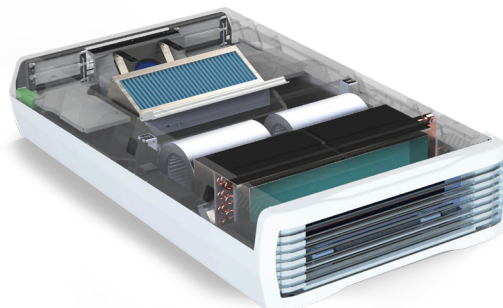


HVR ZERO^{APX}

Hybrid Ventilation Heat Recovery, Heating & Cooling
Product Specification Sheet



Model illustrated in Polar White colour



Designed to maximise efficiency of Offices, Education and Healthcare

Product Description

The next generation of HVR Zero, APX, represents a significant step forward in low energy hybrid ventilation technology. Ensuring excellent air quality is more crucial than ever due to its profound impacts on public health, environmental sustainability, social equity, and economic well-being. The system now incorporates an array of additional monitoring tools to enhance Indoor Air Quality (IAQ). These upgraded sensors monitor internal temperature, humidity, VOC, pollution levels, air flow rates, and CO₂ concentration.

A key feature of the new system is the Passivhaus level of airtightness. The system has been designed to exceed the requirements in the latest CIBSE TM23 guidance which requires ventilation systems to be closed but not sealed during the air testing of buildings, and every system is supplied with an airtightness test certificate.

The system has improved heat recovery and an enhanced two-pipe coil. Specifically designed for compatibility with renewable heating and cooling solutions such as air source or ground source heat pumps. The APX can future proof buildings with the standard provision for cooling.

By seamlessly integrating ventilation, improved heat recovery, exceptional air tightness levels and advanced control over airborne pollutants into a single compact unit, the system significantly reduces overall power consumption in buildings, whilst contributing to unrivalled air quality control. This holistic approach, coupled with a sophisticated automatic control strategy, ensures optimal balance between indoor air quality, thermal comfort, and energy efficiency.

Key Performance Parameters

130	0.06	250	0.19	90	0.22	50.1
Daytime Flow rate (l/s)	Daytime SFP (W/l/s)	Night-time Flow rate (l/s)	Night-time SFP (W/l/s)	Wintertime HX Flow rate (l/s)	Wintertime HX SFP (W/l/s)	Heat Recovery (%)

Features and Benefits

- EPD certified – Zero embodied carbon
- Over 50% heat recovery
- Passivhaus levels of air tightness
- WELL standard IAQ sensor technology
- Active ventilation flow rate monitoring
- IoT remote monitoring technology
- IES modules available for accurate modelling
- Configurable digital wall controller
- Motorised air diffuser increases occupant thermal comfort
- Standard colours available: Polar White, Jet Black and Anthracite Grey
- Bespoke colours also available
- Smart services - automatically controlled

Includes:

- Temperature sensor
- CO₂ concentration sensor
- VOC sensor
- Pollution sensor (PM2.5)
- Humidity sensor
- Flow rate sensor
- With or without ducting
- 1-minute data logging as standard
- Fan speeds automatically controlled
- Carbon offsetting certificate

WHY CHOOSE HVR ZERO APX?

HEAT RECOVERY



By capturing and repurposing excess heat or coolth from exhaust air, our system ensures that valuable thermal energy is not lost but instead utilised to preheat or precool incoming fresh air, significantly reducing energy consumption and operating costs. The inclusion of heat recovery is fundamental when utilising heat pump technology.

Energy Savings: Our system lowers heating and cooling costs and reduces overall energy consumption.

Improved Indoor Air Quality: The continuous flow of fresh air ensures a healthier indoor environment.

Environmental Sustainability: Embrace sustainable environmental practices with our system's focus on low energy consumption.

The heat exchanger efficiency has been optimised for offices, education and healthcare buildings. APX has the perfect balance between fan energy and the heat exchanger resistance.

AIR TIGHTNESS



Experience unparalleled comfort and energy efficiency with our system's meticulous approach to air tightness. Through precision engineering and innovative construction techniques, we guarantee a well-insulated space that eliminates drafts, minimises heat loss, and maintains consistent temperatures throughout your environment.

Our commitment to excellence extends to meeting Passivhaus standards of airtightness. The air testing guidance for buildings is detailed within CIBSE TM23 which was updated in January 2022. Buildings designed after this time are required to be air tested with ventilation products closed and not temporarily sealed.

