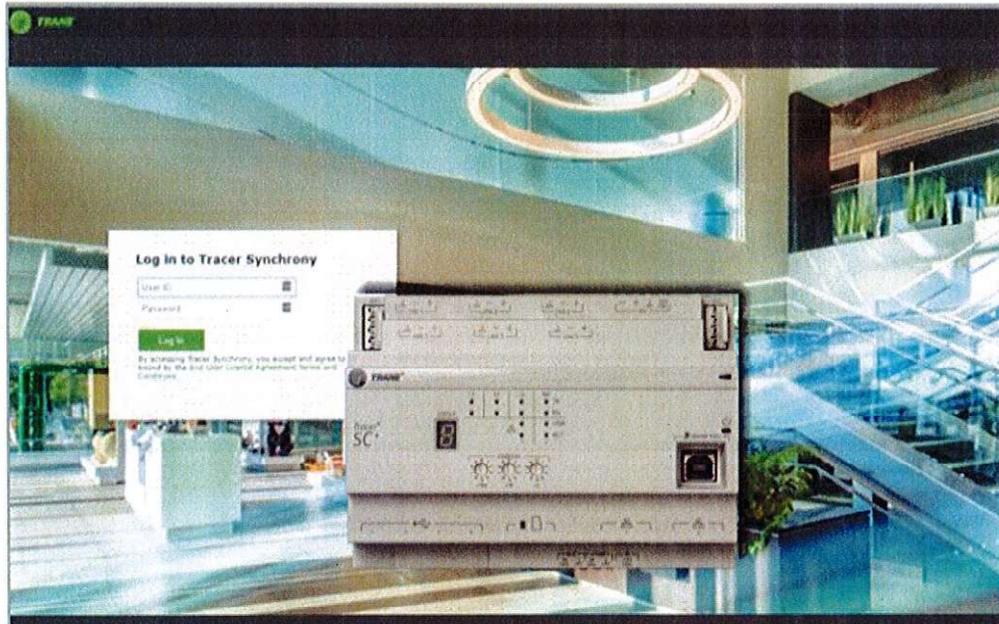




Product Catalog

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



February 2018

BAS-PRC087B-EN





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.

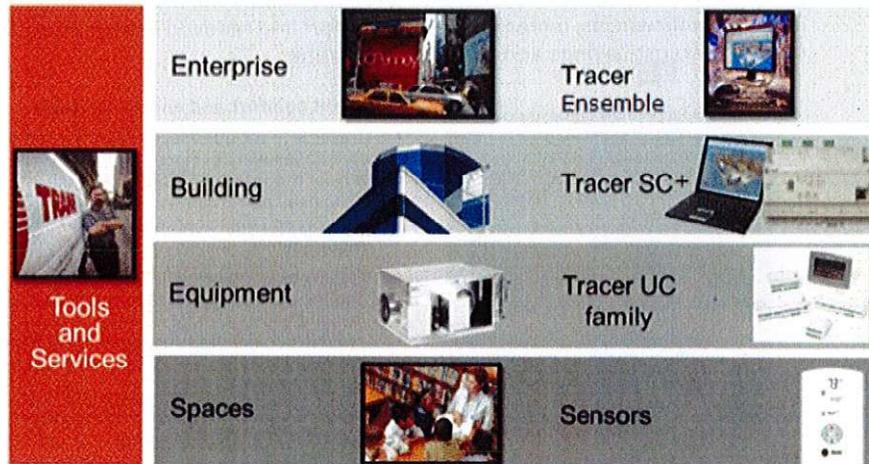
	<p>Occupant comfort and energy savings</p> <ul style="list-style-type: none"> Tracer SC+ includes several factory engineered HVAC applications that have been developed by HVAC system experts and tested on tens of thousands of facilities to ensure that your facility operates at its peak performance. These applications provide consistent comfort and improved indoor air quality, while reducing energy requirements. 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. Tracer Graphical Programming (TGP2) is a powerful graphical program that can be used to customize factory applications or control non-HVAC equipment.
	<p>Access your facility from anywhere</p> <ul style="list-style-type: none"> 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. 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. Trane Connect for Remote Access provides an easy, secure option for remotely connecting to a Tracer SC+.
	<p>Support for open, standard protocols</p> <ul style="list-style-type: none"> 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. Tracer SC+ natively communicates to BACnet® and LonTalk controllers and is listed as a BACnet Building Controller (B-BC) by BACnet Test Labs (BTL). Tracer SC+ supports Trane Air-Fi™ Wireless, providing standard wireless BACnet over Zigbee™ building automation between Trane BACnet controllers and zone sensors.
	<p>Support for Trane Air-Fi™ Wireless</p> <ul style="list-style-type: none"> Trane Air-Fi Wireless brings maximum flexibility to your building automation system. 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. 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.



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.

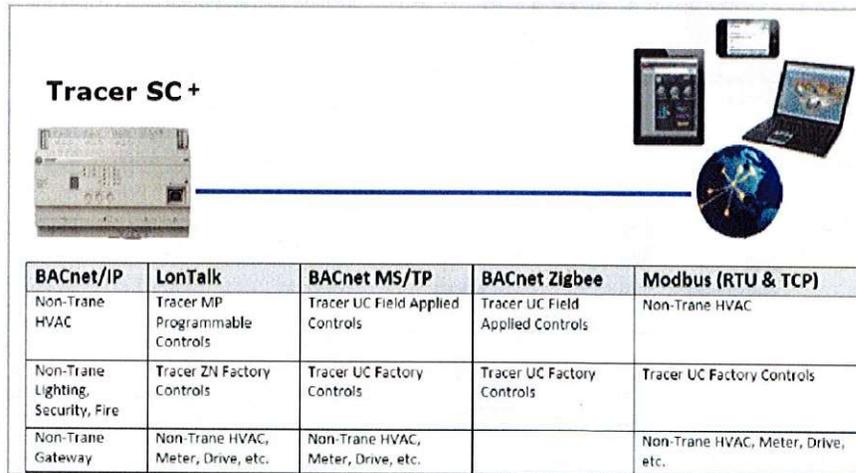
Trane controls are built on open, scalable platforms. They provide options to integrate with your existing equipment and controls, regardless of brand, and give you the latitude to easily expand into other systems within your building, multiple buildings and buildings you'll add in the future.



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.

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 one Application SC+ and one or more associated Base SC+ controllers. 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 SC+ controllers.
- Tracer SC+ facility can support a maximum 240 devices.
- The Tracer SC+ facility can be limited to 120 devices depending on the communications involved (see the following table for device capability).

