2022

Technical catalogue

Control systems

Smoke exhaust, heat removal and skylight systems
Technical Catalogue 2022

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CONTROL SYSTEMS | Table of contents

Technical catalogue

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Dear Clients,

We are pleased to present to you our technical catalogue for smoke exhaust, heat removal and skylight systems. This publication presents in detail „MERCOR" S.A. products, starting from smoke vents and skylights, through smoke curtains, new generation roof hatches, all the way to the comprehensive review of our control systems. We believe the form in which we present our offer facilitates finding all the necessary information on the individual product series, their components, as well as detailed specifications for the elements of each product offered.

Every merchandise delivered from „MERCOR" S.A. to the Client is meticulously controlled in accordance with the highest quality assurance standards, and undergoes a number of approval tests. We take pride in providing safety through our business.

We invite you to see the full extent of our offer.

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1.| General description

» Smoke exhaust control systems

Smoke exhaust control systems are dedicated to smoke vents, but may also control other devices, such as: smoke exhaust louvered vents, automatic smoke curtains, or smoke exhaust and air inlet windows.

The choice of control type depends on the function of the protected building, the type of other fire safety elemets with which the natural smoke exhaust control system is to work, financial expectations of investor, and other requirements the user may have.

» Pneumatic smoke exhaust control system

Industrial and warehouse facilities. Its' biggest advantage is the simplicity of the design and execution, reliability of operation, and the attractive price. It is most often seen in co-operation with sprinklers, where the natural smoke exhaust system is activated through thermal fuses calibrated to appropriate temperature, in relation to the sprinkler system.

The system is supplied from cartridges containing compressed CO_2. Installations are most often copper pipe, with compression fittings used for joining. The system may be fixed to structural elements, eliminating the need of introducing additional installation channels. Manual activation of the smoke exhaust system is operated by the lever in alarm boxes. Pneumatic actuators feature higher operating parameters than electric actuators. The greater push and pull force of the pneumatic actuators' piston rod, and the shorter time of work cycle are the parameters that make this type of control preferable for vents of bigger dimensions.

In buildings with compressed air systems, it is worth to consider using it as a supply source for vents used for ventilation purpose. Smoke exhaust vents with additional ventilation function greatly improve the comfort of using the hall, at a relatively minor increase of costs. It is possible to integrate weather automatics with the control system, through additional electric valves installed in ventilation boxes.

» Smoke exhaust electric control system

Natural smoke exhaust systems with electric control are usually designed for staircases, low and medium-high buildings, and in evacuation routes, such as corridors between offices, passages and atriums in malls. They are used less often in large-area halls, due to high costs.

Smoke exhaust vents may be opened manually, e.g. by pressing smoke exhaust alarm button, automatically - through smoke detectors, or remotely - through smoke detection system. In such case, the system is starting to work in the initial fire phase, improving evacuation conditions of building users, or - with more sophisticated control systems - the smoke exhaust scenario may be adapted to changing fire conditions.

A frequent addition to the vents control system are buttons for manual activation of natural ventilation. The ventilation system may be equipped with a weather monitoring unit with wind-rain sensors, allowing automatic closing of vents in case of adverse weather conditions.

1.1.| System description

Smoke vents with pneumatic smoke exhaust control system, of spot type, or vents installed in continuous rooflights are mainly used in large-area, single-storey buildings, such as storage halls, industrial halls, industrial-storage halls or shopping malls.

Components of pneumatic smoke exhaust control system:
» mcr PROLIGHT smoke vent equipped with: pneumatic actuator and thermal valve with thermal fuse (alcohol ampule) and CO_2 cartridge;
» alarm boxes with CO2 cartridges: alarm opening manually and through electric signal (24 V; 0.3A);
» pneumatic smoke exhaust installation made of copper pipe;

Pneumatic smoke exhaust control system may be activated:
» automatically – after detecting temperature increase by thermal valves at 68/93/110/141°C, installed in vents.
» automatically (remotely) – through 24 V- signal; 0.3A, e.g. from fire signaling central unit (as option, after connection)
» manually – by operator, using CO_2 alarm box.

The main advantages of pneumatic control system of vents are: easy installation, high reliability, lower price in comparison with electric control systems.

1.2 | Flow controller with thermal fuse (thermal valve)

Flow controller with thermal fuse, also called thermal valve is used for supplying pneumatic smoke exhaust actuator from its integrated CO_2 cartridge or CO_2 installation. The releasing of CO_2 cartridge installed in the regulator is performed automatically after exceeding the temperature of thermal fuse (alcohol ampule) - its breakage causes the release of the needle and punching the CO_2 cartridge protection. The released gas is directed to pneumatic smoke exhaust actuator, causing the opening of the vent leaf.

Specific features of thermal valves:
» options:
-TAVE/TAG WV – opening only
-TAVZ/TAG W – opening and closing
» disposable CO_2 cartridge with 1/2" UN threaded connection,
» alcohol ampules for trigger temperatures: 68°C, 93°C, 110°C, 141°C,
» maximum working pressure: 6 MPa,
» for needle tensioning and ampule replacement in TAVE/TAVZ thermal fuses any tools are required.

TAVE / TAG WV type
» smoke exhaust function: manual and remote vent opening (opening only),
» thermal release valve adapted to operation with an alarm box equipped only with manual emergency opening function,
» may be used for single and triple pipe installations,
» 2 x 1/8" connectors,
» integrated initial valve for deaeration of the system or for connecting other control devices (e.g. alarm box or
» ventilation box),
» optional remote activation through electric or pneumatic signal, allowing co-operation with other control systems, e.g. a fire alarm signalling system.

TAVZ / TAG WV type
» smoke exhaust function: manual and remote vent opening and closing (opening, and possible remote closing),
» thermal release valve adapted to operation with an alarm box equipped only with manual emergency opening function,
» may be used for double and four-pipe installations,
» 4 x 1/8" connections,
» integrated initial valve for deaeration of the system or for connecting other control devices (e.g. alarm box or
» ventilation box),
» optional remote activation through electric or pneumatic signal, allowing co-operation with other control systems, e.g. a fire alarm signalling system.

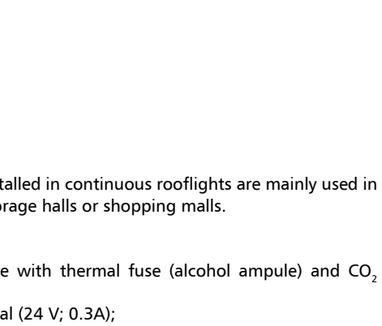


Fig. 1 TAVE thermal valve

Fig. 2 TAVZ thermal valve

1.3 | Pneumatic actuator

Fig. 3 Pneumatic actuator

Pneumatic actuator is used for opening the vents' leafs for ventilation and/or smoke exhaust function:
» double action pneumatic actuator (opening/closing),
» body of anodised aluminium,
» piston rod of stainless steel with anti-dust protection,
» recommended working pressure: 0.6 ÷ 1.0 MPa,
» maximum static working pressure: 6.0 MPa,
» locking in fully extended position – other executions optional,
» maximum axial force transferred by lock: 8000 N,
» manual lock releasing possible.

1.4 Alarm boxes

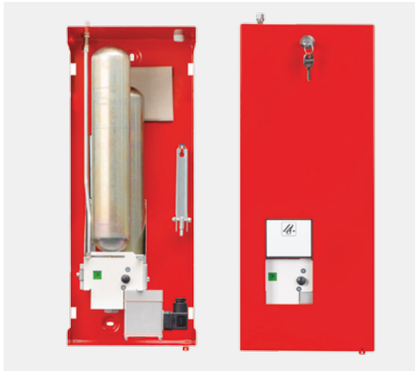


Fig. 4 AK type 10.5 alarm box (closed and after opening)

Alarm boxes are devices used for remote emergency opening of vents using the energy of compressed CO_2 contained in the cartridge installed in the box. The release of gas occurs after manual activation of the valve by using the marked lever which causes the release of the needle, the punching of the CO_2 cartridge, and then the outflow of gas to the system.

Specific features:
» steel sheet box painted in RAL3000 red color,
» lockable cover,
» lever or button controlling emergency opening, including activation indicator, visible through glass panel,
» replaceable glass panel,
» equipped with valves in a configuration depending on the customer's needs; basic executions: opening only, or opening and closing; optionally: opening by remote 24V signal,
» sizes and number of cartridges in the box dependent on customer's application; box size dependent on the size of installed cartridges,
» connections for 6 mm pipe; optionally: for 8 mm pipe, output in upper part,
» connections for CO2 cartridges: "UNF,
» working temperature: –20 ÷ 50 °C,
» maximum working pressure in CO2 circuits: 8.0 MPa,
» note: connection of boxes in series or parallel is not possible without additional elements,
» designed for single group of smoke vents; on special request for larger number of groups,
» AK10 and AK11 type of boxes with reserve cartridge handles,
» AK6 and AK7 type of boxes without reserve cartridge handles.

» Dimensions of selected ventilation boxes

BOX TYPE	BOX DIMENSIONS - WIDTH X HEIGHT X DEPTH [mm]				MAXIMUM CARTRIDGE SIZE [g]
	MANUAL OPENING	MANUAL AND ELECTRIC OPENING	MANUAL AND ELECTRIC CLOSING	MANUAL AND ELECTRIC OPENING, MANUAL CLOSING	
AK6	110 x 500 x 100	-	-	-	500
AK7	110 x 300 x 100	-	-	-	55
AK 10.3	200 x 350 x 130	200 x 350 x 130	-	-	150
AK 10.5	200 x 500 x 130	200 x 500 x 130	-	-	500
AK 10.7	200 x 650 x 130	200 x 650 x 130	-	-	750
AK 10.9	200 x 700 x 170	200 x 700 x 170	-	-	1500
AK 11.3	-	-	300 x 350 x 130	300 x 350 x 130	150
AK 11.5	-	-	300 x 500 x 130	300 x 500 x 130	500
AK 11.7	-	-	300 x 650 x 130	300 x 650 x 130	750
AK 11.9	-	-	320 x 700 x 170	320 x 700 x 170	1500

1.5 Example configurations of alarm boxes from point

MANUAL ALARM OPENING (HA)
» CO_2 releasing for emergency opening of smoke vents by manual pressing of push button or valve lever.

MANUAL ALARM OPENING AND CLOSING (HA-HZ)
» CO_2 releasing for emergency opening and then closing the vents is effected by manual pressing of button or valve lever,
» the box is equipped with separate cartridges for opening and closing,
» protection against faulty operation: the closing button is not visible through the glass panel,
» after switching from opening to closing function, there is automatic deaeration of the part of installation responsible for opening – it is not necessary to remove the cartridge. Deaeration also occurs after switching from losing to opening.

MANUAL AND REMOTE ALARM OPENING (HXA)
» CO_2 releasing for emergency opening of smoke vents is effected by manual pressing of push button or valve lever, or remotely - through electric (HEA) or pneumatic (HPA) signal, which allows for co-operation with other control systems, e.g. fire alarm signalling system.

MANUAL ALARM OPENING AND CLOSING AND MANUAL OPENING (HEA-HZ)
» CO_2 releasing for alarm opening of vents is performed by manual pressing of valve lever, or remotely - through electric (HEA) signal, which allows for co-operation with other control systems, e.g. fire alarm signalling system,
» CO_2 releasing for alarm closing of vents is performed by manual pressing of valve button,
» the box is equipped with separate cartridges for opening and closing,
» protection against faulty operation: the closing button is not visible through the glass panel,
» after switching from opening to closing function, there is automatic deaeration of the part of installation responsible for opening – it is not necessary to remove the cartridge. Deaeration also occurs after switching from closing to opening.

