VZ7656B1000B Series BACnet RTU Thermostats For Commercial Zoning Systems

Product overview

The Viconics VZ7656B1000B thermostat is specifically designed for RTU control and fits within the Viconics Zoning System product family.

The RTU thermostat is designed for single stage or multi-stage control of heating/cooling equipment such as rooftop and self-contained units used in zoning system applications.

Fig.1 -VZ7656B Thermostat

The product features a backlit LCD display with dedicated function menu buttons for ease-of-use operation. Accurate temperature control is achieved through the product's PI proportional control algorithm, which virtually eliminates temperature offset associated with traditional, differential-based thermostats.

This thermostat also contains extra digital inputs, which can be set by the user to monitor filter statuses or used as a general purpose service indicator. All models contain an SPST auxiliary switch, which can be used to control lighting or disable the RTU economizer function during unoccupied periods. It also features a discharge air sensor input. Proportional static pressure logic (input and output) has been integrated to the thermostat to provide a complete single packaged unit for most small to medium sized jobs.

The thermostats are used in conjunction with the Viconics VZ7200F5x00B Zone thermostats for system operation of each zone and the RTU.

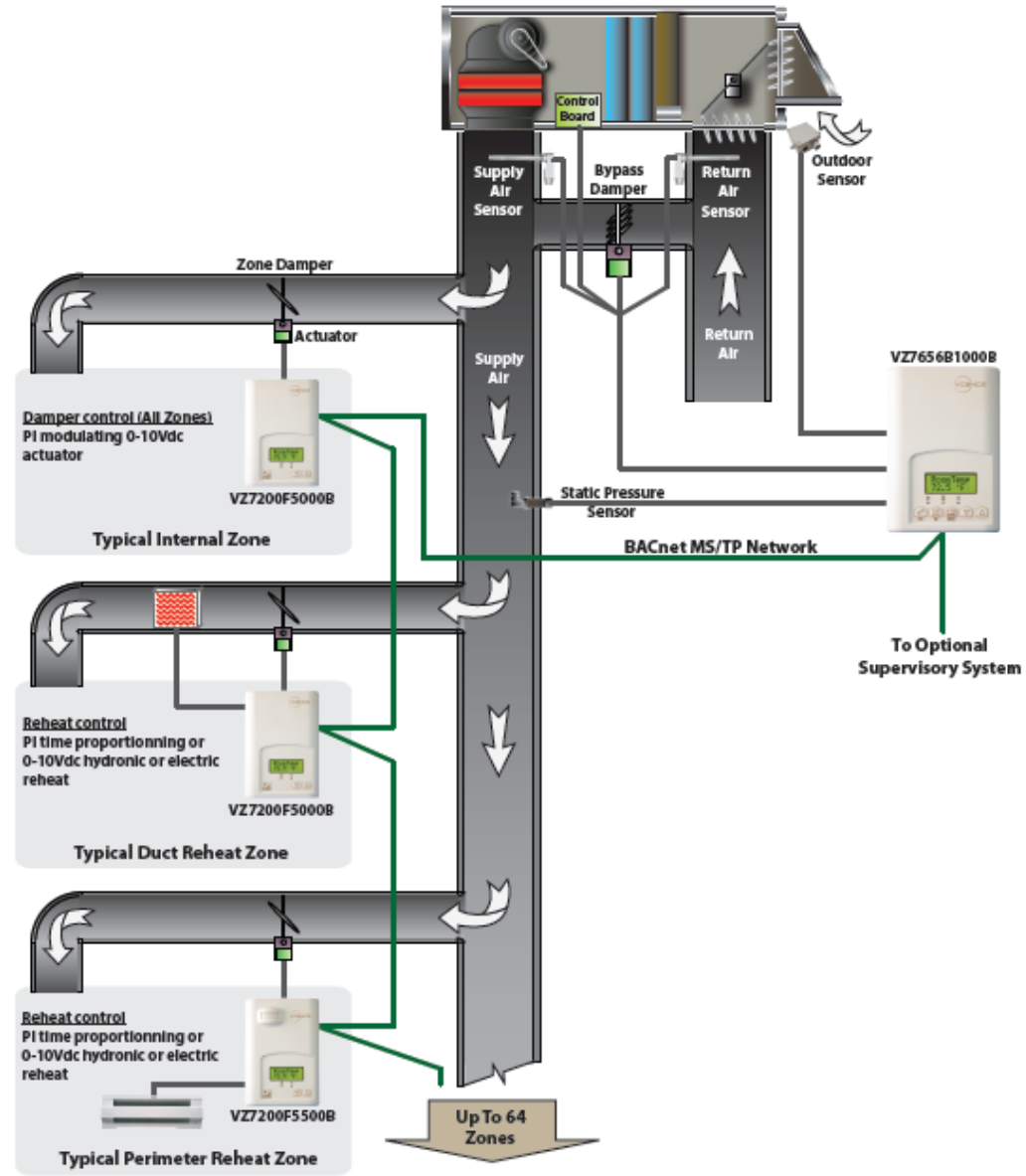
A local BACnet RS485 MS-TP communication bus between all devices insures proper communication and data exchange of all required information between the Zones and the RTUs. These thermostats can be seamlessly integrated into any 3rd party BACnet supervisory system.

Features and benefits

Features	Benefits
• Fully scalable system	⇒ Can meet small and large system requirements
• Authentic stand-alone system	⇒ Does not require a computer to operate
• Pre-engineered design, software and documentation	⇒ Eliminates costly expenses usually associated with DDC systems
• Native BACnet MS/TP solution	⇒ Supports up to 64 zones and will work with any BACnet device, any BACnet network or any BACnet BAS
• By-pass damper output logic for static pressure control	⇒ Can be used with pressure dependent zoning systems
• Intuitive, menu programming (7 day, 2 or 4 events)	⇒ Can be used for all types of establishments
• Easy configuration and self-binding operation	⇒ Easy to configure and no custom programming required
• PI time proportioning algorithm	⇒ Increased comfort , accuracy, and energy savings
• 1 extra digital input	⇒ Adds functionality
• Unique configuration key	⇒ Minimizes parameter tampering
• EEPROM memory	⇒ No loss of programming
• 6 hour reserve time for clock	⇒ No need to reprogram day/time after power shortage
• Outdoor temperature sensor	⇒ Increased flexibility and functionality
• Auxiliary output	⇒ Can be used for lighting and/or economizer override
• Unique local configuration setup utility	⇒ Rapid commissioning and set-up; no laptop required
• Discharge and return air sensor	⇒ Can be used to monitor unit efficiency
• Heating or cooling mode selection based on highest demand or average of various highest demands	⇒ Achieves maximum user comfort
• Return air network lost function	⇒ Guarantees comfort even if network communication is lost
• Reheat output(s) outside air lockout	⇒ Increased energy savings
• Outside air heating and cooling lockout	⇒ Prevents heating and cooling overlap
• Supply and Return air high and low limits	⇒ Can be used with gas or electrical heating units
• Lockable keypad	⇒ Tamper proof, no need for thermostat guards
• Progressive recovery feature	⇒ Increases energy savings and user comfort

BACnet System Overview

Viconics VZ72005x00B Zone thermostats are used in conjunction with the VZ7656B1000B roof top controller thermostats. Combined, they are designed for operating typical; single or multistage RTUs and their associated local zones. For example, a typical job layout system may feature 3 RTU thermostats and a total of 31 zones. This would bring to total number of nodes (individual Com addresses) to 34. RTU 1 would have 10 zones under its command, RTU 2 would have 10 zones under its command and RTU 3 would have 11 zones under its command.



