Vertiv™ SmartAisle 2

User manual

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Technical Support Site

If you encounter any installation or operational issues with your product, check the pertinent section of this manual to see if the issue can be resolved by following outlined procedures.

Visit https://www.vertiv.com/en-us/support/ for additional assistance.

Version	Revision Date	BOM	Revision
1.0	29-06-21	31013717	R0

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Safety Precautions & Measures

In this section, the safety measures related to the entire Vertiv™ SmartAisle 2 will be explained in detail.

- Read the manual prior to installation and operation of the unit. Only qualified personnel should move, install, or service this equipment.
- The user reads and takes into account all the precautions, compliance, and safety measures before working on the equipment. The unit control must be used exclusively for the purpose which it is intended for; the manufacturer takes no liability for incorrect use or a modification to the unit control

WARNING! Please read this manual carefully before installing, maintaining and troubleshooting; especially the Warning/ Danger/ Caution information in the User Guide. Apart from the User Guide, also pay attention to the warning labels on the unit and its components.

This manual is retained for the entire service life of the machine. The user must read all the precautions, danger, warnings, and cautionary measures mentioned in the manual prior to carrying out any operations on the machine.

Adhere to all the notes, warnings, cautions, potential dangers, and precautions mentioned in the manual. Read this manual before carrying out any operation on the unit.

The Warnings/Danger/Cautions/Precautions/Notes do not represent the entire safety points to be observed and only supplementary in nature. This product is tailored for industrial, commercial, or other professional units (such as manufacturing, electrical, and instrumentation setups) and not meant for purposes related wholly to individuals without the credentials. The purpose of the design is well defined and therefore, the manufacturers do not assume any responsibility for any incorrect usage. Strict adherence to the norms and usage should be observed. In case of any improper use or modifications, the warranty will be void; handle with care, especially the key to the product must be allocated to the service personnel responsible for maintenance.

General Safety Instructions

- Use the tools with an insulation handle.
- Wear rubber gloves and safety shoes.
- Avoid placing tools and metal objects on the battery surface
- Remove the watches, rings, or any metal objects.
- Only after all the power is disconnected, operate on the inner components of the product.
- Before operating on the inner components for any maintenance, you must switch off the mains breaker and all UPS power.
- After an alarm occurs through product monitoring platform, the need for timely find the cause, treatment failure, to avoid more trouble, damage.

Risk of electric shock

There is a risk of an electric shock which may lead to personnel injury or death: To prevent or avoid such a situation, the following points must be taken into account:

Disconnect the control box and remote power supplies prior to working on the product.

Local codes, regulations, and protocols may vary from region to region. Therefore, adhere to all these local protocols and rules prior to installing, operating, or servicing of the machine.

Read all the instructions, ensure that all the parts and components are included, and check the nameplate to ascertain that the voltage matches the available mains; Proceed with the installation, maintenance, troubleshooting, and operating on the machine only after going through the preceding steps.

This product is suitable only for the TT and TN type power grid; it doesn't apply to the IT type power grid.

1 Introduction

Vertiv™ SmartAisle 2 is an intelligent, integrated infrastructure in a self-contained line-up solution that is easy to deploy and tailored for large data centers and computer rooms. All data centers have distinct operation and business objectives. Balancing the data center practices for capacity, space utilization, availability, and efficiency has been tedious owing to the ever-increasing demand in the IT space.

SmartAisle 2 – An enclosed complete data center solution for an indoor environment. With Precision cooling, UPS, power management, monitoring and control technologies and fire suppression integrated into a holistic enclosed system, this smart solution is ideally suited for environments where dedicated IT room improvements are neither practical nor cost-effective. It is flexible as it can be placed unobtrusively into workspaces without the clutter or bulk associated with these kinds of solutions. It is highly effective, economical, interoperable, and makes use of the existing infrastructure or whitespace, avoids expensive room upgrades along with the optional fire suppression system- all in one enclosed solution. This top-notch modular enterprise-grade solution is unique and brings together industry-best practices and latest technologies to enable streamlined management in a compact footprint.

It is an ideal solution tailored for 19” rack hardware device, including servers, voice data, the internet network equipment, cabinets, closure assembly and power supply, cooling, monitoring equipment, equipment for bearer cabinets and is best suited for large data centers.

1.1 Configuration Specification for SmartAisle 2

The typical configuration of the SmartAisle 2 solution is shown in **Table 1-1**.

Table 1-1 Configuration

Parameter	Specifications	
Size	Corridor width	1200mm
	Machine external dimensions	See Section 1.5.3
Overall key indicators	Density levels	Low-density
	Power Architecture	Centralized power supply
	Cooling architecture	Air cooled DX based row cooling units, independent cooling modules
	Structured Cabling	Column header network wiring closet
	Fire architecture	External fire, borrow building
	The total number of U-bit single module	1008 (single cabinet 42U, including the network cabinet)
	Redundant power supply	2N
	The average power consumption of a single cabinet	4kW
	IT power consumption single module	92kW
	Single refrigeration module	105kW
	Altitude	Less than 1000m (air conditioning derating more than 1000m)
	Mounting	Raised floor or ground installation
Voltage standard	Voltage	(380 ~ 415) Vac ± 10%, 3N ~
	Frequency	50Hz / 60Hz
Colour	Pantone 877C + RAL7021	

1.2 Salient Features

Vertiv™ SmartAisle 2 has several distinct features that make it an outstanding utility for mid-tier and large data centers.

- Efficiency

Close control of precision air cooling with an exact match with the thermal load using a variable capacity system that provides focussed cooling with high energy savings

- Intelligent Monitoring

Enables supervision and management of the environment, equipment, electric doors, roof and alarm linkage intelligent control system in a centralized manner for the administrator.

- Convenient Operations & Maintenance

Use of electric door anti-pinch safety and access control systems improves the user comfort and safety experience.

- Security Management

Use of electric doors and roof-emergency response system that enables enhanced security feature.

- Intelligent Lighting

The integrated 3-color bright lights, set display, illumination and easy-to-understand interface to facilate appropriate space lighting needs.

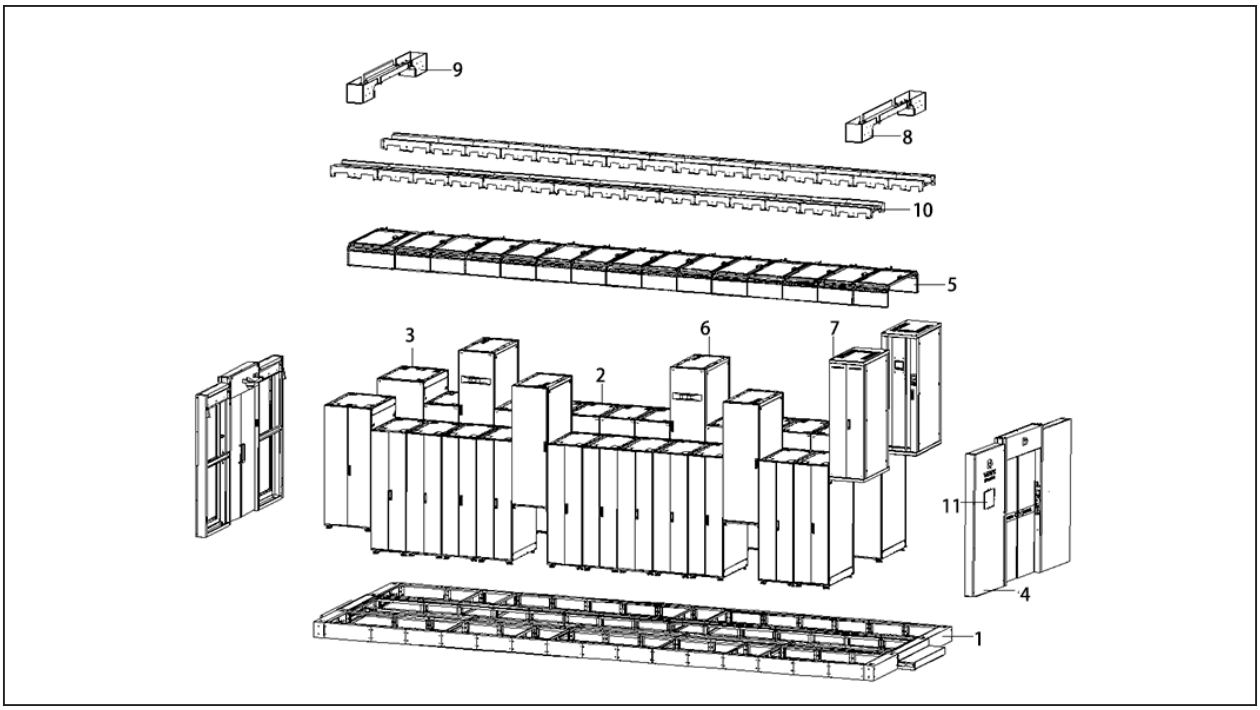
- Human Machine Interface

A 15-inch large control panel which is quite intuitive and advanced enables administrators and facility managers to visualize the entire system operation in real time.

1.3 Appearance and Components

The bifurcation of all components that constitute the Vertiv™ SmartAisle 2 solution is depicted in the following figure (Refer **Figure 1-1**);

Figure 1-1 SmartAisle 2 layout diagram



ITEM	DESCRIPTION
1	Base
2	Server Cabinet
3	Network Cabinet
4	Access door
5	Top Plate
6	A/C Column
7	Distribution Cabinet
8	Strong wire passage groove
9	Power cable trunking; copper and fibre cable tray
10	Cabinet top wire groove
11	Control panel

Configuration of Components

The base enables achieving a common ground to mount the entire machine equipment, eliminating the need to set up static flooring and providing pipeline space.

The cabinet is an ideal utility for 19 "rack-mount hardware, including servers, voice, data, Internet, and other network equipment.

Closure assembly (Access door & Roof) enables achieving closure of the hot and cold aisles, personnel access control, and linkage opening function.

Lighting provides an environment within the channel display, operation, and maintenance of lighting and warning prompts.

A bridge from the distribution cabinet helps realize the connection related to the capacity of the network cabinet to the circuit between the enclosure management functions.

Distribution cabinet power distribution equipment enables achieving the functionality to provide 19” rack-mount hardware.

Refrigerant equipment helps realize a 19” rack mount hardware cooling.

Monitoring device enables achieving the USMS (meaning supervision of Power, Cooling Temperature, Humidity, Water, and Leakage) equipment monitoring and control linkage.

Local Display helps administrators or the concerned facility managers by presenting information to achieve the overall capacity, 2D and 3D temperature fields, alarms, and PUE to name a few.

1.4 Environmental Requirements

1.4.1 Operating conditions

The installation site of the Vertiv™ SmartAisle 2 should be such that the product is away from heat and environments where there is a presence of easy-to-produce sparks, direct sunlight, corrosive gases, and organic solvents.

Operation Conditions are shown in **Table 1-2**:

Table 1-2 Operation Conditions

Parameters	Values
Installation location	The maximum deviation during the product installation at ground level must be less than 0.5mm/m; The maximum equivalent horizontal range of the Indoor and outdoor air-conditioning is 50m. Height difference ΔH: -8m≤ΔH≤30m
Application areas	Large data centers, Mid-size Data centers, Equipment & IT rooms
Ambient temperature	Indoor: 0 °C ~ 40°C Air Conditioners: -20 °C ~ + 45 °C, such as a cryogenic assembly; minimum outdoor working temperature is - 34 °C
Environment humidity	5% RH ~ 90% RH (30 °C, no condensation)
Altitude	<1000m, greater than1000mDerating
Power Characteristics	(380 to 415) Vac ± 10%, 3N ~

NOTE: For detailed installation techniques for the air conditioning and power distribution equipment along with the requirements, refer to the product's user manual.

NOTE: For the Air conditioning derating, contact the Vertiv local office.

1.4.2 Storage Environment

Table 1-3 Product storage environment

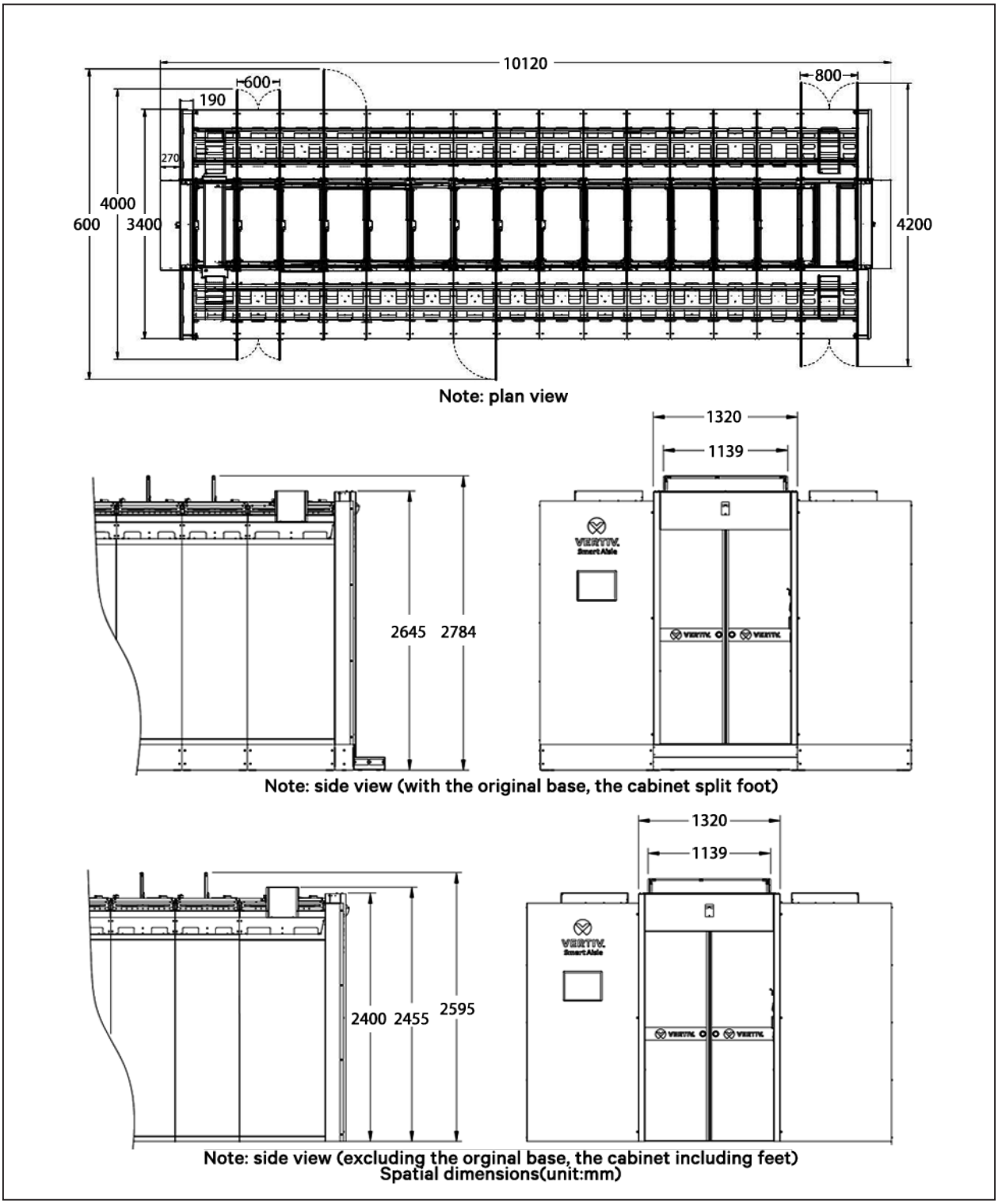
Parameters	Values
Storage Environment	Room should be clean and clear of dust and debris
Environment humidity	5% RH to 95% RH (non-condensing)
Ambient temperature	-33 °C to + 70 °C

1.4.3 Space

Interior space side

Leave enough space for installation, maintenance, repairs and cooling; The space required to open the door shown in **Figure 1-2**.

Figure 1-2 Interior space side (Indoor)



NOTE: Ensure to check the back door open space in front of the cabinet during product installation.

NOTE: Always check and confirm the frame before mounting the product and the spacing between the projecting outer enclosure level bridge.

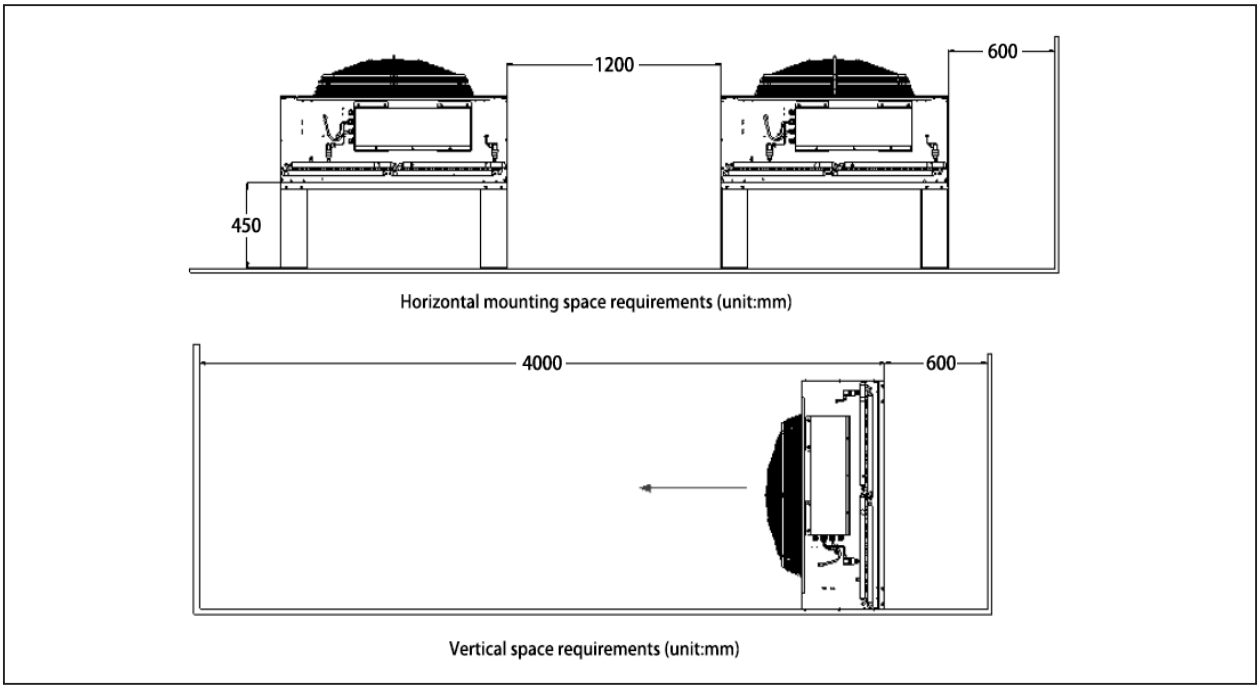
NOTE: Confirm the opening height space between the bridge, lighting, plumbing, and ceiling after the roof opens prior to installation

NOTE: The rear cabinet door and the door from the wall end of the channel reservation must have an appropriate distance between them to ensure easy access to equipment shelves for the maintenance personnel.

Outdoor space

Maintain sufficient space for servicing and repairs around the condenser installation position. The detailed space requirements are depicted in **Figure 1-3**.

Figure 1-3 Outdoor Space



NOTE: Barrier free condenser outlet is 4000mm.

NOTE: Keep a space of 600 mm from the front and rear sides of the condenser for maintenance and repairs.

1.4.4 Indoor unit and outdoor unit distance

If the one way equivalent length is over 30m, or if the vertical height difference between the indoor unit and outdoor unit exceeds the values shown in **Table 1-4**, contact the Vertiv local office or office of the local dealer to ascertain the need for additional components to extend the pipeline and other measures

Table 1-4 Perpendicular to the indoor unit and outdoor unit level difference

Relative position	Drop
The outdoor unit is higher than indoor unit	Maximum: + 30m
The outdoor unit is below the indoor unit	Maximum: -8m

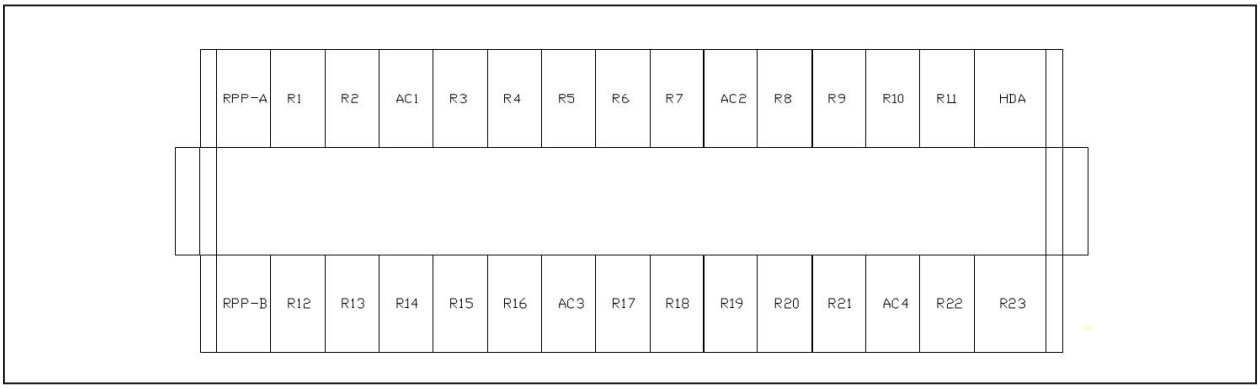
1.4.5 Load-bearing

A typical configuration of the Vertiv™ SmartAisle 2 product is as follows: weight of about 9 tons, an area of about 32.6 sq m, and heavy user equipment is considered the bearing capacity post the installation

1.5 Configuration program

The layout typical configuration is shown in **Figure 1-4**.

Figure 1-4 Configuration Layout



The typical configuration list of Vertiv™ SmartAisle 2 is described in **Table 1-5**.

