
OXYGEN8
VENTUM+
High Performance H/ERV with
Hydronic / VRV Integration and
Optional Mixed Air Ventilation

Who We Are

Oxygen8 is reinventing how buildings provide healthy and comfortable air in an energy efficient way. We work to enhance living and working environments with fresh, filtered air using smart technology for maximum comfort and value.

[ox·y·gen·ate]

Nothing is more refreshing and essential to the human body than oxygen, which happens to be the eighth element in the periodic table. We oxygenate businesses, classrooms, senior care facilities and other buildings with fresh air so people can work, live and breathe in a safe and comfortable environment.

Why We Do What We Do

To Create Healthy Indoor Environments

Indoor air quality can suffer when recirculated air is not properly filtered or humidity is poorly controlled, contributing to discomfort and the spread of airborne contaminants. Healthier buildings balance fresh outdoor air with well managed recirculation, supported by appropriate filtration, humidity control, and energy recovery strategies including both fixed plate and rotary heat recovery technologies. Together, these approaches help regulate heat and moisture while reducing the risk of cross contamination between air streams.

To Move Toward Building Electrification

To reduce greenhouse gases, many North American cities are moving toward net-zero energy over the next decade, which will drive demand for all-electric HVAC systems and low energy technologies. Oxygen8 is here to meet that demand with our all-electric heating and cooling solutions.

For Better Building Design

As building design becomes more insulated and air-tight, the need for energy efficient cooling becomes ever more important. Cooling with fixed-plate energy recovery and VRV integration helps to reduce energy consumption while meeting ventilation requirements.

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VENTUM+ H/ERV
High Performance
Counter-Flow Heat Exchanger

Energy Efficient

Ventum+ features variable speed plenum ECM direct-driven fans with low energy consumption and insulated panels for a high-efficiency solution. The counter-flow core allows for high sensible (HRV) and latent (ERV) energy recovery with no moving parts or cross contamination.

Healthy Buildings

Ventum+ uses 100% outside air, with a mixed-air option for further energy saving options. The counterflow ERV core is made of a polymer membrane with no virus cross-over: tested under ASTM F1671. The units typically ship with MERV 13 filters for outdoor air and MERV 8 filters for return air, with special filtration options per request.

All-Electric

This all-electric ventilation solution helps to reduce the carbon footprint of buildings, while bringing fresh outside air into the space. Ventum+ integrates with Daikin's VRV Outdoor Unit for temperature and humidity control all year round. Ventum+ integrates with heat-pump chillers using hydronic coils and valves

Modular Design with Wide Airflow Range

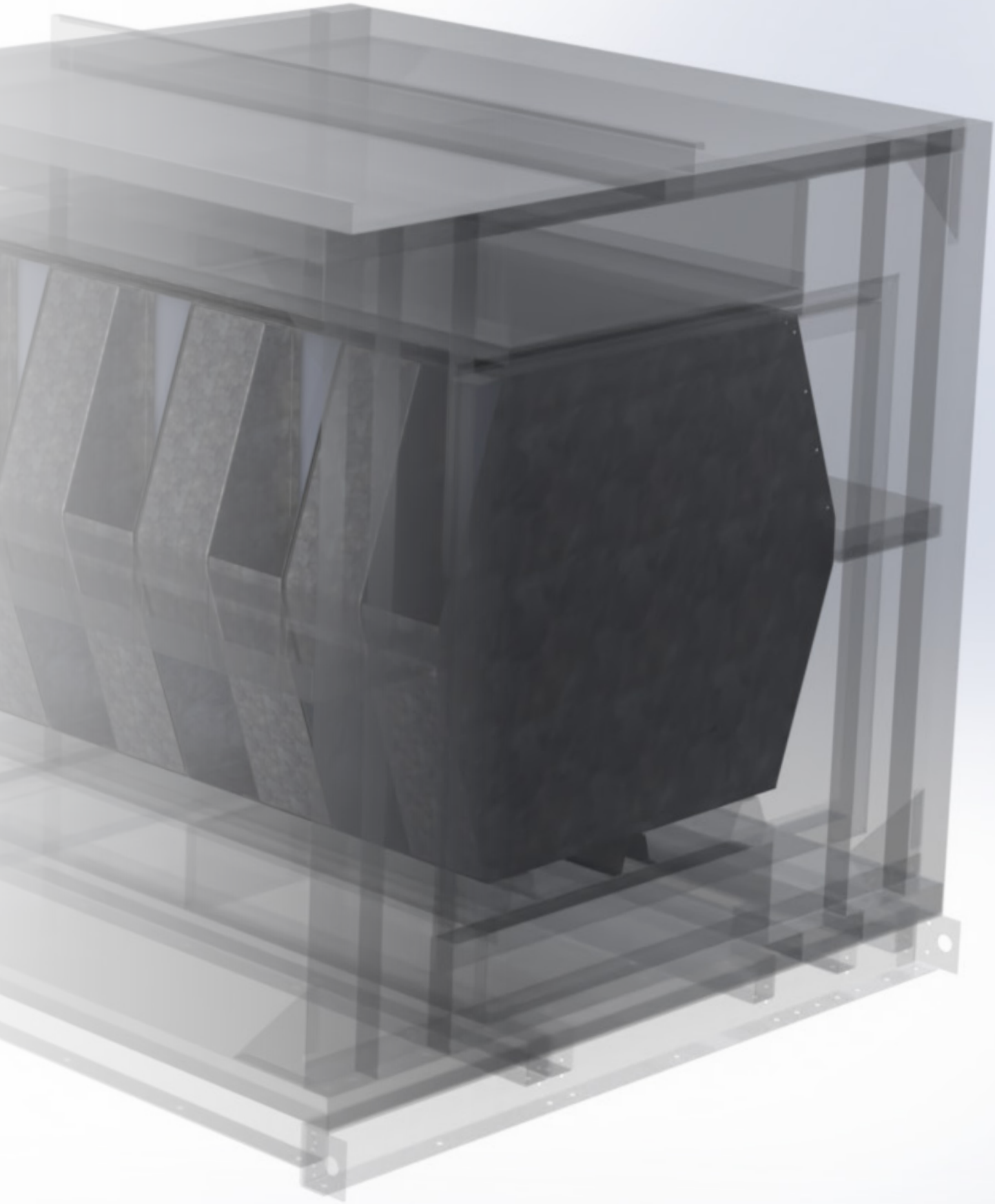
Ventum+ units have a 1,200 – 15,000 cfm range. The units are shipped in smaller modules for indoor installations and can also be mounted on rooftops with horizontal or down discharge.

Integrated Solution

Ventum+ integrates with Daikin's VRV Outdoor Unit and DX or DOAS Controller which comes factory-mounted to the Daikin approved DX Coil and Electronic Expansion Valves.

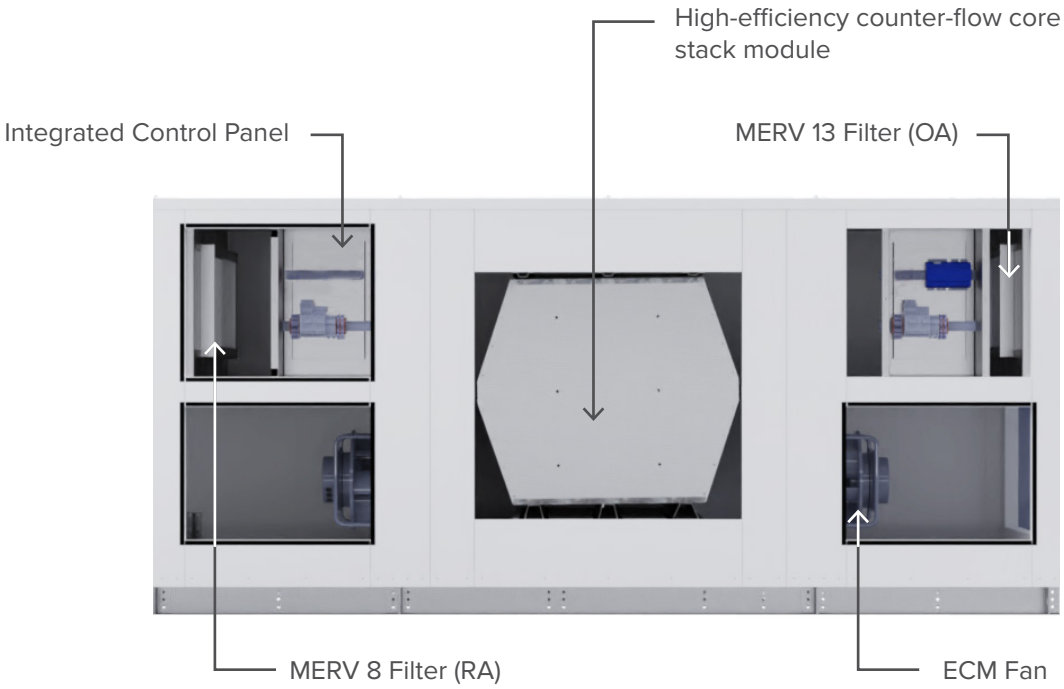
Accurate Temperature & Humidity Control

With Daikin VRV heat recovery systems both leaving air temperature and humidity can be controlled accurately.



