

# VT8000 Room Controllers

## VTR8350/VT8350 Application Guide Fan Coil Unit (FCU) Firmware release version 2.6



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# Overview

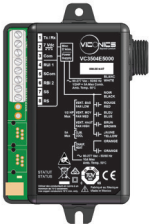
## VTR8350 AND VC3000 LINE-VOLTAGE FAN COIL TERMINAL EQUIPMENT CONTROLLERS AND RELAY PACKS

This new cost-effective solution for upgrading line-voltage fan coil unit thermostats requires only two components; the VTR8350 Terminal Equipment Controller and the VC3000 Relay Pack. This solution allows existing line voltage wiring between the fan coil unit and temperature controller to be re-used, thereby reducing overall costs and installation time.

The VC3000 Relay Pack features an onboard universal voltage power supply and line-voltage relays which directly drive fractional horsepower fan motors and valves. This eliminates the need to install and wire costly pilot relays and transformers. The Relay Pack is not required for the VT8350 models.

| Commercial and Hospitality Interface (Local Override and Degrees C/F Selection)   |                |  |          |            |                     |                            |
|---|----------------|--|----------|------------|---------------------|----------------------------|
|  | Part Number    | Description                                    | Humidity | PIR Sensor | ZigBee on-board     | Communication 0            |
|   | VTR8350A5000B  | BACnet® fan coil terminal equipment controller | Yes      | No         | No. See note below* | BACnet MS/TP or Modbus RTU |
|   | VTR8350A5500B  | BACnet® fan coil terminal equipment controller | Yes      | Yes        | No. See note below* | BACnet MS/TP or Modbus RTU |
|   | VTR8350A5500BP | BACnet® fan coil terminal equipment controller | Yes      | Yes        | Yes                 | BACnet MS/TP or Modbus RTU |

\*Note: ZigBee Pro plug-in module is available

| Transformer Relay Packs for Fan Coil Units  |             |   |
|---|-------------|---|
|  | Part Number | Description   |
|   | VC3500E5000 | Transformer relay pack, 3 fan speed and 2 valve relay outputs                               |
|   | VC3504E5000 | Transformer relay pack, 3 fan speed and 2 valve relay outputs, 4 inputs                     |
|   | VC3514E5000 | Transformer relay pack, 3 fan speed and 2 valve relay outputs, 4 inputs, 1 occupancy output |
|   | VC3400E5000 | Transformer relay pack, 3 fan speed and 1 valve relay outputs, 1 smart Vdc output           |
|   | VC3404E5000 | Transformer relay pack, 3 fan speed and 1 valve relay outputs, 1 smart Vdc output, 4 inputs |
|   | VC3300E5000 | Transformer relay pack, 3 fan speed relay outputs   |

## VTR8350 TERMINAL IDENTIFICATION AND FUNCTION

| Terminal Identification | All VTR8350 Terminal Equipment Controller |
|-------------------------|---|
| Terminal 4              | Tx / Rx Communication                     |
| Terminal 5              | Power Hot 7 Vdc                           |
| Terminal 6              | Power Common                              |
| Terminal 12             | ECM 0-10 Vdc output                       |
| Terminal 13             | BACnet +                                  |
| Terminal 14             | BACnet -                                  |
| Terminal 16             | BI 1 ( Configurable )                     |
| Terminal 17             | BI 2 ( Configurable )                     |
| Terminal 18             | Scom                                      |

**NOTE:** never use any terminal on Room Controller not mentioned in above table.



## COMMUNICATION WIRING TO VC3000 RELAY PACK



Only **ONE** Relay Pack with remote monitoring inputs (VC3404, VC3504 or VC3514) can be used for a single VTR8350 Room Controller. All other Relay Packs must be **without** remote monitoring inputs (VC3300, VC3400 or VC3500).

A maximum of 10 Relay Packs can be used for a single VTR8350 Room Controller.

The Relay Packs can be arranged in any order.

### From VTR8350 to the first VC3000 Relay Pack:

- Uses existing or new field wires
- A minimum of 3 wires are required
- Solid or Stranded, Shield is not necessary
- Distance between the two units must not exceed 15 m (49 ft)
- Wire gauge depends on available distance:
  - ≤ 10 m (33 ft): AWG 16-18 (1.31 - 0.823 mm<sup>2</sup>)
  - > 10 m (33 ft): AWG 16 (1.31 mm<sup>2</sup>)

### From the first VC3000 Relay Pack to all other VC3000 Relay Packs:

- Uses existing or new field wires
- 2 required wires AWG 16-18 (1.31 - 0.823 mm<sup>2</sup>):
  - Tx/Rx (1)
  - Power Common (3)
- Solid or Stranded, Shield is not necessary

## BACnet® Communication Shielded Wiring (if required)

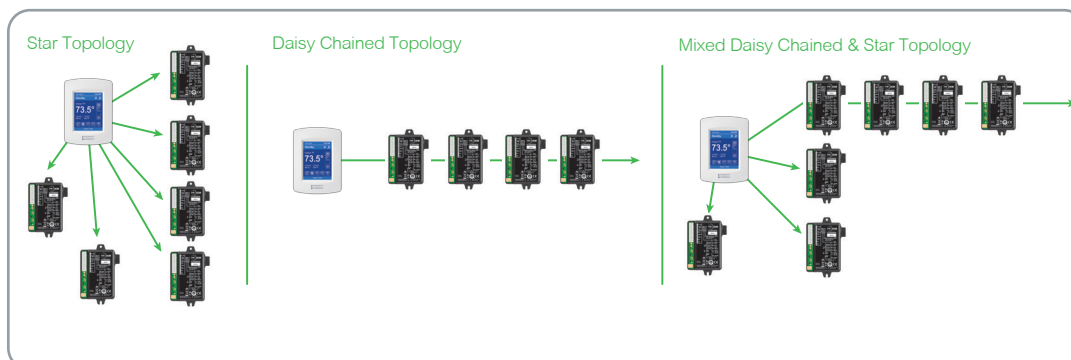


- **NOTE:** See VTR8350 BACnet® integration manual for more details

### NOTE

- Only one VC3404 , VC3504 or VC3514 Relay Pack with remote monitoring inputs can be used for a single VTR8350 Room Controller.


## Network Wiring Topology




## VT8350 LOW-VOLTAGE 24 VAC FAN COIL TERMINAL EQUIPMENT CONTROLLERS

This new cost-effective solution for upgrading low-voltage fan coil unit thermostats requires only the VT8350 Terminal Equipment Controller.

The VT8350 Terminal Equipment Controller can also be used along with a VC2300 Relay Pack for mixed-voltage solutions, when control of both line-voltage and low-voltage end devices is required.

| Commercial and Hospitality Interface (Local Override and Degrees C/F Selection)   |               |  |          |            |                     |                            |
|---|---------------|--|----------|------------|---------------------|----------------------------|
|  | Part Number   | Description                                    | Humidity | PIR Sensor | ZigBee on-board     | Communication              |
|   | VT8350U5000B  | BACnet® fan coil terminal equipment controller | Yes      | No         | No. See note below* | BACnet MS/TP or Modbus RTU |
|   | VT8350U5500B  | BACnet® fan coil terminal equipment controller | Yes      | Yes        | No. See note below* | BACnet MS/TP or Modbus RTU |
|   | VT8350U5500BP | BACnet® fan coil terminal equipment controller | Yes      | Yes        | Yes                 | BACnet MS/TP or Modbus RTU |

\*Note: ZigBee Pro plug-in module is available

| Mixed-voltage Relay Packs for VT8350  |             |                                       |
|---|-------------|---------------------------------------|
|  | Part Number | Description                           |
|   | VC2300E5000 | 3 on/off outputs, 220/240 VAC 3 speed |

## VT8350 TERMINAL IDENTIFICATION AND FUNCTION

### Terminal identification for 3-Speed Fan System

| Fan Type - 3-Speed |  |                  |                   |                      |
|--------------------|--|------------------|-------------------|----------------------|
| Control Type       | On/Off   | Floating         | Analog            |                      |
| 1- BO1             | Not used   | Not used         | Not used          |                      |
| 2- BO2             | Fan-L  | Fan-L            | Fan-L             |                      |
| 3- BO3             | Fan-M  | Fan-M            | Fan-M             |                      |
| 4- BO4             | Fan-H  | Fan-H            | Fan-H             |                      |
| 5- RC / 24 V~ Hot  | 24 V~ Hot  | 24 V~ Hot        | 24 V~ Hot         |                      |
| 6- C / 24 V~ Com   | 24 V~ Com  | 24 V~ Com        | 24 V~ Com         |                      |
| 7- RH              | Aux Heat   | Aux Heat         | Aux Heat          |                      |
| 8- BO8             | Aux Heat   | Aux Heat         | Aux Heat          |                      |
| 9- UO9             | Normally Close Cool Valve  | Close Cool Valve | Not used          |                      |
| 10- UO10           | Normally Close Heat Valve  | Close Heat Valve | Not used          |                      |
| 11- UO11           | Normally Open Cool Valve   | Open Cool Valve  | Analog Heat Valve | Analog Cool Valve *  |
| 12- UO12           | Normally Open Heat Valve   | Open Heat Valve  | Analog Cool Valve | Analog Heat Valve ** |
| 13- RS485 +        | BACnet MS/TP or Modbus (+)   |                  |                   |                      |
| 14- RS485 -        | BACnet MS/TP or Modbus (-)   |                  |                   |                      |
| 15- RS485 Ref      | BACnet MS/TP or Modbus (Ref) (do not wire shield to this terminal) |                  |                   |                      |
| 16- UI16           | UI16 Function  |                  |                   |                      |
| 17- UI17           | UI17 Function  |                  |                   |                      |
| 18- Scom           | Common   |                  |                   |                      |
| 19- UI19           | UI19 Function  |                  |                   |                      |
| 20- UI20           | Remote Room Sensor   |                  |                   |                      |
| 21- Scom           | Common   |                  |                   |                      |
| 22- UI22           | Remote Supply Sensor   |                  |                   |                      |
| 23- UI23           | Not used   |                  |                   |                      |
| 24- UI24           | Not used   |                  |                   |                      |

#### NOTE:

The Analog control terminations are reversed when used in a 4 pipe mixed application (one analog valve and one On/Off or Floating valve):

\* : The "Analog Cool Valve" output moves to terminal UO11 when:

- "No. of pipes" is set to 4
- "Ctrl. type out1" is set to "0-10V DA" or "0-10V RA"
- "Ctrl. type out2" is set to "On/Off" or "Floating"

\*\* : The "Analog Heat Valve" output moves to terminal UO12 when:

- "No. of pipes" is set to 4
- "Ctrl. type out1" is set to "On/Off" or "Floating"
- "Ctrl. type out2" is set to "0-10V DA" or "0-10V RA"

## Terminal identification for ECM Fan System

| Fan Type - ECM    |  |                  |                   |                      |
|-------------------|--|------------------|-------------------|----------------------|
| Control Type      | On/Off   | Floating         | Analog            |                      |
| 1- BO1            | Normally Close Heat Valve  | Close Heat valve | Not used          |                      |
| 2- BO2            | Not used   | Not used         | Not used          |                      |
| 3- BO3            | Not used   | Not used         | Not used          |                      |
| 4- BO4            | ECM Fan Start  | ECM Fan Start    | ECM Fan Start     |                      |
| 5- RC / 24 V~ Hot | 24 V~ Hot  | 24 V~ Hot        | 24 V~ Hot         |                      |
| 6- C / 24 V~ Com  | 24 V~ Com  | 24 V~ Com        | 24 V~ Com         |                      |
| 7- RH             | Aux Heat   | Aux Heat         | Aux Heat          |                      |
| 8- BO8            | Aux Heat   | Aux Heat         | Aux Heat          |                      |
| 9- UO9            | Normally Close Cool Valve  | Close Cool Valve | Not used          |                      |
| 10- UO10          | Analog ECM Fan   | Analog ECM Fan   | Analog ECM Fan    |                      |
| 11- UO11          | Normally Open Cool Valve   | Open Cool Valve  | Analog Heat valve | Analog Cool Valve *  |
| 12- UO12          | Normally Open Heat Valve   | Open Heat Valve  | Analog Cool Valve | Analog Heat Valve ** |
| 13- RS485 +       | BACnet MS/TP or Modbus (+)   |                  |                   |                      |
| 14- RS485 -       | BACnet MS/TP or Modbus (-)   |                  |                   |                      |
| 15- RS485 Ref     | BACnet MS/TP or Modbus (Ref) (do not wire shield to this terminal) |                  |                   |                      |
| 16- UI16          | UI16 Function  |                  |                   |                      |
| 17- UI17          | UI17 Function  |                  |                   |                      |
| 18-Scom           | Common   |                  |                   |                      |
| 19- UI19          | UI19 Function  |                  |                   |                      |
| 20- UI20          | Remote Room Sensor   |                  |                   |                      |
| 21-Scom           | Common   |                  |                   |                      |
| 22- UI22          | Remote Supply Sensor   |                  |                   |                      |
| 23- UI23          | Not used   |                  |                   |                      |
| 24- UI24          | Not used   |                  |                   |                      |

**NOTE:**

The Analog control terminations are reversed when used in a 4 pipe mixed application (one analog valve and one On/Off or Floating valve):


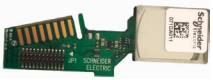

\* : The "Analog Cool Valve" output moves to terminal UO11 when:

- "No. of pipes" is set to 4
- "Ctrl. type out1" is set to "0-10V DA" or "0-10V RA"
- "Ctrl. type out2" is set to "On/Off" or "Floating"

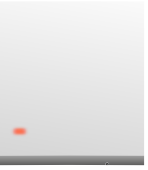



\*\* : The "Analog Heat Valve" output moves to terminal UO12 when:

- "No. of pipes" is set to 4
- "Ctrl. type out1" is set to "On/Off" or "Floating"
- "Ctrl. type out2" is set to "0-10V DA" or "0-10V RA"

## VTR8350/VT8350 WIRELESS MODULES AND ACCESORIES

| Wireless Communication Modules  |                              |  |
|---|------------------------------|--|
|   | Part Number                  | Description  |
|  | VCM8000V5045P*<br>Release 24 | ZigBee Pro extended profile retrofit communication module. |
|  | VCM8001V5045*                | CO2 detection sensor retrofit communication module.        |
|  | VCM8002V5031*<br>Release 1   | Wi-Fi extended profile retrofit communication module.      |

\* **Note:** Only one of the three communication modules can be plugged in at one time.

| Wireless Accessories  |                |  |
|---|----------------|--|
|   | Part Number    | Description  |
|  | SED-CO2-G-5045 | Wireless CO2 sensor with room temperature and humidity |
|   | SED-TRH-G-5045 | Wireless sensor with room temperature and humidity     |
|  | SED-MTH-G-5045 | Wireless motion/temperature/humidity sensor            |
|  | SED-WDC-G-5045 | Wireless window/door sensor                            |
|  | SED-WLS-G-5045 | Wireless water leakage sensor                          |

\* **Note:** Requires embedded ZigBee or a VCM8000V5045P.

# VTR8350 3-Speed Fan

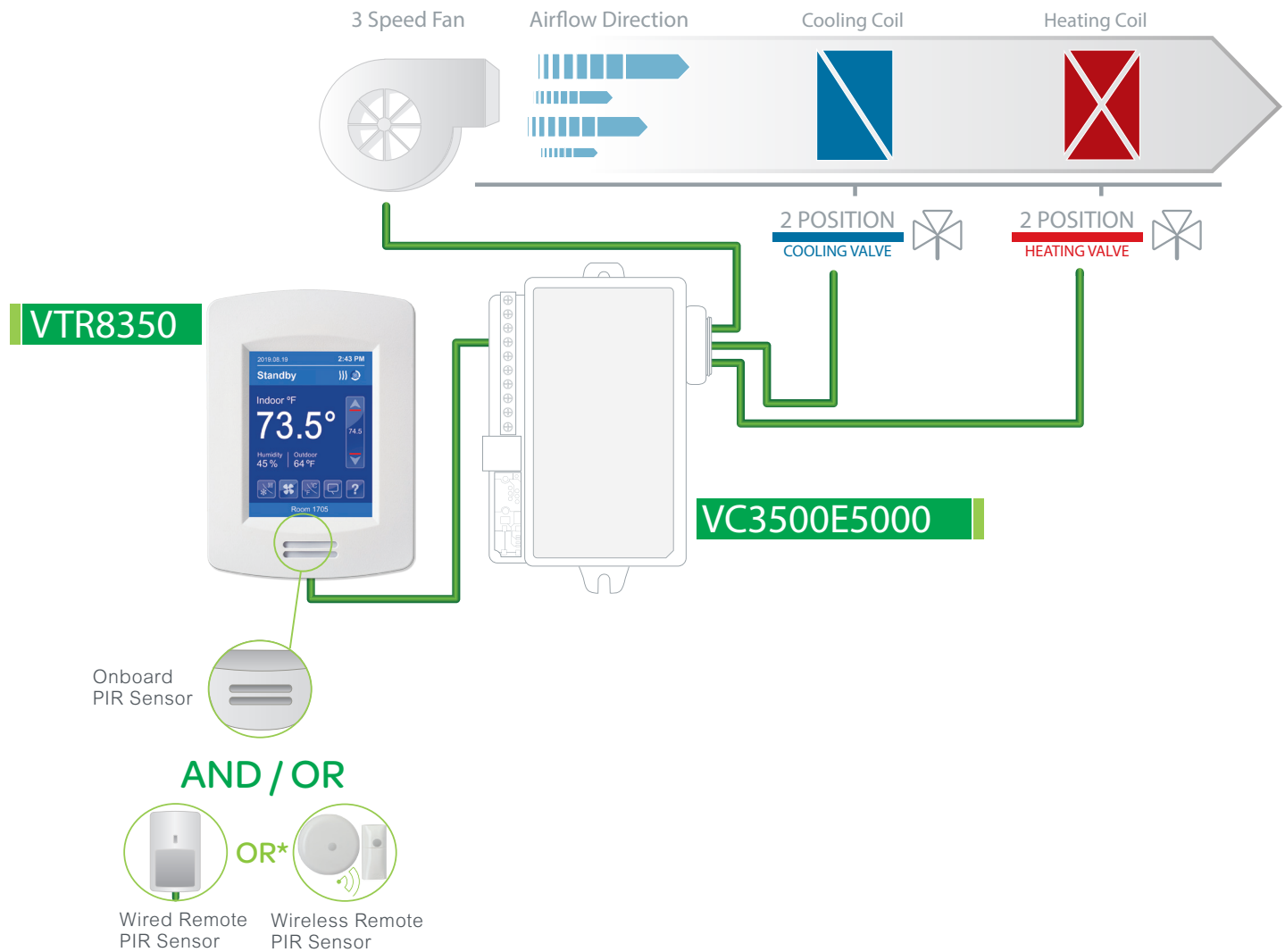
## VTR8350

## 1, 2 OR 3-SPEED FAN APPLICATIONS

| System  | Fan         | Cooling           | Heating           | Other                  |
|---------|-------------|-------------------|-------------------|------------------------|
| 4 pipes | 3 Speed     | 2 positions valve | 2 positions valve | Motion detect          |
| 2 pipes | 3 Speed     | 2 positions valve | Heating SSR       | Dehumidification       |
| 2 pipes | 3 Speed     | 2 positions valve | Changeover sensor | Motion detect          |
| 2 pipes | 3 Speed     | 2 positions valve | Changeover sensor | Fresh air damper       |
| 4 pipes | Two 3 speed | 2 positions valve | 2 positions valve | Two VC3000 relay packs |
| 2 pipes | 3 Speed     | 2 positions valve | Changeover sensor | Window sensor          |
| 4 pipes | 3 Speed     | 2 positions valve | 2 positions valve | Door and motion detect |

See Appendix A for VC3000 relay pack wiring.

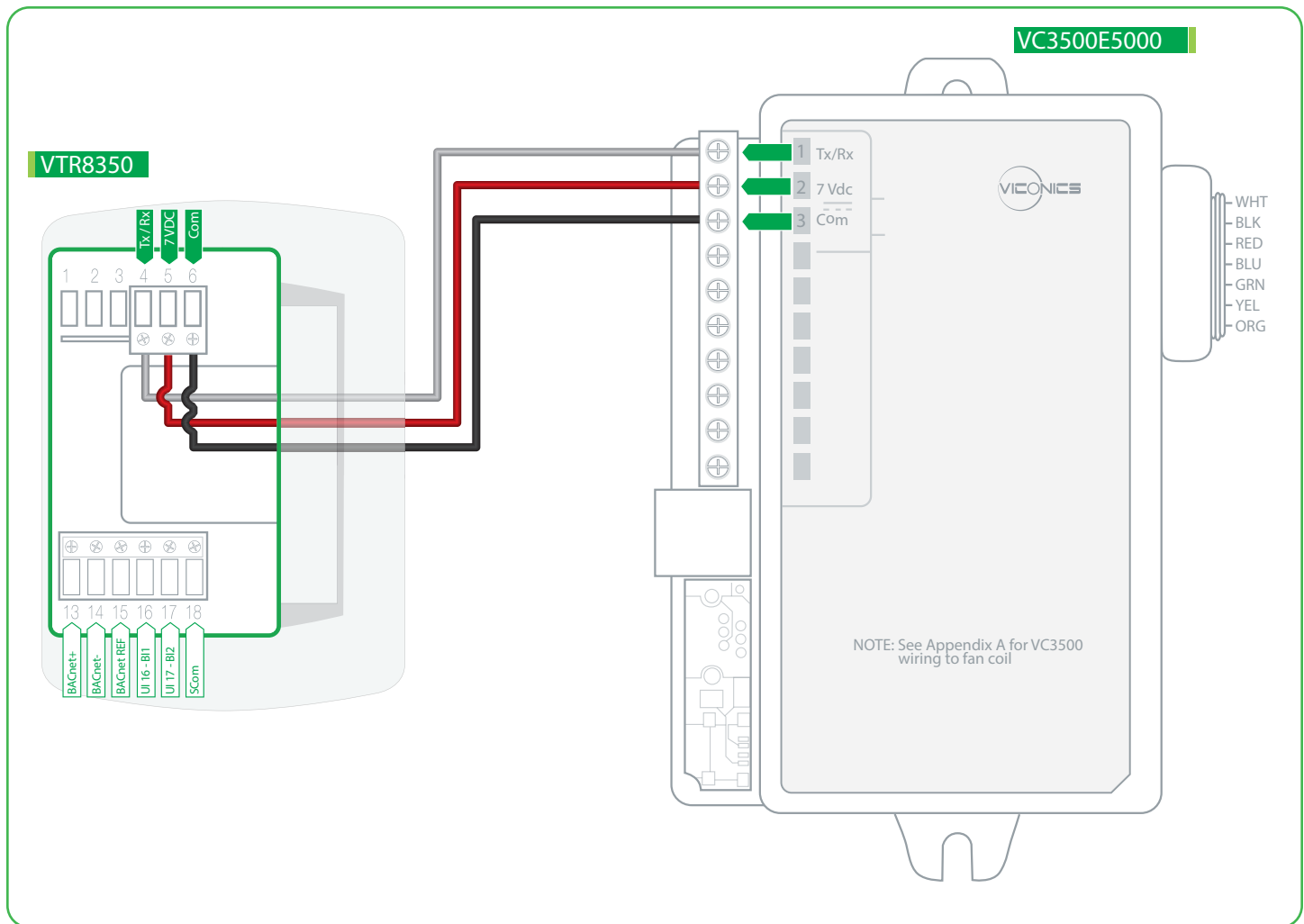
## VTR8350 WITH VC3500 RELAY: HEATING/COOLING 4-PIPE FAN COIL UNIT WITH 3-SPEED FAN AND 2-POSITION VALVES



| Configuration Parameter Name | Configuration Settings                          |
|------------------------------|---|
| Fan type                     | 3 speed   |
| Fan menu                     | L-M-H-A   |
| Fan cont. heat.              | On  |
| BI1 config                   | Motion NO or Motion NC (remote PIR sensor only) |
| BI2 config                   | Door Dry  |
| Pulsed heating               | Off   |
| No. of pipes                 | 4   |
| Operation sequence           | Cool/Heat                                       |

\* Wired remote sensor cannot be used at the same time as wireless remote sensor(s).





## Sequence of Operation and Wiring

### Occupied Mode

Setpoints revert to those defined by occupied cooling and heating.

### Stand-by Mode (only available when PIR motion detector sensor is used)

Setpoints revert to those defined by stand-by cooling and heating.

### Unoccupied Mode

Setpoints revert to those defined by unoccupied heating and cooling.

### Occupied Override Mode

System reverts to occupied mode for duration determined by "ToccTime" parameter.

### On Call for Cool

Cooling valve opens to maintain room temperature. Heating valve closed.

### On Call for Heat

Heating valve opens to maintain room temperature. Cooling valve closed.

### Wireless Door Switch and Motion

Wireless door switch automatically toggles occupancy to standby. Motion will switch to occupied as long as the door stays closed

## Options

- Wireless adapter modules are available. (see Appendix B for network wiring).
- Can be configured for 2-pipe systems (without changeover).
- Binary inputs can be configured to control occupancy via door or window contact, remote motion sensor, or remote night setback.

## 3 Speed Fan Operation

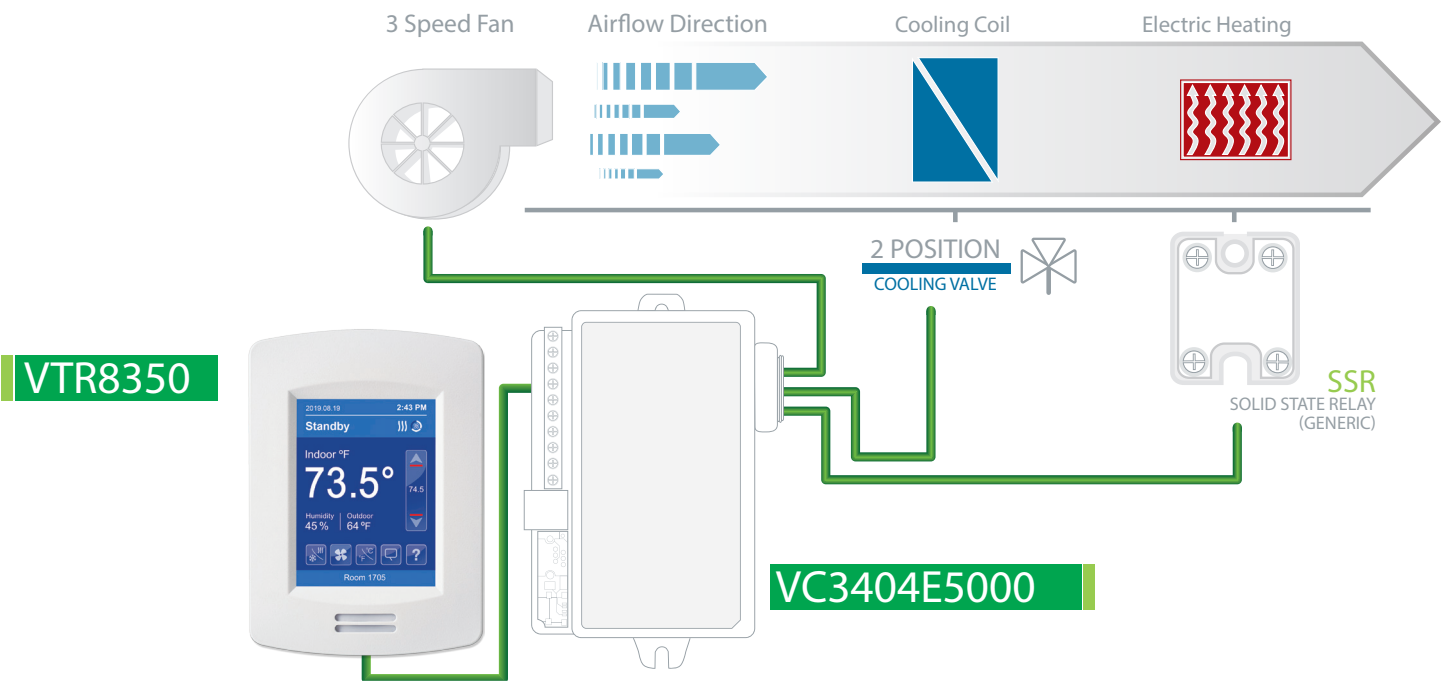
### System Off

Brown, blue and red wires are not energized

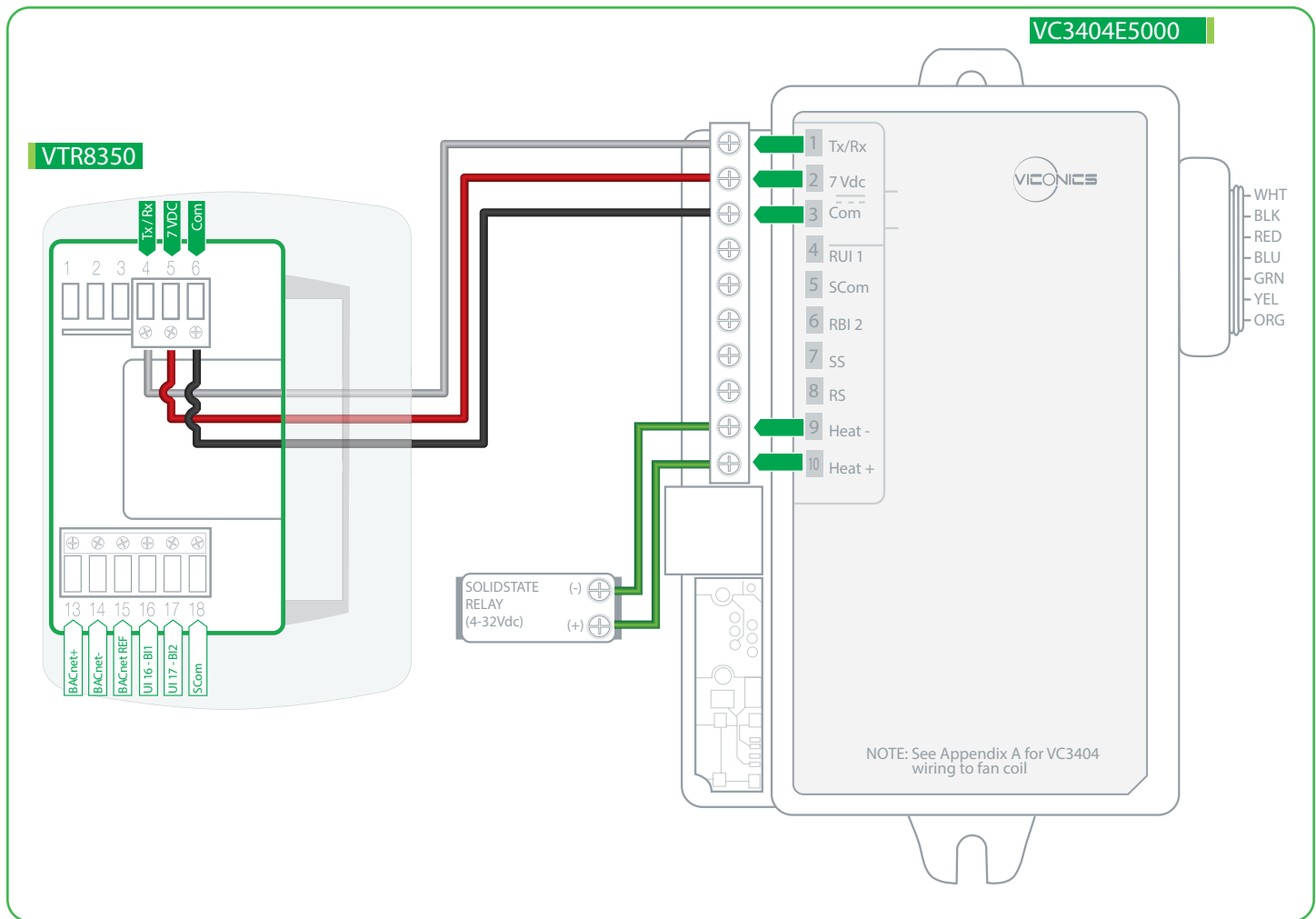
### System On: (Fan modes)

- Low: red wire is energized
- Med: blue wire is energized
- High: brown wire is energized.
- Auto: When there is no demand, brown, blue and red wires are not energized. On demand, system will automatically switch "on" low (red), medium (blue) or high (brown) speed.

VTR8350 WITH VC3404 RELAY: COOLING AND ELECTRIC HEAT 2-PIPE FAN COIL UNIT WITH 3-SPEED FAN, DEHUMIDIFICATION AND 2-POSITION VALVES



| Configuration Parameter Name | Configuration settings                   |
|------------------------------|--|
| Fan type                     | 3 speed                                  |
| Fan menu                     | L-M-H-A                                  |
| Fan cont. heat               | On                                       |
| Pulsed heating               | On                                       |
| No. of pipes                 | 2  |
| Operation sequence           | Cool/Heat (Cooling with electric reheat) |



## Sequence of Operation and Wiring

### Occupied Mode

Setpoints revert to those defined by occupied cooling and heating.

### Stand-by Mode (only available when PIR motion detector sensor is used)

Setpoints revert to those defined by stand-by cooling and heating.

### Unoccupied Mode

Setpoints revert to those defined by unoccupied heating and cooling.

### Occupied Override Mode

System reverts to occupied mode for duration determined by "ToccTime" parameter.

### On Call for Cool

Cooling valve opens to maintain room temperature.

### On Call for Heat

Electric heat operates to maintain room temperature. Cooling valve closes and dehumidification is disabled.

### On a Demand for Dehumidification

Dehumidification achieved via cooling coil using reheat if necessary.

Dehumidification only allowed in COOL mode or if cooling is enabled in AUTO mode.

Dehumidification disabled if room temperature falls below low ambient lockout temperature, which is cooling setpoint minus configuration defined deadband value.

### 3 Speed Fan Operation

#### System Off

Brown, blue and red wires are not energized

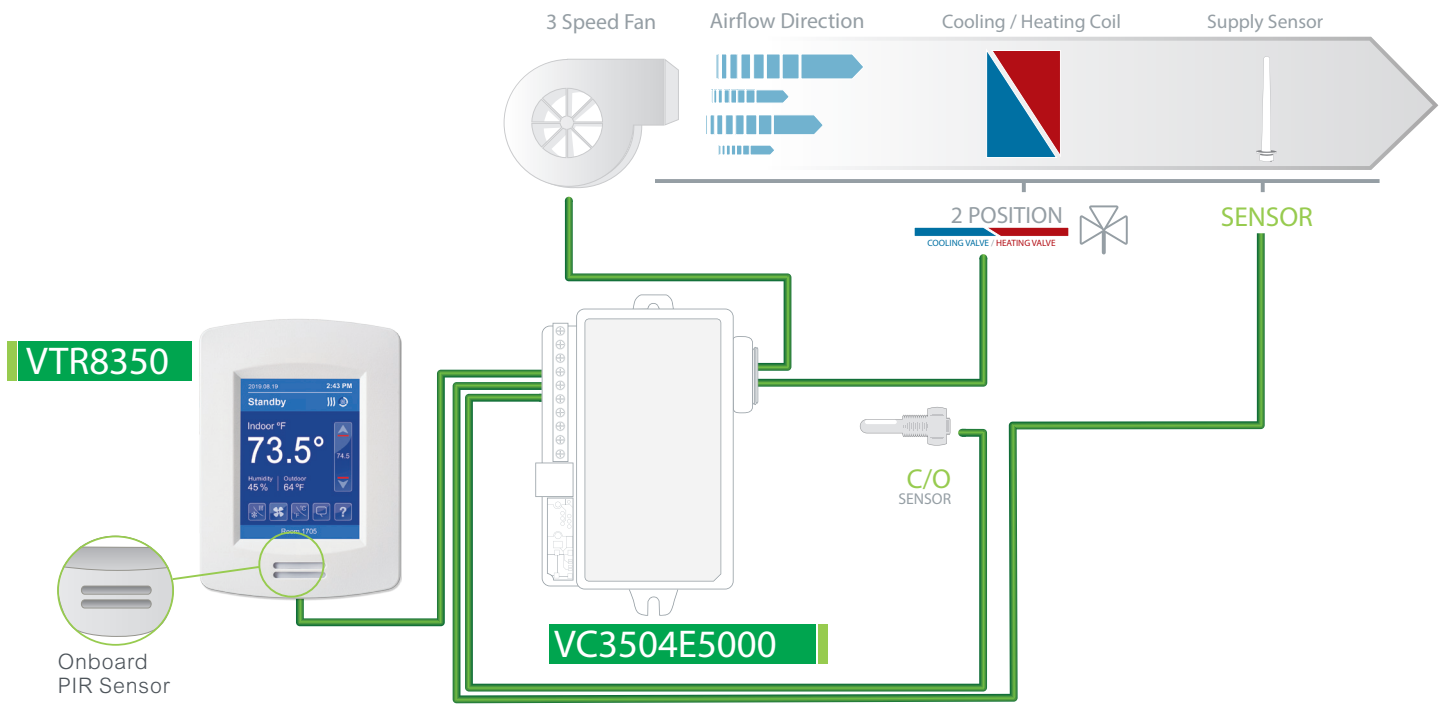
#### System On: (Fan modes)

- Low: red wire is energized
- Med: blue wire is energized
- High: brown wire is energized.
- Auto: When there is no demand, brown, blue and red wires are not energized. On demand, system will automatically switch “on” low (red), medium (blue) or high (brown) speed.

