



**LOADING
SYSTEMS**



SALES INFORMATION BOOK

PowerDoor 601

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1. Prefix

This manual is intended to function as a line for determining the execution of insulated steel sectional doors. The manual includes the different types of lift systems as well as the construction of the door panels. Furthermore, the most common options, suitable and available for our doors are specified as well.

The basic composition of the insulated steel sectional door type 601 is mentioned below; the specified prices in this price list are based on this composition.

Standard specifications:

- Steel industrial panels; outside/inside stucco;
- Without finger trap protection;
- RAL 9010 inside/outside;
- 5C-profile;
- Cable drums with 2 safety wraps;
- Torsion springs with 20.000 motion cycles;
- Manual operation by means of a pull rope;
- Including short spring-actuated bumpers;
- Electrically prepared
- Hollow galvanised shaft with key way, bearing plates;
- Door tracks;
- Door fittings;

Various options can be added to the above mentioned basic composition. The available possibilities are detailed in this manual. Any deviations on this basic composition however will lead to additional costs.

All views are interior views.

We kindly ask you to use our online ordering system salesportal.loading-systems.com for your orders. Using our online system enables you to select all relevant options related to the composition of doors to guarantee correct and prompt handling of your order.

2. EC-Declaration of conformity

Loading Systems International has, in co-operation with an external CE-consultant, subjected the sectional overhead door 601 to a thorough risk analyses procedure. The sectional overhead door has been tested in full to be in compliance with the strict requirements as set by the European harmonized standard for sectional doors: EN 13241-1:2003+A1:2011

Based on this risk analyses it has been fully proven that the sectional overhead door is in total compliance with these standards and as such in full compliance with the EC-guidelines. Furthermore, an *installation instruction* has been formulated, which includes detailed specifications regarding the assembly and mounting of the sectional overhead door. Finally, the *User manual* details the sectional overhead door control.

For this purpose, Loading Systems International has formulated two types of declarations:

1. EC declaration of conformity for machinery
2. Declaration of incorporation of partly completed machinery

1. EC declaration of conformity for machinery:

By signing this declaration, Loading Systems International declares, by her own responsibility, that the sectional overhead door and all pertaining fundamental requirements thereof, in relation to safety and health, are in compliance with the European standards. Signing this type of EC-declaration authorises Loading Systems International to apply the CE-marking to the sectional overhead door.

This declaration is to be submitted to the end user of the sectional overhead door in specific circumstances only, being in situations when:

- all sectional overhead door components have been supplied by Loading Systems International (these components are specified in this Sales Information Manual);
- all safety components have been supplied, as required in accordance with the European standards, as specified in this Sales Information Manual
- the sectional overhead door is assembled while using these components and in accordance with the installation instructions, by authorised and professional personnel.



CAUTION!

- In the event that not all components have been supplied by Loading Systems International and the sectional overhead door is to be assembled in combination with other components, we cannot and will not be held liable for the assembled product.
- Safety can only be guaranteed if the installation instructions are strictly observed and only if mounting of the sectional overhead door is performed by authorised and professional personnel only.

2. Declaration of incorporation of partly completed machinery:

In the event the sectional overhead door is to be assembled in combination with other components, not supplied by Loading Systems International (e.g. electric motor or control box), the end user is to receive a type II B-declaration. The basis of this declaration is that the product is not in compliance with the EC-guideline and that it is prohibited to utilise the products prior to the declaration that the assembled product is in full compliance with the EC-guideline.

3. Dimensions

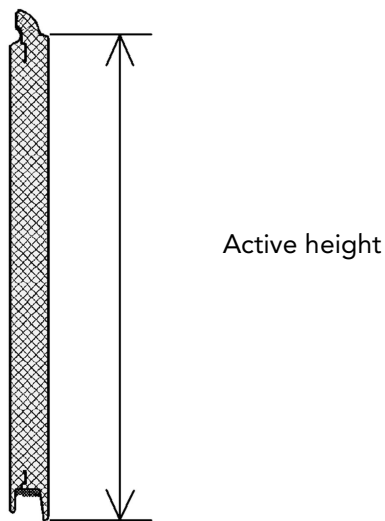
The dimensions of the sectional doors are based on the opening width (W) and opening height (H). Both values are given in mm.

Opening width [W] = the width of the door opening, measured from pier to pier

Opening height [H] = the height of the door opening, measured from the floor on which the door is positioned up to the topside of the opening (lintel)

The dimension of the door is specified as following: **[W x H]**

For substitute panels the dimensions are specified as following: **Opening width x active height**. The active height is the dimension with which the panel contributes to the height of the door.



4. Door types

The correct lift system depends on the built-in situation. An important factor is the available free room above lintel. The area above the door-opening up to the lift is referred to as the free room. For detailed information on built-in measurements, required and or applicable, see the installation drawing.

Pre-assembled door types

For doors sizes up to 5000 x 5500 mm (max. 25 m²) there are two types of doors available with a suspended spring pack which are pre-assembled. These doors are the HL-L (601040) and de VL-L (601045). These door types differ in various ways from the other door types.

The galvanised tube shaft and the springs are completely pre-assembled and mounted onto the sleeve. The complete sleeve is fixed directly above the lintel by means of two triangle-sheets. This (pre-assembled) construction results in a *cost-efficient* door which is *easy to install*. As the spring pack is placed directly above the lintel, no working at heights during installation or maintenance is necessary. More information on these advantageous door types can be found in the paragraphs 4.2.2 and 4.3.2.

4.1. Standard lift system 601010 (SL)

The minimum available free room is 350 mm for a maximum door height of 3600 mm. The minimum available free room is 420 mm for a maximum door height of 5500 mm. The minimum available free room is 500 mm for a maximum door height of 7000 mm. The maximum available free room is 1000 mm. If these measurements are applicable the standard lift system is to be selected. If more or less space is available, a different lift system is to be selected.

4.2. High lift systems

4.2.1. High lift system 601021 up to 601026 (HL)

If the available free room exceeds the space required for a standard lift system, the vertical tracks can go, prior to curving inwards, upwards. This system is called the high lift system. The most important measurement is the so called HL (HIGH LIFT). HL is the measurement, as of the bottom side of the lintel up to the bottom side of the horizontal door tracks. Above the HL, extra space is required, this space is 270 mm minimum up to 360 mm maximum (depending on the HL measurement) and 1000 mm maximum as required for, amongst others, the spring packet. For more details please consult the installation drawing 600.020 IA.

4.2.2. High lift system with pre-assembled suspended spring pack 601040 (HL-L)

In situations where the day-sizes are up to 5000 x 5500 mm (max. 25 m²) and where the free room above the lintel is less than 3250 mm the 601040 is an ideal solution. The 601040 differs from the other door types as large parts of this door are pre-assembled. For this door type the HL-size is important and calculated as following:

- HL-size = free room above lintel - 250 mm;
- For doors up to 4000 x 4000 mm the minimal necessary free room above the lintel is 850 mm; this leads to a minimal HL-size of 600 mm.
- For doors with a width or height more than 4000 mm the minimal necessary free room above the lintel is 1450 mm; this leads to a minimal HL-size of 1200 mm.
- The HL size is bound to a maximum of 3000 mm.

For the sleeve the following dimensions are calculated:

- The sleeve is tailor made: for doors up to 4000 x 4000 mm: 60 x 40 x 3 mm; for doors from 4000 x 4000 mm: 80 x 80 x 2 mm;
- The length of the sleeve is $W + 480$ mm; if the door is equipped with a motor or is to be chain operated an extra length of 40 mm is added;
- Torsion springs and a completely assembled axle are pre-assembled onto the sleeve and this package is delivered completely ready for fixing onto the triangular sheets. With this construction the use of complex steel surfaces (for fixing the door) is not necessary.

Standard specifications:

Rev. 31-10-2017

12EN-601

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- Steel industrial panels; outside/inside stucco;
- Without finger trap protection;
- RAL 9010 inside/outside;
- Complete pre-assembled spring-pack to be placed directly above the lintel on a sleeve;
- Single hollow galvanised shaft with key way;
- Torsion springs and complete axle both pre-assembled onto a sleeve of 60 x 40 x 3 / 80 x 80 x 2 mm, ready for mounting with triangular sheets;
- Manual operation by means of a pull rope;
- Including short spring-actuated bumpers;
- Electrically prepared;
- Tracks with key way;
- Door fittings;
- Cables placed insides with a diversion wheel construction above the vertical axle;
- Easy installation.

4.3. Vertical lift system

4.3.1. Vertical lift system 601030 (VL)

The vertical lift system is used when the available free room is 1 x the height opening + 420 mm minimum. As such no horizontal deflections will occur.

4.3.2. Vertical lift system with pre-assembled suspended spring pack 601045 (VL-L)

In situations where the day-sizes are up to 5000 x 5500 mm (max. 25 m²) and where the free room above the lintel is minimal the day-size height plus 420 mm extra room (H + 420 mm) the 601045 is an ideal solution. The 601045 differs from the other door types as large parts of this door are pre-assembled. For this door type the free room above the lintel is important and calculated as following:

Free room = Opening height (H) + 420 mm for manually operated doors;
 Opening height (H) + 570 mm for electrical operated doors;

For the sleeve the following dimensions are calculated:

- The sleeve is tailor made: for doors up to 4000 x 4000 mm: 60 x 40 x 3 mm; for doors from 4000 x 4000 mm: 80 x 80 x 2 mm;
- The length of the sleeve is W + 480 mm; if the door is equipped with a motor or is to be chain operated no extra length is added;
- Torsion springs and a completely assembled axle are pre-assembled onto the sleeve and this package is delivered completely ready for fixing onto the triangular sheets. With this construction the use of complex steel surfaces (for fixing the door) is not necessary.

Standard specifications:

- Steel industrial panels; outside/inside stucco;
- Without finger trap protection;
- RAL 9010 inside/outside;
- Complete pre-assembled spring-pack to be placed directly above the lintel on a sleeve;
- Single hollow galvanised shaft with key way;
- Torsion springs and complete axle both pre-assembled onto a sleeve of 60 x 40 x 3 / 80 x 80 x 2 mm, ready for mounting with triangular sheets;
- Manual operation by means of a pull rope;
- Including short spring-actuated bumpers;
- Electrically prepared;
- Tracks with key way;
- Door fittings;
- Cables placed insides with a diversion wheel construction above the vertical axle;
- Easy installation.

4.3.3. Vertical lift system with suspended spring pack 601030 (VL-L)

The springs are generally mounted above the door tracks; however, the vertical lift system is available with a spring pack on 1000 mm or 1500 mm above the height opening. The main advantages of this

system are especially characteristic during installation of high doors, at the spring packet and the extended maintenance.

The vertical lift system with suspended spring pack is used when the available free room is 1 x the height opening + 420 mm minimum. As such no horizontal deflections will occur.

The vertical lift system with suspended spring pack can be installed up to a width opening of 4000 mm. For this system extra supports and sleeve profiles are required, for which the following details are to be taken into consideration:

- The sleeve profile (100x100x3 mm) is delivered with correct size
- Steel triangular sheets are delivered for fixing the sleeve
- The length of the sleeve is equal for manual- as well as for powered operation.
- Length of the sleeve = $W + (2 \times 125 \text{ mm})$
- Maximum day-size width (W) = 4000 mm



ATTENTION!

