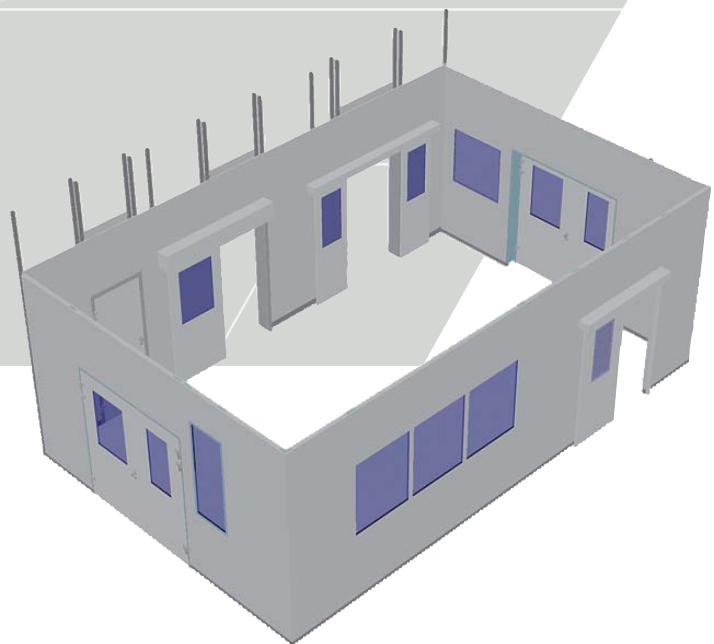


Clean Room Doors and Windows

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Clean rooms: Doors and windows for building elements and filtration technology

FläktGroup quality

FläktGroup have manufactured and supplied complete building-elements and filter systems for integration into clean rooms since 1988. Clean-room systems meet the requirements of ISO 14644 (Clean rooms and associated controlled environments) and EU GMP Guidelines (Good Manufacturing Practice).

Based on the modular system, FläktGroup enable a simple and quick assembly and guarantee highest standards.

Scope and application

Comprehensive clean-room system

The installation system is designed for pharmaceutical production, health care, electronic and food-processing industry as well as other fields. A comprehensive clean-room system comprise:

- various panels
- suspended ceilings
- laminar and low-turbulent air-flow units
- fan-filter units
- air outlets
- and lighting

Full-range clean-room building elements and installation systems include:

- wall panels
- facing panels
- doors and windows
- pass-through doors
- ceilings
- installation fittings, profiles and assembly parts

Purpose of catalogue

This catalogue focuses on doors and windows for clean rooms and contains data for the designers and buyers.

The catalogue includes description, technical data, general installation instructions as well as ordering codes for different versions.



NOTICE!

Catalogues of wall and facing panels are not included in this catalogue.

- Refer to the separate documentation „Clean Rooms - Wall Panels and Partitions“.

Project support

Manufacturing and installation operations are based on the project specifications and design - manufacturing and installation documentation (MID) is compiled by a trained designer and approved by the customer before commencing production.



NOTICE!

On request FläktGroup can provide a file with standard modules in format of AutoCAD blocks. We will be glad to help you with the design, suggest solutions for irregular components or draw up the entire design project.

Clean Room Designer



NOTICE!

- For designing of panels designers can use Clean Rooms Designer Software provided by FläktGroup.

Software features

- Plug-in (add-on) for AutoCAD 2015 and newer
- Language interface in English
- 3D detailed model of clean rooms on a scale 1:1 (connectible with other 3D models, e.g. HVAC ducts)
- Scope:
 - Wall partitions (R/M/G sandwich panels); exhaust panels (RA, MA)
 - Inwall Click, OT or OT+ (C/V/U facing panels)
 - CRWx windows (glazed panels)
 - Doors and pass-through doors
 - Installation panels
 - Ceilings (Light ceiling/ Cassette ceiling/ ES panel ceiling)
 - HVAC units (CGx, Fresh Breeze, Air Shower, Fresh Heaven MAXX) + PURO light fixtures
- Standard and atypical dimensions
- Built-in controls (check of compatibility of panel endings, materials and colours, collisions, etc.)
- Automatic generation of BOM (bill of materials and specification) including profiles and assembly parts (Export of BOM to a text file and to Microsoft Excel)
- Visualization (true rendering of colours, animation)
- Software updates

Availability

You can download the Clean Room Designer software from the FläktGroup website using the following link:

<https://www.flaktgroup.com/api/v1/Documents/47b7668d-ef56-4c45-8f22-2b3fa1d8c752>

Doors form the connecting part between individual rooms or spaces. Doors for clean rooms manufactured by FläktGroup are classified into the following groups:

D-design with sandwich leaf(s)

D-design doors are manufactured by bonding of an insulating slab between two metal sheets. Metal sheets are galvanized and the outer surface is coated with powder polyester.

D-design doors are manufactured with either

- a swivel hinge (DH) or
- with a sliding mechanism (DS).

DH leaf is made with a 25 mm rebate. DH doors are flush with partitions performed as sandwich panels of E, M and R types.

Door frames of a hinged door are mounted in the door opening formed by wall panels and the surface of the floor. Doors are not equipped with sills. Door leafs are covered with a thin PE film to protect them against scratching during manufacturing, transportation, storage and assembly.



NOTICE!

A double-leaf door has one active and one passive leaf. Active leaf is the leaf with a handle (or similar fitting). A passive leaf has two latches on top and bottom of a leaf. These latches are then slid out to fix a passive leaf in a closed position. Latches are accessible after opening of active leaf.

- Ensure on site that the latches and their counterparts are installed in a door frame and floor.

D-design doors can be complemented with an automatic drive. Type of drive depends on a door variant. Control equipment and safety components must be specified by the customer.

The front side of the door is the side on which the hinges are fitted.

T-design with all-glass single leaf

Doors with all-glass leafs are indicated as T-design. The leaf is made from tempered (ESG) glass and is fitted in an aluminium frame.

T-design doors are manufactured

- with swivel hinges (TH) - door frame is mounted in the door opening made by wall panels
- horizontally sliding T-doors (TSH) - are available on request
- vertically sliding T-doors (TSV) (former sliding window, VO).

Colour codes/material

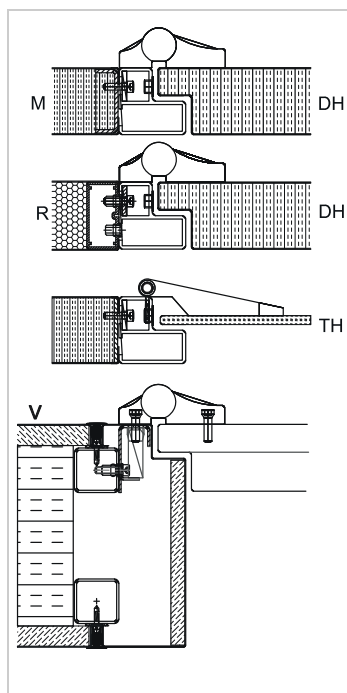
1	RAL9002
2	RAL9010
3	V2A
5	RAL6019

- RAL shades are semi-gloss
- PES (polyester) powder coating
- Other RAL shades or antibacterial surface available on request
- Stainless steel V2A is brushed (scotch brite)

Overview of door leafs

Door type	DH	DS	TH
	Hinged	Sliding	Hinged
Door leaf	Bonded sandwich	Bonded sandwich	Clear tempered glass ESG 8 mm
Width Bw	± 1 mm	± 1 mm	± 1 mm
Height Hw	± 2 mm	± 2 mm	± 2 mm
Thickness	DH 60 ± 1 mm DHX (60 + t _{Pb}) ± 2 mm	DS 32 ± 1 mm DSH 42 ± 1 mm DSX (62+tPb) ± 2 mm	8 mm
Facing	Double-sided galvanised steel sheet thickness 0,75 mm Protective surface coating: Face side: double-layer paint PES coating thickness 25 µm Underside: protective paint coating of thickness 7 µm Available colours: see separate table Protective foil		-
Core	Mineral wool / Expanded polystyrene		-
Weight	~ 20* kg.m ⁻² / ~14* kg.m ⁻²	~ 14* kg.m ⁻²	~ 22 kg.m ⁻²
Glazing (optional)	2x clear float glass thickness 4 mm or single-side mirror, white (RAL9002) frame and sealing		-
Sunblind	Horizontal, white, magnetic turn knob		X
Fittings	Holar (stainless steel)	(stainless steel)	DORMA (white)
Hinges / Drives	3 x Dr.Hahn TB4	GEZE travels & drives	2x DORMA
Seal	white EPDM D-profile (bonded) / + white silicone gasket (into groove)	(white EPDM D-profile)	White silicone rubber Omega profile (bonded)

Door Frames



Type of the door frame depends on the panel system, which defines which type of door is installed. For E, M or R panels the door frame of DH and TH door is made of extruded aluminium profile of thickness 3 mm coated with powder polyester (for standard colours and codes see colour table on page 5). Frame consist of 3 or 4 pieces, screwed with junctions.

DS doors don't have a classic door frame, only set of profiles for minimizing the gap between wall and the leaf.

Doors built in OT/OT+ system (U & V panels) have door frames made of panels reinforced with gypsum plasterboard. Standard facing material of these panels is brushed stainless steel (V2A) sheet of thickness 0,8 mm.

- Ensure to specify thickness of partition (= depth of doorframe).
- Follow U&V panels product code.

Atypical solutions for transition to non-FläktGroup partitions are available on request.

Door frame can include:

- optical sensor of door opening
- preparation for installation of signalling panels (LUDx)
- interlocking device (electromechanical or electromagnetic)

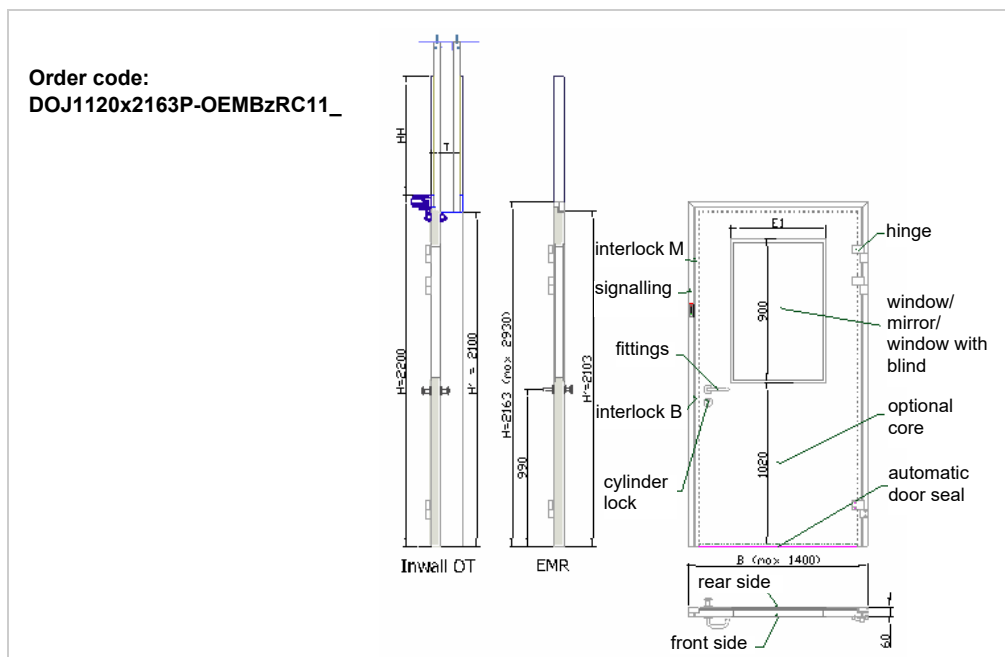
Hinged single-leaf (J) DH door, right version with window, cylinder lock and automatic drop-down seal


