

PERFORMANCE IN PARTNERSHIP



- ▶ maximum strength
- ▶ minimum weight
- ▶ electric operation
- ▶ colour options
- ▶ special applications

TEL : 2692 3399
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BOSTWICK BO-SHAN

**DELTA FOLDING DOORS
TECHNICAL INFORMATION**

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BBSS

Delta Folding Shutter Doors



FOLDING SHUTTER INSTALLED FOR K.C.R.C. WITH LEADING EDGES CUT OUT FOR CABLES PASS THROUGH

For a strong, robust door, it is hard to match the Delta Folding Shutter. The proportional movement of the door, controlled by a pantograph system, provides a design which is tough and yet smooth and easy to operate and which will tolerate the most extreme weather conditions. The top hung, single or double units stack neatly to the side of the opening and occupy very little headroom. A floor channel is generally required but for certain applications a secondary top track can be fitted to prevent sway and allow an uninterrupted threshold. As Delta Doors can be arranged to fit around crane beams or railway catenary wires they are ideal for warehouses and locomotive or carriage sheds. Any number of fixed or floating door units can be combined to cover openings of virtually any width. Single or double units can be power operated and fitted with a wide range of control options.



TYPICAL INDUSTRIAL UNIT APPLICATION



HIGH LEVEL BI-PARTING DOORS WITH RUNWAY BEAM CUT-OUTS

Delta Folding Shutter Doors

Wind resistance is a basic requirement for shutters installed outside. In order to achieve a high performance, Delta Folding Shutter have been tested the strength of various components inside the test laboratory. The test conducted by Construction Research Lab. Inc., Miami, (U.S.A.) proved the shutter will withstand hurricane force winds in excess of 147 M.P.H. and the test in U.K. with Northern Industrial Marine proved the door will withstand 4 Kpa wind load. The reports and substantive calculations are available, please contact our Engineering for more details. The following are typical Hong Kong installation for Delta Folding Shutter.



CHEK LAP KOK BOAT HOUSE

- ▶ up to 9 metres high with unlimited width
- ▶ Plastisol colours
- ▶ manual or electric operation
- ▶ custom made to suit individual requirements



Since 1980, Delta Folding Shutters have been installed at Lamma Island Power Station for Hong Kong Electric. It is a power plant located at the far end of the Island, the sea wind will affect the whole station over the years. In order to protect the power station equipment and leave a big opening for access, 7 meters high Delta Folding Shutters are installed and have performed as the requirement for twenty years.

Chek Lap Kok New Airport open on 1998, BBSS was proud to install four

number of 31 meters wide folding shutter for the Runway Fire Station. Due to the open space of runway, the shutters have to withstand very high wind load over the year. With specially designed wind locking bolt and heavy-duty bottom channel, Delta Folding Shutter is reliable under the typhoon weather conditions.

Even for unusual applications over 7 meters high Delta Folding Shutter have protected the Happy Valley video metric screen for over 15 years from extreme Hong Kong weather conditions.

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SPECIFICATION

Construction: Ribbed steel leaves. 230mm wide rolled edges hinge in patented pickets which are hung from a horizontal tubular track and guided in a channel set into the floor. Proportional movement is achieved by a series of bars in the form of a pantograph fitted to the inside faces of the pickets with pivoting and sliding connections. A fabricated leading edge strengthens the front of the door unit and carries pull handles, locking and the chain gripper for electrically operated doors.

Finish: All rolled components are supplied in galvanized steel. Other steel items are zinc plated except fabricated brackets which are primer painted.

Colourcoat HP200 Plastisol is available, with 0.9mm thick leaves only, up to 6 metres high (See colour chart for availability)

Powder coating is available also, up to the full height limit.

Note that leading edge, outer hinge strips, covers and the outside face of the leaves only are colour finished. Internal door items, pickets and lattice bars for example, are supplied in galvanized finish.