1.6 Ventilation boxes

Ventilation boxes are used for remote controlling of vent opening and closing actuators for the purpose of ventilating spaces. The boxes contain valves controlling the opening and closing of vents, and an air preparation system.

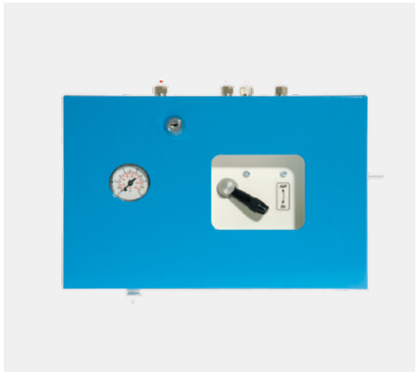


Fig. 5 Example of ventilation box

Specific features:
» steel sheet box painted in RAL 5012 color,
» lockable door, opened to the bottom in standard,
» valves control through levers outside the box,
» 6 mm pipe connections,
» includes filter, dehydrator, pressure reducer (output pressure 0÷1 MPa),
» options 1: valves control lever located inside, no air preparation system, configurations for multiple ventilation and smoke exhaust zones, and co-operation with alarm boxes,
» options 2: possibility of optional co-operation with alarm box for alarm opening or opening and closing, with weather monitoring unit for automatic vent closing in case of rain and strong wind; optional electric or pneumatic remote opening and closing.

» Dimensions of selected ventilation boxes

BOX TYPE	BOX DIMENSIONS width x height x depth [mm]	Notes
PLZ 10.0.1	300 x 200 x 80	for single ventilation group, manual control
PLZ 20.1.1-EA230-EZ230	300 x 200 x 80	1 smoke exhaust group – opening only (co-operation with alarm box for opening), 1 ventilation group with possible ventilation control through 230 V~ signal
PLZ 30.1.1-EZ-230-EA230	300 x 200 x 80	1 smoke exhaust group – opening and closing (co-operation with alarm box for opening and closing), 1 ventilation group with possible ventilation control through 230 V~ signal

1.7 | Sample configurations

1.7.1 | Automatic vent opening by thermal valve (smoke exhaust)

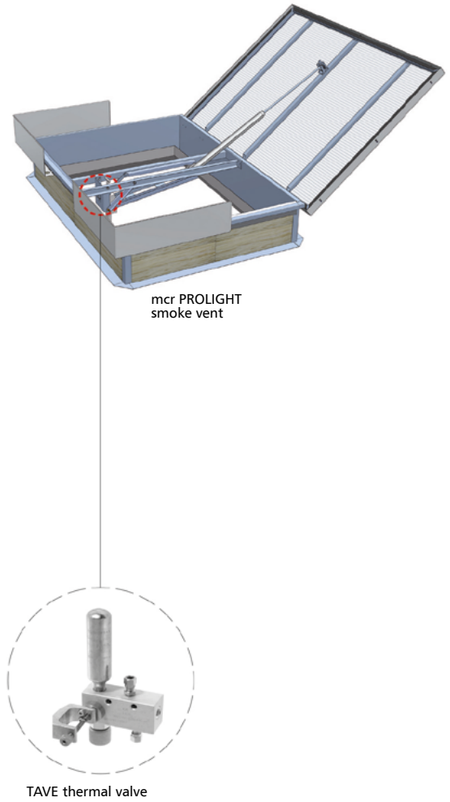


Fig. 6 Smoke exhaust function – automatic alarm opening, with flow controller with thermal fuse

Devices list
» pneumatic actuator for smoke exhaust,
» TAVE thermal valve.

NOTE
Depending on client's needs, the smoke exhaust system devices may vary from the specifications.

1.7.2 | Automatic and manual vent opening (smoke exhaust)

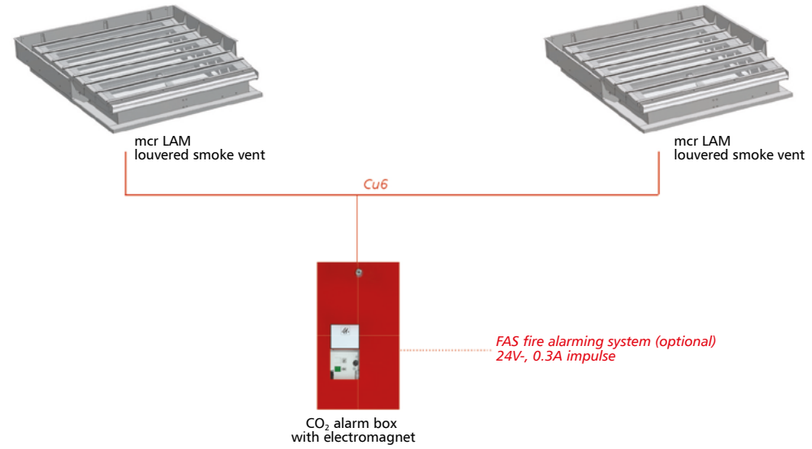


Fig. 7 Smoke exhaust function – automatic and manual alarm opening, with flow controller with thermal fuse and alarm box

Devices list
» pneumatic actuator for smoke exhaust,
» TAVE thermal valve,
» alarm box, e.g. AK6-HA-BVE.

NOTE
Depending on client's needs, the smoke exhaust system devices may vary from the specifications.

1.7.3 | Automatic and manual vent opening (smoke exhaust) with 230V~ electric ventilation

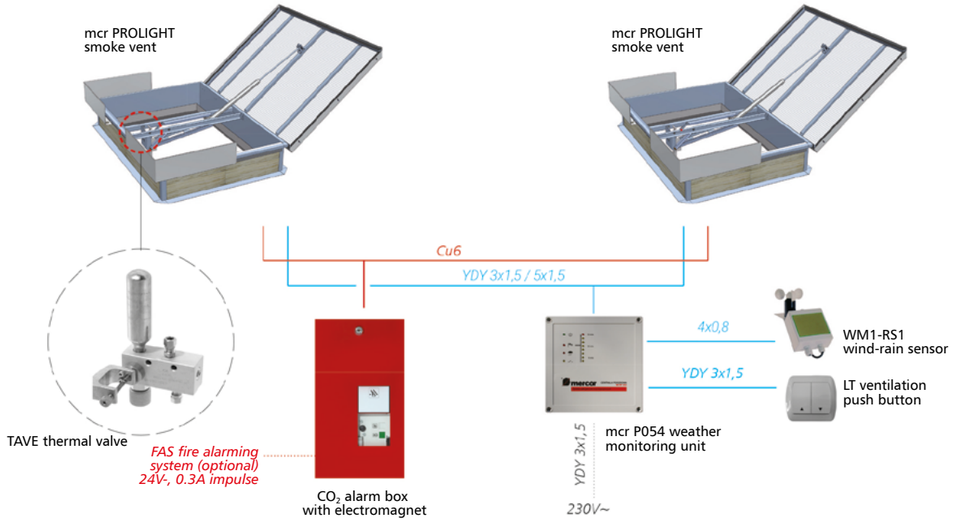


Fig. 8 Smoke exhaust function – automatic and manual alarm opening, with flow controller with thermal fuse and alarm box and ventilation function with 230V~ electric actuator

Devices list
» pneumatic actuator for smoke exhaust,
» TAVE thermal valve,
» alarm box, e.g. AKx-CA-HA-SA,
» E type actuator for daily ventilation,
» ventilation push button,
» mcr P054 weather monitoring unit,
» wind-rain sensor.

NOTE
Depending on client's needs, the smoke exhaust system devices may vary from the specifications.
The use of weather automatics is recommended for systems with daily ventilation system.

1.7.4 | Automatic and manual vent opening, manual vent closing (smoke exhaust)

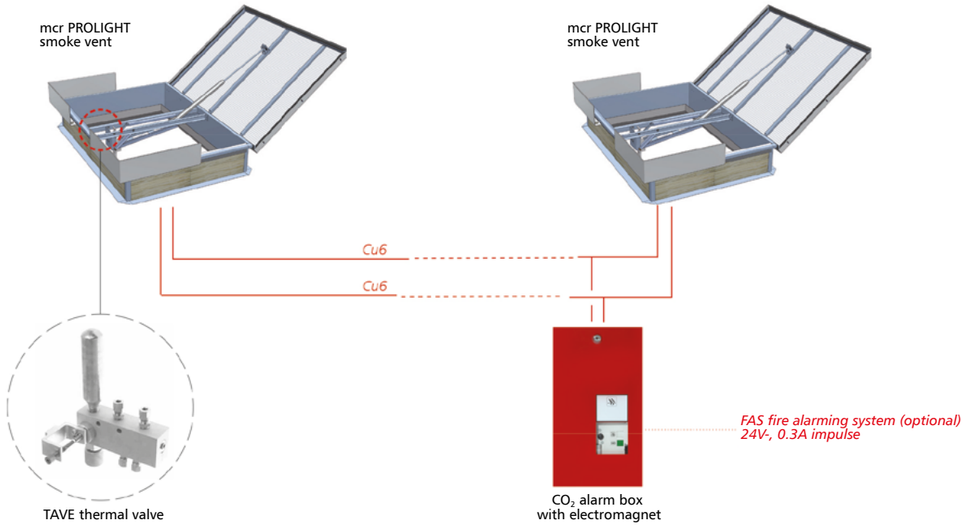


Fig. 9 Smoke exhaust function – automatic alarm opening and manual opening, manual closing with flow controller with thermal fuse and open/shut alarm box

Devices list
- pneumatic actuator for smoke exhaust,
- TAVZ thermal valve,
- alarm box with HA-HZ option, e.g. AKx-CA-HA-HZ-SA.

NOTE
Depending on client's needs, the smoke exhaust system devices may vary from the specifications.

1.7.5 | Automatic and manual vent opening, manual vent closing (smoke exhaust) with 230V~ electric ventilation

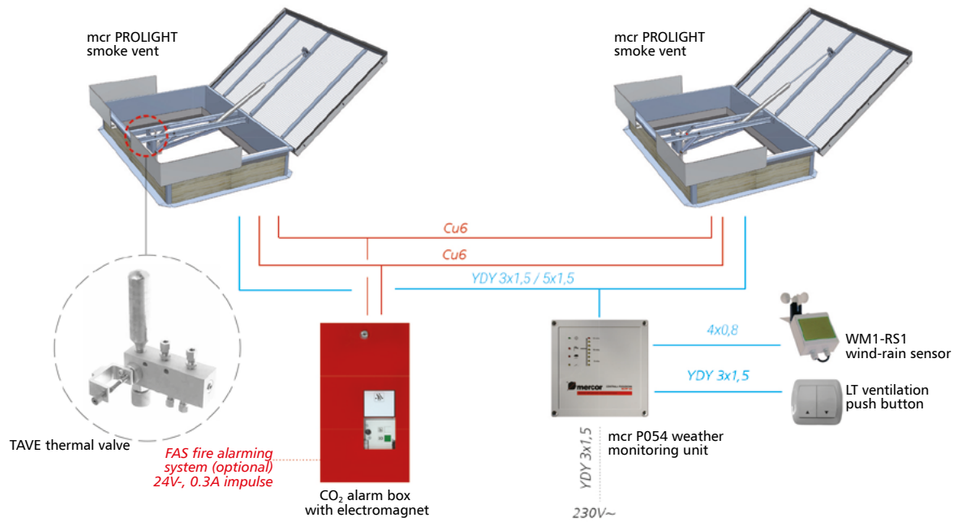


Fig. 10 Smoke exhaust function – automatic and manual alarm opening, manual closing with flow controller with thermal fuse and open/ closed alarm box - and ventilation function with electric actuator

Devices list
- pneumatic actuator for smoke exhaust,
- TAVZ thermal fuse,
- alarm box, e.g. AKx-CA-HA-HZ-SA,
- E type air inlet actuator,
- ventilation push button,
- mcr P054 weather monitoring unit,
- wind-rain sensor.