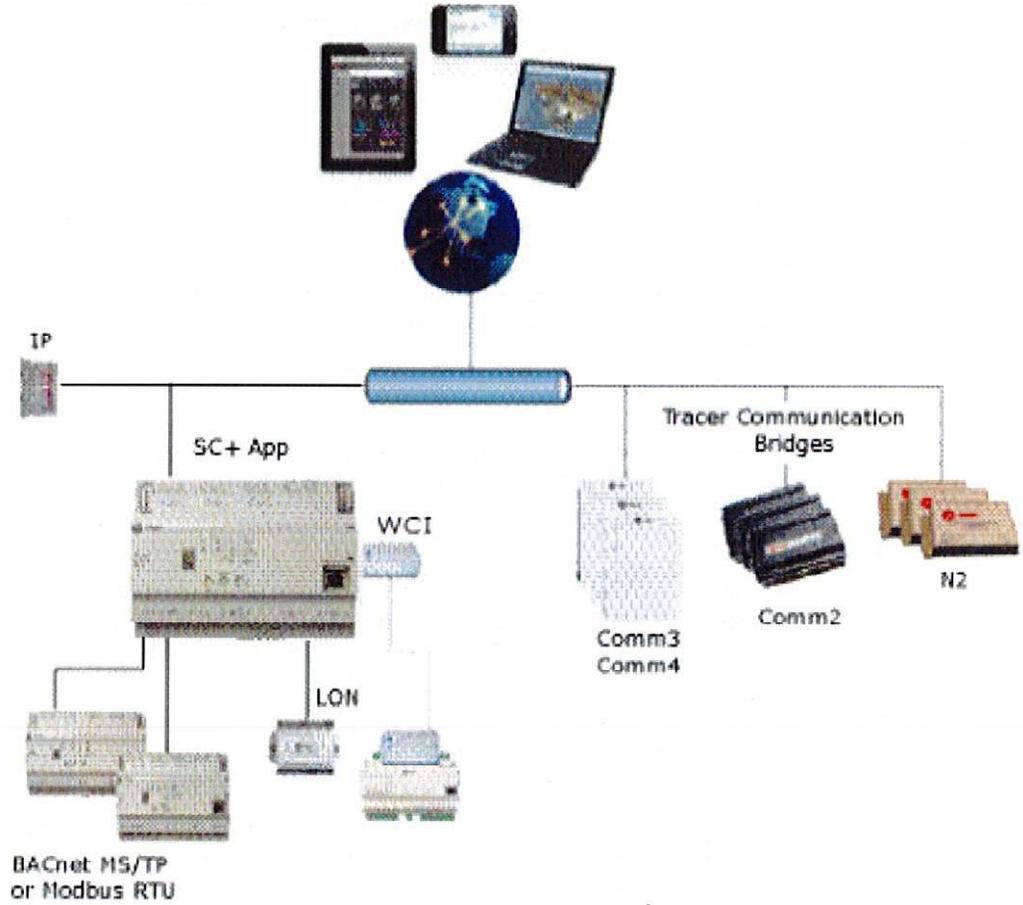
Note: *LonTalk, Modbus TCP, and Modbus RTU devices must all be installed in the Application SC+.*

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™ sensor 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

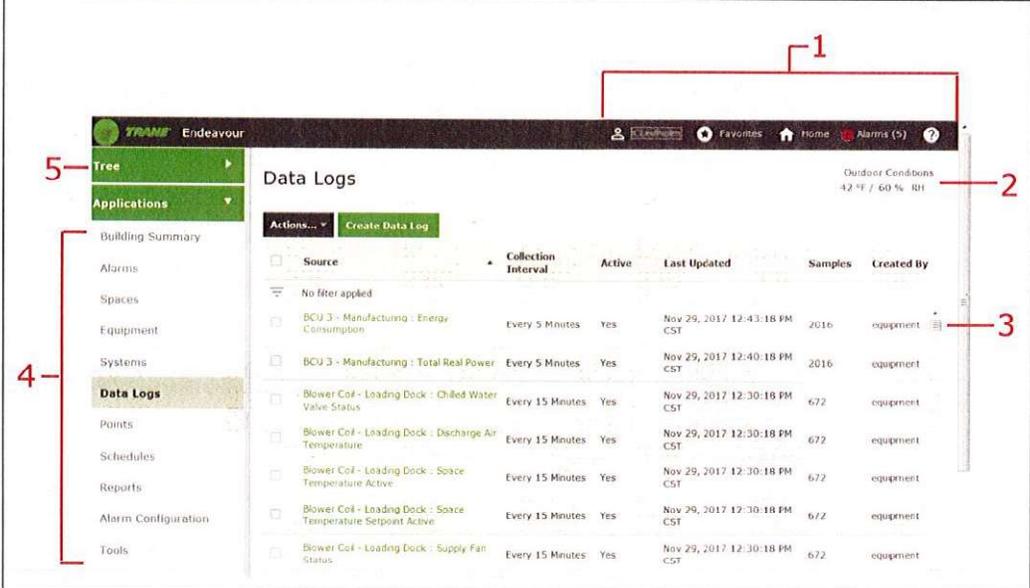
Number	Button/Menu Functions	Description
		
1	Global Navigation Bar	<p>This is visible on every page. From left to right, the bar contains:</p> <ul style="list-style-type: none">  (User) — Click to logout, view or edit preferences, or change your password. Favorites — Click this button to save frequently Tracer Synchrony 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. Admin... Provides access to roles and users. <ul style="list-style-type: none"> 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.  — 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.
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. 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.

Figure 3. Alarms log

Category	Time	Source	Description	Comments	Acknowledgement
No filter applied					
Nov 28, 2017 11:43:21 PM CST	RTU-06 (CO) : Diagnostic: Mixed Air Temp Low Limit Cycle Active	In Alarm		Not Required	
Nov 28, 2017 03:34:38 PM CST	RTU-11 (CV) : Communication Status	Returned To Normal : Communicating		Not Required	
Nov 28, 2017 03:33:58 PM CST	RTU-11 (CV) : Space Temperature Active	Returned To Normal : 74.1 °F		Not Required	
Nov 28, 2017 03:25:35 PM CST	RTU-07 (COB) : Diagnostic: Local Emergency Stop Initiated	In Alarm : Emergency Stop		Required	
Nov 28, 2017 03:25:24 PM CST	RTU-08 (COB) : Alarm Relay Output Status	In Alarm : Energized		Not Required	
Nov 28, 2017 03:25:19 PM CST	RTU-08 (COB) : Diagnostic: Local Emergency Stop Initiated	In Alarm : Emergency Stop		Required	
Nov 28, 2017 03:06:22 PM CST	RTU-11 (CV) : Communication Status	In Alarm : Not Communicating		Not Required	
Nov 28, 2017 03:06:21 PM CST	RTU-07 (COB) : Diagnostic: Local Emergency Stop Initiated	In Alarm : Emergency Stop		Required	
Nov 28, 2017 03:05:50 PM CST	RTU-08 (COB) : Alarm Relay Output Status	In Alarm : Energized		Not Required	
Nov 28, 2017 03:05:37 PM CST	RTU-08 (COB) : Diagnostic: Local Emergency Stop Initiated	In Alarm : Emergency Stop		Required	

Data Logs

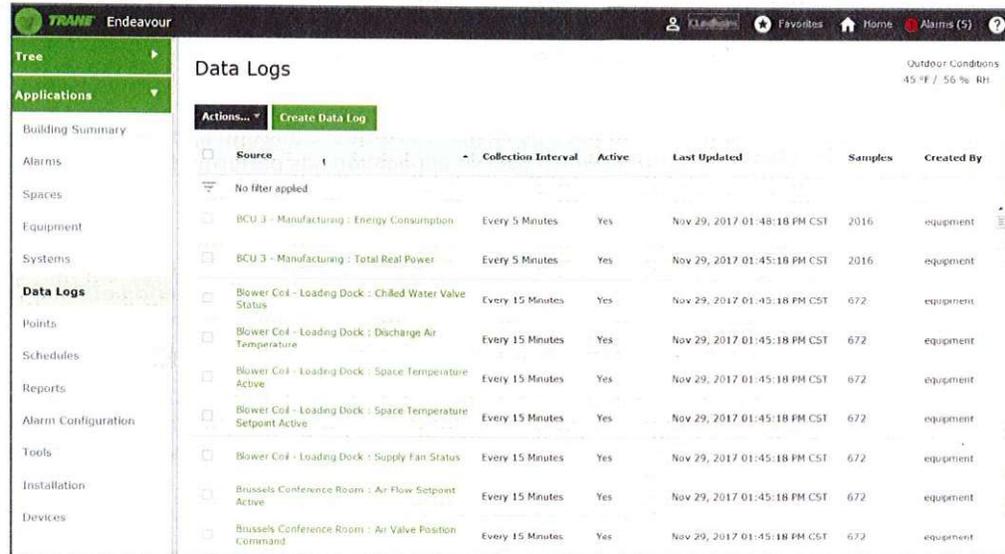
Data Logging, also referred to as trending, records in real-time the value of a data point in the system and the time at which the value was recorded.

