



Datasheets

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Project Name:

Project Location: , ,

Prepared For:

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Customer PO Number:

Customer Project Number:

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Datasheet Index

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TRANE

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TRANE

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Installation Instructions

Tracer™ BACnet® Terminator

Ordering Number: X13651524-01

Packaged Contents

- Two (2) Tracer BACnet terminators
- Two (2) wire cables with power connectors
- One (1) copy of the installation instructions



SAFETY WARNING

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

July 2011

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X39641151-01D

1

BACnet Wiring Guidelines

Observe the following:

- Use 18 AWG, 24 pF/ft, communication wire (Trane purple wire).
- BACnet wiring must use daisy-chain configuration.
- Maximum length is 4,000 ft (1219 m).
- Maintain polarity across the BACnet communication link.
- Limit each link to 60 controllers or 120 total controllers per Tracer SC.
- All Tracer SC BACnet links must be properly terminated; use a BACnet terminator at each end of the link.

Note: Trane devices operate on BACnet MS/TP (Master Slave/Token Passing) communication links. MS/TP is a type of local area network. It is wired using shielded twisted pair wire.

BACnet Link Configuration and Power Wiring

The Tracer BACnet terminator is a powered device that must be connected to either 24 Vac or 24 Vdc power.

Figure 1 on panel 2, illustrates valid daisy-chain configurations and Tracer BACnet terminator locations.

Figure 2 on panel 3 illustrates the most common application, which is connecting to the IMC bus to power the module. Wire cables are supplied for this application.

Note: Refer to the label on the Tracer BACnet terminator for power requirements when connecting the Tracer BACnet terminator to non-Trane devices.

2

Communication Wiring

Follow these guidelines when installing communication wiring:

- The communication wire shield must be connected to the ground terminal of the link termination block at the Tracer SC. The Tracer SC provides the ground for the BACnet link.
 - It is best practice to tape back the shield conductor at the terminator and each end of the link as illustrated in Figure 1.
- Important:** Never connect the shield conductor to ground at the Tracer BACnet terminator.
- Tie shield conductors together and tape back at each BACnet device between the Tracer SC and the BACnet terminator.
 - BACnet communication wiring can be terminated on LINK 1 or LINK 2 on the Tracer SC.

Figure 1. Communication link configurations for Tracer SC and Tracer BACnet terminator

