



**SYSTEM CONFIGURATOR  
AT [WWW.MERCOR.COM.PL](http://WWW.MERCOR.COM.PL)**



## **mcr EXi**

positive-pressure smoke prevention system  
for vertical escape routes



## APPLICATION

Protection against smoke-logging in vertical escape routes is an important feature of the overall fire protection system in buildings. Properly secured staircases are necessary for the safe and efficient evacuation of fire-exposed areas; they facilitate fire fighting efforts and help to mitigate fire damage caused by smoke, heat and the products of thermal decomposition.

Mercor's **mcr EXi positive-pressure smoke prevention system** for installation in staircases helps to ensure the safety of building users. The system consists of dedicated units that together prevent smoke from spreading into the zone protected by a positive pressure differential.

## BENEFITS

- ▶ a wide range of adjustable parameters allows you to customize the system to the actual conditions in the building (adjustable air supply units and air bleed dampers)
- ▶ for the most part mechanically-operated, the system is unaffected by electronic component failures
- ▶ mechanical air bleed dampers provide a rapid response to changes in the fan output level
- ▶ easy to operate – simple design principles combined with uncomplicated selection rules

The mcr EXi system allows investors:

- ▶ to reduce the fire resistance rating of the building
- ▶ to accommodate larger acceptable fire zones
- ▶ to extend escape routes

## OPERATION

The system operations are regulated by the mcr Omega certified control unit.

The mcr EXi positive-pressure system is activated by the alarm smoke vent button or an external trigger device (e.g. signal from the fire detection and fire alarm system).

The signal from the fire detection and alarm system in the building activates the following properly adjusted air supply units: **GZN (top air supply unit)** and/or **DZN (bottom air supply unit)**, installed at specific points in the staircase area. After a few seconds, the staircase is filled with air, resulting in differential pressure between the staircase and the corridor. As a result of the positive pressure of 20-80 Pa in the staircase area, the force required to open the emergency door is not more than 100 N. With an opened emergency door, the excess air from the staircase prevents smoke from spreading into the escape route.

The required air flow rate can be achieved by providing exhaust ventilation on each floor where an air vent is installed. The recommended area of opening should be at least 0.3 m<sup>2</sup> (exhaust ventilation can be achieved by means of e.g. the mcr OSO window smoke exhaust system or dedicated air bleed/smoke extraction ducts with mcr FID or mcr WIP fire dampers).

The pressure level is regulated automatically by the system of suitably located air bleed units: **GZU (top air bleed unit)** and/or **DZU (bottom air bleed unit)**.

## SELECTION

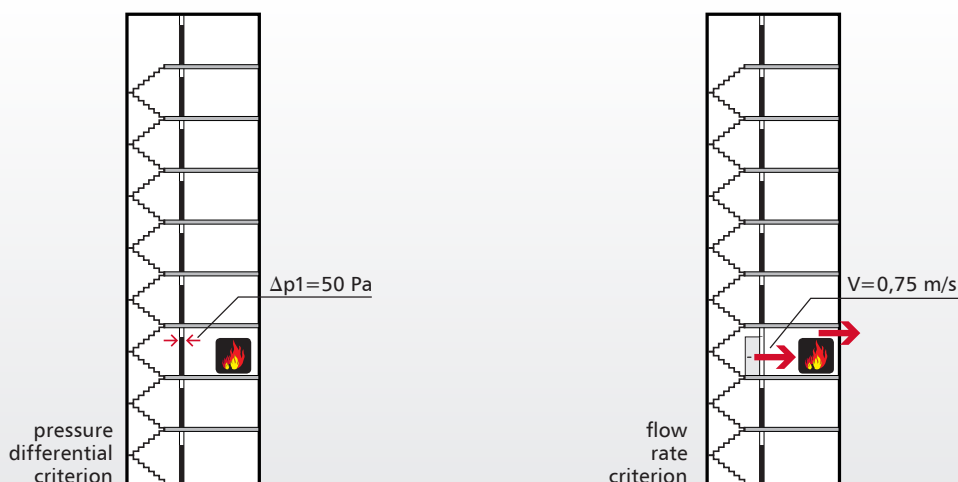
The system was designed in accordance with the requirements laid down in EN 12101-6. This standard refers, among other criteria, to the selection of pressure differential systems based on the intended use of the building and the fire escape plan. When designing a building, special attention should be paid to choosing an appropriate pressure differential system, as the fire and smoke control criteria during the acceptance procedure depend on the system fire rating.

