



## Installation Instructions

### ZN521 Zone Controller

Order Number: 4950-0470, 4950-0570

The Tracer ZN521 is a field-installed designed to control fan coils, unit ventilators, and blower coils. It follows the guidelines of the LonMark™ Space Comfort Controller (SCC). The ZN521 is available in:

- Frame Mount (PN 4950-0470); with a ZN521 circuit board fastened to a metal back plate and a removable molded resin cover.
- Metal Enclosure (PN 4950-0570); with a ZN521 circuit board fastened to the back piece 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

3270 3321

**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.

June 2020

BAS-SVN117F-EN

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## 1 Warnings, Cautions, and Notices

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.

## Storage and Operating Specifications

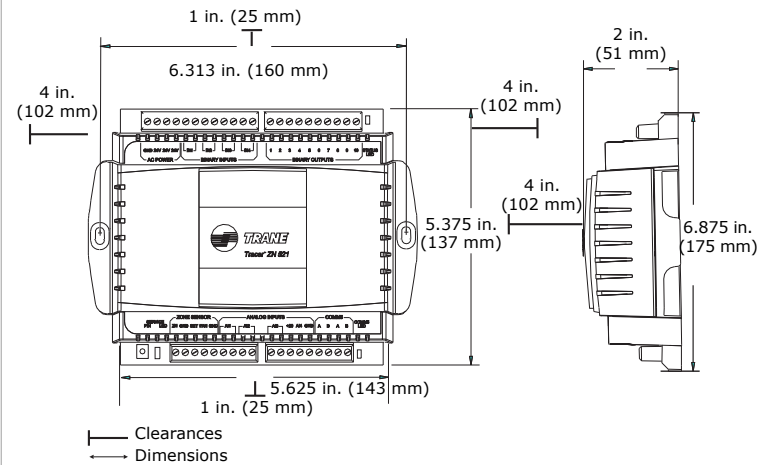
Storage	
Temperature:	-40°F to 185°F (-40°C to 85°C)
Humidity:	5-95%, non-condensing
Operating	
Temperature:	From 32°F to 140°F (0°C to 60°C)
Humidity:	5-95%, non-condensing
Power:	<ul style="list-style-type: none"> <li>• 19-30 Vac (24 Vac nominal), 50-60 Hz</li> <li>• 14 VA per controller and a maximum of 12 VA per output utilized</li> </ul>
Mounting weight (frame-mount):	Mounting surface must be able to support 2 lb (1 kg)
Mounting weight (metal enclosure):	Mounting surface must be able to support 8 lb (4 kg)
Altitude, Installation, Pollution:	6,500 ft (2,000 m), Category 3, Degree 2

## 2 Location

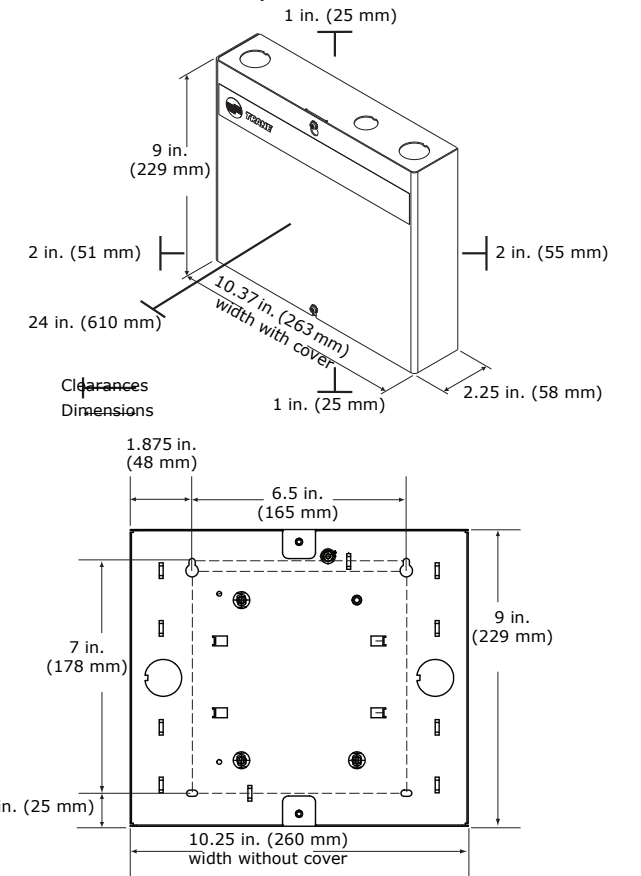
For fan coil or unit ventilator applications, the frame-mount controller can usually be mounted inside the end pocket of the unit. For blower coil applications, the frame-mount controller should be mounted on the side of the unit. For other applications, Trane recommends locating either the frame-mount or the metal-enclosure controller:

