

KAMOUFLAGE MP

Motorised, aesthetic and CE marked smoke control shutter can be perfectly integrated in many smoke control systems



CE
1812

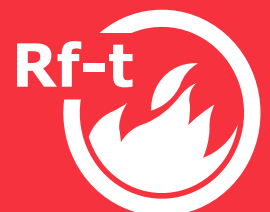






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Explanation of the abbreviations and pictograms

<p>Wn = nominal width Hn = nominal height Sn = free air passage E = integrity I = thermal insulation S = smoke leakage 60/120 = fire resistance time Pa = pascal o -> i = meets the criteria from the outside (o) to the inside (i) i <-> o = fire side not important AA = automatic activation multi = multi compartment 1500 = pressure level 3 (1500Pa) ved = vertical duct</p>	<p>hod = horizontal duct vew = vertical wall penetration V = volt W = watt V AC = Volt alternating current V DC = Volt direct current E.TELE = power supply magnet E.ALIM = power supply motor Auto = automatic Tele = remote controlled Pnom = nominal capacity Pmax = maximum capacity DAS MOD = modular product OP = option (delivered with the product)</p>	<p>KIT = kit (delivered separately for repair or upgrade) PG = connection flange to the duct GKB (type A) / GKF (type F): "GKB" stands for standard plasterboards (type A according to EN 520) while "GKF" plasterboards offer a higher fire resistance for a similar plate thickness (type F according to EN 520) Cal-Sil = calcium silicate ζ [-] = pressure loss coefficient Q = air flow ΔP = static pressure drop v = air speed in the duct Lwa = A-weighted sound power level ME = motorised H = habitat</p>
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	<p>aesthetic solution</p>		<p>superior air tightness (tested at 1500 Pa)</p>
	<p>optimal free air passage and minimal pressure loss</p>		<p>intermediate dimensions on request</p>

DECLARATION OF PERFORMANCE

CE_DoP_Rf-t_V28_EN_A-05/2019

1. Unique identification code of the product-type:		KAMOUFLAGE MP	
2. Intended use/s:		Smoke control damper to be used in smoke control systems, in multi-compartment applications at fire temperatures, or in single-compartment applications.	
3. Manufacturer:		RF Technologies NV, Lange Ambachtstraat 40, B-9860 Oosterzele	
4. System/s of AVCP:		System 1	
5. Harmonised standard / European Assessment Document/notified body / European Technical Assessment, Technical Assessment Body, notified body/certificate of constancy of performance:		EN 12101-8:2011, Efectis with identification number 1812; Efectis_1812_CPR_*** in requestEfectis_	
6. Declared performance according to EN 12101-8:2011		(fire resistance according to EN 1366-10, classification according to EN 13501-4)	
Essential characteristics			
Range	Product	Wall type	Wall
350x385 mm ≤ Kamouflage 1V MP ≤ 700x1075 mm	Kamouflage 60 MP	Shaft	Promatect L500 ≥ 30 mm Geoflam ≥ 30 mm Geotec ≥ 30 mm Technivier ≥ 35 mm Glasroc F V500 ≥ 35 mm Exthamat ≥ 25 mm Desenfire HD ≥ 25 mm HD Concrete ≥ 90 mm Masonry, concrete blocks, concrete ≥ 100 mm
	Kamouflage 120 MP	Shaft	Promatect L500 ≥ 40 mm Geoflam ≥ 35 mm Technivier ≥ 45 mm Exthamat ≥ 30 mm Desenfire ≥ 25 mm THD Concrete ≥ 90 mm Masonry, concrete blocks, concrete ≥ 100 mm
	Kamouflage 120 MP	Shaft	Promatect L500 ≥ 50 mm Geoflam ≥ 45 mm Geoflam Light ≥ 35 mm Geotec ≥ 45 mm Technivier ≥ 50 mm Glasroc F V500 ≥ 50 mm Exthamat ≥ 35 mm Desenfire HD ≥ 35 mm Masonry, concrete blocks, concrete ≥ 100 mm
			max 4 max 2
1	Type of installation: shaft-mounted 0/180°; Minimal in-between distances authorised.		
Performance			
Classification	Installation	Performance	Classification
EI 60 (V _{ed} i ↔ o) S 1500 C I 0000 AA multi	1		EI 60 (V _{ed} i ↔ o) S 1500 C I 0000 AA multi
			EI 90 (V _{ed} i ↔ o) S 1500 C I 0000 AA multi
			EI 120 (V _{ed} i ↔ o) S 1500 C I 0000 AA multi

Harmonised standard
EN 12101-8:2011

Nominal activation conditions/sensitivity:
 Response delay (response time): closure time
 Operational reliability: cycling
 Durability of response delay:
 Durability of operational reliability:
 Approved accessories
 High operational temperature (HOT 400/30):

Pass - automatic activation
 Pass - automatic activation
 10000 cycles (no load)
 Pass
 Pass
 EASY-KAP ME/MP or EASY-KGC ME/MP mounting frame; motor VA MP MEC
 NPD (no performance determined)

The performance of the product identified above is in conformity with the set of declared performance/s. This declaration of performance is issued, in accordance with Regulation (EU) No 305/2011, under the sole responsibility of the manufacturer identified above.

Signed for and on behalf of the manufacturer by:
 Mathieu Steenland, Technical Manager

Oosterzele, 05/2019



Product presentation KAMOUFLAGE MP

The Kamouflage MP is a motorised, aesthetic and CE marked smoke control shutter that can be perfectly integrated in many smoke control systems. It is certified in accordance with EN12101-8, suitable for vertical mounting in ducts or concrete shafts. Offering 60 or 120 minute fire resistance at minimum pressure loss, it is classified as suitable for multi-compartment applications. In addition, Kamouflage MP has a C₁₀₀₀₀ cycling classification, which means it can be used in combined smoke control and environmental, energy saving systems.

It opens to supply and release air or to evacuate smoke in emergency situations whilst maintaining its fire resistant integrity in standby position.

The Kamouflage MP is designed for use in:

- Pressure Differential Systems (PDS): e.g. pressurising staircases.
- Smoke and Heat Exhaust Ventilation Systems (SHEVS): ventilating protected lobbies and corridors through shafts, either naturally or mechanically, or a combination of both.
- Energy saving systems combined with PDS or SHEVS: e.g. night cooling systems.

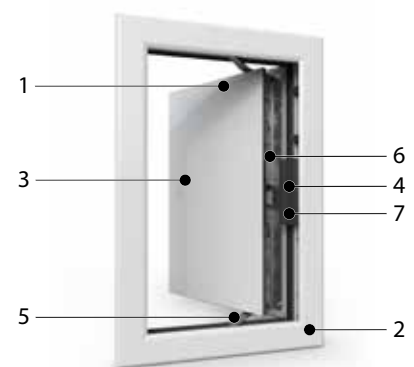
Smoke evacuation shutters and dampers are suitable for use in ventilating protected lobbies, venting to shafts either naturally or mechanically. They open to evacuate smoke in emergency situations whilst maintaining fire resistant integrity in standby position.

- ✓ optimal smoke control system thanks to higher free air passage and minimal pressure loss
- ✓ easy to install thanks to optional mounting frame (EASY KAP ME/MP or EASY KGC ME/MP) and its light weight
- ✓ easy to finish thanks to removable front plate
- ✓ aesthetic solution that can be integrated in any interior design
- ✓ simple operating tests through remote opening and resetting by an actuator
- ✓ fully integrable in the wall finish
- ✓ installation at minimal distances

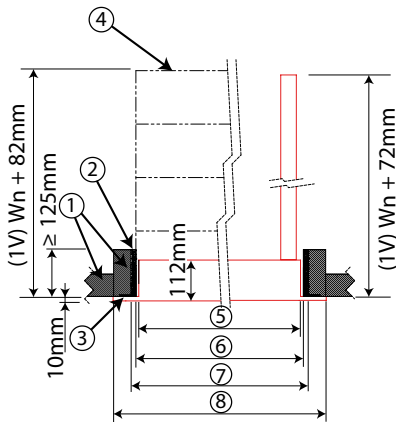


- tested according to EN 1366-10
- compliant with EN 12101-8
- fit for use as air release and air supply vent in PDS-systems according to EN 12101-6
- suited as air supply and smoke evacuation vent in SHEVS-systems according to EN 12101-8
- light weight: ≤ 35 kg
- available with ready-to-install finish (white lacquered RAL 9010)
- approved for installation in calcium-silicate, 'Staff', Tecniver, Glasroc, Extha and concrete shafts.
- maintenance-free
- superior air tightness (tested at 1500 Pa)

1. 1 shutter
2. aluminium frame
3. lock + key
4. connection compartement
5. actuating arm
6. resetting motor
7. product identification



Range and dimensions KAMOUFLAGE MP



1. Refractory material
2. Sealing if mounting frame
3. Mounting frame EASY-KAP ME/MP (optional)
4. EASY-KGC ME/MP mounting frame with drop guard (optional)
5. Nominal dimensions shutter $W_n \times H_n$
6. Built-in dimensions without mounting frame $(W_n+10) \times (H_n+10)$ mm
7. Built-in dimensions with mounting frame $(W_n+20) \times (H_n+20)$ mm
8. Overall (outside) dimensions of the shutter $(W_n+54) \times (H_n+54)$ mm

	IV	IV
$(W_n \times H_n)$ mm	350x385	700x1075

Evolution - kits



KITS VD24-VA

Natural magnet 24 V DC



EASY-KAP ME/MP

Mounting frame (delivered separately)



EASY-KGC ME/MP 1V

Mounting frame with hinged drop guard grid (delivered separately)

Options - at the time of order



TL

Trailing lead 3 m for external connection

Storage and handling

As this product is a safety element, it should be stored and handled with care.