If the intended use of the building is known, a class A to E smoke control system can be chosen.

With our specially designed system configurator, you can easily identify appropriate units to assemble your own fully customized smoke control system. Now available at [www.mercor.com.pl](http://www.mercor.com.pl).

### Class A System – evacuation

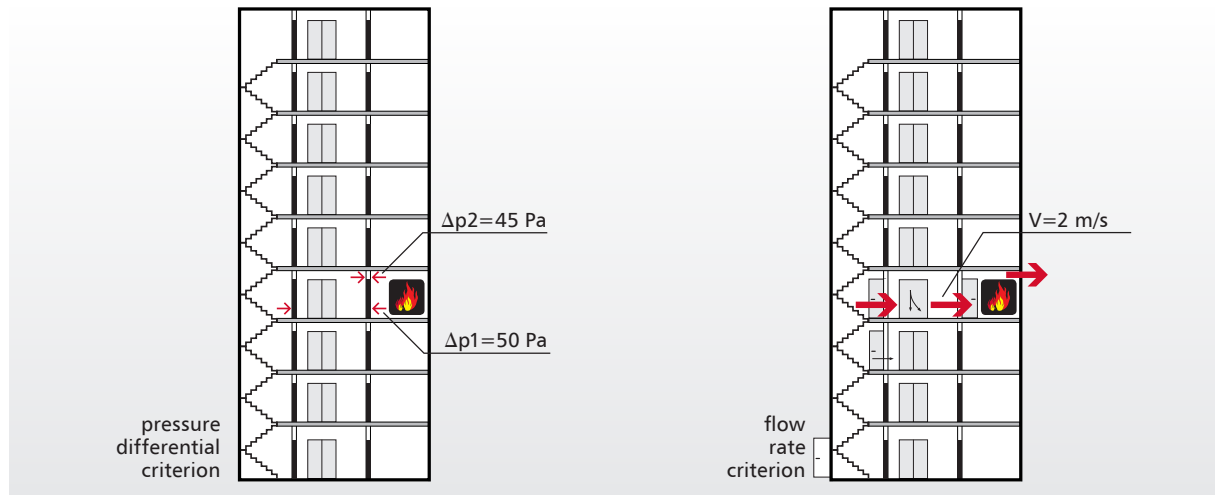
**Objective:** Building users will not be evacuated until there is an immediate risk of fire. The building is divided into compartments so as to ensure the safety of users in non-exposed areas. After the system is activated, only one door will be opened in the staircase, with the other doors most likely closed.





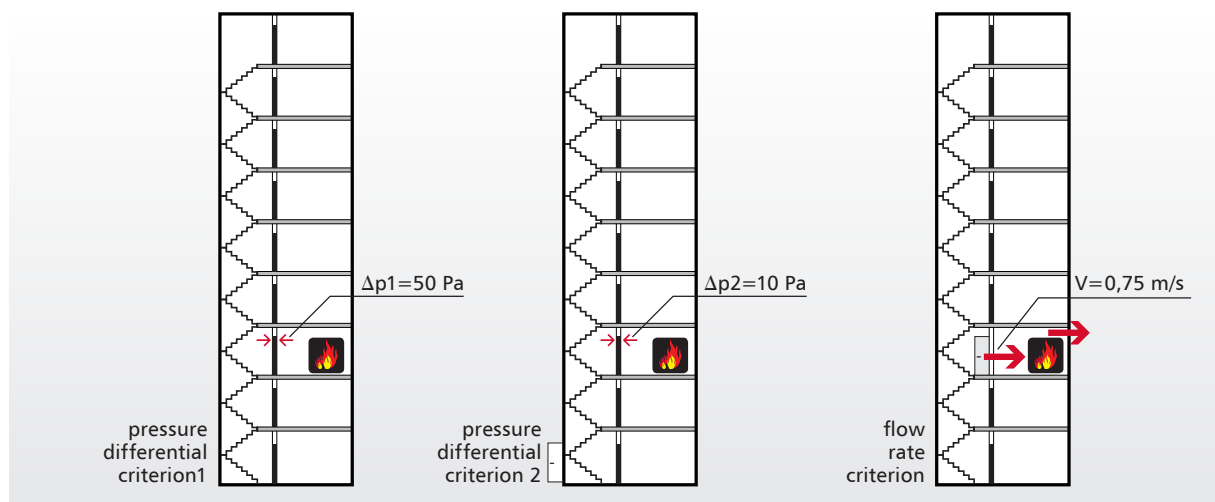
### Class B System – evacuation and fire fighting operations in escape routes

