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.
Revision Summary

BAS-SVX45D-EN:
- UL864 certified (smoke control systems)
- Wireless support (WCI)

BAS-SVX45C-EN:
- Creating and viewing Schedules
- Viewing custom graphics
# Table of Contents

Overview ......................................................................................................................... 6
Smoke Control Support (UUKL) .......................................................... 6
Wireless Comm Interface (WCI) Support ........................................ 6
Expansion Module Requirements .................................................. 6
Specifications .................................................................................................................... 7
Location of LEDs ....................................................................................................... 7
Hardware Terminations ....................................................................................... 8
Agency Listings and Compliance ........................................................ 9
Additional Ordering Options ................................................................................. 9
Required Tools ....................................................................................................... 9
Dimensions and Clearances ................................................................................... 10

Installation .................................................................................................................. 12
Mounting and Removing the UC600 Controller ........................................ 12
DIN Unit Width ........................................................................................................ 12
Setting Addresses using Rotary Switches .................................................. 14
  Setting the MAC Address .............................................................................. 14
  Setting the BACnet Device ID ...................................................................... 15
  Rotary Dial Address Settings for Non-Trane Systems ............................... 15

UC600 Pre-power Checks ..................................................................................... 17
  Resistive Inputs ........................................................................................................ 17
  Voltage Inputs ........................................................................................................ 18
  Current Inputs .......................................................................................................... 18
  Binary Inputs ............................................................................................................ 19

UC600 Power Budget Check in an Un-powered State .................................... 20
  Calculating AC Power Consumption ........................................................... 20
  Calculating DC Power Consumption ............................................................. 21

Wiring and Powering the UC600 ........................................................................ 22
  AC Power Warnings and Cautions .............................................................. 22
  Requirements and Recommendations ....................................................... 22
    Wiring and Circuit Requirements ........................................................... 22
    Transformer Requirements .......................................................................... 23
  Avoid Equipment Damage! ............................................................................ 23
    Terminal Connectors and Tug Test .......................................................... 23
  Wiring AC Power to the UC600 ................................................................. 24
  Controller Startup and Power Check ......................................................... 25
    BACnet MS/TP Link Wiring ......................................................................... 26
  Wiring Inputs and Outputs ............................................................................... 27
<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input/Output Requirements</td>
<td>27</td>
</tr>
<tr>
<td>Providing Low-voltage Power for Inputs/Outputs</td>
<td>28</td>
</tr>
<tr>
<td>Input and Output Wiring</td>
<td>28</td>
</tr>
<tr>
<td>Wiring Universal Inputs</td>
<td>29</td>
</tr>
<tr>
<td>Wiring Binary Inputs</td>
<td>29</td>
</tr>
<tr>
<td>Wiring 0–10 VDC Analog Inputs</td>
<td>30</td>
</tr>
<tr>
<td>Wiring 0–20 mA Analog Inputs</td>
<td>31</td>
</tr>
<tr>
<td>Wiring Variable Resistance Analog Inputs</td>
<td>32</td>
</tr>
<tr>
<td>Wiring Trane Zone Sensors</td>
<td>33</td>
</tr>
<tr>
<td>Wiring Analog Outputs</td>
<td>34</td>
</tr>
<tr>
<td>Wiring Binary Outputs</td>
<td>35</td>
</tr>
<tr>
<td>Connecting Pressure Transducer Inputs</td>
<td>36</td>
</tr>
<tr>
<td>Operation of the UC600</td>
<td>37</td>
</tr>
<tr>
<td>LED Descriptions and Activities</td>
<td>37</td>
</tr>
<tr>
<td>Troubleshooting</td>
<td>38</td>
</tr>
<tr>
<td>Communication Problems</td>
<td>38</td>
</tr>
<tr>
<td>Output Points</td>
<td>38</td>
</tr>
<tr>
<td>Connection Problems</td>
<td>39</td>
</tr>
<tr>
<td>Configuring the UC600 with the Tracer TU Service Tool</td>
<td>40</td>
</tr>
<tr>
<td>Starting a Session of TU and Connection</td>
<td>40</td>
</tr>
<tr>
<td>Connecting Using Tracer SC</td>
<td>41</td>
</tr>
<tr>
<td>Tracer TU Installation and Connection Error Conditions</td>
<td>43</td>
</tr>
<tr>
<td>Upgrading Firmware</td>
<td>44</td>
</tr>
<tr>
<td>Configuring the UC600 and Creating or Editing Points</td>
<td>45</td>
</tr>
<tr>
<td>Configuring the UC600</td>
<td>45</td>
</tr>
<tr>
<td>Using Pre-packaged Solutions (PPS)</td>
<td>46</td>
</tr>
<tr>
<td>Creating or Editing Points for the UC600</td>
<td>46</td>
</tr>
<tr>
<td>Placing Points in Out-of-Service Mode</td>
<td>48</td>
</tr>
<tr>
<td>Creating Points to Monitor Communication and TGP2 Programs</td>
<td>48</td>
</tr>
<tr>
<td>Creating Points for Timed Override (TOV) and <em>/</em>* Functions</td>
<td>49</td>
</tr>
<tr>
<td>Monitoring and Viewing the Status of the UC600</td>
<td>52</td>
</tr>
<tr>
<td>Backup</td>
<td>53</td>
</tr>
<tr>
<td>Restore</td>
<td>53</td>
</tr>
<tr>
<td>Setting Up and Maintaining Schedules</td>
<td>54</td>
</tr>
<tr>
<td>Creating a Weekly Schedule</td>
<td>54</td>
</tr>
<tr>
<td>Changing the Schedule Default Value and Adding Events</td>
<td>56</td>
</tr>
<tr>
<td>Adding Exceptions to a Schedule</td>
<td>58</td>
</tr>
<tr>
<td>Modifying Exceptions</td>
<td>61</td>
</tr>
<tr>
<td>Deleting Events</td>
<td>61</td>
</tr>
<tr>
<td>Deleting Exceptions</td>
<td>62</td>
</tr>
<tr>
<td>Deleting a Schedule</td>
<td>62</td>
</tr>
</tbody>
</table>
Overview

The Tracer UC600 controller, (PN# BMUC600AAA0100011 made in the U.S.A.), is a multi-purpose, programmable, wireless-compatible device. It is designed to control the following types of equipment:

- Air-handling units (AHUs)
- Rooftop units
- Chillers
- Central heating and cooling plants
- Cooling towers
- Generic input/output (I/O) control

Smoke Control Support (UUKL)

The Tracer UC600 programmable controller is now UL864 certified, making it fully capable of serving as a component of a UUKL smoke control system along with the Tracer SC system controller. For more information, see the "Engineered Smoke Control System Applications Guide", BAS-APG019-EN.

Wireless Comm Interface (WCI) Support

The wireless comm interface (WCI) is an alternative to BACnet® wired communication links. The WCI is a wireless communications component (option) added to Tracer controllers and is compatible with Tracer UC600. Tracer UC600 firmware must be at Vv4.00.027 or higher for compatibility with WCI.

Refer to the following documentation for more information:
- Wireless Comm Interface Installation Instructions (X3964411710-01)
- Wireless Comm Installation, Operation, and Maintenance (BAS-SVX40-EN)

Expansion Module Requirements

If additional input or output points are needed, the XM30, XM32, and XM70 expansion modules can be used. The UC600 controller will support up to 120 combined I/O terminations. See the "Tracer Expansion Module IOM," (BAS-SVX46-EN), for application and installation information.
Specifications

The UC600 conforms to the specifications shown in Table 1.

Table 1. Specifications

<table>
<thead>
<tr>
<th>Storage</th>
</tr>
</thead>
</table>
| Temperature:  | -67°F to 203°F (-55°C to 95°C)  
| Relative humidity: | Between 5% to 95% (non-condensing)  

<table>
<thead>
<tr>
<th>Operating</th>
</tr>
</thead>
</table>
| Temperature:  | -40°F to 158°F (-40°C to 70°C)  
| Humidity:     | Between 5% to 95% (non-condensing)  
| Power:        | Input: 20.4–27.6 VAC (24 VAC, ±15% nominal) 50 or 60 Hz, 26 VA (26 VA plus a maximum of 12 VA for each binary output)  
|               | Output: 24 VDC, ±10%, device max load 600 mA  
| Time Clock:   | On-board real time clock with 7 day backup  
| Mounting weight of controller: | Mounting surface must support 1.3 lb. (0.6 kg)  
| Environmental rating (enclosure): | NEMA 1  
| Installation: | UL 840: Category 3  
| Pollution:    | UL 840: Degree 2  

Location of LEDs

Light emitting diodes (LEDs) indicate the operation and communication status of the controller. To interpret the UC600 LEDs and safely operate the UC600, see “LED Descriptions and Activities,” p. 37.

For detailed information about wiring communication links, refer to Tracer SC Unit Controller Wiring Guide (BAS-SVN03) listed in the section, “Other Resources,” p. 74.

Figure 1. UC600 LEDs

![UC600 LEDs Diagram]
# Hardware Terminations

The UC600 supports the following hardware terminations:
- Temperature sensors (resistive and thermistor)
- Linear inputs 0–20 mA, such as humidity sensors
- Linear inputs 0–10 VDC, such as indoor air-quality sensors
- Linear outputs 0–20 mA, such as variable frequency drives
- Linear outputs 0–10 VDC, such as actuators for dampers and valves
- Pulse outputs, such as electric heat or humidifier control
- Binary outputs, such as fan start/stop.
- One 3-wire pressure transducer input

## Table 2. UC600 device connections

<table>
<thead>
<tr>
<th>Input/Output type</th>
<th>Quantity</th>
<th>Types</th>
<th>Range</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Universal input</td>
<td>8</td>
<td>Thermistor</td>
<td>10kΩ – Type II, 10kΩ – Type III, 22kΩ – Type II, 20kΩ – Type IV, 100 kΩ</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Resistive (Setpoint)</td>
<td>100Ω – 1MΩ</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>RTD</td>
<td>Balco™ (Ni-Fe), 1kΩ; 375 (Pt), 385 (Pt), 1kΩ</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Current</td>
<td>0–20 mA (linear)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Voltage</td>
<td>0–20 VDC (linear)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Binary</td>
<td>Dry contact</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pulse Width Accumulator</td>
<td>Minimum 20 ms, opened or closed</td>
<td></td>
</tr>
<tr>
<td>Universal Input/Analog Output</td>
<td>6</td>
<td>Thermistor</td>
<td>10kΩ – Type II, 10kΩ – Type III, 22kΩ – Type II, 20kΩ – Type IV, 100 kΩ</td>
<td>The UC600 provides 600 mA of DC power for 0–20 mA inputs and/or outputs, and to power expansion modules. See the power budget table &quot;UC600 Power Budget Check in an Unpowered State,&quot; p. 20.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Resistive (setpoint)</td>
<td>100Ω – 1MΩ</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>RTD</td>
<td>Balco™ (Ni-Fe), 1kΩ; 375 (Pt), 385 (Pt), 1kΩ</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Current</td>
<td>0–20 mA (linear)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Voltage</td>
<td>0–20 VDC (linear)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Binary</td>
<td>Dry contact</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pulse Width Accumulator</td>
<td>Minimum 20 ms, opened or closed</td>
<td></td>
</tr>
<tr>
<td>Inputs</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outputs</td>
<td></td>
<td>Current</td>
<td>0–20 mA @16 V</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Voltage</td>
<td>0–10 VDC @20 mA</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pulse</td>
<td>12.5 ms to 1 second (12.5 ms resolution), 1 second to 60 seconds (0.5 second resolution)</td>
<td></td>
</tr>
<tr>
<td>Binary output</td>
<td>4</td>
<td>Relay (form A) wet</td>
<td>24 VAC, 0.5A maximum</td>
<td>Ranges are given per contact.</td>
</tr>
<tr>
<td>Pressure input</td>
<td>1</td>
<td>3-wire</td>
<td>0–5 inwc.</td>
<td>Pressure input supplied with 5 VDC. Designed for Kavlico™ pressure transducers.</td>
</tr>
<tr>
<td>Point total</td>
<td>19</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Overview

Agency Listings and Compliance

This section lists compliance with Conformity European (CE) and Underwriters Laboratories (UL) standards for the UC600 controller:

- UL916 PAZX, Open Energy Management Equipment
- UL94-5V, Flammability
- CE Marked
- FCC Part 15, Subpart B, Class B Limit
- UL864 Smoke Control
- BTL Mark—Advanced Application Profile (B-AAC)

Additional Ordering Options

Additional ordering options are available for the UC600:

- TracerTD7 Operator Display (order number: X13651571010)
- TD7 Sealed Ethernet cable (for wet environments) (order number: X19070632020)
- TD7 Display Portable Carry Case (order number: X18210613010)
- TD7 Mounting Bracket (flat surface, fixed position) (order number: X05010511010)
- Tracer XM30 expansion module (order number: X13651537010)
- Tracer XM32 expansion module (order number: X13651563010)
- Tracer XM70 expansion module (order number: X13651568010)
- Tracer BACnetTerm (2 pack) (order number X1365152401)
- Tracer Large enclosure 120 VAC with display capable door (order number: X13651552010)
- Tracer Large enclosure 230 VAC with display capable door (order number: X13651554010)
- Tracer Medium enclosure 120 VAC (order number: X13651559010)
- Tracer Medium enclosure 230 VAC (order number: X13651560010)
- Tracer Small 10" DIN Rail enclosure (order number: X19091354010)
- Power Supply 24VAC to 1.4A 24 VDC for XM modules exceeding UC600 power budget (order number: X1365153801)
- IMC Harness (order number: S3090059462)

Required Tools

A 1/8 in. (3 mm) flat-bladed screwdriver is required to perform functions such as setting rotary addressing switches, tightening or loosening screw terminals, and removing or repositioning the controller on DIN rail.
Dimensions and Clearances

Figure 2. Controller dimensions

8.50 in. (215.9 mm) width (12 DIN units)*

2.17 in. (55 mm)

1.73 in. (44 mm)

4.00 in. (101.6 mm)

* DIN Standard 43 880
Built-in Equipment for Electrical Installations,
Overall Dimensions and Related Mounting
Dimensions.
One DIN unit = 18 mm (0.71 in.)
Figure 3. DIN rail clearances

Note: Allow a minimum of 2.0 in. (50.8 mm) wiring space between controllers, sides of controllers, and bottom of cabinet.

