

English

# Design Description and Technical Guide for Sectional Garage Doors Installation

CLASSIC series

TREND series

2018



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# 1 GENERAL INFORMATION

## 1.1. SCOPE AND CONDITIONS OF DOOR USE

This 'Design description and technical guide for installation' applies to sectional doors from the Classic series and Trend series intended for installation in garages and private housing.

Doors are mounted behind the opening within the building.

Doors are not designed for installation in explosion and fire-hazard zones of buildings and structures nor are they intended for installation in fire-exits in place of fire doors.

The following values of outdoor temperature are determined for sectional doors during operation:

- upper operating is +40 °C;
- lower operating is –45 °C;
- upper operating limit is +45 °C;
- lower operating limit is –50 °C.

### Notes:

1. Operating air temperature values are values within which there has been included the required nominal parameters and economically expedient life cycle of the product.
2. Operating air temperature limit values, are values within which the products can be operated (very occasionally and for not more than six hours and for the lower value of temperature, 12 hours) and thus should:
  - ensure operating capacity but it is not necessary to save the required nominal parameters;
  - restore the required nominal parameters after termination of these operating limit values.

Delivery of the doors into places located in a microclimatic area with a cold climate is only allowed if the average air temperature (from absolute annual minimum temperatures) is not below minus 45 °C.

Doors are produced with manual or automatic control. Electric drives are designed for power networks with a current frequency of 50 Hz and a rated voltage of 230 or 400 Volt. Operation of electric drives is permitted at ambient temperatures from minus 20 to +50 °C.

The doors are designed for operating under the following conditions:

- relative air humidity up to 90% indoors;
- relative air humidity up to 100% outdoors.

## 1.2. COMPLIANCE OF DOORS TO THE REQUIREMENTS OF TECHNOLOGICAL NORMATIVE DOCUMENTS

Doors meet the requirements of:

- directive of Council of European Communities 89/106/EEC about approximation of legislative, regulating and administrative rules regarding building units and replacing this Directive;
- regulation of European Parliament and Council of the European Union No. 305/2011 about the establishment of harmonised conditions for distribution of construction products on the market;
- technical Regulations of the Republic of Belarus 'Buildings and structures, building materials and products. Security';
- standard EN 12604 'Industrial, commercial, garage doors and gates. Mechanical aspects. Requirements';
- standard EN 12453 'Industrial, commercial, garage doors and gates. Safety principles during operation of doors with power drive. Requirements.'

Standards determine requirements for doors which are intended for installation in places reachable by people, for ensuring safe movement of people, for transporting of goods.

European standard EN 12604 specifies the dangerous situations that may arise during the operation of doors, and sets out requirements to ensure security in design and use of the doors basic components, parts, and control and protection elements. Basic requirements regarding mechanical safety aspects and ways of their realisation in ALUTECH sectional doors are listed below.

EN 12604	Implemented in the design of ALUTECH doors
Protection from finger trapping	Special design (shape) of panels and door hinges, angle profiles covered from the sides
Protection from snagging	Cable is located inside construction between vertical angle profile and door leaf
Protection from cutting	Absence of sharp edges on door components. Glazing is made from SAN sheet that will not break or shatter
Protection from uncontrollable movement of door leaf	Equipped with spring system which balances the door leaf in any position. To prevent the rollers from coming out of the tracks special consideration is made in the design of the tracks to eliminate this possibility
Protection from falling of the door leaf	The door is constructed and designed to have a locking mechanism in the shaft to prevent uncontrolled descent of the door even in the case of spring breakage

EN 12604	Implemented in the design of ALUTECH doors
Protection against spring release in case of breakage	Torsion springs are installed on and thus are retained by the shaft. Duplex system of tension springs (spring in spring)
Designing and durability requirements	The use of two independent steel cables with 6-times the margin of safety. Cable drums have space for not less than 20 cable revolutions (this prevents the rope from fracturing). The cable drums are equipped with grooves to prevent the cable sliding off the drum
Manual control device (availability)	There is a handle on the door leaf. A Rope or manual lifting point with a rope for doors with a height of more than 2 metres
Manual control device (hand operation)	150 N—maximum effort is needed as it is equipped with spring balancing
The presence of windows in the areas of vehicle movement	Windows can be installed on all door types
The presence of end switches for door leaf movement	End limit switches are fitted on horizontal tracks
The presence of warning boards and notices, etc	There is a safety board on the doors. Wicket threshold is marked by a black-and-yellow line
Operation Manuals	Doors are supplied with a certificate and a manual
Use of corrosion-proof material and coatings	Doors are manufactured using corrosion-proof materials and coatings

European standard EN 12453 defines the security principles for usage of doors with a power drive and describes the requirements on safety provision for doors equipped with an electric drive. General requirements for safety of doors with electric drives, is set by EN 12453, and the ways of their realisation in sectional doors made by ALUTECH are presented in the table below. All the requirements in the part covering mechanical aspects for construction of doors with electric drives are also considered.

EN 12453	Implemented in the design of ALUTECH doors
Protection from trapping (inability to leave the premises)	The presence of an anti-blocking system for electric drives with the additional facility of manual opening of the door
Protection from lifting of persons	Electric power limit system sense overload of the electric drive while opening the doors
Protection from compression (crushing)	Electric power limit system on the electric drive controls closing the doors backed by an auto-reverse function
Locking device	Mechanical blocking of the latch with the use of an electric drive if the doors are open

Taking into account analysis of potential hazards which may occur during doors operation it is necessary to use additional measures which reduce the risk of dangerous situations in addition to the mentioned above, especially for the doors operated in automatic mode or with remote control:

- lightning of the doors' operating area;
- an audible alarm installation informing people that the door is working in automatic mode;
- an audible alarm installation informing people that the door leaf in operation;
- installation of a system warning of door operation in the places of traffic flow.

The described measures are performed by the door manufacturer and installation company, conducting door installation, based on the requirements specification of the project architect and client/customer.

### 1.3. INFORMATIVE AND TECHNICAL DOCUMENTS

Doors are equipped with product label, safety sign, data sheet, installation manual and operating manual.

### 1.4. DOOR PACKING

Standard door package includes three packs:

- pallet (vertical or horizontal) with panels;
- package with horizontal, vertical tracks and springs;
- box with fixings and hardware.

False panels are supplied in a separate pack. The electric drive is supplied in its original package. Decorative cover profiles for doors fitted in between the walls of a 'tunnel' type opening in a separate pack.



**Packing with vertical pallet**



**Packing with horizontal pallet**

## 2 DESIGN DESCRIPTION AND TECHNICAL GUIDE FOR INSTALLATION OF CLASSIC SERIES SECTIONAL GARAGE DOORS

### 2.1. DOOR VERSIONS

A system for balancing of the door leaf with tension springs is used on doors with a width of 3,500 mm.\* A system for balancing of the door leaf with torsion springs is used on doors with a width of more than 3,500 mm (hereinafter—with torsion springs).

A system for balancing of the door leaf with tension springs includes two sets, each of which consists of a duplex tension spring (spring in spring) with its fastening components paired with galvanised cables fitted with thimbles and a mounting plate.

A system for balancing of the door leaf with torsion springs includes a shaft assembled with spring with caps, an intermediate bracket (or intermediate brackets, depending on the dimensions and weight of the door), cable drums, coupler, two galvanised cables connected with thimbles. The standard package includes brackets with a safety ratchet to prevent the door leaf falling in the case of a spring breaking.

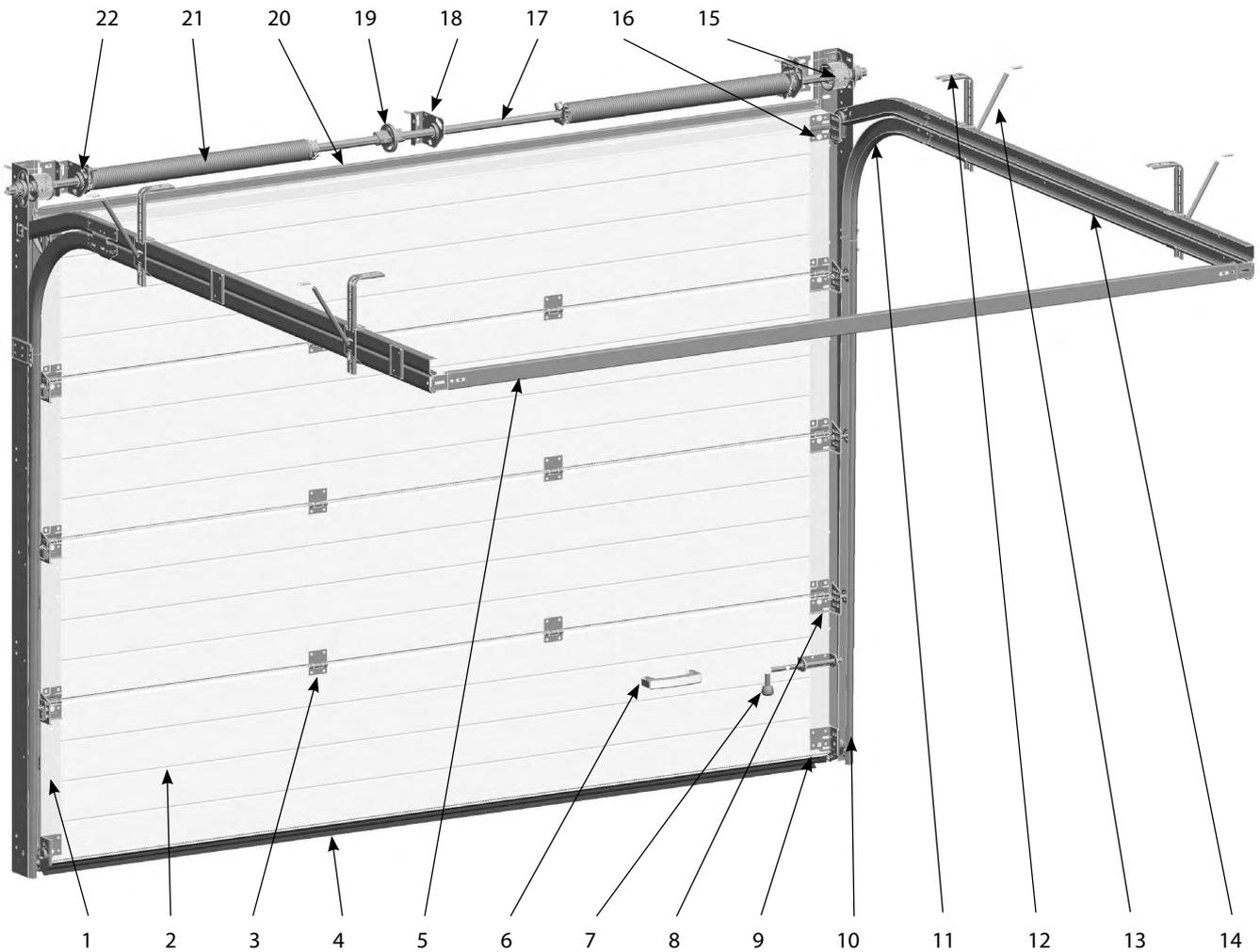
Established spring endurance—up to 25,000 cycles of lifting and lowering the door leaf. Doors with torsion springs are manufactured in three variants depending on the chosen type of mounting—standard, low or high.

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\* The list of door dimensions supplied by default with tension springs is specified in par. 2.10.

## 2.2. TYPICAL DOOR DESIGNS

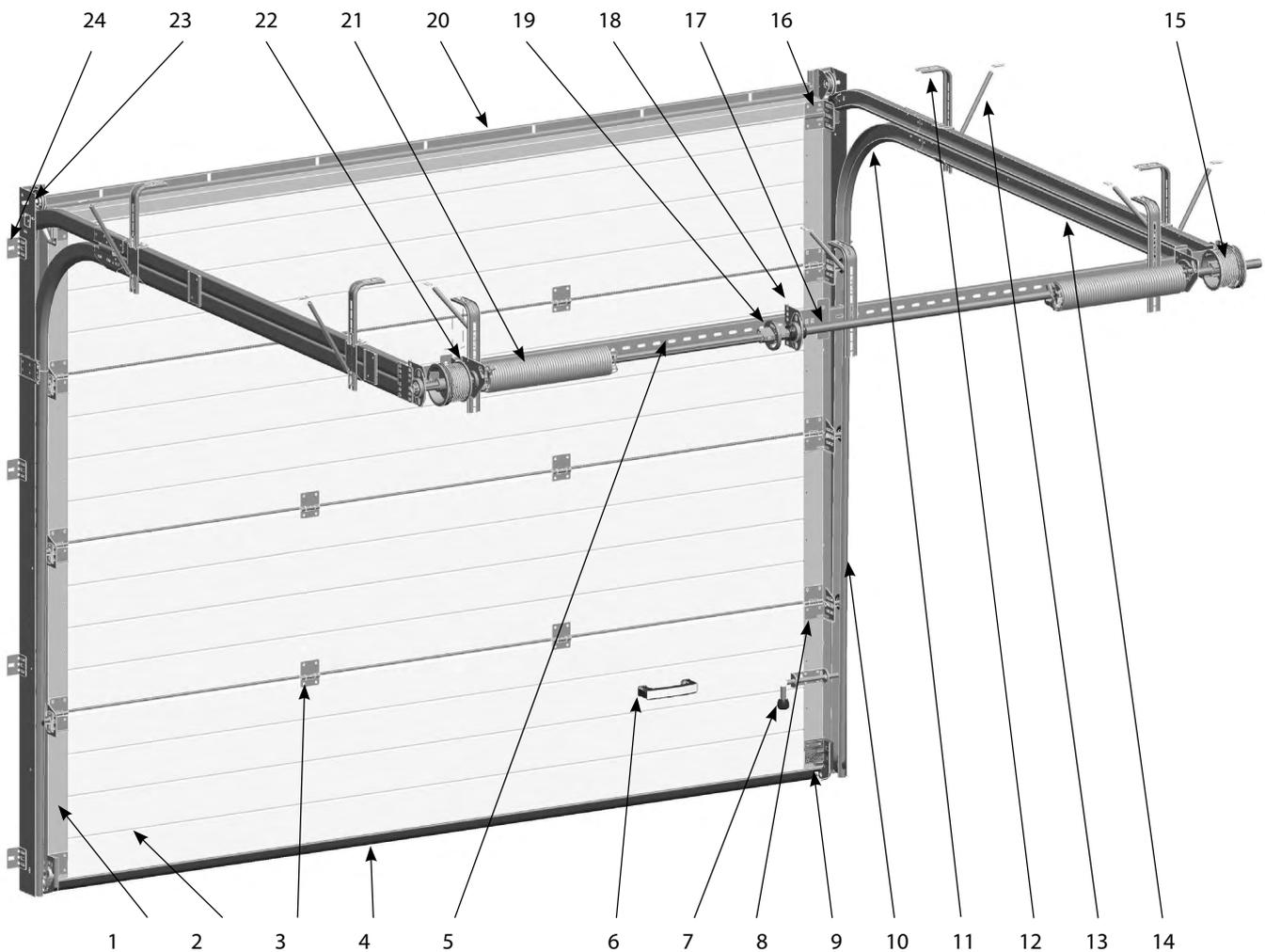
### 2.2.1. CLASSIC SERIES DOOR WITH TORSION SPRINGS. STANDARD MOUNTING



Nr.	Item
1	Side cap
2	Door panel
3	Intermediate hinge
4	Bottom end profile with sealing insert
5	Spacer bar
6	Handle
7	Locking bar
8	Side bracket with roller
9	Bottom bracket with roller
10	Angle bar with vertical track profile and side sealing insert
11	Radius profile

Nr.	Item
12	Telescopic adjustable hanger
13	Crossbar
14	Horizontal track
15	Cable drum
16	Top roller bracket
17	Shaft
18	Intermediate bracket
19	Connecting coupler
20	Cover strip with sealing insert
21	Spring with connecting devices
22	Bracket with safety ratchet jaw clutch

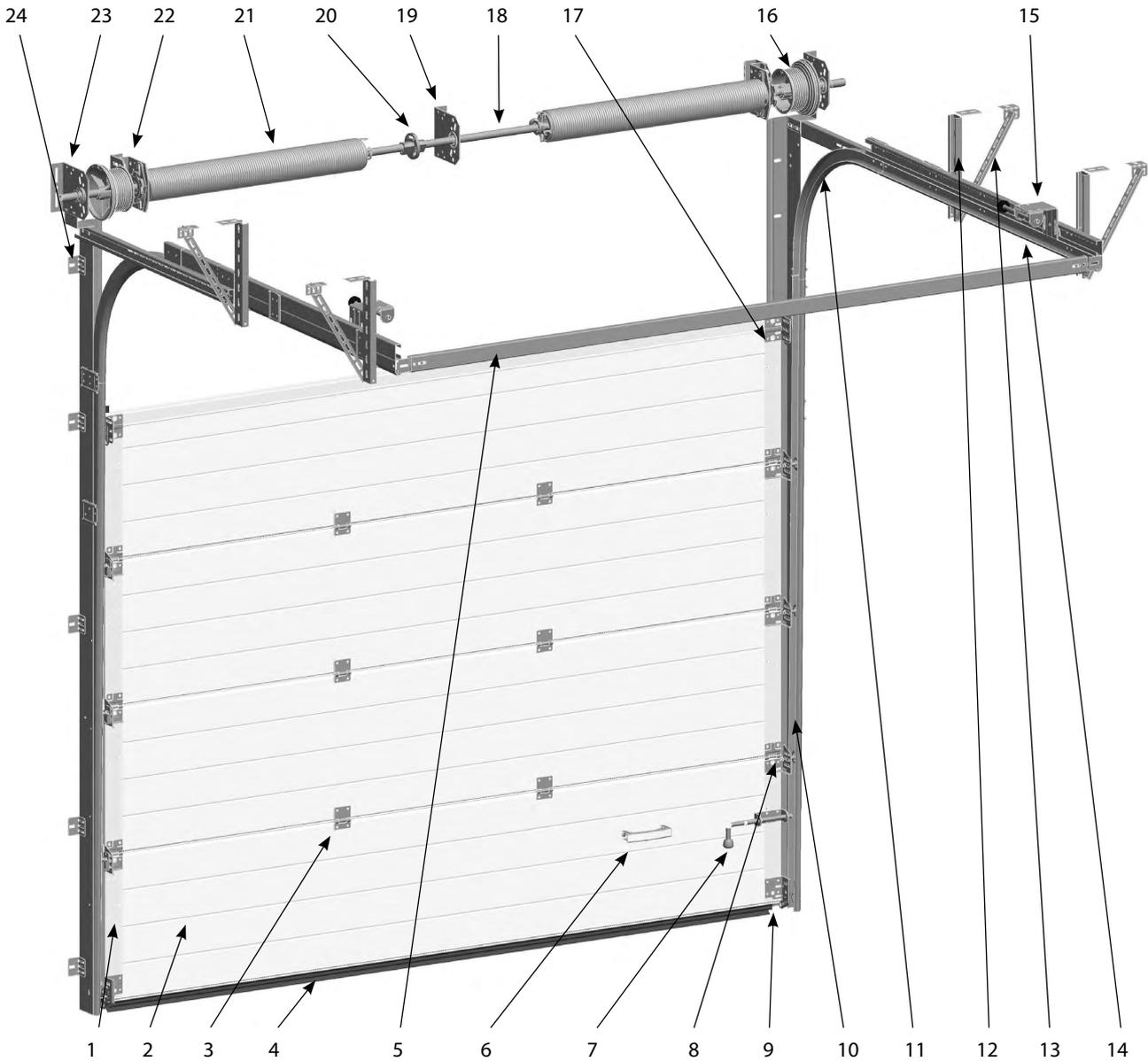
## 2.2.2. CLASSIC SERIES DOOR WITH TORSION SPRINGS. LOW MOUNTING



Nr.	Item
1	Side cap
2	Door panel
3	Intermediate hinge
4	Bottom end profile with sealing insert
5	Spacer bar
6	Handle
7	Locking bar
8	Side bracket with roller
9	Bottom bracket with roller
10	Angle bar with vertical track profile and side sealing insert
11	Radius profile
12	Telescopic adjustable hanger

Nr.	Item
13	Crossbar
14	Horizontal track
15	Cable drum
16	Top roller bracket
17	Shaft
18	Intermediate bracket
19	Connecting coupler
20	Cover strip with sealing insert
21	Spring with connecting devices
22	Bracket with safety ratchet jaw clutch
23	Sheave
24	Reinforcing angle bar

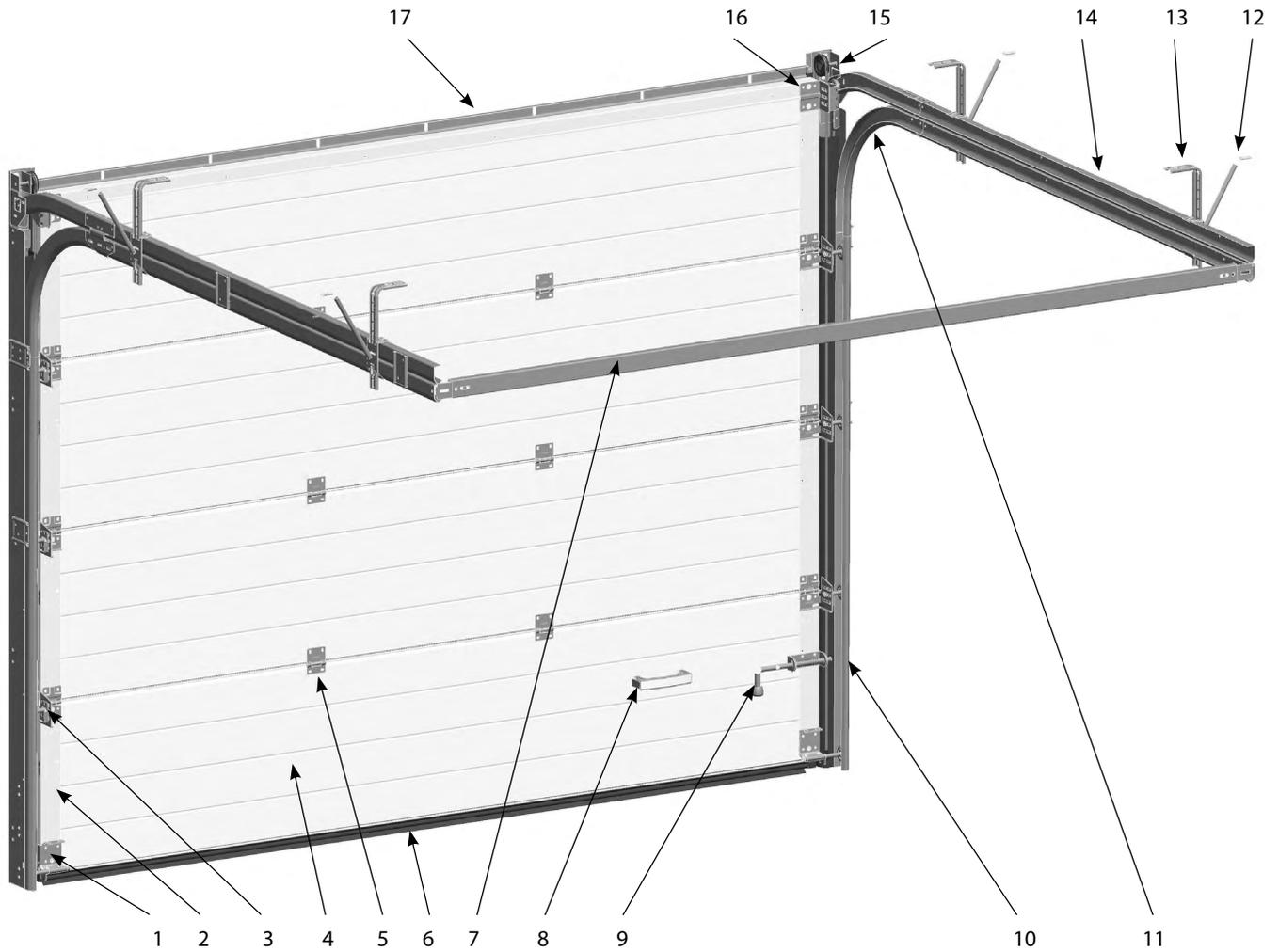
**2.2.3. CLASSIC SERIES DOOR WITH TORSION SPRINGS.  
HIGH MOUNTING**



Nr.	Item
1	Side cap
2	Door panel
3	Intermediate hinge
4	Bottom end profile with sealing insert
5	Spacer bar
6	Handle
7	Locking bar
8	Side bracket with roller
9	Bottom bracket with roller
10	Angle bar with vertical track profile and side sealing insert
11	Radius profile
12	Telescopic adjustable hanger

Nr.	Item
13	Crossbar
14	Horizontal track
15	Spring damper
16	Cable drum
17	Top roller bracket
18	Shaft
19	Intermediate bracket
20	Connecting coupler
21	Spring with connecting devices
22	Bracket with safety ratchet jaw clutch
23	Side support bracket
24	Reinforcing bracket

### 2.2.4. CLASSIC SERIES DOORS WITH TENSION SPRINGS



Nr.	Item
1	Bottom bracket with roller
2	Side cap
3	Side bracket with roller
4	Door panel
5	Intermediate hinge
6	Bottom end profile with sealing insert
7	Spacer bar
8	Handle
9	Locking bar

Nr.	Item
10	Angle bar with vertical track profile and side sealing inserts
11	Radius profile
12	Crossbar
13	Hanger
14	Horizontal track
15	Sheave balancing system
16	Top roller bracket
17	Cover strip with sealing insert

## 2.3. DESCRIPTION OF DOOR SETS

### 2.3.1. STANDARD DOOR SET ELEMENTS:

- door leaf is made of sandwich panels, on the ends of which the steel side caps are installed. Side caps are painted in white-grey (similar to RAL 9002);
- set of inter-panel inserts for the door leaf of S-ribbed, M-ribbed and L-ribbed (art. P1013) panels. Inserts are installed under the side caps at the junction of the panels;
- bottom steel end profile;
- top steel end profile painted in white-grey (similar to RAL 9002);
- bottom flexible sealing insert;
- top flexible sealing insert.

For doors with tension springs the sealing inserts are installed on the cover strip. For doors with torsion springs of standard and low mounting the sealing inserts are installed on the cover strip, and for doors of high mounting type sealing inserts are installed on the top section of the door leaf.

- Set of intermediate hinges made of stainless steel;
- set of adjustable top brackets made of stainless steel, with rollers with bearings;
- set of adjustable side brackets made of stainless steel, with rollers with bearings;
- set of adjustable bottom brackets made of stainless steel, with rollers with bearings;
- balancing system for the door;
- set of reinforcing brackets;
- set of angle bars with vertical track profiles and flexible sealing insert;
- set of horizontal track profiles and radius profiles;
- hanging system for horizontal tracks;
- spring locking bar;
- single- or double side handle for doors opening (customer choice). If the type of mounting is high with  $HL < 635$  mm, it is possible to install only one side handle (art. HG008) or double side handle (art. HGI007);
- rope for manual door lifting;
- set of fixings for the doors assembly with a 3-layer anticorrosive coating (zinc layer, chemical conversion film, heat-treated ceramic layer).

An order should contain the information about the dimensions of the opening, type of mounting, as well as include a full list of optional accessories from the additional configuration set. (see point 2.4.)

### 2.3.2. VARIANTS FROM THE STANDARD SET (FOR DOORS WITH TORSION SPRINGS)

Depending on door leaf weight  $P$  the following shafts are supplied:

- $P \leq 200$  kg—hollow shaft  $\varnothing 25.4$  mm with a key groove;
- $P > 200$  kg—solid shaft  $\varnothing 25.4$  mm with a key groove.

If the doors width  $LDB$  is  $\geq 5$  m, regardless of door weight, the following items are supplied:

- longitudinal reinforcing steel profiles installed on each door panel.

If the doors width  $LDB$  is  $> 5$  m, regardless of door weight, the following items are supplied:

- double set of adjustable side and top roller brackets;
- set of longer roller plates instead of short plates;
- set of rollers with longer spindles;
- wider side caps mounted on the ends of the sandwich panels.

On high type of mounting doors, the steel reinforcing profiles are installed on door leafs wider than 4.5 m.

### 2.3.3. DOOR PANELS

Sandwich panels are manufactured of steel sheets, hot-galvanized, with further protection layers of polyurethane coating. Panels are filled with environmentally friendly foamed polyurethane (without freon). The panel has a special shape providing the finished door with a strong and rigid construction. Panels have special EPDM sealing inserts providing the door with reliable air-tightness.

Sandwich panels used in Classic series doors have a thickness of 45 mm.

Basic colours and wood finish colours used on the outside surfaces of the panels are shown below:

Design of panel surface	Basic colours of the front side of the panel		Wood finish colours of the front side of the panel	
	woodgrain	smooth panel	woodgrain	smooth panel
Microwave	RAL 1015—light ivory* RAL 3004—purple red* RAL 5010—gentian blue* RAL 6005—moss green* RAL 7016—anthracite grey* RAL 8014—sepia brown* RAL 8017—chocolate brown* RAL 9006—white aluminium* RAL 9016—white* ADS 703—anthracite	—	—	—
S-ribbed	RAL 1015—light ivory* RAL 3004—purple red* RAL 5010—gentian blue* RAL 6005—moss green* RAL 7016—anthracite grey* RAL 8014—sepia brown* RAL 8017—chocolate brown* RAL 9006—white aluminium* RAL 9016—white* ADS 703—anthracite	—	—	Golden Oak Dark Oak Cherry
M-ribbed	RAL 8014—sepia brown* RAL 9016—white*	RAL 7016—anthracite grey* RAL 9016—white* ADS704—graphite	—	Golden Oak Dark Oak Cherry
L-ribbed	RAL 8014—sepia brown* RAL 9016—white*	RAL 7016—anthracite grey* RAL 9016—white* ADS703—anthracite ADS704—graphite	—	Golden Oak Dark Oak Cherry
Cassette	RAL 8014—sepia brown* RAL 9016—white*	—	Golden Oak Dark Oak	—

The front side of the panel can be painted in other colours on special request, using colours which closely correspond to the RAL, DB scale or ADS703 colour. The possibility of painting in dark colours, metallic colours, pearl and reflecting colours will also be considered upon request. It is not recommended to install doors made from sandwich panels of dark colours on the sunny side of a building because it can cause panel sagging and a reduction in the lifetime of the door.

The inner side of the panel is painted white-grey (similar to RAL 9002). Due to the doors' design, an outside steel panel is visible at the junction of two sandwich panels. On special request, the inner side of the panels can be painted in other colours which closely correspond to the RAL, DB scale or ADS703 colour. The possibility of painting the inner side of panels in dark colours, metallic colours, pearl and reflecting colours will be considered upon request.

Painted steel coil is used for manufacturing of sandwich panel in standard colours. Liquid paint is applied by special rolls. For manufacturing of sandwich panels in non-standard colours sandwich panels of standard colours painted by liquid paint through air diffusion.

Slight variations in colours may occur when ordering multiple door elements in one colour (e.g. profiles, framing, wicket, sandwich panels with back/face sides, window frames and decorative elements). This is due to the difference in the properties of materials (steel, aluminium, plastic), using different techniques of painting. Variations in the colour of components are also possible when ordering spare parts for repairs to previously installed doors.

## 2.4. OPTIONAL EXTRAS

### 2.4.1. SET OF PANEL CAPS

The set is used for door leaf of S-ribbed or M-ribbed panels. The panel caps are installed under side caps in each groove of sandwich panels to improve thermal insulation and sealing properties.

\* Colours closely correspond to RAL scale.

#### 2.4.2. **BALANCING SYSTEM OF THE DOOR LEAF**

At the request of the customer in doors of 3,500 mm width, a balancing system with tension springs can be replaced by a balancing system with torsion springs.\*

#### 2.4.3. **BUILT-IN WICKET**

The wicket is only built into doors with a balancing system using torsion springs. A standard built-in wicket set includes the following elements:

- set of extruded aluminium profiles without thermal break used for edging a wicket or an opening;
- sealing insert made of EPDM material for sealing of wicket along the perimeter;
- mortice lock; thumb turn cylinder on the inner side and on the outer side key locking; set of keys. On request you can order the locking cylinder with a keyhole on both sides;
- reinforcing lock housing;
- set of twist handles;
- overhead-type door closer;
- electrical sensor connected with automation system to prevent the door from opening if the wicket door is not closed;
- bottom steel reinforcing profile (PRG13—used for the standard threshold, PRG12—used for the low threshold). Reinforcing profiles are painted white-grey (similar to RAL 9002). Wicket door with a flat threshold does not have the bottom reinforcing profile.

A detailed description of the wicket parameters is given in Section 2.9.

#### 2.4.4. **SET OF CAPS FOR WICKET**

Caps are installed under the wicket framing and opening framing in every groove of S-, M-ribbed panels from the outer side. Caps provide additional sealing of the wicket opening.

#### 2.4.5. **WINDOWS**

Recommended parameters, layout and window sizes are given in section 2.7.

#### 2.4.6. **SET OF CAPS FOR WINDOWS**

Caps are installed under the window framing in every groove of S-ribbed and M-ribbed panels from the outer side of garage doors. Caps are used with all types of windows and provide additional sealing of the window framing.

#### 2.4.7. **SET OF REINFORCING PROFILES**

This option is used for doors with torsion springs.

When operating the doors in conditions leading to significant temperature difference of outer and inner surfaces of the door leaf (installation of the dark-coloured doors on the sun side of the buildings and constructions; operating the doors in heated premises while the outside temperature is low, etc.) the sandwich panels can bend due to the thermal expansion/contraction of the steel sheets.

Acceptable index of temperature difference of outer and inner surfaces of the door leaf cannot exceed 40 °C. If this value is exceeded, the doors of more than 3.5 m wide are recommended to be equipped with the set of reinforcing profiles in order to avoid damaging of the components during open/close cycle.

The set includes longitudinal steel reinforcing profiles which are installed on each panel except the panels which have the wicket. Reinforcing profiles also increase rigidity of the door leaf and its resistance to wind/impact loads.

#### 2.4.8. **LOCKING DEVICE**

The locking device is designed to lock the door leaf in the closed position. A locking device set includes a control mechanism (lock) with two push handles and a one-sided cylinder mechanism with a keyhole for a flat key. The control and latch mechanisms are connected by a flexible wire-ropes. In doors fitted with a locking device, the spring locking bar is not used.

For high mounting type with HL < 635 mm the locking device is not installed.

#### 2.4.9. **ELECTRIC DRIVE WITH AUTOMATION SYSTEM**

Doors can be supplied with electric rack-and-gear drives.

#### 2.4.10. **RELEASE SYSTEMS FOR ELECTRIC DRIVES**

Release systems are designed for doors equipped with rail-type drives and used in premises without secondary entrance. Release system allows to release the drive and operate the door manually in case of emergency or power supply failure.

\* List of door sizes supplied with tension springs is specified in par. 2.10.

Release cables RK-4500 and RK-6000 are used for doors equipped with the locking device. They are connected to the locking device. Release mechanism RM0104-4500 fitted into the panel is used for doors without locking device.

**2.4.11. PULLEY BLOCK FOR MANUAL DOOR LIFTING**

A pulley block is used for doors that are not equipped with an electric drive. The door is operated by rope passing over pulley and attached to bottom roller bracket. It is recommended to use the block for doors over 2 m height.

**2.4.12. FALSE PANEL**

False panels are used to cover partly the opening below the headroom. False panel may consist of several panels (depending on height). Each panel consists of sandwich panel framed by C-shaped profile. If false panel consists of several panels they are supplied unassembled. The design and colour of sandwich panels used for the false panel and the door leaf is the same except for door of cassette panels. The false panel for cassette panels is produced of L-ribbed panels. The false panel is supplied complete with a set of brackets for fixing to the opening.

Recommendations and options for the use of false panels are shown in section 2.13.

**Door leaf and false panel framing colour correspondence:**

Door leaf colour	False panel framing colour
RAL 8014 (sepia brown)* RAL 8016 (red- brown)* RAL 8017 (chocolate brown)* RAL 8019 (grey brown)* Golden Oak, Dark Oak, Cherry	RAL 8019 (grey brown)*
Other colours	A00-D6 (silver)

As an option, the colouring of profile framing is available in other colours having a close match to the RAL, DB scale or ADS703 colour. Painting in such colours as metallic, pearl and reflective colours is considered upon request.

**2.4.13. AIR GRIDS**

Air grids provide natural ventilation of premises, creating additional comfort. Recommended parameters and positioning of air grids are presented in section 2.8.

**2.4.14. WICKET EMERGENCY OPEN MECHANISM FOR EMERGENCY EXITS (EN 1125)**

Used for doors made of sandwich panels or doors with panoramic panels AluPro when the wicket section with emergency open mechanism is made of sandwich panel. Anti-panic locks are used on doors, situated in the fire escape routes from premises. Anti-panic locks keep the wicket in the closed position and provides emergency opening of the wicket without using a key simply by pushing a **horizontal bar** located on the inner side of the wicket. Wicket is secured from outside by using a key.

Anti-panic locks meet the requirements of:

- the European standard EN 1125:1997 'Building hardware—panic exit devices operated by a horizontal bar';
- the National Standard of the Russian Federation GOST R 52750-2007 'Devices for emergency opening of doors of evacuation and emergency exits. Specifications'.

**2.4.15. WICKET EMERGENCY OPEN MECHANISM (B, E FUNCTION) FOR EMERGENCY EXITS EN 179**

An emergency open mechanism ('anti-panic') is installed on wicket doors of emergency exits. Anti-panic handle provides possibility to open a wicket door quickly from inside without using a key by pressing the **lever handle**.

Anti-panic handles with **B** or **E** function correspond to the standards of EN 179: 2008-04 European Standard 'Furniture for emergency doors. Requirements and test methods'.

Emergency open mechanism with **B** function is fitted with the **lever** handles both from the inside and outside. The option is available for doors of all mounting types.

Emergency open mechanism with **E** function is fitted with the **lever** handle from the inside, and with the **fixed** handle—from the outside. The option is available for doors of Standard and Low mounting types.

The wicket door is locked with the key from the outside.

**2.4.16. SET OF FIXINGS**

Set of fixings FS10×50D consists of nylon dowels with self-tapping screws and washers necessary for mounting of the door. The set of fixings is used for fixing door frame and elements of torsion shaft to walls made of concrete, bricks, ceramics concrete, natural stone and other similar materials.

\* Colours closely correspond to RAL scale.

For mounting of the doors in the wooden opening screws and washers assemblies included in the set are used, while nylon dowels should not be used. Before tightening the screws it is necessary to drill holes in the wooden structure (5 mm in diameter, 50 mm deep; the wall should be no less than 100 mm thick).

Set of fixing elements FS10×60D includes nylon plugs with screws made of galvanized steel. The set is used for fixing door frame and elements of torsion shaft to walls made of concrete, natural stone, perforated and solid ceramic bricks, perforated and solid sand-lime bricks, lightweight concrete, aerated concrete. Reliable fixing even in the perforated materials.

Set of fixing elements FS8×25 includes 8 and 25 mm long self-tapping screws made of galvanized steel. The set is used for fixing door frame and elements of torsion shaft to walls made of metal.

**2.4.17. SET OF INDUSTRIAL SIDE ROLLER BRACKETS**

Used for doors with torsion springs of standard and low types of mounting up to 5 m wide. It is recommended to use the set for doors which are constantly in use. The set includes side roller brackets, roller plates and track rollers used for our industrial sectional doors. With doors of high type mounting type with torsion springs the brackets are included in the standard installation set.

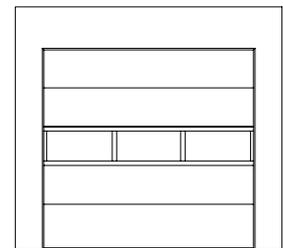
**2.4.18. SET OF PROTECTIVE COVERS**

These are used for doors with tension springs to prevent access to the place where the springs are fitted.

**2.4.19. PANORAMIC GLAZING**

In doors with torsion springs and door leaf consisting of Microwave, S-ribbed, M-ribbed, or L-ribbed sandwich panels one or several sections (except the top and the bottom sections) can be replaced with panoramic glazing sections (panoramic sections) from the AluPro or AluTherm series. All panoramic sections in a door should be of the same series.

Panoramic sections are frames consisting of aluminium extruded profiles. Sections can be filled with translucent glazing inserts from polymer mix of sterol and acrylonitrile (SAN-plastic) with special infill.



**AluPro**—profile system without thermal break



**AluTherm**—profile system with thermal break



**2.4.19.1. Translucent glazing inserts of panoramic sections**

**Section filling for series AluPro:**

- single insert with SAN-plastic 3 mm thick;
- double insert 26 mm thick with SAN-plastic 2 mm thick (double glazed unit 2-22-2). It is used on inserts till 0.5 m<sup>2</sup>;
- double insert 26 mm thick with SAN-plastic 3 mm thick (double glazed unit 3-20-3). It is used on inserts over 0.5 m<sup>2</sup>.

