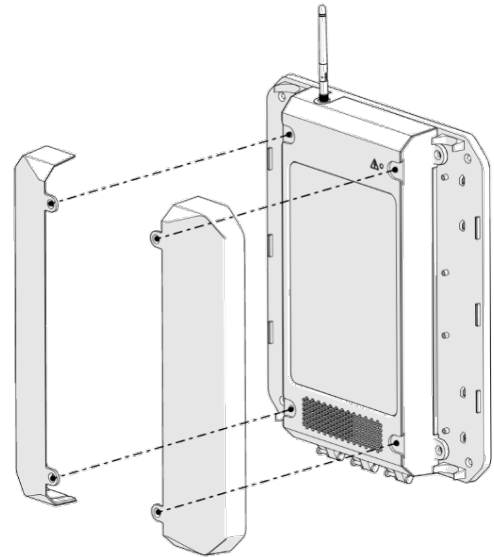


iNVent Acuity

Central Control System for HVR Zero

Product Specification Sheet



Product Concept

iNVent Acuity is Monodraught's central connectivity system that links seamlessly and securely with the HVR Zero systems. This class leading control system has been developed from the ground up and integrates Internet of Things (IoT) connectivity. Utilising automated continuous monitoring software, the control system remotely monitors and diagnoses potential issues before they occur.

Touchscreen Control

Building Management Systems (BMS) are intrinsically linked to the operation of building services. However, they are often considered overly complex for users. The iNVent Acuity with its 10" touch screen provides an elegant system that is easy to use.

Remote Monitoring

Acuity securely uploads operational data of all systems to the cloud via its 4G connection. The data is then autonomously analysed, allowing performance to be reviewed and any issues flagged, allowing Monodraught to pro-actively support and address any issues on site.

Email Notifications

Daily feedback is available to facility managers ensuring that any maintenance requirements or opportunities for energy saving is understood.

Features and Benefits

Management and control of HVR Zero units

At a glance readout of zone status & performance

ModBus and BACnet support

Interface and control of heating & cooling systems

Monitoring and control of up to 55 rooms

External temperature sensor support

General Digital and Analog I/O for future functionality

Includes:

- 10.1" Touchscreen
- 1280x800 Resolution
- 4G Connectivity
- Data logging and monitoring via the Cloud

For more information on this product visit, contact:

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www.monodraught.com | info@monodraught.com | +44 (0)1494 897 700

Variable	Value		
Model reference	HVR-INV-AC-10	HVR-INV-AC-25	HVR-INV-AC-55
Number of rooms supported	10 rooms	25 rooms	55 rooms
Dimensions (mm)	350 (w) x 400 (h) x 60 (d) (excluding antenna)		
Weight (Kg)	2.1		
Materials	ABS		
Touchscreen	10.1" LCD Touchscreen		
Mounting	Unit is designed to be wall mounted in a decentralised location within the building, close to the zones it is controlling, like storage cupboard or plant room		
Power consumption (W)	35 (Max)		
Electrical requirements	230V AC mains with 1A switched fused spur		
Connectivity	4G, MonoComms, Modbus RTU, BACnet/IP, Analog 0-10V I/O, Digital I/O		
Guarantee	3 years for electronics		

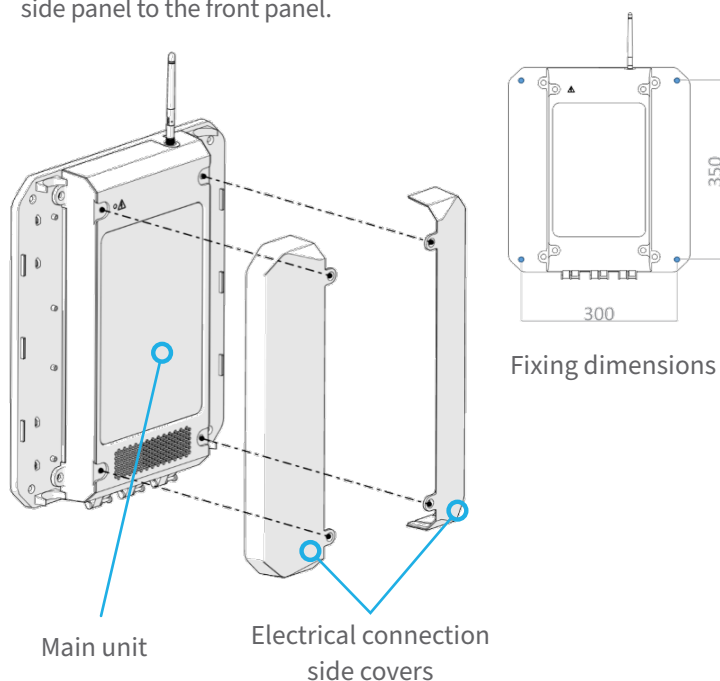
Dimensions



Fitting Instructions

The iNVent Acuity housing is to be fixed into position straight to the wall via four countersunk screws (M5 Metric or No10 Imperial) as detailed above. If using wall plugs, the screws need to be plug length + 15mm.

