



## TRANE Tracer VV550 Variable Air Volume Controller Instruction Manual

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TRANE Tracer VV550 Variable Air Volume Controller



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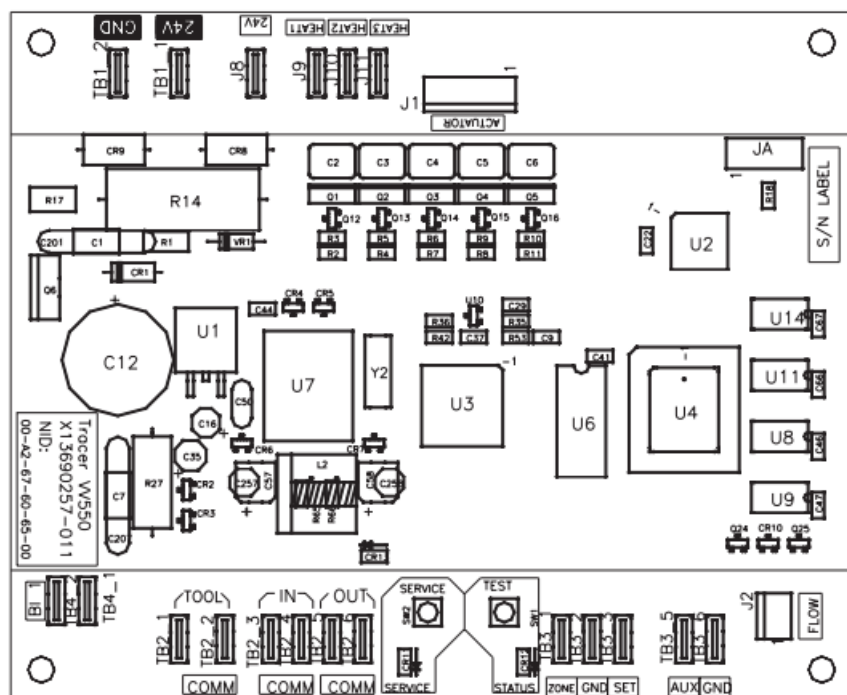
## Introduction

Tracer VV550 and Tracer VV551 variable air volume (VAV) controllers provide single-duct digital control for VAV boxes. They support the following VAV control sequences:

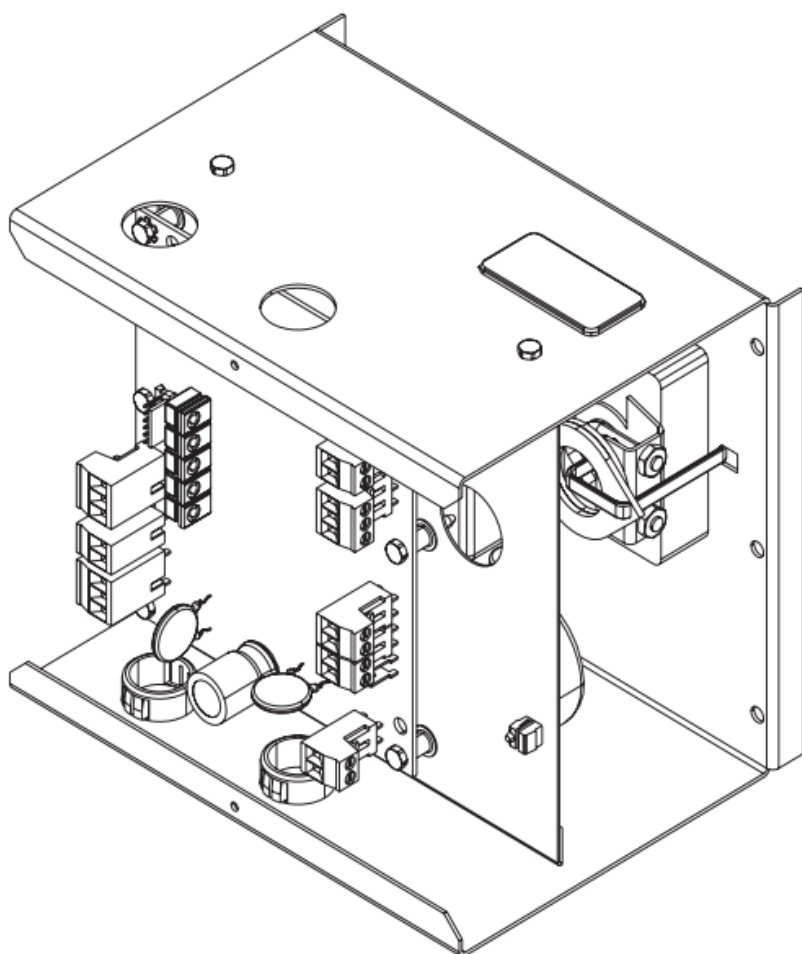
- Space temperature control
- Flow tracking
- Ventilation flow control