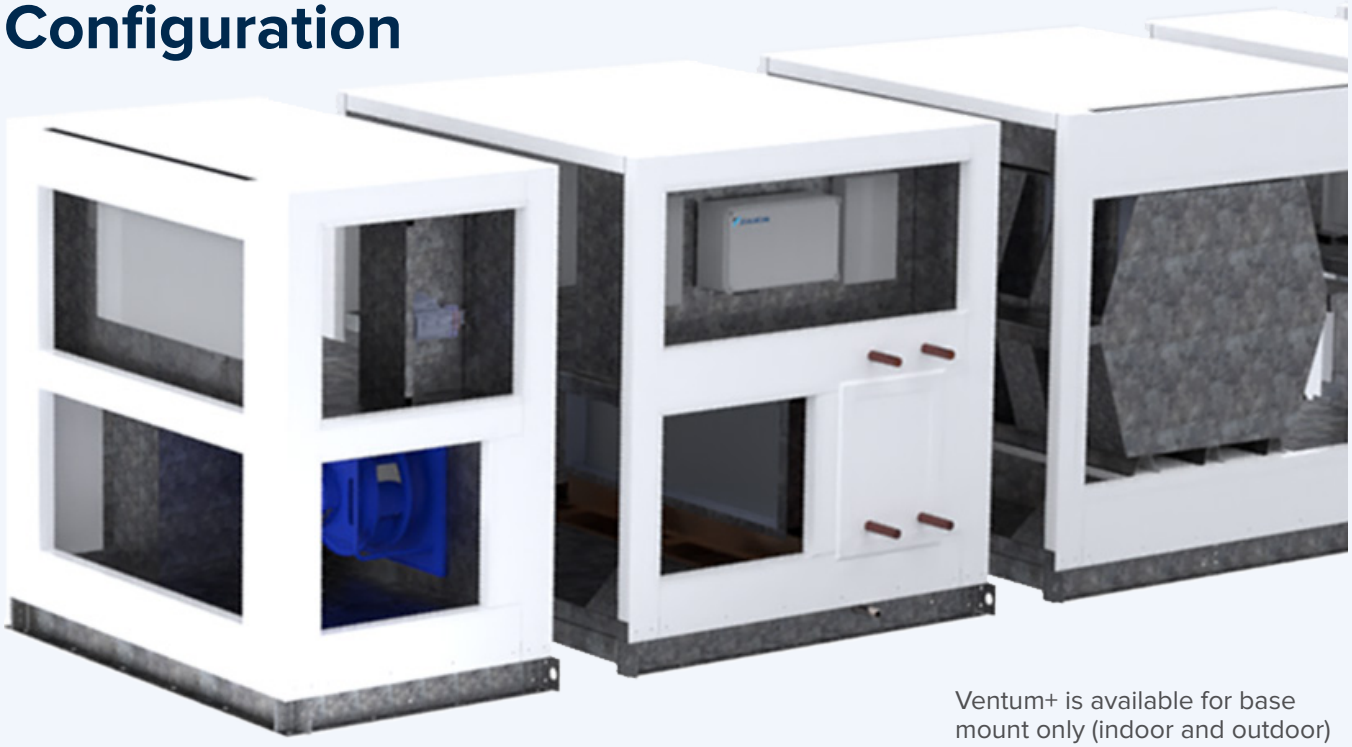
Ventum+ System Overview
Base System Components

Indoor Base Model

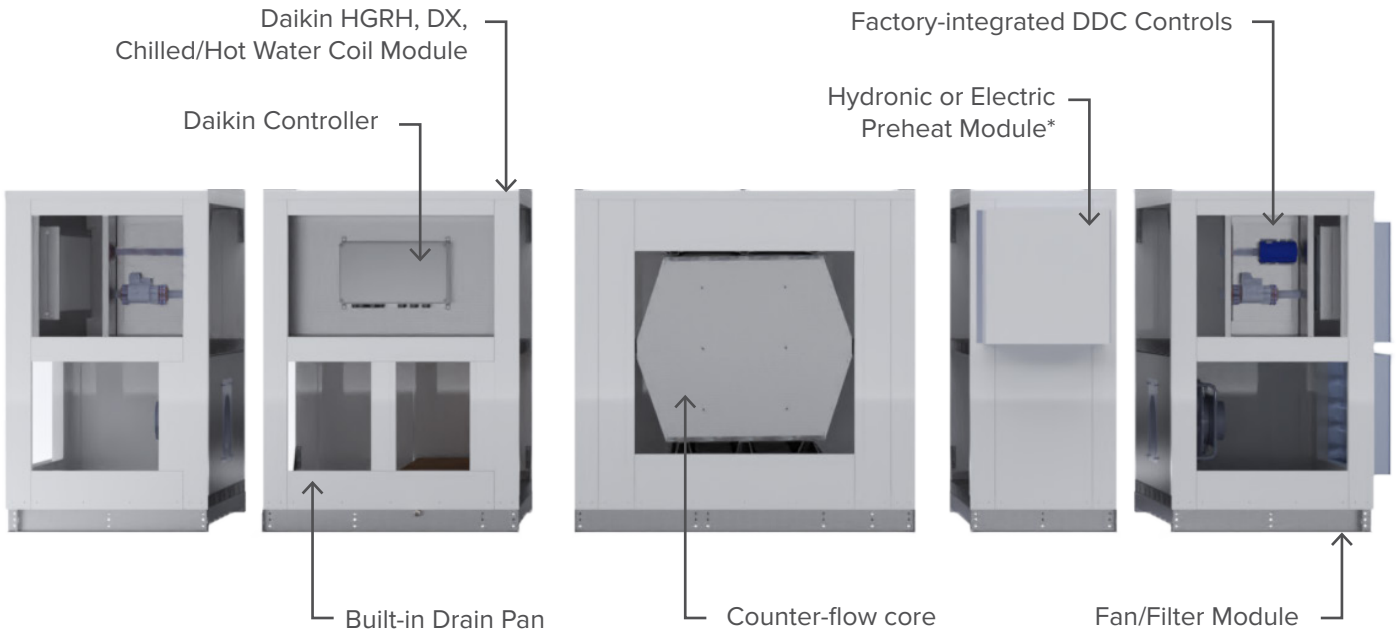


Outdoor Base Model with Optional Downshot Module

Mounting & Configuration



Ventum+ is available for base mount only (indoor and outdoor)



*An electric post-heat option also is available, similar to the pre-heat module shown, but placed between the SA fan and VRV modules

