



Installation, Operation, and Maintenance **Tracer® Connectivity Module Legacy (CML)**



⚠ 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.



Introduction

The Tracer® CMLs serve as a data gateway for older controllers that do not have a direct means to serve their data to Trane™ Cloud. This field-installed device is designed to bring chiller data with the following controllers:

- BCU (Comm 3/4 Chillers)
- CH530
- UC800
- Programmable Unit Controllers (such as UC600/UC400)

Warnings, Cautions, and Notices

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

The three types of advisories are defined as follows:



Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It could also be used to alert against unsafe practices.



Indicates a situation that could result in equipment or property-damage only accidents.

Important Environmental Concerns

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

Important Responsible Refrigerant Practices

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

WARNING

Proper Field Wiring and Grounding Required!

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

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

⚠ WARNING**Personal Protective Equipment (PPE) Required!**

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

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

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

⚠ WARNING**Follow EHS Policies!**

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

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

⚠ WARNING**Cancer and Reproductive Harm!**

This product can expose you to chemicals including lead and bisphenol A (BPA), which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

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General Information

Ordering Numbers

Table 1. Ordering numbers

Ordering Number	Description
X13652027001	Tracer® Connectivity Module Legacy

Specifications

Storage	
Temperature	-67°F to 203°F (-55°C to 95°C)
Relative humidity	Between 5% to 95% (non condensing)
Operating	
Temperature	-40°F to 158°F (-40°C to 70°C)
Humidity	Between 5% to 95% (nonconducting)
Power	20.4 to 27.6 Vac (24 Vac, ±15% nominal) 50 to 60 Hz 24 VA
Mounting weight of controller	Mounting surface must support 0.80 lb. (0.364 kg)
Environmental rating (enclosure)	NEMA 1
Plenum rating	Not plenum rated. The Tracer® CML must be mounted within a rated enclosure when installed in a plenum.
Wiring/Transformer	
16 AWG (recommended) copper wire	
- UL Listed, Class 2 power transformer 20.4 to 27.6 Vac (24 Vac, ±15% nominal) - The transformer must be sized to provide adequate power to the controller.	
Agency Compliance	
- UL60730-1 PAZX (Open Energy Management Equipment) - UL94-5V Flammability - CE Marked. The European Union (EU) Declaration of Conformity is available from your local Trane® office. - UKCA Marked - FCC Part 15, Subpart B, Class B Limit - VCCI-CISPR 32:2016: Class B Limit - AS/NZS CISPR 32:2015: Class B Limit - CAN ICES-003(B)/NMB-003(B)	

Sensors

⚠ WARNING

Electrical Shock Hazard!

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

Do not mix Class 1 and Class 2 voltage wiring in an enclosure or on a controller without an approved barrier between wiring.

Required Tools

The following tools are required to install and initially test the Tracer® CML controller:

- Drill and appropriate bits for DIN rail mounting
- A #2 Phillips-head screwdriver
- A 1/8 inch (3.2 mm) wide, flat-bladed screwdriver
- Digital multimeter

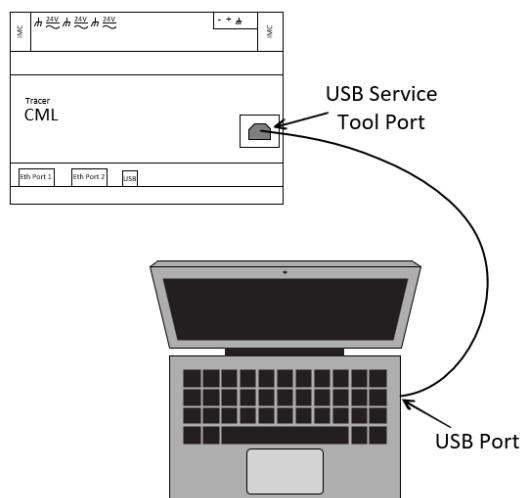
Symbio User Interface (UI)

The Tracer® CML controller offers a web-based user interface (UI) used for installation, integration, and service tasks.

Connecting to Symbio UI

1. Connect a laptop to the USB service tool port using a USB 2.0 A to B cable. Symbio™ UI can only be accessed over USB connection.
2. Open a web browser and connect to <http://198.80.18.1> to access Symbio UI.

Figure 1. Connecting to Symbio UI



Trane Connect

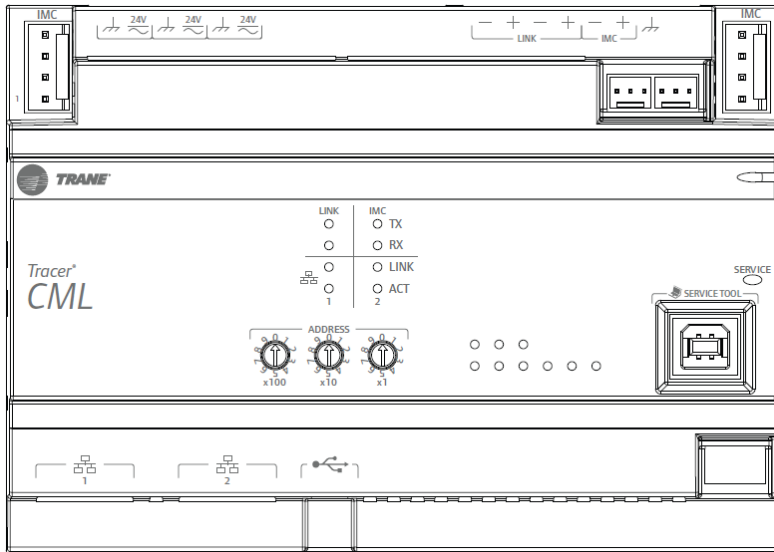
The Tracer® CML is Trane Cloud enabled by either a Geotab Modem or via an IP/Ethernet connection. The web UI is used to setup the module and connection.



Mounting the Tracer CML

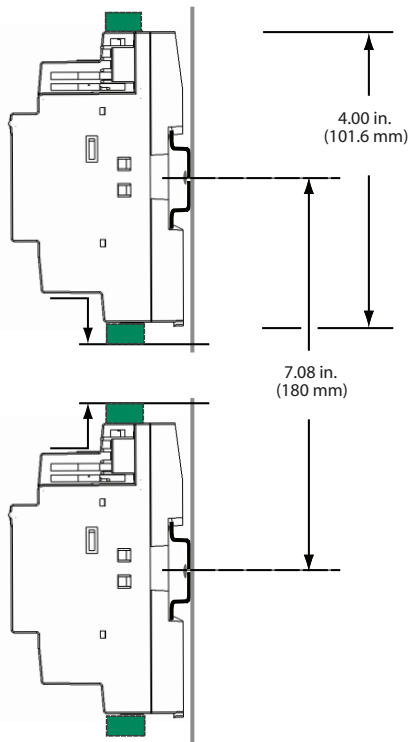
Clearances

Figure 2. Controller dimensions



Note: DIN Standard 43 880, Built-in Equipment for Electrical Installations, Overall Dimensions and Related Mounting Dimensions.

Figure 3. DIN Rail



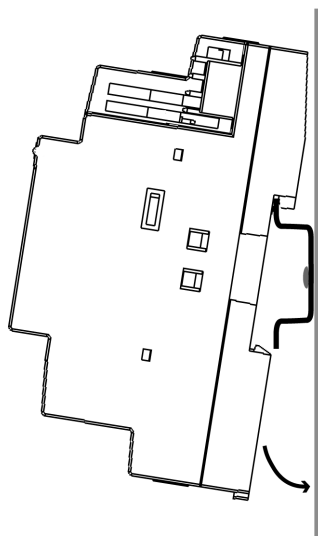
DIN Rail

Note: Always install devices on a horizontally oriented DIN rail to allow proper ventilation.