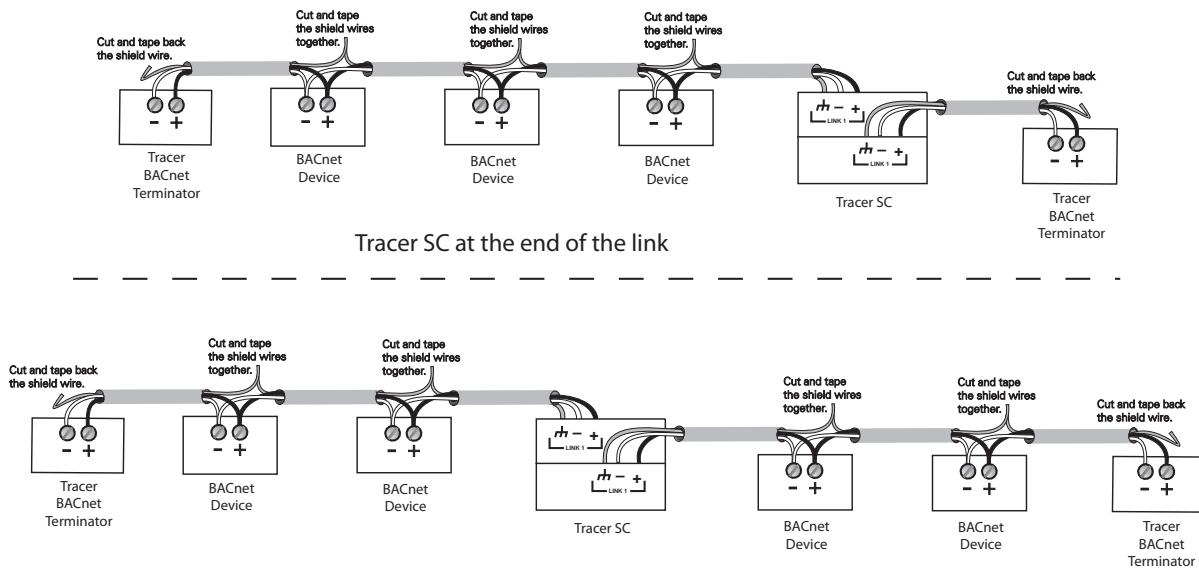
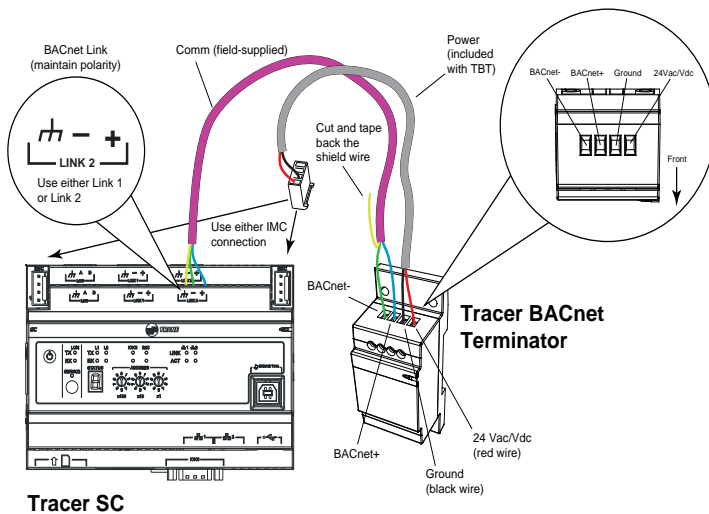


Figure 2. Tracer BACnet terminator connected to a Tracer SC



Note: If an IMC terminal is not available when connecting to a BACnet device, it may be necessary to install a 24 Vac power supply or run power from another 24 Vac or 24 Vdc source.

Installation Options

The Tracer BACnet terminator can be installed onto a DIN rail or directly inside of an enclosure.

Option 1: Install the Tracer BACnet terminator onto a DIN rail

NOTICE

Avoid Equipment Damage! Do not use excessive force to install the Tracer BACnet terminator onto a DIN rail. Excessive force could result in damage to the plastic enclosure.

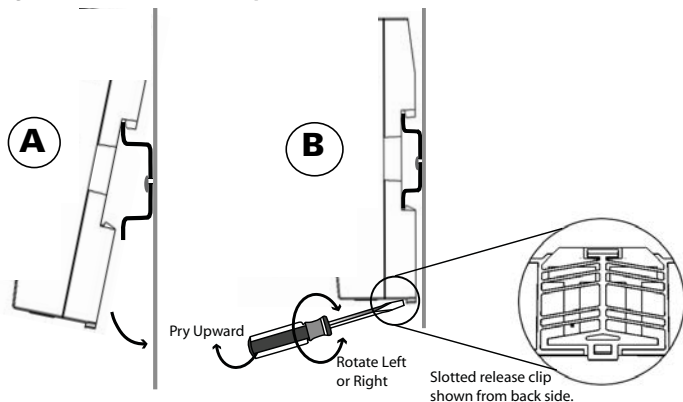
To install the device:

1. Hook device over top of a DIN rail (see Figure 3A).
2. Gently push on lower half of device in the direction of the arrow until the release clip snaps into place.

To remove or reposition the device:

1. Disconnect all connectors before removing or repositioning.
2. Insert screwdriver into slotted release clip and gently pry upward on the clip with the screwdriver (see Figure 3B).
3. While holding tension on the clip, lift device upward to remove or reposition.
4. If repositioned, push on the device until the release clip snaps back into place to secure the device to the DIN rail.