Sizing & Performance

Model Sizing

Model	Airflow Range cfm	Dimensions (L x W x H*) in.	Module Length**		Optional Module Length			
			Core in.	Fan-Filter in.	DX/HGRH Coil in.	Electric Heater in.	Downshot in.	Recirculation Mixing Box in.
V20	1,200 – 1,800	122 x 56.6 x 56	56	33	42	24	40	26
V25	1,800 – 2,400	117.5 x 56.6 x 62	51.5	33	42	24	40	29
V30	2,400 – 3,200	117.5 x 69.8 x 66	51.5	33	42	24	40	30
V40	3,200 – 4,000	122 x 69.8 x 74	56	33	42	24	40	34
V50	4,000 – 4,800	131 x 69.8 x 84	65	33	42	24	40	39
V60	4,800 – 6,400	131 x 85.9 x 86	65	33	48	36	40	39
V80	6,400 – 8,000	138.5 x 85.9 x 100	72.5	33	48	36	44	46
V100	8,000 – 10,000	138.5 x 102.1 x 100	72.5	33	48	36	44	46
V120	10,000 – 12,000	135 x 116 x 100	69	33	48	36	44	46
V150	12,000 – 15,000	135 x 116 x 116	69	33	48	36	52	54

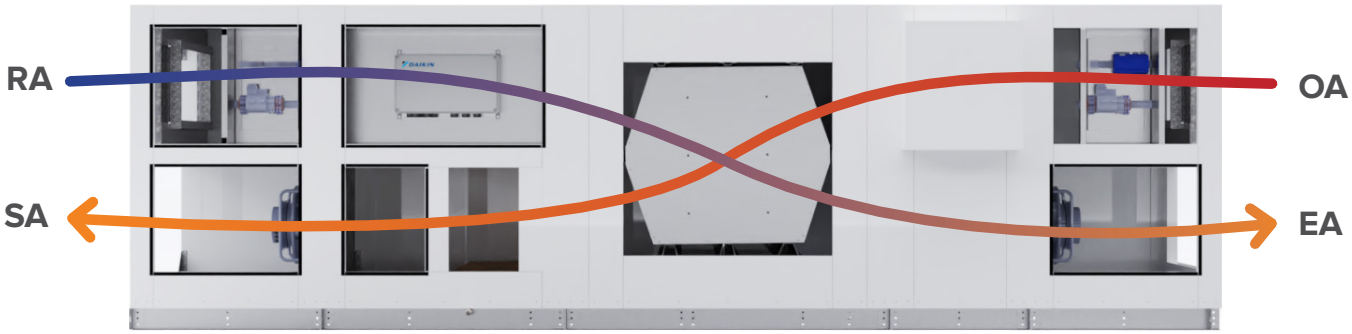
*Height excludes 2-inch standing seams on the roof of rooftop units.
**One core module and 2 fan-filter modules are included in the base unit design.

Model Performance

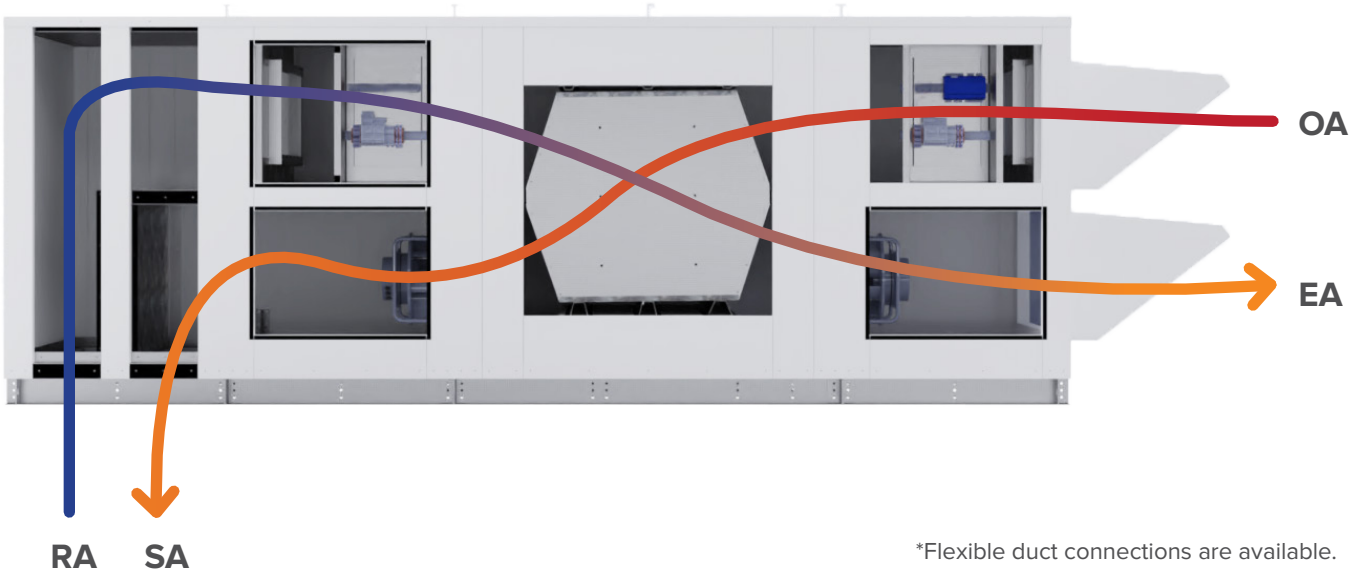
Model	Max Airflow cfm	ERV with Bypass			ERV No Bypass			HRV with Bypass	HRV No Bypass
		SRE	LRE	TRE	SRE	LRE	TRE	SRE	SRE
V20	1,800	72.5	57.4	63.2	75.7	63.3	68.0	81.1	82.5
V25	2,400	72.5	57.4	63.2	75.7	63.3	68.0	81.1	82.5
V30	3,200	72.5	57.4	63.2	75.7	63.3	68.0	81.1	82.2
V40	4,000	72.5	57.4	63.2	75.7	63.3	68.0	81.1	82.2
V50	4,800	72.7	58.4	63.9	75.8	63.9	68.5	79.6	81.4
V60	6,400	72.7	58.4	63.9	75.1	62.6	67.4	79.6	81
V80	8,000	72.7	58.4	63.9	75.1	62.6	67.4	79.6	81
V100	10,000	72.7	58.4	63.9	74.8	62	66.9	79.6	80.7
V120	12,000	72.7	58.4	63.9	74.3	61.3	66.3	79.6	80.7
V150	15,000	72.2	57.7	63.3	73.9	60.5	65.6	77.5	78.5

Airflow & Energy Recovery Technology

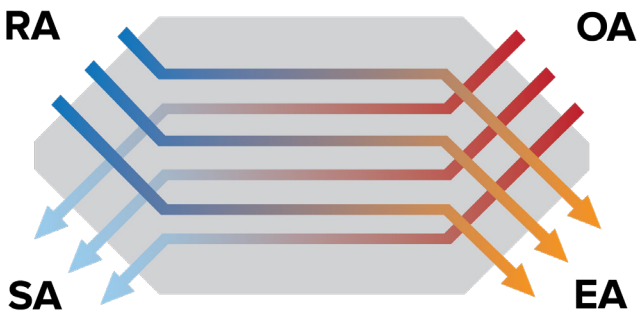
Ventum+ Indoor*



Ventum+ Outdoor with Downshot Module



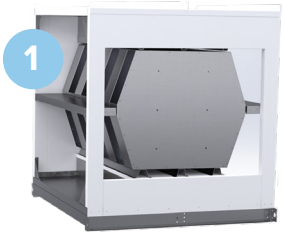
*Flexible duct connections are available.



Counter-Flow Heat Exchanger

Heat recovery counter-flow heat exchangers (HRV) provide up to 90% sensible effectiveness, while energy recovery counter-flow heat exchangers (ERV) provide up to 80% sensible and 70% latent effectiveness. Fixed-plate cores have no moving parts and require little to no maintenance. Due to the structure of the core, return and outdoor air never mix, eliminating the possibility of virus and contaminant crossover.

Modules & Accessories



Core Module

Ventum+ features stacked counterflow HRV or ERV cores. A stainless steel drain pan is included for HRV options.

Fan and Filter Module

The factory-integrated DDC controls are packaged into the upper filter sections, and ECM fans are mounted below. There are two fan/filter modules per unit. Hoods are only included on outdoor EA/OA modules.