The Tracer VV550 VAV controller is available factory-installed on Trane VariTrane VAV boxes (Figure 1). The Tracer VV551 VAV controller is available for field installation for a variety of VAV applications (Figure 2).

**Figure 1. Tracer VV550 controller**



**Figure 2. Tracer VV551 controller (uses same board as Tracer VV550)**



Because the Tracer VV550 and Tracer VV551 VAV controllers use the same logic controller, both offer the same wide range of application and control flexibility. The Tracer VV551 VAV controller includes additional laborsaving packaging features for field installed applications.

Tracer VV550/551 VAV controllers can operate as part of a Trane Integrated Comfort™ system (ICS), as part of a

building management system from another manufacturer, or as a standalone device.

When it is part of a Trane ICS, a Tracer VV550/551 VAV controller enables the building automation system (BAS) to perform functions such as scheduling, trending, alarming, remote communications, and VAV air system (VAS) coordination. The controller communicates with a Tracer Summit BAS over the LonTalk® communications link. The controller can also communicate with other building control systems that are compliant with the LonMark® Space Comfort Controller (SCC) profile

Tracer VV550/551 VAV controllers can be configured using the Rover™ service tool. They have the following inputs and outputs (Figure 3 on page 6):

Analog inputs:

- Space temperature (10 kΩ thermistor)
- Space setpoint (1 kΩ potentiometer)
- Primary/discharge air temperature (10 kΩ thermistor)
- Primary air flow Binary inputs:
- Occupancy or generic Binary outputs:
- Air valve close
- Air valve open
- Heat 1
- Heat 2
- Heat 3 or fan On/Off

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## **Automatic calibration**

Tracer VV550/551 VAV controllers automatically calibrate the flow transducer each time the box transitions to the unoccupied state. This eliminates the need to initiate/schedule calibration for most installations. The exception is 24/7 sites, in which case the Tracer Summit building automation system can be used to initiate/schedule calibration.

## **Ventilation flexibility**

Tracer VV550/551 VAV controllers can manage ventilation in the following ways:

- Fixed occupancy ventilation setpoint
- Scheduled (or otherwise calculated) ventilation setpoint
- Occupancy sensor to switch between normal and reduced ventilation
- CO2 sensor for demand-controlled ventilation

This flexibility gives owners and facility managers an option to simply select one of several effective solutions for managing ventilation.

## **Flow tracking**

Tracer VV550/551 VAV controllers can easily be applied in flow tracking applications. In a flow tracking application, supply and exhaust boxes are paired together for the purpose of maintaining either positive or negative space static pressure. This feature allows the installer to quickly define the relationship of the supply and

exhaust air boxes without the need for custom programming.

## **Ventilation flow control with tempering**

Tracer VV550/551 VAV controllers have been designed for ventilation flow control applications. These applications pair a fresh air unit or self-contained unit with ventilation boxes to provide fresh (tempered) air to a floor/area. With this feature, the installer can quickly configure the flow control boxes and set up the system without the need for custom programming.

## **Local versus remote reheat flexibility**

Tracer VV550/551 VAV controllers can be configured to have local and/or remote heat. This configuration flexibility enables the controllers to be applied across a broad range of VAV applications.

## **Occupied and unoccupied operation**

The occupancy input on a Tracer VV550/ 551 VAV controller works with a motion (occupancy) sensor or a time clock to determine the occupancy mode. An occupancy request can also be communicated from a building automation system to determine the mode of the controller. Whether standalone or combined with a communicated occupancy request, a Tracer VV550/551 controller can be used with an occupancy sensor to save energy whenever a space is vacant.

## **Timed override**

The timed override function for afterhours operation allows users to request unit operation by the touch of a button on the unit zone sensor. Additionally, users can press the CANCEL button at any time to place the unit back into unoccupied mode. This occupancy feature minimizes energy use by running the system only as scheduled or as demanded after hours.