Basic colour for profiles of panoramic section of AluPro series*
RAL 1015—light ivory
RAL 3004—purple red
RAL 5010—gentian blue
RAL 6005—moss green
RAL 7016—anthracite grey
RAL 8014—sepia brown
RAL 8017—chocolate brown
RAL 9006—white aluminium
RAL 9016—white
A00-D6—silver

**Section filling of series AluTherm:**

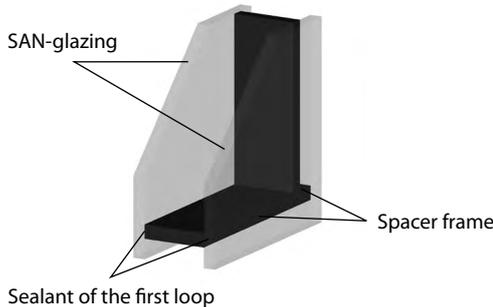
- double insert 26 mm thick with SAN-plastic 2 mm thick (double glazed unit 2-22-2). It is used on inserts till 0.5 m<sup>2</sup>;
- double insert 26 mm thick with SAN-plastic 3 mm thick (double glazed unit 3-20-3). It is used on inserts over 0.5 m<sup>2</sup>;
- triple insert 25 mm thick with SAN-plastic 2 mm thick (double glazed unit 2-9.5-2-9.5-2). It is used on inserts till 0.5 m<sup>2</sup>;
- triple insert 25 mm thick with SAN-plastic 3 mm thick (double glazed unit 3-8-3-8-3). It is used on inserts over 0.5 m<sup>2</sup>.

Basic colour for profiles of panoramic section of AluTherm series*
RAL 5010—gentian blue
RAL 8014—sepia brown
RAL 9006—white aluminium
RAL 9016—white

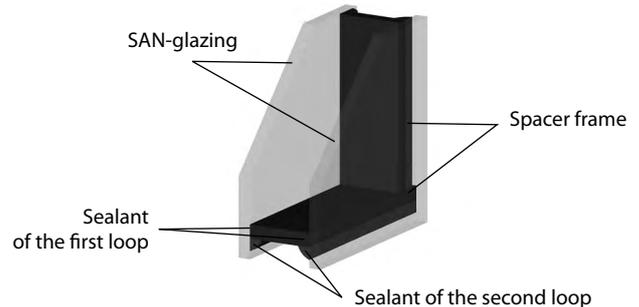
AluPro, AluTherm panoramic sections can be painted other colours which closely correspond to RAL scale or ADS703 colour. Composite panels can be painted in colours according to DB catalogue as well. The possibility of painting in dark, metallic, pearl and reflective colours is considered on individual request.

Double and triple transparent inserts are manufactured with a single or double sealing loop.

It is recommended to fit a double sealing loop if microclimatic conditions inside the premises can cause the generation of condensation in the transparent inserts. Transparent inserts with a double sealing loop have the added benefits of sealing of the second loop.



**A translucent insert with one sealing loop**



**A translucent insert with two sealing loops**

**2.4.19.2. Special infill for panoramic sections**

**Infill for AluPro sections with double glazing:**

- composite panel 26 mm thick, consisting of two aluminium sheets with polyurethane foam space filling. Outer and inner aluminium panel sheets have stucco embossment.

**Infill for AluPro section with single glazing:**

- composite panel 3 mm thick, consisting of two aluminium sheets with high pressure polyurethane foam space filling. Outer and inner aluminium sheets are smooth;
- expanded mesh for panoramic panel. Material: galvanized steel. Cross section of ventilation cuts: 58%. Thickness: 4 mm. Colour: natural colour of steel;
- square mesh 40×40 mm for panoramic panel. Material: galvanized steel. Cross section of ventilation cuts: 83%. Thickness: 4 mm. Colour: natural colour of steel;
- perforated aluminium sheet for panoramic panel. Perforated aluminium sheet, perforation 8–12 mm. Cross section of ventilation cuts: 40%. Thickness: 1.6 mm. Colour: natural colour of aluminium.

\* Colours closely correspond to RAL scale.

**Infill for AluTherm section with double glazing:**

- composite panel 26 mm thick, consisting of two aluminium sheets with polyurethane foam space filling. Outer and inner aluminium panel sheets have stucco embossment.

**Infill for AluTherm type section with triple glazing:**

- composite panel 26 mm thick, consisting of two aluminium sheets with polyurethane foam space filling. Outer and inner aluminium panel sheets have stucco embossment.

Special infill can be painted other colours which closely correspond to RAL scale or ADS703 colour. The possibility of painting in dark, metallic, pearl and reflective colours is considered on individual request.

**2.4.20. SCRATCH RESISTANT COATING**

This is to protect glazing against possible damages (scratches) that may happen to doors after installation. Special surface coating will keep glazing transparent for a long time even after multiple cleaning. This coating is available for AluPro or AluTherm doors with double/triple glazing and single/double sealing.

**2.5. MATCHING DOORS DESIGN (DOOR FACADE SYSTEM)**

If several sectional doors are installed in line on the same building wall it is possible to align on the same level specific door elements, for example:

- panel joints by using the same panel set for all doors;
- windows;
- locks;
- handles for doors opening;
- wickets.

Matching design can be achieved for doors of different mounting types, different heights, with or without wicket. You must specify when ordering the set of doors if this is required. In the order it is necessary to state the individual requirements for the full set of doors that should be matching.

**Attention!** For achieving the same level of door elements it is necessary to ensure matching of ground level for all the openings.

**2.6. TECHNICAL FEATURES**

**Door technical features**

Characteristics	Series Classic	
	Tension springs	Torsion springs
Thermal transmittance (U-value) of ALUTECH sectional doors, W/(m²K)*		
Doors without wicket	1.17	1.06
Doors with wicket	—	1.33
Resistance to wind load (EN 12424)**		
Doors without wicket	Class 4	Class 4
Air permeability (EN 12426)***		
Doors without wicket	Class 5	Class 5
Doors with wicket	—	Class 2
Resistance to water penetration (EN 12425)***		
Doors without wicket	Class 2	Class 2
Doors with wicket	—	Class 2
Specific gravity of the door leaf without reinforcing profiles ****		
	up to 14.7 kg/m²	
Specific gravity of the door leaf with reinforcing profiles ****		
	—	up to 16.5 kg/m²
Loading on ceiling structure		
	up to 32 kg/m²	

\* Characteristics are calculated and tests are carried out at ift. Rosenheim GmbH:

- for garage doors with tension springs with an area of 8.125 m²;
- for garage doors with torsion springs with an area of 18 m².

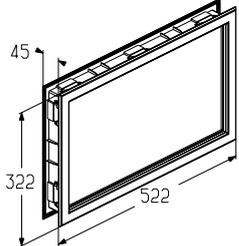
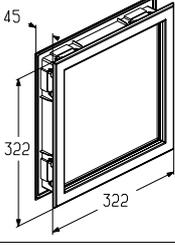
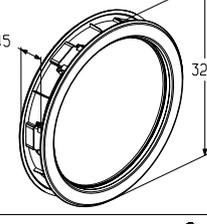
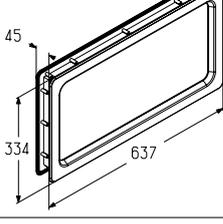
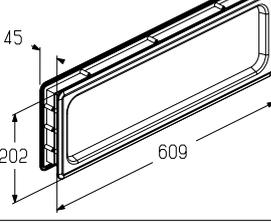
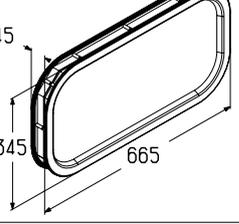
\*\* Calculation is made for doors up to 2.5 m wide without options according to tests conducted by the TÜV NORD CERT GmbH.

\*\*\* The tests have been conducted by NISI testing laboratory (Bulgaria).

\*\*\*\* Parameter of door leaf weight can vary depending on panel type, chosen options and other factors.

## 2.7. RECOMMENDED PARAMETERS AND WINDOW POSITIONING

### 2.7.1. WINDOWS DIMENSIONS

Window article	Image and dimensions	Colour of edging frame	Type of glazing
W043WH-TG		White	Transparent SAN-glazing
W043BR-TG		Brown	
W043WH-CG		White	Crystal SAN-glazing
W043BR-CG		Brown	
W050WH		White	Transparent SAN-glazing
W050BR		Brown	
W050WH-CG		White	Crystal SAN-glazing
W050BR-CG		Brown	
W060WH		White	Transparent acrylic
W060BR		Brown	
W060WH-CG		White	Crystal SAN-glazing
W060BR-CG		Brown	
W046		Black	Transparent SAN-glazing
W085		Black	Transparent SAN-glazing
W095		Black	Transparent SAN-glazing

The outside window frame (art. W043..., W050..., W060...) may be painted outside in colours that closely correspond to the RAL, DB catalogue or ADS703 colour. The possibility of painting window frames in metallic colours, pearl and reflecting colours will be considered individually.

### 2.7.2. WINDOW POSITIONING

Windows are normally aligned vertically. Nonstandard windows positioning should be requested and agreed with the Manufacturer. Maximum number of windows per one panel should be calculated according to the following tables.

**2.7.2.1. Windows quantity for doors of Microwave, S-, M-, L-ribbed panels**
**Classic series doors with torsion springs**

Door width LDB (ordered doors width), mm	Maximum window quantity	Width of window insert B1, mm	Height of window insert H1, mm
<b>art. W043WH-TG, W043WH-CG, W043BR-TG, W043BR-CG</b>			
from 1750 to 2440	2	494	294
from 2445 to 3185	3		
from 3190 to 3925	4		
from 3930 to 4670	5		
from 4675 to 5415	6		
from 5420 to 6000	7		
<b>art. W050WH, W050BR, W050WH-CG, W050BR-CG</b>			
from 1750 to 1840	2	294	294
from 1845 to 2385	3		
from 2390 to 2925	4		
from 2930 to 3470	5		
from 3475 to 4015	6		
from 4020 to 4560	7		
from 4565 to 5105	8		
from 5110 to 5645	9		
from 5650 to 6000	10		
<b>art. W060WH, W060BR, W060WH-CG, W060BR-CG</b>			
from 1750 to 1840	2	Ø294	
from 1845 to 2385	3		
from 2390 to 2925	4		
from 2930 to 3470	5		
from 3475 to 4015	6		
from 4020 to 4560	7		
from 4565 to 5105	8		
from 5110 to 5645	9		
from 5650 to 6000	10		
<b>art. W046</b>			
from 1750 to 1925	1	610	302
from 1930 to 2785	2		
from 2790 to 3645	3		
from 3650 to 4505	4		
from 4510 to 5365	5		
from 5370 to 6000	6		
<b>art. W085</b>			
from 1750 to 1885	1	588	180
from 1890 to 2720	2		
from 2725 to 3560	3		
from 3565 to 4395	4		
from 4400 to 5235	5		
from 5240 to 6000	6		
<b>art. W095</b>			
from 1750 to 1985	1	638	320
from 1990 to 2870	2		
from 2875 to 3760	3		
from 3765 to 4645	4		
from 4650 to 5535	5		
from 5540 to 6000	6		

**Classic series doors with tension springs**

Door width LDB (ordered doors width), mm	Maximum window quantity	Width of window insert B1, mm	Height of window insert H1, mm
<b>art. W043WH-TG, W043WH-CG, W043BR-TG, W043BR-CG</b>			
from 1750 to 2460	2	494	294
from 2465 to 3205	3		
from 3210 to 3500	4		
<b>art. W050WH, W050BR, W050WH-CG, W050BR-CG</b>			
from 1750 to 1860	2	294	294
from 1865 to 2405	3		
from 2410 to 2945	4		
from 2950 to 3490	5		
from 3495 to 3500	6		
<b>art. W060WH, W060BR, W060WH-CG, W060BR-CG</b>			
from 1750 to 1860	2	Ø294	
from 1865 to 2405	3		
from 2410 to 2945	4		
from 2950 to 3490	5		
from 3495 to 3500	6		
<b>art. W046</b>			
from 1750 to 1945	1	610	302
from 1950 to 2805	2		
from 2810 to 3500	3		
<b>art. W085</b>			
from 1750 to 1905	1	588	180
from 1910 to 2740	2		
from 2745 to 3500	3		
<b>art. W095</b>			
from 1750 to 2005	1	638	320
from 2010 to 2890	2		
from 2895 to 3500	3		

**2.7.2.2. Window quantity for doors of Cassette panels****Classic series with torsion springs**

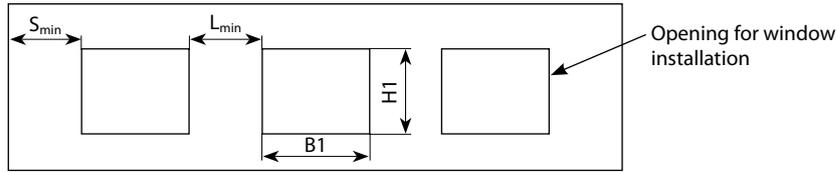
Door width LDB (ordered doors width), mm	Maximum window quantity	Width of window insert B1, mm	Height of window insert H1, mm
<b>art. W043WH-TG, W043WH-CG, W043BR-TG, W043BR-CG</b>			
from 2120 to 2585	3	494	294
from 2600 to 2985	4		
from 3000 to 3410	4		
from 3420 to 3985	5		
from 4000 to 4485	6		
from 4505 to 5000	7		

**Classic series with tension springs**

Door width LDB (ordered doors width), mm	Maximum window quantity	Width of window insert B1, mm	Height of window insert H1, mm
<b>art. W043WH-TG, W043WH-CG, W043BR-TG, W043BR-CG</b>			
from 2140 to 2585	3	494	294
from 2620 to 2985	4		
from 3020 to 3410	4		
from 3440 to 3500	5		

### 2.7.3. LIMITS FOR WINDOW APPLICATION

Minimum distance from the edge of door leaf to inset of the window  $S_{min}$ , and the distance between windows  $L_{min}$  are equal to 250 mm.



For Microwave, S-ribbed 500 and 625 mm high, M-ribbed and L-ribbed panels 500 mm high windows art. W043WH-TG, W043WH-CG, W043BR-TG, W043BR-CG, W050WH, W050BR, W050WH-CG, W050BR-CG, W060WH, W060BR, W060WH-CG, W060BR-CG, W046, W085, W095 are available.

For M-ribbed and L-ribbed panels 450 mm high windows art. W043WH-TG, W043WH-CG, W043BR-TG, W043BR-CG, W050WH, W050BR, W050WH-CG, W050BR-CG, W060WH, W060BR, W060WH-CG, W060BR-CG are available.

For Cassette panels windows art. W043WH-TG, W043WH-CG, W043BR-TG, W043BR-CG are available.

Possibility of windows installation in the top and bottom panels is considered upon request. Windows cannot be installed in the second panel if the door is supplied with a key lock in the second panel.

## 2.8. RECOMMENDED PARAMETERS AND AIR GRIDS POSITIONING

### 2.8.1. TYPES OF AIR GRIDS

Type of air grid	Art.	Colour from outside	Colour from inside	Outside size, mm (W×H)	Square area of the opening, cm <sup>2</sup>
Non-adjustable air grid (white)	VG-368WH	White	White	368×130	143
Non-adjustable air grid (black)	VG-368BK	Black	White	368×130	143
Adjustable air grid (white)	VG-368RWH	White	White	368×130	65
Adjustable air grid (black)	VG-368RBK	Black	White	368×130	65

### 2.8.2. AIR GRIDS POSITIONING PARAMETERS

Air grids are installed on the centre line of the panel (in the middle of the panels' height). Maximum number of air grids per one panel should be calculated according to the following tables:

#### Classic series with torsion springs of Microwave, S-, M-, L-ribbed panels

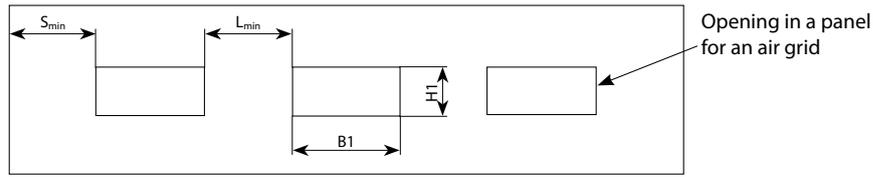
Door width LDB (ordered doors width), mm	Max number of air grids	Air grid width B1, mm	Air grid height H1, mm
from 1750 to 1960	2	335	96
from 1965 to 2545	3		
from 2550 to 3130	4		
from 3135 to 3715	5		
from 3720 to 4300	6		
from 4305 to 4885	7		
from 4890 to 5470	8		
from 5475 to 6000	9		

#### Classic series with tension springs of Microwave, S-, M-, L-ribbed panels

Door width LDB (ordered doors width), mm	Max number of air grids	Air grid width B1, mm	Air grid height H1, mm
from 1750 to 1980	2	335	96
from 1985 to 2565	3		
from 2570 to 3150	4		
from 3155 to 3500	5		

### 2.8.3. AIR GRIDS APPLICATION LIMITS

Minimum distance from the edge of the door leaf to the air grid  $S_{min}$ , and the distance between the air grids  $L_{min}$  are equal to 250 mm.



Minimum height of top panel for an air grid installation is 400 mm. If an air grid is installed on the same side of a door leaf as a locking bar, minimum distance from door panel edge to the air grid is 1,000 mm. Non-standard air grid positioning should be requested and agreed with the Manufacturer. Air grids cannot be installed in the panel where a key lock is installed.

Air grids are not available for doors of cassette panels.

## 2.9. WICKET PARAMETERS

### 2.9.1. PARAMETERS OF WICKET DOORS BUILT INTO DOOR LEAF MADE FROM SANDWICH PANELS

Garage doors can be ordered with a wicket. The wicket is available for doors with torsion springs only (Standard, Low and High mounting types). For high mounting type with  $HL < 635$  mm the wicket door is not installed. Wickets are available in right or left versions. Wickets open outward only.

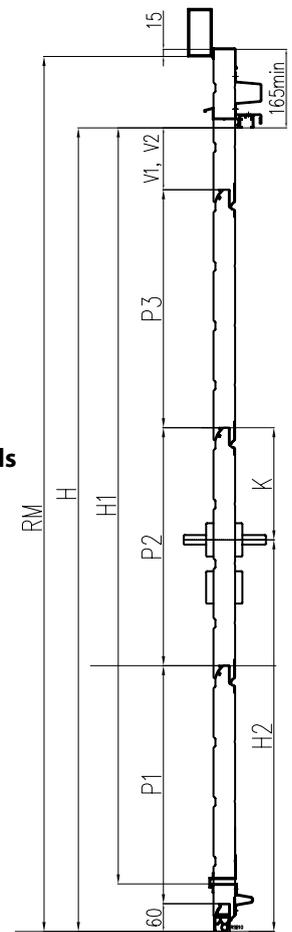
Wickets are not available for doors of cassette panels.

#### 2.9.1.1. Dimensions of wicket with low, standard or flat threshold for Microwave, S-ribbed panels

Clear opening width of wicket—920 mm.

The window can be embedded in the wicket within the third section of the wicket.

Min. opening height ( $R_{min}$ ), mm	Max. opening height ( $R_{max}$ ), mm	Height of panels in a door leaf, mm				Dimensions of cut-in into the last wicket panel ( $V1, V2$ ), mm	Wicket opening height ( $H$ ), mm	Clear wicket opening height ( $H1$ ), mm	Height of handle positioning ( $H2$ ), mm
		P1	P2	P3	P4				
2340	3250	500	500	500	500	130	2190	With flat threshold: H-20;	825
1965		625	500	500	—	130	1815		With low threshold: H-100;
2090		625	500	500	—	255	1940	950	
2215		625	625	500	—	255	2065	1075	
2215		625	625	625	—	130	2065	With standard threshold: H-145	1075



#### 2.9.1.2. Dimensions of wicket with low, standard or flat threshold for M-, L-ribbed panels

Clear wicket opening width—920 mm.

A window can be placed in the wicket in the third or fourth section.

Min. opening height ( $R_{min}$ ), mm	Max. opening height ( $R_{max}$ ), mm	Height of panels in a door leaf, mm				Dimensions of cut-in into the last wicket panel ( $V1, V2$ ), mm	Wicket opening height ( $H$ ), mm	Clear wicket opening height ( $H1$ ), mm	Height of handle positioning ( $H2$ ), mm
		P1	P2	P3	P4				
2140	3250	450	450	450	450	130	1990	With flat threshold: H-20;	1199
2265		450	450	450	450	255	2115		With low threshold: H-100;
2340		500	500	500	500	130	2190	With standard threshold: H-145	

**2.9.1.3. Dimensions limits**

Minimal width of doors with a wicket is 2125 mm (possibility to inbuilt wicket in a door 1915–2120 mm wide can be considered at individual request). Minimal height of a door with a wicket is 1960 mm. The choice of wicket depends on the doors width.

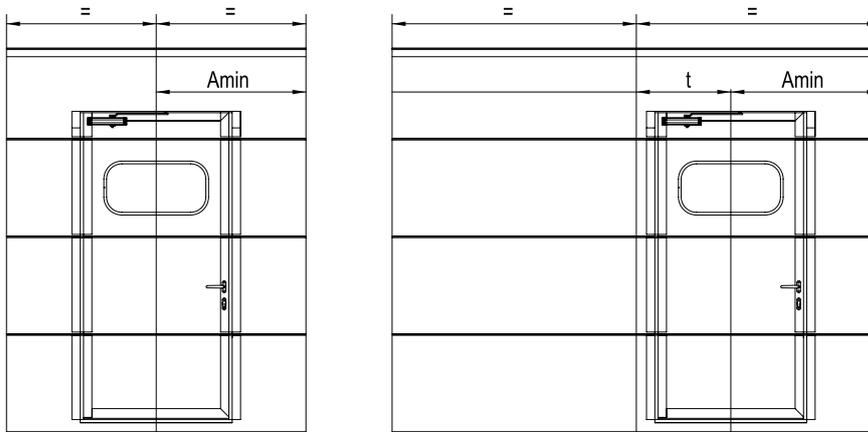
The corresponding limits are shown in table below.

Doors width, mm	Type of wicket
from 1915 to 5000	with flat (20 mm) threshold
from 1915 to 4500	with low (100 mm) threshold
from 4505 to 6000*	with standard (145 mm) threshold

**2.9.1.4. Wicket positioning on door leaf**

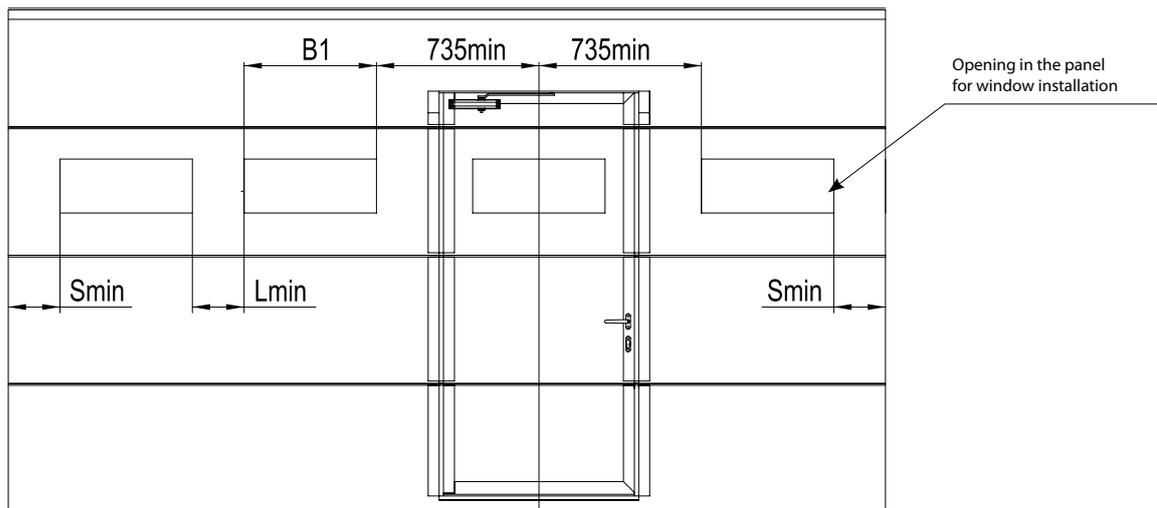
The wicket can be installed in the centre of the door leaf or moved to one side. All measurements are taken as viewed from the inside of the premises. The distance  $t$  between the wicket centre and the door leaf central axis must be multiple of 330 mm.

Minimum distance from the central axis of the wicket to the leaf edge is  $A_{min}=978$  mm, distance from the central axis of the wicket to the opening edge is 958 mm.



To install windows in the door leaf with the wicket the following conditions should be observed:

- minimum possible distance from the door leaf edge to the window  $S_{min}$  must be equal to 250 mm;
- minimum possible distance between windows  $L_{min}$  must be equal to 250 mm;
- minimum possible distance from the central axis of the wicket to the inset of the window must be equal to 735 mm.



**Attention!** Possibility of windows placement in the top wicket panel must be checked and confirmed with the manufacturer in advance.

\* Maximum opening width for the doors with wicket and M-ribbed or L-ribbed sandwich-panels without embossing is 5000 mm.

**Colour correspondence of wicket elements to colour of door leaf**

Colour of the door leaf	Colour of wicket door leaf and opening framing	Colour of wicket handle	
		by default	other variants
RAL 8014 (brown)* RAL 8016 (red-brown)* RAL 8017 (chocolate brown)* RAL 8019 (grey-brown)* Golden Oak, Dark Oak, Cherry	RAL 8019 (grey-brown)*	RAL 8019 (grey-brown)*	A00-D6 (silver) RAL 9005 (black)*
All other colours	A00-D6 (silver)	A00-D6 (silver)	RAL 8019 (grey-brown)* RAL 9005 (black)*
	Other RAL colour**	RAL 9005 (black)*	RAL 8019 (grey-brown)* A00-D6 (silver)

**2.9.2. PARAMETERS OF WICKETS INBUILT INTO THE DOOR LEAF WITH PANORAMIC GLAZING****2.9.2.1. Wicket parameters**

The wicket is built into the door leaf consisting of sandwich panels and panoramic sections from the series AluPro. Wickets are available in right or left versions. Wickets open outward only.

The wicket lock is installed in the second or third panel from the bottom.

The wicket can consist of 3–5 sections depending on the door height.

Wicket width is 920 mm.

Wicket height is from 1800 to 2310 mm high depending of the door height.

Choice of the wicket type depends on the door width. The limits are shown in the table below.

Doors width, mm	Type of wicket
from 2125 to 5000	with flat (20 mm) threshold
from 2125 to 4500	with low (100 mm) threshold
from 4505 to 6000***	with standard (145 mm) threshold

**2.9.2.2. Dimensions limits**

Minimum door width with a wicket is 2125 mm. Minimum door height with a wicket is 1960 mm.

Wicket installation into end sections of doors is not possible.

**2.10. DOOR DIMENSIONS**

Sectional doors are ordered according to the following parameters: opening width × opening height (LDB×RM).

Actual width of the door leaf exceeds the nominal width of the opening:

- by 40 mm (by 20 mm on both left and right sides) for the doors with torsion springs;
- by 20 mm (by 10 mm on both left and right sides) for the doors with tension springs.

Actual height of the door leaf exceeds the nominal height of the opening:

- by 15 mm for both the doors with torsion springs and with tension springs.

\* Colours closely correspond to RAL scale.

\*\* It is possible to paint the framing profiles of the wicket and the opening, in colours which closely correspond to RAL, DB scale or ADS703 colour. The possibility of painting in dark colours, such as metallic colours, pearl and reflective colours will be considered upon request.

\*\*\* Maximum opening width for the doors with wicket and M-ribbed or L-ribbed sandwich-panels without embossing is 5000 mm.





## 2.11. OPENING REQUIREMENTS AND TAKING MEASUREMENTS

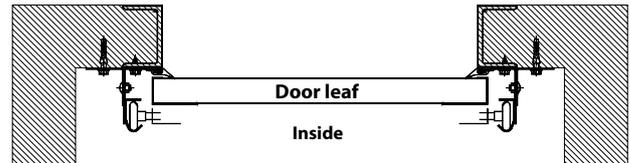
### 2.11.1. REQUIREMENTS FOR THE OPENING

Prepared openings should meet the following requirements:

- openings generally should be rectangular with vertical sides;
- the internal wall face should be straight and flat without rough uneven surfaces;
- the opening should not be out of square between the vertical and horizontal by more than 1.5 mm/m and not more than 5 mm over the full width or height;
- the whole wall face above the lintel and both reveals should be vertical and on the same plane horizontally.

If the walls of the opening are constructed of solid material, e.g. concrete, stone, solid brick etc, it is permissible to fit the fixings of the frames direct to this structure.

If the walls of the opening are made of soft materials e.g. economy brick (cavitated ceramic and silicate brick) or ceramic stones and slotted silicate stones, as well as cellular concrete (gas and foam concrete, gas and foam silicate) and silicate blocks it is recommended to fit the opening with a construction of shaped metal profile.



If installation of metal reinforcing plates is not possible then the fixings should be bolted fully through the wall thickness i.e. through bolt or should be used fittings designed for mounting the doors into the openings made of soft materials.

### 2.11.2. TAKING MEASUREMENTS FOR INSIDE PREMISES AND ENTRANCE OPENINGS

Before taking measurements ensure the floor area is clean and level, so the sizes can be measured accurately from the structural elements. Establish the floor zero point and measure up from there.

The opening is measured from the inside of the premises, as sectional doors are mounted on the inside surface of the opening.

The opening is measured in 3 places on the reveals, top, middle and bottom, and also on the height, left, middle and right sides. The largest of the 3 dimensions are used for ordering the door sizes.

Using a spirit level check the floor and lintel are level and the walls are vertical. To check the opening is square check the diagonals using a tape measure.

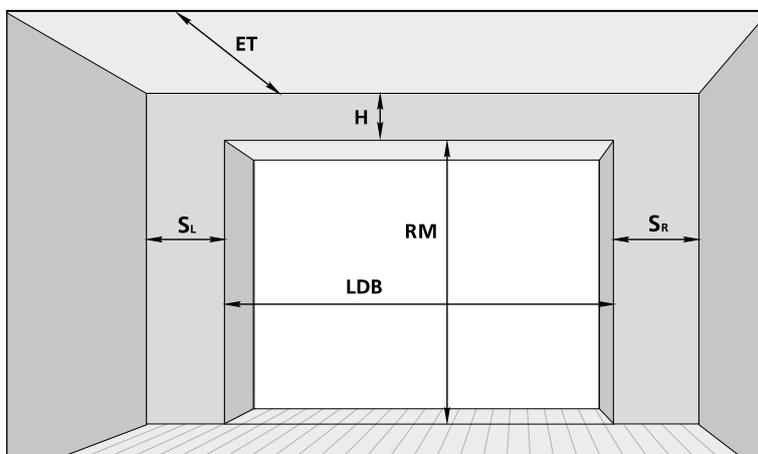
It is assumed that the height of the parallel walls and the distance between the lintel and the floor and the diagonals do not show more than a 5 mm difference. If they are it may be possible to overcome this with the fitting of a wider or higher door.

Check the depth of the room between the floor and ceiling to ensure they are parallel and the roof or floor do not have an excessive slope which would affect the horizontal frame mounting.

The dimensions of the opening you supply are used to calculate the dimensions of the doors (see section 2.10).

**ATTENTION!** Ensure there are no heating pipes, water pipes or ducts or electrical cables in the areas where the door is to be installed and will operate that may foul the door in operation.

### 2.11.3. MEASUREMENT PROCEDURE SCHEME



- RM—Opening height
- LDB—Opening width
- H—Headroom height
- ET—Depth of door entrance into the premises
- SL, SR—Side room

## 2.12. DOOR MOUNTING PLANS

### 2.12.1. MOUNTING PLAN SYMBOLS

Parameter	Description
RM	Opening height
LDB	Opening width
H	Headroom height
H1, H2	Dimensions limiting door operating area
H3	Height to horizontal track
HL	Height of horizontal track positioning from the top of the opening
LDH	Clear opening height
LDW	Clear opening width
ET	Depth of door entering into the premises
BW	Dimension of electric drive positioning
HR	Height of electric drive rail positioning
DM, DH	Positioning of fixing points
$S_{min}$	Minimum side room for angle bars mounting
$T_{min}$	Minimum side room for torsion mechanism

### 2.12.2. GENERAL INFORMATION

Garage door mounting types are chosen based on the current headroom height (dimension H), the presence of a wicket in the door leaf and the type of operating controls selected using the following parameters:

#### Doors with torsion springs

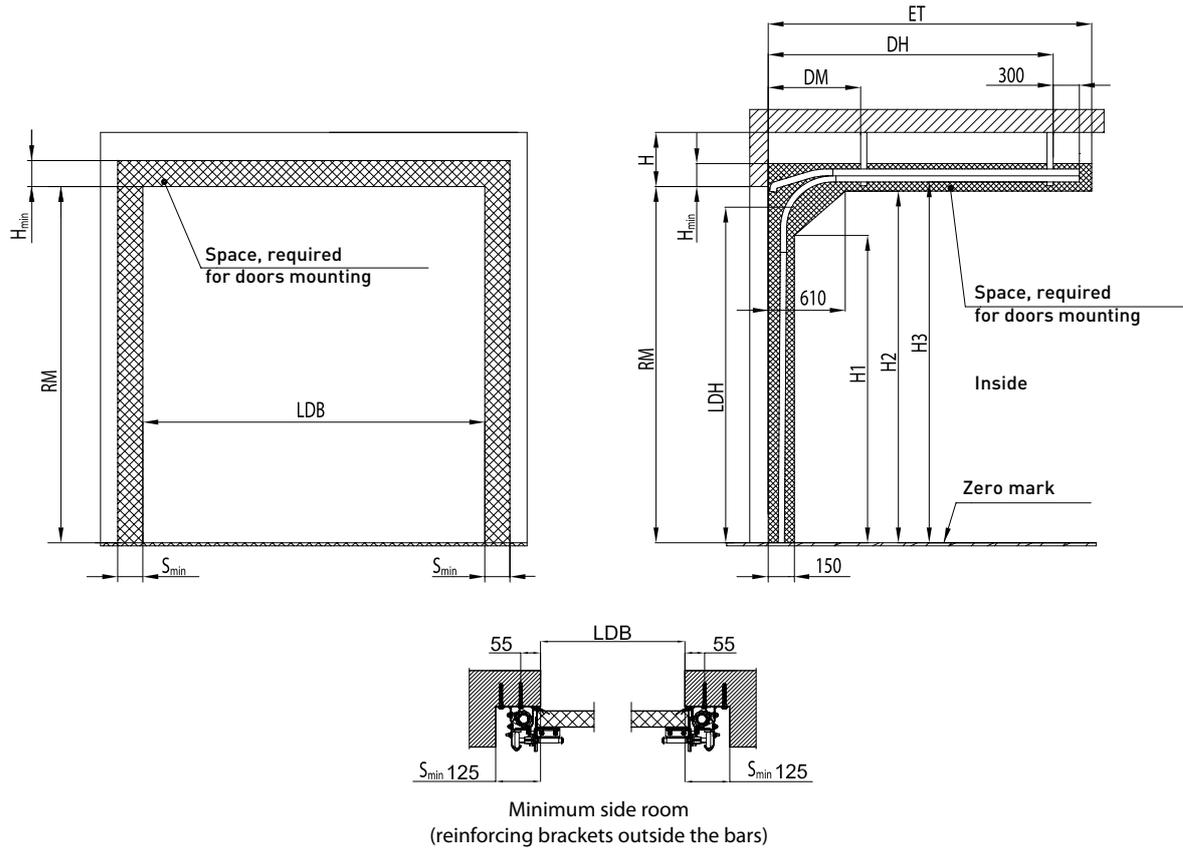
Door type	Operating options	Minimum height of the headroom $H_{min}$ , mm	Mounting type
Garage without wicket	Manual	100	Low
	With electric drive	125	
Garage with wicket	Manual	105	
	With electric drive	130	
Garage with or without wicket	Regardless the type of door control	210	Standard
Garage without wicket	Regardless the type of door control	500	High
Garage with wicket		900	High

#### Doors with tension springs

Door type	Operating options	Minimum height of the headroom $H_{min}$ , mm	Mounting type
Garage without wicket	Manual	100	900
	With electric drive	125	

**ATTENTION!** The minimum side room (S) is required at both sides of the opening and not less than the value given in the table to mounting scheme. When using an HKU001 pulley block, the side space ( $S_{min}$ ) does not increase.

2.12.3. CLASSIC SERIES GARAGE DOORS WITH TENSION SPRINGS

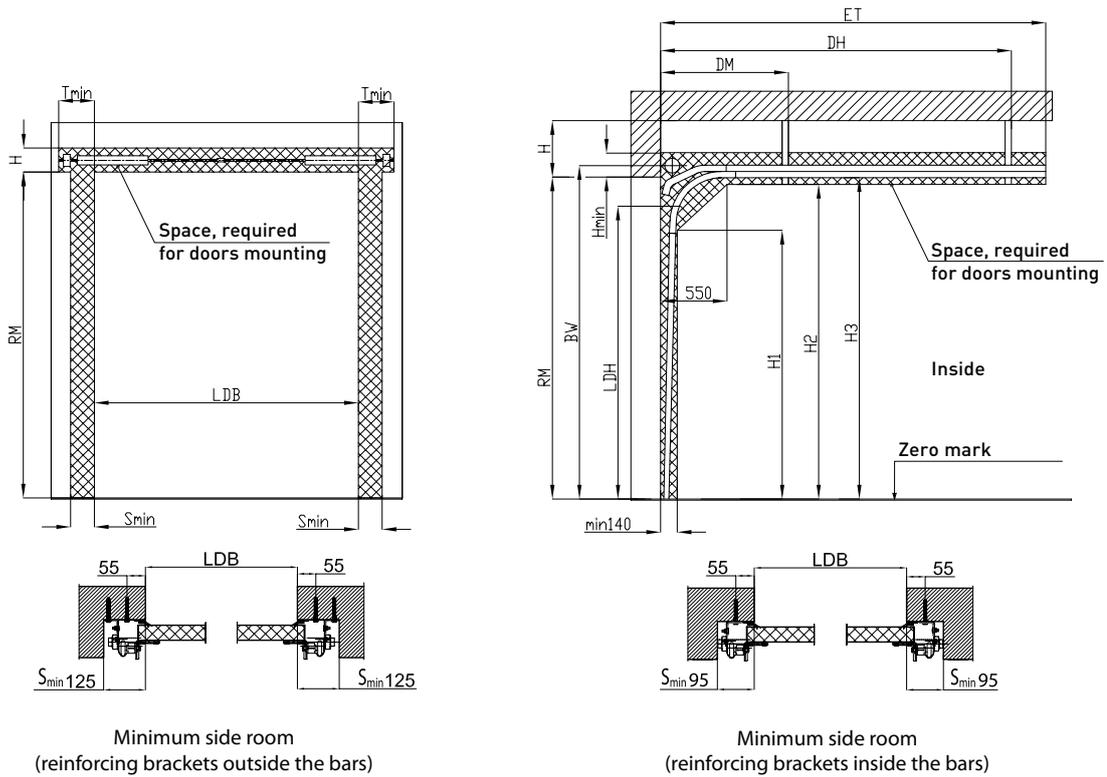


Parameter	Description	Formula or value
H, mm	Headroom height	min 100 (manual operation)
		min 125 (electric drive)
LDH, mm	Clear opening height	RM-170 (manual operation with the stopper RS0301)
		RM-100 (manual operation with the catcher LH3004)
		RM-100 (electric drive with the stopper RS0301)
LDW*, mm	Clear opening width	LDB-50
ET, mm	Depth of door entering into the premises	RM+400
DM, mm	Positioning of the fixing point	900
DH, mm	Positioning of the fixing point	RM+90
H1, mm	Dimension limiting door operating area	RM-420
H2, mm	Dimension limiting door operating area	RM-95
H3, mm	Height to the horizontal track	RM-30
S_min, mm	Minimum side room for angle bars mounting	125

\* Clear opening width is measured as the distance between the vertical seals.

## 2.12.4. CLASSIC SERIES GARAGE DOORS WITH TORSION SPRINGS

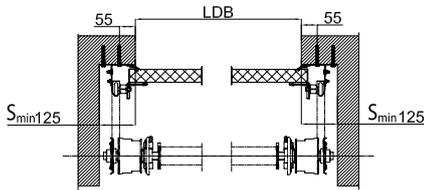
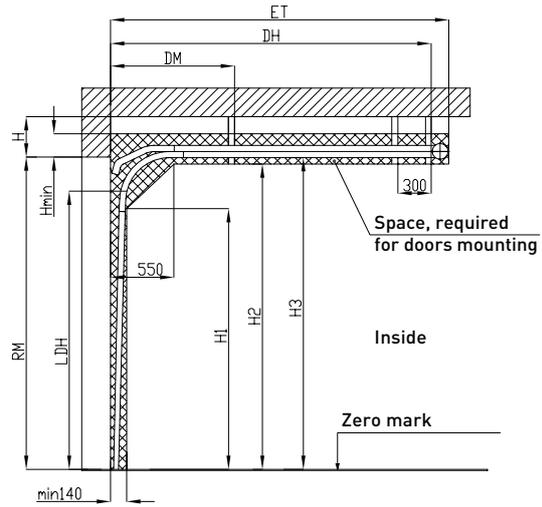
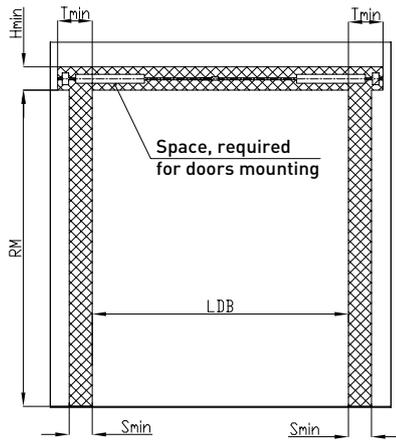
### 2.12.4.1. Doors without wicket. Standard mounting



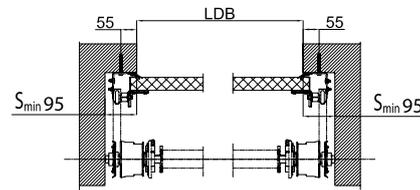
Parameter	Description	Formula or value
H, mm	Headroom height	$H_{min} = 210$
LDH, mm	Clear opening height	RM-120 (manual operation with the stopper RS0301)
		RM-25 (manual operation with the catcher LH3004)
		RM-25 (electric drive with the stopper RS0301)
LDW*, mm	Clear opening width	$LDB - 50$
BW, mm	Height to the shaft axis	$RM + 144$
ET, mm	Depth of door entering into the premises	$RM + 445$
DM, mm	Positioning of the fixing point	900
DH, mm	Positioning of the fixing point	$RM + 45$
H1, mm	Dimension limiting door operating area	$RM - 270$
H2, mm	Dimension limiting door operating area	$RM - 5$
H3, mm	Height to the horizontal track	$RM + 30$
$S_{min}'$ , mm	Minimum side room for angle bars mounting	95 — reinforcing brackets inside the bars; 125 — reinforcing brackets outside the bars
$T_{min}'$ , mm	Minimum side room for torsion mechanism	110

\* Clear opening width is measured as the distance between the vertical seals.

