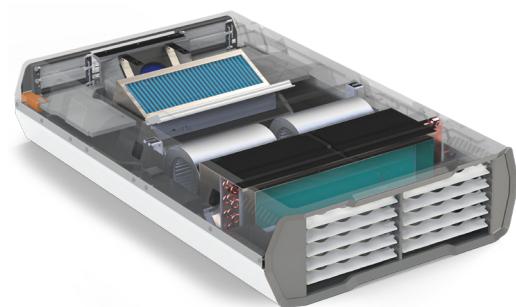


# HVR ZERO XC+

Hybrid Ventilation Heat Recovery & Cooling

## Product Specification Sheet

 Monodraught



## Product Description

HVR Zero sets a new benchmark for the future generation of low energy hybrid ventilation systems that integrate heat recovery ventilation strategies. It provides natural ventilation, hybrid mixing ventilation and low energy mechanical ventilation with heat recovery in one compact unit. The system operates completely autonomously to ensure optimum indoor air quality and thermal comfort with the lowest possible energy use.

The XC+ model includes a two pipe coil complete with condensate tray and condensate pump enclosure. The model is optimised for use with the lower water flow temperatures provided through renewable heating solutions like heat pumps. The system lowers the overall power consumption of buildings by combining ventilation, heat recovery, primary heating and cooling in a highly efficient, integrated solution with a harmonious control strategy.

## Key Performance Parameters

130	0.11	250	0.23	80	0.3
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)

## Features and Benefits

Zero embodied carbon

Zero operational carbon

Innovative, robust modular construction

Quiet and no noise disruption

Low running costs

Remote data monitoring

IES modules are available for accurate modelling

Comfortable environment during peak times

Includes:

- Temperature and CO<sub>2</sub> sensors
- State-of-the-art wall controller
- With or without ducting
- 1-minute data logging as standard
- Fan speeds automatically controlled
- Carbon offsetting certificate



For more information on this product visit, contact:

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# HVR ZERO XC+

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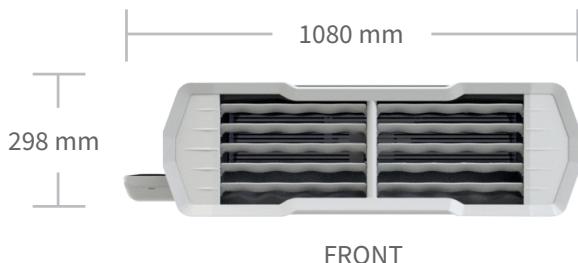
Variable	Value
Model reference	ZC Model
Dimensions (mm)	950 (w) x 298 (h) x 1550(l) Condensate enclosure 1080 (w)
Weight (Kg)	53
Materials	Powder coated aluminium (T6061); Expanded Polypropylene (flame retardant); Copper piping with aluminium fins
Minimum clear ceiling void (mm)	310
External weather louvre min free area (m <sup>2</sup> )	0.13
Louvre panel requirements	Anti-bird mesh grille
Hybrid daytime flow rate (l/s)	130
Daytime power (W)	15.3
Daytime Specific fan power (SFP) (W/l/s)	0.1177
Maximum daytime manual boost flow rate (l/s)	180
Night-time cooling flow rate (l/s)	250
Night-time cooling power (W)	59.1
Night-time SFP (W/l/s)	0.2364
Heating coil capacity (based on 80/60 at 0.1 l/s) (kW)	6
Heating coil capacity (based on 50/40 at 0.1 l/s) (kW)	3.5
Cooling coil capacity (based on 12/18 at 0.1 l/s) (kW)	2.56
Coil connections	2x 3/4" Female BSP Thread
Heat exchanger	Cross flow
Heat exchanger material	Hydrophilic coated aluminium
Heat exchanger efficiency (%)	42
Wintertime heat exchanger flow rate (l/s)	80
Wintertime power (W)	27.5
Wintertime SFP (W/l/s)	0.305
Condensate pump	6m head, installed with 1m 6mm ID (inside diameter) x 9mm OD (outside diameter) connection, 1m mains cable.
Energy recovered at -1°C external temperature (W)	820
Electrical requirement	230V AC mains with switched fused 3A spur
Rated current	0.9A
Peak current	1.1A
Sensors	<ul style="list-style-type: none"> <li>External temperature sensor</li> <li>Recirculation temperature sensor</li> <li>Mixed air supply temperature sensor</li> <li>Coil temperature sensor</li> <li>Room temperature sensor (in wall controller)</li> <li>Room CO<sub>2</sub> sensor (in wall controller) 0-2000 ppm</li> <li>Condensate Pump Float Sensor</li> </ul>
Guarantee	5 year mechanical and 3 year electrical warranty