**Objective:** Protection against smoke-logging in the lift shafts and staircases during the evacuation and fire fighting operations. It is often impossible to close the door so as not to interrupt rescue operations.



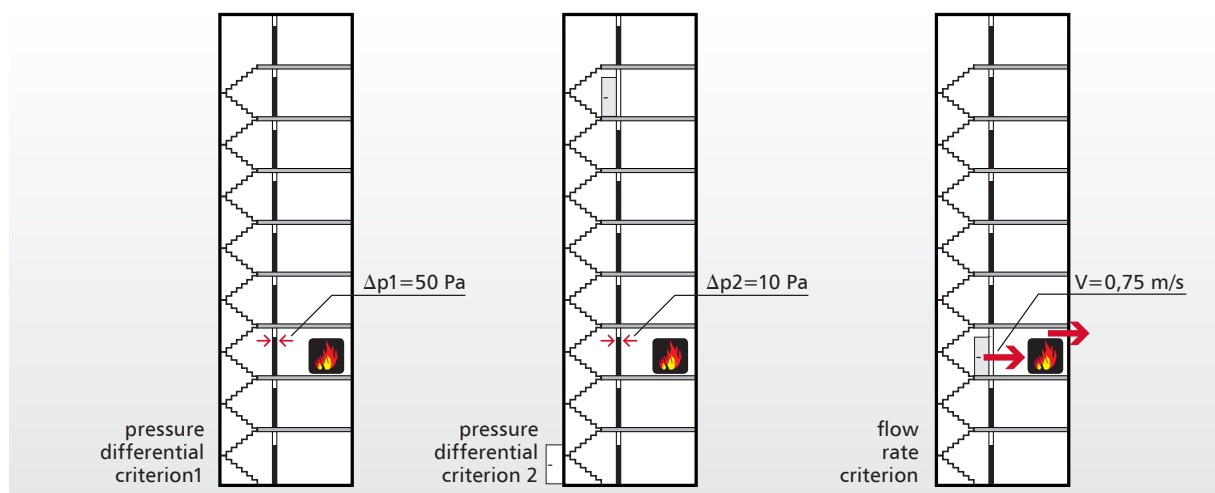
### Class C System – simultaneous evacuation