Fig. 1: DH single-leaf (J) door with window, front and cross section

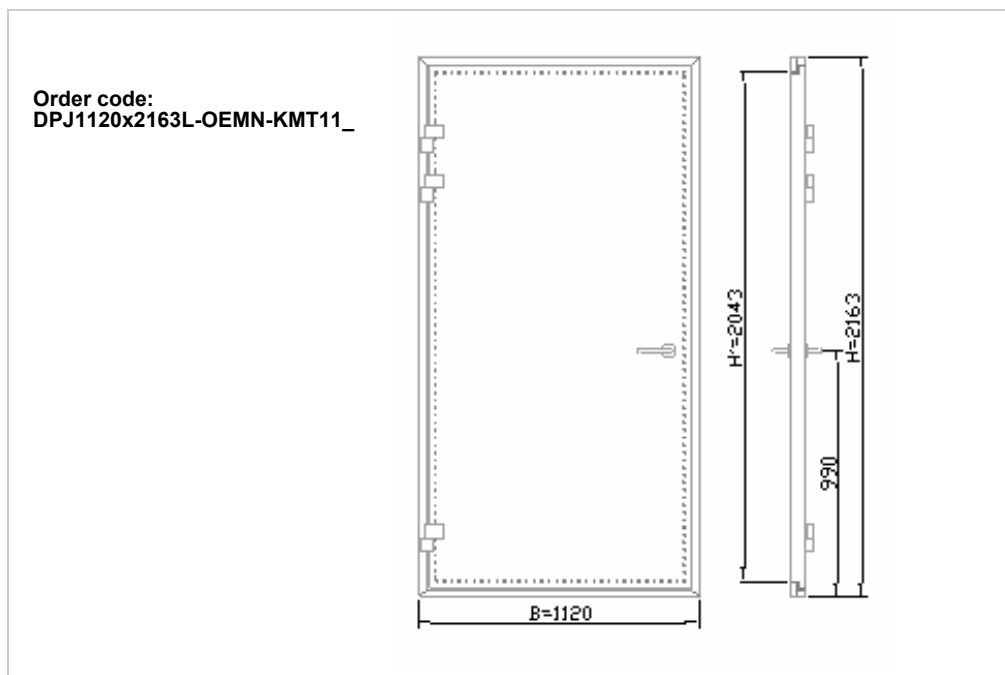
Hinged single-leaf (J) DH door, left version, without cylinder lock and with frame on four sides


Fig. 2: DH single-leaf (J) door without window, front and cross section

Hinged double-leaf door, left version with window, cylinder lock and without automatic drop-down seal

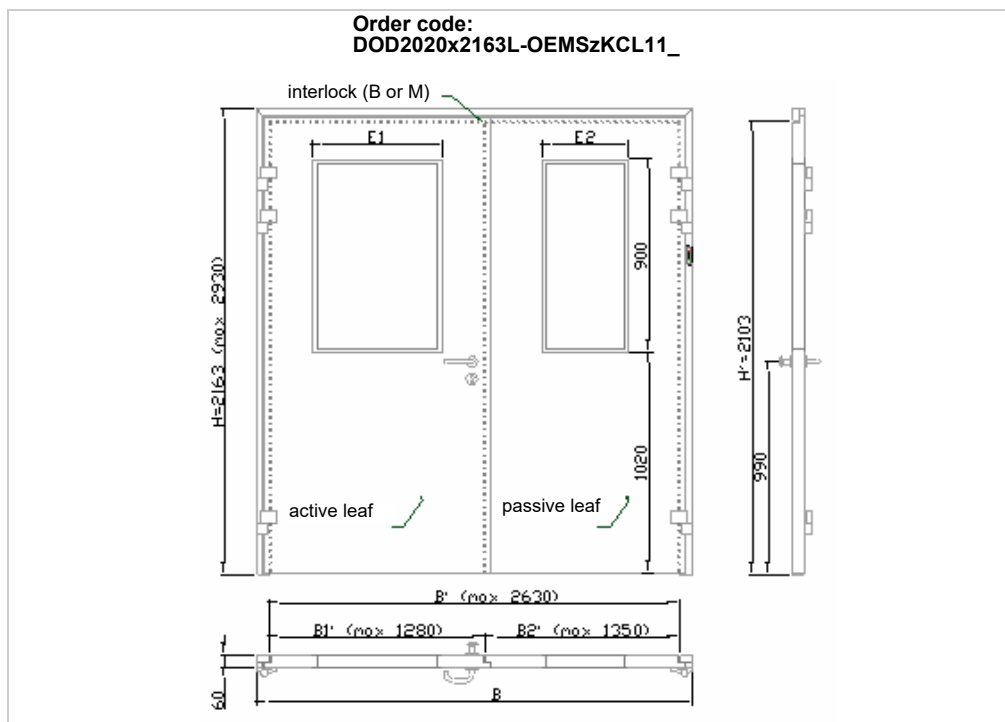


Fig. 3: DH double-leaf (D) door, front and cross section

Hinged door with frame for Inwall OT

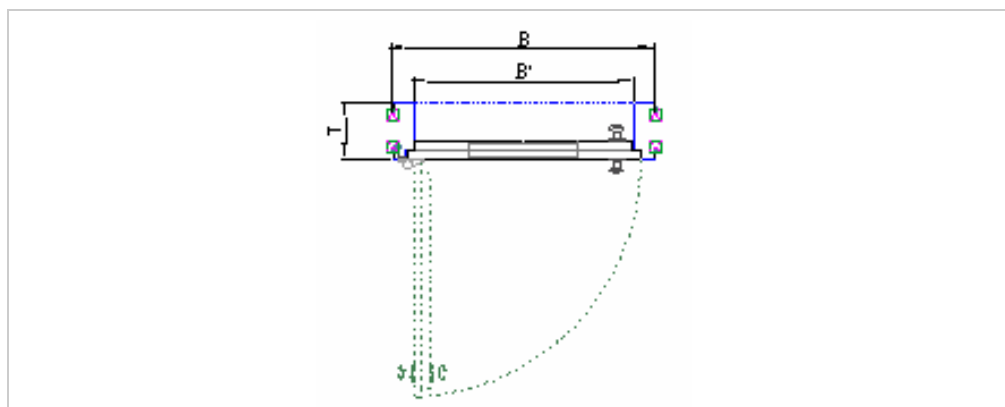


Fig. 4: Hinged door for Inwall OT and possible door fittings

Available door fittings

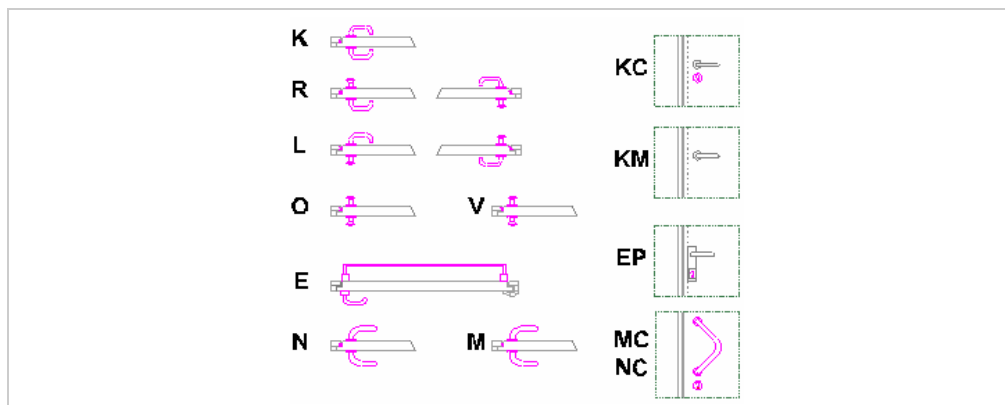


Fig. 5: Options with door fittings

DH		Clear width	Construction width B			Clear width	Window width	Window width
			E / M / R	Inwall OT	Inwall OT+	Active leaf	Active leaf	Passive leaf
		B'	B'+120	B'+160	B'+180	B1'	E1	E2
Single-leaf DHJ	S	600	720	760	780	-	-	-
	S	700	820	860	880	-	400	-
	S	800	920	960	980	-	400	-
	S	900	1020	1060	1080	-	400	-
	S	1000	1120	1160	1180	-	600	-
	S	1080	1200	1240	1260	-	600	-
	E	1100	1220	1260	1280	-	600	-
	E	1200	1320	1360	1380	-	600	-
	E	1280	1400	1440	1460	-	600	-
Double-leaf DHD		1200	1320	1360	1380	800	400	-
		1300	1420	1460	1480	900	400	-
		1400	1520	1560	1580	800	400	-
	S	1500	1620	1660	1680	900	400	-
		1600	1720	1760	1780	1000	600	-
		1700	1820	1860	1880	800	400	400
		1800	1920	1960	1980	900	400	400
	S	1900	2020	2060	2080	1000	600	400
		2000	2120	2160	2180	1000	600	600
		2100	2220	2260	2280	1000	600	600
		2200	2320	2360	2380	1080	600	600
	E	2300	2420	2460	2480	1100	600	600
	E	2400	2520	2560	2580	1200	600	600
	E	2500	2620	2660	2680	1200	600	600
	E	2600	2720	2760	2780	1280	600	600

Tab. 1: DH design doors S = Standard, E = extra width

**NOTICE!**

Thickness of the door leaf and the door frame profile is 60 mm; height of window or mirror is 900 mm.

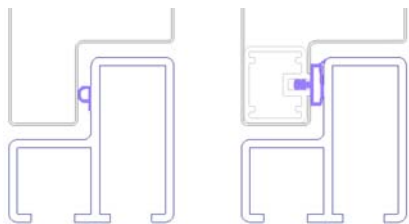
- If doors are mounted into plasterboard or brick walls, ensure that the construction opening is made 5 mm larger on site!
- For the doorway width reaching clear width B' ensure that the door leaf opens by 150°.

For panels:		M / R	V / U	Remark
Door frame		ALU section	stainless steel panels	
Standard clear height	H'	2100	2100	valid for door without bottom frame
Standard construction height	H	2163	2200	ordering code value
Max. clear height	H' _{max}	2870	2870	
Max. construction height	H _{max}	2930	2967	

**NOTICE!**

For Extra wide doors with atypical clear height (H' <> 2100 mm) always contact your FläktGroup sales office.

Door sealing



- Standard door sealing is white self-adhesive EPDM D-profile
- The sealing is glued to the leaf or door frame on site.
- Optionally you can order a door leaf with an integrated groove profile.
- Door leafs can be equipped with automatic drop-down sealing strips.

Automatic drives

FläktGroup doors can be fitted with automatic drives.

DH type doors Hinged (DH) doors can be delivered with a GEZE EMD drive. The drive is optional and can be installed additionally.

DS type doors For sliding doors (DS) the construction of the leaf is different for manually and automatically operated doors. It is also possible to subsequently change the type of drive.

- GEZE EC Drive for DS doors as standard and GEZE SlimDrive SL NT as option
- GEZE PowerDrive for DSX doors with X-ray protection
- TRIDO ADH - PortALP for DSH doors



NOTICE!

For information about electric installation, control options and certification please refer to the documentation provided by the manufacturer of automatic drives.

DH Ordering code		D	O	J	1120	x	2163	L	-	O	E	M	S	z	K	C	L	1	1	_
D	Door				[mm]		[mm]													
P	Full				Constructi- on		Construction													
O	With window, float glass				width B		height H													
S	With window, VSG glass																			
V	Window with sunblind* on front side						Standard:													
U	Window with sunblind* on back side				See size table		2163 for E,M,R													
Z	Mirror on front side																			
Y	Mirror on back side																			
J	Single-leaf						2200													
D	Double-leaf						for OT/OT+													
	Dimensions																			
L	DIN left																			
P	DIN right																			
-	Glued sealing profile																			
+	Sealing gasket in leaf groove																			
O	Hinged door																			
E	Bonded sandwich structure leaf - mineral wool core																			
S	Bonded sandwich structure leaf - polystyrene core																			
M	Manually operated																			
A	Automatic drive Geze EMD																			
N	Normal (without door signalling)																			
S	With signalling																			
B	Electromechanical interlock + signalling																			
M	Electromagnetic interlock + signalling																			
-	Aluminium frame without preparation for signalling panel																			
z	Aluminium frame with preparation for signalling panels LUDS or LUDB (front & back side)																			
v	Stainless steel frame for Inwall OT without preparation for signalling panel																			
u	Stainless steel frame for Inwall OT+ without preparation for signalling panel																			
K	Handle & handle, lock with latch						obligatory for DxD door with interlock (B or M)													
O	Knob & knob, lock with latch						obligatory for DxJ door with interlock B (or M)													
V	Knob & knob, lock with roller						for doors with automatic drive													
R	RIGHT handle & fixed knob, lock with latch																			
L	LEFT handle & fixed knob, lock with latch																			
M	Pull handle & pull handle, lock with roller						for doors with automatic drive													
N	Pull handle & pull handle, lock with latch																			
E	Panic 1-point fitting						FAB 890100 + front plate EN3000 with lockable handle													
C	Double sided cylinder lock																			
M	Without lock																			
P	Cylinder half-lock on front side						only for panic fitting													
N	Without drop-down seal																			
L	With automatic drop-down seal																			
T	With bottom frame																			
Frame	See table of colours on page 5																			
Leaf	See table of colours on page 5																			
-	Standard																			
A	Atypical (describe in remark)																			
X	Lead sheet lining (thickness specify in remark)																			

*) internal sunblind with magnetic control by knob in top right corner of window; white colour; only reclining
Standard colour of leafs and frames is RAL9002 semi-gloss.