# HVR ZERO XC+

Hybrid Ventilation Heat Recovery & Cooling



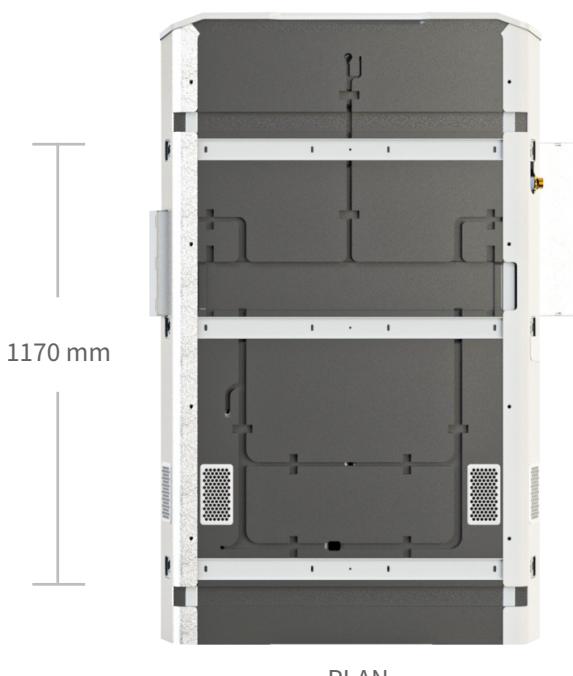
## Dimensions



FRONT

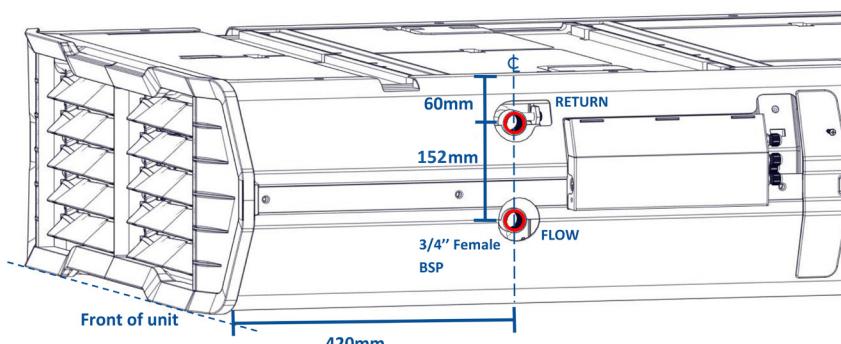


SIDE



PLAN

## Piping Distances

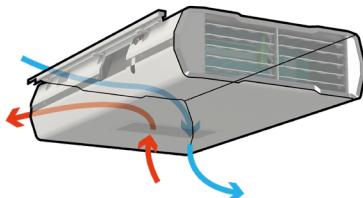


## Acoustics

### Sound power measurements for a single exposed system

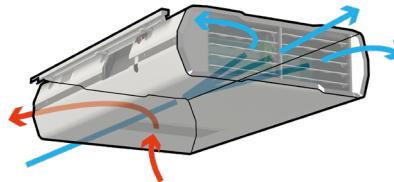
Airflow (l/s)	Octave Band (Hz) Sound Power Level dB re. 1pW								LwA					
	63	125	250	500	1000	2000	4000	8000						
130	46.0#	36.5*	41.0	39.9	33.3*	25.0*	18.8#	21.9#	39.6					
*denotes figures corrected for background					#denotes background levels									
System tested with a standard 50mm external louvre arrangement														
<b>Predicted in room noise of 33dB with two units in a 55m<sup>2</sup> room</b>														