Table 1-5 Typical configuration list

Classification	Project	Product number	Quantity	Remark
Cabinets	600 wide server cabinet	SR-E061120T	24 Nos	
	800 wide server cabinet	SR-E081120T	1 set	
	800 wide network cabinet	SR-E081120T	1 set	
Cabinet Accessories	Cabinet side panel	E-1120S	1 set	
	Vertical cable management panel	IRS-A-CV / E	12 sets	
	Windshield side cabinet	/	2 sets	
	Rectangular cable management unit	IRS-A-CR	16	
	Fixed light load tray	IRS-A-SFL	24	
	1U Blind	IRS-A-B1	24 sets	
	2U blanking plate	IRS-A-B2	24 sets	
	3U Blind	IRS-A-B3	24 sets	
	1U blind plate with a brush	IRS-A-B1P	24 sets	
	PDU	IRS-PL30NN32	46	
Cooling	Indoor air conditioning unit	CR035RA138SS12E10000PV000	4	
	Air Conditioners	LSF42-R3 – Option 1	4	Ambient temperature 35 °C
		LSF52-R3 – Option 2	4	Ambient temperature 40 °C
		LSF76-R3 – Option 3	4	45 °C ambient temperature
	Monitoring Card	ES025RA SIC card assembly	4 pieces	
Supply and distribution	Distribution Cabinet	/	2	
Channel closed	Access door	SA-D1220SEY	1 set	
	600 open skylight	SA-TR0612P	13	
	800 open skylight	SA-TR0812P	1 item	
	SPM open skylight	SA-TP0612P	1 item	
The traces	Strong cross-channel electrical trunking	SA-WAQ121210	1 item	
	Weak trough cross- channel	SA-WAR122610	1 item	
	Roof slot width 600	SA-WR06103009	28	
	800 Roof wide groove	SA-WR08103009	2 pieces	

Classification	Project	Product number	Quantity	Remark
Base	600mm wide base	SA-SR061125	28	
	800mm wide base	SA-SR081125	2 pieces	
	The base access door	SA-SD121125	1 set	
	Positioning the base member	SA-SF121125	6 pieces	
Administration Kit	Administration Kit	SA-MP	1 set	
	Lighting Kit	SA-LP12C	1 set	
	Kit control panel	SA-DP15	1 set	
Management and other host	RDU-M management host	RDU-MI	1 set	
	Smart Device Expansion Card	IRM-4COM	1	
Security	ID card reader	CHD601S	2	
	IP Access Controller	CHD806D2M3	1 set	
	ID card	RFID01A	10	
	Exit Button	EP68	2	
	ID card dispenser card	CHD603B-U	1	
	POE Network HD IR Dome	ES-HND200-EI	2	
	Standard 8 NVR	ES-RN080201-C	1 set	
	2T hard disk	Seagate SV35.5-2T	2	
	POE Smart Switch	H3C S2626-PWR	1 set	
Engineering materials (for field)	Industrial Connectors	IEC 60309 32A 1P	46 sets	
	Single phase cables PDU	ZA-YJV	Several	Feeding rack PDU
	Air conditioning phase cable	ZA-YJV	Several	Air conditioning power cable
	Single-phase power supply line electric door	ZA-YJV	Several	Electric gate power cable
	Cable	Cat6	Several	Communication with the monitoring system
	Control Cable	AWG	Several	Communication with the monitoring system
	Crystal Head	RJ-45	Several	Cable splicing
	Cable tie	/	Several	Tie line with
	Static flooring	600x600x32mm calcium sulfate	1 set	When there is a base

The kit configuration management is described in **Table 1-6**.

Table 1-6

No.	Product name	Product number	Quantity
1	Open controller	IRS-SA-CB	1
2	RDU-A G2	IRM-HOST2	1
3	8 digital / analog output expansion card	IRM-8DOAO	1
4	Temperature and humidity sensor	IRM-S02TH	6
5	Sound and light warning light	IRM-S01AN-B	2
6	Infrared Detectors	IRM-S01IN	1
7	Flooding tape - 10 m	IRM-S01W (10m)	2
8	4 digital input sensor	IRM-S04DI	1
9	Magnetic Roof state	IRM-S01DN-B	3
10	The top button open	IRS-CF-CS	2
11	The top button open the protective cover	IRS-CF-CC	2
12	Cable set top open	IRS-SA-SW	1

The kit Illumination configuration is described in **Table 1-7**.

Table 1-7 Illumination configuration kit

No.	Product name	Product number	Quantity
1	Lighting Controller	IRS-SA-LB	1
2	Rocker	IRS-SA-LS	1
3	Lighting cable set	IRS-SA-LW	1

The Kit control panel configuration is shown in **Table 1-8**.

Table 1-8

No.	Product name	Product number	Quantity
1	Control panel	IRS-SA-PN	1
2	Screen control cable set	IRS-SA-PW	1

The kit RDU501 configuration management is shown in **Table 1-9**.

Table 1-9

No.	Product name	Product number	Quantity
1	Open controller	IRS-SA-CB	1
2	RDU501 data sampling unit	RDU501	1
3	8 digital / analog output expansion card	EXP8DOAO	1
4	Temperature and humidity sensor	IRM-S02TH	6
5	Sound and light warning light	IRM-S01AN-B	2
6	Infrared Detectors	IRM-S01IN	1
7	Flooding tape - 10 m	IRM-S01W (10m)	2
8	4 digital input sensor	IRM-S04DI	1
9	Magnetic Roof state	IRM-S01DN-B	3
10	The top button open	IRS-CF-CS	2
11	The top button open the protective cover	IRS-CF-CC	2
12	Cable set top open	IRS-SA-SW	1
13	HDMI cable 5m	IRS-SA-HDMI-5m	1

2 Installation

In this section, info about installation tools, transportation, unpacking, inspection, installation constraints and procedures will be explained in depth to enable users to get to grips with the process.

NOTE: The Vertiv™ SmartAisle 2 product is on the heavier side and there is a risk of severe injury if not handled properly. Read all the instructions carefully prior to unpacking, shifting, or installing the unit.

NOTE: Wear sturdy safety helmets, gloves, shoes, and glasses while handling the equipment due to sharp edges, objects, and buckles. Prior to moving the equipment such as Cabinets, air conditioning, or the distribution utility, measure the doorways, freight height, or the freight elevators to avoid damage to the stuff or the building.

2.1 Installation Tools

Figure 2-1 shows the pictorial depiction of some of the generic installation tools.

Figure 2-1 Generic installation Tools

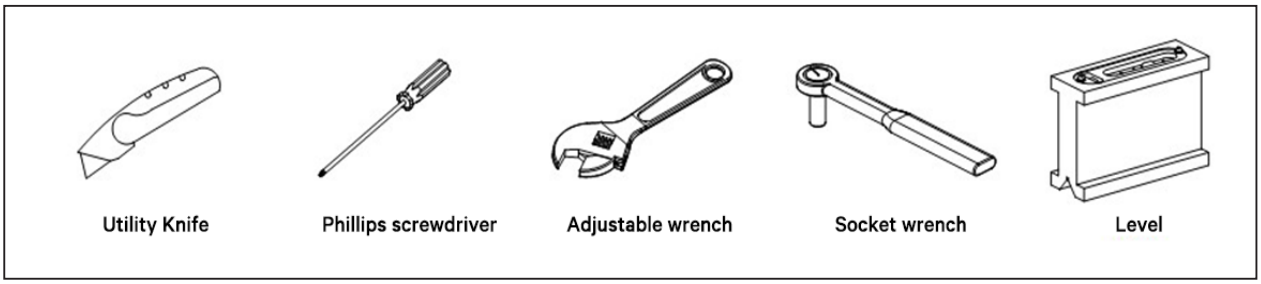


Table 2-1 Installation Tools

Name	Use
Utility Knife	Removing all kinds of packaging equipment
Phillips screwdriver	Tighten the screws when mounting the components
Small flat-blade screwdriver	Install low-voltage terminal devices
Adjustable wrench	Adjust the various types of equipment feet
Socket wrench	Tighten the nut when installing the components
Level	Horizontal leveling control display
L Allen key	Hex bolts mounting the top plate
Line laser	Vertical projection, the level of the laser beam, vertical-horizontal adjustment device
Drill	Install the door frame on the ground
Rubber hammer	Structural parts mounting position fine adjustment tap
Pliers	Cutting the top plate rib hole modulus
Ladder	Equipment installation height

2.2 Equipment handling, unpacking, inspection

Vertiv recommends rail or shipping for the product transportation. If road is the only option, choose less bumpy roads to prevent equipment damage.

The size and weight of the package of each component is depicted in **Table 2-2**.

Table 2-2

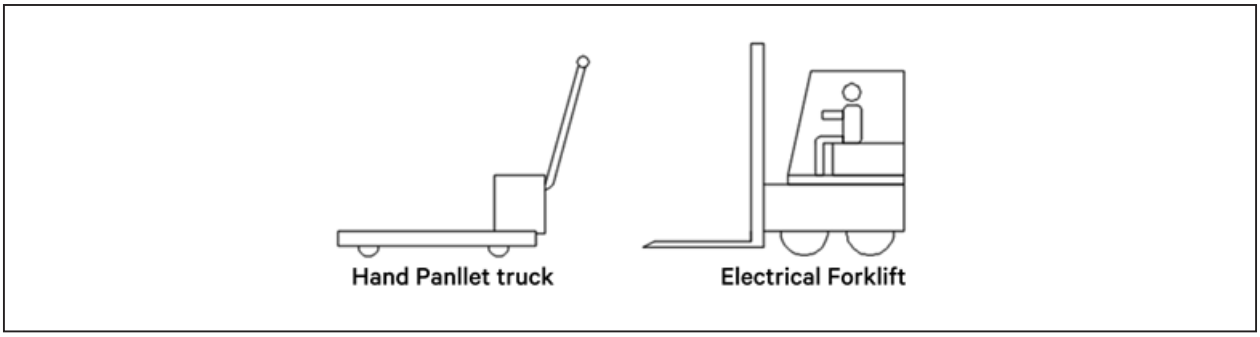
Package	Size range (unit:mm)			Weight range (unit:kg)
	W	D	H	
2000mm height mechanical sliding door for 1200mm width aisle (two ends)	2720	1200	1500	<700
2200mm height mechanical sliding door for 1200mm width aisle (two ends)	2720	1200	1500	<735
2000mm height motorized sliding door for 1200mm width aisle (two ends)	2720	1200	1500	<700
2200mm height motorized sliding door for 1200mm width aisle (two ends)	2720	1200	1500	<735
300mm width fixed roof plate for 1200mm width aisle	1328	418	264	<10
600mm width fixed roof plate for 1200mm width aisle	1328	718	264	<18
800mm width fixed roof plate for 1200mm width aisle	1328	918	264	<24
600mm width openable roof plate for 1200mm width aisle	1328	718	264	<20
800mm width openable roof plate for 1200mm width aisle	1328	918	264	<27
600mm width fixed roof plate for SPM for 1200mm width aisle	1328	718	264	<18
800mm width fixed roof plate for SPM for 1200mm width aisle	1328	918	264	<24
600mm width openable roof plate for SPM for 1200mm width aisle	1328	718	264	<20
800mm width openable roof plate for SPM for 1200mm width aisle	1328	918	264	<27
120mm width cross row overhead cable bridge for power cables	1377	277	540	<16
300mm width cross row overhead cable bridge for data cables	1377	412	540	<24
300mm width rack top mount cable channel	677	392	265	<7
600mm width rack top mount cable channel	742	667	265	<10
800mm width rack top mount cable channel	942	667	265	<14
Rack plinth for 300mm x 1100mm in-row equipment	397	322	345	<11
Rack plinth for 600mm x 1100mm in-row equipment	697	322	345	<16
Rack plinth for 800mm x 1100mm in-row equipment	897	322	345	<19
Aisle sliding door access plinth (two ends)	1436	726	1015	<225

Package	Size range (unit:mm)			Weight range (unit:kg)
	W	D	H	
Plinth fixture kit	1002	177	340	<21
Kit configuration management	742	567	280	<18
Kit RDU501 configuration management	592	562	360	<21
Kit Illumination configuration	477	412	370	<15
Kit control panel configuration	427	427	170	<5
600 E rack bottom plate	892	167	190	<2
800 E rack bottom plate	892	167	190	<3
300 CRV bottom plate	392	167	190	<1.5

Note: For the different cabinets, power distribution cabinets, air conditioning and other equipment, the package weight and size can be obtained by refering to the specific manuals.

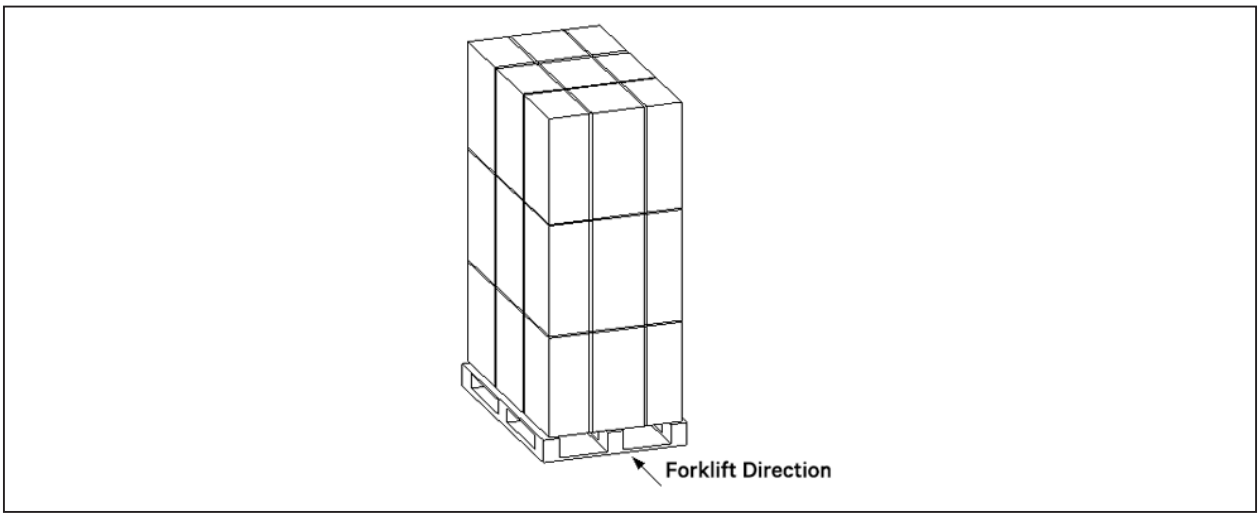
The components and parts need to be shipped to the vicinity of the installation site. Owing to the heavy weight, use machines like a pallet jack or an electric forklift.

Figure 2-2 Forklift and hand pallet



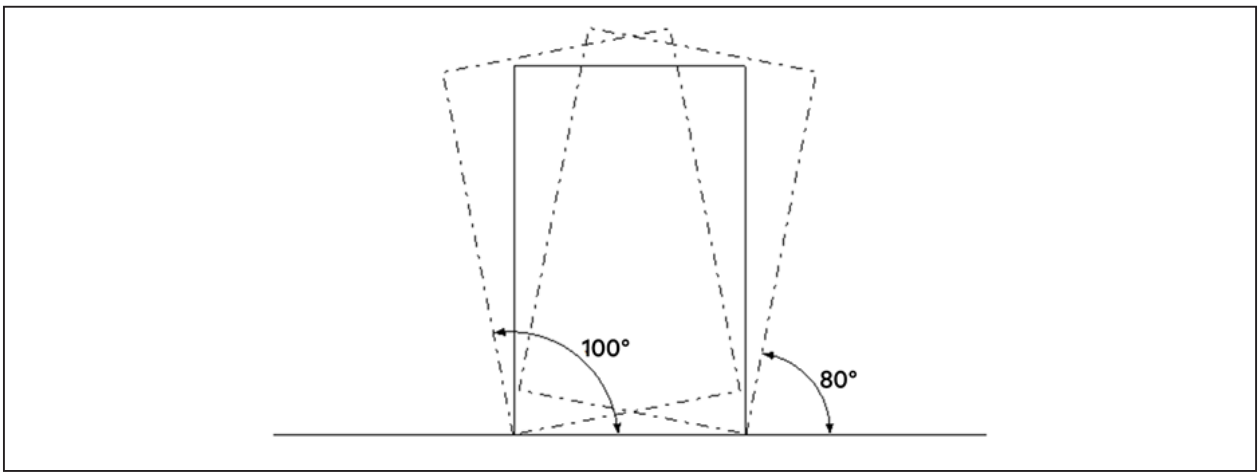
While handling and unloading the equipment and cabinets, the center of gravity of the fork is to be taken into consideration to prevent dumping or equipment damage.

Figure 2-3 Cross direction schematic view



While moving the components, the obliquity should be maintained at an angle of 80° to 100°.

Figure 2-4 Inclination while transporting



NOTE: The devices should remain upright; do not place the unit outdoors.

NOTE: Use a forklift or a pallet jack with the adjustable fork arms open to the widest distance, so that the device is placed just below the pallet. Further, ensure that the fork arm length matches the length of the device.

Packaging material

All the material used in the packaging enclosure is re-cycleable. Either they can be retained for future use or they can be disposed appropriately.

For China, the packaging is done in a carton box. For international locations, a wooden box is utilized. Following are the steps for unpacking the carton box:

1. The product package assembly should be done on an open, solid horizontal surface.
2. During disassembly, open the carton belt with a knife.
3. Remove the device carefully.

4. Carefully, dismantle the film and packaging material on the product with a utility knife.

Following are the steps for unpacking the wooden box for international shipment:

1. The product package assembly should be done on an open, solid horizontal surface.
2. Using a hammer carefully and a screwdriver to dismantle the wooden packaging.
3. Remove the pallet
4. Carefully, dismantle the film and packaging material on the product with a utility knife.

Following the unpacking, confirm the parts and components by referring to the part checklist. If any part is missing or damaged, it has to be immediately moved to the carrier. For concealed damage, inform the local dealer or local Vertiv office immediately

2.3 Installation Precautions

Following are the measures to be adhered prior to installation of the Smart Aisle 2 unit:

1. Close all the doors of the equipment and cabinets before using a forklift to lift the unit.
2. Measure and verify the installation site level prior to installation.
3. Confirm that charging operations are stalled and the installed power is disconnected before installation.
4. For installation of indoor and outdoor air conditioning units, refer to the air conditioning user manual
5. For installation of the distribution cabinet, refer to the specific user manual.

2.4 Installation Procedures

This section deals with the mechanical and electrical installation of the Smart Aisle 2 components.

Ensure that all the installation tools and accessories are in place before proceeding with the installation process. Following is the assembly flowchart for the installation process.

Figure 2-5 Assembly flowchart

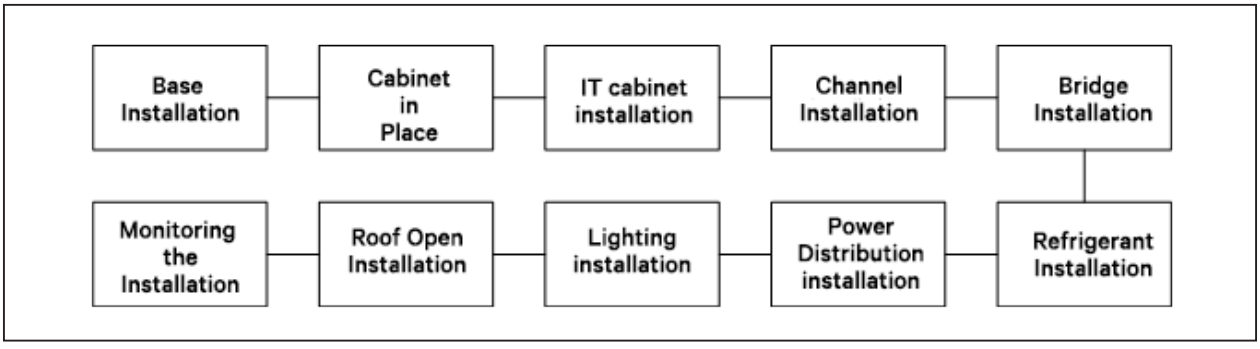
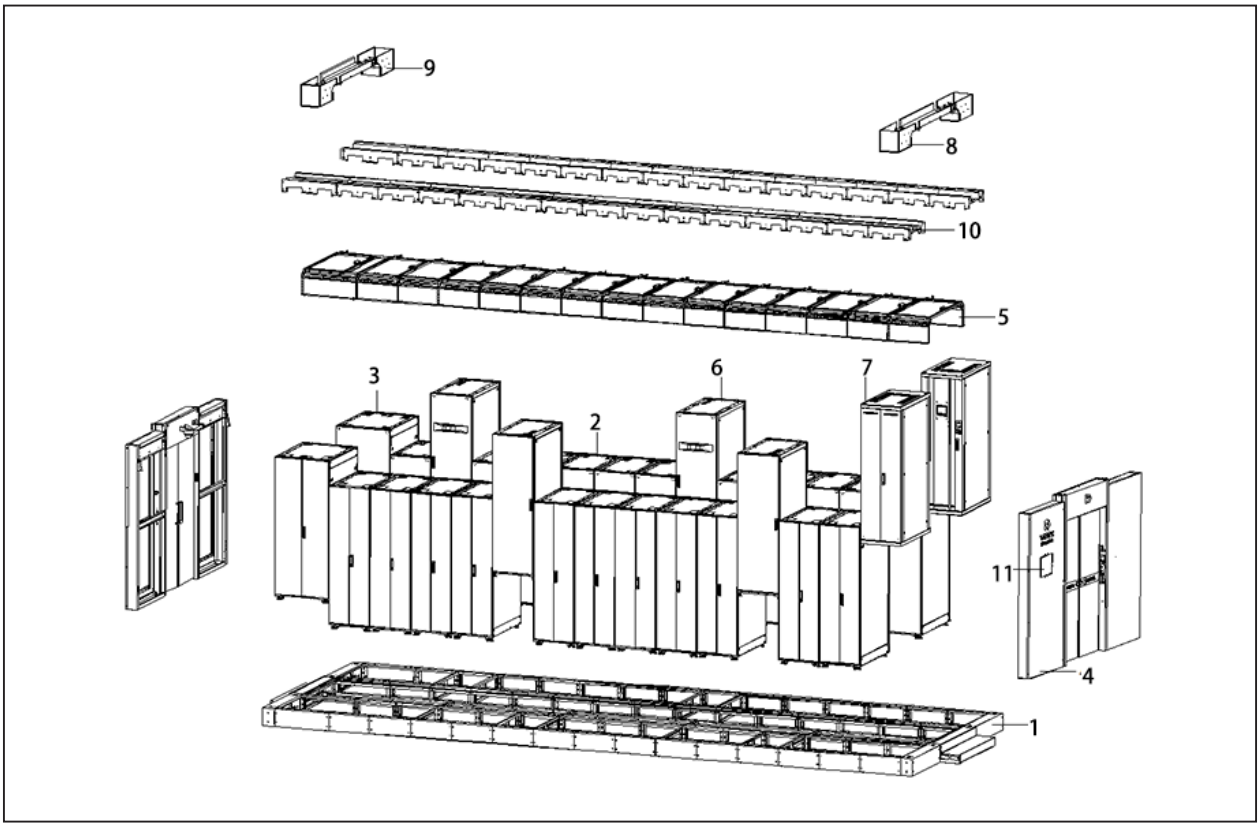