**NOTICE!**

When ordering specify the following door fittings separately:

- Upper closer
- Door stop on wall/floor
- Lower door holder
- Non-standard colour of door frame
- Welded frame

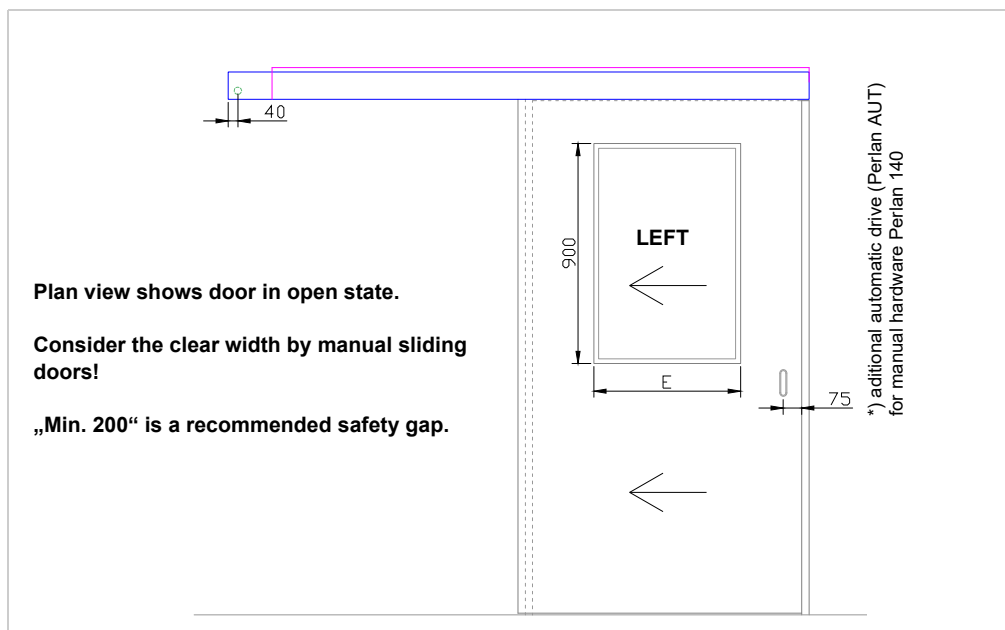
DS single-leaf sliding door, left version with window


Fig. 6: DS single-leaf door (J) with sliding mechanism, front view

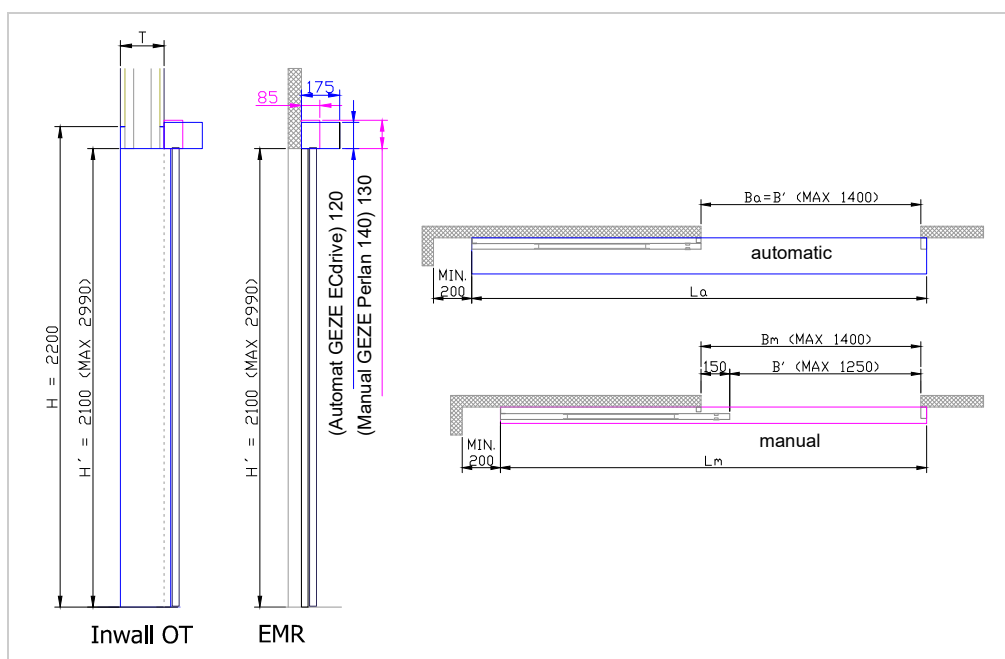


Fig. 7: DS single-leaf door (J) with sliding mechanism, cross section and top view

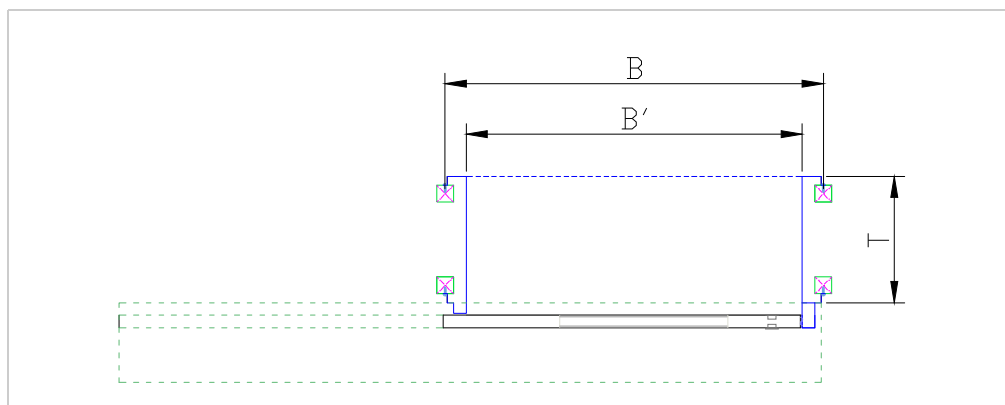
DS single-leaf sliding door with frame for Inwall OT/OT+


Fig. 8: DS single-leaf sliding door and frame for Inwall OT, top view

DS double-leaf symmetrical sliding door with window

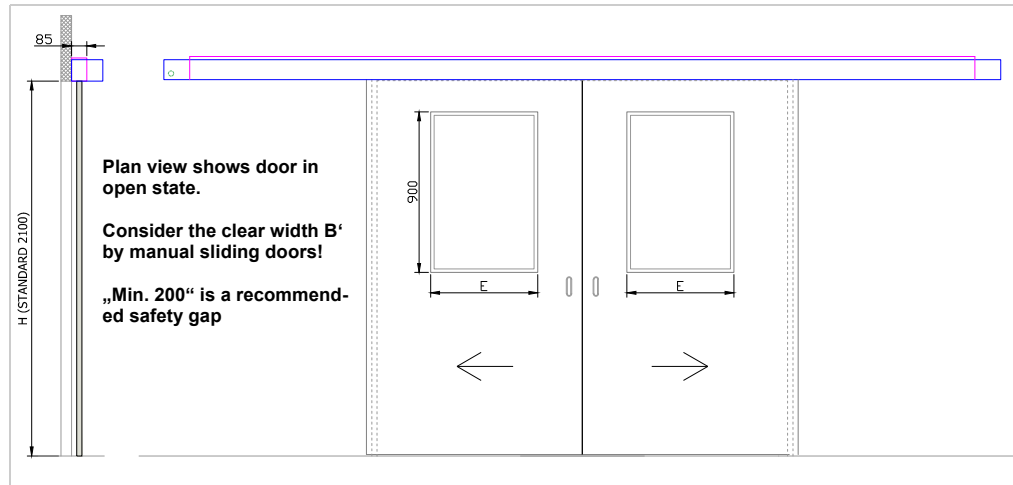


Fig. 9: DS double-leaf symmetrical sliding door with window, front view

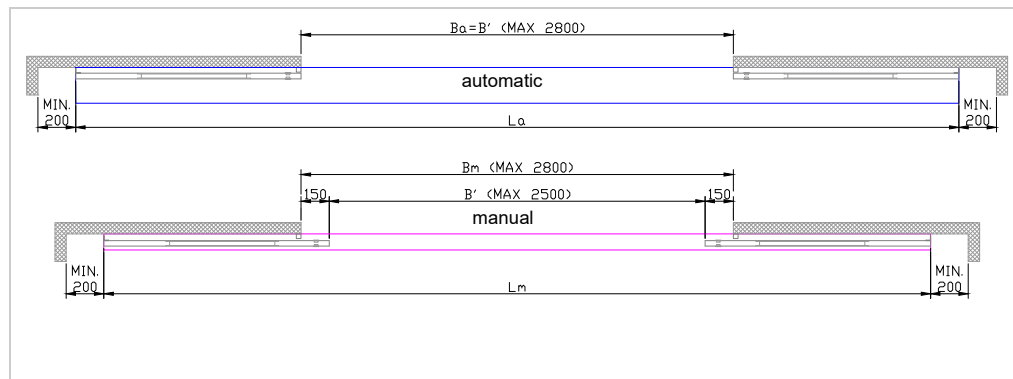


Fig. 10: DS double-leaf symmetrical sliding door with window, top view

DS	Manually Operated							Automatic Drive						
		Clear width	Construction width			Length of traverse	Width of window		Clear width	Construction width Ba			Length of traverse	Width of window
			E/M/R	OT	OT+					E/M/R	OT	OT+		
			B'			Lm	E			B'			La	E
Single-leaf DSJ	S	700	850	950	970	1680	400		700	700	800	820	1530	400
		750	900	1000	1020	1780	600		750	750	850	870	1630	400
	S	800	950	1050	1070	1880	600		800	800	900	920	1730	400
		850	1000	1100	1120	1980	600	S	850	850	950	970	1830	400
	S	900	1050	1150	1170	2080	600		900	900	1000	1020	1930	600
		950	1100	1200	1220	2180	600	S	950	950	1050	1070	2030	600
	S	1000	1150	1250	1270	2280	600		1000	1000	1100	1120	2130	600
	E	1050	1200	1300	1320	2380	600	S	1050	1050	1150	1170	2230	600
	E	1100	1250	1350	1370	2480	600		1100	1100	1200	1220	2330	600
	E	1150	1300	1400	1420	2580	600	S	1150	1150	1250	1270	2430	600
	E	1200	1350	1450	1470	2680	600	E	1200	1200	1300	1320	2530	600
	E	1250	1400	1500	1520	2780	600	E	1250	1250	1350	1370	2630	600
								E	1300	1300	1400	1420	2730	600
								E	1400	1400	1500	1520	2930	600
Double-leaf DSD (symmetric)		1100	1400	1500	1520	2650	400							
		1200	1500	1600	1620	2850	400		1200	1200	1300	1320	2550	400
		1300	1600	1700	1720	3050	400		1300	1300	1400	1420	2750	400
	S	1400	1700	1800	1820	3250	400		1400	1400	1500	1520	2950	400
		1500	1800	1900	1920	3450	600		1500	1500	1600	1620	3150	400
	S	1600	1900	2000	2020	3650	600		1600	1600	1700	1720	3350	400
		1700	2000	2100	2120	3850	600	S	1700	1700	1800	1820	3550	400
	S	1800	2100	2200	2220	4050	600		1800	1800	1900	1920	3750	600
		1900	2200	2300	2320	4250	600	S	1900	1900	2000	2020	3950	600
	S	2000	2300	2400	2420	4450	600		2000	2000	2100	2120	4150	600
	E	2100	2400	2500	2520	4650	600	S	2100	2100	2200	2220	4350	600
	E	2200	2500	2600	2620	4850	600		2200	2200	2300	2320	4550	600
	E	2300	2600	2700	2720	5050	600	S	2300	2300	2400	2420	4750	600
	E	2400	2700	2800	2820	5250	600	E	2400	2400	2500	2520	4950	600
	E	2500	2800	2900	2920	5450	600	E	2500	2500	2600	2620	5150	600
								E	2600	2600	2700	2720	5350	600
								E	2700	2700	2800	2820	5550	600
								E	2800	2800	2900	2920	5750	600

Tab. 2: DS design doors S=Standard, E=extra width

- Standard color RAL9002
- Window height 900 mm

Specification of manually operated drives

- GEZE Perlan 140 for single-leaf versions
- DuoSync for double-leaf version

For partition panels:		M / R	V / U	Remark
Frame		ALU sections	Stainless steel panels	
Standard clear height	H'	2100	2100	
Standard construction height	H	2100	2200	Ordering code value
Max. clear height	H' _{max}	2870	2870	
Max. construction height	H _{max}	2930	2967	