## **Service pin from the Trane zone sensor**

Certain installation scenarios require access to the SERVICE button on the controller. Access to this button typically requires a ladder or a lift. The Tracer VV550/551 VAV controller allows a technician to replicate pressing the SERVICE button by pressing the zone sensor ON button. This feature eliminates the need for accessing the SERVICE button, saving the technician time and energy.

## **Auto-commissioning sequence**

Tracer VV550/551 VAV controllers provide an automatic commissioning sequence. With a discharge air temperature sensor installed, this feature exercises the air valve, fan, and heat in the box and records the discharge air temperature before and after the action. This allows the installer to easily checkout the operation of the box and commission by exception. The data from this test is retained in the controller for immediate reports or retrieval at a later date (for comparison purposes).

## **Manual test function**

A Tracer VV550/551 VAV controller includes a manual test button, which enables a technician to easily exercise the outputs of the controller. On consecutive button presses, the controller steps through a predefined sequence that exercises all of the controller outputs.

## **Drive minimum and maximum from zone sensor**

When applied with a Trane zone sensor module that includes a thumbwheel setpoint, a Tracer VAV VV550/551 controller can easily be overridden to minimum and maximum flow. By simply turning the thumbwheel to , the controller drives the air valve to the minimum cooling flow setpoint. Similarly, turning the thumbwheel to drives the air valve to the maximum cooling flow setpoint. This simple override feature is most useful during the checkout and balancing phases of a project.

## Trane controller compatibility

Tracer VV550/551 VAV controllers are compatible with the latest generation of Trane control products. The controllers communicate over a LonTalk® communications link. This allows Tracer VV550/551 VAV controllers to exist on the same communication wire as other Trane controllers and to share data with them as required.

## Interoperability

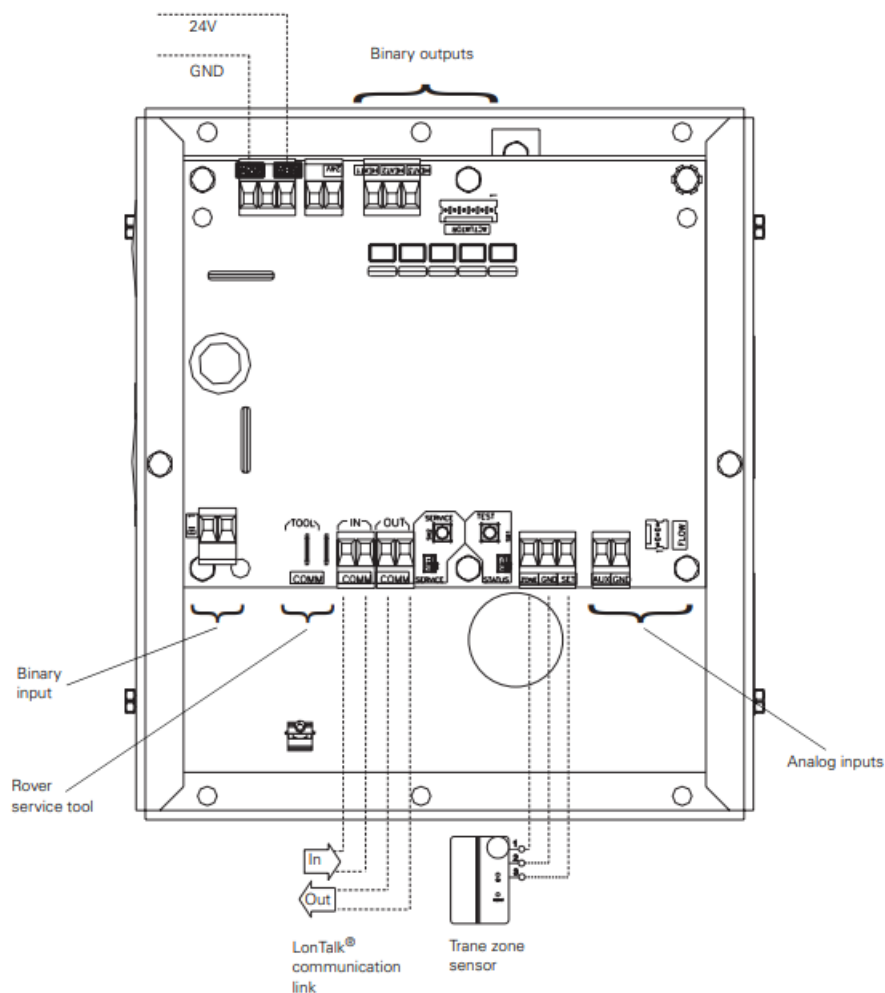
Tracer VV550/551 VAV controllers are designed with LonWorks® technology and are LonMark® certified. They follow the guidelines of the LonMark® Space Comfort Controller (SCC) profile. As such, the Tracer VV550/551 controllers enable control system integration flexibility.