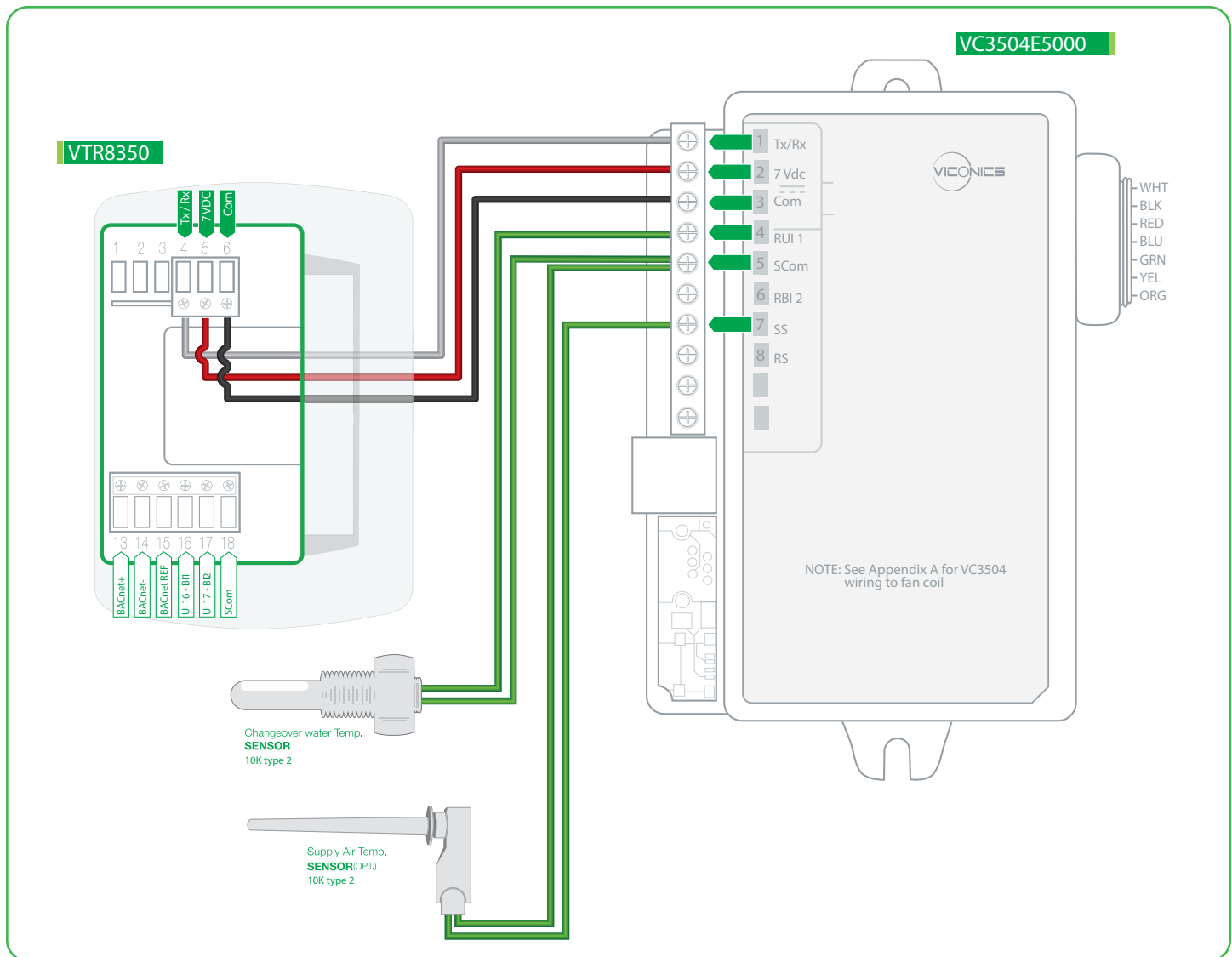
#### Options

- Wireless adapter modules are available. (see Appendix B for network wiring).
- Remote wall mount or return duct sensor ready.
- Can be configured for 2-pipe systems with changeover.
- Binary inputs can be configured to control occupancy via door or window contact, remote motion sensor, remote night setback, or provide alarms for service or filter monitoring.
- Universal input can be configured for changeover sensor.

VTR8350 WITH VC3504 RELAY: HEATING/COOLING WITH CHANGEOVER SENSOR 2-PIPE FAN COIL UNIT WITH 3-SPEED FAN



| Configuration Parameter Name | Configuration Settings |
|------------------------------|------------------------|
| Fan type                     | 3 speed                |
| Fan menu                     | L-M-H-A                |
| Fan cont                     | On                     |
| Bl1 config                   | Window                 |
| RUI1                         | COS                    |
| Pipe No                      | 2                      |
| Operation sequence           | Cool only              |



## Sequence of Operation and Wiring

### Occupied Mode

Setpoints revert to those defined by occupied cooling and heating.

### Stand-by Mode (only available when PIR motion detector sensor is used)

Setpoints revert to those defined by stand-by cooling and heating.

### Unoccupied Mode

Setpoints revert to those defined by unoccupied heating and cooling.

### Occupied Override Mode

System reverts to occupied mode for duration determined by "ToccTime" parameter.

### On Call for Cool

If supply water temperature is less than 24°C (75F), valve opens to maintain room temperature, else valve closes.

### On Call for Heat

If supply water temperature is greater than 25°C (77F), valve opens to maintain room temperature, else the valve closes.

### Supply Air Sensor

Only used for monitoring. Shows automatically if sensor is connected.

### Wireless Window Switch

Wireless window switch automatically locks out heating/cooling when window is opened.

## Options

- Wireless adapter modules are available. (see Appendix B for network wiring).
- Remote wall mount or return duct sensor ready.
- Binary inputs can be configured to control occupancy via door or window contact, remote motion sensor, remote night setback, or provide alarms for service or filter monitoring.

## 3 Speed Fan Operation

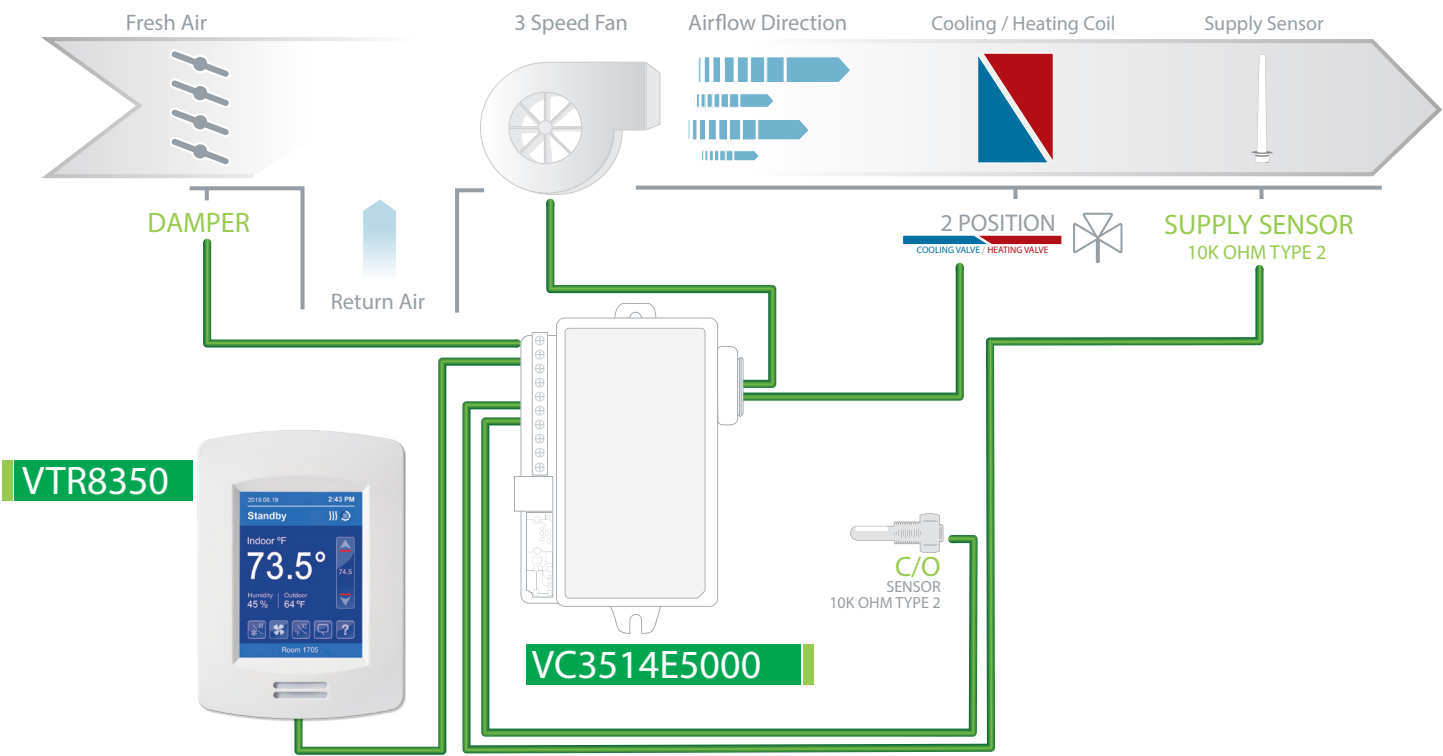
### System Off

Brown, blue and red wires are not energized

### System On: (Fan modes)

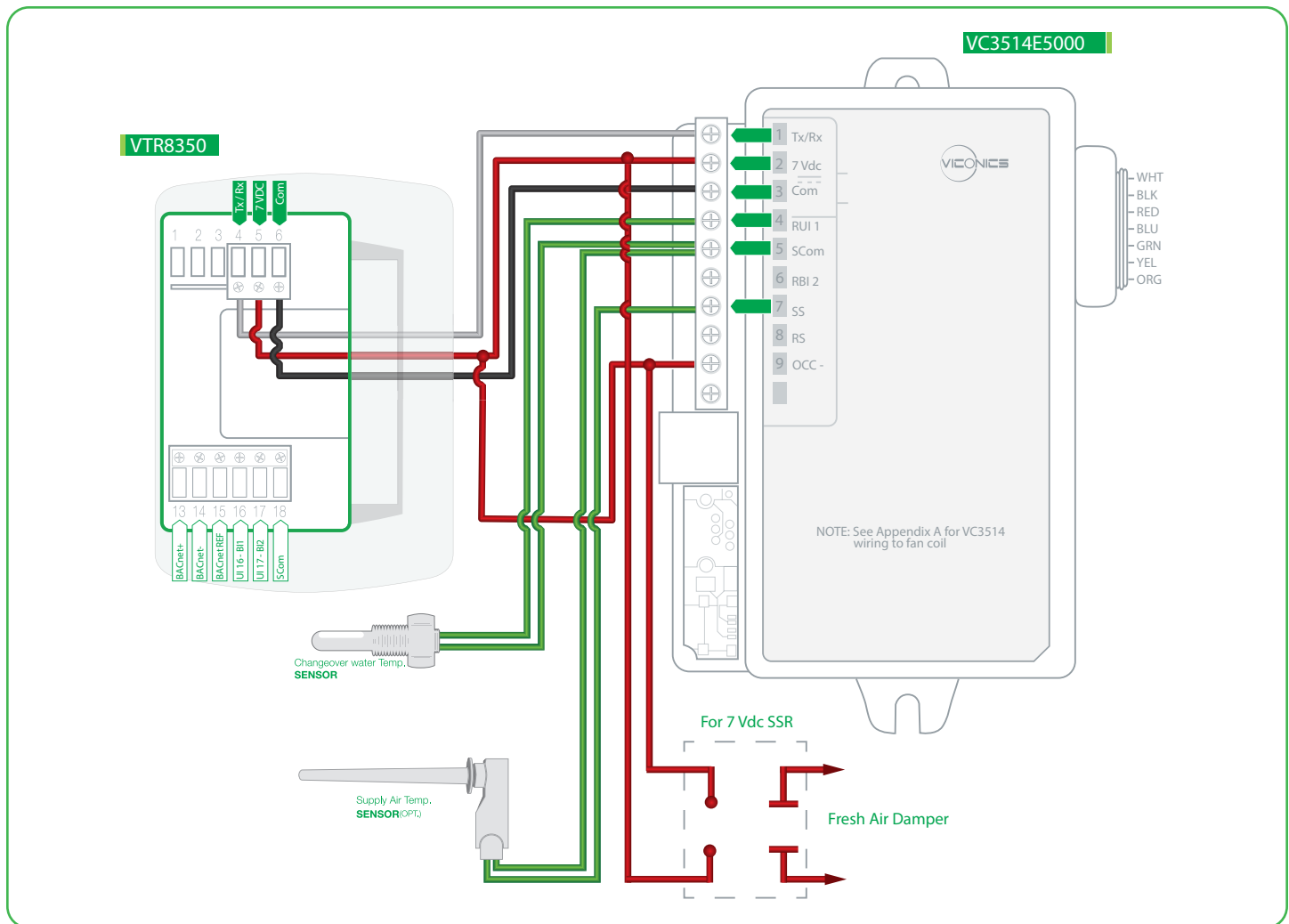
- Low: red wire is energized
- Med: blue wire is energized
- High: brown wire is energized.
- Auto: When there is no demand, brown, blue and red wires are not energized. On demand, system will automatically switch “on” low (red), medium (blue) or high (brown) speed.

VTR8350 WITH VC3514 RELAY: HEATING/COOLING 2-PIPE FAN COIL UNIT WITH 3-SPEED FAN, FRESH AIR DAMPER AND 2-POSITION VALVES



| Configuration Parameter Name | Configuration Settings |
|------------------------------|------------------------|
| Fan control                  | 3 speed                |
| Fan menu                     | L-M-H-A                |
| Fan cont. heat               | On                     |
| RUI1                         | COS                    |
| Pulsed Heating               | Occ Out                |
| Pipe no.                     | 2                      |
| Seq. operation               | Cool                   |





## Sequence of Operation and Wiring

### Occupied Mode

Setpoints revert to those defined by occupied cooling and heating. The occupancy output opens fresh air damper to minimum position.

### Stand-by Mode (only available when PIR motion detector sensor is used)

Setpoints revert to those defined by stand-by cooling and heating.

### Unoccupied Mode

Setpoints revert to those defined by unoccupied heating and cooling. The fresh air damper closes.

### Occupied Override Mode

System reverts to occupied mode for duration determined by "ToccTime" parameter.

### On Call for Cool

If supply water temperature is less than 24°C (75F), cooling valve opens to maintain room temperature, else the valve closes.

### On Call for Heat

If supply water temperature is greater than 25°C (77F), heating valve opens to maintain room temperature, else the valve closes.

### Supply Air Sensor

Only used for monitoring. Shows automatically if sensor is connected.

## Options

- Wireless adapter modules are available. (see Appendix B for network wiring).
- Remote wall mount or return duct sensor ready.
- Binary inputs can be configured to control occupancy via door or window contact, remote motion sensor, remote night setback, or provide alarms for service or filter monitoring.

## 3 Speed Fan Operation

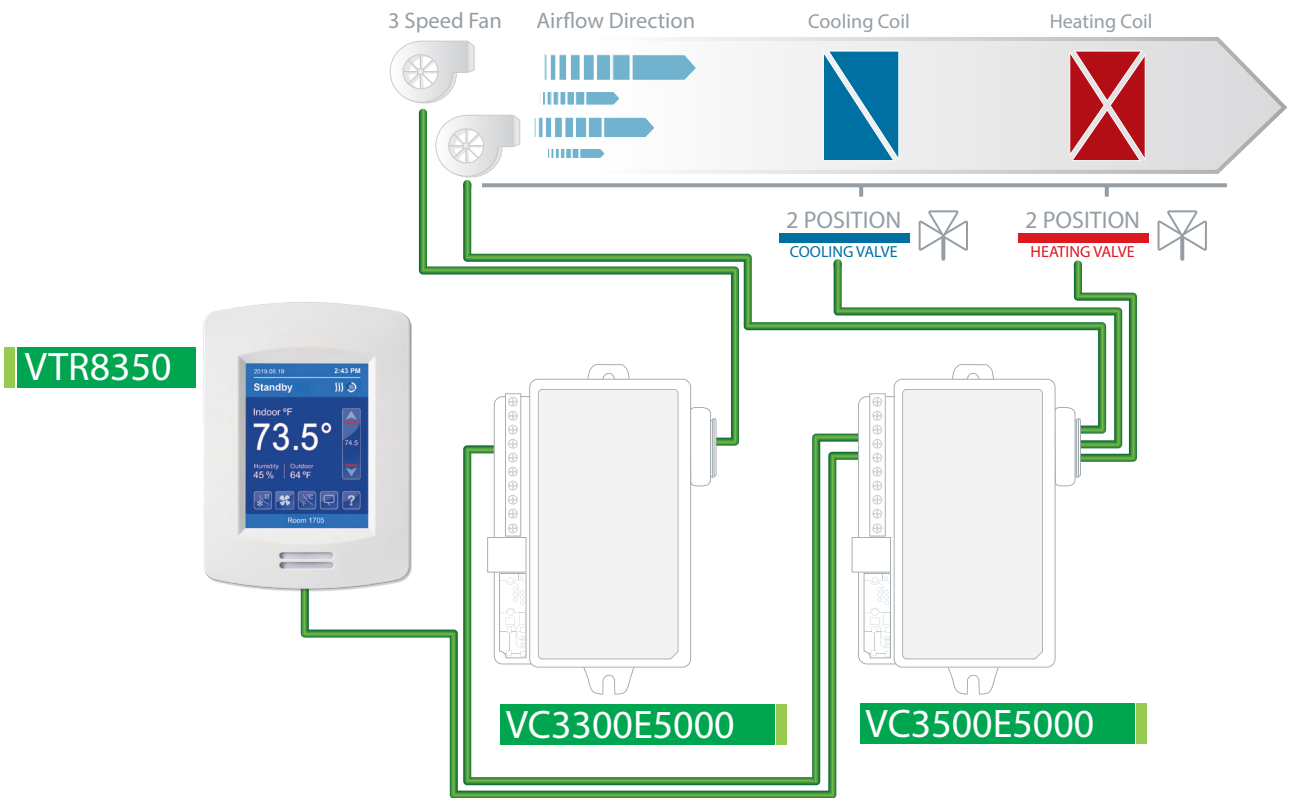
### System Off

Brown, blue and red wires are not energized

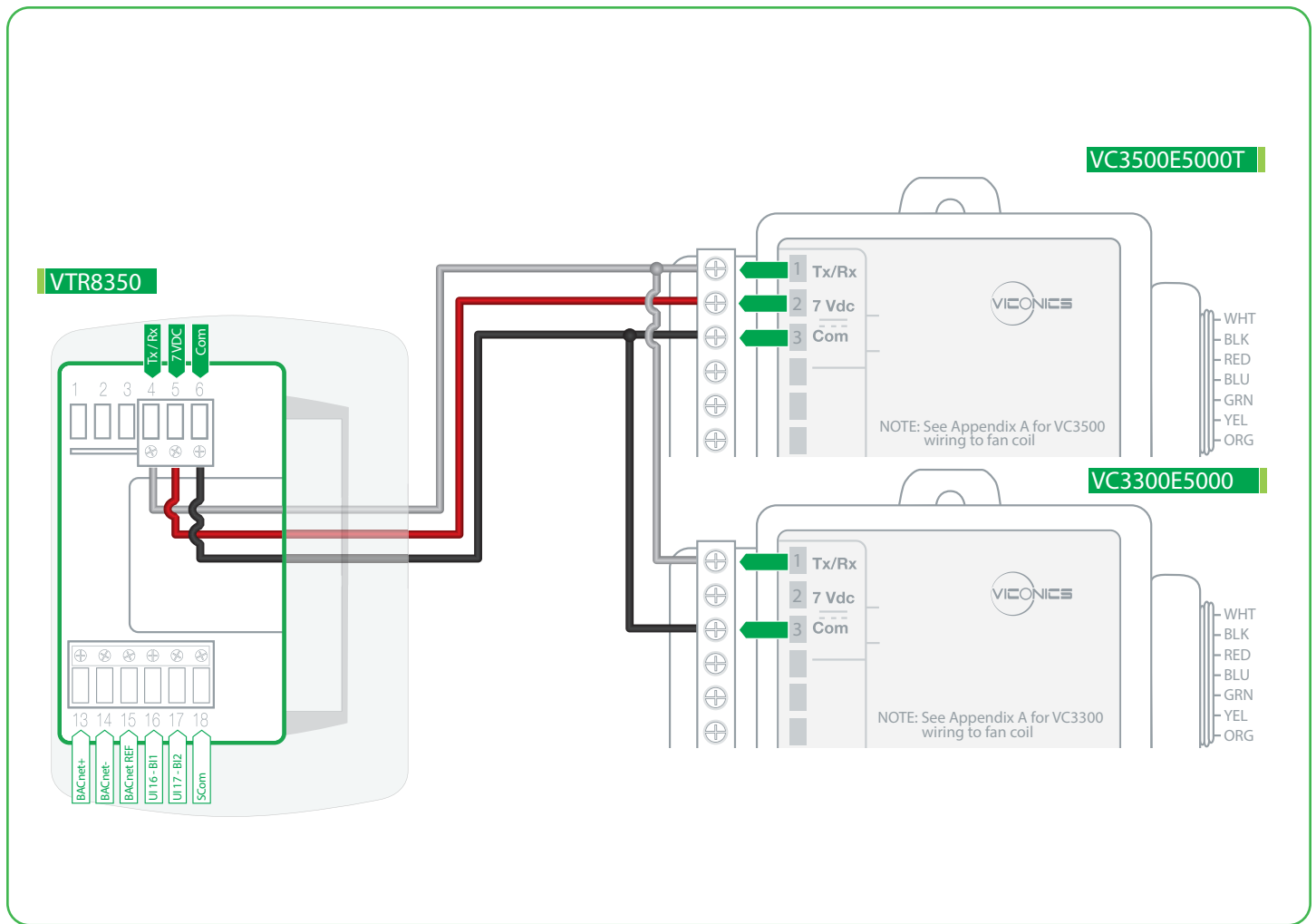
### System On: (Fan modes)

- Low: red wire is energized
- Med: blue wire is energized
- High: brown wire is energized.
- Auto: When there is no demand, brown, blue and red wires are not energized. On demand, system will automatically switch "on" low (red), medium (blue) or high (brown) speed.

VTR8350 WITH VC3500 AND VC3300 RELAYS: HEATING/COOLING 4-PIPE FAN COIL UNIT WITH 3-SPEED FAN AND 2-POSITION VALVES WITH SLAVE RELAY PACK



| Configuration Parameter Name | Configuration Settings |
|------------------------------|------------------------|
| Fan type                     | 3 speed                |
| Fan menu                     | L-M-H-A                |
| Fan cont. heat               | On                     |
| Pipe No                      | 4                      |
| Operation sequence           | Cool/Heat              |



## Sequence of Operation and Wiring

### Occupied Mode

Setpoints revert to those defined by occupied cooling and heating.

### Stand-by Mode (only available when PIR motion detector sensor is used)

Setpoints revert to those defined by stand-by cooling and heating.

### Unoccupied Mode

Setpoints revert to those defined by unoccupied heating and cooling.

### Occupied Override Mode

System reverts to occupied mode for duration determined by "ToccTime" parameter.

### On Call for Cool

Cooling valve opens to maintain room temperature. Heating valve closes.

### On Call for Heat

Heating valve opens to maintain room temperature. Cooling valve closes.

## Options

- Wireless adapter modules are available. (see Appendix B for network wiring).
- Can be configured for 2-pipe systems without changeover.
- Binary inputs can be configured to control occupancy via door or window contact, remote motion sensor, remote night setback, or provide alarms for service or filter monitoring.

## 3 Speed Fan Operation

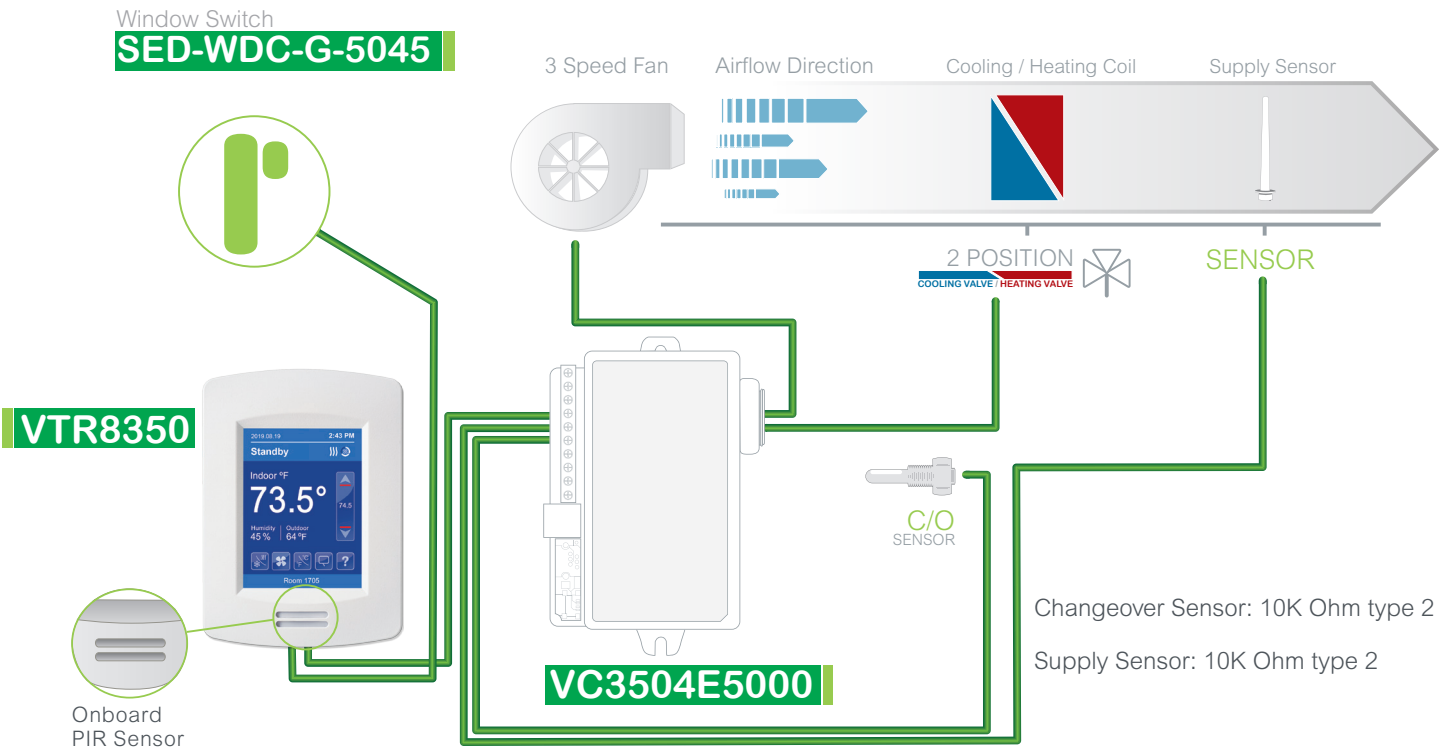
### System Off

Brown, blue and red wires are not energized

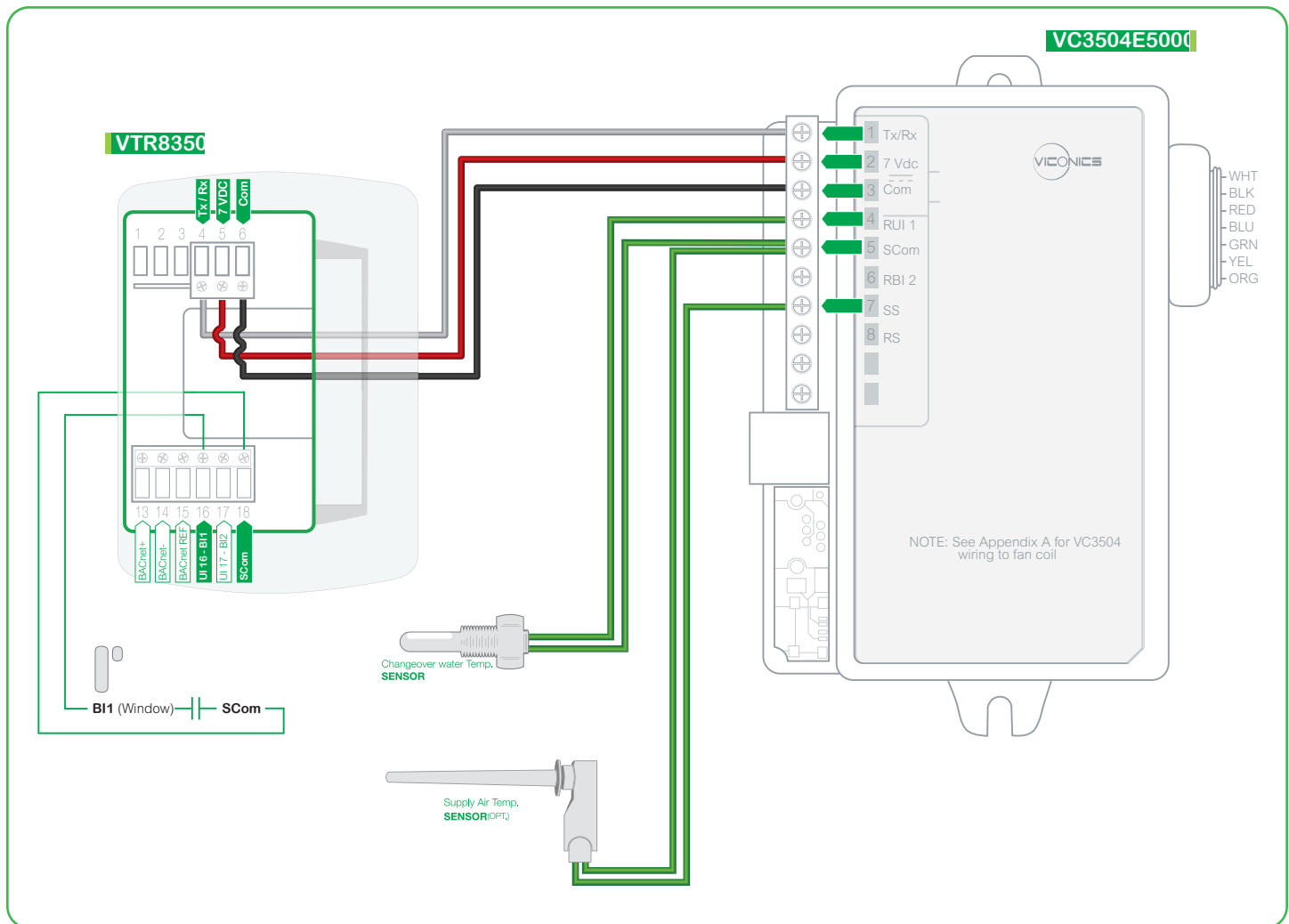
### System On: (Fan modes)

- Low: red wire is energized
- Med: blue wire is energized
- High: brown wire is energized.
- Auto: When there is no demand, brown, blue and red wires are not energized. On demand, system will automatically switch "on" low (red), medium (blue) or high (brown) speed.

VTR8350 WITH VC3504 RELAY: HEATING/COOLING WITH CHANGEOVER SENSOR 2-PIPE FAN COIL UNIT WITH 3-SPEED FAN AND 2-POSITION VALVES



| Configuration Parameter Name | Configuration Settings |
|------------------------------|------------------------|
| Fan type                     | 3 speed                |
| Fan menu                     | L-M-H-A                |
| Fan cont. heat               | On                     |
| BI1 config                   | Window                 |
| RUI1                         | COS                    |
| No. of pipes                 | 2                      |
| Operation sequence           | Cool only              |



## Sequence of Operation and Wiring

### Occupied Mode

Setpoints revert to those defined by occupied cooling and heating.

### Stand-by Mode (only available when PIR motion detector sensor is used)

Setpoints revert to those defined by stand-by cooling and heating.

### Unoccupied Mode

Setpoints revert to those defined by unoccupied heating and cooling.

### Occupied Override Mode

System reverts to occupied mode for duration determined by "ToccTime" parameter.

### On Call for Cool

If supply water temperature is less than 24°C (75F), cooling valve opens to maintain room temperature, else the valve closes.

### On Call for Heat

If supply water temperature is greater than 25°C (77F), heating valve opens to maintain room temperature, else the valve closes.

### Supply Air Sensor

Only used for monitoring. Shows automatically if sensor is connected.

### Wired Window Switch

The window switch automatically locks out heating/cooling when window opens.

## Options

- Wireless adapter modules are available. (see Appendix B for network wiring).
- Models available with factory installed PIR sensor.
- Remote wall mount or duct sensor ready.
- Can be configured for 2-pipe systems with changeover.
- Binary inputs can be configured to control occupancy via door or window contact, remote night setback, or provide alarms for service or filter monitoring.
- Universal input can be configured for changeover sensor.

## 3 Speed Fan Operation

### System Off

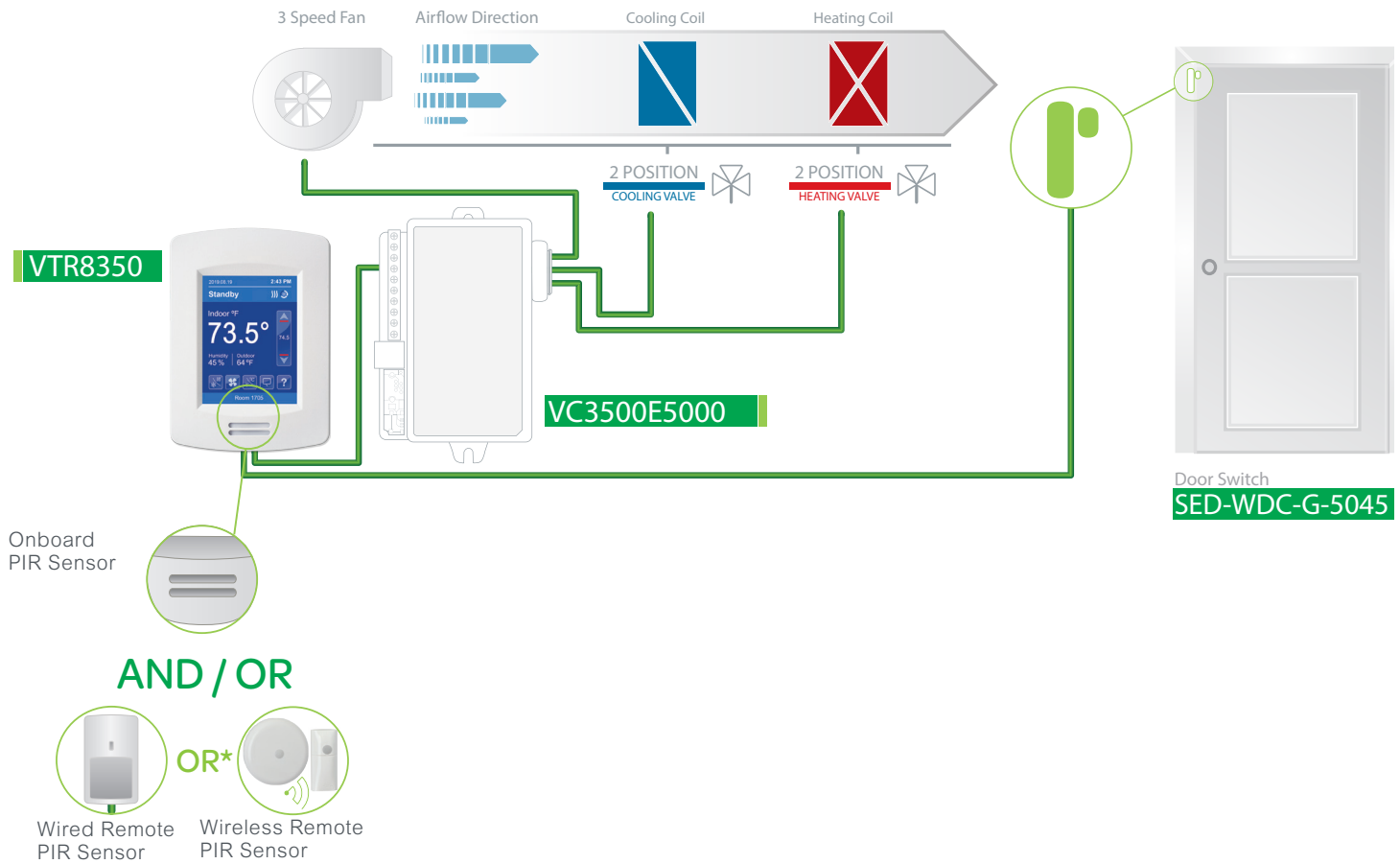
Brown, blue and red wires are not energized

### System On: (Fan modes)

- Low: red wire is energized
- Med: blue wire is energized
- High: brown wire is energized.
- Auto: When there is no demand, brown, blue and red wires are not energized. On demand, system will automatically switch “on” low (red), medium (blue) or high (brown) speed.

