

O X Y G E N 8

# VENTUM

High Performance H/ERV

## 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 100% 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 100% 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

People are getting sick while working in offices, learning in classrooms and convalescing in senior care facilities. Traditional centralized HVAC systems that recirculate air without proper filtration and humidity control are the root cause of poor IAQ. To prevent the transmission of bacteria and viruses, new HVAC systems must provide dedicated outdoor air and eliminate recirculation, have small zoned ventilation systems, include HEPA filters, control humidity levels and used fixed-plate ERV technology that eliminates contaminant cross-over between outside and exhaust streams.

### To Move Toward Building Electrification

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

### For Better Building Design

Super-insulated buildings significantly reduce heating requirements, while climate change and developers' desires for large amounts of glazing will increase cooling needs. The integration of VRV with ERV helps to reduce energy consumption and meet ventilation requirements.

## Table of Contents

Ventum H/ERV	4
Ventum System Overview	6
Ventum Model Sizing	7
Heat Exchanger Comparison	8
Ventum Applications	9
Mounting & Accessories	10
Daikin VRV Coupled Integration	11
Control Box	12
Smart Controls & Integration	13
Common Control Strategies	14
Electrical & Specifications	16
FAQ	17

# 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 and latent energy recovery with no moving parts or cross contamination. The internal bypass option allows for free cooling during shoulder seasons.

### Healthy Buildings

Ventum uses 100% outside air with no recirculation. The counter-flow core is made of a polymer membrane with no virus cross-over: tested under ASTM F1671. The units ship with MERV 13 filters for outdoor air and MERV 8 filters for return air.

### All-Electric

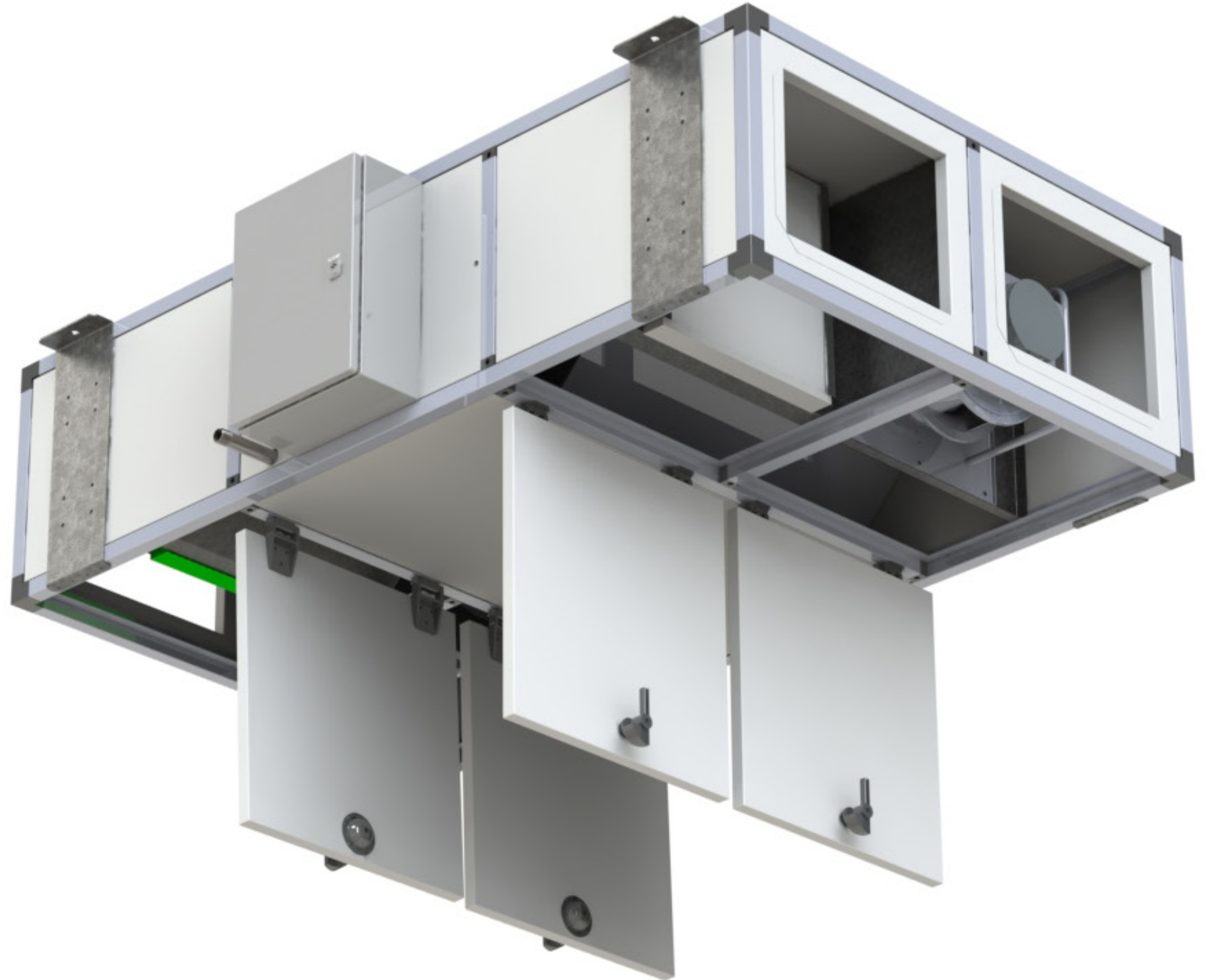
This all-electric ventilation solution helps to reduce the carbon footprint of buildings, while bringing 100% fresh outside air into the space. Ventum integrates with Daikin's VRV Outdoor Unit for temperature and humidity control all year round.

