

Phoenix Controls Traccel™ Room Controllers are ideal in variable air volume (VAV) temperature control applications where consistent directional airflow is critical. In these flow-tracking applications, the controller maintains an offset between the air volume supplied into and exhausted from a space to maintain consistent room pressurization and directional airflow.

Unique 48-point flow characterization curves for the supply and exhaust valves serving the room are downloaded to every Traccel Room Controller's on-board microprocessor before these leave the factory. The controller uses this flow data to accurately control flow-tracking between the two valves. A rise in temperature above the room set point causes the supply valve to open and airflow into the room to increase. The Traccel Room Controller maintains directional airflow by modulating the exhaust valve based on the known position of the supply valve and applying a design flow offset between the two.

### System Benefits

- Factory characterization reduces system commissioning time
- Pressure independent valves avoid rebalancing costs
- No flow sensors to maintain
- High turndowns allow reduced energy costs

### SPECIFICATIONS

#### Construction

- 16 ga. spun aluminum valve body with continuous welded seam
- Valve bodies available as uncoated aluminum or with corrosion-resistant baked phenolic coatings
- Composite Teflon® shaft bearings
- Spring grade stainless steel spring and polyester or PPS slider assembly
- Supply valves\* insulated with 3/8" (9.5 mm) flexible closed-cell polyethylene. Flame/smoke rating 25/50. Density is 2 lb/ft<sup>3</sup> (32 kg/m<sup>3</sup>)

#### Operating Range

- 32-122 °F (0-50 °C) ambient
- 10-90% non-condensing RH

#### Performance

- Pressure independent over a 0.6"-3.0" wc (149-747 Pa) drop across valve
- Volume control accurate to ±5% of airflow command signal
- No additional straight duct runs needed before or after valve
- Available in flows from 35-3000 CFM (59-5097 m<sup>3</sup>/hr)
- Response time to change in command signal: <1 minute

#### Sound

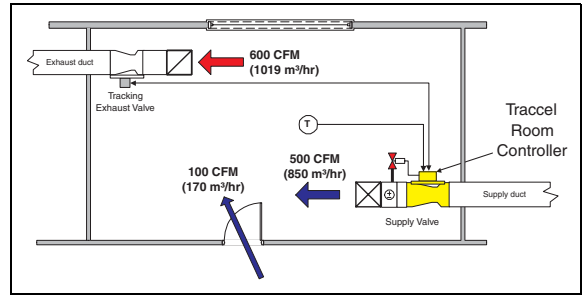
Designed for low sound power levels to meet or exceed ASHRAE noise guidelines

#### Traccel Room Controller

- Power:
- 24 Vac (±15%) @ 50/60 Hz
- Power Consumption:
- Single: 13 VA
  - Dual: 15 VA
- I/O: See Available Inputs & Outputs table on the right
- Interoperability:
- Based on LONWORKS technology for peer-to-peer communication between room controllers
  - LonMark certified according to the Interoperability Guidelines Version 3.4
  - LonMark functional profile SCC-VAV #8502
- Agency compliance:
- CE
  - CSA
  - FCC Part 15, Subpart J, Class A
- Room-level communications:
- FTT-10, 78 KB, LonTalk™ network



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Above: The Traccel Room Controller maintains directional airflow with variable air volume (VAV) temperature control. More room controller applications are described on page 2.

### FEATURES

| FEATURE                | DESCRIPTION   |
|------------------------|---|
| Temperature control    | <ul style="list-style-type: none"> <li>• Primary and secondary PID loops</li> <li>• BAS or local set point input</li> </ul>               |
| Additional flow inputs | <ul style="list-style-type: none"> <li>• Two network flow inputs</li> <li>• One local analog flow input</li> <li>• Dry contact</li> </ul> |
| Occupancy control      | <ul style="list-style-type: none"> <li>• Occupied, standby or unoccupied</li> <li>• BAS or local switch/occupancy sensor</li> </ul>       |
| HVAC emergency modes   | <ul style="list-style-type: none"> <li>• Multiple modes available</li> <li>• Custom setup for each mode</li> </ul>                        |

### AVAILABLE INPUTS & OUTPUTS\*

| TYPE            | NUMBER | NOTES  |
|-----------------|--------|--|
| Universal input | 3      | Accepts volt, mA, ohms or NTC 2 or 3 thermistor signals. |
| Digital input   | 1      | Dry contact closure                                      |
| Analog output   | 2      | Provides volt or mA signals.                             |
| Digital output  | 1      | Type C, 1 amp @ 24 Vac/Vdc                               |

\* The flow tracking function does not use any of the inputs or outputs above. For more details, see the wiring diagram on page 7.