- Controller Height: 4.00 in. (101.6 mm)
- Wiring Space Between Controllers: 7.08 in. (180 mm)
- Represents Terminal Connector
Installation

This section describes how to install the UC600 onto a DIN rail and set rotary switches.

Mounting and Removing the UC600 Controller

The Tracer UC600 controller should be properly mounted on a DIN rail. Enclosure cabinets that include DIN rails are available from Trane. See “Additional Ordering Options,” p. 9.

To mount or remove the controller from the DIN rail, follow the illustrated instructions in Figure 4 and Figure 5, p. 13. If using a DIN rail from another manufacturer, follow the recommended installation procedures that accompany it.

**Important:** When mounting the controller in a control cabinet, provide adequate spacing between modules to allow for ventilation and heat dissipation.

**Notice:**
Avoid Equipment Damage

Do not use excessive force to install the controller on the DIN rail. Excessive force could result in damage to the enclosure.

Figure 4. Mounting the UC600

To mount the UC600:

1. Hook device over top of DIN rail.
2. Gently push on lower half of device in the direction of arrow until the release clip clicks into place.

**DIN Unit Width**
The following table provides DIN unit width measurements for Trane devices.

<table>
<thead>
<tr>
<th>Device</th>
<th>Device Width (mm/in)</th>
<th>DIN Unit Width (1 unit = 18 mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tracer SC system controller</td>
<td>143.6 mm/5.6 in</td>
<td>8</td>
</tr>
<tr>
<td>Tracer UC400 controller</td>
<td>143.6 mm/5.6 in</td>
<td>8</td>
</tr>
<tr>
<td>Tracer UC600 controller</td>
<td>215.9 mm/8.5 in</td>
<td>12</td>
</tr>
<tr>
<td>Tracer UC800 controller</td>
<td>71.6 mm/2.8 in</td>
<td>4</td>
</tr>
<tr>
<td>Tracer XM30 expansion module</td>
<td>53.6 mm/2.1 in</td>
<td>3</td>
</tr>
<tr>
<td>Tracer XM32 expansion module</td>
<td>71.6 mm/2.8 in</td>
<td>4</td>
</tr>
<tr>
<td>Tracer XM70 expansion module</td>
<td>215.9 mm/8.5 in</td>
<td>12</td>
</tr>
<tr>
<td>PM014 power supply module</td>
<td>107.6 mm/4.2 in</td>
<td>6</td>
</tr>
<tr>
<td>Tracer BACnet terminator</td>
<td>35.6 mm/1.4 in</td>
<td>2</td>
</tr>
</tbody>
</table>
Figure 5. Removing the UC600

To remove or reposition the controller:

1. Disconnect all connectors before removing or repositioning.
2. Insert screwdriver into slotted release clip and gently pry upward with the screwdriver to disengage the clip.
3. While holding tension on the clip, lift device upward to remove or to reposition.
4. If repositioned, push on the device until the release clip clicks back into place to secure the device to DIN rail.
Setting Addresses using Rotary Switches

There are three rotary switches on the front of the UC600 for the purpose of defining a three-digit address when the UC600 is installed on a BACnet communications network. The three-digit address setting is used as both the BACnet MAC address and the BACnet device ID.

Setting the MAC Address

The MAC address is the rotary dial address. For Trane systems, this address must be between 1 and 127. Although “0,0,0,” is a valid BACnet address, Trane reserves this address for the Tracer SC controller. For non-Trane systems, see “Rotary Dial Address Settings for Non-Trane Systems,” p. 15. All device addresses on the BACnet MS/TP link must be unique.

- Before powering up the UC600, set the rotary address as shown in Figure 6.
- If the UC600 was previously powered up, do the following if you wish to make changes:
  - Make the preferred changes to the rotary address as illustrated in Figure 6.
  - Power down the UC600; when re-powered the new MAC address should be active.

Note: Valid MAC addresses used with the Tracer UC600 are 001 to 120 for BACnet.

Figure 6. Setting rotary switches

This example illustrates the rotary switches after addresses have been set.

Important: Each UC600 device on the BACnet link must have a unique rotary switch setting, otherwise, communication problems will occur.

Use a 1/8 in. (3 mm) flathead screwdriver to set rotary switches. Dial rotates either direction.
Setting the BACnet Device ID

The BACnet device ID uniquely identifies each BACnet device. It can range from 0 to 4194303. Device IDs cannot be shared among devices on the same network. Each UC600 operates as a device and requires its own device ID, which defaults to the rotary switch address settings. Refer to Figure 7, p. 16.

There are three ways that the BACnet device ID can be set on the UC600:

- After powering up UC600 for the first time, the UC600 device ID will match the rotary address.
- When installing a UC600 on a Tracer SC, the SC will soft set the BACnet device ID based on the SC rotary address, the link number on which it is installed, and the UC600 rotary address. For example, the Tracer SC will create a BACnet device ID of 101030 under the following conditions:
  - The rotary dials on the UC600 are set to 30 (0,3,0), which is also the MAC address.
  - The Tracer SC address is “0,1,0”.
  - The UC600 is installed on link 1.
- Soft set the BACnet device ID by using the TracerTU service tool.

The BACnet device ID is set to the UC600 MAC address on the rotary switches. If a BACnet device ID outside of the allowed range is required, you can soft set the device ID by using the TracerTU service tool.

**Important:** The UC600 BACnet device ID defaults to the value of the rotary switches if the BACnet device ID has not been soft set. If a device ID has been soft set, the rotary switches are no longer representative of the BACnet device ID.

**Note:** When integrating the UC600 with third party vendors refer to “Appendix: Protocol Implementation Conformance Statement (PICS),” p. 69.

Rotary Dial Address Settings for Non-Trane Systems

The Max Master value defines the maximum allowable MAC address (rotary setting) on an MSTP link. The MAC address is present in each device on the MSTP link. When the last communicating device on the MSTP link polls for the Max Master MAC address with no response, the token rotation will be restricted on the MSTP link.

For non-Trane systems, the Max Master value must be greater than the unique address settings from the rotary dials. Although 999 is possible from the dials, the maximum allowed number by BACnet is 127.

The Max Master is not adjustable in Trane SC systems. For example, if the MAC address is 101 and the front-end system has a Max Master value of 100, the device will not be discovered.

Many systems have a minimum BACnet device ID value. Ensure that the device ID is greater than this value.
Figure 7  Rotary switch and Tracer SC addressing

Note: Always start rotary addressing at 1 for each link with no gaps in addresses.
UC600 Pre-power Checks

To avoid equipment damage, a pre-power check for inputs and outputs is recommended before applying power to the UC600.

Before applying power, check for the following:
- All thermistors; check for 10K by using a digital multimeter (DMM).
- Thumbwheels; range between 189 Ω and 890 Ω.
- Binary outputs; check for any dead shorts.
- Analog outputs; verify that AC voltage is not present and that the load does not have 24 VAC or 120 VAC.

This section provides illustrations and methods of how to check the UC600 points before connection has been made and power applied. The step numbers in each illustration correspond to the information in each table. (Refer to Table 2, p. 8 for a list of device connections.)

**Note:** The illustrations in the section, “UC600 Commissioning/Troubleshooting in Powered State,” p. 65 show the location of the UC600.

### Resistive Inputs

<table>
<thead>
<tr>
<th>Checkout Procedure</th>
<th>Measurement</th>
<th>Expected Value</th>
</tr>
</thead>
</table>
| Step 1             | Measure AC voltage across the resistive termination. | VAC = 0.0 V  
AC voltage will affect further measurement. |
| Step 2             | Measure DC voltage across the resistive termination. | VDC = 0.0 V  
DC voltage will affect further measurement. |
| Step 3             | Measure the resistance across the resistive termination. | Compare the measured resistance with the expected value based on the manufacturer’s specification and current conditions. |
Voltage Inputs

The sensor sources voltage and is powered.

<table>
<thead>
<tr>
<th>Checkout Procedure</th>
<th>Measurement</th>
<th>Expected Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>Measure AC voltage across the voltage input.</td>
<td>VAC ≈ 0.0 V&lt;br&gt;AC voltage will affect further measurement.</td>
</tr>
<tr>
<td>Step 2</td>
<td>Measure DC voltage across the voltage termination.</td>
<td>Compare the measured voltage with the expected value based on the manufacturer’s specification and current conditions.</td>
</tr>
</tbody>
</table>

Current Inputs

The sensor sources 4-20 mA and is powered.

<table>
<thead>
<tr>
<th>Checkout Procedure</th>
<th>Measurement</th>
<th>Expected Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>Measure AC voltage across the current input.</td>
<td>VAC ≈ 0.0 V&lt;br&gt;AC voltage will affect further measurement.</td>
</tr>
<tr>
<td>Step 2</td>
<td>Measure DC voltage across the current input.</td>
<td>VDC ≈ 0.0 V&lt;br&gt;DC voltage will affect further measurement.</td>
</tr>
<tr>
<td>Step 3</td>
<td>Measure the DC current across the current input.</td>
<td>Compare the measured current with the expected value based on the manufacturer’s specification and current conditions.</td>
</tr>
</tbody>
</table>
## Binary Inputs

<table>
<thead>
<tr>
<th>Checkout Procedure</th>
<th>Measurement</th>
<th>Expected Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>Measure AC voltage across the resistive termination.</td>
<td>VAC = 0.0 V&lt;br&gt;AC voltage will affect further measurement.</td>
</tr>
<tr>
<td>Step 2</td>
<td>Measure DC voltage across the resistive termination.</td>
<td>VDC = 0.0 V&lt;br&gt;DC voltage will affect further measurements.</td>
</tr>
<tr>
<td>Step 3</td>
<td>Measure the resistance across the resistive termination.</td>
<td>contact open = infinity (∞)&lt;br&gt;contact closed = shorted (0 Ω)</td>
</tr>
</tbody>
</table>
UC600 Power Budget Check in an Un-powered State

This section provides information about power budget consumption for the UC600 in an un-powered state.

Calculating AC Power Consumption

The UC600, along with the 24 VAC transformer, can draw up to 26 VA AC power. Observe the following rules when calculating AC power:

- Each UC600 can power a maximum of two additional modules (XM30, XM32, WCI); reserve 8 VA for this application.
- Additional expansion modules require an additional power supply module (PM014).
- Each UC600 can power a maximum of 10 points, configured as 4-20 mA in/out (loop-powered).

Each of the components in the following table requires a specific amount of power (VA) from the 24 VAC transformer. The following table breaks down the power requirement for each, assuming that:

- Universal inputs (UI) and universal input/outs (UI/O) draw at most, 20 mA.
- Binary outputs (BO) are not loaded; pilot relays are used.
- Expansion modules will draw full power.

<table>
<thead>
<tr>
<th>Table 3. UC600 power draw (transformer sizing)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Component</td>
</tr>
<tr>
<td>UC600 Board</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Subtotal for UC600</td>
</tr>
<tr>
<td>Tracer TD7 display</td>
</tr>
<tr>
<td>Expansion Modules (Maximum of 2)</td>
</tr>
<tr>
<td>Additional 24 VAC needs, such as actuators and additional VA requirements.</td>
</tr>
<tr>
<td>Total for UC600 + expansion modules + end devices</td>
</tr>
</tbody>
</table>
Calculating DC Power Consumption

The UC600 is capable of providing 600 mA of power. Observe the following rules when budgeting for DC power:

- The UC600 can power a maximum of two small modules (WCIs, expansion modules) and a maximum of 10 points configured as 4-20 mA In/Out (loop powered), simultaneously.
- Include any additional devices where the UC600 is providing 24 VDC that are not part of the current loop.

Use the following table to help determine your DC power supply needs.

**Note:** If additional 0-20 mA inputs are needed, expansion modules can be powered from a PM014 power supply module instead of the UC600. See the “Tracer Expansion Modules IOM,” BAS-SVX46-EN, for more details.

### Table 4. DC power budget worksheet

<table>
<thead>
<tr>
<th>Component</th>
<th>No. of terminations</th>
<th>mA power draw</th>
<th>Total mA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base electronics</td>
<td>1</td>
<td>x 146</td>
<td>146</td>
</tr>
<tr>
<td>Universal inputs/outputs</td>
<td></td>
<td>x 20</td>
<td></td>
</tr>
<tr>
<td>XM30 expansion module</td>
<td></td>
<td>x 115</td>
<td></td>
</tr>
<tr>
<td>XM32 expansion module</td>
<td></td>
<td>x 100</td>
<td></td>
</tr>
<tr>
<td>WCI (can be powered by 24 VAC)</td>
<td></td>
<td>x 90</td>
<td></td>
</tr>
<tr>
<td>Additional DC powered devices</td>
<td>1</td>
<td>x (varies)</td>
<td></td>
</tr>
<tr>
<td><strong>Total DC power draw must be less than 600 mA</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Wiring and Powering the UC600

This section describes how to wire and safely power the UC600.

**Important:** If problems occur after powering refer to the troubleshooting section, “UC600 Commissioning/Troubleshooting in Powered State,” p. 65.

**Tip:** Before powering the UC600, read sections, “UC600 Pre-power Checks,” p. 17 and “UC600 Power Budget Check in an Un-powered State,” p. 20.

AC Power Warnings and Cautions

⚠️ **WARNING**

**Hazardous Voltage!**

Disconnect all electric power, including remote disconnects, before servicing. Follow proper lockout and/or tagout procedures to ensure the power cannot be inadvertently energized. Failure to disconnect power before servicing could result in serious injury or death.

⚠️ **CAUTION**

**Personal Injury and Equipment Damage!**

After installation, verify that the 24 VAC transformer is grounded through the controller. Failure to do so could result in personal injury and/or damage to equipment. Measure the voltage between chassis ground and any ground terminal on the controller. Expected result: \( V_{AC} \leq 4.0 \) V. Refer to the section, “Wiring AC Power to the UC600,” p. 24.

**Notice:**

**Equipment Damage!**

Complete input/output wiring before applying power to the UC600 controller. Failure to complete this task may cause damage to the controller or power transformer due to inadvertent connections to power circuits. The designed units accept only copper conductors. Other types may cause equipment damage. Do not share 24 VAC between controllers. Sharing 24 VAC power may cause controller damage (refer to the section, “Transformer Requirements,” p. 23).

Requirements and Recommendations

**Wiring and Circuit Requirements**

All wiring must comply with the National Electrical Code (NEC)™ and local electrical codes.

