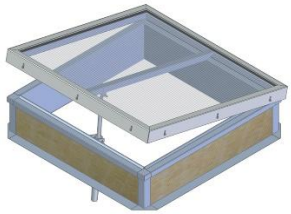
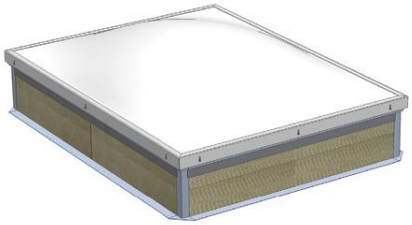
Mercor Light&Vent sp. z o.o.
ul. Grzegorza z Sanoka 2
80-408 Gdańsk

tel. (+48) 58 341 42 45

OPERATIONS AND MAINTENANCE MANUAL.
Skylights, ventilation hatches and roof access hatches
mcr PROLIGHT





- ☐ type C
- ☐ type E
- ☐ type NG
- ☐ type R

Table of contents

1 INTRODUCTION

The present Operations and Maintenance Manual (OMM) describes the purpose, design, operating principles, correct assembling, and support of mcr PROLIGHT non-ventilating and ventilating spot skylights. Furthermore, the documentation includes additional data on operations, maintenance, and warranty conditions.
The Manual applies to:

- C, E, NG, R type mcr PROLIGHT skylights;
- C, E, NG, R type mcr PROLIGHT vents (ventilating skylights), and
- C, E, NG type mcr PROLIGHT roof hatches (ventilating skylights).

Attention! **According to PN-EN1873 Standard, vents and roof hatches are considered as ventilating skylights.**

Consistency with the recommendations contained in this Manual will ensure regular functioning of the systems designed for smoke exhausting and/or ventilation as well as safety to the users.

NOTE
All works related with installation, operation, maintenance and servicing of the roof hatches may only be performed in compliance with the health and safety rules, and with use of appropriate personal protective equipment – including first of all – the fall arrest devices. Any works at height related to electrical connections, etc. may only be performed by personnel with appropriate qualifications.

2 PURPOSE OF THE DEVICE

mcr PROLIGHT spot skylights are used as roof lighting and can be additionally used for comfort ventilation or as an exit to the roof.

mcr PROLIGHT skylights comply with the requirements of PN-EN1873 Standard.

3 DESIGN AND OPERATING PRINCIPLES

Depending on individual requirements, Mercor Light&Vent offers the skylights with upright and slanted bases in a wide range of opening dimensions and base heights.
All steel elements are protected by means of hot dip or electrolytic zinc coating.
Steel sheets used in the skylights comply with the PN-EN 10346:2015-09 standard, surface type A. The surfaces of the aluminum sheets used comply with the provisions of the PN-EN 485-1 standard.

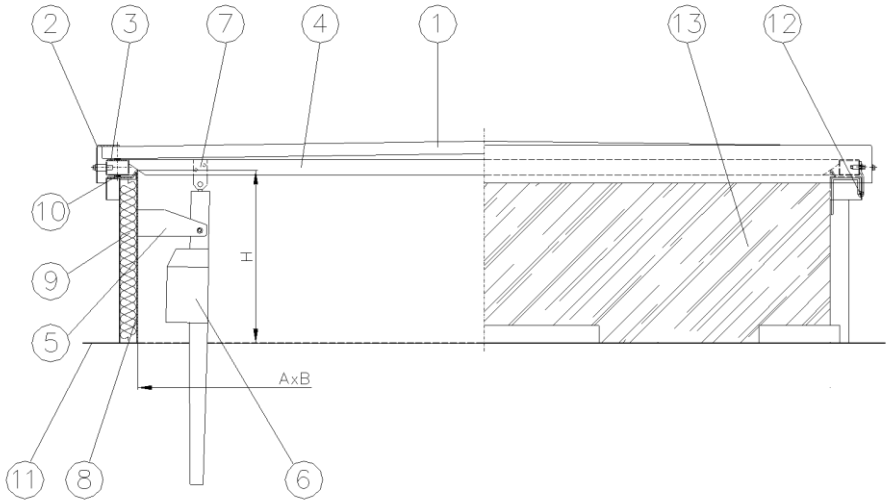
As standard, the bases are delivered with 20 mm thick thermal insulation. It is possible to customize the selection of thickness and type of thermal insulation.
The following types of opening leaf filling are used:

- cellular polycarbonate with a thickness of 10 to 25 mm, with various degrees of transparency and different heat transfer coefficients
- double and triple layer polycarbonate domes
- double and triple layer acrylic domes
- ALU sandwich panels (aluminium–thermal insulation–aluminium)
- B_{ROOF}(t1) class filling – cellular polycarbonate panel combined with polyester panel

Ventilation hatches can be equipped with an electric or pneumatic opening system.

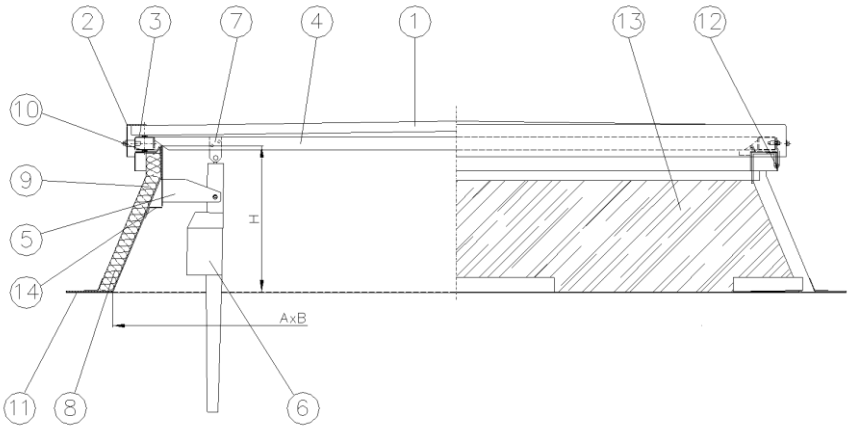
Roof hatches are equipped with gas springs which assist leaf opening; as an option, they may include control systems with electric actuators or pneumatic actuators.
The mcr PROLIGHT openable skylights (ventilation vents and roof hatches) consist of a fixed part – the base – and a movable part – the wings with infill

a/ ventilation hatch, type C, E (electric control)



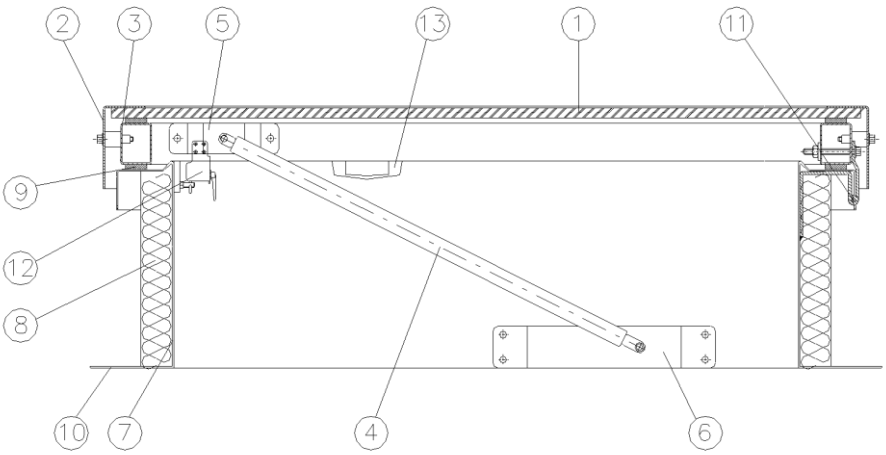
1. leaf glazing / filling
2. pressing frame
3. suporting frame
4. leaf cross-bar
5. actuator mounting bracket
6. electric actuator for ventilation
7. coupling bracket
8. base
9. base thermal insulation
10. leaf seal
11. base flange
12. hinge
13. external flashing: galvanized steel sheet

b/ ventilation hatch, type NG (electric control)



1. leaf glazing / filling
2. pressing frame
3. suporting frame
4. leaf cross-bar
5. actuator mounting bracket
6. electric actuator for ventilation
7. coupling bracket
8. base
9. base thermal insulation
10. leaf seal
11. base flange
12. hinge
13. external flashing: galvanized steel sheet
14. support of actuator mounting bracket

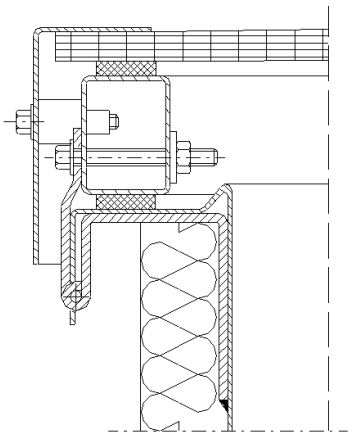
c/ roof access hatch, type C, E (mechanical control – gas springs)



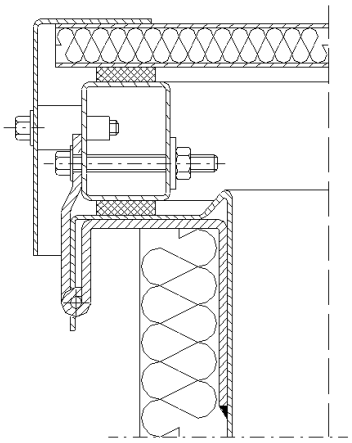
1. leaf glazing / filling
2. pressing frame
3. suporting frame
4. gas spring
5. leaf coupling bracket
6. gas spring mounting bracket
7. base
8. base thermal insulation
9. leaf seal
10. base flange
11. hinge
12. lock with handle
13. grip handle

Fig. 1 mcr PROLIGHT openable skylight cross-section.