#### Input accuracy

- Voltage, current, resistance: ±1% full scale

#### Output accuracy

- 0 to 10 Vdc: ±1% full scale into 10 kΩ minimum
- 4 to 20 mA: ±1% full scale into 500 Ω +0/-50 Ω

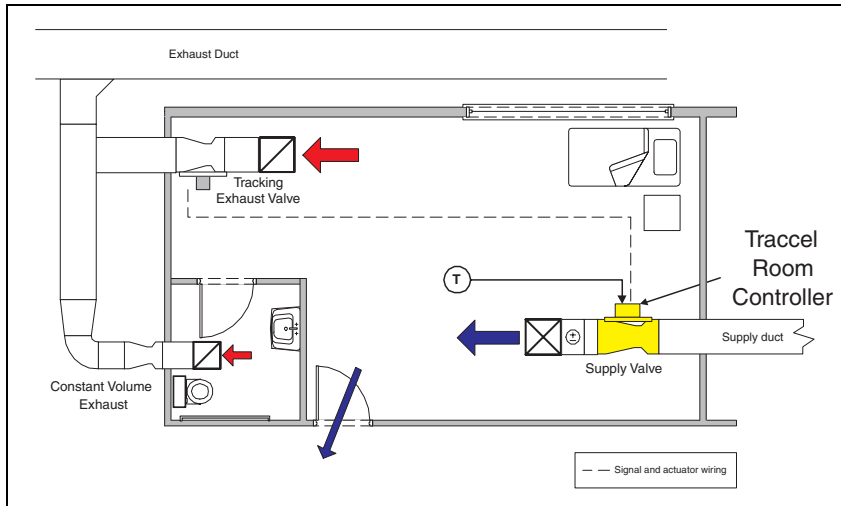
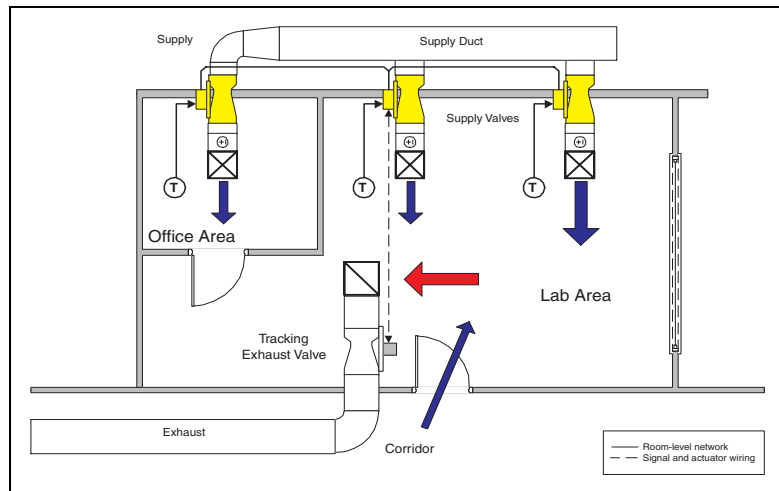
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## APPLICATIONS

### *Temperature Control Flexibility with Multiple Cooling Zones*

Sometimes in larger spaces, temperature gradients vary within the space. In these applications, multiple temperature zones can be used to provide local cooling where needed. In these applications, Traccel Controllers work together to sum the total supply volume for three temperature zones and modulate one exhaust valve to maintain correct directional airflow.

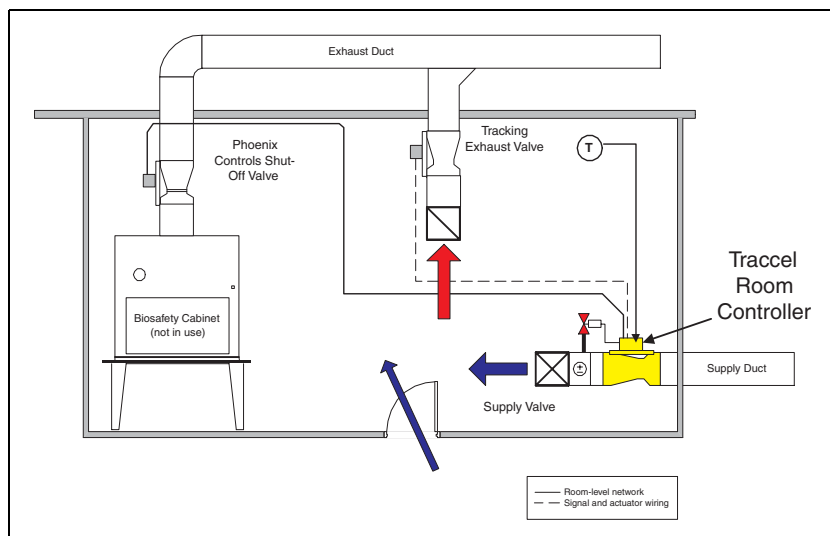


### *Healthcare Applications*

The Traccel Room Controller provides effective protection from airborne pathogens by maintaining correct directional airflow control at all times. Phoenix Controls venturi valves are impervious to the dust and lint found in a hospital environment while they continue to maintain airflow control accuracy even in the event of a power failure, giving the assurance that the correct room pressurization and directional airflow is maintained at all times.

