



VT8000 Room Controllers

VZ8250 Engineering Guide Specification

Low Voltage Variable Air Volume (VAV) Controller and Zone Thermostat

General – The VZ8250 Room Controller is a low-voltage microprocessor-based Variable Air Volume (VAV) controller. All models are configurable to support damper control for Pressure Independent and Pressure Dependent VAV systems. By default, all controllers are ready for networked communication with a Building Management system using BACnet™ (MS/TP on board, or IP via Wi-Fi with the VCM8002V5031), ZigBee™ Pro (native on commercial references ending with a P or VCM8000V5045P), or Modbus (RS-485), as needed. Optionally, models can be equipped with an integrated motion sensor (PIR) and ZigBee™ Pro. Fresh air control is supported when a CO2 sensor is integrated into the system (VCM8001V5045 or SED-CO2). Over 12 customized screens are available for both Commercial and Hospitality use cases.

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

Terminal Equipment Controller power requirements:	20 - 28 Vac, 50/60Hz 6VA + Output Load (100 VA total Max.) RC to RH jumper 2.0 Amps 48 VA maximum
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
Contact output rating:	Electronic Relay output: 1 Amp. Maximum, 3 Amp. Inrush (<100ms).
Occ, Stand-By and Unocc cooling set point range:	12.0 °C to 37.5 °C (54 °F 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 UI16, UI17 & UI19 to Common
Humidity Sensor Precision:	Reading range from 10-90 % R.H. non-condensing



Humidity Sensor Stability:	10 to 20% precision: 10% 20% to 70% precision: 5% 70% to 90% precision: 10%
Dehumidification Setpoint Range:	Less than 0.25 % yearly (typical drift)
Wire gauge:	30% to 95% R.H.
Approximate shipping weight:	18 gauge maximum, 22 gauge typical, 22 gauge minimum
EMC / Safety Standards:	0.75 lb (0.34 kg)
Radio Standards:	EMC Directive 2014/30/EU LVD Directive 2014/35/EU FCC 15 Subpart B Class B ICES-003 Issue 6 2016 Class B EN 60730-1:2016 EMC EN 60730-2-9:2010 EN 60730-2-13 IEC 60730-1:2013/AMD1:2015 IEC 60730-2-9:2008 (3rd Ed.)+Am. 1:2011 CAN/CSA-E60730-1:2015 CAN/CSA-E60730-2-9:2015 IEC 60730-2-13:2014 UL 60730-1:2016 UL 60730-2-9:2017 Radio Equipment Directive (RED) 2014/53/EU ETSI EN 300 328 V2.1.1 ETSI EN 301 489-1 V1.9.2 ETSI EN 301 489-17 V2.2.1 FCC Part 15 Subpart C 15.247:2016 RSS 247 Issue 2:2017

VZ8250 Series

Hardware/Firmware:

- Controller can communicate with BMS using BACnet™ MS/TP or IP.
- Controller can communicate using ZigBee™ Pro wireless protocol either with the onboard ZigBee radio option or when the VCM8000V5045P ZigBee Pro extended profile wireless communication adapter is installed.
 - Controller can be retrofitted with the adapter in the field.
 - Controller with the wireless option can communicate with specified ZigBee Pro enabled end devices by default.
 - Controller with the wireless option can communicate with a BMS using ZigBee Pro through a proprietary ZigBee Pro / BACnet MS/TP or IP gateway.



- Controller is equipped with a TFT transmissive LED-backlit LCD touch screen with a 70.08mm x 52.56mm (2.7in x 2.1in) active area. Display colors of LCD screen is a customizable choice among 10 color options.
- Controller has a removable fascia that can be customized with replacement fascia available in multiple styles and colors.
- Controller has an embedded local configuration utility using the touch screen allowing for simplified configuration, sequence selection, re-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 is configurable by default for display in several languages:
 - English
 - French
 - Spanish
 - Chinese
 - Russian
 - Arabic
 - Bulgarian
 - Czech Danish
 - Dutch
 - Finnish
 - German
 - Hungarian
 - Indonesian
 - Italian
 - Norwegian
 - Polish
 - Portuguese
 - Slovak
 - Swedish
 - Turkish
 - Japanese
 - Hebrew
- Controller is customizable with one of 12 different user interfaces selected based on intended use (Hospitality or Commercial) and level of local control.
- Controller can achieve accurate temperature control using a PI proportional-integral algorithm.
- Controller is supplied with wireless interfaces: BACnet™ IP network interface or ZigBee™ network interface. BACnet™ IP versions are provided with Protocol Implementation Conformance Statement disclosing all object/Standard Network Variable Type (SNVT) properties and instance numbers to facilitate the integration process.
- Controller uses EEPROM memory to back up local configuration parameters in the event of power failure.
- Controller has password protection to prevent unauthorized access to the configuration menu parameters.
- Controller is provided with two (2) floating or two (2) analog proportional-integral control outputs and one configurable auxiliary output to be used for heat or reheat, or local digital output.
- Controller is pre-programmed, containing all required I/O to accomplish local HVAC temperature control.
- Controller is provided with intelligent HMI, which will display only the services that are selected using a local digital input or network layer such as:
 - Outdoor air temperature displays only enabled when outdoor air temperature network variable is received from the BMS.
 - COM Address and various other parameters when a communication module is integrated inside the unit.