Figure 3. Installation: option 1



Option 2: Install the Tracer BACnet terminator inside an enclosure

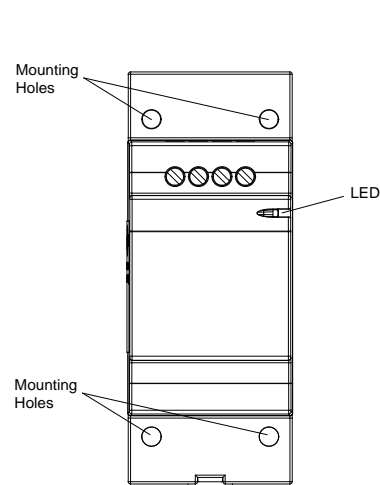
Note: Two #8 pan-head sheet metal or two wood screws (3/4 to 1 in.) are required for installation.

To install the device:

1. If necessary, mark and drill holes in the enclosure.
2. Drill holes suitable for #8 pan-head sheet metal or wood screws (3/4 to 1 in.).
3. Mount the device, matching the mounting holes with the predrilled holes in the enclosure.
4. Secure with screws.

The Tracer BACnet terminator has four mounting holes. Only two screws are required for proper installation.

Figure 4. Installation: option 2



Important: The LED on the front of the Tracer BACnet terminator indicates that the unit is powered. If the LED is not illuminated solid green, the device may not have been wired correctly.



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Product Data Sheet

Tracer® SC+ System Controller

Ordering number: X13651695001

The TracerSC+ building automation system, along with the Tracer Synchrony user interface, is a complete building control solution that delivers high performance and efficiency with the reliability you would expect from Trane. Tracer SC+ coordinates equipment from your building's HVAC, lighting, and other systems and offers control with a simplified, web-enabled user interface so you get easy and convenient access to your systems from virtually anywhere.



Features and Benefits

Feature	Benefit
Occupant comfort and energy savings	<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.
Access your facility from anywhere	<ul style="list-style-type: none">The Tracer Synchrony user interface is accessible from virtually any device with a web browser. 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 Remote Access provides an easy, secure option to connect remotely to a Tracer SC+.
Support for open, standard protocols	<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 with BACnet®, Modbus, and LonTalk controllers and is listed as a BACnet Building Controller (B-BC) by BACnet Test Labs (BTL).
Support for Trane® Air-Fi™ wireless	<ul style="list-style-type: none">Trane Air-Fi Wireless brings maximum flexibility to a building automation system. Trane technology helps prepare your facilities for the future of building information. Trane Air-Fi Wireless runs BACnet protocol over ZigBee building automation standards. <p>Note: ZigBee is a registered trademark of the ZigBee Alliance.</p>
Easy to use	<ul style="list-style-type: none">The Tracer Synchrony user interface provides an easy way for building operators to set up, operate, and modify a building automation system.

⚠ SAFETY WARNING

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Hardware Features

- Four USB ports for LON integration, Wi-Fi and USB memory sticks
- Optional Wi-Fi module that can serve as an access point or a client
- Support for XM30 and XM32 (8 terminations maximum)
- Three EIA-485 ports configurable for BACnet MS/TP or Modbus RTU
- BACnet/IP support on all Ethernet ports (including Wi-Fi client)
- MicroSD card support for backups
- Up to 2 Tracer USB LonTalk modules to support up to 240 LonTalk devices
- Optional battery (BR2032) to preserve regional settings
- Power options: Supply power using a 24 Vac terminal block, Plugin Power Supply, or a PM014 power supply
- Mounts easily onto a standard DIN rail

Tracer SC+ Device Capability

A Tracer SC+ facility is defined as one Application Tracer SC+ and one or more associated Base Tracer SC+. A single building or site can contain more than one facility. See the *Tracer SC+ IOM*, BAS-SVX077, for more details.