Every HVR Zero APX is tested at factory and provided with a certification of air tightness. The rigorous approach minimises time on site and ensures successful completion of the buildings airtightness test for the ventilation provision.

SENSOR-DRIVEN OPTIMISATION



Through the integration of advanced sensors and cutting-edge technology, we prioritise monitoring and maintaining an optimal air quality:

- **Temperature Sensor:** Four integrated temperature sensors per unit monitor the ambient temperatures, including water coil temperatures.
- **CO₂ Sensor:** Integrated CO₂ sensors create an average room carbon dioxide level to be monitored ensuring adequate ventilation and avoiding localised CO₂ peaks.
- **VOC Sensor:** Detects Volatile Organic Compounds that can arise from common products, such as new furniture, paints, and cleaning products
- **Pollutants Sensor:** Measures pollutants in the fresh air supply, such as car fumes. The sensor allows greater automatic control of fresh ventilation air during peak traffic periods.
- **Humidity Sensor:** Monitors humidity levels to prevent mold growth
- **Flow Rates Sensors:** Accurately measures the ventilation air flow rates within the system.

ADVANCED CONTROLS



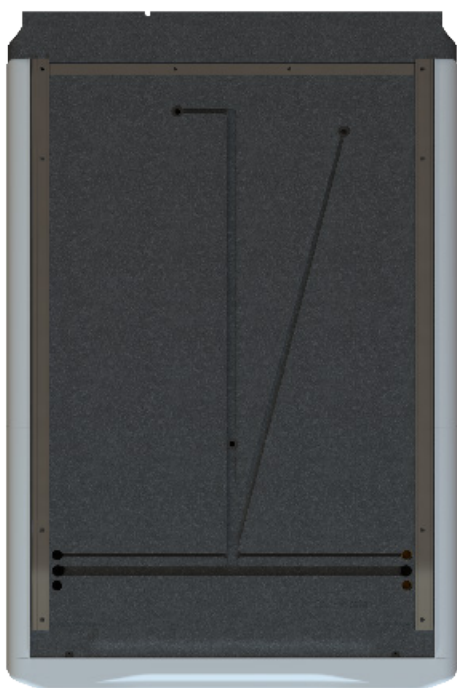
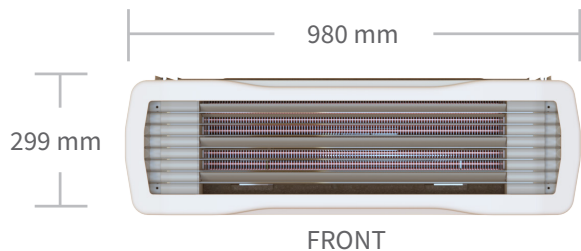
Cutting-edge devices such as Acuity centralised control and Modena wall controllers offer real-time insights into key air quality metrics, empowering informed decision-making and reducing maintenance.

- **Dynamic Data Collection:** Our system continuously collects and analyses data on essential air quality parameters.
- **User-Friendly Interface:** The intuitive control interface presents real-time metrics in a clear and actionable format.

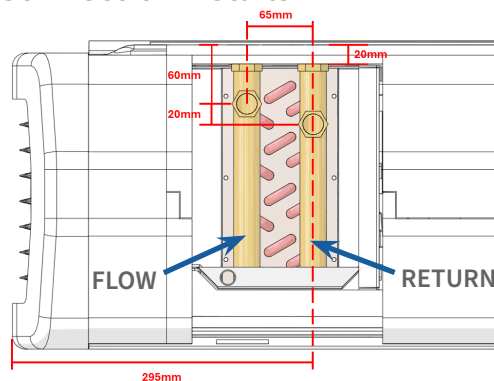
In addition to real-time monitoring, our system offers post occupancy evaluations to assess performance, identify areas for improvement, and fine-tune system settings for optimal functionality.