2x M5x10 countersunk hex socket screws are used to attach each side panel to the front panel.

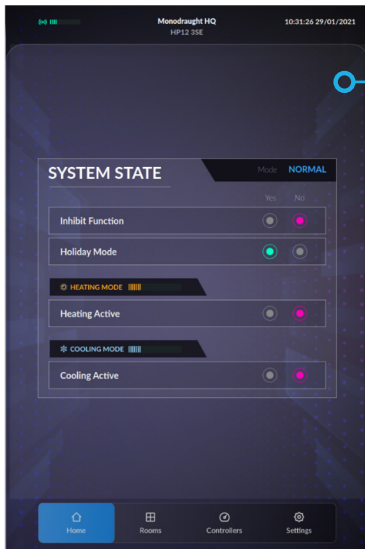


User Interface

Home View

The Home view displays the current system state and allows the user to easily choose between preset modes.

Holiday Mode: Building wide holiday mode disables systems when not needed for a long time.



Rooms View

The Rooms View displays the current temperature and CO₂ levels of all the rooms within each zone. The user can click on an individual room to display more detailed information about that room.

Up to 55 rooms can be connected into the controller and are accessible from this view. With up to 4 HVR units per room, a maximum of 220 HVR units can be linked using a single Acuity controller.

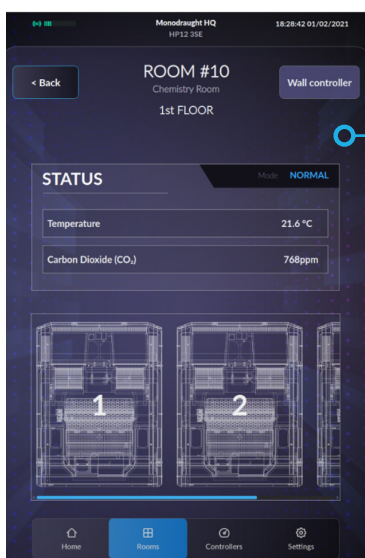


Room Details

The Room Details page gives full details on the room environment and monitoring of the HVR units present within that room.

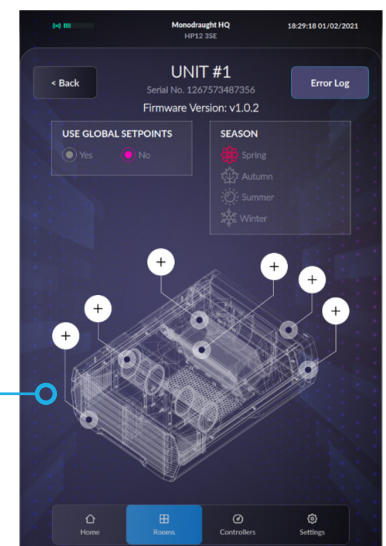
The user can configure which setpoints profile the room should operate with, or customise the setpoints individually for the room.

The user can also select an individual HVR unit to be taken to its specific status page.



HVR Details

The HVR Details page gives full details of the status of the HVR unit.



iNVent Acuity

Central Control System for HVR Zero



iNVent Acuity
Located in plant room or store cupboard

ZONE 1

Mains



Modena
User
Interface

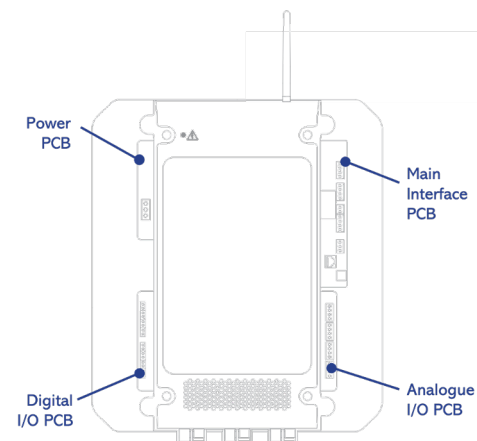
Parent HVR Zero



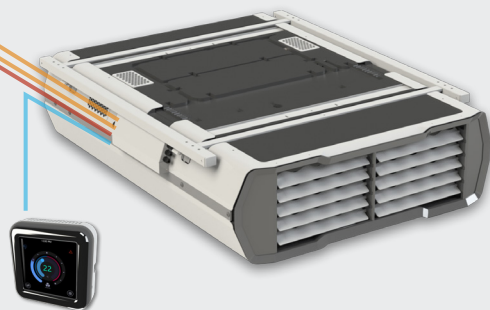
Child HVR Zero
(Up to 3 child systems can be linked.
Total of 4 systems per room)