### Intelligent Controls

Intelligent controls can integrate seamlessly with BMS or operate independently with over 75 built-in control functions including discharge air temperature and humidity control, weekly schedules, economizer and dirty filter alarms.

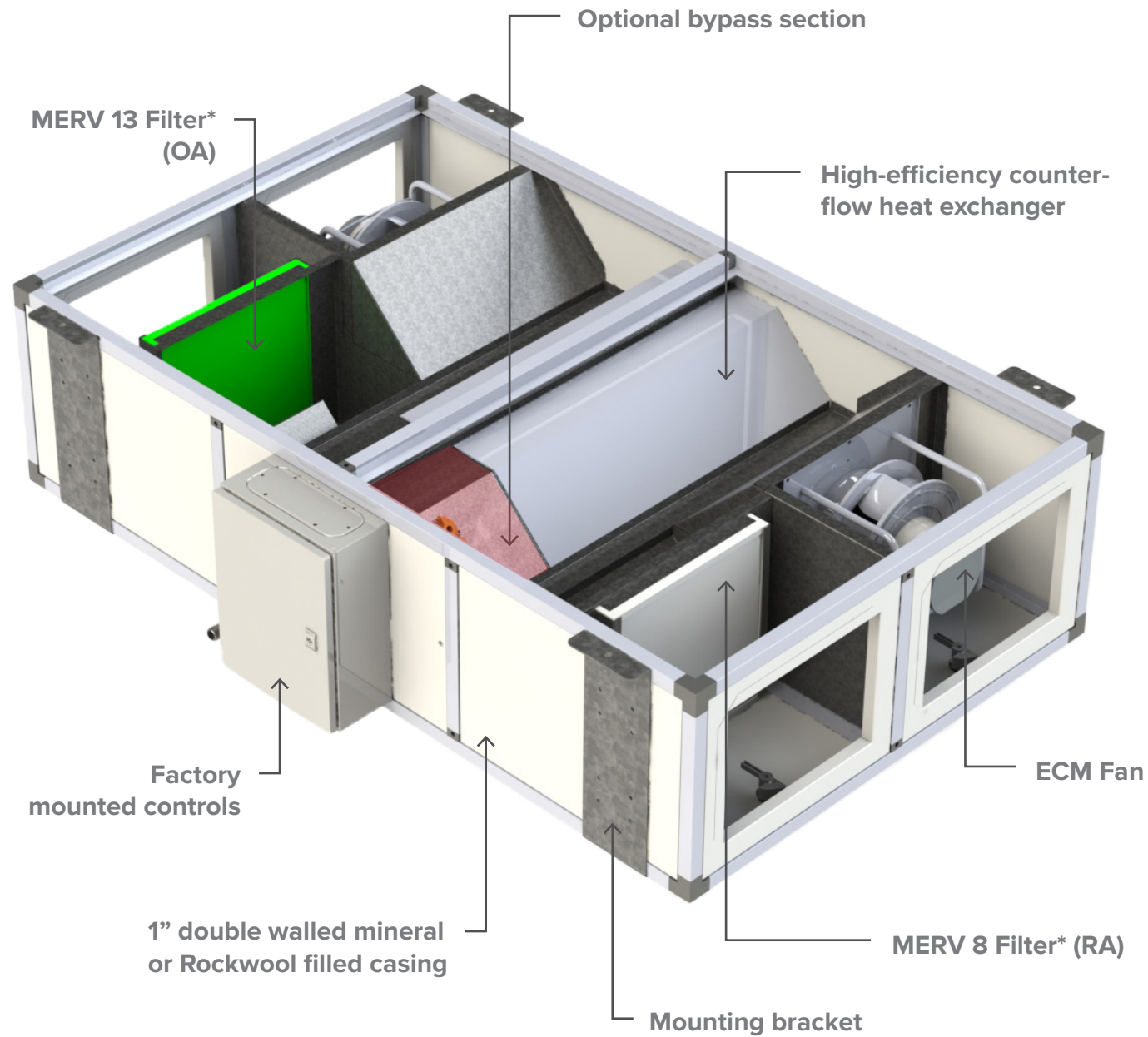
### Low Profile

Ventum units have a 18 – 32" depth and 325 – 3000 cfm range. The units free up valuable mechanical room and/or roof space with decentralized indoor ventilation and add floor space by eliminating vertical duct runs.



