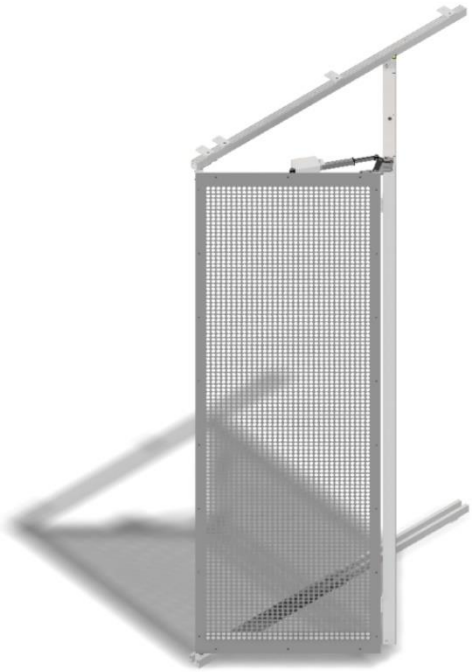
FOLDING SHUTTERS



Technical Manual

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Building Elegance BV
Pottenbakkerstraat 10
4871 EP Etten-Leur

info@buildingelegance.com

www.buildingelegance.com

FOLDING SHUTTERS - IMPRINT

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Declaration of conformity

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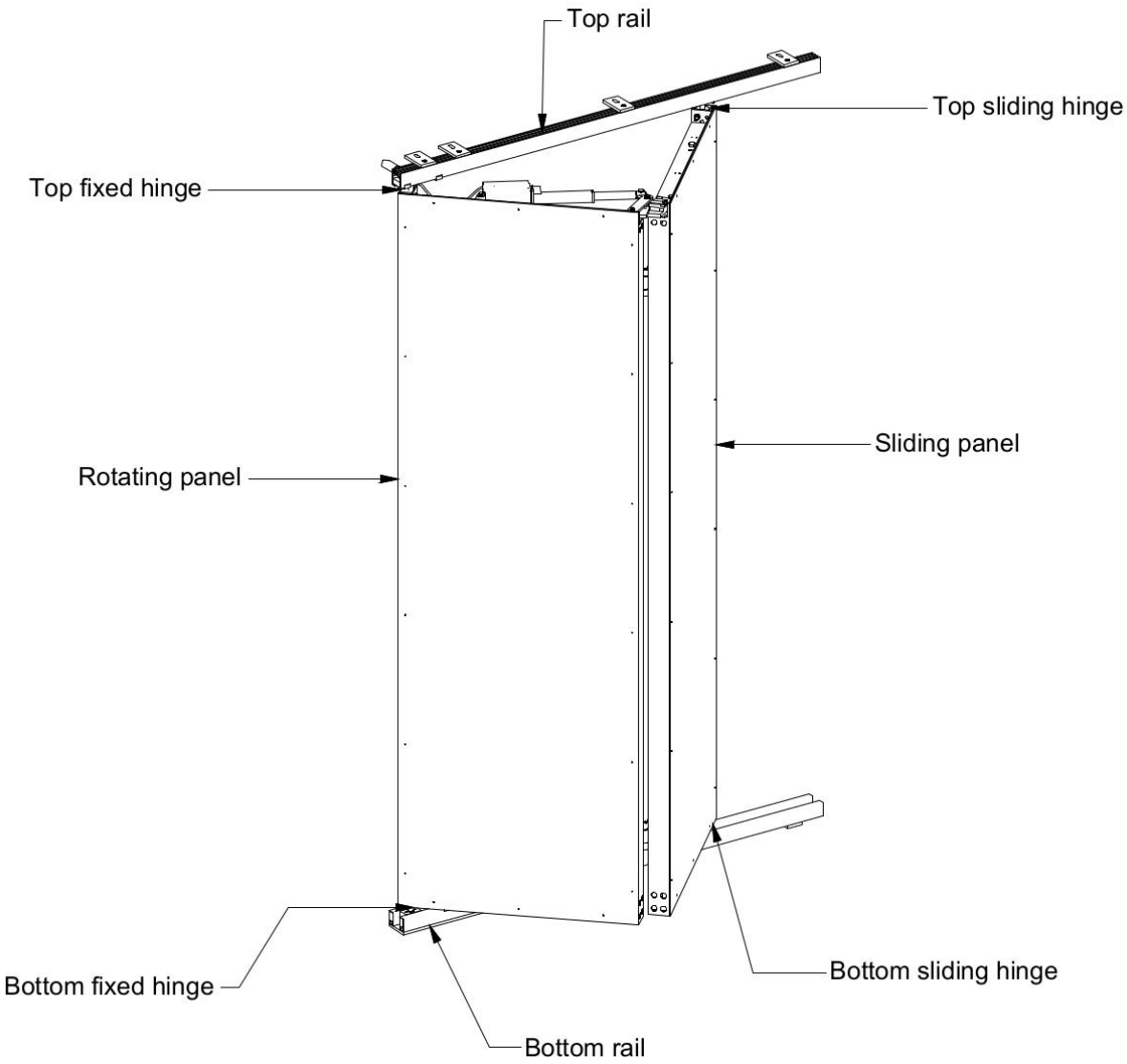
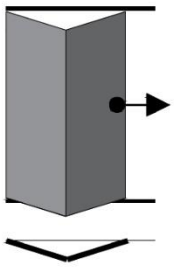
INTRODUCTION

A basic folding shutter consists of two panels hinged together. One side is fixed to the building using a top and bottom fixed hinge. The other side using top and bottom sliding hinges running inside a top and bottom rail.
The open and close direction is horizontal.



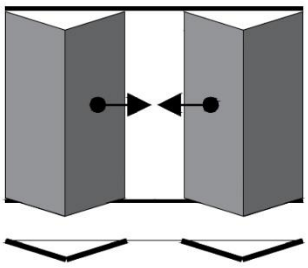
CONFIGURATIONS

A basic folding shutter setup as described previously is called a "V" configuration. There are a couple of variations to this configuration. Next to that a shutter can be operated by hand or by motor. An overview is given below.



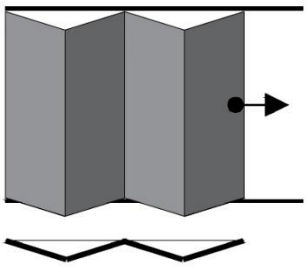
“V” Shutter
Left or right

Motorized: Yes
One motor
Manual: Yes



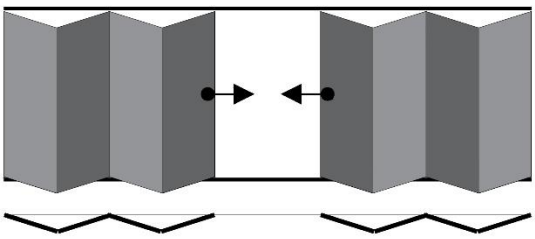
Double “V” Shutter
Mid-opening

Motorized: Yes
Two motors
Manual: Yes



“W” Shutter
Left or right

Motorized: Yes
Two motors
Manual: Yes



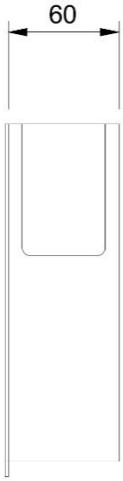
Double "W" shutter
Mid-opening

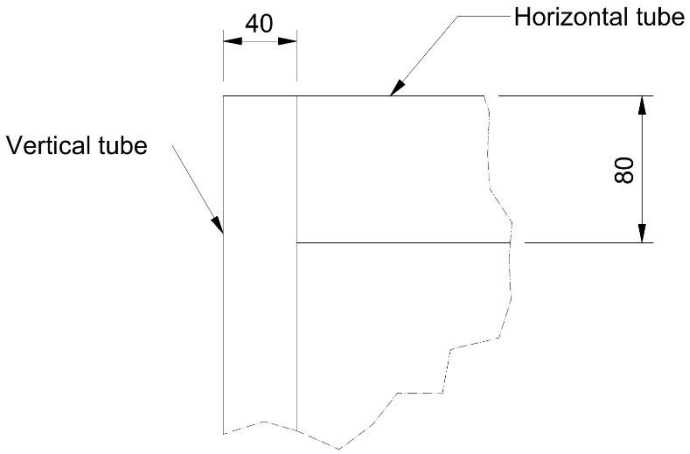
Motorized: Yes
Four motors
Manual: Yes

Should you need any further information about motorized folding shutters, please refer to the document FS Motorization or feel free to contact us at any time.