**Objective:** All building users are evacuated after the fire alarm is activated – simultaneous evacuation.



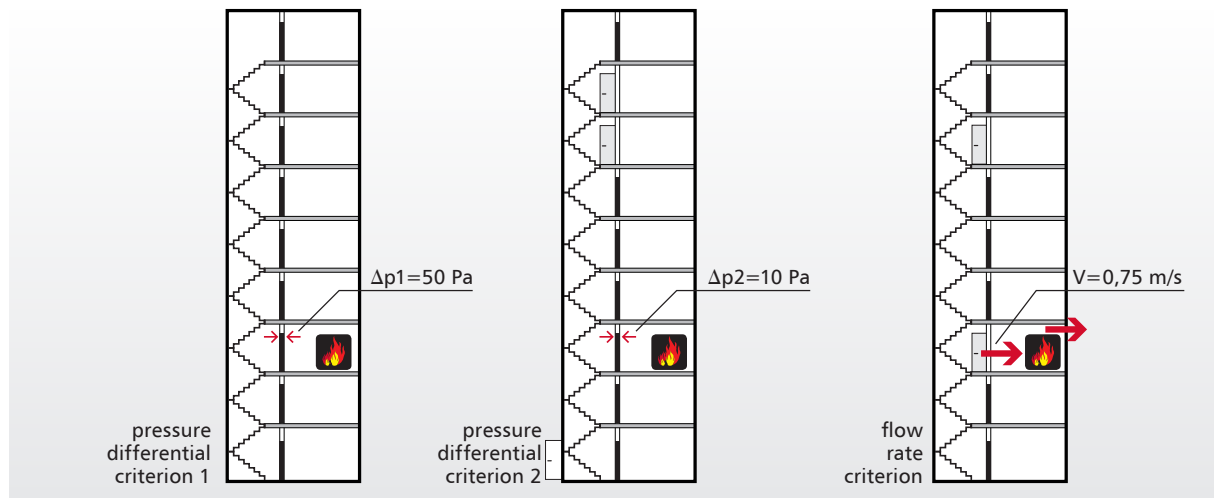
### Class D System – evacuation of building users in hotels, guest houses, hospitals, etc.

**Objective:** Building users are evacuated after the fire alarm is activated, and the evacuation takes longer than expected for physically fit and non-sleeping users.



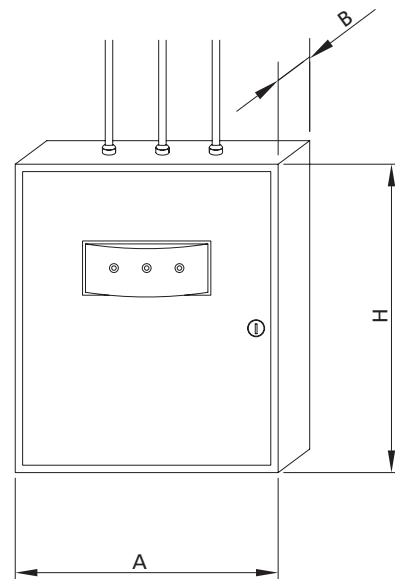
## Class E System – non-simultaneous evacuation

**Objective:** Building users are evacuated on a group-by-group basis after the fire alarm is activated, and the duration of the evacuation operation varies with the evacuation scenario.