**POWER TO BE ISOLATED BEFORE
REMOVING LEFT HAND COVER**



ZONE 2



Parent HVR Zero

ZONE 3



Parent HVR Zero

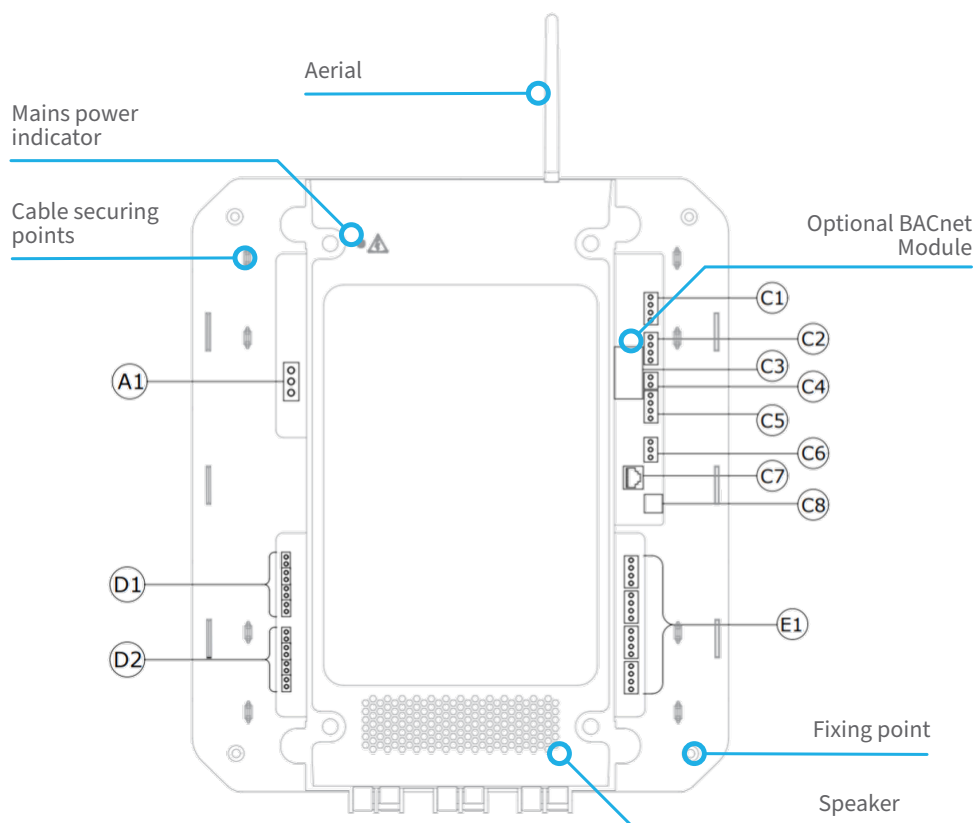
ZONE 4



Parent HVR Zero

Connections Overview

No.	Connector	Description
A1	10mm pitch 3-way Screw Terminal	Mains power to unit
C1	5mm pitch 4-way Screw Terminal 16 AWG Max	MonoComms building-wide network to HVR Zero units
C2	5mm pitch 4-way Screw Terminal 16 AWG Max	BMS monitoring port (Modbus RTU)
C3	RJ45 Connector	BMS monitoring port (BACnet/IP)
C4	5mm pitch 2-way Screw Terminal 16 AWG Max	Fire alarm interlock to disable systems in case of fire. Normally closed connection required.
C5	5mm pitch 4-way Screw Terminal 16 AWG Max	Rain sensor connection. Normally open connection required.
C6	5mm pitch 3-way Screw Terminal 16 AWG Max	External temperature sensor connection (0-10V mapping to -10 to +40°C)
C7	RJ45 Connector	Ethernet Port (for use when 4G is not possible)
C8	3.5mm TRS Socket	UART port for debugging purposes
D1	5mm pitch 2-way Screw Terminal 16 AWG Max	Volt-free inputs for interlinking with external equipment (24V sense voltage)
D2	5mm pitch 2-way Screw Terminal 16 AWG Max	Volt-free outputs for interlinking with external equipment (Max 24V 0.1A rated)
E1	5mm pitch 4-way Screw Terminal 16 AWG Max	0-10V analogue input and output ports with 24V DC power for interlinking with external equipment



Building Management System Connection

Interconnection with Building Management Systems (BMS) is an important part of modern building services for heating and ventilation solutions. iNVent Acuity incorporates Modbus connectivity as standard. The information collated by Acuity can be passed across to BMS systems for inclusion within reporting requirements.

