

Technical catalogue





Smoke exhaust, heat removal and skylight systems
Technical Catalogue 11/2024

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Technical catalogue

2024

Dear Clients,

We are pleased to present to you our technical catalogue for natural smoke and heat exhaust control 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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General description

» Smoke exhaust control systems

Smoke exhaust control systems are dedicated for 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 elements 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



Fig. 1 Example of pneumatic smoke exhaust control system

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

The system is supplied from cartridges containing compressed CO₂. 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



Fig. 2 Example of electric smoke exhaust 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. | System description

Smoke vents with pneumatic smoke exhaust control systems, both point and placed 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 release valve with alcohol ampule and CO₂ cartridge,
- » alarm boxes with CO₂ cartridges: manual opening or through electric signal (24 V-; 0,3 A),
- » 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°C, 93°C, 110°C, 141°C or 182°C installed in vents,
- » **automatically (remotely)** – through 24 V- / 0,3 A electric signal from FAS / BMZ (as an option, after connection),
- » **manually** – by operator, using CO₂ alarm box.

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

1.1 | Thermal release valve

Thermal release valve is used for supplying pneumatic pressure to smoke exhaust actuator from its integrated CO₂ cartridge or CO₂ installation. The releasing of CO₂ cartridge is performed automatically after exceeding the temperature of thermal fuse (alcohol ampule) - its breakage causes the release of the needle punching the CO₂ cartridge. 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 690-41 – opening only
 - TAVZ/TAG-WV 690-42 – opening and closing
- » disposable CO₂ cartridge with 1/2" UN threaded connection,
- » alcohol ampules for temperatures: 68°C, 93°C, 110°C, 141°C, 182°C,
- » maximum working pressure: 6 MPa,
- » for needle tensioning and ampule replacement in TAVE/TAG-WV 690-41 or TAVZ/TAG-WV 690-42 thermal valves no tools are required.

TAVE/TAG-WV 690-41 type

- » smoke exhaust function: manual and remote vent opening (opening only)
- » thermal release adapted to work with the alarm box equipped with a manual alarm opening and closing 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 signal or pneumatic pressure which enables cooperation with other control systems, e.g. FAS.

TAVZ/TAG-WV 690-42 type

- » smoke exhaust function: manual and remote vent opening and closing (opening and remote closing option),
- » thermal release adapted to work with the alarm box equipped with a manual alarm opening and closing 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 signal or pneumatic pressure which enables cooperation with other control systems, e.g. FAS.



Fig. 3 TAVE/TAG-WV 690-41 thermal valve



Fig. 4 TAVZ/TAG-WV 690-42 thermal valve

1.2 | Pneumatic actuator



Fig. 5 Pneumatic actuator

Pneumatic actuator is used for opening the vents leaves 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: $0.6 \div 1.0$ 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.

1.3 | Alarm boxes



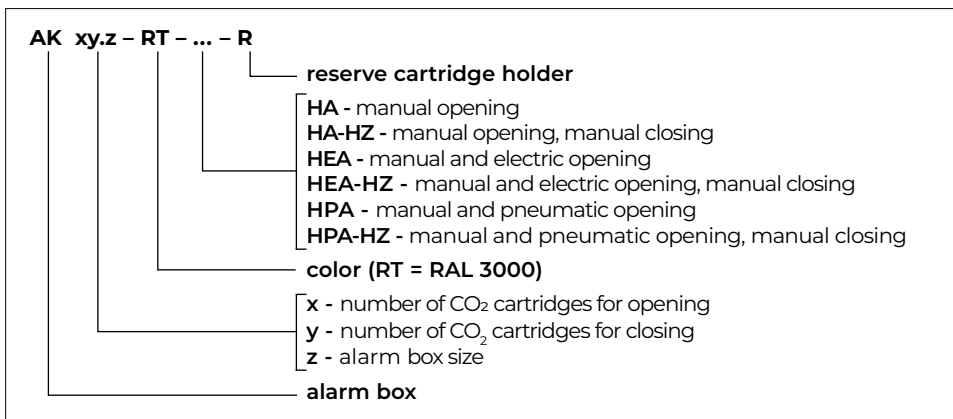
Fig. 6 AK10.5 alarm box (closed or opened)

Alarm boxes are used for emergency opening of vents using the energy of compressed CO₂ contained in the cartridge installed in the box. The release of gas occurs after manual activation of the valve by using the marked lever causing the firing pin to release, puncturing the CO₂ cartridge protection, and then gas flowing into the installation.

Specific features:

- » steel box painted in RAL 3000 red color,
- » lockable cover,
- » lever or button controlling emergency opening, including activation indicator, visible through glass panel,
- » replaceable glass panel,
- » basic functions: opening only, or opening and closing; optionally: opening by remote 24 V- 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 $\varnothing 6$ mm pipe; optionally: for 8 mm pipe, output in upper part,
- » connections for CO₂ cartridges: 1/2" UNF,
- » working temperature: $-20 \div 50$ °C,
- » maximum working pressure in CO₂ circuits: 8.0 MPa,
- » note: connection of boxes in series or parallel require 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.

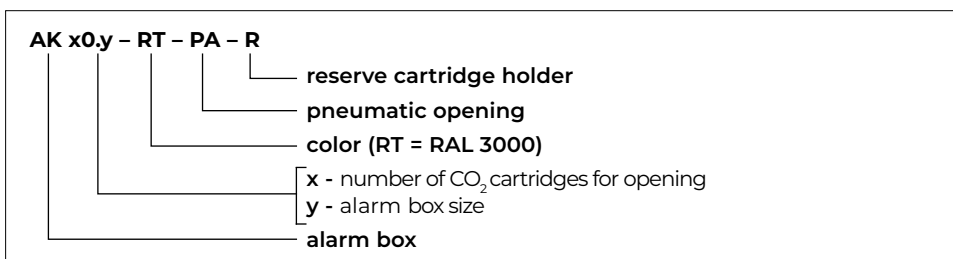
» Parameters of AK xy.z-...-R alarm boxes manually and electrically activated



ALARM BOX TYPE	W [mm]	H [mm]	D [mm]	max amount of CO ₂ to		min. CO ₂ amount in RTC [g]	min. length of external pipe [m]	VdS [*]
				OPEN [g]	CLOSE [g]			
AK 10.3-RT-...-R	200	350	130	1 x 150	-	-	-	G507003
AK 10.5-RT-...-R	200	500	130	1 x 500	-	-	-	G507003
AK 10.7-RT-...-R	200	650	130	1 x 750	-	-	-	-
AK 10.9-RT-...-R	220	700	170	1 x 1500	-	-	-	-
AK 11.3-RT-...-R	300	350	130	1 x 150	1 x 150	-	-	G507003
AK 11.5-RT-...-R	300	500	130	1 x 500	1 x 500	-	-	G507003
AK 11.7-RT-...-R	300	350	130	1 x 750	1 x 750	-	-	-
AK 11.9-RT-...-R	320	700	170	1 x 1500	1 x 1500	-	-	-
AK 20.9-RT-...-R	490	700	170	2 x 1500	-	500	10	-
AK 21.9-RT-...-R	490	700	170	2 x 1500	1 x 1500	500	10	-
AK 22.9-RT-...-R	490	700	170	2 x 1500	2 x 1500	500	10	-
AK 30.9-RT-...-R	490	700	170	3 x 1500	-	500	10	-
AK 31.9-RT-...-R	490	700	170	3 x 1500	1 x 1500	500	10	-
AK 32.9-RT-...-R	670	700	170	3 x 1500	2 x 1500	500	10	-
AK 33.9-RT-...-R	670	700	170	3 x 1500	3 x 1500	500	10	-
AK 40.9-RT-...-R	670	700	170	4 x 1500	-	500	10	-
AK 41.9-RT-...-R	670	700	170	4 x 1500	1 x 1500	500	10	-
AK 42.9-RT-...-R	670	700	170	4 x 1500	2 x 1500	500	10	-
AK 50.9-RT-...-R	670	700	170	5 x 1500	-	500	10	-

* VdS approval only valid with Color RAL 2011 and for variants HA, HA-HZ, HEA, HEA-HZ

» Parameters of pneumatically actuated AK x0.y-PA-R alarm boxes



ALARM BOX TYPE	W [mm]	H [mm]	D [mm]	max amount of CO ₂ to
				OPEN [g]
AK 10.7-RT-PA-R *	300	650	130	1 x 750
AK 10.9-RT-PA-R *	320	700	170	1x 1500
AK 20.7-RT-PA-R **	300	650	130	2 x 750
AK 20.9-RT-PA-R **	320	700	170	2x 1500
AK 30.7-RT-PA-R **	300	650	130	3 x 750
AK 30.9-RT-PA-R **	320	700	170	3x 1500

* Possibility of manual and electric opening

** An additional "pilot" box is required to trigger the pneumatic box.

1.4 | Example configurations of alarm boxes

MANUAL ALARM OPENING (HA)

- » CO₂ is released for emergency opening of the vents by manually pressing the black button.

MANUAL ALARM OPENING AND CLOSING (HA-HZ)

- » CO₂ is released for emergency opening of the vents by manually pressing the black button,
- » manual closure by moving the lever downward,
- » 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.

MANUAL AND REMOTE ALARM OPENING (HEA, HPA)

- » CO₂ is released for emergency opening of the vents by manually pressing the black button or remotely by an electric (HEA) or pneumatic (HPA) signal, which enables cooperation with other control systems, e.g. FAS.

MANUAL AND REMOTE ALARM OPENING, MANUAL CLOSING (HEA-HZ)

- » CO₂ triggering for alarm opening of the vents is done by manually pressing the black button or remotely by electrical signal (HEA), which allows cooperation with other control systems, such as FAS,
- » CO₂ triggering for alarm closure of the vents is done by moving the lever down manually,
- » 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.

1.5 | Ventilation boxes

Ventilation boxes are used to open and close the vents for the purpose of comfort ventilation. The boxes contain valves that control the opening and closing of the dampers and the air preparation system.



Fig. 7 Example of ventilation box

Specific features:

- » steel box painted in RAL 5012 color,
- » lockable door, opened to the bottom in standard,
- » valves control through levers outside the box,
- » Ø6 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 zones and smoke removal, and interfacing with alarm boxes,
- » options 2: optional cooperation with an alarm box for alarm opening or opening and closing, with weather monitoring unit for automatic closing of vents in case of rain and strong wind; optional remote opening and closing controlled electrically or pneumatically.

» 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

1.6 | Example configurations

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

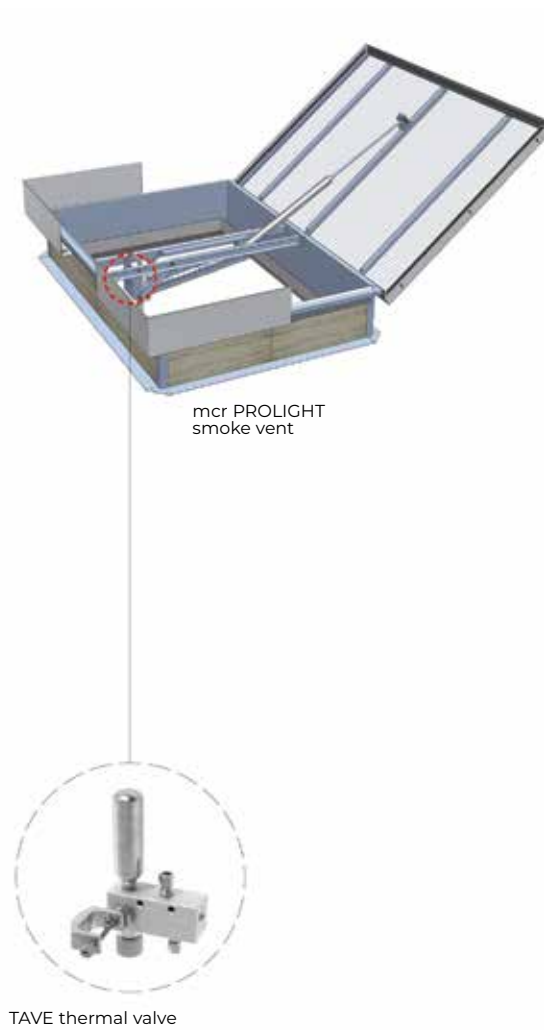


Fig. 8 Smoke exhaust function – automatic alarm opening, by thermal valve with thermal fuse

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.