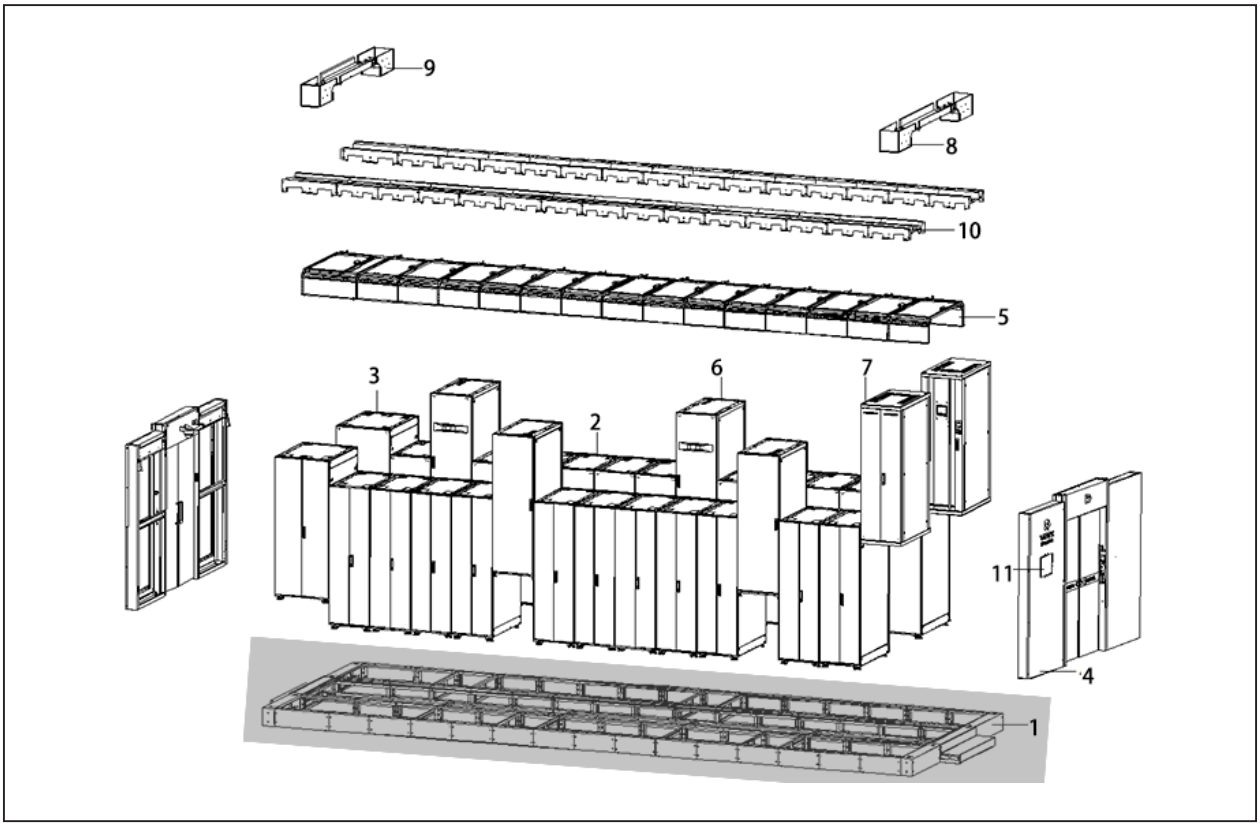
Figure 2-6



S.No	Details of equipment
1	Base
2	Server Cabinet
3	Network Cabinet
4	Access door
5	Top Plate
6	A/C Column
7	Distribution Cabinet
8	Strong wire passage groove
9	Power cable trunking; copper and fibre cable tray
10	Cabinet top wire groove
11	Control panel

2.4.1 Installation of the base

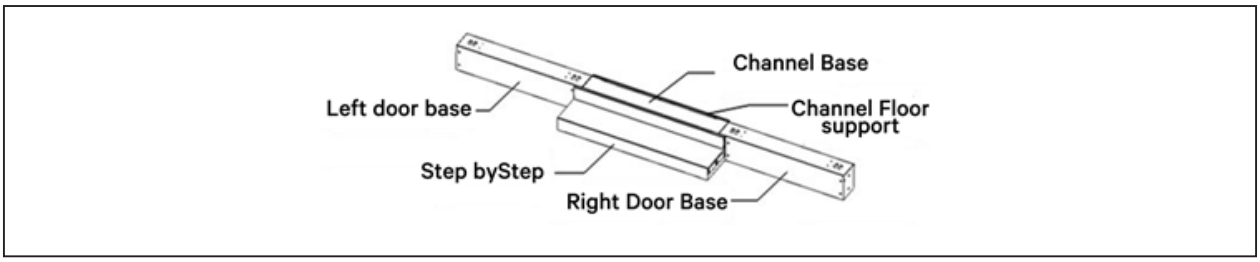
Figure 2-7 Overview of Base



S.No	Details of equipment
1	Base
2	Server Cabinet
3	Network Cabinet
4	Access door
5	Top Plate
6	A/C Column
7	Distribution Cabinet
8	Strong wire passage groove
9	Power cable trunking; copper and fibre cable tray
10	Cabinet top wire groove
11	Control panel

The three parts connected and coupled in steps are the door susceptor by a channel base and the left and right channels of the base door as shown in **Figure 2-8**.

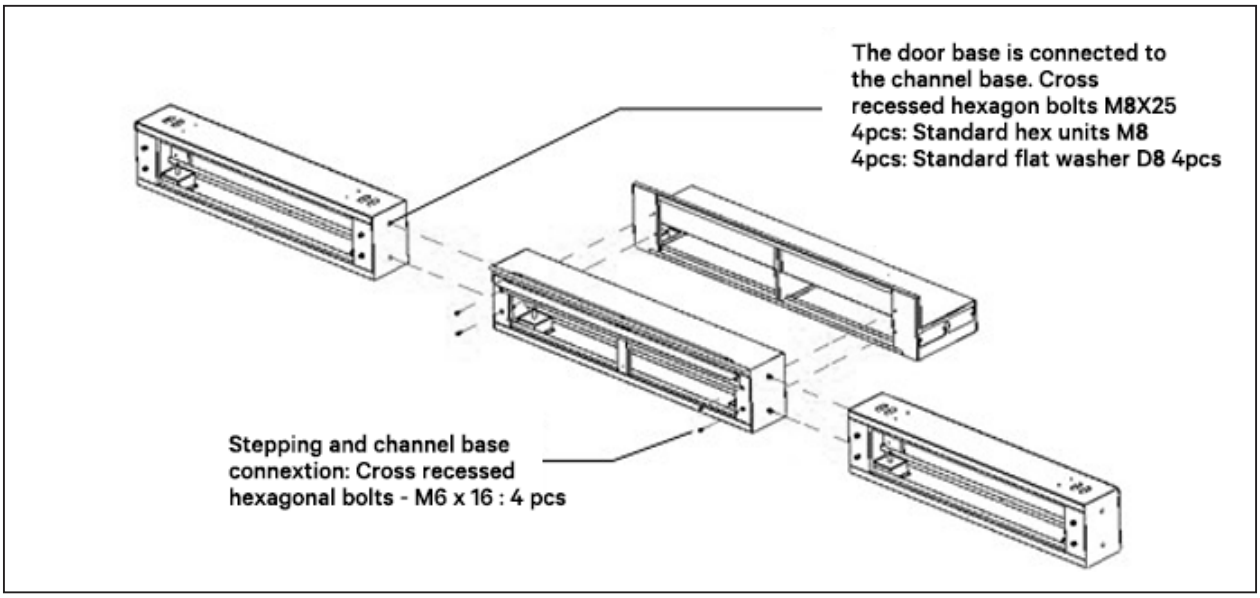
Figure 2-8 Door comprising the base



Door Assembly base

Figure 2-9 shows the base assembly with a door fastener.

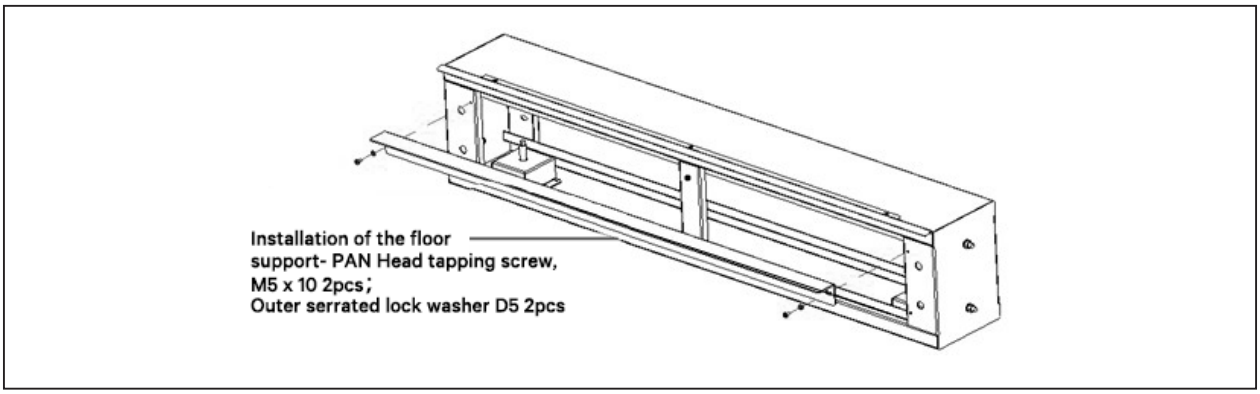
Figure 2-9 Door assembly base



1. Base is mounted inside the channel floor support.

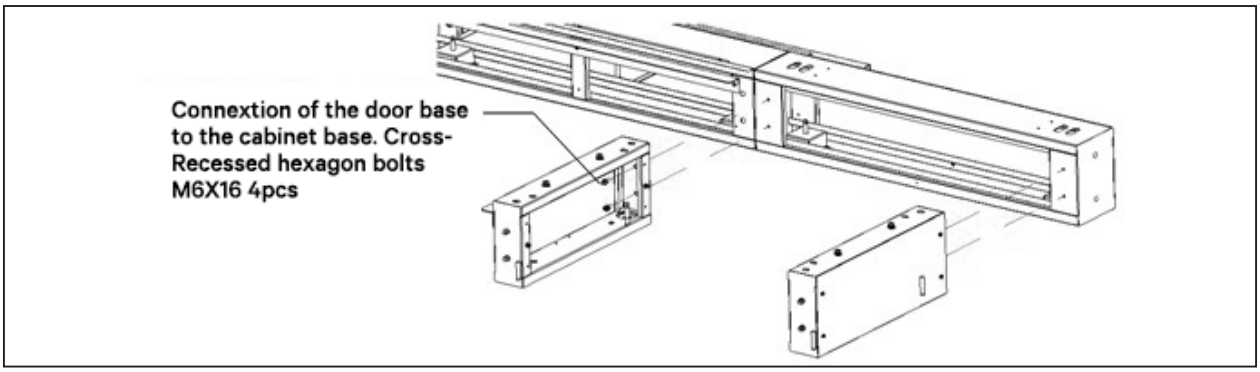
Figure 2-10 shows the support member mounted within the floor channel.

Figure 2-10 A support member mounted within the floor channel



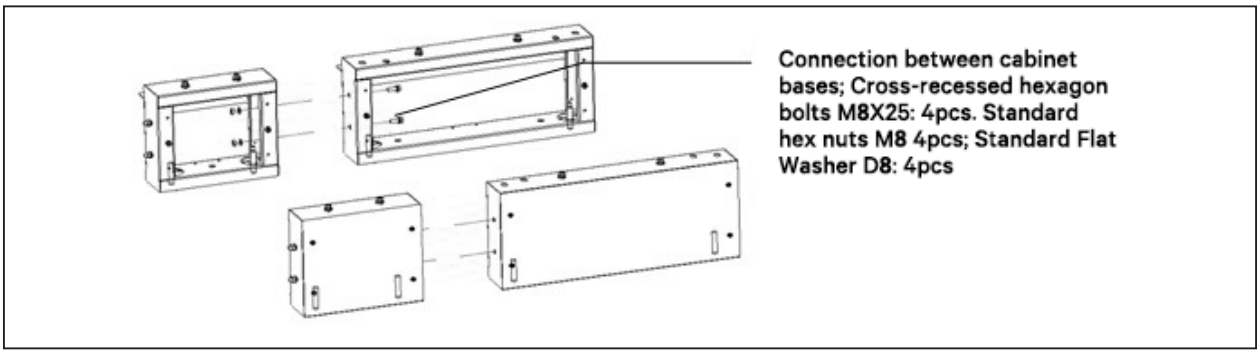
2. The cabinet base is connected to the base of the door pocket and the channel base of the cabinet is connected to the installed floor-side support member with the same base door.

Figure 2-11 Base connected to the base of the cabinet door



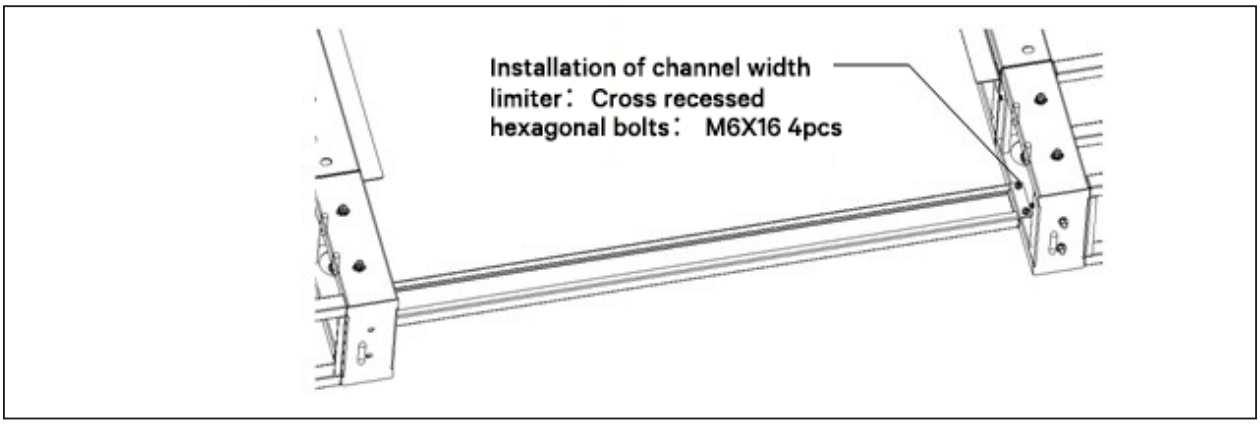
3. The connection between the base of the cabinet includes using bolts and nuts as shown in **Figure 2-12**:

Figure 2-12 The connection between the base of the cabinet



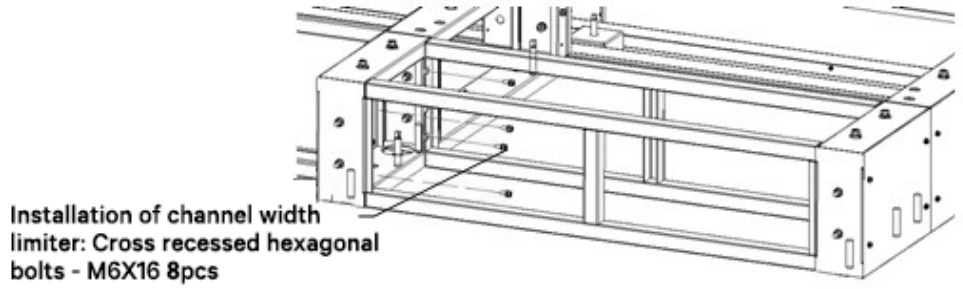
4. While mounting channel width of the stopper member, the channel width stopper base of the cabinet in two rows ensure a pitch of 1200mm. The base of the cabinet is connected to two rows of the stopper member as shown in **Figure 2-13**. Limit the equidistant positioning member mounted in the base assembly as much as possible on completion of the base assembly.

Figure 2-13 Mounting channel width of the stopper member



5. Installing the cabinet depth stop element is done to ensure consistency and depth of the cabinet base is in the specified position with that of the cabinet depth.

Figure 2-14 Installation cabinet depth stop element



NOTE: Stopper must be installed; if a stopper is not installed and that leads to quality issues, the warranty is void as the customer is responsible for it.

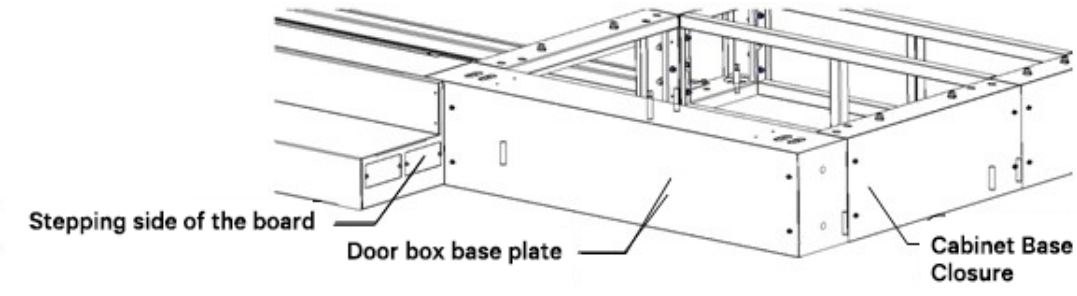
NOTE: Stopper must be installed at each distribution cabinet as well as the base of the air conditioner to facilitate ease of installation

NOTE: Fasteners are not consequential around the base.

2.4.2 Leveling the base

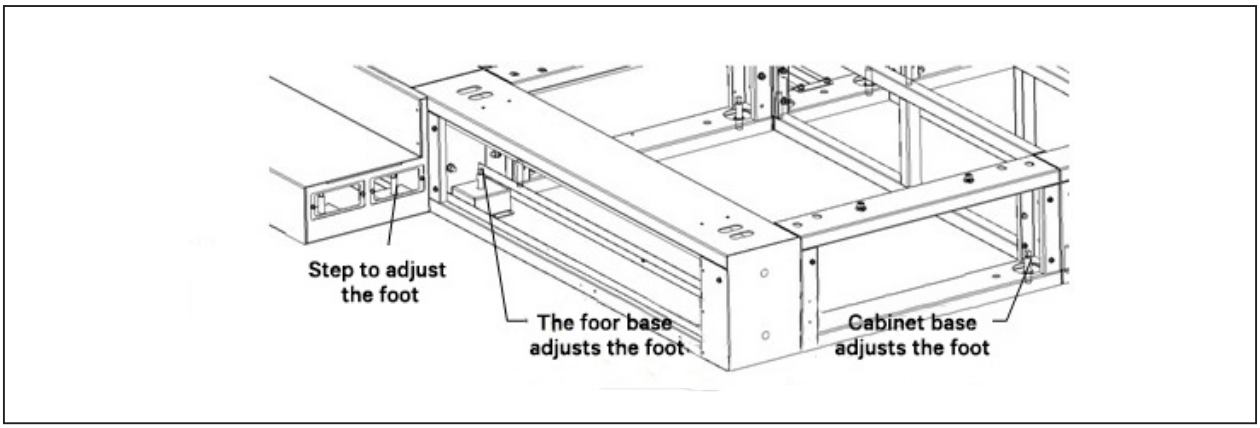
1. **Figure 2-15** shows the removal of the outer base closure plate:

Figure 2-15 Leveling the base of the closure plate to be torn



2. Swing the wrench to the base leveling foot as shown in **Figure 2-16**:

Figure 2-16 Base tone flat feet



3. The nuts and bolts shall be protruding out at their maximum depth throughout the fastener base

NOTE: Levelling the base must be done using a line levelling laser and not on visual inspection by the installation personnel

NOTE: The base must be leveled to meet the cabinet and subsequent installation of a closed system. If quality issues are caused due to uneven surface, the customer is accountable as leveling is mandatory

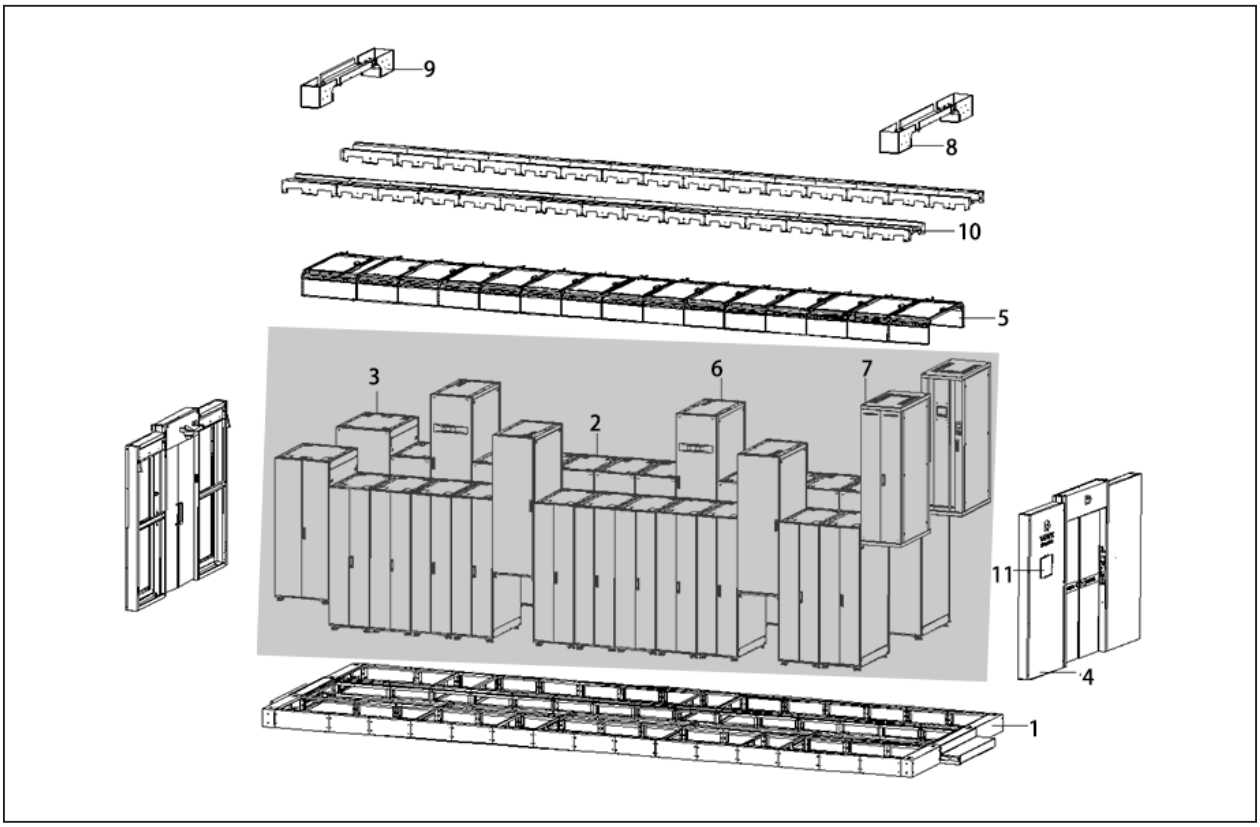
2.4.3 Fixing the base

A base is connected to ground through a fixed orifice. A predetermined ground base fixing hole and ground connection is recommended if there are seismic requirements in the room.

2.4.4 Pre conduit arrangement

The layout diagram of the indoor air conditioning unit is prearranged within the base line and ample length is allowed.

Figure 2-17



S.No	Details of equipment
1	Base
2	Server Cabinet
3	Network Cabinet
4	Access door
5	Top Plate
6	A/C Column
7	Distribution Cabinet
8	Strong wire passage groove
9	Power cable trunking; copper and fibre cable tray
10	Cabinet top wire groove
11	Control panel

2.5 Cabinet Positioning

In this section, IT racks, air conditioning, power distribution, cabinet base, levelling, and cabinet fixing method will be explained in detail.

2.5.1 Removing the cabinet foot

NOTE: During disassembly, multiple personnel are required to prevent severe injury or equipment damage.

NOTE: Incline the cabinet to a specific angle and detach the four feet at the bottom and also remove the four dollars.

NOTE: Vertiv recommends that the cabinet is placed in a step-like edge so that the pin is floating following which the cabinet can be disassembled without a steep angle inclination.

NOTE: Also for the airconditioning and rack-related stuff, refer to their respectiveuser manuals.

