



## NATURAL VENTILATION

Harnessing the environment for building ventilation



**ELLISCO** > +64 9 570 5267  
> info@ellis.co.nz  
> www.ellis.co.nz







**We are  
Pioneering British Greentech**



Cover image:  
Windcatcher X-Air / Cheddar Woods School

Back cover image:  
Sunpipe / Battersea Power Station  
Photo credit: Battersea Power Station Development Company

## CONTENT

• Introduction to Monodraught.....	4
• Natural Ventilation - Why Choose it? .....	7
• Windcatcher Classic.....	10
• Windcatcher Classic Square.....	11
• Windcatcher Classic Oval/Rectangular.....	13
• Windcatcher Classic Circular.....	14
• Windcatcher Classic Heritage.....	15
• Windcatcher Classic Bespoke.....	16
• Control & Acoustic Options .....	17
• Windcatcher X-Air .....	18
• Windcatcher X-Air Thermal Mixing Unit .....	22
• Windcatcher X-Air Acoustic Attenuator .....	28
• Ventsair .....	30
• Sola-Boost Classic .....	36
• Sola-Boost X-Air .....	39
• Case Studies .....	41





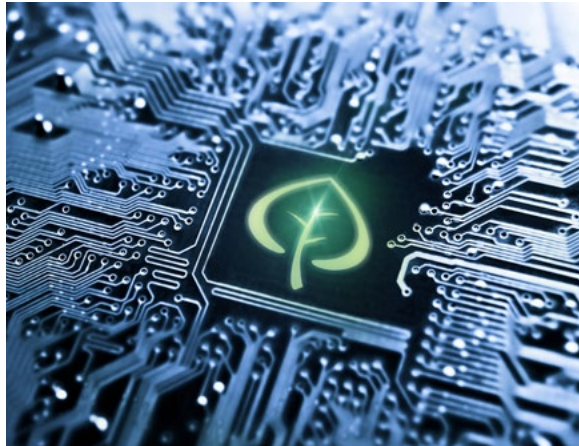
We are  
With you all the way

As a pioneering British Greentech company, we design, install and maintain ventilation, cooling, heating and lighting solutions to commercial buildings in the most sustainable way possible.

We believe that businesses like ours have a responsibility to invest in our community. We purchase our materials from local suppliers, recycle where possible and are proud to partner with a local mental health charity, Buckinghamshire Mind.

Monodraught are committed to minimising the carbon footprint of every building to which we supply our products and services. Our in-house design team model the building, select the most energy efficient equipment and design controls to maximise comfort whilst reducing running costs. We continue to monitor performance post-installation ensuring that it continues to be effective year after year. We can provide on-going service and maintenance of our installed products which ensures systems are all always running at optimum performance whilst keeping costs to a minimum.

Trading for over 45 years, we are proud of our record of awards for innovation from prestigious organisations. These include Ashden, CIBSE and the Queen's Award for Enterprise.



## Awards & Accreditations:

- Queen's Awards for Enterprise: Innovation 2018 - COOL-PHASE
- CIBSE Building Performance Awards 2017 Shortlist - COOL- PHASE Hybrid
- Best Product/Service Range Category at the 2016 Best Business Awards
- Company of the Year Award 2016 - Buckinghamshire Business First
- Best Business in Wycombe District 2016 Award - Buckinghamshire Business First
- Ashden - Award for Energy Innovation for COOL- PHASE
- ISO 9001 and ISO 14001: Established quality and environmental management certificates
- BSI (British Standards Institute) Members
- CIBSE Building Performance Award 2012 - COOL- PHASE





# Natural Ventilation

*Windcatcher Classic Square / East Lothian*

## WHY CHOOSE NATURAL VENTILATION?

### Track Record



Our Victorian forefathers used natural ventilation extensively, as indeed did the Persians and Arabians before that. Today's natural ventilation systems have all the benefits of sophisticated controls but retain the well-established principles of the origins of natural ventilation. A concept which Monodraught have been utilising for over 40 years.

### Healthier



Natural ventilation brings a steady supply of fresh air into the building, topping up oxygen levels, whilst at the same time expelling stale air using the natural buoyancy of thermal forces. Fan noise, often associated with mechanical systems, is eliminated, to the benefit of the occupants.

### Best in Class



Monodraught Natural Ventilation systems have achieved an enviable reputation over the last 2 decades. They are consistently effective and reliable, performing in accordance with initial design criteria. The constant data feedback to our dedicated R&D team enables our products to be fine-tuned and improved for performance.

### Cost Effective



In the current climate with energy costs escalating at an unprecedented rate, there is no telling what energy costs will be in 5 or 10 years' time! Once natural ventilation is installed, **there are no running costs ever** for the life of the building.

### Sustainable Energy in Action



By maximising the use of wind pressure and the natural stack effect of thermal buoyancy, natural ventilation does not use any fossil fuels. Instead it relies on harnessing wind power and the thermal rise of warm air, using it in a controlled way.

### No Maintenance



Since natural ventilation systems essentially have no moving parts, there is nothing to wear out, break down, corrode or indeed require replacement.



## WHY CHOOSE NATURAL VENTILATION?



### MORE THAN JUST PASSIVE STACK

Early Naturally Ventilated building relied purely on a passive stack approach to act like a “chimney stack”. The limitation of such an arrangement is that to work effectively, the temperature in the passive stack has to be some 10°C above the ambient temperature in the room, which in summer months may lead to overheating.

Monodraught systems overcome this problem by incorporating wind driven air intakes to generate a positive pressure in the room below, and combined with temperature differentials, this assists the passive stack element to exhaust the stale air.



*Windcatcher Classic Circular / Kidderminster College*



*Windcatcher X-Air / Takeley Primary School*



## WHY CHOOSE NATURAL VENTILATION?

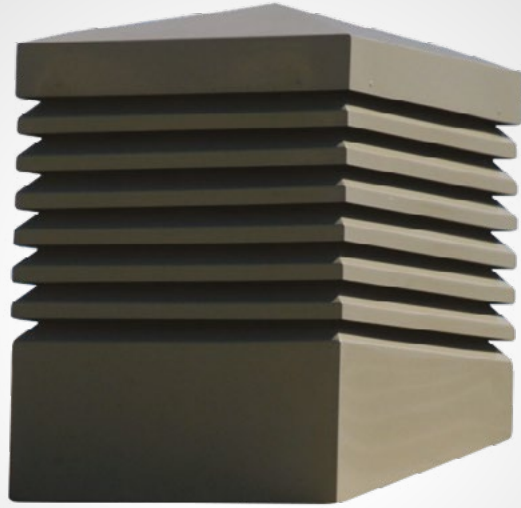
### NO LEAK GUARANTEE

Monodraught's patented WINDCATCHER X-Air natural ventilation system is offered with a 10 YEAR NO LEAK GUARANTEE. This unrivalled level of weather protection for a roof mounted ventilation system guarantees that Windcatcher X-Air units will not leak for ten years thanks to three unique layers of ACTIVLOUVRE weather protection.

1. Monodraught's patented modulating louvre technology allows the weather resistance of the external louvre blade to be increased dependent on weather conditions, even when closed at roof level to prevent snow being blown through its open louvre arrangement.
2. ACTIVLOUVRE uses a weather resistant double-step louvre profile that provides 25% more ventilation than a conventional classic louvre profile.
3. WINDCATCHER X-Air units feature a computer designed, profiled internal rain trap louvre fitted as standard.

Windcatcher X-Air systems carry a 10-year installation guarantee and the systems' control actuators are guaranteed for five years.





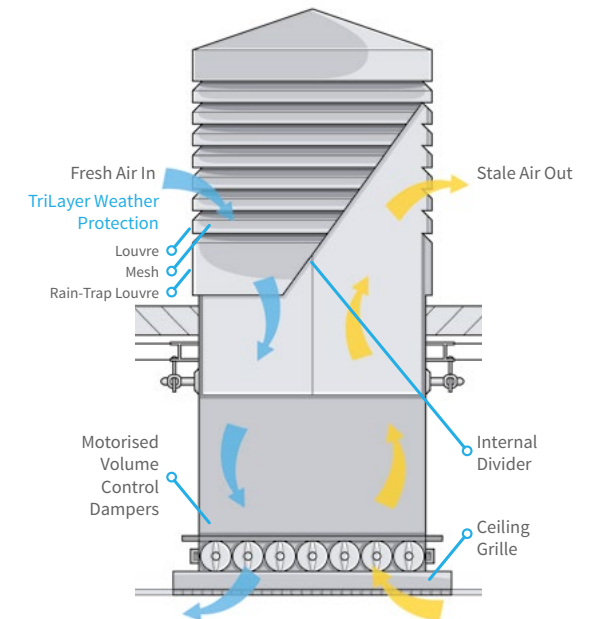
## **WINDCATCHER CLASSIC** (SQUARE)

The Windcatcher classic is an energy free Natural Ventilation system encompassing the benefits of both top-down and passive stack ventilation. The system consists of an external louvre protected internally by Trilayer Weather Protection and is internally divided. The simple, but effective design of the system provides fresh air during the day time as well as night-time cooling. When coupled with Monodraught's iNVent 2 control system (or similar BMS), and operated under Monodraught proven strategy, the system is capable of providing temperature and CO<sub>2</sub> demand controlled ventilation, by means of energy efficient motorised volume control dampers.

### How does Windcatcher Classic work?

The main advantage of the Windcatcher system over other forms of Natural Ventilation is that it doesn't matter which way the wind blows, the louvres on one side will always encapsulate the prevailing wind and turn that air movement down through 90° due to the internal dividers that split the system into four quadrants.

Stack effect is achieved as a result of the difference between the air temperature inside and outside of a building - and the subsequent imbalance effect on air density and pressure gradient of the internal and external air masses results in the warm air rising up through the quadrants, dispersing to the atmosphere.





# WINDCATCHER CLASSIC (SQUARE)

## MODES OF OPERATION

### Night Time and Mid-Season Operation

The WINDCATCHER will still continue to operate during mid-seasons, in the evenings or at weekends, when the building is unoccupied, providing all the benefits of this “free air conditioning”. The system will continue to operate in Night Time Cooling mode utilising the cooler night time air to remove heat from the fabric of the building and cool the room ready for the next day.

Volume control dampers at the base of the system will precisely control the amount of airflow through the system. If the internal temperature falls below 15°C the dampers will automatically close to prevent over cooling.



### Summer Operation

In the summer months, warm air will naturally rise to the ceiling level and out of the system. At the same time, any prevailing wind on the WINDCATCHER system carries a supply of fresh air down into the room below, thereby slightly pressurising the building and increasing the outward flow of stale air. Perimeter windows can be utilised to aid cross flow ventilation.

With fresh air coming in through the windows on the windward side of the building, stale air will be exhausted through the passive stack element of the WINDCATCHER system.



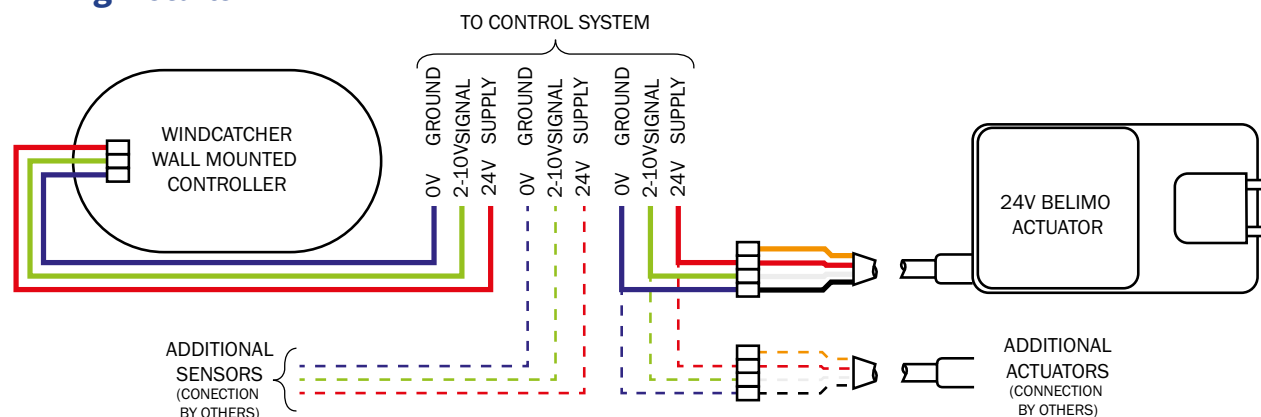
### Winter Operation



To minimise ventilation heat loss, control is essential. Monodraught achieve this through the use of insulated (U-Value of 1.2W/m) fully modulating dampers in conjunction with our fully automatic iNVent 2 control system which is in turn linked to internal and external temperature and CO<sub>2</sub> sensors. This allows the system to continuously meet occupant loading without over ventilating an area, maintaining CO<sub>2</sub> levels in the 1000ppm to 1500ppm range.

Such control can most efficiently be achieved by ensuring that the building structure is airtight and therefore Monodraught specify a damper with low leakage rates of 2.76m<sup>3</sup>/hr/m<sup>2</sup> at 50Pa static pressure.

