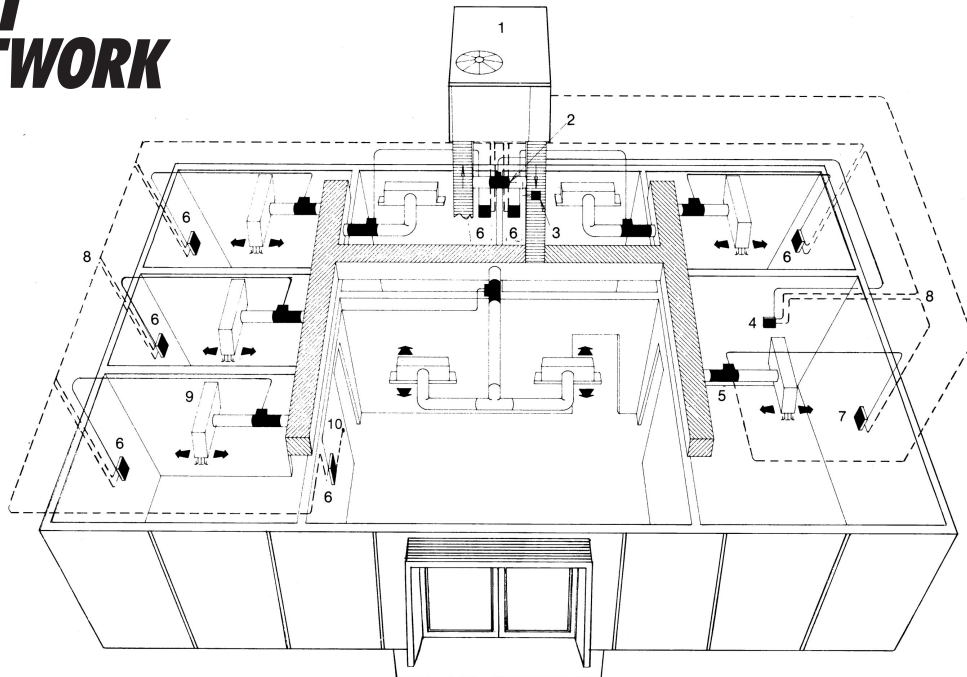




COMFORT NETWORK



33CS

Carrier Comfort System (VVT_{III})

Before VVT a precise level of comfort in all building zones or areas was impossible when using a single zone constant volume HVAC unit without energy wasting reheat. Building loads and personal requirements differed or changed constantly. Some zones were too hot, others too cold. Only the zone with the thermostat gave true individual comfort control to its occupants. With VVT every zone has a micro-electronic thermostat to gather information from the zone, take more decisions and control more devices than any conventional electric, electro-mechanical or pneumatic control system. Zone thermostats control their associated zone damper and regulate the air flow to prevent over-cooling and over-heating. Any one of the zone thermostats can control the Carrier HVAC equipment based on its own requirements and demand. A monitor thermostat acts as the brain of the system and makes decisions based on information and demands from the zone thermostats. Heating and cooling are achieved via the same duct system. No separate heating system is needed, neither is there a need to invest in special VAV or HVAC equipment. The bypass system maintains a constant volume around the standard single zone unit whilst the zones modulate to maintain their individual requirements. With VVT, variable air volume and variable temperature are possible from a standard single zone constant volume Carrier unit.