DX/HGRH Module

The heating and cooling coil section is available in DX, Hot Gas Reheat. Integrated VRV controllers and valve kits are factory wired and powered by the unit. See next page for more details on module and integration.

Hydronic Conditioning / Dehumidification Module

Hydronic chilled water coil and optional hot water reheat coil are packaged in a single module with cabinet space where hydronic valves can be mounted in the field.

Hydronic Heating Module

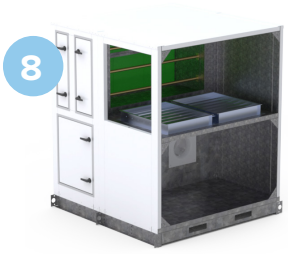
Hydronic pre-heat and post-heat module.

Electric Heating Module

Electric pre-heat and post-heat module.

Downshot Module

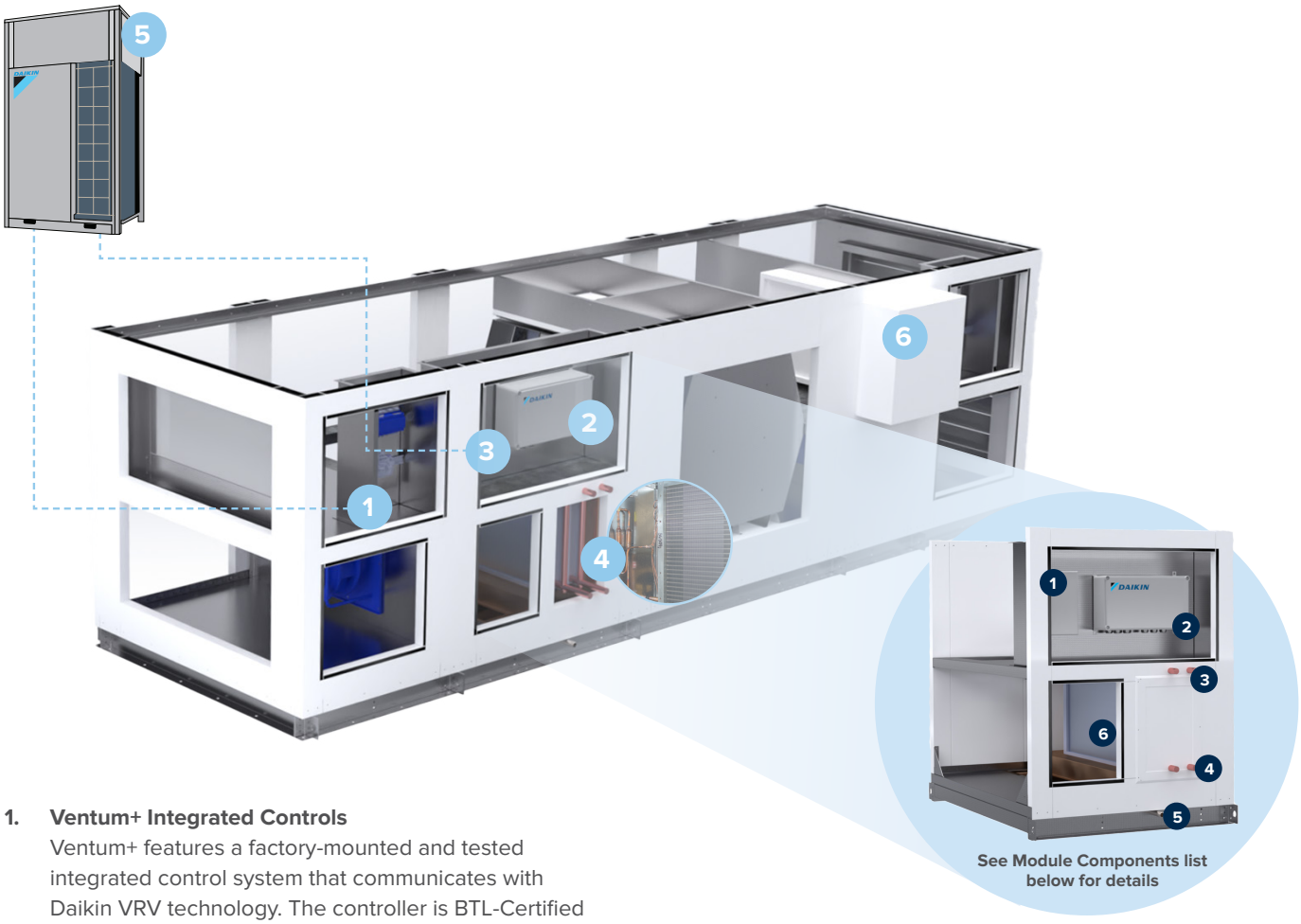
Supply and/or return air streams available through field-supplied roof curb.



Recirculation Module

Mixing box module with modulating Return Air damper(s). Return Air filter module is equipped with an Airflow Station for self-balancing mixed air ventilation options. Outdoor Air damper also modulates for mixed air balancing.

Daikin VRV Integration



1. **Ventum+ Integrated Controls**
   Ventum+ features a factory-mounted and tested integrated control system that communicates with Daikin VRV technology. The controller is BTL-Certified with BACnet IP and MSTP compatibility.

2. **Daikin DX and/or DOAS Controller(s)**
   Factory-mounted to a coupled DX or HGRH coil section, the controller communicates with the Daikin VRV Outdoor Unit, Electronic Expansion Valve Kit and Ventum+ controls for accurate temperature and humidity control.

3. **Daikin Electronic Expansion Valve**
   The electronic expansion valve is modulated by Ventum+ controls to maintain the setpoint. The expansion valve is factory-brazed to the DX or HGRH coil.

4. **DX or Hot Gas Reheat Coil**
   Coils are selected based on Daikin coil selection parameters (3 ton min. cooling). They are factory-mounted into the coupled coil section. Coil section includes a stainless steel double sloped drain pan. Optional electric and hydronic reheat is available.

5. **Daikin VRV Outdoor Unit**
   Daikin's inverter based outdoor unit for either discharge air temperature control (via heat pump) or dew point control (via heat recovery/branch selector box)

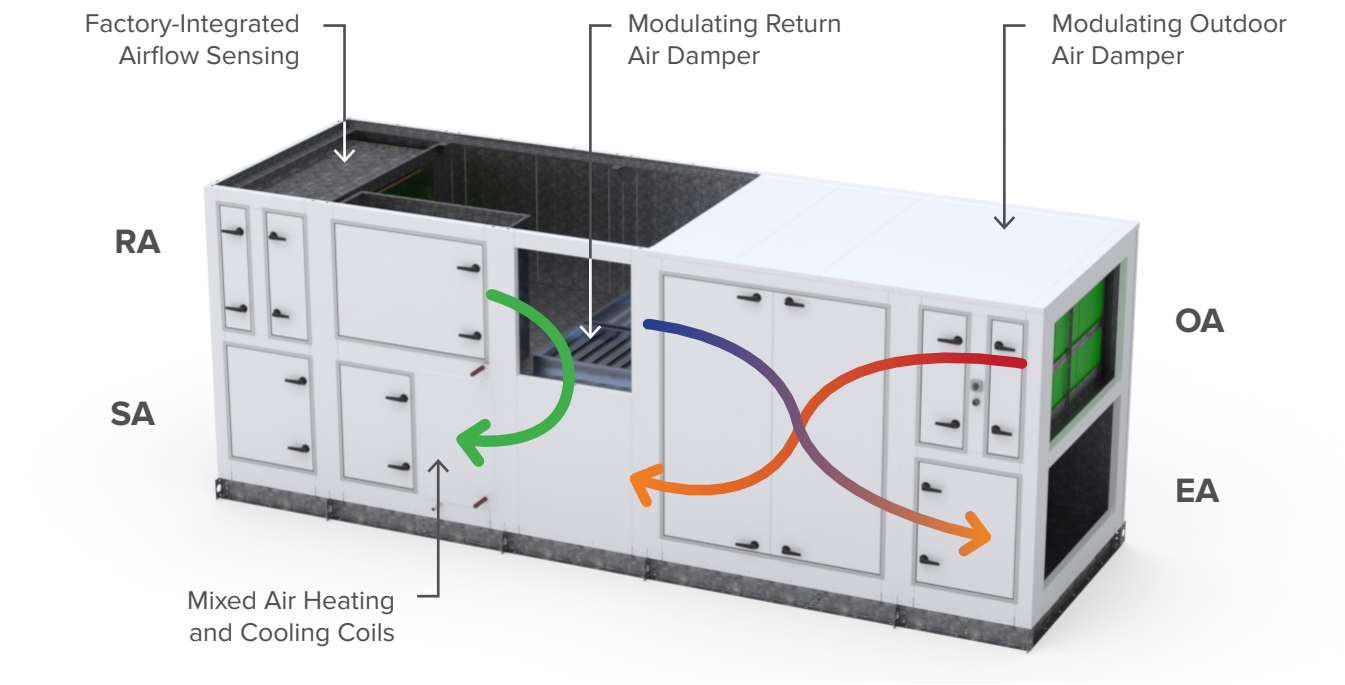
6. **Optional Pre-heat**
   Pre-heat can be hydronic (glycol) or electric. Pre-heat only activates when the outdoor air temperature is below the setpoint.