To ensure proper operation of the UC600, observe the following guidelines:

- The controller should receive AC power from a dedicated power circuit; failure to comply may cause the controller to malfunction.
- A dedicated power circuit disconnect switch must be near the controller, easily accessible by the operator, and marked as the *disconnecting device* for the controller.
- *Do not* run AC power wires in the same wire bundle with input/output wires; failure to comply may cause the controller to malfunction due to electrical noise.
- 18 AWG copper wire is recommended for the circuit between the transformer and the controller.
Transformer Requirements

- AC transformer requirements: UL listed, Class 2 power transformer, 24 VAC ±15%, device max load 26 VA. The transformer must be sized to provide adequate power to the UC600 controller (26 VA) and any external device outputs.
- DC power can be used for 4-20 mA devices and up to two expansion modules (XM30, XM32) and one WCI.
- Include in the total power budget any devices that are powered from the 24 VAC terminal.
- CE-compliant installations: The transformer must be CE marked and SELV compliant per IEC standards.

Avoid Equipment Damage!

Sharing 24 VAC power between controllers could cause equipment damage.

A separate transformer is recommended for each controller. The line input to the transformer must be equipped with a circuit breaker sized to manage the maximum transformer line current.

If a single transformer is shared by multiple UC600 controllers:
- The transformer must have sufficient capacity.
- Polarity must be maintained for every UC600 controller powered by the transformer

Important: If polarity is inadvertently reversed between controllers that are powered by the same transformer, a difference of 24 VAC will occur between the grounds of each controller. The following symptoms could result:
- Partial or full loss of communication on the entire BACnet MS/TP link.
- Improper function of UC600 controller outputs.
- Damage to the transformer or a blown transformer fuse.

Terminal Connectors and Tug Test

When wiring to the UC600 using terminal connectors, strip the wires to expose 1/4 in. (7 mm) of bare wire. Insert each wire into a terminal connector and tighten the terminal screw. A tug test is recommended after tightening terminal screws to ensure all wires are secure.

Torque Reference: tighten screw terminals to 0.5 to 0.6 N-m (71 to 85 ozf-in or 4.4 to 5.3 lbf-in)

N-m (Newton-meter)
ozf-in (ounce force-inch)
lbf-in (pound force-inch)
Wiring and Powering the UC600

Wiring AC Power to the UC600

1. Connect both secondary wires from the 24 Vac transformer to the XFMR terminals on the device.
2. Ensure the device is properly grounded.

**Important:** This device must be grounded for proper operation! The factory-supplied ground wire must be connected from any chassis ground connection on the device to an appropriate earth ground ( ). The chassis ground connection used may be the 24 Vac transformer input at the device, or any other chassis ground connection on the device.

**Note:** The device is not grounded through the DIN rail connection.

Figure 8. Wiring AC power to the transformer

![Diagram of wiring AC power to the transformer]

**Note:** A pigtail connection should be used between the chassis ground on the device and an earth ground, if the device is not grounded through one leg of the transformer wiring.
Controller Startup and Power Check

1. Verify that the 24 VAC connector and the chassis ground are properly wired.
2. Remove the 24 VAC connector from the UC600.
3. Remove the lockout/tagout from the line voltage power to the electrical cabinet.
4. Using a digital multimeter (DMM), verify that 24 VAC is present at the 24 VAC connector.
   If voltage reading is within plus or minus 10%, connect the 24 VAC connector to the transformer XMRF input on the UC600.

The following table describes the UC600 service and power LED indicators.

Table 5. LED startup sequence

<table>
<thead>
<tr>
<th>Power LED</th>
<th>Indicates...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid Green</td>
<td>Normal operation.</td>
</tr>
<tr>
<td>Blinking Red</td>
<td>Alarm or fault is present.</td>
</tr>
<tr>
<td>Solid Red</td>
<td>Low voltage or malfunction.</td>
</tr>
</tbody>
</table>

**Sequence on Powerup:** Illuminates red, then green.

<table>
<thead>
<tr>
<th>Service LED</th>
<th>Indicates...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid Green</td>
<td>LED has been pressed and remains on until powered down.</td>
</tr>
<tr>
<td>Blinking Green</td>
<td>Controller not accessing application software.</td>
</tr>
<tr>
<td>Not illuminated</td>
<td>Normal operation.</td>
</tr>
</tbody>
</table>

**Sequence on Power-up:** Does not illuminate during power-up.
Wiring and Powering the UC600

BACnet MS/TP Link Wiring

BACnet MS/TP link wiring must be field-supplied and installed in compliance with the National Electrical Code and local codes. In addition, the wire must be of the following type: low-capacitance, 18-gauge, stranded, tinned-copper, shielded, twisted-pair.

**Important:** BACnet links are polarity sensitive; consistent wiring polarity must be maintained between devices.

**Note:** For more details on this topic, refer to the Tracer SC Unit Controller Wiring Guide listed under “Other Resources,” p. 74.

The illustration below shows an example of BACnet link wiring with a combination of UC600 and UC400 controllers.

**Note:** A maximum of 20 UC600 controllers are allowed per Tracer SC (10 per MSTP link).

![BACnet link wiring diagram](image-url)
Wiring Inputs and Outputs

Wiring and configuration for UC600 inputs and outputs is described in this section. Refer to Table 2, p. 8 for a complete list of device connections and descriptions of each type.

**Important:** If there are problems after powering, refer to the troubleshooting section, “UC600 Commissioning/Troubleshooting in Powered State,” p. 65.

Input/Output Requirements

All input/output wiring for the UC600 must meet the following requirements:

- All wiring must be in accordance with the National Electrical Code and local codes.
- Do NOT run input/output wires in the same wire bundle with AC-power wires.
- Use only 18–22 AWG (1.02 mm to 0.65 mm diameter), stranded, tinned-copper, shielded, twisted-pair wire.
- Binary output wiring must not exceed 1,000 ft. (300 m).
- Binary input and 0–20 mA input wiring must not exceed 1,000 ft. (300 m).
- Analog and 24VDC output wiring distances are dependent on the specifications of the receiving unit. Use shielding for analog and 24 VDC outputs.
- Thermistor input and 0–10 VDC input or output wiring must not exceed 300 ft. (100 m).

Avoid Equipment Damage!

Remove power to the UC600 controller before making input or output connections. Failure to do so may cause damage to the controller, power transformer, or input/output devices due to inadvertent connections to power circuits.

<table>
<thead>
<tr>
<th>Type</th>
<th>Maximum Wire Lengths</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inputs</td>
</tr>
<tr>
<td>Binary</td>
<td>1,000 ft (300 m)</td>
</tr>
<tr>
<td>0–20 mA</td>
<td>1,000 ft (300 m)</td>
</tr>
<tr>
<td>0–10 VDC</td>
<td>300 ft (100 m)</td>
</tr>
<tr>
<td>Thermistor/Resistive</td>
<td>300 ft (100 m)</td>
</tr>
</tbody>
</table>
Providing Low-voltage Power for Inputs/Outputs

The UC600 is capable of providing low-voltage power to the inputs/outputs. For limitations, refer to the section, “Calculating AC Power Consumption,” p. 20.

**Note:** More than one input or output can receive power from a given terminal. However, the only limitation is the total amount of supplied power.

Input and Output Wiring

Figure 10 shows an example of an input and output wiring configuration.

Figure 10. UC600 wiring example
Wiring Universal Inputs

The UC600 has a total of 14 universal input and output terminals: eight universal inputs located on the upper tier and six universal input/output terminals on the bottom tier. Refer to Table 2, p. 8 for device connections and ranges.

Wiring Binary Inputs

Binary inputs are two-state inputs, such as fan on/off or alarm resets.

1. Connect the common wire to a common terminal as shown below.
   
   **Note:** Because the common terminals are in parallel, wiring can be made to any common terminal.

2. Connect the shield wire to a common terminal at the termination board and tape it back at the input device.

3. Connect the signal wire to an available input terminal.

4. Use the TracerTU service tool to configure the binary input that references the corresponding hardware termination.

Figure 11. Wiring binary inputs
Wiring 0–10 VDC Analog Inputs

Connect 0–10 VDC analog inputs to sensors such as indoor air quality sensors and pressure sensors. Wiring can be done on the top tier or the bottom tier by using a combination of universal and analog input terminations.

To wire a 0–10 VDC analog input:
1. Connect the shield wire (as common connection) to a common terminal as shown in Figure 12.
2. Connect the signal wire to an available input terminal.
3. Connect the supply wire to a 24 VDC or 24 VAC terminal as required.
4. Use the Tracer TU service tool to configure the analog input that references the corresponding hardware termination.

Figure 12. Typical wiring, 0–10 VDC
Wiring 0–20 mA Analog Inputs

Connect any 0–20 mA analog input to sensors such as humidity sensors and pressure sensors.

1. Connect the shield to a common terminal at the terminal board and tape it back at the input device.

   **Note:** Do Not use the shield as the common connection. For 3-wire applications, use a 3-conductor cable with shield and for 2-wire applications, use a 2-conductor cable with separate shield.

2. Connect the signal wire to an available input terminal.
3. Connect the supply wire to a 24 VDC or 24 VAC terminal as required.
4. Use the Tracer TU service tool to configure the analog input that references the corresponding hardware termination.

Figure 13. Typical wiring, 0–20 mA

- **Top tier wiring:** connect to any UI input
- **Bottom tier wiring:** connect to any AO/UI input. Connect 24 VDC wire to available 24 VDC on top tier.

![Typical wiring diagram for 0–20 mA inputs](image_url)
Wiring Inputs and Outputs

Wiring Variable Resistance Analog Inputs

Variable resistance analog inputs include 10K thermistors, resistance temperature detectors (RTD, and setpoint thumbwheels on zone sensors. To wire a variable resistance analog input:

1. Connect the shield to a common terminal at the terminal board and tape it back at the input device.
2. Connect the signal wire to an available input terminal.
3. Use the TracerTU service tool to configure the analog input that references the corresponding hardware termination.

Figure 14. Typical wiring, variable resistance

AO/UI connections located on the bottom tier can also be used. Wire the same way as shown on the top tier.
Wiring Trane Zone Sensors

The table in Figure 15 shows the terminations on a Trane zone sensor and a typical UC600 application.

1. Connect the shield to a common terminal at the terminal board device.
   
   **Note:** Do Not use the shield as the common connection. For 3-wire applications, use a 3-conductor cable with shield and for 2-wire applications, use a 2-conductor cable with separate shield.

2. Connect the zone sensor wires to any available input (UI, UI0) terminals; refer to table 7 as an example.

3. Use the TracerTU service tool to configure the analog input that references the corresponding hardware termination.

Figure 15. Typical wiring, Trane zone sensors

<table>
<thead>
<tr>
<th>Zone Sensor Termination</th>
<th>Zone Sensor Output</th>
<th>UC600 Termination</th>
<th>Type</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Zone Temp</td>
<td>UI1</td>
<td>Thermistor</td>
<td>10kΩ</td>
<td></td>
</tr>
<tr>
<td>2 Ground</td>
<td></td>
<td>n/a</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>3 Zone Temp Setpoint</td>
<td>UI2</td>
<td>Resistive</td>
<td>200kΩ–20kΩ</td>
<td></td>
</tr>
<tr>
<td>4 Fan Mode</td>
<td>UI3</td>
<td>Resistive</td>
<td>200kΩ–20kΩ</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** Example hardware terminations. Any universal input or universal input/analog output may be used for terminating zone temp, zone temp setpoint, or fan mode.
Wiring Analog Outputs

The UC600 has six analog output terminations. These outputs can be used for 0–10 VDC outputs or 0–20 mA outputs and used to control actuators or secondary controllers. To wire an analog output:

1. Connect the shield to a common terminal at the terminal board and tape it back at the input device.
   **Note:** Do Not use the shield as the common connection. For 2-wire applications, use a 2-conductor cable with separate shield.

2. Connect the signal wire to an available output terminal.

3. Connect the supply wire to a 24 VDC or 24 VAC terminal as required.

4. Use the TracerTU service tool to configure the analog output that references the corresponding hardware termination.

Figure 16. Typical wiring, analog outputs
Wiring Binary Outputs

The UC600 has four binary outputs that are used as powered outputs.

**Notice:**
Controlling coil-based loads: Inrush current (the initial surge of a current into a load before it attains normal operating condition) can be three times greater, or more, than the operating current.

**Important:** Use pilot relays for dry contact outputs for load currents greater than 0.5 amperes and use powered outputs for load currents less than 0.5 amperes.

1. Connect the shield to a common terminal at the terminal board and tape it back at the powered output device.
2. Connect the signal wire to an available output terminal.
3. Use the TracerTU service tool to configure the binary output for binary operation.

Figure 17. Typical wiring, relays (binary outputs)
Connecting Pressure Transducer Inputs

The UC600 is equipped with one 3-pin, 5VDC pressure transducer input connection (P1) designed for Kavlico pressure transducers. Transducers measure duct static pressure in UC600 equipment (VAV AHUs) that is detected from the connected sensor (mounted near the UC600).

**Important:** To ensure accurate data transmission, use Kavlico pressure transducers. Contact Trane for more details on pressure transducers.

To connect to the pressure transducer input, press the pressure transducer cable onto the pressure input (P1). Refer to the illustration below.
# Operation of the UC600

## LED Descriptions and Activities

The following table provides a description of LED activity, indicators, and troubleshooting tips. Refer to Figure 1, p. 7, for locations of the LEDs.

