

OPERATION & MAINTENANCE MANUAL

WINDHIVE

EDUCATION BUILDINGS



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1. Company Details

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2. Specification

Ventive Windhive is a roof-mounted Passive Ventilation system with Heat Recovery (PVHR™). PVHR is a patented method of delivering high thermal efficiency and consistent air flow using natural ventilation systems, by securely transferring the heat from exhaust air to fresh incoming air.

The Ventive Windhive has several sensors that constantly monitor the temperature and air quality within classrooms and other school spaces. The sensors communicate with the system's actuators to adapt performance to changing conditions in real time. The parameters set will ensure a comfortable indoor environment is maintained continuously.

Ventive Purge actuated Wall/Window Louvres (where installed) are designed to assist with additional fresh air supply. Installed in the external façade of the building and connected to the Ventive Hub, the louvre's actuator adapts performance to changing conditions in real time by supplying additional fresh air when required. The Windhive actuators open all three dampers creating negative pressure to exhaust air from the room. The louvre actuator uses 24V Modulating (0-10V signal).

Benefits of the system:

- It is completely passive, recovering heat at zero energy cost
- It reduces carbon emissions
- It lowers operating costs and maintenance requirements
- It is easy to install
- It has no fans or motors, meaning it operates silently

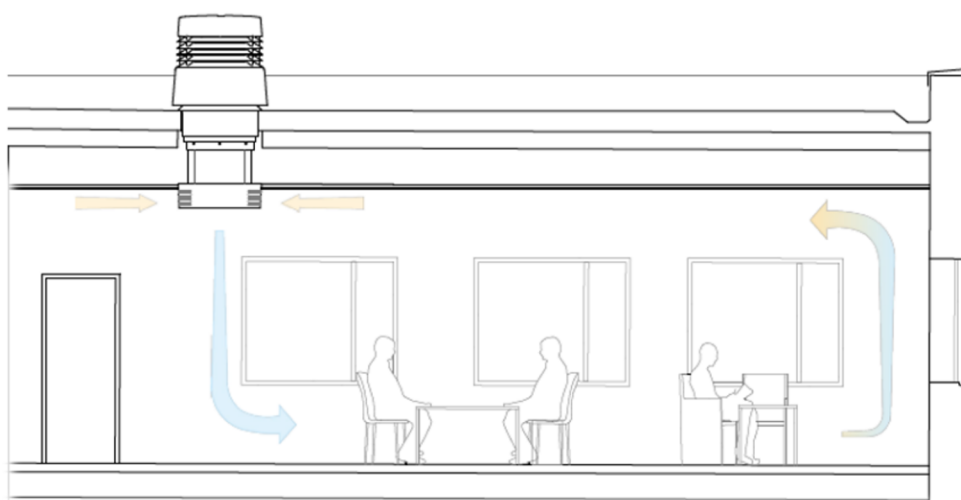


Figure 1 – Image showing Windhive in Heat Recovery Mode

Simple steps to ensure you benefit most from the Ventive Windhive

1. Windhive does not require switching on to operate.
2. Winter: Keep the room sealed by closing windows and ensuring no other openings let the cold air in (including open doors). This will maximise the benefit from the heat recovery system.
3. Summer: During a hot day ensure that windows are shut to prevent the hot air from entering. If you have the night-time cooling package (i.e. Louvres fitted) the system will automatically operate to pre-cool the room overnight.

If you do not have the night-time cooling package (i.e no Louvres fitted) it is advisable to securely open the windows following a hot day. This will help you stay cool and reduce the risk of overheating the following day.

3. System Performance

- Providing ventilation at 200 litres per second using 0W
- Heat Recovery of up to 72% using 0W
- Night time cooling provides 4 air changes per hour reducing the indoor temperature by up to 10°C

4. System Operations

Windhive is capable of the following operation modes:

Full heat recovery – winter conditions

Windhive passes 100% fresh air through pure natural ventilation. The PVHR method ensures there are no cold draughts, reducing heat loss by up to 72%. In winter the dampers close to produce an airlock and ensure heat is retained overnight.