To mount controller:

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

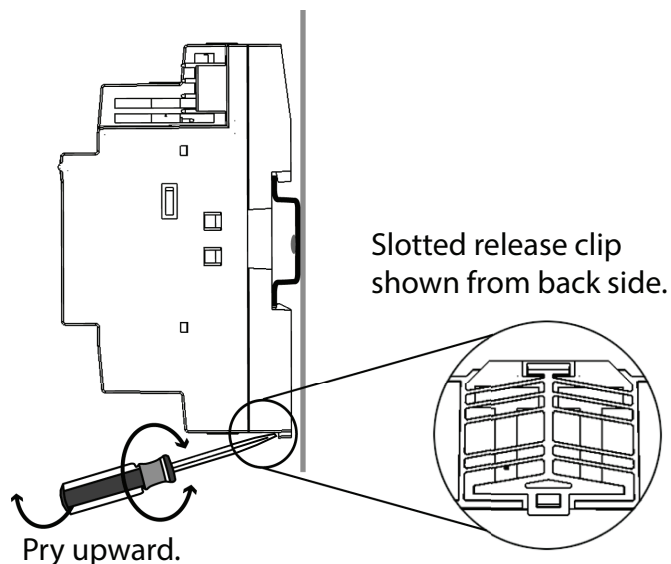
Figure 4. Release clip lock



To remove or reposition the controller:

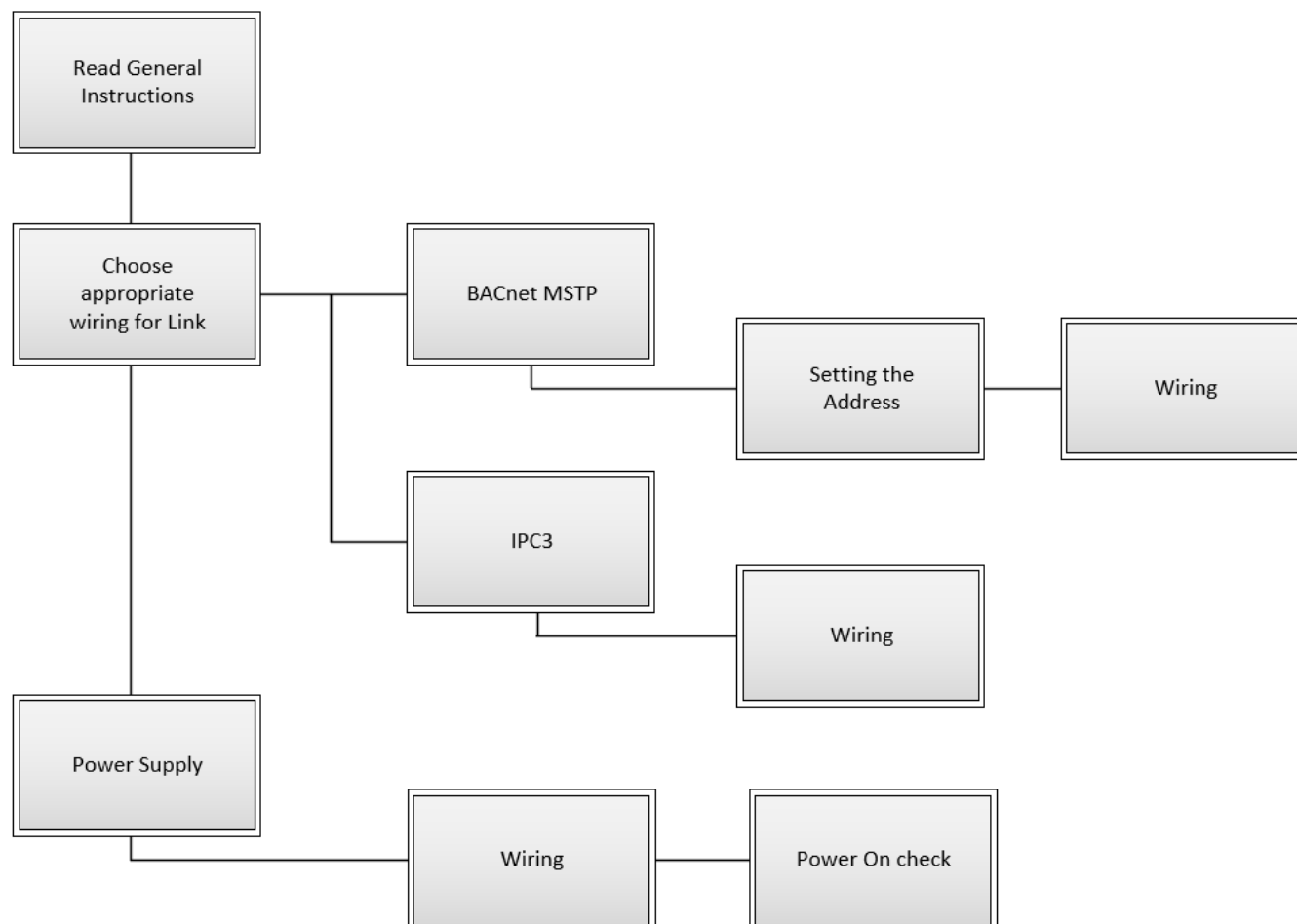
1. Disconnect all connectors.
2. Insert a screwdriver blade into the slotted release clip (shown below) and gently pry upward to disengage the clip.
3. While holding tension on the clip, lift the controller upward to free it from the DIN rail.
4. Reposition the controller by sliding it sideways or by removing it completely and reattaching it.
5. Gently push on lower half of device in the direction of the arrow until the release clip locks into place.

Figure 5. Release clip lock



Wiring

Figure 6. Overview



General Instructions

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

To connect wires to terminals when connecting wires to the Tracer® CML:

1. Strip wires to expose 0.28 inch (7 mm) of bare wire.
2. Insert the wire into a terminal connector.
3. Tighten the terminal screw to 0.5 to 0.6 N-m (71 to 85 ozf-in or 4.4 to 5.3 lbf-in.)
4. Tug on the wires after tightening the screws to ensure all wires are secure.

BACnet MS/TP Communication Link

For more details about BACnet® MS/TP communication link, refer to the *BACnet MS-TP Wiring and Link Performance Best Practices and Troubleshooting Guide* (BAS-SVX51*-EN).

⚠ WARNING

Proper Field Wiring and Grounding Required!

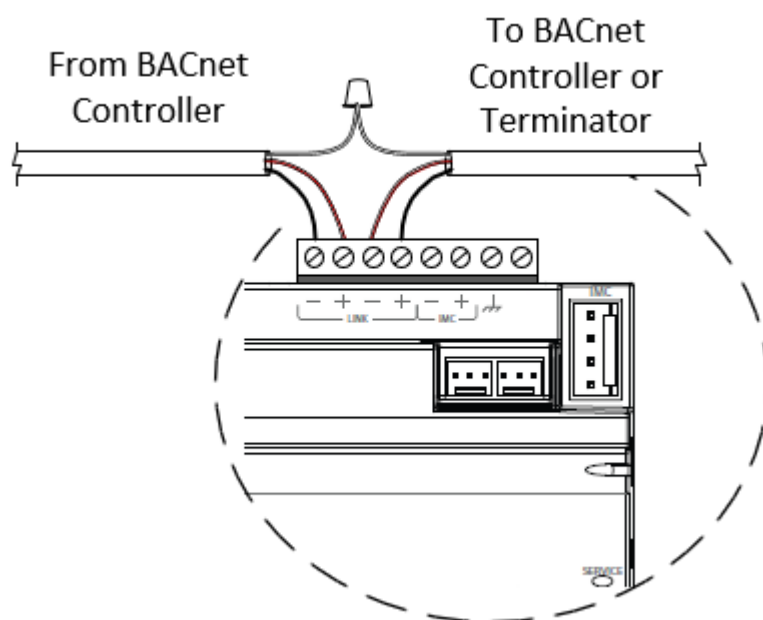
Failure to follow code could result in death or serious injury.