1.6.2 | Automatic and manual vent opening (smoke exhaust)

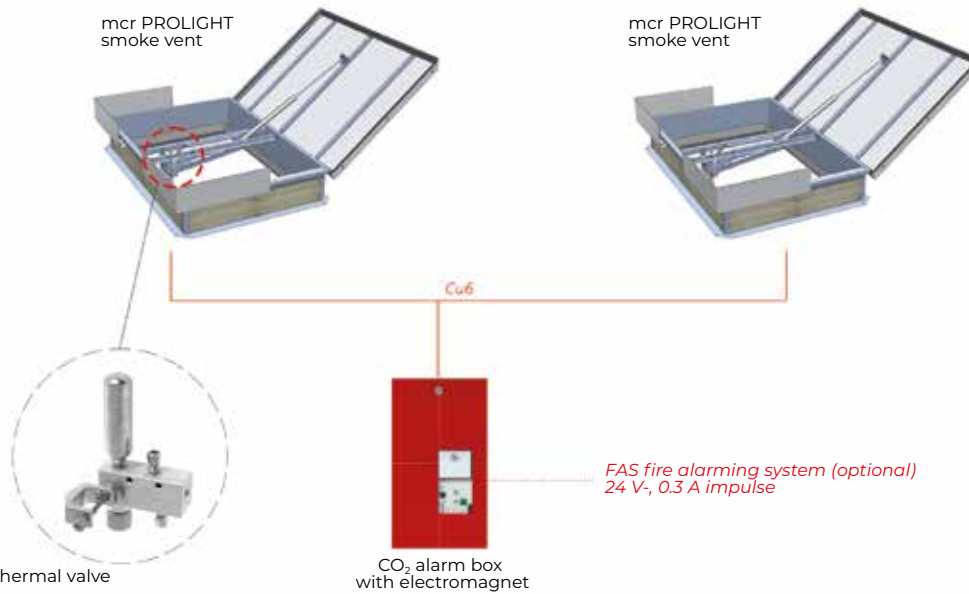


Fig. 9 Smoke exhaust function – automatic and manual alarm opening

Devices list

- » pneumatic actuator for smoke exhaust,
- » TAVE or TAG-WV 690-41 thermal valve,
- » alarm box, AK 10.5-RT-HA-R or AK 10.5-RT-HEA-R for cooperation with FAS.

NOTE

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

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

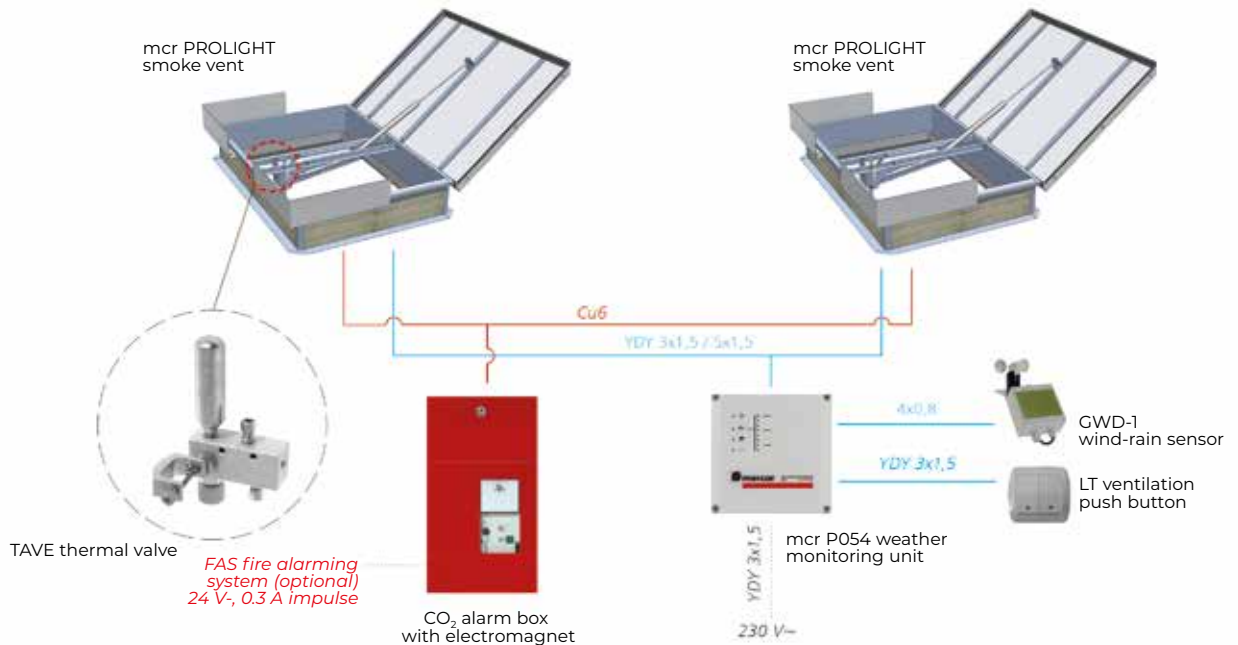


Fig. 10 Smoke exhaust function – automatic and manual alarm opening

Devices list

- » pneumatic actuator for smoke exhaust,
- » TAVE or TAG-WV 690-41 thermal valve,
- » alarm box, e.g. AK 10.7-RT-HA-R or AK 10.7-RT-HEA-R for cooperation with FAS,
- » E type actuator for daily ventilation,
- » ventilation push button,
- » mcr P054 weather monitoring unit,
- » GWD-1 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.

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

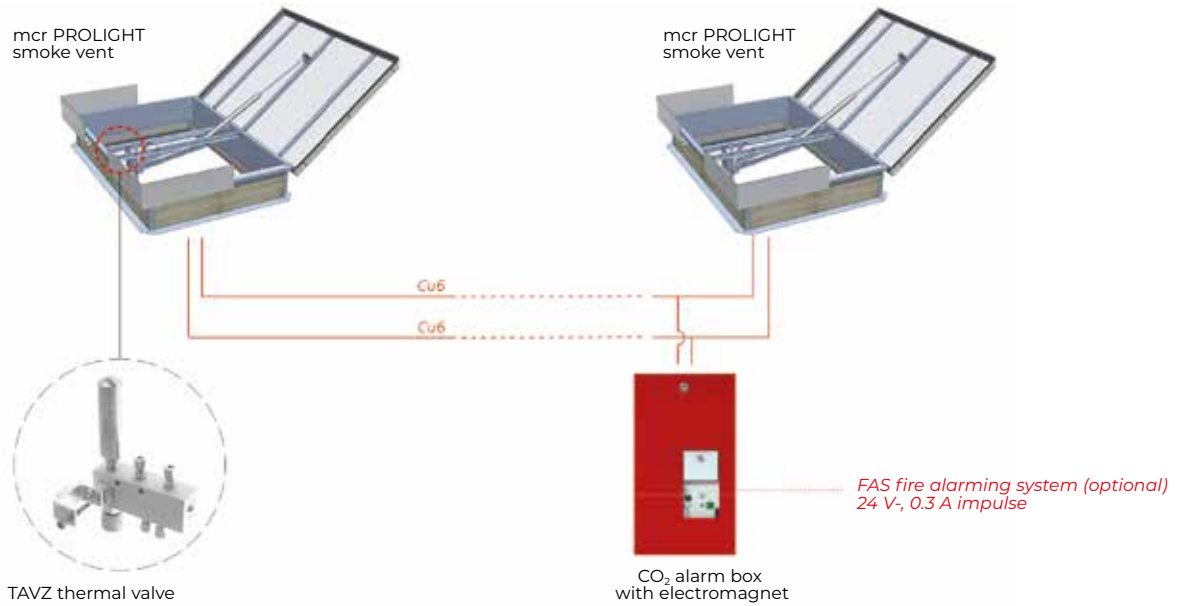


Fig. 11 Smoke exhaust function – automatic alarm opening and manual opening

Devices list

- » pneumatic actuator for smoke exhaust,
- » TAVZ or TAG-WV 690-42 thermal valve,
- » alarm box with AK 11.7-RT-HA-HZ-R lub AK 10.7-RT-HEA-HZ-R for cooperation with FAS.

NOTE

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

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

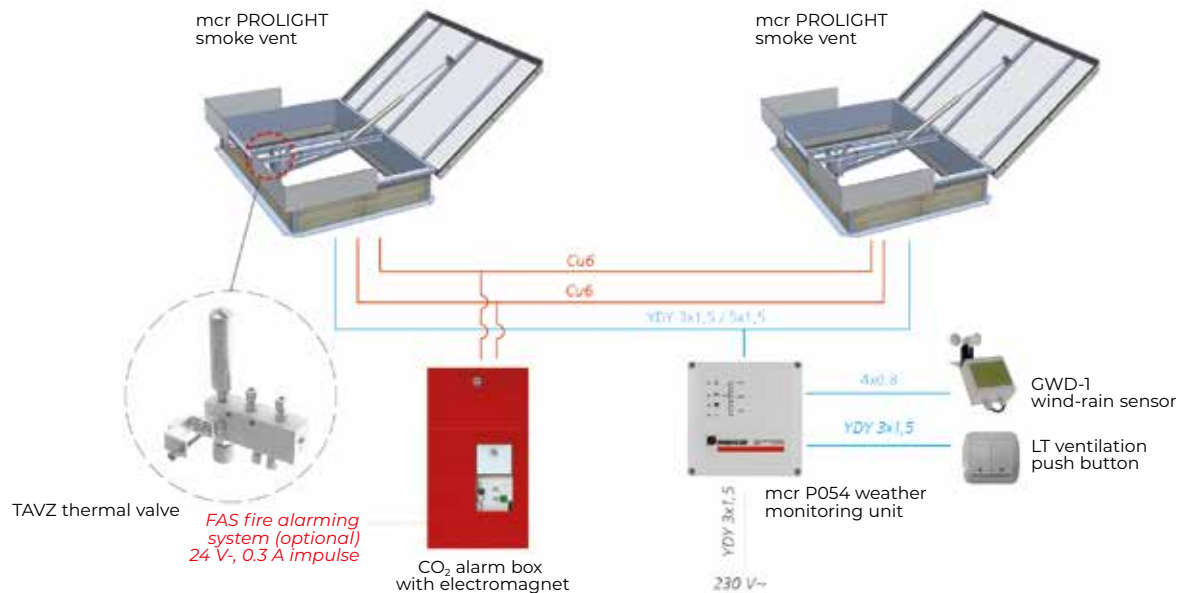


Fig. 12 Smoke exhaust function – automatic and manual alarm opening

Devices list

- » pneumatic actuator for smoke exhaust,
- » TAVZ or TAG-WV 690-42 thermal fuse,
- » alarm box, e.g. AK 11.7-RT-HA-HZ-R lub AK 10.7-RT-HEA-HZ-R for cooperation with FAS,
- » E type air inlet actuator,
- » ventilation push button,
- » mcr P054 weather monitoring unit,
- » GWD-1 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.