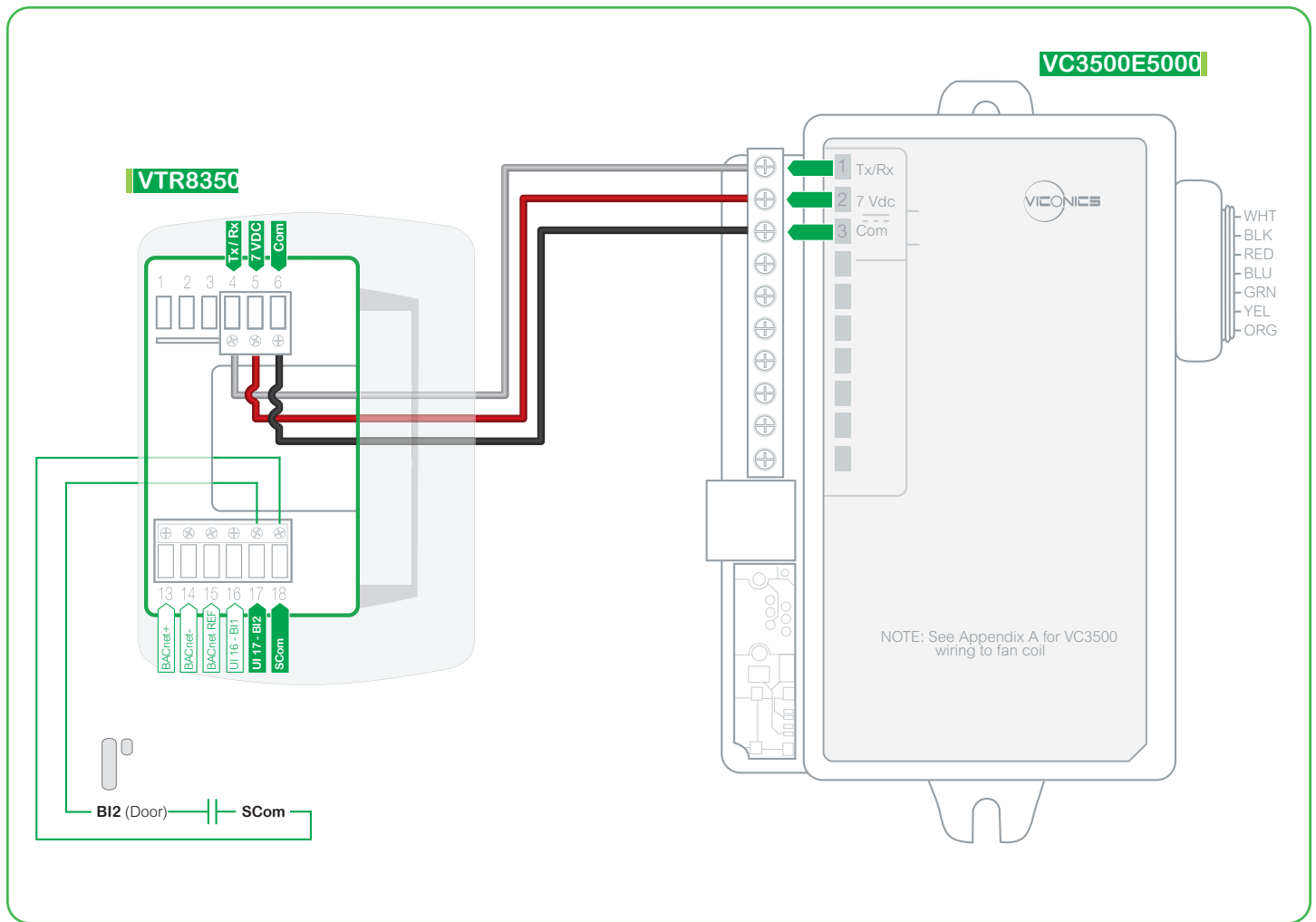
## VTR8350/VT8350 [ Application Guide ]

### VTR8350 WITH VC3500 RELAY: HEATING/COOLING 4-PIPE FAN COIL UNIT WITH 3-SPEED FAN AND 2-POSITION VALVES



| Configuration Parameter Name | Configuration Settings                          |
|------------------------------|---|
| Fan type                     | 3 speed   |
| Fan menu                     | L-M-H-A   |
| Fan cont. heat               | On  |
| BI1 config                   | Motion NO or Motion NC (remote PIR sensor only) |
| BI2 config                   | Door Dry  |
| Pipe No                      | 4   |
| Operation sequence           | Cool/Heat                                       |

\* Wired remote sensor cannot be used at the same time as wireless remote sensor(s).



## Sequence of Operation and Wiring

### Occupied Mode

Setpoints revert to those defined by occupied cooling and heating.

### Stand-by Mode (only available when PIR motion detector sensor is used)

Setpoints revert to those defined by stand-by cooling and heating.

### Unoccupied Mode

Setpoints revert to those defined by unoccupied heating and cooling.

### On Call for Cool

Cooling valve opens to maintain room temperature. Heating valve closes.

### On Call for Heat

Heating valve opens to maintain room temperature. Cooling valve closes.

### Door Switch and Motion

Door switches occupancy to standby. Motion will switch to occupied as long as door stays closed.

## Options

- Wireless adapter modules are available. (see Appendix B for network wiring).
- Models available with factory installed PIR sensor.
- Can be configured for 2-pipe systems without changeover.
- Binary inputs can be configured to control occupancy via door or window contact, remote motion sensor, remote night setback, or provide alarms for service or filter monitoring

## 3 Speed Fan Operation

### System Off

Brown, blue and red wires are not energized

### System On: (Fan modes)

- Low: red wire is energized
- Med: blue wire is energized
- High: brown wire is energized.
- Auto: When there is no demand, brown, blue and red wires are not energized. On demand, system will automatically switch "on" low (red), medium (blue) or high (brown) speed.



**VTR8350 ECM**  
**Fan**

## VTR8350

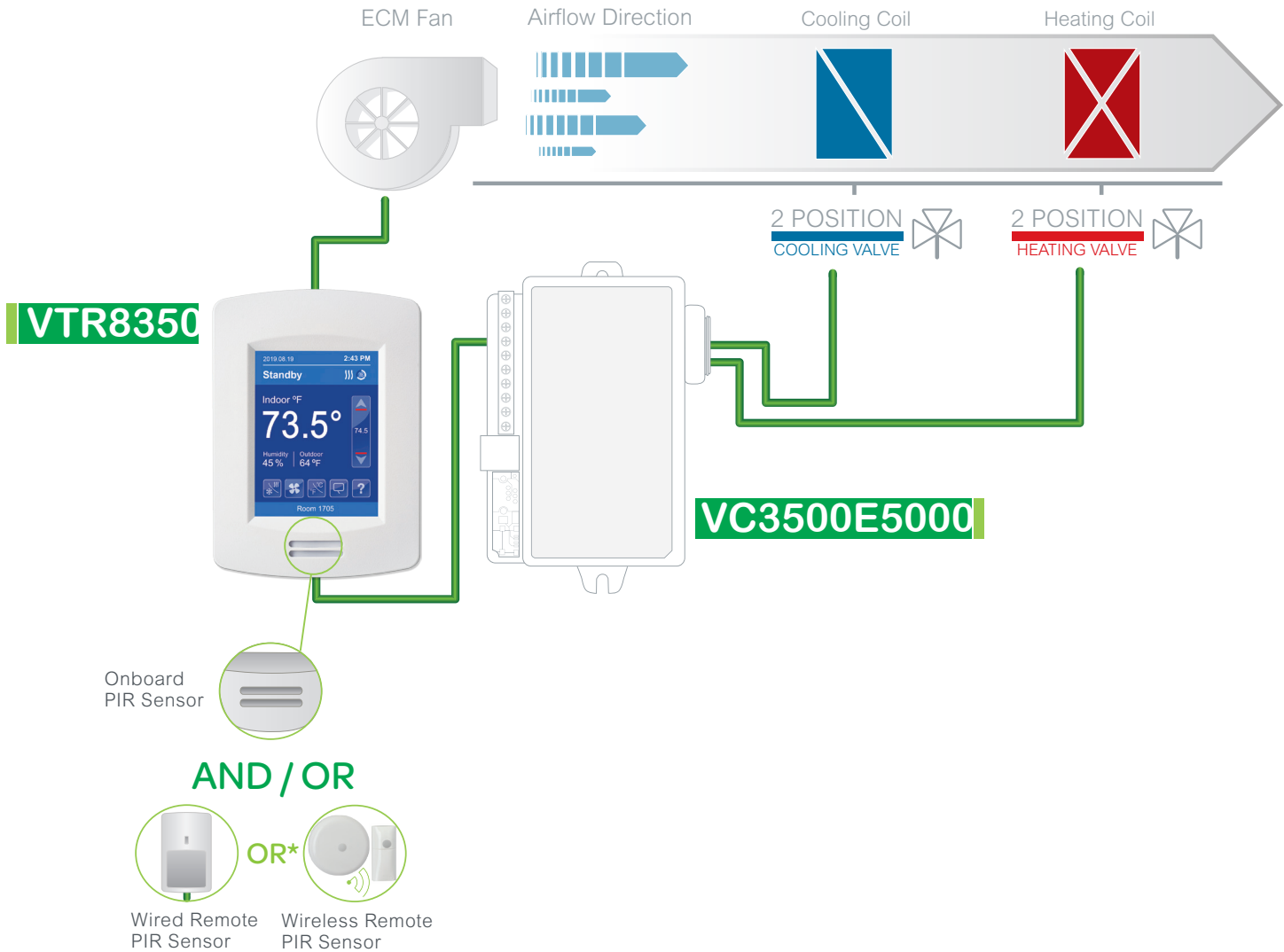
## ECM FAN APPLICATIONS

| System  | Fan | Cooling           | Heating           | Other                    |
|---------|-----|-------------------|-------------------|--------------------------|
| 4 pipes | ECM | 2 positions valve | 2 positions valve | Motion detect            |
| 2 pipes | ECM | 2 positions valve | Heating SSR       | Dehumidification         |
| 2 pipes | ECM | 2 positions valve | Changeover sensor | Fresh air damper         |
| 2 pipes | ECM | 2 positions valve | Changeover sensor | Motion and Window detect |
| 4 pipes | ECM | 2 positions valve | 2 positions valve | Door and motion detect   |

See Appendix A for VC3000 relay pack wiring.

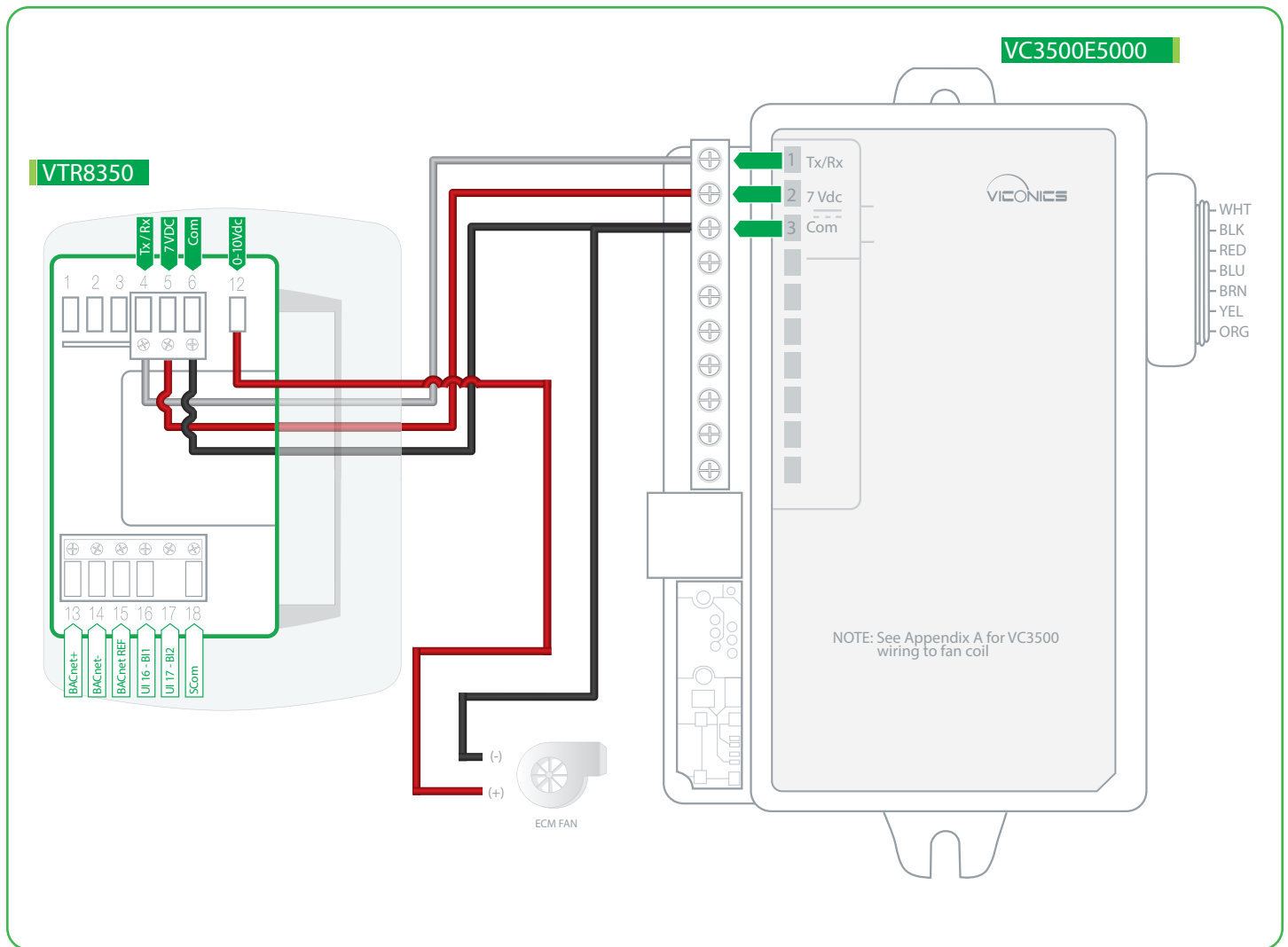
## VTR8350/VT8350 [ Application Guide ]

### VTR8350 WITH VC3500 RELAY: HEATING/COOLING 4-PIPE FAN COIL UNIT WITH ECM FAN AND 2-POSITION VALVES



| Configuration Parameter Name | Configuration Settings                          |
|------------------------------|---|
| Fan type                     | ECM   |
| Fan menu                     | L-M-H-A   |
| Fan cont. heat.              | On  |
| BI1 config                   | Motion NO or Motion NC (remote PIR sensor only) |
| BI2 config                   | Door Dry  |
| Pulsed heating               | Off   |
| No. of pipes                 | 4   |
| Operation sequence           | Cool/Heat                                       |

\* Wired remote sensor cannot be used at the same time as wireless remote sensor(s).



## Sequence of Operation and Wiring

### Occupied Mode

Setpoints revert to those defined by occupied cooling and heating.

### Stand-by Mode (only available when PIR motion detector sensor is used)

Setpoints revert to those defined by stand-by cooling and heating.

### Unoccupied Mode

Setpoints revert to those defined by unoccupied heating and cooling.

### Occupied Override Mode

System reverts to occupied mode for duration determined by "ToccTime" parameter.

### On Call for Cool

Cooling valve opens to maintain room temperature. Heating valve closed.

### On Call for Heat

Heating valve opens to maintain room temperature. Cooling valve closed.

### Wireless Door Switch

Wireless door switch automatically toggles occupancy.

## Options

- Wireless adapter modules are available. (see Appendix B for network wiring).
- Can be configured for 2-pipe systems (without changeover).
- Binary inputs can be configured to control occupancy via door or window contact, remote motion sensor, or remote night setback

## ECM Fan Operation

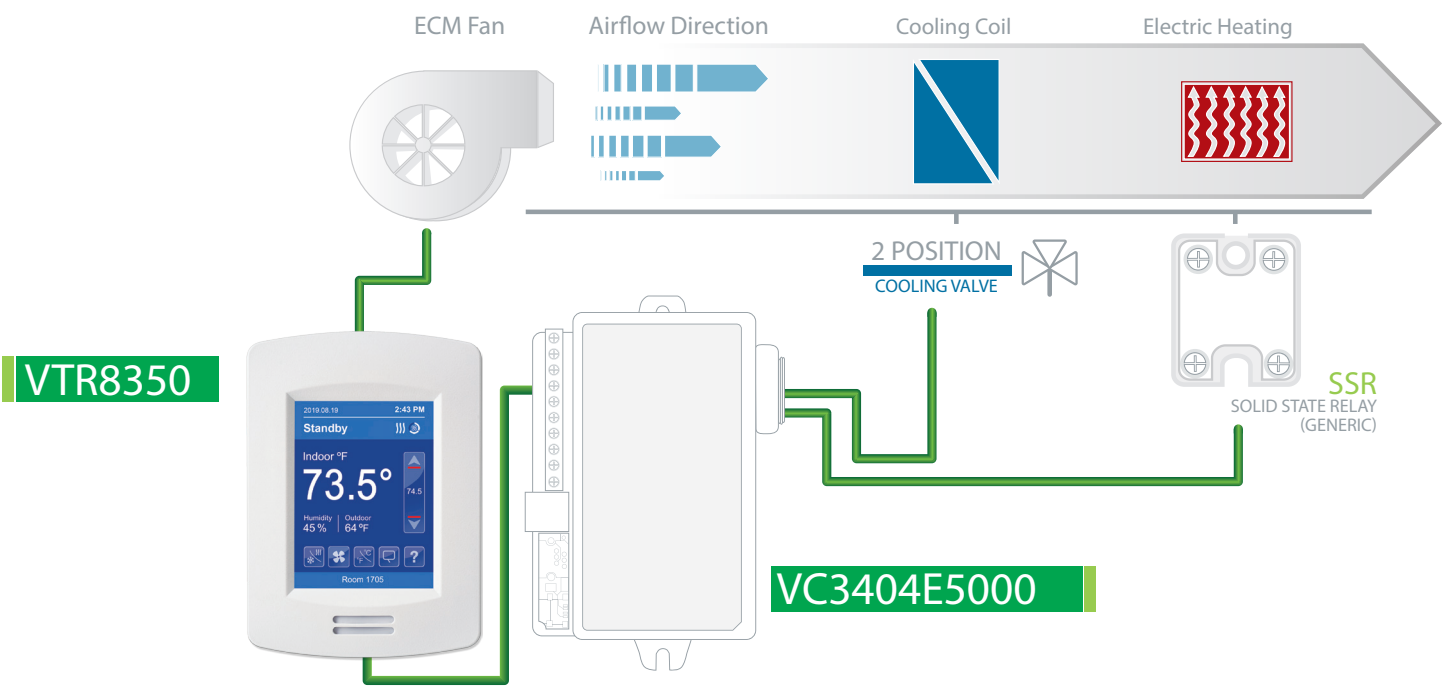
### System Off

- UO12 = 0 Vdc and brown wire (fan start) is not energized

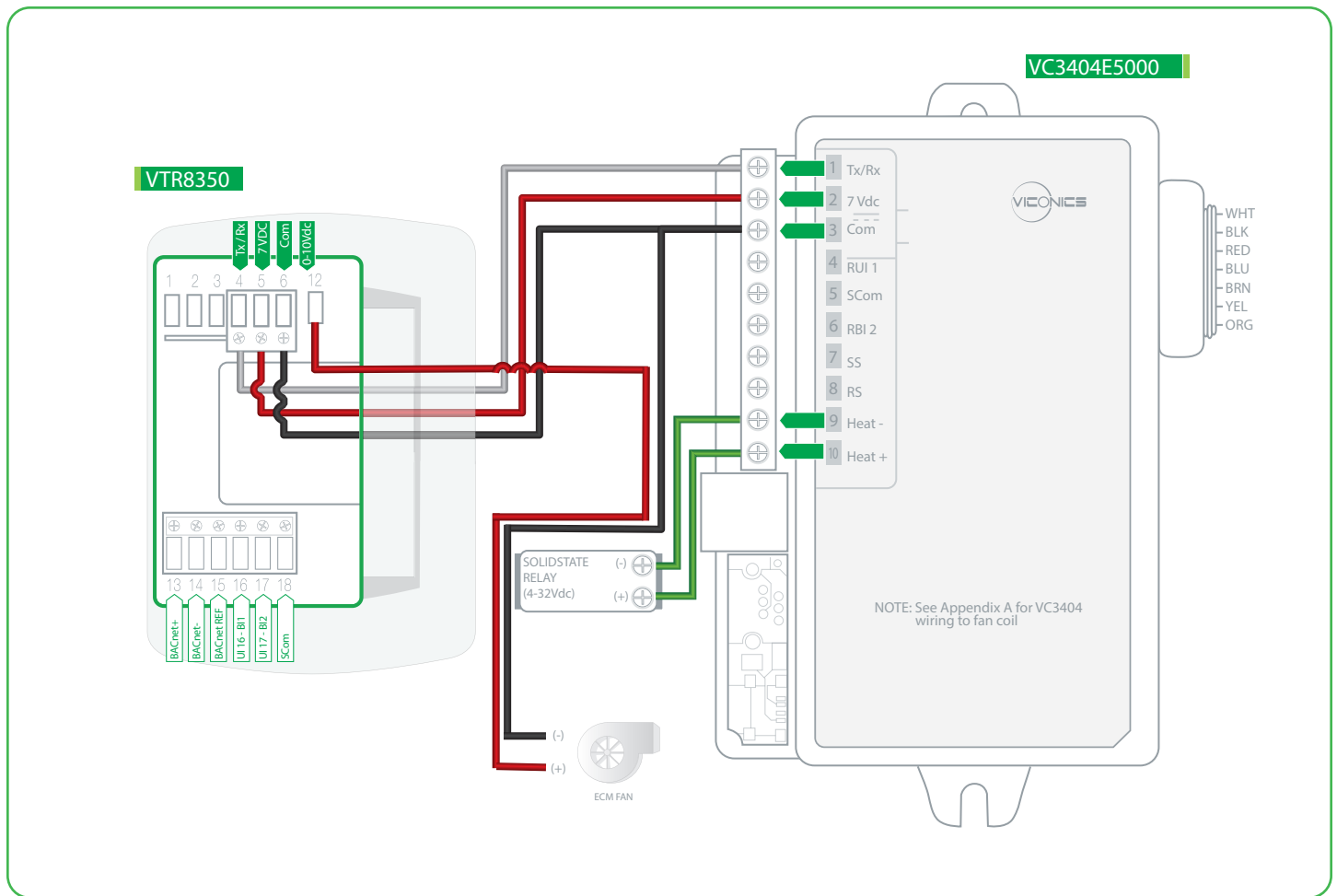
### System On: (Fan modes)

- Low: UO12 = 2.2 Vdc (adjustable from configuration menu) and (optional) brown wire “fan start” is energized.
- Med: UO12 = 6.0 Vdc (adjustable from configuration menu) and (optional) brown wire “fan start” is energized
- High: UO12 = 8.6 Vdc (adjustable from configuration menu) and (optional) brown wire “fan start” is energized.
- Auto: When there is no demand, UO12 = 0 Vdc and (optional) brown wire “fan start” is “off”. On demand, system will modulate from “low” to “high” voltages (adjustable from configuration menu) and (optional) brown wire “fan start” is energized.

VTR8350 WITH VC3404 RELAY: COOLING AND ELECTRIC HEAT 2-PIPE FAN COIL UNIT WITH ECM FAN, DEHUMIDIFICATION AND 2-POSITION VALVES



| Configuration Parameter Name | Configuration settings                   |
|------------------------------|--|
| Fan type                     | ECM                                      |
| Fan menu                     | L-M-H-A                                  |
| Fan cont. heat               | On                                       |
| Pulsed heating               | On                                       |
| No. of pipes                 | 2  |
| Operation sequence           | Cool/Heat (Cooling with electric reheat) |



## Sequence of Operation and Wiring

### Occupied Mode

Setpoints revert to those defined by occupied cooling and heating.

### Stand-by Mode (only available when PIR motion detector sensor is used)

Setpoints revert to those defined by stand-by cooling and heating.

### Unoccupied Mode

Setpoints revert to those defined by unoccupied heating and cooling.

### Occupied Override Mode

System reverts to occupied mode for duration determined by "ToccTime" parameter.

### On Call for Cool

Cooling valve opens to maintain room temperature.

### On Call for Heat

Electric heat operates to maintain room temperature. Cooling valve closes and dehumidification is disabled.

### On a Demand for Dehumidification

Dehumidification achieved via cooling coil using reheat if necessary.

Dehumidification only allowed in COOL mode or if cooling is enabled in AUTO mode.

Dehumidification disabled if room temperature falls below low ambient lockout temperature, which is cooling setpoint minus configuration defined deadband value.

## ECM Fan Operation

### System Off

- UO12 = 0 Vdc and brown wire (fan start) is not energized

### System On: (Fan modes)

- Low: UO12 = 2.2 Vdc (adjustable from configuration menu) and (optional) brown wire “fan start” is energized.
- Med: UO12 = 6.0 Vdc (adjustable from configuration menu) and (optional) brown wire “fan start” is energized
- High: UO12 = 8.6 Vdc (adjustable from configuration menu) and (optional) brown wire “fan start” is energized.
- Auto: When there is no demand, UO12 = 0 Vdc and (optional) brown wire “fan start” is “off”. On demand, system will modulate from “low” to “high” voltages (adjustable from configuration menu) and (optional) brown wire “fan start” is energized.

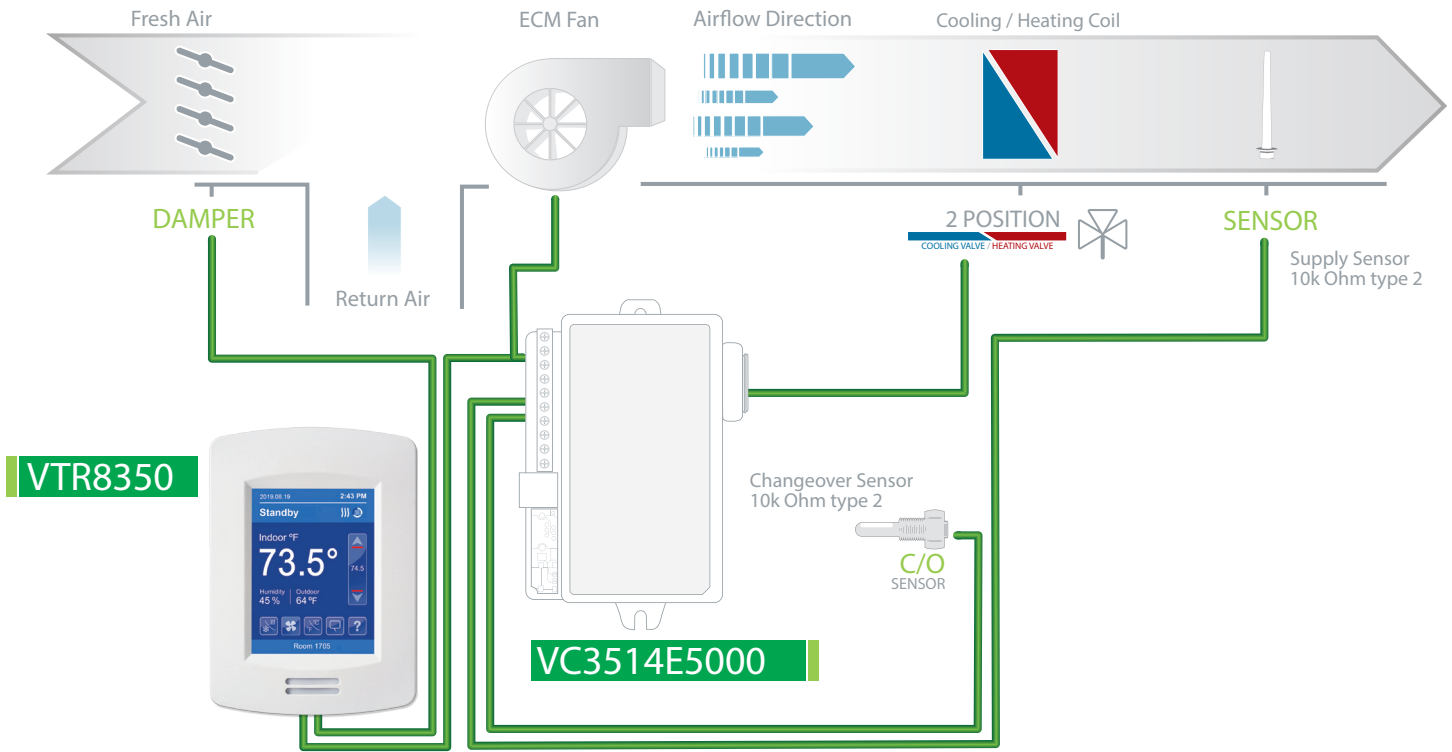
## Options

- Wireless adapter modules are available. (see Appendix B for network wiring).
- Remote wall mount or return duct sensor ready.
- Can be configured for 2-pipe systems with changeover.
- Binary inputs can be configured to control occupancy via door or window contact, remote motion sensor, remote night setback, or provide alarms for service or filter monitoring.
- Universal input can be configured for changeover sensor.

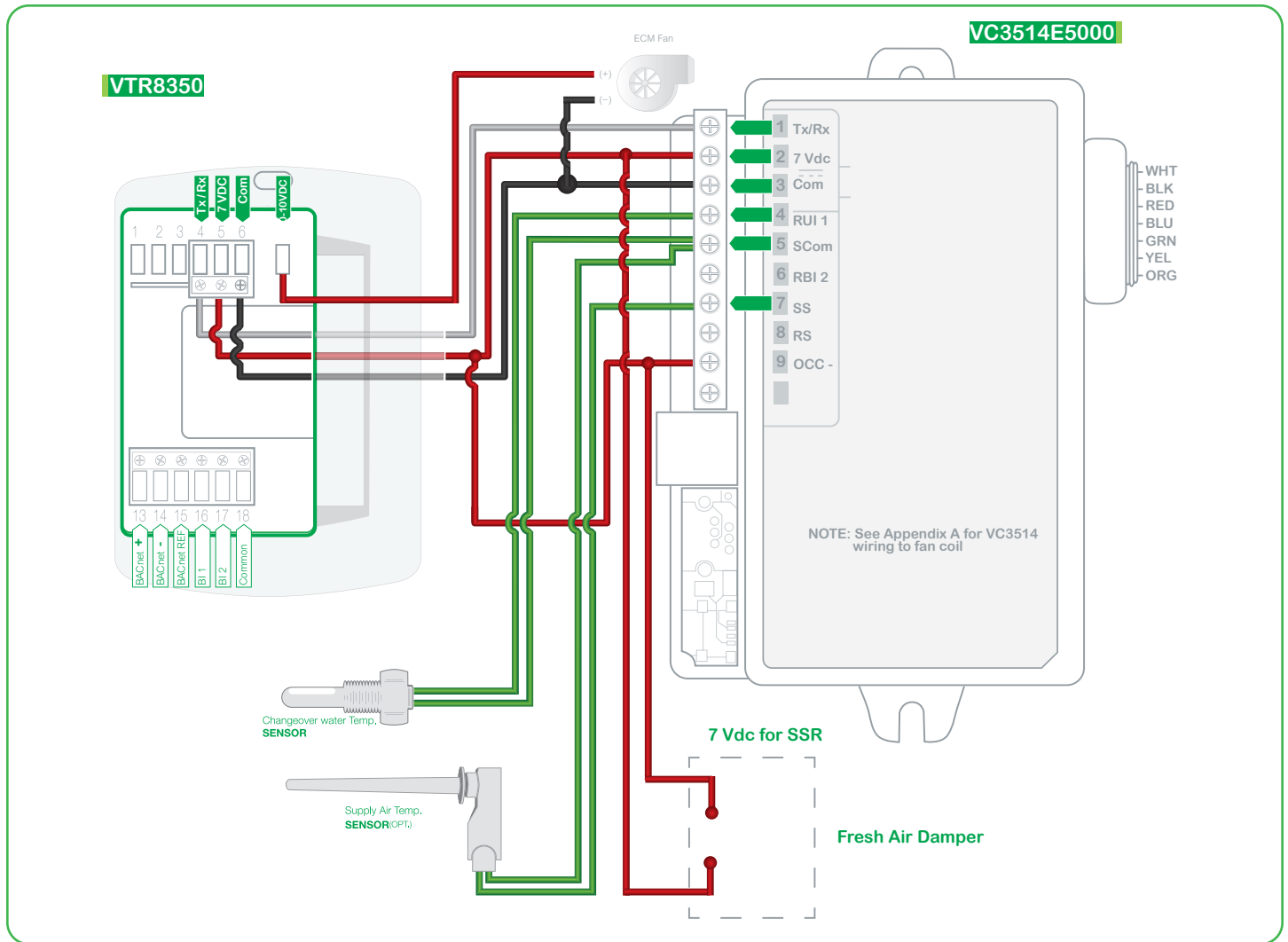


## VTR8350/VT8350 [ Application Guide ]

### VTR8350 WITH VC3514 RELAY: HEATING/COOLING 2-PIPE FAN COIL UNIT WITH 3-SPEED FAN, FRESH AIR DAMPER AND 2-POSITION VALVES



| Configuration Parameter Name | Configuration Settings |
|------------------------------|------------------------|
| Fan control                  | ECM                    |
| Fan menu                     | L-M-H-A                |
| Fan cont. heat               | On                     |
| RUI1                         | COS                    |
| Pulsed Heating               | Occ Out                |
| Pipe no.                     | 2                      |
| Seq. operation               | Cool                   |



## Sequence of Operation and Wiring

### Occupied Mode

Setpoints revert to those defined by occupied cooling and heating. The occupancy output opens fresh air damper to minimum position.

### Stand-by Mode (only available when PIR motion detector sensor is used)

Setpoints revert to those defined by stand-by cooling and heating.

### Unoccupied Mode

Setpoints revert to those defined by unoccupied heating and cooling. The fresh air damper closes.

### Occupied Override Mode

System reverts to occupied mode for duration determined by "ToccTime" parameter.

### On Call for Cool

If supply water temperature is less than 24°C (75F), cooling valve opens to maintain room temperature, else the valve closes.

### On Call for Heat

If supply water temperature is greater than 25°C (77F), heating valve opens to maintain room temperature, else the valve closes.

### Supply Air Sensor

Only used for monitoring. Shows automatically if sensor is connected.

## Options

- Wireless adapter modules for BACnet models are available. (see Appendix B for network wiring).
- Remote wall mount or return duct sensor ready.
- Binary inputs can be configured to control occupancy via door or window contact, remote motion sensor, remote night setback, or provide alarms for service or filter monitoring.

