Installation Instructions

Tracker™ Version 12 Hardware
Building Automation System

⚠ **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.

BMTK-SVN01F-E4

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Warnings, Cautions, and Notices

Warnings, cautions, and notices are provided in appropriate places throughout this document:

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

⚠**CAUTION**: 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.

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

Contents

Overview

The Tracker building automation system (BAS) is an energy management system for small- to medium-size buildings. The Tracker BAS controls heating, ventilating, and air conditioning (HVAC) equipment. It consists of a Tracker controller (Figure 1) and an optional PC workstation.

The Tracker BAS can be operated by using either a Tracker controller or a PC workstation that is running Tracker PC Workstation software. A visual interface enables an operator to set up and change HVAC operating parameters and to collect and display building information. The Tracker PC Workstation software allows a PC to be connected to the Tracker controller directly with a prescribed adapter and cable, locally over a standard Ethernet local area network (LAN) connection, or remotely with a modem and standard phone line.

The Tracker BAS supports Comm5 communications architecture, which is the Trane implementation of LonTalk® protocol. It resides on a network (Figure 2, p. 6 and Figure 3, p. 7) that includes HVAC and other comfort-related equipment, such as Trane VariTrac zoning systems; zoning controls; unit control modules (UCMs), which control and monitor other HVAC equipment; Tracer LCI-V (LonTalk® communication interfaces for Voyager rooftop controls); Tracer LCI-R (LonTalk® communication interfaces for ReliaTel rooftop controls); external input/output (I/O) devices, which help to monitor and control specific areas or devices; and miscellaneous equipment such as sensors, lights, and fans.

Figure 1. Tracker controller
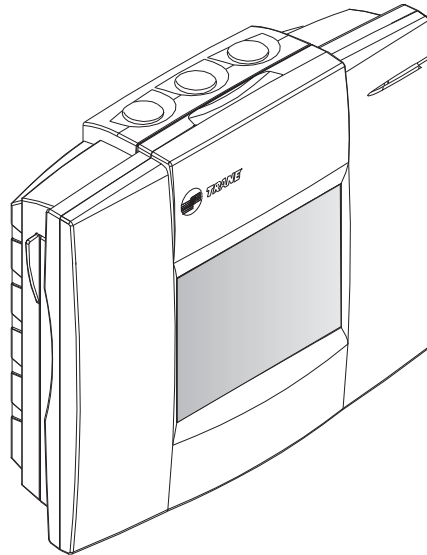
Figure 2. Example Tracker building automation system (models 12 and 24) on a network

VariTrac or VariTrane zone dampers

Voyager constant volume rooftop

Voyager rooftop

Precedent rooftop with ReliaTel controls

Interconnecting wiring (Comm5 link): single, twisted pair, shielded wire for two-way communication.

Tracer LCI-V

VariTrac central control panel

TCI-V

Tracer LCI-R

Utility pulse meter input

Outdoor air temperature sensor input

Priority shutdown contact input

Alarm relay output

Universal inputs

Binary outputs

Tracer MP503 I/O module

Analog inputs

Binary inputs

Binary outputs

Tracer ZN517 unitary controller

Generic rooftop

Tracker controller

Tracker PC Workstation

Direct, dial-in (modem), or Ethernet connection

Controller components

The controller consists of a termination module, main module, and display module (Figure 3).

Figure 3. Tracker controller components

Termination module

Main module

Display module
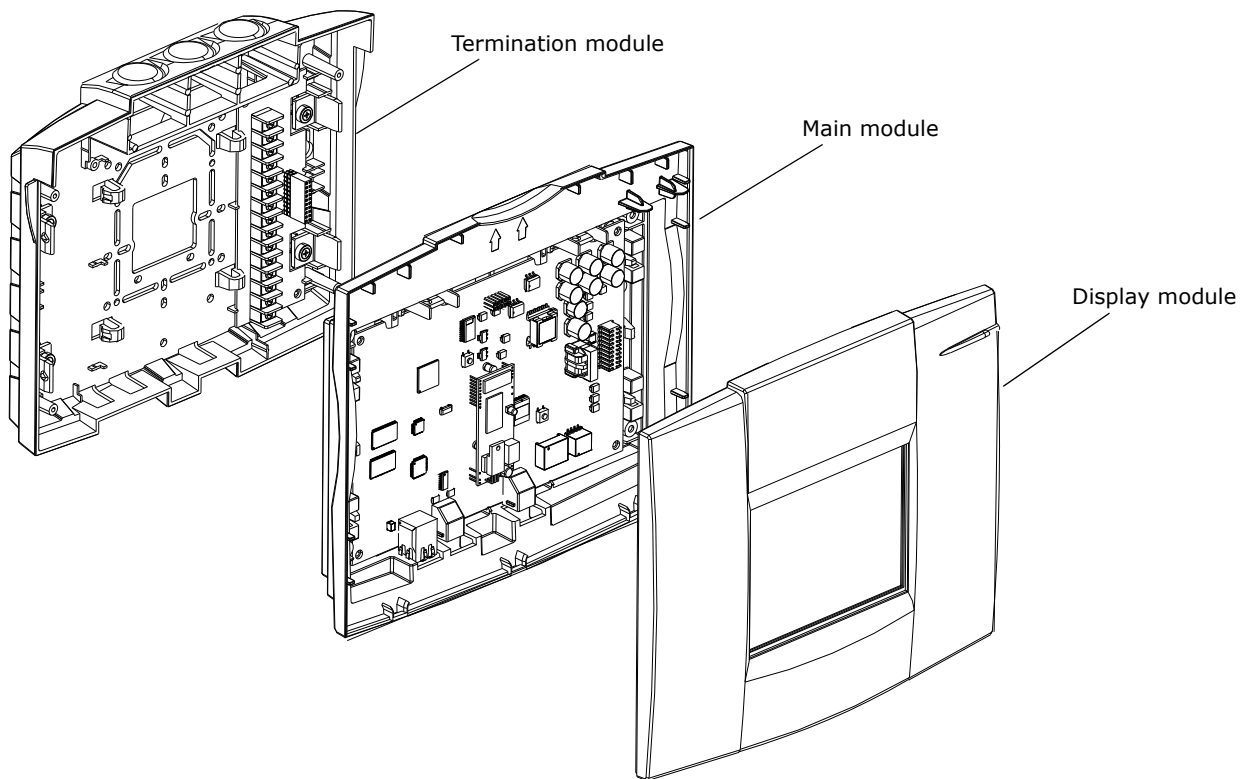
Termination module

The termination module (Figure 4) is a housing that provides a termination board and cable access for power, communications, and system input connections. Mounting holes enable it to be mounted on a wall or a recessed conduit box. The termination board accepts connections for power, communications, and system inputs.

Figure 4. Termination module

Termination board

Cable access
(three places)

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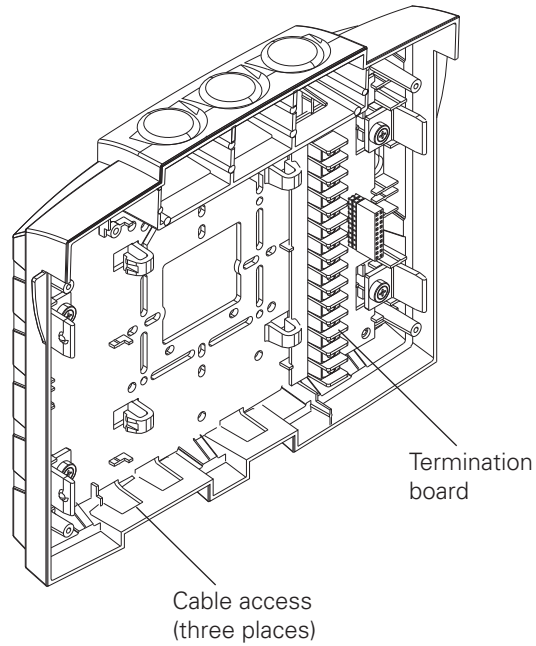
Main module

The main module (Figure 5) is a housing that contains the main logic board and the Ethernet board. The main module can be "hot swapped": it can be removed and installed without removing power from the termination module. When the main module is installed onto a powered termination module, it receives power and begins to operate automatically.

The main logic board provides an Ethernet LAN port, a PC interface port, and a modem port. It provides an internal interface to termination module I/O. It also provides Comm5 communication, 24 VAC power, alarm, and communication indicators. It communicates and exchanges data with the devices wired to the termination module. It also communicates with the display module.

The Ethernet board provides two LED indicators. One shows that an Ethernet link is detected; the other shows that there is serial traffic between the Ethernet board and the main logic board.

Figure 5. Main module

Main logic board

Modem port

PC interface port

Ethernet LAN port
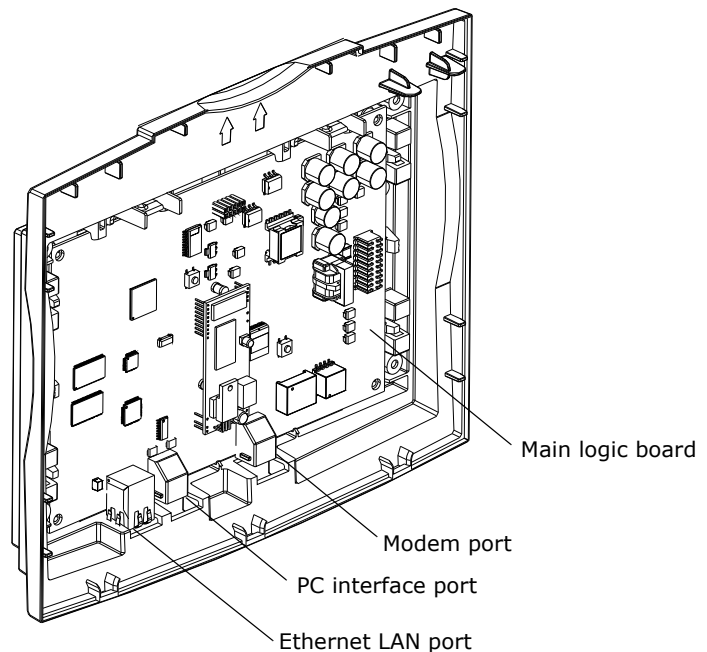
Display module

The display module (Figure 6) is a housing that contains a printed circuit board, liquid crystal display (LCD) touch screen, and an alarm LED. The printed circuit board supports the LCD touch screen and the alarm LED. The touch screen provides the operator access to the user interface program.

The display module can be "hot swapped:" it can be removed and installed without removing power from the main module. When the display module is installed onto a powered main module, it receives power and begins to operate automatically.

Figure 6. Display module

Alarm LED

LCD touch screen
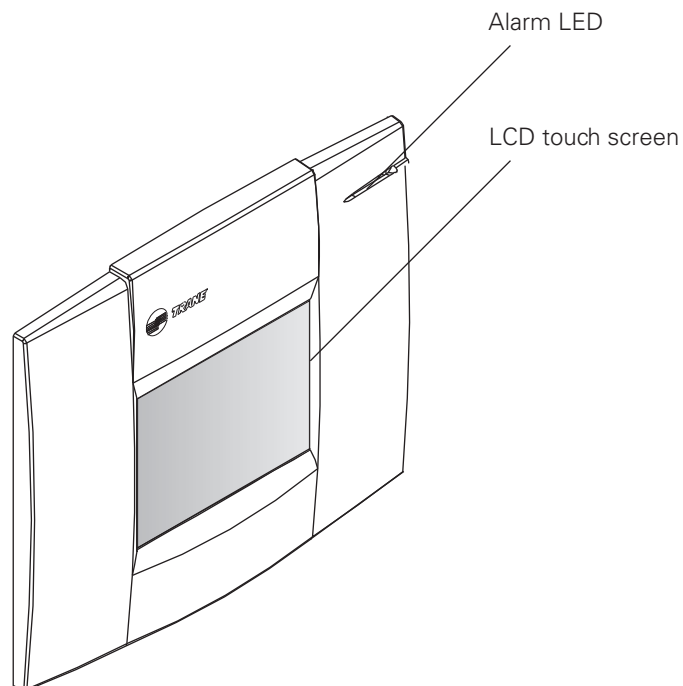
Tracker controller specifications

Table 1 shows the specifications for the Tracker controller.

Table 1. Tracker Controller specifications

Specification	Description
Power	24 Vac nominal (19 Vac to 30 Vac), 50/60 Hz, 1 phase 40 VA minimum, UL Class 2 transformer required
Operating environment	From 0°C to 50°C (32°F to 122°F) 10% to 90% relative humidity, non-condensing
Storage environment	From –40°C to 85°C (–40°F to 185°F) 5% to 95% relative humidity, non-condensing
Cabinet	NEMA 1 resin enclosure—plenum rated
Mounting	Flat wall surface with one of the following recessed conduit boxes: 5.08 cm × 10.15 cm (2 in. × 4 in.) 10.15 cm × 10.15 cm (4 in. × 4 in.)
Dimensions	Height: 22.38 cm (8.75 in.) Width: 26.04 cm (10.25 in.) Depth: 6.99 cm (2.75 in.)
Weight	1.13 kg (2.5 lb)
Analog input • Thermistor	10 kΩ at 25°C (77°F) From –46°C to 93°C (–50°F to 200°F)
Binary inputs • Utility pulse meter • Priority shutdown	User-supplied dry contacts only. Tracker-supplied voltage of 12 Vdc nominal (10 Vdc to 14 Vdc) at 12 mA nominal (10 mA to 14 mA).
Binary output • Alarm relay	Tracker-supplied single-pole single-throw (SPST) dry contact rated at 24 Vac, 0.5 A maximum
Memory backup	At power loss, the system backs up memory and stores all data for seven days. After seven days, trends and alarms are not retained.
Approvals	See Appendix B, Declaration of Conformity.