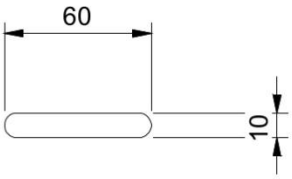
PROFILES

A shutter panel is built using a horizontal and vertical rectangular tube.
Possible infills are fixed fins and perforated sheet.

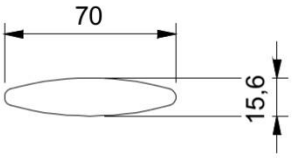




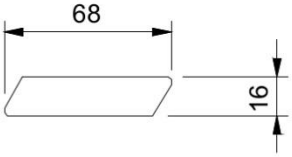
Fin alu rounded
60x10



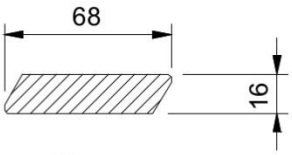
Fin alu foil
70x15



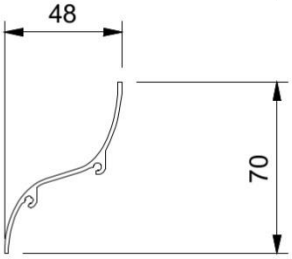
Fin alu rhomboid
68x16



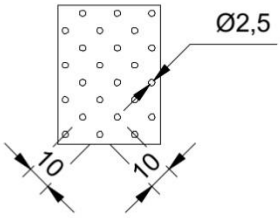
Fin WRC rhomboid
68x16



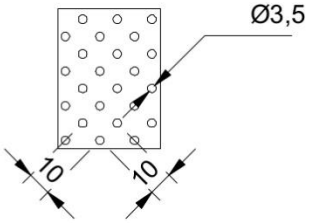
Fin alu S
70x48



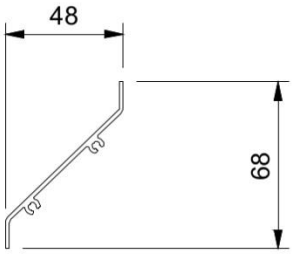
Perforation A:
R2.5 - Z10x10
opening 5%



Perforation B:
R3.5 - Z10x10
opening 10%



Fin alu Z
68x48



DIMENSIONS GENERAL – V-SYSTEM

Shutter Height:
Nominal clear height: Vertical space required to fit a folding shutter system (which includes rails and brackets).

Shutter Height	: (clear height -149mm) The actual shutter height.
Clear height	: (clear height = nominal height +/- 100mm) Taking building tolerances into account the actual clear height is allowed to deviate.

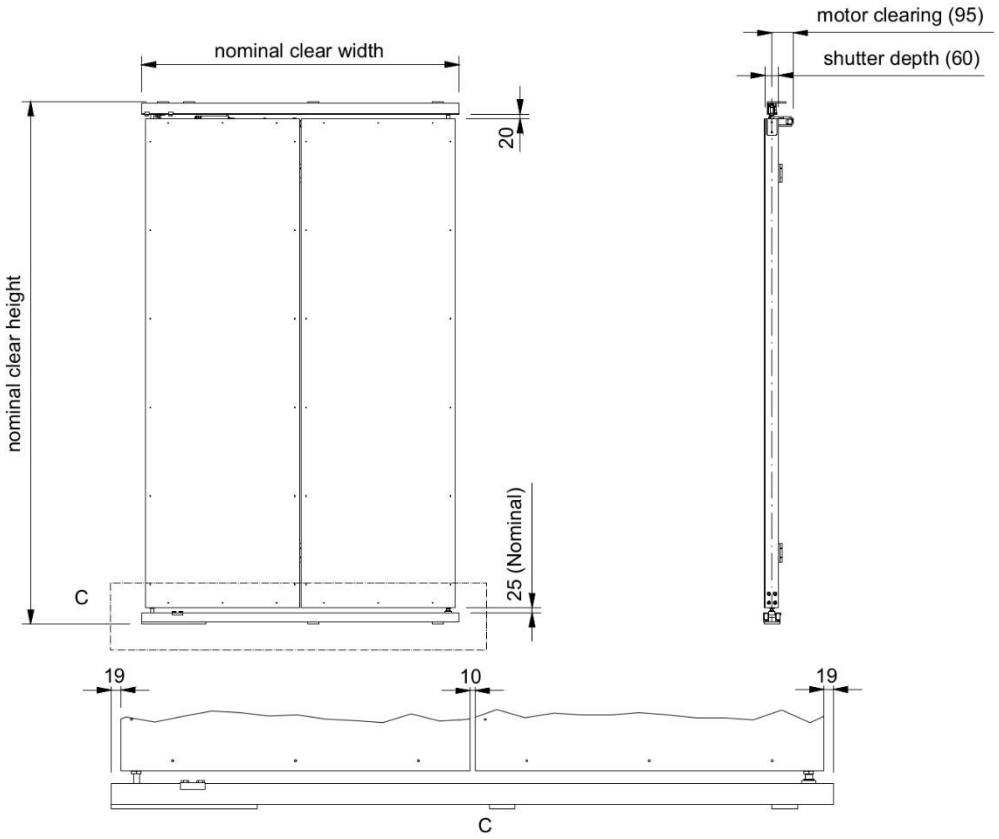
Shutter Width:

Nominal clear width	: Total width required for the shutter to function.
Shutter width	: (nominal clear width - 38mm) Width of two shutter panels including inner spacing of 10mm.
Clear width	: (clear width -> nominal clear width) The building opening in which the shutter should fit cannot be smaller than the nominal clear width: your upper and bottom rail have a max length of the nominal clear width.

Example:
Nominal clear height = 2800mm
Shutter height = 2800 - 149 = 2651mm
Allowable clear height range: 2810 -2790mm

Shutter Depth:

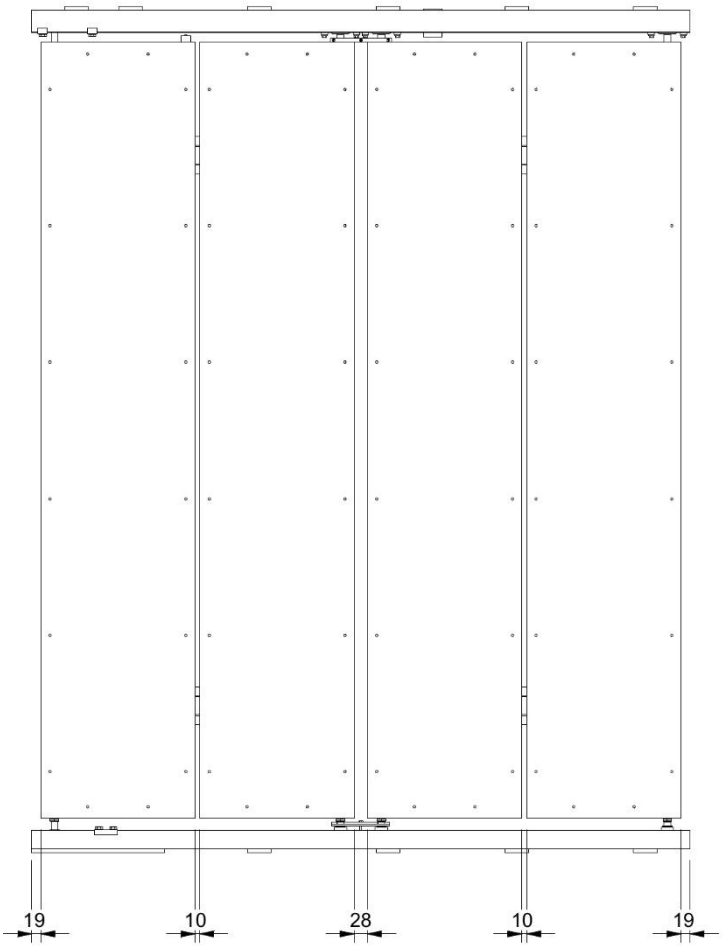
Shutter depth	: The depth of the shutter frame. When sheet material is adds, the shutter depth will increase.
Motor clearing	: (95mm. with respect to center to center of shutter) When a motorized system is used, additional spacing is required.



DIMENSIONS GENERAL – W-SYSTEM

Shutter Height:
Nominal clear height: Vertical space required to fit a folding shutter system (which includes rails and brackets).

