

OPERATION AND MAINTENANCE MANUAL

mcr LAM louvered smoke vents
mcr LAM louvers for daily ventilation

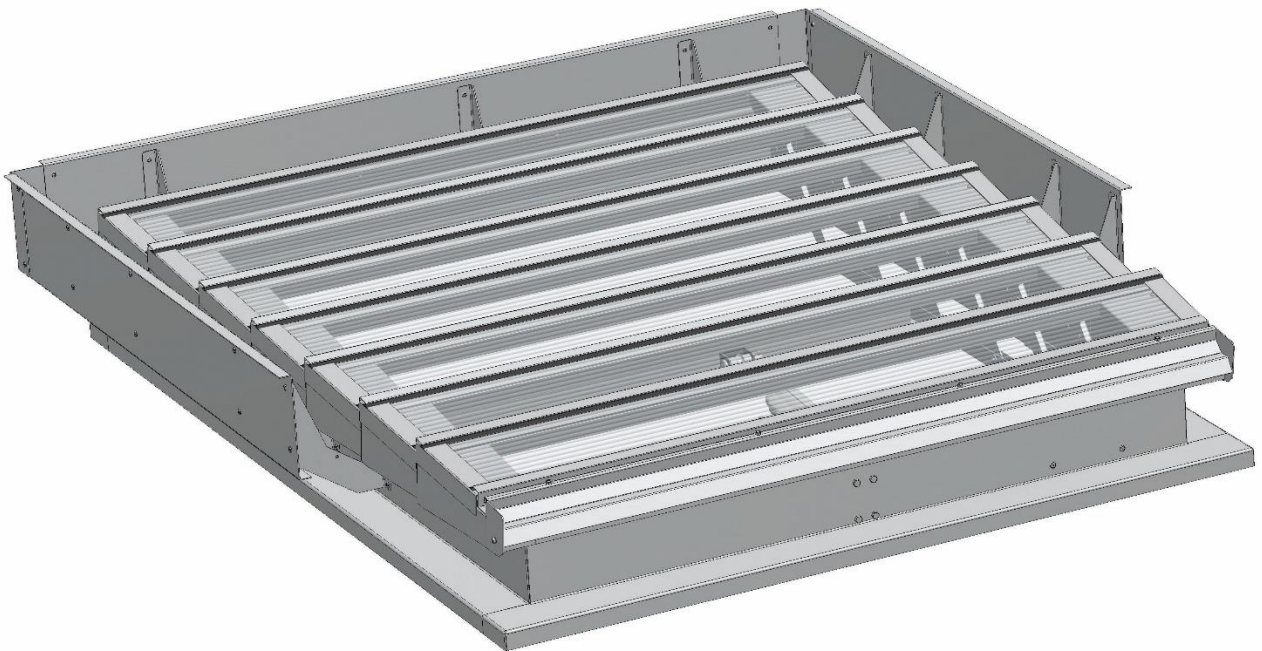


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IMPORTANT !

For safety reasons, the thermal release valve in pneumatically actuated units is not enabled at the factory.

Do not use the unit without prior enabling the thermal release valve!

Enable the thermal release valve and screw in the CO₂ bottle (Sec. 9.1).

1 Introduction

The present Operation and Maintenance Manual (OMM) is a source of practical data on the purpose, design, operating principles, good assembling practices, and support of mcr LAM louvered smoke exhaust ventilators. Furthermore, the OMM contains additional information on the conditions of operations, maintenance, and product warranty prerequisites. Consistency with the recommendations contained in this document is a prerequisite for regular operations of the systems which are designed for smoke exhaust and/or daily ventilation systems, as well for user safety.

2 Intended use

mcr LAM louvered vents are automatic opening smoke release devices. Their primary function is to evacuate the products of fire including smoke, fumes and heat from the interior spaces (for example in production and warehousing facilities, public buildings, etc.) to protect human life and property by:

- reducing to the minimum the amount of smoke in the escape routes,
- facilitating the fire-suppression process and operations by creating near the floor a layer containing little smoke,
- protecting the building structure and the furniture, fixtures and equipment,
- limiting the damage caused by smoke, hot fumes and thermal decomposition products.

Smoke vents can also be used for natural ventilation only, or both for smoke exhaust and natural ventilation and can be installed on the building roof to admit natural light.

After deciding to provide the smoke vents in the premises the Owner can enjoy the following benefits:

- lowered hazard class of the building,
- increased maximum fire zone area,
- increased maximum permitted length of escape routes,

mcr LAM louvered vents comply with the requirements of EN 12101-2:2003, as confirmed by the **CE** Certificate of Conformity No. 1396-CPR-0032, issued by the notified body No. 1396. Compliance of mcr LAM louvered vents with the ITB's Technical Approval No. AT-15-8192/2015 is confirmed by the Certificate of Conformity No. ITB-2461/W.

mcr LAM smoke exhaust vents are part of the overall MERCOR smoke exhaust system, which includes also PROLIGHT leaf vents, smoke vents integrated with in mcr PROLIGHT continuous rooflights, mcr PROSMOKE smoke curtains, MCR9705 and MCR0204 control units, and other products of this kind.

3 Design and principle of operation

MERCOR's louvered vents, mounted on rectangular base assemblies, suit a wide range of structural opening sizes. All the steel components are zinc coated in hot-dip or electro-galvanising process.

The upper part of the base assembly is available in insulated and non-insulated option and the lower part – the roof curb (used in vents higher than 20 cm) is always uninsulated.

Blades types:

- transparent: 16 mm thick multi-wall polycarbonate panels of varying transparency and thermal conductivity,
- opaque: two layers of aluminium sheet separated by an air void, EPS or XPS layer.

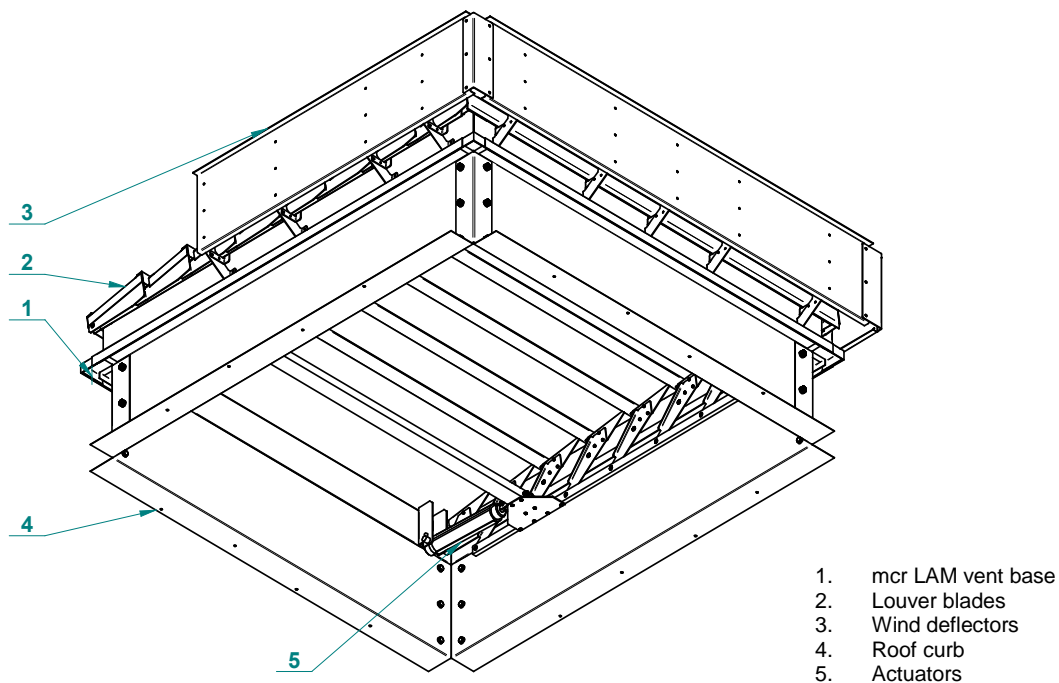
mcr LAM louvered vents come with the following types of actuators:

- electrical, 24 V DC,
- pneumatic – powered by CO₂ (smoke exhaust function) or by compressed air (daily ventilation function),
- electrical 230V AC (daily ventilation only).

Only pneumatically operated mcr LAM smoke vents are equipped with flow control valves with thermal release valve (including thermal fuse).

The louvered vents may be operated locally - manually or automatically by thermal release valves (in the case of smoke vents) or remotely by an MCR smoke control panel or fire alarm control panel.

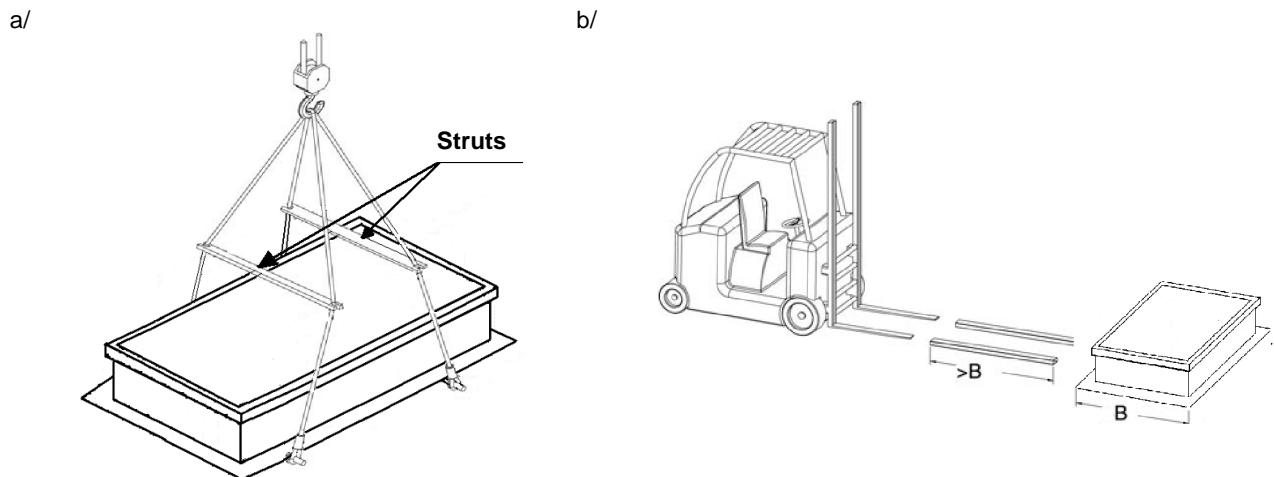
Figure 1. mcr LAM louvered vent



4 Shipment and delivery

mcr LAM louvered vents are supplied factory assembled, except for additional external flashings, higher base assemblies, etc. which, if required, come separately. The roof curbs, i.e. additional base assemblies, always come separately. The reason is to protect the different components from damage during transport and avoid road safety hazards. The vents can be unloaded manually or by means of universal loading equipment in the presence of a person authorised by the manufacturer.

Figure 2. Handling by means of hoist (a) or a forklift truck (b)

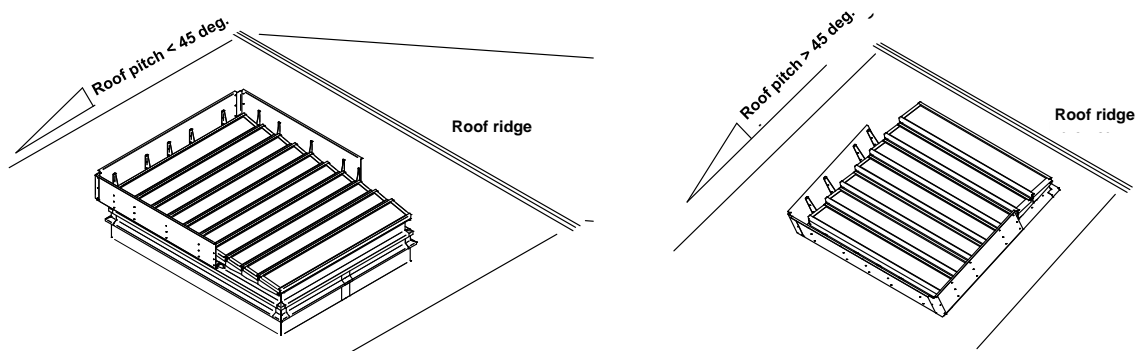


5 Installation

mcr LAM louvered vents are designed for installation on the roof (smoke exhaust function) or in the walls (smoke exhaust and air inlet function).

Roof vents can be supported by the roof structure components, such as purlins, trimmers, metal decking, curbs, etc. If the roof pitch is less than 45° the vent should be oriented with the louver blades running perpendicular to the roof ridge and for greater pitches the louver blades should preferably run parallel to the roof ridge (tilt up to open configuration).

