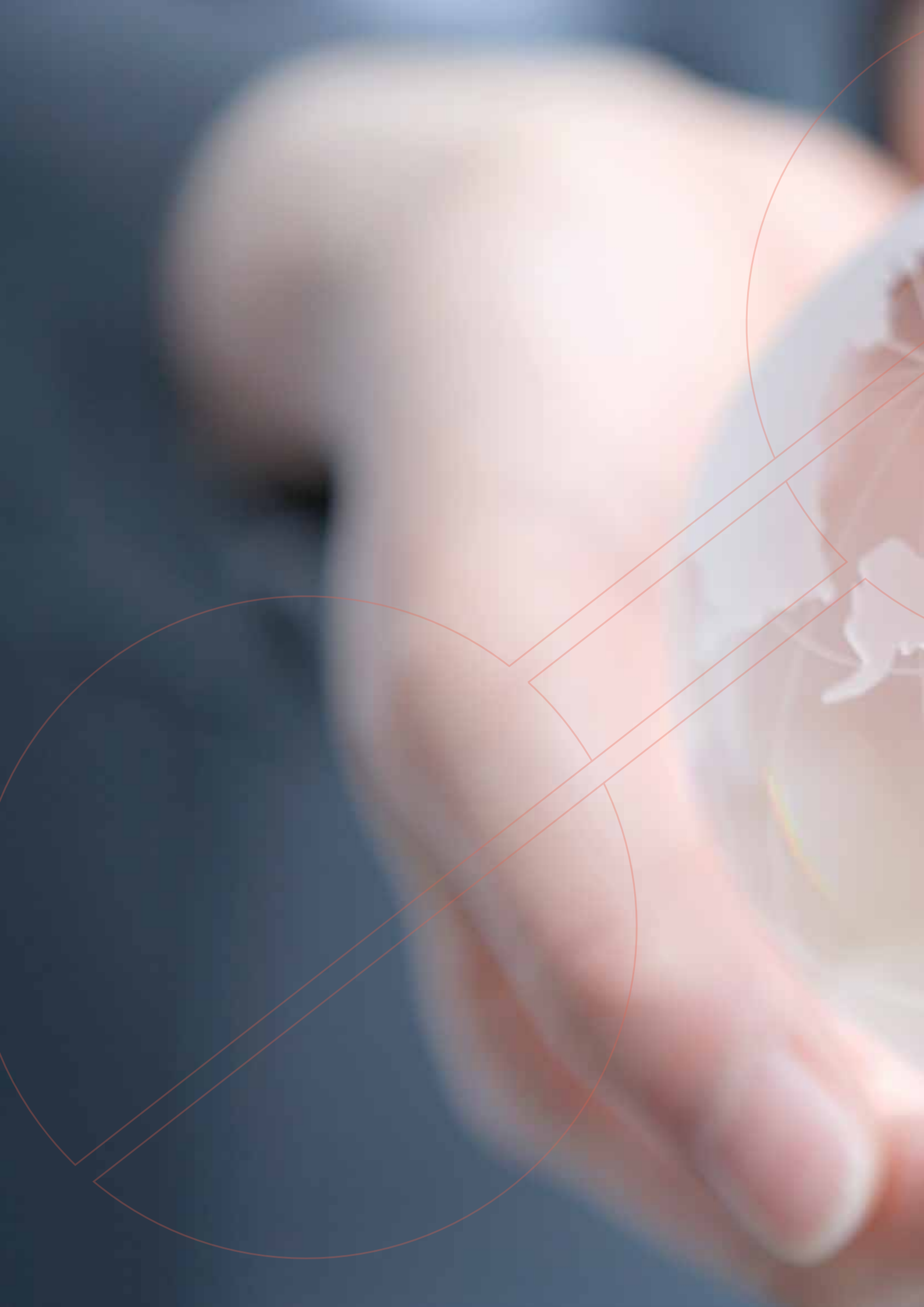
A woman with long brown hair and blue eyes is looking out a window. The background shows a city skyline with a prominent building. The image is overlaid with a red geometric design consisting of several overlapping circles and lines.


Safe smoke ventilation solutions for all building types

Smoke ventilation

Passive smoke ventilation utilises natural driving forces for the efficient and rapid exhaust of smoke and heat from burning buildings







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Why choose natural smoke ventilation?

The majority of people who die in fires do not lose their lives because of the fire itself, but are suffocated by the smoke. It is vital that the smoke is removed from the building as quickly as possible to allow everyone to be able to see and breathe in order to escape, and the fire brigade to extinguish the fire.

Exhausting the smoke ensures that the building does not overheat and that explosions of smoke gases, which can result in the entire building collapsing, do not occur.