2.12.4.2. Doors without wicket. Low mounting



Minimum side room  
(reinforcing brackets outside the bars)

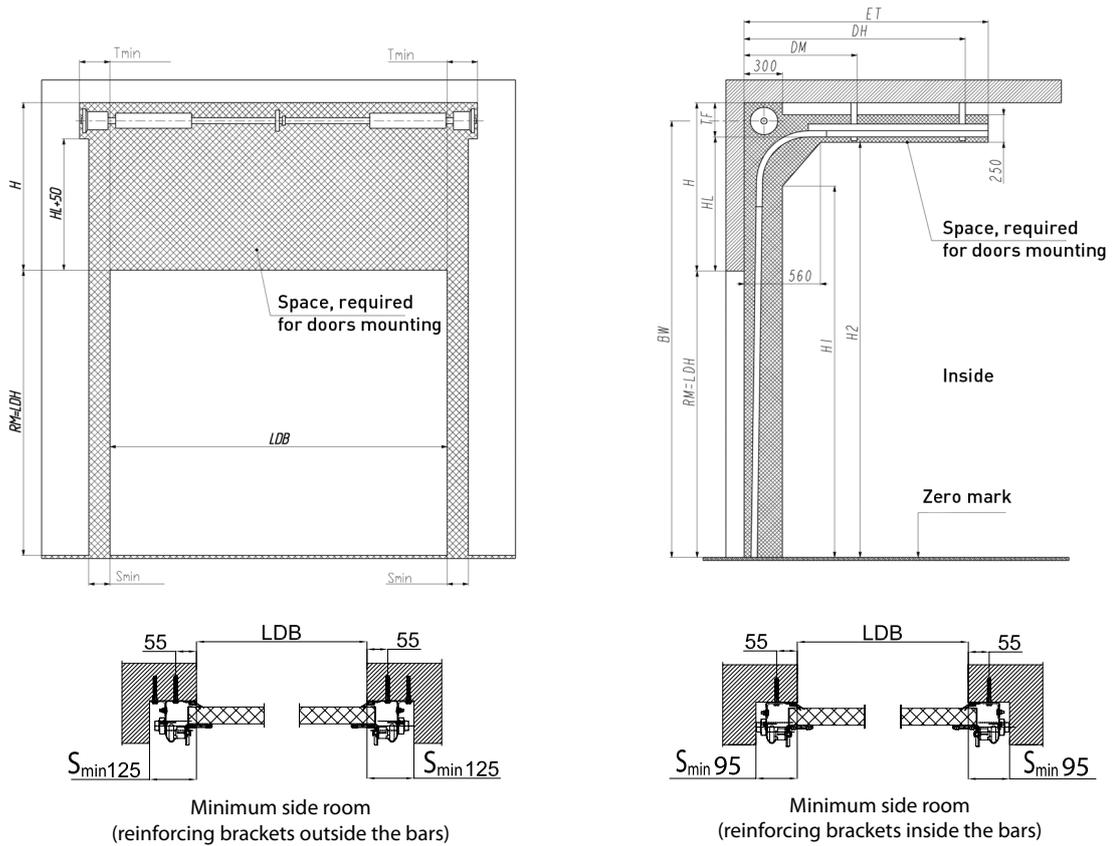


Minimum side room  
(reinforcing brackets inside the bars)

Parameter	Description	Formula or value
H, mm	Headroom height	$H_{min} = 100$ (manual operation)
		$H_{min} = 125$ (electric drive)
LDH, mm	Clear opening height	RM-170 (manual operation with the stopper RS0301)
		RM-100 (manual operation with the catcher LH3004)
		RM-100 (electric drive with the stopper RS0301)
LDW*, mm	Clear opening width	LDB-50
ET, mm	Depth of door entering into the premises	RM+550
DM, mm	Positioning of the fixing point	900
DH, mm	Positioning of the fixing point	RM+225
H1, mm	Dimension limiting door operating area	RM-435
H2, mm	Dimension limiting door operating area	RM-95
H3, mm	Height to the horizontal track	RM-30
$S_{min}$ , mm	Minimum side room for angle bars mounting	95 — reinforcing brackets inside the bars; 125 — reinforcing brackets outside the bars
$T_{min}$ , mm	Minimum side room for torsion mechanism	110

\* Clear opening width is measured as the distance between the vertical seals.

**2.12.4.3. Doors without wicket. High mounting**



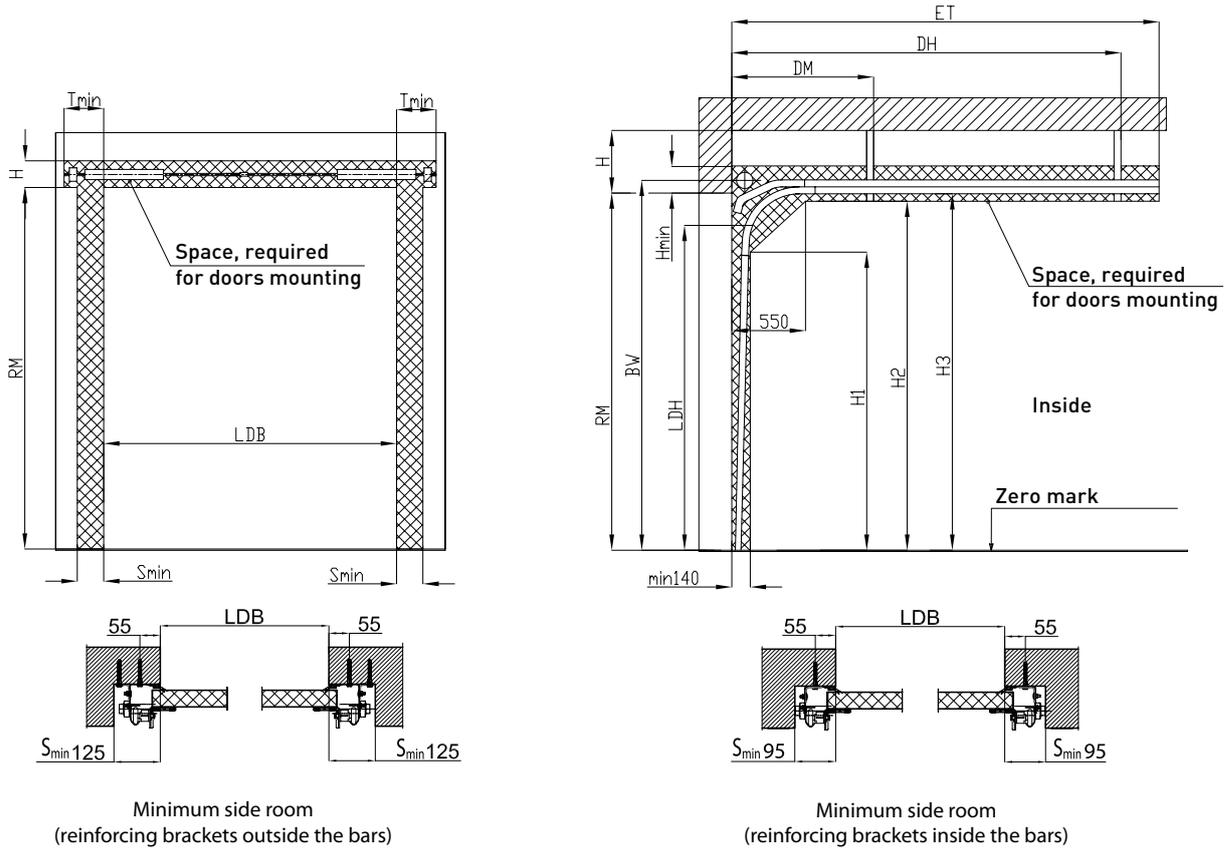
Parameter	Description	Formula or value	
H, mm	Headroom height	$H_{min}=500, H_{max}=1500$	
TF, mm	Minimum distance from the horizontal track to the top edge of operating area in zone of shaft mounting	265	
HL, mm	Height from the top of the opening to the horizontal track	H-TF	$HL_{min}=235^{**}$
			$HL_{max}=1235$
LDH, mm	Clear opening height	RM	
LDW*, mm	Clear opening width	LDB-50	
DM, mm	Positioning of the fixing point	1050	
DH, mm	Positioning of the fixing point	$RM-HL+620$	
ET, mm	Depth of door entering into the premises	$RM-HL+850$	
H1, mm	Dimension limiting door operating area	$RM+HL-455$	
H2, mm	Dimension limiting door operating area	$RM+HL-55$	
BW, mm	Height to the shaft axis	$RM+HL+160$	
$S_{min}'$ , mm	Minimum side room for angle bars mounting	95 — reinforcing brackets inside the bars; 125 — reinforcing brackets outside the bars	
$T_{min}'$ , mm	Minimum side room for torsion mechanism	240	

\* Clear opening width is measured as the distance between the vertical seals.

\*\* If  $HL < 635$  mm:

- it is possible to install only one side handle (art. HG008) or double side handle (art. HGI007);
- the locking device is not installed.

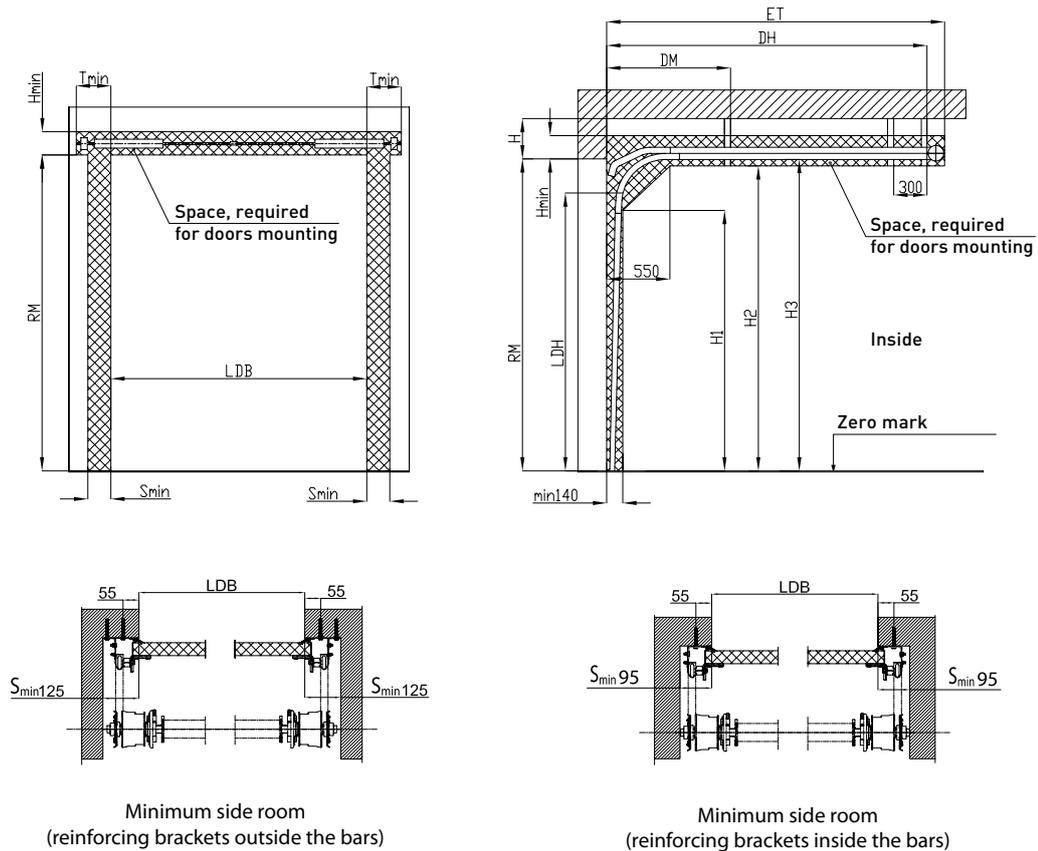
2.12.4.4. Doors with wicket. Standard mounting



Parameter	Description	Formula or value
H, mm	Headroom height	$H_{min} = 210$
LDH, mm	Clear opening height	RM-150 (manual operation with the stopper RS0301)
		RM-80 (manual operation with the catcher LH3004)
		RM-80 (electric drive with the stopper RS0301)
LDW*, mm	Clear opening width	$LDB - 50$
BW, mm	Height to the shaft axis	$RM + 144$
ET, mm	Depth of door entering into the premises	$RM + 445$
DM, mm	Positioning of the fixing point	900
DH, mm	Positioning of the fixing point	$RM + 45$
H1, mm	Dimension limiting door operating area	$RM - 270$
H2, mm	Dimension limiting door operating area	$RM - 5$
H3, mm	Height to the horizontal track	$RM + 30$
$S_{min}$ , mm	Minimum side room for angle bars mounting	95 — reinforcing brackets inside the bars; 125 — reinforcing brackets outside the bars
$T_{min}$ , mm	Minimum side room for torsion mechanism	110

\* Clear opening width is measured as the distance between the vertical seals.

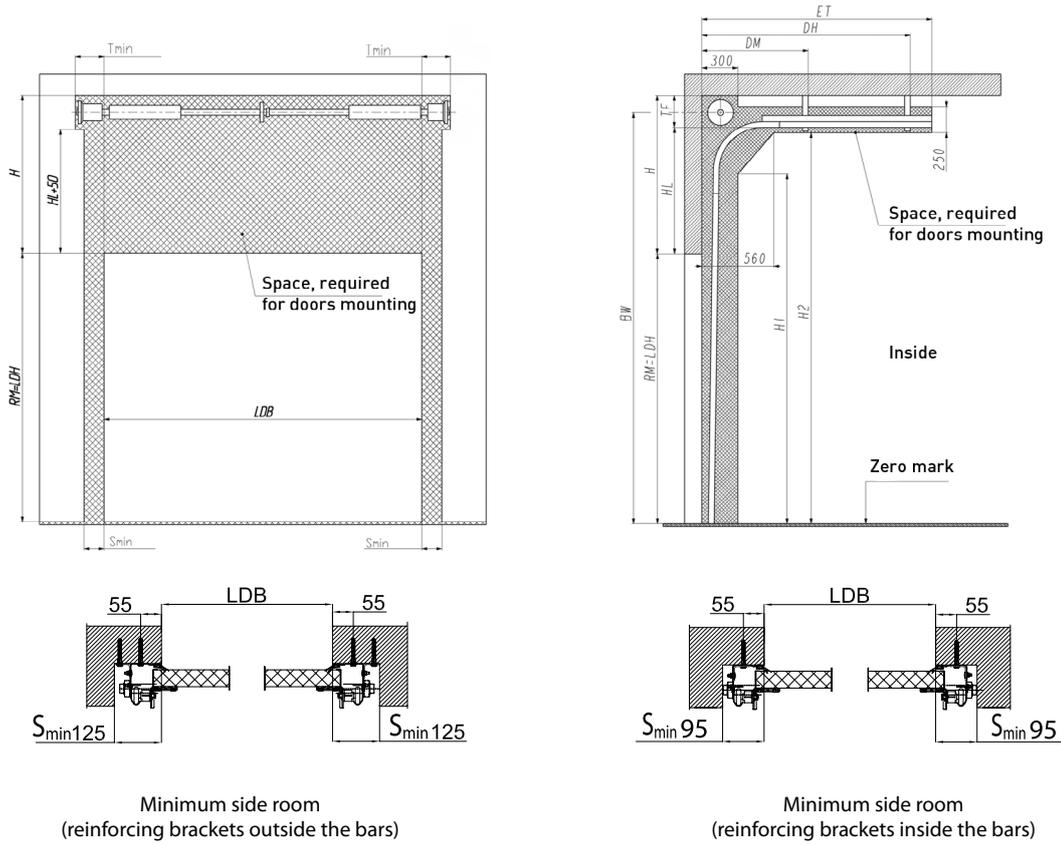
## 2.12.4.5. Doors with wicket. Low mounting



Parameter	Description	Formula or value
H, mm	Headroom height	$H_{min} = 105$ (manual operation)
		$H_{min} = 130$ (electric drive)
LDH, mm	Clear opening height	RM-195 (manual operation with the stopper RS0301)
		RM-125 (manual operation with the catcher LH3004)
		RM-125 (electric drive with the stopper RS0301)
LDW*, mm	Clear opening width	LDB-50
ET, mm	Depth of door entering into the premises	RM+550
DM, mm	Positioning of the fixing point	900
DH, mm	Positioning of the fixing point	RM+225
H1, mm	Dimension limiting door operating area	RM-435
H2, mm	Dimension limiting door operating area	RM-95
H3, mm	Height to the horizontal track	RM-30
$S_{min}$ , mm	Minimum side room for angle bars mounting	95 — reinforcing brackets inside the bars; 125 — reinforcing brackets outside the bars
$T_{min}$ , mm	Minimum side room for torsion mechanism	110

\* Clear opening width is measured as the distance between the vertical seals.

2.12.4.6. Doors with wicket. High mounting



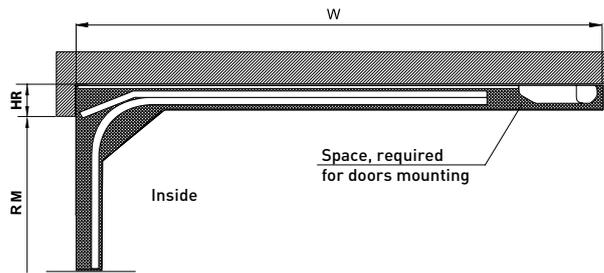
Minimum side room  
(reinforcing brackets outside the bars)

Minimum side room  
(reinforcing brackets inside the bars)

Parameter	Description	Formula or value	
H, mm	Headroom height	$H_{min}=900, H_{max}=1500$	
TF, mm	Minimum distance from the horizontal track to the top edge of operating area in zone of shaft mounting	265	
HL, mm	Height from the top of the opening to the horizontal track	H-TF	$HL_{min}=635$ $HL_{max}=1235$
LDH, mm	Clear opening height	RM	
LDW*, mm	Clear opening width	LDB-50	
DM, mm	Positioning of the fixing point	1050	
DH, mm	Positioning of the fixing point	$RM-HL+620$	
ET, mm	Depth of door entering into the premises	$RM-HL+850$	
H1, mm	Dimension limiting door operating area	$RM+HL-455$	
H2, mm	Dimension limiting door operating area	$RM+HL-55$	
BW, mm	Height to the shaft axis	$RM+HL+160$	
$S_{min}$ , mm	Minimum side room for angle bars mounting	95 — reinforcing brackets inside the bars; 125 — reinforcing brackets outside the bars	
$T_{min}$ , mm	Minimum side room for torsion mechanism	240	

\* Clear opening width is measured as the distance between the vertical seals.

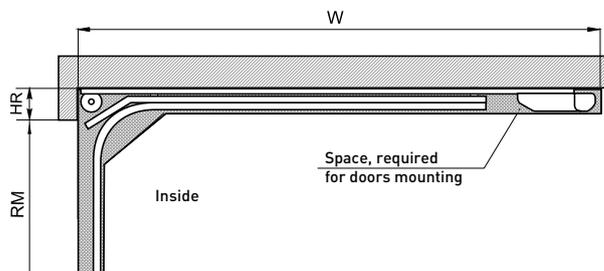
## 2.12.5. ADDITIONAL REQUIREMENTS FOR OPENINGS FOR ELECTRIC DRIVE INSTALLATION ON CLASSIC SERIES DOORS WITH TENSION SPRINGS



Type of electric drive	Opening height (RM), mm	Type of drive rail	Dimensions of drive positioning W, mm	Height of rail positioning HR, mm	
Comfort 50/60	to 2600	SZ-12SL (RU)	3750	130	
Comfort 60L	to 3150	SZ-13SL	4300		
Comfort 260/270/280 (speed)	to 2100	SZ-11SL	3300		
	to 2350	SZ-12SL	3550		
	to 2550	SZ-12SL (RU)	3750		
	to 3100	SZ-13SL	4300		
RT600/1000	to 2650	LGR-3600B	3900		135*/220
	to 3250	LGR-4200B	4500		
ASG600/1000	to 2600	ASGR3/3B	3700	130	
ASG1000	to 3300	ASGR4/4B	4400		
Levigato	to 2400	LGR-3300B/C	3650		
	to 2700	LGR-3600B/C	3950		
	to 3300	LGR-4200B/C	4550		

## 2.12.6. ADDITIONAL REQUIREMENTS FOR OPENINGS FOR ELECTRIC DRIVE INSTALLATION ON CLASSIC SERIES DOORS WITH TORSION SPRINGS

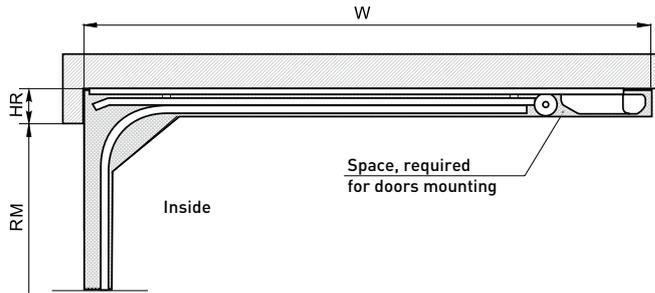
### 2.12.6.1. Standard mounting



Type of electric drive	Opening height (RM), mm	Type of drive rail	Dimensions of drive positioning W, mm	Height of rail positioning HR, mm	
Comfort 50/60	to 2600	SZ-12SL (RU)	3750	210	
Comfort 60L	to 3150	SZ-13SL	4300		
Comfort 260/270/280 (speed)	to 2100	SZ-11SL	3300		
	to 2350	SZ-12SL	3550		
	to 2550	SZ-12SL (RU)	3750		
	to 3100	SZ-13SL	4300		
RT600/1000	to 2650	LGR-3600B	3900		210*/245
	to 3250	LGR-4200B	4500		
ASG600/1000	to 2600	ASGR3/3B	3700	210	
ASG1000	to 3300	ASGR4/4B	4400		
Levigato	to 2400	LGR-3300B/C	3650		
	to 2700	LGR-3600B/C	3950		
	to 3300	LGR-4200B/C	4550		

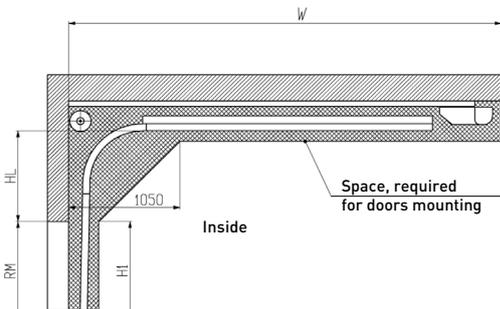
\* Only if to move a rail carriage to a rear door C-profile (the carriage shouldn't be moved beyond the rear door C-profile). Rail carriage design should be taken into consideration for installation of doors with the motor. Detailed information can be found in the motor installation manual.

2.12.6.2. Low mounting



Type of electric drive	Opening height (RM), mm	Type of drive rail	Dimensions of drive positioning W, mm	Height of rail positioning HR, mm
Comfort 50/60	to 2550	SZ-12SL (RU)	3750	130
Comfort 60L	to 3100	SZ-13SL	4300	
Comfort 260/270/280 (speed)	to 2050	SZ-11SL	3300	
	to 2300	SZ-12SL	3550	
	to 2500	SZ-12SL (RU)	3750	
RT600/1000	to 2600	LGR-3600B	3900	
	to 3200	LGR-4200B	4500	
ASG600/1000	to 2550	ASGR3/3B	3700	135*/220
ASG1000	to 3250	ASGR4/4B	4400	
Levigato	to 2350	LGR-3300B/C	3650	130
	to 2650	LGR-3600B/C	3950	
	to 3250	LGR-4200B/C	4550	

2.12.6.3. High mounting



Dimension limiting door operating area  $H1=RM$ .

Electric drive is installed together with extension rod art. 150082 or art. 564868. Choice of the extension rod depends on the parameter HL:

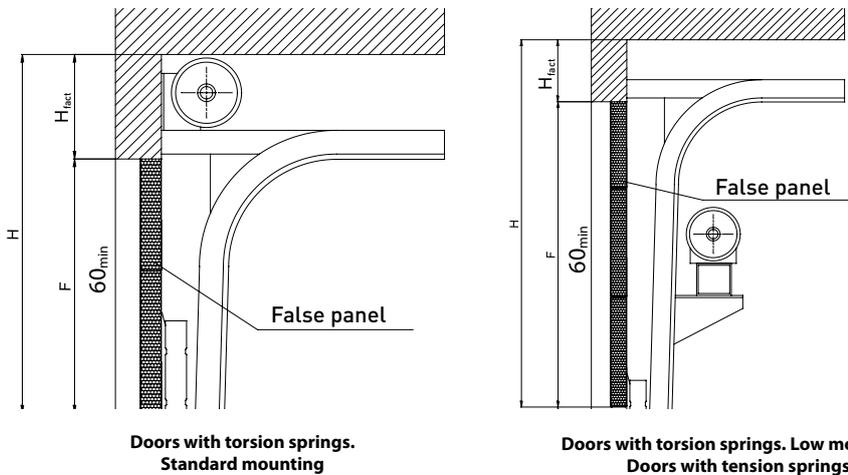
- if  $900 > HL \geq 1500$  mm the rod 2125 mm long is used, art. 564868.
- if  $500 > HL \geq 900$  mm the rod 1000 mm long is used, art. 150082, it is acceptable to use the rod art. 564868.

Type of electric drive	Opening height (RM), mm	Type of drive rail	Dimensions of drive positioning W, mm
Comfort 50/60	to 2550	SZ-12SL (RU)	3750
Comfort 60L	to 3100	SZ-13SL	4300
Comfort 260/270/280 (speed)	to 2050	SZ-11SL	3300
	to 2300	SZ-12SL	3550
	to 2500	SZ-12SL (RU)	3750
	to 3050	SZ-13SL	4300
RT600/1000	to 2500	LGR-3600B	3900
	to 3150	LGR-4200B	4500
ASG600/1000	to 2200	ASGR3/3B	3700
ASG1000	to 2900	ASGR4/4B	4400
Levigato	to 2300	LGR-3300B/C	3650
	to 2600	LGR-3600B/C	3950
	to 3250	LGR-4200B/C	4550

\* Only if to move a rail carriage to a rear door C-profile (the carriage shouldn't be moved beyond the rear door C-profile). Rail carriage design should be taken into consideration for installation of doors with the motor. Detailed information can be found in the motor installation manual.

## 2.13. FALSE PANEL

### 2.13.1. USE OF A FALSE PANEL FOR INCREASING THE HEADROOM HEIGHT



A false panel is used for headroom height less than specified in section 2.12 for the doors:

- with torsion springs of standard and low type of mounting;
- with tension springs.

#### Method of calculating the height of the false panel and ordering the correct door height:

- measure actual height of the headroom— $H_{\text{fact}}$
- compare actual height of the headroom with the minimum required— $H_{\text{min}}$ .
- if  $H_{\text{fact}}$  is less than  $H_{\text{min}}$ , define the required dimension of the false panel  $F$  using the following formula:

$$F = H_{\text{min}} - H_{\text{fact}}$$

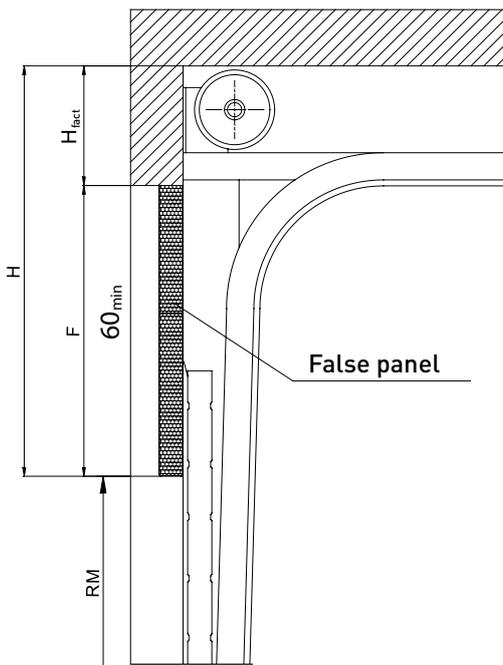
- compare the calculated result  $F$  with the minimum height of the false panel. Minimum height of the false panel  $F_{\text{min}} = 60$  mm.
- if the calculated dimension  $F$  is less than  $F_{\text{min}}$ , it must be increased to the minimum dimension.

And ordered door height must be corrected using the formula:

$$RM = \text{Height to the ceiling} - H_{\text{fact}} - F_{\text{min}}$$

**ATTENTION!** Installation of the torsion shaft elements to the false panel is **PROHIBITED!**

### 2.13.2. USE OF A FALSE PANEL FOR REDUCING THE HEIGHT OF THE DOOR OPENING



This option can be used on garage doors with high mounting if there is a necessity to reduce the doors height.

Minimum actual height of the headroom  $H_{\text{fact}}$  while using the false panel is 350 mm. Minimum height of the false panel  $F_{\text{min}}$  is 60 mm. Minimum height of the false panel  $F_{\text{max}}$  is 1290 mm

#### Method of calculating the height of the false panel and ordering the correct door height:

- measure actual height of the headroom— $H_{\text{fact}}$ ;
- specify the required door height  $RM$ ;
- define the necessary height of the false panel  $F$  using the following formula:

$$F = \text{Height of the ceiling} - RM - H_{\text{fact}}$$

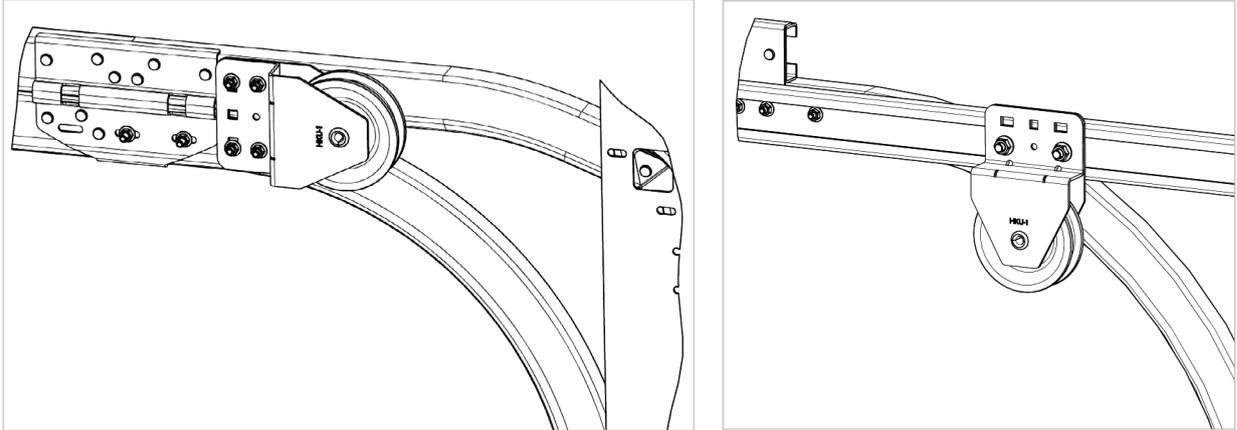
- compare the calculated result  $F$  with the acceptable dimensions of the false panel:
  - if the received result  $F$  is less than  $F_{\text{min}} = 60$  mm, the height of the false panel must be increased to the minimum acceptable;
  - if necessary correct the ordered door height using the following formula:

$$RM = \text{Height to the ceiling} - H_{\text{fact}} - F_{\text{min}}$$

- if the calculated result  $F$  is more than the maximum acceptable  $F_{\text{max}} = 1290$  mm, the height of the false panel must be decreased to the maximum acceptable. If necessary correct the ordered door height using the following formula:

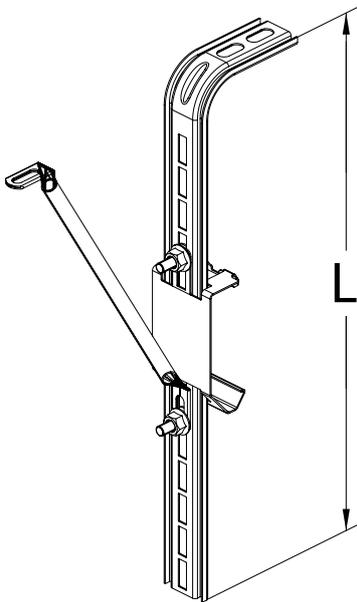
$$RM = \text{Height to the ceiling} - H_{\text{fact}} - F_{\text{max}}$$

## 2.14. PULLEY BLOCK FOR MANUAL DOOR OPENING HKU001



Use of this system does not apply additional requirements to the opening parameters.

## 2.15. TELESCOPIC HANGER SYSTEM



Type of system	Dimensions of telescopic hanger L, mm
CS-1	300
CS-2	500
CS-3	800
CS-4	1000
CS-5	1500

The type of the telescopic hanger is chosen depending on the distance between the ceiling and the door horizontal track.

Standard set for doors of high mounting includes CS-2 hangers; a set for doors of other mounting types include CS-1 hangers.

CS-5 hangers are used only on doors of high mounting type.

Number of hangers for horizontal tracks in garage doors:

Number of hangers for horizontal tracks in one door, pcs.	Doors height (RM), mm
4	RM < 3000
6	RM = 3000

For doors with low type of mounting additional hangers for the spacer bar are supplied. The number of such hangers for every door is defined automatically with a special programme depending on the doors dimensions and number of springs (no more than 6 and no less than 3).

Number of hangers for spacer bar in one door, pcs.	Number of springs, pcs	Doors width (LDB), mm
3	2	LDB < 4000
4	2	LDB ≥ 4000
4	3	LDB < 4000
5	3	LDB ≥ 4000
5	4	LDB < 4000
6	4	LDB ≥ 4000

# 3 DESIGN DESCRIPTION AND TECHNICAL GUIDE FOR INSTALLATION OF TREND SERIES GARAGE SECTIONAL DOORS

## 3.1. DOOR VERSIONS

A system for balancing of the door leaf with tension springs is used on doors with a width of 3500 mm\*. A system for balancing of the door leaf with torsion springs is used on doors with a width of more than 3500 mm (hereinafter—with torsion springs).

A system for balancing of the door leaf with tension springs includes two sets, each of which consists of a duplex tension spring (spring in spring) with its fastening components paired with galvanized cables fitted with thimbles and a mounting plate.

A system for balancing of the door leaf with torsion springs includes a shaft assembled with spring-tipped spring, an intermediate bracket (or intermediate brackets, depending on the dimensions and weight of the door), cable drums, coupler, two galvanized cables connected with thimbles. The standard package includes brackets with a safety ratchet to prevent the door leaf falling in the case of a spring breaking.

Established spring endurance—up to 25.000 cycles of lifting and lowering the door leaf.

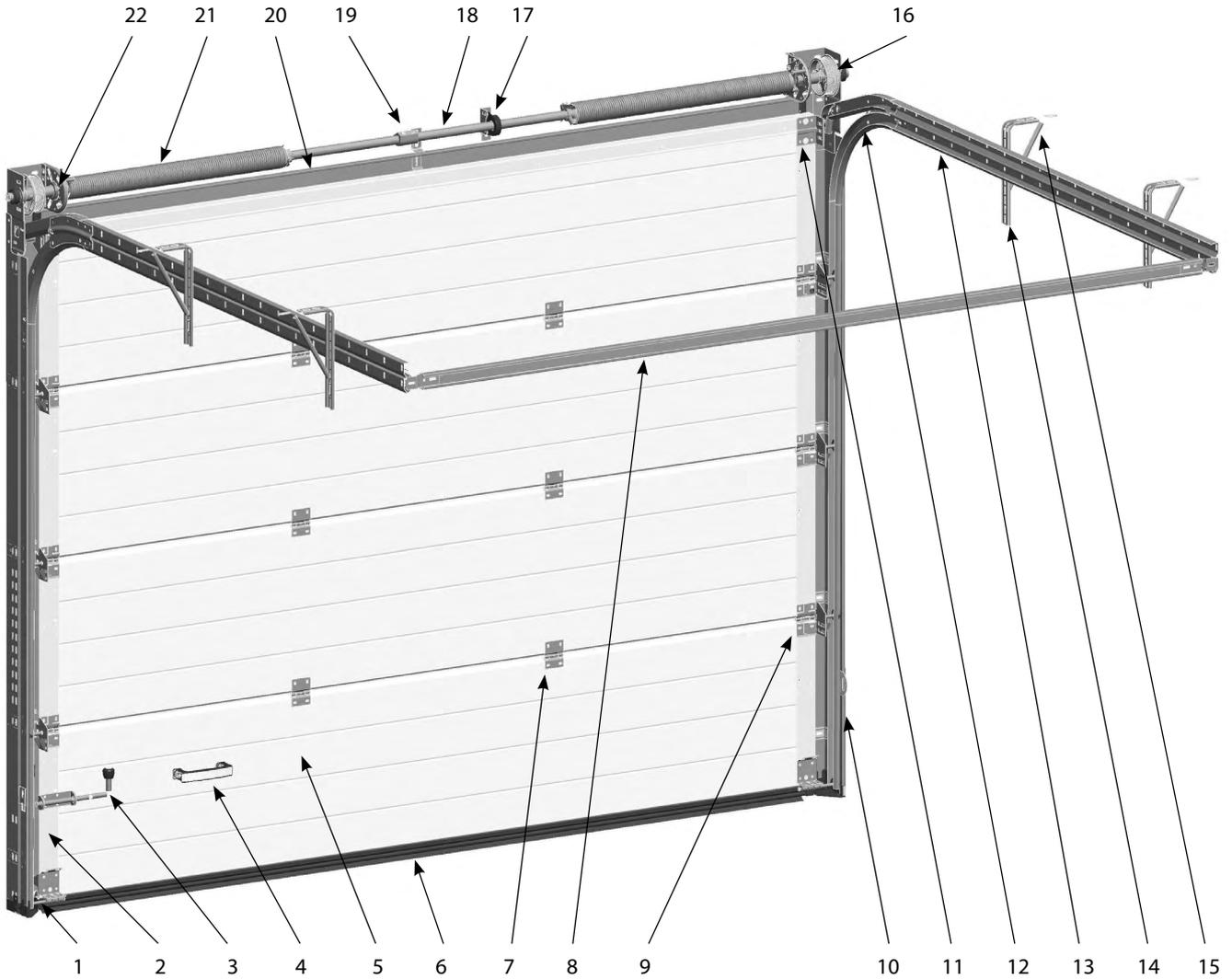
Doors with torsion springs are manufactured in three variants depending on the chosen type of mounting—standard, low or high.

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\* The list of door dimensions supplied by default with tension springs is specified in par. 3.10.