Size Range: Height - up to 9 metres
Width - unlimited with multiple units

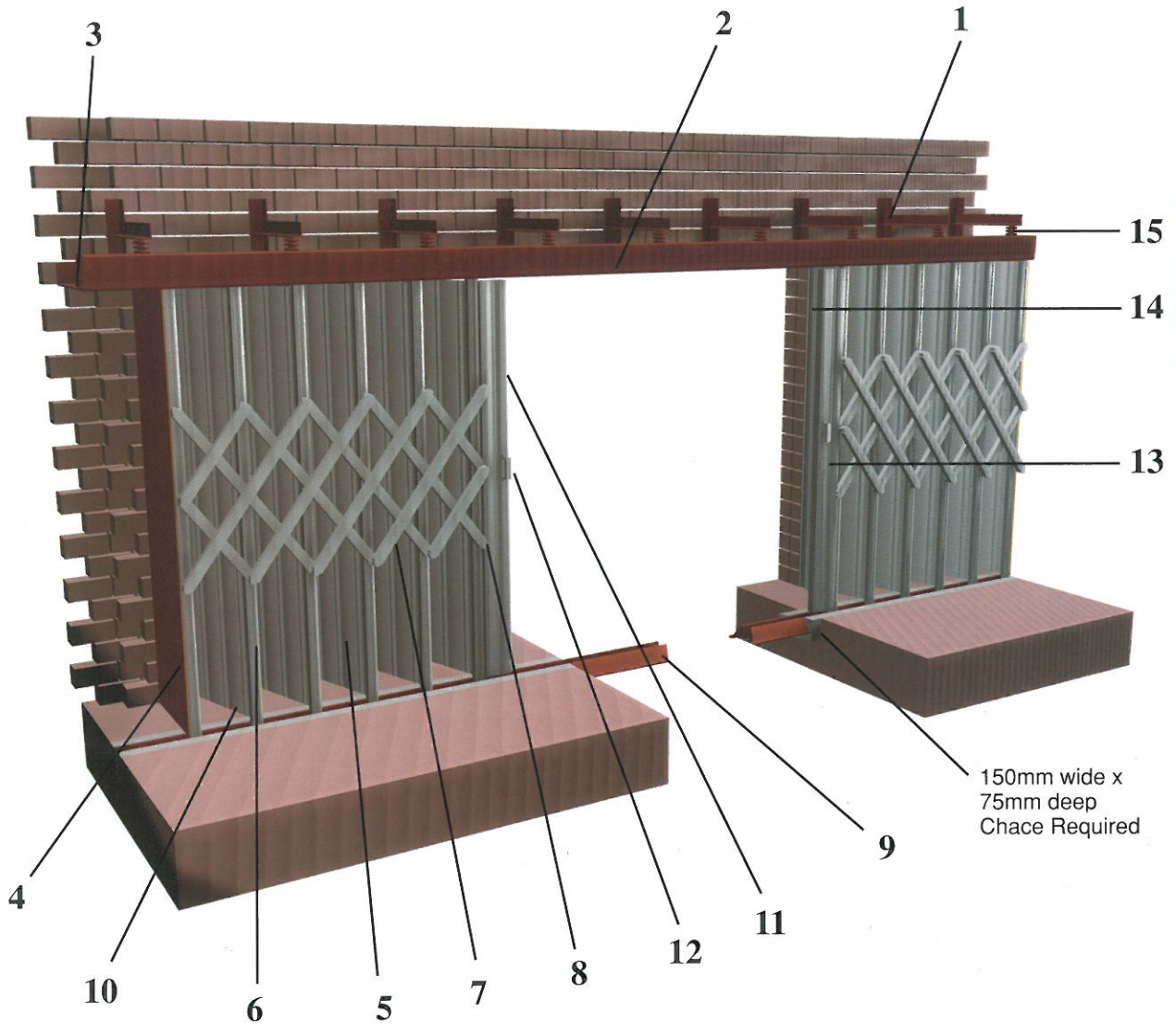
Total Weight: 30Kg/m² minimum

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DF1

TYPICAL DOOR CONSTRUCTION



1. Track brackets - fabricated from steel angles, finish in factory applied primer.
2. Top Track - 2.6mm thick cold formed galvanized steel, supplied in one length when possible. For very large doors a painted heavy duty track, 5mm thick is supplied.
3. Top covers - to reduce draughts. Formed in galvanized steel. Special larger sizes available.
4. End leaf or cover - provides to close the gap between the end picket and the wall.
5. Leaves - ribbed galvanized steel, 0.9mm or 1.2mm thick, 230mm wide, with rolled edges which hinge easily in the pickets and outer hinge strips.
6. Pickets - patented cold rolled galvanized steel section fitted with a sealed ball bearing roller. The pickets support the weight of the leaves and provide connections for the lattice assembly.
7. Lattices - cold rolled in galvanized steel give the door proportional movement allowing even large doors to be manually operated.
8. Lattices sliders - special bolts with Teflon coated heads ensure that the ends of the lattice bars slide freely.
9. Bottom channel - a rugged 2mm thick galvanized steel multi-profile section provides a continuous lip for grouting. Special arrangements are available.
10. Brush strip - nylon in PVC clip-on extrusion is factory fitted to bottom of leaves.
11. Leading edges - in galvanized steel. The standard width is 75mm, but can be up to 300mm to stabilize larger doors or to accommodate cut-out for beams etc. up to 500mm wide.
12. Pull handles - in aluminium.
13. Locking - hasp and staple is standard with a mortised or surface hook bolt available.
14. Outer hinge strip - a ribbed galvanized steel section provides the hinging action for the outer edges of the leaf pairs.
15. Track packers - in zinc plated steel for height adjustment of the track.

Delta Folding Shutter Door

Bunching Details

BUNCHING DETAILS

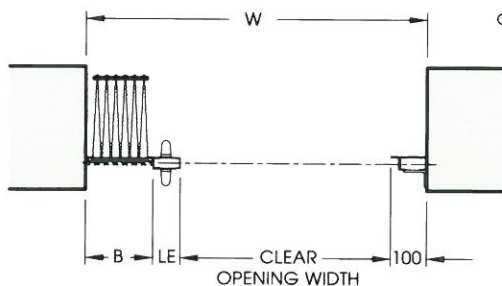
