 255 . 255	Ethernet 1	
IP Address 192 . 168 . 4 . 15 Subnet Mask 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 . 255	 Obtain IP Add Use the follow 	iress Automatically using DHCP
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	IP Address	192 . 168 . 4 . 15
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	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	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		
IP Address 198 80 18 9 Subnet Mask 255 255 255 252	Ethernet 2 (Cor	nnection to TD-7 operator display)
Subnet Mask 255 . 255 . 255 . 252	IP Address 1	198. 80. 18. 9
	Subnet Mask 2	255 . 255 . 255 . 252

- 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.



Identification and Communications	
< Installation Edit	
Symbio 800 Identification Protocol Configuration Air-Fl Configuration IP Configuration Intelligent Services Network Connectivity and SSL	
Hard Name Pupping Country Coun	
nust name Symplo-ElsLulioo	
Ethernet 1	_
O Obtain IP Address Automatically using DHCP	
© Use the following IP address	
IP Address 192 . 168 . 4 . 15	
Subhet Mask 255 255 255 0	
Uerault Gateway 192 . 108 . 4 . 1	
	- 1
Ethernet 2 (Connection to TD-7 operator display)	
IP Address 198 . 80 . 18 . 9	
Subnet Mask 255 . 255 . 255 . 252	
	_
Wi-Fi Network	
Preferred IP Interface	
(9) Ethernet 1	
Wi-Fi Network	
	•
Save	Cancel

- b. Click Wi-Fi Setup.
- Figure 9. Wi-Fi setup

Identification and Communica	ations				
Installation Edit Symbio 800 Identification Protocol Configuration	Air-Fi Configuration IP Configuration Intelligent St	ervices Network Connectivi	ty and SSL		
Host Name Symbio-E20A01392 Ethernet 1					
Method for Obtaining IP Address MAC Address IP Address Subnet Mask	Specified Static address used 00:12:EA:00:82:B3 193:168.1.100 255:255:255:0		Ethernet 2 (Connection to 1 IP Address Subnet Mask	ID-7 operator display) 198.80.18.9 255.255.255.252	
Wi-Fi Network					
Port State Method for Obtaining IP Address MAC Address IP Address Subnet Mask Default Gateway Wi-Fi Host Status	Enabled Specified Static address u 00:23:47:F5:6A:80 198:80.18:65 255:255:255:192	sed	Wi-Fi Setup		
Device Name	IP Address		MAC A	Address	
					* *

- 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

Identification an	d Communicat	ions						
Installation Edit								
Symbio 800 Identification	Protocol Configuration	Air-Fi Configuration	IP Configuration	Intelligent Services	Network	Connectivity and SSL		
System Protocol								
BACnet/IP 👻								
BACnet Configuration								
Device ID Information						Advanced		
Current Device ID		4				BACnet Segment Timeout	5000	
Rotary Dial Setting		4				BACnet APDU Timeout	10000	
Use Software D	evice ID		4			BACnet APDU Retries	3	
BACnet/IP Configuration								
Network Connection	thernet 1 👻							
UDP Port	47808							

- 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

Identification and	Communications						
< Installation Edit							
Symbio 800 Identification Pre	otocol Configuration Air-Fi C	onfiguration IP Configuration	Intelligent Services	Network	Connectivity and SSL		
BACnet/IP -							*
BACnet Configuration							
Device ID Information					Advanced		
Device 1D Information					Advanced		
Current Device ID		4			BACnet Segment Timeout	5000	
Rotary Dial Setting		4			BACnet APDU Timeout	10000	
Use Software Device	e ID	4			BACnet APDU Retries	3	
BACnet/IP Configuration							
Network Connection Ether	rnet 1 👻						
Ether	rnet 1						
Wi-Fi							
UDP Port	47808						
LON Settings							
Adapter Connection Status	Not Connecte	ed					
Neuron ID							
Link Status		_					
	Service Pir	n					
							Save Cancel
							Bave

- 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

etwork Connection	Ethernet 1	
UDP Port	47808	
BBMD	Enabled	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[®]). 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

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	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.