### *Life Science Applications*

In this example, a Phoenix Controls Shut-off Valve is used to isolate the BSC exhaust flow when it is not in use. The Shut-off Valve communicates over the room level network with the Traccel Room Controller, which compensates for the change in flow to maintain room airflow balance and ensures correct directional airflow into or out of the room.

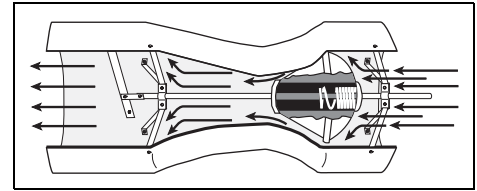


## APPLICATIONS (CONTINUED)

### Pressure Independence

If the static pressure changes in either the supply or exhaust system, Phoenix Controls venturi air valves use a simple mechanical regulator to compensate instantaneously, so accurate flow control is assured at all times.

Unlike commercial controls that use velocity pressure sensors mounted in the airstream to control flow, the Phoenix approach is impervious to dust, dirt and sensor drift. Phoenix venturi valves continue to work even in the event of a power failure, giving the assurance that the correct room pressurization and directional airflow is maintained at all times. Factory characterization of each valve virtually eliminates the need for lengthy field calibration and rebalancing.



### ORDERING GUIDE

**SV1 A 2 1 0 M - N H - P \_ \_**

#### VALVE FAMILY

SV1 = Supply valve with insulation  
EV1 = Exhaust valve

#### VALVE CONSTRUCTION

A = Body and cone—uncoated aluminum;  
Shaft—uncoated 316 stainless steel  
B = Body and cone with phenolic coating,  
PFA coated stainless steel shaft

#### NUMBER OF VALVE BODIES

F = One valve body with welded circular flange  
(single flanged)  
1 = One valve body (single, no flange)  
2 = Two valve bodies (dual, 10" and 12" only)

#### VALVE SIZE

08 = 8" valve (7.88"/200 mm actual diameter)  
10 = 10" valve (9.88"/251 mm actual diameter)  
12 = 12" valve (11.88"/302 mm actual diameter)

#### VALVE OPTIONS

(As required; list alphabetically, then numerically)

B = Square flanges on each end of single body valves  
F = Single square flange mounted on *either*:  
• Inlet of single body exhaust valves *or*  
• Discharge of single body supply valves  
P = Pressure switch (*see note*)