This sheet and sheets DF4 show the various plan arrangement and give information to calculate the bunch size of door units and the clear opening width. Page DF6 illustrates the details at the head relating to each plan type.

A simple coding system is used to designate the plan and head types and whether single or double.

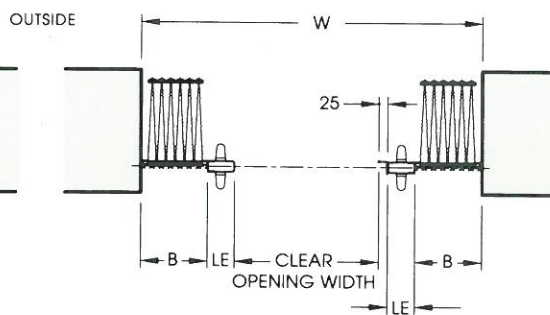
Doors are always handed from the inside of the building.

BJ TYPES (fixed Between Jambs)

Types SBJ (Single)



Types DBJ (Double)



W for SBJ	No. of Pairs per unit	B	LE		W for DBJ		
			Height up to 6m	Height over 6m			
1375	3	120	75	150	2600		
1775	4	150			3400		
2175	5	180			4200		
2575	6	210			5000		
2975	7	240			5800		
3375	8	270			6600		
3725	9	300			7400		
4175	10	330			8200		
4575	11	360			9000		
4975	12	390			9800		
5375	13	420			10600		
5775	14	450			11400		
6175	15	480			12200		
6575	16	510			13000		
6975	17	540			13800		
7375	18	570			14600		
7775	19	600			15400		
8250	20	630			150	300	16350
8650	21	660					17150
9050	22	690	17950				
9450	23	720	18750				
9850	24	750	19550				
10250	25	780	20350				
10800	26	810	21450				
11200	27	840	22500				
11600	28	870	23050				
12000	29	900	23850				
12400	30	930	300	24650			
12800	31	960		25450			
13200	32	990		26250			
13600	33	1020		27050			
14000	34	1050		27850			
14400	35	1080		28650			

Notes

1. Determine the bunch size 'B' and the leading edge dimension 'LE' corresponding to the opening width 'W' using the SBJ or DBJ column as appropriate. Calculate the clear opening width by subtracting from 'W' the relevant amounts indicated on the plan arrangement.
2. Double doors fitted with an electric operator to each unit must have a 300mm leading edge. Increase the total bunch dimensions and reduce the clear opening width accordingly. See DF7 for details of electric operators.
3. If a door will be exposed to a very high wind loading increase the number of pairs of leaves by approximately 20%. This will increase the bunch dimension and reduce the clear opening width.
4. Doors over 6 metres high employ wider leading edges in some cases.