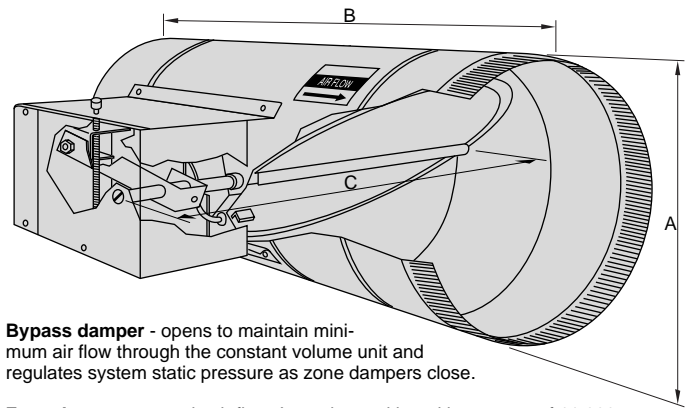
1. Carrier constant volume rooftop or ducted split system unit, single zone air handling unit. (Cooling only, cooling and electric heat, heat pump, or cooling with low pressure hot water heating.)
2. Bypass damper
3. Pressure sensor
4. Bypass controller
5. Zone damper
6. Zone controller
7. Monitor thermostat
8. Communication bus - all major components are interlinked with a 3-wire connection to enable them to talk to each other.
9. Carrier linear VAV boot diffuser - provides excellent air distribution and prevents dumping at low air volumes.
10. Indoor Air Quality sensor

The new 33CS Carrier Comfort System (VVT) is compatible with the Carrier Comfort Network which offers a seamless system solution for VVT and CCN products. Some of the enhanced features and functions include:

- Improved equipment performance, protection and diagnostics
- New economy modes, free cooling, building purge and optimized heating/cooling staging
- Indoor Air Quality algorithm
- 365-day calendar, time clock
- Enhanced user display for simple programming

Zone/bypass damper dimensions, mm

Model	A	B	C
ZD-06	152	457	279
ZD-08	203	457	330
ZD-10	254	457	381
ZD-12	305	610	432
ZD-14	356	610	483
ZD-16	406	610	533



Bypass damper - opens to maintain minimum air flow through the constant volume unit and regulates system static pressure as zone dampers close.

Zone damper - controls air flow. It can be positioned in any one of 11,000 positions for precision control of space temperature.



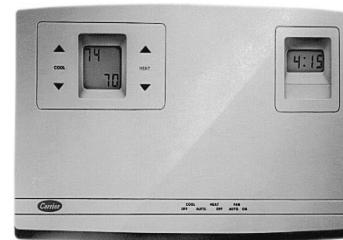
Bypass controller

Bypass controller - receives pressure sensor information and maintains preset air flow by opening and closing the bypass damper.



Zone thermostat

Zone thermostat - interfaced to zone damper. Uses an 8 K micro computer chip, dual heat-cool set points, °C/°F LCD display, system operation mode display (heat, cool, fan, etc). Room temperature display, etc.



Monitor thermostat with time clock

Monitor thermostat - interfaces to its own zone damper and controls the system. Receives information from the zone thermostats every 20 seconds (room set points, room temperature, duct temperature, zone damper position, etc) and selects heating or cooling mode, available with or without a time clock.

Accessories

Mechanical lock for all monitor, slave and bypass controller cases. Electronic limiting of set points option is standard.

Remote room sensor for monitor and slave thermostats.

Remote duct sensor for use with heat pump systems.

Outside air thermostat for intelligent night set back override of heat pumps.

Wall- or duct-mounted CO₂ sensor to monitor indoor air quality levels.

Relay packs to control Carrier HVAC units - 24 volt pilot duty.

Bridge bus dividers used when more than 32 devices are connected to the communication bus.

Network Access Module enables multiple communication buses to be connected and monitored. RS485 to RS485 and RS485 to RS232 models available. Monitoring can be achieved on-site or remote via modem.

Comfort System software provides on-site or remote monitoring facility. Allows the use of standard IBM PCs that may already be in use within the building for monitoring purposes, or via a modem for remote monitoring, service and diagnostics.

Zone damper selection

The following criteria for zone dampers must be adhered to for optimum system performance and quiet system operation.

Step 1: Size run out duct/diffusers per zone based on 125% of zone air flow requirement and 4 m/s maximum velocity.

Step 2: Select the nearest zone damper size to match the run out duct size arrived at in step 1 above.