### Table 8. LED identification and interpretation

<table>
<thead>
<tr>
<th>LED type</th>
<th>LED activity</th>
<th>Indicates…</th>
<th>Troubleshooting/Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Power</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solid green</td>
<td>Normal operation</td>
<td></td>
<td>Sequence on powerup: Illuminates red, then flashes green, then solid green.</td>
</tr>
<tr>
<td>Solid red</td>
<td>Low voltage or malfunction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blinking red</td>
<td>Alarm or fault is present (see note)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Communication</strong></td>
<td>TX (transmit) blinks green</td>
<td>Normal operation; blinks at a fixed rate when transferring data to other devices on the link</td>
<td>TX LED: Regardless of connectivity, the TX will blink as it searches for devices to communicate with.</td>
</tr>
<tr>
<td>RX (receive)</td>
<td>Normal operation; blinks at a fixed rate when receiving data from other devices on the link</td>
<td>RX on solid (yellow)</td>
<td>Reverse polarity is present</td>
</tr>
</tbody>
</table>
| RX on solid (yellow) | Reverse polarity is present | LED not illuminated | The controller is not detecting communication | • Cycle the power to reestablish communication. 
  • Verify that the controller is capable of communicating with other devices on the link. 
  • Check polarity and baud rate. |
| **Service**       | Solid green                      | LED has been pressed and remains on until powered down (does not affect normal operation) |                                            |
| LED not illuminated | Normal operation                 |                                  |                                                                                       |
| **Binary outputs**| Solid yellow                     | Relay coil energized             |                                                                                       |
| (BO1 through BO4) | LED not illuminated             | Relay coil de-energized or No command |                                                                                       |
| **Ethernet**      | LINK on solid (green)            | Valid Ethernet connection        |                                                                                       |
| ACT flickers (yellow) | Data transmission and reception |                                  |                                                                                       |

**Note:** Points that are in an alarm state when the notification type is configured as “alarm” will cause the power LED to flash red. If the notification type of a point is configured as “event,” the power LED will not flash when the point is in an alarm state. Modbus is not supported at this time.
Troubleshooting

The section provides troubleshooting solutions for problems that sometimes occur with the UC600.

Communication Problems

Problem: The UC600 is not communicating with Tracer SC, but can communicate with TracerTU using a direct USB connection.

Possible cause: The “Soft Set Device ID” check box was unchecked after the UC600 was installed onto the Tracer SC.

Possible solution: Reinstall the UC600 device onto the Tracer SC.

1. Verify that the UC600 device ID is set to the rotary address, which is found in TracerTU/controller/controller settings/protocol.
2. Log on to Tracer SC and navigate to the Devices page; select the UC600 device from the list, then select replace from the actions button.

Alternative cause: The baud rate changed in the controller settings.

Solution: In TracerTU, open the Controller Settings page. Set the baud rate to match the baud rate on the Tracer SC MS/TP link.

Alternate Cause: The rotary switch is not set properly or another device on the same MS/TP link is set to the same rotary address.

Solution: Verify that the rotary address is correct. If not, change the address and cycle power. If the device was previously installed in the Tracer SC, the device may need to be “replaced” from the Tracer SC Devices page.

Alternate Solution: If the device is set to the proper rotary address, then another device(s) could be using the same rotary address on the MS/TP link.

1. Power down the UC600 and discover the link with Tracer SC to see if a duplicate device is present.
2. Change address of duplicate device, then reapply power the UC600.

If previously installed, the device may need to be replaced in the Tracer SC.

Output Points

Problem: Output points are not being controlled by the UC600.

Possible cause: The output point was not configured properly in TracerTU.

Solution: Verify the hardware configuration in TracerTU and change as needed.

Problem: The value of an analog point reads correctly in TracerTU but does not read correctly in the Tracer SC.

Solution: Verify that the dimensionality was set properly on the point configuration page of TU. Log on to Tracer SC and navigate to the Devices page; select the UC600 device from the list, then select replace from the actions button.

Alternate solution: Verify that the equipment template is pointing to the proper output point in the UC600.

Problem: The output point is out of service.

Solution: Place point in service from either Tracer TU or Tracer SC.
Connection Problems

Problem: The UC600 is not responding, communicating, or is unable to connect with Tracer SC or the TracerTU service tool. (For more information about the TracerTU service tool, see “Configuring the UC600 with the TracerTU Service Tool,” p. 40.)

Possible cause: Defective application code in the controller.

Possible solution: Reload the application firmware.

1. Power down the controller (make sure to disconnect the USB cable).
2. Continuously hold down the service button pin while applying power. Press the service button until the power LED illuminates green. Connect with Tracer TU and reload the application firmware.

Note: During the above process, the service LED will be green and the communication status LEDs will be inactive.
Configuring the UC600 with the Tracer TU Service Tool

The Tracer TU service tool is comprised of tools that allow users to edit objects, configure equipment, customize TGP2 programs, and create and edit custom graphics. These functions are performed using the Device Navigation Tree and the TU Utility tab. For more detailed information about any of these functions and the TU service tool, refer to “Other Resources,” p. 74.

**Important:** The UC600 is not intended to be disassembled for maintenance.

This section describes:
- Starting a session of TU and establishing a direct USB connection.
- Establishing a connection using Ethernet or LAN.
- Checking and Transferring Application Code.
- Configuring the UC600.
- Creating and editing points for the UC600.
- Monitoring and viewing the status of the UC600.
- Backing up files and replacing corrupt files (Backup and Replace).

**Starting a Session of TU and Connection**

If you need to install the TU service tool, refer to the Tracer TU Service Tool Getting Started Guide (TTU-SVN01). This document will provide information about features, capabilities, and requirements of TU.

To start a TU session:

1. Connect the USB cable directly from the laptop to the UC600.

   **Important:** Observe existing USB standards for cable length. (For more information go to informational Web sites, such as [http://www.USB.org](http://www.USB.org).)

   When connecting to the controller for the first time, the **Found New Hardware Wizard** appears.

2. If the UC600 appears, select **Install the software automatically (Recommended)** and then click **Next**.

   If the UC600 does not appear, repeat the Tracer TU installation.

3. Click **Finish** on the final dialog box to complete the installation.
Configuring the UC600 with the Tracer TU Service Tool

**Note:** If encountering an error condition or message during this installation procedure or during the subsequent connection steps, refer to the section, “Tracer TU Installation and Connection Error Conditions,” p. 43 below for corrective actions.

4. Click either the Tracer TU desktop icon or the Tracer TU program item in the Tracer TU group on the Start menu.

   The Tracer TU splash screen appears briefly followed by the Startup Task Panel dialog box.

5. Select the Direction Connection radio button, if not already selected, for USB.

![Startup task panel dialog box](image)

**Figure 19. Startup task panel dialog box**

Connecting Using Tracer SC

The following instructions describe a direct connection using an Ethernet cable (Tracer SC only) or an indirect connection using an IP address over a local area network (LAN) on which the Tracer SC resides. The UC600 must be installed in the Tracer SC and communication must be up. If necessary, refer to the “Tracer SC System Controller Installation and Setup Guide,” BAS-SVX31.

Using an Ethernet cable or a LAN connection requires Adding a Facility which is set up from the Startup Task Panel dialog box. To add a facility, you must know the IP address assigned to the Tracer SC. The UC600 must also be installed onto the Tracer SC in order for the Tracer SC to pass through by way of an IP address.

To add a new facility:

1. Click either the Tracer TU desktop icon or the Tracer TU program item in the Tracer TU group on the Start menu. The Tracer TU splash screen appears briefly followed by the Startup Task Panel dialog box.

2. Select the Network Connection radio button.

3. From Facility drop-down list (inside the Connect to frame), select Add New Facility Connection. This action expands the contents by adding additional fields (Figure 20, p. 43).

4. Enter a facility name, IP address, and a description. (Select the IP check box if port forwarding will be used.)
5. Click **Save**. The facility is now saved and can be selected from the **Facility** drop-down list.

**Figure 20. Adding a facility**

6. From the **Facility** drop-down list, select the new entry (**Figure 21**).

**Figure 21. Connecting to a facility**

7. Click **Connect**. The **Tracer SC Unit Summary** screen appears (**Figure 22, p. 43**).

8. From the left navigation menu, click on the **UC600** to which you want to connect.

**Note:** The **UC600** must be installed in the **Tracer SC** in order to access the device through the **SC**.
Tracer TU Installation and Connection Error Conditions

During installation or initial connection to a UC600, the user may encounter an error message or error condition. The messages with corrective actions are listed in the following table.

<table>
<thead>
<tr>
<th>Error Message/Condition</th>
<th>Corrective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does not recognize USB hardware</td>
<td>Respond as follows:</td>
</tr>
<tr>
<td></td>
<td>Install correct USB drivers using Tracer TU Setup.exe.</td>
</tr>
<tr>
<td></td>
<td>If the user receives this message and have the correct USB drivers installed, wait for the</td>
</tr>
<tr>
<td></td>
<td>UC600 to completely boot before attaching the USB cable.</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Tracer TU does not respond, or the screen is blank</td>
<td>The phrase <strong>Connected Local USB</strong> should appear in the lower left hand corner of the Tracer</td>
</tr>
<tr>
<td></td>
<td>TU screen. If it does not, the connection has been lost. Restart Tracer TU by clicking the</td>
</tr>
<tr>
<td></td>
<td><strong>Connection</strong> icon in the upper left of the Tracer TU window.</td>
</tr>
<tr>
<td>Found New Hardware (Popup message)</td>
<td>Open the <strong>Found New Hardware Wizard</strong> and verify that UC600 is displayed after &quot;This wizard helps</td>
</tr>
<tr>
<td></td>
<td>you to install software for&quot;. Respond as follows:</td>
</tr>
<tr>
<td></td>
<td>If this text is displayed, then select, <strong>Install the software automatically</strong> (Recommended). If this</td>
</tr>
<tr>
<td></td>
<td>text does not appear, run the Tracer TU installation file, Tracer TU Setup.exe.</td>
</tr>
<tr>
<td>No application code present</td>
<td>Open the File Transfer Utility in the Tracer TU service tool to transfer the UC600 application</td>
</tr>
<tr>
<td></td>
<td>firmware. (Refer to “Upgrading Firmware,” p. 44.)</td>
</tr>
</tbody>
</table>
Configuring the UC600 with the Tracer TU Service Tool

Upgrading Firmware

Firmware upgrades require the use of Tracer TU (version 8.0 or higher).

To upgrade UC600 firmware:

1. Connect Tracer TU to the UC600 using a USB connection (direct connect).
   It is not recommended that the firmware be updated using single-link access or connecting through the Tracer SC.

2. Click the file transfer utility icon ( ) located on the upper left portion of Tracer TU, which opens the File Transfer wizard.

3. Select the UC600 from the Selected devices box. Click Next.
   The Choose files to Transfer to each Device or Device Group dialog box appears.

4. Click Browse, which opens the Selected files dialog box.

5. Browse to the Tracer TU/Firmware/UC600 directory which is often found in My Documents.

6. Select the firmware file that has the .mod file extension. Version 2.0 firmware and higher uses the .mod extension.
   Important: Selecting a lower version of firmware will clear all configuration in the controller.

7. Click Open to open the file (the firmware file).

8. Click Start.
   Do not close Tracer TU or navigate away from the File Transfer page until the File Transfer Summary dialog box appears.

9. When the File Transfer Summary dialog box appears, click Finish.
Configuring the UC600 and Creating or Editing Points

Configuring the UC600

Use the TU Controller Settings Utility to configure the UC600. This utility configures date and time, units of measure, and protocol.

1. Select the **Controller Settings Utility** tab from the vertical tab set located on the right side of the TU window.
   
   **Note:** The content of this screen is based on the type of controller that is connected and the system protocol used to communicate with the controller.

2. Click **Date and Time** to set the preferred date and time formats and then click **Send to Device**.
   
   **Optional:** If daylight saving time is observed in the region where the UC600 resides, select the **Use Daylight Saving Time** check box. Select dates and time from the drop-down lists that follow.

3. Click **Units** and set the preferred units of measure and then click **Send to Device**. (Check **Modify Default Units** to change default units.)

4. Click **Protocol** to display a list of protocol that the UC600 uses to communicate with other controllers. For BACnet protocol, specify the **Baud Rate**, click **Send to Device** (Figure 24).

5. If the device ID must be set manually (typically for 3rd party integrations), click **Protocol** again to display its contents and click **Soft Set Device ID**.

6. Click **Send to Device**.

   If a soft set Device ID is not present or to change an existing soft set Device ID, select the **Soft Set Device ID** check box, enter a new ID, click **Save**, and then cycle the power to the controller for changes to take effect.

   To return to the rotary dial Device ID setting, click **Remove Soft Set ID**, click **Save**, and then cycle the power to the controller for changes to take effect.

**Figure 24. Configuring the date and time**
Using Pre-packaged Solutions (PPS)

Pre-packaged solutions (PPS) is the preferred method to add pre-configured control applications that contain:

- Point configuration
- TGP2 code
- Template for Tracer SC installation
- Pre-defined custom reports
- Standard graphic for air handler unit (AHU)

PPS files for the UC600 are available for download on the My Ingersoll Rand corporate Intranet Web site.

To add points using PPS:

1. Navigate to the Pre-packaged Solutions page from the My Ingersoll Rand Intranet Web site: https://home.ingerrand.com/our%20businesses/ClimateSolutions/Sales/prepackaged/Pages/Home.aspx, or enter pre-packaged solutions in the search field.
2. Locate the UC600 PPS file, then select to save the file to your hard drive.
3. Open a session of Tracer TU.
4. Click on the File Transfer Utility icon located in the upper left-hand side of the TU window and then click Next.
5. Click Browse and locate the PPS file that was previously saved. Highlight the file and click Open.
6. Click Start Transfer. A progress meter displays while the file downloads.
7. Navigate to the Controller Settings Utility screen and rename the controller.
8. From the Controller Settings screen, select Protocols. Verify that the Softset Device ID check box is not checked.
9. For input and output points, verify and set the appropriate hardware references for each.
10. Commission the AHU controls as normal.
11. Discover and install PPS into Tracer SC. The PPS AHUs should auto-install and not require a user-created template.

Note: If adding additional points into the PPS programs it is necessary to first auto-install the device in the Tracer SC in order to load the template. Upon installation, the current template can be used as a basis for the custom template that contains the new points. This can be done by editing the template on the Device List page on the Tracer SC UI.

Creating or Editing Points for the UC600

Note: Points are not pre-configured in the UC600 controller. Refer to Table 9, p. 47 for the maximum number of each point type that can be created in a UC600.

Use the TU Controller Settings Utility to create and edit points.

To create a point:

1. Select the Controller Settings Utility tab from the vertical tab set located on the right side of the TU window.
2. Select the menu option for the type of point to create.
3. Click the Create New button for the type of point you want to create.
4. On the Point Configuration tab, enter a meaningful name in the Name field.
5. If expansion modules have been added, click on button in the Reference frame. The additional points will be available in the drop-down list.
6. Continue to enter required or optional settings on the **Point Configuration** tab and on the **Alarm Configuration** tab. (Refer to Tracer TU online help for descriptions of all fields on these two tabs.)