## Wiring Details



## Cable Specification

### 3-Core Cable:

- PVC Cable
  - Farnell: 2240119
  - RS: 660-4087
  - Elec. Wholesaler: 16-2-3A
  - CSA: 0.5mm<sup>2</sup> (Stranded)
- LSZH Cable
  - Elec. Wholesaler: 1896L
  - CSA: 0.5mm<sup>2</sup> (Stranded)

### 4-Core Cable (Optional):

- PVC Cable
  - Farnell: 2240121
  - RS: 660-4096
  - Elec. Wholesaler: 16-2-4A
  - CSA: 0.5mm<sup>2</sup> (Stranded)
- LSZH Cable
  - Elec. Wholesaler: 1896/4A
  - CSA: 0.5mm<sup>2</sup> (Stranded)

## WINDCATCHER CLASSIC

## SYSTEM TYPES



Windcatcher Square



Windcatcher Oval



Windcatcher Rectangular



Windcatcher Circular



Windcatcher Heritage



Windcatcher Bespoke



### General Specifications

Applicable to Windcatcher Classic Square, Oval, Rectangular, Circular, Heritage and Bespoke

#### Materials



- GRP body with gel coat finish
- Trilayer weather protection

#### Options



- Colours: Available in any RAL or BS 4800 colour (Excludes RAL & BS metallic finishes)
- Truncated capping (to suit specified pitch)
- Modified & extended skirt arrangements (to suit specified roof pitch and alternate upstand arrangements, on request)
- Acoustic foam (22mm, 50mm)

#### Guarantee



- 10 year limited warranty

#### Performance



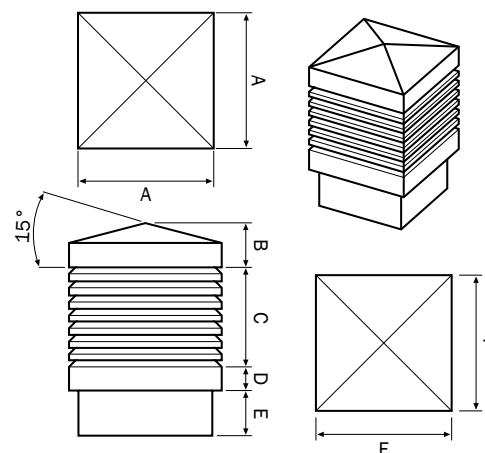
- Fire: BS 476 - 3:2004 / BS 476 - 24:1987
- Sound: BS EN 20140 -10:1992
- Power supply range: 19.2 - 28.8 V DC
- Running time: 150s / 95° (for volume control damper)
- IP54 rated actuator motor



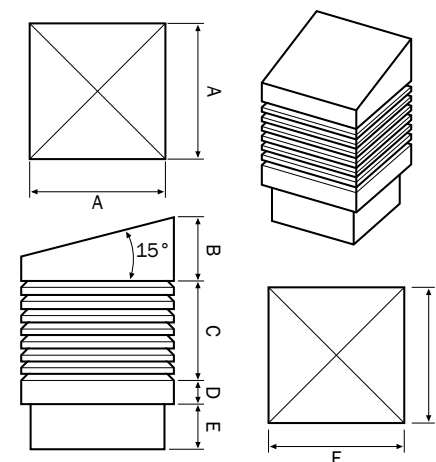


### Product Options

- Standard Capping



- Truncated Capping



Dimensions	40mm high louvre opening 70mm louvre pitch			
	Size	At Nominal Force	At Rest	Wire Sizing
Power Consumption	95	2 W	0.4 W	4 VA
	125	2 W	0.4 W	4 VA
	155	2 W	0.4 W	4 VA
	185	4 W	0.8 W	8 VA

WINDCATCHER Square System - Dimensions									
System Size	Capping Width	Capping Height	Louvre Height	Skirt Height	Trunk Length	Trunk Width	Weight	No. of Louvres	Louvre Free Area m <sup>2</sup>
	Dim A	Dim B	Dim C	Dim D*	Dim E*	Dim F	Kg		
95	706	245	460	150	278	600	49	7	0.196
125	906	271	600	150	278	800	74	9	0.324
155	1106	298	740	150	278	1000	155	11	0.484
185	1206	325	880	150	278	1200	157	13	0.531

\* Dimension may change subject to roof construction, pitch, roof thickness, installation method and upstand requirements. All dimensions shown in mm.





<b>Dimensions (Oval)</b>	Overall size: dependent on ventilation rate required as well as opening and installation arrangements
	Front and rear elevations can be either vertical or slanted dependant on requirement (for slanted systems, faces can be angled to no more than 60° from the horizontal)
	Minimum 2No. louver openings required
	150mm (h), minimum skirt depth
	40mm (h), louver opening
	70mm louver pitch



<b>Dimensions (Rectangular)</b>	Overall size will be dependant on ventilation rate required by specified during calculation stage, as well as opening and installation arrangements
	Overall louver height at face can be calculated by multiplying the number of free louvres by the louver pitched + 40mm
	150mm (h), minimum skirt depth
	Minimum 2No. louver openings required
	40mm (h), louver opening
	70mm louver pitch

## Performance

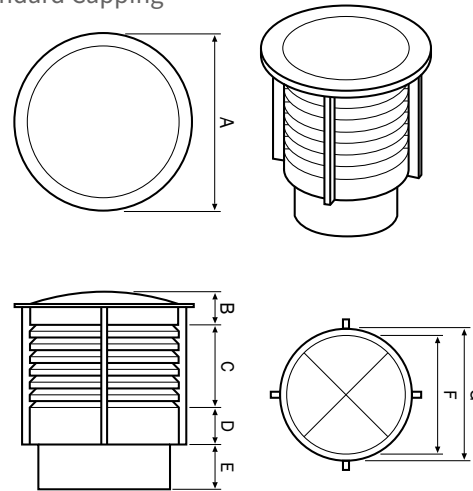


- Power Consumption: 2W @ nominal force, 0.4W at rest, 4VA wire sizing



### Product Options

- Standard Capping



Dimensions	40mm high louvre opening 70mm louvre pitch			
	Size	At Nominal Force	At Rest	Wire Sizing
Power Consumption	95	2 W	0.4 W	4 VA
	125	2 W	0.4 W	4 VA
	155	2 W	0.4 W	4 VA
	185	4 W	0.8 W	8 VA

WINDCATCHER Square System - Dimensions									
System Size	Capping Width	Capping Height	Louvre Height	Skirt Height	Trunk Length	Trunk Width	Weight	No. of Louvres	Louvre Free Area
	Dim A	Dim B	Dim C	Dim D*	Dim E*	Dim F	Kg		m <sup>2</sup>
95	900	203	460	150	278	600	52	7	0.154
125	1100	223	600	150	278	800	78	9	0.255
155	1300	238	740	150	278	1000	118	11	0.484
185	1500	250	880	150	278	1200	156	13	0.580

\* Dimension may change subject to roof construction, pitch, roof thickness, installation method and upstand requirements. All dimensions shown in mm.





# WINDCATCHER CLASSIC (HERITAGE)

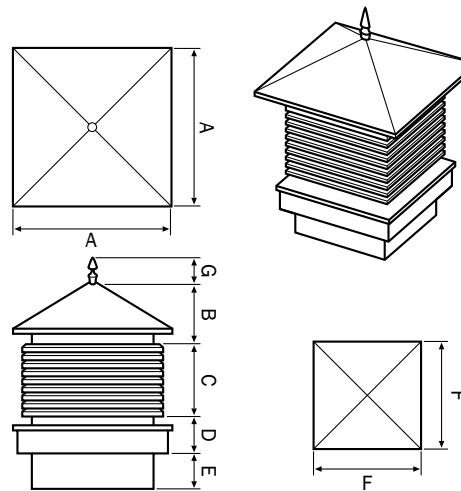
## TECHNICAL SPECIFICATIONS



Windcatcher Heritage

### Product Options

- Heritage Capping



Dimensions	40mm high louvre opening 70mm louvre pitch			
	Size	At Nominal Force	At Rest	Wire Sizing
Power Consumption	95	2 W	0.4 W	4 VA
	125	2 W	0.4 W	4 VA
	155	2 W	0.4 W	4 VA
	185	4 W	0.8 W	8 VA

WINDCATCHER Square System - Dimensions									
System Size	Capping Width	Capping Height	Louvre Height	Skirt Height	Trunk Length	Trunk Width	Weight	No. of Louvres	Louvre Free Area
	Dim A	Dim B	Dim C	Dim D*	Dim E*	Dim F	Kg		m <sup>2</sup>
95	1000	466	460	220	278	600	55	7	0.196
125	1100	524	530	220	278	700	79	8	0.256
155	1400	563	740	220	278	1000	118	11	0.484
185	1600	652	880	220	278	1200	158	13	0.676

\* Dimension may change subject to roof construction, pitch, roof thickness, installation method and upstand requirements. All dimensions shown in mm.



## Materials

- GRP body with gel coat finish
- Trilayer weather protection



## Options

- Colours: Available in any RAL or BS 4800 colour (Excludes RAL & BS metallic finishes)
- Truncated capping (to suit specified pitch)
- Modified & extended skirt arrangements (to suit specified roof pitch and alternate upstand arrangements, on request)
- Acoustic foam (22mm, 50mm)



## Guarantee

- 10 year limited warranty





# WINDCATCHER CLASSIC

## Control Options



### Automatic

Provided as standard in the Monodraught package. These panels are controlled by either temperature and CO<sub>2</sub> sensors, depending upon the requirements of each specific application.



### Semi - Automatic

Operates in the same fashion as the Automatic Control system, but also allows the end user to control the opening or closing the dampers using the push button overrides.

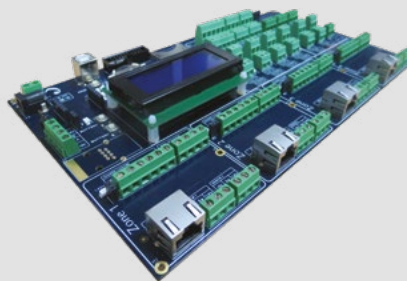


### Manual

Allows the user to operate the manual dampers by a lever at ceiling diffuser level.

## iNvent 2

The iNvent 2 control is a bespoke, in-house designed, Natural Ventilation management system for up to 4 zones of Monodraught Natural Ventilation terminals. It utilises our seasonally adjusted proportional control based on temperature and CO<sub>2</sub> levels.



[www.monodraught.com](http://www.monodraught.com)  
[info@monodraught.com](mailto:info@monodraught.com)

## CONTROLS & ACOUSTICS

## Acoustics



The BRE established that in its standard format, the style of the WINDCATCHER system has the effect of reducing noise transmission by 15 dB as compared to an open window. However, by incorporating 25mm of acoustic lining to the air paths, a further 11 dB was achieved. The chart below shows that on larger systems, a greater thickness of insulation foam has the effect of greater attenuation.

Acoustic pods or other forms of attenuation can also be suspended below the Monodraught terminals to achieve an even greater impact on sound insulation.

Test Number	$D_{n,e,w}$ (C;C <sub>tr</sub> ) (dB)	Construction Detail
12	15 (0 ; -1)	GRP 800 Square System - VCD Open
13	30 (-1 ; -2)	GRP 800 Square System - VCD Closed
14	26 (-1 ; -3)	GRP 800 Square System 25mm Insulation Foam - VCD Open
15	47 (-1 ; -5)	GRP 800 Square System 25mm Insulation Foam - VCD Closed
16	24 (-1 ; -4)	GRP 1000 Square System 25mm Insulation Foam - VCD Open
17	39 (-1 ; -5)	GRP 1000 Square System 25mm Insulation Foam - VCD Closed
18	31 (-1 ; -5)	GRP 1000 Square System 50mm Insulation Foam - VCD Open
19	47 (-2 ; -7)	GRP 1000 Square System 50mm Insulation Foam - VCD Closed



## WINDCATCHER X-AIR

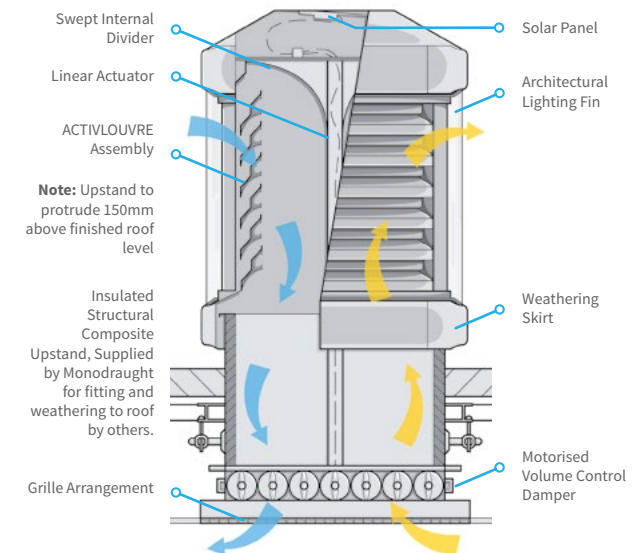
The WINDCATCHER X-AIR is the next generation of natural ventilation systems featuring Monodraught's patented ACTIVLOUVRE modulating aerofoil louvre technology. The system consists of an external static louvre and internal louvre arrangement, which varies the opening and free area through the louvre face. The variable louvres can provide maximum ventilation rates when fully open or modulated to vary the weather resistance or closed to prevent the ingress of precipitation allowing Monodraught system to have our unique **no leak guarantee**.

