



**TRANE®**

*Cooling and Heating  
Systems and Services*

# Installation Guide

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## Tracer ZN523 Zone Controller



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**BAS-SVN003-E4**

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## Installation

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# Introduction

## About this manual

These instructions are given as a guide to good practice in the installation of Trane ZN523 LonMark® control. They do not contain the full service procedures necessary for the continued successful operation of this equipment. The services of a qualified service technician should be employed through a maintenance contract with a reputable service company. Cautions appear at appropriate places in this instruction manual. Your personal safety and the proper operation of this machine require that you follow them carefully. The constructor assumes no liability for installations or servicing performed by unqualified personnel.

**Figure 1: Installation guide use**



# Introduction

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## Controller description

The ZN523 unit controller is a microprocessor-based direct digital controller that is dedicated to the control and the optimization of chilled water terminal units.

ZN523 is designed to provide improved comfort with minimum energy consumption.

The controller uses the measured space temperature as well as discharge air temperature (in cascade control mode) and a control algorithm maintains space temperature at the active cooling setpoint (in cooling mode) or the active heating setpoint (in heating mode) while driving the fan at the lowest possible speed.

- LonMark® HVAC Space Comfort Controller profile 8501.
- Up to 3-speed fan motor control capability.
- Supports various configurations: 2 pipes cooling only, 2 pipes heating only, 2 pipes change over, 2 pipes change over + electric heat, 2 pipes cooling + electric heat, 4 pipes, chilled beam.
- Cascade Proportional Integral control loop space / supply air temperature, or single PI control loop for low profile applications.
- Intelligent 3-speed fan control for acoustic comfort.
- Pre-engineered Master / Slave capability for easy wall, floor arrangement changes.
- Automatic diagnostics control: sensor failure, freeze protection, condensate overflow, dirty filter.
- Designed for field and factory installation.
- Support of hot wax or 3 floating points valve actuators.
- Direct connection to fan.
- Direct control of electric heater (embedded relay with capacity of up to 1.8 kW).
- Capability of driving an external solid state relay for electric heater.
- Multiple mode of operation for occupancy conditions. (occupied / unoccupied / standby).
- PWM control of hot wax valves actuators.
- PWM control of electric heater.
- Automatic Change Over.
- Entering water temperature sampling in 2-way valves applications types.
- 230 Vac power supply.

When provided as a factory installed controller, Trane ZN523 is setup and tested during the assembly process and is ready to run when delivered to the customer's site.

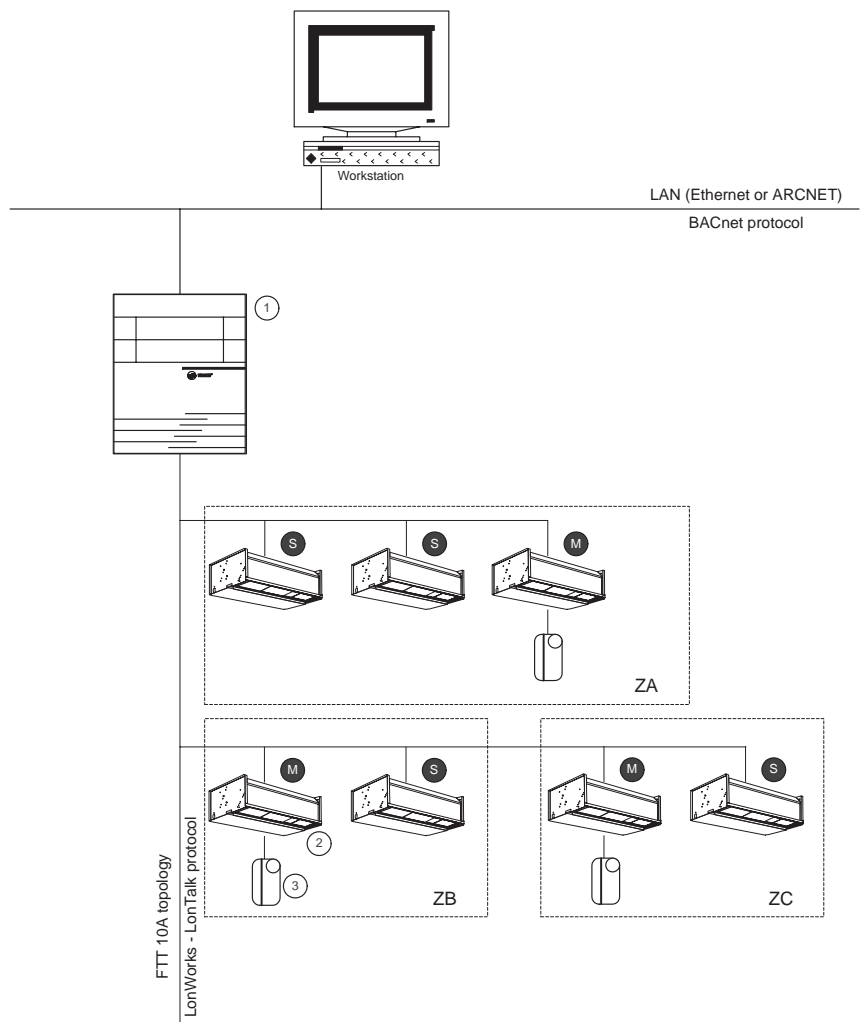
The use of a commissioning software, so called Trane Rover service tool, is required to adjust the various parameters of the controller.

# Introduction

## Typical network architecture

The Tracer zone controllers shown in the figure below can operate on a Tracer Summit™ building automation system, on a peer-to-peer network or as stand-alone devices.

*Figure 2 - ZN523 network architecture*



1. Tracer Summit™ Building Control Unit.
2. Terminal unit + ZN523.
3. Trane communicating zone sensor module.
- M. ZN523 controller with zone sensor
- S. ZN523 controller without zone sensor
- Z. Zone.

# Introduction

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## Hardware inspection

### Warranty

Warranty is based on Trane general terms and conditions. The warranty is void if the equipment is modified or repaired without the written approval of the constructor, if the operating limits are exceeded, or if the control system or the electrical wiring is modified. Damage due to misuse, lack of maintenance or failure to comply with the manufacturer's instructions is not covered by the warranty obligation. If the user does not conform to the instructions given in this document, it may entail cancellation of warranty and liabilities by the constructor.

### Reception

On arrival, inspect the unit before signing the delivery note. Specify any visible damage on the delivery note, and send a registered letter of protest to the last carrier of the goods within 72 hours of delivery. Notify the local Trane sales office at the same time. The delivery note must be clearly signed and countersigned by the driver. Any concealed damage shall be notified by a registered letter of protest to the last carrier of the goods within 72 hours of delivery. Notify the local Trane sales office at the same time.