- 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 piece of equipment to reduce wiring costs
- Where it is easily accessible for service personnel

## Dimensions and Clearances; Frame Mount



## 3 Dimensions and clearances; Metal Enclosure



## 4 Mounting the Frame Mount Controller

### IMPORTANT

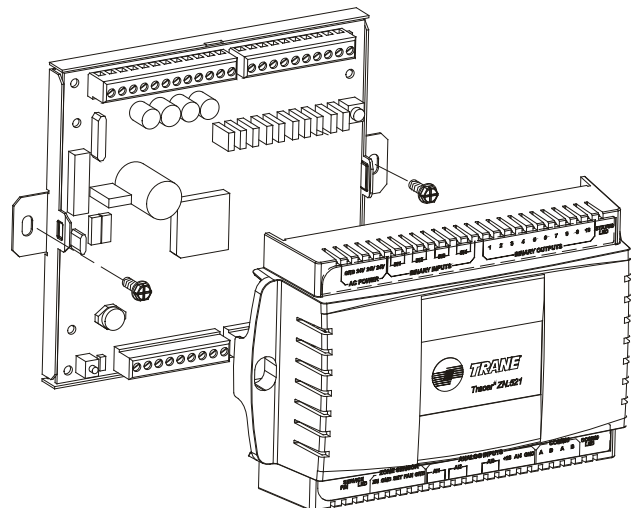
Mount the Tracer ZN521 with the cover on to avoid damaging the circuit board during installation.

To mount the frame-mount controller:

1. Using the module as a template, mark the location of the two mounting holes on the mounting surface as shown below.
2. At the marked locations, drill holes for #10 (5 mm) screws or #10 wall anchors.

**Note:** Insert wall anchors if the mounting surface is sheetrock or masonry.

3. Attach the controller securely with #10 (5 mm) screws (not included) so that it can withstand the vibrations of associated heating, ventilating, and air-conditioning (HVAC) equipment.



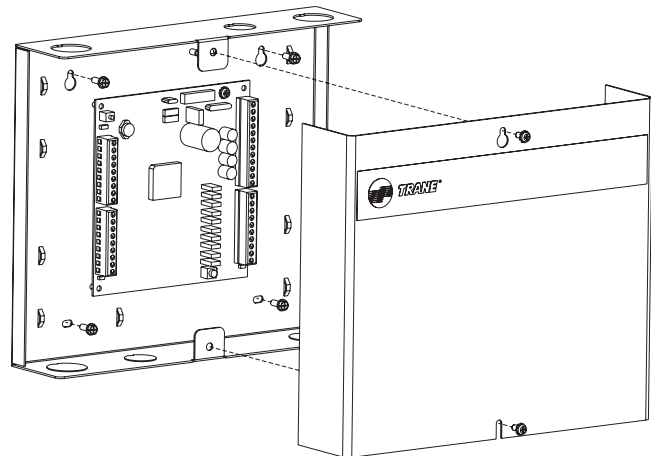
## 5 Mounting the Metal Enclosure Controller

To mount the metal-enclosure controller:

1. Remove the two cover screws and then the cover.
2. Using the enclosure as a template, mark the location of the four mounting holes on the mounting surface as shown below.
3. At the marked locations, drill holes for #10 (5 mm) screws or #10 wall anchors.

**Note:** Insert wall anchors if the mounting surface is sheetrock or masonry.

4. Attach the enclosure to the mounting surface with #10 (5 mm) screws (not included) so that it can withstand the vibrations of associated heating, ventilating, and air-conditioning (HVAC) equipment.



