Installation, Operation, and Maintenance

Tracer® SC System Controller

Model Number: BMSC000AAA011000

⚠ 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.

April 2021

BAS-SVX31U-EN

Introduction

Read this manual thoroughly before operating or servicing this unit.

Warnings, Cautions, and Notices

Safety advisories appear throughout this manual as required. Your personal safety and the proper operation of this machine depend upon the strict observance of these precautions.

The three types of advisories are defined as follows:

⚠ WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION	Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It could also be used to alert against unsafe practices.
NOTICE	Indicates a situation that could result in equipment or property-damage only accidents.

Important Environmental Concerns

Scientific research has shown that certain man-made chemicals can affect the earth's naturally occurring stratospheric ozone layer when released to the atmosphere. In particular, several of the identified chemicals that may affect the ozone layer are refrigerants that contain Chlorine, Fluorine and Carbon (CFCs) and those containing Hydrogen, Chlorine, Fluorine and Carbon (HCFCs). Not all refrigerants containing these compounds have the same potential impact to the environment. Trane advocates the responsible handling of all refrigerants-including industry replacements for CFCs and HCFCs such as saturated or unsaturated HFCs and HCFCs.

Important Responsible Refrigerant Practices

Trane believes that responsible refrigerant practices are important to the environment, our customers, and the air conditioning industry. All technicians who handle refrigerants must be certified according to local rules. For the USA, the Federal Clean Air Act (Section 608) sets forth the requirements for handling, reclaiming, recovering and recycling of certain refrigerants and the equipment that is used in these service procedures. In addition, some states or municipalities may have additional requirements that must also be adhered to for responsible management of refrigerants. Know the applicable laws and follow them.

⚠ WARNING

Proper Field Wiring and Grounding Required!

Failure to follow code could result in death or serious injury.

All field wiring MUST be performed by qualified personnel. Improperly installed and grounded field wiring poses FIRE and ELECTROCUTION hazards. To avoid these hazards, you MUST follow requirements for field wiring installation and grounding as described in NEC and your local/state/national electrical codes.

⚠ WARNING

Personal Protective Equipment (PPE) Required!

Failure to wear proper PPE for the job being undertaken could result in death or serious injury.

Technicians, in order to protect themselves from potential electrical, mechanical, and chemical hazards, MUST follow precautions in this manual and on the tags, stickers, and labels, as well as the instructions below:

- **Before installing/servicing this unit, technicians MUST put on all PPE required for the work being undertaken (Examples; cut resistant gloves/sleeves, butyl gloves, safety glasses, hard hat/bump cap, fall protection, electrical PPE and arc flash clothing). ALWAYS refer to appropriate Safety Data Sheets (SDS) and OSHA guidelines for proper PPE.**
- **When working with or around hazardous chemicals, ALWAYS refer to the appropriate SDS and OSHA/GHS (Global Harmonized System of Classification and Labelling of Chemicals) guidelines for information on allowable personal exposure levels, proper respiratory protection and handling instructions.**
- **If there is a risk of energized electrical contact, arc, or flash, technicians MUST put on all PPE in accordance with OSHA, NFPA 70E, or other country-specific requirements for arc flash protection, PRIOR to servicing the unit. NEVER PERFORM ANY SWITCHING, DISCONNECTING, OR VOLTAGE TESTING WITHOUT PROPER ELECTRICAL PPE AND ARC FLASH CLOTHING. ENSURE ELECTRICAL METERS AND EQUIPMENT ARE PROPERLY RATED FOR INTENDED VOLTAGE.**

⚠ WARNING

Follow EHS Policies!

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

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

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Factory Training

Factory training is available through Trane University™ to help you learn more about the operation and maintenance of your equipment. To learn about available training opportunities contact Trane University™.

Online: www.trane.com/traneuniversity

Phone: 855-803-3563

Email: traneuniversity@trane.com

Revision History

Minor updates to document.

Table of Contents

Product Overview

The Tracer® SC system controller (Tracer SC) serves as the central coordinator for all individual equipment devices on a Tracer building automation system. The Web-based interface of the Tracer SC system controller provides an easy and convenient way for building operators to access their building automation system. Access is available from any personal computer or mobile device, including remote locations.

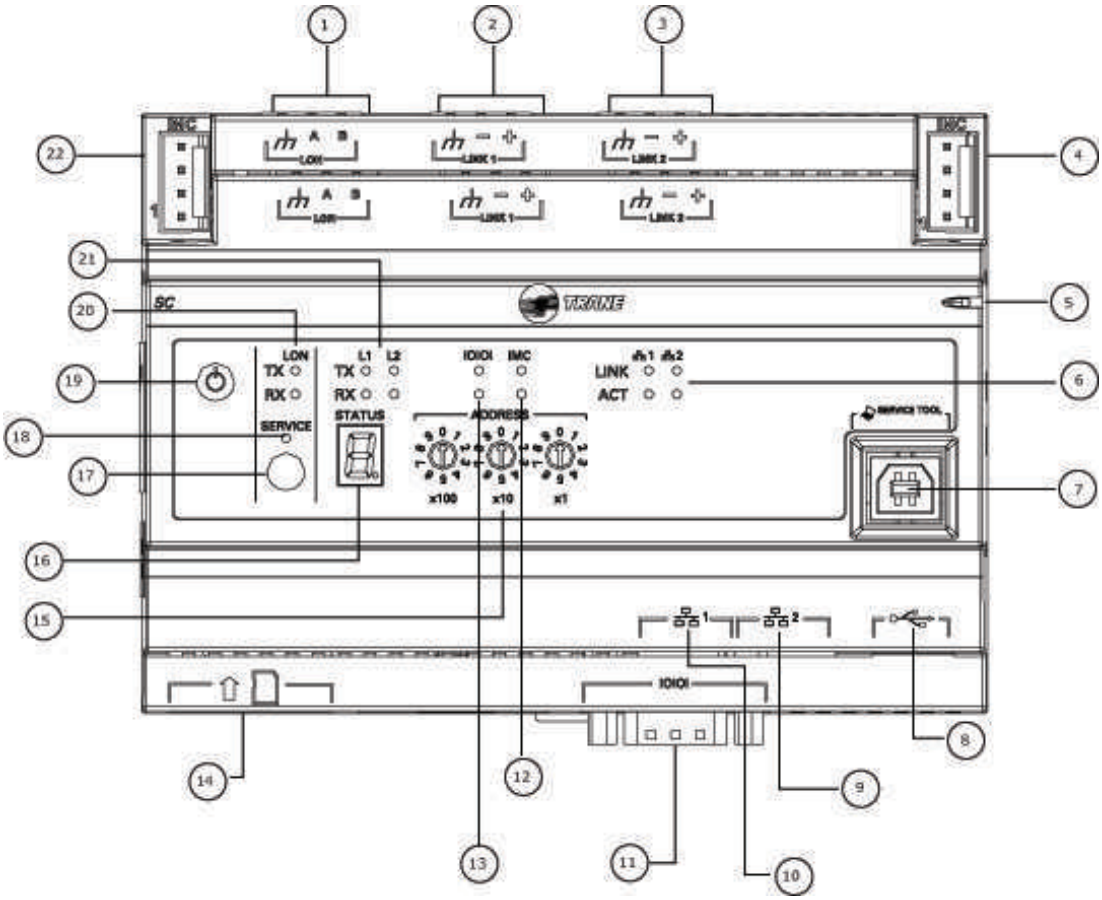
Tracer SC Model Numbers

Model number	Description
BMSC000AAA011000 (current)	Tracer SC with power supply module (PM014) with U.S. outlet, enclosure ordered separately
BMSC000AAA011100 (obsolete)	Tracer SC system controller with power supply module (PM214) with U.S. outlet, in enclosure
BMSC000AAA011200 (obsolete)	Tracer SC system controller with power supply module (PM214), in enclosure

Tracer SC Components

The Tracer SC system controller is equipped with the components shown in the following figure. The table that follows provides descriptions.

Figure 1. Tracer SC Components



Callout Number in Figure	Tracer SC Components Description
1	LonTalk LINK
2	BACnet MS/TP or Modbus RTU LINK 1
3	BACnet MS/TP or Modbus RTU LINK 2
4, 22	IMC Connections
5	Status LED
6	Ethernet LEDs
7	USB service tool port
8	USB host (future)
9	Ethernet network connection 2 (supports TCP/IP, recommended for direct connection to PC)
10	Ethernet network connection 1 (supports Modbus TCP, BACnet and TCP/TP; recommended for building network connections)
11	EIA-232 serial connection
12	IMC LEDs
13	EIA-232 LEDs
14	SD card port (future)
15	Rotary switches
16	7-segment display
17	LonTalk service pin
18	LonTalk service LED
19	Power button
20	LonTalk LEDs
21	BACnet LEDs

Tracer SC Accessories

Description	Order number
BACnet terminator 2 pack [a]	X1365152401
Rover LonTalk interface adaptor[b]	S3090062062

[a] For information about this accessory, see *BACnet MS/TP Wiring Best Practices* (BAS-SVX051).
[b] For more information about this accessory, see *Rover Service Tool Installation, Operation, and Programming* (EMTX-SVX01).

Tracer SC Service Parts

Service parts for the Tracer® SC system controller are shown in the following figure. The following tables provide descriptions.

Note: *Some of the service parts are the same for all models.*

Figure 2. Tracer SC service parts

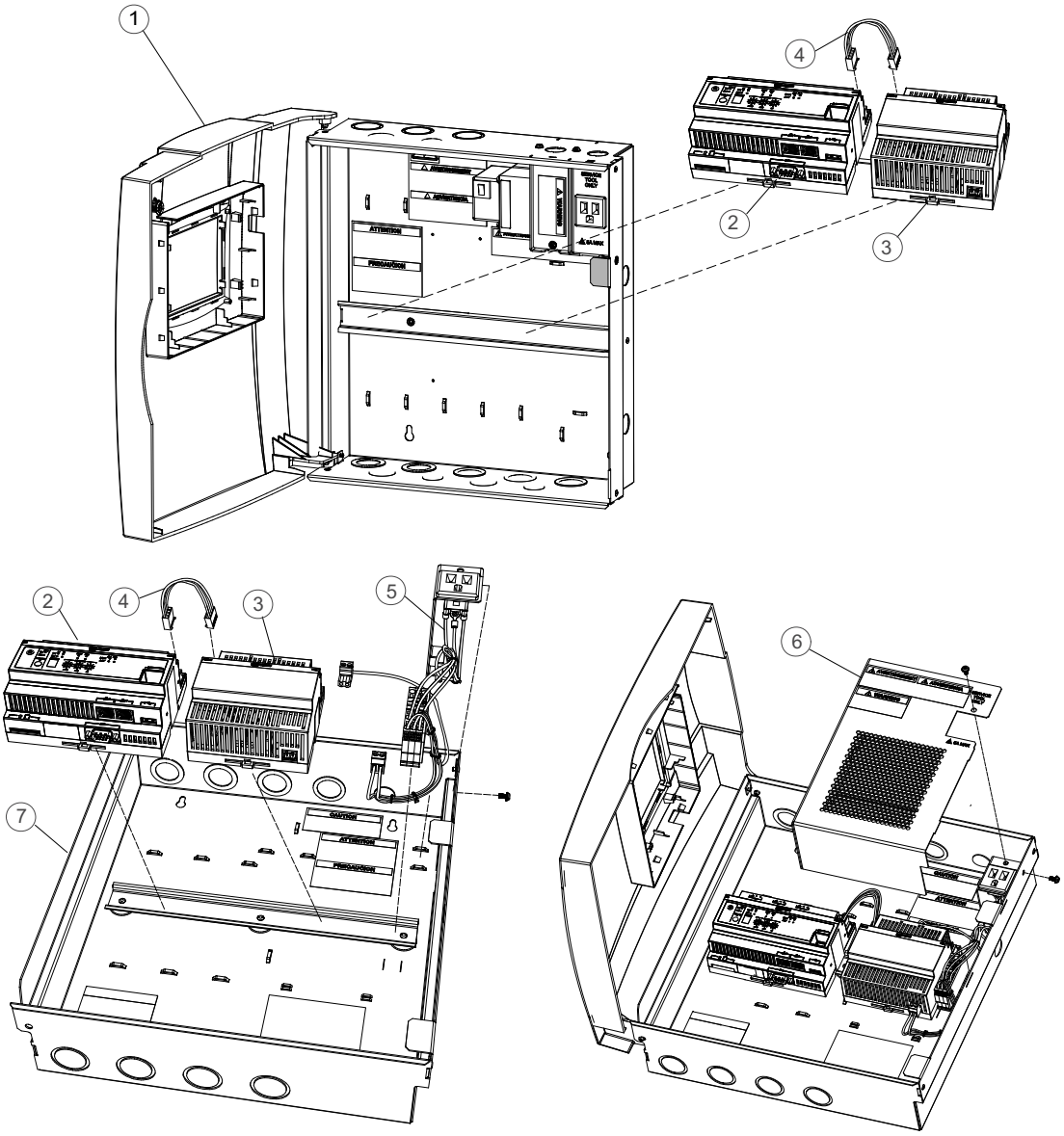


Table 1. Tracer SC model BMSC000AAA011000 (current)

Callout Number in Figure	Description	Order number
1	Enclosure for DIN-mounted controllers (120 VAC, with outlet)	X13651559010
2	Tracer SC module	S3090058462
3	Power supply module	X1365153801
(not shown)	Enclosure for DIN-mounted controllers (230 VAC, no outlet)	X13651560010
(not shown)	Transformer service part	S3090062462
4	IMC power cable	S3090059562
(not shown)	Large enclosure for DIN-mounted controllers, 120 VAC, with outlet (solid door)	X13651552-01
(not shown)	Large enclosure for DIN-mounted controllers, 120 VAC, with outlet (display-capable door)	X13651553-01

Table 1. Tracer SC model BMSC000AAA011000 (current) (continued)

Callout Number in Figure	Description	Order number
(not shown)	Large enclosure for DIN-mounted controllers, 230 VAC, with outlet (display-capable door)	X13651554-01
(not shown)	Large enclosure for DIN-mounted controllers, 230 VAC, with outlet (display-capable door)	X13651555-01

Table 2. Tracer SC models BMSC000AAA011100 and BMSC000AAA011200 (obsolete)

Callout Number in Figure	Description	Order number
2	Tracer SC module	S3090058462
3	Power supply module	S3090058562
4	IMC power cable	S3090059562
5	Cable assembly/modular terminal kit with U.S. outlet	S3090059062
(not shown)	Cable assembly/modular terminal kit	S3090059162
6	Control panel cover (for models with U.S. outlet)	S3090058962
(not shown)	Control panel cover	S3090058862
7	Enclosure	S3090058762

Licensing and Hardware

The number of devices that are supported is limited by the number within the application license. The maximum amount is 240 devices in a single license. As of Tracer® SC version 3.0, all Tracer SCs ship with a base license installed. The order number for an SC Application license is BMCF000AAA0AE00 (15 devices).

To utilize the expanded communications functionality for multi-SC facilities, the following are required:

- One Tracer SC with an Application license
- One or more Tracer SCs with a Base license.

License Type	TIS Ready	Multi SC Ready	BAS App
Application V4.0 +	Up to 240 devices	Yes	Up to 240 devices
Base V4.0 +	Up to 240 devices	Yes	N/A
Base V3.0 — V3.9	Up to 5 devices	Yes	N/A

How to Obtain a Tracer SC for Offsite Programming

With Tracer® SC V4.2+ and Tracer TU V9.0+, offsite programming is supported. One or more physical Tracer SCs (with an appropriate software license) are required to support this functionality. Refer to the Offsite Facility Definition Programming Guide, BAS-SVP025, for more information. It is recommended that you utilize one of the following options:

- The Tracer SC(s) ordered for each job – with appropriate planning, the Tracer SC(s) for a specific job can be utilized.
- Existing licensed Tracer SCs – if you already have one or more Tracer SCs that have been used in your office in the past, they can be utilized to support this functionality.
- Tracer SCs that have been ordered with a new Demo license – a new demo license has been created to support this functionality. The Demo license can be ordered through the Job

Center (part # BMCF000AAA0DA00). The Tracer SC demo license provides support for up to 240 devices and provides licensing for all Tracer SC features.

Note: *You must have a software license with the appropriate device count to support your application.*

Note: *The Tracer SC demo license is time-limited and the Tracer SC will power itself down after five days. A Tracer SC that has a demo license installed will display a banner which reads "Demo" on the login page. It will provide information on the time remaining prior to power down, on the bottom of all pages.*

Setup Requirements

The following are required for setup and normal operation.

Scenario 1: Single Tracer® SC Facility

- Tracer SC must have an application license in order to install equipment and facilitate control.
- Ethernet port 1 must be used for communication over BACnet IP.
- BACnet MS/TP port network number cannot exceed 4193.

Scenario 2: Multi-Tracer SC Facility

- One Tracer SC must have an application license in order to install equipment and facilitate control.
- Additional Tracer SCs do not require a license.
- Ethernet port 1 must be used for communication between multiple SCs over BACnet IP.
- Tracer SC Device IDs must be unique.
- BACnet MS/TP port network number cannot exceed 4193.
- Tracer SCs on separate subnets must have one BBMD per subnet.
- UDP ports must be the same across all SCs in the facility.

  Note: *Both the Tracer SC-App and the Tracer SC-Base must be configured to communicate to each other over BACnet IP. They can reside on the same network subnet or on a separate subnet.*

Scenario 3: TraneConnect and Intelligent Services

- No additional license required.
- TraneConnect and Intelligent Services are enabled in Tracer SC by default. To opt out, edit the settings under the Intelligent Services tab on the Identification and Communications page.
- Configure Tracer SC Ethernet port 1 or 2 to communicate to the Internet.

For more information about Intelligent Services, see "*TIS Technical Specifications", SRV-PRC011.*

Tracer SC Facilities

A Tracer SC facility is defined as one Application SC and one or more associated Base SCs. A single building or site can contain more than one facility. See the following figure for an example of a Tracer SC facility configuration. The following attributes apply to Tracer SC facilities:

- Tracer SC facility is limited to one Application SC.
- Tracer SC facility has one or more Base SCs.
- Tracer SC facility can support a maximum 240 devices.
- Tracer SC facility may be limited to 120 devices depending on the communications involved (see the following table for device capability).

Table 3. Device capability

Communication Type	Single SC	Multi SC
Air-Fi® Wireless	Up to 120 devices	Up to 240 devices
BACnet MS/TP	Up to 120 devices	Up to 240 devices
BACnet IP	Up to 240 devices	Up to 240 devices
COMM 3/4	Up to 240 devices	Up to 240 devices
LON	Up to 120 devices	N/A
Modbus TCP	Up to 240 devices	N/A
Modbus RTU	Up to 60 devices	N/A

Note: *Trane Air-Fi® sensor do not count against the device limits listed above. For more information, see the Air-Fi Wireless System IOM Manual, (BAS-SVX40).*

Software and Service Tools

Specific software and service tools are required for your PC or mobile device, in order to perform all of the functions available with the Tracer® SC.

Supported Web Browsers

Microsoft® Windows 7:

- Mozilla FireFox (most recent version)
- Internet Explorer 11
- Google Chrome (most recent version)

Microsoft® Windows 8.1: (no support)

Microsoft® Windows 10:

- Internet Explore (no support)
- Microsoft Edge™ (latest version)
- Mozilla FireFox (most recent version)
- Google Chrome (most recent version)

Apple® Mac OS (Latest –1)

- Mozilla FireFox (most recent version)
- Google Chrome (most recent version)
- Safari (most recent version)

Mobile Devices:

- iOS (Latest –1)
  - Safari (latest version)
- Android 4.4+
  - Google Chrome (Latest version)
- Microsoft® Windows 10
  - Microsoft Edge™ (latest version)
  - Google Chrome (Latest version)
  - Mozilla FireFox (most recent version)

Service Tools

Two service tools are required for the support of unit controllers and for additional functions on systems using Tracer SC:

The Tracer® TU Service Tool

- For configuring BACnet unit controllers
- For downloading Tracer SC software updates
- For creating TGP2 programs in Tracer SC.
- For creating, editing, and publishing graphics to the Tracer SC with Tracer Graphics Editor.
- As an additional way to backup and restore data to Tracer SC.

The Rover™ Service Tool

- For configuring LonTalk unit controllers.
- For configuring a LonTalk network using the Rover service tool in active mode (Tracer SC is not a network manager).
- For creating TGP programs for the Tracer MP580/581 programmable controller.

New in V7.2 is the ability for Rover to remotely connect to a Tracer SC to configure the downstream LonTalk unit controllers. Active mode is not available during this method of connection, hence custom bindings cannot be made.

Making a Direct Connection Between a PC and a Tracer SC

This section explains how to access a Tracer® SC user interface from your PC through a direct connection. Trane recommends that you make a direct connection from your PC to your Tracer SC:

- To set up your PC for browsing to the Tracer SC user interface before connecting the Tracer SC to a building network.
- Anytime you want to service a Tracer system and do not have access to the customer network.

Connecting Your PC to a Tracer SC

Note: *Ensure that the Tracer TU service tool is installed on your PC before connecting to a Tracer SC.*

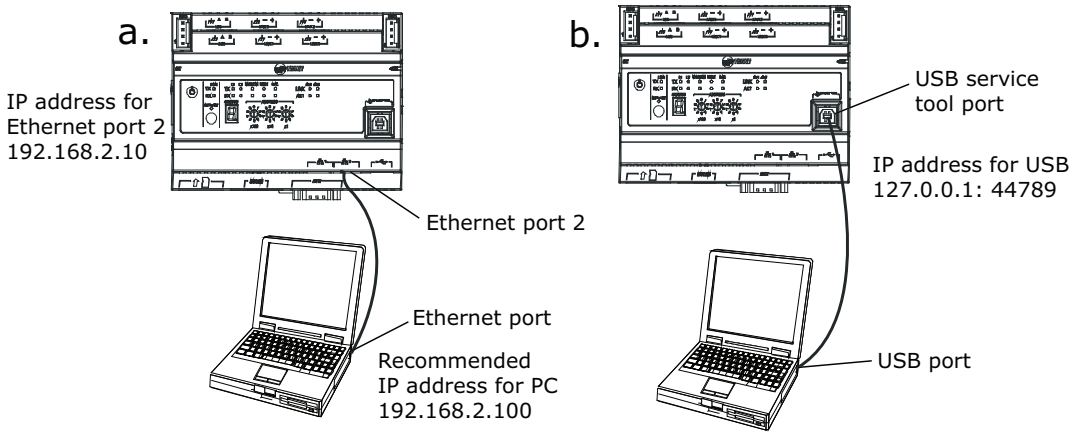
1. Press the power button the Tracer SC.

   All LEDs illuminate and the following sequence flashes on the 7–segment display: 8, 7 ,9, 5, 4, L, dancing dash pattern. The dancing dashes persist while the Tracer SC is operating normally.

2. Connect either of the following (see the following figure).
   a. An Ethernet straight-through or crossover cable from the Ethernet port on your PC to Ethernet port 2 on the Tracer SC. (Continue with procedures for Setting the IP Address on your PC and Setting the Internet Proxy Server Address on your PC.
   b. A USB 2.0 A to B cable from a USB port on your PC to the USB service tool port on the Tracer SC. (Continue with the procedure for Setting the Internet Proxy Server Address on your PC).

      Important: *Do not make multiple connections to Tracer SC using the USB cable. For example, avoid a simultaneous connection to the Tracer SC user interface and Tracer TU. Disconnect the cable between devices to enable the USB Driver to recognize the next software device's request.*

Figure 3. Direct connection between PC and a Tracer SC (prior to LAN connection)



Setting the IP Address on Your PC

Follow this procedure if you are using an Ethernet connection. It describes how to set the Internet Protocol (IP) address on a PC that uses a Microsoft Windows 7 operating system. You may need to modify the process if you are using another compatible operating system.

Note: *If multiple Tracer® SCs are to be on the same network, each one must have a unique IP address.*

To see the IP address on your PC:

1. From the Start menu, Type in Network Connections, then click the View Network Connections link.
2. Right-click the appropriate network name for your PC and then click properties.

   The **Local Area Connection Properties** dialog box appears.
3. Click the Networking tab. Click either Internet Protocol Version 4 (TCP/IPv4) or Internet Protocol Version 6 (TCP/IPv6), and then click Properties.
4. Click the **Properties** button.

   The **Internet Protocol (TCP/IP) Properties** dialog box appears.
5. Click **Use the following IP address**. Enter the following:

   IP address (if connecting to Ethernet Port 2): 192.168.2.100

   Note: *This is the recommended address for the PC. Ethernet Port 2 on the Tracer SC has a factory address of 192.168.2.10. As long as both PC and Tracer SC addresses have the same subnet, 192.168.2, any number between 1 and 254 can be used for the last segment of the address.*

   Subnet mask: 255.255.255.0

   Gateway: Leave blank.
6. Click **OK**.

Setting the Internet Proxy Server Address on your PC

A proxy server provides a way for a PC to access a Tracer® SC through a Web browser. Follow this procedure if you are using either an Ethernet connection or a USB connection. If you are using Internet Explorer, set the proxy server address on your PC as follows.

If you are using Mozilla Firefox, contact Trane Product Support for the procedure. The same settings apply.

1. From the Tools menu of Internet Explorer, select **Internet options**. The **Internet Options** window appears.
2. Click the **Connections** tab.
3. Click the **LAN Settings** button. The Local Area Network (LAN) Settings window appears.
4. In the Proxy frame, select the proxy option, then click the Advanced.

   The **Proxy Settings** dialog box appears.
5. In the HTTP field, enter the following settings.

   Notes: *Separate them from the existing setting, and from one another, with semicolons (;).*

   - *192.168.1.* (for use of Ethernet port 1)*
   - *192.168.2.* (for use of Ethernet port 2)*
   - *127.0.0.1 (for use of USB)*
6. Click **OK**.

You are now ready to log into your Tracer SC.

Configuring a New Tracer SC

This section describes how to configure basic settings on a new Tracer® SC. These procedures can be performed prior to connecting the Tracer SC to the building network.

Note: *This section is intended for installer/programmers. If your job role is that of a building operator, proceed to "The User Interface," p. 34.*

Setting Rotary Addresses on the Tracer SC

The Tracer® SC has a set of three rotary switches on the front of the device, which are used to set the BACnet Device ID. The rotary switch range is 1 to 419. Zero (0) cannot be used because it is the default value assigned to the device at the factory.

Note: *If you set the rotary switch values to a number between 001 and 419, the Tracer SC device ID and the BACnet MS/TP numbers will be calculated from that number.*

To set the rotary switch values, use a small screwdriver to turn the three rotary switches on the Tracer SC to a unique number between 001 and 999.

Device ID Assignment for BACnet MS/TP Devices

Each unit controller must have a unique BACnet device ID. Tracer® SC automates the process by calculating a unique device ID for each unit controller and then saving the device ID to memory in each device.

BACnet MS/TP device IDs are calculated using the following three sets of values:

- The Tracer SC rotary switch value (1 to 419)
- The Tracer SC BACnet MS/TP link number (1 to 2)
- The unit controller rotary switch value (1 to 127)

The three values are joined together to form the BACnet device ID for the unit controller as shown in the following table.

Tracer SC rotary switch value (21)	0	2	1				
Tracer SC BACnet MS/TP link number (1)				1			
Unit controller rotary switch value (38)					0	3	8
BACnet Device ID: 211038	0	2	1	1	0	3	8

Device ID Assignment for BACnet IP Devices

Each unit controller must have a unique BACnet device ID. Tracer SC/SC+ automates the device ID assignment process for Trane unit controllers by calculating a unique device ID for each unit controller and then saving the device ID to memory in each device.

For devices communicating over BACnet IP, Tracer SC/SC+ calculates the device ID using the BACnet network number defined for Ethernet port 1 and the unit controller rotary switch value. The Tracer SC/SC+ rotary switch value is not used in the device ID calculation for IP devices.

BACnet IP device IDs are calculated using the following two sets of values:

- The BACnet network number for Ethernet 1. (This number can be changed by the user).
  - Tracer SC defaults the BACnet IP network number as 1, and under most circumstances it is not changed.
- The unit controller rotary switch value (1 to 999). The Tracer SC/SC+ rotary address is not used to calculate BACnet IP device IDs.

The following table shows this process using a Tracer UC600 unit controller.

BACnet network number Eth port 1 (1)		1			
Unit controller rotary switch value (42)			0	4	2
BACnet IP Device ID: 01042	0	1	0	4	2

Device ID Assignment for Base Tracer SCs

For unit controllers installed using a Base Tracer® SC, the Application Tracer SC calculates the device ID using the BACnet network number of the Base Tracer SC MS/TP link and the rotary switch value of the unit controller.

The example in the following table illustrates this process.

Table 4. Calculating the base Tracer SC device ID

BACnet network number of Base SC MS/TP link 1 (22)	2	2			
Unit controller rotary switch value (001)			0	0	1
Unit controller device ID set by Application SC: 22001	2	2	0	0	1

Device ID Assignment for Wireless Devices

For devices connecting over a wireless network, Tracer SC calculates the device ID using the BACnet network number and the rotary switch value of the wireless device.

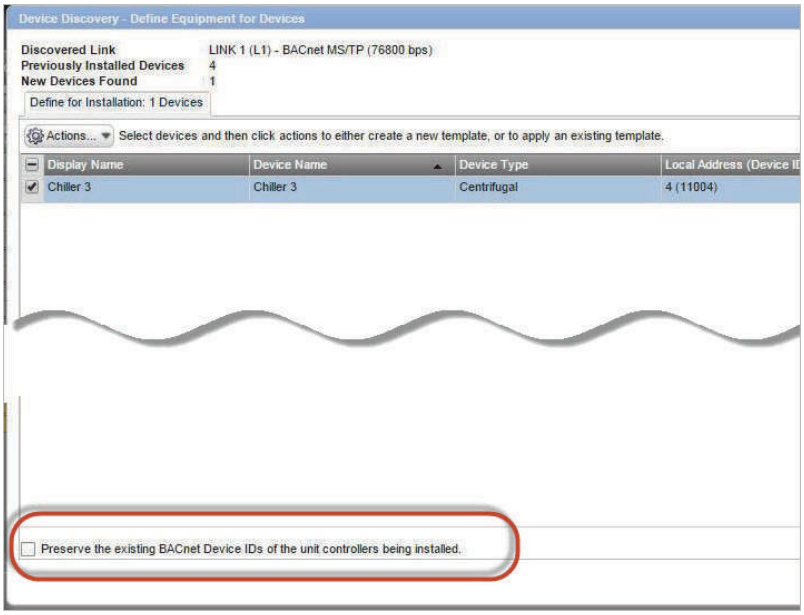
The example in the following table illustrates this process.

BACnet network number of Tracer SC wireless network (13)	1	3			
Wireless unit controller rotary switch value (001)			0	0	1
Wireless unit controller Device ID set by the Tracer SC (app): 13001	1	3	0	0	1

Customizing BACnet Device IDs

For complex BACnet addressing schemes or prescribed job specifications, custom device IDs may be required. You can customize the device IDs of Tracer unit controllers by using the Tracer TU service tool. During the device installation process in Tracer® SC, select the "Preserve the predefined BACnet device ID of the unit controllers being installed" checkbox (see the following figure). As a result, the installed devices will retain their device IDs. This feature applies to Trane and non-Trane BACnet devices.

Figure 4. Customize device IDs (device discovery page)



Logging into Tracer SC for the First Time

Before logging into Tracer for the first time, setup your personal computer (PC) as described in "Making a Direct Connection Between Your PC and a Tracer SC," p. 20.

Initial Login

1. Log into Tracer® SC by either:
   - Launching the Web Browser on your PC and navigating to the Tracer SC by entering its IP address in the Web browser address field.
     - 192.168.1.10 (if using Ethernet port 1)
     - 192.168.2.10 (if using Ethernet port 2)
     - 127.0.0.1: 44789 (if using USB)
   - Or, if your Tracer SC is connected by USB, selecting the**Tracer SC Via USB** desktop icon that appeared on your PC desktop screen when you installed Tracer TU.

   The Tracer SC Login screen will appear. (For future use and easy retrieval, bookmark the IP address.)
2. At the Tracer SC Login page, enter the user ID and password (case-sensitive):
   - User ID: Trane
   - Password: Tracer
3. Click **login**. The End User License Agreement appears.
4. Accept the agreement and click **continue**. The **Change Password** page appears.
5. Enter the old password and the new password, and then confirm the password. Click **Change Password**. The **Tracer SC Initial Setup** page appears.

   Important: *As of version 4.3, The following words are prohibited from use as part of the user password: Trane, Tracer, Admin, Password. Passwords must also now contain at least one number and one special character.*

Tracer SC Initial Setup

The **Tracer SC Initial Setup** page is designed as a quick start for basic configuration. The page automatically launches after logging on to a Tracer® SC for the first time.

Important: *This page will not appear again. You can use the Installation page to change any of the settings, except for system units, at any time after the initial log in is completed.*

The following items are configurable from the **Tracer SC Initial Setup** page:

Date and Time

- The date and time from your PC are used for the Tracer SC.
- You can manually change the date and time.
- The time zone setting configures the appropriate daylight savings time.

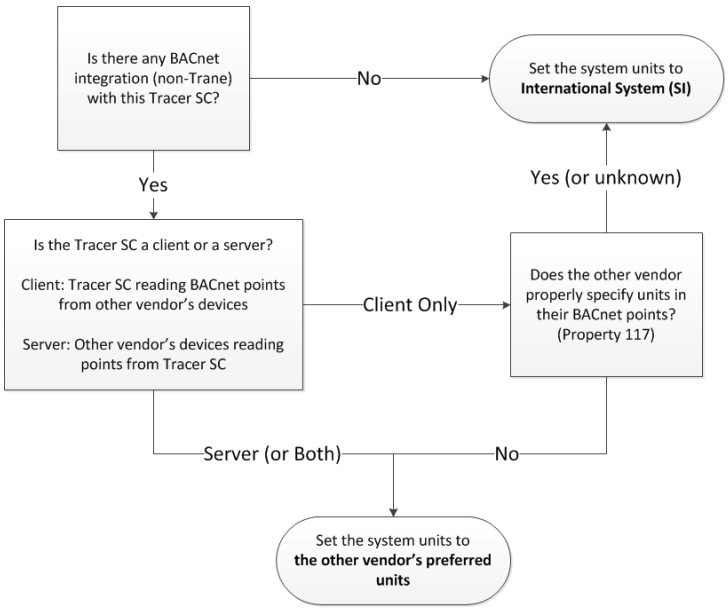
BACnet Identification

- Enter a unique name for the Tracer SC in the BACnet device field.
- The rotary switch settings are used to calculate the device ID for the Tracer SC and the network numbers for MS/TP Port 1 and MS/TP Ports 1 and 2.
- If the Tracer SC is intended to be a BACnet broadcast management device (BBMD), select the checkbox that assigns it as a BBMD. For information about BBMDs, see BACnet Network Communication."BACnet Network Communication," p. 97
- If BACnet unit controllers will be supported on the Tracer system, select the baud rate for the appropriate links. Select 78600 bps for Trane unit controllers.

System Units

- System units are associated with internal Tracer SC data that is communicated to unit controllers and other Tracer SCs. The system unit choices are the International System of Units (SI), inch-pound (IP), or a customized mix of the two.
- You are not allowed to change the system units after this page is saved.

Figure 5. system unit selection for Tracer SC+ and unit controllers



Licensing

Tracer SC product licenses enable Tracer SC applications and determine the number of devices that can be installed onto a Tracer SC system. There are two types of licenses available: the Tracer SC-Base license and the Tracer SC-Application license.

Tracer SC-Base License

This license is applied to every Tracer SC ordered at the factory. The Base license includes connectivity for up to 240 devices for TIS and is Multi-SC Ready. This license does not enable any of the control applications (VAS, Area, CPC, TGP2) that are required to control a building.

Tracer SC-Application License

This license enables the control applications and increases the number of supported devices up to a maximum of 240. A single application license is created by combining multiple, stackable application licenses through the BAS registration site. When installed, the application license will overwrite the base license and will enable the control applications for the number of devices specified in the Tracer SC application license.

You can obtain licenses from: http://www.basregistration.trane.com/Registration/ControlsLicensing.htm. You will need either the Tracer SC hardware serial number (see label on Tracer SC) or the product order number.

To License your Tracer SC:

1. Browse to the license file from www.basregistration.trane.com.
2. Download the file to the Tracer SC. The file upload dialog box appears.
3. Click once on the selected file and then click open to move the file path into the Locate File field.
4. Click import license file to complete the licensing process.

Saving the Initial Setup Configuration

To save the Tracer SC Initial Setup page configuration:

1. Click **save**. The Saving Initial Setup confirmation screen appears.
2. Click **continue** to save the new settings. The Tracer SC will restart.

Note: *To log in again, you need only your user ID and password.*

Force Return to Factory Defaults

In some case, a corrupt database or similar problem may prevent you from accessing the Tracer SC user interface. If this occurs, do the following to return to factory defaults:

1. Power down the Tracer SC.
2. Reset the rotary switches to “999.”
3. Power up the Tracer SC.
4. The 7-segment display shows F, o, r, C, E.
5. Within 30 seconds, set the rotary switches to the intended normal value.
6. The 7-segment display shows C, L, E, A, r, indicating that the database is being cleared. It will then resume normal operation showing –L on the 7-segment display during startup and then “dancing dashes.”

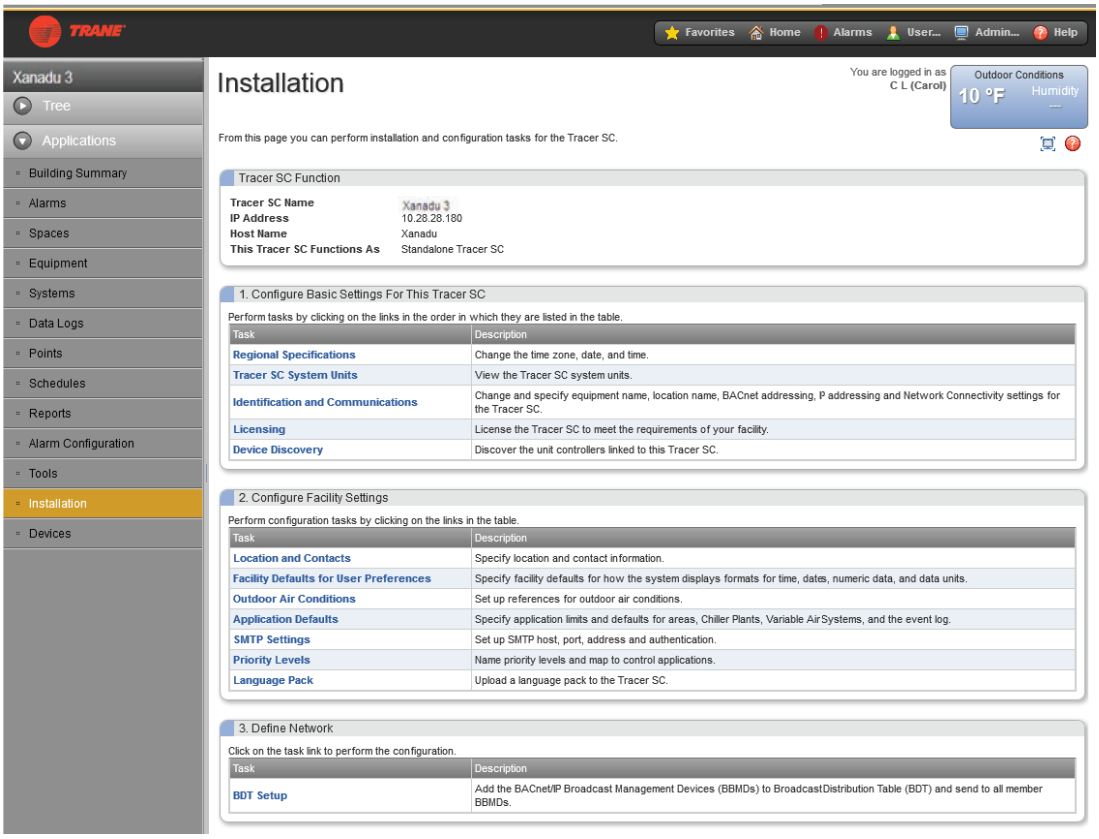
Note: *If rotary switches are not reset within 30 seconds the Tracer SC will power down, leaving the database intact.*

The Installation Page

Basic settings are configured on the **Installation** page. The following four subsections in this manual correspond to the four sections on the **Installation** page. (See the following figure.)

For help with user interface navigation, see “The User Interface,” p. 34.

Figure 6. Tracer SC Installation page



Configuring Basic Settings for the Tracer SC

These settings are for regional specifications, system units, communications, licensing, and device discovery. Except for Device Discovery, these settings were configured during initial configuration. Some of these settings can be edited.

Regional Specifications

This link contains language, time zone, and date and time selections that were made during initial configuration.

About Date and Time synchronization:

Tracer SC can be synchronized using a network time protocol (NTP) server. You can also select to synchronized installed BACnet unit controllers. Tracer SC also provides time synchronization for downstream unit controllers.

Tracer SC can also synchronize the time of all installed downstream devices that support a time clock. Time synchronization occurs daily at 3:00 a.m. and when the Tracer SC time has been edited.

Identification and Communication

The Identification and Communications page allows you to view and edit configurations for the equipment name, location name, BACnet, IP and network address settings, wireless configuration, Trane Intelligent Services, and network connectivity. It is divided into seven tabs.

Tracer SC System Units

This link enables you to view the system units that were selected for the Tracer SC during initial installation. They cannot be edited.

Licensing

This link opens the Product License page, which allows you to browse for and install a Tracer SC license.

Device Discovery

This link opens the Discover Devices page, in which you can discover newly installed unit controllers.

Configuring Facility Settings

A facility can consist of one or more Tracer SC controllers. These settings are used for a stand-alone Tracer SC or the Tracer SC-App in a multi-Tracer SC facility.

Location and Contacts

For entering the facility name and contact information for the facility owner and service provider.

Facility Defaults for User Preferences

The Facility Defaults page shows the formats in which the system displays data. This page is divided into two sections: Regional Preferences and Data Display Units.

Application Defaults

For setting the alarm capacity for each Tracer SC and setpoints to be used by area and variable air systems. Settings can be changed and updated to all existing areas and variable air systems using those setpoints.

Priority Levels

Priority levels establish a strategy used by the system to avoid conflicting control by giving precedence to applications with a higher level of priority. Priority levels are set up in user administration. They are numbered 1 through 16, with 1 highest and 16 lowest.

SMTP Settings

Use to set up your simple mail transfer protocol (SMTP) so that events can be routed to users by e-mail.

Language Pack

Tracer SC offers the ability to display standard pages, graphics, and built-in help systems in other languages. Up to four language packs can be uploaded per Tracer SC.

To upload a language pack:

1. To acquire a Tracer SC language pack, log on to the Software Downloads Web Site at https://tranetechnologies.sharepoint.com/sites/softwaredownloads/SitePages/SC.aspx.
2. From the left navigation menu, click **installation > configure facility settings > language pack**.
3. Search for the preferred language pack by using the **Browse** button.
4. Click **upload language pack**. A pop-up dialog box appears confirming a successful upload. When you click OK, you will be returned to the Login screen.
5. On the Tracer SC Login screen, select the uploaded language button and then enter your User ID and Password. The Tracer SC user interface will now appear in the newly uploaded language.

Defining the Network/Defining Facility

The BACnet Broadcast Distribution Table (BDT), which designates BBMDs in the system, is set up in this section.

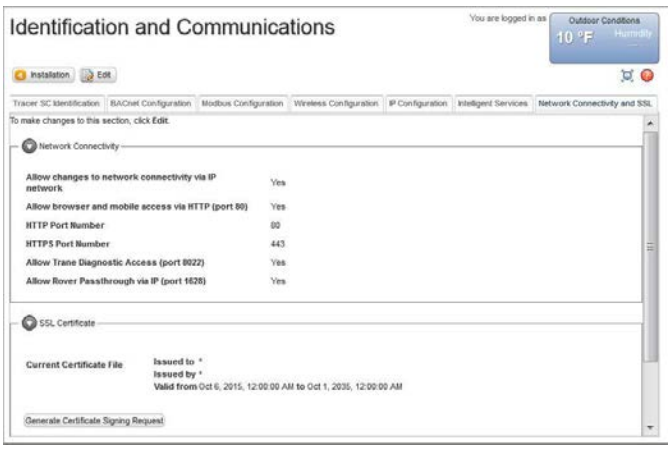
Note: *After a BDT has been set up for the Tracer SC, the Tracer SC can communicate to devices on other subnet.*

Network Connectivity and the SSL Tab

This section covers network security and configurations that will make your customer's Tracer SC more secure. Although enhancing network security is favorable, in some cases it restricts user access or increases the number of steps to gain access.

The following configurations are done in the Network Connectivity section (see the following figure).

Figure 7. Network connectivity and SSL tab



Allow changes to network connectivity via IP network — If selected, users can access the Network Connectivity and SSL tab over the Internet. If not selected, users must connect locally to Tracer SC by using a USB cable to view and make changes to the Network Connectivity and SSL section.

Note: *When this option is left unchecked (not selected), the Network Connectivity and SSL tab will not appear on the Tracer SC user interface when connected over TCP/IP. Any changes, including those made to this option, must be done locally at the Tracer SC user interface while connected via a USB cable. Selections made for this option affects all users of Tracer SC.*

Allow browser and mobile access via HTTP (port 80) — If selected, users can access Tracer SC through the HTTP port, versus HTTPS (secured). If unchecked (not selected), users will encounter a dialog box stating that the connection is untrusted. This is to be expected and users have the option to add the URL as an exception. As of version 4.3, the port assignment is editable. Another option is to obtain an SSL certificate (see below).

Allow Trane Diagnostic Access (port 8022) — This is a low level services port, which provides access to Trane Technical Support when Yes is selected. If not selected, access to this port is denied to all users including Trane Technical Support. As of version 4.3, the port assignment is editable.

SSL Certificate

An SSL certificate establishes a secure encrypted connection between a browser (user's computer) and a server (website). This section describes the process required to obtain an SSL certificate for a customer's Tracer SC.

To request an SSL certificate:

1. From the Tracer SC user interface, navigate to the network Connectivity and SSL tab. Click the **Generate Certificate Signing Request** button, which opens the accompanying dialog box.
2. Enter the requested information in the fields and then click **Generate**. (Consult the customer's IT staff to obtain the requested information).
3. You will be prompted to save a file named TracerSC_ssl_csr.pem. This is a Certificate Signing Request (CSR).
4. Forward the file (CSR) to the customer's IT staff.

5. When you receive the file back from customer IT, open the Network Connectivity and SSL tab on the Tracer SC user interface.
6. Click **Browse** and select the certificate file, then click **Upload Certificate File**.

   Important: *The Certificate Signing Request (CSR) must be generated by the Tracer SC that the certificate will be installed on. If the Tracer SC is replaced, a new CSR and certificate will be required.*

To upload a new SSL certificate:

1. In the **New Certificate** field, click **Browse**.
2. Select the appropriate file and then click **Upload Certificate File**.

Setting Up Intelligent Services (IS)

This section describes how to configure the network settings required to use, view, and modify the Intelligent Services features of Tracer® SC. Intelligent Services Data Collection facilitates data collection and distribution to IS servers. This option must be enabled to use Building Performance, Energy Performance, Active Monitoring, or Alarm Notification IS offerings (TraneConnect is enabled by default.) Use the TraneConnect option to enable secure remote access to the Tracer SC. This is necessary in order to connect to the Tracer SC using Tracer TU, Rover, and the Tracer SC UI from outside of the customer's network.

For detailed instructions on how to configure a Tracer SC as a connectivity module, see "Configuring Tracer SC for Tracer Summit BCU Data Collection and Remote Connectivity," p. 155.

Requirements

The minimum required Tracer SC firmware version is V3.0.0564. To obtain a copy of the latest firmware go to: https://tranetechnologies.sharepoint.com/sites/softwaredownloads/SitePages/SC.aspx.

Configuring the Network

In order for Intelligent Services to work correctly, DNS must be enabled on your network and a DNS must be set up.

1. Navigate to the Identification and Communications page. Click "Identification and Communications" from the **Configure Basic Settings For This Tracer SC** .
2. Click the IP Configuration section to view the settings.

Modifying Intelligent Services and TraneConnect

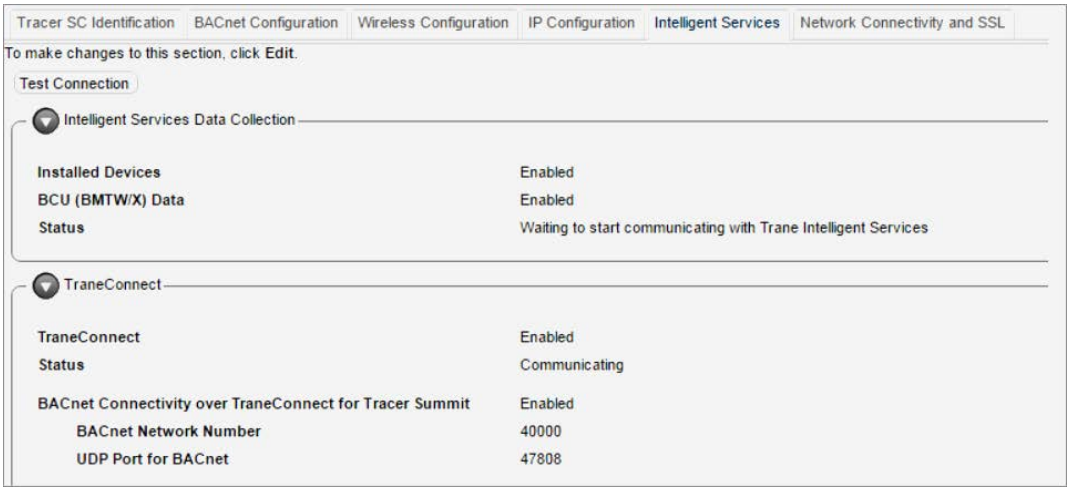
1. From the Identification and Communications page, select the Intelligent Services tab.
2. Click **Edit**.
3. In the **Intelligent Services Data Collection frame** choose to edit the following:
   - **Installed Devices**: Enables/disables the collection of data for TIS on devices that are installed in the Tracer SC.
   - **BCU (BMTX/X) Data**: Enables/disables the collection of data for TIS on devices that are installed on the BCU (applicable only on a Base SC). This field is not visible on an Application SC.
   - **Status**: Displays the status for installed devices or a BCU or both. This field is displayed only when any of the installed devices or BCU data is Enabled in the Tracer SC.
4. In the **TraneConnect frame** choose to edit the following:
   - **TraneConnect**: Allows you to enable/disable TraneConnect for Tracer SC.
   - **Status**: Displays the status of the TraneConnect. This field is displayed only when TraneConnect is enabled.
   - **BACnet Connectivity over TraneConnect for Tracer Summit**: This sets up an additional BACnet IP datalink bound to the TraneConnect connection. When enabled, the

SC acts as a BACnet router allowing external tools such as Tracer Summit to access devices on the SC's BACnet internetwork through TraneConnect. This is not required to access Tracer SC via TraneConnect. Changing any of these settings will cause the SC to restart.

- **BACnet Network Number**: This is the network number assigned to the TraneConnect datalink connection. As with all other links, this MUST be unique across the entire BACnet internetwork (particularly be aware of remote networks accessed via routers that may cause a conflict). If in doubt, choose a large number less than 65535.
- **UDP Port for BACnet**: The UDP port for BACnet IP over TraneConnect datalink. This is the port that will be used when configuring the connection in Tracer Summit or other external tools. Since TraneConnect is on a private IP subnet, it is not necessary to change this from the default of 47808.

5. Click **Save** (see the following figure).

Figure 8. Intelligent Services tab



Troubleshooting Intelligent Services (IS)

Table 5. Test Connection – Response messages

Response	Probable Cause	Resolution
Connection successful.	Connection to Internet is successful. TCP/IP connectivity to the IS and TraneConnect server is successful.	n/a
Unable to communicate with TraneConnect server.	Internet communication with TraneConnect server failed.	Verify network configuration or contact the site's network administrator to confirm network is configured to allow Internet communication to TraneConnect Server.
Unable to communicate with Intelligent Services.	The http settings for the TIS server are incorrect, server is down, or some network settings are incorrect.	Verify network configuration or contact site's network administrator to confirm network is configured to allow Internet communication to TraneConnect Server.
Unable to communicate with all Intelligent Services servers.	Internet communication with Intelligent Services and TraneConnect servers failed.	Verify network configuration or contact site's network administrator to confirm network is configured to allow Internet communication to TraneConnect Server.
All other messages.	Various causes.	Contact Controls Technical Support and provide them with the exact status message.

Table 6. Status – Possible error messages

Message	Probable Cause	Resolution
Communicating	The IS application is communicating normally.	n/a
DNS failed. Check that DNS is enabled and properly configured on the Tracer SC.	Attempts to verify that DNS is enabled and functioning properly have failed.	Confirm that DNS has been enabled and configured properly on the Tracer SC.
Waiting to start communicating with Trane Intelligent Services.	IS has been enabled on Tracer SC but is waiting to startup in order to allow normal Tracer SC functionality to progress.	Wait 5 minutes after Tracer SC startup and this status will be cleared.
No Internet Connection	Tracer SC cannot connect to the Internet.	• Check the networks to ensure they can access the Internet. • Contact the site's network administrator if unable to resolve.
No connection to Multiple Services.	Attempts from multiple IS service apps on the Tracer SC failed to post a message to their corresponding Intelligent Services endpoint.	Contact Controls Technical Support.
No connection to Inventory Service	Attempt to post a message to the Intelligent Services inventory endpoint has failed.	Contact Controls Technical Support.
No connection to Data Collection Service	Attempt to post a message to the Intelligent Services data collection endpoint has failed.	Contact Controls Technical Support.
No connection to Alarm Service	Attempt to post a message to the Intelligent Services alarm endpoint has failed.	Contact Controls Technical Support.
No connection to Configuration Change Service	Attempt to post a message to the Intelligent Services config change endpoint has failed.	Contact Controls Technical Support.
No connection to Health Status Service	Attempt to post a message to the Intelligent Services health endpoint has failed.	Contact Controls Technical Support.
Unable to download Intelligent Services configuration settings	Connection to the IS config server was established successfully but an attempt to download configuration data from the IS config server has failed.	The Tracer SC periodically polls the IS servers for new configuration. This status shows that the last attempt has failed. If this status remains after 5 minutes, consider use of data static endpoints since there may be firewall rules on customer's network restricting communication. Contact IS admin to help set up data static endpoints and resolve this issue.
Unable to download TraneConnect configuration settings	Connection with the TraneConnect server was established successfully but attempt to download configuration data failed.	Contact Controls Technical Support.
Unable to Start TraneConnect Client	TraneConnect Manager attempted to start the tunnel service on the Tracer SC but no tunnel interface was found. Either Tracer SC does not have an open VPN profile or the profile is invalid and the open VPN client cannot be started.	Contact Controls Technical Support.
Communicating. Waiting for TIS admin to configure TraneConnect.	The Tracer SC is not registered with the TraneConnect server.	Contact Controls Technical Support to register the Tracer SC with TraneConnect.
Disable	This feature is disabled.	See the "Modifying Intelligent Services and TraneConnect" procedure to enable.
All other messages	Various causes.	Contact Controls Technical Support and provide them with the exact status message.

Table 7. Outbound network ports and destination servers

Service	Outbound Port	Protocol	Server DNS
TraneConnect	443	TCP	sc-traneconnect.tis.trane.com
	1194* *see note* **(A)**	UDP	
Data Connection	443	TCP	data.tis.trane.com

- No incoming ports required. All communication originates from the Tracer SC inside the customer's network, encrypted using SSL/TLS.
- **(A)** UDP port 1194 provides optimal TraneConnect performance.

The User Interface

The Tracer SC user interface provides an easy way for users to set up, operate, and modify a building automation system. The home page contains system status information and links to navigate to all areas of the system. The navigational elements are described in the following table.

Table 8. Navigating the user interface

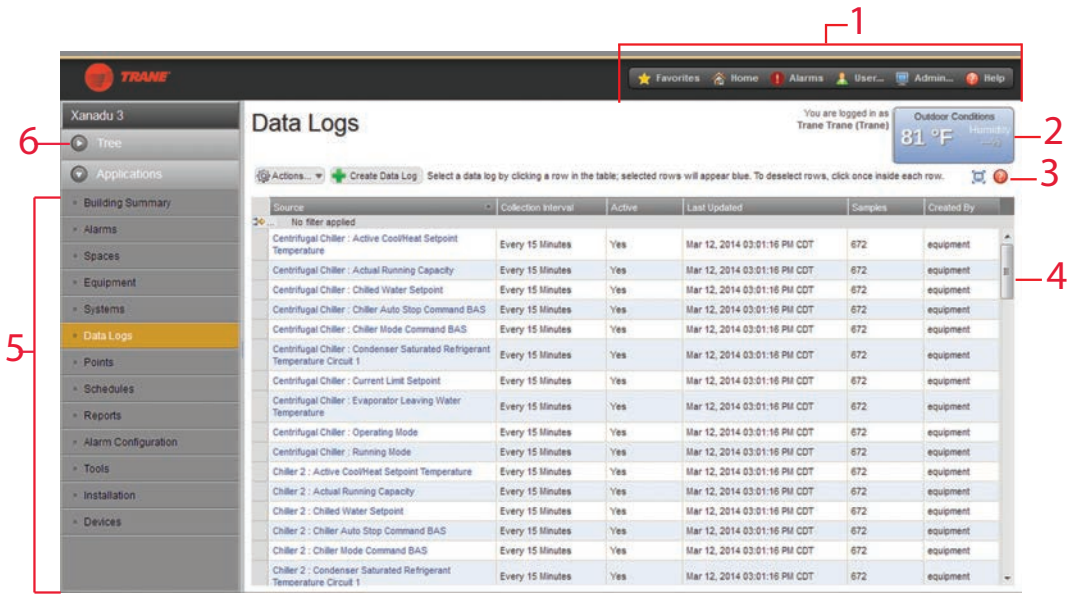
Number	Button/Menu Functions	Description
		
1	Global Navigation Bar	This is visible on every page. From left to right, the bar contains: • **Favorites** Click this button to save frequently Tracer SC UI pages. • **Home** Click this button at anytime to return to your home page. • **Alarms** Shortcut to the **Alarms** page. If a new alarm or event has been detected by the system since the **Alarms** page, the **Alarms** icon flashes. • **User...** Provides access to: – Logout – Enable/disable automatic tree opening – Preferred data view (tabular or graphical) – Table filtering – Regional preferences – Data display units – Change password • **Admin...** Provides access to roles and users. – Appears only if the user has administrative privileges. – A role is a collection of access rights to equipment, functions, and applications. Users are assigned to roles. The role assignment determines a user's access rights. – Six pre-defined user roles exist in the Tracer SC. These roles can be used as is, or as a basis to create additional roles. Roles define the extent to which a user is allowed to perform specific functions. – Each user is assigned a role. If you make a change to a role, all users assigned to that role will have their permissions changed, as prescribed by the updated role. • **Help** Opens the complete Tracer SC help system.
2	Outdoor Conditions	Shows current outdoor temperature and humidity.
3	Contextual Help	Opens a help topic that pertains only to the information on the page in view.

Table 8. Navigating the user interface (continued)

Number	Button/Menu Functions	Description
4	Internal Scroll Bar	An internal scroll bar is available for pages that contain long lists of data and multiple sections.
5	Left Navigation Menu	Contains a list of menu items that are linked to features, applications, and equipment. Some menu items, when selected, expand to reveal a sub-menu of related items.
6	Navigation Tree	A customized view of user-selected elements in the HVAC system. You can group, order, name elements, and assign custom graphics to the tree nodes according to your preferences.

Applying Table Filters

Table filtering allows you to see only selected data by setting up rules and conditions. The option to filter tables is available on the following pages:

- Alarms and Events
- Data Logs
- Reports
- Spaces
- Area, VAS, Chiller Plant (Alarms Tab)

To apply a table filter:

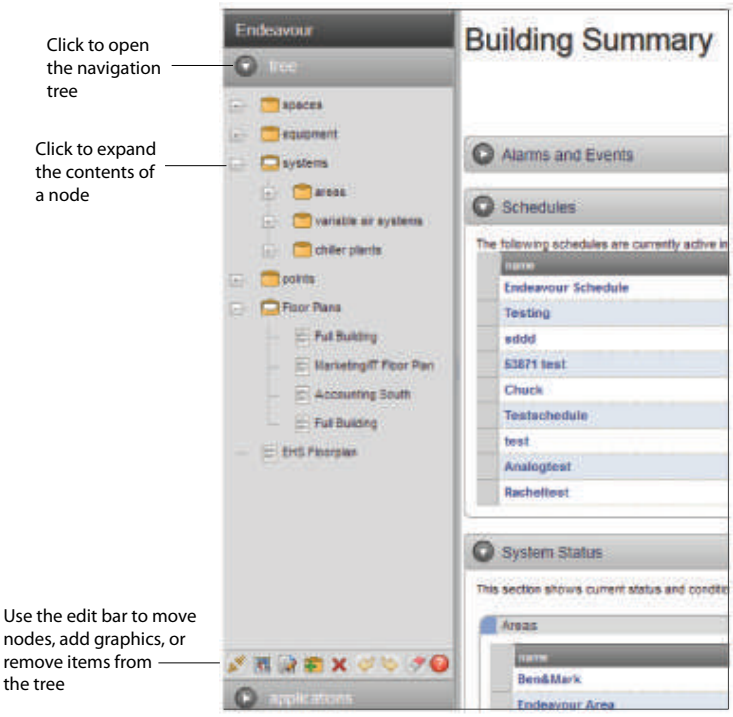
1. From one of the above mentioned pages, click the filter  icon. The Filter dialog box appears.
2. From the **Column** drop-down list, select a column on which to base your filter.
3. From the **Condition** drop-down list, select a condition.
4. In the **Value** field, enter a value that the selected Column and Condition will filter.
5. Click Filter. The table displays results based on the applied filter.
6. Click the  button to add a rule. Up to three rules can be added to a filter.
7. Use the **Match** drop-down list to include all rules or any rules.

