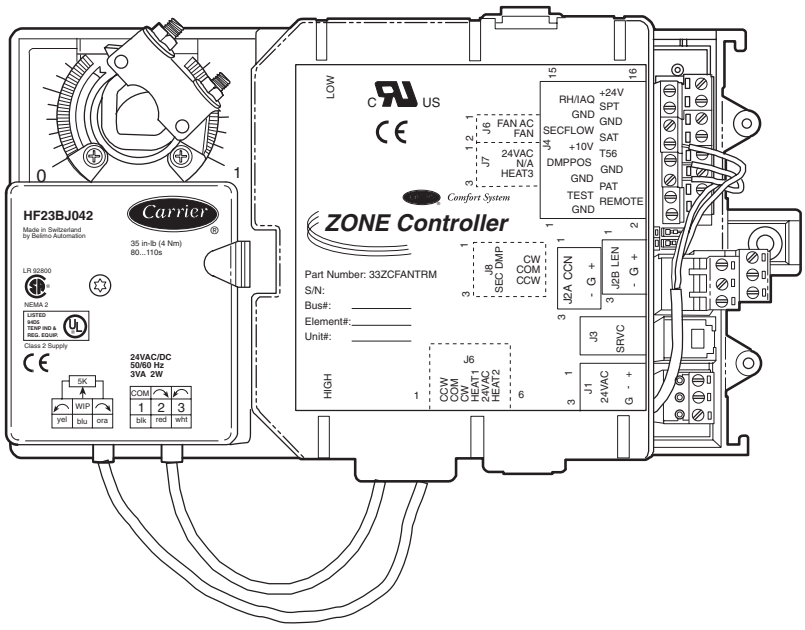
Product Specification

VAV Fan Terminal Zone Controller

Part Number 33ZCFANTRM



The VAV Fan Terminal Zone Controller provides dedicated control functions for series fan or parallel fan powered terminals, single duct terminals with 3 stages of heat, or as a primary controller for dual duct or zone pressurization applications. The zone controller is part of the Carrier ComfortID System.

The 33ZCFANTRM VAV Fan Terminal Zone Controller provides the following features and benefits:

- provides Pressure Independent (VAV) control
- uses Proportional Integral Derivative (PID) control
- mounts directly onto VAV box damper shaft
- terminal fan control
- for terminals up to 9000 cfm or 3.4 sq. ft inlet (primary air)
- auxiliary heating control of modulating (floating) hot water, two-position hot water; single, two, or three stage electric; or zone perimeter heat
- quick and easy commissioning and balancing process
- automatic self calibration of airflow transducer
- capable of stand-alone operation, with supply air temperature sensor
- actuator preassembled to housing
- capable of demand controlled ventilation support with field-installed IAQ sensor
- capable of individual zone pressure control for individual supply and exhaust control in conjunction with field-installed secondary terminal
- easy access to airflow sensor pneumatic connections
- uses Carrier Comfort Network (CCN) protocol
- capable of high-speed 38.4 kilobaud communications network operation

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→ • provides a remote occupancy contact input for a field-supplied occupancy sensor
- 128 controller maximum system (must be located on same CCN bus segment)
- capable of zone humidity control (dehumidification) with field-installed humidity sensor
- Carrier Linkage System capability
- global set point and occupancy scheduling
- capable of local set point adjustment with field-installed temperature sensor (with temperature offset)
- both controller housing and actuator are UL94-5V plenum rated

Features/Benefits

Flexibility for every application

The zone controller is a single duct, fan powered, variable air volume (VAV) terminal control with a factory-integrated controller and actuator. The zone controller maintains precise temperature control in the space by operating the terminal fan and 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 zone controller can support two-position hot water, modulating hot water, or 3-stage electric heat.

With the addition of a secondary terminal and the 33ZCSECTRM controller, either dual duct or zone pressurization applications can be supported.

Carrier Linkage System compatibility

When linked to a Carrier Linkage System, the zone controller provides numerous features and benefits such as weighted average demand for system operation, intelligent supply air temperature reset, set point averaging, global set point schedule, and occupancy scheduling. Duct static reset for the air source is provided, based on terminal requirements.

Additional control features

The 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 indoor air quality (IAQ) or relative humidity monitoring and control are also available.

