



## Product Catalog

# Tracer® SC+ System Controller with the Tracer® Synchrony User Interface





## Introduction

Tracer SC+, the next generation building controller, features a faster processor for increased space for custom graphics, data logs and applications. Tracer SC+ is accompanied by the Tracer Synchrony user interface, which combines performance and function.

Tracer Synchrony features include:

- Customization of the log in screen (apply a custom graphic)
- Expansion module management and point referencing
- USB port management
- Backup and restore — restore backups from earlier version of Tracer SC to Tracer Synchrony

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## Product Overview

Tracer SC+ allows you to streamline facility management without reinventing the entire system. Adding Tracer SC+ to your system provides a flexible, cost effective solution for building automation, and managing the facility climate that can extend to lighting and energy consumption.

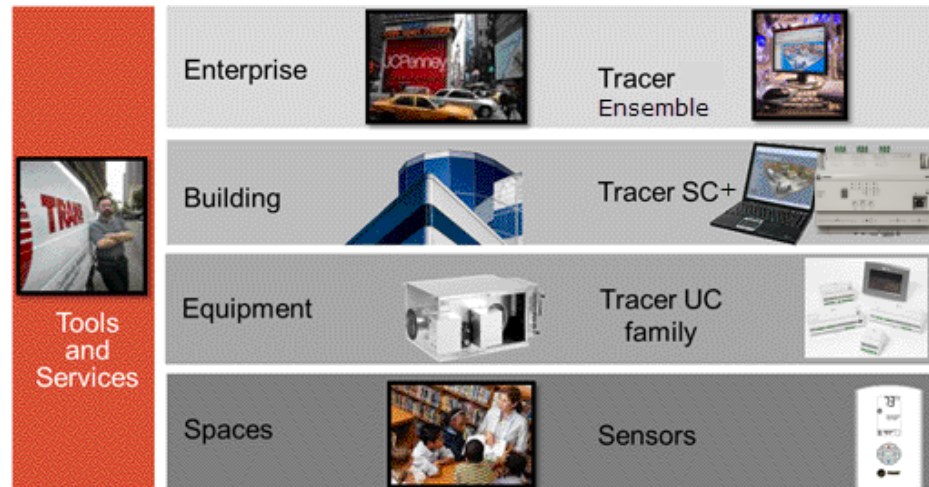
Accessible from most PCs, tablets, and smart phones, the Tracer Synchrony user interface eliminates the need for a dedicated computer and monitor so you can manage system performance whenever and wherever it is convenient. The intuitive online tools provide improved efficiencies, increased tenant comfort and reduced energy costs, which result in operational cost-savings and a better bottom line.

	<p><b>Occupant comfort and energy savings</b></p> <ul style="list-style-type: none"> <li>Tracer SC+ includes several factory engineered HVAC applications that have been developed by HVAC system experts and tested on tens of thousands of facilities to ensure that your facility operates at its peak performance. These applications provide consistent comfort and improved indoor air quality, while reducing energy requirements.</li> <li>For any building owner concerned with energy, indoor air quality, and the environment, Trane EarthWise™ Systems represent a design philosophy whose time has come. EarthWise Systems provide documented sustainability of high efficiency and low emissions over the entire lifetime of the building.</li> <li>Tracer Graphical Programming (TGP2) is a powerful graphical program that can be used to customize factory applications or control non-HVAC equipment.</li> </ul>
	<p><b>Access your facility from anywhere</b></p> <ul style="list-style-type: none"> <li>Tracer Synchrony is web-enabled and accessible from virtually any device with a web browser. All of the most popular device types, operating systems, and browsers are supported.</li> <li>The Tracer BAS Operator Suite is a mobile app that allows you to monitor and manage buildings from virtually anywhere, giving you greater freedom and constant peace of mind.</li> <li>Trane Connect for Remote Access provides an easy, secure option for remotely connecting to a Tracer SC+.</li> </ul>
	<p><b>Support for open, standard protocols</b></p> <ul style="list-style-type: none"> <li>Open, standard protocols are the key to enabling communication among Trane and non-Trane HVAC equipment, as well as other complementary facility systems. These protocols enable communication across systems and vendors to ensure that your building operates at its best on day one and beyond.</li> <li>Tracer SC+ natively communicates to BACnet® and LonTalk controllers and is listed as a BACnet Building Controller (B-BC) by BACnet Test Labs (BTL).</li> <li>Tracer SC+ supports Trane Air-Fi™ Wireless, providing standard wireless BACnet over Zigbee™ building automation between Trane BACnet controllers and zone sensors.</li> </ul>
	<p><b>Support for Trane Air-Fi™ Wireless</b></p> <ul style="list-style-type: none"> <li>Trane Air-Fi Wireless brings maximum flexibility to your building automation system.</li> <li>For contractors, it significantly simplifies building controls projects by minimizing the engineering, estimating and project management tasks associated with communication link. For building owners, it provides easier and more cost-effective controls upgrades and building expansion projects.</li> <li>Trane technology helps prepare your facilities for the future of building information. Trane Air-Fi Wireless runs BACnet protocol over ZigBee building automation standards. Trane Air-Fi is the first HVAC manufacturer to be Zigbee Certified.</li> </ul>

## Tracer Building Automation Systems

From our industry-leading building automation systems to equipment controls and sensors, Trane offers a complete controls portfolio to enable you to operate buildings at peak energy and operational efficiency.

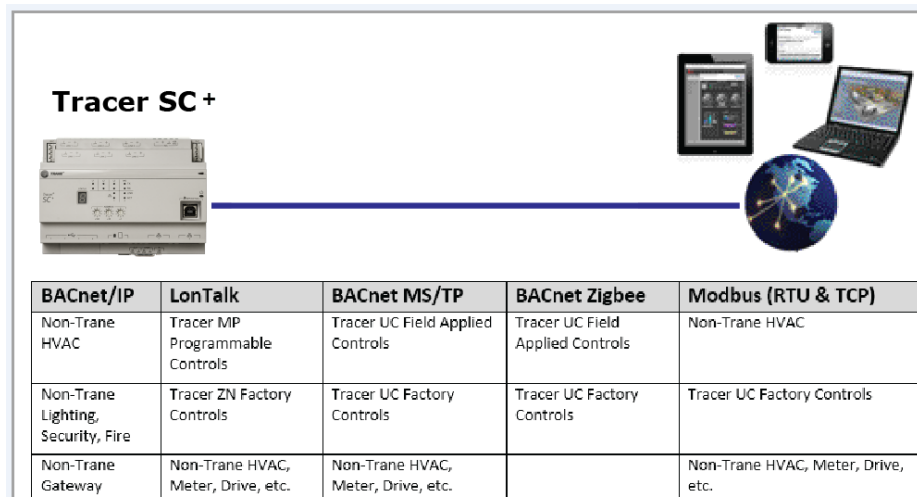
Trane controls are built on open, scalable platforms. They provide options to integrate with your existing equipment and controls, regardless of brand, and give you the latitude to easily expand into other systems within your building, multiple buildings and buildings you'll add in the future.



## Tracer SC+ System Architecture

Tracer SC+, along with the Tracer Synchrony user interface, is at the heart of a Tracer building automation system. Tracer Synchrony provides a web-based front end for your facility that can be accessed with most PCs, tablets and smart phones. Tracer SC+ includes powerful, factory-engineered applications that are designed to provide the perfect balance of energy efficiency and user comfort. Tracer SC+ communicates with a variety of Trane and non-Trane controllers using open, standard protocols, including BACnet, LonTalk, and Modbus. A diagram depicting the high-level system architecture is shown in the following figure.

**Figure 1. Tracer BAS structure (PC/tablet/phone with web browser)**



## BAS R'newal Program

BAS R'newal™ is a Trane building control systems upgrade program that helps customers transition to the current Tracer SC+ system. The program makes it easier to upgrade existing installed Tracer systems and non-Trane systems to the latest technologies including web-access, mobile access, intuitive user interfaces, and advanced features enabled by Intelligent Services (IS). The BAS R'newal program is enabled by Tracer Communication Bridges.

Find out more about BAS R'newal at [http://www.trane.com/commercial/north-america/us/en/services/upgrade-improve/r\\_newal\\_programs.html](http://www.trane.com/commercial/north-america/us/en/services/upgrade-improve/r_newal_programs.html).

## Tracer Communication Bridges

Tracer Communications Bridges integrate legacy control products into current Tracer systems for monitoring and control purposes.

Tracer Communications Bridges use legacy communications protocols to access points stored in previous-generation field-level controllers. The Bridges then convert the points to BACnet objects and properties, which makes them available for system use through the BACnet/IP communications protocol.

### Comm2 to BACnet/IP

This bridge is used to integrate up to three UCP1-controlled chillers (CenTraVac and Series-R) into Tracer systems for monitoring and control purposes. For more information, refer to the *Comm2 to BACnet/IP Product Data Sheet*, (BAS-PRC070).

## Tracer SC+ Facilities

A Tracer SC+ facility is defined as a collection of one or more Tracer SC+ controllers. A single building or campus can contain more than one Tracer SC+ facility.

An Application or App SC+ is a Tracer SC+ controller that has had one or more "Application Licenses" applied to it. The typical deployment of an App SC+ is for actively controlling a system.

A Base SC+ is a Tracer SC+ controller that has not had an "Application License" applied to it. The typical deployment of a Base SC+ is for passively monitoring a system (through web UI or Trane Intelligent Services) OR adding capacity to a Multi-Tracer SC+ facility.

A Single Tracer SC+ facility has the following characteristic:

- It is either an App SC+ or a Base SC+.