   To remove the filter, click **Clear filter** located directly above the first entry in the table in which you are viewing.

The Navigation Tree

The navigation tree contains the logically ordered and grouped content of all the elements of your HVAC system. The navigation tree populates automatically when spaces, systems, points, and equipment are installed. A navigation tree provides an alternate way to navigate through the user interface. The navigation tree consists of nodes, display text, and icons. You build the tree by choosing display text for nodes, arranging the nodes, and assigning associated graphics. The graphics represent equipment and areas of the facility.

Figure 9. Using the Tracer SC navigation tree

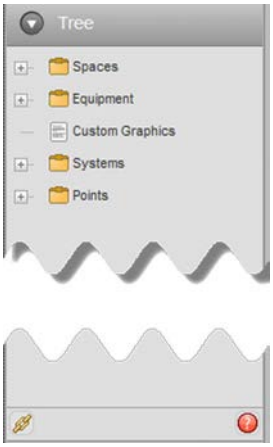


Using the Navigation Tree

Click the arrow icon on the navigation tree to expand the tree and display the contents. The navigation tree can be customized according to your preferences and facility needs. The tree must be unlocked before any changes can be made. Click the chain link icon located at the bottom of the tree.

Note: *To save edits made to the navigation tree, you must lock the tree by clicking the chain link icon.*

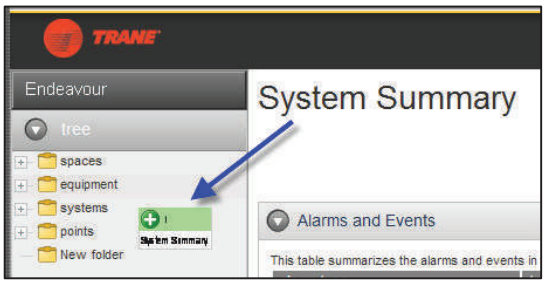
Figure 10. Accessing the navigation tree



Drag a Tracer SC Component onto the Tree

You can create nodes on the tree by dragging them from the title of a Tracer® SC component onto the tree. Click and drag a component from the Tracer SC page onto the tree. An image representing the component appears red, then green when it glides over a valid area. Depending on where you locate the dropped image, the new node will appear under the node you drop it onto. To save your changes, lock the navigation tree by clicking the chain link icon.

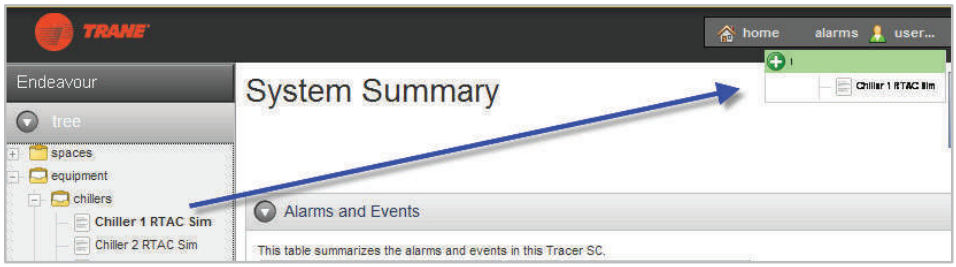
Figure 11. Dragging a Tracer SC component onto the tree



Drag a Tree Component onto the Home Button

Click and drag a component from the navigation tree as shown in the following figure, or from the title of an Tracer SC component on the page to the Home button. To save your changes, lock the navigation tree by clicking the icon.

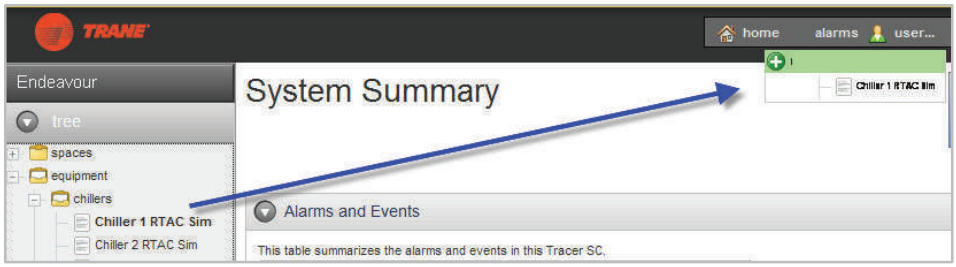
Figure 12. Dragging components from the tree



Drag a Tree Component onto the Home Button

Click and drag a component from the navigation tree as shown below, or from the title of an Tracer SC component on the page to the Home button. To save your changes, lock the navigation tree by clicking the icon.

Figure 13. Dragging components from the tree



Drag Tree Nodes to Other Locations

Nodes can be dragged and dropped to other locations on the tree. When a node is dropped onto another node that is currently not a folder, the node icon will then appear as a folder icon. Multiple nodes can be selected at the same time by clicking on multiple nodes. To save your changes, lock the navigation tree by clicking the icon.

Rename Tree Nodes

Nodes on the tree can be renamed directly within the tree. Rename a node by “slow” clicking on the tree node while in unlocked mode. Slow is defined as two clicks on the same node spaced between 1 and 5 seconds apart. This places the name of the node in edit mode, in which the old name can be deleted and the new one entered. To save your changes, lock the navigation tree by clicking the chain link icon.

Add a Custom Graphics Node to the Tree

1. Click the custom graphics icon located on the edit bar.
2. The **Add a Custom Graphics Node to the Tree** dialog box appears.
3. Select a graphic from list. (A filtering option is available for your convenience).
4. Click **Next**.
5. If the graphic is associated with a template, a tree with all the devices on the SC is displayed. You can then select the equipment with which to associate the graphic. If the graphic is not associated with a template, a pane with the ability to save the graphic is displayed.
6. Save the graphic (template or otherwise).

Edit a Node on the Tree

1. Click to select one or more nodes on the tree.
2. Click the edit node icon located on the edit bar.
3. The **Edit Nodes** dialog box appears.
4. Select an action: Modify custom graphic assignment, or Reset custom node labels to default.
5. Follow the instructions in the dialog box to complete the action.

Add a Custom Folder to the Tree

1. Click the add folder icon located on the edit bar.
2. A new folder appears at the bottom of the tree, or below a selected node.

3. Click once on the folder to place in edit mode; rename the folder.

Delete a Node from the Tree

1. Select a node or folder on the tree (text displays in bold when properly selected).
2. Click the delete icon located on the edit bar.
3. The selected item is deleted.

Undo a Change to the Tree

While editing the tree, you can undo a change by clicking on the undo icon Actions can be undone back to the point where the tree was unlocked for editing. The undo icon will be active only when there are actions that can be undone.

Redo a Previously Undone Change to the Tree

While editing the tree, you can redo a previously undone change by clicking on the redo icon The redo stack is cleared once a new operation is performed. The redo icon will be active only when there are actions that can be redone.

Reset the Tree to Standard Configuration

You can reset the tree to its standard configuration by clicking on the reset icon .

User Accounts and Administration

User accounts hold the necessary information required for a user to interface with the system. Administrative rights grant the user the ability to manage user accounts, create and delete users and reset passwords. There must be at least one “administrator” of the system (the last administrator cannot be deleted.)

Each system user can be setup with a unique user ID and a role assignment that dictates the level of access to systems, equipment, tools and more.

User administrator functions are accessed from the global navigation bar located on the upper right corner of the screen as shown in the following figure. These functions include setting up and editing new users and roles, and establishing secure passwords.

Note: *The Admin selection only appears on the global navigation bar if the user has administrative privileges.*

Figure 14. Accessing administrative functions

Best Practices for User Accounts

Trane recommends establishing at least two user accounts that grant administrative access: One for Trane technicians, and the second account reserved for the customer.

Trane technician user account

- To be used primarily for service and troubleshooting
- The account should grant full access to everything in the system including administrative
- access.
- Account user should be assigned Installer/Programmer role
- Tracer SC includes this user account for initial setup and programming (by default)

Customer user account

- At least one account should be set up that grants administrative access in order to create and manage other users in the system.
  - Should be assigned a role appropriate for daily tasks.
- An additional Super User account can be set up that is responsible for monitoring all equipment and applications in the system.
  - Account user should be assigned the Installer/Programmer role with administrative access.

Creating a New User

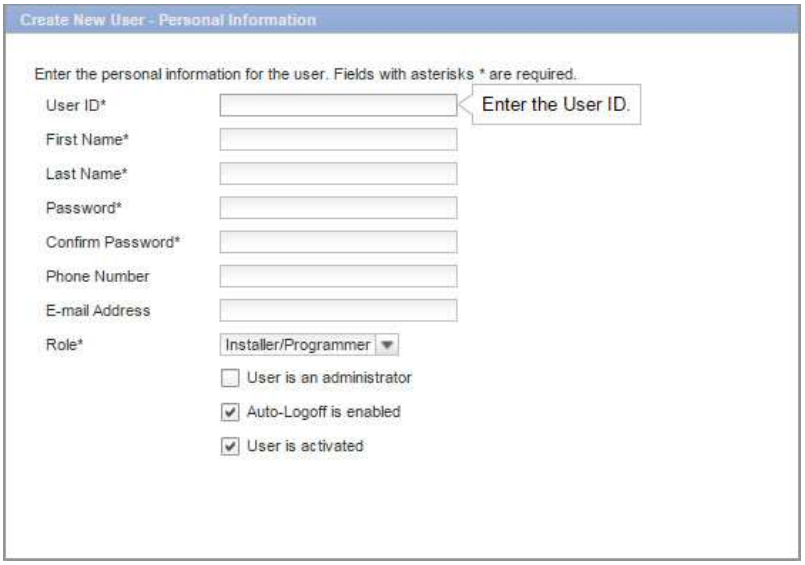
The following is a high-level procedure designed to provide you with the basic navigational steps. For more detailed instructions while creating a new user, click the help icon located on each user interface page.

To create a new user:

1. From the global navigation bar, click **Admin > Users**, which opens the **Users** page.
2. Click the **Create User** button. The **Personal Information** page appears.

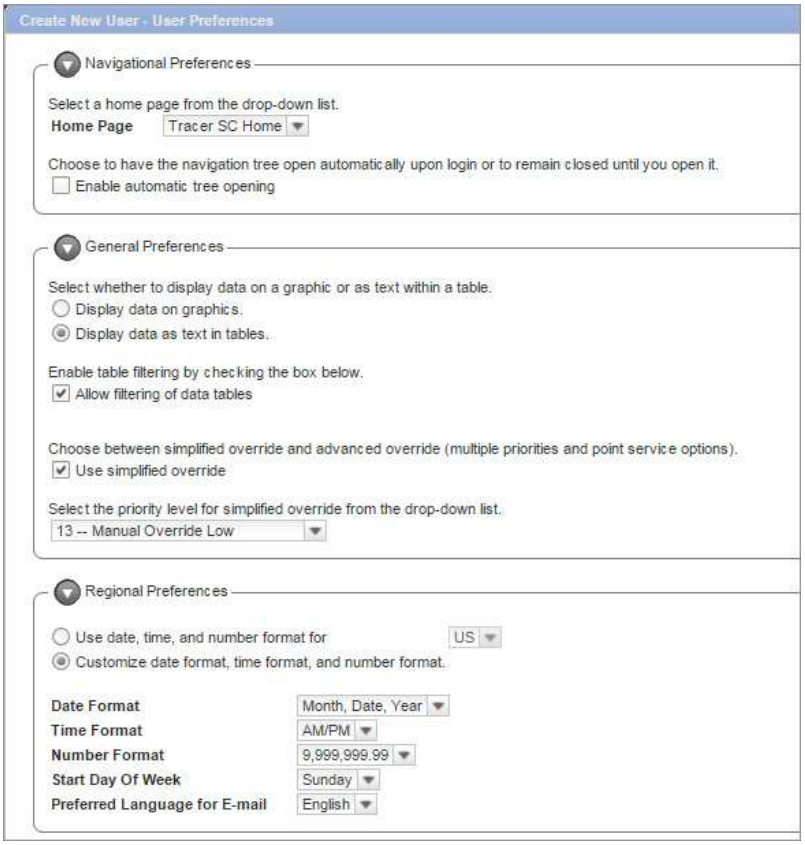
3. Enter the user's personal information, and then click **Next**.

Figure 15. Create new user (personal information)



4. On the **Preferences** page, determine how certain attributes on the Tracer® SC user interface will appear. Click **Next**.

Figure 16. Create new user (preferences)



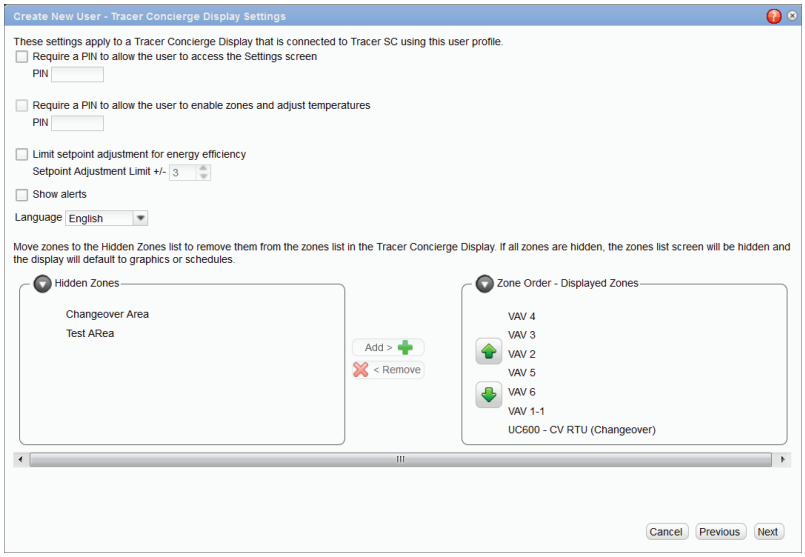
5. On the **Data Display Units Preferences** page, determine the unit type in which data will be displayed. Click **Next**.

Figure 17. Create new user (data display units)

6. On the **Tracer Concierge Display Settings** page, define the Tracer Concierge Display settings. (This page is visible only if the device has a valid Tracer Concierge Display Settings License uploaded.) Click **Next**.

7.

Figure 18. Create new user (Tracer Concierge)



8. On the **Custom Graphics Access** page, select the custom graphics that the user will be able to access. Click **Next**.

Figure 19. Create new user (custom graphics access)

9. On the **Summary** page, review your selections. Click **Finish** to save the new user.

Creating a New Role

Roles are assigned to users to govern the level of permission they have to access the applications and equipment in the Tracer® SC. There are eight predefined roles to choose from. Custom roles can be created to provide the exact level of access required. (The predefined roles cannot be edited or deleted).

The following is a high-level procedure designed to provide you with the basic navigational steps. For more detailed instructions while creating a new role, click the help icon located on each user interface page.

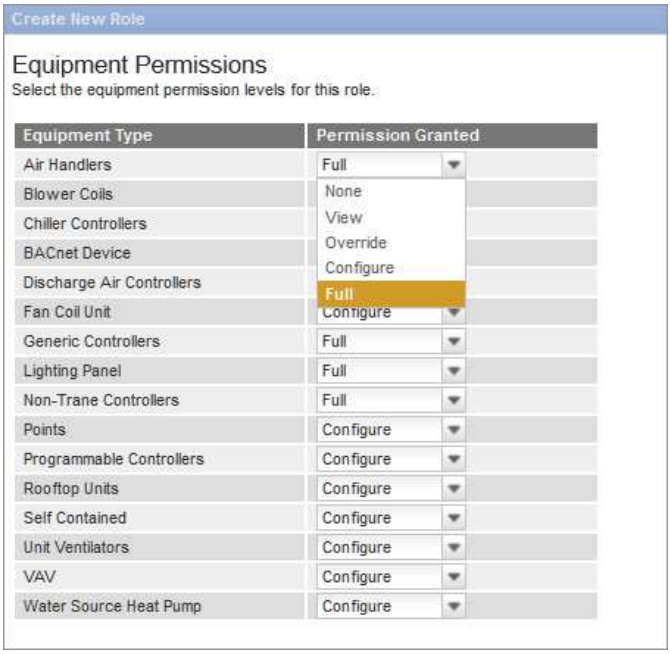
To create a new role:

1. From the global navigation bar, click **Admin > Roles**, which opens the **Roles** page.
2. Click the **Create role** button. The **Role Information** page appears.
3. Complete the fields, and then click **Next**.

   The Base Role is a template that is used as a starting point for defining access to the system. The maximum override priority will dictate the level of control granted to the user. The higher the precedence given to the user's overrides in the system.

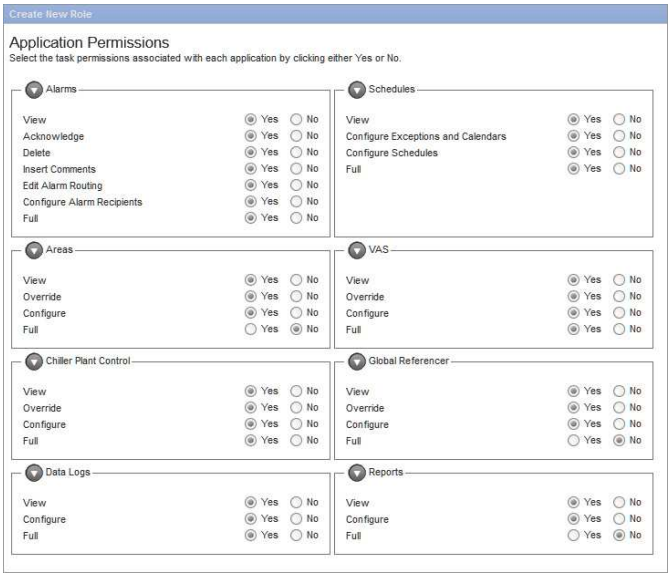
Figure 20. Create new role (information)

4. On the **Equipment Permissions** page, determine the permission levels for equipment. Click **Next**.



5. On the **Application Permissions** page, determine the application permission levels. Click **Next**.

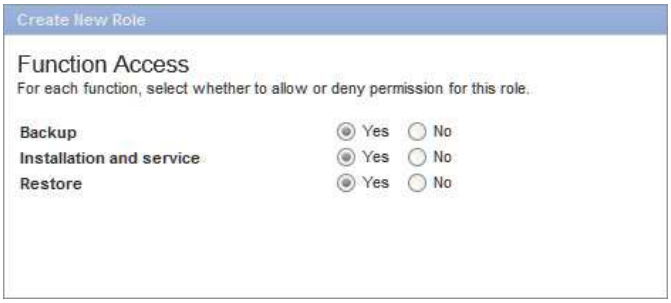
Figure 21. Create new role (application permissions)



6. On the **Function Access** page, select the functions that users in this role will have access to.

   User responsible for configuration and programming for Tracer SC should have access to Installation and Service.

Figure 22. Create new role (function access)



7. On the **Summary** page, review your selections. Click **Finish** to save the new role.

User Security

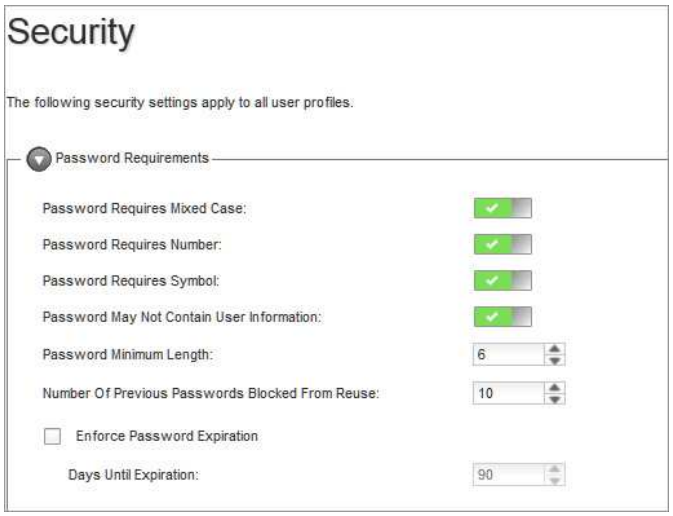
Tracer® SC administrators determine password requirements for all users on this page. As an administrator, you can select or deselect to activate the following options:

- **Password Requires Mixed Case** — Must contain at least one lower case or upper case letter.
- **Password Requires Number** — Must contain at least one number.
- **Password Requires Symbol** — Must contain at least one symbol such as %, $, #, @.
- **Password May Not Contain User Information** — Cannot contain the user ID name.
- **Password Minimum Length** — The minimum number of required characters is 6. Use the spinner box to select a number.

- **Number of Previous Passwords Blocked From Reuse** — Users are prohibited from creating a new password by reusing their most previous password. This can be extended beyond the most previous for heightened security. The valid range is 1 to 75. Use the spinner box to select a number.
- **Enforce Password Expiration** — Select this check box to require users to create a new password when their current passwords expire.

  Note: *The following words are prohibited from use as part of the user password: Trane, Tracer, Admin, Password.*
- **Days Until Expiration** — Use the spinner box to select the maximum number of days that passwords are valid until a new one must be created. Valid range is 7 to 365.

Figure 23. Password security setup



Remote Access to a Tracer BAS

Trane recommends using Trane Connect Remote Access, a pre-engineered, secure IT technology, for remote access. For more information about Trane Connect Remote Access, refer to the *Intelligent Services Software User Interface for Trane Connect Remote Access User Guide,* (BAS-SVU22). If the Tracer BAS does not have access to the internet, a Tracer Cellular Router can be used. For more information about the cellular router solution, including ordering information and remote access, refer to the *Tracer Cellular Router Installation, Operation, and Maintenance Guide,* (BAS-SVX067).

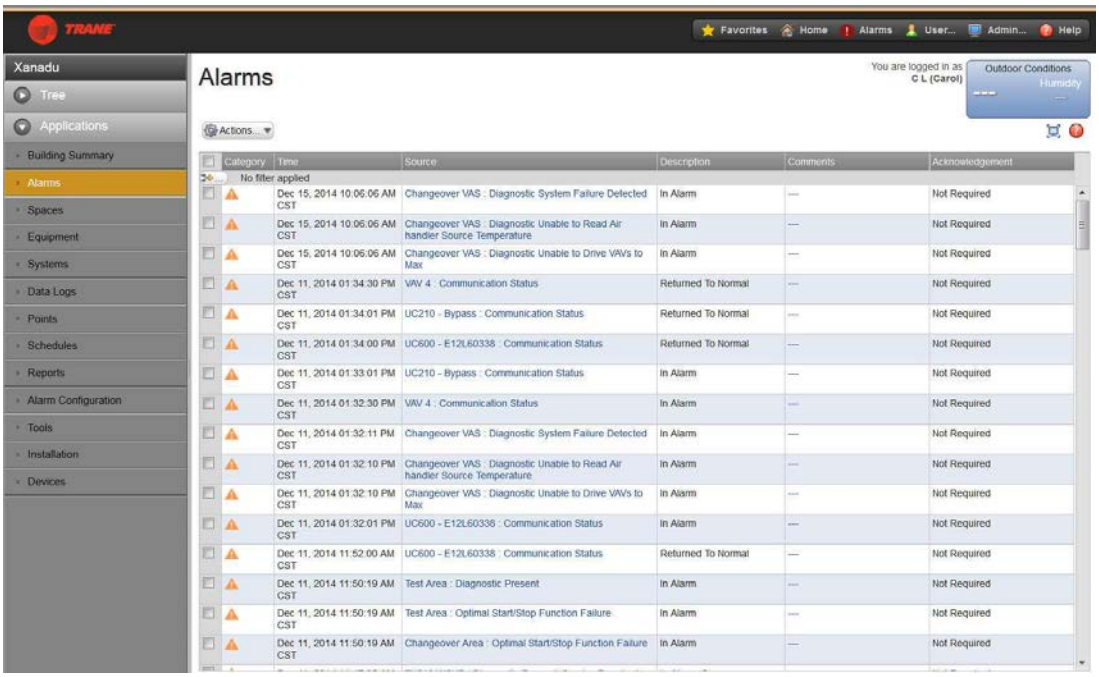
Alarms

The alarm handling capabilities of Tracer SC allow users to receive, view, acknowledge, and make comments on building alarms and events. An event that is triggered by the detection of an abnormal or critical operating condition is generally considered to be an alarm. If a critical alarm exists, an alarm icon flashes in the global navigation bar, which remains visible in the right corner of every page of the user interface.

The Alarms page contains a list of alarms that have been detected by the system. Data displayed in the Alarm log includes when and where the event occurred and whether operator acknowledgment is required.

As of version 4.3, the Alarm log also includes the value of the data associated with the alarm.

Figure 24. Alarms log



Alarm Configuration

Alarm configuration consists of:

- Assigning or creating categories (previously called severities).
- Assigning or creating notification classes.
- Routing alarm e-mail.
- Enable audible alarm notification.
- Creating alarm message templates.

Click Alarm Configuration from the left navigation menu to open the Alarm Configuration page.

Alarm Categories

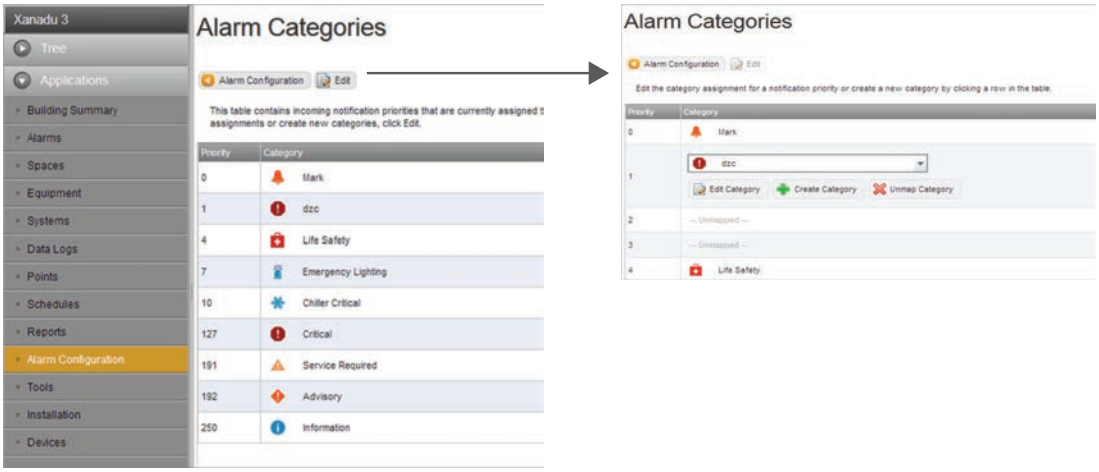
You can categorize alarms to determine how they appear in the Alarm log. A category is assigned to one of 255 priorities. In previous versions of Tracer® SC, alarm categories were limited to four types: Severe, Critical, Advisory, and Information. Now, you can create additional categories and select an accompanying icon. Benefits of customizing alarm categories include the ability to send a specific alarm to a specific person, and to differentiate critical equipment alarms from others.

Creating Alarm Categories

1. Click **Alarm Configuration>Alarm Categories.**The Alarm Categories page opens.
2. Click **Edit**. The table expands to show a list of priorities. (The smaller the number, the higher the priority).
3. Click on a row that is labeled Unmapped, and then click **Create Category**.
4. To select an icon, click on the icon symbol to expand icon choices. a new and then click Create Category. one in the Name field. Click the Save button located within the category.

   Note: *Be mindful of the priority you are mapping. For example, you might want a category for a Chiller's transition to the alarm state to be mapped to a higher priority opposed to a Chiller's return to normal state.*

Figure 25. Creating or editing alarm categories



Edit an Alarm Category

1. From the **Alarm Categories** page, click the **edit** button.
2. Click on the specific category and then click **Edit Category**.
3. To change the icon, click on the existing icon to expand icon choices. To change the name, type a new one in the Name field. Click the **Save** button located within the category.
4. Repeat the above steps if you have additional categories to edit.
5. Click the **Save** button located at the bottom right corner of the page after all your edits have been made.

Unmap an Alarm Category

1. From the Alarm Categories page, click the edit button.
2. Click on a specific category and then click Unmap Category. This will remove the category from any notification classes to which it has been mapped.
3. Repeat the above steps if you have additional categories to unmap.
4. Click the Save button located at the bottom right corner of the page after all your edits have been made.

Notification Classes

When a device has a problem or a fault, such as when the present value of a property rises above a predetermined level, a notification class object defines where a device will send an alarm and the priority of that alarm.

Tracer SC and Tracer unit controllers have their own list of notification classes used for alarm routing. The notification classes in Tracer SC are used for points and applications in Tracer SC only and cannot be assigned to a point in a BACnet unit controller. Likewise, each unit controller uses its own list of notification classes to route alarms.

The most common notification classes are:

- HVAC-Critical
- HVAC-Information
- HVAC-Service Required
- HVAC-Warning

Creating Notification Classes

Create notification classes in Tracer SC after you have created alarm categories.

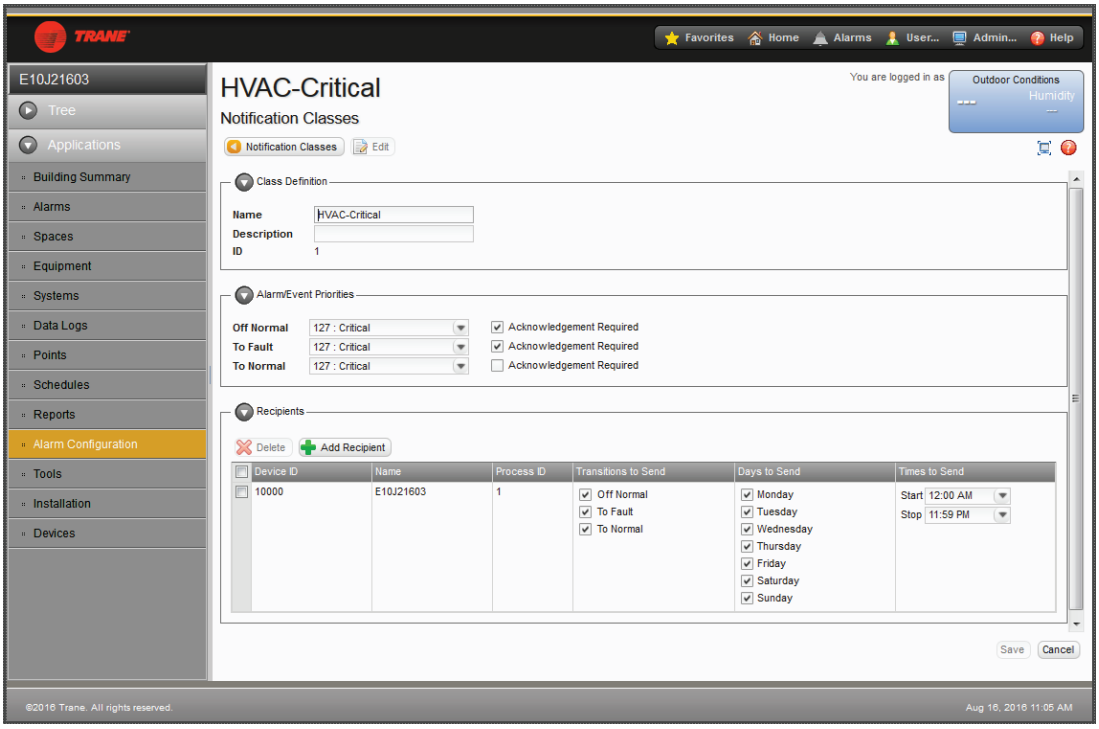
1. From the Tracer SC left navigation menu, click **Alarm Configuration > Notification Classes.** The **Notification Classes** page opens.
2. To view or edit a notification class click on the class name, which opens the definitions page (see the following figure). To make changes, click **Edit**. To create a class, click **Create Notification Class**.

   Note: *The following instructions also apply to creating a notification class.*

   1. In the **Class Definition** section edit or enter a name for the notification class, and a description (optional).
   2. In the **Alarm/Event Priorities**, select an alarm priority/category for each transition and whether or not acknowledgment is required. The state of a point is determined by its internal logic. When a point changes from its current state to another state, a transition has occurred and an event is generated by the point. A point is always in one of the following three states:
      - **Off Normal**: Indicates that the object is functioning correctly, but the value is outside the user-defined range.
      - **To Fault**: Indicates that the object is not functioning correctly and the value is unreliable.
      - **To Normal**: Indicates that the object is functioning correctly and the value is within the user-defined range.

      As of version 4.3, recipients can be added or deleted manually.
3. In the Recipients section select which transitions will be sent to the listed recipients, and the days and the time of day in which they will be notified
4. Click **Save**.

Figure 26. Creating or editing notification classes



Routing Alarm E-mail

Alarm routing consists of rules (or routes), in which alarms are be sent by way of e-mail to specified users. The alarm routing list shows where and when specified alarms will be routed. It is best practice to set up alarm e-mail routing after alarm categories and notification classes have been created. Use the **Actions** button to edit or delete routing rules.

To initiate alarm e-mail routing, routing rules must be configured.

An event routing rule dictates that events mapped to a specified severity value be sent to a specified operator. The rule contains a routing schedule that specifies when e-mails are sent.

Routing rules are created on the **Create Routing Rule** page. After saving a routing rule, it appears on the **Routing Event E-mail** page.

Adding a Routing Rule

1. From the left navigation menu, click **Alarm Configuration>Routing Alarm E-mail**. From the **Routing Alarm E-mail** page, click **Add Routing Rule.** The **Create Routing Rule** page appears as shown in the following figure.
2. In the **Select User** section, select the users who will be notified about specified alarms.

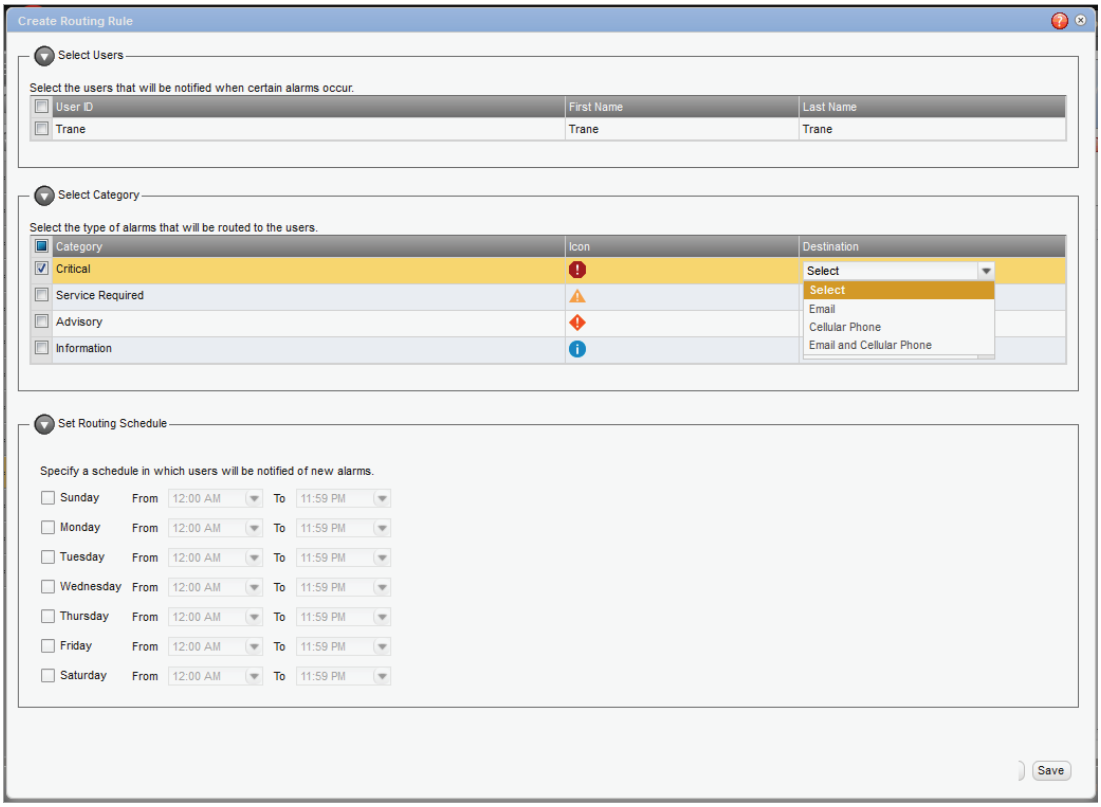
Note: *E-mail addresses are specified in Tracer SC user profiles.*

3. In the **Select Category** section, select alarm categories that the users will be notified about.

As of Tracer SC V4.3, you can now define the destination of the routed alarms, which include e-mail, cellular phone, or a combination of both.

4. In the **Set Routing Schedule** section, specify the days and times in which users will be notified of new alarms.
5. Click **Save**. The **Routing Event E-mail** page appears, which shows the routing rules that you just created.

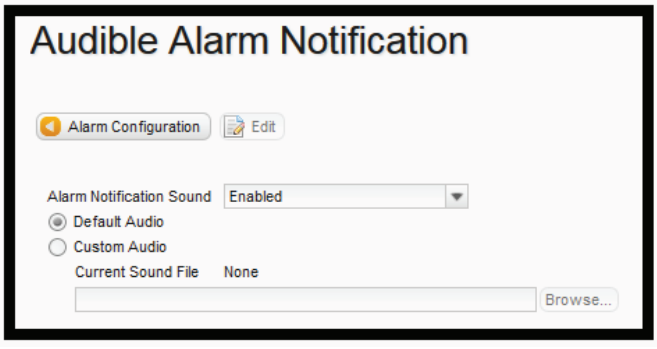
Figure 27. Creating a routing rule



Enabling Audible Alarm Notification

1. From the Alarm Configuration page, click **Audible Alarm Notification**, then click **Edit**.
2. Select to enable (or disable) the **Alarm Notification Sound**.
3. Use the radio buttons to select default audio or custom audio. For custom audio, use the browse feature to make a selection.
4. Click **Save**.

Figure 28. Audible Alarm Notification



Alarm Message Templates

Alarm message templates allow you to control the amount of data to match the recipients device. As an example, cellular text has a character limit. Templates allow you to assign a factory-default template as an e-mail or a cellular template. Custom templates can also be created. Templates that have been assigned will be used to draft the alert message that will be sent to the user

through the selected messaging service (e-mail or cellular text).

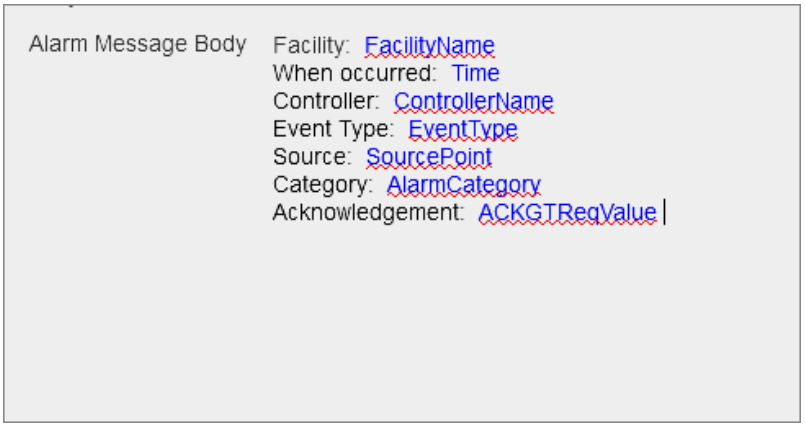
To create an alarm message template:

1. On the Alarm Configuration page, click **Alarm Message Templates**.
2. On the Alarm Message Templates page, click **Create Template**. The **Create Message Template** dialog opens.
3. Enter a name in the **Alarm Message Name** field. For example, "Comm Loss."
4. Enter a description in the **Description** field. For example, "Send this message when Comm Loss occurs."
5. In the **Alarm Message Subject** field, enter a short message that briefly describes the specifics of the event. You can also use terms by selecting from the Place Holders list, then click the **Add** button.

Note: *When a message is delivered the Place Holders will display corresponding values at the time the message was generated. For example, the "Facility Name" place holder will display the name of the facility as defined in the system controller.*

6. In the Alarm Message Body, compose a message that corresponds to the alarm message name and description. Use place holders to indicate important details that should be included in the message. (See the following figure.)
7. Click **Save**.

Figure 29. Example of an Alarm Message template (template body)



To assign a message template:

1. On the Alarm Configuration page, click **Alarm Message Templates**.
2. Select a message template from the list, then click the **Actions** button and select **Assign**. The **Assign Message Templates** dialog opens.

   Note: *The Actions button is displayed only if the user has Alarm configuration permission.*
3. Determine the user or users to which the template will be assigned, then select whether the message will be transmitted by e-mail or cellular.
4. Click **Save**. A confirmation dialog box appears. Click **Save Assignments**.

To delete a message template:

1. Select a message template from the list, then click the **Actions** button and select **Delete**. The **Delete Confirmation** dialog opens.

   Note: *The Actions button is displayed only if the user has Alarm configuration permission.*
2. Click **Delete** to confirm.

Alarm Setup in Point Configuration

In Tracer® SC, each point can be configured to generate alarms under specific conditions.

Configuring System-defined Points

Use the following procedure to configure system-defined points:

1. From the left navigation menu, select **Equipment** or **Spaces**. The **Equipment** or **Spaces** list page appears.
2. Select the preferred equipment from the **name** column, which opens the status page.
3. Select the **Details** tab, which displays all the system-defined points.
4. Select the name of the point that you want to set up for alarming, which opens the point status page.
5. On the point status page, select the **Configuration** tab.
6. Configure the point and then click **Save**.

Configuring User-defined Points

Use the following procedure to configure user-defined points:

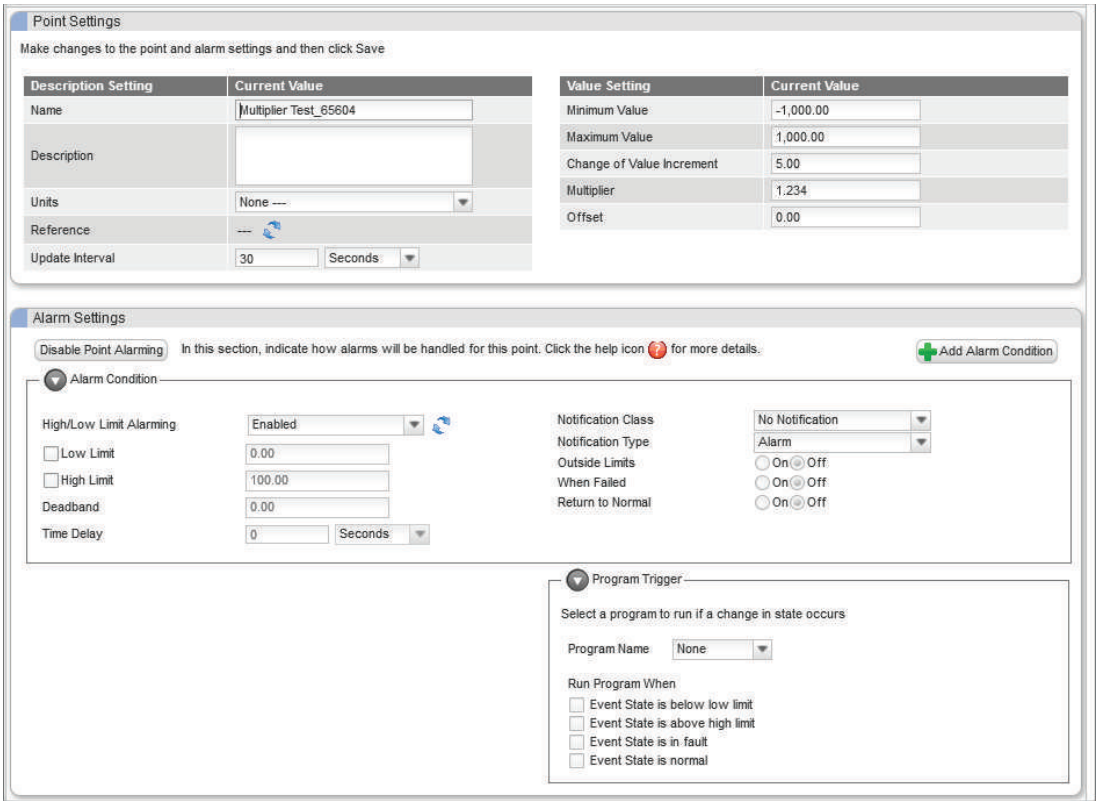
1. From the left navigation menu, select **Points**, and then select Analog, Binary, or Multistate, then select the point type (input, output, value). The selected points list page appears.
2. Select the name of the point that you want to set up for alarming, which opens the point status page.
3. On the point status page, select the **Configuration** tab.
4. Configure the point and click **Save**.

Analog Point Configuration

On the Analog Point Configuration page, you define the conditions that generate alarms for analog points.

Note: *The following figure and the content below show the contents of the analog input configuration page. For help with other point types, refer to the Tracer® SC online help.*

Figure 30. Analog Point Configuration



Point Settings

- **Name** — Enter a name for the point.
- **Description** — Enter a detailed description of the point function. This is an optional configuration.
- **Units** — The type of measurement that the point is configured to read. This property, along with the user preferred units, determines the type of units that a user sees on the screen. For example, if Units is configured for temperature and the user preference for temperature is Celsius (°C), then all relevant point information is shown in °C units.
- **Reference** — Click the reference icon to select a referencer for the point. Select a binary or multistate point. The point must reside in Tracer SC. External referencing is not allowed.
- **Update Interval** — The update interval defines the frequency at which the point requests the value of its reference. To configure the update interval, select the amount of time and a time unit. The suggested minimum interval is 10 seconds.
- **Minimum Value** — Enter a minimum value for the point before it will enter a fault state. The point value is capable of reporting a value below the minimum value, but any referenced value sent by the point will be capped at the minimum value. The system will not allow users to override a point at a value less than the minimum value. Third party systems are typically not affected by these parameters while performing overrides.
- **Maximum Value** — Enter a maximum value for the point before it will enter a fault state. The point value is capable of reporting a value above the maximum value, but any referenced value sent by the point will be capped at the maximum value. The system will not allow users to override a point at a value greater than the maximum value. Third party systems are typically not affected by these parameters while performing overrides.
- **Change of Value Increment** — The Change of Value Increment triggers the point to send the new current value to all subscriptions. When exceeded, and there is a change of value (COV) subscription for the point, the point sends the recipient of the subscription the new point value. For example, if the COV increment is set at 1.0 and the current value changes by 0.8, notification is not sent. However, if the current value changes by 1.1 since the last update, the point will send the new value to all subscriptions.
- **Multiplier** — The multiplier value reads the referencer value of the point and then multiplies it by the current multiplier value.
- **Offset** — The offset value is added to the raw point value. If the offset is positive, the value will be added to the referenced value. If the offset is negative, the value will be subtracted from the referenced value.

Alarm Settings: Alarm Condition

- **Enable/Disable Point Alarming** — Click this button to enable or disable point alarming. Point alarming must be enabled in order to configure alarm conditions. Disabling point alarming turns off all alarming functionality for the point (limits, failures, transitions).
- High/Low Limits Alarming — This feature detects whether the value of the point exceeds the range defined by the high and low limits. The limits can be enabled or disabled. If disabled, the point value range will have no high or low limit; therefore, an alarm will not be triggered. Disabling limits is useful when the space is unoccupied. When the Outside Limits Calculation is enabled, and the value of the point exceeds the high or low limit, the point will transition to the OFF-Normal state (In Alarm). When High/Low Limits Alarming is disabled, the point will not transition to the OFF-Normal (In Alarm) state if the point's value exceeds the limits.
- **Low Limit**: A value lower than the low limit generates an alarm.
- **High Limit:** A value higher than the high limit generates an alarm.
- **Deadband**: This value is set to prevent rapid transition between states, which generates nuisance alarms. The deadband functions as follows:
  - If an alarm condition exists because the low limit has been exceeded, the value must be greater than the low limit plus the deadband to return to normal operating conditions.
  - If an alarm condition exists because the high limit has been exceeded, the value must be less than the high limit minus the deadband to return to normal operating conditions.

- **Time Delay**: If an alarm condition exists, time delay is the amount of time to elapse before an alarm is generated.
- **Add Alarm Condition**: Click this button to create secondary alarm conditions that occur in situations outside the primary alarm conditions. It works in conjunction with the High/Low Limits Alarming feature. For example, a space temperature setpoint is configured to go into alarm if the temperature drops below 65 degrees. However, if you do not want the alarm to be activated when the space is unoccupied, High/Low Limits Alarming prevents this from occurring. But there is still a need for an alarm if the space temperature drops below 50 degrees. Therefore, you can create additional alarm conditions to trigger an alarm when the space drops below 50 degrees.

Alarm Settings: Event Notification

- **Notification class**: See The "*Notification Classes*" section in this guide.

  Notify type: If **alarm** is selected, the point will appear in the **All Items in Alarm** site report if the point is in **Outside Limits** when the report is run.
- **Outside Limits**: If **On** is selected, an alarm generates when the **Low Limit** or **High Limit**, as specified in Alarm Condition, is exceeded.
- **When Failed**: If **On** is selected, an alarm generates if the **Minimum Value** or the **Maximum Value**, as set in the Point Settings section, is exceeded.
- **Return to Normal**: If **On** is selected, an alarm generates when point status returns to normal.

Alarm Settings: Program Trigger

Program Trigger is not affected by the Add Alarm Condition feature.

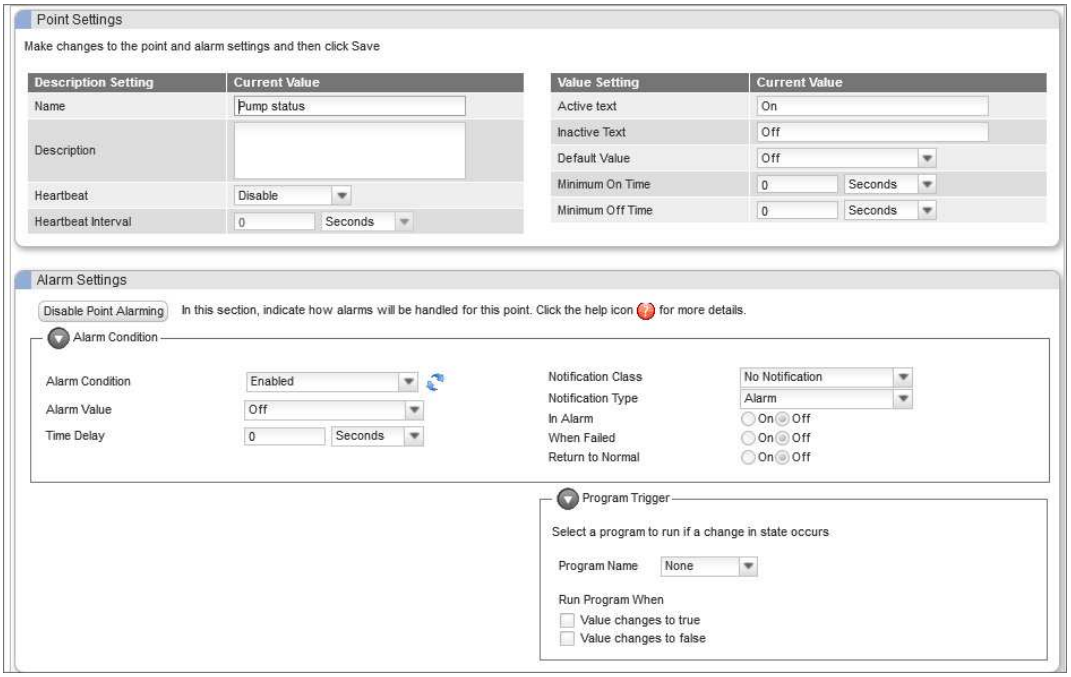
- **Program Name**: If selected, the associated TGP program will run when the selected event state occurs.
- **Run Program When:** The selected program will run when a specific event state is selected.

Binary Point Configuration

On the Binary Point Configuration page, you define the conditions that generate alarms for binary points.

Note: *The following figure and the content below show the contents of the binary value configuration page. For help with other point types, refer to the Tracer® SC online help.*

Figure 31. Binary value configuration



Point Settings

- **Heartbeat —** Use the drop-down list to enable or disable this function.
- **Heartbeat Interval** — Enter the maximum amount of time in which the point must receive a command. If the point is not commanded within this interval, the point will enter a fault state.
- **Active Text** — This text appears when the binary point is true.
- **Inactive Text** — This text appears when the binary point is false.
- **Default Value** — This is the default value of the point. The point reverts to this value if the point is not in control by another application or overridden by the user (priority array is empty).
- **Minimum On Time** — This is the minimum time that the point must remain on when it transitions from Off to On before it will respond to an Off command. Configuring this value to zero disables the minimum on timer. Select an amount of time and a time unit.
- **Minimum Off Time** — This is the minimum time that the point must remain off when it transitions from On to Off before it will respond to an on command. Configuring this value to zero disables the minimum off timer. Select an amount of time and a time unit.

Alarm Settings: Alarm Condition

- **Enable/Disable Point Alarming** — Click this button to enable or disable point alarming. Point alarming must be enabled in order to configure alarm conditions. Disabling point alarming turns off all alarming functionality for the point (limits, failures, transitions).
- **Alarm Condition** — To conditionally enable/disable high/low limit alarming set a reference to a Binary or Multistate point and select the states that will enable alarming. When the value of the reference matches the defined states, alarming is enabled. The point reference for alarming is limited to points that reside within the controller, there is no off-box referencing.
- **Alarm Value**: Defines the alarm state (either active or inactive).
- **Time Delay**: If an alarm condition exists, time delay is the amount of time to elapse before an alarm is generated.

Alarm Settings: Event Notification

- **Notification class**: See the "*Alarm configuration*" section of this guide.
- **Notification Type**: If alarm is selected, the point will appear in the **All Items in Alarm** site report if the point is **In Alarm** when the report is run.
- **In Alarm**: Identifies the state that will initiate an event.
- **When Failed**: If **On** is selected, an alarm generates if no valid value exists (point in fault).
- **Return to Normal**: If **On** is selected, an alarm generates if the point returns to its non-alarm state.

Alarm Settings: Program Trigger

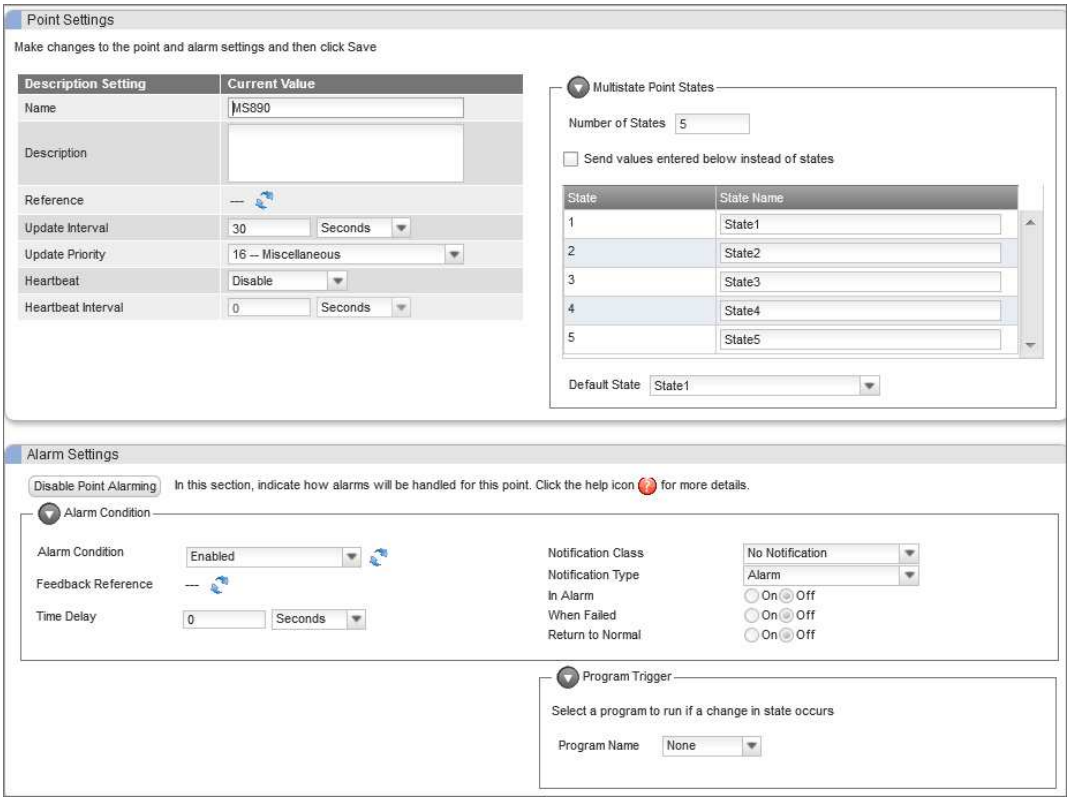
- **Program Name**: If selected, the associated TGP program will run when the selected event state occurs.
- **Run Program When:** The selected program will run when a specific event state is selected.

Multistate Point Configuration

On the Multistate Point Configuration page, you define the conditions that generate alarms for multistate points.

Note: *The following figure and the content below show the contents of the multistate output configuration page. For help with other point types, refer to the Tracer® SC online help.*

Figure 32. Multistate output configuration



Point Settings: Multistate Point Values:

- **Reference** — Select a referencer for the point by clicking the referencer icon. Referencers obtain values and state status from another source within the system, such as the fan-speed selector switch on a thermostat. Any multistate point can be referenced. However, when the **Send values entered below instead of states** check box is selected only an analog point can be referenced. See note below.
- **Update Interval** — The update interval defines the frequency at which the point requests the value of its reference. The suggested minimum interval is 10 seconds.
- **Heartbeat —** Use the drop-down list to enable or disable this function.
- **Heartbeat Interval** — Enter the maximum amount of time in which the point must receive a command. If the point is not commanded within this interval, the point will enter a fault state.
- **Number of States** — Enter the number of states for the point.
- **State name** — Enter a descriptive state name in this field.
- **Send values entered below instead of states** — Select this check box to reference analog values and convert to state values. This option adds a value column to the table and a deadband field.
- When the "**Send values entered below instead of states"** check box is selected:
- Trane multistate input points have the enhanced capability of referencing analog values and then converting them to state values. This feature is enabled by selecting the **Send values entered below instead of states** check box. When enabled, an analog point must be referenced and the analog value table and the deadband value must be defined.

Alarm Settings: Alarm Condition

- **Enable/Disable Point Alarming** — Click this button to enable or disable point alarming. Point alarming must be enabled in order to configure alarm conditions. Disabling point alarming turns off all alarming functionality for the point (limits, failures, transitions).

- **Alarm Condition** — To conditionally enable/disable high/low limit alarming set a reference to a Binary or Multistate point and select the states that will enable alarming. When the value of the reference matches the defined states, alarming is enabled. The point reference for alarming is limited to points that reside within the controller, there is no off-box referencing.
- **Feedback Reference** — This is the value that the referencer uses to compare the actual state of the point. If the feedback referencer value and the point value do not match continuously for a period of time that exceeds the event time delay, the point will enter an alarm state.
- Command Failure alarm is generated when the feedback referencer is selected and the feedback referencer value does not match the value of the binary output point. A Command Successful message is generated when the feedback referencer value matches the value of the binary output point and the point is already in Command Failure state.
- **Time Delay** — This is the amount of time that must elapse when the point is out of range before the point will enter an alarm or fault condition. Time delay also applies when a point is returned to a normal condition.

Alarm Settings: Event Notification

- **Notification class**: See .
- **Notification Type**: If **Alarm** is selected, the point will appear in the **All Items in Alarm** site report if the point is **In Alarm** when the report is run.
- **In Alarm**: If **On** is selected, an alarm is generates if the point enters one of the defined alarm states.
- **When Failed**: If **On** is selected, an alarm generates if the point enters one of the defined failure states.
- **Return to Normal**: If **On** is selected, an alarm generates if the point enters one of the defined normal states.

Alarm Settings: Program Trigger

- **Program Name**: If selected, the associated TGP program will run when the selected event state occurs.
- **Run Program When:** The selected program will run when a specific event state is selected.

Data Logs

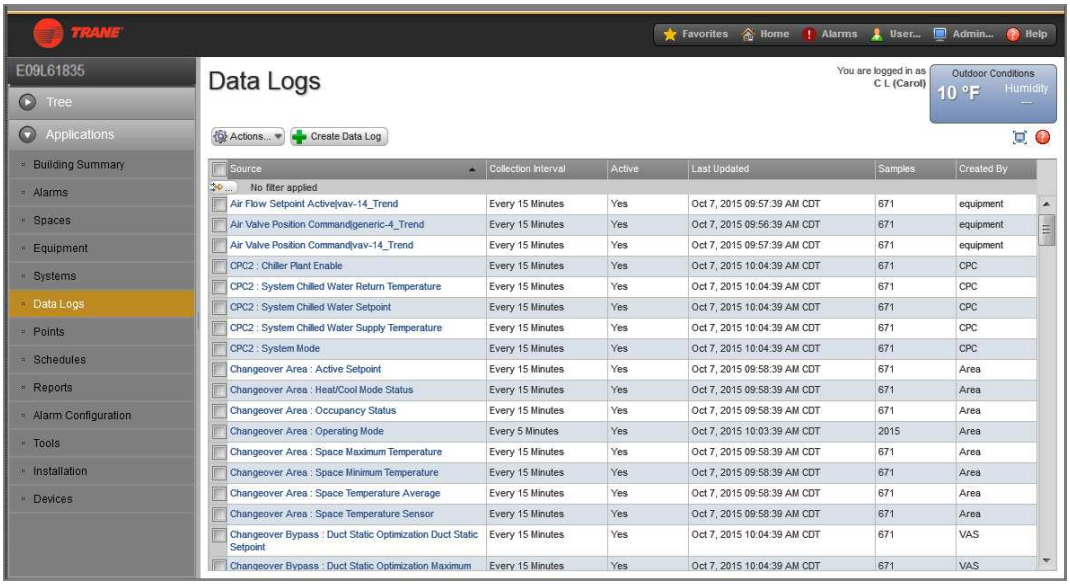
Data Logging, also referred to as trending, records in real-time the value of a data point in the system and the time at which the value was recorded.