NOTE
Depending on client's needs, the smoke exhaust system devices may vary from the specifications.
The use of weather automatics is recommended for systems with ventilation system.

1.7.6 | Automatic and manual vent opening, manual vent closing (smoke exhaust) with pneumatic ventilation

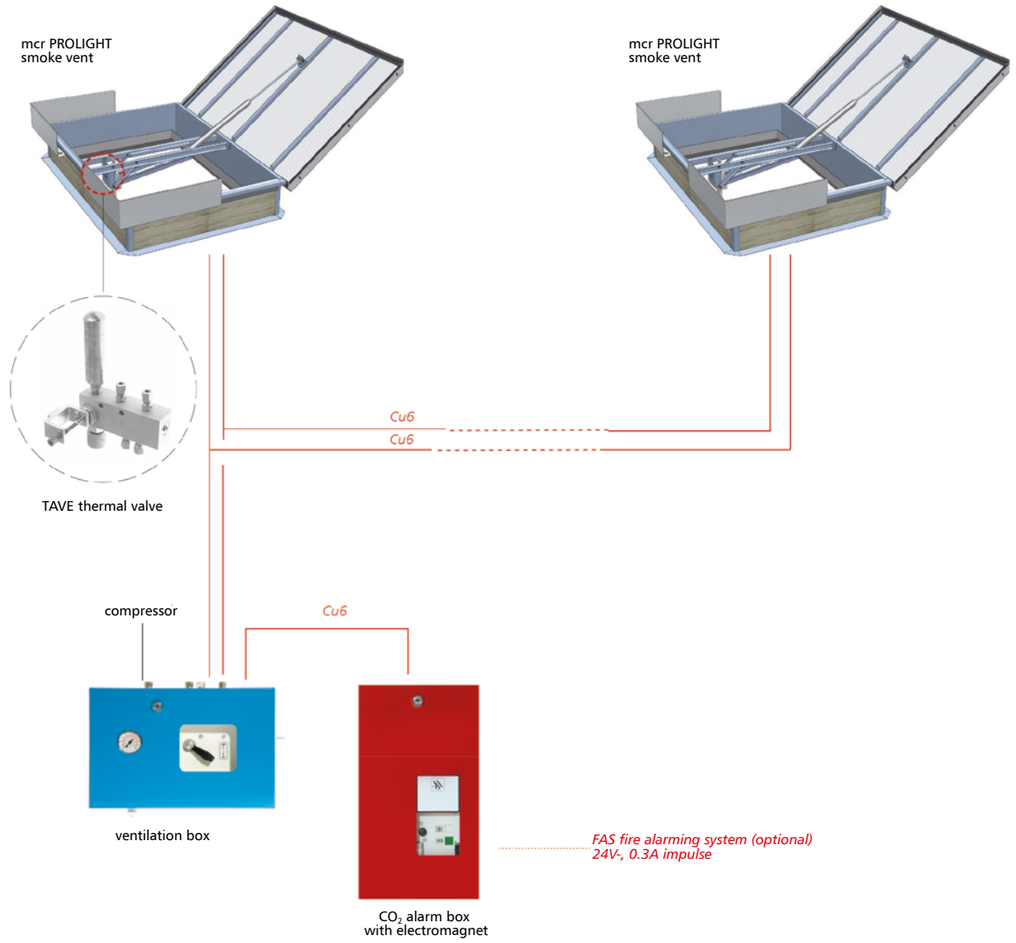


Fig. 11 Smoke exhaust function – automatic and manual alarm opening, with flow controller with thermal fuse and alarm box (opening) and pneumatic ventilation function with ventilation box (open/shut) - 2-pipe system

Devices list
- pneumatic actuator for smoke exhaust,
- pneumatic actuator for ventilation,
- ZSV-BVE valve,
- TAVZ thermal valve,
- ventilation box with VVZ option,
- alarm box, e.g. AK 10.

NOTE
Depending on client's needs, the smoke exhaust system devices may vary from the specifications.
The use of weather automatics is recommended for systems with ventilation system.

2.| 24V- electric control system

Smoke vents with electric smoke exhaust control system are mainly used for staircases of public utility buildings, in passages of malls, and - sporadically - in smaller storage or industrial halls.

Components of electric smoke exhaust control system:
» mcr PROLIGHT vent with 24 V- electric actuator,
» electric smoke exhaust and ventilation control unit,
» mcr RPO-1 emergency push buttons,
» optical smoke sensors,
» ventilation push buttons (LT buttons) – optional,
» weather monitoring unit with wind-rain sensor – optional,
» electric installations.

Activation options of electric smoke exhaust control system:
» automatic – after smoke detection – through a signal from optical smoke sensor,
» automatic (remote) – through signal e.g. from fire signaling unit (as option, after connection),
» manually – by operator, using RPO-1 smoke exhaust button.

Ventilation control through electric smoke exhaust system.
Vents with 24 V- electric actuators may be used for daily ventilation after connecting ventilation push buttons to smoke exhaust control unit. Use of weather automatics is recommended for closing vents in ventilation position in case of strong wind (to protect the vent structure) and/or wind (to protect property).
Alarm signals and alarm functions of the control units have priority over ventilation functions.

2.1 | mcr 9705 control unit

mcr 9705 smoke exhaust control unit is used to activate devices of MERCOR electric smoke exhaust system based on alarm signal from thermal or optical smoke sensors, from manual fire alarming devices (red call point buttons), or from another control unit (e.g. fire alarm system, building automatics system).
The control unit is supplied from 230 V alternating current and feeds 24V= voltage to electric smoke exhaust system devices. Thanks to its batteries, the control unit is not exposed to power shortage, and may stand-by for 72 hours from power failure, with a single launching of devices possible after that time (e.g. opening smoke vents).

The control unit allows for:
» remote activation of smoke exhaust system devices from fire alarm unit (NC voltage-free contact or 24V- signal),
» fuseing with the use of alarm buttons,
» automatic fuseing from conventional smoke sensors (thermal or optical),
» indicating the unit status through diodes on its face plate and buzzer,
» co-operation with mcr RPO-1 emergency push button,
» providing information on alarm activation of unit (NC/NO contact and diode on mcr RPO-1 emergency push button),
» providing information on failure or power shortage (NC/NO contact and diode on mcr RPO-1 emergency push button),
» providing information on vent opening (NC/NO contact),
» monitoring readiness of connected smoke exhaust devices and indicating failures on a panel inside the control unit,
» manual opening of smoke exhaust vents for daily ventilation during normal operation (without fuseing alarm state, separately for each group),
» automatic closing of vents opened for daily ventilation in case of rain fall or strong window, in response to a signal from weather monitoring unit (does not interfere with alarm operation).

Fig. 12 mcr 9705 control unit

2.2 | Technical data of mcr 9705 control unit.

PARAMETER	VALUE	
range	5 A	8 A
supply voltage	230 V~, 50 Hz	
output voltage (actuators supply)	150 VA	250 VA
output voltage - actuators	24 V-, max. 5,2 A	24 V-, max. 8 A
back-up power supply	2 psc. of batteries 12 V-, 3,2 Ah, connected in series	
operating temperature range	–5°C ÷ +40°C °	
time of operation after mains failure in ready state	min. 72 h	
carrying capacity of relay outputs	max. 100 mA, 24 V	
casing protection rating	IP 54	
dimensions (width x height x depth)	300 x 300 x 120 mm	

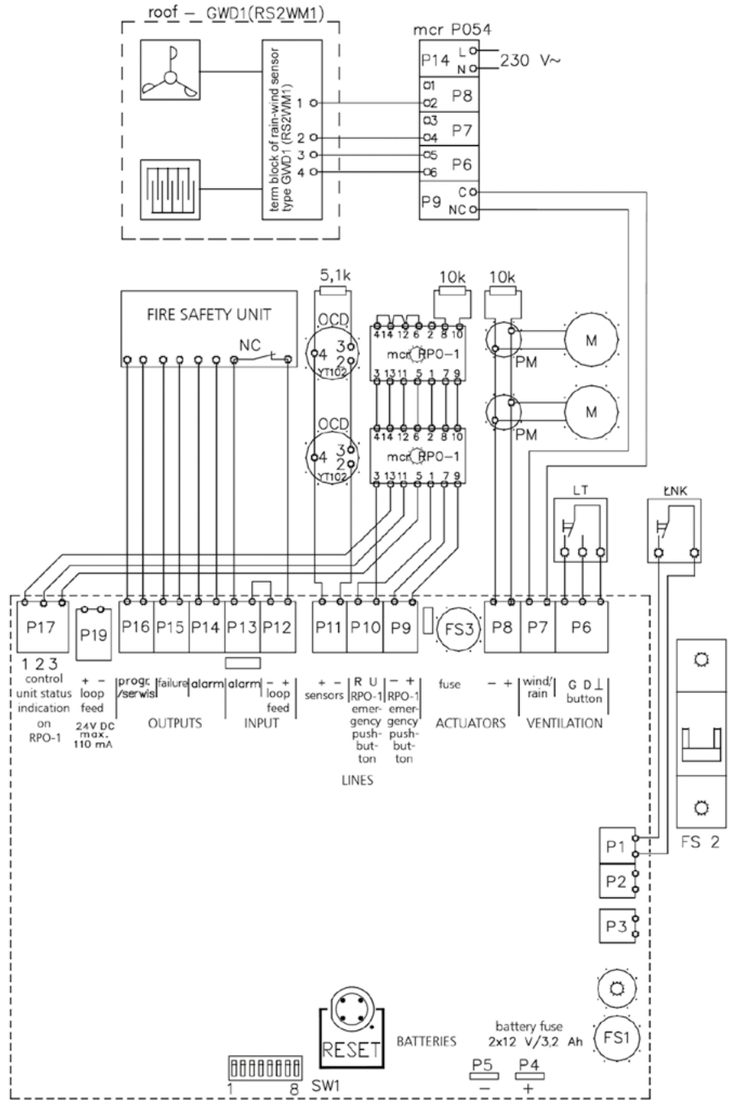
» **mcr 9705 - 5A control units series of types**

UNIT TYPE	SUPPLY VOLTAGE	NUMBER OF OUTPUTS (ACTUATOR LINES) LOAD CAPACITY	CASING VERSION [mm]	NOMINAL POWER INPUT [VA]	SECONDARY SUPPLY SOURCE
mcr 9705-5A	230 V~ 50 Hz	5 A (basic)	300 x 300 x 150	150	2 x (12 V-,. 3.3…3.6 Ah)
mcr 9705-10A		2 x 5 A	400 x 400 x 200	300	4 x (12 V-, 3.3…3.6 Ah)
mcr 9705-15A		3 x 5 A	600 x 600 x 200	450	6 x (12 V-, 3.3…3.6 Ah)
mcr 9705-20A		4 x 5 A	600 x 600 x 200	600	8 x (12 V-, 3.3…3.6 Ah)
mcr 9705-25A		5 x 5 A	800 x 600 x 300	750	10 x (12 V-, 3.3…3.6 Ah)
mcr 9705-30A		6 x 5 A	800 x 600 x 300	900	12 x (12 V-, 3.3…3.6 Ah)
mcr 9705-35A		7 x 5 A	1000 x 600 x 400	1050	14 x (12 V-, 3.3…3.6 Ah)
mcr 9705-40A		8 x 5 A	1000 x 600 x 400	1200	16 x (12 V-, 3.3…3.6 Ah)
mcr 9705-45A		9 x 5 A	1000 x 800 x 400	1350	18 x (12 V-, 3.3…3.6 Ah)
mcr 9705-50A		10 x 5 A	1000 x 800 x 400	1500	20 x (12 V-, 3.3…3.6 Ah)
mcr 9705-55A		11 x 5 A	1000 x 800 x 400	1650	22 x (12 V-, 3.3…3.6 Ah)
mcr 9705-60A		12 x 5 A	1000 x 800 x 400	1800	24 x (12 V-, 3.3…3.6 Ah)