Avoid:

- any kind of impact or damage
- contact with water
- deformation of the casing

It is recommended:

- to unload in a dry area
- not to flip or roll the product to move it
- not to use the damper as a scaffold, working table, etc.
- not to store smaller dampers inside larger ones

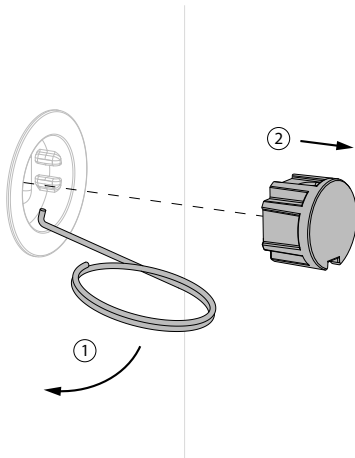
Installation

General points

- The installation must comply with the installation manual delivered with the product and the classification report.
- The installation of the shaft must comply with the classification report delivered by the shaft manufacturer.
- Axis orientation: see the declaration of performance.
- Verify if the blade can move freely.
- Rf-t smoke dampers may be applied to ducts that have been tested according to EN 1366-8 and EN 1366-9, as appropriate. They have to be constructed from similar materials with a fire resistance, thickness and density equal or superior to these of the tested materials.
 - ⚠ Caution: when fitting, the product should be handled with care and remain protected from any sealing products.
 - ⚠ Caution: before putting the installation into operation, clean off all the dust and dirt.
 - ⚠ Caution: bear in mind the blade's clearance inside the smoke evacuation duct.

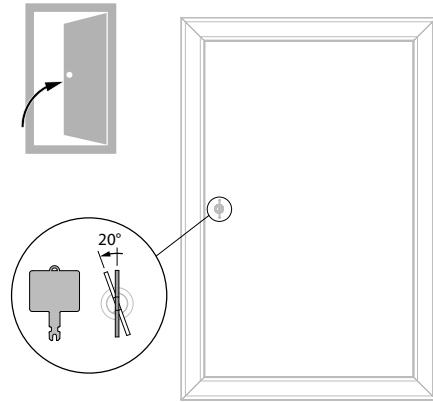
Operation: manual opening

1



1. Remove the finishing cap from the shutter. To do this, use the hook with key ring that is delivered with the product. You may attach this tool to the key through its handy key ring.

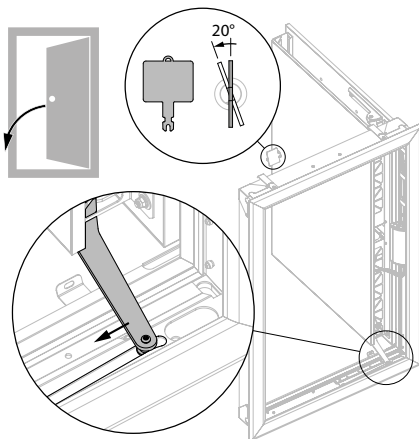
2



2. Unlocking 1V
Turn the key 20° anti-clockwise and push the shutter into its open position.

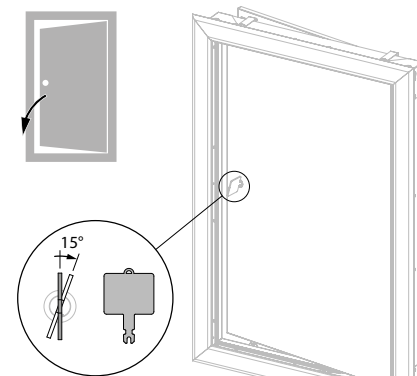
Operation: manual closing

1



1. Turn the key 20° anti-clockwise. Push the actuating arm in the direction of the arrow and pull the shutter into its closed position.

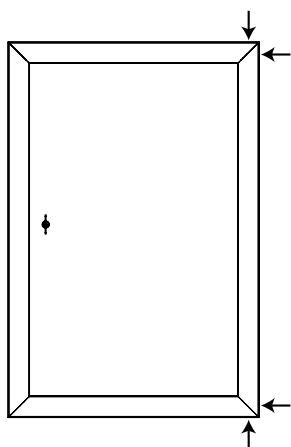
2



2. Turn the key 15° clockwise. The key blocks in the lock and the door can be pulled into its lock.

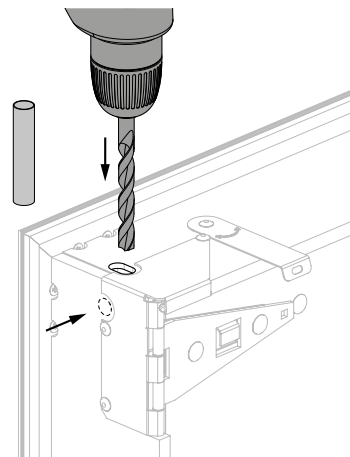
Electrical connection

1



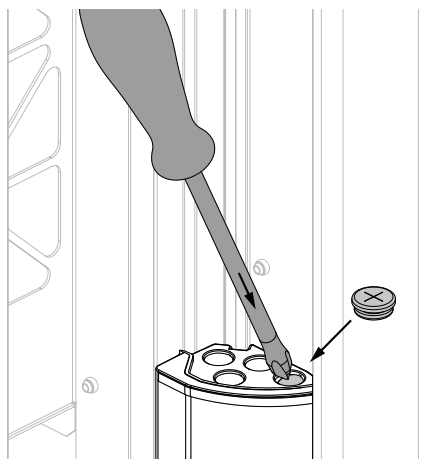
1. The electrical connection is possible via the 2 corners at the side of the hinges.

2



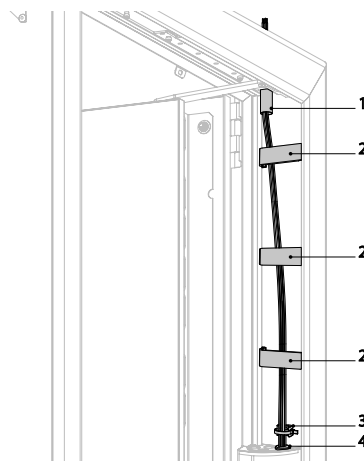
2. Drill a hole in the refractory material at the chosen corner(s). The galvanised part at the inside of the shutter is already indented.

3



3. Pierce an opening in the connection box. Affix the grommet delivered with the product.

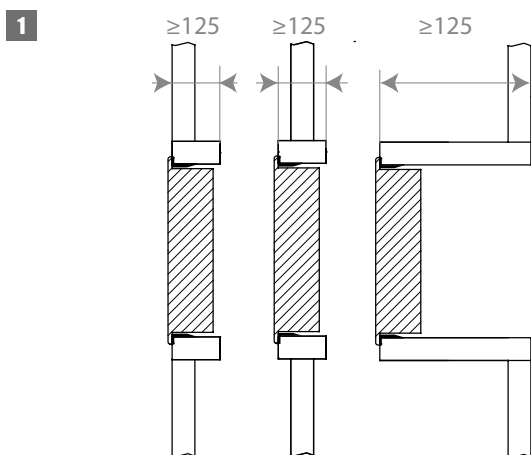
4



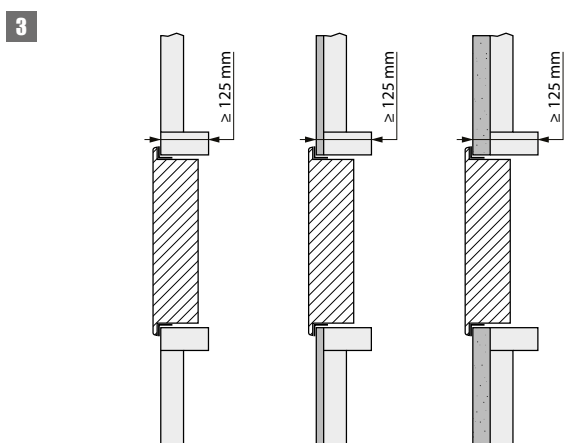
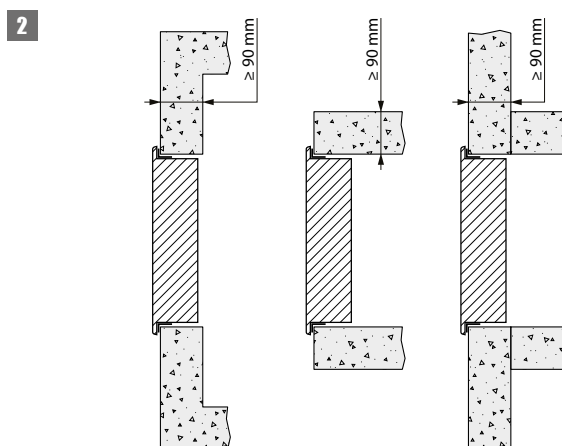
4. Lead the cables through the opening. Use the protective sleeve (1), the fixation clips (2) and the plastic cable clamp (3) to attach the cables to the frame. Lead the cables to the connection box through the grommet (4) and connect according to the electrical connection diagram.

⚠ Caution: after passing and fixing the cables, you need to seal the drilled hole in the refractory around the electrical cables with fire resistant adhesive sealant (BCM f.e.).

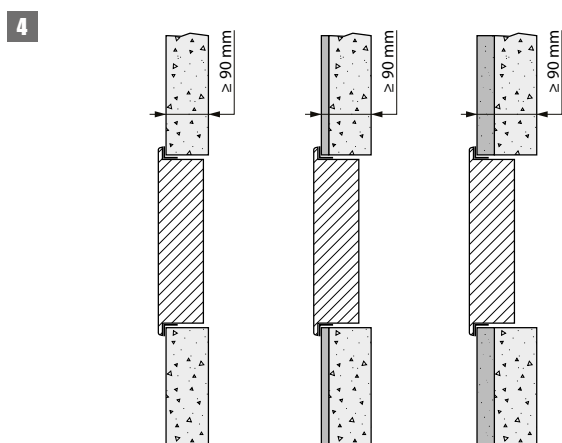
Position in the shaft



1. The shutter is affixed to the smoke evacuation shaft through a sleeve. That sleeve can be installed either in the shaft, in the axis of the shaft or outside the shaft (or shaft extension).



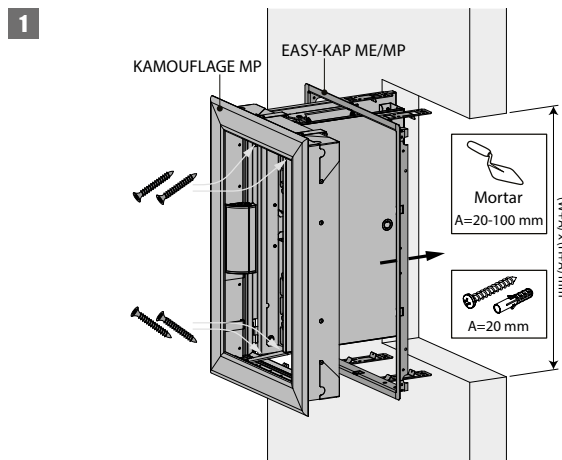
3. In order to prevent cracks around the opening in the long term, a finishing layer (plasterboard, (cellular) concrete, rigid wall) can be added between the mounting frame and the opening.