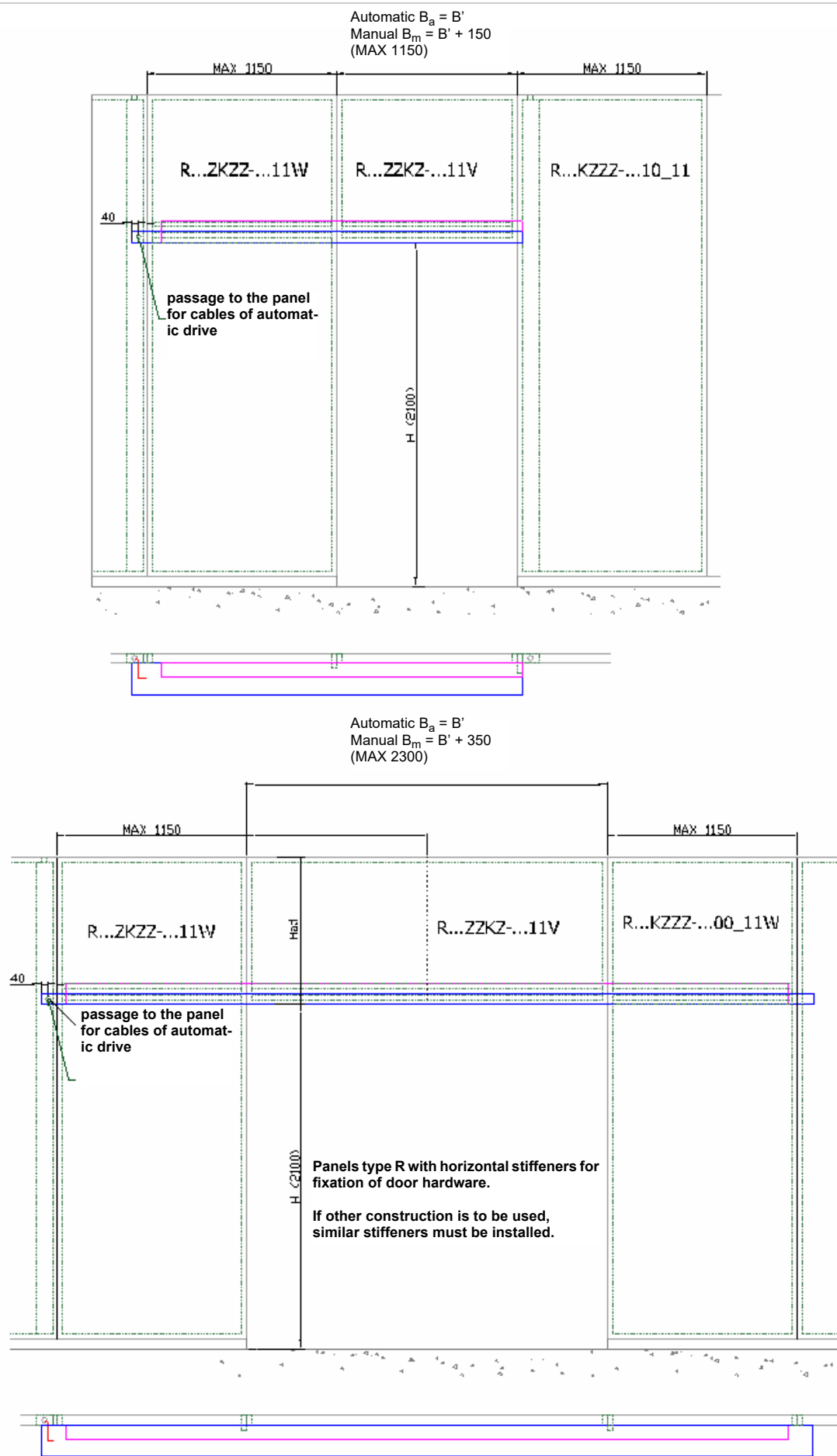


Fig. 11: Designing of R panels for sliding doors

Design view of DSH single-leaf sliding door with increased tightness

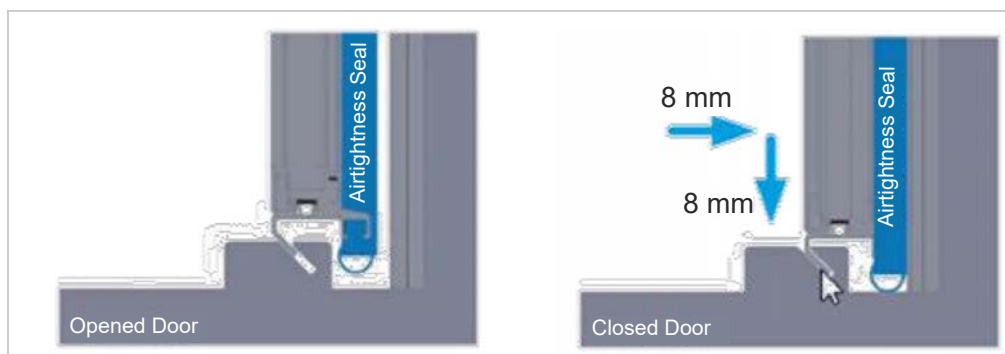
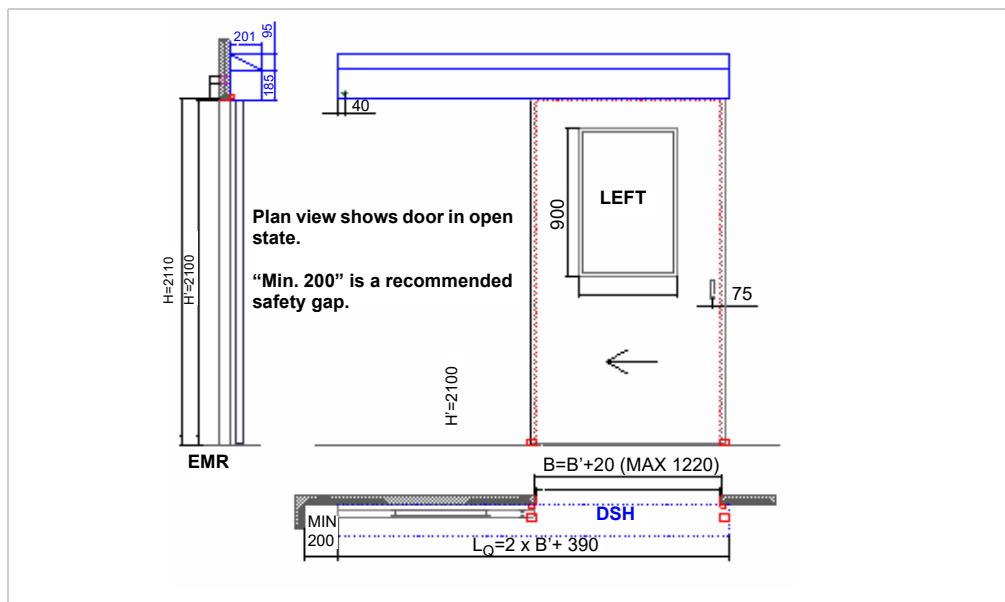
DSH door in open and closed state

Dimensions of DSH single-leaf sliding door with increased tightness


Fig. 12: Automatic single-leaf tight sliding door DSH, left version with window, top and front view

Construction width $B=B'+20$ mm

Standard clear height $H'=2100$ mm

Standard clear height $H=H'+10$ (standard $H=2110$ mm)

Configuration and design of DSH sliding doors with R panels

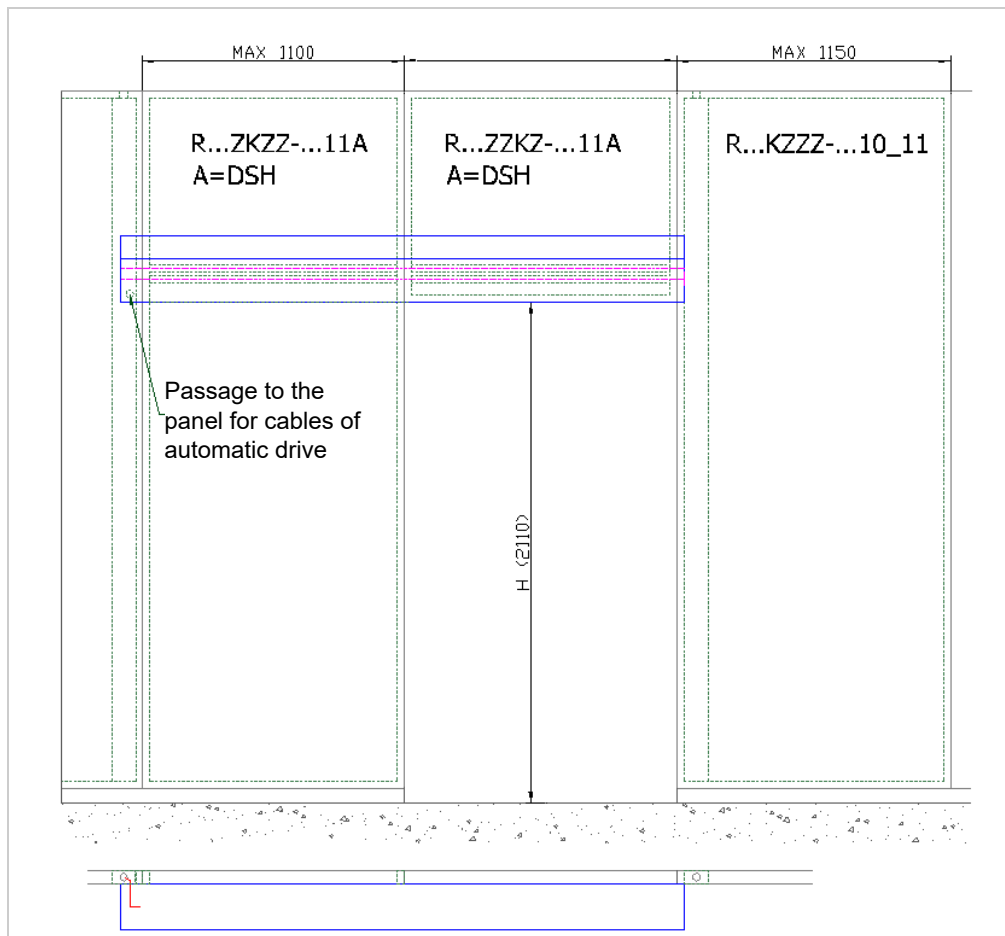


Fig. 13: Design of R panels for DSH sliding doors

Clean Room Doors and Windows

DS-Doors		D	O	J	1150	x	2100	L	-	S	S	M	-	N	1	_
D	Door				[mm]		[mm]									
P	Full				Construction		Construction									
O	With window				Width B		Height H									
S	With window, VSG glass															
V	Window with sunblind*						Standard									
J	Single-leaf				see		2100 for E,M,R									
D	Double-leaf				table on page 15		2200 for Inwall OT									
Dimensions (for DSH type refer to page 17)																
L	Left (single-leaf)															
P	Right (single-leaf)															
D	Synchronized symmetric (double-leaf)															
-																
S	Sliding															
S	Bonded sandwich structure leaf with polystyrene core															
E	Bonded sandwich structure leaf with mineral wool core															
M	Manually operated						Geze Perlan 140									
A	Automatic drive						Geze ECdrive									
F	Automatic drive for emergency doors															
-	Frame for E, M, R panels															
v	Stainless steel frame for Inwall OT															
u	Stainless steel frame for Inwall OT+															
N	Without automatic drop-down seal															
L	With automatic drop-down seal															
H	With increased tightness						ONLY single-leaf									
leaf	See table of colours on page 5															
-	Standard															
A	Atypical (describe in remark)															
X	Lead sheet lining (thickness specify in remark)															

*) internal sunblind with magnetic control by knob in top right corner of window; white colour, knob on front side only

Standard colour of leaf faces is RAL9002 semi-gloss.

Control elements of automatic doors (elbow switches, radars, ...) must be specified according to customer's demands regarding type of clean room.

Manually opened doors always have pull handles on both sides.

Doors with X-ray protection

Special variant (especially for healthcare facilities) are sandwich doors (DH, DS) with bonded lead insert.

This lead sheet thickness is designed and calculated by others (not by FläktGroup) and protects staff and patients from radiation of X-rays. Lead sheet is also bonded in the door frame.

Maximal dimensions of doors with X-ray protection depend on the lead sheet thickness.

- Technical features*
- Standard dimensions of window are 400 x 400 mm
 - A door leaf can be equipped with glazing including X-ray protection glass
 - Thickness of *DHX* leaf with X-ray protection = 62 mm + thickness of lead sheet (Pb)
 - Thickness of *DSX* leaf with X-ray protection = 62 mm + thickness of lead sheet (Pb)
 - Core is polystyrene or mineral wool
 - Automatic drive is by GEZE PowerDrive
 - Weight: for every 1 mm of lead thickness add ~12 kg/m²



NOTICE!

- For additional information on doors with X-ray protection and doors with fire resistance please contact DH sales office.

Description of TH doors

This type of doors is used for pass-through ("transfer") doors and boxes and Air Showers.

Dimensions depend on the customer requirements, common clear dimensions are 600 x 600 mm (total dimensions 720 x 720 with aluminium frame).