1.6.6 | Automatic and manual vent opening (smoke exhaust), manual closing, pneumatic comfort ventilation

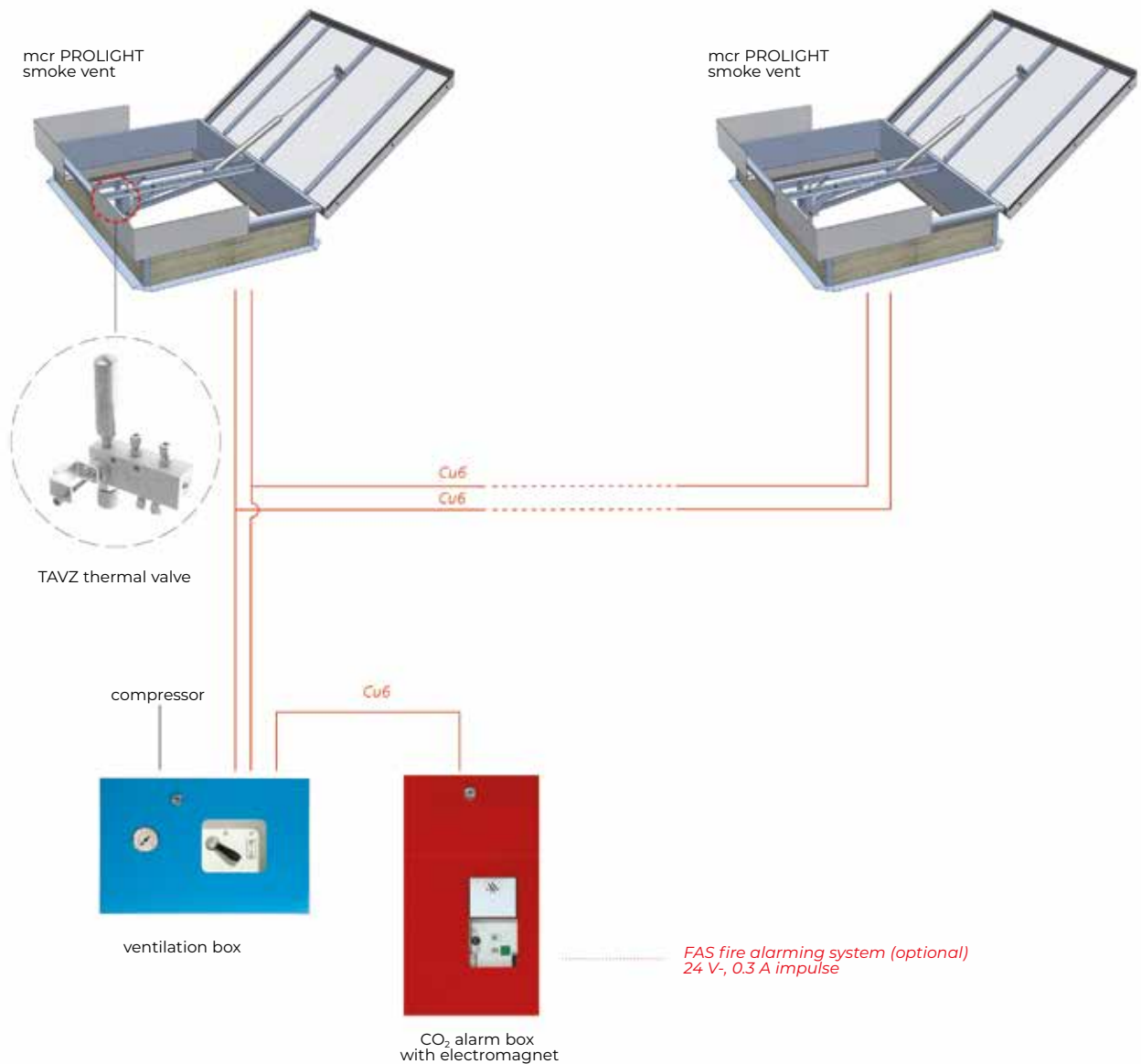


Fig. 13 Smoke exhaust function – automatic and manual alarm opening, with thermal release valve and alarm box (opening) and pneumatic ventilation function with ventilation box (open/close) – 2-pipe system

Devices list

- » pneumatic actuator for smoke exhaust,
- » pneumatic actuator for ventilation,
- » ZSV-BVE valve,
- » TAVZ or TAG-WV 690-42 thermal valve
- » ventilation box with an option for cooperation with FAS, for example, PLZ30.1.1-...,
- » alarm box, e.g. AK 10.7-RT-HA-R or AK 10.7-RT-HEA-R for cooperation with FAS.

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. | 24 V- 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 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 fire alarm buttons,
- » optical smoke sensors,
- » ventilation push buttons – optional,
- » weather monitoring unit mcr P054 with wind-rain sensor GWD-1 (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 from FAS/BMZ,
- » **manually** – by RPO-1 fire alarm 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 rain (to protect the user's 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" S.A. electric smoke exhaust system based on alarm signal from thermal or optical smoke sensors, from manual alarm button or from another control unit (e.g. fire alarm system, building automatics system). The control unit is supplied from 230 V~ and feeds 24 V- voltage to electric smoke exhaust system devices. Thanks to its batteries, control unit 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 system (NC voltage-free contact or 24 V- signal),
- » activation by the use of alarm buttons,
- » automatic activation from conventional smoke sensors (thermal or optical),
- » co-operation with mcr RPO-1 fire alarm button,
- » providing information of system status: ready / alarm / fault / opening,
- » manual opening of smoke exhaust vents for daily ventilation during normal operation without alarm state,
- » 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. 14 mcr 9705 control unit



» Technical data of mcr 9705 control unit.

PARAMETER	VALUE	
model	5 A	8 A
supply voltage	230 V~, 50 Hz	
nominal power	150 VA	250 VA
output voltage, max current	24 V-, max. 5.2 A	24 V-, max. 8.0 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	

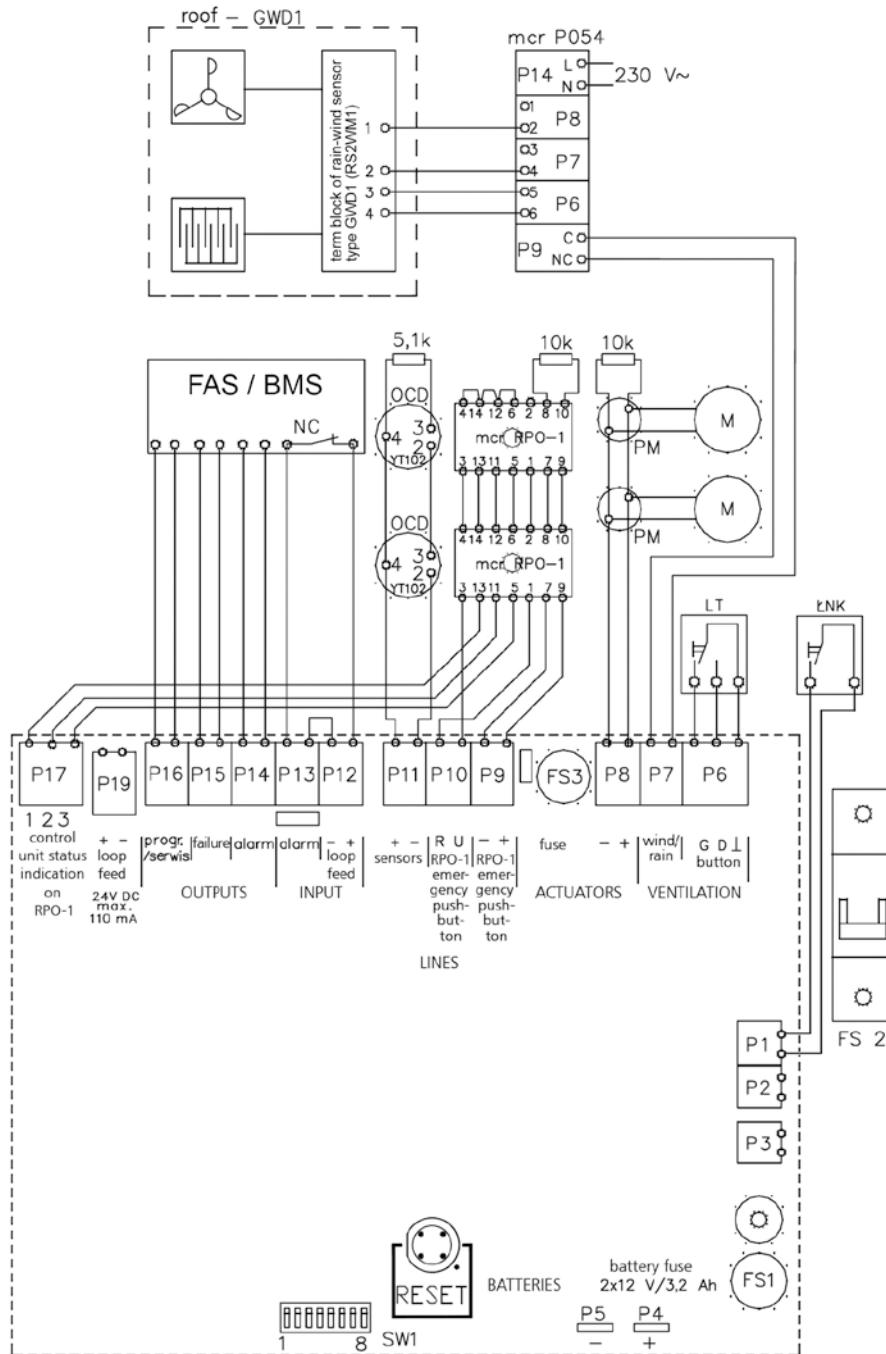
» mcr 9705 – 5 A control units series of types

UNIT TYPE	SUPPLY VOLTAGE	NUMBER OF OUTPUTS (ACTUATOR LINES) LOAD CAPACITY	CASING DIMENSIONS [mm]	NOMINAL POWER [VA]	BATTERIES
mcr 9705-5 A	230 V~ 50 Hz	5 A (basic)	300 x 300 x 120	150	2 x (12 V-, 3.3...3.6 Ah)
mcr 9705-10 A		2 x 5 A	400 x 400 x 200	300	4 x (12 V-, 3.3...3.6 Ah)
mcr 9705-15 A		3 x 5 A	600 x 600 x 200	450	6 x (12 V-, 3.3...3.6 Ah)
mcr 9705-20 A		4 x 5 A	600 x 600 x 200	600	8 x (12 V-, 3.3...3.6 Ah)
mcr 9705-25 A		5 x 5 A	800 x 600 x 300	750	10 x (12 V-, 3.3...3.6 Ah)
mcr 9705-30 A		6 x 5 A	800 x 600 x 300	900	12 x (12 V-, 3.3...3.6 Ah)

» mcr 9705 – 8 A control units series of types

UNIT TYPE	SUPPLY VOLTAGE	NUMBER OF OUTPUTS (ACTUATOR LINES) LOAD CAPACITY	CASING DIMENSIONS [mm]	NOMINAL POWER [VA]	BATTERIES
mcr 9705-8 A	230 V~ 50 Hz	8 A (basic)	300 x 300 x 120	250	2 x (12 V-, 3.3...3.6 Ah)
mcr 9705-16 A		2 x 8 A	400 x 400 x 200	500	4 x (12 V-, 3.3...3.6 Ah)
mcr 9705-24 A		3 x 8 A	600 x 600 x 200	750	6 x (12 V-, 3.3...3.6 Ah)
mcr 9705-32 A		4 x 8 A	600 x 600 x 200	1000	8 x (12 V-, 3.3...3.6 Ah)
mcr 9705-48 A		6 x 8 A	800 x 600 x 300	1500	12 x (12 V-, 3.3...3.6 Ah)

2.2 | Typical configuration of smoke exhaust system with mcr 9705-5 A control unit



- LT – ventilation push button
- ENK – key switch for activating the “hatch” mode
- FAS / BMZ – fire alarm system
- mcr RPO-1 – fire alarm button
- mcrP054 – weather monitoring unit
- M – electric actuator
- OCD – optical smoke sensor
- PM – junction box
- FS1 – battery fuse
- FS2 – 230 V~ main fuse
- FS3 – power supply fuse
- SW1 – configuration switch for control unit (see operation and maintenance)

2.3 | mcr 0204 control unit

mcr 0204 unit is used to activate devices of “MERCOR” S.A. electric smoke exhaust system based on alarm signal from thermal or optical smoke sensors and from manual alarm button. The control unit is supplied from 230 V~ and feeds 24 V- voltage to electric smoke exhaust system devices. Thanks to its batteries, control unit 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:

- » activation by the use of alarm buttons,
- » automatic activation from conventional smoke sensors,
- » co-operation with mcr RPO-1 alarm button,
- » providing information of system status: alarm/fault,
- » manual opening of smoke exhaust vents for daily ventilation during normal operation without alarm state,
- » 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).