» **mcr 9705 - 8A control units series of types**

UNIT TYPE	SUPPLY VOLTAGE	NUMBER OF OUTPUTS (ACTUATOR LINES) LOAD CAPACITY	CASING VERSION [mm]	NOMINAL POWER INPUT [VA]	SECONDARY SUPPLY SOURCE
mcr 9705-8A	230 V~ 50 Hz	8 A (basic)	300 x 300 x 150	250	2 x (12 V-, 3.3…3.6 Ah)
mcr 9705-16A		2 x 8 A	400 x 400 x 200	500	4 x (12 V-, 3.3…3.6 Ah)
mcr 9705-24A		3 x 8 A	600 x 600 x 200	750	6 x (12 V-, 3.3…3.6 Ah)
mcr 9705-32A		4 x 8 A	600 x 600 x 200	1000	8 x (12 V-, 3.3…3.6 Ah)
mcr 9705-40A		5 x 8 A	800 x 600 x 300	1250	10 x (12 V-, 3.3…3.6 Ah)
mcr 9705-48A		6 x 8 A	800 x 600 x 300	1500	12 x (12 V-, 3.3…3.6 Ah)
mcr 9705-56A		7 x 8 A	1000 x 600 x 400	1750	14 x (12 V-, 3.3…3.6 Ah)
mcr 9705-64A		8 x 8 A	1000 x 600 x 400	2000	16 x (12 V-, 3.3…3.6 Ah)

2.3 | Typical configuration of smoke exhaust system with mcr 9705-5A control unit and with mcr P054 weather monitoring unit



LT ventilation push button
mcr RPO mcr RPO-1 emergency push button
M electric actuator
OCD optical smoke sensor (YT102 here)
PM installation box
FS1 battery fuse
FS2 automatic 230 V~ mains fuse
FS3 actuators line fuse
SW 1 configuration switch for control unit (see operation and maintenance)

2.4 | mcr 0204 control unit

mcr 0204 smoke exhaust control unit is a control device for electric smoke exhaust system. mcr 0204 unit is used for activating electric systems of MERCOR smoke exhaust system based on alarm signal from thermal or optical smoke sensors, and mcr RPO-1 emergency push buttons. The device is supplied with 230 V~ alternating current, the output operating voltage is 24 V-. The control unit includes batteries allowing operation of the system for 72 hours from mains voltage failure - a single alarm opening of vents or smoke windows is possible after that time.

The control unit allows for:

- remote activation of smoke exhaust system devices from fire alarm unit (NC voltage-free contact or 24V- signal),
- fuseing with the use of alarm buttons,
- automatic fuseing from conventional smoke sensors (thermal or optical),
- indicating the unit status through diodes on its face plate and buzzer,
- co-operation with mcr RPO-1 emergency push button,
- providing information on alarm activation of unit (NC/NO contact and diode on mcr RPO-1 emergency push button),
- providing information on failure or power shortage (NC/NO contact and diode on mcr RPO-1 emergency push button),
- providing information on vent opening (NC/NO contact),
- monitoring readiness of connected smoke exhaust devices and indicating failures on a panel inside the control unit,
- manual opening of smoke exhaust vents for daily ventilation during normal operation (without fuseing alarm state, separately for each group),
- automatic closing of vents opened for daily ventilation in case of rain fall or strong window, in response to a signal from weather monitoring unit (does not interfere with alarm operation).

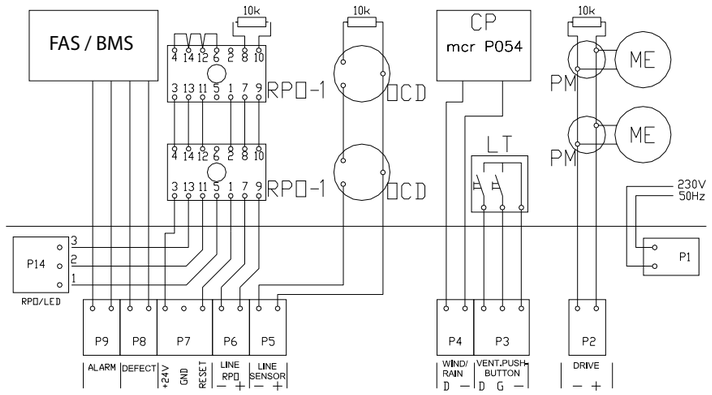
Fig. 13 mcr 0204 control unit

2.5 | Technical data of mcr 0204 control unit

- **mcr 0204 unit series of types**

PARAMETER	VALUE
power supply voltage	230 V~, 50 Hz
rated power	100 VA
output voltage (actuators supply)	24 V=, max. 4 A
secondary supply	2 pcs. of 12 V-, 2 Ah batteries, connected in series
operating temperature range	–10°C ÷ 40°C
maximum diameter of cords entering the unit	1,5 mm^2
time of operation after mains failure in READY state	min. 72 h
carrying capacity of relay outputs	max. 100 mA, 24 V-
casing protection rating	IP 54
insulation grade	II
dimensions (width x height x depth)	300 x 230 x 86 mm

2.6 | Typical configuration of smoke exhaust system with mcr 0204 control unit and with mcr RPO-1 emergency push button



FAS / BMS fire alarm system
OCD optical smoke sensor (YT102 here)
mcr RPO-1 emergency push button
PM mount box
M electric actuator
mcrP054 weather monitoring unit
LT ventilation push button
SW1 configuration switch for control unit (see operation and maintenance)
FS1 battery fuse
FS2 230 V~ main fuse
FS3 power supply fuse

2.7 | mcr R 0424, mcr R 0448 extension modules

mcr R-04xx extension module is used for supplying a single group of 24V- actuators of total current consumption up to 48 A or 24 A, depending on variant. The module is controlled by 24 V- signal from mcr 9705 or mcr 0204 smoke exhaust control units (from actuators line output). The modules are made in 7 variants, of different carrying capacity and number of output lines:

- mcr R 0424-1 or mcr R-0424K — 1 output line 24 A,
- **mcr R 0424-2** — **2 output lines, 12 A each,**
- mcr R 0448-1 or mcr R 0448K — 1 output line 48 A,
- **mcr R 0448-4** — **4 output lines, 12 A each,**
- mcr R 0448-2 — 2 output lines, 24 A each,.

Bolded font – typical making.
K or Kx suffix – making for mcr PROSMOKE CE/CE1 curtains, where x stands for number of output lines of curtains.

The device, in combination with mcr control unit, allows for detection of all actuator lines connected to it. mcr R04xx module has 2 sources for supplying the connected devices: primary, from mains, or secondary, from the batteries, which are activated automatically engaged in case of mains failure. The battery allows for a 72 h stand-by, and at least a single opening of vents in that time.

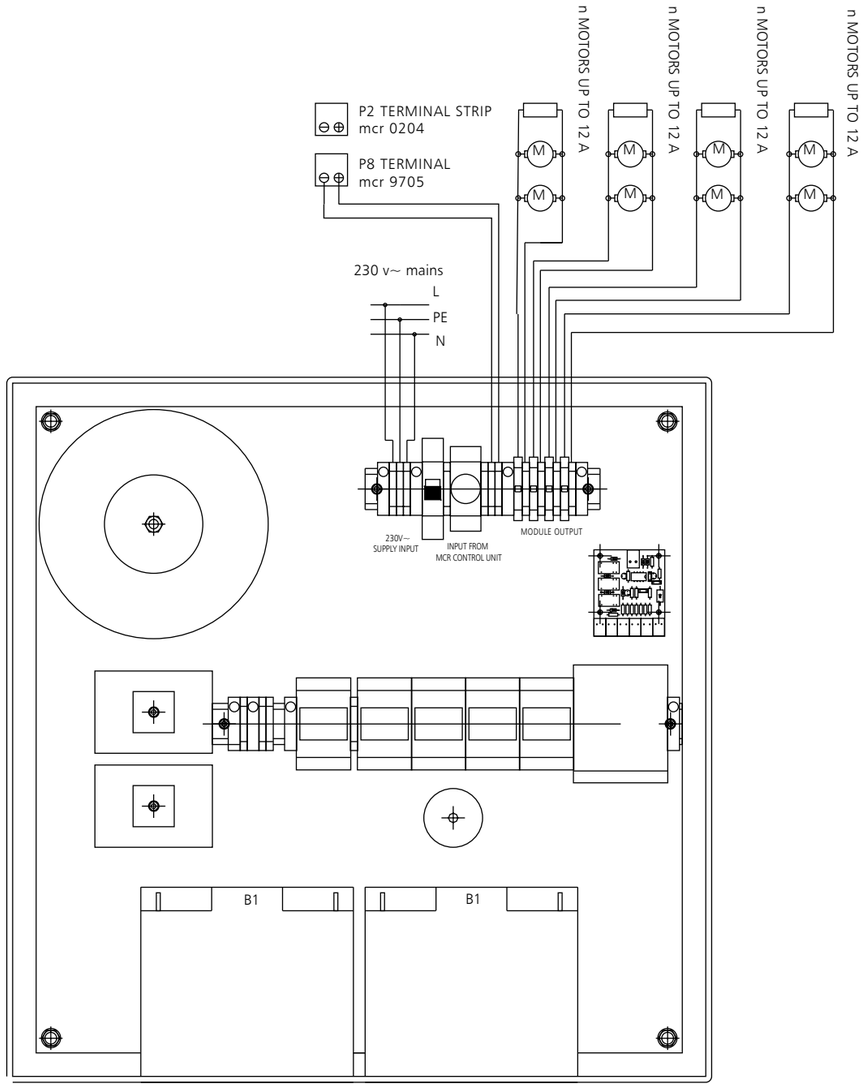
The batteries charging time from complete discharge is up 24 hours.
mcr R04xx module features signaling of the following states:
- 230 V~ supply correct, green diode lit,
- actuators actions - yellow diode lit,
- failure - yellow diode lit,
- and signal providing to control unit (in case of actuators line failure, mains failure, secondary 24 V-= supply failure).

Fig. 14 mcr R04xx extension module

Technical data of mcr R0424 and MCR R0448 extension modules

PARAMETER	VALUE							
type	**mcr R 0424**				**mcr R 0448**			
variant	**0424-1**	**0424-2**	**0424-K** for mcr PROSMOKE CE curtains	**0424-K4** for mcr PROSMOKE CE curtainsE	**0448-1**	**0448-2**	**0448-4**	**0448-Kx** for mcr PROSMOKE CE curtains
number of output lines (actuators) and line carrying capacity	1 x 24 A	2x 12 A	1x 24 A	4x 6 A	1x 48 A	2x 24 A	4x 12 A	up to 8 lines, 6,3 A each
power supply voltage	230 V~, 50 Hz							
max. power consumption from main supply	750 V A				1500 V A			
output voltage	24 V-							
operating temperature range	-5°C … 40°C							
dimensions (height x width x depth)	60 x 60 x 20 cm							
casing protection rating	IP 54							
cords running	from the back or top of casing							

2.8 | Typical configuration of mcr R04xx extension module (4 x 12A)



2.9 | OCD optical smoke sensors

Optical smoke sensors are used for detecting visible smoke that appears during the majority of fires. It allows to detect smoke in its initial stage, where the material has just started to burn, which usually comes long before the outburst of open flame and the noticeable increase in temperature. The sensors feature resistance to wind, pressure changes and water vapour condensation. They have large sensitivity to visible smoke.