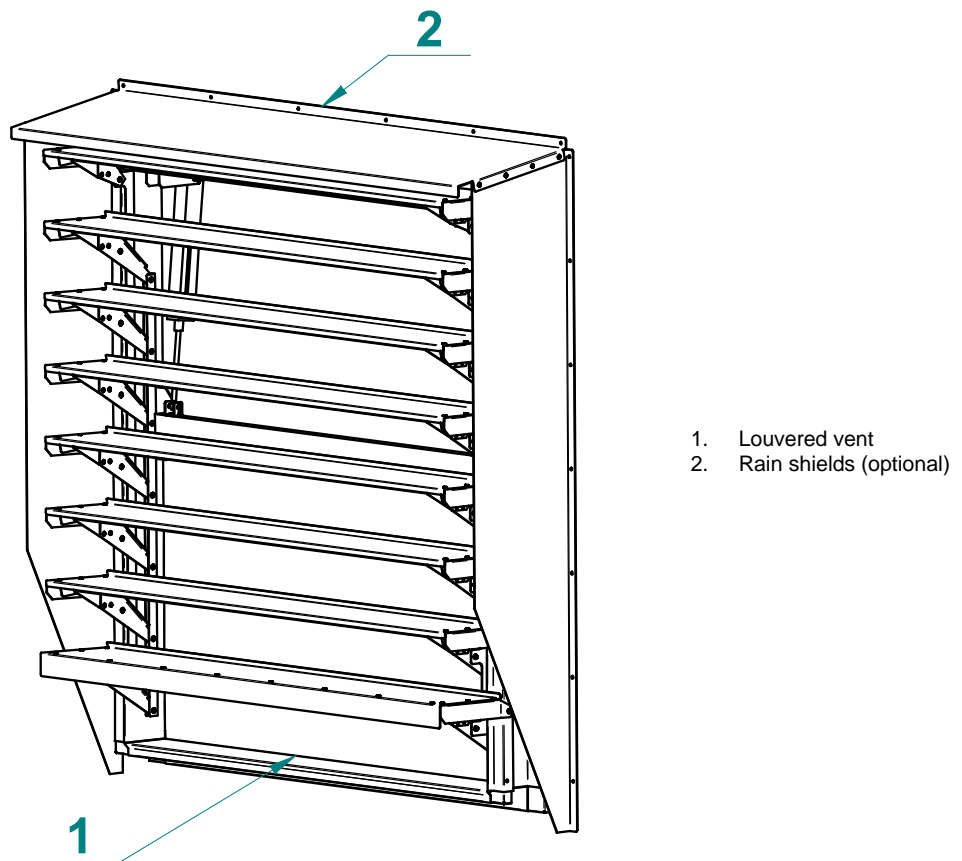
Figure 3. Recommended spatial orientation of mcr LAM vent in relation to the roof ridge



mcr LAM louvered vents can be mounted on steel, concrete or timber roofs. The additional lower part of base, the roof curb, features a ledge at its bottom to support and secure the vent to the supporting structure. The fasteners should be appropriate to the supporting structure material (steel, concrete, timber) and not smaller than 6 mm in diameter. The intervals between fasteners should not be greater than 50-60 cm.

When installed in walls, the louver blades should be positioned horizontally. In this configuration the louver blades are tilted up to open.

Figure 4. Mounting position of mcr LAM vent installed in a wall



The vent bases are designed for trimming with roofing paper or PCV roofing membrane or roofing sheet metal.

6 Roof installation examples

Figure 5. mcr LAM vent mounted on a concrete base

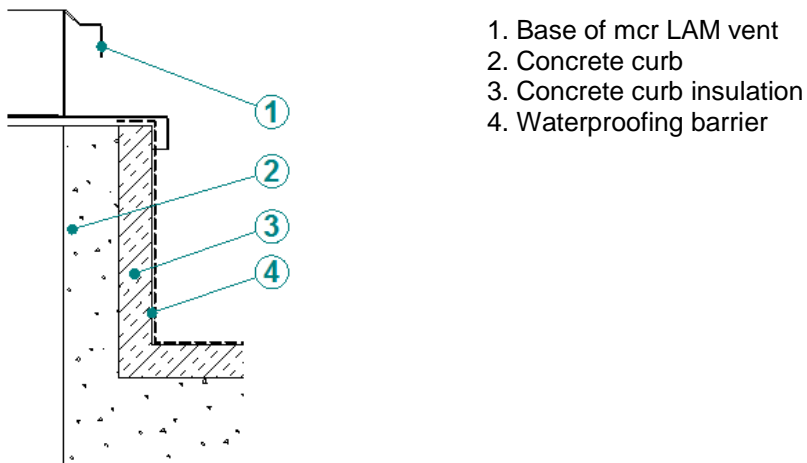
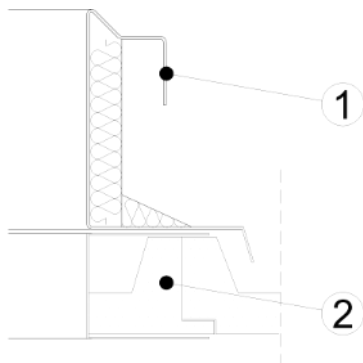
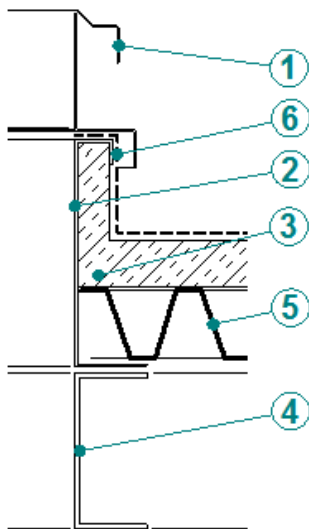


Figure 6. mcr LAM vent installed on a panel roofing system



1. Base of mcr LAM vent
2. Roofing panel

Figure 7. mcr LAM vent c/w roof curb mounted on steel structure.



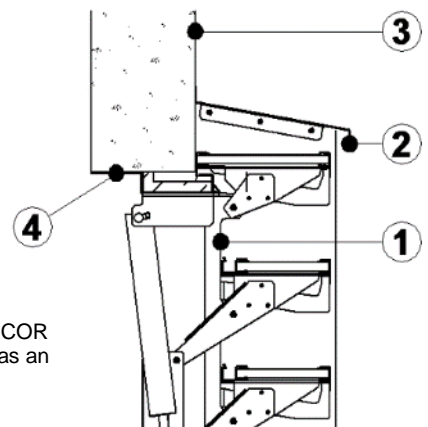
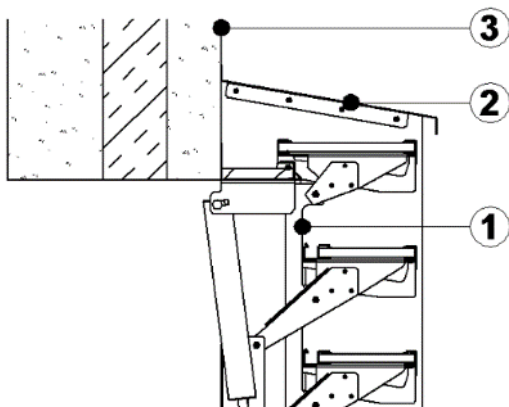
1. Base of mcr LAM vent
2. Roof curb
3. Thermal insulation
4. Steel roof frame
5. Sheet metal decking
6. Waterproofing barrier