- The cables always run around the outer side if the spring pack is positioned on 1000 mm above the width opening.
- If the springs are positioned at 1500 mm above the width opening, the cables can run within the doors up to 16 m². Larger doors always have the cables at the outer side.

Console for VL-L system with springs at 1000 or 1500mm
height (2 pieces)
Sleeve profile for VL-L system (per m¹)

: 601000181
: 601000185

4.4. Low lift system

4.4.1. Low lift system with cables inside 601051 (LL-CI)

When the free room is limited to 200 mm, there is the low lift system. The springs are mounted in the rear and with this type the cables run inside which is safer for use. This low lift system has double horizontal door tracks instead of single.



ATTENTION!

- Utilisation of a chain transmission or an endless hauling chain (as a result of electrical operation) at a Low lift system, will result in the fact that the pertaining chain will be positioned at the end of the horizontal door tracks in the building.
- This system is to be used for a door surface up to a maximum of 23 m² and/or a maximum width of 6000 mm and/or a maximum height of 5000 mm and/or a maximum weight of the doorleaf of 300 kg.

4.5. Lift system following the slope of the roof (FR--)

The horizontal door tracks of the SL-, HL- and LL-system generally runs up to 90 degrees and levels inwards. For canting roofs, the horizontal door track suspension runs into the free space, which could be a disadvantage in relation to the suspension of the horizontal door track or free space for transverse traffic. The solution here is the lift system following the slope of the roof. However, this requires an exact determination of the graduation of the door track.

This system can be utilised in combination with Standard, - Low, - and High lift systems, but not in combination with the pre-assembled doors (601040/-045). The lift system following the slope of the roof is optional and on request above 45 degrees. For the low lift systems with cables inside, a few degrees is possible, namely 0, 5, 10, 15, 20, 28 degrees.

"Following the slope of the roof" (FR--) up to 8°	: 601000060/8
"Following the slope of the roof" (FR--) up to 12°	: 601000060/12
"Following the slope of the roof" (FR--) up to 25°	: 601000060/25
"Following the slope of the roof" (FR--) up to 39°	: 601000060/39
"Following the slope of the roof" (FR--) up to 45°	: 601000060/40

4.6. Man-door

It is possible to position a man-door adjacent to the sectional door. The construction of the man-door is equal to that of the sectional door and matching. A dimensional sketch is of importance, here details regarding positioning, direction of rotation and hanging can be found.

Standard specifications:

- Completely assembled, can be mounted directly onto the assembly frame
- Frame, consisting of steel anodized profiles
- Brush 25 mm on the bottom
- Lock including catch bolt and dead bolt
- Inner and outer door handle including cylinder shields
- Euro profile cylinder including three keys
- Rubber sealing
- The standard frame is 1000x 2000mm (WxH), which implies that the free passage measurements are as follows:
 - Free passage width = 870 mm
 - Free passage height ¹⁾ = 1935 mm (minimum)

¹⁾ The free passage height is measured as of the floor on which the sectional door rests, up to the top side of the man-door.

The day size width can be chosen freely up to 1200 mm. Depending on the positioning, either *in front* of the clear opening, *in* the clear opening or *behind* the clear opening the frame width and thus the clear width will vary little.

The clear height can vary between a minimum of 1990 mm up to a maximum of 6000 mm. When the clear height is above 2500 mm the door will be equipped with a fixed upper panel. In this situation the door part is 2500 mm and from this height to the clear height the fixed panel is fitted.

If the day size dimensions of the door are not fixed at this moment, then it is advised to use the dimensions as given according to DIN 18225. According to the directive 18255, the free passage width is calculated depending on the use of the door. The dimensions are as following:

Number of persons	Up to 5	Up to 20	Up to 100	Up to 250	Up to 400
Free passage width (mm)	875	1000	1250	1750	2250

The price of a man-door is dependent on surface of the frame (up to 2m² fixed, above 2m² an extra price per m²). The proportion between frame sizes and day size dimensions can be found in the installation drawings.

Possibilities of location and sizes

W = clear opening width; H = clear opening height

- Positioning in front of opening
 - Clear passage width = W – 120 mm
 - Clear passage height when H ≤ 2400 is H – 60 mm / when H > 2400 is always 2030 mm
 - Frame width = W + 10 mm; frame height = H + 5 mm
- Positioning in the opening
 - Clear passage width = W – 140 mm
 - Clear passage height when H ≤ 2400 is H – 70 mm / when H > 2400 is always 2030 mm
 - Frame width = W - 10 mm; frame height = H - 5 mm
- Positioning behind the opening
 - Clear passage width = W – 120 mm
 - Clear passage height when H ≤ 2400 is H – 60 mm / when H > 2400 is always 2030 mm
 - Frame width = W + 10 mm; frame height = H + 5 mm

Man-door

: 601-440

4.7. Fixed side panel

A fixed side panel consists of the exact same steel anodized profiles as used for the man-door. The construction of the fixed side panel is equal to the construction of the sectional door and matching. The price depends on the surface of the panel and is calculated per m¹.

Fixed side panel

: 601-455

5. Door panels

5.1. Glazing

Additional natural light inside the building can be reached by windows in the door leaf. Windows placed in a 40 mm panel have double glazing. For 80 mm panels windows with triple glazing are used providing better heat insulation.

Windows with the click-system are difficult to disassemble and the panel may be damaged. Windows that are bolted are more easy to disassemble .

The windows are horizontally aligned in the middle of the panels. The distance between the windows is equal. A pass door may include a window in the 2nd and 3rd sections only.

The various possibilities for glazing are detailed in table 5.1 and the number of windows (oval or rectangular) are detailed below.

Window	Construction	Fastening	Option number
Oval	Plexiglas windows, dimensions 663 x 343 mm (wxh)	Click-system	601000203
Oval	Plexiglas windows, dimensions 665 x 345 mm (wxh)	Bolt-system	601000211
Oval	Plexiglas windows, dimensions 665 x 345 mm (wxh), for 80 mm panel	Bolt-system	601000211
Rectangular	Plexiglas windows, dimensions 680 x 373 mm (wxh)	Click-system	601000205
Rectangular	Plexiglas windows, dimensions 637 x 334 mm (wxh)	Bolt-system	601000212
Rectangular	Plexiglas windows, dimensions 637 x 334 mm (wxh), for 80 mm panel	Bolt-system	601000212
Rectangular	Plexiglas windows, dimensions 609 x 146 mm (wxh)	Bolt-system	601000207

Table 5.1: Glazing possibilities in steel sectional door, type S-250

Width opening [mm]	Number of windows
< 710	0
711–1420	1
1421–2130	2
2131–2600	3
2601–3400	4
3401–4200	5
4201–5000	6
5100–5800	7
5801–6600	8
> 6600	9

5.1.1. Full Vision panels

Furthermore it is possible to provide the doors with full glazed panels. These are the so called **Full Vision** panels, made of anodised aluminium profiles. The glazing are available in the varieties SAN (acrylate + styrene), polycarbonate and tempered glass. Insulated aluminium stucco fillings are available also.

5.1.2. Full Vision doors

No standard construction regarding the panels is required for Full Vision doors. For an overview of the underneath calculation methods, see Appendix IV where this is visualised.

Full Vision sections can be used up to the opening width of 7000 mm for a door without pass door. For a door with a pass door the maximum opening width is 6000 mm. All aluminium frame profiles are anodized as a standard. This surface finish protects doors against climatic effects and at the same time it is scratch resistant.

Option 1: *The top and the bottom sections are both panels, the other section are FV only or a combination of panels and FV.*

Option 2: The bottom section is a panel, the other sections are FV.

Example: The opening height is 4000 mm and the clear height of the door blade (without sealing rubber) is 3980 mm, the height of the bottom section is 617 mm. $3980 - 617 = 3363$ mm for FV sections. Divide this measurement by 610 mm: $3363/610 = 5.52$. Select 6 FV sections on the door. The 5 middle sections will have the same height, the top section will be higher. Calculation of clear heights of FV sections is $3363 - 43$ mm = 3320 mm/6 = 553 mm. The middle FV sections will have a height of 553 mm, the top section will have height $553+43$ mm = 596 mm. This calculation ensures that glass plates in all 6 FV sections have an equal height.

Option 3: All door blade sections are FV.

Example: The opening height is 4000 mm and the clear height of the door blade (without sealing rubber) is 3980 mm. $3980/610 = 6.53$ so there will be 7 FV sections. When the bottom section is FV, we use side profiles instead of bottom profiles (difference in heights is 20 mm). When the top section is FV, we use side profiles instead of top profiles (difference in heights is 43 mm). $3980 - 20 - 43 = 3917$ mm. $3917/7 = 559$ mm. The middle sections will be 559 mm high, the bottom section will be $559 + 20 = 579$ mm high and the top section will be $559 + 43 = 602$ mm high. This calculation ensures that the glass plates in all 7 FV sections have an equal height.

A maximum height per panel, per type of glass, as specified below, is applicable to Full Vision panels. If it occurs that a maximum height per panel is exceeded, the calculation as detailed above is to include an additional panel. The actual height per panel will thus decrease (For the example as detailed above, 6 panels are to be selected, in order to obtain an actual height of $3383/6 = 564$ mm.)

Maximum panel heights FV per type of glass:

- Single synthetic material : 700 mm
- Double synthetic material : 750 mm
- Single tempered glass : 610 mm
- Insulated stucco fillings : 750 mm

Height of Full Vision sections

There are 3 possible ways how to include aluminium frame sections into the door leaf:

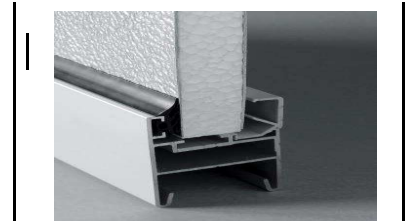
- if the top and bottom sections are made of panels, the height of Full Vision sections is 610 mm (the top panel is to be cut to fit the opening height)
- if the bottom section is a panel section and other sections are Full Vision, then Full Vision sections are made in the way that particular section sights have the same height
- door leaf made only of Full Vision sections is made in the way that particular section sights have the same height.

Single-walled SAN:	1 x 2.5 mm	6.4 kg/m ²	: 601000220
Single-walled polycarbonate:	1 x 3.0 mm	9.7 kg/m ²	: 601000230
Single-walled tempered glass:	1 x 4.0 mm	12.8 kg/m ²	: 601000240
Double-walled SAN:	2 x 2.5 mm	12.8 kg/m ²	: 601000250
Double-walled SAN 1x resistant to abrasion:	2 x 2.5 mm	12.8 kg/m ²	: 601000250.10
Double-walled SAN 2x resistant to abrasion:	2 x 2.5 mm	12.8 kg/m ²	: 601000250.20
Double-walled SAN with colored panes:	2 x 2.5 mm	12.8 kg/m ²	: 601000250.Co
Double-walled polycarbonate:	2 x 3.0 mm	19.4 kg/m ²	: 601000260
Insulated brute aluminium stucco fillings:		1.0 kg/m ²	: 601000270
Insulated brute aluminium flat fillings:		1.0 kg/m ²	: 601000270.20
Expanded mesh:			: 601000280
Expanded mesh ensured in aluminium frame:			: 601000280.10

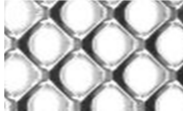
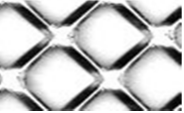
Double wall SAN UV

Single wall SAN UV

Insulated fillings



Variants of colored panes (250.Co)			
b	light blue	m	milk (opal)
g	light green	s	smoke (grey transparent)
w	white	f	frosted satin

Variants of expanded mesh	
16/8	22/12
	

In table 5.2 the characteristics of the various glazing types are specified.

