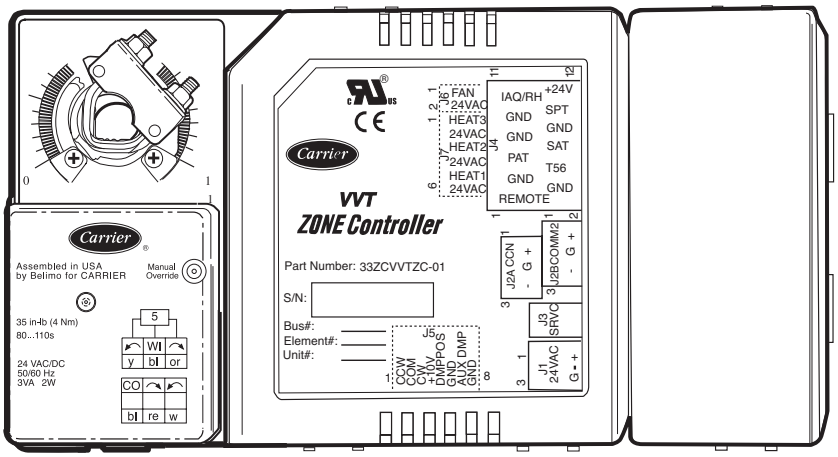
Product Specification

VVT® Zone Controller 3V™ Control System 33ZC

Part Number: 33ZCVVTZC-01



The VVT Zone Controller is a component of Carrier's 3V Control System and is used to provide zone level temperature and air quality control for Variable Volume and Temperature Applications. The VVT zone controller can be operated and configured through the Carrier communicating network with the System Pilot user interface.

The VVT Zone Controller provides the following features and benefits:

- provides pressure dependent (VVT) control
- uses Proportional Integral Derivative (PID) control
- mounts directly onto VVT terminal damper shaft
- optional terminal fan control

NOTE: Terminal fan control requires the VVT Zone Controller Option Board P/N 33ZCOPTBRD-01

- optional auxiliary heating control of: two-position hot water; one, two, or three-stage electric; modulating hot water valve; or combination radiant/ducted heat stages

NOTE: Auxiliary heating requires the VVT Zone Controller Option Board P/N 33ZCOPTBRD-01

- VVT control for terminals up to 2.7 sq. ft inlet
- quick and easy commissioning and balancing process via a dedicated maintenance table for system wide air balancing
- capable of stand-alone operation with supply-air temperature sensor
- actuator preassembled to housing with conduit box and hinged covers
- capable of zone level Demand Controlled Ventilation support with field-installed CO_2 sensor
- communicates to all Carrier 3V networked devices
- capable of high-speed 38.4 kilobaud communications network operation

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- 128 controller maximum system (must be located on same network bus segment)
- up to 32 zone controllers per system
- capable of zone humidity monitoring with field-installed humidity sensor
- Carrier Linkage System capability
- global set point and occupancy scheduling
- sensor averaging
- foreign language support for ASCII based character set
- dedicated port for System Pilot connection
- can drive up to 4 linked damper actuators
- capable of local set point adjustment using field-installed temperature sensor (with temperature offset)
- both controller housing and actuator are UL94-5V plenum rated
- control complies with ASHRAE 62.1

Features/Benefits

Flexibility for every application

The VVT® zone controller is a single duct, variable volume and temperature terminal control with a factory-integrated controller and actuator. The VVT zone controller maintains precise temperature control in the space by regulating the flow of conditioned air into the space.

Buildings with diverse loading conditions can be supported by controlling reheat (single duct only) or supplemental heat. The VVT zone controller can support two-position hot water, modulating hot water, 3-stage electric heat, or combination baseboard and ducted heat.

→ Carrier linkage system compatibility

When linked to a Carrier Linkage System, the VVT zone controller provides numerous features and benefits such as weighted average demand for system operation, reference zone temperature and set points, set point averaging, global set point schedule, and occupancy scheduling.

Additional control features

The VVT zone controller provides additional control features such as Occupied/Unoccupied scheduling initialized via the network. The zone controller offers override invoked from a wall sensor during unoccupied hours from 1 to 1440 minutes in 1-minute increments. Optional CO_2 control or relative humidity monitoring are also available.

Simple actuator connection

The VVT zone controller control assembly contains an integral VVT actuator assembly that is field mounted to the terminal damper shaft, similar to the mounting of a standard actuator. The actuator is rated at 35 lb.-in. (3.95 N-m) torque, a 90-degree stroke, and provides 90-second nominal timing at 60 Hz. The actuator is suitable for mounting onto a $^3/_8$-in. (9.5 mm) square or round VVT box damper shaft, or onto a $^1/_2$-in. (13 mm) round damper shaft. The minimum VVT box damper shaft length is $1^3/_4$-in. (45 mm). The VVT zone controller is designed for vertical or horizontal mounting.

