



VT8000 Room Controllers

VTR8350 Engineering Guide Specification

Line Voltage Fan Coil Unit (FCU) Controller

General – The VTR8350 Fan Coil Controller and VC3000 Relay Pack are specifically designed for controlling line voltage fan-coils. Models are available controlling single speed and multi-speed (up to three (3) speeds) fan-coil units as well with on/off outputs for 2 pipe/4pipe applications as well as pulsed or on/off reheat outputs. Standard models capable of communicating using the BACnet™ MS-TP protocol, and models additionally capable of using the Zigbee™ wireless protocol are available depending on the application. Models with integrated relative humidity sensor are available for increased occupant comfort through dehumidification.

Quality Assurance - The controller shall be manufactured within a systems certified **ISO 9001** and **ISO 14001** facility and must have the following specifications and industry approvals:

VTR8350 Series Specifications	
Room Controller power requirements:	7.0 VDC +/- 10% 2.4 watts minimum
Operating conditions:	0 °C to 50 °C (32 °F to 122 °F) 0% to 95% R.H. non-condensing
Storage conditions:	-30 °C to 50 °C (-22 °F to 122 °F) 0% to 95% R.H. non-condensing
Temperature sensor:	Local 10 K NTC type 2 thermistor
Temperature sensor resolution:	± 0.1 °C (± 0.2 °F)
Temperature control accuracy:	±0.5 °C (± 0.9 °F) @ 21 °C (70 °F) typical calibrated
Humidity sensor and calibration	Single point calibrated bulk polymer type sensor Reading range from 10-90% R.H. non-condensing
Humidity sensor precision:	10 to 20% precision is 10% 20 to 80% precision is 5% 80 to 90% precision is 10%
Humidity sensor stability:	Less than 1.0% yearly (typical drift)
Dehumidification set point range	30 to 95% R.H
Occ, Stand-By and Unocc cooling set point range:	12.0 to 37.5 °C (54 to 100 °F)
Occ, Stand-By and Unocc heating set point range:	4.5 °C to 32 °C (40 °F to 90 °F)
Room and outdoor air temperature display range:	-40 °C to 50 °C (-40 °F to 122 °F)
Proportional band for room temperature control:	Cooling & Heating: Default: 1.8°C (3.2°F)
Binary inputs:	Dry contact across terminal B11, B12 & UI3 to Scdm
Wire gauge:	14 gauge maximum, 22 gauge recommended
Approximate shipping weight:	0.75 lb (0.34 kg)
Agency Approvals all models:	UL: UL 873 (US) and CSA C22.2 No. 24 (Canada), File E27734 with CCN XAPX (US) and XAPX7 (Canada) Industry Canada: ICES-003 (Canada) FCC: Compliant to CFR 47, Part 15, Subpart B (US) CE: EMC Directive 89/336/EEC (Europe Union) C-Tick: AS/NZS CISPR 22 Compliant (Australia / New Zealand) Supplier Code Number N10696
Agency Approvals Wireless models:	FCC: Compliant to: Part 15, Subpart C CE: R&RTTE Directive 1999/5/EC (Europe Union)



VC3000 Relay Pack Specifications	
Power Supply:	90 to 277 VAC universal, 50-60 Hz
Fan line voltage contact electrical ratings:	Brown, Blue, Red wires ½ HP maximum
Main heat and cool line voltage contact electrical ratings:	Yellow wire 10A maximum
Isolated heat line voltage contact electrical ratings:	Orange wires 10A maximum
Output ratings:	
-Heat Valve: (Orange wire):	10 Amps @ 277 VAC maximum
-Cool Valve: (Yellow wire):	5 Amps @ 277 VAC maximum
-Fan: (red, blue, brown wire(s)):	1/2 HP @ 277 VAC maximum
Operating conditions:	0 °C to 50 °C (32 °F to 122 °F) 0% to 95% RH non-condensing
Approximate shipping weight:	0.75lb (0.34kg)
Agency approvals all models:	cTUVus: UL 873 (US) and CSA C22.2 No. 24 (Canada) CE: LVD 2014/35/EU (Europe Union) CE: EMC 2014/30/EU (Europe Union) CE for RF: RTTE 2014/53/EU FCC: Compliant to: Part 15, Subpart B FCC for RF: Compliant to: Part 15, Subpart C

VTR8350 Series

Terminal Equipment Controller for Fan Coils:

General – The line voltage fan coil controller shall be capable of on/off of a valve actuator for two-pipe heating and/or cooling application, or four-pipe heating and cooling applications as well as auxiliary reheat depending on the VC3000 model. The wall mounted VTR8350 shall work with the VC3000 Series Relay Pack typically installed in the fan coil. The VTR8350 shall only require three wires to the VC3000 Relay Pack for power (7Vdc, Common) as well as the communication wire. The VC3000 shall receive the commands from the VTR8350 and switch the heating/cooling accordingly.