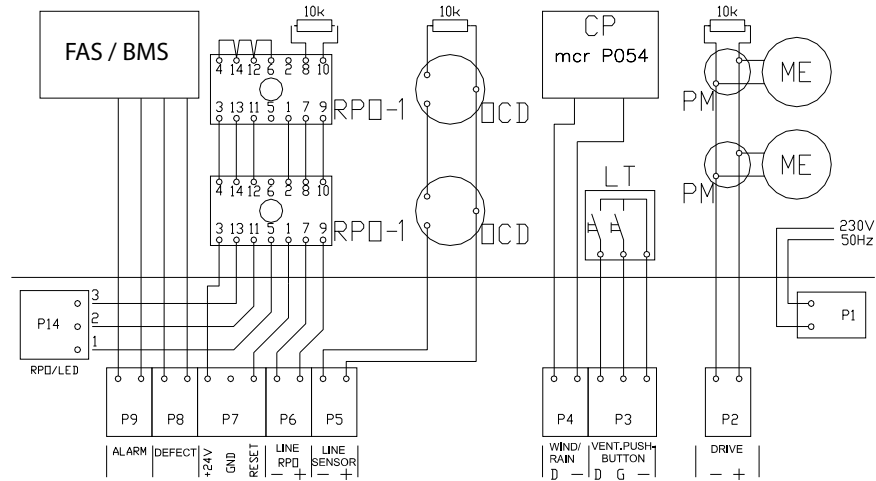


Fig. 15 mcr 0204 control unit

» Technical data of mcr 0204 control unit

PARAMETER	VALUE
supply voltage	230 V~, 50 Hz
nominal power	100 VA
output voltage, max current	24 V-, max. 4 A
battery back-up	2 pcs. of 12 V-, 2 Ah batteries, connected in series
operating temperature range	-10°C ÷ 40°C
maximum thickness of wires entering the unit	1.5 mm
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

2.4 | Typical configuration of smoke exhaust system with mcr 0204 control unit



- FAS / BMZ – fire alarm system
- OCD – optical smoke sensor
- mcr RPO-1 – fire alarm button
- PM – junction box
- M – electric actuator
- mcr P054 – 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

2.5 | mcr R0424, mcr R0448 extension modules

mcr R04xx extension module is used for supplying a single group of 24 V- actuators of total current consumption from 24 A up to 48 A, depending on variant. The module is controlled by 24 V- signal from mcr 9705 or mcr 0204 control units (from actuators line output). The modules are made in 7 variants, for example:

- » mcr R0424-1 1 output line 24 A,
- » mcr R0424-2 2 output lines 12 A each,
- » mcr R0424-K (for curtains) 1÷10 output lines, 24 A,
- » mcr R0448-1 1 output line 48 A,
- » mcr R0448-2 2 output lines 24 A each,
- » mcr R0448-4 4 output lines 12 A each,
- » mcr R0448-K (for curtains) 1÷10 output lines, 48 A.

The device, in combination with mcr control unit, allows for detection of all damaged actuator lines connected to it. Battery back-up 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 to 24 hours.

mcr R04xx module features signaling of the following states:

- » 230 V~ supply correct green LED
- » actuators actions yellow LED,
- » failure yellow LED,
- » and signal sent to the control panel (in case of actuator line failure, lack of mains power supply, lack of 24 V- backup power supply).

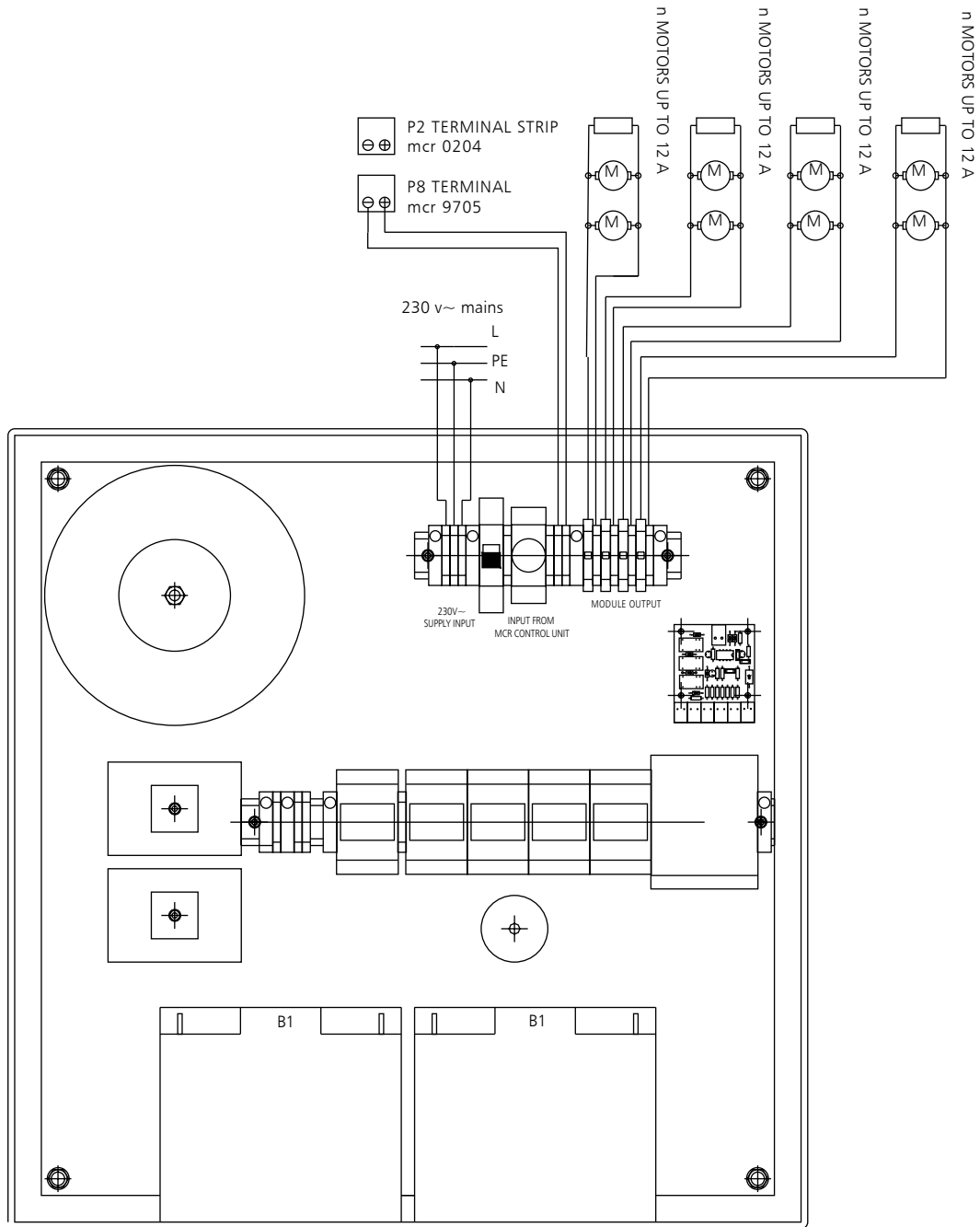


Fig. 16 mcr R04xx extension module

» Technical data of mcr R0424 and mcr R0448 extension modules

PARAMETER	VALUE									
	mcr R0424			mcr R0448						
type	0424-1		0424-2	0424-K			0448-1	0448-2	0448-4	0448-Kx
variant	0424-1	0424-2	0424-K	0448-1	0448-2	0448-4	0448-Kx			
number of output lines (actuators) and line carrying capacity	1 x 24 A	2 x 12 A	for mcr PROSMOKE CE curtains	1 x 48 A	2 x 24 A	4 x 12 A	for mcr PROSMOKE CE curtains			
power supply voltage	230 V~, 50 Hz									
nominal power	750 VA			1500 VA						
output voltage	24 V-									
operating temperature range	-5°C ÷ 40°C									
dimensions (height x width x depth)	600 x 600 x 200 mm									
casing protection rating	IP 54									
cables output	from the back or top of casing									

2.6 | Typical configuration of mcr R0448 extension module (4 x 12 A)



2.7 | 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 fusing of alarm state. The sensors are equipped with optical fusing 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 fusing indicators. The sensors are installed in appropriate consoles.

» Technical details

PARAMETER	VALUE
operating voltage	10.8 - 33 V-
max. monitoring current	80 [µA]
alarm current	22/55< [mA]
operating temperature range	-10 ÷ 50 [°C]
max. relative humidity	0 – 95 [%] without condensation and icing
dimensions of sensor, incl. socket	Ø100 x 46 [mm]
weight, incl. socket	130 g / set with base
color	white



Fig. 17 SD 119-2 optical smoke sensor

2.8 | mcr RPO-1 fire alarm button

mcr RPO-1 fire alarm button is used in smoke exhaust systems for manual alarm triggering and for indication of operating status of the smoke exhaust unit. Additionally, the button allows for reset of control panel.

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 fire alarm button.

The button is dedicated for working with mcr 0204 and mcr 9705 smoke exhaust control units.

Button is designed for installation inside buildings.

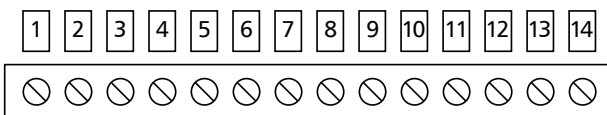
» Technical details

PARAMETR	VALUE
alarm button parameters	24 V-, max 100 mA
operating temperature range	-5°C ÷ 40°C
casing protection rating	IP 3X
dimensions (width x height x depth)	135 x 135 x 33 mm
min. number of wires in cable running to unit	7 (e.g. 4 x 2 x 0.8)
casing color	orange