## Wiring diagram

See Figure 3 on page 6.

## Wiring diagram for Tracer VV550/551 VAV controllers

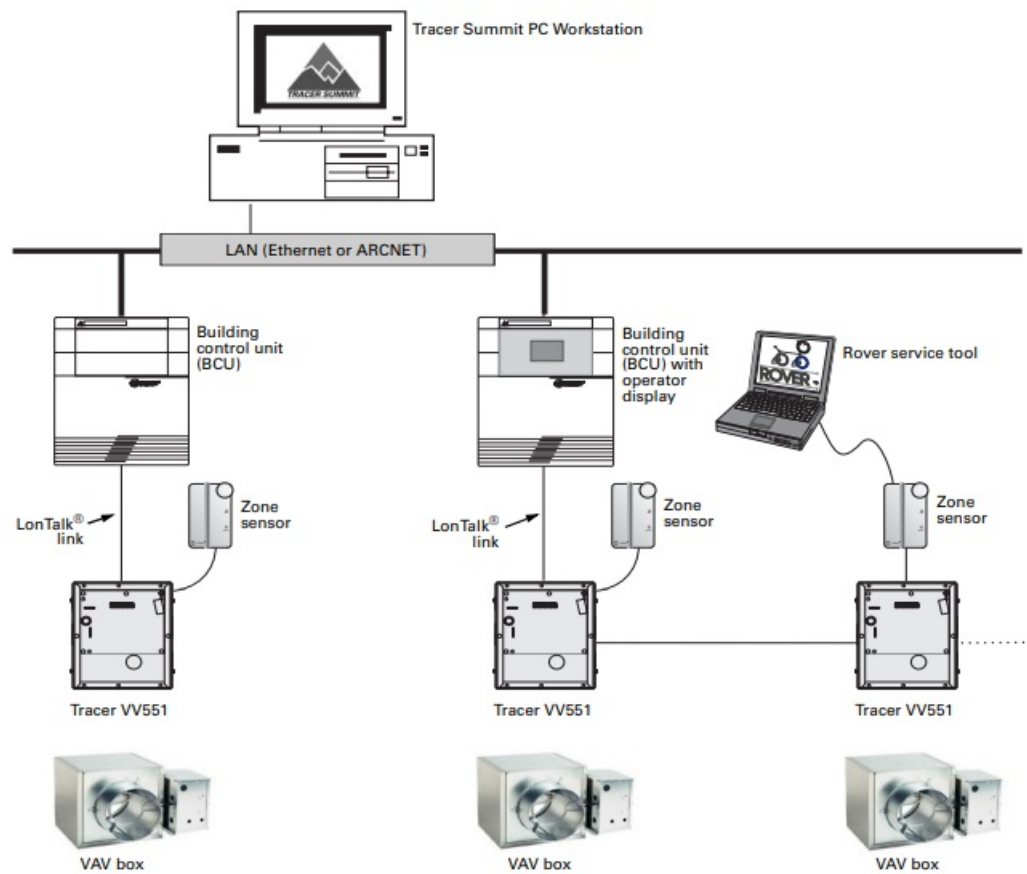
Figure 3. Tracer VV550/551 wiring diagram



Network architecture

Tracer VV550/551 VAV controllers can operate on a Tracer Summit BAS, on a building management system from another manufacturer, on a peer-to-peer network, or as stand-alone devices. The Rover service tool can configure the controllers at any accessible location on the Lon Talk® communication link (Figure 4).

Figure 4. Network architecture with Tracer VV551 VAV controllers



Zone sensor options

Zone sensors are available in a variety of configurations. Table 1 describes the features of the five Trane zone sensors that are available for use with Tracer VV550/551 VAV controllers. The same five sensors are shown in Figure 5.

Contact your Trane sales office about other compatible zone sensors.