7 Wall installation examples

Figure 8. mcr LAM vent mounted in a wall

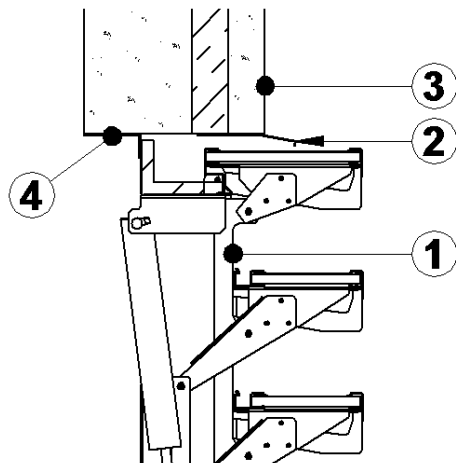
a/ attached directly to the wall surface

b/ attached using additional elements (option 1)

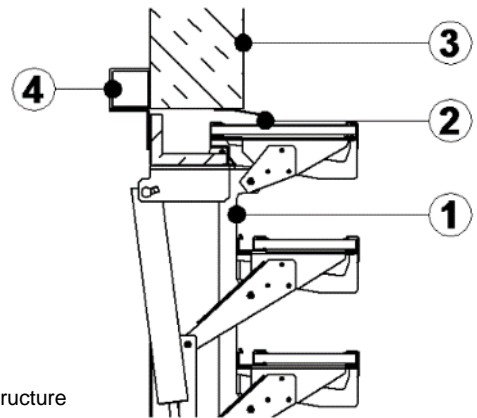


1. mcr LAM vent
2. Rain shield (MERCOR product supplied as an option)
3. Wall or facade
4. Support angle

c/ in a wall opening, without additional elements (option 2)



d/ attached to the steel frame of the wall



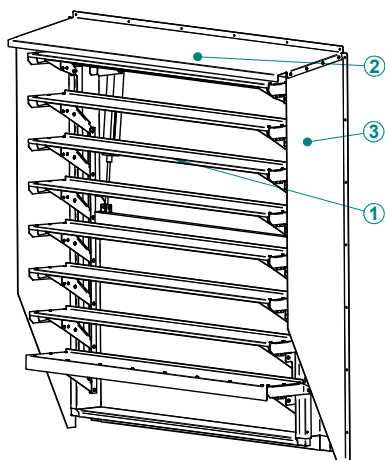
1. mcr LAM vent
2. Drip cap
3. Wall or facade
4. Support angle or structure

The mounting and fitting details depend on the wall construction and should be determined before installation.

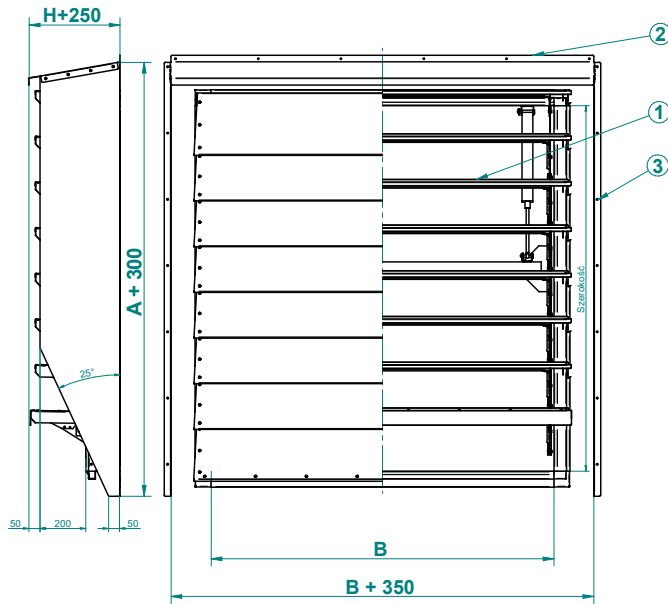
Vents installed in walls should be fitted with rain shields. The rain shields are attached to the vent once it has been mounted in the wall. Use fasteners adequate to the wall type, 4.0..4.5 mm in diameter. For fixing the shields to the wall use the pre-drilled mounting holes. The gap between the rain shields and the wall should be filled with the supplied PES 5x20 gasket or butyl tape or a silicone sealant.

With the rain shield in place, the assembly is not as yet weatherproof. To make it fully weatherproof, the joint between the base and the wall surface must be sealed.

Figure 9. mcr LAM vent with rain shields in place



1. mcr LAM vent
2. Rain shield – top plate
3. Rain shield – side plate
- A – vent width
- B – vent length



8 Limit switches

mcr LAM vent can be fitted with limit switches to indicate:

- fully open position
- fully open position or any mid-position
- fully open, fully closed or any mid-position.

Fully open position is indicated by COMEPI AP3T71W20 limit switch.

Figure 10. COMEPI AP3T71W20



Fully open closed or any mid-position is indicated by COMEPI AP3T38W20 limit switch.

Figure 11. COMEPI AP3T38W20



The limit switches fitted on mcr LAM louvered vents are factory pre-set. These limit switches might get misadjusted during transport and then the adjustment procedure described in the manual Connection and Adjustment of COMEPI limit switches in mcr LAM units should be followed.

9 Control

The control systems to open and close the vent blades are an indispensable part of mcr LAM louvered vents. Smoke exhaust control or smoke exhaust and ventilation control systems can be employed in this function. Two type of smoke exhaust control systems are available, each comprising a different set of components:

- pneumatic,
- electric.

9.1 Pneumatic control

Depending on the system configuration it may be necessary to connect additional pneumatic lines to the vent (e.g. copper/steel tube connecting to the alarm box including bottles).

Threaded connections of pipe unions with valves, actuators, etc. area sealed by applying appropriate chemical agents, such as Loctite 243 (recommended) or PTFE thread seal tape. To seal the connection with Loctite 243 apply a few (2-3) drops on the tread surface. After the connection has been tightened, the applied Loctite 243 will set, thus protecting the connection from uncontrolled loosening (important for connections of actuators). It is impossible to loosen a union protected in this way other than by means of hand tools.