By default, Tracer SC automatically generates system-created data logs (for equipment and standard applications) on a 15-minute interval and then stores that data for seven days. Data storage is a continuous window where only the most recent seven days of data are stored. Data older than seven days is discarded in order to make room for the newest data.

Users can also create data logs (either scheduled or triggered) by clicking the log data button on equipment and applications pages, or by using the create data log wizard.

A list of data logs can be accessed by clicking **Data Logs** from the left navigation menu. From this page you can take action on a data log, such as comparing or exporting, by selecting one or more data logs and then clicking the **Actions** button.

Figure 33. Data Logs page



Using the Trend Viewer

The trend viewer displays trend data in a chart. The trend viewer supports a time comparison mode that allows you to compare trend data at different points in time (day-to-day, month-to-month, year-to-year). A maximum of six data logs are supported (up to two data logs when time comparison mode is enabled). A maximum of two types of dimensionality are supported on the left and right y axis. Samples are plotted on a date/time scale on the x axis. Samples in fault (due to communication loss) are not plotted and will result in an interpolation gap within the plotted line. if all samples are in fault, no line will be displayed.

The trend viewer is available on the data logs tab of status pages for equipment and systems. To view trends graphically, select up to six data logs from the Data logs page and then select **View data** from the **Actions** button.

Figure 34. Tracer SC+ Trend Viewer

1	**Duration preset buttons and Export/Options buttons** The duration preset buttons change the range of data displayed in the trend as described below:
	1d — displays one day of data
	1w — displays 1 week of data
	1m — displays one month of data
	1y — displays one year of data
	Max — displays all available data
	Export — displays options for printing or exporting the chart data in various formats (SVG, PNG, JPEG, PDF, CSV, XLS).
	Options — displays options to hide or display the legend, or hide or display tooltips.
2	**Indicators** display the nearest sampled point on the chart. The indicators show up as a circle with a light gray outline. Each indicator will be filled with the color of the associated trend line.
3	The **Range Slider** represents the range of data displayed in the trend. Click and drag the range slider to shift the date and time of the data displayed in the plot.
4	**Bumper buttons** shift the date and time in small increments. Bumper buttons are available to shift the data to the left and the right.

Zooming: You can zoom in and out of the range of all trends by clicking and dragging your mouse in the preferred area on the chart. Click the Reset Zoom button to return to normal view.

Creating a Scheduled Data Log

Scheduled data logs collect data based on a scheduled start and stop time.

To create a scheduled data log:

1. Click the **Create Data Log** button located on the Data Logs page.

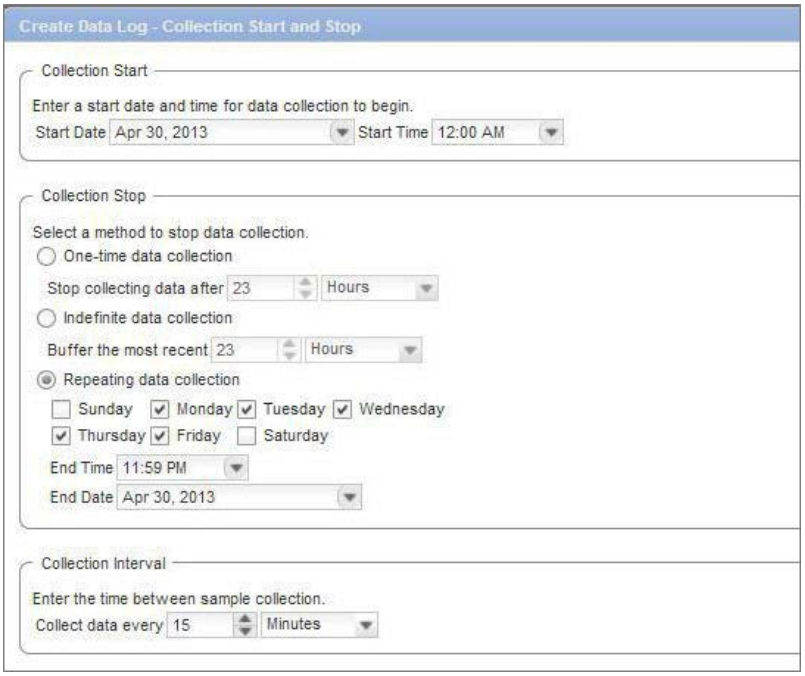
   The **Create Data Log – Select Data points** page appears.

2. Select data points from the **Member Selection Tree** and click **Add** to move to the **selected**

items frame. Click **Next**.

3. On the **Create Data Log** – **Choose Type** page, select **Data collection starts on a schedule** and then click **Next**.
4. On the **Create Data Log** – **Collection Start and Stop** page, enter a a start date and time for collection to begin.
5. In the **Collection Stop** frame, select a method that will stop data collection.
   - **One-time data collection** – this option collects data for a short period of time (for example, a 24-hour period).
   - **Indefinite data collection** – this option allows for a continuous window of a defined period of time. For example, seven days of data at 15-minute intervals. The seven day window will always maintain data for the last seven days. The maximum window is three years.
   - **Repeating data collection** – this option allows for a defined period of collection that can contain significantly more data (for example, 12 months at 15 minute intervals).
1. In the **Collection Interval**frame, enter the amount of time that passes between sample collections.
2. Click **Next**. The **Create Data Log — Summary** page appears.
3. Review the data log summary page and then click **Finish**.

Figure 35. Creating a scheduled data log



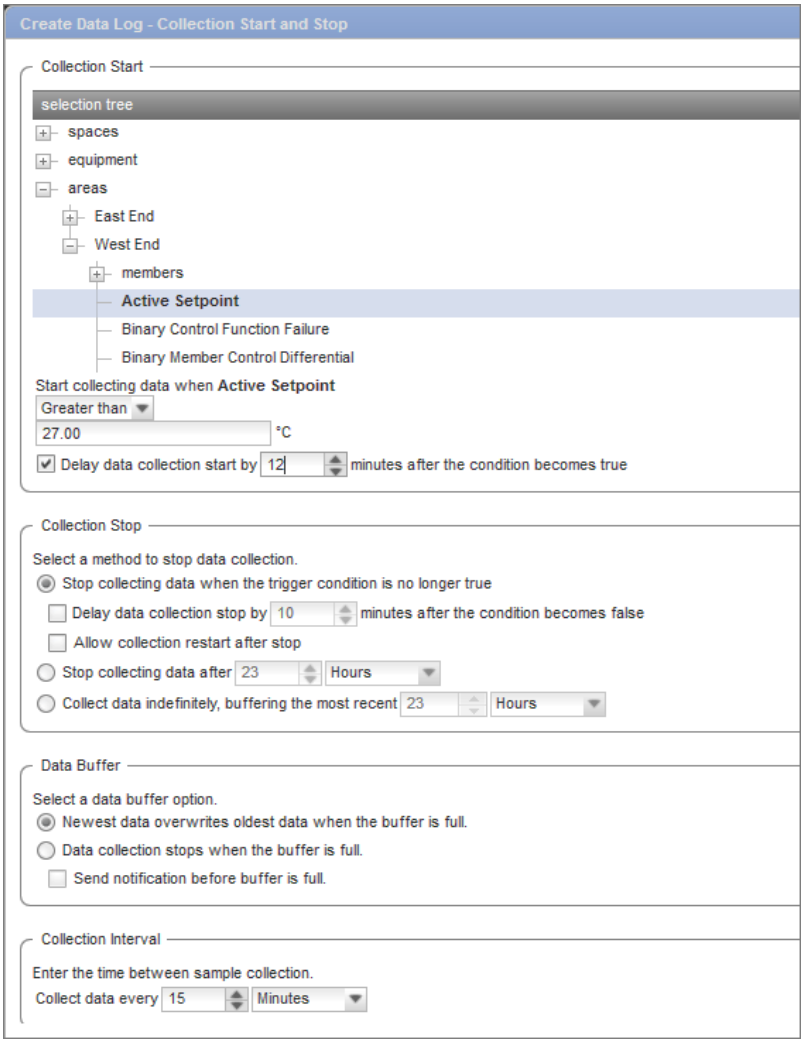
Creating a Triggered Data Log

This type of data log collects data when triggered by a condition. For example, a triggered data log could be set up to log the temperature of a space only when the fan is running.

1. Click the **Create Data Log** button located on the Data Logs page.
2. The **Create Data Log** – **Select Data points** page appears.
3. Select data points from the **Member Selection Tree** and click **Add** to move to the **selected items** frame.
4. Click **Next**. The **Create Data Log** – **Choose Type** page appears.
5. In the Data Log type frame, select **Data collection starts on a trigger**.

6. On the **Create Data Log** – **Collection Start and Stop** page, determine the conditions that will trigger data collection by selecting a value from the **selection tree.**
7. From the **Start collecting data when** drop-down list, select either Greater than or Less than and then manually enter a value.
   - **Stop collecting data when the trigger condition is no longer true** – this option stops collecting data when the defined start trigger condition is no longer true. Additional options to delay collection start/stop and resume data collection after a stop are available.
   - **Stop collecting data after X time** – this option collects a sample for a defined period of time after the trigger condition is met, and when collection begins (for example, a 24-hour period).
   - **Indefinite data collection** – this option allows for a continuous window of a defined amount of time after the trigger condition is met and when collection begins. For example, seven days of data at a 15-minute intervals. The seven day window will always maintain the last seven days. The maximum window is seven days.
8. Optionally, you can check the **Delay data collection start by** box to determine an amount of time to delay collection start after the trigger condition occurs.
9. In the **Collection Stop** frame, select a method to stop data collection.
10. In the **Data Buffer** frame, select a data buffer option.
11. In the **Collection Interval** frame, enter the amount of time that passes between sample collection.
12. Click **Next**. The **Create Data Log** – **Summary** page appears.
13. Review the data log summary page and then click **finish** (or previous to make changes).

Figure 36. Creating a Triggered Data Log



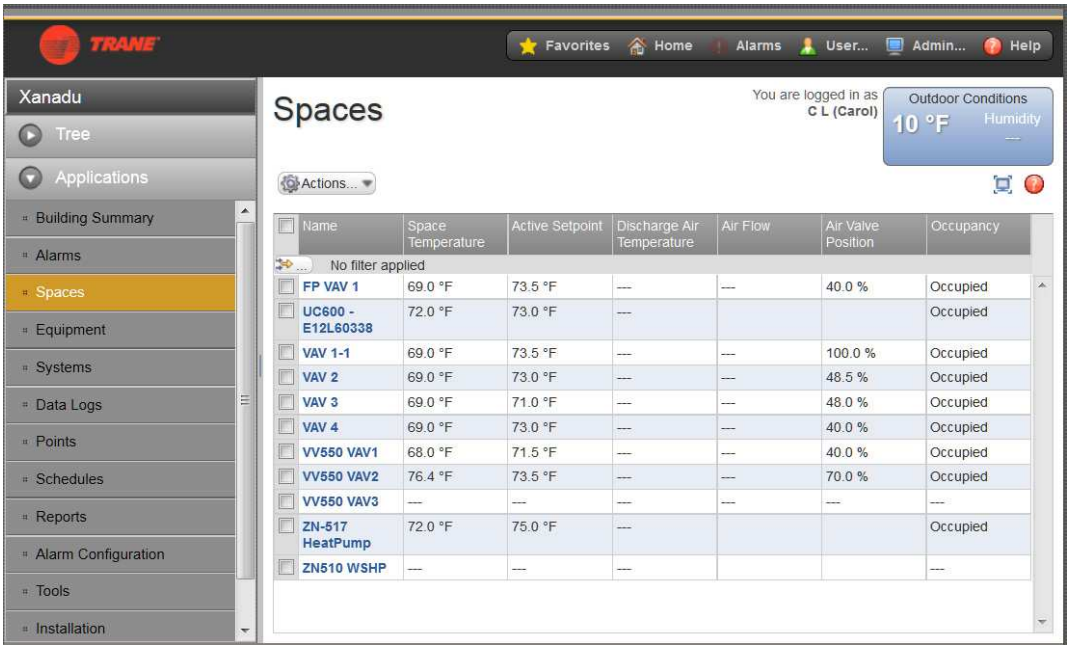
Spaces

Spaces refer to equipment that controls a single space, such as:

- Variable-air-volume (VAV) boxes

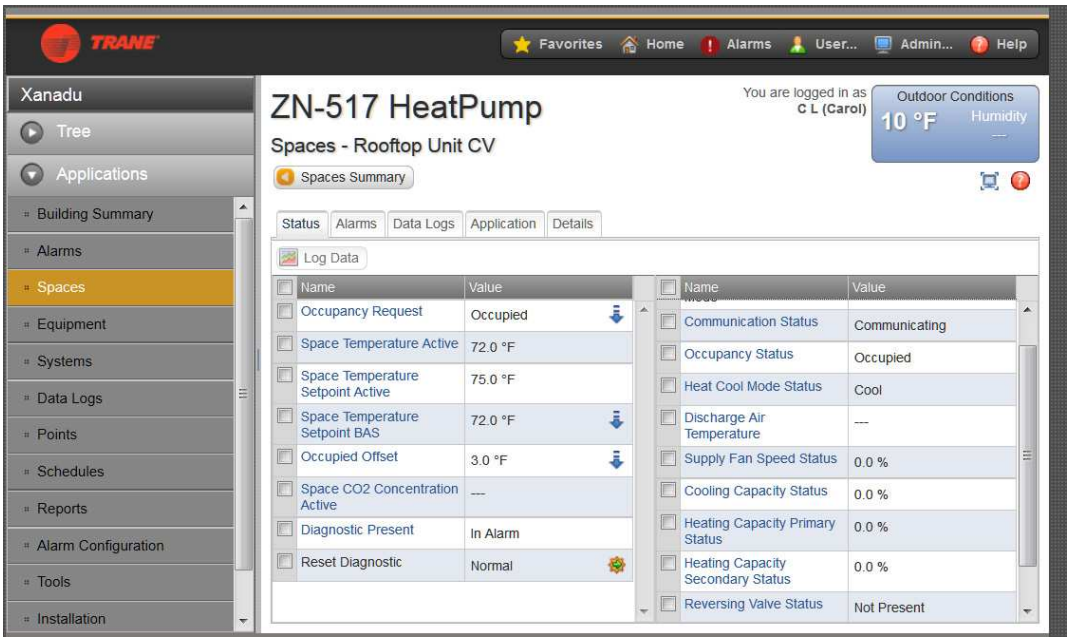
The Spaces page contains the most frequently needed data for equipment of these types.

Figure 37. Spaces page



To view a status page for a specific space, click an item in the **Name** column of the Spaces page. The following figure shows an example of a spaces status page.

Figure 38. Spaces status page



Equipment

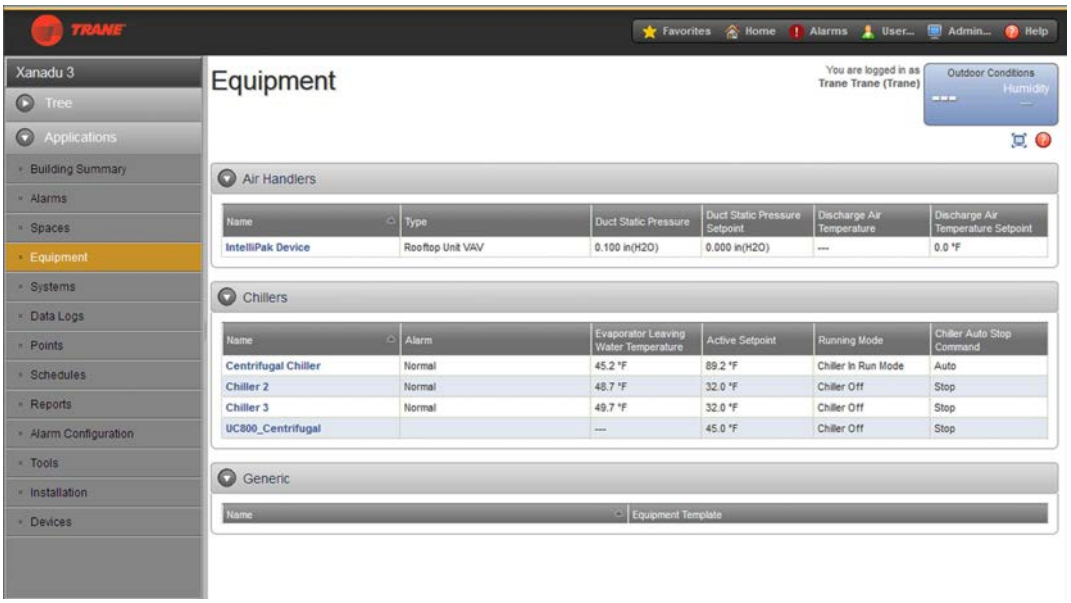
Equipment is the function and role, or software representation, of the physical devices in the Building Automation System (BAS). All devices are represented as equipment upon installation, which makes them available to view and control by the BAS.

The following are examples of equipment:

- Air handling units (AHUs) — including rooftop, commercial self-contained, and built-up units (modular climate changers) — that are either of the following types:
  - Constant-volume AHUs, which perform space temperature control using a constant airflow
  - Variable-air-volume AHUs, which modulate the supply air, based on static or space temperature control

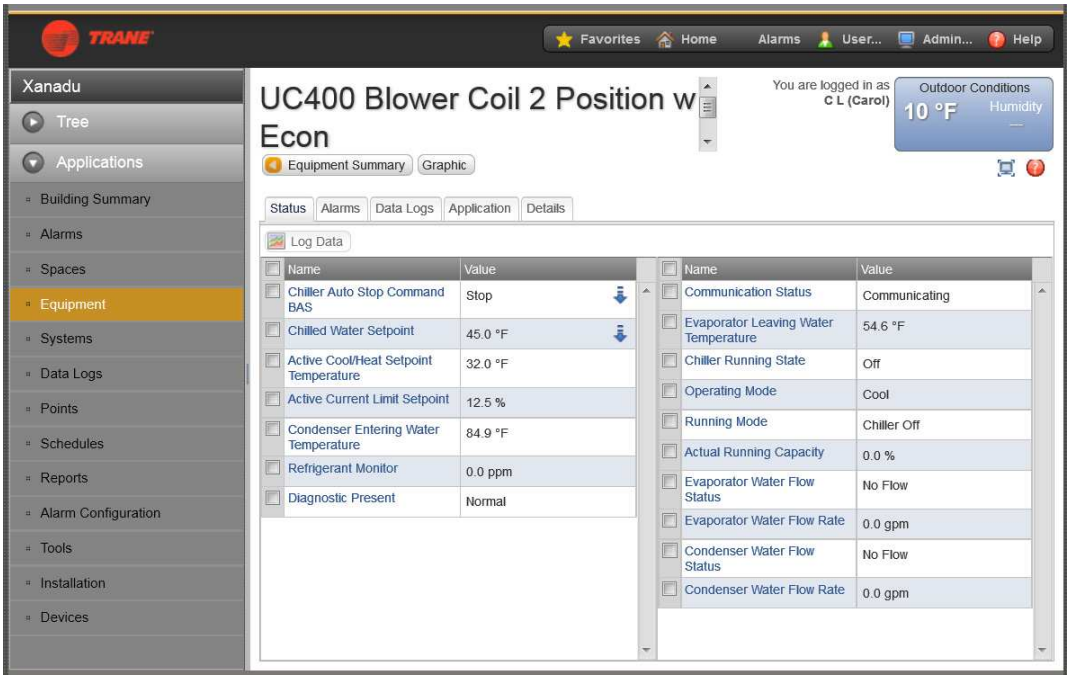
The **Equipment** list page contains the most frequently needed data for each piece of equipment of these types.

Figure 39. Equipment list page



To view a status page for a specific piece of equipment, click an item in the name column of the Equipment list page. The following figure shows an example of an equipment status page. On the Equipment Status page you can navigate to Alarms, Data Logs, and Applications that are specific to the equipment by clicking on the individual tabs. New data logs can be created by clicking the **Log Data** button.

Figure 40. Equipment status page



Systems

Tracer® SC supports three system applications:

- Area
- Variable Air Systems (VAS)
- Chiller Plant Control (CPC)

The individual pages for each system component allow you to view status, configure the system and its functions, and to view and add members.

Area Application

Area is an application that resides on the Tracer SC. The primary function of Area is to coordinate the start and stop of equipment based on a schedule stored in the Tracer SC. An Area may consist of a single room, a group of rooms, a large open warehouse, a manufacturing space, or any grouping defined by a system user. Area allows such functions as synchronizing member setpoints and controlling a large number of devices to be performed as one efficient operation.

Area can be configured to use multiple algorithms, along with area temperatures and humidity inputs, to make an economizing decision.

Area also supports:

- Optimal start/stop
- Humidity pulldown
- Night purge
- Unoccupied heating/cooling setpoints
- Unoccupied humidify/dehumidify
- Timed override functions

Additionally, the Area application allows users to efficiently perform a single operation, such as changing a setpoint, creating a schedule, performing an override, and apply it to all members of the area. For more information, see the *Air Systems for Tracer SC Applications Guide,* (BAS-APG007).

Variable Air Systems (VAS) Application

The variable air system (VAS) coordinates the control of air handlers, rooftop units, and variable air volume terminal units. The VAS includes valuable tools to help manage tasks that were previously problematic and time consuming, such as:

- Determining Heat/Cool mode for changeover systems
- Coordinating AHU and VAV box operation
- Commissioning VAV boxes
- Scheduling common spaces
- Optimizing ventilation
- Optimizing duct static pressure

For more information, see the *Air Systems for Tracer Synchrony Application Guide,* (BAS-APGXXX).

Chiller Plant Control (CPC) Application

The Chiller Plant Control (CPC) application coordinates chillers and provides system chilled water control.

The CPC application allows you to configure a chiller plant for optimal efficiency and reliability, and provides a means for you to monitor and control the daily operation. Depending upon the many possible chiller plant configurations and design differences, the CPC application can:

- Provide overall chiller plant status information and alarms to local and remote users.

- Enable or disable chiller plants.
- Start, stop, and monitor the status of system chilled water pumps.
- Calculate individual chilled water setpoints for individual chillers in series chiller plants
- Request when chillers are added or subtracted according to building load requirements and user-specified add and subtract logic
- Rotate chillers according to user-defined intervals
- Remove chillers from the rotation in the event

For more information, see the *Chiller Plant Application Guide,* (BAS-APG012).

Points

In an automated building control system, points are the building blocks used to create a control system. They are used in setpoints, controlling outputs on a device, reading the values of hardware inputs and holding calculated data. In addition, points provide the only means to generate and route alarms to the event log.

Tracer® SC defines points in two ways:

User-defined: You can create points to use, for example, with a TGP program or to monitor a temperature for a building.

System-defined: These points are created when you create an Area, a VAS, and when you install equipment or spaces.

Points Types

Tracer® SC classifies points according to one of three types (analog, binary, multistate) and one of three functions (input, output, value). In total, there are nine point types:

- Analog inputs—These are typically values such as room temperature or air flow pressure generated by a sensor or device. Inputs points obtain their value from a selected referencer. Input points are typically used to read values from other controllers such as LonTalk devices or unit controller input points.
- Analog outputs—These are used to control devices such as damper actuators or water valves, or to provide setpoints to control other devices. Analog outputs can be controlled and overridden by using priority control.
- Analog values—These are points that have real number values. Analog values do not contain referencers but can be controlled and overridden by using priority control. Value points are typically used for calculated values or setpoints.
- Binary inputs—These are typically two-state inputs, such as on/off or alarm/normal. Binary inputs are generated by switching devices. Inputs points obtain their value from a selected referencer. Input points are typically used to read values from other controllers such as LonTalk devices or unit controller input points.
- Binary outputs—These points are typically used to turn devices on or off. Binary outputs can be controlled and overridden by using priority control.
- Binary values—These points can only be true or false. Binary values do not contain referencers but can be controlled and overridden by using priority control. Value points are typically used for calculated values or setpoints.
- Multistate inputs— Multistate points have between 1 and 20 states. Text is displayed for each state rather than a numerical value. Inputs points obtain their value from a selected referencer. Input points are typically used to read values from other controllers such as LonTalk devices or unit controller input points.
- Multistate outputs— Multistate points have between 1 and 20 states. Text is displayed for each state rather than a numerical value. Multistate outputs can send their values to a defined referencer and can be controlled and overridden by using priority control. Multistate outputs are typically setpoints that are sent to controllers such as occupancy or heat cool mode request on LonTalk controllers.
- Multistate values—Multistate points have between 1 and 20 states. Text is displayed for each state rather than a numerical value. Multistate values do not contain referencers but can be controlled and overridden by using priority control. Multistate values are typically calculated values in controllers or applications such as such as occupancy status or heat cool mode status.

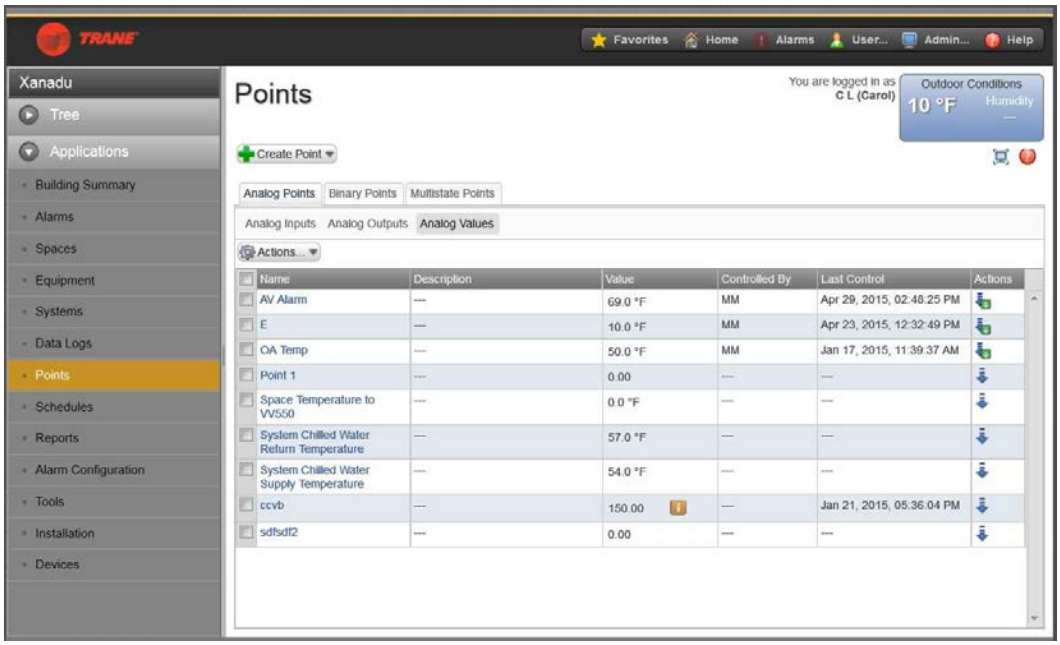
User-defined Points

You can access user-defined points by selecting **points** in the left navigation menu. The **Points** page shows a table of all user-created points currently in the system, will appear.

The page is arranged with tabs: **Analog Points**, **Binary Points**, and **Multistate Points**. Each tab of the table contains a sub-tab of the point type (input, output, or value). The table consists of the following columns:

- Name —The identifiable name of the point
- Value —The current value of the point.
- Controlled by — The user of application currently controlling the point.
- Last control — The date and time that the point was last controlled.
- Actions — This column allows users to take action on a point by initiating an override, stopping an override, or making changes to an existing override.

Figure 41. Points page



Viewing a User-defined Point Status Page

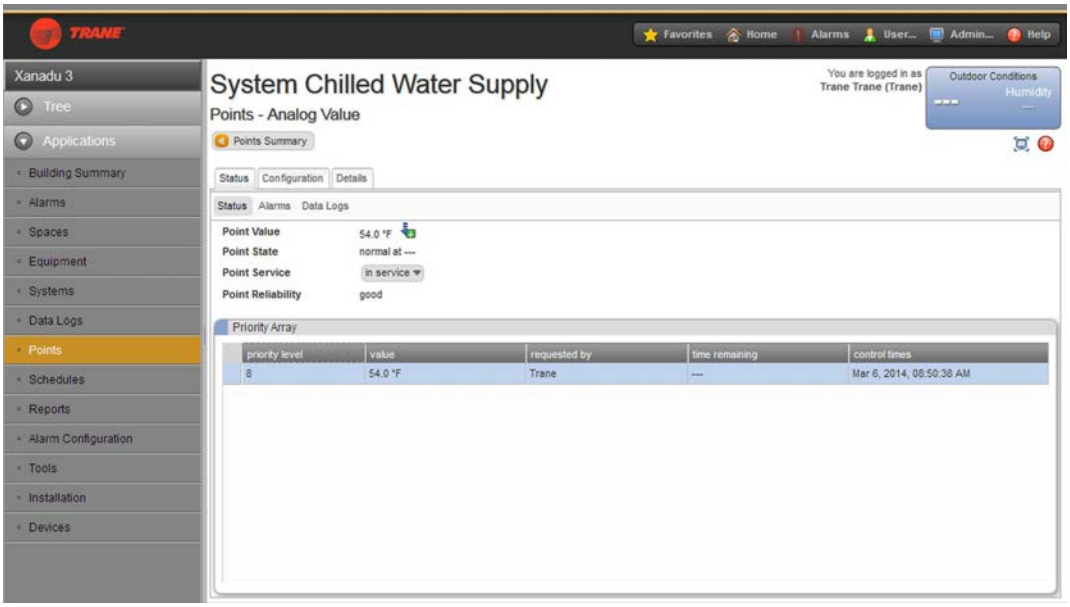
To view a point status page:

1. Select points in the left navigation menu to view the **Points** page, then select the point tab (Analog, Binary, or Multi-state).
2. Select the point type sub-tab (Inputs, Outputs, or Values), and then select a point from the table to view. The selected point status page opens.

   The point status page shows the current status of the selected point.

   There are two additional sub-tabs: Alarms and Data Logs. Click on the **Alarms** tab to view a list of alarms for the point. Click on the **Data Logs** tab to see a graphical view of data logs that have been set up for the point.

Figure 42. Point status page



Creating a User-defined Point

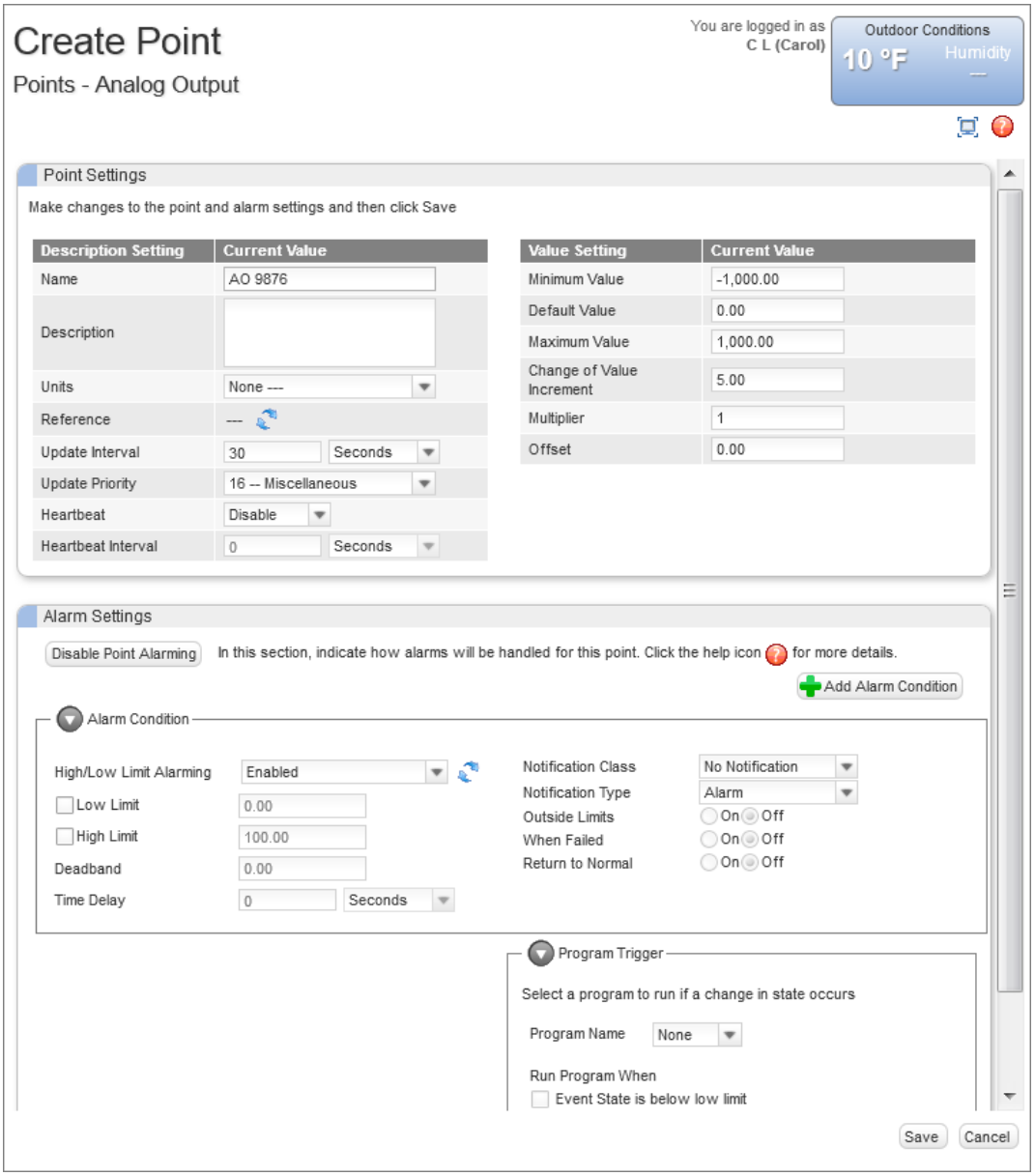
New in Tracer® SC V4.1 is the option to add an additional alarm condition when creating or editing analog points as shown in the following figure.

This creates a secondary alarm condition that occurs in situations outside the primary alarm conditions. It works in conjunction with the High/Low Limits Alarming feature. Access the Tracer SC Help at the user interface for more information.

Note: *The Add Alarm Condition option is only available for Analog points.*

1. From the **Points** page, click the **Create Point** button and then select a point type. The Create Point page for the selected point type will appear.
2. Configure the new point and click **Save.**

Figure 43. Create point page (analog point shown)



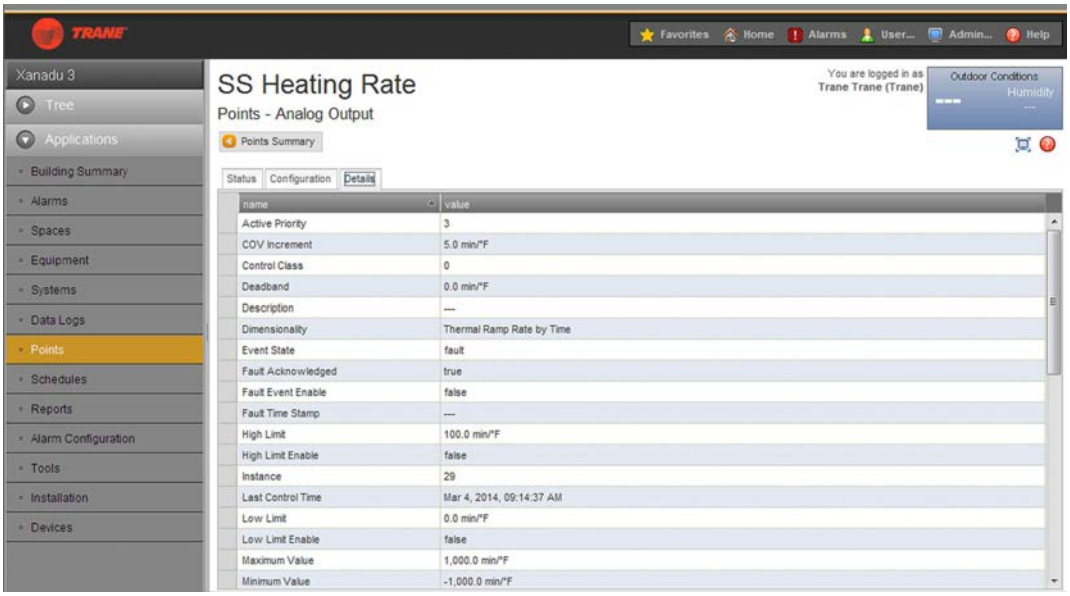
System-defined Points

You can access system-defined points as follows:

Click the **Details** tab on a **spaces**, **equipment**, or **systems** page. A table contains system-defined points appears (see the following figure).

Note: *The points in black type in the name column are internal equipment properties, for monitoring only. They cannot be changed.*

Figure 44. Point details page



Point Overrides

An override refers to the action of a user taking control of a point rather than allowing the system to control it. Point values can be overridden for output and value points by users who have been assigned a priority level that gives them override capability. Priority levels of 1–16 exist, with 1 being the highest. The following four priority levels have been pre-assigned for user overrides:

- 1: Life Safety - Manual
- 8: Manual Override High
- 11: Manual Override Medium
- 13: Manual Override Low (the default for user overrides)

A user with a priority level higher than 13 has advanced override capability.

Overrides take place based on a user's priority level. If a user with a higher priority level has performed an override, an override entered by a user with a lower priority level will not take effect until the entry by the higher priority user clears.

Points appearing with the following icon on their right can be overridden: .

A point that has been overridden appears with the following icon: 

- A user override exists: 
- A temporary user override exists: 

Performing Simple Overrides

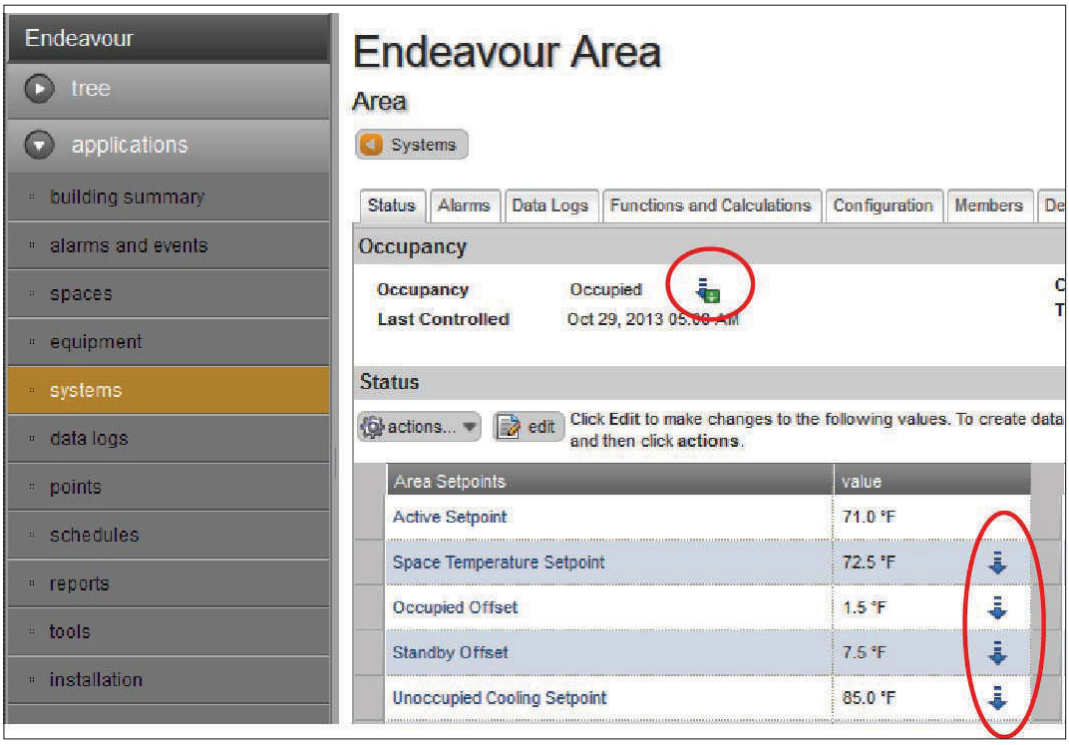
The simple override feature uses a priority level of 13 —*Manual Override Low*.

To perform a simple override of an output or value point:

1. Begin at one of the following pages:
   - For a point, begin at the page containing the list of points of that type.
   - For the occupancy mode of a point, begin at the status page for the specific equipment.
   - For a space or equipment setpoint, begin at the status page for the specific equipment, then click the **configure** button to open the **Configuration** page.
2. Select the override icon () to the right of the point. The simple override page appears.

Select or enter a point value, with or without an expiration time.

3. Click **Save**.



On the Tracer SC user interface, points that can be overridden, or have existing user overrides show one of the icons displayed in the following table.

Override Icon	Override Icon Description
	Indicates that the point can be overridden
	Indicates that a user override is in effect
	Indicates that a temporary user override is in effect and will expire at a designated time.

Performing Advanced Overrides

The advanced override feature allows the user to:

- See the current override priority
- See all priority levels controlling the point
  - Priority levels of 1 through 16 are available, with 1 being the highest.
  - The maximum priority level is specified by the role that is assigned to a user.
  - The simple override feature uses a priority level of 13 —*Manual Override Low*.
- Release an existing override at a selected priority level
- Set a priority level and a point value, with or without an expiration time

To perform an advanced override of an output or value point:

1. Begin at one of the following pages:

- The page containing the list of points of the type you want to override; for example, the **Analog Input Points** list page.
- For the occupancy mode of a point, begin at the status page for the specific space or equipment.

  For a space or equipment setpoint, begin at the status page for the specific space or equipment and then click the **configure** button to open the **Configuration** page.

2. Select the override icon ( ) to the right of the point. The simple override page appears.
3. Select **more options**. The advanced override page appears in which the following options appear:
   - Select the override priority level, and then select or enter a point value.
   - Release control of an existing override by selecting its priority level from the drop-down list and then selecting **release control**. (There must be an override at the selected priority level for the release control option to appear.)
4. Click **Apply**.

Point Service

Points can be put in or out of service. Points are put out of service typically for testing purposes.

- **Input points**: When input points are out of service, they no longer update their value based on the referenced property. Instead, the user must enter the point value.
- **Output points**: When output points are out of service, they no longer control the value (reference).
- **Value points**: When value points are out of service, they no longer respond to automated control (TGP programming or application control).

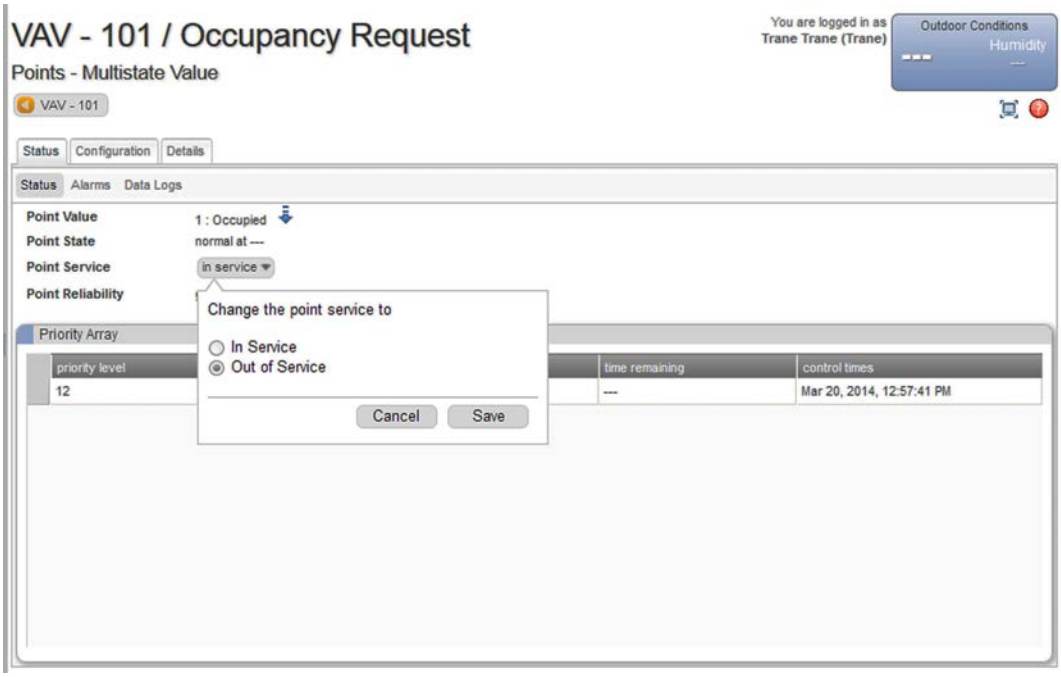
Note: *For equipment using a Tracer UC400, set the point service from the equipment configuration page.*

Placing Points In or Out of Service

To place a point in or out of service:

1. Click on the name of the point. A status page for that point will appear. (For system-defined points, click on the Details tab for a points list.)
2. On the point status page, select the **Point Service** drop-down list.
3. Make your selection and then click **Save**.

Figure 45. Placing a point in or out of service



Space Temperature Setpoints

A temperature setpoint can be communicated to a unit controller in three ways:

- From the Tracer system
- From the sensor thumbwheel
- From the values stored in the unit controller

This section explains how to determine the source of the space temperature setpoint and how to change the setpoint source for VAV boxes.

Determining the Space Temperature Setpoint Source

The space temperature setpoint source for a unit is determined by the following two points:

- Space Temperature Setpoint BAS
- Space Temperature Setpoint Use Local

If Space Temperature Setpoint BAS is in service, the unit uses the setpoint sent from the Tracer® SC. If the Space Temperature Setpoint BAS is out of service, the unit uses either the thumbwheel or its locally stored setpoint; the decision is based on the following conditions:

- If the Space Temperature Setpoint BAS is out of service and Space Temperature Setpoint Use local is enabled, the unit uses the thumbwheel.
- If the Space Temperature Setpoint BAS is out of service and Space Temperature Setpoint Use local is disabled, the unit uses the locally stored setpoints for control.

Source of control	Space Temperature Setpoint BAS	Space Temperature Setpoint Use Local
Tracer SC	In service	N/A
Thumbwheel	Out of service	Enabled
Stored setpoints	Out of service	Disabled

Changing the Temperature Setpoint Control for VAV Boxes

The method of changing the setpoint control depends on how the VAV box is receiving the

temperature setpoint.

Tracer System Control

If the Space Temperature BAS is out of service (the temperature setpoint value is controlled by a thumbwheel or a locally stored setpoint), you can change the control to the Tracer system as follows:

1. From the **Spaces** page, click on the appropriate VAV box. The VAV box status page opens.
2. Click on **Space Temperature Setpoint BAS**, which opens the associated point status page.
3. From the **Point Service** drop-down list, select **in service** and then click **Save.**
4. The VAV box will now use the value communicated by the Tracer system to calculate its active setpoint:
   - If the VAV box is in heating and occupied mode, the active setpoint is the Space Temperature Setpoint BAS – Occupied Offset.
   - If the VAV box is in cooling and occupied mode, the active setpoint is the Space Temperature Setpoint BAS + Occupied Offset.

Thumbwheel Control

If the Space Temperature Setpoint BAS is in service (that is, if the temperature setpoint value is controlled by the Tracer system), you can change the control to the thumbwheel as follows:

1. From the **Spaces** page, click on the appropriate VAV box, which open the associated status page.
2. Click on the **Space Temperature Setpoint BAS** point, which opens the associated status page.
3. From the **Point Service** drop-down list, select **Out of Service** and then click **Save**. This action removes the control of the setpoint from the Tracer system.
4. Return to the **Spaces** page and click to highlight the equipment for which you just changed the point service.
5. From the **Actions** button**,** select **Enable Local Setpoint** and then click **save.**

   The VAV box will now use the value communicated by the thumbwheel to calculate its active setpoint.

   Note: *If thumbwheel control fails, the controller will revert to the locally stored setpoint.*

Locally Stored Setpoint Control

If If Space Temperature BAS is enabled (that is, if the temperature setpoint is controlled by the Tracer system or the thumbwheel), you can change control of the setpoint to its locally stored value as follows:

1. From the **Spaces** page, click on the appropriate VAV box, which open the associated status page.
2. Click on the **Space Temperature Setpoint BAS** point, which opens the associated status page.
3. From the **Point Service** drop-down list, select **Out of Service** and then click **Save**. This action removes the control of the setpoint from the Tracer system.
4. Return to the **Spaces** page and click to highlight the equipment for which you just changed the point service.
5. From the **Actions** button, select **Disable Local Setpoint** and then click **Save**.

   The VAV box will now use its locally stored temperature setpoint to calculate its active setpoint.

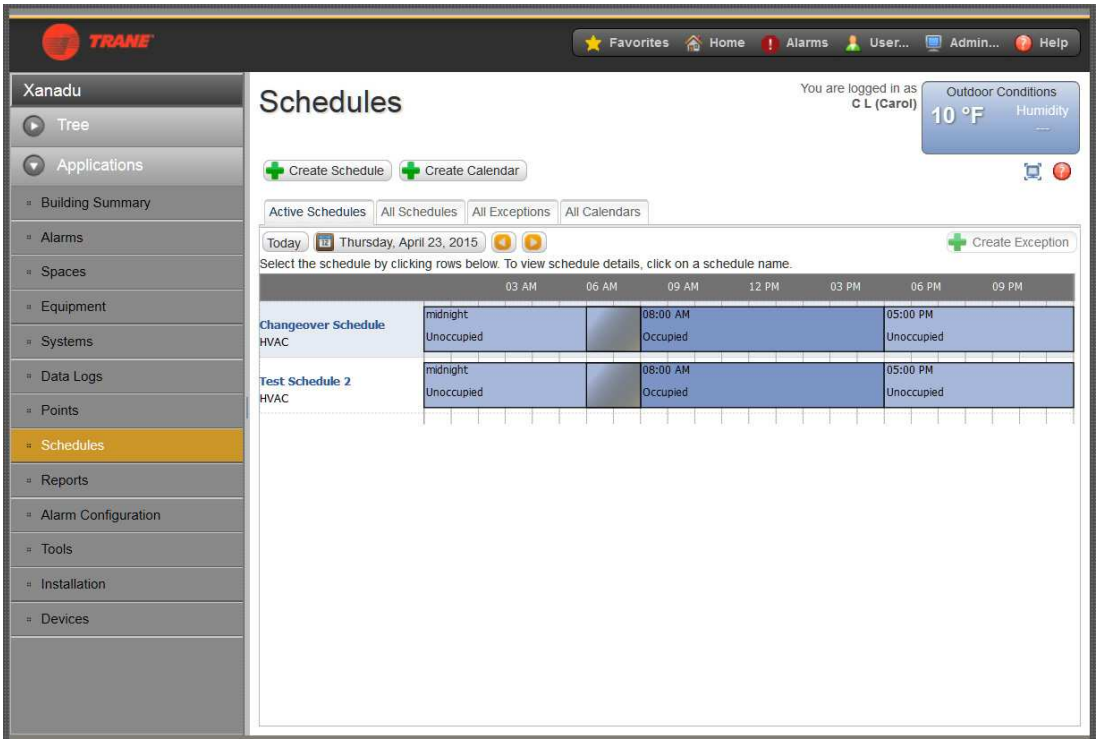
Schedules

Scheduling for Tracer SC is based on the BACnet schedule object implementation. Scheduling is one of a facility's most important energy-saving strategies. It ensures that equipment runs only when needed. Scheduling facilitates the following tasks:

- Creating, editing, and deleting schedules
- Creating, editing, and deleting calendars and exception schedules
- Viewing all effective schedules in a facility

The Schedules page contains four tabs: Active Schedules, All Schedules, All Exceptions, and All Calendars.

Figure 46. All Schedules (Active Schedules shown)



Optimal Start/Stop

Optimal start and stop times can be defined for HVAC schedules. HVAC refers to both Area and equipment.

The schedule coordinates with the Area application or equipment to calculate when the optimal start and stop occurs. Optimal start/stop times are based on outside air conditions, space temperature, and occupied setpoints.

Exceptions and Calendars

Exceptions are temporary modifications to a schedule. Exceptions contain one set of dates or one repeating pattern of dates. If a schedule has an exception applied, a red box outline will appear.

Calendars

For multiple dates and repeating patterns a calendar can be created, which is then applied to the exception.

Calendars are used to group dates, which can then have exceptions applied to these dates on a schedule. For example, a school might create a calendar to group the days that require extended operating hours for after-school meetings.

Release Function

The release function is a predetermined time in which the present schedule or the event releases control over to the next event based on priority. Conceptually, a scheduled release is very similar to a timed override. For example, after the daily schedule ends at 12:00 am (midnight), the schedule releases control over to the next event.

Reports

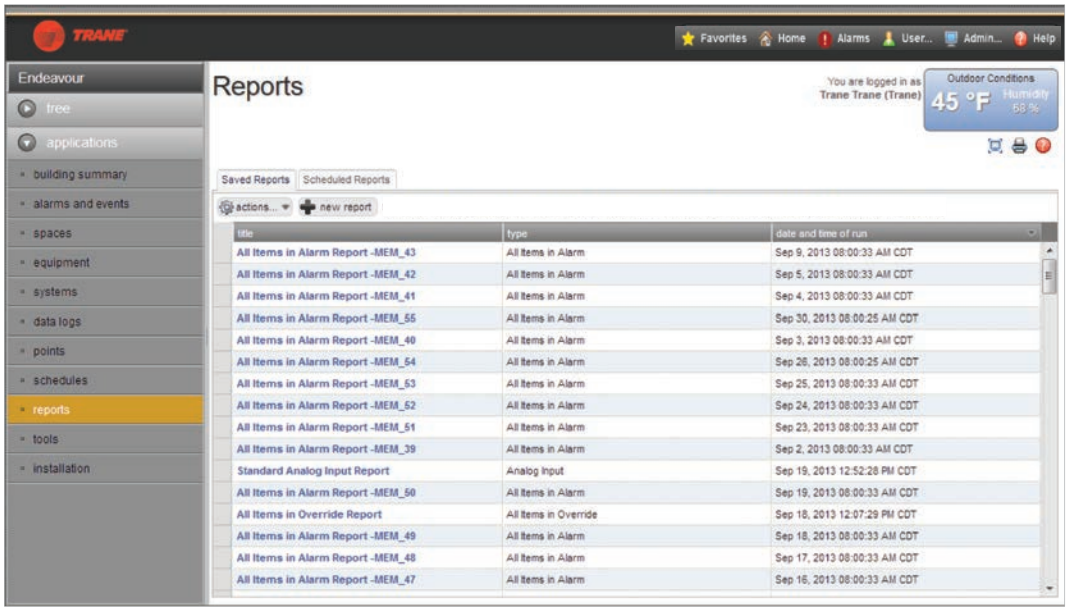
You can generate the following types of reports for Trane equipment:

- Site reports
- VAS commissioning reports
- Points reports

Report features include:

- Scheduling reports to run during specific date periods and run frequencies
- Specifying file storage options for scheduled reports
- Exporting reports to save to your PC as CSV, HTML, or PDF files
- Editing scheduled reports

Figure 47. Reports page



Creating a New Report

Reports can be created to run manually, or you can create a scheduled report. Either way, the new report is stored as a saved report after it is run. The following instructions describe how to create a new scheduled report.

1. From the **Reports** page, click on the **new report** button. The **New Report – Select Report Type** page opens.
2. Select a report from the **Report Definition Category** drop-down list. The type of reports, based on your selection, will appear in the table directly below.
3. Select a report type from the table, and then select **schedule** from the **Actions** button. The **Schedule Report – Select Items** page opens.
4. Select items listed in the table that you want included in the new report.
5. Click **Next**. The **Schedule Report – Options** page opens.
6. Select a **File Storage Option:**
   a. **Overwrite previous file of same scheduled report** — select this option to overwrite the previously saved file with the new one. Data in the previously run report cannot be recovered from the system. The file name is based on the report title.
   b. **Create unique file name by adding a sequence number each time the report is run** —

select this option to save the report after each run by adding a sequence number to the file name. This results in multiple saved reports. For example, "East Wing Chiller 2, East Wing Chiller 3, and East Wing Chiller 4."

7. Select **Report Date(s)** options:
   a. Select a recurrence pattern: single date, daily, weekly, monthly, or yearly.
   b. Select one or more days of the week that it will recur.
   c. Select a start date (End date is optional).
   d. Select the time of day that the report will run.
8. Click **Next**. The **Schedule Summary** page opens. To confirm your selections, click **Finish**.

Exporting a Report

When you export a saved report, it is saved locally to your computer (PC) or an external device into a format of your choice.

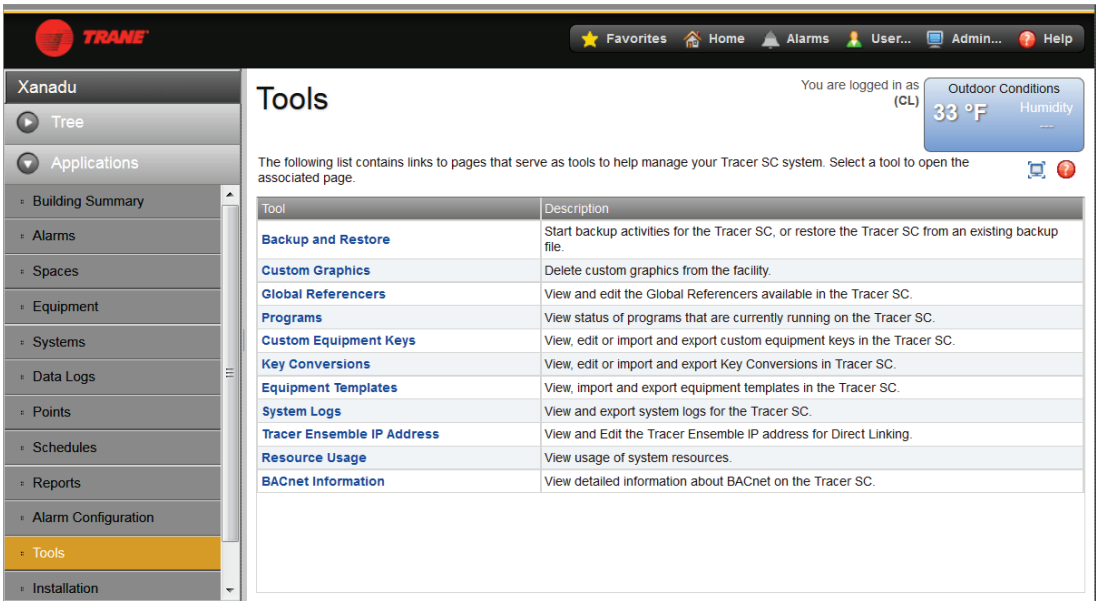
1. From the Reports page select a saved report to view (Saved Reports tab). The selected report page opens.
2. Select **export as** from the **Actions** button. Format choices are HTML, PDF, and CSV. If CSV format is selected, the **Export Report** dialog box appears: Click export to save the report. Select a location to save the report, then click save.
3. If PDF or HTML formats were selected, export (save) the report to your PC other external storage device.

The Tools Menu

To effectively manage your Tracer® SC, a selection of task-based tools are available. The following tools described in this section are accessible from the Tools page:

- Backup and Restore
- Custom Graphics
- Global Referencers
- Programs
- Custom Equipment Keys
- Key Conversions
- Equipment Templates
- System Logs
- Tracer Ensemble IP Address
- Resource Usage
- BACnet Information

Figure 48. Tools menu



Backup and Restore

From the left navigation menu click **Tools > Backup and Restore**. Backup and Restore is a process that involves creating an exact duplication of a Tracer® SC, exporting (saving) the duplicated copy, and then restoring that copy at a later time. Use the Restore tool to restore the Tracer SC system configuration file that was produced by the backup tool.

It is important to back up Tracer SCs in the event that a system failure occurs. Backups should also be performed prior to upgrading software, adding devices, or adding new applications.

Follow best practices when implementing a backup and restore procedure plan for your system. Backups do not include license files.

Important: *If an SD card has been installed in the Tracer SC, it will store the backup on the SD card rather than its internal memory. The SD card must support SDHC. SDHC has a maximum size of 32 GB. SD cards that exceed 32 GB will not work.*

Custom Graphics

You can use custom graphics in the Tracer® SC user interface to view and navigate through the building automation system. Custom graphics can be used as your home page, as status pages, and can be associated with the customized navigation tree.

Custom graphics can display data related to building environments, such as climate, lighting, and other controllable operations, and can be used to change setpoints and override equipment operation.

Creating Custom Graphics

Use the Tracer Graphic Editor (TGE) to create custom graphics. For instructions on creating custom graphics, see the *Tracer Graphics Editor Applications Guide* (BAS-APG020).

Note: *TGE is a component of the Tracer TU service tool and is launched from a Tracer TU menu item. To obtain the Tracer TU installation file, go to the Service Technicians page on the Trane portal. See the Tracer TU Service Tool Getting Started Guide (TTU-SVN01) for reference.*

Deleting Custom Graphics from Tracer SC

On the **Custom Graphics** page, select the graphic(s) you want to delete. From the **Actions** button, select **Delete**.

Setting Up User Access for Custom Graphics

An administrator must set up access privileges individually for each user, to enable users to have access to graphics.