Important notice: No shipping claims will be accepted by Trane if the above mentioned procedure is not respected.

Note: More stringent national rules can apply in some countries.

For more information, refer to the general sales conditions of your local Trane sales office.

# Mounting and wiring

## ZN523 mounting recommendations

To mount the ZN523 unit controller:

- Select a location, near the controlled equipment to reduce wiring costs, and EMC disturbance risks.
- Verify that the location conforms to the specifications below.
- Secure the controller to a 35 mm DIN rail. (Use only 10/10 mm thickness sheet).

Figure 3 - ZN523 mounting

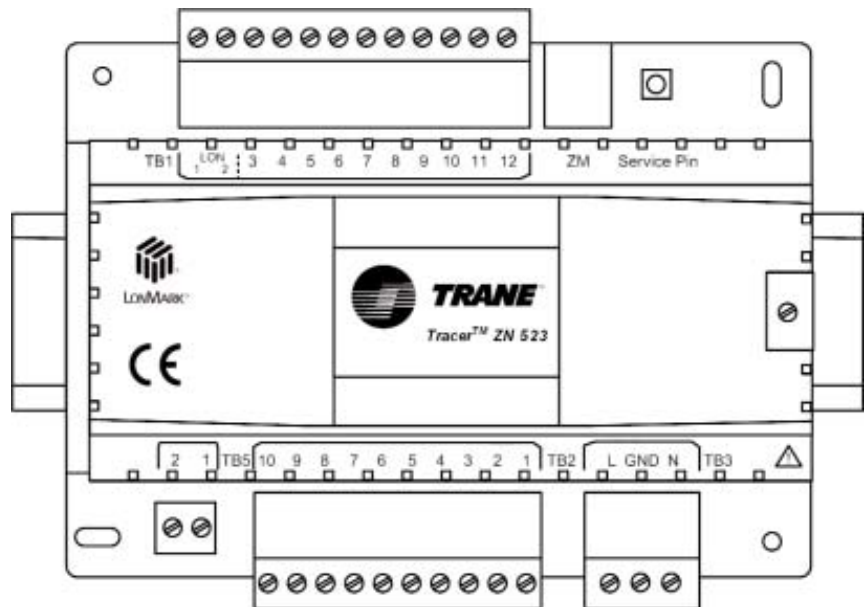


Table 1 - ZN523 unit controller specifications

|                              |  |
|------------------------------|--|
| <b>Board dimensions</b>      | 95 mm height x 132 mm width x 56 mm depth  |
| <b>Minimum clearances</b>    | Front 100 mm<br>Each side 25 mm<br>Top and bottom 100 mm   |
| <b>Operating environment</b> | Temperature: from 0° to 60°C<br>Relative Humidity: from 5% to 95% non-condensing<br>Dust protection: pollution level 1 |
| <b>Storage environment</b>   | Temperature: from -40° to 85°C<br>Relative Humidity: from 5% to 95% non-condensing                                     |

# Mounting and wiring

## ZN523 Power Supply recommendations

The ZN523 unit controller is powered by 230 Vac. A 3-wire quick-connect terminal (TB3) is provided for 230 Vac connection to the board.

To ensure the controller will operate properly, verify that the power supply circuit is in compliance with the following circuit requirements:

**Table 2 - Power supply recommendations**

|                           |  |
|---------------------------|--|
| <b>Power requirements</b> | 230 Vac (+10%/-15%)<br>50 or 60 Hz<br>3 A maximum (all outputs utilized)   |
| <b>Protection</b>         | The unit controller must receive power from a dedicated circuit, it must be protected by a 3 A circuit breaker/fuse located next to it.<br><br>The electric heater (when present ) must receive power from a dedicated circuit, it must be protected by a circuit breaker/fuse located next to it (value dependant on electric heater capacity). |
| <b>Recommended wire</b>   | The AC-power wiring requires three-wire 230 Vac service.<br>The recommended wire is 16 AWG (1.5mm <sup>2</sup> ) copper wire.  |
| <b>Standards</b>          | The AC-power wiring must comply with applicable local electrical codes.<br><br>89/336/EEC European directive for electromagnetic compatibility:<br>- Immunity: 61000-6-1<br>- Emission: 61000-6-3<br><br>73/23/EEC European directive for low voltage electrical equipment:<br>- EN 60335-1<br>- EN 60335-2-40                                   |



# Mounting and wiring

## ZN523 inputs wiring recommendations and restrictions

### Binary inputs

Two binary inputs are available on ZN523. A third contact may be used in parallel with the analog input n°3.

Each binary input associates an input signal less than 2 Vdc with closed contacts and greater than 3 Vdc with open contacts.

The active state of each binary input can be adjusted as Normally Open / Normally Closed by using Trane commissioning tool.

### Analog Inputs

Three analog inputs are available on ZN523.

### Wiring recommendations

To ensure that the binary and analog inputs will operate correctly, verify that they are connected in compliance with the following recommendations:

**Table 3 - Binary inputs characteristics**

| Description                        | Tag | Terminals        | NO / NC       | Rating - Impedance                |
|------------------------------------|-----|------------------|---------------|-----------------------------------|
| Occupancy                          | BI1 | TB1-3<br>TB1-4   | Configurable  | 5 Vdc / 7.7 mA - 650 ohms maximum |
| Window contact                     | BI2 | TB1-5<br>TB1-6   | Configurable  | 5 Vdc / 7.7 mA - 650 ohms maximum |
| Condensate overflow (in // of AI3) | BI3 | TB1-11<br>TB1-12 | Normally Open | 5 Vdc / 7.7 mA - 650 ohms maximum |

**Table 4 - Analog inputs characteristics**

| Description                        | Function                        | Tag | Terminals | Range - Impedance                    |
|------------------------------------|---------------------------------|-----|-----------|--------------------------------------|
| Return air temperature             | Gnd                             | AI1 | TB1-7     | 10 kohms NTC (0°C .. 100°C)          |
|                                    | Return air temperature (RAT)    |     | TB1-8     |                                      |
| Water temperature                  | Gnd                             | AI2 | TB1-9     | 10 kohms NTC (0°C .. 100°C)          |
|                                    | Water temperature (WT)          |     | TB1-10    |                                      |
| Discharge air temperature (Note 1) | Gnd                             | AI3 | TB1-11    | 10 kohms NTC (0°C .. 100°C) (Note 2) |
|                                    | Discharge air temperature (DAT) |     | TB1-12    |                                      |

Note 1: A condensate overflow contact (BI3) might be wired in parallel of the discharge air temperature.