Characteristics	Perspex	SAN UV	Polycarbonate	Tempered glass
Chemical name	Polymethyl methacrylate	Polymethyl methacrylate + Styrene	Polycarbonate	
Clear	++	++	+	++
Optical clear	++	+	+/-	++
Impact-resistant	+	+	++	+/-
Rigid	+	++	++	++
Scratch-resistant	+	+	+/-	++
UV-resistant	++	+	+	++
Burglar-resistant	+	+	++	+/-

Table 5.2: Glazing characteristics

In table 5.3 the number of glass surfaces per Full Vision panel, per width opening are specified.

Width opening [mm]	Number of glass surfaces
Up to 2500	2
2501 up to 3750	3
3751 up to 4750	4
4751 up to 5750	5
5751 up to 6750	6
6751 up to 7000	7

Table 5.3: Full Vision loose panels

The Full Vision panels can be spray-painted in the colours as detailed in paragraph 5.3. The price for single-sided and two-faced spray-painting panels in the same colour is identical. This price is also applicable if only the Full Vision panels in the door are spray-painted. The black synthetic glazing beads can not be spray-painted.

5.2. Panels

The standard panels for Loading Systems sectional overhead door are industrial panels. It is however possible to have overhead door panels with finger protection. In addition to these two options, the panels are available in 80 mm for additional insulation.

Please note that there are some differences between these three panels. Industrial panels are stucco on the inside and outside of the panel. Besides, they do not have finger trap protection as standard on the panels.


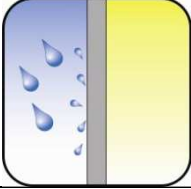
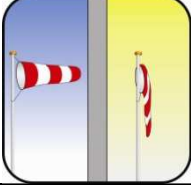
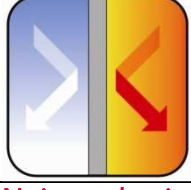

When 80 mm panels are selected, only the oval and rectangular Plexiglas windows with dimensions 665 x 345 or 637 x 334 mm (wxh) are possible (option 601000211 or 601000212). 80 mm panels are only standard in RAL 9002/9010 (outside/inside). All other colours require additional pricing of painting.

The panel with finger protection can be supplied in two different designs: the standard stucco design or the more elegant V-profile.

Panel type

: 601000300

Lift systems	Panel with standard nose		Panel with finger safe protection	
	H ≤ 2750 mm	H > 2750 mm	H ≤ 2750 mm	H > 2750 mm
Low lift (LL-CI)	X	✓	✓	✓
Standard lift (SL)	X	✓	✓	✓
High lift (HL, HL-L)	X	✓	✓	✓
Vertical lift (VL, VL-L)	✓	✓	✓	✓

	Industrial panel	Panel with finger protection	Extra insulating panel
Size range	Width up to 4000 mm Height up to 3500 mm		
Resistance to wind load 1) 	Class 3	Class 3	Class 4
Resistance to water penetration 2) 	Class 1	Class 3	Class 3
Air permeability 3) 	Class 3	Class 4	Class 4
Heat insulation 4) 	14 m ² door surface area without wicket door U = 1,16 W/m ² K 14 m ² door surface area with wicket door U = 1.48 W/m ² K	14 m ² door surface area without wicket door U = 1,43 W/m ² K 14 m ² door surface area with wicket door U = 1.75 W/m ² K	14 m ² door surface area without wicket door U = 0.86 W/m ² K
Noise reduction 5) 	R = 25 dB	R = 24 dB	R = 25 dB

- 1) EN 12424;
2) EN 12425;
3) EN 12426;
4) EN 13241, annex B EN 12428;

5) EN 717-1

The aforementioned values are dependent on the overhead door's particular specifications. The rating of the door supplied to you may vary.

5.3. Construction of door panels

Table 5.4 details a summary of all available panel types and the pertaining standard colours. The number of panels is detailed in [Annexe I: Construction of door panels](#).

Type of panel	Construction of panel	Colour outer side	Colour inner side	Option number
S-80	Variation II ¹⁾	RAL 9002	RAL 9010	601000340
S-250	Variation II ¹⁾	RAL 9002	RAL 9002	601000340
S-500	Variation II	RAL 9002	RAL 9010	601000340
S-500	Variation II	RAL 9010	RAL 9010	601000340
S-250	Variation III ²⁾	RAL 9010	RAL 9002	601000342
S-250	Variation III	RAL 1021	RAL 9002	601000342
S-250	Variation III	RAL 3000	RAL 9002	601000342
S-250	Variation III	RAL 5010	RAL 9002	601000342
S-250	Variation III	RAL 6009	RAL 9002	601000342
S-250	Variation III	RAL 7016	RAL 9002	601000342
S-250	Variation III	RAL 8014	RAL 9002	601000342
S-500	Variation III	RAL 5010	RAL 9010	601000342
S-500	Variation III	RAL 7016	RAL 9010	601000342
S-250	Variation II	RAL 9006 (metallic)	RAL 9002	601000343
S-250	Variation III	RAL 9007 (metallic)	RAL 9002	601000343
S-278	Variation II	RAL 9006 (metallic)	RAL 9002	601000343
S-278	Variation II	RAL 9007 (metallic)	RAL 9002	601000343
S-500	Variation III	RAL 9006 (metallic)	RAL 9010	601000343
S-500	Variation III	RAL 9007 (metallic)	RAL 9010	601000343

Table 5.4: Type of panel and standard colours for steel sectional type 601

¹⁾ Variation II : height of panel 500 mm and 610 mm

²⁾ Variation III: height of panel 610 mm



- The standard construction of a panel depends on the colour scheme;
- Different panel types are **not** interchangeable;
- Inner- and outer sides can **not** be exchanged;
- Plastisol Coatings (PI.) in Colorcoat HP S 200 with Scintilla finish; samples available upon request.

N.B. Outer- and inner plating (0.5 mm) are galvanised (sendzimir).

Definition: panels, which have to be in keeping with each other

1. When doors with *equal* opening heights have to be in keeping with each other, the panel structure of all doors will be equal. So, the hinges are positioned at one line.
2. When doors with *unequal* opening heights have to be in keeping with each other, the windows will be positioned at one line. The panel structure of these doors will not always be equal, so the hinges are positioned at different lines.

5.4. Colour

The colours as specified in table 5.4 are our standard colours. Our doors are available in nearly all other colours, even if the requested colour is not a RAL-colour. If the latter applies, we require a useful colour sample in order to determine the correct colour.

All standard RAL-colours are based on 1-layer Autocryl industrial lacquer.

RAL-colour, as requested, per side (price/m ²)	: 601000350
RAL top/bottom profile outside	: 601000352
RAL-colour end caps powder coated in RAL 9010	: 601000353
Metallic RAL-colour, as requested, per side no Full Vision (price/m ²)	: 601000355
Full Vision spray-painted in RAL-colour, as requested, per side (price/m ²)	: 601000365
Full Vision spray-painted in RAL-colour, as requested, inner-and outer side in 1 colour (price/m ²)	: 601000366
Full Vision stucco panels spray-painted, in RAL-colour as requested (price/panel)	: 601000367
RAL expanded mesh	: 601000638

Table 5.5 shows an overview of the applied thickness of the paint:

Standard RAL-coating (9010 & 9002)	25 µm
Plastisol Coating	200 µm

Table 5.5: Thickness of the paint

The following colours are not available:

RAL 1026fluo yellow	RAL 2005	fluo orange
RAL 2007fluo bright orange	RAL 3026	fluo bright red
RAL 6025fern green	RAL 2013	pearl orange
RAL 3032pearl ruby red	RAL 3033	pearl pink
RAL 4011pearl violet	RAL 4012	pearl blackberry pink
RAL 5026pearl night blue	RAL 6036	pearl opal green
RAL 7048pearl dun	RAL 9022	pearl light grey
RAL 1035pearl beige	RAL 1036	pearl gold
RAL 4010telemagenta	RAL 5025	pearl gentian blue
RAL 6035pearl green	RAL 8029	pearl copper
RAL 9023pearl dark blue		



ATTENTION!

If a dark colour is chosen and the door width is larger than 4500 mm, it is advised to use horizontal profiles. Because of exposure to the sun, the panels could heat up and can cause outer deflection of the door leaf. After cooling, the door leaf comes to the original position, but if opened in deflected state, it may be damaged due to lintel contact. This deflection can be prevented using struts, see chapter (6.1).

6. Fittings

6.1. Double studs

Double side hinges and bearing rollers with a long shaft for doors with a width opening of 5000 mm or higher are supplied as a standard. The price for these items has already been included in the base price.

6.2. Hanging- and consolidation equipment

Sectional door

At least one standard length (L = 3045 mm) of perforated galvanised diagonal per door is to be ordered additionally (with the exclusion of the "Vertical" lift system). If required, an extra mounting strip can be supplied.

Perforated galvanised diagonal 31 x 31 x 2.4 mm, L = 3045 mm	: 601000370
Perforated galvanised diagonal 51 x 51 x 2.5 mm, L = 3045 mm	: 601000371

Man door

For the installation of the man door diagonals can be used on the sides and top. The aluminium profiles can be ordered separately as a set. The price is depending on the dimensions of the man door.

Set aluminium profiles man-door, frame ≤ 2m ²	: 601000374
Set aluminium profiles man-door, frame > 2m ²	: 601000375

6.3. Screws

Screws, long (standard for Sectional door)	: 601000372
Screws, short (standard for Full Vision door)	: 601000373

6.4. Horizontal profiles

6.4.1. 5C-profile

The 5C-profile is the profile onto the horizontal door track and is used to ensure a 'user-friendly' mounting for the suspension of the horizontal door tracks and the spring bumpers. The 5C-profile is supplied with the door, as a standard.

6.4.2. Coupling at the end of the horizontal door track

This ensures connection between the two horizontal door tracks as a result of which an increased stability is guaranteed. Furthermore, this type of construction requires a less heavy suspension. These are required for manually operated VL-doors.

Coupling at the end of the horizontal door track	: 601000376
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6.5. Torsion springs

6.5.1. Motion cycles

The number of cycles for which the standard torsion springs are designed is 20.000 minimum. Torsion springs with 50.000 or 100.000 motion cycles are optional, when possible. As a standard torsion springs are supplied with anti-corrosion surface finish.

20.000 Spring motion cycles	: 601000381
50.000 Spring motion cycles	: 601000383
100.000 Spring motion cycles	: 601000384

6.5.2. Number of torsion springs

The number of torsion springs per door depends on the width opening. Table 6.1 specifies the standard numbers required, which are applicable for almost all situations (approximately 95%):

Width opening (W) mm	Standard number of torsion springs
$W < 2000$	1
$2000 \leq W < 6000$	2
$W \geq 6000$	4

Table 6.1: Number of torsion springs required per clear width (W)

For some combinations of width opening in combination with height opening and lift systems, these standard numbers do not apply, for the number of torsion springs required can not be calculated in advance. Unfortunately no limit value can be obtained beforehand.