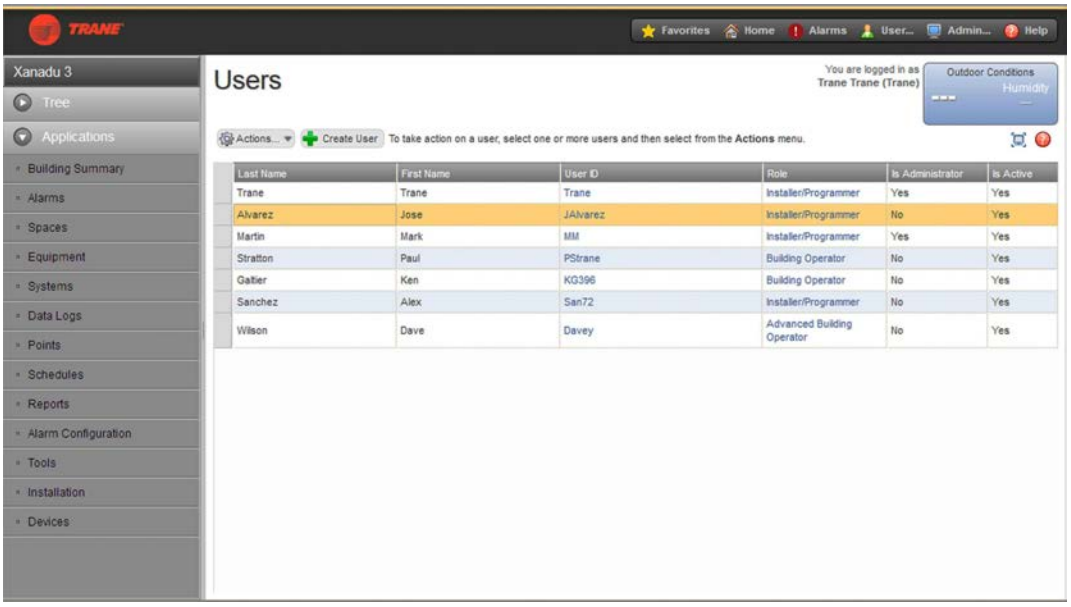
After an administrator has assigned graphics access privileges to a user the user can:

- Choose a graphic as a home page
- View status pages graphically
- Choose to have the navigation tree open automatically upon log in or to remain closed until the user opens it

To set up graphics access privileges:

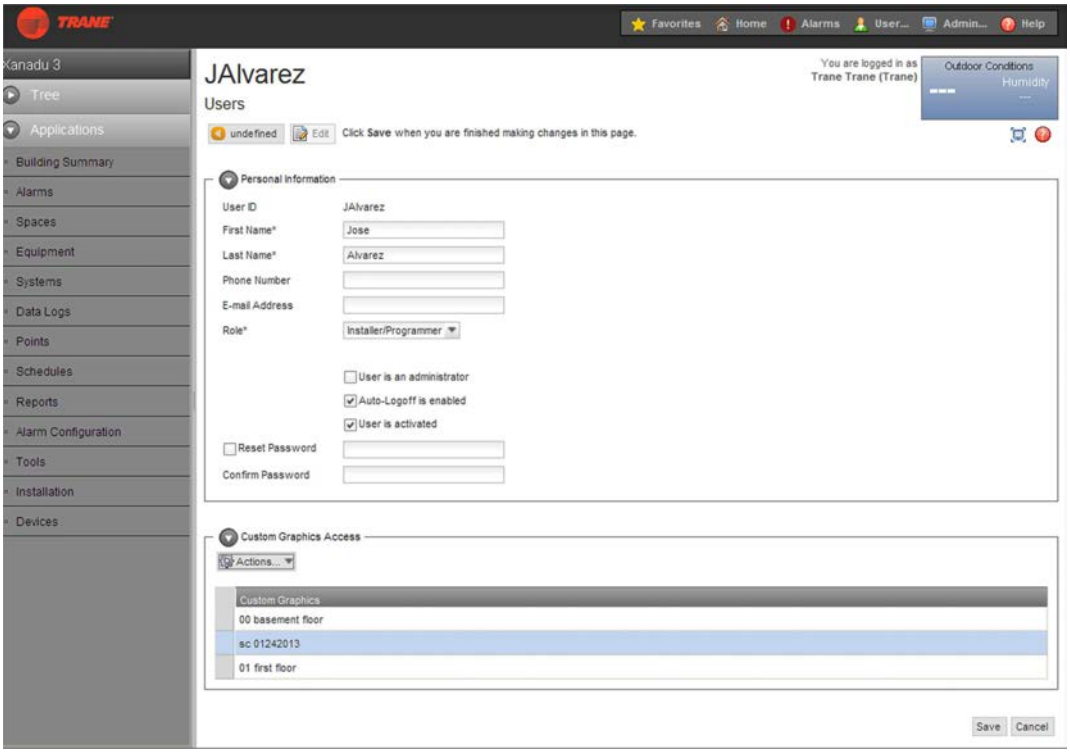
1. Select **Admin...** in the global navigation bar of any Tracer® SC page.
2. Select **Users** from the drop-down list. The **Users** list page appears.

Figure 49. Users page



3. Select the check box to the left of the name of the user you are setting up. Then, from the **Actions** button, select **View**. Information for the selected user is displayed, as shown in the following figure.

Figure 50. Individual user's page



4. Click the **Edit** button. In the **Custom Graphics Access** section of the page, select the check boxes to the left of the graphics that you want the user to be able to access.
5. Click **Save**.

Editing User Preferences

Users can choose the where and how graphics are displayed on the Tracer® SC user interface. These are initially set up by the administrator.

1. Select **User...** in the global navigation bar of any Tracer SC page.
2. Select **preferences** from the drop-down list. The **Users Preferences** page appears.
3. Graphics-related preferences are in the General Preferences section.
4. To edit preferences, click the **Edit** button and make selections.
5. Click **Save**.

Global Referencers

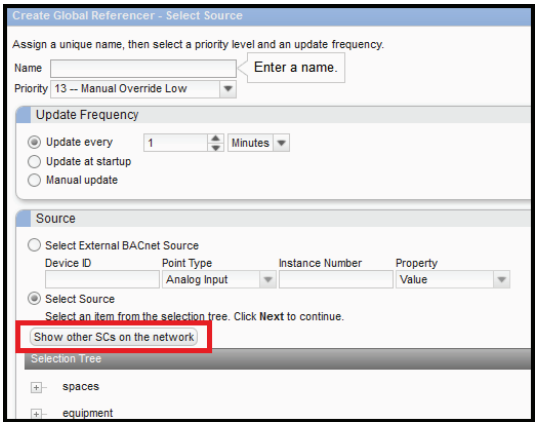
A global reference is a connection that is made between a data point in the Tracer® SC and one or more systems that are configured to respond to the value of the data point. A global reference is made up of one trigger and one or more targets. It allows you to read a piece of data from one place and then send to one or more places. Global references can be made to a point in the Tracer SC or to external points of BACnet MS/TP equipment.

From the left navigation menu click **Tools** > **Global Referencers.** The Global Referencers list page serves as a starting point for additional options.

Beginning with version 4.3, passing data from one Tracer SC to another has been simplified when creating a global referencer as described below:

1. Click **Create Global Referencer**. The **Create Global Referencer — Select Source** dialog box opens.
2. Click **Show other SCs on the network**, which populates the **Select Source** window with the other Tracer SCs.
3. From there, select the equipment or point for reference.
4. Click **Next** to continue.

Figure 51. Create global referencer — show other SC+s on network



Programs

Tracer Graphical Programming (TGP2) programs are created and downloaded to the Tracer® SC by using the Tracer TU service tool. To view the status of programs after they have been downloaded to the Tracer SC, select **Tools** > **Programs** from the left navigation menu. The **Programs** list page shows the how often programs in the Tracer SC run and the most recent run time.

Custom TGP2 routines for installed equipment can now be viewed in real-time. Data points in the routine will reflect present value and gets updated for every 15 seconds.

Note: *See the Tracer TU Service Tool Getting Started Guide (TTU-SVN01).*

Custom Equipment Keys

You can create equipment keys during the device discovery process if a predefined equipment key is not available.

Mapping points to Tracer® SC keys makes communication between controllers and the Tracer SC possible. Each key is a predefined data object recognized by Tracer SC. For example, the key “Space Temperature Setpoint Active" can be used by both the BACnet UC400 (with the BACnet object of the same name) and the LonTalk VV550 (nvoSpace Temp).

From the left navigation menu click **Tools > Custom Equipment Keys**. Click on a key name to view details.

To edit an equipment key, select a key to view from the Custom Equipment Keys page and then click edit.

Key Conversion

The Key Conversion page displays both custom and factory key conversions. Select a tab to view either Custom of Factory.

Custom key conversions:

- Custom key conversions are displayed with the type, the key, and whether the key conversion is in use.

- To view details of a custom key conversion, click on the name; the **Key Conversion Details** page opens.
- Delete or export custom key conversions, by selecting one or more and then making a selection from the Actions button.
- To import a new custom key conversion, click the Import button.

Factory key conversions:

- Factory key conversions are displayed with the type, the key, and whether the key conversion is in use.
- To view details of a factory key conversion, click on the name; the **Key Conversion Details** page opens.

Equipment Templates

Equipment templates are used when installing devices onto the Tracer SC. Some equipment templates are pre-defined, others are created based on the device that is being installed.

From the left navigation menu click **Tools > Equipment Templates.** Click on an equipment template name to view details.

To edit an equipment template, select a template from the Equipment Templates page and then click edit.

System Logs

System logs that are currently on the system are available for viewing or exporting. System logs can be the standard "hydra" log files (hydra.log, hydra.log.0, hydra.log.1, hydra.log.2, hydra. log.3, hydra.log.4), any stack dump log files (stackdump.log.x), or any additional log files that may be generated by a Tracer SC application and/or process.

From the left navigation menu click **Tools > System Logs**.

Tracer Ensemble IP Address

This tool only applies to facilities with Tracer Ensemble installed. You can view and edit the Tracer Ensemble IP address for Direct Linking. To access, select **Tools > Tracer Ensemble IP Address** from the left navigation menu.

Resource Usage

Resource Usage displays system usage among applications, memory, and points. This is primarily used by Trane Technical support.

BACnet Information

Information about BACnet configurations is shown on this page. This information is typically used by Trane Technical Support.

Connecting a Tracer SC to a Building Network

Today, most business systems use Internet Protocol (IP) networks. A Tracer® building automation system can exist on an IP network along with the other business systems. An IP network allows all applications on the network to be accessed from a single PC. All networks referred to in this guide are IP networks. A single IP network can exist in a single building or can connect a group of buildings separated by several feet or hundreds of miles. An IP network that is confined to a single building or group of buildings is referred to as a local area networks (LAN). LANs can be connected together over any distance by using telephone lines and radio waves. A system of LANs connected in this way is called a wide area network (WAN).

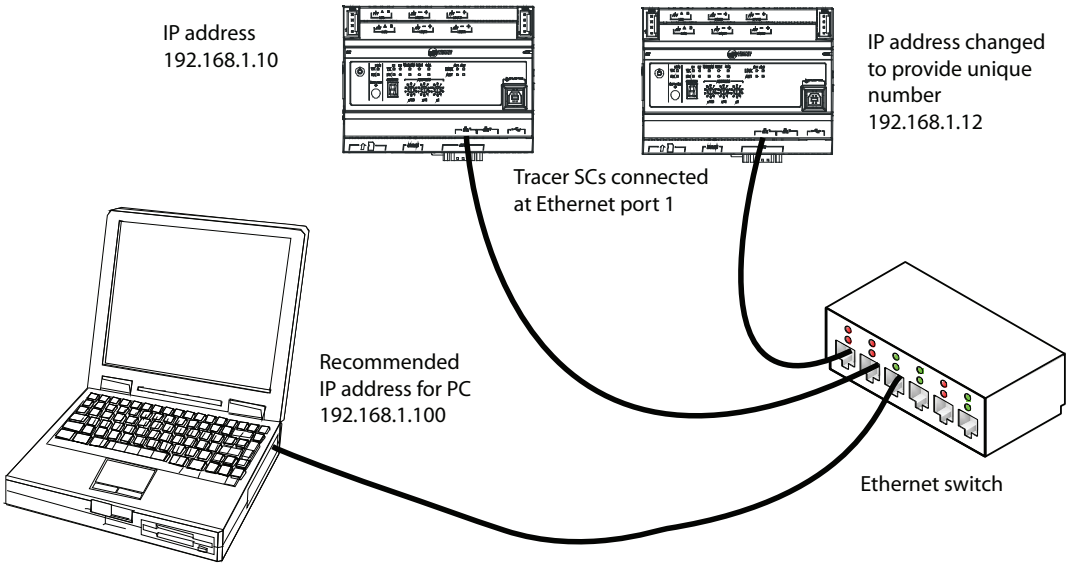
Network Pre-installation

Before installing a Tracer SC on a network, determine if the network will be used on one or more Tracer SCs and if the network will be divided into subnets. Meet with the customer's IT staff to discuss where the Tracer SCs are to be located and to obtain required information and equipment.

Single and Multiple Tracer SC Facilities

The following figure shows a multi-Tracer SC facility. Two Tracer SCs are connected to a PC by an Ethernet switch. The Tracer SC on the left still has its IP address. The Tracer SC on the right has had its IP address changed so that it is unique. The PC has the recommended IP address.

Figure 52. Multiple Tracer SCs connected through an Ethernet switch



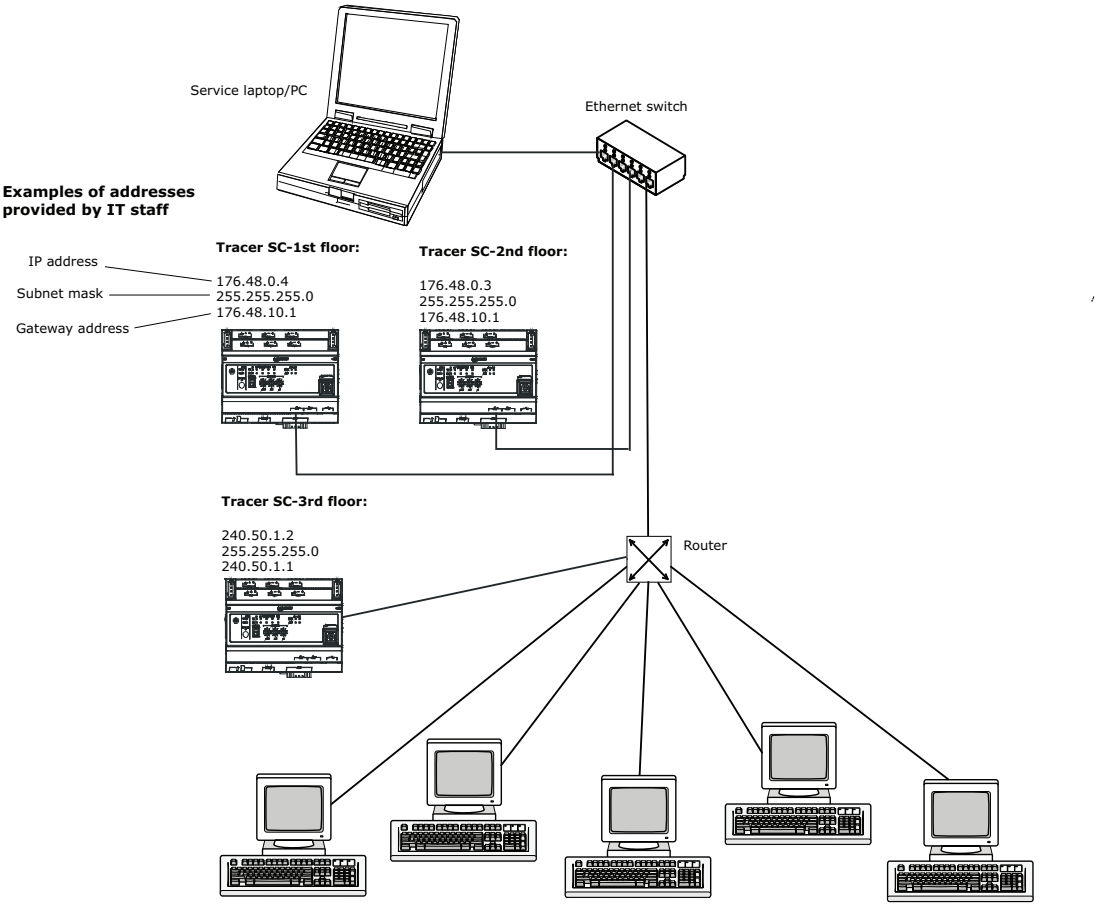
Networks with Multiple Subnets

Large complex networks are often divided into segments called subnets. It is crucial to involve the customer's IT staff in setting up such networks.

Subnets make network communication more efficient. A typical subnet might consist of, for example, all the equipment at one geographic location, in one building, or on a single LAN (if the network is a WAN).

A router separates a network into subnets and controls excessive network traffic which can slow network performance. Some broadcast messages (messages that are sent to all devices on an entire network) are not needed by all devices. Devices on the same subnet have IP and gateway addresses with a common IP routing prefix. The router manages communication between the subnets by using the gateway addresses to determine which messages pass from one subnet to another.

Figure 53. Networks with multiple subnets



Network Installation

The following information and equipment is required or optional, as stated, for installing Tracer® SC on a building network.

Note: *A memo is available for communicating with the customer's IT staff about the information that must be obtained from them for network installation.*

Obtaining the IP Address

A unique IP address is required for each Tracer SC for all networks. Tracer SCs can use either:

- A permanently assigned (static) IP address, or
- An address that is sent from a Dynamic Host Configuration Protocol (DHCP) server. The DHCP server must be set up to send the Tracer SC the same reserved IP address each time the Tracer SC connects to the DHCP server.

You can obtain IP addresses from the customer's IT staff.

To edit the IP address of a Tracer SC:

1. Select Identification and Communications from the Installation page, then select the IP Configuration tab.
2. Click **Edit.** To edit the network address for one or both Ethernet Network ports, select one of the following options:
   - **Obtain IP address automatically using DHCP**. A Dynamic Host Configuration Protocol (DHCP) requests an IP address from a server.
   - **Use the following IP address**. Enter an IP address in the provided fields.

3. Click **Save**.

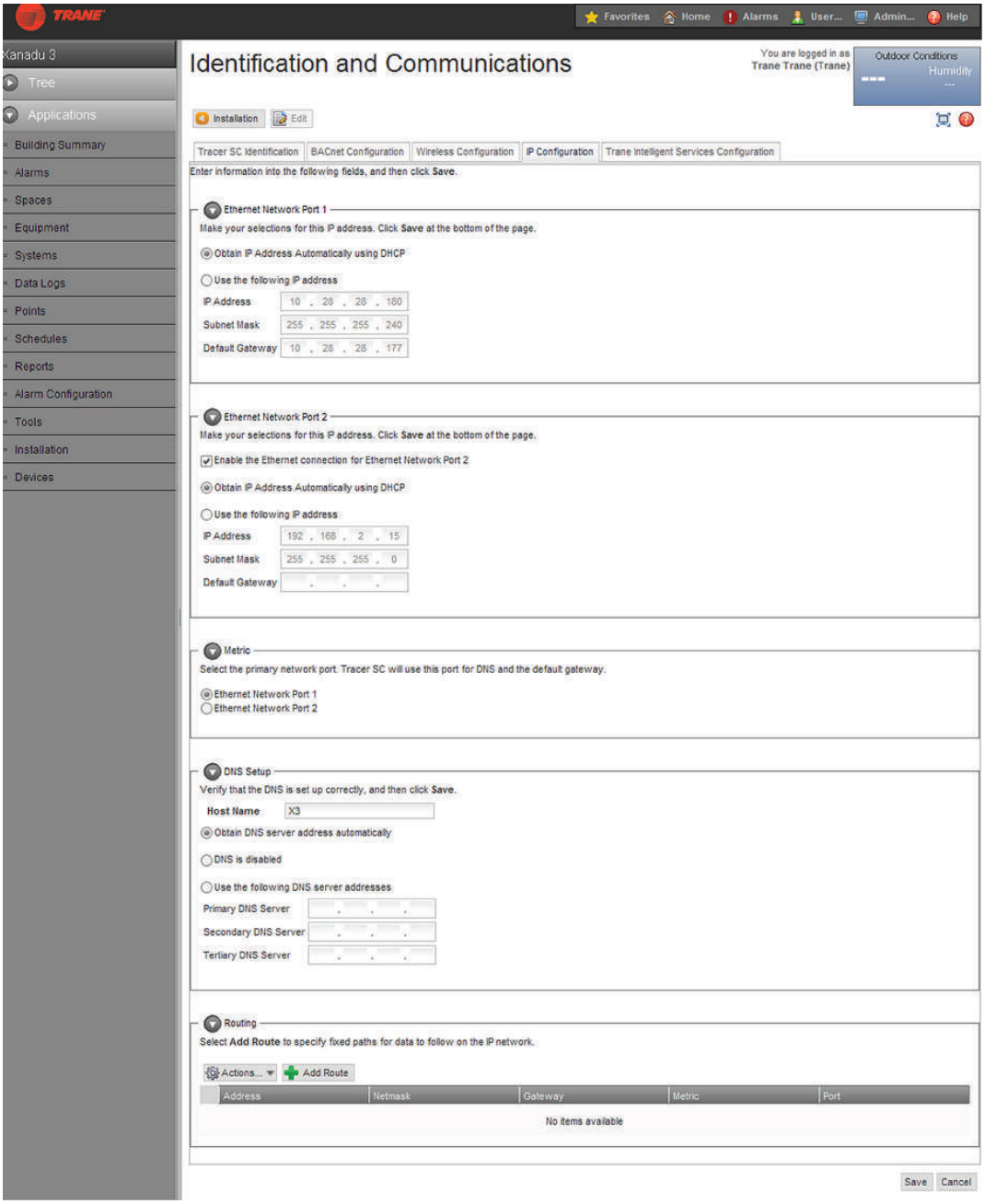
Routing

Routing is the process of selecting paths in a network to send network traffic. Use network routing for Trane Intelligent Services (TIS) applications or in any case where the BAS network must be separated from the Internet.

To select network routing:

1. Use the check boxes to select one or more network addresses.
2. Click the actions button to edit or delete the address.
3. Click **Save**. OR add a network route by clicking the add route button. The **add route** dialog box appears.
4. Enter the required information in the fields, then click **Save**.

Figure 54. Editing IP configuration



DHCP

If the network uses the Dynamic Host Configuration Protocol (DHCP), DHCP server must be set up to send the Tracer SC (unless it is a BBMD) the same reserved IP address each time the Tracer SC connects to the DHCP server. If the Tracer SC is a BBMD, the IP address must be fixed.

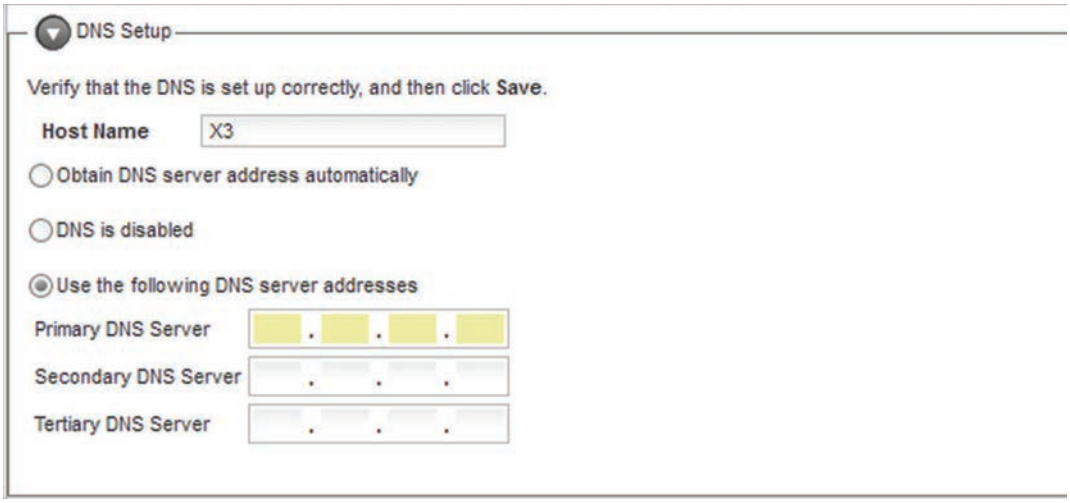
DNS Server

Domain Name System (DNS) is an Internet service that translates domain names into IP addresses. It may be necessary to configure the DNS server for network routing. Use network routing for Trane Intelligent Services (TIS) applications or in any case where the BAS network must be separated from the Internet.

To manually configure the DNS server:

1. From the left navigation menu, click **Installation > Identification and Communications > IP Configuration**.
2. Click **Edit**.
3. In the **DNS Setup** section, select the **Use the following DNS server addresses** radio button.
4. Enter the DNS server addresses for Primary, Secondary, and Tertiary (where applicable).
5. Click **Save**.

Figure 55. DNS setup



Jacks and Cabling

Required for connecting the network. (Obtain from IT staff).

Gateway Address

Required for all networks. The gateway address allows traffic to be routed between the Internet and an internal network. (Obtain from IT staff.)

MAC Address

Required for all networks. A media access control (MAC) address — also called a physical address — is a unique number assigned by the manufacturer for identification. The IT staff at the customer site will request that you provide the MAC address of any Tracer SC that is to be installed on the building network. The MAC address can be found in the IP configuration section of the Tracer SC user interface.

You can also obtain the MAC address by doing the following:

1. Select **Start > Run.**
2. In Run, type **command**. A DOS screen opens and presents a prompt.
3. At the prompt, type **ping** followed by a space and then the IP address. Click Enter.
4. At the next prompt, type **arp -a**. Click Enter.

   The response contains the MAC address below the heading, “Physical Address.”

Ethernet Switch

An Ethernet switch is an optional device used to connect multiple Tracer SCs on the same facility for convenience and as a way of optimizing network traffic. Use Ethernet port 1 to connect multiple Tracer SCs individually to the Ethernet switch.

Router

Required to separate a network into subnets to manage network traffic.

Subnet Mask

Required for subnets. A subnet mask is a number used for routing traffic to a particular subnet. The subnet mask is stored in the PC, server, or router and is matched up with the incoming IP address to determine whether to accept or reject a packet. (Obtain from IT staff.)

Securing Your Network with VPN

Trane recommends the use of a Virtual Private Network (VPN) to provide extra security to your BAS. VPN is a mechanism that safely extends a private network across a public network such as the Internet.

VPN provides an additional layer of security to your BAS without comprising your ability to access Tracer SC remotely. A VPN can help to prevent Internet based attacks on your BAS by requiring an additional layer of authentication. This method requires a VPN server and VPN client software to be set up by the customer's IT staff.

Frequently Asked Questions about VPN

My facility already uses SSL; do I still need to use a VPN?

The use of a VPN is still recommended as an additional layer of security. Attacks can come from both inside and outside of your network.

After I set up a VPN, do I still need to use SSL?

Yes. A VPN only provides encryption between the VPN endpoints (the VPN client and server). Traffic from the VPN endpoint to and from the server is not encrypted unless SSL is used.

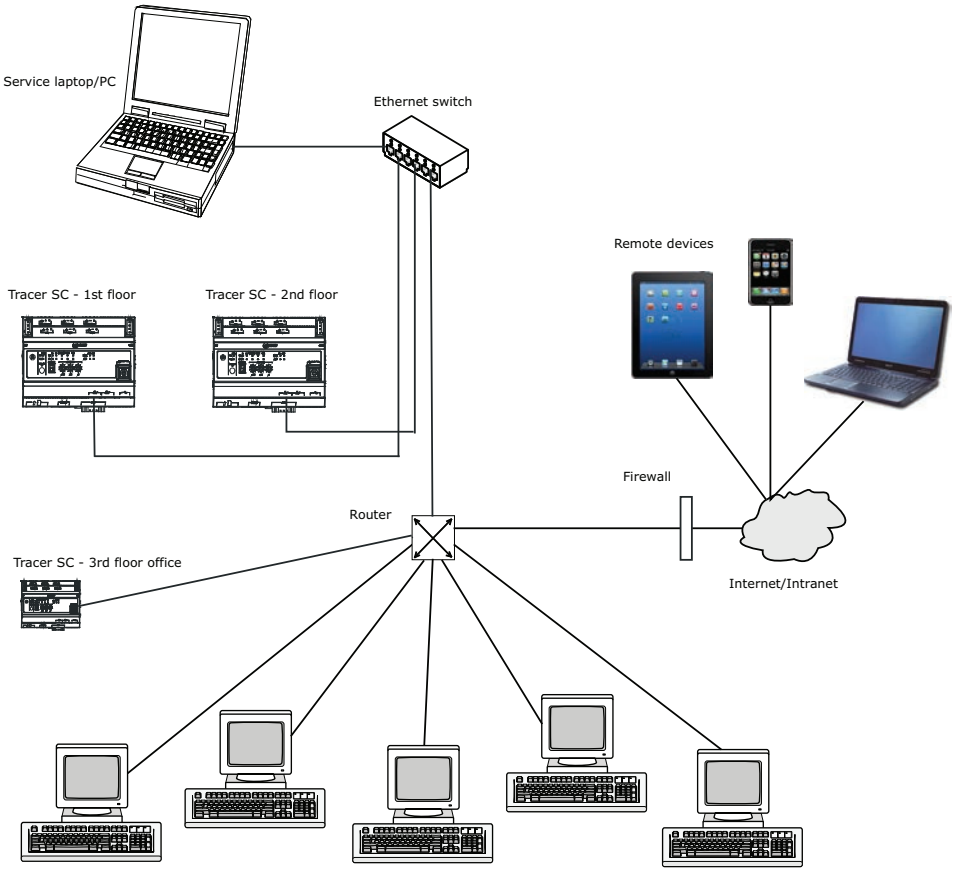
Do I still need a firewall?

Yes. Firewall rules should be set up to restrict Internet access to the VPN port only. Consider setting up rules with the VPN server to restrict VPN access to only the required IP addresses and port.

What is the impact of VPN on my system performance?

Impact to performance should be minimal.

Figure 56. Remote access to a Tracer SC by port forwarding through a firewall or VPN



Ethernet Network Wiring

Ethernet network requirements are described in this section.

Network Wiring Specifications

Trane requires Cat5, 5e, or 6 cable for Ethernet network wiring.

The Ethernet port on Tracer® SC supports only twisted-pair wire (10BaseT or 100BaseT) with RJ45 connectors. With twisted-pair wiring, one pair is used to receive data signals and the other pair is used to transmit data signals.

If a direct connection between two devices is required, use a straight-through or crossover cable. If multiple devices are required to communicate, use an Ethernet switch.

The EIA/TIA cabling standard recommends a maximum segment length of 295 ft (90 m) between the wire termination equipment in the wiring closet and the wall plate in the office. This recommendation provides 33 ft (10 m) of cable allowance to accommodate patch cables at each end of the link and signal losses in intermediate wire terminations on the link.

Note: *Cable installations must comply with both federal and local codes. Plenum-rated cable is available to meet NEC Article 725, which addresses flame resistance and smoke emission for signal cables*

Due to the high precision required when performing twisted-pair wire terminations, Trane recommends that only qualified technicians with the proper equipment handle all terminations and splicing.

Wire type	Maximum total wire length [a]	Minimum distance between two devices
10BaseT or 100BaseT	328 ft (100 m)	1.64 ft (0.5 m)

[a] You can increase distances and the number of devices by using an Ethernet switch.

Fiber-Optic Cable Recommendations

Fiber-optic cable can be used for networks involving long distances, inter-building cabling, and areas with a potential for electrical noise. Fiber optic signals are less susceptible to electrical noise, including lightning, EMI/RFI, voltage conductors, and ground loops.

Fiber-Optic Cable

Trane requires duplex, 62.5 mm core glass fiber-optic cable with ST connectors, which comes in a variety of types for specific applications, such as indoor, outdoor, burial, aerial, and duct. You can order fiber-optic cable, fiber-optic modems, ST-type crimp connectors, epoxy connectors, and other accessories from Trane Buying Group suppliers.

Important: *Trane recommends that only qualified and experienced fiber-optic technicians prepare the fiber-optic end connectors and cable run lengths. Improper methods may result in faulty communication due to signal degradation (decibel loss), which must be less than 14 dB on each fiber.*

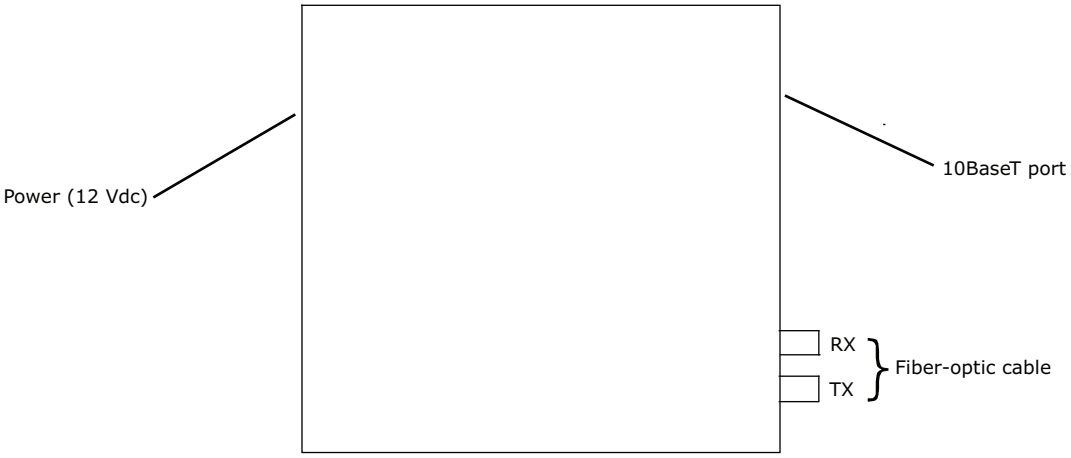
Fiber-Optic Media Converter

Fiber-optic media converters converts the electrical signals from a twisted pair of wires to optical signals, which are sent over the fiber-optic cable. Trane supports the following fiber-optic media converters:

- Connect Air Int. W4869 for connecting fiber-optic cable to 10BaseT wire.
- Allied Telesyn AT-MC101 XL for connecting fiber-optic cable to 100BaseT wire

The following figure shows a port for a fiber-optic cable (TX and RX) and a 10BaseT port for connecting the media converter to the Tracer SC. At the other end is a 12 Vdc port to connect power to the media converter.

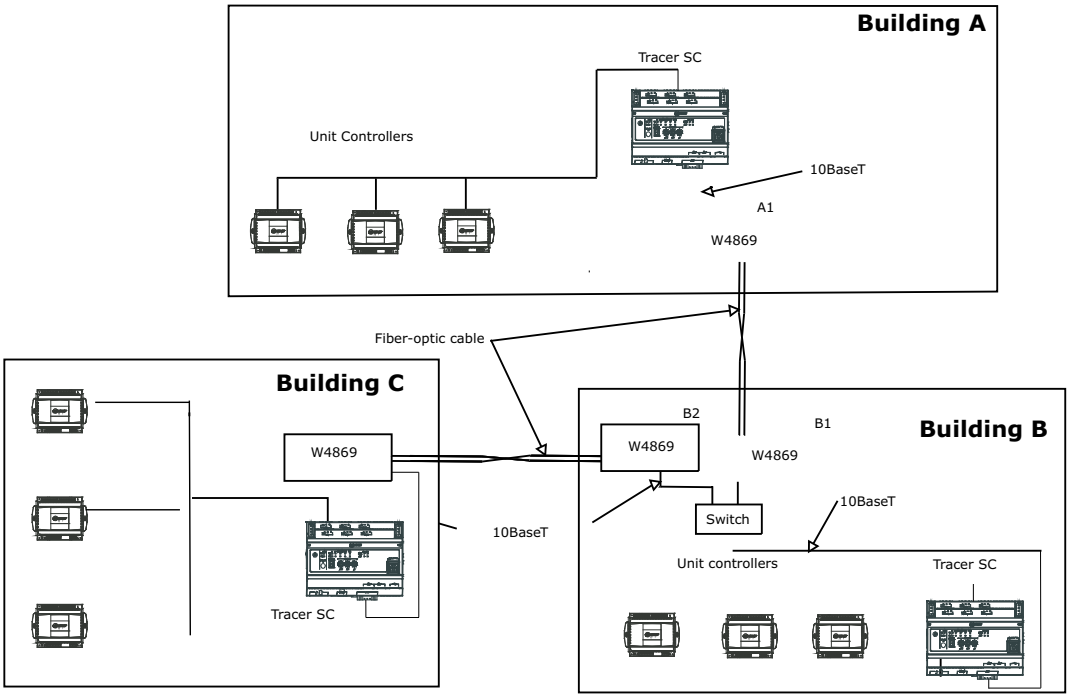
Figure 57. Fiber-optic media converter for 10BaseT wire (connect Air Int. W4869)



To wire a fiber-optic media converter on an inter-building network, follow these procedures (refer to the following figure):

1. In Building A, connect the power supply to the 12 Vdc port on media converter A1.
2. Connect the 10BaseT cable from the Tracer SC to the 10BaseT port on media converter A1.
3. Connect the terminated fibers to the fiber optic TX-RX connections on media converter A1.
4. In Building B, connect the power supply to the 12 Vdc port on media converter B1.
5. Connect the fiber-optic cables from media converter A1 to the TX-RX connections on media converter B1, observing reversed polarity.
6. If only one Tracer SC exists on the network in Building B, connect 10BaseT cable from the Tracer SC to the 10BaseT port on media converter B1 to complete the fiber-optic network between Buildings A and B.
   a. If multiple Tracer SCs exist within the building, connect 10BaseT cable from media converter B1 to a hub that connects the Tracer SCs.
   b. If another fiber connection is desired (as shown in the following figure), connect 10BaseT cable from media converter B1 to a hub that connects the Tracer SC(s), and connect 10BaseT cable from the hub to another media converter (B2).
7. Connect the power supply to the 12 Vdc port on media converter B2.
8. Connect terminated fiber-optic cables to the TX-RX connection on media converter B2.
9. Add a media converter (C1) in Building C. Connect the power supply to its 12 Vdc port.
10. Connect terminated fiber-optic cables from media converter B2 to the TX-RX connection on media converter C1, observing reversed polarity.
11. If only one Tracer SC exists on the network in Building C, connect 10BaseT cable from the Tracer SC to the 10BaseT port on media converter C1 to complete the fiber-optic network for Buildings A, B, and C.
    a. If multiple Tracer SCs exist within the building, connect 10BaseT cable from media converter C1 to a hub that connects the Tracer SCs.
    b. If another fiber connection is desired, connect 10BaseT cable from media converter C1 to a hub that connects the Tracer SC(s), and connect 10BaseT cable from the hub to another media converter.

Figure 58. Example of inter-building fiber-optic cabling for an IP network



BACnet Network Communication

BACnet communication must be configured for Tracer® SCs. For communication between Tracer SCs, BACnet IP addressing is used. For communication with unit controllers on a twisted-pair communication link, the BACnet MS/TP protocol is used. Review your network configurations to determine whether or not Tracer SCs are able to communicate with each other. Depending on how your network is configured, BBMDs may not be required. See for examples.

BBMDs

BBMDs are required for subnets. To ensure that messages are routed properly through the network, one controller on each subnet must be assigned as the BBMD for that subnet. BBMDs are assigned during configuration of the Tracer SC.

A subnet's local BBMD enables the passing of a BACnet message from one subnet to the next by repackaging it as a *directed message* (a message that is intended for specific devices), and then sending it to each remote BBMD on its broadcast distribution table (BDT). The subnet's local BBMD then rebroadcasts the message to the devices on its subnet. A Tracer SC that is a BBMDs must have a fixed IP address.

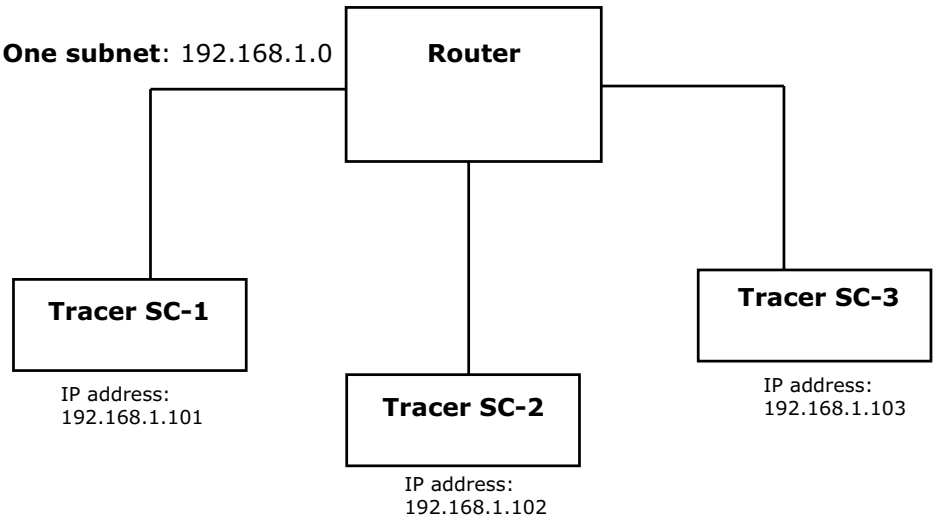
BDTs

BDTs are required for subnets. A broadcast distribution table (BDT) is essential for routing broadcast messages. It is created during Tracer SC configuration. A BDT contains the IP address for each BBMD on the network. An identical BDT must be downloaded to each BBMD on a site, which is facilitated by the BDT editor in the Tracer SC

UDP Port

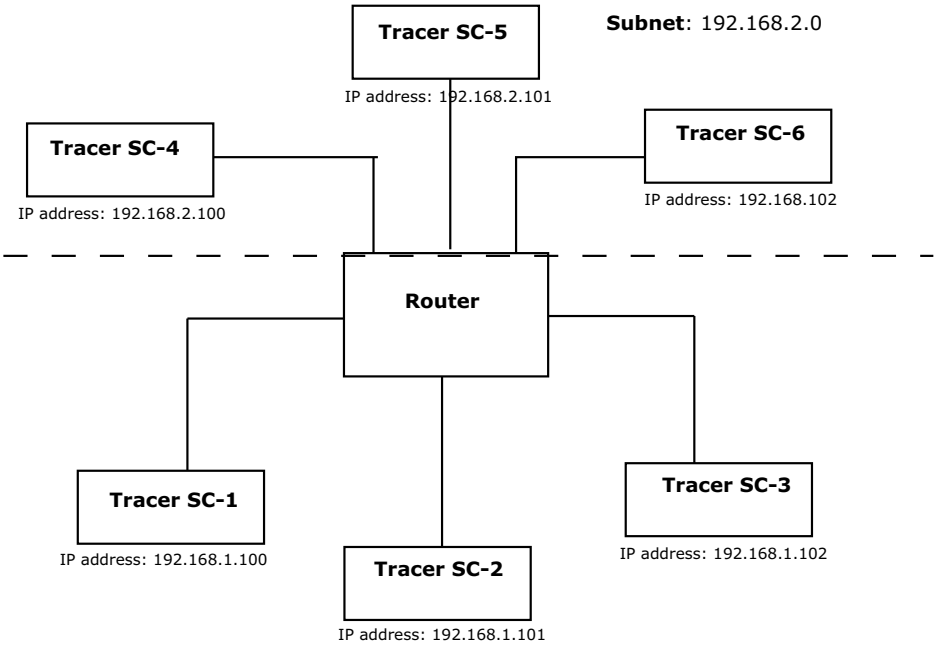
UDP ports are always required for BACnet IP, even if there is only one subnet. The User Datagram Protocol (UDP) is an Internet protocol used for BACnet device communication. The default UDP port number is 47808, and can be changed in the SC configuration section. Refer to the following two figures for examples.

Figure 59. Example of a facility that does not require BBMDs (single subnet)



Some facilities do require a BBMD if they are configured with more than one subnet as shown in the following figure.

Figure 60. Example of a facility that requires BBMDs (multiple subnets)



Multi-Tracer SC Facilities

Multi-SC facilities provide improved performance and job layout options, particularly in large facilities such as college campuses. A multi-SC facility consists of one Tracer® SC with an application license (SC-App) and controls all applications (schedules, systems, reports and so forth), and one or more Tracer SCs with a base license (SC-Base) that serve as BACnet routers. With this layout, a Tracer SC installation can utilize:

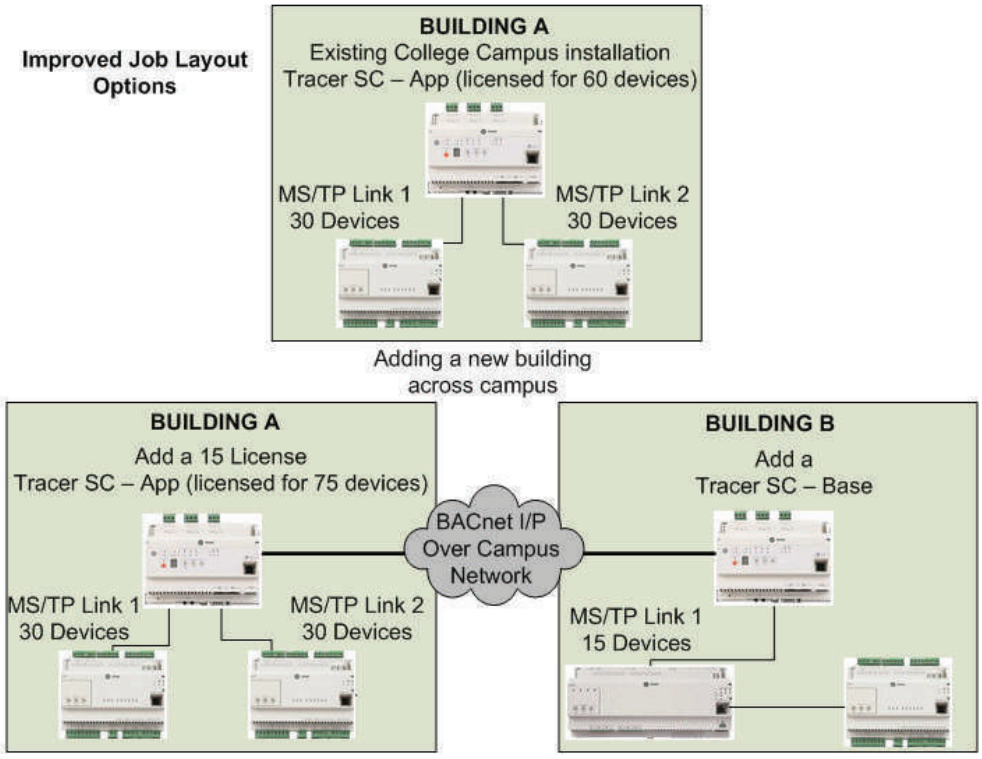
- One or more MS/TP links with 60 devices on each link
- A variety of customized configurations

The following table shows both single SC and multi-SC support for various protocols

Communication Type	Single SC	Multi SC
Air-Fi® Wireless	Up to 120 devices	Up to 240 devices
BACnet MS/TP	Up to 120 devices	Up to 240 devices
BACnet IP	Up to 240 devices	Up to 240 devices
COMM 3/4	Up to 240 devices	Up to 240 devices
LON	Up to 120 devices	N/A
Modbus TCP	Up to 60 devices	Up to 120 devices
Modbus RTU	Up to 60 devices	Up to 120 devices

Note: *Trane Air-Fi sensors do not count against the device limits listed above. For more information, see the Air-Fi Wireless System IOM Manual, (BAS-SVX40).*

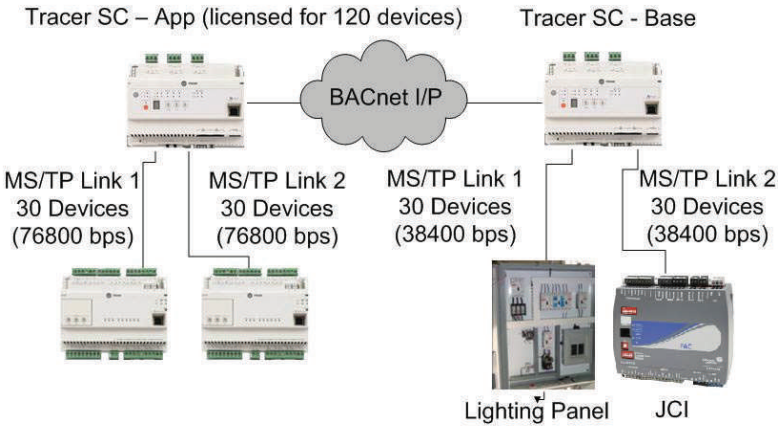
Figure 61. Example of a multi-SC facility



Multi-SC communication also allows for increased integration options with non-Trane BACnet systems. The following figure illustrates a sample facility layout with an additional Tracer SC that serves as a base module and non-Trane devices with slower baud rates.

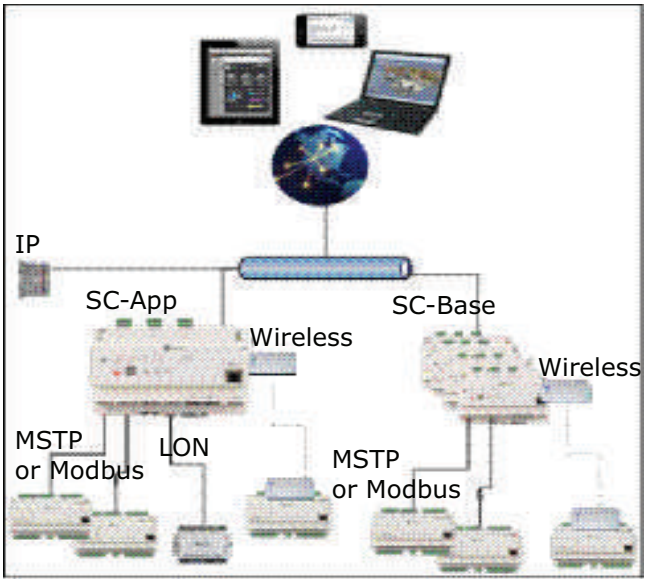
Note: *Please contact Trane Product Support in St. Paul to assist with implementation and provide up-to-date support.*

Figure 62. Example layout with non-Trane devices and slower baud rates



The following figure illustrates how LonTalk devices must be physically connected to the Tracer SC-App. BACnet unit controllers can be physically connected to any Tracer SC.

Figure 63. Example layout with LonTalk and wireless devices



Setting Up BACnet Communication for Multiple Tracer SCs

To set up BACnet communication:

1. Determine how your Tracer® SCs are configured on the BACnet network. If there is more than one subnet, a BBMD is required on each subnet.
2. Record the IP addresses for all Tracer SCs and subnet masks; save for a later step.
3. Navigate to the Identification and Communications section of the Tracer SC Installation page, then expand the BACnet Configuration section.
4. Ensure that the "This Tracer SC is a BACnet Broadcast Management Device (BBMD)" checkbox is selected. If not, make the appropriate changes and click **save.** Navigate back to the Installation page.
5. In the Define Network section, click BDT Setup, then click the Set up BDT button. The Set Up BDT page opens as shown in the following figure.

Figure 64. Setting up a BDT

6. Enter the IP address of the other BBMD Tracer SCs into the IP address field. The entries in the BDT table are BBMDs. If your network requires additional BBMDs, click add BBMD.

   Important: *Only one Tracer SC can be set up as a BBMD on a subnet even if multiple Tracer SCs reside on the same subnet.*

7. Click **Save and Send**.

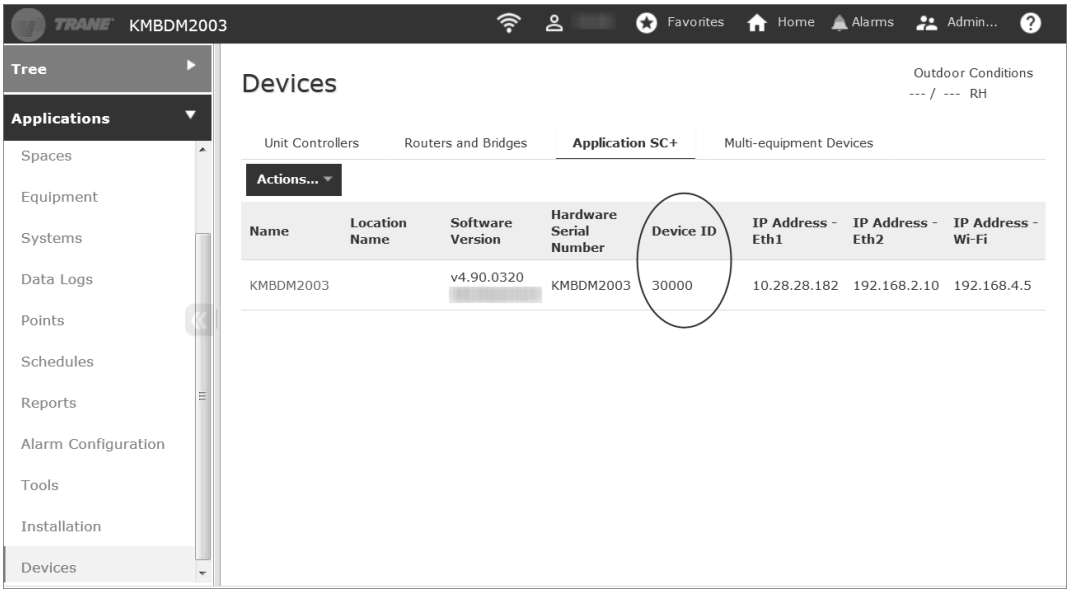
Sharing Data Between Two Tracer SCs

Sharing Data Using the Pull Method

After setting up BACnet communication, you will need to create points in the Tracer® SCs in order to share data between Tracer SCs. There are two methods that can be used: the pull method and the push method.

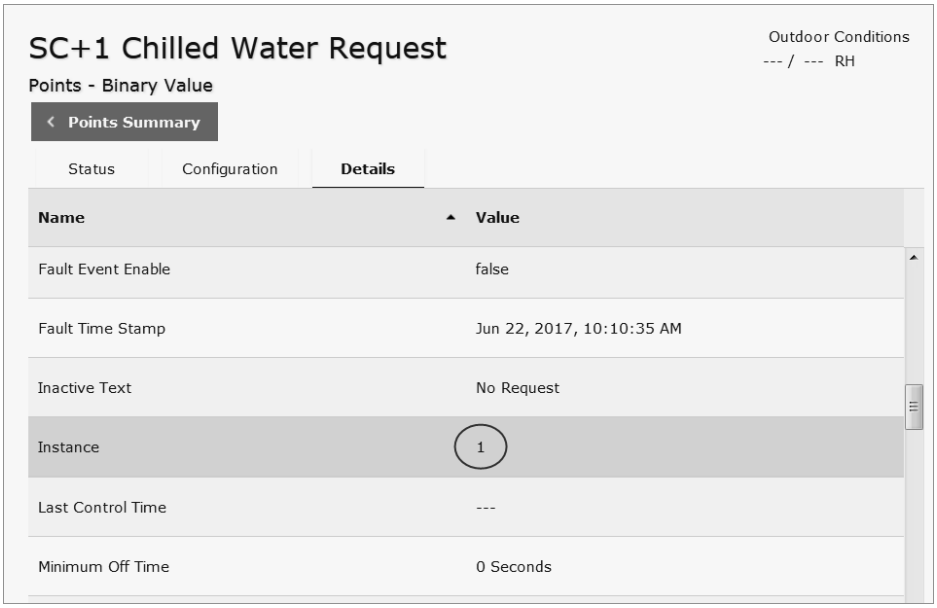
1. At the Tracer SC user interface, click **Devices** from the left navigation menu. The **Devices** page opens.
2. Click on the **Application SC** tab. Locate and record the device ID; save for a later step.

Figure 65. Locating the device ID



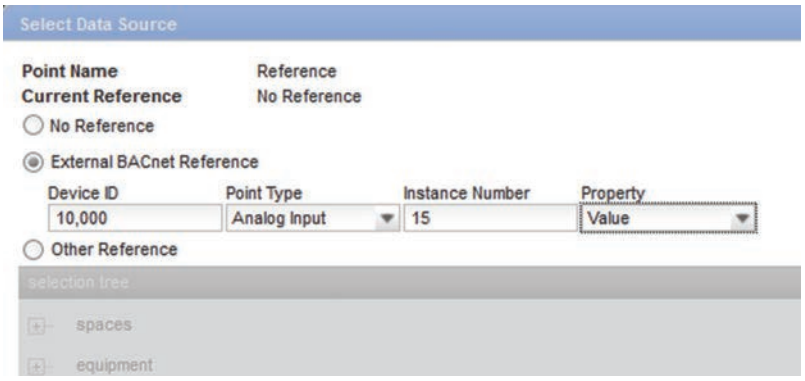
3. Navigate to the **Details** tab of the point that will be referenced from SC-1, and locate the instance number. Record the instance number for a later step.

Figure 66. Point details page (locating the instance number)



4. At the Tracer SC user interface, click **Points** from the left navigation menu. The **Points** page opens.
5. Click the **Create Point** button, then select the appropriate point type. In this example, analog input was selected.
6. Enter the point name and units information in the fields.
7. Click the reference icon . The **Select Data Source** dialog box appears.

Figure 67. Select data source dialog box



8. Click **Select external BACnet reference.**
9. Enter the device ID, point type, and instance number that you recorded in an earlier step. Select **value** from the property drop-down list.
10. Click **Apply** to return to the **Create Point** page.
11. Set the Update Interval to determine how often data is read.
    - An interval of 1 to 5 minutes is recommended for BACnet IP data sharing
      – An interval of 5 to 15 minutes is recommended for BACnet MS/TP data sharing
12. Enter any other preferred point data.
13. Click **Save**.

Sharing Data Using the Push Method

Data is pushed from the Tracer SC (SC-1) that has the data, to a point on the Tracer SC (SC-2) that requires the data. This is done by creating an output point on SC-1 and referencing a value point on SC-2.

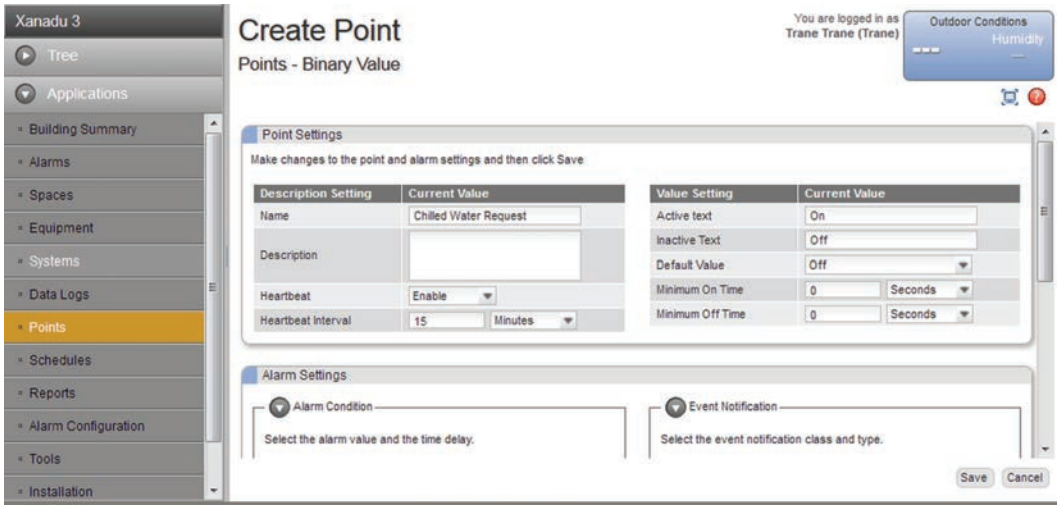
By using this method, the output point can be configured to send the data at a rate that is faster than the heartbeat interval on the receiving value object. This allows for multiple attempts to be made at sending the data before the value point enters a fault state.

In the Tracer SC that will receive the data:

1. Locate and record the device ID and the point instance number as described in "Sharing Data Using the Pull Method." Save for a later step.
2. At the Tracer SC user interface, click **Points** from the left navigation menu. The **Points** page opens.
3. Click the **Create Point** button, then select **Binary Value**.
4. Enter the following information in the fields as shown in the following figure.
   - Name – Chilled water request (user specified)
     - Heartbeat – enable (to detect communication failures)
     - Heartbeat Interval – 15 minutes (recommended range is 30 seconds to 12 hours)

     Note: *The point will enter a fault state if not written to within the heartbeat interval. This value should be a multiple of the update interval of the point in the source device (Tracer SC).*
5. Enter preferred data in the remaining fields.

Figure 68. Creating a binary value point



6. Click **Save**.

In the Tracer SC that has the data:

1. At the Tracer SC user interface, click **tools > Global Referencers > create global referencer**. The Create Global Referencer dialog box opens.
2. In the Name field, enter Chilled water request from SC 1.
3. Select a priority level. For example, 15 – Application low.
4. In the Update Frequency section, set the Update Interval to determine how often data is read. For example, 5 minutes. This information is sent to the other Tracer SC every 5 minutes. (This should be an interval of the heartbeat time of the point created in step 3).
5. In the Source section, click **Select External BACnet Source.**

6. Click the reference icon  . The **Select Data Source** dialog box appears.
7. Click **Select external BACnet reference.**
8. Enter the device ID, point type, and instance number; select a value from the property drop-down list.
9. Click **Apply** to return to the **Create Point** page.
10. Enter preferred data in remaining fields.
11. Click **Save**.