Note 2: Accuracy +/- 0.2 °C.

For thermistor resistance characteristics see appendix section.

**Table 5 - Inputs wiring recommendations**

|                         |  |
|-------------------------|--|
| <b>Inputs</b>           | Verify that sensors/contacts conforms to inputs specifications above     |
| <b>Recommended wire</b> | Use only 18-22 AWG, twisted pair with stranded, tinned-copper conductors |
| <b>Standards</b>        | All wiring must comply with the applicable local electrical codes        |

# Mounting and wiring

## ZN523 outputs wiring recommendations

Eight binary outputs are available on ZN523:

- 3 for fan motor speed control.
- 2 for cooling valve actuator control.
- 2 for heating valves actuator control.
- 1 for electric heater control.

**Table 6 - Binary outputs characteristics**

| Description                                  | Function              | Tag | Terminals | Output type | Output Rating                              |
|--|-----------------------|-----|-----------|-------------|--|
| Fan  | Fan high              | BO1 | TB2-1     | Relay       | 230 Vac, max 3 A                           |
|  | Fan medium            | BO2 | TB2-2     | Relay       | 230 Vac, max 3 A                           |
|  | Fan Low               | BO3 | TB2-3     | Relay       | 230 Vac, max 3 A                           |
|  | Fan neutral           |     | TB2-4     |             |  |
| Cool valve                                   | Cool open             | BO4 | TB2-5     | Triac       | 230 Vac, max 0.3 A (Note 1)                |
|  | Cool neutral          |     | TB2-6     |             |  |
|  | Cool close            | BO5 | TB2-7     | Triac       | 230 Vac, max 0.3 A (Note 1)                |
| Heat valve                                   | Heat open             | BO6 | TB2-8     | Triac       | 230 Vac, max 0.3 A (Note 1)                |
|  | Heat neutral          |     | TB2-9     |             |  |
|  | Heat close            | BO7 | TB2-10    | Triac       | 230 Vac, max 0.3 A (Note 1)                |
| Electric heat (triac)<br>+ solid state relay | Electric heat         | BO6 | TB2-8     | Triac       | 230 Vac, max 0.3 A (Note 2)                |
|  | Electric heat neutral |     | TB2-9     |             | This output must drive a solid state relay |
| Electric heat (relay)                        | Electric heat         | BO8 | TB5-2     | Relay       | 1.8 kW at 230 Vac max (note 3)             |
|  | Electric heat neutral |     | TB5-1     |             |  |

Note 1: Current peak must not exceed 0,8A during 20ms

Note 2: See table 8 for solid state relay characteristics, minimum triac PWM cycle time is 10 seconds.

Note 3: TB5 is a 2 points screw connector (torque 0,5 Nm). Minimum relay PWM cycle time is 360 seconds.

**Table 7- Typical valve actuator wiring**

| Actuator type     | Cooling valve       | Heating valve        |
|-------------------|---------------------|----------------------|
| Thermal (hot wax) | TB2-5, TB2-6        | TB2-8, TB2-9         |
| 3 floating points | TB2-5, TB2-6, TB2-7 | TB2-8, TB2-9, TB2-10 |

**Table 8 - Solid state relays characteristics**

| Switching mode | Rated operational voltage | Control voltage | Rated operational current | Input Impedance |
|----------------|---------------------------|-----------------|---------------------------|-----------------|
| Zero switching | 230 Vac rms               | 230 Vac         | From 2 A to 40 A (Note 1) | 60 kohms        |

Note 1: Electric heater from 500 W to 10 kW

Note 2: See appendix for solid state relay suggestions.

# Mounting and wiring

**Table 9: ZN523 output assignment.**

| Description            | Function              | Terminals | 2-pipe cooling only | 2-pipe heating only | 2-pipe change over | 2-pipe cooling + electric heat (relay) | 2-pipe cooling + electric heat (triac) | 2-pipe change over + electric heat (relay) | 2-pipe change over + electric heat (triac) | 4-pipe | Chilled beam (cooling only) | Chilled beam (cooling only + electric heat) |
|------------------------|-----------------------|-----------|---------------------|---------------------|--------------------|--|--|--|--|--------|-----------------------------|---|
| Fan                    | Fan high              | TB2-1     | x                   | x                   | x                  | x                                      | x                                      | x  | x  | x      |                             |   |
|                        | Fan medium            | TB2-2     | x                   | x                   | x                  | x                                      | x                                      | x  | x  | x      |                             |   |
|                        | Fan low               | TB2-3     | x                   | x                   | x                  | x                                      | x                                      | x  | x  | x      |                             |   |
|                        | Fan neutral           | TB2-4     | x                   | x                   | x                  | x                                      | x                                      | x  | x  | x      |                             |   |
| Cool valve<br>3-wire   | Cool open             | TB2-5     | x                   |                     | x                  | x                                      | x                                      | x  | x  | x      | x                           | x   |
|                        | Cool neutral          | TB2-6     | x                   |                     | x                  | x                                      | x                                      | x  | x  | x      | x                           | x   |
|                        | Cool close            | TB2-7     | x                   |                     | x                  | x                                      | x                                      | x  | x  | x      | x                           | x   |
| Heat valve<br>3-wire   | Heat open             | TB2-8     |                     | x                   |                    |  |  |  |  |        | x                           |   |
|                        | Heat neutral          | TB2-9     |                     | x                   |                    |  |  |  |  |        | x                           |   |
|                        | Heat close            | TB2-10    |                     | x                   |                    |  |  |  |  |        | x                           |   |
| Cool valve<br>Hot wax  | Cool open             | TB2-5     | x                   |                     | x                  | x                                      | x                                      |  |  | x      | x                           | x   |
|                        | Cool neutral          | TB2-6     | x                   |                     | x                  | x                                      | x                                      |  |  | x      | x                           | x   |
| Heat valve<br>Hot wax  | Heat open             | TB2-8     |                     | x                   |                    |  |  |  |  |        | x                           |   |
|                        | Heat neutral          | TB2-9     |                     | x                   |                    |  |  |  |  |        | x                           |   |
| Electric heat<br>Relay | Electric heat         | TB5-2     |                     |                     |                    | x                                      |  | x  |  |        |                             | x   |
|                        | Electric heat neutral | TB5-1     |                     |                     |                    | x                                      |  | x  |  |        |                             | x   |
| Electric heat<br>Triac | Electric heat         | TB2-8     |                     |                     |                    |  | x                                      |  | x  |        |                             | x   |
|                        | Electric heat neutral | TB2-9     |                     |                     |                    |  | x                                      |  | x  |        |                             | x   |

## Wiring recommendations

To ensure that outputs will operate correctly, verify that they are connected in compliance with the following recommendations:

**Table 10 - Outputs wiring recommendations**

|                         |  |
|-------------------------|--|
| <b>Outputs</b>          | Verify that wiring conforms to outputs specifications above              |
| <b>Recommended wire</b> | Use only 18-22 AWG, twisted pair with stranded, tinned-copper conductors |
| <b>Standards</b>        | All wiring must comply with the applicable local electrical codes        |

# Mounting and wiring

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## Trane communicating zone sensor mounting

To mount Trane communicating zone sensor:

- Select a location near the controlled equipment to reduce wiring costs and EMC disturbance risks.
- Verify that the location conforms to the specifications below.
- Secure the zone sensor to the wall with screws.