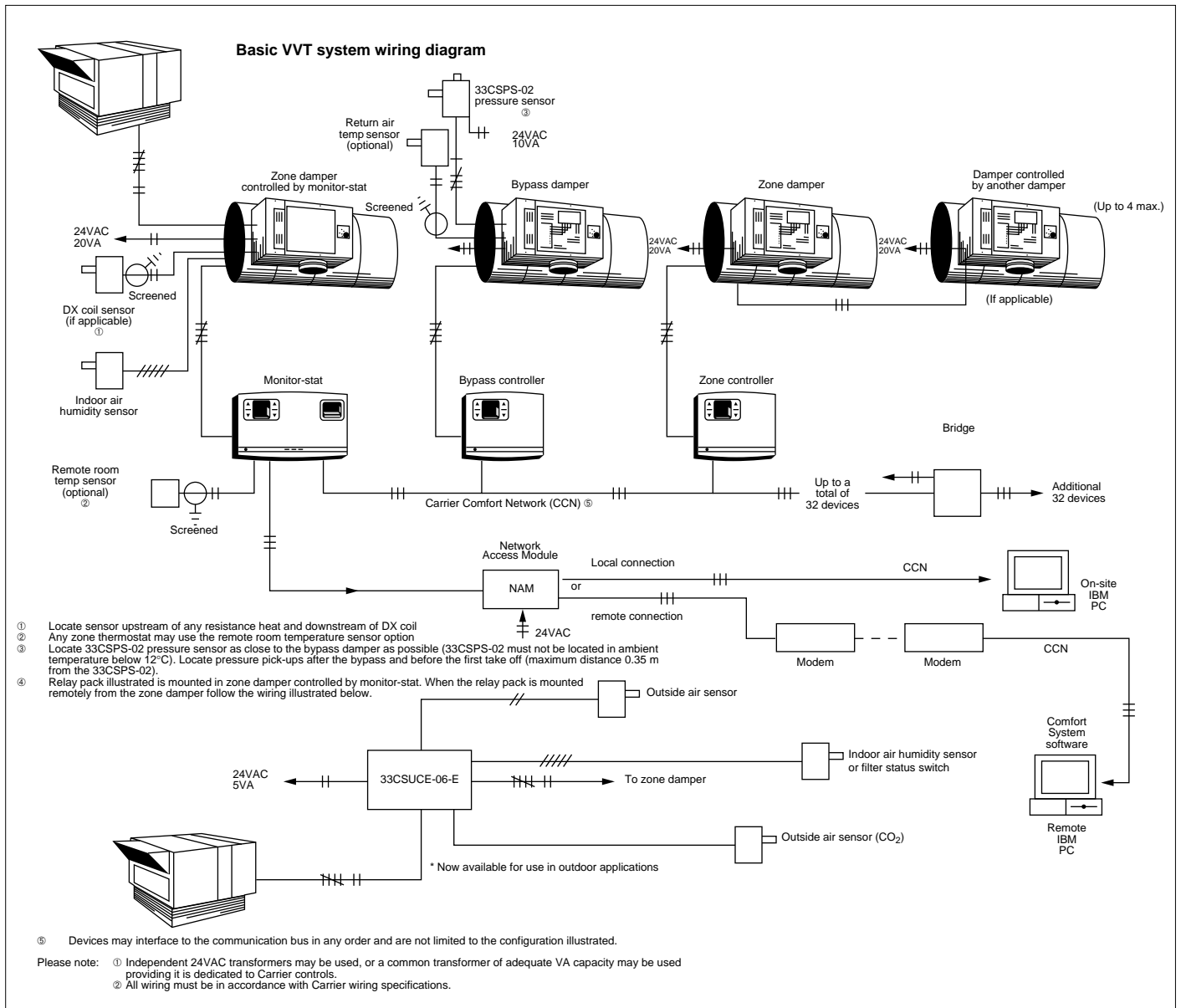
Step 3: If a zone damper does not match the calculated duct size, upsize the duct to match the next size zone damper available.