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

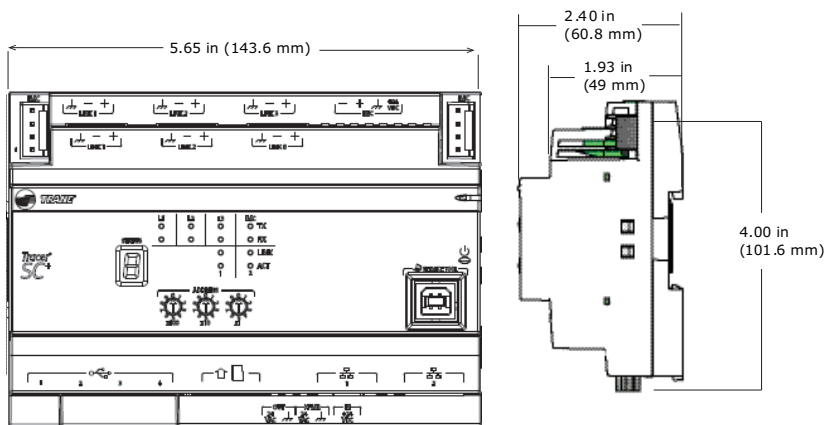
Controller Specifications

Client Software Requirements	
PC or Mac	Microsoft® Windows 7: <ul style="list-style-type: none"> • Internet Explorer™ version 11 • Mozilla Firefox® — most recent version • Google Chrome™ — most recent version Microsoft® Windows 10: <ul style="list-style-type: none"> • Internet Explore - no support • Microsoft Edge™ - latest version • Mozilla Firefox® — most recent version • Google Chrome™ — most recent version Apple® Mac OS 10.9/10.10: <ul style="list-style-type: none"> • Mozilla Firefox® — latest version • Google Chrome™ — latest version • Safari® — latest version
Tablet/Phone	iOS (iPad®/iPhone®) — 8, 9: <ul style="list-style-type: none"> • Safari — most recent version Android — 4.4+ <ul style="list-style-type: none"> • Google Chrome — version 45 or higher Microsoft® Windows 10: <ul style="list-style-type: none"> • Microsoft Edge™ - latest version

Tracer SC+ System Controller	
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
Power requirements	24 Vac @ 30 VA Class 2 transformer- Output: 600mA at 24 Vdc@ 50C, Plugin power supply w/single barrel connector - Output: 0.75A max at 24 Vdc @50C. Polarity: outer ground, inner 24 Vdc, PM014power supply module through inter-module-communication bus (IMC) - Output: 1.4A max @ 24 Vdc @ 70C
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"> • Optional BR2032 battery that preserves regional settings (including date/time) for up to 30 days.
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 • 10BASE-T/100BASE-TX dedicated Ethernet (ISO/IEC 8802-3) or Transmission Control Protocol/Internet Protocol (TCP/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) - <i>Note: this requires an external Echelon U60 module (part# X13651698001).</i> • 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
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)

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

Dimensions



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Product Data Sheet



Tracer[®] UC400 Programmable Controller

Ordering Number: BMUC400AAA0100011

The Tracer[®] UC400 controller is a multi-purpose, programmable, wireless sensor support device. This field- or factory-installed device is designed to control the following equipment:

- Single- and dual-duct variable-air-volume (VAV) units
- Fan coils
- Unit ventilators
- Blower coils
- Water-source heat pumps (WSHP)
- Small air handlers