Optical sensor comprises of a set of two diodes. The first of them – infrared LED diode – emits a light beam. The other, receiving diode is placed in a labyrinth tunnel. In normal conditions, this diode is not exposed to visible light from outside, or from the sender diode. Upon penetration of smoke into the sensor, the receiving diode starts to receive the light emitted through the sending diode, scattered on smoke particles. This causes response of the sensor, and the fuseing of alarm state.
The sensors are equipped with optical fuseing indicators (alarm) in the form of diode diode. This facilitates finding activated sensor. Additionally, if the sensors are placed in invisible places, they can be equipped with external fuseing indicators.
The sensors are installed in appropriate consoles.

» Technical details

PARAMETER	VALUE
operating voltage	24 V- (9 ÷ 28)
max. monitoring current	60 [μA]
alarm current	30< [mA]
operating temperature range	-10 ÷ 50 [°C]
max. relative humidity	93 [%]
dimensions of sensor, incl. socket	Ø103 x 55 [mm]
weight, incl. socket	~0,155 [kg]
color	white

Fig. 16 Optical smoke sensor

2.10 | mcr RPO-1 emergency push button

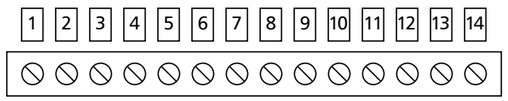
mcr RPO-1 emergency push button is used in smoke exhaust systems for manual alarm fuseing, and for indication of operating status of the smoke exhaust unit. Additionally, the button allows for remote deleting errors.
The button includes three indication diodes:
» red – ALARM
» yellow – FAILURE
» green – OK
The diodes are connected directly and independently to terminal strip, which ensures versatility of mcr RPO-1 emergency push button.
The button is dedicated for working with mcr 0204 and mcr 9705 smoke exhaust control units.
Button is designed for installation inside buildings.

» Technical details

PARAMETR	VALUE
alarm button parameters	24 V-, max 100 mA
operating temperature range	-10°C ÷ 55°C
casing protection rating	IP 30
dimensions (width x height x depth)	135 x 135 x 33 mm
min. number of wires in cable running to unit	7 (np. 4 x 2 x 0,8)
casing color	orange

Fig. 17 mcr RPO-1 emergency push button

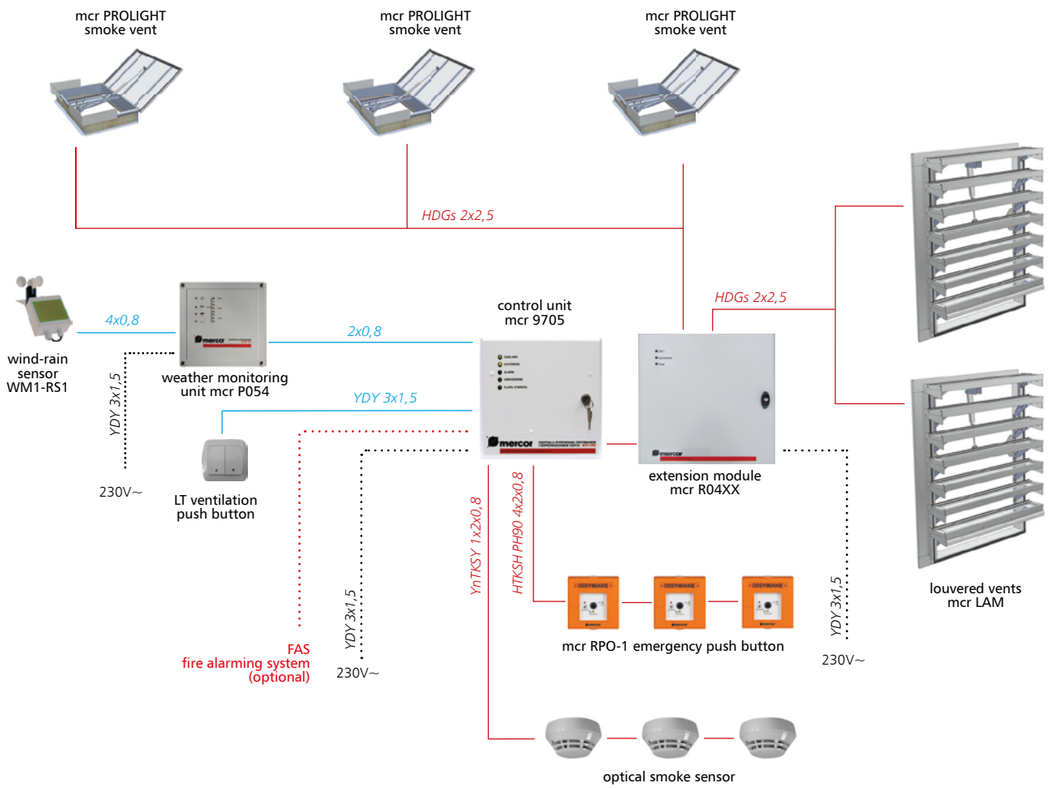
» RPO-1 terminal strip description



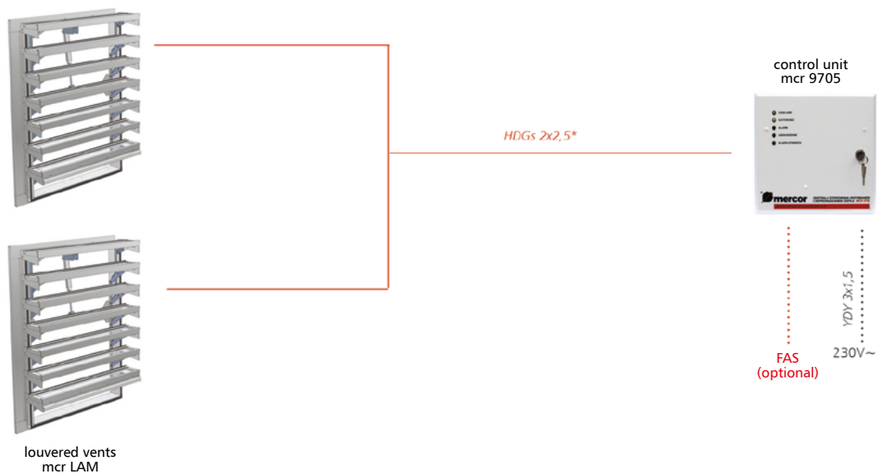
1, 2 – RESET line, cable 1
3, 4 – RESET line, cable 2
5 – diode ALARM cathode
6 – diode ALARM anode
7, 8 – RPO line, cable 1
9, 10 – RPO line, cable 2
11 – FAILURE diode, cathode
12 – FAILURE diode, anode
13 – OK diode, cathode
14 – OK diode, anode

2.11 | Sample configurations

2.11.1 | Sample connection diagram of 24V- smoke exhaust and ventilation



2.11.2 | Sample connection diagram of 24V- smoke exhaust or ventilation



3 | System description

Smoke exhaust vents with pneumatic control, spot skylights, as well as vents in continuous rooflights may be delivered with 230V~ electric actuators for ventilation. The use of such actuators allows for daily ventilation of the building, without the necessity of activating alarm opening of vents.

Components of electric ventilation control system
The ventilation system comprises:
» weather monitoring unit with wind-rain sensor
» LT ventilation push button, and additional equipment
» ventilation actuators

Operating principle of electric ventilation system
entilation push button is used for opening and closing vents/windows during their everyday operation. It is additionally recommended to provide the system with weather monitoring unit with wind-rain sensor, causing automatic closing of vents opened for ventilation during adverse weather conditions (rain fall or wind).

3.1 | mcr P054 weather monitoring unit

mcr P054 control unit is used for controlling the operation of actuators of vents or ventilation windows, which should be closed during rain or wind. Smoke exhaust control units, ventilation control units or drives supplied by 230 V~ current may be connected to the device. Closing signal is sent based on parameters from W01 wind sensor and RS1 rain sensor.

» the device includes 4 switchable contacts which are fuseed in case of rain/wind, or at mains supply failure; the contact remains switched for a preset time after the ending of rain fall/wind,
» alarm fuseing rain intensity is preset by the user (minor rainfall - intense rainfall),
» alarm fuseing wind force value is preset by the user, ranging from weak wind (about 5 m/s) to strong wind (about 15 m/s),
» additional input for vent opening sensor (closed when open), allows for optical monitoring of the vents status,
» the device includes indication of the following states:
- 230 V~ supply - green diode,
- “wind” alarm - red diode,
- “rain” alarm - red diode,
- “vent open” indication - yellow diode,
- wind speed indication - light scale: 7 yellow and 1 red diode (red for wind speed above 15 m/s).
» plastic wall casing, dimensions height x width x depth: 180 x 180 x 75 mm. IP 54, light grey (RAL 7035), cables outputfrom top or back of casing.

Fig. 18 mcr P05 weather monitoring unit

» **Weather monitoring unit additional accessories**

KE 2a extension module:
Controlling contactor for expansion of mcr P054 weather monitoring unit to over four independent control groups that are simultaneously shut during wind or rain.
» 230 V~ control voltage, 5A/ 230 V~ voltage-free contact,
» thermoplastic casing, grey RAL 7035,
» dimensions: 158 x 118 x 76 [mm] (width x height x depth).
» controlling contactor with six contacts for expanding the weather
» monitoring unit to five independent groups.

3.2 | GWD-1 wind-rain sensor

WM1 wind sensor:
» sensor for measuring wind speed,
» sold with rain sensor on mounting console,
» option: available separately.

RS1/ RS2 rain sensor
» heated rain sensor (heating is enabled after sensor fuseing, and is disabled after its drying),
» gold-plated sensing area 80 cm^2,
» sold with wind sensor on mounting console,
» option: available separately.

Sample connection cord of GWD-1 sensors set to weather monitoring unit: 4x0.8.

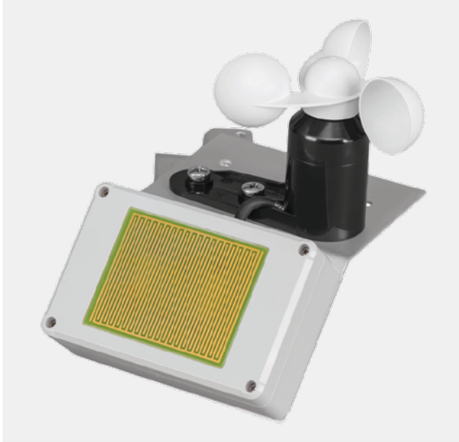


Fig. 19 GWD-1 wind-rain sensor

3.3 | Connection diagrams of mcr P054 weather monitoring unit and WM1-RS1/RS2 wind-rain sensors

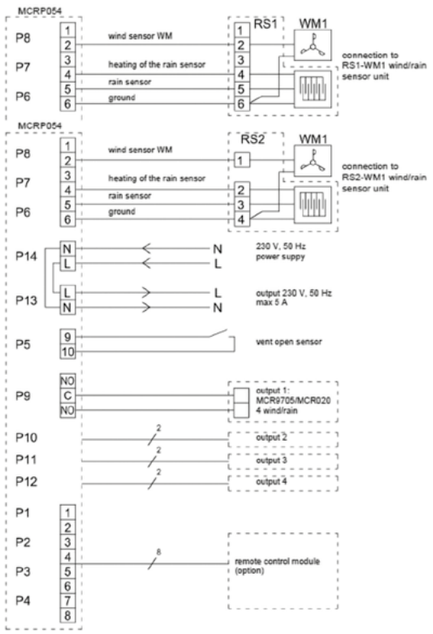


Fig. 20 Connection diagram of mcr 054 weather monitoring unit with WM1-RS1 sensors

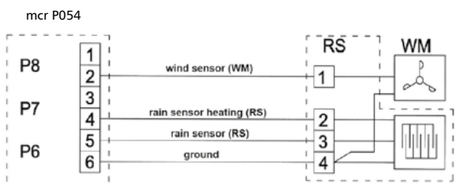


Fig. 21 Connection diagram of mcr 054 weather monitoring unit with WM1-RS2 sensors

3.4| mcr E electric actuators

Actuators for ventilation are used in smoke vents with pneumatic control, in ventilation vents, and in vents in continuous rooflights. They can be controlled through LT ventilation push button and/or mcr P054 weather monitoring unit.