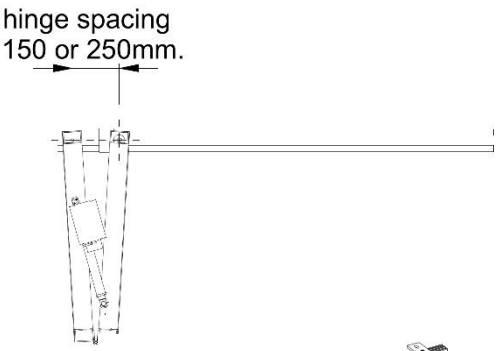
Shutter Height	: (clear height -149mm) The actual shutter height.
Clear height	: (clear height = nominal height +/- 100mm) Taking building tolerances into account the actual clear height is allowed to deviate.
Shutter Width:	
Nominal clear width	: Total width required for the shutter to function.
Shutter width	: (nominal clear width - 38mm) Width of two shutter panels including inner spacing of 10, 28 and 10mm.
Clear width	: (clear width -> nominal clear width) The building opening in which the shutter should fit cannot be smaller than the nominal clear width: your upper and bottom rail have a max length of the nominal clear width..
Shutter Depth:	
Shutter depth	: The depth of the shutter frame. When sheet material is adds, the shutter depth will increase.
Motor clearing	: (95mm. with respect to center to center of shutter) When a motorized system is used, additional spacing is required.



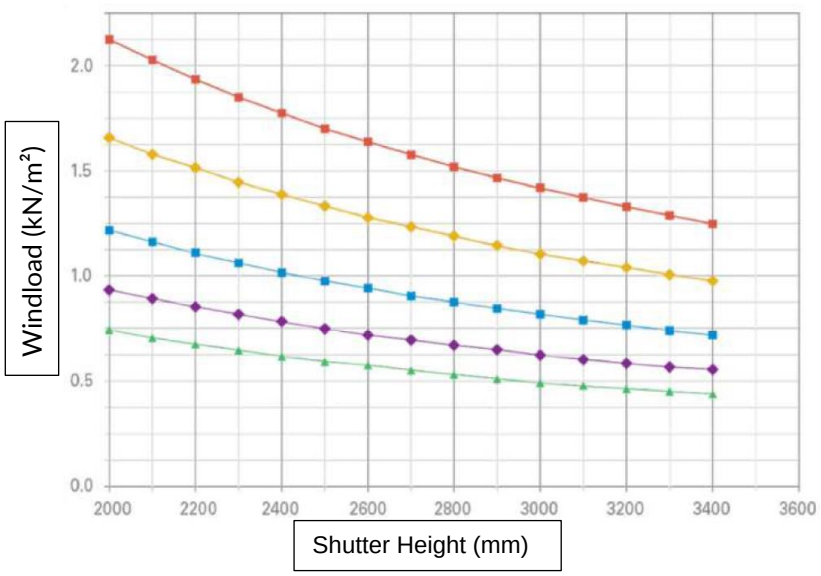
SPANS – PERFORATED SHEET

Shutter dimensions are constrained by the windloads that act on them.
The shutters are most subjected to windloads when they are in open position, meaning folded perpendicular with respect to the facade.
An increase spacing between the fixed and sliding rotation points increases the allowable shutter dimensions.

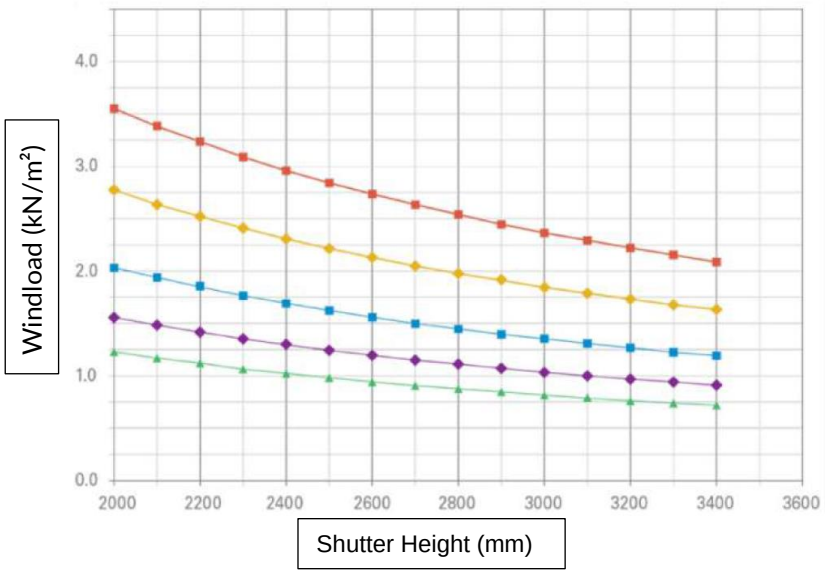
Two possible spacings are posible: 150 and 250mm.
Possible shutter spans are displayed below.

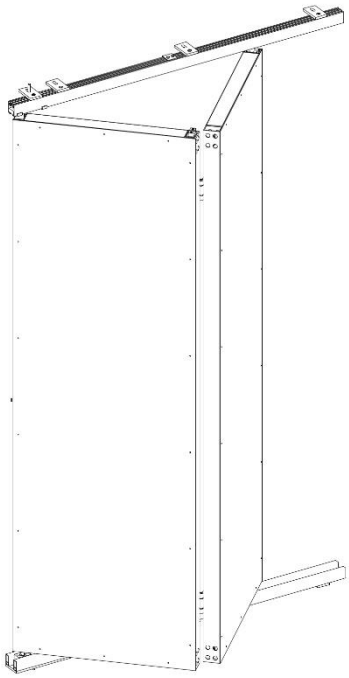


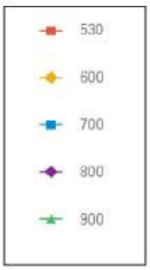
150mm Hinge space



250mm Hinge space





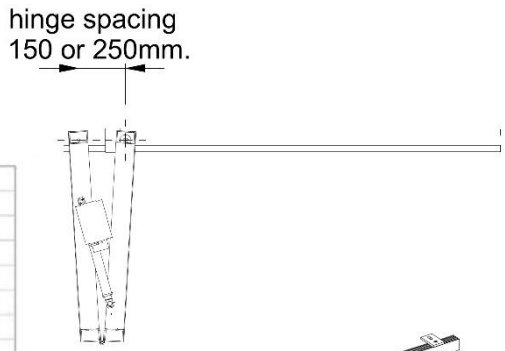


Shutter Width

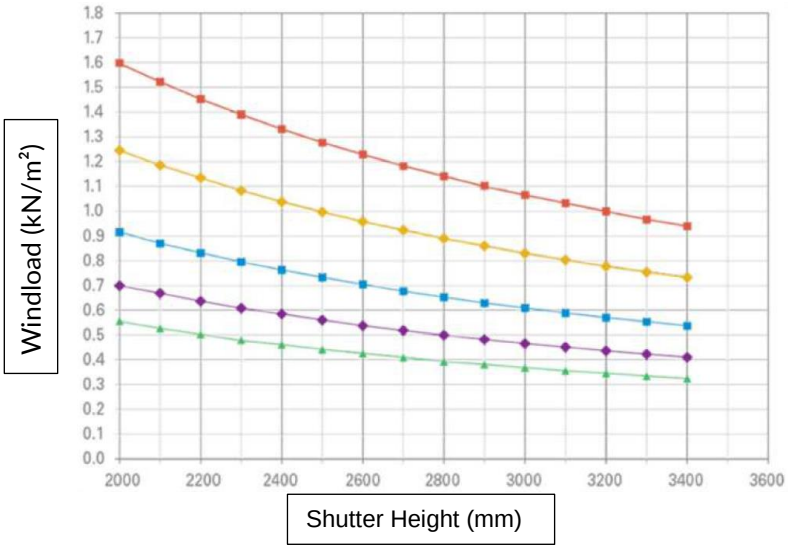
SPANS – FINS

Shutter dimensions are constrained by the windloads that act on them.
The shutters are most subjected to windloads when they are in open position, meaning folded perpendicular with respect to the facade.
An increase spacing between the fixed and sliding rotation points increases the allowable shutter dimensions.

