

DESIGN DESCRIPTION AND TECHNICAL GUIDE FOR SECTIONAL GARAGE DOORS INSTALLATION

English

CLASSIC series
TREND series

2016

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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 doors climatic category is U1 according to GOST 15150. For this climatic category the following values of the outdoor air temperature during operation are set:

- 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 °C to +50 °C.

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/Günther sectional doors are listed below.

EN 12604	Implemented in design of ALUTECH/Günther 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.
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).

EN 12604	Implemented in design of ALUTECH/Günther doors
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/Günther 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/Günther 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.

In addition to above points (especially for doors, controlled in automatic mode or with a remote control) safety standard recommends taking additional measures, which decrease the possibility of dangerous situations during door operation.

Such measures are:

- lightning of the door operating area;
- an audible alarm installation, informing people that the door is working in automatic mode;
- an audible alarm installation, informing people of door leaf movement;
- installation of a light signal for regulation of traffic;
- installation of viewing windows near where the door operates and in the areas where vehicles are in motion.

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.

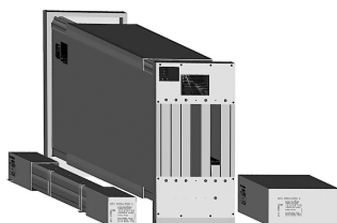
1.4. DOOR PACKING

Standard door package includes three packs:

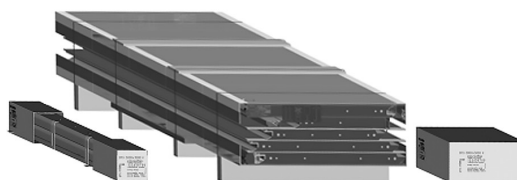
- pallet (vertical or horizontal) with panels;
- package with horizontal, vertical tracks and springs;
- box with fixings and hardware.

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 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 galvanised cables fitted with thimbles and a mounting plate.

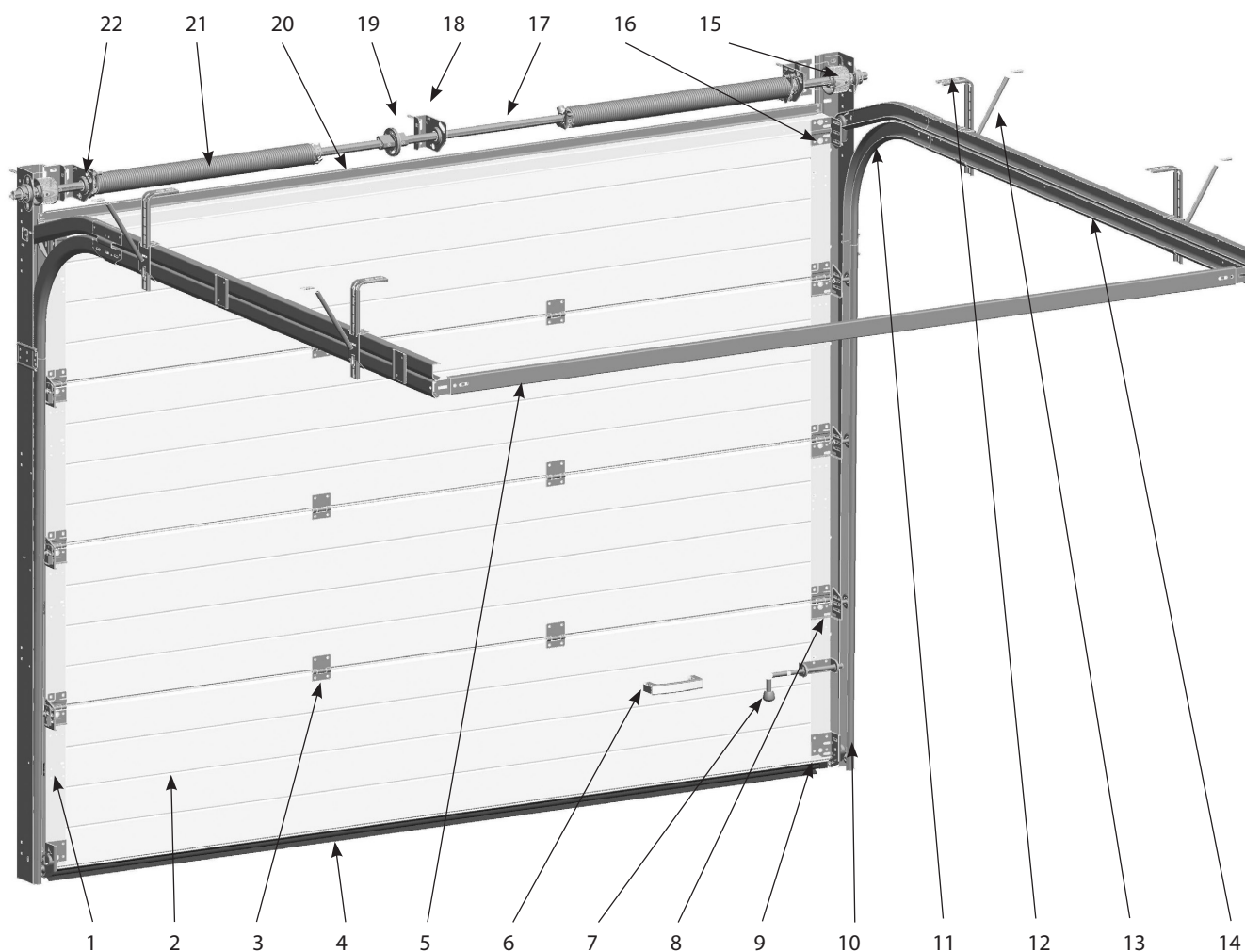
A system for balancing of the door leaf with torsion springs includes a shaft assembled with spring with caps, an intermediate bracket (or intermediate brackets, depending on the dimensions and weight of the door), cable drums, coupler, two galvanised cables connected with thimbles. The standard package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

Established minimum spring endurance – 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.

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

2.2. TYPICAL DOOR DESIGNS

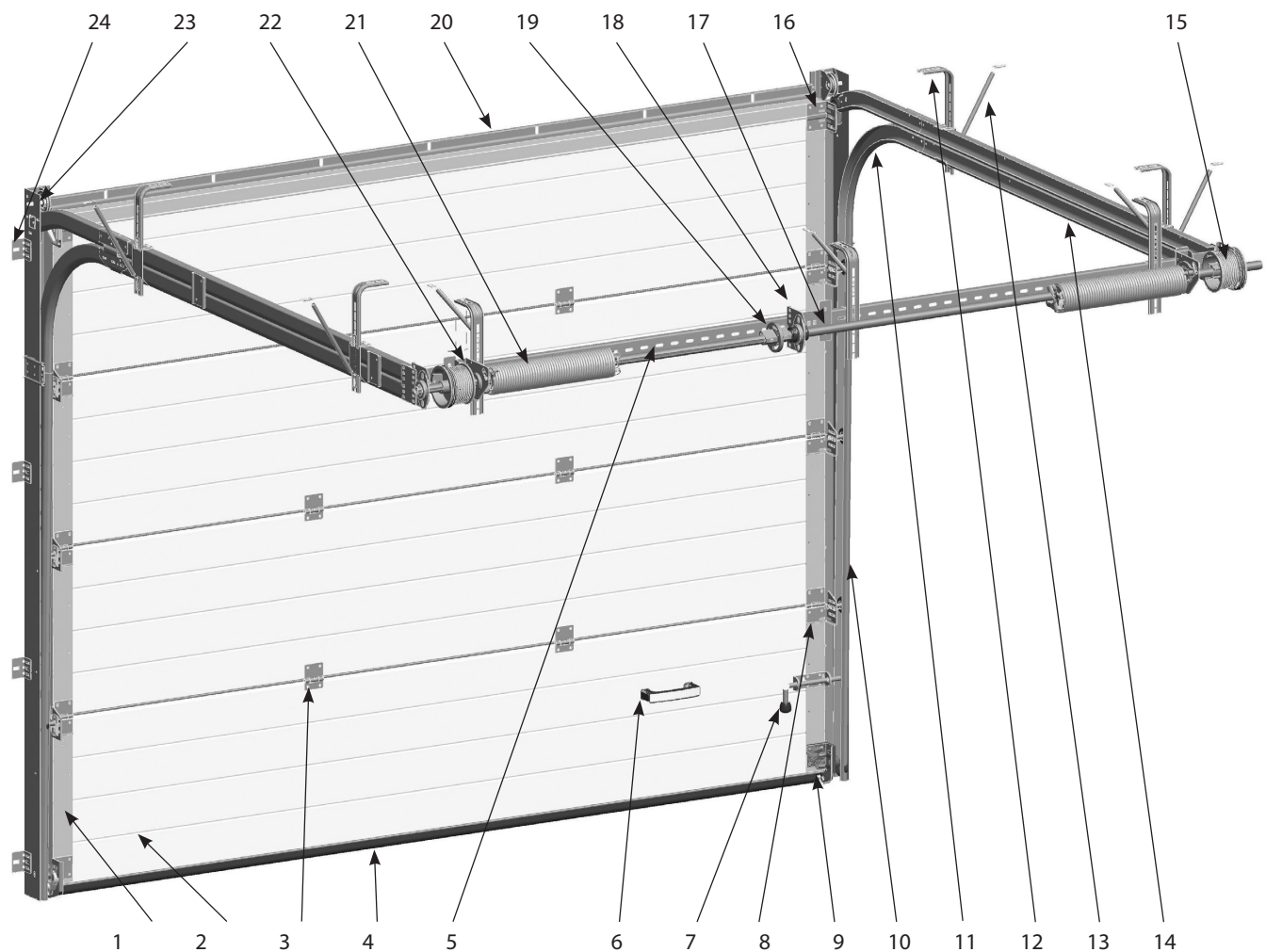
2.2.1. CLASSIC SERIES DOOR WITH TORSION SPRINGS. STANDARD MOUNTING



No.	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

No.	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

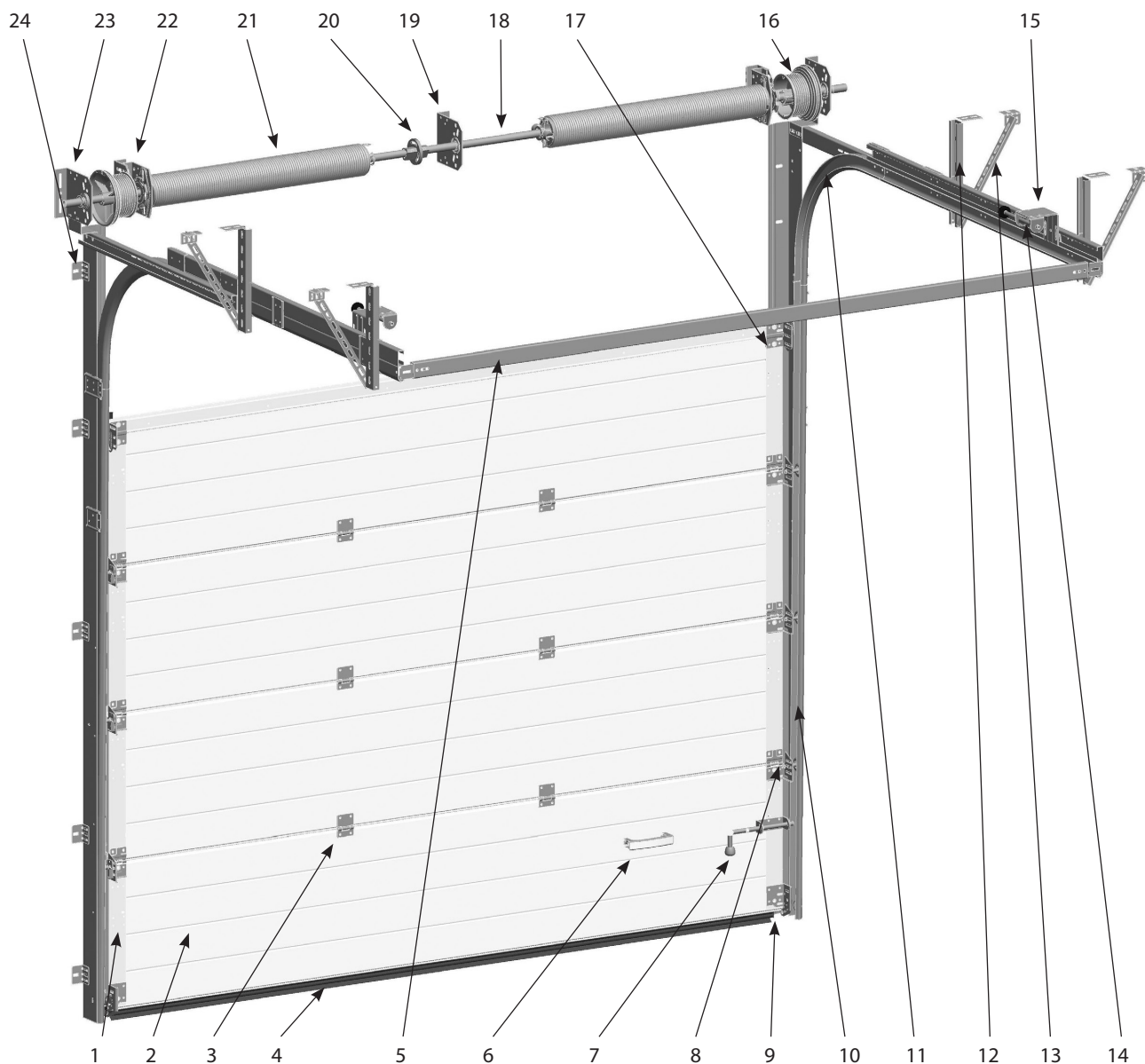
2.2.2. CLASSIC SERIES DOOR WITH TORSION SPRINGS.
LOW MOUNTING



No.	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

No.	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

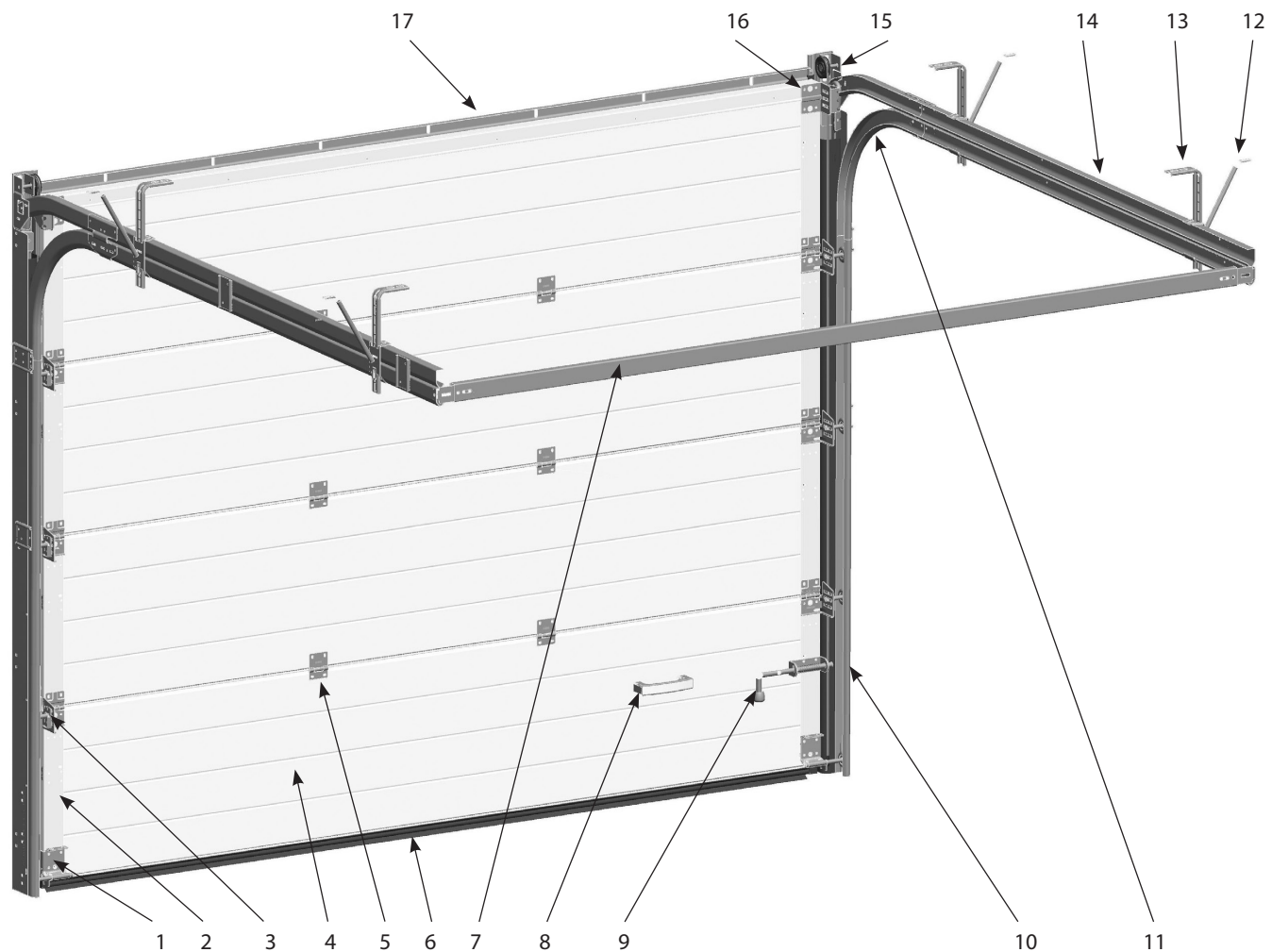
2.2.3. CLASSIC SERIES DOOR WITH TORSION SPRINGS. HIGH MOUNTING



No.	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

No.	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 angle bar

2.2.4. CLASSIC SERIES DOORS WITH TENSION SPRINGS



No.	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

No.	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 caps for the door leaf of S-ribbed, M-ribbed and L-ribbed (art. P1013) panels. Caps are installed under the side strips 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 on high mounting type 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 bottom brackets made of stainless steel, with rollers with bearings;
- balancing system for the door;
- 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);
- rope for manual door lifting;
- set of galvanised fixings and components required for door installation.

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. COMPLETING OPTIONS AS PART OF STANDARD DOOR SET (FOR DOORS WITH TORSION SPRINGS)

Depending on the weight of the door leaf **P** it is possible to use the following types of shafts:

- **P** ≤ 200 kg – hollow shaft Ø25,4 mm with a key groove;
- **P** > 200 kg – solid shaft Ø25,4 mm with a key groove.

With a width of door panel **LDB** > 5 m, regardless of the door leaf weight, the following elements are installed:

- longitudinal reinforcing steel profiles which are installed on each door panel to make it more rigid;
- wider side caps mounted on the ends of the sandwich panels;
- twin set of adjustable side roller brackets which are used on our industrial doors;
- set of long roller cover plates;
- set of rollers with long spindles.

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	—	—	—

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
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	—

* Colours closely correspond to RAL scale.

The front side of the panel can be painted in other colours on special request, using colours which closely correspond to the RAL scale. 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 scale. The possibility of painting the inner side of panels in dark colours, metallic colours, pearl and reflecting colours will be considered upon request.

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

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

2.4.2. BALANCING SYSTEM OF 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*.

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 reinforced profile (PRG13 – used for the standard threshold, PRG12 – used for the low threshold). Reinforced 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.

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

2.4.4. SET OF CAPS FOR WICKET

Caps are installed under the wicket framing and opening framing in every groove of S-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

If there is a great difference in temperature between the inside and outside of premises (e.g. doors that are mounted on the sunny side of buildings or in heated rooms, etc.) sandwich panels can sag which is caused by temperature expansion/contraction of steel sheets in the sections. Thus, to preserve the endurance of the door it is recommended to install a set of reinforcing profiles in doors more than 4 m wide.

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-rope. In doors fitted with a locking device, the spring locking bar is not used.

2.4.9. ELECTRIC DRIVE WITH AUTOMATION SYSTEM

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

2.4.10. OUTSIDE DISCONNECT SYSTEM FOR ELECTRIC DRIVES

Outside disconnect systems for electric drives are designed to allow manual lifting of the door, in the case of emergencies or electric power failure, when installed without an additional entrance,

In the case of doors equipped with a locking device as an outside disconnect system for the electric drive, the locking device and a set of unlocking cable RK-4500 and RK-6000 are used. In case doors are not equipped with a locking device as an outside disconnect system for the electric drive, an unlocking set mechanism RM0104-4500 is used. In doors fitted with outside disconnect systems for the electric drive, a spring locking bar is used.

2.4.11. PULLEY BLOCK FOR MANUAL DOOR LIFTING

Pulley block for manual door lifting is designed for door lifting and lowering without the electric drive. Door lifting and lowering is carried out manually using a rope thrown over the pulley block and mounted on the bottom bracket. It is recommended to use the pulley block on doors over 2 metres high.

2.4.12. FALSE PANEL

The false panel is designed to partially overlap the entrance aperture height directly below the bridge.

The false panel consists of sandwich-panels and is edged with a C-shaped profile. The false panel is supplied complete with a set of brackets for fixing it to the opening. The external surfaces of sandwich panels used for producing false panels and door leafs are the same. If the door leaf is produced from sandwich panels with the cassette style, the false panel is produced from panels with the pattern microwave. Recommendations on options for the use of false panels are shown in section 2.13.

Correspondence of colours between door leaf and false panel framing:

Door colour	Colour of false panel framing
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);

* Colours closely correspond to RAL scale.

As an option, the colouring of profile framing is available in other colours having a close match to the RAL scale. 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. EMERGENCY PANIC EXIT PUSH BARS FOR WICKET

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. SET OF FIXINGS

Set of fixings FS10×50D consists of nylon dowels with self-tapping screws and washers necessary for mounting certain doors.

Set of fixings is used for fixing the doors to walls made of concrete, bricks, ceramsite concrete, natural stone and other similar materials.

2.4.16. 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.

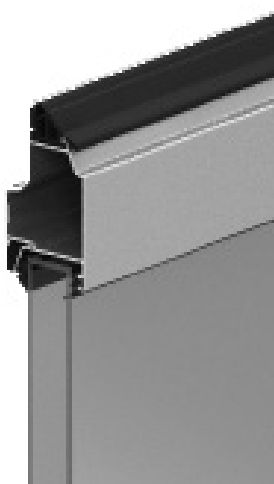
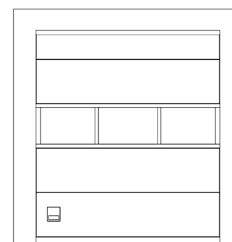
2.4.17. SET OF PROTECTIVE COVERS

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

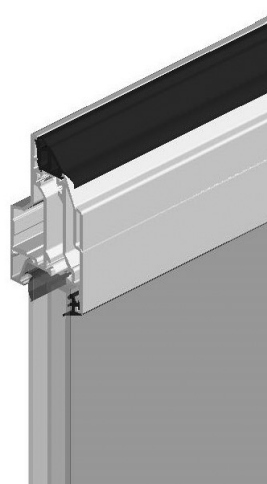
2.4.18. PANORAMIC GLAZING

In doors consisting of sandwich panels with the pattern microwave, S-panel, M- panel and L- panel 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. Sections of one series can be installed in one door leaf.

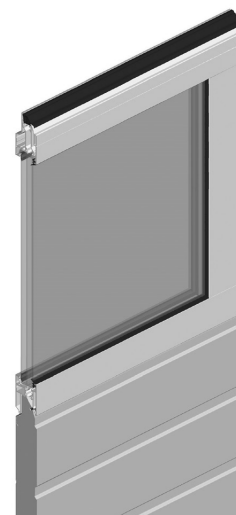
Panoramic sections are frames consisting of aluminium extruded profiles. Sections can be filled with translucent glazing inserts from polymer mix of sterol and acrylonitrile (SAN-plastic) or metallic meshes.



AluPro – profile system without thermal break



AluTherm – profile system with thermal break



Translucent glazing inserts of panoramic sections

Section filling for series AluPro:

- single insert with SAN-plastic 3 mm thick;
- double insert 26 mm tick with SAN-plastic 2 mm thick (double glazed unit 2-22-2). It is used on inserts till 0,5 m²;
- double insert 26 mm tick with SAN-plastic 3 mm thick (double glazed unit 3-20-3). It is used on inserts over 0,5 m².

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

* Colours closely correspond to RAL scale.

Section filling of series AluTherm:

- double insert 26 mm tick with SAN-plastic 2 mm thick (double glazed unit 2-22-2). It is used on inserts till 0,5 m²;
- double insert 26 mm tick with SAN-plastic 3 mm thick (double glazed unit 3-20-3). It is used on inserts over 0,5 m²;
- triple insert 25 mm tick with SAN-plastic 2 mm thick (double glazed unit 2-9.5-2-9.5-2). It is used on inserts till 0,5 m²;
- triple insert 25 mm tick with SAN-plastic 3 mm thick (double glazed unit 3-8-3-8-3). It is used on inserts over 0,5 m².

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

* Colours closely correspond to RAL scale.

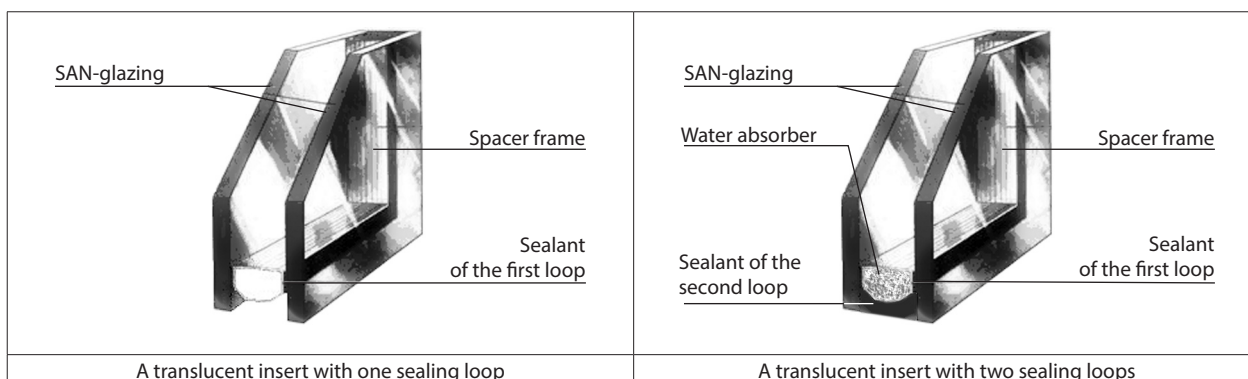
It is not recommended to install doors of dark colours fitted with panoramic sections series AluTherm on the sunny side of buildings because it can cause panel sagging and a reduction in the lifetime of the door.

In panoramic sections series AluTherm with triple glazing, there are transparent inserts between the SAN sheets. This construction avoids adhesion of the SAN sheets caused by temperature expansion of the material.

In panoramic sections series AluPro and AluTherm with double glazing, protection against adhesion is ensured by a greater distance between the SAN sheets (20-22 mm). Inserts are not fitted.

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 molecular sieve (dehumidifier) filling in the air-gap and sealing of the second loop.



Metallic meshes for panoramic sections

Section filling for series AluPro:

- expanded mesh for panoramic panel. Material: galvanized steel. Cross section of ventilation cuts: 58%. Thickness: 4 mm;
- square mesh 40×40 mm for panoramic panel. Material: galvanized steel. Cross section of ventilation cuts: 83%. Thickness: 4 mm;
- perforated aluminum sheet for panoramic panel. Perforated aluminum sheet, perforation 8-12 mm. Cross section of ventilation cuts: 40%. Thickness: 1,6 mm.

For all types of panoramic doors these infills are applied in natural colour (galvanized steel or aluminum).

2.4.19. SCRATCH RESISTANT COVERING

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 glazing and single sealing.

2.5. DOOR FACADE SYSTEMS

If several sectional doors are installed in line on the same building facade it is possible to align them based on a specific door element, for example:

- panel joints through using the same panel set for all doors;
- windows;
- locks;
- handles for doors opening;
- wicket (if applicable).

Facade system can be achieved for doors of different mounting types, different heights, with wicket, or without. 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! To achieve a facade system it is necessary to provide the point at which all the doors have to be aligned from or to inform us of the Zero base point.