- ▶ simple application coding system
- ▶ wide variety of track fixing arrangement

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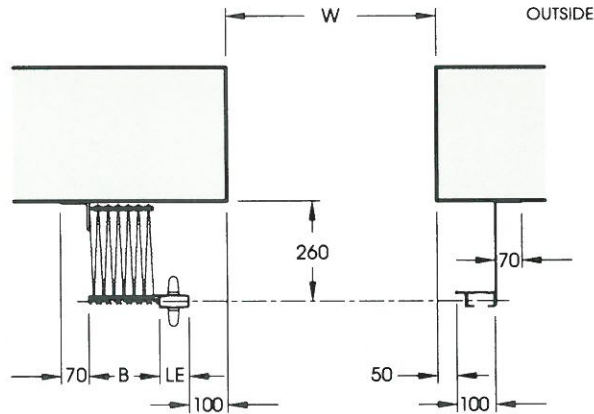
DF3

Delta Folding Shutter Door

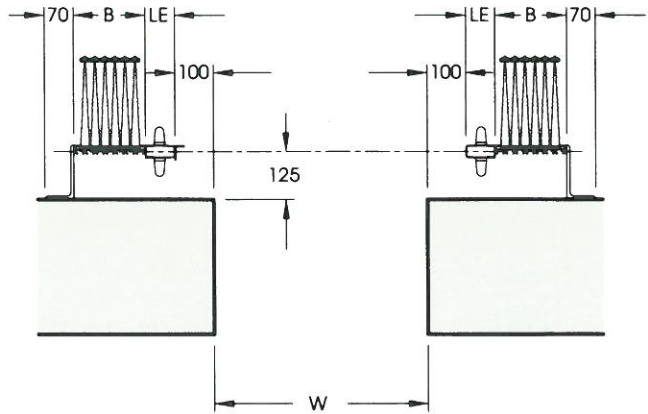
Bunching Details

IR/OR TYPES (fixed Inside or Outside Reveals)

Types SIR/SOR (Single - IR shown)



Types DIR/DOR (Double - OR shown)



W for SIR/SOR	No. of Pairs per unit	B	LE		W for DIR/DOR
			Height up to 6m	Height over 6m	
925	3	120	75	150	2000
1300	4	150			2750
1675	5	180			3500
2050	6	210			4250
2425	7	240			5000
2800	8	270			5750
3175	9	300			6500
3550	10	330			7250
3925	11	360			8000
4300	12	390			8750
4675	13	420			9500
5050	14	450			10250
5425	15	480			11000
5800	16	510			11750
6175	17	540			12500
6550	18	570			13250
6925	19	600			14000
7300	20	630	150	14750	
7675	21	660		15500	
8050	22	690		16250	
8425	23	720		17000	
8800	24	750		17750	
9175	25	780		18500	
9550	26	810		300	19250
9925	27	840	20000		
10300	28	870	20750		
10675	29	900	21500		
11050	30	930	22250		
11425	31	960	23000		
11800	32	990	23750		
12175	33	1020	24500		
12550	34	1050	25250		
12925	35	1080	26000		

Notes

1. Determine the bunch size 'B' and the leading edge dimension 'LE' corresponding to the opening width 'W' using the SIR/SOR or DIR/DOR column as appropriate. Calculate the overall door size by adding the relevant amounts indicated on the plan arrangement.
2. If the sideroom is insufficient to accommodate the end closure angle, it can be reversed.
3. The tables are constructed to suit the setbacks of the leading edges and slam post as shown. If it is required to increase a setback dimension, simply add the increase to the structural opening width and use this revised figure as 'W' to determine the bunch and leading edge dimensions. If a setback is reduced then 'W' is reduced accordingly.
4. Double doors fitted with an electric operator to each unit must have a 300mm leading edge. Increase the total bunch dimensions accordingly. See DF7 for details of electric operators.
5. If a door will be exposed to a very high wind loading increase the number of pairs of leaves by approximately 20%. This will increase the bunch dimension and reduce the clear opening width.
6. Doors over 6 metres high employ wider leading edges in some cases.