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

Wiring Guidelines for Wired BACnet MS/TP

- Use 18 AWG Trane™ purple-shielded communication wire for BACnet® installations.
- Link limit of 4,000 ft and 60 devices maximum (without a repeater).
- Use a Trane BACnet termination on each end of the link.
- Use daisy chain topology.
- Maintain polarity.

Figure 7. BACnet MS/TP link wiring



Wiring Best Practices

For proper network communication, follow the recommended wiring and best practices below when installing communication wire:

- All wiring must comply with the National Electrical Code™ (NEC) and local codes.
- Confirm 24 Vac power supplies are consistent in regards to grounding. Avoid sharing 24 Vac between controllers.
- Avoid over tightening cable ties and other forms of cable wraps. This can damage the wires inside the cable.
- Do not run communication cable alongside or in the same conduit as 24 Vac power. This includes the conductors running from TRIAC-type inputs.
- In open plenums, avoid running wire near lighting ballasts, especially those using 277 Vac.

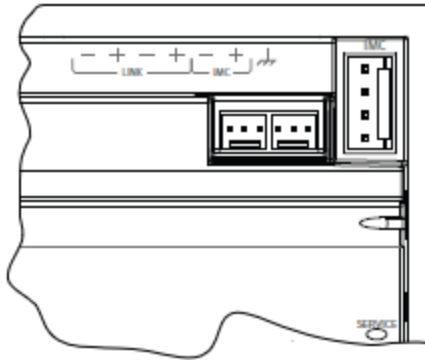
Setting up the Controller on a BACnet Link

Observe the following when setting up the Tracer® CML controller on a BACnet link.

- Use 18 AWG shielded communication wire for BACnet® MS/TP installations.

- Limit BACnet MS/TP wiring links to 4,000 ft. There is a maximum of 60 devices per link (*without a repeater*).
- Three (3) BACnet links are available on the Tracer SC+.
- Connect the BACnet link to the Tracer CML controller terminals labeled *Link* as shown on the right. Incoming wires can be connected to the first two terminals, and the outgoing wires can be connected to the second set of terminals, so there is only one wire per termination.

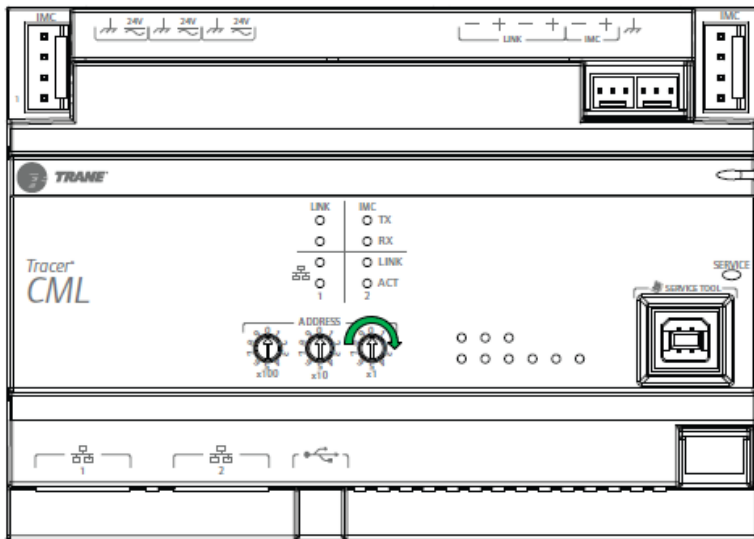
Figure 8. Tracer CML BACnet links



Setting the Address

The three rotary address dials on the Tracer® CML serve one or two purposes depending upon the network: they are always used for the MAC Address, which is sometimes all or part of the BACnet® Device ID.

Figure 9. Setting the rotary address



Use a 1/8 inch (3.2 mm) flathead screwdriver to set rotary address dials. These dials rotate in either direction.

MAC Address

The MAC Address is required by the RS-485 communication protocol on which BACnet operates. Valid MAC addresses are 001 to 127 for BACnet.

Important: Each device on the link must have a unique MAC Address/Device ID. A duplicate address or a 000 address setting will interrupt communications and cause the Tracer SC+ device installation process to fail.

Device ID Assignment for BACnet MS/TP Devices

Each unit controller must have a unique BACnet® device ID. Tracer® SC+ automates the process by calculating a unique device ID for each unit controller and then saving the device ID to memory in each device. BACnet MS/TP device IDs are calculated using the following three sets of values:

- The Tracer SC+ rotary switch value (1 to 419)
- The Tracer SC+ BACnet MS/TP link number (1 to 3)
- The unit controller rotary switch value (1 to 127)

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

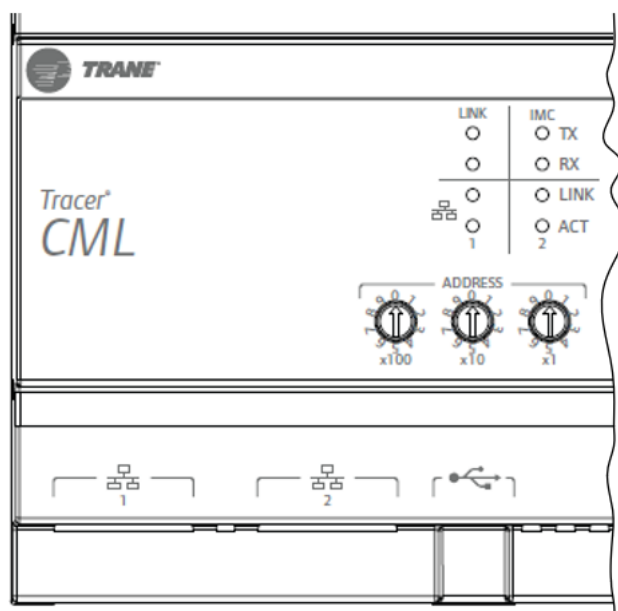
Table 2. Calculating the BACnet Device ID

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

Ethernet

The Tracer® CML controller has two Ethernet ports. The ports labelled 1 and 2 are internally connected as one port.

Figure 10. Tracer CML Ethernet ports



Power Supply

⚠ WARNING

Hazardous Voltage!

Failure to disconnect power before servicing could result in death or serious injury.

Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power can not be inadvertently energized. Verify that no power is present with a voltmeter.



Wiring

⚠ WARNING

Proper Ground Connection Required!

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

After installation, ensure that the 24 Vac transformer is grounded through the controller. Measure the voltage between chassis ground and any ground terminal on the controller. Expected result: Vac <4.0 volt.

NOTICE

Equipment Damage!

Sharing 24 Vac power between controllers could result in equipment damage.

Transformer Recommendations

The Tracer® CML controller can be powered with 24 Vac or 24 Vdc.

- **AC transformer requirements:** UL listed, Class 2 power transformer, 24 Vac $\pm 15\%$ – the transformer must be sized to provide adequate power to the controller (21 VA).
- **DC power supply requirements:** UL listed, Class 2 power supply, 24 Vdc $\pm 15\%$, device max load 420 mA.
- **CE-compliant installations:** The transformer must be CE marked and SELV compliant per IEC standards.