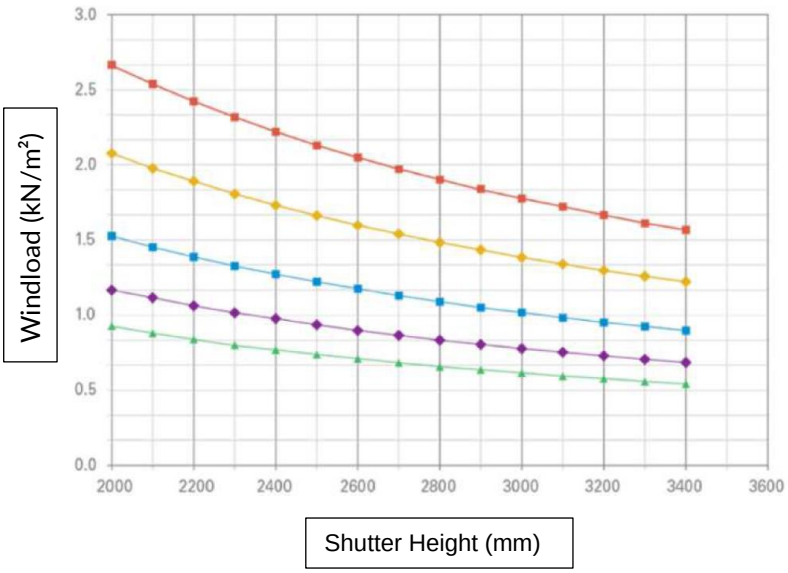
Two possible spacings are posible: 150 and 250mm.
Possible shutter spans are displayed below.

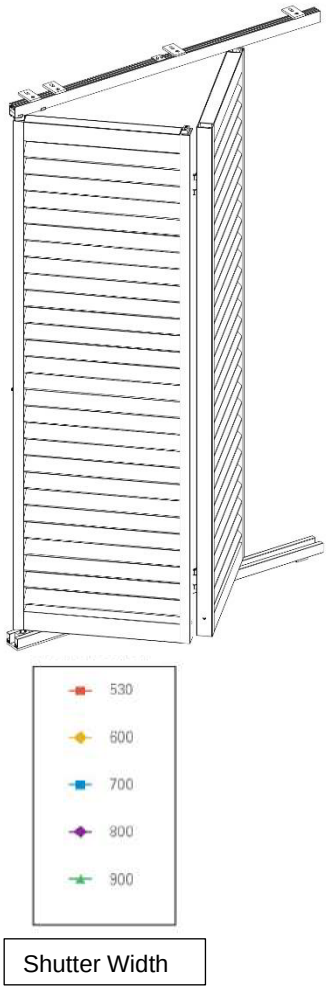


150mm Hinge space



250mm Hinge space



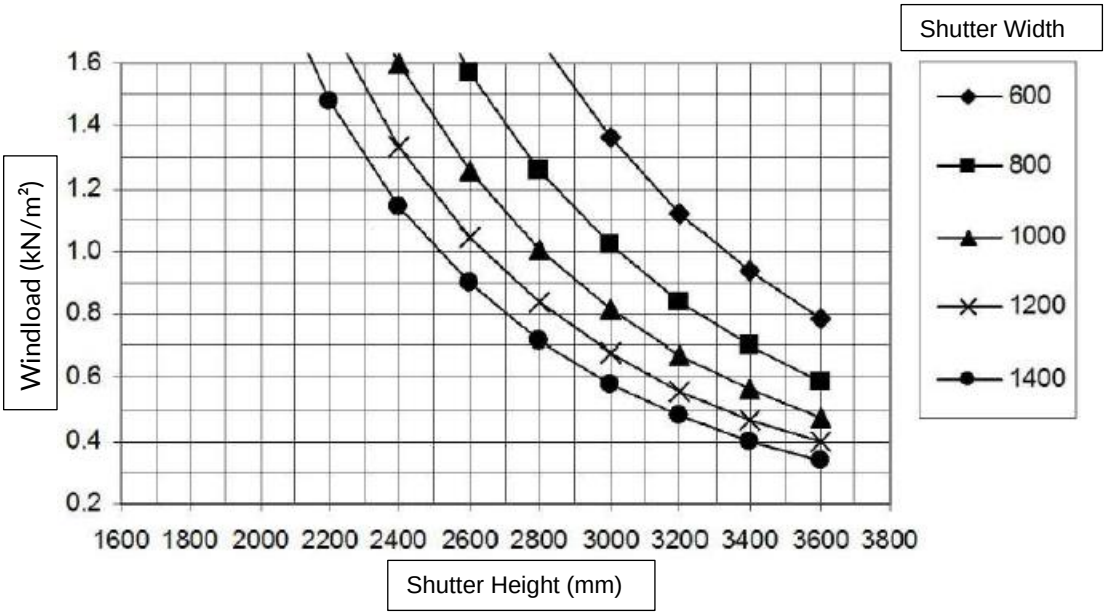


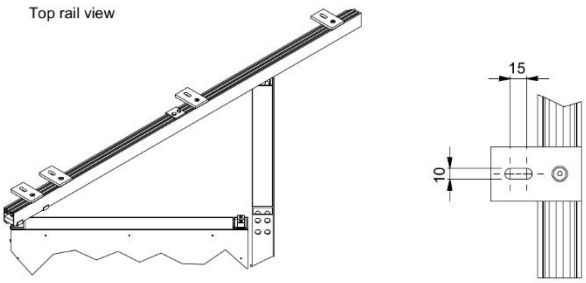
INSTALLATION BRACKETS

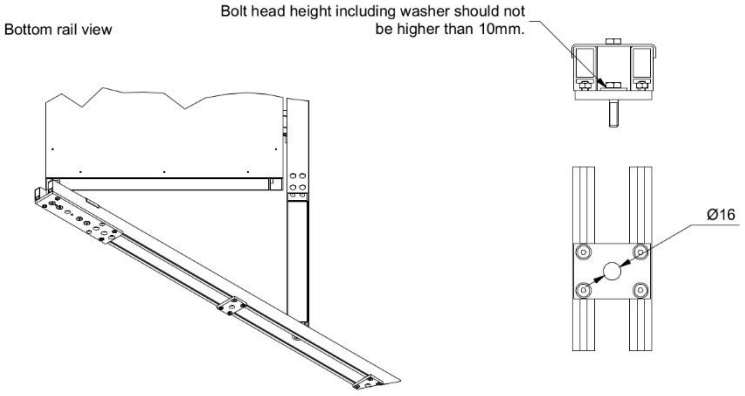
Shutter heights fixed fins

Top and bottom rails are connected to the building using four brackets.
Near the fixed rotation points of the shutter, two brackets are placed next to each other. The remaining two are distributed evenly across the rail. (For details, see next page)

Advised fixing materials are M8 bolts in combination with ISO 9021 washers.