In addition to the ACTIVLOUVRE arrangement, the system also incorporates external air catchment fins to provide

greater area at the louvre improving performance in relation to wind speed. Pressure release vanes at the fins provide a means to reduce face pressure under high winds. The systems can also be specified to include solar powered architectural lighting.

### How does Windcatcher X-Air Work?

Stack effect is achieved as a result of the difference between the air temperature inside and outside of a building, and the subsequent imbalance effect on air density and pressure gradient of the internal and external air masses, results in the warm air rising up through the quadrants, dispersing to the atmosphere.





## WINDCATCHER X-AIR

### Composite Upstand



Monodraught have developed an insulated upstand arrangement to be used with the WINDCATCHER X-AIR. The upstand is a multi-layer construction allowing for high levels of insulation, and also ensures every system maintains an air tight seal, whilst also minimising install time. The WINDCATCHER X-AIR can be installed onto flat roofs and roof with a pitch of up to 35°.

### ACTIVLOUVRE Modulating Aerofoil Louvre Technology



Monodraught have developed an insulated upstand arrangement to be used with the WINDCATCHER X-AIR. The upstand is a multi-layer construction allowing for high levels of insulation, and also ensures every system maintains an air tight seal, whilst also minimising install time. The WINDCATCHER X-AIR can be installed onto flat roofs and roof with a pitch of up to 35°.

### Swept Divider

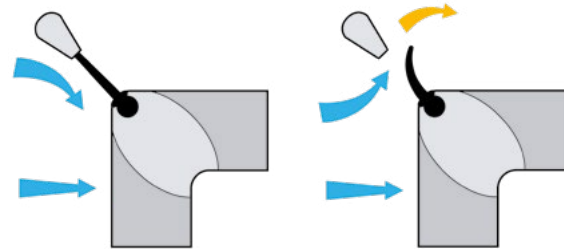


The WINDCATCHER X-AIR system incorporates swept turning vanes to gently direct air flow while avoiding flow separation and increased frictional losses.

### External Air Catchment Fins



Monodraught WINDCATCHER systems are divided into four separate quadrants, but the WINDCATCHER C-AIR system incorporates swept turning vanes to gently direct air flow while avoiding flow separation and increased frictional losses.



### Aerofoil Louvre



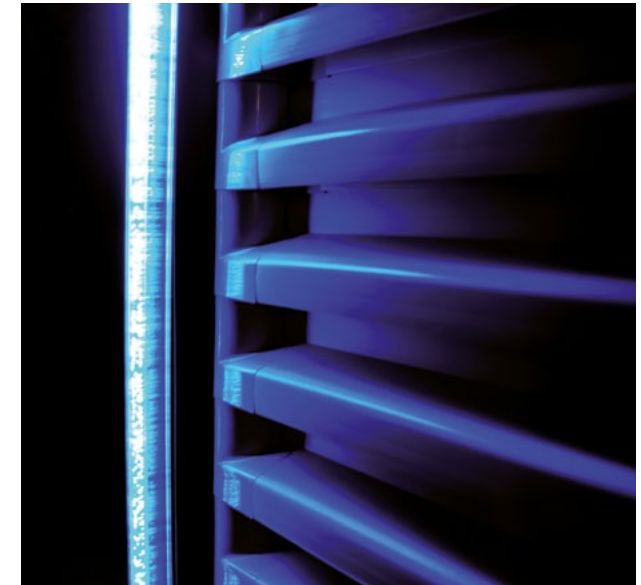
The ACTIVLOUVRE technology is designed to provide ventilation control, but also be aerodynamically efficient and protect against rain. By reducing losses through the louvred section, the level of ventilation per system is increased, compared with a standard louvre. The aerodynamic profile was developed using a computational fluid dynamic (CFD) techniques and wind tunnel tests in association with the University of Reading and University of Nottingham.

## MAIN FEATURES

### Architectural Solar Powered Lighting System



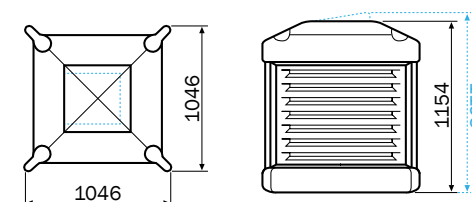
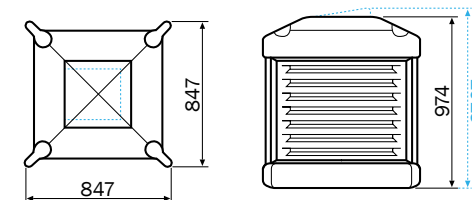
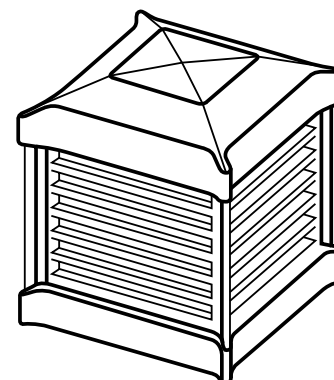
The WINDCATCHER X-AIR incorporates an architectural lighting system powered by a 10W photovoltaic panel, mounted within the cap of the system. The solar panel collects solar energy throughout the day charging an internal Lithium ION battery, even during overcast skies. The system automatically illuminates at low light providing soft architectural lighting without the need for user input.



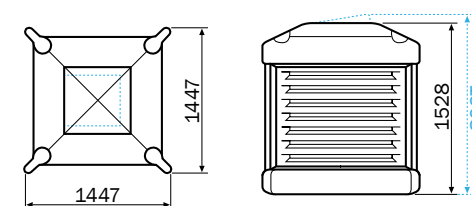
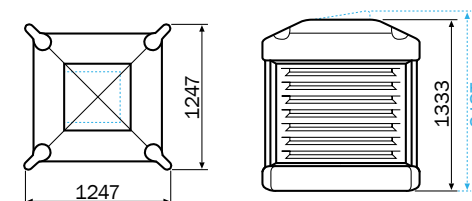
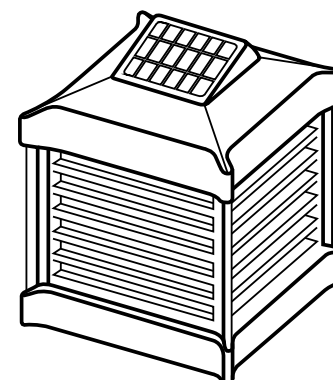
<b>Materials</b>	Injection moulded luran S 757 G UV - ASA			
	Extruded luran S 776SE UV - ASA			
	Extruded shore A 58 flexible compound			
	Extruded FLUOR-ACRYL® PMMA			
	Extruded styron CALIBRE™ 603 3 polycarbonate			
	Extruded thermoform sheet; P60R - recycled impact polystyrene			
	Extruded thermoform sheet; P91UV - high impact polystyrene with UV resistant capping			
	Extruded thermoform sheet; ASA200			
	6063 aluminium extrusion to T6 temper			
	Carbon sheet steel construction to BS EN			
<b>Options</b>	10 W monocrystalline photovoltaic solar panel (LED version only)			
	Colours (RAL 7037 Dusty Grey / RAL 7038 agate grey)			
	Architectural LED lighting (white / blue / green)			
	Acoustic foam (25mm, 50mm)			
<b>Guarantee</b>	GRP extended colour-matched skirt (to suit roof pitch from 15 - 35°)			
	10 year limited warranty			
<b>Performance</b>	No leak guarantee			
	Fire: DIN EN 13501 - 1:2010 - 01 (Class E)			
	Sound: BS EN 20140 - 10:1992			
	Sound: ISO 140 - 10:1991			
	Power supply range: 19.2 - 28.8V DC			
	Running time: 150s/100mm (for active louvre)			
<b>Power Consumption</b>	Running time: 150s/95° (for volume control damper)			
	IP54 rated actuator motors			
	<b>Size</b>	<b>At Nominal Force</b>	<b>At Rest</b>	<b>Wire Sizing</b>
	110	4 W	0.8 W	8 VA
	140	6 W	1.2 W	12 VA
	170	6 W	1.2 W	12 VA
	200	8 W	1.6 W	16 VA

## Product Options

- Standard Capping



- LED Capping





### Night Time and Mid-Season Operation

The WINDCATCHER X-AIR will still continue to operate during mid-seasons, in the evenings or at weekends, when the building is unoccupied, providing all the benefits of this “free air conditioning”. The system will continue to operate in Night Time Cooling mode utilising the cooler night time air to remove heat from the fabric of the building and cool the room ready for the next day.

Volume control dampers at the base of the system at the ceiling level will precisely control the amount of airflow through the system. If the internal temperature falls below 15°C the dampers will automatically close to prevent over cooling.



### Summer Operation

In the summer months, warm air will naturally rise to the ceiling level and out of the system. At the same time, any prevailing wind on the WINDCATCHER X-AIR system carries a supply of fresh air down into the room below, thereby slightly pressurising the building and increasing the outward flow of stale air. Perimeter windows can be utilised to aid cross flow ventilation.

With fresh air coming in through the windows on the windward side of the building, stale air will be exhausted through the passive stack element of the WINDCATCHER X-AIR system.



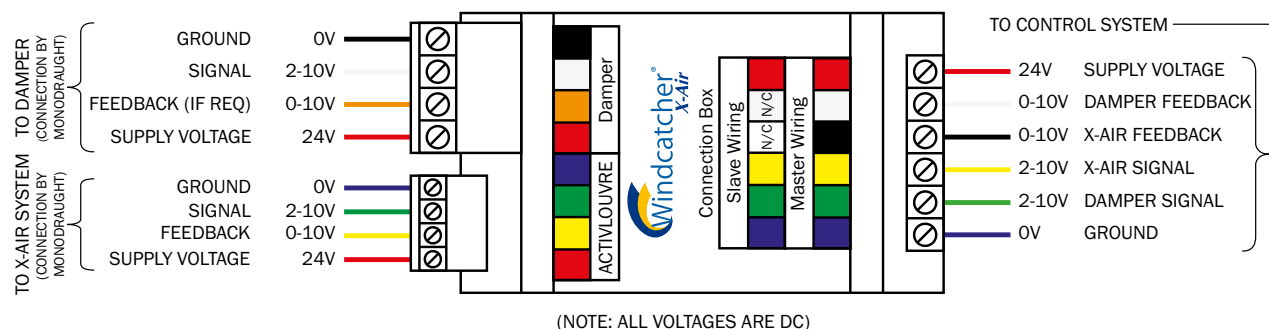
### Winter Operation



To minimise ventilation heat loss, control is essential. Monodraught achieve this through the use of insulated (U-Value of 1.2W/m) fully modulating dampers in conjunction with our fully automatic iNVent 2 control system which is in turn linked to internal and external temperature and CO<sub>2</sub> sensors. This allows the system to continuously meet occupant loading without over ventilating an area, maintaining CO<sub>2</sub> levels in the 1000ppm to 1500ppm range.

Such control can most efficiently be achieved by ensuring that the building structure is airtight and therefore Monodraught specify a damper with low leakage rates of 2.76m<sup>3</sup>/hr/m<sup>2</sup> at 50Pa static pressure.

### Wiring Details



### Cable Specification

#### 4-Core Cable:

- PVC Cable
  - Farnell: 2240121
  - RS: 660-4096
  - Elec. Wholesaler: 16-2-4A
  - CSA: 0.5mm<sup>2</sup> (Stranded)
- LSZH Cable
  - Elec. Wholesaler: 1896L/4L
  - CSA: 0.5mm<sup>2</sup> (Stranded)

#### 6-Core Cable (Optional):

- PVC Cable
  - Farnell: 2240123
  - RS: 660-4099
  - Elec. Wholesaler: 16-2-6A
  - CSA: 0.5mm<sup>2</sup> (Stranded)
- LSZH Cable
  - Elec. Wholesaler: 1896/6L
  - CSA: 0.5mm<sup>2</sup> (Stranded)



## X-AIR THERMAL MIXING UNIT

The WINDCATCHER X-AIR Thermal Mixing Module system from Monodraught is designed to provide natural ventilation, hybrid ventilation, secure night time cooling and boosted levels of ventilation during summer.

The system is ideally suited for classrooms and relieves unnecessary strain on the building heating system by making use of the thermal gains within the space. The unit intelligently analyses the external and internal environments to manage the rate of thermal energy required and works in conjunction with natural ventilation provided by manual or automatic windows/louvres in cross flow or stack ventilation strategies.

When the external air temperature is below a determined

point, the X-AIR Thermal Mixing Unit switches to thermal mixing mode operating the hybrid fan to mix the room air with fresh ventilation air to provide tempered fresh air. The system is able to modulate the level of natural ventilation forcing a room air to mix within the central fan core.

Designed to meet Priority School Building Programme requirements, the Monodraught X-Air Thermal Mixing Unit uses TriFlow heat recovery with low specific fan powers and features an intelligent system. The control system is supplied as standard with full data logging facility, temperature and CO<sub>2</sub> control and an optional BACnet or Modbus modules.