## ECM Fan Operation

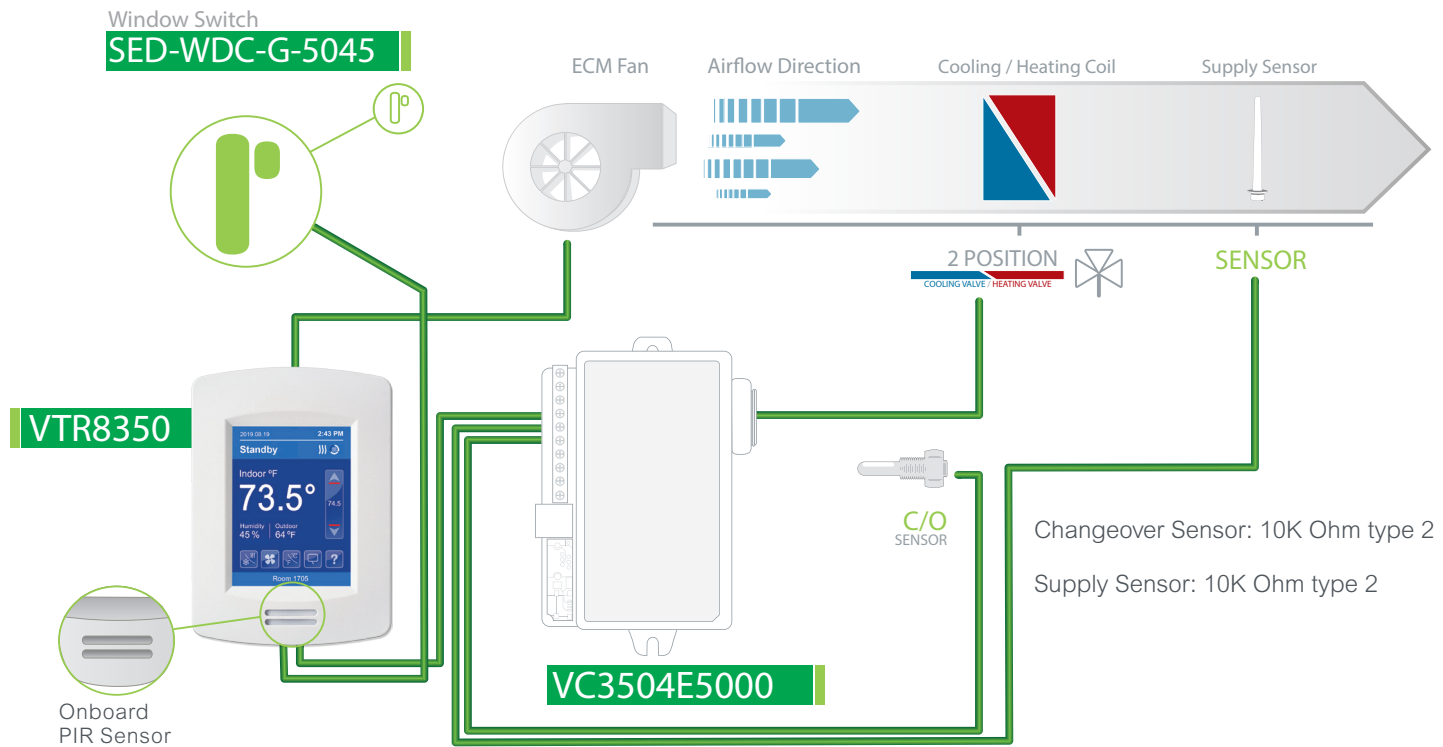
### System Off

- UO12 = 0Vdc and brown wire (fan start) is not energized

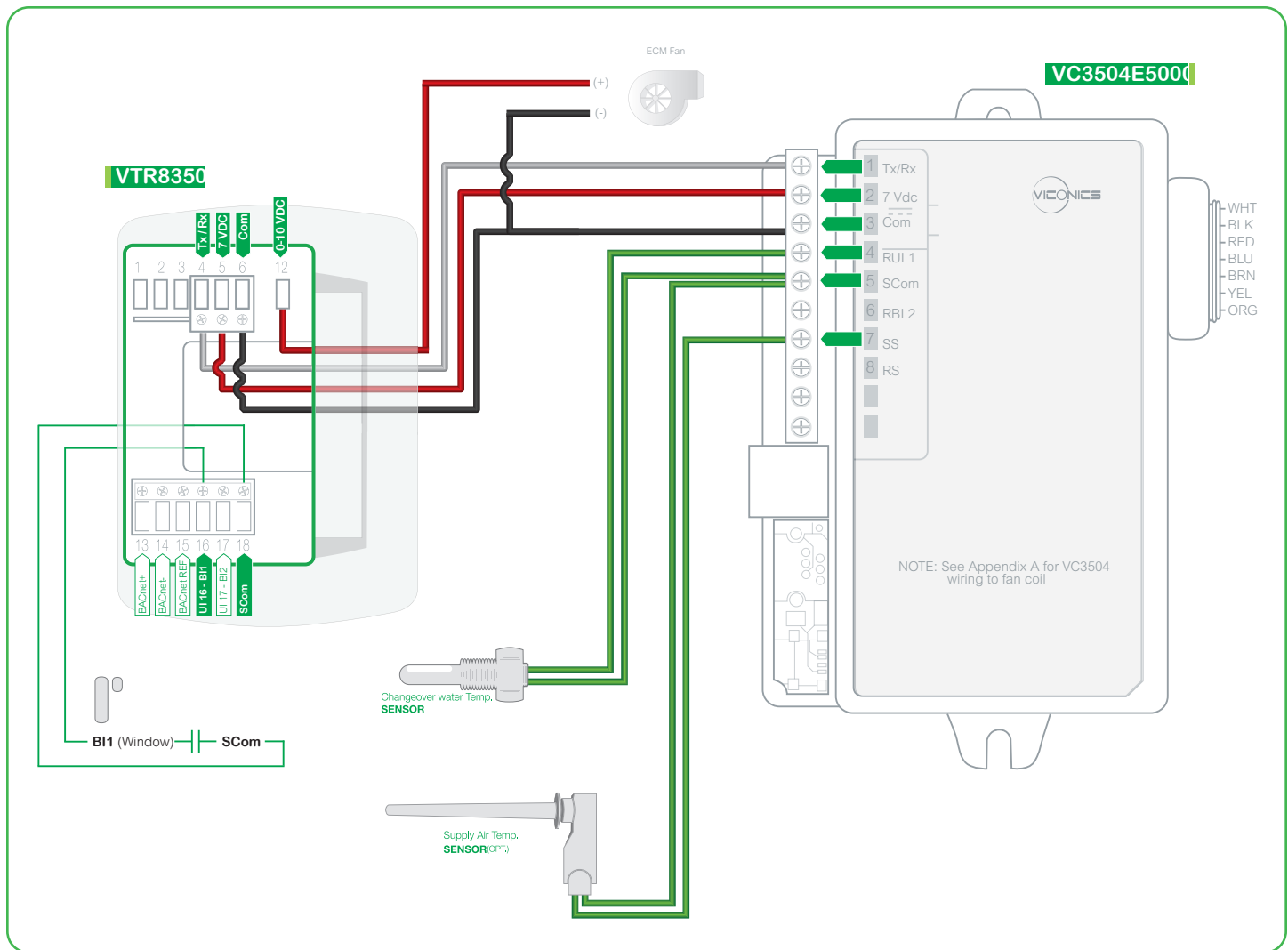
### System On: (Fan modes)

- Low: UO12 = 2.2 Vdc (adjustable from configuration menu) and (optional) brown wire “fan start” is energized.
- Med: UO12 = 6.0 Vdc (adjustable from configuration menu) and (optional) brown wire “fan start” is energized.
- High: UO12 = 8.6 Vdc (adjustable from configuration menu) and (optional) brown wire “fan start” is energized.
- Auto: When there is no demand, UO12 = 0 Vdc and (optional) brown wire “fan start” is “off”. On demand, system will modulate from “low” to “high” voltages (adjustable from configuration menu) and (optional) brown wire “fan start” is energized.

VTR8350 WITH VC3504 RELAY: COOLING AND ELECTRIC HEAT 2-PIPE FAN COIL UNIT WITH 3-SPEED FAN AND 2-POSITION VALVES



| Configuration Parameter Name | Configuration Settings |
|------------------------------|------------------------|
| Fan type                     | ECM                    |
| Fan menu                     | L-M-H-A                |
| Fan cont. heat               | On                     |
| BI1 config                   | Window                 |
| RUI1                         | COS                    |
| No. of pipes                 | 2                      |
| Operation sequence           | Cool only              |



## Sequence of Operation and Wiring

### Occupied Mode

Setpoints revert to those defined by occupied cooling and heating.

### Stand-by Mode (only available when PIR motion detector sensor is used)

Setpoints revert to those defined by stand-by cooling and heating.

### Unoccupied Mode

Setpoints revert to those defined by unoccupied heating and cooling.

### Occupied Override Mode

System reverts to occupied mode for duration determined by "ToccTime" parameter.

### On Call for Cool

If supply water temperature is less than 24°C (75F), cooling valve opens to maintain room temperature, else the valve closes.

### On Call for Heat

If supply water temperature is greater than 25°C (77F), heating valve opens to maintain room temperature, else the valve closes.

### Supply Air Sensor

Only used for monitoring. Shows automatically if sensor is connected.

### Wired Window Switch

The window switch automatically locks out heating/cooling when window opens.

## Options

- Wireless adapter modules are available. (see Appendix B for network wiring).
- Models available with factory installed PIR sensor.
- Remote wall mount or duct sensor ready.
- Can be configured for 2-pipe systems with changeover.
- Binary inputs can be configured to control occupancy via door or window contact, remote night setback, or provide alarms for service or filter monitoring.
- Universal input can be configured for changeover sensor.

## ECM Fan Operation

### System Off

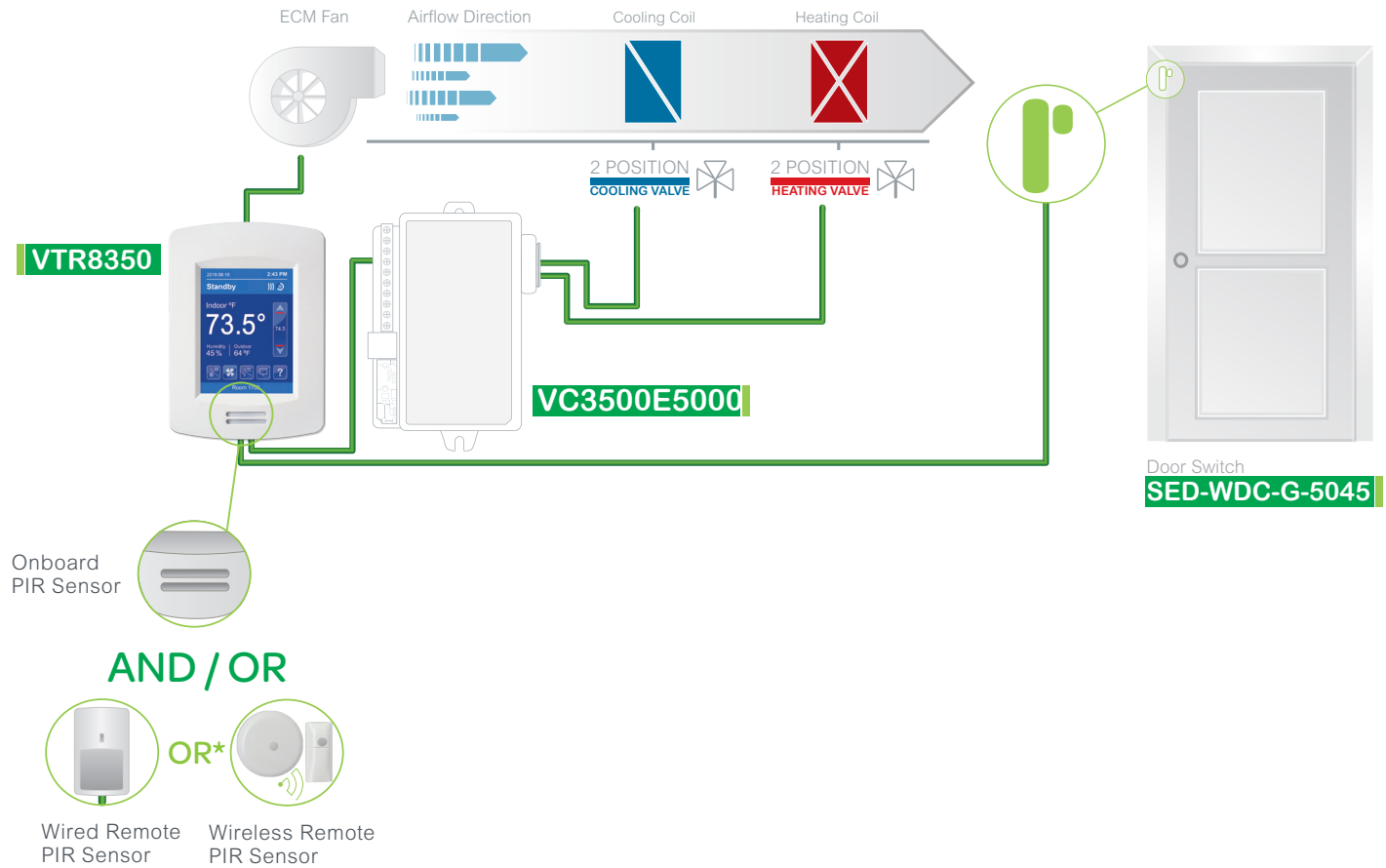
- UO12 = 0 Vdc and brown wire (fan start) is not energized

### System On: (Fan modes)

- Low: UO12 = 2.2 Vdc (adjustable from configuration menu) and (optional) brown wire “fan start” is energized.
- Med: UO12 = 6.0 Vdc (adjustable from configuration menu) and (optional) brown wire “fan start” is energized.
- High: UO12 = 8.6 Vdc (adjustable from configuration menu) and (optional) brown wire “fan start” is energized.
- Auto: When there is no demand, UO12 = 0 Vdc and (optional) brown wire “fan start” is “off”. On demand, system will modulate from “low” to “high” voltages (adjustable from configuration menu) and (optional) brown wire “fan start” is energized.

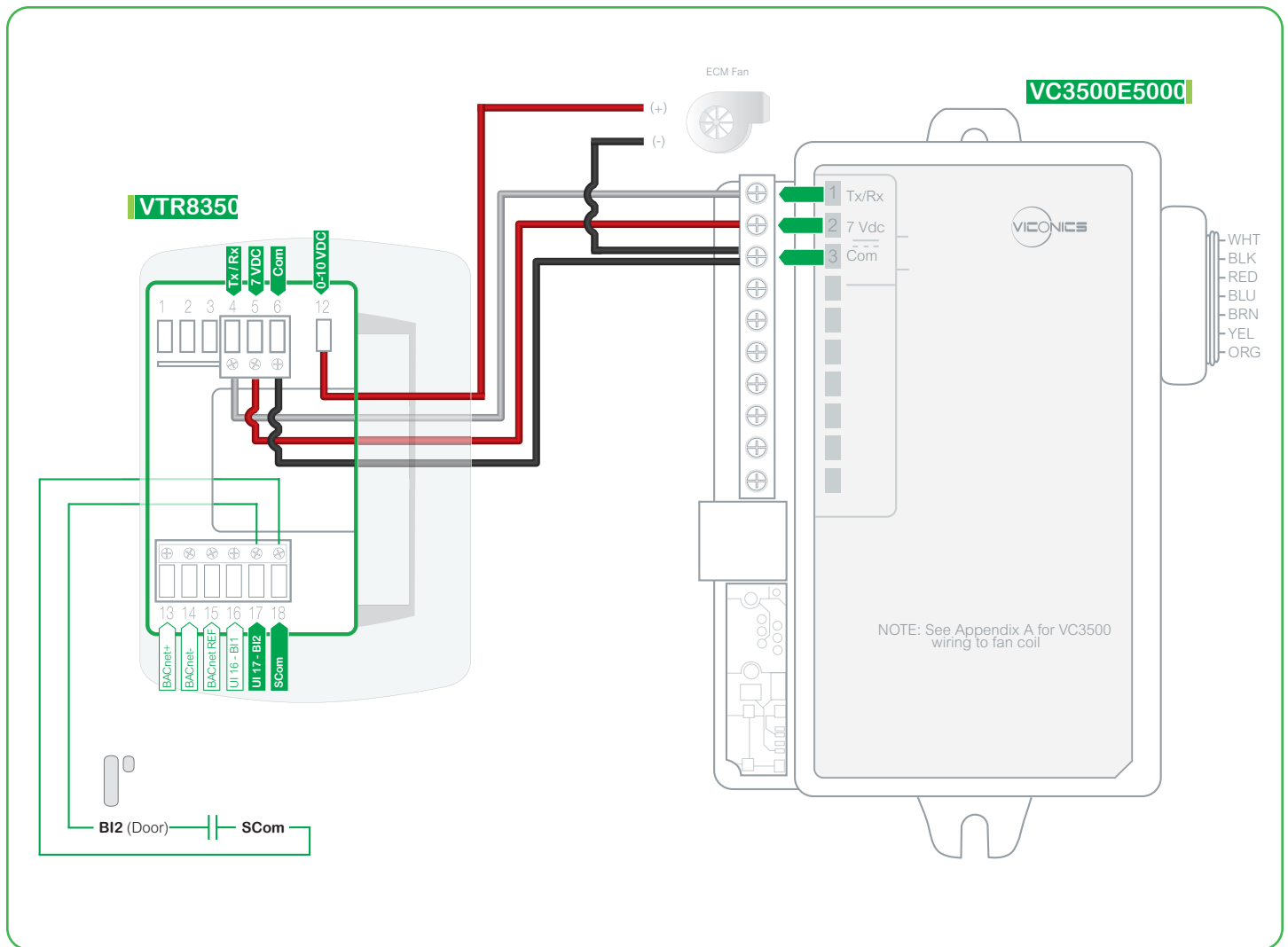
## VTR8350/VT8350 [ Application Guide ]

### VTR8350 WITH VC3500 RELAY: HEATING/COOLING 4-PIPE FAN COIL UNIT WITH ECM FAN AND 2-POSITION VALVES



| Configuration Parameter Name | Configuration Settings                          |
|------------------------------|---|
| Fan type                     | ECM   |
| Fan menu                     | L-M-H-A   |
| Fan cont. heat               | On  |
| BI1 config                   | Motion NO or Motion NC (remote PIR sensor only) |
| BI2 config                   | Door Dry  |
| Pipe No                      | 4   |
| Operation sequence           | Cool/Heat                                       |

\* Wired remote sensor cannot be used at the same time as wireless remote sensor(s).



## Sequence of Operation and Wiring

### Occupied Mode

Setpoints revert to those defined by occupied cooling and heating.

### Stand-by Mode (only available when PIR motion detector sensor is used)

Setpoints revert to those defined by stand-by cooling and heating.

### Unoccupied Mode

Setpoints revert to those defined by unoccupied heating and cooling.

### On Call for Cool

Cooling valve opens to maintain room temperature. Heating valve closes.

### On Call for Heat

Heating valve opens to maintain room temperature. Cooling valve closes.

### Door Switch And Motion

Door switch automatically toggles occupancy to Standby.

Motion will switch to Occupied, as long as the door stays closed.



## Options

- Wireless adapter modules for BACnet models are available. (see Appendix B for network wiring).
- Models available with factory installed PIR sensor.
- Can be configured for 2-pipe systems without changeover.
- Binary inputs can be configured to control occupancy via door or window contact, remote motion sensor, remote night setback, or provide alarms for service or filter monitoring.

## ECM Fan Operation

### System Off

UO12 = 0 Vdc and brown wire (fan start) is not energized

### System On: (Fan modes)

- Low: UO12 = 2.2 Vdc (adjustable from configuration menu) and (optional) brown wire “fan start” is energized.
- Med: UO12 = 6.0 Vdc (adjustable from configuration menu) and (optional) brown wire “fan start” is energized
- High: UO12 = 8.6 Vdc (adjustable from configuration menu) and (optional) brown wire “fan start” is energized
- Auto: When there is no demand, UO12 = 0 Vdc and (optional) brown wire “fan start” is “off”. On demand, system will modulate from “low” to “high” voltages (adjustable from configuration menu) and (optional) brown wire “fan start” is energized.

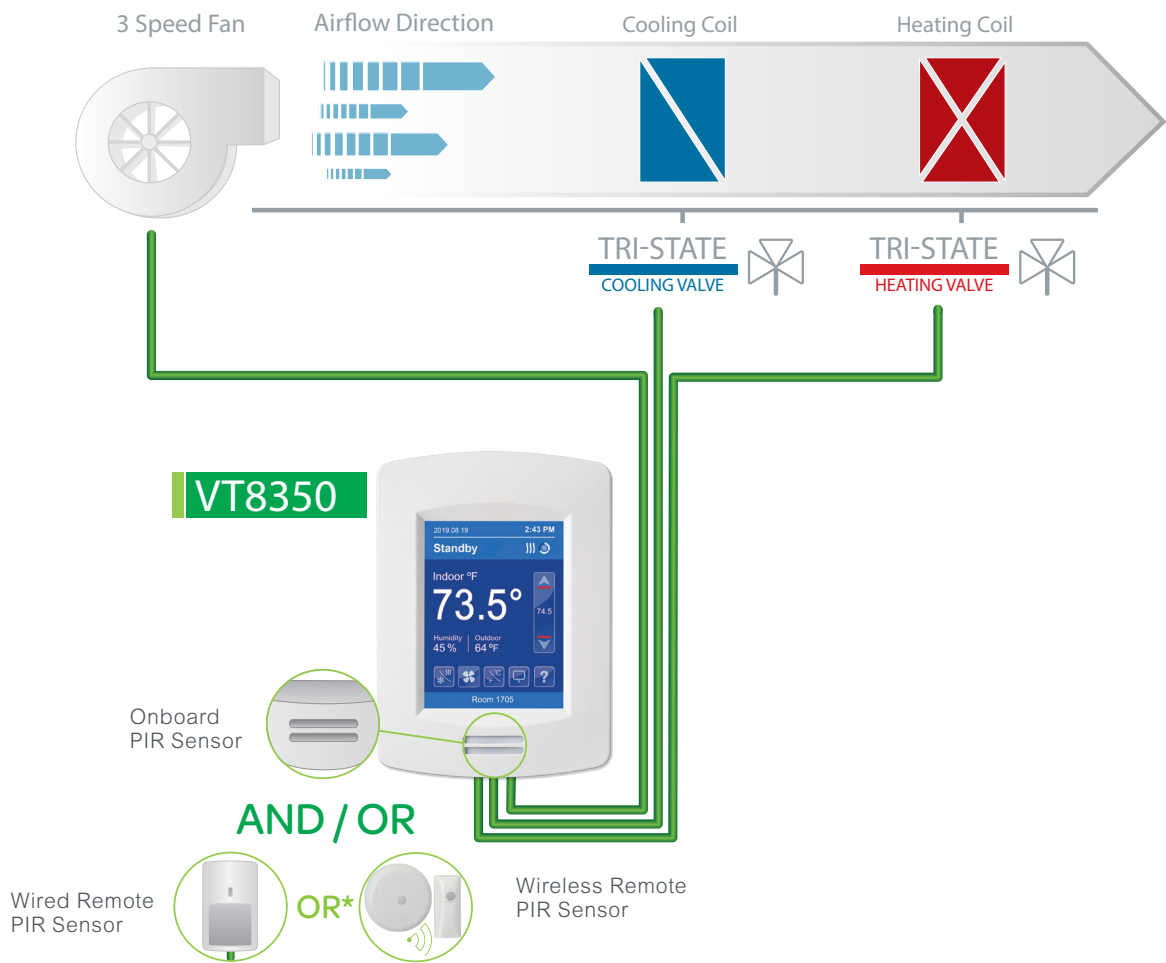
# VT8350 3-Speed Fan

## VT8350

## 1, 2 OR 3-SPEED FAN APPLICATIONS

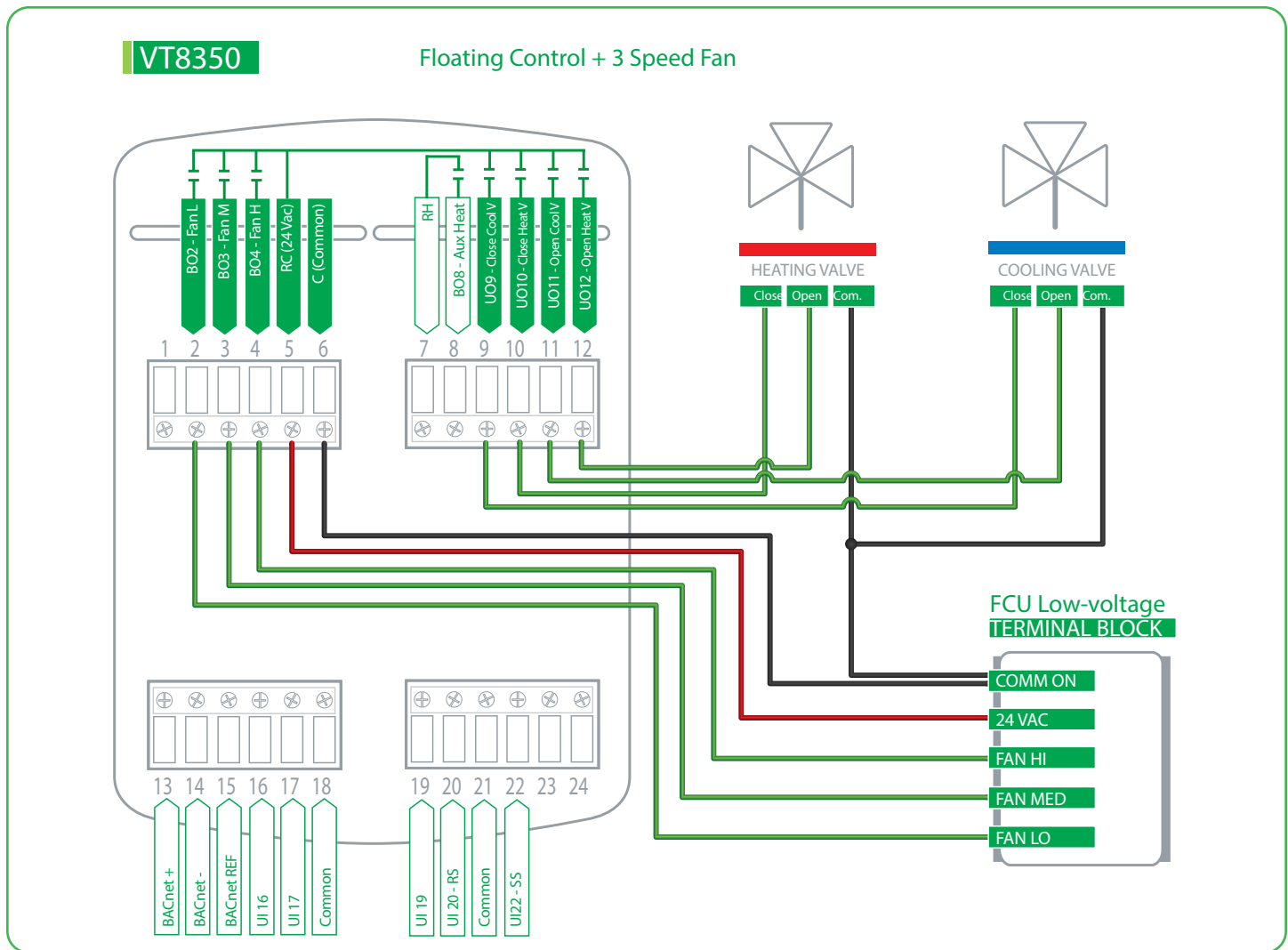
| System  | Fan     | Cooling                    | Heating                           | Other                                     |
|---------|---------|----------------------------|-----------------------------------|---|
| 4 pipes | 3 Speed | Tri-state valve actuator   | Tri-state valve actuator          | Door and motion detect + dehumidification |
| 4 pipes | 3 Speed | 0-10 Vdc valve actuator    | 0-10 Vdc valve actuator           | Motion detect + dehumidification          |
| 4 pipes | 3 Speed | 2 positions valve actuator | 2 positions valve actuator        | Motion detect + dehumidification          |
| 2 pipes | 1 Speed | 2 positions valve actuator | None                              | Fresh air damper                          |
| 4 pipes | 3 Speed | 0-10 Vdc valve actuator    | 2 positions valve actuator reheat | ---                                       |
| 2 pipes | 3 Speed | 0-10 Vdc valve actuator    | None                              | ---                                       |
| 2 pipes | 3 Speed | 0-10 Vdc valve actuator    | Electric reheat                   | ---                                       |

VT8350 HEATING/COOLING 4-PIPE FAN COIL UNIT WITH 3-SPEED FAN, TRI-STATE FLOATING VALVES AND DEHUMIDIFICATION SEQUENCE FOR LOW VOLTAGE



| Configuration Parameter Name | Configuration Settings                          |
|------------------------------|---|
| Fan type                     | 3 speed   |
| Fan menu                     | L-M-H-A   |
| Ctrl. type out1              | Floating  |
| Ctrl. type out2              | Same as 1                                       |
| UI16 config                  | Motion NO or Motion NC (remote PIR sensor only) |
| UI17 config                  | Door Dry  |
| No. of pipes                 | 4   |
| Operation sequence           | Cool/Heat                                       |

\* Wired remote sensor cannot be used at the same time as wireless remote sensor(s).



## Sequence of Operation and Wiring

### Occupied Mode

Setpoints revert to those defined by occupied cooling and heating.

### Stand-by Mode (only available when PIR motion detector sensor is used)

Setpoints revert to those defined by stand-by cooling and heating.

### Unoccupied Mode

Setpoints revert to those defined by unoccupied heating and cooling.

### Occupied Override Mode

System reverts to occupied mode for duration determined by "TocTime" parameter.

### On Call for Cool

Cooling valve opens to maintain room temperature. Heating valve closes.

### On Call for Heat

Heating valve opens to maintain room temperature. Cooling valve closes.

### On Demand for Dehumidification

Dehumidification is achieved via cooling coil using heating coil for reheat if necessary.

Dehumidification is only allowed in COOL mode, or if cooling is enabled in AUTO mode.

Dehumidification is disabled if room temperature falls below low ambient lockout temperature, which is the cooling setpoint minus the configuration defined deadband value.

Reheat disabled if cooling demand reaches 100%.

### 3 speed Fan Operation

#### System Off

BO2, BO3 and BO4 are not energized

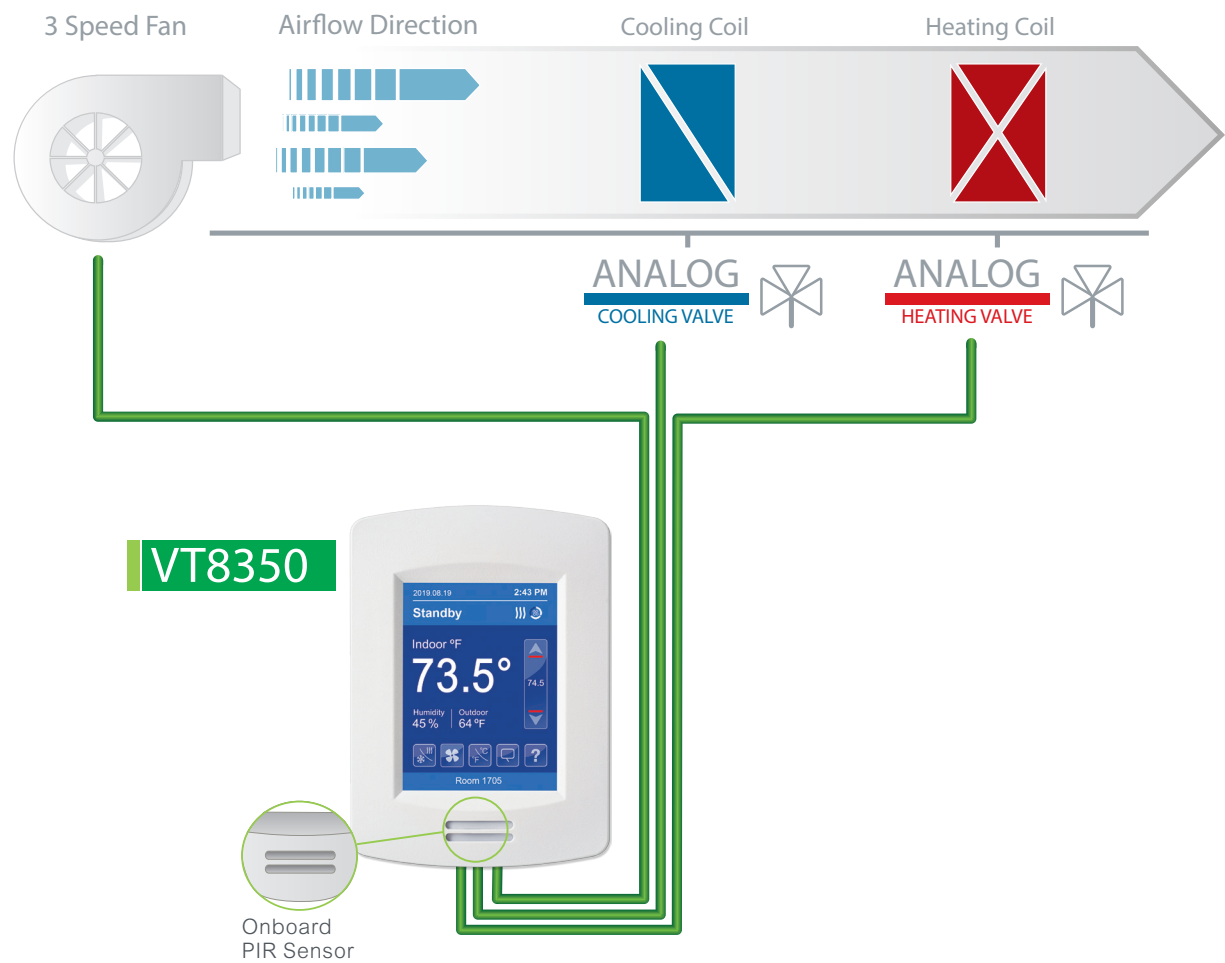
#### System On: (Fan modes)

- BO2 is energized.
- BO3 is energized
- BO4 is energized.
- Auto: When there is no demand, BO2, BO3 and BO4 are not energized. On demand, system will automatically switch "On" low (BO2), medium (BO3) or high (BO4) speed.

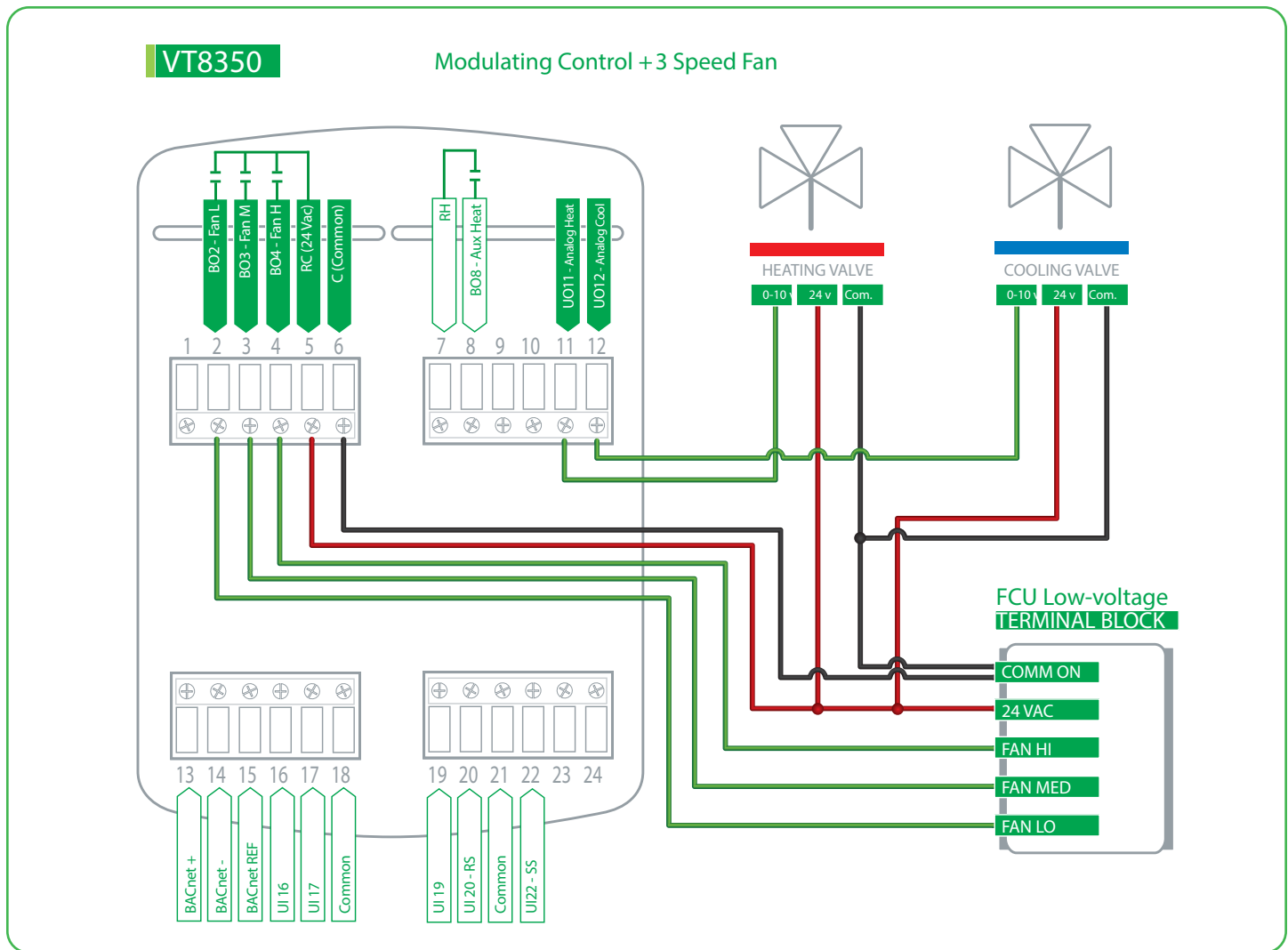
### Options

- Wireless adapter modules for BACnet models are available. (see Appendix B for network wiring).
- Remote wall mount or duct sensor ready.
- Can be configured for 2-pipe systems with changeover.
- 3 universal inputs can be used and configured for advanced functionality as required by the application.
- Universal input can be configured for changeover sensor.

VT8350 HEATING/COOLING 4-PIPE FAN COIL UNIT WITH 3-SPEED FAN, 0-10 VDC ANALOG VALVES AND DEHUMIDIFICATION SEQUENCE FOR LOW VOLTAGE



| Configuration Parameter Name | Configuration Settings        |
|------------------------------|-------------------------------|
| Fan type                     | 3 speed                       |
| Ctrl. type out1              | 0-10V DA or 0-10V RA (Analog) |
| Ctrl. type out2              | Same as 1                     |
| Fan menu                     | L-M-H-A                       |
| No. of pipes                 | 4                             |
| Operation sequence           | Cool/Heat                     |



## Sequence of Operation and Wiring

### Occupied Mode

Setpoints revert to those defined by occupied cooling and heating.

### Stand-by Mode (only available when PIR motion detector sensor is used)

Setpoints revert to those defined by stand-by cooling and heating.

### Unoccupied Mode

Setpoints revert to those defined by unoccupied heating and cooling.

### Occupied Override Mode

System reverts to occupied mode for duration determined by "ToccTime" parameter.

### On Call for Cool

Cooling valve opens to maintain room temperature. Heating valve closes. Dehumidification enabled.

### On Call for Heat

Heating valve opens to maintain room temperature. Cooling valve closes. Dehumidification disabled.

### On Demand for Dehumidification

Dehumidification is achieved via cooling coil using heating coil for reheat if necessary.

Dehumidification only allowed in COOL mode, or if cooling is enabled in AUTO mode.

Dehumidification disabled if room temperature falls below low ambient lockout temperature, which is cooling setpoint minus configuration defined deadband value.

Reheat disabled if cooling demand reaches 100%.