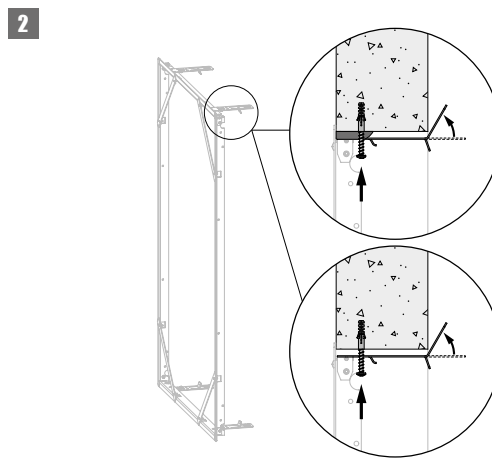
Installation into vertical concrete shaft with built-in mounting frame

The product was tested and approved in:

Product	Range	Wall type	Classification
Kamouflage 60 MP	350x385 mm ≤ Kamouflage 1V MP ≤ 700x1075 mm	Shaft	Concrete ≥ 90 mm
Kamouflage 60 MP	350x385 mm ≤ Kamouflage 1V MP ≤ 700x1075 mm	Shaft	Masonry, concrete blocks, concrete ≥ 100 mm
Kamouflage 120 MP	350x385 mm ≤ Kamouflage 1V MP ≤ 700x1075 mm	Shaft	Concrete ≥ 90 mm
Kamouflage 120 MP	350x385 mm ≤ Kamouflage 1V MP ≤ 700x1075 mm	Shaft	Masonry, concrete blocks, concrete ≥ 100 mm
Kamouflage 120 MP	350x385 mm ≤ Kamouflage 1V MP ≤ 700x1075 mm	Shaft	Masonry, concrete blocks, concrete ≥ 100 mm



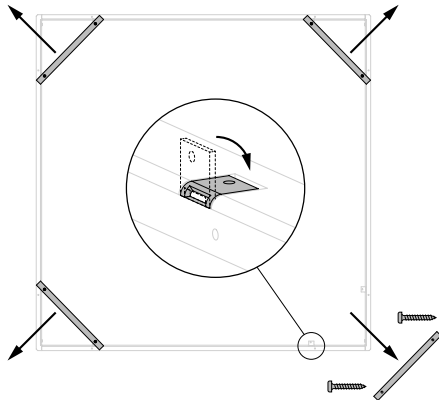
1. In case the mounting frame is screwed:
 Make an opening with dimensions $(W+20) \times (H+20)$ mm.
 In case the mounting frame is fixed with mortar:
 Make an opening with dimensions $(W+20) \times (H+20)$ mm till $(W+100) \times (H+100)$ mm.



2. The mounting frame should always be fastened to the concrete shaft with screws and dowels ($\varnothing 6$ x minimum 60 mm, steel or stainless steel).
 For an opening with dimensions up to $(W+20) \times (H+20)$ mm:
 Two fixing lugs are provided at the bottom and at the top of the mounting frame: fold these against the shaft and fasten the mounting frame with 4 screws $\varnothing 6 \times 60$ mm, taking care not to misshape it. These screws can be inserted through any of the punched holes in the lugs, depending on the thickness of the shaft wall.
 The finished opening must have the same size as the mounting frame $(W+10) \times (H+10)$ mm.

For an opening with dimensions up to $(W+100) \times (H+100)$ mm:
 Apply mortar around the opening to reduce the opening to the outer dimensions of the frame, then proceed as mentioned above to fasten the frame into the opening. Make sure that the gap between the frame and the opening is sealed completely with mortar.
 The mortar must harden completely before the damper is fastened to the mounting frame.

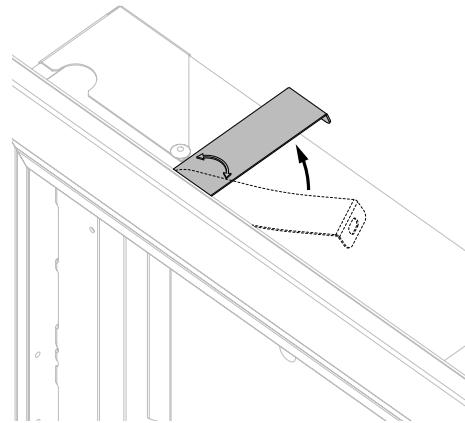
3



3. Put aside the screws that are affixed to one of the cross slats, then unscrew the 4 cross slats of the mounting frame and fold the 8 fastening plates in the frame.

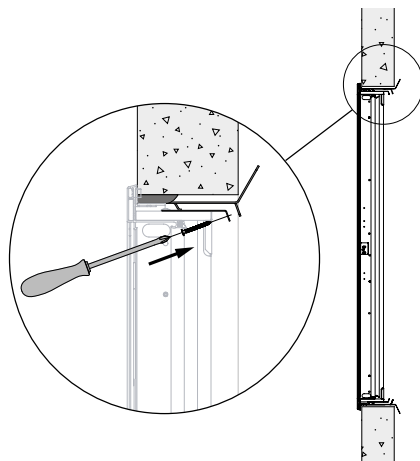
When the EASY-KGC ME/MP mounting frame is used, unfold the drop-guard grid (90°) in the shaft.

4



4. Rotate the four fastening plates on the damper 90° (to the upright position).

5



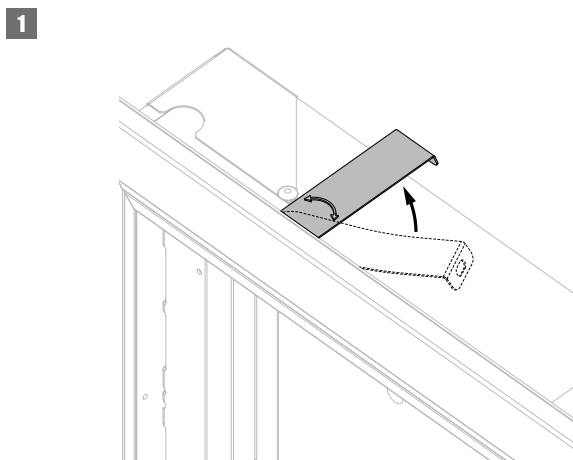
5. Open the shutter and position it in the mounting frame. Fasten the shutter onto the mounting frame with the 4 screws supplied, as shown in the drawing. Tightening the screws pulls the shutter towards the wall until its final position. You can also slightly correct the angle of the shutter with respect to the mounting frame. Connect the mechanism according to the wiring diagram.

⚠ Caution: Connecting the frame to a uneven surface can lead to distortion of this frame. Check whether the slack between the frame and the surface of the door is still acceptable. Check the mobility of the shutter.

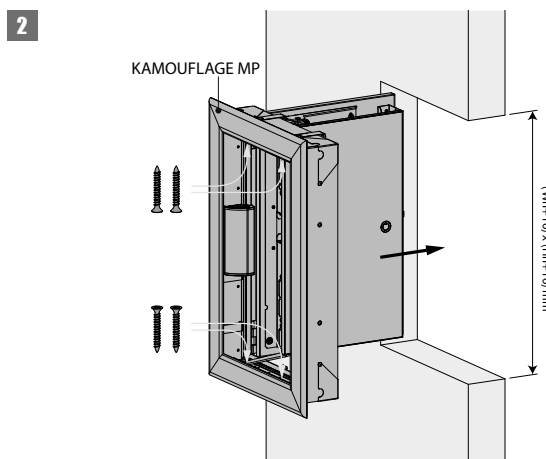
Installation into vertical concrete shaft (without a mounting frame)

The product was tested and approved in:

Product	Range	Wall type	Classification
Kamouflage 60 MP	350x385 mm ≤ Kamouflage 1V MP ≤ 700x1075 mm	Shaft	Concrete ≥ 90 mm
Kamouflage 60 MP	350x385 mm ≤ Kamouflage 1V MP ≤ 700x1075 mm	Shaft	Masonry, concrete blocks, concrete ≥ 100 mm
Kamouflage 120 MP	350x385 mm ≤ Kamouflage 1V MP ≤ 700x1075 mm	Shaft	Concrete ≥ 90 mm
Kamouflage 120 MP	350x385 mm ≤ Kamouflage 1V MP ≤ 700x1075 mm	Shaft	Masonry, concrete blocks, concrete ≥ 100 mm
Kamouflage 120 MP	350x385 mm ≤ Kamouflage 1V MP ≤ 700x1075 mm	Shaft	Masonry, concrete blocks, concrete ≥ 100 mm

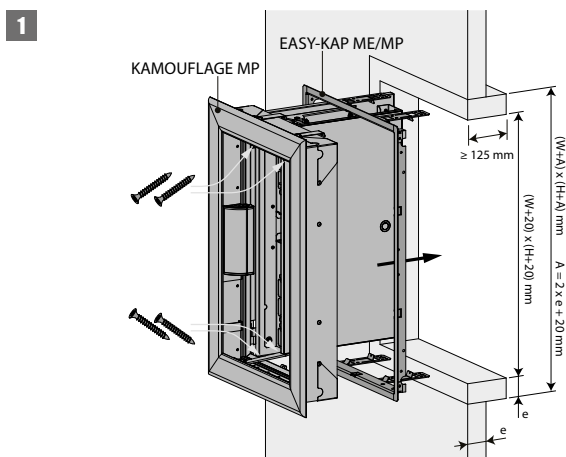


1. Rotate the four fastening plates on the damper 90° (to the upright position).
The fastening plates are not used for an installation without a mounting frame.

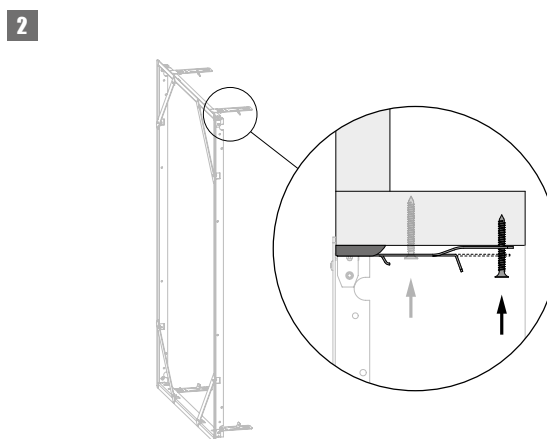


2. With the prepared opening the shutter can be handled into position, from the room side. Ensure that the trailing lead cables are not trapped at this stage and freely hang loose. Do not distort or twist the frames as this will affect the correct operation and sealing of the shutter. Check for squareness by measuring the frame diagonals (they must measure the same). Make an opening with dimensions (W+10) x (H+10) mm. Fix the shutter in the opening using 4 screws and dowels Ø6 x 40 mm. Connect the mechanism according to the wiring diagram. Check the mobility of the shutter.