# Ventum System Overview

## For Indoor Applications



\*MERV rating can be increased upon request



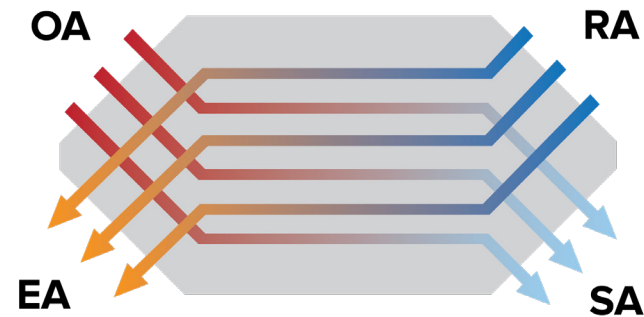
## Model Sizing

Model	Dimensions (W x L x H) in.	Energy Recovery Ventilator			Heat Recovery Ventilator		TSP in. w.g.	ESP in. w.g.	Orientation
		Airflow cfm	SRE* %	LRE* %	Airflow cfm	SRE* %			
H05	70 x 42.5 x 18	600	75.7	69.7	600	82.5	3	1.3	Horizontal
H05 with Bypass		600	72.5	63.4	600	80.8			
H10	70 x 62.5 x 18	1000	74.5	67.3	1000	81.9	3	1.3	Horizontal
H10 with Bypass		1000	72.5	63.4	1000	80.8			
H15	78 x 62.5 x 21	1350	74.5	67.5	1350	81.9	5	3	Horizontal
H15 with Bypass		1350	71.5	61.5	1350	80.4			
H20	78 x 77.5 x 21	1800	73.8	66.1	1800	81.6	5	3	Horizontal
H20 with Bypass		1800	71.5	61.5	1800	80.4			
H25	102 x 62.5 x 32	2250	76	70	2250	83.3	5	3	Horizontal
H25 with Bypass		2250	73	64.6	2250	81.5			
H30	102 x 77.5 x 32	3000	75.3	68.8	3000	83	5	3	Horizontal
H30 with Bypass		3000	73	64.6	3000	81.5			

\*These values are rated at the maximum airflow rate and subject to increase with de-rated airflows.

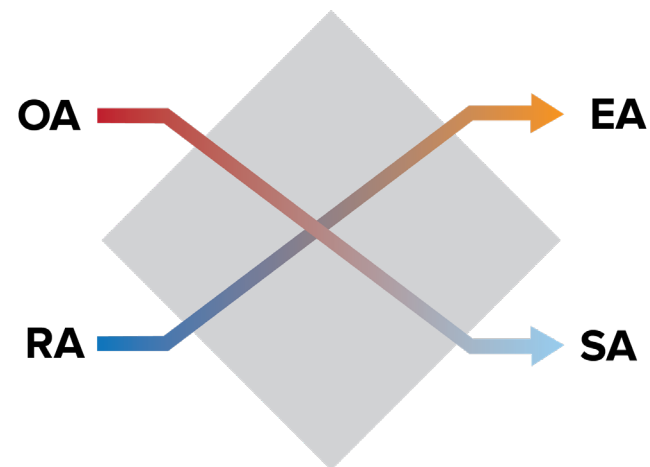
See page 14 for defrost strategies and summer economizer selections for bypass.

# Counter-Flow, Cross-Flow and Rotary Heat Exchangers



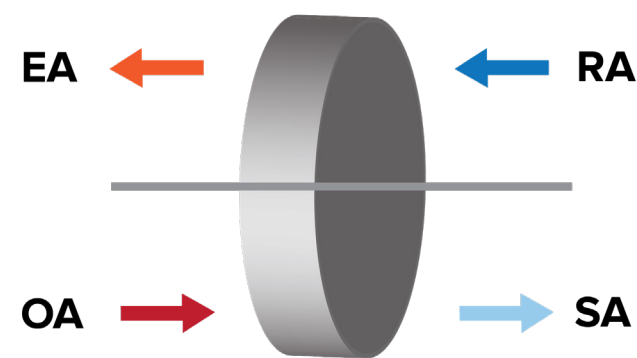
## Counter-Flow Heat Exchanger

Heat recovery counter-flow heat exchangers provide up to 90% sensible effectiveness, while energy recovery counter-flow heat exchangers provide up to 80% sensible and 70% latent effectiveness. Fixed-plate enthalpy 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.



## Cross-Flow Heat Exchanger

Energy recovery cross-flow heat exchangers provide up to 70% sensible and 65% latent effectiveness. Fixed-plate enthalpy 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.



## Rotary Heat Exchanger

Wheels achieve high flow rates while maintaining a compact size and 45-80% effectiveness. To function, heat and mass transfer media move between air streams. Air may potentially become trapped in the media channels and enter the other airstream, or may leak through the seal. Wheels require maintenance for moving parts including belts, seals, wheel drive motor (and VFD), bearings, which can fail. In order to minimize cross-contamination, wheels must utilize a purge. Purge airflow is a parasitic fan energy waste because it continually uses fan energy to send OA into the EA airstream - this can be as much as 10% of supply airflow.

