

The Control Panel

Cylon control panels can provide the control features described overleaf, to serve several zones or rooms independently. For temperature-based control, one or more temperature sensors are positioned in each control zone or room to provide an average input. The manual override buttons are incorporated on the temperature sensors themselves.

The controls package normally includes all sensors and commissioning.

Each Cylon control panel measures 400mm x 300mm x 200mm deep and can be located in a separate room to the area to be controlled, such as a plant control room. The power requirement is 230V AC, isolated to a 5A fused spur.

The Cylon control panel does have the facility for other various options, such as CO₂ sensors or air quality sensors and generally, the panel incorporates a heating system relay and interlock but, as you can appreciate, everything revolves on price. We, therefore, try to offer the most cost effective automatic control system commensurate with low cost.

These settings are recommended for our standard temperature based control approach but can be reprogrammed to suit individual sites and we would always be pleased to discuss individual requirements on a Project by Project approach.

Semi-automatic and manual based controls

A separate leaflet has been produced for semi-automatic and manual based control systems.

We do hope the above points have been of assistance in forming a better understanding of the Monodraught Windcatcher natural ventilation system. If you require any further information, please contact our Technical Design Department.



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Monodraught Windcatcher

for energy free natural ventilation

Advantages

- **Maintenance** – Virtually zero maintenance, since systems are manufactured in GRP, which will last the life of the building and requires no continual maintenance as compared to metal or timber products.
- **Running and Energy Costs** – Virtually zero. The only power required is for operating the modulating dampers.
- **Night Time Cooling** – Provides all the benefits of free night time cooling without compromising the security of the building.
- **Environmentally Friendly** – Since Windcatchers utilise the wind and thermal buoyancy, they are the very epitome of sustainability.
- **Design Freedom** – Monodraught offer a wide range of exciting, standard designs but can also offer bespoke systems to suit the building
- **Health** – Many people dislike air conditioning systems, which they claim produces dry air and can circulate germs.
- **Healthier** – Windcatcher systems take their air from above roof level, which is considered to be relatively free from dust, dirt and traffic pollution, as compared to low level air intakes.
- **More Space** – Since Windcatchers eliminate the need for air conditioning, this frees up space usually required for chillers.
- **Security** – No-one can break in through a Windcatcher system!
- **Windows** – In summer months, openable windows will always add to the cross ventilation but can be closed and made secure during night time, since the Windcatcher system will provide all necessary night time cooling.
- **SunCatchers** – Monodraught Windcatchers can be combined with the remarkable SunPipe system to provide natural ventilation and natural daylight in one complete package.
- **Guarantee** – 25-year guarantee on Monodraught systems with a life expectancy of 35 years.
- **After Sales Service** – Monodraught provide a free 12 month operational check and cleaning service within a 300 miles radius of High Wycombe. Thereafter, a ten year annual maintenance contract is provided at a nominal cost.

Putting the wind and sun to work



Daimler Chrysler, Milton Keynes

Advantages of the Monodraught Windcatcher Natural Ventilation System



Interior view of
Daimler Chrysler
offices.

We have often been asked to set out the advantages of the Windcatcher systems as compared to air conditioning systems.

Many of the points that we make may be considered by some as rather contentious and their relevance will apply in varying degrees to your particular Project.

We also recognise that there are limitations on the application of any natural ventilation system, which must also be taken into account in this presentation.

In general terms, natural ventilation has been welcomed as a cost effective, energy saving and environmentally friendly approach, to provide an alternative to mechanically driven air conditioning systems.

We do hope that the following points will be of assistance in forming a better understanding of the Monodraught Windcatcher natural ventilation systems.