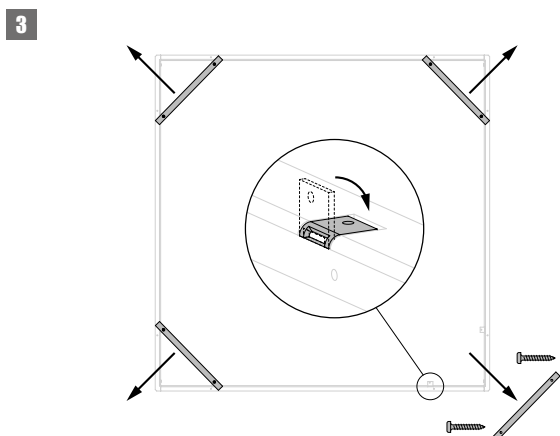
Installation into vertical shaft with built-in mounting frame: general instructions for all types of shafts (other than concrete)



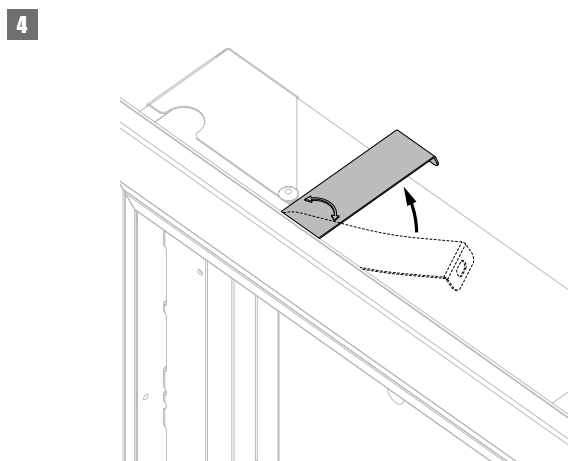
1. Make an opening with dimensions $(W+A) \times (H+A)$ mm.
 $A = 2 \times \text{thickness sleeve } (e) + 20 \text{ mm}$.
 Fit a sleeve of the same type of material and thickness of the duct (thickness e) of minimum 125 mm deep in the opening.
 Fasten and seal the mounting frame. See details per type of shaft hereafter.



2. Two fixing lugs are provided at the bottom and at the top of the mounting frame: fold these against the sleeve.
 When fixed with screws, fasten the mounting frame to the sleeve with chipboard screws ($\varnothing 6 \times e$) mm. These screws can be fixed in one of the openings provided for this purpose, depending on the depth of the sleeve.
 Take care not to misshape the frame during its installation. The finished opening must have the same size as the mounting frame $(W+10) \times (H+10)$ mm.

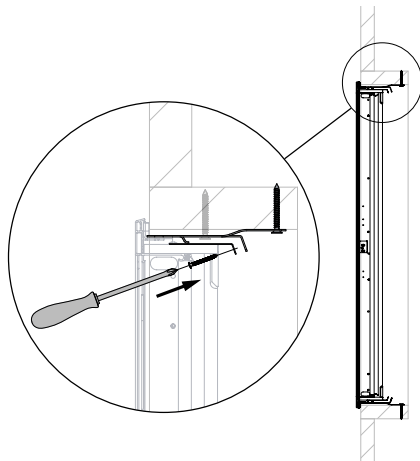


3. Put aside the screws that are affixed to one of the cross slats, then unscrew the 4 cross slats of the mounting frame and fold the 8 fastening plates in the frame.
 When the EASY-KGC ME/MP mounting frame is used, unfold the drop-guard grid (90°) in the shaft.



4. Rotate the four fastening plates on the damper 90° (to the upright position).

5

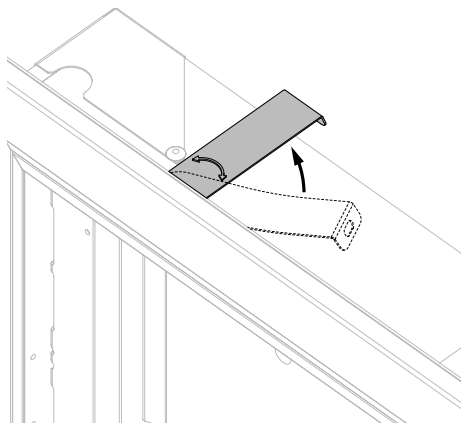


5. Open the shutter and position it in the mounting frame. Fasten the shutter onto the mounting frame with the 4 screws supplied, as shown in the drawing. Tightening the screws pulls the shutter towards the wall until its final position. It also makes it possible to slightly correct the angle of the shutter with respect to the mounting frame. Connect the mechanism according to the wiring diagram.

⚠ Caution: Connecting the frame to a non-flat surface can lead to distortion of this frame. Check whether the slack between the frame and the door leaf is still acceptable. Check the mobility of the shutter.

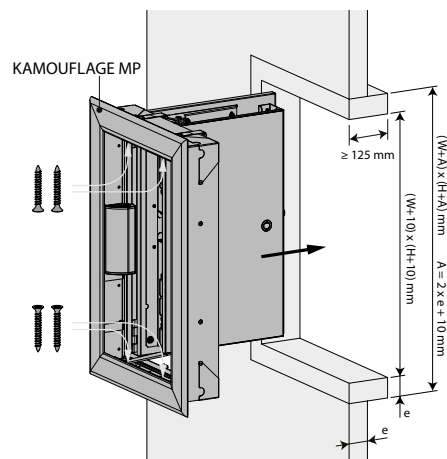
Installation into vertical shaft (without a mounting frame): general instructions for all types of shafts (other than concrete)

1



1. Rotate the four fastening plates on the damper 90° (to the upright position). The fastening plates are not used for an installation without a mounting frame.

2



2. Make an opening with dimensions $(W+A) \times (H+A)$ mm. $A = 2 \times \text{thickness sleeve } (e) + 10$ mm. Fit a sleeve of the same type of material and thickness of the duct (thickness e) of minimum 125 mm deep in the opening. Place the shutter in the opening. Ensure the cables are not trapped at this stage. Fix the shutter in the opening using 4 screws $\text{Ø}6 \times 40$ mm.

⚠ Caution: make sure that the screws don't exceed the sleeve's thickness!

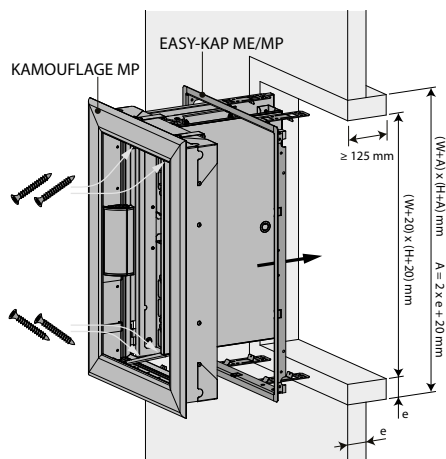
Connect the mechanism according to the wiring diagram. Check the mobility of the shutter.

Installation into vertical shaft PROMATECT L500 with built-in mounting frame

The product was tested and approved in:

Product	Range	Wall type		Classification
Kamouflage 60 MP	$350 \times 385 \text{ mm} \leq \text{Kamouflage 1V MP} \leq 700 \times 1075 \text{ mm}$	Shaft	Promatect L500 $\geq 30 \text{ mm}$	EI 60 ($v_{ed} i \leftrightarrow o$) S 1500 C10000 AA multi
Kamouflage 120 MP	$350 \times 385 \text{ mm} \leq \text{Kamouflage 1V MP} \leq 700 \times 1075 \text{ mm}$	Shaft	Promatect L500 $\geq 40 \text{ mm}$	EI 90 ($v_{ed} i \leftrightarrow o$) S 1500 C10000 AA multi
Kamouflage 120 MP	$350 \times 385 \text{ mm} \leq \text{Kamouflage 1V MP} \leq 700 \times 1075 \text{ mm}$	Shaft	Promatect L500 $\geq 50 \text{ mm}$	EI 120 ($v_{ed} i \leftrightarrow o$) S 1500 C10000 AA multi

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1. Assemble the sleeve with staples and affix the assembled sleeve to the shaft wall with staples.

Coat the edges of the opening with adhesive plaster type Promacol S.

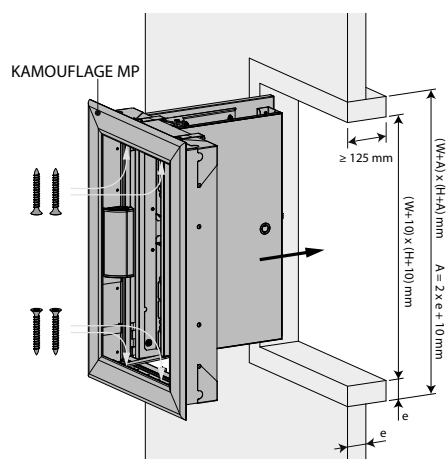
Screw the mounting frame to the sleeve with chipboard screw ($\varnothing 6 \times e$)mm. Two fixing lugs are provided at the bottom and at the top of the mounting frame: fold these against the sleeve. Seal the mounting frame with Promacol S taking care not to misshape it. The finished opening must have the same size as the mounting frame $(W+10) \times (H+10) \text{ mm}$.