UCM maximum capacities for Tracker models 12 and 24

The Tracker model 12 and 24 controllers can control and monitor specific types and numbers of Trane unit control modules (UCMs) as specified in this topic. The supported UCMs are as follows:

- HVAC controllers that conform to the LonMark® Space Comfort Controller (SCC) profile: the primary controller options are the Voyager rooftop with a Tracer LCI-V, Precedent rooftop with ReliaTel controls and a Tracer LCI-R, and Tracer ZN517 unitary controller. Other controllers are limited to the Tracer ZN510, ZN511, and ZN524.

- VariTrac central control panels (CCPs) with a TCI-V.

- Tracer MP503 I/O module.

Table 2 shows the maximum number of each UCM type that can be linked to each Tracker controller model. Any combination of the specified UCMs may be used in aggregate if they do not exceed the maximum. (For example: A fully loaded Tracker 24 controller can control 24 SCC devices, 10 VariTrac CCPs, and 4 Tracer MP503 I/O modules.)

The Trane VariTrac CCP is the main controller for either a changeover bypass system configuration or a delivered variable air volume (VAV) system configuration. Any combination of CCP configurations may be used in aggregate, as long as they do not exceed the maximum.

> **Note:**
> - Each VariTrac CCP configured for changeover bypass can control 1 HVAC device and up to 24 VAV UCMs.
> - Each VariTrac CCP configured for delivered VAV can control 1 HVAC device and up to 32 VAV UCMs.
> - See repeater information, "Requirements for repeaters on Comm5 communication links," p. 34.

Table 2. Tracker controller models 12 and 24 UCM capacities

Tracker model	UCM type	Maximum UCMs
24	SCC*	24
	Trane VariTrac CCP	10
	Tracer MP503 I/O module	4
	Total maximum UCMs supported	**38**
12	SCC*	12
	Trane VariTrac CCP	5
	Tracer MP503 I/O module	4
	Total maximum UCMs supported	**21**
* SCCS supported by Tracker are limited to Voyager rooftops, Precedent rooftops with ReliaTel controls, Tracer ZN517, ZN510, ZN511, and ZN524.		

Before installation

Before beginning to install the Tracker controller, make sure that you have all the necessary controller components and that they are undamaged. Also, take steps to protect components until they are needed.

IMPORTANT
Before you install the Tracker hardware, review this guide and other Tracker support literature and create an installation plan.
Any Tracker II that is rev. 103 or higher requires image 12.54.001 or higher to operate properly.

Verify the shipment

When the shipment arrives at the job site, carefully unpack the carton. Even though outgoing orders are thoroughly reviewed before leaving the factory, compare the items in the shipment with the shipping authorization paper and verify that all items are present.

Verify that the controller model received is the model that you ordered and write down the model number for use later.

> **Note:**
>
> Contact your sales office to order additional Tracker literature, if needed.

Inspect for shipping damage

Inspect the items in the shipment to verify that no shipping damage or loss occurred. If your inspection reveals damage or material shortage:

*   Make the appropriate notation on the carrier delivery receipt.
*   Immediately file a claim with the carrier, specifying the extent and type of damage and/or shortage found.
*   Notify the appropriate Trane representative.

Store unused components until needed

Notice:
Avoid Equipment Damage!
Store all Tracker components off-site until most or all of the building construction is complete. Failure to do so could result in damage to components.

The termination module is shipped detached from the main module and display module assembly. To protect the controller from damage, Trane recommends storing the main module and display module assembly away from the construction and/or installation site to prevent it from being damaged or lost. Verify that the storage site conforms to the specifications shown in Table 1, p. 11.

After installation

After installing the Tracker hardware, use the post-installation checklist (Table 3) to verify that all installation procedures are completed.

Table 3. Tracker controller post-installation checklist

Inspect shipment upon receipt ___ Verify that the shipment is complete. ___ Inspect the controller and accessories to verify that there has been no shipping damage or loss. ___ File a damage claim with the carrier, if necessary. ___ Verify that the controller received is the one that was ordered. ___ Write down the controller model number for use later. Verify termination module mounting ___ Verify that the controller is in a safe indoor environment. ___ Verify that the location enables appropriate personnel to access the controller. ___ Verify that the controller is mounted securely with recommended fasteners and screws. ___ Verify that the installation conforms to controller dimensions, recommended clearances, and viewing angles. Verify 24 Vac power wiring ___ Verify that the power wiring complies with applicable codes. ___ Verify the 24 Vac power connection to the controller termination Block TB1. ___ Check the power wiring for shorts and improper grounds. ___ If using conduit connections, make sure separate conduits are used for power and communications. _____Inspect the controller printed circuit card for damage. Verify input and output wiring ___ Verify that wiring complies with specifications. ___ Inspect all binary and analog terminations at TB1.	Verify communication wiring ___ Verify that wiring complies with specifications. ___ Inspect communication wiring between devices. ___ Verify that all connections are properly shielded. Verify wire terminations with a voltmeter ___ Verify that the tests detailed in Table 15 on page 52 provide acceptable values. Verify main module installation ___ Verify that the main module is snapped in tightly against the termination module. ___ Verify that there is LED5 (HRT) activity. Verify display module installation ___ Verify that the display module is snapped in tightly against the main module. ___ Verify that the touch screen illuminates when touched. Verify direct and modem communication wiring ___ Verify that the recommended cable is used for a direct PC connection. ___ Verify that the recommended adapter is used for the direct connection cable. ___ Verify that the direct connection cable is connected to the correct Tracker port. ___ Verify that the phone cable is connected to the correct Tracker port. Verify Ethernet communication wiring ___ Verify that the recommended cable is used for the connection. ___ Verify that the Ethernet connection cable is connected to the correct Tracker port.

FCC compliance

The Tracker controller generates, uses, and radiates radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio and television reception. The Tracker controller has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference in a commercial installation.

There is no guarantee that interference will not occur in a particular installation. If the Tracker controller does cause interference, consult a radio or television technician for suggestions to correct the problem. Also, the booklet *How to Identify and Resolve Radio-TV Interference Problems* is available from the U.S. Government Printing Office, Washington DC 20402. Order stock number 004-000-00345-4.

Termination module mounting

After unpacking and inspecting the shipment, mount the termination module. The mounting process for the termination module consists of selecting a location and mounting the module. This chapter provides information and procedures that enable you to mount the termination module.

Select a location for the controller

When selecting a location for the Tracker controller:

- Select a location that is in a clean, non-corrosive, indoor environment. The controller is only intended for indoor installation.

- Consider both security and control wire lengths when making the selection.

- Select a location that limits controller access to operating and service personnel.

- Select a location that conforms to the operating environment described in Table 1, p. 11. The recommended operating environment will extend the life of the electronic components. Verify that the location does not subject the controller to extreme operating conditions (including excessive vibration).

Notice:
Avoid Equipment Damage!
Install the Tracker controller out of direct sunlight. Failure to do so may cause overheating, which could result in equipment damage.

IMPORTANT
Do not install the Tracker controller near high-power radio signals, electrical switching gear, power buses, large motors, or other sources of electrical noise. The electrical interference may lead to control malfunctions.

Verify location conformance to controller specifications

Verify that the selected location conforms to the applicable controller specifications listed in Table 1 on page 11.

Verify location conformance to controller dimensions and clearances

Verify that the selected location provides enough space to accommodate the controller (Figure 7) and its minimum clearances (Figure 8, p. 17):

- The top clearance allows for ventilation and conduit entry.
- The bottom clearance allows for PC cable interface clearance.
- The front clearance allows for operation and service access.
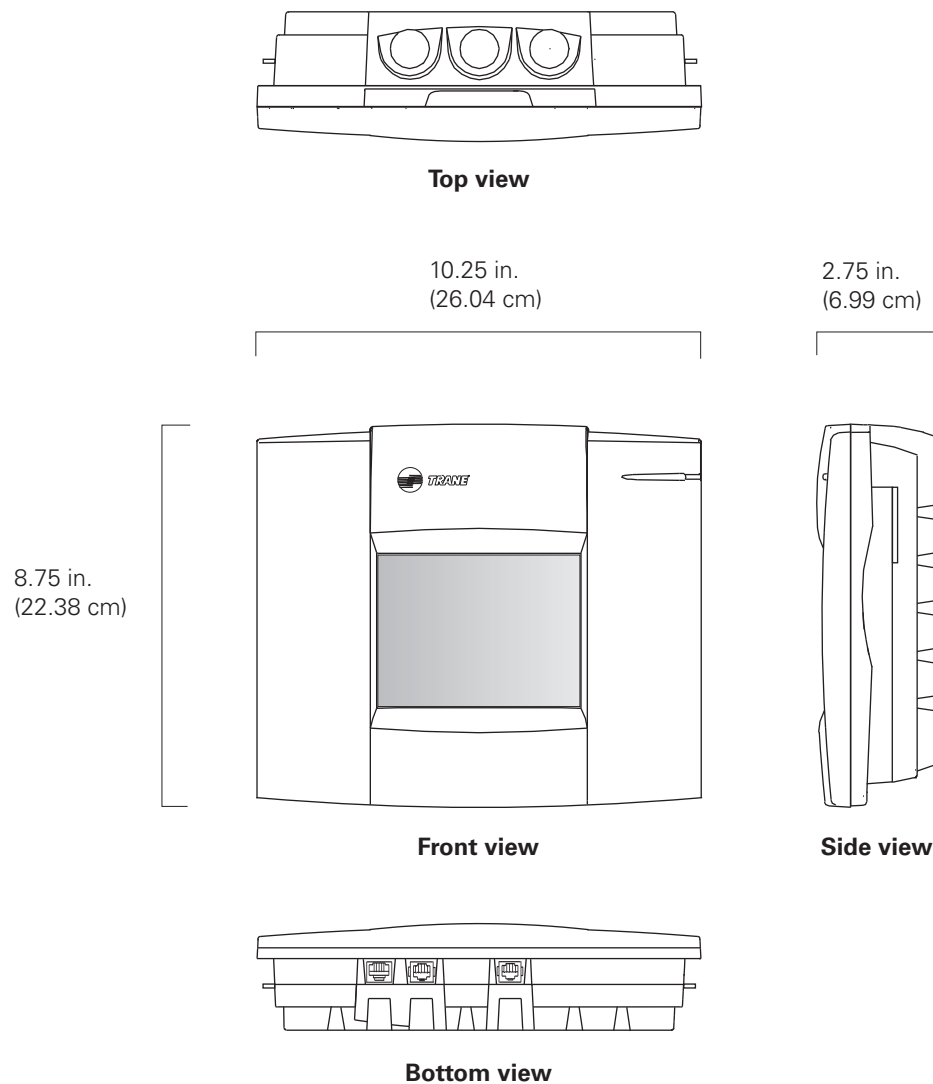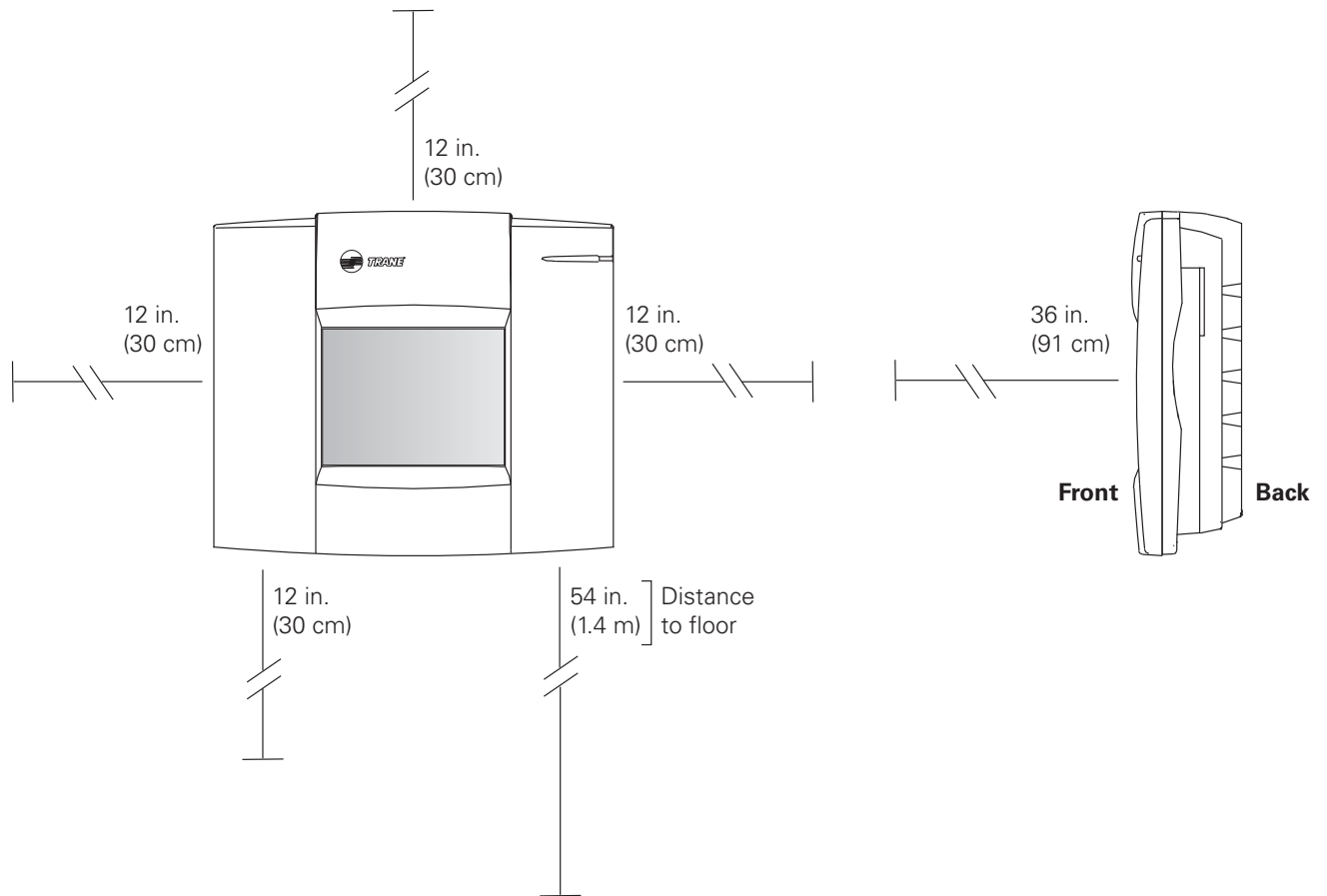
Figure 7. Dimensions