Figure 12. Method of installation of elastic air tubes

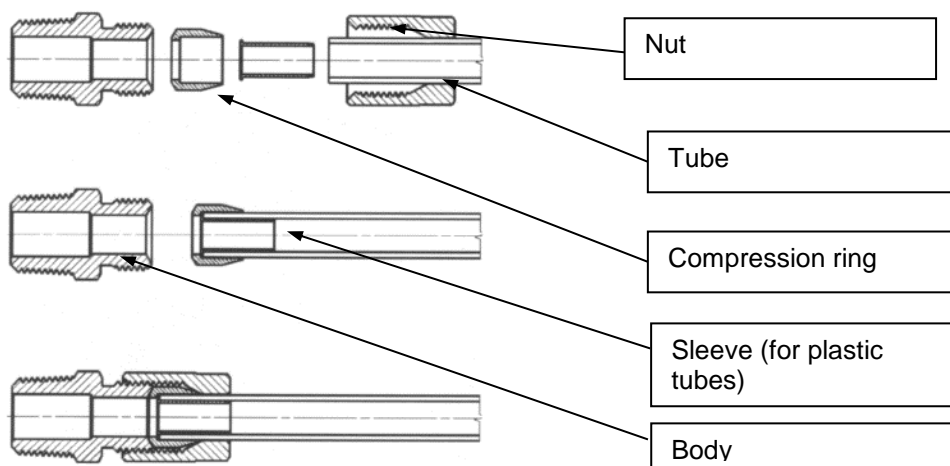
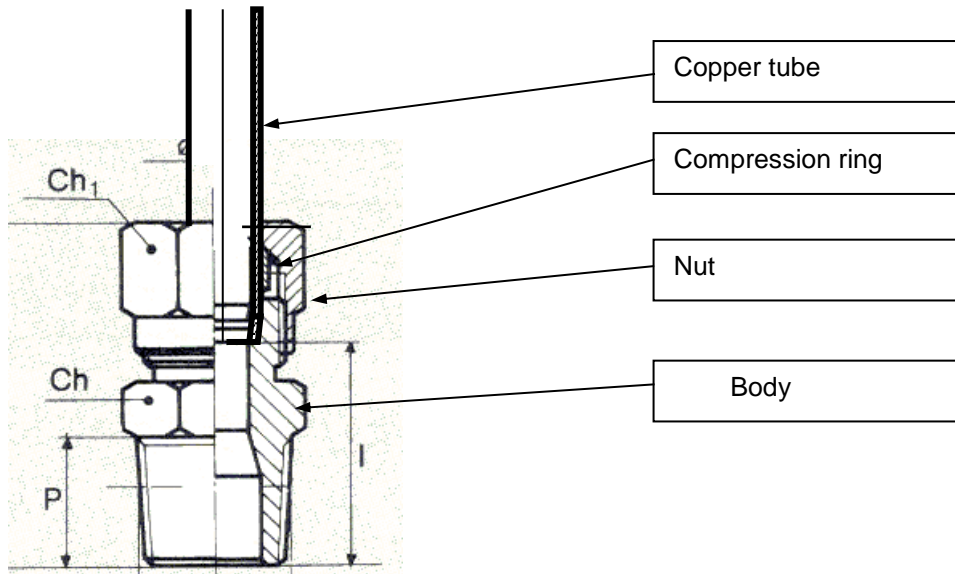


Figure 13. Connection of union with a copper/steel air tube



IMPORTANT: For safety reasons, the thermal release valve fitted in the vent is not engaged before shipping. Therefore, the valve must be engaged once the vent has been installed on the roof.

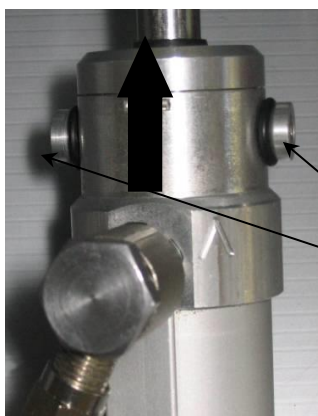
Figure 14. Thermal release valve



Enabling the thermal release valve

- check if the tension spring of the puncture assembly (1) is unscrewed and, if not, unscrew it by hand until it would not turn any more,
- fit the thermo bulb (2) in the gas flow regulator, with the pointed tip towards the body, tighten the bulb press screw by hand,
- insert the valve slider (4),
- manually tighten the piercing assembly spring by turning the tension screw (1) until it would not turn any more,
- check if the piercing needle is withdrawn and if there is a seal in the bottle seat,
- screw in the CO₂ bottle (3) by hand.

Figure 15. Pneumatic actuator – lock releasing direction



5 Actuator locks

The following two types of pneumatic actuators are used:

1. Powered by CO₂ (smoke exhaust) or by compressed air (natural ventilation) – for opening and closing. Types of control: C1 – only opening (closing vents by hand), C2 – opening and closing.
2. Powered by CO₂ (smoke exhaust) or by compressed air (natural ventilation) – for opening only, closed manually from the roof level or by a gas spring (automatic). Types of control: c#.

The pneumatic actuator for smoke exhaust features integral locks, which prevent opening of the louver blades when the vent is idle or closing them when it has been opened in the emergency mode (to extract smoke).

Closing of pneumatically operated vents after emergency opening – for systems without remote closing function:

1. Release CO₂: unscrew the bottle from the thermal release valve or alarm box (Warning 1: high pressure! unscrew slowly! Warning 2: the CO₂ bottle may frost over).
2. Release the actuator locks (5) by lifting them in the motion direction of the actuator (shown by arrow in Figure 14 Pneumatic actuator – lock release direction).
3. Tilt down the louver blades.
4. Check closing status.
5. Fit a new CO₂ bottle in the thermal release valve or in the alarm box.
6. The thermal fuse (thermo bulb) should be replaced if needed (2).

Closing of vents fitted with a pneumatic actuator and a gas spring after emergency opening – for systems without remote closing function:

1. Release CO₂: unscrew the bottle from the thermal release valve or alarm box (Warning 1: high pressure! unscrew slowly! Warning 2: the CO₂ bottle may frost over).
2. Move the ventilation box valve lever to the vent opening position.
3. After ca. 5 sec. move the ventilation box valve lever to the vent closing position.
4. Fit a new CO₂ bottle in the thermal release valve or in the alarm box.
5. The thermo bulb (alcohol filled glass bulb) should be replaced if needed (2).

9.2 Electric control

9.2.1. Louvered smoke vents

The vent opening/ closing system, based on 24 V DC electric actuator, used for smoke exhaust, is pre-installed at the factory. This control system is called E1.

Wiring diagram of MCR-W actuator (polarity of conductors):

Brown +	}	Rod is withdrawn	Brown –	}	Rod is extended
Blue –		(vent closes)	Blue +		(vent opens)