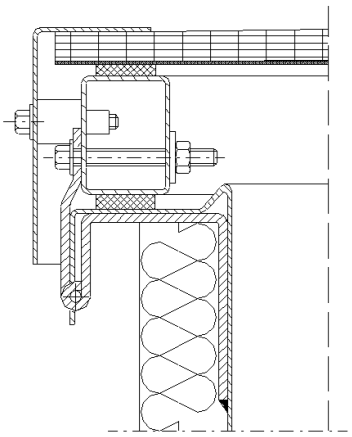
a) polycarbonate panel



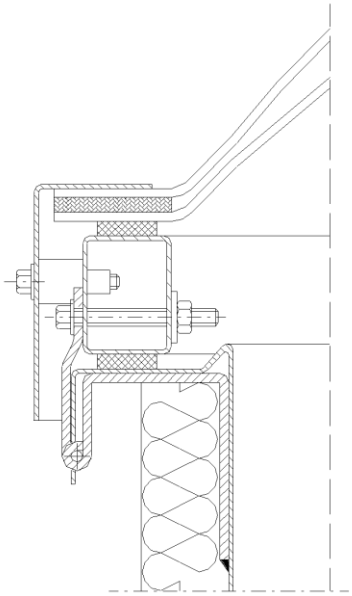
b) ALU sandwich panel



c) polycarbonate panel + polyester panel - (B_{ROOF}(t1) classification)



d) doble layer acrylic dome



e) triple layer acrylic dome

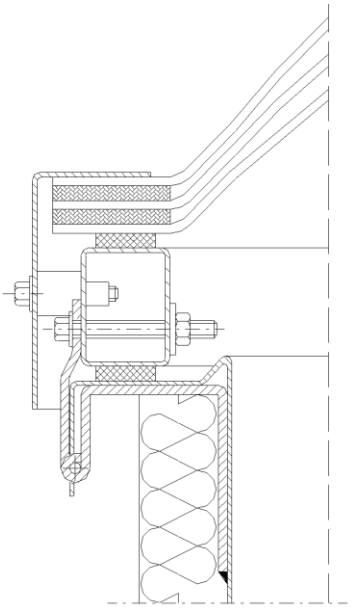


Fig. 2 Typical glazings / fillings of mcr PROLIGHT skylight and roof access hatches..

4 TRANSPORT AND DELIVERY

Mcr PROLIGHT skylights are delivered as assembled units. In special circumstances, however (additional external treatment, low base, etc.), skylights may be supplied as detached subassemblies components because individual elements must be protected from damages during the transport in order to ensure road traffic safety. Unloading should be monitored by a person authorised by the manufacturer. For unloading, use commonly available appliances or unload by hand, in compliance with applicable occupational health and safety rules.

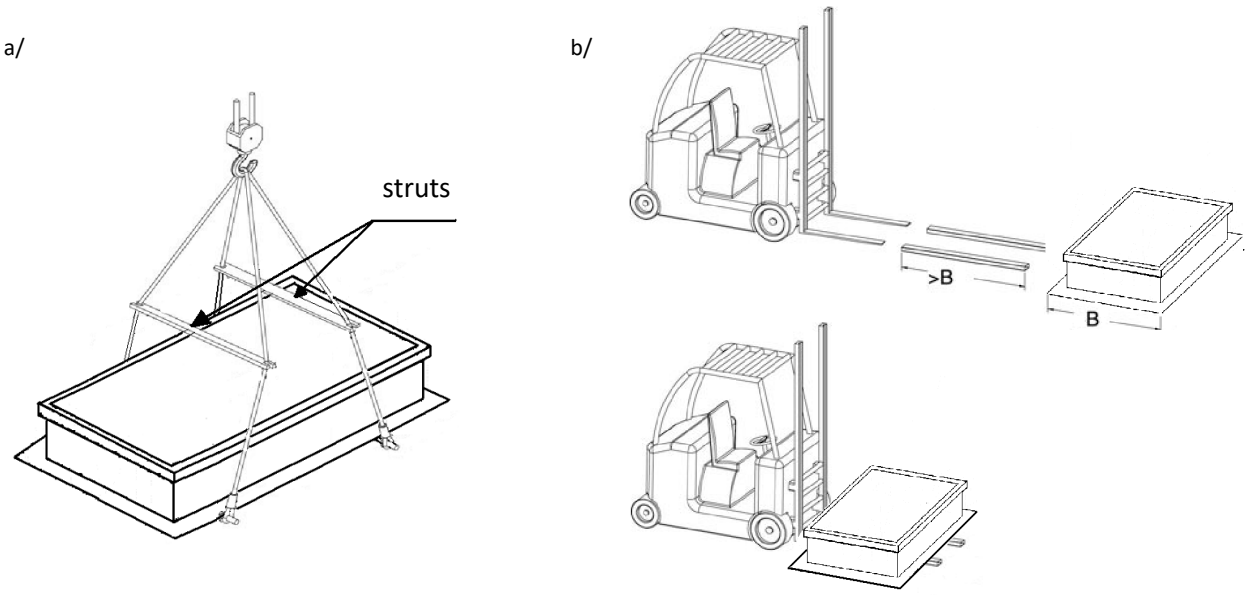


Fig. 3 Handling using crane (a) and forklift (b).

The device must be installed in observance of all the applicable health and safety rules, particularly those related with working at height, using adequate personal protective equipment.

The skylights must rest on the roof's structural elements such as: purlin, trimmers, structural sheet, reinforced concrete plinth. Any elements causing collision with the vent leaf at full opening range should be removed.

Skylights may be installed on roofs of steel, concrete or wooden structure. The vent base has a protrusion (shelf) in its lower part, allowing to rest and fix the vent to the supporting structure.
Fasteners should be selected depending on the material from which the supporting structure is made, in accordance with the table below. The connectors should be installed at max. 50÷60 cm spacing.

supporting structure type	minimum fixture diameter
steel	min. Ø4.8 mm
concrete	min. Ø6 mm
wood	min. Ø6 mm

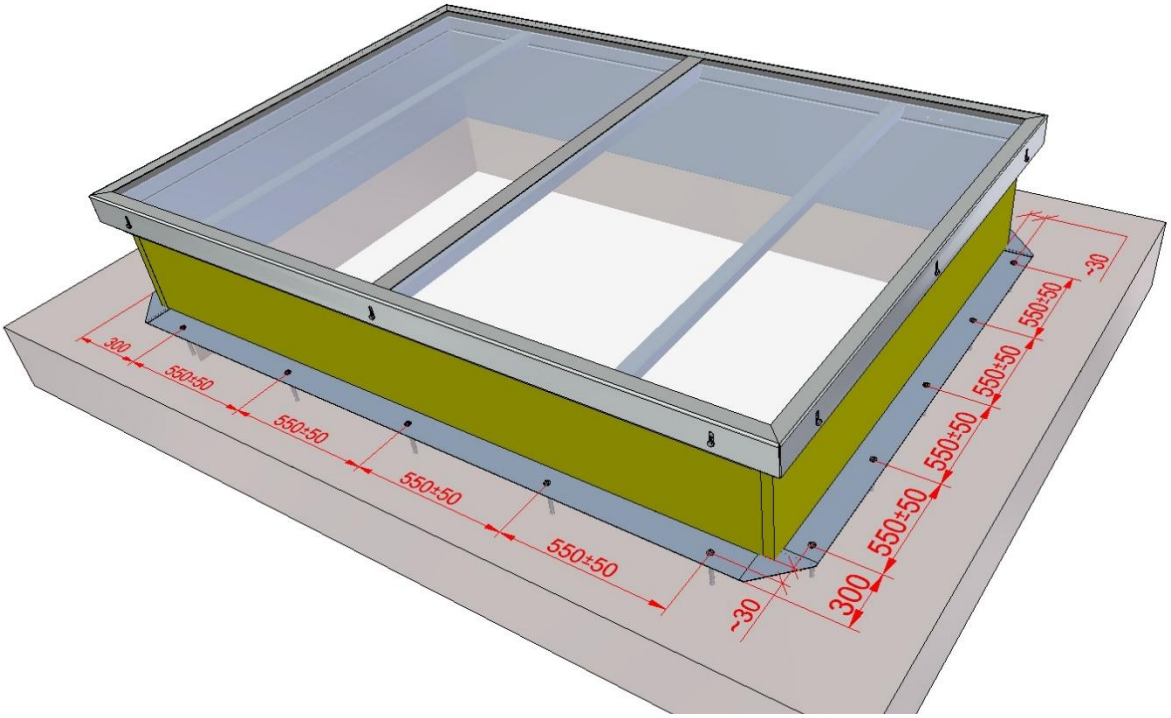


Fig. 4 Method of mounting the mcr PROLIGHT skylights and roof access hatches on the roof – spacing of connectors.