Top view

10.25 in.
(26.04 cm)

2.75 in.
(6.99 cm)

8.75 in.
(22.38 cm)

Front view

Side view

Bottom view

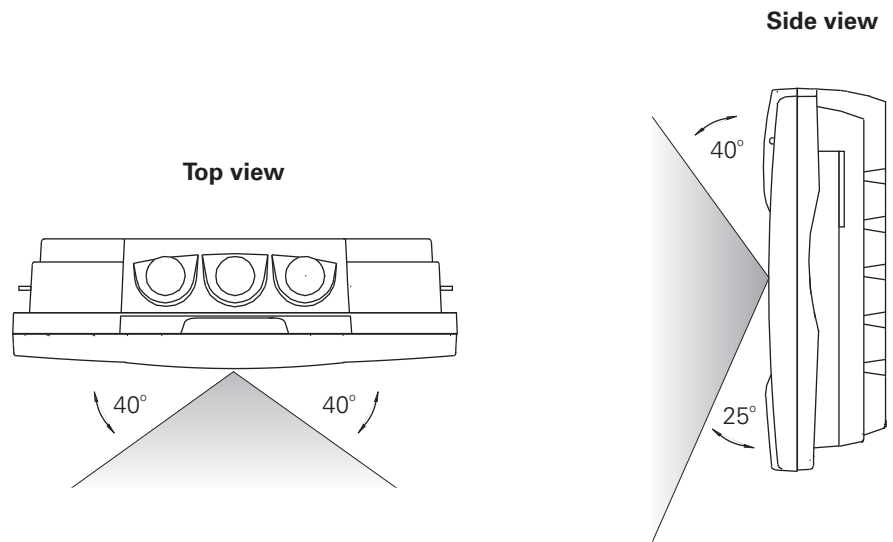**Figure 8. Minimum clearances**

Verify location conformance to optimal touch screen viewing angles

Verify that the height and location enable the user to view the touch screen at the optimal viewing angles (Figure 9).
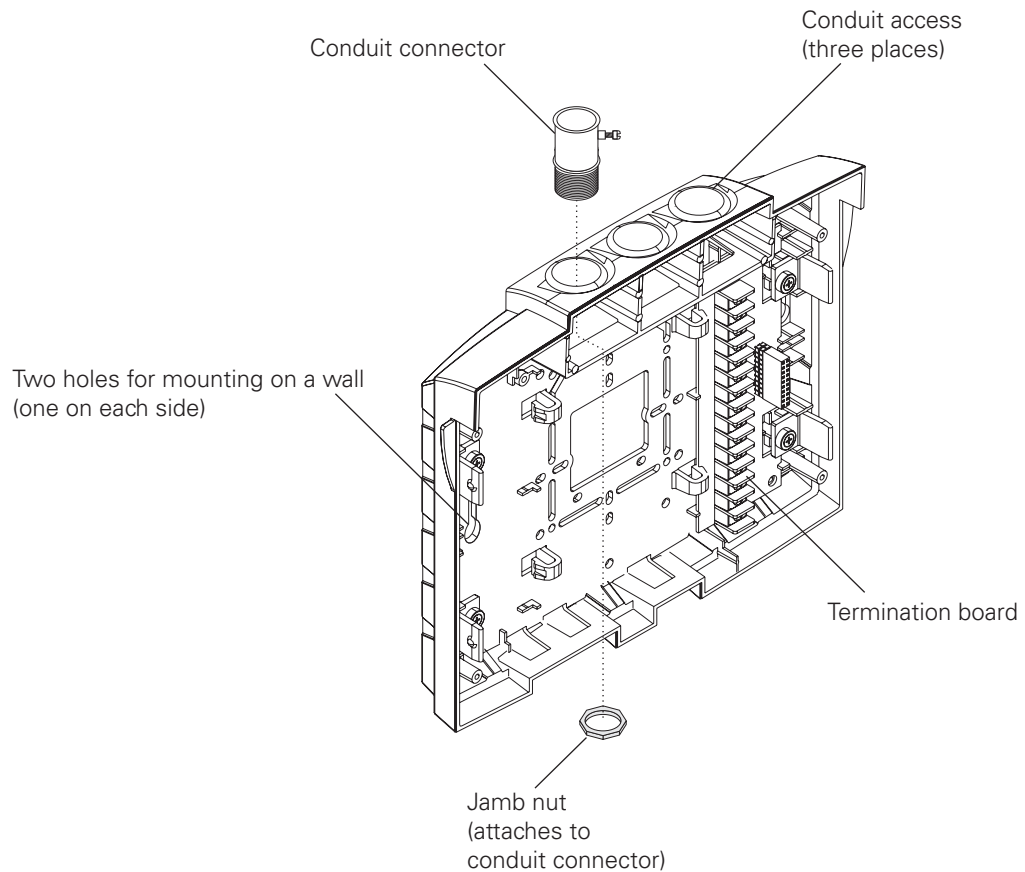
Figure 9. Optimal touch screen viewing angles

Side view

Top view

Mount the termination module

After selecting a suitable location for the Tracker controller, mount the termination module. Mounting consists of securing the termination module to a wall.

Figure 10. Termination module conduit access and mounting holes

Conduit connector

Conduit access (three places)

Two holes for mounting on a wall (one on each side)

Termination board

Jamb nut (attaches to conduit connector)

Securing the termination module to a wall

1. Mark the location of the two mounting holes on the wall.
2. Set the termination module aside and drill mounting holes.
3. Secure the termination module to the wall with the supplied hardware (#10 × 1 in. screw with plastic anchor).

Installing electrical conduit

Use the conduit openings on the top of the Tracker termination module to supply power or communication wires to the controller.

If the controller is mounted on a wall, you must use electrical conduit. If the controller is mounted to a conduit box through which power, input/output, and communications are supplied, you do not need to use electrical conduit.

IMPORTANT
The 24 Vac wire conduit may not contain input/output or communication wires. Failure to comply will cause the Tracker controller to malfunction due to electrical noise.

1. Remove one of the 22 mm (^{7}/8 in.) diameter plugs at the top of the termination module (Figure 11).

2. Install 12 mm (^{1}/2 in.) conduit connector (Figure 10) in opening.

3. Install the conduit jamb nut on the conduit connector threads and tighten it to secure the connector to the Tracker panel.

Figure 11. Electrical conduit installation
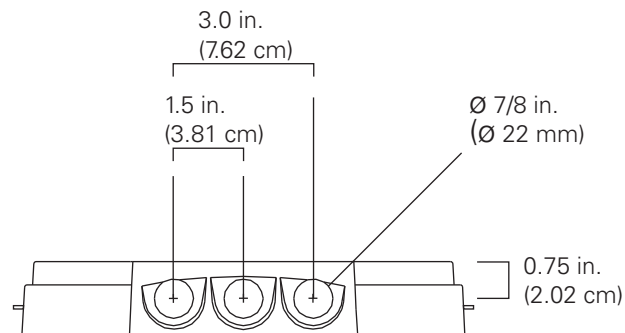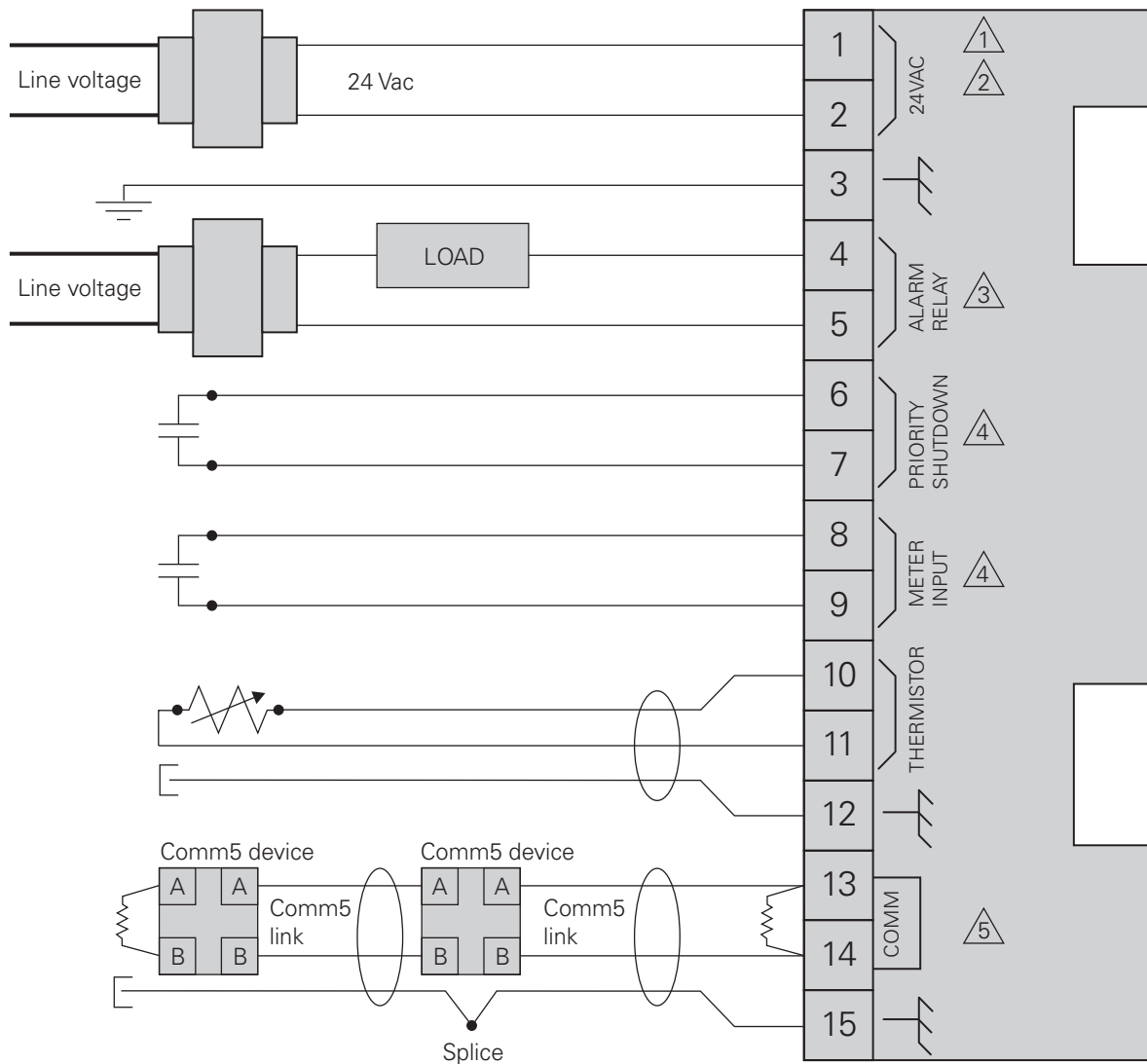

Termination module top view

Termination board wiring

After mounting the termination module, wire the termination board. The wiring process consists of wiring the termination board to 24 Vac power, inputs, outputs, and UCMs. This chapter provides information and procedures that enable you to wire the termination board. Figure 12 shows all field wiring connections.

Refer to the required and optional supply checklists in Appendix A (Table 12 and Table 13) to verify that you have the materials required to wire the Tracker controller. When termination board wiring is complete, use the termination module post-installation checklist in Appendix A (Table 15) to verify the wiring.

Figure 12. Tracker field wiring connections

Line voltage — 24 Vac — 1 / 2 — 24VAC — note 1, note 2

3 — (shield ground)

Line voltage — LOAD — 4 / 5 — ALARM RELAY — note 3

6 / 7 — PRIORITY SHUTDOWN — note 4

8 / 9 — METER INPUT — note 4

10 / 11 / 12 — THERMISTOR

Comm5 device — Comm5 link — Comm5 device — Comm5 link — 13 / 14 / 15 — COMM — note 5

Splice

Legend

= Transformer	= Twisted pair, shielded wire per Trane specifications	= Earth ground
= Thermistor device per Trane specifications	= Shield termination	= Shield ground
= Termination resistor	= Contact points	= Figure note

Figure Notes:

1 All customer wiring must be in accordance with national, state, and local electrical codes.

2 Trane recommends a dedicated transformer for 24 Vac power.

3 Alarm relay circuit must not exceed 24 Vac, 1 A.

4 Do not apply voltage to the priority shutdown inputs.

5 Example of Comm5 communication link wiring. See product-specific literature for Comm5 wire connection details.

Wire 24 Vac power

After the termination module is mounted in the selected location, wire 24 Vac power to the termination board. Table 4 shows the specifications for power wiring.