#### VALVE ORIENTATION

H = Horizontal  
U = Vertical upflow  
D = Vertical downflow

#### VALVE CONTROLLER DESIGNATION

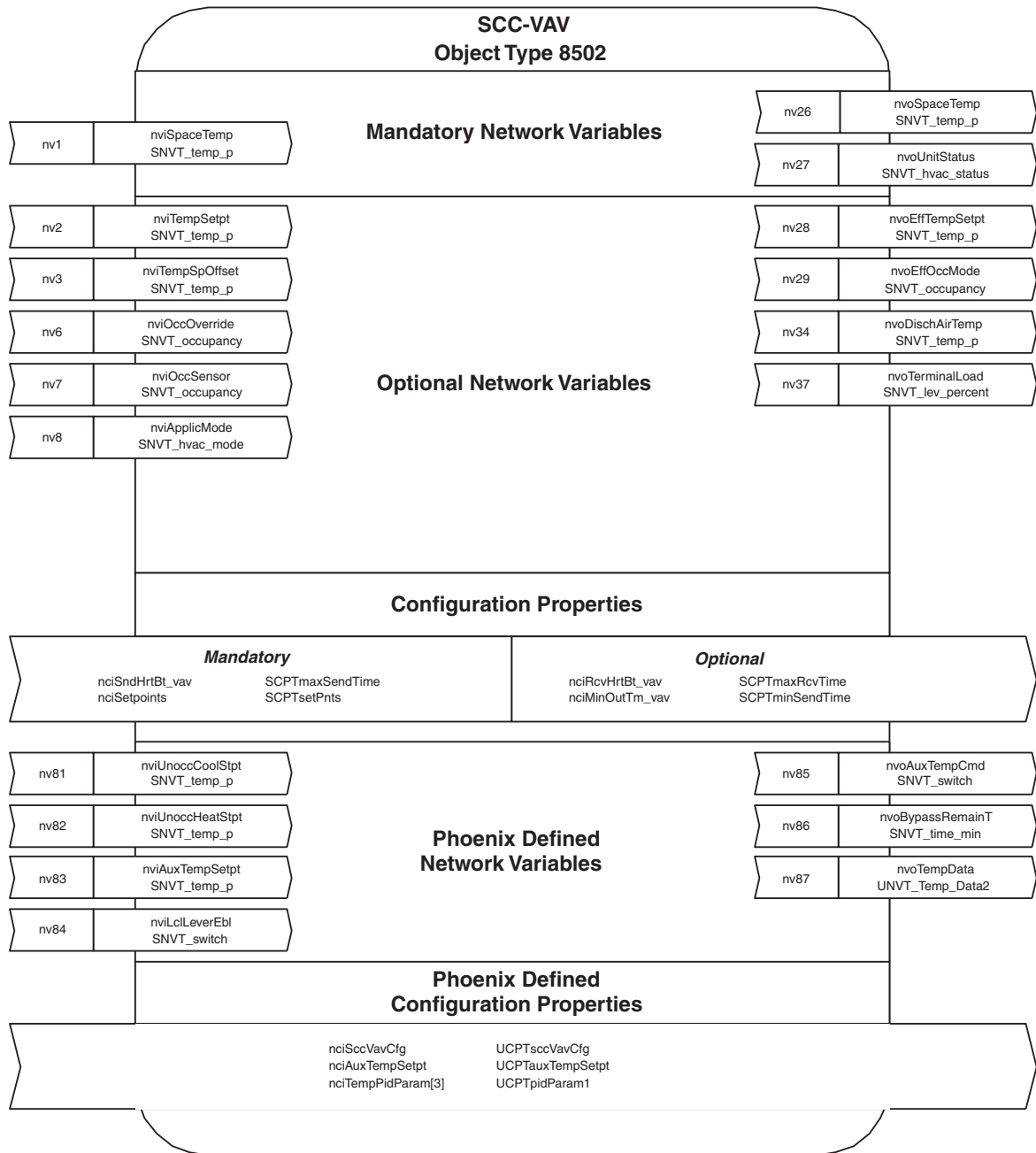
E = Tracel Room Controller (supply valves only)  
N = No controller (exhaust valves only)