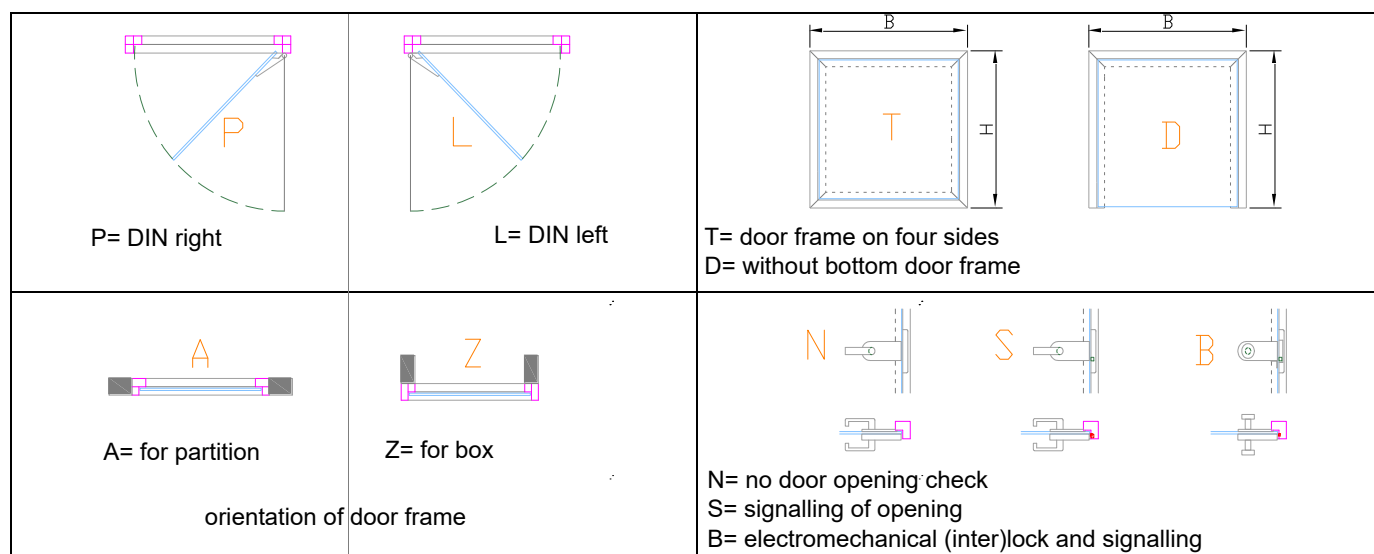


Fig. 14: TH doors variants

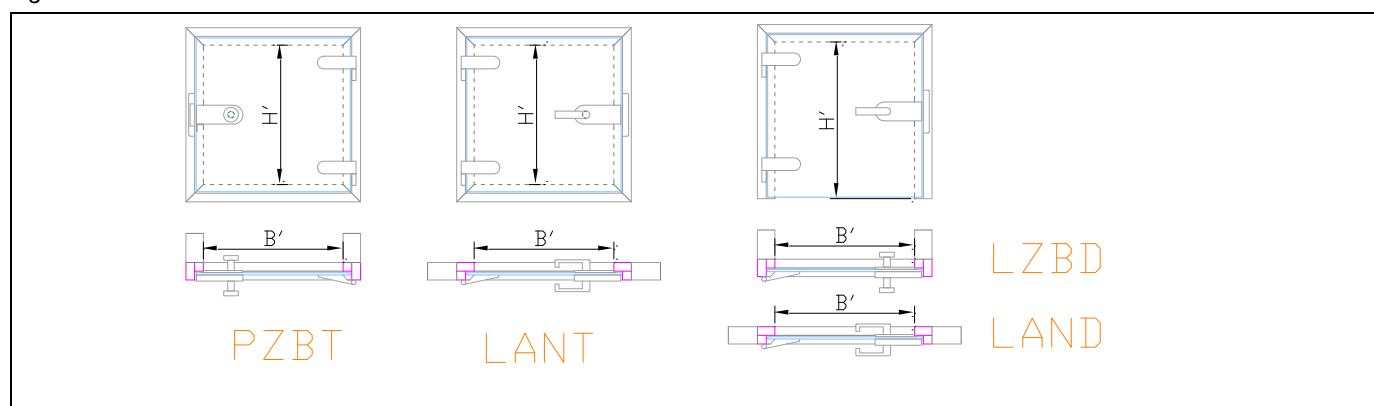


Fig. 15: TH door examples

TH-Doors		T	0720	x	0720	L	A	B	z	T	1	_
			[mm]		[mm]							
T	Door with ESG glass leaf		Width B		Height H							
	Dimensions											
L	Left											
P	Right											
A	For wall partition											
Z	For transfer box											
N	No door opening check				handle-handle							
S	With signalling device				handle-handle							
B	With electromechanical interlock and signalling function				knob-knob							
-	Without preparation for signalling in the doorframe (always for N)											
z	Preparation for signalling in T-door frame (LUDS or LUDB)											
T	Doorframe on all sides											
D	Without bottom frame											
L	Without bottom frame with automatic drop-down seal											
Frame	See table of colours on page 5											
-	Standard production											
A	Custom (atypical) - specify details; e.g. lock with cylinder											

TSH - horizontally sliding doors with all-glass leafs

- Please contact your FläktGroup sales office for details.

TSV – vertically sliding door with all-glass / plexi-glass leaf

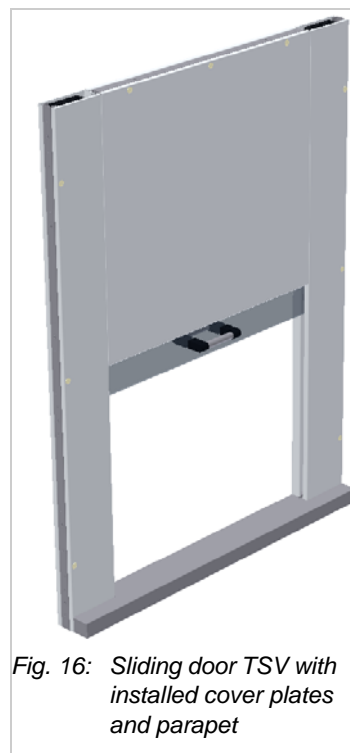


Fig. 16: Sliding door TSV with installed cover plates and parapet

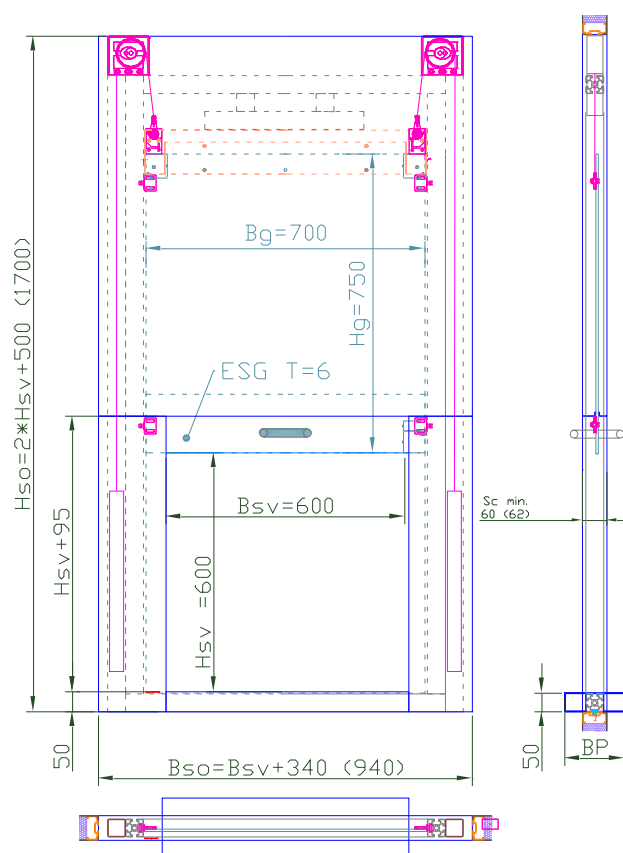
Description

A vertically sliding door is intended for clean rooms with lower demands for the purity of the environment (due to the cleaning access of sliding mechanism). The advantage is the low weight and operating reliability.

The door can be built in the partitions manufactured by FläktGroup (sandwich panels or Inwall OT/OT+) or to the gypsum board partition (in combination with Inwall Click facing).

Materials

- Self-supporting frame consists of aluminium profiles.
- Outer cables are made of stainless steel (service life 50.000 movements).
- Handle is performed in aluminium.
- The sliding door is equipped with a pair of redundant fall arrestors for lifting doors (in accordance with the requirements of the Machinery Directive 2006/42/EC).
- Profiles, sliders, cables, balancing mechanism and safety catches are made by **Bosch Rexroth**.
- Standard sliding leaf is made of tempered ESG glass of thickness 6 mm. For special request leaf can be made of transparent polycarbonate.
- Standard **cover sheets** are made of lacquered metal sheets of shade RAL9002 semi-gloss. The covers are fastened with screws (visible plastic caps).
- The parapet is made of stainless steel sheet.



Dimensions:

B_{SV} ... clear width

B_{SO} ... construction width (= width of under-door panel)

$B_{SO} = B_{SV} + 340 \text{ mm}$

H_{SV} ...clear height

H_{SO} ...construction height $H_{SO} = 2 * H_{SV} + 500 \text{ mm}$

BP ... parapet depth

Note:

Maximum dimensions depend on the area of sliding door and material (weight) of door and must be assessed individually. **Please contact manufacturer.**

Ordering example:

Vertically sliding door $B_{SV}=600$; $H_{SV}=500$; $BP=100$ with covers in RAL 9002

Installation

TSV is delivered partially assembled.

- Please follow order specific instruction and drawings.

Description and application

D-MAXX access control system is designed to ensure compliance with mode of movement of personnel and material within clean (or otherwise controlled) rooms. As a part of clean room technology, this system helps to protect spaces from contamination due to pressure gradient disruptions on the borders between zones with varied cleanliness classes and control the proper procedure of the entry and exit of personnel and material to and from clean rooms. The system is designed for doors (D-type) and pass-through doors (T-type) and their combinations.

Principle



Basic door status indication kit consists of one D-MAXX/ CONTROL unit, 1 or 2 signalling units and 1(2) door position sensor(s). By linking more control units (up to 200) a system is created to divide clean rooms into individual sections and separates them to prevent undesirable or disallowed connection.

Circuit with only two doors can be controlled via one D-MAXX/CU2 unit.

The control unit is configured using a DIP switch on the front of the unit. Sections are created by connecting communication terminals K1 and K2 among units. The system evaluates the status of doors depending on the configuration settings of DIP switches optically and possibly acoustically indicates the individual status of the system or blocks the opening of the door. The status of the unit is indicated by LED diodes. Control units are installed in a joint switchboard on a DIN rail together with a power supply.

Signalling

Optical and acoustic status-indicating signals for operators are provided via door-frame signalling units LUDS (with a siren) and LUDB (interlock – with contactless KEY button and siren). As standard all signalling units are installed on the front and on the back of the door frame (alternatively signalling units LUS and LUB can be used for installation in wall panels). *Two adjacent units (e.g. in the door frame) LUxx can be connected via jumper cable (LUKP).*

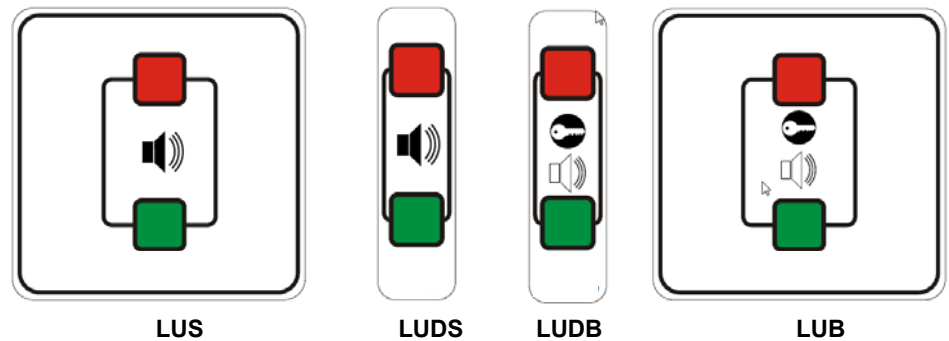


Fig. 17: Overview of signalling units

The basic status (all doors are closed) is indicated by green signalling lights. If any door of the group opens, red lights go on. If operators do not pay attention to the warning signal and open another door of the group, an acoustic alarm starts or a disturbance is reported to the central monitoring system (if the systems are linked). In more complex systems where e.g. a single door belongs to two groups these units may be further arranged into higher ranking circuits. These can define for a shared door to react in all groups concerned.

The system is compatible with nearly all types of detection sensors. The standard solution is an optical analogue or digital sensor, or a mechanical door switch (part of an electromechanical lock). The unit has two relay outputs to pass information on the monitoring status of a higher ranking system or simply for external indication.

