



## Viconics VT76x7 Series Rooftop Unit Controllers Engineering Guide Specification

**General** – The VT76x7 series is designed for single-stage and multi-stage control of heating/cooling equipment such as rooftop and self-contained units with humidifier and/or dehumidifier. Non-communicating “Network-Ready” models as well as communicating BACnet™ MS-TP, Echelon™ Lontalk™ and Zigbee™ wireless models are available depending on the application. 7 day schedule programmable model and non-programmable model are also available.

**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:

<b>Terminal Equipment Controller power requirements:</b>	19-30 VAC 50 or 60 Hz; 2 VA Class 2 RC to RH jumper 2.0 Amps 48 VA maximum
<b>Operating conditions:</b>	0 °C to 50 °C ( 32 °F to 122 °F ) 0% to 95% R.H. non-condensing
<b>Storage conditions:</b>	-30 °C to 50 °C ( -22 °F to 122 °F ) 0% to 95% R.H. non-condensing
<b>Temperature sensor: Resolution:</b>	Local 10 K NTC thermistor
<b>Control accuracy:</b>	± 0.1 °C ( ± 0.2 °F ) Humidity ± 0.1% ± 0.5 °C ( ± 0.9 °F ) @ 21 °C ( 70 °F ) typical calibrated
<b>Humidification set point: Dehumidification set point:</b>	±5% RH from 20 to 0% RH at 50 to 90° F (10 to 32 °C) 10% RH to 90% RH 15% RH to 95% RH
<b>Contact output rating: Humidification analog output rating: Humidification analog output accuracy</b>	Relay output: 30 VAC, 1 Amp. Maximum, 3 Amp. In-rush. Analog: 0 to10VDC into 2KΩ resistance min. ± 3% typical
<b>Occ, Stand-By and Unocc cooling set point range: Occ, Stand-By and Unocc heating set point range: Room and outdoor air temperature display range:</b>	12.0 to 37.5 °C ( 54 to 100 °F ) 4.5 °C to 32 °C ( 40 °F to 90 °F ) -40 °C to 50 °C ( -40 °F to 122 °F )
<b>Proportional band for room temperature control:</b>	Factory set, Cooling & Heating: 1.1°C ( 2°F )
<b>Digital inputs: Analog high limit &amp; remote humidity inputs:</b>	Relay dry contact only across C terminal to D1 Analog: 0 to10VDC into 2KΩ resistance min. 18 gauge maximum, 22 gauge 0.75 lb ( 0.34 kg )
<b>Wire gauge: Approximate shipping weight:</b>	
<b>Agency Approvals all models:</b>	<b>UL:</b> UL 873 (US) and CSA C22.2 No. 24 (Canada), File E27734 with CCN <b>XAPX</b> (US) and <b>XAPX7</b> (Canada) <b>Industry Canada:</b> ICES-003 (Canada) <b>FCC:</b> Compliant to CFR 47, Part 15, Subpart B, Class A (US) <b>CE :</b> EMC Directive 89/336/EEC (Europe Union) <b>C-Tick:</b> AS/NZS CISPR 22 Compliant (Australia / New Zealand) Supplier Code Number N10696 <b>FCC:</b> Compliant to: Part 15, Subpart C



<b>Agency Approvals Wireless models:</b>	
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## VT76x7 Series

**General** – The low-voltage rooftop unit controller shall be capable of (single stage heating and cooling, multi-stage 2 heat / 2 cool) and shall be **(programmable / non-programmable)**. The controller shall be **(a non-communicating “Network-Ready” model, BACnet™ MS-TP communicating model, Echelon™ Lontalk™ communicating model or Zigbee™ wireless communicating model)**.