## 3.2. TYPICAL DOOR DESIGNS

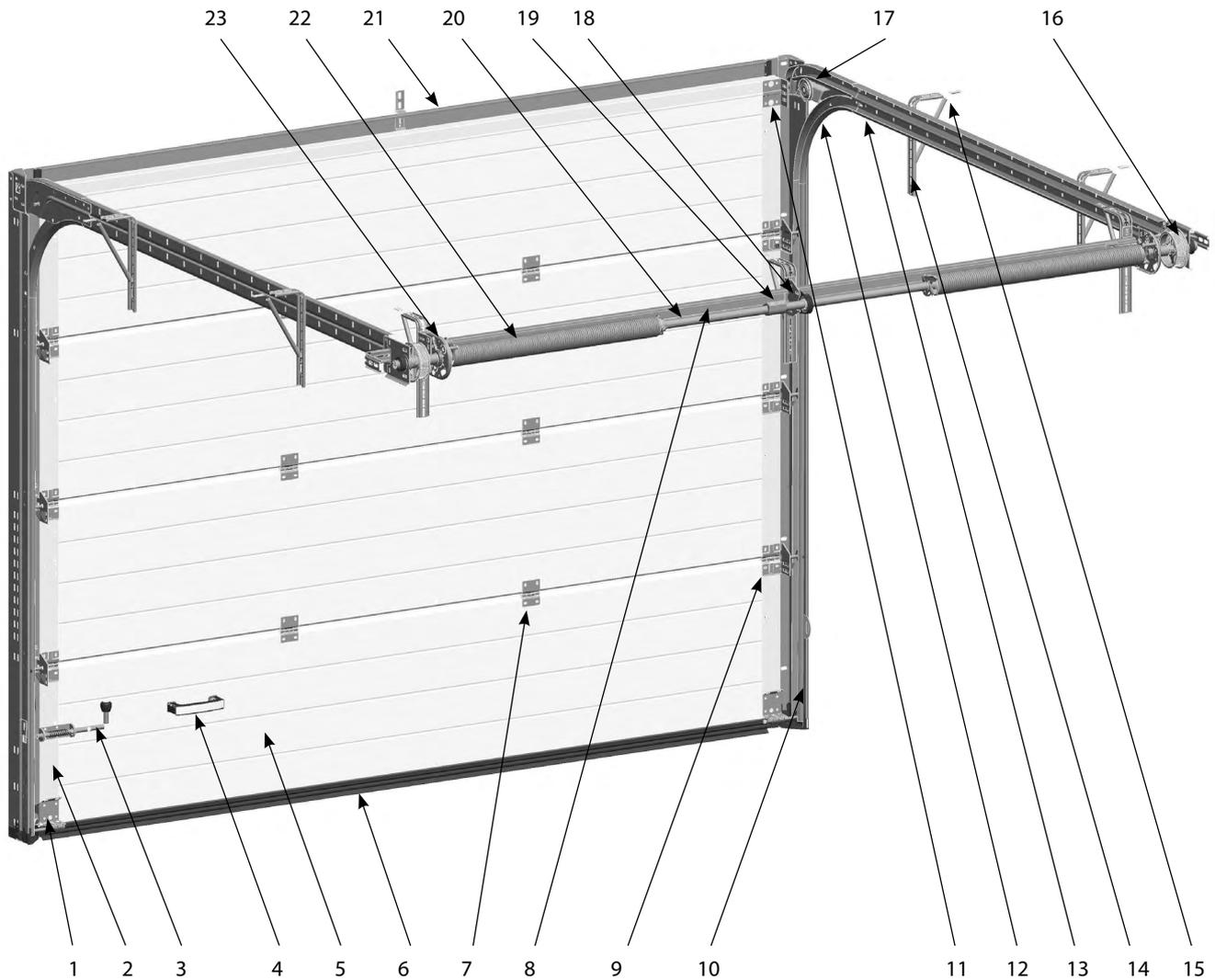
### 3.2.1. TREND SERIES DOORS WITH TORSION SPRINGS. STANDARD MOUNTING



Nr.	Item
1	Bottom bracket with roller
2	Side cap
3	Locking bar
4	Handle (inner or double side)
5	Door panel
6	Bottom end profile with sealing insert
7	Intermediate hinge
8	Spacer bar
9	Side bracket with roller
10	Angle bar with vertical track profile and side sealing insert
11	Top roller bracket

Nr.	Item
12	Radius profile
13	Horizontal track
14	Hanger
15	Crossbar
16	Cable drum
17	Intermediate bracket
18	Shaft
19	Connecting coupler
20	Cover strip with sealing insert
21	Spring with connecting devices
22	Bracket with safety ratchet jaw clutch

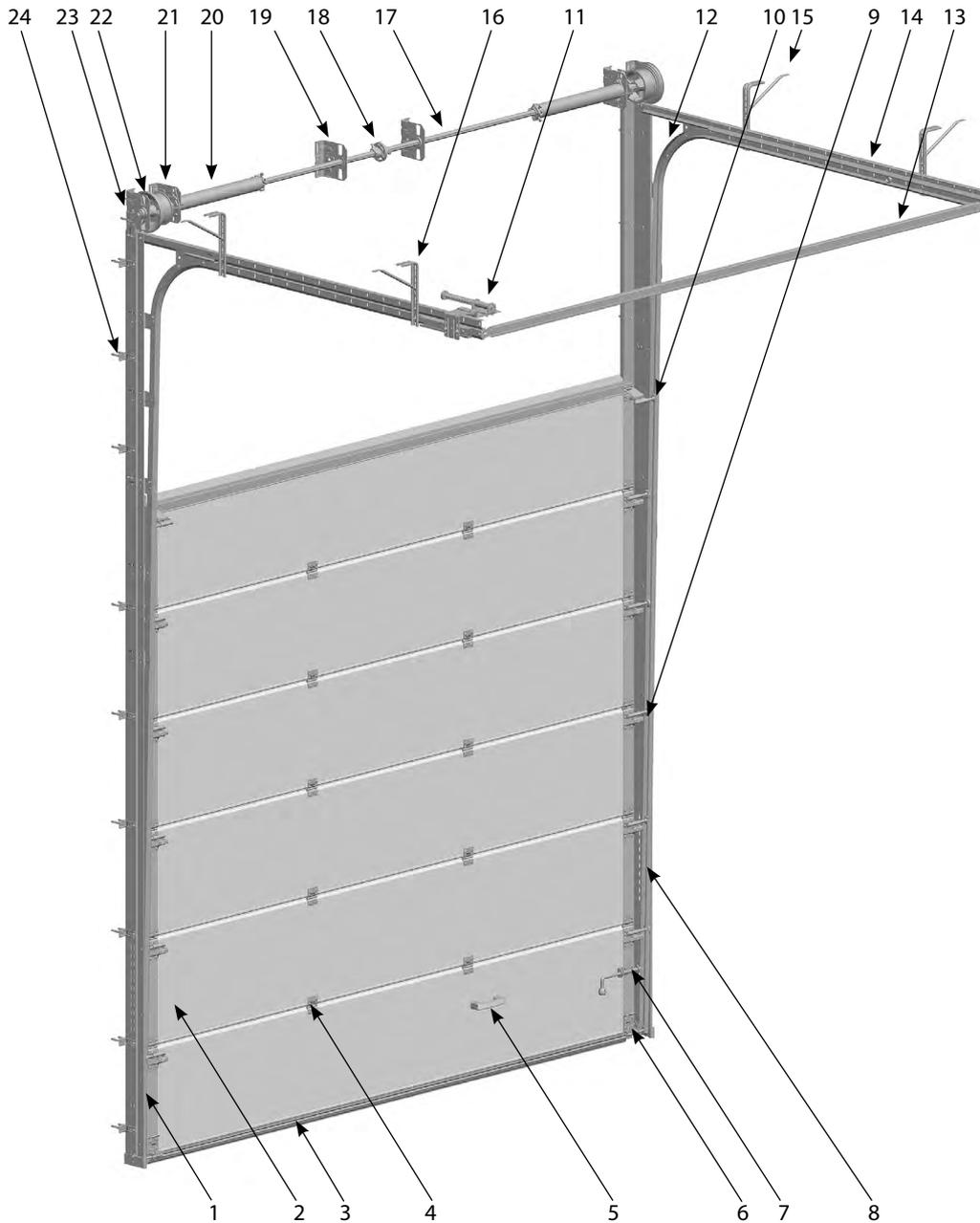
### 3.2.2. TREND SERIES DOORS WITH TORSION SPRINGS. LOW MOUNTING



Nr.	Item
1	Bottom bracket with roller
2	Side cap
3	Locking bar
4	Handle (inner or double side)
5	Door panel
6	Bottom end profile with sealing insert
7	Intermediate hinge
8	Spacer bar
9	Side bracket with roller
10	Angle bar with vertical track profile and side sealing insert
11	Top roller bracket
12	Radius profile

Nr.	Item
13	Horizontal track
14	Hanger
15	Crossbar
16	Cable drum
17	Sheave
18	Intermediate bracket
19	Connecting coupler
20	Shaft
21	Cover strip with sealing insert
22	Spring with connecting devices
23	Bracket with safety ratchet jaw clutch

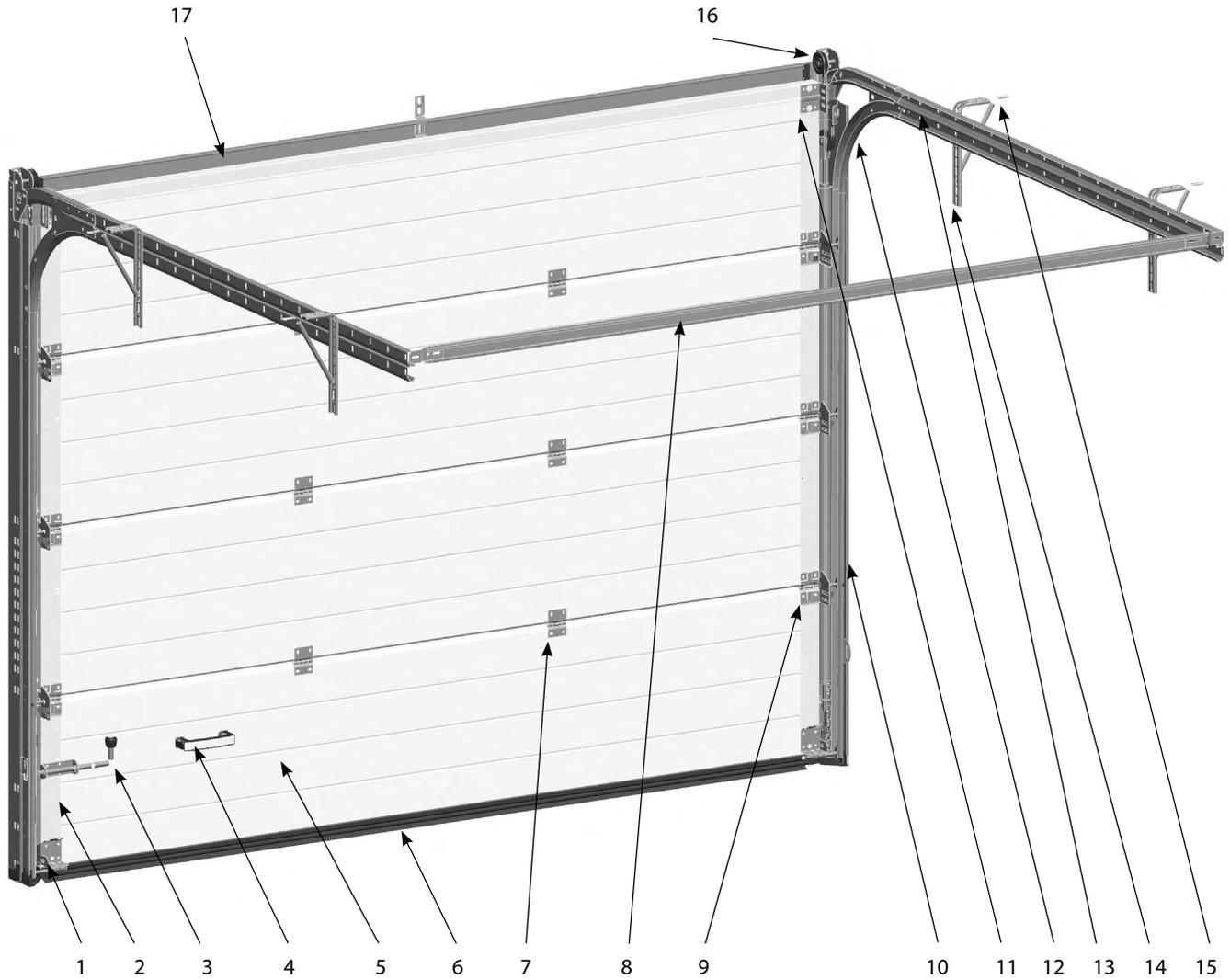
**3.2.3. TREND SERIES DOORS WITH TORSION SPRINGS.  
HIGH MOUNTING**



Nr.	Item
1	Side cap
2	Door panel
3	Bottom end profile with sealing insert
4	Intermediate hinge
5	Handle (inner or double side)
6	Bottom bracket with roller
7	Locking bar
8	Angle bar with vertical track profile and side sealing insert
9	Side bracket with roller
10	Top roller bracket
11	Spring damper
12	Radius profile

Nr.	Item
13	Spacer bar
14	Horizontal track
15	Crossbar
16	Hanger
17	Shaft
18	Connecting coupler
19	Intermediate bracket
20	Spring with connecting devices
21	Bracket with safety ratchet jaw clutch
22	Cable drum
23	Side support bracket
24	Reinforcing bracket

### 3.2.4. TREND SERIES DOORS WITH TENSION SPRINGS



Nr.	Item
1	Bottom bracket with roller
2	Side cap
3	Locking bar
4	Handle (inner or double side)
5	Door panel
6	Bottom end profile with sealing insert
7	Intermediate hinge
8	Spacer bar
9	Side bracket with roller

Nr.	Item
10	Angle bar with vertical track profile and side sealing insert
11	Top roller bracket
12	Radius profile
13	Horizontal track
14	Hanger
15	Crossbar
16	Sheave balancing system
17	Cover strip with sealing insert

### 3.3. DESCRIPTION OF DOOR SETS

#### 3.3.1. STANDARD DOOR SET ELEMENTS:

- door leaf is made of sandwich panels, on the ends of which the steel side caps are installed. Side caps are painted in a white-grey colour (similar to RAL 9002);
- set of inter-panel inserts for the door leaf of S-ribbed, M-ribbed and L-ribbed (art. P1013) panels. Inserts are installed under the side caps at the junction of the panels;
- bottom steel end profile;
- top steel end profile painted in white-grey (similar to RAL 9002);
- bottom flexible sealing insert;
- top flexible sealing insert installed on cover strip;
- set of intermediate hinges made of galvanized steel;
- set of adjustable top brackets made of galvanized steel, with rollers with bearings;
- set of adjustable side brackets made of galvanized steel, with rollers with bearings;
- set of adjustable bottom brackets made of galvanized steel, with rollers with bearings;
- balancing system for the door;
- set of angle bars with vertical track profiles and flexible sealing insert.

It is possible to move angle bars and cover strip into the opening. Doors with white (closely correspond to RAL 9016) bars and cover strip are supplied at no extra charge. The angle bars and cover strip can be painted in other colours which closely correspond to the RAL scale as an option. The possibility of painting in dark colours, metallic colours, pearl and reflecting colours is considered upon preliminary request. Only the visible areas of vertical angle bars and cover strip are painted (outside view).

- set of reinforcing brackets;
- set of horizontal track profiles and radius profiles;
- hanging system for horizontal tracks;
- spring locking bar;
- handle for door opening-closing:
  - inner side (for doors without a wicket door and/or reinforcing profiles on the door leaf);
  - double side handle can be ordered optionally;
- rope for manual door lifting;
- set of fixings for the doors assembly with a 3-layer anticorrosive coating (zinc layer, chemical conversion film, heat-treated ceramic layer).

An order should contain the information about the dimensions of the opening, type of mounting, as well as include a full list of optional accessories from the additional configuration set (see 3.4).

#### 3.3.2. VARIANTS FROM THE STANDARD SET (FOR DOORS WITH TORSION SPRINGS)

Depending on door leaf weight  $P$  the following shafts are supplied:

- $P \leq 200$  kg—hollow shaft  $\varnothing 25.4$  mm with a key groove;
- $200 \text{ kg} < P \leq 200$  kg—solid shaft  $\varnothing 25.4$  mm with a key groove.

If the doors width  $LDB$  is  $\geq 5$  m, regardless of door weight, the following items are supplied:

- longitudinal reinforcing steel profiles installed on each door panel.

If the doors width  $LDB$  is  $> 5$  m, regardless of door weight, the following items are supplied:

- double set of adjustable side and top roller brackets;
- set of longer roller plates instead of short plates;
- set of rollers with longer spindles;
- wider side caps mounted on the ends of the sandwich panels.

On high type of mounting doors, the steel reinforcing profiles are installed on door leafs wider than 4.5 m.

#### 3.3.3. DOOR PANELS

Sandwich panels are manufactured of steel sheets, hot-galvanized, with further protection layers of polyurethane coating. Panels are filled with environmentally friendly foamed polyurethane (without freon).

The panel has a special shape providing the finished door with a strong and rigid construction. Panels have special EPDM sealing inserts providing the door with reliable air-tightness.

Sandwich panels used in Trend series doors have a thickness of 40 mm.

Basic colours and wood finish colours used on the outside surfaces of the panels are shown below.

Design of panel surface	Basic colours of the front side of the panel		Wood finish colours of the front side of the panel	
	woodgrain	smooth panel	woodgrain	smooth panel
Microwave	RAL 1015—light ivory* RAL 3004—purple red* RAL 5010—gentian blue* RAL 6005—moss green* RAL 7016—anthracite grey* RAL 8014—sepia brown* RAL 8017—chocolate brown* RAL 9006—white aluminium* RAL 9016—white* ADS 703—anthracite	—	—	—
S-ribbed	RAL 1015—light ivory* RAL 3004—purple red* RAL 5010—gentian blue* RAL 6005—moss green* RAL 7016—anthracite grey* RAL 8014—sepia brown* RAL 8017—chocolate brown* RAL 9006—white aluminium* RAL 9016—white* ADS 703—anthracite	—	—	Golden Oak Dark Oak Cherry
M-ribbed	RAL 8014—sepia brown* RAL 9016—white*	RAL 7016—anthracite grey* RAL 9016—white*	—	Golden Oak Dark Oak Cherry
L-ribbed	RAL 8014—sepia brown* RAL 9016—white*	RAL 7016—anthracite grey* RAL 9016—white* ADS703—anthracite	—	Golden Oak Dark Oak Cherry
Cassette	RAL 8014—sepia brown* RAL 9016—white*	—	Golden Oak Dark Oak	—

The front side of the panel can be painted in other colours on special request using colours which closely correspond to the RAL, DB scale or ADS703 colour. The possibility of painting in dark colours, metallic colours, pearl and reflecting colours will also be considered upon request. It is not recommended to install doors made from sandwich panels of dark colours on the sunny side of a building because it can cause panel sagging and reduction in the lifetime of the door.

The inner side of the panel is painted white-grey (similar to RAL 9002). Due to the doors' design an outside steel panel is visible at the junction of two sandwich panels. On special request the inner side of the panels can be painted in other colours which closely correspond to the RAL, DB scale or ADS703 colour. The possibility of painting the inner side of panels in dark colours, metallic colours, pearl and reflecting colours will be considered upon request.

Painted steel coil is used for manufacturing of sandwich panel in standard colours. Liquid paint is applied by special rolls. For manufacturing of sandwich panels in non-standard colours sandwich panels of standard colours painted by liquid paint through air diffusion. Slight variations in colours may occur when ordering multiple door elements in one colour (e.g. profiles, framing, wicket, sandwich panels with back/face sides, window frames and decorative elements). This is due to the difference in the properties of materials (steel, aluminium, plastic), using different techniques of painting. Variations in the colour of components are also possible when ordering spare parts for repairs to previously installed doors.

### 3.4. OPTIONAL EXTRAS

#### 3.4.1. SET OF PANEL CAPS

The set is used for door leaf of S-ribbed or M-ribbed panels. The panel caps are installed under side caps in each groove of sandwich panels to improve thermal insulation and sealing properties.

#### 3.4.2. BALANCING SYSTEM FOR THE DOOR LEAF

At the request of the customer in doors of 3500 mm width a balancing system with tension springs can be replaced by a balancing system with torsion springs.\*\*

\* Colours closely correspond to RAL scale.

\*\* List of door sizes supplied with tension springs is specified in par. 3.10.

### 3.4.3. BUILT-IN WICKET

The wicket is only built into doors with a balancing system using torsion springs. A standard built-in wicket set includes the following elements:

- set of extruded aluminium profiles without thermal break used for edging a wicket or an opening;
- sealing insert made of EPDM material for sealing of wicket along the perimeter;
- mortice lock; thumb turn cylinder on the inner side and on the outer side key locking; set of keys. On request you can order the locking cylinder with a keyhole on both sides;
- reinforcing lock housing;
- set of twist handles;
- overhead-type door closer;
- electrical sensor connected with automation system to prevent the door from opening if the wicket door is not closed;
- bottom steel reinforcing profile (PRG13—used for the standard threshold, PRG12—used for the low threshold). Reinforcing profiles are painted white-grey (similar to RAL 9002). Wicket door with a flat threshold does not have the bottom reinforcing profile.

A detailed description of the wicket parameters is given in Section 3.9.

### 3.4.4. SET OF CAPS FOR WICKET

Caps are installed under the end caps in every groove of S-, M-ribbed panels from the outer side. Caps provide additional sealing of the wicket opening.

### 3.4.5. WINDOWS

Recommended parameters, layout and window sizes are given in section 3.7.

### 3.4.6. SET OF CAPS FOR WINDOWS

Caps are installed under the window framing in every groove of S-ribbed and M-ribbed panels from the outer side of garage doors. Caps are used with all types of windows and provide additional sealing of the window framing.

### 3.4.7. SET OF REINFORCING PROFILES

This option is used for doors with torsion springs. When operating the doors in conditions leading to significant temperature difference of outer and inner surfaces of the door leaf (installation of the dark-coloured doors on the sun side of the buildings and constructions; operating the doors in heated premises while the outside temperature is low, etc.) the sandwich panels can bend due to the thermal expansion/contraction of the steel sheets.

Acceptable index of temperature difference of outer and inner surfaces of the door leaf cannot exceed 40 °C. If this value is exceeded, the doors of more than 3.5 m wide are recommended to be equipped with the set of reinforcing profiles in order to avoid damaging of the components during open/close cycle.

The set includes longitudinal steel reinforcing profiles which are installed on each panel except the panels which have the wicket. Reinforcing profiles also increase rigidity of the door leaf and its resistance to wind/impact loads.

### 3.4.8. LOCKING DEVICE

The locking device is designed to lock the door leaf in the closed position. A locking device set includes a control mechanism (lock) with two push handles and a one-sided cylinder mechanism with a keyhole for a flat key. The control and latch mechanisms are connected by a flexible wire-ropes. In doors fitted with a locking device the spring locking bar is not used.

### 3.4.9. ELECTRIC DRIVE WITH AUTOMATION SYSTEM

Doors can be supplied with electric rack-and-gear drives.

### 3.4.10. RELEASE SYSTEMS FOR ELECTRIC DRIVES

Release systems are designed for doors equipped with rail-type drives and used in premises without secondary entrance. Release system allows to release the drive and operate the door manually in case of emergency or power supply failure.

Release cables RK-4500 and RK-6000 are used for doors equipped with the locking device. They are connected to the locking device. Release mechanism RM0104-4500 fitted into the panel is used for doors without locking device.

### 3.4.11. PULLEY BLOCK FOR MANUAL DOOR LIFTING

A pulley block is used for doors that are not equipped with an electric drive. The door is operated by rope passing over pulley and attached to bottom roller bracket. It is recommended to use the block for doors over 2 m height.

**3.4.12. FALSE PANEL**

False panels are used to cover partly the opening below the headroom. False panel may consist of several panels (depending on height). Each panel consists of sandwich panel framed by C-shaped profile. If false panel consists of several panels they are supplied unassembled. The design and colour of sandwich panels used for the false panel and the door leaf is the same except for door of cassette panels. The false panel for cassette panels is produced of L-ribbed panels. The false panel is supplied complete with a set of brackets for fixing to the opening.

Recommendations and options for the use of false panels are shown in section 3.13.

**Door leaf and false panel framing colour correspondence:**

Door leaf colour	False panel framing colour
RAL 8014 (sepia brown)* RAL 8016 (red-brown)* RAL 8017 (chocolate brown)* RAL 8019 (grey brown)* Golden Oak, Dark Oak, Cherry	RAL 8019 (grey brown)*
Other colours	A00-D6 (silver)

As an option, the colouring of profile framing is available in other colours having a close match to the RAL, DB scale or ADS703 colour. Painting in such colours as metallic, pearl and reflective colours is considered upon request.

**3.4.13. AIR GRIDS**

Air grids provide natural ventilation of premises, creating additional comfort. Recommended parameters and positioning of air grids are presented in section 3.8.

**3.4.14. SET OF FIXINGS**

Set of fixings FS10×50D consists of nylon dowels with self-tapping screws and washers necessary for mounting of the door. The set of fixings are used for fixing the door frame and elements of torsion shaft to walls made of concrete, bricks, ceramsite concrete, natural stone and other similar materials.

For mounting of the doors in the wooden opening screws and washers assemblies included in the set are used, while nylon dowels should not be used. Before tightening the screws it is necessary to drill holes in the wooden structure (5 mm in diameter, 50 mm deep; the wall should be no less than 100 mm thick).

Set of fixing elements FS10×60D includes nylon plugs with screws made of galvanized steel. The set is used for fixing door frame and elements of torsion shaft to walls made of concrete, natural stone, perforated and solid ceramic bricks, perforated and solid sand-lime bricks, lightweight concrete, aerated concrete. Reliable fixing even in the perforated materials.

Set of fixing elements FS8×25 includes 8 and 25 mm long self-tapping screws made of galvanized steel. The set is used for fixing door frame and elements of torsion shaft to walls made of metal.

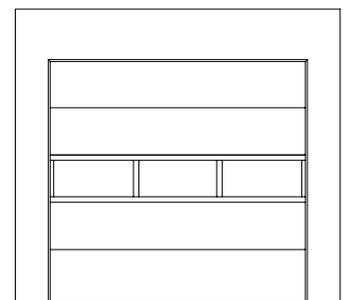
**3.4.15. SET OF PROTECTIVE COVERS**

These are used for doors with tension springs to prevent access to the place where springs are fitted.

**3.4.16. PANORAMIC GLAZING**

In doors with torsion springs and door leaf consisting of Microwave, S-ribbed, M-ribbed, or L-ribbed sandwich panels one or several sections (except the top and the bottom sections) can be replaced with panoramic glazing sections (panoramic sections) from the AluTrend series.

Panoramic sections are frames consisting of aluminium extruded profiles. Sections can be filled with translucent glazing inserts from polymer mix of steryl and acrylonitrile (SAN-plastic) or with special infill.



\* Colours closely correspond to RAL scale, DB.

### 3.4.16.1. Infill types with translucent glazing for panoramic sections



AluTrend—profile system without thermal break

#### Section infill for series AluTrend:

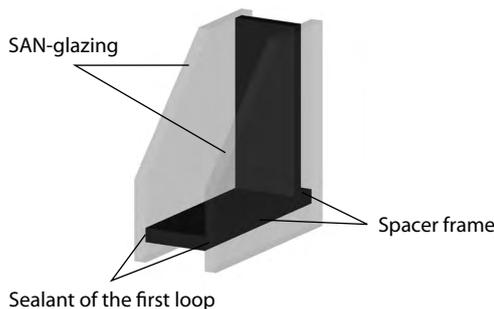
- single insert with SAN-plastic 3 mm thick;
- double insert 26 mm thick with SAN-plastic 2 mm thick (double glazed unit 2-22-2). It is used on inserts till 0.5 m<sup>2</sup>;
- double insert 26 mm thick with SAN-plastic 3 mm thick (double glazed unit 3-20-3). It is used on inserts over 0.5 m<sup>2</sup>.

#### Basic colour for profiles of panoramic section AluTrend series\*

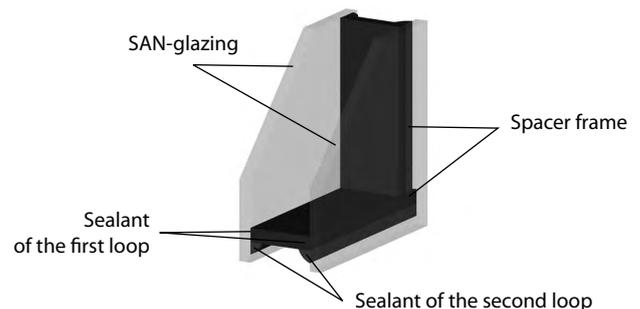
RAL 1015—light ivory
RAL 3004—purple red
RAL 5010—gentian blue
RAL 6005—moss green
RAL 7016—anthracite grey
RAL 8014—sepia brown
RAL 8017—chocolate brown
RAL 9006—white aluminium
RAL 9016—white

AluTrend panoramic sections can be painted other colours which closely correspond to RAL scale or ADS703 colour. The possibility of painting in dark, metallic, pearl and reflective colours is considered on individual request.

Double transparent inserts are manufactured with a single or double sealing loop. It is recommended to fit a double sealing loop if microclimatic conditions inside the premises can cause the generation of condensation in the transparent inserts. Transparent inserts with a double sealing loop have the added benefits of sealing of the second loop.



A translucent insert with one sealing loop



A translucent insert with two sealing loops

### 3.4.16.2. Special infill for panoramic sections

Composite panel 26 mm thick, consisting of two aluminium sheets with polyurethane foam space filling. Outer and inner aluminium panel sheets have stucco embossment.

#### Infill for AluTrend section with single glazing:

- composite panel 3 mm thick, consisting of two aluminium sheets with high pressure polyurethane foam space filling. Outer and inner aluminium sheets are flat.

#### Infill for AluTrend section with double glazing:

- expanded mesh for panoramic panel. Material: galvanized steel. Cross section of ventilation cuts: 58%. Thickness: 4 mm. Colour: natural colour of steel;
- square mesh 40×40 mm for panoramic panel. Material: galvanized steel. Cross section of ventilation cuts: 83%. Thickness: 4 mm. Colour: natural colour of steel;
- perforated aluminium sheet for panoramic panel. Perforated aluminium sheet, perforation 8–12 mm. Cross section of ventilation cuts: 40%. Thickness: 1.6 mm. Colour: natural colour of aluminium.

Special infill can be painted other colours which closely correspond to RAL scale or ADS703 colour. The possibility of painting in dark, metallic, pearl and reflective colours is considered on individual request. Composite panels can be painted in colours according to DB catalogue as well.

\* Colours closely correspond to RAL scale.

### 3.4.17. SCRATCH RESISTANT COATING

This is to protect glazing against possible damages (scratches) that may happen to doors after installation. Special surface coating will keep glazing transparent for a long time even after multiple cleaning. This coating is available for AluTrend doors with double glazing and single / double sealing.

### 3.4.18. DOUBLE SIDE HANDLE

The option is available for doors with tension springs and torsion springs without inbuilt wicket door and/or reinforcing profiles. Double side handle is included in a standard delivery set for doors with a wicket and/or reinforcing profiles.

## 3.5. MATCHING DOORS DESIGN (DOOR FACADE SYSTEM)

If several sectional doors are installed in line on the same building wall it is possible to align on the same level specific door elements, for example:

- panel joints, by using the same panel set for all doors;
- windows;
- locks;
- handles for door opening;
- wicket.

Matching design can be achieved for doors of different mounting types, different heights, with or without wicket. You must specify when ordering the set of doors if this is required. In the order it is necessary to state the individual requirements for the full set of doors included in the facade system.

**Attention!** For achieving the same level of door elements it is necessary to ensure matching of ground level for all the openings.

## 3.6. TECHNICAL FEATURES

### 3.6.1. DOOR TECHNICAL FEATURES

Characteristics	Series Trend	
	Tension springs	Torsion springs
Thermal transmittance (U-value) of ALUTECH sectional doors, W/(m <sup>2</sup> K)*		
Doors without wicket	1.55	1.35
Doors with wicket	—	1.46
Resistance to wind load (EN 12424)**		
Doors without wicket	Class 4	Class 4
Air permeability (EN 12426)***		
Doors without wicket	Class 3	Class 3
Doors with wicket	—	Class 3
Resistance to water penetration (EN 12425)***		
Doors without wicket	Class 2	Class 2
Doors with wicket	—	Class 2
Specific gravity of the door leaf without reinforcing profiles ****	up to 13.9 kg/m <sup>2</sup>	
Specific gravity of the door leaf with reinforcing profiles ****	—	up to 15.7 kg/m <sup>2</sup>
Loading on ceiling structure	up to 32 kg/m <sup>2</sup>	

\* Characteristics are calculated and tests are carried out at ift. Rosenheim GmbH:

- for garage doors with tension springs with an area of 7.875 m<sup>2</sup>;
- for garage doors with torsion springs with an area of 18 m<sup>2</sup>.

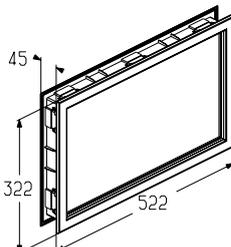
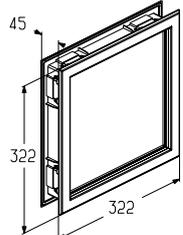
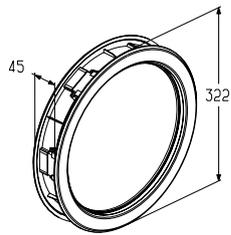
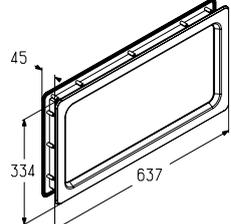
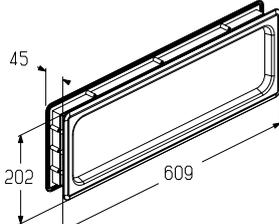
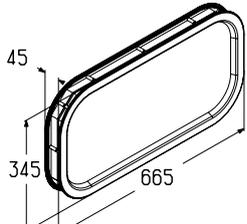
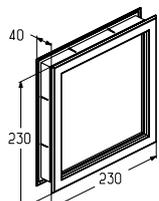
\*\* Calculation is made for doors up to 2.5 m wide without options according to tests conducted by the TÜV NORD CERT GmbH..

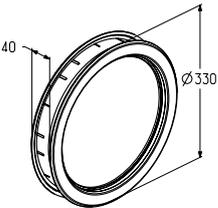
\*\*\* The tests have been conducted by TÜV SÜD Czech s.r.o.

\*\*\*\* Parameter of door leaf weight can vary depending on panel type, chosen options and other factors.

### 3.7. RECOMMENDED PARAMETERS AND WINDOW POSITIONING

#### 3.7.1. WINDOWS DIMENSIONS

Window article	Image and dimensions	Colour of edging frame	Type of glazing
W043WH-TG40		White	Transparent SAN-glazing
W043BR-TG40		Brown	
W043WH-CG40		White	Crystal SAN-glazing
W043BR-CG40		Brown	
W050WH-40		White	Transparent SAN-glazing
W050BR-40		Brown	
W050WH-CG40		White	Crystal SAN-glazing
W050BR-CG40		Brown	
W060WH-40		White	Transparent acrylic
W060BR-40		Brown	
W060WH-CG40		White	Crystal SAN-glazing
W060BR-CG40		Brown	
W046-40		Black	Transparent SAN-glazing
W085-40		Black	Transparent SAN-glazing
W095-40		Black	Transparent SAN-glazing
W51SS-40		Stainless steel	Transparent acrylic

Window article	Image and dimensions	Colour of edging frame	Type of glazing
W61SS-40		Stainless steel	Safety glass, transparent

The outside window frames (art. W043..., W050..., W060...) can be painted outside in colours that closely correspond to the RAL, DB catalogue or ADS703 colour. The possibility of painting window frames in metallic colours, pearl and reflecting colours will be considered individually.

### 3.7.2. WINDOW POSITIONING

Windows are normally aligned vertically. Nonstandard windows positioning should be requested and agreed with the Manufacturer. Maximum number of windows per one panel should be calculated according to the following tables.

#### 3.7.2.1. Windows quantity for doors of Microwave, S-, M-, L-ribbed panels

##### Trend series doors with torsion and tension springs

Door width LDB (ordered doors width), mm	Maximum window quantity	Width of window insert B1, mm	Height of window insert H1, mm
<b>art. W043WH-TG40, W043WH-CG40, W043BR-TG40, W043BR-CG40</b>			
from 1750 to 2450	2	494	294
from 2455 to 3195	3		
from 3200 to 3935	4		
from 3940 to 4680	5		
from 4685 to 5425	6		
from 5430 to 6000	7		
<b>art. W050WH-40, W050BR-40, W050WH-CG40, W050BR-CG40</b>			
from 1750 to 1850	2	294	294
from 1855 to 2395	3		
from 2400 to 2935	4		
from 2940 to 3480	5		
from 3485 to 4025	6		
from 4030 to 4570	7		
from 4575 to 5115	8		
from 5120 to 5655	9		
from 5660 to 6000	10		
<b>art. W060WH-40, W060BR-40, W060WH-CG40, W060BR-CG40</b>			
from 1750 to 1850	2	Ø294	
from 1855 to 2395	3		
from 2400 to 2935	4		
from 2940 to 3480	5		
from 3485 to 4025	6		
from 4030 to 4570	7		
from 4575 to 5115	8		
from 5120 to 5655	9		
from 5660 to 6000	10		
<b>art. W046-40</b>			
from 1750 to 1935	1	610	302
from 1940 to 2795	2		
from 2800 to 3655	3		
from 3660 to 4515	4		
from 4520 to 5375	5		
from 5380 to 6000	6		

Door width LDB (ordered doors width), mm	Maximum window quantity	Width of window insert B1, mm	Height of window insert H1, mm		
<b>art. W085-40</b>					
from 1750 to 1895	1	588	180		
from 1900 to 2730	2				
from 2735 to 3570	3				
from 3575 to 4400	4				
from 4410 to 5245	5				
from 5250 to 6000	6				
<b>art. W095-40</b>					
from 1750 to 1995	1	638	320		
from 2000 to 2880	2				
from 2885 to 3770	3				
from 3775 to 4655	4				
from 4660 to 5545	5				
from 5550 to 6000	6				
<b>art. W515S-40</b>					
from 1750 to 2030	3	205	205		
from 2035 to 2485	4				
from 2490 to 2940	5				
from 2945 to 3395	6				
from 3400 to 3850	7				
from 3855 to 4305	8				
from 4310 to 4760	9				
from 4765 to 5215	10				
from 5220 to 5670	11				
from 5675 to 6000	12				
<b>art. W615S-40</b>					
from 1750 to 1800	2			280	280
from 1805 to 2330	3				
from 2335 to 2860	4				
from 2865 to 3390	5				
from 3395 to 3920	6				
from 3925 to 4450	7				
from 4455 to 4980	8				
from 4985 to 5510	9				
from 5515 to 6000	10				

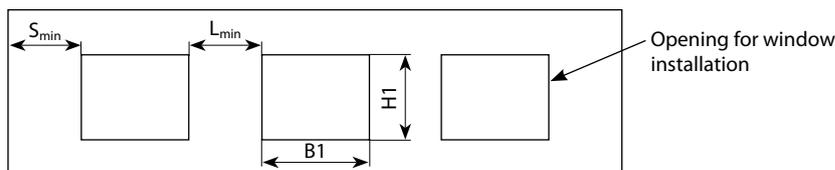
### 3.7.2.2. Windows quantity for doors of Cassette panels

#### Trend series doors with torsion and tension springs

Door width LDB (ordered doors width), mm	Maximum window quantity	Width of window insert B1, mm	Height of window insert H1, mm
<b>art. W043WH-TG40, W043WH-CG40, W043BR-TG40, W043BR-CG40</b>			
from 2130 to 2585	3	494	294
from 2610 to 2985	4		
from 3010 to 3405	4		
from 3430 to 3985	5		
from 4010 to 4490	6		
from 4515 to 5000	7		

### 3.7.3. LIMITS FOR WINDOWS APPLICATION

Minimum distance from the edge of door leaf to inset of the window  $S_{min}$ , as well as the distance between windows  $L_{min}$  are equal to 250 mm.



For Microwave, S-ribbed panels 500 and 625 mm high, M-ribbed and L-ribbed panels 500 mm high windows art. W043WH-TG40, W043WH-CG40, W043BR-TG40, W043BR-CG40, W050WH-40, W050BR-40, W050WH-CG40, W050BR-CG40, W060WH-40, W060BR-40, W060WH-CG40, W060BR-CG40, W046-40, W085-40, W095-40, W51SS-40, W61SS-40 are available.

For M-ribbed and L-ribbed panels 450 mm high windows art. W043WH-TG40, W043WH-CG40, W043BR-TG40, W043BR-CG40, W050WH-40, W050BR-40, W050WH-CG40, W050BR-CG40, W060WH-40, W060BR-40, W060WH-CG40, W060BR-CG40, are available.

For Cassette panels windows art. W043WH-TG40, W043WH-CG40, W043BR-TG40, W043BR-CG40 are available.

Possibility of windows installation in the top and bottom panels is considered upon request.

Windows cannot be installed in the second panel if the door is supplied with a key lock in the second panel.

## 3.8. RECOMMENDED PARAMETERS AND AIR GRIDS POSITIONING

### 3.8.1. TYPES OF AIR GRIDS

Type of air grid	Art.	Colour from outside	Colour from inside	Outside size, mm (W×H)	Square area of the opening, cm <sup>2</sup>
Non-adjustable air grid (white)	VG-368WH	White	White	368×130	143
Non-adjustable air grid (black)	VG-368BK	Black	White	368×130	143
Adjustable air grid (white)	VG-368RWH	White	White	368×130	65
Adjustable air grid (black)	VG-368RBK	Black	White	368×130	65

### 3.8.2. AIR GRIDS POSITIONING PARAMETERS

Air grids are installed on the centre line of the panel (in the middle of the panels' height).

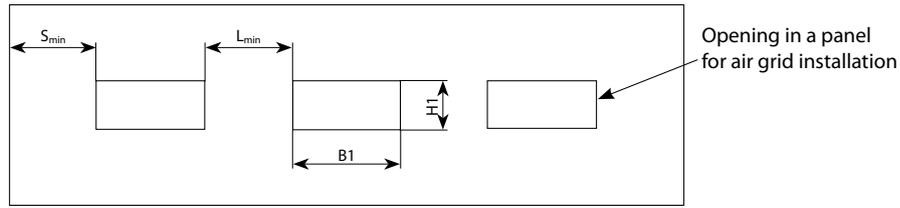
Maximum number of air grids per one panel should be calculated according to the following tables:

#### Trend series doors with torsion and tension springs of Microwave, S-, M-, L-ribbed panels

Door width LDB (ordered doors width), mm	Max number of air grids	Air grid width B1, mm	Air grid height H1, mm
from 1750 to 1970	2	335	96
from 1975 to 2555	3		
from 2560 to 3140	4		
from 3145 to 3725	5		
from 3730 to 4310	6		
from 4315 to 4895	7		
from 4900 to 5480	8		
from 5485 to 6000	9		

### 3.8.3. AIR GRIDS APPLICATION LIMITS

Minimum distance from the edge of the door leaf to the air grid  $S_{min}$ , as well as the distance between the air grids  $L_{min}$  are equal to 250 mm.



Minimum height of top panel for an air grid installation is 400 mm.

If an air grid is installed on the same side of a door leaf as a locking bar, minimum distance from door panel edge to the air grid is 1000 mm. Non-standard air grid positioning should be requested and agreed with the Manufacturer. Air grids cannot be installed in the panel where a key lock is installed.

Air grids are not available for doors of cassette panels.