## COMPONENTS

### MCR OMEGA CONTROL AND POWER SUPPLY UNIT

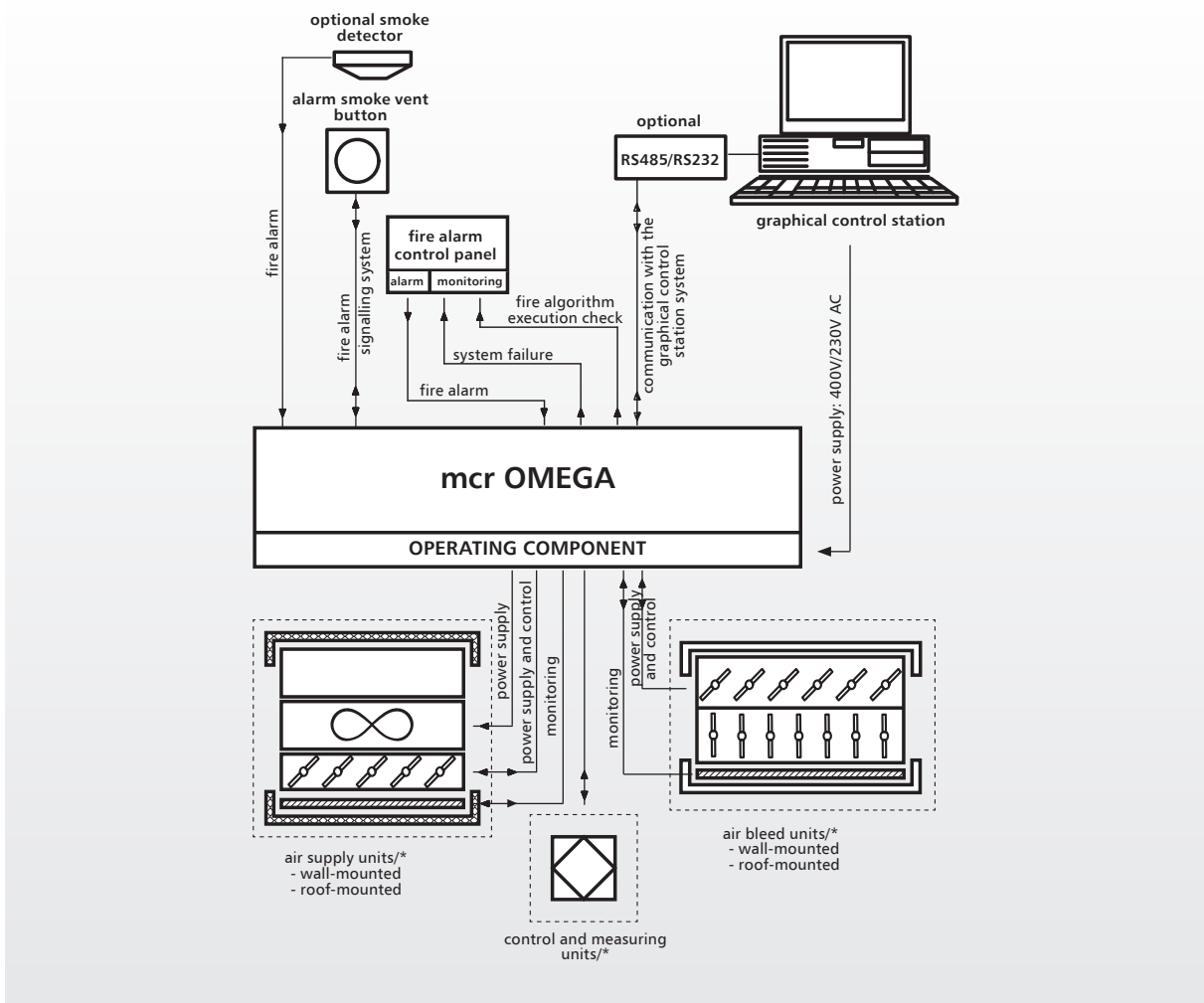


type CZS	dimensions AxHxB [mm]	type CZS	dimensions AxHxB [mm]
mcr Omega 2100c-1	400x600x250	mcr Omega 2100c-4	1000x1000x300
mcr Omega 2100c-2	600x800x250	mcr Omega 2100c-5	1000x1200x300
mcr Omega 2100c-3	800x1000x300	mcr Omega 2100c-6	1200x1400x300

#### Intended use

The C2100C mcr Omega unit is the key component of the mcr EXi positive-pressure smoke control system. It is used for controlling, power feeding, monitoring and visualizing the functional condition of the other system components. It may also be used as a fire partition controller.

Typical configuration of the electronic control system based on the mcr Omega unit

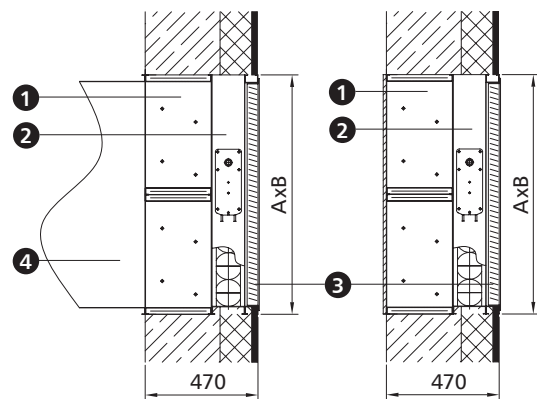


\*/ Location and amount varies with the air demand for the system

The configuration and amount of individual system components depend on the requirements, design and location of the protected staircase, lift shaft, etc.