6.5.3. Installation provision for springs

An installation provision is to be fitted, for each torsion spring is to be fastened to the bearing plate. The latter is to be secured to the wall on one location. The location is detailed on the installation drawing. When 6" or duplex springs are to be mounted, 2 **supportive bearing plates** are to be used to prevent sagging of the shafts and to retain the drums. The supportive bearing plates are installed at 300 mm from the side of the piers.

The standard supplies of the following doors include 6" springs and therefore also two supportive bearing plates:

- $W > 3500$ and $H > 4000$ mm, with a Vertical lift system
- $W > 3500$ and $H > 4000$ mm, with a High lift system > 1370 mm
- $W > 5000$ and < 6000 mm all lift systems

For the pre-assembled door types (601040/-045), other (easier) installation requirements are needed, please consult the corresponding installation drawings for more information.



ATTENTION!

- The lower boundary is not specified, for it could occur that the supportive bearing plates are to be installed on doors with different dimensions as specified above.

6.5.4. Construction of the shaft

The shaft can be constructed in a one- or two-part construction, hollow or massive, galvanised or not-galvanised. Furthermore two different dimensions can be applicable. Table 6.2 allows selection of the required shaft.

Construction of shaft	Range of application
Two-part	Standard for the application of two or four springs. The shaft coupling is situated in the middle of the shaft.
One-part	For the application of 1 spring, in combination with <i>adjustable</i> bottom bracket and up to and including a maximum width opening of 3000 mm . The spring is too heavy for larger width openings, as a result of which the shaft will sag. These are standard for the 601040/-045.
1" tube shaft, galvanised with key way	Standard construction up to a maximum opening of 4500 x 4270 mm (W x H) and a maximum door weight (incl. door fittings) of 300 kg . For bigger sizes or higher weight, the massive shaft is to be selected.
1" shaft, massive galvanised with key way	This type of shaft can be used up to an opening width of 7000 mm and a maximum weight of the door leaf (incl. door fittings) of 550 kg (approx. 37 m ²). Besides that, this type is galvanised.
1¼" shaft, massive galvanised with key way	For width openings > 7000 mm and high opening > 3000 mm, or for doors of which the weight of the door leaf is more than 550 kg (approx. 37 m ²). Fitting bearing plates are included.

Table 6.2: Construction of shaft



ATTENTION!

- When the opening width > 4500 mm or the opening height > 4270 mm, or the weight of the door leaf exceeds 300 kg, a massive shaft is to be selected.
- When a 1¼" shaft is used, the correct spring break safety device 1¼" is to be selected (see paragraph 7.1), or, if the door is operated by electrical control, select the motor coupling 1¼" (and spring break safety device 1¼" in case of a motor type E) (see paragraph 8.4).

1" tube shaft, galvanised with key way	: 601000390
1" shaft, massive galvanised with key way	: 601000392
1¼" shaft, massive galvanised with key way (not for 601040/-045)	: 601000395

The shaft length can be determined as follows:

- Basic length is the opening width;
- When the cables run around the outer side an additional length of 160 mm on each side is to be taken;
- When the cables run within the door tracks an additional length of 125 mm on each side is to be taken;
- Above that, an additional length of 125 mm is to be taken in all cases, in order to allow all kinds of operation.

The shaft length can be determined as follows for the pre-assembled doors (601040/-045):

- Basic length is the opening width;
- For the 601040 a length of 450 mm is to be added; if the door is operated with a motor or with a chain, an extra 120 mm is to be added on one side;
- For the 601045 a length of 340 mm is to be added; if the door is operated with a motor or with a chain, an extra 145 mm is to be added on one side;

For more detailed information about constraints for height, width or weight per lift system, please consult the corresponding installation drawings

6.6. Coupling at the shaft

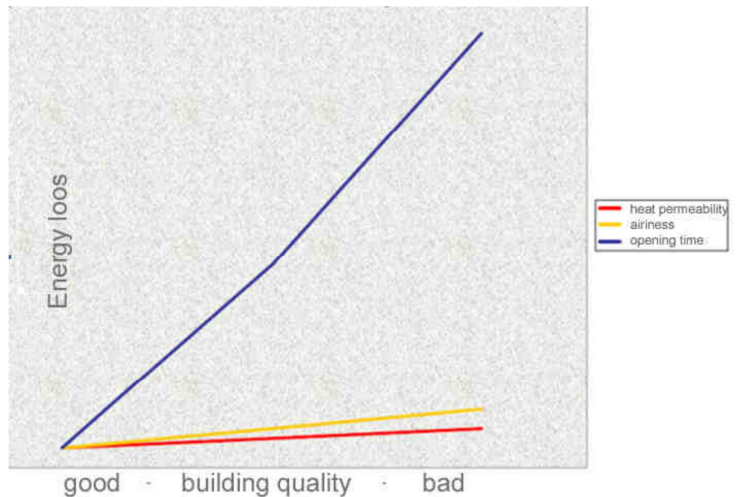
Which type of shaft coupling has to be selected is depending on the type of bottom brackets or cable break security devices (see also paragraph 6.17 and 7.4). When ordering a fixed (read: non-adjustable) coupling, the adjustable bottom bracket is required. Only then the door can be adjusted. In case of an adjustable shaft coupling, the non-adjustable bottom bracket will suffice.

We recommend using a fixed coupling in combination with adjustable bottom brackets or cable break security devices (if possible), because that will make installation and service easier. For pre-assembled doors this options is not relevant.

Fixed coupling 1", length 120 mm (not for 601040/-045)	: 601000396
Adjustable coupling 1" (not for 601040/-045)	: 601000397
Adjustable coupling 1¼" (not for 601040/-045)	: 601000398

6.7. Operation

The doors can be operated by electrical control as well as by manual control. In order to select the type of control, the weight as well as the frequency of use is to be taken into consideration. With increased number of cycles it is possible by further automation of closing and opening to prevent a considerable energy loss in form of heat leakage from inside. The most important influence on energy performance of a building is not the panel thickness but the frequency of use. Investment into an operator may be an investment with a very short return! The choice of an operator is directly related to the building preparation.



The various possibilities in relation to manual control are detailed below.

Manual control by means of a pull rope (for a door panel surface of 17 m² maximum)	: 601000401
Manual control by means of a chain (transmission 1: 3) (not for 601040/-045))	: 601000410
Manual control by means of a chain (transmission 1: 4)	: 601000415
Extra meter chain (1:4)	: 601000416

Doors with a door panel surface of >17 m² are available for chain operated control and electrical control only.

In case chain transmission is selected, the standard option is the 1:4 model, which is pushed-on the shaft. If the lateral space is too limited, the 1:3 model is to be selected. This construction is mounted on the wall, with the drive chain to a chain wheel, which is installed on the shaft.

It is possible, even without any heavy interference in construction, to change the type of control in a later stage observing the requirements stipulated by the European norms. Manually operated doors, even without any chain drive, are recommended to be completed with a handle enabling door opening. For manually operated doors a spring break device is obligatory, see chapter 7.1.

6.8. Pass door

From an opening height of 2250 mm and a width opening up to and including 6000 mm (except at Full vision doors with a maximum opening width of 5500 mm), a pass door can be installed in the sectional door (not for 601-040/-045). The maximum surface of the door leaf including a pass door is 30 m² but when the door leaf consist of more than 3 Full Vision sections, the maximum surface of the door leaf is limited to 22 m².

The lower four panels are used for the installation of the pass door.

For sectional doors with reinforcing struts, a pass door can be installed as well. However, this implicates that the second and third panel of the sectional door do not contain stabilisers.

When oval or rectangular windows are to be applied, the fourth panel, at the location of the pass door, can not hold a window.

When the maximum width of the door does not exceed 3500 mm, the pass door can be equipped with a low door step of 80 mm. When the maximum width of the door does not exceed 5000 mm, the pass door can be equipped with a low door step of 25 mm. With a threshold of 25 mm high, it is not possible to choose for a passage security device. A dead man operated door must be chosen in that case. The minimum distance of a pass door from the side of the door, in case of a threshold of 80 or 25 mm is 1 m.

Pass doors open outwards. Opening inwards is not possible for safety reasons. The pass door is always provided with a sensor for door opening.


In order to identify the position of hinges uniquely, it is always NECESSARY to mention if it is a left door (view from within – hinges on the sectional door are always on the right) or a right door (view from within – hinges on the sectional door are always on the left). In order to provide for an optimum rigidity of the door with entry door reinforcement for installation on the fourth section is supplied as a standard.

Standard specifications:

- Door-spring with sliding arm
- Euro profile cylinder with three keys
- Double rubber sealing
- Threshold of 200 mm
- Executed in accordance with DIN 18225, implicating that the free passage dimensions are as following:

Free passage width	= 850 mm
Free passage height ¹⁾	= 2040 mm

¹⁾ The free passage height is measured as of the floor, upon which the sectional door is standing, up to the upper side of the pass door.

	<p>CAUTION!</p> <ul style="list-style-type: none"> The pass door is supplied excluding a lock, for the type of lock is dependent on the type of ceiling system. The various available locks are specified in paragraph 6.8.1. If a door is electronically driven, or will be in the future, the pass door is to be provided with a pass door contact (see paragraph 7.5.2). It is not feasible to provide a pass door contact after installation of the door. For a pass door in combination with a low lift system, the order is to include a low lift door-spring with sliding arm.
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If required the pass door, with door-spring and sliding arm, can be installed on other lift systems as well.

Pass door	: 601000430
Lowered threshold (80mm)	: 601000431
Extra low threshold (25mm)	: 601000433

6.8.1. Pass doors and locks

The pass door can be supplied with a panic lock.

Panic lock with fixed door knob with cylinder outside, handle and cylinder with knob inside	: 601000452
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	<p>ATTENTION!</p> <p>The lock for the pre-assembled doors is always delivered with a ring instead of a handle on the outer side of the door.</p>
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6.8.2. Pass door profiles

The pass door profiles are standard in aluminium colour on the inside and on the outside. Optionally, e.g. when the entire door is painted in a specific RAL colour on the inside and/or the outside, the pass door profiles can be sprayed in almost every RAL colour (for available RAL colours see § 5.3 and 5.4).