The zone damper capacity table is given for information purposes only. Damper selection is arrived at by following the above procedure.

Physical data

Zone damper capacities

Model	Air flow, l/s	Velocity, m/s	Pressure drop, Pa
ZD-06	76	4.6	6.2
	99	6.1	12.5
	122	7.9	18.7
	147	9.0	25.0
ZD-08	134	4.6	6.2
	177	6.1	12.5
	230	7.9	18.7
	264	9.0	25.0
ZD-10	231	4.6	6.2
	310	6.1	12.5
	400	7.9	18.7
	466	9.6	25.0
ZD-12	305	4.6	6.2
	395	6.1	12.5
	518	7.9	18.7
	590	9.0	25.0
ZD-14	453	4.6	6.2
	604	6.1	12.5
	783	7.9	18.7
	896	9.0	25.0
ZD-16	487	4.6	6.2
	708	6.1	12.5
	904	7.9	18.7
	1610	9.0	25.0



Bypass damper selection

Bypass damper selection is carried out as follows:

1. The bypass damper must be sized at 90% of the total system air flow.
2. The velocity through the bypass must not exceed 6 m/s to 7.5 m/s.
3. A manual balancing damper must be installed next to the bypass damper to assist in air balancing.

Note: If more than one Carrier Zone Damper is required due to the air volume, it is strongly recommended that a HTA (high torque actuator) is used along with a locally obtained opposed blade damper. The HTA has a 60° stroke (full open/full closed) and 1/2" diameter linkage connection.

Network Access Module (NAM)

The Network Access Module is used to communicate with the Carrier Comfort Network from a remote location via a modem or locally via a PC. The NAM provides access to the CCN for the purpose of data and alarm inquiry, troubleshooting and configuration modification. Note: The NAM can be used to access any device residing on the CCN bus.

Comfort System software

The Comfort System software package is to provide, through the use of a personal computer, the ability to monitor, diagnose, and modify devices on the installed Carrier Comfort Network.

The Comfort System software provides the ability to: access each device connected to the Carrier Communication Bus (Carrier Comfort Network); examine device and system operating parameters; examine each device error register and perform troubleshooting; and examine and modify the individual configurable options of the devices.

Comfort System software communicates with devices by means of the Carrier Comfort Network (CCN). The user can monitor and configure the following Carrier Comfort System devices:

- TEMP system monitors with and without timeclocks
- VVT monitor thermostats with timeclocks (4-zone, 16-zone and 32-zone)
- VVT monitor thermostats without timeclocks (4-zone, 16-zone and 32-zone)
- VVT zone controllers
- VVT bypass controllers

If the Assured Comfort System (ACS) software has been installed on the personal computer, the ACS software can be activated from Comfort System software.

There are two modes of operation - Basic and Expert Mode. The table below illustrates the functions supported for both these modes.

Basic and Expert Mode functions

Category	Basic Mode	Expert Mode*
CS Centre	Network Search (Open Bridge List and Display Bridge only) Bus Scan (Open Device List and Display Device List only) Device View Status (view only) Time Schedule Holiday Set Point Configuration (view only) Service Config. (view only) Maintenance Controller ID Set Device Time System Summary Unit Status	Network Search Bus Scan Device View System Summary Unit Status Copy Configuration Copy Time Sch and Holidays Modify Device Names Save Device List
System Setup	No functions available	Connect to Site Network Parameters Disconnect Modem Configuration Display Units
ACS Centre!	ACS Centre!	ACS Centre!
About	About	About

* All commands are available for the menu items listed, including Force, Auto and Download when applicable.

The figure below shows the parameters displayed when a device on the network is viewed.