Typical BACnet zoning system installation

For detailed information and design guidelines on the BACnet version zoning system: please refer to the following Viconics documents:

The following documents are available at: www.viconics.com.

- For detailed information on the system, please refer to and read the BACnet Zoning System Product Guide. Detailed installation and commissioning information is available on the following document: *BACnet-Zoning-System-Guide-Exx.*
- For detailed information on the Viconics VZ72 Zone thermostat, please refer to and read the VZ72 Product Guide. Installation and commissioning information is available on the following document: *LIT-VZ7200B-Exx.*
- PIR cover installation information is available on the following document: *PIR Cover Installation-Exx.*
- Information on 3rd party BACnet integration is available on the following document *ITG-VZ7xxx-BAC-Exx.*

Theory of Operation

The VZ7656B uses a proprietary adaptive logic algorithm that operates based on the heating and cooling zone demands. This algorithm controls the heating / air conditioning system to minimize overshooting the demanded temperature while still providing optimized comfort to the people occupying specific zones. It provides exceptional accuracy due to its unique PI time proportioning control algorithm, which virtually eliminates temperature offset associated with traditional, differential-based on/off thermostats.

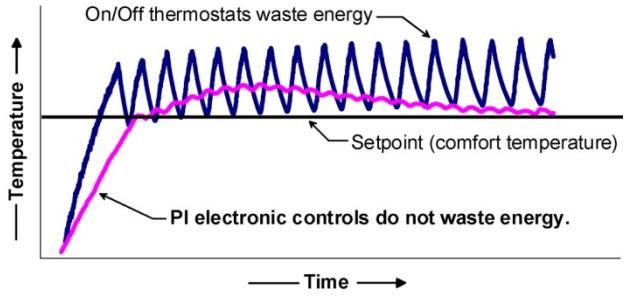


Fig.2 - On/Off mechanical control vs PI electronic control.

Feature Overview

- 7 day programmable models, 2 or 4 events.
- Gas/oil or electric system compatibility for all types of applications.
- Remote outdoor sensing capability for added functionality.

- *System mode heating and cooling lock out.*
- *Zone perimeter reheat lockout.*

- Remote discharge air sensor input for monitoring and control purpose.

- *System efficiency feedback.*
- *Discharge high limit heating lockout.*
- *Discharge low limit cooling lockout.*

- Remote return air sensor input for monitoring and control.

- *System efficiency feedback.*
- *Return high limit heating lockout.*
- *Return low limit cooling lockout.*
- *Communication lost control function.*

- Lockable keypads for security, no need for thermostat guards.
- A programmable digital input is for added flexibility. Each input can be programmed as the following:

- **None:** No function will be associated with the input.
- **Service:** a backlit flashing **Service** alarm will be displayed on the thermostat LCD screen when the input is energized. It can be tied in to the AC unit control card, which provides an alarm in case of malfunction.
- **Filter:** a backlit flashing **filter** alarm will be displayed on the thermostat LCD screen when the input is energized. It can be tied to a differential pressure switch that monitors filters.

- **Rem NSB:** remote NSB timer clock input will disable the internal scheduling of the thermostat. The scheduling will now be set according to the digital input. The menu part related to scheduling will be disabled and no longer accessible. This provides low cost setback operation via the occupancy sensor or from a dry contact.

- **RemOVR:** temporary occupancy contact disables all override menu functions of the thermostat. The override function is now controlled by a manual remote momentarily closed contact. When configured in this mode, the input toggles between unoccupied and override.
  With this function enabled it is now possible to toggle between unoccupied & occupied setpoints for the amount of time set by the parameter “TOccTime” (temporary occupancy time).

- Automatic smart fan operation saves energy during unoccupied periods.
- Non volatile EEPROM memory prevents loss of parameters in the event of power shortages.
- Configurable SPST output relay on programmable models for lighting, exhaust fan or fresh air control.
- 6 hour reserve time for clock in case of power loss
- Built in 0 to 10 Vdc by-pass damper output logic for static pressure control.
  - *Built in static pressure loop control.*
  - *0 to 5 Vdc static pressure input.*

Easy Configuration and Self-Binding Operation

- Easy configuration without using any special software or additional tools.

- Can be used as stand-alone or with a BACnet MS-TP supervision controller for monitoring purposes.

- Truly scalable in terms of supported number of zones and RTU units.

Installation

- Remove the security screw on the bottom of thermostat cover.
  - Open up by pulling on the bottom side of thermostat.
  - Remove assembly and remove wiring terminals from the sticker. **(Fig. 3)**

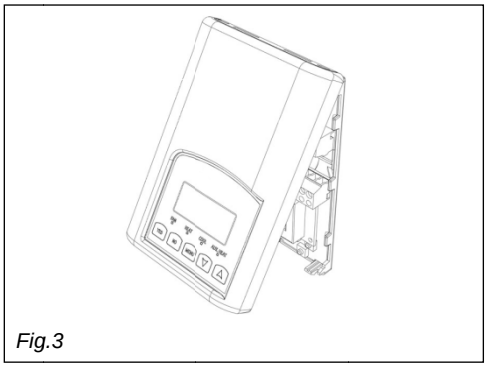


Fig.3

A) **Location:**

1- Must <u>not</u> be installed on an outside wall.
2- Must be installed away from any heat source.
3- Should not be installed near an air discharge grill.
4- Must be installed away from direct sun radiation.
5- Nothing must restrain vertical air circulation to the thermostat.

B) **Installation:**

1- Swing open the thermostat PCB to the left by pressing and applying pressure to the PCB locking tabs. **(Fig. 4)**
2- Pull out cables 6" from the wall.
3- Wall surface must be flat and clean.
4- Insert cable into the central hole of the base.
5- Align the base and mark the location of the two mounting holes on the wall. Install proper side of base up. Please make sure the display is on the bottom.
6- Affix the anchors to the wall.
7- Insert screws in mounting holes on each side of the base. **(Fig. 4)**
8- Gently swing back the circuit board on the base and push on it until the tabs lock it.
9- 10- Strip each wire 1/4 inch.
10- 11- Insert each wire according to the wiring diagram.
11- Gently push the excess wiring back into the hole. **(Fig. 5)**
12- Re-install wiring terminals in their correct locations. **(Fig. 5)**
13- Re-install the cover (top side first) and gently push back extra wire length into the hole in the wall.
14- Install the security screw.