Fig. 18 mcr RPO-1 fire alarm button

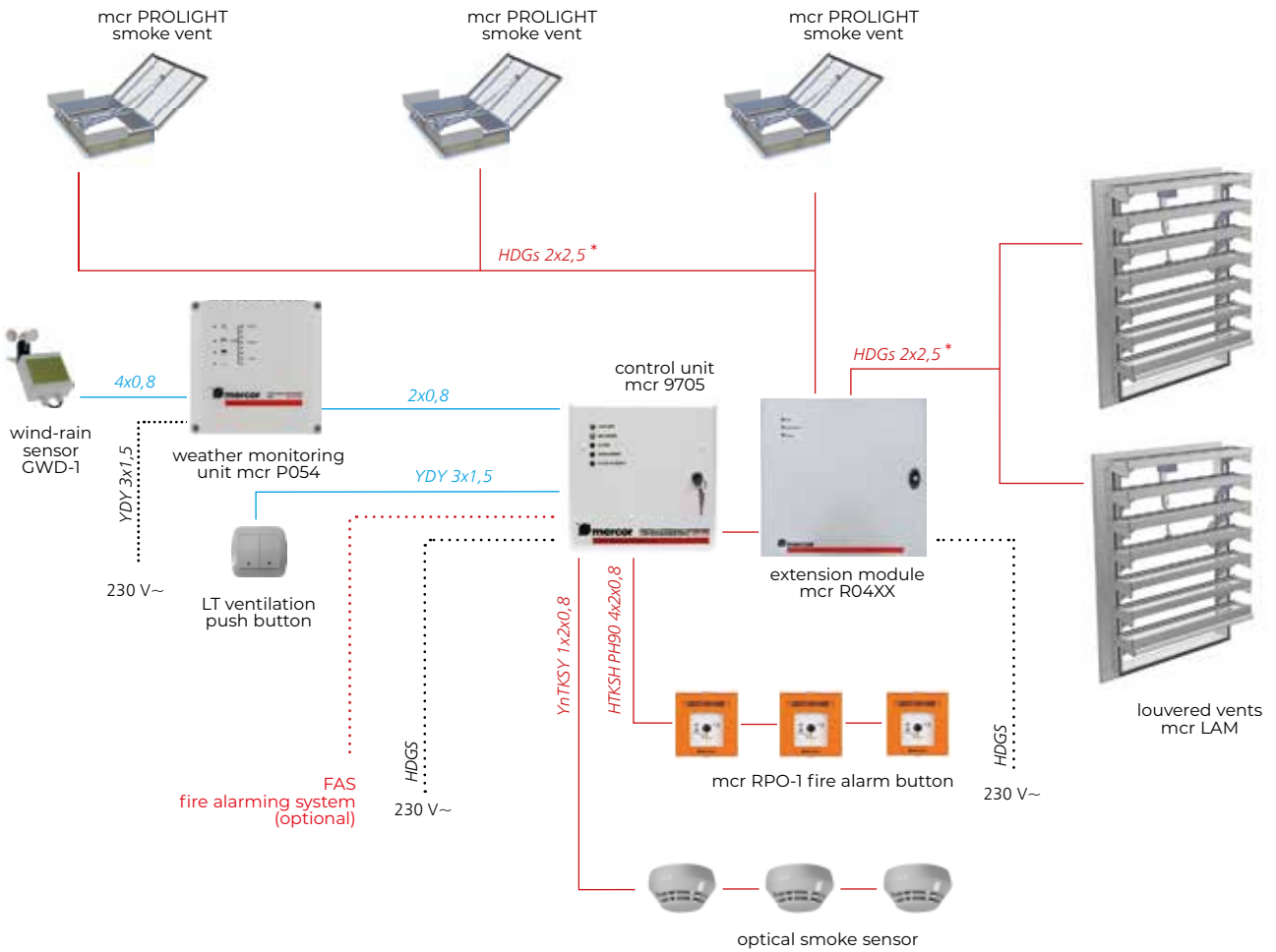
» RPO-1 terminal strip description



- 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

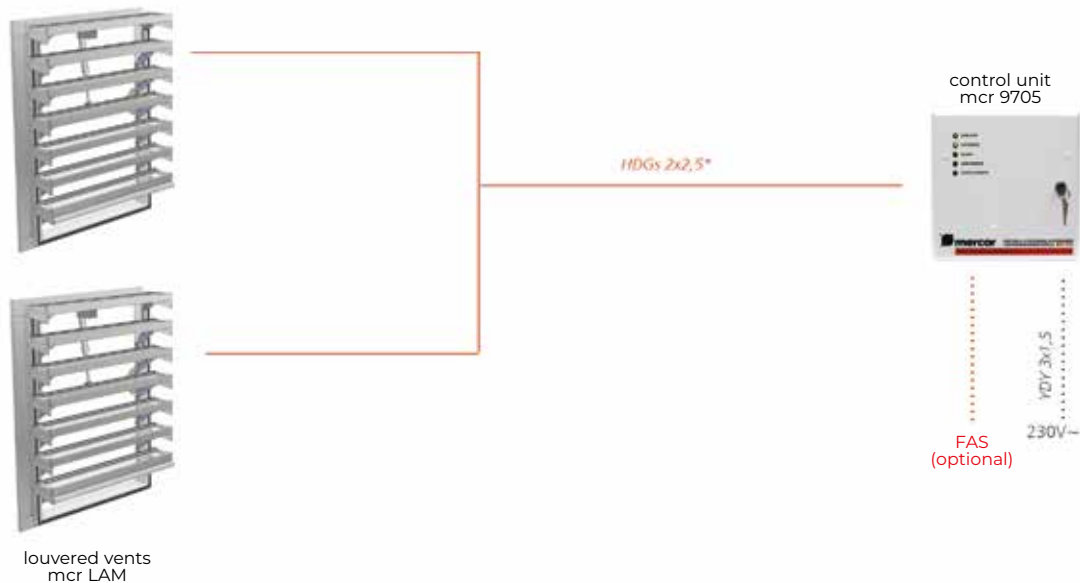
2.9 | Example configurations

2.9.1 | Example connection diagram of 24 V- smoke exhaust and ventilation



* Example cable type

2.9.2 | Example connection diagram of 24 V- 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 230 V~ 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 mcr P054 with GWD-1 wind-rain sensor,
- » LT ventilation push button, and additional equipment,
- » ventilation actuators,
- » electrical system.

Operating principle of electric ventilation system

Ventilation 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 based on parameters from WM wind sensor and RS 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,
- » rain intensity is preset by the user (minor rainfall – intense rainfall),
- » 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 LED,
 - “wind” alarm – red LED,
 - “rain” alarm – red LED,S
 - “vent open” indication – yellow LED,
 - wind speed indication – light scale: 7 yellow and 1 red LED (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 output from top or back of casing.



Fig. 19 mcr P054 weather monitoring unit

» Accessory equipment for the weather panel

KE 2a expansion module:

Control contactor for expanding the mcr P054 weather panel into more than four independent control groups that will be simultaneously closed during rain and wind.

- » control voltage 230 V~, voltage free contact 5 A/ 230 V~,
- » casing made of thermoplastic material, grey RAL 7035,
- » dimensions: 158 x 118 x 76 [mm] (width x height x depth),
- » control contactor with six contacts for expanding the weather panel with five independent groups.

3.2 | GWD-1 wind-rain sensor

The device consists of two components:

WM wind sensor:

- » sensor for measuring wind speed,
- » sold with rain sensor on mounting console.

RS rain sensor:

- » heated rain sensor (heating is enabled after sensor fuseing, and is disabled after its drying),
- » gold-plated sensing area 80 cm²,
- » sold with wind sensor on mounting console.

Example connection cable of GWD-1 sensors set to weather monitoring unit: YTKSY2x2x0,8.

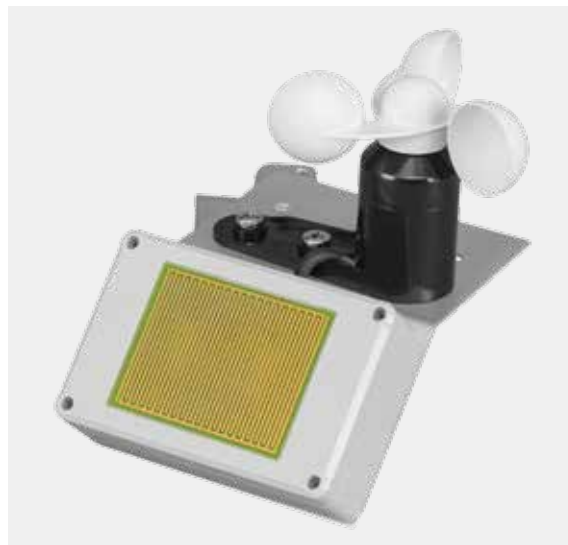


Fig. 20 GWD-1 wind-rain sensor

3.3 | Connection diagrams of mcr P054 weather monitoring unit and GWD-1 wind-rain sensors

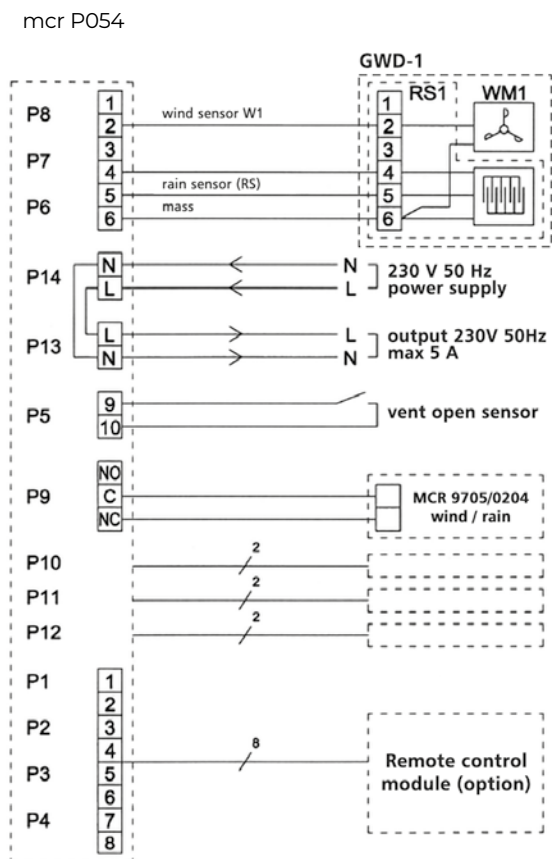


Fig. 21 Connection diagram of mcr P054 weather monitoring unit with GWD-1 wind-rain sensors

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	LOAD CAPACITY	CLOSING FORCE	POWER CONSUMPTION	EXTENSION	CASING MATERIAL	OPERATING MODE (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%