# Ventum Applications

## ERV

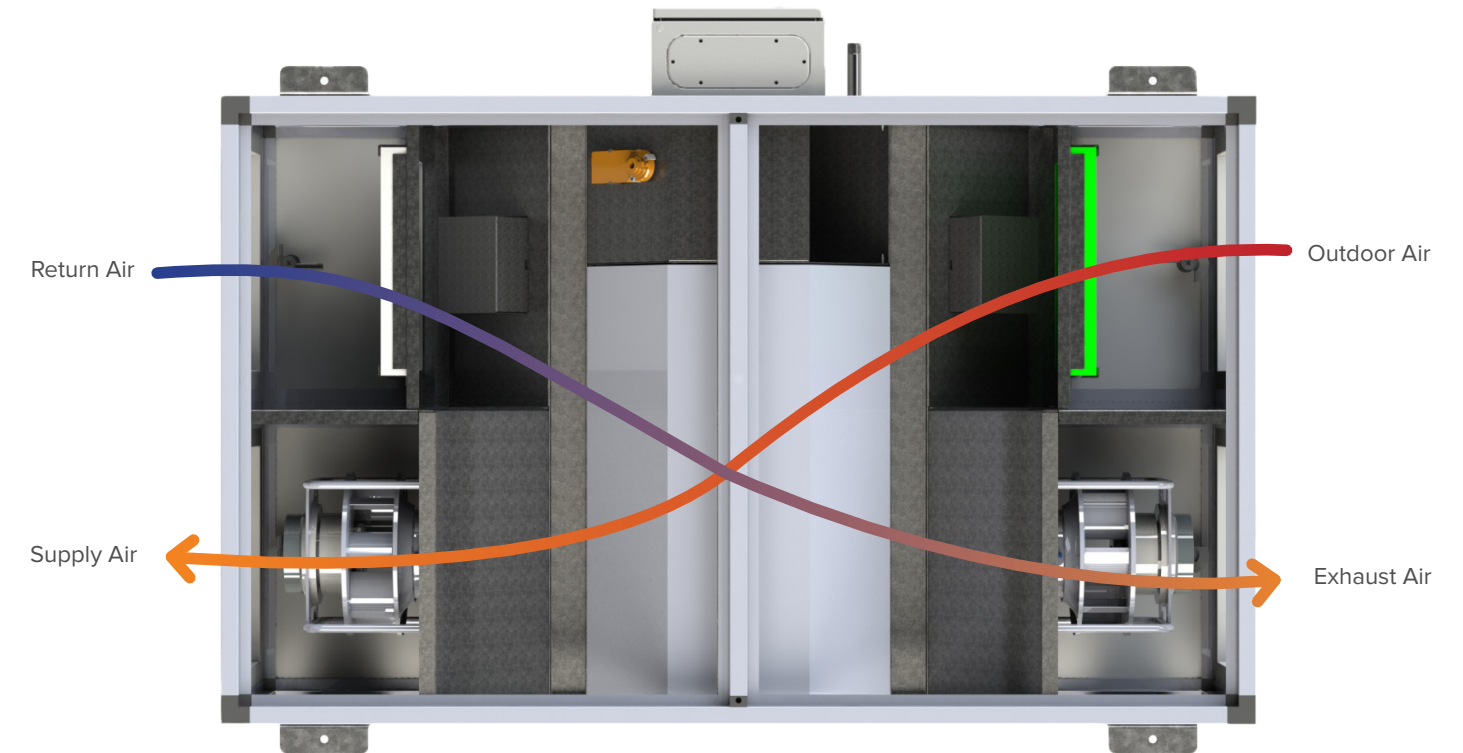
*Hot, Humid Climates and Cold Climates*

Ventum ERV functions best in cold, dry winters and hot, humid summers. During a cold and dry winter, ERVs can help retain some of the moisture inside the space while also recovering heat and providing fresh air. In humid climates, ventilation air can be dehumidified independent from heating and cooling. Ventum will prevent moist ventilation air from entering the space.

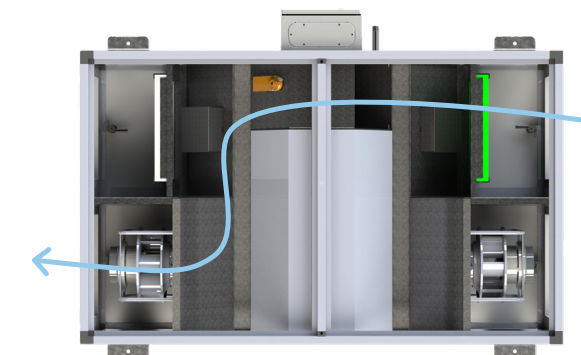
## HRV

*Mild Climates*

Ventum HRV is best for mild climates. The HRV system uses the heat from the exhaust air to pre-heat incoming fresh air. This reduces the amount of energy required to heat outside air up to ambient room temperature.



## Internal Bypass Air Stream



## Mounting & Accessories



Ventum H/ERV is available exclusively in a horizontal orientation for ceiling mounts.

Units ship with mounting brackets.



### 1 Hydronic Coils

The hydronic coils are available with hot water and chilled water options. Chilled water coils include external drain and vent connections. Cooling coils are mounted in a rack over a stainless-steel double sloped condensate pan. Both hot and chilled water coils are supplied with hydronic valves (2/3-way) and actuators.