Module Components

1. Electronic Expansion Valve Kit
2. DX and DOAS Controller
3. Liquid Supply
4. Suction
5. Condensate Drain
6. DX and/or HGRH Coil(s)

Recirculation for Mixed Air Ventilation

Mixing Box Module Add On



Recirculation Options

1. **Modulating Recirculation**
   Automatic Outdoor Air balancing, controlled with internal airflow station. Can handle Mixed Air balances of 20–90% OA (10-80% Recirculation).

2. **Fixed Recirculation**
   Return and Outdoor Air dampers set manually during commissioning for mixed air requirements. No airflow station is required.

3. **DOAS with Nighttime Setback**
   100% Outdoor Air normal operation with 100% Recirculated Air during Unoccupied periods.

4. **Occupied / Unoccupied**
   All options allow scheduling of unoccupied periods with 100% recirculation. Unoccupied temperature and humidity is also adjustable.

Controls Options

1. **Single-Zone VAV**
   Automatically adjust airflow to maintain set temperature and ventilation levels in a space with optimal energy efficiency.

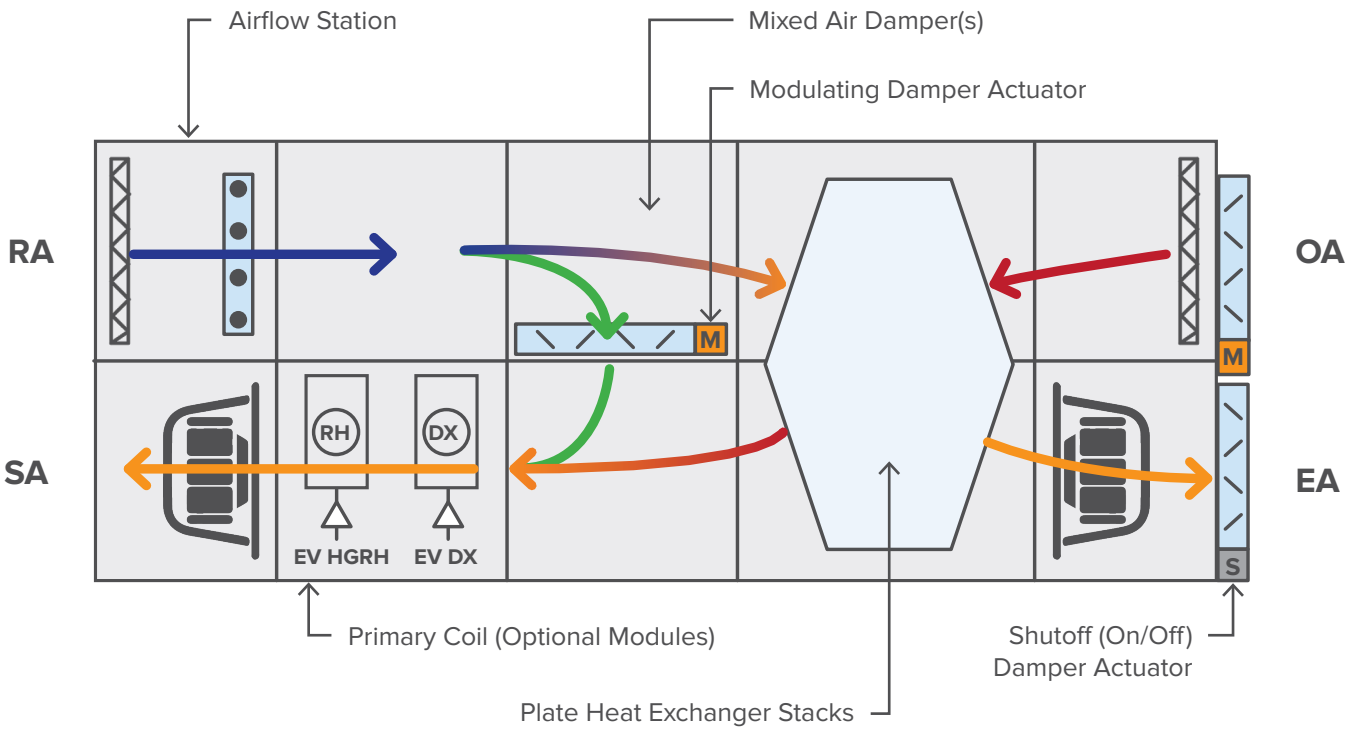
2. **Enthalpy Economizer**
   Maximize energy savings by allowing 100% outside air during periods when OA enthalpy is closer to the setpoint than RA enthalpy.

3. **Recirc VRV Defrost**
   When the Daikin Condensing Unit enters defrost mode, the unit will temporarily enter 100% recirculation to mitigate extra cold air entering the space while keeping airflow across the DX coil.

4. **Optimal Start**
   Sequence allows for optimized transition from unoccupied to occupied setpoints.

5. **CO2 Demand Control Ventilation (DCV)**
   Automatically engages 100% outside air while CO2 levels exceed the ppm setpoint.

Recirculation Design Considerations



1 **Primary Coils**

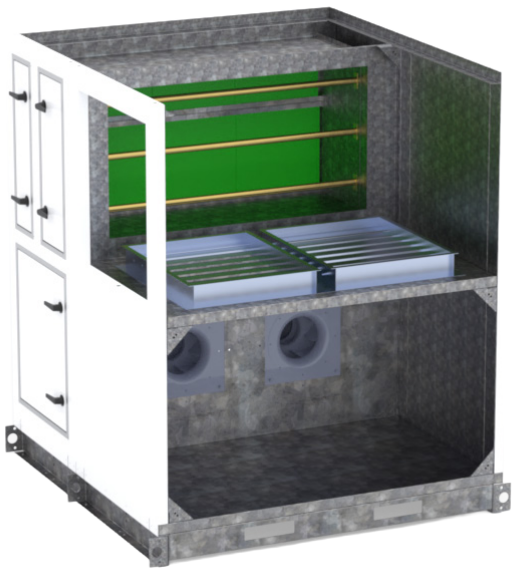
Must always be downstream of the core and mixing box. The core-mixing-coil sequence cannot be rearranged.