The controller shall be **(a non-communicating “Network-Ready” model, BACnet™ MS-TP communicating model, or Zigbee™ wireless communicating model).**

- Controller shall be equipped with a TFT transmissive LED-backlit LCD touch screen with a 70.08 mm x 52.56 mm active area. Display colors of LCD screen shall be a customizable choice among 5 color options.
- Controller shall have a customizable fascia available in 10 styles and colors.
- Controller shall have an embedded local configuration utility using the touch screen allowing for simplified configuration, sequence selection, initialization, setting of setpoints and control of display settings. Controllers requiring external configuration tools or network interface for start-up and configuration are not acceptable.
- Controller shall be configurable for display in several languages.
- Controllers shall be customizable with one of 12 different user interfaces selected based on intended use (Hospitality or Commercial) and level of local control.
- Controller shall achieve accurate temperature control using a PI proportional-integral algorithm. Traditional differential-based controllers are not acceptable.
- Controller shall be supplied **(with BACnet™ MS-TP network interface, or with additional Zigbee™ wireless network interface).**
- Controller shall utilize EEPROM memory to back up local configuration parameters in the event of power failure. Controllers requiring batteries, or have no provisions for retention during loss of power shall not be acceptable.



- Controller shall have password protection to prevent unauthorized access to the configuration menu parameters.
- Controller shall have integrated changeover function, which will allow seamless switching between cooling and heating mode based upon temperature or network value input.
- Controller shall have a configurable sequence to allow the fan to be disabled in heating mode if required (ex: Cooling only 2 pipe system with baseboard heating).
- Controller shall have configurable Heat/Cool outputs depending on the type of valve being controlled (Normally open or normally closed).
- Controller shall have the option of an installed “Passive Infrared” (PIR) sensor for advanced active occupancy logic. An additional occupancy level “Stand-by” shall be added between “occupied” and “unoccupied” modes for additional energy savings strategies.
- Controller shall be capable of local or remote override during unoccupied mode. The controller shall resume occupied set points and will revert back to unoccupied set points after a certain amount of time (adjustable from 0 – 24hours in one hour increments).
- Controller shall have an adjustable “Auto Fan” parameter (depending on selected Fan sequence):
 1. **AS (Default)** = Auto Speed during occupied periods. Fan is always on during occupied periods. Low, medium and high speeds operate on temperature offset from set point.
 2. **AS AD** = Auto Speed / Auto Demand during occupied periods. In this mode, medium and high speeds operate on temperature offset from set point. Low speed operates on demand and will shut down when no demand is present.
- Controller shall have configurable temporary or permanent local override set points. When the “temporary set points” mode is enabled, once the temporary occupancy timer expires, the set points will revert back to their default values.
- Controller shall have adjustable local unoccupied heating and cooling set point limits as well as maximum heating and minimum cooling limits.
- Controller shall have an adjustable dead band (from 2 °F to 5 °F, 1 °C to 2.5 °C).
- Controller shall have an adjustable proportional band (from 3 °F to 10 °F, 1.2 °C to 5.6 °C).
- Controller shall have six (6) adjustable lockout levels limiting access as follows:

Level	Occupied temperature set points	System mode setting	Fan mode setting	Unoccupied Override
0	Yes access	Yes access	Yes access	Yes access
1	Yes access	Yes access	Yes access	No access
2	Yes access	No access	No access	Yes access
3	Yes access	No access	No access	No access
4	No access	No access	No access	Yes access
5	No access	No access	No access	No access



- Controller shall provide the following local monitoring capabilities:
 - BI-1
 1. **None:** No function will be associated with the input (free input to be used for alarming or monitoring of a remote digital contact to be shared over a communications network).
 2. **Remote Night Setback:** Remote night setback timer clock input. Scheduling shall be set as per the binary input providing low cost setback operation via a dry contact.
 3. **Motion NO and Motion NC:** Advanced PIR occupancy functions using Normally Open (NO) or Normally Closed (NC) remote PIR motion sensor.
Occupancy mode shall be set as per applied PIR function and configuration.
 4. **EMS:** Door/window strategy. Shall display an alarm if door/window is open and thus heating/cooling has stopped.
 - BI-2
 1. **None:** No function will be associated with the input (free input to be used for alarming or monitoring of a remote digital contact to be shared over a communications network)
 2. **(Door Dry) Door contact & Motion detector:** This configuration is only functional if binary input #1 is set to Motion NO or Motion NC or a PIR accessory cover is used. When sequence is enabled, the occupancy shall be dictated through 2 inputs. Any motion detected shall set the zone to occupied status. The zone shall remain permanently in occupied mode until the door contact switch opens momentarily. The controller shall then go in stand-by mode. If more movements are detected, the occupied mode shall resume. While the door is opened, any movements detected by the remote PIR sensor or the PIR accessory cover shall be ignored.
 3. **(Override):** A temporary close contact on input BI 2 will override temporarily to occupied mode.
 - RUI1
Controller shall have a configurable remote universal input (applies only to VTR8350 that are wired to a VC3504E5000 or VC3404E5000 relay pack with 4 added inputs)
 1. **None:** No function will be associated with the input (free input to be used for remote network monitoring)
 2. **Filter:** A backlit flashing Filter alarm shall be displayed on the local controller LCD screen when input (from a differential pressure switch) is energized.
 3. **Service:** A backlit flashing Service alarm shall be displayed on the local controller LCD screen when input is energized.
 4. **COC/NH:** Change over dry contact - Normally Heat: For two-pipe systems
 5. **COC/NC:** Change over dry contact - Normally Cool: For two-pipe systems
 6. **(COS):** Change over analog sensor: For two-pipe systems
 - RBI1
Controller shall have a configurable remote binary input
 1. **None:** No function will be associated with the input (free input to be used for remote network monitoring)
 2. **Filter:** A backlit flashing Filter alarm shall be displayed on the local controller LCD screen when input (from a differential pressure switch) is energized.
 3. **Service:** A backlit flashing Service alarm shall be displayed on the local controller LCD screen when input is energized.
 - Occupancy cmd
 1. **(Loc Occ):** Occupancy is determined by local sequences
 2. **(Occupied):** Force occupied mode
 3. **(Unoccup):** Force unoccupied mode