Location of PCB retaining tabs

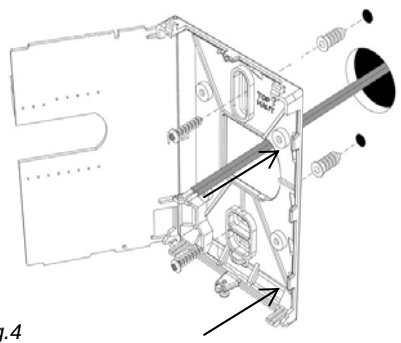


Fig.4

Re-install terminal blocks

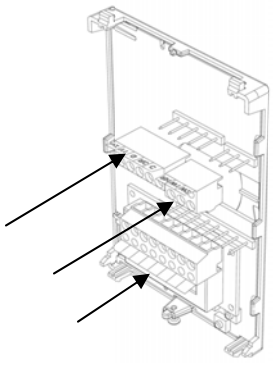


Fig.5

- If replacing an old thermostat, label the wires before removal of the old thermostat.
- Electronic controls are static sensitive devices. Discharge yourself properly before manipulation and installing the thermostat.
- Short circuit or wrong wiring may permanently damage the thermostat or the equipment.
- Anti-short cycling can be set to 0 minutes for equipment that posses their own anti cycling timer. Do not use that value unless the equipment is equipped with such internal timer. Failure to do so can damage the equipment.
- All VT7000 series thermostats are to be used only as operating controls. It becomes the responsibility of the user to add safety devices and/or an alarm system to protect against catastrophic failures or whenever a control failure could lead to personal injury and/or the loss of property.

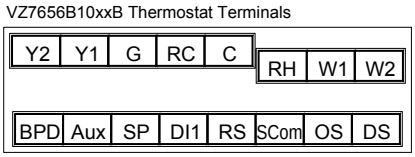
Thermostat assembly
(VT7300F1000 shown as example)

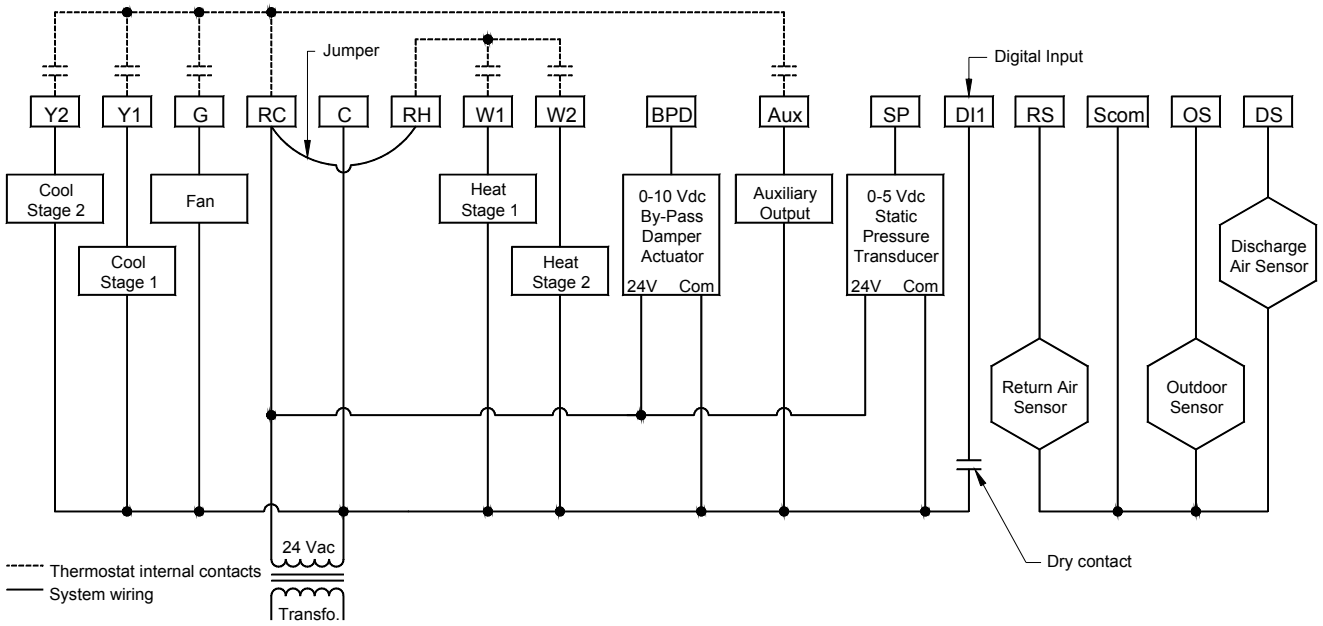
Fig.6

Terminals Identification

Terminal Use	Terminal Identification	Description
1 – Cool2	**Y2**	Output for RTU cooling stage number 2.
2 – Cool1	**Y1**	Output for RTU cooling stage number 1.
3 - Fan	**G**	Output for the fan.
4 - 24 V ~ Hot	**RC**	Power supply of thermostat, hot side (Delivered from the RTU).
5 - 0 V ~ Com	**C**	Power supply of thermostat, common side. Also used as reference for the analog BPD output when used (Delivered from the RTU).
6 – Heat Switch Leg	**RH**	24 Vac switched leg for the heating stages. • If heating stages are part or RTU, install a jumper across RC & RH. • If heating stages are part of a separate equipment with a different power supply, feed external switched power leg through RH ***without*** installing a jumper across RC & RH.
7 – Heat1	**W1**	Output for heating stage number 1.
8 – Heat2	**W2**	Output for heating stage number 2.
9 – By-pass damper	**BPD**	Local analog 0 - 10 Vdc by-pass damper output.
10 – Aux output	**AU**	Auxiliary output used to disable economizer damper minimum position or control lighting during unoccupied periods.
11 – Static pressure	**SP**	Local analog 0 – 5 Vdc static pressure input.
12 - DI1	**DI1**	Configurable extra digital input. See parameter section for more information.
13 - RS	**RS**	Return air temperature sensor input. If sensor fails, thermostat will use the on-board thermistor sensor to control if the communication is lost.
14 - Scom	**Scom**	Reference input for DI 1, RS, OS & DS.
15 - OS	**BI2**	Outside air temperature sensor input.
16 - DS	**UI 3**	Discharge air temperature sensor input.
BACnet Network Connections		
Bacnet Com	**Com +**	BACnet communication bus + connection.
Bacnet Com	**Com -**	BACnet communication bus – connection.
Ref	**Ref**	Communication bus reference terminal. o ***DO NOT USE FOR OTHER THAN SERVICING ISSUES*** o ***DO NOT WIRE SHIELD TO THAT POSITION***

Screw Terminal Arrangement and Wiring





Remote Sensor Accessories

Model no.	Description
S2020E1000	Outdoor temperature sensor
S2060A1000	Averaging temperature sensor
S2000D1000	Duct mounted temperature sensor

Remote mount temperature sensors use 10K NTC thermistors.