#### FLOW/PRESSURE OPERATING RANGE

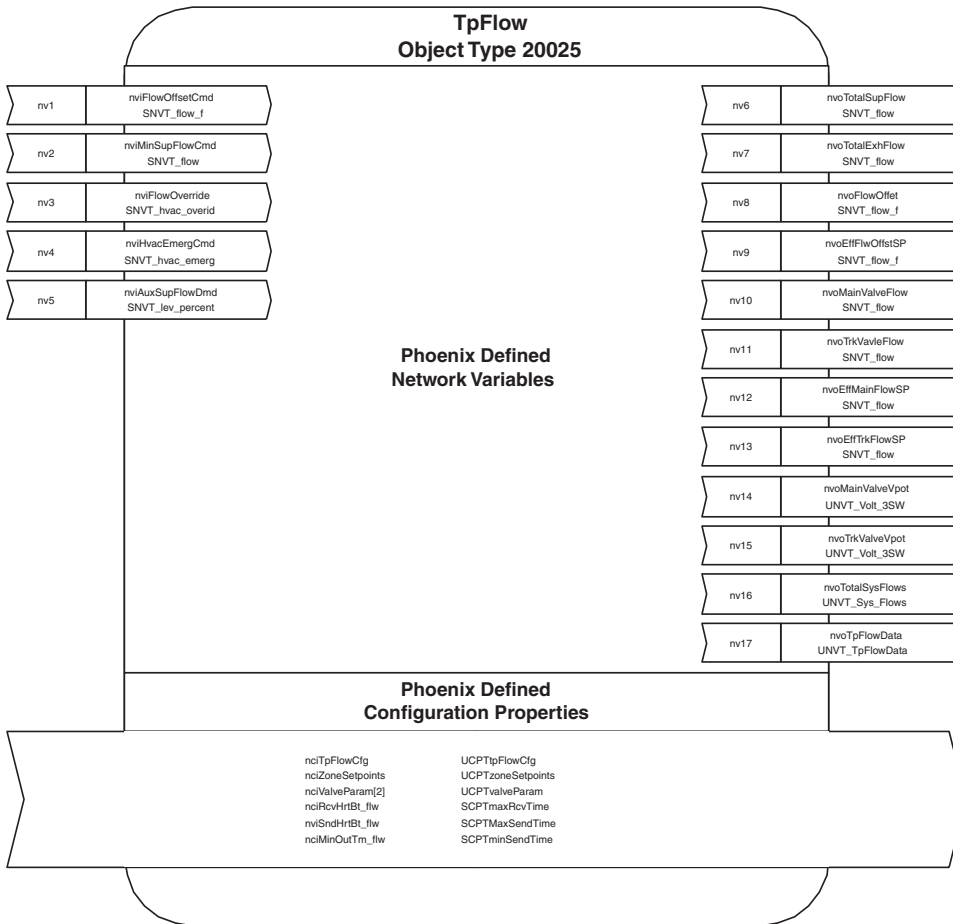
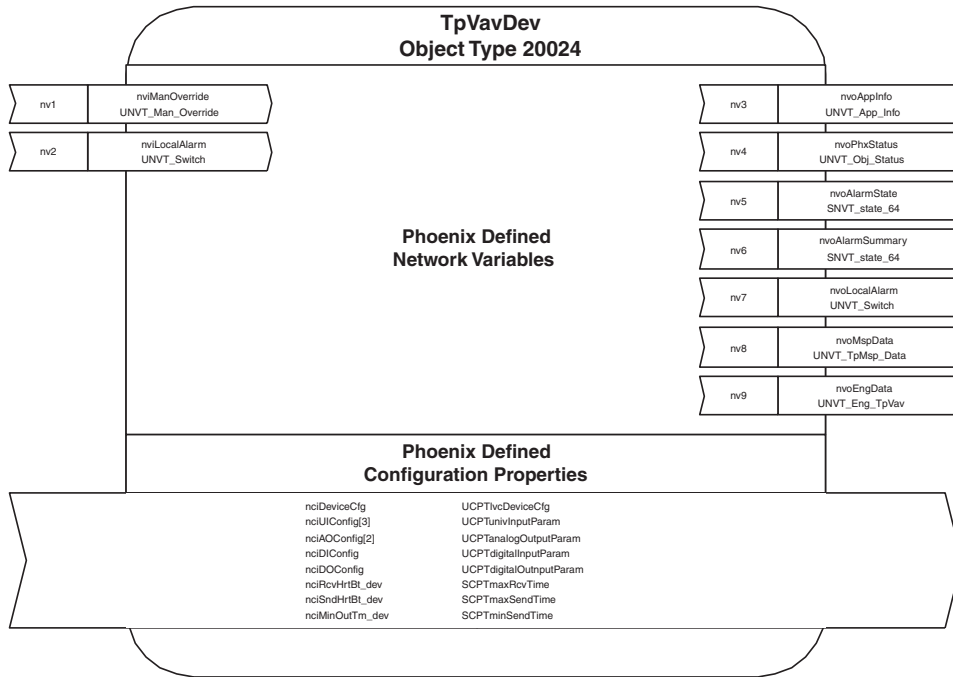
| Designation         | Size | Operating Range<br>in CFM (m <sup>3</sup> /hr) |                        | Pressure Drop<br>Across Valve |
|---------------------|------|--|------------------------|-------------------------------|
|                     |      | Single   | Dual                   |                               |
| M = Medium pressure | 08"  | 35-700<br>(59-1189)                            | —                      | 0.6-3.0" WC<br>(149-747 Pa)   |
|                     | 10"  | 50-1000<br>(85-1699)                           | 100-2000<br>(170-3398) |                               |
|                     | 12"  | 90-1500<br>(153-2549)                          | 180-3000<br>(306-5097) |                               |
| L = Low pressure    | 08"  | 35-500<br>(59-850)                             | —                      | 0.3-3.0" WC<br>(75-747 Pa)    |
|                     | 10"  | 50-550<br>(85-934)                             | 100-1100<br>(170-1869) |                               |
|                     | 12"  | 90-1050<br>(153-1784)                          | 180-2100<br>(306-3568) |                               |

#### NOTE:

Pressure switch set point = 0.3" WC (75 Pa)