ACTUATOR TYPE	PUSH FORCE	PULL FORCE	POWER CONSUMPTION	STROKE	CASING MATERIAL	DUTY CYCLE (AS PER DIN VDE 0530)
	[N]	[N]	[W]	[mm]		
E-300-230	500	250	23	300	plastic	S3 25%
E-500-230	500	250	23	500	plastic	S3 25%
E-750-230	500	250	23	750	plastic	S3 25%

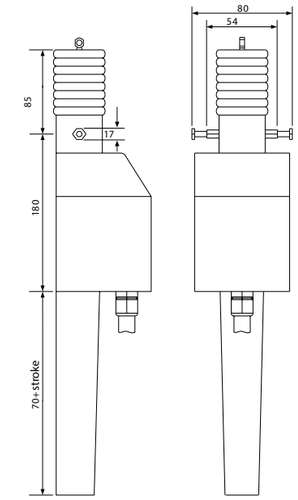


Fig. 22 Dimensions of mcr E actuator

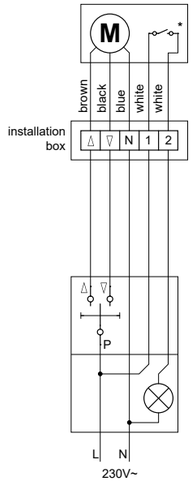


Fig. 23 Connections diagram for mcr E actuator

3.5 | LT ventilation push button switch

Used for activating (opening and closing) ventilation vents or windows during regular use.
» casing color: white,
» dimensions: 80 x 80 x 55 mm.

Electric diagram

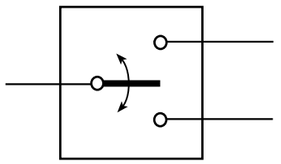


Fig. 24 LT ventilation push button switch

3.6 | Configurations of ~230V electric ventilation control system

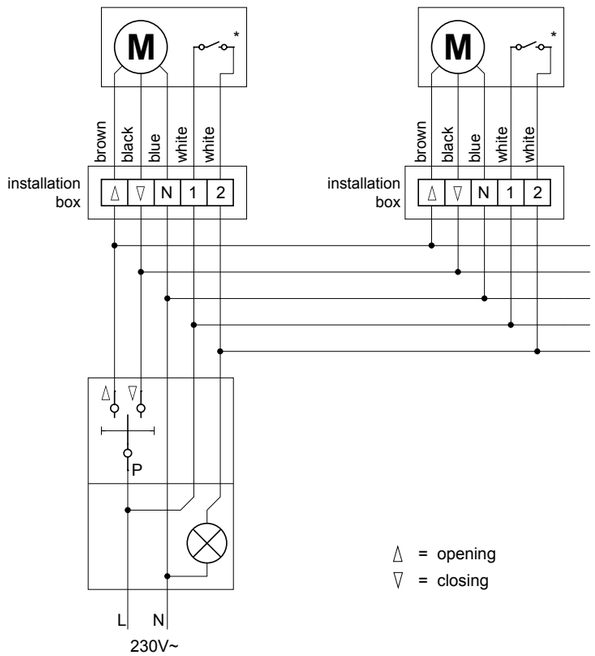


Fig. 25 Connections diagram for 230V~ electric ventilation control system

NOTE
The use of weather automatics in ventilation vents and windows activated through actuators is recommended.

3.7 | Electric ventilation control system - with weather monitoring unit

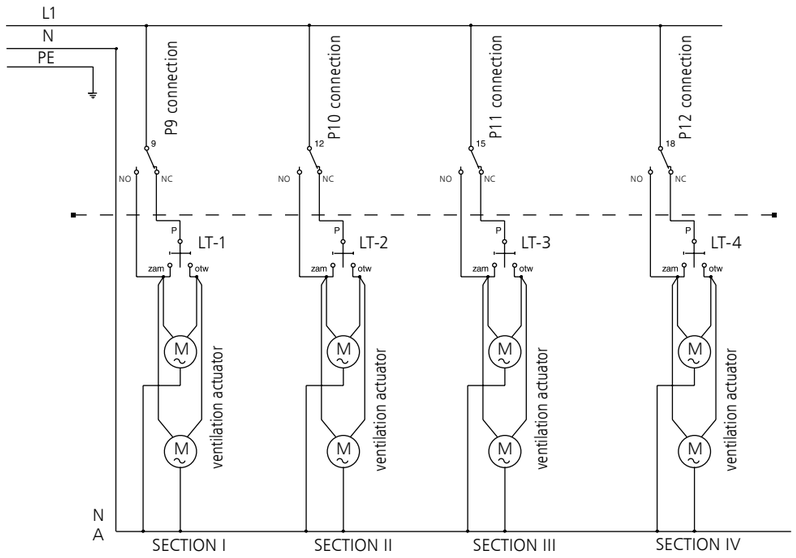
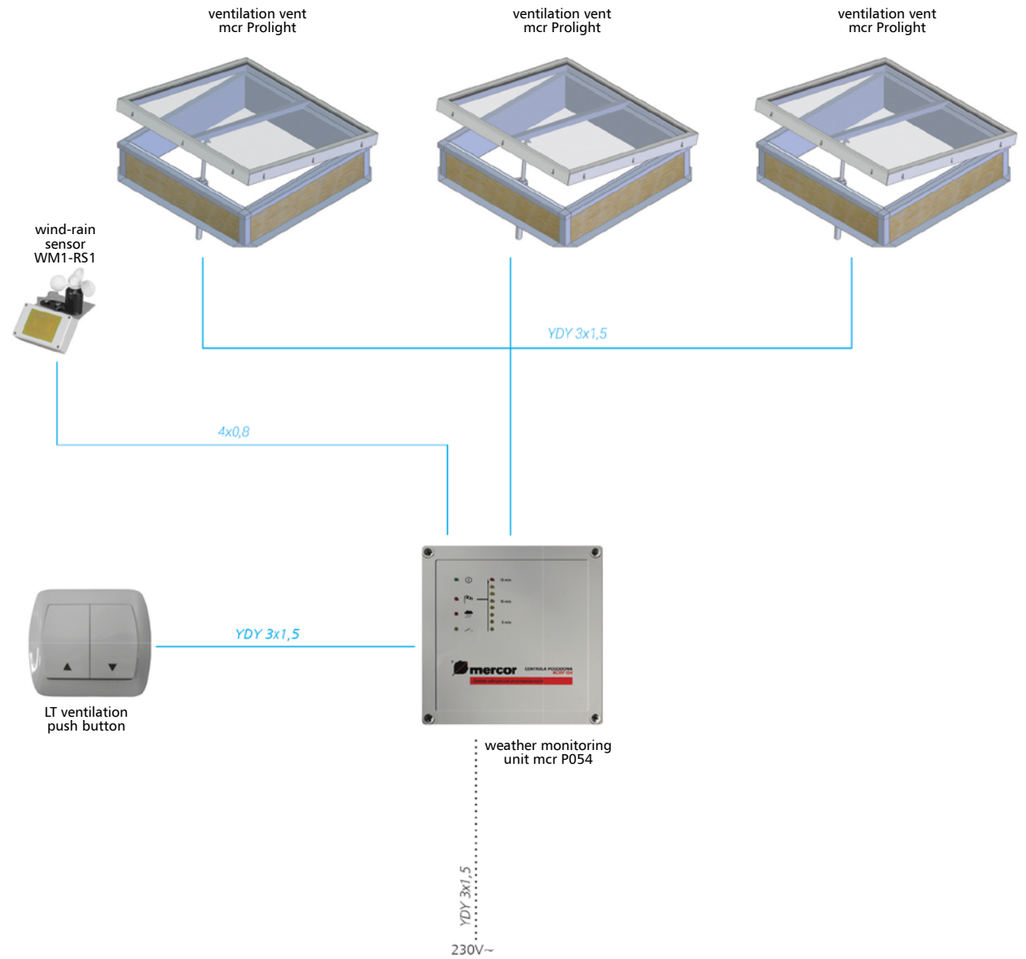


Fig. 26 Connections diagram of ventilation actuators to mcr P054 weather monitoring unit and GWD-1 wind-rain sensor

3.8| Sample configurations of - 230-V~ electric ventilation control system



4.1 | mcr SVM / SVM EI 24V - 5A or 8A control unit

Classification in accordance with EN 12101-10 (CE Certificate). mcr SVM control unit is used to activate smoke exhaust devices by alarm signal from various sources. It allows to operate one fire zone and one comfort ventilation group. The control unit is supplied from 230V AC and provides 24V DC output.
Batteries allow for a 72 h stand-by, and at least a single launch of vents in that time.

The control unit allows for:
» remote alarm activation from Fire Alarm System,
» alarm activation by BVT emergency push buttons,
» automatic alarm activation by smoke detectors,
» comfort ventilation through manual buttons
» comfort ventilation through remote control
» transfer of all information to another SVM or SV control unit through relay bus
» automatic closing of vents opened for ventilation in case of rain or strong wind, in response to a signal from wind and rain sensor
» displaying the unit status through LEDs on its face plate and buzzer,
- OK
- control unit failure
- actuator line failure
- AC supply failure
- DC battery failure
- alarm state
- opening of the vent
» SVM EI control panel is in addition equipped with:
The Fireman Priority switch is an override switch, which makes it possible for the Fireman to control the panel regardless of sensor inputs.

Fig. 27 mcr SVM / SVM EI

Technical specifications	SVM 24V - 5A	SVM 24V - 8A
Power supply	230 V~ / max. 1.2 A	230 V~ / max. 1.7 A
Output supply	24 - 28 V-	24 - 28 V-
Motor outputs	1 pcs. (line detection: 1-4 lines)	1 pcs. (line detection: 1-4 lines)
Max. load	5A	8A
Batteries	2 pcs. 12 V- / 7.2 Ah	2 pcs. 12 V- / 7.2 Ah
Dimensions (W x D x H)	238 x 113 x 286 mm	238 x 113 x 286 mm
Fire groups	1 pcs. with line detect. / Max. power consumption for fire switches (LED + buzzer) = 17.6 mA = approx. 8 fire switches	
Comfort groups	1 pcs. unlimited number of comfort switches	
Detector (smoke/heat) input	1 pcs. with line detection / Max. power consumption for detectors = 2.2 mA = approx. 22 pcs. detectors. Trigger point 30 mA	
Weather sensor input/ close all	Yes	Yes
Bus communication	Yes - connection of 2-35 pcs. control panels - line detection	

4.2 | mcr SV-ds 24V / 48V control unit

Classification in accordance with EN 12101-10 (CE Certificate). mcr SV control unit is used to activate smoke exhaust devices by alarm signal from various sources. It allows to operate **one or two fire zones and comfort ventilation groups**. The control unit is supplied from 230 V AC and provides 24 V DC or 48V DC output. Batteries allow for a 72 h stand-by, and at least a single launch of vents in that time.