Temperature vs. Resistance Chart for 10 Kohm NTC Thermistor

($R_{25°C}$ = 10KΩ±3% - $B_{25/85°C}$ = 3975K±1.5%)

°C	°F	Kohm	°C	°F	Kohm	°C	°F	Kohm	°C	°F	Kohm	°C	°F	Kohm
-40	-40	324.3197	-20	-4	94.5149	0	32	32.1910	20	68	12.4601	40	104	5.3467
-39	-38	303.6427	-19	-2	89.2521	1	34	30.6120	21	70	11.9177	41	106	5.1373
-38	-36	284.4189	-18	0	84.3147	2	36	29.1197	22	72	11.4018	42	108	4.9373
-37	-35	266.5373	-17	1	79.6808	3	37	27.7088	23	73	10.9112	43	109	4.7460
-36	-33	249.8958	-16	3	75.3299	4	39	26.3744	24	75	10.4443	44	111	4.5631
-35	-31	234.4009	-15	5	71.2430	5	41	25.1119	25	77	10.0000	45	113	4.3881
-34	-29	219.9666	-14	7	67.4028	6	43	23.9172	26	79	9.5754	46	115	4.2208
-33	-27	206.5140	-13	9	63.7928	7	45	22.7861	27	81	9.1711	47	117	4.0607
-32	-26	193.9703	-12	10	60.3980	8	46	21.7151	28	82	8.7860	48	118	3.9074
-31	-24	182.2686	-11	12	57.2044	9	48	20.7004	29	84	8.4190	49	120	3.7607
-30	-22	171.3474	-10	14	54.1988	10	50	19.7390	30	86	8.0694	50	122	3.6202
-29	-20	161.1499	-9	16	51.3692	11	52	18.8277	31	88	7.7360	51	124	3.4857
-28	-18	151.6239	-8	18	48.7042	12	54	17.9636	32	90	7.4182	52	126	3.3568
-27	-17	142.7211	-7	19	46.1933	13	55	17.1440	33	91	7.1150	53	127	3.2333
-26	-15	134.3971	-6	21	43.8268	14	57	16.3665	34	93	6.8259	54	129	3.1150
-25	-13	126.6109	-5	23	41.5956	15	59	15.6286	35	95	6.5499	55	131	3.0016
-24	-11	119.3244	-4	25	39.4921	16	61	14.9280	36	97	6.2866	56	133	2.8928
-23	-9	112.5028	-3	27	37.5056	17	63	14.2629	37	99	6.0351	57	135	2.7886
-22	-8	106.1135	-2	28	35.6316	18	64	13.6310	38	100	5.7950	58	136	2.6886
-21	-6	100.1268	-1	30	33.8622	19	66	13.0307	39	102	5.5657	59	138	2.5926

S2000D1000; remote duct mounted temperature sensor c/w junction box.

This sensor can be used for:

- Remote return air temperature sensing with the sensor mounted on the return air duct.
- Outside air temperature sensing with the sensor installed in the fresh air plenum.
- Supply air temperature sensing.

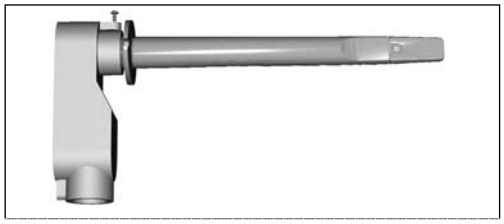


Fig.10 – Remote Duct Mounted Temperature Sensor

S2060A1000; remote averaging duct mounted temperature sensor c/w junction box.

This sensor can be used for:

- Remote averaging return air temperature sensing with the sensor mounted on the return air duct.
- Outside air temperature averaging sensing with the sensor installed in the fresh air plenum.
- Supply air temperature averaging sensor for economizer models with the sensor in the mixing plenum.

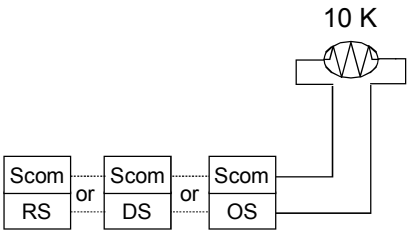
S2020E1000; outdoor air temperature sensor

This sensor can be used for:

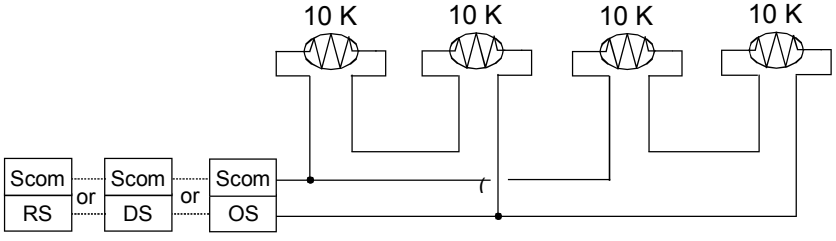
- Outside air temperature sensing with the sensor installed directly exposed to the elements.
- Sensor uses a water resistant NEMA 4 ABS enclosure for outdoor applications.

WIRING S2000D1000, S2060A1000 and S2020E1000

Remote wiring 1 sensor



Remote wiring 4 sensors



Programming and Status Display Instructions

1. Status display

The thermostat features a two-line, eight-character backlit LCD display which is always active and illuminated in low light. When left unattended, the thermostat has an auto scrolling display that shows the actual status of the system.

Each item is scrolled one by one with the back lighting in low level mode. Pressing any key will cause the back light to come on to high level. When left unattended for 10 seconds after changes are made, the display will resume automatic status display scrolling.

To turn on the back light to high level, press any key on the front panel. The backlit display will return to low level when the thermostat is left unattended for 45 seconds.

There is an option in the configuration menu to lockout the scrolling display and to only present the room temperature and conditional outdoor temperature to the user. With this option enabled, no local status is given of mode, occupancy and outdor temperature.

Sequence of auto-scroll status display:

Clock Status	System Mode	Schedule Status	Outdoor Temperature	Alarms (if detected)	
Monday 12:00 AM	Sys Mode Off	Occupied	Outdoor xx.x °C or °F	Service	Valid only if DI1 is configures / used as Service Alarm
	Sys Mode Auto	Unoccupied		DAS Alrm	Valid only if Dis HL or Dis LL alarms are triggered
		Override		SetClock	Valid only if power off clock time retention expired
				Filter	Valid only if DI1 is configures / used as Filter Alarm
				Comm Lost	Valid only if communication is lost to the Zones **
					** Not necessarily represents a BACnet Com failure

If alarms are detected, they will automatically be displayed at the end of the status display scroll. During an alarm message display, the back lit screen will light up at the same time as the message and shut off during the rest of the status display. Two alarms maximum can appear at any given time.