RAL colour pass door profiles	: 601000432
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6.8.3. Panel structure – application of pass door

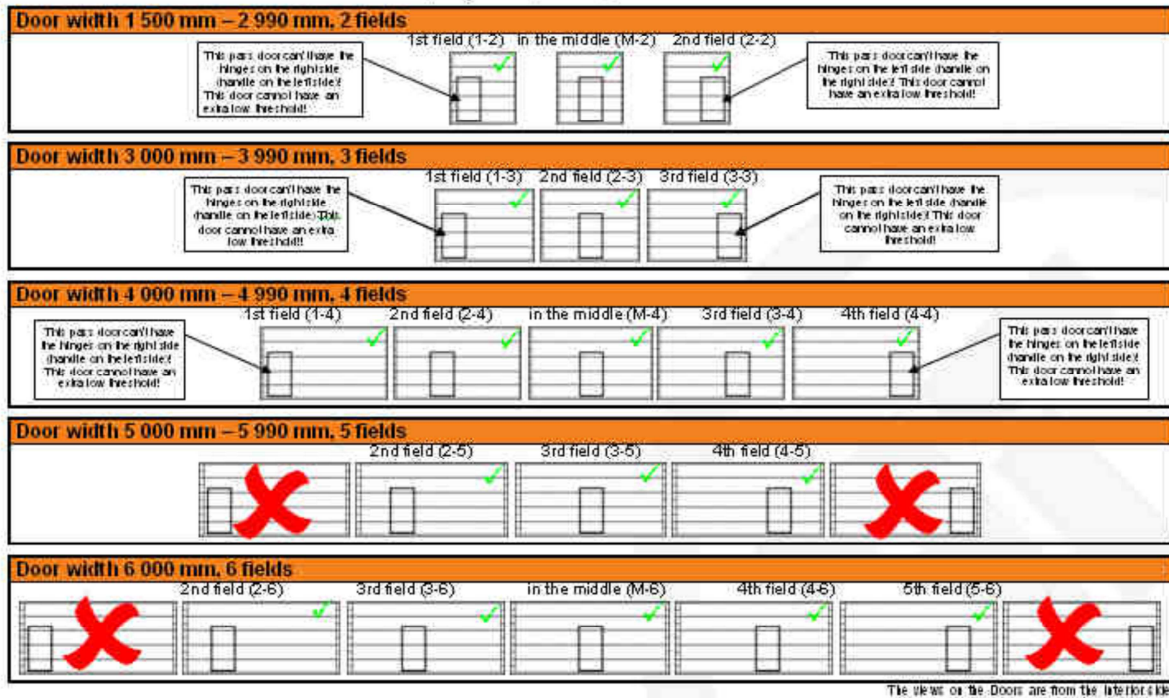
Due to the free passage height of 2000 mm minimum, the following possibilities regarding panel structure for the application of a pass door, as specified in Table 6.3, are to be taken into consideration. This includes those sectional doors, which have a different basic structure, of which one will be provided with a pass door, will not match as before. If matching is required, the 'closed'

sectional door is to be adapted to match the structure of the sectional door including the pass door. In this situation occurs, please contact Loading Systems International.

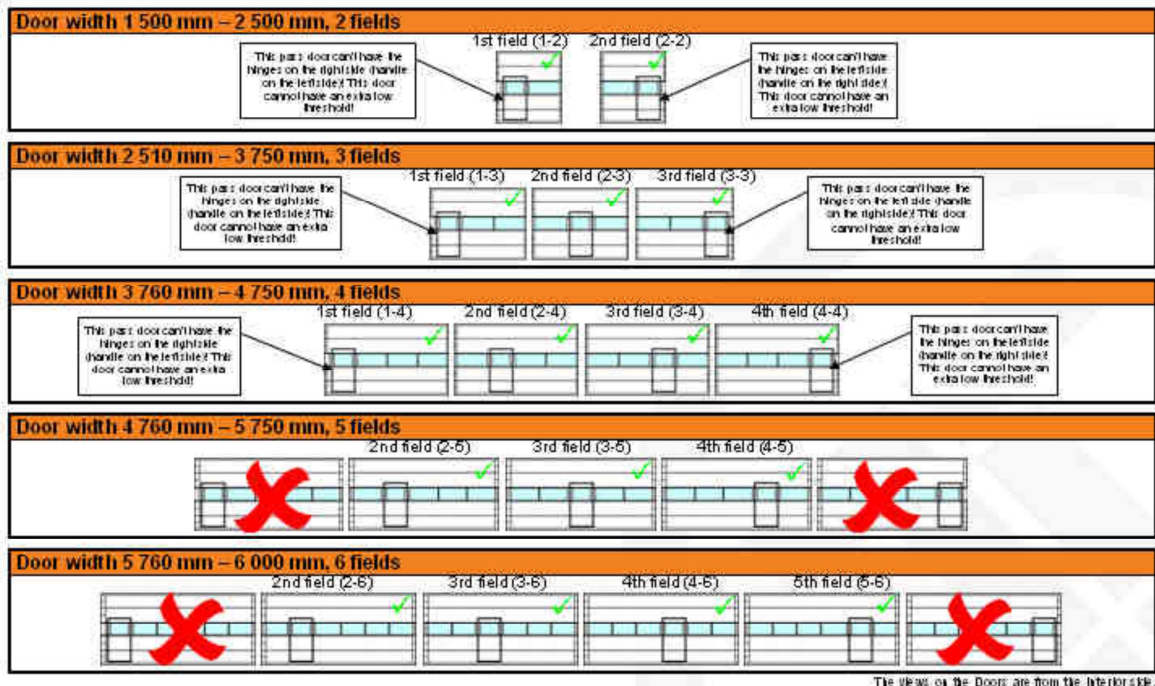
Panel	Structure 1	Structure 2	Structure 3
3 rd intermediate panel	610 mm	500 mm	500 mm
2 nd intermediate panel	610 mm	610 mm	500 mm
1 st intermediate panel	610 mm	610 mm	610 mm
Lower panel	610 mm	610 mm	610 mm

Table 6.3: Panel structure of a steel sectional door type 601 in combination with pass doors

Door blade without aluminium sections (only from panels)



Door blade with min. 1 aluminium section



6.9. Lock options man-door

The lock of the man door is standard equipped with an euro cylinder with a door handle on the inner- and outer side of the man door. However it is possible to make modifications to the standard lock options on the inner and/or outer side. These possibilities are underlined the beneath mentioned options.

Fixed door knob with cylinder opening outside, handle with cylinder opening inside	: 601000442
Panic beam (cross bar) without cylinder inside, handle with cylinder opening outside	: 601000449a
Panic beam (cross bar) without cylinder inside, fixed door knob with cylinder opening outside	: 601000449b
Door spring with sliding arm	: 601000448

6.9.1. Panic lock

The panic lock can be used by both the man door as the pass door. This panic lock has a fixed door handle and cylinder opening on the outside. On the inside this panic lock has a door handle and a cylinder with a rotary knob to lock the door. On the inside no key is required to lock or open the door. From the inside, the door can be opened at all times by using the door handle, even if the door is locked. From the outside, the door can only be opened and locked by using the key.

Panic lock with fixed door knob with cylinder outside, handle and cylinder with knob inside	: 601000452
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6.10. Fixed top panel

If the free upper passage is less than 200 mm, the possibility to install a sectional door is still present (also refer to Chapter 4). When this limited upper space applies, a Low ceiling system including a fixed top panel is selected. The spring package can be hidden behind this panel. The fixed top panel is custom made and has a height of 3050 mm maximum with panels of 610mm height. The fixed top panel is to be finished as following: the top and lower side are to be provided with the standard aluminium bottom profile, the sides are to exclude side covers.

However it is also possible to install a fixed top panel above the door opening in order to integrate the door more into the building, or to close a gap above the door. In this case there is no maximum height to the fixed upper panel and required RAL colour can be selected.

Minimum height is 100 mm. Max. height of fixed top panel is 620 and max. width is 8000 mm.

Fixed top panel as FVE section may be 250 mm up to 620 mm high and its max. width is 7000 mm.

Fixed top panel	: 601000450
RAL colour fixed top panel	: 601000453
RAL colour profiles fixed top panel	: 601000455

6.11. Handgrip

Manual operated doors are to be provided with a built-in or wall-mounted handgrip. Fully glazed doors are to be provided with a nylon wall-mounted hand-grip. Chain operated doors can be provided with a handgrip, however this is not compulsory.

Manually operated doors and doors with chain hoist are recommended to be fitted with a handle. Handles can be in one-sided or both-sided versions. Handles serve only for hand, not foot operation of the door!

Handgrip / Footstep, built-in F-640T	: 601000460
Handgrip, built-up F-634	: 601000465

6.12. Air grates

If more adequate ventilation is required, the doors can be provided with synthetic air grates (option). The net air permeability is 70% of the surface of the air grates' dimensions.

Synthetic air grate, lockable dimension 338x132 mm

: 601000470

6.13. Reinforcing struts

Reinforcing struts are to be installed in case of large width. With reference to large width openings, we advise following (see table 6.4):

Width opening [mm]	Number of struts	Positioning	Type of strut	Option number
5001 up to 5500	1	1x top section	S 65	601000480
5501 up to 6000	min. 2	1x top section 1x 3rd section from top	S 65	601000480
6001 up to 7000	1 per section	Each section	S 65	601000480
7001 up to 8000	1 per section	Each section	S 110	601000485
4500 up to 5000 (with pass door)	1	1x above pass door	S 65	601000480
5001 up to 5500 (with pass door)	2	1x above pass door 1x top section	S 65	601000480
5501 up to 6000 (with pass door)	min. 3	1x above pass door 1x top section 1x bottom section	S 65	601000480

Table 6.4: Number of reinforcing struts per panel required, based on different width openings

The door panels can bend when the temperature on the inner side is different from the temperature on the outer side. This is a normal physical phenomenon which can occur for example when dark colored panels are positioned on the sunny side of a building. This phenomenon can affect the functioning of the door. This bending can be reduced by using reinforcing struts. Installation of struts is necessary for vertical and high lift systems and advised for other lift systems. In addition to the table here above, advised number of reinforcing struts for doors with dark panels is mentioned in the table here below (6.4a).

Width opening [mm]	Positioning	Type of strut	Option number
4001 up to 5000	1x top section 1x 3rd section from top	S 65	601000480
5001 up to 6000	1x top section 1x each odd section from bottom	S 65	601000480

Table 6.4a: Advised number of reinforcing struts for dark panels

For the total number of struts on doors with a pass-door, the lift type has to be taken into consideration as well.

If there are windows in the panel, reinforcement struts should always be placed above the windows!

For the total number of reinforced panels required, we refer to Appendix I: Construction of door panels.

6.14. Wind load

Normally the sectional overhead door can be used up to wind power 8 (on Beaufort's scale) without any problems. When it is expected that strong wind load is structural (for example when the door is placed in a building near by the coast), Loading Systems International has to be contacted to see if (extra) reinforcing struts are necessary, *also* when the opening width is smaller than 6000 mm.

6.15. Slide bolts and cylinder locks

Doors can be secured by using various locks. Manual- and chain operated doors can be provided with a bolt or cylinder lock.

	Slide bolt F-632	601000490
	Slide bolt F-629	601000491
	Cylinder lock F-638-40 (for SL and LL only)	601000495
	Cylinder lock, aluminium/galvanised, silver outside, black inside	601000497A
	Cylinder lock, aluminium/galvanised, black outside, black inside	601000497B
	Cylinder lock, aluminium/galvanised, black outside, black inside for 80 mm panel	601000497C
	Cylinder lock, cylinder opening outside, black plate	601000498
	Foot lock; mechanical lock on door; only for manual operated doors	601000499



ATTENTION!

Only the slide bolt F-632 can be placed on Full Vision panels, be aware of this when ordering a lock for a door with (multiple) Full Vision panels

6.16. Spring bumpers

Normally the door is equipped with short spring bumpers. Long spring bumpers are required for a Standard lift system, a Low lift system or High lift systems with HL < 570 mm, in combination with chain- or electrical control.

Short spring bumpers
Long spring bumpers

: 601000520
: 601000525

6.17. Bottom bracket

The type of bottom bracket which have to be selected, depends on the type of shaft coupling (see paragraph 6.6). We recommend the adjustable bottom brackets, in combination with the fixed shaft coupling.

If an overhead door is wider than 5500 mm (6000 mm for overhead doors with a low lift system (051)), higher than 6000 mm or when the total area of the door leaf is larger than 22.5 m², then a bottom bracket is not allowed according to CE standards. In these cases, the cable break device should be selected.