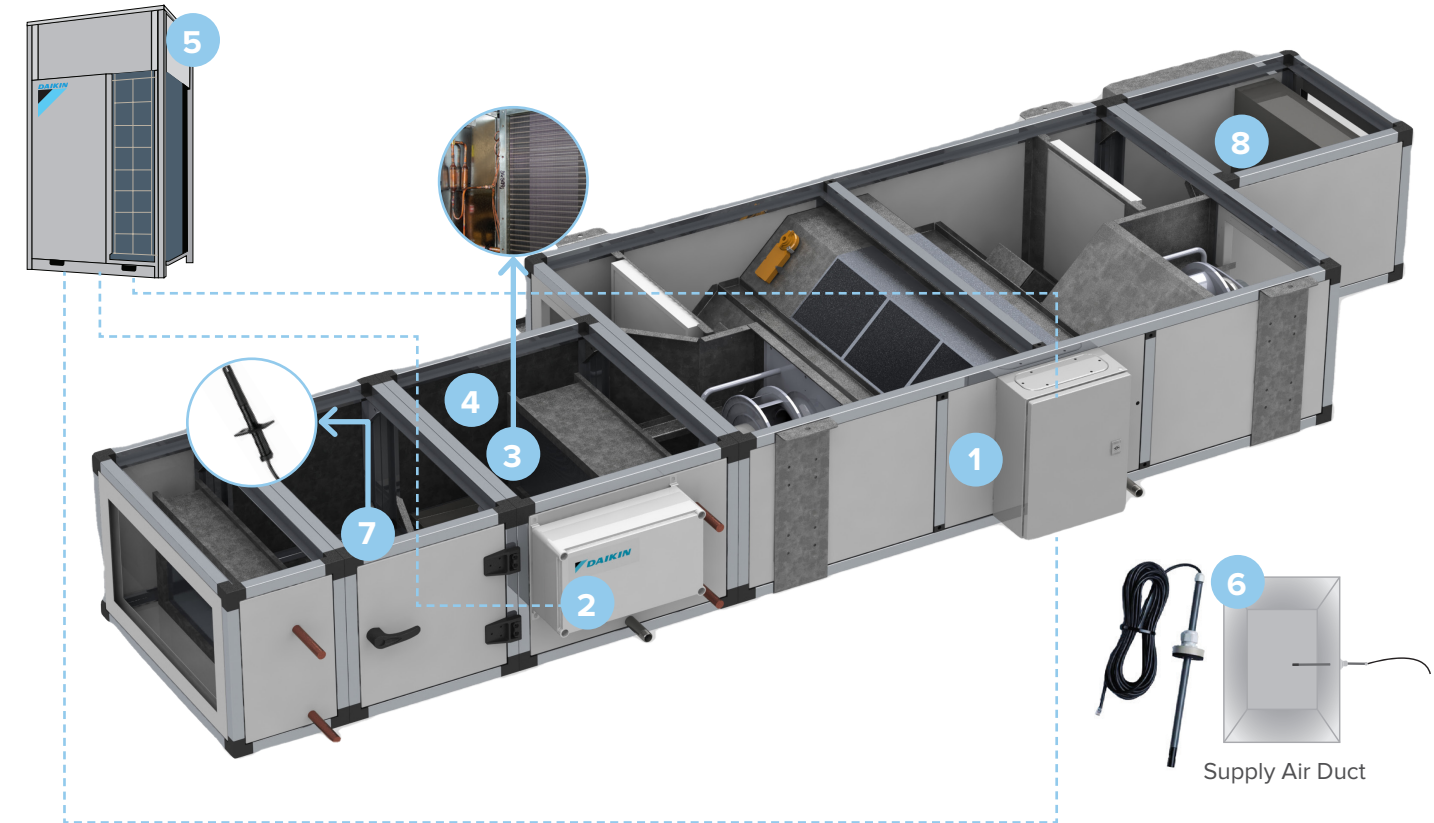
### 2 DX Coils

DX coils come with a factory-mounted Daikin controller and factory-brazed Daikin expansion valve. DX coils have an interlaced circuit to match the Daikin Outdoor Unit temperatures. Coils come shipped with nitrogen holding charge.

### 3 Electric Coils

SCR controlled electric coils are available for pre- and post-heat applications.

## Ventum & Daikin VRV Coupled Integration



### 1. Ventum Controller

Ventum units include a factory-mounted and tested controller to integrate with Daikin's systems. The controller is BTL-Certified with BACnet IP compatibility.

### 2. Daikin W-Controller

Factory-mounted to a coupled DX coil section, the controller communicates with the Daikin VRV Outdoor Unit, Electronic Expansion Valve Kit and Ventum controller for discharge air temperature control.

### 3. Daikin Electronic Expansion Valve

Electronic expansion valve is properly sized based on the discharge air temperature and modulated by the Ventum controller to maintain the setpoint. The expansion valve is factory mounted to the DX coil, tested under 400 psi and nitrogen charged for shipment to site.

### 4. DX Coil

DX Coils are selected based on Daikin coil selection parameters. 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 (HGRH available 2022).

### 5. Daikin VRV Outdoor Unit

Daikin's inverter based outdoor unit for either heating or cooling (heat pump) operations. Available with air or water source options.

### 6. Discharge Temperature/Humidity Sensor

Mounted up-stream of the coil section, the sensor constantly measures the discharge air temperature and humidity level and communicates with the Ventum controller.

### 7. Dew Point Sensor

The Ventum controller calculates the dew point based on the discharge temperature and humidity level. Mounted between the DX and the reheat coil, the dew point sensor controls DX cooling for dehumidification requirements.

### 8. Optional Pre-heat

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

# Control Box



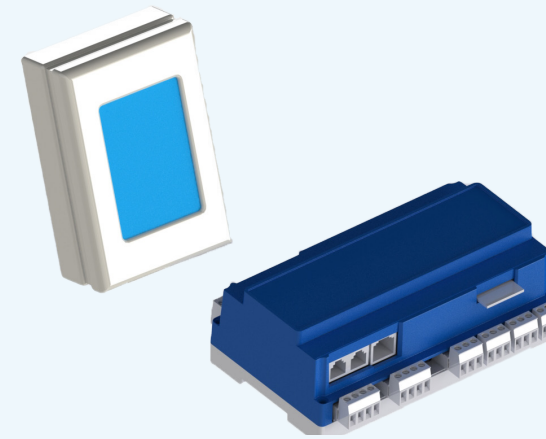
# Optional Sensors



- 1. Combined Humidity & Temperature Sensor**  
Sensor is duct mounted and wired back to the unit controller.
- 2. VOC/CO<sub>2</sub> Sensor**  
The VOC sensor measures the content of volatile organic compounds. The sensor is duct mounted and wired back to the unit controller.
- 3. Pressure Sensor**  
Measures the pressure differential in the ductwork.