Table 4. Power wiring specifications

24 Vac power terminals	Description	Wire specifications
24 Vac TB1-1, TB1-2, Earth ground TB1-3	Power input 24 Vac nominal (19–30 Vac), 50/60 Hz, 1 phase 40 VA minimum, class 2 transformer required	Trane recommends 18 AWG (1.02 mm²) wire and metal conduit. Low voltage (24 Vac) wire must comply with National Electrical Code (NEC) and federal, state, and local electrical codes.

IMPORTANT
The 24 Vac wire conduit may not contain input/output or communication wires. Failure to comply may cause the Tracker controller to malfunction due to electrical noise.

1. Route input wires into the termination module through the conduit box or any of the conduit access openings designated for input and communication wiring (Figure 10, p. 19).

2. Wire the two 24 Vac power input wires and the ground wire to the controller 24 VAC terminals (Figure 12, p. 22).

Wire optional inputs and outputs

The Tracker controller provides input and output terminals as follows:

- Input for an optional priority shutdown device
- Input for an optional utility pulse meter
- Input for an optional outdoor air temperature sensor
- Output terminal for an optional alarm relay

Refer to Table 5 for input and output wire specifications, and to the termination board wiring diagram in Figure 12, p. 22 for wiring all inputs and outputs.

Table 5. Input and output wire specifications

Input and output terminals	Description	Wire specifications
Alarm relay output TB1-4, TB1-5	Binary output Dry contact Operating range: 24 V, 1 A maximum	Trane recommends 18 AWG (1.02 mm^2) wire and metal conduit. Maximum length = 1000 ft (305 m) *†
Priority shutdown device input TB1-6, TB1-7	Binary input Operating range: 12 Vdc nominal (10 Vdc to 14 Vdc) at 12 mA nominal (10 mA to 14 mA) < 50 Ω = switch closed > 1000 Ω = switch open	Trane recommends 18—22 AWG (1.02 mm^2—0.643mm^2) wire and metal conduit. Maximum length = 1000 ft (305 m) *‡
Utility pulse meter input TB1-8, TB1-9		
Thermistor input TB1-10, TB1-11, shield ground TB1-12	Analog input for an outdoor air temperature sensor Operating range: From –50°F to 200°F (–46°C to 93°C) Thermistor, 10 kΩ at 77°F (25°C)	Shielded wire, 18—22 AWG (1.02 mm^2—0.643mm^2) twisted pair Maximum length = 300 ft (91 m) *‡

* All field-installed binary wiring is low voltage and must comply with National Electrical Code (NEC) and federal, state, and local electrical codes.

† Alarm relay wires and 24 Vac wires may reside in the same conduit.

‡ Do not run input wires and ac power wires together in the same conduit or wire bundle.

Wire the alarm relay

Wire the alarm relay to the termination board output.

CAUTION

Avoid Equipment Damage!

Use a dedicated power transformer for this output. Failure to do so will damage the main module, if the alarm output is powered from the Tracker 24 Vac input (TB-1 and TB-2) and the circuit shorts to ground.

1. Route input wires into the termination module through a conduit opening (Figure 10, p. 19) or the conduit box.
2. Connect the wires to the ALARM RELAY terminals on the termination board (Figure 12, p. 22).
3. Connect the other end of the wires to the customer-supplied power supply and load.

Wire the priority shutdown device

Wire the priority shutdown device to the termination board input.

1. Route input wires into the termination module through a conduit opening (Figure 10, p. 19) or the conduit box.
2. Connect the wires to the PRIORITY SHUTDOWN terminals on the termination board (Figure 12, p. 22).
3. Connect the other end of the wires to the contacts of the priority shutdown device.

Wire the utility pulse meter

Wire the utility pulse meter to the termination board input.

1. Route input wires into the termination module through a conduit opening (Figure 10, p. 19) or the conduit box.

2. Connect the wires to the METER INPUT terminals on the termination board (Figure 12, p. 22).

3. Connect the other end of the wires to the pulsed-output contacts of the electrical meter.

Wire the thermistor

The thermistor input is for a Trane outdoor air temperature sensor only. The input cannot be used for any other purpose. Using wire that meets the specifications listed in Table 5, p. 24, wire the thermistor to the termination board input.

1. Route input wires into the termination module through a conduit opening (Figure 10, p. 19) or the conduit box.

2. Connect the wires to the THERMISTOR terminals on the termination board (Figure 12, p. 22).

3. Connect the shield to the ground terminal.

Note:

The thermistor input is not polarity sensitive.

1. Connect the other end of the wires to the thermistor device.

IMPORTANT
Tape the shield at the sensor. Any connection between the shield and ground will cause a malfunction.

Wire the UCMs

The Comm5 communication link connects unit control modules (UCMs) to the Tracker termination module. Each controller has one Comm5 communication link. This topic includes information and procedures for wiring a UCM to a termination module:

> **Note:**
>
> Do not exceed the maximum number of UCMs that can communicate on a Tracker controller (see "UCM maximum capacities for Tracker models 12 and 24," p. 12 for details).

Wire specifications

Tracker Comm5 communication-link and sensor wiring is low-voltage Class 2 wire and must be field-supplied and installed in compliance and local codes. To prevent electrical noise interference, all wiring must comply with requirements outlined in this topic for wire selection and link-wiring topology.

Trane recommends that you use Level 4 (Echelon) shielded cable for the Tracker communication link wiring between the Tracker and the Comm5 UCMs to which it communicates. Trane also recommends that you use it for communication wiring between the VariTrac CCP and its associated VariTrac or VariTrane UCMs, and for sensor wiring to these devices.

Level 4 cable is available in shielded, plenum and non-plenum versions. Level 4 cable is available from Trane-approved suppliers as well as other suppliers. The communication-link wire must be plenum-rated, 0.64 mm2 (18 AWG), shielded, twisted pair with stranded, tinned-copper conductors. Use only Trane part number 400-2028 wire or equivalent. Table 6 provides the specifications for Level 4 compliant cables.

Table 6. Specifications for Echelon Level 4 compliant cables

Specification		Value
dc resistance (Maximum resistance of a single copper conductor regardless of whether or not it is solid or stranded and regardless of whether or not it is metal coated.)		18.0 Ω/1000 feet at 20°C
dc resistance unbalance (maximum)		5%
Mutual capacitance of a pair (maximum)		17 pF/foot
Pair-to-ground unbalance (maximum)		1000 pF/foot/1000 feet
Characteristic impedance	772 kHz	102 Ω ± 15%
	1.0 MHz	100 Ω ± 15%
	4.0 MHz	100 Ω ± 15%
	8.0 MHz	100 Ω ± 15%
	10.0 MHz	100 Ω ± 15%
	16.0 MHz	100 Ω ± 15%
	20.0 MHz	100 Ω ± 15%
Attenuation (maximum dB/1000 feet at 20°C)	772 kHz	4.5 dB/1000 feet at 20°C
	1.0 MHz	5.5 dB/1000 feet at 20°C
	4.0 MHz	11.0 dB/1000 feet at 20°C
	8.0 MHz	15.0 dB/1000 feet at 20°C
	10.0 MHz	17.0 dB/1000 feet at 20°C
	16.0 MHz	22.0 dB/1000 feet at 20°C
	20.0 MHz	24.0 dB/1000 feet at 20°C
Worst-pair near-end crosstalk (minimum) (Values shown are for information only. The minimum NEXT coupling loss for any pair combination at room temperature is to be greater than the value determined using the formula NEXT (F_{MHz})>NEXT(0.772)-15$_{log10}$ (F_{MHz}/0.72) for all frequencies in the range of 0.772 MHz–20 MHz for a length of 1000 feet.)	772 kHz	58 dB
	1.0 MHz	56 dB
	4.0 MHz	47 dB
	8.0 MHz	42 dB
	10.0 MHz	41 dB
	16.0 MHz	38 dB
	20.0 MHz	36 dB
dc resistance unbalance (maximum)		5%

UCM wiring configurations

The Tracker UCM Comm5 communication-link wiring must be installed in a daisy-chain configuration (Figure 13 and Figure 14).

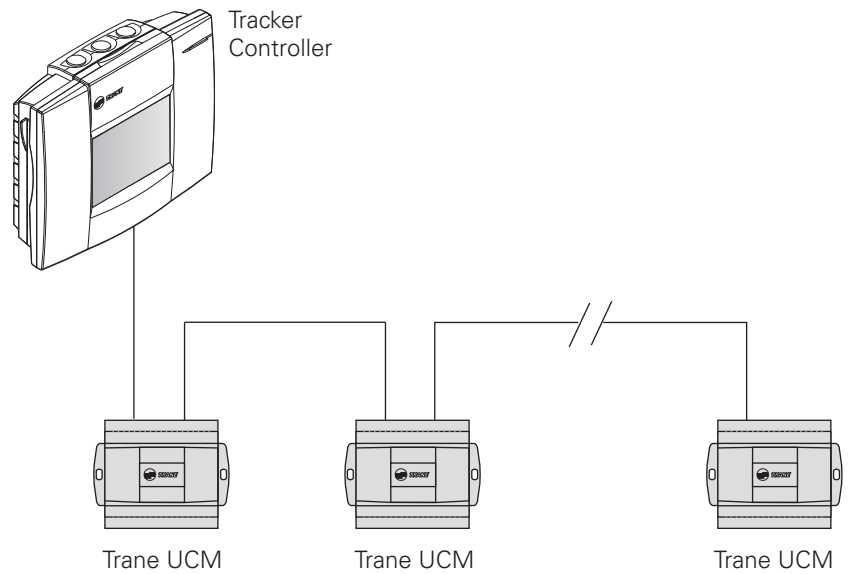**Figure 13. Daisy-chain configuration for UCM communication-link wiring (preferred configuration)**

Figure Note:
Maximum wire length for daisy-chained wiring is 1400 m (4593 ft).

Figure 14. Daisy-chain configuration for UCM communication-link wiring with Tracker controller in middle of link
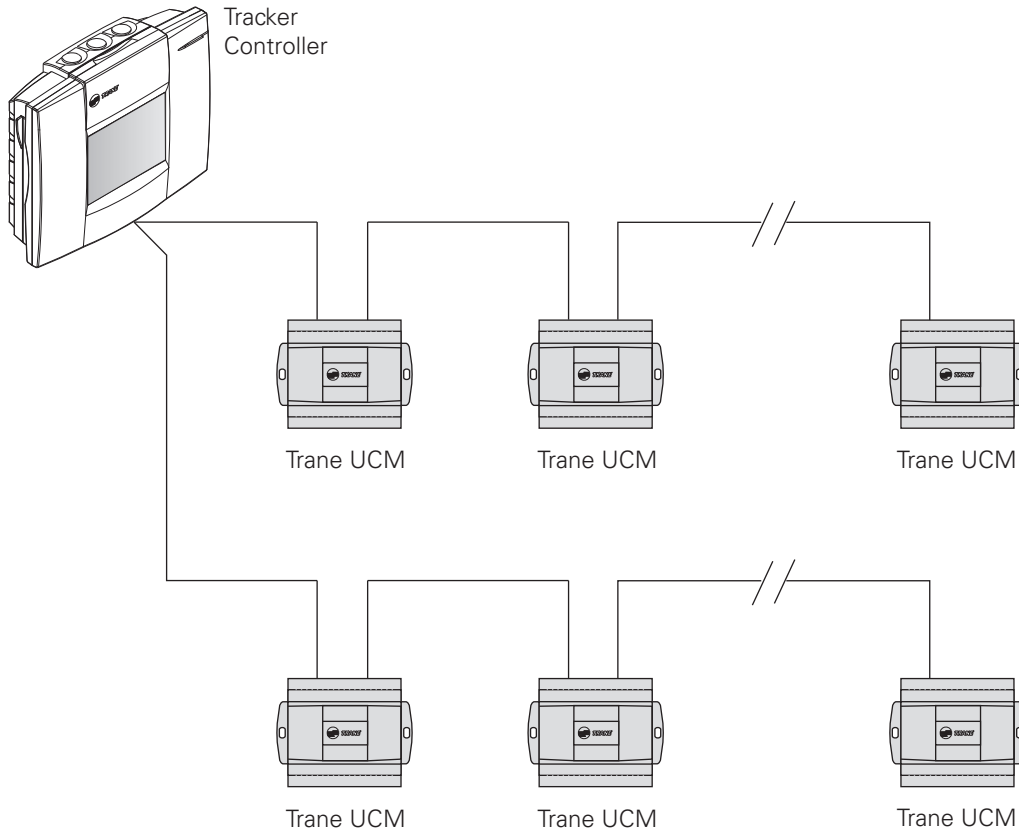

Figure Note:
- Maximum wire length for daisy-chained wiring is 1400 m (4593 ft) unless a Comm5 repeater is used.

Termination resistor placement for Comm5 links

Install one 105 Ω resistor across the communication link terminals of the device at the beginning of the daisy chain, which is typically a Tracker controller. Then install a second 105 Ω resistor across the communication terminals at the last UCM on each link. See Figure 15 for an example of a link that begins with a Tracker controller. See Figure 16 for an example of a link that does not begin with a Tracker controller.

Note:

If, after installation, the link is extended to add more UCMs, the resistor must be relocated to the new last UCM on the link.

IMPORTANT
For maximum performance of the Comm5 link, use the 105 Ω resistors that are included with the Tracker controller. If they are not available, as a second choice, use a 100 Ω, ¼ W, 5% tolerance resistor, or as a third choice, a 110 Ω, ¼ W, 5% tolerance resistor. Failure to comply may cause the controller to malfunction.

The resistor value can be determined by reading its color bands. Table 7 provide the resistor color coding.