The control unit allows for:
» remote alarm activation from Fire Alarm System,
» alarm activation by mcr BVT emergency push buttons,
» automatic alarm activation by smoke detectors,
» comfort ventilation through manual buttons,
» comfort ventilation through remote control,
» transfer of all information to another mcr SV or mcr SVM control unit through relay bus,
» automatic closing of vents opened for ventilation in case of rain or strong wind, in response to a signal from wind and rain sensor,
» displaying the unit status through LEDs on its face plate and buzzer,
- OK
- actuator line failure
- AC supply failure
- DC battery failure
- alarm state

Fig. 28 mcr SV-ds

Technical specifications	mcr SV 24V-xx-ds Control Panels	mcr SV 48V-xx-ds Control Panels
Power supply	230 V AC +- 15% / max. 5 A	230 V AC +- 15% / max. 10A
Output supply	24 V-	48 V-
Motor outputs	2 pcs. (line detection: 1-10 lines)	2 pcs. (line detection: 1-10 lines)
Max. total load	8A / 24A / 30A / 32A	8A / 24A / 30A / 32A
Max. load each motor output	4A / 16A	4A / 16A
Batteries	8A – 24A = 2 pcs. 12 V- / 7.2 Ah 30A – 32A = 2 pcs. 12 V- / 12 Ah	8A – 24A = 4 pcs. 12 V- / 7.2 Ah 30A = 2 pcs. 12 V / 12 Ah + 2 pcs. 12 V- / 7.2 Ah 32A = 4 pcs. 12 V- /12 Ah
Dimensions (W x D x H)	343 x 178 x 450 mm	343 x 178 x 450 mm
Fire groups	1 or 2 pcs. (by dip switch) with line detect. / Max. power consumption for fire switches (LED + buzzer) = 14mA = approx. 6 fire switches	
Comfort groups	1 or 2 pcs. (by dip switch) - Unlimited number of comfort switches	
Detector (smoke/heat) input	2 lines max. 22 pcs. on each / max. power consumption 1,1 mA per line ≈ app. 2 x 22 = 44 detectors. Trigger point 30 mA	
Weather sensor input/ close all	Yes	Yes
Detector (smoke/heat) input	Yes - connection of 2-10 control panels - line detection	

4.3 | mcr BVT / mcr BVSA emergency push button / Firemans Priority Switch with reset

Emergency push button is used in desmoking systems for manual alarm fusing and for indication of alarm or failure status. mcr BVT mcr BVSA button or Firemans Priority Switch with reset is designed for mcr SVM or mcr SV control units.

Technical Data
mcr BVT
Functions: Alarm, reset, sound indicator
LED indication: ''ok'', ''error'' (yellow), ''alarm activated'' (red)
Size: 125 mm x 125 mm x 36 mm (W x H x D)
Colour: Grey or Orange
Protection degree: IP40

Fig. 29 mcr BVT

Technical Data
mcr BVSA
Functions: Alarm, reset, sound indicator
LED indication: ''ok'', ''error'' (yellow), ''alarm activated'' (red)
Size: 125 mm x 125 mm x 75 mm (W x H x D)
Colour: Grey or Orange
Protection degree: IP65

Fig. 30 mcr BVSA

Technical Data
Firemans Priority Switch with reset
Functions: Manual override of alarm to open or close smoke vent
LED indication: Open / Close (blue)
Size: 125 mm x 125 mm x 35 mm (W x H x D)
Colour: Orange
Protection degree: IP40

Fig. 31 Firemans Priority Switch with reset

4.4.1 | mcr AR/AWR 24/250 Wind & Rain Sensor

Wind and Rain Sensor consists of a wind wheel and a rain sensor surface. It is developed for automatic control of smoke and comfort ventilation system. Sensor is equipped with a potential free relay with a contact rating of 250 V~ / 8A or 24 V- / 8A. In case of wind and / or rain the relay is activated. Settings for the wind trigger point is adjusted using rotary switch on the main PCB.

Technical Data
Power supply: 18 V – 35 V / 20V – 35 V- / 200 V – 250 V~
Output contact: NO-NC 1 x potential free change-over contact
Contact rating: 250 V~ / 8A or 24 V- / 8A
Dimensions: 80 x 160 x 55 mm (W x H x D / without wind wheel)
Weight: Approx. 0,7 kg
Protection class: IP65
Setting of the wind mode: Approx. 1 - 9 m/s (+-20%)
CE-marking: in accordance with the EMC - directive and low voltage directive
Connecting the controller has to be carried out by professionals
The sensor must be cleaned regularly, depending on soil degree, with a wet cloth with water - non abrasive

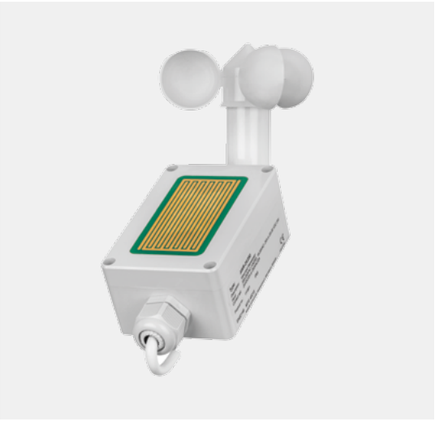


Fig. 32 mcr AR/AWR 24/250 Wind & Rain Sensor

4.4.2 | Remote Control for mcr SVM and mcr SV control units

Enables wireless control of comfort ventilation in mcr SVM and mcr SVC control units. Easy installation - simply fit the RF-receiver PCB into the socket. The remote control is paired with the RF-receiver PCB from factory, but it is possible to connect more remote controls.

Technical Data
Battery: 12 V- / 33 mAh type LRV08
Battery lifetime: app. 2000 of 1 sec. operate function
One receiver can memorize maximum 20 transmitters / remote controls
Carrier frequency: 868.915 MHz
Range: Line of clear sight approx. 400 meters
Protection degree: IP65

Fig. 33 Remote Control for mcr SVM and mcr SV control units

4.5 | Electric chain actuator mcr HCV Door Drive 24/36/48 V DC for all doors

» For all doors,
» Compact and elegant design,
» Built-in electronic overload protection,
» Power supply 24/36/48 V-,
» 2 wire line monitoring,
» Up to 500N force at chain entrance point,
» 600 mm chain length,
» Soft Close function (reduced closing speed),
» 2.5 m Silicone cable,
» Housing made of anodized aluminium,
» Tested according to EN12101-2

Fig. 34 mcr HCV Door Drive

Model	Power supply	Pushing / pulling force (N)	Opening angle	Locking pressure	Protection	Temperature	Speed (mm/sec.)		Size (mm) (L x W x H)
							Natural	Smoke & Heat (High Speed	
Door Drive	-	-	-	-	-				
HCV 500/600mm	24 V- / 1.4A 36 V- / 1.05A 48 V- / 0.7A	500 / 500	90°	2000 N	IP 32	-25°C - +75°C	7	10	587 x 82 x 41

» **Dimensions**

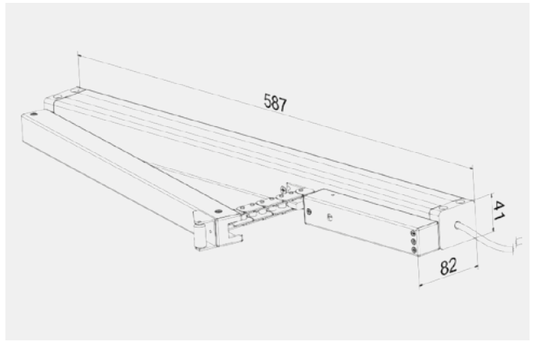


Fig. 35

» **Opening bracket set for Inwards**

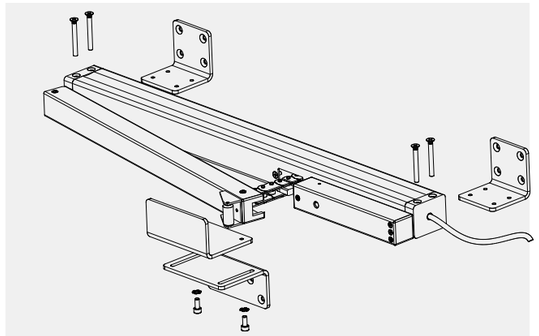


Fig. 36

» **Outwards opening**

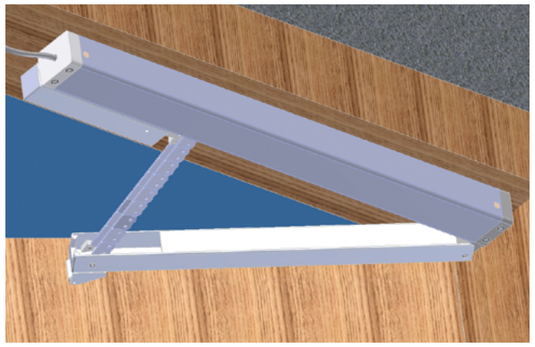


Fig. 37

» **Inwards opening**

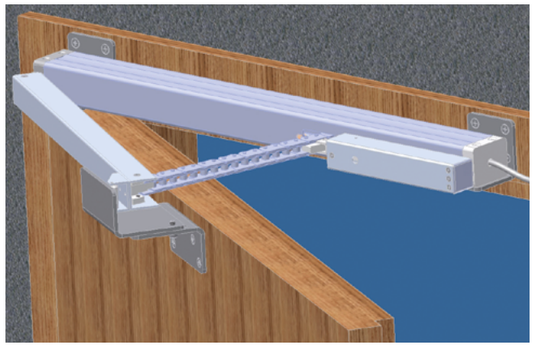
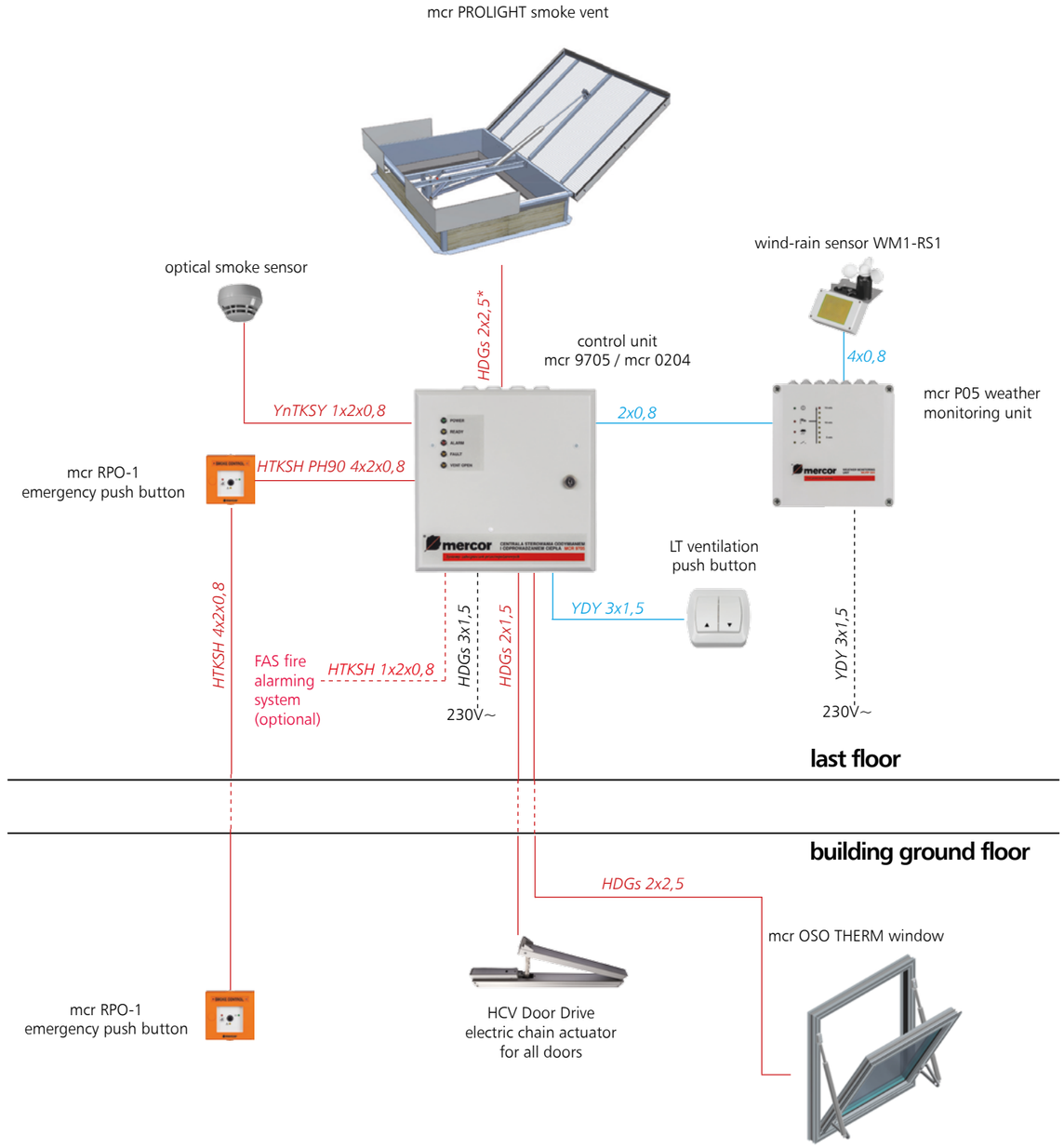