## 6 Agency Listings and Compliance

- CE marked
- UL and C-UL 916 listed: Energy management system
- UL 94-5V (UL flammability rating for plenum use)
- FCC Part 15, Class A
- ASHRAE Cycle 1 & Cycle 2

## 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™ and local codes.

If providing a new transformer for power, use a UL-listed Class 2 power transformer supplying a nominal 24 Vac (19-30 Vac). The transformer must be sized to provide adequate power to the Tracer ZN521 (14 VA) and output devices, including relays and valve actuators (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.

## 7 CAUTION

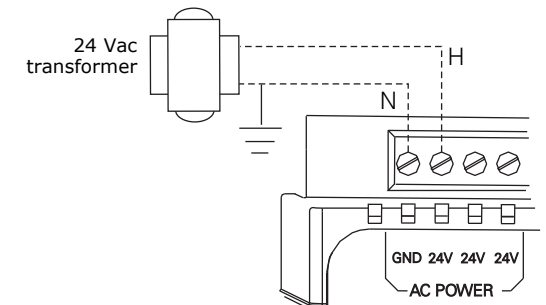
### Equipment Damage!

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.

## Wiring AC Power; Frame Mount

To connect ac-power to the frame-mount controller:

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.

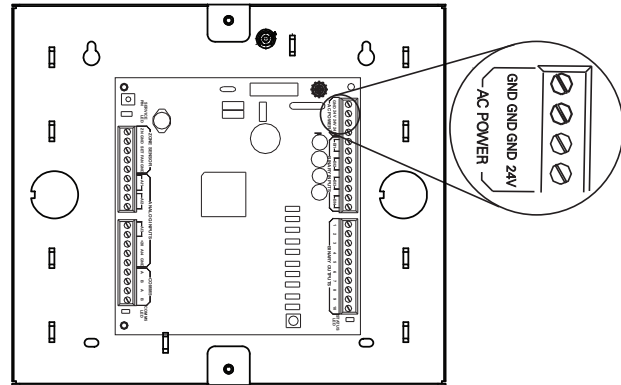


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**Wiring AC Power; Metal Enclosure**

To connect ac-power wiring to the 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 (Figure 7).
- 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 ZN521 communicates with the building automation system (BAS) and with other controllers by means of a Comm5 communication link. Comm5 is Trane’s implementation of LonTalk®. For instructions on Comm5 communication wiring and addressing, follow the *Tracer Summit Hardware and Software Installation* guide (BMTW-SVN01D), the *Tracer Building Automation System Hardware Installation* guide (BMTK-SVN01B), or another BAS installation manual.

**Input/Output terminal wiring**

All input/output terminal wiring for the Tracer ZN521 is application specific. Input/output terminal wiring must meet the following requirements:

- All wiring must be in accordance with the National Electrical Code and local codes.
- Use only 18–22 AWG, stranded, tinned-copper, shielded, twisted-pair wire.
- Binary input and output wiring should be a maximum length of 300 ft (100 m).
- Analog input wiring should be a maximum length of 300 ft (100 m).
- Do not run input/output wires in the same wire bundle with any ac power wires.

Binary inputs, binary outputs, and analog inputs are identified by label and function in Table 1, Table 2, and Table 3, respectively. See the latest edition of the *Tracer ZN521 Zone Controller Installation and Operation* guide (CNT-SVX07) for application-specific wiring diagrams.

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**Table 1. Binary inputs**

Binary input	Functions
BI1	• Low temperature detection
BI2	• Condensate overflow
BI3	• Occupancy • Generic
BI4	• Fan status

**Table 2. Binary outputs**

Binary output	Functions
1	• Fan high
2	• Fan medium • Exhaust fan or damper
3	• Fan low
4	• Modulating cooling/changeover valve, open • Two-position cooling/changeover valve, open • DX cooling
5	• Modulating cooling/changeover valve, close • Face-and-bypass damper, open to face
6	• Modulating heating valve, open • Two-position heating valve • Electric heat, stage 1
7	• Modulating heating valve, close • Face-and-bypass damper, close (bypass) • Electric heat, stage 2
8	• Outdoor air damper, open
9	• Outdoor air damper, close

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**Table 2. Binary outputs (continued)**