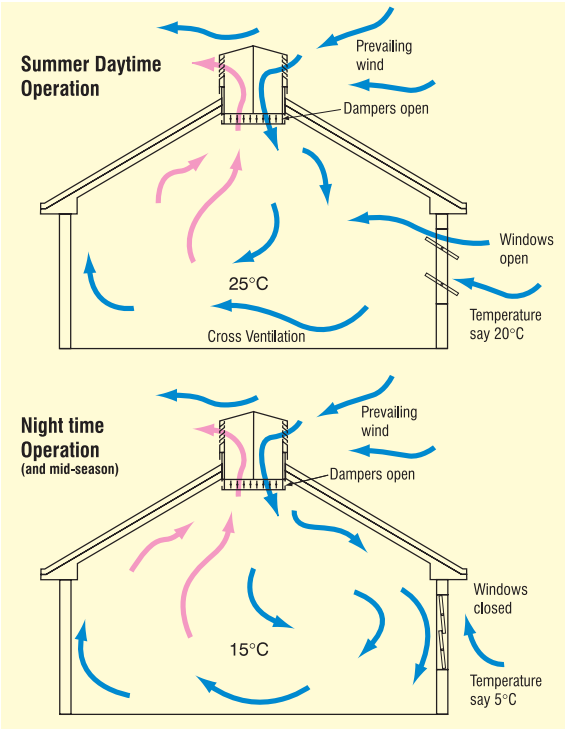
Although there may be limitations on the application of natural ventilation systems, in general terms we consider they offer considerable advantages over the application of air conditioning systems.

Some of the Disadvantages of Air Conditioning Systems as compared to Natural Ventilation

- In some cases, people have complained that air conditioned offices can lead to soreness of the eyes, dryness in the throat, and other forms of mild discomfort.
- In severe cases, this has lead to SBS (Sick Building Syndrome). The exact causes of SBS are still not fully understood but it is considered it is probably a combination of several factors of the recirculation of stale air; the implicit need for the regular cleaning of all filters, both on the fresh air intake and on filtering the recirculation of polluted air, plus concerns on the original design of the system, which can vary from one firm to another.
- Whereas air conditioning systems require regular maintenance, the general consensus is that it must be preferable to bring in fresh air from outside rather than recirculate the internal air.
- Some people consider that the recirculation of air within an office can give rise to the spread of germs and infections although this is not proven.
- Many people find that the ‘thermal shock’ of working in an artificially cooled space, having walked in from a warm summery day, can lead to summer colds and minor ailments.
- The imposition of air conditioned offices results in a ‘one size fits all’ scenario with some people feeling too cold and others finding it not cool enough! As a result, this can sometimes lead to personal irritation and discomfort.
- Air conditioning systems use certain refrigerant gases, which in the long term have been considered harmful to our environment and there is therefore a general government policy to reduce the use of such refrigerants by at least 20% over the forthcoming years.
- Air conditioning systems are energy dependent, using up electricity. If for any reason, the air conditioning systems should break down or the power supply should fail, there is no back up procedure and the buildings will then automatically overheat. Furthermore, the space required for the chillers and equipment itself impacts on the building design and layout, often taking up valuable space that can be used and put to better purposes.
- Many of the older air conditioning systems are relatively noisy and create their own headaches and noise problems.
- Air conditioning systems must be properly and regularly maintained; they eventually wear out and must be replaced.

Advantages of Natural Ventilation Systems

- Where Windcatcher systems are used, fresh air is drawn from above roof level, which is relatively clean and free from contamination, as compared to the dust, dirt and pollutants that are more prevalent at ground level.
- It is generally considered by most staff that the down flow of fresh air from the Windcatcher system can be very refreshing and welcome on a hot summer’s day and highlights the Monodraught principle of ‘bringing the outdoors, indoors’.
- Where openable windows are installed, staff can still open windows if they wish, since this does not have any detrimental effect on the operation of the Windcatcher systems.



- Windcatchers can be used to advantage throughout the year, even during the winter months, when it is generally recommended that the Windcatcher dampers remain 5% open, so as to allow background trickle ventilation. This allows warm, stale air to escape but also brings a constant supply of fresh air into the working space. The separate section on controls details the wide scope of the control strategy for Windcatcher systems, which can bring air quality, humidity, and a variety of other control options into play.

Night Time Cooling

- This is probably the most important aspect of natural ventilation systems, which air conditioning systems do not possess.
- At midnight, regardless of temperature, the dampers open fully to allow any build up of warm stale air to rise up through the Windcatcher segments and be expelled to the outside air. At the same time, the cool night air will descend to replace the warm air that rises up through the Windcatcher system.