2.6. TECHNICAL FEATURES

Door technical features

Characteristics	Series Classic	
	Tension springs	Torsion springs
Thermal transmittance (U-value) of ALUTECH/Günther sectional doors, W/(m ² K)*		
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
Doors with wicket	—	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/m ²	
Specific gravity of the door leaf with reinforcing profiles **	—	up to 16,5 kg/m ²
Loading on ceiling structure	up to 32 kg/m ²	

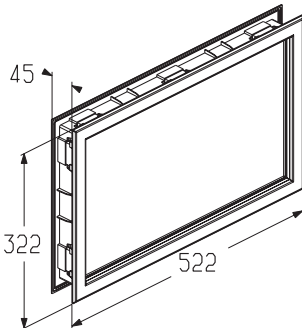
* Characteristics are calculated and tests are carried out at ift. Rosenheim GmbH:

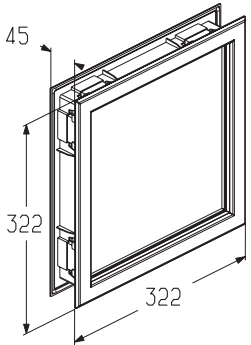
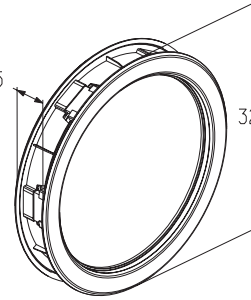
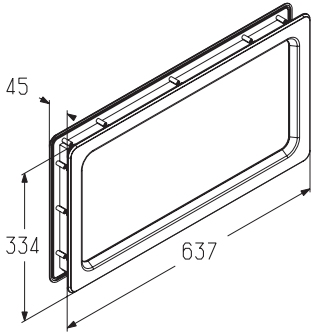
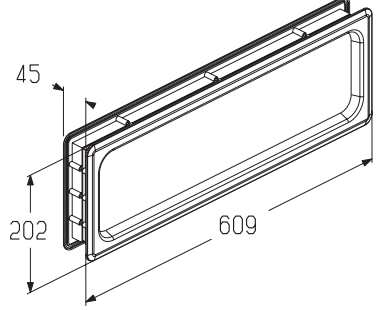
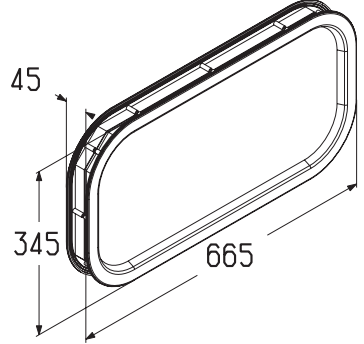
- for garage doors with tension springs with an area of 8.125 m²;
- for garage doors with torsion springs with an area of 18 m².

** Parameter of door leaf weight can vary depending on the set of panels, presence of additional fittings and other factors.

2.7. RECOMMENDED PARAMETERS AND WINDOW POSITIONING

2.7.1. WINDOWS DIMENSIONS

Window article	Image and dimensions	Color of edging frame	Type of glazing
W043WH-TG		White	Transparent acrylic
W043WH-CG			Crystal acrylic
W043BR-TG		Brown	Transparent acrylic
W043BR-CG			Crystal acrylic

Window article	Image and dimensions	Color of edging frame	Type of glazing
W050WH		White	Transparent acrylic
W050BR		Brown	
W060WH		White	Transparent acrylic
W060BR		Brown	
W046		Black	Transparent acrylic
W085		Black	Transparent acrylic
W095		Black	Transparent acrylic

The outside window frame (art. W043WH-TG, W043WH-CG, W043BR-TG, W043BR-CG, W050WH, W050BR, W060WH, W060BR) may be painted in colours from the RAL catalogue. The possibility of painting window frames in metallic colours, pearl and reflecting colours will be considered individually.

2.7.2. WINDOW POSITIONING

When glazing the doors, the windows are normally aligned vertically. Irregular positioning of windows should be approved by individual customers (ideally in writing).

To choose the maximum number of windows located in one panel it is necessary to use the following table.

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
art. W043WH-TG, W043WH-CG, W043BR-TG, W043BR-CG			
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		
art. W050WH, W050BR			
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		
art. W060WH, W060BR			
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		
art. W046			
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		
art. W085			
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		

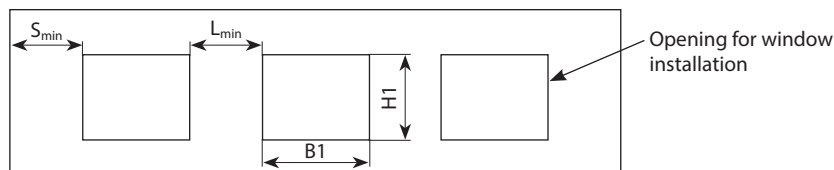
art. W095			
from 1750 to 1985	1	638	320
from 1990 to 2870	2		
from 2875 to 3760	3		
from 3765 to 4645	4		
from 4650 to 5535	5		
from 5540 to 6000	6		

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
art. W043WH-TG, W043WH-CG, W043BR-TG, W043BR-CG			
from 1750 to 2460	2	494	294
from 2465 to 3205	3		
from 3210 to 3500	4		
art. W050WH, W050BR			
from 1750 to 1860	2	294	294
from 1865 to 2405	3		
from 2410 to 2945	4		
from 2950 to 3490	5		
3495 to 3500	6		
art. W060WH, W060BR			
from 1750 to 1860	2	Ø294	
from 1865 to 2405	3		
from 2410 to 2945	4		
from 2950 to 3490	5		
3495 to 3500	6		
art. W046			
from 1750 to 1945	1	610	302
from 1950 to 2805	2		
from 2810 to 3500	3		
art. W085			
from 1750 to 1905	1	588	180
from 1910 to 2740	2		
from 2745 to 3500	3		
art. W095			
from 1750 to 2005	1	638	320
from 2010 to 2890	2		
from 2895 to 3500	3		

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.



Into panels with the pattern microwave and S-type panels 500 and 625 mm high, M-type and L-type panels 500 mm high windows art. W043WH-TG, W043WH-CG, W043BR-TG, W043BR-CG, W050WH, W050BR, W060WH, W060BR, W046, W085, W095 are installed. Into M-type and L-type panels 450 mm high windows art. W043WH-TG, W043WH-CG, W043BR-TG, W043BR-CG, W050WH, W050BR, W060WH, W060BR are installed. Into cassette panels windows art. W043WH-TG, W043WH-CG, W043BR-TG, W043BR-CG are installed.

Glazing of top and bottom panels should be approved by customers individually (ideally in writing) and only carried out if technically feasible. If the lock is situated in the second panel from the bottom this panel cannot be glazed.

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 ²
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).

When choosing the maximum number of grids arranged in a door width in one panel, you must use the following tables:

Classic series doors with torsion springs

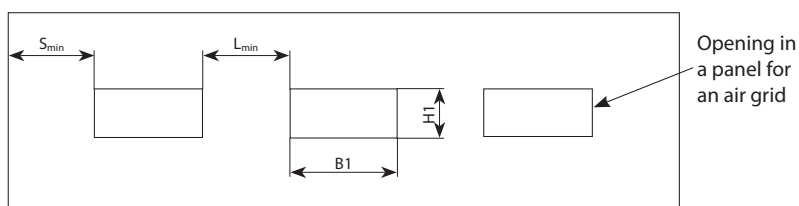
Door width LDB (ordered doors width), mm	Max number of air grids	Air grid width B1, mm	Air grid height H1, mm
from 1750 to 1960	2	335	96
from 1965 to 2545	3		
from 2550 to 3130	4		
from 3135 to 3715	5		
from 3720 to 4300	6		
from 4305 to 4885	7		
from 4890 to 5470	8		
from 5475 to 6000	9		

Classic series doors with tension springs

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.



Air grids can be installed in the upper panel providing it has a panel height of not less than 400 mm.

If a locking bar is installed, an air grid cannot be installed closer than 1000 mm from the door panel edge on the same side.

Non-standard key lock air grid positioning should be agreed with the customer individually (ideally in writing).

If there is a key lock on a panel, air grids are not installed on this panel.

Air grids are not installed into cassette type door leafs.

2.9. WICKET PARAMETERS

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

Doors are manufactured with a built-in wicket to special order.

The wicket can only be built into doors with torsion springs (standard, low and high types of installation).

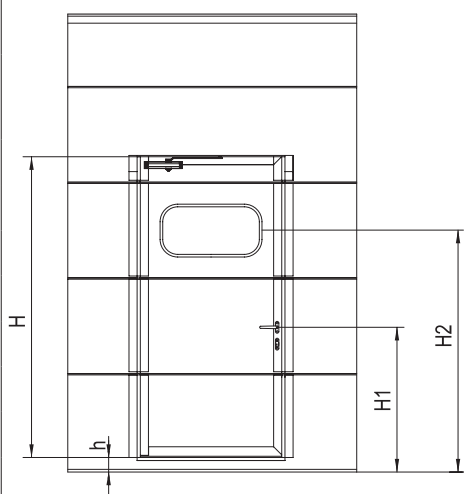
The wicket only opens outward and can be right or left handed (doors that open from the right-hand side have the hinges on the right-hand side when viewed from outside).

Wicket doors are not available on Cassette panel, M-ribbed or L-ribbed panels.

2.9.1.1. Wicket dimensions with pattern 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.

	Wicket daylight opening height H, mm			Height of handle positioning H1, mm	Height of window positioning H2, mm
	Threshold height (h)=20 mm	Threshold height h=100 mm	Threshold height h=145 mm		
1960...2080	1800	1725	1680	820	1270
2085...2205	1925	1850	1805	945	1395
2210...2240	2030	1975	1930	1070	1520
2245...2490					1580
2495...2515	1925	1850	1805	945	1395
2520...2740	2050	1975	1930	1070	1520
2745...2865					1580
2870...3000					1580

2.9.1.2. Dimensions limits.

Minimum width of doors with a wicket is 2125 mm (it is possible to build a wicket into a door leaf with a width from 1915 to 2120 mm). Wicket is built into doors of all types of mounting starting from the height 1960 mm.

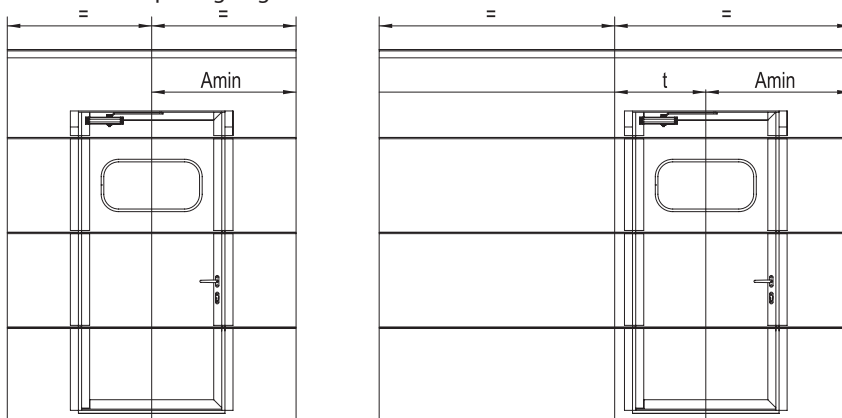
The choice of wicket depends on the doors' width. The corresponding limits are shown in Table below.

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

2.9.1.3. WICKET POSITIONING ON DOOR LEAF

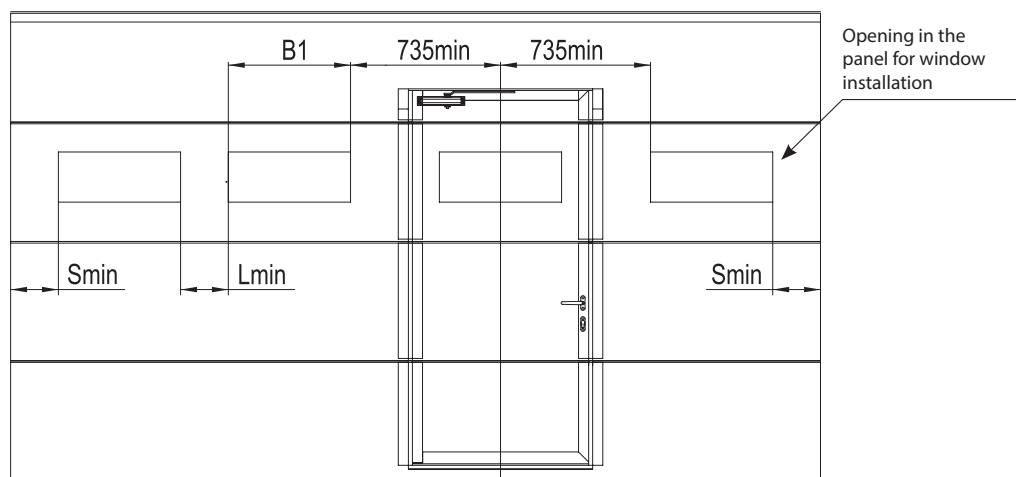
The wicket can be installed in the centre of the door or offset to one side. All measurements are taken as viewed from the inside of the door. It is possible to position the door from the centre axis in multiples of 330 mm increments.

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! Window positioning in the fourth (bottom) section of the door leaf with a wicket must be confirmed with the manufacturer and is only installed if it is technically possible.

Colour correspondence of wicket elements to colour of door leaf

Colour of the door leaf	Colour of framing profiles of doors and opening	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)

* 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 scale.
The possibility of painting in dark colours, such as metallic colours, pearl and reflective colours will be considered upon request.

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. The wicket only opens outward and can be manufactured in two variants: left hand and right hand (hinges on the right-hand wicket are positioned on the right if looking at the doors from the outside).

The key lock is built into the second panel from the bottom.

The wicket can consist of 3 or 4 sections depending on the door height.

Wicket width is 920 mm.

The wicket can be 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.

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 5000	With standard (145 mm) threshold

2.9.2.2. Dimensional limitations of the doors with a wicket

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).

2.10.1. DIMENSIONAL MATRIX FOR DOORS

2.10.1.1. Dimensional matrix for doors without wicket from Classic series: types Microwave, S, M, L-ribbed

Door height, mm	Door width, mm																																				
	1750	1875	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		
1710																																					
1835																																					
1960																																					
2085																																					
2210																																					
2335																																					
2460																																					
2585																																					
2710																																					
2835																																					
2960																																					
3085																																					

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

From the dimensional matrix above doors can only be manufactured in 5 mm increments in both width and/or height.

Doors made of type M-panel and L-panel with the height 2030-2070, 2730-2770 are not manufactured.

2.10.1.2. Dimensional matrix for doors without wicket from Classic series: Cassette type

Door height, mm	Door width, mm																								
	2110	2250	2375	2500	2625	2750	2875	3000	3125	3250	3375	3500	3625	3750	3875	4000	4125	4250	4375	4500	4625	4750	4875	5000	
2100																									
2125																									
2250																									
2375																									
2500																									
2550																									
2625																									
2700																									
2850																									
2975																									
3000																									

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




From the dimensional matrix above, doors can only be manufactured with 5 mm increments in width and 25 mm increments in height within stated limits.

Please take into account that:

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

2.10.1.3. Dimensional matrix for doors with wicket from Classic series: types Microwave, S-ribbed

Door height-mm	Door width, mm																			
	1915	2000	2125	2250	2375	2500	2625	2750	2875	3000	3125	3250	3375	3500	3625	3750	3875	4000	4125	4250
1960																				
2085																				
2210																				
2335																				
2460																				
2585																				
2710																				
2835																				
2960																				
3085																				

-  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).

From the dimensional matrix above doors can only be manufactured in 5 mm increments in width and/or height.

2.10.1.4. Dimensional matrix for doors with wicket from Classic series with flat threshold: types Microwave, S-ribbed

Door height, mm	Door 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																									
2085																									
2210																									
2335																									
2460																									
2585																									
2710																									
2835																									
2960																									
3085																									

From the dimension matrix above doors can only be manufactured in 5 mm increments in width and/or height.

2.11. OPENING REQUIREMENTS AND TAKING MEASUREMENTS

2.11.1. REQUIREMENTS FOR THE OPENING

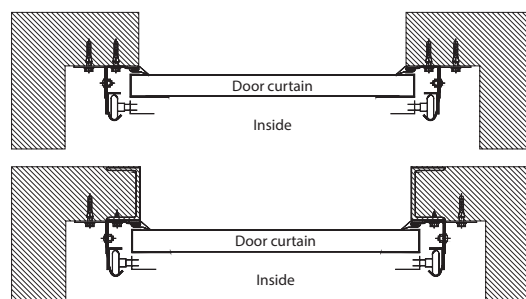
Prepared openings should meet the following requirements:

- 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.



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.

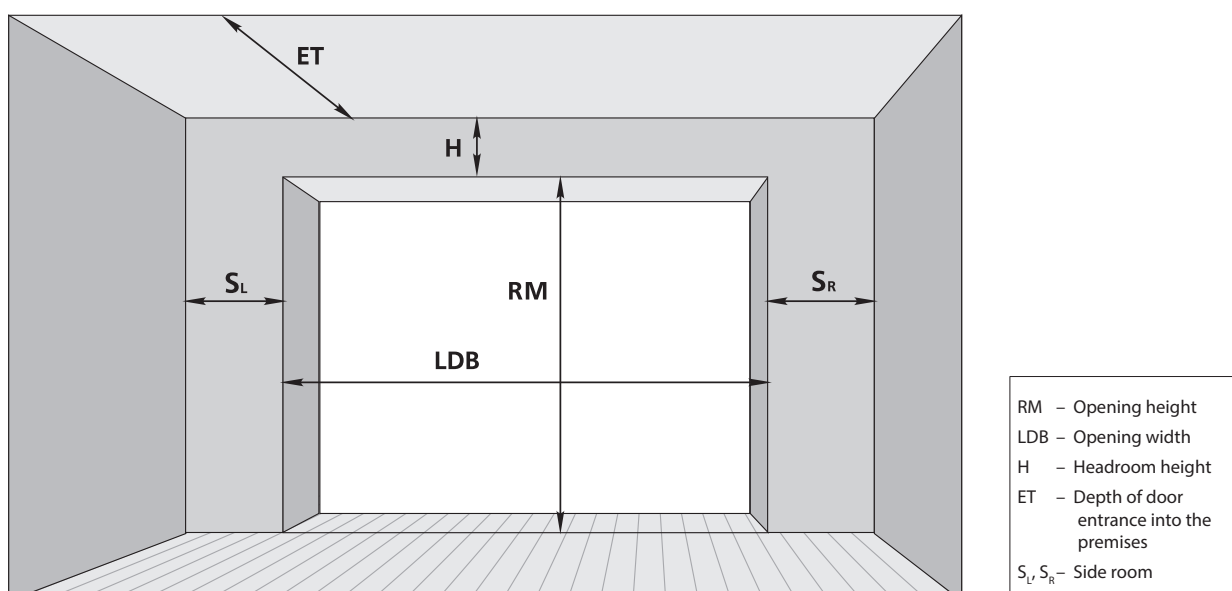
It is assumed that the height of the parallel walls and the distance between the lintel and the floor and the diagonals do not show more than a 5 mm difference. If they are it may be possible to overcome this with the fitting of a wider or higher door.

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. PLAN OF WHERE TO TAKE THE MEASUREMENTS



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 dimension height

Parameter	Description
LDW	Clear dimension 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

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
		900	High

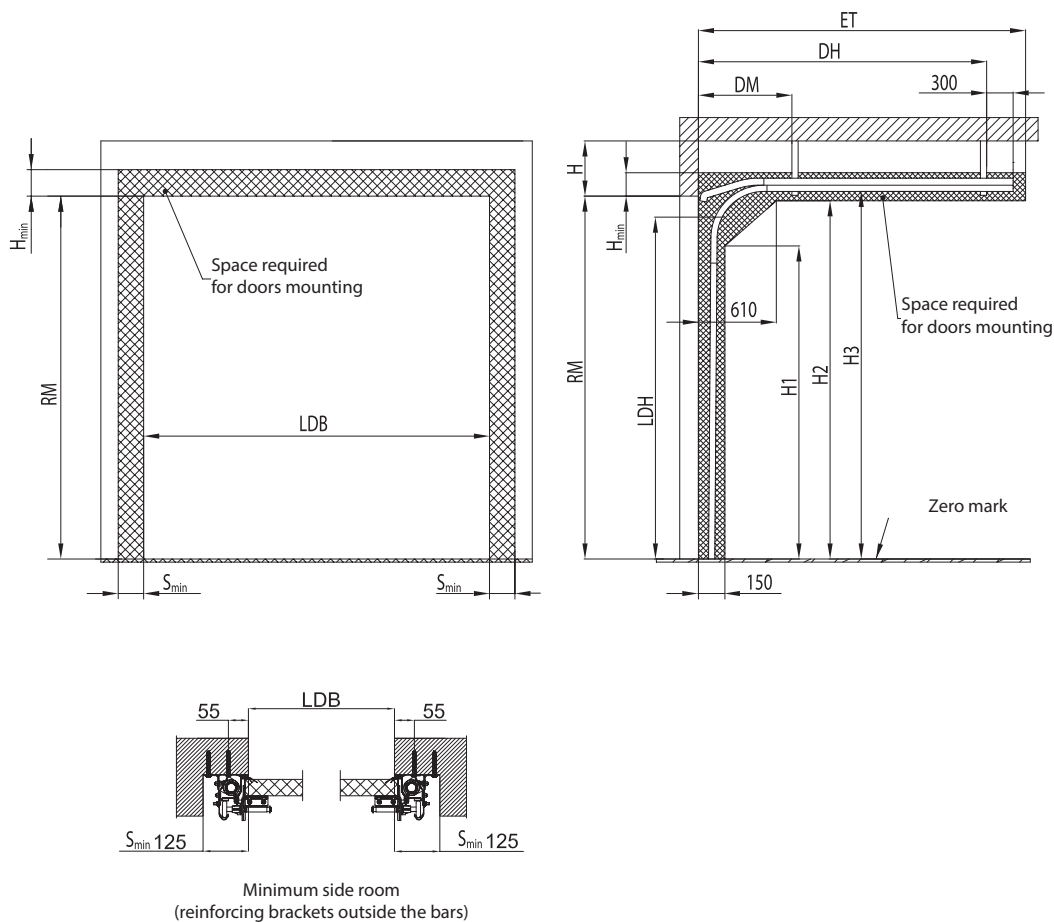
Doors with tension springs

Door type	Operating options	Minimum height of the headroom H_{min} , mm	Maximum height of the headroom H_{min} , 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 HKU001 manual lift block, the side space (S_{min}) does not increase.

2.12.3. CLASSIC SERIES GARAGE DOORS WITH TENSION SPRINGS

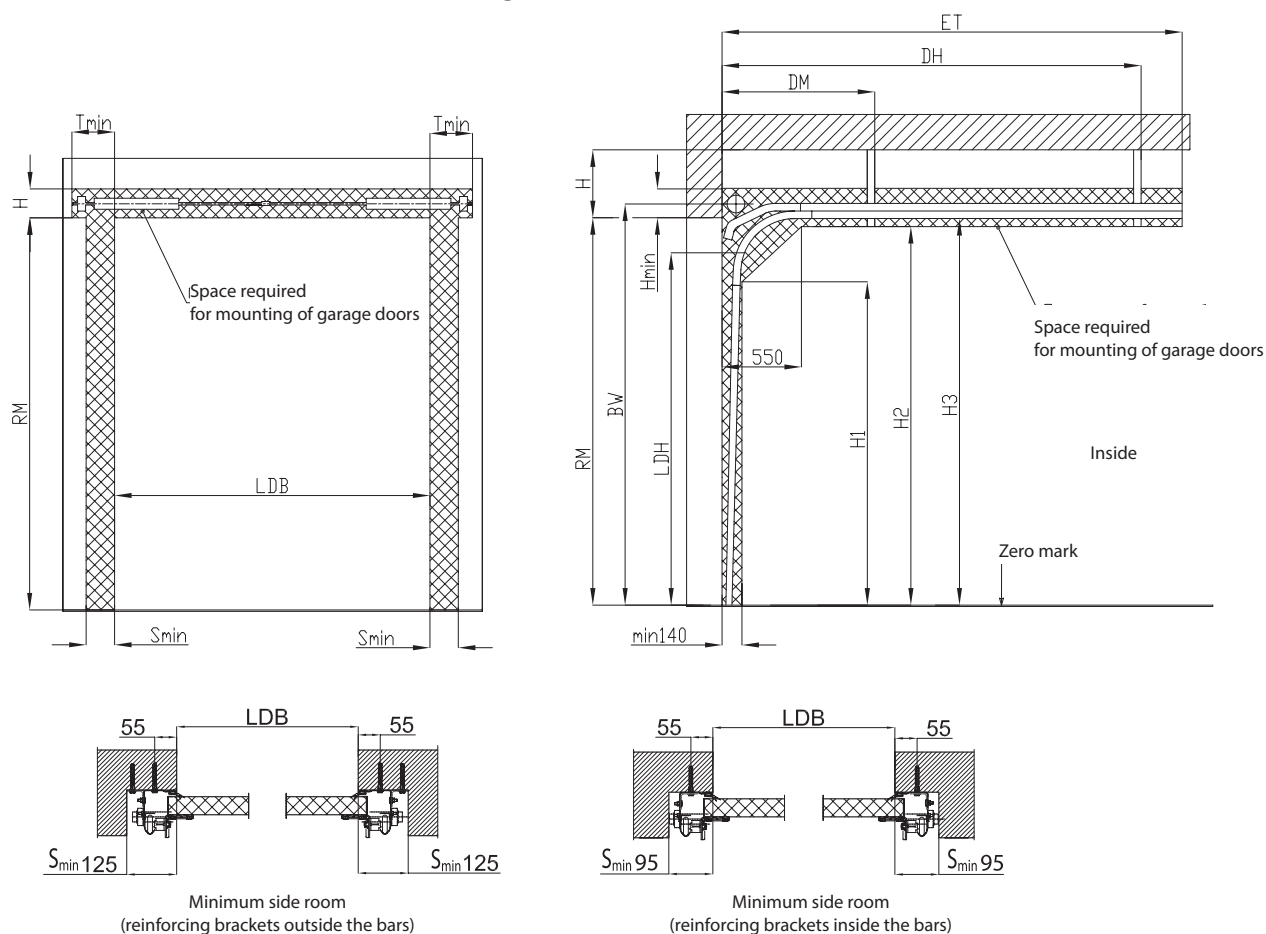


Parameter	Description	Formula or value
H, mm	Headroom height	min 100 (manual operation)
		min 125 (electric drive)
LDH, mm	Clear dimension height	RM-170 (manual operation with the limiting device RS0301)
		RM-100 (manual operation with the fixing device LH3004)
		RM-100 (electric drive with the limiting device RS0301)
LDW*, mm	Clear dimension 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 dimension width is measured as the distance between the vertical seals.

2.12.4. CLASSIC SERIES GARAGE DOORS WITH TORSION SPRINGS

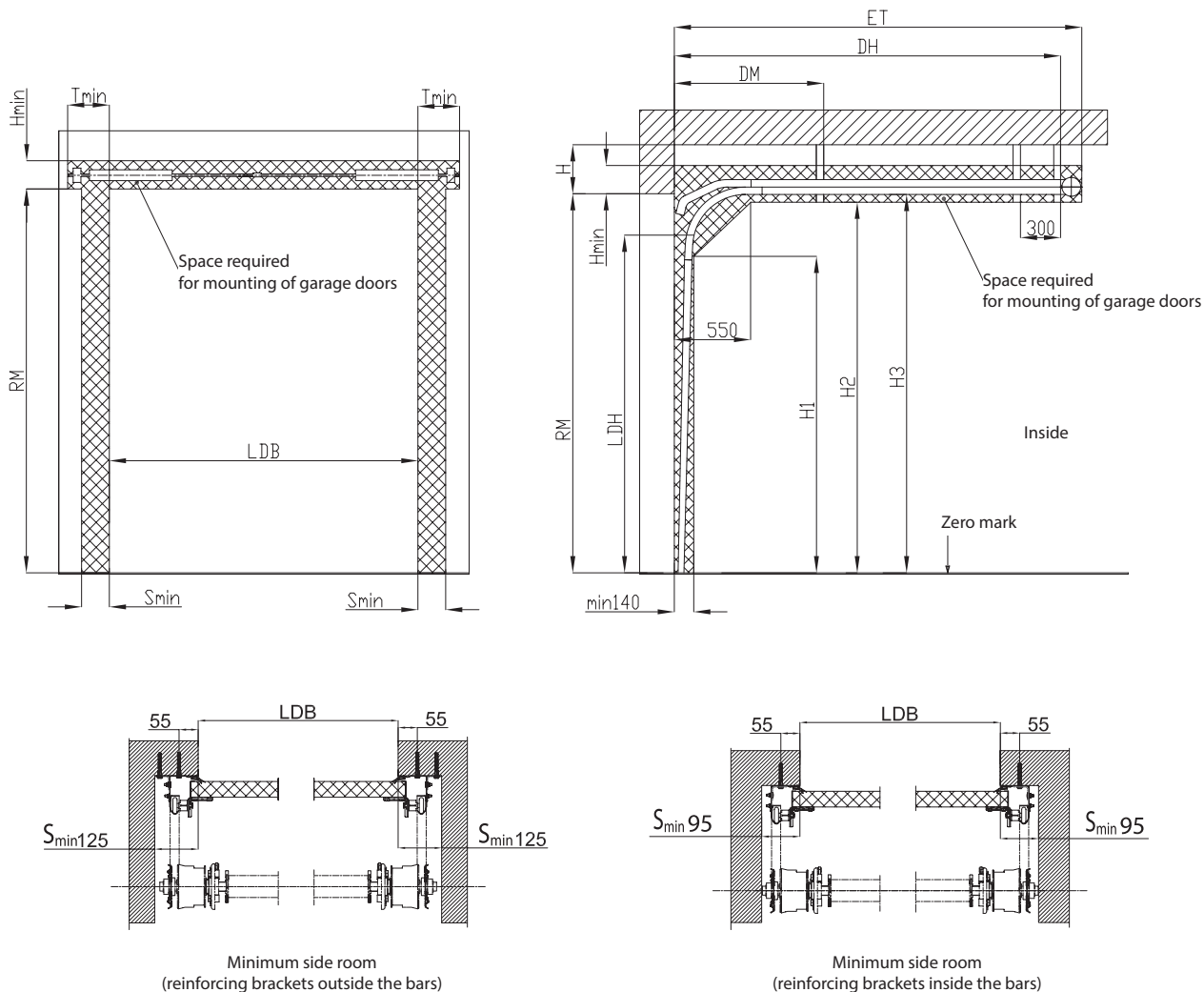
2.12.4.1. Doors without wicket. Standard mounting



Parameter	Description	Formula or value
H, mm	Headroom height	$H_{min} = 210$
LDH, mm	Clear dimension height	RM-120 (manual operation with the limiting device RS0301) RM-25 (manual operation with the fixing device LH3004) RM-25 (electric drive with the limiting device RS0301)
LDW*, mm	Clear dimension 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 dimension width is measured as the distance between the vertical seals.