Simple actuator connection

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

Ease of installation

The zone controller is provided with removable connectors for power and communications. The zone controller has non-removable screw type connectors for inputs. The removable connectors are designed so that they can be inserted one way so as to prevent installation errors. The zone controller also provides an RJ-14 modular phone jack for the Network Service tool connection to the module via the Carrier Comfort Network (CCN) communications.

An optional conduit box cover (Part Number 33ZCCONBOX) provides for field wiring connection via conduit. The conduit box is designed to accept two $^1/_2$-in. (13 mm) EMT conduits.

User interface

The 33ZCFANTRM is designed to allow a service person or building owner to configure and operate the unit through the CCN user interfaces. 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, ComfortVIEW™, or ComfortWORKS® software.

Specifications

Wiring connections

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

→ Inputs

- space temperature sensor
- primary air damper position
- airflow sensor (factory installed)
- field-installed remote wall sensor set point adjustment
- optional supply temperature sensor (required for heat and supply air monitoring)
- optional primary air temperature sensor (required for systems which do not utilize a linkage compatible air source)
- optional IAQ sensor
- optional relative humidity sensor
- optional secondary airflow (zone pressure or dual duct)
- optional remote occupancy contact input

Outputs

- internally factory-wired VAV actuator
- heating
  - modulating (floating) heat
  - up to 3 stage heat
  - two-position heat
- fan start/stop
- secondary damper actuator

Power supply

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

Power consumption

The power requirement sizing allows for accessory water valves and for the fan contactor. Water valves are limited to 8 VA on both two-position and modulating hot water. The fan contactor is limited to 11 VA (holding).

NOTE: If a water valve or fan contactor exceeds these limits, or external contactors are required for electric heat, then it is recommended a 60 VA transformer be used. The maximum rating for any output is 20 VA.

Accuracy

Terminal airflow (nominal cfm) is rated at 1 in. wg (249 kPa) measured velocity pressure. The zone controller is capable of controlling to as low as 10% or as high as 125% of nominal airflow with an accuracy of ± 3% (nominal) at any point within the range.

Hardware (memory)

FLASH EPROM

Differential pressure range

0 to 2.0 in. wg (0 to 498 kPa) maximum for the onboard flow sensor.

Specified sensing temperature range

The zone controller space temperature range is –40 to 245 F (–40 to 118 C). The zone controller has an allowable control set point range from 40 to 90 F (4 to 32 C) for heating and 45 to 99 F (7 to 37 C) for cooling.

Communications

The number of controllers is limited to 128 zones 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 to 140 F (0° to 60 C) at 0 to 90% RH (non-condensing)

Shipping Temperature: –40 to 185 F (–40 to 85 C) at 0 to 90% RH (non-condensing)

Vibration

Performance vibration: 0.014-in. (0.356 mm) peak to peak displacement, 5 to 31 Hz; 0.75 G, 31 to 300 Hz

Corrosion

Office environment. Indoor use only.

Approvals

Listed under UL 916-PAZX, UL 873, and UL94-5V.

Accessories

Secondary terminal controller — The 33ZCSECTRM secondary terminal controller is required for dual duct or zone pressurization applications. The secondary terminal is used on a field-supplied, single zone damper.

Conduit box — The 33ZCCONBOX conduit box provides two conduit connections to the zone controller for installations requiring the use of conduit due to local electrical codes.

Supply air temperature sensor — The 33ZCSENSAT supply air temperature sensor is required for heating applications or stand-alone operation. The sensor is optional on cooling only applications and is used for supply air monitoring. The sensor has an operating range of –40 to 245 F (–40 to 118 C).

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 CCN linkage compatible air source. The sensor is used to monitor the equipment's supply air temperature. The temperature is broadcast to the zone controllers which receive information from the linkage coordinator. The sensor has an operating range of –40 to 245 F (–40 to 118C).