The skylight bases are ready for roofing works with roofing paper, PVC membrane or sheet metal.

The skylight base, in its upper part, is equipped with a strip of galvanized steel sheet around the entire circumference, which is used for fixing roof flashings / roof coverings using screws. For roofs covered with roof membrane, an optional PVC-coated sheet strip may be used to facilitate installation.

NOTE

1. **If roofing paper is to be welded to the above mentioned sheet strip, IT IS ABSOLUTELY REQUIRED to use a cover for protecting the skylight glazing and spacer sleeves from the effect of fire/hot air.**

2. **After installing the skylight, protective foil must be removed from all external aluminium elements of the vent (pressing frames, pressing strip) and from the vent glazing (PCA, sandwich panels, acrylic domes). Leaving foil on the device may cause permanent discolorations of elements, and become hard to remove.**

3. **If the skylight is supplied to the construction site in parts for assembly, maintain special caution when installing polycarbonate panels. Damaging the tape protecting the edges of polycarbonate panels will cause contamination to penetrate into the PCA chambers, which is not covered by warranty**

5.1 Methods of installing the skylights and roof access hatches

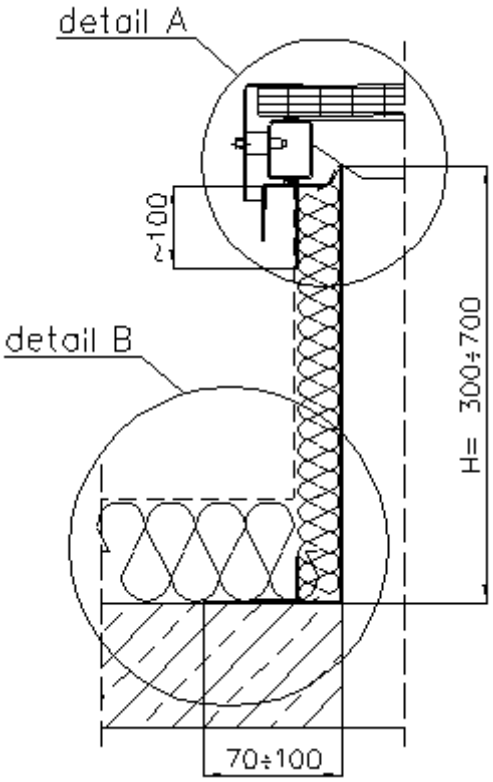
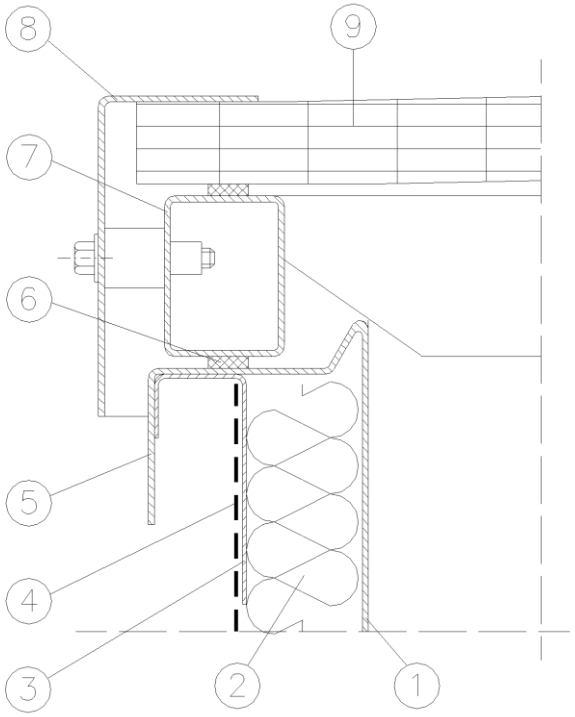
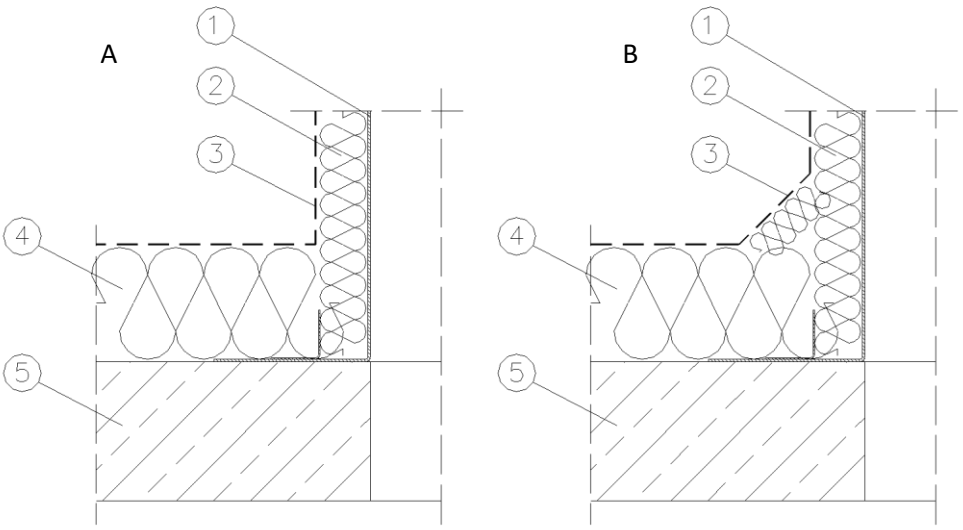


Fig. 5 Placement of steel base on the roof (DETAIL B) and method of sealing with roof membranę or roofing paper (DETAIL A).



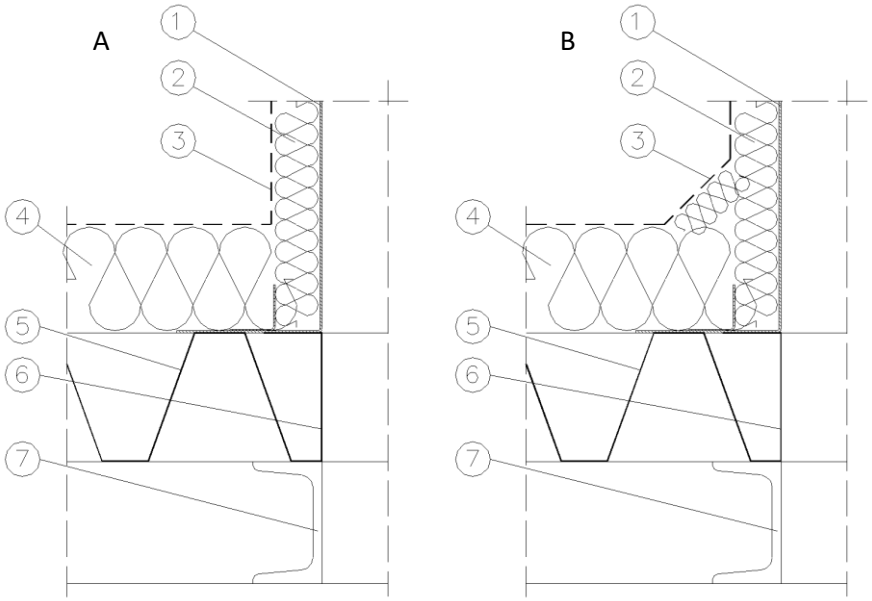
1. steel base
2. thermal insulation of base
3. sheet strip for installing roof membrane or roofing paper
4. roofing membrane or roofing paper
5. base eaves
6. leaf gasket
7. supporting frame
8. pressing frame
9. leaf glazing

Fig. 6 Method of sealing with roof membranę or roofing paper (DETAIL A).