7. Click **Save to File** to save the new point configuration or click **Send to Device** to send the new point configuration to the controller.

To edit, copy, or delete a point:

1. Select the **Controller Settings Utility** tab from the vertical tab set located on the right side of the TU window.
2. Select the menu option for the type of point to edit.
3. Select an existing point from the **Name** field drop-down list.
4. Choose an action to perform.
5. Click **OK** to save the change.

---

**Figure 25. Creating and editing points**

---

**Table 9. Maximum number of points supported in the UC600 by type**

<table>
<thead>
<tr>
<th>Point Type</th>
<th>Point Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analog Input</td>
<td>160</td>
</tr>
<tr>
<td>Analog Output</td>
<td>80</td>
</tr>
<tr>
<td>Analog Value</td>
<td>160</td>
</tr>
<tr>
<td>Binary Input</td>
<td>160</td>
</tr>
<tr>
<td>Binary Output</td>
<td>80</td>
</tr>
<tr>
<td>Binary Value</td>
<td>160</td>
</tr>
<tr>
<td>Multistate Input</td>
<td>64</td>
</tr>
<tr>
<td>Multistate Output</td>
<td>64</td>
</tr>
<tr>
<td>Multistate Value</td>
<td>64</td>
</tr>
</tbody>
</table>
Configuring the UC600 with the Tracer TU Service Tool

Placing Points in Out-of-Service Mode

Inputs/Outputs
The out-of-service mode disconnects the point from its reference, which has the following effect on input and output points:

Inputs
An input point no longer obtains the value from its reference; however, you are allowed to write a value to the point. This is primarily used for testing purposes.

Outputs
An output point will not push (write) its value to its output reference. The value of the point can be changed without affecting the referenced value.

Note: This will require the use of the priority table.

Values
Value objects will not accept a written value from applications on the controller, such as TGP2 or schedules. A remote application, such as Tracer TU or Tracer SC, allows you to write to a value object when out-of-service.

Note: This will require the use of the priority table.

Creating Points to Monitor Communication and TGP2 Programs

Multistate points can be created to monitor expansion module (XM) communication, Tracer SC communication, and TGP2 programs as well as program states and results. When multistate input points are created that reference these properties, Tracer TU will automatically define the number of states and the state text, based on the selected property.

Note: Tracer TU Version 8.1 and Tracer UC600 Version 3.34 and higher are required for this functionality.

To create points for XM communication loss:
1. Open a session of Tracer TU.
2. Select the Controller Settings Utility tab from the vertical tab set located on the right side of the Tracer TU window.
3. Select the Multistate tab.
4. Click the Create New button.
5. On the Point Configuration tab, enter a meaningful name in the Name field.
6. Click on the button in the Reference field. The Reference dialog box appear.
7. From the Selection Tree, select the appropriate XM module located under the Device node (Figure 26, p. 49).
   After the XM is selected, Communication Status appears in the Available Properties frame.
8. Click Ok, which returns you to the Point Configuration tab. Click Ok to return to the Multistate Point page.
9. Click Send to Device to send the new point configuration to the controller.
Creating Points for Timed Override (TOV) and */** Functions

Functionality for TOV and */** (thumb wheel) functions can be configured for the UC600, UC400, and the XM70. This is required in order for TGP2 when creating programs for TOV and */**. After creating points as described below, see “Enabling TOV and */** for TGP2 Programs,” p. 50.

To create points for TOV functions
1. Open a session of Tracer TU.
2. Select the Controller Settings Utility tab from the vertical tab set located on the right side of the Tracer TU window.
3. Select the Analog tab.
4. Click the Create New button.
5. On the Point Configuration tab, enter a meaningful name in the Name field.
6. Click on the button in the Reference field. The Reference dialog box appears.
7. Select a point to reference, then select analog value from the Available Properties frame. Click OK.
8. In the Definition frame, select the Create an associated Multistate Input check box.
9. The required multistate input is automatically created (Figure 27, p. 50).
10. Click Send to Device to send the new point configuration to the controller.
Configuring the UC600 with the Tracer TU Service Tool

To create points for the */** function

1. Complete steps 1 through 6 as described in “To create points for TOV functions,” p. 49.
2. In the Reference dialog box, select mode from the Available Properties frame. Click OK.
3. In the Definition frame, select the Create an associated Multistate Input check box. The required multistate input is automatically created (Figure 28).
4. Click Send to Device to send the new point configuration to the controller.

Enabling TOV and */** for TGP2 Programs

After creating points specifically for TOV and */** functions, you can now enable the points in the TGP2 Editor.

To enable TOV and */** points:
1. Open up a session of TGP2.
2. Select the point type from the left side bar; click and drag onto the editing space.
3. Right-click and then choose **Block Properties** from the menu. The **Point Properties** Dialog box appears.
4. Use the check boxes to select either TOV or */**, depending on the point.
5. Click **Save**.
6. Continue to build the TGP2 program using the provided TGP2 Editor tools (Figure 29).
7. When finished, name and save your new TGP2 program.

**Note:** For additional information, see “TGP2 Applications Guide, BAS-APG008-EN.”

**Figure 29. TGP2 program example**
Configuring the UC600 with the Tracer TU Service Tool

Monitoring and Viewing the Status of the UC600

Use the Status Utility tab to monitor and view the details of UC600 points list, alarms, and controller status.

To monitor and view details:

1. Select the **Status Utility** tab from the vertical tab set located on the right side of the TU window. Tabs are located across the top of the TU screen for analog, binary, and multistate points, controller status, and alarms.

2. Choose and select a member tab to view its list of information such as data type, value, unit, state, control, and details.

   **Note:** If viewing alarm status, this tab screen displays up to 100 active alarms. Alarms automatically reset when their condition returns to normal.
Backup

When you commission a system, it is strongly recommended that you create a backup file of the initial configuration settings. If necessary, the backup file can be restored at a later date.

The backup procedure stores TGP2 files, all object configuration, setup files, and BACnet identification files. In addition, the data log configuration is stored in the backup file (data excluded).

To back up files from the controller:
1. Click the Backup Wizard icon in the upper left corner of the TU window. The Welcome to the Backup Wizard opens.
2. Click Next.
   The Choose From Available Devices dialog box appears.
3. Select the controller from which you will be backing up files.
4. Click Next.
   The Backup File Name and Destination dialog box appears.
5. Click Browse to navigate to the directory where the backup file will be saved.
6. Click Start Backup.
   A dialog box containing a progress meter appears. When the backup process is complete, a message appears stating, "The backup is now complete. 0 errors were found."
7. Click Close and then click Yes.

Restore

You can restore files on the controller with backup files in the event that the controller becomes corrupt or must be replaced.

To restore files to the controller:
1. Click the File Transfer Wizard icon in the upper left corner of the TU window. The Welcome to the File Transfer Wizard opens.
2. Click Next.
   The Choose From Available Devices dialog box appears.
3. Select the controller that you will be restoring files for.
4. Click Next and then click Browse to navigate to the directory to locate the file to restore.
5. Select the last backup file on the Choose the Files Affected dialog box.
   The Start Transfer button is now enabled.
6. Click Start Transfer to download the backup file to the controller.
   Note: Backup files are controller dependent. Backup files made for a UC600 can only be restored on a UC600.
Setting Up and Maintaining Schedules

Tracer UC600 supports three types of schedules: analog, binary, and multistate. Schedules can be set up and maintained in Tracer TU and the Tracer TD7 Display (see "Tracer TD7 Display, Installation, Operation, and Maintenance, “BAS-SVX50C-EN). Schedules are based on a series of “events” that occur on each day of the week. An event is a change in a value at a specific time that can occur during any day of the week. Each day is independent of the others and always begins with the schedule default value. The schedule default value is applied to each day of the week and is the value that the schedule defaults to at 12:00 a.m. for any given day. In addition to the schedule default, a maximum of ten unique events can be defined for each day of week.

Note: Scheduling requires installation of UC600 version 3.0 or higher firmware.

Creating a Weekly Schedule

1. Open a session of Tracer TU.
2. Select Utilities > Equipment > Scheduling.
3. Expand one of the unused Schedule boxes.
4. Click the Edit icon on the right of the Schedule box to activate the Name and Description fields (Figure 31).

Figure 31. Creating a new schedule
5. Enter a schedule Name and Description.
   The Type and Dimensionality boxes will be populated based on the selections you make in the Members group box.

6. Expand the Members group box and select the Point Type (Analog, Binary, or Multistate) from the Point Type drop-down list.
   The point list is filtered to exclude all points other than the selected type. All members must be the same type.
   If you selected analog as the point type, specify a dimensionality from the drop-down list (Figure 32). All analog members must have the same dimensionality.

7. Use the arrow controls to select up to 10 members by transferring points from the All Points box to the Selected Points box (Figure 33).
   The first member added will filter the remaining list of available members to display only members with the same point type and units.

8. Click Send to Device to save the schedule. If working offline, click Save to File, which will save the schedule to the configuration file.
Changing the Schedule Default Value and Adding Events

After creating a schedule and selecting the members, the next step is to determine the schedule default value and add weekly events. An event is defined as a time-value pair.

**About the Schedule Default Value**

- The default value is the relinquish default value of the first specified member. However, changing this value affects only the schedule. It does not affect the Relinquish Default value specified in that member’s point configuration.
- The default value can be changed. (Changing the default value does not affect the actual configured default value of the point.)
- The default value goes into effect each day at 12:00:00 a.m., provided that no other event takes control at that time. It remains in effect until the first event occurs.
- If the schedule members are multistate points, the states of the first selected member are used for all members. You can select a default value from these states from the drop-down list.

**Changing the Schedule Default Value**

1. Open the schedule that in which you want to make changes.

   When a schedule is created, the only event in the schedule is the schedule default value. This value occurs every day at midnight and cannot be removed. If the schedule default value is edited, the value applies to each day in the schedule.

2. From the Default Value drop-down list select a different value.

3. Click Go. The new value is applied to the schedule.

**Figure 34. Changing the schedule default value**
Adding Events

1. From the Actions drop-down list, select **Add Event** then click **Go** to display the **Events** dialog box (Figure 35).
   
   Events for a particular day can be viewed by selecting the day of the week at the top of the **Add Events** dialog box (Figure 36).

   **Figure 35. Selecting Add Event from Actions list**

   ![Scheduled Events dialog box](image)

2. Follow the steps in the dialog box to add events to one or more days at a time. (Events are defined as time-value pairs.)
   a. Select the day or days that share the event.
   b. Set the start time and value.
   c. Click **Add Events** to add the events to the schedule for the days selected.

   **Note:** Verify that the events are current for each day by selecting the day of the week at the top of the Add Events dialog box.

   **Figure 36. Add Events dialog box**

   ![Add Event dialog box](image)
3. Repeat the above steps to add up to 10 events for each day of the week. Click OK to return to the Schedules page.

**To modify events on a particular day:**
Select a day in the Event Table from the Add Event dialog box. Use the arrow buttons to change the value. The new value is automatically saved.

**To delete an event:**
Select a day in the Event Table from the Add Event dialog box. Click the Delete button, which removes the event from the schedule for that particular day.

### Adding Exceptions to a Schedule

After you have created a schedule and have added events, you can add exceptions for holidays and other special events. Each exception can also contain up to ten (10) of its own events. The UC600 can support up to 25 exceptions in a single schedule. However, it is not recommended to place more than one exception on a single day.

Exceptions contain their own set of events. Exceptions can be:

- Configured for a single date or to recur on a user-defined recurrence pattern such as the third Thursday of the month.
- Stacked on a single day, with the newest defined exception having the higher rank.

There are two main purposes for exceptions:

- To override an entire day.
- To extend or change a schedule’s events over a normal daily schedule.

For a exceptions that last an entire day, you should define an exception event at midnight. The exception then takes control of the normal daily events for the entire day.
To add exceptions:

1. Open the schedule to which you want to add exceptions.
2. From the Actions drop-down list Select Add Exceptions. Click Go to display the Add Exceptions dialog box (Figure 37). (Or access from the Exception list page).

Figure 37. Adding exceptions

3. Select Does Not Recur for a one-time exception and then select the specific date in the Occurs on Date fly-out calendar on the right. Otherwise, select Monthly or Yearly recurrence options and specify the appropriate recurrence pattern on the right.

   Note: Exceptions that occur on the same date each year, such as Christmas Day and New Year's Day, are examples of exceptions that should be set as recurring.

4. Enter the StartTime and Value. A second event can be added by selecting the corresponding check box.
5. Click Add Event(s).

   The event(s) appear in the Exceptions list at the bottom of the dialog box.
6. Repeat steps 4 and 5 to add more events for an exception. Up to 10 events can be added.
7. Click OK when you have finished adding all exceptions and events.

   Note: It is best practice to add an event at midnight to ensure that the exception is in control of the events for the entire day.

Figure 38, p. 60 shows a typical schedule (resultant) with events and exceptions applied. Exceptions that do not recur are identified by a downward pointing arrow icon. Exceptions that do recur are identified by an circular arrow icon.
Click on day in the resultant to view all exceptions applied to the day from the highest priority to the lowest, with normal events at the bottom.

Figure 38. Typical schedule (resultant) with events and exceptions

Weekly View

Click inside the row of a particular day in the schedule for an expanded daily view.

Expanded View (Thursday)
Modifying Exceptions

1. Open the schedule containing the exception you want to modify.
2. Select an exception from those listed in the Exceptions group box.
3. From Actions drop-down list, select Modify Selected Exception, then click Go.

Figure 39. Modifying exceptions

4. Do one of the following to modify the exception:
   • Change the start time and / or the value of an event.
   • Add an event.
   • Delete an event.
5. Click Add Event(s).
6. Repeat above steps as necessary.
7. Click OK when you have finished modifying the events.

Deleting Events

1. Open the schedule from which you want to delete events.
2. From the Actions drop-down list in the Events group box, select Modify Events and then click Go.
3. Click the tab of the first day of the week to which the event belongs.
4. Click the Delete button in the row of the event you want to delete (Figure 39).
5. Repeat for all other affected days.
6. Click OK to return to the schedule.

Deleting Exceptions
1. Open the schedule containing the exception you want to delete.
2. Select an exception from those listed in the Exceptions group box.
3. From the **Actions** drop-down list, select **Delete Selected Exception** and then click **Go**.