## AIR BLEED UNITS

GZU/S and DZU/S - top and bottom air bleed units (wall-mounted)  
 GZU/K and DZU/K - top and bottom air bleed units (duct-mounted)



- 1 - damper
- 2 - air regulation damper
- 3 - air intake/exhaust unit
- 4 - ventilating duct

type DZU/S, DZU/K, GZU/S, GZU/K	dimensions AxB [mm]	mounting hole CxD [mm]
450x450	450x450	480x480
550x550	550x550	580x580
650x650	650x650	680x680
800x800	800x800	830x830

DZU/S units (bottom air bleed units – wall-mounted) are used if a bottom air bleed unit is to be installed. GZU/S units (top air bleed units – wall-mounted) are used in addition to GZU/D units if roof-mounted units are insufficient to achieve the total air extraction.

Wall-mounted dampers are used in both cases.

#### Intended use

The dampers are used as a so-called safety valve to maintain an appropriate pressure differential in front of and behind the partition by preventing pressure increase (e.g. in the protected staircase area) above the set value.

#### Design

The units are composed of an enclosure made of galvanized steel with a partition in the form of moveable blades inside. The individual blades of an appropriate shape are made of galvanized steel. As a result of the multileaf design, the moveable blades do not project beyond the enclosure of the damper. For greater integrity of the system, a number of seals are installed across the dampers.

The enclosure of the damper is provided with steel bumpers to limit the opening angle of the blades.

The units are available in all RAL colours (default colour option: RAL 9006).

#### Installation

The units are designed for both ducted and wall mounting. Wall-mounted units are provided with a wider sealing flange so that the damper can be installed to the face of the wall with an opening. The design and construction of the device provides a response time <3 s, in accordance with EN 12101-6.

#### Operation

The units are usually closed (during normal service conditions). When the pressure differential exceeds the threshold value (e.g. 50 Pa, set by the manufacturer), the blades of the damper open rapidly and restore normal pressure. After normal pressure is restored in the protected zone, the weights cause the blades to return automatically to their stand-by position. The rapid response of the device to changing pressure provides an appropriate air flow rate.

#### Technical specifications

Series of available damper types:

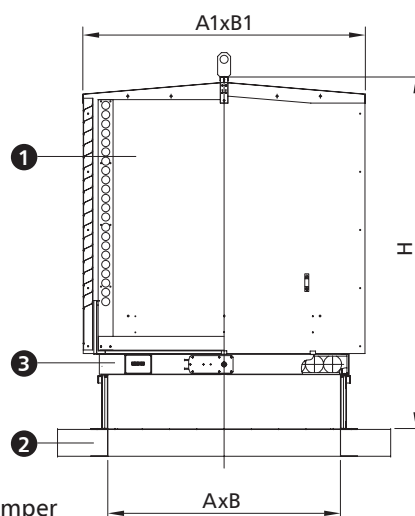
height [H mm]	width B [mm]											
	450	550	650	800	900	1100	1300	1350	1600	1650	1800	1950
450	1(450)				2(450)			3(450)			4(450)	
550		1(550)				2(550)				3(550)		
650			1(650)				2(650)					3(650)
800				1(800)					2(800)			
900	2(450)				4(450)			6(450)			8(450)	
1100		2(550)				4(550)				6(550)		
1300			2(650)				4(650)					6(650)
1350	3(450)				6(450)			9(450)			12(450)	
1600				2(800)					4(800)			
1650		3(550)				6(550)				9(550)		
1800	4(450)				8(450)			12(450)			16(450)	
1950			3(650)				6(650)					9(650)

Type designation: x(yyy)  
x - number of dampers in one system  
(yyy) - dimensions of dampers in one system

Note:  
H and B are gross dimensions

If larger dampers are required (due to a greater air flow rate), the system is supplied as a multiple unit (bank of dampers). The bank of dampers is composed of an appropriate number of single standard dampers, flat bars and connecting components.

## GZU/D - top air bleed unit (roof-mounted)



- 1 - damper
- 2 - base
- 3 - air regulation damper

type GZU/D	dimensions A1xB1xH [mm]	mounting hole AxB [mm]	weight [kg]
800x800	117x1080x1525	800x800	129
1300x1300	1580x1490x1975	1300x1300	315

The standard GZU/D air bleed unit consists of air-bleed/positive-pressure dampers for roof mounting.