Installation into vertical shaft PROMATECT L500 (without a mounting frame)

The product was tested and approved in:

Product	Range	Wall type		Classification
Kamouflage 60 MP	$350 \times 385 \text{ mm} \leq \text{Kamouflage 1V MP} \leq 700 \times 1075 \text{ mm}$	Shaft	Promatect L500 $\geq 30 \text{ mm}$	EI 60 ($v_{ed} i \leftrightarrow o$) S 1500 C10000 AA multi
Kamouflage 120 MP	$350 \times 385 \text{ mm} \leq \text{Kamouflage 1V MP} \leq 700 \times 1075 \text{ mm}$	Shaft	Promatect L500 $\geq 40 \text{ mm}$	EI 90 ($v_{ed} i \leftrightarrow o$) S 1500 C10000 AA multi
Kamouflage 120 MP	$350 \times 385 \text{ mm} \leq \text{Kamouflage 1V MP} \leq 700 \times 1075 \text{ mm}$	Shaft	Promatect L500 $\geq 50 \text{ mm}$	EI 120 ($v_{ed} i \leftrightarrow o$) S 1500 C10000 AA multi

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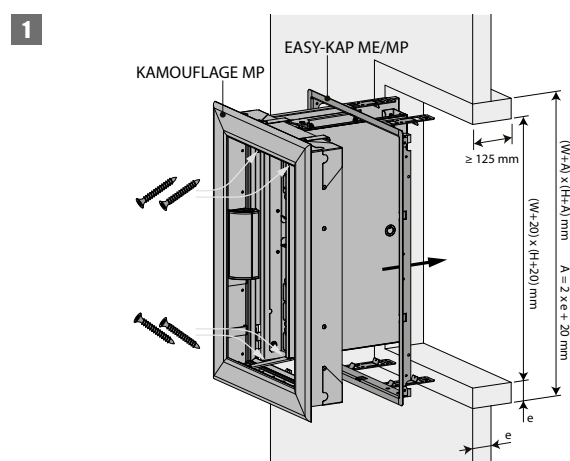


1. Assemble the sleeve with staples and affix the assembled sleeve to the shaft wall with staples.

Installation into vertical shaft GEOFLAM (LIGHT) / GEOTEK with built-in mounting frame

The product was tested and approved in:

Product	Range	Wall type		Classification
Kamouflage 60 MP	$350 \times 385 \text{ mm} \leq \text{Kamouflage 1V MP} \leq 700 \times 1075 \text{ mm}$	Shaft	Geoflam $\geq 30 \text{ mm}$	EI 60 ($v_{ed} i \leftrightarrow o$) S 1500 C10000 AA multi
Kamouflage 60 MP	$350 \times 385 \text{ mm} \leq \text{Kamouflage 1V MP} \leq 700 \times 1075 \text{ mm}$	Shaft	Geotec $\geq 30 \text{ mm}$	EI 60 ($v_{ed} i \leftrightarrow o$) S 1500 C10000 AA multi
Kamouflage 120 MP	$350 \times 385 \text{ mm} \leq \text{Kamouflage 1V MP} \leq 700 \times 1075 \text{ mm}$	Shaft	Geoflam $\geq 35 \text{ mm}$	EI 90 ($v_{ed} i \leftrightarrow o$) S 1500 C10000 AA multi
Kamouflage 120 MP	$350 \times 385 \text{ mm} \leq \text{Kamouflage 1V MP} \leq 700 \times 1075 \text{ mm}$	Shaft	Geoflam $\geq 45 \text{ mm}$	EI 120 ($v_{ed} i \leftrightarrow o$) S 1500 C10000 AA multi
Kamouflage 120 MP	$350 \times 385 \text{ mm} \leq \text{Kamouflage 1V MP} \leq 700 \times 1075 \text{ mm}$	Shaft	Geoflam Light $\geq 35 \text{ mm}$	EI 120 ($v_{ed} i \leftrightarrow o$) S 1500 C10000 AA multi
Kamouflage 120 MP	$350 \times 385 \text{ mm} \leq \text{Kamouflage 1V MP} \leq 700 \times 1075 \text{ mm}$	Shaft	Geotec $\geq 45 \text{ mm}$	EI 120 ($v_{ed} i \leftrightarrow o$) S 1500 C10000 AA multi

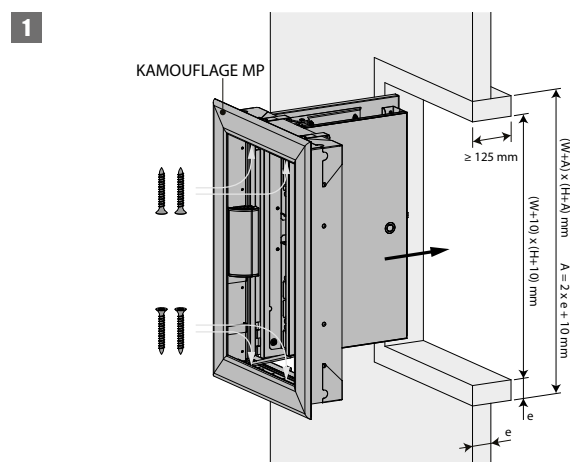


1. Coat the edges of the opening with adhesive plaster type PLACOL (in case of Geoflam) or GEOCOL (S) (in case of Geotec). In case of Geotec you can also assemble the sleeve with glue and screws $\varnothing 5 \times (2 \times e)$ mm and affix the assembled sleeve to the shaft wall with glue and screws $\varnothing 5 \times (2 \times e)$ mm every 100 mm. Seal the joints between uprights and cross pieces and between the lining and the wall with vegetable fibre caulking and plaster or with GEOCOL (S) (in case of Geotec). Two fixing lugs are provided at the bottom and at the top of the mounting frame: fold these against the sleeve. Caulk the mounting frame to the duct with vegetable fibre or (in case of Geotec) you can also coat the opening with Geocol (S) and fasten the mounting frame with screws of $\varnothing 5 \times e$ mm. Take care not to misshape the frame. The finished opening must have the same size as the mounting frame $(W+10) \times (H+10)$ mm.

Installation into vertical shaft GEOFLAM (LIGHT) / GEOTEK (without a mounting frame)

The product was tested and approved in:

Product	Range	Wall type		Classification
Kamouflage 60 MP	$350 \times 385 \text{ mm} \leq \text{Kamouflage 1V MP} \leq 700 \times 1075 \text{ mm}$	Shaft	Geoflam $\geq 30 \text{ mm}$	EI 60 ($v_{ed} i \leftrightarrow o$) S 1500 C10000 AA multi
Kamouflage 60 MP	$350 \times 385 \text{ mm} \leq \text{Kamouflage 1V MP} \leq 700 \times 1075 \text{ mm}$	Shaft	Geotec $\geq 30 \text{ mm}$	EI 60 ($v_{ed} i \leftrightarrow o$) S 1500 C10000 AA multi
Kamouflage 120 MP	$350 \times 385 \text{ mm} \leq \text{Kamouflage 1V MP} \leq 700 \times 1075 \text{ mm}$	Shaft	Geoflam $\geq 35 \text{ mm}$	EI 90 ($v_{ed} i \leftrightarrow o$) S 1500 C10000 AA multi
Kamouflage 120 MP	$350 \times 385 \text{ mm} \leq \text{Kamouflage 1V MP} \leq 700 \times 1075 \text{ mm}$	Shaft	Geoflam $\geq 45 \text{ mm}$	EI 120 ($v_{ed} i \leftrightarrow o$) S 1500 C10000 AA multi
Kamouflage 120 MP	$350 \times 385 \text{ mm} \leq \text{Kamouflage 1V MP} \leq 700 \times 1075 \text{ mm}$	Shaft	Geoflam Light $\geq 35 \text{ mm}$	EI 120 ($v_{ed} i \leftrightarrow o$) S 1500 C10000 AA multi
Kamouflage 120 MP	$350 \times 385 \text{ mm} \leq \text{Kamouflage 1V MP} \leq 700 \times 1075 \text{ mm}$	Shaft	Geotec $\geq 45 \text{ mm}$	EI 120 ($v_{ed} i \leftrightarrow o$) S 1500 C10000 AA multi



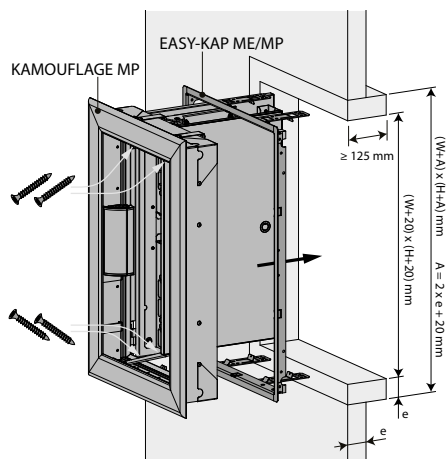
1. Coat the edges of the opening with adhesive plaster type PLACOL (in case of Geoflam) or GEOCOL (S) (in case of Geotec). Seal the joints between uprights and cross pieces and between the lining and the wall with vegetable fibre caulking and plaster or with GEOCOL (S) (in case of Geotec). In case of Geotec you can also assemble the sleeve with glue and screws $\varnothing 5 \times (2 \times e)$ mm and affix the assembled sleeve to the shaft wall with glue and screws $\varnothing 5 \times (2 \times e)$ mm every 100 mm.

Installation into vertical shaft TECNIVER with built-in mounting frame

The product was tested and approved in:

Product	Range	Wall type		Classification
Kamouflage 60 MP	$350 \times 385 \text{ mm} \leq \text{Kamouflage 1V MP} \leq 700 \times 1075 \text{ mm}$	Shaft	Tecniver $\geq 35 \text{ mm}$	EI 60 ($v_{ed} i \leftrightarrow o$) S 1500 C10000 AA multi
Kamouflage 120 MP	$350 \times 385 \text{ mm} \leq \text{Kamouflage 1V MP} \leq 700 \times 1075 \text{ mm}$	Shaft	Tecniver $\geq 45 \text{ mm}$	EI 90 ($v_{ed} i \leftrightarrow o$) S 1500 C10000 AA multi
Kamouflage 120 MP	$350 \times 385 \text{ mm} \leq \text{Kamouflage 1V MP} \leq 700 \times 1075 \text{ mm}$	Shaft	Tecniver $\geq 50 \text{ mm}$	EI 120 ($v_{ed} i \leftrightarrow o$) S 1500 C10000 AA multi

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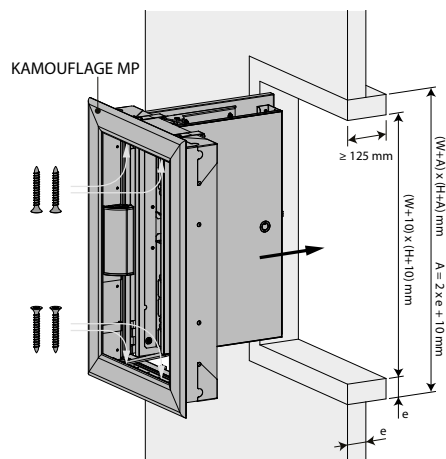
1. Put glue type CF GLUE on the uprights and cross pieces and between the lining and the wall. Screw the sleeve using chipboard screws $\varnothing 5 \times 70 \text{ mm}$ at 150 mm intervals. Two fixing lugs are provided at the bottom and at the top of the mounting frame: fold these against the sleeve. First coat the opening with glue CF GLUE. Glue the mounting frame to the lining taking care not to misshape it. The finished opening must have the same size as the mounting frame $(W+10) \times (H+10) \text{ mm}$.