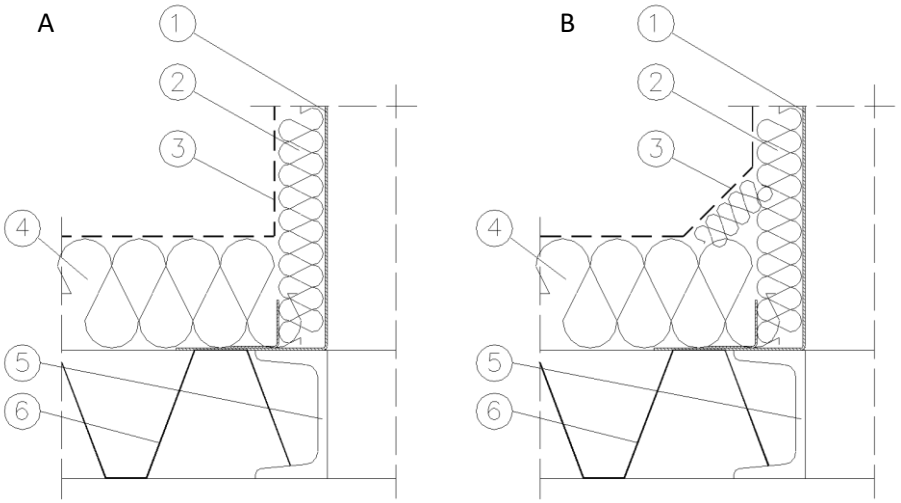
1. steel base of the skylight
2. base thermal insulation
3. covering with PVC membrane or roofing paper
4. roof thermal insulation
5. reinforced concrete slab

Fig. 7 Detail B - Steel base on reinforced concrete slab (A – covering with PVC membrane, B – covering with roofing paper).



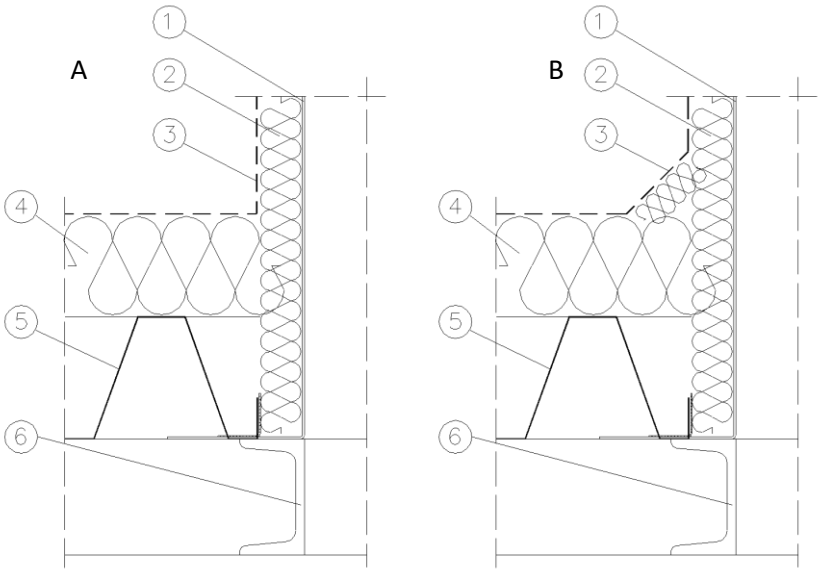
1. steel base of the skylight
2. base thermal insulation
3. covering with PVC membrane or roofing paper
4. roof thermal insulation
5. corrugated roofing sheet
6. additional roof flashing
7. steel bearing structure

Fig. 8 Steel base on steel structure (A – covering with PVC membrane, B – covering with roofing paper).



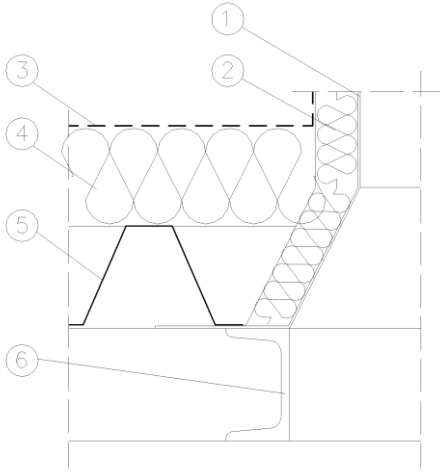
1. steel base of the skylight
2. base thermal insulation
3. covering with PVC membrane or roofing paper
4. roof thermal insulation
5. steel bearing structure
6. corrugated roofing sheet

Fig. 9 Steel base on steel structure (A – covering with PVC membrane, B – covering with roofing paper).



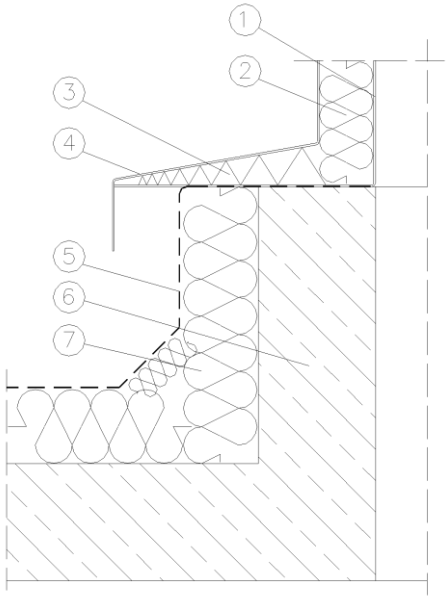
1. steel base of the skylight
2. base thermal insulation
3. processing with membrane or roofing paper
4. roof thermal insulation
5. corrugated roofing sheet
6. steel bearing structure

Fig. 10 Steel base on steel structure (A – covering with PVC membrane, B – covering with roofing paper).



1. slanted steel base of the skylight
2. base thermal insulation
3. covering with PVC membrane or roofing paper
4. roof thermal insulation
5. corrugated roofing sheet
6. steel bearing structure

Fig. 11 Slanted steel base on steel structure.



1. overlay type steel base oft he vent
2. thermal insulation
3. thermal insulation
4. external planking of overlay base
5. covering with PVC membrane or roofing paper
6. reinforced concrete plinth
7. roof thermal insulation

Fig. 12 Steel overlay base placed on a steel, wooden or reinforced concrete plinth.

6 CONTROL SYSTEM

The operation of openable spot skylight is based on devices used for controlling their opening and closing. A set of such devices forms together a ventilation control system. Depending on the equipment used in it, the ventilation control system may be offered in the following variants:

- pneumatic system,
- electrical system,
- mechanical system (gas springs).

In case of control mechanism failure and it is not possible to close the skylight leaf, please contact the service department immediately (see section 10.).

If it is required to close the leaf immediately before the technician arrives, you should: disconnect the immobilized actuator from the leaf (e.g. disconnect the actuator / gas spring from the mounting bracket or disconnecting eyebolt from the coupling bracket or unscrew the eyebolt from the actuator), then close the leaf and secure it against opening in closed position.

6.1 Electric control

The electrical actuator for ventilation is usually **not factory-mounted** due to transport considerations. It should be mounted in the mounting bracket attached to the base wall, using fixing plugs ST 12-1/8 (for the Exxx-230 actuators, xxx – the number means the actuator stroke) or fixing plugs M8x8/ Ø 12x13 (actuator VN1 230V) or threaded bolts (actuator JMBB-500-300-LA) delivered with the actuator. It is recommended to secure ST12 and M8x8/Ø 12x13 fixing plugs against unscrewing with Loctite 243 or similar.

The venting actuator is equipped with a T-shaped screw, which should be installed instead of the eyebolt. The mechanical hook lock should snap onto the T-shaped screw.

A weather monitoring station, e.g. mcr P054, is recommended in the ventilation control system, to automatically close the vents in the case of a strong wind or rain, in order to protect the user property and the vent structure against damage.

Fig. 13 Electric actuator for ventilation Exxx-230.

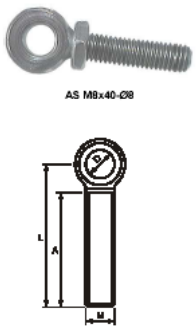


Fig. 14 Eye bolt.

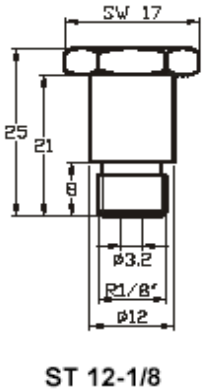


Fig. 15 Fixing plug ST12-1/8.

Fig. 16 Actuator for ventilation VN1 230V.