### Advantages



- Low energy mixing fan significantly reduces energy usage over conventional thermal tempering methods
- Summer boosted exhaust mode provides additional rate of cross ventilation and cooling in summer.

Materials			
Powder coated mild steel RAL 9003			
ABS			
Dimensions			
X-Air System	Internal Upstand (mm)	Mixing Chamber (mm)	Min Upstand Height (mm)
140	800 x 800	690 Ø	750
170	1000 x 1000	900 Ø	750
200	1200 x 1200	1090 Ø	750

# X-AIR THERMAL MIXING UNIT

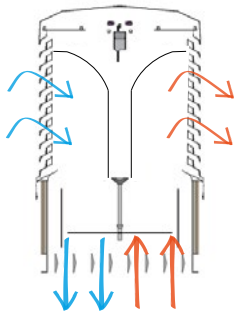
## WHY CHOOSE X-AIR THERMAL MIXING UNIT?

The following modes are used during the normal occupied hours during the whole year. Depending on the current season, different set points are used by each mode.



### TriFlow Heat Recovery

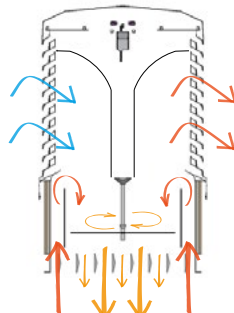
1. A series of louvered openings provide ventilation air and exhaust air. The louvered openings are able to modulate dependant on the requirement for ventilation mode and weather protection. Internal dividers form a diagonal cross section with a central fan core.
2. Within a lower insulated trunk section, a three bladed hybrid fan is mounted within the central fan core.
3. At the base an insulated volume control damper is used to control the level of natural ventilation air being provided and adjust the direction of the ventilation air.



### Natural Ventilation

External temp  $>15^{\circ}\text{C}$  and internal temp  $>21^{\circ}\text{C}$  or  $\text{CO}_2 >1000\text{ppm}$

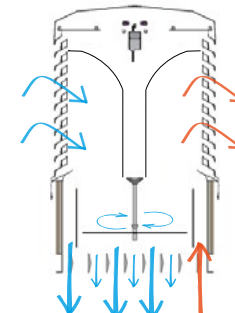
The X-Air Thermal Mixing Unit can provide natural ventilation through the buoyancy of the internal air and wind pressures exerted upon the system at roof level. Warm air is extracted through the leeward side of the system due to the negative pressure upon the roof terminal. Fresh air is entrained in the windward side.



### Hybrid Thermal Mixing

External temp  $<15^{\circ}\text{C}$  and internal temp  $>22^{\circ}\text{C}$  or  $\text{CO}_2 >1200\text{ppm}$

When the external air temperature is below the set point the X-Air Thermal Mixing Unit switches to thermal mixing operation. The hybrid fan is used to mix room air with ventilation air to provide tempered fresh air. Within the X-Air system louvres modulate restricting the level of natural ventilation with the resulting pressure differential forcing room air to mix within the central fan core.

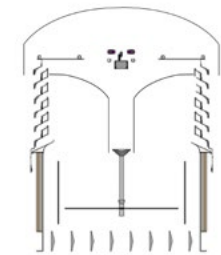


### Natural Ventilation Boost

External temp  $>15^{\circ}\text{C}$  and internal temp  $>26^{\circ}\text{C}$  or  $\text{CO}_2 >1400\text{ppm}$

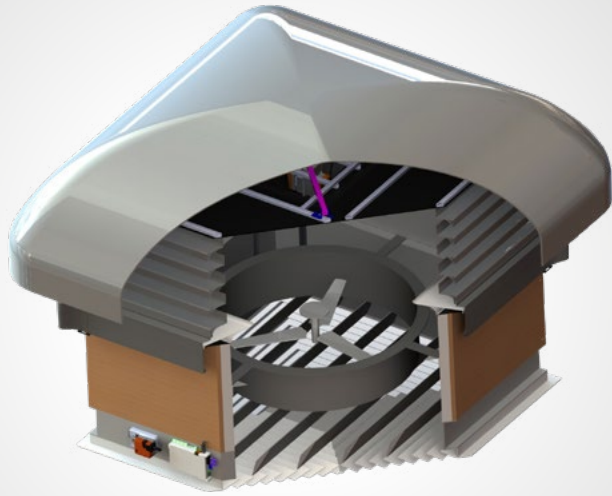
The X-Air Thermal Mixing unit can supply boosted ventilation during daytime conditions, when the internal temperature is greater than  $26^{\circ}\text{C}$  to supplement natural ventilation and to ensure good internal air quality.

Additionally during summer time periods supplemented night time cooling can be provided.



Alternatively you can  
choose the Thermal  
Mixing Unit with  
mushroom cowl





## **X-AIR THERMAL MIXING UNIT** MUSHROOM COWL VERSION

The X-Air Thermal Mixing Unit is designed to provide natural ventilation, hybrid ventilation incorporating mixed tempered fresh air for winter periods and the ability to provide secure night time cooling and boosted levels of ventilation during summer.

The system is designed to work as a standalone top down ventilation solution but can also be used in conjunction with manual or automatic windows and in cross flow or stack ventilation strategies.

Externally, a GRP mushroom cowl provides a natural

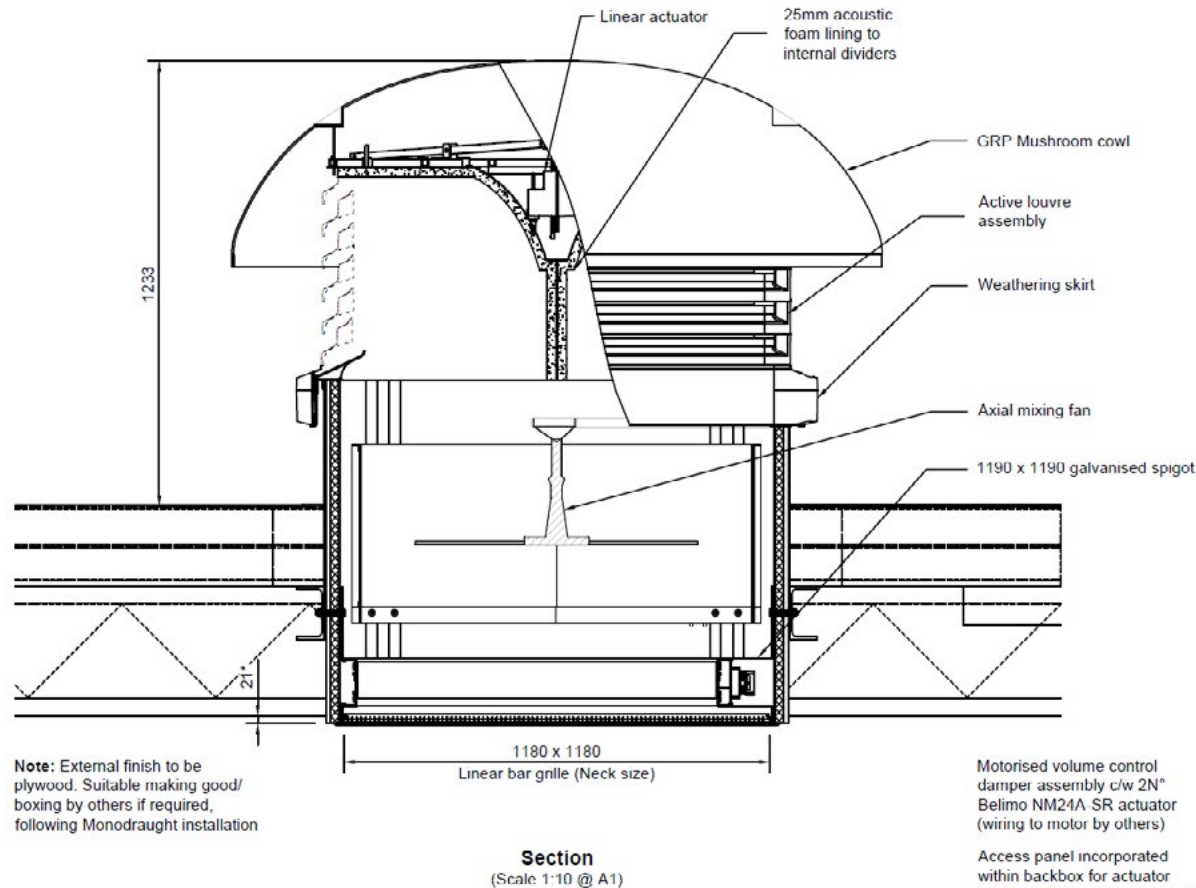
ventilation air path utilising Monodraught's patented ActivLouvre technology. The roof unit is provided with a no leak guarantee even under windblown snow conditions.

A flat packed composite upstand is provided for fitting and weathering into the roof construction (by others) prior to the Windcatcher installation. The composite upstand minimises onsite labour, guarantees correct site fitting of the unit and ensures air tightness of the building envelope.

The system comprises of an intelligent and fully automatic control system coupled with a low energy ventilation system which switches between operational modes dependant on season, external/internal temperature conditions and indoor air quality (IAQ).

Designed to meet Priority School Building Programme requirements, the system uses TriFlow air tempering with low specific fan powers and features an intelligent control system. The control system is supplied as standard with full data logging facility, temperature control and CO<sub>2</sub> control and an optional BACnet module.

# **X-AIR THERMAL MIXING UNIT** MUSHROOM COWL VERSION



\* Please note the Windcatcher R system is only 233mm taller than the originally proposed system. This increase in height allows for additional ventilation air to be captured by the louvre turret increasing performance.

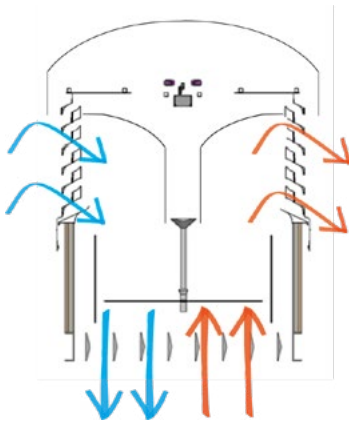
## TECHNICAL SPECIFICATIONS

Material	Extruded rigid uPVC insulated and rubber sealed volume control dampers
	Aluminium blade cores
	Powder coated mild steel RAL 9003
	Due to the coastal location all external metal work components will be coated in a special marine grade coating to ensure long term performance
	ASA and Glass Reinforced Plastic (GRP)
Colour	Aluminium powder coated grilles
	All metal work supplied powder coated to RAL 9003
Performance	GRP to any BS or RAL colour (excluding metallics)
	U-Value through external air shut off damper = 1.2 Wm <sup>2</sup> K.
	Air tightness = 3 m <sup>3</sup> /h/m <sup>2</sup> @50Pa
	A face area of 1.2 m <sup>2</sup>
	Total louvre area of 3.12 m <sup>2</sup>
	Louvre faced area of 0.78 m <sup>2</sup>
	Total louvre free area of 1.9 m <sup>2</sup>
	Fan power is 50W at 200 l/s the SFP will be 0.25 SFP
	Fan power is 45W at 150 l/s the SFP will be 0.3 SFP

# **X-AIR THERMAL MIXING UNIT** MUSHROOM COWL VERSION

## OPERATION MODES

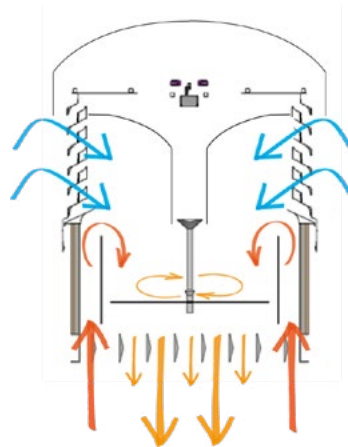
The Windcatcher R system is designed to provide natural ventilation, hybrid ventilation incorporating mixed tempered fresh air for winter periods and the ability to provide secure night time cooling and boosted levels of ventilation during summer.



### Natural Ventilation

External Temp  $>15^{\circ}\text{C}$  and internal temp  $>21^{\circ}\text{C}$  or  $\text{CO}_2 >1000\text{ppm}$

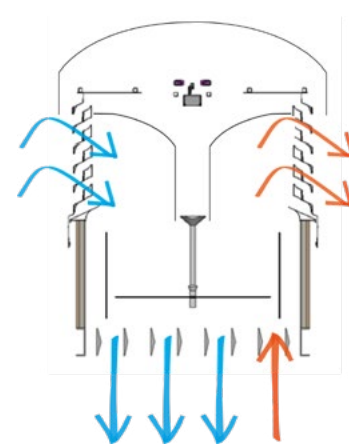
The Thermal Mixing Unit can provide natural ventilation through the buoyancy of the internal air and wind pressures exerted upon the system at roof level. Warm air is extracted through the leeward side of the system due to the negative pressure upon the roof terminal. Fresh air is entrained in the windward side.