Table 7. Resistor color band table

Tolerance	Color sequence
105 Ω ± 1% tolerance	Brown, black, green, brown
100 Ω ± 5% tolerance	Brown, black, brown, gold
110 Ω ± 5% tolerance	Brown, brown, brown, gold

If a repeater is used, each link of the configuration that is created by the repeater requires termination resistors (see "Requirements for repeaters on Comm5 communication links").

Create a set of as-built drawings or a map of the communication wire layout during installation. Ensure that sketches of the communication layout show the placement of the termination resistors.

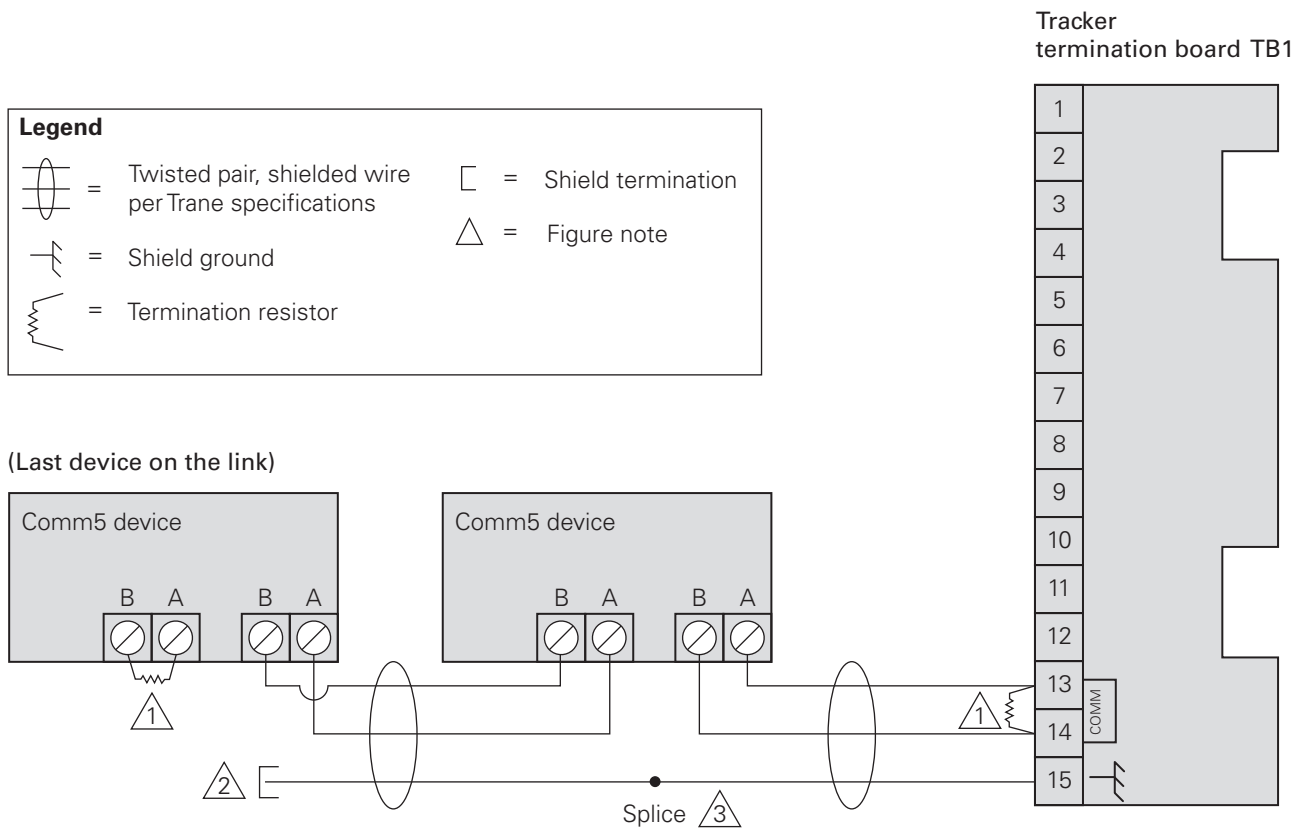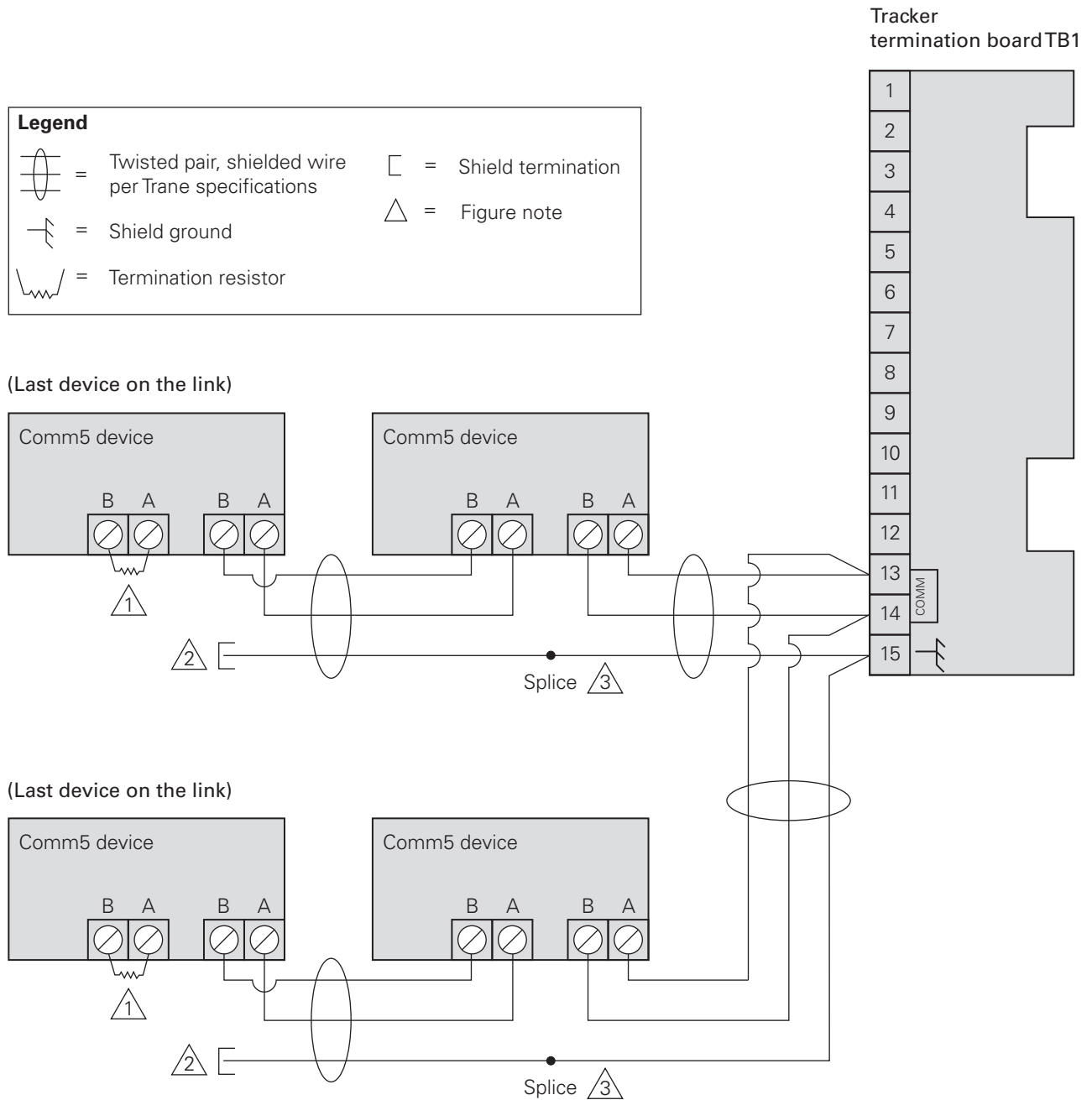**Figure 15. Daisy-chain termination resistor placement**

Figure Notes:

1 105 Ω termination resistor

2 Shield must be cut back and taped at last unit controller.

3 A continuous shield is required. At each unit controller, splice shield wire and tape back to prevent grounding.

Figure 16. Termination resistor placement with a Tracker controller in the middle of the link

Figure Notes:
1 105 Ω termination resistor
2 Shield must be cut back and taped at last unit controller of each link.
3 A continuous shield is required. At each unit controller, splice shield wire and tape back to prevent grounding.

Wire supported UCMs

Wire the supported UCMs to the Tracker termination board. When installing communication wire:

- Keep the polarity consistent throughout the site. Although Comm5 is not polarity sensitive, consistency will improve serviceability.

- Strip away a maximum of 50 mm (2 inches) of the outer conductor and foil shield when splicing or terminating shielded wire.

IMPORTANT
Use extreme care when stripping away the outer conductor and foil shield. Be careful not to nick the insulating jacket of the two conductors. A nick in the insulating jacket will cause communication problems.

Wire the UCMs as follows:

1. Install termination resistors in the correct locations.

2. Route input wires into the termination module through the conduit box or any of the conduit openings designated for input and communication wiring (Figure 10).

3. Connect the wires to the COMM terminals on the termination board (Figure 12).

4. Connect the shield to the ground terminal.

5. Connect the other end of the wires to the UCMs, as necessary.

Requirements for repeaters on Comm5 communication links

The Comm5 communication link repeater is a device that repeats and regenerates the signal on a Comm5 link in order to enhance signal quality or extend the length of the run. The Comm5 link goes from the Tracker controller to the UCMs to the repeater. A second link segment extends from the other side of the repeater to the rest of the devices. The configuration on either side of the repeater must be a daisy-chain configuration. Both link segments require termination.

A link repeater is required when:

- The total wire length is greater than the maximum wire run length of 1400 m (4593 ft) for a daisy-chain configuration.

- More than 60 devices are connected to a link. This total does not include the Tracker controller, the link repeater, and the possible use of the Rover service tool on the same link.

The link repeater has several limitations:

- Only one link repeater can be used on a link.

- The use of a repeater doubles the maximum allowable wire length. For example, when a repeater is used with a daisy-chain configuration, the total wire length can be 2800 m (9186 ft) (with half the wire length on either side of the repeater).

- The link repeater is limited to 60 devices on either side of the link (120 devices total).

- The link repeater requires an earth ground. The installer should be aware of this before making power connections.

Recommended shield connections are shown in Figure 17. Figure 18 shows a daisy-chain repeater connection. Follow these guidelines when using a repeater:
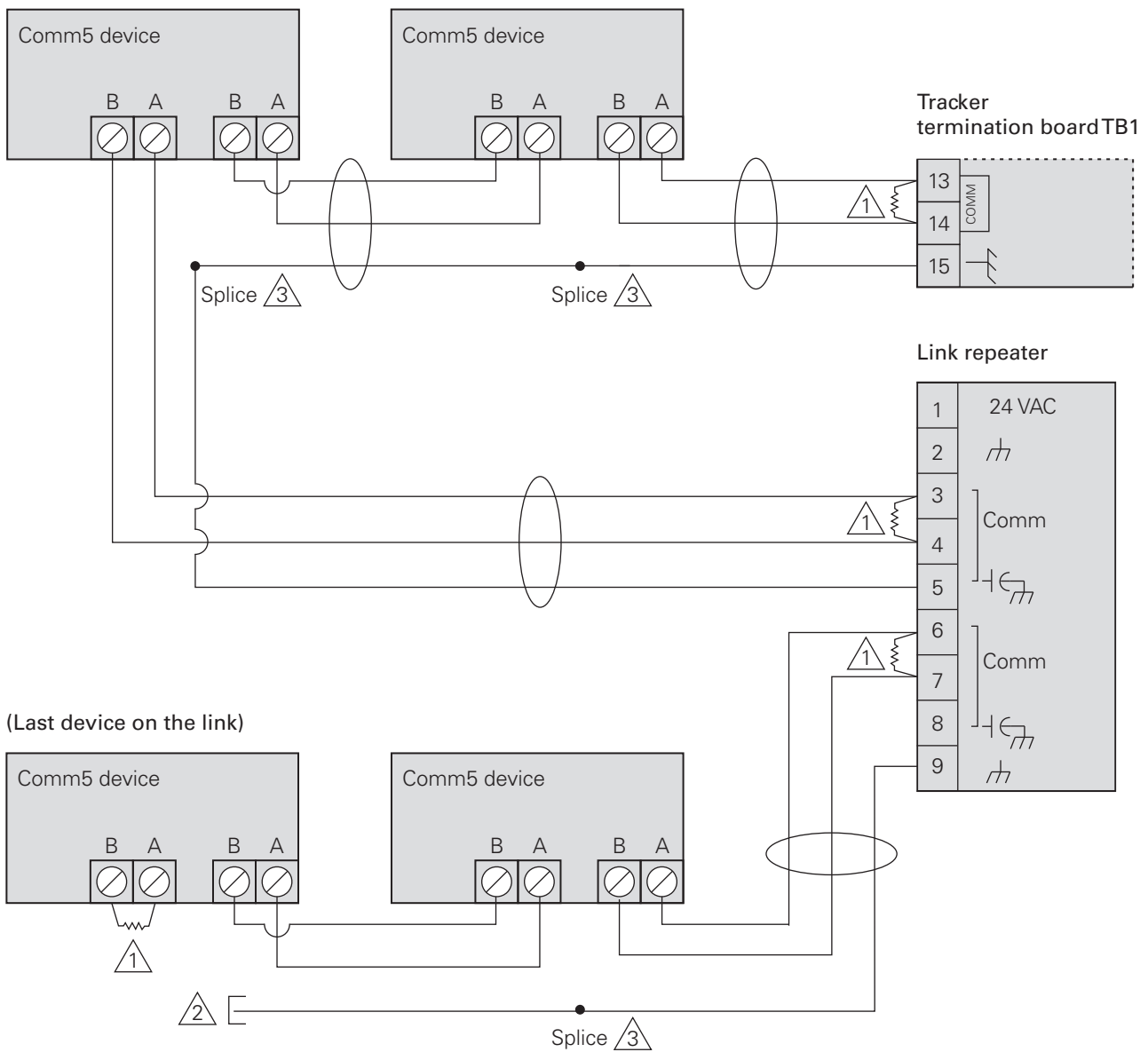
- Reference the installation information that comes with the link repeater (*Comm5 repeater installation*, 3270 3285).