**Caution:** Do not install the communicating zone sensor near or above a source of heat (i.e. direct sunlight, hot lamps or radiator).

**Caution:** Thermostats should be installed at least 1.5 m above floor level.

**Table 11 -Communicating zone sensor characteristics**

|                              |  |
|------------------------------|--|
| <b>Dimensions</b>            | 120 mm diameter  |
| <b>Operating environment</b> | Temperature: from 0° to 60°C<br>Relative Humidity: from 5% to 95% non-condensing   |
| <b>Storage environment</b>   | Temperature: from -40° to 85°C<br>Relative Humidity: from 5% to 95% non-condensing |
| <b>Protection class</b>      | IP 30  |

# Mounting and wiring

## Trane communicating zone sensor wiring

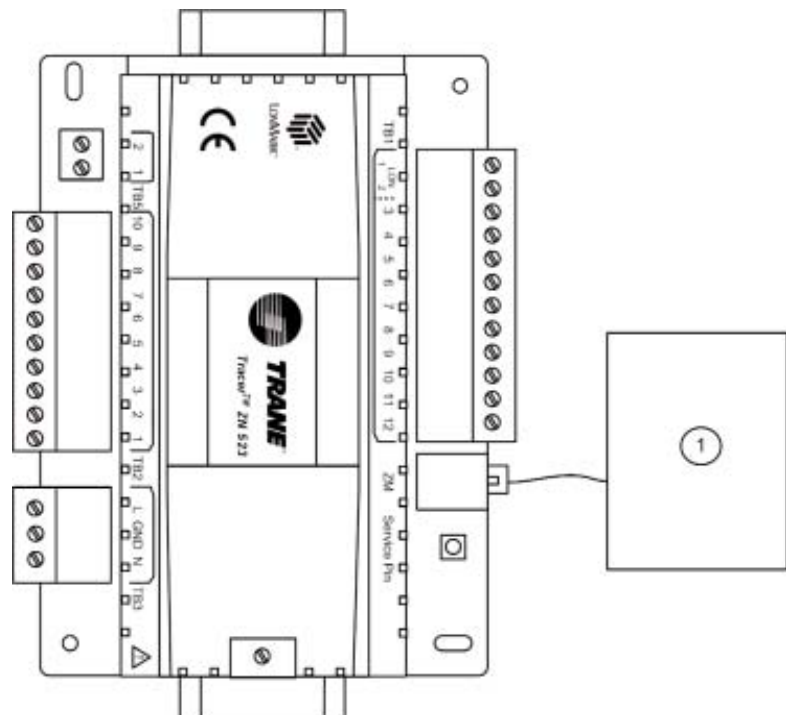
The communicating zone sensor is powered by the controller to which it is related.

To ensure proper zone sensor module installation, follow the recommended wiring practices described in this section.

**Table 12- Communicating zone sensor wiring recommendations**

|                          |  |
|--------------------------|--|
| <b>Connector</b>         | RJ9 polycarbonate, UL94V0  |
| <b>Cable length</b>      | Maximum 12 meters  |
| <b>Recommended cable</b> | FCC-68: flat cable, 4 white conductors, 26 AWG<br>(Suitable for FCC-68 connectors and Western digital) |

**Figure 4: Trane communicating zone sensor typical wiring**



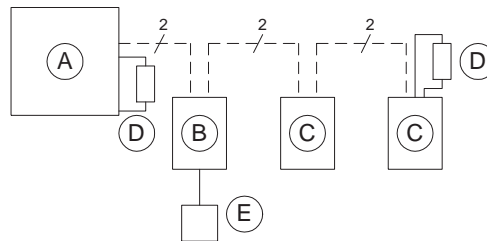
1. Trane Communicating zone sensor module

# Mounting and wiring

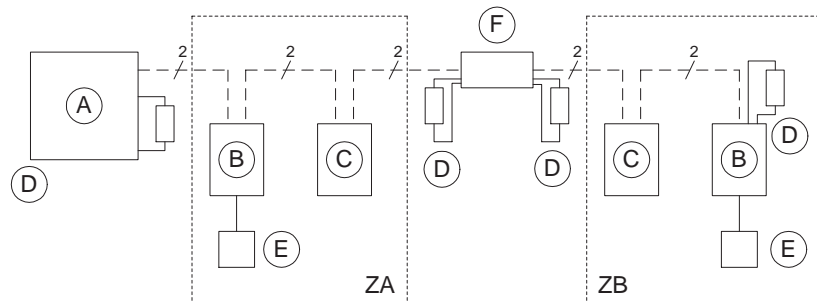
## Network layout

To ensure proper network communication, follow the recommended wiring practices described in this section:

**Figure 5 - LonTalk® communication link: daisy chain topology**



**Figure 6 - LonTalk® communication link: alternate daisy chain topology**



- A. Tracer Summit™ BCU / network manager
- B. ZN523 with zone sensor
- C. ZN523 without zone sensor
- D. Termination resistor (100 ohms)
- E. Trane communicating zone sensor module
- F. Repeater
- ZA. Zone A
- ZB. Zone B

# Mounting and wiring

## Wiring Communication Link

- Although LonWorks® FTT-10A does not require polarity sensitivity, Trane recommends keeping polarity consistent throughout the site.
- Do not run a communication wire alongside or in the same conduit as 230 Vac power or higher.
- In open plenums, avoid running wire near lighting ballasts.
- Trane strongly recommends using a daisy chain topology.
- Use termination resistors as described in the following "Placing termination resistors" section.
- Insulate termination-resistors leads.
- Use only one type of communication wire (same characteristics wire) all along the network.
- A LonWorks® link repeater is required when more than 60 devices are connected to a link.