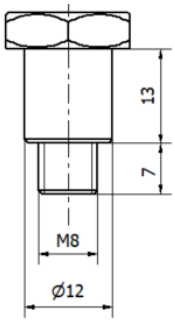


Fig. 17 Fixing plug M8x8/Ø12x13.

a) Actuator of type E-xxx-230 has two circuits:
- operating – movement direction control (wire: black/brown – blue)
- signalling (wire: 2 x white; signalling of actuator opening – voltage-free contact)

No.	Color of wire
1	*BLACK*
2	*BROWN*
3	*BLUE*
4	*WHITE*
5	*WHITE*

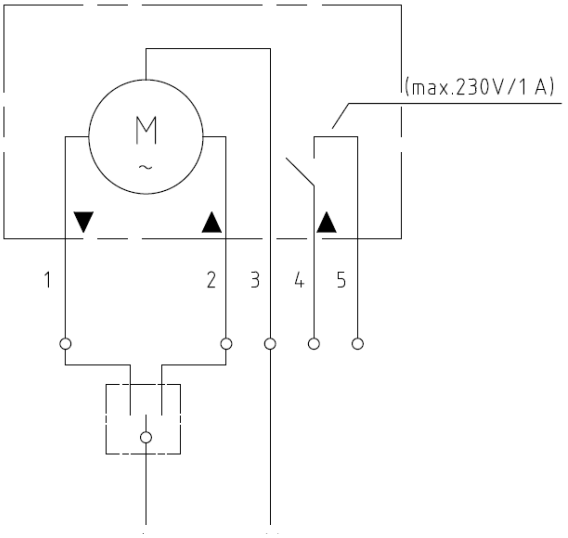


Fig. 18 Connection diagram of the E-xxx-230.

b) Actuator of type JMBB-500-300-LA has two circuits:
- operating – movement direction control (wires: brown / black1 - blue)
- signalling (wires: black2/black3; signalling of actuator opening – voltage-free contact)

No.	Color of wire
1	*BROWN*
2	*BLACK 1*
3	*BLUE*
4	*BLACK 2*
5	*BLACK 3*

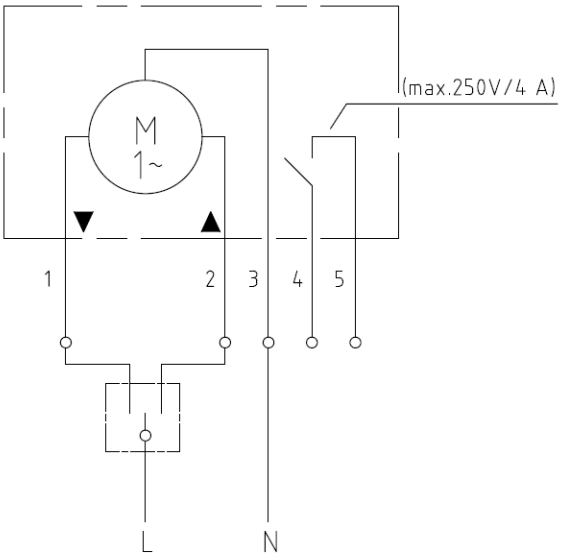


Fig. 19 Connection diagram for JMBB-500-300-LA actuator.

c) Actuator of type VN1 230V has two circuits:
- operating – movement direction control
- (wires: brown/black - blue),
- signalling of actuator opening – (wire: white/grey)

No.	Color of wire
1	*BROWN*
2	*BLACK*
3	*BLUE*
4	*WHITE*
5	*GREY*

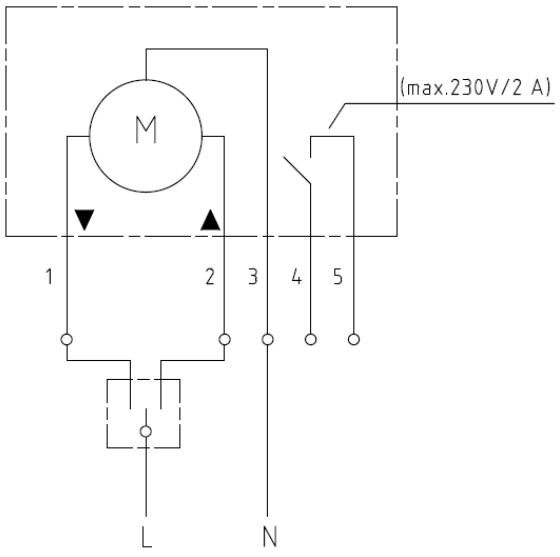


Fig. 20 Connection diagram for VN1 230V actuator.

6.2 Pneumatic control

Pneumatic control system includes one or two pneumatic actautors with standard cylinder diameter of 32 mm and stroke of 300 mm. Depending on the customer, available are also other cylinder diameter and stroke values. Once the skylight is installed, connect the actuators by means of flexible or rigid tubes (recommended Ø6/4 mm) running from the ventilation box with the integrated pneumatic valve. We recommend the actuator operating pressure of 0.4...0.8 MPa.

Pneumatic actuators are adjusted by means of tightening the eye bolt inside the actuator piston rod.

A weather monitoring station, e.g. mcr P054, is recommended in the ventilation control system, to automatically close the skylights in the case of a strong wind or rain, in order to protect the user property and the vent structure against damage

Threaded connections of pipe fittings with valves, actuators, etc. are sealed using suitable chemical agents, e.g. Loctite 243 (recommended) or Teflon tape, by applying it on the thread. Loctite 243 should be applied in several (2-3) drops on the thread. After making the screwed connection, Loctite 243 sets, sealing the connection and protecting it against uncontrolled loosening (important in the case of connections with pneumatic cylinder). Such protected hose joint may only be unscrewed using hand tools.

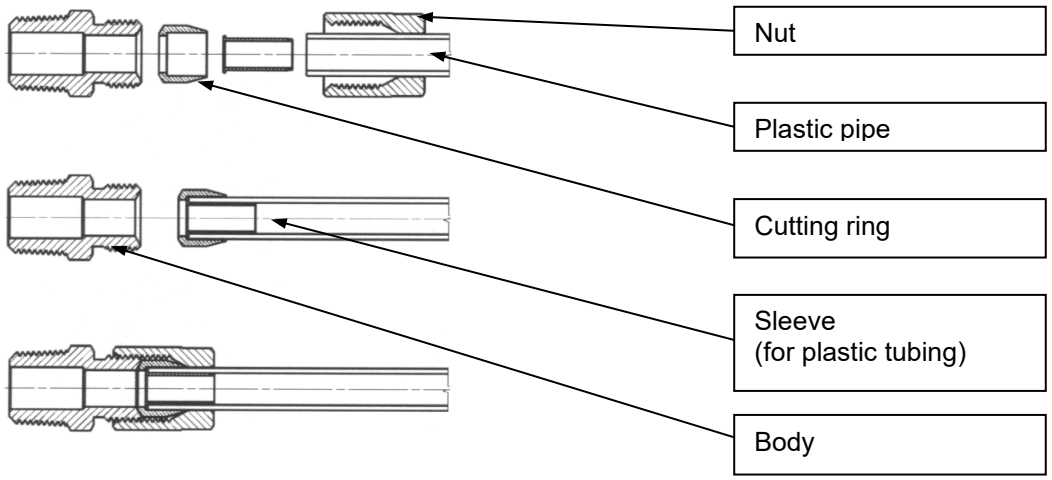


Fig. 21 Method of installing flexible pipes of the pneumatic system.

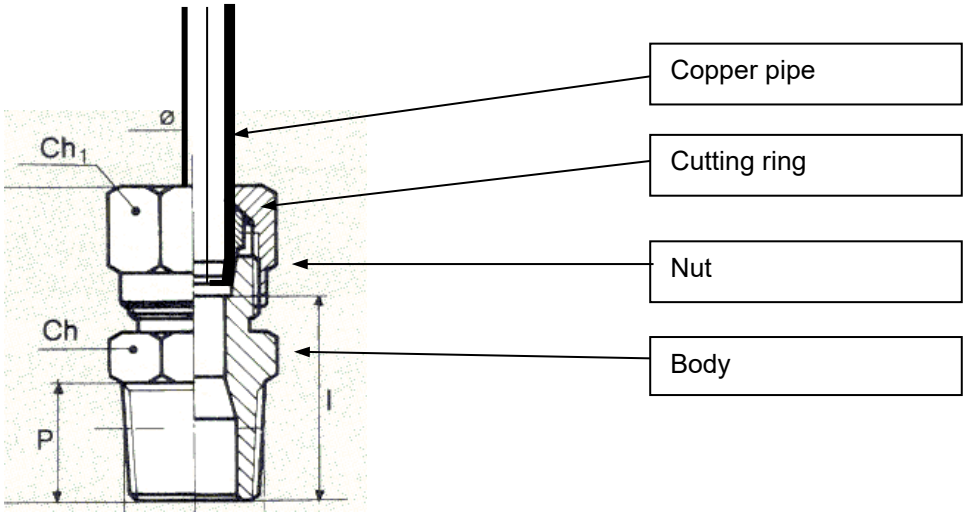


Fig. 22 Method of installing hard pipes (steel, copper).

Pneumatic cylinders have an internal locking that prevents the closing of a fully opened vent leaf. In order to close the skylight leaf, in an emergency situation, release the **actuator locks (1)** by lifting them in the direction of the actuator's working movement (according to the arrow in Fig. 23).