A Multi-Tracer SC+ facility has the following characteristics:

- It can have at most one App SC+.
- It can optionally have one or more Base SC+s.
- It can support a maximum of 240 controllers, although the practical limitation may be lower due to the combination of Tracer SC+ controllers and protocol.

The following table shows the maximum device capability for the communication type and the facility type. However, observe the following when configuring your facility:

- Do not exceed Individual link limitations
  - BACnet MS/TP 60 per link (App or Base Tracer SC+)
  - Modbus RTU 30 per link (App SC+ only)
  - LonTalk 120 per link (App SC+ only)
- Three links can be configured as BACnet MS/TP or Modbus RTU
- Do not exceed the maximum of 240 total devices per facility

**Note:** In a Multi-Tracer SC+ installation, LonTalk, Modbus TCP, and Modbus RTU controllers must all be installed in the App SC+.

**Table 1. Device Capability**

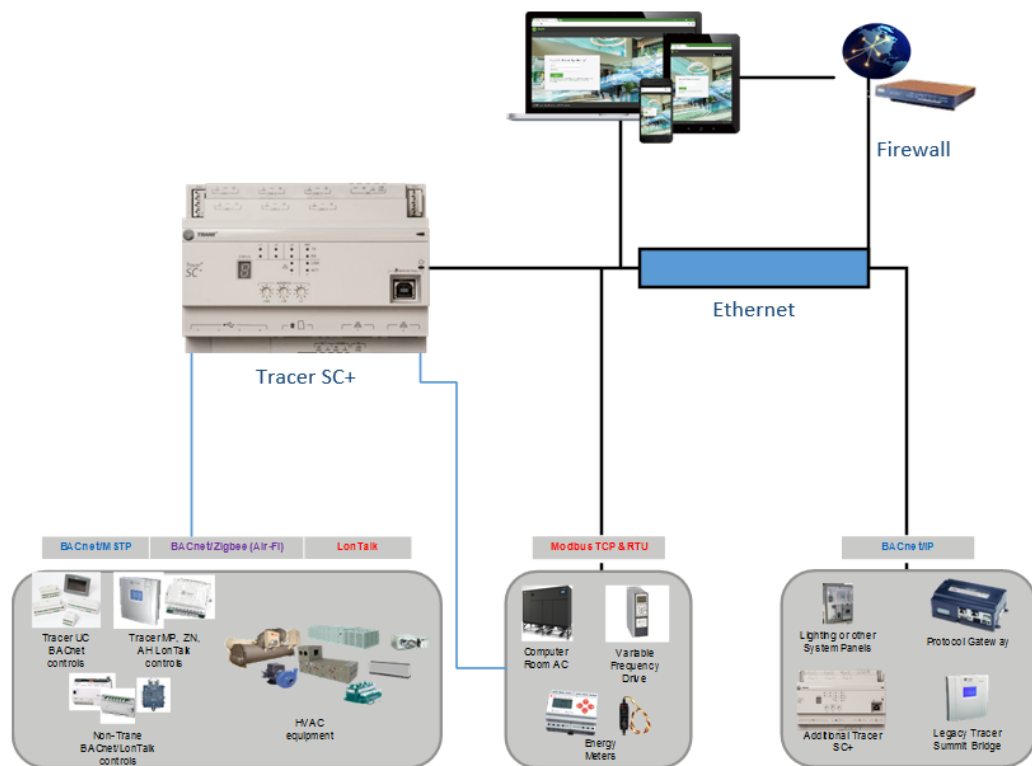
Communication Type	Single SC+	Multi SC+
Air-Fi Wireless	Up to 120 devices	Up to 240 devices
BACnet/MSTP	Up to 180 devices	Up to 240 devices
BACnet/IP	Up to 240 devices	Up to 240 devices
COMM 3/4*	Up to 240 devices	Up to 240 devices
LonTalk	Up to 240 devices (when using two Tracer USB LonTalk modules)	Up to 240 devices (when using two Tracer USB LonTalk modules)**
Modbus TCP	Up to 240 devices	Up to 240 devices**
Modbus RTU	Up to 90 devices	Up to 90 devices**

\* A BMTB is required for communication to COMM 3/4

\*\* Must be installed on the Application SC+

**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 2. Example of a single SC+ facility configuration**

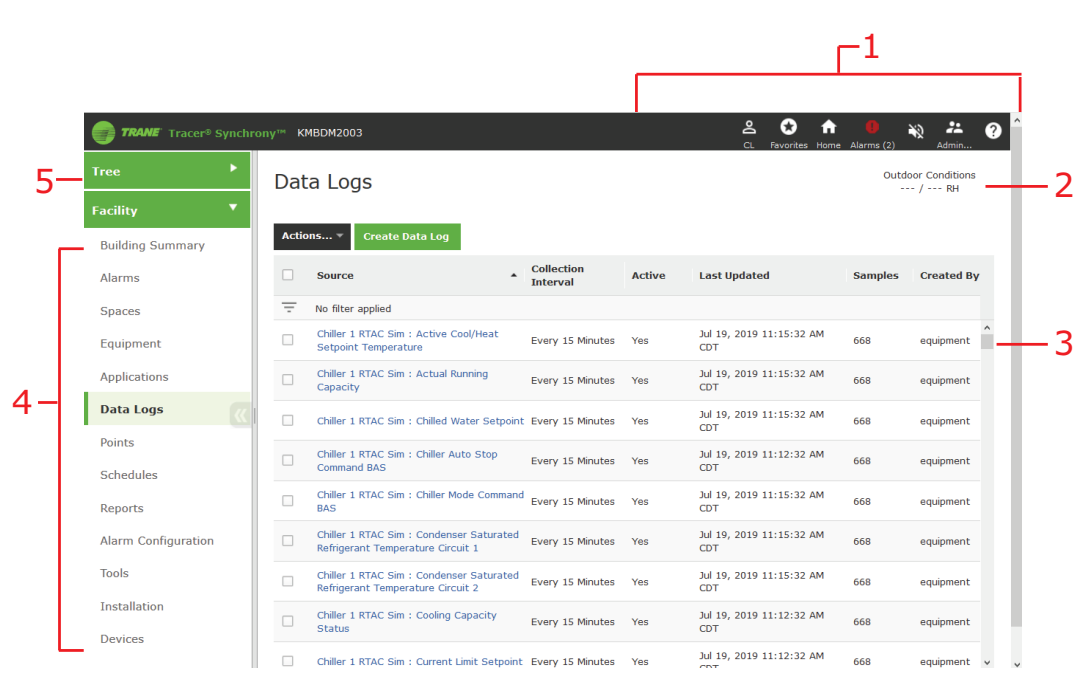






# The User Interface

The Tracer Synchrony 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 2. Navigating the user interface**

Number	Button/Menu Functions	Description
		
1	Global Navigation Bar	<p>This is visible on every page. From left to right, the bar contains:</p> <ul style="list-style-type: none"> <li> (User) — Click to logout, view or edit preferences, or change your password.</li> <li><b>Favorites</b> —Click this button to save frequently Tracer Synchrony UI pages.</li> <li><b>Home</b> —Click this button at anytime to return to your home page.</li> <li><b>Alarms</b> —Shortcut to the <b>Alarms</b> page. If a new alarm or event has been detected by the system since the <b>Alarms</b> page, the <b>Alarms</b> icon flashes.</li> <li><b>Admin...</b> Provides access to roles and users. <ul style="list-style-type: none"> <li>Appears only if the user has administrative privileges.</li> <li>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.</li> <li>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.</li> <li>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.</li> </ul> </li> <li> — Click to open a help topic that pertains only to the information on the page in view. When the help topic is opened, click "show" to access the entire Tracer Synchrony help system.</li> </ul>
2	Outdoor Conditions	Shows current outdoor temperature and humidity.
3	Internal Scroll Bar	An internal scroll bar is available for pages that contain long lists of data and multiple sections.

**Table 2. Navigating the user interface (continued)**

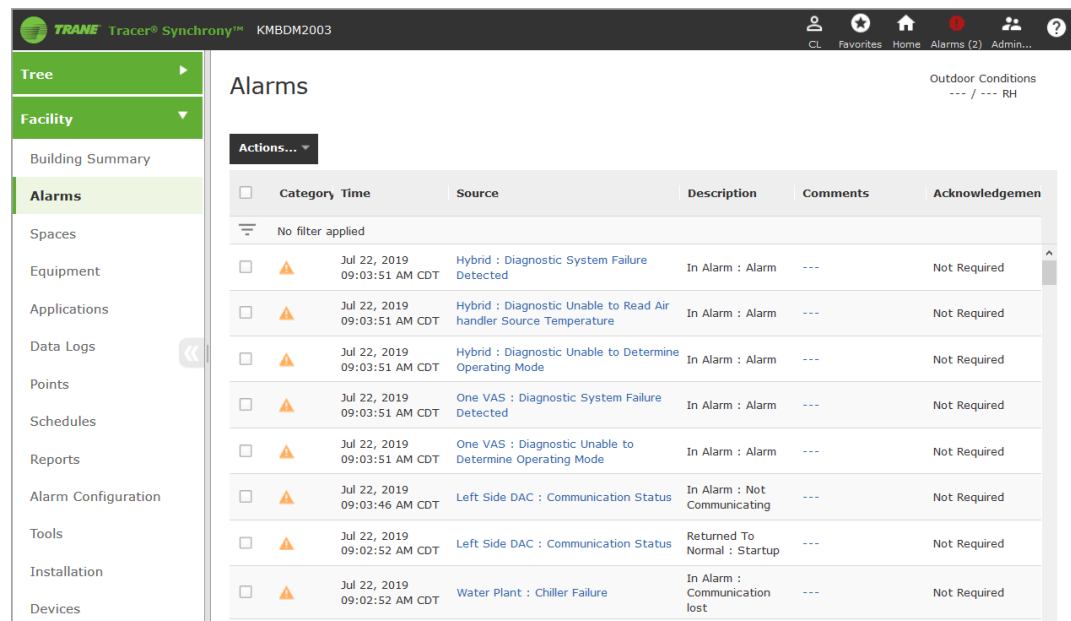
Number	Button/Menu Functions	Description
4	Left Navigation Menu	Contains a list of menu items that are linked to features, applications, and equipment.
5	Navigation Tree	A customized view of user-selected elements in the HVAC system. You can group, order, name elements, and assign custom graphics to the tree nodes according to your preferences.