## Placing termination resistors

LonWorks® FTT-10A communication links require termination resistors. To correctly place termination resistors, follow these guidelines:

- Terminate a daisy chain configuration with a 100 ohms resistor at the extreme end of each wire. (See Figure 5, D)
- If a repeater is used, each link of the configuration that is created by the repeater requires termination resistors.

**Table 13 - LonTalk wiring recommendations**

|                                       |  |
|---------------------------------------|--|
| <b>Number of devices</b>              | Maximum 60<br>(120 with a repeater, 60 devices maximum per branch)   |
| <b>LonWorks® link limit</b>           | 1400m ( 2800 m with a repeater, 1400m per branch)                    |
| <b>Termination Resistor placement</b> | 100 ohms, ¼ W, 1% at each end of branch                              |
| <b>Recommended wire</b>               | 22 AWG, Level 4, twisted pair, unshielded<br>(see suggestions below) |

**Table 14 - Suggested cables**

| <b>CABLES</b>                   | <b>8471</b>   | <b>85102</b>  | <b>JY (st) Y 2x2x0.8</b> | <b>Level IV</b> | <b>TIA 568A category 5</b> |
|---------------------------------|---------------|---------------|--------------------------|-----------------|----------------------------|
| Number of pairs                 | 1             | 1             |                          |                 | 4                          |
| Total number of conductors      | 2             | 2             | 4                        |                 | 8                          |
| Conductors diameter             | 1.3 mm        | 1.3 mm        | 0.8 mm                   | 0.65 mm         | 0.5 mm                     |
| AWG                             | 16            | 16            | 20.4                     | 22              | 24                         |
| Stranding                       | 19x29         | 19x29         |                          |                 |                            |
| Conductors material             | Tinned copper | Tinned copper |                          |                 |                            |
| Plenum                          | No            | No            |                          |                 |                            |
| Insulation                      | PVC           | Tefzel        |                          |                 |                            |
| Outer shield material           | Unshielded    | Unshielded    | Shielded                 | Unshielded      |                            |
| Outer jacket material           | PVC           | Tefzel        |                          |                 |                            |
| Conductor DC resistance / 20°C  | 28 ohms/km    | 28 ohms/km    | 73 ohms/km               | 106 ohms/km     |                            |
| Cond to cond capacitance / 1khz | 72 nF/km      | 56 nF/km      | 98 nF/km                 | 49 nF/km        |                            |
| Maximum distance node to node   | 400 m         | 500 m         | 320 m                    | 400 m           | 250 m                      |
| Cable maximum length            | 500 m         | 500 m         | 500 m                    | 500 m           | 450 m                      |
| Suggested suppliers             | BELDEN        | BELDEN        | PIRELLI SIEMENS AG       | NEXANS          | LUCENT TECHNOLOGIES        |

# Installation

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All electrical connections have to be made on the terminal blocks of the main electrical control box.

**Warning:** Disconnect the power supply before making electrical connections. Failure to do so may cause serious accidents as well as irreversible damage to electrical components (motors, relays, etc..).

**Caution:** Use copper conductors only. Unit terminals are not designed to accept other types of wiring.

**Warning:** For electric heat connection, use local electrical codes recommended protection.

**Warning:** Do not perform an output short-circuit! Failure to comply may entail cancellation of warranty and liabilities by the constructor.



# Installation

## Electrical connection: Power supply and binary output

To ensure proper actuators connection to ZN523, follow the recommended wiring practices described in this section.

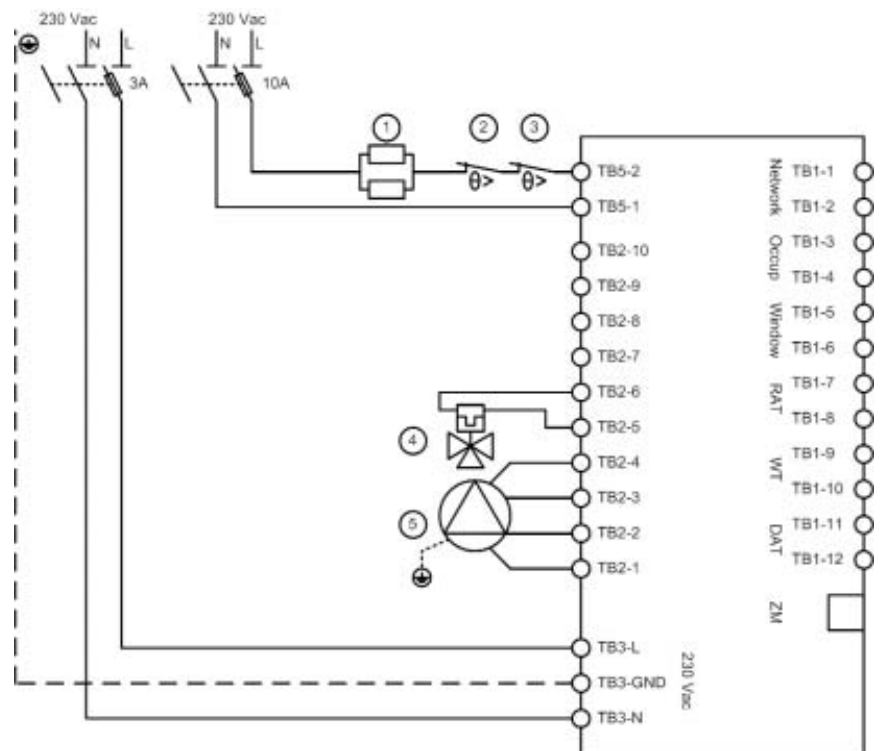
Notes on electric heaters wiring:

- High temperature limit protection must be used.
- They can either be wired in series with the heating element or with the relay coil that switches the heater.

