



## Installation Instructions

### Tracer® MP503 I/O Module

Order Number: 4950-0490, 4950-0590

The Tracer MP503 input/output (I/O) module is a field-installed device used to monitor inputs and control binary outputs. The I/O module has four (4) universal inputs that can be configured as binary, thermistor, 0–20 mA, or 0–10 Vdc, and four (4) binary outputs. The MP503 is available in:

- Frame Mount (PN 4950-0490); with a MP503 circuit board fastened to a metal back plate and a removable molded resin cover.
- Metal Enclosure (PN 4950-0590); with a MP503 circuit board fastened to the back plate of the metal enclosure and a removable metal cover.

Visually inspect all parts for obvious defects or damage. All components are thoroughly inspected before leaving the factory. Any claims for damage incurred should be filed with the carrier.

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#### 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.

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## 1 Warnings, Cautions, and Notices

Read this manual thoroughly before operating or servicing this unit. 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:

**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 equipment or property-damage only accidents.

**NOTICE** 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-including industry replacements for CFCs such as HCFCs and HFCs.

### 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.

## 2 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 electrical codes.

## WARNING

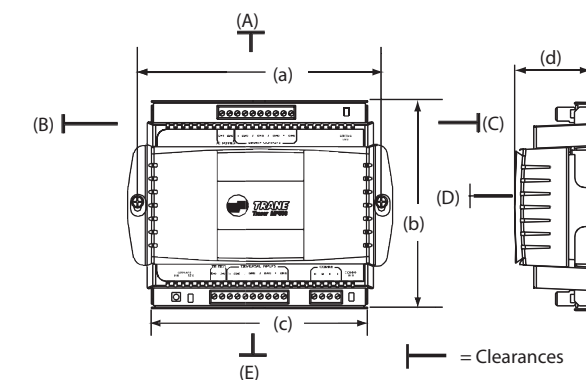
**Personal Protective Equipment Required!**  
Installing/servicing this unit could result in exposure to electrical, mechanical and chemical hazards. Before installing/servicing this unit, technicians MUST put on all Personal Protective Equipment (PPE) recommended for the work being undertaken. ALWAYS refer to appropriate SDS sheets and OSHA guidelines for proper PPE. When working with or around hazardous chemicals, ALWAYS refer to the appropriate SDS sheets and OSHA guidelines for information on allowable personal exposure levels, proper respiratory protection and handling recommendations. If there is a risk of arc or flash, technicians MUST put on all necessary Personal Protective Equipment (PPE) in accordance with NFPA70E for arc/flash protection PRIOR to servicing the unit. Failure to follow recommendations could result in death or serious injury.

### Storage/Operating Specifications

|                     |   |
|---------------------|---|
| <b>Temperature:</b> | -40°F to 185°F (-40°C to 85°C)  |
| <b>Humidity:</b>    | 5–95%, non-condensing   |
| <b>Temperature:</b> | From 32°F to 140°F (0°C to 60°C)  |
| <b>Humidity:</b>    | 5–95%, non-condensing   |
| <b>Power:</b>       | <ul style="list-style-type: none"> <li>• 20–30 Vac (24 Vac nominal), 50–60 Hz</li> <li>• 10 VA per I/O module and a maximum of 12 VA per output utilized</li> </ul> |

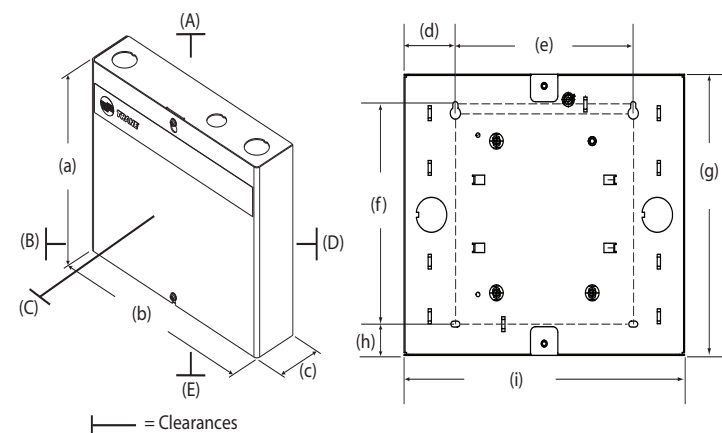
|   |   |
|---|---|
| <b>Mounting Weight:</b>                   | <ul style="list-style-type: none"> <li>• Frame Mounted: Mounting surface must be able to support 4lb (2 kg)</li> <li>• Mounting surface must be able to support 16 lb (7.5 kg)</li> </ul> |
| <b>Altitude, Installation, Pollution:</b> | 6,500 ft (2,000 m), Category 3, Degree 2  |

### Dimension/Clearances for Frame Mount



| Clearances |                | Dimensions |                    |
|------------|----------------|------------|--------------------|
| A          | 1 in. (25 mm)  | a          | 6.313 in. (160 mm) |
| B          | 4 in. (102 mm) | b          | 5.375 in. (137 mm) |
| C          | 4 in. (102 mm) | c          | 5.625 in. (143 mm) |
| D          | 1 in. (25 mm)  | d          | 2 in. (51 mm)      |
| E          | 4 in. (102 mm) | e          | 6.875 in. (175 mm) |