Sequence of manual-scroll status display:

Manual scroll of each menu item is achieved by pressing the Yes (scroll) key repetitively. The last item viewed will be shown on the display for 30 seconds before returning to automatic scrolling. Temperature is automatically updated when scrolling is held.

Clock Status	System Mode	Schedule Status	Outdoor Temperature	Alarms (if detected)
Monday 12:00 AM	Sys Mode Off	Occupied	Outdoor xx.x °C or °F	Service
	Sys Mode Auto	Unoccupied		DAS Alrm
		Override		SetClock
				Filter
				Comm Lost

Current Zone Sequence	Return Air Temperature	Discharge Air Temperature	Current Static Pressure
Zone Seq Off	RA Temp xx.x °C or °F	DA Temp xx.x °C or °F	Pressure x.x WC or Pa
Zone Seq Cool			
Zone Seq Heat			

Effective PI Heat Demand at RTU	Effective PI Cool Demand at RTU	Highest PI Heat Demand Zone Address	Highest PI Cool Demand Zone Address
Heat Out xxx %	Cool Out xxx %	Heat MAC xxx	Cool MAC xxx

User interface status display:

Three status LEDs on the thermostat cover are used to indicate the status of the fan, a call for heat, or a call for cooling.

- When the fan is on, the FAN LED will illuminate.
- When heating is on, the HEAT LED will illuminate.
- When cooling is on, the COOL LED will illuminate.

Fig.11 – VZ7656B1000B Interface

2. User programming instructions menu

The VZ7656B series of thermostats feature an intuitive, menu-driven, back-lit LCD display that walks users and installers through the programming steps, making the programming process extremely simple. This menu is typically accessed by the user to set the parameters such as the clock time set, the schedule time events and the system mode.

It is possible to bring up the user menu at any time by depressing the MENU key. The status display automatically resumes after exiting the user-programming menu.

If the user pauses at any given time during programming, **Auto Help** text is displayed to help and guide the user through the usage and programming of the thermostat.

Ex.:	**Press yes key to change cooling temperature setpoint** **Use the up or down arrow to adjust cooling setpoint**

Each of the sections in the menu are accessed and programmed using 5 keys on the thermostat cover.
The priority for the alarms is as follows:

YES SCROLL	The YES key is used to confirm a selection, to move onto the next menu item and to manually scroll through the displayed information.
NO	The NO key is used when you do not desire a parameter change, and to advance to the next menu item. Can also be used to toggle between heating and cooling setpoints.
MENU	The MENU key is used to access the Main User Menu or exit the menu.
▽	The down arrow key is used to decrease temperature setpoint and to adjust the desired values when programming and configuring the thermostat.
△	The up arrow key is used to increase temperature setpoint and to adjust the desired values when programming and configuring the thermostat.

When left unattended for 45 seconds, the display will resume automatic status display scrolling.
To turn on the back light, press any key on the front panel. The back lit display will turn off automatically after 45 seconds.

Sequence of user menu:

Override Resume	System mode setting	Schedules setting	Clock setting
Override schd Y/N Appears only in unoccupied mode	**Sys mode set Y/N**	**Schedule set Y/N**	**Clock set Y/N**
Cancel ovrd Y/N Appears only in override mode			

A) Override an unoccupied period

Override schd Y/N

This menu will appear only when the thermostat is in unoccupied mode. The unoccupied mode is enabled either by the internal timer scheduling or by a network unoccupied command on the occupancy object.

If DI1 is configured to operate as a remote temporary override contact, this menu will be disabled.

Answering yes to this prompt will cause the all the zones attached to the RTU thermostat to go into occupied mode for an amount of time equal to the parameter “TOccTime” (1 to 12 hours).

B) Resume regular scheduling

Cancel ovrd Y/N

This menu does not appear in regular operation. It will appear only when the thermostat is in override mode.

Answering “Yes” to this question will cause all the zones attached to the RTU thermostat to resume the regular programmed scheduling of the RTU thermostat schedule.

B) System mode setting

Sys mode set Y/N

This menu is accessed to set system mode operation
Use ▲▼ to set value, yes key to confirm.

Sys mode auto	**Automatic mode** Automatic changeover mode between heating and cooling operation based on local zone demands voting for RTU system operation.
Sys mode off	**Off mode** Normal cooling or heating operation disabled.

C) Schedule set (2 events)

Scheduling can have 2 or 4 events per day. This is set in the configuration menu as per parameter; (2/4event).

Schedule set Y/N

This section of the menu permits the user to set the weekly schedule for all the zones attached to the RTU thermostat. Each day can be tailored to specific schedules if needed.

- 2 events can be programmed per day.
- Occupied & unoccupied periods can be set for each day.

Monday timer Schedule set		Tuesday timer Schedule set		Wednesday timer Schedule set		Other days are identical
Monday set? Y/N	No next → Yes down ↓	Tuesday set? Y/N	No next → Yes down ↓	Wednesda set? Y/N	No next → Yes down ↓	Selects the day to be programmed or modified
Yes key to access day scheduling, No key to jump to next day						
Occupied Day? Y/N	No next → Yes down ↓	Occupied Day? Y/N	No next → Yes down ↓	Occupied Day? Y/N	No next → Yes down ↓	Yes = Daily schedules will be accessed No = Unoccupied mode all day
Yes key to access day scheduling, No key to jump to next day						
		Copy Y/N Previous	Yes next → No down ↓	Copy Y/N Previous	Yes next → No down ↓	Yes = Will copy previous day schedule No = Daily schedules will be accessed
Yes key to copy previous day, No key to set new time value for each day						
Occupied 00:00 AM	Use ▲▼ To set value	Occupied 00:00 AM	Use ▲▼ To set value	Occupied 00:00 AM	Use ▲▼ To set value	Sets Event # 1 Occupied time Will activate occupied setpoints
Use ▲▼ to set value, Yes key to confirm						
Unoccup 00:00 AM	Use ▲▼ To set value	Unoccup 00:00 AM	Use ▲▼ To set value	Unoccup 00:00 AM	Use ▲▼ To set value	Sets Event # 2 Unoccupied time Will activate unoccupied setpoints
Use ▲▼ to set value, Yes key to confirm						

Typical examples of a 2 event office schedule

Ex. #1 Office building closed all weekend

Event	Period #1 - Event #1	Period #1 - Event #2
	Occupied	**Unoccupied**
Monday	7.00 AM	6.00 PM
Tuesday	7.00 AM	6.00 PM
Wednesday	7.00 AM	6.00 PM
Thursday	7.00 AM	6.00 PM
Friday	7.00 AM	6.00 PM
Saturday	12.00 PM *	12.00 PM *
Sunday	12.00 PM *	12.00 PM *

Note: 12:00 PM = Noon 12:00 AM = Midnight
Daily Occupancy
Day time only
Day time only
Day time only
Day time only
Day time only
Unoccupied
Unoccupied

* Programming consecutive events to the same time will cause the thermostat to choose the last event as the time at which it will set its schedule. In the above example, the thermostat will control the unoccupied set point until 7:00 AM Monday.