→ Ease of installation

The VVT zone controller is provided with removable connectors for power, communications, and damper. The VVT zone controller has non-removable screw type connectors for inputs. The VVT zone controller also provides an RJ-14 modular phone jack for the Carrier network software connection to the module via Carrier network communications.

User interface

The VVT zone controller is designed to allow a service person or building owner to configure and operate the unit through the System Pilot user interface. A user interface is not required for day-to-day operation. All maintenance, configuration, setup, and diagnostic information is available through the Level II communications port to allow data access by an attached computer running Network Service Tool or ComfortVIEW™ software.

Functions

- Pressure dependent space temperature control for single duct, series fan powered and parallel fan powered air terminals
- Auxiliary heat functions including two-position hot water valve, 3 stages of electric heat, modulating hot water valve and combination radiant/ducted heat stages
- T55/T56 wall mounted space temperature sensor interface
- T56 space temperature set point reset (slide potentiometer)
- Timed override (T55/T56 pushbutton) with one-minute granularity
- Space temperature and set point reset sharing
- Display of relative humidity based on local or remote sensor
- Local occupancy control
- Remote occupancy override
- Airside linkage
- Linkage function for multiple terminals with and without an air source
- Adaptive optimal start (AOS)
- Sensor grouping function
- Commissioning functions
- System-wide air balancing
- Damper calibration
- Sensor trim
- Carrier network tables and alarms
- Demand Controlled Ventilation (DCV)
- Analog CO_2 monitoring and control
- Loadshed/redline response
- System Pilot interface

Specifications

Wiring connections

Field wiring is 18 to 22 AWG (American Wire Gage). The VVT zone controller is a NEC (National Electronic Code) Class 2 rated device.

Inputs

- Space temperature sensor
- T55/T56 wall-mounted space temperature sensor interface
- T56 space temperature set point reset (slide potentiometer)
- Optional supply air temperature sensor (required for reheat and stand-alone operation)
- Optional primary air temperature sensor (one required per system that does not utilize a linkage compatible air source)
- Optional CO_2 sensor
- Optional relative humidity sensor (for monitoring only)
- Optional remote occupancy contact input

Outputs

- Integrated factory-wired pressure dependent damper actuator
- Heating (requires VVT Zone Controller Option Board 33ZCOPTBRD-01)
  - — Two-position hot water
  - — One to three stages of heat
  - — Modulating hot water valve
  - — Combination radiant/ducted heat stages
- Terminal fan (requires VVT Zone Controller Option Board 33ZCOPTBRD-01)
- Damper position output (0 to 10v) for linked dampers

Power supply

The power supply is 24 vac ± 10% at 40 va (50/60 Hz).

Communications

The number of controllers is limited to 128 devices maximum, with a limit of 8 systems (Linkage Coordinator configured for at least 2 zones). Bus length may not exceed 4000 ft (1219 m), with no more than 60 devices on any 1000 ft (305 m) section. Optically isolated RS-485 repeaters are required every 1000 ft (305 m).

At 19,200 and 38,400 baud, the number of controllers is limited to 128 maximum, with no limit on the number of Linkage Coordinators. Bus length may not exceed 1000 ft (305 m).

Environmental ratings

Operating Temperature. . . . .32 F to 131 F (0° C to 55 C)
Storage Temperature . . . . . .32 F to 158 F (0° C to 70 C)
Operating Humidity . . . . . .10% to 95%, non-condensing
Storage Humidity . . . . .10% to 41% at 158 F, condensing

Power consumption

The power requirement sizing allows for accessory water valves and for the fan contactor. Water valves are limited to 15 va. The fan contactor is limited to 10 va (holding).

Vibration

Performance Vibration:

1.5 G measured at 20 to 300 Hz

Corrosion

Office environment. Indoor use only.

Approvals

- NEC Class 2
- UL 916-PAZX and UL 873
- Conforms to requirements per European Consortium standards EN50081-1 (CISPR 22, Class B) and EN50082-1 (IEC 801-2, IEC 801-3, and IEC 801-4) for CE mark labeling
- UL94-5V (actuator)

Accessories

Supply air temperature sensor — The 33ZCSENSAT supply air temperature sensor is required for heating applications or stand-alone operation. The sensor has an operating range of –40 to 245 F (–40 to 118 C) and includes a 6-in. stainless steel probe and cable.

Duct air temperature sensor — The 33ZCSENDAT Duct Air Temperature Sensor is required for cooling only applications on non-33ZC dampers. The sensor is used for supply air monitoring. The sensor has an operating range of –40 to 245 F (–40 to 118 C) and includes a mounting grommet and 75-in. cable.

Primary air temperature sensor — The 33ZCSENPAT Primary Air Temperature sensor is required on a linkage coordinator Zone Controller if the Zone Controller is not using a Carrier network, linkage compatible air source. The sensor is used to monitor the equipment's supply-air temperature. The temperature is broadcast to the system Zone Controllers which receive information from the master. The sensor has an operating range of –40 to 245 F (–40 to 118 C) and includes a 6-in. stainless steel probe with conduit box.