2 **Configur8**

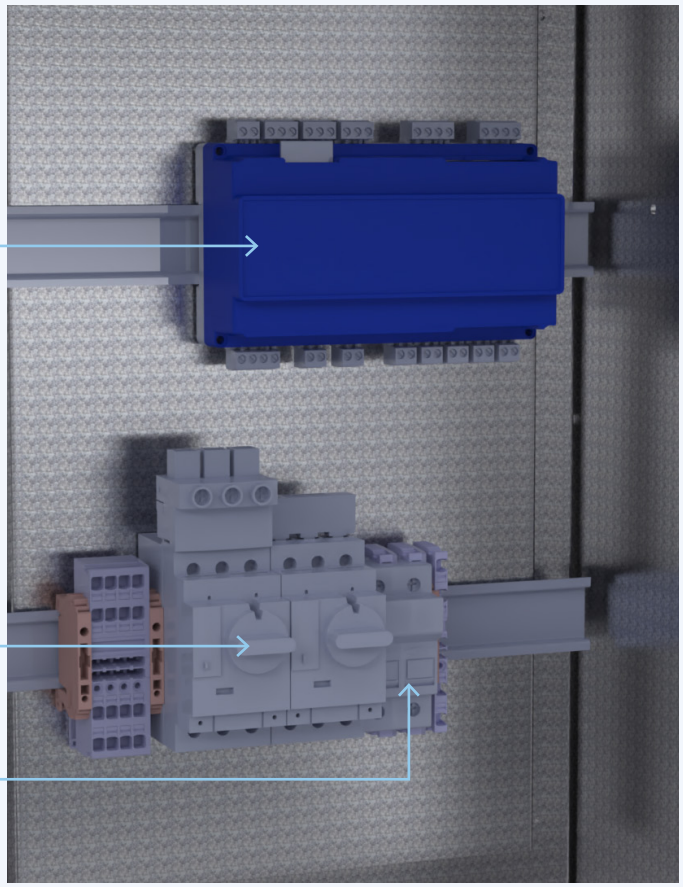
Oxygen8's Selection Software, Configur8, restricts individual duct systems (e.g. SA) external static pressure to 3" w.g. and total system external static pressure based on the unit size and voltage.

3 **Unavailable Options**

The VAV - Constant Duct Pressure - Fan Control option is currently unavailable with recirculation.



Integrated Controls



Standard Sensors

1 **Dual Differential Pressure — Huba 699M**

Differential Pressure for Fans and Filters

2 **Supply Air Temperature and Relative Humidity — Tasseron THHDEY2D-C**

Used to control post-heat, cooling, DX coil and HGRH

For all optional IAQ sensors, please reference Oxygen8's Controls Brochure, or contact your local Sales Rep.

Standard Control Algorithms

1. Airflow Control

Constant Flow
Constant Pressure
Demand Controlled Ventilation (CO_2/VOC, Occupancy)
Single Zone VAV

2. Temperature & Humidity Control

Constant Supply Air or Return Air Temperature Cooling and Heating

3. Humidity Control

Humidification (3rd party)
Dew point control for dehumidification
Enthalpy Economizer

4. Defrost Control

Monitoring Pressure Drop Across Heat Exchanger
Monitoring Exhaust Air Temperature and Humidity
Timed Exhaust
Return Air VRV Defrost (Recirculation module required)

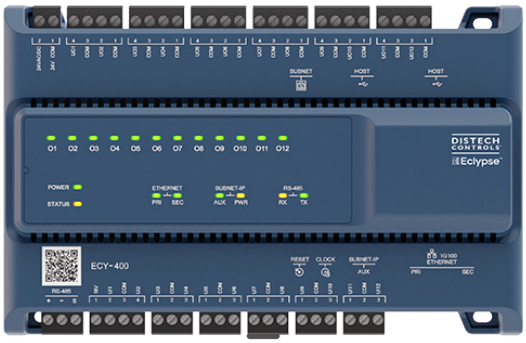
5. Frost Prevention

Electric Pre-Heat
Enthalpy Sensors (Temperature and Relative Humidity Measuring)
Hydronic Pre-Heat

6. Remote Access

Via BACnet IP or MSTP
Via 3rd Party Cell Modem
Via Building Network

Controls by Distech



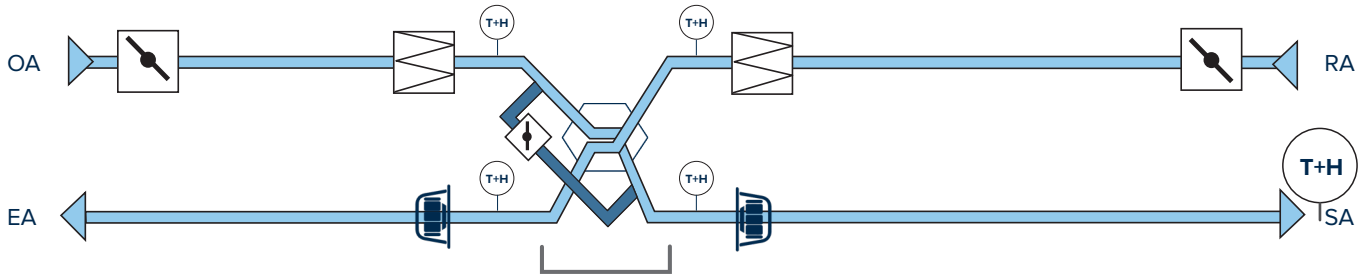
Eclypse 400 Series

Allure Unitouch Room Thermostat

EC SmartAir Sensor

Common Control Strategies

Economizer / Free Cooling

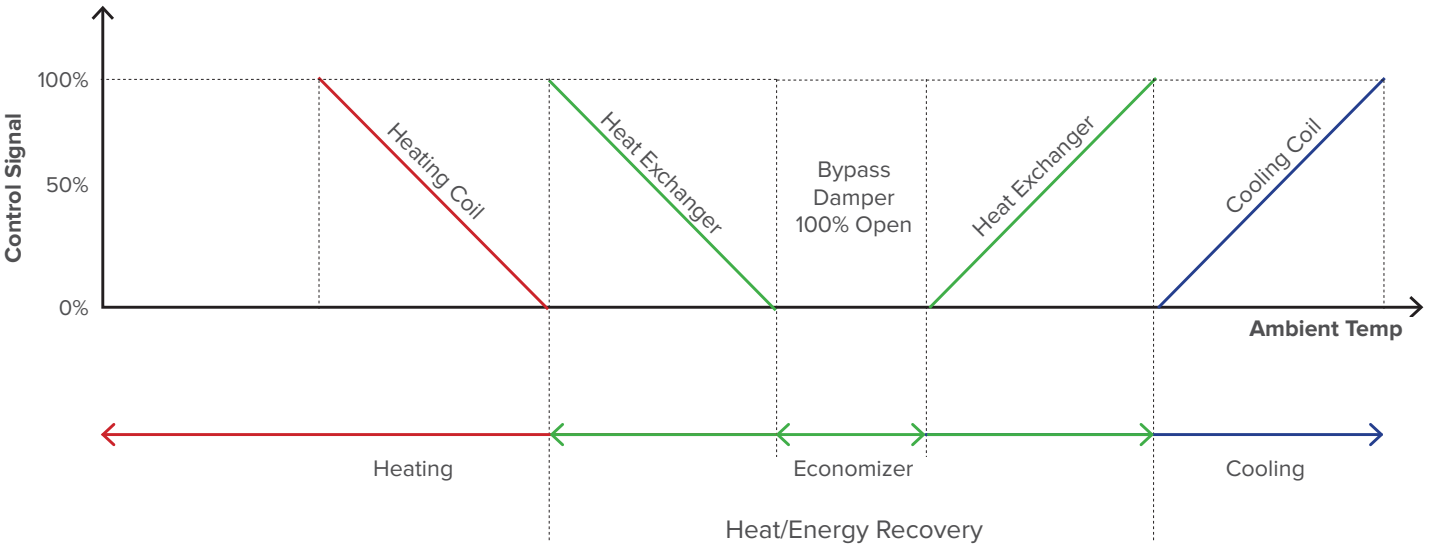


Filter
Fan
Damper
Electric Heating Coil
Pressure Sensor
Temperature & Humidity Sensor
Counter-flow Heat Exchanger
Drain Pan
Hydronic Heating Coil
Hydronic Cooling Coil
Combo Heat/Cool Coil

The Ventum+ unit controller takes advantage of the economizer option to provide “free” cooling (or heating) by bypassing outdoor air around the core and directly supplying air into the building when conditions allow.