Bypass mode – spring/autumn conditions

Windhive dynamically adjusts to sensor data from the classrooms to provide an optimal balance of heat recovery with air quality. This can change multiple times during the day as occupancy levels vary.

Passive cooling – summer conditions

During warm conditions Windhive engages in secure night-time purging. Supplying fresh air through a wall louvre, the Windhive actuators open all three roof dampers to create negative pressure and draw warm air out of the room. Capable of 4 air changes per hour, this method can reduce temperatures overnight by up to 10°C.

5. Components

- Windhive Roof mounted Cowl
- Heat Exchanger Core
- Actuated Diffuser Box incorporating supply, exhaust and bypass air
- External Diffuser (Below ceiling option)
- Ducted Plenum Box (Above Ceiling Option)
- Ducting as per project specification
- Wall/Window Louvre (where installed)
- Ventive Hub Controls



Figure 2 - CO2 controller

6. Controls

Your Windhive system has been installed with a controls system to ensure it is working at optimum level and maintaining a healthy indoor environment (please note, this is fully automated and does not require any interaction). For electrical details, please refer to the standard wiring diagram in section 7. For wiring details specific to your project please refer to the wiring diagram supplied during the design stage. Please see below for information about the CO2 sensor.

The Ventive Windhive range CO2 Sensor is designed to detect Carbon Dioxide concentration and temperature in classrooms and other occupied spaces. The units have "traffic lights" for alarm functionality set to Green (below 1500ppm); Amber (between 1500ppm and 2000ppm) and Red (above 2000ppm), as prescribed by BB101. The CO₂ sensor calibrates automatically. The sensors have linear 0 to 10V signal outputs relating to CO₂ concentration that can also be linked to temperature and humidity. The sensors should be installed directly onto a wall mounted box in a dry indoor environment.

CO2 Sensor Technical Data

Power Supply		24Vac/dc -10%/+15%, max 1VA
Displays and Interfaces	Alarm LEDs (Traffic Lights)	Green, Yellow and Red LEDs. Alarm limits adjustable (Default: CO ₂ Amber: 1500ppm, CO ₂ Red: 2000 ppm)
	Push Button	Timed Bypass Override
Signal Outputs	Analog	Up to 3 0..10Vdc < 5mA; 100k min impedance for 1% accuracy
	Option	2 x 24Vac Triacs; 2A maximum; Requires 24Vac Power Supply
Connections	Terminal Connections	Solid and Stranded Cable; 55° Angle for Wiring; Cable Size: 0.05 to 1.5mm ² (EN ISO); Rising Clamp: Size 2.5 x 1.9mm
Environmental Conditions	Temperature	0°C...+50°C (32..122°F)
	Degree of Protection	IP20
Housing	Material	ABS Plastics, Self-Extinguishing, RAL9010 Pure White
	Mounting	Wall or Junction Box Mounting
	Dimensions	W86 x H120 x D29mm
Sensing Characteristics		
Carbon Dioxide (CO₂)	Range	0...5000ppm CO ₂ (Range Adjustable)
	Accuracy	± 50ppm + 3% of the reading @ 25°C (@77°F)
	Technology	Auto Calibrating; Non-Dispersive Infrared (NDIR)
	Non-Linearity	<1% FS
	Warm-Up Time	<20 seconds
	Response Time	2 minutes
Temperature (option)	Range	0..50°C (32..122°F)
	Accuracy	±0.3°C
Humidity – RH (option)	Range	0..100%rH
	Accuracy	±2% RH (within 0..90% RH)
Connections		
Wiring Terminals	DO1	Digital Output; 24Vac Triac Switching to 0V; max. 2A (option)
	DO2	Digital Output; 24Vac Triac Switching to 0V; max. 2A (option)
	G	24Vac/dc Power Supply
	G0	0V Common
	Y1	0..10Vdc Analogue Output (Function Selectable, default CO ₂)
	Y2	0..10Vdc Analogue Output
	Y3	0..10Vdc Analogue Output
	G0	0V Common