### Hybrid Thermal Mixing

External Temp  $<15^{\circ}\text{C}$  and internal temp  $>22^{\circ}\text{C}$  or  $\text{CO}_2 >1200\text{ppm}$

When the external air temperature is below the set point, the X-Air Thermal Mixing Unit switches to thermal mixing operation. The axial fan is used to mix room air with ventilation air to provide tempered fresh air. Louvres modulate restricting the level of natural ventilation with the resulting pressure differential forcing room air to mix within the central fan core.

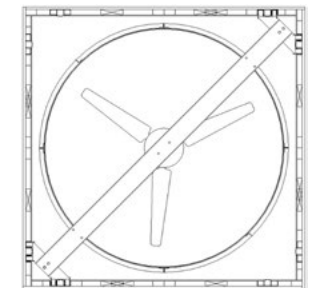


### Natural Ventilation Boost

External Temp  $>15^{\circ}\text{C}$  and internal temp  $>26^{\circ}\text{C}$  or  $\text{CO}_2 >1400\text{ppm}$

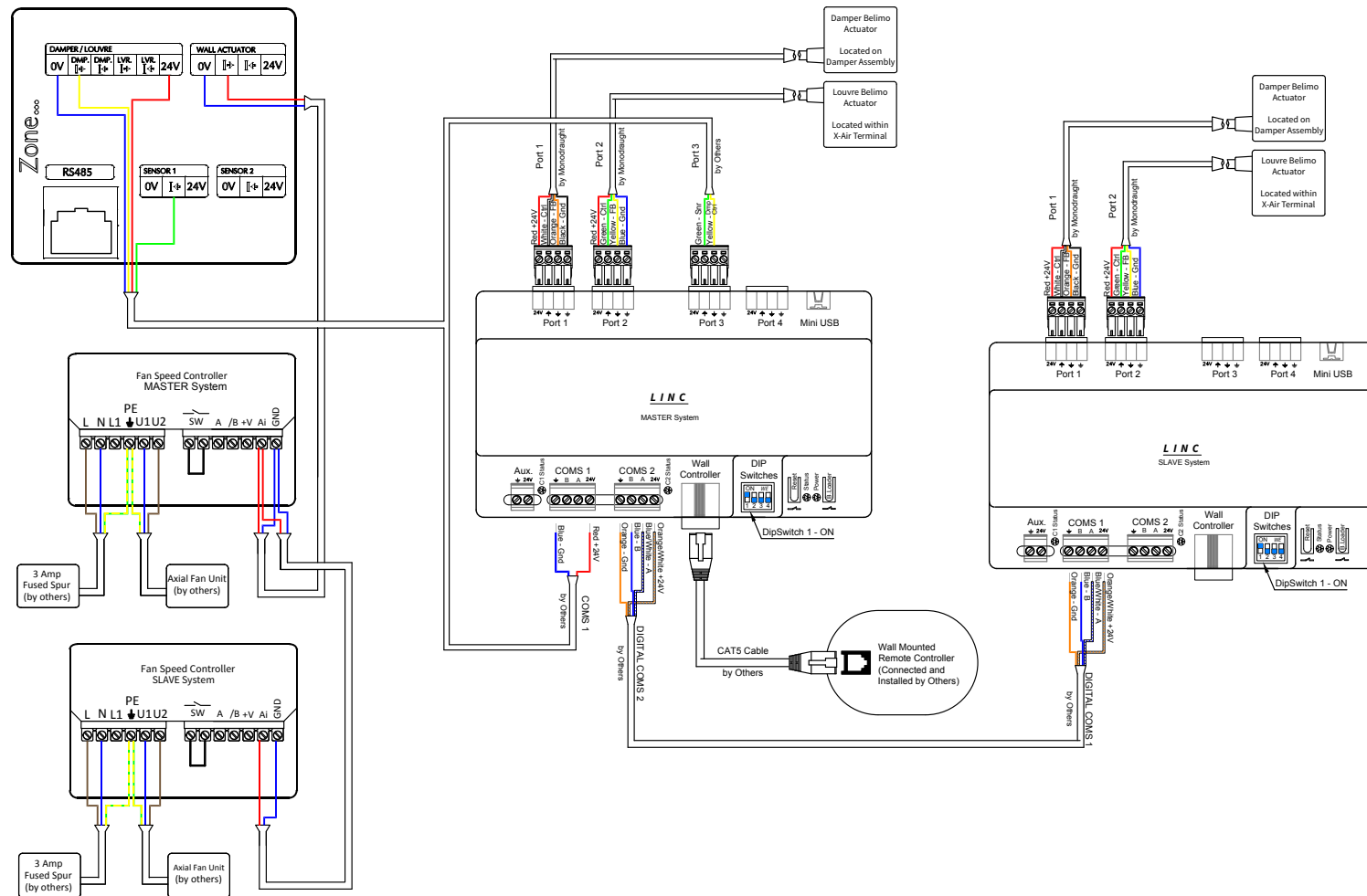
The X-Air Thermal Mixing unit can supply boosted ventilation during daytime conditions, when the internal temperature is greater than  $26^{\circ}\text{C}$  to supplement natural ventilation and to ensure good internal air quality.

Additionally during summer time periods supplemented night time cooling can be provided.



### Top Elevation of Fan Module





## Cable Specification

### 4-Core Cable:

- PVC Cable
  - Farnell: 2501031
  - MFR: PP001165
  - Wire gauge: 24AWG/0.5mm
  - Screened

### Colour Coding:

#### Pair one:

Blue/White & White/Blue

#### Pair two:

Orange/White & White/Orange



## ACOUSTIC ATTENUATOR

The WINDCATCHER X-Air upstand duct silencer is a highly innovative upstand module for Monodraught's X-Air natural ventilation system which enables a high level of acoustic attenuation with minimal impact to the systems' natural ventilation performance. This is achieved by providing a break to the direct line of sound transfer from external sources without reducing the free area through the system.

### Standards

- BB93 / BB101 / PSBP



### Features



- Swept internal dividers and internal upstand lining manufactured in high density glass wool panels reinforced with glass fibre mesh
- Reinforced galvanised steel supporting framework
- Module is housed within X-Air upstand
- High level sound attenuation with minimal impact to natural ventilation
- Ideal for projects where both internal and external noise breakout is a concern.

### Technical Specifications

Available for WINDCATCHER X-Air 140, 170 and 200 systems

Performance Rating of X-Air 200 system according to BS EN ISO 717-1:1997 -  $D_{n,e,w}(C;Ctr) = 33 (-2;-6)$  dB

### Materials

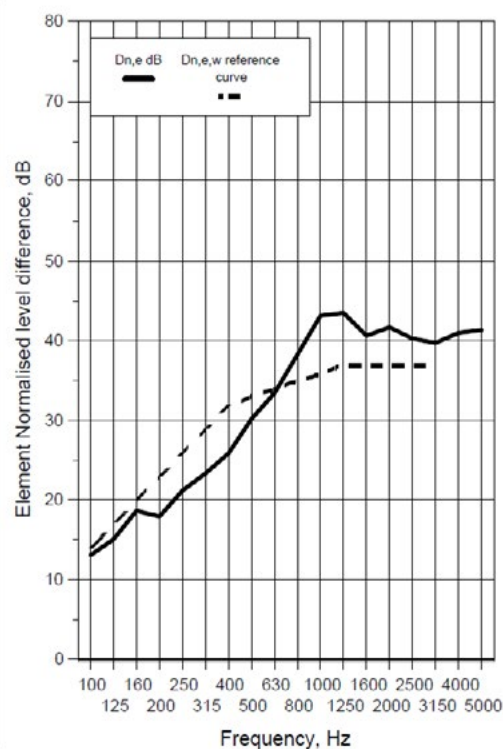
High density glass wool

Galvanised steel

# ACOUSTIC ATTENUATOR

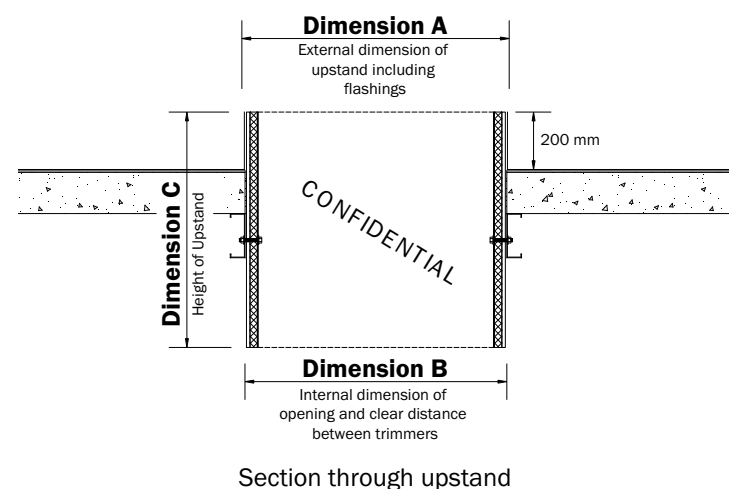
## Acoustic Performance of X-Air 200 system

Freq f Hz	Element normalised level difference Dn,e dB	
	1/3 Oct	1/1 Oct
100	13.0	15.0
125	15.0	
160	18.6	
200	17.9	20.2
250	21.1	
315	23.4	
400	25.8	28.7
500	30.2	
630	33.5	
800	38.3	40.9
1000	43.1	
1250	43.5	
1600	40.7	40.9
2000	41.8	
2500	40.3	
3150	39.8	40.7
4000	41.0	
5000	41.4	
6300+	40.5	40.7
8000+	40.2	
10000+	41.4	
Average 100-3150	30.4	



## ACOUSTIC PERFORMANCE & SECTION VIEW

### Section View



Dimensions			
X-Air System	Dimension A (mm)	Dimension B (mm)	Dimension C (mm)
140	900	890	800
170	1100	1090	1000
200	1300	1290	1200





## VENTSAIR ROOF MOUNTED TERMINAL

The Ventsair roof mounted terminal have a similar appearance to the standard Windcatcher Classic systems but have a different internal configuration. The main difference being the removal of the internal dividers, allowing the Ventsair to act simply as an intake or exhaust system.

Ventsair systems are mainly used to encourage cross flow ventilation within a room, usually where the aspect is too deep for openable windows or other wall openings to work efficiently. In these cases, the Ventsair roof mounted terminal would be located at the far end of the room to draw the air through the room and allow the warm stale air to be exhausted via the passive stack method.

Product Specifications	
<b>Outer Casing</b>	Glass-fibre construction in Class 1 fire retardant resin
<b>Internal Airways</b>	GRP airway protected internally with Trilayer weather protection and plastic anti-bird mesh
<b>Capping</b>	GRP construction
<b>Kerb</b>	Roofers prepared kerb upstand to suit associated roof Volume control dampers with 24V actuator
<b>Ceiling Grilles</b>	White powder coated eggcrate or linear bar grilles
<b>Controls</b>	Automatic control: iNVent 2 programmable control system with night-time cooling facility, temperature sensors and manual override - contractor to allow for internal electrical wiring
<b>Guarantee</b>	Monodraught Ventsair roof mounted terminal systems are covered by a 10 year guarantee Dampers and controls fitted with Monodraught systems will be covered by the standard manufacturer's warranty
<b>Dimension</b>	GRP systems manufactured to any bespoke arrangement

# VENTSAIR ROOF MOUNTED TERMINAL

## TECHNICAL DETAILS

### Acoustic Performance



The Building Research Establishments (BRE) carried out a series of airborne acoustic tests on the full range of Ventsair Natural Ventilation systems, together with various insulation thicknesses.

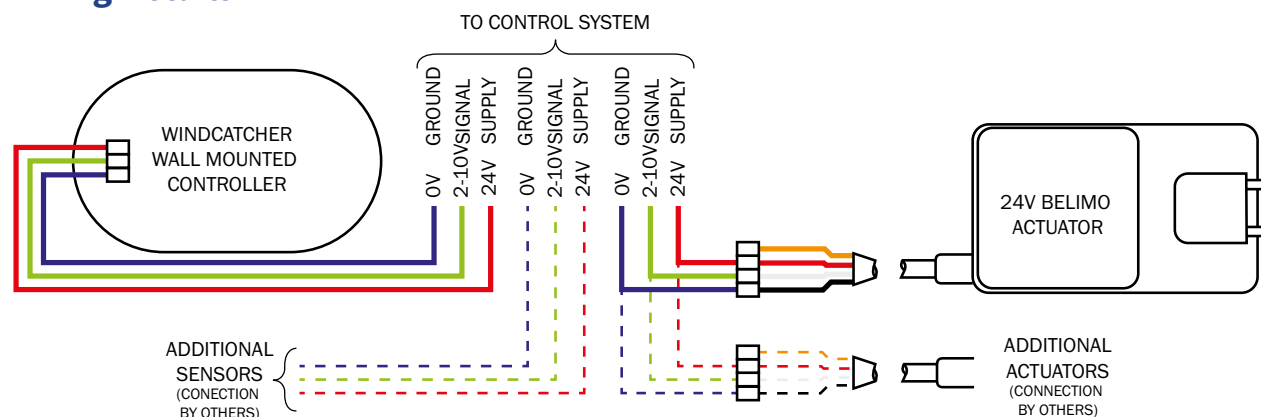
The BRE established that in its standard format, the style of the Ventsair roof mounted terminal system has the effect of reducing noise transmission by 15 dB as compared to an open window. However, by incorporating 25mm of acoustic lining to the air paths, a further 11 dB was achieved.