With a passive smoke ventilation solution the high level smoke vents (skylights, windows or proprietary smoke vents) will open automatically in conjunction with the low level replacement air openings. This system, when designed and controlled correctly, will ensure that the smoke is exhausted rapidly, enabling the occupants to escape and therefore reducing the risk of fatalities.





Smoke ventilation based on natural forces does not only create safety and security for the users of the building. The openings in the facade and roof can also be used every day to provide a pleasant indoor climate using comfort ventilation.

Comfort ventilation is intelligent management of the indoor climate using natural ventilation, which is both energy-saving and environmentally friendly. The system measures temperature and air quality in each room and,

depending on the weather conditions, opens windows as required to allow precisely the right amount of air into the building.

This means that the safety solution is not just an investment in protection in the event of a fire or smoke incident, but it also becomes an active part of providing users with a balanced day-to-day indoor climate that is environmentally friendly.



Two series of smoke control panels for all building types



Flexibility in your smoke panel connectivity

It is not possible to prevent all building fires, but heat and smoke ventilation is one of the main life-safety and protection measures that can be installed.

The configuration of the final solution depends on the size of the building, the number of smoke vents, the window actuator amperage requirements and the number of smoke zones / rooms.

The choice of the right smoke control panel depends on the specific requirements of your building. For example, if you require several smoke ventilation groups, you could connect several CompactSmoke™ panels in a master/slave connection or choose FlexiSmoke™, which is a modular panel.

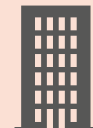


We supply two series of smoke control panels



CompactSmoke™

Compact smoke control panels for smaller areas. Available in 4-20A and covering up to 10 smoke ventilation groups.



FlexiSmoke™

Flexible, modular smoke control panels for larger areas. Available in 20-60A and covering up to 39 smoke ventilation groups.



CompactSmoke™

For small and medium-sized areas



Panels for single smoke zones

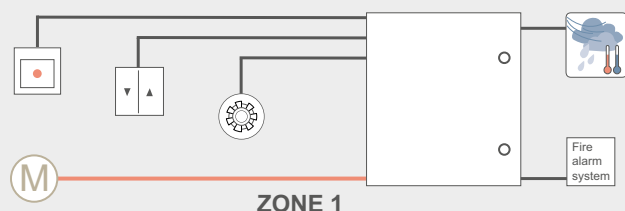
Compact smoke control panels, for the control of $\pm 24V$ DC actuators. Predominantly used for small and medium-sized areas such as stairwells and other single smoke zones. The smoke control panels contain a single smoke / comfort ventilation group.

Several panels can be joined in a master / slave connection so that they can be used in larger buildings.

It is possible to connect common wind and rain sensors and with the use of additional modules, the panel can also be used for daily comfort ventilation.

Illustrative example

The smoke panel can be connected to a number of components so that the controls can be adapted to the specific project. Either a fire alarm system or a smoke detector can be connected at a time.



See symbol description on page 17

WHY CHOOSE WSC 204 OR WSC 304 61?

- Supplied with 4A or 4.8A
- A single smoke ventilation and comfort group
- Value for money
- For smaller areas
- Control of $\pm 24V$ DC actuators
- Comes with two back-up batteries
- Can be combined in master / slave connections
- WSC 204 is tested to the most recent standard, EN 12101-10

The smoke control panel has one opening speed

- $\pm 24V$ DC standard motor with one speed (H&S)

4A

WSC 304 61

VdS-Nb.: G502028



4.8A

WSC 204



STANDARD with DIP switches

Compact smoke control panels for the control of $\pm 24V$ DC and MotorLink® actuators for small and medium-sized areas e.g. stairwells, sports halls and restaurants.

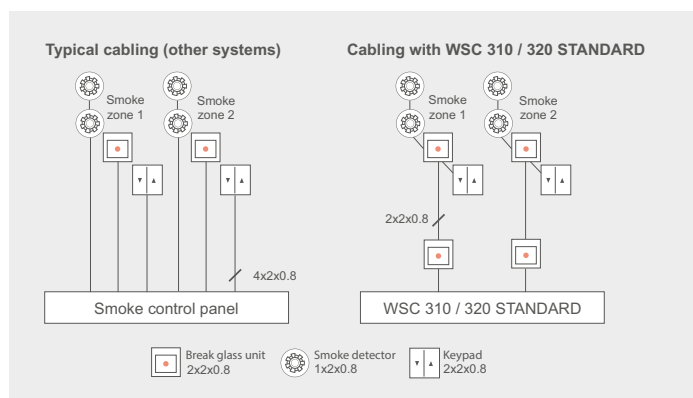
The smoke control panels are supplied in two versions, 10A or 20A with up to 2 smoke zones and up to 2 comfort groups.