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

TRANE Symbio 80)		😩 🚷 Favorites 🏫 Home 🛕 Alarms 🏞 Admin 🤗
Applications T	Poi	nts	
Summary			
Alarms	Ana	log Points Binary Points Multistate Points Recycled Points	
Data Logs	Bin	ary Inputs Binary Outputs Binary Values	
Points	Acti	ORS *	
Schedules		Name Description	Value
Alarm Configuration		Condensate Overflow Input Indicates the status of the condensate overflow input	Normal
Tools		Diagnostic Present Diagnostic Present	In Alarm
Installation		Timed Override Timer Is Active Indicates whether or not the timed override timer 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
<u></u>		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 controller	Off
		FDD: Outdoor Air Temperature Sensor Failure FDD: Indicates when the outdoor air temperature sensor has failed	Active
		Economizer Airside Status Indicates the status of airside economizing	Inactive
		Compressor 18 Status Indicates the operating status of compressor 18	Off
		Coll Frost Protection Status Circuit 1 Indicates the status of evaporator frost protection function for circuit 1	Inactive
©2019 Trane Symbio ^{***} 800 - v1-20.0	0013 (release) - WebUT 123	Apr 22, 2020 05/41 PM

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

TRANE Symbio 80				은 😒 Favorite	s 🛖 Home 🛕 Alarms 🎿 Admin 🢡
Applications 🔻	Poi	nts			
Summary					
Alarms	Ana	Binary Points Multistate Points Rec	ycled Points		
Data Logs	Bin	ary Inputs Binary Outputs Binary Values			
Points	Acti	ons *			
Schedules	D	elete	Description	Value	
Alarm Configuration		Condensate Overflow Input	Indicates the status of the condensate overflow input	Normal	Â
Tools		Diagnostic Present	Diagnostic Present	In Alarm	
Installation		Timed Override Timer Is Active	Indicates whether or not the timed override timer 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 controller	Off	
		FDD: Outdoor Air Temperature Sensor Fallure	FDD: Indicates when the outdoor air temperature sensor has failed	Active	
		Economizer Airside Status	Indicates the status of airside economizing	Inactive	
		Compressor 1B Status	Indicates the operating status of compressor 1B	Off	
		Coil Frost Protection Status Circuit 1	Indicates the status of evaporator frost protection function for circuit 1	Inactive	
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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.
- 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

TRAME Symbio 80.					,	😒 Favorites	🔒 Home 🛕 Alarms	👥 Admin 🥐
Applications 🔻	Poi	ints						
Summary								
Alarms	Ana	nalog Points Binary Points Multistate Points	Recycled Points					
Data Logs	Res	estore						
Points		Point Type	Instance	L)	Name			1
Schedules		Binary Input	10140		Unit Running State			*
Alarm Configuration		Binary Input	10176	I	Diagnostic Present			
Tools		Binary Input	10614)	Diagnostic: Condensate Overflow Lockout			
								*
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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

symbio 800 Function	
iymbio 800 Name P Address Iost Name 'his Symbio 800 Functions As	Symbio 800 192.168.4.15 Symbio-E18L01166 Standalone Symbio 800
. 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 80
USB Ports and microSD	View USB Ports and microSD status and safely unmount devices.
Licensing	License the Symbia 800

4. Click the Protocol Configuration tab.

Figure 17. Protocol Configuration

Identification and	d Communicati	ons			
< Installation Edit Symbio 800 Identification	Protocol Configuration	Air-Ei Configuration	TP Configuration	Intelligent Services	Network Connectivity and SSI
Symbio 600 Identification	Protocol Conliguration	All-Fi Comiguration	TP Configuration	Intelligent Services	Network connectivity and SSL
Name	Symbio 800				
Location	222				
Description	<u></u>				
Equipment Serial Number	515				
Equipment Model Number	555				
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

stallation Edit						
sio 800 Identification Protocol Configurat	ion Air-Fi Configuration	IP Configuration I	ntelligent Services	Network Connectivity and SSL		
em Protocol						
adhus BTU 👻						
Address						
Address	4			Baud Rate	19200 bps ~	
Address Address Rotary Dial Setting	4			Baud Rate	19200 bps •	
Address Address Rotary Dial Setting	4	4		Baud Rate Parity	19200 bps 2 Even 4	