Unit controllers

Unit controllers provide all necessary unit control functions. They operate associated unitary equipment, while ensuring that all built-in safety features are enabled and that diagnostics are issued. Each controller is designed to operate in stand-alone mode. Therefore, if system control fails, unit operation can continue. Unit controllers installed on a Tracer SC can be a combination of the following BACnet, LonTalk, Air-Fi wireless, and legacy unit controllers:

BACnet MS/TP Unit Controllers Supported by Tracer SC

- Tracer UC210 unit controller for variable-air-volume (VAV) equipment
- Tracer UC400 unit controller for variable-air-volume (VAV) equipment
- Tracer UC400 unit controller for programmable equipment
- Tracer UC400 blower coil
- Tracer UC400 Variable Speed Water Source Heat Pump (WSHP)
- Tracer UC400 2 Heat/2 Cool
- Tracer UC400 Fan Coil
- Tracer UC600 programmable unit controller
- Tracer UC800/AdaptiView unit controller for CenTraVac chillers
- BCI-I: BACnet communications interface for IntelliPak system
- BCI-C: BACnet communications interface for chillers
- BCI-R: BACnet communications interface for ReliaTel
- Communicating thermostats for rooftop units, heat pumps, and fan coil applications
- Trane Enercept Flex Power and Energy Meters
- Trane E50 Series Power and Energy Meters
- Non-Trane BACnet MS/TP) devices

BACnet IP Unit Controllers Supported by Tracer SC

- Tracer UC600 Programmable controller
- Non-Trane BACnet IP devices

Air-Fi Wireless Unit Controllers Supported by Tracer SC

- Tracer UC210 unit controller for variable-air-volume (VAV) equipment
- Tracer UC400 unit controller for variable-air-volume (VAV) equipment
- Tracer UC400 unit controller for programmable equipment
- Tracer UC600 unit controller for Air Handler (AHU) equipment
- Tracer UC600 unit controller for programmable equipment

LonTalk Unit Controllers Supported by Tracer SC

- Tracer AH540/541 air-handler controllers
- Tracer MP501 multi-purpose controller
- Tracer MP503 input/output module
- Tracer MP580/581 programmable controller
- Tracer VV550/551 VAV controller
- Tracer ZN510/511 zone controller
- Tracer ZN517 unit controller
- Tracer ZN520/521 zone controller

- Tracer ZN523 zone controller
- Tracer ZN524 water-source heat pump unit controller
- Tracer ZN525 zone controller
- Tracer CH530 chiller controller
- Tracer CH532 chiller controller
- LCI-C: LonTalk communications interface for chillers
- LCI-I: LonTalk communications interface for IntelliPak systems
- LCI-R: LonTalk communications interface for ReliaTel systems
- LCI-V: LonTalk communications interface for Voyager systems
- Trane TR200 Variable Frequency Drive (VFD)
- WAGO High Density I/O module (third-party)
- Trane Enercept Flex Power & Energy Meters
- Trane E50 Series Power & Energy Meters
- Non-Trane LonTalk devices using SCC, DAC, and chiller profiles, devices that support LonTalk standard network generic variables, and devices with Standard Network Variable Types (SNVTs)

Trane Legacy Unit Controllers (Comm3/4) Supported by Tracer SC

Note: *The following devices are supported through the use of Legacy Comm Bridge.*

- Variable Air Volume (VAV I, II, III, IV)
- IntelliPak
- Voyager
- Commercial Self-Contained (CSC)
- Thermostat Control Module (TCM)
- Programmable Control Module (PCM)
- Universal Programmable Control Module (UPCM)
- Terminal Unit Controller (TUC)
- Centrifugal Chillers (UCP2)
- Helical Rotary Chillers (UCP2)
- CGX Chillers
- Series-R Chillers (RTA/RTW)

Non-Trane Unit controllers Support by Tracer SC

For a list of non-Trane LonTalk, BACnet, and Modbus controllers supported by Tracer SC, visit the Trane.com Commercial product page at http://www.trane.com/COMMERCIAL/Internal/View.aspx?i=2757 and open the Tracer SC Integration Capabilities link.

Or, contact St. Paul Trane Product Support for updated procedures to determine the risks associated with integration to a particular device.

Quantity of Unit Controllers Supported by Tracer SC

Each Tracer SC can support a maximum quantity of 240 unit controllers. Unit controllers installed on a Tracer SC can be a combination of BACnet and LonTalk unit controllers.

Notes:

- *Scalable 15-device licenses available.*
- *A maximum of 120 wireless devices are supported in a single Tracer SC facility and 240 in a multiple Tracer SC facility.*
- *LonTalk devices must be physically installed on the Tracer SC-App.*
- *BACnet UCs can be physically connected on the Tracer SC-App or a Tracer SC-Base (maximum of 120 devices).*
- *Tracer UC600s cannot exceed 10 per MS/TP link or a total of 20 per Tracer SC system.*

The BACnet Unit Controller Network

Every BACnet device on a Tracer® building automation system, including unit controllers, must have a BACnet device ID. Trane BACnet unit controllers use MS/TP communication.

Observe the following best practices when installing, replacing, or adding BACnet devices:

- Equally distribute the number devices between Tracer SC BACnet MS/TP links 1 and 2.
- Sequentially address each BACnet MS/TP link (using the rotary switches), starting at 1, 2, 3, and so forth. Each BACnet MS/TP should start at address 1.
- Do not leave any gaps when setting addresses.
- Minimize unnecessary communication on the links by setting up event-triggered TGP and slow sample rates.

  Note: *After you have established communication-link and power wiring for the unit controllers, you can connect the Tracer TU service tool to a BACnet unit controller and access any other BACnet unit controller on the link.*

Installing Factory-Programmed BACnet Unit Controllers

Trane recommends installing factory-programmed controllers before field-programmable controllers. Factory-programmed BACnet unit controllers currently include the Tracer® UC400 controller configured for VAV.

Note: *Follow the wiring procedures given in the BACnet MS/TP Wiring Best Practices (BAS-SVX051).*

To install factory-programmed BACnet unit controllers on the Tracer SC, follow these steps.

1. Mount the unit controller and connect the power supply.
2. Using a small screwdriver, set the rotary switches on the unit controllers. The valid range is 001–127 (000 will prevent BACnet link communication). This setting is used as the BACnet device ID.
3. Using a USB cable, connect the Tracer TU service tool to the controller.
4. In Tracer TU, on the **Controller Settings** tab:
   - Enter the name (the default is “UC400”).
   - In the Protocol section:
     - Verify that the device baud rate is set to 76800 bps.
     - Verify the BACnet device ID, which was set in step 2.
5. Connect the communication link to the unit controller.
6. Repeat Step 1 through Step 5 for each unit controller.
7. Connect the communication link wiring to the Tracer SC.

   Note: *BACnet devices automatically perform a time synchronization daily at 3:00 a.m. If manually changing the time on the Tracer SC, it may take up to 5 minutes for synchronization.*

Installing Field-Programmable BACnet Unit Controllers

Field-programmable BACnet unit controllers currently include the Tracer UC400 programmable controller.

Note: *Follow the wiring procedures given in the BACnet MS/TP Wiring Best Practices (BAS-SVX051).*

To install factory-programmed BACnet unit controllers on the Tracer SC, follow these steps in order:

1. Mount the unit controller and connect the power supply.
2. Using a small screwdriver, set the rotary switches on the unit controllers. The valid range is 001–127 (000 will prevent BACnet link communication). This setting is used as the BACnet

device ID.

3. Using a USB cable, connect the Tracer TU service tool to the controller.
4. In Tracer TU, on the **Controller Settings** tab:
   - Enter the name (the default is "UC400").
   - In the Protocol section:
     – Verify that the device baud rate iis set to 76800 bps.
     – Verify the BACnet device ID, which was set in step 2.
5. Connect the communication link wiring to the controller.
6. Repeat Step 1 through Step 5 for each unit controller.
7. Connect the communication link wiring to the Tracer SC.

   Note: *BACnet devices automatically perform a time synchronization daily at 3:00 a.m. If manually changing the time on the Tracer SC, it may take up to 5 minutes for synchronization.*

Adding BACnet Unit Controllers

Note: *Follow the wiring procedures provided in the BACnet MS/TP Wiring Best Practices (BAS-SVX051).*

If you need to add a BACnet unit controller to an existing communication link on the Tracer® SC, follow these steps to ensure that currently installed controllers do not lose communication.

To add BACnet unit controllers:

1. Follow steps 1 through 4 of "Installing Factory-Programmed BACnet Unit Controllers" or steps 1 through 4 of "Installing Field-Programmable BACnet Unit Controllers."
2. In Tracer TU, set up application specific settings for a factory-configured controller or TGP2 and point configuration for a field programmable applications.
3. Connect the communication link wiring to the unit controller.
4. To complete the installation on the Tracer SC, select **installation** > **devices**. The **Devices** page opens.
5. Click the **Discover Devices** button, which initiates the device discovery process.

Replacing BACnet Unit Controllers

Note: *Follow the wiring procedures given in the BACnet MS/TP Wiring Best Practices (BAS-SVX051).*

To replace BACnet unit controllers on the Tracer® SC, follow these steps in order:

1. Mount the new unit controller and connect the power supply.
2. Using a small screwdriver, set the rotary switches to match the settings on the unit controller that is being replaced.
3. Using a USB cable, connect the Tracer TU service tool to the controller.
4. In Tracer TU, configure the controller to be the same as the one you are replacing.
5. Connect the communication link wiring to the unit controller.
6. Connect the communication link wiring to the Tracer SC.
7. To complete the installation on the Tracer SC, navigate to the **Devices** page (**Installation** > **Devices**).
8. Select the check box to the left of the device to be replaced. From the actions menu, select **replace device**. A pop-up window appears. Click **OK**.

The LonTalk Unit Controller Network

Every LonTalk device on a Tracer building automation system, including unit controllers, must have a valid network address (domain, subnet, node [DSN]). The Tracer® SC does not provide any type of LonTalk network management function. The Rover™ service tool in Active mode provides the this function for the LonTalk communication link.

Note: *After you have established communication-link and power wiring for the LonTalk unit controllers, you can connect the Rover service tool to a LonTalk unit controller and access any other LonTalk unit controllers on the link.*

Installing Factory-Programmed LonTalk Unit Controllers

Trane recommends installing factory-configured controllers first.

- For MP580/581 controllers configured with a DAC or SCC profile, use the following procedure (preferred method). All programmed points in the MP580 will be available using the factory installation method. It is not necessary to create a template for any configuration of the MP580.
- For MP501 controllers with generic-mode configuration and for all MP503 controllers, refer to instructions for installing field-programmable LonTalk unit controllers.

  Note: *Follow the wiring procedures given in the BACnet MS/TP Wiring Best Practices (BAS-SVX051).*

To install factory-programmed LonTalk unit controllers on Tracer® SC, follow these steps in order:

1. Mount the unit controller and connect the power supply.
2. Connect the communication link wiring to the unit controller.
3. Repeat steps 1 and 2 for each unit controller.
4. Connect the communication link wiring to the Tracer SC.
5. Connect and launch the Rover service tool.

   Note: *For information about using Rover, see the latest version of Rover Service Tool Installation, Operation, and Programming (EMTX-SVX01).*
6. Configure the LonTalk network addresses by using Rover V7 in Active mode to discover the communication link.
7. Active mode discovery automatically sets up the network by assigning a unique DSN address to all LonTalk unit controllers and the Tracer SC system controller. Alternatively, other network management tools can be used to assign a unique DSN for each LonTalk controller.

   Note: *The Tracer SC is given a valid DSN during initial power-up; it does not need to be present when configuring the LonTalk network on a Trane domain.*
8. To complete the installation on the Tracer SC, select the **Device Discovery** link on the **Installation** page of the user interface. The **Discover Devices** page opens.

   Note: *The Tracer SC installation procedure will not change the DSN.*

Installing Field-Programmable LonTalk Unit Controllers

Field-programmable LonTalk unit controllers currently refer to MP501 controllers with generic-mode configuration and all MP503 controllers.

- For MP580/581 controllers configured with a DAC or SCC profile, use the procedure for “Installing Factory-Programmed LonTalk Unit Controllers” (preferred method). All programmed points in the MP580 will be available using the factory installation method. It is not necessary to create a template for any configuration of the MP580.
- For more specific details about wiring procedures, refer to the BACnet MS/TP Wiring Best Practices (BAS-SVX051).

To install a field-programmable LonTalk unit controller on the Tracer® SC, follow these steps in order:

1. Mount the unit controller and connect the power supply.
2. Connect the communication link wiring to the unit controller.
3. Repeat steps 1 and 2 for each unit controller.
4. Connect the communication link wiring to the Tracer SC.
5. Connect and launch the Rover service tool. The **Active Group View** lists the devices on the LonTalk link.

   Note: *For information about using Rover, see "Connecting to a Tracer SC Using the LonTalk Interface Adapter" in the latest version of Rover Service Tool Installation, Operation, and Programming (EMTX-SVX01).*
6. Configure the LonTalk network addresses by using Rover V7 in Active mode to discover the communication link. (From the Rover main menu, select **Group** > **Tool Mode** > **Active**.)
7. Active mode discovery automatically sets up the network by assigning a unique DSN address to all LonTalk unit controllers and the Tracer SC system controller. Alternatively, other network management tools can be used to assign a unique DSN for each LonTalk controller.

   Note: *The Tracer SC is given a valid DSN during initial power-up; it does not need to be present when configuring the LonTalk network on a Trane domain.*
8. To complete the installation on the Tracer SC, go to the **Device Discovery** link on the **Installation** page of the user interface. The **Discover Devices** page opens.

   Note: *The Tracer SC installation procedure will not change the DSN.*

Retrofitting a LonTalk Link: Tracer Summit to a Tracer SC System

To move a LonTalk communication link from a Tracer Summit to a Tracer® SC system, follow these steps in the order given:

1. If the site has custom bindings, use the Rover service tool to generate a Bindings Report.

   Note: *For information about using Rover, see the latest version of Rover Service Tool Installation, Operation, and Programming (EMTX-SVX01).*
2. Remove the communication link from the BCU.

   Note: *Connect the communication link to the Tracer SC following the wiring procedures given in the BACnet MS/TP Wiring Best Practices (BAS-SVX051).*
3. Connect and launch the Rover service tool.
4. Connect and launch the Rover service tool. The **Active Group View** lists the devices on the LonTalk link.

   Note: *For information about using Rover, see "Connecting to a Tracer SC Using the LonTalk Interface Adapter" in the latest version of Rover Service Tool Installation, Operation, and Programming (EMTX-SVX01).*
5. Configure the LonTalk network addresses by using Rover V7 in Active mode to discover the communication link. (From the Rover main menu, select **Group** > **Tool Mode** > **Active**.)

   When asked if this is a network installation, select **No**. Two more screens appear to confirm your selection; select **Yes** for both.
6. Use Rover V7 in Active mode to re-create custom bindings.
7. To complete the installation on the Tracer SC:
   - For factory-programmed unit controllers, refer to instructions for installing factory-programmed LonTalk devices.
   - For field-programmable unit controllers, refer to instructions for installing field-programmable LonTalk devices.

   Note: *The installation procedure will not change the DSN.*

Replacing LonTalk Unit Controllers

To replace a LonTalk unit controller on the Tracer® SC, follow these steps in order to ensure that:

- The network configuration is not lost.
- The bindings between devices other than of the one being replaced are not lost.
- Currently installed controllers do not lose communication.

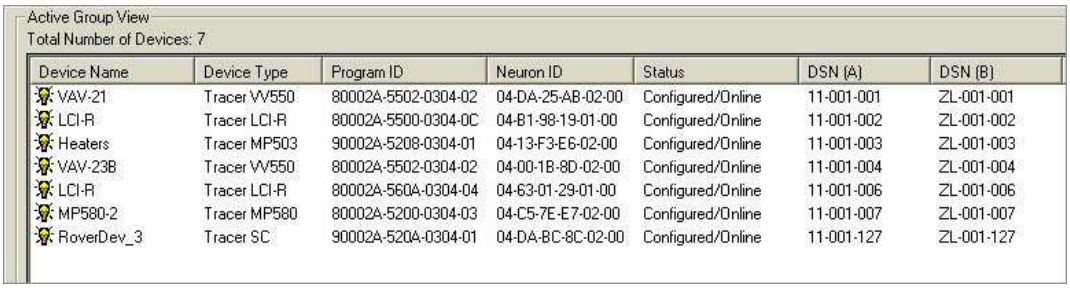
Important: *The selected device must match the functionality and configuration of the device that is being replaced.*

To replace a LonTalk unit controller:

1. Remove the old device from the communication link wiring.
2. Mount the new unit controller and connect the power supply.

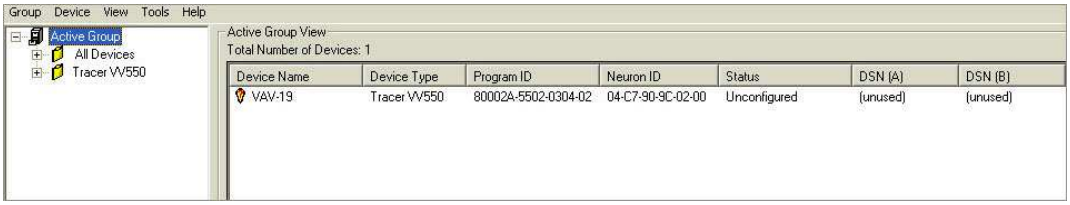
   Important: *Do not connect the new controller to the communication link wiring yet.*
3. Connect and launch the Rover service tool. The **Active Group View** lists the devices on the LonTalk link (see the following figure).

Figure 69. Rover Active Group View: devices on the LonTalk link



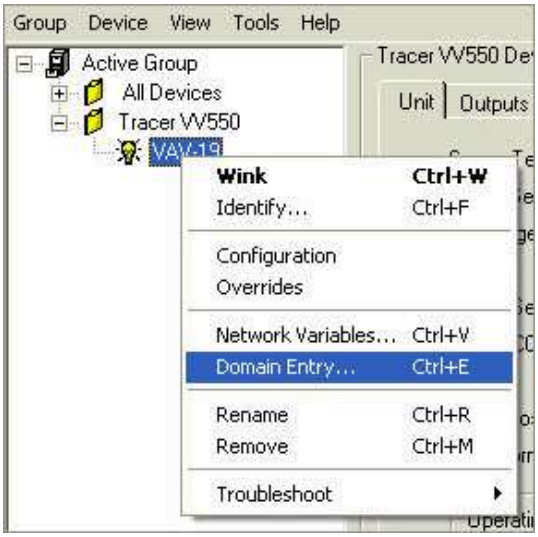
4. Identify a number that is not currently in use by looking in the **DSN(A)** column. Disconnect the Rover service tool from the existing LonTalk link.
5. At the new device, remove the network configuration by holding down the service pin for 15 seconds. The red service LED will flash.
6. Connect the Rover service tool to the new device *only*, and click the **LonTalk Service Tool** button. In the **Active Group View** table, "Unconfigured" will appear in the **Status** column (see).

Figure 70. Rover Active Group View: unit controller status appears as "unconfigured"



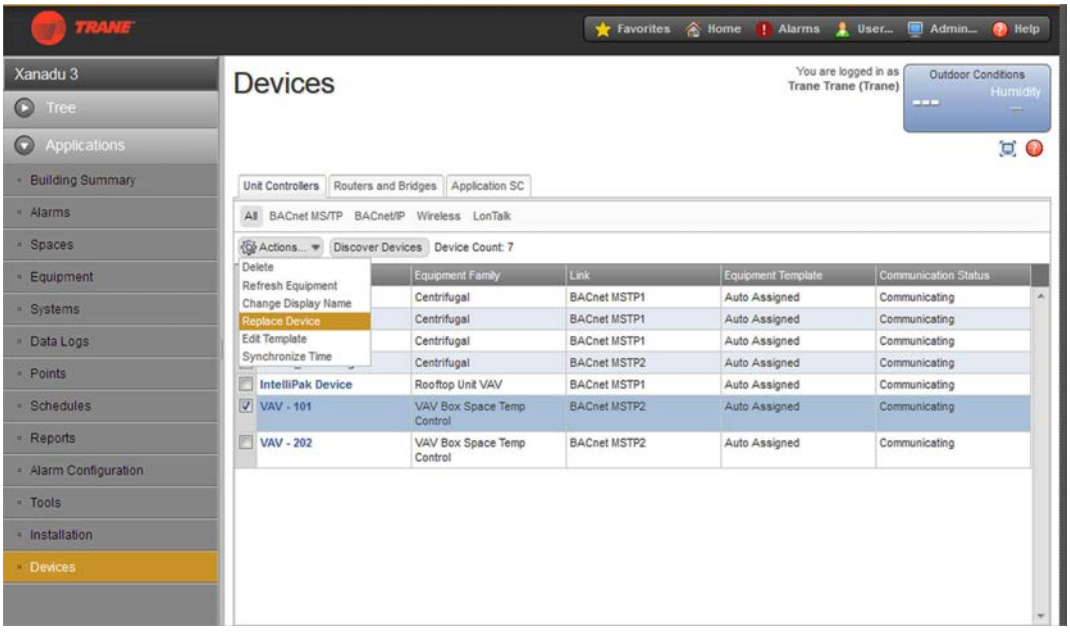
7. From the Rover main menu, select **Group** > **Tool Mode** > **Active** to discover the new device. When asked if this is a network installation, select **No**. Two more screens appear to confirm your selection; select **Yes** for both.
8. After the device has been discovered, it will appear in the navigation tree. Right-click on it and select **Domain Entry**. A warning message will appear.

Figure 71. Rover Active Group navigation tree: new device and domain entry selected



9. Click **OK**. The Domain Entry dialog box appears. The new device must be configured independently with an unused DSN before reconnecting all the devices on the LonTalk link.
10. Enter the unused DSN that you identified in Step 4. Click **Set**.
11. Configure the new device to match the settings of the device that has been replaced.
12. Connect the communication link wiring to the new unit controller.
13. Disconnect the Rover service tool.
14. To complete the installation on the Tracer SC, click **Installation** > **Devices**. The **Devices** page opens.

Figure 72. Replacing a device



15. Select the check box to the left of the device that is to be replaced, then select **Replace Device** from the actions menu as shown in the above figure.
16. Select a communication link and then click **Discover**. The device discovery process is

initiated. When discovery is complete, a list of discovered devices appears.

17. From the list of discovered devices, select the replacement device and click **Replace.**

Adding LonTalk Unit Controllers

To add a LonTalk unit controller to an existing communication link that has been installed on the Tracer SC, follow these steps to ensure that:

- The network configuration is not lost.
- The bindings between installed devices are not lost.
- Currently installed controllers do not lose communication.

To add a LonTalk unit controller:

1. Mount the new unit controller and connect the power supply.

   Important: *Do not connect the new controller to the communication link wiring yet.*
2. Connect and launch the Rover service tool. Configure the unit controller for application specific information, such as point programming and TGP.
3. Navigate to the **Active Group View** screen on the Rover service tool.
4. Follow steps 4 through 11 of "Replacing LonTalk Unit Controllers".
5. Set up the device for application specific features, such as VAV and fan coil, if not previously programmed.
6. Connect the communication link wiring to the new unit controller.
7. Disconnect the Rover service tool.
8. To complete the installation on the Tracer SC, click **Installation** > **Devices**. The **Devices** page opens.
9. Click the **Discover Devices** button, which initiates the device discovery process. To complete device discovery, refer to instructions for Installing Factory-Programmed LonTalk Unit Controllers, or Installing Field-Programmable LonTalk Unit Controllers.

The Modbus Unit Controller Network

Modbus unit controllers are placed into one of two types — RTU or TCP. For more information, refer to the *Tracer SC System Controller Integration Guide*, BAS-SVP028.

Although many of the discovery and installation steps are similar across communication links, there are some notable differences depending on the link type.

- Both RS-485 links of the Tracer SC now support Modbus RTU devices in addition to BACnet MS/TP. The link must be dedicated to either Modbus RTU or BACnet MS/TP.
- BACnet MS/TP must first be disabled for a link in order to enable Modbus RTU.
- Both Ethernet ports of the Tracer SC now support Modbus TCP devices.
- Modbus TCP and BACnet IP devices can coexist on the LAN.

Modbus RTU:

- Link 1 and Link 2 of the Tracer SC are enabled by default for BACnet MS/TP.
- If there are no BACnet controllers already installed on a given link, the Link can be enabled for Modbus RTU. This action automatically disables BACnet MS/TP functionality for the Link.

Modbus TCP:

- Ethernet Network Port 1 and Port 2 on Tracer SC supports Modbus TCP communication.
- Although the links for Modbus RTU can be individually enabled and disabled, Port 1 and Port 2 for Modbus TCP (and BACnet IP) are always enabled.

Wire and Network Characteristics

Modbus TCP

- Uses standard Ethernet wire. Most Modbus TCP devices use the familiar RJ-45 connector for Ethernet communications.

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Modbus RTU

- Wiring tends to be more complicated. Tracer SC+ supports Modbus RTU using 2-wire EIA/TIA-485.
- EIA/TIA-485 can be 2-wire or 4-wire. A 4-wire (full duplex) device can be converted to a 2-wire (half-duplex) device.
  - Refer to the manufacturer's documentation. Typically, jumpering both transmit (+) terminals and jumpering both receive (-) terminals will convert the device to be a 2-wire device.

Important: *Modbus RTU wiring must be assembled in a daisy-chain configuration.*

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Important: *Some Modbus devices use Modbus RTU with EIA/TIA-232 wiring; these are **NOT** supported by Tracer SC+. A third party, addressable EIA/TIA 232 to 485 converter can be used to convert the device to EIA/TIA-485. Companies such as Advantech B+B SmartWorx (formerly B&B Electronics) stock EIA/TIA-232 to EIA/TIA-485 converters.*

Refer to manufacturer documentation for specific wiring requirements, termination resistors, and the maximum number of devices supported per link. If third-party product literature is not available, general low-data rate guidelines are as follows:

- Wire Style - braid or foil shield, twisted pair wire
- Wire Impedance – 120 ohms (recommended)
- Wire Capacitance – 16pF per foot
- Wire gauge – 18–24 AWG
- Maximum wire length – 4000 feet
- Termination resistors – 120 ohm (should match the wire impedance)
- Number of devices per link – 30

Modbus Addressing

Modbus RTU is a Client/Server protocol where only one device is the client on a link. All communication requests are initiated by the client. For this reason, there can only be a single client controller on the Modbus network at a time. Tracer SC+ and most Modbus tools are client devices; therefore, Tracer SC+ must be removed from the Modbus link before using most Modbus tools.

Modbus RTU has a simple addressing scheme that uses only a server address. Each Modbus server device must have a unique address.

- Modbus server addresses range from 0 through 247.
- Modbus client devices do not have an address.
- Address 0 is reserved for sending a broadcast message to all server devices. Tracer SC+ does not use Modbus broadcasts.

Modbus TCP devices have a unit identifier and port number. The unit identifier is often referred to as a server address, similar to Modbus RTU. Modbus TCP is not restricted to a single client. All Modbus TCP devices must have a unique identifier.

Some Modbus TCP devices can represent multiple Modbus devices. In this case, they would use the same IP address with a unique unit identifier. The port number may or may not be unique for each Modbus device.

- Unit identifier or server address range 1 through 247, 255.

  Note: *0 and 255 addresses are reserved for Modbus TCP devices that represent a single Modbus TCP device.*
- IP address of the Modbus TCP device.
- Port number (default is 502).

Refer to the manufacturer literature to properly configure the network parameters of a specific Modbus TCP device.

Replacing Modbus Devices

1. From the **Devices** list page, select a device and then select **Replace Device** from the **Actions** button. The **Replace Device** dialog box appears.
2. Select a communication link to discover the replacement device, and then click **Discover**.

   If the communication link is Modbus TCP enter the IP address, Port number, and address range.
3. When discovery is complete, select a new device from the Replacement Device section, and then click **Replace**.
4. Click **replace device**. The "replace device" loading popup appears, which refreshes the page.

Devices

Devices are the unit controllers, sensors, and communications wiring that provide the physical control of the facility. After the unit controllers have been mounted and wired in the facility, you are now ready to discover and install the devices.

This section contains the following topics:

- Discovering and installing BACnet, LonTalk, Legacy Comm 3/4 devices, and Modbus devices
- Creating and editing an equipment template
- Applying an existing template to a device
- Changing the display name of a device
- Replacing devices
- Deleting a device
- Updating the IP address of the centralized controller

Discovering and Installing SC-App and SC-Base Devices

After configuring the network settings for the Tracer® SC-App and the Tracer SC-Base, you must now discover and install devices that will be communicating through the Tracer SC-Base. The discovery and installation process must be facilitated by using the Tracer SC-App (except for TIS ready sites with a single SC).

- For Single SC and Multiple SC facilities, devices must always be installed into the SC-App. **DO NOT** install devices using the Tracer SC-Base.
- For TIS Ready sites where no SC-App exists, devices must be installed into the SC-Base.

To discover and install devices:

1. Connect to the Tracer SC-App using a USB connection or TCP/IP address.
2. Navigate to **Configure Basic Settings For This Tracer SC** located on the Tracer SC Installation page, then click **Device Discovery.**
3. Select the **Remote Network via BACnet Router** radio button.
4. The Tracer SC-App automatically searches for all Tracer SC-Base controllers in the facility. For each BACnet MS/TP port that is enabled in a Tracer SC-Base, an additional network number will appear in the list.

   Note: *If there are multiple Tracer SC-Apps on the same network and UDP port, they will also be listed. Installation of devices already installed in another Tracer SC-App is not supported.*
5. Select a remote network, then click **Start Discovery.**
6. When discovery is complete, click **Install Devices.**
7. The **Define Equipment for Devices** page will list all the devices discovered on the selected network.
8. Select the devices to be installed and then click **Install Selected Devices**.
9. The Tracer SC-App will now install the devices wired to the Tracer SC-Base.

   Equipment wired to the Tracer SC-Base is now available for use in the applications of the Tracer SC-App.

Discovering BACnet Devices

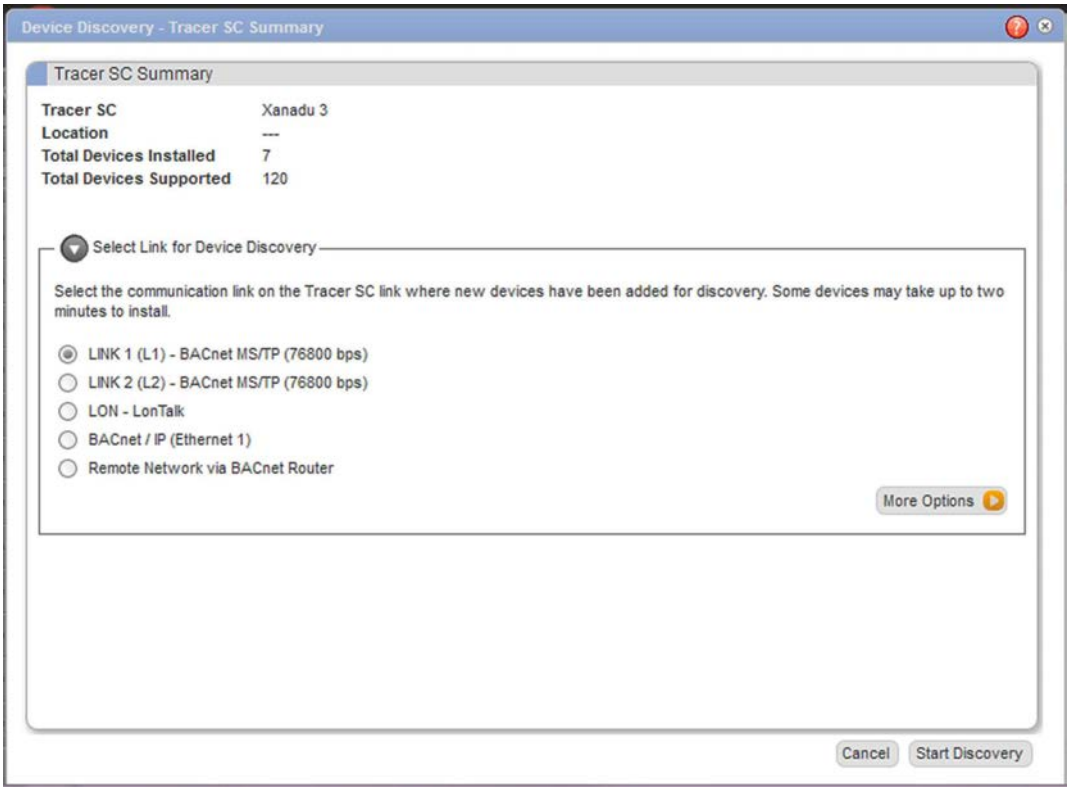
After physically installing the unit controllers (devices) on the Tracer® SC, BACnet devices must be discovered and installed at the Tracer SC user interface.

1. From the left navigation menu, click **Devices**.
2. Click the **Discover Devices** button. The **Device Discovery** page opens.
3. Select BACnet MS/TP link 1 or link 2 and then click **Start Discovery**. After discovery is complete, the Discovery in Progress subheading will change to Discovery Completed, and the

button will change from **Cancel discovery** to **Install Devices.**

4. Click **install devices**. The **Define Equipment for Devices** page opens.
5. Proceed to the following sections to install the devices (depending on whether the device is factory- or field-programmed.

Figure 73. Device Discovery (BACnet)

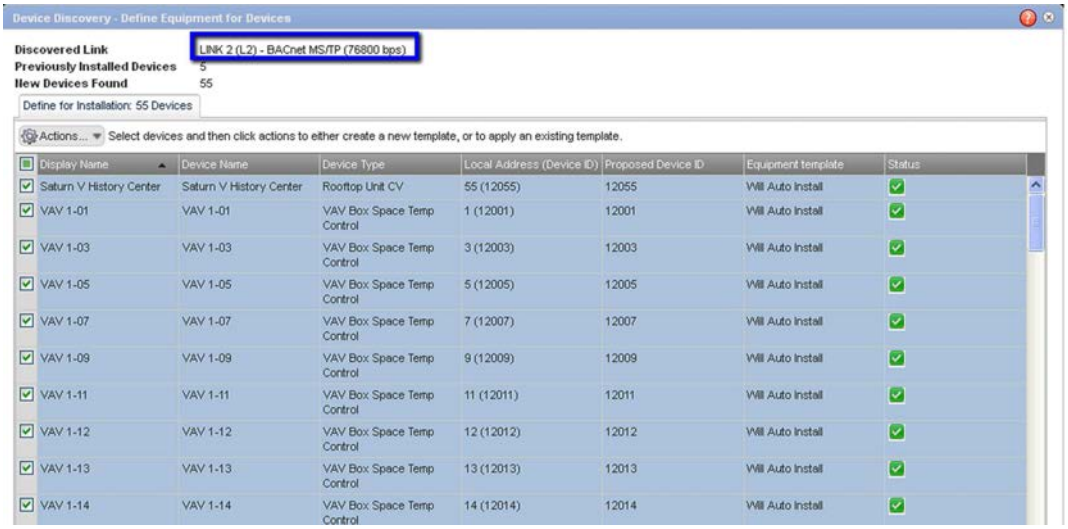


Installing Factory-Programmed BACnet Devices

Factory-programmed controllers can be identified by "Will Auto Install" in the **equipment template** column in the Ready to Install section.

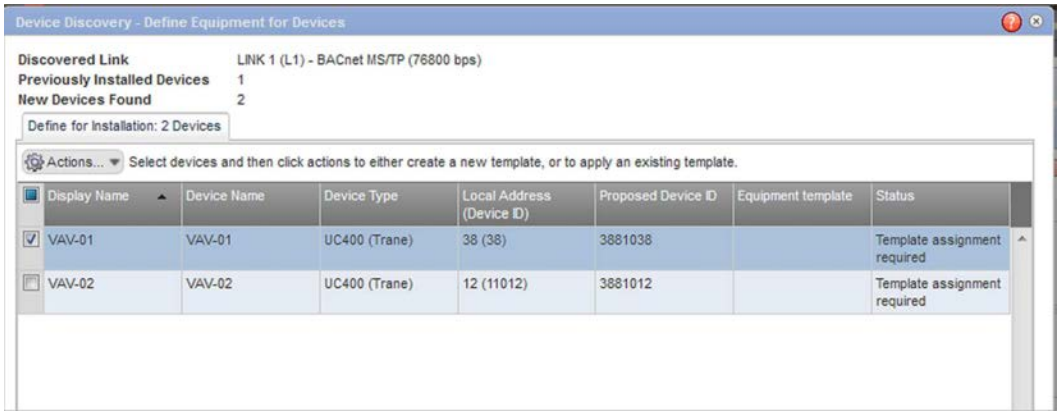
1. Select the devices that you want to install. Then click the **install selected devices** button. A confirmation pop-up window appears.
2. Click the **Install Selected Devices** button. The **Installation Complete** page appears, which include a summary of the installed devices.

Figure 74. BACnet devices: will auto install



Installing Field-Programmable BACnet Devices

1. Review the **Define for Installation** section. Field-programmable controllers can be identified by "Template assignment required" in the **status** column (see the following figure).
2. Select the device that you want to install. Depending on the device, you may be able to apply an existing equipment template, or create a new equipment template.

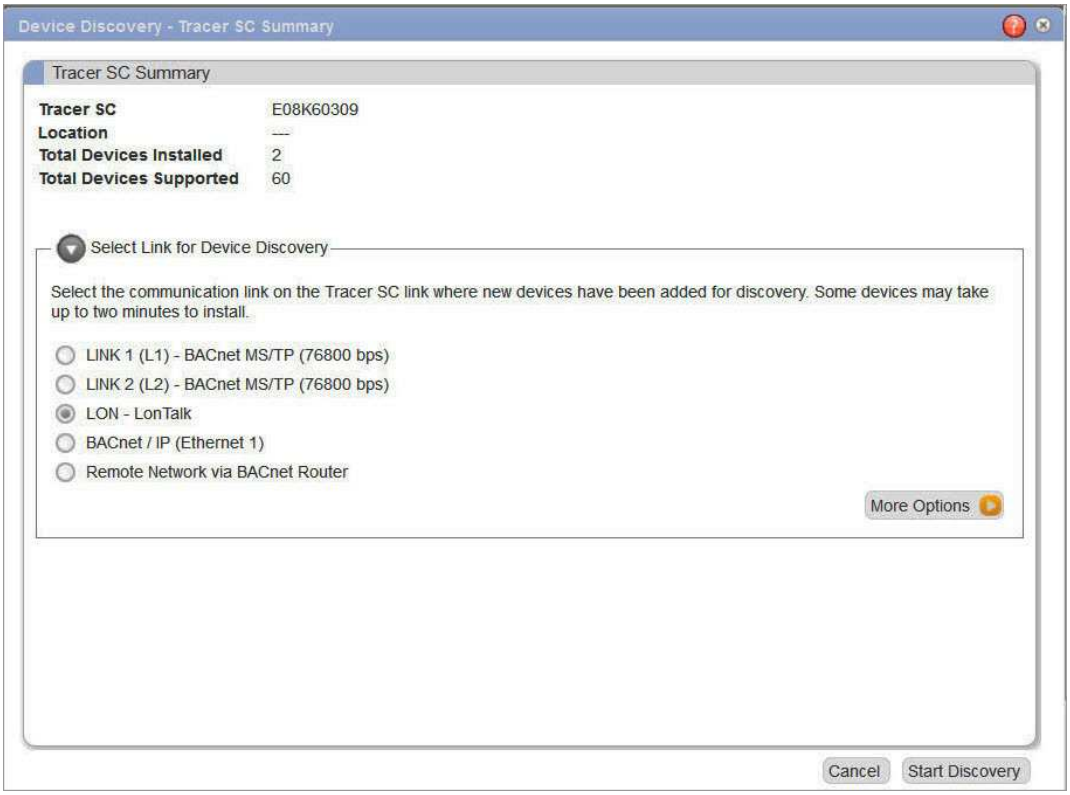


Discovering LonTalk Devices

After physically installing the unit controllers (devices) on the Tracer® SC, LonTalk devices must be discovered and installed at the Tracer SC user interface.

1. From the left navigation menu click **Devices**.
2. Click the **Discover Devices** button. The **Device Discovery** page opens.
3. Select the LonTalk communication link, and click **Start Discovery**. After discovery is complete, the Discovery in Progress subheading will change to Discovery Completed, and the button will change from **cancel discovery** to **install devices.**
4. Click **install devices**. The **Install Devices: Define Equipment for Devices** page opens.
5. Proceed to the following sections to install the devices (depending on whether the device is factory- or field-programmed).

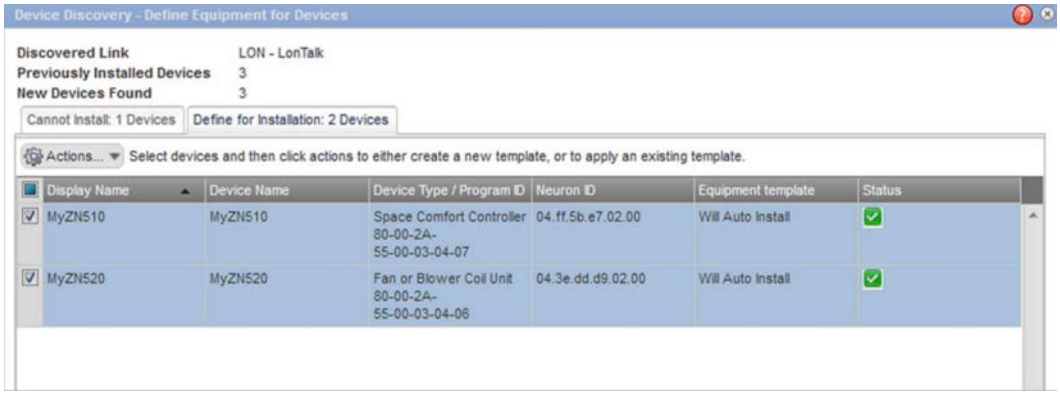
Figure 75. Device Discovery (LonTalk)



Installing Factory-Programmed LonTalk Devices

1. Review the Define for Installation section. Factory-programmed controllers can be identified by "Will Auto Install" in the **equipment template** column as shown in the following figure.

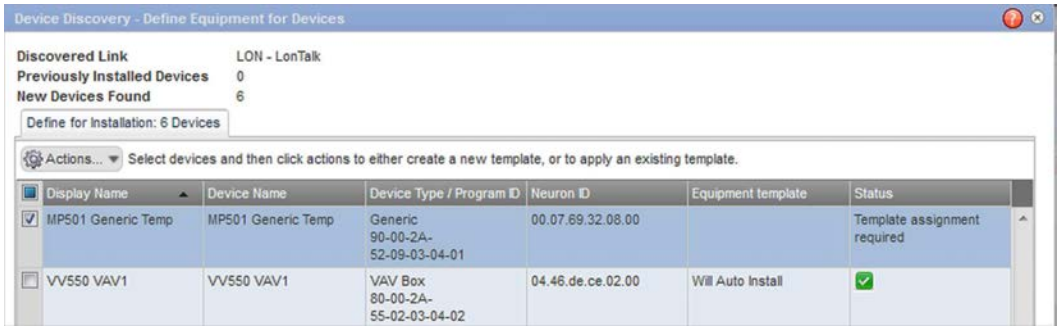
Figure 76. LonTalk devices: will auto install



Installing Field-Programmable LonTalk Devices

1. Review the **Define for Installation** section. Field-programmable devices are identified by "Template assignment required" in the **Status** column.
2. Select the device that you want to install. Depending on the device, you may be able to apply an existing equipment template, or create a new equipment template.

Figure 77. LonTalk devices: template assignment required



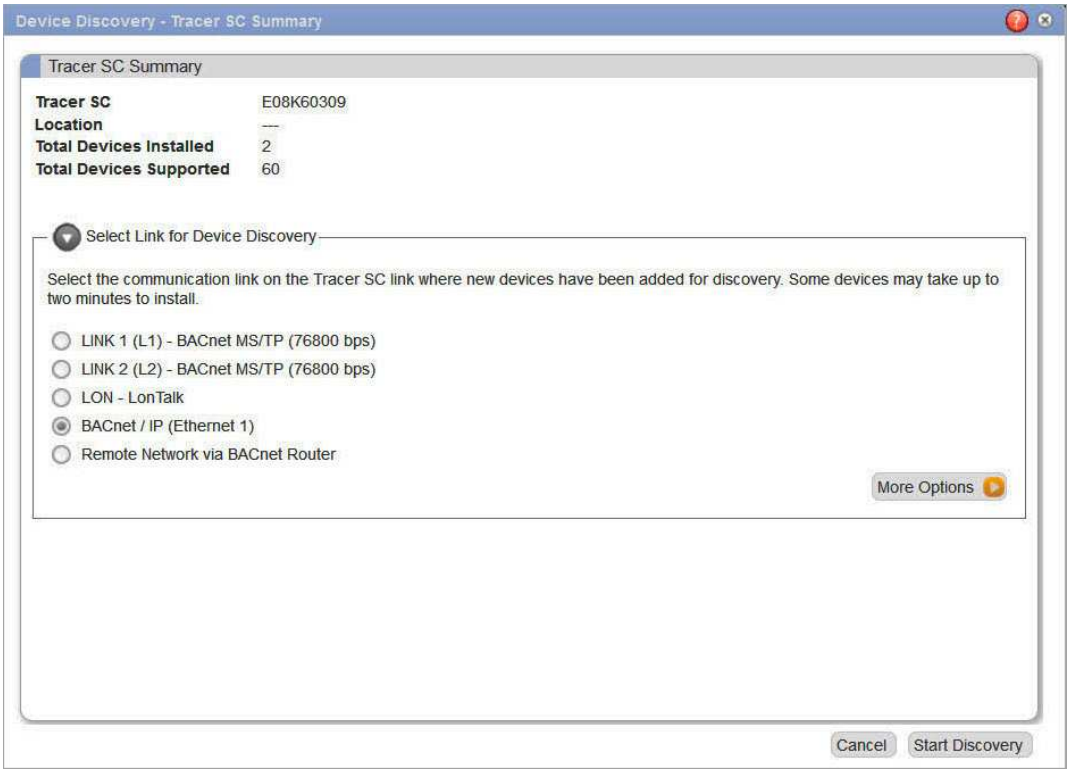
Discovering Legacy Comm3/4 Devices

After physically installing the unit controllers (devices) on the Tracer® SC, Legacy Comm 3/4 devices must be discovered and installed at the Tracer SC user interface

Legacy devices require the use of a Tracer Communication bridge in order to communicate with Tracer SC. For more information, refer to the *Tracer Communications Bridge Comm3/4 to Tracer SC Configuration Guide*, BAS-SVX064.

1. From the left navigation menu click **Devices**, then click **Discover Devices**. The **Device Discovery** page opens.
2. Select the BACnet IP (Ethernet 1) communication link, and then click **Start Discovery** .
3. After discovery is complete, the Discovery in Progress subheading will change to Discovery Completed and the button will change from **Cancel discovery** to **Install Devices**.
4. Click **Install Devices**. The **Define Equipment for Devices** page opens.
5. Proceed to the following sections to install the devices (depending on whether the device is factory- or field-programmed.

Figure 78. Device discovery (Legacy Comm3/4 devices)



Installing Factory-Programmed Legacy Comm3/4 Devices

1. Review the **Define for Installation** section. Factory-programmed controllers can be identified by "Will Auto Install" in the **equipment template** column. shows an example for BACnet devices. The actual screen for Legacy Comm3/4 will closely resemble this.
2. The Comm3/4 devices will appear under the Define for Installation tab. The Comm3/4 bridge will appear under the Cannot Install table, because the bridge is not considered a device that can be installed.
3. Use the check boxes to select the devices, and then click **Install Selected Devices**. The Installation Complete page appears, which provides a summary of the installed devices.

   Note: *Factory-programmed controllers can have additional input/output points (I/O) programmed in the field. See for procedural help.*

Installing Field-Programmable Legacy Comm3/4 Devices

1. Review the **Define for Installation** section. Field-programmable controllers can be identified by "Template assignment required" in the **status** column. shows an example for BACnet controllers. The actual screen for Legacy Comm3/4 will closely resemble this.
2. Select the device that you want to install. Depending on the device, you may be able to apply an existing equipment template, or create a new equipment template.

Discovering Modbus RTU Devices

After physically installing the controllers (devices) on the Tracer SC, Modbus devices must be discovered and installed at the Tracer SC user interface. Before discovering and installing devices, make any necessary configurations to the specific communication link as described below. The settings for each link define the communication protocol in use. Modbus RTU and BACnet MS/TP devices CANNOT co-exist on the same link. For more information, refer to the *Tracer SC Integration Guide* (BAS-SVP028).

To enable Modbus RTU on either Link 1 and/or Link 2:

1. Navigate to **Installation>Identification and Communications**.
2. Select the **Modbus Configuration** tab, and then click **Edit**.
3. For Link 1 and/or Link 2, edit the **Modbus** field to **Enabled**.
4. Select the baud rate for the Modbus link(s).
5. Click **Save**.

   Note: *When Modbus is enabled for a link, BACnet for that link is automatically disabled.*

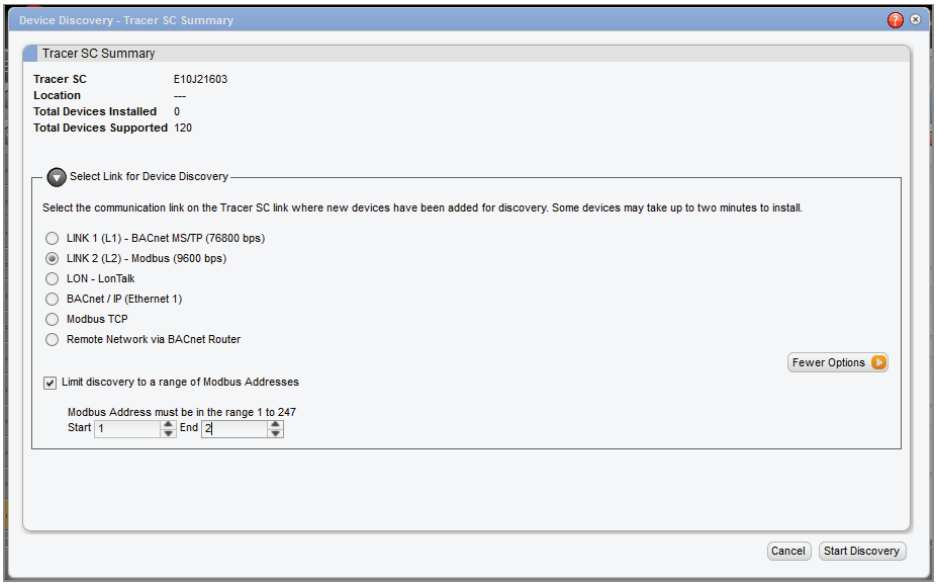
With the Modbus link(s) properly configured, discovery can be initiated:

6. From the left navigation menu, click **Devices**.
7. From the **Devices** page, click **Device Discovery.** The **Device Discovery** page opens.
8. Select the communication link (Link 2 in this example).
9. Optionally, select the **Limit Discovery to a Range of Modbus Addresses** check box to limit the address range for discovery, then edit the Start and End addresses for the limited range.

   Note: *Limiting the address range of discovery will reduce the overall time of device discovery.*

10. Click **Start Discovery**.

Figure 79. Device discovery dialog box (RTU)



Discovering Modbus TCP Devices

After physically installing the controllers (devices) on the Tracer SC, Modbus devices must be discovered and installed at the Tracer SC user interface.

Unlike Modbus RTU, Modbus TCP is always enabled and does not require link configuration. Additionally, Modbus TCP devices can co-exist in the IP network with other TCP/IP devices, including BACnet IP devices. For more information, refer to the *Tracer SC Integration Guide, BAS-SVP028.*

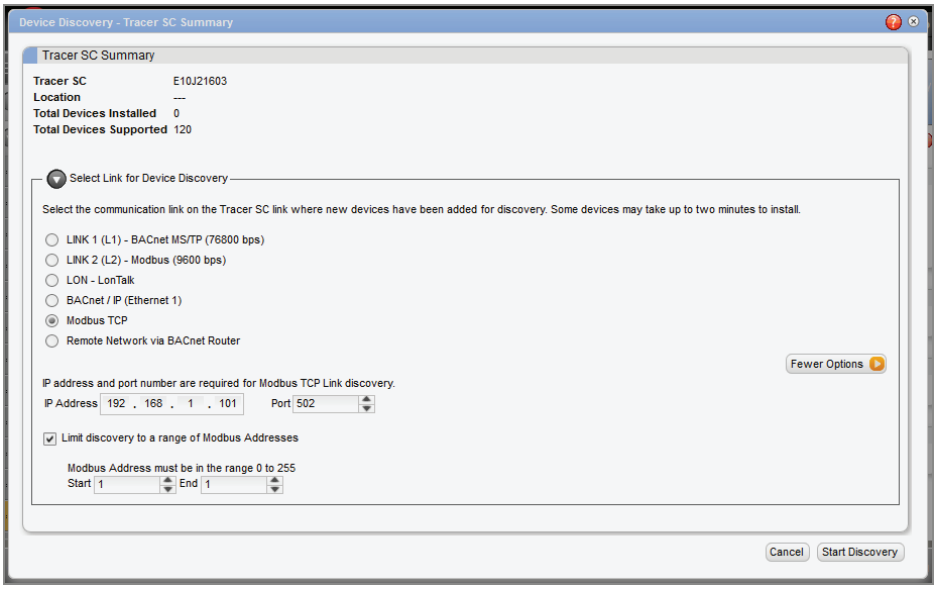
Initiate discovery for a single Modbus TCP device:

1. From the left navigation menu, click **Devices**.
2. From the **Devices** page, click **Device Discovery.** The **Device Discovery** page opens.
3. Select the **Modbus TCP** communication link.
4. 4. Enter the IP Address of the connected device, including the Port (default port is 502).
5. Optionally, select the **Limit Discovery to a Range of Modbus Addresses** check box to limit the address range for discovery, then edit the Start and End addresses for the limited range.

Note: *Limiting the address range of discovery will reduce the overall time of device discovery.*

6. Click **Start Discovery**.
7. Repeat discovery for each Modbus TCP device, changing the IP Address for each device prior to discovery.

Figure 80. Device discovery dialog box (TCP)

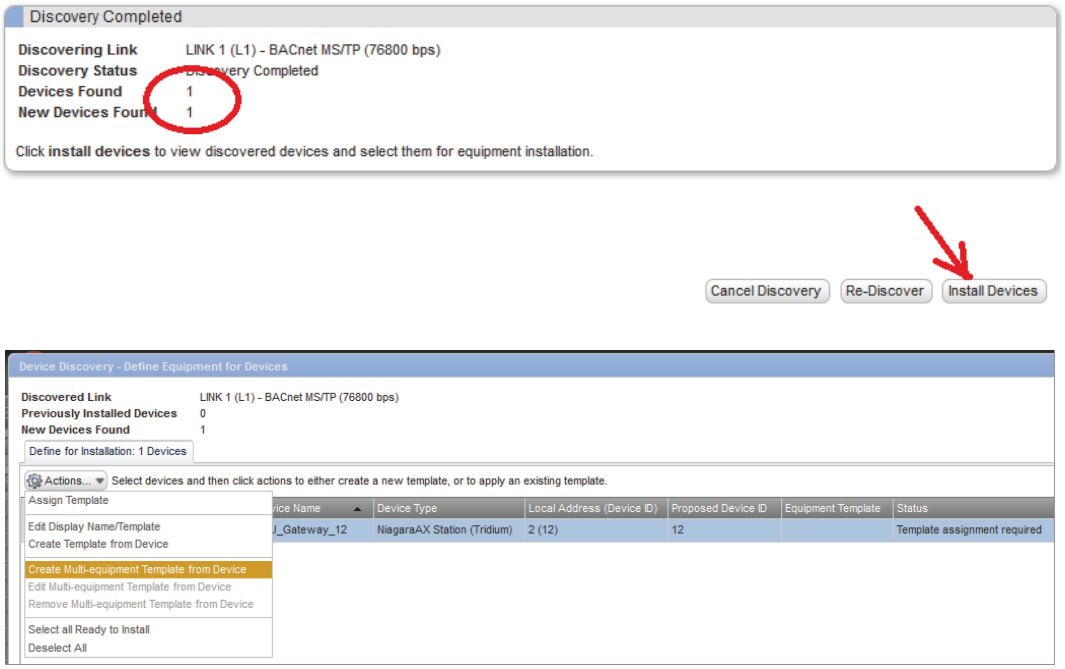


Creating a Virtual Equipment Template

In the following example, four identical constant volume rooftops that will be installed as virtual equipment devices.

1. Following device discovery in Tracer SC, click **Install Devices**. The **Define Equipment for Devices** page opens.
2. Select the gateway device from the list and then select **Create Multi-equipment Template from Device** from the **Actions** button. The **Define Multi-equipment Device Template** page opens.

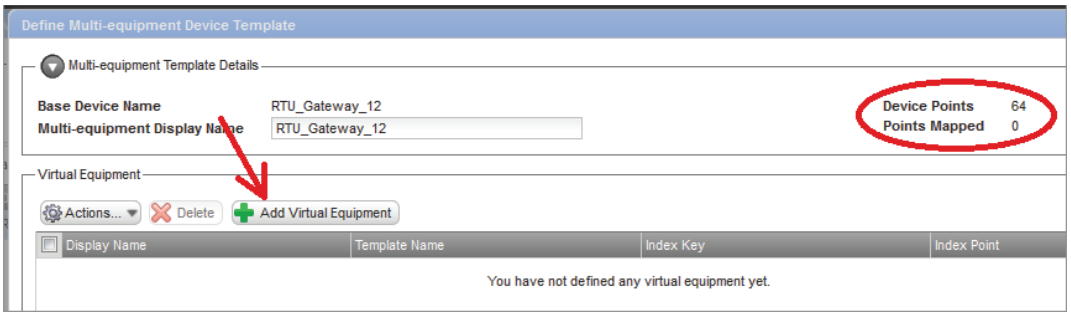
Figure 81. Creating a virtual equipment template (Steps 1 and 2)



3. Click **Add Virtual Equipment**. The **Virtual Equipment Information** dialog opens.

   Note: *The total number of discovered device points is displayed in the upper right portion of the page.*

Figure 82. Add virtual equipment

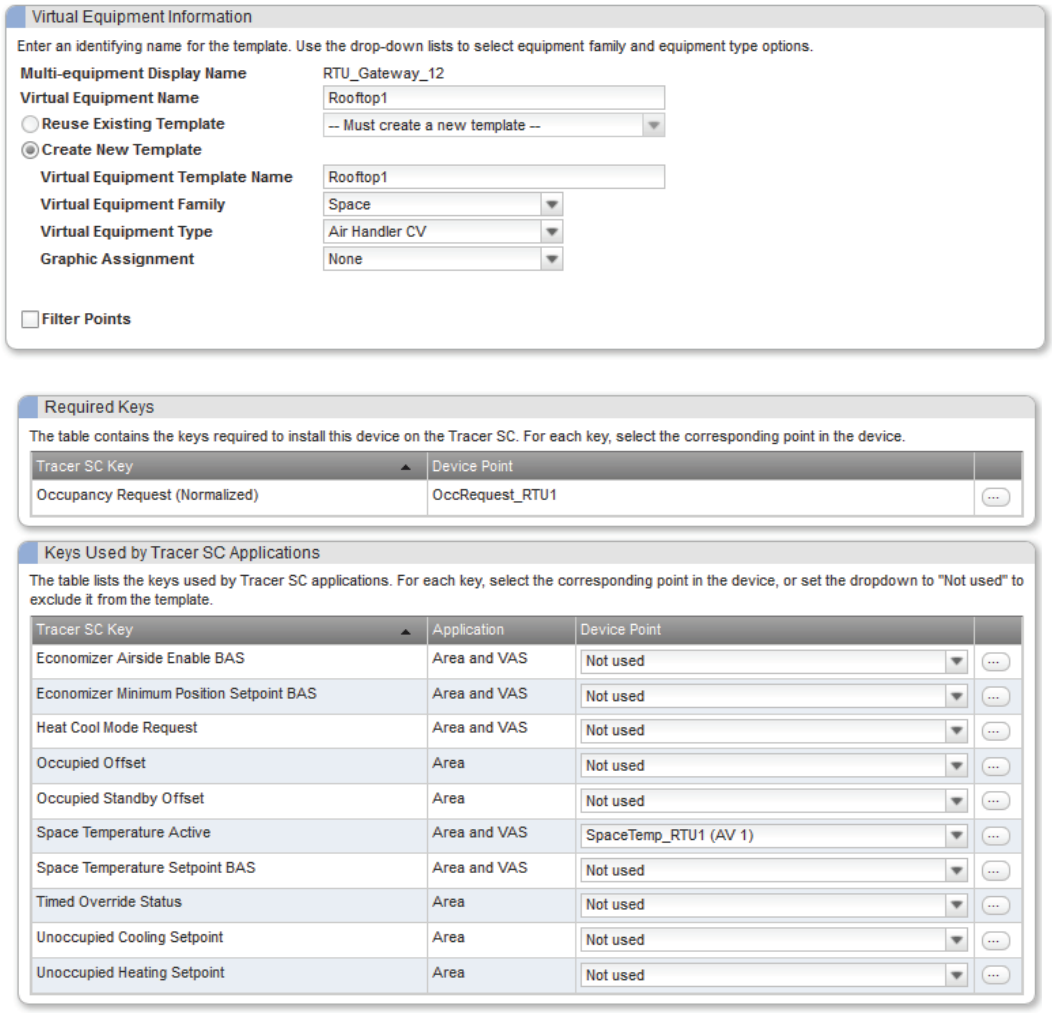


The equipment template for the first rooftop unit must be defined. Because the template has not yet been defined, a new template must be created.

4. Click **Create New Template.** Assign an appropriate name (Rooftop 1), and select drop-down options based on the installed equipment type. Click **Next**.
5. Continue to define the virtual equipment template by mapping the required and suggested standard keys.

   Note: *It may be necessary to use key conversion as part of this process if the standard key and device point are not inherently compatible. Key conversion is a feature new to Tracer SC V4.3.*

Figure 83. Create new template for virtual equipment



6. After all of the device points have been mapped to keys in the template, click **Add Virtual Equipment**. This completes the definition of the virtual equipment template. It can be reused on the remaining three rooftop units.