⚠ SAFETY WARNING

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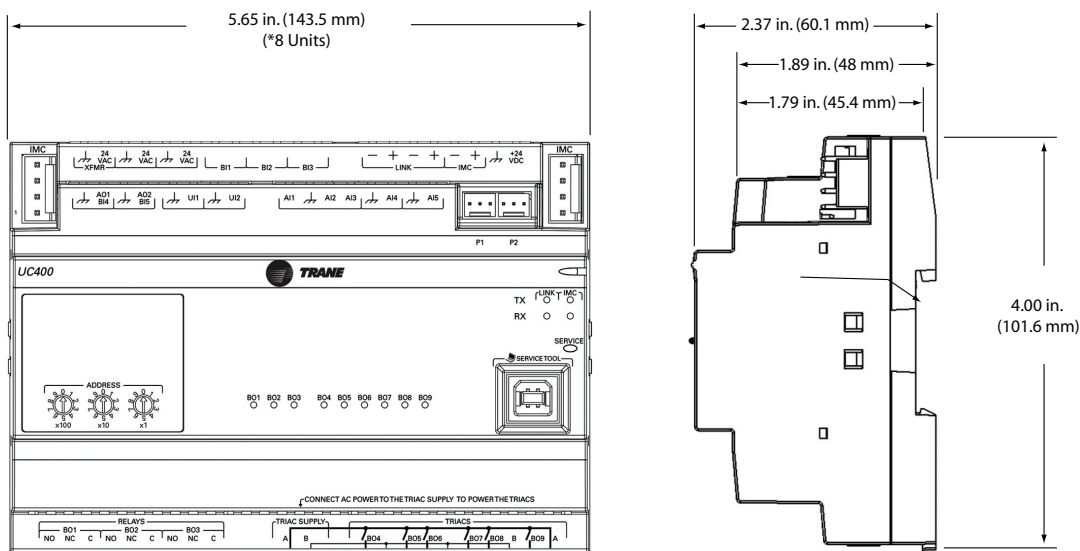
Features and Benefits

Feature	Benefit
BACnet MS/TP	An open standard building automation communications protocol which enables connections to other BAS systems and controllers.
Configurable and Fully Programmable	<ul style="list-style-type: none"> • Factory programs available through quick configuration for lowest setup time. • Programmable for flexibility to meet unique sequence or hardware needs.
Total of 23 I/O Points, Built-in	Meets most terminal unit needs with extra built-in I/O available to network or additional programming on controller.
Expandable to 55 Points	Flexibility to meet additional equipment needs.
Data Logging—25,000 Samples	Easier investigation of equipment, zone, or building problems.
Factory and Field Mounting Options	Options to best meet job schedule and bidding process.
Removable Connectors, DIN Rail Mounting, Multiple Service Tool Connections	Ease of installation and service.
Compatible with Trane Wireless Comm	Provides wireless communication between Trane BACnet® unit and system controllers and zone sensors. This allows faster, easier, lower-risk installation and life-cycle savings due to future space re-configuration, upgrades, and expansions.

Controller Specifications and Agency Compliance

Storage	
Temperature:	-48°F to 203°F (-55°C to 95°C)
Relative Humidity:	Between 5% to 95% (non-condensing)
Operating	
Temperature:	-40°F to 158°F (-40°C to 70°C)
Humidity:	Between 5% to 95% (non-condensing)
Power:	20.4–27.6 Vac (24 Vac, ±15% nominal) 50–60 Hz 24 VA (24 VA plus binary output loads for a maximum of 12 VA for each binary output)
Mounting Weight of Controller:	Mounting surface must support .80 lb. (.364 kg)
Environmental Rating (Enclosure):	NEMA 1
Altitude:	6,500 ft maximum (1,981 m)
Installation:	UL 840: Category 3
Pollution:	UL 840: Degree 2
Wiring/Transformer	
16 AWG (recommended) copper wire	
<ul style="list-style-type: none"> • UL Listed, Class 2 power transformer 20.4–27.6 Vac (24 Vac, ±15% nominal) • The transformer must be sized to provide adequate power to the UC400 controller (12 VA) and outputs (maximum 12 VA per binary output) 	
Agency Compliance	
<ul style="list-style-type: none"> • UL-864/UUKL listed (when installed and programmed in accordance with the Engineered Smoke Control System Application Guide, BAS-APG019-EN) • UL916 PAZX- Open Energy Management Equipment • UL94-5V Flammability • CE Marked • FCC Part 15, Subpart B, Class B Limit • AS/NZS CISPR 22:2006 • VCCI V-3/2008.04 • ICES-003, Issue 4:2004 • Communications BACnet MS/TP, supports BACnet protocol ASHRAE 135-2004 and meets BACnet Testing Laboratory (BTL) as an Application Specific Controller (ASC) profile device 	