- Controller shall be equipped with large, 2 line, 16 character LCD dual intensity backlit display with three status LEDs showing FAN, HEAT, COOL.
- Controller shall achieve accurate temperature control using a PI proportional-integral algorithm. Traditional differential-based controllers are not acceptable.
- Controller shall have an embedded local “real text” configuration utility for simplified sequence selection, start-up and configuration using an integrated five-button keypad. Controllers requiring external configuration tools or network interface for start-up and configuration are not acceptable.
- Controller shall have an internal relative-humidity sensor as well as embedded humidification and dehumidification sequences. The controller shall have a 0-10Vdc analog output to control modulating humidifiers. The controller shall also have a discreet output (dry contact) to activate the dehumidifying sequence.
- Controller shall have ability to display the actual relative humidity directly on the LCD display.
- Controller shall have embedded outdoor reset ramp for indoor humidity and proportional discharge high limit control (outdoor air temperature sensor required).
- Controller shall have a supply relative humidity high limit set point to protect equipment in case of sensor failure (0-5Vdc sensor required).
- Controller shall have the ability to lockout the dehumidification sequence based on outside air temperature from –40°F up to 122°F, -40°C up to 50°C (outdoor air temperature sensor required).
- Controller shall have the option for frost protection to prevent temperatures below 42°F (5.6°C).
- Controller shall be supplied (without networking interface, BACnet™ MS-TP network interface, Echelon™ Lontalk™ network interface, Zigbee™ wireless network interface). BACnet™ MS-TP versions shall be provided with Protocol Implementation Conformance Statement or Lonmark approval disclosing all object/SNVT properties and instance numbers to facilitate the integration process. Echelon™ Lontalk™ communicating versions shall be provided with appropriate application files and LNS plug-in as required free of charge from the manufacturer. “Network Ready” non-communicating model can be field upgraded by adding one of the following communication adapters:
  1. VCM7600V5000B: Terminal Equipment Controller BACnet™ MS-TP communication adapter
  2. VCM7600V5000E: Terminal Equipment Controller Echelon™ Lontalk™ communication adapter
  3. VCM7000V5000W: Terminal Equipment Controller wireless communication adapter
- 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 support continuous, “smart” and auto-fan sequences.
- 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 be compatible with the Viconics VI-PIR “Passive Infrared” cover for advanced active occupancy logic.
- 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 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 configurable maximum heating set points (40 to 90 °F, 4.5 to 32.0 °C) and minimum cooling set points (54 to 100 °F, 12.0 to 37.5 °C ).
- Controller shall have an adjustable deadband between heating and cooling set points (from 2°F to 4°F, 1°C to 2.0°C).
- Controller shall have an adjustable proportional band between heating and cooling set points (from 2°F to 8°F, 1.1°C to 4.4°C).
- Controller shall have an adjustable anti-cycling on/off operation time of cooling and heating stages from 0 minutes to 5 minutes.
- Controller shall have adjustable heating and cooling cycles per hour.
- Controller shall have removable connectors for easier wiring.
- Controller shall have a PCB board that swings on hinges for easier installation.
- Controller shall have an auxiliary contact that can be used to energize peripheral devices such as: lighting equipment, exhaust fans, economizers, etc. This contact shall operate in parallel with the internal occupied/unoccupied schedule of the controller or the remote night setback contact if DI1 or DI2 is used. When the system is in OFF mode, the contact shall remain in its unoccupied status independently of the occupied / unoccupied schedule.
- Controller shall have three (3) adjustable keypad lockout levels limiting access as follows:

Level	Resume/Override scheduling	Permanent Occupied and Unoccupied Setpoints	Temporary set points using arrows	Humidity Setpoints	System mode setting	Fan mode setting	Schedule setting	Clock setting	Permanent hold
	Resume sched Y/N	Temperature set Y/N	Up key (▲) Down key (▼)	Humidity set Y/N	Sys mode set Y/N	Fan mode set Y/N	Schedule set Y/N	Clock set Y/N	Schedule hold Y/N
<b>0</b>	Yes access	Yes access	Yes access	Yes access	Yes access	Yes access	Yes access	Yes access	Yes access
<b>1</b>	Yes access	No access	Yes access	No Access	No access	No access	No access	Yes access	No access
<b>2</b>	No access	No access	No access	No Access	No access	No access	No access	Yes access	No access



- Controller shall provide the following local monitoring capabilities:
  - DI-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. **Remote Override:** Temporary occupancy remote override contact. Local keypad override shall be disabled. Override function shall be controlled only by a manual remote toggle signal.
    4. **Filter:** A backlit flashing “Filter” alarm shall be displayed on the local controller LCD screen when input (from a differential pressure switch) is energized.
    5. **Service:** A backlit flashing Service alarm shall be displayed on the local controller LCD screen when input (ex. rooftop unit malfunction) is energized.
  - DI-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. **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. **Remote Override:** Temporary occupancy remote override contact. Local keypad override shall be disabled. Override function shall be controlled only by a manual remote toggle signal.
    4. **Filter:** A backlit flashing “Filter” alarm shall be displayed on the local controller LCD screen when input (from a differential pressure switch) is energized.
    5. **Service:** A backlit flashing “Service” alarm shall be displayed on the local controller LCD screen when input (ex. rooftop unit malfunction) is energized.
- 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 available as switched through local digital input or network layer such as:
  - Outdoor air temperature display only enabled when outdoor air temperature sensor is connected
  - COM Address and various other parameters when a communication module is integrated inside the unit.



### **VI-PIR Viconics Passive Infrared Cover**

- Controller shall be supplied with (or capable of being retrofitted on site) with the VI-PIR cover. Passive infrared sensor shall be integrated into the cover of the controller. Controls with remote motion detectors are not acceptable.
- VI-PIR shall add an adjustable “Unoccupied Timer” integrated to change the occupancy mode from “Occupied” to “Unoccupied” if no motion is detected.

**Programmable controllers shall be Viconics, model VT7657B5000x**

**Non-programmable controllers shall be Viconics, model VT7607B5000x**

**Programmable controllers with integrated motion sensor shall be Viconics, model VT7657B5500x**

**Non-programmable controllers with integrated motion sensor shall be Viconics, model VT7607B5500x**