Address #	Name	Units	Description	Data Type
Date/Time				
0	Year	Years	Year	16-bit Unsigned Integer
1	Month	Months	Month	16-bit Unsigned Integer
2	Day	Days	Day	16-bit Unsigned Integer
3	Hour	Hours	Hour	16-bit Unsigned Integer
4	Minute	Minutes	Minute	16-bit Unsigned Integer
Acuity Status				
5	Status	N/A (See #)	Overall Status of Acuity	16-bit Unsigned Integer
7	External Temperature	0.1 °C	External Temperature	16-bit Signed Integer
Room Status (x10)				
20 + (N * 10)	Operating Mode	N/A (See @)	Operating mode	16-bit Unsigned Integer
21 + (N * 10)	Fault Code	N/A (See %)	Code indicating any faults that are present	16-bit Unsigned Integer
22 + (N * 10)	Room Temperature	0.1 °C	Temperature of the room	16-bit Signed Integer
23 + (N * 10)	Room CO2	ppm	CO2 level in the room	16-bit Unsigned Integer
24 + (N * 10)	Supply Fan Speed	%	Supply fan speed in percent	16-bit Unsigned Integer
25 + (N * 10)	Extract Fan Speed	%	Extract fan speed in percent	16-bit Unsigned Integer
26 + (N * 10)	Intake Temperature	0.1 °C	Temperature of air brought in from outside	16-bit Signed Integer
27 + (N * 10)	Recirc Temperature	0.1 °C	Temperature of air recirculated from the room	16-bit Signed Integer
28 + (N * 10)	Supply Air Temperature	0.1 °C	Temperature of air supplied to the room	16-bit Signed Integer
29 + (N * 10)	Heating Coil Temperature	0.1 °C	Temperature of the hot water supply pipe to the heating coil (If fitted)	16-bit Signed Integer

Where N is from 0 to (Number of Rooms - 1), so the first Room (N=0) would report to input registers 20 to 29, the 2nd room (N=1) would report to input registers 30 to 39 etc.

The number of rooms is dependent upon the Model of acuity (i.e. HVR-INV-AC-10 = 10 Rooms, HVR-INV-AC-25 = 25 Rooms, and HVR-INV-AC-55 = 55 Rooms)

Coils

Address #	Name	Description
0	Global Enable	Setting this to 0 puts all Rooms into "Off" mode

Discrete Inputs

Address #	Name	Description
0	Fire Interlock	State of Fire Interlock Input
1	Rain Sensor	State of Rain Sensor Input

(#) Acuity Status Value Description

Number	Mode
0	Unknown
1	Off
2	Normal
3	Fire Interlock

(@) Room Operating Mode Value Description

Number	Mode
0	Off
1	Mix
2	Boost
3	Natural Ventilation
4	Manual Fan Speed
5	Manual Control
6	Night Cooling
7	Science
8	Heating
9	Heating + Ventilation
10	Acoustic Test
11	Self-Test
12	Pre-heat
13	Heat-Pump Cooling

Acuity Modbus Registers

The fault code is a numeric value that indicates any fault present on the system. Each fault has a unique code allocated to it ($2(n-1)$ where n is the fault number) which are added together to form the fault code. So if there was a fault with the RTC, External Damper and Supply Fan, the fault code would be 1029 ($1 + 4 + 1024$).

Fault Number	Hex Code	Decimal Code	Fault
1	0x0001	1	RTC
2	0x0002	2	FLASH
3	0x0004	4	External Damper
4	0x0008	8	Exhaust Damper
5	0x0010	16	Air Mixing Damper
6	0x0020	32	Grille Actuator
7	0x0040	64	Intake Temperature Sensor
8	0x0080	128	Recirculation Temperature Sensor
9	0x0100	256	Supply Air Temperature Sensor
10	0x0200	512	Heating Coil Temperature Sensor
11	0x0400	1024	Supply Fan
12	0x0800	2048	Extract Fan
13	0x1000	4096	User Interface
14	0x2000	8192	Heating
15	0x4000	16384	Cooling
16	0x8000	32768	Parent/Child Communications



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 CO₂ over the last two decades.

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