# Smart Controls

## Standard Control Algorithms



### 1. Airflow Control

Constant Flow  
Constant Pressure  
Demand Controlled Ventilation (CO<sub>2</sub>/VOC, Occupancy)

### 2. Temperature Control

Constant Supply Air or Return Air Temperature  
Cooling and Heating

### 3. Humidity Control

Humidification  
Dehumidification

### 4. Defrost Control

Exhaust Air Temperature  
Measuring Pressure Drop Across Heat Exchanger  
Timed Exhaust

### 5. Frost Prevention

Hydronic Pre-Heat  
Electric Pre-Heat

### 6. Remote Access

Via Building Network  
Via BACnet IP

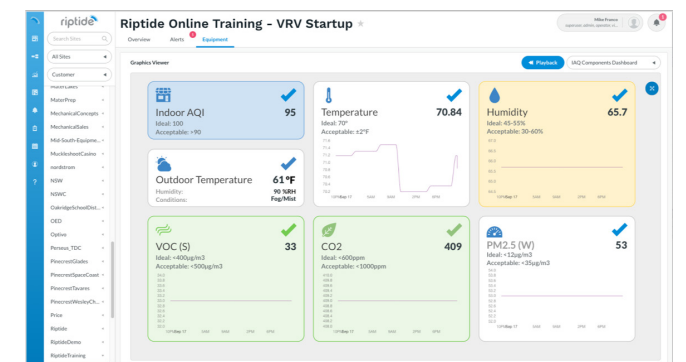
# Riptide Integration

Oxygen8 offers remote connectivity and Indoor Air Quality Management through Riptide.



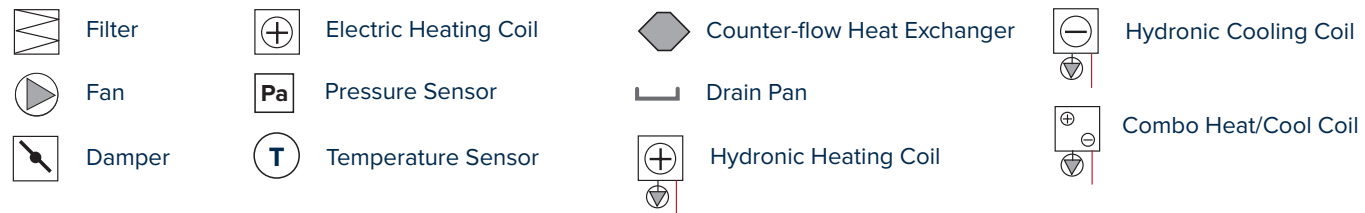
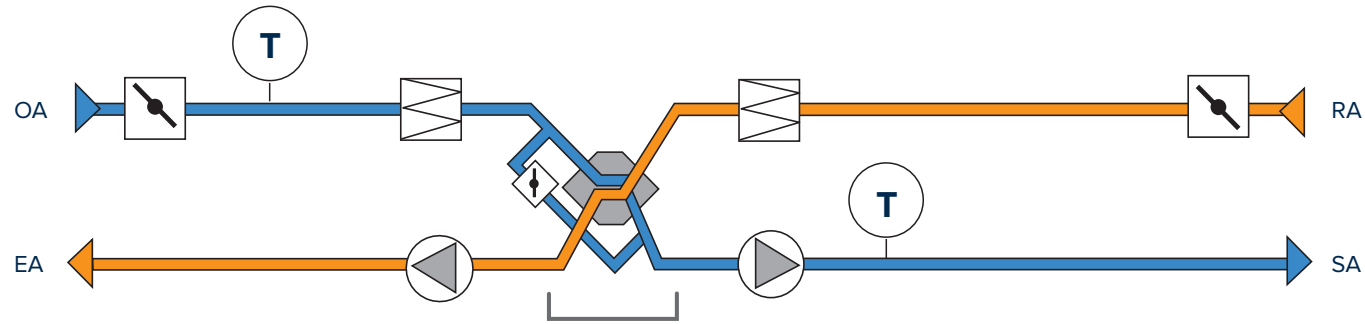
Riptide's Smart Building solutions are specifically designed for multi-unit operations and mid-sized facilities without a traditional automation system. Its easy-to-use cloud-based app works with any mobile device and is suitable for schools, healthcare facilities, commercial buildings and retailers.

Riptide allows building owners to remotely manage all of their equipment. Smart device sensors enable equipment to report statuses automatically to a personalized Riptide hub. Users can set up mobile notifications for specific trends or issues.