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.

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					
BCU 3 - Manufacturing : Energy Consumption	Every 5 Minutes	Yes	Nov 29, 2017 01:48:18 PM CST	2016	equipment
BCU 3 - Manufacturing : Total Real Power	Every 5 Minutes	Yes	Nov 29, 2017 01:45:18 PM CST	2016	equipment
Blower Coil - Loading Dock : Chilled Water Valve Status	Every 15 Minutes	Yes	Nov 29, 2017 01:45:18 PM CST	672	equipment
Blower Coil - Loading Dock : Discharge Air Temperature	Every 15 Minutes	Yes	Nov 29, 2017 01:45:18 PM CST	672	equipment
Blower Coil - Loading Dock : Space Temperature Active	Every 15 Minutes	Yes	Nov 29, 2017 01:45:18 PM CST	672	equipment
Blower Coil - Loading Dock : Space Temperature Setpoint Active	Every 15 Minutes	Yes	Nov 29, 2017 01:45:18 PM CST	672	equipment
Blower Coil - Loading Dock : Supply Fan Status	Every 15 Minutes	Yes	Nov 29, 2017 01:45:18 PM CST	672	equipment
Brussels Conference Room : Air Flow Setpoint Active	Every 15 Minutes	Yes	Nov 29, 2017 01:45:18 PM CST	672	equipment
Brussels Conference Room : Air Flow Position Command	Every 15 Minutes	Yes	Nov 29, 2017 01:45:18 PM CST	672	equipment

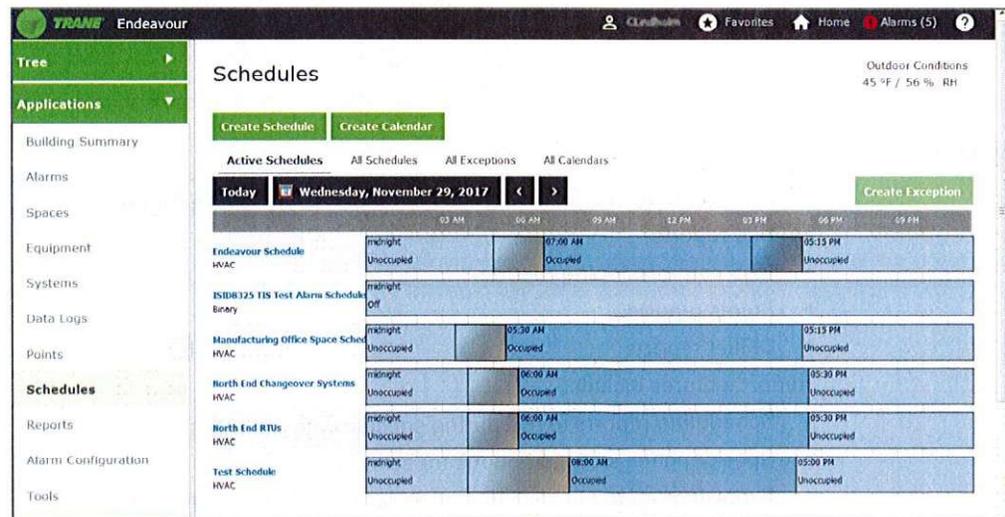
Schedules

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

Name	Owner Name	Value	Priority	Priority Owner Name	Last Control Time	Value Description
No filter applied						
Chilled Water Valve Status	Blower Coil - Loading Dock	0.0 %	9	cool_vlv_modTrac	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 - Loading Dock				Nov 29, 2017 03:01:34 PM CST	...

Reports

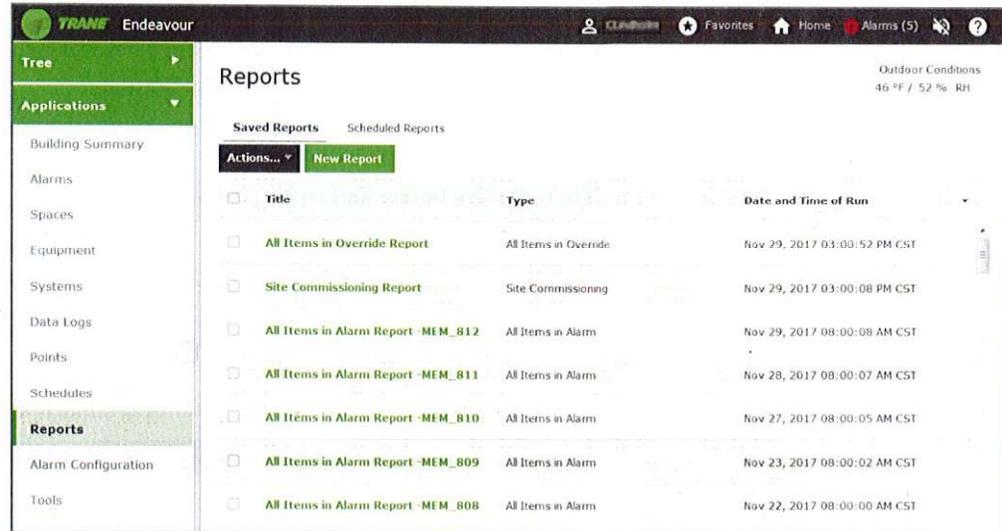
You can generate the following types of reports for Trane equipment:

- 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

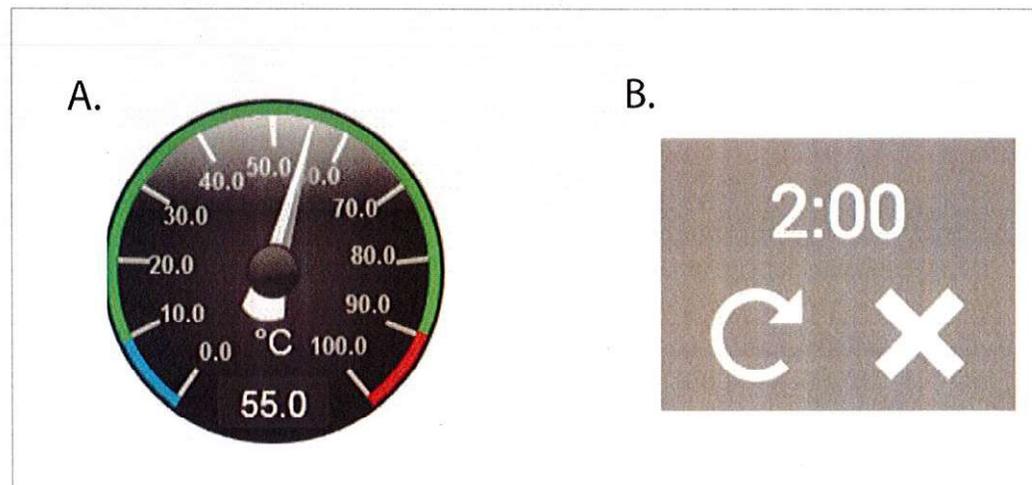
Figure 7. Reports page



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)