Fig. 38

4.6 | mcr PROLIGHT - sample connection diagram of 24V- – smoke exhaust and ventilation in staircase



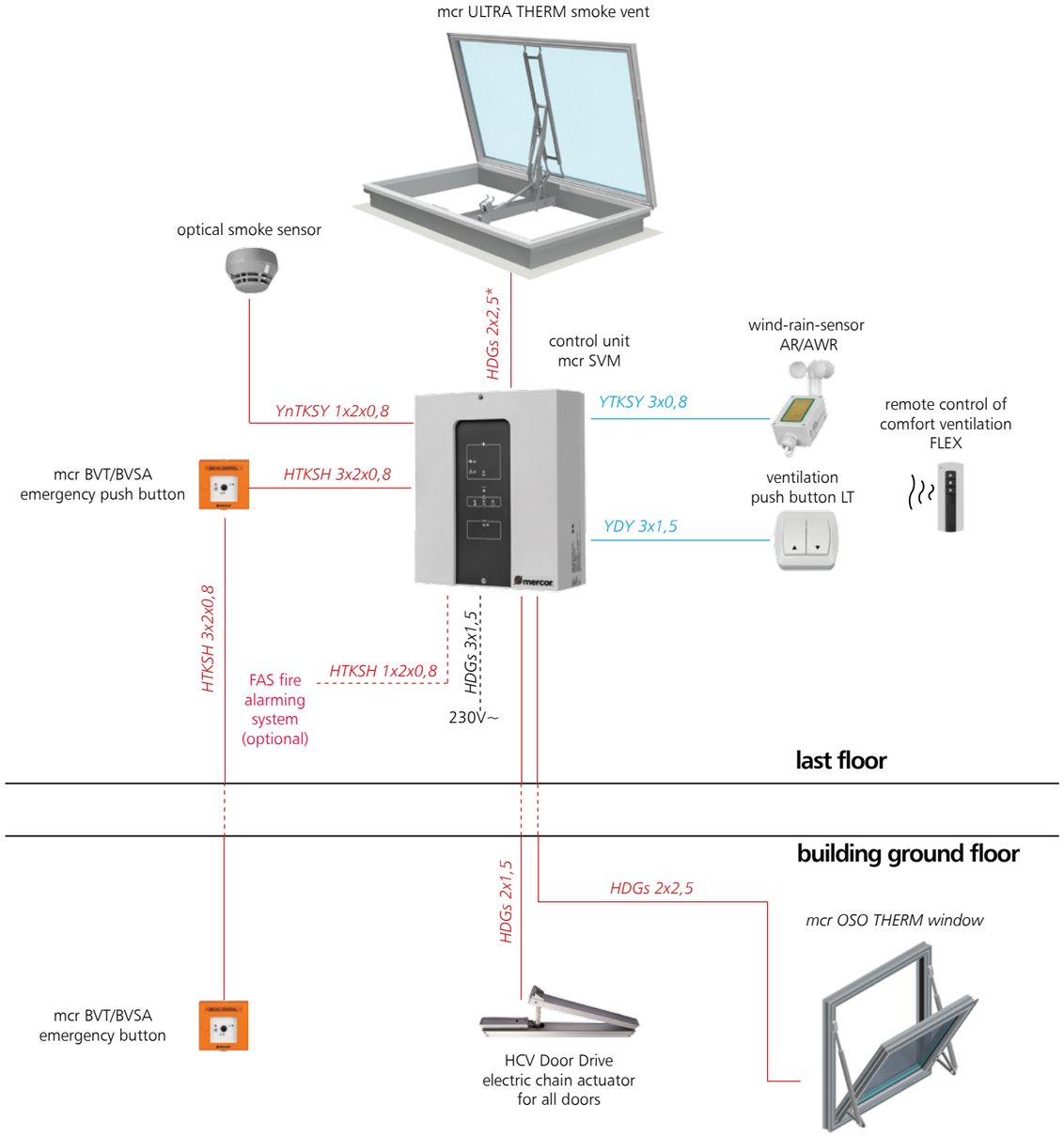
» **Description of the functioning of the electric smoke exhaust mcr Therm System (with mcr Prolight smoke vents)**

The smoke exhaust system is activated when a fire starts. This automatically opens mcr PROLIGHT smoke vents, mcr OSO THERM windows. The entire system is operated by the mcr 9705 or mcr 0204 control unit.

Methods for starting the electric smoke exhaust system:
» automatically when smoke is detected by the optical smoke detector signal,
» automatically (remotely) - via a signal e.g. from the fire alarming system FAS (as an option when connected)
» manually by the operator, use emergency push button on the mcr RPO-1

Electrical equipment can also be used for daily, natural ventilation of the room using the LT ventilation push button. The mcr WM1-RS1 wind and rain sensor automatically closes the smoke vents during adverse weather conditions (rain or wind).

4.7 | mcr ULTRA THERM - sample connection diagram of 24V- – smoke exhaust and ventilation in staircase



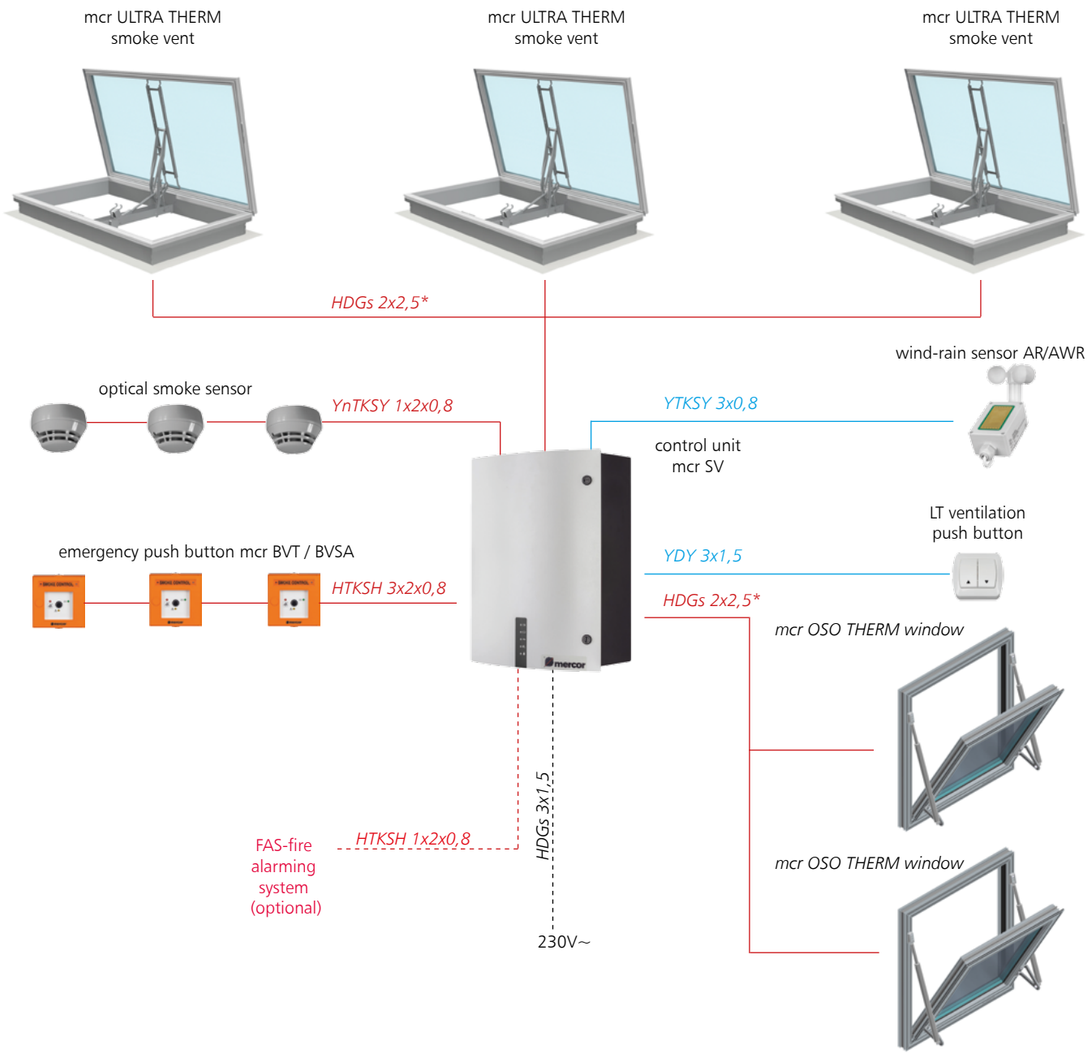
» **Description of the functioning of the electric smoke exhaust system (with mcr Ultra Therm smoke vents)**

The smoke exhaust system is activated when a fire starts. This automatically opens mcr ULTRA THERM smoke vents and mcr OSO THERM windows. The entire system is operated by the mcr SVM control unit.

Methods for starting the electric smoke exhaust system:
» automatically when smoke is detected by the optical smoke detector signal,
» automatically (remotely) - via a signal e.g. from the fire alarming system FAS (as an option when connected)
» manually by the operator, use the emergnecy push button on the mcr BVT/BVSA

Electrical equipment can also be used for daily, natural ventilation of the room using the LT ventilation push button. The mcr AR/AWR wind and rain sensor automatically closes the smoke vents during adverse weather conditions (rain or wind).

4.8 | mcr ULTRATHERM - sample connection diagram of 24V- / 48V- – smoke exhaust and ventilation



» **Description of the functioning of the electric smoke exhaust as mcr Therm System (with mcr Ultra Therm smoke vents)**

The smoke exhaust system is activated when a fire starts. This automatically opens mcr ULTRA THERM smoke vents, mcr OSO THERM windows and air supply doors. The entire system is operated by the mcr SVM control unit.

Methods for starting the electric smoke exhaust system:
» automatically when smoke is detected by the optical smoke detector signal,
» automatically (remotely) - via a signal e.g. from the fire alarming system FAS (as an option when connected)
» manually by the operator, use the emergnecy push button on the mcr BV/BVS

Electrical equipment can also be used for daily, natural ventilation of the room using the LT ventilation push button. The mcr AR/AWR wind and rain sensor automatically closes the smoke vents during adverse weather conditions (rain or wind).

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