The chart shows that on larger systems, a greater thickness of insulation foam has the effect of greater attenuation.

Acoustic Performance		
Test Number	$D_{n,e,w} (C; C_u)$ (dB)	Construction Details
12	15 (0 ; -1)	GRP 800 Square system - VCD Open
13	30 (-1 ; -2)	GRP 800 Square system - VCD Closed
14	26 (-1 ; -3)	GRP 800 Square system 25mm insulation foam - VCD Open
15	47 (-1 ; -5)	GRP 800 Square system 25mm insulation foam - VCD Closed
16	24 (-1 ; -4)	GRP 1000 Square system 25mm insulation foam - VCD Open
17	39 (-1 ; -5)	GRP 1000 Square system 25mm insulation foam - VCD Closed
18	31 (-1 ; -5)	GRP 1000 Square system 50mm insulation foam - VCD Open
19	47 (-2 ; -7)	GRP 1000 Square system 50mm insulation foam - VCD Closed



### Wiring Details



### Cable Specification

#### 3-Core Cable:

- PVC Cable
  - Farnell: 2240119
  - RS: 660-4087
  - Elec. Wholesaler: 16-2-3A
  - CSA: 0.5mm<sup>2</sup> (Stranded)

- LSZH Cable
  - Elec. Wholesaler: 1896L
  - CSA: 0.5mm<sup>2</sup> (Stranded)

#### 4-Core Cable (Optional):

- PVC Cable
  - Farnell: 2240121
  - RS: 660-4096
  - Elec. Wholesaler: 16-2-4A
  - CSA: 0.5mm<sup>2</sup> (Stranded)

- LSZH Cable
  - Elec. Wholesaler: 1896/4A
  - CSA: 0.5mm<sup>2</sup> (Stranded)



## VENTSAIR FAÇADE

The Ventsair Façade ventilation system (VAF) is a high specification louvre system designed for use within the commercial industry. It comprises of an external aluminium louvre, a volume control damper and an internal grille.

### VA38 External Weather Louvre

The VA38 is a high specification small format louvre system designed for use within the commercial industry. The system has been used extensively in education facilities, health facilities as well as retail schemes.

### VA150/VA300 Sound Attenuating Louvre

The VA150 and VA300 are available powder coated in any BS or RAL colour reference. Supplied in panel format, they are specifically designed for commercial projects.

### VA38 External Weather Louvre

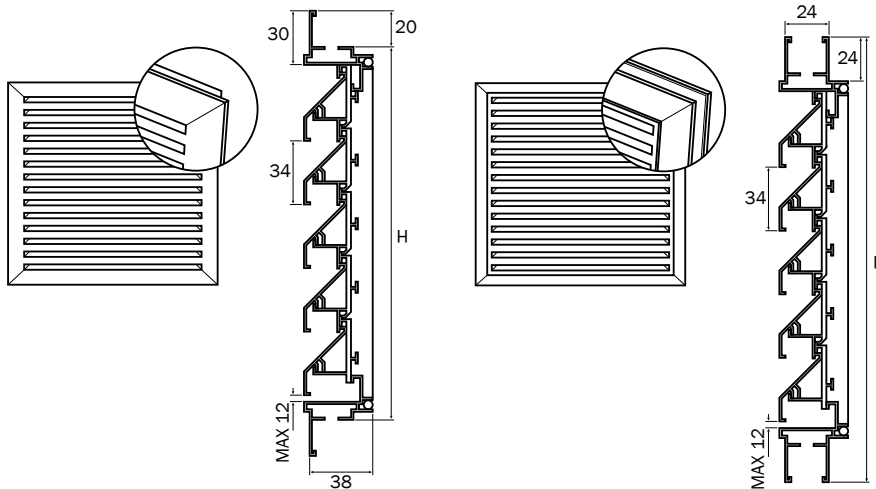
<b>Material</b>	Extruded aluminium alloy profiles to 6063 T6
	Profile thickness of 1.5mm
	Mechanically jointed with Zintec corner chevrons
<b>Options</b>	24 or 28mm glazed-in frames as standard
	Flanged outer frame
<b>Performance</b>	Class "A" BSRIA tested weathering performance
	Physical free area approximately 40%
	Mean Ce Factor 0.202 (Class 3)
	Security bars fitted internally as standard
<b>Dimension</b>	34mm blade pitch
	Product depth 38mm overall
	Glazing rebate height 24mm
	Minimum manufacture height 171mm (for glazed-in variants)

### VA150/VA300 Sound Attenuating Louvre

<b>Material</b>	Manufactured from 2.0mm thick aluminium sheet
	Comprising 120mm depth of acoustic infill material of 45kg/m <sup>2</sup> density tissue faced
	Powder coated in any BS or RAL colour reference
<b>Options</b>	Expanded metal bird guard is fitted as standard
	Flanged outer frame
	Internal insect mesh available
	Glazed-in outer frames to suit 24 and 28mm as standard
<b>Dimensions</b>	Available in sizes 500 x 500mm up to 2000mm wide and 1500mm high
	90mm air passage with intervening acoustic infill blade of 120mm depth
	Depth: VA150 - 150mm and VA300 - 300mm
	Weight: VA150 - approx 30kg/m <sup>2</sup> and VA300 - approx 50Kg/m <sup>2</sup>



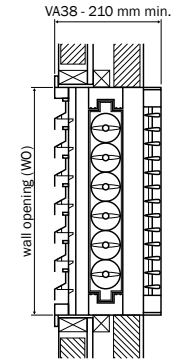
## External Weather Louvre



## Sound Attenuating Louvre

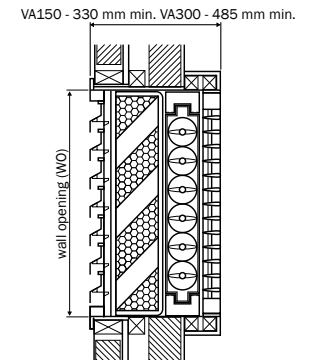
### Standard Façade System

The system is designed to suit a variety of different building façade applications to provide controlled fresh air during the day and secure night time cooling. They do this through use of the external weather louvre. This catches any prevailing wind, whilst still ensuring there is no weather ingress. The amount of air that is then let into the room is determined by the motorised volume control dampers, ensuring a suitable level of ventilation is provided to the room occupants.



### Acoustic Façade System

Façade variants include the VAF150 and VAF300 models. Both of these systems are available for applications with acoustic considerations, and are able to provide deeper louvre profile that is specifically designed to reduce noise entering the room. The system is manufactured from 2mm aluminium sheet, and comprises of 120mm depth of acoustic infill material of 45kg/m<sup>2</sup> material density that can be powder coated in any BS or RAL colour reference.



### Acoustic Performance

	Louvre Type Depth Airborne Sound Reduction Index (dB) at Octave Band							
	63	125	250	500	1K	2K	4K	8K
VA150	6	3	4	8	12	11	9	9
VA300	8	6	7	14	19	20	15	14

\* Free area may vary due to size and configuration though generally a 36% free area is achieved.



## VENTSAIR ACOUSTIC AIR TRANSFER SYSTEM

The Ventsair Acoustic Air Transfer System (ATS) is a patented, internal wall mounted, attenuating air transfer system, utilised to naturally promote cross flow ventilation within rooms reducing heat build-up and providing fresh air to occupants. The system has a number of options including; intumescent fire damper and volume control dampers. It has been designed to maximise air flow and minimise sound transfer and meets the requirements for both BB93 and BB101.

<b>Material</b>	Acoustic ducting finished in white
	Internal and External Metal Frame
	High and low frequency attenuating materials
<b>Options</b>	Recycled HIPs
	Intumescent fire damper
<b>Performance</b>	Volume control damper
	Sound reduction of 34 - 39 Dn,e,w
<b>Outer Casing</b>	Extruded aluminium alloy profiles to 6063 T6
	Foam board body finished in white
<b>Internal Airways</b>	Constructed from perforated aluminium sheet
<b>Wall Opening</b>	Builders to prepare opening to suit associated wall

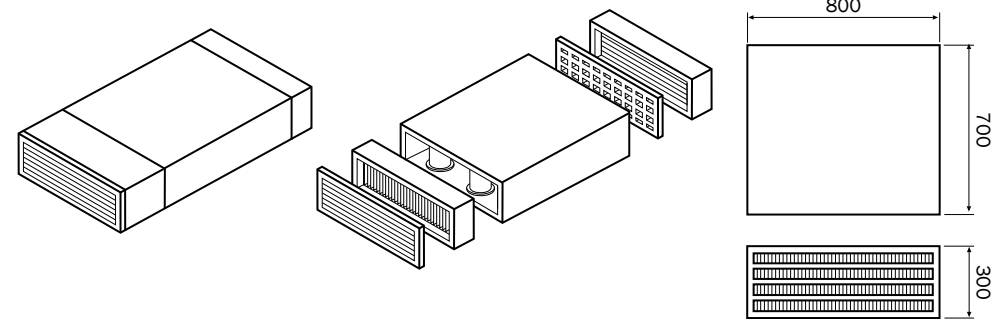
<b>Dampers (Optional)</b>	Volume control dampers with 24 Volt actuator
<b>Wall Grilles</b>	White powder coated eggcrate or linear bar grilles
<b>Controls (if dampers selected)</b>	Automatic control - iNvent 2 programmable control system with night time cooling facility, temperature sensors and manual override - contractor to allow for internal electrical wiring
<b>Guarantee</b>	Monodraught Ventsair Acoustic Air Transfer Systems are covered by a 10 year guarantee
	Dampers and controls fitter with Monodraught systems will be covered by standard manufacturer's warranty

# VENTSAIR ACOUSTIC AIR TRANSFER SYSTEM

## PRODUCT OPTIONS



### Product Options and Dimensions



### Acoustic Performance

Attenuator Option Airborne Sound Reduction Index (dB) at Octave Band Mid Frequency (Hz)										
	63	125	250	500	1K	2K	4K	8K	Weighted Sound Reduction Index	Inc. Grilles
Standard - 5No. Pods	25.6	18.8	23.0	27.7	39.4	40.1	36.3	33.0	34	35





## SOLA-BOOST

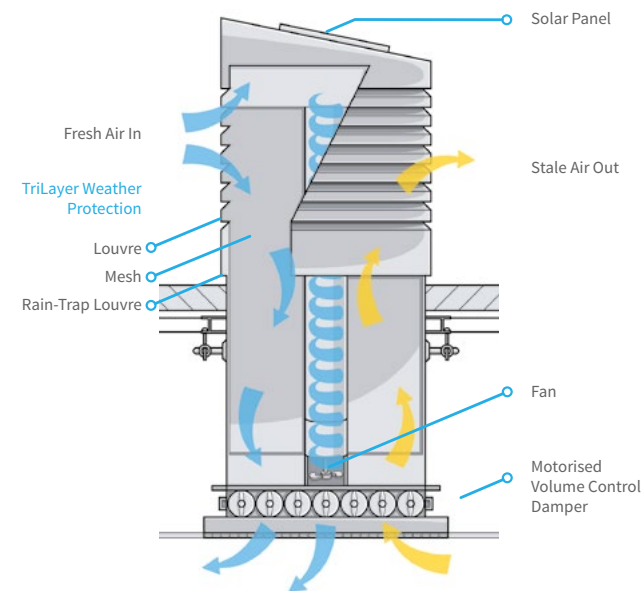
The Sola-Boost Classic is an energy free Natural Ventilation system encompassing the benefits of both top-down and passive stack ventilation and DC solar powered fan, controlled by Monodraught's PowerTrack system. The system consists of an external louvre protected internally by a Trilayer Weather Protection and is internally divided. The simple, but effective design of the system provides fresh air during the daytime as well as secure night time cooling.

A fan served by a central core provides intake or extract air (intake as standard), powered by solar panels situated within the system capping. In order to maximise the performance of the solar powered fan, the system utilises

the PowerTrack control system, ensuring a steady current from the solar panels to the fan. Due to the flexibility of the Sola-Boost Classic, the system can be tailored to suit the needs of almost any area, and has been proven within schools, colleges, healthcare environments, and commercial properties, as well as many other areas.

### Fan & Solar Panel

The fan used in the Sola-Boost system can be set up to either bring in fresh air from the outside or expel the stale air from the room the system is serving. The high efficiency polycrystalline solar panel is optimised for sunny weather, so more power is transmitted on sunny days.