- Controller shall be provided with six unique sequences to meet the needs of most zone temperature control applications.

Sequence selected	Mode Menu
0 = Cooling only	Off - Cool
1 = Heating only	Off - Heat
2 = Cooling With Reheat	Off – <u>Auto</u> * – Heat – Cool
3 = Heating With Reheat	Off - Heat
4 = Cooling / Heating 4 pipes	Off – <u>Auto</u> * – Heat – Cool
5 = Cooling / Heating 4 pipes with Reheat	Off – <u>Auto</u> * – Heat – Cool

* Auto. The Auto mode can be disabled from the menu

- Controller shall be pre-programmed, containing all required I/O to accomplish local HVAC temperature control.
- Controllers shall be provided with intelligent HMI, to which will display services only as are available as switched through local digital input or network layer such as:
 - Outdoor air temperature display only enabled when outdoor air temperature network variable is received.
 - “Stand-by time” and “Stand-by set point” parameters only when SCE-PIR cover is connected.
 - COM Address and various other parameters when a communication module is integrated inside the unit.
- **For hotel/lodging applications only:** Controller shall be provided with a temperature scale touchscreen button instead of a Mode button to prevent occupant from overriding the schedule. Occupant may change between C and F.

VC3000 Transformer Relay Pack Specifications

- The following relay packs are designed to work specifically with the VTR8350 series fan coil controls.

VC3500E5000	VC3504E5000	VC3400E5000	VC3404E5000	VC3300E5000 Slave Fan Unit
LINE VOLTAGE CONNECTIONS				
Power supply: - 90 to 277 VAC universal all models - Black Hot L1 Power VAC(Switches: Brown, Blue, Red, and Yellow) - White neutral power VAC				
3 Fan speed control	3 Fan speed control	3 Fan speed control	3 Fan speed control	3 Fan speed control
4 Pipe Cool output, or 2 Pipe Heat/Cool output	4 Pipe Cool output, or 2 Pipe Heat/Cool output	4 Pipe Cool output, or 2 Pipe Heat/Cool output	4 Pipe Cool output, or 2 Pipe Heat/Cool output	4 Pipe Cool output, or 2 Pipe Heat/Cool output
4 Pipe Heat output, or 2 Pipe Reheat output	4 Pipe Heat output, or 2 Pipe Reheat output	4 Pipe Heat output, or 2 Pipe Reheat output	4 Pipe Heat output, or 2 Pipe Reheat output	4 Pipe Heat output, or 2 Pipe Reheat output



Optional: Passive Infrared (PIR) Sensor

- Controller can be supplied with an installed PIR sensor. Passive infrared sensor shall be integrated into the cover of the controller. Controls with remote motion detectors are not acceptable.
- PIR sensor shall add a third level of occupancy, “Stand-by” in between “Occupied” and “Unoccupied”. Controller shall have an adjustable “Stand-by timer” integrated to change the occupancy mode from “Occupied” to “Stand-by” if no motion is detected. Additionally, the controller shall drop from “Stand-by” mode to “Unoccupied” if no motion is detected for a certain amount of time during “Stand-by” mode. Both timers are adjustable. “Stand-by” mode shall have adjustable heating and cooling set points. Stand-by set points are intended to be set a few degrees less or more than “Occupied” set points to ensure a quick recovery to “Occupied” set points when motion is detected. Controls with motion detectors that only switch from “Unoccupied” mode to “Occupied” mode without a stand-by mode are not acceptable.

Model Specific Features:

Controllers are Schneider Electric model VTR8350A5000B

Controllers with integrated PIR sensor are Schneider Electric model VTR8350A5500B

Controllers with integrated PIR sensor and onboard ZigBee radio are Schneider Electric model VTR8350A5500BP

Relay Packs are Schneider Electric model VC3xxxE5000