Table 1. Zone sensors for use with Tracer VV550/551

| GCC order number | Zone                 |                    | Timed override buttons |        | LCD | Comm jack |
|------------------|----------------------|--------------------|------------------------|--------|-----|-----------|
|                  | Setpoint thumb wheel | Temperature sensor | ON                     | CANCEL |     |           |
| 4190 1087        |                      | x                  |                        |        |     | x         |
| 4190 1088        |                      | x                  | x                      | x      |     | x         |
| 4190 1090        | x                    | x                  | x                      | x      |     | x         |
| 4190 1094        | x                    | x                  |                        |        |     | x         |
| 4190 1120        | x                    | x                  | x                      | x      | x   | x         |

Figure 5. Zone sensors for use with Tracer VV550/551



## Dimensions and specifications

### Power requirements

Supply: 18–32 Vac (24 Vac nominal) at 50/60 Hz

### Operating environment



Temperature: 32 to 140°F (0 to 60°C)  
Relative humidity: From 5 to 95% non-condensing

#### **Storage environment**

Temperature: -40 to 185°F (-40 to 85°C)  
Relative humidity: From 5 to 95% non-condensing

#### **Dimensions**

(See Figure 6 on page 10.)

##### **Board only**

Height: 4.5 in. (11.4 cm)

Width: 5.5 in. (13.8 cm)

Depth: 2 in. (5.1 cm)

##### **With enclosure (VV551)**

Height: 7.5 in. (13.7 cm)

Width: 6.5 in. (16.7 cm)

Depth: 5.5 in. (14.0 cm)

#### **Weight with enclosure (Tracer VV551)**

With no actuator: 3.9 lb (1.77 kg)

With Belimo actuator: 5.0 lb (2.27 kg)

With Trane actuator: 5.2 lb (2.36 kg)

#### **Analog inputs**

Space temperature; thermistor:

10 kΩ@ 77°F (25°C) From 14 to 122°F (-10 to 50°C)

Space setpoint; potentiometer: 1 kΩ

From 50 to 90°F (-10 to 32.2°C) Primary/discharge air temperature; thermistor: 10 kΩ@ 77°F (25°C)

From -40 to 212°F (-40 to 100°C)

Primary air flow; pressure transducer: From 0 to 2 in. water (0 to 498 Pa)

#### **Binary input**

Occupancy or generic (dry contact)