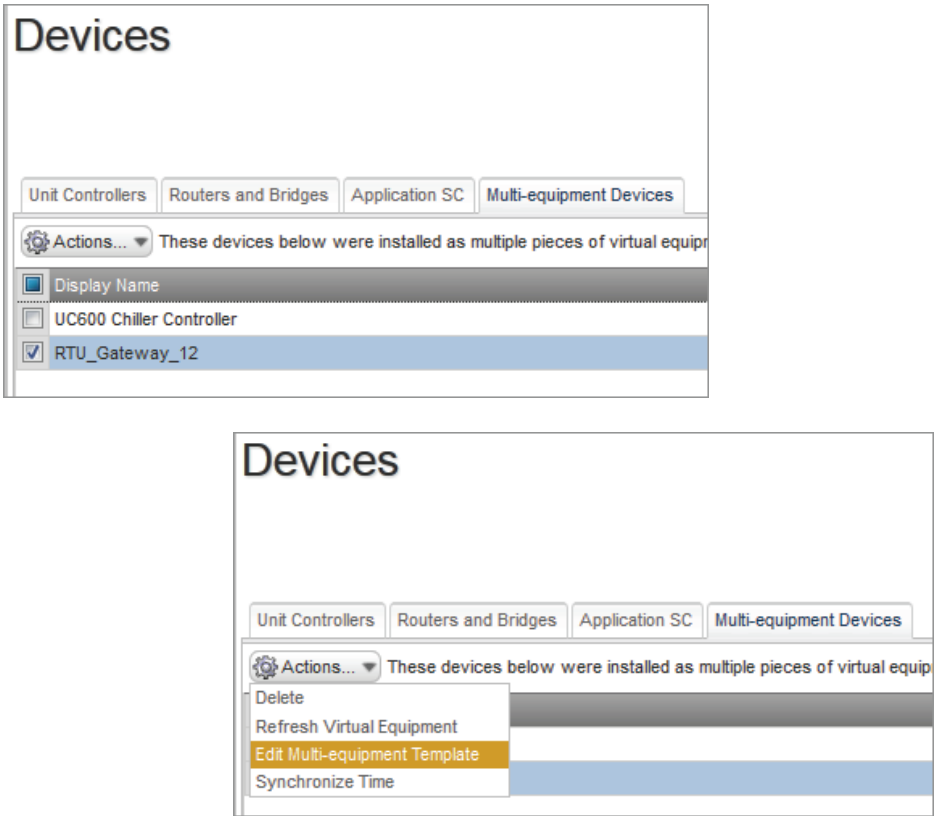
Important: *After the virtual equipment template has been defined it cannot be edited. If any edits are necessary, a new template must be created and associated with the device.*

Editing Multi-equipment Device Templates

Unlike virtual equipment templates, the multi-equipment templates can be edited. Multi-equipment templates contain one or more virtual equipment templates as part of their definition. To add or remove one or more virtual devices to the template, edit the multi-equipment device template as follows.

1. On the **Devices** page, click the **Multi-equipment Devices** tab.
2. Select the appropriate device and then select **Edit Multi-equipment Template** from the **Actions** button.

Figure 84. Editing multi-equipment device templates (steps 1 and 2)

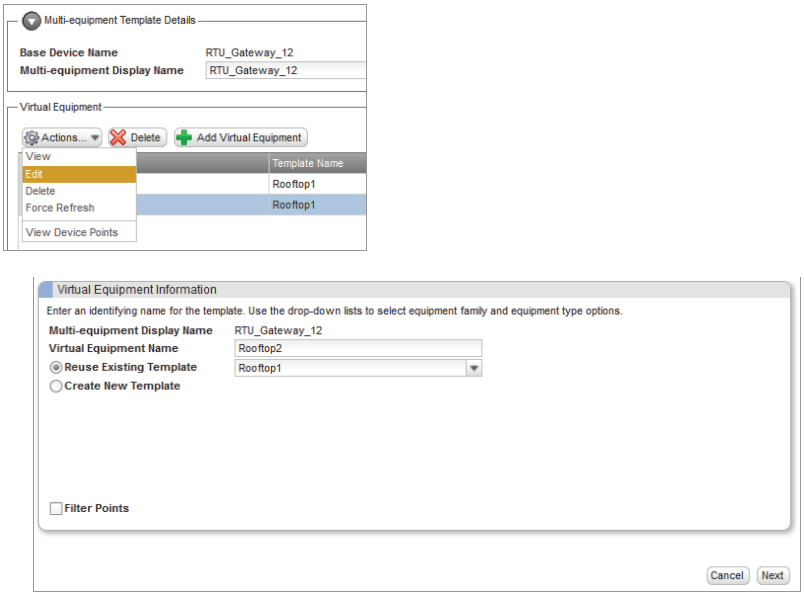


To redefine the multi-equipment template, either edit the existing virtual equipment list or add (new) virtual equipment.

Editing Existing Virtual Equipment

1. On the **Devices** page, select the appropriate device and then click **Edit Multi-equipment Template** from the **Actions** button.
2. Click the **Add Virtual Equipment** button to add additional virtual devices to the multi-equipment template.
3. Define the additional virtual equipment, then select **Update Multi-equipment Template**.

Figure 85. Edit existing virtual equipment



Adding New Virtual Equipment to an Existing Multi-equipment Template

1. On the **Devices** page, select the appropriate device and then click **Edit Multi-equipment Template** from the **Actions** button.
2. Click the **Add Virtual Equipment** button to add additional virtual devices to the multi-equipment template.
3. Define the additional virtual equipment, then select **Update Multi-equipment Template**.

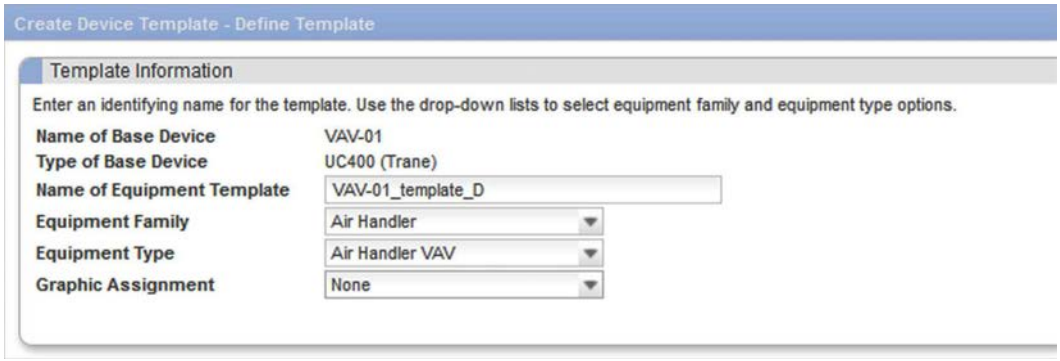
Creating an Equipment Template

1. From the Define Equipment for Devices page, select a device and then select **Create Template from Device** from the Actions button. The **Create Device Template - Define Template** dialog box appears.
2. In the **Template Information** section, complete all the fields:
   a. Enter a name for the template that does not include spaces. Trane recommends using the equipment type followed by “template” and a letter; for example, “CV_template_A.”
   b. Select the equipment family and type, which will determine where the equipment appears in the Tracer® SC user interface.

      Or, choose **Select Existing Template** if most information you need for a template is very similar to an existing one, or if you are installing a Tracer UC800.

      Note: *For items that exist in the template, but not in the device, the key mapping is omitted and will not display.*

Figure 86. Define equipment template (information section)

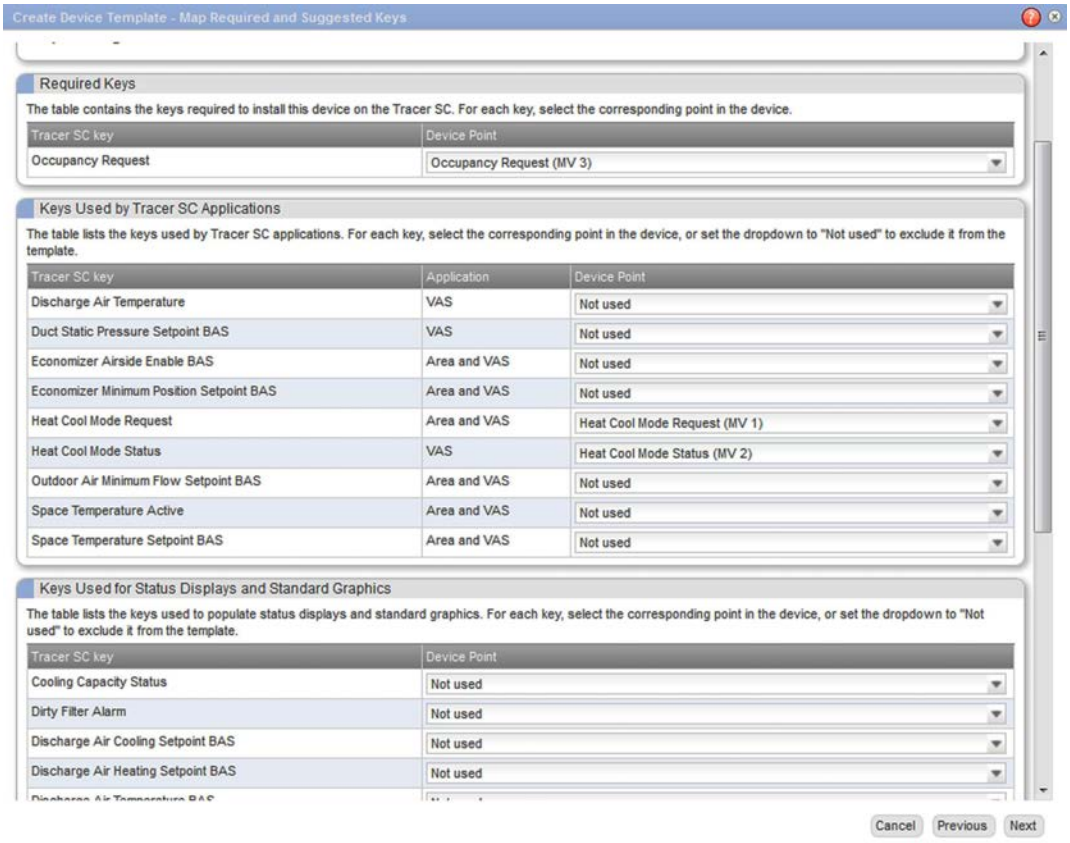


3. Click **Next**. The **Map Required and Suggested Keys** dialog box appears as shown in the following figure.
4. In the Required Keys section, select a device point for Occupancy Request (AHUs and spaces) from the drop-down list. For chillers, select a point for Chiller Auto Stop Command.
5. In the Keys Used By Tracer SC Applications section, select device points for the associated keys to be used in Tracer SC applications such as Area and VAS. Or, select Not used to exclude from the template.

   Note: *By default, the system will attempt to auto-map a suggested status key to a device point. If there is no match, then the "Not used" option appears by default.*
6. In the Keys Used for Status Displays and Standard Graphics section, select device points for common keys that will populate equipment status displays or on standard graphic pages.
7. Click **Next**. The **Map the Remaining Points in the Device** dialog box appears.
8. Confirm that the points in the list that are selected to be mapped should be. Deselect points that should be excluded from the template. To edit key mapping or create user keys, click the more options button , which opens the More Options dialog box.

   Note: *Generic templates: By default, every point in the list will be selected. Deselect any points that should be excluded from the template.*
9. Click Next. The Template Summary popup appears. Click **Create Template.** You will be returned to the Define Equipment for Devices page.
10. Click the **Install Selected Devices** button. The **Install Devices** page shows the installation progress. When installation is complete, the new devices will appear on the **Devices** page and the **Equipment** or **Spaces** list pages, depending on the type of equipment.

Figure 87. Mapping required and suggested keys



Editing an Equipment Template

To edit an equipment template:

1. From the left navigation menu, click **installation > devices**. The **Devices** list page opens.
2. Select the preferred device from the list and then select **edit template** from the **actions** menu. The **Edit Equipment Template** page opens.
3. Provide a new name for the template and make your preferred changes in the **Map Equipment Keys to Device Properties** section. The equipment family or type cannot be changed.
4. Click **save**. Tracer® SC loads the new data into each device that was previously assigned to the equipment template. The status for each device is shown in the **Edit Equipment Template Status** Panel. This make take several minutes.

   Important: *Closing this page will cause all edits to be lost.*

Editing an Equipment Template When adding Additional Points

You can add additional input and output points to factory-programmed BACnet controllers in the field after they have been discovered.

To add additional points:

1. From the left navigation menu, click **Devices**. The **Devices** list page opens.
2. Select the preferred device from the list and then select **edit template** from the **actions** menu. The **Edit Device Template** dialog box opens.
3. Make your preferred changes. The equipment family or type cannot be changed.
4. In the **Map Equipment Keys to Device Properties** section, select the equipment keys to

map to the device properties (points). If necessary, you can create additional equipment keys for points that cannot be mapped to a key.

5. Click **Next**. Select a different device points for the following (if preferred): Occupancy Request and Keys Used by Tracer® SC Applications section.
6. Click **Next**.
7. Map any remaining points in the device, or create new keys if necessary.
8. Click **Next**. The Template Summary dialog opens.

   Note: *In Tracer SC versions earlier than V3.0, the edit template function is not supported for auto-installed controllers.*

Deleting an Equipment Template

Note: *Templates that are currently in use cannot be deleted.*

To delete an equipment template:

1. From the left navigation menu click **Tools > Equipment templates.** The **Equipment Templates** list page opens.
2. Select the template that you want to delete and then click **Delete** from the **Actions** menu.

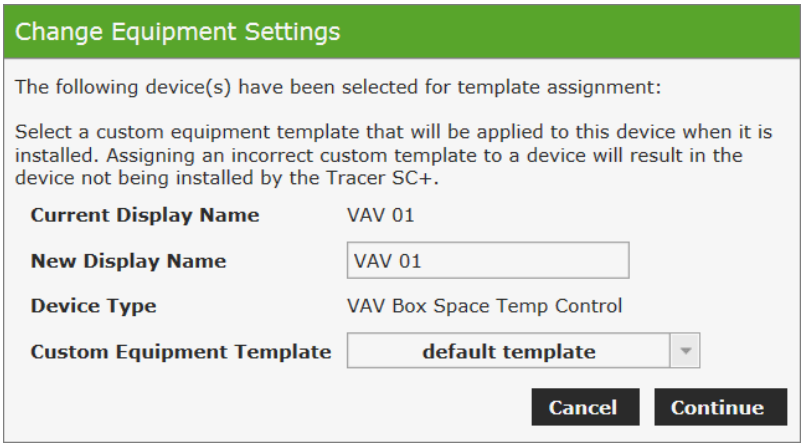
Applying an Existing Template to a Device

To apply an existing template to a device/multiple devices:

1. On the Define for Installation page for any type of device, select a device and then select one of the following from the **Actions** button:
   - **Edit Display Name/Template** – if you are applying a template to a single device.
   - **Assign Template** – If you are applying a template to multiple devices, select the option.

   Figure 88, p. 131 shows the dialog box for a single device; the assign template for multiple devices is very similar.
2. Select the appropriate template from the Custom EquipmentTemplate list, and then click **Continue**.
3. Repeat the above steps for each device that needs an existing template assigned to it.
4. When you are ready to install, click **install selected devices.**

Figure 88. Assign an existing template



Exporting and Importing Equipment Templates

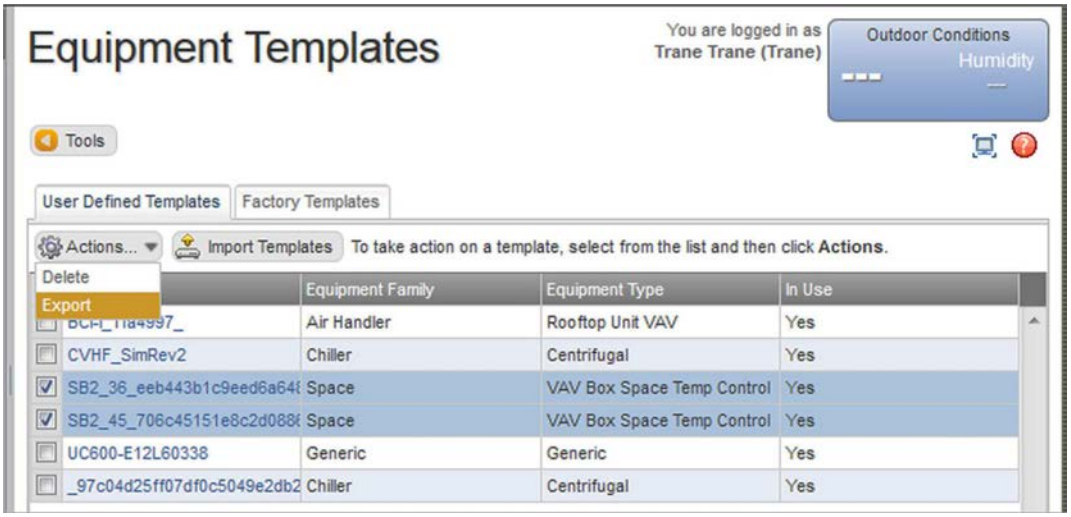
You can copy equipment templates and equipment keys from one Tracer® SC to another Tracer SC by using the export and import functions. Copying equipment templates is useful when

working on multiple job sites. For example, if the unit controls are identical, or even similar to those in building A, then the equipment templates and keys can be imported to the Tracer SC in building B.

To export equipment templates:

1. From the left navigation menu click **Tools > Equipment Templates.** The **Equipment Templates** page opens.
2. Select one or more equipment templates from the list and then select **export** from the **Actions** button as shown in the following figure. The **File Download** dialog box appears.
3. Click **Save File** to copy to your local PC hard drive or another external storage device.

Figure 89. Exporting an equipment template



To import equipment templates:

4. From the left navigation menu click **Tools > Equipment Templates.** The **Equipment Templates** page opens.
5. Click the **Import Templates** button. The **Import Equipment Templates and Keys** page opens.
6. In the **Template Filename** field, browse for the template file to be imported.
7. Click **Import**. Tracer SC begins the file loading process and then the **Import Equipment Templates and Keys** page opens.
8. Use the check boxes to select the equipment templates and keys to be saved in the Tracer SC.
9. Click **Finish**.

Note: *All equipment templates and keys must have unique names. If duplicate names are discovered, the rename template or rename key dialog box appears. Enter a new name in the field, then click rename. Keys — display names cannot exceed 64 characters. Equipment templates — display names cannot exceed 64 characters or contain spaces.*

Replacing a Device

Before replacing a device, ensure that the new device has been properly configured. Devices are typically replaced when an installed device has failed. For device replacement instructions, see "Replacing BACnet Unit Controllers," p. 109, "Replacing LonTalk Unit Controllers," p. 111, and "Replacing Modbus Devices," p. 116.

Notes: *The selected device must match the functionality and configuration of the device it is replacing.*

- *Air Flow Override*
- *Auto Commissioning Command*
- *Auxiliary Heat Control Request*
- *Base Loading Auto/On Request BAS*
- *Base Loading Setpoint*
- *Chilled Water Setpoint*
- *Chiller Auto Stop Command BAS*
- *Chiller Mode Command BAS*
- *Current Limit Setpoint*
- *Demand Limit Request BAS*
- *Demand Limit Setpoint*
- *Discharge Air Cooling Setpoint BAS*
- *Discharge Air Heating Setpoint BAS*
- *Discharge Air Reheat Setpoint BAS*
- *Discharge Air Temperature Setpoint Active*
- *Discharge Air Temperature Setpoint BAS*
- *Duct Static Pressure Setpoint BAS*
- *Economizer Airside Enable BAS*
- *Economizer Minimum Position Enable Command*
- *Economizer Minimum Position Setpoint BAS*
- *Economizer Minimum Position Setpoint BAS*
- *Electric Heat Timer Reset*
- *Emergency Override BAS*
- *Exhaust Fan Minimum Speed BAS*
- *Filter Timer Reset*
- *Heat Cool Mode Request*
- *Hot Water Setpoint*
- *Keypad Lockout*
- *Morning Warmup Setpoint BAS*
- *Noise Reduction Request BAS*
- *Occupancy Request*
- *Occupied Offset*
- *Occupied Standby Offset*
- *Outdoor Air Minimum Flow Setpoint BAS*
- *Outdoor Air Minimum Flow Setpoint BAS*
- *Reset Diagnostic*
- *Return Fan Minimum Speed BAS*
- *Reversing Valve*
- *Source Temperature BAS*
- *Space Static Pressure Setpoint BAS*
- *Space Static Pressure Setpoint BAS*
- *Space Temperature Setpoint BAS*

- *Supply Fan Minimum Speed BAS*
- *System Control Command*
- *Unoccupied Cooling Setpoint*
- *Unoccupied Heating Setpoint*
- *Ventilation Ratio Limit BAS*
- *Water Valve Override*

Refreshing Equipment (Devices)

This action updates configuration changes made to the equipment without the need to rediscover and reinstall the equipment. This action can be used on multiple pieces of equipment simultaneously.

Following are examples when refreshing equipment might be used:

- A user has edited an equipment key assigned to a device and wants to update the device with new data.
- A user has imported a new template from another device and wants to update the equipment to the new template definitions.
- A technician has upgraded the firmware in a device that adds new properties or communication performance enhancements between the device and Tracer® SC.

To refresh equipment:

1. From the **Devices** list page, select a device and then select **refresh equipment** from the actions button.
2. The **refreshing device** loading pop-up appears, which refreshes the page.
3. When the **Device Refresh Status** dialog box appears, click **OK**.

Changing the Display Name of an Installed Device (Equipment)

To change the name of an installed device (equipment):

1. Select **Devices** from the Tracer® SC left navigation menu. The **Devices** page opens.
2. Select the check box to the left of the device that is to have its display name changed. From actions menu, select **change display name**. A popup window appears. Enter the new display name.
3. Click **Save.** The new display name will appear in the **display name** column.

Deleting a Device

To delete a device:

1. Select **Devices** from the Tracer® SC left navigation menu. The **Devices** page opens.
2. Select the check box to the left of the device (or devices) that is to be deleted. From the actions, menu, select **delete**. A confirmation window appears.
3. Click **Yes – Delete**. The devices will be removed from the list of devices.

   Note: *Before deleting a device, remove the device from TGP programs and applications such as Area, VAS, and Scheduling. The Tracer SC does not automatically remove a device from application memberships. Any graphics that reference information on the device that is to be deleted will need to be corrected.*

LEDs and the 7–Segment Display

This section describes how to interpret the activity of the Tracer® SC LEDs and the 7–segment display.

Powering Up/Powering Down the Tracer SC

To power up the Tracer SC, press the power button.

All LEDs illuminate and the following sequence flashes on the 7-segment display: 8, 7, 9*, 5, 4, L, dancing dash pattern. The dancing dashes persist while the Tracer SC is operating normally.

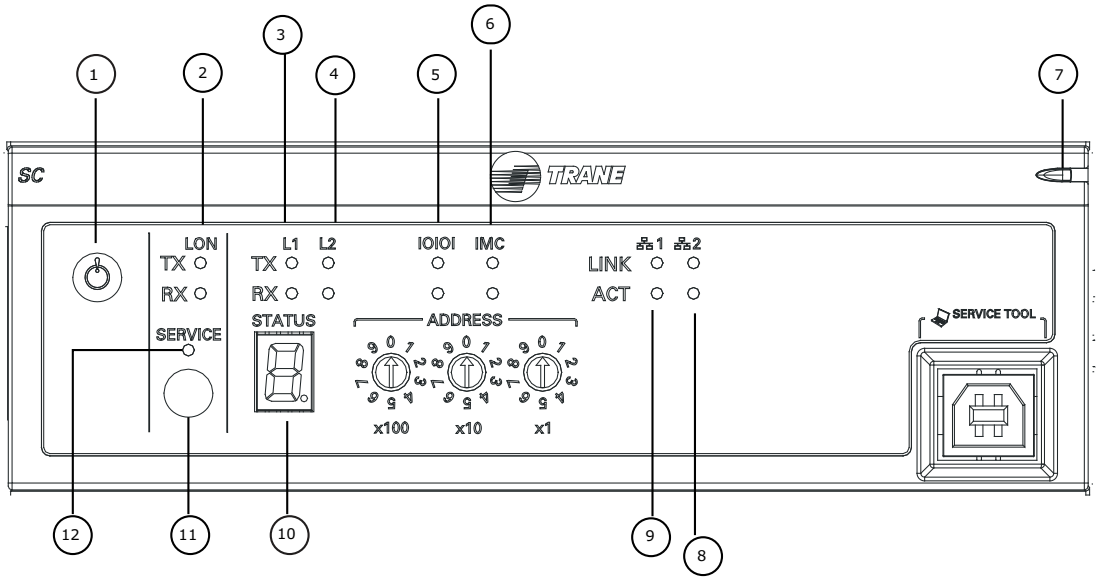
Note: *7-segment 6 was changed to 9 to indicate the new boot file had been successfully applied.*

To power down the Tracer SC, press the power button. The 7-segment display performs a shut-down sequence (3, -, 2, -, 1, -) before the Tracer SC powers down.

The LEDs and the 7–Segment Display

The LEDs and the 7-segment display on the Tracer SC indicate the operation and communication status of the Tracer building automation system. The following figure and the corresponding table show their locations on the front of the controller.

Figure 90. Location of the LEDs and the 7–segment display on Tracer SC



Callout Number in Figure	Description
1	Power button
2	LonTalk communication LEDs
3	BACnet MS/TP link 1 communication LEDs
4	BACnet MS/TP link 2 communication LEDs
5	EIA-232 LEDs
6	IMC LEDs
7	Status LED
8	Ethernet 2 LEDs
9	Ethernet 1 LEDs

Callout Number in Figure	Description
10	7-segment display
11	LonTalk service pin
12	LonTalk service LED

Interpreting the LEDs

The following table identifies the LEDs and interprets their activity.

Table 9. LED identification and interpretation

LED type	LED activity	Indicates...
Status	On steady (green)	Power reception
	Flashing (red), and an "F" appears on the 7-segment display followed by a code	Fatal error. Service required.
	Flashing (red), and an "H" appears on the 7-segment display followed by a code	Hardware failure. SC will probably need to be replaced.
Link 1 communication	L1 TX flickers (green)	Data transmission
	L1 RX flickers (yellow)	Data reception
Link 2 communication	L2 TX flickers (green)	Data transmission
	L2 RX flickers (yellow)	Data reception
LonTalk communication	Lon TX flickers (green)	Data transmission
	Lon RX flickers (yellow)	Data reception
LonTalk service	On steady (red)	LonTalk service pin has been pressed: • Short press–broadcast neuron ID and program ID identifies itself so Rover can assign it a DSN. • Long press (more than 15 sec.)–Forces the SC LON node to an unconfigured state and disables LonTalk until reconfigured with Rover.
|O|O| [EIA-232 serial connection]	IOIOI TX (green)	Data transmission
	IOIOIO RX (yellow)	Data reception
IMC	IMC TX (green)	Data transmission
	IMC RX (yellow)	Data reception
Ethernet 1, Ethernet 2	LINK on steady (green)	Valid Ethernet connection
	ACT flickers (yellow)	Data transmission and reception

Interpreting the 7–Segment Display

The 7–segment display shows the operating status of the Tracer SC as described in the following table.

Table 10. 7-segment display: Codes and interpretation

Red/Green LED	7-segment display	Indicates...
Green	8	Processor in reset, or no functioning software. A persistent "8" means that service is required.
Green	7	Starting level 1 boot loader
Green	9	Starting level 2 boot loader

Table 10. 7-segment display: Codes and interpretation (continued)

Red/Green LED	7-segment display	Indicates...
Green	5	Entering operating system. A persistent "5" means the operating system is malfunctioning.
Green	4 (this number remains for a few seconds)	Booting operating system.
Green	–L	Loading and initializing main program.
Green	"Dancing dash" dashes flash one at a time: top, middle, bottom	Normal operation
Green	3, -, 2, -, 1, - (sequence repeats)	Power button was pressed and Tracer SC is shutting down. May take 10 or more seconds.
Green	3, 2, 1 (sequence repeats)	Main program shutting down due to reboot command. In most cases, the main program will be restarted.
Flashing Red	7 F	Mismatch between level 1 boot loader and hardware. Service is required.
Flashing Red	7 H	Hardware failure. SC will probably need to be replaced.
Flashing Red	7 A	Missing level 2 boot loader.
Flashing Red	7 U	Mismatch between level 2 boot loader and hardware.
Green	Single digit during operation	Rotary switch was changed. The new setting of the changed switch is displayed on the 7-segment LED for several seconds.
	U, P, d	Firmware update is in progress.
	d, o, n, E	Updating of the operating system is finished. The Tracer SC can be powered off, the SD card removed, and the Tracer SC restarted.
	F, o, r, C, E	Rotary switches set to 999; forced return to factory defaults in progress.
	C, L, E, A, r	Tracer SC is restoring factory defaults (whether by force return, UI command, or at the beginning of a database restore operation).
	r	Database restore in progress.
Flashing Red	H, O, L, d	Main program is delayed due to multiple crashes (may take up to 4 hours).
Red	F	Cannot load operating system. May be remedied by SD-card update with appropriate software version.
Flashing Green	U	Power button was pressed when main program was not running/not responsive. SC is shutting down; wait for LEDs to turn off.

Normal startup sequence: 8, 7, 9, 5, 4, -L, dancing dashes

Shutdown sequence: Press power button. LED displays 3, -, 2, - 1 - until the application shuts down. Press the power button to turn power off.

Troubleshooting

The following troubleshooting suggestions are meant to help resolve most common problems associated with the Tracer® SC. If you are unable to resolve a problem, contact a qualified Trane service technician or the Trane Product Support team.

Troubleshooting with LEDs and the 7-Segment Display

The LEDs and the 7-segment display can be used for troubleshooting. Refer to the following table for causes and resolutions to specific LED displays.

Event	Probable cause	Resolution
7-segment display sequence does not follow the start-up sequence	May indicate a failure of the Tracer SC.	To reset the Tracer SC, press the power button to shut down, and then press again to restart. Contact the Trane Product Support team if this does not solve the problem
F code displays on the 7-segment display	Indicates a fatal error.	Contact the Trane Product Support team for assistance.
H, o, L, D displays on the 7-segment display	This code indicates that a recoverable error is present, and is waiting to restart. The restart process may take up to four hours.	Contact the Trane Product Support team if your Tracer SC does not restart after the maximum four hour period.
Ethernet LINK LED is not illuminated	This indicates that the Tracer SC is not connected to Ethernet.	Check all cables and connections. It may be possible that the Ethernet cable is not working. Attempt to resolve by replacing the Ethernet cable.
Ethernet ACT LED is not illuminated	This indicates that communication does not exist between the Tracer SC and Ethernet.	Verify that the IP address you have entered is correct.
Red status LED along with an F code or H code on the 7-segment display		Contact the Trane Product Support team
Status LED is unlit.	The Tracer SC is not receiving power.	Verify that the power supply is functioning properly.
LonTalk Service LED is red ***Note:*** *Upon startup, the LonTalk LED is momentarily red and is not a cause for alarm.*		Contact the Trane Product Support team.
7-segment display shows 3, 2, 1 and then lower-left, upper-right in sequence	Indicates that the application is shutting down and not restarting.	Attempt to resolve the problem by cycling power to the SC. If it recurs, contact the Trane Product Support team.

Force Return to Factory Defaults

In some cases, a corrupt database or similar problem may prevent you from accessing the Tracer SC user interface in order to return to factory defaults.

If this occurs, do the following to return to factory defaults:

1. Power down the Tracer SC.
2. Reset the rotary switches to “999.”
3. Power up the Tracer SC.
   The 7-segment display shows F, o, r, C, E.
4. Within 30 seconds, set the rotary switches to the intended normal value.
   The 7-segment display shows C, L, E, A, r, indicating that the database is being cleared. It will then resume normal operation showing –L on the 7-segment display during startup and then “dancing dashes.”

   Note: *If rotary switches are not reset within 30 seconds, the Tracer SC will power down leaving the database intact.*

Troubleshooting Network Connections

Troubleshoot network connections to a Tracer SC by using the following tools and procedures.

PING

PING is a PC utility that is provided with every Microsoft operating system. You can use it to verify the connectivity between two devices on an IP network.

To perform the test:

1. Select **Start > Run.**
2. In Run, type **ping** followed by the IP address of the device you want to verify connection with. Click Enter.

   You will receive a message with either a positive or negative response. A positive response to PING, but a negative response to the Web browser may indicate a problem with proxy settings, IP addressing, or network communication.

IPCONFIG

IPCONFIG is a software program that is provided with every Microsoft operating system. It identifies all of the configured connections for your PC. Use this tool to verify your connection settings.

To perform the test:

1. Select **Start > Run.**
2. In Run, type **cmd**. Click Enter.
3. In the cmd/exe window, type **ipconfig/**. Click **Enter**.

   You will receive a detailed list of all hardware and software connections and their settings.

Specifications

This section contains specifications for Tracer SC system controllers and for Tracer building automation systems.

Table 11. Tracer SC specifications

Tracer SC system controller		Microsoft Windows 7: • Internet Explorer™ (version 11.0) • Mozilla Firefox® (latest version • Google Chrome™— latest version) Microsoft Windows 8.1: (no support) Microsoft Windows 10: • Internet Explorer™— no support • Mozilla Firefox® (latest version) • Google Chrome™ (latest version) • Microsoft Edge™ (latest version) Apple®Mac OS (Latest — 1): • Mozilla Firefox (latest version) • Google Chrome (latest version) • Safari® (latest version)
	Mobile Devices	iOS ® (Latest – 1): • Safari (latest version) Android — 4.4+: • Google Chrome (latest version) Microsoft® Windows 10 • Microsoft Edge™ (latest version) • Google Chrome (latest version) • Mozilla FireFox (latest version)
	Concurrent Users	• Five
	Supported Languages	Up to four languages are supported per Tracer SC. • English • Chinese (Simplified/Traditional) • French • French Canadian • Portuguese (Brazil) • German • Indonesian • Japanese • Korean • Spanish (Latin America) • Thai • Polish • Arabic

Table 11. Tracer SC specifications (continued)

Tracer SC system controller	Power requirements	From PM014 Power Supply: 24 Vdc @ 0.3A; 14VA max (PM014 input VA)
	Operating environment	• Temperature: From –40°F to 122°F (–40°C to 50°C) • Relative humidity: From 10% to 90%, non-condensing
	Storage environment	• Temperature: From –40°F to 158°F (–40°C to 70°C) • Relative humidity: From 5% to 95%, non-condensing
	Agency Listings	UL: • UL-864/UUKL listed (when installed and programmed in accordance with the Engineered Smoke Control System Application Guide, BAS-APG019-EN) • UL-916-PAZX – energy management • CUL-C22.2-signal devices – Canada FCC: • FCC part 15, Class A CE CE: • The European Union (EU) Declaration of Conformity is available from your local Trane® office. ISO: • 9001:2008
	Processor	PowerPC405 Core
	Memory	• FLASH 400 MB • SDRAM 256 MB
	Battery	• No battery required. The clock is maintained for a minimum of three days by the super capacitor. All other programs are backed up by nonvolatile memory.

Table 11. Tracer SC specifications (continued)

Protocol Communications	BACnet	Tracer building automation systems communicates with BACnet devices that support: • Communications based on the BACnet ASHRAE/ANSI 2012 standard • ENV-1805-1/ENV-13321-1 • User Datagram Protocol/Internet (UDP/IP) compatible network Tracer SC is listed by BACnet Test Labs (BTL) as a BACnet Building Controller (B-BC). Listing information can be found at: http://www.bacnetinternational.net
	LonTalk	Tracer building automation systems communicates with LonTalk devices that support: • Communications based on the EIA-709.1 (LonTalk) standard • LonTalk standard network variable types (SNVTs) • FTT-10A or FT-X1 transceivers • Twisted-pair physical media (Level 4 wiring)
	Modbus	• Communications based on Modbus RTU defacto standard over EIA/TIA 485 (2–wire) • Communications based on Modbus TCP defacto standard over 10BASE-T/100BASE-TX Transmission Control Protocol/Internet Protocol (TCP/IP) compatible network
	Device Limits	Tracer SC facility (combination of all protocols) • Up to 240 devices BACnet (per link/Per facility) • Tracer UC200 Series - 60/240 • Tracer UC400 Series - 60/240 • Tracer UC600 Series- 10/20 • Tracer UC800 Series - 60/240 • BCI Series - 60/240 • Trane Communicating Thermostats - 60/120 • Non-Trane BACnet - 32/240 LonTalk (Per link/Per facility) • AH Series - 120/120 • CH Series - 120/120 • VV Series - 120/120 • ZN Series - 120/120 • MP503 - 120/120 • MP580 - 20/20 • Trane Communicating Thermostats - 120/120 • Non-Trane LON - 120/120 Modbus (Per link/Per facility) • Modbus TCP – 240/NA • Modbus RTU – 60/NA Air-Fi Wireless (Per network/Per facility) • WCI - 30/240

Table 11. Tracer SC specifications (continued)

Medium Enclosure (optional)	NEMA Type	NEMA-1
	Weight	14 lb. (6.5 kg)
	Mounting	Wall-mounted with #10 (5 mm) screws and #10 wall anchors. Mounting surface must be able to support 60 lb. (28 kg)
Large Enclosure (optional)	NEMA Type	NEMA-1
	Weight	50 lb (23.0 kg)
	Mounting	Wall-mounted with #10 (5 mm) screws and #10 wall anchors. Mounting surface must be able to support 120 lb. (56 kg)

Resources

The following is a list of related Tracer® SC documentation and training resources.

- **Tracer SC System Controller Installation Sheet (X39641154-01)**

  For mounting the enclosure and providing AC power.

- **Tracer SC Help**

  An online help system is included with the Tracer SC user interface. Global help has a table of contents and is searchable. Contextual help is specific to the information on each page.

- **Tracer BAS Operator Suite (Mobile App) Getting Started Guide (BAS-SVU23)**

  Describes how to obtain, download, install, and set up the mobile app.

- **BACnet® MS/TP Best Practices and Troubleshooting (BAS-SVX051)**

  Provides best practices, procedures, and troubleshooting for wiring BACnet unit controllers to a Tracer SC system controller.

- **Tracer SC Air Systems Application Guide (BAS-APG007)**

  Describes variable-air-volume strategies for variable air systems. It also include constant-volume applications and area application strategies for Tracer SC.

- **Tracer Graphical Programming (TGP2) Applications Guide (BAS-APG008)**

  Describes how to use the TGP2 editor and typical implementation strategies and best practices for using TGP2.

- **Tracer TU Service Tool Getting Started Guide (TTU-SVN01)**

  This document describes how to use the Tracer TU service tool to

  – Transfer programs to the Tracer SC

  – Start the Tracer Graphical Programming (TGP2) Editor and the Tracer Graphics Editor from within Tracer TU

  – Backing up and restoring firmware and TGP2 programs

- Rover™ Service Tool Installation, Operation, and Programming Guide (EMTX-SVX01)

  Describes how to use the Rover service tool for configuring, monitoring, and testing Tracer controllers that use Comm4 and LonTalk communications.

- **Trane College of Building Automation**

  The Trane College of Building Automation (TCBA) offers a comprehensive portfolio of technical courses to help you effectively monitor and coordinate your HVAC equipment and systems.

  https://tranetechnologies.sharepoint.com/commhvac

Building Network Installation Memo

You can use this memo for communicating your networking needs to the IT staff.

To: IT Staff

From: Local Trane office

Date: _____

Subject: Tracer® building automation system installation

As part of the upcoming building renovation project, Trane has been selected to provide the new facility-wide Tracer building automation system. This system will control heating, air conditioning, and ventilation in the building, which will provide increased comfort and decreased utility costs.

Tracer SCs will be used for configuration and operation and to control the equipment in the building. As part of the construction specifications, Trane will be using the IP network for communication.

The Tracer building automation system uses the BACnet protocol, ASHRAE/ANSI 135-95 and IP communication adheres to annex J-1999 of the same standard.

Any point of access to the corporate Intranet can be used to connect the Tracer building automation system.

Critical networking requirements are as follows:

- The items requested in the table below for each Tracer SC:

Location	Provided by IT				Provided by Trane
	Network jacks (10Bas-eT)	IP address[a]	Subnet mask	Gateway address	MAC address

[a] If using a DHCP server, please provide static IP addresses.

- For BACnet device communications, the UDP port address is 47808. If IT wants to use a different address, please enter it here:

  UDP port: _____
- A firewall that allows UDP at the designated port and exposes the IP addresses of the Tracer SC.
- NTP server address: _____ (for acquiring network time for use by Tracer SC)
- SMTP server address: _____(for sending e-mail notifications of alarms)

Please e-mail the information requested to my e-mail address _____, or fax this page to me _____.

If you have any questions or concerns, please call me at _____.

Thank you,

Project Manager

Setting Up Trane Connect Remote Access

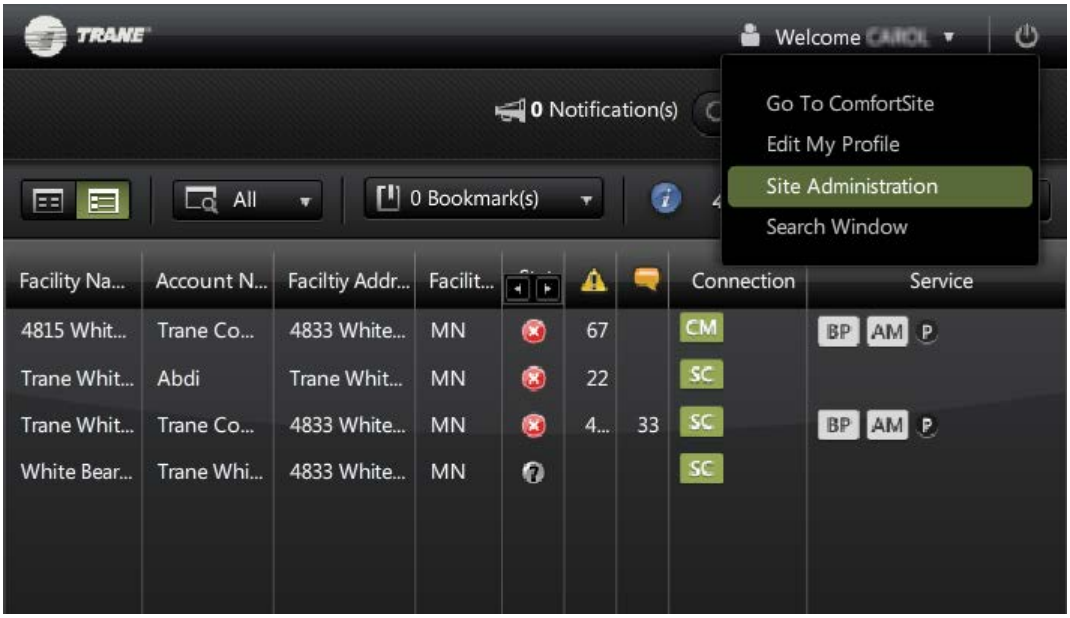
This section describes the process of setting up Trane Connect Remote Access to enable safe and secure remote access to the Tracer BAS.

Registering a Tracer BAS Controller or Tracer Concierge with TIS Command Center

The following procedure describes how to register a new Tracer BAS controller in the TIS Command Center (mybuilding.trane.com). Trane Offices and Trane technicians use this interface to self-register Tracer BAS controllers in the TIS Command Center and to set up Trane Connect.

1. Log on to mybuilding.trane.com. Click on **TIS Command Center**, then click **Site Administration** from the **Welcome** drop-down list. The Account Overview page opens (see Figure 92, p. 147).

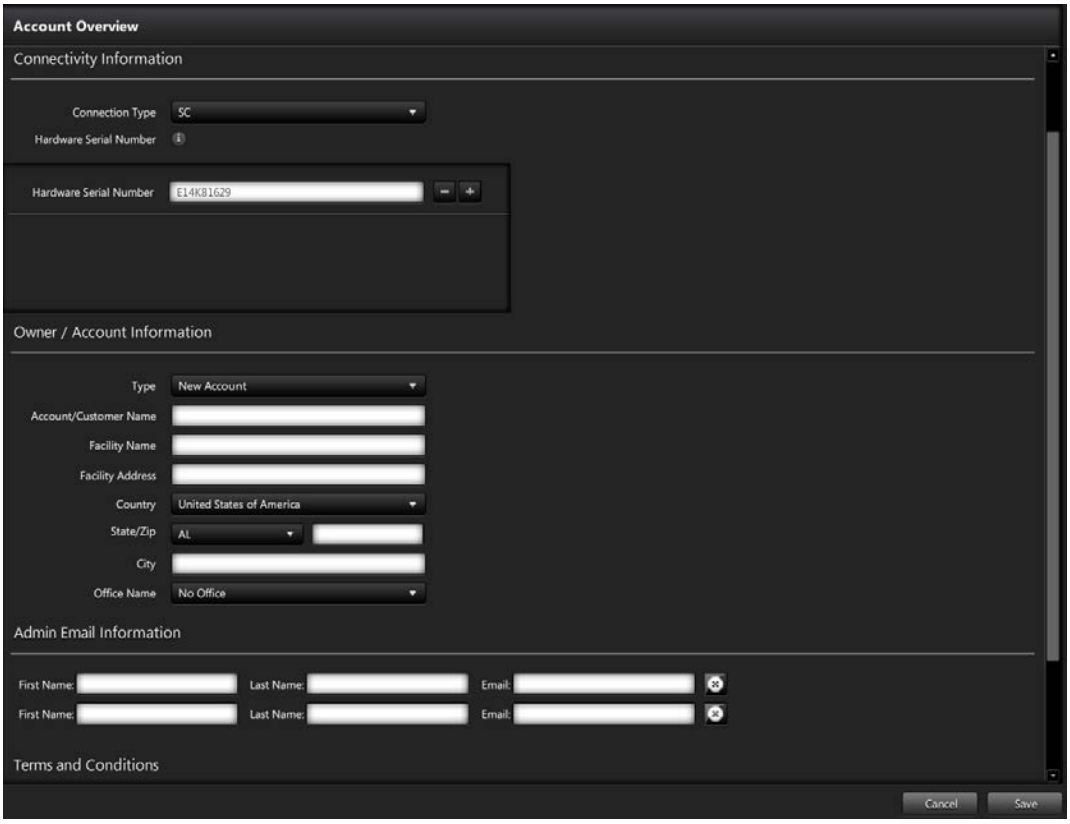
Figure 91. Navigating to Site Administration (TIS Command Center)



2. In the **Connectivity Information** section, select SC from the **Connection Type** drop-down list. Then enter the Tracer BAS controller's hardware serial numbers in the provided fields.
3. In the **Owner/Account Information** section, select an existing account or enter a new one.
4. Enter the name and address of the facility in the provided fields.
5. Select a Trane office from the **Office Name** drop-down list.
6. In the **Admin Email Information** section, enter the name and e-mail address of the individual who will serve as the Trane Connect customer administrator for the facility. (This information is only required if setting up remote access for customers.)

   Only two customer Admins can be created for each Tracer BAS controller. The Customer Admin user is the only user who can set up other customer users. A customer user can remotely access a Tracer BAS using Trane Connect.
7. Agree to the Terms and Conditions and then click **Save**.
8. Proceed to "Customer Admin Initial Account Creation," p. 149, if setting up remote access for customers.

Figure 92. Registering a Tracer BAS controller (TIS Command Center)

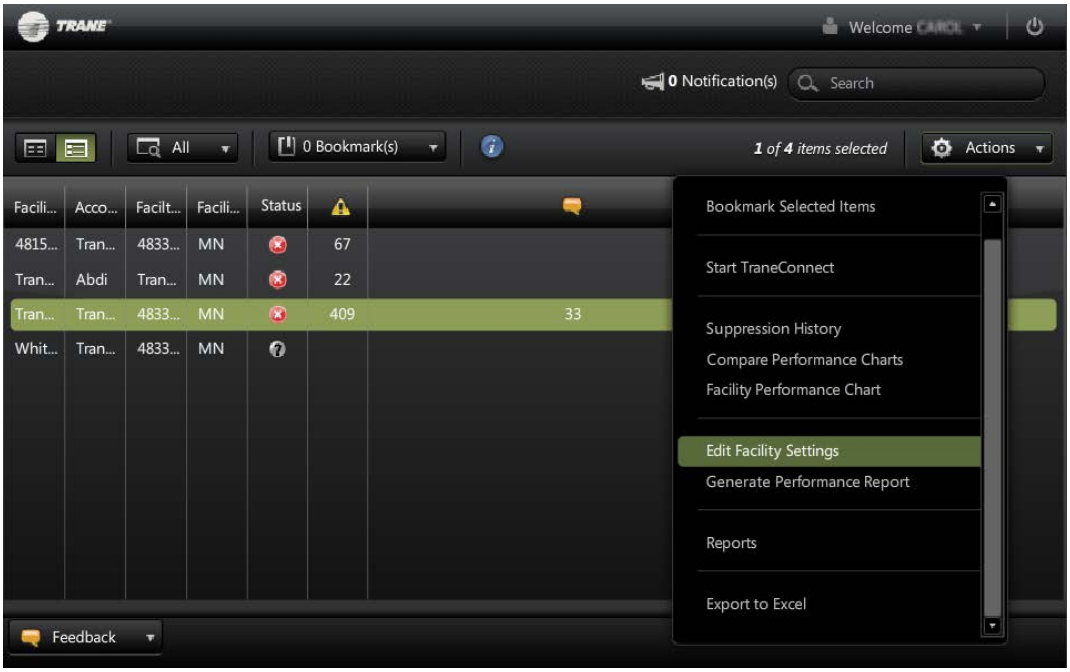


Modifying a Previously Registered Tracer BAS Controller

The following process describes how to add a new customer administrator to an existing Tracer BAS controller in TIS Command Center (mybuilding.trane.com).

1. In TIS Command Center, select the Tracer BAS controller (facility) and then click **Edit Facility Settings** from the **Actions** menu (see Figure 93, p. 148).

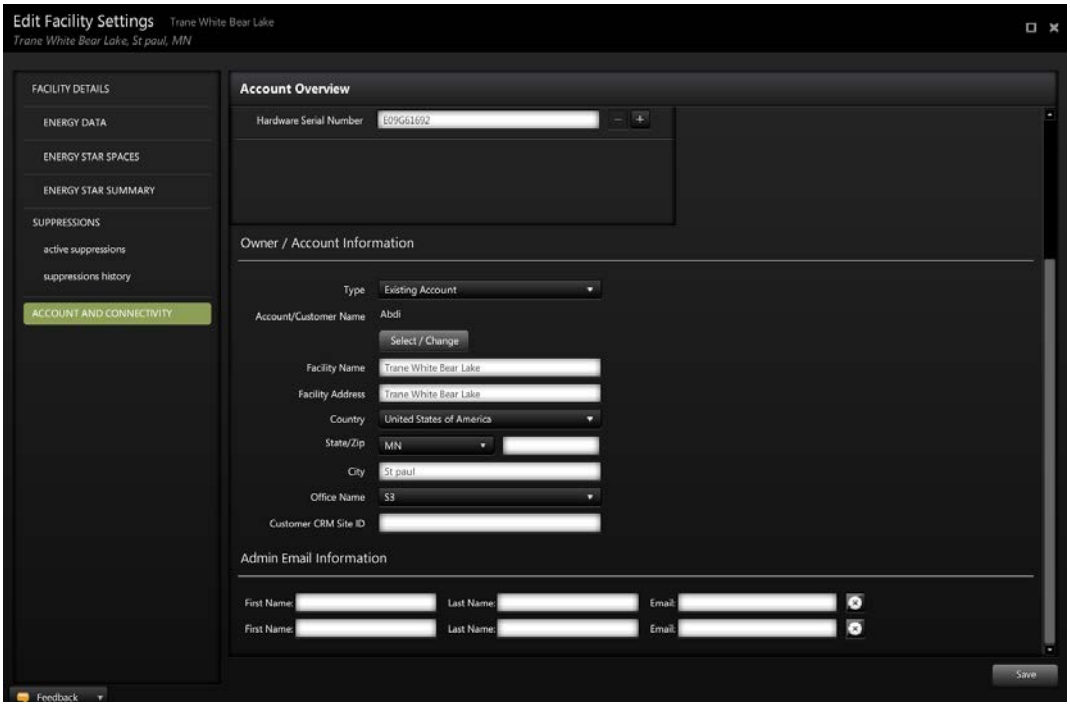
Figure 93. Edit a Facility (TIS Command Center)



2. From the left-hand menu, click **Account and Connectivity**. The Edit Facilities page opens (Figure 94, p. 149).
3. In the **Admin Email Information** section, enter the name and e-mail address of the individual who will serve as the Trane Connect Remote Access customer administrator for the facility. (This information is only required if setting up remote access for customers.)

   Only two customer Admins can be created for each Tracer BAS controller. The Customer Admin user is the only user who can set up other customer users. A customer user can remotely access a Tracer BAS using Trane Connect Remote Access.
4. Agree to the Terms and Conditions and then click **Save**.
5. Proceed to "Customer Admin Initial Account Creation," p. 149, if setting up remote access for customers.

Figure 94. Add a customer administrator (TIS Command Center)



Customer Admin Initial Account Creation

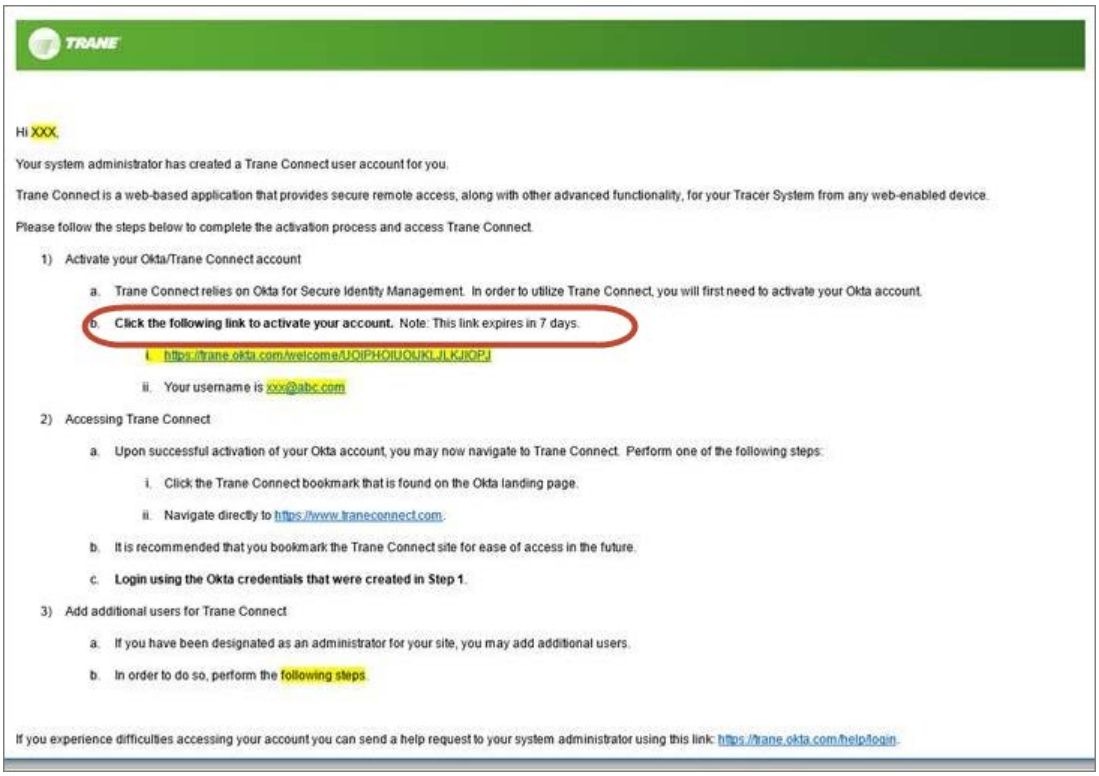
The customer admin who was defined in TIS Command Center will receive a "Welcome to Trane Connect" e-mail message. Trane Connect utilizes Okta, a User Authentication tool, to do the following:

- Synchronize Trane Active Directory users with Trane Connect users.
- Authenticate customers with Trane Connect.

To authenticate a new customer admin account:

1. Upon receipt of the "Welcome to Trane Connect" e-mail, click on the activation link (see the following figure).

   Important: *The customer administrator* ***must activate the link in the e-mail within 7 days*** *or the account activation will expire.*



TRANE

Hi XXX,

Your system administrator has created a Trane Connect user account for you.

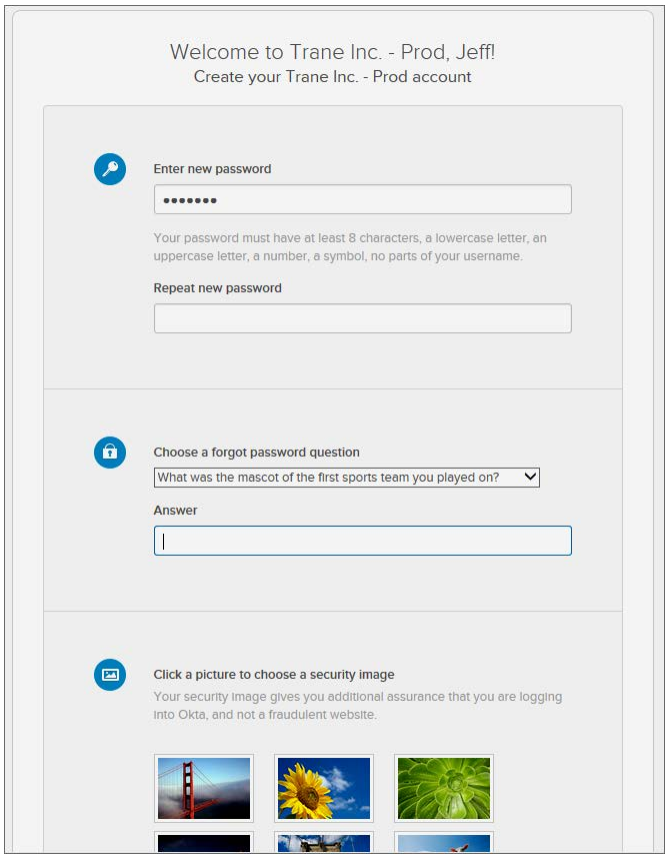
Trane Connect is a web-based application that provides secure remote access, along with other advanced functionality, for your Tracer System from any web-enabled device.

Please follow the steps below to complete the activation process and access Trane Connect.

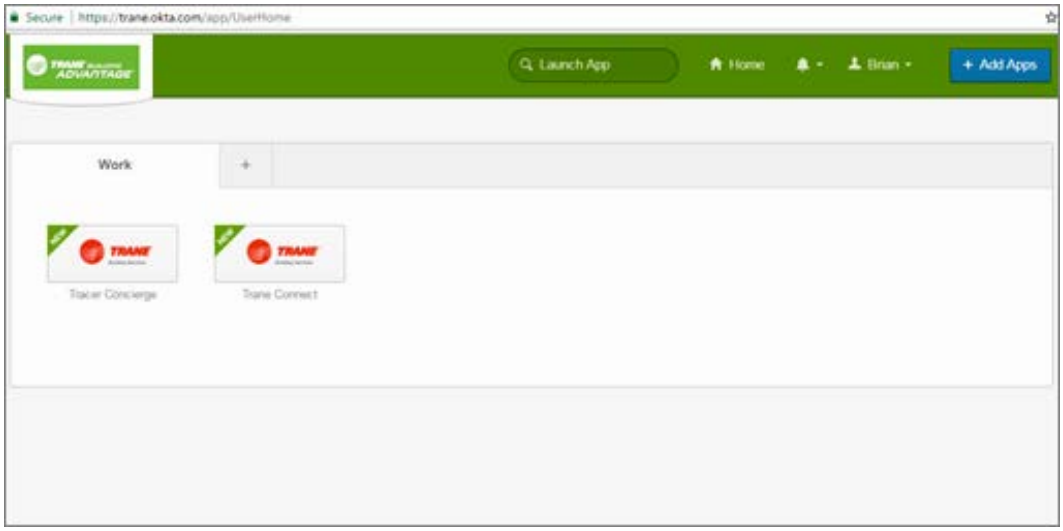
1) Activate your Okta/Trane Connect account
   a. Trane Connect relies on Okta for Secure Identity Management. In order to utilize Trane Connect, you will first need to activate your Okta account.
   b. **Click the following link to activate your account.** Note: This link expires in 7 days.
      i. https://trane.okta.com/welcome/UOIPHOIUOIJKLJLKJIOPJ
      ii. Your username is xxx@abc.com
2) Accessing Trane Connect
   a. Upon successful activation of your Okta account, you may now navigate to Trane Connect. Perform one of the following steps:
      i. Click the Trane Connect bookmark that is found on the Okta landing page.
      ii. Navigate directly to https://www.tranеconnect.com.
   b. It is recommended that you bookmark the Trane Connect site for ease of access in the future.
   c. **Login using the Okta credentials that were created in Step 1.**
3) Add additional users for Trane Connect
   a. If you have been designated as an administrator for your site, you may add additional users.
   b. In order to do so, perform the following steps.

If you experience difficulties accessing your account you can send a help request to your system administrator using this link: https://trane.okta.com/help/login.

2. The account creation screen appears after clicking the activation link (see the following figure). Enter and re-enter a new password, select a security question/answer, and select a security image that will be presented upon subsequent logins.



Upon successful account creation and login, the customer activation screen appears (see the following figure).