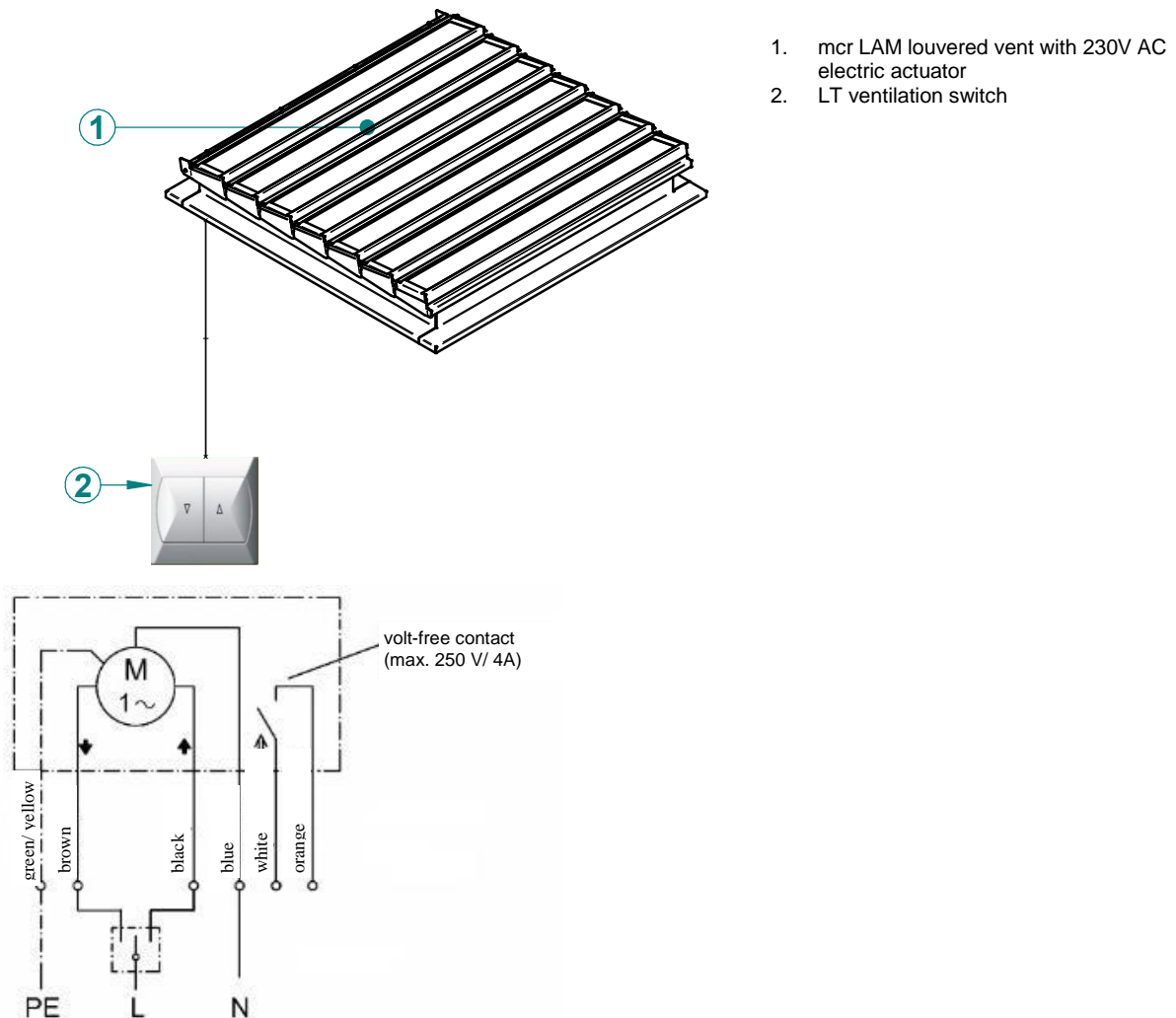
MCR9705, MCR0204 smoke exhaust and daily ventilation control units with MCRR0424 and/or MCRR0448 extension modules are used to supply electricity and control the MCR-W actuators fitted in mcr LAM louvered vents.

9.2.2. Louvers for daily ventilation

The vent opening/ closing system, based on 230 V AC electric actuator, used for daily ventilation, is pre-installed at the factory. The control system is called E2.

Below is the wiring diagram for connection of the actuator to the mains, via LT (or equivalent) ventilation switch.

Figure 16. Wiring diagram for connection of 230 V AC louvered vent actuator (type control E2)



9.3 Use of louvered smoke vents for daily ventilation

In louvered vents daily ventilation is effected by actuators which open the vent to let the smoke out.

In order to enable using the mcr LAM louvered vents w/ pneumatic actuators for daily ventilation the pneumatic system must be provided with ventilation boxes (with a double-pipe priority valve, such as VVAZ for smoke vents opened by alarm boxes) and the vent must be fitted with a TAVZ thermal release valve (except for the vents equipped with a pneumatic actuator and a gas spring).

Figure 17. Pneumatic diagram showing connection of mcr LAM louvered vent fitted with a pneumatic actuator (type control C2) with the alarm and ventilation boxes