Variable	Value
Model reference	APX Model
Dimensions (mm)	980 (w) x 299 (h) x 1425(l)
Weight (Kg)	48
Materials	Powder coated aluminium (T6061); Expanded Polypropylene (flame retardant); Copper piping with aluminium fins
Minimum clear ceiling void (mm)	310
External weather louvre min free area (m²)	0.135
Louvre panel requirements	Anti-bird mesh grille
Hybrid daytime flow rate (l/s)	130
Daytime power (W)	8.3
Daytime Specific fan power (SFP) (W/l/s)	0.064
Maximum daytime manual boost flow rate (l/s)	180
Night-time cooling flow rate (l/s)	250
Night-time cooling power (W)	48.1
Night-time SFP (W/l/s)	0.19
Heating coil capacity (based on 50/40 at 0.1 l/s (max 0.18 l/s)) (kW)	4
Cooling coil capacity (based on 12/18 at 0.1 l/s (max 0.18 l/s)) (kW)	2.5
Coil connections (horizontal and vertical options)	2x 1/2" Female BSP Thread
Heat exchanger	Cross flow
Heat exchanger material	Hydrophilic coated aluminium
Heat exchanger efficiency (%)	50.1
Wintertime heat exchanger flow rate (l/s)	90
Wintertime power (W)	19.8
Wintertime SFP (W/l/s)	0.22
Energy recovered at -1°C external temperature (W)	1280
Electrical requirement	230V AC mains with switched fused 3A spur
Rated current	0.9A
Peak current	1.1A
Sensors	• External temperature sensor • Recirculation temperature sensor • Mixed air supply temperature sensor • Coil water temperature sensor • Recirculation CO₂ sensor • Air flow rate sensor • VOC sensor • Humidity sensor • Pollution sensor (PM2.5) • Room temperature sensor (in wall controller) • Room CO₂ sensor (in wall controller) 0-2000 ppm
Guarantee	5 year mechanical and 3 year electrical warranty

Dimensions



Coil Connection Details

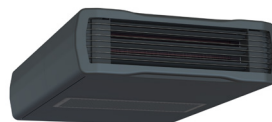


Units can be specified with a coil connection on either the left or right hand side. All units supplied with both vertical or horizontal connection options.

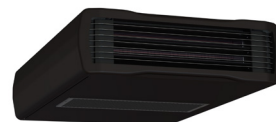
Colour Alternatives



Polar White



Anthracite Grey



Jet Black

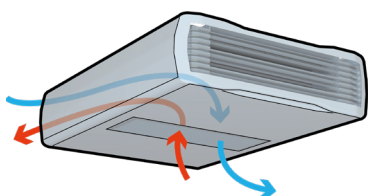


Acoustics

Sound power measurements for a single exposed system

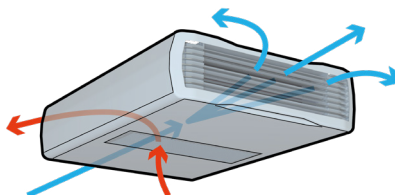
Airflow (l/s)	Octave Band (Hz) Sound Power Level dB re. 1pW								LwA
	63	125	250	500	1000	2000	4000	8000	
130	42.8*	36.2*	35.8	33.1	27.3*	22.0*	20.8#	26.0#	34.4
*denotes figures corrected for background					#denotes background levels				
System tested with a standard 50mm external louvre arrangement									
Predicted in room noise of 27dB with two units in a 55m² room									

Operation Modes



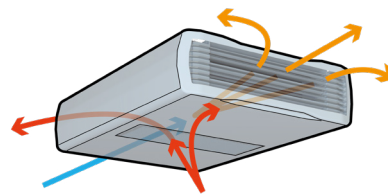
1. Natural Ventilation Mode

Dampers are opened, natural ventilation combined with openable windows expels stale air and ventilates the space with fresh external air.



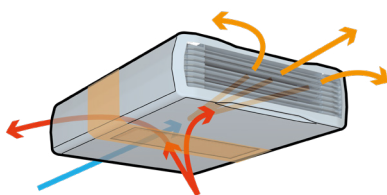
2. Boost Fan Mode

Dampers are opened and mechanical fan operates to bring fresh air into the room. Especially useful in summer months.



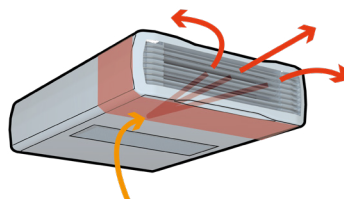
3. Mixed Recirculation Mode

Dampers are opened, mechanical fan operates, stale indoor air is expelled, warm internal air is recirculated and tempers fresh external air via separate discharge pathways.



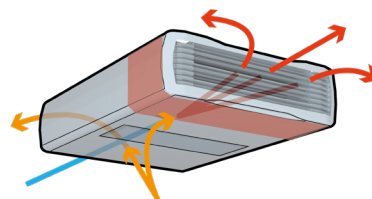
4. Heat Recovery Mode

During winter periods, the cross flow heat exchanger increases the temperature of the intake outside air by harvesting heat from the indoor environment whilst expelling stale air.