<b>Materials</b>	GRP body with gel coat finish			
	TriLayer Weather Protection			
	225mm Diameter 24V axial fan			
	40W monocrystalline photovoltaic solar module			
<b>Options</b>	Colours: Available in any RAL or BS 4800 colour (Excludes RAL & BS metallic finishes)			
	Intake fan arrangement or extract fan arrangement			
	Modified & extended skirt arrangements (to suit specified roof pitch and alternate upstand arrangements, on request)			
	Acoustic foam (25mm, 50mm)			
<b>Guarantee</b>	10 year limited warranty			
<b>Performance</b>	Fire: BS 476 - 3:2004 / BS 476 - 24:1987			
	Sound: BS EN 20140 - 10:1992			
	Power supply range: 19.2 - 28.8 V DC			
	Running time: 150s/95° (for volume control damper)			
	IP54 rated actuator motor			
<b>Power Consumption</b>	260 l/s maximum fan flow			
	<b>Size</b>	<b>At Nominal Force</b>	<b>At Rest</b>	<b>Wire Sizing</b>
	95	2 W	0.4 W	4 VA
	125	2 W	0.4 W	4 VA
	155	2 W	0.4 W	4 VA
	185	4 W	0.8 W	8 VA

SOLA-BOOST Classic System - Dimensions										
System Size	Capping Width	Capping Height	Louvre Height	Skirt Height	Trunk Length	Trunk Width	Fan Core Dia.	Weight	No. of Louvres	Louvre Free Area
	Dim A	Dim B	Dim C	Dim D*	Dim E*	Dim F	Dim G	Kg		m²
95	706	339	460	150	278	600	49	55	8	0.140
125	906	395	600	150	278	800	74	79	10	0.252
155	1106	446	740	150	278	1000	155	118	12	0.396
185	1206	500	880	150	278	1200	157	158	14	0.572

\* Dimension may change subject to roof construction, pitch, roof thickness, installation method and upstand requirements. All dimensions shown in mm.

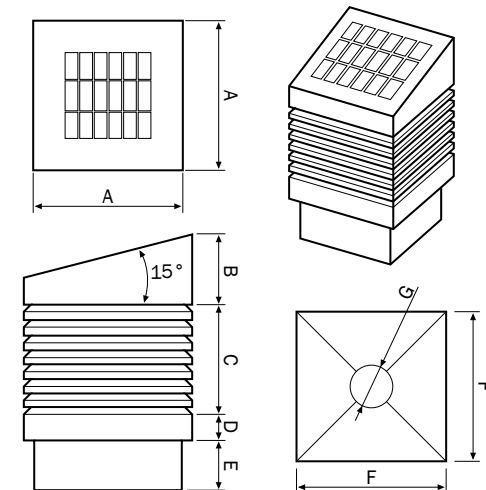
## Product Options



### Trilayer Weather Protection

Monodraught's Trilayer Weather Protection combines the use of the Windcatcher Classics external louvre bank, rain trap louvre and internal fibre mesh to protect against extreme conditions, such as snow. It is supplied as standard on the Sola-Boost system.

- Standard Capping



### Normal Conditions

Under normal weather conditions, the Windcatcher technology provides natural ventilation without any moving parts by encapsulating the prevailing wind, no matter how light, and turning that wind movement down through 90°. Using the compartmentalised vertical vents, fresh air is brought into the room and stale air is expelled using the natural energy of buoyancy and stack effect common to all natural ventilation systems.



### Sunny Conditions

The high efficiency polycrystalline solar panel activates the fan once the DC electricity generated exceeds a set point. Passing of a second set point for electricity generation will cause the patented PowerTrack system to boost the power transmitted even further, resulting in a 250% increase in the speed of the fan. Maximum efficiency of the system can be achieved by ensuring the solar panel is south facing when the Sola-Boost is installed.

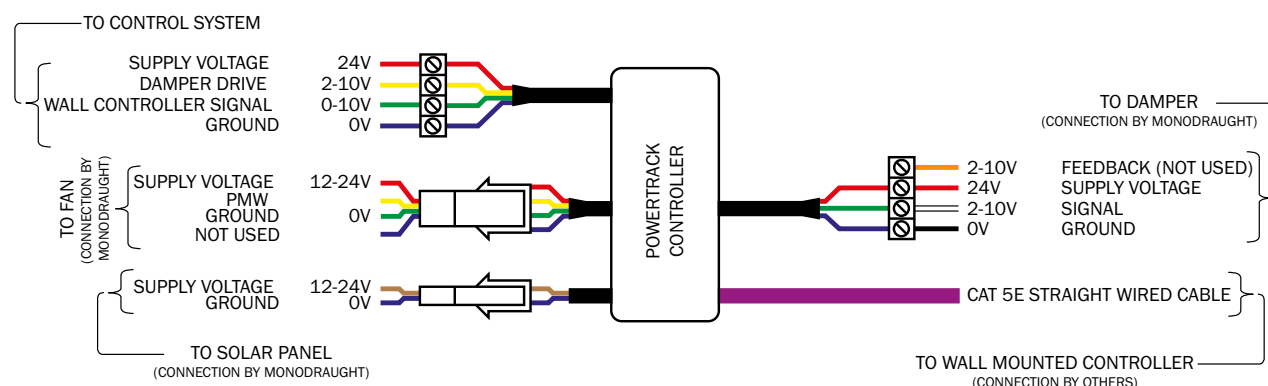


### PowerTrack™



The unique feature of the system is the patented PowerTrack control system. This system works on the basis that the brighter the sun, the greater the speed of the boost fan. The unique switching maximises the solar output to provide a smooth current from the solar panels and optimised fan flow and results in 2.5 times more power from the solar panel that can otherwise be achieved by a direct connection.

## Wiring Details



## Cable Specification

Monodraught provides a 10m long CAT 5E network cable as standard, for connecting to the wall mounted controller. Should additional length be required, these must be straight wired to TIA/EIA-568-B RJ45 wiring standard (T-568B at both ends).

### 4-Core Cable:

- PVC Cable
  - Farnell: 2240121
  - RS: 660-4096
  - Elec. Wholesaler: 16-2-4A
  - CSA: 0.5mm<sup>2</sup> (Stranded)
- LSZH Cable
  - Elec. Wholesaler: 1896/4L
  - CSA: 0.5mm<sup>2</sup> (Stranded)



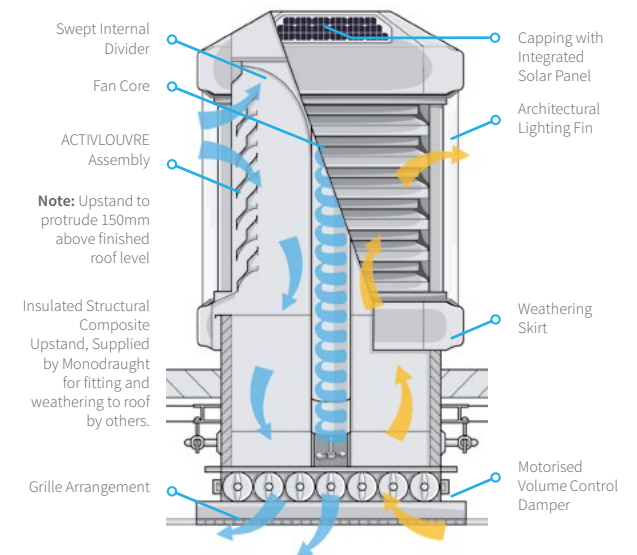


## SOLA-BOOST X-AIR

The Sola-Boost X-Air is the next generation of Natural Ventilation system featuring the patented ACTIVLOUVRE modulating aerofoil louvre technology and DC solar powered fan controlled by Monodraught's PowerTrack system.

The system consists of an external static louvre and internal active louvre arrangement, which varies the opening and free area through the louvre face. The variable louvres can provide maximum ventilation rates when fully open or be modulated to vary the weather resistance or closed to prevent the ingress of precipitation.

A fan served by a central core provides intake or extract air (intake as standard), powered by solar panels situated within the system capping. In order to maximise the performance of the solar powered fan, the system utilises the PowerTrack control system, ensuring a steady current from the solar panels to the fan. Further features include external air catchment fins, pressure release vanes and optional solar powered architectural lighting.



## SOLA-BOOST X-AIR

### Normal Conditions

Under normal weather conditions, the Windcatcher technology provides natural ventilation without any moving parts by encapsulating the prevailing wind, no matter how light, and turning that wind movement down through 90°. Using the compartmentalised vertical vents, fresh air is brought into the room and stale air is expelled using the natural energy of buoyancy and stack effect common to all natural ventilation systems.

### Sunny Conditions

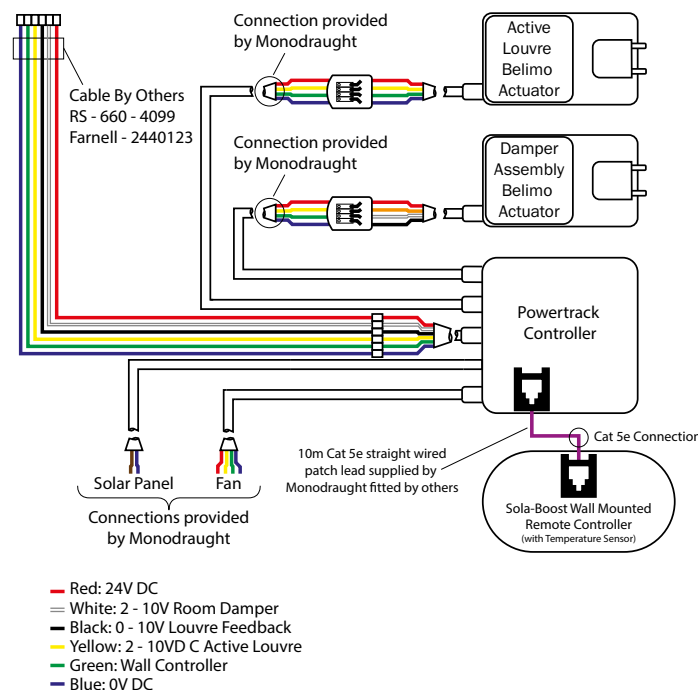
The high efficiency polycrystalline solar panel activates the fan once the DC electricity generated exceeds a set point. Passing of a second set point for electricity generation will cause the patented PowerTrack system to boost the power transmitted even further, resulting in a 250% increase in the speed of the fan. Maximum efficiency of the system can be achieved by ensuring the solar panel is south facing when the Sola-Boost is installed.

### PowerTrack™

The unique feature of the system is the patented PowerTrack control system. This system works on the basis that the brighter the sun, the greater the speed of the boost fan. The unique switching maximises the solar output to provide a smooth current from the solar panels and optimised fan flow and results in 2.5 times more power from the solar panel that can otherwise be achieved by a direct connection.

## WEATHER CONDITIONS & WIRING DETAILS

### Wiring Details



### Cable Specification

#### 4-Core Cable:

- PVC Cable
  - Farnell: 2240121
  - RS: 660-4096
  - Elec. Wholesaler: 16-2-4A
  - CSA: 0.5mm<sup>2</sup> (Stranded)
- LSZH Cable
  - Elec. Wholesaler: 1896/4L
  - CSA: 0.5mm<sup>2</sup> (Stranded)

#### 6-Core Cable (Optional):

- PVC Cable
  - Farnell: 2240123
  - RS: 660-4099
  - Elec. Wholesaler: 16-2-6A
  - CSA: 0.5mm<sup>2</sup> (Stranded)
- LSZH Cable
  - Elec. Wholesaler: 1896/6L
  - CSA: 0.5mm<sup>2</sup> (Stranded)

Monodraught provides a 10m long CAT 5E network cable as standard, for connecting to the wall mounted controller. Should additional length be required, these must be straight wired to TIA/EIA-568-B RJ45 wiring standard (T-568B at both ends).

### National Memorial Arboretum

- **Location:** Alrewas, Staffordshire
- **Application:** Other
- **Sector:** New Build
- **Architect:** Glen Howells Architects
- **Main Contractor:** Daly Engineering Services Ltd
- **Products Installed:**
  - 5 No. WINDCATCHER Classic 185 Monodraught Natural Ventilation systems c/w 24V boost fan
  - 3 No. WINDCATCHER Classic rectangular 2000 x 1000mm Monodraught Natural Ventilation systems c/w 24V boost fan
  - 1 No. iNvent 2 Control Panel c/w PV Optimiser

Monodraught were selected as the natural ventilation solution for the expansion of the National Memorial Arboretum in Staffordshire.

The National Memorial Arboretum is the UK's year-round centre of Remembrance; a spiritually uplifting place which honours the fallen, recognises service and sacrifice, and fosters pride in our country.

The Windcatcher encompasses the benefits of both top-down and passive stack ventilation and when coupled with iNvent two BMS controls, the system is capable of providing temperature and CO<sub>2</sub> demand controlled ventilation.

The system requires little maintenance which is ideal for the Arboretum as it relies heavily on regular visitor numbers to maintain voluntary donation contributions, so needs to remain available to the public as much as possible.