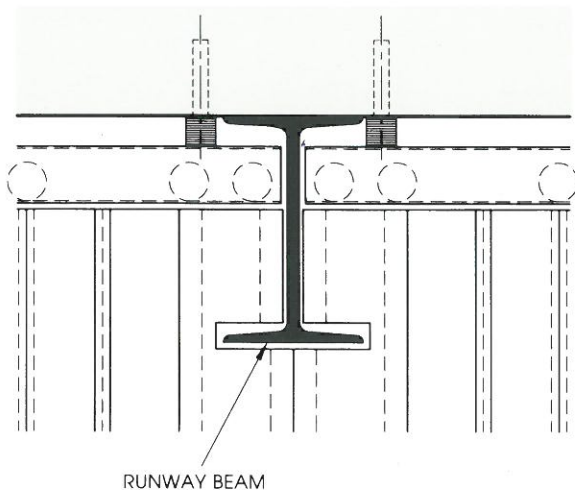
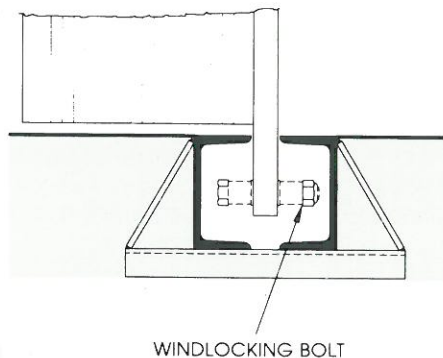
Delta Folding Shutter Door

Optional Features

Special Bottom Channel

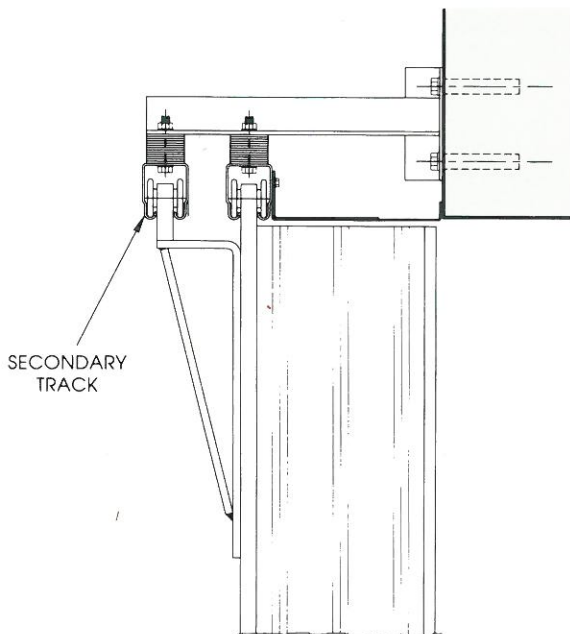
Extra deep bottom channels can be supplied for very high or very wide doors to ensure that the bottom of the door is always retained.

For extreme wind conditions windlocks can be fitted to the extended pickets.



Beams and Rails

The leading edges of a double door can be cut away to fit around a runway beam or power cable etc, passing through an opening. The maximum width of cut-out possible is 500mm. Doors can also be arranged to cross railway or crane rails. This involves cutting through the rails to allow the bottom of the extra length pickets to pass.



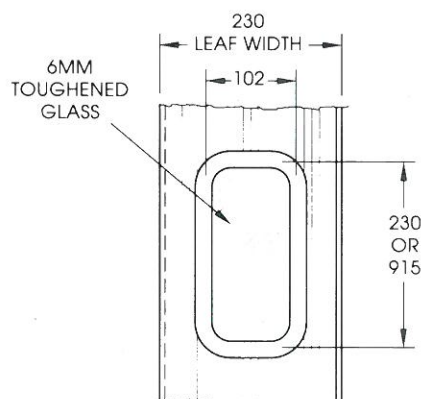
Anti-Sway Tracks

Doors up to 4 metres high and 6 metres wide can be fitted with a secondary track system to hold the door vertical. A floor channel is not then required. This arrangement has limited application - discuss special jobs with your Regional Sales Office.

Vision Windows

Available in two sizes with 6mm toughened glass infill. If required in adjacent leaves they must be offset in height to eliminate clashing together and preventing full door bunching being achieved.

(With Plastisol finish leaves the 230mm size window only is available.)