Installation into vertical shaft TECNIVER (without a mounting frame)

The product was tested and approved in:

Product	Range	Wall type		Classification
Kamouflage 60 MP	$350 \times 385 \text{ mm} \leq \text{Kamouflage 1V MP} \leq 700 \times 1075 \text{ mm}$	Shaft	Tecniver $\geq 35 \text{ mm}$	EI 60 ($v_{ed} i \leftrightarrow o$) S 1500 C10000 AA multi
Kamouflage 120 MP	$350 \times 385 \text{ mm} \leq \text{Kamouflage 1V MP} \leq 700 \times 1075 \text{ mm}$	Shaft	Tecniver $\geq 45 \text{ mm}$	EI 90 ($v_{ed} i \leftrightarrow o$) S 1500 C10000 AA multi
Kamouflage 120 MP	$350 \times 385 \text{ mm} \leq \text{Kamouflage 1V MP} \leq 700 \times 1075 \text{ mm}$	Shaft	Tecniver $\geq 50 \text{ mm}$	EI 120 ($v_{ed} i \leftrightarrow o$) S 1500 C10000 AA multi

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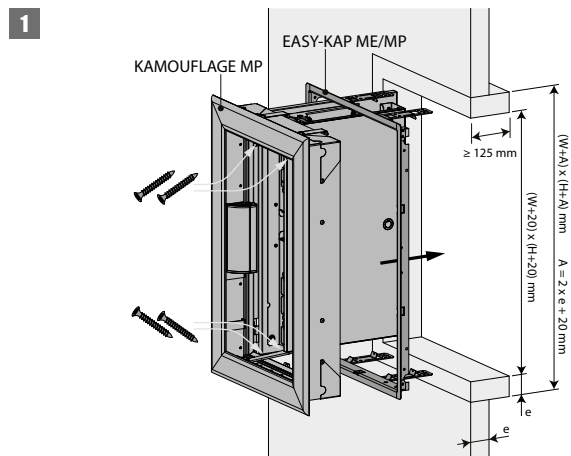


1. Put glue type CF GLUE on the uprights and cross pieces and between the lining and the wall. Screw the sleeve using chipboard screws $\varnothing 5 \times 70 \text{ mm}$ at 150 mm intervals.

Installation into vertical shaft GLASROC F V500 with built-in mounting frame

The product was tested and approved in:

Product	Range	Wall type		Classification
Kamouflage 60 MP	$350 \times 385 \text{ mm} \leq \text{Kamouflage 1V MP} \leq 700 \times 1075 \text{ mm}$	Shaft	Glasroc F V500 $\geq 35 \text{ mm}$	EI 60 ($v_{ed} i \leftrightarrow o$) S 1500 C10000 AA multi
Kamouflage 120 MP	$350 \times 385 \text{ mm} \leq \text{Kamouflage 1V MP} \leq 700 \times 1075 \text{ mm}$	Shaft	Glasroc F V500 $\geq 50 \text{ mm}$	EI 120 ($v_{ed} i \leftrightarrow o$) S 1500 C10000 AA multi

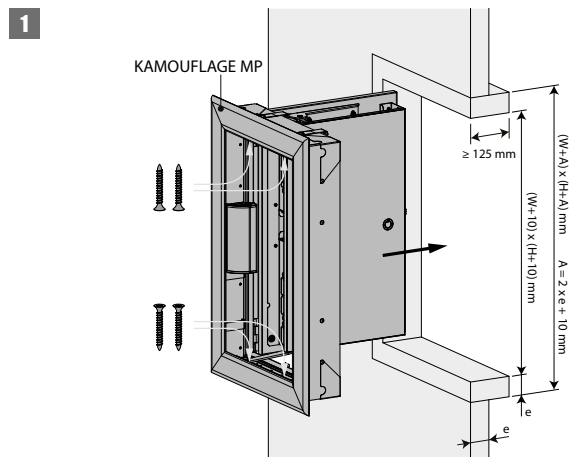


1. Put glue type GLASROC F V500 on the uprights and cross pieces and between the lining and the wall. Screw the sleeve using chipboard screws $\varnothing 5 \times 70 \text{ mm}$ at 150 mm intervals. Two fixing lugs are provided at the bottom and at the top of the mounting frame: fold these against the sleeve. First coat the opening with glue GLASROC F V500. Glue the mounting frame to the lining taking care not to misshape it. The finished opening must have the same size as the mounting frame $(W+10) \times (H+10) \text{ mm}$.

Installation into vertical shaft GLASROC F V500 (without a mounting frame)

The product was tested and approved in:

Product	Range	Wall type		Classification
Kamouflage 60 MP	$350 \times 385 \text{ mm} \leq \text{Kamouflage 1V MP} \leq 700 \times 1075 \text{ mm}$	Shaft	Glasroc F V500 $\geq 35 \text{ mm}$	EI 60 ($v_{ed} i \leftrightarrow o$) S 1500 C10000 AA multi
Kamouflage 120 MP	$350 \times 385 \text{ mm} \leq \text{Kamouflage 1V MP} \leq 700 \times 1075 \text{ mm}$	Shaft	Glasroc F V500 $\geq 50 \text{ mm}$	EI 120 ($v_{ed} i \leftrightarrow o$) S 1500 C10000 AA multi

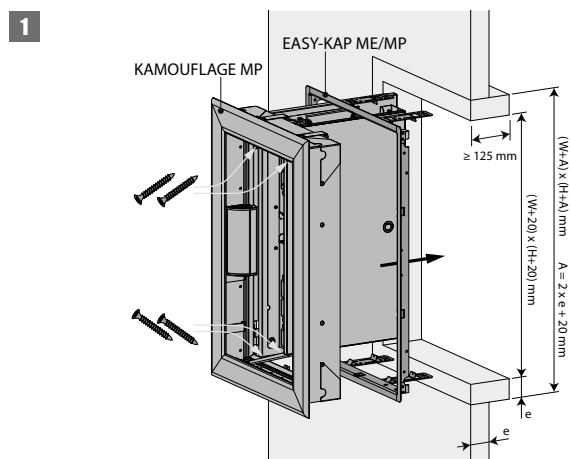


1. Put glue type GLASROC F V500 on the uprights and cross pieces and between the lining and the wall. Screw the sleeve using chipboard screws $\varnothing 5 \times 70 \text{ mm}$ at 150 mm intervals.

Installation into vertical shaft EXTHAMAT with built-in mounting frame

The product was tested and approved in:

Product	Range	Wall type		Classification
Kamouflage 60 MP	$350 \times 385 \text{ mm} \leq \text{Kamouflage 1V MP} \leq 700 \times 1075 \text{ mm}$	Shaft	Exthamat $\geq 25 \text{ mm}$	EI 60 ($v_{ed} i \leftrightarrow o$) S 1500 C10000 AA multi
Kamouflage 120 MP	$350 \times 385 \text{ mm} \leq \text{Kamouflage 1V MP} \leq 700 \times 1075 \text{ mm}$	Shaft	Exthamat $\geq 30 \text{ mm}$	EI 90 ($v_{ed} i \leftrightarrow o$) S 1500 C10000 AA multi
Kamouflage 120 MP	$350 \times 385 \text{ mm} \leq \text{Kamouflage 1V MP} \leq 700 \times 1075 \text{ mm}$	Shaft	Exthamat $\geq 35 \text{ mm}$	EI 120 ($v_{ed} i \leftrightarrow o$) S 1500 C10000 AA multi



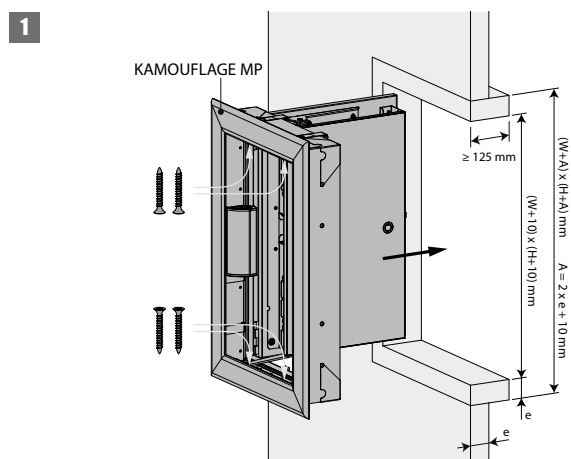
1. Coat the edges of the opening with adhesive plaster. Seal the joints between uprights and cross pieces and between the lining and the wall with vegetable fibre caulking and plaster.

Two fixing lugs are provided at the bottom and at the top of the mounting frame: fold these against the sleeve. Caulk the mounting frame to the duct with vegetable fibre and taking care not to misshape it. The finished opening must have the same size as the mounting frame $(W+10) \times (H+10) \text{ mm}$.

Installation into vertical shaft EXTHAMAT (without a mounting frame)

The product was tested and approved in:

Product	Range	Wall type		Classification
Kamouflage 60 MP	$350 \times 385 \text{ mm} \leq \text{Kamouflage 1V MP} \leq 700 \times 1075 \text{ mm}$	Shaft	Exthamat $\geq 25 \text{ mm}$	EI 60 ($v_{ed} i \leftrightarrow o$) S 1500 C10000 AA multi
Kamouflage 120 MP	$350 \times 385 \text{ mm} \leq \text{Kamouflage 1V MP} \leq 700 \times 1075 \text{ mm}$	Shaft	Exthamat $\geq 30 \text{ mm}$	EI 90 ($v_{ed} i \leftrightarrow o$) S 1500 C10000 AA multi
Kamouflage 120 MP	$350 \times 385 \text{ mm} \leq \text{Kamouflage 1V MP} \leq 700 \times 1075 \text{ mm}$	Shaft	Exthamat $\geq 35 \text{ mm}$	EI 120 ($v_{ed} i \leftrightarrow o$) S 1500 C10000 AA multi

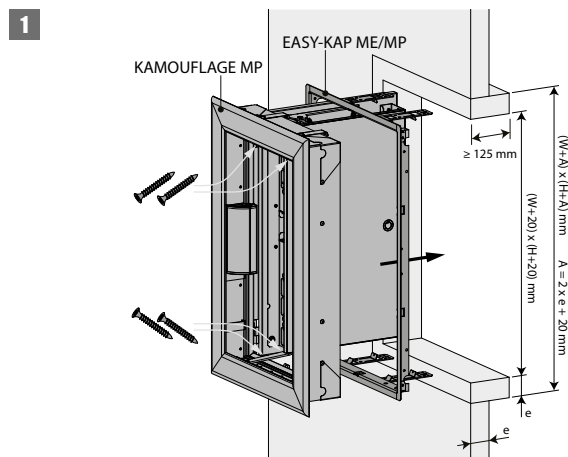


1. Coat the edges of the opening with adhesive plaster. Seal the joints between uprights and cross pieces and between the lining and the wall with vegetable fibre caulking and plaster.