# Common Control Strategies

## Economizer / Free Cooling



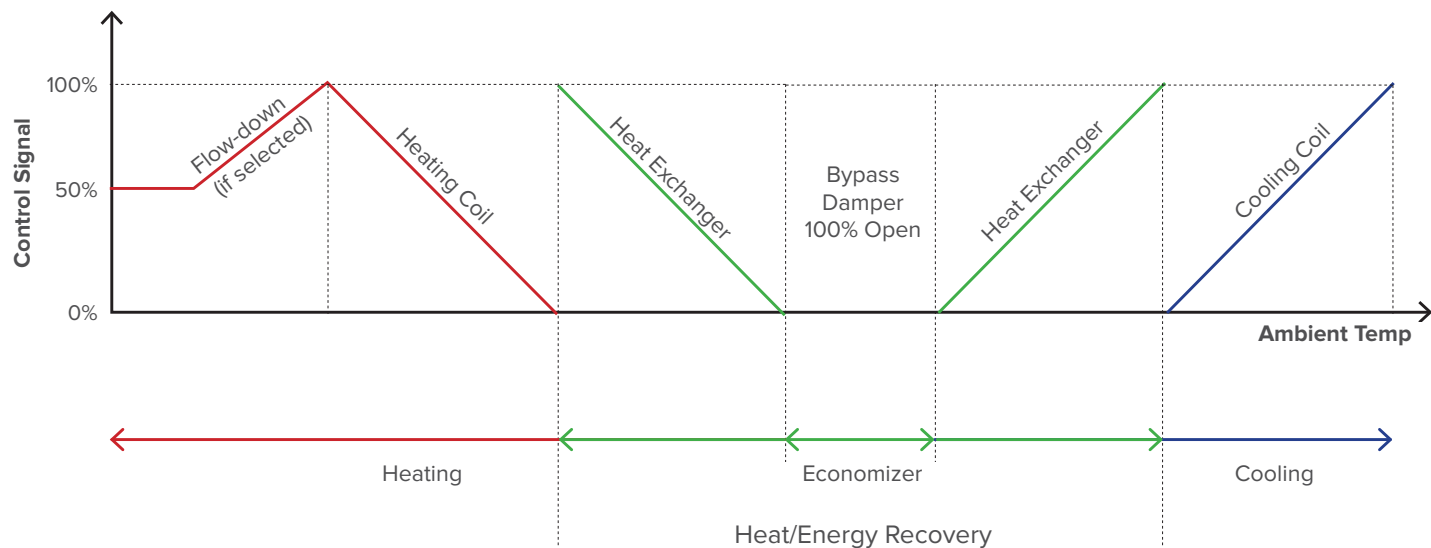
Ventum's unit controller takes advantage of the economizer option to provide "free" cooling (or heating) by bypassing outdoor air around the core and directly supplying air into the building when conditions allow.

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

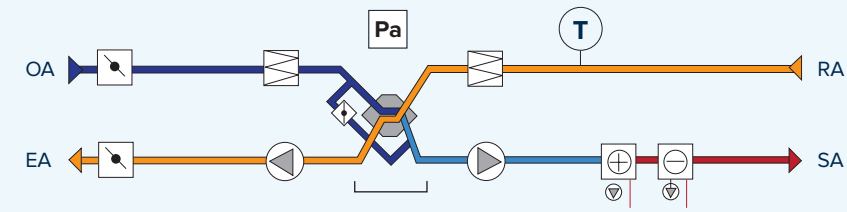
recovery position when a cooling cycle is starting. If the outdoor air temperature raises to a value higher than the supply air temperature or room air temperature, then the cooling coil will be activated.

If the flow-down step function is activated (triggers during heating mode) and the setpoint cannot be reached with all heating sources active, the unit will decrease the flow down to 50% of the rated flow to attempt to achieve the desired setpoint



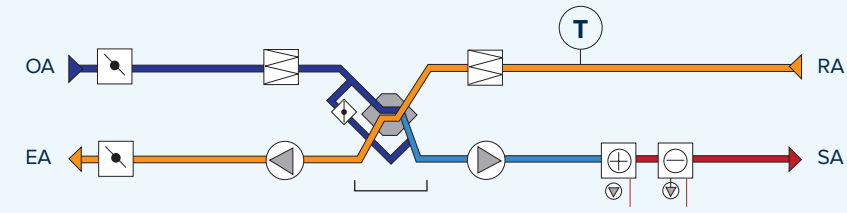
## Defrost Strategy

### Monitor Pressure Drop Across the Heat Exchanger



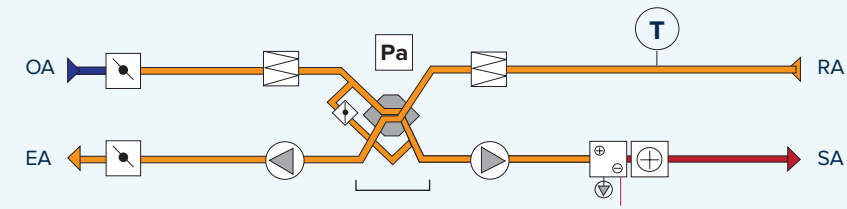
The heat exchanger can be protected against frosting by continuously monitoring the pressure drop (PD) across the heat exchanger. Defrost will start when the PD rises above the setpoint. During defrost the bypass damper will open 100% for a specified period of time.

### 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.

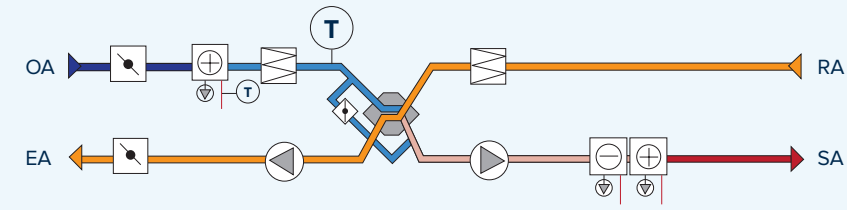
### Timed Exhaust



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).