Ex. #2 Commercial building which is occupied all weekend

Event	Period #1 - Event #1	Period #1 - Event #2	
	Occupied	Unoccupied	Daily Occupancy
Monday	8.00 AM	5.00 PM	Day time only
Tuesday	8.00 AM	5.00 PM	Day time only
Wednesday	8.00 AM	5.00 PM	Day time only
Thursday	8.00 AM	5.00 PM	Day time only
Friday	8.00 AM	5.00 PM	Day time only
Saturday	12.00 AM **	11.59 PM **	Occupied
Sunday	12.00 AM **	11.59 PM **	Occupied

**To program a day as occupied for 24 hours, set that day occupied time to 12:00 AM and unoccupied time to 11:59 PM There will be a 1 minute unoccupied period every night at 11:59 PM with this schedule configuration.

D) Schedule set (4 events)

Schedule set Y/N

This section of the menu permits the user to set the weekly schedule for all the zones attached to the RTU thermostat. Each day can be tailored to specific schedules if needed.

- 4 events can be programmed per day.
- Occupied & Unoccupied periods can be set for each day.
- Programming the 3 rd. & 4 th. events to the same time will cancel the last period.

Monday timer Schedule set		Tuesday timer Schedule set		Wednesday timer Schedule set		Other days are identical
Monday set? Y/N	No next → Yes down ↓	**Tuesday set? Y/N**	No next → Yes down ↓	**Wednesda set? Y/N**	No next → Yes down ↓	Selects the day to be programmed or modified
Yes key to access day scheduling, No key to jump to next day						
Occupied Day? Y/N	No next → Yes down ↓	**Occupied Day? Y/N**	No next → Yes down ↓	**Occupied Day? Y/N**	No next → Yes down ↓	Yes = Daily schedules will be accessed No = Unoccupied mode all day
Yes key to access day scheduling, No key to jump to next day						
		Copy Y/N Previous	Yes next → No down ↓	**Copy Y/N Previous**	Yes next → No down ↓	Yes = Will copy previous day schedule No = Daily schedules will be accessed
Yes key to copy previous day, No key to set new time value for each day						
Occupied 00:00 AM	Use ▲▼ To set value	**Occupied 00:00 AM**	Use ▲▼ To set value	**Occupied 00:00 AM**	Use ▲▼ To set value	Sets Event # 1 Occupied time Will activate occupied setpoints
Use ▲▼ to set value, Yes key to confirm						
Unoccup 00:00 AM	Use ▲▼ To set value	**Unoccup 00:00 AM**	Use ▲▼ To set value	**Unoccup 00:00 AM**	Use ▲▼ To set value	Sets Event # 2 Unoccupied time Will activate unoccupied setpoints
Use ▲▼ to set value, Yes key to confirm						
Occupie2 00:00 AM	Use ▲▼ To set value	**Occupie2 00:00 AM**	Use ▲▼ To set value	**Occupie2 00:00 AM**	Use ▲▼ To set value	Sets Event # 3 Occupied time Will activate occupied setpoints
Use ▲▼ to set value, Yes key to confirm						
Unoccup2 00:00 AM	Use ▲▼ To set value	**Unoccup2 00:00 AM**	Use ▲▼ To set value	**Unoccup2 00:00 AM**	Use ▲▼ To set value	Sets Event # 4 Unoccupied time Will activate unoccupied setpoints
Use ▲▼ to set value, Yes key to confirm						

Ex. #1 Four event retail establishment schedule

Event	Period 1 - Event 1	Period 1 - Event 2	Period 2 - Event 3	Period 2 - Event 4	
Setpoint	**Occupied**	**Unoccupied**	**Occupied**	**Unoccupied**	**Daily Occupancy**
Monday	7.00 AM	5.00 PM	12.00 PM *	12.00 PM *	Day time only
Tuesday	7.00 AM	5.00 PM	12.00 PM *	12.00 PM *	Day time only
Wednesday	7.00 AM	5.00 PM	12.00 PM *	12.00 PM *	Day time only
Thursday	7.00 AM	5.00 PM	7.00 PM	10.30 PM	Day/evening time only
Friday	7.00 AM	5.00 PM	7.00 PM	10.30 PM	Day/evening time only
Saturday	12.00 PM *	12.00 PM *	12.00 PM *	12.00 PM *	Unoccupied
Sunday	12.00 PM *	12.00 PM *	12.00 PM *	12.00 PM *	Unoccupied

* Programming events to the same time will cancel the last period and leave the thermostat in unoccupied mode

E) Clock/Day Settings

Clock set Y/N

This section of the menu permits the user to set the time and day.

Time setting		Day setting		Time format setting	
Time set? Y/N	No next → Yes down ↓	**Day set? Y/N**	No next → Yes down ↓	**12/24hrs set? Y/N**	No = exit Yes down ↓
Time 0:00	Use ▲▼ To set value	**Day Monday**	Use ▲▼ To set value	**12/24hrs 12 hrs**	Use ▲▼ To set value

Installer configuration parameter menu

Configuration can be done through the network or locally at the thermostat.

- To enter the configuration menu, press and hold the middle button (**Menu**) for 8 seconds.
- Press the No button repetitively to scroll between all the available parameters.
- Press the Yes button to select the desired parameter.
- Use the up and down key to change the parameter to the desired value.
- To acknowledge and save the new value, press Yes.
- The next listed parameter is now displayed.

Configuration Parameters	**Description and Default Value**	**Significance and Adjustments**
RTC MAC	Zone Thermostat Controller network address Default Value: **4**	RTC MAC address must be unique for the entire network. **1 to 255** (Increments: 1 or 10) o For BACnet models valid range to use is from 1 to 127.
RTC Baud	RTC Thermostat Communication Baud Rate Default Value: 4 = **Auto**	This parameter will set the network's baud rate. 0 = 9600 KBps 1 = 19200 KBps 2 = 38400 KBps 3 = 76800 KBps 4 = Auto Bauding (Baud Rate will match detected Baud Rate).
Lockout	Local keypad lockout levels Default value = **0**	**0 =** Level 1 **1 =** Level 2 **2 =** Level 3

	Global Unocc Override	**System mode setting**	**Schedule setting**	**Clock setting**
Levels	**Override ** ….Y/N**	**Sys mode set Y/N**	**Schedule set Y/N**	**Clock set Y/N**
0	Yes access	Yes access	Yes access	Yes access
1	Yes access	No access	No access	Yes access
2	No access	No access	No access	Yes access

******Global Unocc Override appears only when in unoccupied mode

Pwr del	Power-up delay Default value = **30 seconds**	On initial power up of the thermostat (each time 24 Vac power supply is removed & re-applied) there is a delay before any operation is authorized (fan, cooling or heating). This can be used to sequence or start up multiple units / thermostats in one location. **10 to 120 seconds** (increments: 1 or 10).
CntrlTyp	Sets how the Zones attached to the RTU thermostat vote to determine the actual system mode of operation. (Heat or Cool) Default Value: **1 = AV_H3**	This parameter will select the type of operation required for the RTU based on the size of the system. Please refer to the Viconics Zoning System Guide for recommended settings. Only the Zones that actually have values above 0% in their (**PIHT Wei** & **PICL Wei)** configuration parameters will be able to vote on the RTU operational mode calculation. **0 =Highest:** The highest PI Heating or PI Cooling demand from the selected voting zones will dictate heating or cooling operation of the RTU thermostat. **1 = AV_H3:** The average of the 3 highest PI Heating or PI Cooling demands from the selected voting zones will dictate heating or cooling operation of the RTU thermostat. **2 = AV_H5:** The average of the 5 highest PI Heating or PI Cooling demands from the selected voting zones will dictate heating or cooling operation of the RTU thermostat.