- Connect the shield-drain wires entering the repeater to a terminal marked with a capacitor symbol. The entering shield-drain wire must be connected to earth ground at the Tracker controller.

- Connect the shield-drain wires leaving the repeater to the repeater terminal marked with an earth ground symbol.

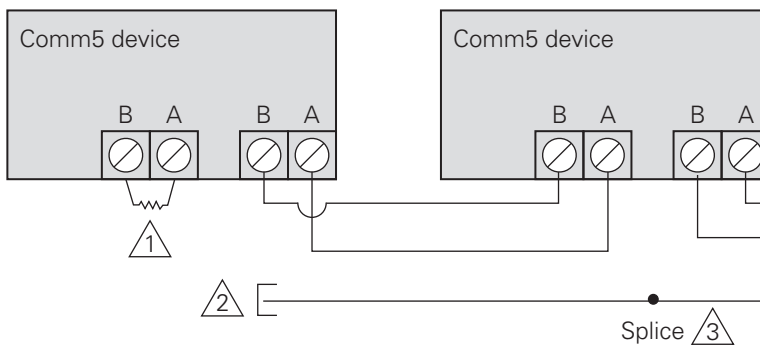**Figure 17. Connecting communication link shield wiring to repeater**
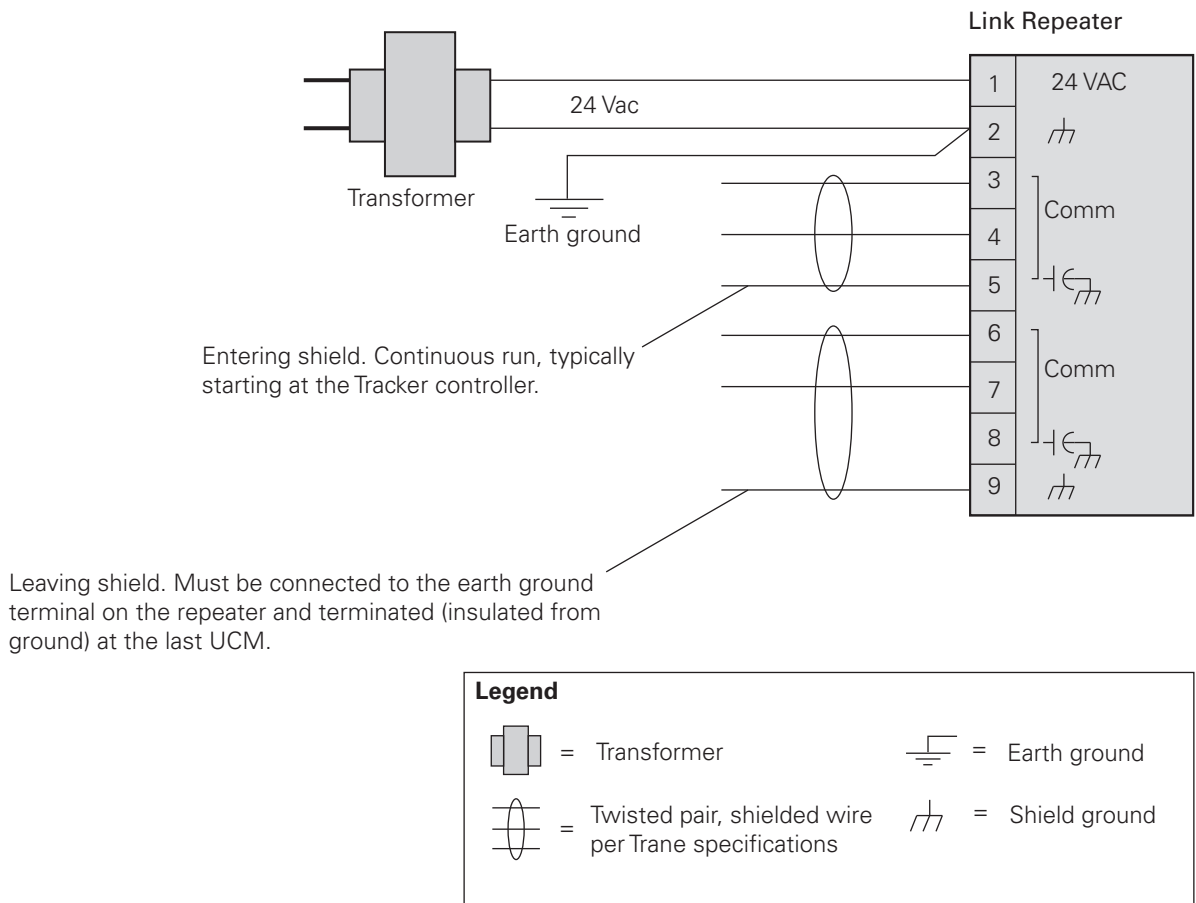
Figure 18. Comm5 daisy-chain repeater connection

Legend

⬡ = Twisted pair, shielded wire per Trane specifications

⊥ = Shield ground

∿ = Termination resistor

⌐ = Shield termination

△ = Figure note

Figure Notes:

1 105 Ω termination resistor

2 Shield must be cut back and taped

3 A continuous shield is required. At each controller, splice shield wire and tape back to prevent grounding.

Main module mounting

After mounting and wiring the termination module, attach the main module to the termination module. This chapter provides information and procedures that enable you to mount the main module.

> **Note:**
>
> The Tracker controller ships with the display module assembled to the main module. If those two modules are assembled, performing this procedure also mounts the display module.

> **Note:**
>
> It is not necessary to turn off 24 Vac power to the Tracker controller prior to mounting or removing the main module.

1. Verify that all wires on the termination module are securely fastened in place.
2. Carefully line up the alignment pins on the termination module with the back side of the main module (Figure 19, p. 38).

CAUTION
Avoid Equipment Damage!
Do not use excessive force when mounting the module. If the module does not snap easily into place, slightly reposition it on the alignment pins. Failure to comply may cause damage to the module.

3. Firmly push the main module onto the termination module until it snaps into place. If 24 Vac power is applied, the main module will start. If the display module is not assembled to the main module, you will see the LEDs on the main module flash on and off after a few seconds. If the display module is assembled to the main module, it will turn on and display information.

Figure 19. Main module mounting

Termination module

Alignment pin
(four places)
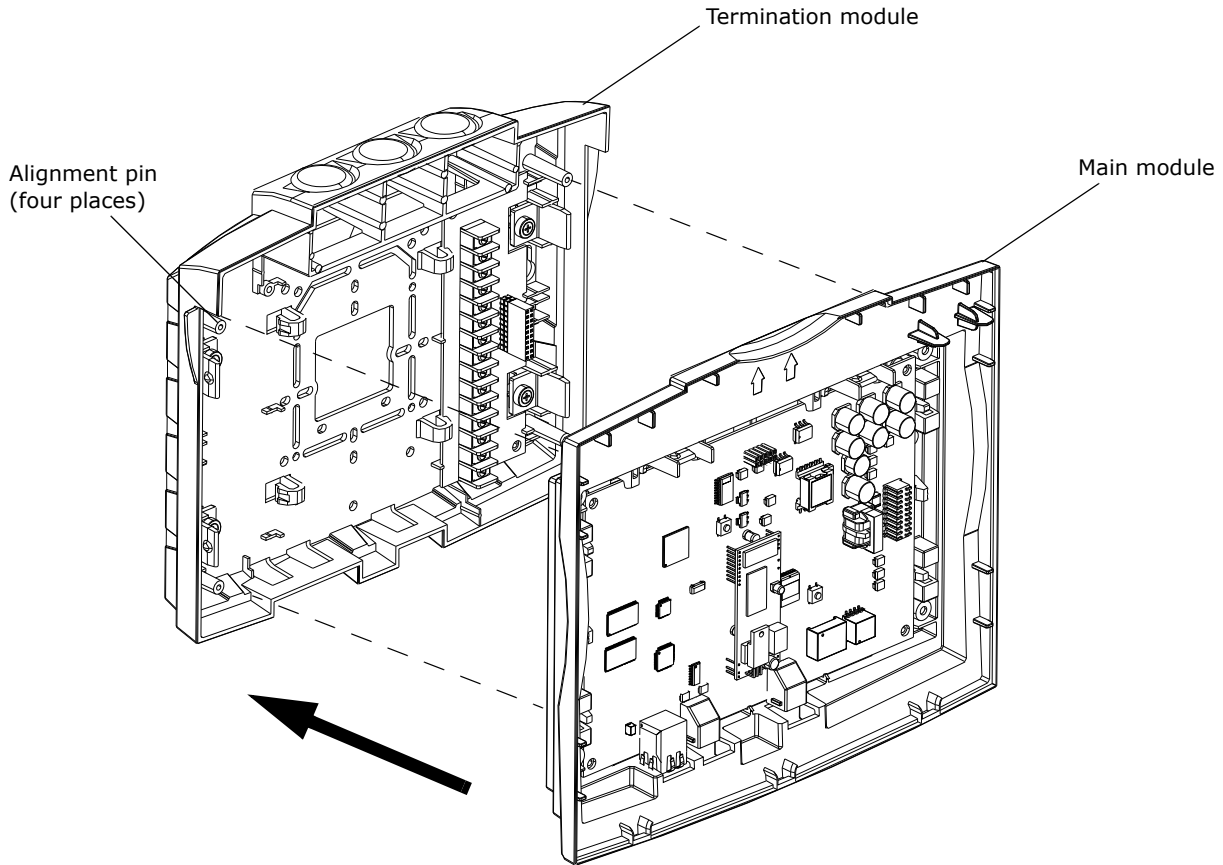
Main module

Display module mounting

After mounting the main module, attach the display module to the main module. This chapter provides information and procedures that enable you to mount the display module.

> **Note:**
>
> The Tracker controller ships with the display module assembled to the main module. If those two modules are assembled, you need only to perform the main module mounting procedure (Figure 19, p. 38).

> **Note:**
>
> It is not necessary to turn off 24 Vac power to the Tracker controller prior to mounting or removing the display module.

1. Tilt the top of the display module about 30 degrees toward you.

2. Line up the three tabs on the bottom of the display module with the slots on the bottom of the main module (Figure 20, p. 40).

3. Starting with the center tab, insert the tabs into the slots.

CAUTION
Avoid Equipment Damage!

Do not use excessive force when mounting the module. If the module does not snap easily into place, slightly reposition it on the alignment pins. Failure to comply may cause damage to the module.

4. Push the top of the display module toward the main module until it snaps into place while making sure that the tabs on the display module engage the slots on the main module (Figure 21, p. 42). If 24 Vac power is applied to the Tracker controller, the display module will turn on and display information.

Figure 20. Tab and slot alignment

Main module

Display module

Slot (three places, two
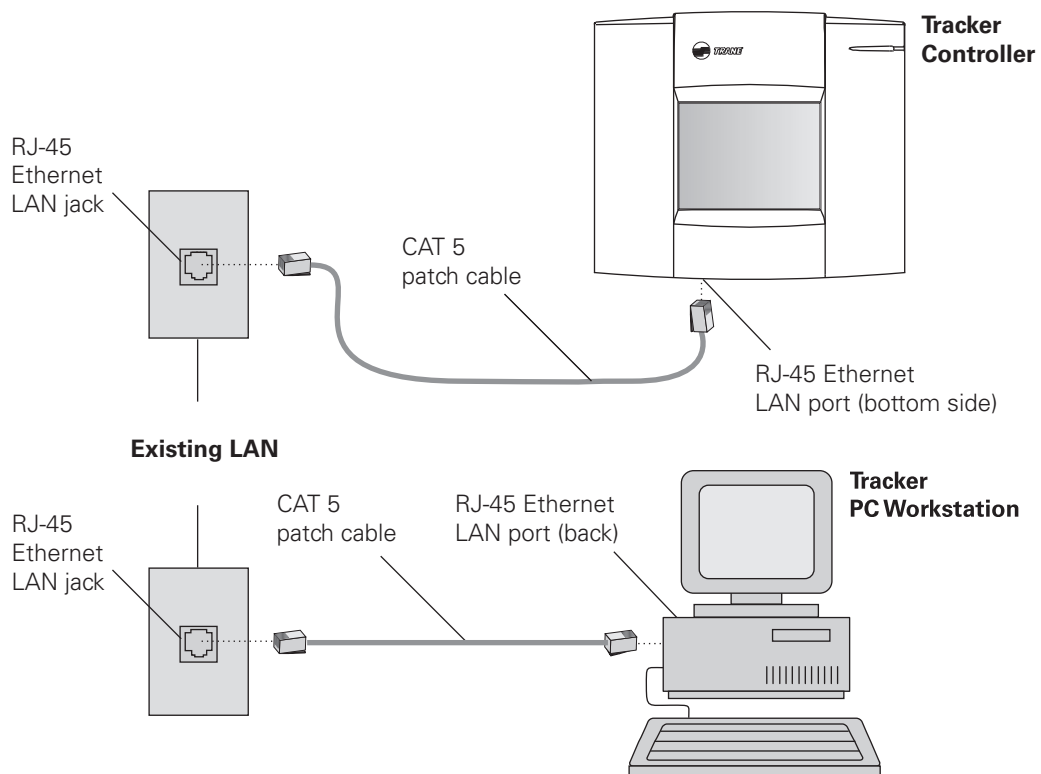shown)