Application:

- The low-voltage Variable Air Volume (VAV) controller has the following control options and sensors:
 - Fan type:
 - Binary (24Vac)
 - ECM (0-10Vdc)
 - Air flow sensor (Pressure Independent only).
 - Damper:
 - 0-10Vdc DA analog actuator
 - Floating actuator
 - Changeover & supply sensors.
 - Reheat – Duct:
 - 0-10Vdc DA analog actuator
 - Floating actuator
 - On/off or PWM
 - Reheat – Baseboard:
 - Relay with transformer (dry contact)
 - 24Vac
- For applications not covered by built-in program, the controller must accept custom programs (Lua) to match project requirements.
- Controller has integrated changeover function, which will allow seamless switching between cooling and heating mode based upon temperature or network value input.
- Controller has 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 to their default values.
- Controller is capable of local or remote override during unoccupied mode. The controller will resume occupied set points and will revert to unoccupied set points after a certain amount of time (adjustable from 0 – 24hours in one-hour increments).
- Controller has adjustable local unoccupied heating and cooling set point limits as well as maximum heating and minimum cooling limits.
- Controller has an adjustable deadband (from 2 °F to 5 °F, 1 °C to 2.5 °C).
- Controller has an adjustable proportional band (from 3 °F to 10 °F, 1.2 °C to 5.6 °C).



- Controller provides the following local monitoring capabilities, useable with standard or custom applications:
 - UI-16:
 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 is 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 is set as per applied PIR function and configuration.
 4. **Window:** Door/window strategy. Displays an alarm if a window is open and thus heating/cooling has stopped.
 - UI-17:
 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 is dictated through 2 inputs. Any motion detected sets the zone to occupied status. The zone remains permanently in occupied mode until the door contact switch opens momentarily. The controller then goes in stand-by mode. If more movements are detected, the occupied mode will resume. While the door is opened, any movements detected by the remote PIR sensor or the PIR accessory cover will be ignored.
 3. **Remote Override:** Temporary occupancy remote override contact. Local keypad override is disabled. Override function is controlled only by a manual remote toggle signal.
 4. **Filter:** A backlit flashing Filter alarm is displayed on the local controller LCD screen when input (from a differential pressure switch) is energized.
 5. **Service:** A backlit flashing Service alarm is displayed on the local controller LCD screen when input is energized.
 - UI-19:
 1. **None:** No function will be associated with the input (free input to be used for monitoring of a remote 10k type II thermistor (discharge air, outside air, return air etc.) to be shared over a communications network).
 2. **COC/NH:** Change over dry contact - Normally Heat: For two-pipe systems.
 3. **COC/NC:** Change over dry contact - Normally Cool: For two-pipe systems.
 4. **(COS):** Change over analog sensor: For two-pipe systems.
- **For hospitality/lodging applications only:** Controller is provided with a temperature scale touchscreen button instead of a Mode button to prevent occupant from overriding the schedule. Occupant may change between F° and C°.



Optional: Passive Infrared (PIR) Sensor

- Controller can be supplied with an installed PIR sensor. Passive infrared sensor is integrated into the controller. Controls with remote motion detectors are not acceptable.
- PIR sensor adds a third level of occupancy, “Stand-by” in between “Occupied” and “Unoccupied”.
- Controller has an adjustable timer integrated to change the occupancy mode from “Occupied” to “Stand-by” if no motion is detected for the specified amount of time during “Occupied” mode.
- Controller has an adjustable timer integrated to change the occupancy mode from “Stand-by” mode to “Unoccupied” if no motion is detected for the specified amount of time during “Stand-by” mode.
- “Stand-by” mode has adjustable heating and cooling set points. Stand-by set points are intended to be set a few degrees less or more respectively than “Occupied” set points to ensure a quick recovery to “Occupied” set points when motion is detected.

Optional: ZigBee Pro wireless communication on-board or adapter

- Controller can pair with up to 10 ZigBee end devices and 1 Green Power device using interface screen to enter pairing mode.

Controllers are Viconics Technologies Inc. model VZ8250U5000B

Controllers with integrated PIR sensor are Viconics Technologies Inc. model VZ8250U5500B

Controllers with integrated PIR sensor and onboard ZigBee radio are Viconics Technologies Inc. model VZ8250U5500BP