Bottom bracket, aluminium, adjustable, cables inside	: 601000540
Bottom bracket, stainless steel	: 601000550

6.18. Tandem rollers

Single bearing rollers as well as tandem roller models are available. Doors with a width opening as of 5000 mm are provided with double metal work as a standard (see paragraph 6.1). If the latter applies the top roller container and bottom plate are provided and supplied with single bearing rollers.

Tandem rollers (on request/ not for 601040/-045)	: 601000560
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6.19. Stainless steel

The rails, end caps, hardware, diagonals, spring bumpers and bottom bracket are supplied in galvanised steel, as a standard. In some case it is recommendable to execute one or more of these optional parts of the door in stainless steel. However, stainless steel is available in different qualities. Which quality is to be selected depends on the place where the door is situated. Therefore, the quality of the stainless steel has to be determined in mutual deliberation with Loading Systems International.

Rails in stainless steel	: 601000563
End caps in stainless steel	: 601000564
Hardware in stainless steel	: 601000559
Diagonals in stainless steel	: 601000567
Spring bumpers in stainless steel	: 601000568
Bottom bracket in stainless steel	: 601000569

6.20. Cable pull set

The cable pull set ensures constant tension on the lifting cable and thus avoids the uncontrolled running off, of the lifting cable, of the drum. It can be technically advisable for some type of doors to use a cable pull set to ensure the right closing of the door in the first phase. When closing the door slowly until the first section is in vertical position, a cable pull set is not needed. However by Low Lift systems with a larger surface that 18 m² is can sometimes be useful to use a cable pull set.

For a proper and safe closing of the door leaf it is necessary to fit sectional doors with low and standard lift (see chapter 4) with horizontal track and angle less than 5 degrees with a cable pull set. This applies for both doors with an operator and chain drive.

Cable pull set (not for 601040/-045)	: 601000570
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6.21. Construction of the door tracks

Depending on the width opening (in combination with the height opening) 2" or 3" door tracks are to be applied.

2" door track: Standard door track section, as applicable for most doors.

3" door track: Heavy door track for doors wider than 7500 mm. Doors with a height opening equal to or exceeding 4500 mm and a width opening as of 6500 mm, require the 3" door tracks as well.

Door track 2"	: 601000580
Door track 3" (not for 601040/-045/-051)	: 601000585

6.22. Numbers

For all sectional doors to be numbered, numbers are available. The numbers, made of synthetic material, can be applied on the doors. The numbers are 40 cm in height and are in the colour black, as a standard. Other colours are available upon request.

Numbers, black

: 601000590

7. Security devices

Various different types of door security devices are available. These security devices are each designed to prevent insecure situations, in which personal injury as well as damage to the door can be prevented. Appendix II describes the minimal required level of security, in order to meet the European standards EN 12604 and EN 12453. In this chapter the various devices are specified in detail.

7.1. Torsion spring break security device

A torsion spring break security device is applied to manually operated sectional doors and to disconnectable motors. This type of security device prevents the door from falling in case of spring break. Per torsion spring, one single torsion spring break security device is provided (see paragraph 6.5.2 for the number of torsion springs).

The motors, type KU and KE as supplied by us, are non-declutchable motors. As such a torsion spring break safety device is not required, for the motor functions in accordance with this specific security device. However, motors of the type E are declutchable and thus require the installation of a torsion spring break security device.

Torsion spring break security device, shaft 1"	: 601000610
Torsion spring break security device, shaft 1¼" (not for 601040/-045)	: 601000615

7.2. Finger trap protection on the inside

In the event the door panel deviates below 2500 mm, safety precautions are to be provided to prevent the possible occurrence of fingers being trapped between the panels. For this purpose, a synthetic strip will be positioned across the seams on the inside, to seal off the seams, as a result of which finger trapping can not occur. Finger trap protection on the outside is standard for the S-250 panels.

Finger trap protection on the inside	: 601000617
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7.3. Wheel guards

If sectional doors are installed in residential or industrial environments, where possibly children could be present, guards are to be positioned on the bearing rollers. As such the possibility of fingers being trapped between the guides rails and bearing rollers is prevented.

Wheel guards	: 601000618
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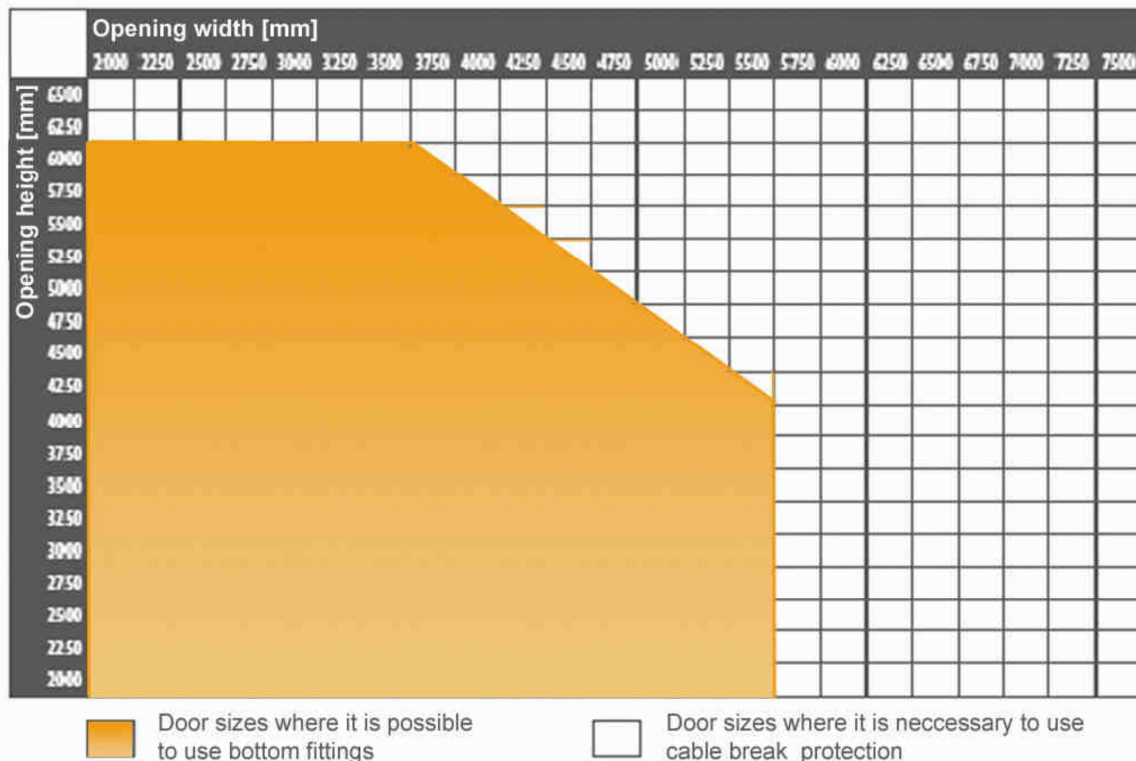
7.4. Cable break security device

This type of security device prevents breakage of one or both lifting cables as well as the "dropping down" of the door. This security device is compulsory in various countries according EN 12604. The cable break security device is available in adjustable and non-adjustable execution. In case the cables run around the outer side (LL or VL-L with springs on 1000 mm), it is not possible to deliver adjustable cable break security devices.

When possible, we recommend the adjustable execution, in combination with the fixed shaft coupling (see also paragraph 6.6).

Based on tests Loading Systems has determined max. door sizes to be able to operate without cable break security device keeping the requirements included in the above mentioned norm. The above said does not rule out the possibility to use cable break device even on smaller doors (i.e. on doors with bottom brackets without integrated fall down protection). Again regarding higher safety using of cable break device is desirable and in some countries it is required above the European norm by local regulations.

Size table showing where it possible to use bottom fitting without integrated downfall protection



Cable break security device, adjustable, cables inside : 601000622
 Cable break security device for door tracks 3", non-adjustable : 601000625
 Cable break security device, adjustable with cover : 601000626

7.4.1. Anti-lifting device

Bolts are an advisable anti-lifting protection. If for any reasons it is not possible to use a bolt, another available solution is cable break security device with integrated anti-lift protection.

The name of the anti-lifting device is actually self-explanatory: it protects the door against lifting. It is a mechanical safety device and operates without power. If the door is locked, the anti-lifting safety device automatically clicks into the guide rail stop, is immediately locked and protected against lifting. This safety device ensures that uninvited persons cannot gain access. Since the door also remains locked for burglars, it is also an anti-theft safety device.

The anti-lifting safety device can only be selected in combination with 1" hardware and the adjustable break cable safety device. The anti-lift safety device functions best in combination with a slack cable safety device by means of a pull switch.

The device can be used up to the weight of door leaf 450 kg. For this reason the use of this device is limited by max. door space 32 m2 and its max. width of door leaf 6 000 mm. This cable break security device cannot be used for doors with cables guided outside (HL-L and VL-L with shaft 1000 mm above the lintel).

Anti-lifting device for cable break security : 601000627

7.5. Security devices at electrical drives

7.5.1. Weak cable security device

Utilization of a weak cable security device ensures de-activation of the motor as soon as the cable is released or free hanging. This device prevents a sudden, unexpected falling of the door. This type of security is compulsory in case the door can be electrically operated in impuls mode for closing the door. For dead man operated doors a weak cable security is not required.

For doors with an adjustable bottom bracket (option 540) a *pull switch* is used as weak cable security device.

Doors with cable break security devices are using micro switches, because they are installed onto the cable break security devices.

Loading Systems advises to always use 2 pieces of weak cable security device.

Weak cable security device micro switch	: 601000630
Weak cable security device pull switch	: 601000632

7.5.2. Double pass door contact

A double pass door contact is used for sectional doors provided with a pass door and ensures that the sectional door can not be electrically operated if the pass door is open.

Double pass door contact	: 601000640
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7.5.3. Pneumatic passage security device

The pneumatic passage security device functions by means of a pneumatic switch (DW-switch), which is activated by means of air displacement in the lower rubber of the door.

Characteristics of the pneumatic passage security device:

- Applicable for a door width of 5000 mm
- Pressure switch with auto diagnostic: If the door touches the floor, the pressure switch (DW-switch) sends an impulse to the control. If the impulse is not send, a red LED signal will occur and the next time, the door can only be closed by the dead man's control. The failure report can be neutralized by disconnecting the power supply to the control box.

Standard specifications:

- Terminal box with possibility to connect the DW-switch, weak cable security device and pass door contact
- Pneumatic switch (DW-switch), built-in in the terminal box
- 2 power fuses, of which one fuse is provided with an air hose, for installation in the lower rubber
- Mounting material

Pneumatic passage security device	: 601000650
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7.5.4. Passage security device with photo cells

This type of passage security device functions by means of photo cells, positioned in the lower rubber of the door. The security device is activated as soon as the lower rubber is pressed in and the light beam is interrupted.

Characteristics of the passage safety device with photo cells:

- Transmission range: 100-12000 mm
- Quick activation of security device
- Can not be influenced by temperature variation
- Yellow display (LED) on if safety-edge is activated.

Standard specifications:

- Terminal box for security device with possibility to connect the weak cable security device and pass door contact
- 2 photocells (transmitter/receiver) with either 10,5 and 0,4 meter cable
- 2 adapters for installation in the lower rubber
- Mounting material

The length of the necessary cable is dependent of the width of the door. There are three possible options: for doors up to a width of 3500mm, 4m cable is supplied; doors with a maximum width of 5500mm will need 6m cable and other doors up to 9500mm will be supplied with a 10m cable.