Device View (VVT monitor thermostat shown)

Comfort System - Expert
 Status Schedules Setpoint Configuration Service

Site Name: Local Network Connection: Local Comm Status: Enabled

<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> ↑ COOL ↓ </div> <div style="text-align: center;"> ↑ HEAT ↓ </div> </div> <div style="text-align: center; margin-top: 10px;"> </div> <p>IAQ Status Normal</p>	<p>Occupancy Sched Local Optimal Start? No Outside Air Temp 20 Outdoor Humidity 58 Zone Temperature 23 Duct Temperature 21 Damper Position N/A</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Relay</th> <th>Status</th> </tr> </thead> <tbody> <tr><td>COOL 1</td><td>On</td></tr> <tr><td>COOL 2</td><td>On</td></tr> <tr><td>HEAT 1</td><td>Off</td></tr> <tr><td>HEAT 2</td><td>Off</td></tr> <tr><td>Pan</td><td>On</td></tr> <tr><td>AUX</td><td>Off</td></tr> </tbody> </table> <p style="margin-top: 10px;">Cool Enable Heat Enable Fan On</p>	Relay	Status	COOL 1	On	COOL 2	On	HEAT 1	Off	HEAT 2	Off	Pan	On	AUX	Off
Relay	Status															
COOL 1	On															
COOL 2	On															
HEAT 1	Off															
HEAT 2	Off															
Pan	On															
AUX	Off															

Name	Description	Address	Type	Ver	Alarm	Dev	Time
33CSVM	VVT Monitor	0 10	1VM	02.0	SE_01x	SAT	05:34

Occ?	Occ Strt	Occ End	Next Day	Next Tim	Mtr1	Mtr2	Mtr3
Yes	00:00	24:00	Mon	00:00	0	0	0

Device View Status: Idle 02-20-1996 05:34:22

Temp Comfort System (Single Zone) 33CSTMT-01

A temp system is a network of Carrier temp system thermostats, each serving its own zone and heating/cooling unit. This allows you to easily access each system from a single location, in the same building or elsewhere in the town.

The temp system is ideal for department stores, small office buildings, fast food chains, schools and hotels. It is a cost-effective way to maintain comfortable building environments.

The affordable single-zone temp systems thermostats are state-of-the-art microelectronic programmable HVAC thermostats. They are designed to replace inaccurate mercury/bimetallic thermostats and provide many unique features and benefits.

Features

- Attractive and slim. No more ugly boxes on the wall.
- Ultra safe low voltage. 24 VAC power and 9VDC internal.
- Easy to read LCD display. Setpoints, operating mode (cool, heat, fan, one or two stages), time clock, etc.
- Dual setpoints for maximum comfort and energy efficiency.
- Can be used with heat pump models.
- One- or two-stage cool/heat applications.
- Solid state room sensor (remote sensor optional).
- Locking cover and system switches (supplied loose for field fitting).
- Communicates directly on the Carrier Comfort Network.
- Setpoint limiting feature - prevents unauthorised adjustment outside a temperature range that you decide.
- Built-in setback/out of hours override timer - adjustable between 10 and 2550 minutes (42.5 hours).
- 365-day programmable time clock - eight on/off periods per day.
- Digital display or room, outside air, supply air temperatures and relative humidity on demand to 1/10th of a degree C or F.
- Built-in direct digital temperature sensor calibration. Requires the use of a hand-held digital thermometer with 1/10th °C and °F resolution. No more resistance vs temperature graphs.
- Cooling and heating operation lockout vs ambient temperature - prevents equipment operation below/above predetermined temperatures to maximise energy savings (requires optional outside air sensor).
- Built-in self diagnostic display via LCD screen.
- Set-back relay. When not used the reversing valve relay on the relay pack can be used to control (on/off) other building services on the same time schedule as the temp thermostat, e.g. exhaust fans, lights, vending machines, etc.
- HVAC unit metering (requires optional PC software). System can meter set-back override or total HVAC unit run-time hours.
- Compatible with gas fired units.
- Built-in high/low limit unit protection based on supply air temperature. Added HVAC unit protection (requires optional supply air sensor).
- Built-in Time Guard protection. Prevents compressor short cycling and eliminates additional HVAC unit accessories.
- Staggered start feature. Multiple unit applications are staged-in to prevent excess power draw after a power failure and when programmed to start at the same time.