Installation into vertical shaft DESENFIRE (HD) with built-in mounting frame

The product was tested and approved in:

Product	Range	Wall type	Classification
Kamouflage 60 MP	350x385 mm ≤ Kamouflage 1V MP ≤ 700x1075 mm	Shaft	Desenfire HD ≥ 25 mm HD
Kamouflage 120 MP	350x385 mm ≤ Kamouflage 1V MP ≤ 700x1075 mm	Shaft	Desenfire ≥ 25 mm THD
Kamouflage 120 MP	350x385 mm ≤ Kamouflage 1V MP ≤ 700x1075 mm	Shaft	Desenfire HD ≥ 35 mm
Kamouflage 120 MP	350x385 mm ≤ Kamouflage 1V MP ≤ 700x1075 mm	Shaft	Desenfire ≥ 45 mm

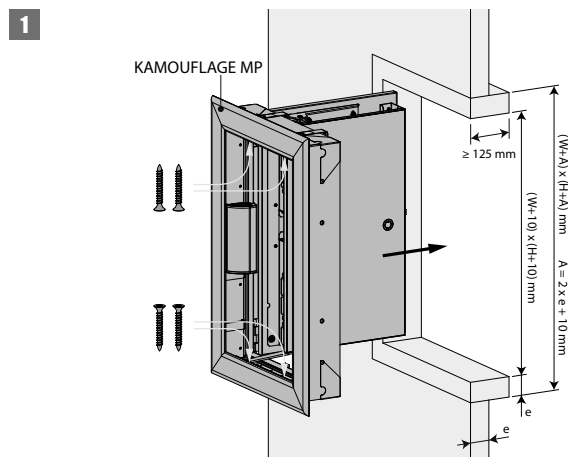


1. Coat the edges of the opening with adhesive plaster, type FACILIS.
Seal the joints between uprights and cross pieces and between the lining and the wall with vegetable fibre caulking and plaster.
Two fixing lugs are provided at the bottom and at the top of the mounting frame: fold these against the sleeve. Caulk the mounting frame to the duct with vegetable fibre and taking care not to misshape it. The finished opening must be the same size as the mounting frame (W+10) x (H+10) mm.

Installation into vertical shaft DESENFIRE (HD) (without a mounting frame)

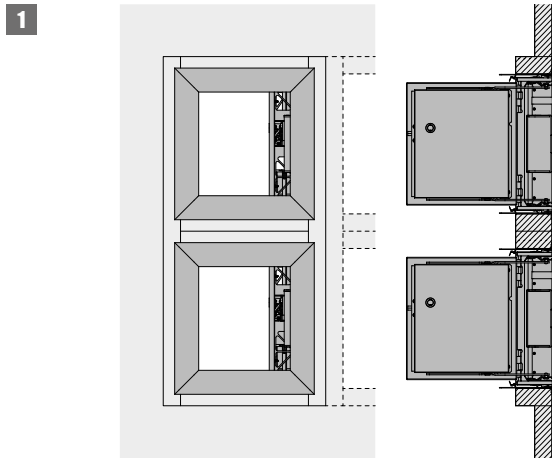
The product was tested and approved in:

Product	Range	Wall type	Classification
Kamouflage 60 MP	350x385 mm ≤ Kamouflage 1V MP ≤ 700x1075 mm	Shaft	Desenfire HD ≥ 25 mm HD
Kamouflage 120 MP	350x385 mm ≤ Kamouflage 1V MP ≤ 700x1075 mm	Shaft	Desenfire ≥ 25 mm THD
Kamouflage 120 MP	350x385 mm ≤ Kamouflage 1V MP ≤ 700x1075 mm	Shaft	Desenfire HD ≥ 35 mm
Kamouflage 120 MP	350x385 mm ≤ Kamouflage 1V MP ≤ 700x1075 mm	Shaft	Desenfire ≥ 45 mm

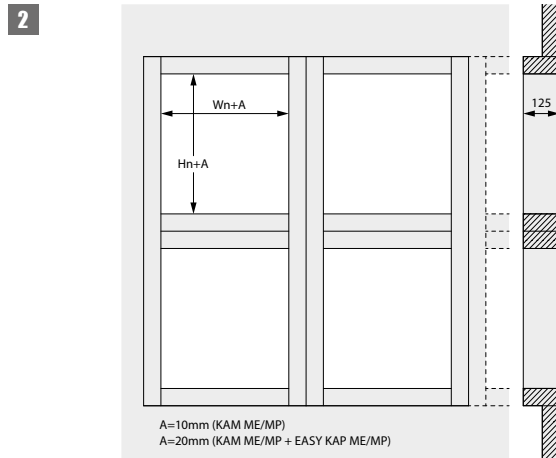


1. Coat the edges of the opening with adhesive plaster, type FACILIS.
Seal the joints between uprights and cross pieces and between the lining and the wall with vegetable fibre caulking and plaster.

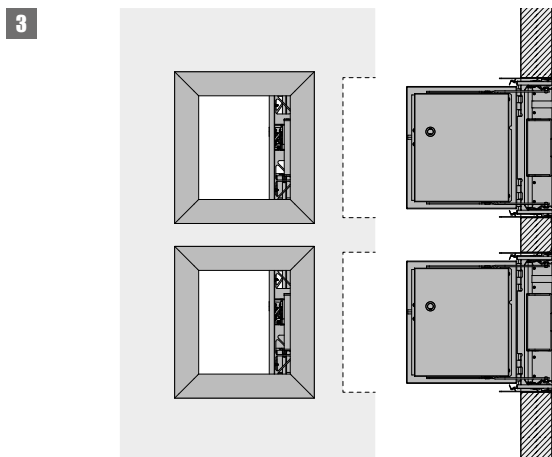
Installation at minimal distances



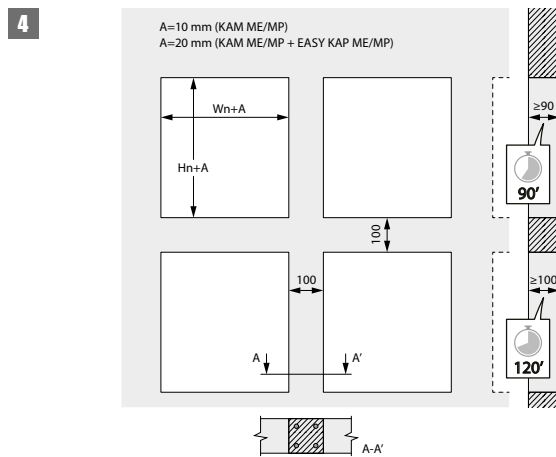
1. The shutters can be installed at minimal distance on top of or next to each other, if they are mounted in separate sleeves made from the shaft material with the required fire resistance. It is advised not to exceed a 4 x 2 configuration (W x H).



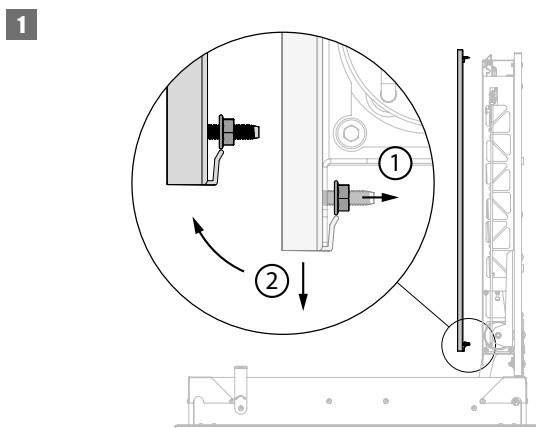
2. In case several shutters are mounted at a minimal distance, the bearing and reinforcement points of the shaft must be adjusted in proportion to the increased weight. The installation of the shaft must comply with the classification report delivered by the shaft manufacturer.



3. When mounting in a concrete shaft, you need to provide a continuous reinforcement in the vertical columns of at least 4 x Ø 8 mm.



Finishing



1. The ATOUT RAL9010 option facilitates the finishing of the shutter. You can remove the front plate by unscrewing the bolts at the bottom and top on the hinge side. Then you can slide the plate in the direction of the hinges.

Product maintenance

Smoke control dampers must form part of a professionally designed Smoke and Heat Exhaust Ventilation System (SHEVS) that will be specially suited to an individual buildings size, usage and structure. SHEVS are Fire Safety Installations and it is essential they are subject to the routine inspection and maintenance requirements of the country of installation of the SHEV system. For example, BS7346 part 8, NF S 61-933 and EN 13306. Kamouflage MP dampers are virtually maintenance free, however, they will require occasional operation and maintenance as part of a system specific routine operational test and maintenance procedure. It is recommended that as part of the system testing and maintenance procedure that different individual dampers are operated at each system test such that each damper within a system is inspected, checked and tested at least once in any 6-month period. The following instructions are a general guide and our recommendations to the procedures required: a) Operate each ventilator at least once; checking that the unit opens and closes fully. b) Visually observe the control mechanisms ensuring the devices are in place and are not obviously damaged or obstructed. c) Inspect each ventilator in its open position to check that the intumescent fire seals and smoke seals between the vent frame and doors are not damaged and are securely attached. Wipe any dirt build up from the seals. Inspect the door leading and trailing edge seals and lightly lubricate with a machine oil and a silicone grease to the release latch.

Maintenance

- No specific maintenance required.
- Schedule at least two running visual checks each year.
- Remove dust and all other particles before start-up.
- Follow the local maintenance regulations (i.e. BS9999 Annex V; NF S 61-933) and EN13306.

Operation and mechanisms

Operation: general points

- See under 'Installation' (manual opening and closing).
- ⚠ Caution : please note dampers must be fully opened before starting supply and/or extract fans.



VA KAM MP MEC Mechanism for remote controlled unlocking and resetting.

Mechanism for the smoke evacuation shutter KAMOUFFLAGE MP. Remote controlled unlocking and resetting.