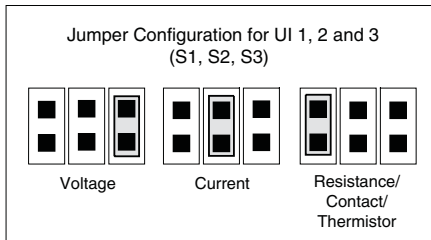
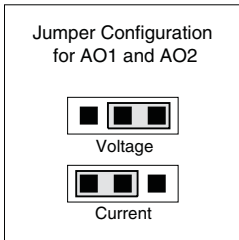
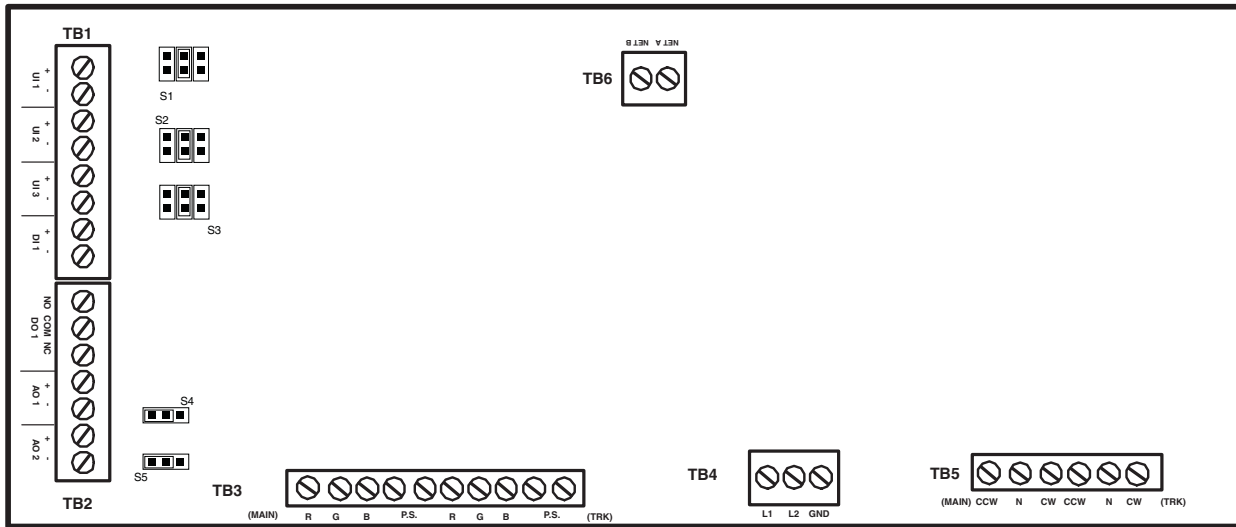


# PHOENIX DEFINED NETWORK VARIABLES



**WIRING** (see submittal wiring diagram for project-specific details.)

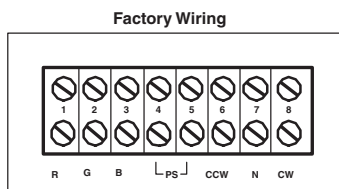
**Main Valve**



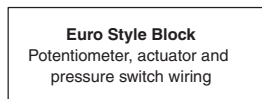
**TERMINAL BLOCKS**

| Terminal Block | Typical Function                                | No. of Terminations |
|----------------|---|---------------------|
| TB1            | Input connections                               | 8                   |
| TB2            | Output connections                              | 7                   |
| TB3            | Main and tracking valve pot and pressure switch | 10                  |
| TB4            | Power (24 Vac input)                            | 3                   |
| TB5            | Main and tracking low-speed electric actuators  | 3                   |
| TB6            | Communication (FTT-10)                          | 2                   |

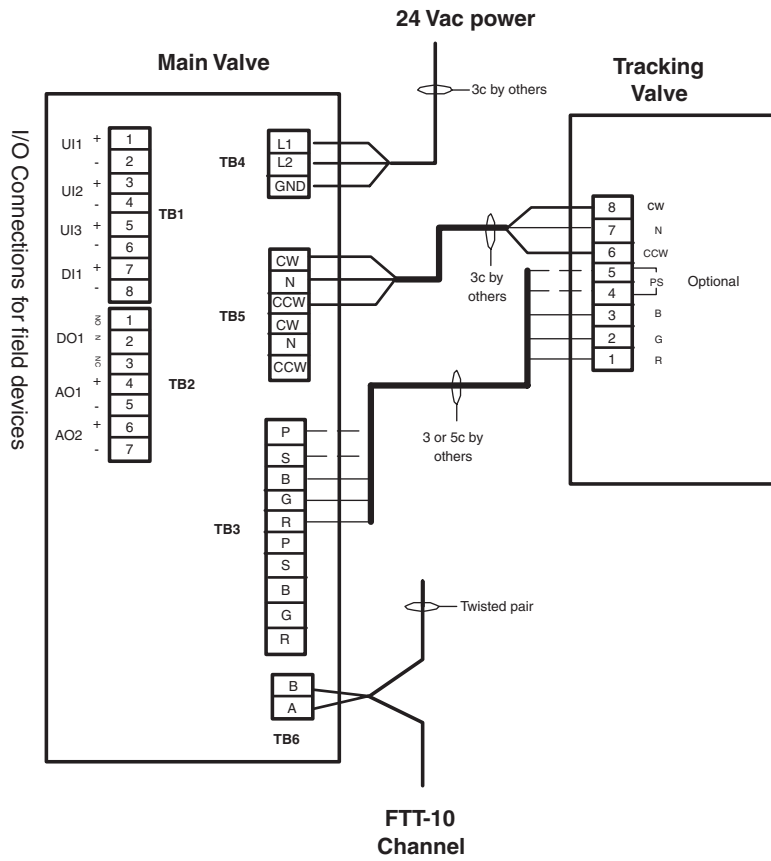
**Tracking Valve**



Field Wiring



**Typical Wiring Diagram**



## POINTS

The two tables in this section contain points available for integration in a building management system (BMS). Table 1 is a list of points for open Lon integration and Table 2 is a list of points for integration through the Phoenix Controls gateway.