Based on the number of connected inputs to the smoke control panel the panel automatically detects the number of smoke zones. Smoke detectors can be connected to each zone. Furthermore keypads for daily comfort ventilation can be connected.

Smoke detectors and keypads can be connected directly to the break glass unit.

Ease of cabling

Connecting smoke detectors and comfort keypads to the break glass units and using bus technology, significantly reduces cabling.



WHY CHOOSE WSC 310 / 320 STANDARD?

- Supplied with 10A or 20A
- 2 smoke zones / 2 ventilation groups
- Smoke detectors, break glass units and keypads can be connected to each group
- Configuration on DIP switches
- Ease of cabling
- tested to the most recent standard, EN 12101-10

The smoke control panel gives the possibility of up to two motor speeds depending on the type of motor:

- $\pm 24V$ DC standard motor with one speed (H&S)
- MotorLink® motor with two speeds (H&S / comfort ventilation)



10-20A
WSC 310 / 320 Standard



PLUS with LCD touch screen

Compact smoke control panels for the control of $\pm 24V$ DC and MotorLink® actuators for small and medium-sized areas e.g. stairwells, sports halls and restaurants.

The smoke control panels are supplied in two versions, 10A or 20A with up to 10 smoke zones / comfort groups and up to 12 inputs for keypads (can also be configured for other input functions) – the number of zones / inputs depends on the type of smoke panel.

The PLUS-version includes an easy-to-use 2½" LCD touch screen, which makes the panel easy to configure, commission and maintain – also without the need of a PC. System errors are described on screen to facilitate troubleshooting and initialisation.

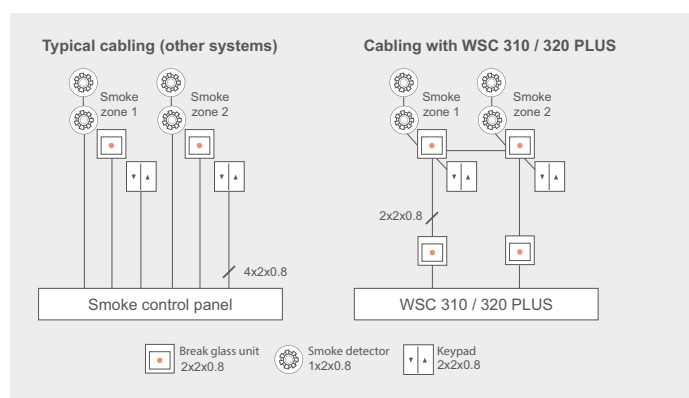


The panel can be expanded with a field bus card, so that comfort ventilation is possible via bus communication KNX, BACnet IP, BACnet MS/TP, RS485 or Modbus RTU. The PLUS panels can also be combined with NV Comfort® and NV Advance® systems. The field bus card is to be ordered separately.

By connecting PLUS panels together, they can also be used in larger buildings.

Ease of cabling

Connecting smoke detectors and comfort keypads to the break glass units and using bus technology, significantly reduces cabling.



WHY CHOOSE WSC 310 / 320 PLUS?

- Supplied with 10A or 20A
- Up to 10 smoke zones / 10 ventilation groups
- Smoke detectors, break glass units and keypads can be connected to each group
- Up to 12 inputs for keypads
- Easy and simple configuration to fulfill the individual demands of the building.
- In connection with comfort ventilation, bus communication via KNX, BACnet IP, BACnet MS/TP, RS485 or Modbus RTU is possible
- Ease of cabling
- Tested to the most recent standard, EN 12101-10

The smoke control panel gives the possibility of up to three motor speeds depending on the type of motor:

- $\pm 24V$ DC standard motor with one speed (H&S)
- MotorLink® motor with two speeds (H&S / comfort ventilation)
- MotorLink® motor and bus communication with three speeds (H&S / comfort ventilation / automatic operation)