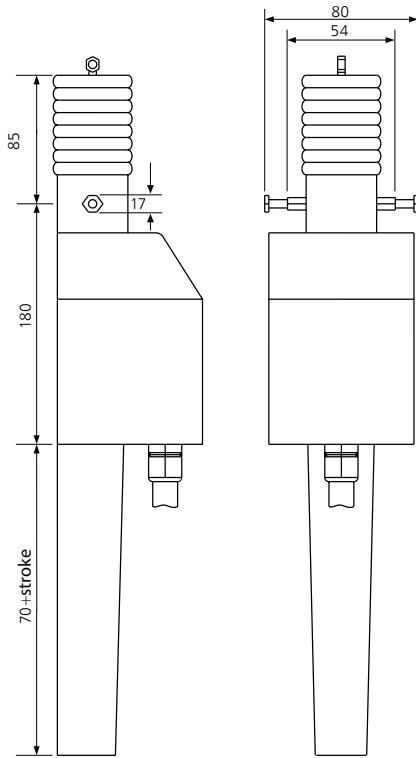


Fig. 22 Dimensions of mcr E actuator

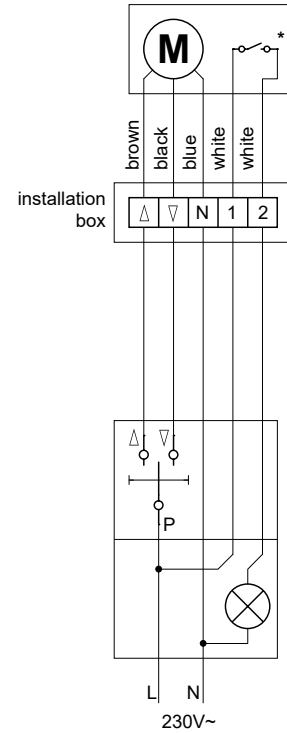


Fig. 23 Connections diagram for mcr E actuator

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

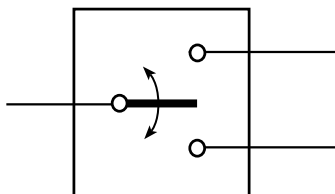


Fig. 24 LT ventilation button switch

3.6 | Configurations of 230 V~ electric ventilation control system

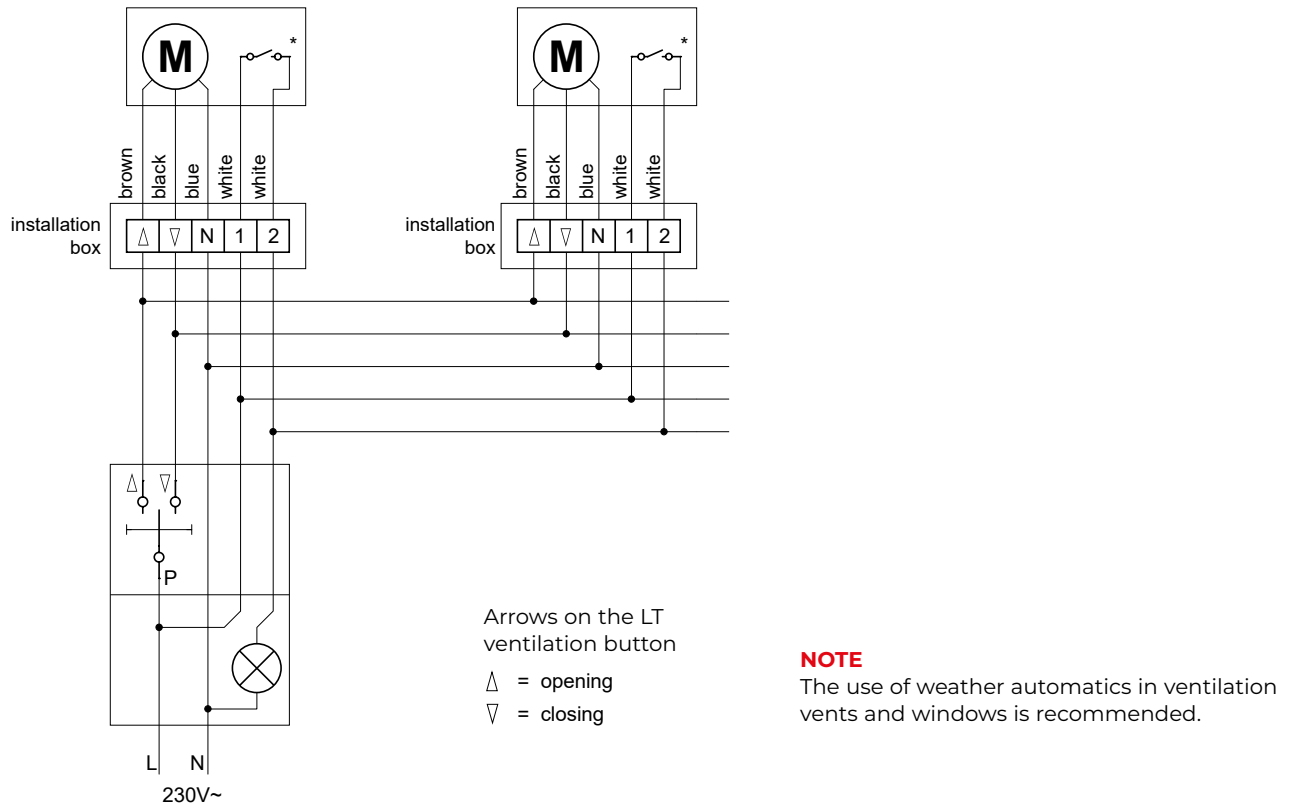


Fig. 25 Connections diagram for 230 V~ electric ventilation control system

3.7 | Electric ventilation control system – with weather monitoring unit

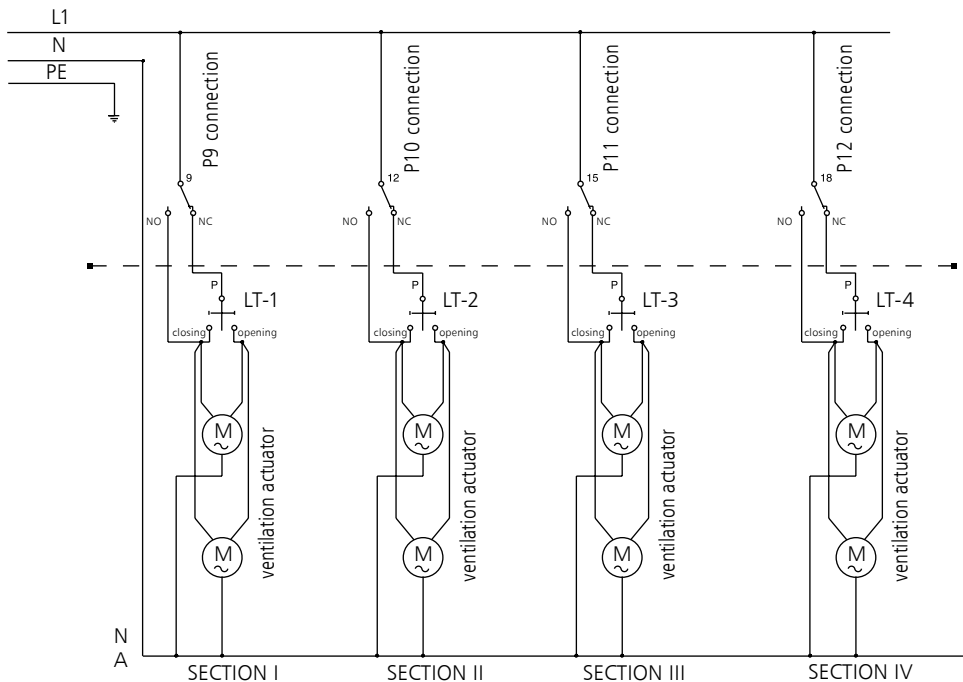
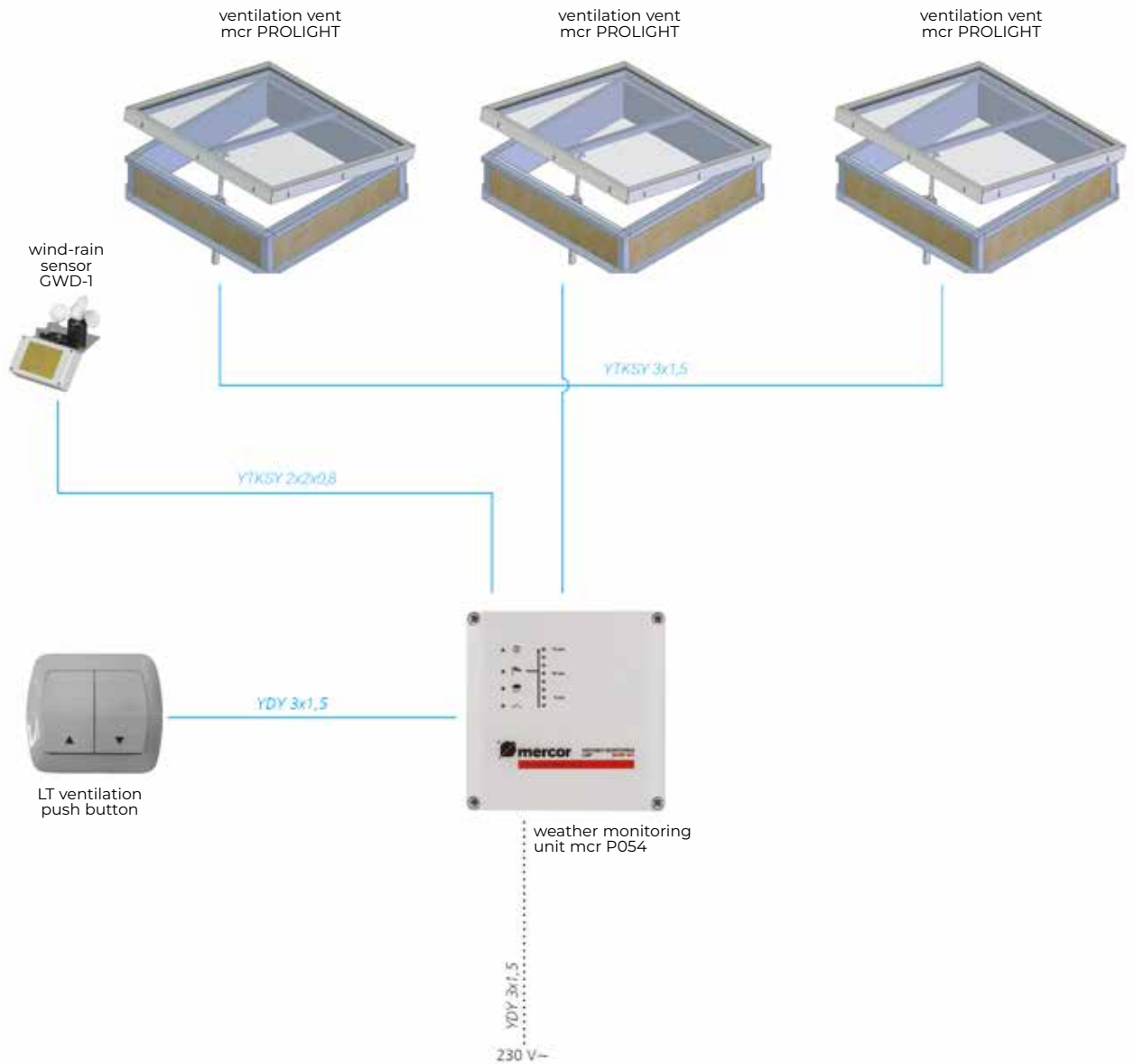


Fig. 26 Connections diagram of ventilation actuators to mcr P054 weather monitoring unit and GWD-1 wind-rain sensor

3.8 | Example configurations of 230 V~ electric ventilation control system



4. | Electrical smoke and ventilation control system 24 V-/48 V-

4.1 | mcr SVM / SVM EI 24 V- 5 A or 8 A 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 230 V~ and provides 24 V- 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 fire alarm buttons,
- » automatic alarm activation from smoke detectors,
- » comfort ventilation through manual buttons,
- » comfort ventilation through remote control (option),
- » transfer of all information to another SVM or SV-ds 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 control panel with EI option (SVM EI) is in addition equipped with: "The Fireman Priority" override switch input, which allows for the Fireman to control the panel regardless of sensor inputs.



Fig. 27 mcr SVM / SVM EI

TECHNICAL SPECIFICATIONS	SVM 24 V- 5A	SVM 24 V- 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	5 A	8 A
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 24 V- / 48 V- control unit

Classification in accordance with EN 12101-10 (CE Certificate). mcr SV-ds 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~ and provides 24 V- or 48 V- 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 fire alarm buttons,
- » automatic alarm activation from smoke detectors,
- » comfort ventilation through manual buttons,
- » comfort ventilation through remote control (option),
- » transfer of all information to another mcr SV-ds 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
 - control unit failure
 - actuator line failure
 - AC supply failure
 - DC battery failure
 - alarm state



Fig. 28 mcr SV-ds

TECHNICAL SPECIFICATIONS	mcr SV 24 V-xx-ds Control Panels	mcr SV 48 V-xx-ds Control Panels
Power supply	230 V~ +- 15% / max. 5 A	230 V~ +- 15% / max. 10 A
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	8 A / 24 A / 30 A / 32 A	8 A / 24 A / 30 A / 32 A
Max. load each motor output	4 A / 16 A	4 A / 16 A
Batteries	8 A – 24 A = 2 pcs. 12 V- / 7.2 Ah 30 A – 32 A = 2 pcs. 12 V- / 12 Ah	8 A – 24 A = 4 pcs. 12 V- / 7.2 Ah 30 A = 2 pcs. 12 V / 12 Ah + 2 pcs. 12 V- / 7.2 Ah 32 A = 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) = 14 mA = 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 ≈ approx. 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 fire alarm button / Firemans Priority Switch

Fire alarm button is used in desmoking systems for manual alarm triggering 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-ds control units.

Technical Data
mcr BVT
Functions: Alarm, reset, sound indicator
LED indication: "ok" (green), "error" (yellow), "alarm activated" (red)
Size: 125 mm x 125 mm x 36 mm (W x H x D)
Color: Grey or Orange
Protection degree: IP 40



Fig. 29 mcr BVT

Technical Data
mcr BVSA
Functions: Alarm, reset, sound indicator
LED indication: "ok" (green), "error" (yellow), "alarm activated" (red)
Size: 125 mm x 125 mm x 75 mm (W x H x D)
Color: Grey or Orange
Protection degree: IP 65



Fig. 30 mcr BVSA

Technical Data
Firemans Priority Switch
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)
Color: Orange
Protection degree: IP 40



Fig. 31 Firemans Priority Switch

4.4 | 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~ / 8 A or 24 V- / 8 A. 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. It is designed for mcr SVM or mcr SV-ds control units.

Technical Data
Power supply: 18 V – 35 V- / 20 V – 35 V- / 200 V – 250 V~
Output contact: NO-NC 1 x potential free change-over contact
Contact rating: 250 V~ / 8 A or 24 V- / 8 A
Dimensions: 80 x 160 x 55 mm (W x H x D / without wind wheel)
Weight: approx. 0.7 kg
Protection class: IP 65
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

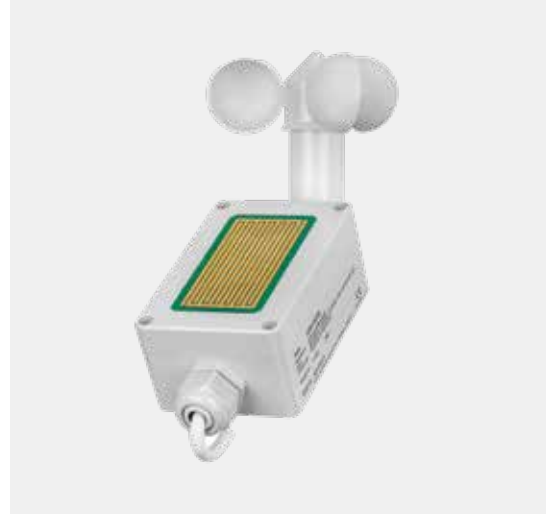


Fig. 32 mcr AR/AWR 24/250 Wind & Rain Sensor

4.5 | Remote Control for mcr SVM and mcr SV-ds control units

Enables wireless control of comfort ventilation in mcr SVM and mcr SV-ds 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: approx. 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: IP 65



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

4.6 | Electric chain actuator mcr HCV Door Drive 24/36/48 V- 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 500 N force at chain entrance point,
- » 600 mm chain length,
- » soft Close function (reduced closing speed),
- » 2.5 m Silicone cable,
- » casing 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)
HCV 500/600mm	24 V- / 1.4 A 36 V- / 1.05 A 48 V- / 0.7 A	500 / 500	90°	2000 N	IP 32	-25°C – +75°C	7	10	587 x 82 x 41