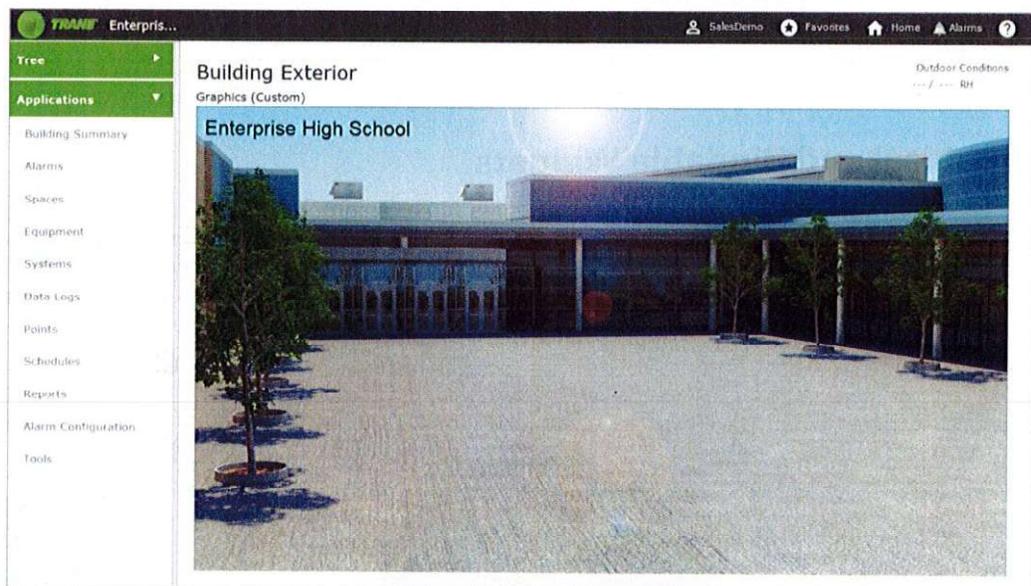


Figure 10. Tracer Synchrony home page with floor plan graphic (example 2)

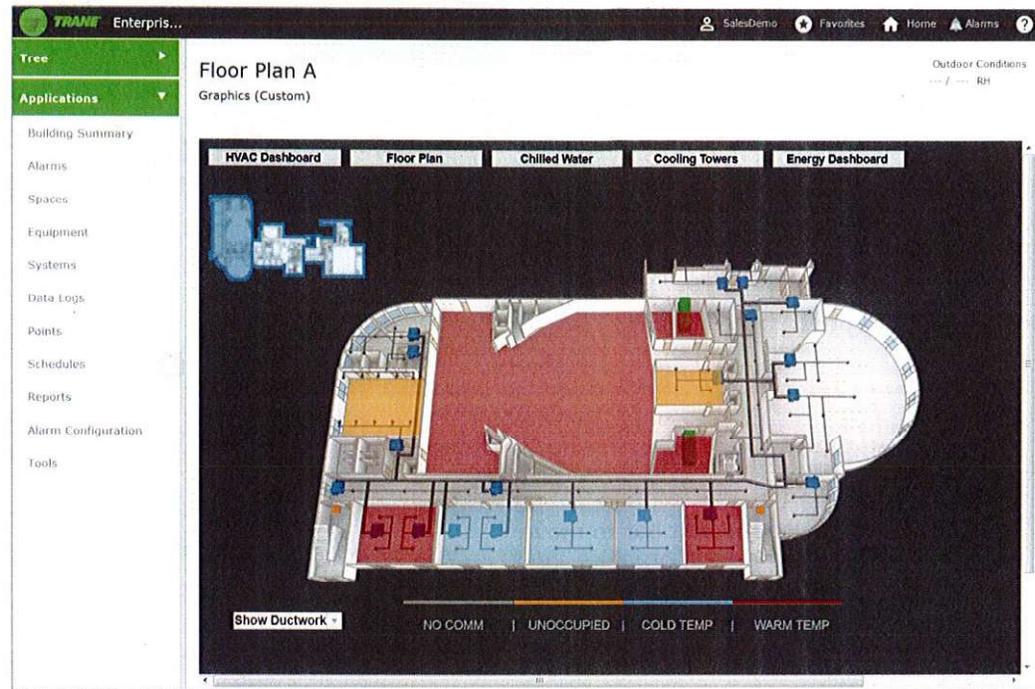
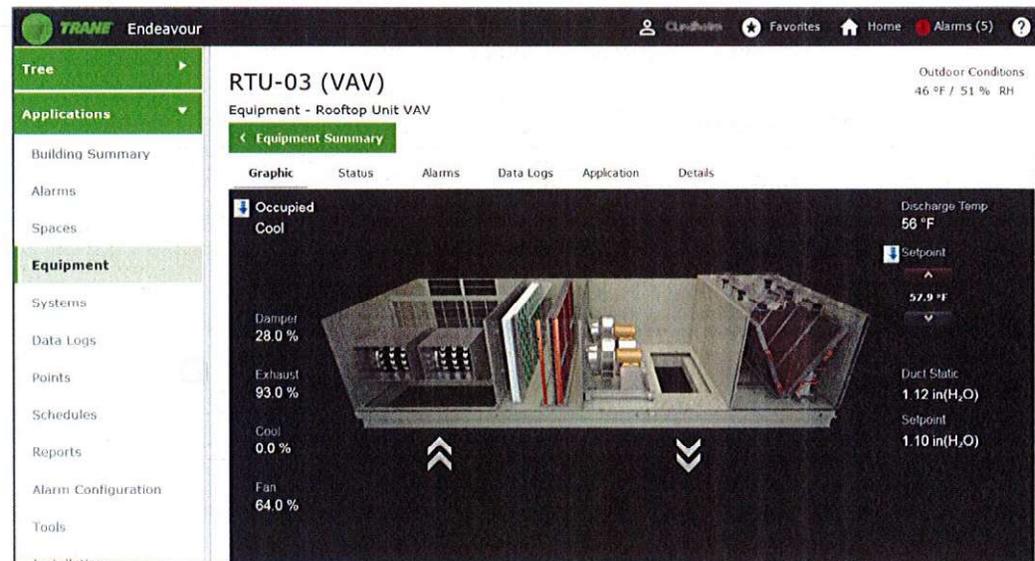
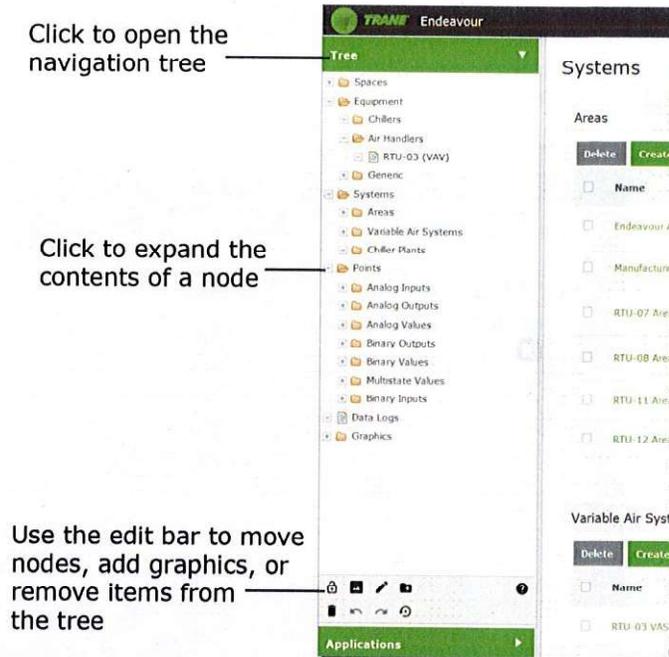


Figure 11. Equipment status graphic (example 3)



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.