Binary output	Functions
10	• Baseboard heat • Generic

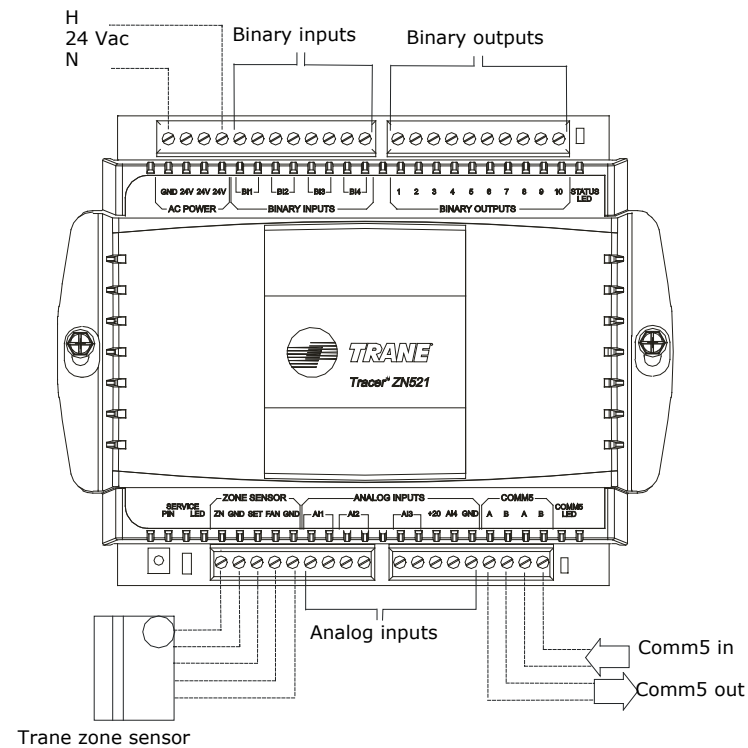
**Notes:** The common wire should be connected to the appropriate binary output terminal and the hot wire should be connected to one of the ac power 24 V (24V) terminals.

**Table 3. Analog inputs**

Analog input	Functions
ZN	• Zone temperature
SET	• Local setpoint
FAN	• Fan mode input
AI1	• Leaving water temperature
AI2	• Discharge air temperature
AI3	• Outdoor air temperature • Generic temperature (thermistor)
AI4	• Relative humidity • Generic 4–20 mA input (example: CO <sub>2</sub> )

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**Input/Output Terminal Wiring**



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**Declaration of Conformity**

**Manufacturer's Name:** Trane  
**Manufacturer's Address:** 4833 White Bear Parkway  
 St. Paul MN 55110  
 USA

The manufacturer hereby declares that the product

**Product Name:** Unit Ventilator and Blower Coil Retrofit Controller  
**Model Number:** ZN521 (4950 0470 and 4950 0570)

Conforms to the following standards or other normative documents:

**Electromagnetic Emission:** EN50081-1:1992  
 (by Council Directive 89/336/EEC) Radiated EN55022:1994 Class A limit: 4950 0570  
 Class B limit: 4950 0470  
 Conducted EN55022:1994 Class B limit

**Electromagnetic Immunity:** EN50082-2:1995  
 (by Council Directive 89/336/EEC) IEC 1000-4-2:1995 ±4.0 kV by Contact  
 EN61000-4-2 IEC 1000-4-3:1995 10.0 V/m  
 EN61000-4-3:1996 80 ... 1000 MHz  
 Amendment A1:1998 IEC 1000-4-4:1995 ±2.0 kV Signal Lines  
 EN61000-4-4 ±2.0 kV AC Power Lines  
 IEC 1000-4-5 EN61000-4-5 IEC 1000-4-6:1996 10 V  
 EN61000-4-6 0.15 ... 80 MHz  
 IEC 1000-4-8:1993 30 A/m  
 EN61000-4-8 IEC 1000-4-11:1994  
 EN61000-4-11

**When and Where Issued**  
 Electromagnetic Emission 01/31/2001  
 Electromagnetic Immunity 02/08/2001

*John Olson*

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 Design/Compliance Engineer



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This document validates CE conformity of the European Unit Ventilator and Blower Coil Retrofit Controller, ZN521.

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