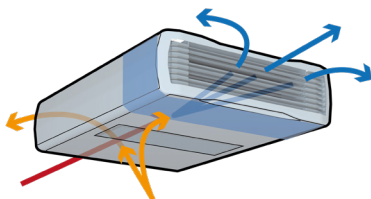
5. Pre-Heating Mode

Recirculates indoor air across the heat exchanger coil to pre-heat the room before the start of the day.



6. Occupied Heating Mode

When the room is too cool, the off coil temperature is limited, flow rate reduced, and room air is recirculated.



7. Cooling Mode

If the internal temperature of an occupied space is too high, the system will actively cool the space by recirculating room air over the coil. It also has the ability to cool external fresh air should the CO₂ level rise too high.

8. Night-time Cooling

Peak ventilation during summer nights removes warm air from the space ready for the next day.

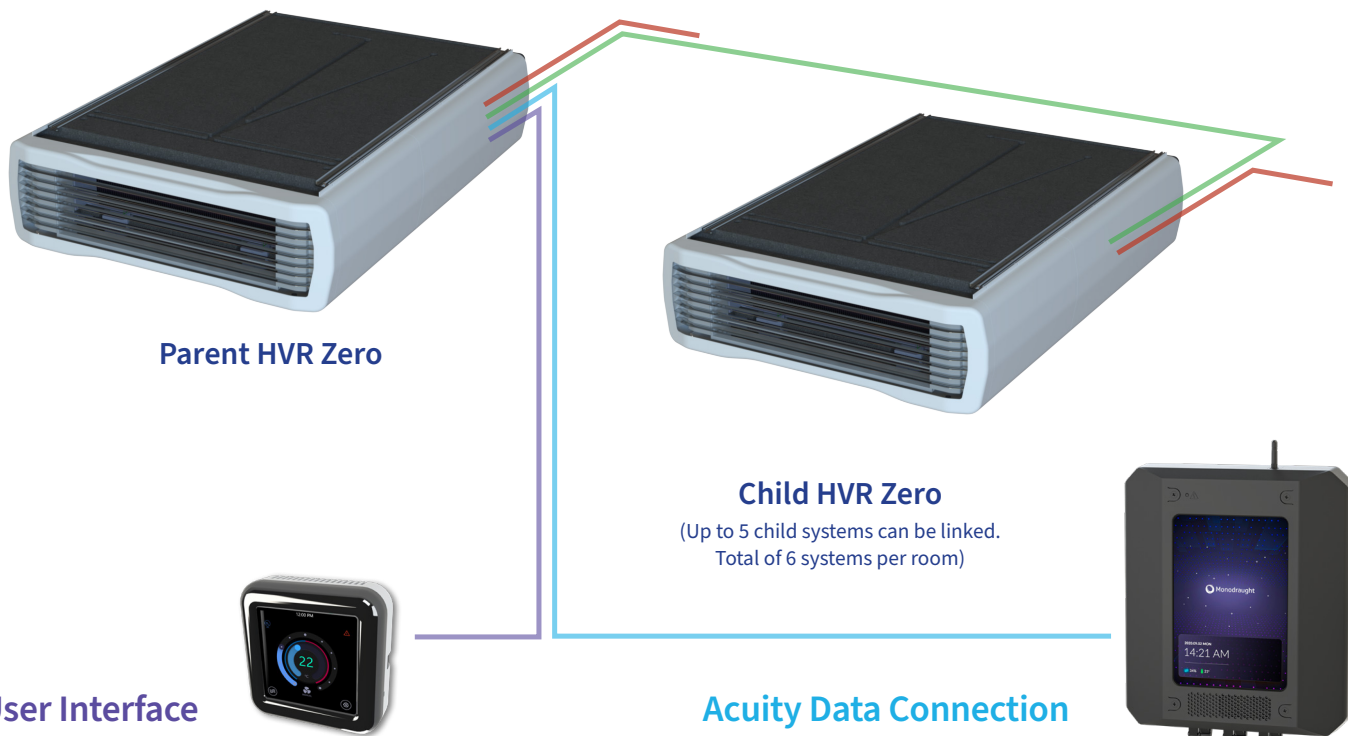
Self-learning Algorithm

The APX model will preheat the room before the occupied period, allowing higher air flow rates, temperatures and velocities, therefore heating the room more efficiently whilst keeping noise to a minimum during occupied periods. The space is actively heated by recirculating room air which is blown across the heating coil.

The system is also able to directly heat fresh air during occupied hours while actively ventilating the indoor space to keep CO₂ levels within a range of specific set points.