» Dimensions

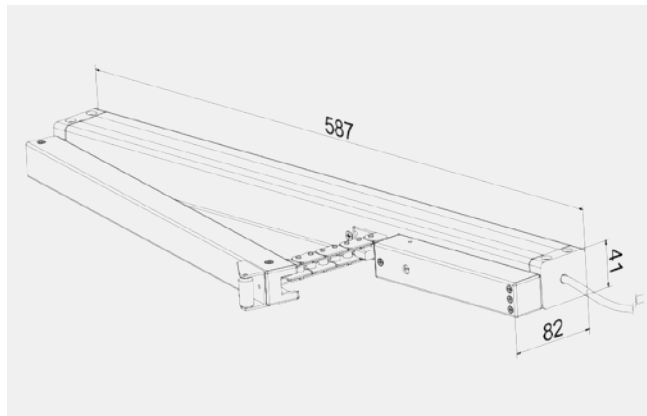


Fig. 35

» Opening bracket set for Inwards

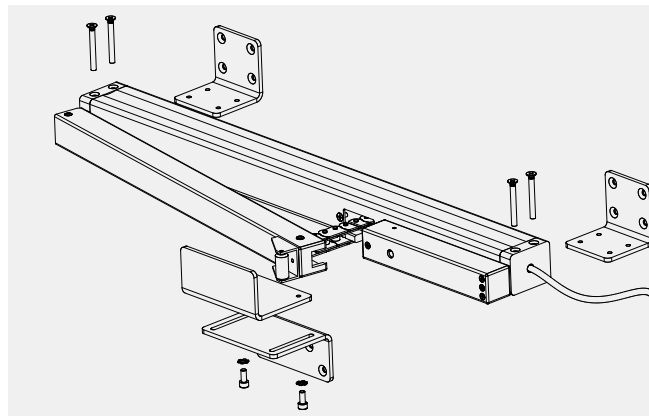


Fig. 36

» Outwards opening

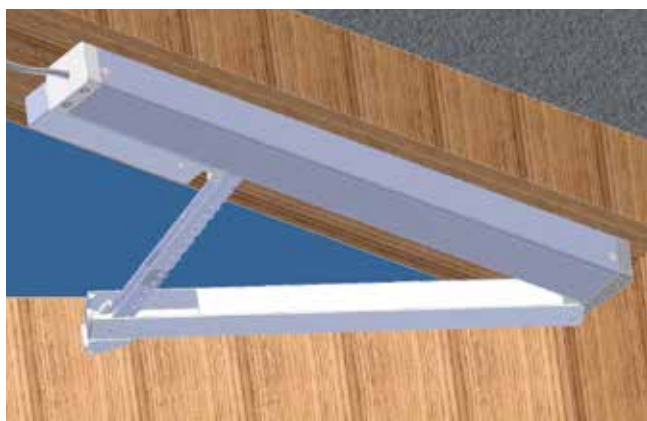


Fig. 37

» Inwards opening

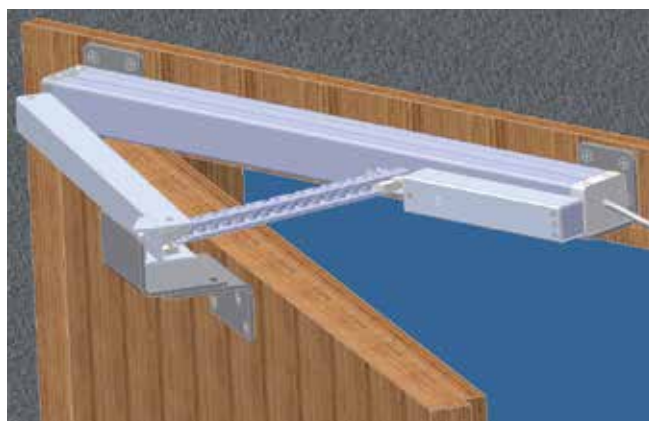
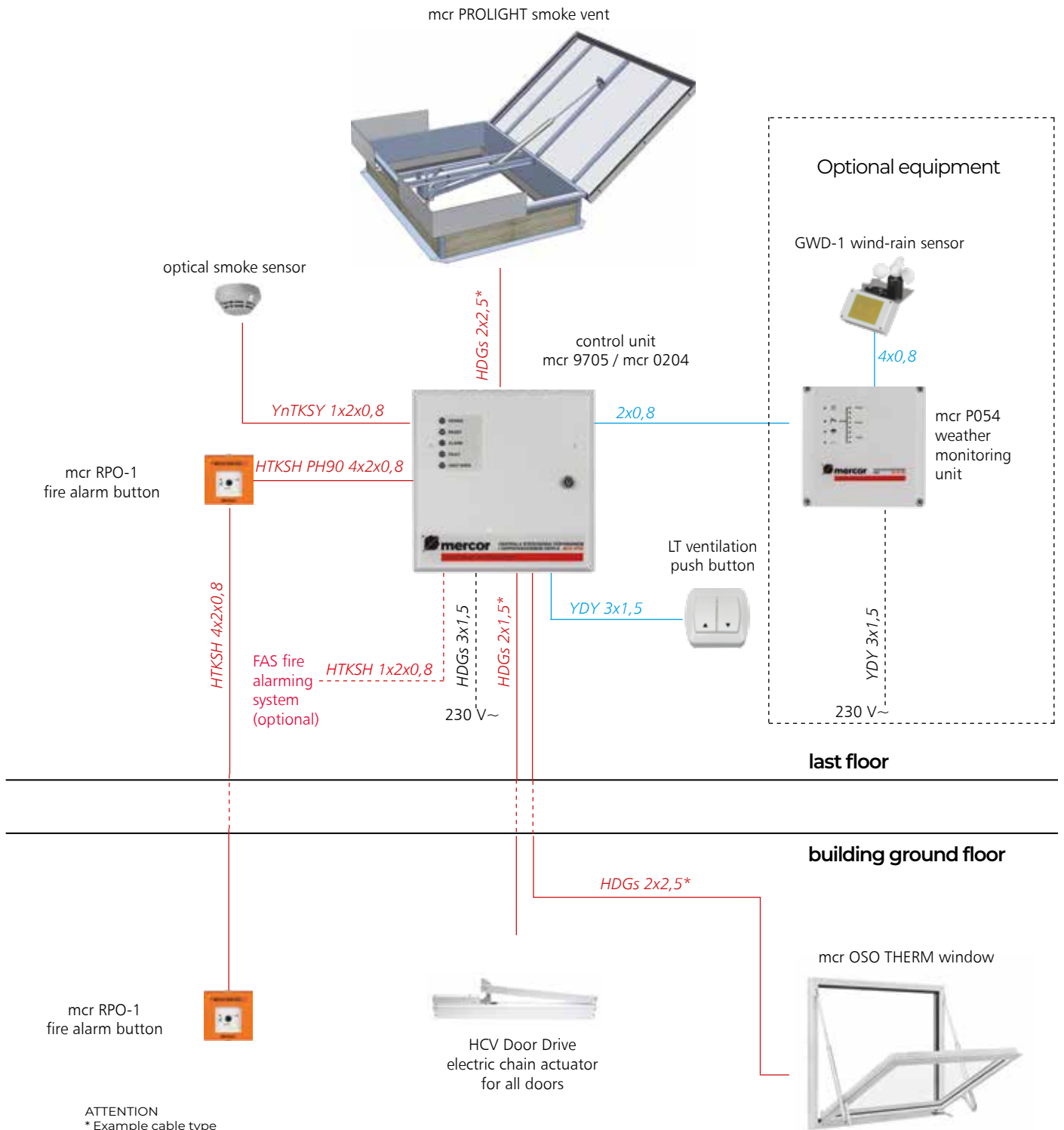


Fig. 38

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



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

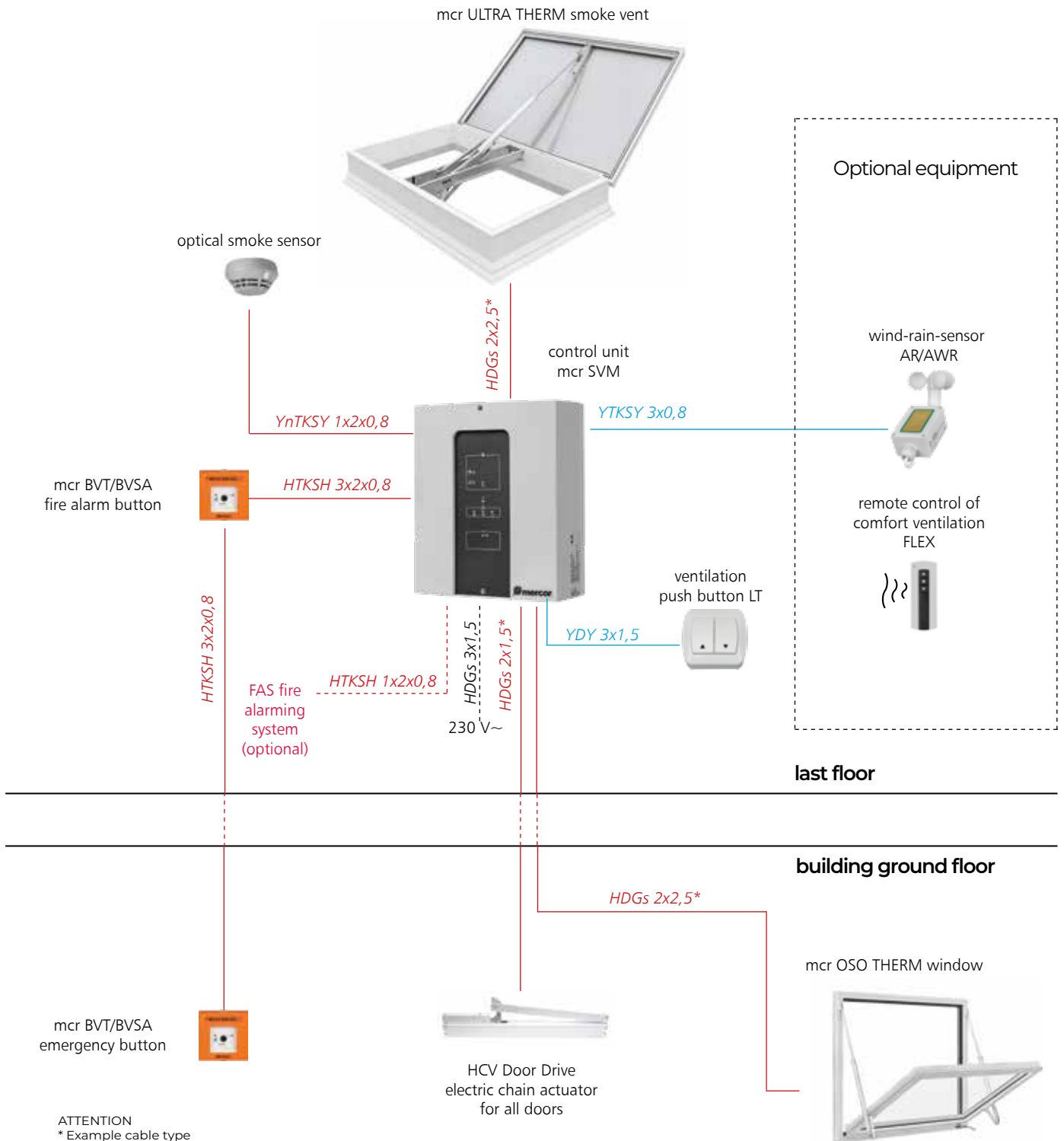
The smoke exhaust system is activated when a fire starts. This automatically opens mcr PROLIGHT smoke vents, mcr OSO THERM windows. The entire system is operated by the mcr 9705 or mcr 0204 control unit.

Activation of the electric smoke exhaust system:

- » automatically – when smoke is detected by the optical smoke detector,
- » automatically (remotely) – via a signal e.g. from the fire alarming system FAS (as an option when connected),
- » manually – by the operator, hitting fire alarm 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 wind-rain sensor GWD-1 automatically closes the smoke vents during adverse weather conditions (rain or wind).