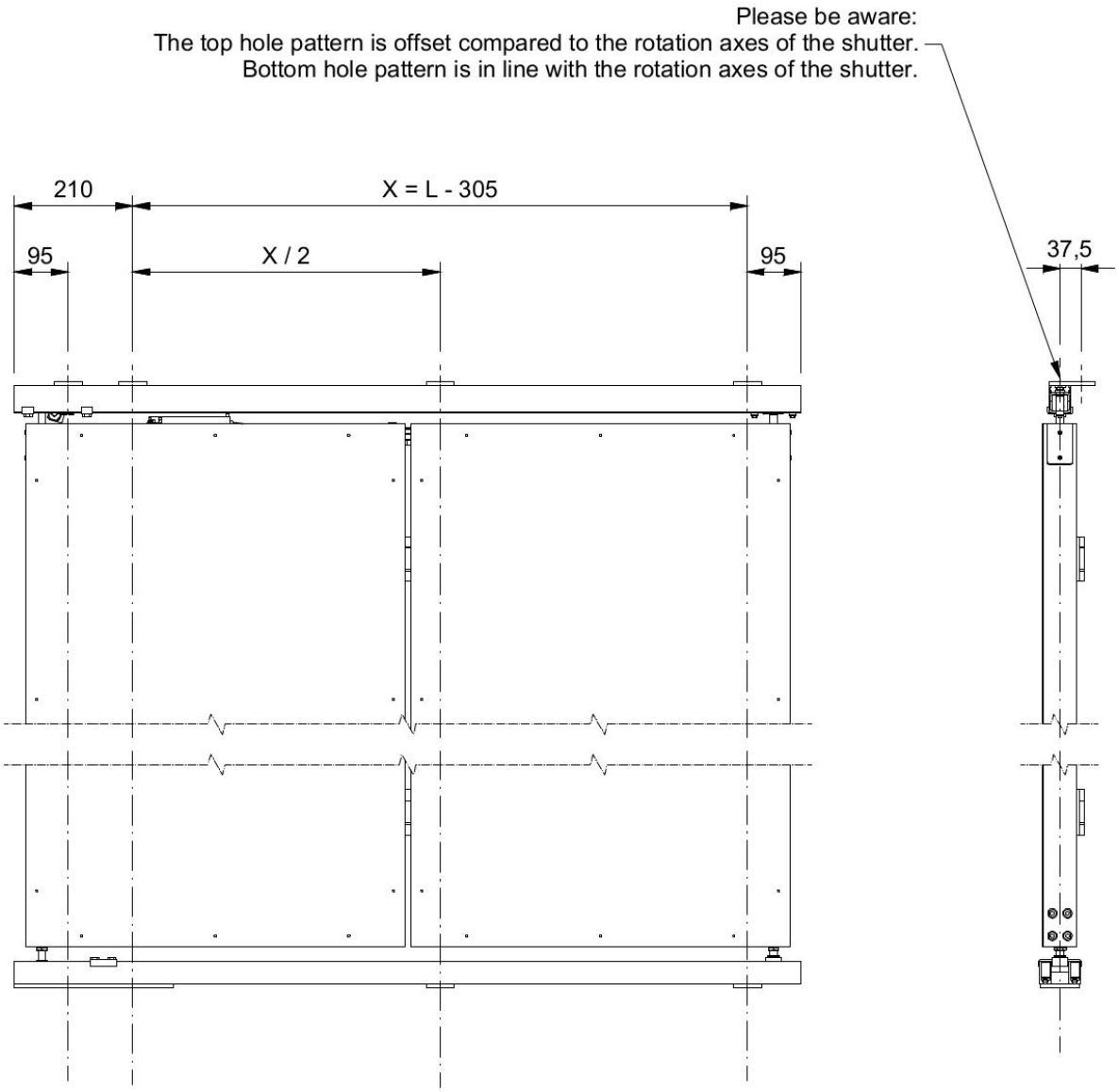






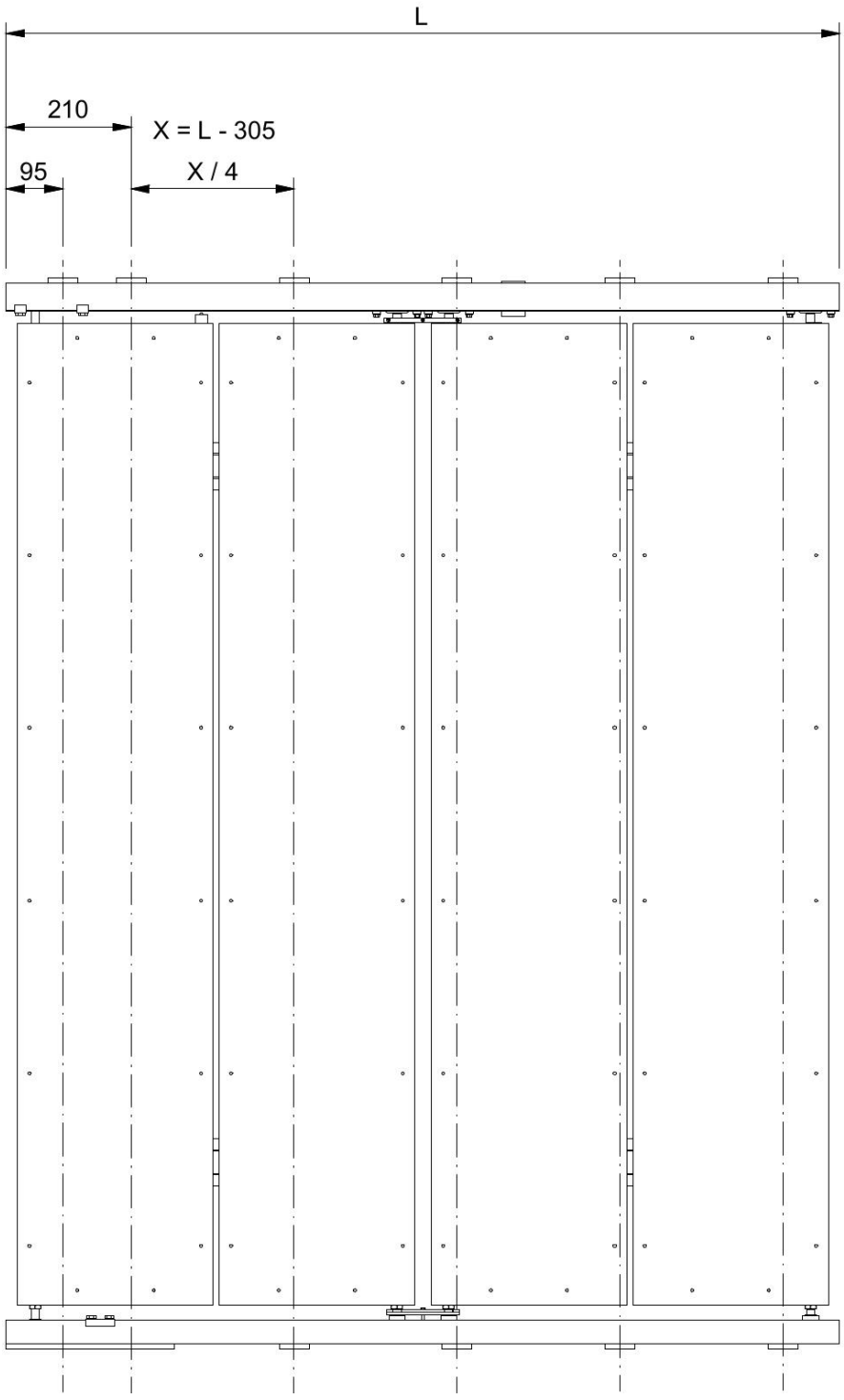
INSTALLATION – PLACING TOP AND BOTTOM RAIL – V-SHUTTER

Fix bottom and top rail to the building
Create a hole pattern as displaced below



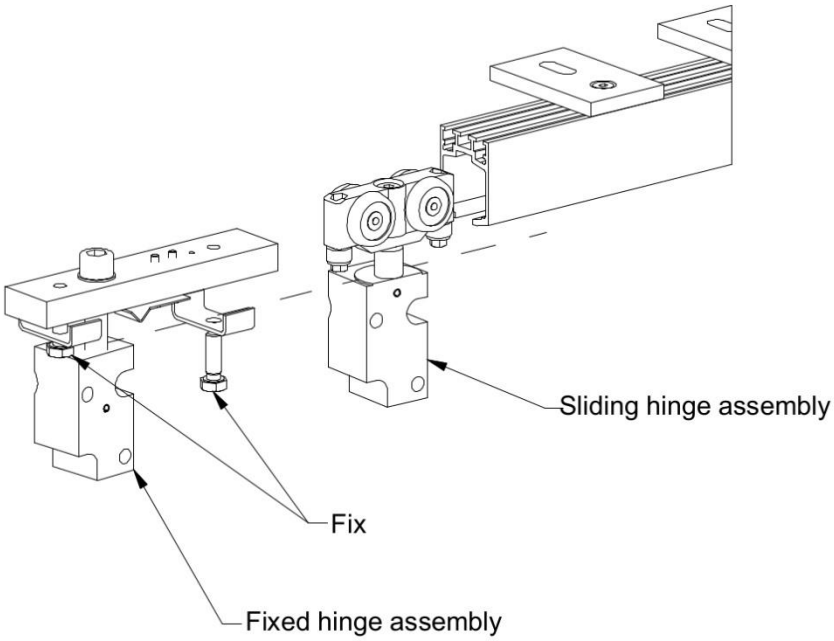
INSTALLATION – PLACING TOP AND BOTTOM RAIL – W-SHUTTER

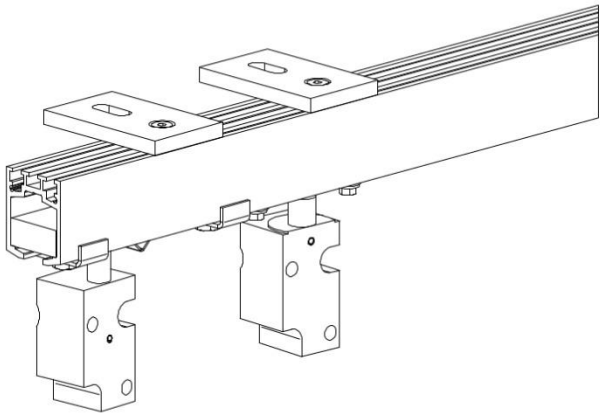
Fix bottom and top rail to the building
Create a hole pattern as displaced below

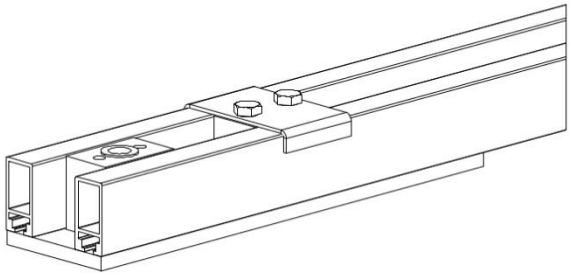


INSTALLATION – PLACING HINGES

Fix bottom and top rail to the building. Make sure the clear height keeps within the allowed tolerance as described earlier.
Put the fixed hinge assembly inside the top rail. Depending on the particular situation this should be done before the top rail is fixed to the building.