**Warning:** Control panel and unit cabinet must be grounded.

**Warning:** Circuit breaker/fuse and thermal protections must be calculated according to electric heater capacity.

**Figure 7 - 2-pipe cooling valve (thermal) + electric heat < 1.8 kW (relay control)**



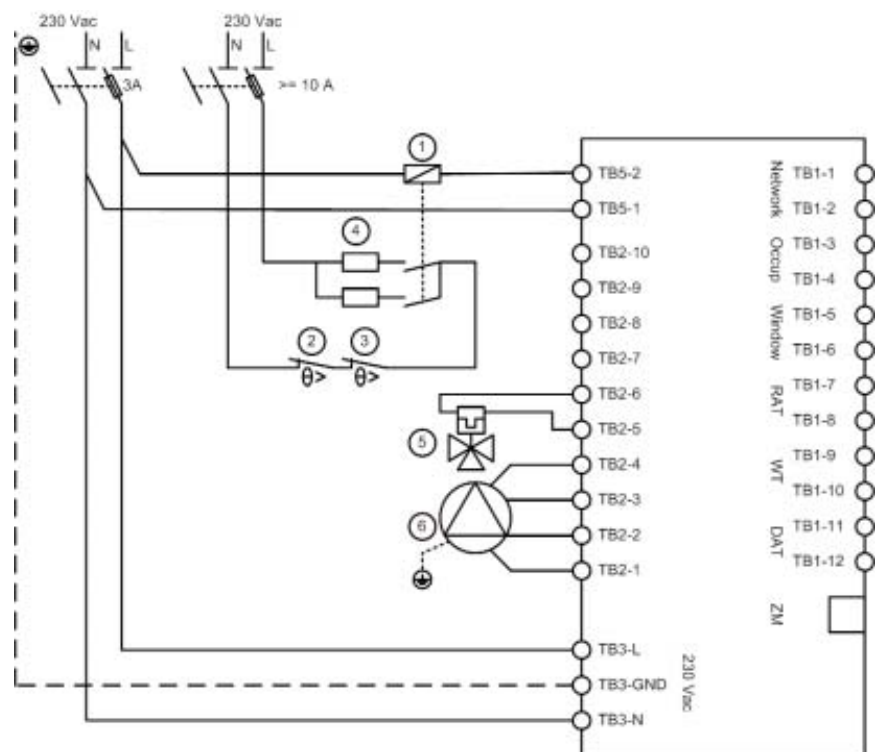
1. Electric heater (in this case 2 units of resistance)
2. Electric heat high temperature limit protection (automatic reset)
3. Electric heat high temperature limit protection (manual reset)
4. Cooling valve actuator
5. Fan motor

# Installation

**Warning:** Control panel and unit cabinet must be grounded.

**Warning:** Circuit breaker/fuse protection, power relay and thermal protections must be calculated according to electric heater capacity.

**Figure 8: 2-pipe cooling valve (thermal) + electric heat  $\geq 1.8$  kW (relay)**



1. Heating coil contactor
2. Electric heat high temperature limit protection (automatic reset)
3. Electric heat high temperature limit protection (manual reset)
4. Electric heater (in this case 2 units of resistance)
5. Cooling valve actuator
6. Fan motor

# Installation

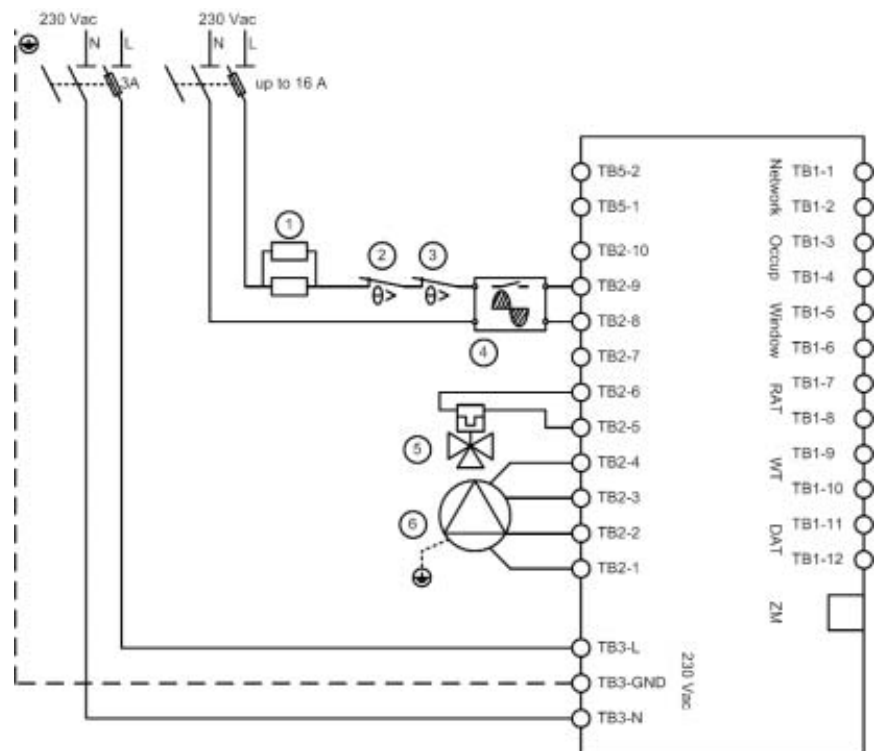
**Warning:** Control panel and unit cabinet must be grounded.

**Warning:** Do not use this diagram for electric heat > 3,6 kW.

**Warning:** Circuit breaker/fuse and thermal protections must be calculated according to electric heater capacity.

**Warning:** Solid state relay must be equipped with a heat sink and a fan for thermal dissipation. The calculation of these accessories is under contractor responsibility.

**Figure 9 - 2-pipe cooling valve (thermal) + electric heat control (triac)**

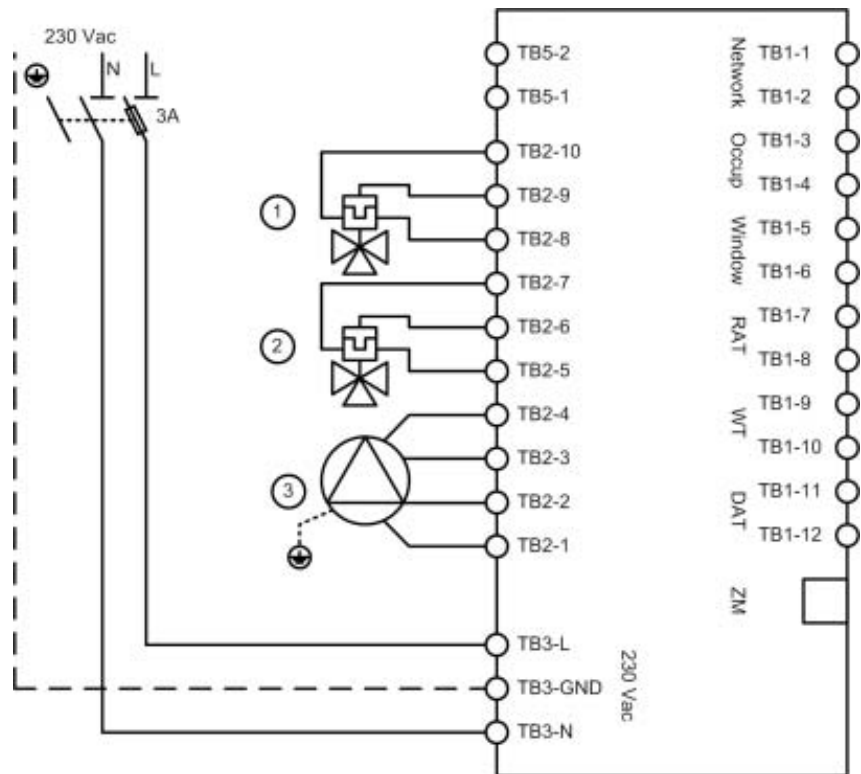


1. Electric heater (in this case 2 units of resistance)
2. Electric heat high temperature limit protection (automatic reset)
3. Electric heat high temperature limit protection (manual reset)
4. Solid state relay
5. Cooling valve actuator
6. Fan motor