2.5.2 Cabinet base

WARNING! During disassembly, multiple personnel are required to prevent severe injury or equipment damage.

WARNING! Each cabinet will move to the base based on the layout placed in an appropriate position.

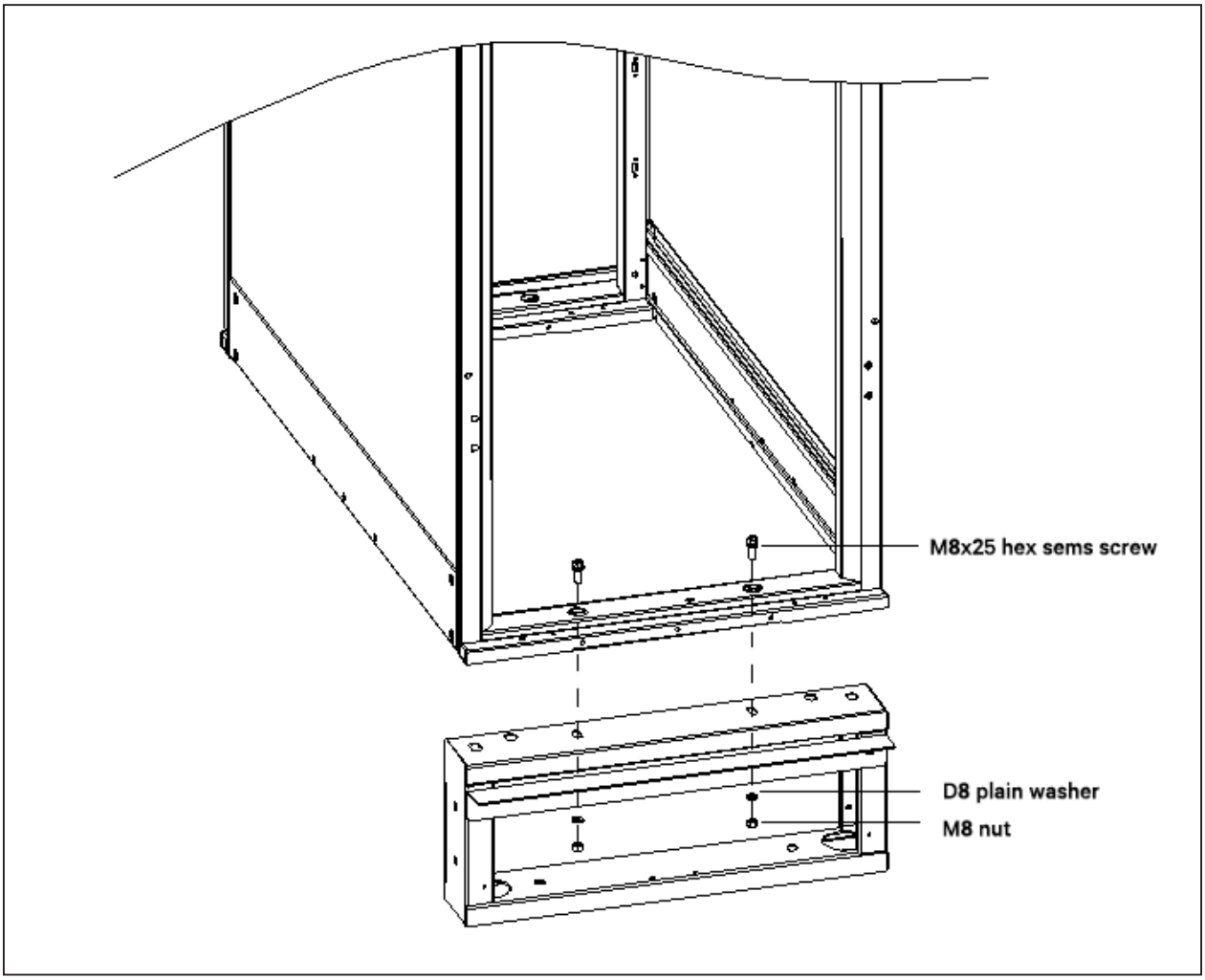
NOTE: Air conditioning and power distribution cabinets along with heavy equipment must be on the base and finally on IT Racks.

NOTE: To reduce weight and facilitate manual operation, the front base and front-and-back doors of the cabinet along with the side plates must be removed.

2.5.3 Leveling the cabinet

1. Use a line level laser and other tools through the cabinet leveling feet when there is no leveling done on the base cabinet.
2. If a base is used, connect the fastener to the base and the cabinet as shown in **Figure 2-18**.
3. As the base has already been leveled earlier, use laser level tools to adjust the connection between the fastener and the base cabinet and fine tune the adjustment shims.

Figure 2-18 Base connected to the cabinet



WARNING! During disassembly, multiple personnel are required to prevent severe injury or equipment damage.

NOTE: Leveling the control cabinet and a base connected to the fasteners isn't necessary.

NOTE: For SPM, Air conditioner, and racks, refer to the respective user manuals for leveling procedures.

NOTE: The cabinet must be leveled to meet the subsequent installation of a closed system; if not implemented and if quality issues occur, the customer is accountable.

2.5.4 Cabinet and Cabinet connections

While the cabinet's own connection between any two pieces of the cabinet and the cabinet, refer to the respective user manuals meaning rack manual for rack-related connections or the CRV manual for the air conditioner.

2.5.5 Fastening the cabinet

Fastener is to be used between the cabinet and base followed by replacing the closure plate base of the cabinet.

2.6 Rack System Installation

The Rack System installation comprises the installation of the cabinet PDU and cabinet accessories. The cabinet PDU hangs on the vertical cable management panel of the cabinet.

NOTE: For mounting the rack PDU, refer to the user manual of the IRS-P Series PDU.

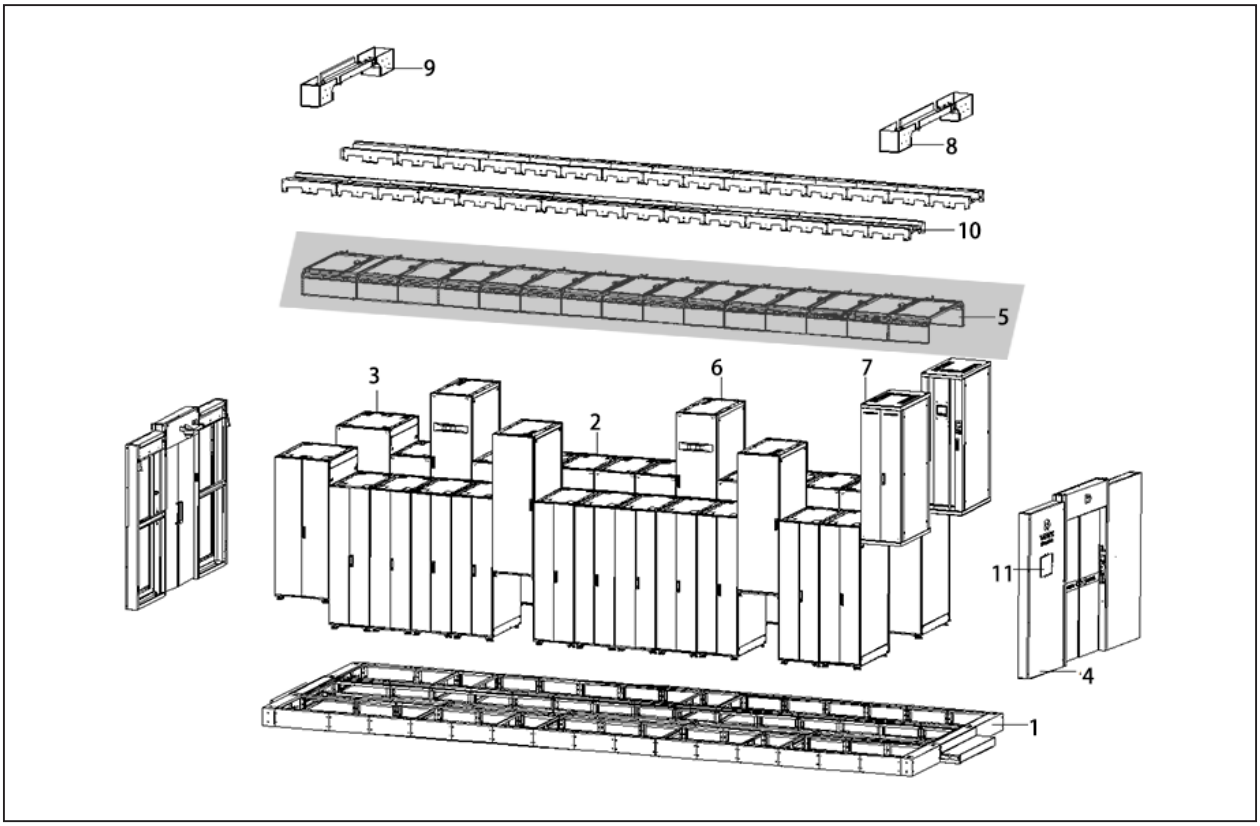
The accessories include a vertical cable management attachment plate, blind plates, trays, and windshield to name a few. Refer to the corresponding user manual on the cabinet accessories for more details.

2.7 Installation of the Channel System

In this section, installation of the roof, electric door, mechanical door,and the bottom of the windshield is explained in detail.

2.7.1 Roof Installation

Figure 2-19



S.No	Details of equipment
1	Base
2	Server Cabinet
3	Network Cabinet
4	Access door
5	Top Plate
6	A/C Column
7	Distribution Cabinet
8	Strong wire passage groove
9	Power cable trunking; copper and fibre cable tray
10	Cabinet top wire groove
11	Control panel

In this section, the roof installation will be explained in depth with the help of schematic diagrams to enable users to get to grips with the procedure.

1. The Roof support mounting as shown in the **Figure 2-20** and **Figure 2-21** includes centering of the cabinet bracket to the left using an L-shaped hexagonal wrench. This is to ensure that the stent plate is flush with the cabinet frame

Figure 2-20 A schematic bracket mounting

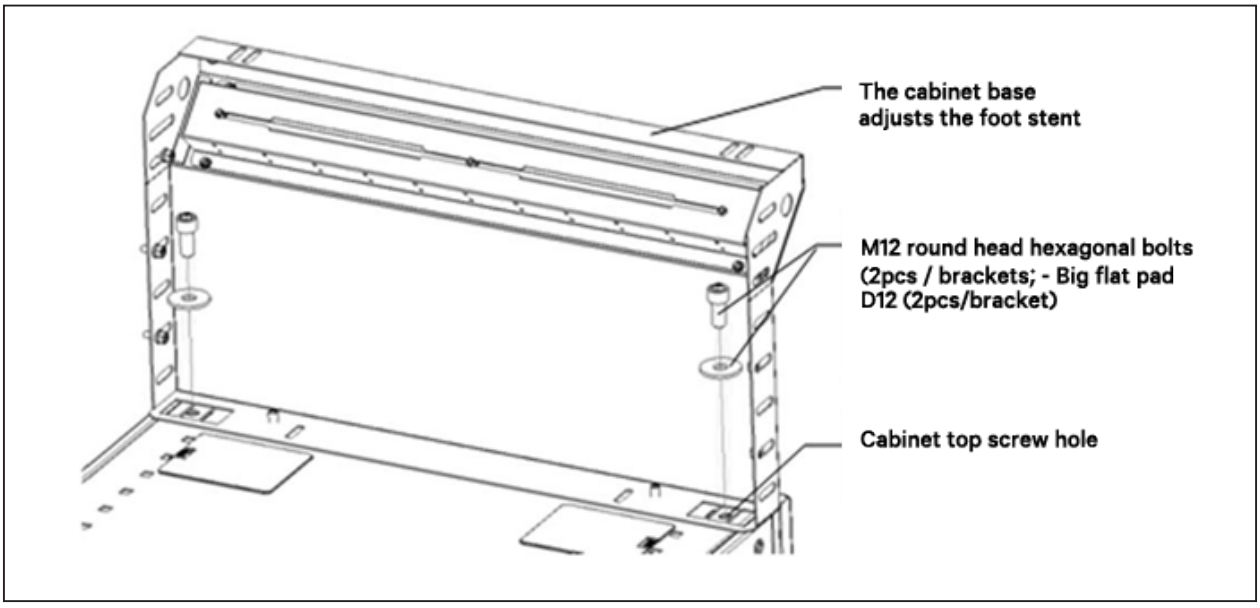
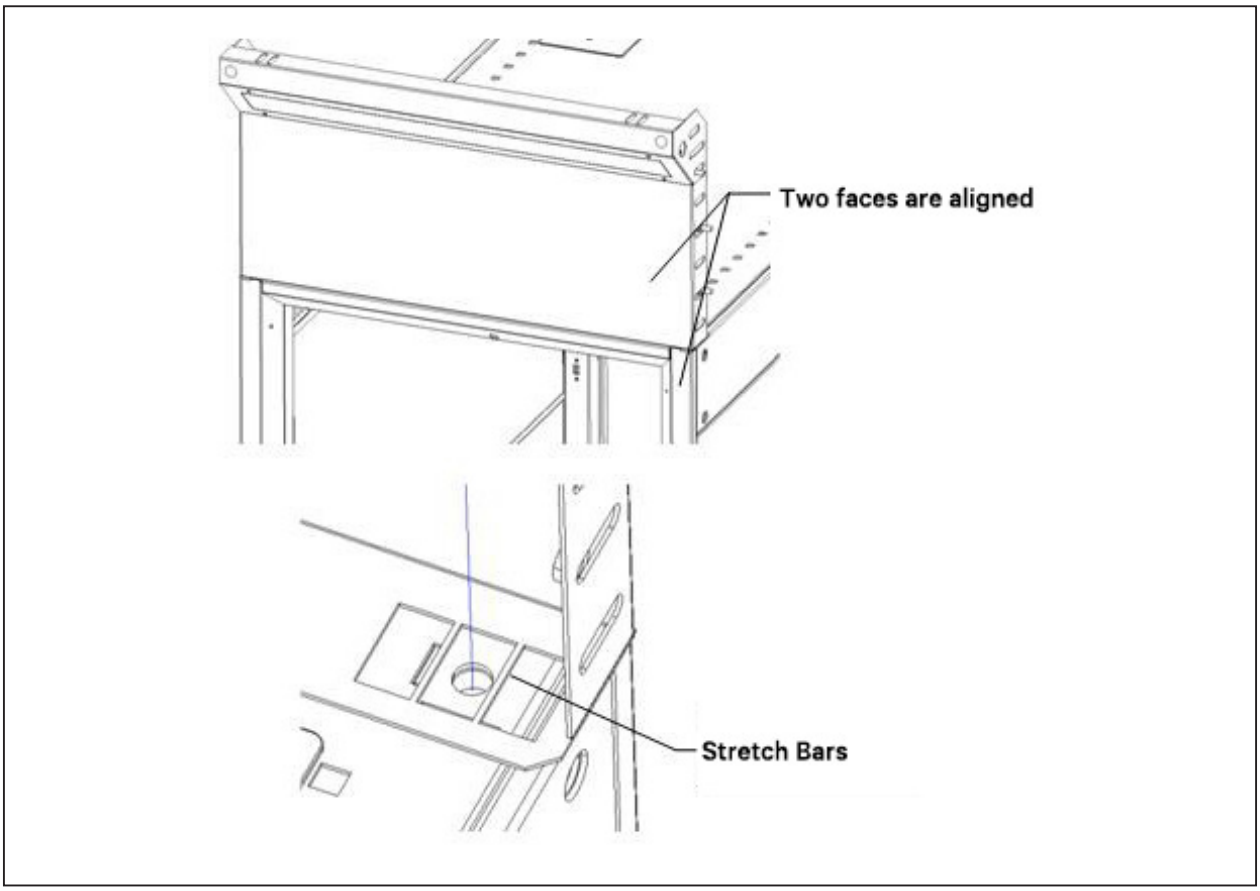


Figure 2-21 Notes bracket installation



NOTE: Support and center the cabinet to the left to facilitate subsequent installation and appearance.

NOTE: Passage stent side surface and the rear post flush is required to assist the installation and appearance.

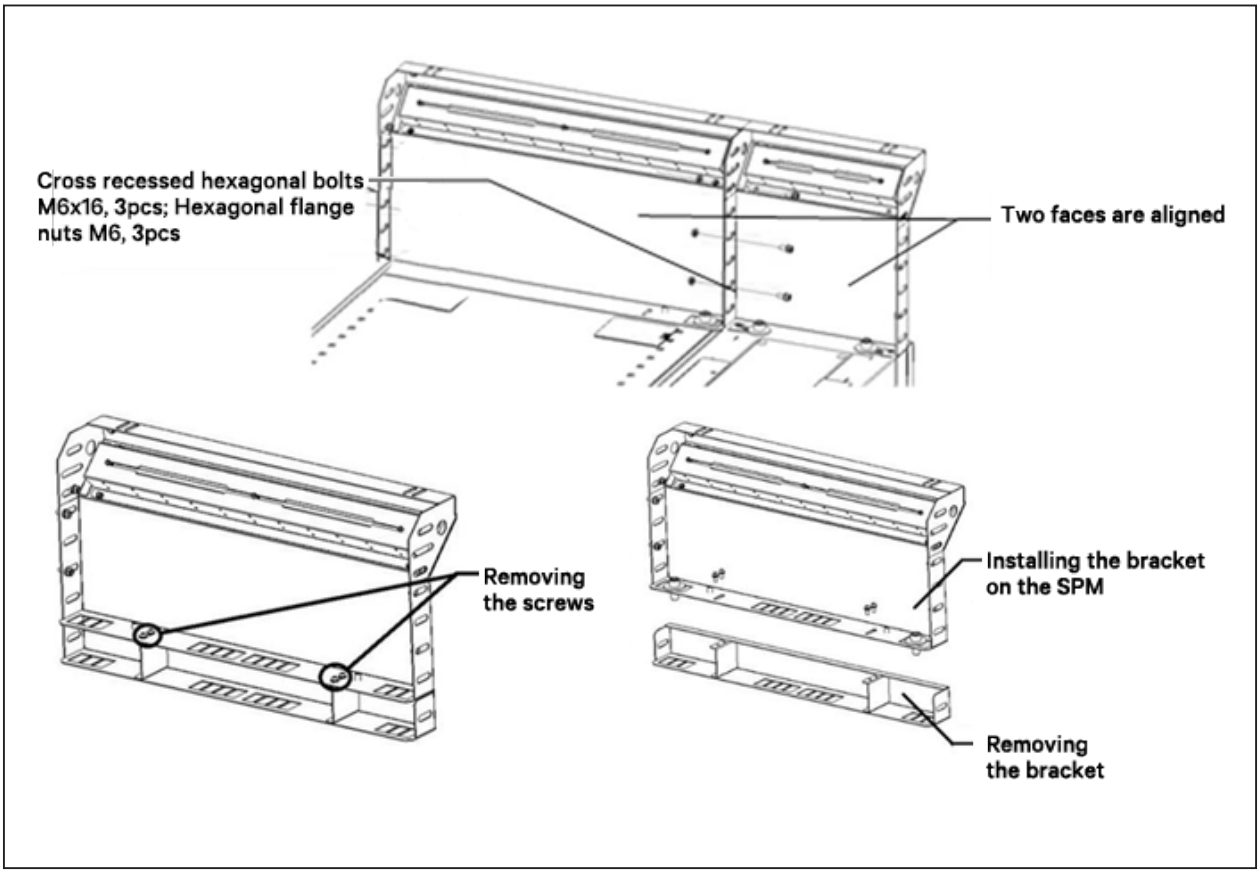
NOTE: There are different specifications of the screw on the top of the cabinet. The cabinet stand is reserved for a variety of modulus hole. If the screw is blocked, the roof scaffold ribs overlap and need to be cut using a plier.

NOTE: For Asia FII in the cabinet, the fastener packages selected for the cabinet bracket belong to the FII(code : 02357590) only.

NOTE: Take utmost care while mounting the brackets as the bracket falling may even lead to severe injury to the personnel.

2. The cabinet is connected with the support by a screw nut at three points. For a highly uniform stent enclosure, ensure that at least one spacer hole is mounted.

Figure 2-22 Roof mounting bracket

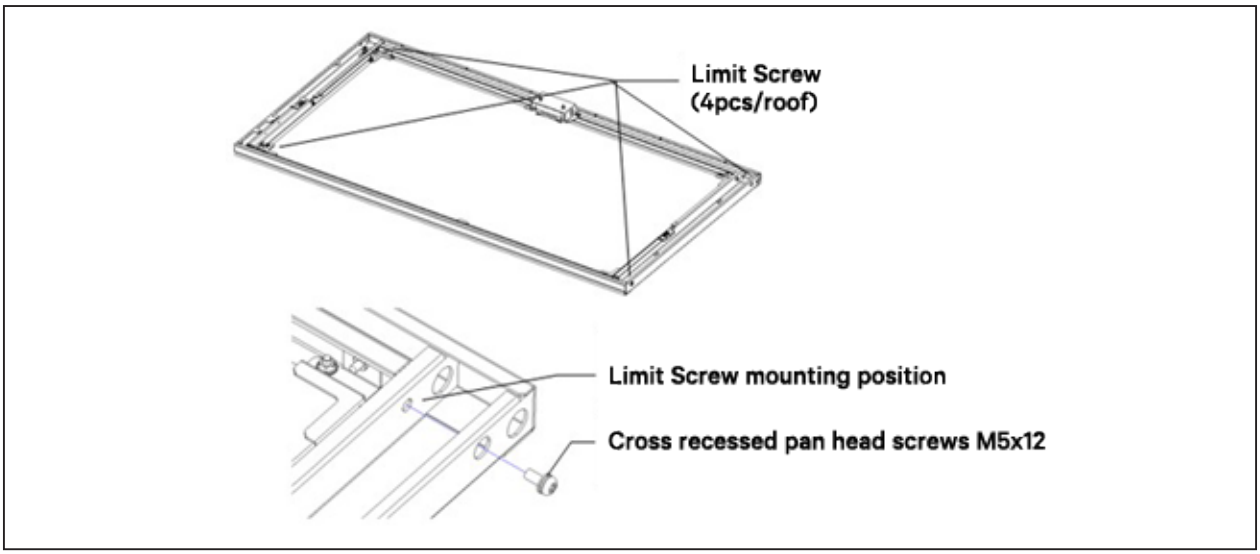


NOTE: Ensure vertical alignment of the two supports while mounting the brackets so that there is no longitudinal displacement or movement.

NOTE: There are five types of specification brackets , i.e. 300 mm wide cabinet for mounting 300mm wide bracket, 600mm wide cabinet mounting for 600mm wide bracket, 800mm wide cabinet mounting for 800mm wide bracket. In addition, the SPM requires a special bracket. Also, remove the height difference of the sealing plate. The SPM also adopts a special bracket corresponding to 600mm and 800mm cabinet enclosure with five types of mounting brackets.

3. In roof installation preparation, remove the factory fitted limit screw from the top plate if the top plate is to be opened in a pivot. The top plate doesn't require any rotation for opening it.