Wiring Recommendations

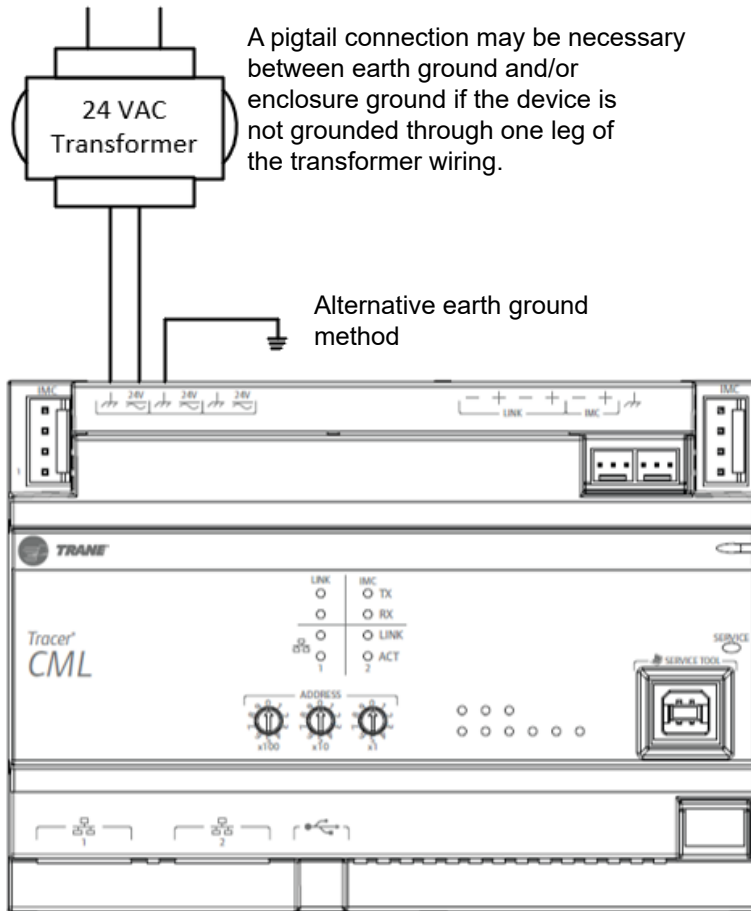
For proper operation of the Tracer CML controller, install the power supply circuit in accordance with the following guidelines:

- The controller must 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 (0.823 mm²) copper wire is recommended for the circuit between the transformer and the controller.

Connecting Wires

Disconnect power to the transformer and then ground one of the terminals on the controller to the enclosure (if the enclosure is adequately grounded) or to an alternate earth ground.

Figure 11. Tracer CML transformer



Power On Check

1. Verify that the 24 Vac connector and the chassis ground are properly wired.
2. Remove the lockout/tagout from the line voltage power to the electrical cabinet.
3. Energize the transformer to apply power to the Symbio controller.
4. Observe the Symbio controller when power is applied to verify the power check sequence:
 - a. The power LED lights red for 1 second.
 - b. The power LED lights green.
 - c. If the sequence completes as described, the controller is properly booted and ready for the application code.
 - d. If the power LED flashes red, a fault condition exists.

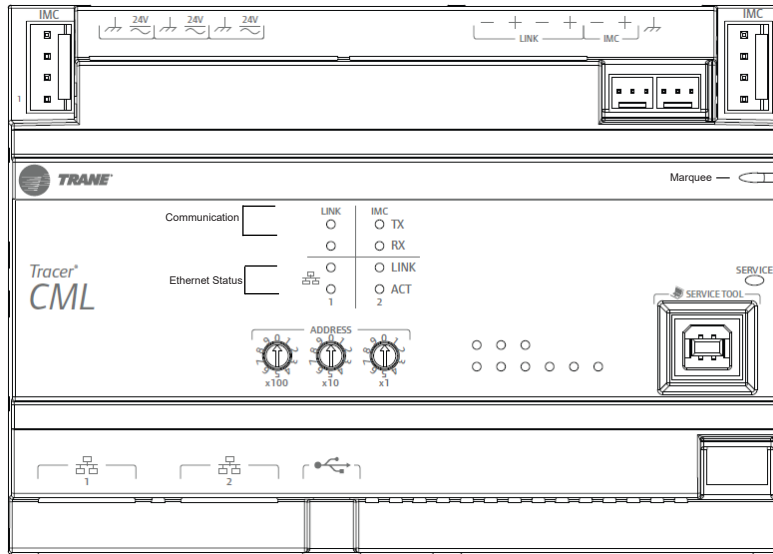
Operation

LED Locations

The Symbio™ controllers have the following LEDs located on the front (refer to the following illustration):

- Marquee LED
- Communication Status LEDs and IMC Status LEDs
- Service Button LED

Figure 12. Tracer CML LED locations



LED Descriptions, Activities, and Troubleshooting

The following table provides a description of LED activity, an indication or troubleshooting tip for each, and any relative notes.

Table 3. LED activities and troubleshooting tips

LED Name	Activities	Indication and Troubleshooting Tips	Notes
Marquee LED	Shows solid green when the unit is powered and no alarm exists.	Indicates normal operation	When powering the Tracer® CML, the Marquee LED will blink RED, blink GREEN (indicating activated and controller/expansion module are communicating), and then stay GREEN CONTINUOUSLY (indicating normal power operation).
	Shows blinking green during a device reset or firmware download.	Indicates normal operation	
	Shows solid red when the unit is powered, but represents low power or a malfunction.	- If low power; could be under voltage or the microprocessor has malfunction. Follow the troubleshoot procedure "24 Vac Measurement," p. 46 to measure for the expected value range. In addition, see Table 4, p. 24, for a list of 24 Vac draws. - If malfunction; un-power and then re-power unit to bring the unit back up to normal operation.	
	Shows blinking red when an alarm or fault exists.	An alarm or fault condition will occur if the value for a given point is invalid or outside the configured limits for the point. Alarm and fault conditions vary, and they can be configured by the programmer.	
	LED not lit.	Indicates power is OFF or there is a malfunction. OFF or malfunction; cycle the power.	
Link and IMC	TX blinks green.	Blinks at the data transfer rate when the unit transfers data to other devices on the link.	TX LED: Regardless of connectivity or not, this LED will constantly blink as it continually looks for devices to communicate to. LED not lit: Determine if, for example, a Tracer Synchrony or BACnet® device is trying to talk to the controller or if it is capable of talking to the controller. Also determine if the communication status shows down all of the time. In addition, check polarity and baud rate.
	RX blinks yellow.	Blinks at the data transfer rate when the unit receives data from other devices on the link. ON solid yellow; indicates there is reverse polarity.	
	LED is not lit.	Indicates that the controller is not detecting communication. Not lit; cycle the power to reestablish communication.	
Service	Shows solid green when the LED has been pressed.		When the Tracer CML is placed into boot mode, the system will not run any applications such as trending, scheduling, and TGP2 runtime. The controller will be placed into boot mode if the service pin is held in when power is applied. In boot mode, the controller is non-operational and is waiting for a new main application to be downloaded.
	LED not lit.	Indicates controller is operating normally.	

Marquee LED Status and Error Codes

Each of the following codes is a two digit number following this pattern: First digit, 600mS pause, Second digit, 2 second pause and then repeat the pattern.