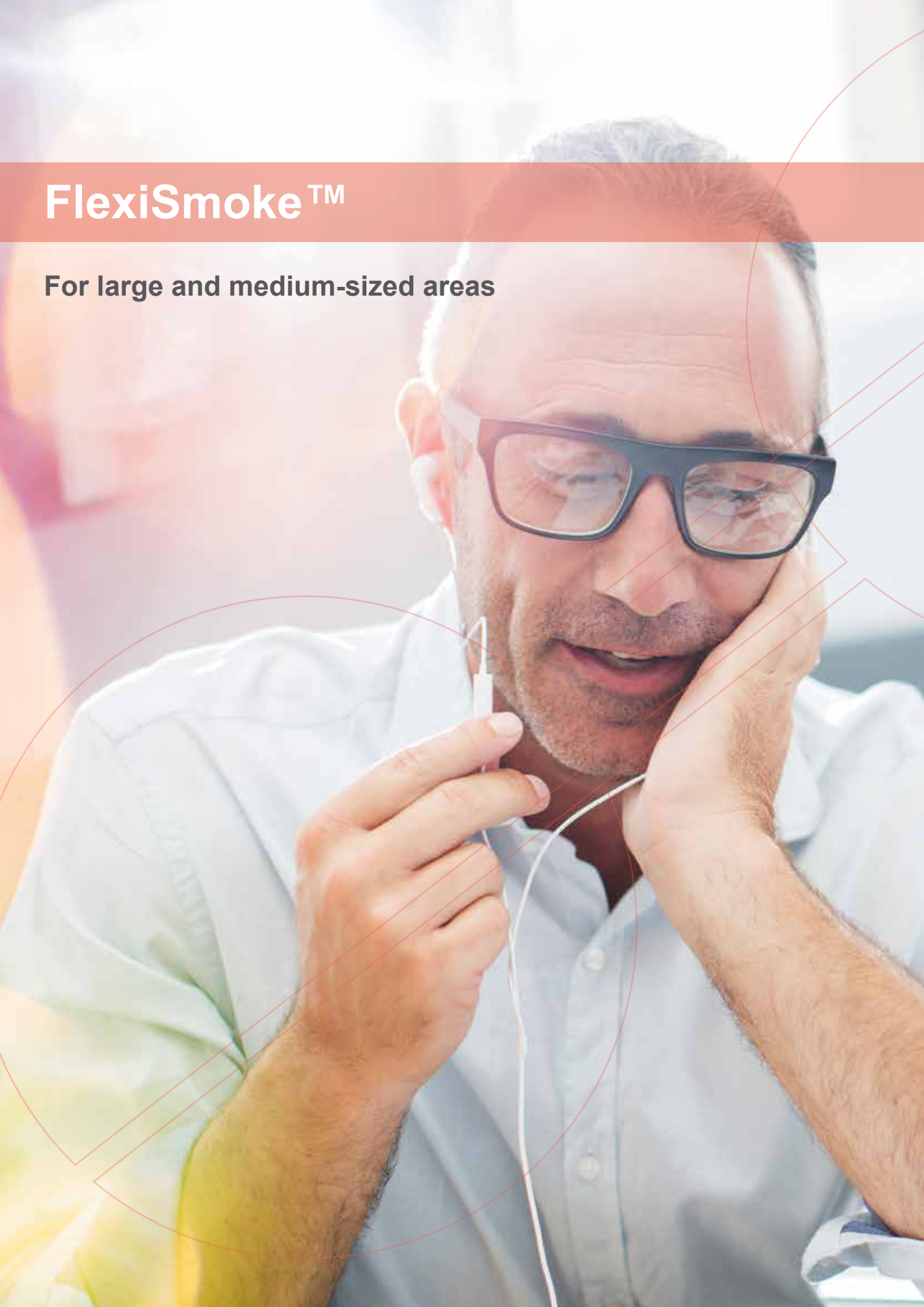


10-20A
WSC 310 / 320 Plus



FlexiSmoke™

For large and medium-sized areas



Flexible system structure

FlexiSmoke™ is a range of modular smoke control panels for the control of $\pm 24V$ DC and MotorLink® window actuators in large and medium-sized areas, e.g. shopping centres, schools and sports halls.

With the combination of several panels, FlexiSmoke™ can be used in very large buildings or areas.

Up to 39 smoke zones and comfort groups can be implemented, depending on panel variant type.

Easy initialisation

Easy-to-use 3½" LCD touch screen makes the panel easy to configure, commission and maintain – also without the need of a PC. System errors are described on screen to facilitate troubleshooting and initialisation.



The panel can be expanded with a field bus card, so that comfort ventilation is possible via bus communication KNX or BACnet IP. FlexiSmoke™ can be controlled by NV Comfort® and NV Advance® for comfort ventilation.

WHY CHOOSE FLEXISMOKE™?

- Easy cabling using single bus technology
- Bus communication via KNX or BACnet IP for comfort ventilation
- Smoke ventilation based on wind direction
- Flexible system structure
- Simple system adaptation in the event of renovation
- Configuration and troubleshooting with the integrated touch screen without the use of a PC. A PC can be connected without additional modules
- Tested to the most recent standard EN 12101-10



Structure

Sections

The FlexiSmoke™ smoke ventilation panel is available in three different sizes 20A, 40A and 60A. The smoke ventilation panel consists of 20A-sections, thus WSC 520 contains one section, WSC 540 two sections and WSC 560 three sections.

Modules

Each section contains the power supply module, the overall control module and 3 slots for expansion modules. The overall control module is available with or without field bus interface for KNX or BACnet IP.