Figure 2-23 Ready to install Roof

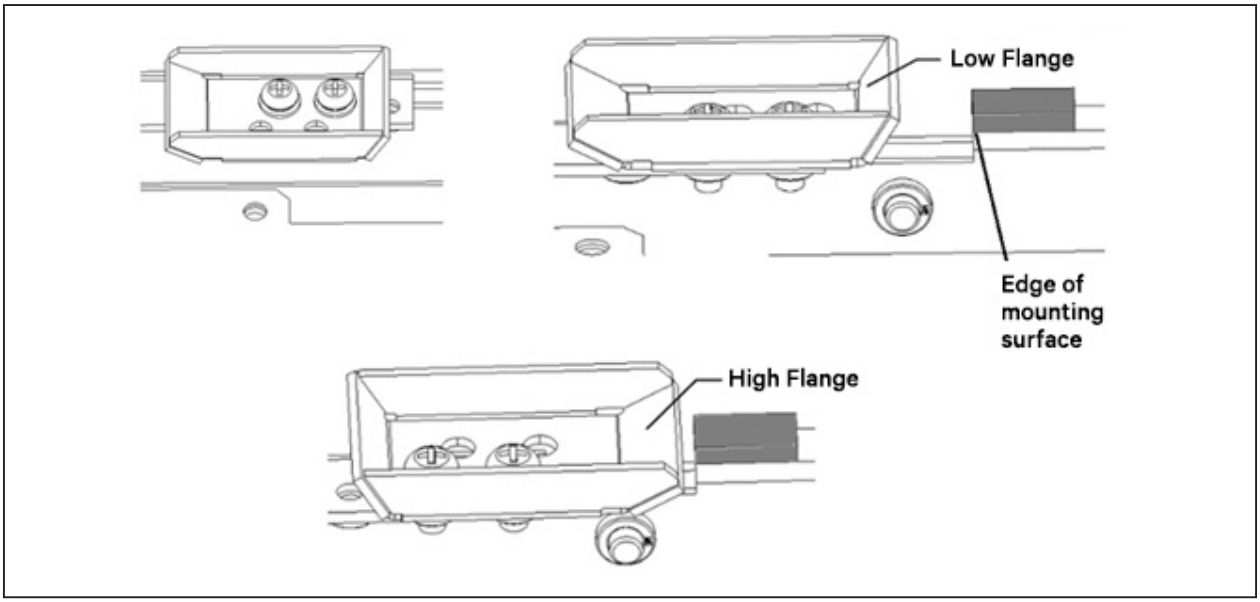


NOTE: Limiting screw during the transport function provides a fixed rotation plate. Confirm that the four screws are removed prior to use.

NOTE: The four screws that are removed can be utilized in the future.

4. Moving forward, the open roof angle must be set. Remove the factory-fitted adjustment fixing plate and rotate it at an angle. Once the corresponding pressing position results in the adjustment, fit the screw for the fixing tabs.

Figure 2-24 Open Angle Adjustment – left to right direction at an angle of 30°to 60°



NOTE: If the factory adjustment is such that there is no need to adjust the angle, skip the preceding step.
NOTE: Low flange extends out of the mounting surface edge at a roof opening angle of 30 degree; high flange extends out of the mounting surface edge at a roof opening angle of 60 degree; ether high or low flange do not extend out of edge indicate roof open angle maximum.
NOTE: By timely fixing the screws, the position of the tab moves up thereby helping avoid the influence of the rotation adjustment tab.

5. Next steps for roof installation involves the top plate to be mounted on the bracket with nut screws around it.

Figure 2-25 Roof installation

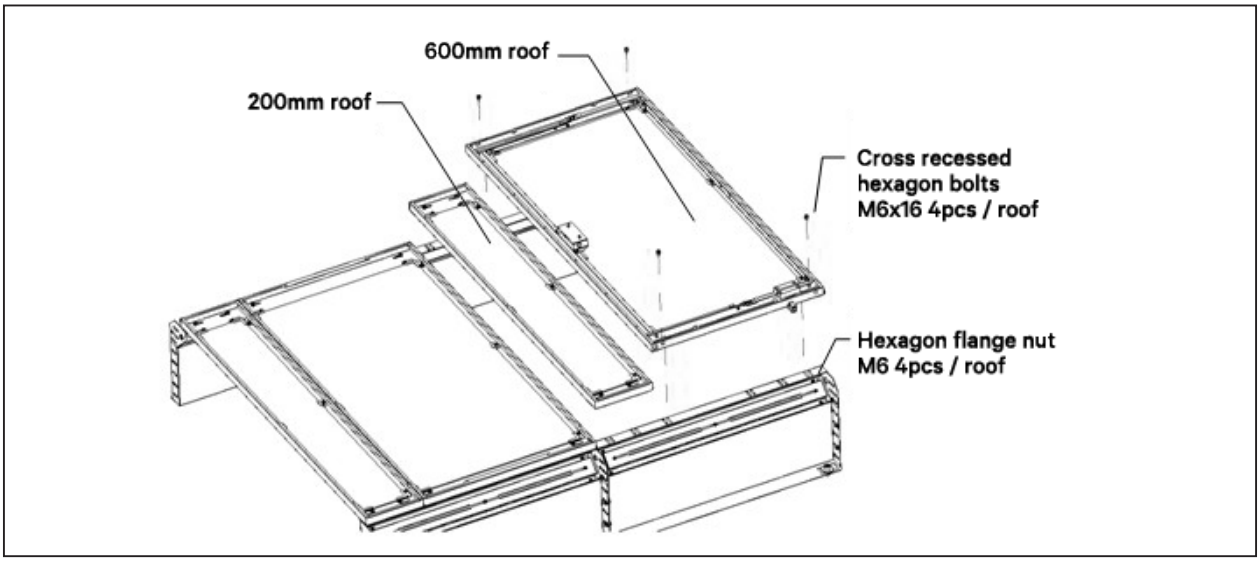
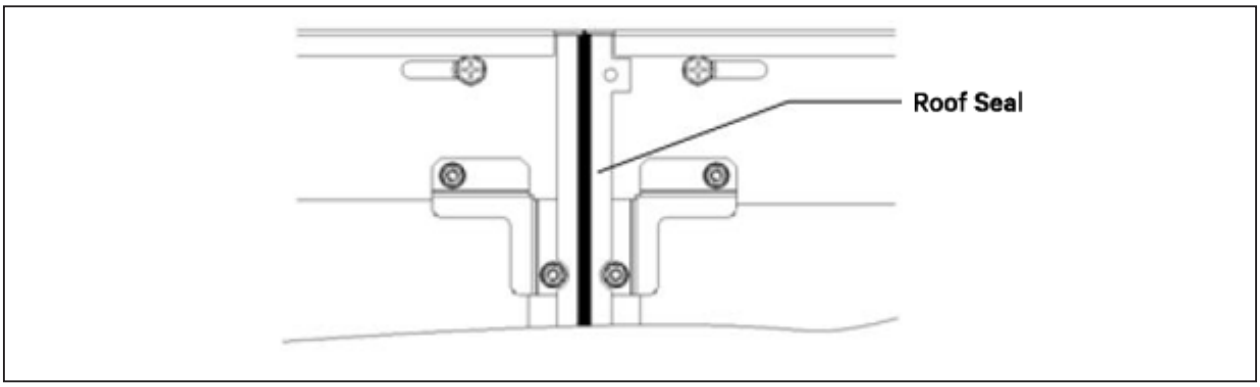


Figure 2-26 Seal between the top plates



NOTE: Based on the width of the rack, a fixed roof of 300mm is mounted on the 300 mm wide cabinet, 600mm is mounted on the 600mm wide cabinet, 800mm/wide cabinet is mounted on a 600mm top plate with an additional top plate of 200mm.

NOTE: An open top plate is fixed to meet two objectives which are field selectable based on the requirements.

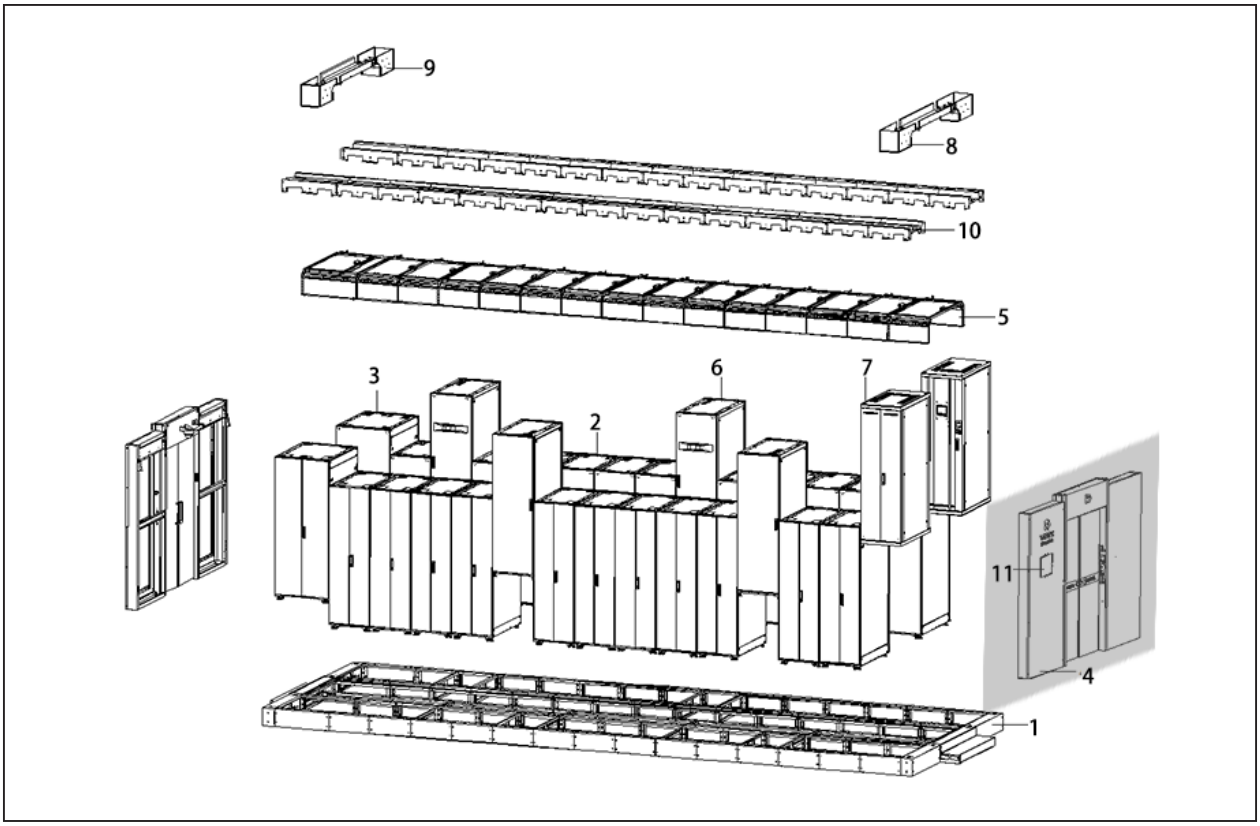
NOTE: Seal only one side of each roof to ensure that there is a seal between the top plate and the roof during installation; however, do not touch the mounting of the sealing strip.

NOTE: Ensure the alignment of each channel with the mounted top plate, else it will affect the operation and appearance of the roof opening.
NOTE: The passage to the respective top panel and the center of the channel should be symmetrical. The top edge of the bracket mounting surface of the mounting rim must be aligned correctly to avoid leaks.

NOTE: Install the roof carefully to avoid severe injury to the personnel in case the roof falls.

2.7.2 Installation of electric gates

Figure 2-27

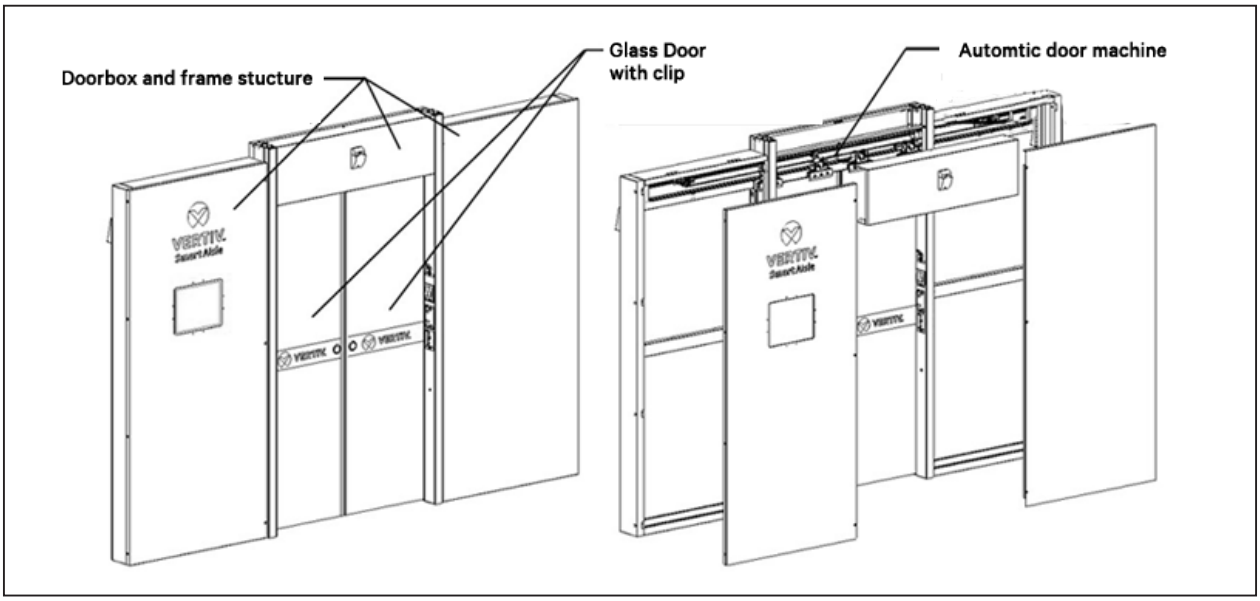


S.No	Details of equipment
1	Base
2	Server Cabinet
3	Network Cabinet
4	Access door
5	Top Plate
6	A/C Column
7	Distribution Cabinet
8	Strong wire passage groove
9	Power cable trunking; copper and fibre cable tray
10	Cabinet top wire groove
11	Control panel

Following is the procedure for installing the electric gates:

1. The electric sliding door configuration comprises of an automatic door, glass door (including hanging folders), box door, and the frame structure as illustrated in **Figure 2-28**.

Figure 2-28 Electric sliding door configuration



2. An automatic door system comprises the various parts as described in **Figure 2-25** and Vertiv recommends the installation of the aluminium groove member.

Figure 2-29 Naming of parts in an automatic door system

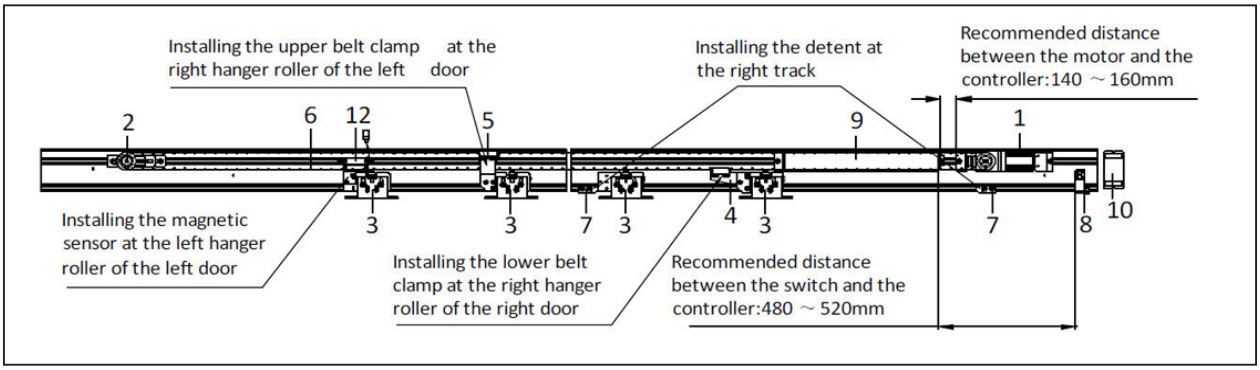
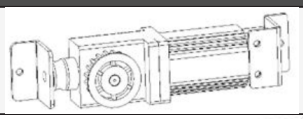
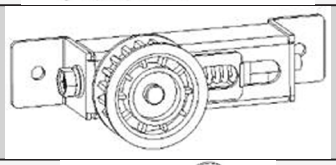
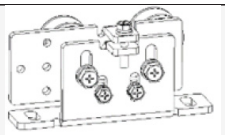
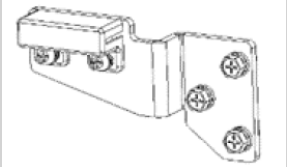
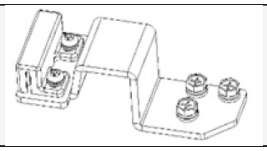
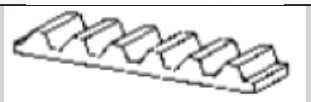
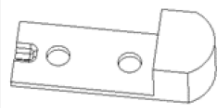
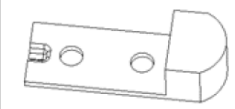
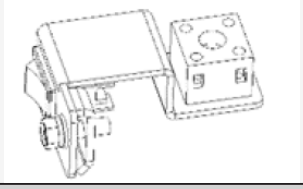
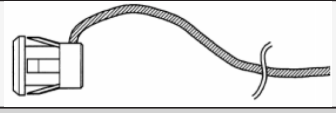
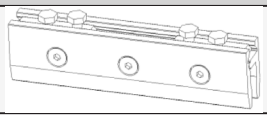
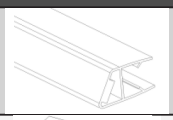
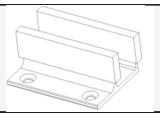


Table 2-3 shows a clear image of all the components that constitute the automatic door mechanism.

Table 2-3 Automatic Door parts

NO.	Part Name	Icon	Quantity	Remark
1	Motor		1	
2	Driven wheel		1	
3	Hanger device		4	
4	Belt fixture		1	
5	Double door belt fixture		2	
6	Leather belt		1	
7	Brake		1	
8	Power Supply		2	
9	Controller		1	
10	Safety light sensor		1	
11	A pair of auxiliary light sensor		1	
12	Sensor door magnet (with door unit)		1	
13	Glass hanging folders (pre-installed)		1	

NO.	Part Name	Icon	Quantity	Remark
14	Glass stripe (pre)		4	
15	Decoration system preventing the (pre)		2	

3. Electric pan mounted door frame and the door pocket of the structure:

a. The structural parts which are provided along with the doors have to be removed. These parts are kept to prevent deformation of the transport. The left and right doors are fitted with an incoming frame (with the cover and base). The front pillar on the outer end are first mounted on the left and right doors. The front cover housing the silver lintel needs to be removed.