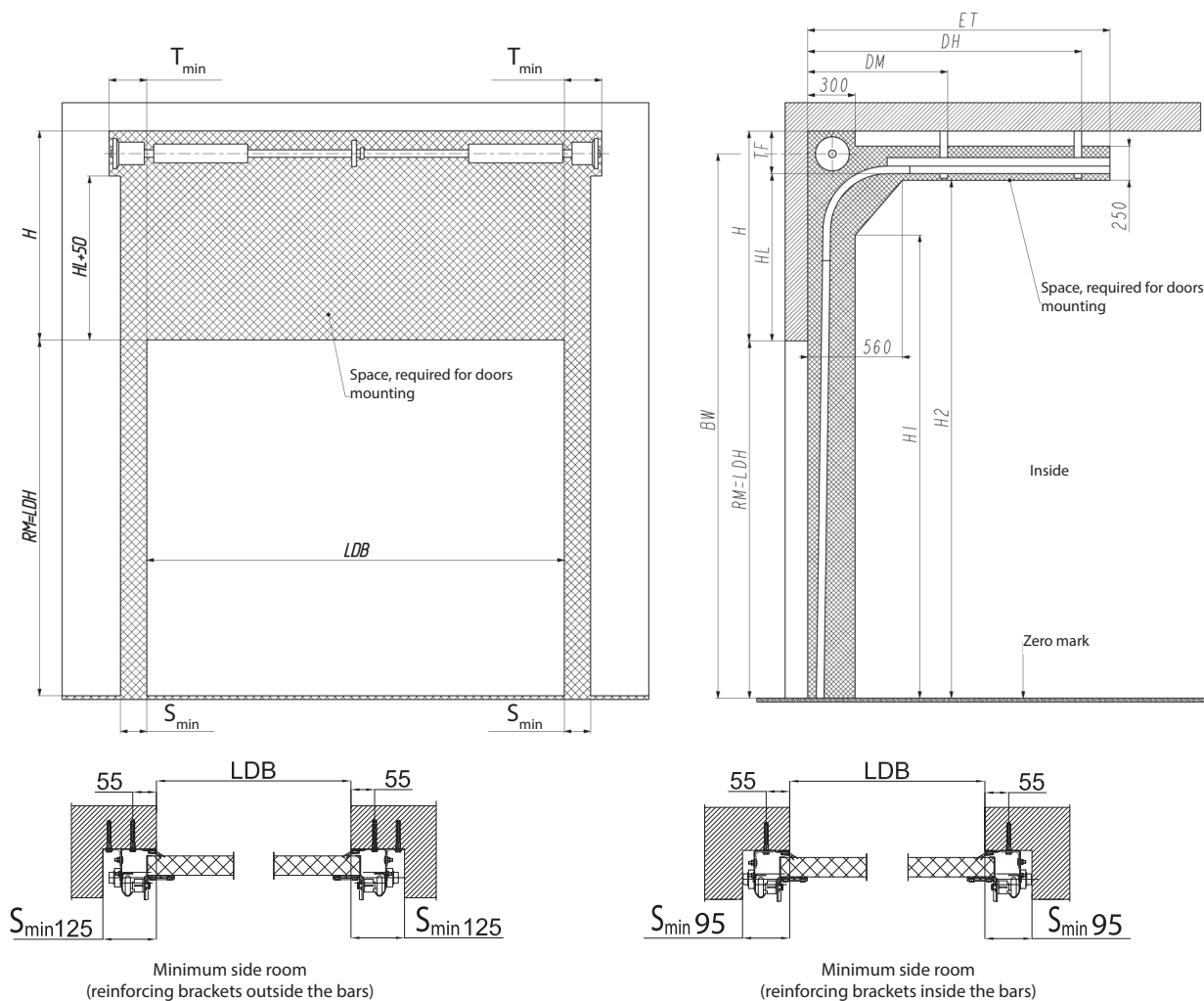
2.12.4.2. Doors without wicket. Low mounting



Parameter	Description	Formula or value
H, mm	Headroom height Clear dimension height	$H_{min} = 100$ (manual operation)
		$H_{min} = 125$ (electric drive)
LDH, mm	Clear dimension width	RM-170 (manual operation with the fixing device RS0301)
		RM-100 (manual operation with the fixing device LH3004)
		RM-100 (electric drive with the limiting device RS0301)
LDW*, mm	Height to the shaft axis	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 dimension width is measured as the distance between the vertical seals.

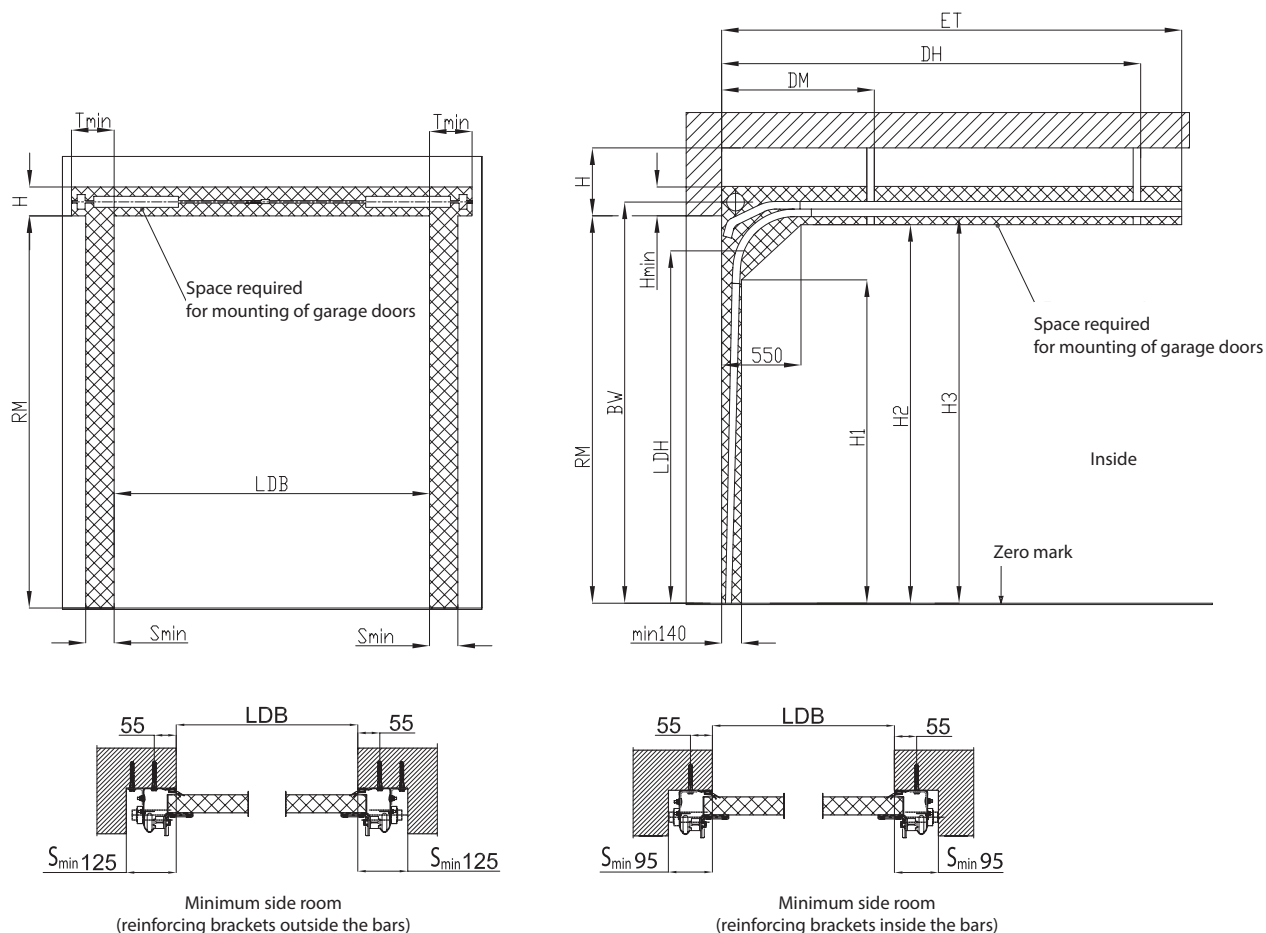
2.12.4.3. Doors without wicket. High mounting



Parameter	Description	Formula or value	
H, mm	Headroom height	$H_{min}=900, H_{max}=1500$	
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 dimension height	RM	
LDW*, mm	Clear dimension 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 dimension width is measured as the distance between the vertical seals.

2.12.4.4. Doors with wicket. Standard mounting

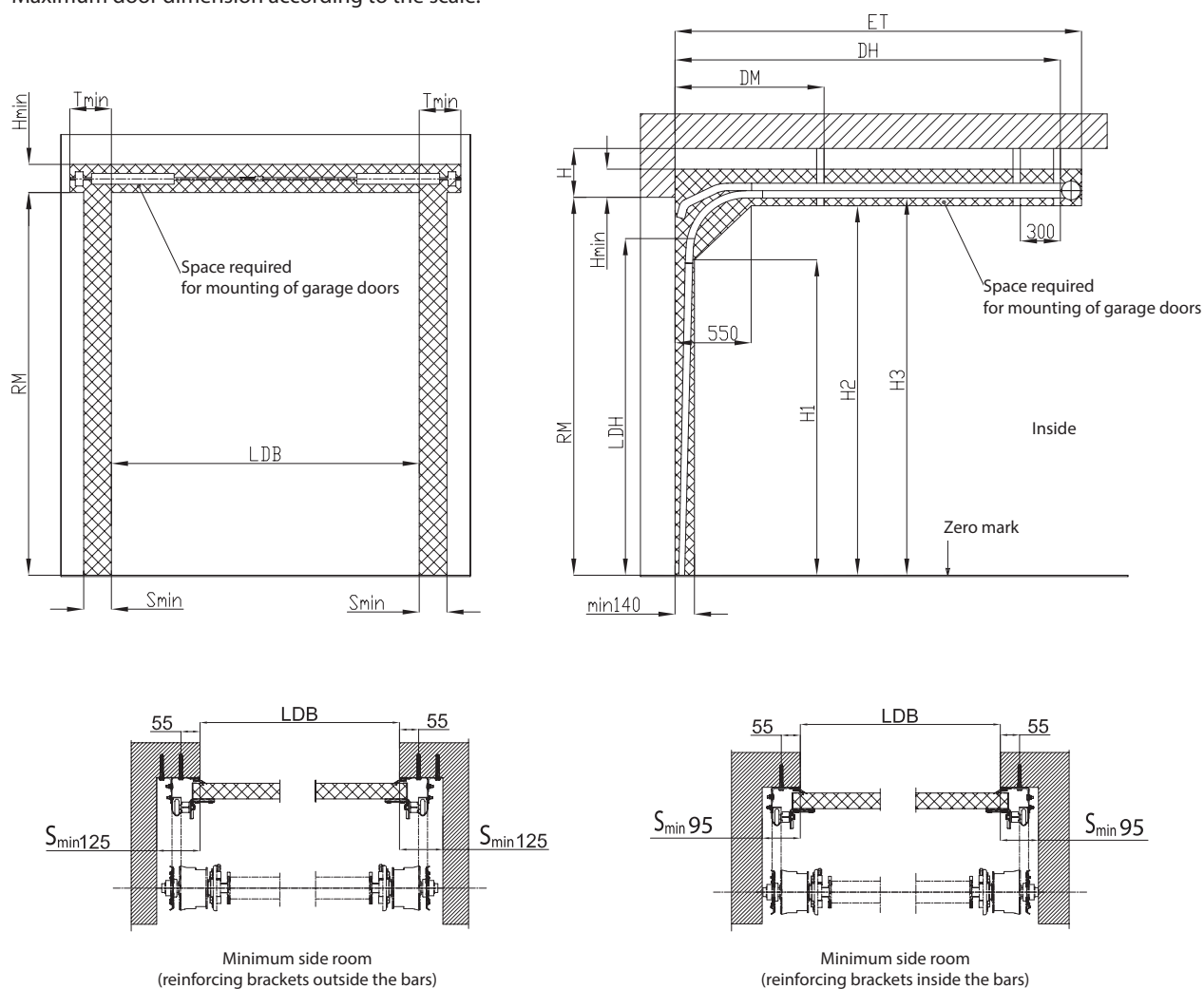


Parameter	Description	Formula or value
H, mm	Headroom height	$H_{min} = 210$
LDH, mm	Clear dimension height	RM-150 (manual operation with the limiting device RS0301) RM-80 (manual operation with the fixing device LH3004) RM-80 (electric drive with the limiting device RS0301)
LDW*, mm	Clear dimension 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 dimension width is measured as the distance between the vertical seals.

2.12.4.5. Doors with wicket. Low mounting

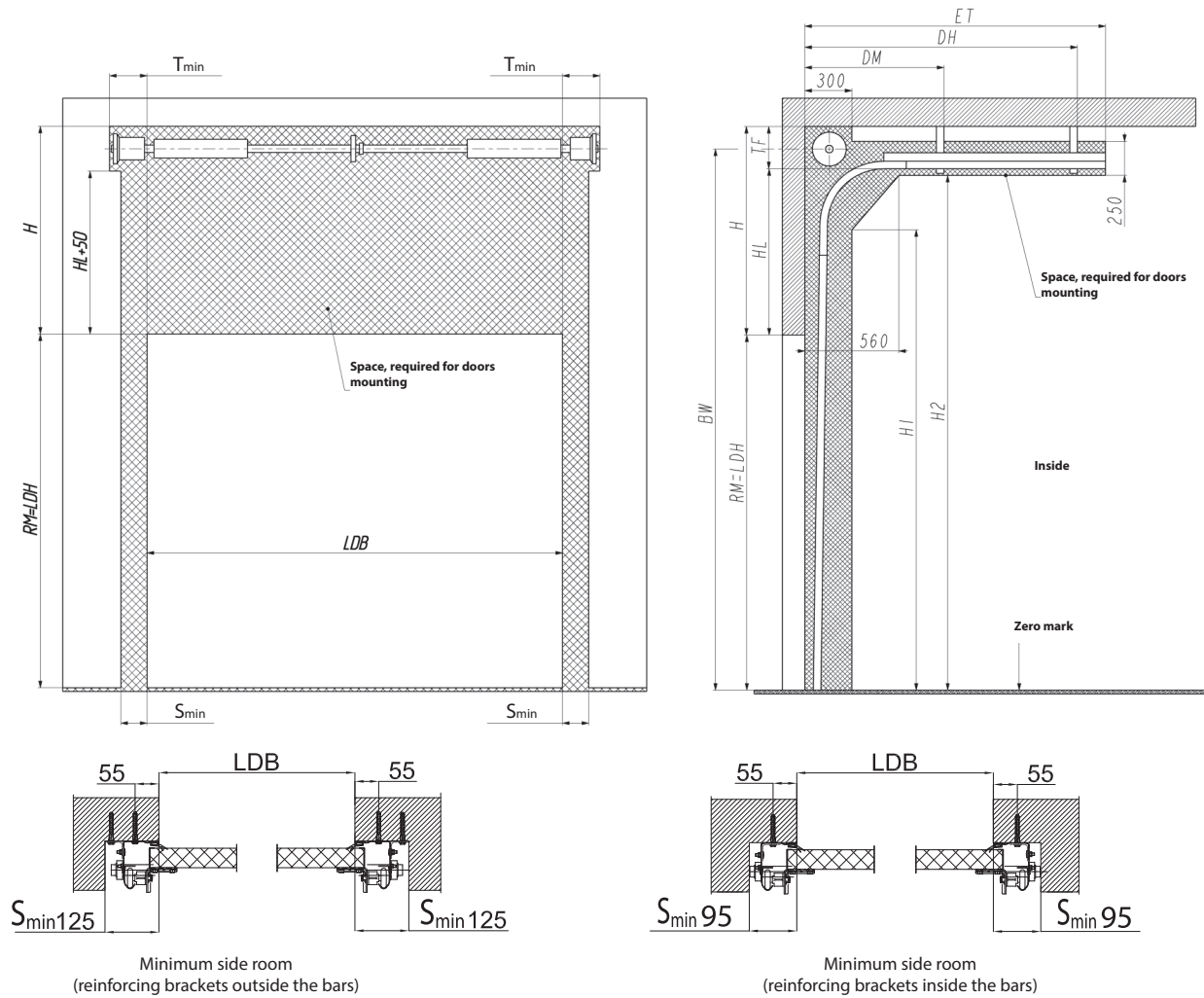
Maximum door dimension according to the scale.



Parameter	Description	Formula or value
H, mm	Headroom height	$H_{min} = 105$ (manual operation)
		$H_{min} = 130$ (electric drive)
LDH, mm	Clear dimension height	RM-195 (manual operation with the limiting device RS0301)
		RM-125 (manual operation with the fixing device LH3004)
		RM-125 (electric drive with the limiting device RS0301)
LDW*, mm	Clear dimension 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 dimension width is measured as the distance between the vertical seals.

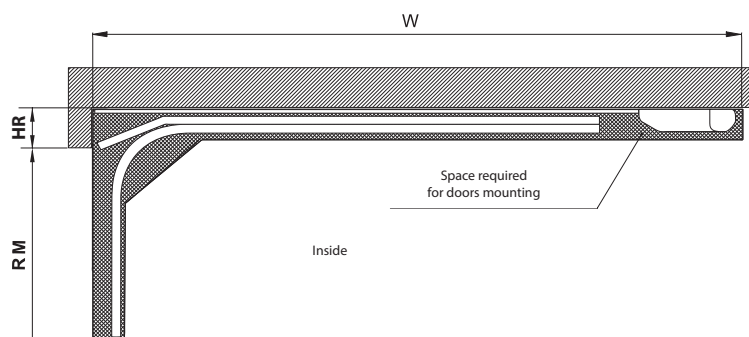
2.12.4.6. Doors with wicket. High mounting



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 dimension height	RM	
LDW*, mm	Clear dimension 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 dimension width is measured as the distance between the vertical seals.

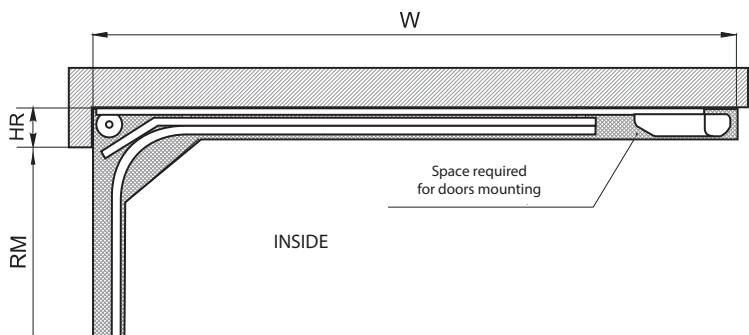
2.12.5. ADDITIONAL REQUIREMENTS FOR OPENINGS FOR ELECTRIC DRIVE INSTALLATION ON CLASSIC SERIES DOORS WITH TENSION SPRINGS



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 2575	SZ-12SL (RU)	3735	125 – doors without wicket 130 – doors with wicket
Comfort 60L	to 3085	SZ-13SL	4300	
Comfort 260/270/280 (speed)	to 2155	SK(SZ)-11SL	3290	
	to 2375	SK-12SL	3540	
	to 2575	SZ-12SL (RU)	3740	
	to 3000	SK(SZ)-13SL	4300	
Spido	to 2310	BPA 0331A	3370	140 – doors without wicket 145 – doors with wicket
	to 3000	BPA 0331A+SPA21	4370	
Spin	to 2300	SNA30	3350	
	to 3000	SNA6	4135	
ASG600/1000	to 2575	ASGR3/3B	3700	135 – doors without wicket 140 – doors with wicket
ASG1000	to 3000	ASGR4/4B	4400	

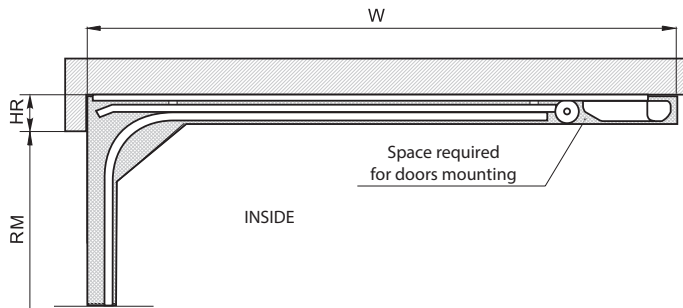
2.12.6. ADDITIONAL REQUIREMENTS FOR OPENINGS FOR ELECTRIC DRIVE INSTALLATION ON CLASSIC SERIES DOORS WITH TORSION SPRINGS

2.12.6.1. Standard mounting



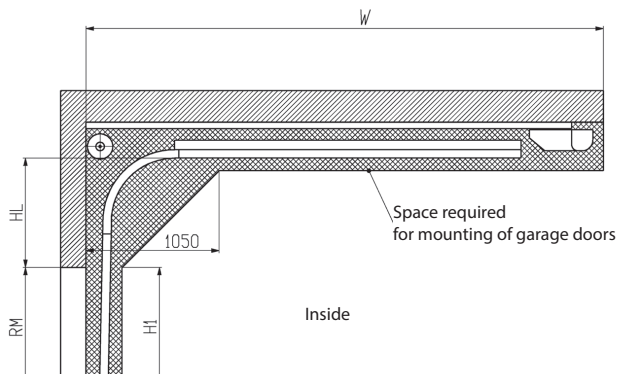
Type of electric drive	Opening height (RM), mm	Type of drive rail	Dimensions of drive positioning W, mm	Height of rail positioning HR, mm
Comfort 50/60	to 2700	SZ-12SL (RU)	3735	210
Comfort 60L	to 3000	SZ-13SL	4300	
Comfort 260/270/280 (speed)	to 2280	SK(SZ)-11SL	3290	
	to 2500	SK-12SL	3540	
	to 2700	SZ-12SL (RU)	3740	
	to 3000	SK(SZ)-13SL	4300	
Spido	to 2435	BPA 0331A	3370	
	to 3000	BPA 0331A+SPA21	4370	
Spin	to 2430	SNA30	3350	
	to 3000	SNA6	4135	
ASG600/1000	to 2700	ASGR3/3B	3700	
ASG1000	to 3000	ASGR4/4B	4400	

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 2575	SZ-12SL (RU)	3735	125 – doors without wicket 130 – doors with wicket
Comfort 60L	to 3085	SZ-13SL	4300	
Comfort 270/280 (speed)	to 2155	SK(SZ)-11SL	3290	
	to 2375	SK-12SL	3540	
	to 2575	SZ-12SL (RU)	3740	
	to 3000	SK(SZ)-13SL	4300	
Spido	to 2310	BPA 0331A	3370	140 – doors without wicket 145 – doors with wicket
	to 3000	BPA 0331A+SPA21	4370	
Spin	to 2300	SNA30	3350	
	to 3000	SNA6	4135	
ASG600/1000	to 2575	ASGR3/3B	3700	135 – doors without wicket 140 – doors with wicket
ASG1000	to 3400	ASGR4/4B	4400	

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 $HL \geq 900$ mm the rod 2125 mm long is used, art. 564868.

if $HL < 900$ mm the rod 1000 mm long is used, art. 150082, it is acceptable to use the rod art. 564868.

Type of electric drive	Type of drive rail	Dimensions of drive positioning W, mm
Comfort 50/60	SZ-12SL (RU)	3600
Comfort 60L	SZ-13SL	4300
Comfort 260/270/280 (speed)	SK(SZ)-11SL	3290
	SK-12SL	3540
	SZ-12SL (RU)	3740
	SK(SZ)-13SL	4300
Spido	BPA 0331A	3370
	BPA 0331A+SPA21	4370
Spin	SNA30	3350
	SNA6	4135
ASG600/1000	ASGR3/3B	3700
ASG1000	ASGR4/4B	4400

Way of defining the type of required drive rail

Calculate W_{required} using the formula:

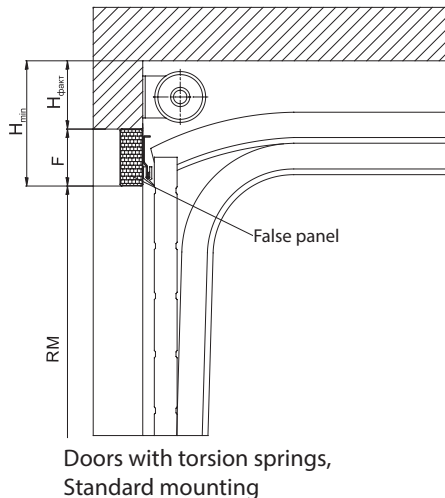
$$W_{\text{required}} = (HL + 250) / 0,86 + RM - HL + 560,$$

where: RM – Opening height, mm; HL – Height from the top of the opening to the horizontal track, mm.

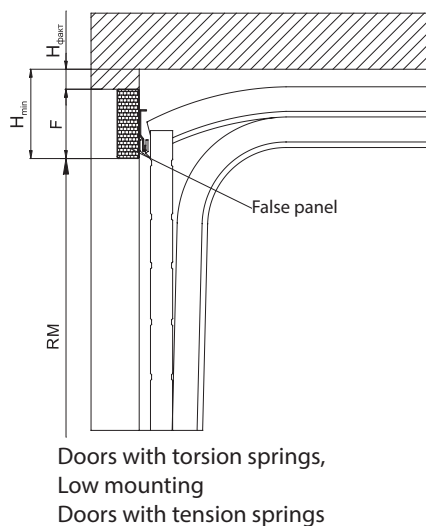
Using the table define the required type of the motor rail if $W_{\text{required}} \leq W$.

2.13. FALSE PANEL

2.13.1. 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 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 – $H_{fact'}$;
- set the required height of the opening RM;
- calculate the required height of the false panel F using the following formula:

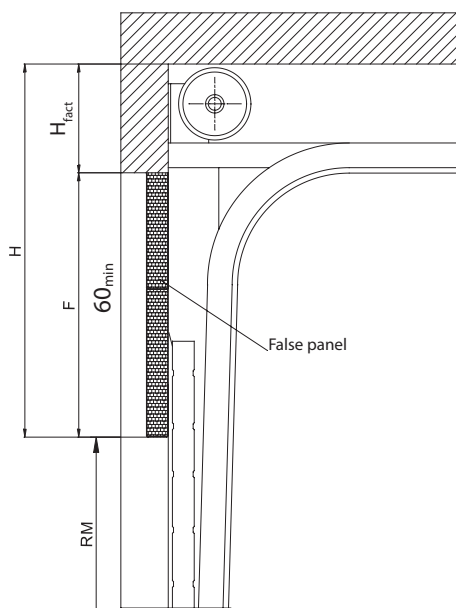
$$F = \text{Height of the ceiling} - RM - H_{fact}$$

- compare the calculated result F with the minimum acceptable dimensions of the false panel. Minimum acceptable dimensions of the false panel $F_{min} = 60$ mm;
- if the calculated dimension F is less than $F_{min'}$ it must be extended to the minimum acceptable and correct the required height 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!