At the 3 slots an input / output module, the $\pm 24V$ DC standard motor module or the MotorLink® motor module can be connected. The type and number of the modules are selected specifically to suit the smoke panel required function.

Smoke ventilation based on wind direction

The smoke control panel can be set so that opening and closing of windows is determined by wind direction and speed.

This means that the roof and facades can be utilised efficiently as part of the smoke ventilation strategy.



The smoke control panel gives the possibility of up to three motor speeds depending on the type of motor:

- $\pm 24V$ DC standard motor with one speed (H&S)
- MotorLink® motor with two speeds (H&S / comfort ventilation)
- MotorLink® motor and bus communication with three speeds (H&S / comfort ventilation / automatical operation)



Power supply module
WSA 5PS



Overall control module
WSA 5MC



Overall control module
WSA 5MC KNX



Input / output module
WSA 5IO



Motor module
WSA 5SM, $\pm 24V$ DC

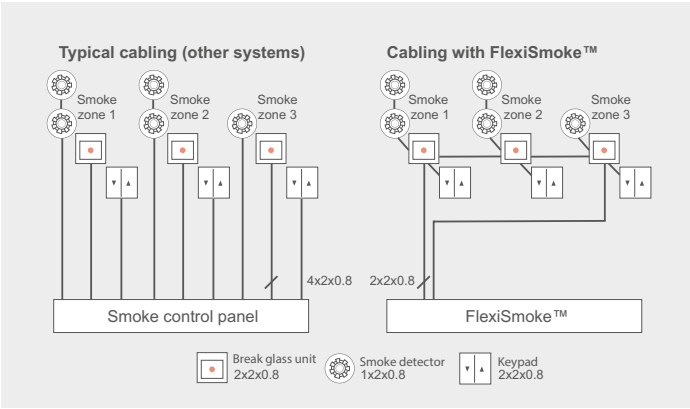


Motor module
WSA 5ML, MotorLink®

Ease of cabling

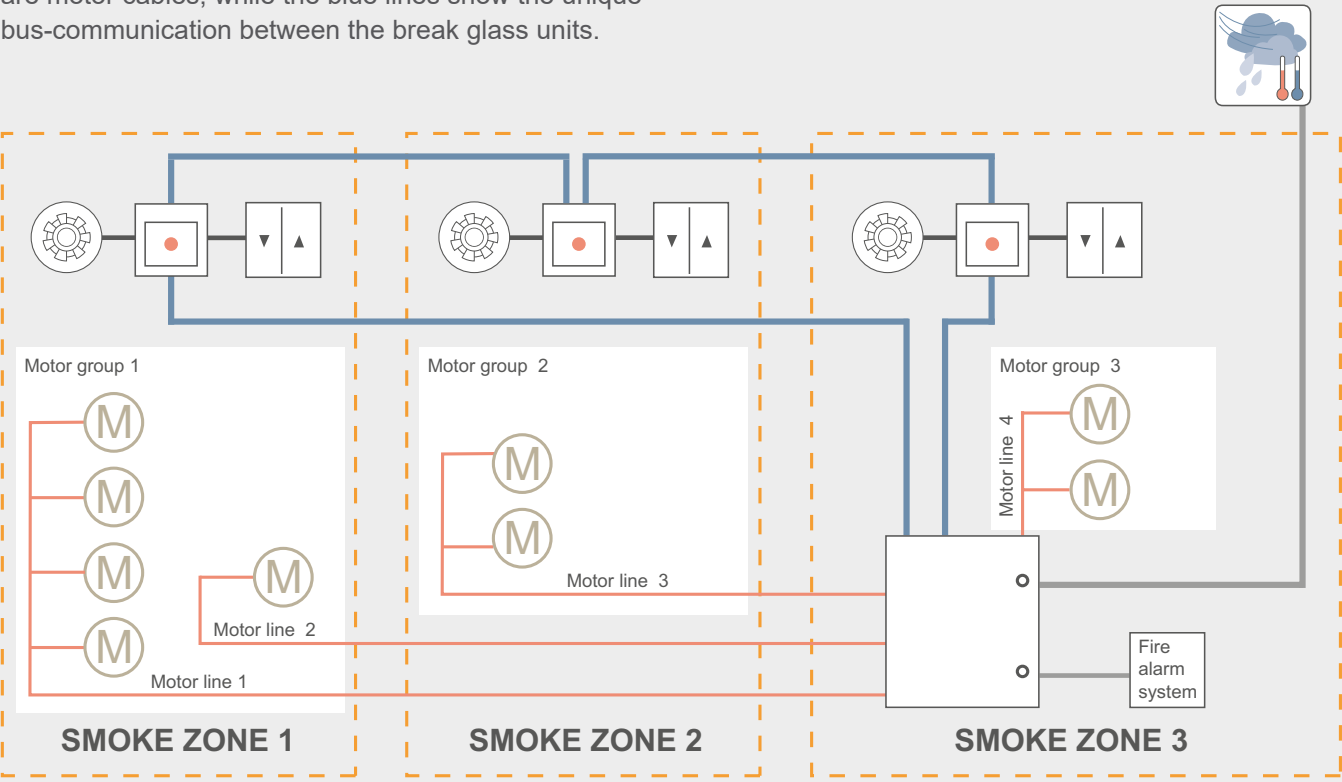
FlexiSmoke™ uses bus technology and the overall cabling for break glass units, smoke detectors and keypads is significantly reduced compared to other types of smoke panels:

- the break glass units are connected in series, therefore it is not necessary to cable from each break glass unit to the smoke ventilation panel
- keypads for ventilation and smoke detectors are connected directly to the break glass units in the smoke areas

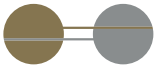


Illustrative example

FlexiSmoke™ can be connected to a number of components so that the controls can be adapted to the specific project. An example is shown here with three zones and component connections where the red lines are motor cables, while the blue lines show the unique bus-communication between the break glass units.



See symbol description on page 17



How to compose a solution for smoke ventilation

A photograph of three people (two men and one woman) leaning over a table, looking at architectural plans or documents. The man on the left is wearing a dark blue patterned shirt. The man in the center is wearing a green sweater over a plaid shirt. The woman on the right is wearing a blue top. They are in a bright room with large windows in the background. The image is overlaid with a large, faint, orange-red circular graphic element.

**Natural smoke ventilation can be installed
in the majority of buildings**

A sports hall with smoke and comfort ventilation

A sports hall usually comprises one large hall, an entrance area and a plant room. Each room constitutes an independent zone.

Zone 1: The hall

Ten motorised skylights have been installed in the roof of the large hall. If smoke develops, these will remove the smoke from the hall. Low level replacement air openings ensure the smoke is exhausted speedily.

Zone 2: Entrance area

The entrance area has two motorised facade windows and a motorised skylight as well as one break glass unit.

Zone 3: Plant room

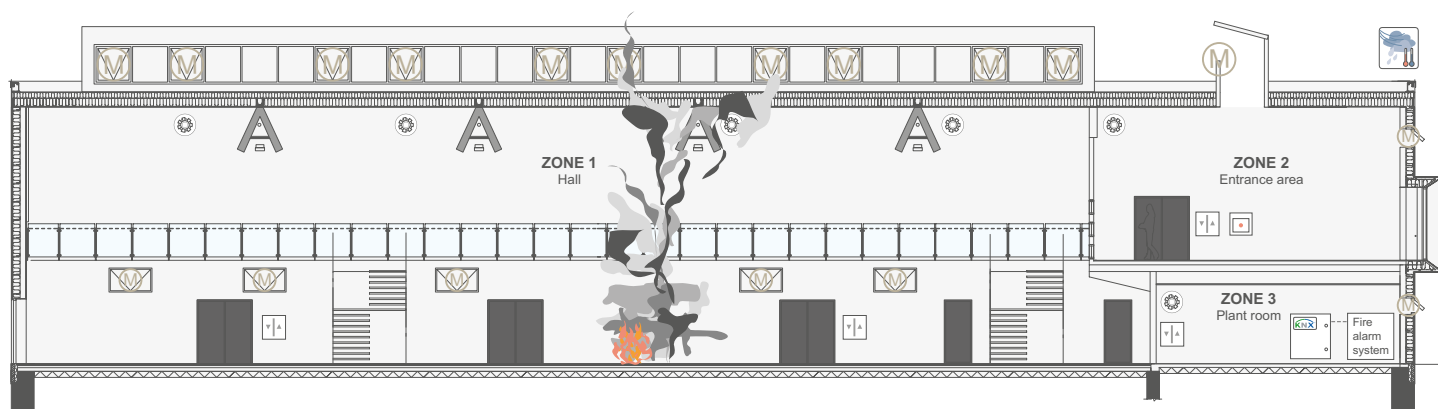
The plant room has two motorised facade windows. All products are controlled from a modular smoke control panel in the plant room, which transmits error information to an alarm system. The alarm system detects and activates the smoke ventilation system.

Each zone has at least one smoke detector and manual operation keypad.

A wind and rain sensor, which has been mounted on the roof over the entrance area, is used to close the windows when using comfort ventilation.

