BMS Information - WINDCATCHER X-Air

A Building Management System (BMS) is a control system that can be used to monitor and manage the mechanical, electrical and electromechanical services within a facility.

In its most basic form, a BMS consists of software, a server with a database and smart sensors connected to an internet-capable network. The smart sensors situated throughout the building will gather data and send it to the BMS, where it is then stored in a database.

The data collected can then be used to control a number of different aspects of the building; including power, heating, ventilation and air-conditioning, etc. This makes connecting a Monodraught control system to a BMS very useful as it will allow for a Monodraught Natural Ventilation or Cooling product to be automatically controlled, dependant on pre-defined conditions.

When using the WINDCATCHER® X-Air to Naturally Ventilate a space, a WINDCATCHER X-Air wall controller can be connected to the BMS to provide temperature, override and optional CO_2 information. This will allows the WINDCATCHER system to be controlled in order to create a comfortable and healthy environment by means of expelling stale air from the room and supplying fresh air from outside.

The Monodraught WINDCATCHER X-Air wall mounted controller can be connected to the BMS via a three core cable (16-2-3A. RS: 660-4087 or Farnell 1190282) as follows:

Red   24V DC
Green   0 - 10V signal (conveying Temperature, Override and optional CO_2 information)
Blue   0V DC

Monodraught®
engineering delivered naturally

WINDCATCHER Controller

1. **Open Button:** Sends a signal to the control system (output > 9.2V) to open the damper fully for a 20 minute period. After the 20 minute period the system reverts back to Normal operation/ Automatic Mode.
2. **Normal Button:** Reverts the system back to automatic mode cancelling any override before the timer expires.
3. **Close Button:** Sends a signal to the control system (output < 0.5V) to close the damper fully for a 20 minute period. After the 20 minute period the system reverts back to Normal operation/ Automatic Mode.
4. **CO_2 Sensor (Optional):** When the CO_2 level in the area goes above 1500 ppm the output signal will be in the region of 8.5 - 9.2V until the level in the space falls below 1300 ppm.
5. **Temperature Sensor:** When override or CO_2 is not being communicated to the controls the 0.5 - 8.5V signal represents 10 - 26°C.
   The Override time can be set to 20 minutes, 1 hour or 3 hours.

Output to BMS System

Meaning	v
Override Closed	0 - 0.5V
11°C	0.6V
12°C	1.1V
13°C	1.7V
14°C	2.2V
15°C	2.7V
16°C	3.2V
17°C	3.7V
18°C	4.2V
19°C	4.7V
20°C	5.2V
21°C	5.8V
22°C	6.3V
23°C	6.8V
24°C	7.3V
25°C	7.8V
26°C	8.3V
CO2	8.6V - 9.2V
Override Open	9.2V - 10.0V

Damper Positioning

% Open by Rotation	Voltage (DC)
0%	0V - 1.99V
5%	2.4V
10%	2.8V
15%	3.2V
20%	3.6V
40%	5.2V
60%	6.8V
80%	8.4V
100%	10V

The profile to be used for opening the damper assembly to the required percentage based on the recommended Monodraught control strategy

Active Louvre Positioning

% Open	Voltage (DC)
0%	10V
25%	7.25V
50%	6.25V
100%	2V

X-Air System Connection

A second cable with six cores (16-2-6A. RS: 660-4099 or Farnell 1190288) should be run from the BMS to the Master WINDCATCHER X-AIR system connection box as follows:

Red	24V DC
White	Master Damper Feedback
Black	Master Active Louvre Feedback
Yellow	Active Louvre Control
Green	Damper Control
Blue	0V DC