Tab (three places, not
shown)
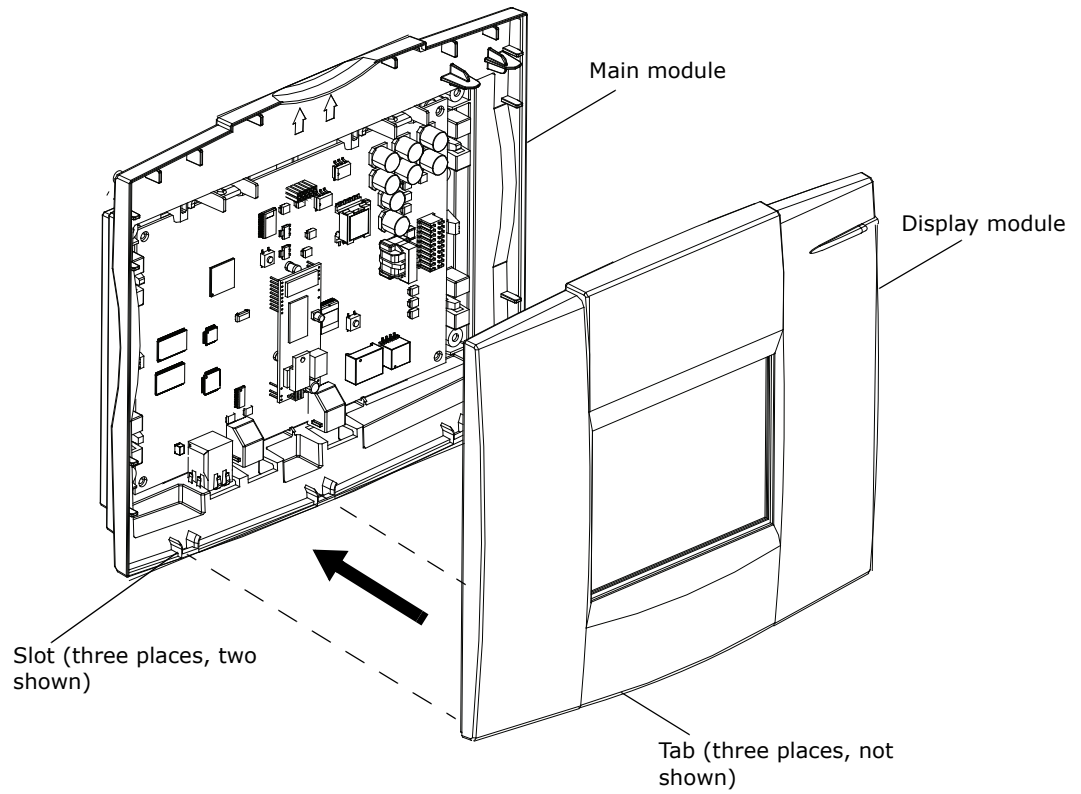
Ethernet connection to PC workstation

Connecting over an existing LAN

To make an Ethernet LAN connection between the Tracker controller and a Tracker PC Workstation through an existing customer LAN, you need two CAT 5 patch cables.

1. Connect one end of the first CAT 5 patch cable to the RJ-45 Ethernet port on the bottom side of the Tracker controller (Figure 21).

2. Connect the other end of the cable to an RJ-45 Ethernet wall jack near the controller.

3. Connect one end of the second CAT 5 patch cable to an RJ-45 Ethernet wall jack near the Tracker PC Workstation.

4. Connect the other end of the cable to the RJ-45 Ethernet port on the PC workstation.

Figure 21. Tracker Ethernet LAN connection to a PC workstation over an existing LAN
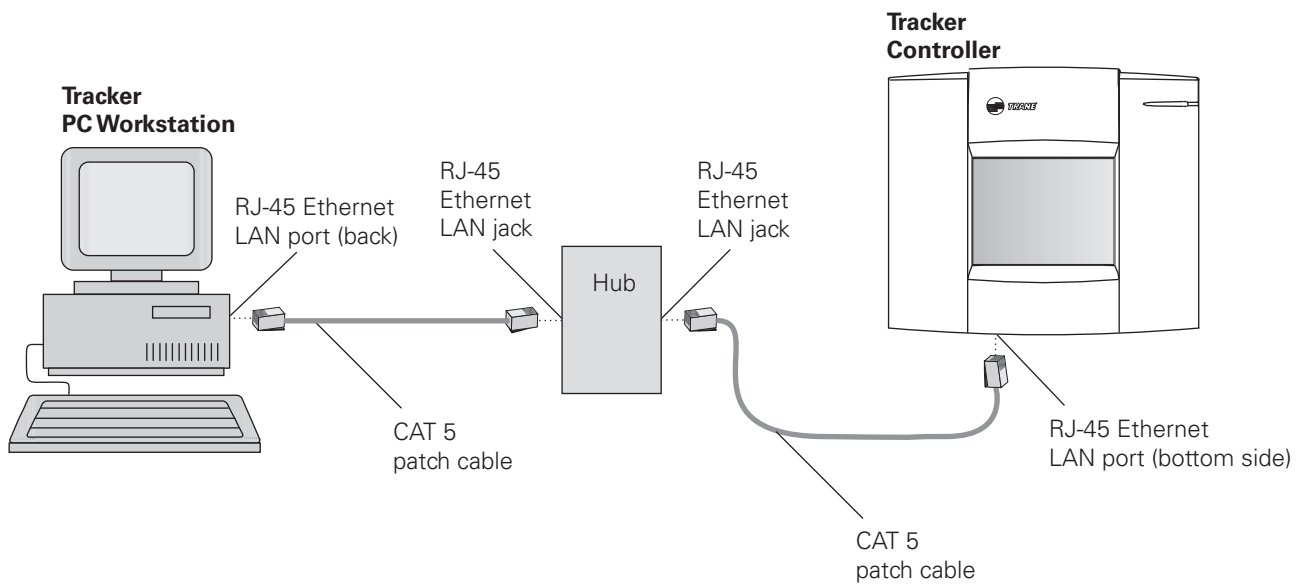
Connecting through a hub

To make an Ethernet connection between the Tracker controller and a Tracker PC Workstation through a hub, you need two CAT 5 patch cables.

1. Connect one end of the first CAT 5 patch cable to the RJ-45 Ethernet port on the bottom side of the Tracker controller (Figure 21).

2. Connect the other end of the cable to an RJ-45 Ethernet port on the hub.

3. Connect one end of the second CAT 5 patch cable to an RJ-45 Ethernet port on the hub.

4. Connect the other end of the cable to the RJ-45 Ethernet port on the Tracker PC Workstation.

Figure 22. Tracker Ethernet LAN connection to a PC workstation through a hub

Connecting with one cable

To make an Ethernet connection between the Tracker controller and a Tracker PC Workstation using one cable, you need one CAT 5 crossover cable.

1. Connect one end of the CAT 5 crossover cable to the RJ-45 Ethernet LAN port on the bottom side of the Tracker controller (Figure 23).

2. Connect the other end of the cable to the RJ-45 Ethernet LAN port on the Tracker PC Workstation.

Figure 23. Tracker Ethernet LAN connection to a PC workstation with one cable
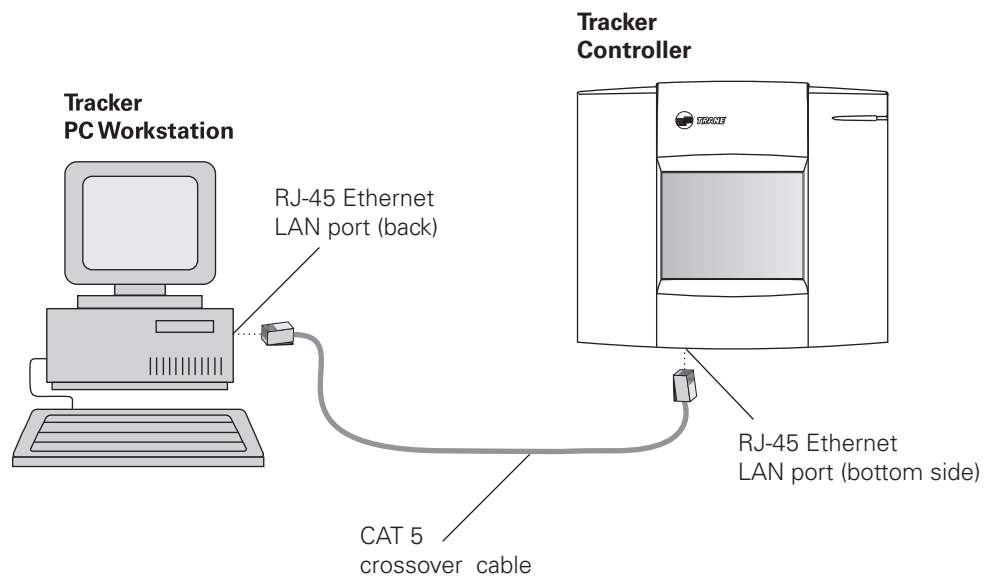
Troubleshooting

Troubleshooting components

Light-emitting diodes (LEDs) and reset buttons are used for troubleshooting the Tracker system.

LEDs

The LEDs on the Tracker controller main logic board and display module show central processing unit (CPU) status and traffic on the Comm5 communication link, the Ethernet module, and the EIA-232 connection. Figure 24 shows the location of the main logic board LEDs; Table 8 provides a description of them. Figure 24 shows the location of the Ethernet module LEDs; Table 8 provides a description of them. Figure 6 shows the location of the alarm LED on the display module; Table 9 provides a description of it.

Reset buttons

Table 10 on page 45 describes the reset buttons that are located on the main logic board. They are used for rebooting the controller and for Neuron identification.

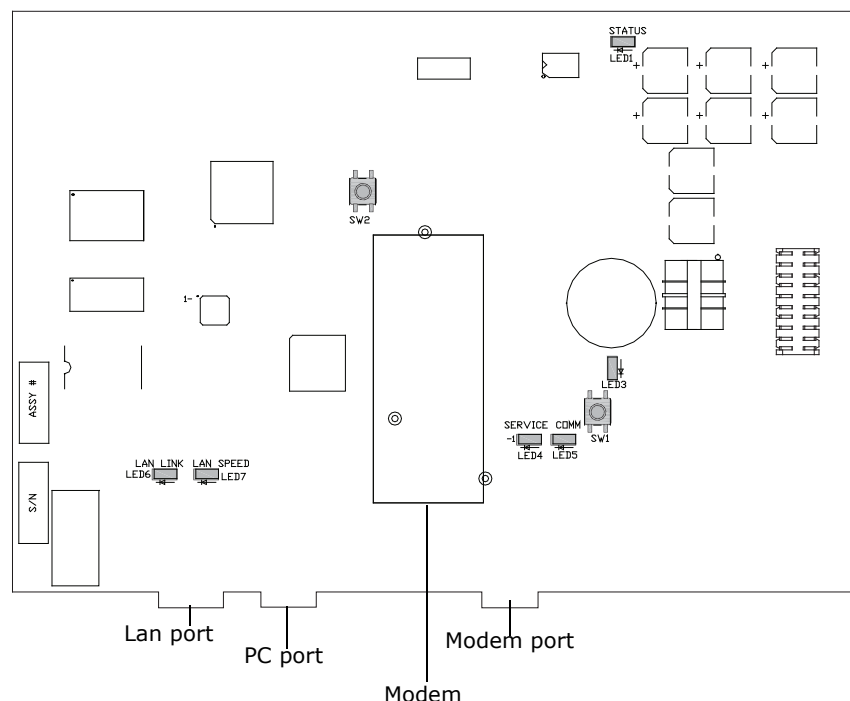**Figure 24. Tracker controller main logic board component location**

Lan port

PC port

Modem port

Modem

Table 8. Tracker main logic board LEDs

LED name	LED number	Color	Description
STATUS	LED1	Green	Shows the status of the CPU. This LED is on continuously while the controller boots up and during normal operation.
BOP	LED3	Red	Flashes when the controller binary output relay is energized and when an appropriate alarm condition exists.
SERVICE	LED4	Red	Shows that Comm5 service is required. This LED is normally off. LED is on continuously to show that controller hardware is defective. LED is on continuously to show that the reset button (SW2) was pressed. Flashes to show that the controller must be rebooted.
COMM	LED5	Yellow	Shows that network traffic is on the Comm5 link. Flashes when the controller receives data from a Comm5 device.
LAN link	LED6	Green	Shows that an Ethernet link is detected.
LAN speed	LED7	Green	When illuminated, this indicates that the LAN is not functioning due to improper LAN speed (possibly 100 mbps). Note: LAN speed is functioning properly (10 mbps) only when the LED is **not** illuminated.

Table 9. Alarm LED

State	Color	Description
Normal	Green	LED is on continuously when the controller is operating normally and has received no alarms of the appropriate severity.
Alarm	Red	Flashes when the controller receives an alarm of the appropriate severity. To acknowledge the alarm and turn off the LED, press the Alarm function button displayed on the user interface home screen.
Note: Alarm LED is only available on Operator Display.		

Table 10. Main logic board and reset buttons

Reset buttons	Function
SW1	Momentarily pressing this button causes the controller to broadcast Neuron ID and Program ID. This action also turns on LED4.
SW2	This is the reset button. Pressing SW2 for more than 10 seconds reboots the controller. It starts the same operation as does rebooting the controller from either the controller or the PC software. All RAM data is permanently lost. Note: Before pressing this button, attempt to restart the controller by cycling power; this method retains the RAM image.