## 3.9. WICKET PARAMETERS

### 3.9.1. PARAMETERS OF WICKET DOORS BUILT INTO DOOR LEAF MADE FROM SANDWICH PANELS

Garage doors can be ordered with a wicket.

The wicket is available for doors with torsion springs only (Standard, Low or High mounting types).

Wickets are available in right or left versions. Wickets open outward only.

Wickets are not available for doors of cassette panels.

#### 3.9.1.1. Dimensions of wicket with low or standard threshold for Microwave, S-ribbed panels

Clear opening width of wicket—920 mm.

The window can be embedded in the wicket within the third section of the wicket.

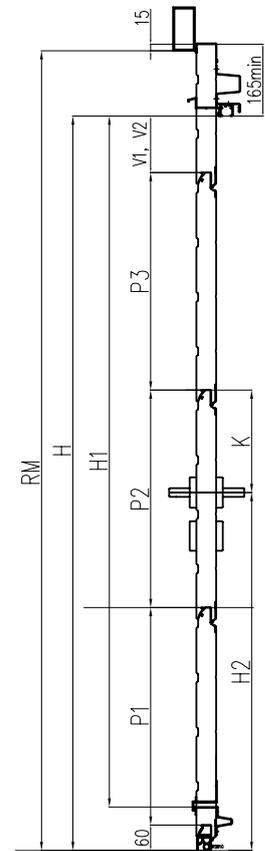
Min. opening height ( $R_{min}$ ), mm	Max. opening height ( $R_{max}$ ), mm	Height of panels in a door leaf, mm				Dimensions of cut-in into the last wicket panel ( $V1, V2$ ), mm	Wicket opening height ( $H$ ), mm	Clear wicket opening height ( $H1$ ), mm	Height of handle positioning ( $H2$ ), mm
		P1	P2	P3	P4				
2335	3250	500	500	500	500	130	2185	With low threshold: H-100;	820
1960		625	500	500	—	130	1810		945
2085		625	500	500	—	255	1935	With standard threshold: H-145	945
2210		625	625	500	—	255	2060		1070
2210		625	625	625	—	130	2060		1070

#### 3.9.1.2. Dimensions of wicket with low or standard threshold for M-, L-ribbed panels

Clear wicket opening width—920 mm.

A window can be placed in the wicket in the third or fourth section.

Min. opening height ( $R_{min}$ ), mm	Max. opening height ( $R_{max}$ ), mm	Height of panels in a door leaf, mm				Dimensions of cut-in into the last wicket panel ( $V1, V2$ ), mm	Wicket opening height ( $H$ ), mm	Clear wicket opening height ( $H1$ ), mm	Height of handle positioning ( $H2$ ), mm
		P1	P2	P3	P4				
2135	3250	450	450	450	450	130	1985	With low threshold: H-100;	1194
2260		450	450	450	450	255	2110		1194
2335		500	500	500	500	130	2185	With standard threshold: H-145	820
2435		525	525	525	525	130	2285		856
2035		525	525	525	—	255	1885		856



**3.9.1.3. Dimensions of wicket with flat threshold for Microwave, S-, M-, L-ribbed panels**

Clear wicket opening width—920 mm.

A window can be placed in the wicket in the third or fourth section.

Min. opening height (R <sub>min</sub> ), mm	Max. opening height (R <sub>max</sub> ), mm	Height of panels in a door leaf, mm				Dimensions of cut-in into the last wicket panel (V1, V2), mm	Wicket opening height (H), mm	Clear wicket opening height (H1), mm	Height of handle positioning (H2), mm
		P1	P2	P3	P4				
2125	3250	450	450	450	450	130	1975	With flat threshold: H-18	1184
2250		450	450	450	450	255	2100		1184
2325		500	500	500	500	130	2175		810
2425		525	525	525	525	130	2275		846
2025		525	525	525	—	255	1875		846
1960		625	500	500	—	130	1800		935
2075		625	500	500	—	255	1925		935
2200		625	625	500	—	255	2050		1060
2200		625	625	625	—	130	2050		1060

**3.9.1.4. Dimensions limits**

Minimal width of doors with a wicket is 2125 mm (possibility to inbuilt wicket in a door 1915–2120 mm wide can be considered at individual request). Minimal height of a door with a wicket is 1960 mm.

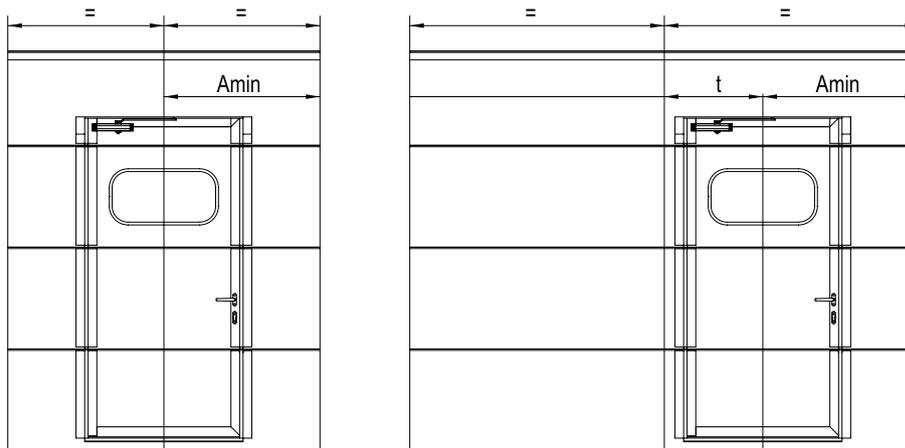
The choice of wicket depends on the doors width. The corresponding limits are shown in table below.

Doors width, mm	Type of wicket
from 1915 to 5000	with flat (18 mm) threshold
from 1915 to 4500	with low (100 mm) threshold
from 4505 to 6000*	with standard (145 mm) threshold

**3.9.1.5. Wicket positioning on door leaf**

The wicket can be installed in the centre of the door or offset to one side. All measurements are taken as viewed from the inside of the premises. The distance *t* between the wicket centre and the door leaf central axis must be multiple of 330 mm.

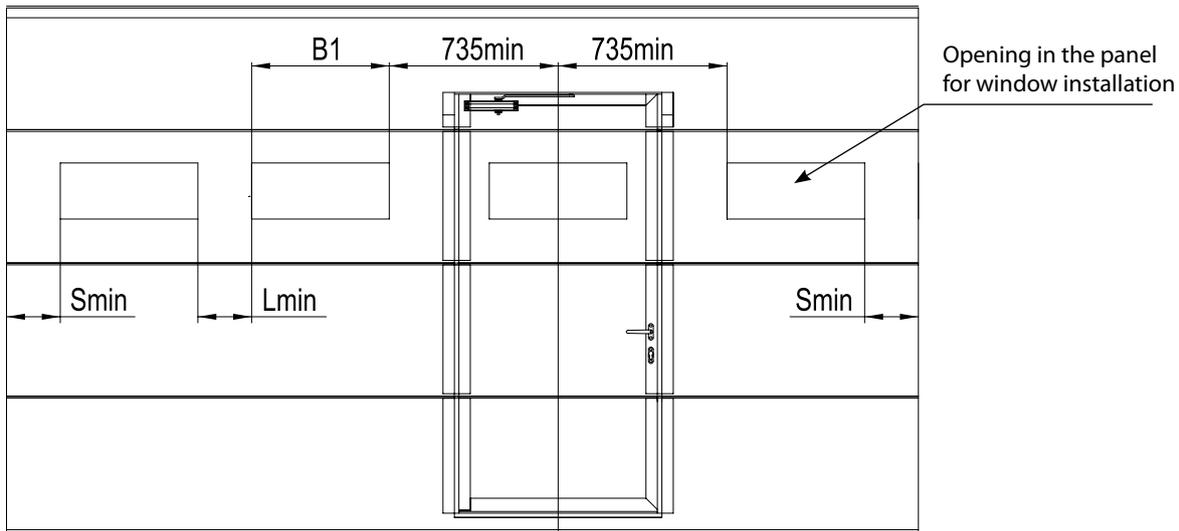
Minimum distance from the central axis of the wicket to the leaf edge is A<sub>min</sub>=973 mm, distance from the central axis of the wicket to the opening edge is 958 mm.



To install windows in the door leaf with the wicket the following conditions should be observed:

- minimum possible distance from the door leaf edge to the window S<sub>min</sub> must be equal to 250 mm;
- minimum possible distance between windows L<sub>min</sub> must be equal to 250 mm;
- minimum possible distance from the central axis of the wicket to the inset of the window must be equal to 735 mm.

\* Maximum opening width for the doors with wicket and M-ribbed or L-ribbed sandwich-panels without embossing is 5000 mm.



**Attention!** Possibility of windows placement in the top wicket panel must be checked and confirmed with the manufacturer in advance.

**Colour correspondence of wicket elements to colour of door leaf**

Colour of the door leaf	Colour of wicket door leaf and opening framing	Colour of wicket handle	
		by default	other variants
RAL 8014 (brown)* RAL 8016 (red-brown)* RAL 8017 (chocolate brown)* RAL 8019 (grey-brown)* Golden Oak, Dark Oak, Cherry	RAL 8019 (grey-brown)*	RAL 8019 (grey-brown)*	A00-D6 (silver) RAL 9005 (black)*
All other colours	A00-D6 (silver)	A00-D6 (silver)	RAL 8019 (grey-brown)* RAL 9005 (black)*
	Other RAL colour**	RAL 9005 (black)*	RAL 8019 (grey-brown)* A00-D6 (silver)

**3.9.2. PARAMETERS OF WICKETS INBUILT INTO THE DOOR LEAF WITH PANORAMIC GLAZING**

**3.9.2.1. Wicket parameters**

The wicket is built into the door leaf consisting of sandwich panels and panoramic sections from the series AluTrend. Wickets are available in right or left versions. Wickets open outward only.

The wicket lock is installed in the second or third panel from the bottom.

The wicket can consist of 3–5 sections depending on the door height. Wicket width is 920 mm. Wicket height is from 1800 to 2310 mm high depending of the door height.

Choice of the wicket type depends on the door width. The limits are shown in the table below.

Doors width, mm	Type of wicket
from 2125 to 5000	with flat (18 mm) threshold
from 2125 to 4500	with low (100 mm) threshold
from 4505 to 6000***	with standard (145 mm) threshold

**3.9.2.2. Dimensions limits**

Minimum door width with a wicket is 2125 mm. Minimum door height with a wicket is 1960 mm. Wicket installation into end sections of a door leaf is not possible.

\* Colours closely correspond to RAL scale.

\*\* It is possible to paint the framing profiles of the wicket and the opening in colours which closely correspond to RAL, DB scale or ADS703 colour. The possibility of painting in dark colours, such as metallic colours, pearl and reflective colours will be considered upon request.

\*\*\* Maximum opening width for the doors with wicket and M-ribbed or L-ribbed sandwich-panels without embossing is 5000 mm.

### 3.10. DOOR DIMENSIONS

Sectional doors are ordered according to the following parameters: opening width × opening height (LDB×RM).

Actual width of the door leaf exceeds the nominal width of the opening:

- by 30 mm (by 15 mm on both left and right sides) for the doors with torsion or tension springs.

Actual height of the door leaf exceeds the nominal height of the opening:

- by 15 mm for both the doors with torsion springs and with tension springs.

#### 3.10.1. DIMENSIONAL MATRIX FOR DOORS

##### 3.10.1.1. Dimensional matrix for Trend series doors without wicket: Microwave, S, M, L-ribbed panels

Door height, mm	Doors width, mm																																							
	1 750	1 875	2 000	2 125	2 250	2 375	2 500	2 625	2 750	2 875	3 000	3 125	3 250	3 375	3 500	3 625	3 750	3 875	4 000	4 125	4 250	4 375	4 500	4 625	4 750	4 875	5 000	5 125	5 250	5 375	5 500	5 625	5 750	5 875	6 000					
1 750																																								
1 875																																								
2 000																																								
2 125																																								
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2 625																																								
2 750																																								
2 875																																								
3 000																																								
3 125																																								
3 250																																								

In this range the doors with a torsion spring balancing system are manufactured on request (optional)

Maximum height of the doors with tension springs is 3085 mm

Intermediate values of door width and height can be manufactured with a pitch of 5 mm from the mentioned dimensional scale. Doors made of type M-panel and L-panel with the height 2030–2070, 2730–2770, 3180–3250 mm are not manufactured.

##### 3.10.1.2. Dimensional matrix for doors Trend series without wicket: Cassette panels

Door height, mm	Doors width, mm																																								
	2 110	2 250	2 375	2 500	2 625	2 750	2 875	3 000	3 125	3 250	3 375	3 500	3 625	3 750	3 875	4 000	4 125	4 250	4 375	4 500	4 625	4 750	4 875	5 000																	
1 700																																									
1 800																																									
1 900																																									
2 000																																									
2 100																																									
2 125																																									
2 250																																									
2 375																																									
2 500																																									
2 550																																									
2 625																																									
2 700																																									
2 850																																									
2 975																																									
3 000																																									
3 150																																									

In this range the doors with a torsion spring balancing system are manufactured on request (optional)

Intermediate values of door width and height can be manufactured with a pitch of 5 mm in width and 25 mm in height from the mentioned dimensional scale. Please take into account that:

- doors of standard height stated in the matrix are manufactured from panels with the same height;
- doors of intermediate height (25 mm increments) are manufactured from two panels of different height. The difference in height is 25 mm.

**3.10.1.3. Dimensional matrix for Trend series doors with a wicket with low or standard threshold:  
Microwave, S-, M-, L-ribbed panels**

Door height, mm	Doors width, mm																																				
	1915	2000	2125	2250	2375	2500	2625	2750	2875	3000	3125	3250	3375	3500	3625	3750	3875	4000	4125	4250	4375	4500	4625	4750	4875	5000	5125	5250	5375	5500	5625	5750	5875	6000			
1960																																					
2000																																					
2125																																					
2250																																					
2375																																					
2500																																					
2625																																					
2750																																					
2875																																					
3000																																					
3125																																					
3250																																					

 Doors with wicket with low threshold (of 100 mm high) are manufactured on request	 Doors with wicket with low threshold (of 100 mm high)	 Doors with wicket with standard threshold (of 145 mm high)
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Intermediate values of door width and height can be manufactured with a pitch of 5 mm from the mentioned dimensional scale. Doors made of type M-panel and L-panel with the height 2030–2130, 2730–2770, 3180–3250 mm are not manufactured.

**3.10.1.4. Dimensional matrix for Trend series doors with a wicket with flat threshold:  
Microwave, S-, M-, L-ribbed panels**

Doors width, mm	Doors width, mm																																				
	2125	2250	2375	2500	2625	2750	2875	3000	3125	3250	3375	3500	3625	3750	3875	4000	4125	4250	4375	4500	4625	4750	4875	5000													
1960																																					
2000																																					
2125																																					
2250																																					
2375																																					
2500																																					
2625																																					
2750																																					
2875																																					
3000																																					
3125																																					
3250																																					

Intermediate values of door width and height can be manufactured with a pitch of 5 mm from the mentioned dimensional scale. Doors made of type M-panel and L-panel with the height 2020–2120, 2720–2760, 3170–3250 mm are not manufactured.

### 3.11. OPENING REQUIREMENTS AND TAKING MEASUREMENTS

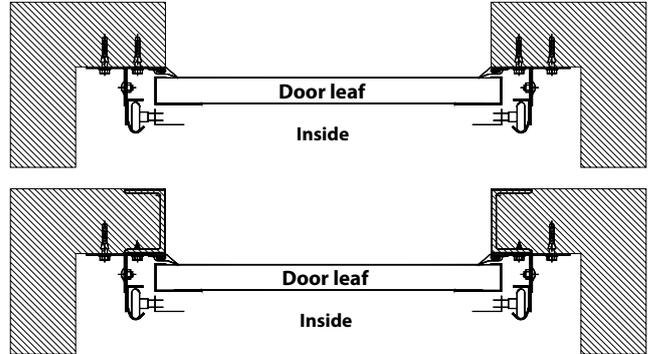
#### 3.11.1. REQUIREMENTS FOR THE OPENING

Prepared openings should meet the following requirements:

- openings generally should be rectangular with vertical sides;
- the internal wall face should be straight and flat without rough uneven surfaces;
- the opening should not be out of square between the vertical and horizontal by more than 1.5 mm/m and not more than 5 mm over the full width or height;
- the whole wall face above the lintel and both reveals should be vertical and on the same plane horizontally.

If the walls of the opening are constructed of solid material, e.g. concrete, stone, solid brick etc, it is permissible to fit the fixings of the frames direct to this structure.

If the walls of the opening are made of soft materials e.g. economy brick (cavitated ceramic and silicate brick) or ceramic stones and slotted silicate stones, as well as cellular concrete (gas and foam concrete, gas and foam silicate) and silicate blocks it is recommended to fit the opening with a construction of shaped metal profile.



If installation of metal reinforcing plates is not possible then the fixings should be bolted fully through the wall thickness i.e. through bolt or should be used fittings designed for mounting the doors into the openings made of soft materials.

#### 3.11.2. TAKING MEASUREMENTS FOR INSIDE PREMISES AND ENTRANCE OPENINGS

Before taking measurements ensure the floor area is clean and level so the sizes can be measured accurately from the structural elements. Establish the floor zero point and measure up from there.

The opening is measured from the inside of the premises, as sectional doors are mounted on the inside surface of the opening. The opening is measured in 3 places on the reveals, top, middle and bottom, and also on the height, left, middle and right sides. The largest of the 3 dimensions are used for ordering the door sizes.

Using a spirit level check the floor and lintel are level and the walls are vertical. To check the opening is square check the diagonals using a tape measure.

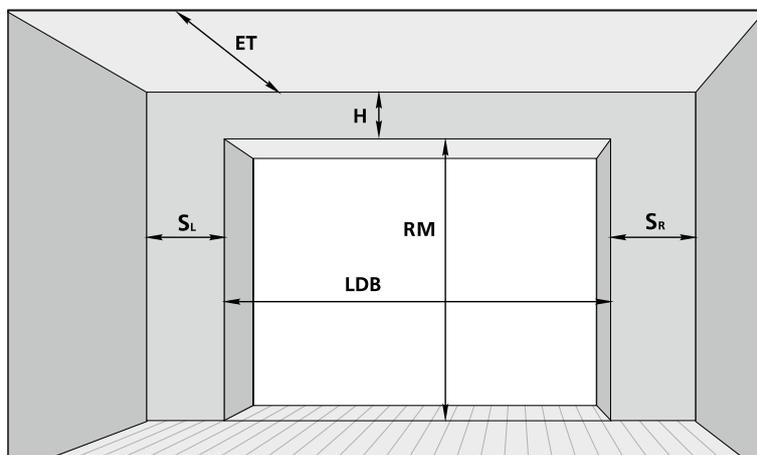
It is assumed that the height of the parallel walls and the distance between the lintel and the floor and the diagonals do not show more than a 5 mm difference. If they are it may be possible to overcome this with the fitting of a wider or higher door.

Check the depth of the room between the floor and ceiling to ensure they are parallel and the roof or floor do not have an excessive slope which would affect the horizontal frame mounting.

The dimensions of the opening you supply are used to calculate the dimensions of the doors (see section 3.10).

**ATTENTION!** Ensure there are no heating pipes, water pipes or ducts or electrical cables in the areas where the door is to be installed and will operate that may foul the door in operation.

#### 3.11.3. MEASUREMENT PROCEDURE SCHEME



- RM—Opening height
- LDB—Opening width
- H—Headroom height
- ET—Depth of door entrance into the premises
- SL, SR—Side room

## 3.12. DOOR MOUNTING PLANS

### 3.12.1. MOUNTING PLAN SYMBOLS

Parameter	Description
RM	Opening height
LDB	Opening width
H	Headroom height
H1, H2	Dimensions limiting door operating area
H3	Height to horizontal track
HL	Height of horizontal track positioning from the top of the opening
LDH	Clear opening height
LDW	Clear opening width
ET	Depth of door entering into the premises
W	Dimension of electric drive positioning
HR	Height of electric drive rail positioning
DM, DH	Positioning of fixing points
$S_{min}$	Minimum side room for angle bars mounting
$T_{min}$	Minimum side room for torsion mechanism

### 3.12.2. GENERAL INFORMATION

Garage door mounting types are chosen based on the current headroom height (dimension H), the presence of a wicket in the door leaf and the type of operating controls selected using the following parameters:

#### Doors with torsion springs

Doors type	Operating options	Minimum headroom height $H_{min}$ , mm	Mounting type
Garage without wicket	Manual	100	Low
	With electric drive	125	
Garage with wicket	Manual	105	
	With electric drive	130	
Garage with or without wicket	Regardless the type of doors control	210	Standard
Garage with or without wicket	Regardless the type of doors control	500	High

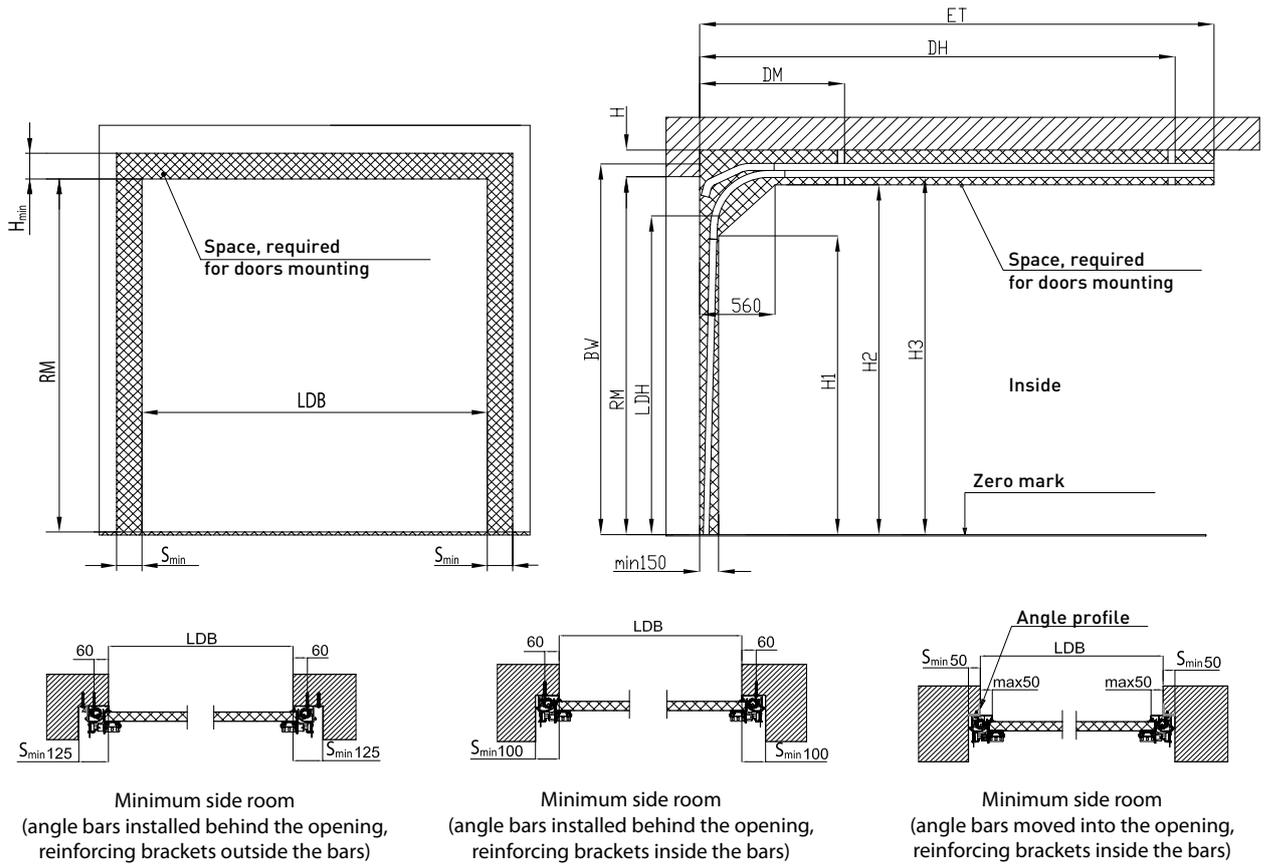
#### Doors with tension springs

Doors type	Operating options	Minimum headroom height $H_{min}$ , mm	Maximum headroom height $H_{max}$ , mm
Garage without wicket	Manual	100	900
	With electric drive	125	

**ATTENTION!** The minimum side room ( $S$ ) is required at both sides of the opening and not less than the value given in the table to mounting scheme.

When using an HKU-002 pulley block, the side space ( $S_{min}$ ) does not increase.

3.12.3. TREND SERIES GARAGE DOORS WITH TENSION SPRINGS



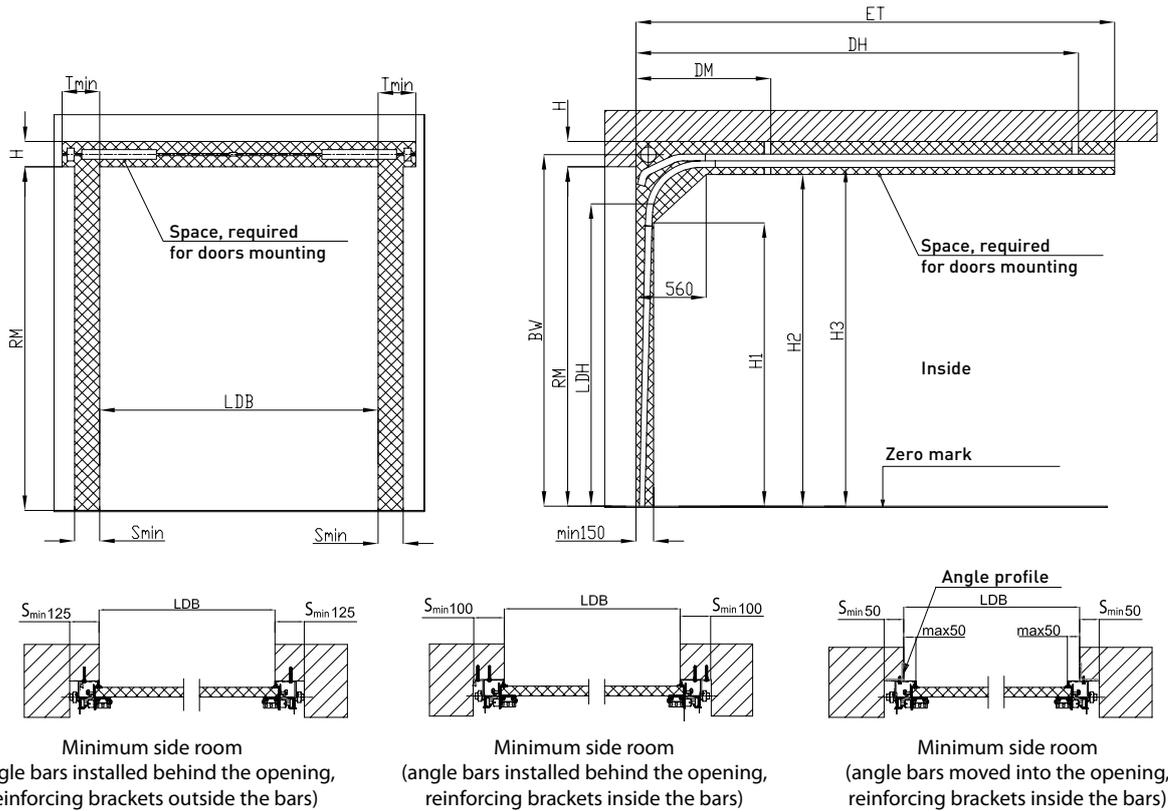
Parameter	Description	Formula or value
H, mm	Headroom height	min 100 (manual operation without locking device), min 115 (manual operation with locking device) min 125 (electric drive)
LDH, mm	Clear opening height	RM-170 (manual operation with the stopper RS-3516) RM-100 (manual operation with the catcher LHT-3004) RM-100 (electric drive with the stopper RS-3516)
LDW*, mm	Clear opening width	LDB-30
DM, mm	Positioning of the fixing point	950
H1, mm	Dimension limiting door operating area	RM-440
H2, mm	Dimension limiting door operating area	RM-50
H3, mm	Height to the horizontal track	RM-15
S_min**, mm	Minimum side room for angle bars mounting	50 — angle bars moved into the opening, reinforcing brackets inside the bars**; 100 — angle bars installed behind the opening, reinforcing brackets inside the bars; 125 — angle bars installed behind the opening, reinforcing brackets outside the bars

Depth of door entering into the premises ET and Positioning of the fixing point DH depending on opening height RM													
RM, mm	1750-1845	1850-1945	1950-2045	2050-2145	2150-2245	2250-2345	2350-2445	2450-2545	2550-2645	2650-2745	2750-2845	2850-2945	2950-3000
ET, mm	2240	2340	2440	2540	2640	2740	2840	2940	3040	3140	3240	3340	3440
DH, mm	1940	2040	2140	2240	2340	2440	2540	2640	2740	2840	2940	3040	3140

\* Clear opening width is measured as the distance between the vertical seals.  
 \*\* It is necessary to reinforce the opening with a steel tube or angle profile (not included in standard set).

### 3.12.4. TREND SERIES GARAGE DOORS WITH TORSION SPRINGS

#### 3.12.4.1. Doors without wicket. Standard mounting

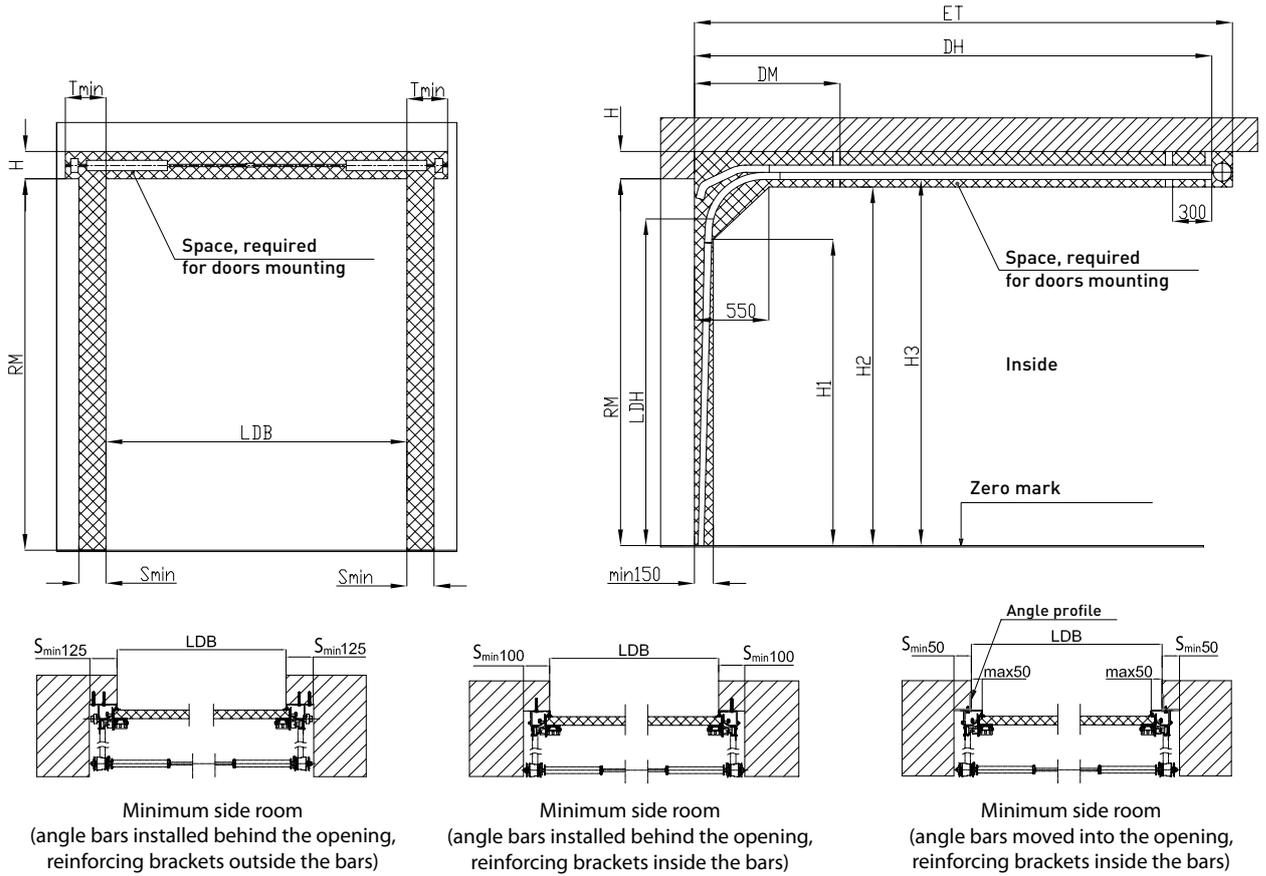


Parameter	Description	Formula or value
H, mm	Headroom height	min 210
LDH, mm	Clear opening height	RM-120 (manual operation with the stopper RS-3516)
		RM-25 (manual operation with the catcher LHT-3004)
		RM-25 (electric drive with the stopper RS-3516)
LDW*, mm	Clear opening width	LDB-30
BW, mm	Height to the shaft axis	RM+126
DM, mm	Positioning of the fixing point	950
H1, mm	Dimension limiting door operating area	RM-360
H2, mm	Dimension limiting door operating area	RM-20
H3, mm	Height to the horizontal track	RM+46
S <sub>min</sub> *, mm	Minimum side room for angle bars mounting	50 — angle bars moved into the opening, reinforcing brackets inside the bars**; 100 — angle bars installed behind the opening, reinforcing brackets inside the bars; 125 — angle bars installed behind the opening, reinforcing brackets outside the bars
T <sub>min</sub> *, mm	Minimum side room for torsion mechanism	120

Depth of door entering into the premises ET and Positioning of the fixing point DH depending on opening height RM													
RM, mm	1750-1845	1850-1945	1950-2045	2050-2145	2150-2245	2250-2345	2350-2445	2450-2545	2550-2645	2650-2745	2750-2845	2850-2945	2950-3000
ET, mm	2240	2340	2440	2540	2640	2740	2840	2940	3040	3140	3240	3340	3440
DH, mm	1940	2040	2140	2240	2340	2440	2540	2640	2740	2840	2940	3040	3140

\* Clear opening width is measured as the distance between the vertical seals.  
 \*\* It is necessary to reinforce the opening with a steel tube or angle profile (not included in standard set).

3.12.4.2. Doors without wicket. Low mounting



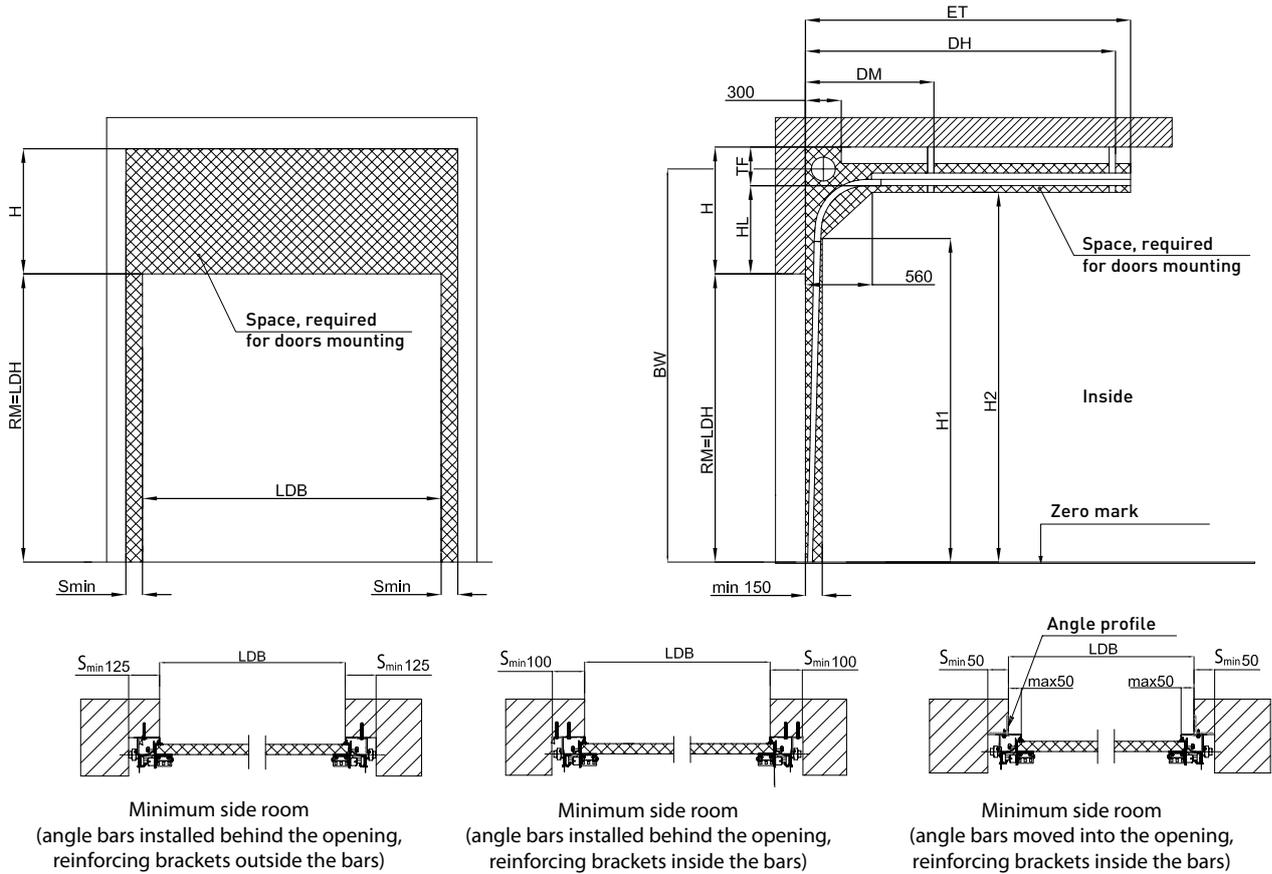
Parameter	Description	Formula or value
H, mm	Headroom height	min 100 (manual operation without locking device), min 115 (manual operation with locking device)
		min 125 (electric drive)
LDH, mm	Clear opening height	RM-170 (manual operation with the stopper RS-3516)
		RM-100 (manual operation with the catcher LHT-3004)
		RM-100 (electric drive with the stopper RS-3516)
LDW*, mm	Clear opening width	LDB-30
DM, mm	Positioning of the fixing point	950
H1, mm	Dimension limiting door operating area	RM-440
H2, mm	Dimension limiting door operating area	RM-50
H3, mm	Height to the horizontal track	RM-15
S <sub>min</sub> *, mm	Minimum side room for angle bars mounting	50 — angle bars moved into the opening, reinforcing brackets inside the bars**; 100 — angle bars installed behind the opening, reinforcing brackets inside the bars; 125 — angle bars installed behind the opening, reinforcing brackets outside the bars
T <sub>min</sub> *, mm	Minimum side room for torsion mechanism	120

Depth of door entering into the premises ET and Positioning of the fixing point DH depending on opening height RM													
RM, mm	1750-1845	1850-1945	1950-2045	2050-2145	2150-2245	2250-2345	2350-2445	2450-2545	2550-2645	2650-2745	2750-2845	2850-2945	2950-3000
ET, mm	2410	2510	2610	2710	2810	2910	3010	3110	3210	3310	3410	3510	3610
DH, mm	2230	2330	2430	2530	2630	2730	2830	2930	3030	3130	3230	3330	3430

\* Clear opening width is measured as the distance between the vertical seals.

\*\* It is necessary to reinforce the opening with a steel tube or angle profile (not included in standard set).