Table 4. Marquee LED status and error codes

LED Blink Pattern	Message	Description	Action by User
Green LED Blink Pattern			
Solid green light	No active alarms or messages		None - normal operation
11	Load Field	Attempting to load the field kernel and device tree from NAND flash.	None- normal operation
13	Boot Field	Successfully loaded the field images and are attempting to boot.	None- normal operation
14	Load Recover	Attempting to load the recover image from NAND flash.	None- normal operation
16	Boot Recover	Successfully loaded the recovery image and are attempting to boot.	None- normal operation
17	Recovery	Successfully booted into the recovery partition.	None- normal operation
23	Field Format	Reformatting the field file system.	None- normal operation
28	Starting Update	Starting the firmware update process.	None- normal operation
29	Locating Firmware File	Attempting to locate a firmware update file.	None- normal operation
33	Validating Firmware	Validating the signature on the firmware update file.	None- normal operation
35	Decrypting Firmware	Decrypting the firmware update file.	None- normal operation
36	Update Success	Done performing the firmware update.	None- normal operation
37	Clearing Database	Clearing the database.	None- normal operation
38	Validating Firmware	Validating the signature on the firmware update file.	None- normal operation
41	Decrypting Firmware	Decrypting the firmware update file.	None- normal operation
43	Restoring Backup	Restoring a database backup.	None- normal operation
45	Force Database Clear	The user has 30 seconds to set the rotaries to something other than 9-9-9 to start the process of returning to factory defaults.	None- normal operation
46	Clear Done	Done returning the database to factory defaults.	None- normal operation
47	Done	Done returning whatever process was started (usually a forced recovery partition update).	None- normal operation
51	Backup Retored	Database backup has been restored.	None- normal operation
52	Updating Firmware	Updating the firmware.	None- normal operation
53	Firmware Updated	Firmware was updated.	None- normal operation
55	Updating Firmware	Firmware is currently being updated.	None- normal operation
56	Updating Kernel	The kernel is currently being updated.	None- normal operation
58	Updating Device Tree	The kernel is currently being updated.	None- normal operation
61	Updating Bootloader	The bootloader is being updated.	None- normal operation
63	Updating Recovery	The recovery file system is being updated.	None- normal operation
Red LED Blink Pattern			
12	Load Field Fail	Attempted load of the field kernel or device tree failed.	1. Thumb drive with .scfx file, power down, set address rotaries to 991, and power up. 2. Replace controller.
15	Load Recovery Fail	Attempted load of the recovery image failed.	Replace controller

Table 4. Marquee LED status and error codes (continued)

LED Blink Pattern	Message	Description	Action by User
18	Field Mount Fail	Failed to mount the field partition during a firmware update attempt.	1. Thumb drive with .scfx file, power down, set address rotaries to 991, and power up. 2. Replace controller.
19	Bad Switch Setting	Rotary switches are set to a bad/unknown value.	Contact technical support.
21	Bad Firmware File	Unable to mount the firmware update file.	Download firmware file again and retry download.
22	Firmware Not Compatible	Firmware file downloaded is not compatible with this hardware.	Download the correct FW file for the controller.
24	Field Format Fail	Failed to reformat the field file system.	Replace controller.
25	Field Attach UBI Fail	Failed to attach (UBI) to the field file system.	Replace controller.
26	Field Mount Fail	Failed to mount the field file system.	Replace controller.
27	Bad Update Method	Don't know what our update method is.	Contact technical support.
31	No Firmware File Found	Unable to find a firmware update file.	Thumb drive has no .scfx file. .scfx file must be located at the root of the USB drive.
32	Multiple Firmware Found	Multiple firmware update files were found.	Too many .scfx files on the thumb drive. Can only have one .scfx file and must be located in the root of the USB drive.
34	Firmware Invalid		Download the firmware file again and retry download.
39	Firmware Invalid		Download the correct FW file again and retry download.
42	Bad Firmware File	Unable to mount the firmware update file.	Download the firmware file again and retry download.
44	Restore Failed	Database restore failed for some reason.	Try to restore using a different backup file (Restore file may be corrupt).
48	Hold	Crashed too many times and are now "holding."	Contact technical support.
49	Abnormal Termination	The embedded application terminated abnormally.	Contact technical support.
54	Firmware Not Compatible	The firmware file downloaded is not compatible with this hardware.	Download the correct FW file for the controller.
57	Kernel Update Failure	Failed to update the kernel.	1. Try upgrading the controller firmware again 2. Replace controller.
59	Device Tree Failure	Failed to update the kernel device tree.	Not applicable for 210, 400-B, or 600.
62	Bootloader Failure	Failed to update the bootloader.	1. Try upgrading the controller firmware again 2. Replace controller.
64	Recovery Failure	Failed to update the recovery file system.	1. Try upgrading the controller firmware again 2. Replace controller.



Maintenance

Symbio™ controllers have no user-serviceable components. The controllers do not contain batteries or removable memory storage disks. No maintenance is required.

If replacement is necessary, the best practice is to use Tracer TU to restore a user-created backup file.



Configuration

Using Multiple USB Cables

Using two USB cables is strongly recommended for most installations. You will need one connection to the Tracer® CML and, in most cases, another to the device connected to the Tracer CML for data. While a single USB cable can be used, it is more difficult. The Symbio™ UI of the Tracer CML uses whichever cable is connected, while other tools, such as TechView/ KestrelView or Tracer TU, prompt you to select the cable or port.

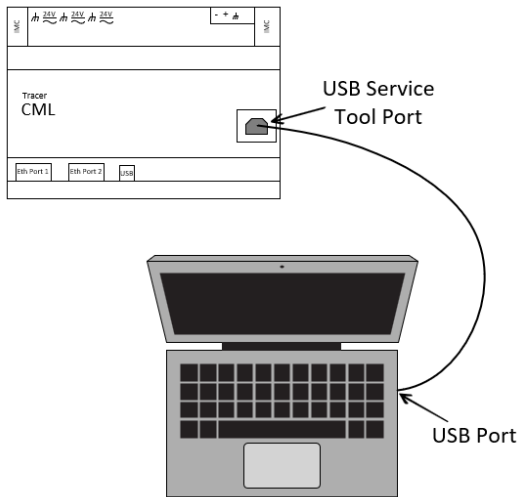
Using Symbio UI to Configure Settings

Symbio™ UI is a built-in web-based user interface that is used for basic setup and configuration of the Tracer® CML.

Connecting to Symbio UI

1. Connect a laptop to the USB service tool port using a USB 2.0 A to B cable. Symbio™ UI can only be accessed over USB connection.
2. Open a web browser and connect to <http://198.80.18.1> to access Symbio UI.

Figure 13. Connecting to Symbio UI



Connecting to Customer's Network

Perform the following steps to connect to customer's network if using IP for Trane™ Cloud Data.

1. With Symbio™ UI open in a web browser, navigate to the **Installation** menu on the left-hand navigation.
2. In the **Installation** menu, select **Identification and Communications**.
3. In the **Identification and Communications** window, select the **IP Configuration** tab.
4. Select **Edit** and set up Ethernet 1 or 2 to match customer's network setting.
5. Select **Save**.

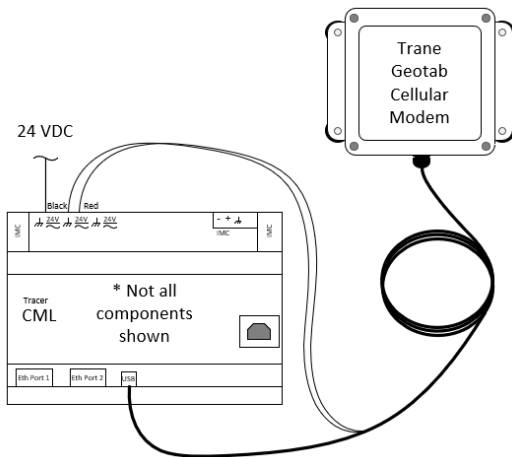
Configuring Cell Modem

Perform the following steps to configure cell modem using Geotab for Trane™ Cloud Data.