## Alarms

The alarm handling capabilities of Tracer SC+ allow users to receive, view, acknowledge, and make comments on building alarms and events. BACnet standard requires alarms and events. An alarm is used to indicate an abnormal condition such as a sensor failure. An event is something that is expected to happen in a system, such as a chiller shutting down because it was no longer needed. Trane Tracer uses categories to classify the alarms; however, third party BAS systems still use the events. If a critical alarm exists an alarm icon flashes in the global navigation bar, which remains visible in the right corner of every page on 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.

**Figure 3. Alarms log**



Category	Time	Source	Description	Comments	Acknowledgement
<input type="checkbox"/>	Jul 22, 2019 09:03:51 AM CDT	Hybrid : Diagnostic System Failure Detected	In Alarm : Alarm	---	Not Required
<input type="checkbox"/>	Jul 22, 2019 09:03:51 AM CDT	Hybrid : Diagnostic Unable to Read Air handler Source Temperature	In Alarm : Alarm	---	Not Required
<input type="checkbox"/>	Jul 22, 2019 09:03:51 AM CDT	Hybrid : Diagnostic Unable to Determine Operating Mode	In Alarm : Alarm	---	Not Required
<input type="checkbox"/>	Jul 22, 2019 09:03:51 AM CDT	One VAS : Diagnostic System Failure Detected	In Alarm : Alarm	---	Not Required
<input type="checkbox"/>	Jul 22, 2019 09:03:51 AM CDT	One VAS : Diagnostic Unable to Determine Operating Mode	In Alarm : Alarm	---	Not Required
<input type="checkbox"/>	Jul 22, 2019 09:03:46 AM CDT	Left Side DAC : Communication Status	In Alarm : Not Communicating	---	Not Required
<input type="checkbox"/>	Jul 22, 2019 09:02:52 AM CDT	Left Side DAC : Communication Status	Returned To Normal : Startup	---	Not Required
<input type="checkbox"/>	Jul 22, 2019 09:02:52 AM CDT	Water Plant : Chiller Failure	In Alarm : Communication lost	---	Not Required

## Data Logs

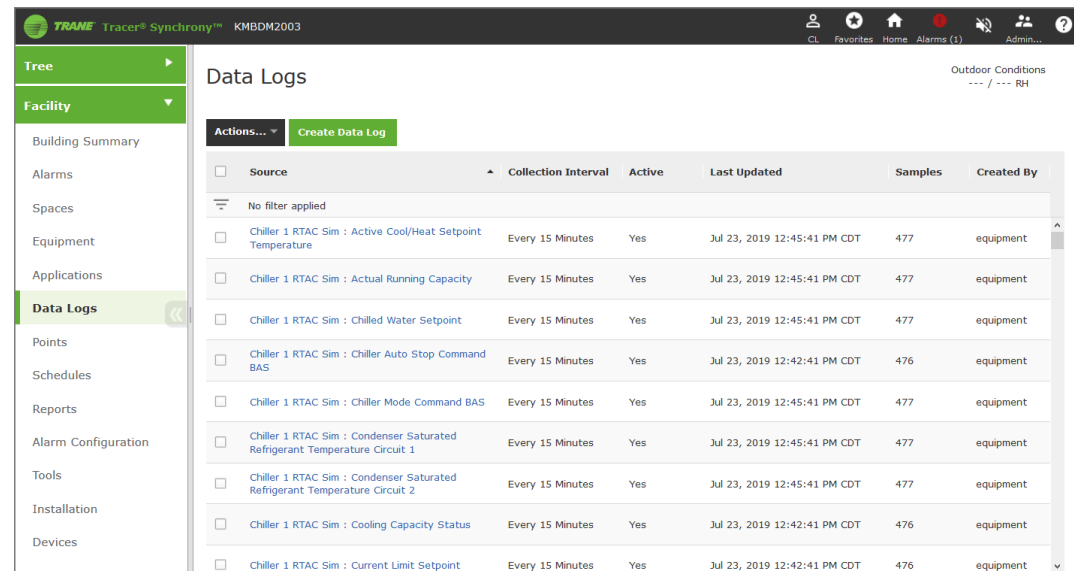
Data Logging, also referred to as trending, records in real-time the value of a data point in the system and the time at which the value was recorded.

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 from the Data Logs section.

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 4. Data logs page**



Source	Collection Interval	Active	Last Updated	Samples	Created By
No filter applied					
Chiller 1 RTAC Sim : Active Cool/Heat Setpoint Temperature	Every 15 Minutes	Yes	Jul 23, 2019 12:45:41 PM CDT	477	equipment
Chiller 1 RTAC Sim : Actual Running Capacity	Every 15 Minutes	Yes	Jul 23, 2019 12:45:41 PM CDT	477	equipment
Chiller 1 RTAC Sim : Chilled Water Setpoint	Every 15 Minutes	Yes	Jul 23, 2019 12:45:41 PM CDT	477	equipment
Chiller 1 RTAC Sim : Chiller Auto Stop Command BAS	Every 15 Minutes	Yes	Jul 23, 2019 12:42:41 PM CDT	476	equipment
Chiller 1 RTAC Sim : Chiller Mode Command BAS	Every 15 Minutes	Yes	Jul 23, 2019 12:45:41 PM CDT	477	equipment
Chiller 1 RTAC Sim : Condenser Saturated Refrigerant Temperature Circuit 1	Every 15 Minutes	Yes	Jul 23, 2019 12:45:41 PM CDT	477	equipment
Chiller 1 RTAC Sim : Condenser Saturated Refrigerant Temperature Circuit 2	Every 15 Minutes	Yes	Jul 23, 2019 12:45:41 PM CDT	477	equipment
Chiller 1 RTAC Sim : Cooling Capacity Status	Every 15 Minutes	Yes	Jul 23, 2019 12:42:41 PM CDT	476	equipment
Chiller 1 RTAC Sim : Current Limit Setpoint	Every 15 Minutes	Yes	Jul 23, 2019 12:42:41 PM CDT	476	equipment

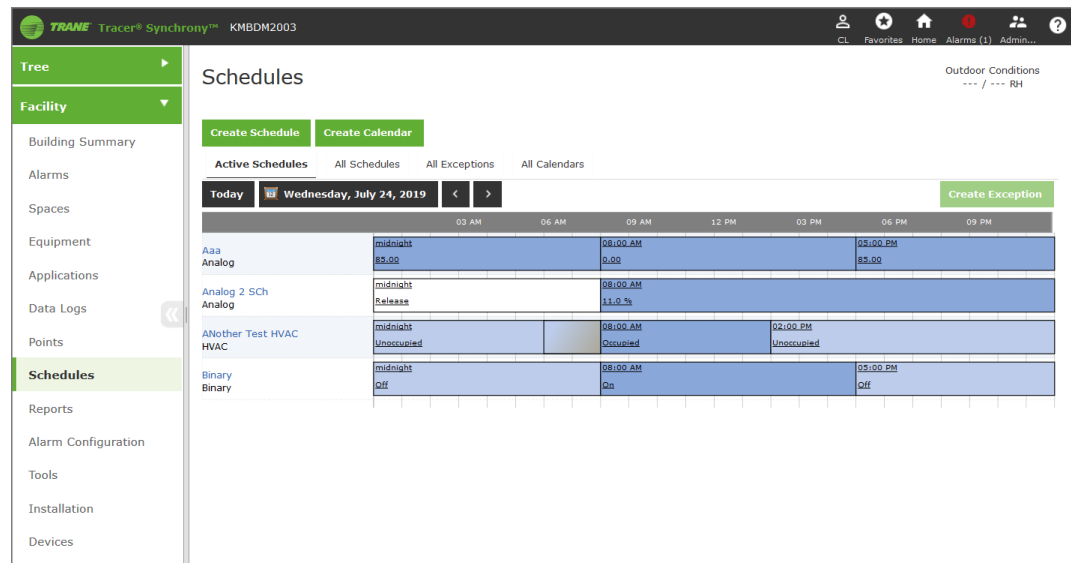
## Schedules

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 5. All Schedules (Active shown)**



## Overrides

A typical challenge that facility managers have is maintaining the balance between automatic and manual system control. Tracer SC+ provides multiple methods of overriding equipment, applications, and points while also ensuring that the proper balance of automatic and manual system control is kept. These methods include:

### Permanent Overrides

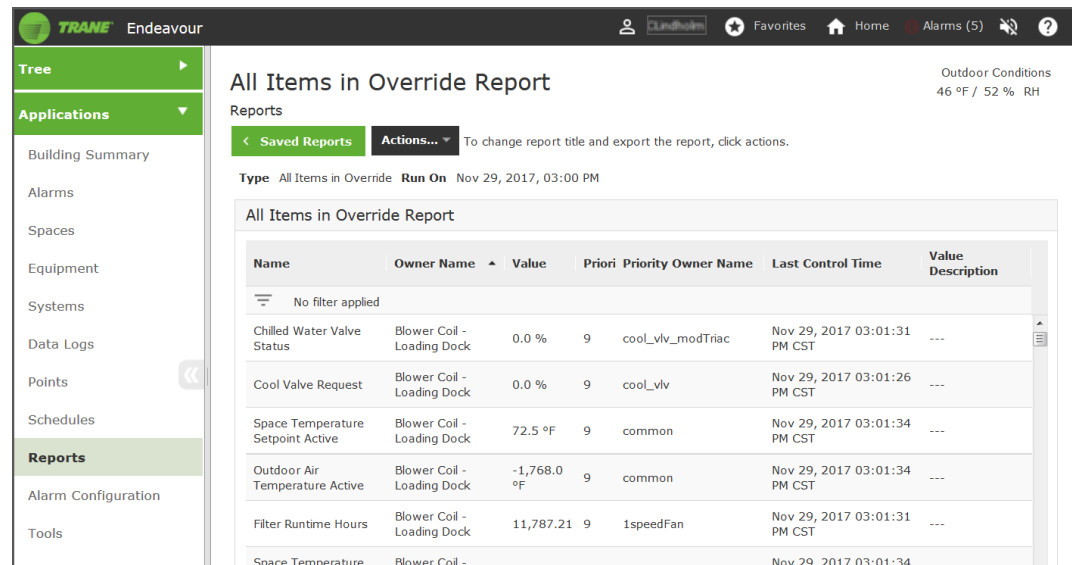
The most typical use of a permanent override is through applications. Tracer SC+ provides the ability to determine which user or application has performed an override to quickly determine who has overridden a setpoint.

### Temporary Overrides

A common challenge in facilities is inadvertent overrides. Tracer SC+ provides a default override option for users, which allows an override to expire after a period of time. This ensures that temporary overrides do not inadvertently become permanent overrides.

### All items in Override Report

It can be difficult to track down overrides that have become permanent and are causing a facility to act differently than a facility manager expects. Tracer SC includes a standard report that allows a user to quickly identify all points within the system that have been overridden. See the following figure.

**Figure 6. All Items in Override Report**


**TRANE Endeavour** | User: [Name] | Favorites | Home | Alarms (5) | ?

**Tree** | **Applications** | Building Summary | Alarms | Spaces | Equipment | Systems | Data Logs | Points | Schedules | **Reports** | Alarm Configuration | Tools

### All Items in Override Report

Outdoor Conditions: 46 °F / 52 % RH

Reports: **< Saved Reports** | Actions... | To change report title and export the report, click actions.

Type: All Items in Override | Run On: Nov 29, 2017, 03:00 PM

Name	Owner Name	Value	Priori	Priority	Owner Name	Last Control Time	Value Description
No filter applied							
Chilled Water Valve Status	Blower Coil - Loading Dock	0.0 %	9	cool_vlv_modTriac		Nov 29, 2017 03:01:31 PM CST	---
Cool Valve Request	Blower Coil - Loading Dock	0.0 %	9	cool_vlv		Nov 29, 2017 03:01:26 PM CST	---
Space Temperature Setpoint Active	Blower Coil - Loading Dock	72.5 °F	9	common		Nov 29, 2017 03:01:34 PM CST	---
Outdoor Air Temperature Active	Blower Coil - Loading Dock	-1,768.0 °F	9	common		Nov 29, 2017 03:01:34 PM CST	---
Filter Runtime Hours	Blower Coil - Loading Dock	11,787.21	9	1speedFan		Nov 29, 2017 03:01:31 PM CST	---
Space Temperature	Blower Coil -					Nov 29, 2017 03:01:34	

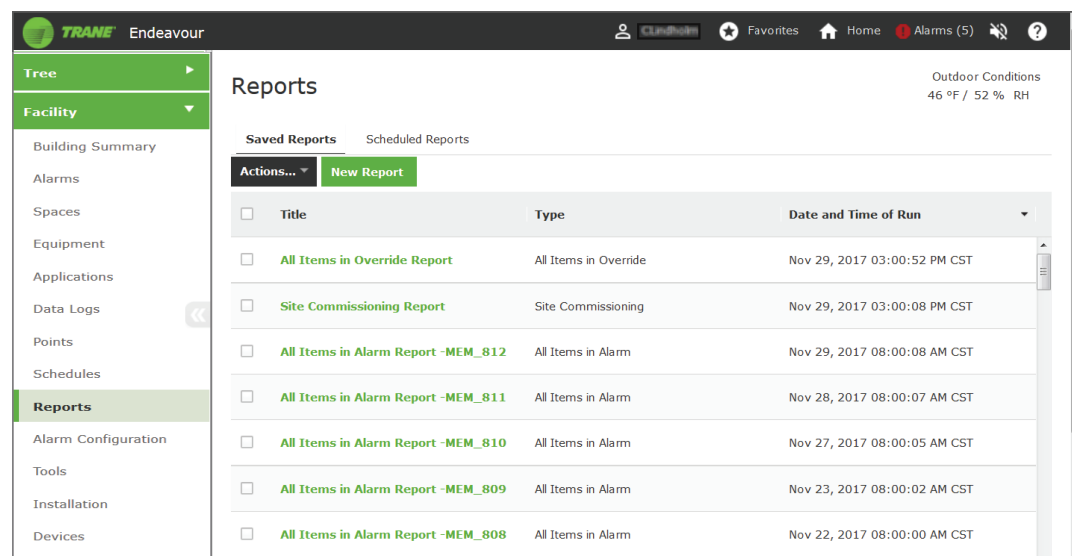
## Reports

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

- Site reports
- VAS commissioning reports
- Points reports
- Chiller 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 7. Reports page**


**TRANE Endeavour** | User: [Name] | Favorites | Home | Alarms (5) | ?

**Tree** | **Facility** | Building Summary | Alarms | Spaces | Equipment | Applications | Data Logs | Points | Schedules | **Reports** | Alarm Configuration | Tools | Installation | Devices

### Reports

Outdoor Conditions: 46 °F / 52 % RH

Saved Reports | Scheduled Reports

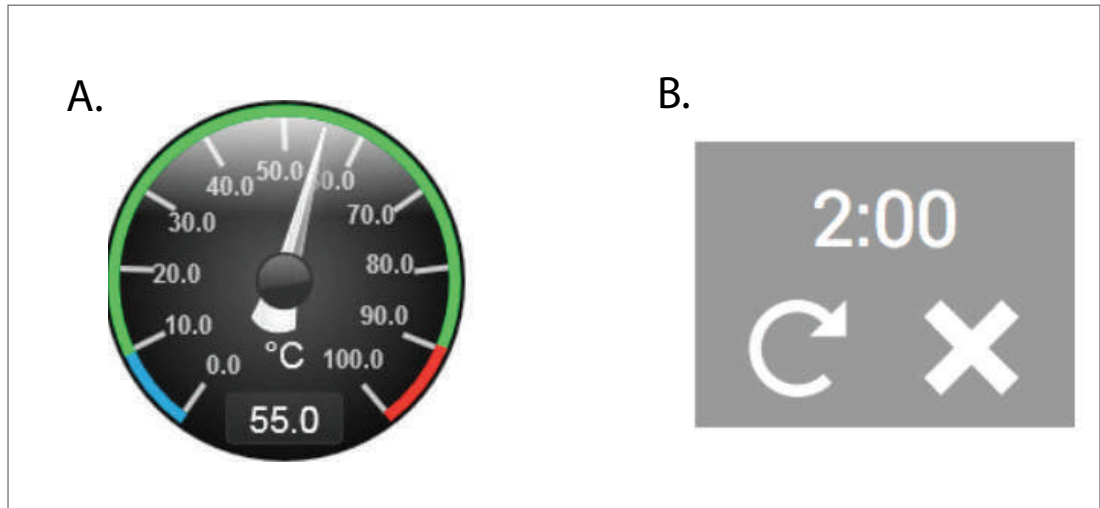
Actions... | **New Report**

<input type="checkbox"/>	Title	Type	Date and Time of Run
<input type="checkbox"/>	All Items in Override Report	All Items in Override	Nov 29, 2017 03:00:52 PM CST
<input type="checkbox"/>	Site Commissioning Report	Site Commissioning	Nov 29, 2017 03:00:08 PM CST
<input type="checkbox"/>	All Items in Alarm Report -MEM_812	All Items in Alarm	Nov 29, 2017 08:00:08 AM CST
<input type="checkbox"/>	All Items in Alarm Report -MEM_811	All Items in Alarm	Nov 28, 2017 08:00:07 AM CST
<input type="checkbox"/>	All Items in Alarm Report -MEM_810	All Items in Alarm	Nov 27, 2017 08:00:05 AM CST
<input type="checkbox"/>	All Items in Alarm Report -MEM_809	All Items in Alarm	Nov 23, 2017 08:00:02 AM CST
<input type="checkbox"/>	All Items in Alarm Report -MEM_808	All Items in Alarm	Nov 22, 2017 08:00:00 AM CST

## Graphical and Bindable Widgets

Graphical and bindable widgets can be incorporated into Tracer SC+ custom pages. Graphical widget components provide a visual representation of an analog process such as the current temperature or the current level of a water tank. Bindable widgets provide control and display of system controls and states in a simplified way. The following figure provides an example of each.