3.12.4.3. Doors without wicket. High mounting

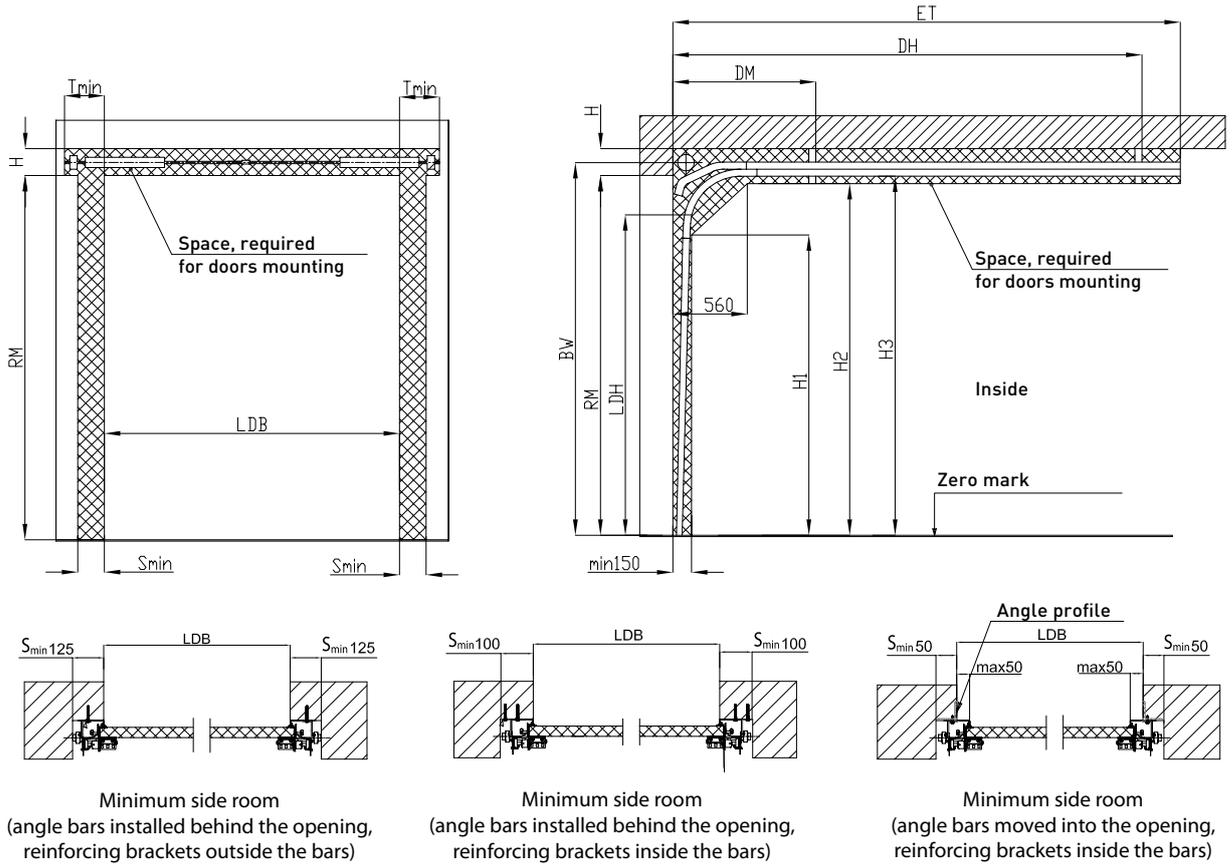


Parameter	Description	Formula or value
H, mm	Headroom height	$H_{min}=500, H_{max}=1500$
TF, mm	Minimum distance from the horizontal track to the top edge of operating area in zone of shaft mounting	290
HL, mm	Height from the top of the opening to the horizontal track	$H-TF (HL_{min}=210, HL_{max}=1110)$
LDH, mm	Clear opening height	RM
LDW*, mm	Clear opening width	$LDB-30$
DM, mm	Positioning of the fixing point	800
DH, mm	Positioning of the fixing point	$RM-HL+620$
ET, mm	Depth of door entering into the premises	$RM-HL+850$
H1, mm	Dimension limiting door operating area	$RM+HL-455$
H2, mm	Dimension limiting door operating area	$RM+HL-55$
BW, mm	Height to the shaft axis	$RM+HL+160$
$S_{min}$ , mm	Minimum side room for angle bars mounting	50 — angle bars moved into the opening, reinforcing brackets inside the bars**; 100 — angle bars installed behind the opening, reinforcing brackets inside the bars; 125 — angle bars installed behind the opening, reinforcing brackets outside the bars

\* Clear opening width is measured as the distance between the vertical seals.

\*\* It is necessary to reinforce the opening with a steel tube or angle profile (not included in standard set).

3.12.4.4. Doors with wicket. Standard mounting



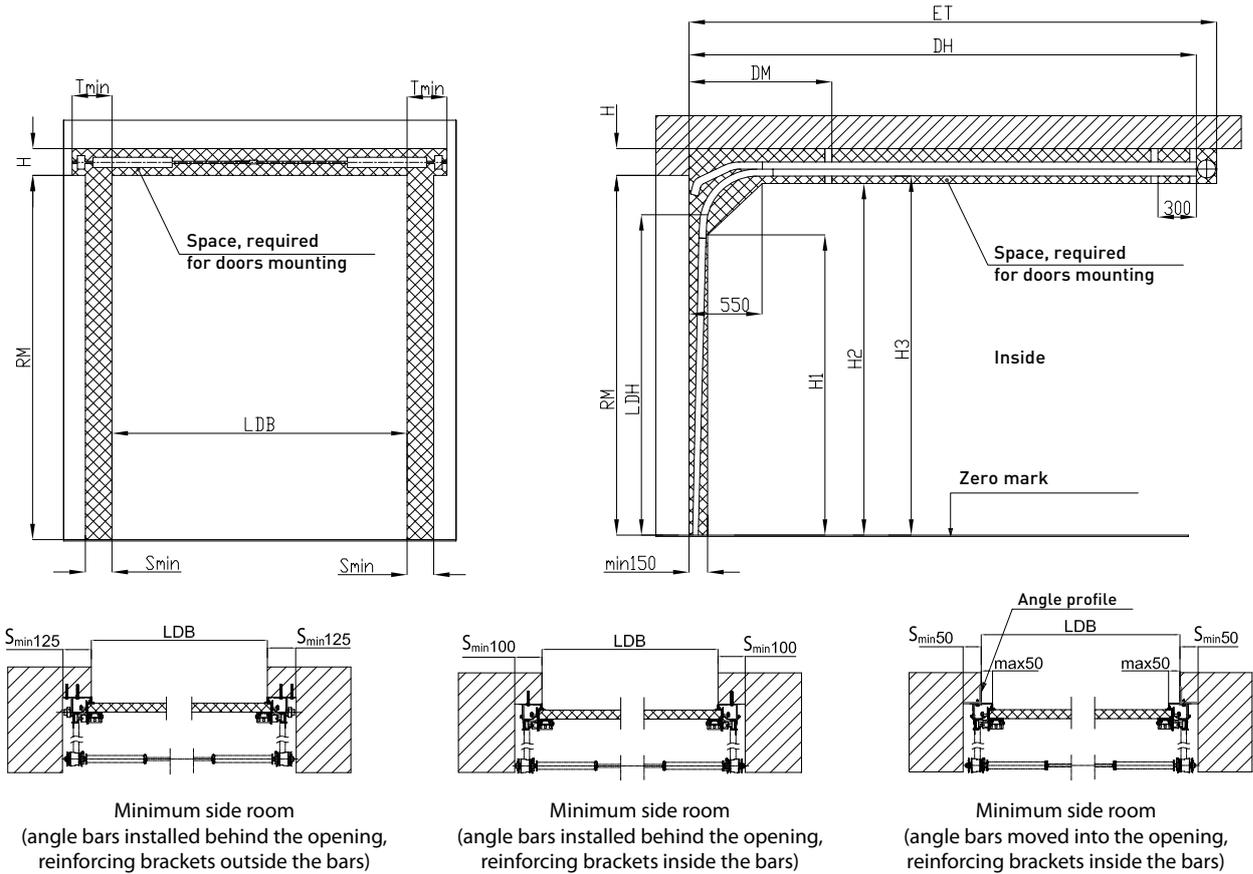
Parameter	Description	Formula or value
H, mm	Headroom height	min 210
LDH, mm	Clear opening height	RM-150 (manual operation with the stopper RS-3516)
		RM-80 (manual operation with the catcher LHT-3004)
		RM-80 (electric drive with the stopper RS-3516)
LDW*, mm	Clear opening width	LDB-30
BW, mm	Height to the shaft axis	RM+126
DM, mm	Positioning of the fixing point	950
H1, mm	Dimension limiting door operating area	RM-360
H2, mm	Dimension limiting door operating area	RM-20
H3, mm	Height to the horizontal track	RM+46
S <sub>min'</sub> , mm	Minimum side room for angle bars mounting	50 — angle bars moved into the opening, reinforcing brackets inside the bars**; 100 — angle bars installed behind the opening, reinforcing brackets inside the bars; 125 — angle bars installed behind the opening, reinforcing brackets outside the bars
T <sub>min'</sub> , mm	Minimum side room for torsion mechanism	120

Depth of door entering into the premises ET and Positioning of the fixing point DH depending on opening height RM													
RM, mm	1750-1845	1850-1945	1950-2045	2050-2145	2150-2245	2250-2345	2350-2445	2450-2545	2550-2645	2650-2745	2750-2845	2850-2945	2950-3000
ET, mm	2240	2340	2440	2540	2640	2740	2840	2940	3040	3140	3240	3340	3440
DH, mm	1940	2040	2140	2240	2340	2440	2540	2640	2740	2840	2940	3040	3140

\* Clear opening width is measured as the distance between the vertical seals.

\*\* It is necessary to reinforce the opening with a steel tube or angle profile (not included in standard set).

3.12.4.5. Doors with wicket. Low mounting



Minimum side room  
(angle bars installed behind the opening,  
reinforcing brackets outside the bars)

Minimum side room  
(angle bars installed behind the opening,  
reinforcing brackets inside the bars)

Minimum side room  
(angle bars moved into the opening,  
reinforcing brackets inside the bars)

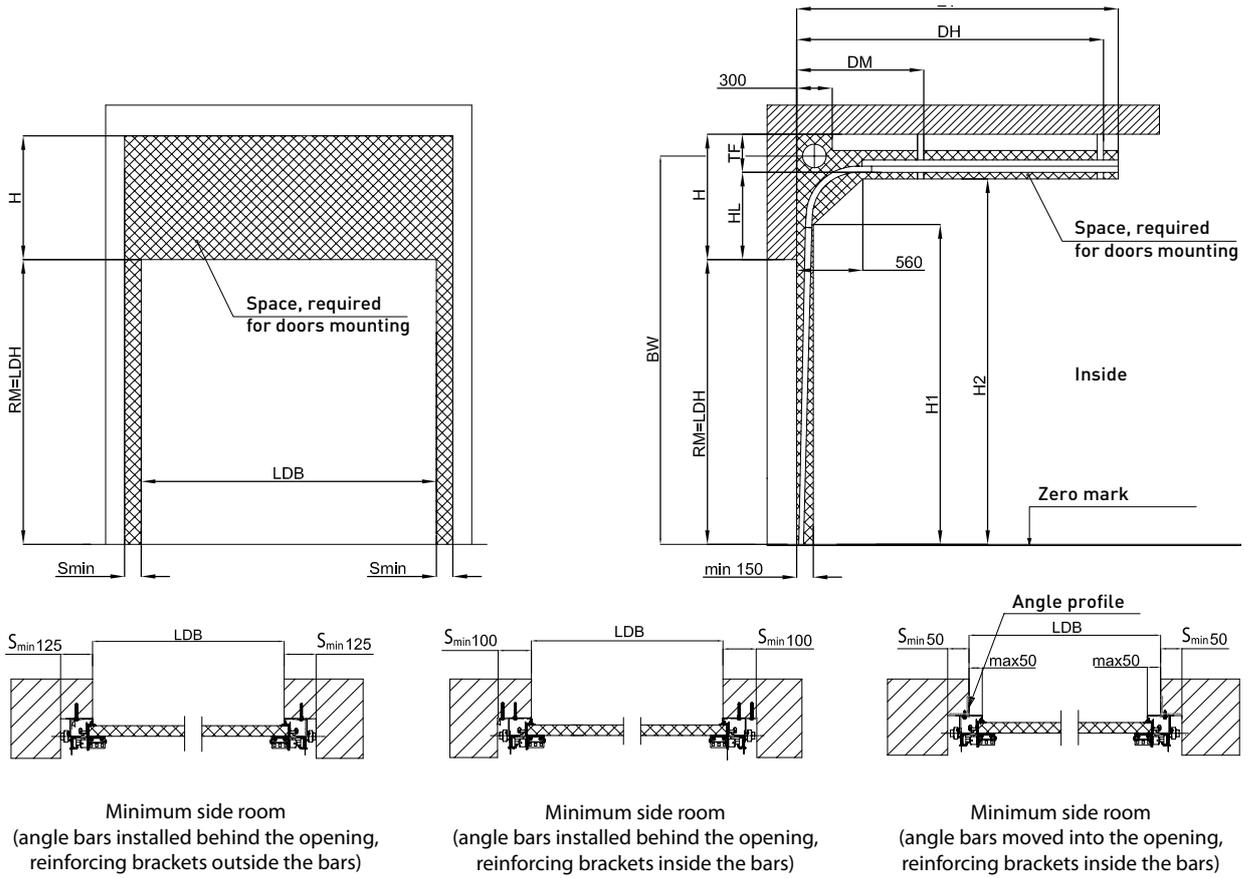
Parameter	Description	Formula or value
H, mm	Headroom height	min 100 (manual operation without locking device), min 115 (manual operation with locking device)
		min 125 (electric drive)
LDH, mm	Clear opening height	RM-195 (manual operation with the stopper RS-3516)
		RM-125 (manual operation with the catcher LHT-3004)
		RM-125 (electric drive with the stopper RS-3516)
LDW*, mm	Clear opening width	LDB-30
DM, mm	Positioning of the fixing point	950
H1, mm	Dimension limiting door operating area	RM-440
H2, mm	Dimension limiting door operating area	RM-50
H3, mm	Height to the horizontal track	RM-15
S <sub>min</sub> *, mm	Minimum side room for angle bars mounting	50 — angle bars moved into the opening, reinforcing brackets inside the bars**; 100 — angle bars installed behind the opening, reinforcing brackets inside the bars; 125 — angle bars installed behind the opening, reinforcing brackets outside the bars
T <sub>min</sub> *, mm	Minimum side room for torsion mechanism	120

Depth of door entering into the premises ET and Positioning of the fixing point DH depending on opening height RM													
RM, mm	1750-1845	1850-1945	1950-2045	2050-2145	2150-2245	2250-2345	2350-2445	2450-2545	2550-2645	2650-2745	2750-2845	2850-2945	2950-3000
ET, mm	2410	2510	2610	2710	2810	2910	3010	3110	3210	3310	3410	3510	3610
DH, mm	2230	2330	2430	2530	2630	2730	2830	2930	3030	3130	3230	3330	3430

\* Clear opening width is measured as the distance between the vertical seals.

\*\* It is necessary to reinforce the opening with a steel tube or angle profile (not included in standard set).

3.12.4.6. Doors with wicket. High mounting



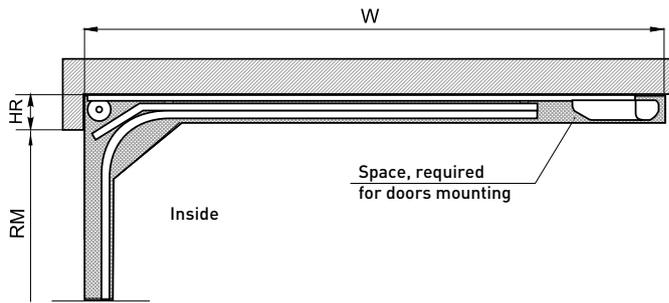
Parameter	Description	Formula or value
H, mm	Headroom height	$H_{min}=500, H_{max}=1500$
TF, mm	Minimum distance from the horizontal track to the top edge of operating area in zone of shaft mounting	290
HL, mm	Height from the top of the opening to the horizontal track	$H-TF$ ( $HL_{min}=210, HL_{max}=1110$ )
LDH, mm	Clear opening height	RM
LDW*, mm	Clear opening width	$LDB-30$
DM, mm	Positioning of the fixing point	800
DH, mm	Positioning of the fixing point	$RM-HL+620$
ET, mm	Depth of door entering into the premises	$RM-HL+850$
H1, mm	Dimension limiting door operating area	$RM+HL-455$
H2, mm	Dimension limiting door operating area	$RM+HL-55$
BW, mm	Height to the shaft axis	$RM+HL+160$
$S_{min}$ , mm	Minimum side room for angle bars mounting	50 — angle bars moved into the opening, reinforcing brackets inside the bars**; 100 — angle bars installed behind the opening, reinforcing brackets inside the bars; 125 — angle bars installed behind the opening, reinforcing brackets outside the bars"

\* Clear opening width is measured as the distance between the vertical seals.

\*\* It is necessary to reinforce the opening with a steel tube or angle profile (not included in standard set).

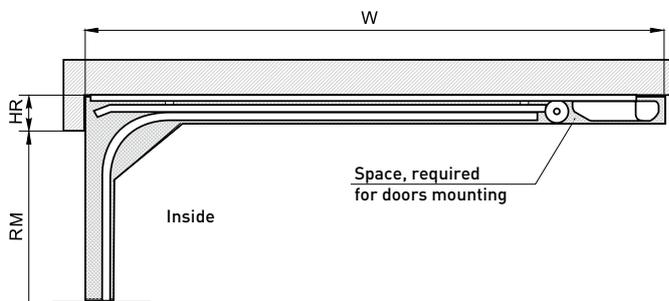
### 3.12.5. ADDITIONAL REQUIREMENTS FOR OPENINGS FOR ELECTRIC DRIVE INSTALLATION

#### 3.12.5.1. Doors with tension springs



Type of electric drive	Maximum opening height (RM), mm	Type of drive rail	Dimensions of drive positioning W, mm	Minimum height of rail positioning HR, mm
Comfort 50/60	to 2600	SZ-12SL (RU)	3750	130
Comfort 60L	to 3150	SZ-13SL	4300	
Comfort 260/270/280 (speed)	to 2100	SZ-11SL	3300	
	to 2350	SZ-12SL	3550	
	to 3100	SZ-13SL	4300	
RT600/1000	to 2650	LGR-3600B	3900	
	to 3250	LGR-4200B	4500	
ASG600/1000	to 2600	ASGR3/3B	3700	135*/220
ASG1000	to 3300	ASGR4/4B	4400	
Levigato	to 2400	LGR-3300B/C	3650	130
	to 2700	LGR-3600B/C	3950	
	to 3300	LGR-4200B/C	4550	

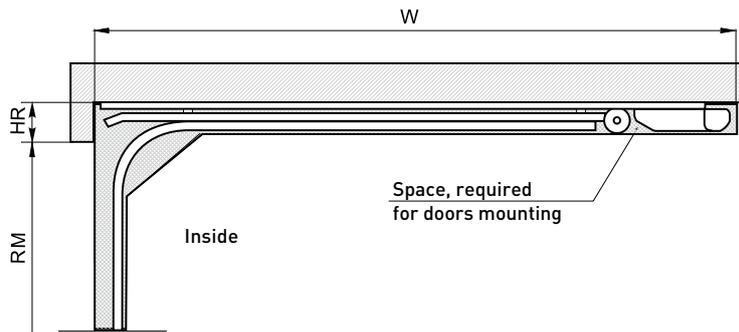
#### 3.12.5.2. Doors with torsion springs. Standard mounting



Type of electric drive	Maximum opening height (RM), mm	Type of drive rail	Dimensions of drive positioning W, mm	Minimum height of rail positioning HR, mm
Comfort 50/60	to 2600	SZ-12SL (RU)	3750	210
Comfort 60L	to 3150	SZ-13SL	4300	
Comfort 260/270/280 (speed)	to 2100	SZ-11SL	3300	
	to 2350	SZ-12SL	3550	
	to 3100	SZ-13SL	4300	
RT600/1000	to 2650	LGR-3600B	3900	
	to 3250	LGR-4200B	4500	
ASG600/1000	to 2600	ASGR3/3B	3700	210*/245
ASG1000	to 3300	ASGR4/4B	4400	
Levigato	to 2400	LGR-3300B/C	3650	210
	to 2700	LGR-3600B/C	3950	
	to 3300	LGR-4200B/C	4550	

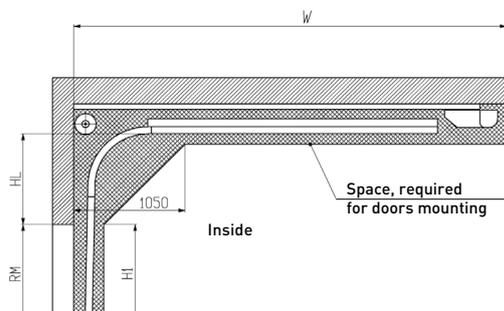
\* Only if to move a rail carriage to a rear door C-profile (the carriage shouldn't be moved beyond the rear door C-profile). Rail carriage design should be taken into consideration for installation of doors with the motor. Detailed information can be found in the motor installation manual.

## 3.12.5.3. Doors with torsion springs. Low mounting



Type of electric drive	Maximum opening height (RM), mm	Type of drive rail	Dimensions of drive positioning W, mm	Minimum height of rail positioning HR, mm
Comfort 50/60	to 2550	SZ-12SL (RU)	3750	130
Comfort 60L	to 3100	SZ-13SL	4300	
Comfort 260/270/280 (speed)	to 2050	SZ-11SL	3300	
	to 2300	SZ-12SL	3550	
	to 3050	SZ-13SL	4300	
RT600/1000	to 2500	SZ-12SL (RU)	3750	
	to 2600	LGR-3600B	3900	
ASG600/1000	to 3200	LGR-4200B	4500	135*/220
	to 2550	ASGR3/3B	3700	
ASG1000	to 3250	ASGR4/4B	4400	130
Levigato	to 2350	LGR-3300B/C	3650	
	to 2650	LGR-3600B/C	3950	
	to 3250	LGR-4200B/C	4550	

## 3.12.5.4. Doors with torsion springs. High mounting



Dimension limiting door operating area  $H1 = RM$ .

Electric drive is installed together with extension rod art.150082 or art. 564868. Choice of the extension rod depends on the parameter HL:

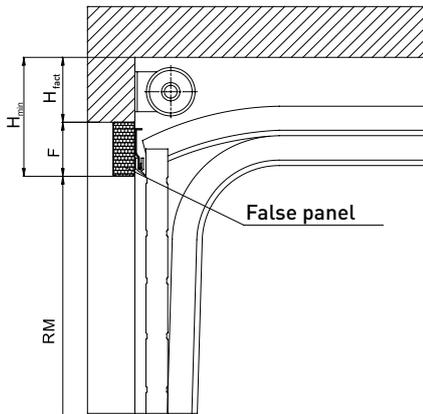
- if  $900 > HL \geq 1500$  mm the rod 2125 mm long is used, art. 564868.
- if  $500 > HL \geq 900$  mm the rod 1000 mm long is used, art. 150082, it is acceptable to use the rod art. 564868.

Type of electric drive	Opening height (RM), mm	Type of drive rail	Dimensions of drive positioning W, mm
Comfort 50/60	to 2550	SZ-12SL (RU)	3750
Comfort 60L	to 3100	SZ-13SL	4300
Comfort 260/270/280 (speed)	to 2050	SZ-11SL	3300
	to 2300	SZ-12SL	3550
	to 2500	SZ-12SL (RU)	3750
	to 3050	SZ-13SL	4300
RT600/1000	to 2500	LGR-3600B	3900
	to 3150	LGR-4200B	4500
ASG600/1000	to 2200	ASGR3/3B	3700
ASG1000	to 2900	ASGR4/4B	4400
Levigato	to 2300	LGR-3300B/C	3650
	to 2600	LGR-3600B/C	3950
	to 3250	LGR-4200B/C	4550

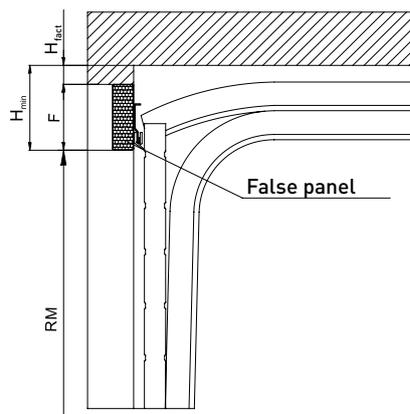
\* Only if to move a rail carriage to a rear door C-profile (the carriage shouldn't be moved beyond the rear door C-profile). Rail carriage design should be taken into consideration for installation of doors with the motor. Detailed information can be found in the motor installation manual.

### 3.13. FALSE PANEL

#### 3.13.1. USE OF A FALSE PANEL FOR INCREASING THE HEADROOM HEIGHT



Doors with torsion springs.  
Standard mounting



Doors with torsion springs. Low mounting.  
Doors with tension springs

A false panel is used for headroom height less than specified in section 3.11 for the doors:

- with torsion springs of standard and low type of mounting;
- with tension springs.

#### Method of calculating the height of the false panel and ordering the correct door height:

- measure actual height of the headroom— $H_{fact}$ .
- compare actual height of the headroom with the minimum required —  $H_{min}$ .
- if  $H_{fact}$  is less than  $H_{min}$ , define the required dimension of the false panel  $F$  using the following formula:

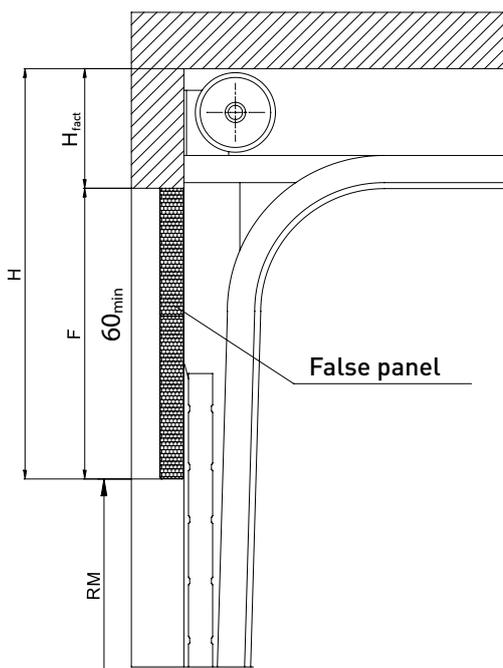
$$F = H_{min} - H_{fact}$$

- compare the calculated result  $F$  with the minimum height of the false panel. Minimum height of the false panel  $F_{min} = 60$  mm.
- if the calculated dimension  $F$  is less than  $F_{min}$ , it must be increased to the minimum dimension.
- and ordered door height must be corrected using the formula:

$$RM = \text{Height to the ceiling} - H_{fact} - F_{min}$$

**ATTENTION!** It is forbidden to secure the fixings of the torsion shaft to the false panel!

#### 3.13.2. USE OF A FALSE PANEL FOR REDUCING THE HEIGHT OF THE DOOR OPENING



This option can be used on garage doors with high mounting if there is a necessity to reduce the doors height.

Minimum actual height of the headroom  $H_{fact}$  while using the false panel is 350 mm. Minimum height of the false panel  $F_{min}$  is 60 mm. Minimum height of the false panel  $F_{max}$  is 1290 mm

#### Method of calculating the height of the false panel and ordering the correct door height:

- measure actual height of the headroom— $H_{fact}$ ;
- specify the required door height  $RM$ ;
- define the necessary height of the false panel  $F$  using the following formula:

$$F = \text{Height of the ceiling} - RM - H_{fact}$$

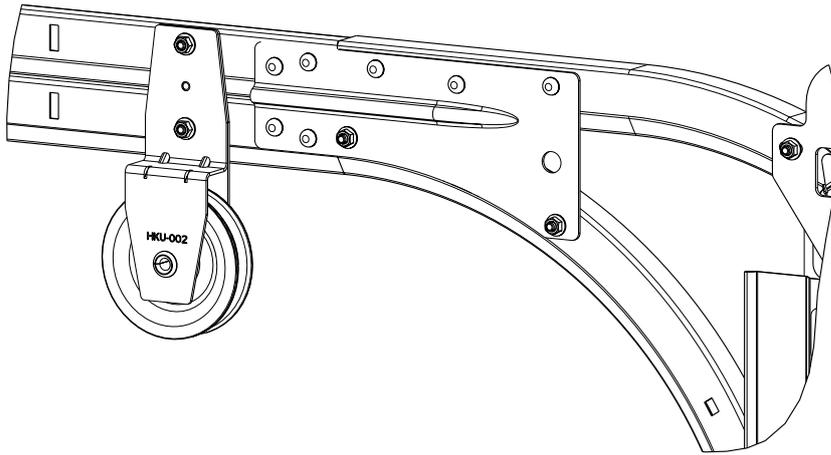
- compare the calculated result  $F$  with the acceptable dimensions of the false panel:
  - if the received result  $F$  is less than  $F_{min} = 60$  mm, the height of the false panel must be increased to the minimum acceptable;
  - if necessary correct the ordered door height using the following formula:

$$RM = \text{Height to the ceiling} - H_{fact} - F_{min}$$

- if the calculated result  $F$  is more than the maximum acceptable  $F_{max} = 1290$  mm, the height of the false panel must be decreased to the maximum acceptable. If necessary correct the ordered door height using the following formula:

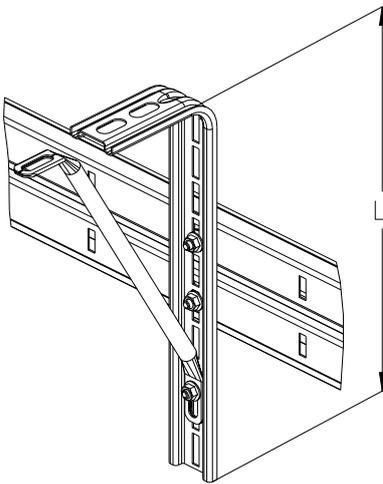
$$RM = \text{Height to the ceiling} - H_{fact} - F_{max}$$

### 3.14. PULLEY BLOCK FOR MANUAL DOOR OPENING HKU-002



Use of this system does not apply additional requirements to the opening parameters.

### 3.15. TELESCOPIC HANGER SYSTEM



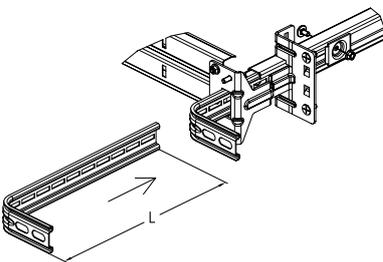
Type of hanger	Dimensions of hanger L
CS-1	300
CS-2	500
CS-3	800
CS-4	1000

The type of the telescopic hanger is chosen depending on the distance between the ceiling and the door horizontal track or between C-profil and the side wall of the premises.

Standard set for doors includes CS-1 hangers.

#### Number of hangers for horizontal tracks in garage doors:

Number of hangers for horizontal tracks in one door, pcs.	Doors height (RM)
4	RM < 3000
6	RM = 3000



Number of hangers for spacer bar in one door, pcs.	Number of springs, pcs	Doors width (LDB), mm
3	2	LDB < 4000
4	2	LDB ≥ 4000
4	3	LDB < 4000
5	3	LDB ≥ 4000
5	4	LDB < 4000
6	4	LDB ≥ 4000

For doors with low type of mounting additional hangers for the spacer bar are supplied. The number of such hangers for every door is defined automatically with a special programme depending on the doors dimensions and number of springs (no more than 6 and no less than 3).

# 4 DESCRIPTION AND TECHNICAL INFORMATION FOR SECTIONAL GARAGE DOORS FITTED IN BETWEEN THE WALLS OF A 'TUNNEL' TYPE OPENING

## 4.1. APPLICATION

Tunnel type openings are characterised by the absence of side room and top headroom or their sizes are small for conventional installation of garage doors.

Dimensions of side room and headroom:

- side room 0 to 125 mm;
- headroom 0 to 145 mm.

## 4.2. DESCRIPTION OF GARAGE DOOR SET

The following types of sectional garage doors can be fitted in between the walls of a 'tunnel' type opening:

- Classic series garage doors with torsion springs of low mounting type;
- Classic series garage doors with tension springs;
- Trend series garage doors with torsion springs of low mounting type;
- Trend series garage doors with tension springs.

The standard set for garage doors fitted in between the opening comprises of one of the garage door types above and one of the following mounting sets:

- the mounting sets 100/145 mm (art. FWO100) or 145/145 mm (art. FWO145) are used with doors Classic series.
- the mounting sets 100/145 mm (art. FWO100/145-40) or 145/145 mm (art. FWO145/145-40) are used with doors Trend series.

The mounting set 100/145 mm (art. FWO100, FWO100/145-40) includes:

- two decorative cover profiles 107 mm thick (side cover profiles);
- one decorative cover profile 145 mm thick (upper cover profile);
- brackets and fixings for installing the garage door and cover profiles.

The mounting set 145/145 mm (art. FWO145, art. FWO145/145-40) includes:

- three decorative cover profiles 145 mm thick;
- brackets and fixings for installing the garage door and cover profiles.

Standard colours of decorative cover profiles:

- white (close to RAL 9016);
- chocolate brown (close to RAL 8017);
- sepia brown (close to RAL 8014);
- anthracite (ADS703).

A set of heat insulation materials for inbuilt mounting art. HFWO is used for improvement of thermal-insulating properties of the decorative casing. Heat insulation materials are 20 mm thick and are made of foamed polyethylene.

## 4.3. DOOR DIMENSIONS

Sectional garage doors fitted in between the opening are specifically made to suit the opening size: opening width **LDB** and opening height **RM** are determined in accordance with the size range for Classic and Trend garage doors with torsion springs of low mounting type and Classic and Trend garage doors with tension springs.

Maximum width of the opening for the doors of inbuilt type of mounting is 5000 mm.

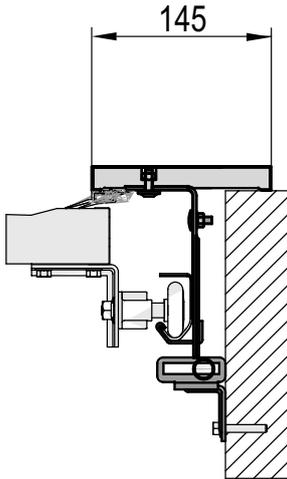
## 4.4. TYPES OF INSTALLATION

These sectional garage doors can be fitted either in front or between or behind the opening.

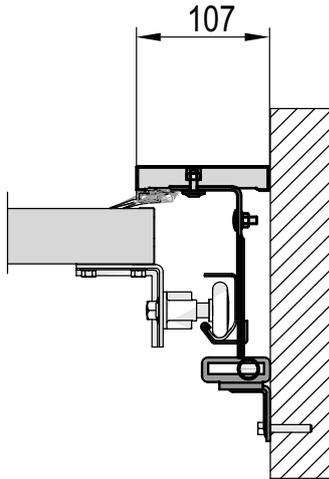
If there is no side room available for the sectional garage door to fit behind the opening then it can be fitted either in front of the opening or in between the opening.

If there is enough room on both sides of the opening for the sectional garage door to fit behind the reveals, then the door can be placed behind the opening.

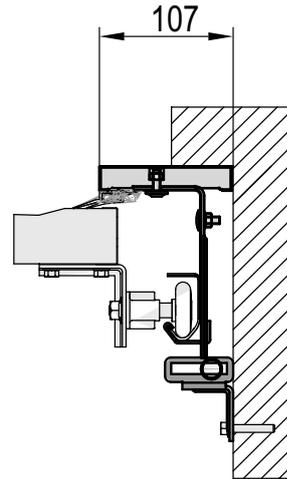
**Fitting in front of the opening**  
Set art. FWO145



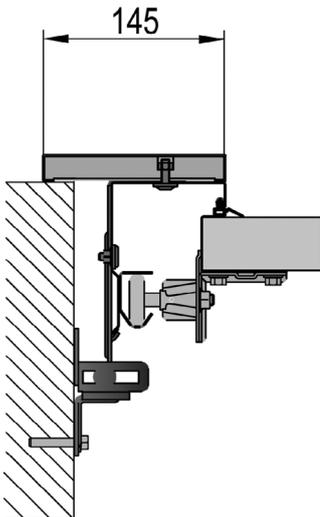
**Fitting in between the opening**  
Set art. FWO100



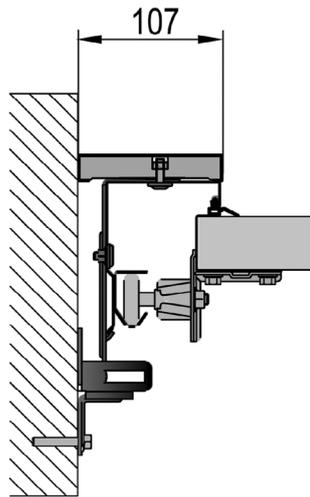
**Fitting behind the opening**  
Set art. FWO100



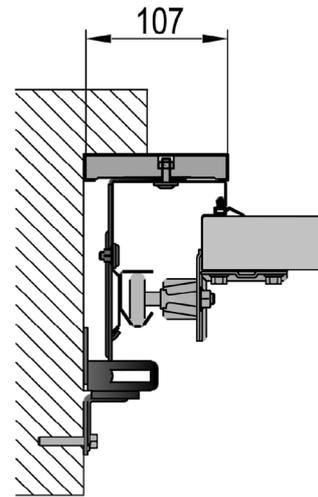
**Fitting in front of the opening**  
Set art. FWO145/145-40



**Fitting in between the opening**  
Set art. FWO100/145-40

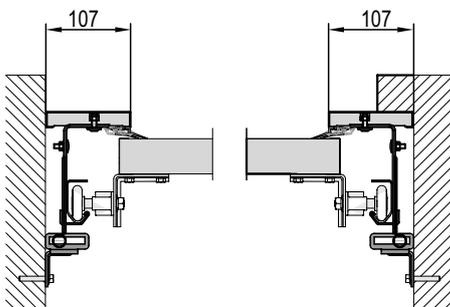


**Fitting behind the opening**  
Set art. FWO100/145-40

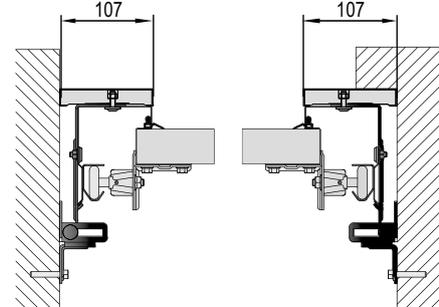


If there is enough room on one side of the opening only to fit the sectional garage door behind it then the complex fitting type (below) can be used when one vertical track is mounted into the opening and the other one is placed behind it.