Figure 2-30 Removing the structural parts

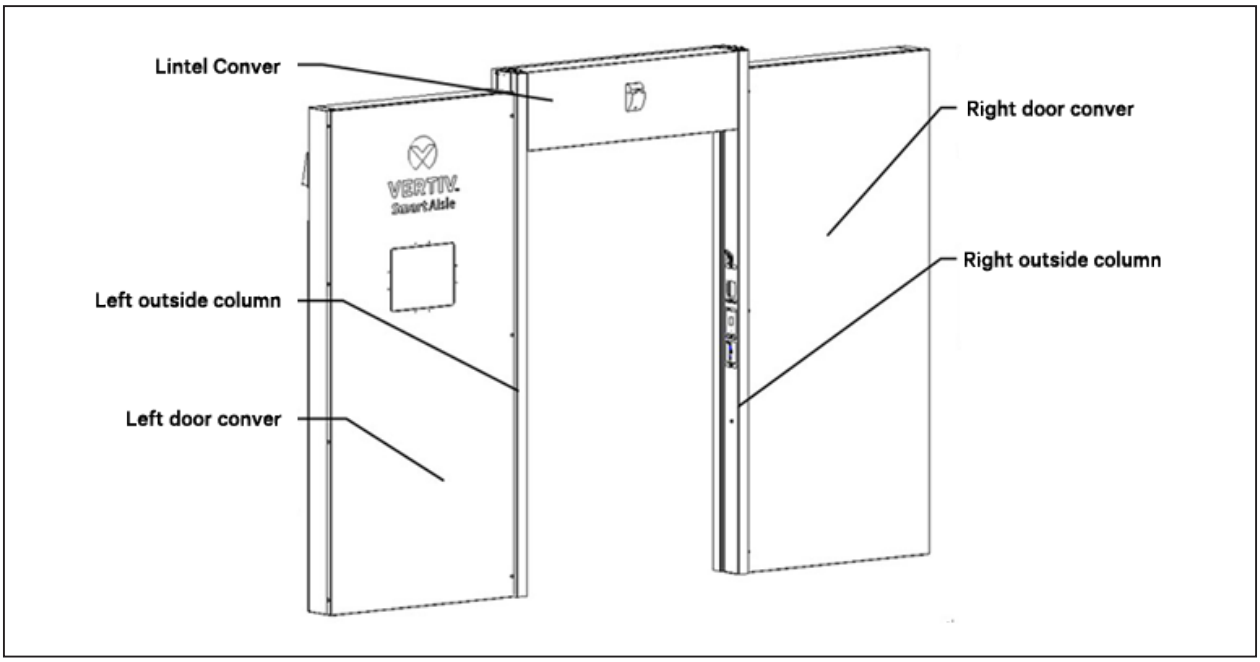


Figure 2-31 Remove door cover plate

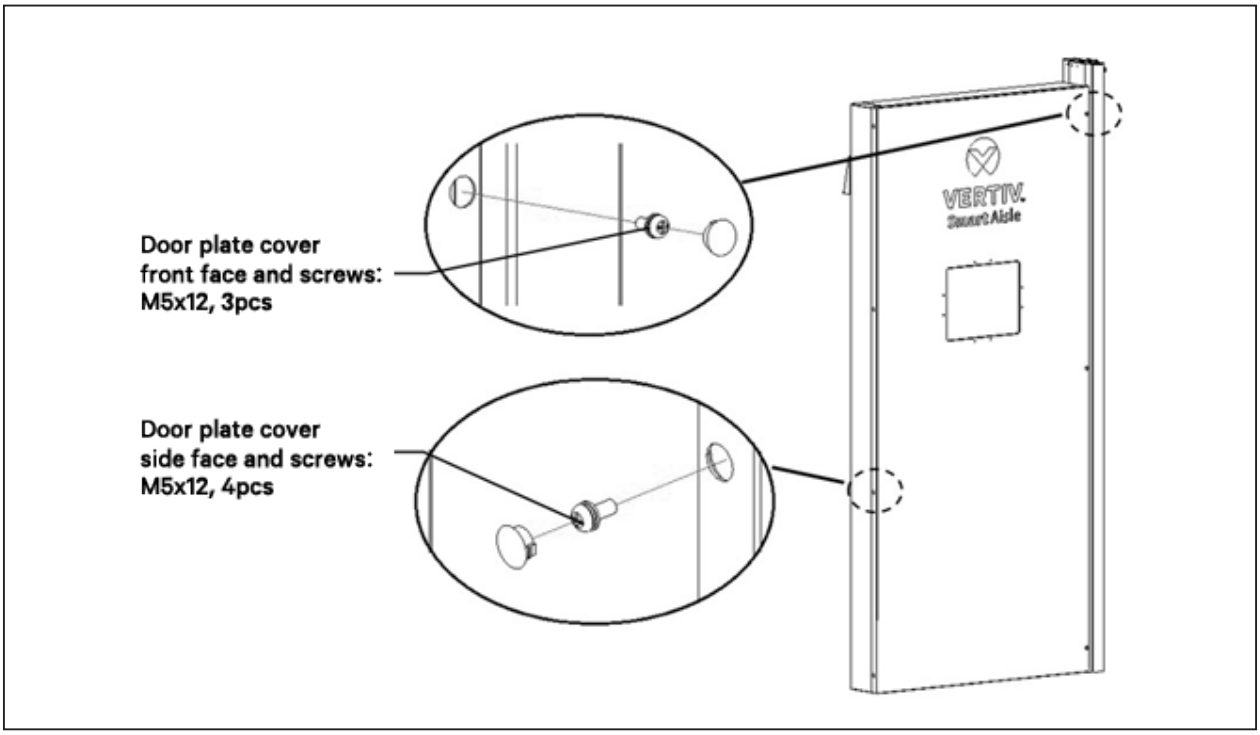


Figure 2-32 Removing the outer column

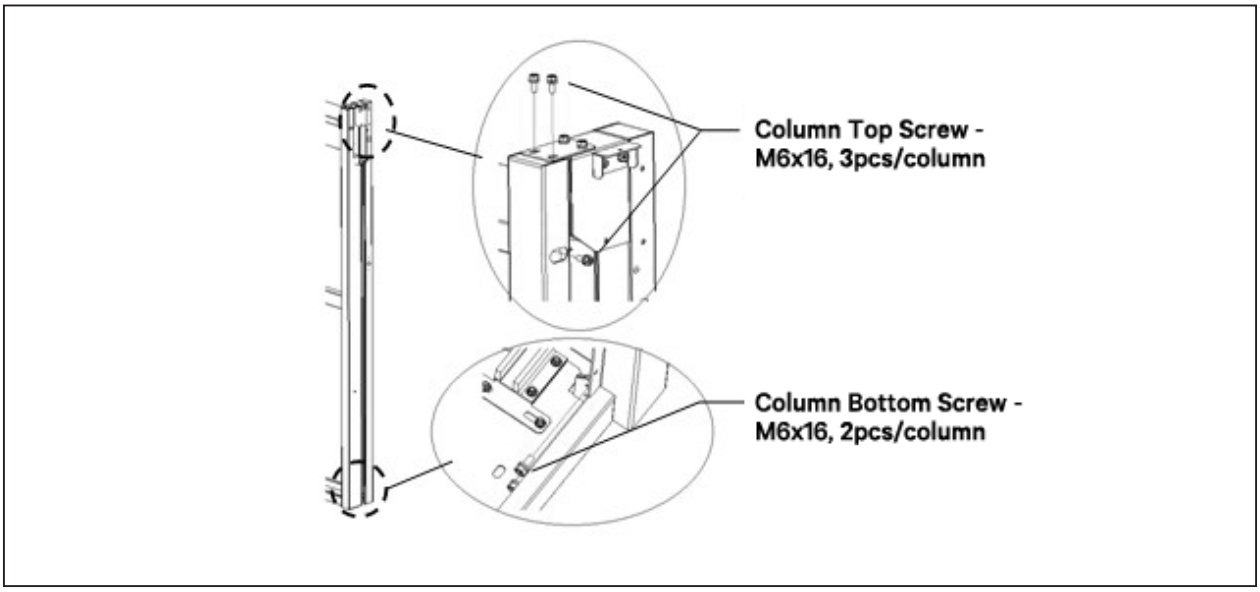
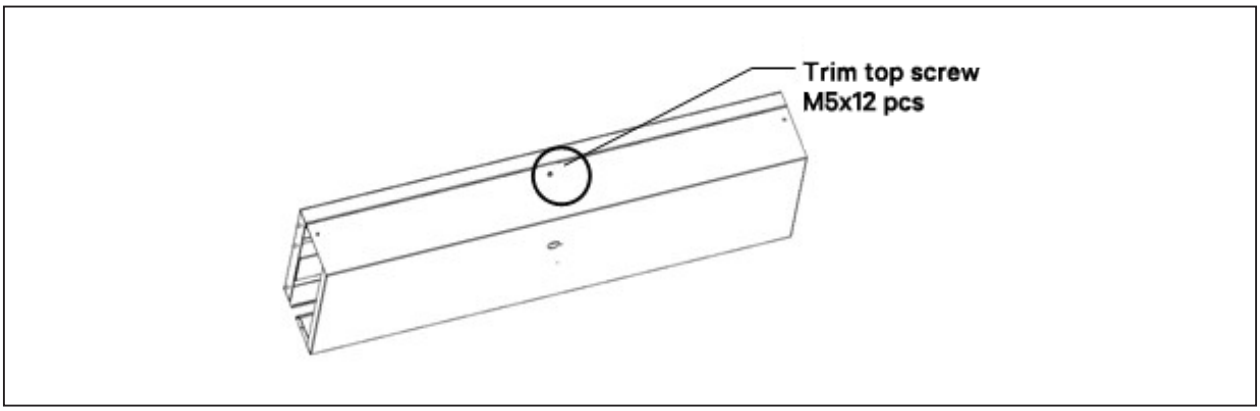
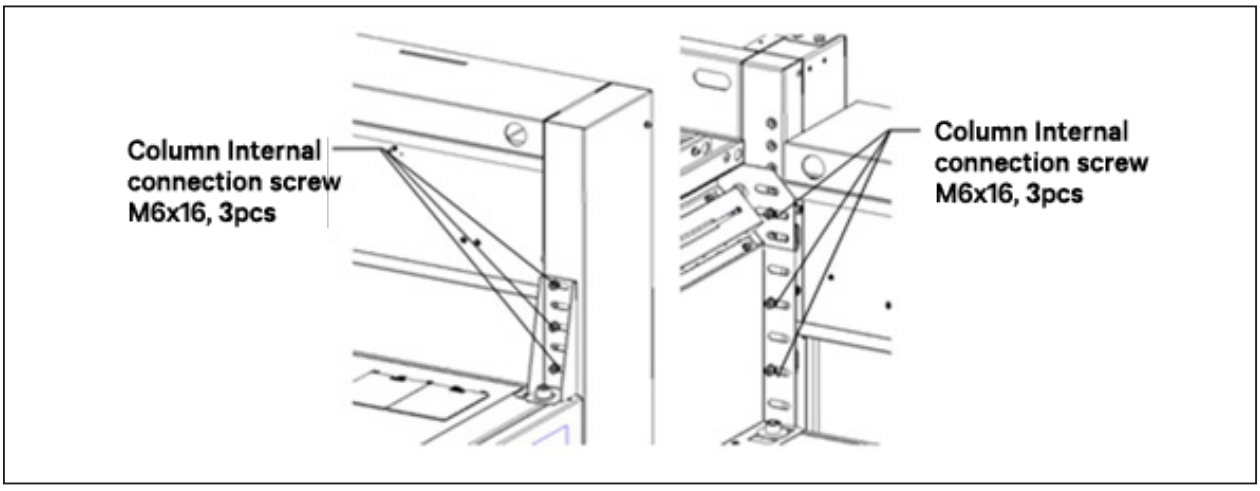


Figure 2-33 Removing the lintel cover



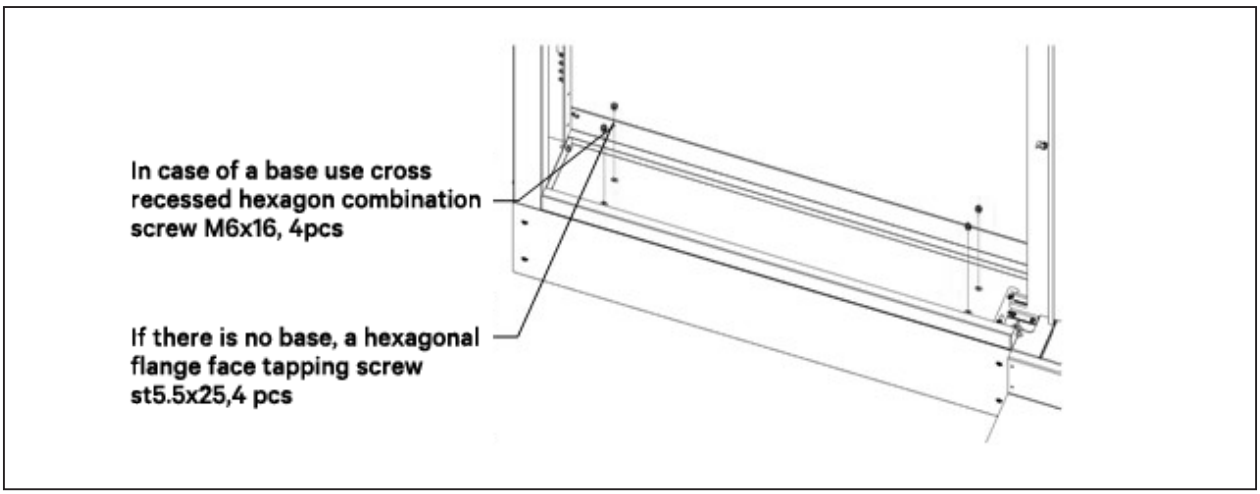
b. The cartridge door frame is connected to the top plate and cabinet while the outer door top box is connected to the cabinet by fixing the top adapter. A top end surface of the inner side of the sunroof bracket is connected firmly by using at least three connecting surface mounting M6 bolts.

Figure 2-34 Top of the door box is connected and fixed



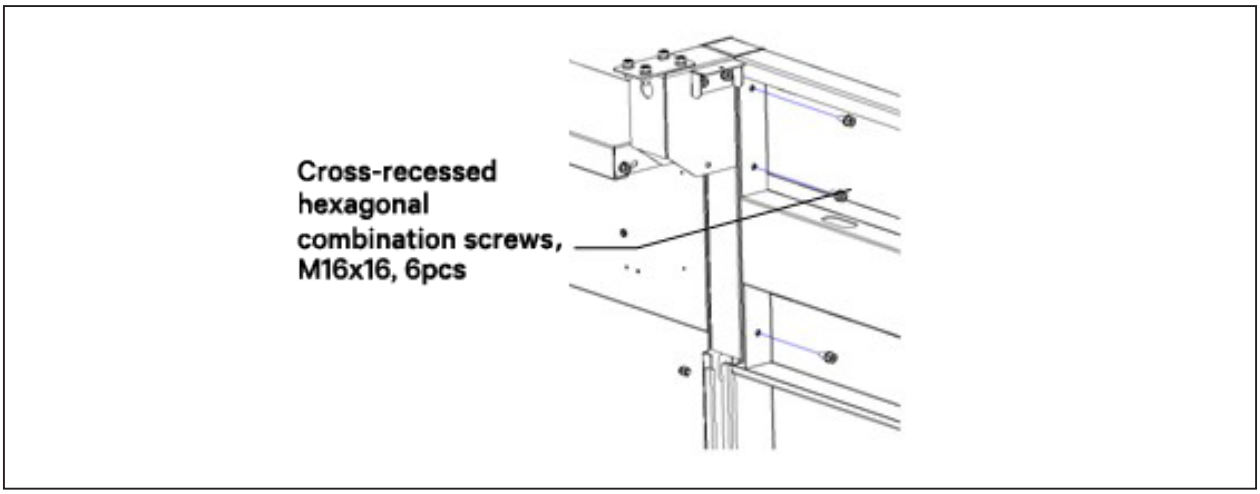
c. Connecting the door frame and door pocket base/floor: if the base is present, the bottom of the door frame is connected to the base box using M6x16 screws. If the base is not present or not used, the bottom of the door frame is directly connected to the box floor using hex st 5.5X25 flange tapping screws fixed to the floor.

Figure 2-35 Bottom of the door connected and fixed



d. Connecting the cartridge and the door lintel framework: the lintel and the door post connection box, each to the left and right sides are fastened by six M6X16 screws,

Figure 2-36 Lintel and door pocket is connected and fixed

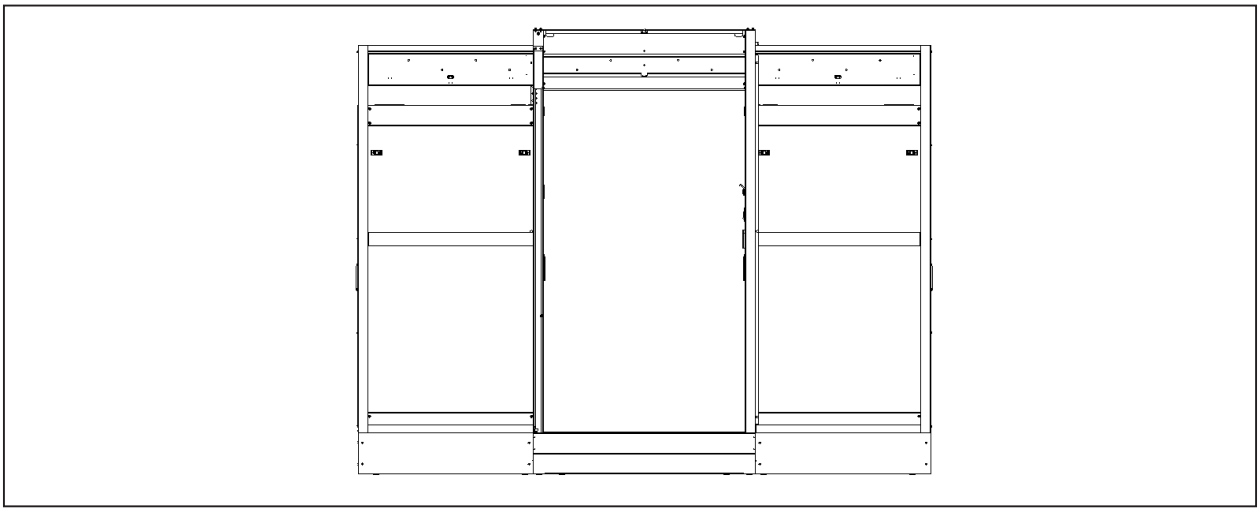


NOTE: Removal of structural parts should be properly preserved after the demolition to avoid scratches.

NOTE: Remove the fastener assembly based on the classification structure to avoid losing or ambiguity.

NOTE: Cassette door frame and the door base connection screws and the screws of the cartridge frame are not the same regarding the floor. Therefore, this process must be done with utmost care and precision.

Figure 2-37 End door frame mounted state of the cartridge



4. Mounting rail: Usually divided into two sections of equal length of the total length of 3100mm rail by self-tapping drill screw ST5 .5X22 from the rail to the frames. Both originate from the engine case during the installation process and uniform spacing of screws less than 400 mm is maintained while firmly mounting to the upper and lower rows.

Figure 2-38 A schematic rail mounting

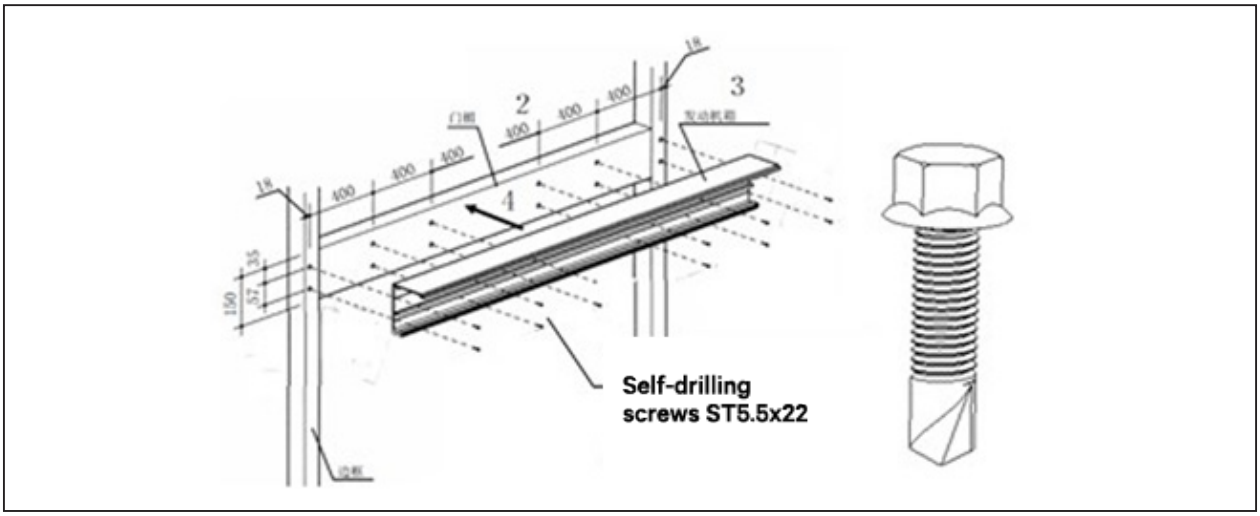
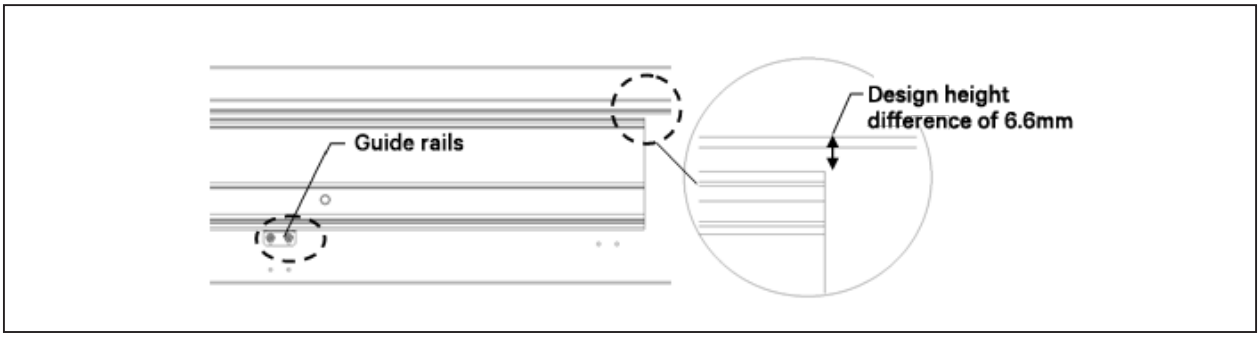


Figure 2-39 A schematic rail mounting



NOTE: Guide rail mounted on the rim from the edge of the board is designed at a height difference of 6.6 mm to ensure that the mounting rail is in a horizontal state. This is done by a positioning member carrying the cassette door in a preliminary position needs to ensure correct leveling. Adjust the exact position of the positioning member using a screw. After the completion of the positioning, the positioning member must be removed to avoid interference with the subsequent installation of the glass door.

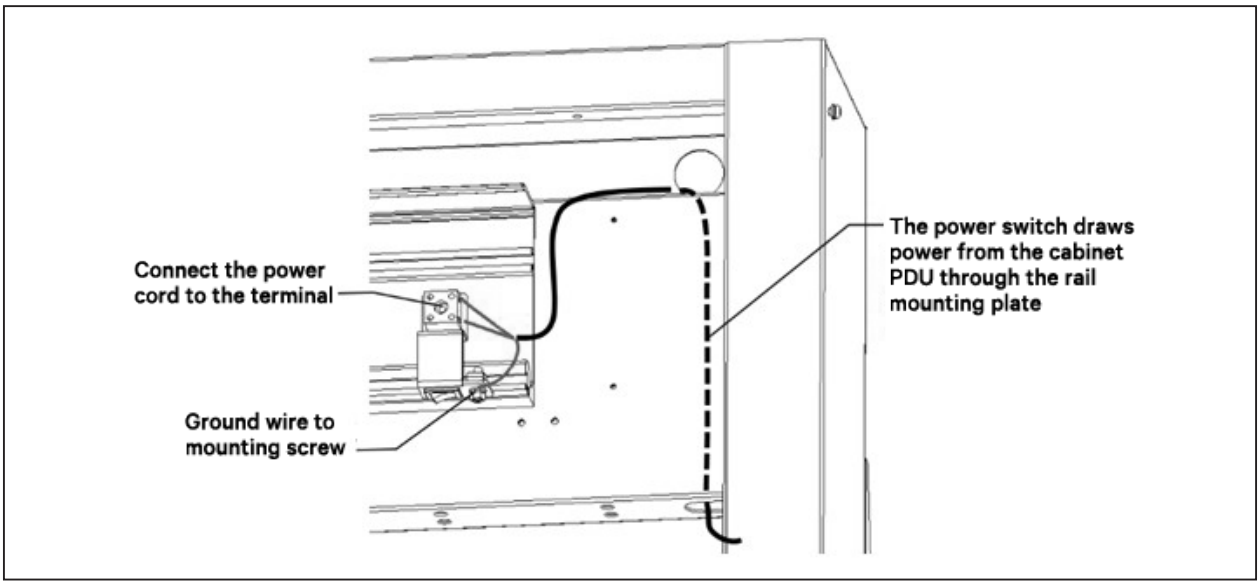
NOTE: Handle the track installation carefully, else it will affect the performance and pulley life.

NOTE: The docking of the two rails should be at the center of the door, while the two rails should be kept at the same level, horizontally, and the gap between the two rails should be greater than or equal to 15mm

5. Installation of the door drive device :

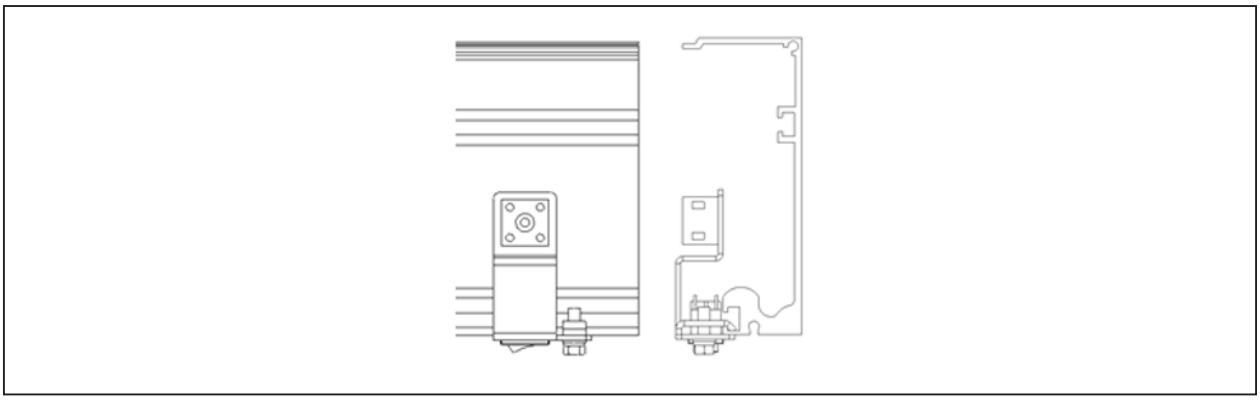
a. Mounting a power switch – An upper portion of the power switching device is embedded in the trench of the guide rail followed by embedding in the lower part of the trench wherein the position of the power switch is to the far right of the guide rail. Tighten the mounting bolt. Route the power cable to the right of the guide rail as shown in the following diagram. Connect the power cord and the power switch terminal based on the wiring diagram. Remove the mounting bolt of the power switch and connect the ground wire at the position shown in the following diagram.