**Figure 8. Widget examples (A. Graphical, B. Bindable)**



## Graphics and The Tracer Graphics Editor

With the Tracer Graphics Editor (TGE), available through the Tracer TU service tool, users can create, edit, and publish graphics for use on Tracer Synchrony. Graphics on Tracer Synchrony monitor and control building equipment and applications. They can display data related to climate, lighting, and other controllable operations. They can be used to change setpoints and to override equipment operation.

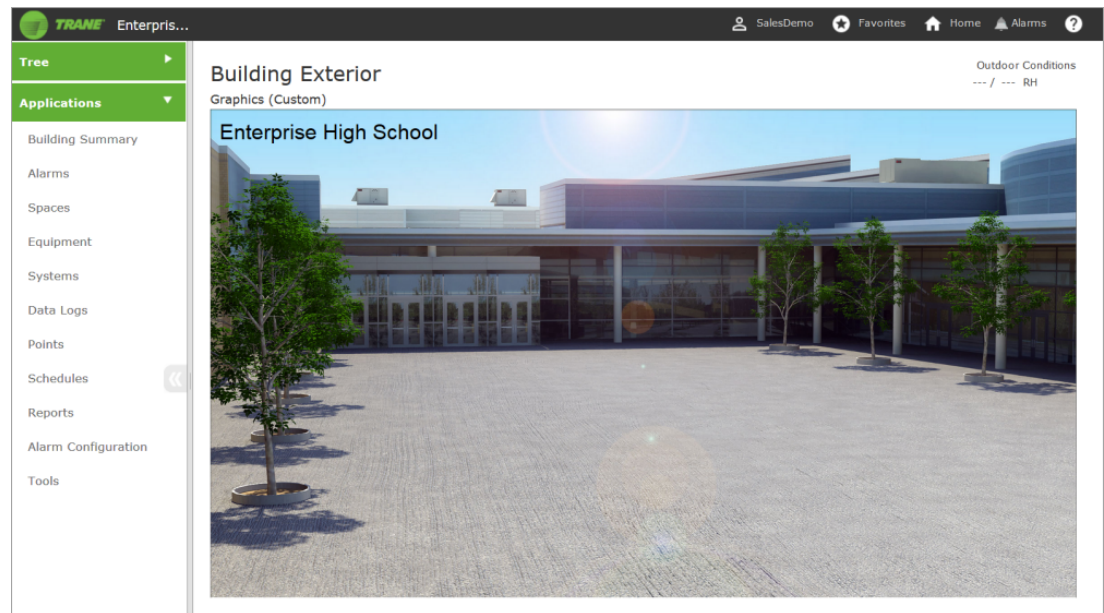
TGE can be used to align graphical elements, determine which elements appear on top, and perform cut, copy, and paste functions.

Graphics can include:

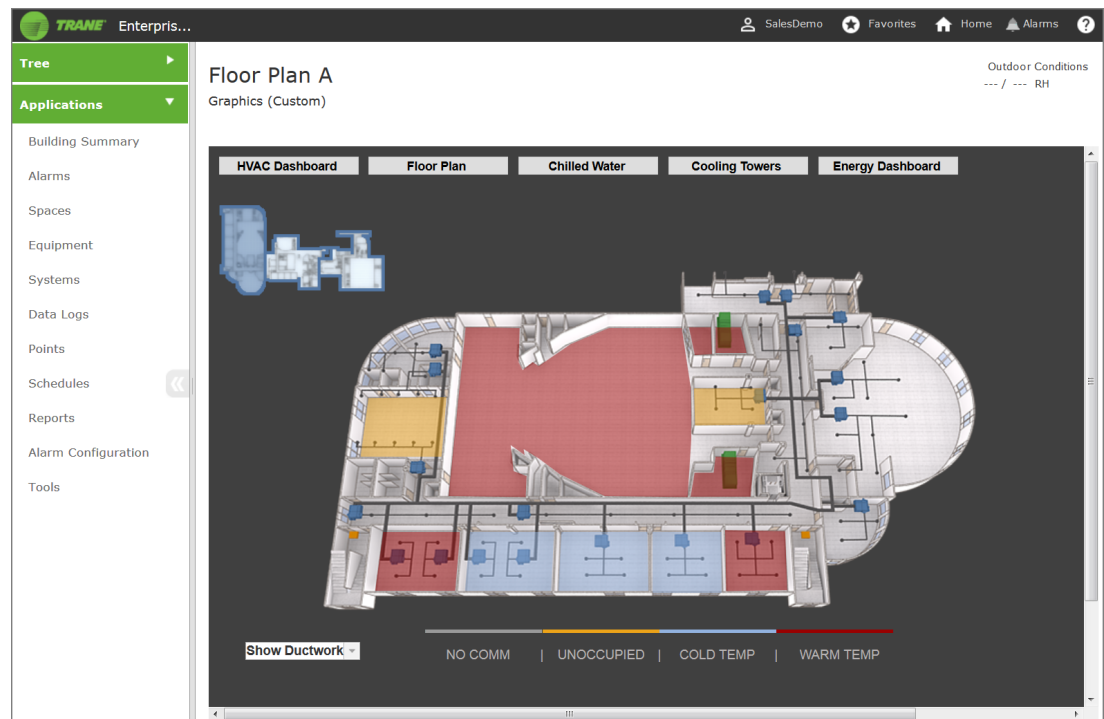
- Data from external websites — including weather data, documents and other information.
- Any data that is available in the system as a numerical or text value
- Analog values that can change colors if they deviate from a desired value
- Multiple graphic images in JPEG, GIF, and animated GIF formats
- Visual elements from the building, such as floor plans or exterior views from CAD drawings
- Digital photography in JPG and GIF formats
- Animated images to represent binary and analog values
- Target buttons that provide links to related sources
- User controls including push buttons, check boxes, drop-down list boxes, and entry fields

Graphics can be grouped in a logical way to simulate navigation through the building automation system. See the following figures for examples.

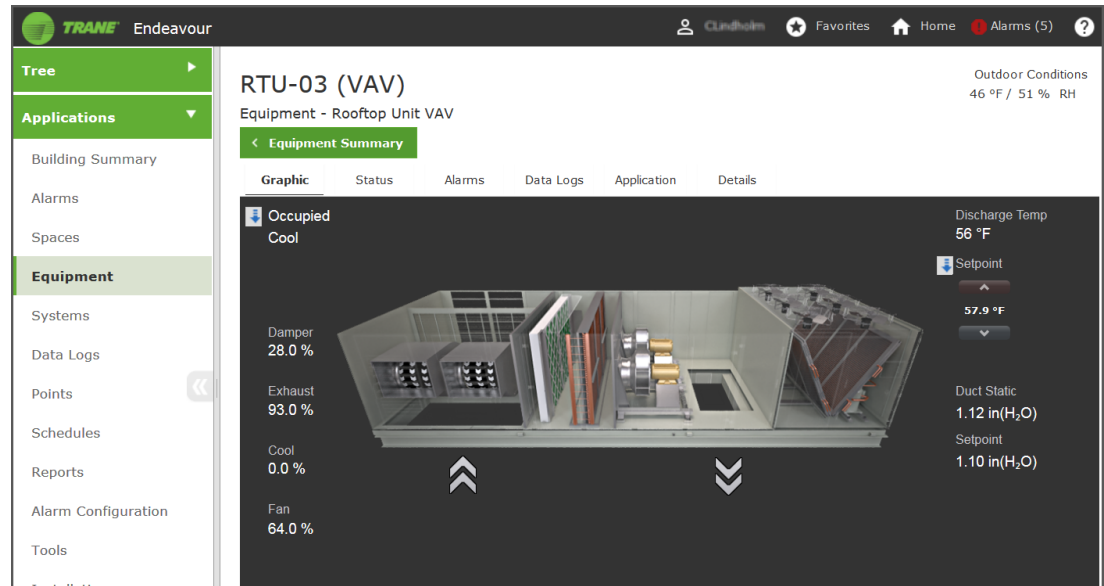
**Figure 9. Tracer Synchrony home page with building exterior graphic (example 1)**



**Figure 10. Tracer Synchrony home page with floor plan graphic (example 2)**



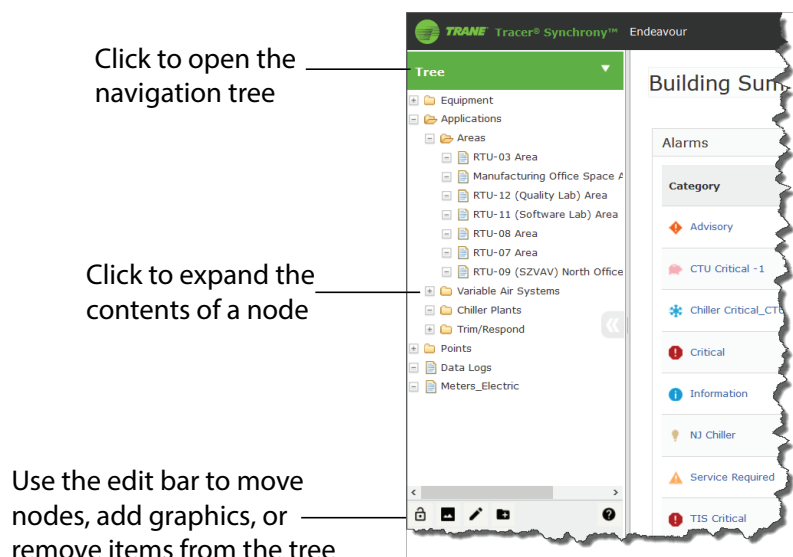
**Figure 11. Equipment status graphic (example 3)**



## 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 12. The navigation tree**



## User Security

A sophisticated password system protects a Tracer system from unauthorized access. Password strength criteria is editable and can be tailored to meet security requirements.