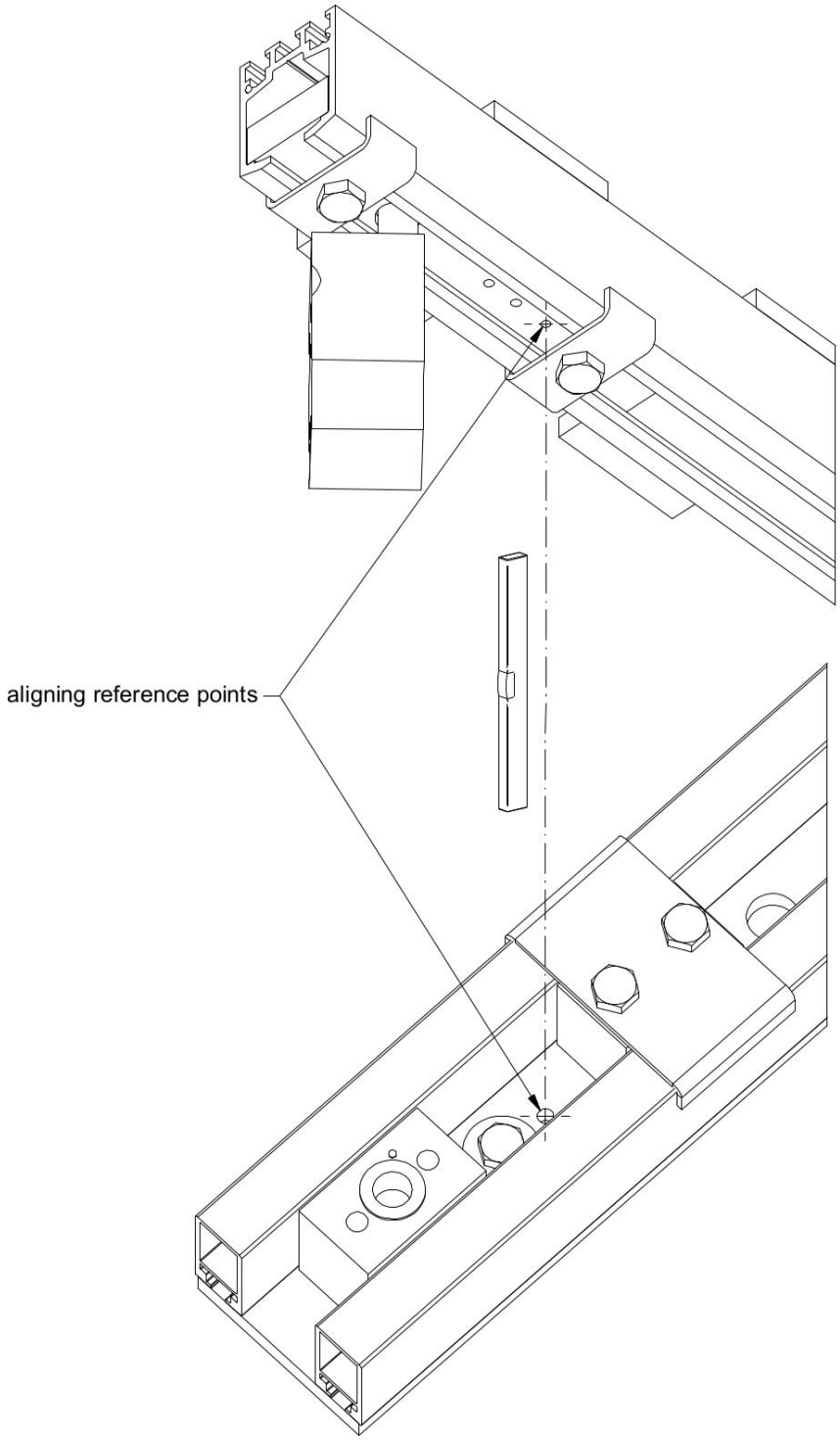






INSTALLATION – ALIGNING

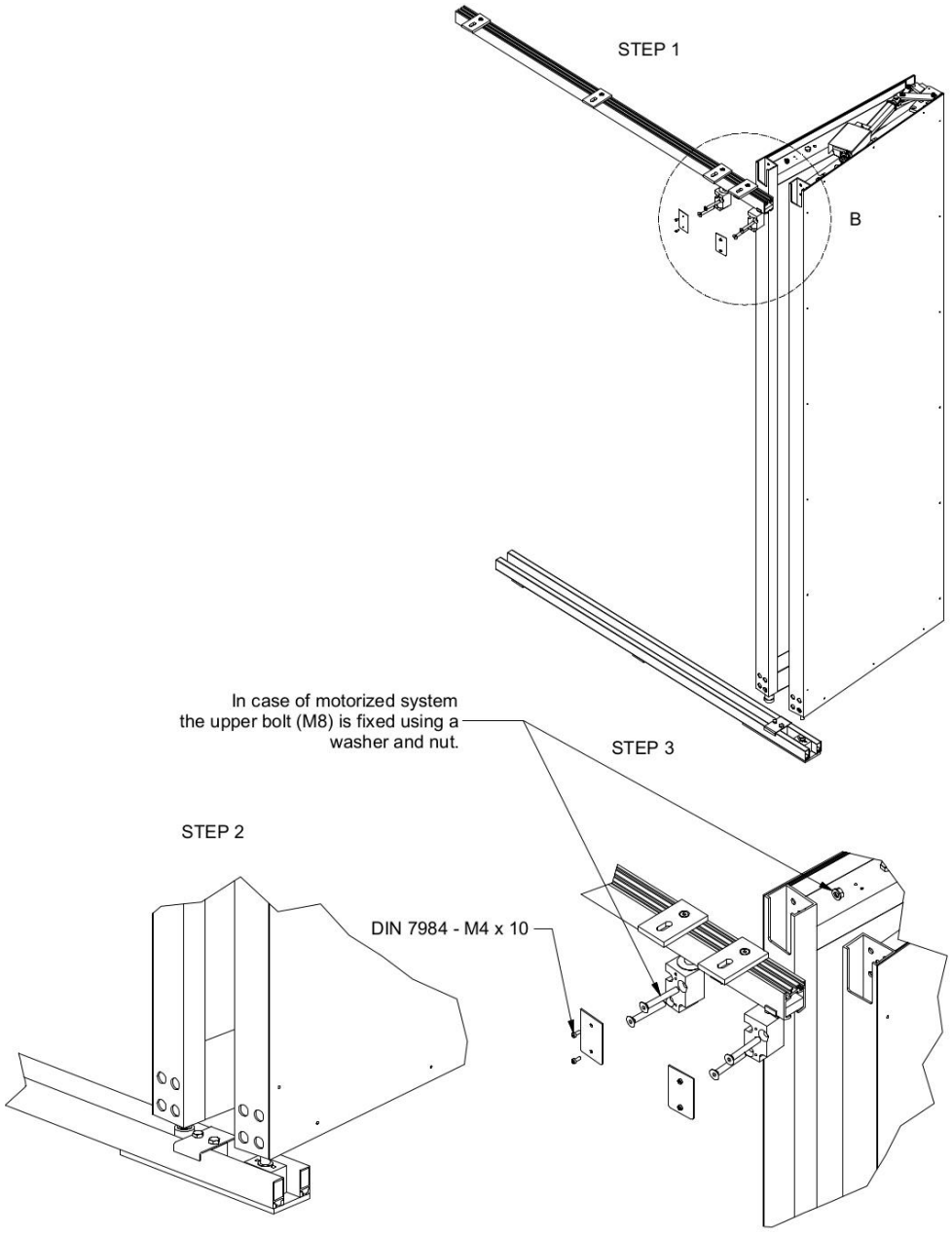
Use the provided reference points and a plumb bob for aligning the rotation points in both top and bottom rail.