### 3 speed Fan Operation

**System Off**

BO2, BO3 and BO4 are not energized

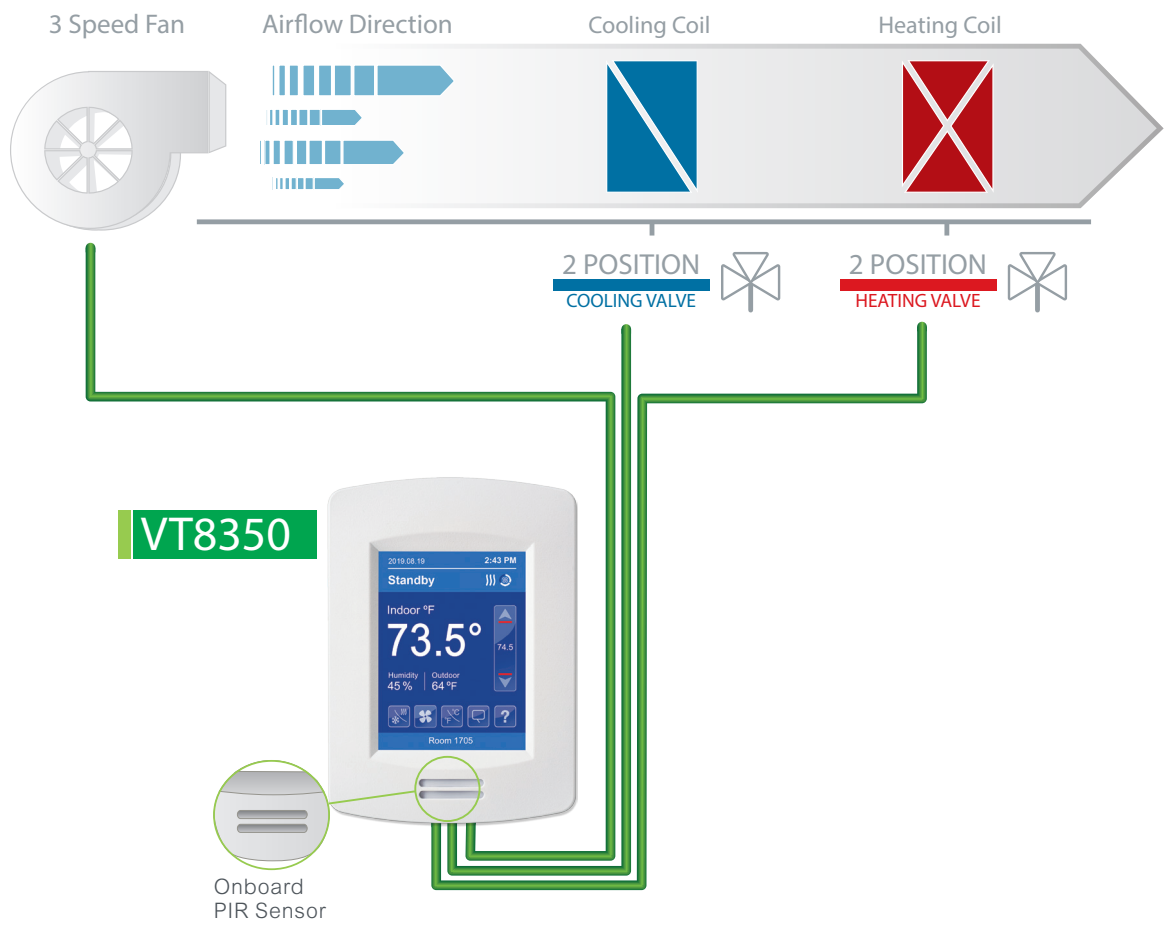
**System On: (Fan modes)**

- BO2 is energized.
- BO3 is energized
- BO4 is energized.
- Auto: When there is no demand, BO2, BO3 and BO4 are not energized. On demand, system will automatically switch "On" low (BO2), medium (BO3) or high (BO4) speed.

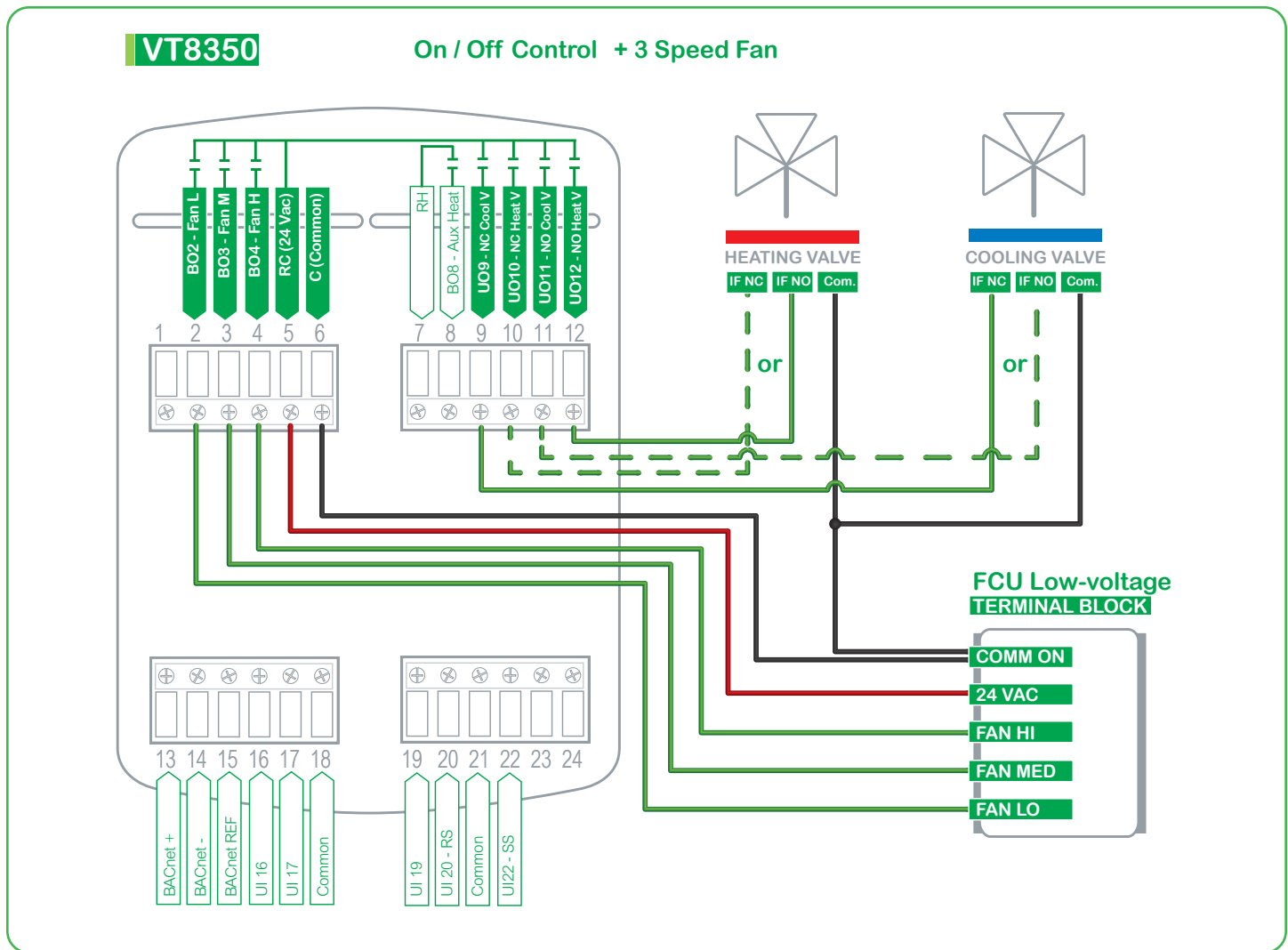
### Options

- Wireless adapter modules for BACnet models are available. (see Appendix B for network wiring).
- Remote wall mount or duct sensor ready.
- Can be configured for 2-pipe systems.
- 3 universal inputs can be used and configured for advanced functionality as required by the application.
- Universal input can be configured for changeover sensor.

VT8350 HEATING/COOLING 4-PIPE FAN COIL UNIT WITH 3-SPEED FAN, 2-POSITION VALVES AND DEHUMIDIFICATION SEQUENCE FOR LOW VOLTAGE



| Configuration Parameter Name | Configuration Settings |
|------------------------------|------------------------|
| Fan type                     | 3 speed                |
| Fan menu                     | L-M-H-A                |
| Ctrl. type out1              | On/Off                 |
| Ctrl. type out2              | Same as 1              |
| No. of pipes                 | 4                      |
| Operation sequence           | Cool/Heat              |



## Sequence of Operation and Wiring

### Occupied Mode

Setpoints revert to those defined by occupied cooling and heating.

### Stand-by Mode (only available when PIR motion detector sensor is used)

Setpoints revert to those defined by stand-by cooling and heating.

### Unoccupied Mode

Setpoints revert to those defined by unoccupied heating and cooling.

### Occupied Override Mode

System reverts to occupied mode for duration determined by "ToccTime" parameter.

### On Call for Cool

Cooling valve opens to maintain room temperature. Heating valve closes. Dehumidification enabled.

### On Call for Heat

Heating valve opens to maintain room temperature. Cooling valve closes. Dehumidification disabled.

### On Demand for Dehumidification

Dehumidification is achieved via cooling coil using heating coil for reheat if necessary.

Dehumidification only allowed in COOL mode, or if cooling is enabled in AUTO mode.

Dehumidification disabled if room temperature falls below low ambient lockout temperature, which is cooling setpoint minus configuration defined deadband value.

Reheat disabled if cooling demand reaches 100%.

### 3 speed Fan Operation

#### System Off

BO2, BO3 and BO4 are not energized

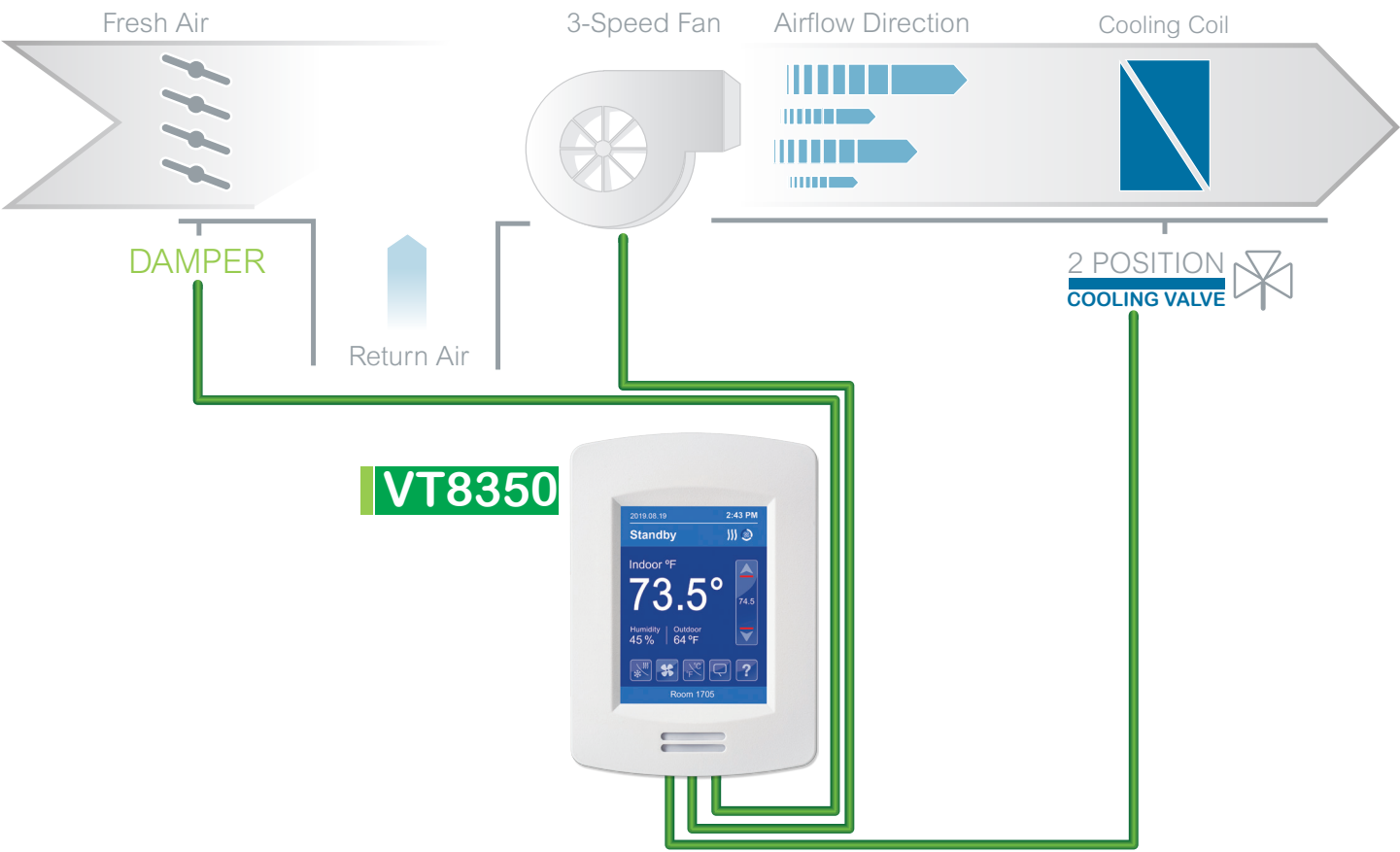
#### System On: (Fan modes)

- BO2 is energized.
- BO3 is energized
- BO4 is energized.
- Auto: When there is no demand, BO2, BO3 and BO4 are not energized. On demand, system will automatically switch "On" low (BO2), medium (BO3) or high (BO4) speed.

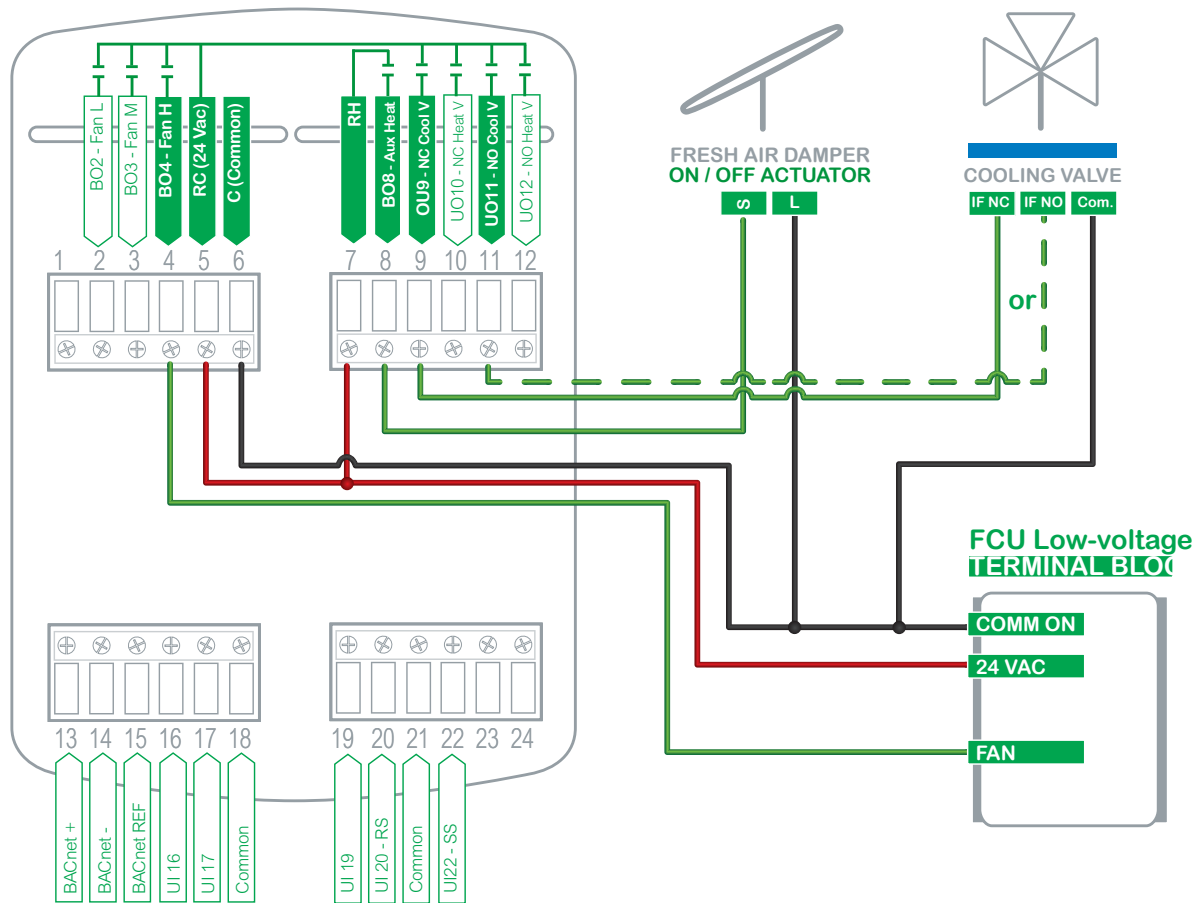
### Options

- Wireless adapter modules for BACnet models are available. (see Appendix B for network wiring).
- Models available with factory installed PIR sensor.
- Remote wall mount or duct sensor ready.
- Can be configured for 2-pipe systems.
- 3 universal inputs can be used and configured for advanced functionality as required by the application.
- Universal input can be configured for changeover sensor.

VT8350 COOLING ONLY 2-PIPE FAN COIL UNIT WITH SINGLE SPEED FAN, 2-POSITION COOLING VALVE AND FRESH AIR DAMPER FOR LOW VOLTAGE



| Configuration Parameter Name | Configuration Settings |
|------------------------------|------------------------|
| Fan type                     | 3 speed                |
| Fan menu                     | On-Auto                |
| Ctrl. type out1              | On/Off                 |
| Ctrl. type out2              | Same as 1              |
| BO8 aux. config              | Aux NO                 |
| No. of pipes                 | 2                      |
| Operation sequence           | Cool only              |

**VT8350****On / Off Control + 3 Speed Fan****Sequence of Operation and Wiring****Occupied Mode**

Setpoints revert to those defined by occupied cooling and heating. The auxiliary contact closes forcing fresh air damper to open.

**Stand-by Mode (only available when PIR motion detector sensor is used)**

Setpoints revert to those defined by stand-by cooling and heating.

**Unoccupied Mode**

Setpoints revert to those defined by unoccupied heating and cooling. The auxiliary contact opens causing fresh air damper to close completely.

**Occupied Override Mode**

System reverts to occupied mode for duration determined by "ToccTime" parameter. The auxiliary contact closes forcing fresh air damper to open.

**On Call for Cool**

Cooling valve opens.

**On Call for Heat**

Cooling valve closes.

**Options**

- Wireless adapter modules are available. (see Appendix B for network wiring).
- Remote wall mount or duct sensor ready.
- Can be configured for 4-pipe systems.
- 3 universal inputs can be used and configured for advanced functionality as required by the application.
- Can be configured for two speed or three speed fan control.

**1 speed Fan Operation****System Off**

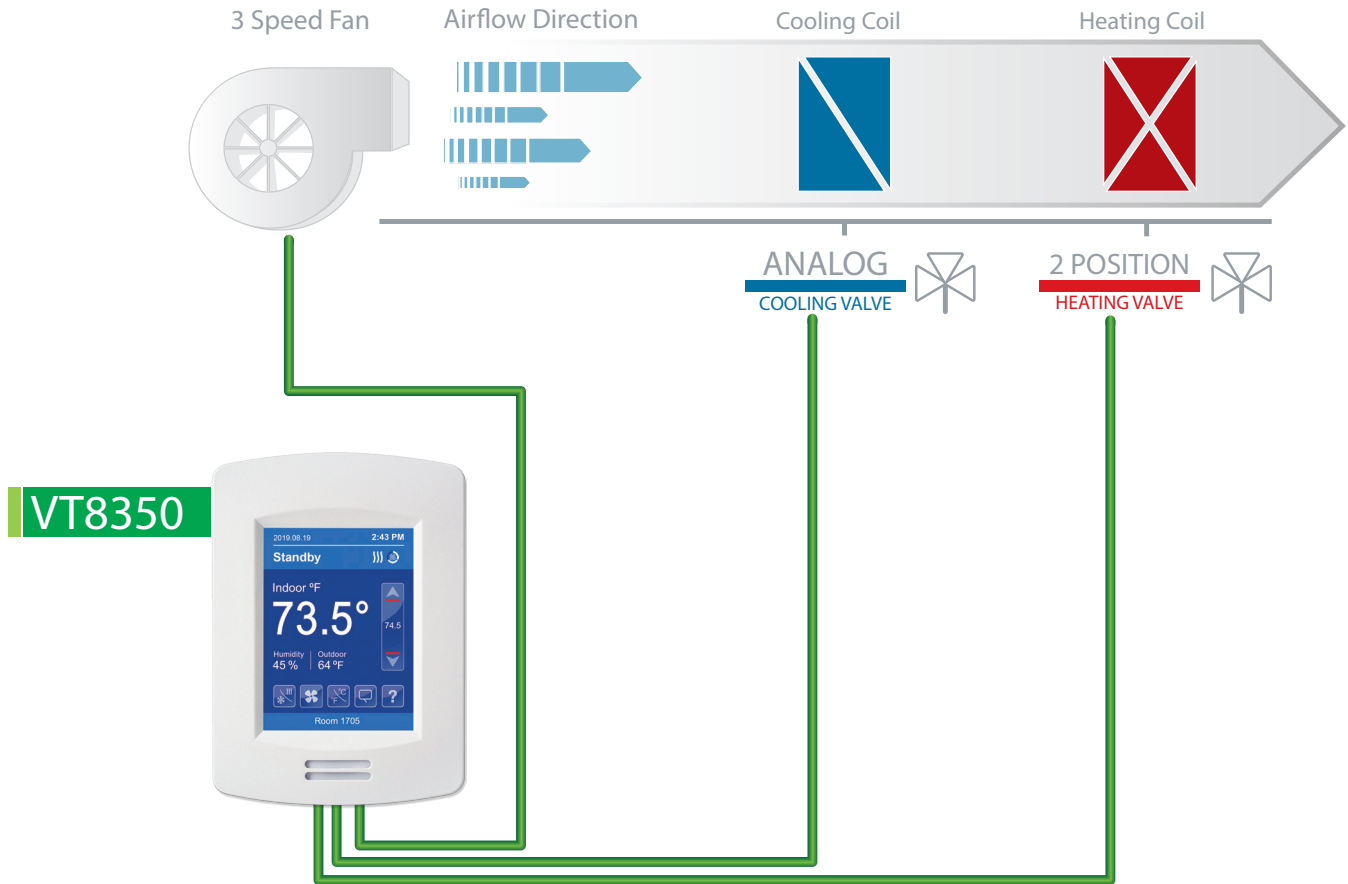
BO2, BO3 and BO4 are not energized

**System On: (Fan modes)**

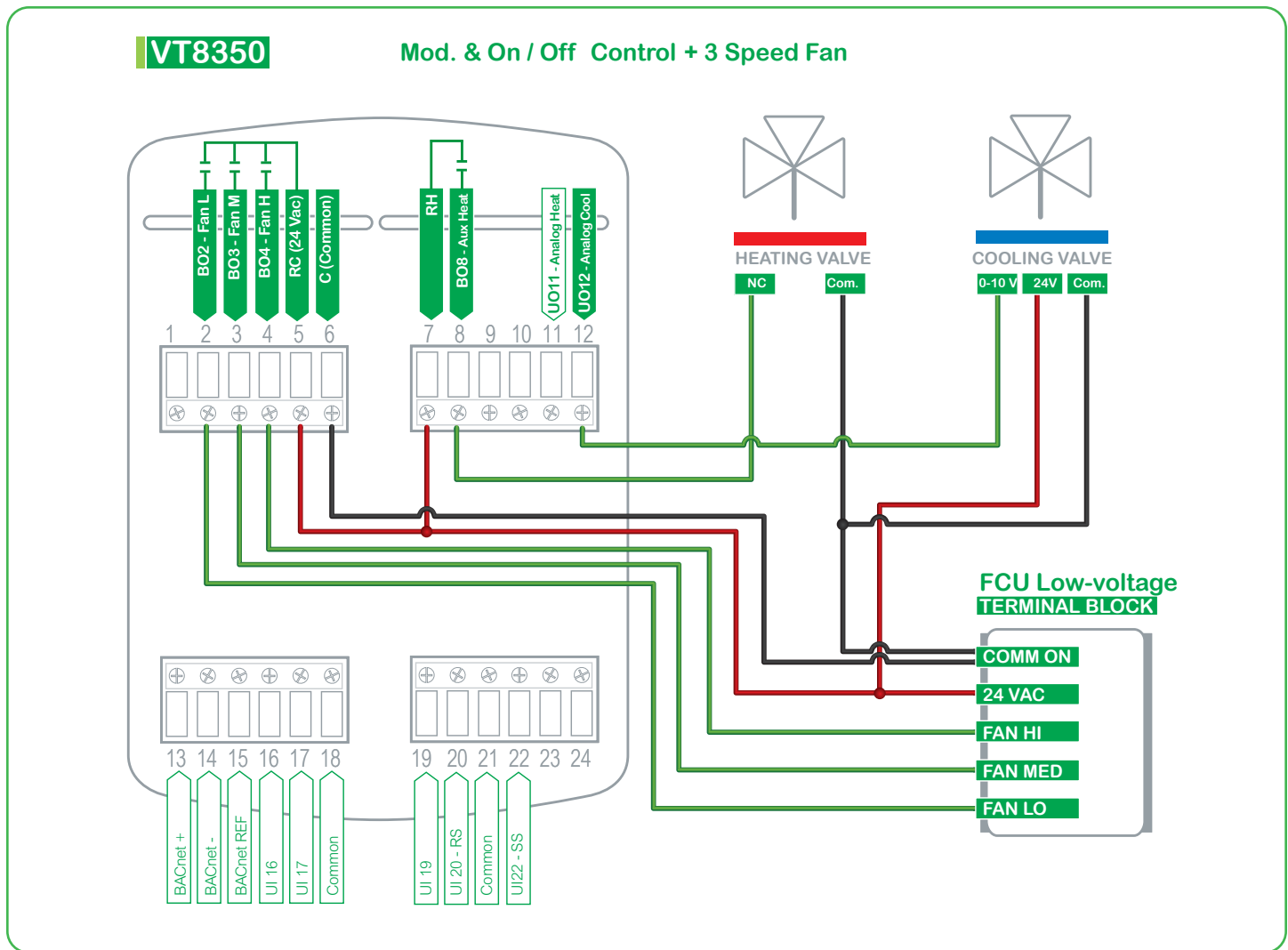
- On: BO4 is energized.
- Auto: When there is no demand, BO4 is not energized. On demand, BO4 will be energized.

## VTR8350/VT8350 [ Application Guide ]

### VT8350 COOLING WITH REHEAT 4-PIPE FAN COIL UNIT WITH 3-SPEED FAN, ANALOG COOLING VALVE AND N.C. ON/OFF HEATING VALVE FOR LOW VOLTAGE



| Configuration Parameter Name | Configuration Settings                            |
|------------------------------|---|
| Fan type                     | 3 speed   |
| Ctrl. type out1              | 0-10V DA or 0-10V RA (Analog)                     |
| Ctrl. type out2              | Same as 1   |
| Fan menu                     | L-M-H-A   |
| BO8 out time                 | 15 min.   |
| BO8 aux. config              | Reheat NO   |
| No. of pipes                 | 2 (Configured for 2-Pipe application with reheat) |
| Operation sequence           | Cool-rht  |



## Sequence of Operation and Wiring

### Occupied Mode

Setpoints revert to those defined by occupied cooling and heating.

### Stand-by Mode (only available when PIR motion detector sensor is used)

Setpoints revert to those defined by stand-by cooling and heating.

### Unoccupied Mode

Setpoints revert to those defined by unoccupied heating and cooling.

### Occupied Override Mode

System reverts to occupied mode for duration determined by "ToccTime" parameter.

### On Call for Cool

Analog valve starts modulating based on cooling demand.

### On Call for Heat

Heating valve opens.

## Options

- Wireless adapter modules are available. (see Appendix B for network wiring).
- Remote wall mount or duct sensor ready.
- Can be configured for 2-pipe systems.
- Can be configured to single or two speed fan.
- 3 universal inputs can be used and configured for advanced functionality as required by the application.

## 3 speed Fan Operation

### System Off

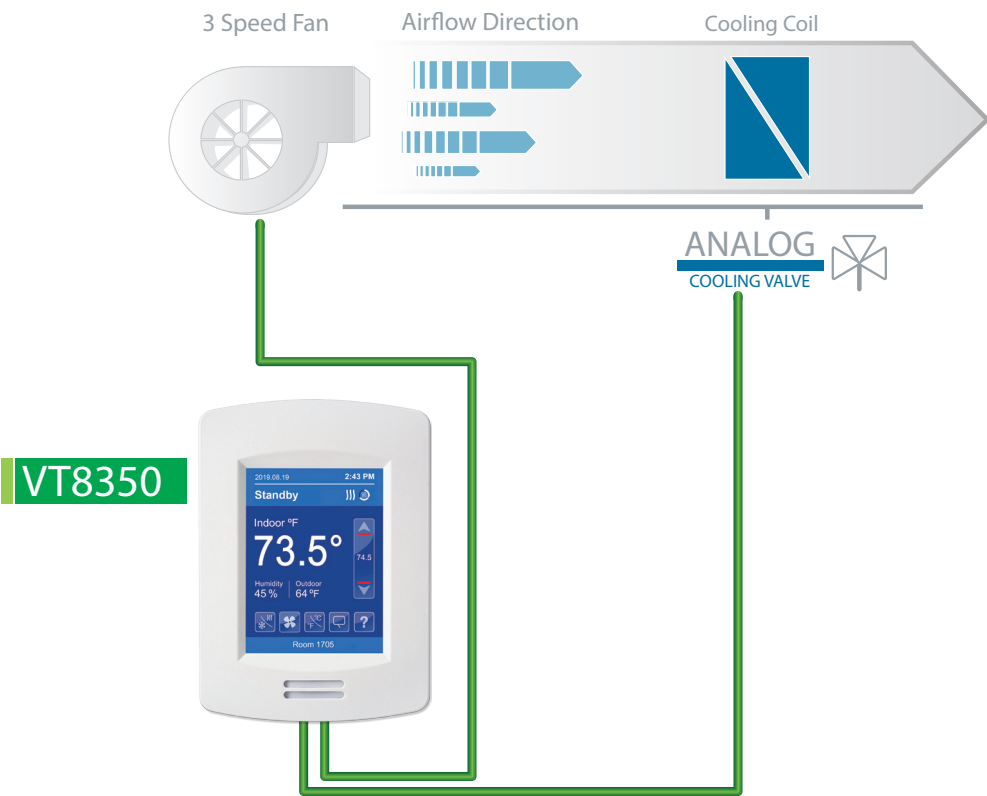
BO2, BO3 and BO4 are not energized

### System On: (Fan modes)

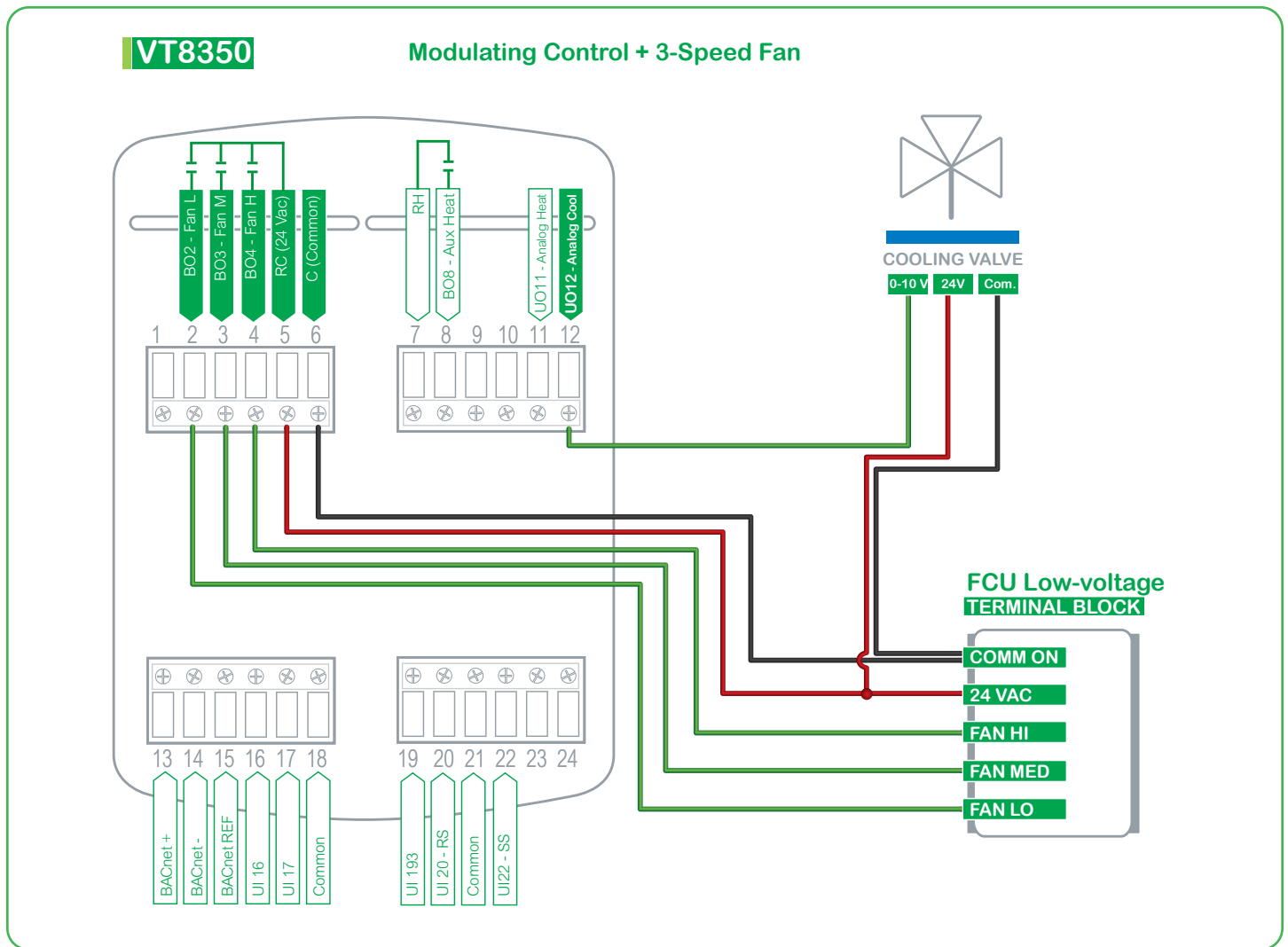
- BO2 is energized.
- BO3 is energized
- BO4 is energized.
- Auto: When there is no demand, BO2, BO3 and BO4 are not energized. On demand, system will automatically switch "On" low (BO2), medium (BO3) or high (BO4) speed.



VT8350 COOLING ONLY 2-PIPE FAN COIL UNIT WITH 3-SPEED FAN AND 0-10 VDC ANALOG COOLING VALVE FOR LOW VOLTAGE



| Configuration Parameter Name | Configuration Settings        |
|------------------------------|-------------------------------|
| Fan type                     | 3 speed                       |
| Ctrl. type out1              | 0-10V DA or 0-10V RA (Analog) |
| Ctrl. type out2              | Same as 1                     |
| Fan menu                     | L-M-H-A                       |
| No. of pipes                 | 2                             |
| Operation sequence           | Cool only                     |



## Sequence of Operation and Wiring

### Occupied Mode

Setpoints revert to those defined by occupied cooling and heating.

### Stand-by Mode (only available when PIR motion detector sensor is used)

Setpoints revert to those defined by stand-by cooling and heating.

### Unoccupied Mode

Setpoints revert to those defined by unoccupied heating and cooling.

### Occupied Override Mode

System reverts to occupied mode for duration determined by "ToccTime" parameter.

### On Call for Cool

Analog valve modulates allowing cool air to flow to reach setpoint.

### On Call for Heat

Valve closes.

## Options

- Wireless adapter modules are available. (see Appendix B for network wiring).
- Remote wall mount or duct sensor ready.
- Can be configured for 4-pipe systems.
- 3 universal inputs can be used and configured for advanced functionality as required by the application.
- Can be configured to two or three speed fan.