To minimise energy use, the heating control system has an adaptive algorithm that estimates how long it will take to heat the room up to the heating set point temperature compensating for weather conditions and room temperatures.

Wiring Diagram



To connect the user interface wall controller a 2 pair shielded cable is required from the HVR Zero parent unit to the wall controller. The cable specification is a screened, 2 pair cable.

Cable specification – twisted pair cable with shielding, 2 pairs, total of 4 cores, 26AWG, 0.14mm²

Data Interlink

When multiple HVR Zero units are used within the same room a data interlink cable is needed. The cable specification is a screened, 2 pair cable.

Cable specification – twisted pair cable with shielding, 2 pairs, total of 4 cores, 26AWG, 0.14mm²

Power Supply

To simplify wiring each HVR Zero requires connection to a dedicated 3A switched fused spur.

To achieve complete connectivity and to enable linking to third party BMS systems, a data cable is required to be daisy chained from the Acuity system to every Parent HVR Zero unit. Up to 50 HVR Zero parent units can be connected to an Acuity system. An RS485 shielded 1.5 pair cable is required for the data connection.

Cable specification – twisted pair RS485 screened cable, 2 pairs, total of 4 cores, characteristic impedance of 120 Ω, 24AWG, 0.2mm²

Connection Options

Wall Controller	Modena Touch Screen
Central Control	iNVent Acuity
Fire Alarm	Relay Connection (N/C)
Inhibit/Run	Relay Connection (N/C)
Science Mode	Relay Connection (N/O)

Additional Components



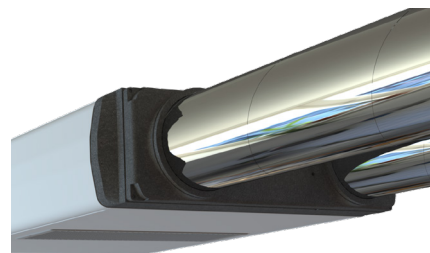
Top Shroud

To hide fixings and pipework connections from the top of the unit to a suspended ceiling, a white RAL 9003, 3 piece component can be supplied.



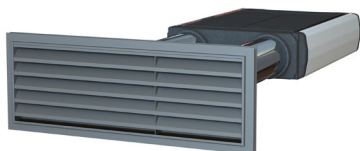
Façade Extension

Utilised to enhance the Façade Transition with 100mm increments, it can accommodate up to four sections, offering the essential depth required for wall installations that paired with the wall plate. The final surface finish matches the façade transition appearance.



Façade Duct Transition

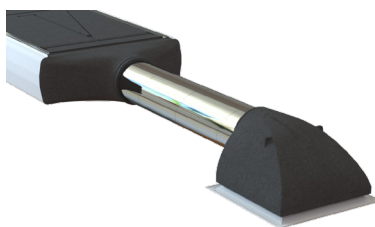
Enabling a limitless array of options for positioning HVR Zero units within rooms, the Façade Duct Transition component, when attached to the Façade Transition component, facilitates the use of 250mm diameter spiral wound ducting to connect the unit to external weather louvres.



Weather Louvre

We strongly suggest the inclusion of our weather louvre in the specification to ensure correct ventilation performance. With a minimum louvre face dimension of 900mm x 300mm our glazed in weather louvre is designed to suit a 950mm x 350mm glass size with 28mm or 32mm thickness.

The 50mm deep weather louvre is supplied complete with anti-bird mesh and in any BS or RAL colour. When provided by Monodraught the louvre transition can be provided pre-fitted ensuring an airtight seal at this junction.



Duct Kit

The duct kit is used when the unit is mounted above a suspended ceiling and provides connection from the air outlet to a high-performance ceiling diffuser.

Comprising of an EPP Swept Duct Transition with integrated silencer pods, short length of flexible duct, an EPP ceiling grille transition hood with noise attenuating internal profile and a low-pressure linear ceiling diffuser.



Wall Plate

A White RAL 9003 powder coated aluminium closure plate is used to seal between brickwork wall openings and the Façade Extension component.



We are pioneers in the design and manufacture of advanced sustainable ventilation, cooling, heating and lighting solutions for new and refurbished commercial and public buildings. We deliver outstanding temperature-control and indoor air quality whilst minimising the consumption of both electricity and refrigerants so as to reduce our carbon footprint. Monodraught have over 50 years' experience and our products have saved the equivalent of nearly 540,000 tonnes CO₂ over the last two decades.

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HVRAPX/06.2024



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