Blocking (Interlock)

The system enables control of electromechanical or electromagnetic locks, thus blocking the opening of doors. Besides the standard blocking of a second door when another door in the group is open, a door can be blocked via a time delay feature.

A signalling system project, installation or connecting cables are not delivery of FläktGroup. The warranty period for components is 2 years, with warranty and post-warranty servicing provided by FläktGroup and authorized service firms.

- For detailed planning and installation instructions see a separate document.

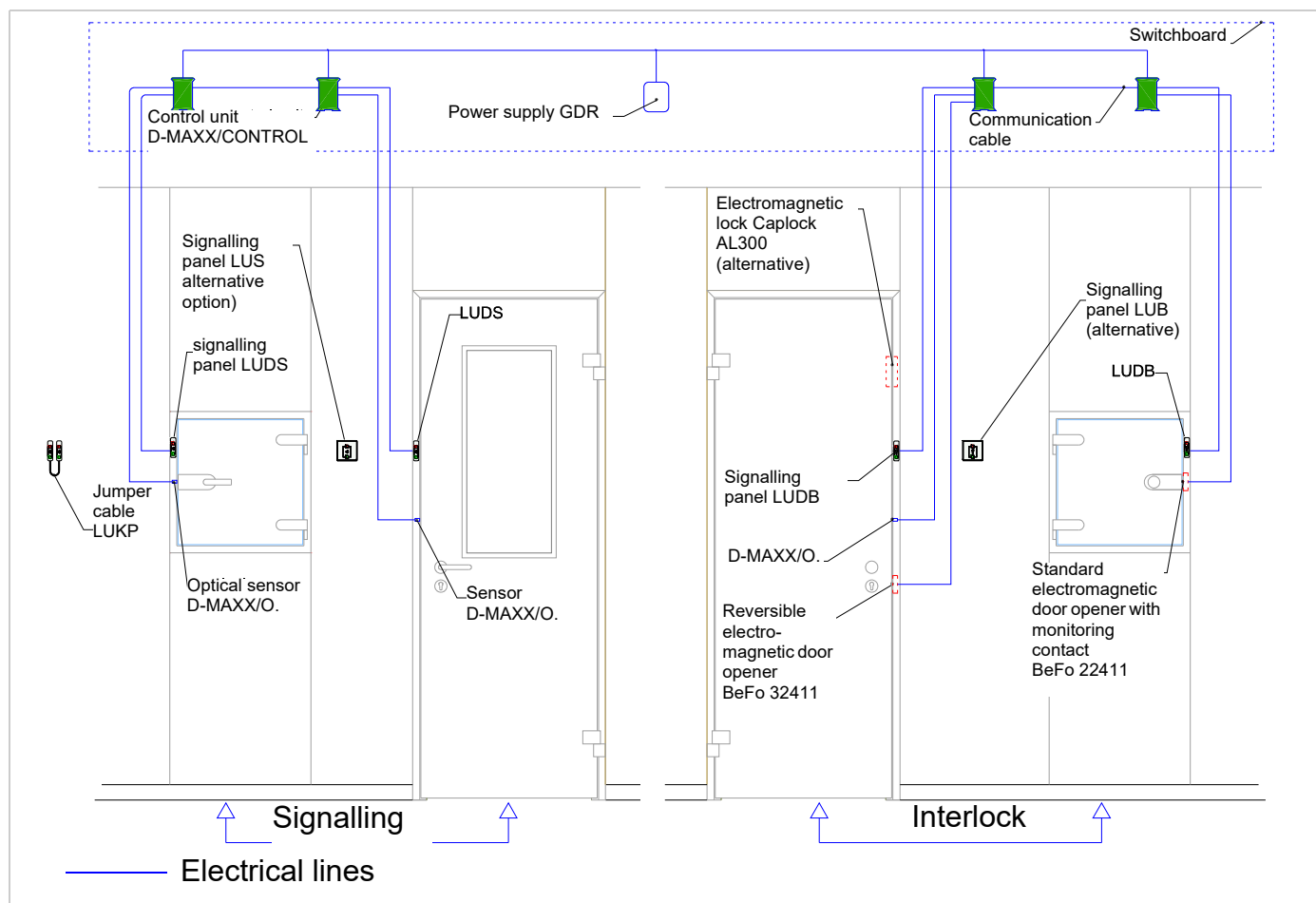


Fig. 18: Scheme with communication and power lines of D-MAXX access control system

Overview of D-MAXX system components

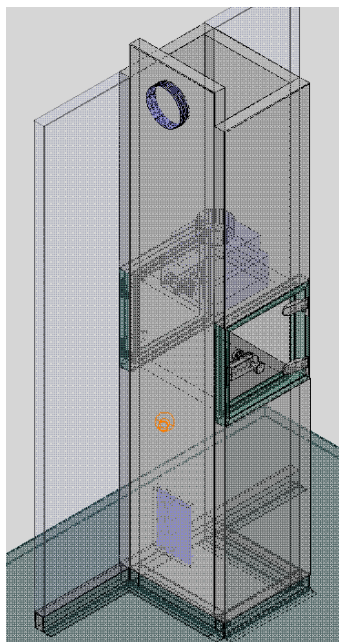
Name	Ordering No.	Function
D-MAXX/CONTROL	A50382	Control unit (module for a DIN strip)
D-MAXX/CU2	A78823	Control unit for pair of doors (two-door circuit)
D-MAXX/OA	A50383	Analogue optical element (sensor)
D-MAXX/OD	A50384	Digital optical element (sensor)
D-MAXX/LUDS	A51934	Optical-acoustic signalling unit (for door frame)
D-MAXX/LUDB	A51936	Optical-acoustic signalling unit with button (for door frame)
D-MAXX/LUS	A51933	Optical-acoustic signalling units (for wall panel)
D-MAXX/LUB	A51935	Optical-acoustic signalling unit with button (for wall panel)
D-MAXX-LUKP	A67091	Jumper cable for interconnection of two LUxx units
BeFo Profi reversible 32411	A00879	Electromechanical door opener (standard for D-type doors)
BeFo Profi reversible 322411	A00879	Electromechanical door opener (for Air Shower T-doors)
BeFo Profi standard 22411	A50377	Electromechanical door opener with monitoring contact (standard for T-type doors)
Caplock AL300 SU	A50379	Electromagnetic lock (special door frames)
Fuse F100mA	A50381	Accessory for BeFo opener (24VDC)
Fuse socket	A50380	For a DIN strip
Cabling	3 410 004	Wire LiYY 10x0,5 (meters)

Recommended power supply

GDR-20-24	A50385	Power supply for 1-5 units (module for a DIN strip)
GDR-40-24	A50386	Power supply for 6-10 units (module for a DIN strip)
GDR-60-24	A50387	Power supply for 11-15 units (module for a DIN strip)
MDR-120-24	A50388	Power supply for 16-25 units (module for a DIN strip)

Active box (tower)

Active box is a pass through box with filtered air flow.

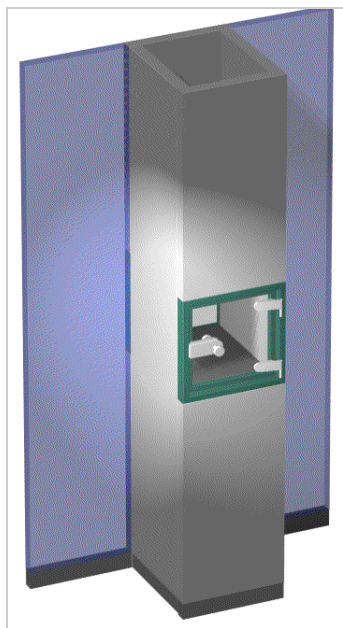


- 6x panel of type R
- 2x pass-through door (T-type variant Z.T alternatively A.T)
- safety glass leaf
- signalling or interlock possible
- perforated stainless steel bottom panel – optionally all interior surfaces
- overhead panel with aperture for CGF clean air diffuser (CGF is not part of delivery)
- other surfaces and frames lacquered RAL9002
- air exhaust
- through exhaust grille (OMS) to the room with lower cleanliness
- through exhaust panel (RA)
- standard dimensions

	Inner	Outer
Width	Wi=596	Wo=720
Length	Li= 596	Lo=720
Height	Hi=600	-
Elevation of bottom panel = 1000		
Room height = ?		

Fig. 19

Passive box (tower)



Passive box is pass through box without air flow.

- 6x panel of type R
- 2x pass-through door (T-type variant Z.T alternatively A.T)
- stainless steel bottom panel – optionally all interior surfaces
- other surfaces and frames lacquered RAL9002
- standard dimensions – see Active TB

Fig. 20

Passive box (Tower) for trolley transit

- 4x panel of type R
- 2x pass-through door with (T-type variant Z.D)
- all surfaces and frames lacquered RAL9002
- optionally sides or all interior surfaces in stainless steel
- customized dimensions

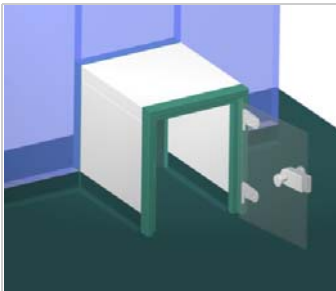
Passive box for trolley transit

Fig. 21

We recommend to use a tower version, as the depicted version has disadvantages due to horizontal surfaces.

- 3x panel of type R
- 2x pass-through door with (T-type variant Z.D)
- all surfaces and frames lacquered RAL9002
- optionally sides or all interior surfaces in stainless steel
- customized dimensions

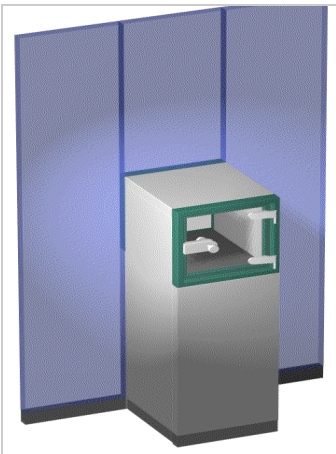
Passive box with under-panels

Fig. 22

We recommend to use a tower version, as the depicted version has disadvantages due to horizontal surfaces.

- 5x panel of type R
- 2x pass-through door
- stainless steel bottom – optionally all interior
- other surfaces and frames lacquered RAL9002
- standard dimensions 720

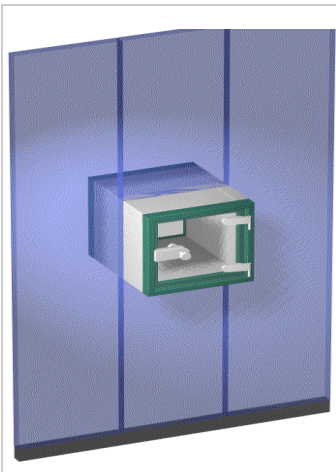
Passive box

Fig. 23

Please consider disadvantages of this configuration due to horizontal surfaces.

- 4x panel of type R
- 2x pass-through door (T-type variant Z.T)
- stainless steel bottom – optionally all interior
- other surfaces and frames lacquered RAL9002
- standard dimensions 720x720x720

Windows for clean rooms: product features and benefits

Windows conform to the below requirements:

- smooth surface, practically not releasing any particles from the surface
- all joints are sealed with elastic silicone sealant in a shade that is closest to the panel shell
- resistance to cleaning and disinfecting agents
- no health risks

This catalogue describes glassed-in panels (non-opening windows; the "windows" hereinafter) for clean rooms and the way of their use with cross or facing panels.