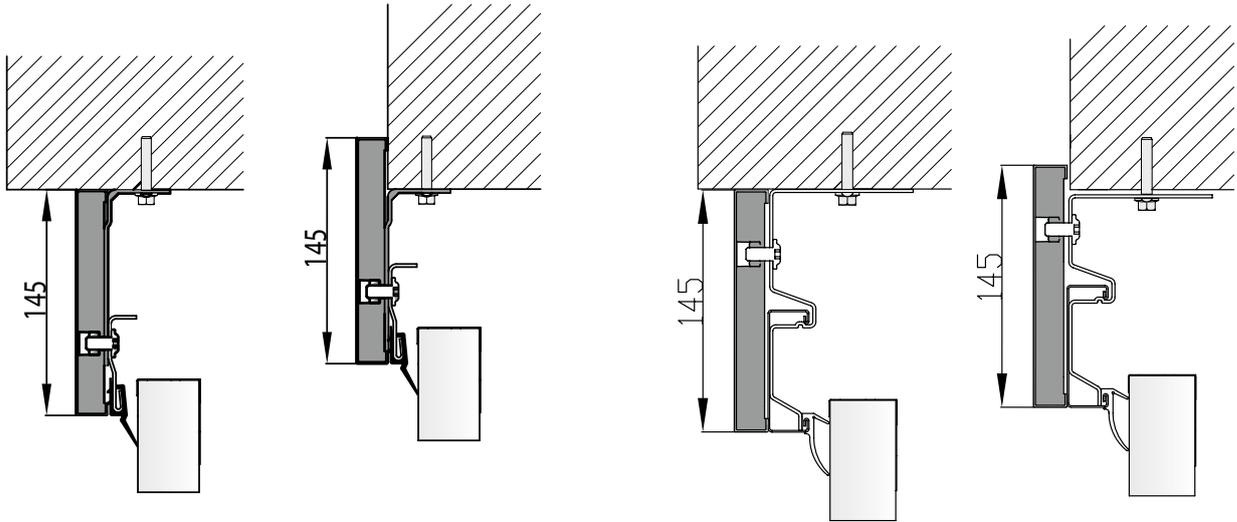
**Complex type of fitting**  
Set art. FWO100



**Complex type of fitting**  
Set art. FWO100/145-40



## 4.5. MOUNTING OF DECORATIVE COVER PROFILE



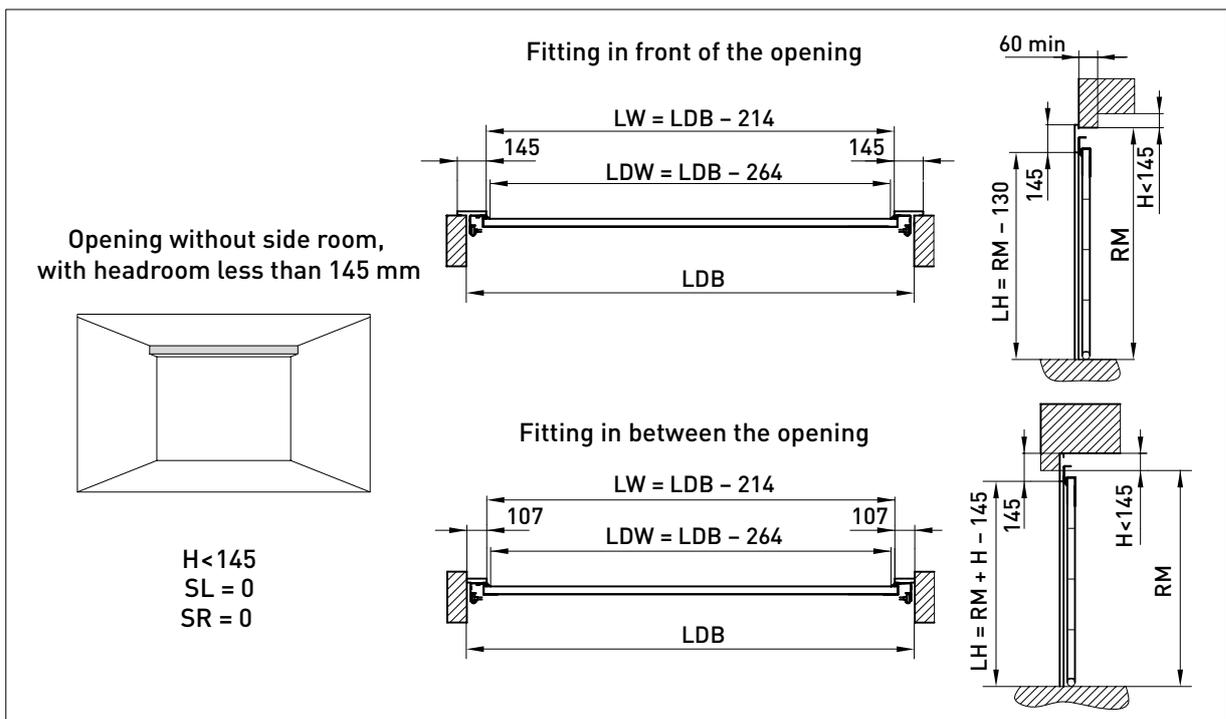
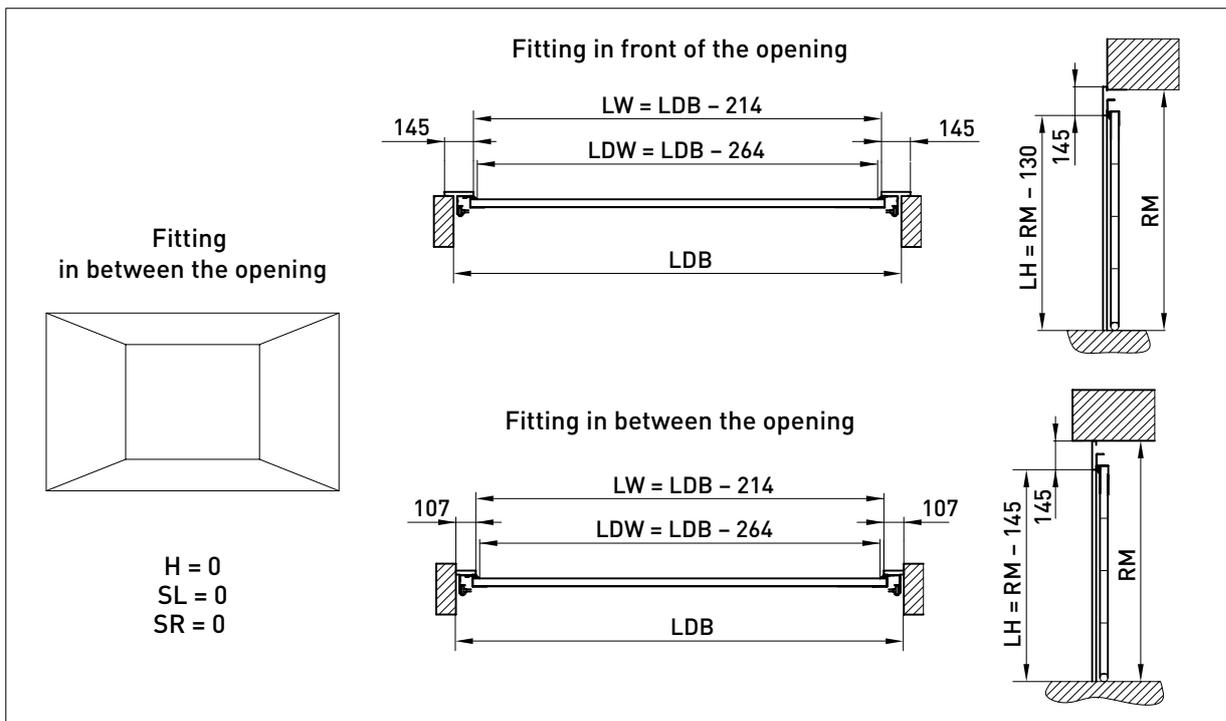
Doors series Classic

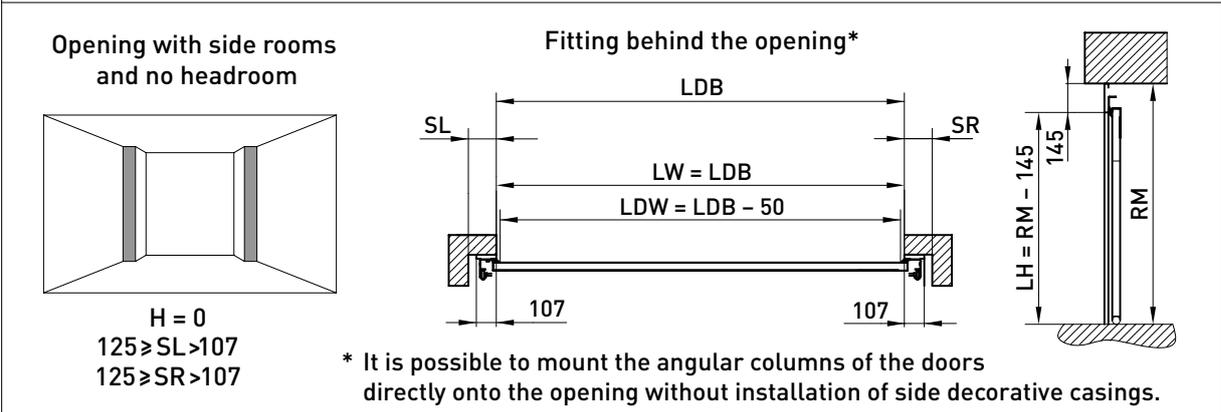
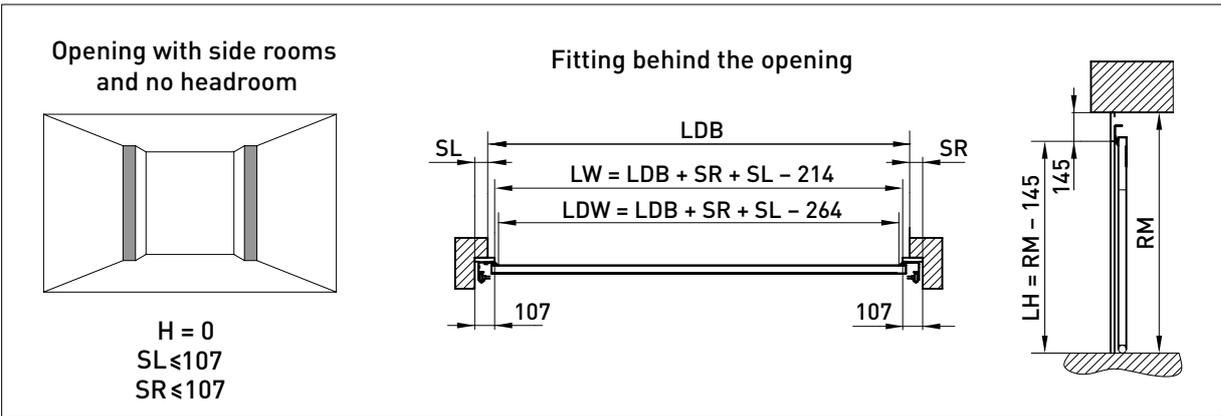
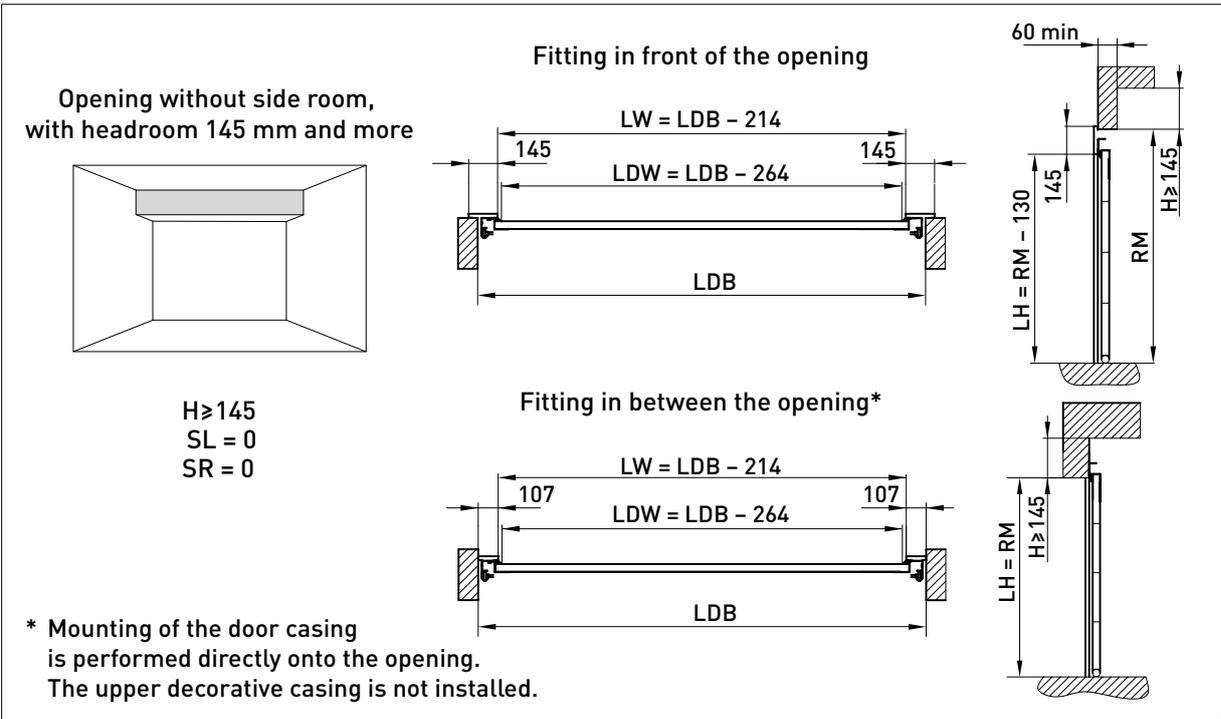
Doors series Trend

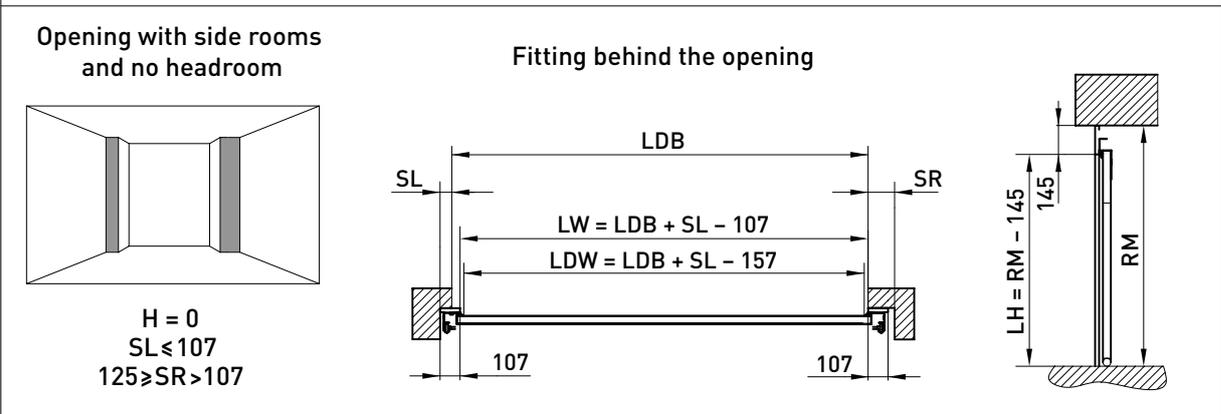
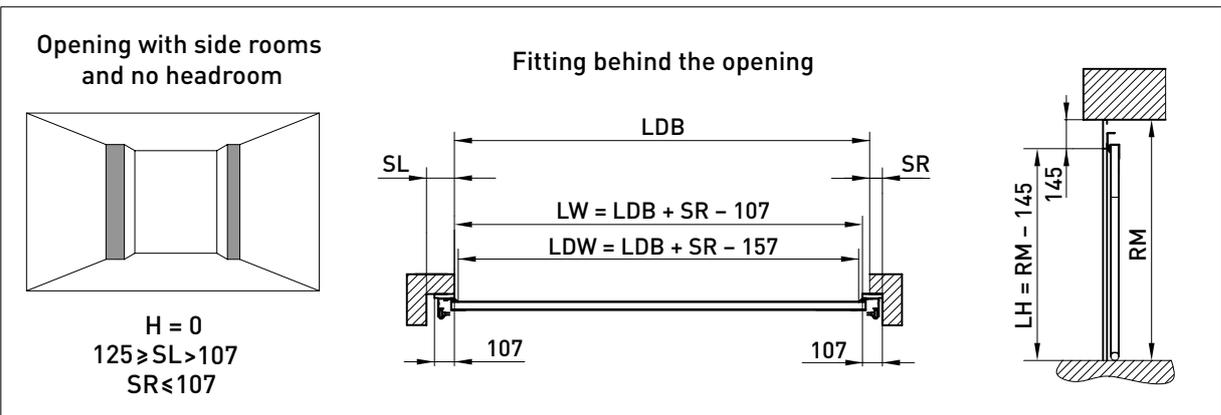
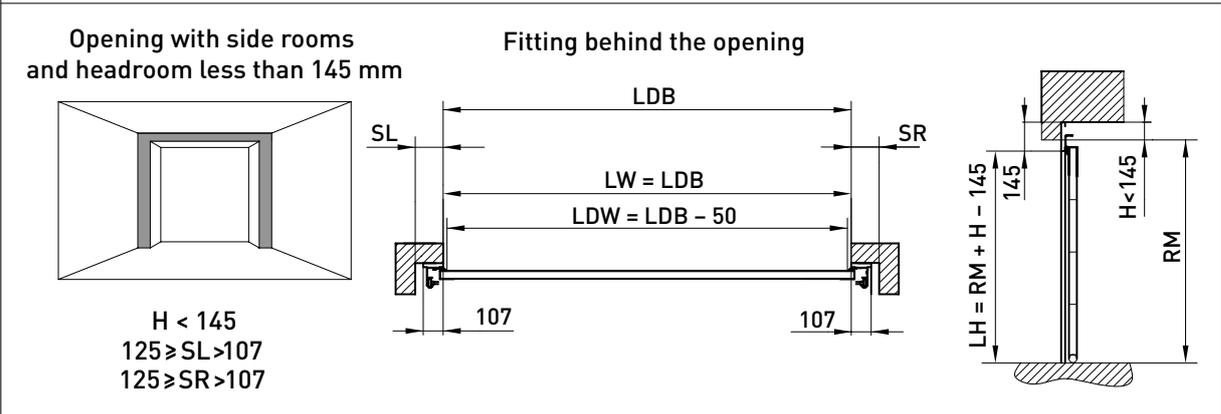
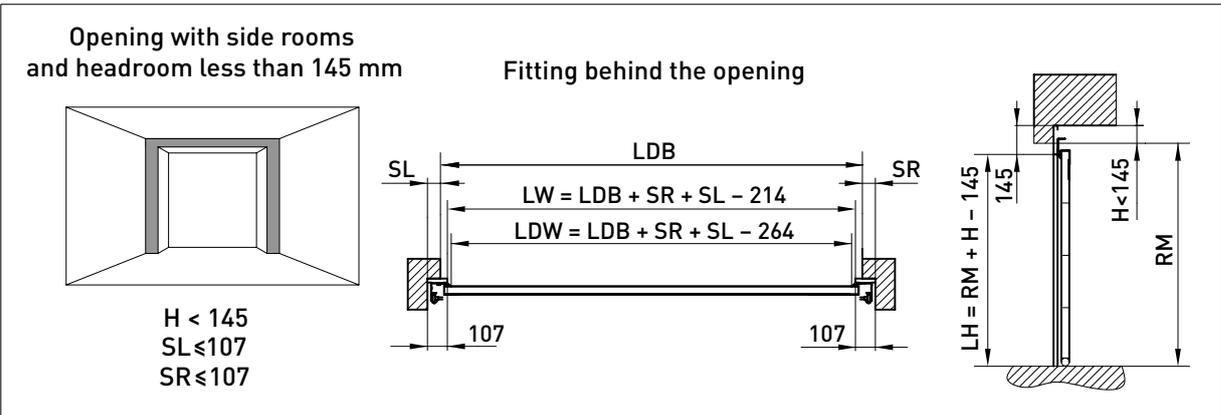
## 4.6. DOOR MOUNTING PLANS

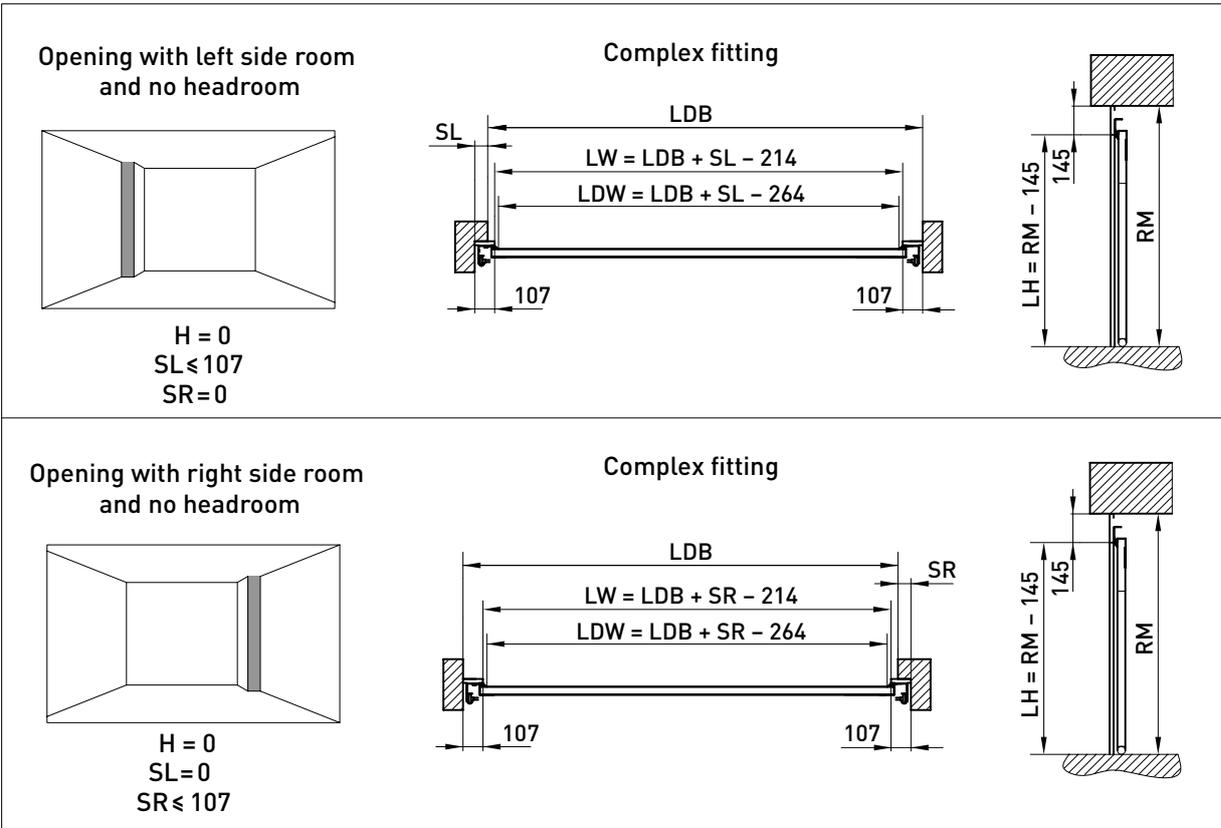
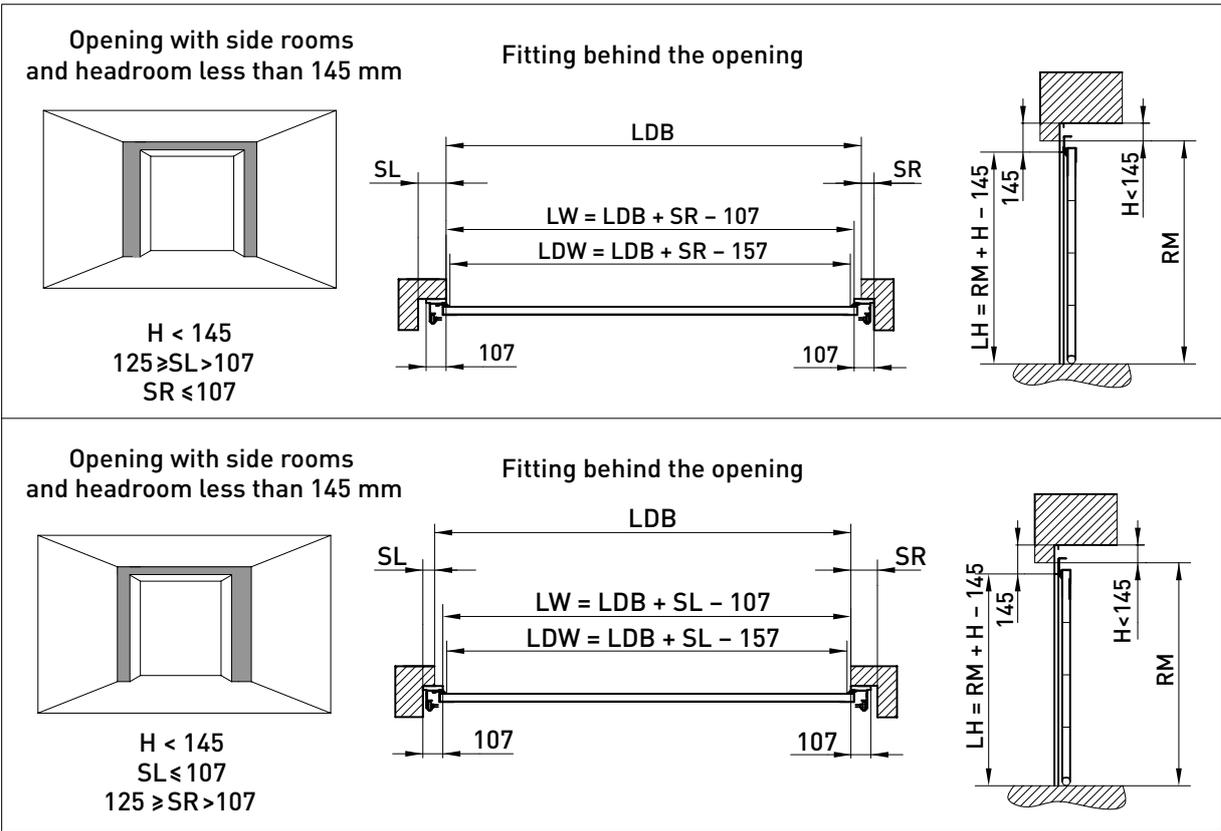
### Mounting plan symbols

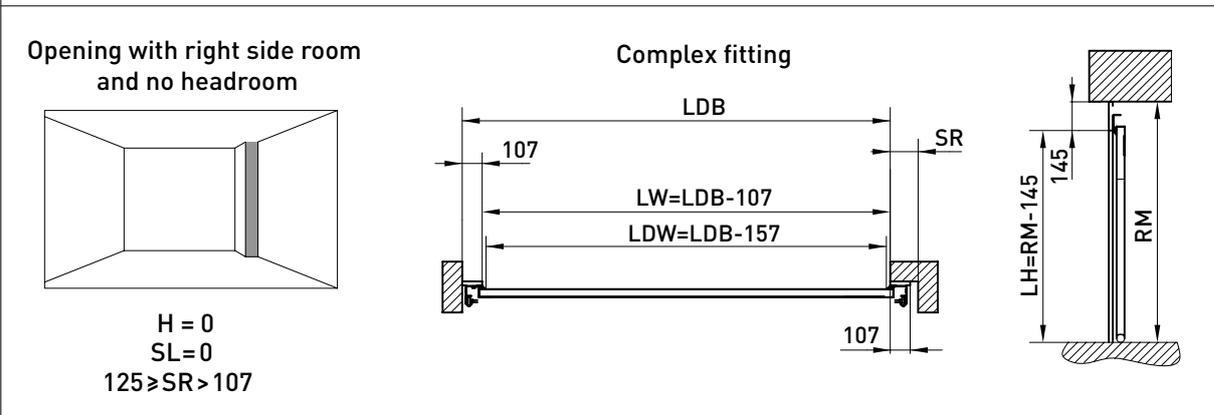
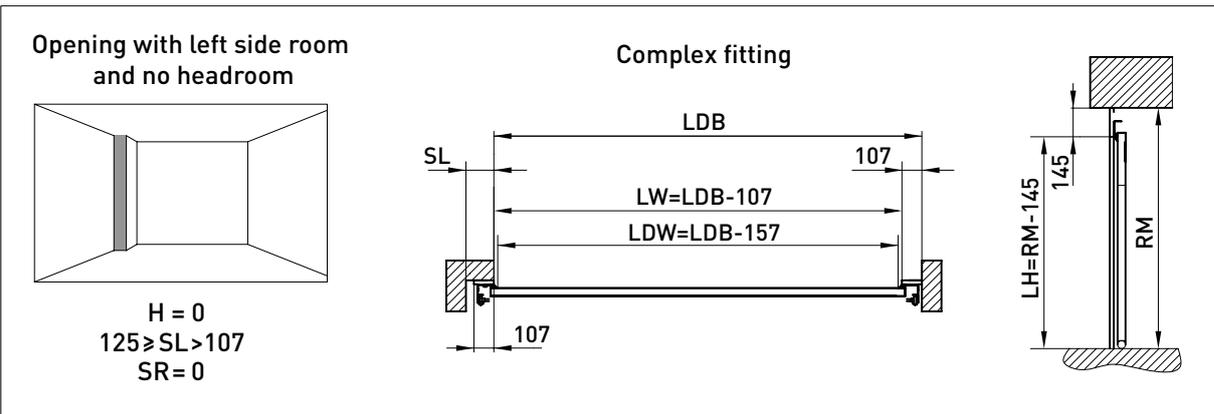
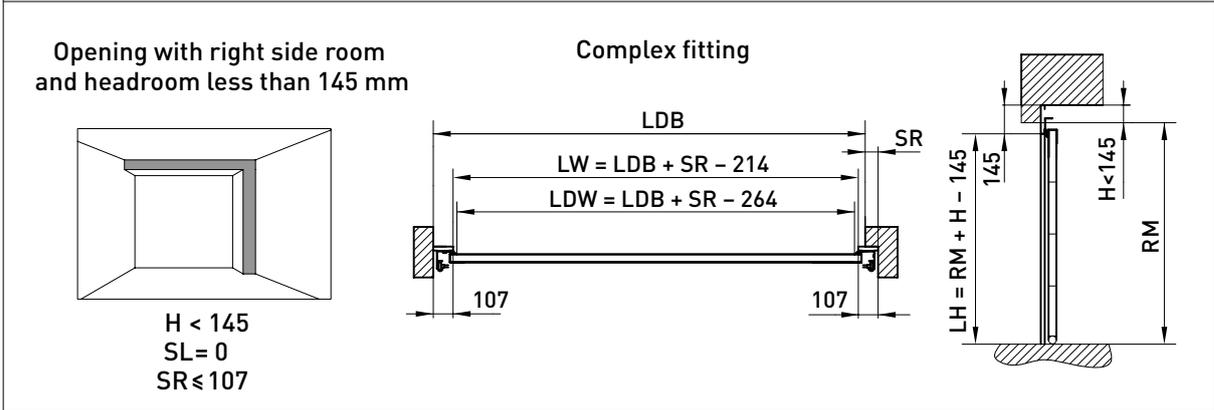
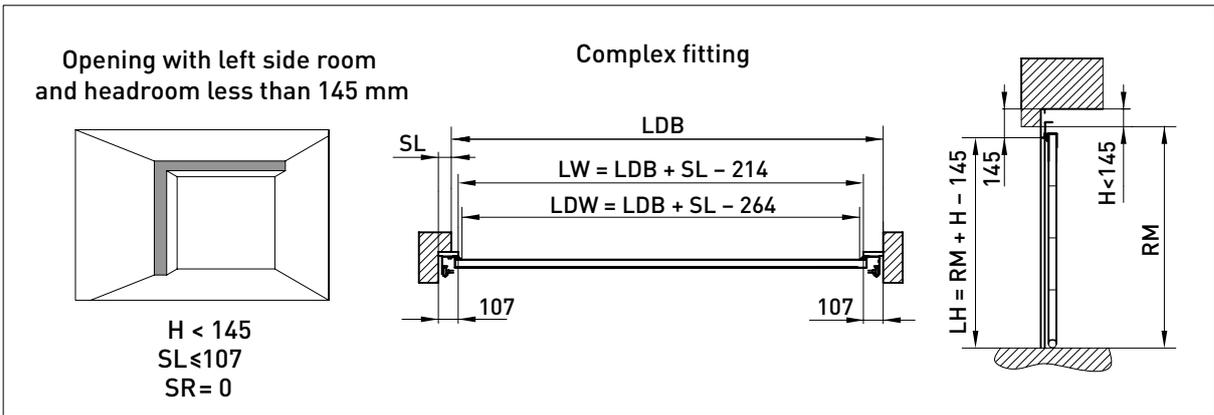
Parameter	Description
RM	Opening height
LDB	Opening width
H	Headroom height
LH	Design opening height
LW	Design opening width
LDW	Clear dimension width
SR	Right side room
SL	Left side room

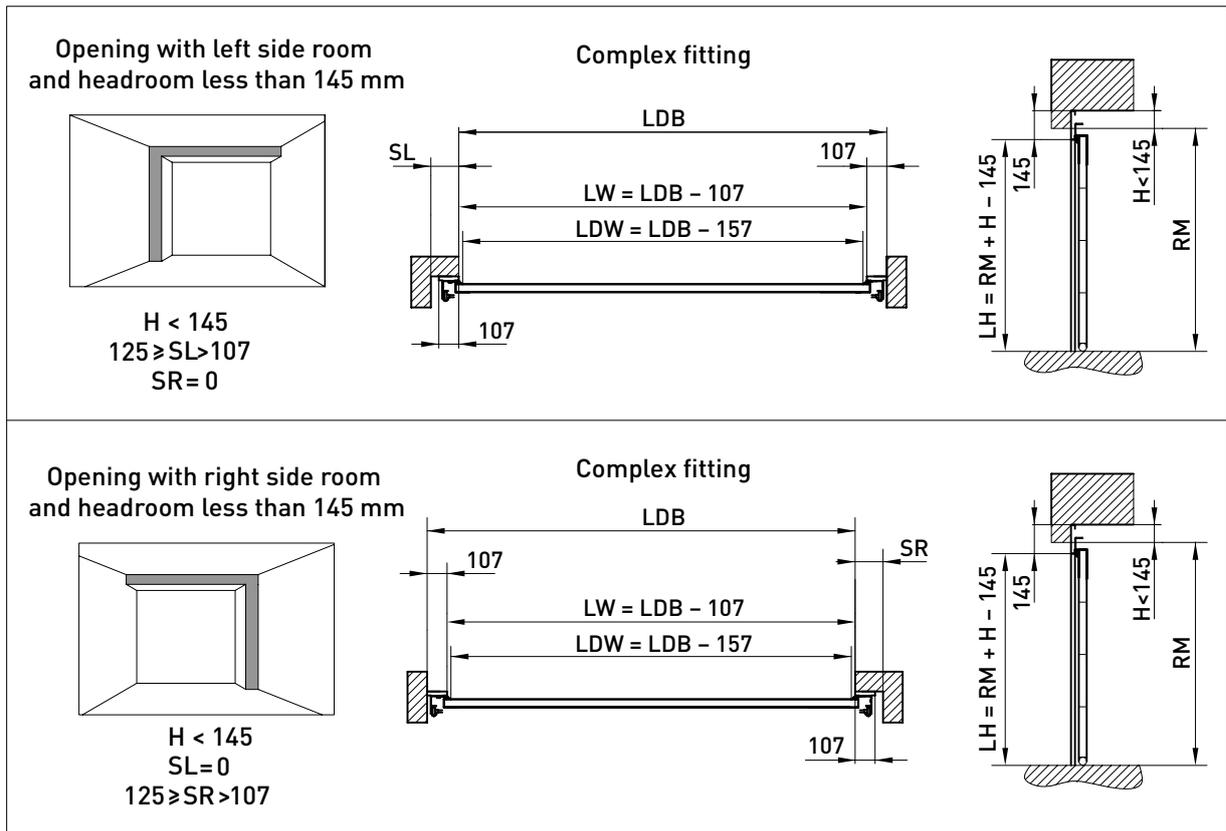




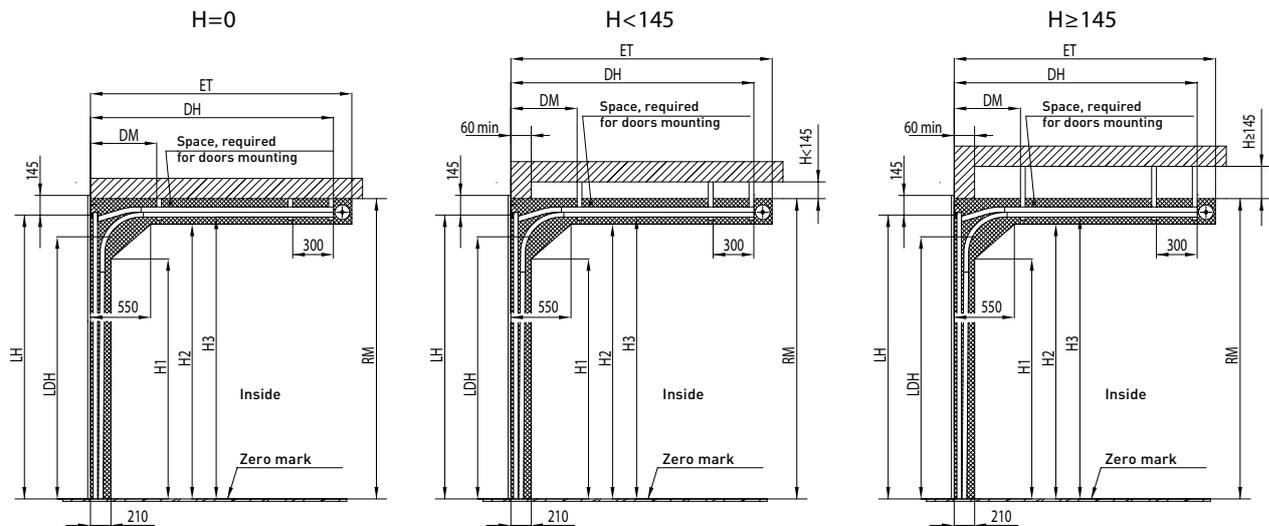






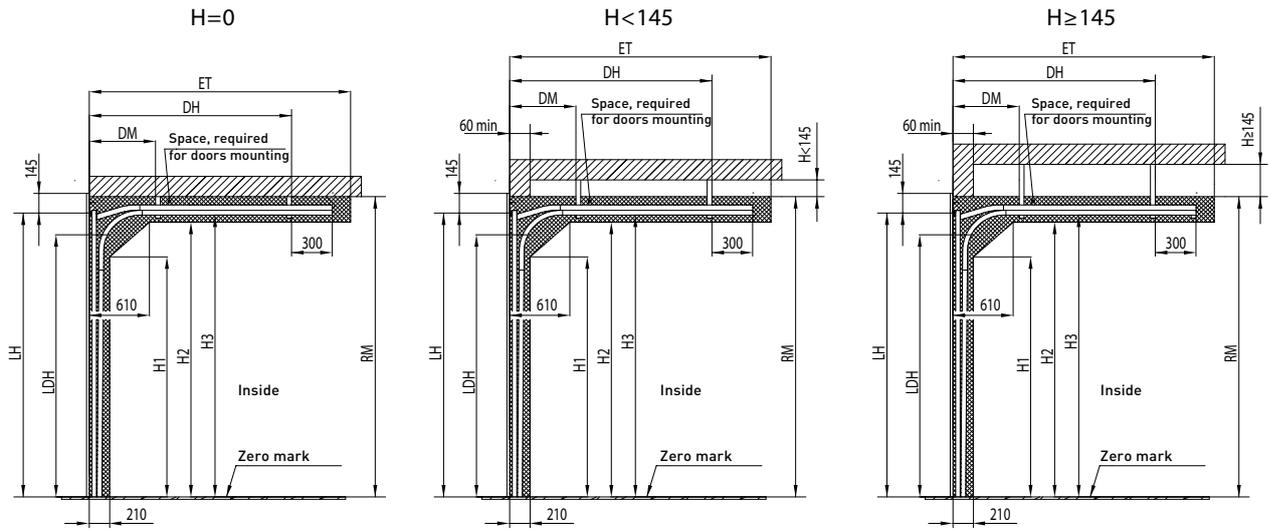


#### 4.6.1. CLASSIC SERIES DOORS WITH TORSION SPRINGS. LOW MOUNTING. FITTING IN FRONT OF THE OPENING



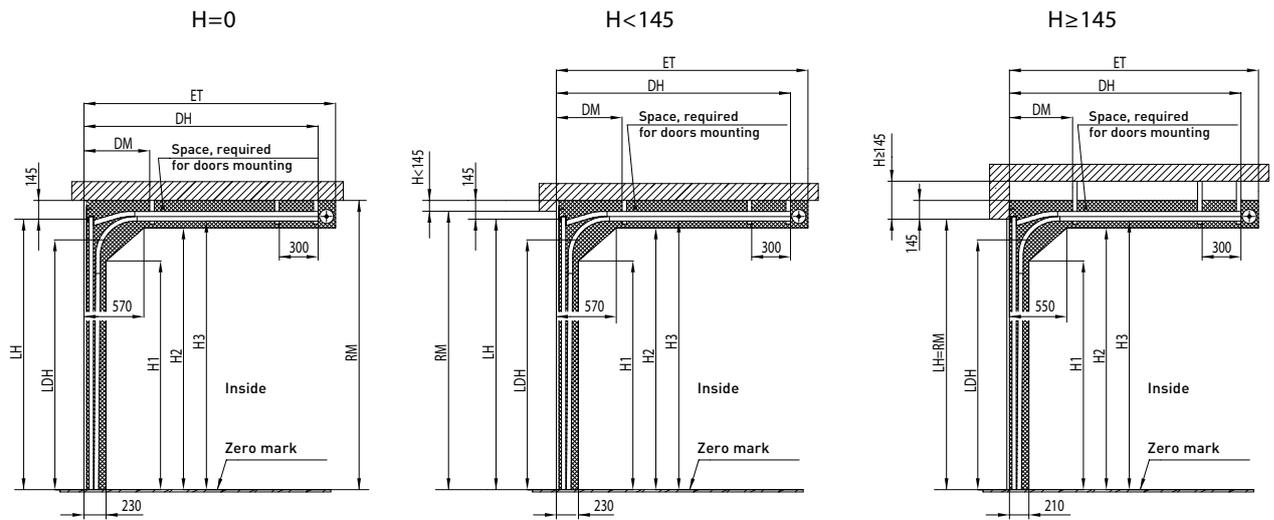
Parameter	Description	Formula or value
RM, mm	Opening height	Actual value
H, mm	Headroom height	$H=0, H<145, H\geq 145$
LH, mm	Design opening height	$RM - 130$
LDH, mm	Doors without wicket	$RM - 300$ (manual operation with the stopper RS0301)
		$RM - 230$ (manual operation with the catcher LH3004)
	Doors with wicket	$RM - 230$ (electric drive with the stopper RS0301)
		$RM - 325$ (manual operation with the stopper RS0301)
		$RM - 255$ (manual operation with the catcher LH3004)
	$RM - 255$ (electric drive with the stopper RS0301)	
DM, mm	Positioning of the fixing point	900
DH, mm	Positioning of the fixing point	$RM + 270$
ET, mm	Depth of door entering into the premises	$RM + 420$
H1, mm	Dimension limiting door operating area	$RM - 565$
H2, mm	Dimension limiting door operating area	$RM - 225$
H3, mm	Height to the horizontal track	$RM - 160$

**4.6.2. CLASSIC SERIES DOORS WITH TENSION SPRINGS.  
FITTING IN FRONT OF THE OPENING**



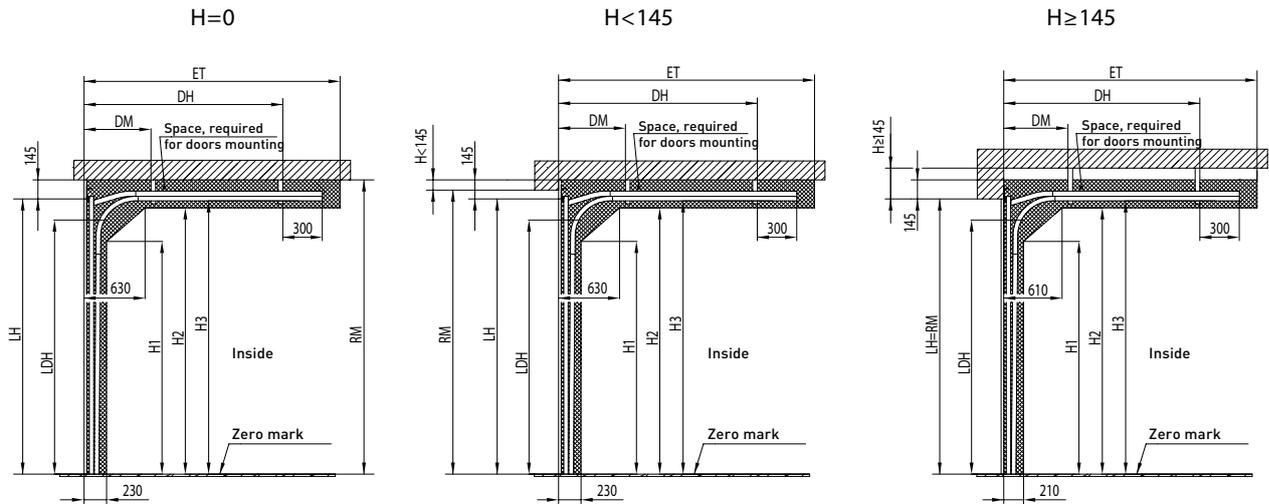
Parameter	Description	Formula or value
RM, mm	Opening height	Actual value
H, mm	Headroom height	$H=0, H<145, H\geq 145$
LH, mm	Design opening height	$RM-130$
LDH, mm	Clear opening height	$RM-300$ (manual operation with the stopper RS0301)
		$RM-230$ (manual operation with the catcher LH3004)
		$RM-230$ (electric drive with the stopper RS0301)
DM, mm	Positioning of the fixing point	900
DH, mm	Positioning of the fixing point	$RM-40$
ET, mm	Depth of door entering into the premises	$RM+270$
H1, mm	Dimension limiting door operating area	$RM-550$
H2, mm	Dimension limiting door operating area	$RM-225$
H3, mm	Height to the horizontal track	$RM-160$