3. Click the Trane Connect image, which opens traneconnect.com.

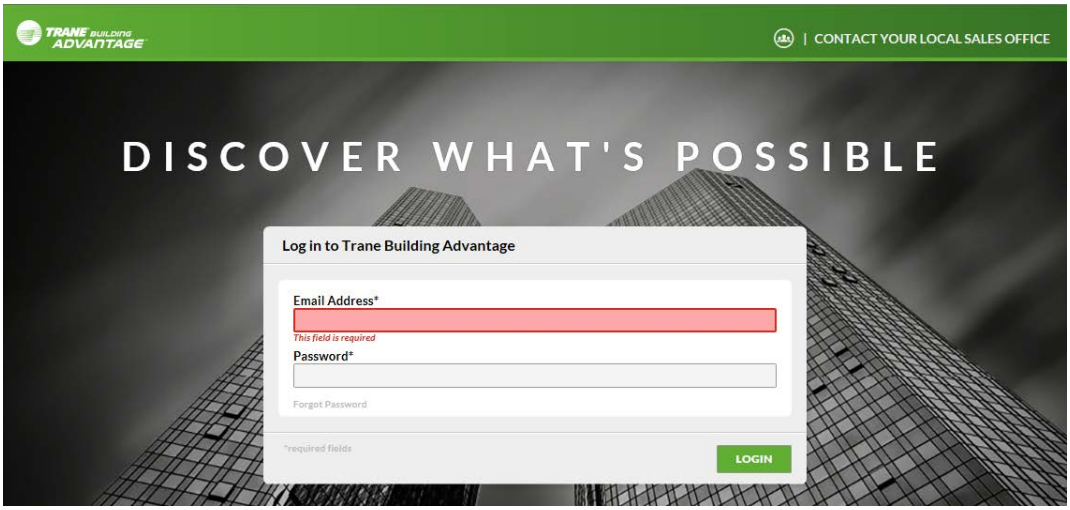
   Note: *Customers who have more than one site will see a list of multiple sites.*

Logging in to Trane Connect

After customer administrators have activated their accounts from the Welcome to Trane Connect e-mail, they are now able to access Trane Connect.

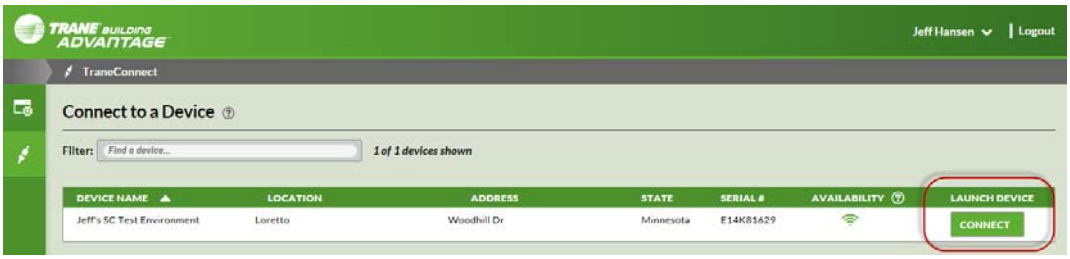
1. Navigate to TraneConnect.com. The Trane Connect login page opens (see the following figure).
2. Enter the credentials that were created in the Customer Account Creation procedure and then click the Login button. The **Connect to a Device** page opens, in which displays a list of devices that you can securely connect to.

   Note: *It is recommended that users create a bookmark for traneconnect.com in order to navigate directly to the site on subsequent visits.*



3. Select the device to which you want to connect. Click on the **Connect** button in the Launch Device column to open the Tracer BAS user interface. A new browser tab is launched, which displays a login page for the device.

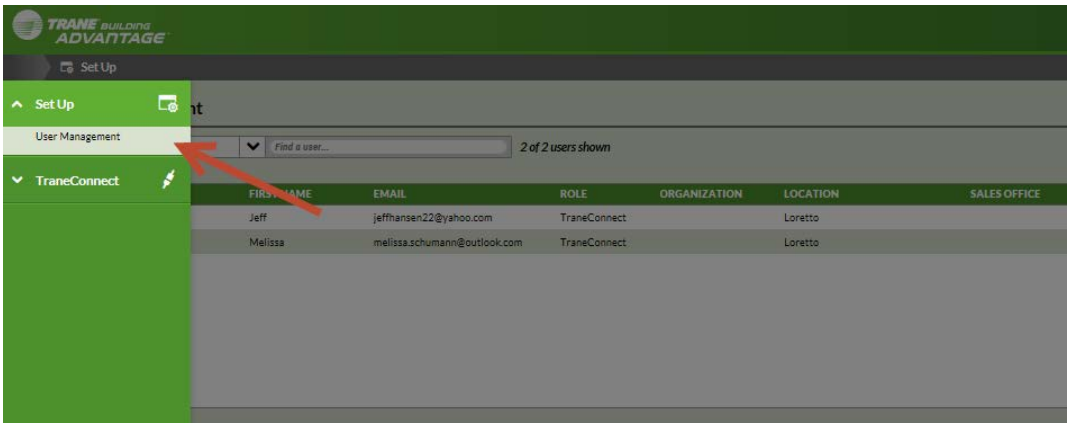
   Note: *Multiple devices can be accessed simultaneously in separate browser tabs.*



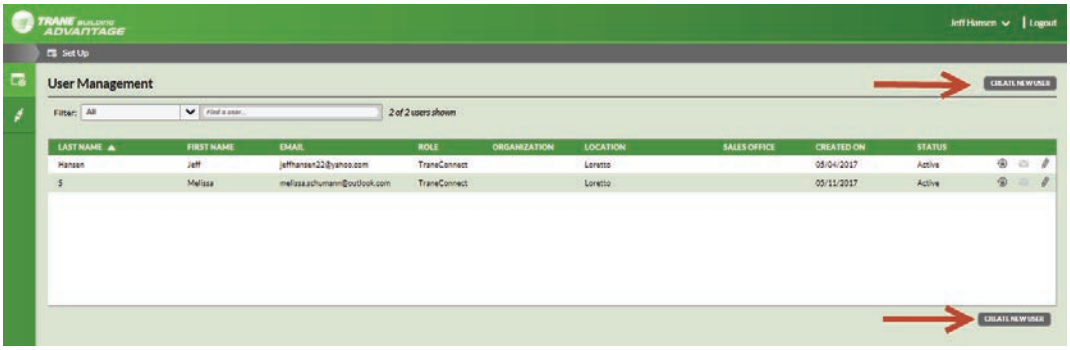
Creating Additional Trane Connect Users

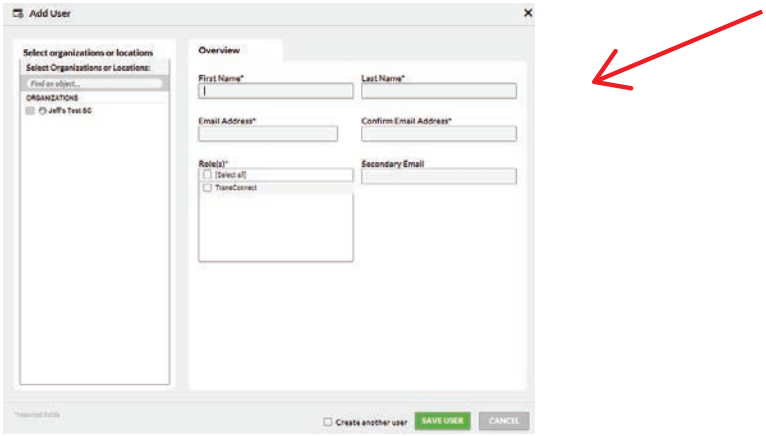
Customer admins have the ability to create and delete accounts for additional users for each device.

1. Log into Trane Connect. Click the Set Up icon located at the top of the left navigation menu, then select **User Management** (see the following figure). A list of current users is displayed.



2. From the upper-right portion of the screen, click **Create New User**. The **Add User** dialog box appears.





3. Search for the user's location/organization in the search box. Enter the user information, Trane Connect role, and appropriate devices for the user.
4. When complete, click **Save User**.

   The user will receive a Welcome to Trane Connect e-mail.

   Important: *The new user **must activate the link in the e-mail within 7 days** or the account activation will expire.*

   Trane Connect utilizes a User Authentication tool called Okta to do the following:

- Synchronize Trane Active Directory users with Trane Connect users.
- Authenticate customers with Trane Connect.

If a user requests the e-mail be resent, or if a user profile must be edited, click the appropriate icon located in the individual user list (see the following figure).

Frequently Asked Questions

Can I utilize Tracer TU, Tracer Summit, Rover, or other tools with Trane Connect Remote Access?

These tools can be used, but only through TIS Command Center and with the OpenVPN client installed on the client workstation. Trane employees (not customers) can continue to utilize these tools in the same manner as they always have.

Is there a charge for Trane Connect Remote Access?

Trane Connect Remote Access is free and does not require an Intelligent Services contract.

If my customers can access Comfortsite and have Trane University credentials, do they need Trane Connect too?

Yes. Trane Connect is a separate application from Comfortsite and Trane University, and requires separate credentials. Terms and Conditions for using Trane Connect are included in your Controls Contracting Agreement with the customer, as well as in the Tracer BAS EULA.

How can I get the "Welcome to Trane Connect" e-mail for customer admin users re-sent if the link expires after the 7–day period?

Contact the Trane employee who originally set up the customer admin. The e-mail will need to be re-sent by this individual, which will contain a new activation link.

Configuring Tracer SC for Tracer Summit BCU Data Collection and Remote Connectivity

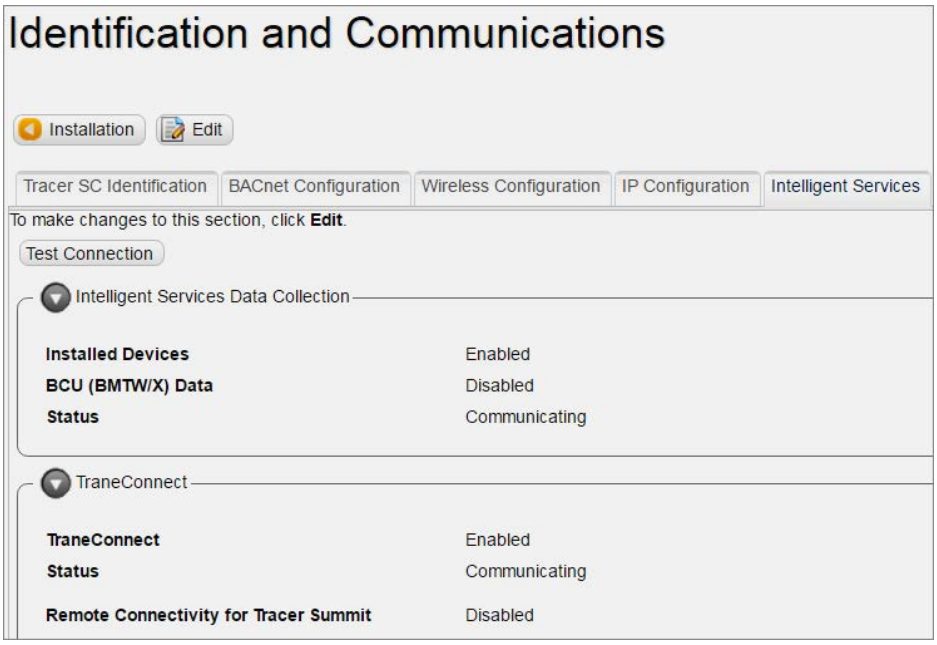
Tracer SCs without an application license (Base SC) can function as a Connectivity Module, facilitating an interface to the Tracer Summit Workstation through Trane Connect as well as the collection of BCU data.

To configure Tracer SC to collect data from a Tracer Summit BCU:

Note: *This BCU feature is only supported on a Base SC (a Tracer SC without an application license).*

1. Install the Tracer SC-base at the customer site.
2. At the Tracer SC user interface, navigate to **Installation > Identification and Communications > Intelligent Services**. The **BCU (BMTW/X) Data** and **Remote Connectivity for Tracer Summit** fields will initially be disabled.

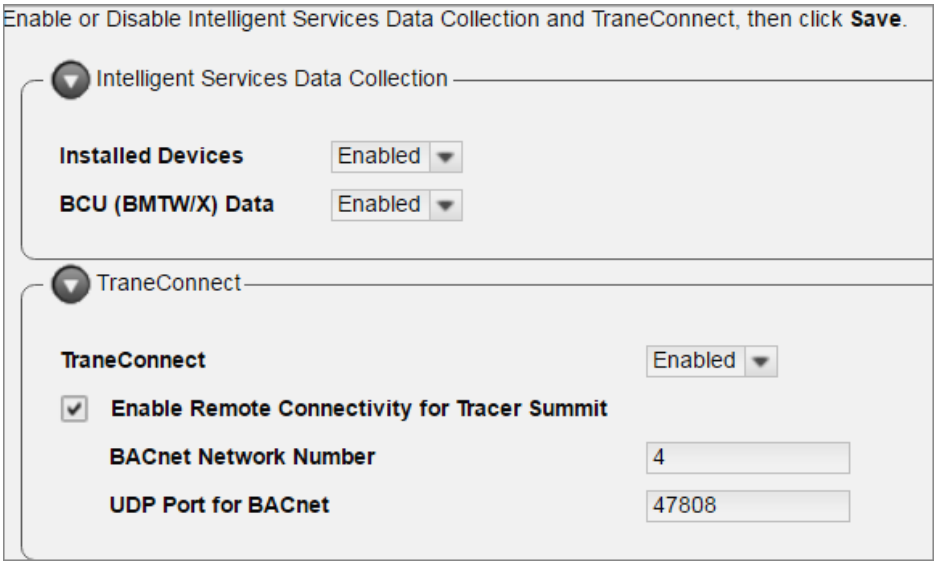
Figure 95. Intelligent Services screen



3. Click the **Edit** button.
4. In the **Intelligent Service Data Collection** frame, select to enable **BCU (BMTW/X) Data**.
5. In the **Trane Connect** frame, confirm that Trane Connect is enabled; if not, select Enable.
6. Select the checkbox for **Enable Remote Connectivity for Tracer Summit**. (See Figure 96, p. 156)

.

Figure 96. Intelligent Services (remote connectivity enabled)

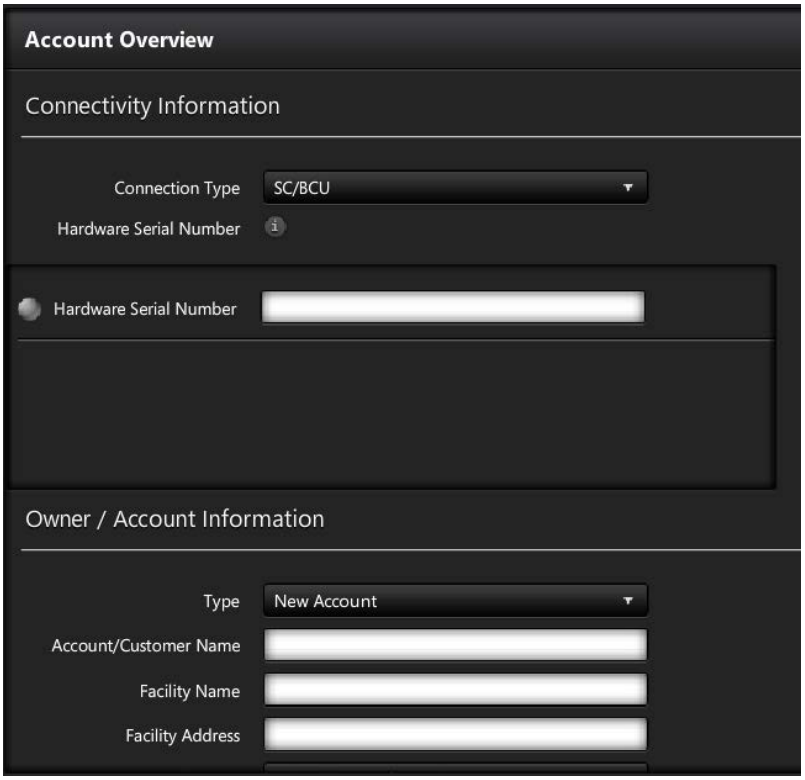


BACnet network number: This number defaults to 4. Change it only if there is another BACnet device with the same number.

UDP port for BACnet: The default is 47808. Typically, there is no need to change this number. It does not need to match your BCU UDP port.

7. Click **Save**. You will be prompted to restart Tracer SC. Click **OK**.
8. Log in to MyBuilding.Trane.com.
9. Click on **TIS Command Center**, then select **Site Administration**.
10. In the **Connection Type** drop-down, select **SC/BCU**.
11. Enter the information in the provided fields. A new tile is created in TIS Command Center and equipment/data will be collected. (See Figure 97, p. 157).

Figure 97. Intelligent Services Command Center Registration



12. Select **Start Trane Connect** in TIS Command Center in order to use Tracer Summit remotely. Enter the IP address and port listed on the Trane Connect screen.

    Note: *Do not use the BBMD IP and UDP port from the BCU.*

13. Set up alarming on the BCU; configure Tracer SC as a workstation in Tracer Summit:
    a. Navigate to **Setup > Site Configuration > Devices** tab.
    b. Select **Create Workstation**. This enables Tracer SC as a workstation, so it can be set up to receive alarms from the BCUs.
    c. Navigate to **Setup > Site Configuration > Event Receivers**.
    d. Set up the Tracer SC Workstation in the **Event Receiver** field.

Note: *If you have systems that require mapping (programmable controller, chilled water system), use TIS Command Center to perform the mapping. If you want the Tracer SC to receive alarms from the BCU, you must configure the BCU to send alarms to the Tracer SC. These alarms are then routed to Intelligent Services. For more information, refer to the Software Interface Data Mapping for TIS Equipment How-to-Guide, BAS-SVU18.*

Tracer SC LonTalk UNVT and SVNT Support

LonTalk UNVT Support

Tracer SC V4.4 introduces a new LON integration feature, which allows Tracer SC to integrate previously non-supported standard network variable types (SNVTs) and user defined network variable types (UNVTs). Some LonTalk devices use proprietary (user-defined) network variables that, prior to V4.4, were not possible to integrate into Tracer SC.

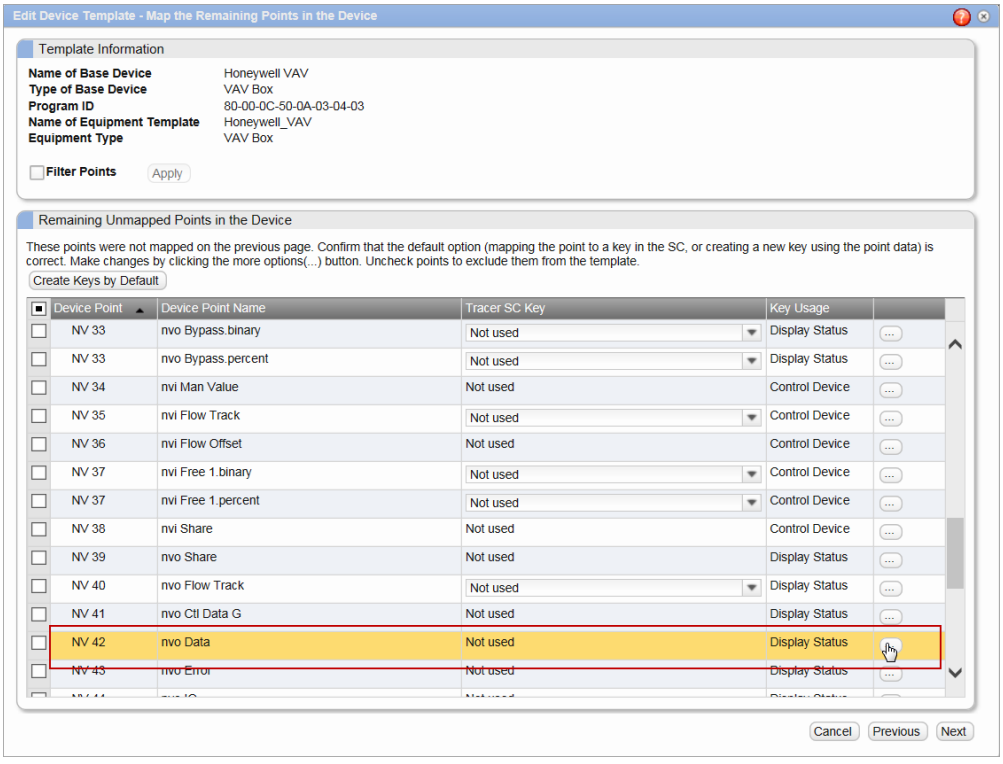
The **UNVT More Options** dialog in the Tracer SC user-interface is used to define a single UNVT into one or many points as defined by the manufacturer of the LonTalk device. Specific manufacturer product documentation that describes how the UNVT is defined is required. Product documentation for a specific vendor's UNVTs can typically be found in the following places:

- The integration guide from the manufacturer
- Device Resource Files (DRF) on LonMark
- Industry or community discussion boards

UNVT Mapping Procedure

The **UNVT More Options** dialog is available when creating or modifying a LonTalk device template. The following procedure describes how to use the **UNVT More Options** dialog.

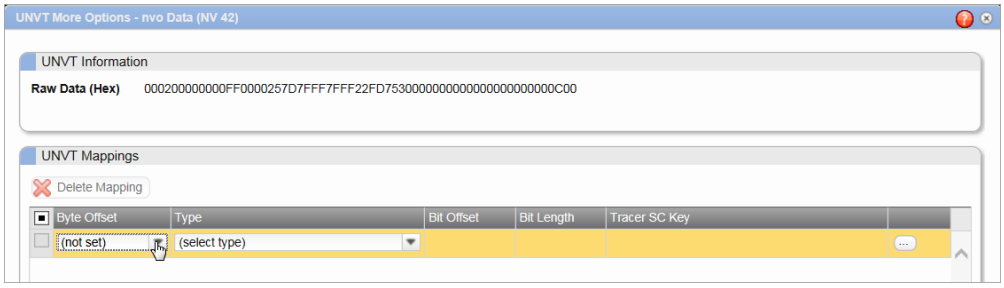
1. On the **Edit Device Template - Map the Remaining Points in the Device** screen, search for UNVTs (and previously unsupported SNVTs). These can be identified by the absence of a drop-down box in the **Tracer SC Key** column. In the figure below, nviManValue, nviFlowOffset, nviShare, nvoShare, nvoCtlDataG, nvoData, and nvoError are all UNVTs.



2. Click the ellipse icon  in the far-right column, which opens the **UNVT More Options** dialog.

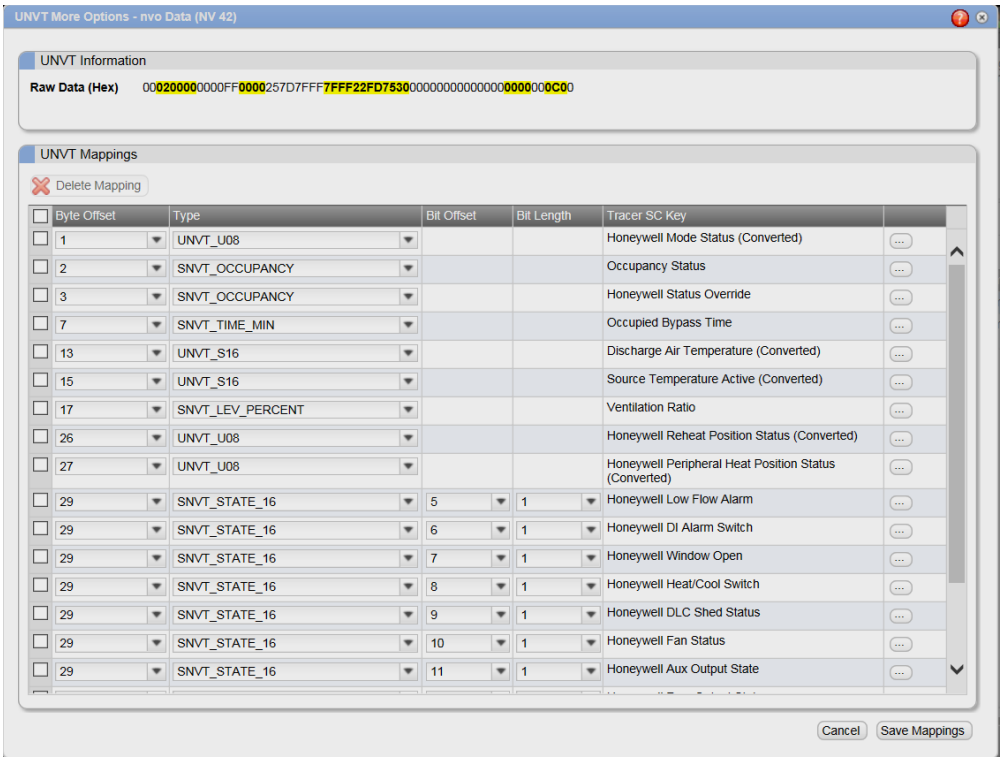
The **UNVT More Options** dialog shows the raw value in hex in the **UNVT Information** section. The raw value is extremely helpful because it displays the data length of the point, and it allows you to verify that the correct pieces of data are being used to create a point in Tracer SC. The raw value is only read when starting the UNVT editor – it does not automatically refresh.

3. Using the vendor documentation that defines the UNVT, identify the point or points that must be extracted from the UNVT. Some UNVTs will be short and may represent a single point; other UNVTs may be very large and provide multiple points.
4. In the **Byte Offset** column select "not set" and then select the starting location of the first point to be created in Tracer SC. A byte offset of 0 starts with the left-most byte of data with sequential bytes moving left to right.



5. select the appropriate (data) type in the Type field. The Type field includes SNVTs and proprietary data types. Based on the Byte Offset and Type that are defined, the raw bytes to be used will be highlighted in yellow in the Raw Data (Hex) field. Proprietary data type have a prefix of UNVT_. Some examples of UNVT_ data types are:
   - UNVT_U08 Unsigned 8 bits
   - UNVT_S08 Signed 8 bits
   - UNVT_U16 Unsigned 16 bits
   - UNVT_S16 Signed 16 bits
   - UNVT_STATE_08 1 to 8 bits of data. Use the Bit Offset and Bit Length fields.
   - UNVT_STATE_16 1 to 16 bits of data. Use the Bit Offset and Bit Length fields.
6. Select an existing Tracer SC key or click the ellipse icon  to create a new key. A key conversion may also be applied or created as needed.
7. Click **Save Mappings**, and continue the device template create/edit procedure.

The following figure shows an example of more complicated UNVT. This UNVT has many points, which use a variety of types with standard and custom keys.



SNVT Types Supported by Tracer SC

Standard Network Variable Types (SNVTs) facilitate interoperability by providing a well-defined interface for communication between devices made by different manufacturers. Devices can be installed in a network and connected to other devices by using network variables, providing the data types match.

The following table contains SNVT types supported by Tracer® SC.

Table 12. Supported SVNT types (alphabetical)

SNVT Type	SNVT Index
SNVT_ABS_HUMID	160
SNVT_AMP	1
SNVT_AMP_AC	139
SNVT_AMP_F	48
SNVT_AMP_MIL	2
SNVT_ANGLE_DEG	104
SNVT_BTU_F	67
SNVT_BTU_KILO	5
SNVT_BTU_MEGA	6
SNVT_CHLR_STATUS	127
SNVT_COUNT	8
SNVT_COUNT_F	51
SNVT_COUNT_INC	9
SNVT_COUNT_INC_F	52

Table 12. Supported SVNT types (alphabetical) (continued)

SNVT Type	SNVT Index
SNVT_DEFR_MODE	120
SNVT_DEFR_STATE	122
SNVT_DEFR_TERM	121
SNVT_DENSITY_F	101
SNVT_ELEC_KWH	13
SNVT_ELEC_KWH_1	146
SNVT_ELEC_WHR	14
SNVT_ELEC_WHR_F	68
SNVT_ENTHALPY	153
SNVT_EVAP_STATE	118
SNVT_FLOW	15
SNVT_FLOW_F	53
SNVT_FLOW_P	161
SNVT_FREQ_F	75
SNVT_FREQ_HZ	76
SNVT_FREQ_KILOHZ	77
SNVT_HVAC_EMERG	103
SNVT_HVAC_MODE	108
SNVT_HVAC_OVERIDE	111
SNVT_HVAC_STATUS	112
SNVT_LENGTH	17
SNVT_LENGTH_F	54
SNVT_LENGTH_MIL	20
SNVT_LEV_CONT	21
SNVT_LEV_CONT_F	55
SNVT_LEV_DISC	22
SNVT_LEV_PERCENT	81
SNVT_LUX	79
SNVT_MASS_KILO	24
SNVT_MASS_MEGA	25
SNVT_MULTIPLIER	82
SVNT_OCCUPANCY	109
SNVT_PH_F	126
SNVT_POWER	27
SNVT_POWER_F	57
SNVT_POWER_KILO	28
SNVT_PPM	29
SNVT_PPM_F	58

Table 12. Supported SVNT types (alphabetical) (continued)

SNVT Type	SNVT Index
SNVT_PRESS	30
SNVT_PRESS_F	59
SNVT_PRESS_P	113
SNVT_PWR_FACT	98
SNVT_PWR_FACT_F	99
SNVT_RES	31
SNVT_RES_F	60
SNVT_RES_KILO	32
SNVT_RPM	102
SNVT_SETTING	117
SNVT_SOUND_DB	33
SNVT_SOUND_DB_F	61
SNVT_SPEED	34
SNVT_SPEED_F	62
SNVT_SPEED_MIL	35
SNVT_STATE	83
SNVT_STATE_64	165
SNVT_STR_ASC	36
SNVT_SWITCH	95
SNVT_TEMP_DIFF_P	147
SNVT_TEMP_F	63
SNVT_TEMP_P	105
SNVT_TEMP_SETPT	106
SNVT_THERM_MODE	119
SNVT_TIME_HOUR	124
SNVT_TIME_F	64
SNVT_TIME_MIN	123
SNVT_TIME_SEC	107
SNVT_TIME_STAMP	84
SNVT_TOD_EVENT	128
SNVT_TURBIDITY_F	144
SNVT_VOL	41
SNVT_VOL_F	65
SNVT_VOL_KILO	42
SNVT_VOLT	44
SNVT_VOLT_AC	138
SNVT_VOLT_F	66
SNVT_VOLT_KILO	46

Table 12. Supported SVNT types (alphabetical) (continued)

SNVT Type	SNVT Index
SNVT_VOLT_MIL	47
SNVT_STATE_64	165

Table 13. Supported SNVT types (arranged by index)

SNVT Type	SNVT Index
SNVT_AMP	1
SNVT_AMP_MIL	2
SNVT_BTU_KILO	5
SNVT_BTU_MEGA	6
SNVT_COUNT	8
SNVT_COUNT_INC	9
SNVT_HVAC_OVERIDE	11
SNVT_ELEC_KWH	13
SNVT_ELEC_WHR	14
SNVT_FLOW	15
SNVT_LENGTH	17
SNVT_LENGTH_MIL	20
SNVT_LEV_CONT	21
SNVT_LEV_DISC	22
SNVT_MASS_KILO	24
SNVT_MASS_MEGA	25
SNVT_POWER	27
SNVT_POWER_KILO	28
SNVT_PPM	29
SNVT_PRESS	30
SNVT_RES	31
SNVT_RES_KILO	32
SNVT_SOUND_DB	33
SNVT_SPEED	34
SNVT_SPEED_MIL	35
SNVT_STR_ASC	36
SNVT_VOL	41
SNVT_VOL_KILO	42
SNVT_VOLT	44
SNVT_VOLT_KILO	46
SNVT_VOLT_MIL	47
SNVT_AMP_F	48

Table 13. Supported SNVT types (arranged by index) (continued)

SNVT Type	SNVT Index
SNVT_COUNT_F	51
SNVT_COUNT_INC_F	52
SNVT_FLOW_F	53
SNVT_LENGTH_F	54
SNVT_LEV_CONT_F	55
SNVT_POWER_F	57
SNVT_PPM_F	58
SNVT_PRESS_F	59
SNVT_RES_F	60
SNVT_SOUND_DB_F	61
SNVT_SPEED_F	62
SNVT_TEMP_F	63
SNVT_TIME_F	64
SNVT_VOL_F	65
SNVT_VOLT_F	66
SNVT_BTU_F	67
SNVT_ELEC_WHR_F	68
SNVT_FREQ_F	75
SNVT_FREQ_HZ	76
SNVT_FREQ_KILOHZ	77
SNVT_LUX	79
SNVT_LEV_PERCENT	81
SNVT_MULTIPLIER	82
SNVT_STATE	83
SNVT_TIME_STAMP	84
SNVT_SWITCH	95
SNVT_PWR_FACT	98
SNVT_PWR_FACT_F	99
SNVT_DENSITY_F	101
SNVT_RPM	102
SNVT_HVAC_EMERG	103
SNVT_ANGLE_DEG	104
SNVT_TEMP_P	105
SNVT_TEMP_SETPT	106
SNVT_TIME_SEC	107
SNVT_HVAC_MODE	108
SVNT_OCCUPANCY	109
SNVT_HVAC_STATUS	112

Table 13. Supported SNVT types (arranged by index) (continued)

SNVT Type	SNVT Index
SNVT_PRESS_P	113
SNVT_SETTING	117
SNVT_EVAP_STATE	118
SNVT_THERM_MODE	119
SNVT_DEFR_MODE	120
SNVT_DEFR_TERM	121
SNVT_DEFR_STATE	122
SNVT_TIME_MIN	123
SNVT_TIME_HOUR	124
SNVT_PH_F	126
SNVT_CHLR_STATUS	127
SNVT_TOD_EVENT	128
SNVT_VOLT_AC	138
SNVT_AMP_AC	139
SNVT_TURBIDITY_F	144
SNVT_ELEC_KWH_1	146
SNVT_TEMP_DIFF_P	147
SNVT_ENTHALPY	153
SNVT_ABS_HUMID	160
SNVT_FLOW_P	161
SNVT_STATE_64	165

Key Mapping and Enumerations for Unit Controllers

This section contains information necessary for installing unit controllers on a Tracer® SC.

Tracer UC400 Unit Controller Points

The following tables map Tracer SC user-display names to the most commonly used Tracer UC400 points for the following applications:

- Constant-volume air-handling unit (CV AHU)
- Air-handling unit variable-air-volume (VAV AHU)
- 2-heat/2-cool (2H/2C)
- Fan-coil unit
- VAV box

Table 14. Tracer UC400 unit controller points: CV AHU applications

UC400 point name	UC400 point type	Description
Space Temperature Local	AI1	
Space Temperature Setpoint Local	AI2	Hardwired space temperature setpoint value
Discharge Air Temperature Local	AI	Hardwired discharge temperature sensor value
Mixed Air Temperature	AI	Hardwired mixed air temperature sensor value
Outdoor Air Temperature Local	AI	
Space Humidity Local	AI	
Cooling Valve	AO	Position of the cooling valve
Heating Valve	AO	Position of the heating valve
Outdoor Air Damper	AO	Position of the outdoor air damper
Discharge Air Temperature Setpoint Active	AV	Temperature value the control system will maintain for the air leaving the discharge of the equipment
Economizer Enable Temperature Setpoint BAS	AV	A BAS supplied temperature value that is compared with the outdoor air temperature to determine when the economizer system should be enabled
Economizer Minimum Position Setpoint BAS	AV	BAS supplied position value of the outdoor air damper when the minimum amount of outdoor air is required
Economizer Minimum Position Setpoint Active	AV	
Economizer Minimum Position Setpoint Default	AV	Unit controller supplied position value of the outdoor air damper when the minimum amount of outdoor air is required and no other control source is available
Occupied Bypass Time	AV	Amount of time a unit will remain in occupied mode after a tenant override event has occurred
Occupied Cooling Setpoint	AV	
Occupied Heating Setpoint	AV	
Occupied Offset	AV	Delta value applied to the space temperature setpoint to calculate the occupied cooling and heating setpoints
Outdoor Air Temperature Active	AV	Outdoor air temperature being used by the control system to make control decisions
Outdoor Air Temperature BAS	AV	BAS supplied outdoor air temperature
Space Humidity Setpoint Active	AV	

Table 14. Tracer UC400 unit controller points: CV AHU applications (continued)

UC400 point name	UC400 point type	Description
Space Humidity Setpoint BAS	AV	BAS supplied space air humidity value
Space Humidity Setpoint Default	AV	
Space Temp Setpoint Default	AV	
Space Temperature Active	AV	Space temperature value being used by the unit controller to make control decisions
Space Temperature BAS	AV	BAS supplied space temperature value
Space Temperature Setpoint Active	AV	Space temperature value being used by the unit controller to make control decisions
Space Temperature Setpoint BAS	AV	BAS supplied space temperature setpoint value
Standby Offset	AV	Delta value applied to the space temperature setpoint to calculate the standby cooling and heating setpoints
Unoccupied Cooling Setpoint	AV	The space temperature that a unit will maintain when in unoccupied cooling mode
Unoccupied Heating Setpoint	AV	The space temperature that a unit will maintain when in unoccupied heating mode
Mixed Air Low Limit Cutout	BI	Indicates if the mixed air temperature is below the low limit setpoint
Supply Fan Status	BI	The measured state of the supply fan
Supply Fan Start Stop	BO	Commanded state of the supply fan hardware output
Dehumidification Mode	BV	
Fan Failure Reset	BV	Reset for supply fan failure diagnostics
Heat Cool Mode Active	BV	
Night Heat Cool	BV	
Outdoor Air Temperature Failure	BV	
Space Temperature Failure	BV	
Startup Delay Completed	BV	
Supply Fan Failure	BV	
Communication Status	MI	Indicates if the unit is communicating with a parent device on the BAS network
Enthalpy Mode	MV	
Heat Cool Mode Request	MV	The mode of operation the BAS is requesting for unit control
Heat Cool Mode Status	MV	The mode of operation the unit is currently in
Occupancy Request	MV	The mode of occupancy the BAS is requesting for unit control
Occupancy Status	MV	The mode of occupancy the unit is currently in

Table 15. Tracer UC400 unit controller points: VAV AHU applications

UC400 point name	UC400 point type	Description
Space Temperature Local	AI1	
Space Temperature Setpoint Local	AI2	
Discharge Air Temperature Local	AI	Hardwired discharge temperature sensor value

Table 15. Tracer UC400 unit controller points: VAV AHU applications (continued)

UC400 point name	UC400 point type	Description
Duct Static Pressure Local	AI	
Mixed Air Temperature	AI	Hardwired mixed air temperature sensor value
Outdoor Air Temperature Local	AI	
Cooling Valve	AO	Position of the cooling valve
Heating Valve	AO	Position of the heating valve
Outdoor Air Damper	AO	Position of the outdoor air damper
Supply Fan Speed	AO	The supply fan speed value sent by unit to the fan controller
Discharge Air Cooling Setpoint Active	AV	
Discharge Air Cooling Setpoint BAS	AV	BAS supplied discharge air temperature setpoint when the unit is in cooling mode
Discharge Air Cooling Setpoint Default	AV	
Discharge Air Heating Setpoint Active	AV	
Discharge Air Heating Setpoint BAS	AV	BAS supplied discharge air temperature setpoint when the unit is in heating mode
Discharge Air Heating Setpoint Default	AV	
Discharge Air Temperature Setpoint Active	AV	Temperature value the control system will maintain for the air leaving the discharge of the equipment
Duct Static Pressure Active	AV	Static air pressure value in the supply duct being used by the control system to make control decisions
Duct Static Pressure BAS	AV	BAS supplied static air pressure value in the supply duct
Duct Static Pressure Setpoint Active	AV	Static pressure value the control system will maintain for the air in the supply duct
Duct Static Pressure Setpoint BAS	AV	BAS supplied static pressure value the control system will maintain for the air in the supply duct
Duct Static Pressure Setpoint Default	AV	
Economizer Enable Temperature Setpoint BAS	AV	A BAS supplied temperature value that is compared with the outdoor air temperature to determine when the economizer system should be enabled
Economizer Minimum Position Setpoint Active	AV	
Economizer Minimum Position Setpoint BAS	AV	BAS supplied position value of the outdoor air damper when the minimum amount of outdoor air is required
Economizer Minimum Position Setpoint Default	AV	
Occupied Bypass Time	AV	Amount of time a unit will remain in occupied mode after a tenant override event has occurred
Occupied Cooling Setpoint	AV	
Occupied Heating Setpoint	AV	
Occupied Offset	AV	Delta value applied to the space temperature setpoint to calculate the occupied cooling and heating setpoints
Outdoor Air Temperature Active	AV	Outdoor air temperature being used by the control system to make control decisions
Outdoor Air Temperature BAS	AV	BAS supplied outdoor air temperature
Mixed Air Low Limit Setpoint Default	AV	

Table 15. Tracer UC400 unit controller points: VAV AHU applications (continued)

UC400 point name	UC400 point type	Description
Space Temp Setpoint Default	AV	
Space Temperature Active	AV	Space temperature value being used by the unit controller to make control decisions
Space Temperature BAS	AV	BAS supplied space temperature value
Space Temperature Setpoint Active	AV	Space temperature value being used by the unit controller to make control decisions
Space Temperature Setpoint BAS	AV	BAS supplied space temperature setpoint value
Standby Offset	AV	Delta value applied to the space temperature setpoint to calculate the standby cooling and heating setpoints
Unoccupied Cooling Setpoint	AV	The space temperature that a unit will maintain when in unoccupied cooling mode
Unoccupied Heating Setpoint	AV	The space temperature that a unit will maintain when in unoccupied heating mode
Mixed Air Low Limit Cutout	BI	Indicates if the mixed air temperature is below the low limit setpoint
Supply Fan Status	BI	The measured state of the supply fan
Supply Fan Start Stop	BO	Commanded state of the supply fan hardware output
Heat Cool Mode Active	BV	
Night Heat Cool	BV	
Outdoor Air Temperature Failure	BV	
Space Temperature Failure	BV	
Startup Delay Completed	BV	
Supply Fan Failure	BV	
Supply Fan Failure Reset BAS	BV	
Communication Status	MI	Indicates if the unit is communicating with a parent device on the BAS network
Heat Cool Mode Request	MV	The mode of operation the BAS is requesting for unit control
Heat Cool Mode Status	MV	The mode of operation the unit is currently in
Occupancy Request	MV	The mode of occupancy the BAS is requesting for unit control
Occupancy Status	MV	The mode of occupancy the unit is currently in

Table 16. Tracer UC400 unit controller points: 2H/2C applications

UC400 point name	UC400 point type	Description
Space Temperature Local	AI1	
Space Temperature Setpoint Local	AI2	Hardwired space temperature setpoint value
Discharge Air Temperature Active	AI	The temperature of the air at the discharge opening of the equipment
Space CO2 Concentration Local	AI	
Supply Fan Speed	AO	The supply fan speed value sent by unit to the fan controller
Auxiliary Heat Control Request	AV	Maximum amount of reheat available to control space temperature

Table 16. Tracer UC400 unit controller points: 2H/2C applications (continued)

UC400 point name	UC400 point type	Description
Cabinet Style	AV	Describes the cabinet style of the unit
Cool Type	AV	Describes the cooling type installed in the unit
Cooling Capacity Status	AV	Indicates the unit cooling capacity being utilized
Cooling Enable BAS	AV	Allows a BAS to control the unit cooling system
Cooling Setpoint High Limit	AV	Maximum value allowed for the Cooling Temperature Setpoint
Cooling Setpoint Low Limit	AV	Minimum value allowed for the Cooling Temperature Setpoint
Economizer Minimum Position Setpoint BAS	AV	BAS supplied economizer position minimum setpoint value
Economizer Minimum Position Setpoint Local	AV	Indicates the local economizer minimum position setpoint
Economizer System Status	AV	Indicates the operating state of the waterside economizer system
Economizer Temperature Enable Setpoint	AV	Temperature setpoint below which economizer mode can be used
Filter Runtime Hours	AV	Indicates the number of hours air has flowed through the filter
Filter Runtime Hours Setpoint	AV	The setpoint value used by the filter run hours calculation
Heat Primary Capacity Status	AV	Indicates the unit primary heating capacity being utilized
Heating Setpoint High Limit	AV	Maximum value allowed for the Heating Temperature Setpoint
Heating Setpoint Low Limit	AV	Minimum value allowed for the Heating Temperature Setpoint
Occupied Bypass Time	AV	Time an override of the occupancy mode will stay in effect
Occupied Offset	AV	Offset value used to calculate setpoints in occupied mode
Outdoor Air Damper Position Status	AV	Indicates the unit outside air damper position
Outdoor Air Temperature BAS	AV	BAS supplied outdoor air temperature sensor value
Preheat Type	AV	Describes the heating type installed in the unit
Reheat Type	AV	Describes the reheat type installed in the unit
Space CO2 Concentration Active	AV	Space CO2 concentration value being used for unit control
Space CO2 Concentration BAS	AV	BAS supplied space CO2 sensor value
Space Humidity Active	AV	The space humidity currently used for unit control
Space Humidity BAS	AV	BAS supplied space humidity sensor value
Space Temp Setpoint Default	AV	
Space Temperature Active	AV	The space temperature currently used for unit control
Space Temperature BAS	AV	BAS supplied space air temperature sensor value
Space Temperature Setpoint Active	AV	Space air temperature setpoint value being used for unit control
Space Temperature Setpoint BAS	AV	Base value to calculate setpoints in occupied and standby modes
Standby Offset	AV	Offset value used to calculate setpoints in standby mode
Supply Fan Type	AV	Describes the supply fan type installed in the unit

Table 16. Tracer UC400 unit controller points: 2H/2C applications (continued)

UC400 point name	UC400 point type	Description
Unit Energy Demand	AV	Indicates the current heat/cool energy demand of the unit
Unoccupied Cooling Setpoint	AV	Cooling temperature setpoint used for control in unoccupied mode
Unoccupied Heating Setpoint	AV	Heating temperature setpoint used for control in unoccupied mode
Occupancy Input	BI	
Cool Output 1	BO	Indicates the commanded state of cooling output 1
Cool Output 2	BO	Indicates the commanded state of cooling output 2
Heat Output 1	BO	Indicates the commanded state of heating output 1
Heat Output 2	BO	Indicates the commanded state of heating output 2
Cooling Fan Control Method	BV	Fan control method when the unit is in cooling mode
Cooling Fan Default Status	BV	The fan speed when the unit is in cooling mode
Diagnostic Reset Command BAS	BV	Command used to reset latching diagnostics
Filter Timer Reset	BV	Command the unit to reset the accumulated filter run hours
Heating Fan Control Method	BV	Fan control method when the unit is in heating mode
Heating Fan Default Status	BV	The fan speed when the unit is in heating mode
Communication Status	MI	Indicates if the unit is communicating with a parent device
Timed Override Status	MI	Timed override request or cancel from zone sensor
Economizer Airside Enable BAS	MV	Command the state of the airside economizer system
Economizer Type	MV	General description of the equipment economizer system
Emergency Override BAS	MV	Command the unit into an emergency mode of operation
Exhaust Return Fan Type	MV	Describes the exhaust or return fan type installed in the unit
Heat Cool Mode Request	MV	Command the unit to a specific application mode
Heat Cool Mode Status	MV	Indicates the current application mode of the equipment
Occupancy Request	MV	Command the unit to a specific occupancy mode
Occupancy Status	MV	Indicates the current occupancy mode of the unit
Outdoor Damper Status	MV	Indicates the state of the outdoor air damper
Unit Type	MV	General description of the equipment type classification

Table 17. Tracer UC400 unit controller points: Fan-coil unit applications

UC400 point name	UC400 point type	Description
Space Temperature Local	AI1	
Space Temperature Setpoint Local	AI2	Setpoint value from space mounted sensor device
Discharge Air Temperature	AI	Hardwired discharge temperature sensor value
Entering Water Temperature	AI	The temperature of water entering the unit
Space CO2 Concentration Local	AI	
Supply Fan Speed	AO	The supply fan speed value sent by unit to the fan controller

Table 17. Tracer UC400 unit controller points: Fan-coil unit applications (continued)

UC400 point name	UC400 point type	Description
Water Valve Position	AO	
Auxiliary Heat Control Request	AV	Maximum amount of reheat available to control space temperature
Cabinet Style	AV	Describes the cabinet style of the unit
Cool Type	AV	Describes the cooling type installed in the unit
Cooling Capacity Status	AV	Indicates the unit cooling capacity being utilized
Cooling Enable BAS	AV	Allows a BAS to control the unit cooling system
Cooling Setpoint High Limit	AV	Maximum value allowed for the Cooling Temperature Setpoint
Cooling Setpoint Low Limit	AV	Minimum value allowed for the Cooling Temperature Setpoint
Economizer Airside Enable BAS	AV	Command the state of the airside economizer system
Economizer Minimum Position Setpoint BAS	AV	BAS supplied economizer position minimum setpoint value
Economizer Minimum Position Setpoint Local	AV	Indicates the local economizer minimum position setpoint
Economizer Temperature Enable Setpoint	AV	Temperature setpoint below which economizer mode can be used
Exhaust Enable Position	AV	The minimum position of outdoor air damper to start exhaust fan
Exhaust Return Fan Type	AV	Describes the exhaust or return fan type installed in the unit
Fan Speed Command	AV	Allows a BAS to override the local unit fan speed
Filter Runtime Hours	AV	Indicates the number of hours air has flowed through the filter
Filter Runtime Hours Setpoint	AV	The setpoint value used by the filter run hours calculation
Heat Output Secondary Status	AV	Indicates the amount of reheat provided by the unit
Heating Setpoint High Limit	AV	Maximum value allowed for the Heating Temperature Setpoint
Heating Setpoint Low Limit	AV	Minimum value allowed for the Heating Temperature Setpoint
Occupied Bypass Time	AV	Time an override of the occupancy mode will stay in effect
Occupied Offset	AV	Offset value used to calculate setpoints in occupied mode
Outdoor Air Damper Position	AV	Indicates the unit outside air damper position
Outdoor Air Temperature Active	AV	The outdoor air temperature currently used for unit control
Outdoor Air Temperature BAS	AV	BAS supplied outdoor air temperature sensor value
Outdoor Damper Status	AV	Indicates the state of the outdoor air damper
Preheat Type	AV	Describes the heating type installed in the unit
Primary Heat Output	AV	Indicates the unit primary heating capacity being utilized
Reheat Capacity	AV	Indicates the unit reheat capacity being utilized
Reheat Type	AV	Describes the reheat type installed in the unit
Source Temperature BAS	AV	Temperature of the air or water entering the unit
Space CO2 Concentration Active	AV	Space CO2 concentration value being used for unit control
Space Humidity Active	AV	The space humidity currently used for unit control
Space Humidity BAS	AV	BAS supplied space humidity sensor value

Table 17. Tracer UC400 unit controller points: Fan-coil unit applications (continued)

UC400 point name	UC400 point type	Description
Space Temp Setpoint Default	AV	
Space Temperature Active	AV	The space temperature currently used for unit control
Space Temperature BAS	AV	BAS supplied space air temperature sensor value
Space Temperature Setpoint Active	AV	Space air temperature setpoint value being used for unit control
Space Temperature Setpoint BAS	AV	Base value to calculate setpoints in occupied and standby modes
Standby Offset	AV	Offset value used to calculate setpoints in standby mode
Supply Fan Type	AV	Describes the supply fan type installed in the unit
Unit Energy Demand	AV	Indicates the current heat/cool energy demand of the unit
Unoccupied Cooling Setpoint	AV	Cooling temperature setpoint used for control in unoccupied mode
Unoccupied Heating Setpoint	AV	Heating temperature setpoint used for control in unoccupied mode
Occupancy Input	BI	
ECM Fan Output	BO	
Fan Output	BO	
Heat Output 1	BO	
Heat Output 2	BO	
Heat Output 3	BO	
Cooling Fan Default Status	BV	The fan speed when the unit is in cooling mode
Filter Timer Reset	BV	Command the unit to reset the accumulated filter run hours
Heating Fan Default Status	BV	The fan speed when the unit is in heating mode
Reset Diagnostic	BV	Command used to reset latching diagnostics
Supply Fan Switch Local Control	BV	Controls when the unit fan speed switch is used for control
Communication Status	MI	Indicates if the unit is communicating with a parent device
Timed Override Status	MI	Timed override request or cancel from zone sensor
Baseboard Heat Status	MV	Indicates the state of base board heating in the space
Defrost System Status	MV	Indicates the state of the unit defrost function
Dehumidification System Status	MV	Indicates the state of the unit dehumidification function
Economizer Type	MV	General description of the equipment economizer system
Emergency Override BAS	MV	Command the unit into an emergency mode of operation
Heat Cool Mode Request	MV	Command the unit to a specific application mode
Heat Cool Mode Status	MV	Indicates the current application mode of the equipment
Occupancy Request	MV	Command the unit to a specific occupancy mode
Occupancy Status	MV	Indicates the current occupancy mode of the unit
Unit Type	MV	General description of the equipment type classification
Water Valve Override	MV	Allows a user to command the position of the water valve

Table 18. Tracer UC400 unit controller points: VAV box applications

UC400 point name	UC400 point type	Description
Space Temperature Local	AI1	
Space Temperature Setpoint Local	AI2	Setpoint value from space mounted sensor device
Space CO2 Concentration Local	AI	
Discharge Air Temperature	AI	Temperature of the air leaving the unit
Pressure 1	AI	
Supply Air Temperature Local	AI	
Air Valve Position Status	AO	The current position of the air valve
Supply Fan Speed	AO	The supply fan speed value sent by unit to the fan controller
Water Valve Position	AO	
Air Flow Gain	AV	
Air Flow Measurement Offset	AV	
Air Flow Minimum Setpoint Active	AV	The minimum air flow that will be provided to the space
Air Flow Nominal Status	AV	Factory assigned air flow value based on unit size
Air Flow Override Percent	AV	Percent of air flow based on Air Flow Maximum Setpoint
Air Flow Setpoint Active	AV	Amount of air that the unit will to deliver to the space
Air Flow Setpoint Maximum	AV	Maximum air that may be provided when the supply air is cold
Air Flow Setpoint Maximum Heat	AV	Maximum air that may be provided when the supply air is hot
Air Flow Setpoint Minimum	AV	Minimum air that must be provided when the supply air is cold
Air Flow Setpoint Minimum Heat	AV	Minimum air that must be provided when the supply air is hot
Air Flow Setpoint Minimum Local Heat	AV	Minimum air flow setpoint when reheat is active
Air Flow Setpoint Minimum Standby	AV	Minimum air supplied when supply air is cold and unit in standby
Air Flow Setpoint Minimum Standby Heat	AV	Minimum air supplied when supply air is hot and unit in standby
Auxiliary Heat Control Request	AV	Maximum amount of reheat available to control space temperature
Cabinet Style	AV	Describes the cabinet style of the unit
Cool Type	AV	Describes the cooling type installed in the unit
Cooling Setpoint High Limit	AV	Maximum value allowed for the Cooling Temperature Setpoint
Cooling Setpoint Low Limit	AV	Minimum value allowed for the Cooling Temperature Setpoint
Discharge Air Flow	AV	The volume of air provided to the space
Heat Output Secondary Status	AV	Indicates the amount of reheat provided by the unit
Heating Setpoint High Limit	AV	Maximum value allowed for the Heating Temperature Setpoint
Heating Setpoint Low Limit	AV	Minimum value allowed for the Heating Temperature Setpoint
Occupied Bypass Time	AV	Time an override of the occupancy mode will stay in effect
Occupied Offset	AV	Offset value used to calculate setpoints in occupied mode
Preheat Type	AV	Describes the heating type installed in the unit.

Table 18. Tracer UC400 unit controller points: VAV box applications (continued)

UC400 point name	UC400 point type	Description
Reheat Type	AV	Describes the reheat type installed in the unit
Space CO2 Concentration Active	AV	Space CO2 concentration value being used for unit control
Space CO2 Concentration BAS	AV	BAS supplied space CO2 sensor value
Space CO2 Limit	AV	CO2 concentration limit where CO2 demand ventilation ends
Space CO2 Low Limit	AV	CO2 concentration limit where CO2 demand ventilation begins
Space Temp Setpoint Default	AV	
Space Temperature Active	AV	The space temperature currently used for unit control
Space Temperature BAS	AV	BAS supplied space air temperature sensor value
Space Temperature Setpoint Active	AV	Space air temperature setpoint value being used for unit control
Space Temperature Setpoint BAS	AV	Base value to calculate setpoints in occupied and standby modes
Standby Offset	AV	Offset value used to calculate setpoints in standby mode
Supply Air Temperature Active	AV	
Supply Air Temperature BAS	AV	Temperature of the air or water entering the unit
Supply Fan Type	AV	Describes the supply fan type installed in the unit
Unoccupied Cooling Setpoint	AV	Cooling temperature setpoint used for control in unoccupied mode
Unoccupied Heating Setpoint	AV	Heating temperature setpoint used for control in unoccupied mode
Ventilation Ratio	AV	The ratio of the ventilation setpoint to actual air flow
Ventilation Ratio Limit BAS	AV	The maximum ventilation ratio used for air flow control
Ventilation Setpoint Active	AV	The ventilation setpoint calculated by the unit
Ventilation Setpoint BAS	AV	The ventilation or air flow setpoint provided by the BAS
Ventilation Setpoint Local	AV	The ventilation or air flow setpoint for stand alone operation
Ventilation Standby Setpoint	AV	The ventilation or air flow setpoint for stand by operation
Occupancy Input	BI	
ECM Fan Output	BO	
Fan Output	BO	
Heat Output 1	BO	
Heat Output 2	BO	
Heat Output 3	BO	
Diagnostic: Air Flow Override Local	BV	Binary point for alarming.
Diagnostic: Flow Sensor Calibration Failure	BV	Binary point for alarming.
Diagnostic: Flow Sensor Failure	BV	Binary point for alarming.
Diagnostic: Low Primary Air Flow	BV	Binary point for alarming.
Diagnostic: High Air Flow	BV	Binary point for alarming.
Communication Status	MI	Indicates if the unit is communicating with a parent device

Table 18. Tracer UC400 unit controller points: VAV box applications (continued)

UC400 point name	UC400 point type	Description
Timed Override Status	MI	Timed override request or cancel from zone sensor
Air Flow Minimum Setpoint Source	MV	The application providing the air flow minimum setpoint value
Air Flow Override	MV	Allows a user to override the air valve to a desired flow
Emergency Override BAS	MV	Command the unit into an emergency mode of operation
Heat Cool Mode Request	MV	Command the unit to a specific application mode
Heat Cool Mode Status	MV	Indicates the current application mode of the equipment
Occupancy Request	MV	Command the unit to a specific occupancy mode
Occupancy Status	MV	Indicates the current occupancy mode of the unit
Unit Type	MV	General description of the equipment type classification
Water Valve Override	MV	Allows a user to command the position of the water valve

Tracer MP501 Unit Controller Points

The following table provides network variable information for an MP501 and serves as a guide for Tracer SC key mapping. Determine the configuration used in the MP501 and map the appropriate network variables.

Table 19. Network variable information and key mapping guide for the Tracer MP501 multi-purpose controller

MP501 configured for:					NV Name	SNVT Type	NV Index	Tracer SC Key	Point Type Created in Tracer SC
Tempera-ture	Pres-sure	Flo-w	Per-cent	PPM					
*	*	*	*	*	nvoStage1	SNVT_switch	27	Generic Stage 1 Status	BI
*	*	*	*	*	nvoStage2	SNVT_switch	28	Generic Stage 1 Status	BI
*	*	*	*	*	nvoOutput-Percent	SNVT_lev_ percent	29	Generic Output Percent Status	AI
X	X	X	X	X	nvoRelayS-tate	SNVT_switch	30	Generic Relay Status	BI
X	X	X	X	X	nvoBI1State	SNVT_switch	31	Generic Binary Input Status	BI
X	X	X	X	X	nviLoopEna-ble	SNVT_switch	32	Generic Loop Enable BAS	BO
X	X	X	X	X	nviCmdO-verride	SNVT_lev_ percent	33	Generic Output Override BAS	AO
X	X	X	X	X	nviRelayO-verride	SNVT_switch	34	Generic Relay Override BAS	BO
			X		nviSetptPer-cent	SNVT_lev_ percent	35	Generic Percent Setpoint BAS	AO
		X			nviSetptFlow	SNVT_flow	36	Generic Flow Setpoint BAS	AO
	X				nviSetpoint-Pressure	SNVT_press_ p	37	Generic Pressure Setpoint BAS	AO
X					nviSetptTemp	SNVT_temp_ p	38	Generic Temperature Setpoint BAS	AO

Table 19. Network variable information and key mapping guide for the Tracer MP501 multi-purpose controller (continued)

MP501 configured for:					NV Name	SNVT Type	NV Index	Tracer SC Key	Point Type Created in Tracer SC
Tempera-ture	Pres-sure	Flo-w	Per-cent	PPM					
				X	nviSetptPPM	SNVT_ppm	39	Generic PPM Setpoint BAS	AO
			X		nvoInputPer-cent	SNVT_lev_ percent	40	Generic Input Percent Status	AI
		X			nvoInputFlow	SNVT_flow	41	Generic Input Flow Status	AI
	X				nvoInput-Pressure	SNVT_press_ p	42	Generic Input Pressure Status	AI
X					nvoInput-Temp	SNVT_temp_ p	43	Generic Input Temperature Status	AI
				X	nvoInputPPM	SNVT_ppm	44	Generic Input PPM Status	AI
			X		nviInputPer-cent	SNVT_lev_ percent	45	Generic Percent BAS	AO
		X			nviInputFlow	SNVT_flow	46	Generic Flow BAS	AO
	X				nviInputPres-sure	SNVT_press_ p	47	Generic Pressure BAS	AO
X					nviInputTemp	SNVT_temp_ p	48	Generic Temperature BAS	AO
				X	nviInputPPM	SNVT_ppm	49	Generic PPM BAS	AO

Note: *Available based on MP501 output configuration.*

Tracer MP503 Unit Controller Points

The following table provides network variable information for an MP503 and serves as a guide for Tracer SC key mapping.