**Figure 13. Password requirements**

## Security

The following security settings apply to all user profiles.

Password Requirements

Password Requires Mixed Case:
☒

Password Requires Number:
☒

Password Requires Symbol:
☒

Password May Not Contain User Information:
☒

Password Minimum Length:

Number Of Previous Passwords Blocked From Reuse:

☐ Enforce Password Expiration

Days Until Expiration:

Operators are assigned a role, which defines their access rights.

- Operators have access only to those features that are defined in their roles.
- Several predefined roles can be selected from Tracer SC+ and roles can also be customized.
- An operator with administrative-level security can manage users and roles and has the ability to reset passwords.

**Figure 14. Tracer SC+ user roles**

Roles		Outdoor Conditions --- / --- RH
<div> <div>Actions...</div> <div>Create Role</div> </div>		
<input type="checkbox"/>	Name	Description
<input type="checkbox"/>	Installer/Programmer	Installs and configures system equipment and program functions, modifies points and other system objects, and can override most equipment and application setpoints.
<input type="checkbox"/>	Building Operator	Acknowledges alarms, responds to building occupant requests, creates and modifies schedules, and can override most equipment.
<input type="checkbox"/>	Facility Manager	Configures and runs schedules, data logs, and standard reports that are used as tools for budgeting and planning.
<input type="checkbox"/>	Advanced Building Operator	Acknowledges alarms, responds to building occupants requests, creates and modifies schedules, data logs, and standard reports.
<input type="checkbox"/>	Remote Building Operator	Responds to and acknowledges alarms and space comfort requests from occupants, and creates and modifies schedules.
<input type="checkbox"/>	Tenant	Views the alarm log and data logs, operates the building light functions, and has full scheduling capabilities.
<input type="checkbox"/>	Trane Concierge	Intended for use with Tracer Concierge display. Configure schedules, override most equipment and application setpoints. Similar to the Installer/Programmer role.
<input type="checkbox"/>	Trane Concierge without Schedules	Intended for use with Tracer Concierge display for National Accounts. No access to schedules. Override most equipment and application setpoints.

## Remote Access to a Tracer BAS

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



## The User Interface

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solution, including ordering information and remote access, refer to the *Trane Cellular Router Installation, Operation, and Maintenance Guide*, (BAS-SVX067).



# System Control

Tracer SC+ includes a powerful system control engine. Every Tracer SC+ ships with several factory engineered HVAC applications, support for Trane Earthwise™ Systems, and a powerful custom graphical programming language.

## 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
- Setpoint synchronization

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+ Application Guide*, (BAS-APG036).

## 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 Tracer SC+ 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-APG037).

## 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 Tracer SC+ 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 SC+ Application Guide*, (BAS-APG036).

## Trane EarthWise Systems

For any building owner concerned with energy, indoor air quality, and the environment, Trane's EarthWise™ Systems represent a design philosophy whose time has come. EarthWise and EarthWise Elite Systems, by definition, provide documented sustainability of high efficiency and low emissions over the entire lifetime of the building.

Trane EarthWise Systems include:

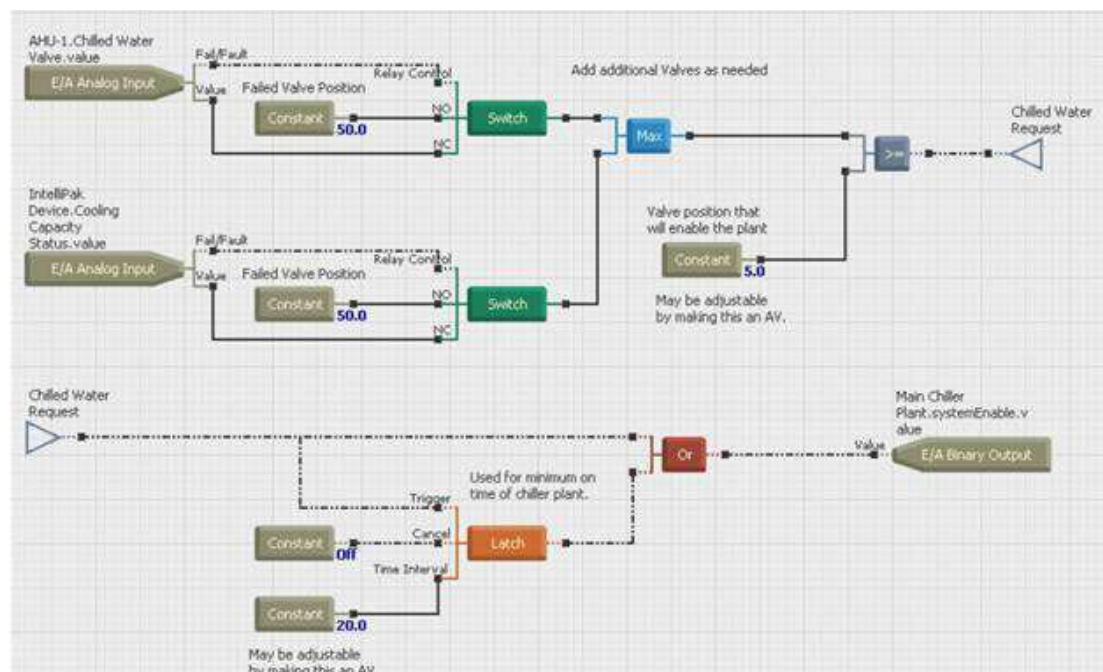
- Low Flow, Low Temperature CentraVac™ Chilled Water Systems
- Ice Enhanced, Air-Cooled Chiller Plant
- Intelligent Variable Air System for chilled-water applications
- Intelligent Variable Air System for IntelliPak™ rooftop applications
- Central Geothermal Systems

Find out more about EarthWise at <http://www.trane.com/commercial/north-america/us/en/products-systems/earthwise-systems.html>

## Tracer Graphical Programming (TGP2)

Tracer Graphical Programming (TGP2) is a powerful graphical program that allows you to customize Tracer system applications. TGP2 routines are typically used for sequencing equipment, calculating setpoints and values, and performing shutdown sequences. See the following figure for an example.

**Figure 15. TGP2 example**





## Unit control

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 & Energy Meters
- Trane E50 Series Power & 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+**

A maximum of 240 legacy devices can be installed and controlled through multiple Comm3/4 bridges (BTMB). There is no limit to the number of bridges allowed.

- 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)



## Resources

The following is a list of related Tracer SC+/Synchrony documentation and training resources.

- **Tracer SC+ System Controller Installation and Setup Guide (BAS-SVX077)**  
Describes detailed configuration for network settings, Ethernet network wiring, and IT security.
- **Tracer SC+ System Controller Installation Sheet (X39641320001)**  
For mounting the enclosure and providing AC power.
- **Tracer Synchrony online help**  
An online help system is included with the Tracer Synchrony 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 Wiring Best Practices and Troubleshooting (BAS-SVX51)**  
Provides best practices, procedures, and troubleshooting for wiring BACnet unit controllers to a Tracer SC+ system controller.
- **Tracer SC+ Air Systems Application Guide (BAS-APG036)**  
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
- **Trane University™**  
Trane University offers a comprehensive portfolio of technical courses to help you effectively monitor and coordinate your HVAC equipment and systems.  
<https://hub.ingersollrand.com/community/communities/trane-university/tcba>

# Specifications

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

**Table 3. Controller specifications**

Tracer SC+ Controller	
Web Browsers	<p>Microsoft Windows 7:</p> <ul style="list-style-type: none"> <li>Internet Explorer™ (version 11.0)</li> <li>Mozilla Firefox® (latest version)</li> <li>Google Chrome™ — latest version)</li> </ul> <p>Microsoft Windows 8.1: (no support)</p> <p>Microsoft Windows 10:</p> <ul style="list-style-type: none"> <li>Internet Explorer™ — no support</li> <li>Mozilla Firefox® (latest version)</li> <li>Google Chrome™ (latest version)</li> <li>Microsoft Edge™ (latest version)</li> </ul> <p>Apple® Mac OS (Latest — 1):</p> <ul style="list-style-type: none"> <li>Mozilla Firefox (latest version)</li> <li>Google Chrome (latest version)</li> <li>Safari® (latest version)</li> </ul>
Mobile Devices	<p>iOS ® (Latest – 1):</p> <ul style="list-style-type: none"> <li>Safari (latest version)</li> </ul> <p>Android — 4.4+:</p> <ul style="list-style-type: none"> <li>Google Chrome (latest version)</li> </ul> <p>Microsoft® Windows 10</p> <ul style="list-style-type: none"> <li>Microsoft Edge™ (latest version)</li> <li>Google Chrome (latest version)</li> <li>Mozilla FireFox (latest version)</li> </ul>
Concurrent Users	<ul style="list-style-type: none"> <li>Five</li> </ul>
Supported Languages	<p>Up to four languages are supported per Tracer SC+.</p> <ul style="list-style-type: none"> <li>English</li> <li>Chinese (Simplified/Traditional)</li> <li>French</li> <li>French Canadian</li> <li>Portuguese (Brazil)</li> <li>German</li> <li>Indonesian</li> <li>Japanese</li> <li>Korean</li> <li>Spanish (Latin America)</li> <li>Thai</li> <li>Polish</li> <li>Arabic</li> </ul>