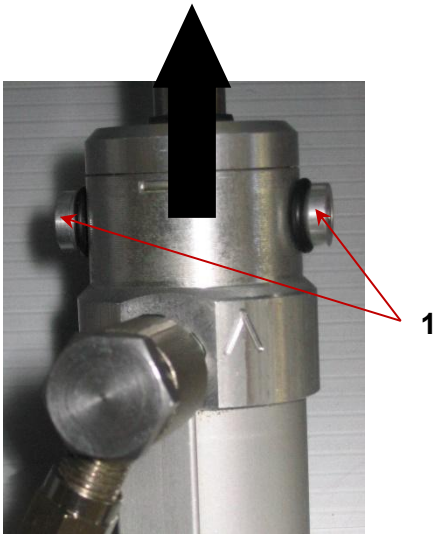
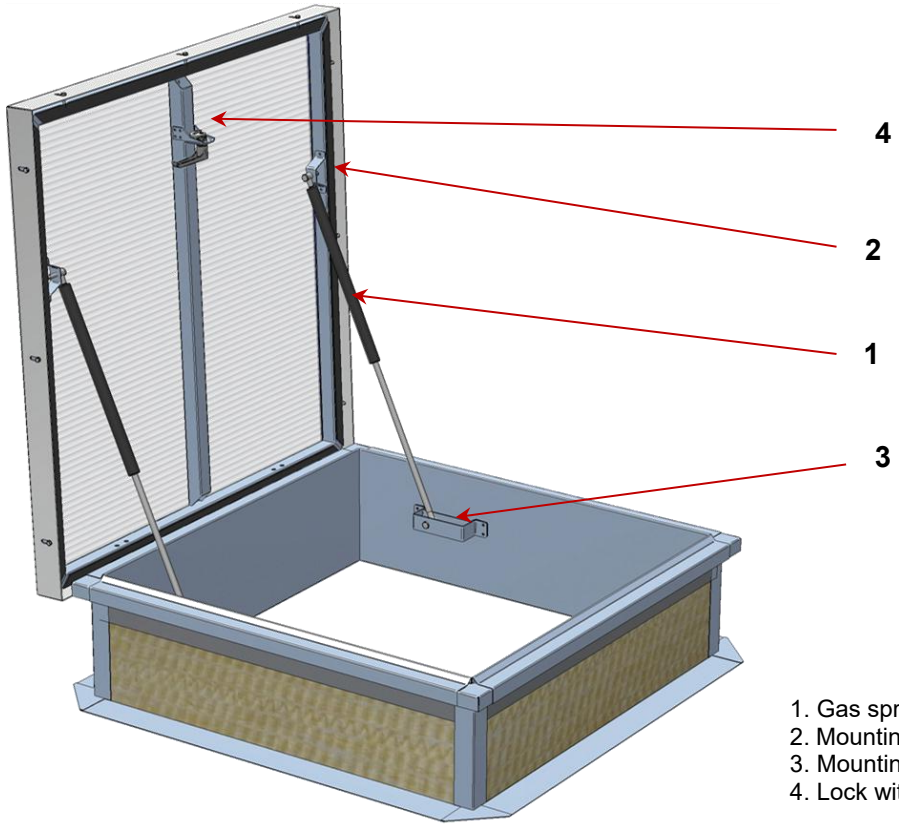


Fig. 23 Unlocking the pneumatic cylinder POAV.

6.3 Mechanical control

Mechanical control in mcr PROLIGHT type C, E, NG roof access hatches is performed using gas springs (gas struts).
Gas springs supporting the opening of roof hatches are mounted in brackets located on the side walls of the hatch base.



1. Gas spring
2. Mounting bracket on the opening leaf
3. Mounting bracket in the base
4. Lock with handle

Fig. 24 mcr PROLIGHT roof access hatch, type C or E, with gas springs.

7 GLAZING OF THE LEAF

For transport reasons, the domes to be installed as a skylight filling are delivered separately. The domes should be mounted to the skylight leaf on site, after installing the skylight in the roof, as follows:

1. remove the pressure frame (unscrew the M6x30 screws, remove the spacer sleeves)
2. check the condition of the PES seal on the supporting frame (clean it from dust)
3. place the shells of multi-layer domes one by one from the lowest to the highest – separate each dome shell with the supplied gasket – glue the gasket to the previously placed dome shell – around the perimeter (see the drawing below) leaving a 1 cm gap at the corners
4. install the pressure frame
5. insert the spacer sleeves
6. screw in the M6x30 screws while pressing the frame from above

The filling made of cellular polycarbonate panels is delivered factory-installed. If replacement is necessary, perform steps 1, 2, 4, 5, 6 according to the above points.

If the pressure frame becomes loose, unscrew the M6x30 screws slightly and then screw them in again one by one while pressing the frame from above.

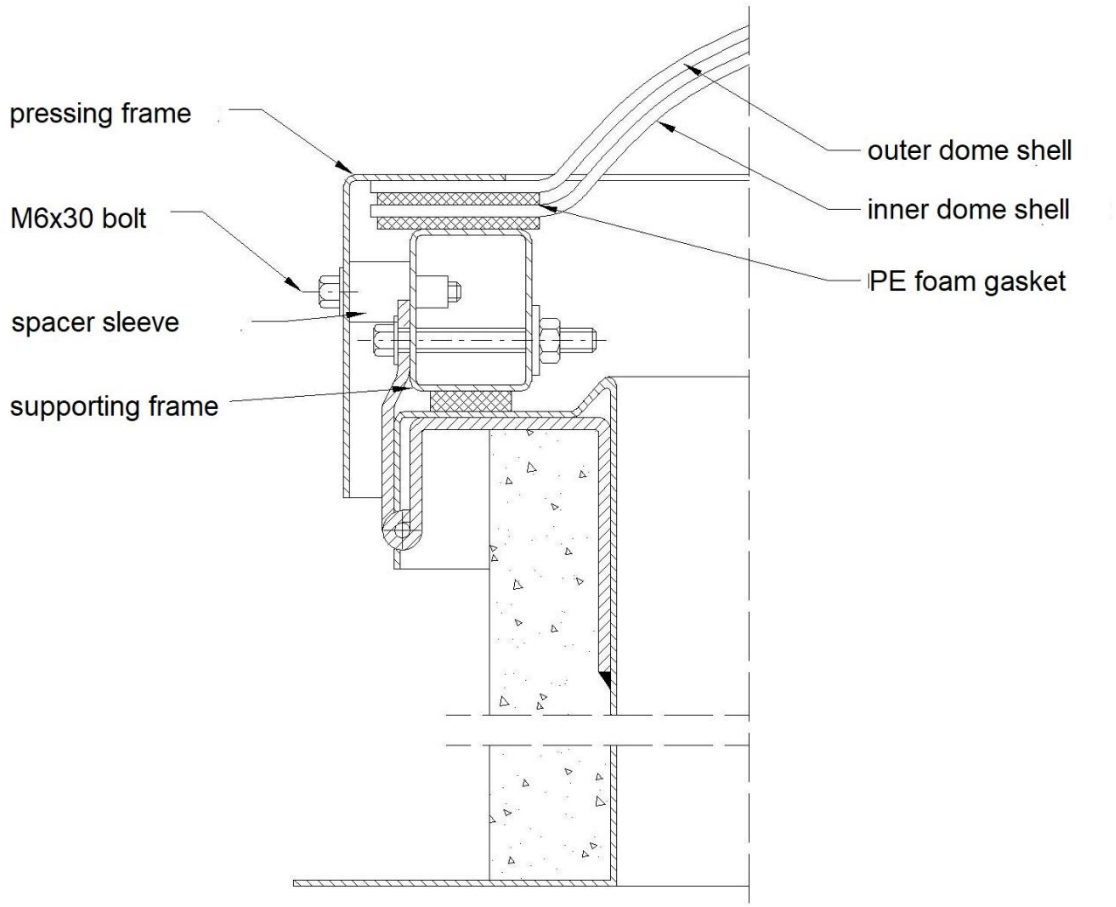


Fig. 25 Acrylic dome installation.

8 SKYLIGHTS WITH ANTI-BURGLARY BARS OR SAFETY NETS

Skylights can be equipped with anti-burglary bars or safety nets.

Safety nets are delivered as a ready-made element mounted in the skylight. The nets are resistant to impact of a large soft body with energy <1200 J (according to PN-EN 1873 – feature SB1200).
Anti-burglary bars can be delivered ready-assembled or as a set of elements to be assembled on site. Anti-burglary bars are resistant to impact of a large soft body with energy <1200 J.

mcr PROLIGHT roof access hatches can be equipped with openable safety nets. Safety nets are delivered as a ready-made element mounted in the skylight. The safety net is equipped with brackets enabling the net to be locked, e.g. with a padlock. If the openable safety net is to be resistant to the impact of a large soft body, it must be secured with a padlock or shackle.