- This incoming air is also assisted by any external air movement, which is encapsulated by the air intakes of the Windcatcher system, slightly pressurising the space below and encouraging the outflow of the warmer stale air from the building.
- The night time cooling program is based on BSRIA Technical Note TN11/95. This allows the building's structure and fabric to be saturated with cool air during the night time period, thereby increasing the building's capacity to absorb heat during the day.
- This downwash of the cool night air continues throughout the night, purging the building of any stale air, leaving the building feeling fresh and clean the following day.
- A sensor will close the dampers automatically should the internal temperature drop to below 15°C. The controls reset themselves for normal operation from 6am onwards.

Control of Natural Ventilation Systems

Whereas natural ventilation has seen tremendous increase in applications over the last ten years, one of the early criticisms from Architects and Clients was that the principles of design and application were fine but they generally felt disappointed that the explanation of the control of natural ventilation was either too complicated, too sophisticated or conversely, in many cases, was non-existent at all! Where there have been changes of staff or personnel in a building and indeed, when the building is initially occupied, it is vital that the responsibility for this information passes from the Contractor to the Client. The end user, therefore, requires a control system that provides a refined control yet is simple to use and understand.

We recognise that there can sometimes be quite a difference between the design usage of a building (which is often designed at a quite early stage) and the actual usage, which can be somewhat different to the original Designer’s thoughts. Accordingly, we consider that with all natural ventilation Projects, provision should be made within the Contract, to ‘revisit’ the site or Project, say three months after occupation has been completed, to ‘fine tune’ the control strategy in accordance with the end user’s wishes.

The control of the natural ventilation systems can, of course, be linked to the building’s BEM system but otherwise, control of the system is via our own separate control panel.

Monodraught's Controls Philosophy

The control system installed provides a fully automatic system and is not dependent on input from the end user during day-to-day use. At the same time, we recognise that the system must allow the end user to be involved (by the use of manual overrides) and then for the system to revert to its pre-programmed settings, so as to comply with the overall control strategy.

For smooth temperature control, the natural ventilation system needs to provide a proportional response to conditions within the room. This is usually achieved by the dampers opening progressively as the room temperature increases and proportionately closing as the room temperature decreases.

Each of the seasons requires a slightly different approach, although it has to be stressed that the main application and benefit of natural ventilation is during the summer months. Nevertheless, we do recognise that in mid-season (spring and autumn) natural ventilation is also desirable and, of course, in winter months, trickle ventilation is recommended. We also recognise that there can be ‘freak’ temperature conditions, where natural ventilation is required and it is for these reasons, we have considered that a range of options should be provided.

Control Settings (based on temperature)

Three settings are provided for automatic operation to cover the following 'seasons':-

Summer	June - August
Winter	November - March
Spring/Autumn	April - May September - October

Summer Program

Up to 16°C	Dampers remain closed
At 17°C	Dampers 20% open
At 18°C	Dampers 40% open
At 19°C	Dampers 60% open
At 20°C	Dampers 80% open
At 21°C	Dampers fully open

Night time cooling is incorporated in the programming, so as to drive the dampers fully open from midnight to 6am.

Spring/Autumn Program

Up to 19°C	Dampers remain closed
At 20°C	Dampers 20% open
At 24°C	Dampers fully open

Note: Night time cooling does not form part of the spring/autumn program.

Winter Program

We recognise that far less natural ventilation is required in the winter and, therefore, the following settings are recommended.

Up to 22°C	Dampers remain closed or can be set to 5% open to provide trickle ventilation
At 23°C	Dampers 20% open

The Override Facility

The override facility is designed to enable the end user to open the dampers fully when additional ventilation is required. The end user may also wish to close the dampers if there is too much ventilation.

One distinct push on the override will drive the dampers fully open. The dampers will remain open for one hour in the Summer, 40 minutes in the Spring/Autumn, and 20 minutes in the Winter. At the end of that designated period, the dampers will automatically revert to their programmed

position, normally based on temperature.

The principle of the Spring/Autumn override facility is to take account of unusual weather conditions, such as an 'Indian Summer' or a warm spring day.

Two distinct pushes will fully close the dampers for the override period. If the end user wishes to cancel the override instruction, then a third distinct push will send a signal to the control panel to take the dampers back to their original pre-programmed position.

Note: Once the override button is pushed, the Belimo motor is quite slow in operation and it takes approximately two minutes for the dampers to fully operate. The end user should, therefore, be instructed not to keep pushing the button!

If the Project is fitted with air quality sensors, the air quality sensors will always override the temperature sensors and will drive the dampers fully open if the air quality deteriorates.