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_{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:

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

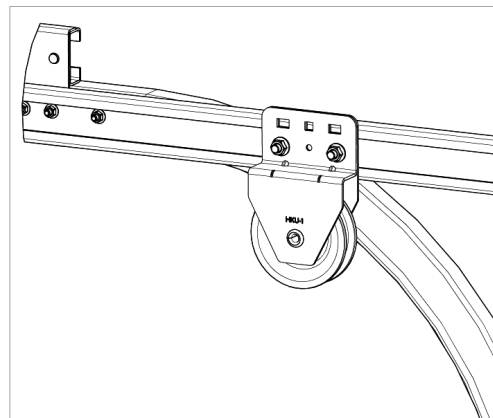
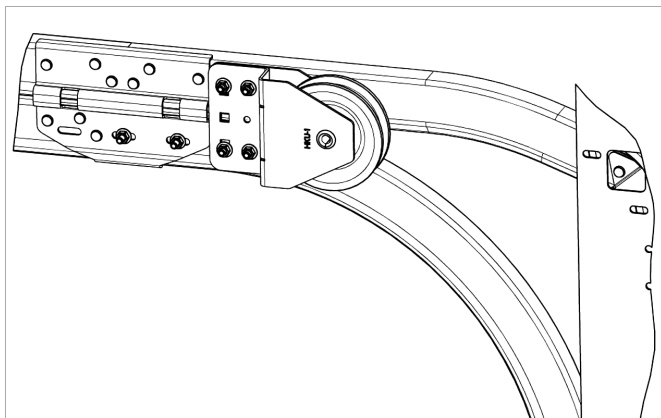
- compare the calculated result F with the acceptable dimensions of the false panel:
 - if the received result F is less than $F_{min} = 60$ mm, the height of the false panel must be increased to the minimum acceptable.
 - if necessary correct the ordered door height using the following formula:

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

- 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:

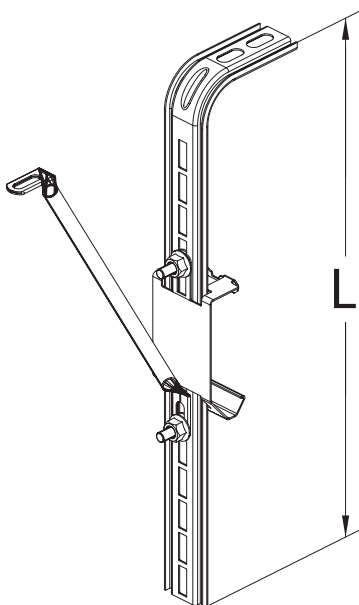
$$RM = \text{Height to the ceiling} - H_{fact} - F_{max}$$

2.14. PULLEY BLOCK FOR MANUAL DOOR OPENING HKU001



Use of this system does not require additional changes in the opening requirements.

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 brackets; a set for doors of other mounting types include CS-1 brackets.

CS-5 bracket is 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

Moreover, 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 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.

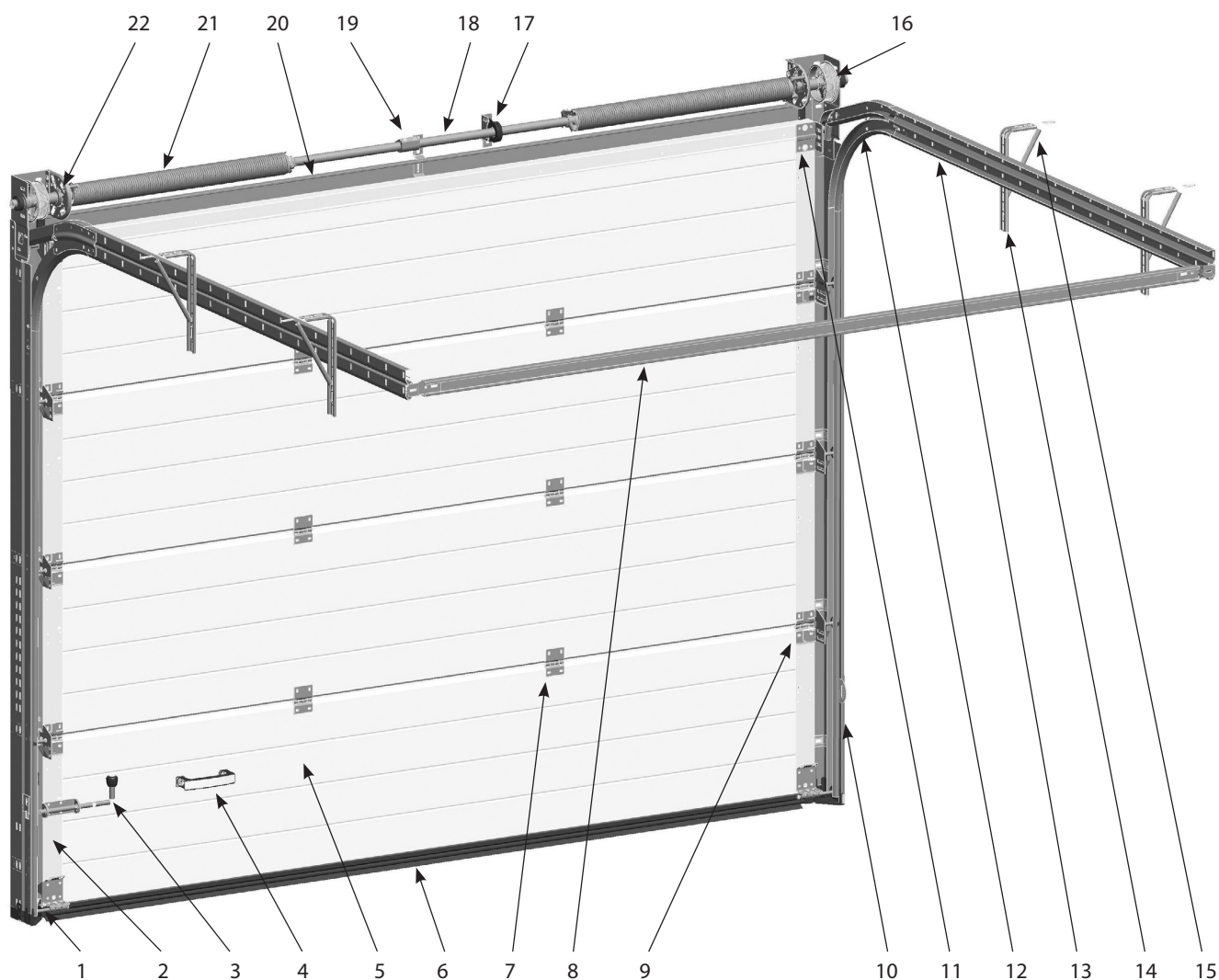
Established minimum spring endurance – 25.000 cycles of lifting and lowering the door leaf.

Doors with torsion springs are manufactured in two variants depending on the chosen type of mounting – standard or low.

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

3.2. TYPICAL DOOR DESIGNS

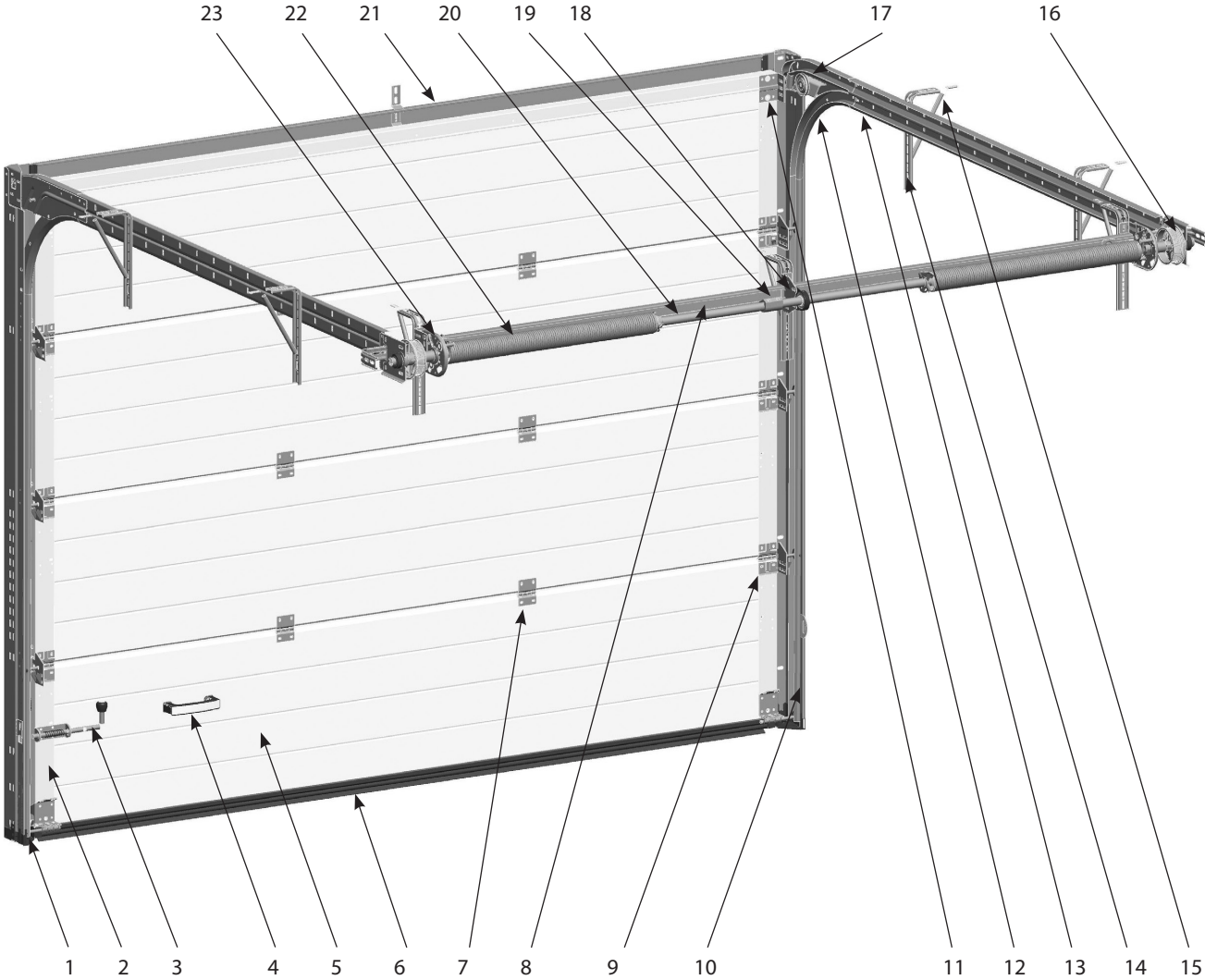
3.2.1. TREND SERIES DOORS WITH TORSION SPRINGS. STANDARD MOUNTING



Nº	Item
1	Bottom bracket with roller
2	Side cap
3	Locking bar
4	Handle
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

Nº	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

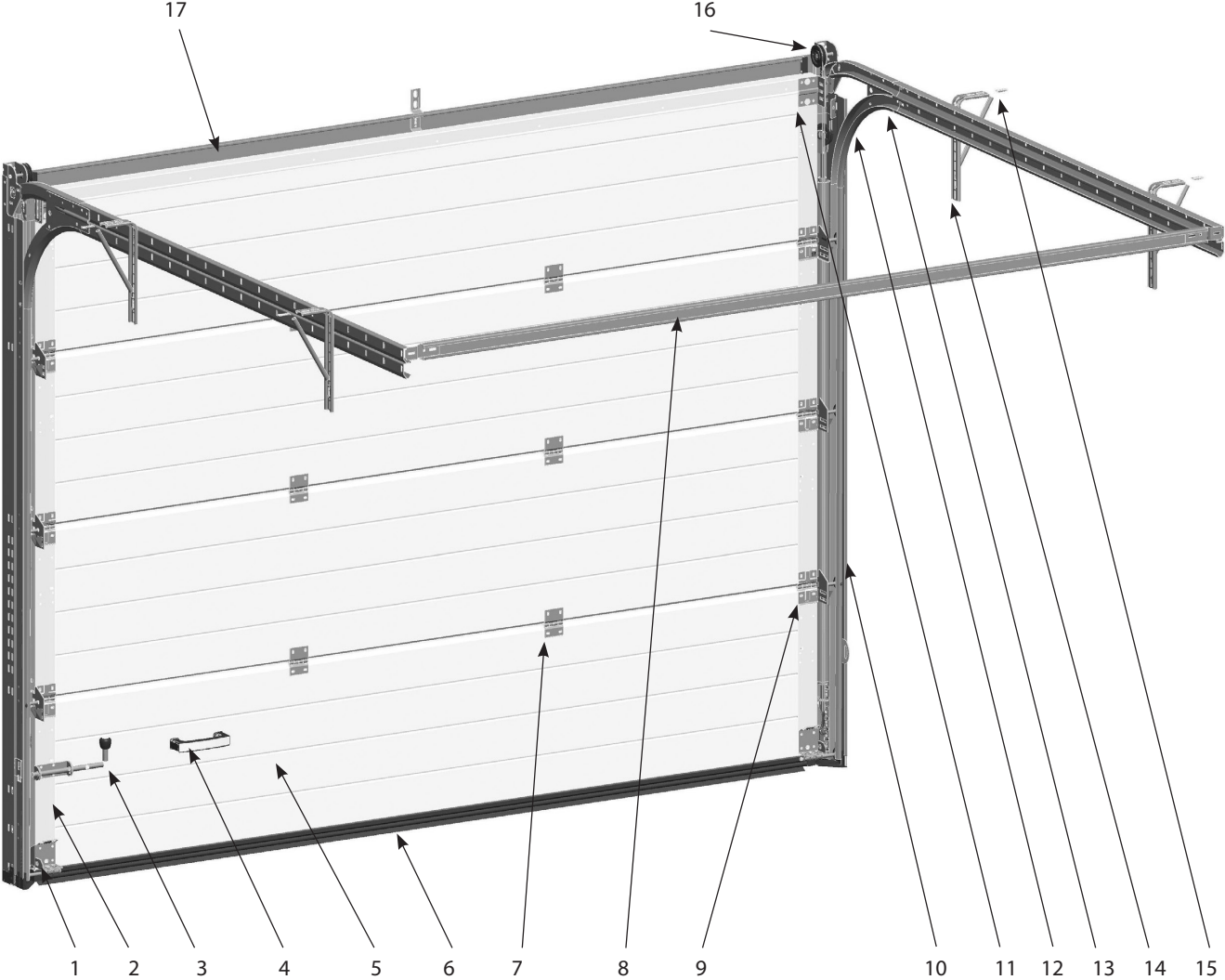
3.2.2. TREND SERIES DOORS WITH TORSION SPRINGS.
LOW MOUNTING



Nº	Item
1	Bottom bracket with roller
2	Side cap
3	Locking bar
4	Handle
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

Nº	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 TENSION SPRINGS



Nº	Item
1	Bottom bracket with roller
2	Side cap
3	Locking bar
4	Handle
5	Door panel
6	Bottom end profile with sealing insert
7	Intermediate hinge
8	Spacer bar
9	Side bracket with roller

Nº	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 caps for the door leaf of S-ribbed, M- ribbed and L- ribbed (art. P1013) panels. Caps are installed under the side strips 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 bottombrackets 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 install angle bars and cover strip inside the opening. Doors with white (closely correspond to RAL9016) bars and cover strip are supplied at no extra charge. The angle bars and cover strip can be painted in other colours on special request using colours which closely correspond to the RAL scale. The possibility of painting in dark colours, metallic colours, pearl and reflecting colours will also be considered upon request. Only the visible areas of vertical angle bars and cover strip are painted (outside view);
- set of horizontal track profiles and radius profiles;
- hanging system for horizontal tracks;
- spring locking bar;
- doors opening-closing handle:
 - single side (for doors without a wicket door and/or reinforcing profiles on the door leaf). Double side handle can be ordered optionally;
 - double side (for doors with inbuilt wicket door and/or reinforcing profiles on the door leaf);
- rope for manual door lifting;
- set of galvanised fixings and components required for door installation.

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. COMPLETING OPTIONS AS PART OF STANDARD DOOR SET (FOR DOORS WITH TORSION SPRINGS)

Depending on the weight of the door leaf **P** it is possible to use the following types of shafts:

- $P \leq 200$ 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 seal.

With a width of door panel $LDB > 5$ m, regardless of the door leaf weight, the following elements are installed:

- longitudinal reinforcing steel profiles which are installed on each door panel to make it more rigid;
- wider side caps mounted on the ends of the sandwich panels;
- twin set of adjustable side roller brackets which are used on our industrial doors;
- set of long roller cover plates;
- set of rollers with long spindles.

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* ADS 703 – anthracite	—	Golden Oak Dark Oak Cherry
Cassette	RAL 8014 – sepia brown* RAL 9016 – white*	—	Golden Oak Dark Oak	—

* Colours closely correspond to RAL scale.

The front side of the panel can be painted in other colours on special request using colours which closely correspond to the RAL scale. 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 scale. The possibility of painting the inner side of panels in dark colours, metallic colours, pearl and reflecting colours will be considered upon request.

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

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

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*.

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;

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

- 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 reinforced profile (PRG13 – used for the standard threshold, PRG12 – used for the low threshold). Reinforced 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-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.

If there is a great difference in temperatures between the inside and outside of premises (e.g. doors that are mounted on the sunny side of buildings or in heated rooms, etc.) sandwich panels can sag which is caused by temperature expansion/contraction of steel sheets in the sections. Thus to preserve the endurance of the door it is recommended to install a set of reinforcing profiles in doors more than 4 m wide.

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-rope.

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. OUTSIDE DISCONNECT SYSTEM FOR ELECTRIC DRIVES

Outside disconnect systems for electric drives are designed to allow manual lifting of the door, in case of emergencies or electric power failure, when installed without an additional entrance.

In the case of doors equipped with a locking device as an outside disconnect system for the electric drive, the locking device and a set of unlocking cable RK-4500 and RK-6000 are used.

In the case of doors not being equipped with a locking device as an outside disconnect system for the electric drive an unlocking set mechanism RM0104-4500 is used. In doors fitted with outside disconnect systems for the electric drive, a spring locking bar is not used.

3.4.11. PULLEY BLOCK FOR MANUAL DOOR LIFTING

Pulley block for manual door lifting is designed for door lifting and lowering without the electric drive. Door lifting and lowering is carried out manually using a rope thrown over the pulley block and mounted on the bottom bracket. It is recommended to use the pulley block on doors over 2 metres high.

3.4.12. FALSE PANEL

The false panel is designed to partially overlap the entrance aperture height directly below the bridge.

The false panel consists of sandwich-panels and is edged with a C-shaped profile. The false panel is supplied complete with a set of brackets for fixing it to the opening. The external surfaces of sandwich panels used for producing false panels and

door leafs are the same. If door leaf is produced from sandwich panels with the cassette style, the false panel is produced from panels with the pattern microwave. Recommendations on options for the use of false panels are shown in section 3.13.

Correspondence of colours between door leaf and false panel framing:

Door colour	Colour of false panel framing
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);

* Colours closely correspond to RAL scale.

As an option, the colouring of profile framing is available in other colours having a close match to the RAL scale. 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. EMERGENCY PANIC EXIT PUSH BARS FOR WICKET

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.'

3.4.15. SET OF FIXINGS

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

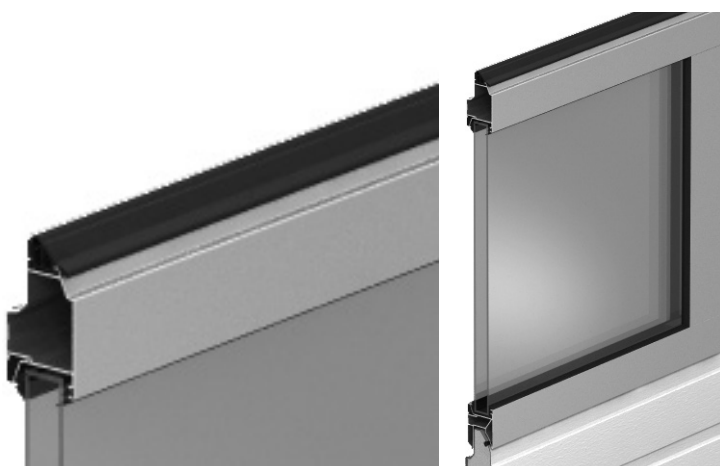
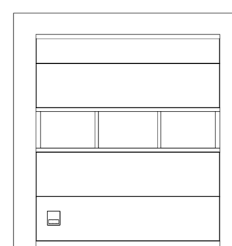
3.4.16. SET OF PROTECTIVE COVERS

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

3.4.17. PANORAMIC GLAZING

In doors with torsion springs with the pattern microwave, S-panel, M- panel and L- panel 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 sterol and acrylonitrile (SAN-plastic) or metallic meshes.



AluTrend – profile system without thermal break

Infill types with translucent glazing for panoramic sections

Section filling for series AluTrend:

- double insert 26 mm tick with SAN-plastic 2 mm thick (double glazed unit 2-22-2). It is used on inserts till 0,5 m²;
- double insert 26 mm tick with SAN-plastic 3 mm thick (double glazed unit 3-20-3). It is used on inserts over 0,5 m².

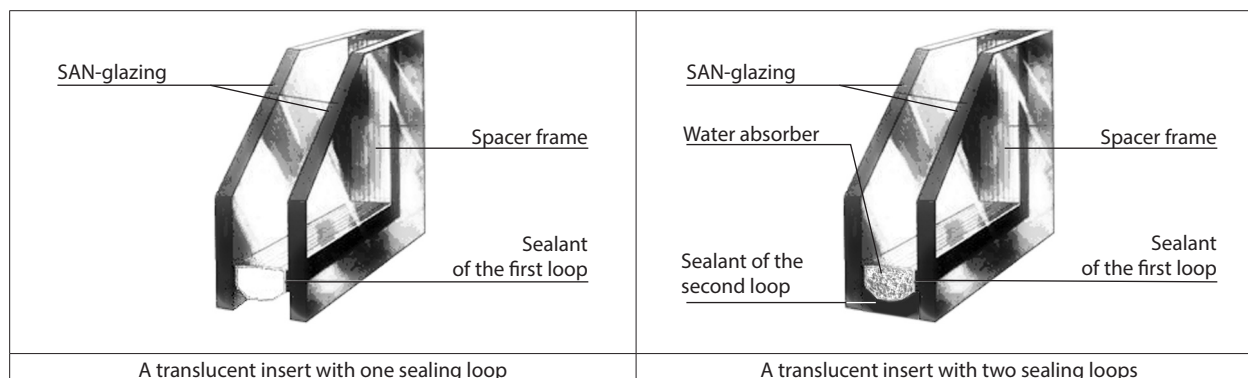
Basic colour for profiles of panoramic section AluTrend series*
RAL 1015 – light ivory
RAL 3004 – purple red
RAL 5010 – gentian blue
RAL 6005 – moss green
RAL 7016 – anthracite grey
RAL 8014 – sepia brown
RAL 8017 – chocolate brown
RAL 9006 – white aluminium
RAL 9016 – white

* Colours closely correspond to RAL scale.

In panoramic sections series AluTrend with double glazing, protection against adhesion is ensured by a greater distance between the SAN sheets (20-22 mm). Inserts are not fitted.

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 molecular sieve (dehumidifier) filling in the air-gap and sealing of the second loop.



Metallic meshes for panoramic sections

Section filling for series AluTrend:

- expanded mesh for panoramic panel. Material: galvanized steel. Cross section of ventilation cuts: 58%. Thickness: 4 mm;
- square mesh 40×40 mm for panoramic panel. Material: galvanized steel. Cross section of ventilation cuts: 83%. Thickness: 4 mm;
- perforated aluminum sheet for panoramic panel. Perforated aluminum sheet, perforation 8-12 mm. Cross section of ventilation cuts: 40%. Thickness: 1,6 mm.

For all types of panoramic doors these infills are applied in natural colour (galvanized steel or aluminum).

3.4.18. SCRATCH RESISTANT COVERING

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 sealing.

3.4.19. DOUBLE SIDE HANDLE

The option is available for doors with tension springs and torsion springs without inbuilt wicket door and/or reinforcing profiles. When there is a wicket door and/or reinforcing profiles, the double side handle is in a standard delivery set.

3.5. DOOR FACADE SYSTEMS

If several sectional doors are installed in line on the same building facade it is possible to align them based on a specific door element, for example:

- panel joints, through using the same panel set for all doors;
- windows;
- locks;
- handles for door opening;
- wicket (if applicable).

Facade system can be achieved for doors of different mounting types, different heights, with wicket, or without. 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! To achieve a facade system it is necessary to provide the point at which all the doors have to be aligned from or to inform us of the Zero base point.

3.6. TECHNICAL FEATURES

3.6.1. DOOR TECHNICAL FEATURES

Characteristics	Trend	
	Tension springs	Torsion springs
Thermal transmittance (U-value) of ALUTECH/Günther sectional doors, W/(m ² K)*		
Doors without wicket	1,55	1,35
Doors with wicket	—	1,46
Resistance to wind load (EN 12424)		
Doors without wicket	Class 1-4***	Class 1-4***
Doors with wicket	—	Class 1-4***
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 with reinforcing profiles **	up to 13,9 kg/m ²	
Specific gravity of the door leaf without reinforcing profiles **	—	up to 15,7 kg/m ²
Loading on ceiling structure	up to 32 kg/m ²	

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

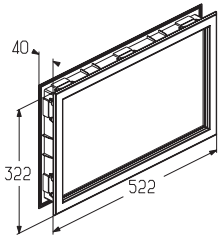
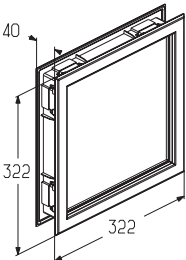
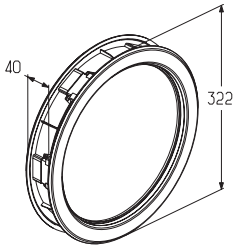
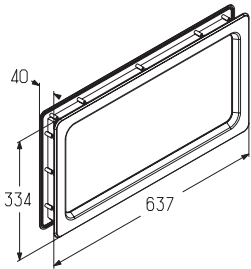
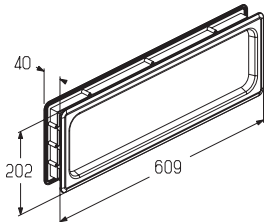
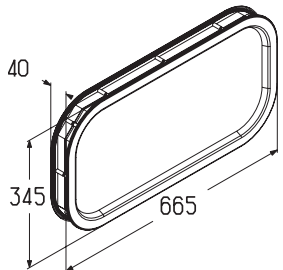
- for garage doors with tension springs with an area of 7.875 m²;
- for garage doors with torsion springs with an area of 18 m².

** Parameter of door leaf weight can vary depending on the set of panels, presence of additional fittings and other factors.

*** Depends on the doors width.

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 acrylic
W043WH-CG40		White	Crystal acrylic
W043BR-TG40		Brown	Transparent acrylic
W043BR-CG40		Brown	Crystal acrylic
W050WH-40		White	Transparent acrylic
W050BR-40		Brown	
W060WH-40		White	Transparent acrylic
W060BR-40		Brown	
W046-40		Black	Transparent acrylic
W085-40		Black	Transparent acrylic
W095-40		Black	Transparent acrylic

The outside of the window frames (art. W043WH-TG40, W043WH-CG40, W043BR-TG40, W043BR-CG40, W050WH-40, W050BR-40, W060WH-40, W060BR-40) can be painted in colours from the RAL catalogue. The possibility of painting window frames in metallic colours, pearl and reflecting colours will be considered individually.

3.7.2. WINDOW POSITIONING

When glazing the doors the windows are normally aligned vertically. Irregular positioning of windows should be approved by individual customers (ideally in writing).

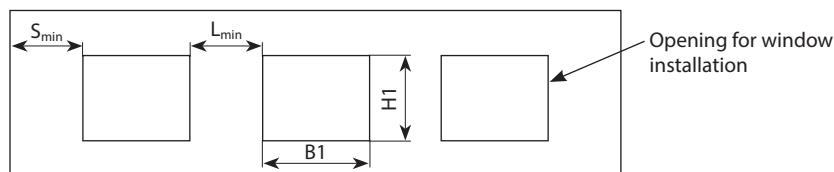
To choose the maximum number of windows located in one panel it is necessary to use the following table.