## 4 Dimension/Clearances for Metal Enclosure



| Clearances |                 | Dimensions |                                  |
|------------|-----------------|------------|----------------------------------|
| A          | 1 in. (25 mm)   | a          | 9 in. (229 mm)                   |
| B          | 2 in. (51 mm)   | b          | 10.37 in. (263 mm) Without Cover |
| C          | 24 in. (610 mm) | c          | 2.25 in. (58 mm)                 |
| D          | 2 in. (51 mm)   | d          | 1.875 in. (48 mm)                |
| E          | 1 in. (25 mm)   | e          | 6.5 in. (165 mm)                 |
|            |                 | f          | 7 in. (178 mm)                   |
|            |                 | g          | 9 in. (229 mm)                   |
|            |                 | h          | 1 in. (25 mm)                    |
|            |                 | i          | 10.25 in. (260 mm) Without Cover |

## 5 Selecting Mounting Location

Recommendations:

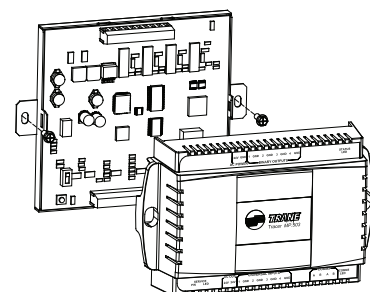
- In an indoor environment for protection from the elements.
- Where public access is restricted to minimize the possibility of tampering or vandalism.
- Near the controlled equipment to reduce wiring costs.
- Where is easily accessible for service personnel.

### Mounting

#### Frame Mount

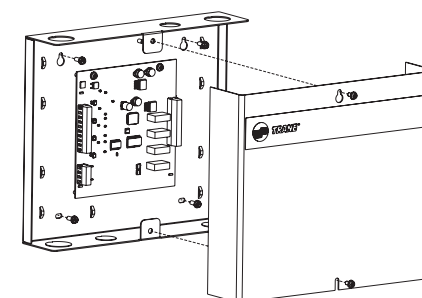
**Important:** Mount the Tracer MP503 with the cover on to avoid damaging the circuit board during installation.

1. Using the module as a template, mark the location of the two (2) mounting holes on the mounting surface as shown below.
2. Set aside the module and drill holes for the screws at the marked locations
3. Drill holes for #10 screws (5 mm) or #10 wall anchors. Use wall anchors if the mounting surface is dry wall or masonry.
4. Insert wall anchors if needed.
5. Secure the module to the mounting surface with #10 (5 mm) screws (not included). Attach the frame mount module securely so that it can withstand the vibrations of associated heating, ventilating, and air-conditioning (HVAC) equipment.



## 6 Metal Enclosure

1. Remove the two (2) cover screws and then the cover.
2. Using the enclosure as a template, mark the location of the four (4) mounting holes on the mounting surface as shown below.
3. Set aside the module and drill holes for #10 screws (5 mm) or #10 wall anchors. Use wall anchors if the mounting surface is dry wall or masonry.
4. Insert wall anchors if needed.
5. Secure the module to the mounting surface with #10 (5 mm) screws (not included).



## 7 AC Power Wiring

**Important:** Ensure that the 24 Vac power supplies are consistently grounded. Do not share 24 Vac between controllers.

The recommended wire for ac power is 16 AWG copper wire. All wiring must comply with National Electrical Code™ (NEC) and local codes.

If providing a new transformer for power, use a UL-listed Class 2 power transformer supplying a nominal 24 Vac (20–30 Vac). The transformer must be sized to provide adequate power to the MP503 (10 VA) and outputs (a maximum of 12 VA per output utilized).

#### WARNING

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

#### CAUTION

**Injury and Equipment Damage!**  
Ensure that the 24 Vac transformer is properly grounded. Failure to do so may result in personal injury and/or damage to equipment.

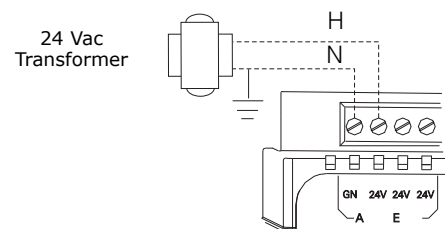
#### CAUTION

**Equipment Damage!**  
Complete input/output wiring before applying power to the controller. Failure to do so may cause damage to the controller or power transformer due to inadvertent connections to power circuits. Do not share 24 Vac between controllers. Failure to do so may cause controller damage.

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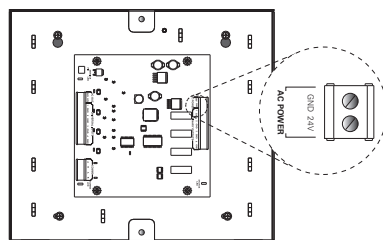
### Wiring AC Power to the Frame Mount

1. Connect the ground wire from the 24 Vac transformer to the GND terminal as shown below.
2. Connect the power wire to the 24V terminal.