**Table 1. Points for Open Lon Integration**

| Description  | Object Type | Object Name | Standard Network Variable Type (SNVT) | Network Variable (NV) Name |
|--|-------------|-------------|---------------------------------------|----------------------------|
| Space temperature sensor input                         | 8502        | SCC VAV     | SNVT_temp_p                           | nviSpaceTemp               |
| Occupied temperature set point                         | 8502        | SCC VAV     | SNVT_temp_p                           | nviTempSetpt               |
| Occupied temperature set point offset input            | 8502        | SCC VAV     | SNVT_temp_p                           | nviTempSpOffset            |
| Effective primary temperature control loop set point   | 8502        | SCC VAV     | SNVT_temp_p                           | nvoEffTempSetpt            |
| Effective space temperature                            | 8502        | SCC VAV     | SNVT_temp_p                           | nvoSpaceTemp               |
| Auxiliary temperature set point input                  | 8502        | SCC VAV     | SNVT_temp_p                           | nviAuxTempSetpt            |
| Auxiliary temperature control loop command             | 8502        | SCC VAV     | SNVT_switch                           | nvoAuxTempCmd              |
| Unoccupied cooling set point                           | 8502        | SCC VAV     | SNVT_temp_p                           | nviUnoccCoolStpt           |
| Unoccupied heating set point                           | 8502        | SCC VAV     | SNVT_temp_p                           | nviUnoccHeatStpt           |
| Occupancy override input                               | 8502        | SCC VAV     | SNVT_occupancy                        | nviOccOverride             |
| Occupied sensor input                                  | 8502        | SCC VAV     | SNVT_occupancy                        | nviOccSensor               |
| Occupancy mode status                                  | 8502        | SCC VAV     | SNVT_occupancy                        | nvoEffOccMode              |
| Bypass active remaining time output                    | 8502        | SCC VAV     | SNVT_time_min                         | nvoBypassremainT           |
| Discharge air temperature                              | 8502        | SCC VAV     | SNVT_temp_p                           | nvoDischAirTemp            |
| Terminal load  | 8502        | SCC VAV     | SNVT_lev_percent                      | nvoTerminalLoad            |
| Local temeprature set point lever enable/scaling input | 8502        | SCC VAV     | SNVT_switch                           | nviLclLeverEbl             |
| Auxiliary supply flow demand percent                   | 20025       | TpFlow      | SNVT_lev_percent                      | nviAuxSupFlowDmd           |
| BMS zone flow offset set point                         | 20025       | TpFlow      | SNVT_flow_f                           | nviFlowOffsetCmd           |
| Effective zone volumetric offset set point             | 20025       | TpFlow      | SNVT_flow_f                           | nvoEffFlwOffsetSP          |
| Zone volumetric offset feedback                        | 20025       | TpFlow      | SNVT_flow_f                           | nvoFlowOffset              |
| BMS minimum supply flow set point                      | 20025       | TpFlow      | SNVT_flow                             | nviMinSupFlowCmd           |
| Main valve flow set point                              | 20025       | TpFlow      | SNVT_flow                             | nvoEffMainFlowSp           |
| Supply valve flow feedback                             | 20025       | TpFlow      | SNVT_flow                             | nvoMainValveFlow           |
| Exhaust valve flow feedback                            | 20025       | TpFlow      | SNVT_flow                             | nvoTrkValveFlow            |
| Zone total supply flow                                 | 20025       | TpFlow      | SNVT_flow                             | nvoTotalSupFlow            |
| Zone total exhaust flow                                | 20025       | TpFlow      | SNVT_flow                             | nvoTotalExhFlow            |
| BMS HVAC flow override command                         | 20025       | TpFlow      | SNVT_hvac_overid                      | nviFlowOverride            |
| BMS HVAC emergency override                            | 20025       | TpFlow      | SNVT_hvac_emerg                       | nviHvacEmergCmd            |
| Unit status output                                     | 8502        | SCC VAV     | SNVT_hvac_status                      | nvoUnitStatus              |
| Application mode input                                 | 8502        | SCC VAV     | SNVT_hvac_mode                        | nviApplicMode              |
| Local alarm input                                      | 20024       | TpVavDev    | UNVT_switch                           | nviLocalAlarm              |
| Local alarm output                                     | 20024       | TpVavDev    | UNVT_switch                           | nvoLocalAlarm              |
| Current alarm status of all alarm bits                 | 20025       | TpFlow      | SNVT_state_64                         | nvoAlarmState              |
| Summary of alarm activity                              | 20025       | TpFlow      | SNVT_state_64                         | nvoAlarmSummary            |