1. Connect Geotab Cell Modem to the Tracer® CML.

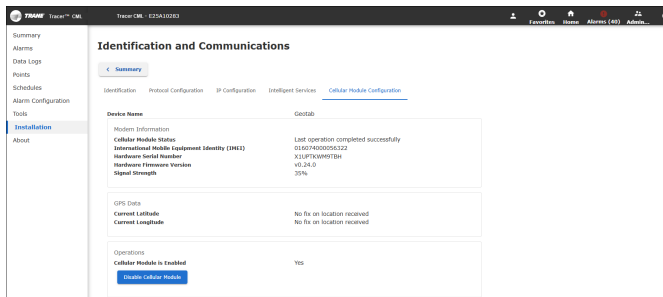
Note: Geotab Cell Modem is 24VDC only.

Figure 14. Geotab cell modem wiring



2. With Symbio UI open in a web browser, navigate to the **Installation** menu on the left-hand navigation.
3. In the **Installation** menu, select **Identification and Communications**.
4. In the **Identification and Communications** window, select the **Cellular Module Configuration** tab.
5. Select the **Enable Cellular Module** button to enable the port for the Cell Modem and populate the fields on the page.

Figure 15. Identification and communication



Setting System Units

Set the system units the same way as the controller of the chiller. Confirm the chiller controller is set to SI or IP and set the Tracer® CML to match it. This is done through the Symbio™ UI under **Installation/System Units**.

Entering Model and Serial Numbers

Trane™ Cloud Automated Tests rely on the chiller's model and serial numbers, so this information must flow to Trane Cloud. To confirm it is available, enter it in Tracer® CML under the **Installation/Identification and Communications/Identification** tab. In all operating modes except BCU, Tracer CML connects to a single chiller and is installed at the chiller, so the model and serial numbers can be taken from the chiller nameplate. In BCU mode, Tracer CML may connect to multiple chillers. If the chillers are the same model, enter the model and serial number from one chiller. If they are different models, enter the model and serial numbers at the Trane Cloud level.

Enabling Intelligent Services

Set up the **Installation/Identification and Communications/Intelligent Service** tab to connect the Tracer® CML to the Trane Cloud.

- Click **Edit**.
- Select **Enabled for Intelligent Services Data Collection and Interface for Trane Connect Remote Access**.
- Click **Save**.
- Select **Test Connection** to verify connection is successful

Setting Time Sync

It is important to sync the Tracer® CML's time with Trane™ Cloud to assure proper data transfers.

1. Navigate to **Installation > Regional Specifications**.
2. Click **Edit**.
3. Select **Set the date and time automatically from the Trane Server**.
4. Click **Synchronize Now** and confirm a successful connection.
5. Click **Save**.

Operation Mode Decision Making

Before setting up Tracer® CML's operation mode, determine chiller's configuration. If the chiller is stand-alone, choose the mode you prefer to set up or choose a mode that matches the chiller's configuration. Review the following diagrams to determine the mode to choose and then refer to that mode's section on how to wire and set up the Tracer CML.

Figure 16. Operation mode: choice of BCI (if available) or LCI active

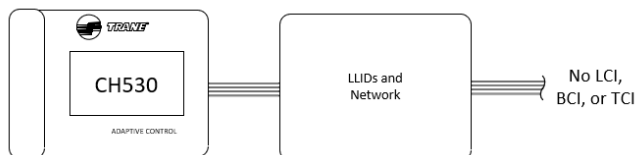


Figure 17. Operation mode: choice of LCI active or BACnet to UC800

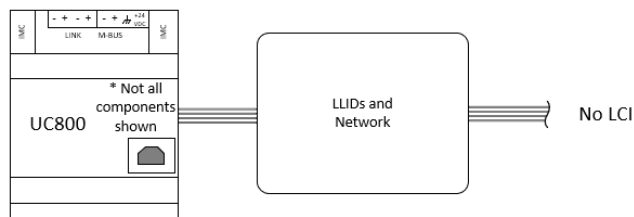


Figure 18. Operation mode: LCI passive

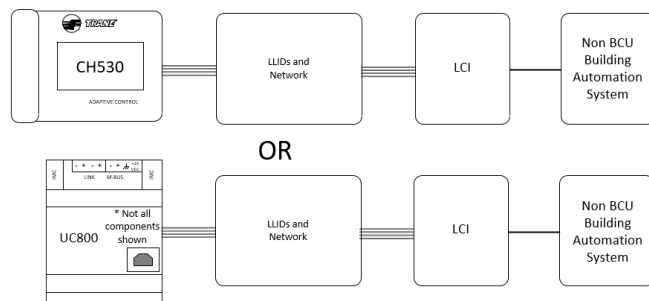


Figure 19. Operation mode: BCI passive

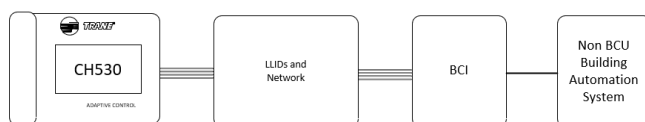
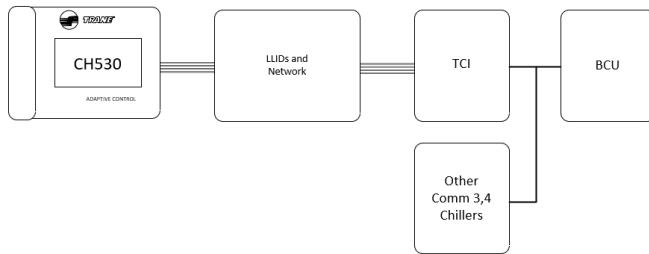


Figure 20. Operation mode: BCU



Setting up Operation Modes

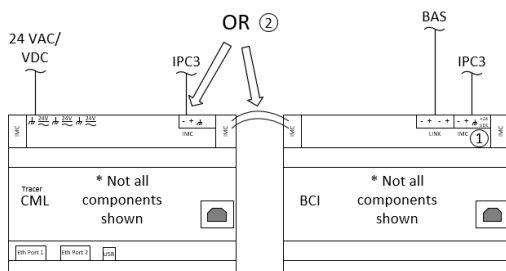
Choose one of the following operating modes that matches the application. Follow its wiring and setup instructions to populate points to serve to Trane™ Cloud.

Operation Mode: BCI/Passive

Wiring

Connect the Tracer® CML to the IPC3 Link (link to LLIDs), which also powers the Tracer CML.

Figure 21. CH530, BCI mode, passive



Notes:

- Although the etching is labeled IMC, it actually indicates IPC3.
- You can pass through the IPC3 via two of the 4-pin IMC connection or wire it to the top IMC connection. A 4-pin IMC connection is not available on the BCI-R card.

Setup

Note: Setup steps must be done in the Tracer® CML Symbio™ UI and TechView/KrestrelView.

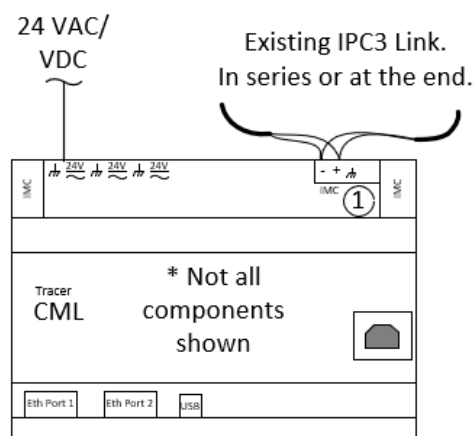
1. In the Tracer CML Symbio UI, navigate to **Installation > Tracer CML Configuration**.
2. Click **Edit**.
3. Set **Operation Mode** to **BCI** and **Passive Mode** to **Yes**.
4. Set **Legacy Hardware Type** to match the type of BCI installed in the chiller. For example, **UC400** for the white plastic enclosure type BCI and **BCI-R** for the red circuit board type BCI.
5. Click **Save**.
6. Connect to the CH530 with proper cables and TechView/KrestrelView.
7. Navigate to **Views/Binding View**. This triggers the CH530 to check the IPC3 link. Once this check is initiated, the Tracer CML will begin listening for data.
8. Exit the **5. LLID Building** tab.
9. In Symbio UI, navigate to **Points**. The points should now be populated and ready to connect the Tracer CML to Trane Cloud.