Controller Dimensions



*DIN Standard 43 880, Built-in Equipment for Electrical Installation. Overall Dimensions and Related Mounting Dimensions.

Device Connections

Table 1. Device connections

Connection	Quantity	Types	Range	Notes
*Analog input (AI1 to AI5)	5	Temperature	10 k Ω thermistor	Typically used for fan speed switch.
		Setpoint	0 Ω to 1,000 Ω	
		Resistive	200 Ω to 20 k Ω	
Universal input (UI1 and UI2)	2	Linear	0–20 mA	These inputs may be configured to be thermistor inputs, 0–10 Vdc inputs, or 4–20 mA inputs.
		Linear	0–10 Vdc	
		Resistive	*Refer to analog input connection for ranges and types above	
		Binary	Solid state open collector	
		Pulse	Solid state open collector	Minimum dwell time is 25 milliseconds (ms) ON and 25 milliseconds OFF .
Binary input ^(a) (BI1 to BI3)	3		24 Vac detect	The UC400 controller provides the 24 Vac that is required to drive the binary inputs when using the recommended connections.
Binary output ^(a) (BO1 to BO3)	3	Relay	2.88 A @24 Vac pilot duty (For further power ratings, refer to the Tracer UC400 Installation, Operation, and Maintenance Manual [BAS-SVX20]).	Power needs to be wired to the binary output. All outputs are isolated from each other and from ground or power. Ranges given are per contact.
Binary output ^(a) (BO4 to BO9)	6	TRIAC	0.5 A max @24–277 Vac, resistive and pilot duty (For further power ratings, refer to the Tracer UC400 Installation, Operation, and Maintenance Manual [BAS-SVX20]).	Use for modulating TRIAC. User determines whether closing high side (providing voltage to the grounded load) or low side (providing ground to the power load). Ranges given are per contact and power comes from TRIAC SUPPLY circuit.

Table 1. Device connections (continued)

Connection	Quantity	Types	Range	Notes
Analog output/binary input (AO1/BI4 and AO2/BI5)	2	Linear output	0–20 mA	Each termination must be configured as either an analog output or binary input.
		Linear output	0–10 Vdc	
		Binary input	Dry contact	
Pressure inputs (PI1 and PI2)	2	3-wire	0–5 in H ₂ O	Pressure inputs supplied with 5 volts of power. Designed for Kavlico™ pressure transducers.
Overall Point Total	23			

(a) Binary Inputs, Binary Outputs, and TRIACs: **For safety precautions, do not mix Class 1 and Class 2 voltages in an enclosure or on a controller without a physical barrier between these units.**

Additional Ordering Options

- UC400 Controller (Made in U.S.A. Version) (Order Number: *BMUC400UAA0100011*)
- UC 400 Controller Pre-programmed for RTU or Heat Pump (Order Number: *UC400ABA0100011*)
- Tracer® XM30 Expansion Module (Order Number: *X13651537010*)
- Tracer XM32 Expansion Module (Order Number: *X13651563010*)
- Tracer XM70 Expansion Module (Order Number: *X13651568010*)
- Tracer XM7 Expansion Module (Made in the U.S.A version) (Order Number: *X13651597010*)
- Tracer BACnet Term (2 pack) (Order Number: *X1365152401*)
- Tracer Small 10" DIN Rail Enclosure (Order Number: *X19091354010*)
- Tracer Medium Enclosure, 120 VAC (Order Number: *X13651559010*)
- Tracer Medium Enclosure, 230 VAC (Order Number: *X13651560010*)
- Tracer Large Enclosure, 120 VAC with display capable door (Order Number: *X13651552010*)
- Tracer Large Enclosure, 230 VAC with display capable door (Order Number: *X13651554010*)

Agency Listing and Compliance

The European Union (EU) Declaration of Conformity is available from your local Trane® office.