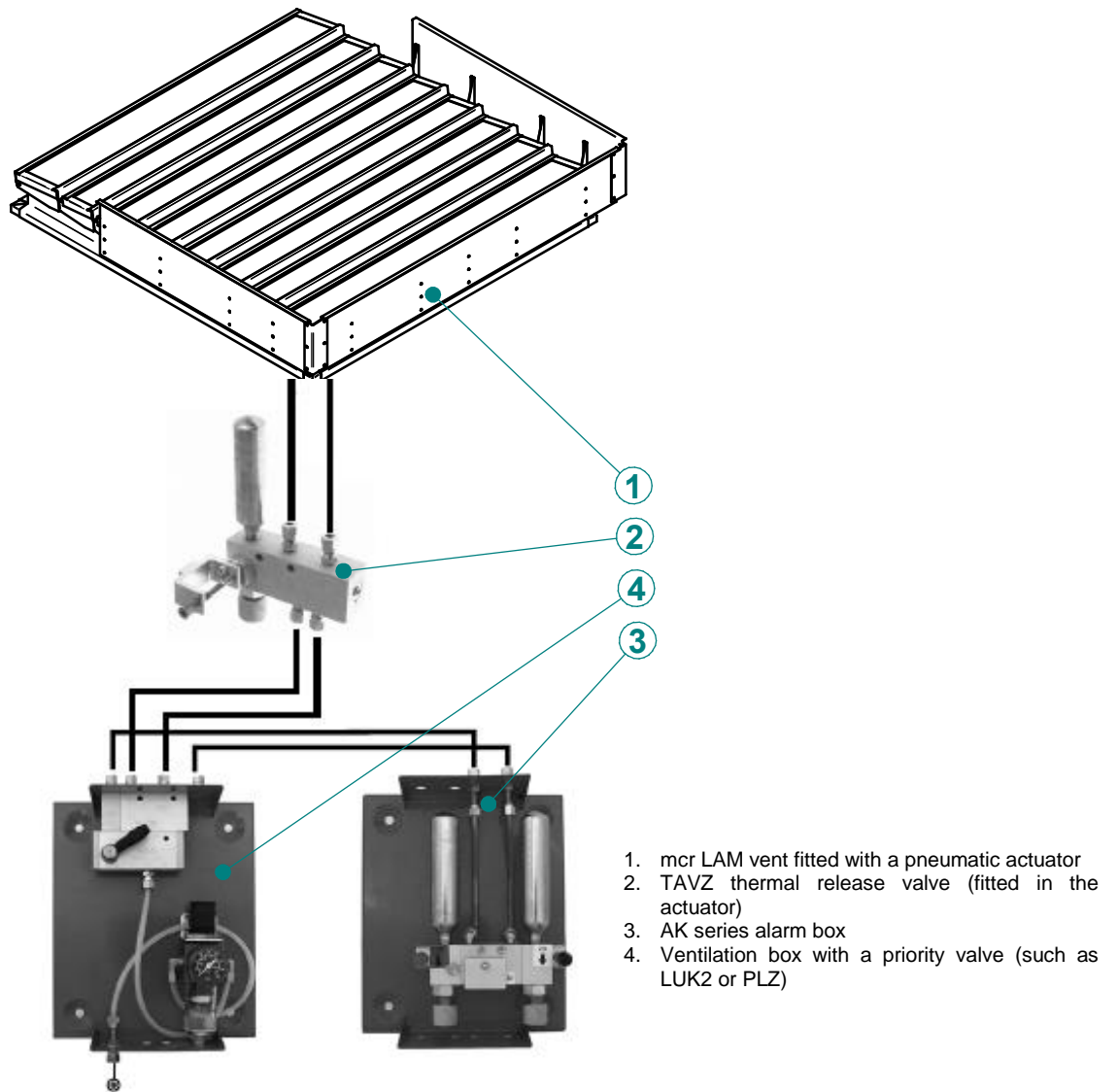
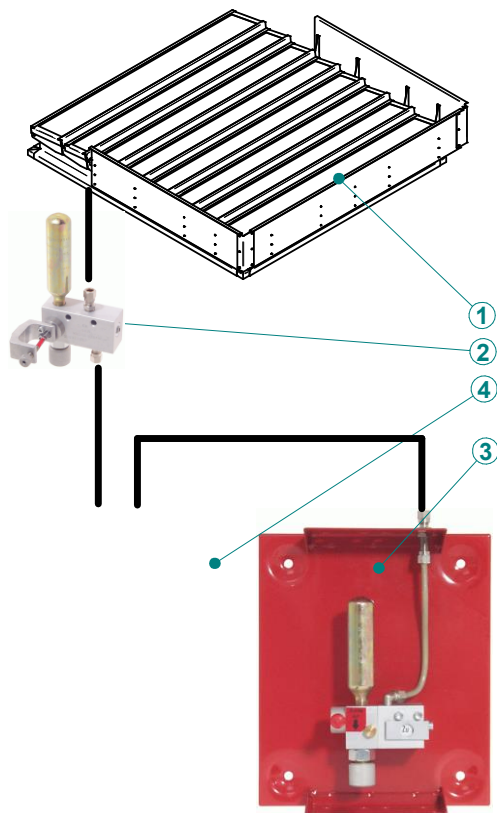
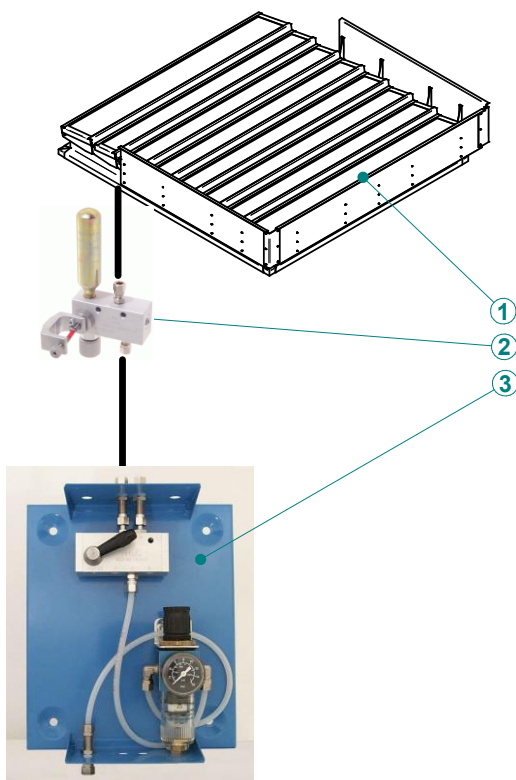


Figure 18. Pneumatic diagram showing connection of mcr LAM vent (type control C3)



1. mcr LAM vent with a pneumatic actuator and gas spring
2. TAVZ thermal release valve (fitted in the vent)
3. AK series alarm box
4. Ventilation box with a priority valve (such as LUK2 or PLZ)

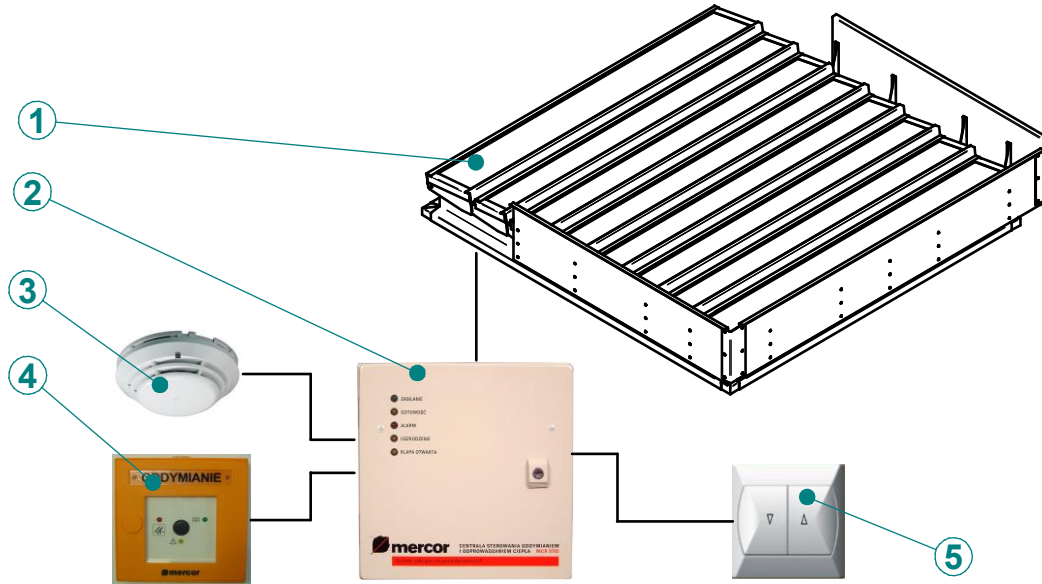
Figure 19. Pneumatic diagram showing connection of mcr LAM vent fitted with a pneumatic actuator (type control C1) and gas spring with alarm and ventilation boxes



1. mcr LAM vent fitted with a pneumatic actuator and gas spring
2. TAVZ thermal release valve (fitted in the vent)
3. Ventilation box (such as LUK2 or PLZ)

In order to use vents equipped with 24 V electric actuator for daily ventilation it is necessary to connect the LT ventilation switch to the control unit in accordance with the wiring diagram included in the control unit Operation and Maintenance Manual (OMM).

Figure 20. Idea diagram showing connection of mcr LAM vent fitted with 24 V electric actuator (type control E1) to enable its use for daily ventilation



1. mcr LAM vent fitted with 24 V actuator
2. Control unit
3. Optical smoke detector
4. RPO-1 emergency pushbutton
5. LT ventilation switch

A control unit with integrated wind/rain module is recommended, such as MCRP054, in order to close the vents during strong wind or rain, thus protecting the property and the vents from damage. The control unit must be connected according to the wiring diagram included in the Operation and Maintenance Manual (OMM).