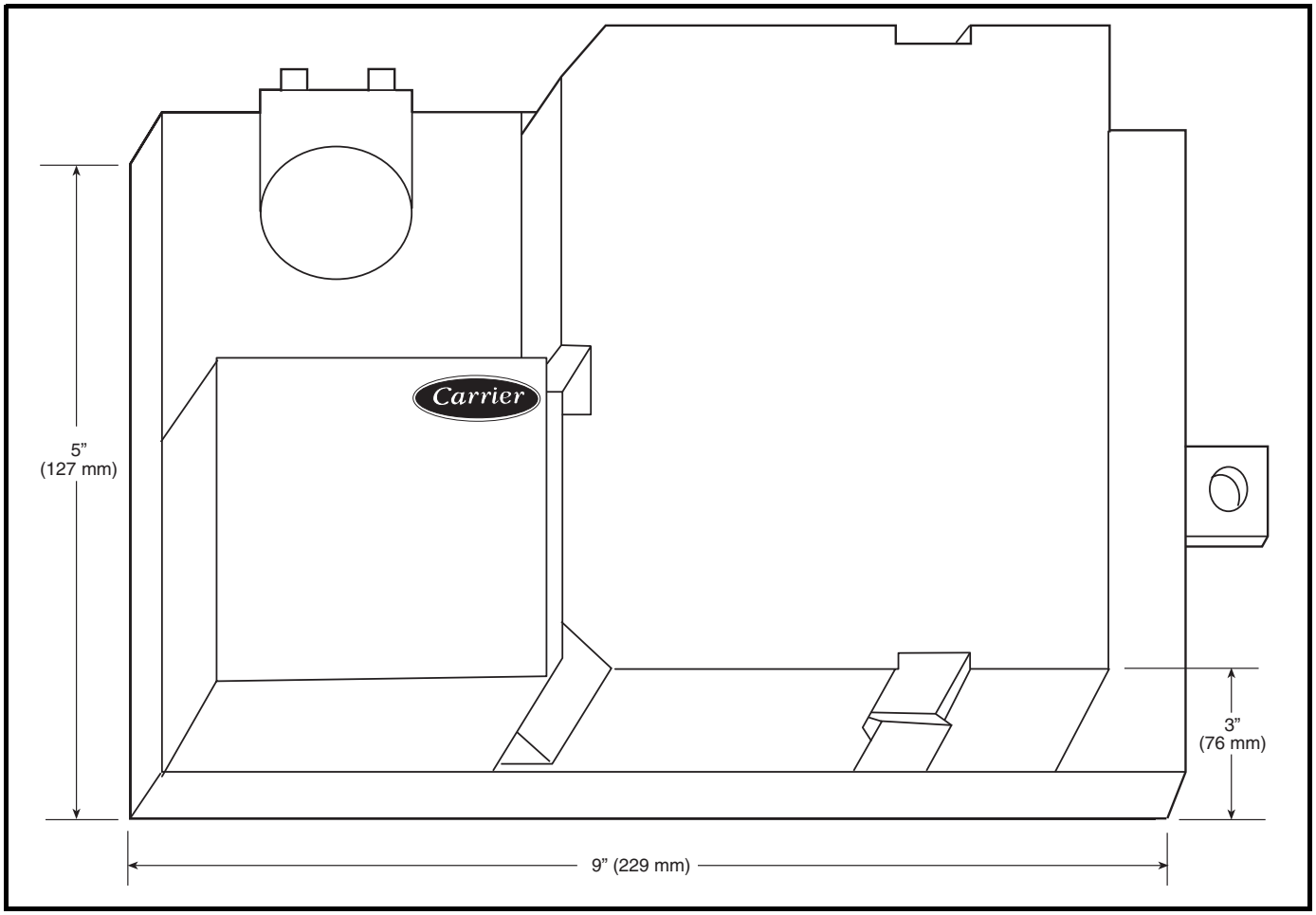
Space temperature sensor with override button — The 33ZCT55SPT space temperature sensor with override button is required for all applications. The space temperature sensor monitors room temperature which is used by the zone controller to determine the amount of conditioned air that is allowed into the 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 allows up to a ± 15° F (8° C) temperature adjustment by the room occupant.

Relative humidity sensor — The 33AMSENRHS000 relative humidity sensor (indoor space) is required for zone humidity control (dehumidification).

NOTE: The relative humidity sensor and CO_2 sensor cannot be used on the same zone controller.

CO_2 sensor — Two CO_2 sensors are available for optional demand control ventilation. The CGCDXSEN002A00 CO_2 sensor is an indoor, wall mounted sensor with an LED (light-emitting diode) display. The CGCDXSEN003A00 CO_2 sensor is an indoor, wall mounted sensor without display.

NOTE: The relative humidity sensor and CO_2 sensor cannot be used on the same zone controller.

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