7. Wiring Detail

Key

Controller wiring: RS458

Power & supply wiring: n-core YY cable with CSA=0.75mm² is required*

1 core (part of the n-core YY cable)

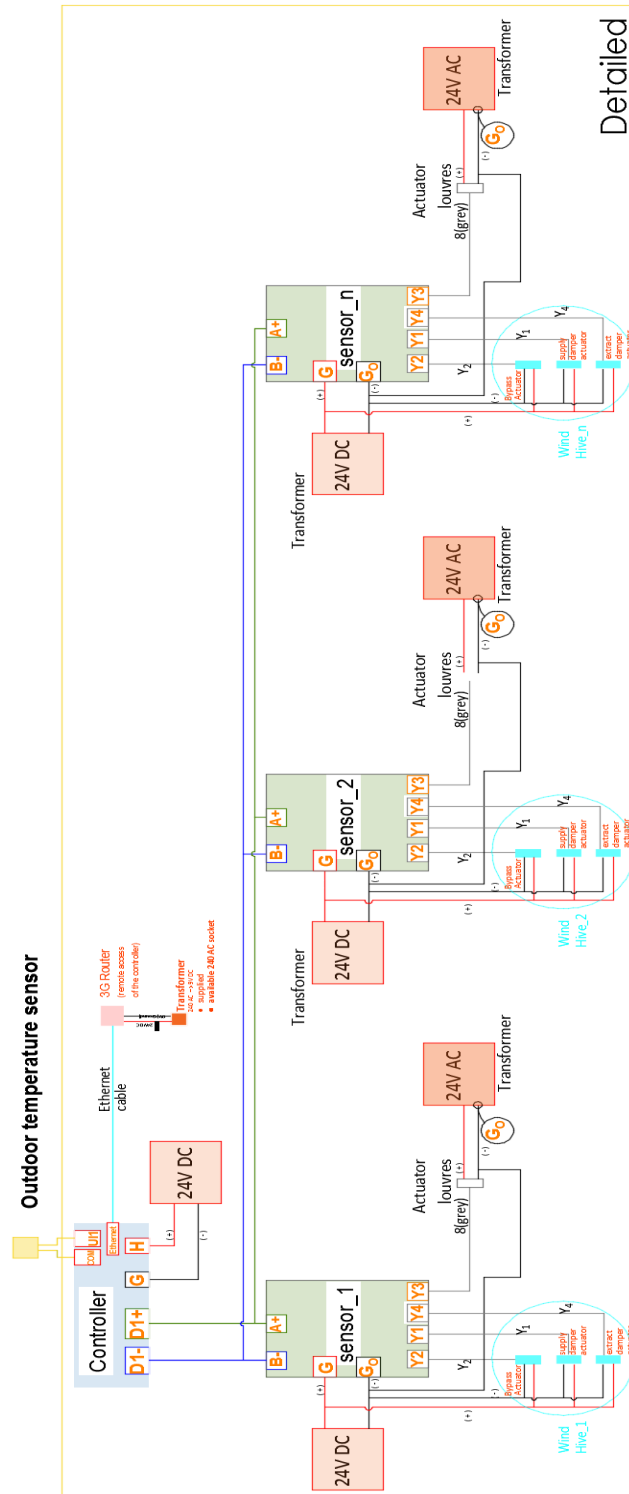


Figure 3 – Standard wiring diagram

8. Maintenance

The Ventive Windhive has been designed to have little/no maintenance required.

Ventive systems are designed and built to function in all weather conditions in the UK. Any firmware updates are installed remotely and automatically through the Ventive cloud ensuring users are always using the latest software version. We monitor the systems weekly for a period of one year to ensure that there aren't any irregularities with the operation of the units.

Should you have any issues with the performance of your Ventive system, please contact the contractor responsible for installation for more information on warranty.

9. Warranty Period

The warranty period for the Windhive unit is for a duration of 1 year from date of commissioning. The system is covered against faults and defects. In all cases this warranty is invalid if the system is accidentally damaged, intentionally damaged, sabotaged, modified or effected by acts of nature.

Warranty is issued in addition to your statutory rights. Nothing in this warranty effects your statutory rights.



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