#### **Binary outputs**

Air valve close: maximum output rating: 12 VA

Air valve open: maximum output rating: 12 VA

Heat stage 1: maximum output rating: 12 VA

Heat stage 2: maximum output rating: 12 VA

Heat stage 3/Fan on/off: maximum output rating: 12 VA

#### **Agency listings/compliance**

##### **Tracer VV550:**

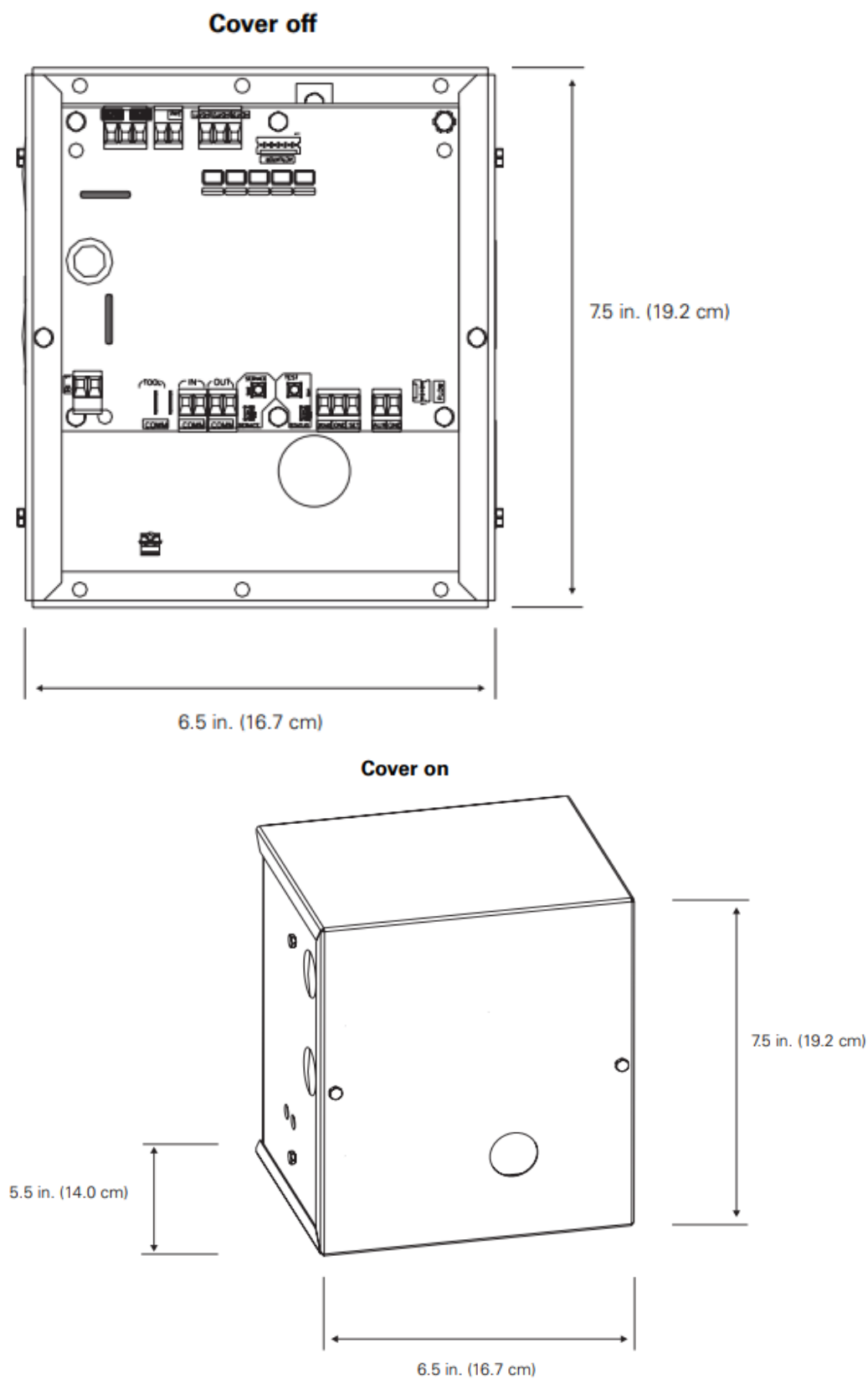
UL 873 and CSA C22.2 No. 24-93: Temperature Indicating and Regulating Equipment

##### **Tracer VV551:**

UL and C-UL 916, Energy management equipment

UL 94-5V (UL flammability rating for plenum use) FCC Part 15, Class A

Figure 6. Tracer VV551 dimensions



**Data lists**

Table 2 provides an input/output listing for Tracer VV550/551 VAV controllers. Table 3 provides the configuration properties for the controller. The content of the lists conforms to both the Lon Mark® SCC functional profile 8500 and the Lon Mark® node object.

**Table 2. Input/output listing**

| Input description         | Input            | SNVT type        |
|---------------------------|------------------|------------------|
| Space temperature         | nviSpaceTemp     | SNVT_temp_p      |
| Setpoint                  | nviSetpoint      | SNVT_temp_p      |
| Occupancy, schedule       | nviOccSchedule   | SNVT_tod_event   |
| Occupancy, manual command | nviOccManCmd     | SNVT_occupancy   |
| Occupancy sensor          | nviOccSensor     | SNVT_occupancy   |
| Application mode          | nviApplicMode    | SNVT_hvac_mode   |
| Heat/cool mode input      | nviHeatCool      | SNVT_hvac_mode   |
| Fan speed command         | nviFanSpeedCmd   | SNVT_switch      |
| Auxiliary heat enable     | nviAuxHeatEnable | SNVT_switch      |
| Valve override            | nviValveOverride | SNVT_hvac_overid |
| Flow override             | nviFlowOverride  | SNVT_hvac_overid |
| Emergency override        | nviEmergOverride | SNVT_hvac_emerg  |
| Source temperature        | nviSourceTemp    | SNVT_temp_p      |
| Space CO2                 | nviSpaceCO2      | SNVT_ppm         |
| Clear alarms/ diagnostics | nviRequest*      | SNVT_obj_request |

|                                |                 |             |
|--------------------------------|-----------------|-------------|
| Air flow setpoint input        | nviAirFlowSetpt | SNVT_flow   |
| Ventilation ratio limit        | nviVentRatioLim | SNVT_temp_p |
| Ventilation for the zone input | nviVentSetpt    | SNVT_flow   |
| * Part of the node object.     |                 |             |