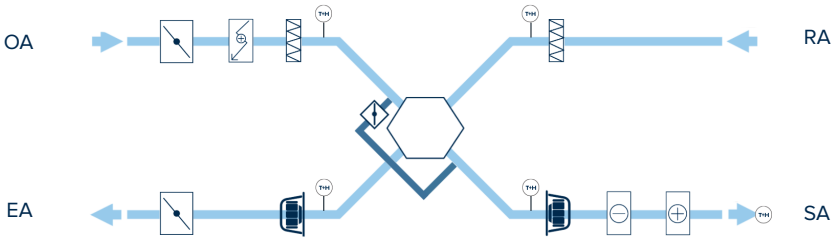
The control algorithm constantly monitors the outdoor and return air temperatures, while modulating the bypass damper based on the supply air setpoint.

By default, the bypass will be controlled to 100% sensible recovery position when a cooling cycle is starting. If the outdoor air temperature raises to a value higher than the supply air temperature or room air temperature, then the cooling coil will be activated.

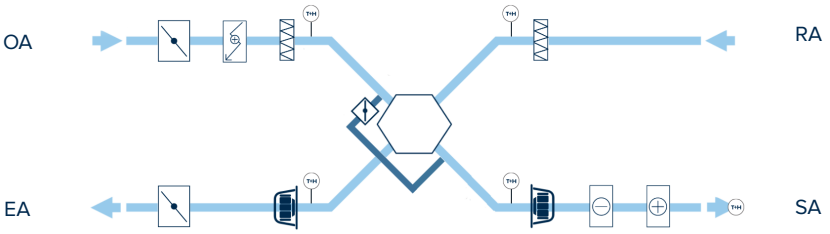


Frost Prevention

Electric Pre-Heat



Hydronic Pre-Heat



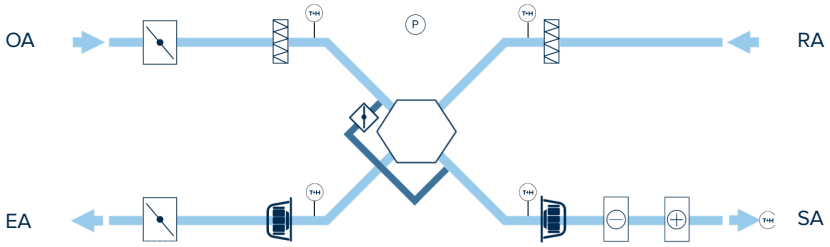
An electric pre-heat coil ensures that the temperature entering the heat exchanger is maintained at a required minimum temperature. The pre-heat temperature sensor will come installed in the unit, positioned in the outdoor air stream. Preheat is controlled by the unit, has integrated SCR control and is fully modulating.

A hydronic pre-heat coil ensures that the temperature entering the heat exchanger is maintained at a required minimum temperature. If the maximum heat supply from the pre-heat coil cannot maintain the setpoint, a warning will be activated.

For electric and hydronic pre-heat options, setpoint temperature reset is adjusted by the exhaust air humidity level. This function increases the pre-heat setpoint when the return air humidity conditions are low.

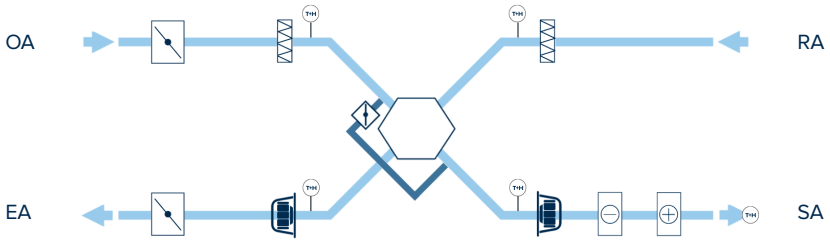
Defrost Strategy

Monitor Pressure Drop Across the Heat Exchanger



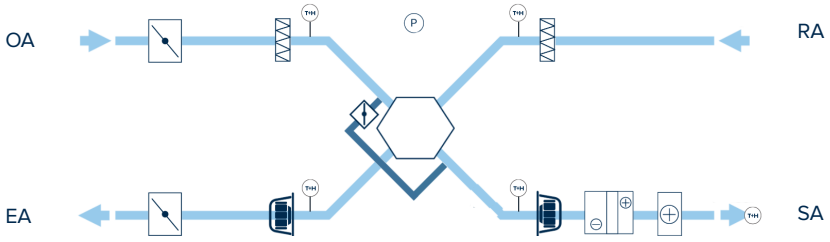
The heat exchanger can be protected against frosting by continuously monitoring the pressure drop (PD) across the heat exchanger. Defrost will start when the PD rises above the setpoint. During defrost the bypass damper will open 100% for a specified period of time.

Monitor the Exhaust Air Temperature



At temperatures below set value for the exhaust air temperature, the bypass damper will open to 100%. The outdoor air passes around the heat exchanger and the return air passes through the heat exchanger. Due to the relatively high room temperature, this function will lead to the thawing of the frost formation on the heat exchanger.

Timed Exhaust



When frost formation is detected the supply fan ceases operation for 5* minutes (*adjustable), while the exhaust fan continues to operate and thaw the ice accumulation on the heat exchanger. After 5 minutes, the supply fan will resume normal operation until frost is accumulated again. This cycle repeats itself until minimum normal operating cycle time, 30* minutes (*adjustable).

Electrical Ratings

Standard Units

Model	Airflow	Voltage (V)	Phase	Fan Qty (Total)	FLA (A)	MCA (A)	MOP/RFS (A)
V20	1,800	208	3	2	13.9	14.6	20
		460	3	2	9.0	9.0	15
		575	3	2	8.7	9.0	15
V25	2,400	208	3	2	19.1	20.5	25
		460	3	2	12.6	13.1	15
		575	3	2	9.1	9.5	15
V30	3,200	208	3	2	19.9	21.4	30
		460	3	2	11.8	12.2	15
		575	3	2	10.3	10.8	15
V40	4,000	208	3	4	25.9	26.6	30
		460	3	4	17.0	17.0	20
		575	3	4	16.7	17.0	20
V50	4,800	208	3	4	36.3	37.7	45
		460	3	4	24.2	24.7	30
		575	3	4	17.5	17.9	20
V60	6,000	208	3	4	38.8	41.0	50
		460	3	4	23.1	23.0	25
		575	3	4	20.2	20.4	25
V80	8,000	208	3	6	54.4	56.5	60
		460	3	6	36.3	36.3	40
		575	3	6	26.2	26.3	30
V100	10,000	208	3	6	56.8	59.0	60
		460	3	6	33.9	33.8	35
		575	3	6	29.8	30.0	30
V120	12,000	208	3	8	74.8	77.0	80
		460	3	8	44.7	44.6	45
		575	3	8	39.4	39.6	40
V150	15,000	208	3	8	109.2	112.5	125
		460	3	8	68.7	69.3	70
		575	3	8	39.4	39.6	40

RA Return Air
SA Supply Air
MCA Minimum Circuit Ampacity
MOP/RFS Maximum Over Current Protective Device / Recommended Fuse Size
Data is relevant for H/ERV-only units. For electrical data involving single-point power electric heaters, please refer to the project-specific submittal.

Specifications

System Overview

Oxygen8's Ventum+ series is a modular design with a base H/ERV unit, optional coil modules for heating, cooling and Daikin VRV integration, and an optional mixing box for return air recirculation.