Configuration Parameters	Description and Default value	Significance and Adjustments
Dis HL	Discharge air temperature high limit Default: **120°F**	Discharge air high temperature value at which the heating stages will be locked out. **70°F to 150°F (21°C to 65°C)** (increments: 0.5° or 5°)
Dis LL	Discharge air temperature low limit Default: 4**5°F**	Discharge air low temperature value at which the cooling stages will be locked out. **35 to 65°F (2.0°C to 19.0°C)** (increments: 0.5° or 5°)
Anticycl	Minimum on/off operation time for stages Default value = **2 minutes**.	Minimum On/Off operation time of cooling & heating stages. ***IMPORTANT,*** *anti-short cycling can be set to 0 minutes for equipment that possess their own anti cycling timer. Do not use this value unless the equipment has the above mentioned internal timer. Failure to follow this guideline may lead to damaged equipment.* **0, 1, 2, 3, 4 & 5 minutes.**
Heat cph	Heating stages cycles per hour Default value = **4 C.P.H.**	Will set the maximum number of heating stage cycles per hour under normal control operation. It represents the maximum number of cycles that the equipment will be turned on and off in the span of an hour. Note that a higher C.P.H will represent a higher accuracy of control at the expense of wearing down mechanical components faster. **3, 4, 5, 6,7 & 8 C.P.H.**
Cool cph	Cooling stages cycles per hour Default value = **4 C.P.H.**	Will set the maximum number of cooling stage cycles per hour under normal control operation. It represents the maximum number of cycles that the equipment will be turned on and off in the span of an hour. Note that a higher C.P.H will represent a higher accuracy of control at the expense of wearing down mechanical components faster. **3 or 4 C.P.H.**
Deadband	Minimum deadband Default value = **2.0 °F (1.1 °C)**	Minimum deadband value between the heating and cooling setpoints. Used only with the setpoints used during communication failure (ComLost Alarm) while operation is under the return air sensor. If modified, it will be applied only when any of the setpoints are modified. **2, 3 or 4 °F (1.0 to 2.0 °C)**
Units	Sets the display scale of the thermostat Default value = **Imp**	**0 = SI** for Celsius / Pa pressure scale. **1 = Imp** for Fahrenheit / in. WC pressure scale.
Fan del	Fan delay Default value = **Off**	Fan delay extends fan operation by 60 seconds after calls for heating or cooling stages have ceased. Valid only for unoccupied fan mode operation. The fan is always on during occupied periods. **Off or On.**

Configuration Parameters	Description and Default value	Significance and Adjustments
DI 1	Digital input 1 configuration Default value = **None**	Open contact input = function not energized. Closed contact input = function energized. **None**: No function will be associated with the input. **Rem NSB**, remote NSB timer clock input. Will disable the internal scheduling of the thermostat. The scheduling will now be set as per the digital input. The time is still displayed as information, but the menu part related to scheduling is disabled and no longer accessible. Open contact = occupied RTU operation mode. Closed contacts = unoccupied RTU operation mode. **RemOVR;** temporary override remote contact. Disables all override menu functions of the RTU thermostat. The override function is now controlled by a manual remote momentarily closed contact. When configured, in this mode the input toggles between unoccupied and override. With this function enabled it is now possible to toggle between unoccupied & occupied RTU operation modes for the amount of time set by the parameter “TOccTime.” (Temporary occupancy time). When override is enabled, an override status message will be displayed. **Filter:** a back-lit flashing **filter** alarm will be displayed on the thermostat LCD screen when the input is energized. **Service:** a back-lit flashing **service** alarm will be displayed on the thermostat LCD screen when the input is energized.
TOccTime	Temporary occupancy time Default value = **3 hours**	Temporary occupancy time with occupied mode setpoints when override function is enabled. When the thermostat is in unoccupied mode, this function is enabled with either the menu or DI1 or DI2 configured as the remote override input. **0,1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 & 12 hours**
cal RS	Return air temperature sensor calibration Default value = **0.0 °F or °C**	Offset that can be added/subtracted to the actual room temperature displayed and used. **± 5.0 °F (± 2.5 °C)**
cal OS	Outside air temperature sensor calibration Default value = **0.0 °F or °C**	Offset that can be added/subtracted to the actual outside air temperature displayed and used. **± 5.0 °F (± 2.5 °C)**
H stage	Number of heating stages installed at RTU. Default value = **2 stages**	Will revert the operation of 2 stage thermostats to a single stage when the second heating step is not needed. **1 or 2 stages**
C stage	Number of cooling stages installed at RTU. Default value = **2 stages**	Will revert the operation of 2 stage thermostats to a single stage when the second cooling step is not needed. **1 or 2 stages**