INSTALLATION – SHUTTER PLACEMENT

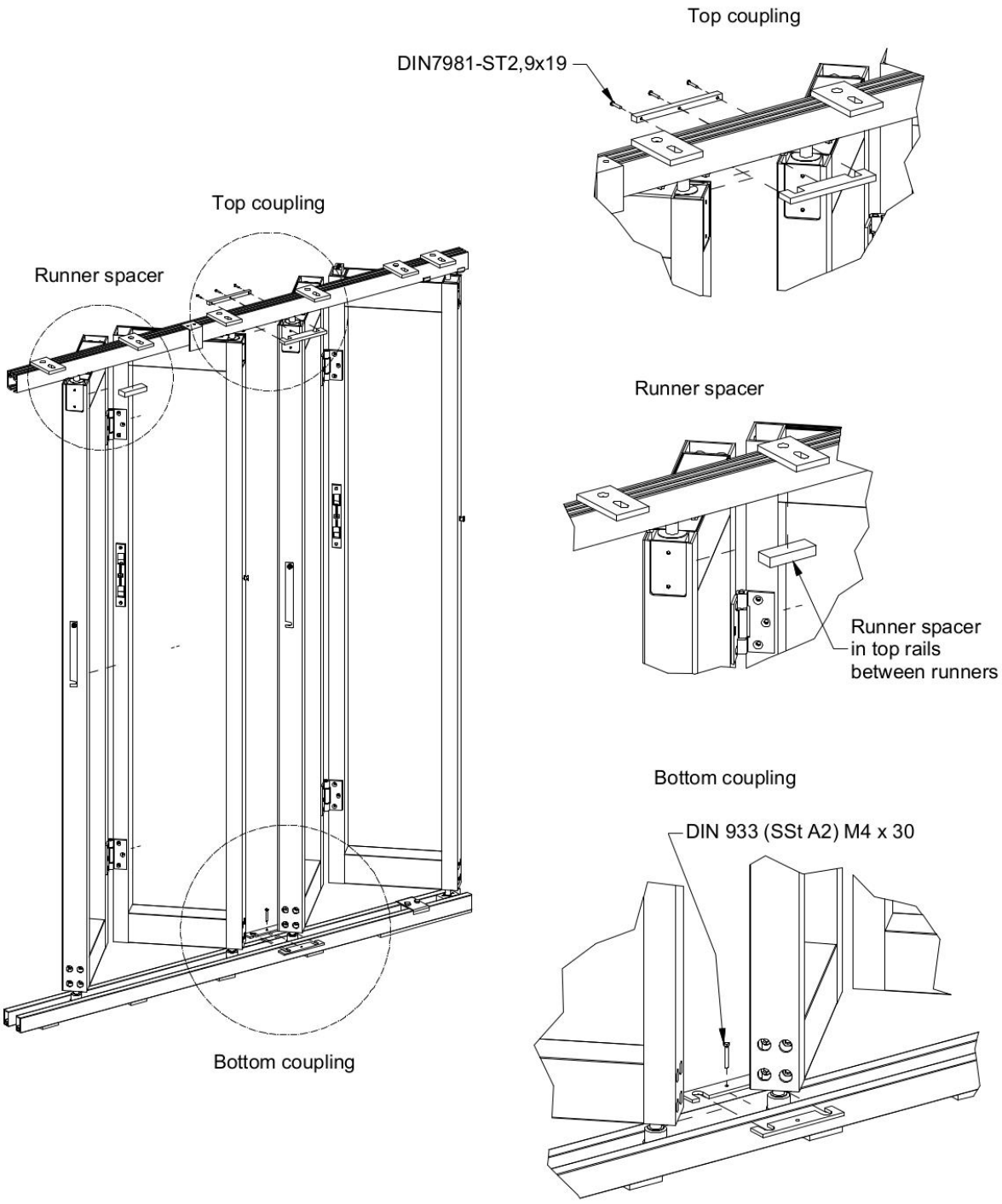
When the top and bottom rails are mounted, the shutter can be placed.

1. Put the shutter in folded position.
2. Place the bottom fixed pivot inside the bottom rail bearing and the bottom runner inside the rail.
3. Connect the shutter to the fixed hinge assembly and sliding hinge assembly located in the top rail and fix it using the provided bolts. Place the endcaps.



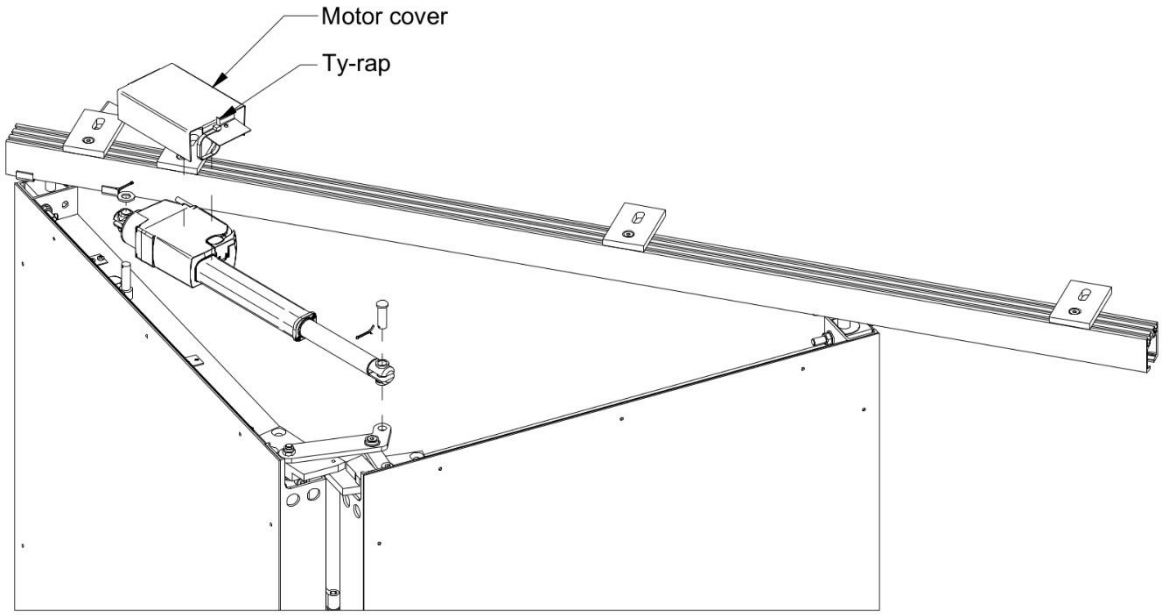
INSTALLATION – W SHUTTER

A W-shutter is installed as two individual V-shutters which are later coupled in the middle using a top and bottom coupling set.

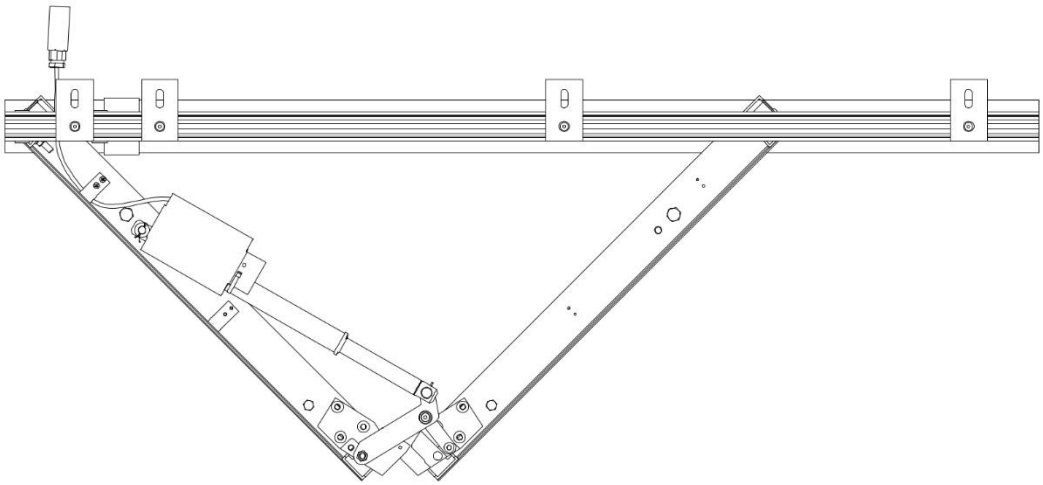


INSTALLATION – MOTORIZED SHUTTER

In case of a motorized shutter: as soon as the shutter is in place, the motor can be attached to the shutter drive mechanism.