![Figure 40. Deleting an exception](image)

Deleting a Schedule
1. Select **Utilities > Equipment > Scheduling** to display the Schedules screen.
2. Expand the Schedule box containing the schedule you want to delete.
3. From the **Actions** drop-down list in the Scheduled Events group box, select **Delete Schedule** and then click **Go** (Figure 41).

![Figure 41. Deleting a schedule](image)

The schedule is deleted. You can then create a new schedule with a new set of members.

Custom Graphics

Graphics can be viewed in Tracer TU by accessing the TD7 operator display user interface.

To access, navigate to the Unit Summary screen. Click the **Operator Display User Interface** button located on the bottom left portion of the page. It is not necessary to be connected to a TracerTD7 Display to view the interface.

**Note:** In order to view the TD7 operator display user interface, you must be connected to the UC600 using a USB cable.
Custom graphics are created and loaded using Tracer Graphics Editor (TGE). See the TGE online help for more information. Standard graphics are available in the most recent Pre-Packaged Solutions (PPS) library at https://home.ingerrand.com/our%20businesses/ClimateSolutions/Sales/prepackaged/Pages/Home.aspx.

Graphics allow you to:

- Perform overrides
- Assign a graphic as your home page
- Link to the Alarms page
- Link to a schedule
- Link to the All Points Report and Custom Reports
- Link to another graphic
Graphics Best Practices

Individual graphic files cannot exceed 2 megabytes (Mbs). Files that exceed 2 Mbs will cause slow controller performance and increased graphic loading times.

Observe the following best practices:

- Use a program such as Microsoft Paint to save graphics using the following recommended formats: png, jpg, or gif. File formats such as bitmap (bmp) result in much larger files sizes.
- Open the image using Microsoft Paint, and resize the image to smaller dimensions.
- If the image file was created by Centralized Graphics or another graphics specialist, request a new image with a file size under 2 Mb.

**Note:** Verify that the image quality is acceptable after saving in one of the recommended formats. JPG and GIF file formats use image compression which can reduce the quality of the image.
UC600 Commissioning/Troubleshooting in Powered State

This section provides instructions for testing the UC600 points after making connection and applying power (indicated in each figure by the terminal connector and U600 label). The step numbers or method numbers in each figure correspond to the information in each table. (Refer to Table 2, p. 8 for a list of device connections.)

The following equipment is required in order to test inputs and outputs:

- Digital multimeter (DMM)
- Small flat-bladed screwdriver
Resistive Inputs

Checkout Procedure | Measurement | Expected Value
--- | --- | ---
Step 1 | Measure AC voltage across the resistive termination | $V_{ac} = 0.0 \, V$
| | AC voltage will affect further measurement | 

Step 2 | Measure DC voltage across the resistive termination | Refer to the charts below

Charts show measurements across thermistor input (Fahrenheit and Celsius) and resistive input.
Voltage Inputs

<table>
<thead>
<tr>
<th>Checkout Procedure</th>
<th>Measurement</th>
<th>Expected Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>Measure AC voltage across the voltage termination</td>
<td>Vac = 0.0 V, AC voltage will affect further measurement</td>
</tr>
<tr>
<td>Step 2</td>
<td>Measure DC voltage across the voltage termination</td>
<td>Compare to input status in Tracer TU</td>
</tr>
</tbody>
</table>
Current Inputs - Methods 1 or 2

Method 1 capitalizes on the very low input resistance of a DMM in current measurement mode. However, this method affects the value that the UC600 will use while controlling outputs. When the meter is set to current mode, the current flowing into the UC600 circuit will drop to zero or near zero.

### Step 1
- Measure AC voltage across the current input
- Expected Value: $V_{ac} = 0.0$ V
- AC voltage will affect further measurement

### Step 2
- Measure DC voltage across the current input
- Expected Value: $V_{dc} = 0.0$ V
- DC voltage will affect further measurement.

### Step 3
- Measure DC current across the current input
- Expected Value: Compare to input status in Tracer TU

Method 2 is less disruptive to the system. In voltage mode, the DMM affects the circuit less. Additional information is needed to translate the voltage measured to current flowing through the circuit.

### Step 1
- Measure AC voltage across the voltage input
- Expected Value: $V_{ac} = 0.0$ V
- AC voltage will affect further measurement

### Step 2
- Measure DC voltage across the voltage termination
- Expected Value: Refer to the chart below

### Chart

**Measured Voltage Across a Linear Current Input**

- **Voltage Measured Across Input–Vdc**
- **Linear Current Input–mA**

<table>
<thead>
<tr>
<th>Linear Current–mA</th>
<th>0</th>
<th>0.5</th>
<th>1</th>
<th>1.5</th>
<th>2</th>
<th>2.5</th>
<th>3</th>
<th>3.5</th>
<th>4</th>
<th>4.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage Measured</td>
<td>0</td>
<td>0.5</td>
<td>1</td>
<td>1.5</td>
<td>2</td>
<td>2.5</td>
<td>3</td>
<td>3.5</td>
<td>4</td>
<td>4.5</td>
</tr>
</tbody>
</table>
24 Vac Measurement

Checking the voltage that powers the UC600 is often a necessary step when commissioning or troubleshooting. Operational issues and LED operation may result in a need to measure the input power. When troubleshooting, it is faster to take measurements while the load is in place. If Step 1 indicates an out-of-specification voltage, disconnect the UC600 and measure the AC voltage across the transformer. These measurements can direct you toward the problem source.

<table>
<thead>
<tr>
<th>General Information</th>
<th>Checkout Procedure</th>
<th>Measurement</th>
<th>Expected Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Checking the voltage that powers the UC600 is often a necessary step when commissioning or troubleshooting. Operational issues and LED operation may result in a need to measure the input power. When troubleshooting, it is faster to take measurements while the load is in place. If Step 1 indicates an out-of-specification voltage, disconnect the UC600 and measure the AC voltage across the transformer. These measurements can direct you toward the problem source.</td>
<td>Step 1</td>
<td>Measure AC voltage with the UC600 connected. Perform this measurement while the unit is under load.</td>
<td>$20.0 \text{ Vac} \leq V_{AC} \leq 30.0 \text{ Vac}$</td>
</tr>
<tr>
<td></td>
<td>Step 2</td>
<td>Measure AC voltage with the UC600 unconnected. Perform this measurement while the unit is not under load.</td>
<td>$20.0 \text{ Vac} \leq V_{AC} \leq 30.0 \text{ Vac}$</td>
</tr>
</tbody>
</table>
Binary Inputs, 24 Vac Detect- Methods 1 or 2

**Method 1:**
Voltage across binary input measured without reference to chassis ground.
- Measure AC voltage across the binary input
  - \( V_{ac} \approx 0.0 \text{ V (state = ON)} \)
  - \( V_{ac} \approx 24.0 \text{ V (state = OFF)} \)

**Method 2:**
Voltage across binary input measured with reference to chassis ground. Any connection with chassis ground symbol can serve as a ground reference for this method.
- Measure DC voltage across the binary input
  - \( V_{dc} \leq 2.0 \text{ V (state = ON)} \)
  - \( V_{dc} \geq 2.0 \text{ V (state = OFF)} \)

**General Information and Checkout Procedure**

**Measurement**
- \( V_{ac} \)
- \( V_{dc} \)

**Expected Value**
- \( V_{ac} = 0.0 \text{ V (state = ON)} \)
- \( V_{ac} = 24.0 \text{ V (state = OFF)} \)
- \( V_{dc} = 0.0 \text{ V (state = OFF)} \)
- \( V_{dc} = 24.0 \text{ V (state = ON)} \)

### Binary Inputs- Based on Analog Output Connection

**General Information**
The UC600 analog output connections can be configured as binary inputs. This can be used only with dry contact or open collector-type sensors.

**Checkout Procedure**
1. **Step 1**
   - Measure AC voltage across the binary input
     - \( V_{ac} = 0.0 \text{ V} \)
     - AC voltage will affect further measurement

2. **Step 2**
   - Measure DC voltage across the binary input
     - \( V_{dc} \leq 2.0 \text{ V (state = ON)} \)
     - \( V_{dc} \geq 2.0 \text{ V (state = OFF)} \)

**Measurement**
- \( V_{ac} \)
- \( V_{dc} \)

**Expected Value**
- \( V_{ac} = 0.0 \text{ V} \)
- \( V_{dc} = 2.0 \text{ V (state = ON)} \)
- \( V_{dc} = 2.0 \text{ V (state = OFF)} \)
Open-collector Based Binary Sensors

Open-collector based binary sensors use a bipolar junction transistor (BJT). This is a three-terminal device in which emitter-to-collector current is controlled by base current as the switching device in place of a relay. The term, open-collector, refers to the collector connection on the transistor itself. Open-collector circuits are used for their low fatigue rate and quick response relative to relay-based outputs.

The circuit within the pulse meter is completed when adding a pull-up resistance and reference voltage. On the UC600, both universal input (UI) and analog output (AO) circuits add the necessary resistance and voltage without external parts.

**Note:** The reference voltage must always be DC.

The voltage across the pulse meter terminals will bounce between $V_{sat}$ (saturation voltage) of the transistor in the pulse meter and the $V_{ref}$ (reference voltage) provided by the UI or AO circuits of the UC600. Most bipolar transistors have a $V_{sat}$ of less than 0.2 Vdc.

The DMM sampling rate may be too slow to measure pulse meter output transitions.

**Note:** Check the specifications of the DMM. It may be necessary to use an oscilloscope to measure the transition voltages.

<table>
<thead>
<tr>
<th>Measurement Procedure</th>
<th>Expected Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measure DC voltage across the binary input</td>
<td>$V_{dc} \leq 0.2$ V (BJT = ON)</td>
</tr>
<tr>
<td></td>
<td>UI: $V_{dc} = 3.3$ V (BJT = OFF)</td>
</tr>
<tr>
<td></td>
<td>AO: $V_{dc} = 22.0$ V (BJT = ON)</td>
</tr>
</tbody>
</table>
Voltage Analog Output

Measure DC voltage across the voltage termination. Compare the expected value based on request from controller. This request may be based on an override of the output value.

Current Analog Output- Methods 1 or 2

Method 1: Shorting the current output- this method leaves the circuit intact, however, it will cause the vast majority of the current to flow through the meter instead of the load (*NOTE LOAD RESISTANCE*).

Method 2: Measuring current directly- this method is most the typical way to measure current and has the advantage of leaving the load in the loop. However, the circuit must be broken when using this method.

General Information and Checkout Procedure

<table>
<thead>
<tr>
<th>Measurement Procedure</th>
<th>Measurement</th>
<th>Expected Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measure DC current across the current termination</td>
<td>Compare expected value based on request from controller. This request may be based on an override of the output value.</td>
<td></td>
</tr>
</tbody>
</table>
## Ground Measurements

<table>
<thead>
<tr>
<th>General Information and Checkout Procedure</th>
<th>Measurement</th>
<th>Expected Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Method 1:</strong> AC voltage between shield conductors and device chassis ground - the voltage difference between BACnet MS/TP device chassis ground connections should be close to zero. If the voltage difference is greater than 4.0 Vac, there will be marginal communication or intermittent communication problems. If the voltage difference is greater than 7.0 Vac, some devices will no longer communicate.</td>
<td>Measure AC current across the current termination and confirm that only one end of the shield conductor is tied to the earth ground</td>
<td>Vac ≤ 2.0 V</td>
</tr>
<tr>
<td><strong>Method 2:</strong> AC voltage between earth ground and device chassis ground - the chassis ground of the UC600 needs to be connected to earth ground by some route.</td>
<td>Measure AC current across the current termination and confirm that only one end of the shield conductor is tied to the earth ground</td>
<td>Vac ≤ 4.0 V (Must comply with National Electrical Code™ and local electrical codes)</td>
</tr>
<tr>
<td><strong>Note:</strong> Do not assume that the building frame is a valid earth ground.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Method 3:</strong> AC voltage between case (nominal chassis ground) and device chassis ground connector - in this illustration the connection appears as a short. However, it is possible that the chassis ground connection on the controller may actually be connected to the equipment metal some distance away. Use this measurement method if there are communication issues or input stability problems.</td>
<td>Measure AC voltage across the current termination. For this measurement, confirm that only one end of the shield conductor is tied to the earth ground.</td>
<td>Vac ≤ 4.0 V (Must comply with National Electrical Code™ and local electrical codes)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Typically, this should be Vac ≤ 1.0 V</td>
</tr>
</tbody>
</table>
Other Resources

For more detailed information, refer to the following documentation:

- Tracer SC System Controller Installation and Setup (BAS-SVX31)
- BACnet Best Practices and Troubleshooting Guide (BAS-SVX51-EN)
- Tracer Graphical Programming 2 (TGP2) Editor Online Help
- Tracer Graphical Programming (TGP2) Application Guide (BAS-APG008)
- Tracer TU Online Help
- Tracer TU Service Tool Getting Started Guide (TTU-SVN01)
- Tracer UC600 Installation Instructions (X39641178-01)
- Tracer XM30 Expansion Module Installation Instructions (X39641148-01)
- Tracer XM32 Expansion Module Installation Instructions (X39641174-01)
- Tracer Expansion Module Installation, Operation, and Maintenance (BAS-SVX046-EN)
Appendix: Protocol Implementation Conformance Statement (PICS)

This section contains the Tracer UC600 BACnet Protocol Implementation Conformance Statement (PICS). The UC600 can be programmed with a variety of sequence of operations. All data used in the sequences are accessed through the BACnet protocol.