Operation Mode: BCI/Active - CH530

Wiring

Connect the Tracer® CML to the IPC3 Link (link to LLIDs), which also powers the Tracer CML.

Figure 22. Typical IPC3 link wiring



Note: Although the etching is labeled IMC, it actually indicates IPC3.

Setup

Note: Setup steps must be done in the Tracer® CML Symbio™ UI and TechView/KrestrelView.

1. In the Tracer CML Symbio UI, navigate to **Installation > Tracer CML Configuration**.
2. Click **Edit**.
3. Set **Operation Mode** to **BCI** and **Passive Mode** to **No**.
4. Leave **Legacy Hardware Type** set to **UC400**. Depending on the model and version of the chiller, it will either support UC400 or BCI-R. If reading points are unsuccessful with the Tracer CML set to **UC400**, repeat steps with it set to **BCI-R**.
5. Click **Save**.
6. Connect to the CH530 with proper cables and TechView/KrestrelView.
7. Navigate to **Views > Configuration**.
8. Select **CH530** or **Options** tab (depends on the model).
9. Navigate to **BAS Interface** and set to **BACnet BCI-C Interface**.

Note: The initial display should read **Not Installed**. If **Not Installed** is not shown, verify that no other interface card (LCI, BCI, or Comm 4) is installed in the chiller, as the passive instructions for that protocol must then be followed. Some models do not support BCI communications. Confirm model and software compatibility.

10. Select **Load Configurations**.
11. Navigate to **Views > Binding View**.
12. Select the **BCI-C Communication Interface** line item.
13. Select the **Bind** command at the top of **Binding View** window.

Note: Do not answer **Yes** to the pop-up question.

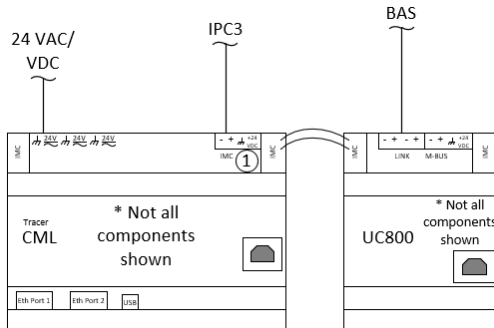
14. In the Symbio UI/ Tracer CML Configuration, select **Activate For Binding**.
15. In the TechView/KrestrelView, answer **Yes** to the pop-up question. The binding process should take place and show a good bind status.
16. Exit the **5. LLID Building** tab.
17. In Symbio UI, navigate to **Points**. The points should now be populated and ready to connect the Tracer CML to Trane Cloud.

Operation Mode: LCI/Passive

Wiring

Wiring for CH530 application is the same as BCI/Passive. But the wiring for the U800 is different.

Figure 23. UC800, LCI mode, passive



Note: Although the etching is labeled IMC, it actually indicates IPC3.

Setup

Note: Setup steps must be done in the Tracer® CML Symbio™ UI and TechView/KrestrelView for CH530 and in Tracer TU for UC800.

1. In the Tracer CML Symbio UI, navigate to **Installation > Tracer CML Configuration**.
2. Click **Edit**.
3. Set **Operation Mode** to **LCI** and **Passive Mode** to **Yes**.
4. Click **Save**.
5. Connect to the CH530 with proper cables and TechView/KrestrelView.
6. Navigate to **Views > Binding View**. This triggers the CH530 to check the IPC3 link. Once this check is initiated, the Tracer CML begins listening for data.
7. Exit the **5. LLID Building** tab.
8. Connect to the UC800 with USB Cable and Tracer TU.
9. Navigate to the **Equipment Utilities > 5. LLID Binding** tab. This triggers the CH530 to check the IPC3 link. Once this check is initiated, the Tracer CML will begin listening for data.
10. Exit the **5. LLID Building** tab.
11. In the Symbio UI, navigate to **Points**. The points should now be populated and ready to connect the Tracer CML to Trane Cloud.

Operation Mode: LCI/Active - CH530

Wiring

Connect the Tracer® CML to the IPC3 Link (link to LLIDs), which also powers the Tracer CML. Refer to [Figure 22, p. 25](#).

Note: Although the etching is labeled IMC, it actually indicates IPC3.

Setup

Note: Setup steps must be done in the Tracer® CML Symbio™ UI and TechView/KrestrelView.

1. In the Tracer CML Symbio UI, navigate to **Installation > Tracer CML Configuration**.
2. Click **Edit**.
3. Set **Operation Mode** to **BCI** and **Passive Mode** to **No**.
4. Click **Save**.

5. Connect to the CH530 with proper cables and TechView/KrestrelView.
6. Navigate to **Views > Configuration**.
7. Select **CH530** or **Options** tab (depends on the model).
8. Navigate to **BAS Interface** and set to **LCI-C (Comm5) Extension**.

Note: The initial display should read **Not Installed**. If **Not Installed** is not shown, verify that no other interface card (LCI, BCI, or Comm 4) is installed in the chiller, as the passive instructions for that protocol must then be followed.

9. Select **Load Configurations**.
10. Navigate to **Views > Binding View**.
11. Select the **LCI-C (Comm5) Extension** line item.
12. Select the **Bind** command at the top of **Binding View** window.

Note: Do not answer **Yes** to the pop-up question.

13. In the Symbio UI/ Tracer CML Configuration view, select **Activate For Binding**.
14. In the TechView/KrestrelView, answer **Yes** to the pop-up question. The binding process takes place and shows a good bind status.
15. Exit the **5. LLID Building** tab.
16. In Symbio UI, navigate to **Points**. The points should now be populated and ready to connect the Tracer CML to Trane Cloud.
17. In the TechView/KrestrelView, navigate to **Unit View** and change the values for Chiller/Setpoint Source to **Ext/FP**.

Operation Mode: LCI/Active - UC800

Wiring

Connect the Tracer® CML to the IPC3 Link (link to LLIDs), which also powers the Tracer CML. Refer to [Figure 22, p. 25](#).

Note: Although the etching is labeled IMC, it actually indicates IPC3.

Setup

1. In the Tracer® CML Symbio™ UI, navigate to **Installation > Tracer CML Configuration**.
2. Click **Edit**.
3. Set **Operation Mode** to **LCI** and **Passive Mode** to **No**.
4. Click **Save**.
5. Connect to the UC800 with USB cable and Tracer TU.
6. Navigate to **Equipment Utilities > 4. Configuration**.
7. Expand **Options**.
8. Navigate to **BAS Communications** and set to **Tracer LCI-C (Lon Talk Comm5)**.

Note: The initial display should read **Not Installed**. If **Not Installed** is not shown, verify that no other interface card (LCI, BCI, or Comm 4) is installed in the chiller, as the passive instructions for that protocol must then be followed. If it is set to Modbus, connection to the Tracer CML will not be possible.

9. Click **Save**.
10. Navigate to **5. LLID Building** tab.
11. Select the **LCI-C (Comm5) Interface** line item.
12. Select the **Bind** command at the bottom right of Binding window.

Note: Do not answer **Yes** to the pop-up question.

13. In the Symbio UI/ Tracer CML Configuration view, select **Activate For Binding**.
14. In Tracer TU, answer **Yes** to the pop-up question. The binding process takes place.
15. Exit the **5. LLID Building** tab.
16. In Symbio UI, navigate to **Points**. The points should now be populated and ready to connect the Tracer CML to Trane Cloud.
17. In Tracer TU, navigate to **Equipment Utilities > 1. Setpoints**.