## Operation Modes



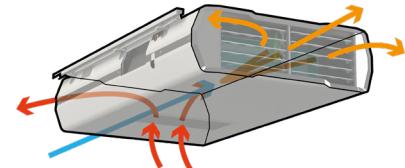
### 1. Natural Ventilation Mode

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



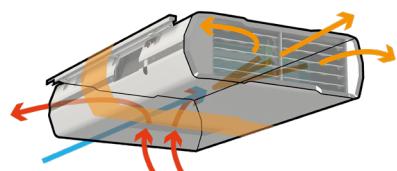
### 2. Boost Fan Mode

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



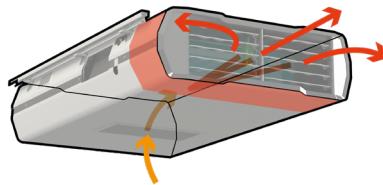
### 3. Mixed Recirculation Mode

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.



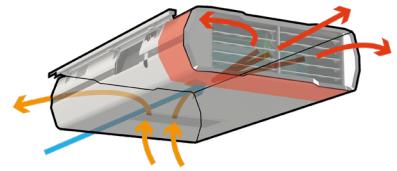
### 4. Heat Recovery Mode

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.



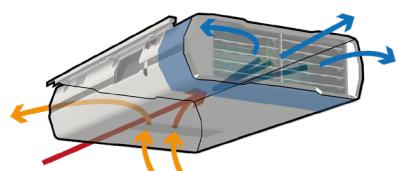
### 5. Pre-Heating Mode

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 CO<sub>2</sub> level rise too high.