<table>
<tr><th>Configuration Parameters</th><th>Description and Default value</th><th>Significance and Adjustments</th></tr>
<tr><td>H lock</td><td>Outside air temperature heating lockout
Default value = 120 °F
(49 °C)</td><td>Disables heating operation based on outdoor air temperature.
Please refer to the Viconics Zoning System Guide for recommended settings.
From -15 °F up to 120 °F (-26 °C up to 49 °C)
(increments: 5° or 50°)</td></tr>
<tr><td>C lock</td><td>Outside air temperature cooling lockout.
Default value = -40 °F
(-40 °C)</td><td>Disables cooling operation based on outdoor air temperature.
Please refer to the Viconics Zoning System Guide for recommended settings.
From -40 °F up to 95 °F (-40 °C up to 35 °C)
(increments: 5° or 50°)</td></tr>
<tr><td>2/4event</td><td>Number of events configuration
Default value = 2 event</td><td>• 2 events, will set up programming for the following;
Event 1 is for occupied setpoints.
Event 2 is for unoccupied setpoints.
• 4 events, will set up programming for the following;
Event 1 is for occupied setpoints.
Event 2 is for unoccupied setpoints.
Event 3 is for occupied setpoints.
Event 4 is for unoccupied setpoints.</td></tr>
<tr><td>Aux cont</td><td>Auxiliary contact configuration
Default value = N.O. normally open</td><td>This contact can be used to energize peripheral devices such as: lighting equipment, exhaust fans and disabling the economizer minimum position.
This contact will operate in parallel with the internal occupancy of the RTU thermostat.
When the system is in OFF mode, the contact will remain in its unoccupied status independently of the occupied / unoccupied schedule.
<table>
<tr><th>Configured</th><th>Contact occupied status</th><th>Contact unoccupied status</th></tr>
<tr><td>N.O.</td><td>Closed</td><td>Opened</td></tr>
<tr><td>N.C.</td><td>opened</td><td>Closed</td></tr>
</table></td></tr>
<tr><td>Prog rec</td><td>Progressive recovery enabled
Default value = Off
Progressive recovery is automatically disabled if BI 1 is configured remote NSB</td><td>Off, = no progressive recovery.
The programmed occupied schedule time is the time at which the system will restart and send the occupied status to the attached zones.
On, = progressive recovery active.
The programmed occupied schedule time is the time at which the desired occupied temperature setpoints will be attained at the Zones. The RTU thermostat will automatically optimize the equipment start time.</td></tr>
<tr><td>Occ CL</td><td>Return air sensor network lost occupied cooling setpoint
Default: 75°F</td><td>If network communication is lost with the zone controllers, the return air sensor will control the RTC to maintain this setpoint.
54°F to 100°F (12°C to 37.5°C)
(increments: 0.5° or 5°)</td></tr>
</table>

Configuration Parameters	Description and Default value	Significance and Adjustments
Occ HT	Return air sensor network lost occupied heating setpoint Default: **72°F**	If network communication is lost with the zone controllers, the return air sensor will control the RTC to maintain this setpoint. **40 to 90°F (4.5°C to 32°C)** (increments: 0.5° or 5°)
Unocc CL	Return air sensor network lost unoccupied cooling setpoint Default: **82°F**	If network communication is lost with the zone controllers, the return air sensor will control the RTC to maintain this setpoint. **54 to 100°F (12°C to 37.5°C)** (increments: 0.5° or 5°)
Unocc HT	Return air sensor network lost unoccupied heating setpoint Default: **65°F**	If network communication is lost with the zone controllers, the return air sensor will control the RTC to maintain this setpoint. **40 to 90°F (4.5°C to 32°C)** (increments: 0.5° or 5°)
Sp range	Static Pressure sensor range Default: **0**	Static pressure transducer range. Voltage input range is 0 to 5 Vdc. **0 = 0 to 1.5 in WC** **1 = 0 to 2 in WC** **2 = 0 to 3 in WC** **3 = 0 to 4 in WC** **4 = 0 to 5 in WC**
Pressure	Static Pressure setpoint Default: **0.8”WC**	Bypass damper will maintain this supply static pressure set point. Please refer to the Viconics Zoning System Guide for recommended settings. **0 to 2 in WC (0 Pa to 500 Pa)** (increments: 0.1” WC or 25 Pa)

Specifications

Thermostat power requirements:	19-30 Vac 50 or 60 Hz; 2 VA (RC & C) Class 2 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
Sensor:	Local and remote 10 K NTC thermistor
Resolution:	± 0.1 °C (± 0.2 °F)
Occupied and unoccupied setpoint range cooling:	12.0 to 37.5 °C (54 to 100 °F)
Occupied and unoccupied setpoint range heating:	4.5 °C to 32 °C (40 °F to 90 °F)
Room and outdoor air temperature range	-40 °C to 50 °C (-40 °F to 122 °F)
Supply air temperature range	-40 °C to 65 °C (-40 °F to 150 °F)
Digital input:	Relay dry contact only across Scom terminal to DI1
Contact output rating:	Each relay output: (Y1, Y2, G, W1, W2 & AU) 30 Vac, 1 Amp. maximum 30 Vac, 3 Amp. in-rush
By-pass damper analog output rating:	0 to 10 Vdc into 2KΩ resistance min.
By-pass damper analog output accuracy:	± 3% typical
Wire gauge	18 gauge maximum, 22 gauge recommended
Dimensions:	4.94” x 3.38” x 1.13”
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, Class A (US) **CE:** EMC Directive 2004/108//EC (Europe Union) **C-Tick:** AS/NZS CISPR 22 Compliant (Australia / New Zealand) Supplier Code Number N10696

Drawing & dimensions

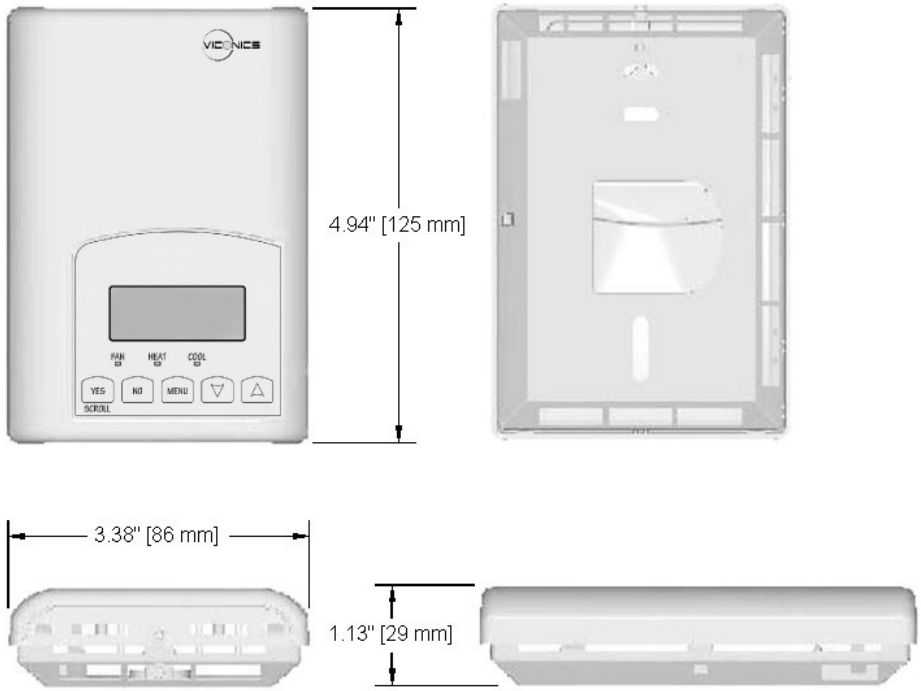


Fig.13 – Thermostat dimensions

Important notice

All VZ7600 series controls are for use as operating controls only and are not safety devices. These instruments have undergone rigorous tests and verifications prior to shipment to ensure proper and reliable operation in the field. It becomes the responsibility of the user / installer / electrical system designer to incorporate safety devices (such as relays, flow switch, thermal protections, etc…) and/or alarm system to protect the entire system against catastrophic failures or Whenever a control failure could lead to personal injury and/or loss of property, Tampering with the devices or mis-application of the device will void warranty.