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
art.W043WH-TG40, W043WH-CG40, W043BR-TG40, W043BR-CG40			
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		
art.W050WH-40, W050BR-40			
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		
art.W060WH-40, W060BR-40			
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		
art.W046-40			
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		
art.W085-40			
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		
art.W095-40			
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		

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.



Into panels with the pattern microwave and S-type panels 500 and 625 mm high, M-type and L-type panels 500 mm high windows art. W043WH-TG40, W043WH-CG40, W043BR-TG40, W043BR-CG40, W050WH-40, W050BR-40, W060WH-40, W060BR-40, W046-40, W085-40, W095-40 are installed.

Into M-type and L-type panels 450 mm high windows art. W043WH-TG40, W043WH-CG40, W043BR-TG40, W043BR-CG40, W050WH-40, W050BR-40, W060WH-40, W060BR-40 are installed.

Into cassette panels windows art. W043WH-TG40, W043WH-CG40, W043BR-TG40, W043BR-CG40 are installed.

Glazing of top and bottom panels should be approved by customers individually (ideally in writing) and only carried out if technically feasible.

If the lock is situated in the second panel from the bottom this panel cannot be glazed.

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 ²
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).

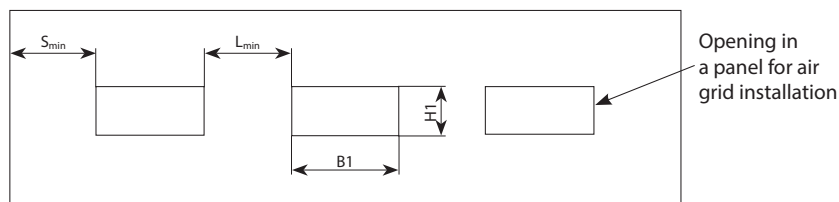
When choosing the maximum number of grids arranged in a door width in one panel, you must use the following tables:

Trend series doors with torsion and tension springs

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.



Air grids can be installed in the upper panel providing it has a panel height of not less than 400 mm. If a locking bar is installed an air grid cannot be installed closer than 1000 mm from the door panel edge on the same side. Non-standard key lock air grid positioning should be agreed with the customer individually (ideally in writing). If there is a key lock on a panel, air grids are not installed on this panel. Air grids are not installed into cassette type door leaves.

3.9. WICKET PARAMETERS

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

Doors are manufactured with a built-in wicket to special order.

The wicket can only be built into doors with torsion springs (standard and low types of installation).

The wicket only opens outward and can be right or left-handed (doors that open from the right-hand side have the hinges on the right-hand side when viewed from outside).

Wicket doors are not available on Cassette panel, M-ribbed or L-ribbed panels.

3.9.1.1. Wicket dimensions with pattern 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.

Dimensions of doors on height, mm	Wicket daylight opening height H, mm			Height of handle positioning H1, mm	Height of window positioning H2, mm
	Threshold height (h)=18 mm	Threshold height h=100 mm	Threshold height h=145 mm		
1960...2080	1802	1725	1680	820	1270
2085...2205	1927	1850	1805	945	1395
2210...2240	2032	1975	1930	1070	1520
2245...2490					1580
2495...2515	1927	1850	1805	945	1395
2520...2740	2052	1975	1930	1070	1520
2745...2865					1580
2870...3000					1580

3.9.1.2. Dimensions limits.

Minimum width of doors with a wicket is 2125 mm (it is possible to build a wicket into door leaf with the width from 1915 to 2120 mm). Wicket is built into doors from the height 1960 mm.

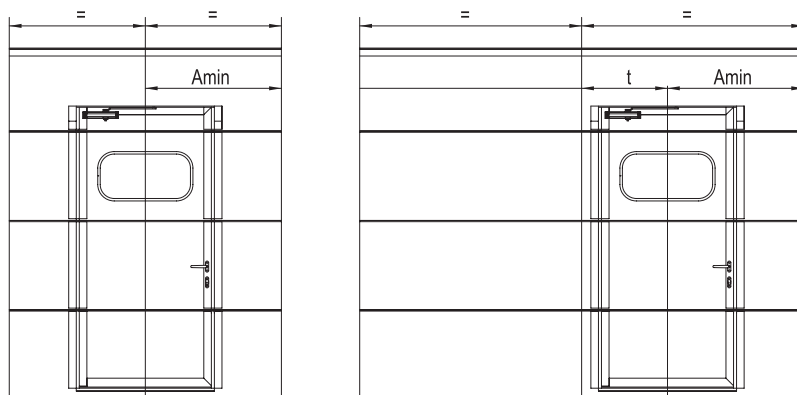
The choice of wicket depends on the doors width. The corresponding limits are shown in Table below.

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

3.9.1.3. WICKET POSITIONING ON DOOR LEAF

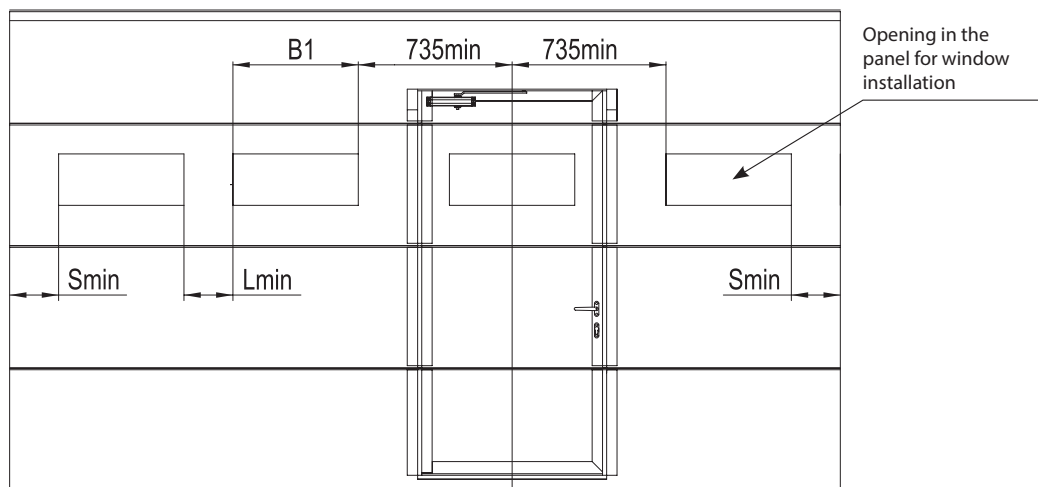
The wicket can be installed in the centre of the door or offset to one side. All measurements are taken as viewed from the inside of the door. It is possible to position the door from the centre axis in multiples of 330 mm increments.

Minimum distance from the central axis of the wicket to the leaf edge is $A_{\min}=973$ 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_{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! Window positioning in the fourth (bottom) section of the door leaf with a wicket must be confirmed with the manufacturer and is only installed if it is technically possible.

Colour correspondence of wicket elements to colour of door leaf:

Colour of the door leaf	Colour of framing profiles of doors and opening	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)

* 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 scale. The possibility of painting in dark colours, such as metallic colours, pearl and reflective colours will be considered upon request.

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. The wicket opens only outward and can be manufactured in two variants: left hand and right hand (hinges on the right hand wicket are positioned on the right if looking at the doors from the outside).

The key lock is built into the second panel from the bottom.

The wicket can consist of 3 or 4 sections depending on the door height.

Wicket width is 920 mm. The wicket can be 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.

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 5000	With standard (145 mm) threshold

3.9.2.2. Dimensional limitations of the doors with a wicket

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.

3.10. DOOR DIMENSIONS

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

3.10.1. DIMENSIONAL MATRIX FOR DOORS

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

Door height, mm	Doors width, mm																																			
	1750	1875	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	
1750																																				
1875																																				
2000																																				
2125																																				
2250																																				
2375																																				
2500																																				
2625																																				
2750																																				
2875																																				
3000																																				

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

From the dimensional matrix above doors can only be manufactured in 5mm increments in both width and/or height.

Doors made of type M-panel and L-panel with the height 2030-2070, 2730-2770 are not manufactured.

3.10.1.2. Dimensional matrix for doors without wicket from Trend series: Cassette type

Door height, mm	Doors width, mm																			
	2110	2250	2375	2500	2625	2750	2875	3000	3125	3250	3375	3500	3625	3750	3875	4000	4125	4250	4375	4500
2100																				
2125																				
2250																				
2375																				
2500																				
2550																				
2625																				
2700																				
2850																				
2975																				
3000																				

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




From the dimensional matrix above doors can only be manufactured with 5 mm increments in width and 25 mm increments in height within stated limits.

Please take into account that:

- doors of standard height stated in the matrix are manufactured from panels with the same height;
- doors of intermediate dimensions (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 doors with wicket from Trend series: types Microwave, S-panel

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																																			

-  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)

From the dimensional matrix above doors can only be manufactured in 5 mm increments in width and/or height

3.10.1.4. Dimensional matrix for doors with wicket from Trend series with flat threshold: types Microwave, S-panel

Door height, 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																									

From the dimensional matrix above doors can only be manufactured in 5 mm increments in width and or height

3.11. OPENING REQUIREMENTS AND TAKING MEASUREMENTS**3.11.1. REQUIREMENTS FOR THE OPENING**

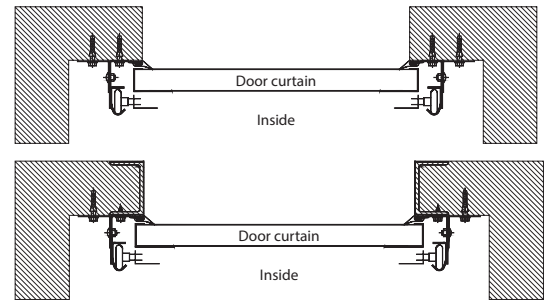
Prepared openings should meet the following requirements:

- 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.



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.

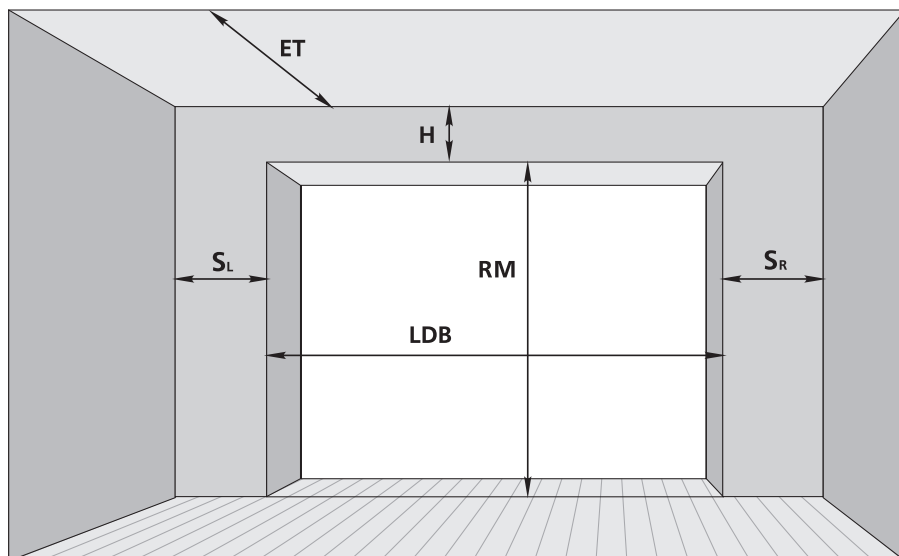
It is assumed that the height of the parallel walls and the distance between the lintel and the floor and the diagonals do not show more than a 5 mm difference. If they are it may be possible to overcome this with the fitting of a wider or higher door.

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 3.9).

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. PLAN OF WHERE TO TAKE THE MEASUREMENTS



RM	Opening height
LDB	Opening width
H	Headroom height
ET	Depth of door entrance into the premises
S _L , S _R	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 dimension height

Parameter	Description
LDW	Clear dimension 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

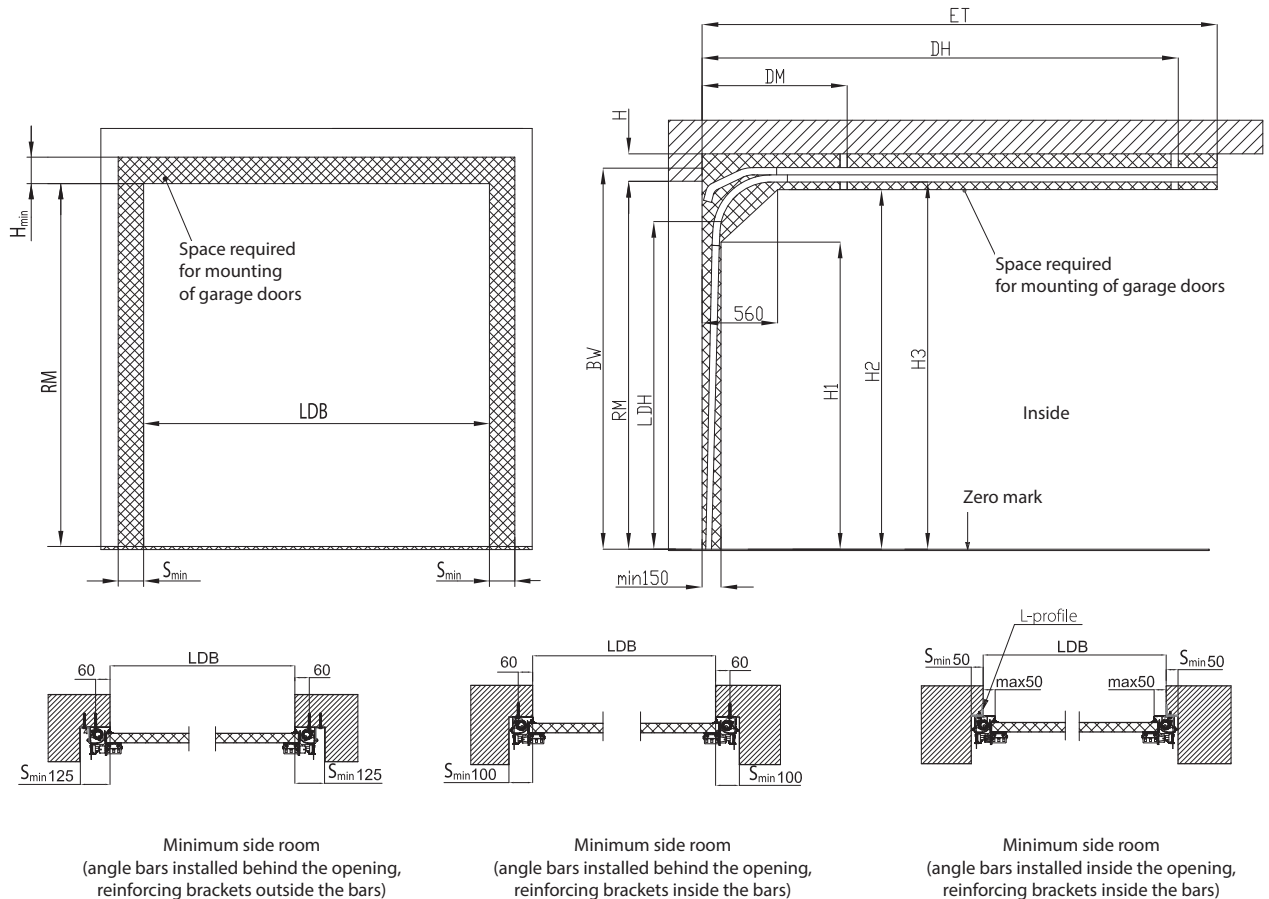
Doors with tension springs

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 manual lift 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 dimension height	RM-170 (manual operation with the limiting device RS-3516) RM-100 (manual operation with the fixing device LHT-3004) RM-100 (electric drive with the limiting device RS-3516)
LDW*, mm	Clear dimension 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 inside 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

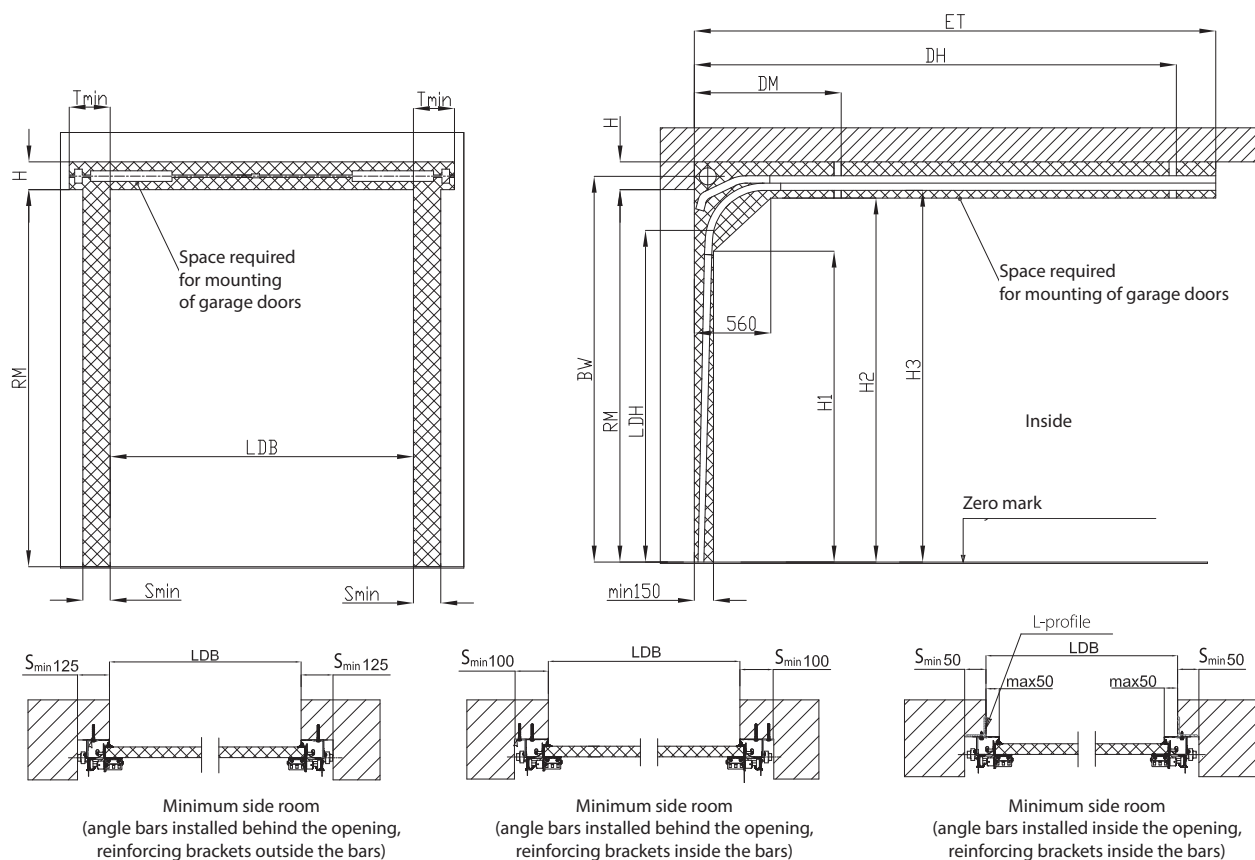
* Clear dimension width is measured as the distance between the vertical seals.

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

Depth of door entering into the premises ET and Positioning of the fixing point DH depending on aperture 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

3.12.4. TREND SERIES GARAGE DOORS WITH TORSION SPRINGS

3.12.4.1. Doors without wicket. Standard mounting



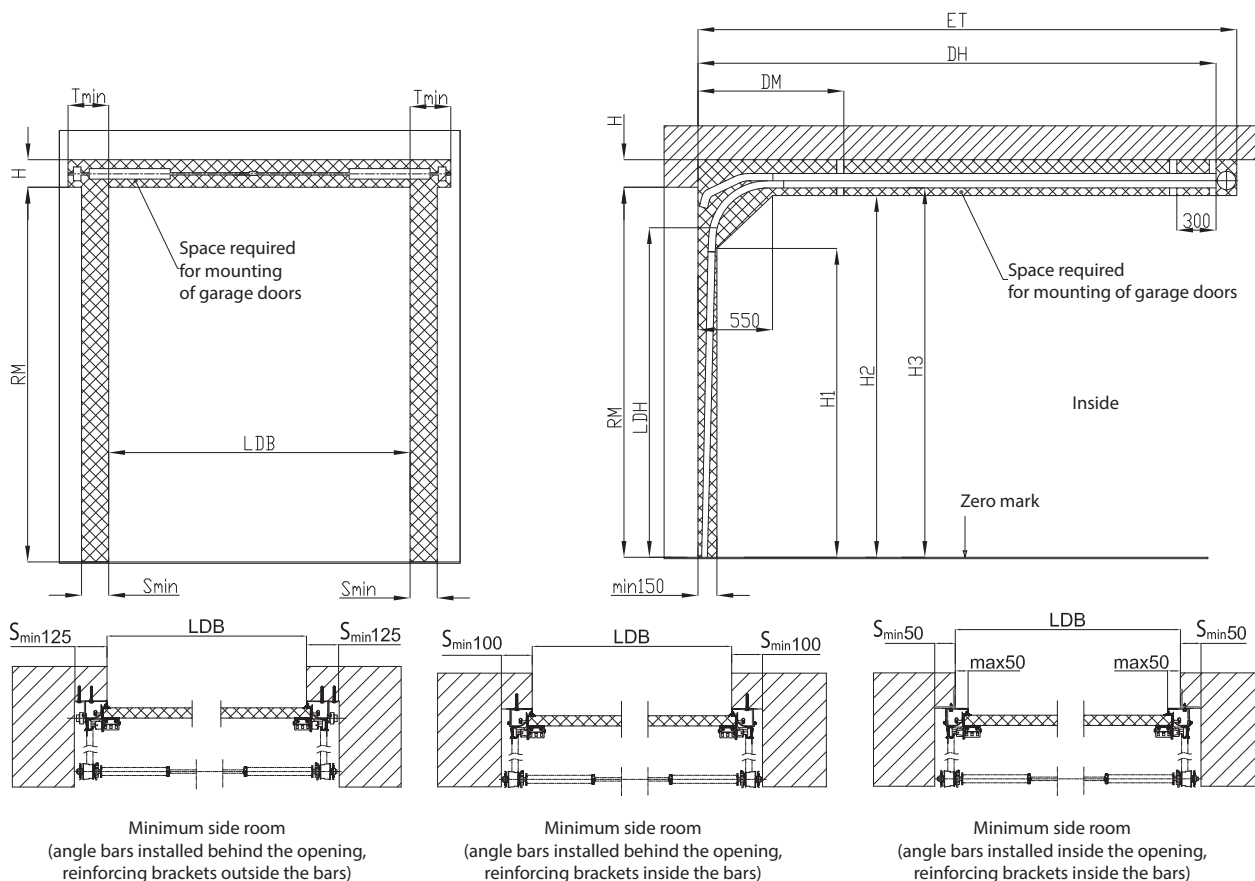
Parameter	Description	Formula or value
H , mm	Headroom height	min 210
LDH , mm	Clear dimension height	RM-120 (manual operation with the limiting device RS-3516)
		RM-25 (manual operation with the fixing device LHT-3004)
		RM-25 (electric drive with the limiting device RS-3516)
LDW^* , mm	Clear dimension 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_{min} , mm	Minimum side room for angle bars mounting	50 – angle bars inside 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_{min} , mm	Minimum side room for torsion mechanism	120

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

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

Depth of door entering into the premises ET and Positioning of the fixing point DH depending on aperture 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

3.12.4.2. Doors without wicket. Low mounting



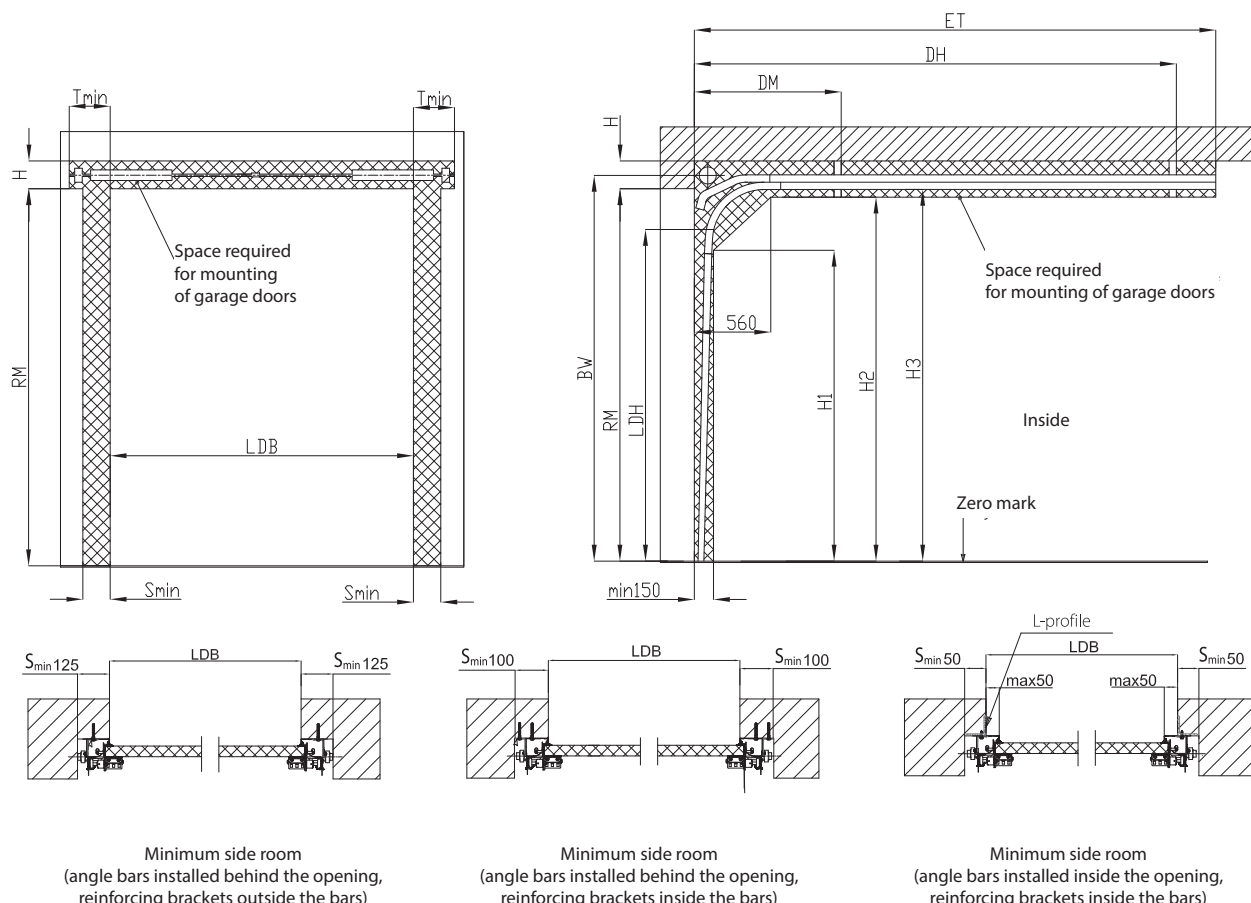
Parameter	Description	Formula or value
H, mm	Headroom height	min 100 (manual operation without locking device), min 115 (manual operation with locking device) min 125 (electric drive)
LDH, mm	Clear dimension height	RM-170(manual operation with the limiting device RS-3516) RM-100 (manual operation with the fixing device LHT-3004) RM-100 (electric drive with the limiting device RS-3516)
LDW*, mm	Clear dimension 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 inside 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 _{min} *, mm	Minimum side room for torsion mechanism	120

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

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

Depth of door entering into the premises ET and Positioning of the fixing point DH depending on aperture 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	26710	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