### Intended use

The dampers are used as a so-called safety valve to maintain an appropriate pressure differential in front of and behind the partition by preventing pressure increase (e.g. in the protected staircase area) above the set value.

### Design

Standard subunits of the dampers include: cut-off partitions, air exhaust subunits, frame and damper weights. Roof-mounted damper systems come in two size options with standard dimensions of 800 x 800 mm and 1300 x 1300 mm. They are available in all RAL colours (default colour option: RAL 9006).

The system features multileaf air regulation dampers used to prevent free air flow when the units are not in operation.

The units can be provided with optional de-icing systems.

### Installation

The roof-mounted damper system can be installed on a specially designed base or mounted on the roof slope via insulated roof mounts, provided by Mercor on an individual basis, according to the type of the roof on which the system is to be installed. The design and construction of the device provides a response time <3 s, in accordance with EN 12101-6.

### Operation

The dampers are opened due to pressure increase in the staircase area. If the pressure differential exceeds the threshold value (e.g. 50 Pa, set by the manufacturer), the damper blades open rapidly, thus restoring normal pressure. After normal pressure is restored in the protected zone, the weights cause the blades to return automatically to the closed position.

The rapid response of the device to changing pressure provides an appropriate air flow rate.



## AIR SUPPLY UNITS



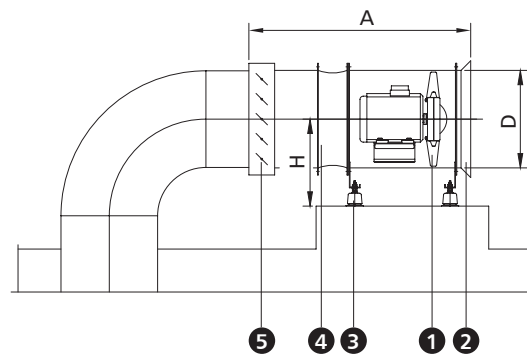
The air supply units in the mcr EXi system are composed of axial-flow fans and additionally provided units. Axial-flow fans provide high efficiency at relatively low pressure levels. They are compatible with air bleed dampers. Axial-flow fans are used to provide sufficient air flow to meet the requirements prescribed in the standard.

The fans can be installed inside or outside, with the motor in a horizontal position, on mounting stands.

They are available in all RAL colours (default colour option: RAL 9006).

**GZN/D or GZN/DR - top air supply unit (can be provided with an optional stand-by fan).**

The figure below shows the typical configuration of the air supply system used to provide the required air flow rate. It is usually installed on the roof of the building by combining a standard unit with the other system components.

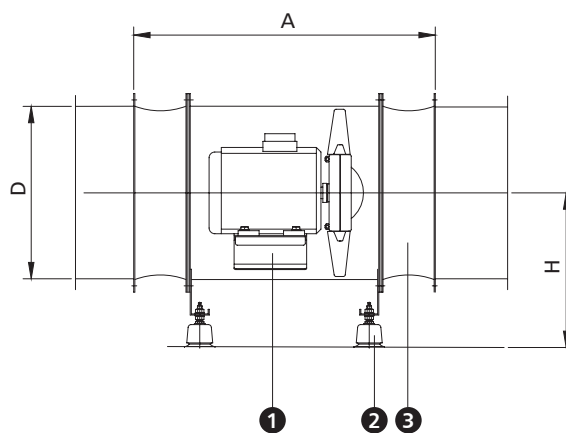


type GZN/D	dimensions ~AxHxD [mm]
450	1400x400x450
630	1700x510x630
710	1900x560x710
800	1900x610x800

- 1 - fan
- 2 - conical inlet nozzle
- 3 - vibration isolator
- 4 - flexible connection
- 5 - air regulation damper

### DZN/K - bottom air supply unit (duct-mounted)

DZN/K is used as a bottom air supply unit. DZN/K comes in five options which must be provided with complete connecting installation.