Wiring from the Master connection box out to slave units in the same control zone should use a 4 core cable (16-2-4A. RS: 660-4096 or Farnell 1190286) and only the Blue, Green, Yellow and Red cables are connected to subsequent Slave systems. (The feedback lines MUST NOT be commoned between systems)
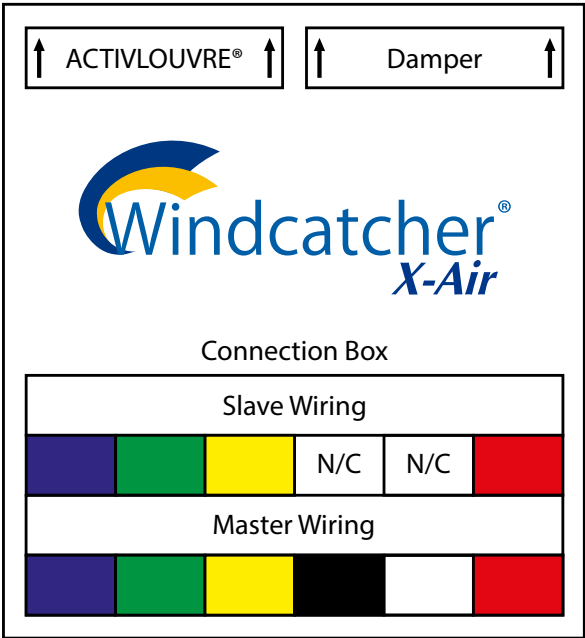
Damper Control Strategy

The WINDCATCHER X-Air Damper should be controlled according to the following strategy.

Season	Spring	Summer	Autumn	Winter
Start Date	01 March	01 June	01 September	01 December
Finish Date	31 May	30 August	30 November	Last Day of Feb
Zone Temperature	Damper Output			
Up to 16°C	Dampers Closed	Dampers Closed	Dampers Closed	Dampers Closed
At 17°C		Dampers Open 20%		
At 18°C		Dampers Open 40%		
At 19°C		Dampers Open 60%		
At 20°C	Dampers Open 20%	Dampers Open 80%	Dampers Open 20%	
At 21°C	Dampers Open 40%		Dampers Open 40%	
At 22°C	Dampers Open 60%	Dampers Fully Open	Dampers Open 60%	Dampers Open 10%
At 23°C	Dampers Open 80%		Dampers Open 80%	Dampers Open 20%
At 24°C	Dampers Fully Open		Dampers Fully Open	Dampers Open 30%
At 25°C				Dampers Open 40%
At 26°C				Dampers Open 50%
Night Time Cooling	✕	✔	✕	✕
ActivLouvre Opening	50%	100%	50%	25%

Note: During the summer season between the hours of midnight and 6:00 am the system should be programmed to open the dampers in all zones where the measured temperature is > 16°C. This night time cooling mode pre-cools the space ready for the next day and reduced the peak temperature for the following day.

CO_2 Control (Requires Controller within the zone to have integrated CO_2 sensor): If the CO_2 trip voltage is received from the controller the system should open the dampers by an additional 20% from the current setting. While this voltage is still present the damper position should be increased by 20% every 5 minutes.

Override Control: Override voltages should be echoed to the damper motor as long as a higher priority input (e.g. Heat/Fire) is not being exerted to the system.

Additional Input Control Parameters

Rain
The systems should ignore temperature and CO_2 control and CLOSE immediately on rain. Higher priorities should be actioned. (Override and Fire etc.).

Heating Interlock
The Dampers should ignore temperature control and be set to 10% or 20%. Higher Priorities should still be actioned.

External Temperature (ET) (if available)
Can be used to season shift as shown as in the table below.

Current Calendar Season	Spring	Summer	Autumn	Winter
External Temp (ET)	Operational Season for Next 24 Hours			
ET < 8°C	Winter	Spring	Winter	Winter
8°C < ET < 15°C	Spring	Spring	Autumn	Winter
15°C < ET < 22°C	Spring	Summer	Autumn	Spring
22°C < ET	Summer	Summer	Summer	Spring

It can also be used in real time for closing the systems if the external temperature is below 5°C for the Snow/Frost Mode (As Rain mode with Rain Priority). Also the dampers can be set to ignore temperature control when the external temperature is more than 3°C above internal and the internal is above a high temp threshold (Usually 25°C internal and > 28°C external).

Input Priority List

There are priorities associated with each input so that certain inputs override others, such as Fire Alarm input overriding the CO_2 mode. This is shown in the table on the below. The CO_2 and heating interlock priorities can be swapped via configuration settings.

	Input	Priority
1	Fire Key Switch	Highest
2	Fire Alarm	
3	Competition Switch	
4	Override Open	
5	Override Close	
6	Rain/Snow/Frost Protection	
7	CO_2	
8	Heating Interlock	
9	Temperature	Lowest

Monodraught ®

engineering delivered. naturally

Halifax House, High Wycombe
Buckinghamshire, HP12 3SE

www.monodraught.com

info@monodraught.com