Figure 2-40 Mounting the power switch



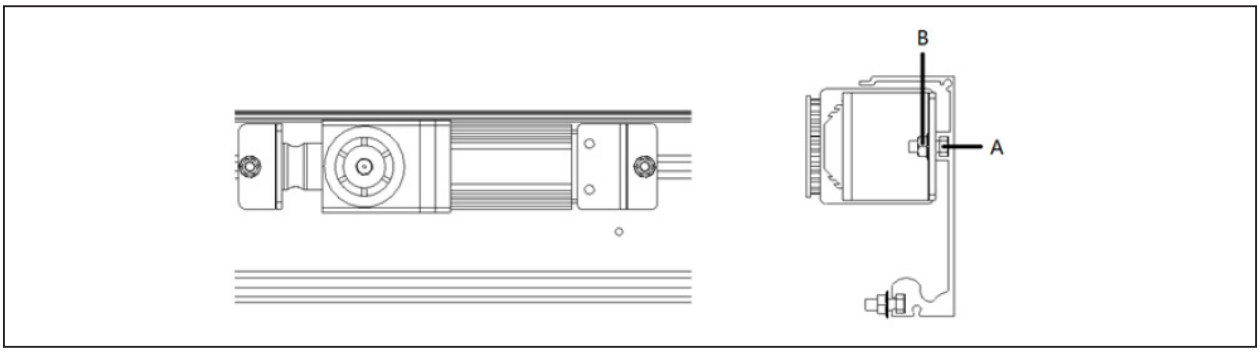
Remove the mounting bolt of the power switch and connect the ground wire at the position shown in the following diagram. Insert the power switch snap into the lower groove of the rail; move th power switch to the rightmost portion of the rail followed by tightening the mounting bolt.

Figure 2-41 Power switch installation



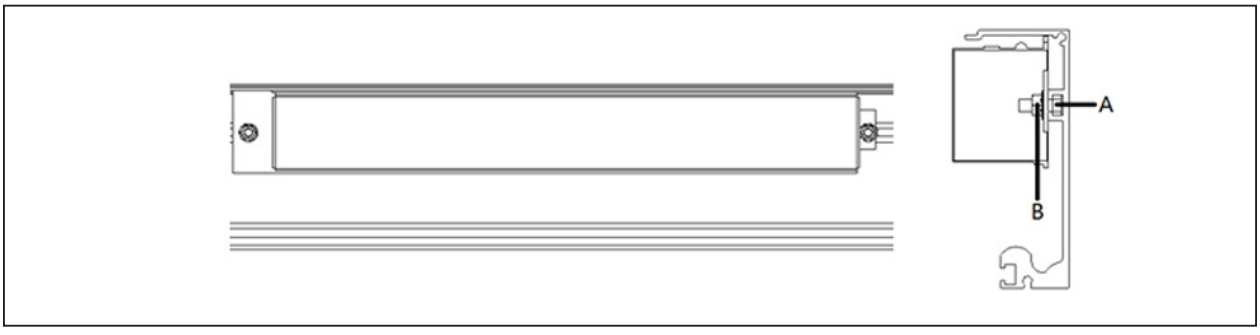
b. Motor installation: Put the wire with the connector on the front of the motor. Slide the screw A from the right to the left on the guide rail into the groove on the guide rail and place it on the right end. Then adjust the screw spacing and the motor is mounted on the screw; Tighten the mounting nut B; Place the lead wire with the power switch through the top of the motor unit to the left of the motor unit. Ensure that the lead wire should not be sagging.

Figure 2-42 Motor installation



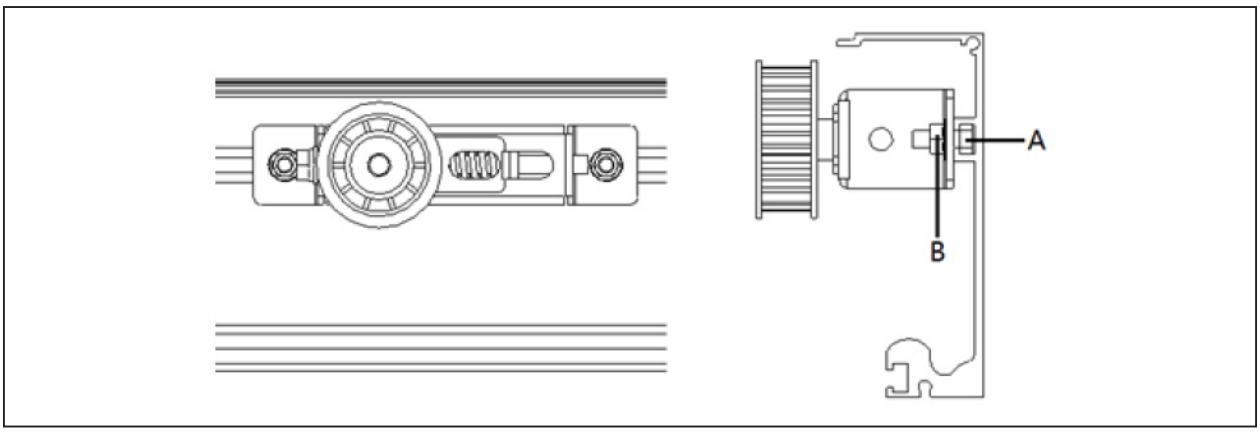
c. Installation Control- Slide the screw A from the left to the right in the middle of the two guide rails into the groove on the guide rail and place it on the left side of the motor. Then, adjust the screw spacing with the controller installed on the screw; Adjust the distance between the controller and the motor to the position where the wires can be connected and tighten the mounting nut B.

Figure 2-43 Control Installation



d. Installation of the driving wheel - Slide the screw A from the left to the right on the guide rail into the groove on the guide rail and place it on the left end. Then adjust the screw spacing with the driven wheel mounted on the screw; Install the nut B on the screw A but do not tighten it; Confirm that the driven wheel assembly is temporarily fixed on the guide rail gently so that it can move slightly.

Figure 2-44 Driving wheel installation



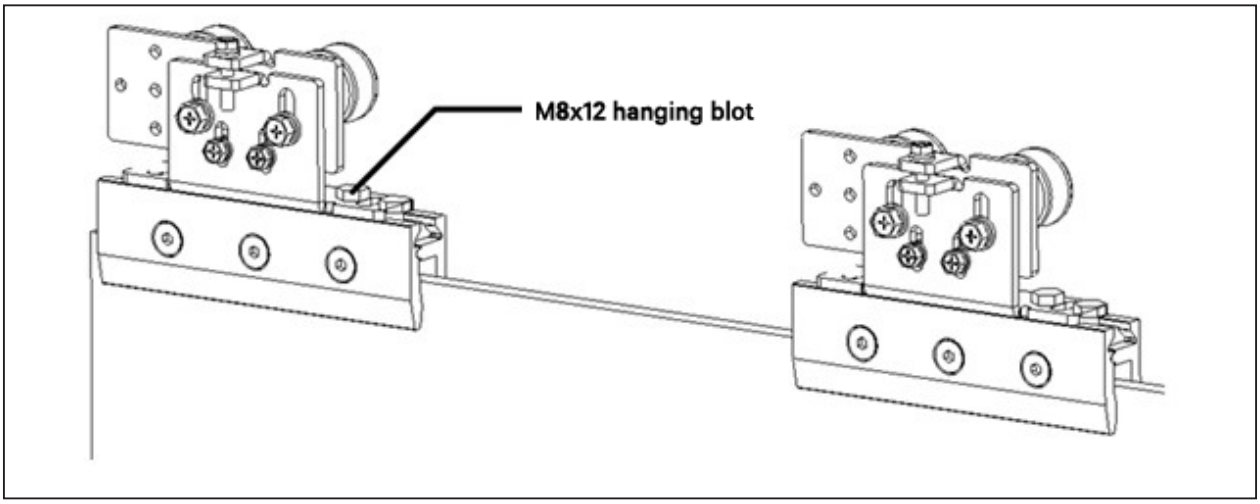
NOTE: Ensure that the power switch is mounted in the wiring space of the power lines and signal lines.

NOTE: The device can fall if the cable connections of the device are not carried out correctly.

NOTE: Control the distance between the motor and the control device to ensure ease of wiring.

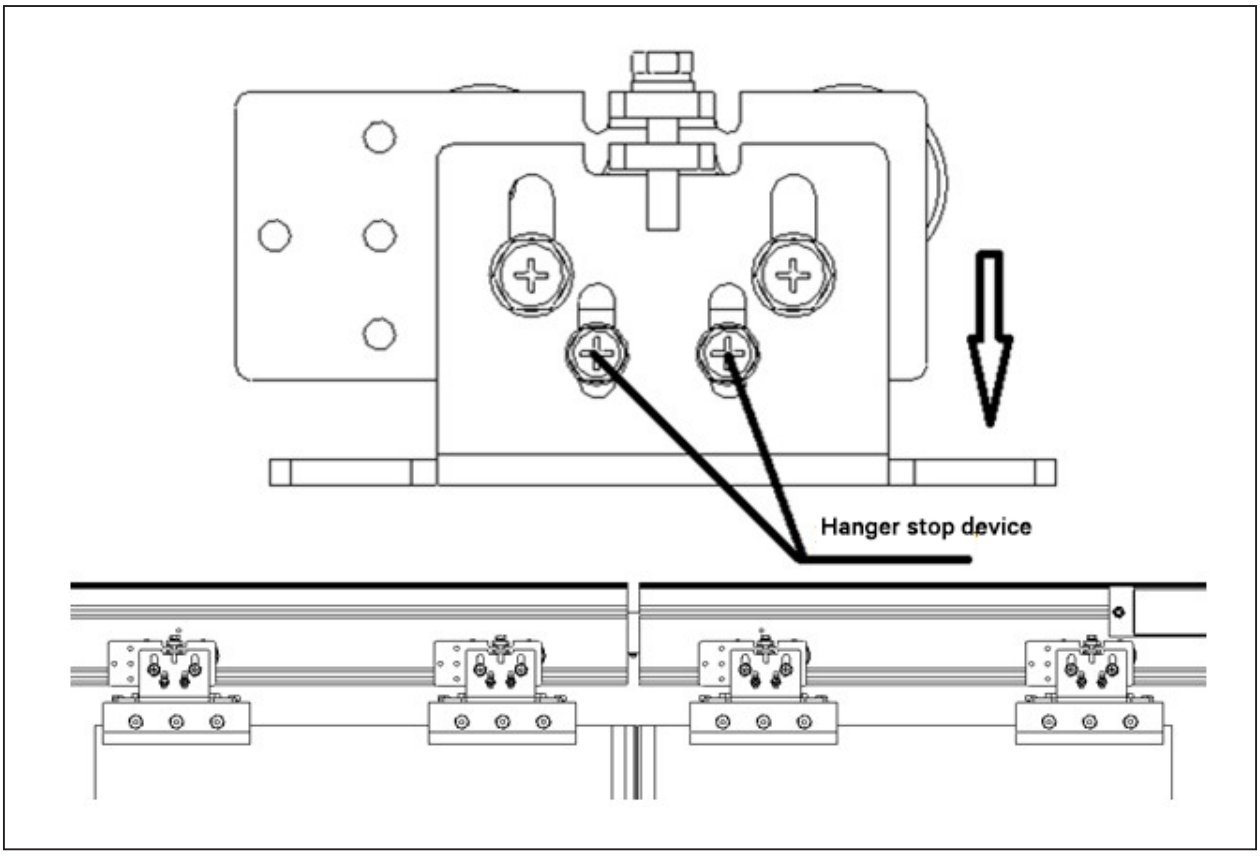
e. Glass installation and adjustment – The Glass door clamp and magnetic stripe have been pre-installed on the glass door where it spans 50mm from edge to edge. Before assembly, check if the doors are in a reliable and correct position. Check if the installation direction is correct; each hanger and glass door clamp connection should be done by using the door clamp hanging bolt.

Figure 2-45 Hanger installation



Loosen the mounting bolts of the hanger stopper and lower the hanger stopper to hang the hanger pulley onto the guide rail.

Figure 2-46 Glass door with the hangers

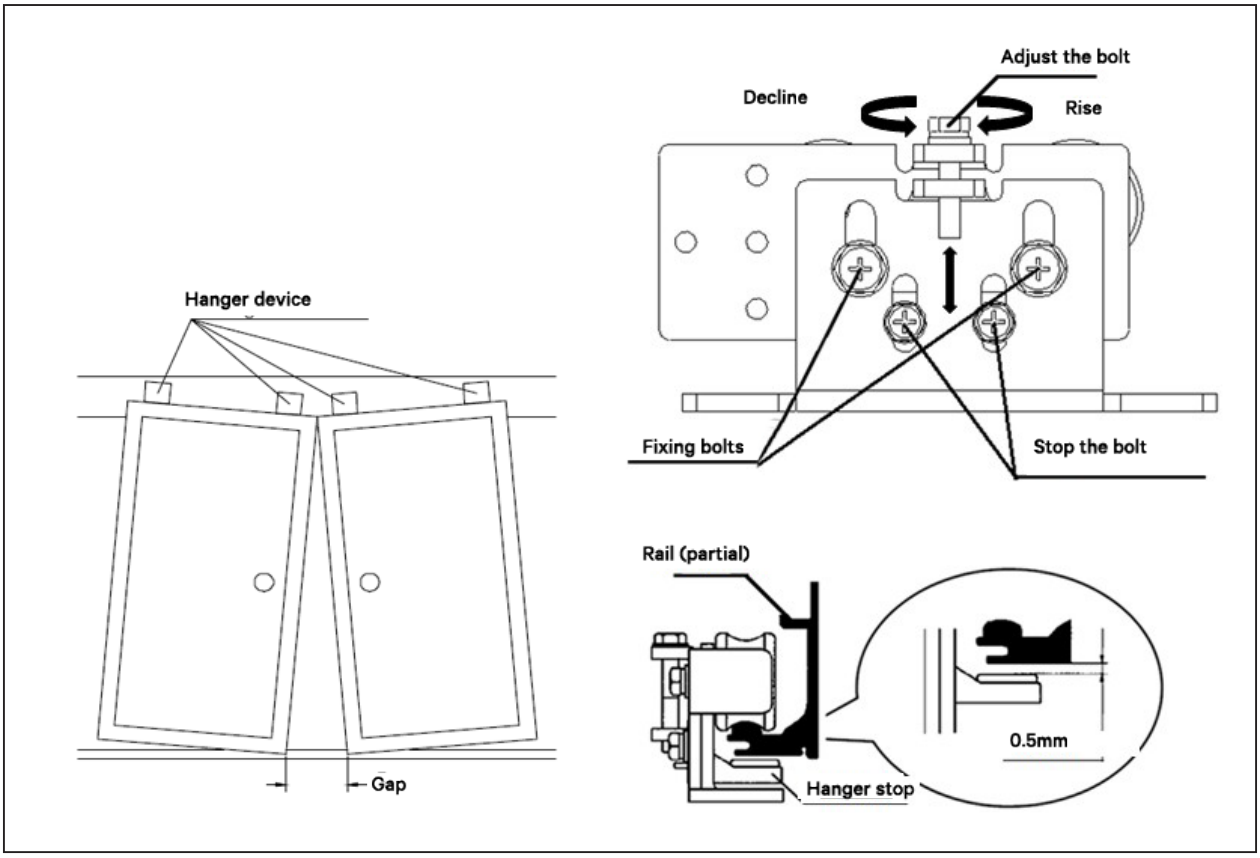


NOTE: Prior to installation, ensure the glass doors is connected accurately, else it will fall out.

NOTE: On unscrewing the suspension bolt, the glass door slider within the holder may slide out and fall. Pay attention to the assembly direction of the hanger and the glass clamp; ensure that the bolt head of the glass clamp is positive.

f. Glass Door Adjustment – For this process, the following steps need to be implemented, namely – Loosen the fixing bolt. Adjust the height using the adjusting bolt (M6). (Clockwise rotation, door rising. Counterclockwise rotation, door descending.). Tighten the fixing bolts. After confirming the gap with the lower part of the guide rail, attach the pylon detachment device firmly. Note that the clearance is 0.5mm. Confirm the walking resistance. (Confirm that one index finger can move the door leaf with a walking resistance of less than 5.88N (600gf).) Move the door and check whether the hanger device can slide on the rail.

Figure 2-47 Glass door adjustment



NOTE: Whether hanger assembly is vertically mounted on the door.

NOTE: Minimum sliding friction between the lower portion with a bottom door leaf.

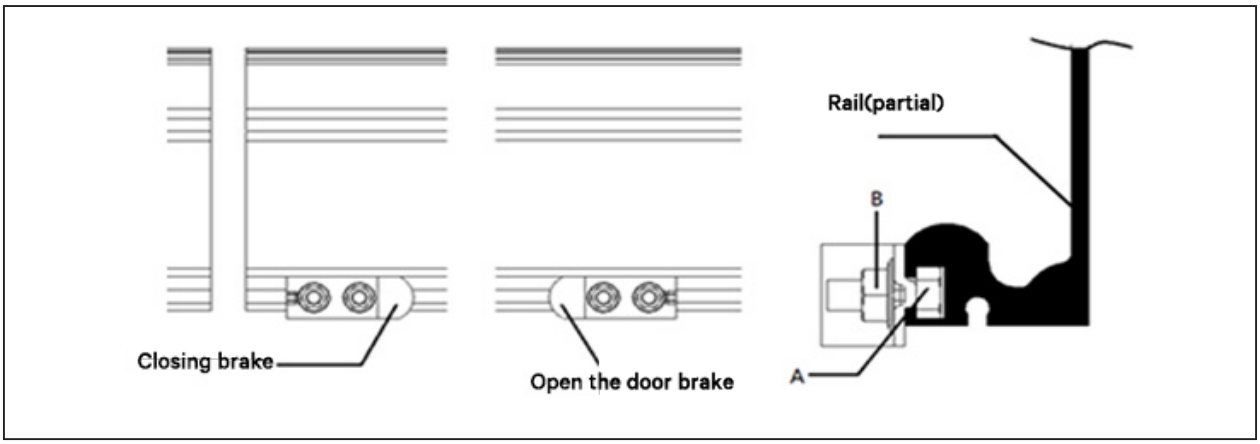
NOTE: Hanger assembly to ensure that there is minimum friction between the guide rails and the motion assembly.

NOTE: Check for friction between the hanger assembly and the horizontal frame.

NOTE: Check for friction between the door and the door frame

g. Brake installation- The brake is installed on both sides of the right door, For the closed brake, slide the screw A from the left to the right in the middle of the two sections of the guide rail into the lower groove of the guide rail and place it on the left side of the right glass door hanger; For door-open brakes, slide the screw A right-to-left from the right side of the rail into the groove under the rail and place it to the right of the right-hand glass door hanger; Then adjust the screw spacing with the brake mounted on the screw; Move the opening and closing position of the door to determine the position of the brake device. It is advised to ensure that the maximum opening position of the sliding doors does not go beyond the brake position It is advised to ensure that the maximum position of the glass door opening does not reach beyond it's sliding point to sink inside the door box by correctly fixing the brake position. Tighten the nut B to fix the brake position.

Figure 2-48 Brake Installation



6. Belt installation

Following are the steps for fixing the belt apparatus:

a. Remove bolts A (M5) to remove the belt from the belt holder fittings.

b. Once the belt is removed, proceed to cut the belt. Cut off from the center of the bottom of the belt. The length of the cut is approximately determined by the following formula :

c. L=(2 * DW - 100) *4 where DW is the width of a single door.

d. Confirm the actual size and adjust it according during installation.

e. The ends of the belt from the center of the crossed belt must be placed in the belt holder. Take utmost care to ensure that the belt is not twisted during the installation.

f. The belt holder is securely mounted to the belt fittings. Take into consideration the direction of the belt holder.

g. Hang the belt onto the belt pulley at the motor end and subsequently link it to the driven wheel.

h. Refer to **Figure 2-45** and **Figure 2-46** to see the process and the mounting position of the belt fixing device using the supplied mounting bolts (M6 X 12 with spring washers). It should be attached to the hanger assembly securely. Use a wrench and socket spanners to tighten the bolts.

i. The adjustment process is explained in the next section.

j. The 2nd door should be in a closed position.

Figure 2-49 Belt cut off and installation

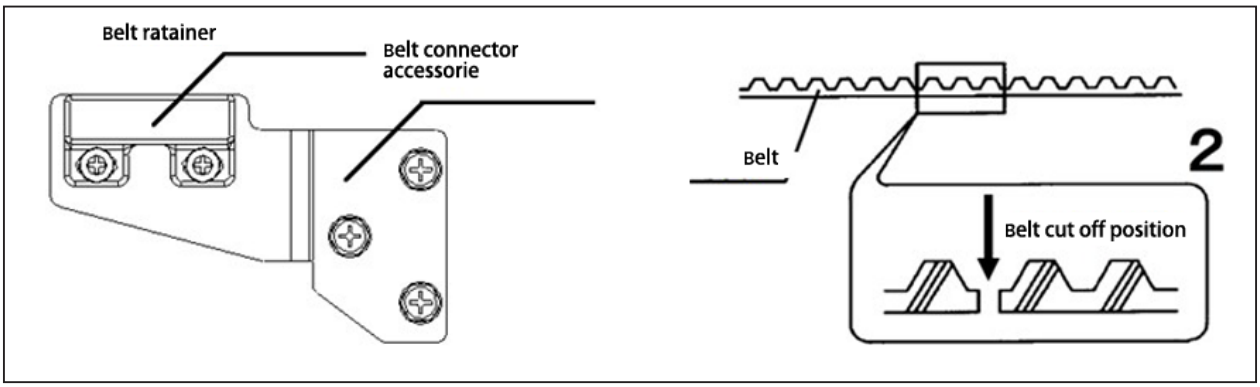
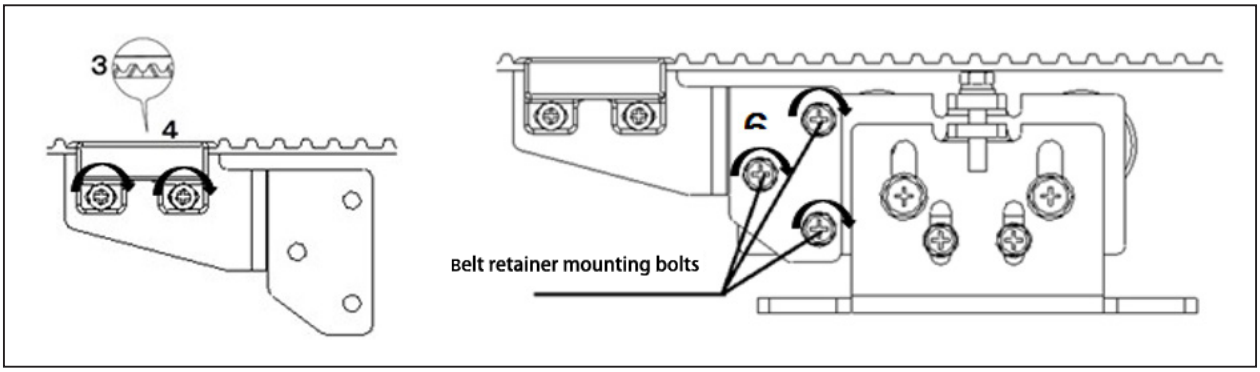


Figure 2-50 Lower fixed belt



k. Refer to the following mounting position diagram to attach the belt retainer to the belt and bolt B to fix the belt retainer on the upper belt joint fitting.

l. Use the included belt fixing device mounting bolt (M6 × 12) to attach securely to the hanger device and secure it.

m. After adjusting the position of the door, tighten the bolt B.

n. Remove the upper belt holder bolt B (M5) and remove it from the upper belt joint fitting.