### Standardized Device Profile (Annex L)

<table>
<thead>
<tr>
<th>Device Type</th>
<th>Supported</th>
</tr>
</thead>
<tbody>
<tr>
<td>BACnet Operator Workstation (B-OWS)</td>
<td></td>
</tr>
<tr>
<td>BACnet Building Controller (B-BC)</td>
<td></td>
</tr>
<tr>
<td>BACnet Advanced Application Controller (B-AAC)</td>
<td>✔️</td>
</tr>
<tr>
<td>BACnet Application Specific Controller (B-ASC)</td>
<td></td>
</tr>
<tr>
<td>BACnet Smart Sensor (B-SS)</td>
<td></td>
</tr>
<tr>
<td>BACnet Smart Actuator (B-SA)</td>
<td></td>
</tr>
</tbody>
</table>

### Interoperability Building Blocks (Annex K)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Supported</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Data Sharing</strong></td>
<td></td>
</tr>
<tr>
<td>Data Sharing-ReadProperty-B (DS-RP-B)</td>
<td>✔️</td>
</tr>
<tr>
<td>Data Sharing-ReadPropertyMultiple-B (DS-RPM-B)</td>
<td>✔️</td>
</tr>
<tr>
<td>Data Sharing-WriteProperty-B (DS-WP-B)</td>
<td>✔️</td>
</tr>
<tr>
<td>Data Sharing-WritePropertyMultiple-B (DS-WPM-B)</td>
<td>✔️</td>
</tr>
<tr>
<td><strong>Alarm and Event Management</strong></td>
<td></td>
</tr>
<tr>
<td>Alarm and Event-Notification Internal-B (AE-N-I-B)</td>
<td>✔️</td>
</tr>
<tr>
<td>Alarm and Event-ACKI-B (AE-ACK-B)</td>
<td>✔️</td>
</tr>
<tr>
<td>Alarm and Event-Alarm Summary-B (AE-ASUM-B)</td>
<td>✔️</td>
</tr>
<tr>
<td>Alarm and Event-Enrollment Summary-B (AE-ESUM-B)</td>
<td>✔️</td>
</tr>
<tr>
<td>Alarm and Event-Information-B (AE-INFO-B)</td>
<td>✔️</td>
</tr>
<tr>
<td><strong>Scheduling</strong></td>
<td></td>
</tr>
<tr>
<td>Scheduling-Internal-B (SCHED-I-B)</td>
<td>✔️</td>
</tr>
<tr>
<td><strong>Trending</strong></td>
<td></td>
</tr>
<tr>
<td>Trending-viewing and Modifying Trends Internal-B (T-VMT-I-B)</td>
<td>✔️</td>
</tr>
<tr>
<td>Trending-Automated Trend Retrieval-B (T-ATR-B)</td>
<td>✔️</td>
</tr>
<tr>
<td><strong>Device Management</strong></td>
<td></td>
</tr>
<tr>
<td>Device Management-Dynamic Device Binding-A (DM-DDB-A)</td>
<td>✔️</td>
</tr>
<tr>
<td>Device Management-Dynamic Device Binding-B (DM-DDB-B)</td>
<td>✔️</td>
</tr>
<tr>
<td>Device Management-Dynamic Object Binding-B (DM-DOB-B)</td>
<td>✔️</td>
</tr>
<tr>
<td>Device Management-Device Communication Control-B (DM-DCC-B)</td>
<td>✔️</td>
</tr>
<tr>
<td>Device Management-TimeSynchronization-B (DM-TS-B)</td>
<td>✔️</td>
</tr>
<tr>
<td>Device Management-UTC Time Synchronization (DM-UTC-B)</td>
<td>✔️</td>
</tr>
<tr>
<td>Device Management-Reinitialize Device-B (DM-RD-B)</td>
<td>✔️</td>
</tr>
<tr>
<td>Device Management-Backup and Restore-B (DM-BR-B)</td>
<td>✔️</td>
</tr>
<tr>
<td>Device Management-List Manipulation-B (DM-LM-B)</td>
<td>✔️</td>
</tr>
<tr>
<td>Device Management-Object Creation and Deletion-B (DM-OCD-B)</td>
<td>✔️</td>
</tr>
</tbody>
</table>
Appendix: Protocol Implementation Conformance Statement (PICS)

Segmentation Capability

<table>
<thead>
<tr>
<th>Segmentation</th>
<th>Supported</th>
</tr>
</thead>
<tbody>
<tr>
<td>Segmented Requests/Window Size: 1</td>
<td>☒</td>
</tr>
<tr>
<td>Segmented Responses/Window Size: 1</td>
<td>☒</td>
</tr>
</tbody>
</table>

Object Types

*Note: For objects that contain the Present_Value and Reliability properties, these properties are only writable when the Out_Of_Service property is True.*

Table 10. Descriptions and configurations

<table>
<thead>
<tr>
<th>Object Type</th>
<th>Writable Properties</th>
<th>Required Properties</th>
<th>Optional Properties Supported</th>
<th>Ability to Create</th>
<th>Ability to Delete</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analog Input</td>
<td>• Object_Name • Description • Out_Of_Service • Present_Value • Reliability • Min_Pres_Value • Max_Pres_Value • COV_Increment • Time_Delay • Notification_Class • High_Limit • Low_Limit • Deadband • Limit_Enable • Event_Enable • Notify_Type</td>
<td>• Object_Identifier • Object_Name • Object_Type • Present_Value • Status_Flags • Event_State • Out_Of_Service • Units</td>
<td>• Description • Reliability • Min_Pres_Value • Max_Pres_Value • COV_Increment • Time_Delay • Notification_Class • High_Limit • Low_Limit • Deadband • Limit_Enable • Event_Enable • Acked_Transitions • Notify_Type • Event_Time_Stamps</td>
<td>Yes</td>
<td>Yes, user created objects only</td>
</tr>
<tr>
<td>Analog Output</td>
<td>• Object_Name • Description • Out_Of_Service • Present_Value • Reliability • Min_Pres_Value • Max_Pres_Value • Relinquish_Default • COV_Increment • Time_Delay • Notification_Class • High_Limit • Low_Limit • Deadband • Limit_Enable • Event_Enable • Notify_Type</td>
<td>• Object_Identifier • Object_Name • Object_Type • Present_Value • Status_Flags • Event_State • Out_Of_Service • Units • Priority_Array • Relinquish_Default</td>
<td>• Description • Reliability • Min_Pres_Value • Max_Pres_Value • COV_Increment • Time_Delay • Notification_Class • High_Limit • Low_Limit • Deadband • Limit_Enable • Event_Enable • Acked_Transitions • Notify_Type • Event_Time_Stamps</td>
<td>Yes</td>
<td>Yes, user created objects only</td>
</tr>
<tr>
<td>Analog Value</td>
<td>• Object_Name • Description • Out_Of_Service • Present_Value • Reliability • Relinquish_Default • COV_Increment • Time_Delay • Notification_Class • High_Limit • Low_Limit • Deadband • Limit_Enable • Event_Enable • Notify_Type</td>
<td>• Object_Identifier • Object_Name • Object_Type • Present_Value • Status_Flags • Event_State • Out_Of_Service • Units</td>
<td>• Description • Reliability • Priority_Array • Relinquish_Default • COV_Increment • Time_Delay • Notification_Class • High_Limit • Low_Limit • Deadband • Limit_Enable • Event_Enable • Acked_Transitions • Notify_Type • Event_Time_Stamps</td>
<td>Yes</td>
<td>Yes, user created objects only</td>
</tr>
</tbody>
</table>
### Table 10. Descriptions and configurations (continued)

<table>
<thead>
<tr>
<th>Object Type</th>
<th>Writable Properties</th>
<th>Required Properties</th>
<th>Optional Properties</th>
<th>Ability to Create</th>
<th>Ability to Delete</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Binary Input</strong></td>
<td>• Object_Name&lt;br&gt;• Description&lt;br&gt;• Out_Of_Service&lt;br&gt;• Inactive_Text&lt;br&gt;• Active_Text&lt;br&gt;• Present_Value&lt;br&gt;• Reliability&lt;br&gt;• Change_Of_State_Count&lt;br&gt;• Elapsed_Active_Time&lt;br&gt;• Time_Delay&lt;br&gt;• Notification_Class&lt;br&gt;• Alarm_Value&lt;br&gt;• Event_Enable&lt;br&gt;• Polarity&lt;br&gt;• Notify_Type</td>
<td>• Object_Identifier&lt;br&gt;• Object_Name&lt;br&gt;• Object_Type&lt;br&gt;• Present_Value&lt;br&gt;• Status_Flags&lt;br&gt;• Event_State&lt;br&gt;• Out_Of_Service&lt;br&gt;• Polarity</td>
<td>• Description&lt;br&gt;• Inactive_Text&lt;br&gt;• Active_Text&lt;br&gt;• Change_Of_State_Time&lt;br&gt;• Change_Of_State_Count&lt;br&gt;• Time_Of_State_Count_Reset&lt;br&gt;• Elapsed_Active_Time&lt;br&gt;• Time_Of_Active_Time_Reset&lt;br&gt;• Notification_Class&lt;br&gt;• Alarm_Value&lt;br&gt;• Event_Enable&lt;br&gt;• Acked_Transitions&lt;br&gt;• Notify_Type&lt;br&gt;• Event_Time_Stamps&lt;br&gt;• Reliability</td>
<td>Yes</td>
<td>Yes, user created objects only</td>
</tr>
<tr>
<td><strong>Binary Output</strong></td>
<td>• Object_Name&lt;br&gt;• Description&lt;br&gt;• Out_Of_Service&lt;br&gt;• Inactive_Text&lt;br&gt;• Active_Text&lt;br&gt;• Present_Value&lt;br&gt;• Reliability&lt;br&gt;• Change_Of_State_Count&lt;br&gt;• Elapsed_Active_Time&lt;br&gt;• Minimum_On_Time&lt;br&gt;• Minimum_Off_Time&lt;br&gt;• Relinquish_Default&lt;br&gt;• Time_Delay&lt;br&gt;• Notification_Class&lt;br&gt;• Event_Enable&lt;br&gt;• Notify_Type&lt;br&gt;• Polarity</td>
<td>• Object_Identifier&lt;br&gt;• Object_Name&lt;br&gt;• Object_Type&lt;br&gt;• Present_Value&lt;br&gt;• Status_Flags&lt;br&gt;• Event_State&lt;br&gt;• Out_Of_Service&lt;br&gt;• Polarity&lt;br&gt;• Priority_Array&lt;br&gt;• Relinquish_Default</td>
<td>• Description&lt;br&gt;• Inactive_Text&lt;br&gt;• Active_Text&lt;br&gt;• Change_Of_State_Time&lt;br&gt;• Change_Of_State_Count&lt;br&gt;• Time_Of_State_Count_Reset&lt;br&gt;• Elapsed_Active_Time&lt;br&gt;• Time_Of_Active_Time_Reset&lt;br&gt;• Minimum_On_Time&lt;br&gt;• Minimum_Off_Time&lt;br&gt;• Time_Delay&lt;br&gt;• Notification_Class&lt;br&gt;• Feedback_Value&lt;br&gt;• Event_Enable&lt;br&gt;• Acked_Transitions&lt;br&gt;• Notify_Type&lt;br&gt;• Event_Time_Stamps&lt;br&gt;• Reliability</td>
<td>Yes</td>
<td>Yes, user created objects only</td>
</tr>
<tr>
<td><strong>Binary Value</strong></td>
<td>• Object_Name&lt;br&gt;• Description&lt;br&gt;• Out_Of_Service&lt;br&gt;• Inactive_Text&lt;br&gt;• Active_Text&lt;br&gt;• Present_Value&lt;br&gt;• Reliability&lt;br&gt;• Change_Of_State_Count&lt;br&gt;• Elapsed_Active_Time&lt;br&gt;• Minimum_On_Time&lt;br&gt;• Minimum_Off_Time&lt;br&gt;• Relinquish_Default&lt;br&gt;• Time_Delay&lt;br&gt;• Notification_Class&lt;br&gt;• Alarm_Value&lt;br&gt;• Event_Enable&lt;br&gt;• Notify_Type&lt;br&gt;• Alarm_Value</td>
<td>• Object_Identifier&lt;br&gt;• Object_Name&lt;br&gt;• Object_Type&lt;br&gt;• Present_Value&lt;br&gt;• Status_Flags&lt;br&gt;• Event_State&lt;br&gt;• Out_Of_Service</td>
<td>• Description&lt;br&gt;• Inactive_Text&lt;br&gt;• Active_Text&lt;br&gt;• Change_Of_State_Time&lt;br&gt;• Change_Of_State_Count&lt;br&gt;• Time_Of_State_Count_Reset&lt;br&gt;• Elapsed_Active_Time&lt;br&gt;• Time_Of_Active_Time_Reset&lt;br&gt;• Priority_Array&lt;br&gt;• Relinquish_Default&lt;br&gt;• Minimum_On_Time&lt;br&gt;• Minimum_Off_Time&lt;br&gt;• Time_Delay&lt;br&gt;• Notification_Class&lt;br&gt;• Alarm_Value&lt;br&gt;• Event_Enable&lt;br&gt;• Acked_Transitions&lt;br&gt;• Notify_Type&lt;br&gt;• Event_Time_Stamps&lt;br&gt;• Reliability</td>
<td>Yes</td>
<td>Yes, user created objects only</td>
</tr>
<tr>
<td><strong>Calendar</strong></td>
<td>• Object_Name&lt;br&gt;• Description&lt;br&gt;• Date_List</td>
<td>• Object_Identifier&lt;br&gt;• Object_Name&lt;br&gt;• Object_Type&lt;br&gt;• Present_Value&lt;br&gt;• Date_List</td>
<td>• Description</td>
<td>Yes</td>
<td>Yes, user created objects only</td>
</tr>
</tbody>
</table>
### Table 10. Descriptions and configurations (continued)