### 8. Night-time Cooling

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

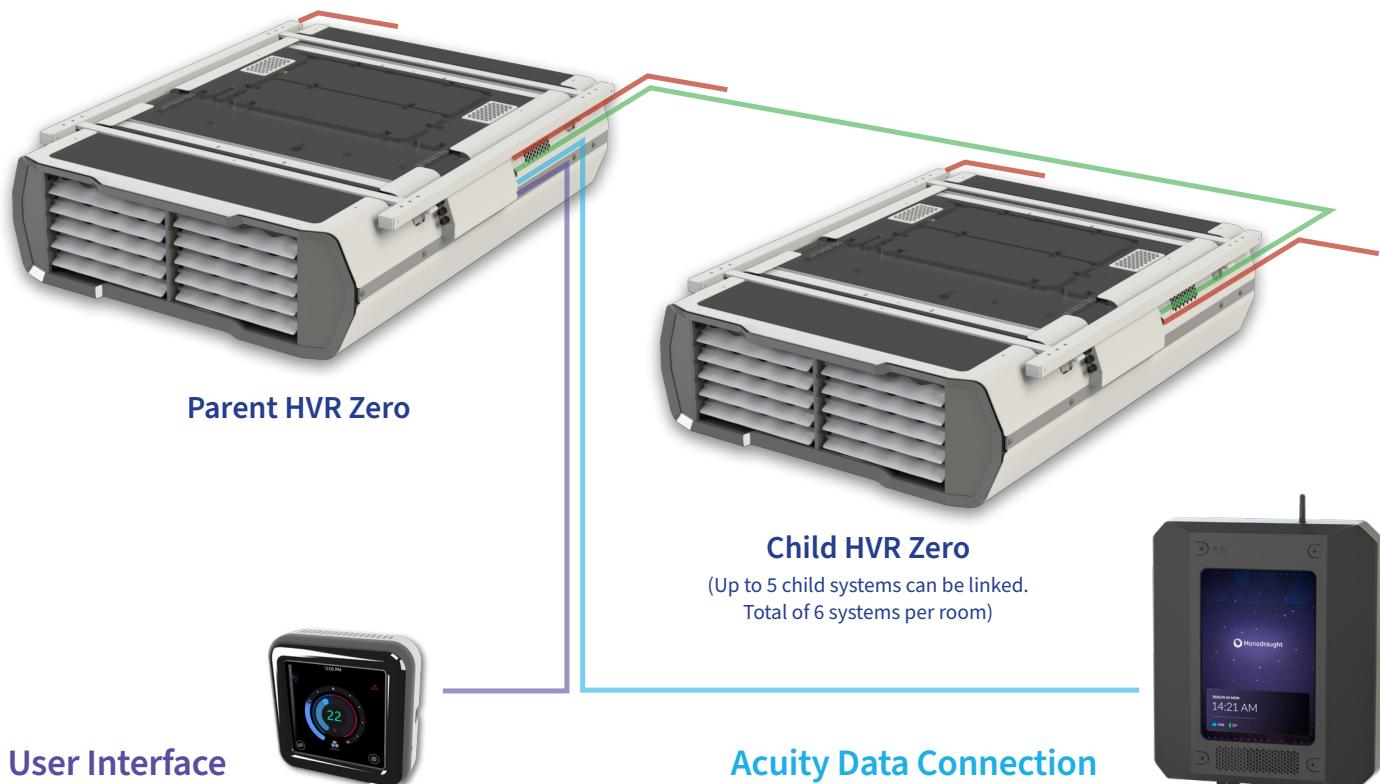
## Self-learning Algorithm

The XC+ 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 CO<sub>2</sub> 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



### User Interface

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 an RS485 shielded 2 pair cable.

Cable specification – Farnell 3382509 – 9842 EQ Multipair Cable, 2 pair, 24 AWG, 0.203mm<sup>2</sup>

### Data Interlink

When multiple HVR Zero units are used within the same room a data interlink cable is needed. The cable specification is an RS485 shielded 1.5 pair cable.

Cable specification – Farnell 3382509 – 9842 EQ Multipair Cable, 2 pair, 24 AWG, 0.203mm<sup>2</sup>

### Electronics Enclosure

A side mounted metal electronics enclosure contains the HVR Zero unit PCB. Power must be isolated before removing cover.

### Acuity Data Connection

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 – Farnell 3382509 – 9842 EQ Multipair Cable, 2 pair, 24 AWG, 0.203mm<sup>2</sup>

### Power Supply

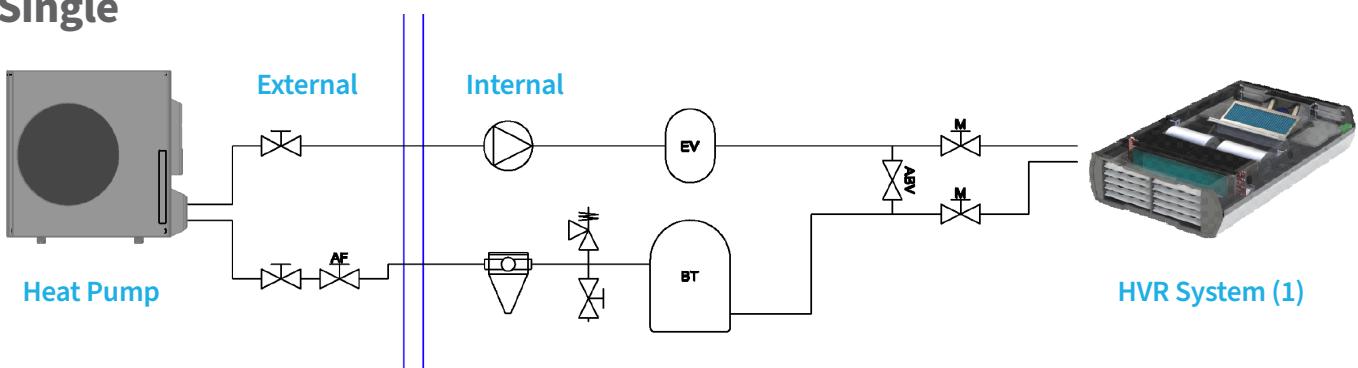
To simplify wiring each HVR Zero requires connection to a dedicated 3A switched fused spur.