Space temperature sensor with override button — The 33ZCT55SPT Space Temperature Sensor with Override Button is required for all applications. The space temperature sensor monitors room temperature, which is used by the Zone Controller to determine the amount of conditioned air that is allowed into the space.

Space temperature sensor with override button and set point adjustment — The 33ZCT56SPT Space Temperature Sensor with Override Button and Set Point Adjustment can be used in place of the 33ZCT55SPT space temperature sensor if local set point adjustment is required. A space temperature sensor is required for all applications. The space temperature sensor monitors room temperature, which is used by the Zone Controller to determine the amount of conditioned air that is allowed into the space. The set point adjustment bar is configurable

Accessories (cont)

for up to a ± 15 F (8 C) temperature adjustment by the room occupant.

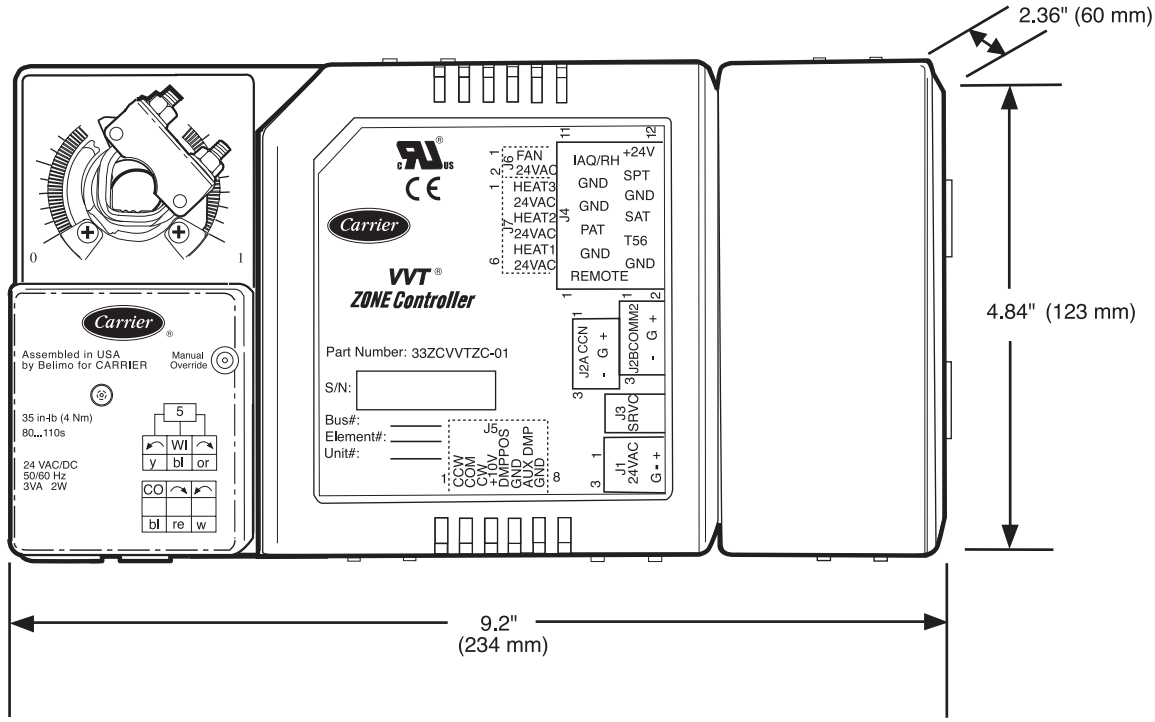
Space temperature sensor with override button, set point adjustment, and liquid crystal display (LCD) — The 33ZCT59SPT space temperature sensor with override button, set point adjustment, and LCD can be used in place of the 33ZCT56SPT space temperature sensor if an LCD is required. A space temperature sensor is required for all applications.

Relative humidity sensor — The 33ZCSENSRH-01 Relative Humidity sensor (indoor space) is required for zone humidity monitoring.

Indoor air quality sensor — Two CO_2 sensors are available for optional Demand Controlled Ventilation (DCV). They are indoor, wall-mounted sensors. The 33ZCT55CO2 CO_2 sensor is a combination CO_2 sensor and temperature sensor with pushbutton timed override. The 33ZCT56CO2 has these features and includes a set point offset slidebar.

NOTE: The Relative Humidity sensor and Indoor Air Quality (CO_2) sensor cannot be used on the same zone controller.

VVT® zone controller option board (33ZCOPTBRD-01) — The 3V-VVT Zone Controller Option Board is required for use of auxiliary heat and fan control functions. The Option Board is field installed and provides four triac discrete outputs, three for supplemental heat and one for the fan output.

Dimensions

→ **ZONE CONTROLLER**