- 1. Set the Communication Protocol drop down to Modbus RTU.
- 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 s	ystem	protocol
--------	-----	-------	-------	----------

Identification ar	nd Communicati	ions			
Installation Edit Symbio 800 Identification	Protocol Configuration	Air-Fi Configuration	IP Configuration	Intelligent Services	Network Connectivity and SSL
System Protocol					
Communication Protoco	Modbus TCP				

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

Figure 20. Set IP address

	ations		
Installation Edit Symbio 800 Identification Protocol Configuration	Air-Fi Configuration IP Configuration Intelligent Services	Network Connectivity and SSL.	
Sthemat 1			
Ethernet 1		Ethernet 2 (Connection to TD-7 operator display)	

3. Click Edit.



Identificati	on and C	Communic	ations			
< Installation Symbio 800 Identi	Edit fication Proto	col Configuration	Air-Fi Configuration	IP Configuration	Intelligent Services	Network Connectivity and SSL
Host Name	Symbio-E18L011	56		E. Trans. International Contractor of Contra		
Ethernet 1						
 Obtain IP Add Use the follow 	ress Automatically	v using DHCP				
IP Address	192 . 168 .	4.15				
Subnet Mask	255 . 255 .	255 . 0				
Default Gateway	192 . 168 .	4.1				
Ethernet 2 (Cor	nection to TD-7	operator displa	v)			
IP Address 1	98.80.1	8.9				
Subnet Mask 2	55 . 255 . 2	55 . 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 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.

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

TRANE Symbio 80.	••		옫 😪 Favorites 🏫 Home 🛕 Alarms 🤽 Admin ?
Applications 🔻	Poi	nts	
Summary			
Alarms	Ana	alog Points Binary Points Multistate Points Recycled Points	
Data Logs	Bin	ary Inputs Binary Outputs Binary Values	
Points	Acti	ons *	
Schedules		Name Description	Value
Alarm Configuration		Condensate Overflow Input Indicates the status of the condensate overflow input	Normal
Tools		Diagnostic Present Diagnostic Present	In Alarm
Installation		Timed Override Timer Is Active Indicates whether or not the timed override timer 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 controller:	Off
		FDD: Outdoor Air Temperature Sensor Fallure FDD: Indicates when the outdoor air temperature sensor has failed	Active
		Economizer Airside Status Indicates the status of airside economizing	Inactive
		Compressor 18 Status Indicates the operating status of compressor 18	Off
		Coll Frost Protection Status Circuit 1 Indicates the status of evaporator frost protection function for circuit 1	Inactive
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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

TRANE Symbio 80			온 😪 Favorites 🏫 Home 🛕 Alarms 😕 Admin ??		
Applications 🔻	Points				
Summary	Analog Points Binary Points Multistate Points Recy	cled Points			
Data Logs	Binary Inputs Binary Outputs Binary Values				
Points	Actions *				
Schedules	Log Data Delete	Description	Value		
Alarm Configuration	Condensate Overflow Input	Indicates the status of the condensate overflow input	Normal		
Tools	Diagnostic Present	Diagnostic Present	In Alarm		
Installation	Timed Override Timer Is Active	Indicates whether or not the timed override timer 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 controller	Off		
	D FDD: Outdoor Air Temperature Sensor Failure	FDD: Indicates when the outdoor air temperature sensor has failed	Active		
	Economizer Airside Status	Indicates the status of airside economizing	Inactive		
	Compressor 1B Status	Indicates the operating status of compressor 18	Off		
	Coll Frost Protection Status Circuit 1	Indicates the status of evaporator frost protection function for circuit 1	Inactive		
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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.
- 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

TRAME Symbio 80.		8	🚼 Favorites	🔒 Home 🛕 Alarm:	Admin	0
Applications T	Points					
Summary						
Alarms	Analog Points Binary Points Multistate Points Recycled Points					
Data Logs	Restore					
Points	Point Type Instance Name					
Schedules	Dinary Input 10140 Unit Running State					*
Alarm Configuration	Diagnostic Present					
Tools	Diagnostic: Condensate Overflow Lockout					
						÷
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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.





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



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