18. Under **Chiller Setpoints**, set setpoint source to **Ext/FP**.

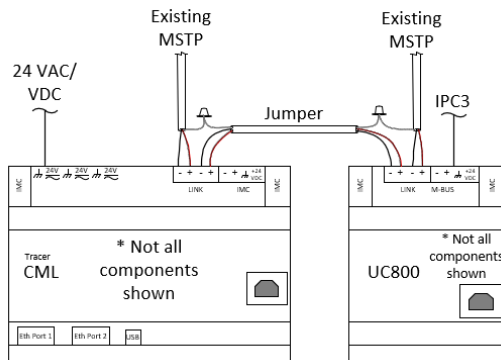
19. Click **Save**.

Operation Mode: BACnet

Wiring

The Tracer® CML must be on the same BACnet™ MSTP Link as the Chiller's UC800.

Figure 24. UC800 MSTP wiring



If the UC800 is connected to a BAS gateway, the address and the baud rate of the Tracer CML must be set accordingly. Set the address, with rotaries, to an address that does not conflict with another address on the BACnet MSTP link.

Set the CML to a high MAC address, then use the discovery tools in its UI or Serial Spy to find an available address for readdressing. When setting the MAC address, verify the Max Master settings. Although 127 is usually the default, some vendors may set Max Master higher than the last address on the network. A MAC address above Max Master will not work.

See [“Appendix A – Using Serial Spy to Find Unused Address,” p. 30](#). Set and/or confirm baud rate through the Symbio UI, under **Installation/Identification and Communications/Protocol Configuration**.

Setup

1. In the Tracer® CML Symbio™ UI, navigate to **Installation > Tracer CML Configuration**.
2. Click **Edit**.
3. Set **Operation Mode** to **BACnet**.
4. Click **Save**.
5. Click **Discover Controllers**. When discovering controllers is successful, a pop up displays the number of controllers found.
6. Click **OK**.
7. From the newly populated **Device** table, select the desired device to pull in its data points.
8. Click **Configure Selected**. A popup message displays the progress and then eventually shows complete.
9. Click **OK**.
10. Navigate to **Points** to see the live points from the connected controller.
11. Proceed to Trane Cloud to set up the site and start collecting the Tracer CML's data.

Note: Follow the same process for programmable unit controllers (such as UC600, UC400).

Operation Mode: BCU

This operation mode is only for Comm 3/4 chillers connected to a BCU.

Initial Setup

1. In the Symbio™ UI, navigate to **Installation > Identification and Communications > Protocol Configuration**.
2. Click **Edit**.

3. Set **Communication Protocol** to **BACnet IP**.
4. Set **Network Connection** to **Ethernet 1**.
5. Set **UDP Port** same as the BCU UDP port.
6. Click **Save**.
7. Navigate to **Installation > Identification and Communications > IP Configuration**.
8. Set the IP address, subnet mask, and default gateway to the same subnet as the BCU but IP address to a different address (preferably 1 off if available).
9. Click **Save**.

Wiring

The Tracer® CML intercepts the BACnet™/IP connection to the BCU.

1. Unplug the Ethernet cable from the BCU and plug it into Eth Port 1 on the Tracer CML.
2. Install an Ethernet patch cable between the Tracer CML's Eth Port 2 and the Ethernet port on the BCU.

Setup

1. In the Symbio™ UI, navigate to **Installation > Tracer CML Configuration**.
2. Click **Edit**.
3. Set **Operation Mode** to **BCU**.
4. Click **Save**. The Tracer CML maps over applicable chillers and their points. This takes a few minutes.
5. Proceed to Trane Cloud to set up the site and start collecting the Tracer CML's data.

Appendix A – Using Serial Spy to Find Unused Address

For BACnet® applications, the Tracer® CML must be on chiller's BACnet MSTP network and have a unique MSTP address. If no frontend is readily available, it might be necessary to use Serial Spy to find a unique address. There are plenty of Serial Spy references on the Help Center, but here is a basic overview.

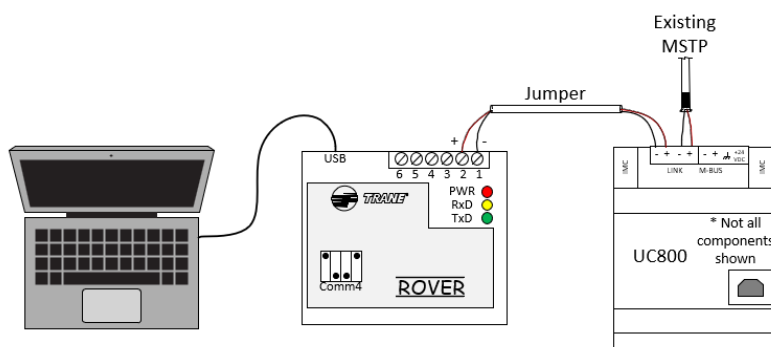
Software

Serial Spy can be found on the software download website or Trane™ Updater.

Wiring

A Rover Comm4 USB adapter is needed to capture data. It must be configured for Comm4 (see dip switches) and tied into the chiller's existing MSTP network.

Figure 25. Connecting Comm4 adapter



Using Serial Spy

1. Launch Serial Spy.
2. Under **Options**, set the **Communications Port** to match your USB cable's port.
3. Set Display Option to **Show All**.
4. Select **Capture**. Data scrolls down the screen.
5. Look for an unused address based off the token passing.

Figure 26. Serial Spy sample capture

SerialSpy Protocol Analyzer version 3.7.2. Property of the Trane Company

File	Edit	Options	Capture
Capture	Triggers	Statistics	Protocol
Log	Save	Load	Tail
Show all			

478	10:09:31.658914	7->0	TOKEN
479	10:09:31.658940	0->1	TOKEN
480	10:09:31.658953	1->2	TOKEN
481	10:09:31.658979	2->3	TOKEN
482	10:09:31.674773	3->4	TOKEN
483	10:09:31.674838	4->6	TOKEN
484	10:09:31.674903	6->7	TOKEN
485	10:09:31.674929	7->8	POLL
486	10:09:31.706778	7->0	TOKEN
487	10:09:31.706869	0->1	TOKEN
488	10:09:31.706934	1->2	TOKEN
489	10:09:31.707000	2->3	TOKEN
490	10:09:31.707052	3->4	TOKEN
491	10:09:31.707117	4->6	TOKEN
492	10:09:31.707169	6->7	TOKEN
493	10:09:31.707273	7->9	POLL
494	10:09:31.738757	7->0	TOKEN
495	10:09:31.738835	0->1	TOKEN
496	10:09:31.738901	1->2	TOKEN
497	10:09:31.754799	2->3	TOKEN
498	10:09:31.754877	3->4	TOKEN
499	10:09:31.754916	4->6	TOKEN
500	10:09:31.754981	6->7	TOKEN
501	10:09:31.755020	7->10	POLL
502	10:09:31.786765	7->0	TOKEN

Appendix A – Using Serial Spy to Find Unused Address

Sample Capture Description:

- Address 0 is the owner of the token (SC+ in this case). Address 0 sends the token to Address 1. Address 1 responds, takes the token, and then passes it to Address 2.
- Address 7 performs a poll for Address 8. A poll occurs when there is a gap in addressing. Because Address 8 does not respond, Address 7 sends the token back to Address 0, and the process starts again. On the next cycle, it is recognized that Address 8 is not responding, so Address 7 polls for Address 9 instead.
- Address 5 is skipped by the token because it was previously polled without success.

Thus, this capture shows that Address 5 and 7-10 are not currently associated with a device. Best practice would be to use address 7 for the Tracer® CML.

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