Passage security device with photo cells, 4m cable	: 601000655-4
Passage security device with photo cells, 6m cable	: 601000655-6
Passage security device with photo cells, 10m cable	:601000655-10

7.5.5. Automatic bottom adjustment

For doors operated by a motor with digital limit switches, there is the ability within the control box to switch on the special option "automatic bottom adjustment".

With this option, the software remembers the segments counted by the digital limit switch when the door moves downward. The counting starts at the set value of the upper limit switch and is bounded in the downward movement by the set value of the lower limit switch. The counted value should remain stable at each closure of the door.

However in practice, by newly installed doors and after a number of times lifting the total weight of the panels, an effect occurs that the lifting cables stretched themselves after several weeks. This effect causes the door panel to reach the floor earlier then the counting of the digital limit switch indicates. This could result in the fact that the lifting cables are no longer under tension. This can lead to undesired operating of the weak cable security or even lead to the effect that the cable will roll off the cable drum.

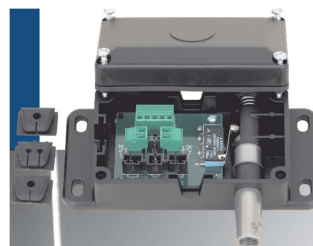
The option for automatic bottom adjustment will ensure that the door stops a little earlier at the next closing. By doing so, the programmed position of the lower limit switch will be adapted slightly upwards. This means that the lifting cables will always remain under tension at the moment that the door is closed.

For a proper functioning of this "self-learning function", it is important to recognize that the door stops at its "limit switch" and not at a stop signal coming from a "passage security device". The difference between both stop signals should therefore always be clearly distinguished. Since the function of the passage security device is switched off by a pre-limit switch in the last 50 mm of the door movement, necessary for the self test function of this device, the distinction of the correct type of stop signal in that range is usually not possible.

For this reason, the option "automatic bottom adjustment" always requires the use of a SBA-sensor. The SBA sensor includes a metal stud with a small contact surface. This is in contrast to the passage security device, which detects an obstacle by using the large contact surface of the rubber bottom profile. Once the stud of the SBA-sensor reaches the floor, this operates a micro switch with which the attainment of the lower limit switch is recorded and simultaneously the stopping at the lower limit switch is defined.



Automatic bottom adjustment (SBA-Sensor)



: 601000657

7.5.6. Spiral cable and Z-bracket

A 5-core spiral cable and Z-bracket (which functions as a spacer block for the cable) is to be included in the order of one or more of the following items, at all times:

- Weak cable security device (7.5.1)
- Pass door contact (7.5.2)
- Pneumatic passage door security device (7.5.3)
- Passage security device with photo cells (7.5.4)
- Additional terminal box set (7.5.6)

Spiral cable (5-core) and Z-bracket

: 601000660

7.5.7. Additional terminal box

A terminal box set is to be ordered at all times for the weak cable security device and or pass door contact without passage security device. In situations where the door width requires two weak cable devices, multiple terminal box sets can be ordered.

Standard specifications:

- Terminal box with possibility to connect weak cable security device and pass door contact
- 8,5 meter pluggable cable to connect two terminal boxes
- Mounting material

Additional terminal box

: 601000665

7.5.8. Rolling contact

This contact is used for electrically operated doors in combination with a bolt. The contact is positioned behind the bolt to ensure that the sectional door, when secured, can not be opened by a motor.

Adjustable rolling contact (behind sliding bolt excl. cable)

: 601000670

8. Motors

If a door is electrically operated, or will be in the future, it is essential that all electrical preparations are provided. This implicates the requirement of a 250 mm longer shaft, in order to mount the motor. When ordering the motors, the construction of the shaft: 1"- or 1¼"-model (see paragraph 6.5.4) is to be taken into consideration.

8.1. Emergency controls

Various types of emergency control are available.

8.1.1. Type KU

Characteristics of motor type KU:

- Non-declutchable, as a result of which the torsion spring break security device is not required.
- Emergency control by means of a handle in order to open and close the door (by turning) in case of electricity failure.

8.1.2. Type KE

Characteristics of motor type KE:

- Non-declutchable, as a result of which the spring break security device is not required.
- Emergency control by means of an endless hauling chain in order to open and close the door (by turning) in case of electricity failure.

8.1.3. Type E

Characteristics of motor type E:

- Emergency control in order to declutch the shaft in case of electricity failure and to gain manual control. Due to this a handgrip on the door is required. The torsion spring break security device is therefore essential for this type of motor.

8.2. Determination of the type of motor required

In order to determine the type of motor the required emergency control KU, KE or E needs to be selected.

Motors with the power of 0.37 kW and 0.55 kW are available. The power of the motor is mainly depending on the total weight of the door panel. The values as recommended in table 8.1 are to be considered for the determination of the door panel's weight.

Type of sectional door	Weight including door fittings [kg/m ²]
601: insulated steel with panel type S-250	13,5

Table 8.1: recommended values of the weight of the door panel per m²

	<p>ATTENTION!</p> <p>The recommended values in table 8.1 do not include the reinforcing struts. These profiles increase the weight of the door panel.</p> <ul style="list-style-type: none"> • The S 65 reinforcing strut weighs 1.25 kg/m • The S 110 reinforcing strut weighs 2.40 kg/m
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The number of revolutions of the motor depends on the maximum diameter of the cable drums and the weight of the door panel. The maximum weight of the door panel per type of motor is specified in table 8.2.


Motor	Maximum weight of door panel
0.37kW 20 rpm	340 kg
0.37kW 20 rpm	525 kg
0.55kW 17 rpm	800 kg

Table 8.2: Maximum weight of door panel admissible by correctly balanced sectional overhead door

By using the maximum weight of the door panel admissible as specified in table 8.2, in combination with the recommended values as specified in table 8.1, the following standard/rule for sectional doors can be formulated:

*Insulated **steel** sectional doors:*

Motor 0.37 kW and 20 rpm **up to a door panel of 38 m²**

	<p>ATTENTION!</p> <p>The above mentioned recommended values for the maximum door panel surface are applicable only if no reinforcing struts have been fitted.</p>
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Should the sectional door be fitted with a reinforcing struts, the weight of the door panel can be determined by means of the values as specified in table 8.1, in which the total weight of the reinforcing struts is to be added. This weight can be determined by the details as specified in table 6.4 (number of reinforced door panels per panel required) and Annexe I (Construction of door panels).

8.2.1. Velocity

The velocity with which the door moves upwards and downwards is to be calculated by using the following formula: $v_{\text{door}} = (D_{\text{drum}} \times \pi \times n_{\text{motor}}) / 60$

v_{door}	:	velocity of the door [cm/sec]
$D_{\text{drum}}^{1)}$:	cable drum diameter [cm]
π	:	constant ($\pi \approx 3.1416$)
n_{motor}	:	number of revolutions of the motor [rpm]

¹⁾ The cable drums to be provided, for a High- or Vertical lift system, are to be (partially) conical. As such D_{drum} is variable and the calculation is to be $D_{\text{drum}} = (D_{\text{max}} + D_{\text{min}}) / 2$. If the door moves in upwards position, the cable rolls from the largest to the smallest diameter. The extend to which the conical part of the cable rolls, depends on the width opening and as a consequence the maximum diameter is variable a well. The values as specified in table 8.3 are the ultimate values, which can be used to *estimate* the actual velocity of the door.

Cable drums					
Type	Construction	Max. opening height	Max. HL	Minimum diameter	Maximum diameter
FF-NL-12	Standard Lift	3680 mm	--	105,6 mm	105,6 mm
FF-NL-18	Standard Lift	5570 mm	--	138,4 mm	138,4 mm
FF-NL-32	Standard Lift	10175 mm	--	208,5 mm	208,5 mm
FF-HL-54	High Lift	4800 mm ¹⁾	1380 mm	138,4 mm	182,8 mm
FF-HL-120	High Lift	5050 mm ²⁾	3060 mm	151,0 mm	231,6 mm
FF-HL-164	High Lift	6000 mm	4100 mm	167,1 mm	272,0 mm
FF-VL-11	Vertical Lift	3300 mm	--	68,4 mm	211,2 mm
FF-VL-18	Vertical Lift	5950 mm	--	68,4 mm	278,0 mm

Table 8.3: Minimum and maximum diameter of the various cable drums

¹⁾ from HL = 230 mm

²⁾ from HL = 1370 mm

8.3. Specifications of the electric motors KU, KE and E

The following motors are included in the standard delivery program:

KU; 0.37 kW;	suitable till 525 kg	: 60100710
KU; 0.55 kW;	suitable till 800 kg	: 60100715
KE; 0.37 kW;	suitable till 525 kg	: 60100720
KE; 0.55 kW;	suitable till 800 kg	: 60100725
E; 0.37 kW;	suitable till 525 kg	: 60100730
E; 0.55 kW;	suitable till 800 kg	: 60100735

Standard specifications:

- According to the new CE norms EN 12453;
- Protection class IP 54;
- Safety crank (255 x 92 mm (lxh), Ø 10 mm) (type KU);
- Endless hauling chain, 10 meter, including chain lock (type KE);
- Emergency control rope, 5 meter, to declutch the motor (type E);
- Motor support, 2 adjusting rings (1") and 1 cotter.

8.3.1. Power supply

Motor 1 phase 230V AC; suitable till 340 kg	: 601000740
Motor 3 phase 230V	: 601000741
Motor 3 phase 400V	: 601000742

8.3.2. Limit switches

The motors are available with mechanical or electronical limit switches.

Electronical limit switch	: 601000745
Mechanical limit switch, 6 cams	: 601000746

The electronical limit switch offers a number of significant benefits compared to the mechanical limit switches. The adjustment of the limit switches is faster and is done on floor level in the control box and not the motor. This results in a significant reduction of the installation time. Furthermore, the electronical limit switch is equipped with a automatic slack rope adjustment function. With this function the sectional overhead door can adjust itself automatically to account for any slacking of the cable after installation, making it no longer necessary to readjust the door after installation due to slacking of the cables.

8.3.3. Door leveller security

In situations where the door is in closed position above the dock leveller, it is recommended to apply a door/leveller security. This protection ensures that the leveller will remain locked while the door is closed. This will avoid substantial damage when, with the door closed, the leveller is operated by mistake earlier than the door itself. Think of the damage of door panels, sliding bolts, locks, etc., and consequential damages because of damaged rails.

The leveller will only be released after the door is opened so far that it has been sent up above the location of the photo sensor, which is installed in the guide rails of the door. Another possibility is to release the dock leveller once the upper limit switch of the door motor is addressed.

By placing a photo sensor in the tracks, it is always possible to realise a door/leveller security. In the case of a manually operated door, this is the only way.

Exploiting the upper limit switch of the door motor is subjected to a number of conditions: If the door motor is equipped with mechanical limit switches, it is always possible to use this limit switch for "door open" for the door/leveller safety. In that case, the mechanical limit switch is connected directly on the motor to the appropriate terminal on the dock leveller print in the control box.

In case of a door motor with electronic limit switches the choice is determined by whether to apply a safety edge on the door.

If there is a safety edge on the door, the door print in the control box contains already modules K2 and K4 (integrated or not). The module K4 is only available in conjunction with the K2 module for safety edge and provides for the door/leveller security required potential free contact. This contact is triggered when the electronic limit switch determines that the position "open" is reached. The potential free contact of K4 is connected directly to the appropriate terminal on the leveller print in the control box.