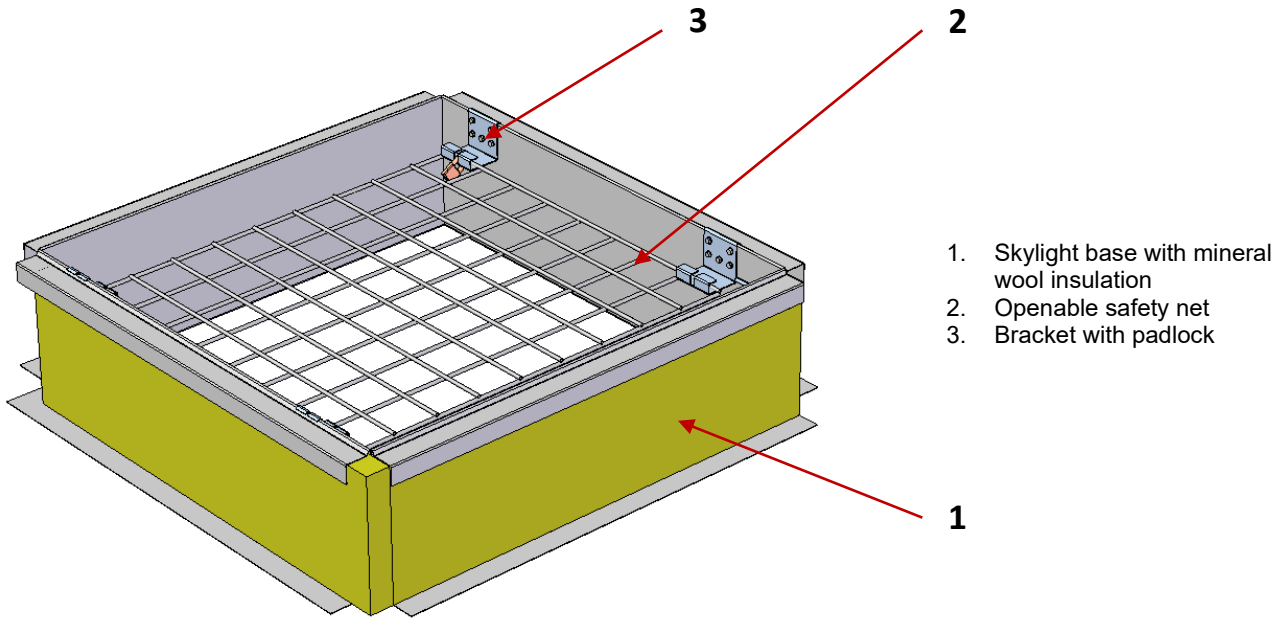
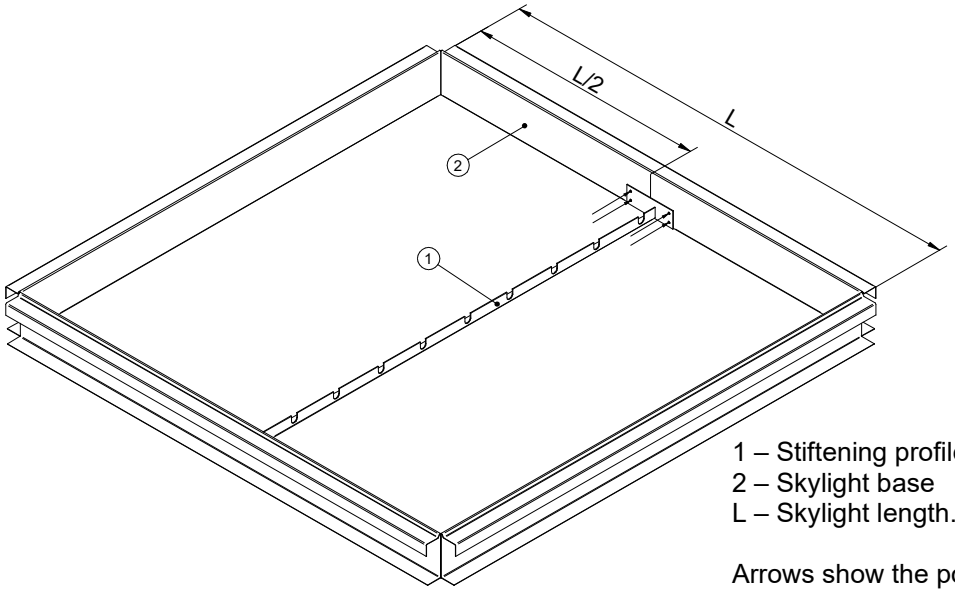


Fig. 26 View of the base of the mcr PROLIGHT type C openable skylight with a hinged safety net (without control and skylight leaf).

If the anti-burglar bars are delivered as separate elements, they should be installed following the instructions below:

I. Installation of the stiftening profile inside the base



1 – Stiftening profile with end sheets
2 – Skylight base
L – Skylight length.

Arrows show the points of bolting.

Fig. 27 Installation of stiftenning profile inside the skylight base.

- Place the end sheets along with welded bracing at the half length of the skylight at a distance of 20 mm from the top of the base.
- Fix the stiftening profile by means of four self-tapping bolts ø 6.3 to the skylight base through the holes in the end sheets.

II. Installation of bar supporting profiles.

3 – Bar supporting profile (steel sheet #2 mm)

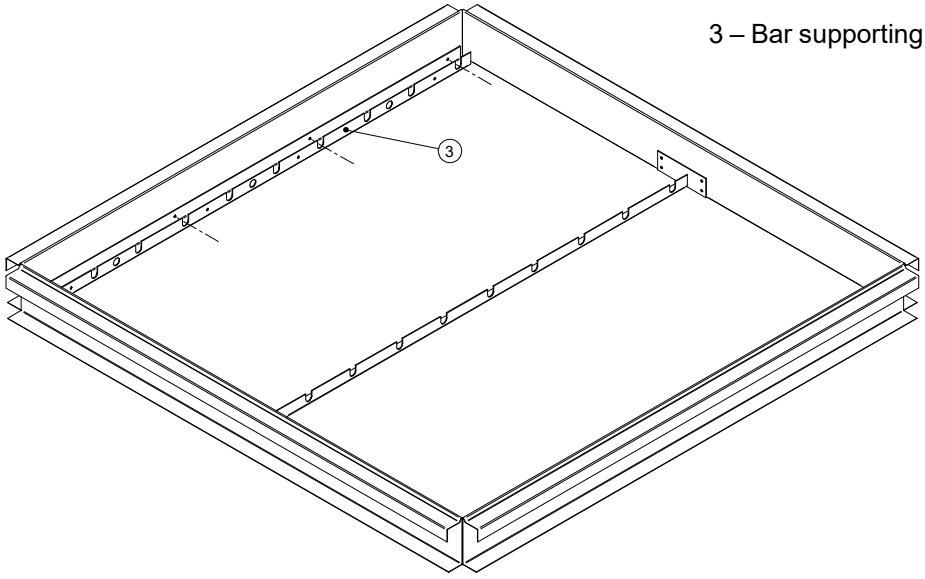
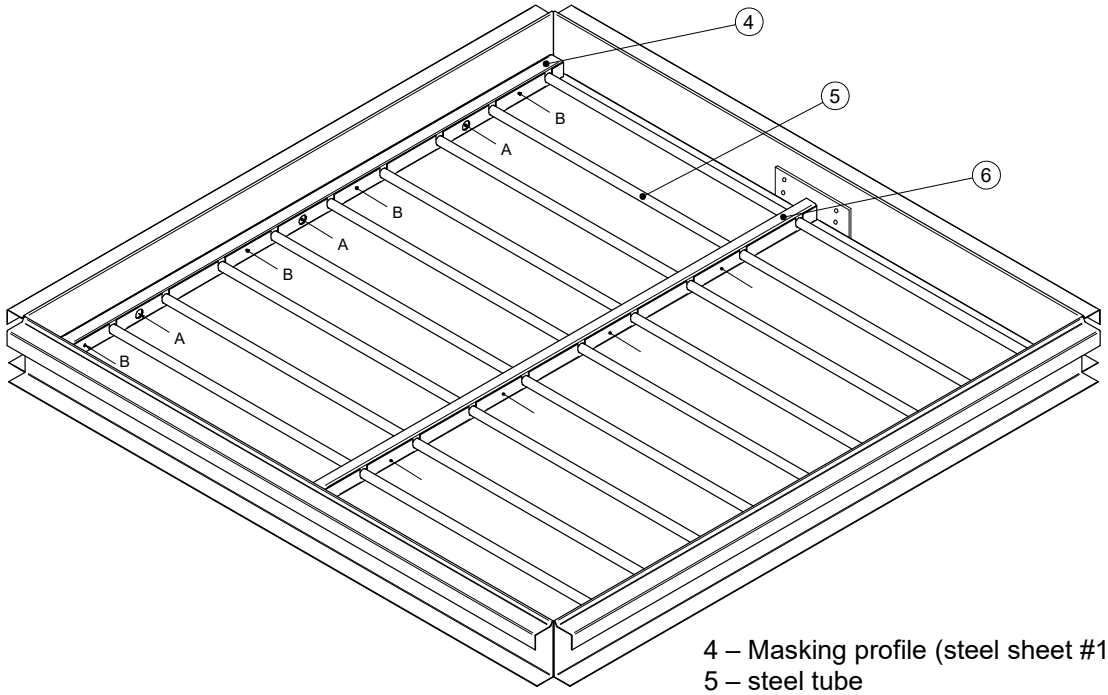


Fig. 28 Installation of bar supporting profiles inside the skylight base.