3.12.4.3. Doors with wicket. Standard mounting



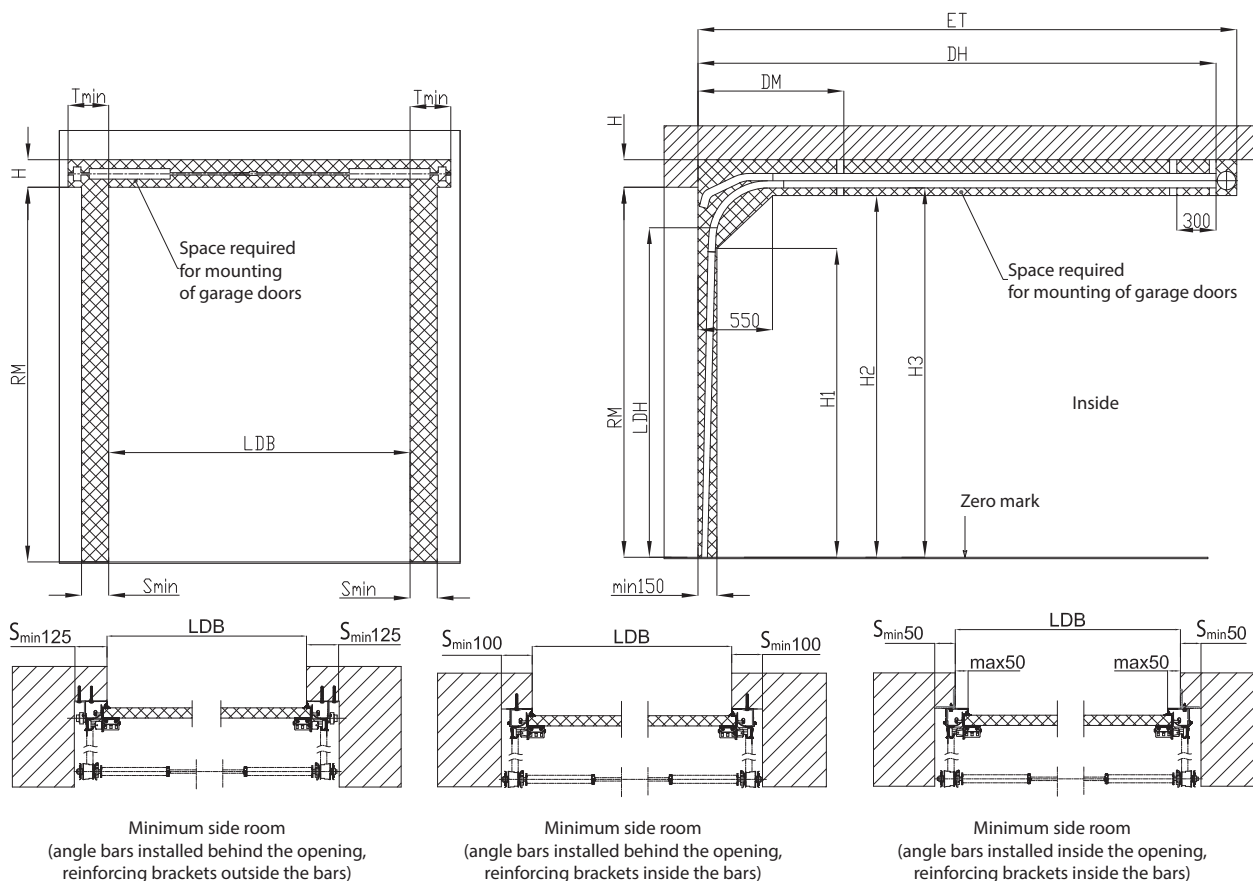
Parameter	Description	Formula or value
H, mm	Headroom height	min 210
LDH, mm	Clear dimension height	RM-150 (manual operation with the limiting device RS-3516)
		RM-80 (manual operation with the fixing device LHT3004)
		RM-80 (electric drive with the limiting device RS-3516)
LDW*, mm	Clear dimension width	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 _{min} , mm	Minimum side room for angle bars mounting	50 – angle bars inside 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 _{min} , mm	Minimum side room for torsion mechanism	120

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

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

Depth of door entering into the premises ET and Positioning of the fixing point DH depending on aperture 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

3.12.4.4. Doors with 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 dimension height	RM-195 (manual operation with the limiting device RS-3516)
		RM-125 (manual operation with the fixing device LHT-3004)
		RM-125 (electric drive with the limiting device RS-3516)
LDW*, mm	Clear dimension 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 inside 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 _{min} ', mm	Minimum side room for torsion mechanism	120

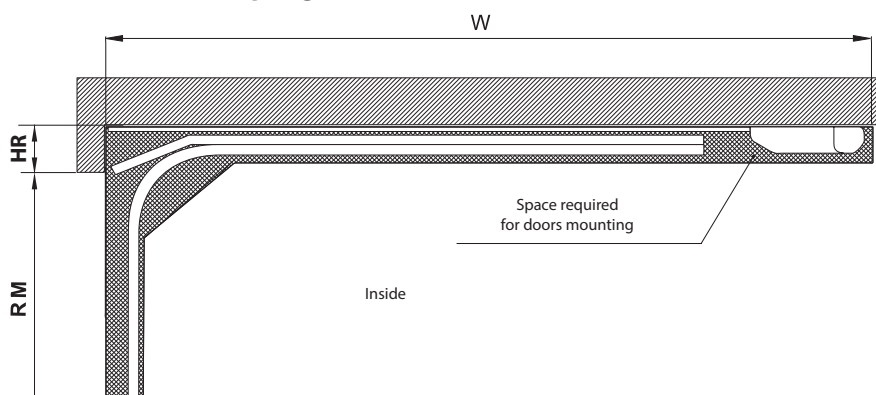
* Clear dimension width is measured as the distance between the vertical seals.

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

Depth of door entering into the premises ET and Positioning of the fixing point DH depending on aperture 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

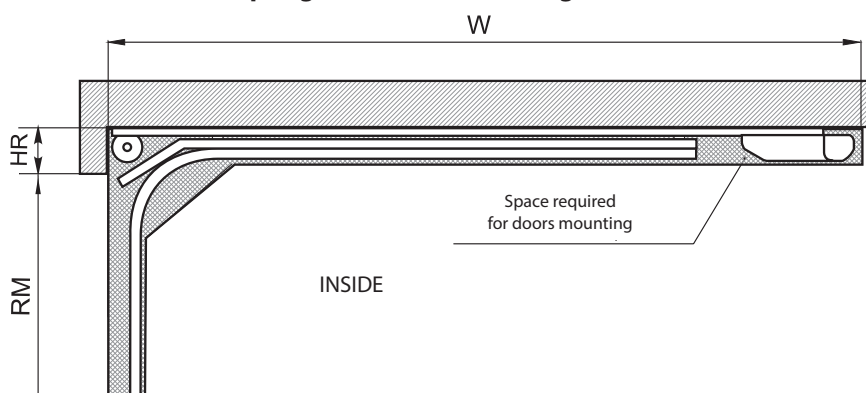
3.12.5. ADDITIONAL REQUIREMENTS FOR OPENINGS FOR ELECTRIC DRIVE INSTALLATION

3.12.5.1. Doors with tension springs



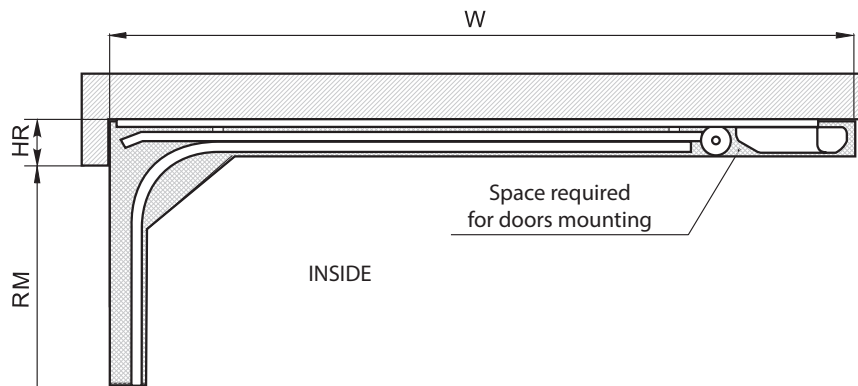
Type of electric drive	Opening height (RM), mm	Type of drive rail	Dimensions of drive positioning W, mm	Height of rail positioning HR, mm
Comfort 50/60	to 2700	SZ-12SL (RU)	3735	125 – doors without wicket 130 – doors with wicket
Comfort 60L	to 3000	SZ-13SL	4300	
Comfort 260/270/280 (speed)	to 2300	SK(SZ)-11SL	3290	
	to 2500	SK-12SL	3540	
	to 2700	SZ-12SL (RU)	3740	
	to 3000	SK(SZ)-13SL	4300	
Spido	to 2400	BPA 0331A	3370	140 – doors without wicket 145 – doors with wicket
	to 3000	BPA 0331A+SPA21	4370	
Spin	to 2400	SNA30	3350	
	to 3000	SNA6	4135	
ASG 600/1000	to 2600	ASGR3/3B	3700	235
ASG1000	to 3000	ASGR4/4B	4400	

3.12.5.2. Doors with torsion springs. 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 2700	SZ-12SL (RU)	3735	210
Comfort 60L	to 3000	SZ-13SL	4300	
Comfort 260/270/280 (speed)	to 2300	SK(SZ)-11SL	3290	
	to 2500	SK-12SL	3540	
	to 2700	SZ-12SL (RU)	3740	
	to 3000	SK(SZ)-13SL	4300	
Spido	to 2400	BPA 0331A	3370	
	to 3000	BPA 0331A+SPA21	4370	
Spin	to 2400	SNA30	3350	235
	to 3000	SNA6	4135	
ASG600/1000	to 2600	ASGR3	3700	
ASG1000	to 3000	ASGR4	4400	

3.12.5.3. Doors with torsion springs. Low mounting



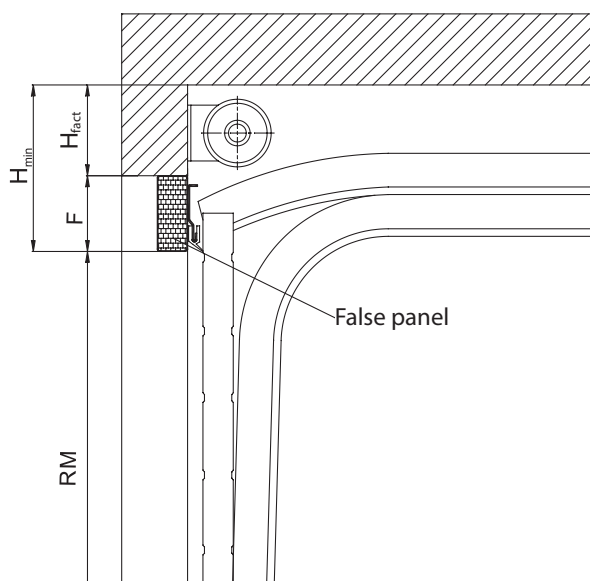
Type of electric drive	Opening height (RM), mm	Type of drive rail	Dimensions of drive positioning W, mm	Height of rail positioning HR, mm
Comfort 50/60	to 2580	SZ-12SL (RU)	3735	125 – Doors without wicket 130 – Doors with wicket
Comfort 60L	to 3000	SZ-13SL	4300	
Comfort 260/270/280 (speed)	to 2100	SK(SZ)-11SL	3290	
	to 2300	SK-12SL	3540	
	to 2580	SZ-12SL (RU)	3740	140 – Doors without wicket 145 – Doors with wicket
	to 3000	SK(SZ)-13SL	4300	
Spido	to 2200	BPA 0331A	3370	
	to 3000	BPA 0331A+SPA21	4370	
Spin	to 2200	SNA30	3350	210 – Doors without wicket 215 – Doors with wicket
	to 3000	SNA6	4135	
ASG600/1000	to 2580	ASGR3/3B	3700	
ASG1000	to 3000	ASGR4/4B	4400	

3.13. FALSE PANEL

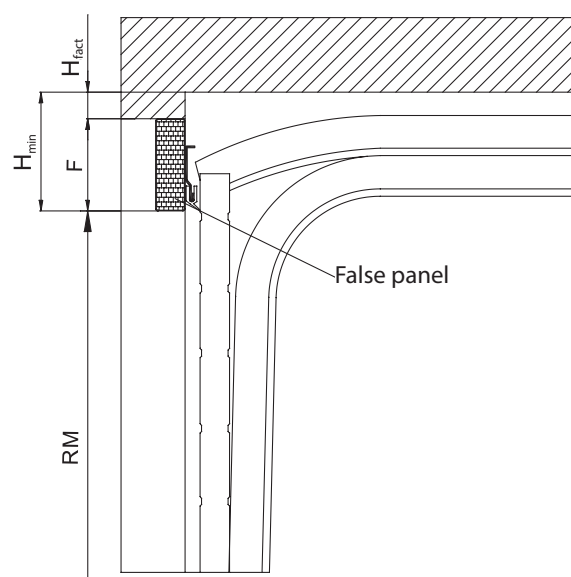
3.13.1. USE OF A FALSE PANEL FOR INCREASING THE HEADROOM HEIGHT

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

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



Doors with torsion springs.
Standard mounting



Doors with torsion springs. Low mounting.
Doors 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}
- set the required height of the opening RM.
- calculate the required height of the false panel F using the following formula:

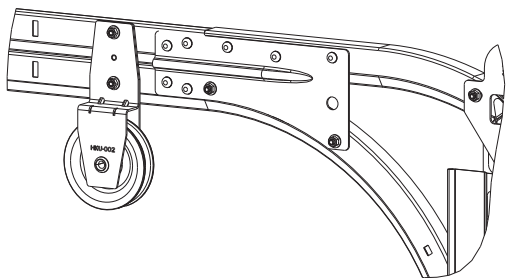
$$F = \text{height of the ceiling} - RM - H_{\text{fact}}$$

- compare the calculated result F with the minimum acceptable dimensions of the false panel.
Minimum acceptable dimensions of the false panel $F_{\text{min}} = 60 \text{ mm}$.
- if the calculated dimension F is less than F_{min} , it must be extended to the minimum acceptable and correct the required height using the formula:

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

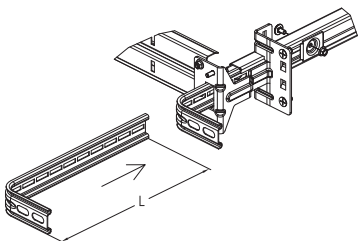
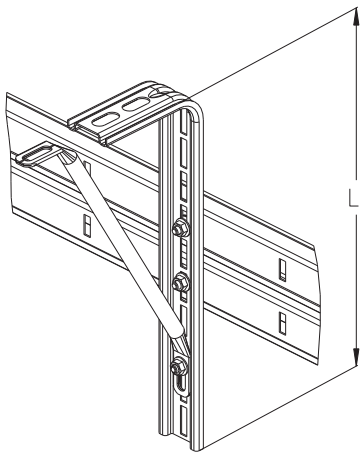
ATTENTION! It is forbidden to secure the fixings of the torsion shaft to the false panel!

3.14. PULLEY BLOCK FOR MANUAL DOOR OPENING HKU-002



Use of this system does not require additional changes in the opening requirements.

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 from the C-profil to the side wall of the premises.

Standard set for doors includes CS-1 brackets.

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	$LDB \geq 4000$
4	3	$LDB < 4000$
5	3	$LDB \geq 4000$
5	4	$LDB < 4000$
6	4	$LDB \geq 4000$

Moreover, 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 mm to 125 mm;
- headroom 0 mm 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 torsion 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 (ADS 703).

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.

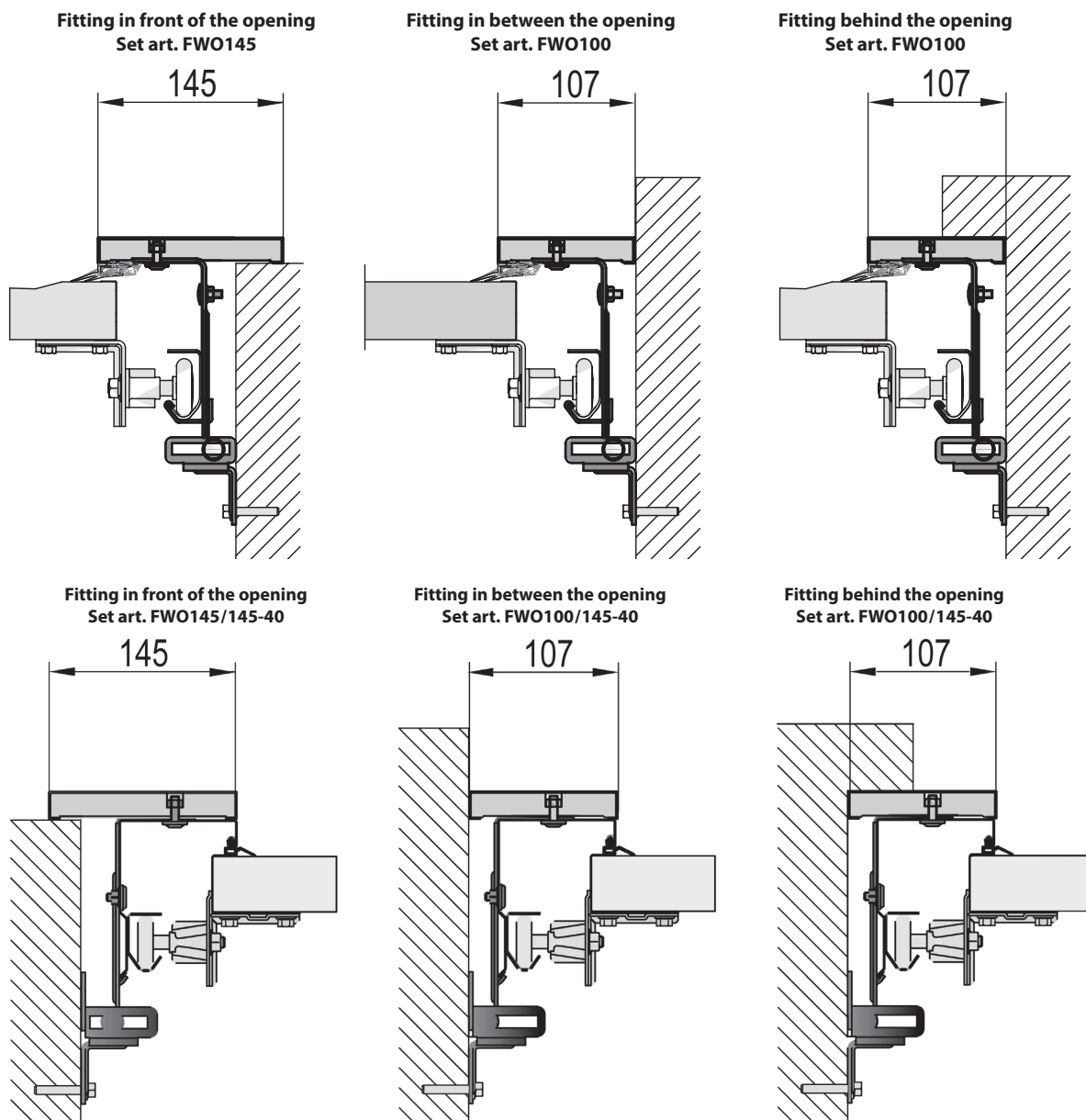
Maximum width of the opening for the doors of inbuilt type of mounting is 5000 mm.

4.4. TYPES OF INSTALLATION

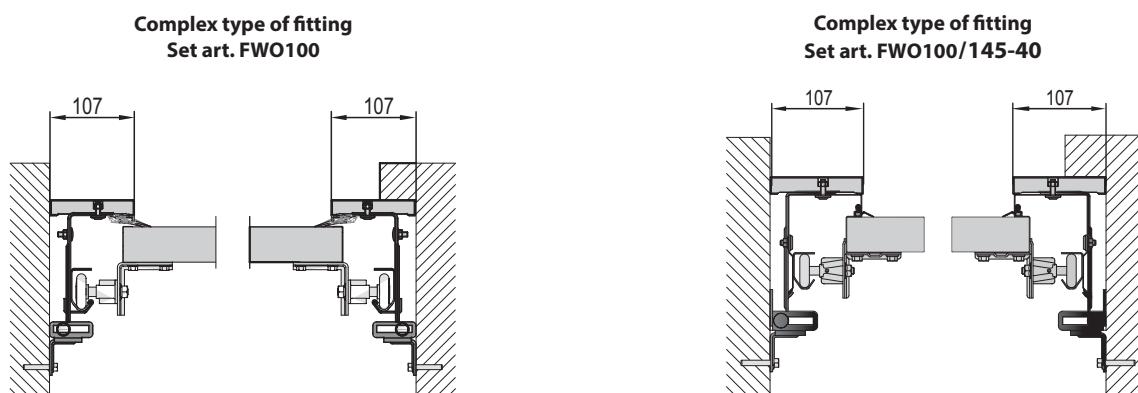
These sectional garage doors can be fitted either in front or between or behind the opening.

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.

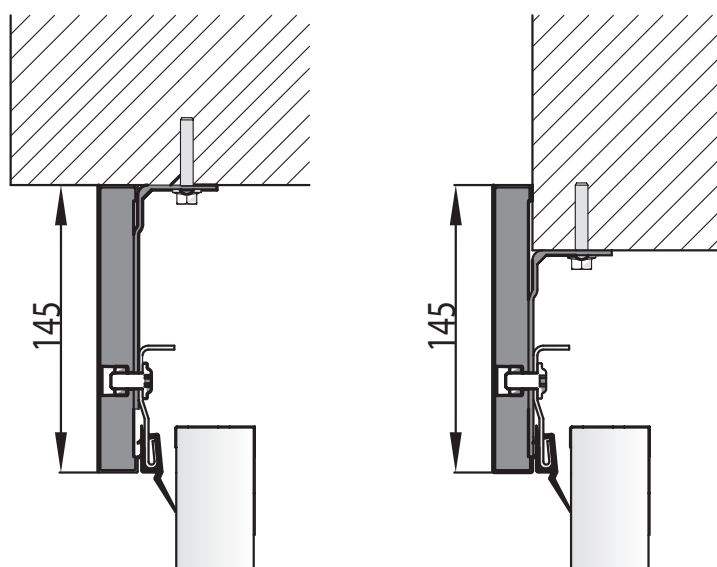
If there is enough room on both sides of the opening for the sectional garage door to fit behind the reveals, then the door can be placed behind the opening.



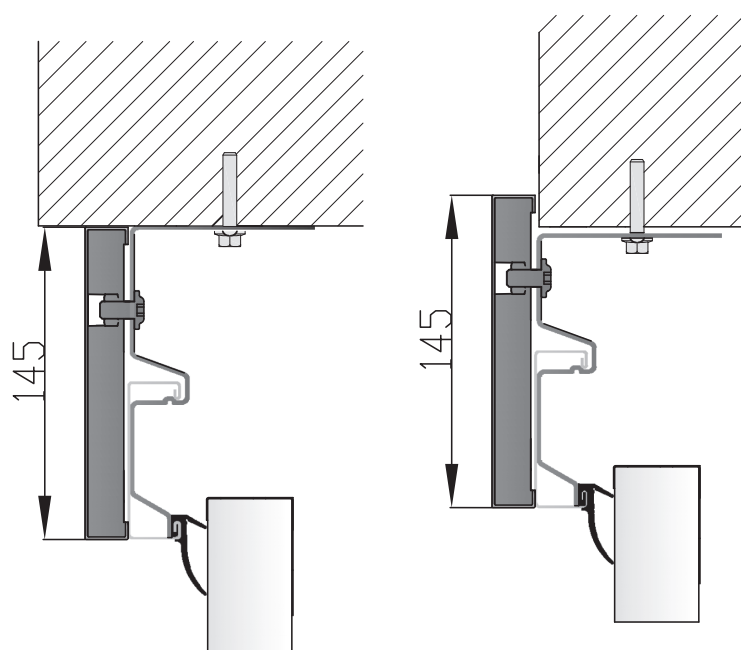
If there is enough room on one side of the opening only to fit the sectional garage door behind it then the complex fitting type (below) can be used when one vertical track is mounted into the opening and the other one is placed behind it.



4.5. MOUNTING OF DECORATIVE COVER PROFILE



Doors series Classic

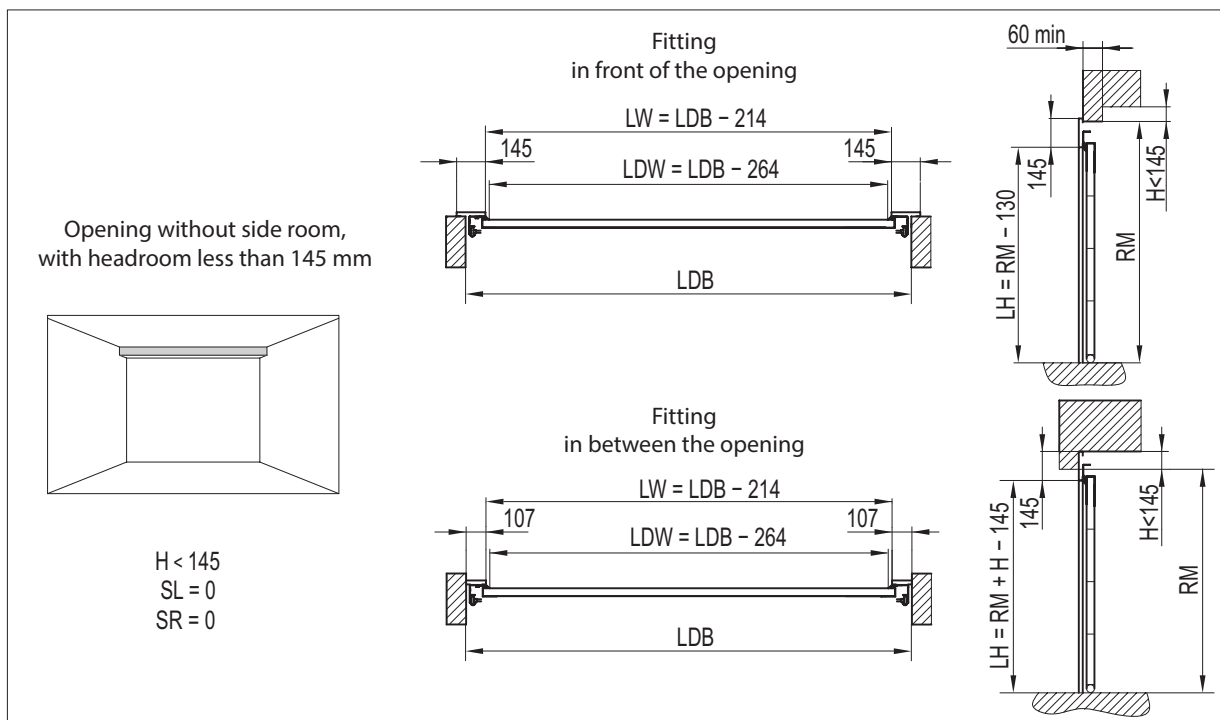
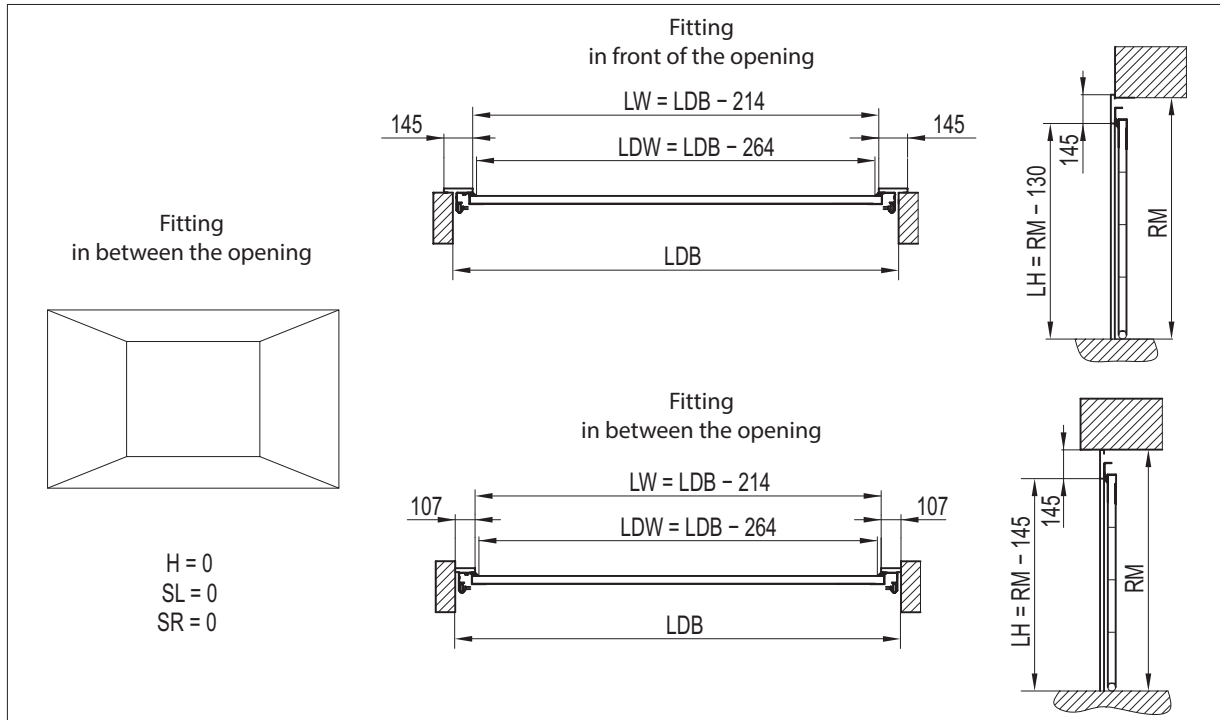