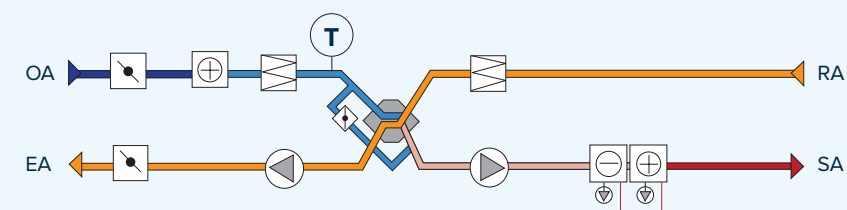
## Frost Prevention

### Hydronic Pre-Heat



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 frost alarm will be activated and the fans will be stopped.

### Electric 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. Pre-heat is controlled by a 0-10V signal.



# Electrical

Model	Nom. V	Motor (kW)	SA Fan Qty	RA Fan Qty	Unit FLA	MCA	MROPD	RFS
H05	208/240	0.50	1	1	5.29	5.91	8.41	15A
H10	208/240	0.78	1	1	8.09	9.06	12.96	15A
H15	208	2.00	1	1	12.33	13.83	19.83	15A
H15	460	2.50	1	1	8.14	9.14	13.14	15A
H20	208	2.00	1	1	12.33	13.83	19.83	15A
H20	460	2.50	1	1	8.14	9.14	13.14	15A
H25	208	2.70	1	1	17.53	19.68	28.28	25A
H25	460	3.70	1	1	11.74	13.19	18.99	15A
H30	208	2.70	1	1	17.53	19.68	28.28	25A
H30	460	3.70	1	1	11.74	13.19	18.99	15A

**MCA** Minimum Circuit Ampacity

**MROPD** Maximum Rating of Over-current Protective Device

**RFS** Recommended Fuse Size

## Specifications

### 1 System Overview

Oxygen8's Ventum series is a modular design with a base ERV unit and optional coil modules for heating, cooling and Daikin VRV integration.

### 2 Standard Features

- High-Efficiency Variable Speed EC Direct-Drive Motor
- Backward Inclined Fans
- 4 Standard Temperature Sensors (OA, RA, EA, SA)
- Integrated Controls with BACnet IP and BTL-Certification
- Non-Fused Disconnect Switch
- 1" Rockwool Filled Double-Wall Panels (6.5)
- Pre-Painted White Exterior Casing
- 22-Gauge Galvanized Steel Exterior/Interior Panel
- Filter Alarms: Signaled by factory-mounted pressure sensors to measure filter pressure drop across filter
- 2" Pleated MERV 8 Return Air Filter, 2" MERV 13 Supply Air Filter
- Removable Hinge Pins for Limited Access
- DAT Sensor for Dehumidification Control
- Hydronic 2/3-Way Valves and Actuators for Field Installation

### 3 Electric Coil Specifications

- SCR Controlled
- Non-Fused Disconnect Switch
- Requires a Separate Electrical Connection

### 4 Installation Options

- Horizontal (Ceiling Mount) – Brackets included
- Orientation: Right Hand or Left Hand
- Access Options: Front Doors

### 5 Warranty

- 24 Months from Start-Up and No Later than 30 Months from Shipment on ERV Core

### 6 VRV Integration

- Factory-Mounted DX Coil and Factory Brazed Expansion Valve Kit to the Coil
- Factory-Mounted and Wired W-Controller to the Coil Section (W-Controller requires a separate electrical connection)

### 7 Options

- Integrated Bypass for Economizer and/or Defrost Strategy
- 3- or 5-Year Warranty Add-On
- Optional Sensors: CO<sub>2</sub>/VOC, Humidity, Pressure

# 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.

### Can the electrical/control box be mounted on a different location than the ERV?

Yes, please provide Oxygen8 with the distance from the unit to calculate the wire harness length.

### Does the W-Controller require a separate power supply and what is the amp draw?

Yes, a 230V/1ph power supply, 15A.

### Do you offer non-fused disconnect?

Yes, it is standard. We use a switch disconnect with internal breakers.

### Is the damper powered by the unit?

Yes.

### How are the dampers controlled?

Damper control is automatic based on the operation of the unit. The Nova BTL-Certified BACnet controller will provide an on/off output signal to the dampers. Dampers can be provided in matching casing or loose.

### Where is the damper actuator located?

It is located outside of the air stream.

### Is a filter sensor provided with the unit?

Yes. Dirty filter sensors are standard - an alert will be sent when filters need to be changed.

### 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?

Yes, but a gateway would be required by the controls contractor.

### How is the Daikin VRV controlled?

The preferred operation is through the W-Controller with a 0-10v signal. Oxygen8 provides a DAT sensor downstream of the coils to control leaving air temperature.

### What sensors come integral to the unit?

There are 4 internal temperature sensors for the unit and 1 for the electric pre-heat that are included.

### Do you provide mounting brackets?

Yes, we will provide hanging brackets for both the unit and coil modules.

### Do Ventum HRV units require a drain connection?

Yes, all HRV Ventum units come with a drain pan and 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.

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[oxygen8.ca](http://oxygen8.ca)