Unlocking

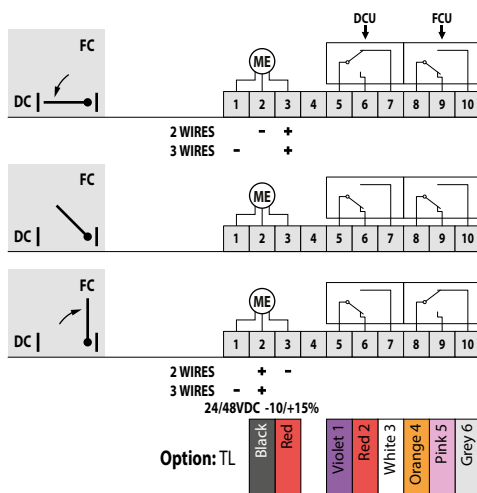
- manual unlocking:** with the key (delivered in the bag together with the installation guidelines)
- automatic unlocking:** n/a
- remote unlocking:** remote by connection of 24 V DC or 48 V DC

Resetting

- manual resetting:** rearm magnetic latch with key (delivered in the bag together with the installation guidelines), press the drive linkage arm to unlock position and pull the damper closed
- motorised resetting:** remote controlled by reversing (2-wire) control or alternating (3-wire) control of the voltage to the motor. After the unlocking or rearmament is complete, the voltage on the motor may be stopped.

Electrical connection

VA KAM MP MEC



DC: Switch closed position smoke evacuation shutter

FC: Switch open position smoke evacuation shutter

MEC	Nominal voltage motor	Nominal voltage magnet	Power consumption (stand-by)	Power consumption (operating)	Standard switches	Protection class
VA KAM MP MEC	24/48 V DC (-10/+15%)	N/A	N/A	P _{nom} = 4W	1mA...1A 60V	IP 42

Weights

KAMOUFLAGE MP 1V60 - 1V120 with ATOUT 1V MP RAL9010

Hn\Wn [mm]		350	400	450	500	550	600	650	700
385	kg	10,4	11,2	12,0	12,6	13,5	14,2	14,9	15,5
415	kg	11,0	11,8	12,6	13,3	14,2	14,9	15,7	16,3
445	kg	11,4	12,3	13,1	13,8	14,7	15,6	16,4	17,0
475	kg	11,8	12,7	13,6	14,4	15,3	16,2	17,0	17,7
505	kg	12,3	13,2	14,1	14,9	15,9	16,8	17,7	18,4
535	kg	12,7	13,7	14,6	15,5	16,5	17,4	18,4	19,1
565	kg	13,1	14,2	15,2	16,0	17,1	18,1	19,0	19,8
595	kg	13,6	14,7	15,7	16,6	17,7	18,7	19,7	20,5
625	kg	14,1	15,2	16,2	17,2	18,3	19,4	20,4	21,3
655	kg	14,5	15,6	16,7	17,7	18,9	20,0	21,1	22,0
685	kg	14,9	16,1	17,2	18,3	19,5	20,6	21,7	22,7
715	kg	16,0	16,6	17,8	18,8	20,1	21,3	22,4	23,4
745	kg	16,5	17,1	18,3	19,4	20,7	21,9	23,1	24,1
775	kg	16,9	17,6	18,8	19,9	21,3	22,5	23,8	24,8
805	kg	17,4	18,9	19,3	20,5	21,9	23,2	24,4	25,5
835	kg	17,8	19,4	19,8	21,1	22,5	23,8	25,1	26,2
865	kg	18,3	19,9	20,4	21,6	23,1	24,5	25,8	27,0
895	kg	18,8	20,4	20,9	22,2	23,7	25,1	26,5	27,7
925	kg	19,3	20,9	22,5	22,7	24,3	25,7	27,1	28,4
955	kg	19,7	21,4	23,0	23,3	24,9	26,3	27,8	29,1
985	kg	20,2	22,0	23,6	23,9	25,5	27,0	28,5	29,8
1015	kg	20,7	22,5	24,2	25,8	26,1	27,6	29,2	30,5
1045	kg	21,2	23,0	24,7	26,4	26,7	28,3	29,8	31,2
1075	kg	21,6	23,5	25,3	27,0	27,3	28,9	30,5	34,1

Selection data

$$\Delta p = 0,6 * v^2 * \zeta$$

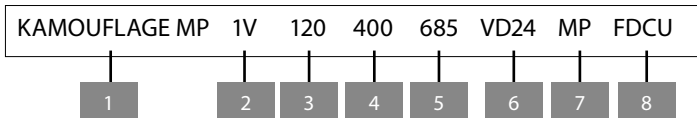
KAMOUFLAGE MP 1V60 - 1V120

Hn\Wn [mm]		350	400	450	500	550	600	650	700
385	ζ [-]	3,860	3,158	2,677	2,329	2,063	1,856	1,688	1,550
415	ζ [-]	3,468	2,829	2,408	2,090	1,858	1,668	1,521	1,394
445	ζ [-]	3,149	2,581	2,191	1,907	1,691	1,522	1,380	1,269
475	ζ [-]	2,867	2,360	2,000	1,747	1,547	1,396	1,269	1,168
505	ζ [-]	2,650	2,176	1,851	1,613	1,432	1,290	1,175	1,079
535	ζ [-]	2,464	2,020	1,723	1,499	1,334	1,199	1,095	1,004
565	ζ [-]	2,305	1,895	1,613	1,400	1,245	1,122	1,022	0,940
595	ζ [-]	2,155	1,778	1,510	1,320	1,171	1,057	0,961	0,885
625	ζ [-]	2,034	1,674	1,426	1,245	1,106	0,997	0,909	0,836
655	ζ [-]	1,927	1,583	1,352	1,178	1,049	0,944	0,860	0,791
685	ζ [-]	1,832	1,502	1,280	1,118	0,995	0,896	0,817	0,752
715	ζ [-]	1,738	1,435	1,221	1,068	0,949	0,854	0,779	0,716
745	ζ [-]	1,660	1,370	1,168	1,020	0,907	0,818	0,745	0,686
775	ζ [-]	1,592	1,310	1,118	0,976	0,866	0,783	0,713	0,656
805	ζ [-]	1,522	1,256	1,070	0,936	0,832	0,751	0,684	0,630
835	ζ [-]	1,463	1,210	1,030	0,899	0,801	0,722	0,658	0,605
865	ζ [-]	1,410	1,163	0,993	0,868	0,772	0,696	0,635	0,583
895	ζ [-]	1,361	1,121	0,956	0,837	0,743	0,671	0,612	0,564
925	ζ [-]	1,310	1,082	0,924	0,808	0,719	0,648	0,591	0,544
955	ζ [-]	1,269	1,046	0,894	0,781	0,696	0,627	0,573	0,527
985	ζ [-]	1,229	1,015	0,867	0,757	0,674	0,608	0,554	0,510
1015	ζ [-]	1,188	0,983	0,839	0,735	0,652	0,590	0,538	0,495
1045	ζ [-]	1,154	0,954	0,814	0,712	0,634	0,573	0,522	0,480
1075	ζ [-]	1,122	0,926	0,792	0,692	0,616	0,556	0,508	0,467

KAMOUFFLAGE MP 1V60 - 1V120 - Free air passage (m²)

Hn\Wn [mm]		350	400	450	500	550	600	650	700
385	Sn [m ²]	0,1080	0,1260	0,1430	0,1600	0,1780	0,1950	0,2120	0,2300
415	Sn [m ²]	0,1180	0,1360	0,1550	0,1740	0,1930	0,2120	0,2310	0,2500
445	Sn [m ²]	0,1270	0,1470	0,1680	0,1880	0,2080	0,2290	0,2490	0,2690
475	Sn [m ²]	0,1360	0,1580	0,1800	0,2020	0,2240	0,2460	0,2670	0,2890
505	Sn [m ²]	0,1460	0,1690	0,1920	0,2160	0,2390	0,2620	0,2860	0,3090
535	Sn [m ²]	0,1550	0,1800	0,2050	0,2300	0,2540	0,2790	0,3040	0,3290
565	Sn [m ²]	0,1640	0,1910	0,2170	0,2430	0,2700	0,2960	0,3230	0,3490
595	Sn [m ²]	0,1740	0,2020	0,2290	0,2570	0,2850	0,3130	0,3410	0,3690
625	Sn [m ²]	0,1830	0,2120	0,2420	0,2710	0,3010	0,3300	0,3590	0,3890
655	Sn [m ²]	0,1930	0,2230	0,2540	0,2850	0,3160	0,3470	0,3780	0,4080
685	Sn [m ²]	0,2020	0,2340	0,2670	0,2990	0,3310	0,3640	0,3960	0,4280
715	Sn [m ²]	0,2110	0,2450	0,2790	0,3130	0,3470	0,3800	0,4140	0,4480
745	Sn [m ²]	0,2210	0,2560	0,2910	0,3270	0,3620	0,3970	0,4330	0,4680
775	Sn [m ²]	0,2300	0,2670	0,3040	0,3400	0,3770	0,4140	0,4510	0,4880
805	Sn [m ²]	0,2390	0,2780	0,3160	0,3540	0,3930	0,4310	0,4690	0,5080
835	Sn [m ²]	0,2490	0,2890	0,3280	0,3680	0,4080	0,4480	0,4880	0,5280
865	Sn [m ²]	0,2580	0,2990	0,3410	0,3820	0,4230	0,4650	0,5060	0,5470
895	Sn [m ²]	0,2670	0,3100	0,3530	0,3960	0,4390	0,4820	0,5240	0,5670
925	Sn [m ²]	0,2770	0,3210	0,3650	0,4100	0,4540	0,4980	0,5430	0,5870
955	Sn [m ²]	0,2860	0,3320	0,3780	0,4240	0,4700	0,5150	0,5610	0,6070
985	Sn [m ²]	0,2950	0,3430	0,3900	0,4380	0,4850	0,5320	0,5800	0,6270
1015	Sn [m ²]	0,3050	0,3540	0,4030	0,4510	0,5000	0,5490	0,5980	0,6470
1045	Sn [m ²]	0,3140	0,3650	0,4150	0,4650	0,5160	0,5660	0,6160	0,6670
1075	Sn [m ²]	0,3240	0,3750	0,4270	0,4790	0,5310	0,5830	0,6350	0,6860

Sample order



1. product
2. 1 shutter
3. fire resistance of 60 or 120 minutes
4. width
5. height
6. option: type magnet and voltage
7. resetting motor: MP
8. limit switch 'open/closed'

Approvals and certificates

All our products are submitted to a number of tests by official test institutes. Reports of these tests form the basis for the approvals of the products.



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