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 12. 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 13. Tracer SC+ user roles

Roles

Actions...
Create Role

Outdoor Conditions
--- / --- RH

	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 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:

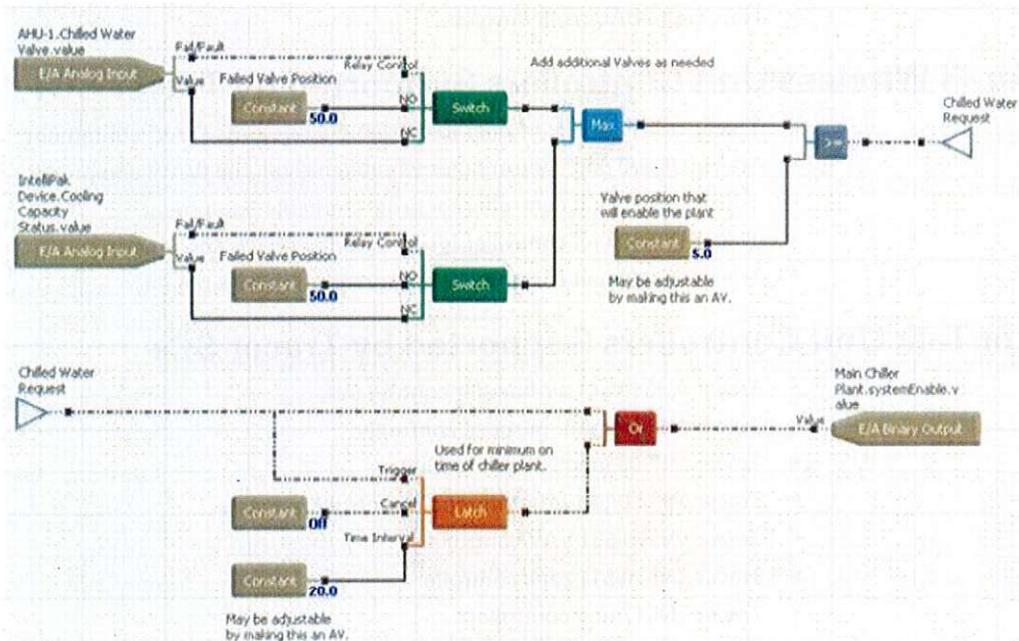
- Low Flow, Low Temperature CentraVac™ Chilled Water Systems
- Ice Enhanced, Air-Cooled Chiller Plant
- Intelligent Variable Air System for chilled-water applications
- Intelligent Variable Air System for IntelliPak™ rooftop applications
- Central Geothermal Systems

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

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"> • Temperature: From -40°F to 158°F (-40°C to 70°C) when 24 Vdc and 500 mA max. USB current. • -40°C to 50°C (-40°F to 122°F) for all other configurations. • Relative humidity: From 10% to 90%, non-condensing
Storage environment	<ul style="list-style-type: none"> • Temperature: From -40°F to 158°F (-40°C to 70°C) • Relative humidity: From 5% to 95%, non-condensing
Agency Listings	CE: <ul style="list-style-type: none"> • The European Union (EU) Declaration of Conformity is available from your local Trane® office.
Processor	Arm A9 Cortex Dual Core
Memory	<ul style="list-style-type: none"> • FLASH 4 GB eMMC • SDRAM 1 GB DDR3
Battery	<ul style="list-style-type: none"> • Coin cell battery that preserves regional settings (including date/time) for up to 30 days.
Protocol Communications	
BACnet	Tracer building automation systems communicates with BACnet devices that support: <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • Communications based on the EIA-709.1 (LonTalk) standard • LonTalk standard network variable types (SNVTs)* *Note: requires an external Tracer USB LonTalk module (part# X13651698001) <ul style="list-style-type: none"> • FTT-10A or FT-X1 transceivers • Twisted-pair physical media (Level 4 wiring)
Modbus	<ul style="list-style-type: none"> • 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

Table 3. Controller specifications (continued)

Device Limits	<p>Tracer SC+ facility (combination of all protocols)</p> <ul style="list-style-type: none"> • Up to 240 devices <p>BACnet (per link/Per facility)</p> <ul style="list-style-type: none"> • Tracer UC200 Series - 60/240 • Tracer UC400 Series - 60/240 • Tracer UC600 Series- 10/240 • Tracer UC800 Series - 60/240 • BCI Series - 60/240 • Trane Communicating Thermostats (BACnet) - 60/240 • Non-Trane BACnet - 32/240 <p>LonTalk (Per link/Per facility)</p> <ul style="list-style-type: none"> • AH Series - 120/240 • CH Series - 120/240 • VV Series - 120/240 • ZN Series - 120/240 • MP503 - 120/240 • MP580 - 20/40 • Trane Communicating Thermostats (LonTalk) - 120/240 • Non-Trane LON - 120/240 <p>Modbus (Per link/Per facility)</p> <ul style="list-style-type: none"> • Modbus TCP – 240/240 • Modbus RTU – 60/180 <p>Air-Fi Wireless (Per network/Per facility)</p> <ul style="list-style-type: none"> • WCI - 30/240
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)



Hardware Components

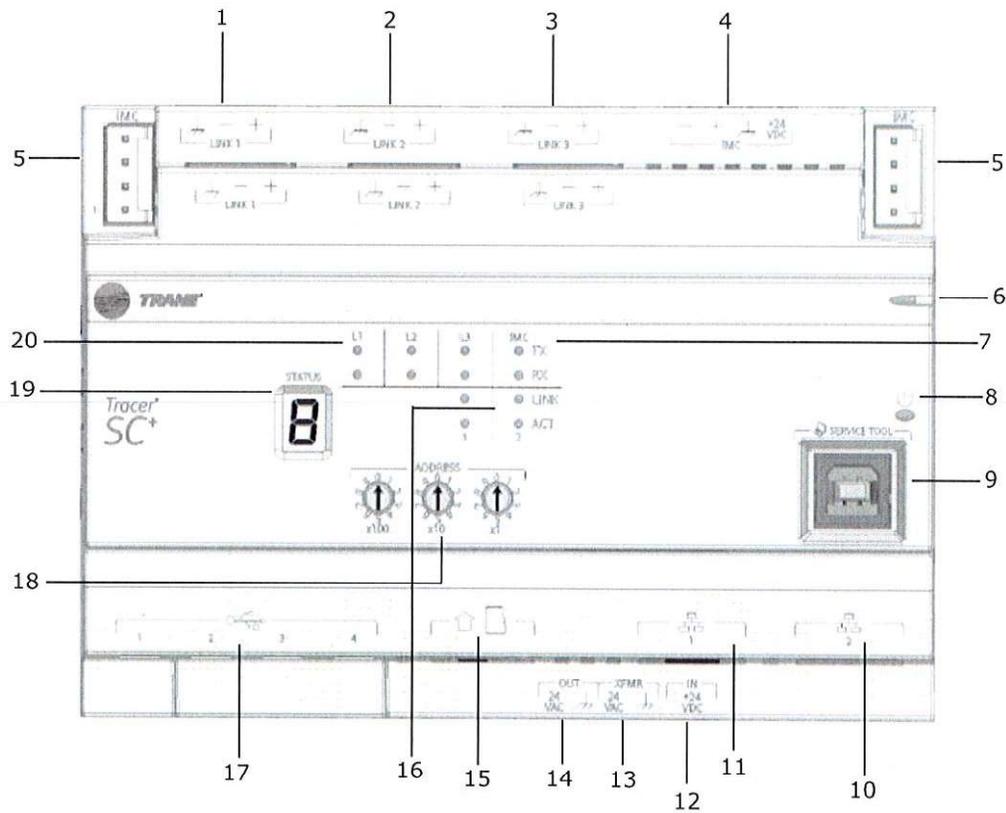
The Tracer SC+ system controller and additional hardware options are described in this section.