| Output description        | Output          | SNVT type        |
|---------------------------|-----------------|------------------|
| Space temperature         | nvoSpaceTemp    | SNVT_temp_p      |
| Unit status, mode         | nvoUnitStatus   | SNVT_hvac_status |
| Effective setpoint        | nvoEffectSetpt  | SNVT_temp_p      |
| Effective occupancy       | nvoEffectOccup  | SNVT_occupancy   |
| Heat cool mode            | nvoHeatCool     | SNVT_hvac_mode   |
| Setpoint                  | nvoSetpoint     | SNVT_temp_p      |
| Discharge air temperature | nvoDischAirTemp | SNVT_temp_p      |
| Terminal load             | nvoTerminalLoad | SNVT_lev_percent |
| Space CO2                 | nvoSpaceCO2     | SNVT_ppm         |

|                             |                   |                 |
|-----------------------------|-------------------|-----------------|
| Effective air flow setpoint | nvoEffectFlowSP   | SNVT_flow       |
| Air flow                    | nvoAirFlow        | SNVT_flow       |
| File table address          | nvoFileDirectory* | SNVT_address    |
| Object status               | nvoStatus*        | SNVT_obj_status |
| Alarm message               | nvoAlarm Message  | SNVT_str_asc    |
| * Part of the node object.  |                   |                 |

**Table 3. Configuration properties**

| Configuration property description | Configuration property | SNVT type       | SCPT reference       |
|------------------------------------|------------------------|-----------------|----------------------|
| Send heartbeat                     | nciSndHrtBt            | SNVT_time_sec   | SCPTmaxSendTime (49) |
| Occ temperature setpoints          | nciSetpoints           | SNVT_temp_setpt | SCPTsetPnts (60)     |
| Minimum send time                  | nciMinOutTm            | SNVT_time_sec   | SCPTminSendTime (52) |
| Receive heartbeat                  | nciRecHrtBt            | SNVT_time_sec   | SCPTmaxRcvTime (48)  |
| Location label                     | nciLocation            | SNVT_str_asc    | SCPT location (17)   |

|                                       |                 |                 |                       |
|---------------------------------------|-----------------|-----------------|-----------------------|
| Local bypass time                     | nciBypassTime   | SNVT_time_min   | SCPT bypass Time (34) |
| Manual override time                  | nciManualTime   | SNVT_time_min   | SCPT manOverTime (35) |
| Space CO2 limit                       | nciSpaceCO2Lim  | SNVT_ppm        | SCPTlimitCO2 (42)     |
| Nominal air flow                      | nciNomFlow      | SNVT_flow       | SCPTnomAirFlow (57)   |
| Air flow measurement gain             | nciFlowGain     | SNVT_multiplier | SCPTsensConstVAV (67) |
| Minimum air flow                      | nciMinFlow      | SNVT_flow       | SCPTminFlow (54)      |
| Maximum air flow                      | nciMaxFlow      | SNVT_flow       | SCPTmaxFlow (51)      |
| Minimum air flow for heat             | nciMinFlowHeat  | SNVT_flow       | SCPTminFlowHeat (55)  |
| Maximum air flow for heat             | nciMaxFlowHeat  | SNVT_flow       | SCPTmaxFlowHeat (37)  |
| Minimum flow for standby              | nciMinFlowStdby | SNVT_flow       | SCPTminFlowStby (56)  |
| Firmware major version                | nciDevMajVer*   | n/a             | SCPTdevMajVer (165)   |
| Firmware minor version                | nciDevMinVer*   | n/a             | SCPTdevMinVer (166)   |
| Flow offset for tracking applications | nciFlowOffset   | SNVT_flow_f     | SCPToffsetFlow (265)  |

|                                |                  |           |                            |
|--------------------------------|------------------|-----------|----------------------------|
| Local heating minimum air flow | nciMinFlowUnitHt | SNVT_flow | SCPTminFlowUnitHeat ( 270) |
| * Part of the node object.     |                  |           |                            |

Customer Support

Trane

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For more information, contact your local Trane office or e-mail us at
[comfort@trane.com](mailto:comfort@trane.com)

Trane has a policy of continuous product and product data improvement and reserves the right to change design and specifications without notice.

[firealarmresources.com](http://firealarmresources.com)



Documents / Resources

|   |   |
|---|---|
|  | <a href="#">TRANE Tracer VV550 Variable Air Volume Controller</a> [pdf] Instruction Manual VV551, VV550, Tracer VV550 Variable Air Volume Controller, Tracer VV550, Variable Air Volume Controller, Air Volume Controller, Controller |
|---|---|

References

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