10 Maintenance and inspections

The user of MERCOR S.A. equipment **shall ensure periodic inspection** and maintenance **every six months** throughout the whole period of operation, both during and after the warranty period.

Therefore, adequate means of access must be provided to enable carrying out periodic inspections, maintenance and warranty repairs of the equipment concerned. The equipment installed on the roof must be accessible by adequate means of access (ladder or lift).

In addition, between the successive inspections it is recommended to:

1. Check the electrical lines, paying particular attention to any mechanical damage.
2. Check the pneumatic lines, focusing on mechanical damage, paying particular attention to any mechanical damage.
3. Check the hook brackets (verify if they are fully closed and not blocked).
4. Check if the leaf hold frame is securely fixed and the seals abut the leaf infill.
5. Periodically clean the domes, polycarbonate panels. use a sponge or soft cloth and lukewarm water with some amount of a typical, mild household cleaner. Do not scrub the panels with brushes or sharp utensils. Do not use abrasives, strong alkaline substances, solvents, etc. If unsure, try the cleaner on a sample or small area of the product.
6. Due to natural environmental processes, water vapour may condensate inside the cells of polycarbonate panels. A mist forms in most cases and clearly seen drops can also appear if humidity is really high. Subject to ensuring diffusion of air between the cells and the outside environment the levels of humidity will equalise and the above-described visual effects should disappear.

Condensation of water vapour does not compromise the service life of the material or the quality of the product.

NOTE:

Do not use ice melt salts on roofs where there are mcr LAM louvered vents. Salt can discolour or even damage the polycarbonate panels, acrylic domes or aluminium sections. Note that the resulting damage is not covered by the warranty.

11 Warranty terms and conditions

1. "MERCOR" S.A. grants a 12-month quality guarantee for equipment, starting from the date of purchase, unless the agreement provides otherwise.
2. If during the term of guarantee any physical defects of the equipment become evident, "MERCOR" S.A. shall remove them within 21 days of the written notification, subject to paragraph 5.
3. In the event of defects resulting from inappropriate operation of the equipment or due to other reasons stated in par. 6, the Buyer/Guarantee Holder shall bear the costs of their removal.
4. Liability under the Guarantee covers only defects resulting from causes inherent in the equipment sold.
5. "MERCOR" S.A. reserves the right to lengthen the repair time in the event of complicated repairs or those that require non-standard sub-assemblies [elements] or spare parts to be purchased.
6. The guarantee does not cover:

- damages and breakdowns of the equipment due to inappropriate operation, user's interference, lack of maintenance or periodic servicing;
 - equipment damages resulting from causes other than those that MERCOR is responsible for, in particular: acts of God such as torrential rainfall, flood, hurricane, flooding, stroke of thunder, overvoltage in the mains, explosion, hail, fall of aircraft, fire, avalanche, landslide and secondary damages due to the above-listed causes. Torrential rain is defined as rain with an efficiency index of at least 4 (or 5 in Chomicz scale or torrential rain grade IV (A4)). Should it be impossible to determine the index mentioned in the previous sentence, the actual condition and the degree of damage at the place of its origin proving that it is the consequence of torrential rain will be considered. Hurricane is defined as wind blowing at the speed of at least 17.5 m/s (damages are deemed to have been caused by hurricane if the effects of hurricane have been found in the immediate neighbourhood);
 - damages due to failure to immediately report the defect discovered;
 - worsened quality of coating due to the natural ageing process (fading, oxidation);
 - defects due to using abrasive or aggressive cleaning products;
 - parts liable to natural wear and tear during operation (e.g. seals) unless a manufacturing fault has occurred;
 - damages due to aggressive external factors, especially chemical and biological ones;
 - ingress of dust, particles or solids with the effective grain size below 50 µm into the polycarbonate sheet chambers;
 - condensation in the polycarbonate sheet chambers.
7. Each defect under guarantee should be reported to a local representative of "MERCOR" S.A. immediately, i.e. within 7 days of its discovery.
8. The Buyer/Guarantee Holder is responsible for proper operation and maintenance of the equipment and for regular (min. twice a year) servicing.
9. The Guarantee shall expire forthwith if:
- The Buyer/Guarantee Holder makes design modifications on his own without consulting "MERCOR" S.A.,
 - Maintenance or periodic servicing are not done in due time or are performed by unauthorized persons or a service center not authorized by "MERCOR" S.A., or the equipment is operated in the wrong way,
 - Any interference of unauthorized persons – except activities connected with normal operation of the equipment.
10. Moreover, in the cases specified in par. 9, "MERCOR" S.A. has no warranty obligations.

SERVICING INSPECTIONS:

1. Devices should be subject to periodical servicing inspections every 6 months during the entire period of their operation.
2. The servicing inspections should be performed by companies having adequate authorization of MERCOR SA.
3. On issues related to service please contact a local representative of "MERCOR" S.A.

12 Certificate of conformity

 Reg. No. 041/P-007	NOTIFIED BODY No. 1396 Osloboditeľov 282, 059 35 Batizovce, Slovakia tel. +421 52 7752298 fax. +421 52 7881412 http://www.fires.sk	 The Experts on Fire Safety
<h3>Certificate of constancy of performance</h3> <p>1396 – CPR – 0032</p> <p>In compliance with Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011 (the Construction Products Regulation or CPR), this certificate applies to the construction product</p> <p style="text-align: center;">Natural smoke and heat exhaust ventilator louver-type MCR LAM</p> <p>having the performances and used in conditions given by initial type testing report No. C1396/08/0042/5003/SC issued by FIRES, s.r.o., NB 1396, Slovakia, on 26. 05. 2009, produced by</p> <p style="text-align: center;">MERCOR SA ul. Grzegorza z Sanoka 2, 80-408 Gdansk, Poland</p> <p style="text-align: center;">and produced in the manufacturing plant</p> <p style="text-align: center;">MERCOR SA Zakład Produkcyjny, ul. Kwarцова 3A, Ciepłewo, 83-031 Łęgowo Poland</p> <p>This certificate attests that all provisions concerning the assessment and verification of constancy of performance described in Annex ZA of the standard</p> <p style="text-align: center;">EN 12101-2: 2003</p> <p style="text-align: center;">under system 1 for the performances set out in this certificate are applied and that the construction product fulfils all the prescribed requirements for these performances.</p> <p>This certificate was first issued on 26. 05. 2009 and will remain valid as long as the test methods and/or factory production control requirements included in the harmonised standard, used to assess the performance of the declared essential characteristics, do not change, and the construction product, and the manufacturing conditions in the plant are not modified significantly, unless suspended or withdrawn by the product certification body.</p> <p>Batizovce, 14. 11. 2014</p>		
064273 FIRES 136a/C-29/07/2014-E		 Ing. Mária Gašperová Head of Product Certification Body