Categories and description of windows for clean rooms

Design overview

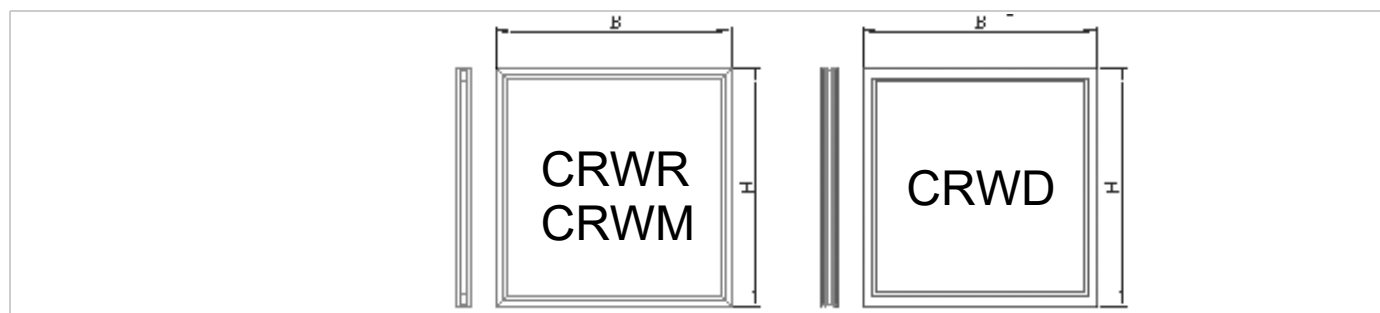
Window type	For panels	Glass thickness [mm]	Glazing	Window thickness [mm]	Max size	Frame material	Interchangeable B and H *
Windows for sandwich panels							
CRWM	M-	4	double	60	1200 x 1500	aluminium	Yes
CRWR	R	4	double	60	1200 x 1500	aluminium	Yes
CRWD	R	4	double	62	970 x 970	aluminium	Yes
Special purpose windows							
CRWX	OT+X	6+T**+6	triple	60+tPb	on request	steel	No
CRWG	Gr	4+T**+4	triple	82	1000 x 1000		No
CRWF	Me	6+T**+6	triple	60	1000 x 1000	steel	No
Windows for facing Inwall panels							
CRWZ	^C Inwall Click	6	simple	28	1200 x 1800	steel	Yes
CRWU	^U Inwall OT+	4	simple	27	1200 x 1500	aluminium	No
CRWV	^V Inwall OT	6	simple	27	1000 x 1000	steel	No

*) i.e. CRWR 1200 x 1500 is the same as CRWR 1500 x 1200

**) special glass

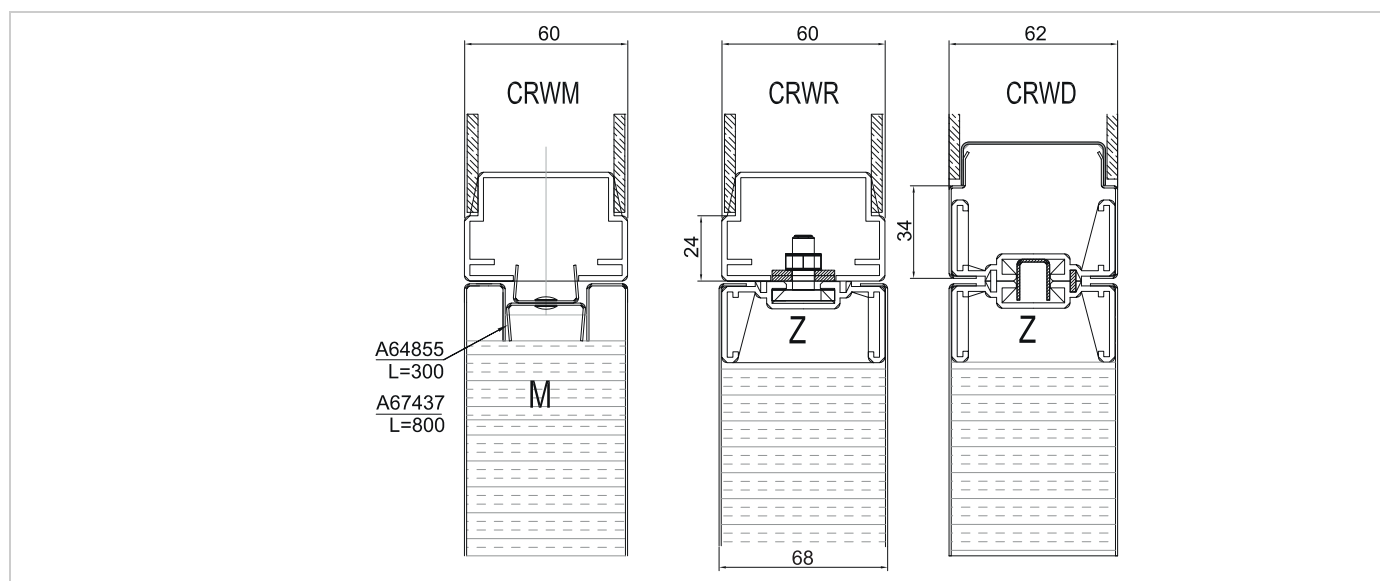
Technical data

- Tolerances:**
- Width Bw +0 / -2 mm
 - Height Hw +0 / -2 mm
 - Thickness +1 / -1 mm
 - All windows are glazed with white silicone sealant, regardless of colour of the frame.



Windows for sandwich panels CRWM and CRWR are windows with double glazing.

- The frame is made of special aluminium profile with sheet glass fitted in and sealed.
- The frame is coated with polyester paint in a desired RAL shade.
- Glazing is smooth on both sides, also in place with the surface of the crossbar ("pharma" glazing).
- The windows are 60 mm thick.



CRWM

CRWM windows are used with M type panels. Window frames are fixed to panels with CRWM plates (A64855 L=300; A67437 L=800). A standard bottom-mounted panel has TTSO endings, atyp B. A standard top-mounted panel has a TTOC ending. The ending of the beside-window mounted panel is O (identical to that of M design).

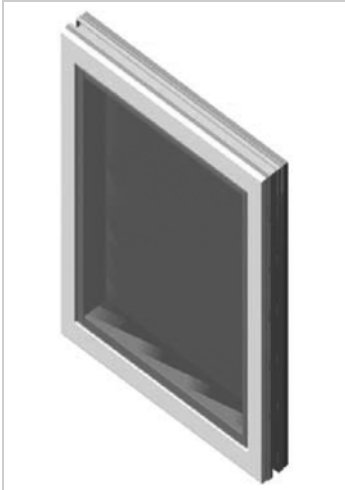
CRWR

CRWR windows are used with R type panels. Windows are supplied including CRWR plates (783152) for fitting in R type panels. A standard bottom-mounted panel has a ZZZZ ending, atyp B. A standard top-mounted panel has a ZZZZ ending. The ending of the beside-window mounted panel is Z.

Recommended dimensions of CRWM, CRWR						
CRWM, R		Bw width				
		600	900	1000	1200	1500
Hw height	900	✓	✓	✓	✓	✓
	1000	✓	✓	✓	✓	✓
	1200	✓	✓	✓	✓	✓
	1500	✓	✓	✓	✓	

Possible dimensions of CRWD			
CRWD	Bw		
	470	670	970
470		✓	✓
670	✓	✓	✓
970	✓	✓	✓

CRWD



CRWD window is designed in R panel crossbars that are made of different materials on the front and rear side or at least one side is stainless.

Window shells are made of stainless or painted steel plate; therefore each side of the window can be made of a different material. At the same time the harmony of colour shades and the crossbar is guaranteed. Colour encoding is identical with other products of FläktGroup range

Note: the colour of the inner window profiles is identical with the colour of the front part of the window.

- The window frame is made of the same aluminium profile as the Z ending of the R type panel.
- The window is 62 mm thick and aligned with the crossbar.
- Both sides of the window is glazed with flat glass of 4 mm thickness.

A standard bottom-mounted panel has a ZZZZ ending; atypical B. A standard top-mounted panel has a ZZZZ ending. The ending of the beside-window mounted panel is Z.

The window is connected to the surrounding R panels by means of CC U couplers (catalogue number 783325) embedded in the groove of the window frame and the panel. The bonding material is included in the delivery of the window.



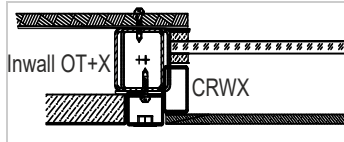
Notice!

Due to technological reasons, the dimensions of CRDW windows are limited to 470, 670 and 970 mm (both the height and the width).

Special purpose windows

Overview

CRWX (with protection against X-ray radiation)



CRWX windows with lead glass are used in OT+X system (with protection against X-ray radiation).

The required thickness of lead glass shall be determined by a specialist (calculations not by FläktGroup).

The window is supplied in a disassembled state as two glazed frames, a lead glass plate and fitting parts.

The assembly procedure is specified in a special drawing.

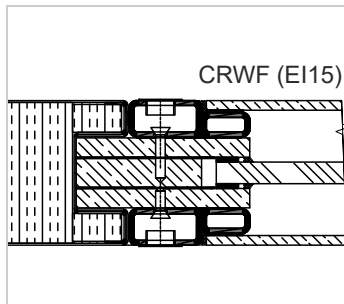


Notice!

The transport, assembly and maintenance of lead glass require special attention.

- Refer to instructions and regulations provided by the glass manufacture.

CRWF (EI15)

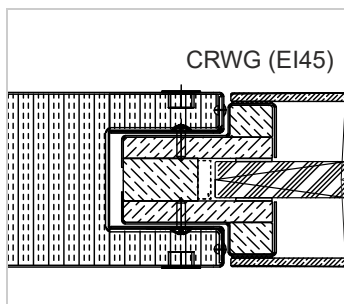


Fire resistant CRWF windows consist of two outer glass plates and one inner fire glass plate.

CRWF windows can be used with panels of Me design. Window is 60 mm thick.

The windows cannot be mounted next to each other or one above another.

CRWG (fire resistant)



Fire resistant CRWG windows consist of two outer glass plates and one inner fire glass plate. Outer glass plates are glued on the frame made of fire resistant material which carries a symmetrically located fire resistant glass.

CRWG windows are designed only for fire panels of E type and Gr design (certified in the Russian Federation). The windows are 82 mm thick. The windows cannot be mounted next to each other or one above another.

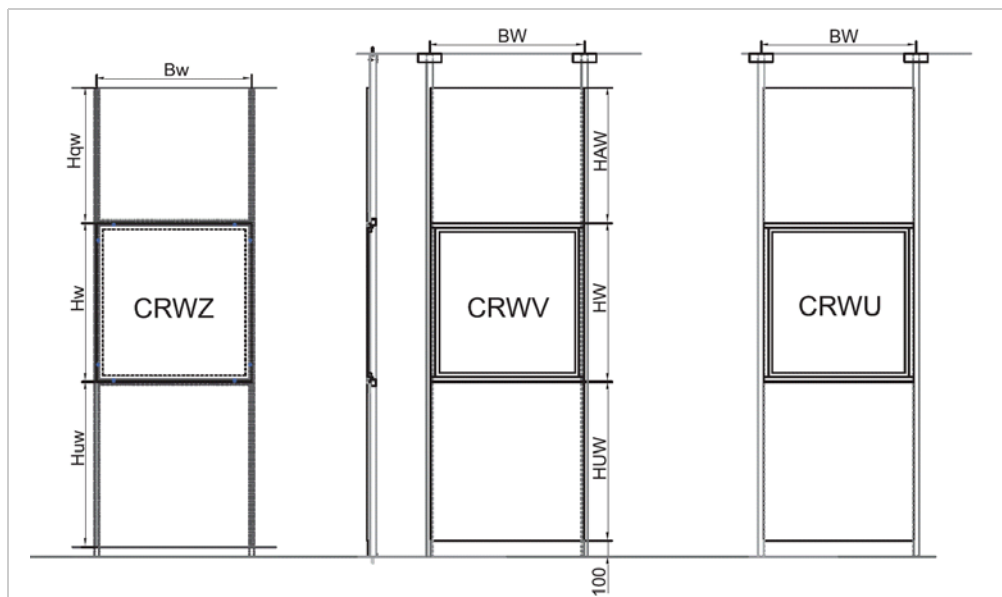


Notice!

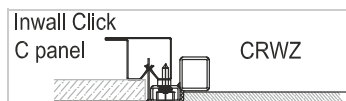
There are no systemic window for G- and Ge panels.

- Should you have any special requirements please do not hesitate to contact your FläktGroup sales office.

Overview



CRWZ

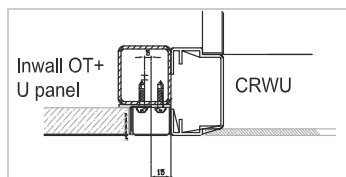


CRWZ panel is designed for an Inwall Click facing.

- CRWZ window frame is made of closed steel profiles.
- The frame is coated with polyester paint in a desired RAL shade.
- A sheet glass of 6 mm thickness is glued in the frame and sealed.
- The window is fixed in base profiles or walls using bolts provided with plastic caps.

Dimensions of windows are specified based on the requirements of the construction. The maximum dimension of a CRWZ window is 1200 x 1800 mm; i.e. the window circumference shall not exceed 6,000 mm.

CRWU



CRWU panel is designed for an Inwall OT+ facing.

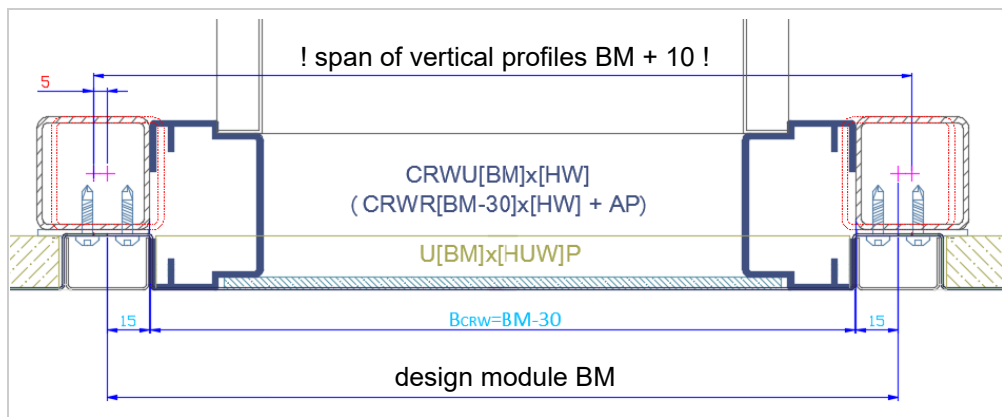
- The frame of the window is made of aluminium profile.
- One sheet of glass (thickness 4 mm) is sealed in the frame.
- Windows are fixed to the bearing profiles by hangers A66446 (2x) and A65698 (2x).