If no safety edge is applied, the door print in the control box contains the module K1E. On this module is lacking the required potential free contact for the door/leveller security. That means that in this case the door/leveller security can be achieved only by using a photo sensor in the rail of the door. It is possible in this case to replace the K1E module by the combination K2/K4. There will be no use of the K2, which is for the safety edge. It is then possible to omit the photo sensor and door/leveller security still to be achieved through the potential free contact of the K4 module. The choice K1E/photo sensor or K2/K4 is thereby made mostly for cost reasons.

Door-/leveller security by sensor	: 601000748
Door-/leveller security by potential free contact	: 601000748

8.3.4. Options for motors

Various options are available on the motors:

Protection class IP 65	: 601000755
Cast-iron cog-wheels	: 601000760
Steel cog-wheels	: 601000761
Pendulum rod 3 meter (type KU)	: 601000770
Pendulum rod 6 meter (type KU)	: 601000775
Extended endless hauling chain (type KE), per meter	: 601000780
Chain connector (type KE)	: 601000781
Extended emergency control rope (type E), per meter	: 601000785
5 meter pluggable cable set (12 cores)	: 601000788
11 meter pluggable cable set (12 cores)	: 601000789
5 meter pluggable cable set (14 cores)	: 601000791
11 meter pluggable cable set (14 cores)	: 601000792


8.4. Installation of the motor

Three types of shaft-drives are available:

Sideways, immediately on the shaft	: 601000790
Sideways, via chain (for wall-mounting)¹⁾ (not for 601040/-045)	: 601000794
Drive in the centre of the shaft ²⁾ (not for 601040/-045)	: 601000796

¹⁾ Complete, with chain, chain wheel and motor support

²⁾ Complete with extra shaft coupling and extra shaft with L = 400

	<p>ATTENTION!</p> <ul style="list-style-type: none"> • In case of installation in the centre of the shaft, it has to be taken into account that the motor is more difficult to service or to control with the emergency control, when the door is complete open. We advise to use a declutchable motor (type E). • When using a sideways shaft-drive via chain (for wall-mounting) a torsion spring brake security must be installed at the door.
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9. Controls

See Sales Information Manual: 12e-930 Loading Systems Controls.

Appendix I: Construction of door panels

The standard height of panels is 610 mm.

Some panels are also available in 500 mm high. The door leaf then consists of panels of both heights. Panels of 610 mm high are included first from the bottom and only then panels 500 mm high will follow. If there is not enough space for a complete top panel, this panel will be horizontally cut.

Variation II

Height >	Height <=	500 mm	610 mm	Height >	Height <=	500 mm	610 mm
	1870	-	3	3980	4090	2	5
1870	2040	4	-	4090	4200	1	6
2040	2150	3	1	4200	4310	-	7
2150	2260	2	2	4310	4370	5	3
2260	2370	1	3	4370	4480	4	4
2370	2500	-	4	4480	4590	3	5
2500	2540	5	-	4590	4700	2	6
2540	2650	4	1	4700	4810	1	7
2650	2760	3	2	4810	4920	-	8
2760	2870	2	3	4920	4980	5	4
2870	2980	1	4	4980	5090	4	5
2980	3100	-	5	5090	5200	3	6
3100	3150	5	1	5200	5310	2	7
3150	3260	4	2	5310	5420	1	8
3260	3370	3	3	5420	5530	-	9
3370	3480	2	4	5530	5590	5	5
3480	3590	1	5	5590	5700	4	6
3590	3700	-	6	5700	5810	3	7
3700	3760	5	2	5810	5920	2	8
3760	3870	4	3	5920	6030	1	9
3870	3980	3	4				

Variation III

Height	610 mm
1870	3
2500	4
3100	5
3700	6
4310	7
4920	8
5530	9
6140	10
6750	11

Appendix II: Minimum level of safety according EN 13241-1

Type of control	type of user		
	Instructed users (not visitors) Type 1	Instructed users (visitors) Type 2	Not instructed users Type 3
Dead man	A	B	not possible
Impulse, outside view/detection area - door	C or E	C or E	C and D, or E
Impulse, outside view/detection area - door	C or E	C and D, or E	C and D, or E
Automatic	C and D, or E	C and D, or E	C and D, or E

- A. Dead man's control
- B. Dead man's control including key-operated switch on control panel
- C. Limitation of forces, by means of:
 - Pneumatic front roller safety device (PSPE) }
 - Front roller safety device including photo cells: opto-sensor (ESPE) } see ¹⁾
 - Electronic control of rotational speed }
- D. A safety system to detect a person or obstacle standing on the floor, on one single side of the door. In the event two safety device systems function simultaneously and combined, i.e. C and D, it is not inevitable that the operation of D will comply with the requirements, printed in *Italic*, as detailed below (see ¹⁾). If this occurs, periodical inspections of the safety device D are to be performed, which should, at all times, be effected within a period of 6 months.
- E. A safety system to detect persons, designed as such that under no circumstances whatsoever, a person can be touched by the moving door panel. This type of safety system is to comply with the requirements below, as printed in *Italic* (see ¹⁾).

¹⁾ *The safety systems are to be designed as such that:*

- They function as soon as the front roller safety device (PSPE or ESPE) is activated, or activates an output signal;
- The command STOP continues to be activated, during the time period the front roller safety device is activated, or until the signal "reverse" is activated;
- The systems are to be inspected regarding the complete operation and correct functioning, spiral cable and in the event of a PSPE, the lower rubber of the door is to be inspected (leak or closed/sealed). It could occur that one single defect will not be detected immediately; however, it will be detected at the end of the cycle in which the defect occurred. As soon as the cycle has been completed, the control is to, automatically, switch to dead man's control.

Other types of safety devices

<u>Spring failure safety device:</u>	Compulsory if:	<ul style="list-style-type: none"> - manual control - motors, type E (disconnectable - axle)
	<u>Not</u> compulsory if:	<ul style="list-style-type: none"> - motors, type KU and KE, for these are equipped with a self-locking drive unit (worm wheel transmission in the reduction gearbox)
<u>Finger trap safety device:</u>	Compulsory if:	<ul style="list-style-type: none"> - the door pan, deviates significant below 2.5 m, as a result of which the risk occurs that fingers will/can be trapped. The possibility of the risk is only present if and when the door panel moves downwards
	<u>Not</u> compulsory if:	<ul style="list-style-type: none"> - the door panel will not deviate below 2.5 m. For VL-doors or (higher) HL-doors this type of safety device is not to be considered at all
<u>Wheel guards (at bearing rollers):</u>	Compulsory if:	<ul style="list-style-type: none"> - sectional doors are positioned in residential areas or industrial areas where children could be present
	<u>Not</u> compulsory if:	<ul style="list-style-type: none"> - all other circumstances
<u>Safety against breakage in cable:</u>	<u>Not</u> compulsory if:	<ul style="list-style-type: none"> - one single cable can support the full dynamic load in the event the other cable breaks. Our door-programme includes all cables, designed and manufactured in accordance with a minimum safety of 6, which is sufficient.
<u>Safety device – release of cable:</u>	Compulsory if:	<ul style="list-style-type: none"> - Electrically driven (only impuls operated), 2 pcs left/right
	<u>Not</u> relevant if:	<ul style="list-style-type: none"> - Manually operated doors or for dead man operated doors.
<u>Cable –pull Set:</u>	Compulsory if:	<ul style="list-style-type: none"> - Chain-operated doors, type SL, LL or HL including HL < 570 mm - Electrical controlled doors, type SL, LL or HL including HL < 570 mm
	<u>Not</u> compulsory if:	<ul style="list-style-type: none"> - Chain-operated and electrical operated doors of other ceiling systems - Manually operated doors (being: excluding chain-operated control)
<u>Pass contact:</u>	Compulsory if:	<ul style="list-style-type: none"> - Electrical controlled doors
	<u>Not</u> relevant if:	<ul style="list-style-type: none"> - Manually operated doors
<u>Rolling contact:</u>	Compulsory if:	<ul style="list-style-type: none"> - Electrical controlled doors, provided with a tower bolt or cylinder lock
	<u>Not</u> relevant if:	<ul style="list-style-type: none"> - Manually operated doors

Emergency stop in accordance with EN 418:

Compulsory if: - Electrical control

Main switch on control panel:

Compulsory if: - The control panel is continuously connected, that is excluding plug connection

Not compulsory if: - The control panel is not continuously connected, that is including plug connection. The voltage can thus be taken from the control panel (for maintenance operations) by removing the plug from the socket.

Appendix III: IP-values

In the table below, the method by which the IP indication is to be read is explained:

IP	Protection	Name	Remark
0X	Negligible		
1X	d > 50 mm		Hand
2X	d > 12 mm / l > 80 mm		Finger
3X	d > 2.5 mm		Screw driver
4X	d > 1 mm		Thread
5X	Harmless substance	Dust-free	
6X	Dustproof	Dustproof	

IP	Protection	Name	Remark
X0	Negligible		
X1	Drops	Drip-proof	
X3	Spraying	Rainwater proof	
X4	Splashing	Splash waterproof	
X5	Jets	Spray waterproof	
X6	Waves		
X7	Immersion	Waterproof	½ hours on a depth of 1 meter
X8	Below water	Press waterproof	

Appendix IV: Calculation method for Full Vision doors

Following the description of the different options for Full Vision doors as described in paragraph 5.1.1, we hereby explain the different calculation methods:

		Example A (fixed height of FV):	Example B (fixed height of bottom and top panels):
1	<div> <div>top</div> <div>middle</div> <div>middle</div> <div>middle</div> <div>bottom</div> </div>	Clear opening: H: 3000mm => Doorblade: H: Total no. of panels: $x=5$ No. of FV panels: $y=x-2=3$ Middle panel (FV): H: 610 mm Top panel: dependant of doorblade Bottom panel: dependant of doorblade	Clear opening: H: 3000 mm => Doorblade: H: 2975 (= opening - 25mm rubber) Bottom panel: H: 617 Top panel: H: 642 Middle panel (FV): $H: 1716/3 = 572$
2	<div> <div>top</div> <div>middle</div> <div>middle</div> <div>middle</div> <div>middle</div> <div>middle</div> <div>bottom</div> </div>	Example: Clear opening: H: 4000 mm => Doorblade: H: 3980 mm No. of FV panels: $(3980-617)/610\text{mm} = 5,52 \text{ panels} \Rightarrow 6 \text{ panels}$ Top panel (FV): $H: (553+43) = 596 \text{ mm}$ Middle panel (FV): $H: (3363-43)/6 = 553 \text{ mm}$ Bottom panel: H: 617 mm	
3	<div> <div>top</div> <div>middle</div> <div>middle</div> <div>middle</div> <div>middle</div> <div>middle</div> <div>middle</div> <div>bottom</div> </div>	Example: Clear opening: H: 4000 mm => Doorblade: H: 3980 mm No. of FV panels: $(3980)/610\text{mm} = 6,53 \text{ panels} \Rightarrow 7 \text{ panels}$ Top panel (FV): $H: (559+43) = 602 \text{ mm}$ Middle panel (FV): $H: (3980-20-43)/7 = 559 \text{ mm}$ Bottom panel (FV): $H: (559+20) = 579 \text{ mm}$	