# Installation

**Warning:** Control panel and unit cabinet must be grounded.

**Figure 10: 4-pipe cooling and heating valve (3 points)**

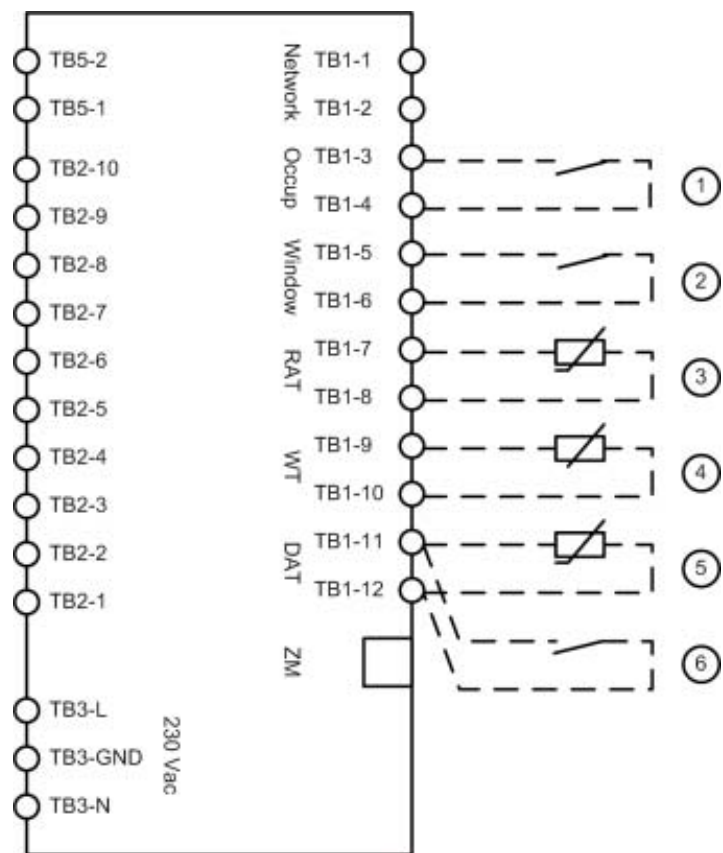


1. Heating valve actuator
2. Cooling valve actuator
3. Fan motor

# Installation

## Electrical connection: Inputs

Figure 11 - Binary inputs wiring

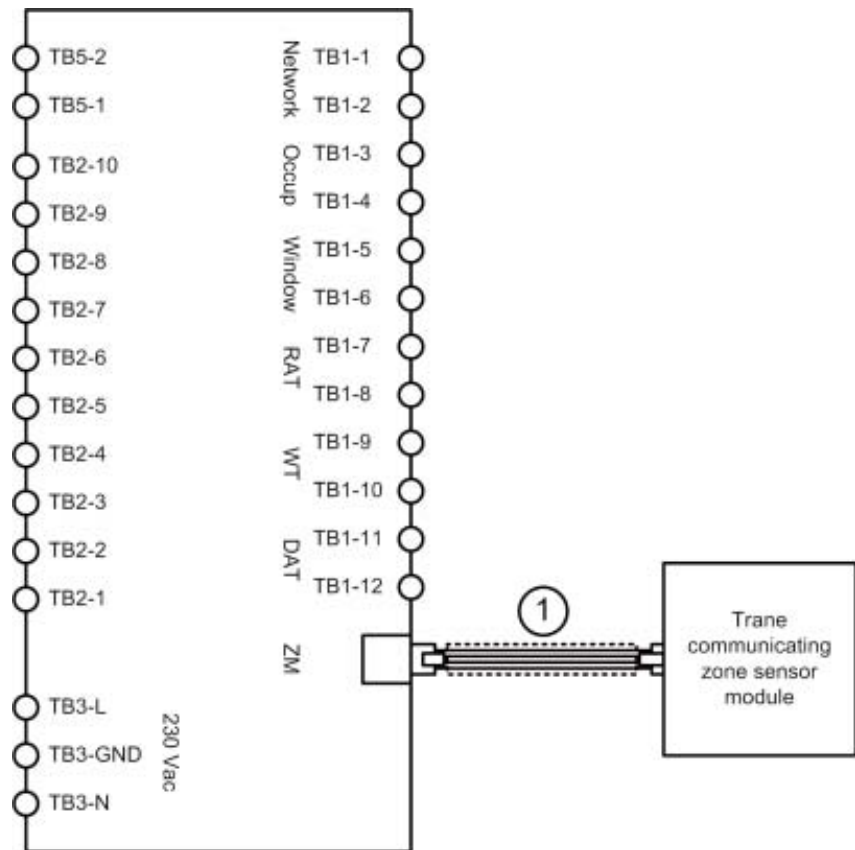


1. Zone occupancy
2. Window contact
3. Return Air Temperature
4. Water Temperature
5. Discharge Air Temperature
6. Condensate overflow

# Installation

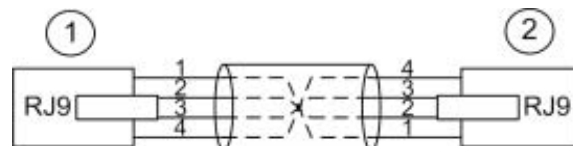
## Electrical connection: Trane communicating zone sensor