### Wiring AC Power to the Metal Enclosure

1. Remove the cover of the enclosure.
2. Remove the knockout for the 0.5 in. (13 mm) conduit from the enclosure and attach the conduit.
3. Feed the power wire into the enclosure.
4. When mounting on dry wall or other non-conductive surface, connect an earth ground to the earth-ground screw on the enclosure.
5. Connect the ground wire from the 24 Vac transformer to the GND terminal as shown below.
6. Connect the power wire to the 24V terminal.
7. Replace the cover of the enclosure.



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### Communication Link Wiring

The Tracer MP503 communicates with the building automation system (BAS) and with other controllers by means of a LonTalk™ (formerly called Comm5) communication link. For instructions on LonTalk communication wiring and addressing, refer to the Tracer Summit Hardware and Software Installation Guide (BMTW-SVN01), the Tracker Building Automation System Hardware Installation Guide (BMTK-SVN01), or another BAS installation manual.

### Input/Output Terminal Wiring

All input/output terminal wiring for the Tracer MP503 must meet the following requirements:

- All wiring must be in accordance with the National Electrical Code™ (NEC) and local codes.
- Use only 18–22 AWG, stranded, tinned-copper, shielded, twisted-pair wire.
- Binary output wiring must not exceed 1000 ft (300 m).
- Binary input and 4–20 mA input wiring must not exceed 1000 ft (300 m).
- Thermistor input and 0–10 Vdc input wiring must not exceed 300 ft (100 m).
- Do not run input/output wires in the same wire bundle with any AC-power wires.

### 24 Vdc Outputs

The Tracer MP503 provides power for mA and Vdc sensors. The DC OUT 24V outputs are current-limited to 80mA (refer to Panel 11). If sensors draw more than 80mA, the output of the circuit drops from 24V to 0V. Periodically, the circuit is turned On to test the current draw and if the draw is less than 80mA, the 24V DC OUT output returns to 24Vdc.

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### Binary Outputs

The binary outputs are form A (SPST) relay outputs. These relays are not dry contacts; they switch 24 Vac. A pilot relay is required for any application requiring dry contacts. Relays connected to the binary outputs on the I/O module cannot exceed 12 VA or 0.5 A current draw at 24 Vac.

### Universal Inputs

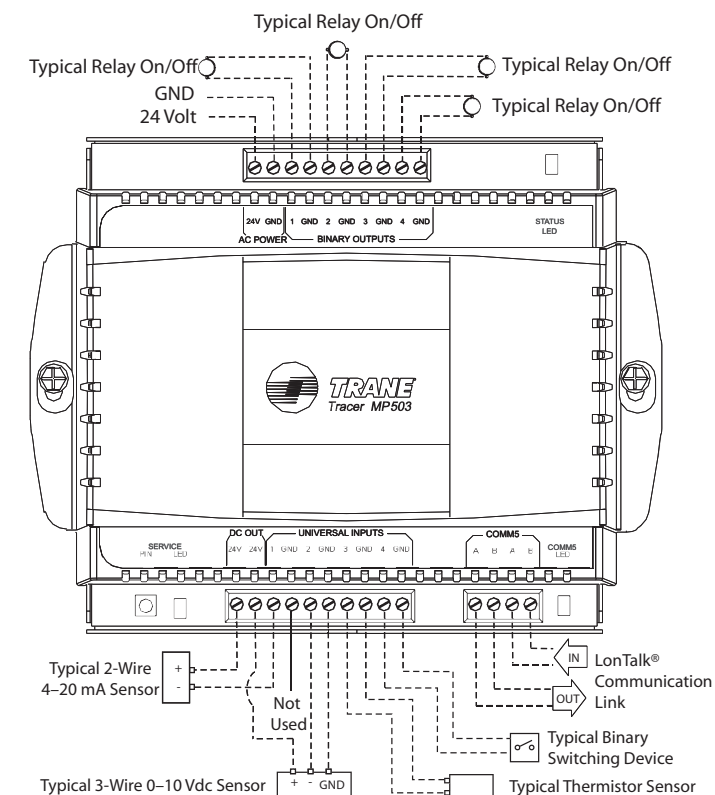
Each of the four (4) universal inputs may be configured as:

- Binary
- Thermistor
- 0–20 mA
- 0–10 Vdc

You can configure each input using the device plug-in and a service tool, such as the Rover™ service tool. The inputs are software configurable only; there are no jumpers to set on the circuit board. The inputs are factory-configured to be thermistors. The following illustration shows some typical sensor types wired to the Tracer MP503.

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### Input/Output Terminal Wiring



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### Agency Listings and Compliance

- CE marked
- UL and C-UL 916 listed: Energy Management Equipment— PAZX (U.L.916)
- UL 94-5V (UL flammability rating for plenum use)
- FCC Part 15, Subpart B, Class B

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

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