- No batteries needed for memory retention. All programmed data is maintained indefinitely through the use of a Non Volatile Ram (NVR) chip. Time clock is guaranteed to retain its memory for a minimum of 8 hours after a power failure, via a capacitor discharge system. Eliminates the use and maintenance of batteries.
- Temperature Trend Staging (TTS). Uses the room temperature rate-of-change to reduce the use of second stage cooling/heating and maximise energy efficiency.
- Energy saver lock-out. When space demand exceeds more than 4.4°C the second stage cooling/heating is delayed for 20 minutes. This feature operates once per day on start up to give the first stage a chance to satisfy the demand without the use of the second stage.

Developed from Carrier's highly successful VVT controls, the Temp System has standard features that have never before been available at the price or for single zone CAV HVAC equipment.

Applications:

- Single packaged units
- All electric
- Heat pump and low pressure hot water heating units
- Split system units
- Water source heat pumps (ceiling void mounted)
- Fan coils (ceiling void mounted)

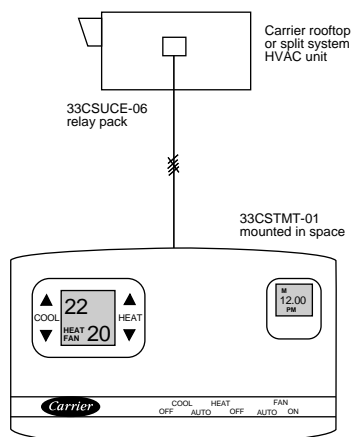
Optional accessories

- Sensors
- Remote room sensor
- Supply air sensor
- Outside air sensor
- Relative humidity sensor

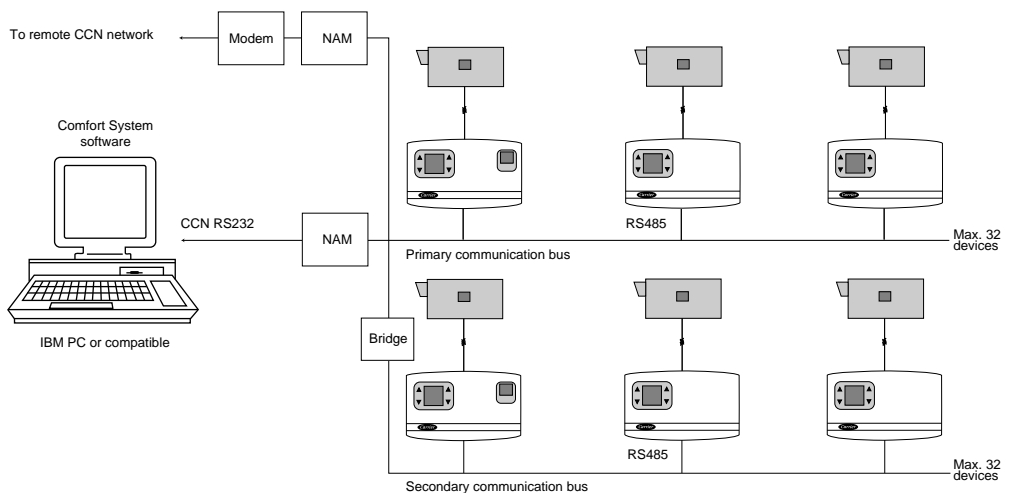
Communication accessories

- RS485 isolation for multiple communication bus applications.
- NAM RS232 to RS485 isolation for PC and modem interface.
- RS232 telephone modem. For remote communications.
- Comfort System software for on-site or remote communications.

Single Zone Application



Multiple Single Zone Application





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Manufacturer reserves the right to change any product specifications without notice.

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