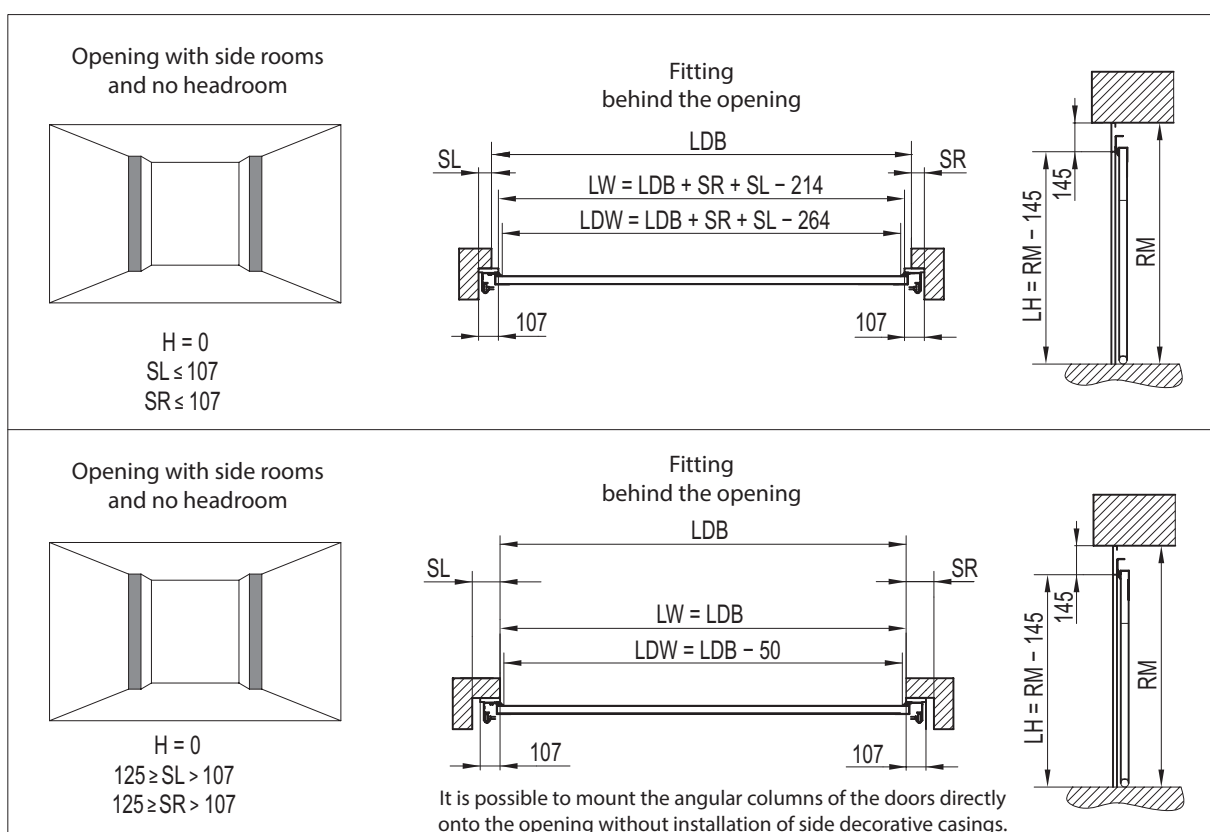
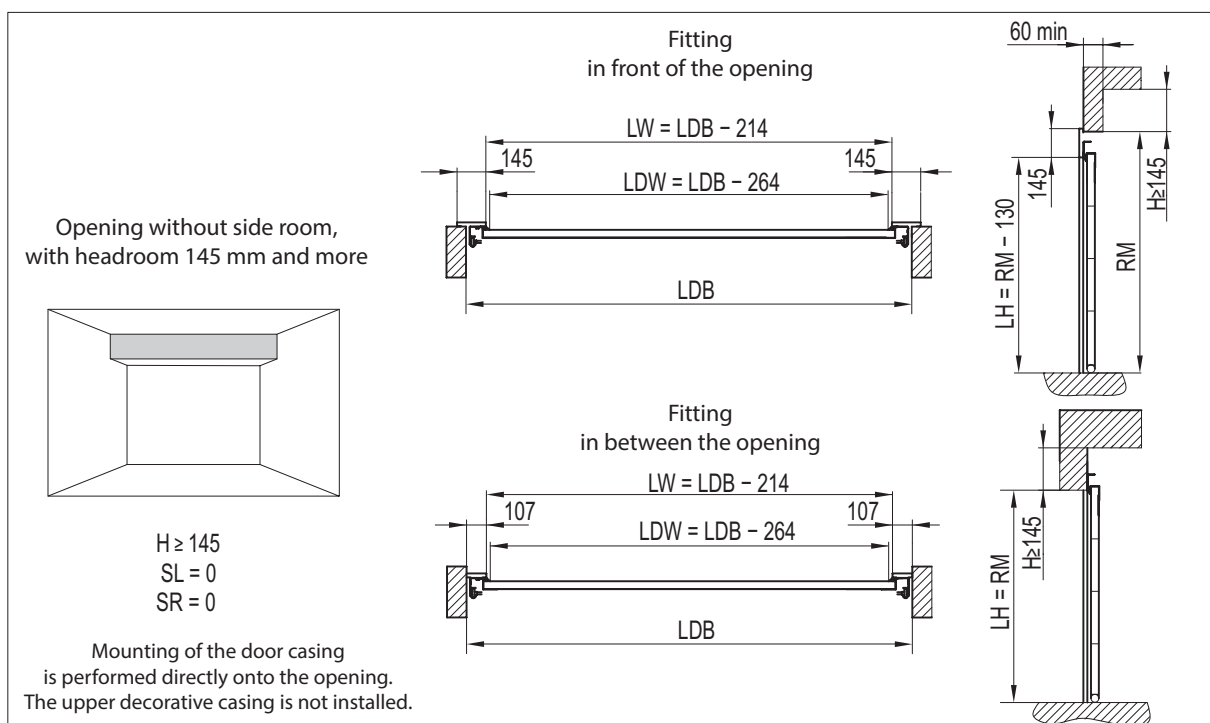
Doors series Trend

4.6. DOOR MOUNTING PLANS. MOUNTING PLAN SYMBOLS

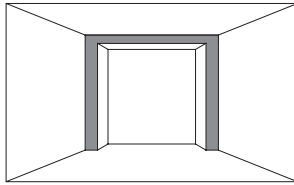
Parameter	Description
RM	Opening height
LDB	Opening width
H	Headroom height
LH	Design opening height

Parameter	Description
LW	Design opening width
LDW	Clear dimension width
SR	Right side room
SL	Left side room



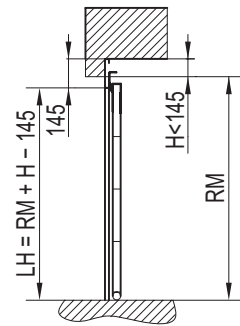
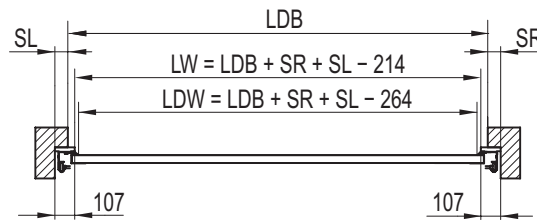


Opening with side rooms
and headroom less than 145 mm

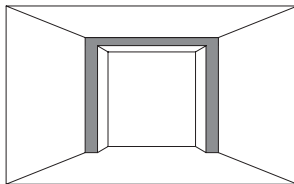


$$\begin{aligned} H &< 145 \\ SL &\leq 107 \\ SR &\leq 107 \end{aligned}$$

Fitting
behind the opening

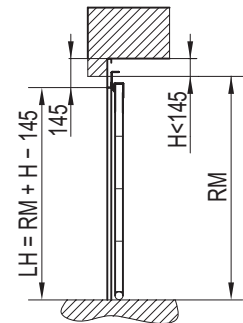
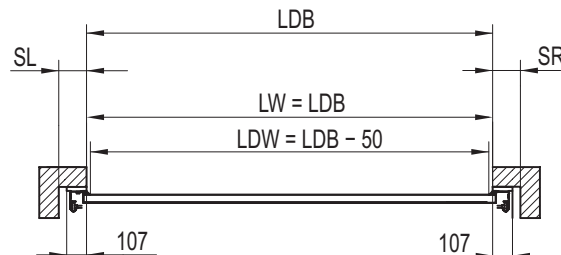


Opening with side rooms
and headroom less than 145 mm

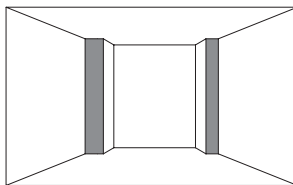


$$\begin{aligned} H &< 145 \\ 125 &\geq SL > 107 \\ 125 &\geq SR > 107 \end{aligned}$$

Fitting
behind the opening

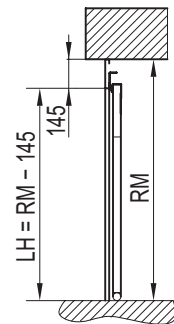
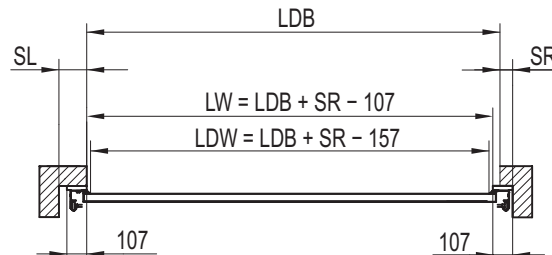


Opening with side rooms
and no headroom

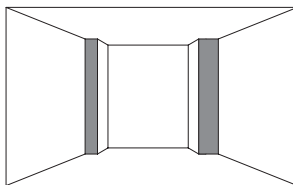


$$\begin{aligned} H &= 0 \\ 125 &\geq SL > 107 \\ SR &\leq 107 \end{aligned}$$

Fitting
behind the opening

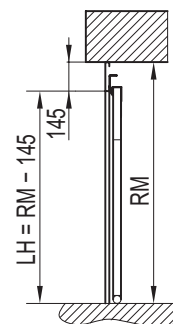
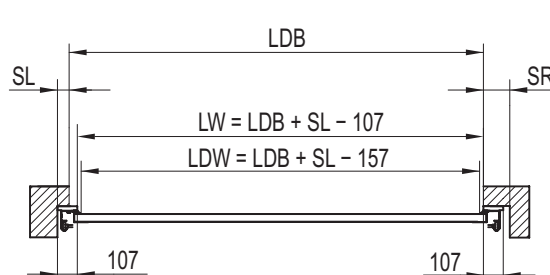


Opening with side rooms
and no headroom

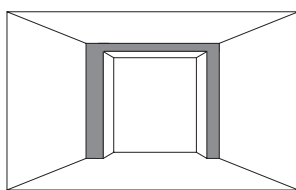


$$\begin{aligned} H &= 0 \\ SL &\leq 107 \\ 125 &\geq SR > 107 \end{aligned}$$

Fitting
behind the opening

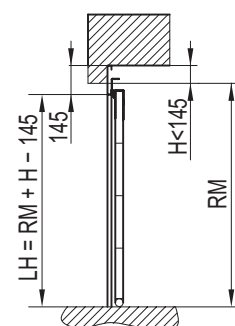
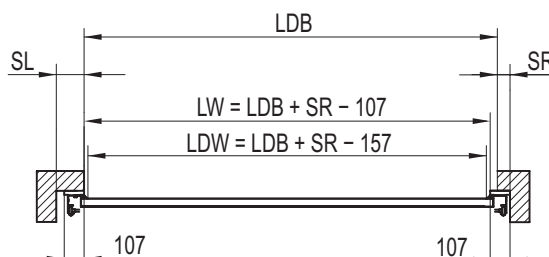


Opening with side rooms
and headroom less than 145 mm

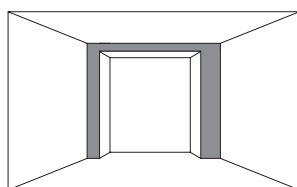


$$\begin{aligned} H &< 145 \\ 125 &\geq SL > 107 \\ SR &\leq 107 \end{aligned}$$

Fitting
behind the opening

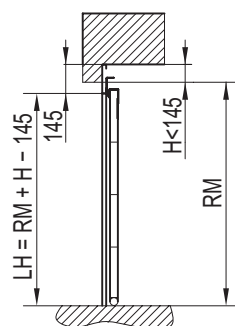
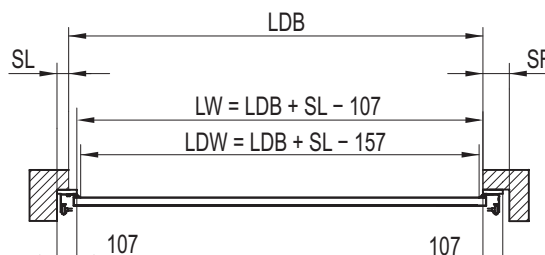


Opening with side rooms
and headroom less than 145 mm

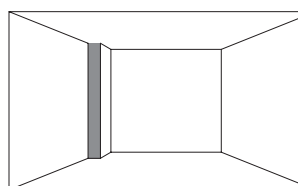


$$\begin{aligned} H &< 145 \\ SL &\leq 107 \\ 125 &\geq SR > 107 \end{aligned}$$

Fitting
behind the opening

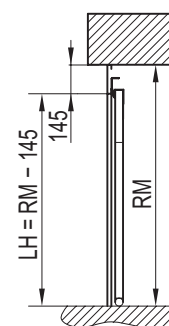
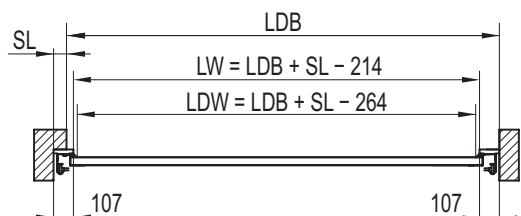


Opening with left side room
and no headroom

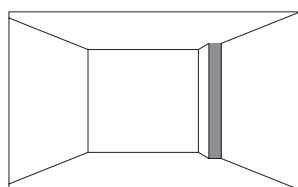


$$\begin{aligned} H &= 0 \\ SL &\leq 107 \\ SR &= 0 \end{aligned}$$

Complex fitting

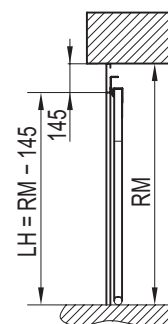
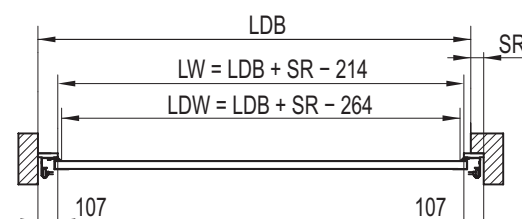


Opening with right side room
and no headroom

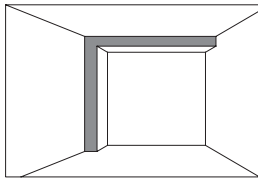


$$\begin{aligned} H &= 0 \\ SL &= 0 \\ SR &\leq 107 \end{aligned}$$

Complex fitting

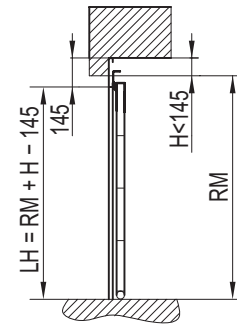
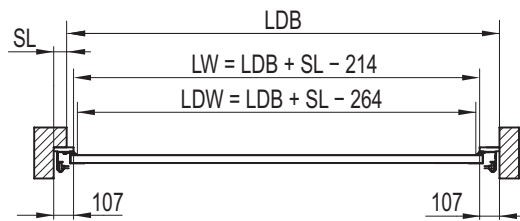


Opening with left side room
and headroom less than 145 mm

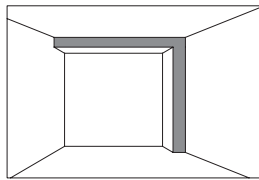


$H < 145$
 $SL \leq 107$
 $SR = 0$

Complex fitting

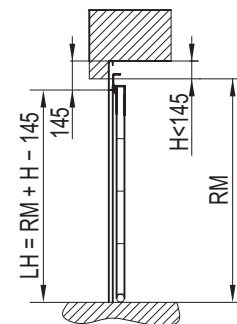
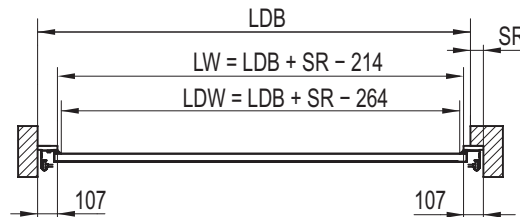


Opening with right side room
and headroom less than 145 mm

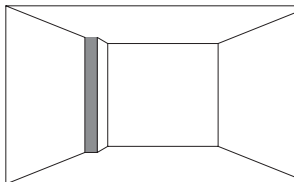


$H < 145$
 $SL = 0$
 $SR \leq 107$

Complex fitting

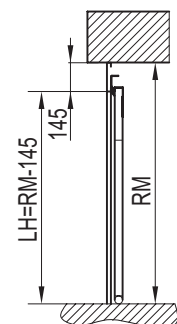
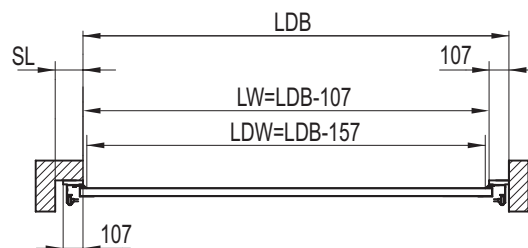


Opening with left side room
and no headroom

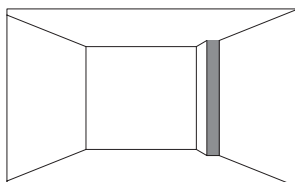


$H = 0$
 $125 \geq SL > 107$
 $SR = 0$

Complex fitting

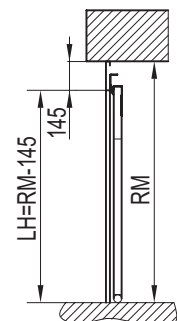
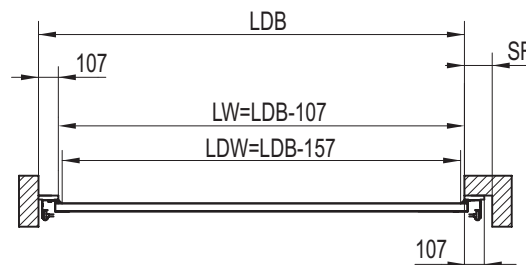


Opening with right side room
and no headroom

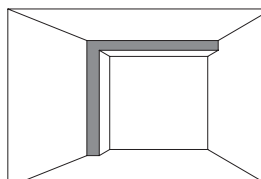


$H = 0$
 $SL = 0$
 $125 \geq SR > 107$

Complex fitting

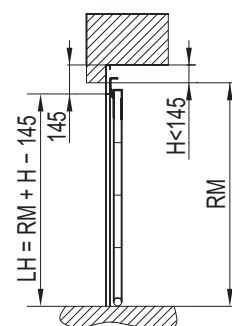
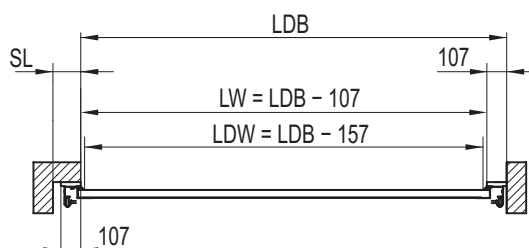


Opening with left side room
and headroom less than 145 mm

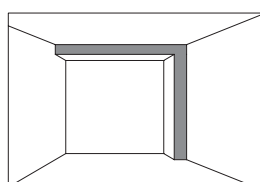


$$\begin{aligned} H &< 145 \\ 125 &\geq SL > 107 \\ SR &= 0 \end{aligned}$$

Complex fitting

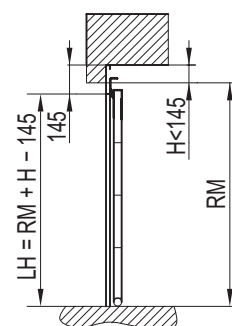
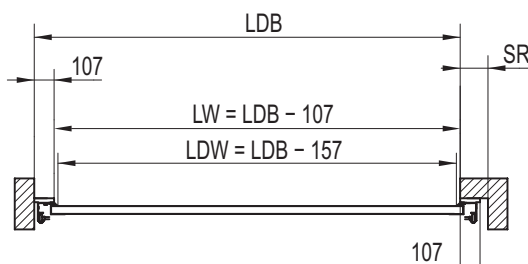


Opening with right side room
and headroom less than 145 mm

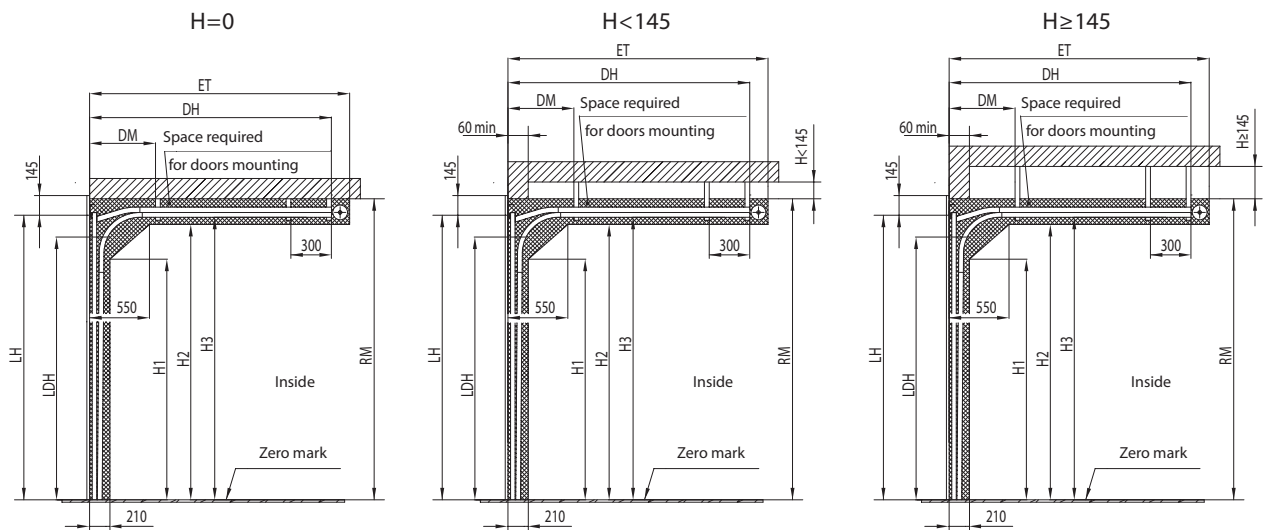


$$\begin{aligned} H &< 145 \\ SL &= 0 \\ 125 &\geq SR > 107 \end{aligned}$$

Complex fitting

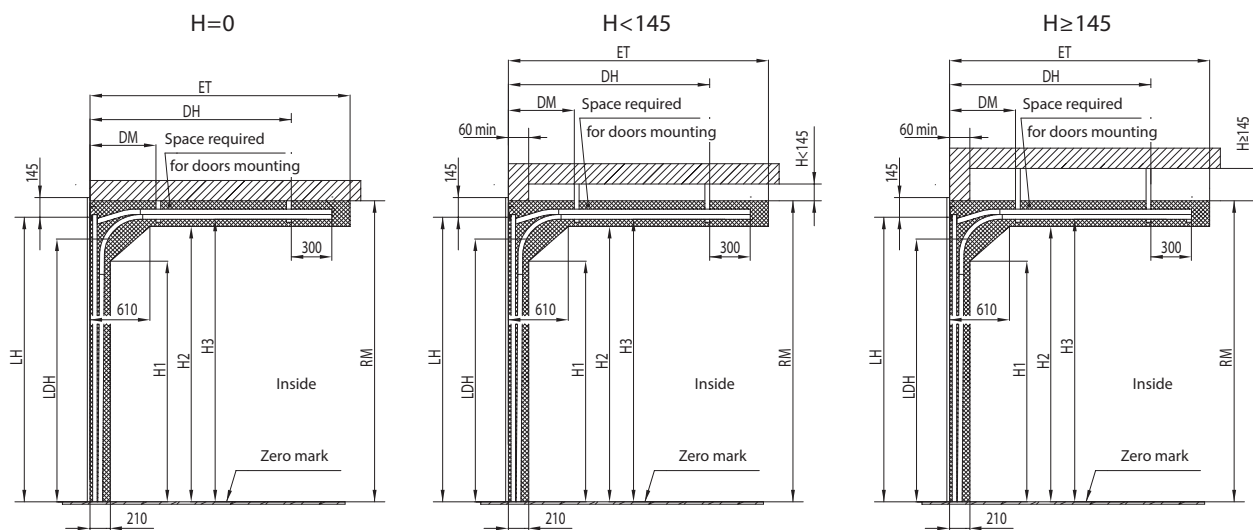


4.6.1. CLASSIC SERIES DOORS WITH TORSION SPRINGS. LOW MOUNTING. FITTING IN FRONT OF THE OPENING



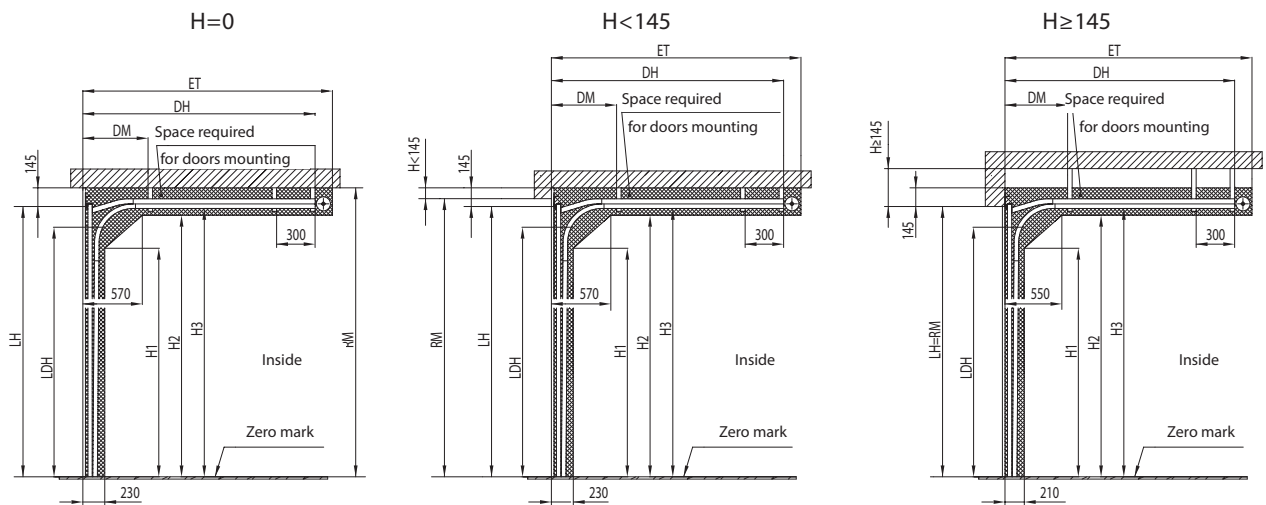
Parameter	Description		Formula or value
RM, mm	Opening height		Actual value
H, mm	Headroom height		H=0, H<145, H≥145
LH, mm	Design opening height		RM–130
LDH, mm	Clear dimension height	Doors without wicket	RM–300 (manual operation with the limiting deviceRS0301)
			RM–230 (manual operation with the fixing device LH3004)
			RM–230 (electric drive with the limiting device RS0301)
		Doors with wicket	RM–325 (manual operation with the limiting deviceRS0301)
			RM–255 (manual operation with the fixing device LH3004)
			RM–255 (electric drive with the limiting device 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