### Science Use

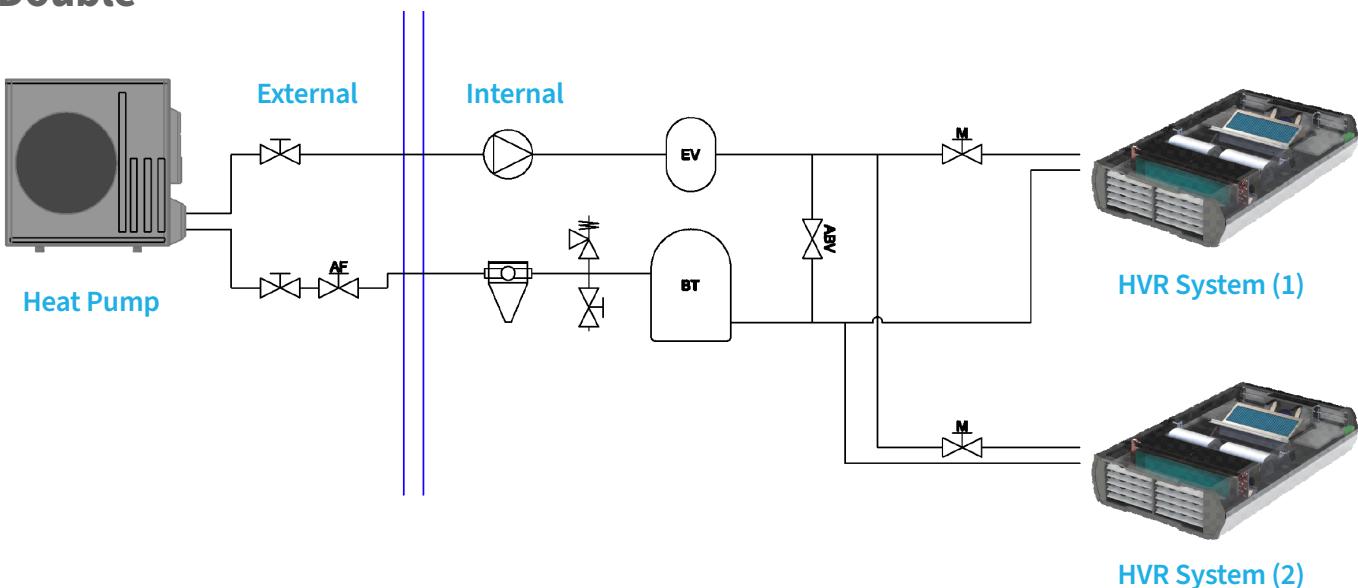
The HVR Zero systems can be connected to a gas proving device to enable automatic activation of a Science mode ensuring correct ventilation rates.

## Heat Pump System Typical Schematic Details

## Single



## Double



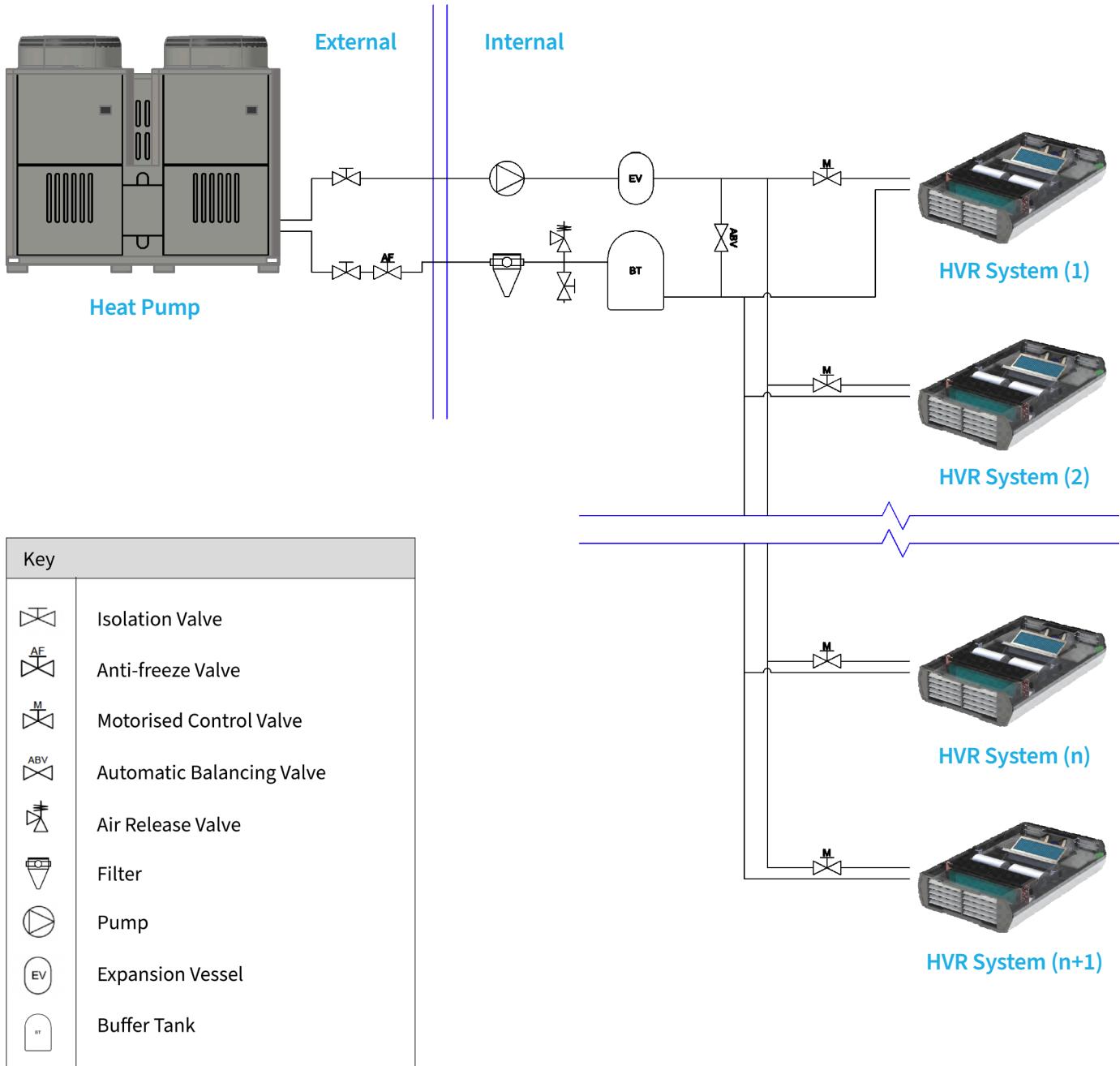
Key (Single and Double wiring schematics)					
	Isolation Valve		Automatic Balancing Valve		Pump
	Anti-freeze Valve		Air Release Valve		Expansion Vessel
	Motorised Control Valve		Filter		Buffer Tank