- 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 15. Tracer SC+ components

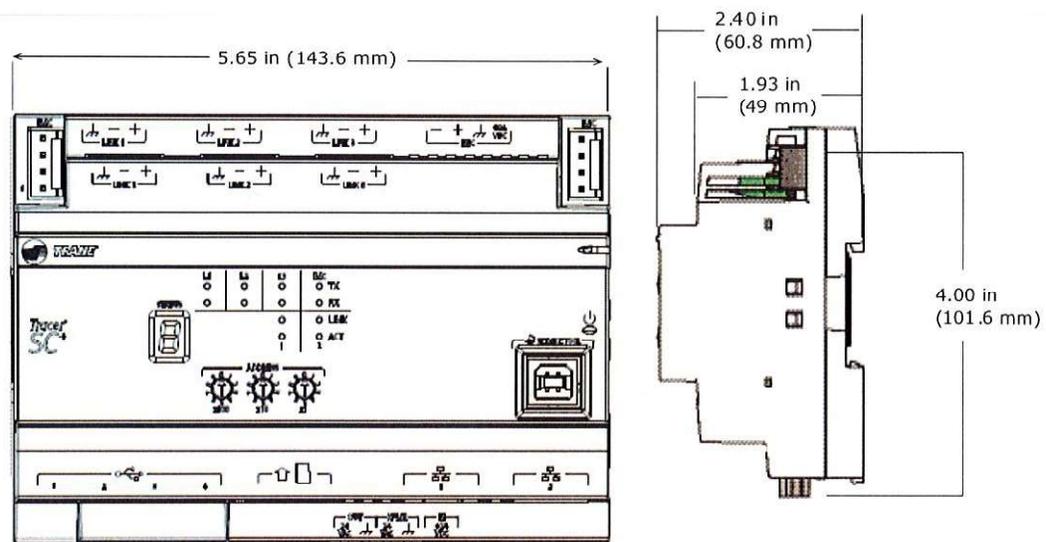


Callout Number in Figure	Tracer SC+ Components Description
1	Communication Link 1: RS-485 port configurable for BACnet MS/TP or Modbus RTU
2	Communication Link 2: RS-485 port configurable for BACnet MS/TP or Modbus RTU
3	Communication Link 3: RS-485 port configurable for BACnet MS/TP or Modbus RTU
4	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 (PN# X13770352001)
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 (PN# X13651698001), WiFi and USB mass storage
18	Rotary switches
19	7-segment display
20	RS-485 communication link LEDs

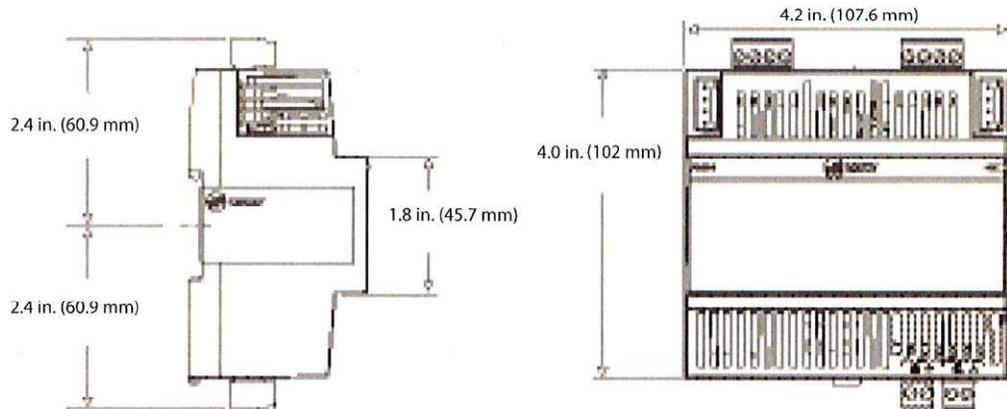
Dimensions

Figure 16. Tracer SC+ system controller dimensions



Trane PM014 Power Supply Module

The PM014 power supply module provides 24 Vdc for Trane inter-module communication (IMC) buses. IMC buses are used in components of Trane building automation systems, including the Tracer SC+ system controller. Refer to the *Power Supply Module Installation, Operation, and Troubleshooting Guide*, (BAS-SVX33).

Figure 17. PM014 power supply module (dimensions)


The Tracer SC+ can be powered in one of three ways depending on the type and quantity of applied peripherals. Below is a list of supported peripherals and corresponding percentage of power* consumed.

- WCI — 11%
- XM30 — 22%
- XM32 — 22%
- Tracer USB LonTalk module — 6%
- Trane Wi-Fi Adapter — 14%
- USB flash drive — 14%

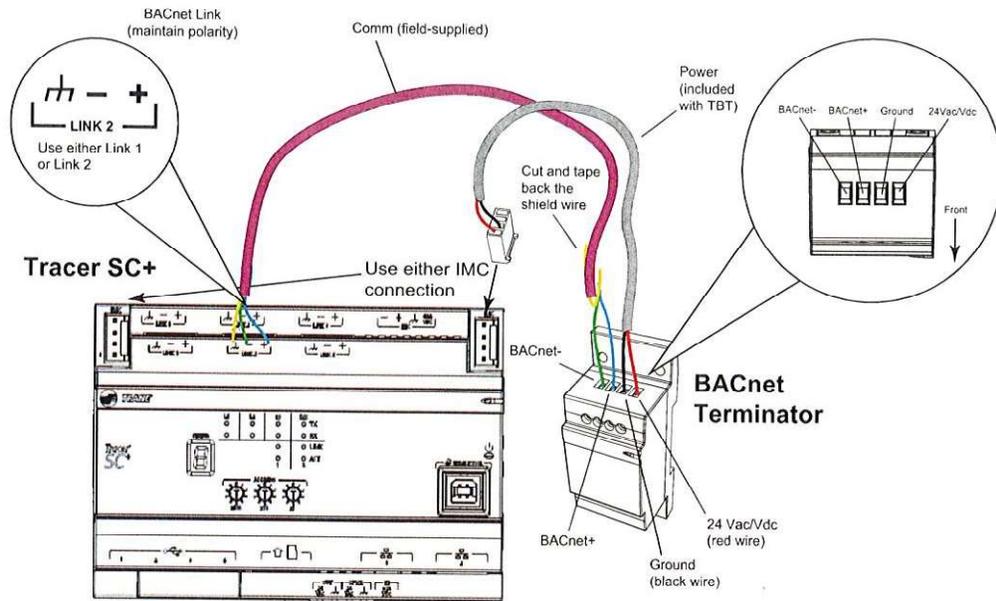
Calculate the total percentages for all peripherals intended for use with the application. If the sum exceeds 100%, a PM014 power supply is required. If the sum is 100% or less, power the Tracer SC+ using the 24 Vac input or a Plugin power supply.

* Based on direct 24 Vac input.

Tracer BACnet Terminator

A Tracer BACnet terminator (order no. X13651524-01) 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).