The following components have been used

- 1 x FlexiSmoke™ panel – WSC 540
- 1 x break glass unit – WSK 501
- 1 x actuator – WMU 885 – actuator in a CE marked EN 12101-2 roof ventilator
- 19 x actuators – WMU 836 – actuator in a CE marked EN 12101-2 facade ventilator
- 4 x keypads – WSK 100
- 1 x wind and rain sensor – WLA 330



Symbols:



Keypad



Smoke detector



Fire alarm system



Actuator



Smoke control panel



Break glass unit



Wind and rainsensor



Accessories for CompactSmoke™ and FlexiSmoke™

We supply complete smoke ventilation solutions and are able to offer all required modules and accessories

1. Smoke detectors

On the occurrence of smoke, the smoke detector sends a signal to the smoke control panel and thereby activates the smoke ventilation system.

2. Break glass units

Break glass units are available in several colours – with or without audible signal. They also provide system health monitoring and a means of resetting the panel.

3. Modules

For the single zone smoke panels we supply a wide range of modules for special functions as well as for extension and joining of smoke ventilation panels. WindowMaster also supply KNX, BACnet and Modbus modules for the WSC 3XX panels.

4. Actuators

Our actuators are available in a wide range of models and sizes and can, in most cases, be concealed in the window profile. We supply both chain and spindle actuators. Actuators used for smoke ventilation are approved according to EN 12101-2.

5. Batteries

Appropriate 12-volt back-up batteries are provided in various sizes and capacities depending on the chosen smoke control panel.

6. Keypads

A keypad on the wall enables the user to control the indoor climate manually, e.g. to open / close windows. The keypads can also be linked to other functions such as sun screening and lighting.

7. Sensors

WindowMaster supply several types of wind- / rain sensors for use in smoke and comfort ventilation. Furthermore, wind direction measurements make it possible to implement wind direction dependent smoke ventilation.

8. Accessories

WindowMaster also supply various replacement parts and accessories for the systems, e.g. lock cylinders and additional keys.





Also for comfort ventilation

WindowMaster's smoke ventilation solutions can also be combined with comfort ventilation to ensure that the building's users enjoy a comfortable indoor climate every day

The technology behind our smoke and comfort ventilation solutions is the same. This means that a smoke ventilation system can be utilized for natural ventilation to ensure a comfortable day-to-day indoor climate.

Our comfort ventilation solutions



NV Solo® is our simplest solution for indoor climate control in a single zone / room. Easy to install – easy to operate.



NV Comfort® is the solution for natural ventilation and heat control in small and medium-sized areas. The system can be extended to control sun screens, lighting and mechanical ventilation (mixed mode ventilation).



NV Advance® is our most advanced solution for the complete management of indoor climate in large areas. The system can control sun screens, lighting, heating, and mechanical ventilation (mixed mode ventilation).



Checklist

What are the main considerations when choosing the right smoke ventilation solution? This list helps you on your way. You are, of course, always welcome to contact us – we are happy to help

What are the regulatory solution requirements?

Remember to find out about smoke ventilation legislation related to your building type. Please note that the same legislation does not necessarily apply to new-builds and renovation projects.

What are the parameters that need to be taken into consideration when choosing a smoke ventilation solution?

The configuration of the final solution depends on the size of the building, the number of smoke vents, the window actuator ampage requirements and the number of smoke zones / rooms.

How large should the opening area be?

The required opening area depends on the size of the building and usage category, which can often be found in the fire strategy report. The opening area that can be achieved depends on the size of the vents, the stroke of the actuators and the overall number of openings in the building. The aerodynamic free opening area is shown on the smoke vent's CE certificate.

What actuator should you choose for the window used for replacement air?

The type of smoke vents (whether they are top-hung, bottom-hung, side-hung, open outwards or inwards, etc.), brand / profile range, frame dimensions, frame weight and pitch of roof for skylights affect the choice of suitable actuator. Actuators used for smoke ventilation should be approved according to EN 12101-2 and should form part of a CE marked smoke ventilator.

What type of smoke control panel should you choose and how many amps are required?

The choice of smoke control panel depends on the specific requirements of your building. For example, if you require several smoke ventilation groups, you should choose FlexiSmoke™, which is a modular panel, or connect several CompactSmoke™ panels in a master / slave connection.

How should the smoke control panel be activated?

Activation of the automatic smoke ventilation system (the smoke control panel) can be done with a signal from a separate alarm system, smoke detectors and / or manual break glass units.

Are accessories needed, i.e. for comfort ventilation?

If the system is to be used in a combination of smoke and comfort ventilation, you may need accessories such as room sensors (temperature, CO₂, humidity), and keypads.



Service and maintenance

Regular inspection of smoke ventilation systems is a legal requirement. You must also have the system inspected and tested at fixed intervals.