*Windcatcher Classic Square / National Memorial Arboretum, Alrewas, Staffordshire*



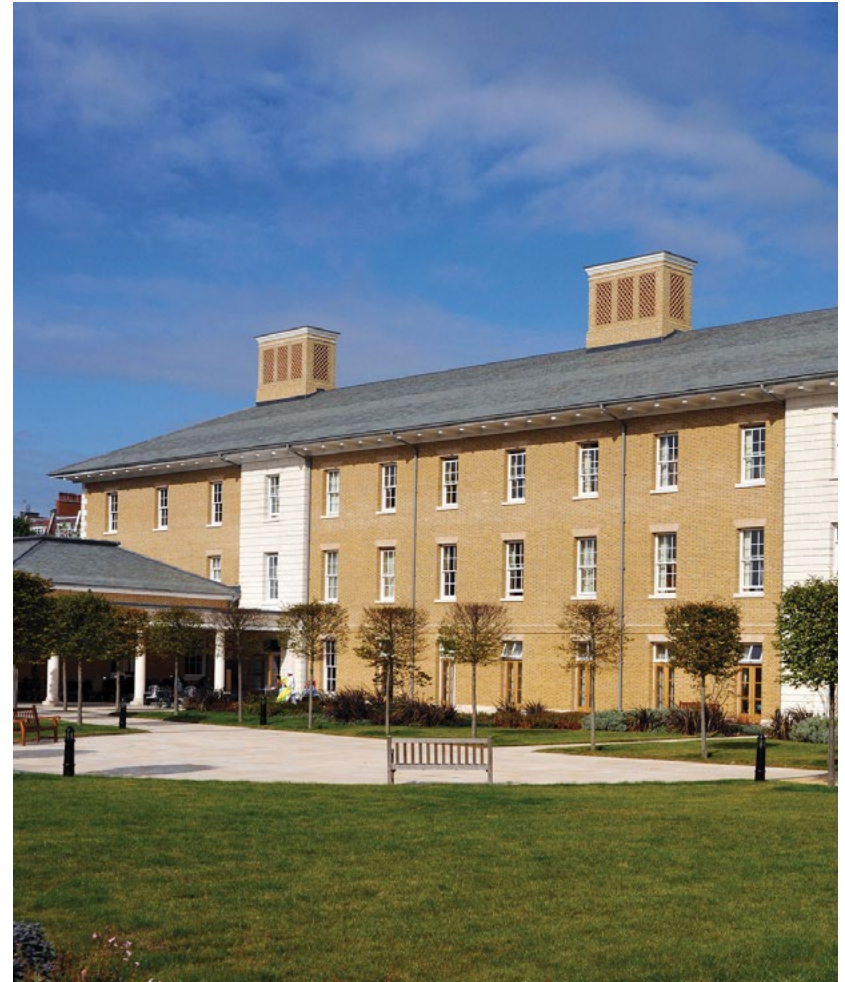
## CASE STUDY

### Royal Chelsea Hospital

- **Location:** London
- **Application:** Healthcare Centre
- **Sector:** Refurbishment
- **Architect:** Steffian Bradley Architects (SBA)
- **Consultant:** Delap & Waller
- **Products Installed:**
  - 15 No. WINDCATCHER Bespoke Monodraught Natural Ventilation systems

Monodraught Windcatcher natural ventilation systems were selected to provide energy-free air throughout the three storey flagship care home. The fifteen systems were cleverly adapted by Monodraught to complement the architectural style of the new infirmary, which is in context with original Wren and Soane buildings.

The units were clad in clay pantiles to ensure a perfect blend with the architectural style. CFD analysis was carried out using Monodraught's own development team and then verified using external specialists to optimise the architectural cladding.



*Windcatcher Classic Bespoke / Royal Chelsea Hospital, London*

### St. Joseph's School

- **Location:** Ipswich
- **Application:** Education/Halls and Dining Area
- **Sector:** New Build
- **Architect:** Wincer Kievenvaar
- **Consultant:** Johns, Slater & Haward
- **Products Installed:**
  - 6 No. WINDCATCHER circular Monodraught Natural Ventilation systems
  - 1 No. WINDCATCHER oval truncated Monodraught Natural Ventilation system

A state-of-the-art Infants and Junior School characterised by the use of bold organic forms, natural light and bright colours designed to inspire its young pupils. The school provides a clear statement of environmental intent by naturally ventilating the 125 square metre hall, a circular library and a series of interlinked shared spaces. Greg Allen, Facilities Manager at St Joseph's School said, "The systems have regulated the internal temperatures without any outside assistance".

Using the fairly dominant appearance of WINDCATCHER systems, the Architect created a very striking design for their school building. Colours as well as shapes can be used to great effect as proved by this project.



*Windcatcher Bespoke / St. Joseph's School, Ipswich*

## CASE STUDY

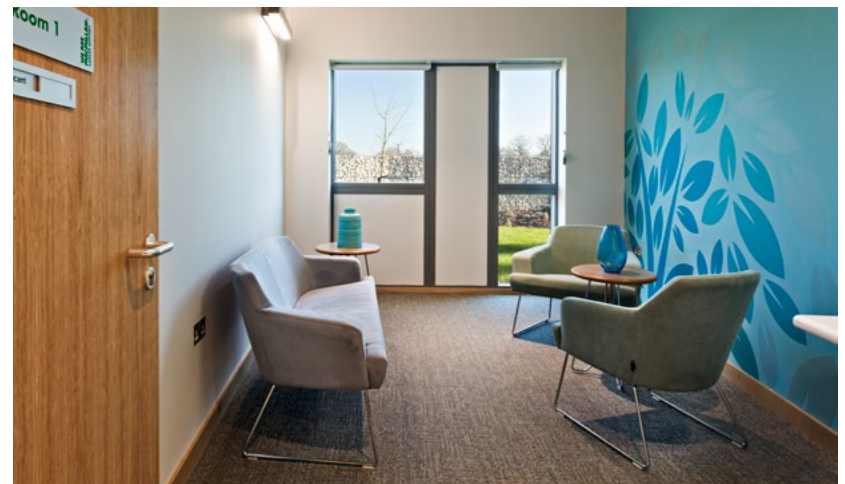
### Macmillan Cancer Centre

- **Location:** East Surrey
- **Application:** Healthcare Centre
- **Sector:** New Build
- **Construction:** Buxton Building Contractors
- **Products Installed:**
  - 4 No. Circular ABS 550 WINDCATCHER natural ventilation systems
  - 1 No. iNvent 2 fully automatic control system with night time cooling facility

The East Surrey Macmillan Cancer Support Centre was developed through a partnership between Surrey and Sussex Healthcare NHS Trust and Macmillan Cancer Support. It was opened in February 2016 by a previous patient. The cancer support centre offers those affected by cancer additional holistic care in a friendly, informal and non-clinical environment.

The Circular ABS 550 WINDCATCHER systems were installed in 2 therapy rooms and 2 quiet rooms and provide natural ventilation for staff, patients and visitors. The simple, but effective design of the system provides fresh air during the daytime as well as night-time cooling.

There are a number of benefits for the Macmillan Cancer Support centre of using this system. By using a natural ventilation system the centre is able to reduce CO<sub>2</sub> levels by expelling stale air and also maintaining a comfortable fresh environment. Natural ventilation ensures that the system will not be affected by changing energy costs and low maintenance means there is little need for disturbing the calm environment at the centre. The cost effective and low maintenance system means that funds can be focused on supporting staff and patients.



Windcatcher Classic Circular / Macmillan Cancer Care Centre, East Surrey



### Imperial College



Windcatcher Classic Square / Imperial College, London

- **Location:** London
- **Application:** Education/Halls and Library
- **Sector:** Refurbishment
- **Architect:** Gatehouse Architectural Consultants
- **Products Installed:**
  - 6 No. WINDCATCHER Classic Square Monodraught Natural Ventilation systems

The library is on the top floor, with full height glazing and suffered for many years from chronic overheating in the summer months. However, the Windcatcher natural ventilation systems were the chosen strategy due to their energy saving features.

Another major benefit and consideration for the College was the improved health and comfort aspects of natural ventilation systems, which have proved to provide a more calm and stress-free working and studying environment.

Phil Evans, Energy Manager says, “We are all aware how difficult is to study and work in a stuffy and warm environment and this was one of the key factors in the College’s decision. After all, what could be more energy efficient than ‘free fresh air’.”

## CASE STUDY

### Wycombe Sports Centre

- **Location:** High Wycombe, Buckinghamshire
- **Application:** Leisure/Sports Centre
- **Sector:** New Build
- **Contractor:** Willmott Dixon
- **Products Installed:**
  - 13 No. WINDCATCHER X-AIR 200 Monodraught natural ventilation systems
  - 1 No. WINDCATCHER X-AIR 140 Monodraught natural ventilation systems
  - 6 No. VENTS AIR 3000 x 1000mm Monodraught wall mounted systems
  - 3 No. iNvent 2 Control Panels
  - Over 250 AIR-PRECISION grilles, diffusers and louvres supplied

Monodraught are pleased to have been part of a major local construction project, the Handy Cross re-development scheme. The £150m Handy X Hub development is based on an exercise well, eat well, and work well mix. In addition to a new state of the art Leisure Centre and a full size Waitrose, the development includes a new purpose-built coachway park and ride and the potential to provide fast coach services to Heathrow, London and other national connections.

The Monodraught Windcatcher X-Air is the latest generation of natural ventilation that follows in the footsteps of the successful Windcatcher classic systems. This is an energy free natural ventilation system encompassing the benefits of both top-down and passive stack ventilation. The simple, but effective design of the system provides fresh air during the daytime as well as night-time cooling.

The Ventsair wall mounted natural ventilation system is a high specification small format louver system. The system has been used extensively in education facilities, health facilities as well as retail schemes.



Windcatcher X-Air / Wycombe Sport Centre, High Wycombe

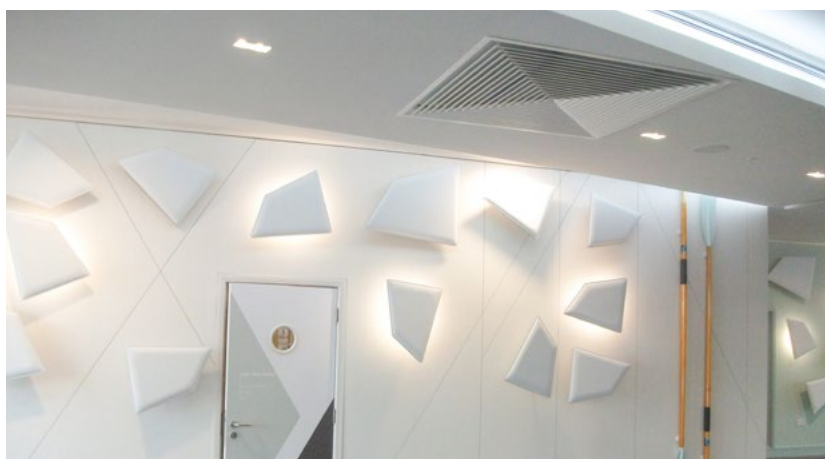
### Eton College Boathouse

- **Location:** Dorney Lake, Windsor
- **Application:** Education/Conference Area
- **Sector:** Refurbishment
- **M&E Consultant:** TMI Mechanical Ltd
- **Contractors:** WFC
- **Products Installed:**
  - 4 No. SOLA-BOOST X-Air 170 Monodraught Natural Ventilation systems
  - 1 No. iNvent 2 Control Panel

Monodraught were specified as a natural ventilation solution as part of the recent refurbishment of Eton College Boathouse function room. Four Sola-Boost X-Air systems were installed in the conference area and ensure that the area is kept cool even when the room is fully occupied.

Low CO<sub>2</sub> levels and good air quality are maintained to keep attendees feeling fresh and focused throughout the day. The iNvent 2 control system utilises seasonally adjusted proportional control based on internal temperature and CO<sub>2</sub>. It has a configurable sensor, strategy and actuator mapping via USB as well as built in data logging which can be useful for facility managers to improve building performance.

Monodraught natural ventilation systems have proved to be consistently effective and reliable over many years. Monodraught are delighted to be part of such prestigious development and inspiring setting.



*Sola-Boost X-Air / Eton College Boathouse, Dorney Lake, Windsor*



## WE ARE WITH YOU ALL THE WAY



### R&D and Manufacture



Our large R&D team are continually challenging the boundaries developing new products to ensure customers continue to receive market leading products for which Monodraught are renowned. These products are all manufactured within our High Wycombe factory and as R&D is in the same location as production, then the highest levels of quality can be ensured.

### Building Simulation



To help architects and consultants deliver ultra low energy efficient designs, Monodraught and building performance analysis specialist IES have developed Performance Components. Our Project Design Engineers are able to work with you to create the right design for your building.

### Installation



We have a team of contract managers who will work with you and your clients from order creation through to delivery and maintenance if required. Our own team of installers work across England and Wales with partner agencies installing in Scotland, Ireland and worldwide. We will visit your site ahead of installation to ensure that everything goes smoothly.

### Maintenance



We can provide on-going service and maintenance of our installed products. This helps provide performance data for our customers and structured feedback that can assist product development, resulting in a system running at optimum performance whilst keeping costs to a minimum.





*Windcatcher X-Air - Little Miracles DIY SOS, Peterborough*





Halifax House, High Wycombe  
Buckinghamshire, HP12 3SE



+44 (0) 1494 897700



[www.monodraught.com](http://www.monodraught.com)



[info@monodraught.com](mailto:info@monodraught.com)

Follow us on:



**ELLISCO** > +64 9 570 5267  
> [info@ellis.co.nz](mailto:info@ellis.co.nz)  
> [www.ellis.co.nz](http://www.ellis.co.nz)