## Notes:

- Typical pipework schematic for one or two HVR X+ or HVR XC+ units connected to a heatpump.
  - This is a typical installation schematic. Heat pump should be installed as per the Manufacturer's recommendations.
  - Requirement/size of buffer tank and expansion vessel are project specific. See heat pump manufacturers literature for more details.
  - Anti-freeze valves are required when an anti-freeze agent is not added to the systems water (e.g. propylene glycol).

## Heat Pump System Typical Schematic Details

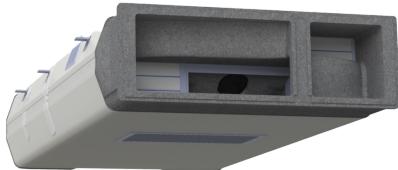
### Multi



### Notes:

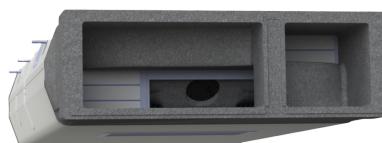
- Typical pipework schematic for multiple HVR X+ or HVR XC+ units connected to a heatpump.
- This is a typical installation schematic. Heat pump should be installed as per the Manufacturer's recommendations.
- Requirement/size of buffer tank and expansion vessel are project specific. See heat pump manufacturers literature for more details.
- Anti-freeze valves are required when an anti-freeze agent is not added to the systems water (e.g. propylene glycol).

## Additional Components



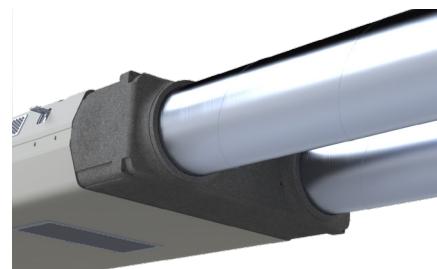
Façade Transition

A dark grey EPP component used to draw the horizontal air flow paths for intake and exhaust and sweeps them into separate connection paths. The façade transition has a 200mm depth that provides internal separation between intake and exhaust to connect to a louvre arrangement.



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.



Wall Plate

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

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.



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 45 years' experience and our products have saved the equivalent of nearly 390,000 tonnes CO<sub>2</sub> over the last two decades.

HVRXC+/10.2023

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