WindowMaster offer maintenance agreements for both our own and other types of smoke ventilation systems. We inspect the complete system in accordance with the applicable legislation. Maintenance of the smoke ventilation system includes checking windows, window actuators and emergency power and checking that triggering and control functions are fully functional.

Please contact us for further information about how we are able to tailor a service agreement to suit your requirements.

§ Legislation

It is important to note that different countries and governing authorities have differing requirements for smoke ventilation in various building types. These requirements depend on whether the building is a new-build or renovation and apply to product choice, installation and subsequent inspection and testing. WindowMaster has comprehensive experience in providing expert advice in the design, installation and servicing of smoke ventilation solutions. We have worked with a wide range of window and facade manufacturers to develop, test and certify solutions that meet the latest requirements laid down in European standard EN 12101-2.

Selected references



New Street Square

Client : Land Securities
Consulting Engineers : Cundall
M&E Contractor : N G Bailey

A 730,000 sq ft (16.000m²) mixed use scheme to replace a cluster of post-war offices with four contemporary buildings. Smoke ventilation system using cross ventilation. WindowMaster supplied compact smoke panels to control over 2,000 actuators installed within the facade windows.



West Quay, Newhaven

Developer : Oakdene Homes plc
Architect : Morgan Carn Partnership

A £15M mixed development comprising of 105 luxury flats and 6 commercial units all looking across an existing natural marina. WindowMaster supplied actuators for the facade windows and modular smoke panels to provide the life safety smoke ventilation system for each individual floor in the residential blocks.



Radisson Blu Hotel, East Midlands Airport

Contractor : Bowmer & Kirkland
Architect : Leach Rhodes Walker
Roof domes : Lareine Engineering

WindowMaster supplied the compact control panels for the smoke ventilation system, controlling the automatic roof domes from Lareine Engineering.



Field's, shopping centre

Builder : Steen og Strøm Danmark
Architect : CF Møller, Evenden og Haskolls

WindowMaster supplied actuators for the windows placed over the shopping aisles and smoke panels to provide the life safety smoke ventilation system.



Glossary of technical terms

ASV system

Automatic smoke ventilation system. The purpose of which is to remove smoke and heat from a building. ASV includes smoke vents, smoke panels, automatic break glass units and smoke detectors.

Fire alarm system

Fire or Smoke detection system, which is used to activate the installed automatic smoke ventilation system. It is often required that the alarm system provides a direct signal to the rescue service.

Aerodynamic free opening area

The total effective area of the openings which exhaust hot smoke. This area must be shown on the CE certificate on the smoke vent or calculated in line with local legislation or guidance.

EN 12101-2

Standard used for type testing and CE certification of smoke vents. To comply with the fire standard EN 12101-2 a smoke vent should carry a CE certification which means that a window and actuator have been tested and certified together and purchased as a complete unit.

Replacement air

Air supplied into the building via low level openings should be activated simultaneously with the high level smoke vents. Openings for replacement air do not require CE certification. The volume of replacement air should be, as a minimum, equal to the volume of exhausted smoke.

Passive smoke ventilation

Smoke ventilation based on thermal buoyancy. This means that the hot smoke is ventilated away through high level openings (smoke vents) in the building.

Mechanical smoke ventilation

Smoke ventilation based on forced air movement using mechanical fans to force smoke and heat out of a building, e.g. via the duct system.

Smoke vent

Smoke ventilation opening located in or near the roof or high level facade to remove smoke in conjunction with passive smoke ventilation.

Smoke zone

A smoke section – a room or part of a room which is partitioned with smoke screens and/or walls.



WindowMaster aspires to protect people and the environment by creating a healthy and safe indoor climate, automatically ventilating spaces with fresh air through facade and roof windows in buildings. We offer the construction industry foresighted, flexible and intelligent window actuators and control systems for natural ventilation, mixed mode ventilation, and smoke ventilation – of the highest quality.

WindowMaster employs around 135 highly experienced cleantech specialists in Denmark, Norway, Germany, United Kingdom, Ireland, Switzerland, and the United States of America. In addition, we work with a vast network of certified partners. With our extensive expertise built up since 1990, WindowMaster is ready to help the construction industry meet its green obligations and achieve their architectural and technical ambitions.

WindowMaster has more than 20 years experience of supplying smoke ventilation solutions that use natural ventilation to ensure efficient smoke and heat exhaust in the event of fire.

FlexiSmoke™ and CompactSmoke™, our two ranges of smoke control panels, can be combined with state-of-the-art technology and a wide range of window actuators in tailored solutions for any kind of building.

WindowMaster's smoke ventilation solutions can also be combined with comfort ventilation to ensure that the building's users enjoy a comfortable indoor climate every day.

windowmaster.com