Table 20. Network variable information and key mapping guide for the Tracer MP503 input/output module

NV Name	SNVT Type	NV Index	Tracer SC Key	Point Type Created in Tracer SC
nviBOP1Request	UNVT_switch_binary	1	Binary Output Request 1	BO
nviBOP2Request	UNVT_switch_binary	2	Binary Output Request 2	BO
nviBOP3Request	UNVT_switch_binary	3	Binary Output Request 3	BO
nviBOP4Request	UNVT_switch_binary	4	Binary Output Request 4	BO
nviBOP1Override	UNVT_switch_binary	5	Binary Output Override 1	BO
nviBOP2Override	UNVT_switch_binary	6	Binary Output Override 2	BO
nviBOP3Override	UNVT_switch_binary	7	Binary Output Override 3	BO
nviBOP4Override	UNVT_switch_binary	8	Binary Output Override 4	BO
nvoTemperature1	SNVT_temp_p	14	Temperature 1	AI

Table 20. Network variable information and key mapping guide for the Tracer MP503 input/output module (continued)

NV Name	SNVT Type	NV Index	Tracer SC Key	Point Type Created in Tracer SC
nvoTemperature2	SNVT_temp_p	15	Temperature 2	AI
nvoTemperature3	SNVT_temp_p	16	Temperature 3	AI
nvoTemperature4	SNVT_temp_p	17	Temperature 4	AI
nvoBIP1Status	UNVT_switch_binary	18	Binary Input Status 1	BI
nvoBIP2Status	UNVT_switch_binary	19	Binary Input Status 2	BI
nvoBIP3Status	UNVT_switch_binary	20	Binary Input Status 3	BI
nvoBIP4Status	UNVT_switch_binary	21	Binary Input Status 4	BI
nvoCurrent1	SNVT_amp_mil	22	Current 1	AI
nvoCurrent2	SNVT_amp_mil	23	Current 2	AI
nvoCurrent3	SNVT_amp_mil	24	Current 3	AI
nvoCurrent4	SNVT_amp_mil	25	Current 4	AI
nvoVolts1	SNVT_volt	26	Voltage 1	AI
nvoVolts2	SNVT_volt	27	Voltage 2	AI
nvoVolts3	SNVT_volt	28	Voltage 3	AI
nvoVolts4	SNVT_volt	29	Voltage 4	AI
nvoBOP1Status	UNVT_switch_binary	30	Binary Output Status 1	BI
nvoBOP2Status	UNVT_switch_binary	31	Binary Output Status 2	BI
nvoBOP3Status	UNVT_switch_binary	32	Binary Output Status 3	BI
nvoBOP4Status	UNVT_switch_binary	33	Binary Output Status 4	BI

Tracer SC Enumerations

Table 21. Tracer SC enumerations

Tracer SC Point Name	Enumerations and State Text
Active Base Loading Setpoint Source	1 = Front Panel 2 = External 3 = Ice 4 = BAS
Active Chilled Water Setpoint Source	1 = Front Panel 2 = External 3 = Ice 4 = BAS
Active Current Limit Setpoint Source	1 = Front Panel 2 = External 3 = Ice 4 = BAS
Active Hot Water Setpoint Source	1 = Front Panel 2 = External 3 = Ice 4 = BAS
Add Input	false = Inactive true = Active
Add Request Exist	false = Inactive true = Active

Table 21. Tracer SC enumerations (continued)

Tracer SC Point Name	Enumerations and State Text
AHU Mode Request	1 = Occupied 2 = Unoccupied 3 = Optimal Start 4 = Humidity Pulldown 5 = Optimal Stop 6 = Unoccupied Heating/Cooling 7 = Night Purge 8 = Unoccupied Humidify 9 = Unoccupied Dehumidify 10 = Unknown Operating Mod
Air Flow Minimum Setpoint Source	1 = None (no min enforced) 2 = Cooling Minimum 3 = Heating Minimum 4 = Local Heating Minimum 5 = Standby Cooling Minimum 6 = Standby Heating Minimum 7 = Derived from Ventilation Requirements 8 = Pressure Dependent Mode Min
Air Flow Override	1 = Air Valves Auto Control 2 = Not Used 3 = Not Used 4 = Not Used 5 = Air Valves Full Open 6 = Air Valves Full Closed 7 = Air Valves Minimum Setpoint 8 = Air Valves Maximum Setpoint
Air Valve Position Control	false = pressure independent control true = position control/pressure dependent
Alarm Relay Output Status	false = De-energized true = Energized
All Chillers Are Unavailable	false = None true = Failure
All Chillers Have Failed	false = None true = Failure
Ambient Temperature Lockout Active	false = Disabled true = Enabled
Ambient Temperature Lockout Function	false = Disabled true = Enabled
Auto Calibration Enabled	false = Disabled true = Enabled
Auto Commissioning Active	false = Disabled true = Enabled
Auto Commissioning Command	false = Cancel true = Start
Auto Commissioning State	1 = Waiting 2 = Calibrating 3 = Flow Test 4 = Fan Test 5 = Reheat Test 6 = Finished 7 = Canceled
Available	false = Unavailable true = Available
Base Loading Active	false = Inactive true = Active
Base Loading Auto/On Request BAS	false = Auto true = On

Table 21. Tracer SC enumerations (continued)

Tracer SC Point Name	Enumerations and State Text
Baseboard Heat Status	1 = Off 2 = On 3 = Not Present
Binary Member Control Function	false = Disabled true = Enabled
Boiler Pump 1 Fault Status	false = Normal true = In Alarm
Boiler Pump 1 Flow Status	false = No Flow true = Flow
Boiler Pump 1 Reset BAS	false = Normal true = Reset
Boiler Pump 1 Start Stop Output	false = Off true = On
Boiler Pump 1 VFD Fault Status	false = Normal true = In Alarm
Boiler Pump 2 Fault Status	false = Normal true = In Alarm
Boiler Pump 2 Flow Status	false = No Flow true = Flow
Boiler Pump 2 Reset BAS	false = Normal true = Reset
Boiler Pump 2 Start Stop Output	false = Off true = On
Boiler Pump 2 VFD Fault Status	false = Normal true = In Alarm
Boiler Pump 3 Fault Status	false = Normal true = In Alarm
Boiler Pump 3 Flow Status	false = No Flow true = Flow
Boiler Pump 3 Reset BAS	false = Normal true = Reset
Boiler Pump 3 Start Stop Output	false = Off true = On
Boiler Pump 3 VFD Fault Status	false = Normal true = In Alarm
Bypass Chilled Water System Flow Status	false = No Flow true = Flow
Calibration Active	false = Inactive true = Active
Capacity Limited	false = Not Limited true = Limited
Chilled Water Flow	false = No Flow true = Flow
Chilled Water Pump 1 Fault Status	false = Normal true = In Alarm
Chilled Water Pump 1 Flow Status	false = No Flow true = Flow
Chilled Water Pump 1 Reset BAS	false = Normal true = Reset
Chilled Water Pump 1 Start Stop Output	false = Off true = On

Table 21. Tracer SC enumerations (continued)

Tracer SC Point Name	Enumerations and State Text
Chilled Water Pump 1 VFD Fault Status	false = Normal true = In Alarm
Chilled Water Pump 2 Fault Status	false = Normal true = In Alarm
Chilled Water Pump 2 Flow Status	false = No Flow true = Flow
Chilled Water Pump 2 Reset BAS	false = Normal true = Reset
Chilled Water Pump 2 Start Stop Output	false = Off true = On
Chilled Water Pump 2 VFD Fault Status	false = Normal true = In Alarm
Chilled Water Pump 3 Fault Status	false = Normal true = In Alarm
Chilled Water Pump 3 Flow Status	false = No Flow true = Flow
Chilled Water Pump 3 Reset BAS	false = Normal true = Reset
Chilled Water Pump 3 Start Stop Output	false = Off true = On
Chilled Water Pump 3 VFD Fault Status	false = Normal true = In Alarm
Chilled Water Pump 4 Fault Status	false = Normal true = In Alarm
Chilled Water Pump 4 Flow Status	false = No Flow true = Flow
Chilled Water Pump 4 Reset BAS	false = Normal true = Reset
Chilled Water Pump 4 Start Stop Output	false = Off true = On
Chilled Water Pump 4 VFD Fault Status	false = Normal true = In Alarm
Chilled Water Valve Status	false = Closed true = Open
Chiller 1 Chilled Water Flow Status	false = No Flow true = Flow
Chiller 1 Pump Request BAS	false = Off true = On
Chiller 1 Pump Request Local	false = Off true = On
Chiller 2 Chilled Water Flow Status	false = No Flow true = Flow
Chiller 2 Pump Request BAS	false = Off true = On
Chiller 2 Pump Request Local	false = Off true = On
Chiller 3 Chilled Water Flow Status	false = No Flow true = Flow
Chiller 3 Pump Request BAS	false = Off true = On
Chiller 3 Pump Request Local	false = Off true = On

Table 21. Tracer SC enumerations (continued)

Tracer SC Point Name	Enumerations and State Text
Chiller 4 Chilled Water Flow Status	false = No Flow true = Flow
Chiller 4 Pump Request BAS	false = Off true = On
Chiller 4 Pump Request Local	false = Off true = On
Chiller Auto Stop Command	false = Stop true = Auto
Chiller Auto Stop Command BAS	false = Stop true = Auto
Chiller Auto Stop Command Multistate BAS	1 = Stop 2 = Auto
Chiller Available	false = Unavailable true = Available
Chiller Failure	1 = No Failures 2 = Failed To Command Chiller Pump On 3 = Failed To Confirm Chilled Water Flow 4 = Failed To Command Chiller On 5 = Failed To Confirm Chiller Running. Chiller Plant Reset Required 6 = Failed To Command Chiller Off 7 = Failed To Confirm Chiller Off 8 = Failed To Command Chiller Pump Off 9 = Failed To Confirm Chiller Chilled Water Flow Off 10 = Chiller Manual Reset Active 11 = Optional Chiller Failure Input Active 12 = Communication Lost
Chiller Failure Exists	false = None true = Failure
Chiller Failure Reset	false = None true = Failure
Chiller Lockout	false = Normal true = Lockout
Chiller Manual Reset Active	false = None true = Failure
Chiller Mode Command BAS	1 = Cooling 2 = Heating 3 = Ice Building 4 = Free Cool
Chiller Plant Enable	false = Disabled true = Enabled
Chiller Plant Pump Request	false = Disabled true = Enabled
Chiller Pump 1 Status	false = Off true = Running
Chiller Pump 2 Status	false = Off true = Running
Chiller Running State	false = Off true = On
Chiller Setpoint Source	1 = BAS 2 = External 3 = Front Panel
Chillers Running Out of Sequence	false = Inactive true = Active
Circuit 1 Enable	false = Disabled true = Enabled

Table 21. Tracer SC enumerations (continued)

Tracer SC Point Name	Enumerations and State Text
Circuit 2 Enable	false = Disabled true = Enabled
Communication Lost	false = None true = Failure
Communication Status	1 = Not Communicating 2 = No Logical Device Connected 3 = Communicating 4 = Startup
Compressor 1A Status	false = Off true = Running
Compressor 1A Status	1 = Off 2 = Running 3 = Alarm ***Note:*** *This enumeration is only valid for UC800 controllers.*
Compressor 1B Status	false = Off true = Running
Compressor 1B Status	1 = Off 2 = Running 3 = Alarm ***Note:*** *This enumeration is only valid for UC800 controllers.*
Compressor 1C Status	false = Off true = Running
Compressor 1C Status	1 = Off 2 = Running 3 = Alarm ***Note:*** *This enumeration is only valid for UC800 controllers.*
Compressor 2A Status	false = Off true = Running
Compressor 2A Status	1 = Off 2 = Running 3 = Alarm ***Note:*** *This enumeration is only valid for UC800 controllers.*
Compressor 2B Status	false = Off true = Running
Compressor 2B Status	1 = Off 2 = Running 3 = Alarm ***Note:*** *This enumeration is only valid for UC800 controllers.*
Compressor 2C Status	false = Off true = Running
Compressor 2C Status	1 = Off 2 = Running 3 = Alarm ***Note:*** *This enumeration is only valid for UC800 controllers.*
Compressor Lead Lag Enable Command	false = Disable true = Enable
Compressor Lockout Status	false = Normal true = Locked out
Condenser Fan 1 Circuit 1 Status	false = Off true = Running
Condenser Fan 1 Circuit 2 Status	false = Off true = Running

Table 21. Tracer SC enumerations (continued)

Tracer SC Point Name	Enumerations and State Text
Condenser Fan 2 Circuit 1 Status	false = Off true = Running
Condenser Fan 2 Circuit 2 Status	false = Off true = Running
Condenser Fan 3 Circuit 1 Status	false = Off true = Running
Condenser Fan 3 Circuit 2 Status	false = Off true = Running
Condenser Fan A Status	false = Off true = Running
Condenser Fan B Status	false = Off true = Running
Condenser Fan C Status	false = Off true = Running
Condenser Fan Circuit 1 Status	false = Off true = Running
Condenser Fan Circuit 2 Status	false = Off true = Running
Condenser Fan D Status	false = Off true = Running
Condenser Fan E Status	false = Off true = Running
Condenser Fan F Status	false = Off true = Running
Condenser Fan G Status	false = Off true = Running
Condenser Fan H Status	false = Off true = Running
Condenser Pump 1 Fault Status	false = Normal true = In Alarm
Condenser Pump 1 Flow Status	false = No Flow true = Flow
Condenser Pump 1 Reset BAS	false = Normal true = Reset
Condenser Pump 1 Start Stop Output	false = Off true = On
Condenser Pump 1 VFD Fault Status	false = Normal true = In Alarm
Condenser Pump 2 Fault Status	false = Normal true = In Alarm
Condenser Pump 2 Flow Status	false = Normal true = In Alarm
Condenser Pump 2 Reset BAS	false = Normal true = Reset
Condenser Pump 2 Start Stop Output	false = Off true = On
Condenser Pump 2 VFD Fault Status	false = Normal true = In Alarm
Condenser Pump 3 Fault Status	false = Normal true = In Alarm

Table 21. Tracer SC enumerations (continued)

Tracer SC Point Name	Enumerations and State Text
Condenser Pump 3 Flow Status	false = No Flow true = Flow
Condenser Pump 3 Reset BAS	false = Normal true = Reset
Condenser Pump 3 Start Stop Output	false = Off true = On
Condenser Pump 3 VFD Fault Status	false = Normal true = In Alarm
Condenser Pump 4 Fault Status	false = Normal true = In Alarm
Condenser Pump 4 Flow Status	false = No Flow true = Flow
Condenser Pump 4 Reset BAS	false = Normal true = Reset
Condenser Pump 4 Start Stop Output	false = Off true = On
Condenser Pump 4 VFD Fault Status	false = Normal true = In Alarm
Condenser Type	1 = None 2 = Air Cooled Condenser 3 = Water Cooled Condenser 4 = Evaporative Condenser
Condenser Water Flow BAS	1 = Flow 2 = No Flow 3 = Auto
Condenser Water Flow Status	false = No Flow true = Flow
Condenser Water Pump Request	false = Off true = On
Condenser Water Pump Status	false = Off true = On
Cool Output 1	1 = Off 2 = On 3 = Not Present
Cool Output 1 Status	
Cool Output 2	1 = Off 2 = On 3 = Not Present
Cool Output 2 Status	false = Off true = On
Cool Output 3	1 = Off 2 = On 3 = Not Present
Cool Output 4	1 = Off 2 = On 3 = Not Present
Cool Output 5	1 = Off 2 = On 3 = Not Present
Cool Output 6	1 = Off 2 = On 3 = Not Present

Table 21. Tracer SC enumerations (continued)

Tracer SC Point Name	Enumerations and State Text
Cool Output 7	1 = Off 2 = On 3 = Not Present
Cool Output 8	1 = Off 2 = On 3 = Not Present
Cooling Fan Default Status	1 = No Default 2 = Off 3 = Low 4 = Undefined 5 = Medium 6 = Not Used 7 = Not Used 8 = Not Used 9 = High 10 = Not Used 11 = Not Used 12 = Not Used 13 = Not Used 14 = Not Used 15 = Not Used 16 = Not Used 17 = Auto
Cooling Fan Operation Default	false = Cycling true = Continuous
Cooling Reset Type Status	1 = None 2 = Outdoor Air 3 = Zone 4 = Return Air
Cooling Type	1 = Water Cooled 2 = Air Cooled
Current Operation	1 = Disabled 2 = Waiting To Add 3 = Waiting To Subtract 4 = Starting Chiller 5 = Shutting Off Chiller 6 = Start Interval Active 7 = No Changes Needed 8 = System Chilled Water Request Active 9 = In Second Step 10 = Second Step Shutting Off Chiller
Daytime Warmup Enable Command	false = Disable true = Enable
Dehumidification Command	false = Disable true = Enable
Dehumidification Reheat Control	false = Disable true = Enable
Dehumidification Status	false = Off true = On
Dehumidification System Status	1 = Off 2 = On 3 = Not Present
Detailed Chiller Status	1 = Unit Is Running 2 = Stopped By Alarm 3 = Stopped By BMS 4 = Stopped By Clock 5 = Stopped By External Signal 6 = Stopped By Operator 7 = Oil Cycle Running
Diagnostic Alarm Present	false = Inactive true = Active

Table 21. Tracer SC enumerations (continued)

Tracer SC Point Name	Enumerations and State Text
Diagnostic Condensate Overflow	false = Normal true = In Alarm
Diagnostic Present	false = Normal true = In Alarm
Diagnostic Present	false = Inactive true = Active ***Note:*** *This enumeration is only valid for the Area system point.*
Diagnostic Shutdown Present	false = Normal true = In Alarm
Dirty Filter Alarm	false = Normal true = In Alarm
Display Temperature Scale	false = °C true = °F
Drive Fault Status	false = Normal true = In Alarm
Drive Motor Status	false = Off true = On
Duct Static Optimization	1 = Active 2 = Disabled 3 = No VAV Data 4 = In Test 5 = Maximum Heat 6 = Air Handler Off 7 = Air Valve Closed 8 = Unknown Status
Duct Static Optimization Function	false = Inactive true = Active
ECM Fan Output Status	false = Off true = On
Economizer Airside Enable Command	1 = Disabled 2 = Enabled 3 = Auto
Economizer Decision Method	1 = Absolute Temperature 2 = Relative Temperature 3 = Absolute Enthalpy 4 = Comparative Enthalpy
Economizer Minimum Position Enable Command	false = Enable true = Disable
Economizer Status	false = Disabled true = Enabled
Economizer System Status	1 = Disabled 2 = Enabled 3 = Not Present
Economizer Type	1 = None 2 = 2 Position Ventilation 3 = Modulation Economizer 4 = 2 Position Ventilation/Waterside Economizer 5 = Waterside Economizer 6 = Airside/Waterside Economizer 7 = TRAQ Damper 8 = Airside Economizer and TRAQ Damper/Sensor 9 = Waterside Economizer and TRAQ Damper/Sensor 10 = Airside/Waterside Economizer and TRAQ Damper/Sensor
Economizer Waterside Enable Command	1 = Disabled 2 = Enabled 3 = Auto

Table 21. Tracer SC enumerations (continued)

Tracer SC Point Name	Enumerations and State Text
Electric Heat Timer Reset	false = Normal true = Reset
Emergency Heat Status	false = Off true = On
Emergency Override Command	1 = Normal 2 = Pressurize 3 = Depressurize 4 = Purge 5 = Shutdown 6 = Fire
Emergency Stop	false = Off true = On
Energy Recovery Frost Avoidance Status	false = Inactive true = Active
Energy Recovery Preheat Status	false = Inactive true = Active
Energy Recovery Status	false = Inactive true = Active
Enforce Minimum Setpoint Differential	false = Disabled true = Enabled
Evaporator Water Flow Status	false = No Flow true = Flow
Evaporator Water Pump Request	false = Off true = On
Exhaust Fan Failure	false = Normal true = In Alarm
Exhaust Fan Failure Reset	false = Normal true = Reset
Exhaust Fan Output	1 = Off 2 = On 3 = Not Present
Exhaust Fan Proving Status	1 = Off 2 = On 3 = Not Present
Exhaust Fan Status	false = Off true = On
Fail Chiller On Alarm	false = None true = Failure
Failed To Command Chiller Off	false = None true = Failure
Failed To Command Chiller On	false = None true = Failure
Failed To Command Chiller Pump Off	false = None true = Failure
Failed To Command Chiller Pump On	false = None true = Failure
Failed To Command System Pump Off	false = None true = Failure
Failed To Command System Pump On	false = None true = Failure
Failed To Confirm Chilled Water Flow Off	false = None true = Failure
Failed To Confirm Chilled Water Flow On	false = None true = Failure

Table 21. Tracer SC enumerations (continued)

Tracer SC Point Name	Enumerations and State Text
Failed To Confirm Chiller Off	false = None true = Failure
Failed To Confirm Chiller Running	false = None true = Failure
Failed To Confirm System Chilled Water Flow Off	false = None true = Failure
Failed To Confirm System Chilled Water Flow On	false = None true = Failure
Failed To Read Bypass Flow	false = None true = Failure
Fan Mode BAS	1 = On 2 = Auto 3 = Smart
Fan Output Status	false = Off true = On
Fan Speeds Configured	1 = Zero 2 = One 3 = Two 4 = Three 5 = Variable Speed
Filter Timer Reset	false = Normal true = Reset
Final Filter Status	1 = Clean 2 = Dirty 3 = Not Present
Forced Rotation Enabled	false = Disabled true = Enabled
Front Panel Auto Stop Status	1 = Stop 2 = Auto
Front Panel Base Loading Command	false = Auto true = On
Front Panel Chiller Mode	1 = Cooling 2 = Heating 3 = Ice Building 4 = Free Cool
Frost Detection Input	1 = Off 2 = On 3 = Not Present
Generic Binary Input Status	false = Off true = On
Generic Binary Input Status 1	false = Off true = On
Generic Binary Input Status 2	false = Off true = On
Generic Binary Input Status 3	false = Off true = On
Generic Binary Input Status 4	false = Off true = On
Generic Binary Output Override 1	false = Off true = On
Generic Binary Output Override 2	false = Off true = On
Generic Binary Output Override 3	false = Off true = On

Table 21. Tracer SC enumerations (continued)

Tracer SC Point Name	Enumerations and State Text
Generic Binary Output Override 4	false = Off true = On
Generic Binary Output Request	false = Off true = On
Generic Binary Output Request 1	false = Off true = On
Generic Binary Output Request 2	false = Off true = On
Generic Binary Output Request 3	false = Off true = On
Generic Binary Output Request 4	false = Off true = On
Generic Binary Output Status	false = Off true = On
Generic Binary Output Status 1	false = Off true = On
Generic Binary Output Status 2	false = Off true = On
Generic Binary Output Status 3	false = Off true = On
Generic Binary Output Status 4	false = Off true = On
Generic Heat Cool Mode Request	1 = Auto 2 = Heat 3 = Morning Warm-up 4 = Cool 5 = Night Purge 6 = Pre Cool 7 = Off 8 = Test 9 = Emergency Heat 10 = Fan Only 11 = Free Cool 12 = Ice-Making 13 = Max Heat 14 = Economizer 15 = Dehumidify 16 = Calibrate
Generic Heat Cool Mode Status	1 = Auto 2 = Heat 3 = Morning Warm-up 4 = Cool 5 = Night Purge 6 = Pre Cool 7 = Off 8 = Test 9 = Emergency Heat 10 = Fan Only 11 = Free Cool 12 = Ice-Making 13 = Max Heat 14 = Economizer 15 = Dehumidify 16 = Calibrate
Generic Loop Enable BAS	false = Off true = On
Generic Relay Override BAS	false = Off true = On
Generic Relay Status	false = Off true = On

Table 21. Tracer SC enumerations (continued)

Tracer SC Point Name	Enumerations and State Text
Generic Stage 1 Status	false = Off true = On
Generic Stage 2 Status	false = Off true = On
Generic State Input 1	1 = Off 2 = On 3 = Not Present
Generic State Input 2	1 = Off 2 = On 3 = Not Present
Generic State Input 3	1 = Off 2 = On 3 = Not Present
Generic State Input 4	1 = Off 2 = On 3 = Not Present
Generic State Input 5	1 = Off 2 = On 3 = Not Present
Generic State Input 6	1 = Off 2 = On 3 = Not Present
Generic State Input 7	1 = Off 2 = On 3 = Not Present
Generic State Input 8	1 = Off 2 = On 3 = Not Present
Generic State Output 1	1 = Off 2 = On 3 = Not Present
Generic State Output 2	1 = Off 2 = On 3 = Not Present
Generic State Output 3	1 = Off 2 = On 3 = Not Present
Generic State Output 4	1 = Off 2 = On 3 = Not Present
Generic State Output 5	1 = Off 2 = On 3 = Not Present
Generic State Output 6	1 = Off 2 = On 3 = Not Present
Generic State Output 7	1 = Off 2 = On 3 = Not Present
Generic State Output 8	1 = Off 2 = On 3 = Not Present
Head Relief Request	false = Off true = On

Table 21. Tracer SC enumerations (continued)

Tracer SC Point Name	Enumerations and State Text
Heat Cool Mode Request	1 = Auto 2 = Heat 3 = Morning Warm-up 4 = Cool 5 = Night Purge 6 = Pre Cool 7 = Off 8 = Test 9 = Emergency Heat 10 = Fan Only 11 = Free Cool 12 = Ice-Making 13 = Max Heat 14 = Economizer 15 = Dehumidify 16 = Calibrate
Heat Cool Mode Status	1 = Auto 2 = Heat 3 = Morning Warm-up 4 = Cool 5 = Night Purge 6 = Pre Cool 7 = Off 8 = Test 9 = Emergency Heat 10 = Fan Only 11 = Free Cool 12 = Ice-Making 13 = Max Heat 14 = Economizer 15 = Dehumidify 16 = Calibrate
Heat Output 1	1 = Off 2 = On 3 = Not Present
Heat Output 1 Status	false = Off true = On
Heat Output 2	1 = Off 2 = On 3 = Not Present
Heat Output 2 Status	false = Off true = On
Heat Output 3	1 = Off 2 = On 3 = Not Present
Heat Output 3 Status	false = Off true = On
Heat Output 4	1 = Off 2 = On 3 = Not Present
Heat Output 5	1 = Off 2 = On 3 = Not Present
Heat Output 6	1 = Off 2 = On 3 = Not Present
Heat Output 7	1 = Off 2 = On 3 = Not Present
Heat Output 8	1 = Off 2 = On 3 = Not Present

Table 21. Tracer SC enumerations (continued)

Tracer SC Point Name	Enumerations and State Text
Heat/Cool Mode Request	1 = Auto 2 = Heat 3 = Morning Warm-up 4 = Cool 5 = Night Purge 6 = Pre Cool 7 = Off 8 = Test 9 = Emergency Heating 10 = Fan Only 11 = Economizing 12 = Ice Making 13 = Maximum Heat 14 = Economy 15 = Dehumidify 16 = Calibrate 17 = Emergency Cool 18 = Emergency Heat 19 = Humidify
Heat/Cool Mode Status	1 = Auto 2 = Heat 3 = Morning warm-up 4 = Cool 5 = Night Purge 6 = Pre Cool 7 = Off 8 = Test 9 = Emergency Heating 10 = Fan Only 11 = Free Cool 12 = Ice-Making 13 = Max Heat 14 = Economizer 15 = Dehumidify 16 = Calibrate
Heating Fan Default Status	false = Cycling true = Continuous
Heating Fan Operation Default	false = Normal true = In Alarm
High Static Alarm	false = Normal true = In Alarm
Hot Gas Bypass Active	false = Inactive true = Active
Hot Water Pump 1 Fault Status	false = Normal true = In Alarm
Hot Water Pump 1 Flow Status	false = No Flow true = Flow
Hot Water Pump 1 Reset BAS	false = Normal true = Reset
Hot Water Pump 1 Start Stop Output	false = Off true = On
Hot Water Pump 1 VFD Fault Status	false = Normal true = In Alarm
Hot Water Pump 2 Fault Status	false = Normal true = In Alarm
Hot Water Pump 2 Flow Status	false = No Flow true = Flow
Hot Water Pump 2 Reset BAS	false = Normal true = Reset
Hot Water Pump 2 Start Stop Output	false = Off true = On

Table 21. Tracer SC enumerations (continued)

Tracer SC Point Name	Enumerations and State Text
Hot Water Pump 2 VFD Fault Status	false = Normal true = In Alarm
Hot Water Pump 3 Fault Status	false = Normal true = In Alarm
Hot Water Pump 3 Flow Status	false = No Flow true = Flow
Hot Water Pump 3 Reset BAS	false = Normal true = Reset
Hot Water Pump 3 Start Stop Output	false = Off true = On
Hot Water Pump 3 VFD Fault Status	false = Normal true = In Alarm
Hot Water Valve Status	false = Closed true = Open
Humidification Command	false = Disable true = Auto
Humidity Pulldown Can Occur	false = Disabled true = Enabled
Humidity Pulldown Function	false = Disabled true = Enabled
In Defrost	false = Not in Defrost true = Defrost
Include In Calculation Function	false = Disabled true = Enabled
Include In Dehumidify Function	false = Disabled true = Enabled
Include In Economize Function	false = Disabled true = Enabled
Include In Humidify Function	false = Disabled true = Enabled
Is Equipment	false = No true = Yes
Keypad Lockout	1 = Setpoint, Mode, Fan, TOV 2 = Setpoint, Mode, Fan 3 = Setpoint, TOV 4 = Setpoint Only 5 = TOV Only 6 = No Access
Light 1 Request BAS	false = Off true = On
Light 1 Request Local	false = Off true = On
Light 1 Status	false = Off true = On
Light 2 Request BAS	false = Off true = On
Light 2 Request Local	false = Off true = On
Light 2 Status	false = Off true = On
Local Setpoint Control	false = Remote control true = Local control

Table 21. Tracer SC enumerations (continued)

Tracer SC Point Name	Enumerations and State Text
Low Temperature Alarm	false = Normal true = In Alarm
Maintenance Ping	false = Off true = On
Manual Override Exists	false = Off true = On
Manual Reset Present	false = Inactive true = Active
Manufacturing Location	1 = Field Applied 2 = La Crosse 3 = Pueblo 4 = Charmes 5 = Rushville 6 = Macon 7 = Waco 8 = Lexington 9 = Forsyth 10 = Clarksville 11 = Ft. Smith 12 = Penang 13 = Colchester 14 = Curitiba 15 = Taicang 16 = Taiwan 17 = Epinal 18 = Golbey
Maximum Capacity	false = Off true = On
Model Information	1 = RTA 2 = CVH 3 = CVG 4 = CVR 5 = CDH 6 = RTH 7 = CGW 8 = CGA 9 = CCA 10 = RTW 11 = RTX 12 = RTU 13 = CCU 14 = CXA 15 = CGC 16 = RAU
Morning Warmup Enable Command	false = Disable true = Enable
MP Communication Status	1 = Communications 2 = Communication Loss 3 = Failed to Establish 4 = Waiting To Establish
Night Purge Economizing Referencer Input	false = Disabled true = Enabled
Night Purge Enable	false = Disabled true = Enabled
Night Purge Function	false = Disabled true = Enabled
Noise Reduction Active	false = Off true = On
Noise Reduction Request BAS	false = Normal true = Reduce Noise

Table 21. Tracer SC enumerations (continued)

Tracer SC Point Name	Enumerations and State Text
Occupancy Input	false = Occupied true = Unoccupied
Occupancy Request	1 = Occupied 2 = Unoccupied 3 = Occupied Bypass 4 = Occupied Standby 5 = Auto
Occupancy Request	1 = Occupied 2 = Unoccupied 3 = Bypass 4 = Standby 5 = Unknown ***Note:*** *This enumeration is only valid for the Area system point.*
Occupancy Status	1 = Occupied 2 = Unoccupied 3 = Occupied Bypass 4 = Occupied Standby 5 = Auto
Occupancy Status	1 = Occupied 2 = Unoccupied 3 = Bypass 4 = Standby 5 = Unknown ***Note:*** *This enumeration is only valid for the Area and VAS system point.*
Occupant Call	false = Off true = On
Operating Mode	1 = Cooling 2 = Heating 3 = Ice Building 4 = Free Cool ***Note:*** *This enumeration os only valid for chillers.*
Operating Mode	1 = Occupied 2 = Unoccupied 3 = Optimal Start 4 = Humidity Pulldown 5 = Optimal Stop 6 = Unoccupied Heating/Cooling 7 = Night Purge 8 = Unoccupied Humidify 9 = Unoccupied Dehumidify 10 = Unknown Operating Mode ***Note:*** *This enumeration is only valid for the Area and VAS system point.*
Operating Status	1 = Disabled 2 = Disabling 3 = Dispatch 4 = Turning System Water Request On 5 = Waiting for System Chilled Water Flow 6 = Unload 7 = Turning Chiller Pump On 8 = Waiting for Chiller Chilled Water Flow On 9 = Turning Chiller On 10 = Verifying Chiller On 11 = Turning Chiller Off 12 = Verifying Chiller Off 13 = Turning Chiller Pump Off 14 = Turning System Water Request Off 15 = Verifying System Chilled Water Flow Off
Optimal Start Can Occur	false = Disabled true = Enabled

Table 21. Tracer SC enumerations (continued)

Tracer SC Point Name	Enumerations and State Text
Optimal Stop Can Occur	false = Disabled true = Enabled
Optional Chiller Failure Input Active	false = None true = Failure
Outdoor Air Damper Status	1 = At or Below Minimum Position 2 = Above Minimum Position 3 = Not Present
Outdoor Air Temperature Compensation	false = Disabled true = Enabled
Plant Type	1 = Constant Flow - Water always flows through all chillers (Subtract on Temperature) 2 = Constant Flow - Water always flows through all chillers (Subtract on Capacity) 3 = Variable Flow - Water flows though running chillers only (Subtract on Temperature) 4 = Variable Flow - Water flows though running chillers only (Subtract on Capacity) 5 = Decoupled System (Primary-Secondary) - Water flows through running chillers only (Subtract on Temperature) 6 = Decoupled System (Primary-Secondary) - Water flows through running chillers only (Subtract on Flow) 7 = Decoupled System (Primary-Secondary) - Water flows through running chillers only (Subtract on Capacity) 8 = Variable Primary Flow - Variable water flows through chillers
Power Failure Recovery Function	false = Normal true = Rapid
Prefilter Status	1 = Clean 2 = Dirty 3 = Not Present
PreHeat Valve Status	false = Closed true = Open
Primary Chilled Water Pump 1 Fault Status	false = Normal true = In Alarm
Primary Chilled Water Pump 1 Flow Status	false = No Flow true = Flow
Primary Chilled Water Pump 1 Reset BAS	false = Normal true = Reset
Primary Chilled Water Pump 1 Start Stop Output	false = Off true = On
Primary Chilled Water Pump 1 VFD Fault Status	false = Normal true = In Alarm
Primary Chilled Water Pump 2 Fault Status	false = Normal true = In Alarm
Primary Chilled Water Pump 2 Flow Status	false = No Flow true = Flow
Primary Chilled Water Pump 2 Reset BAS	false = Normal true = Reset
Primary Chilled Water Pump 2 Start Stop Output	false = Off true = On
Primary Chilled Water Pump 2 VFD Fault Status	false = Normal true = In Alarm
Primary Chilled Water Pump 3 Fault Status	false = Normal true = In Alarm
Primary Chilled Water Pump 3 Flow Status	false = No Flow true = Flow

Table 21. Tracer SC enumerations (continued)

Tracer SC Point Name	Enumerations and State Text
Primary Chilled Water Pump 3 Reset BAS	false = Normal true = Reset
Primary Chilled Water Pump 3 Start Stop Output	false = Off true = On
Primary Chilled Water Pump 3 VFD Fault Status	false = Normal true = In Alarm
Primary Chilled Water Pump 4 Fault Status	false = Normal true = In Alarm
Primary Chilled Water Pump 4 Flow Status	false = No Flow true = Flow
Primary Chilled Water Pump 4 Reset BAS	false = Normal true = Reset
Primary Chilled Water Pump 4 Start Stop Output	false = Off true = On
Primary Chilled Water Pump 4 VFD Fault Status	false = Normal true = In Alarm
Primary Filter Status	1 = Clean 2 = Dirty 3 = Not Present
Pump Out Relay Circuit 1	false = Off true = On
Pump Out Relay Circuit 2	false = Off true = On
Purge Compressor Relay Circuit 1	false = Off true = On
Purge Compressor Relay Circuit 2	false = Off true = On
Purge Regenerating Valve Solenoid Circuit 1	false = Off true = On
Purge Regenerating Valve Solenoid Circuit 2	false = Off true = On
Refrigerant Type	1 = R-11 2 = R-12 3 = R-22 4 = R-123 5 = R-134A 6 = R-407C 7 = R-410A 8 = R-113 9 = R-114 10 = R-500 11 = R-502 12 = R-404A
ReHeat Valve Status	false = Closed true = Open
Release Overrides	1 = No Release 2 = Temperature setpoint release 3 = Fan speed command release 4 = Occupant call release 5 = Release all overrides
Request Pending	0 = None 1 = Add 2 = Subtract

Table 21. Tracer SC enumerations (continued)

Tracer SC Point Name	Enumerations and State Text
Requested Operating Mode	1 = Occupied 2 = Unoccupied 3 = Optimal Start 4 = Humidity Pulldown 5 = Optimal Stop 6 = Unoccupied Heating/Cooling 7 = Night Purge 8 = Unoccupied Humidify 9 = Unoccupied Dehumidify 10 = Unknown Mode
Reset Diagnostic	false = Normal true = Reset
Return Fan Failure	false = Normal true = In Alarm
Return Fan Failure Reset	false = Normal true = In Alarm
Return Fan Output	1 = Off 2 = On 3 = Not Present
Return Fan Proving Status	1 = Off 2 = On 3 = Not Present
Return Fan Status	false = Off true = On
Reversing Valve	false = Denergized true = Energized
Reversing Valve Status	1 = Heating 2 = Cooling 3 = Not Present
Rotation Input	false = Inactive true = Active
Run Enabled	false = Run Not Enabled true = Run Enabled
Running Mode	1 = Chiller Off 2 = Chiller In Start Mode 3 = Chiller In Run Mode 4 = Chiller In Pre-Shutdown Mode 5 = Chiller In Service Mode
Secondary Chilled Water Pump 1 Fault Status	false = Normal true = In Alarm
Secondary Chilled Water Pump 1 Flow Status	false = No Flow true = Flow
Secondary Chilled Water Pump 1 Reset BAS	false = Normal true = Reset
Secondary Chilled Water Pump 1 Start Stop Output	false = Off true = On
Secondary Chilled Water Pump 1 VFD Fault Status	false = Normal true = In Alarm
Secondary Chilled Water Pump 2 Fault Status	false = Normal true = In Alarm
Secondary Chilled Water Pump 2 Flow Status	false = No Flow true = Flow
Secondary Chilled Water Pump 2 Reset BAS	false = Normal true = Reset
Secondary Chilled Water Pump 2 Start Stop Output	false = Off true = On

Table 21. Tracer SC enumerations (continued)

Tracer SC Point Name	Enumerations and State Text
Secondary Chilled Water Pump 2 VFD Fault Status	false = Normal true = In Alarm
Secondary Chilled Water Pump 3 Fault Status	false = Normal true = In Alarm
Secondary Chilled Water Pump 3 Flow Status	false = No Flow true = Flow
Secondary Chilled Water Pump 3 Reset BAS	false = Normal true = Reset
Secondary Chilled Water Pump 3 Start Stop Output	false = Off true = On
Secondary Chilled Water Pump 3 VFD Fault Status	false = Normal true = In Alarm
Secondary Chilled Water Pump 4 Fault Status	false = Normal true = In Alarm
Secondary Chilled Water Pump 4 Flow Status	false = No Flow true = Flow
Secondary Chilled Water Pump 4 Reset BAS	false = Normal true = Reset
Secondary Chilled Water Pump 4 Start Stop Output	false = Off true = On
Secondary Chilled Water Pump 4 VFD Fault Status	false = Normal true = In Alarm
Send Allow VAV Auxillary Heat at Night	false = Disabled true = Enabled
Send VAV Drive Max to VAV Boxes	false = Disabled true = Enabled
Send VAV Source Temperature To VAV Boxes	false = Disabled true = Enabled
Series Chiller Plant	false = No true = Yes
Service Test Status	1 = Inactive 2 = Fan On 3 = IGV Open 4 = IGV Closed 5 = Min Vent 6 = Econ Open 7 = Cool 1 8 = Cool 2 9 = Cool 3 10 = Dehumidification/Reheat 11 = Heat 1 12 = Heat 2 13 = Heat 3 14 = Heat 4 15 = Defrost 16 = Emergency Heat
Service Test Mode Status	false = Inactive true = Active
Soft Start Function	false = Disabled true = Enabled
Space Temperature Setpoint Use Local	false = Disabled true = Enabled
Subtract Input	false = Inactive true = Active
Subtract Request Exist	false = Inactive true = Active

Table 21. Tracer SC enumerations (continued)

Tracer SC Point Name	Enumerations and State Text
Sunblind 1 Request BAS	false = Close true = Open
Sunblind 1 Request Local	false = Close true = Open
Sunblind 1 Status	false = Close true = Open
Sunblind 2 Request BAS	false = Close true = Open
Sunblind 2 Request Local	false = Close true = Open
Sunblind 2 Status	false = Close true = Open
Supply Air Tempering Enable Command	false = Disable true = Enable
Supply Air Tempering Status	false = Disable true = Enable
Supply Fan Configuration Status	false = Cycling true = Continuous
Supply Fan Failure	false = Normal true = In Alarm
Supply Fan Failure Reset	false = Normal true = Reset
Supply Fan Mode Command	false = Cycling true = Continuous
Supply Fan Output	1 = Off 2 = On 3 = Not Present
Supply Fan Proving Status	1 = Off 2 = On 3 = Not Present
Supply Fan Speed Setpoint BAS	1 = Auto 2 = Off 3 = Low 4 = Medium 5 = High
Supply Fan Speed Setpoint Local	1 = Auto 2 = Off 3 = Low 4 = Medium 5 = High
Supply Fan Staged Speed Status	1 = Auto 2 = Off 3 = Low 4 = Medium 5 = High
Supply Fan Status	false = Off true = On
Supply Fan Switch Local Control	false = Disable true = Enable
System Chilled Water Flow	false = No Flow true = Flow
System Chilled Water Flow Lost	false = None true = Failure

Table 21. Tracer SC enumerations (continued)

Tracer SC Point Name	Enumerations and State Text
System Chilled Water Flow Sensor Exists	false = No true = Yes
System Chilled Water Pump Request	false = Disabled true = Enabled
System Chilled Water Request Failures Enabled	false = Disabled true = Enabled
System Chilled Water Return Sensor Failure	false = None true = Failure
System Chilled Water Supply Sensor Failure	false = None true = Failure
System Control Command	false = Stand Alone Control true = BAS Control
System Control Status	false = Stand Alone Control true = BAS Control
System Failure Exists	false = None true = Failure
System Mode	1 = Off 2 = Ambient Lockout 3 = Shutdown in Progress 4 = Softstart 5 = Normal 6 = Rapid Power Failure Recovery ***Note:*** *This enumeration is only valid for the Chiller Plant Control system point.*
System Mode	1 = Off 2 = Air Handler Startup Delay 3 = On 4 = Common Space VAV Shutdown Delay 5 = Unknown ***Note:*** *This enumeration is only valid for the VAS system point.*
Tenant Override Function	false = Disabled true = Enabled
Timed Override Active	false = Inactive true = Active
Timed Override Duration Setpoint	1 = 0 Hour 2 = 1 Hour 3 = 2 Hours 4 = 3 Hours 5 = 4 Hours 6 = 5 Hours 7 = 6 Hours 8 = 7 Hours 9 = 8 Hours 10 = 9 Hours 11 = 10 Hours 12 = 11 Hours 13 = 12 Hours
Timed Override Function	false = Disabled true = Enabled
Timed Override in Control	false = Inactive true = Active
Timed Override Option Input	1 = Auto 2 = Timed Override Request 3 = Timed Override Cancel
Timed Override Status	1 = Idle 2 = On 3 = Cancel

Table 21. Tracer SC enumerations (continued)

Tracer SC Point Name	Enumerations and State Text
Tower 1 Fan 1 Fault Status	false = Normal true = In Alarm
Tower 1 Fan 1 Flow Status	false = No Flow true = Flow
Tower 1 Fan 1 Low Speed Start Stop Output	false = Off true = On
Tower 1 Fan 1 Reset BAS	false = Normal true = Reset
Tower 1 Fan 1 Start Stop Output	false = Off true = On
Tower 1 Fan 1 VFD Fault Status	false = Normal true = In Alarm
Tower 1 Fan 2 Fault Status	false = Normal true = In Alarm
Tower 1 Fan 2 Flow Status	false = No Flow true = Flow
Tower 1 Fan 2 Low Speed Start Stop Output	false = Off true = On
Tower 1 Fan 2 Reset BAS	false = Normal true = Reset
Tower 1 Fan 2 Start Stop Output	false = Off true = On
Tower 1 Fan 2 VFD Fault Status	false = Normal true = In Alarm
Tower 1 Isolation Valve Output	false = Close true = Open
Tower 1 Isolation Valve Status	false = Close true = Open
Tower 1 Request BAS	false = Off true = On
Tower 1 Request Local	false = Off true = On
Tower 2 Fan 1 Fault Status	false = Normal true = In Alarm
Tower 2 Fan 1 Flow Status	false = No Flow true = Flow
Tower 2 Fan 1 Low Speed Start Stop Output	false = Off true = On
Tower 2 Fan 1 Reset BAS	false = Normal true = Reset
Tower 2 Fan 1 Start Stop Output	false = Off true = On
Tower 2 Fan 1 VFD Fault Status	false = Normal true = In Alarm
Tower 2 Fan 2 Fault Status	false = Normal true = In Alarm
Tower 2 Fan 2 Flow Status	false = No Flow true = Flow
Tower 2 Fan 2 Low Speed Start Stop Output	false = Off true = On
Tower 2 Fan 2 Reset BAS	false = Normal true = Reset

Table 21. Tracer SC enumerations (continued)

Tracer SC Point Name	Enumerations and State Text
Tower 2 Fan 2 Start Stop Output	false = Off true = On
Tower 2 Fan 2 VFD Fault Status	false = Normal true = In Alarm
Tower 2 Isolation Valve Output	false = Close true = Open
Tower 2 Isolation Valve Status	false = Closed true = Open
Tower 2 Request BAS	false = Off true = On
Tower 2 Request Local	false = Off true = On
Tower 3 Fan 1 Fault Status	false = Normal true = In Alarm
Tower 3 Fan 1 Flow Status	false = No Flow true = Flow
Tower 3 Fan 1 Low Speed Start Stop Output	false = Off true = On
Tower 3 Fan 1 Reset BAS	false = Normal true = Reset
Tower 3 Fan 1 Start Stop Output	false = Off true = On
Tower 3 Fan 1 VFD Fault Status	false = Normal true = In Alarm
Tower 3 Fan 2 Fault Status	false = Normal true = In Alarm
Tower 3 Fan 2 Flow Status	false = No Flow true = Flow
Tower 3 Fan 2 Low Speed Start Stop Output	false = Off true = On
Tower 3 Fan 2 Reset BAS	false = Normal true = Reset
Tower 3 Fan 2 Start Stop Output	false = Off true = On
Tower 3 Fan 2 VFD Fault Status	false = Normal true = In Alarm
Tower 3 Isolation Valve Output	false = Close true = Open
Tower 3 Isolation Valve Status	false = Closed true = Open
Tower 3 Request BAS	false = Off true = On
Tower 3 Request Local	false = Off true = On
Tower Low Water Level Status	false = Off true = On
Tower Makeup Water System Status	false = Off true = On
Tower Sump Water Heater Status	false = Off true = On

Table 21. Tracer SC enumerations (continued)

Tracer SC Point Name	Enumerations and State Text
Trane Unit Type	1 = 1 Heat/1 Cool 2 = Heat Pump 3 = Blower Coil 4 = Unit Ventilator 5 = Fan Coil 6 = Rooftop 7 = Air Handler 8 = Vertical Self Contained 9 = Unitary 10 = VAV Box 11 = Fan Coil
Unload at Start	false = Disabled true = Enabled
Unload Request	false = Inactive true = Active
Unoccupied Dehumidify Function	false = Disabled true = Enabled
Unoccupied Heating/Cooling Function	false = Disabled true = Enabled
Unoccupied Humidify Function	false = Disabled true = Enabled
VAV Drive Maximum Status	false = Auto true = Open
Ventilation Optimization Function	false = Inactive true = Active
Ventilation Optimization Status	1 = Active 2 = Disabled 3 = No VAV Data 4 = Air Handler Not Occupied 5 = No Qualified VAVs 6 = Unknown
Water Pump Request	false = Off true = On
Water Valve Override	1 = Off 2 = Not Valid 3 = Not Valid 4 = Not Valid 5 = Open 6 = Close

Table 21. Tracer SC enumerations (continued)

Tracer SC Point Name	Enumerations and State Text
When Will A Chiller Be Added?	1 = Suspended 2 = No Chillers Available 3 = Normal Add Input In Fault Add Delay Timer Active 4 = Normal Add Input In Fault Add Delay Timer Not Active 5 = Normal Add Delay Timer Active 6 = Normal Add Delay Timer Not Active 7 = Soft Start Add Input In Fault Add Delay Timer Active 8 = Soft Start Add Input In Fault Add Delay Timer Not Active 9 = Soft Start Add Delay Timer Active 10 = Soft Start Add Delay Timer Not Active 11 = Rapid Power Fail Recovery
When Will A Chiller Be Subtracted?	1 = Suspended 2 = No Chillers Available 3 = On Temp Subtract Input In Fault Subtract Delay Timer Active 4 = On Temp Subtract Input In Fault Subtract Delay Timer Not Active 5 = On Temp Subtract Delay Timer Active 6 = On Temp Subtract Delay Timer Not Active 7 = On Flow Subtract Input In Fault Subtract Delay Timer Active 8 = On Flow Subtract Input In Fault Subtract Delay Timer Not Active 9 = On Flow Subtract Delay Timer Active 10 = On Flow Subtract Delay Timer Not Active 11 = On RLA Subtract Input In Fault Subtract Delay Timer Active 12 = On RLA Subtract Input In Fault Subtract Delay Timer Not Active 13 = On RLA Subtract Delay Timer Active 14 = On RLA Subtract Delay Timer Not Active

Configuring TCP/IP and BACnet Settings

Configuration for TCP/IP and BACnet settings is located in the Identification and Communications section on the Tracer® SC Installation page.

The following instructions provide example configuration settings when both the Tracer SC-App and the Tracer SC-Base both reside on the same subnet and a BBMD is not required.

Tracer SC-App and Tracer SC-Base Reside on the Same Subnet

Configure the Tracer SC-App

1. Log on to the Tracer SC-App controller.
2. Navigate to the Identification and Communications section on the Tracer SC Installation page.
3. Click the **IP Configuration** tab and then click **Edit**.
4. Click **Use the Following Address** radio button and enter the following:
   - IP address — 192.168.1.10
   - Subnet Mask — 255.255.255.0
   - Default Gateway — 192.168.1.254
5. Click **Save**. An error message appears stating that your PC will restart. Click **OK.**
6. Return to the Identification and Communications page. Click the **BACnet Configuration** tab, and then click **Edit**.
7. Enter the following:
   - Rotary Switch Setting — 1
   - Device ID — 10000
   - BACnet Network Number for Ethernet Port 1 — 1
   - UDP Port for BACnet IP using Ethernet Network Port 1— 55110
   - This Tracer SC is a BACnet Broadcast Management Device (BBMD) — No
   - BACnet Network Number for MS/TP Port 1 — 11
   - Baud Rate for MS/TP Port 1 - 76800 bps
   - BACnet Network Number for MS/TP Port 2 — 12
   - Baud Rate for MS/TP Port 2 — 76800 bps
8. Click **Save**

Configure the Tracer SC-Base

1. Log on to the Tracer SC-Base controller.
2. Navigate to the Identification and Communications section on the Tracer SC Installation page.
3. Click the IP Configuration tab and then click **Edit**.
4. Click **Use the Following Address** radio button and enter the following:
   - IP address — 192.168.1.20
   - Subnet Mask — 255.255.255.0
5. Click **Save**. An error message appears stating that your PC will restart. Click OK.
6. Return to the **Identification and Communication**s page. Click the **BACnet Configuration** tab and then click **Edit**.
7. Enter the following:
   - Rotary Switch Setting — 2
   - Device ID — 20000
   - BACnet Network Number for Ethernet Port 1 — 1
   - UDP Port for BACnet IP using Ethernet Network Port 1— 55110

- This Tracer SC is a BACnet Broadcast Management Device (BBMD) — No
- BACnet Network Number for MS/TP Port 1 — 21
- Baud Rate for MS/TP Port 1 —76800 bps
- BACnet Network Number forMS/TP Port 2 — 22
- Baud Rate for MS/TP Port 2 — 76800 bps

8. Click **Save**.

Tracer SC-App and Tracer SC-Base Reside on Separate Subnets

The following instructions provide example configuration settings when both the Tracer-App and the Tracer SC-Base both reside on separate subnets and a BBMD is required for both.

Configure the Tracer SC-App

1. Log on to the Tracer SC-App controller.
2. Navigate to the **Identification and Communications** section on the Tracer SC Installation page.
3. Click the **IP Configuration** tab and then click **Edit**.
4. Click **Use the Following Address** radio button and enter the following:
   - Click **Use the Following Address** radio button and enter the following:
   - IP address — 192.168.1.10
   - Subnet Mask — 255.255.255.0
   - Default Gateway — 192.168.1.254
5. Click **Save**. An error message appears stating that your PC will restart. Click OK.
6. Return to the Identification and Communications page. Click the **BACnet Configuration** tab, then click **Edit**.
7. Enter the following:
   - Rotary Switch Setting —1
   - Device ID — 10000
   - BACnet Network Number for Ethernet Port 1—1
   - UDP Port for BACnet IP using Ethernet Network Port 1— 46410
   - This Tracer SC is a BACnet Broadcast Management Device (BBMD) — Yes
   - BACnet Network Number for MS/TP Port 1—11
   - Baud Rate for MS/TP Port 1— 76800 bps
   - BACnet Network Number for MS/TP Port 2 —12
   - Baud Rate for MS/TP Port 2 —76800 bps

Configure the Tracer SC-Base

1. Log on to the Tracer SC-Base controller.
2. Navigate to the Identification and Communications section on the Tracer SC Installation page.
3. Click the **IP Configuration** tab and then click **Edit**.
4. Click **Use the Following Address** radio button and enter the following:
   - IP address — 192.168.1.20
   - Subnet Mask — 255.255.255.0
5. Click **Save**. An error message appears stating that your PC will restart. Click OK.
6. Return to the Identification and Communications page. Click the **BACnet Configuration** tab and then click **Edit**.
7. Enter the following:

- Rotary Switch Setting — 2
- Device ID — 20000
- BACnet Network Number for Ethernet Port 1 — 1
- UDP Port for BACnet IP using Ethernet Network Port 1 — 46410
- This Tracer SC is a BACnet Broadcast Management Device (BBMD) — Yes
- BACnet Network Number for MS/TP Port 1 — 21
- Baud Rate for MS/TP Port 1 - 76800 bps
- BACnet Network Number for MS/TP Port 2 — 22
- Baud Rate for MS/TP Port 2 — 76800 bps

8. Click **Save**.
9. Set up a BDT table.

Setting Up the BDT Table

A broadcast distribution table (BDT) contains BACnet IP broadcast management devices (BBMDs). BDTs are required for a Tracer SC-App and Tracer SC-Base controllers when both reside on separate subnets.

1. Log on to the Tracer SC-App controller.
2. Navigate to the **Define Network** section on the Tracer SC Installation page and then click **BDT Setup**.

   The BDT Setup page displays which contains a list of BBMDs for the Tracer SC-App.
3. Click **Set up BDT**.
4. Click **add BBMD.**
5. In the provided fields, enter the IP address of the Tracer SC-Base.
6. Click **test** to verify communication.
7. Click **save and send.**

   Repeat the above steps if using more than one Tracer SC-Base.

Networking and IT Security

This section provides details on how Tracer® products interact with an IT network. For more detailed information, refer to the *Best Practices for IT Security Guide, (BAS-SVU035)*.

Network

HTTP and HTTPS Ports

Tracer SC and Tracer ES use HTTP and HTTPS to exchange data between a Web client and server. The facility network administrator must open these ports to enable access to the BAS from an external network location.

Simple Network Management Protocol (SNMP)

SNMP is not supported by Tracer SC or Tracer ES. Internet protocol (IP) network configuration of either system is performed with the user interface. Application administration privileges are required to modify device network configuration.

Active Directory Services

Microsoft active directory services are not supported by either Tracer SC or Tracer ES. User credentials are managed with the software application.

Domain Name Services (DNS)

Tracer SC and Tracer ES support outbound DNS functionality. With this capability it is easy to configure the system to send alarm and event messages by e-mail to multiple users of the system.

Network Bandwith Usage

A Trane BAS system requires very little network bandwidth because of the network architecture design. For small to medium size facilities, only the Tracer SC resides on the building LAN. The Tracer SC uses BACnet MS/TP or LonWorks FTT-10 protocols to communicate with equipment-level controllers. Neither protocol is IP based.

- **Communication among Tracer SCs in a multi-Tracer SC facility.** This communication is BACnet IP (UDP) based and the amount of traffic will vary depending on how the system is configured. Generally, this communication will be infrequent and will utilize very small IP packets.
- **Communication between an active Web client and the Tracer SC Web server**. The server application Web pages and images are optimized for a Web environment and the transfer of a Web page uses very little bandwidth.
- **Communication between multiple BAS sites and Tracer ES**. Tracer ES provides a Web based user interface to manage multiple BAS sites. The bandwidth required for communication is typical of other client/server applications.

IP Addressing and Network Address Translation (NAT) Routing

The BACnet protocol requires that all BACnet IP devices be assigned a static IP address. Because of this requirement, BACnet systems do not support Network Address Translation. To enable external communication with the system, the network firewall must be configured to accept packets directed at the Tracer SC IP address.

Virtual Local Area Network (VLAN)

Trane BAS systems may reside on VLAN networks. The same rules apply as stated in the IP Addressing and NAT Routing section above.

Security

Software

The Tracer SC customer interface requires a modern browser with no plug-ins (this includes Internet Explorer, Chrome and Firefox). Some configuration pages require the Adobe Flash Player and the Java SE Runtime Environment. These pages are currently transitioning to an environment that does not utilize plug-ins.

Network Connectivity and SSL

Beginning with Tracer SC V4.1, customers can choose to enhance network security by limiting user access over the IP network, restricting access through HTTPS only, and disallowing access to port 8022 (Trane Diagnostic Access). The customer's IT staff should be consulted when setting up enhanced security.

Client Access and Password

Tracer SC and Tracer ES support individual user accounts and a role-based security access system. Tracer SC emphasizes ease of use while protecting the BAS from inadvertent access by unauthorized users. Trane strongly recommends the enforcement of optional complex password requirements. Tracer SC administrators have the authority to require users to adhere to the following when setting up a password:

- Password minimum length (must be at least 6 characters)
- Password requires mixed case
- Password requires a symbol
- Password cannot contain user information (cannot contain the user ID)
- Previous passwords blocked from reuse (valid range is 1 to 175)
- Password expiration

Network Ports

Incoming

- Port 80/443: TCP/HTTP(S) – Used for initial device setup and configuration and to provide runtime status of the device.
- Port 47808: UDP – Used for BACnet IP communications. This port can be changed if dictated by job requirements, or personal preference.

Outgoing

- Port 443: TCP /HTTPS – Used for sending data to Trane and to communicate control messages to the Tracer SC.
- Port 1194: UDP/TLS – Used to provide high speed, secure access for the Trane Intelligent Services Center (ISC) to service a building system.
- Port 47808: UDP – Used for BACnet IP communications. This port can be changed if dictated by job requirements, or personal preference.

Firewalls

Trane systems do not have built in firewalls and rely on the network security infrastructure for protection. Trane recommends that Tracer products be installed behind a firewall. For correct operation behind a firewall, the following ports should be opened:

Incoming

If remote access to the web browser interface is required, Tracer SC supports the following options:

- Internet routable (external) IP address of Tracer SC.
- VPN as defined in VPN Client access.

Outgoing

If the existing network configuration allows outbound communications to the Internet, then no additional work is required (standard configuration). If outbound ports are restricted, then ports 443 (HTTPS) and 1194 (UDP) must be opened for the assigned IP address of the Tracer SC.

VPN Client Access

A Virtual Private Network (VPN) can be used to allow a user to access the BAS from outside a firewall. This is a typical configuration for remote access of a Tracer BAS system. You may need to contact your administrator to request VPN access.

VPN LAN to LAN Access

Trane supports some LAN to LAN trusted network connections, but recommends the secure tunneling methods built into Tracer SC. Contact Trane Product Support for inquiries regarding LAN to LAN connections.

Cellular Routers

Cellular Routers can be connected directly to the Tracer SC as a convenient way to allow external access to the BAS system prior to its connection to the building network. Permanent use of a router may be an efficient way to isolate the BAS from the IT network. Monthly cost and BAS performance should be considered prior to selecting this option. Trane has created a standard solution, process, and support system for Trane offices to use when the preferred remote access method cannot be achieved or the customers's network is not available. For more information, refer to the *Tracer Cellular Router Installation, Operation, and Maintenance Guide, (BAS-SVX067)*.

Air-Fi® Wireless

Trane BAS systems can be ordered with an Air-Fi® Wireless System instead of a wired fieldbus. Air-Fi® is communicated over the Zigbee (IEEE 802.15.4) wireless protocol and can coexist with other wireless protocols, including Wi-Fi. Trane Air-Fi® networks are secured so that only Trane devices can operate with them. Although wireless access might extend beyond the site perimeter, the Air-Fi® network uses authentication encryption to provide confidentiality and integrity of the data.

Physical Security

The BACnet protocol is an open standard protocol. There are many vendor and publicly offered software tools that, when connected to a network, can read and write data to any vendor's BACnet system. This is a core benefit of the BACnet protocol. Physical access to devices and networks should be controlled to a level appropriate for your facility. Physically mounting devices in restricted access areas is a good best practice.

Special Considerations: Anti-virus Software

Trane does not support the installation of anti-virus software on Tracer SC, as it may interrupt its intended operation. Services not in use have been turned off to mitigate susceptibility to viruses and malicious software (malware).

Notes

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.

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