**Table 3. Controller specifications (continued)**

Power requirements	24 Vdc @ 0.4A; OR 24 Vac @ 30 VA. Class 2 power source only
Operating environment	<ul style="list-style-type: none"> <li>Temperature: From –40°F to 158°F (–40°C to 70°C) when 24 Vdc and 500 mA max. USB current.</li> <li>–40°C to 50°C (–40°F to 122°F) for all other configurations.</li> <li>Relative humidity: From 10% to 90%, non-condensing</li> </ul>
Storage environment	<ul style="list-style-type: none"> <li>Temperature: From –40°F to 158°F (–40°C to 70°C)</li> <li>Relative humidity: From 5% to 95%, non-condensing</li> </ul>
Agency Listings	CE: <ul style="list-style-type: none"> <li>The European Union (EU) Declaration of Conformity is available from your local Trane® office.</li> </ul>
Processor	Arm A9 Cortex Dual Core
Memory	<ul style="list-style-type: none"> <li>FLASH 4 GB eMMC</li> <li>SDRAM 1 GB DDR3</li> </ul>
Battery	<ul style="list-style-type: none"> <li>Coin cell battery (2032 type) that preserves regional settings (including date/time) for up to 30 days. Battery must be obtained from an outside vendor.</li> </ul>
<b>Protocol Communications</b>	
BACnet	Tracer building automation systems communicates with BACnet devices that support: <ul style="list-style-type: none"> <li>Communications based on the BACnet ASHRAE/ANSI 2012 standard</li> <li>ENV-1805-1/ENV-13321-1</li> <li>User Datagram Protocol/Internet (UDP/IP) compatible network</li> </ul> Tracer SC+ is listed by BACnet Test Labs (BTL) as a BACnet Building Controller (B-BC). Listing information can be found at: <a href="http://www.bacnetinternational.net">http://www.bacnetinternational.net</a>
LonTalk	Tracer building automation systems communicates with LonTalk devices that support: <ul style="list-style-type: none"> <li>Communications based on the EIA-709.1 (LonTalk) standard</li> <li>LonTalk standard network variable types (SNVTs)*</li> </ul> *Note: requires an external Tracer USB LonTalk module (part# X13651698001) <ul style="list-style-type: none"> <li>FTT-10A or FT-X1 transceivers</li> <li>Twisted-pair physical media (Level 4 wiring)</li> </ul>
Modbus	<ul style="list-style-type: none"> <li>Communications based on Modbus RTU defacto standard over EIA/TIA 485 (2-wire)</li> <li>Communications based on Modbus TCP defacto standard over 10BASE-T/100BASE-TX Transmission Control Protocol/Internet Protocol (TCP/IP) compatible network</li> </ul>

**Table 3. Controller specifications (continued)**

Device Limits	<p>240 per facility - per device limits below (per link/per facility)</p> <p>BACnet  Tracer UC200/400/600/800/BCI - 60/240  Non-Trane BACnet - 32/240  Trane Communicating Thermostats - 60/240  Air-Fi® (BACnet/Zigbee) - 30/240  Symbio 800 - 60/240</p> <p>LonTalk  AH/CH/VV/ZN Series - 120/240  MP503 - 120/240  MP580 - 20/40  Trane Communicating Thermostats - 120/240  Symbio 800 - 120/240</p> <p>Modbus  TCP - 240/240  RTU - 30/90</p> <p>Legacy Trane  Comm 2 - 240 through Comm 2 bridge  Comm 3 - 240 through BMTB  Comm 4 - 240 through BMTB</p>
<b>Medium Enclosure (optional)</b>	
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)
<b>Large Enclosure (optional)</b>	
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)

# Hardware Components

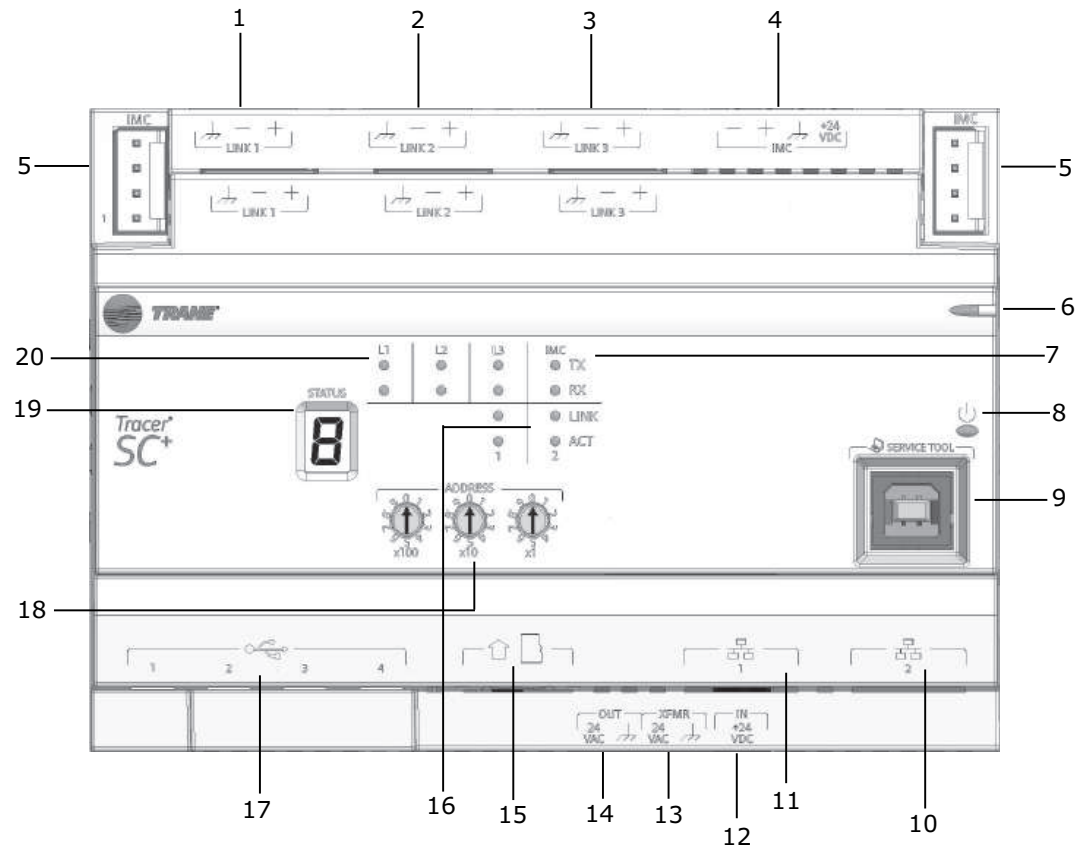
The Tracer SC+ system controller and additional hardware options are described in this section.

- Tracer SC+ system controller components
- Trane PM014 power supply module
- Tracer BACnet terminator
- Medium enclosure
- Large 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 16. Tracer SC+ components**

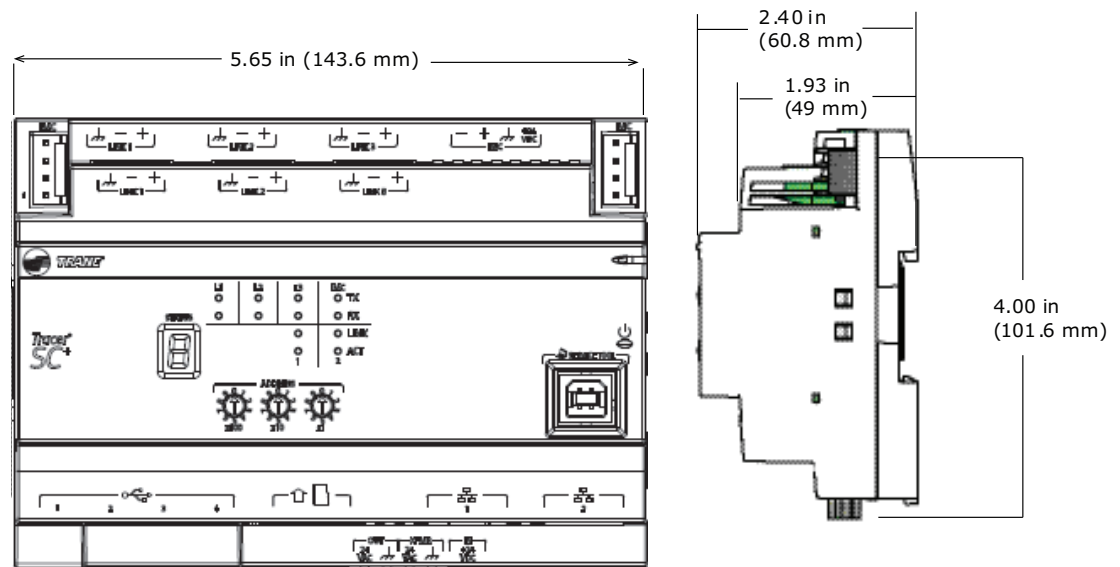


Callout Number in Figure	Tracer SC+ Components Description
1	Communication Link 1: RS-485 port configurable for BACnet MS/TP or Modbus RTU
2	Communication Link 2: RS-485 port configurable for BACnet MS/TP or Modbus RTU
3	Communication Link 3: RS-485 port configurable for BACnet MS/TP or Modbus RTU
4	4-pin IMC terminal block port
5	IMC pin connection
6	Status LED

Callout Number in Figure	Tracer SC+ Components Description
7	IMC LEDs
8	Power button
9	USB service tool port
10	Ethernet network connection 2: supports TCP/IP, BACnet/IP, and Modbus TCP communication
11	Ethernet network connection 1: supports TCP/IP, BACnet/IP, and Modbus TCP communication
12	24 Vdc power adapter port: supports external 24Vac/dc power adapter
13	24 Vac input
14	24 Vac output
15	Micro SD card slot: support for backups (up to 10 backup files, FIFO)
16	Ethernet LEDs
17	USB 2.0 ports: support for Tracer USB LonTalk module, WiFi and USB mass storage
18	Rotary switches
19	7-segment display
20	RS-485 communication link LEDs

## Dimensions

**Figure 17. Tracer SC+ system controller dimensions**



## Tracer SC+ Power Supply

The Tracer SC+ controller can be powered in one of the following three ways.