Standard Features

- High-Efficiency Variable Speed EC Direct-Drive Motor
- Plenum Backward Inclined Fans
- Factory-Mounted Shut-off Dampers (Standard for Outdoor Applications, available as optional for indoor applications)
- 4 Standard Temperature and Humidity Sensors (OA, RA, EA, SA)
- Integrated Controls with BACnet IP and BTL-Certification
- Non-Fused Disconnect Switch
- 2" Foam-Injected Double-Wall Panels (R13)
- Pre-Painted White Exterior Casing
- Galvanized Steel Panels
- 12-Ga Galvanized Steel Base Frame (24 Ga doors, 18 Ga structural posts, 18 Ga internal wall panels, 24 Ga external wall panels)
- Filter Alarms: Signaled by factory-mounted pressure gauges to measure filter pressure drop across filter
- 4" Pleated MERV 13 Outdoor Air Filter
  4" MERV 8 Return Air Filter
- Duct mounted discharge temperature and humidity sensor for units with coils
- Hydronic 2/3-Way Valves and Actuators for Field Installation
- Internally-located Control Panels

Electric Coil Specifications

- SCR Controlled
- Non-Fused Disconnect Switch
- Single-Circuit Power Connection (with limitations)
- Integrated heater capacity as high as 25 W/CFM

Installation Options

- Indoor or Outdoor
- Indoor: Floor-Mounted, Horizontal Airflow
- Outdoor: Curb-Mounted, Horizontal or Down discharge and return
- Orientation: Right Hand or Left Hand
- Access Options: Front Doors

Warranty

- 24 Months from Shipment

VRV Integration

- Factory Mounted DX Coils and Factory-Brazed Expansion Valve kit to the Coil
- Factory Mounted Hot Gas Reheat Coils and Factory-Brazed Expansion Valve kit to the Coil
- Factory Mounted and Wired DX and/or DOAS Controller
- Factory integrated refrigerant leak detection sensors where required for R32 applications

Recirculation

- Mixing box for Return Air recirculation for nighttime setback or mixing with fresh air downstream of core module
- Modulating Fresh Air damper for mixed air balancing
- Airflow station in Return Air path for self-balancing of modulating recirculation option

Options

- Integrated Bypass for Economizer and/or Defrost Strategy
- Extended Warranty
- Optional Sensors: CO_2/VOC, Humidity, Pressure
- Virtual Start-Up Appointment

FAQ

General

What material is the Oxygen8 casing made of?
Painted 22-gauge steel panel exterior with galvanized interior.

Who manufactures the ECM fans?
Ziehl Abegg or EBM Papst.

Do you offer non-fused disconnect?
Yes, it is standard. We use a switch disconnect with internal breakers.

Are the shutoff and bypass dampers powered by the unit?
Yes.

Do Ventum+ units require a drain connection?
Models with a cooling coil and HRV core come with a drain pan and require a drain connection. ERV units do not require a drain connection.

When is a drain connection required for bypass?
Anytime bypass is being used for defrost control a drain connection is required.

Filtration

Is a filter sensor provided with the unit?
Yes. Dirty filter gauges are standard - an alert will be sent when filters need to be changed.

Is carbon filtration or prefiltering an option?
Yes, these options are both available as a special option. Please contact Oxygen8 to verify the application.

Controls

Is your controller standard on all units, and native BACnet IP, or do we need to add a card?
Yes, integrated, programmable controls come standard with every unit. They are BTL-Certified for BACnet IP. The card is native BACnet IP.

Are your controls MSTP compatible?
Controller is MSTP native, no gateway is required.

What sensors come integral to the unit?
There are 4 temperature and humidity sensors and 2 fan flow sensors.

How are the dampers controlled?
Damper control is automatic based on the operation of the unit. The Ventum BTL-Certified BACnet controller will provide an on/off output signal to the dampers. Dampers are factory-installed and wired.

Daikin VRV

Does the DX/DOAS Controller require a separate power supply and what is the amp draw?
No, the Daikin controller is powered directly by the unit, using a stepdown transformer for any input voltage to achieve 24V supply to the integration kits.

How is the Daikin VRV controlled without Hot Gas Reheat?
The preferred operation is through the Daikin DX Controller with a Modbus link to the Oxygen8 DDC controller (standard). Oxygen8 provides a DAT sensor downstream of the coils to control leaving air temperature when controller is provided.

How is the Daikin VRV controlled with Hot Gas Reheat?
The preferred operation is through the Daikin DOAS (and DX, where necessary) Controller(s) with a Modbus link to the Oxygen8 DDC controller (standard). Oxygen8 provides a DAT sensor downstream of the coils to control leaving air temperature when controller is provided.

Recirculation

What if I want controls by others?
No problem, a “no controls” option is offered with landing strips for control inputs. The airflow station will be omitted.

Can I reduce my unit size if I have a lower OA%? The unit is sized based on the supply air cooling coil airspeed limitations. If no cooling coil, size based on Supply Air fan and core limitations.

What if I want my mixed air unit to also be capable of 100% OA when needed?
Configur8 has a checkbox to size all components for 100% OA conditions.

Can occupancy sensors be used instead of an occupancy schedule?
Yes, occupancy sensors can be used to toggle between occupied and unoccupied modes.

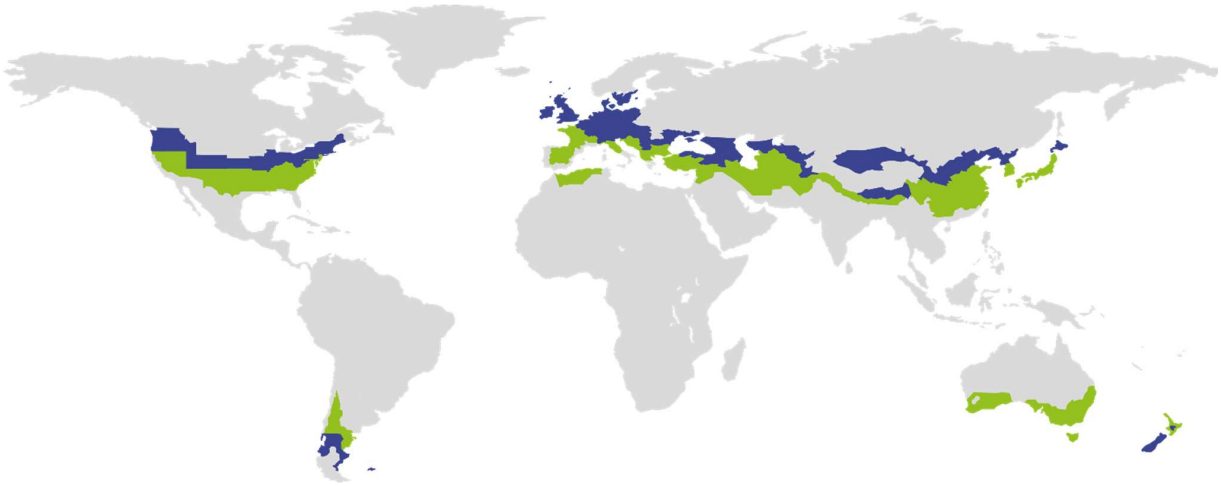
Does the SA flow Rate modulate during CO2 DCV damper modulation to increase OA%?
No, SA flow rate is maintained while the dampers increase OA%

CERTIFICATE

Certified Passive House Component

Passive House Institute
Dr. Wolfgang Feist
64283 Darmstadt
Germany

For more details on Ventum+ Passive House Certification, visit us online at oxygen8.ca



Category:	**Air handling unit with heat recovery**
Manufacturer:	**Oxygen8 Solutions Inc.**
	Canada
Product name:	**Ventilation unit series**
	Ventum+
Specification:	Airflow rate > 353 cfm
Heat exchanger:	Recuperative

This certificate was awarded based on the product meeting the following main criteria

Heat recovery rate	η_{HR}	≥	75 %
Specific electric power	$P_{el,spec}$	≤	0.77 W/cfm
Leakage		<	3 %
Comfort	Supply air temperature ≥ 61.7 °F at outdoor air temperature of 14 °F [3)]		

Airflow range
1765 – 6356 cfm at an external pressure of 1.22 – 1.49 in.wc.
Heat recovery rate
η_{HR} ≥ 75 % [2)]
Specific electric power
$P_{el,spec}$ ≤ 0.75 W/cfm
Humidity recovery
η_x ≥ 65 %
Performance number
> 8.9

[1)] The pressure drop of filters is covered in the listed external pressure. Additional components decrease the available pressure difference accordingly.
[2)] For residential use a heat recovery rates of 80% and better can be applied.
[3)] Achieved by use of an external electric preheater.

cool, temperate climate

CERTIFIED COMPONENT
Passive House Institute

OXYGEN8