**POINTS (CONTINUED)**

**Table 2. Points for Intergration through the Phoenix Controls Gateway**

| Description  | Standard Network Variable Type (SNVT) | Network Variable (NV) Name | Field Name        |
|--|---------------------------------------|----------------------------|-------------------|
| Space temeprature                                      | SNVT_temp_p                           | nvoTempData                | SpaceTemp         |
| Occupied temperature set point                         | SNVT_temp_p                           | nviTempSetpt               | nviTempSetpt      |
| Effective primary temperature control loop set point   | SNVT_temp_p                           | nvoTempData                | EffPrimarySetpt   |
| Primary temperature control loop cooling command       | SNVT_lev_percent                      | nvoTempData                | PrimaryCoolCmd    |
| Primary temperature control loop heating command       | SNVT_lev_percent                      | nvoTempData                | PrimaryHeatCmd    |
| Effective auxiliary temperature control loop set point | SNVT_temp_p                           | nvoTempData                | EffAuxiliarySetpt |
| Auxiliary temperature control loop command             | SNVT_switch.value                     | nvoTempData                | AuxTempCmd_value  |
| Auxiliary temperature control status (high/low)        | SNVT_switch.state                     | nvoTempData                | AuxTempCmd_state  |
| Unoccupied cooling set point                           | SNVT_temp_p                           | nviUnoccCoolStpt           | nviUnoccCoolStpt  |
| Unoccupied heating set point                           | SNVT_temp_p                           | nviUnoccHeatStpt           | nviUnoccHeatStpt  |
| Occupancy mode command                                 | SNVT_occupancy                        | nviOccOverride             | nviOccOverride    |
| Occupancy mode status                                  | SNVT_occupancy                        | nvoTpFlowData              | EffOccMode        |
| Discharge air temperature                              | SNVT_temp_p                           | nvoTempData                | DischAirTemp      |
| Enable local set point lever                           | SNVT_switch                           | nviLclLeverEbl             | state             |
| Local set point lever value                            | SNVT_switch                           | nviLclLeverEbl             | value             |
| Volumetric offset set point                            | SNVT_flow_f                           | nviFlowOffsetCmd           | nviFlowOffsetCmd  |
| Effective volumetric offset set point                  | SNVT_flow_f                           | nvoEffFlwOffstSP           | nvoEffFlwOffstSP  |
| Actual volumetric offset                               | SNVT_flow_f                           | nvoTpFlowData              | FlowOffset        |
| Minimum supply flow set point                          | SNVT_flow                             | nviMinSupFlowCmd           | nviMinSupFlowCmd  |
| Total supply flow                                      | SNVT_flow                             | nvoTpFlowData              | TotalSupply       |
| Total exhaust flow                                     | SNVT_flow                             | nvoTpFlowData              | TotalExhaust      |
| Supply valve flow set point                            | SNVT_flow                             | nvoTpFlowData              | EffMainFlowSP     |
| Supply valve flow                                      | SNVT_flow                             | nvoTpFlowData              | MainFlow          |
| Exhaust valve flow set point                           | SNVT_flow                             | nvoTpFlowData              | EffTrackFlowSP    |
| Exhaust valve flow                                     | SNVT_flow                             | nvoTpFlowData              | TrackFlow         |
| Supply valve jam alarm                                 | UNVT_PccAlarm                         | nvoAlarmState              | JamAlarm          |
| Supply valve flow alarm                                | UNVT_PccAlarm                         | nvoAlarmState              | FlowAlarm         |
| Tracking exhaust valve jam alarm                       | UNVT_PccAlarm                         | nvoAlarmState              | JamAlarm_2        |
| Tracking exhaust valve flow alarm                      | UNVT_PccAlarm                         | nvoAlarmState              | FlowAlarm_2       |
| Phoenix emergency mode command                         | UNVT_Emergency                        | nviPccEmergCmd             | nviPccEmergCmd    |
| Phoenix emergency mode status                          | UNVT_Emergency                        | nvoTpFlowData              | EffPccEmergMode   |
| SCC VAV emergency mode status                          | SNVT_hvac_emerg                       | nvoTpFlowData              | EffHvacEmergMode  |

## MAINTENANCE

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Tracel Room Controllers require no ongoing preventative maintenance. Once the field engineer has completed the field start-up, the valves will provide years of continuous operation.

### FCC COMPLIANCE FOR DIGITAL VALVES

**WARNING:** Changes or modifications to this unit not expressly approved by the party responsible for compliance (Phoenix Controls) could void the user's authority to operate the equipment.

**NOTE:**

- This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.
- This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual (Phoenix Controls product data sheets and wiring diagrams), may cause harmful interference to radio communications.
- Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.