## 3 speed Fan Operation

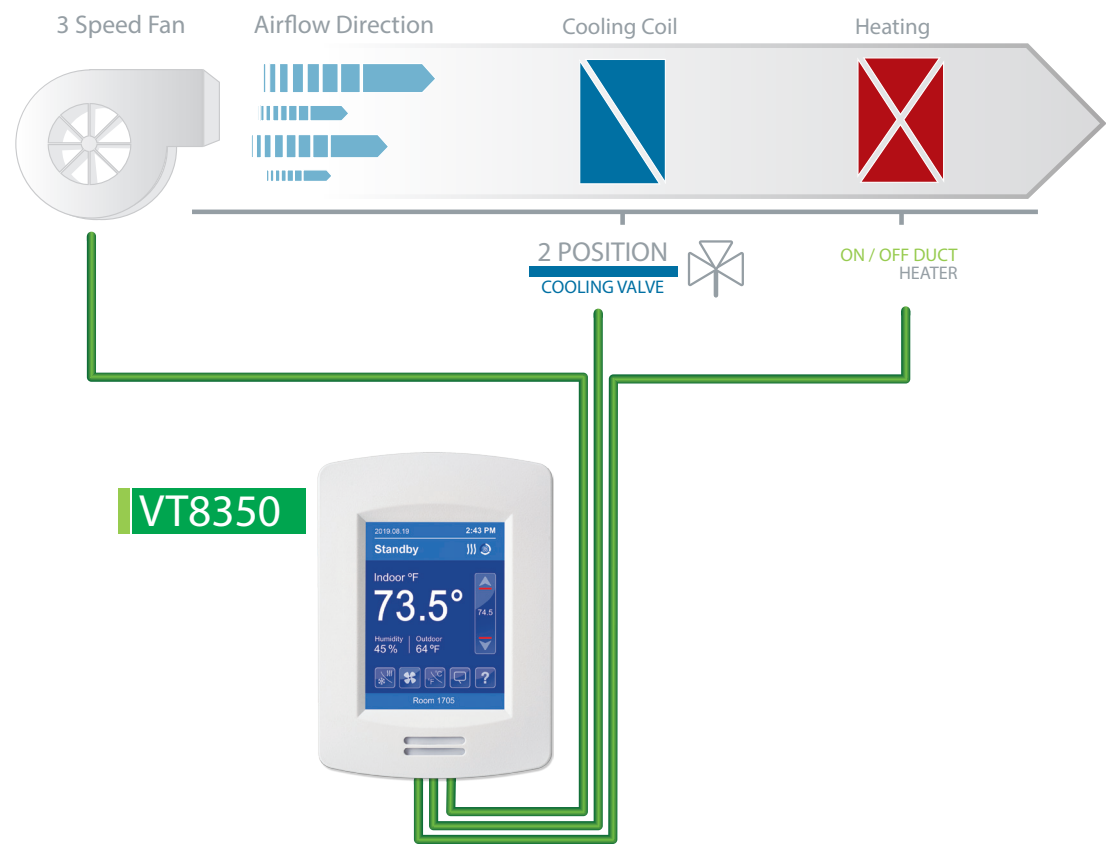
### System Off

BO2, BO3 and BO4 are not energized

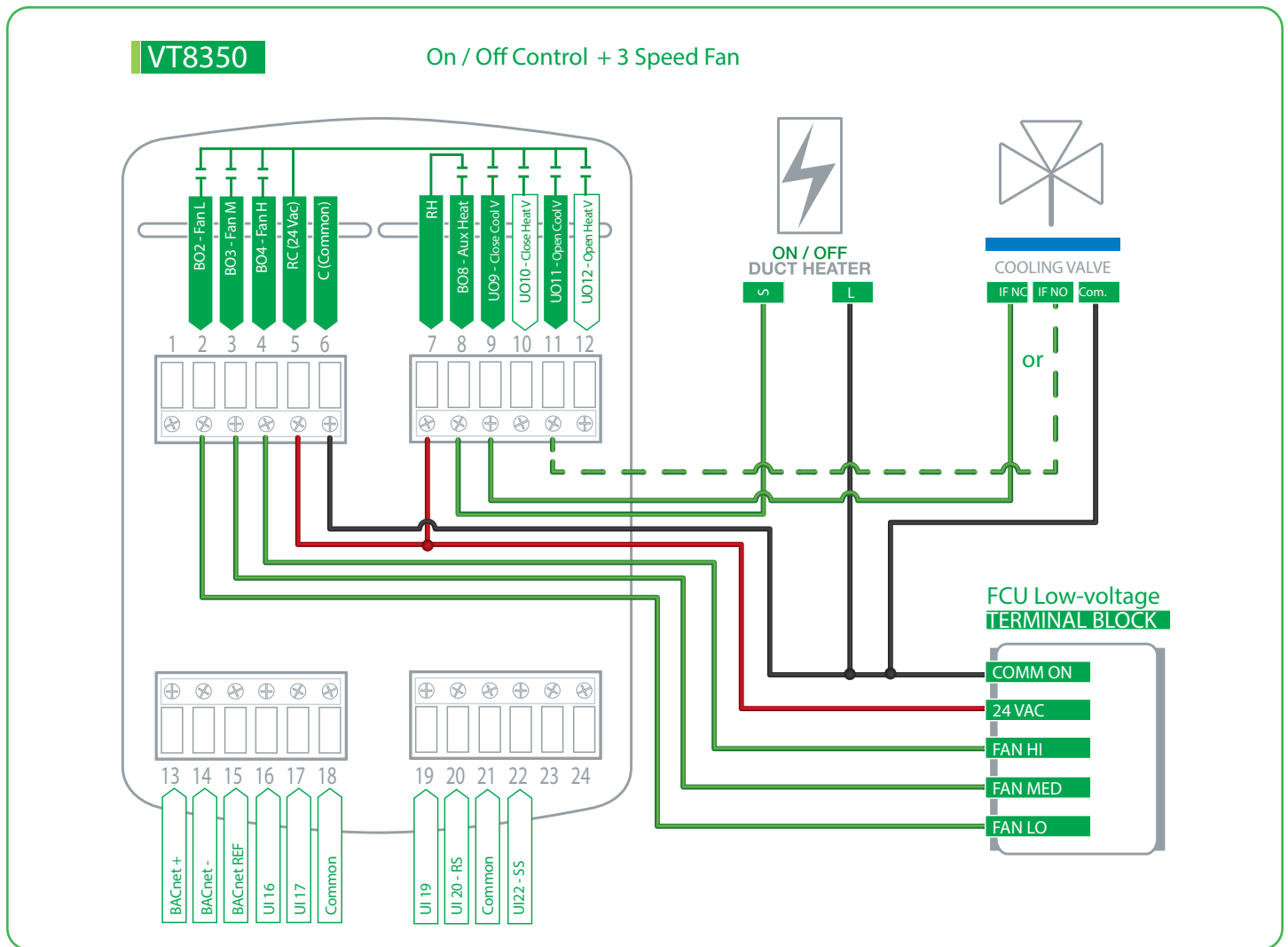
### System On: (Fan modes)

- BO2 is energized.
- BO3 is energized
- BO4 is energized.
- Auto: When there is no demand, BO2, BO3 and BO4 are not energized. On demand, system will automatically switch "On" low (BO2), medium (BO3) or high (BO4) speed.

VT8350 COOLING WITH REHEAT 2-PIPE FAN COIL UNIT WITH 3-SPEED FAN, 2-POSITION VALVE AND ELECTRIC REHEAT FOR LOW VOLTAGE



| Configuration Parameter Name | Configuration Settings |
|------------------------------|------------------------|
| Fan type                     | 3 speed                |
| Fan menu                     | L-M-H-A                |
| Ctrl. type out1              | On/Off                 |
| Ctrl. type out2              | Same as 1              |
| BO8 out time                 | 15 min.                |
| BO8 aux. config              | Reheat NO              |
| No. of pipes                 | 2                      |
| Operation sequence           | Cool-rht               |



## Sequence of Operation and Wiring

### Occupied Mode

Setpoints revert to those defined by occupied cooling and heating. The changeover sensor sends supply air temperature to controller.

### Stand-by Mode (only available when PIR motion detector sensor is used)

Setpoints revert to those defined by stand-by cooling and heating.

### Unoccupied Mode

Setpoints revert to those defined by unoccupied heating and cooling.

### Occupied Override Mode

System reverts to occupied mode for duration determined by "ToccTime" parameter.

### On Call for Cool

Cooling valve opens. Electric heat stays Off.

### On Call for Heat

Valve closes. Electric heat activates.

## Options

- Wireless adapter modules for BACnet models are available. (see Appendix B for network wiring).
- Remote wall mount or duct sensor ready.
- Can be configured for 4-pipe systems.
- 3 universal inputs can be used and configured for advanced functionality as required by the application.
- Can be configured to single or two speed fan.

## 3 speed Fan Operation

### System Off

BO2, BO3 and BO4 are not energized

### System On: (Fan modes)

- BO2 is energized.
- BO3 is energized
- BO4 is energized.
- Auto: When there is no demand, BO2, BO3 and BO4 are not energized. On demand, system will automatically switch "On" low (BO2), medium (BO3) or high (BO4) speed.

**VT8350 ECM Fan**

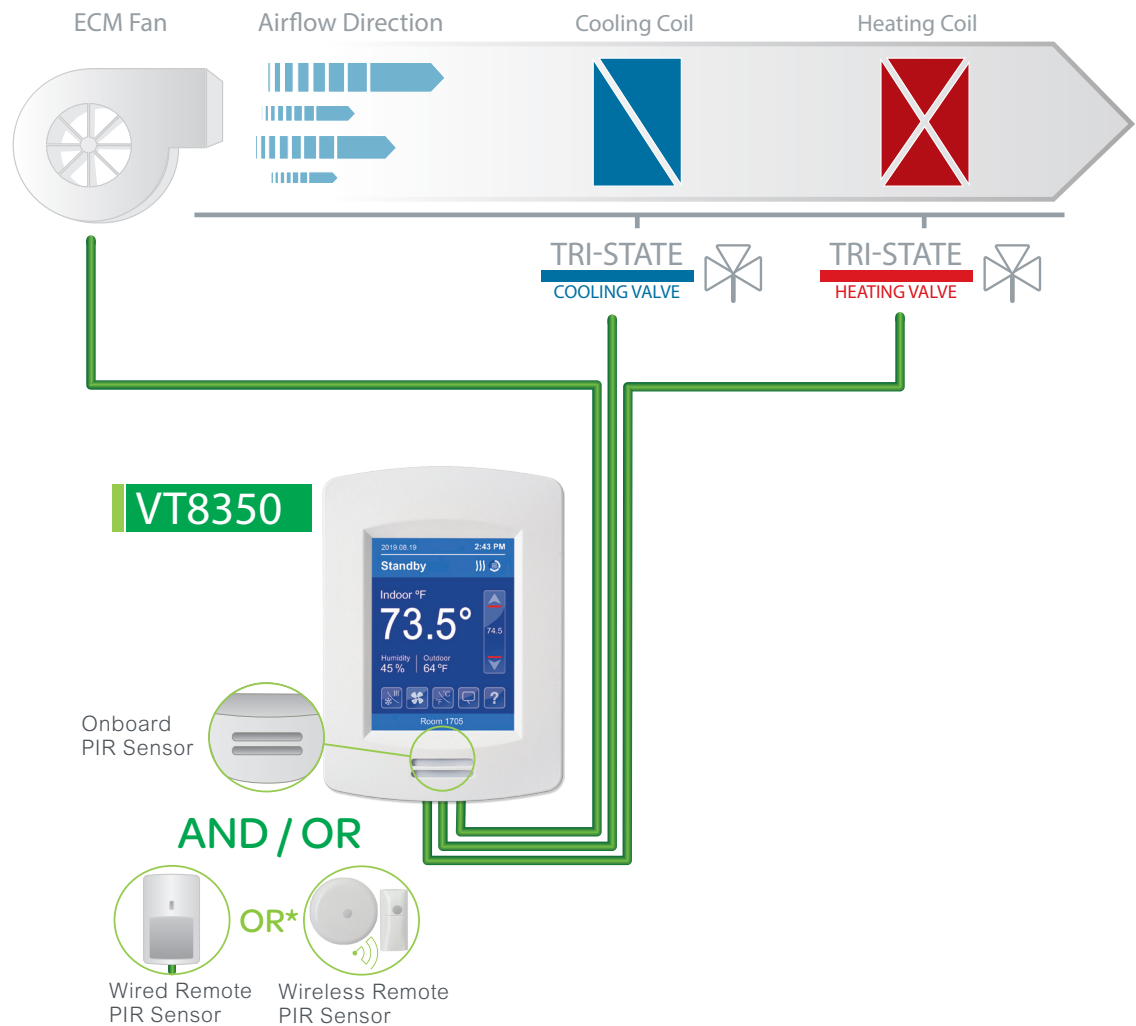
## VT8350

## ECM FAN APPLICATIONS

| System  | Fan | Cooling                    | Heating                           | Other                                     |
|---------|-----|----------------------------|-----------------------------------|---|
| 4 pipes | ECM | Tri-state valve actuator   | Tri-state valve actuator          | Door and motion detect + dehumidification |
| 4 pipes | ECM | 0-10 Vdc valve actuator    | 0-10 Vdc valve actuator           | Motion detect + dehumidification          |
| 4 pipes | ECM | 2 positions valve actuator | 2 positions valve actuator        | Motion detect + dehumidification          |
| 4 pipes | ECM | 0-10 Vdc valve actuator    | 2 positions valve actuator reheat | ---                                       |
| 2 pipes | ECM | 0-10 Vdc valve actuator    | None                              | ---                                       |
| 2 pipes | ECM | 0-10 Vdc valve actuator    | Electric reheat                   | ---                                       |

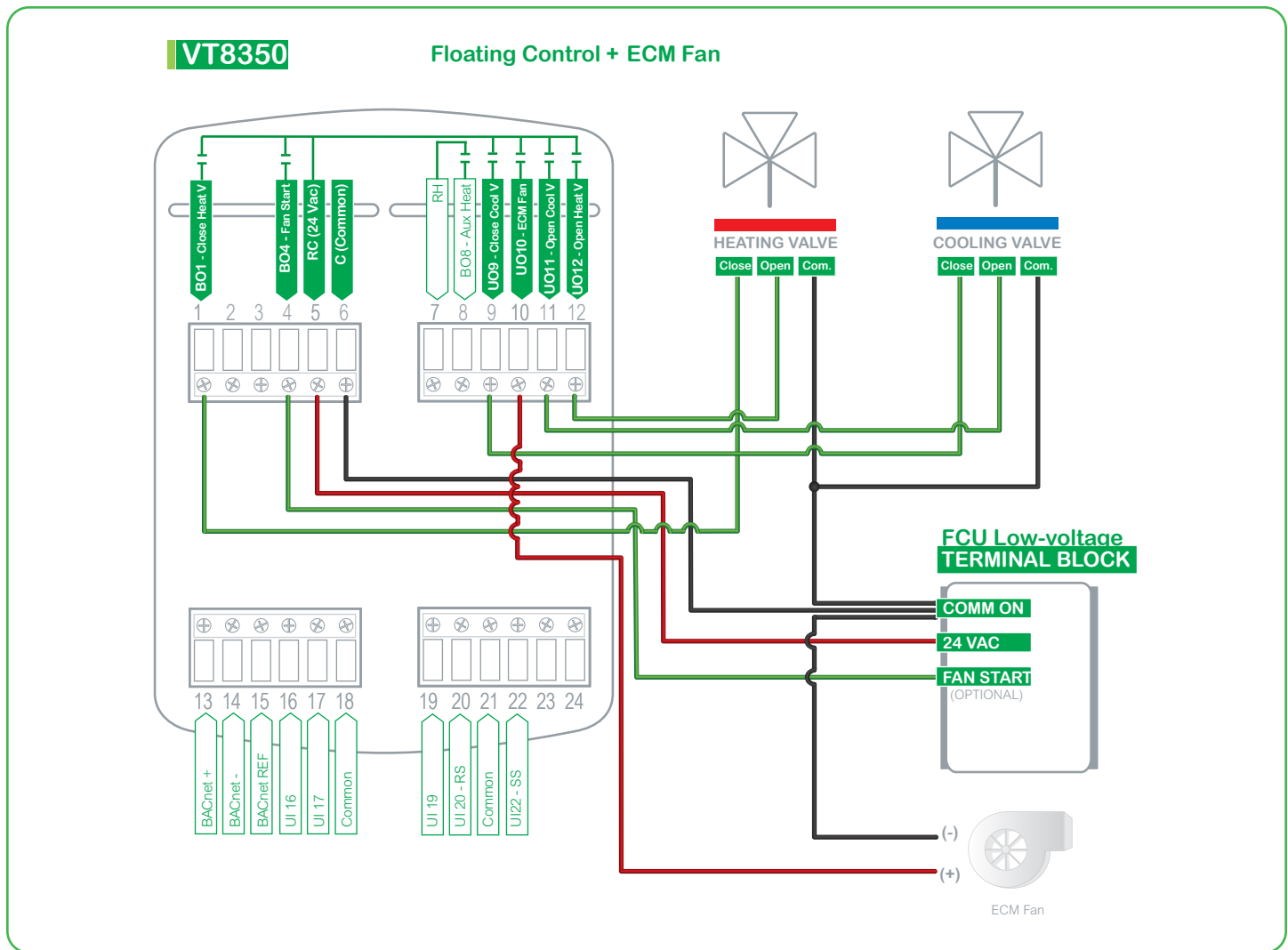
## VTR8350/VT8350 [ Application Guide ]

### VT8350 HEATING/COOLING 4-PIPE FAN COIL UNIT WITH ECM FAN, TRI-STATE FLOATING VALVES AND DEHUMIDIFICATION SEQUENCE FOR LOW VOLTAGE



| Configuration Parameter Name | Configuration Settings                          |
|------------------------------|---|
| Fan type                     | ECM   |
| Fan menu                     | L-M-H-A   |
| Ctrl. type out1              | Floating  |
| Ctrl. type out2              | Same as 1                                       |
| UI16 config                  | Motion NO or Motion NC (remote PIR sensor only) |
| UI17 config                  | Door Dry  |
| No. of pipes                 | 4   |
| Operation sequence           | Cool/Heat                                       |

\* Wired remote sensor cannot be used at the same time as wireless remote sensor(s).



## Sequence of Operation and Wiring

### Occupied Mode

Setpoints revert to those defined by occupied cooling and heating.

### Stand-by Mode (only available when PIR motion detector sensor is used)

Setpoints revert to those defined by stand-by cooling and heating.

### Unoccupied Mode

Setpoints revert to those defined by unoccupied heating and cooling.

### Occupied Override Mode

System reverts to occupied mode for duration determined by "ToccTime" parameter.

### On Call for Cool

Cooling valve opens to maintain room temperature. Heating valve closes.

### On Call for Heat

Heating valve opens to maintain room temperature. Cooling valve closes.

### On Demand for Dehumidification

Dehumidification is achieved via cooling coil using heating coil for reheat if necessary.

Dehumidification is only allowed in COOL mode, or if cooling is enabled in AUTO mode.

Dehumidification is disabled if room temperature falls below low ambient lockout temperature, which is the cooling setpoint minus the configuration defined deadband value.

Reheat disabled if cooling demand reaches 100%.



## ECM Fan Operation

### System Off

- UO10 = 0 Vdc and BO4 (fan start) is not energized

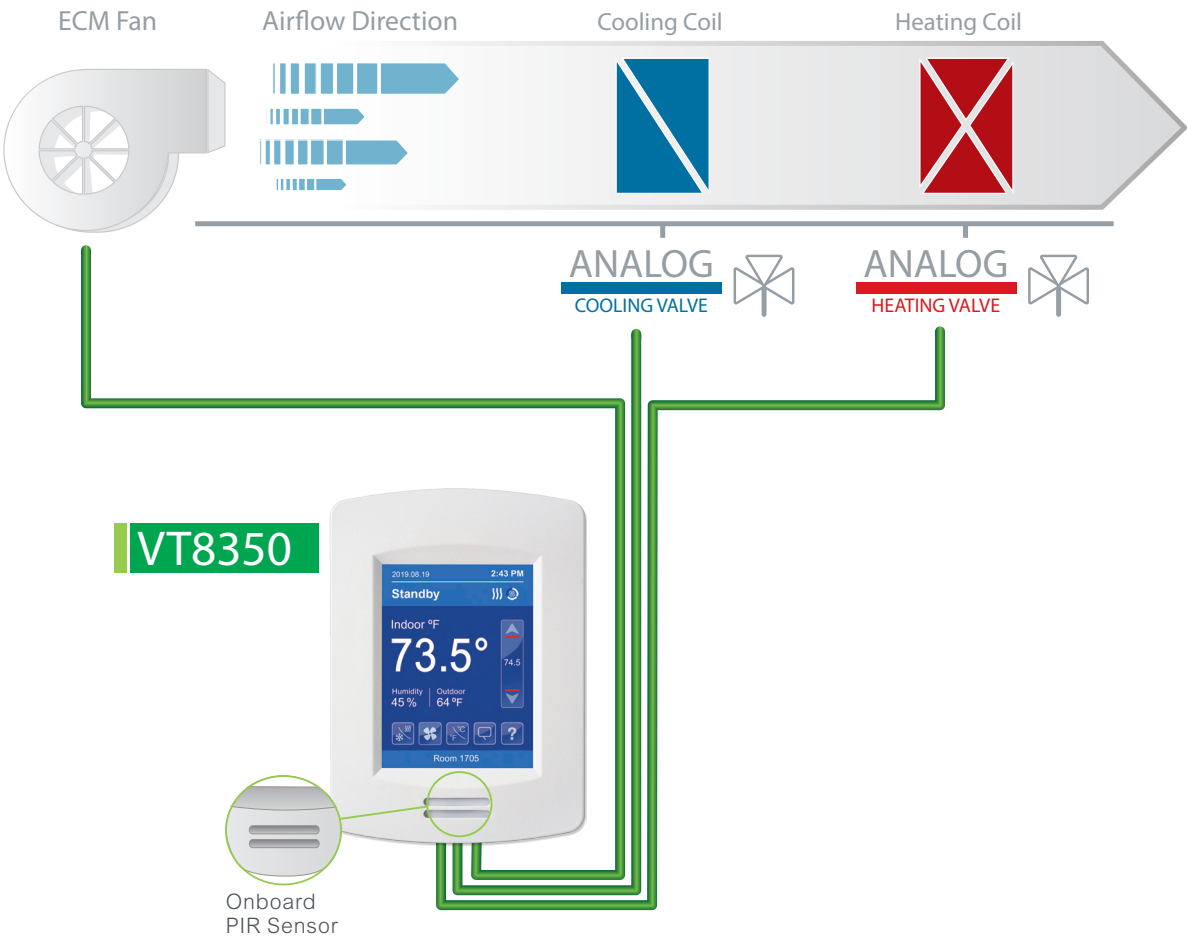
### System On: (Fan modes)

- Low: UO10 = 2.2 Vdc (adjustable from configuration menu) and BO4 “fan start” is energized.
- Med: UO10 = 6.0 Vdc (adjustable from configuration menu) and BO4 “fan start” is energized.
- High: UO10 = 8.6 Vdc (adjustable from configuration menu) and BO4 “fan start” is energized.
- Auto: When there is no demand, UO10 = 0 Vdc and BO4 “fan start” is not energized. On demand, system will modulate from “low” to “high” voltages (adjustable from configuration menu) and BO4 “fan start” is energized.

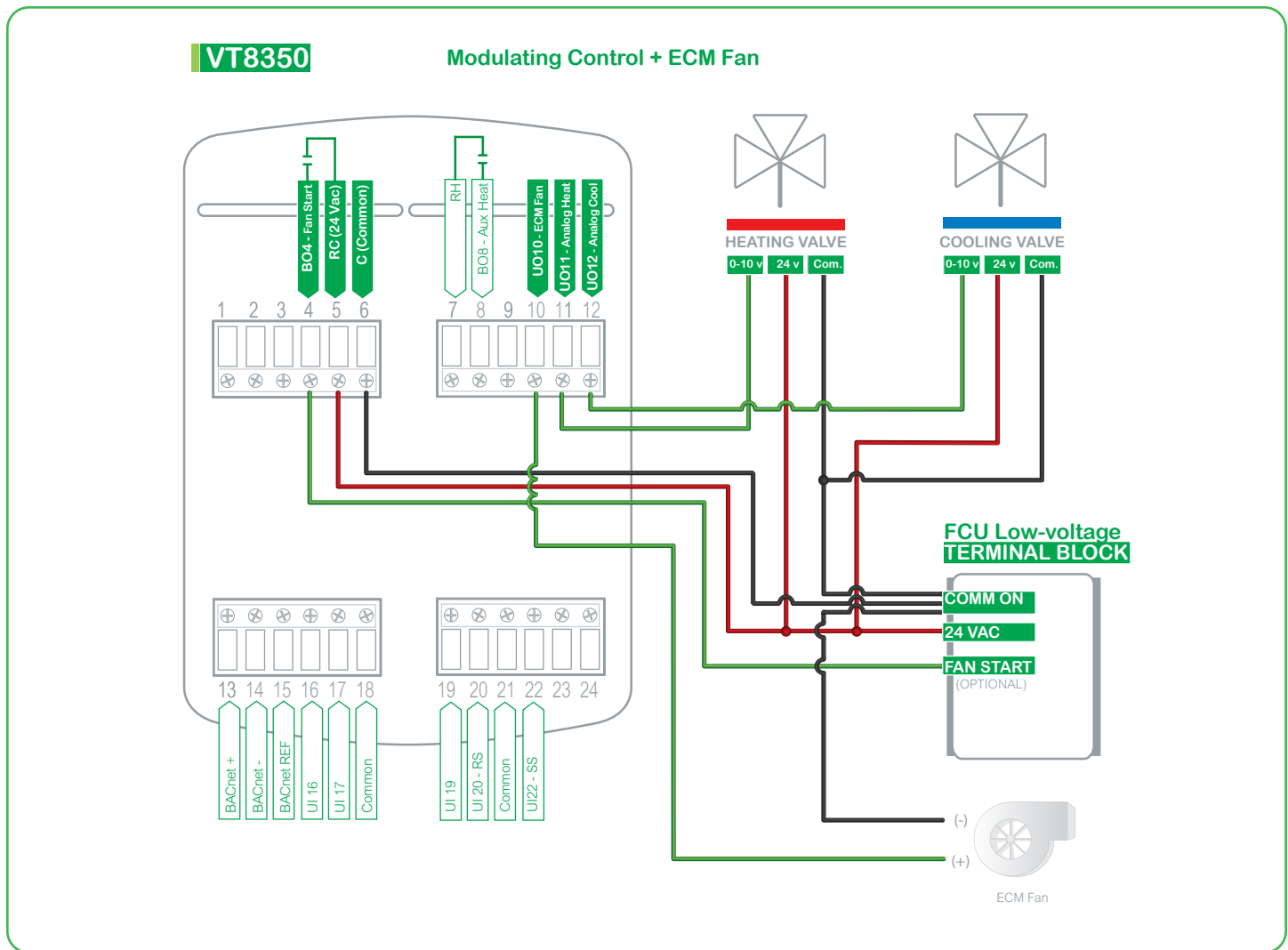
## Options

- Wireless adapter modules are available. (see Appendix B for network wiring).
- Remote wall mount or duct sensor ready.
- Can be configured for 2-pipe systems with changeover.
- 3 universal inputs can be used and configured for advanced functionality as required by the application.
- Universal input can be configured for changeover sensor.

VT8350 HEATING/COOLING 4-PIPE FAN COIL UNIT WITH ECM FAN, 0-10 VDC ANALOG VALVES AND DEHUMIDIFICATION SEQUENCE FOR LOW VOLTAGE



| Configuration Parameter Name | Configuration Settings        |
|------------------------------|-------------------------------|
| Fan cotrol                   | ECM                           |
| Ctrl. type out1              | 0-10V DA or 0-10V RA (Analog) |
| Ctrl. type out2              | Same as 1                     |
| Fan menu                     | L-M-H-A                       |
| No. of pipes                 | 4                             |
| Operation sequence           | Cool/Heat                     |



## Sequence of Operation and Wiring

### Occupied Mode

Setpoints revert to those defined by occupied cooling and heating. The changeover sensor sends supply air temperature to controller.

### Stand-by Mode (only available when PIR motion detector sensor is used)

Setpoints revert to those defined by stand-by cooling and heating.

### Unoccupied Mode

Setpoints revert to those defined by unoccupied heating and cooling.

### Occupied Override Mode

System reverts to occupied mode for duration determined by "ToccTime" parameter.

### On Call for Cool

Cooling valve opens to maintain room temperature. Heating valve closes. Dehumidification enabled.

### On Call for Heat

Heating valve opens to maintain room temperature. Cooling valve closes. Dehumidification disabled.

### On Demand for Dehumidification

Dehumidification is achieved via cooling coil using heating coil for reheat if necessary.

Dehumidification only allowed in COOL mode, or if cooling is enabled in AUTO mode.

Dehumidification disabled if room temperature falls below low ambient lockout temperature, which is cooling setpoint minus configuration defined deadband value.

Reheat disabled if cooling demand reaches 100%.

## ECM Fan Operation

### System Off

- UO10 = 0 Vdc and BO4 (fan start) is not energized

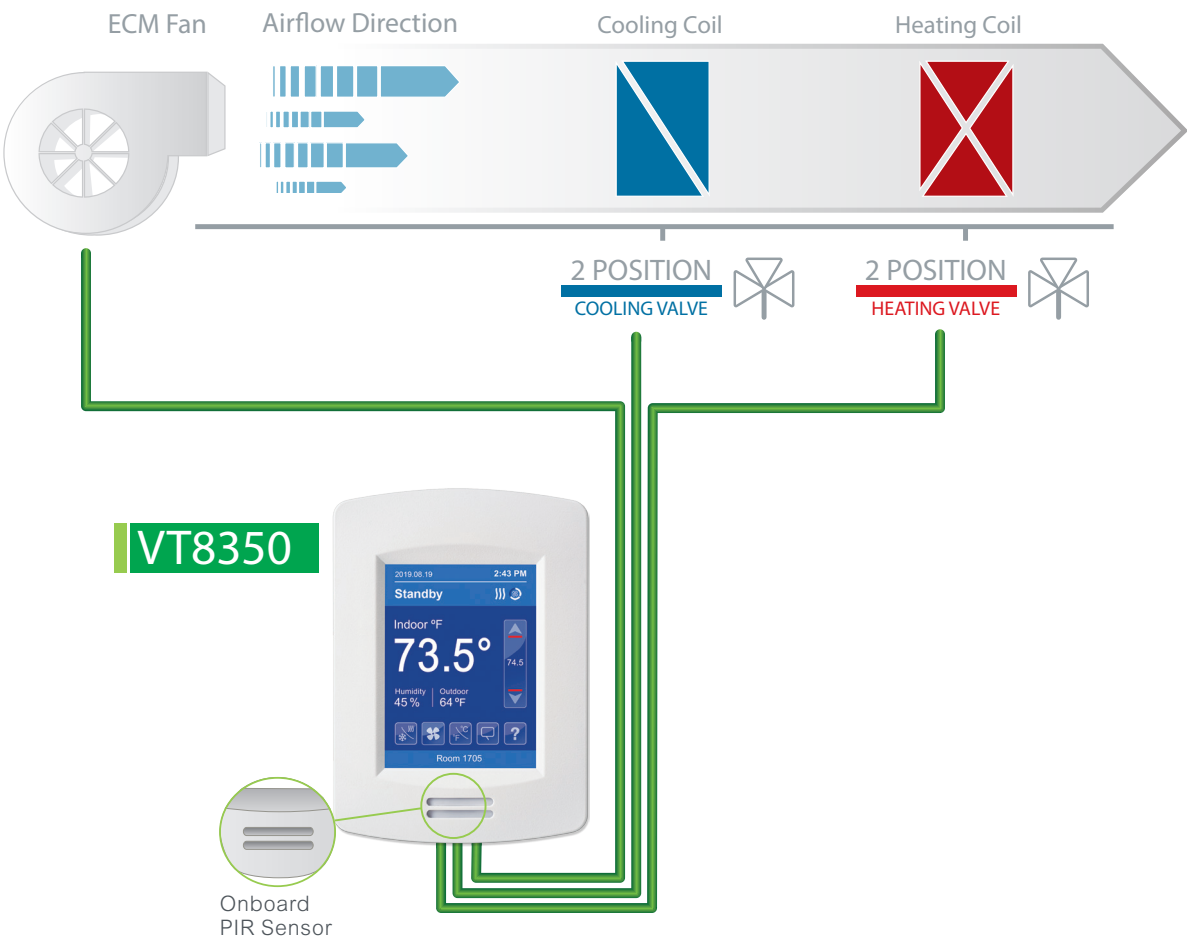
### System On: (Fan modes)

- Low: UO10 = 2.2 Vdc (adjustable from configuration menu) and BO4 “fan start” is energized.
- Med: UO10 = 6.0 Vdc (adjustable from configuration menu) and BO4 “fan start” is energized.
- High: UO10 = 8.6 Vdc (adjustable from configuration menu) and BO4 “fan start” is energized.
- Auto: When there is no demand, UO10 = 0 Vdc and BO4 “fan start” is not energized. On demand, system will modulate from “low” to “high” voltages (adjustable from configuration menu) and BO4 “fan start” is energized.

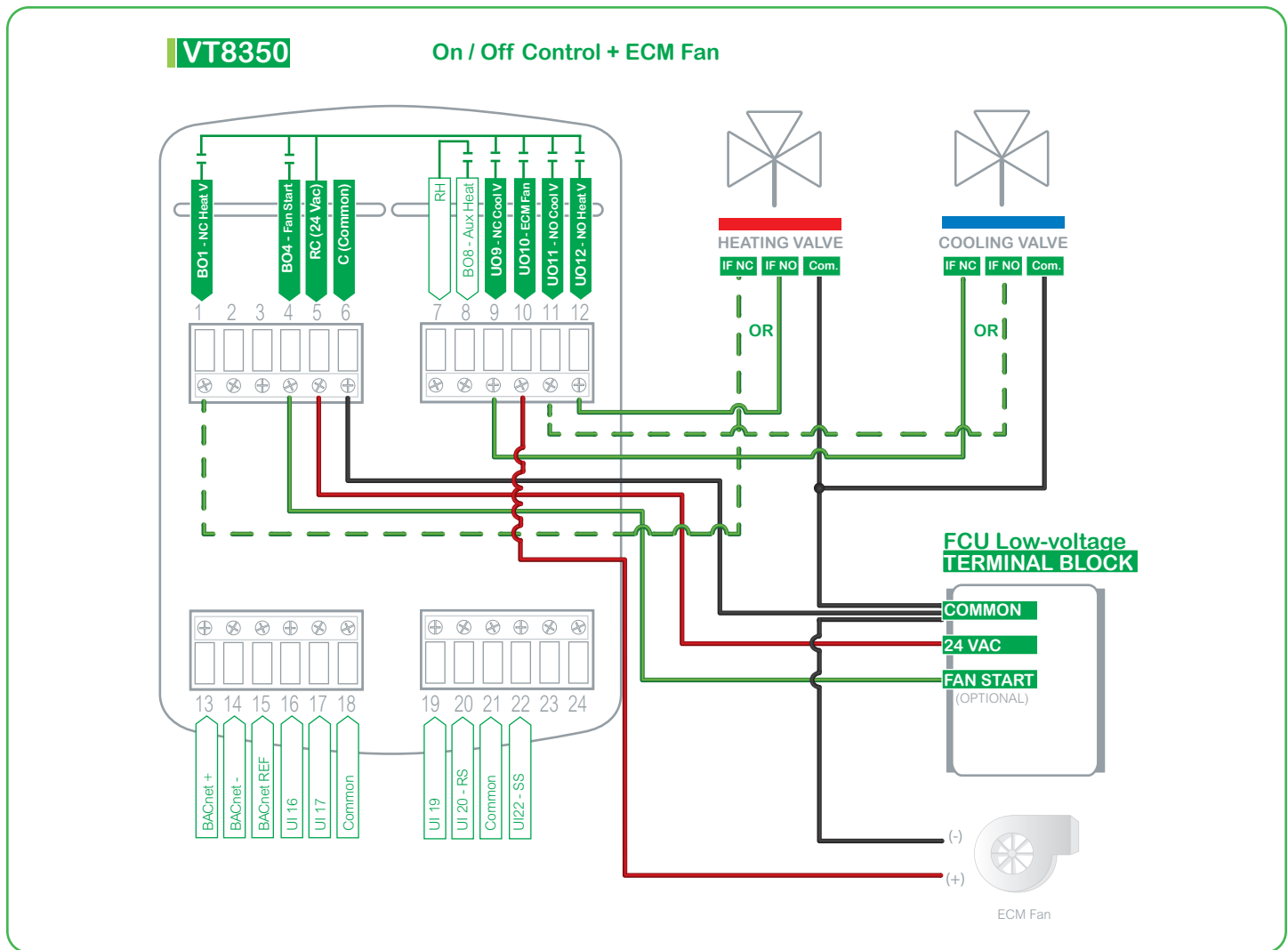
## Options

- Wireless adapter modules are available. (see Appendix B for network wiring).
- Remote wall mount or duct sensor ready.
- Can be configured for 2-pipe systems.
- 3 universal inputs can be used and configured for advanced functionality as required by the application.
- Universal input can be configured for changeover sensor.

VT8350 HEATING/COOLING 4-PIPE FAN COIL UNIT WITH ECM FAN, 2-POSITION VALVES AND DEHUMIDIFICATION SEQUENCE FOR LOW VOLTAGE



| Configuration Parameter Name | Configuration Settings |
|------------------------------|------------------------|
| Fan type                     | ECM                    |
| Fan menu                     | L-M-H-A                |
| Ctrl. type out1              | On/Off                 |
| Ctrl. type out2              | Same as 1              |
| No. of pipes                 | 4                      |
| Operation sequence           | Cool/Heat              |



## Sequence of Operation and Wiring

### Occupied Mode

Setpoints revert to those defined by occupied cooling and heating.

### Stand-by Mode (only available when PIR motion detector sensor is used)

Setpoints revert to those defined by stand-by cooling and heating.

### Unoccupied Mode

Setpoints revert to those defined by unoccupied heating and cooling.

### Occupied Override Mode

System reverts to occupied mode for duration determined by "ToccTime" parameter.