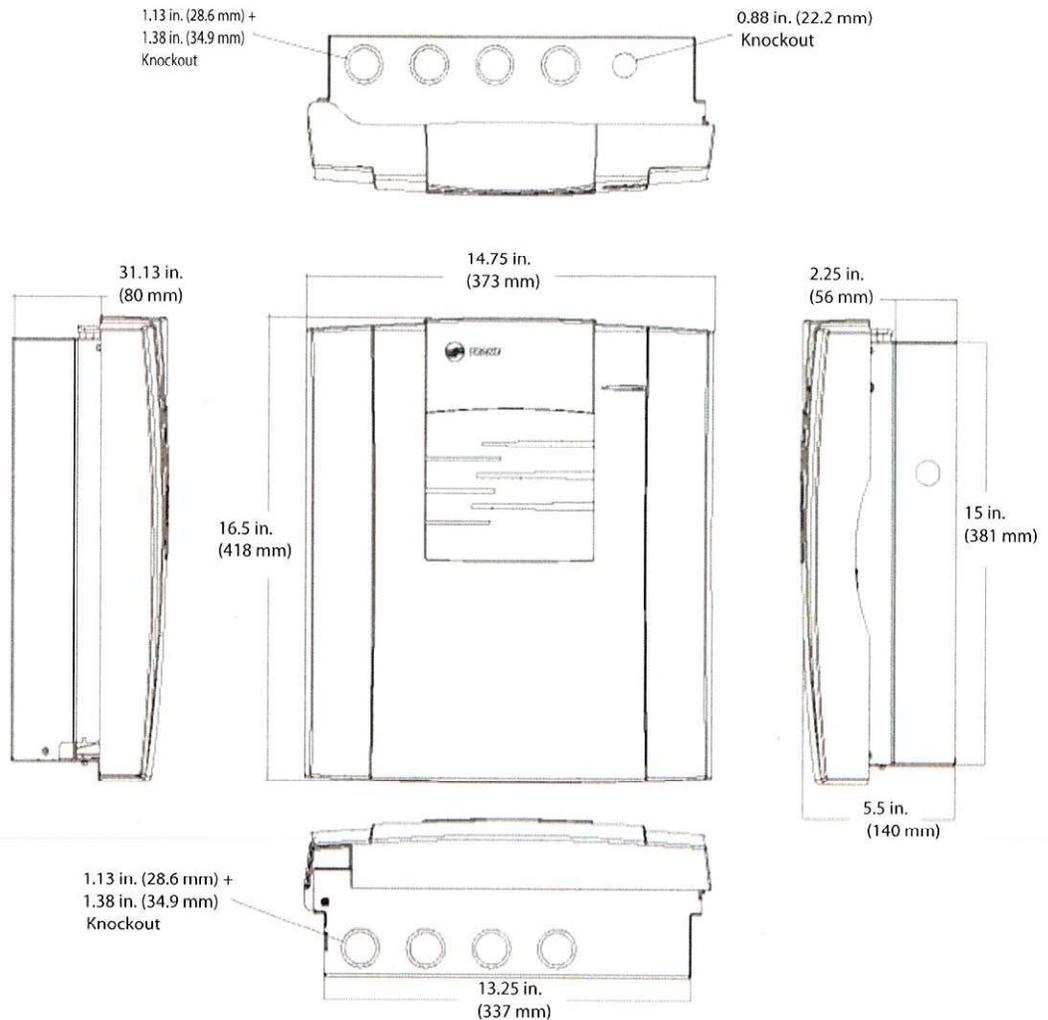
Figure 18. BACnet terminator (wiring)



Medium Enclosure (Optional)

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

- 120 Vac with 1 outlet (order number: X1365155910)
- 120 Vac with 3 outlets (order number: X13651699001)
- 230 Vac without outlet (order number: X13651560010)

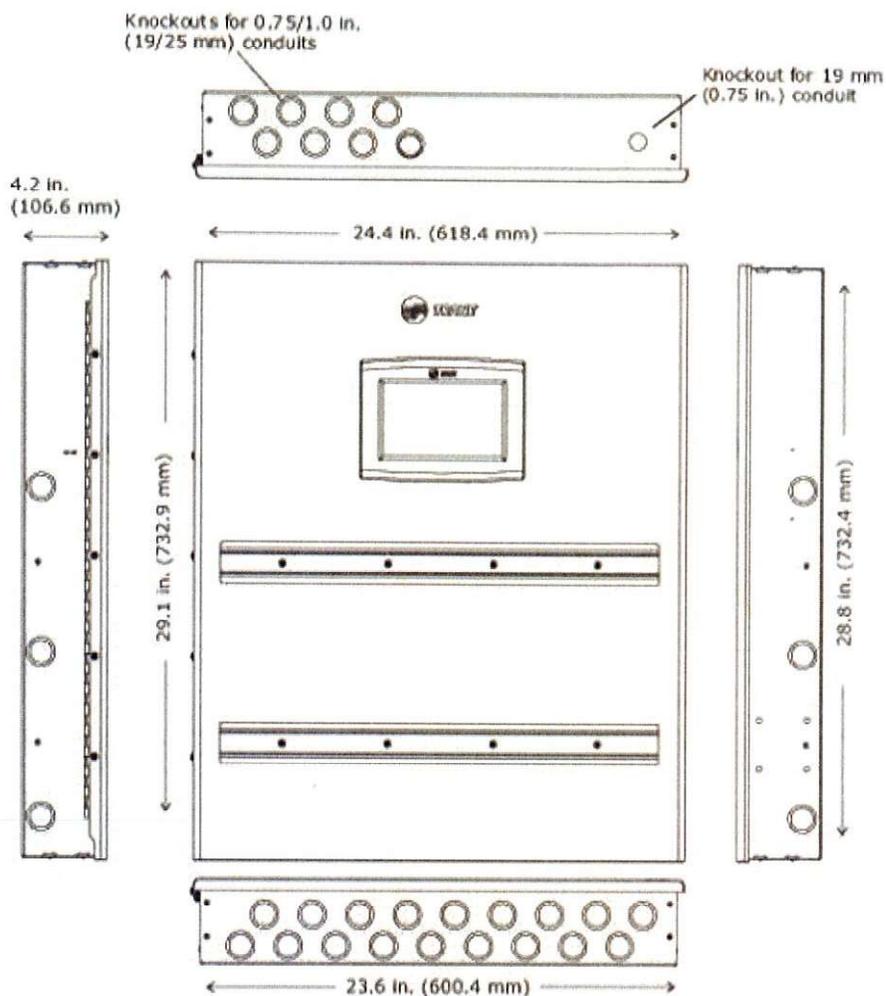
Figure 19. Medium enclosure (dimensions)


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 20. Large enclosure (dimensions)





Ingersoll Rand (NYSE: IR) advances the quality of life by creating comfortable, sustainable and efficient environments. Our people and our family of brands – including Club Car®, Ingersoll Rand®, Thermo King® and Trane® – work together to enhance the quality and comfort of air in homes and buildings; transport and protect food and perishables; and increase industrial productivity and efficiency. We are a global business committed to a world of sustainable progress and enduring results.



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LET'S GO BEYOND™



*Tracer® SC+ Building
Automation System
with Tracer® Synchrony™ User Interface*



Tracer[®] SC+ BAS

Connect to your building's highest potential

Buildings are full of hidden potential to be more comfortable, more sustainable, and more influential to your mission. Tracer SC+ taps into this potential by making the connections between technology and people more intuitive and complete.

CONSISTENCY + CUSTOMIZATION

Tracer SC+ is designed to deliver high performance systems, consistently. Trane delivers its proven systems knowledge to every job through comprehensive, factory engineered applications. These applications improve quality and are fully-documented to simplify ongoing operations and service. Each application is customizable to allow for fine-tuning to meet the unique needs of each job.

EXISTING + FUTURE

Tracer SC+ includes support for equipment from all generations. Built on a foundation of open, industry-standard protocols, including BACnet, LonTalk, and Modbus, Tracer SC+ provides robust support for Trane and non-Trane equipment.

Legacy Trane and non-Trane proprietary equipment can be integrated through a simple communications bridge, allowing you to replace legacy equipment on a schedule that fits your budget.