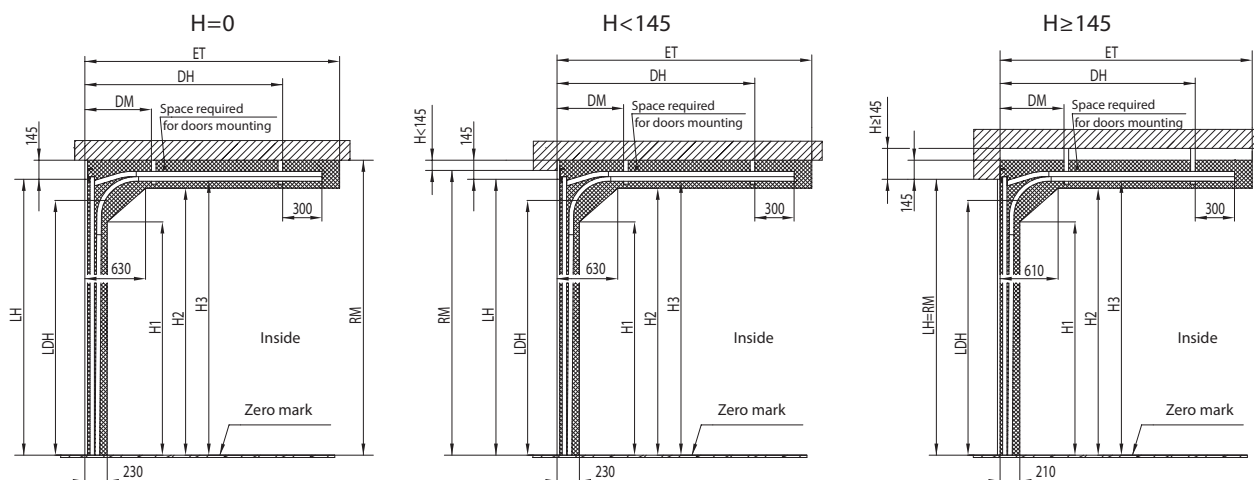
Parameter	Description	Formula or value
RM, mm	Opening height	Actual value
H, mm	Headroom height	$H=0$, $H<145$, $H\geq 145$
LH, mm	Design opening height	$RM-130$
LDH, mm	Clear dimension height	$RM-300$ (manual operation with the limiting device RS0301)
		$RM-230$ (manual operation with the fixing device LH3004)
		$RM-230$ (electric drive with the limiting device 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



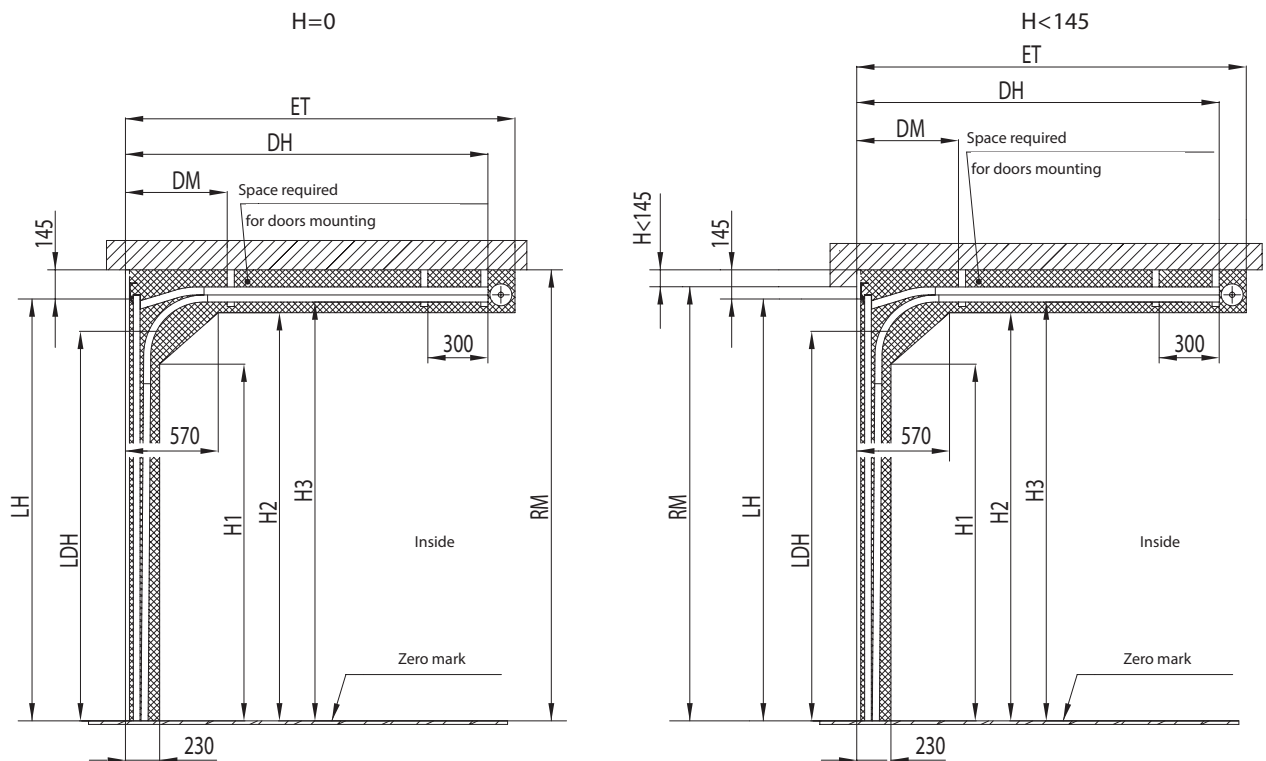
Parameter	Description		Formula or value		
RM, mm	Opening height		Actual value		
H, mm	Headroom height		H=0	H<145	H≥145
LH, mm	Design opening height		RM-145	RM+H-145	RM
LDH, mm	Clear dimension height	Doors without wicket (manual operation with the limiting device RS0301)	RM-315	RM+H-315	RM-170
		Doors without wicket (manual operation with the fixing device LH3004)	RM-245	RM+H-245	RM-100
		Doors without wicket (electric drive with the limiting device RS0301)	RM-245	RM+H-245	RM-100
		Doors with wicket (manual operation with the limiting device RS0301)	RM-340	RM+H-340	RM-195
		Doors with wicket (manual operation with the fixing device LH3004)	RM-270	RM+H-270	RM-125
		Doors with wicket (electric drive with the limiting device 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



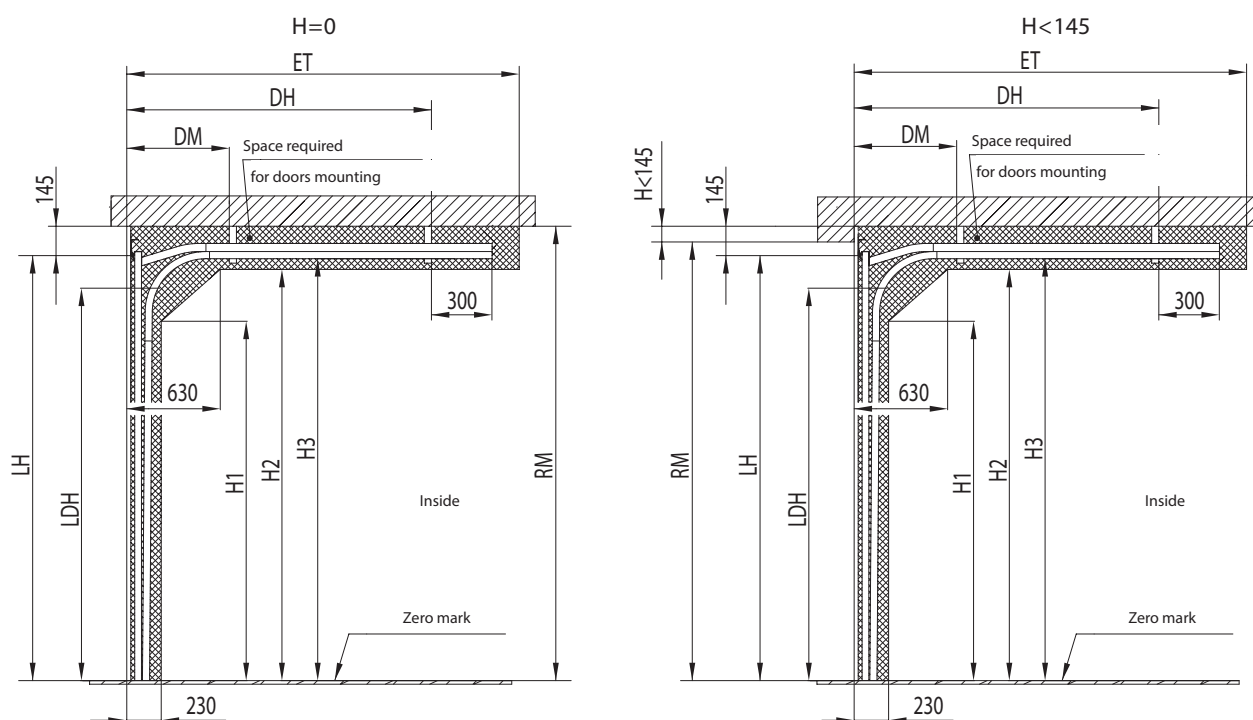
Parameter	Description		Formula or value		
RM, mm	Opening height		Actual value		
H, mm	Headroom height		H=0	H<145	H≥145
LH, mm	Design opening height		RM-145	RM+H-145	RM
LDH, mm	Clear dimension height	manual operation with the limiting device RS0301	RM-315	RM+H-315	RM-170
		manual operation with the fixing 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



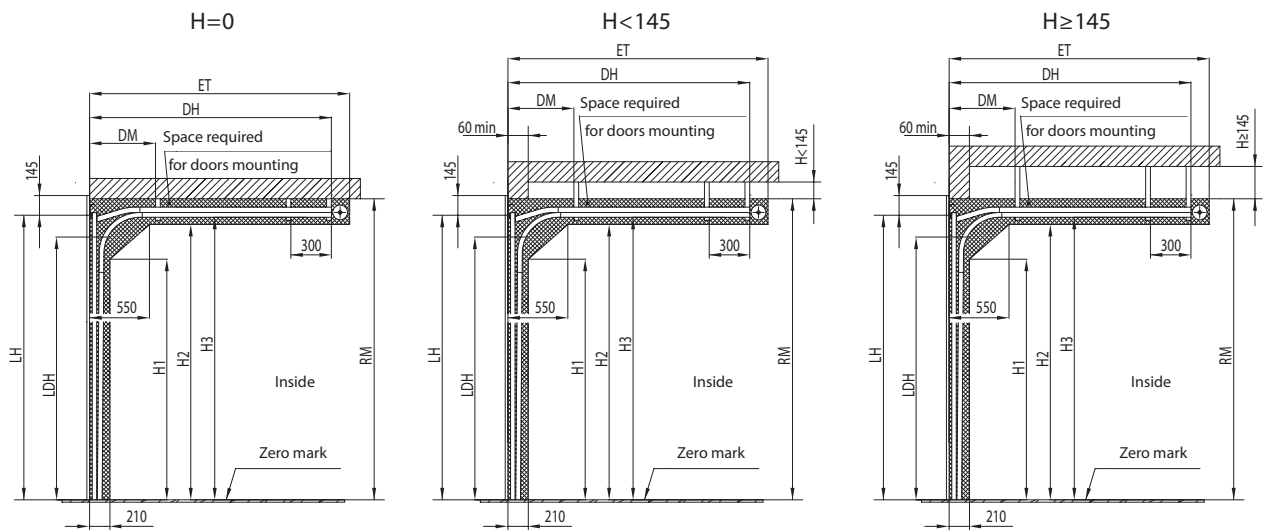
Parameter	Description		Formula or value	
RM, mm	Opening height		Actual value	
H, mm	Headroom height		H=0	H<145
LH, mm	Design opening height		RM-145	RM+H-145
LDH, mm	Clear dimension height	Doors without wicket (manual operation with the limiting device RS00301)	RM-315	RM+H-315
		Doors without wicket (manual operation with the fixing device LH3004)	RM-245	RM+H-245
		Doors without wicket (electric drive with the limiting device RS0301)	RM-245	RM+H-245
		Doors with wicket (manual operation)	RM-340	RM+H-340
		Doors with wicket (manual operation with the fixing device LH3004)	RM-270	RM+H-270
		Doors with wicket (electric drive with the limiting device 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	Clear dimension height	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

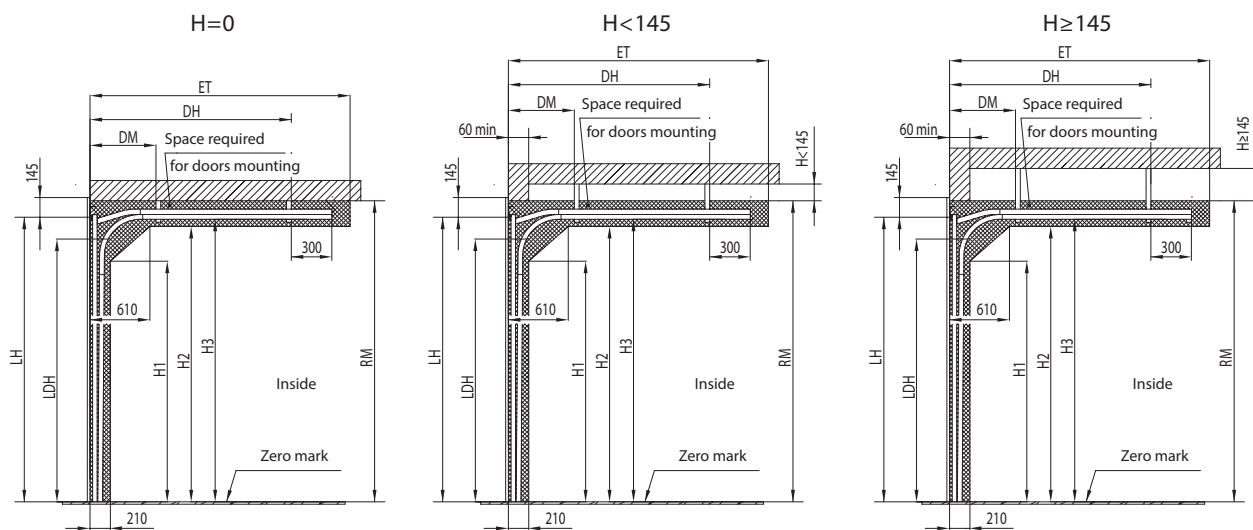
4.6.7. TREND SERIES DOORS WITH TORSION SPRINGS. LOW MOUNTING. FITTING IN FRONT OF THE OPENING



Parameter	Description		Formula or value
RM, mm	Opening height		Actual value
H, mm	Headroom height		H=0, H<145, H≥145
LH, mm	Design opening height		RM–130
LDH, mm	Clear dimension height	Doors without wicket	RM–300 (manual operation with the limiting device RS-3516)
			RM–230 (manual operation with the fixing device LHT3004)
		Doors with wicket	RM–230 (electric drive with the limiting device RS-3516)
	RM–325 (manual operation with the limiting device RS-3516)		
	RM–255 (manual operation with the fixing device LHT3004)		
	RM–255 (electric drive with the limiting device 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	2850-2945	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

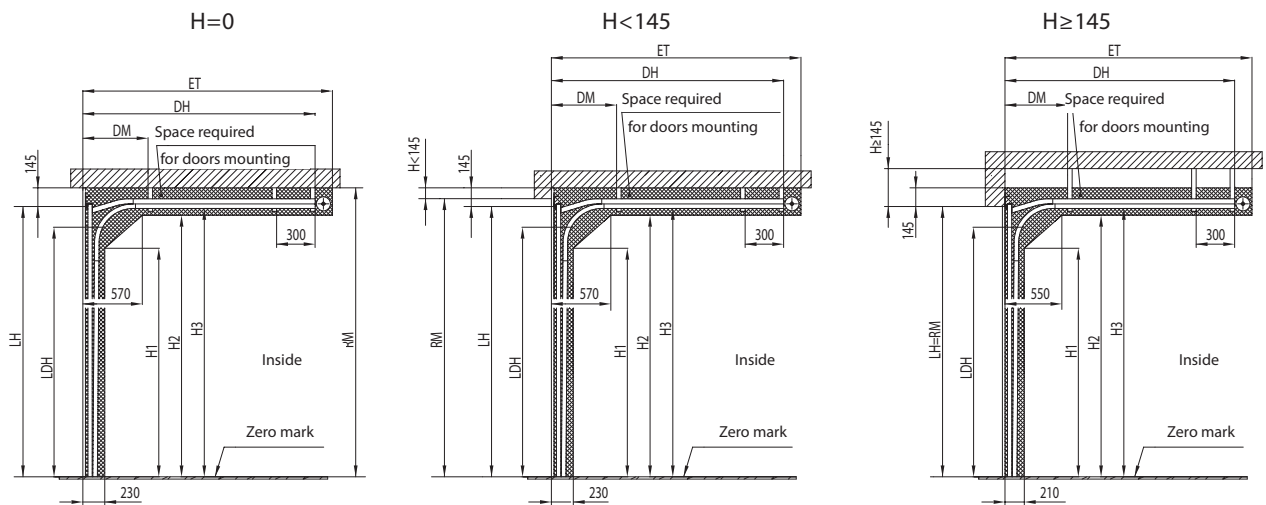
4.6.8. TREND SERIES DOORS WITH TENSION SPRINGS. FITTING IN FRONT OF THE OPENING



Parameter	Description	Formula or value
RM, mm	Opening height	Actual value
H, mm	Headroom height	$H=0, H<145, H\geq 145$
LH, mm	Design opening height	$RM-130$
LDH, mm	Clear dimension height	$RM-300$ (manual operation with the limiting device RS-3516)
		$RM-230$ (manual operation with the fixing device LHT3004)
		$RM-230$ (electric drive with the limiting device 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	2850-2945	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

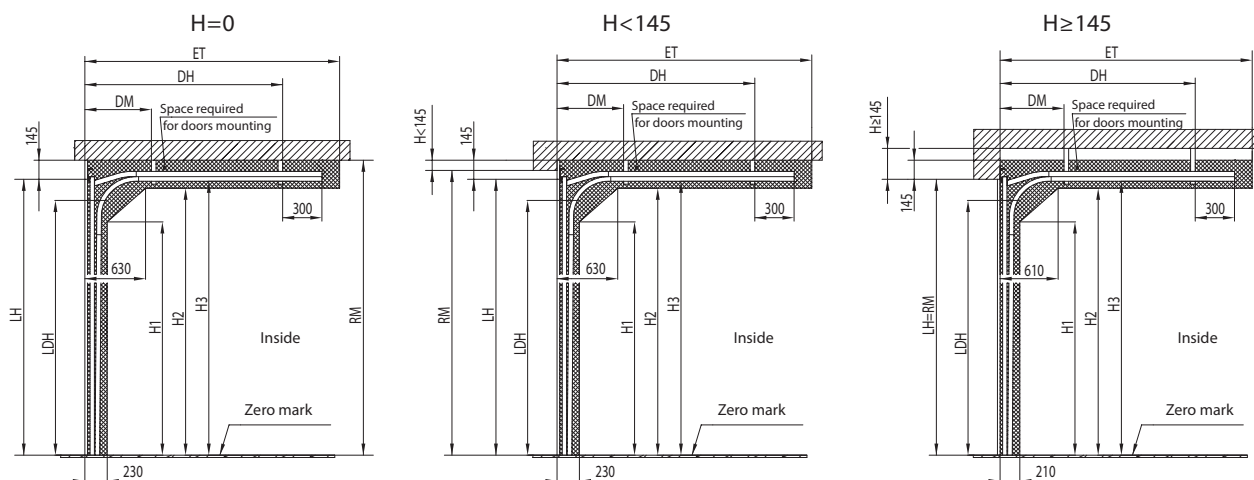
4.6.9. TREND SERIES DOORS WITH TORSION SPRINGS. LOW MOUNTING. FITTING IN BETWEEN THE OPENING



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	Clear dimension height	Doors without wicket (manual operation with the limiting device RS-3516)	RM-315	RM+H-315	RM-170
		Doors without wicket (manual operation with the fixing device LHT3004)	RM-245	RM+H-245	RM-100
		Doors without wicket (electric drive with the limiting device RS-3516)	RM-245	RM+H-245	RM-100
		Doors with wicket (manual operation with the limiting device RS-3516)	RM-340	RM+H-340	RM-195
		Doors with wicket (manual operation with the fixing device LHT3004)	RM-270	RM+H-270	RM-125
		Doors with wicket (electric drive with the limiting device 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	2850-2945	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

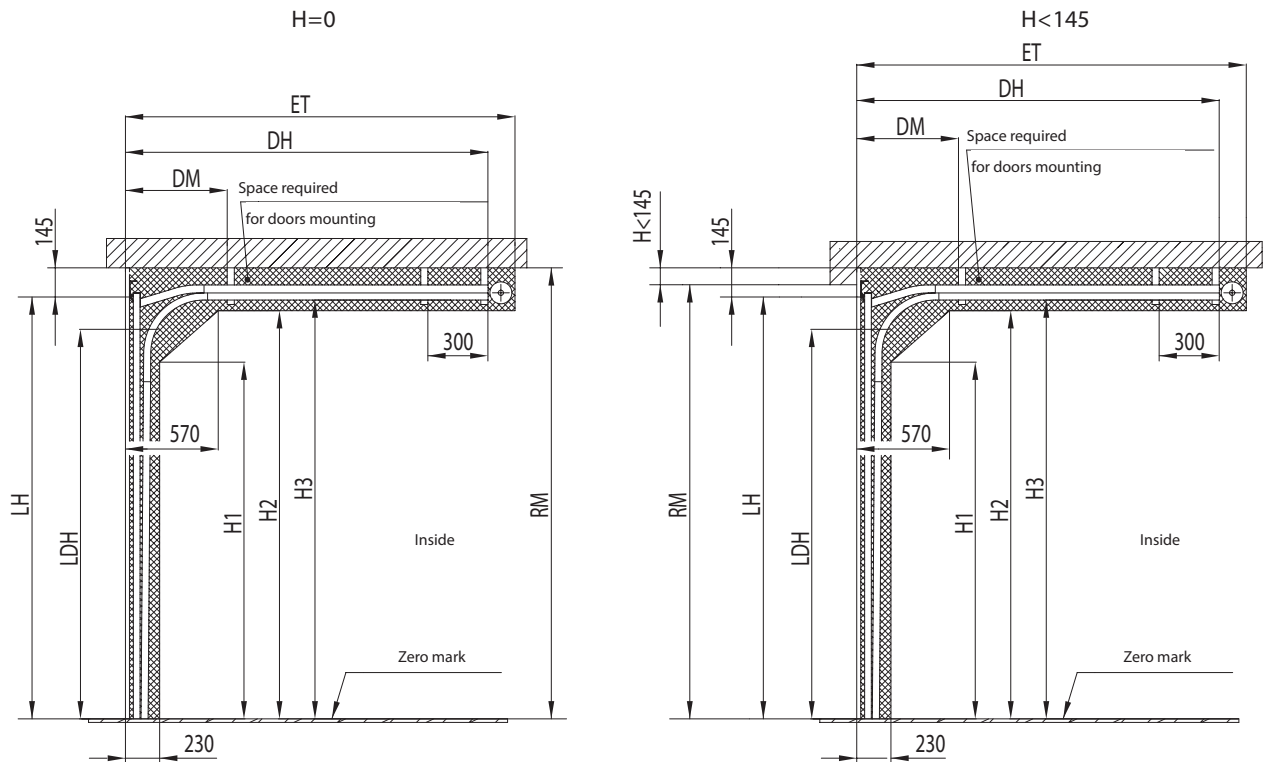
4.6.10. TREND SERIES DOORS WITH TENSION SPRINGS. FITTING IN BETWEEN THE OPENING



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	Clear dimension height	manual operation with the limiting device RS-3516	RM-315	RM+H-315	RM-170
		manual operation with the fixing device LHT3004	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	2850-2945	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

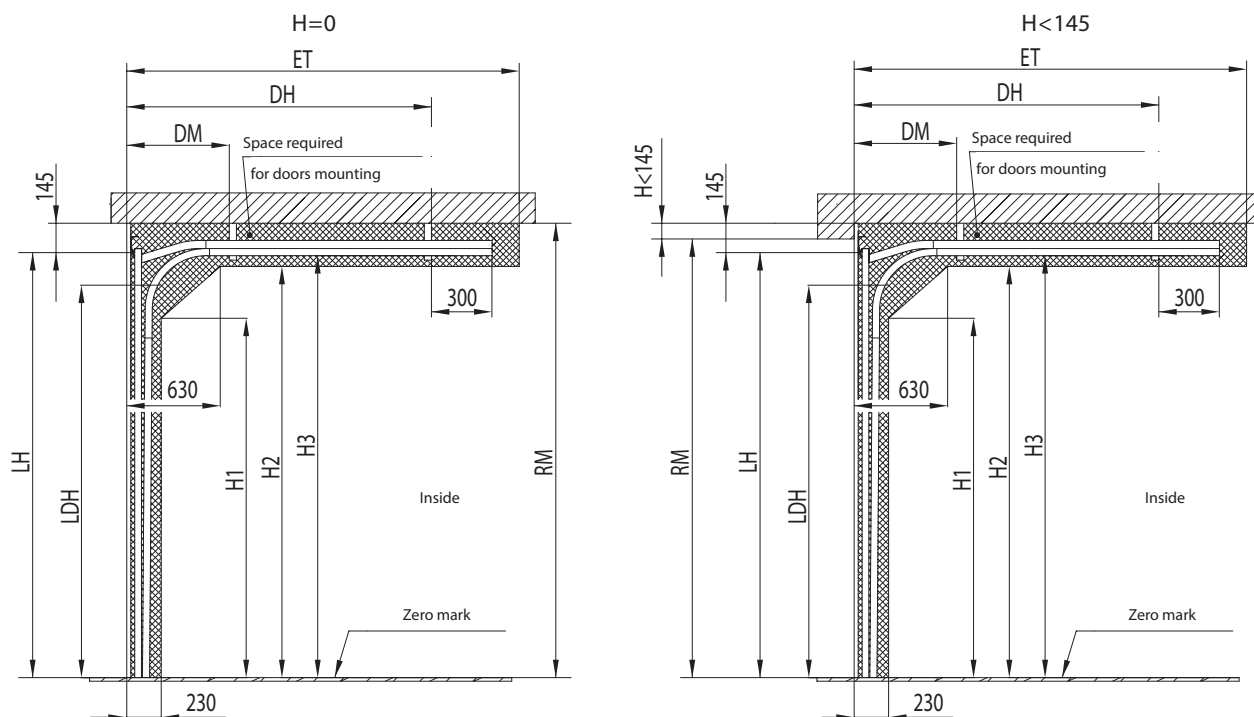
4.6.11. TREND SERIES DOORS WITH TORSION SPRINGS. LOW MOUNTING. FITTING BEHIND THE OPENING, COMPLEX TYPE OF FITTING



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	Clear dimension height	Doors without wicket (manual operation with the limiting device RS-3516)	RM-315	RM+H-315
		Doors without wicket (manual operation with the fixing device LHT3004)	RM-245	RM+H-245
		Doors without wicket (electric drive with the limiting device RS-3516)	RM-245	RM+H-245
		Doors with wicket (manual operation with the limiting device RS-3516)	RM-340	RM+H-340
		Doors with wicket (manual operation with the fixing device LHT3004)	RM-270	RM+H-270
		Doors with wicket (electric drive with the limiting device 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	2850-2945	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

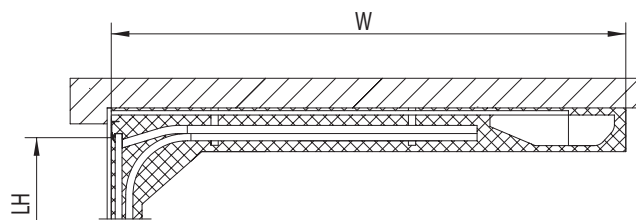
4.6.12. TREND SERIES DOORS WITH TORSION SPRINGS. FITTING BEHIND THE OPENING, COMPLEX TYPE OF FITTING



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	Clear dimension height	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	2850-2945	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



Type of electric drive	Design opening height (LH), mm	Type of drive rail	Dimensions of drive positioning W, mm
Comfort 50/60	to 2700	SZ-12SL (RU)	3735
Comfort 60L	to 3000	SZ-13SL	4300
Comfort 260/270/280 (speed)	to 2300	SK(SZ)-11SL	3290
	to 2500	SK-12SL	3540
	to 2700	SZ-12SL (RU)	3740
	to 3000	SK(SZ)-13SL	4300
Spido	to 2400	BPA 0331A	3370
	to 3000	BPA 0331A+SPA21	4370
Spin	to 2400	SNA30	3350
	to 3000	SNA6	4135
ASG600/1000	to 2600	ASGR3/3B	3700
AGS1000	to 3000	ASGR4/4B	4400





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