- 24 Vac @ 30 VA Class 2 Transformer with 4-position terminal block.
  - Output: 600mA at 24 Vdc @ 50C
- Tracer Plugin power supply with single barrel connector.
  - Output: 0.75 A max at 24 Vdc @ 50C. Polarity: outer ground, inner 24 Vdc
- PM014 power supply module through inter-module-communication bus (IMC).

- Output: 1.4 A max @ 24 Vdc @ 70C. Refer to the *PM014 Power Supply IOM*, (BAS-SVX33).

## Direct Current Requirements for SC+ and Peripherals

The Tracer SC+ output is 24 Vdc. Table 4, p. 29 provides the current draw per component for DC power budgeting.

**Table 4. 24 Vdc current draw per component on a Tracer SC+ controller**

Component	Current withdraw
SC+ controller	150mA
Each USB port	62mA
WCI	50mA
New WCI (see note)	10mA
XM30	110mA
XM32	100mA

**Note:** New WCI part numbers: X13790901030 (*Field Installed Indoor*), X13790941030 (*Field Installed Outdoor*), X13790902030 (*Service Indoor Flush*), X13790903030 (*Factory Indoor*), and X13790904030 (*Factory Indoor Flush*).

### Tracer SC+ DC Power Budget

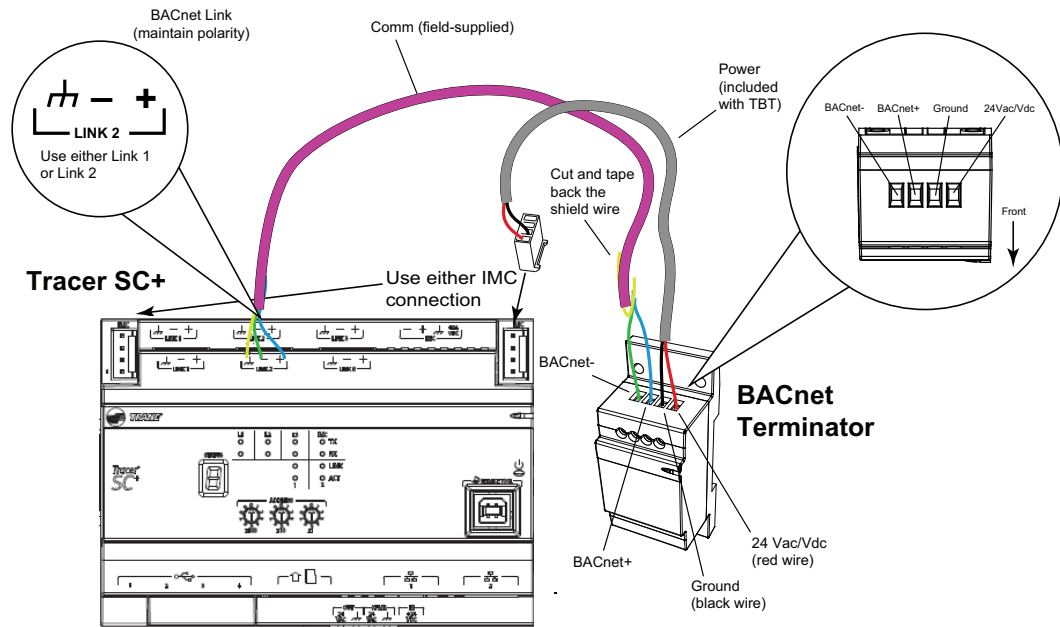
Depending on the power source, Tracer SC+ has a maximum current available for peripheral devices. Perform a power budget if you have more than three external devices connected through the IMC.

- AC Powered
  - The preferred power method is to provide 24 Vac from a transformer. Using the values from Table 4, p. 29, calculate the current draw for all the components connected to the SC+. If the total exceeds 600mA, use a PM014 module or a plug-in power supply.
- Tracer Plug-in power supply
  - Using the values from Table 4, p. 29, calculate the current draw for all the components connected to the SC+. The total cannot exceed 0.75A. If the sum exceeds 750mA, use a PM014 module.
- PM014 powered
  - Using the values from Table 4, p. 29, calculate the power draw for all the components connected to the SC+. The total cannot exceed 1.4A.

## Tracer BACnet Terminator

A Tracer BACnet® terminator is placed at the end of each communication link in order to decrease communication signal degradation. Refer to the *BACnet® Wiring Best Practices and Troubleshooting Guide*, (BAS-SVX51).

**Figure 18. BACnet terminator (wiring)**



## Medium/Large Enclosure (Optional)

**Table 5. Medium/Large enclosure**

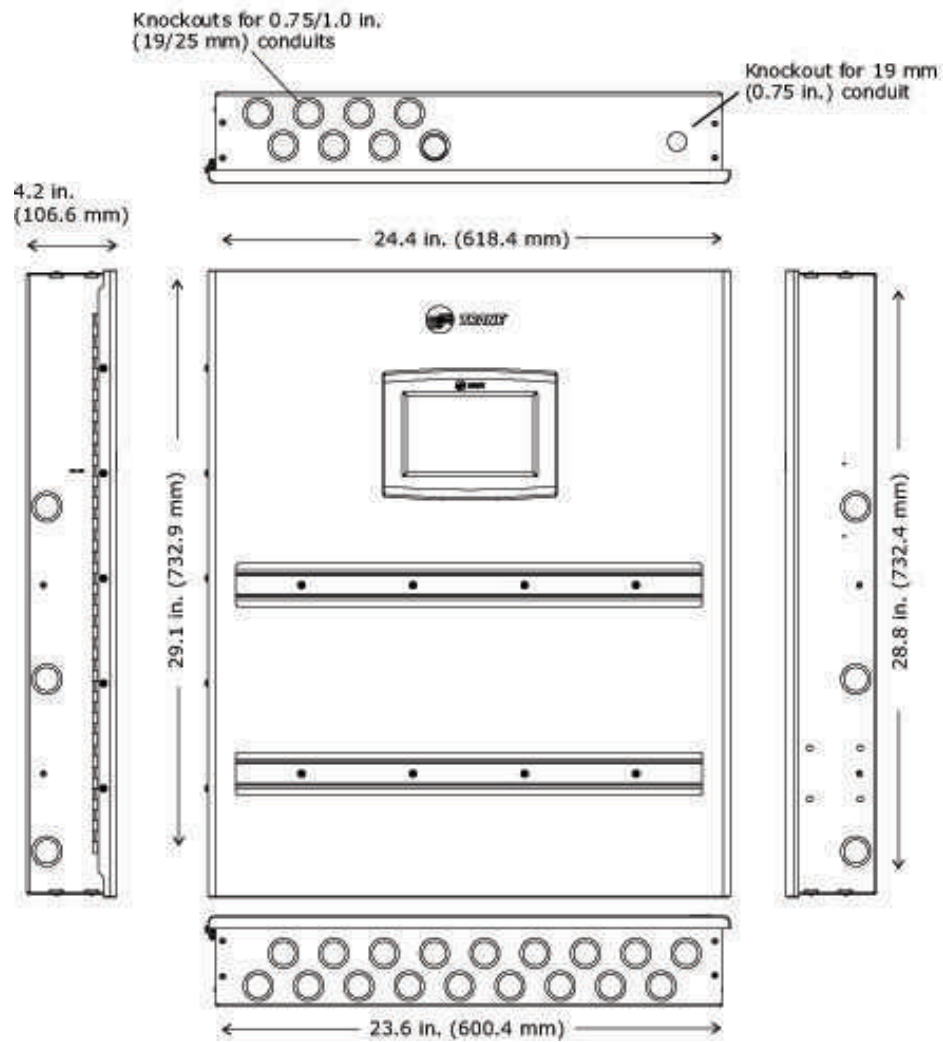
Type	Details	Order number
Medium Enclosure, 120 Vac with 1 outlet	Tracer DIN-mounted controller	X13651559010
Medium Enclosure, 120 Vac with 3 outlets	Tracer DIN-mounted controller	X13651699001
Medium Enclosure, 230 Vac with 0 outlet	Tracer DIN-mounted controller	X13651560010
Large Enclosure, 120 Vac	Tracer DIN-mounted controller with solid door	X1365155201
Large Enclosure, 120 Vac	Tracer DIN-mounted controller with display-capable door	X1365155301
Large Enclosure, 230 Vac Dual Transformer	Tracer DIN-mounted controller with solid door	X1365155401
Large Enclosure, 230 Vac Dual Transformer	Tracer DIN-mounted controller with display-capable door	X1365155501

## Large Enclosure (Optional)

The large enclosure for Tracer DIN-mounted controllers is available in the following:

- 120 VAC
  - solid door (order number: X1365155201)
  - display-capable door (order number: X1365155301)
- 230 VAC Dual Transformer
  - solid door (order number: X1365155401)
  - display-capable door (order number: X1365155501)

**Figure 19. Large enclosure (dimensions)**



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