FLEXIBLE + OPTIMIZED

Trane has the ability to go significantly beyond traditional HVAC systems to optimize comfort and lifecycle costs. Lighting systems, energy meters, VFDs and more can be utilized to provide more advanced algorithms. Tracer SC+ provides a robust backbone for even the most complex systems.

Join the age of the smart building.

Built-in, regularly-updated IT standards help you move forward with confidence. Once Tracer SC+ is installed, we can help you optimize your building using data-driven operations, cloud analytics and Intelligent Services. Connected buildings are more responsive to occupants and set new standards for sustainability.

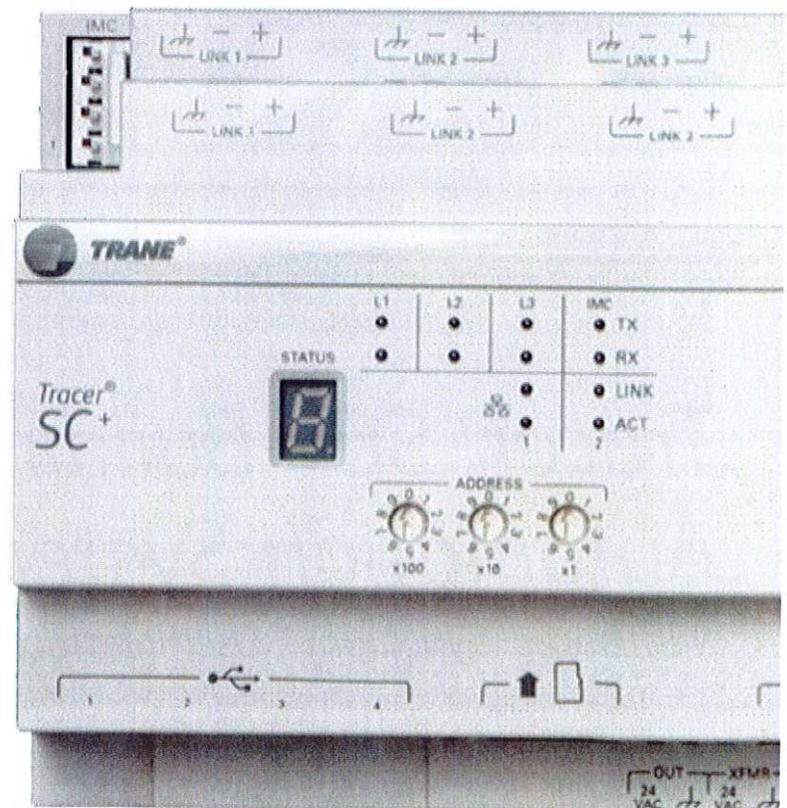
TECHNICAL ADVANTAGES



Tracer SC+ supports BACnet (wired and wireless), LONTalk[®] and Modbus[®].

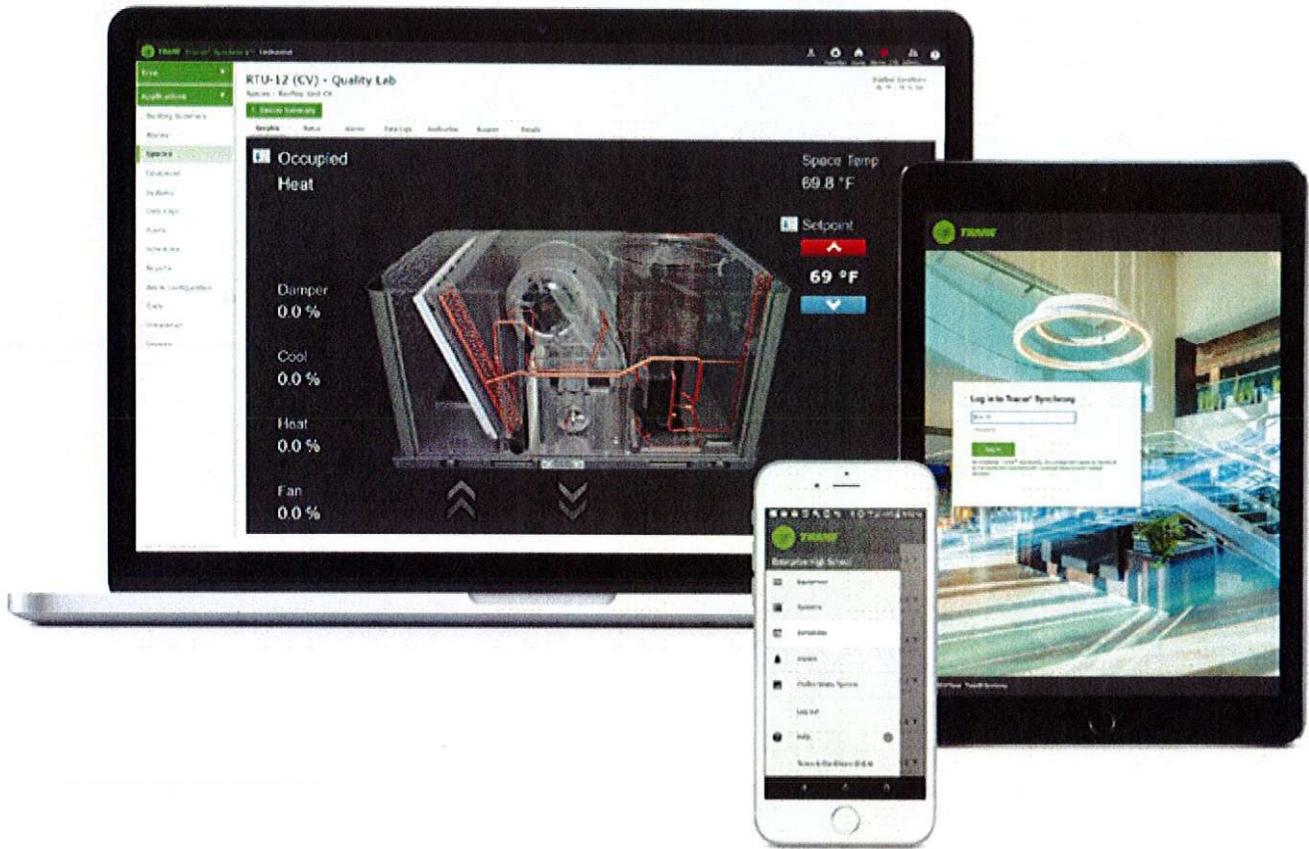


Tracer[®] Synchrony™ works with the technology you use every day, including phones, tablets and PCs.



Tracer® Synchrony™ User Interface

The Tracer Synchrony user interface is so easy to navigate and use, it keeps the full potential of Tracer SC+ accessible—forever—by eliminating the need for repeated operator training. Even experienced operators will find they can do more: Tasks that used to be complex have been simplified into a few intuitive clicks.



Common tasks are supported through streamlined space, equipment, and application pages



Standard equipment graphics depict status through animations



Where tasks get more complicated, there's instant online help



Floorplans and dashboards can simplify interaction with the system



Historical data is captured out of the box to ensure it's available when you need it



Keeping your automation system automated has never been simpler with features that include temporary overrides



Full capabilities are accessible by web browser, or by smart phone via the BAS Operator Suite mobile app



Different users have different needs. Trane has an option for everyone.



✓ Tracer Concierge™

Provides limited access for non-technical users to make simple adjustments, such as setpoint changes and schedule overrides.



✓ Tracer® Synchrony™

The built-in user interface for Tracer SC+ provides full system access for facilities managers and service technicians.



✓ Tracer® Ensemble™

Designed for building management professionals, it provides advanced tools that enable users to make more informed decisions on how to run their facilities more proactively.

LET'S GO BEYOND™



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