Figure 12 - Trane communicating zone sensor module wiring



1. Flat straight cable, 4 conductors.

Figure 13 - RJ9 cable wiring diagram



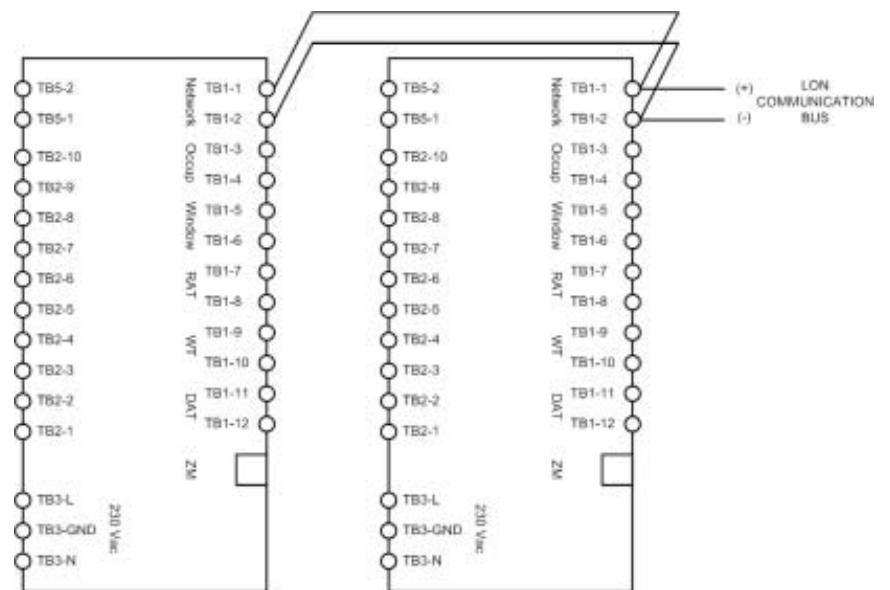
1 = to ZM terminal on ZN523  
2 = back of zone sensor (ZSM)

# Installation

## Electrical connection: Communication link

The ZN523 unit controller provides two terminals (TB1-1 and TB1-2) for the LonTalk® communication link connections.

*Figure 14 - Communication between ZN523 unit controllers*



# Installation check-up

## ZN523 INSTALLATION CHECK-LIST

### Mounting

- Location: \_\_\_\_\_
- Verify that the location conforms to the specifications (Minimum clearances, operating conditions)
- Verify that the module is securely mounted on DIN rail

### Power wiring

- Verify that power supply conforms to recommendations (voltage, current, protection)
- Verify the use of recommended cable
- Verify compliance with applicable local electrical codes

### Inputs wiring

- |                                 |               |                          |                 |                          |
|---------------------------------|---------------|--------------------------|-----------------|--------------------------|
| - Occupancy contact:            | Normally open | <input type="checkbox"/> | Normally closed | <input type="checkbox"/> |
| - Window contact:               | Normally open | <input type="checkbox"/> | Normally closed | <input type="checkbox"/> |
| - Condensate overflow contact : | Normally open | <input type="checkbox"/> | Normally closed | <input type="checkbox"/> |
- Verify that input wiring conforms to recommendations
  - Verify the use of recommended cable
  - Verify compliance with applicable local electrical codes

### Outputs wiring

- Verify that output wiring conforms to recommendations
- Verify the use of recommended cable
- Verify compliance with applicable local electrical codes

### Network wiring

- Neuron ID: 

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
- Verify that wiring conforms to LonMark specifications (topology, cable length & type, termination resistor)

## COMMUNICATING ZONE SENSOR INSTALLATION CHECK-LIST

### Mounting

- Verify that the zone sensor is not located above a source of heat
- Verify that the location conforms to the specifications (Minimum clearances, operating conditions)
- Verify that the zone sensor is installed at least 1.5 m above floor level
- Verify that the module is securely mounted on wall

### Zone sensor wiring

- Verify use of recommended cable
- Verify that cable length conforms to specifications
- Verify compliance with applicable local electrical codes



# Configuration

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When provided as a factory installed controller, Trane ZN523 controller is setup and tested during the assembly process, and is ready to run when delivered to the customer's site.

When not provided as a factory installed controller, Trane ZN523 must be configured by a qualified service technician after installation.

These instructions are given as a guide to good practice in the installation of Trane ZN523 LonMark<sup>®</sup> control. They do not contain the full service procedures necessary for the continued successful operation of this equipment.

# Appendix

**Table 15 - Thermistor sensor electrical characteristics**

| Temperature (°C) | Thermistor resistance (ohms) |
|------------------|------------------------------|
| 0                | 33237                        |
| 10               | 20104                        |
| 12               | 18248                        |
| 14               | 16583                        |
| 16               | 15086                        |
| 18               | 13741                        |
| 20               | 12530                        |
| 22               | 11437                        |
| 24               | 10452                        |
| 26               | 9561                         |
| 28               | 8756                         |
| 30               | 8026                         |
| 32               | 7365                         |
| 34               | 6765                         |
| 36               | 6220                         |
| 38               | 5724                         |
| 40               | 5273                         |
| 50               | 3546                         |
| 60               | 2436                         |
| 70               | 1707                         |
| 80               | 1219                         |
| 90               | 885                          |
| 100              | 653                          |

**Table 16 - Suggested solid state relays / General specifications**

| Product reference           | RS1A23A2-25 & RS1A23A2-40  |
|-----------------------------|----------------------------|
| Supplier                    | Carlo Gavazzi              |
| Operational voltage range   | 42 to 265 Vac rms          |
| Non-rep peak voltage        | $\geq 650$ Vp              |
| Zero voltage tum-on         | $\leq 15$ V                |
| Operational frequency range | 45 to 65 Hz                |
| Power factor                | $\geq 0.95$ at 230 Vac rms |
| Approvals                   | UL                         |
| Marking                     | CE                         |

# Appendix

**Table 17 - Suggested solid state relays / Input specifications**

|                                    |                |
|------------------------------------|----------------|
| Control voltage                    | 200 to 260 Vac |
| Control frequency                  | 50 / 60 Hz     |
| Pick-up voltage                    | 190 Vac        |
| Drop-out voltage                   | 90 Vac         |
| Input current at max input voltage | 13 mA          |
| Typical response time pick-up      | 20 ms          |
| Typical response time drop-out     | 20 ms          |

**Table 18 - Suggested solid state relays / Output specifications**

| Product reference             | RS1A23A2-25  | RS1A23A2-40  |
|-------------------------------|--------------|--------------|
| Rated operational current     | 25 A rms     | 40 A rms     |
| Minimum operational current   | 150 mA       | 150 mA       |
| Rep overload current t= 1 sec | < 37 Aac rms | < 60Aac rms  |
| Off-state leakage current     | < 3 mA rms   | < 3 mA rms   |
| Critical di/dt                | >= 50A/μs    | >= 100A/μs   |
| On-state voltage drop         | <= 1.6 V rms | <= 1.6 V rms |
| Critical dV/dt off-state      | >= 250 V/μs  | >= 250 V/μs  |



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|-------------------------|--------------------|
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**Trane has a policy of continuous product and product data improvement and reserves the right to change design and specifications without notice. Only qualified technicians should perform the installation and servicing of equipment referred to in this publication.**

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