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



» Description of the functioning of the electric smoke exhaust system (with mcr ULTRA THERM smoke vents)

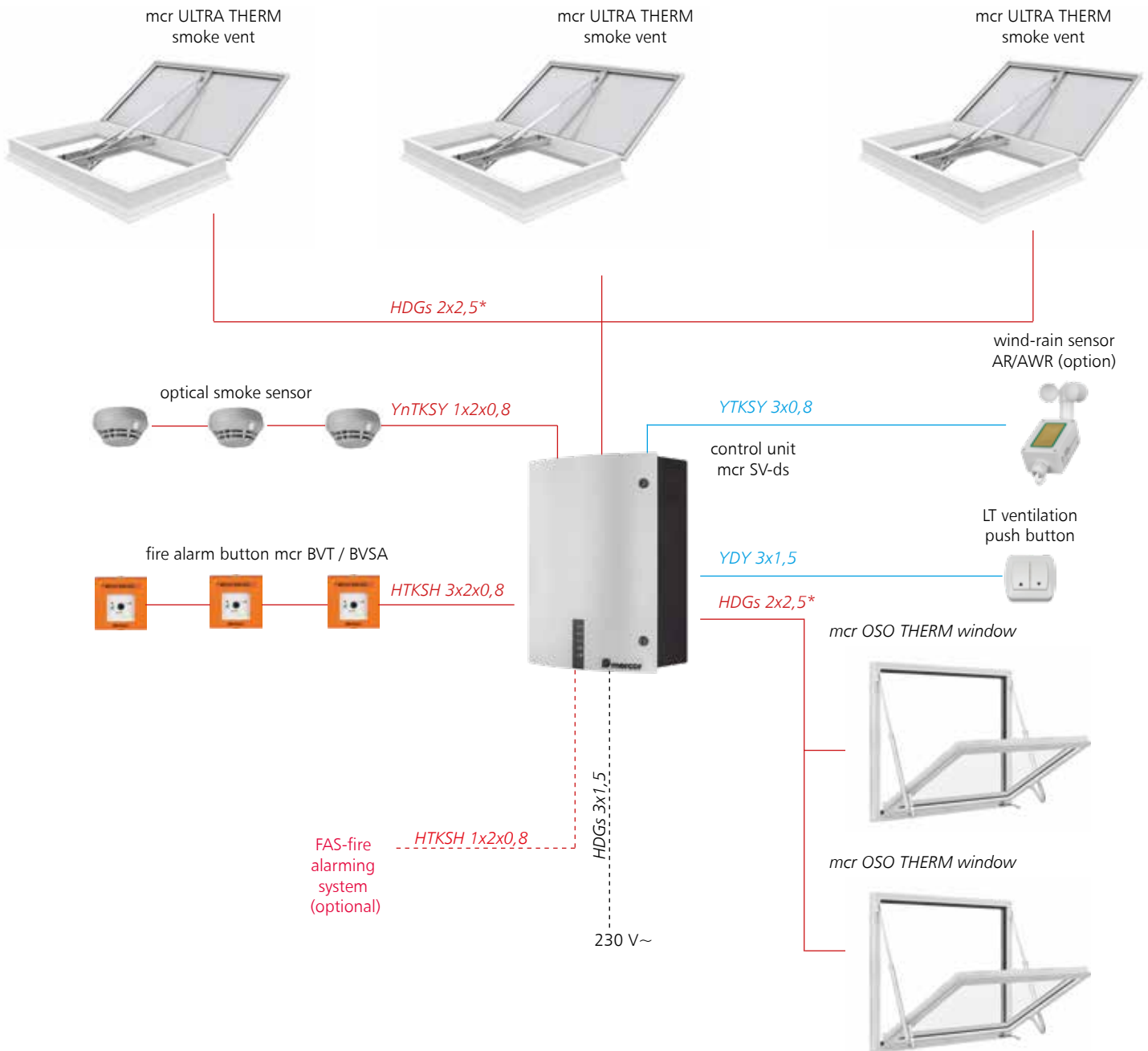
The smoke exhaust system is activated when a fire starts. This automatically opens mcr ULTRA THERM smoke vents and mcr OSO THERM windows. The entire system is operated by the mcr SVM control unit.

Activation of the electric smoke exhaust system:

- » automatically – when smoke is detected by the optical smoke detector,
- » automatically (remotely) – via a signal e.g. from the fire alarming system FAS (as an option when connected),
- » manually – by the operator, hitting fire alarm button on the mcr BVT/BVSA.

Electric devices can also be used for daily, natural room ventilation with the LT ventilation button. The electric system can be equipped with a wind-rain sensor, causing automatic closing of the ventilation vents during adverse weather conditions (rainfall or wind).

4.9 | mcr ULTRA THERM – example connection diagram of 24 V- / 48 V- smoke exhaust and ventilation in staircase



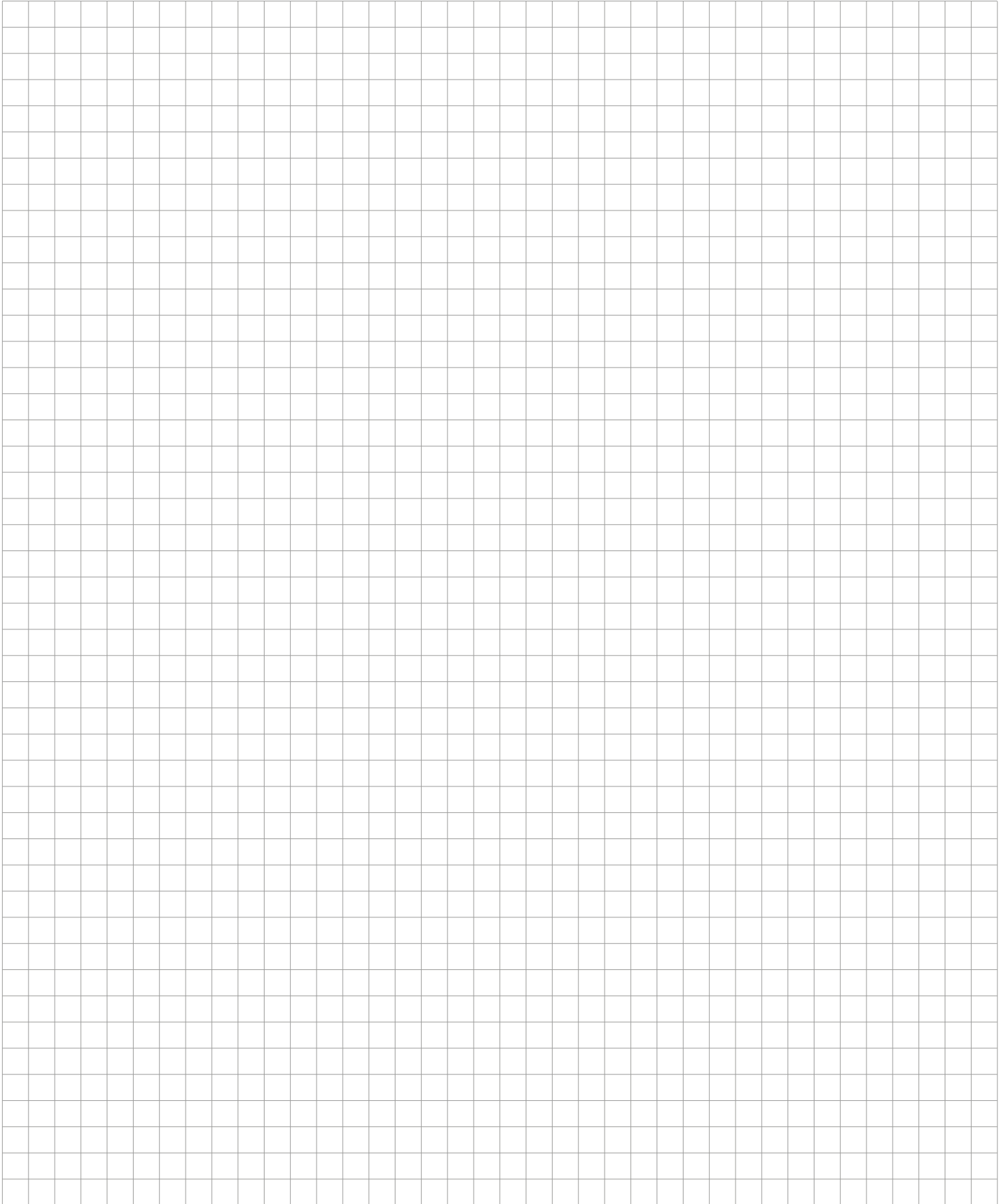
» Description of the functioning of the electric smoke exhaust as mcr Therm System (with mcr ULTRA THERM smoke vents)

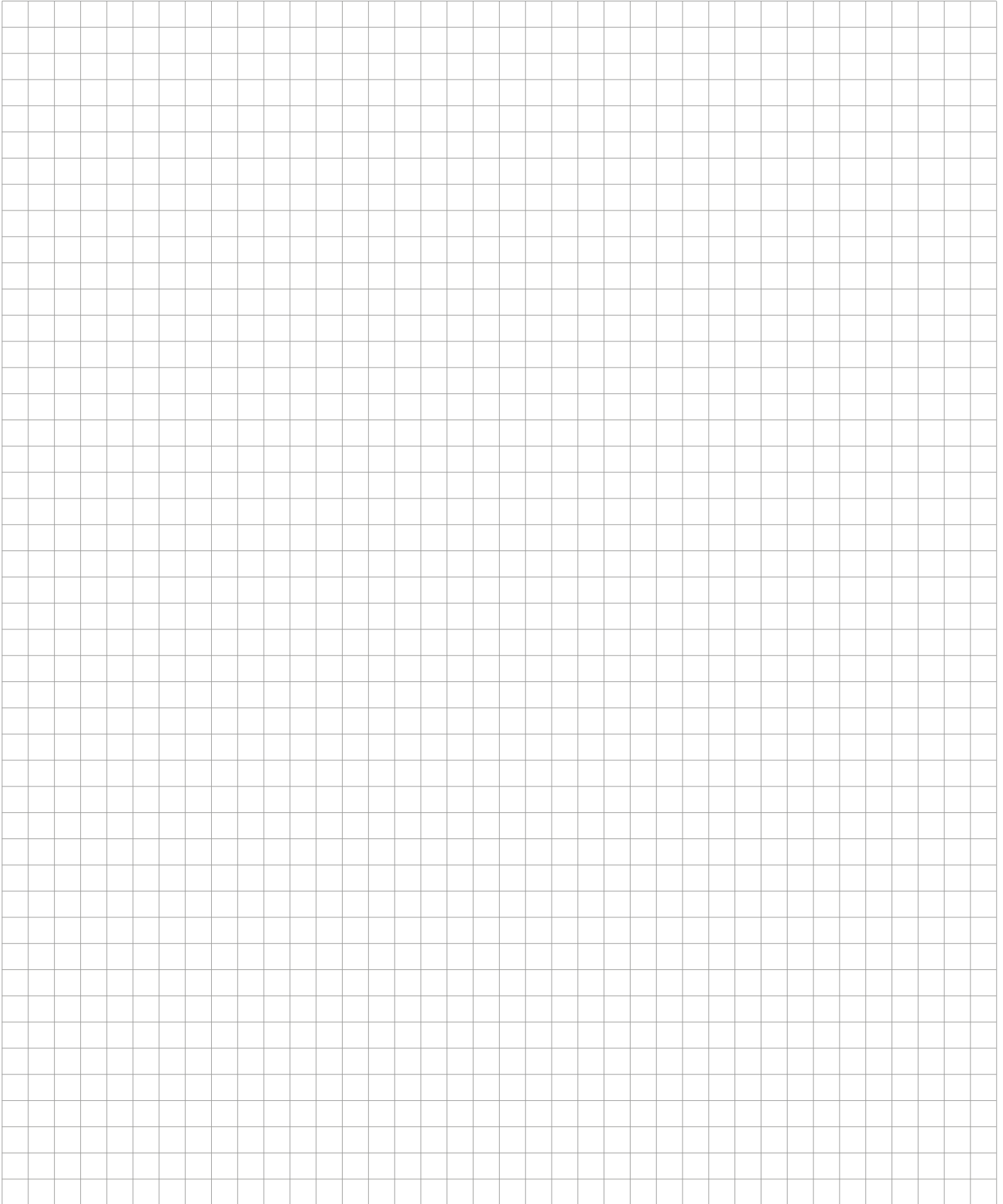
The smoke exhaust system is activated when a fire starts. This automatically opens mcr ULTRA THERM smoke vents, mcr OSO THERM windows and air supply doors. The entire system is operated by the mcr SV-ds control unit.

Activation of the electric smoke exhaust system:

- » automatically – when smoke is detected by the optical smoke detector,
- » automatically (remotely) – via a signal e.g. from the fire alarming system FAS (as an option when connected),
- » manually – by the operator, hitting fire alarm button on the mcr BVT/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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