### On Call for Cool

Cooling valve opens to maintain room temperature. Heating valve closes. Dehumidification enabled.

### On Call for Heat

Heating valve opens to maintain room temperature. Cooling valve closes. Dehumidification disabled.

### On Demand for Dehumidification

Dehumidification is achieved via cooling coil using heating coil for reheat if necessary.

Dehumidification only allowed in COOL mode, or if cooling is enabled in AUTO mode.

Dehumidification disabled if room temperature falls below low ambient lockout temperature, which is cooling setpoint minus configuration defined deadband value.

Reheat disabled if cooling demand reaches 100%.

## ECM Fan Operation

### System Off

- UO10 = 0 Vdc and BO4 (fan start) is not energized

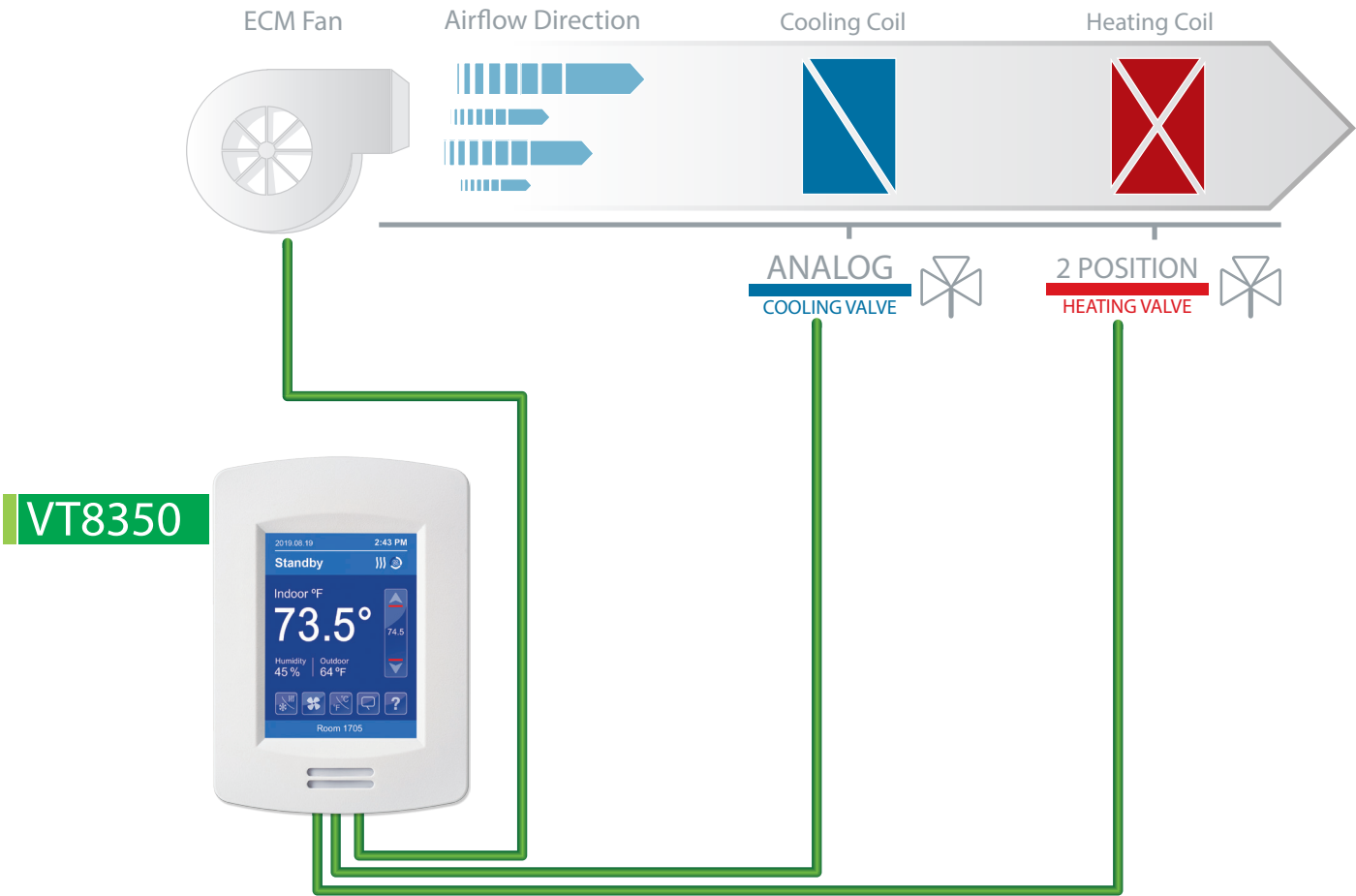
### System On: (Fan modes)

- Low: UO10 = 2.2 Vdc (adjustable from configuration menu) and BO4 “fan start” is energized.
- Med: UO10 = 6.0 Vdc (adjustable from configuration menu) and BO4 “fan start” is energized.
- High: UO10 = 8.6 Vdc (adjustable from configuration menu) and BO4 “fan start” is energized.
- Auto: When there is no demand, UO10 = 0 Vdc and BO4 “fan start” is not energized. On demand, system will modulate from “low” to “high” voltages (adjustable from configuration menu) and BO4 “fan start” is energized.

## Options

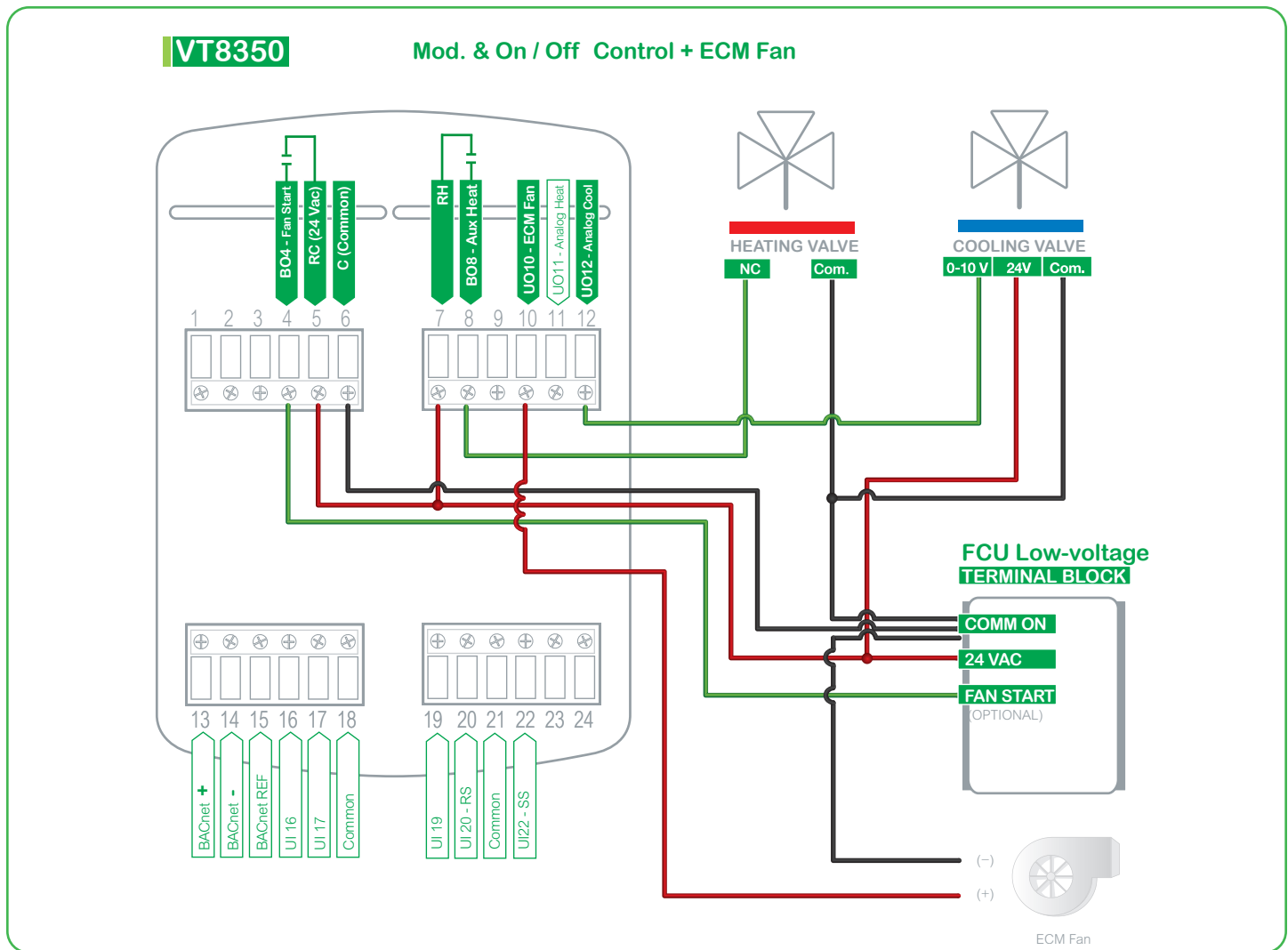
- Wireless adapter modules are available. (see Appendix B for network wiring).
- Models available with factory installed PIR sensor.
- Remote wall mount or duct sensor ready.
- Can be configured for 2-pipe systems.
- 3 universal inputs can be used and configured for advanced functionality as required by the application.
- Universal input can be configured for changeover sensor.

VT8350 COOLING WITH REHEAT 4-PIPE FAN COIL UNIT WITH ECM FAN, ANALOG COOLING VALVE AND N.C. ON/OFF HEATING VALVE FOR LOW VOLTAGE



| Configuration Parameter Name | Configuration Settings                            |
|------------------------------|---|
| Fan type                     | ECM   |
| Ctrl. type out1              | 0-10V DA or 0-10V RA (Analog)                     |
| Ctrl. type out2              | Same as 1   |
| Fan menu                     | L-M-H-A   |
| BO8 out time                 | 15 min.   |
| BO8 aux. config              | Reheat NO   |
| No. of pipes                 | 2 (Configured for 2-Pipe application with reheat) |
| Operation sequence           | Cool-rht  |





## Sequence of Operation and Wiring

### Occupied Mode

Setpoints revert to those defined by occupied cooling and heating.

### Stand-by Mode (only available when PIR motion detector sensor is used)

Setpoints revert to those defined by stand-by cooling and heating.

### Unoccupied Mode

Setpoints revert to those defined by unoccupied heating and cooling.

### Occupied Override Mode

System reverts to occupied mode for duration determined by "ToccTime" parameter.

### On Call for Cool

Analog valve starts modulating based on cooling demand.

### On Call for Heat

Heating valve opens.

## Options

- Wireless adapter modules are available. (see Appendix B for network wiring).
- Remote wall mount or duct sensor ready.
- Can be configured for 2-pipe systems.
- Can be configured to single or two speed fan.
- 3 universal inputs can be used and configured for advanced functionality as required by the application.

## ECM Fan Operation

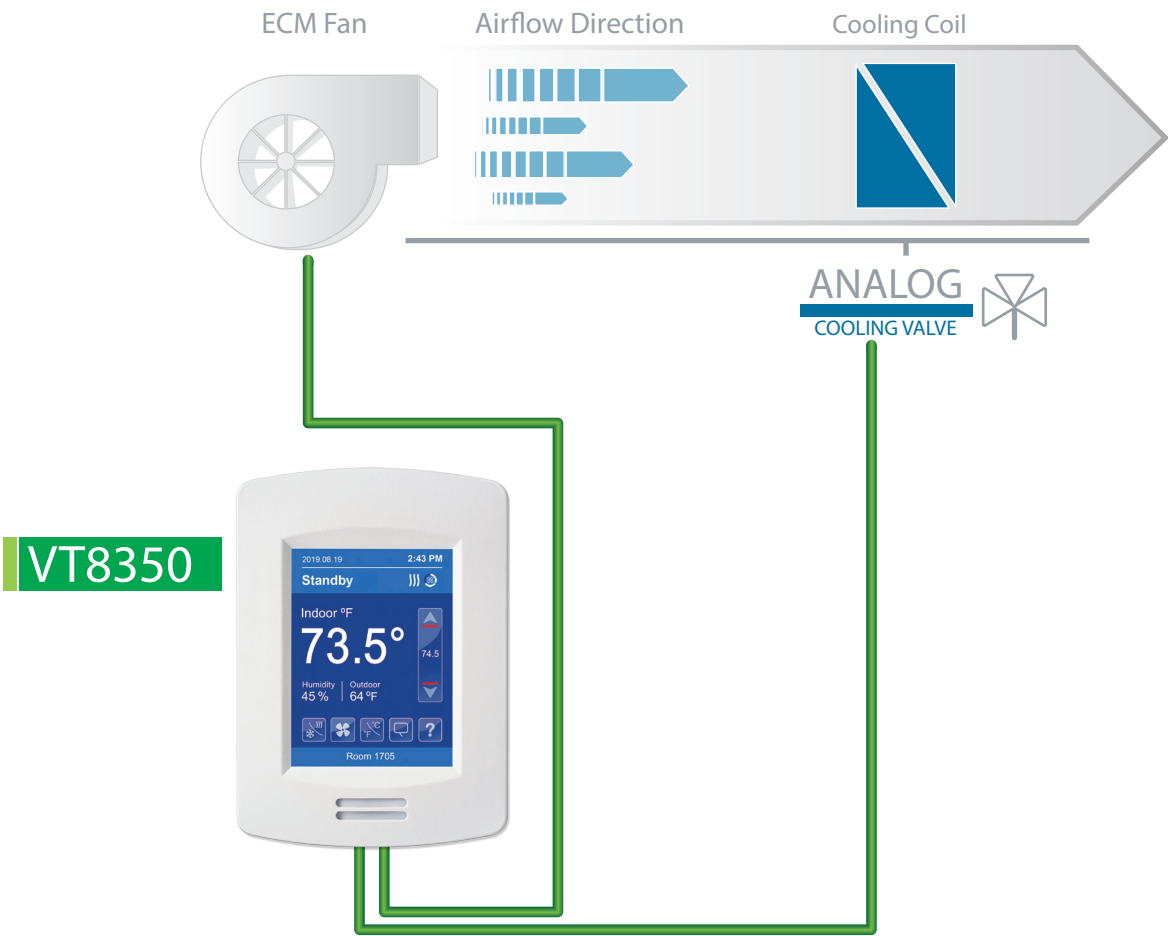
### System Off

UO10 = 0 Vdc and BO4 (fan start) is not energized

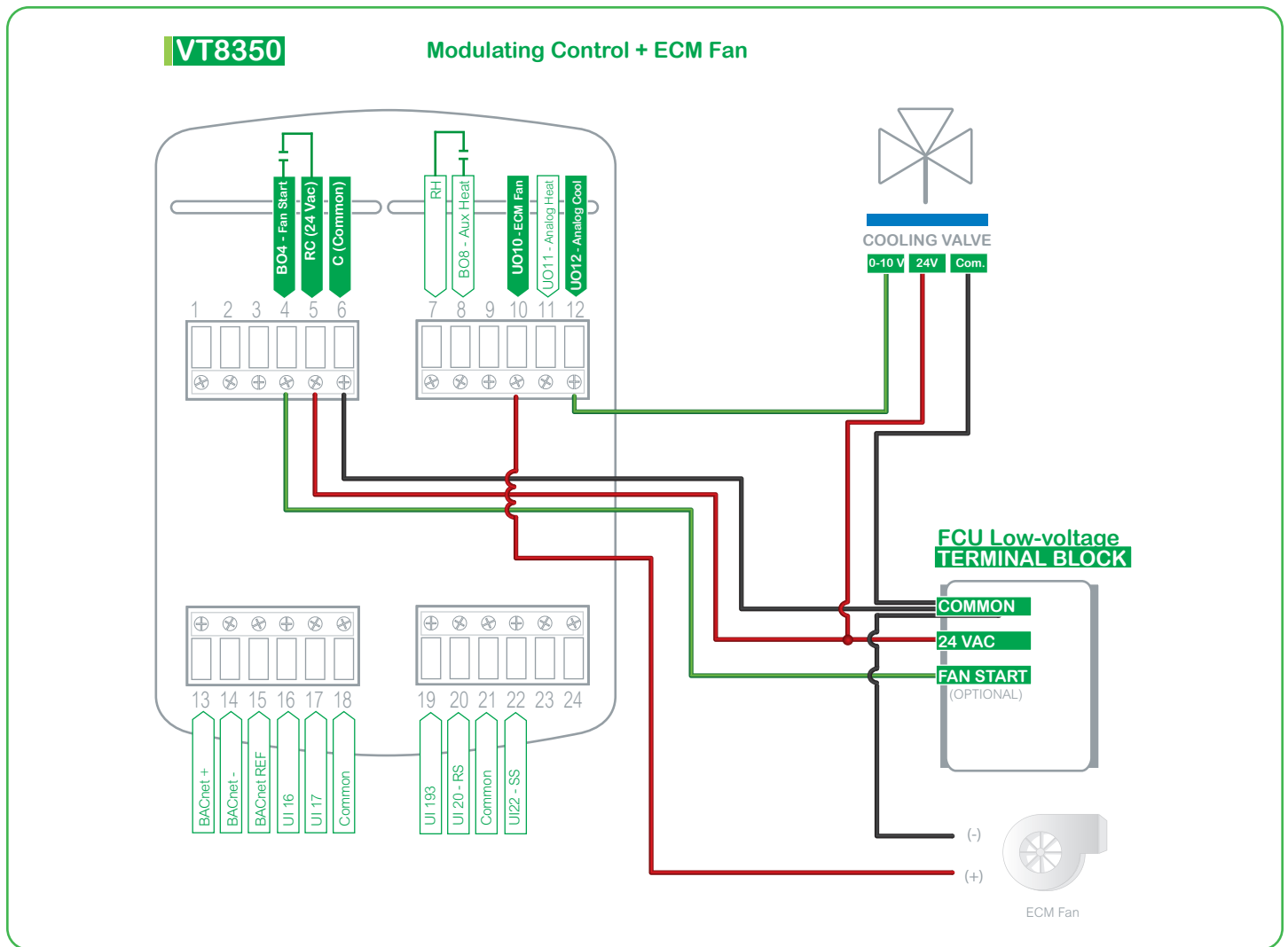
### System On: (Fan modes)

- Low: UO10 = 2.2 Vdc (adjustable from configuration menu) and BO4 “fan start” is energized.
- Med: UO10 = 6.0 Vdc (adjustable from configuration menu) and BO4 “fan start” is energized.
- High: UO10 = 8.6 Vdc (adjustable from configuration menu) and BO4 “fan start” is energized.
- Auto: When there is no demand, UO10 = 0 Vdc and BO4 “fan start” is not energized. On demand, system will modulate from “low” to “high” voltages (adjustable from configuration menu) and BO4 “fan start” is energized.

VT8350 COOLING ONLY 2-PIPE FAN COIL UNIT WITH ECM FAN AND 0-10 VDC ANALOG COOLING VALVE FOR LOW VOLTAGE



| Configuration Parameter Name | Configuration Settings        |
|------------------------------|-------------------------------|
| Fan type                     | ECM                           |
| Ctrl. type out1              | 0-10V DA or 0-10V RA (Analog) |
| Ctrl. type out2              | Same as 1                     |
| Fan menu                     | L-M-H-A                       |
| No. of pipes                 | 2                             |
| Operation sequence           | Cool only                     |



## Sequence of Operation and Wiring

### Occupied Mode

Setpoints revert to those defined by occupied cooling and heating.

### Stand-by Mode (only available when PIR motion detector sensor is used)

Setpoints revert to those defined by stand-by cooling and heating.

### Unoccupied Mode

Setpoints revert to those defined by unoccupied heating and cooling.

### Occupied Override Mode

System reverts to occupied mode for duration determined by "ToccTime" parameter.

### On Call for Cool

Analog valve modulates allowing cool air to flow to reach setpoint.

### On Call for Heat

Valve closes.

## Options

- Wireless adapter modules are available. (see Appendix B for network wiring).
- Remote wall mount or duct sensor ready.
- Can be configured for 4-pipe systems.
- 3 universal inputs can be used and configured for advanced functionality as required by the application.
- Can be configured to two or three speed fan.

## ECM Fan Operation

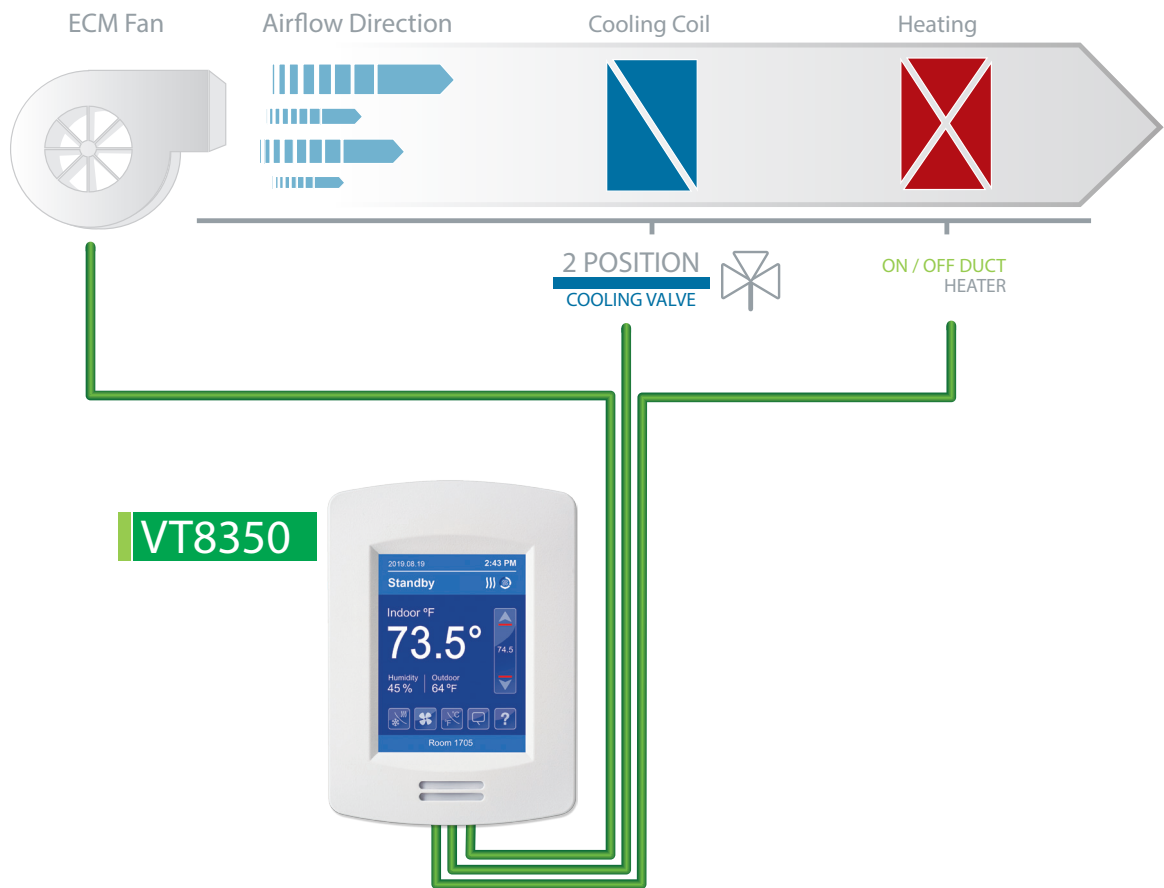
### System Off

UO10 = 0 Vdc and BO4 (fan start) is not energized

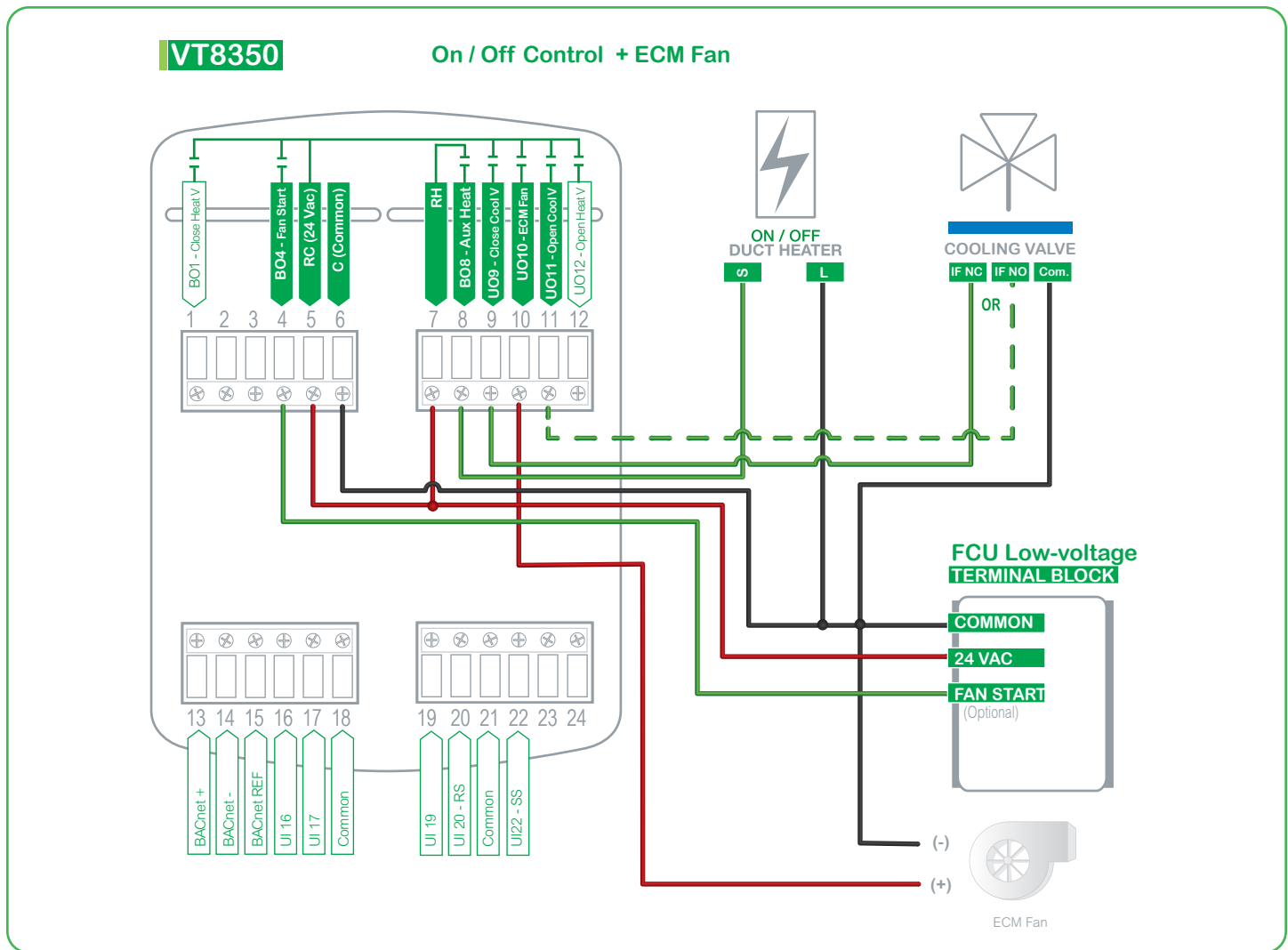
### System On: (Fan modes)

- Low: UO10 = 2.2 Vdc (adjustable from configuration menu) and BO4 “fan start” is energized.
- Med: UO10 = 6.0 Vdc (adjustable from configuration menu) and BO4 “fan start” is energized.
- High: UO10 = 8.6 Vdc (adjustable from configuration menu) and BO4 “fan start” is energized.
- Auto: When there is no demand, UO10 = 0 Vdc and BO4 “fan start” is not energized. On demand, system will modulate from “low” to “high” voltages (adjustable from configuration menu) and BO4 “fan start” is energized.

VT8350 COOLING WITH REHEAT 2-PIPE FAN COIL UNIT WITH ECM FAN, 2-POSITION VALVE AND ELECTRIC REHEAT FOR LOW VOLTAGE



| Configuration Parameter Name | Configuration Settings |
|------------------------------|------------------------|
| Fan type                     | ECM                    |
| Fan menu                     | L-M-H-A                |
| Ctrl. type out1              | On/Off                 |
| Ctrl. type out2              | Same as 1              |
| BO8 out time                 | 15 min.                |
| BO8 aux. config              | Reheat NO              |
| No. of pipes                 | 2                      |
| Operation sequence           | Cool-rht               |



## Sequence of Operation and Wiring

### Occupied Mode

Setpoints revert to those defined by occupied cooling and heating.

### Stand-by Mode (only available when PIR motion detector sensor is used)

Setpoints revert to those defined by stand-by cooling and heating.

### Unoccupied Mode

Setpoints revert to those defined by unoccupied heating and cooling.

### Occupied Override Mode

System reverts to occupied mode for duration determined by "ToccTime" parameter.

### On Call for Cool

Cooling valve opens. Electric heat stays Off.

### On Call for Heat

Valve closes. Electric heat activates.

## Options

- Wireless adapter modules for BACnet models are available. (see Appendix B for network wiring).
- Remote wall mount or duct sensor ready.
- Can be configured for 4-pipe systems.
- 3 universal inputs can be used and configured for advanced functionality as required by the application.

Can be configured to single or two speed fan.

## ECM Fan Operation

### System Off

UO10 = 0 Vdc and BO4 (fan start) is not energized

### System On: (Fan modes)

- Low: UO10 = 2.2 Vdc (adjustable from configuration menu) and BO4 “fan start” is energized.
- Med: UO10 = 6.0 Vdc (adjustable from configuration menu) and BO4 “fan start” is energized.
- High: UO10 = 8.6 Vdc (adjustable from configuration menu) and BO4 “fan start” is energized.
- Auto: When there is no demand, UO10 = 0 Vdc and BO4 “fan start” is not energized. On demand, system will modulate from “low” to “high” voltages (adjustable from configuration menu) and BO4 “fan start” is energized.



**VT8350**  
**Mixed Voltage**

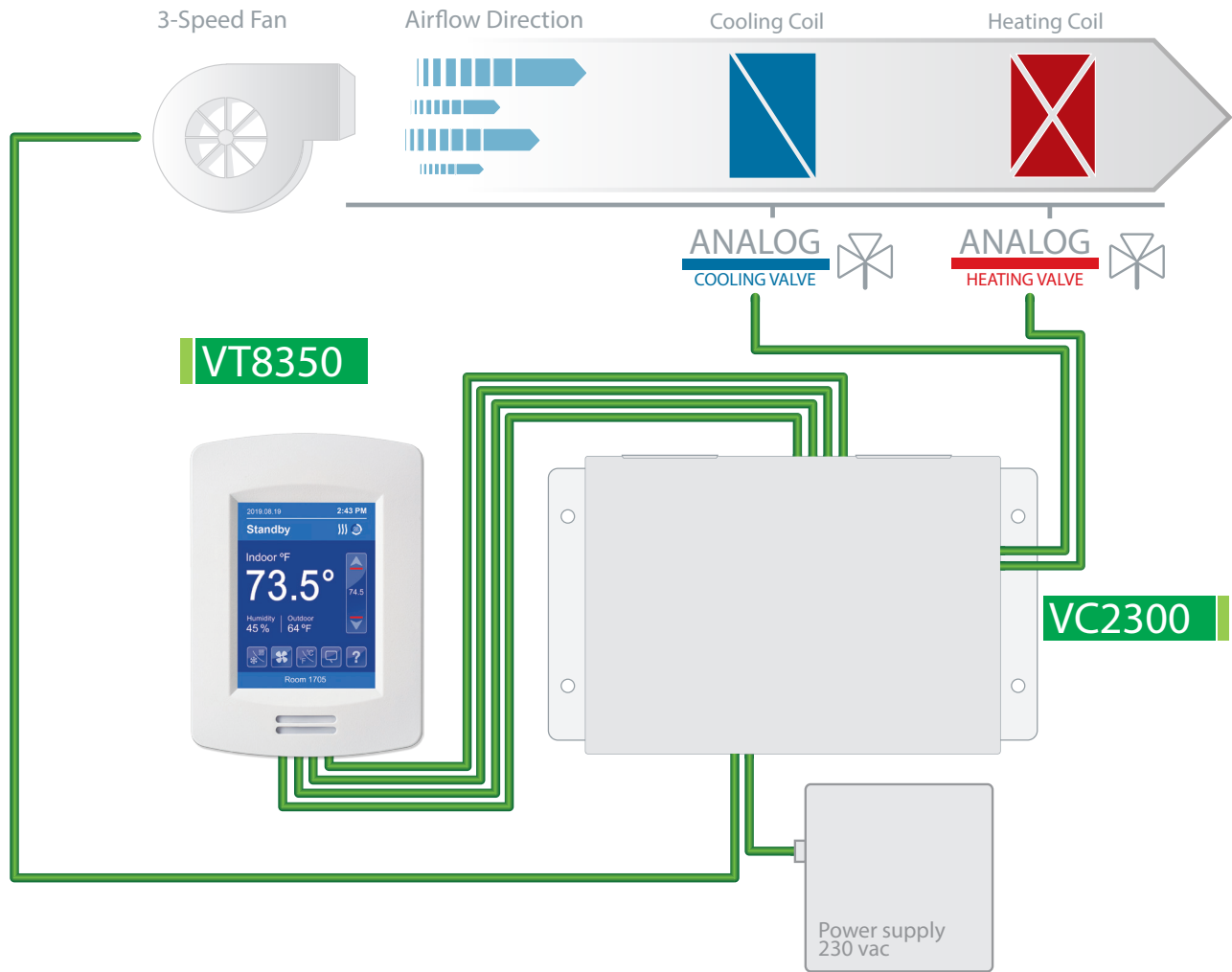
VT8350

3-SPEED MIXED VOLTAGE APPLICATIONS

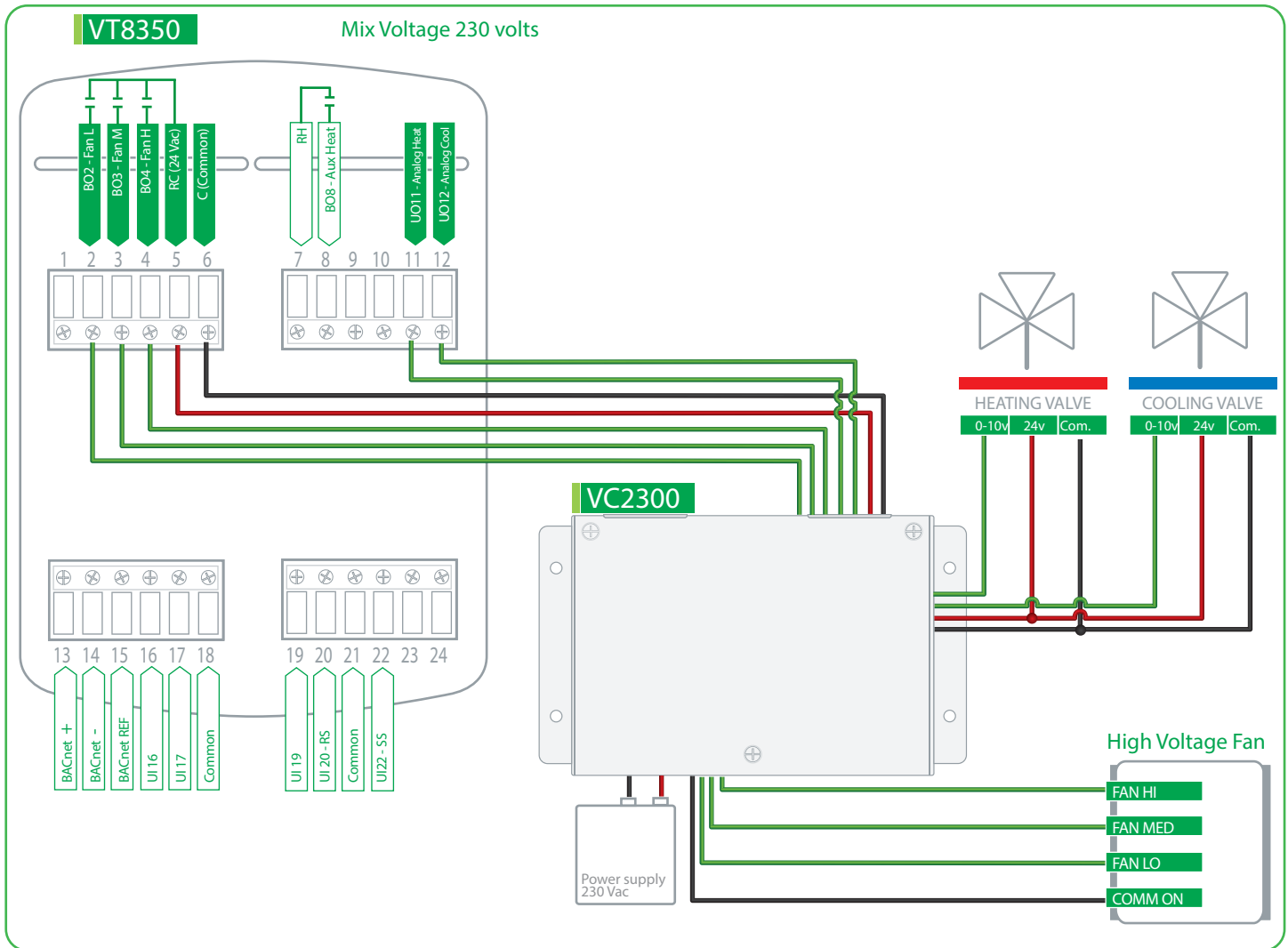
| System  | Fan             | Cooling                  | Heating                  | Other                              |
|---------|-----------------|--------------------------|--------------------------|------------------------------------|
| 4 pipes | 3-speed 230 Vac | 0-10 Vdc valve actuator  | 0-10 Vdc valve actuator  | need the optional VC2300 relay box |
| 4 pipes | 3-speed 230 Vac | Tri-state valve actuator | Tri-state valve actuator | need the optional VC2300 relay box |

## VTR8350/VT8350 [ Application Guide ]

MIXED VOLTAGE VT8350 AND VC2300 230 VAC RELAY HEATING/COOLING 4-PIPE FAN COIL UNIT WITH HIGH VOLTAGE 3-SPEED FAN, AND 0-10 VDC ANALOG VALVES AND DEHUMIDIFICATION SEQUENCE FOR LOW VOLTAGE



| Configuration Parameter Name | Configuration Settings        |
|------------------------------|-------------------------------|
| Fan type                     | 3 speed                       |
| Fan menu                     | L-M-H-A                       |
| Ctrl. type out1              | 0-10V DA or 0-10V RA (Analog) |
| Ctrl. type out2              | Same as 1                     |
| No. of pipes                 | 4                             |
| Operation sequence           | Cool/Heat                     |



## Sequence of Operation and Wiring

### Occupied Mode

Setpoints revert to those defined by occupied cooling and heating. The changeover sensor sends supply air temperature to controller.