- Fasten two bar supporting profiles at a distance of 20 mm from the top of the skylight base (on opposite sides oft he base) by means of self-tapping screws ø 6.3x19. The profile should be placed so as to make the cutouts for tubes lie in one axis with the cutouts in the bracing.

III. Installation of bar tubes and masking profiles.



4 – Masking profile (steel sheet #1.25 mm)
5 – steel tube
6 – Bar bracing with holes

Fig. 29 Installation of bar tubes and masking profiles.

- Place the anti-burglar bar tubes in supporting profiles and bracing
- Place the masking profiles and fix to the base through the supporting profile at the points indicated by the holes (A) and with supporting profile (B) by means of self-tapping screws ø 6.3x19;
- Place the bar bracing (6) and fix it by means of self-tapping bolts ø 6.3x19.

ATTENTION:

Depending on the size of the skylight, the number of tubes and mounting screws will vary. This manual refers to the C160 skylight

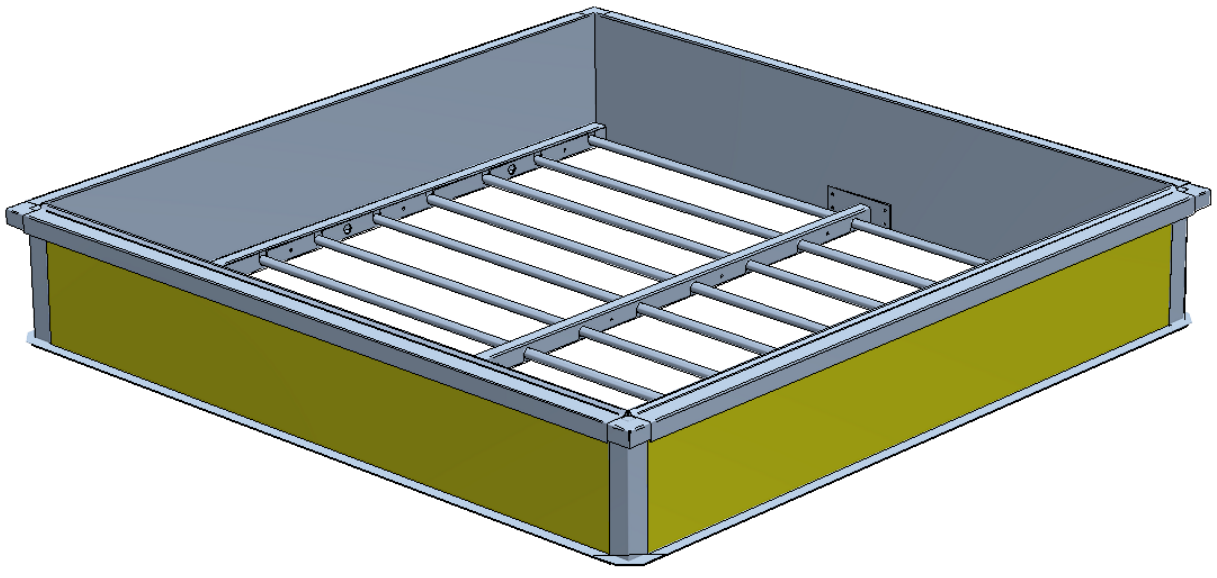


Fig. 30 View of the base of the mcr PROLIGHT type C fixed skylight with anti-burglary bars (without glazing).

9 MAINTENANCE

The equipment should be maintained in compliance with any applicable occupational health and safety regulations, specifically as regards high-rise works, and using suitable personal protections.

During the operations, ensure regular maintenance and service reviews of the equipment. Service support and maintenance works are conducted by a team authorised by Mercor Light&Vent. The time between the service reviews is 6 months.

Between individual reviews, we recommend the works specified below:

1. Checking the condition of electrical wiring with special attention to mechanical damage.
2. Checking the condition of pneumatic system with special attention to mechanical damage.
3. Checking the condition of actuator mounting brackets (if they are mounted securely)
4. Check whether the pressure frame holding the leaf filling is securely mounted, if it is loose, proceed as per chapter 7.
5. Periodical cleaning of the surfaces of polycarbonate panels: for cleaning use a sponge or soft fabric and lukewarm water with common household mild cleansers. Do not scrub the panels with brushes or sharp things. Do not use abrasive materials, strong alkaline substances, solvents, etc. In doubtful cases make a test of the cleaning agent on a sample or a small surfaceni.
6. Due to natural processes occurring in nature, condensation of water vapor may occur in the chambers of polycarbonate panels. This is most often manifested by the appearance of mist or, in the case of heavy moisture, by visible drops. If air exchange is ensured by diffusion between the air inside the chambers and the outside air, after some time the moisture content in both areas will equalize and the visual effects described above will disappear.

Condensation of water vapor does not affect the life of the material or the quality of the product.

ATTENTION!

It is prohibited to use salt to clear snow from roofs on which the mcr PROLIGHT skylights are installed – it may cause discoloration and damage to polycarbonate panels, acrylic domes and aluminum profiles. Damage to the product caused in this way does not constitute grounds for filing a complaint.

10 WARANTY CONDITIONS

1. Mercor Light&Vent grants a 12-month quality guarantee for equipment, starting from the date of purchase, unless the agreement provides otherwise.

2. Each defect under guarantee should be reported to a local representative of Mercor Light&Vent immediately, i.e. within 7 days of its discovery.

3. Applications can be made by phone at +48/ 58 341 42 45, by email to claim@mercor.com.pl or by sending a letter to: Mercor Light&Vent, Grzegorza z Sanoka 2, 80-408 Gdańsk, Poland.

4. If during the term of guarantee any physical defects of the equipment become evident, Mercor Light&Vent shall remove them as soon as possible, subject to paragraph 5.

5. Mercor Light&Vent 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. Liability under the Guarantee covers only defects resulting from causes inherent in the equipment sold.

7. 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.

8. In accordance with the generally accepted practice, 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 Light&Vent 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 (A_4)). 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 neighborhood);
   - 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;
   - damages due to aggressive external factors, especially chemical and biological ones.
   - parts liable to natural wear and tear during operation (e.g. seals) unless a manufacturing fault has occurred;
   - damages due to improper transport, unloading and storage of the device;
   - damages due to installation inconsistent with the OMM and the rules of good construction practice;
   - 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.

9. Guarantee and warranty is void in the following cases:
   - The Buyer/Guarantee Holder makes design modifications on his own without consulting Mercor Light&Vent,
   - Maintenance or periodic servicing are not done in due time or are performed by unauthorized persons or a service center not authorized by Mercor Light&Vent, or the equipment is operated in the wrong way,
   - Any interference of unauthorized persons – except activities connected with normal operation of the equipment.

10. The Buyer/Guarantee Holder is responsible for proper operation and maintenance of the equipment and for regular (min. twice a year) servicing according to service and maintenance instructions included in OMM.

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 Light&Vent.
3. On issues related to service please contact a local representative of Mercor Light&Vent.

Other conditions:

1. As regards matters not regulated by these “Warranty terms and conditions”, the law applicable is Polish law.
2. Any disputes that may arise in connection with the “Warranty terms and conditions” shall be settled through negotiations between the Parties. This provision is not an arbitration clause.
3. If the Parties fail to reach an agreement by negotiation, any disputes arising from or related to the contract shall be settled by the Polish court competent for the seat of the Seller.

Service

1. **The devices should be subjected to periodic technical inspections and maintenance activities every 6 months during their entire period of operation (§ 3, section 3 of the Regulation of the Minister of Internal Affairs and Administration of April 21, 2006 on fire protection of buildings, other construction facilities and areas, Journal of Laws .U. of 2006, No. 80, item 563).**
2. **Periodic technical inspections and maintenance activities should be carried out by companies with appropriate authorization from Mercor Light&Vent (§ 3, section 3 of the Regulation of the Minister of Internal Affairs and Administration of April 21, 2006 on fire protection of buildings, other construction facilities and areas, Journal of Laws of 2006, No. 80, item 563).**
3. **In matters related to technical inspections, maintenance and service of devices, please contact the Service Department by phone: +48 58 341 42 45, extension: 173, 175, 177 or fax: +48 58 341 39 85, email: service@mercor.com.pl, 8 – 16 o’clock (Mon-Fri).**