After the motor has been placed the motor cover can be attached and fixed with a Ty-rap.

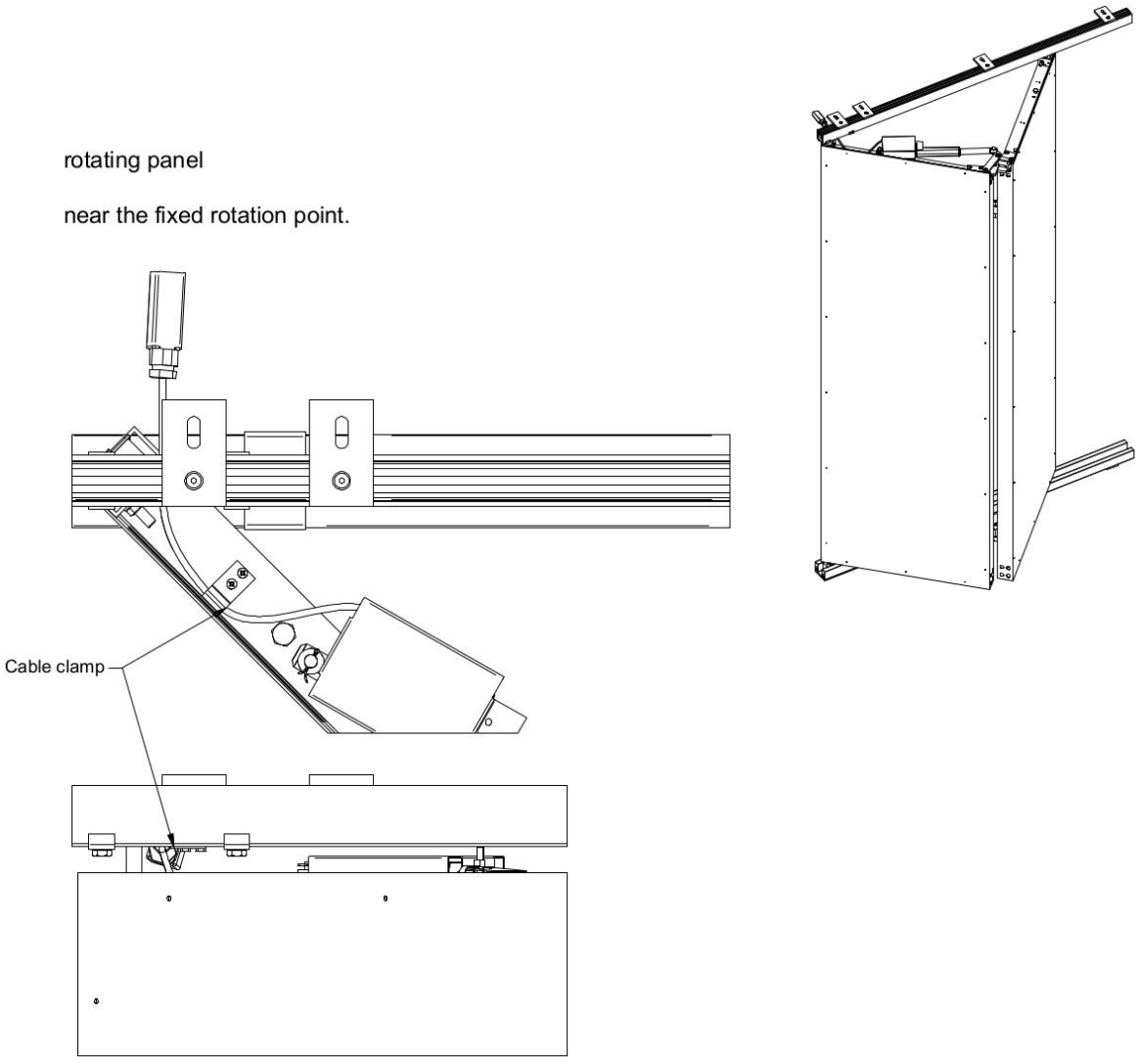


INSTALLATION – CABLE MANAGEMENT

The motor is located at the top of the rotating panel.
A power cable attached to the motor has two extra fixation points on the system after it can be led to the inside to the motor controller:

1. Rotating cable clamp. On top of the frame.
2. Fixed cable clamp. On top of the rail.

As the motor is a moving part, the cable should be fixed at the clamps in such a way it still allows movement without stretching the cable, and in such a way, the excess cable cannot be trapped inside the moving parts of the shutter.

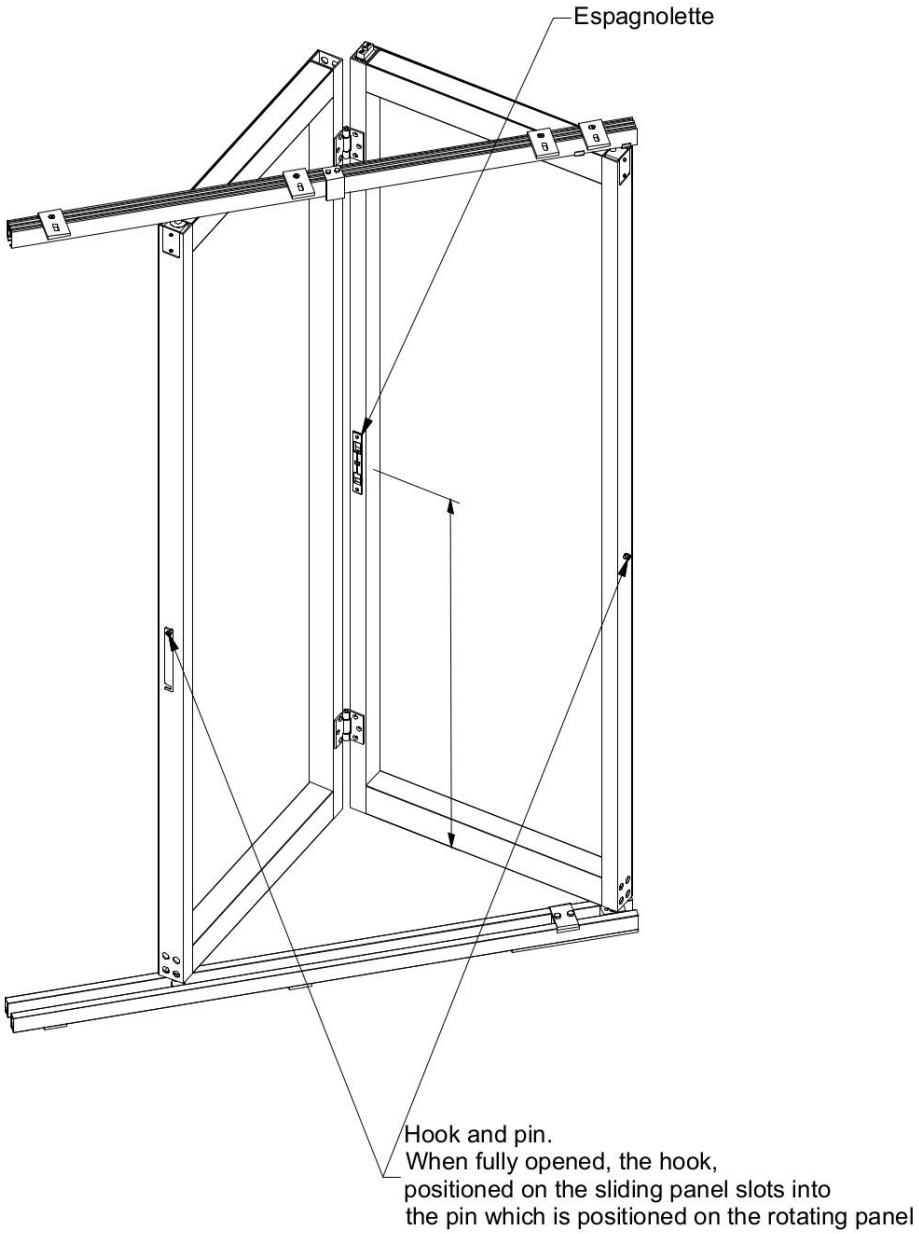


INSTALLATION - OPERATION

A manually operated system can be locked in its fully opened and closed position.
An espagnolette is used for the fully closed position. The espagnolette locks inside the opening of the top rail.

A hook and pin is used for the fully opened position.

By default both locking mechanisms are positioned 1000mm above the bottom part of the shutter panels.



Building Elegance B.V.
Pottenbakkerstraat 10
4871 EP Etten-Leur

Info@buildingelegance.com
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