Design

CRWU window is modified CRW window with one side glazing (on request both side glazing).

Standard sizes of windows are same as CRW
(e.g. 1200 x 1500 – multiples of 100 mm).

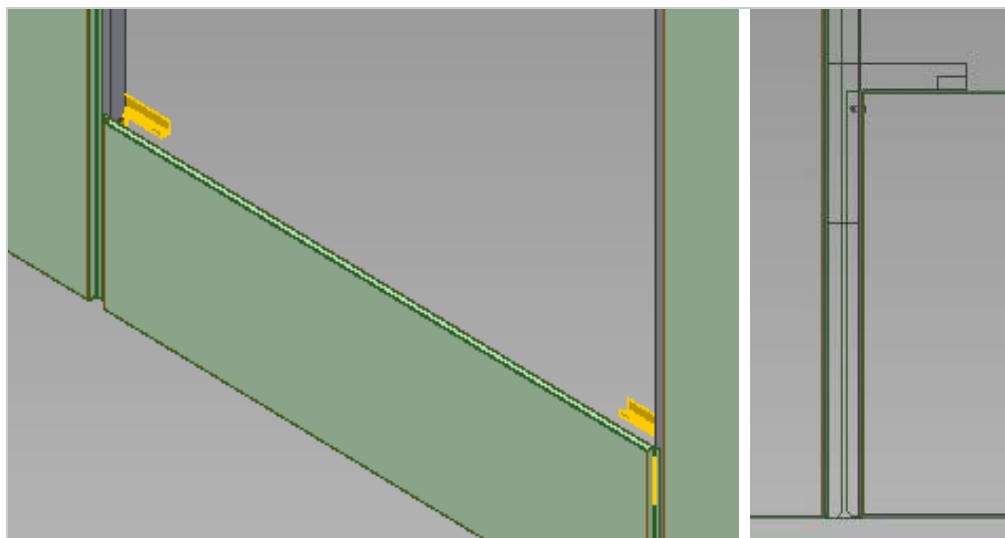
Width of CRWU design module (BM) is width of CRW window + 30 mm (e.g. 1230).



Installation

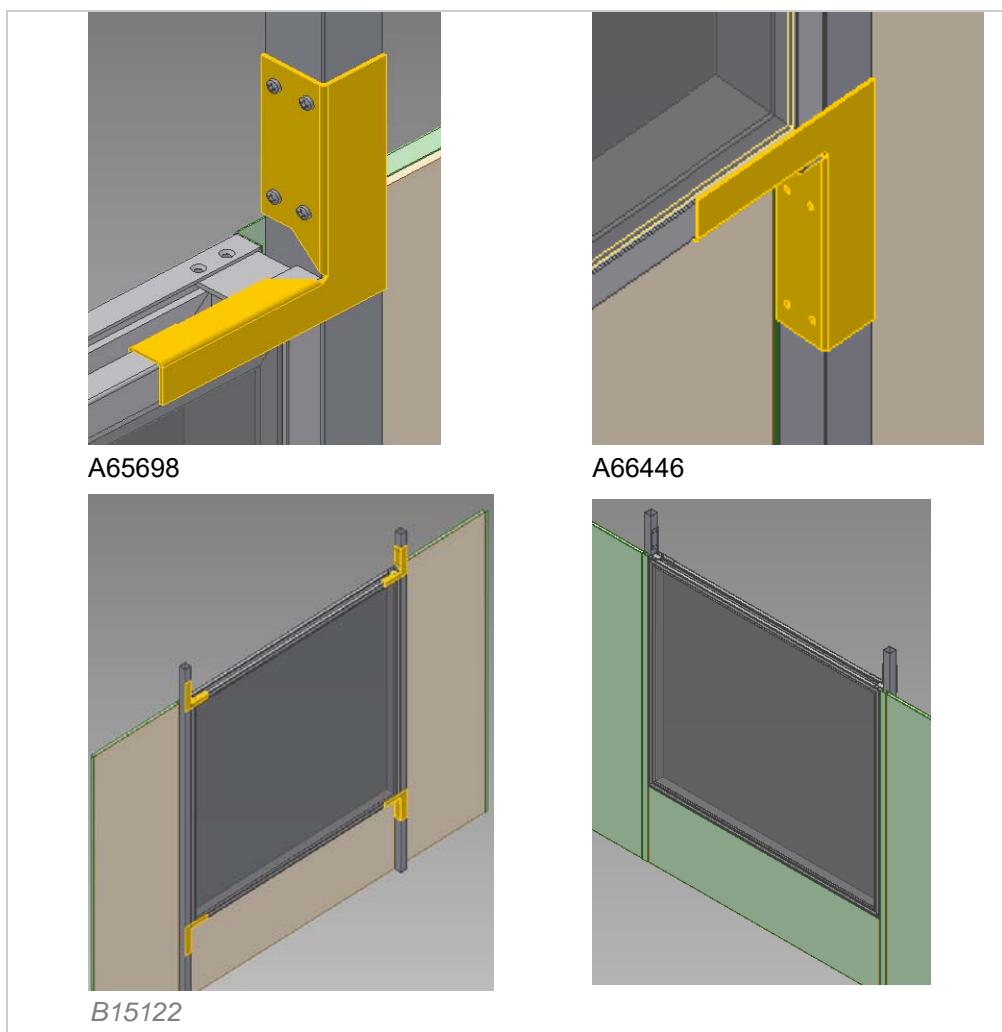
Vertical profiles (40 x 40) of system Inwall OT+ must be offset from the center of the window module by 5 mm (span BM + 10 e.g. for window of width 1200 mm the span is 1200 + 30 + 10 = 1240 mm).

Fasten the lower brackets A65698 + A66446 to the vertical profiles with screws Quadrex:



The position of the brackets corresponds to the upper edge of the under-window U panel.

Insert CRWR window (glazed side to the room) to the brackets and fix it with upper brackets.



Install above-window U panel.

For designing and installation of window with X-rays shielding CWRX for Inwall OT+ see separate document.

CRWV



X-ray shielding

CRWV panel is designed for an Inwall OT facing.

- The frame of the window is made of bent steel profile.
- A sheet glass of 6 mm thickness is glued in the frame and sealed.
- Windows are fixed in the bearing profile by bolts (on vertical window sides only).
- The bolts are covered with a silicone rubber profile.

Windows for Inwall facing can be combined with X-ray protection glass (ask for details).

Sunblinds

All above variants of windows can be fitted with internal sunblinds, manually controlled by detachable knob located in top right corner of the window; standard colour of fins is white. Sunblinds can be operated by an external motor.

In the panel wall structure, not more than 3 CRWM or CRWR windows shall be installed and the total sum of their widths shall not exceed 4,000 mm (= the length of the bottom-mounted panel). Not more than two windows shall be placed one above another.

- Please contact us should you need to place multiple windows next to each other in two rows above each other.

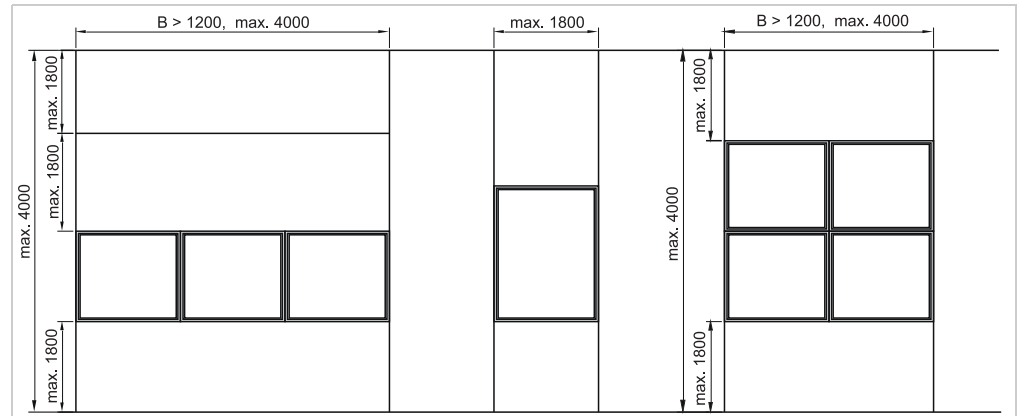


Fig. 24: Overview of configurations with special windows

- If the height of crossbars assembled in the so-called zigzag manner exceeds 4 metres, do not install windows one next to another.

CRWZ, CRWU and CRWW windows can be placed one next to each other in any number, but not more than 2 windows one above another. Every vertical and horizontal joint shall be supported with a bearing profile.

A CRWZ window delivery can be accompanied with bent sheet steel profiles for implementation of various constructional solutions:

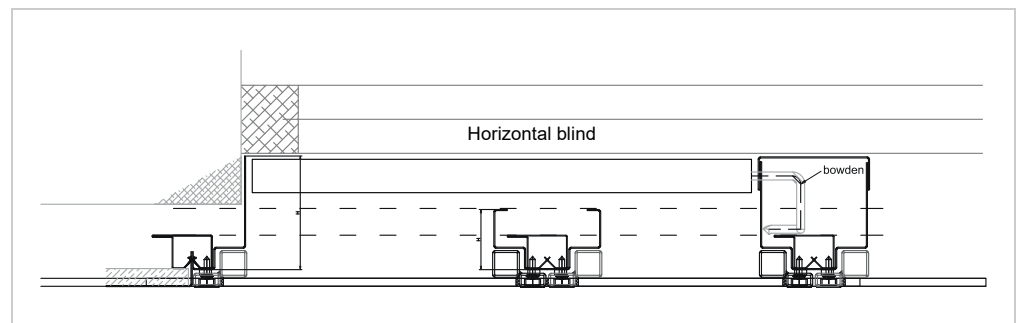


Fig. 25: CRWZ window with steel profiles

Ordering code

Clean Room Doors and Windows

CRW ordering code		CRW	R	0900	x	1200	-	1	3
				[mm]		[mm]			
CRW	Glassed-in panel (clean room 'window')			Width B*		Height H*			
M	For type M panels								
R	For type R panels								
D	For double colour/stainless partition of R panels								
Z	In Inwall Click facing								
V	In Inwall OT facing								
U	In Inwall OT+ facing								
X	For OT+X (with lead glass)								
G	For Gr (EI45) type panels								
F	For Me panels (EI15)								
Dimensions									
Type of (outer) glass									
-	Clear glass			Float		(Standard)			
E	Clear tempered safety glass			ESG					
S	Clear multi-layer laminated glass			VSG					
Frame	See table of materials on page 5					CRWD - front side			
Rear side	See table of materials on page 5					for CRWD only			

Assembly

Doors and windows are supplied including fitting parts. The assembly procedure is specified in a drawing that relates to the given door type. If a customer requires atypical frame fixing or fixing in another wall type, it is necessary to specify this detail in a separate note for the order: *e.g.: brick wall fixtures*.

To accurately assemble doors a flat floor and precise dimensions of structures according to building plans are required. Assembly is not included in the delivery of doors. If required by the customer, FläktGroup can arrange assembly through an external assembly company.

Maintenance and service

In accordance with the relevant cleaning schedule, observe the points below:

- Clean and disinfect the surface of doors and windows (have the list of tested cleaning agents on request; if different cleaning agents are used the quality of the surface cannot be guaranteed).
- Do not use agents that can damage the surface (e.g. steel wool, sands).
- Check the integrity of electrical parts (signalling, interlocks, drives)

Warranty terms

Warranty terms form a part of the commercial agreement and comply with the provisions of the commercial or civil code. The manufacturer guarantees that the product quality complies with the declared technical conditions. The manufacturer shall be held liable for the product throughout the warranty term stated in the agreement.

Warranty claims during the stated period are not accepted, if the product is used in contradiction to the original documentation, was damaged due to improper transport, storage, assembly or maintenance.

ESG glass is susceptible to SPONTANEOUS BREAKAGE. We recommend to order additional HST test (EN 14179) for supplementary charge. Without this test the breakage can not be accepted as a reason for a warranty claim.

Certification

The doors and windows are certified by the Technical and Test Institute for Construction, branch Prague, state enterprise (TZUS).

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CLEAN ROOM DOORS
AND WINDOWS

EXCELLENCE IN SOLUTIONS

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