- ▶ custom made covers and canopies
- ▶ personnel access
- ▶ locking options
- ▶ sump box and vision options

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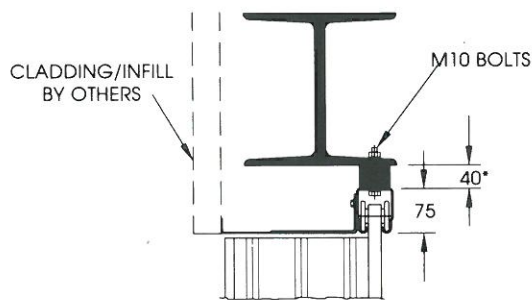
DF5

Delta Folding Shutter Door Head Details

Fixing: The tracks can be fixed in a variety of ways to suit the position of the lintel and the plan arrangement. Where possible the amount of cantilever should be kept to a minimum to reduce twisting of the beam. This can be achieved, with the IR application for example, by positioning a beam above the line of the track and using a BJ head details rather than fitting it flush with the inside face of the jambs. Track fixings are at 900mm pitch with additional fixings above the bunch positions. M10 bolts or expansion fixings are used.

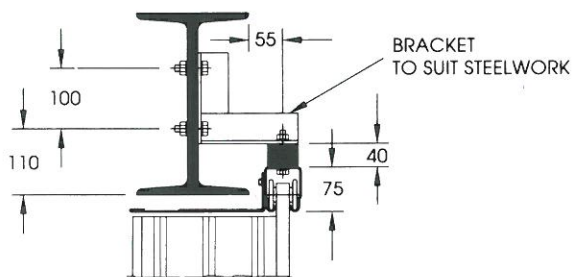
Packing washers are supplied for levelling the track during installation and to allow for subsequent adjustment in the event of settling or deflection.

FIXING TO STEEL WORK

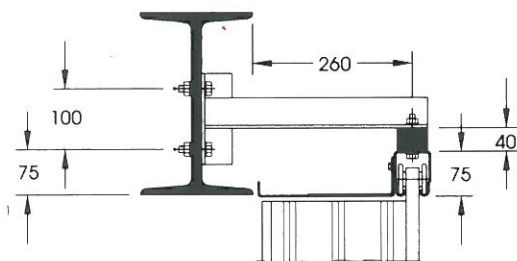


OUTSIDE

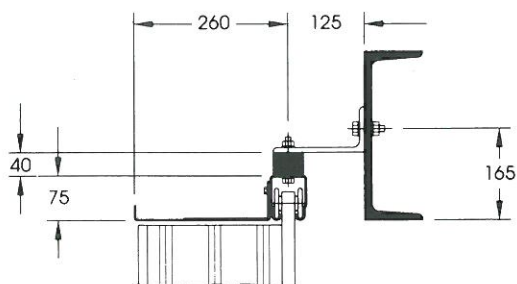
BJ1



LBJ1



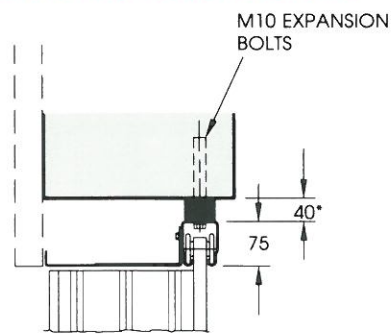
IR1



OR1

FIXING TO CONCRETE

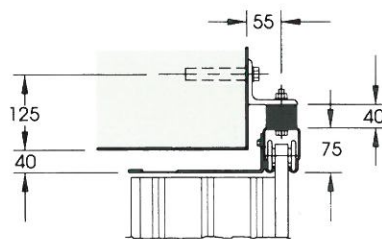
BJ Type



BJ2

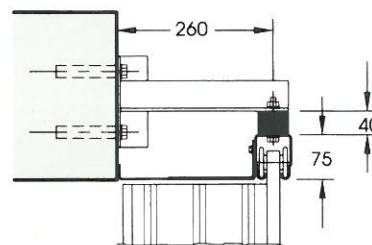
INSIDE

LBJ Type



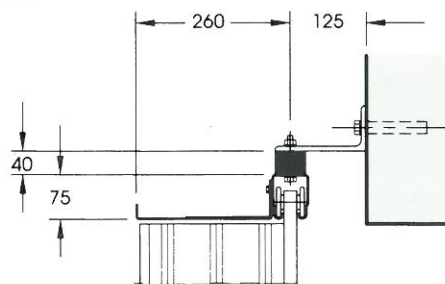
LBJ2

LBJ Type



IR2

OR Type



OR2

* The 40mm height of packing can increase, with electrically operated doors, up to 85mm with BJ head types.