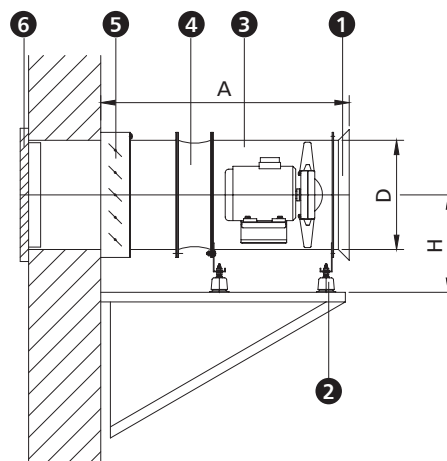


type DZN/K	dimensions ~AxHxD [mm]
450	800x400x450
630	1000x510x630
710	1150x560x710
800	1150x610x800

- 1 - fan
- 2 - vibration isolator
- 3 - flexible connection

### GZN/S and DZN/S - top and bottom air supply units (wall-mounted)

If duct-mounted units cannot be used to provide the required air supply, wall-mounted units should be installed. The units can be installed symmetrically inside or outside the room.



type GZN/S, DZN/S	dimensions ~AxHxD [mm]
450	1400x400x450
630	1700x510x630
710	1900x560x710
800	1900x610x800

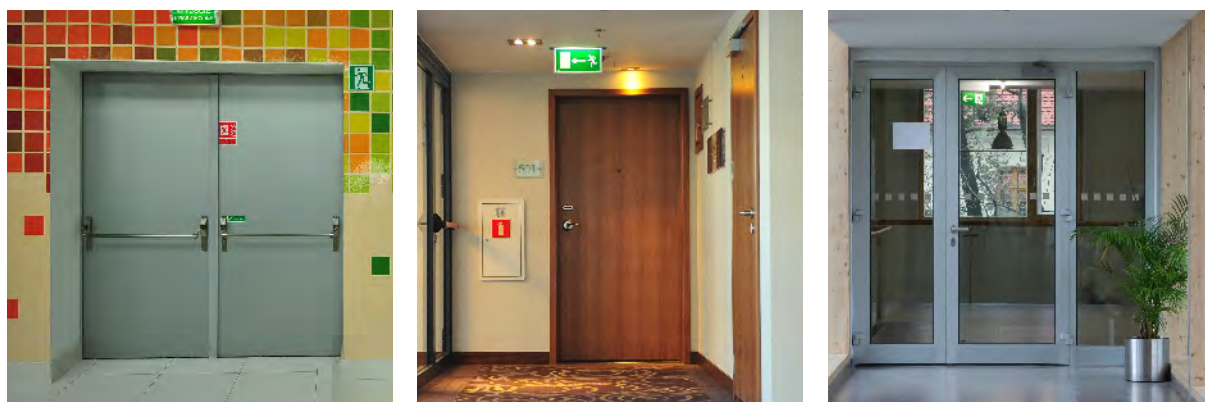
- 1 - conical inlet nozzle
- 2 - vibration isolator
- 3 - fan
- 4 - flexible connection
- 5 - air regulation damper
- 6 - grill/air intake unit

## ADDITIONAL COMPONENTS

For proper operation of the mcr EXi system, it is important to provide appropriate partitions in the positive-pressure area. The fire door should comply with the appropriate fire resistance and air-tightness requirements to minimize smoke-logging of the area not protected by positive pressure.

As a manufacturer of fire protection systems, Mercor offers a wide range of doors to protect escape routes (options vary according to the intended use and type of building):

- ▶ mcr ALPE steel fire door
- ▶ mcr DREW PLUS wooden fire door
- ▶ mcr PROFILE ISO profiled fire door and partition



In addition to the partitions, it is also essential to provide mcr Isotrans transfer grating with a fire resistance rating corresponding to that of the partition, as well as mcr WIP multileaf dampers used to transfer air in fire lobbies.

The essential components of the mcr EXi system:



## FIRE PROTECTION SYSTEMS

- ▶ fireproof partitions
- ▶ smoke and heat exhaust systems
- ▶ fire ventilation systems
- ▶ fire protection of building structures



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