Symptom/action troubleshooting

Table 11 provides a list of symptoms that indicate a problem in the Tracker system. For each symptom, the table provides one or more actions that you can perform in an attempt to resolve the problem.

Table 11. Symptom/action troubleshooting

Symptom	Action
Tracker controller does not communicate by modem.	• Verify that the telephone cable is connected to the PC modem port (Figure 21). • Verify that the phone line is an analog line (not digital). • Perform the modem self-test procedure from the display module. Note: The modem is an integral component of the main module and is not field replaceable. Replacement of the modem requires replacement of the main module.
Tracker controller does not communicate by EIA-232 port.	• Verify that the cable is connected to the PC direct connect port (Figure 21). • Verify that the proper cable is used. (Refer to Table 8.) • Verify that the PC workstation is using the Tracker controller software; other communications software will not work.
Tracker controller did not discover UCMs when initially started.	When the controller is initially powered up, it automatically discovers all communicating UCMs of the proper type and installs them into its database. The discovery process takes several minutes, depending on how many UCMs are installed on the communication link. After the controller has built its database after the initial power up, the controller no longer automatically discovers UCMs. If you want to initiate the discovery process, you must do so manually. Initiate the discovery process when a new UCM is added to the system or an existing UCM is replaced. • Verify proper wiring of the Comm5 communication link. (UCMs can be discovered only if Comm5 communication has been established.) • Wait at least 5 minutes for the controller to discover the UCMs. Note: You can press the reset button on a UCM at any time to check if it is communicating with the controller. Pressing the reset button causes the UCM status LED to flash on and off (known as "winking"), if the controller is communicating with that UCM.
Touch screen beeps when touched but does not progress to the next screen.	Touch screen is out of calibration. • Perform the procedures for calibrating the touch screen in *Tracker Building Automation System Controller Operations* guide (BMTK-SVU01-EN).
Touch-screen back light and contrast is out of adjustment.	• Perform the adjust brightness and contrast procedure from the display module.
Tracker I/O status is wrong.	• Verify electrical connection using the post-installation checklist (Table 15). • Verify I/O status as indicated on home display on the display module. • Display Tracker I/O status self test from display module.
Tracker alarm output is not working as expected.	• Confirm proper wiring of the alarm relay output. Consult the post-installation checklist (Table 15 on page 52) for details. • Initiate the BOP self test from the display module. Note: The binary output is for alarm notification only. There must be an unacknowledged alarm present of the proper severity to actuate the alarm output.

Table 11. Symptom/action troubleshooting (Continued)

Symptom	Action
Tracker controller will not communicate with its UCMs.	• Look for wiring problems (shorts or opens, for example) that develop when wire is damaged during installation. • Look for shorts between the two conductors resulting from nicks in the insulating jacket. (This can be caused by improper technique when stripping away the outer jacket and shield.) • Look for a strong source of EMI/RFI interference nearby. • Look for ac power disturbances from nearby transformers and electrical equipment. This is especially true when running communication links in close proximity to florescent lighting ballasts. • Verify the UCM has not failed. • Verify proper termination resistance.
Tracker processor is locked up.	• Cycle power to the Tracker main module by removing it from the termination module. • If the processor is still locked up after cycling power to the controller, perform a reboot from the display module or the PC software (if the controller is able to communicate). • If the controller will not respond to the above listed methods, push the reset button (SW2) on the main module (see Figure 24). Note: Heartbeat LED (STATUS LED1) will be solid green.
Alarm LED on the display is flashing red.	• At the Tracker controller user interface home screen, push the alarm button on the display module to acknowledge the alarm, then take the proper corrective action. Note: The alarm LED flashes when the controller receives an alarm of the appropriate severity. Pressing the Alarm button acknowledges the alarm and turns off the flashing LED (until the controller receives another alarm of the appropriate severity).
Tracker controller is annunciating an alarm.	• At the Tracker controller user interface home screen, push the alarm button on the display module to acknowledge the alarm, then take the proper corrective action. Note: The alarm relay energizes when the controller receives an alarm of the appropriate severity. Pressing the alarm button acknowledges the alarm and turns off the alarm relay output (until the controller receives another alarm of the appropriate severity).
Display module is not illuminated.	• Press anywhere on the touch screen surface to turn the back light on. The controller automatically turns off the back light during extended periods of inactivity to conserve energy and bulb life. • Confirm that the controller has 24 Vac power. When the display module has power, the alarm LED will be either solid green or flashing red.
Display module does not respond to the touch.	• Confirm that the controller has 24 Vac power. When the display module has power, the alarm LED will be either solid green or flashing red. • If the display module is not responding correctly when the display module is powered up and the back light is on, initiate the touch-screen calibration procedure from the display module.
Tracker controller displays the wrong date.	• Verify if the electrical power has been off for more 5 days at room temperature (the actual time varies depending on storage temperature). Note: The controller default date (displayed when the controller is initially powered up or whenever the super capacitor is unable to back up the controller time) is January 1, 2000.

Table 11. Symptom/action troubleshooting (Continued)

Symptom	Action
Outdoor air temperature is not reading correctly.	• Measure the resistance of the outdoor air temperature thermistor (preferably at the termination module). Check the measurement using Table 16. • Inspect the location of the outdoor air temperature sensor. It must not be mounted in the sunlight or near another source of radiant heat. Note: The outdoor air temperature sensor can be used for this purpose only.
Ethernet link is not detected (on the Ethernet board, the left LED is off)	• Verify that the correct type of cable is used. When communicating over a network, use a patch cable. When communicating to an Ethernet card on a lap top computer, use a crossover cable.

Maintenance

The only maintenance necessary for the controller is to occasionally clean and calibrate the touch screen.

Cleaning the touch screen

To clean the touch screen, wipe it off with a non-abrasive cloth. For more aggressive cleaning, use low-pressure compressed air to blow off the surface and then wipe it off with a non-abrasive cloth.

To clean fingerprints from the touch screen, lightly spray it with a mild glass cleaner. Immediately wipe the touch screen with an absorbent, non-abrasive cloth.

CAUTION
Avoid Equipment Damage!
Immediately wipe moisture from the surface of the LCD touch screen. Failure to do so will cause the operator display to malfunction.

Calibrating the touch screen

To calibrate the touch screen:

1. At the Tracker home screen, press the Advanced button. The Advanced Selections screen displays.
2. Press the Calibrate Touch Screen button. A calibration screen displays.

CAUTION
Avoid Equipment Damage!
Do not allow the touch screen to come in contact with sharp objects.

3. Touch the target using a small, pliable, blunt object, such as a pencil eraser. Hold until the beeping stops. A second calibration screen displays.
4. Again, touch the target with the object. Hold until the beeping stops. The Advanced Selection screen displays.

To exit this procedure, press the Home button. The home screen displays.

Appendixes

Required supplies

Table 12 lists the supplies required for all Tracker installations.

Table 12. Required supplies checklist

☑	Wiring installation	Item
☐ ☐	24 Vac	18 AWG (1.02 mm^2) wire recommended 24 Vac, 40 VA minimum transformer
☐	Comm	Communication wire (see Table 6 on page 27 and Table 6 on page 28 for specifications)

Optional supplies

Table 13 lists the supplies that may or may not be necessary, depending on the Tracker installation.

Table 13. Optional supplies checklist

☑	Inputs/output wiring installation	Item
☐	Alarm relay wiring	18 AWG (1.02 mm^2) wire and metal conduit
☐	Priority shutdown wiring and Meter input	18—22 AWG (1.02 mm^2—0.643 mm^2) wire and metal conduit
☐	Thermistor wire	18—22 AWG (1.02 mm^2—0.643 mm^2) twisted pair, shielded wire
☐	Alarm relay power supply	Power supply for alarm relay output (not to exceed 24 Vac)
☐	Alarm relay output load	Load for alarm relay output (not to exceed 1 amp at 24 Vac)
☐	Thermistor	Outdoor air temperature sensor

Comm5 UCM identification and location

Each UCM has a unique 12-digit identifier that serves as its address. The Tracker controller uses the address to communicate with the UCM. The installer must know the UCM addresses when assigning names to UCMs during setup.

Use Table 14 to record the name, location, and ID of each UCM (SCCs, VariTrac CCPs, and I/O modules) connected to the Comm5 link. The 12-digit identifier is on a sticker attached to the UCM. Some UCMs have peel-away stickers that can be detached and applied to the table.

Table 14. Comm5 UCM identification and location

Space Comfort Controllers (24 maximum)		
Edited name	**Location or area served**	**12-digit ID**
I/O modules (4 maximum)		
Edited name	Location or area served	12 digit ID

Pre-installation wiring notes

The wiring for the Tracker system will have been completed prior to Tracker installation. All Tracker wiring conforms to the following guidelines:

- The Tracker controller receives 24 Vac from a dedicated power circuit. If not, the Tracker controller may malfunction.
- Each UCM receives 24 Vac from a dedicated power source. If not, the UCM may malfunction.
- Input wires and ac power wires are run in separate conduits or wire bundles. If not, the Tracker controller may malfunction due to induced electrical noise.
- Comm5 cable and ac power wires are run in separate conduits or wire bundles. If not, the Tracker controller may malfunction due to induced electrical noise.
- UCM communication cables do not run near lighting ballasts or other transformers. If they do, the UCM may malfunction due to induced electrical noise.

Termination module post-installation checklist

Use Table 15 to verify that the circuits connected to the termination board on the termination module are wired correctly. Record test results in the "Actual value" column.

Table 15. Termination module post-installation checklist

Circuit	Mandatory wiring	Test	Actual value
24 Vac TB1-1, TB1-2, TB1-3	✓	Measure the voltage between TB1-1 and TB1-2. It must be 24 Vac nominal (19 Vac to 30 Vac).	
		Measure the voltage between TB1-1 and TB1-3. It must be approximately the same voltage as measured between TB1-1 and TB1-2	
		The ground wire must be connected to terminal TB-3. It must be tied to building or earth ground at nearest location. Measure the voltage between TB1-2 and TB1-3. It must be approximately 0 V.	
Alarm relay TB1-4, TB1-5		Measure the voltage between TB1-4 and TB1-5. It must not exceed 24 Vac. these two terminals. The user-supplied load should now be energized and active.	
Priority shutdown TB1-6, TB1-7		There must be no voltage applied to these terminals. These terminals must be connected to dry contacts only. Measure the resistance between TB1-6 and TB1-7. It must be approximately 0 Ω with the user-supplied contacts in the closed position, and infinity ohms with the contacts in the open position.	
Meter input TB1-8, TB1-9		There must be no voltage applied to these terminals. The terminals must be connected to dry contacts only. Measure the resistance between TB1-8 and TB1-9. It must be approximately 0 Ω with demand meter contacts in the closed position, and infinity ohms with the contacts in the open position.	

Table 15. Termination module post-installation checklist (Continued)

Circuit	Mandatory wiring	Test	Actual value
Thermistor TB1-10, TB1-11, TB1-12		There must be no voltage applied to these terminals. The cable shield must be connected to terminal TB1-12. Measure the resistance between TB1-10 and TB1-11.	
		Note the approximate temperature at the location of the outdoor air temperature sensor.	
		Compare the resistance and temperature values to the listed values in Table 16 on page 53.	
Comm TB1-13, TB1-14, TB1-15	✓	There must be no voltage applied to these terminals. Measure the resistance between TB1-13 and TB1-14. The resistance must be approximately 50 Ω with daisy-chained wiring. This test confirms the correct usage of the termination resistors as well as the continuity of the wire.	

Table 16. Thermistor sensor electrical characteristics

Temperature ($^{\circ}$F)	Temperature ($^{\circ}$C)	Sensor resistance (ohms x 1000)
–30	–34	241.1
–20	–29	170.1
–10	–23	121.4
0	–18	87.6
10	–12	63.8
20	–7	46.9
30	–1	34.5
40	4	26.2
50	10	20.0
60	16	15.3
70	21	11.9
77	25	10.0
80	27	9.3
90	32	7.3
100	38	5.8
110	43	4.7
120	49	3.8
130	54	3.0
140	60	2.5
150	66	2.0

Appendix B: Declaration of CE Conformity

Manufacturer name:	Trane
Manufacturer address:	4833 White Bear Parkway Saint Paul, MN 55110 USA

The manufacturer hereby declares that the product:

Product name:	Tracker model 12, 24, and water-source heat pump (WSHP)	
Product numbers:	BMTK000AAB0110	BMTKKBBAAB0110
	BMTK000AAB0210	BMTKKBBAAB0210
	BMTK000AAB0510	BMTKKBBAAB0510
	BMTK000ABB0110	BMTKKBBABB0110
	BMTK000AAB0210	BMTKKBBABB0210
	BMTK000ABB0510	BMTKKBBABB0510

Conforms to the following standards or other normative documents:

Electromagnetic Emission:	EN61326-1:2006	Class A for radiated and conducted emission
(by Council Directive 89/336/EEC)		
Electromagnetic Immunity:	Industrial locations:	EN 61326-1:2006
		EN 61000-3-2:2006
		EN 61000-3-3:1995 +A1:2001+A2:2006
UL and C-UL listing	916, Energy management equipment	
Flammability rating	UL 94-5V (UL flammability rating for plenum use)	
FCC	FCC part 15, Class A, CFR 47	

Where and When Issued:	Electromagentic Emission	12/08/2009 - 12/11/2008
	Electromagentic Immunity	12/08/2009 - 12/11/2008
	Saint Paul, Minnesota USA	

Mark of Compliance:

$C\!\in$

European Contact
Sociеτе 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

This document validates CE conformity of the Tracker model 12, 24, and water-source heat pump

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