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Product Data Sheet



Tracer™ XM30 Expansion Module

Ordering Number: X13651537010

The Tracer XM30 Expansion Module provides additional points when needed for Tracer UC400 applications. Each expansion module has a total of 4 points that can be configured using any combination of inputs/outputs (refer to the table below). A maximum of eight (8) expansion modules can be added to a Tracer UC400. Use of a PM014 DC power supply is required for applications requiring more than two XM30 modules.

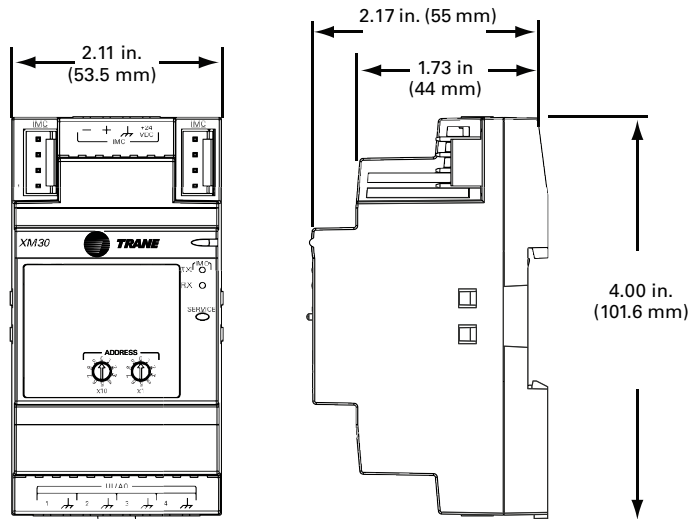
XM30 Configurable Connections

The table below provides information about the XM30 configurable connections.

Connection	Quantity	Types	Range
Inputs	Can be configured using any combination of analog or binary inputs/analog outputs	Thermistor	2252 Ω , 10k, 20k, 100k Ω
		Resistive (Setpoint)	100 Ω to 1 M Ω
		RTD	1 k Ω ; platinum, Balco™ or nickel
		Current	0–20 mA (linear)
		Voltage	0–20 Vdc (linear)
		Binary	Dry Contact
		Pulse Accumulator	Minimum 20 milliseconds open or closed
Outputs		Current	0–20 mA @ 16V
		Voltage	0–16 Vdc @ 20mA
Overall Point Total	4		

Specifications, Agency Compliance, and Dimensions

Storage	
Temperature:	-67°F to 203°F (-55°C to 95°C)
Relative humidity:	5% to 95% (non-condensing)
Operating	
Temperature:	-40°F to 158°F (-40°C to 70°C)
Humidity:	5% to 95% (non-condensing)
Power:	24 Vdc \pm 10%, 120 mA
<ul style="list-style-type: none"> Mounting weight of controller: Mounting weight of controller with terminal connectors: 	<ul style="list-style-type: none"> Mounting surface must support 0.27 lb. (0.122 kg) Mounting surface must support 0.31 lb. (0.142 kg)
Environmental rating (enclosure):	NEMA 1
Installation:	UL 840: Category 3
Pollution:	UL 840: Degree 2
Agency Compliance	
<ul style="list-style-type: none"> UL916 PAZX- Open Energy Management Equipment UL94-5V, Flammability UL864/UUKL Smoke Control (when installed and programmed in accordance with the Tracer SC Applications Guide, BAS-APG019-EN CE Marked FCC Part 15, Subpart B, Class B Limit 	



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