<table>
<thead>
<tr>
<th>Object Type</th>
<th>Writable Properties</th>
<th>Required Properties</th>
<th>Optional Properties Supported</th>
<th>Ability to Create</th>
<th>Ability to Delete</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device</td>
<td>• Object_Name &lt;br&gt; • Location &lt;br&gt; • Description &lt;br&gt; • APDU_Segment_Timeout &lt;br&gt; • APDU_Timeout &lt;br&gt; • Number_Of_APDU_Retries &lt;br&gt; • Max_Master &lt;br&gt; • Max_Info_Frames &lt;br&gt; • Backup_Failure_Timeout</td>
<td>• Object-Identifier &lt;br&gt; • Object_Name &lt;br&gt; • Object_Type &lt;br&gt; • System_Status &lt;br&gt; • Vendor_Name &lt;br&gt; • Vendor_Identifier &lt;br&gt; • Model_Name &lt;br&gt; • Firmware_Revision &lt;br&gt; • Application_Software_Version &lt;br&gt; • Protocol_Version &lt;br&gt; • Protocol_Revision &lt;br&gt; • Protocol_Services_Supported &lt;br&gt; • Protocol_Object_TYPES_Supported &lt;br&gt; • Object_List &lt;br&gt; • Max_APDU_Length_Accepted &lt;br&gt; • Segmentation_Supported &lt;br&gt; • APDU_Timeout &lt;br&gt; • Number_Of_APDU_Retries &lt;br&gt; • Device_Address_Binding &lt;br&gt; • Database_Revision</td>
<td>• Location &lt;br&gt; • Description &lt;br&gt; • Max_Segments_Accepted &lt;br&gt; • APDU_Segment_Timeout &lt;br&gt; • Max_Master &lt;br&gt; • Max_Info_Frames &lt;br&gt; • Local_Time &lt;br&gt; • Local_Date &lt;br&gt; • UTC_Offset &lt;br&gt; • Daylight_Savings_Status &lt;br&gt; • Configuration_Files &lt;br&gt; • Last_Restore_Time &lt;br&gt; • Backup_Failure_Timeout &lt;br&gt; • Profile_Name</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Event Enrollment</td>
<td>• Object_Name &lt;br&gt; • Notify_Type &lt;br&gt; • Event_Parameters &lt;br&gt; • Object_Property_Reference &lt;br&gt; • Event_Enable &lt;br&gt; • Notification_Class</td>
<td>• Object-Identifier &lt;br&gt; • Object_Name &lt;br&gt; • Object_Type &lt;br&gt; • Event_Type &lt;br&gt; • Notify_Type &lt;br&gt; • Event_Parameters &lt;br&gt; • Object_Property_Reference &lt;br&gt; • Event_State &lt;br&gt; • Event_Enable &lt;br&gt; • Aced_Transitions &lt;br&gt; • Notification_Class &lt;br&gt; • Event_Time_Stamps</td>
<td>• None</td>
<td>Yes</td>
<td>Yes, user created objects only</td>
</tr>
<tr>
<td>Event Log</td>
<td>• Object_Name &lt;br&gt; • Enable &lt;br&gt; • Stop_When_Full &lt;br&gt; • Record_Count</td>
<td>• Object-Identifier &lt;br&gt; • Object_Name &lt;br&gt; • Object_Type &lt;br&gt; • Status_Flags &lt;br&gt; • Event_State &lt;br&gt; • Enable &lt;br&gt; • Stop_When_Full &lt;br&gt; • Buffer Size &lt;br&gt; • Log_Buffer &lt;br&gt; • Record_Count &lt;br&gt; • Total_Record_Count</td>
<td>• None</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Multistate Input</td>
<td>• Object_Name &lt;br&gt; • Description &lt;br&gt; • State_Text &lt;br&gt; • Out_Of_Service &lt;br&gt; • Present_Value &lt;br&gt; • Reliability &lt;br&gt; • Time_Delay &lt;br&gt; • Notification_Class &lt;br&gt; • Alarm_Values &lt;br&gt; • Fault_Values &lt;br&gt; • Number_Of_States &lt;br&gt; • Event_Enable &lt;br&gt; • Notify_Type</td>
<td>• Object-Identifier &lt;br&gt; • Object_Name &lt;br&gt; • Object_Type &lt;br&gt; • Present_Value &lt;br&gt; • Status_Flags &lt;br&gt; • Event_State &lt;br&gt; • Out_Of_Service &lt;br&gt; • Number_Of_States</td>
<td>• State_Text &lt;br&gt; • Description &lt;br&gt; • Reliability &lt;br&gt; • Time_Delay &lt;br&gt; • Notification_Class &lt;br&gt; • Alarm_Values &lt;br&gt; • Fault_Values &lt;br&gt; • Event_Enable &lt;br&gt; • Aced_Transitions &lt;br&gt; • Notify_Type &lt;br&gt; • Event_Time_Stamps</td>
<td>Yes</td>
<td>Yes, user created objects only</td>
</tr>
<tr>
<td>Multistate Output</td>
<td>• Object_Name &lt;br&gt; • Description &lt;br&gt; • State_Text &lt;br&gt; • Out_Of_Service &lt;br&gt; • Present_Value &lt;br&gt; • Reliability &lt;br&gt; • Relinquish_Default &lt;br&gt; • Time_Delay &lt;br&gt; • Notification_Class &lt;br&gt; • Event_Enable &lt;br&gt; • Number_Of_States &lt;br&gt; • Notify_Type</td>
<td>• Object-Identifier &lt;br&gt; • Object_Name &lt;br&gt; • Object_Type &lt;br&gt; • Present_Value &lt;br&gt; • Status_Flags &lt;br&gt; • Event_State &lt;br&gt; • Out_Of_Service &lt;br&gt; • Number_Of_States &lt;br&gt; • Priority_Array &lt;br&gt; • Relinquish_Default</td>
<td>• State_Text &lt;br&gt; • Description &lt;br&gt; • Reliability &lt;br&gt; • Time_Delay &lt;br&gt; • Notification_Class &lt;br&gt; • Feedback_Values &lt;br&gt; • Event_Enable &lt;br&gt; • Aced_Transitions &lt;br&gt; • Notify_Type &lt;br&gt; • Event_Time_Stamps</td>
<td>Yes</td>
<td>Yes, user created objects only</td>
</tr>
</tbody>
</table>
Table 10. Descriptions and configurations (continued)

<table>
<thead>
<tr>
<th>Object Type</th>
<th>Writable Properties</th>
<th>Required Properties</th>
<th>Optional Properties Supported</th>
<th>Ability to Create</th>
<th>Ability to Delete</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multistate Value</td>
<td>• Object_Name&lt;br&gt;• Description&lt;br&gt;• Number_of_States&lt;br&gt;• State_Text&lt;br&gt;• Out_of_Service&lt;br&gt;• Present_Value&lt;br&gt;• Reliability&lt;br&gt;• Relinquish_Default&lt;br&gt;• Time_Delay&lt;br&gt;• Notification_Class&lt;br&gt;• Alarm_Values&lt;br&gt;• Fault_Values&lt;br&gt;• Event_Enable&lt;br&gt;• Notify_Type</td>
<td>• Object_Identifier&lt;br&gt;• Object_Name&lt;br&gt;• Object_Type&lt;br&gt;• Present_Value&lt;br&gt;• Status_Flags&lt;br&gt;• Event_State&lt;br&gt;• Out_of_Service&lt;br&gt;• Number_of_States</td>
<td>• State_Text&lt;br&gt;• Description&lt;br&gt;• Priority_Array&lt;br&gt;• Reliability&lt;br&gt;• Relinquish_Default&lt;br&gt;• Time_Delay&lt;br&gt;• Notification_Class&lt;br&gt;• Alarm_Values&lt;br&gt;• Fault_Values&lt;br&gt;• Event_Enable&lt;br&gt;• Acked_Transitions&lt;br&gt;• Notify_Type&lt;br&gt;• Event_Time_Stamps</td>
<td>Yes</td>
<td>Yes, user created objects only</td>
</tr>
<tr>
<td>Notification Class</td>
<td>• Object_Name&lt;br&gt;• Priority&lt;br&gt;• Ack_Required&lt;br&gt;• Recipient_List</td>
<td>• Object_Identifier&lt;br&gt;• Object_Name&lt;br&gt;• Object_Type&lt;br&gt;• Present_Value&lt;br&gt;• Status_Flags&lt;br&gt;• Event_State&lt;br&gt;• Out_of_Service</td>
<td>• None</td>
<td>Yes</td>
<td>Yes, user created objects only</td>
</tr>
<tr>
<td>Schedule</td>
<td>• Object_Name&lt;br&gt;• Description&lt;br&gt;• Present_Value&lt;br&gt;• Effective_Period&lt;br&gt;• Weekly_Schedule&lt;br&gt;• Exception_Schedule&lt;br&gt;• List_of_Object_Property_References&lt;br&gt;• Priority_For_Writing&lt;br&gt;• Out_of_Service</td>
<td>• Object_Identifier&lt;br&gt;• Object_Name&lt;br&gt;• Object_Type&lt;br&gt;• Present_Value&lt;br&gt;• Effective_Period&lt;br&gt;• Weekly_Schedule&lt;br&gt;• Exception_Schedule&lt;br&gt;• List_of_Object_Property_References&lt;br&gt;• Priority_For_Writing&lt;br&gt;• Status_Flags&lt;br&gt;• Reliability&lt;br&gt;• Out_of_Service</td>
<td>• Description</td>
<td>Yes</td>
<td>Yes, user created objects only</td>
</tr>
<tr>
<td>Trend</td>
<td>• Object_Name&lt;br&gt;• Enable&lt;br&gt;• Start_Time&lt;br&gt;• Stop_Time&lt;br&gt;• Log_DeviceObjectProperty&lt;br&gt;• Log_Interval&lt;br&gt;• Stop_When_Full&lt;br&gt;• Buffer_Size&lt;br&gt;• Record_Count&lt;br&gt;• Notification_Threshold&lt;br&gt;• Notification_Class&lt;br&gt;• Event_Enable&lt;br&gt;• Notify_Type</td>
<td>• Object_Identifier&lt;br&gt;• Object_Name&lt;br&gt;• Object_Type&lt;br&gt;• Enable&lt;br&gt;• Stop_When_Full&lt;br&gt;• Buffer_Size&lt;br&gt;• Log_Buffer&lt;br&gt;• Record_Count&lt;br&gt;• Total_Record_Count&lt;br&gt;• Event_State&lt;br&gt;• Logging_Type&lt;br&gt;• Status_Flags&lt;br&gt;• Start_Time&lt;br&gt;• Stop_Time&lt;br&gt;• Log_Device_Object_Property&lt;br&gt;• Log_Interval&lt;br&gt;• Notification_Threshold&lt;br&gt;• Records_Since_Notification&lt;br&gt;• Last_Notify_Record&lt;br&gt;• Notification_Class&lt;br&gt;• Event_Enable&lt;br&gt;• Acked_Transitions&lt;br&gt;• Event_Time_Stamps&lt;br&gt;• Notify_Type&lt;br&gt;• Event_Time_Stamps</td>
<td>Yes</td>
<td>Yes, user created objects only</td>
<td></td>
</tr>
</tbody>
</table>

BACnet Protocol

Data Link Layer Options

<table>
<thead>
<tr>
<th>Data Link Layer</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>BACnet IP, (Annex J)</td>
<td>□</td>
</tr>
<tr>
<td>BACnet IP, (Annex J), Foreign Device</td>
<td>□</td>
</tr>
<tr>
<td>ISO 8802-3, Ethernet (Clause 7)(10Base2, 10Base5, 10BaseT, Fiber)</td>
<td>□</td>
</tr>
<tr>
<td>ANSI/ATA 878.1, 2.5 Mb ARCNET (Clause 8)</td>
<td>□</td>
</tr>
<tr>
<td>ANSI/ATA 878.1, RS-485 ARCNET (Clause 8), Baud Rate(s)</td>
<td>□</td>
</tr>
<tr>
<td>MS/TP Master (Clause 9), Baud Rate(s): 9600, 19200, 38400, and 76800</td>
<td>☒</td>
</tr>
<tr>
<td>MS/TP Slave (Clause 9), Baud Rate(s)</td>
<td>□</td>
</tr>
<tr>
<td>Point-to-Point, EIA 232 (Clause 10), Baud Rate(s): 9600, 19200, 38400</td>
<td>□</td>
</tr>
<tr>
<td>Point-to-Point, Modem (Clause 10), Baud Rate(s): 9600, 19200, 38400</td>
<td>□</td>
</tr>
</tbody>
</table>
Appendix: Protocol Implementation Conformance Statement (PICS)

Device Address Binding

Is static device binding supported? ☑ Yes ☐ No

Networking Options

Router ☐
Annex H, BACnet Tunneling ☐
BACnet/IP Broadcast Management Device (BBMD) ☐
Does the BBMD Support Registrations by Foreign Devices? ☐

Character Sets

Indicating support for multiple characters sets does not imply that all character sets are supported simultaneously. Maximum supported string length is 64 bytes (any character set).

ANSI X3.4 (UTF-8) ☑
IBM/Microsoft DBCS ☐
JIS C 6226 ☐
ISO 10646 (UCS-4) ☐
ISO 10646 (UCS2) ☐
ISO 8859-1 ☐
Declaration of CE Conformity

Manufacturer name: Trane
Manufacturer address: 3600 Pammel Creek Road
LaCrosse, WI 54601
USA

The manufacturer hereby declares that the product:

**Product name:** Tracer™ UC600 Unit Controller

**Model numbers:** X13651548

Conforms to the following standards or other normative documents:

**Electromagnetic Emission:**

- EN61326-1:2006
  - Class B Limit (30 MHz—1000 MHz, 1 GHz—2 GHz)
  - 150 kHz—30 MHz

**Electromagnetic Immunity for Industrial:**

- EN61326-1:2006
  - 8 kV air, 4 kV contact
- EN61000-4-3: 2002 Radiated Fields
  - 10 V/m, 80 MHz—1000 MHz
  - 3 V/m, 1.4 GHz—2.0 GHz
  - 1 V/m, 2.0 GHz—2.7 GHz
- EN61000-4-4: 2004 Fast Transients
  - I/O port, 1 kV
  - AC inputs and output ports, 2 kV
  - AC input ports (L/L), differential mode, 1 kV
- EN61000-4-6: 1996+A1: 2001 Conducted Disturbance
  - 3 V, 0.15 MHz—80 MHz
- EN61000-4-8: 1993+A1: 2001 Power Frequency Magnetic Field
  - 30 A/m, 50 Hz
- EN61000-4-11: Second Edition: 2004 Voltage Dips and Interruptions
  - 0% V<sub>nom</sub>, 1 cycle; 70% V<sub>nom</sub>, 25 cycle; 40% V<sub>nom</sub>, 10 cycle; 0% V<sub>nom</sub>, 250 cycle

**Where and When Issued:**

- Electromagnetic Emission: 10/01/2010
- Electromagnetic Immunity: 10/13/2010

**Mark of Compliance:**

This document validates CE conformity of the Tracer UC600 Unit Controller

**European Contact**

Societe Trane (Epinal, France)
1, rue des Ameriques, B.P. 6
F-88191 Golbey Cedex, France
Phone: (33) 329.31.73.00
Fax: (33) 329.81.24.98
Trane optimizes the performance of homes and buildings around the world. A business of Ingersoll Rand, the leader in creating and sustaining safe, comfortable and energy efficient environments, Trane offers a broad portfolio of advanced controls and HVAC systems, comprehensive building services, and parts. For more information, visit www.Trane.com.

Trane has a policy of continuous product and product data improvement and reserves the right to change design and specifications without notice.