### Stand-by Mode (only available when PIR motion detector sensor is used)

Setpoints revert to those defined by stand-by cooling and heating.

### Unoccupied Mode

Setpoints revert to those defined by unoccupied heating and cooling.

### Occupied Override Mode

System reverts to occupied mode for duration determined by "ToccTime" parameter.

### On Call for Cool

Cooling valve opens to maintain room temperature. Heating valve closes. Dehumidification enabled.

### On Call for Heat

Heating valve opens to maintain room temperature. Cooling valve closes. Dehumidification disabled.

### On Demand for Dehumidification

Dehumidification is achieved via cooling coil using heating coil for reheat if necessary.

Dehumidification only allowed in COOL mode, or if cooling is enabled in AUTO mode.

Dehumidification disabled if room temperature falls below low ambient lockout temperature, which is cooling setpoint minus configuration defined deadband value.

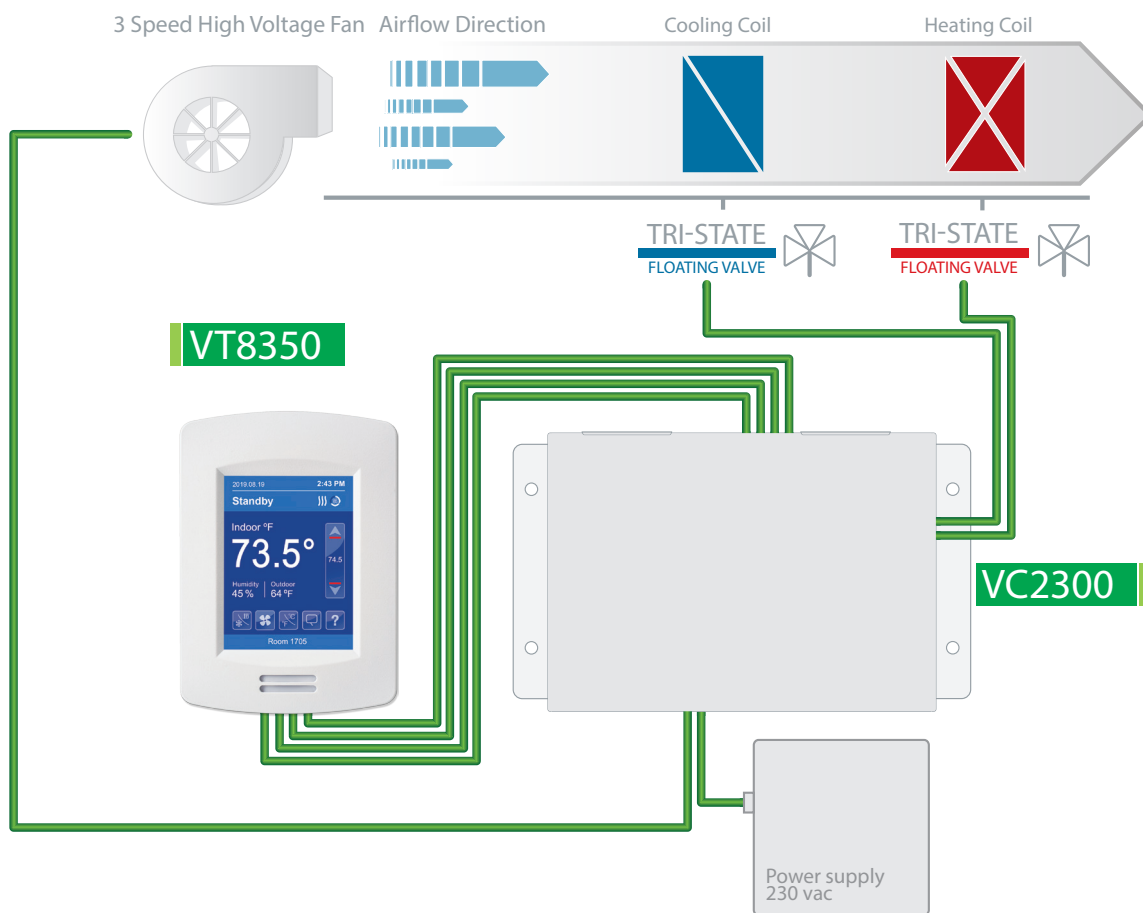
Reheat disabled if cooling demand reaches 100%.

### Options

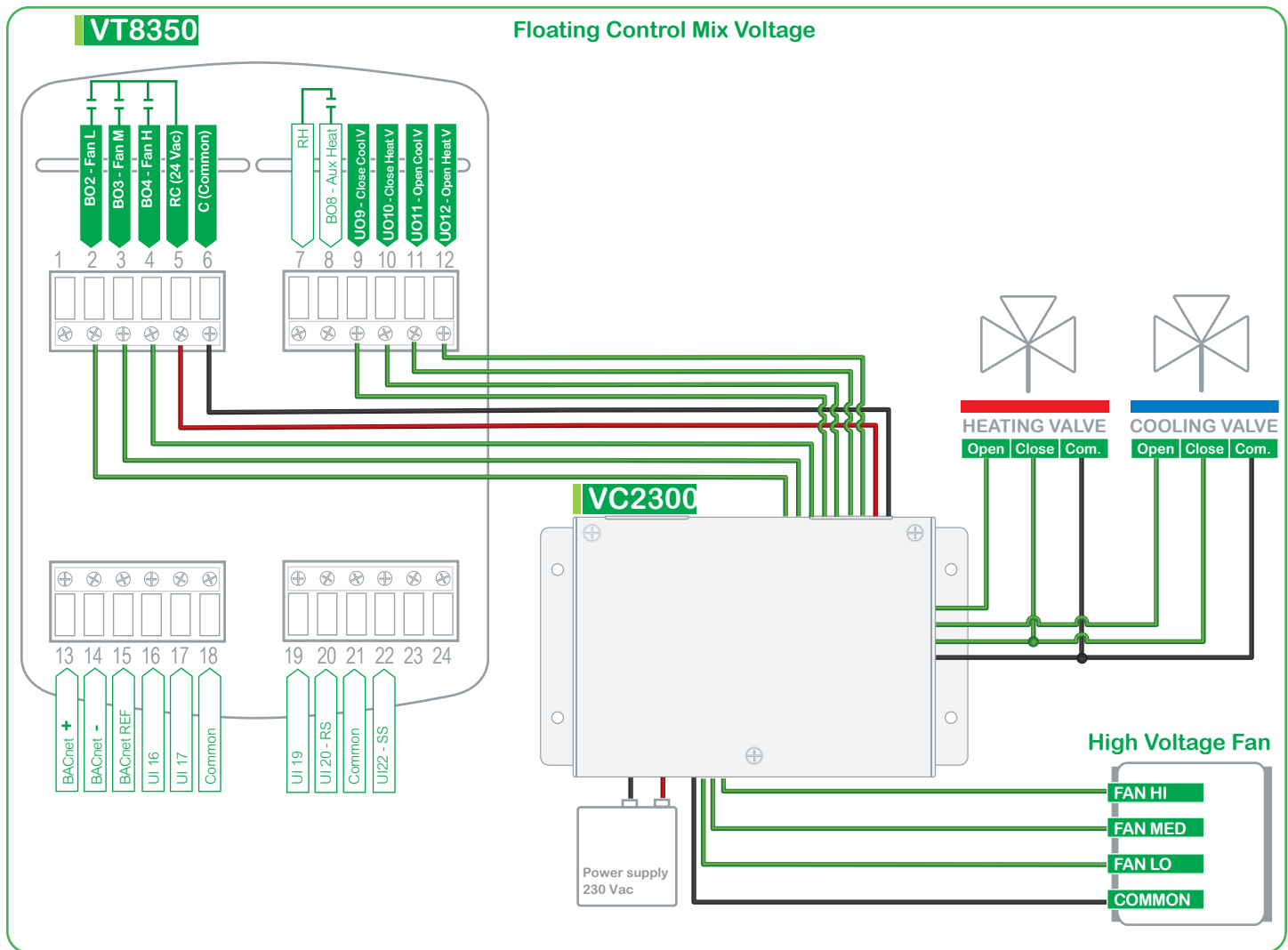
- Wireless adapter modules are available. (see Appendix B for network wiring).
- Remote wall mount or duct sensor ready.
- Can be configured for 2-pipe systems.
- 3 universal inputs can be used and configured for advanced functionality as required by the application.
- Universal input can be configured for changeover sensor.

## VTR8350/VT8350 [ Application Guide ]

MIXED VOLTAGE VT8350 AND VC2300 230 VAC RELAY HEATING/COOLING 4-PIPE FAN COIL UNIT WITH HIGH VOLTAGE 3-SPEED FAN, TRI-STATE FLOATING VALVES AND DEHUMIDIFICATION SEQUENCE FOR LOW VOLTAGE



| Configuration Parameter Name | Configuration Settings |
|------------------------------|------------------------|
| Fan type                     | 3 speed                |
| Fan menu                     | L-M-H-A                |
| Ctrl. type out1              | Floating               |
| Ctrl. type out2              | Same as 1              |
| No. of pipes                 | 4                      |
| Operation sequence           | Cool/Heat              |



## Sequence of Operation and Wiring

### Occupied Mode

Setpoints revert to those defined by occupied cooling and heating.

### Stand-by Mode (only available when PIR motion detector sensor is used)

Setpoints revert to those defined by stand-by cooling and heating.

### Unoccupied Mode

Setpoints revert to those defined by unoccupied heating and cooling.

### Occupied Override Mode

System reverts to occupied mode for duration determined by "ToccTime" parameter.

### On Call for Cool

Cooling valve opens to maintain room temperature. Heating valve closes.

### On Call for Heat

Heating valve opens to maintain room temperature. Cooling valve closes.

### On Demand for Dehumidification

Dehumidification is achieved via cooling coil using heating coil for reheat if necessary.

Dehumidification is only allowed in COOL mode, or if cooling is enabled in AUTO mode.

Dehumidification is disabled if room temperature falls below low ambient lockout temperature, which is the cooling setpoint minus the configuration defined deadband value.

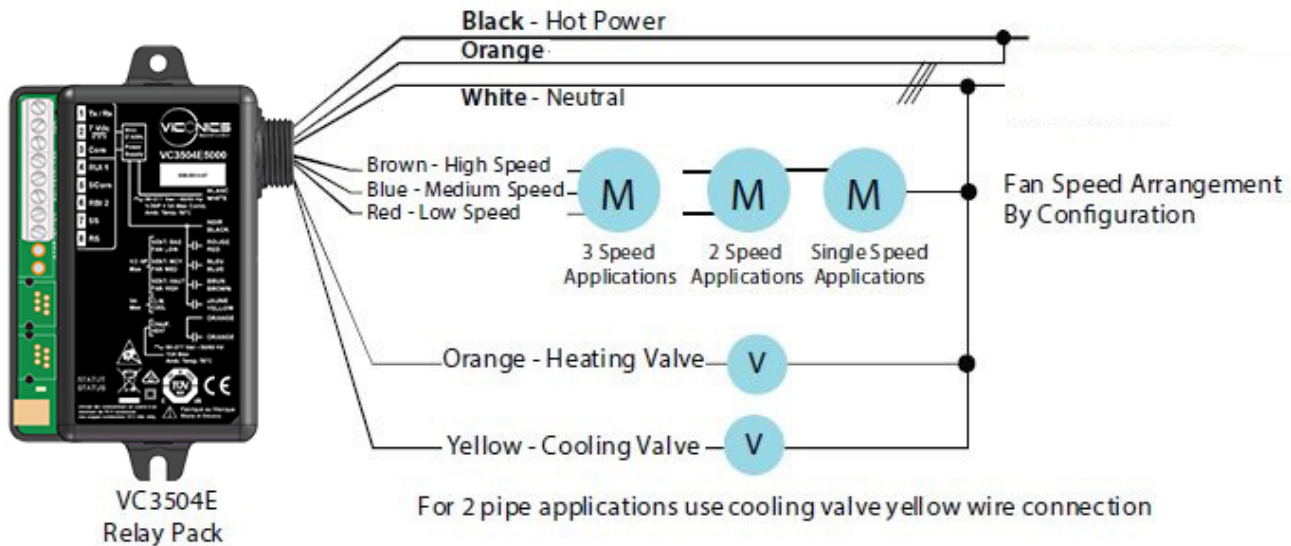
Reheat disabled if cooling demand reaches 100%.

## Options

- Wireless adapter modules are available. (see Appendix B for network wiring).
- Remote wall mount or duct sensor ready.
- Can be configured for 2-pipe systems with changeover.
- 3 universal inputs can be used and configured for advanced functionality as required by the application.
- Universal input can be configured for changeover sensor.

## APPENDIX A - VC3000 RELAY PACK WIRING

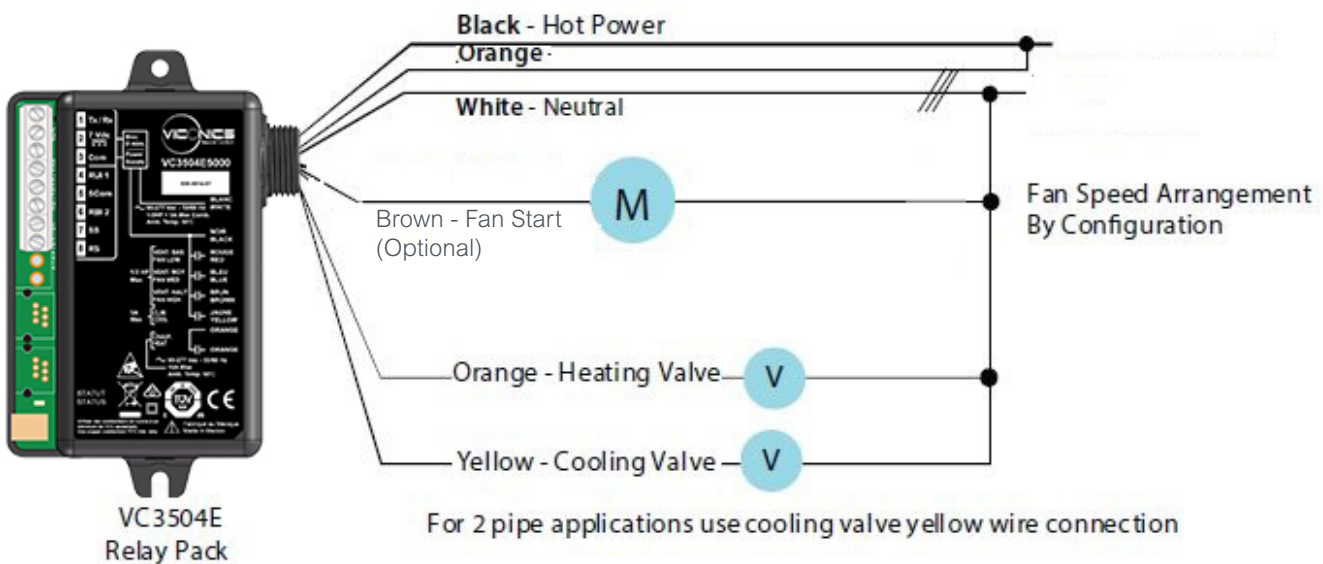
## TYPICAL WIRING EXAMPLES FOR 3 SPEED FAN



Orange - Electric Reheat - R

For electric reheat applications where current draw is above 10 A use a line powered coil pilot duty relay or contactor for the heating element in place of the heating valve.

## TYPICAL WIRING EXAMPLES FOR ECM FAN



Orange - Electric Reheat - R

For electric reheat applications where current draw is above 10 A use a line powered coil pilot duty relay or contactor for the heating element in place of the heating valve.

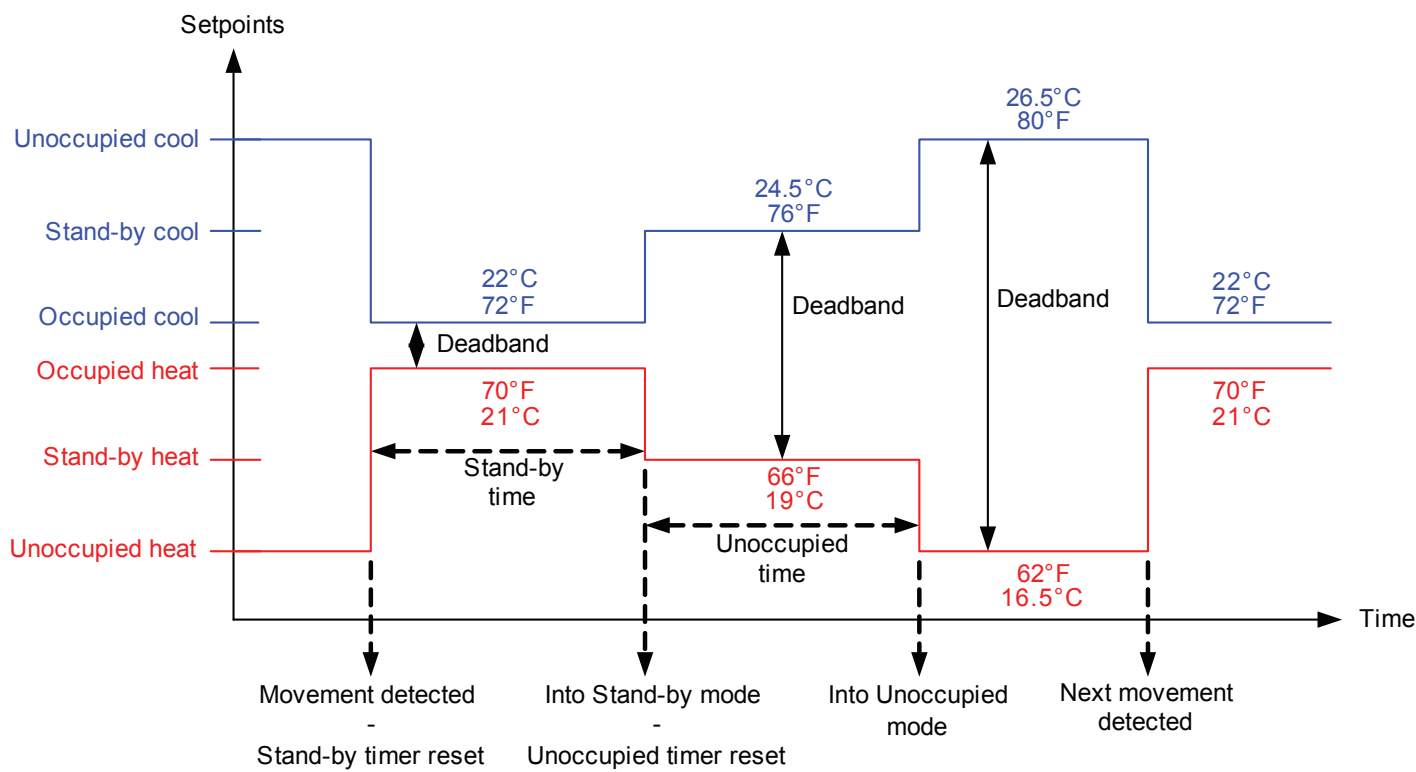
## BACnet communication wiring



- 
- The diagram illustrates a smart home environment with various sensors and a central hub. The components shown are:
- Camera:** A white, dome-shaped camera mounted on the ceiling.
  - Motion Sensor:** A small, white, rectangular sensor mounted on the wall.
  - Contact Sensor:** A small, white, rectangular sensor mounted on the door frame.
  - Contact Sensor:** A small, white, rectangular sensor mounted on the window frame.
  - Base Station:** A white, rectangular device with an antenna, likely the central hub for the system.
  - Temperature Sensor:** A small, white, rectangular sensor mounted on the wall.
  - Smoke Detector:** A white, dome-shaped sensor mounted on the ceiling.



APPENDIX D - SCHEMATIC OF CONTROLLERS OCCUPANCY SEQUENCE OF OPERATION WITHOUT DOOR SENSOR



## APPENDIX E - DEPLOYMENT

Placement of the Room Controller must be given consideration. It is recommended to install the Room Controller as close to a door as possible (but not so as to be blocked by the door), or in an area with high occupant movement.

Ideally the Room Controller should be installed 5 feet (1.5 meters) above the floor surface to ensure maximum detection range is achieved. As well, Room Controller placement should ensure the occupant crosses the lens beam in a perpendicular path within the prescribed detection zone.

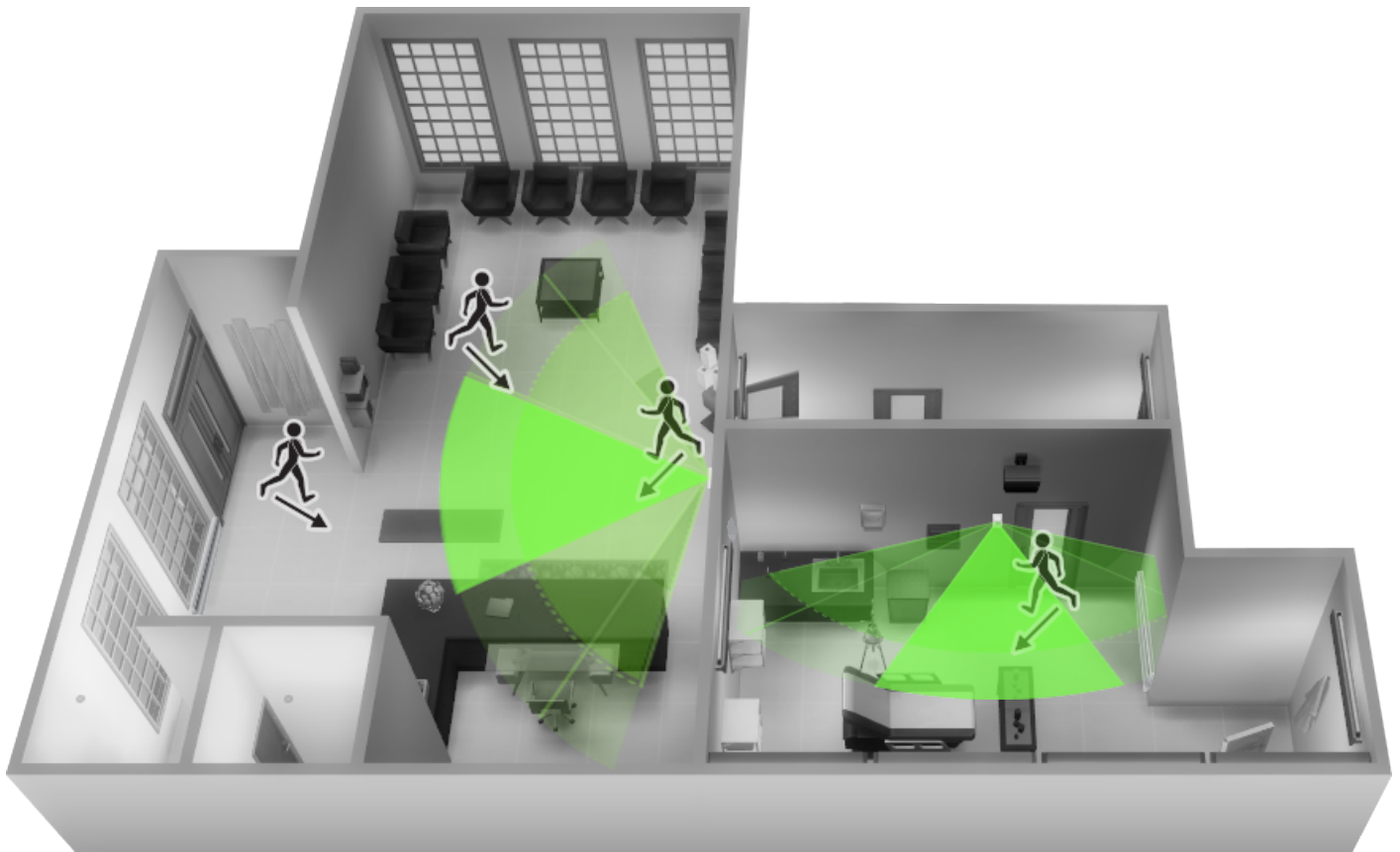
The Room Controller's PIR sensor is very sensitive and can be triggered by vibration from nearby equipment, such as fans or compressor motors. To avoid false motion detection, make sure to place the Room Controller away from vibration sources and install vibration isolators on HVAC equipment.

### Example of Recommended Deployment

The below shows Room Controllers installed in ideal locations for two rooms.

The examination room shows one Room Controller installed adjacent to the door. In this area of the room, occupant traffic is high and ensures the occupant will almost always cross the PIR detection path laterally and within the detection range.

The waiting room shows one Room Controller installed beside a door in the middle of the room. As shown in the diagram below, occupant traffic is high in several areas of the room including the entrance, waiting room, access to the door and activity around the reception desk. Moreover, for each case aforementioned, occupant movement almost always moves lateral to the PIR, which ensures detection by the PIR, as well as respecting the PIR detection range of 20 feet (6 meters) at 140°, and 16 feet (5 meters) between 15° to 30° laterally.



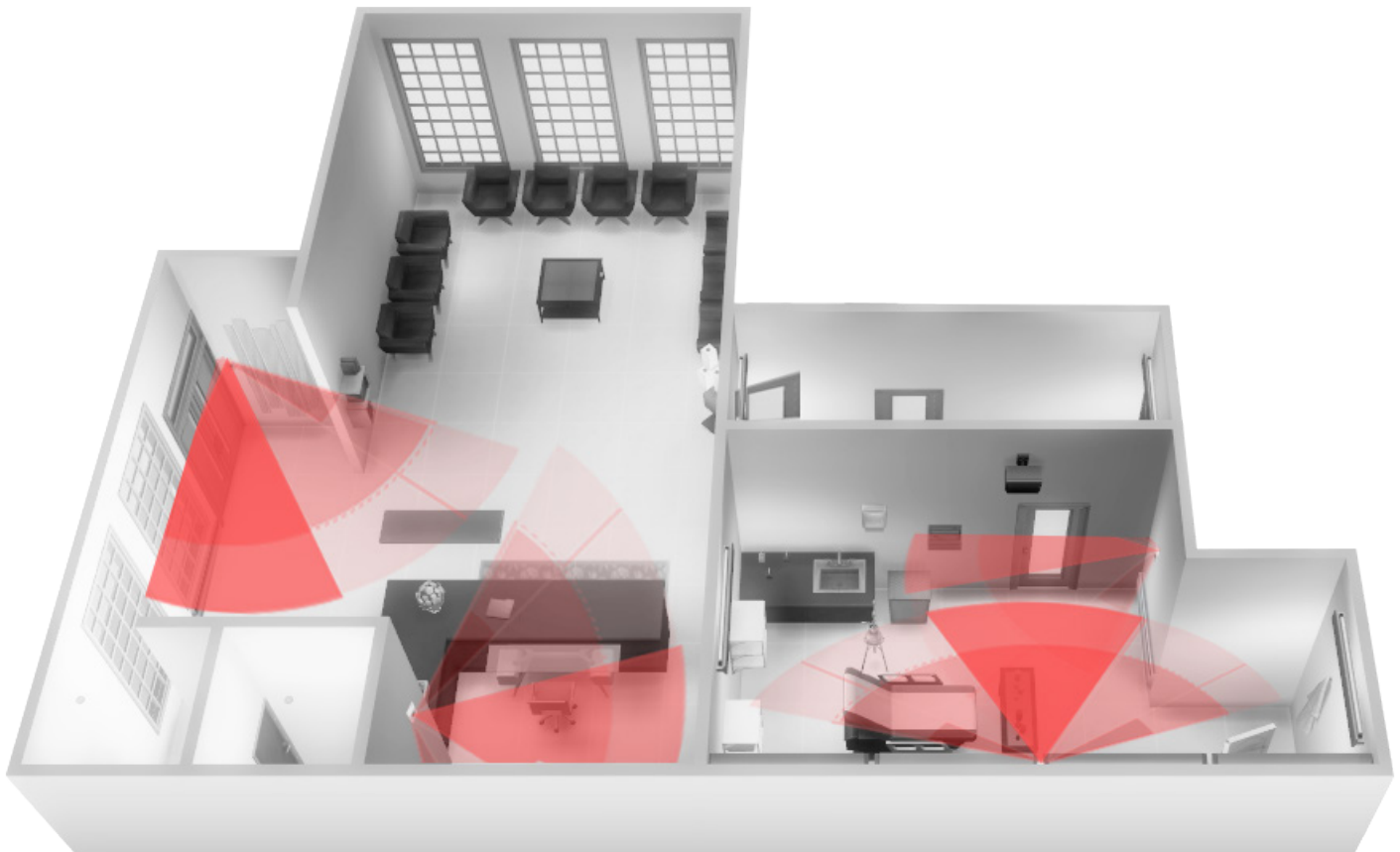
Recommended Installation

### Example of Non-Recommended Deployment

The below shows four Room Controllers (two for each room) installed in non-ideal locations for the two rooms.

The examination room shows one Room Controller installed in a low traffic area near the door, and a second Room Controller installed on the wall directly opposite the door. For the Room Controller installed in the corner wall, the PIR could be blocked by the opened door, while occupant traffic could also be minimal in this area of the room. For the second Room Controller installed opposite the door, the PIR detection could fall outside the specified detection zone, while at the same time most occupant movement would be not be lateral to the PIR, thereby not respecting optimal crossing patterns for PIR detection.

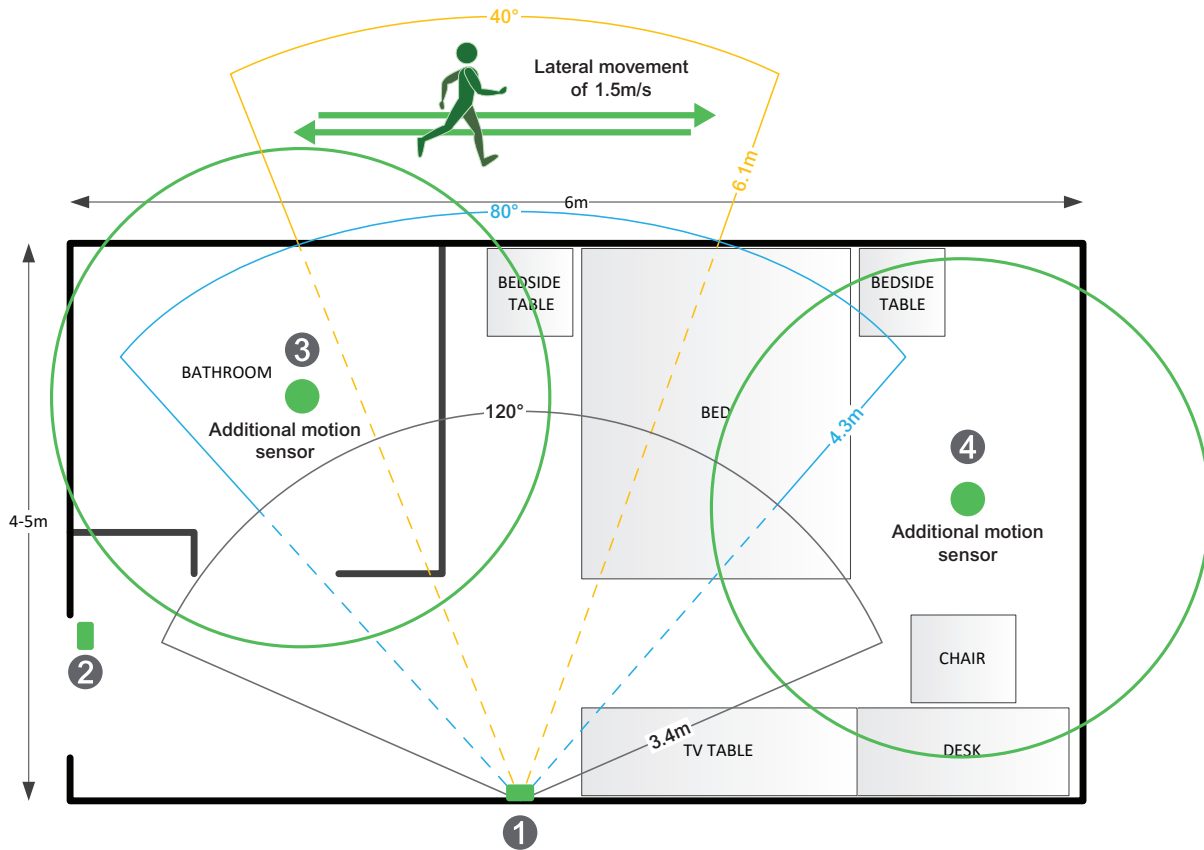
The waiting room shows one Room Controller installed in the corner of the room, and a second Room Controller installed beside the reception area. For the Room Controller installed in the corner, the opening/closing of the door creates high probability that the PIR would get blocked, and therefore, occupancy going undetected. For the Room Controller installed beside the reception area, occupant traffic could fall outside the detection zone, and the receptionist would often be below the 5 foot recommended installation height for the Room Controller.



Non-Recommended Installation

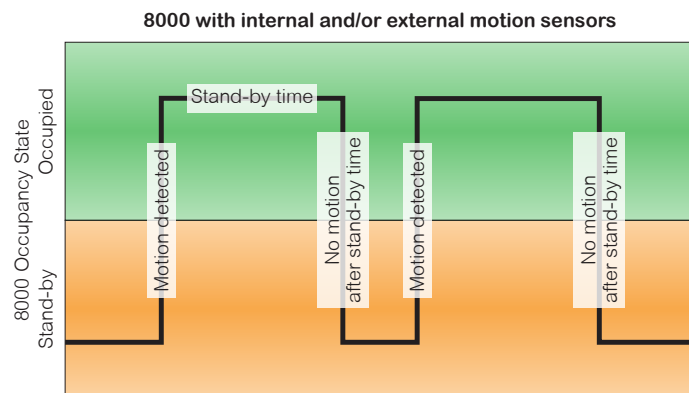
## Room Controller PIR Sensor Details

The internal Room Controller PIR sensor only detect lateral movement. It cannot detect movement when a person is moving toward it. It will not detect someone seating on a chair and/or lying on the bed.

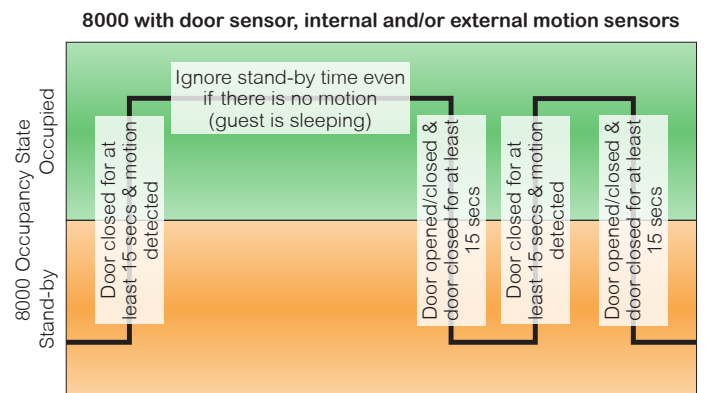


## Recommendations for Installations

1. Install the Room Controller to cover more lateral movement.
2. Install a door sensor, the internal Room Controller occupancy logic works better with a door sensor. Once a motion is detected after a door is opened, the room stays in occupied state until the door is opened again which put the Room Controller in stand-by mode and if there is a motion then it goes back in occupied mode. It is also recommended to disable the unoccupied mode, set the unoccupied time to 0, so there is only 2 modes in the Room Controller: stand-by and occupied for a stand-alone solution. Please refer to the two(2) diagrams below for the Room Controller internal occupancy states transition.



More aggressive energy savings logic but may cause bad guest experience (when guest is sleeping or not moving)



Good energy savings logic and better guest experience even when the guest is sleeping or not moving

- 3. Install additional motion sensor in the bathroom.
- 4. Install additional motion sensor for better motion detection in the entire room.

Energy Savings

PIR can maximize your energy saving from 10-30% by adjusting temperature set points in unoccupied zones during scheduled periods.

PIR can maximize your energy saving from 10-30% by adjusting temperature set points in unoccupied zones during scheduled periods.