### 4.6.3. CLASSIC SERIES DOORS WITH TORSION SPRINGS. LOW MOUNTING. FITTING IN BETWEEN THE OPENING



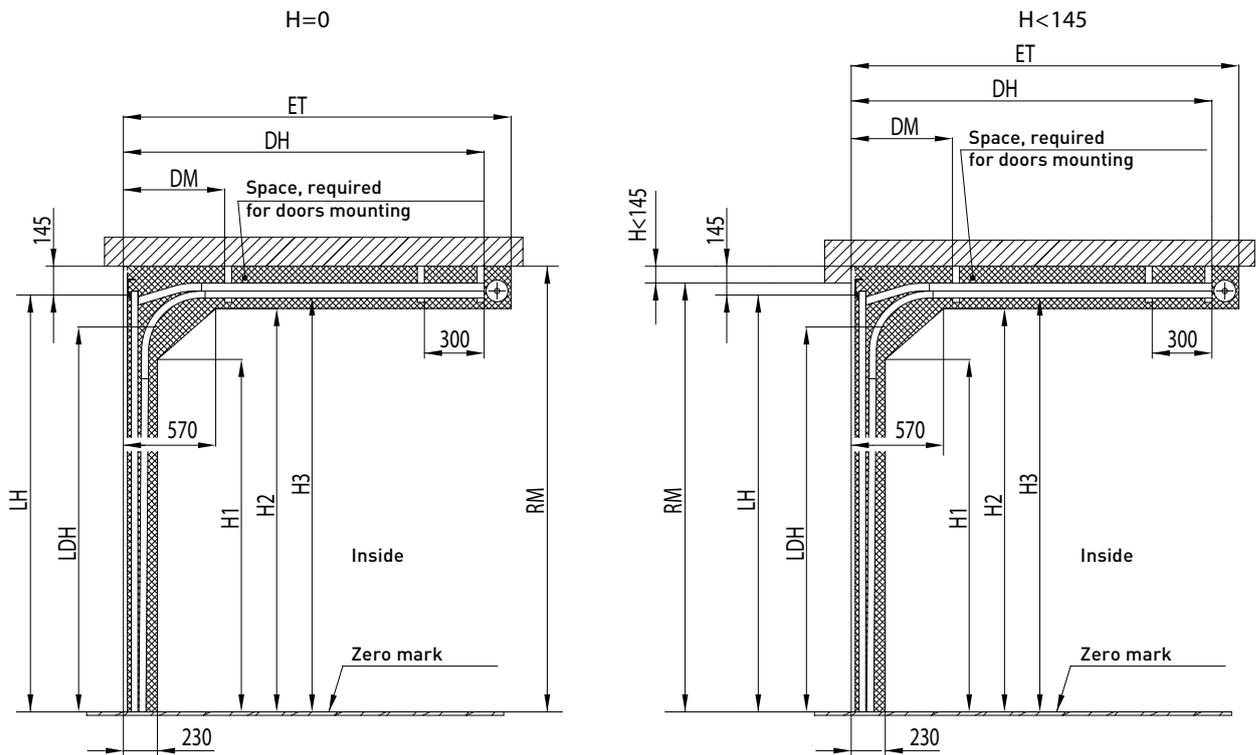
Parameter	Description	Formula or value		
RM, mm	Opening height	Actual value		
H, mm	Headroom height	H=0	H<145	H≥145
LH, mm	Design opening height	RM-145	RM+H-145	RM
LDH, mm	Doors without wicket (manual operation with the stopper RS0301)	RM-315	RM+H-315	RM-170
	Doors without wicket (manual operation with the catcher LH3004)	RM-245	RM+H-245	RM-100
	Doors without wicket (electric drive with the stopper RS0301)	RM-245	RM+H-245	RM-100
	Doors with wicket (manual operation with the stopper RS0301)	RM-340	RM+H-340	RM-195
	Doors with wicket (manual operation with the catcher LH3004)	RM-270	RM+H-270	RM-125
	Doors with wicket (electric drive with the stopper RS0301)	RM-270	RM+H-270	RM-125
DM, mm	Positioning of the fixing point	920	920	900
DH, mm	Positioning of the fixing point	RM+300	RM+H+300	RM+400
ET, mm	Depth of door entering into the premises	RM+405	RM+H+405	RM+550
H1, mm	Dimension limiting door operating area	RM-580	RM+H-580	RM-435
H2, mm	Dimension limiting door operating area	RM-240	RM+H-240	RM-95
H3, mm	Height to the horizontal track	RM-175	RM+H-175	RM-30

**4.6.4. CLASSIC SERIES DOORS WITH TENSION SPRINGS.  
FITTING IN BETWEEN THE OPENING**



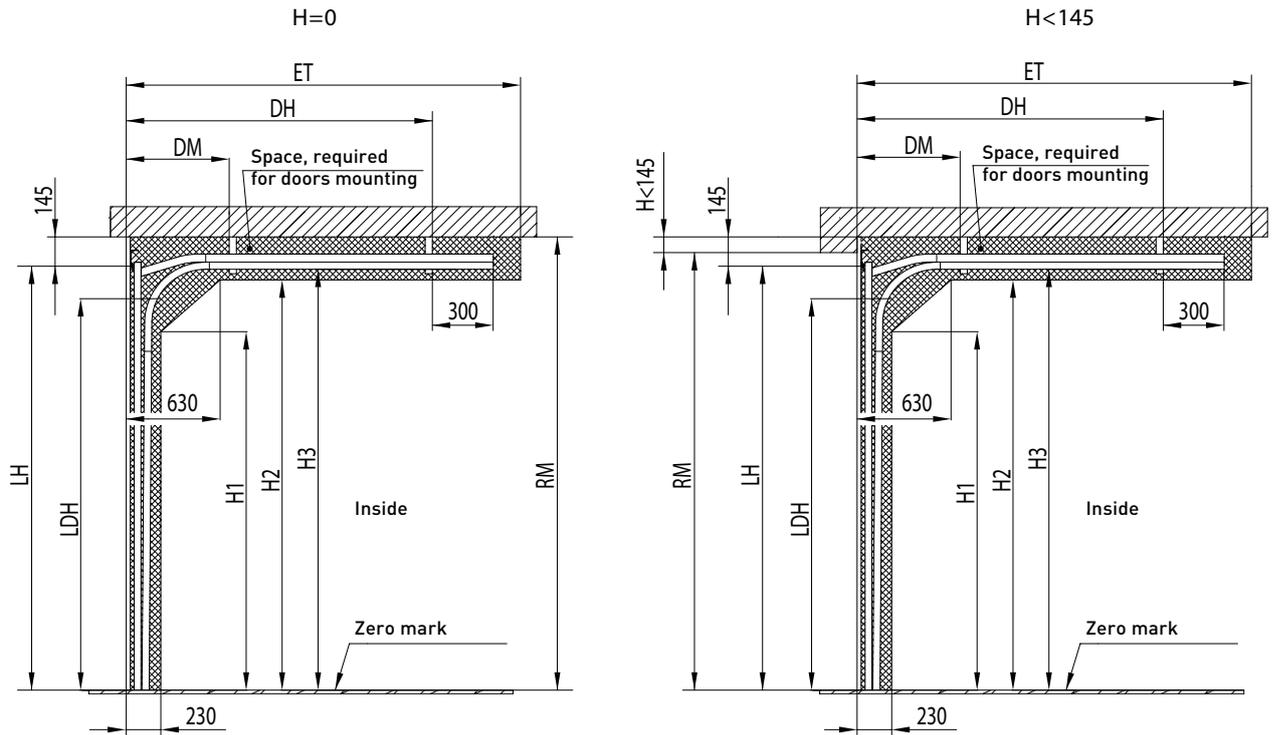
Parameter	Description	Formula or value		
		Actual value		
RM, mm	Opening height	Actual value		
H, mm	Headroom height	H=0	H<145	H≥145
LH, mm	Design opening height	RM-145	RM+H-145	RM
LDH, mm	Manual operation with the limiting device RS0301	RM-315	RM+H-315	RM-170
	Manual operation with the fixing device LH3004	RM-245	RM+H-245	RM-100
	Electric drive with the limiting device RS0301	RM-245	RM+H-245	RM-100
DM, mm	Positioning of the fixing point	920	920	900
DH, mm	Positioning of the fixing point	RM-35	RM+H-35	RM+90
ET, mm	Depth of door entering into the premises	RM+275	RM+H+275	RM+400
H1, mm	Dimension limiting door operating area	RM-565	RM+H-565	RM-420
H2, mm	Dimension limiting door operating area	RM-240	RM+H-240	RM-95
H3, mm	Height to the horizontal track	RM-175	RM+H-175	RM-30

#### 4.6.5. CLASSIC SERIES DOORS WITH TORSION SPRINGS. LOW MOUNTING. FITTING BEHIND THE OPENING, COMPLEX TYPE OF FITTING



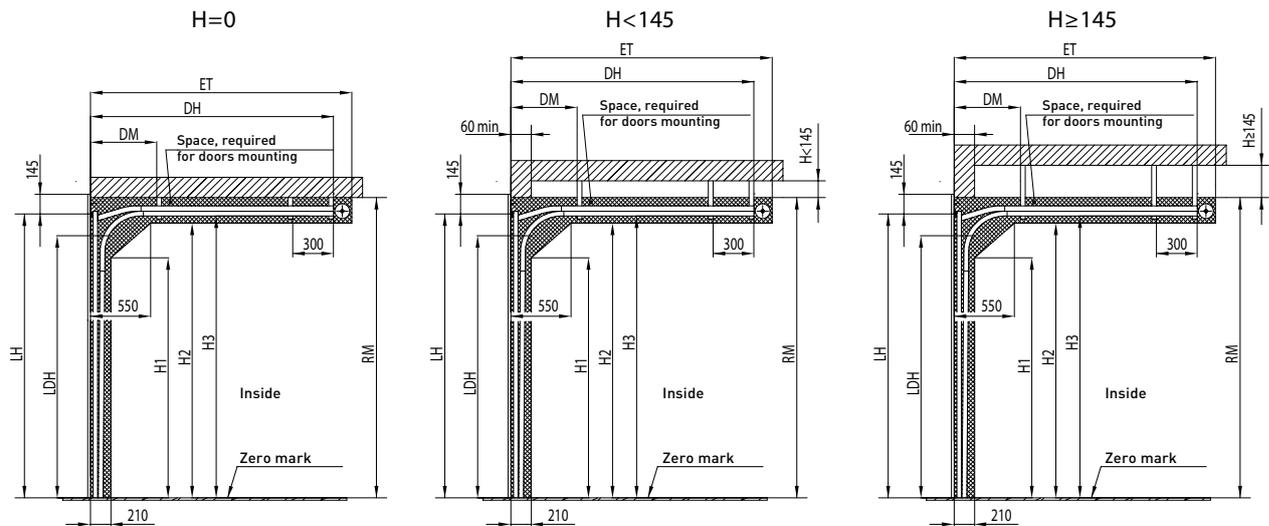
Parameter	Description	Formula or value	
RM, mm	Opening height	Actual value	
H, mm	Headroom height	H=0	H<145
LH, mm	Design opening height	RM-145	RM+H-145
LDH, mm	Doors without wicket (manual operation with the stopper RS0301)	RM-315	RM+H-315
	Doors without wicket (manual operation with the catcher LH3004)	RM-245	RM+H-245
	Doors without wicket (electric drive with the stopper RS0301)	RM-245	RM+H-245
	Doors with wicket (manual operation with the stopper RS0301)	RM-340	RM+H-340
	Doors with wicket (manual operation with the catcher LH3004)	RM-270	RM+H-270
	Doors with wicket (electric drive with the stopper RS0301)	RM-270	RM+H-270
DM, mm	Positioning of the fixing point	920	
DH, mm	Positioning of the fixing point	RM+255	RM+H+255
ET, mm	Depth of door entering into the premises	RM+405	RM+H+405
H1, mm	Dimension limiting door operating area	RM-580	RM+H-580
H2, mm	Dimension limiting door operating area	RM-240	RM+H-240
H3, mm	Height to the horizontal track	RM-175	RM+H-175

4.6.6. CLASSIC SERIES DOORS WITH TENSION SPRINGS.  
FITTING BEHIND THE OPENING, COMPLEX TYPE OF FITTING



Parameter	Description	Formula or value	
RM, mm	Opening height	Actual value	
H, mm	Headroom height	H=0	H<145
LH, mm	Design opening height	RM-145	RM+H-145
LDH, mm	Manual operation with the limiting device RS0301	RM-315	RM+H-315
	Manual operation with the fixing device LH3004	RM-245	RM+H-245
	Electric drive with the limiting device RS0301	RM-245	RM+H-245
DM, mm	Positioning of the fixing point	920	
DH, mm	Positioning of the fixing point	RM-35	RM+H-35
ET, mm	Depth of door entering into the premises	RM+275	RM+H+275
H1, mm	Dimension limiting door operating area	RM-565	RM+H-565
H2, mm	Dimension limiting door operating area	RM-240	RM+H-240
H3, mm	Height to the horizontal track	RM-175	RM+H-175

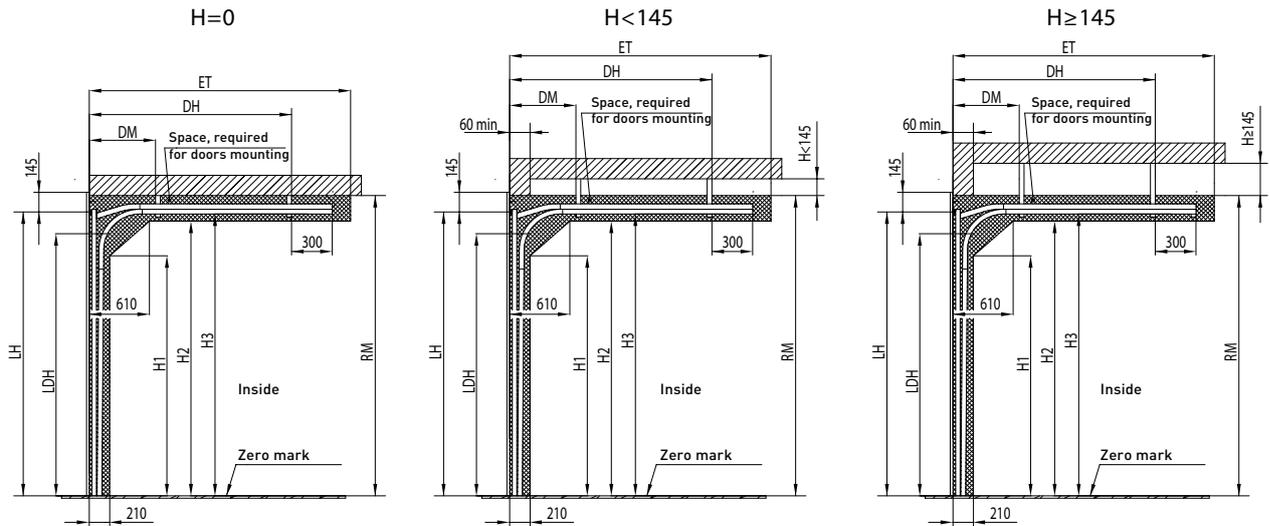
#### 4.6.7. TREND SERIES DOORS WITH TORSION SPRINGS. LOW MOUNTING. FITTING IN FRONT OF THE OPENING



Parameter	Description	Formula or value
RM, mm	Opening height	Actual value
H, mm	Headroom height	$H=0, H<145, H\geq 145$
LH, mm	Design opening height	$RM-130$
LDH, mm	Doors without wicket	$RM-300$ (manual operation with the stopper RS-3516)
		$RM-230$ (manual operation with the catcher LHT-3004)
	Doors with wicket	$RM-230$ (electric drive with the stopper RS-3516)
		$RM-325$ (manual operation with the stopper RS-3516)
		$RM-255$ (manual operation with the catcher LHT-3004)
	$RM-255$ (electric drive with the stopper RS-3516)	
DM, mm	Positioning of the fixing point	950
H1, mm	Dimension limiting door operating area	$RM-570$
H2, mm	Dimension limiting door operating area	$RM-180$
H3, mm	Height to the horizontal track	$RM-115$

Depth of door entering into the premises ET and Positioning of the fixing point DH depending on doors height LH													
LH, mm	1750-1845	1850-1945	1950-2045	2050-2145	2150-2245	2250-2345	2350-2445	2450-2545	2550-2645	2650-2745	2750-2845	2850-3945	2950-3000
ET, mm	2210	2310	2410	2510	2610	2710	2810	2910	3010	3110	3210	3310	3410
DH, mm	2030	2130	2230	2330	2430	2530	2630	2730	2830	2930	3030	3130	3230

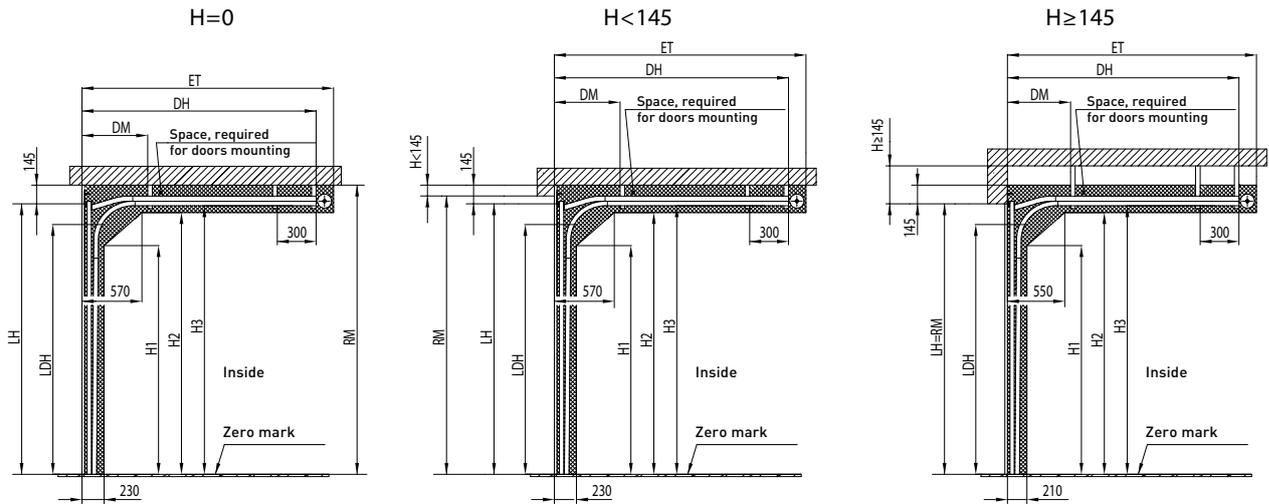
**4.6.8. TREND SERIES DOORS WITH TENSION SPRINGS.  
FITTING IN FRONT OF THE OPENING**



Parameter	Description	Formula or value
RM, mm	Opening height	Actual value
H, mm	Headroom height	H=0, H<145, H≥145
LH, mm	Design opening height	RM-130
LDH, mm	Clear opening height	RM-300 (manual operation with the stopper RS-3516)
		RM-230 (manual operation with the catcher LHT-3004)
		RM-230 (electric drive with the stopper RS-3516)
DM, mm	Positioning of the fixing point	950
H1, mm	Dimension limiting door operating area	RM-570
H2, mm	Dimension limiting door operating area	RM-180
H3, mm	Height to the horizontal track	RM-115

Depth of door entering into the premises ET and Positioning of the fixing point DH depending on doors height LH													
LH, mm	1750-1845	1850-1945	1950-2045	2050-2145	2150-2245	2250-2345	2350-2445	2450-2545	2550-2645	2650-2745	2750-2845	2850-3945	2950-3000
ET, mm	2040	2140	2240	2340	2440	2540	2640	2740	2840	2940	3040	3140	3240
DH, mm	1740	1840	1940	2040	2140	2240	2340	2440	2540	2640	2740	2840	2940

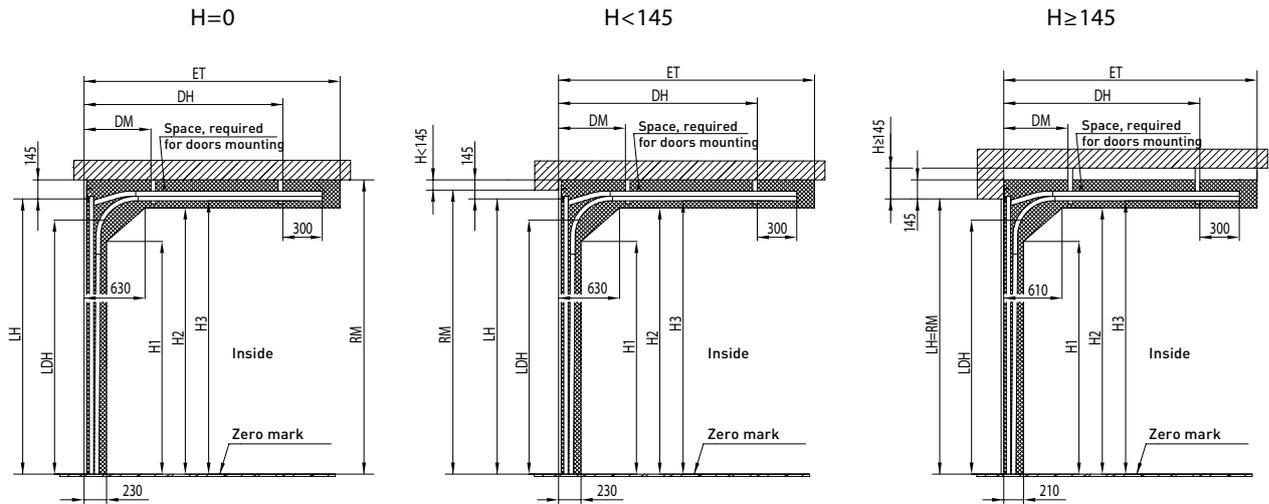
**4.6.9. TREND SERIES DOORS WITH TORSION SPRINGS.  
LOW MOUNTING. FITTING IN BETWEEN THE OPENING**



Parameter	Description	Formula or value		
RM, mm	Opening height	Actual value		
H, mm	Headroom height	H=0	H<145	H≥145
LH, mm	Design opening height	RM-145	RM+H-145	RM
LDH, mm	Doors without wicket (manual operation with the stopper RS-3516)	RM-315	RM+H-315	RM-170
	Doors without wicket (manual operation with the catcher LHT-3004)	RM-245	RM+H-245	RM-100
	Doors without wicket (electric drive with the stopper RS-3516)	RM-245	RM+H-245	RM-100
	Doors with wicket (manual operation with the stopper RS-3516)	RM-340	RM+H-340	RM-195
	Doors with wicket (manual operation with the catcher LHT-3004)	RM-270	RM+H-270	RM-125
	Doors with wicket (electric drive with the stopper RS-3516)	RM-270	RM+H-270	RM-125
DM, mm	Positioning of the fixing point	970	970	950
H1, mm	Dimension limiting door operating area	RM-585	RM+H-585	RM-440
H2, mm	Dimension limiting door operating area	RM-195	RM+H-195	RM-50
H3, mm	Height to the horizontal track	RM-130	RM+H-130	RM+15

Depth of door entering into the premises ET and Positioning of the fixing point DH depending on doors height LH													
LH, mm	1750-1845	1850-1945	1950-2045	2050-2145	2150-2245	2250-2345	2350-2445	2450-2545	2550-2645	2650-2745	2750-2845	2850-3945	2950-3000
ET, mm	2230	2330	2430	2530	2630	2730	2830	2930	3030	3130	3230	3330	3430
DH, mm	2050	2150	2250	2350	2450	2550	2650	2750	2850	2950	3050	3150	3250

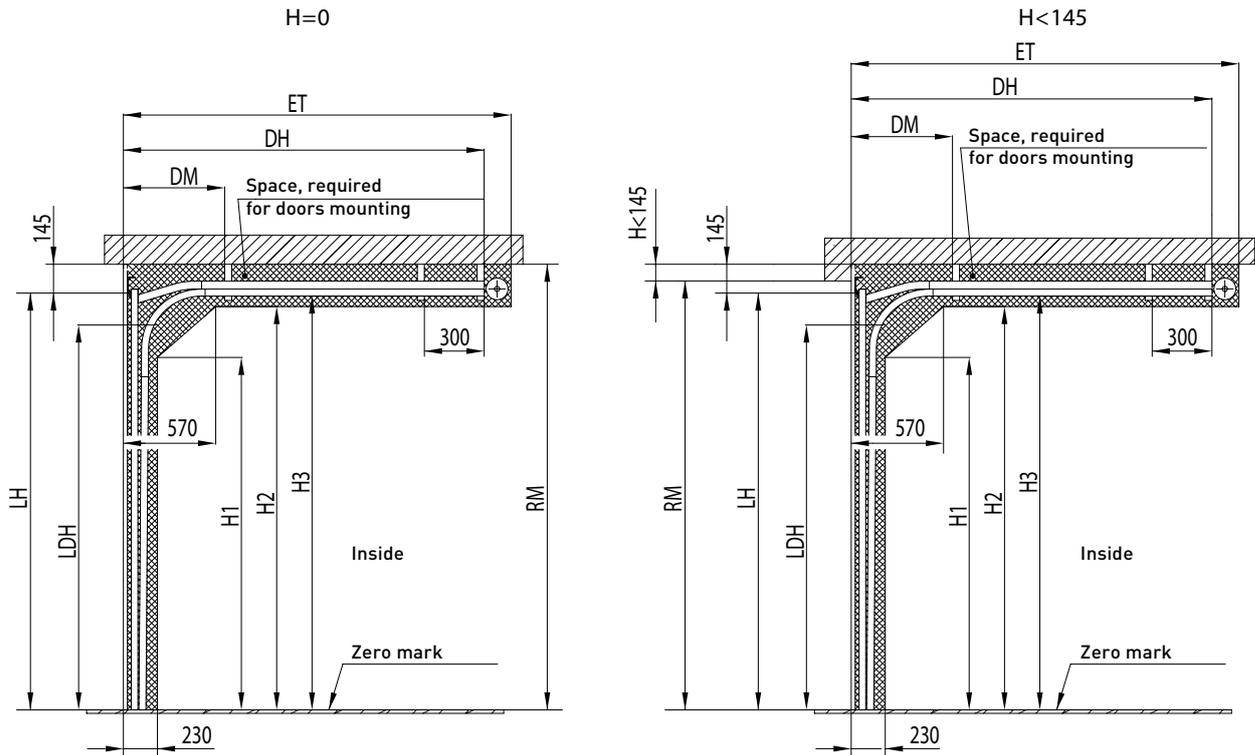
**4.6.10. TREND SERIES DOORS WITH TENSION SPRINGS.  
FITTING IN BETWEEN THE OPENING**



Parameter	Description	Formula or value		
RM, mm	Opening height	Actual value		
H, mm	Headroom height	H=0	H<145	H≥145
LH, mm	Design opening height	RM-145	RM+H-145	RM
LDH, mm	Manual operation with the limiting device RS-3516	RM-315	RM+H-315	RM-170
	Manual operation with the fixing device LHT-3004	RM-245	RM+H-245	RM-100
	Electric drive with the limiting device RS-3516	RM-245	RM+H-245	RM-100
DM, mm	Positioning of the fixing point	970	970	950
H1, mm	Dimension limiting door operating area	RM-585	RM+H-585	RM-440
H2, mm	Dimension limiting door operating area	RM-195	RM+H-195	RM-50
H3, mm	Height to the horizontal track	RM-130	RM+H-130	RM+15

Depth of door entering into the premises ET and Positioning of the fixing point DH depending on doors height LH													
LH, mm	1750-1845	1850-1945	1950-2045	2050-2145	2150-2245	2250-2345	2350-2445	2450-2545	2550-2645	2650-2745	2750-2845	2850-3945	2950-3000
ET, mm	2060	2160	2260	2360	2460	2560	2660	2760	2860	2960	3060	3160	3260
DH, mm	1760	1860	1960	2060	2160	2260	2360	2460	2560	2660	2760	2860	2960

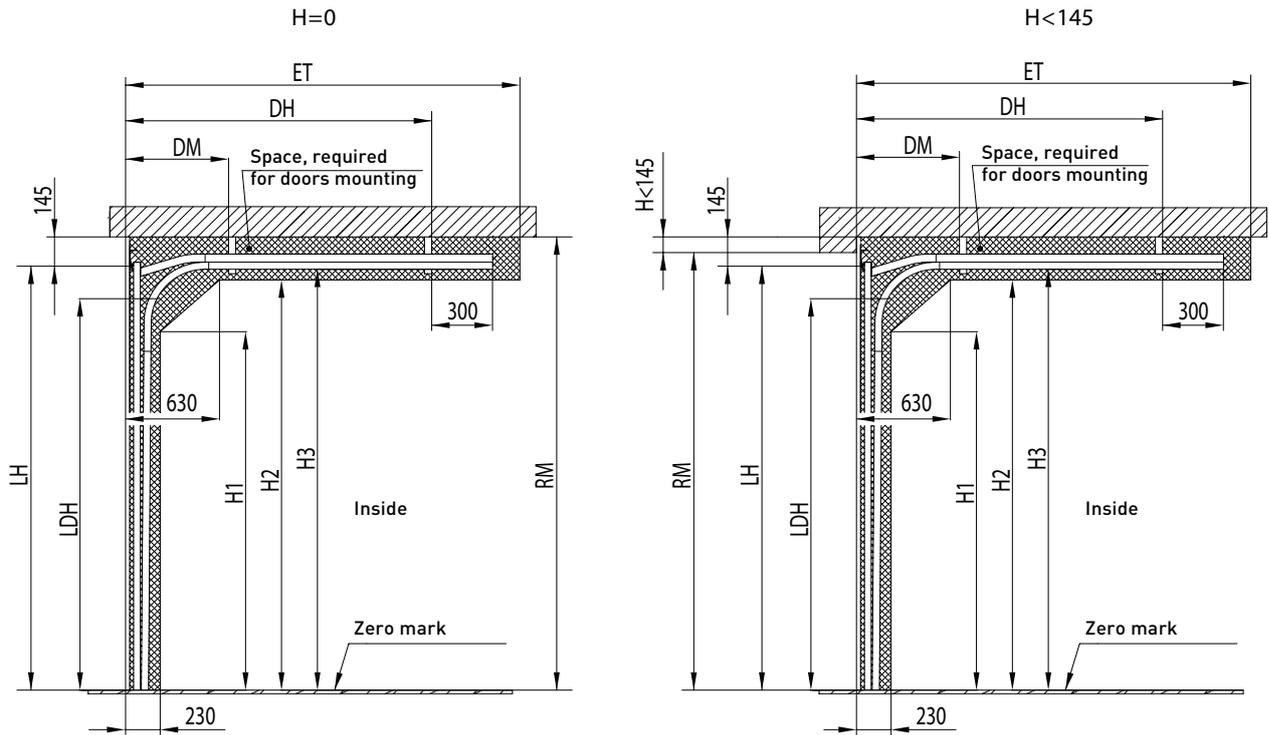
**4.6.11. TREND SERIES DOORS WITH TORSION SPRINGS. LOW MOUNTING. FITTING BEHIND THE OPENING, COMPLEX TYPE OF FITTING**



Parameter	Description	Formula or value	
RM, mm	Opening height	Actual value	
H, mm	Headroom height	H=0	H<145
LH, mm	Design opening height	RM-145	RM+H-145
LDH, mm	Doors without wicket (manual operation with the stopper RS-3516)	RM-315	RM+H-315
	Doors without wicket (manual operation with the catcher LHT-3004)	RM-245	RM+H-245
	Doors without wicket (electric drive with the stopper RS-3516)	RM-245	RM+H-245
	Doors with wicket (manual operation with the stopper RS-3516)	RM-340	RM+H-340
	Doors with wicket (manual operation with the catcher LHT-3004)	RM-270	RM+H-270
	Doors with wicket (electric drive with the stopper RS-3516)	RM-270	RM+H-270
DM, mm	Positioning of the fixing point	970	
H1, mm	Dimension limiting door operating area	RM-585	RM+H-585
H2, mm	Dimension limiting door operating area	RM-195	RM+H-195
H3, mm	Height to the horizontal track	RM-130	RM+H-130

Depth of door entering into the premises ET and Positioning of the fixing point DH depending on doors height LH													
LH, mm	1750-1845	1850-1945	1950-2045	2050-2145	2150-2245	2250-2345	2350-2445	2450-2545	2550-2645	2650-2745	2750-2845	2850-3945	2950-3000
ET, mm	2230	2330	2430	2530	2630	2730	2830	2930	3030	3130	3230	3330	3430
DH, mm	2050	2150	2250	2350	2450	2550	2650	2750	2850	2950	3050	3150	3250

**4.6.12. TREND SERIES DOORS WITH TORSION SPRINGS.  
FITTING BEHIND THE OPENING, COMPLEX TYPE OF FITTING**



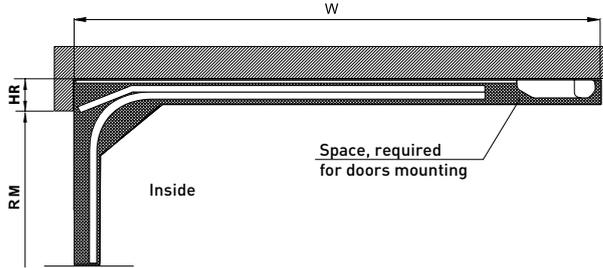
Parameter	Description	Formula or value	
RM, mm	Opening height	Actual value	
H, mm	Headroom height	H=0	H<145
LH, mm	Design opening height	RM-145	RM+H-145
LDH, mm	Manual operation with the limiting device RS-3516	RM-315	RM+H-315
	Manual operation with the fixing device LH3004	RM-245	RM+H-245
	Electric drive with the limiting device RS-3516	RM-245	RM+H-245
DM, mm	Positioning of the fixing point	970	
H1, mm	Dimension limiting door operating area	RM-585	RM+H-585
H2, mm	Dimension limiting door operating area	RM-195	RM+H-195
H3, mm	Height to the horizontal track	RM-130	RM+H-130

Depth of door entering into the premises ET and Positioning of the fixing point DH depending on doors height LH													
LH, mm	1750-1845	1850-1945	1950-2045	2050-2145	2150-2245	2250-2345	2350-2445	2450-2545	2550-2645	2650-2745	2750-2845	2850-3945	2950-3000
ET, mm	2060	2160	2260	2360	2460	2560	2660	2760	2860	2960	3060	3160	3260
DH, mm	1760	1860	1960	2060	2160	2260	2360	2460	2560	2660	2760	2860	2960

## 4.7. ADDITIONAL PARAMETERS FOR ELECTRIC DRIVE INSTALLATION

### 4.7.1. CLASSIC SERIES DOORS WITH TENSION SPRINGS

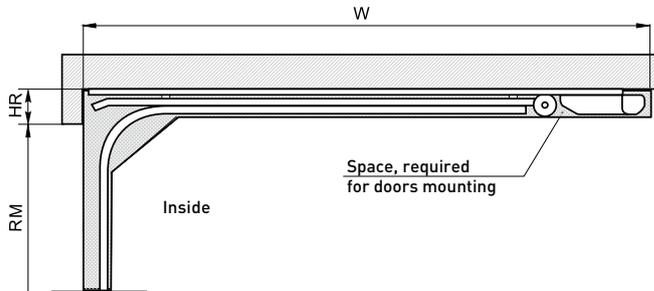
Fitting in front of the opening. Fitting in between the opening. Fitting behind the opening, complex type of fitting.



Type of electric drive	Opening height (RM), mm	Type of drive rail	Dimensions of drive positioning W, mm	Height of rail positioning HR, mm
Comfort 50/60	to 2600	SZ-12SL (RU)	3750	130
Comfort 60L	to 3150	SZ-13SL	4300	
Comfort 260/270/280 (speed)	to 2100	SZ-11SL	3300	
	to 2350	SZ-12SL	3550	
	to 2550	SZ-12SL (RU)	3750	
RT600/1000	to 2650	LGR-3600B	3900	
	to 3250	LGR-4200B	4500	
ASG600/1000	to 2600	ASGR3/3B	3700	135*/220
ASG1000	to 3300	ASGR4/4B	4400	
Levigato	to 2400	LGR-3300B/C	3650	130
	to 2700	LGR-3600B/C	3950	
	to 3300	LGR-4200B/C	4550	

### 4.7.2. CLASSIC SERIES DOORS WITH TORSION SPRINGS. LOW MOUNTING

Fitting in front of the opening. Fitting in between the opening. Fitting behind the opening, complex type of fitting.

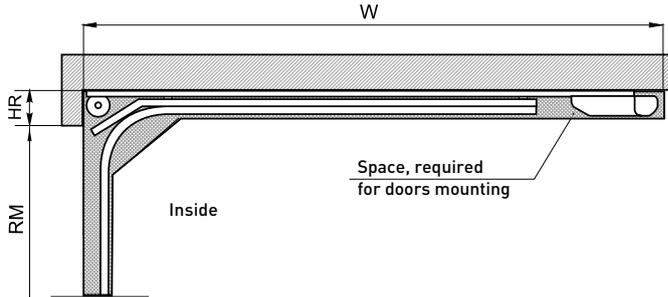


Type of electric drive	Opening height (RM), mm	Type of drive rail	Dimensions of drive positioning W, mm	Height of rail positioning HR, mm
Comfort 50/60	to 2550	SZ-12SL (RU)	3750	130
Comfort 60L	to 3100	SZ-13SL	4300	
Comfort 260/270/280 (speed)	to 2050	SZ-11SL	3300	
	to 2300	SZ-12SL	3550	
	to 2500	SZ-12SL (RU)	3750	
RT600/1000	to 2600	LGR-3600B	3900	
	to 3200	LGR-4200B	4500	
ASG600/1000	to 2550	ASGR3/3B	3700	135*/220
ASG1000	to 3250	ASGR4/4B	4400	
Levigato	to 2350	LGR-3300B/C	3650	130
	to 2650	LGR-3600B/C	3950	
	to 3250	LGR-4200B/C	4550	

\* Only if to move a rail carriage to a rear door C-profile (the carriage shouldn't be moved beyond the rear door C-profile). Rail carriage design should be taken into consideration for installation of doors with the motor. Detailed information can be found in the motor installation manual.

### 4.7.3. TREND SERIES DOORS WITH TENSION SPRINGS

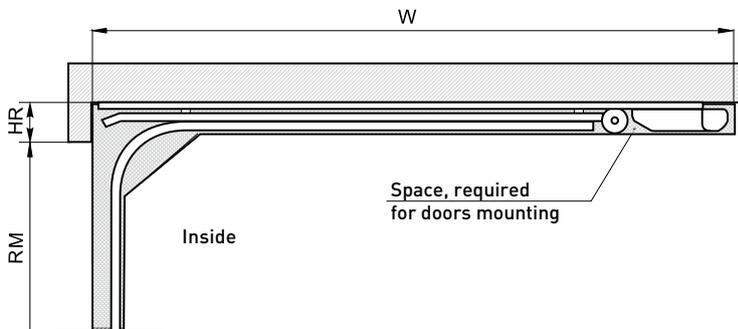
Fitting in front of the opening. Fitting in between the opening. Fitting behind the opening, complex type of fitting.



Type of electric drive	Maximum opening height (RM), mm	Type of drive rail	Dimensions of drive positioning W, mm	Minimum height of rail positioning HR, mm
Comfort 50/60	to 2600	SZ-12SL (RU)	3750	130
Comfort 60L	to 3150	SZ-13SL	4300	
Comfort 260/270/280 (speed)	to 2100	SZ-11SL	3300	
	to 2350	SZ-12SL	3550	
	to 3100	SZ-13SL	4300	
RT600/1000	to 2650	LGR-3600B	3900	135*/220
	to 3250	LGR-4200B	4500	
ASG600/1000	to 2600	ASGR3/3B	3700	130
ASG1000	to 3300	ASGR4/4B	4400	
Levigato	to 2400	LGR-3300B/C	3650	
	to 2700	LGR-3600B/C	3950	
	to 3300	LGR-4200B/C	4550	

### 4.7.4. TREND SERIES DOORS WITH TORSION SPRINGS. LOW MOUNTING

Fitting in front of the opening. Fitting in between the opening. Fitting behind the opening, complex type of fitting.



Type of electric drive	Maximum opening height (RM), mm	Type of drive rail	Dimensions of drive positioning W, mm	Minimum height of rail positioning HR, mm
Comfort 50/60	to 2550	SZ-12SL (RU)	3750	130
Comfort 60L	to 3100	SZ-13SL	4300	
Comfort 260/270/280 (speed)	to 2050	SZ-11SL	3300	
	to 2300	SZ-12SL	3550	
	to 3050	SZ-13SL	4300	
RT600/1000	to 2500	SZ-12SL (RU)	3750	135*/220
	to 2600	LGR-3600B	3900	
ASG600/1000	to 3200	LGR-4200B	4500	130
	to 2550	ASGR3/3B	3700	
ASG1000	to 3250	ASGR4/4B	4400	
Levigato	to 2350	LGR-3300B/C	3650	
	to 2650	LGR-3600B/C	3950	
	to 3250	LGR-4200B/C	4550	

\* Only if to move a rail carriage to a rear door C-profile (the carriage shouldn't be moved beyond the rear door C-profile). Rail carriage design should be taken into consideration for installation of doors with the motor. Detailed information can be found in the motor installation manual.





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