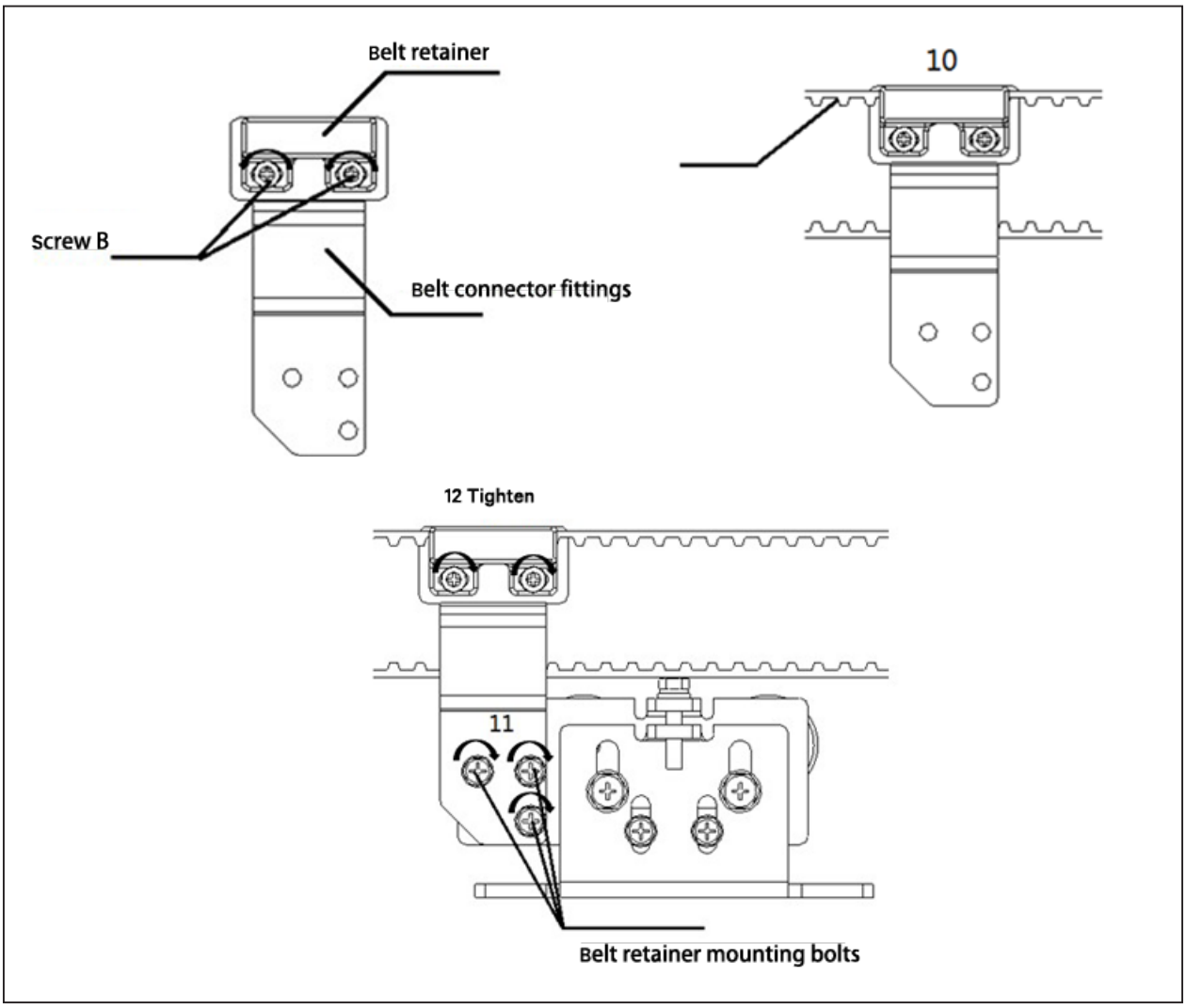
o. Refer to the **Figure 2-47** for the mounting position of the belt anchor which hosts the belt following which the belt B is fixed with bolts in the double-open type belt fixing fittings.

p. A belt fixing device, using the supplied mounting bolts (M6 X 12 with spring washers) securely attached with the hanger means, is securely mounted.

q. Ensure that the bolts are firmly mounted using a wrench or socket wrench

r. After adjusting the position of the door, the bolt B is screwed.

Figure 2-51 Top stationary belt



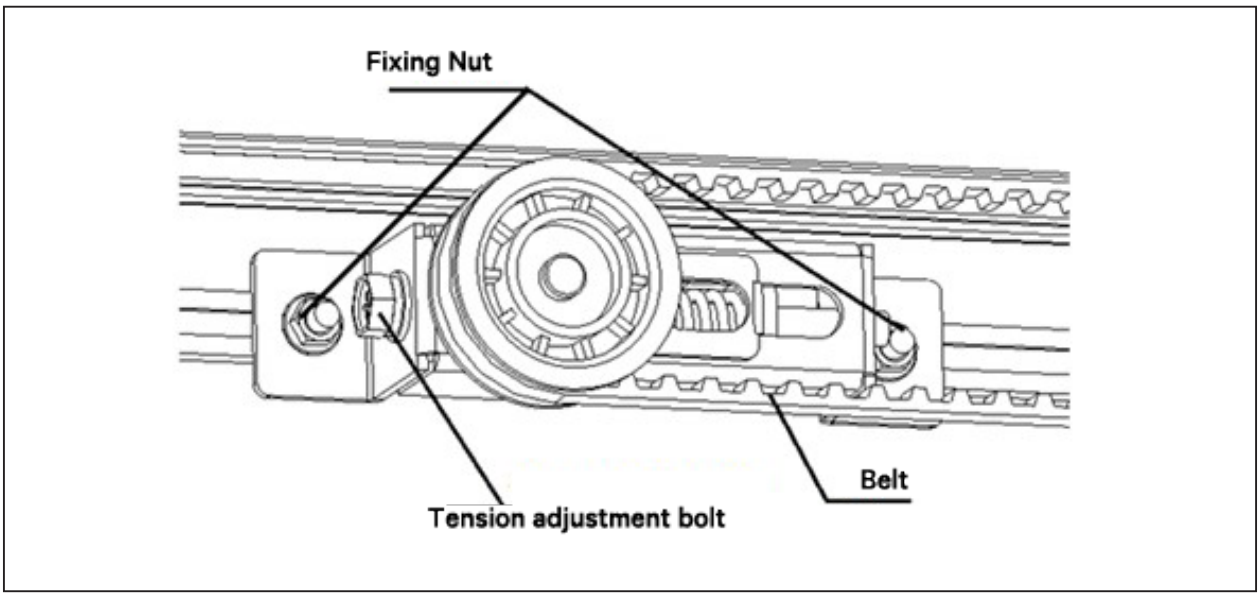
NOTE: Use a wrench, socket wrench, etc. to secure the bolt.

7. Belt Adjustment

The driven wheel assembly is pulled to the left followed by tightening the fixing bolts. Turn the tension adjusting bolt in a clockwise direction to adjust the belt tension.

NOTE:Adjust the gasket and adjust the front of the board wherein they coincide as the most appropriate.

Figure 2-52 Belt Adjustment



8. Cold Ailse door installation

The sensor door magnetic cable is not installed in the lower part of the adapter; the sensor door magnetic wiring is installed in the upper adapter; Use M6x12 bolts to install the lower adapter on the left hanger of the left door. Do not tighten the screws. Slide the screw A from the right to the left in the middle gap of the two sections of guide rail into the groove on the left side guide rail; Adjust the screw spacing; install the adapter on the screw and fix it with nut B but do not tighten it. In the closed position of the door to adjust the position of the adapter, is the left and right door alignment magnet alignment; pay attention to adjust the gap between the upper and lower parts of about 4mm. Tighten the upper and lower adapter screw nut.

Figure 2-53 Sensor door magnetic installation 1

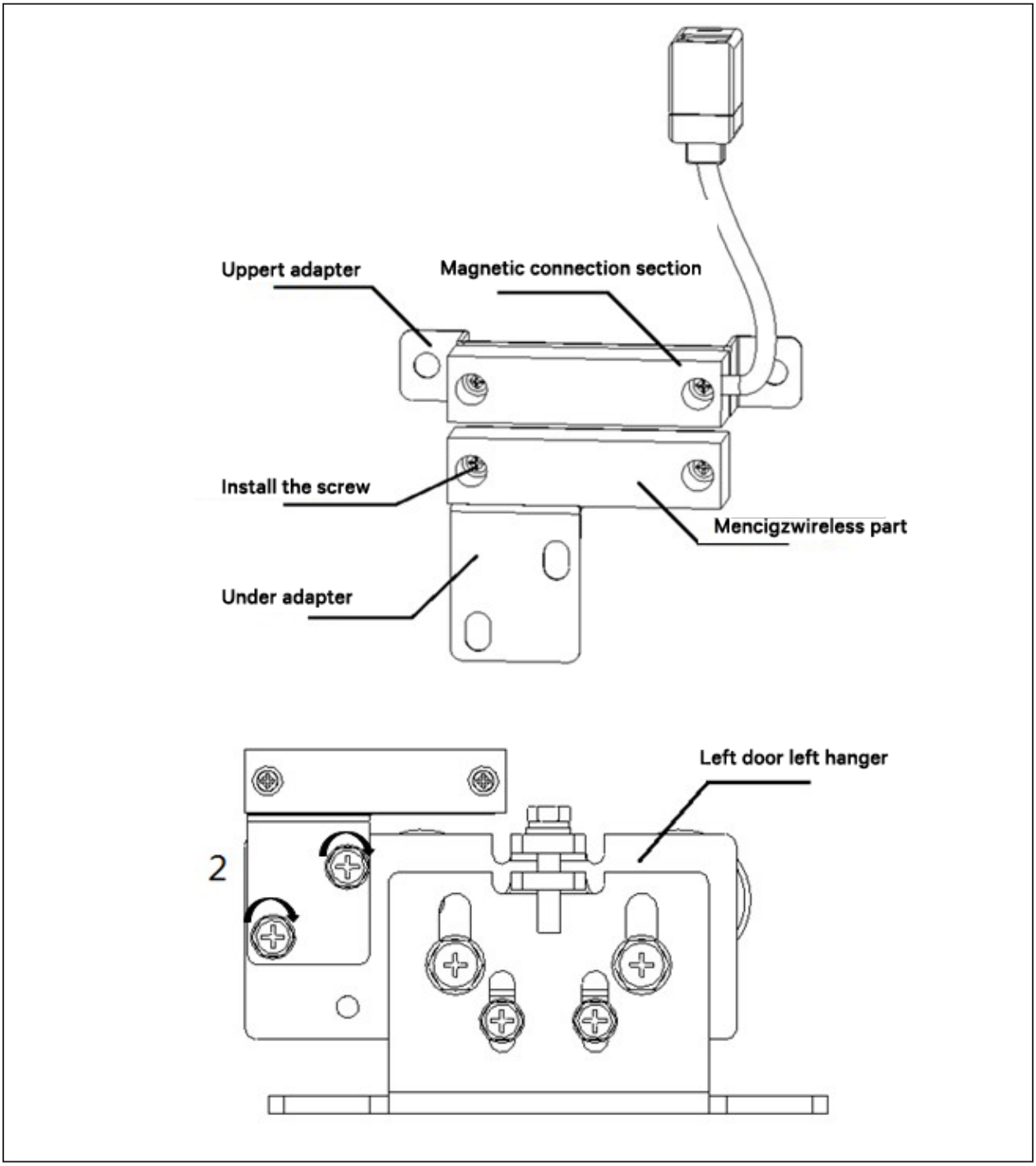
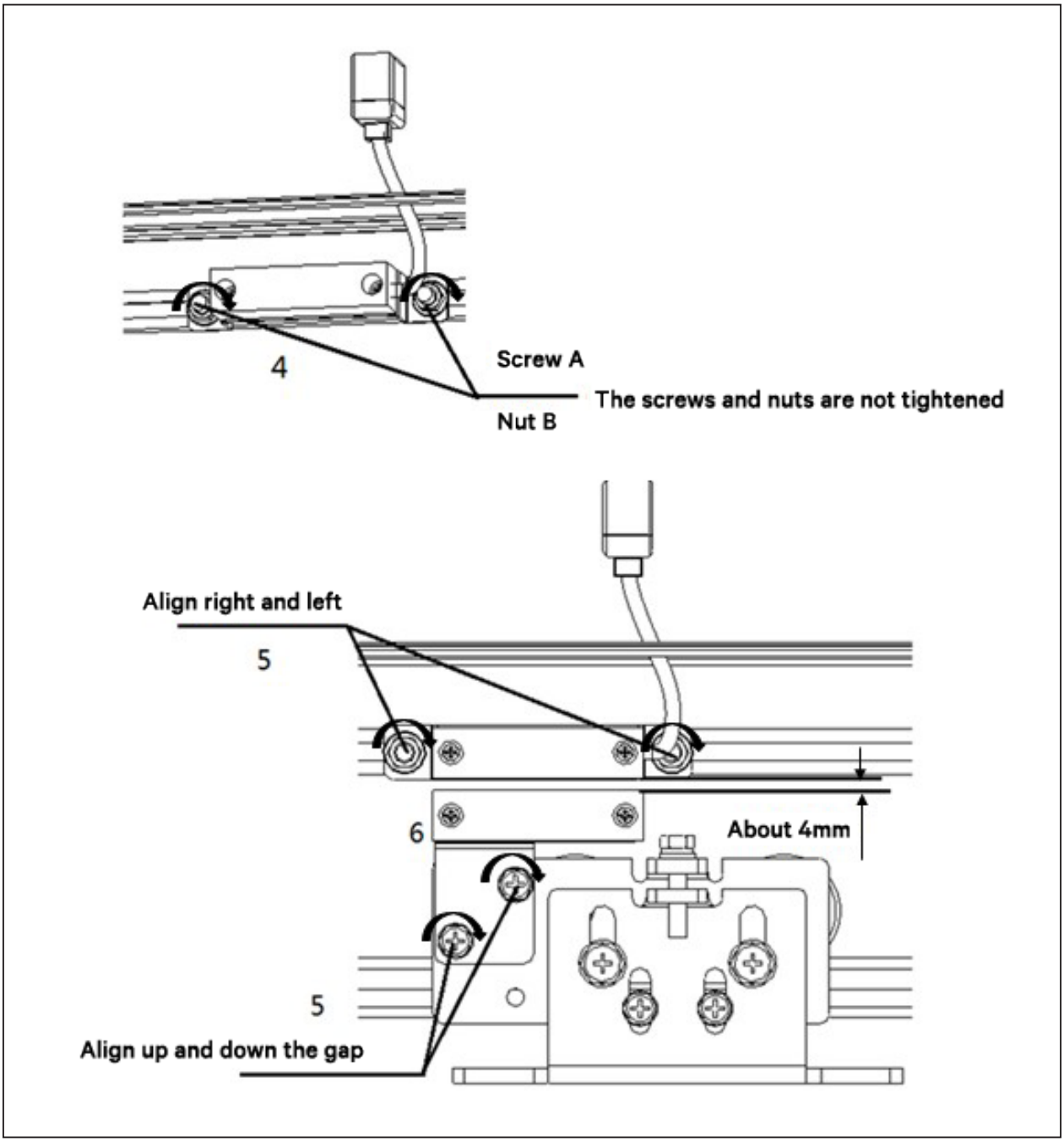


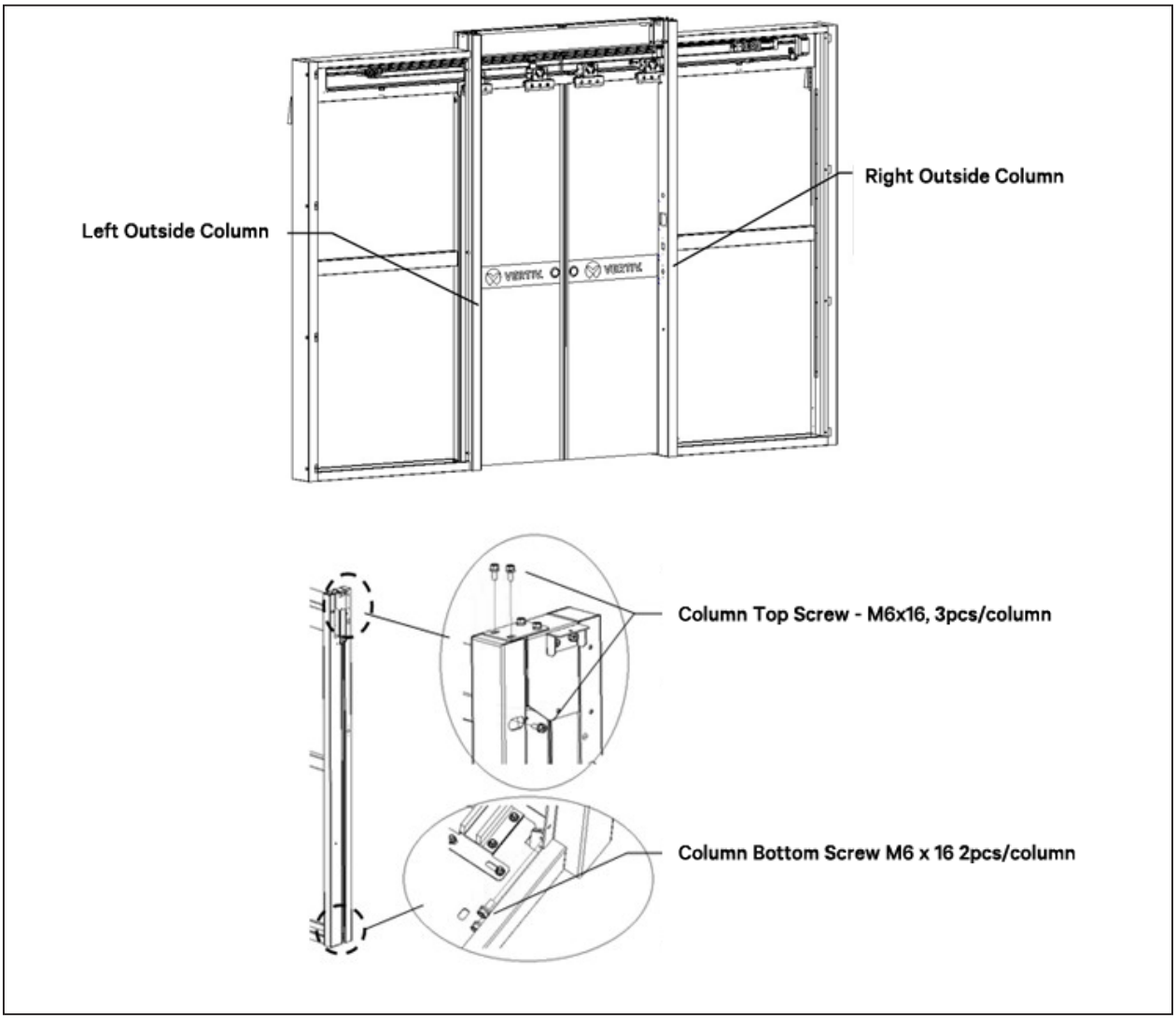
Figure 2-54 Sensor door installation 2



9. Installing the outer column

1) The inner and outer side of the glass has a pillar tops columns; utmost care needs to be taken while installing the pillar tops to prevent it from falling off.

Figure 2-55 Installing the outer column



10. Mounting the safety auxiliary light

Install the safety light sensor on the right side of the rail; The safety light sensor photoelectric head of the receiving end and the light-emitting end are installed in the left and right posts below the hole; Wire the safety light sensor and door operator based on the wiring diagram. The cable is bypassed from the top of the motor and the controller, and the cable is fixed with the hook and loop fastener. Wire the photoelectric head cable and safety light sensor as shown in the following diagram:

Figure 2-56 Auxiliary light installation

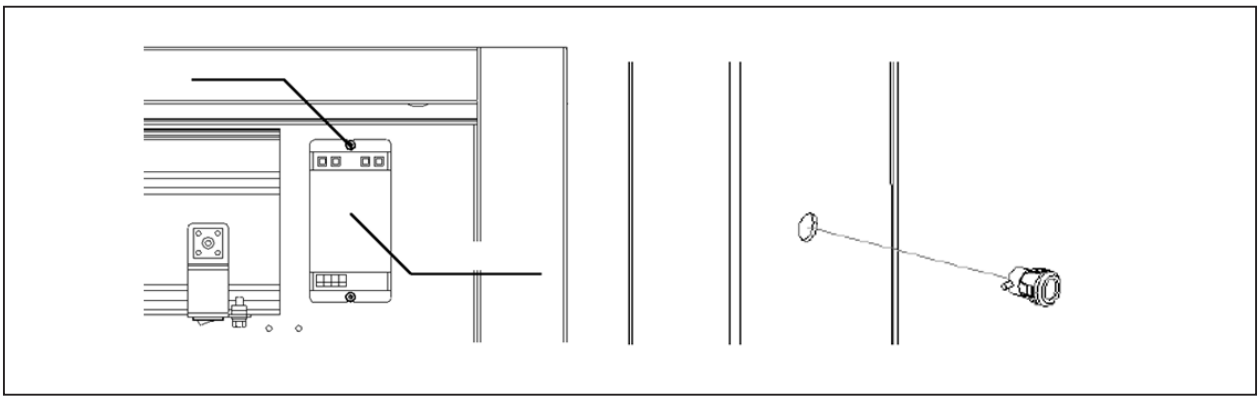
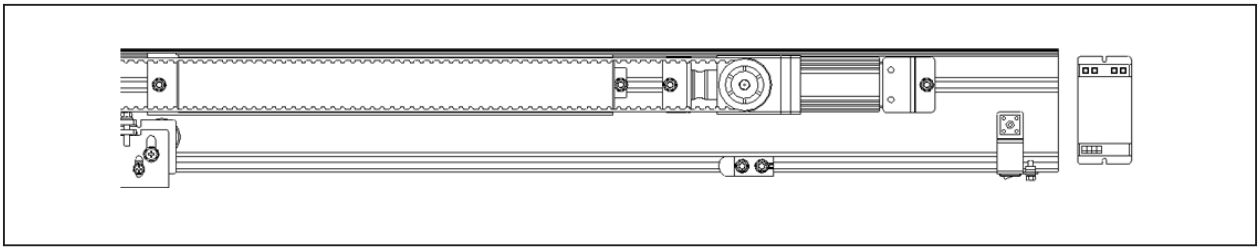


Figure 2-57 Safety light sensor wiring routing

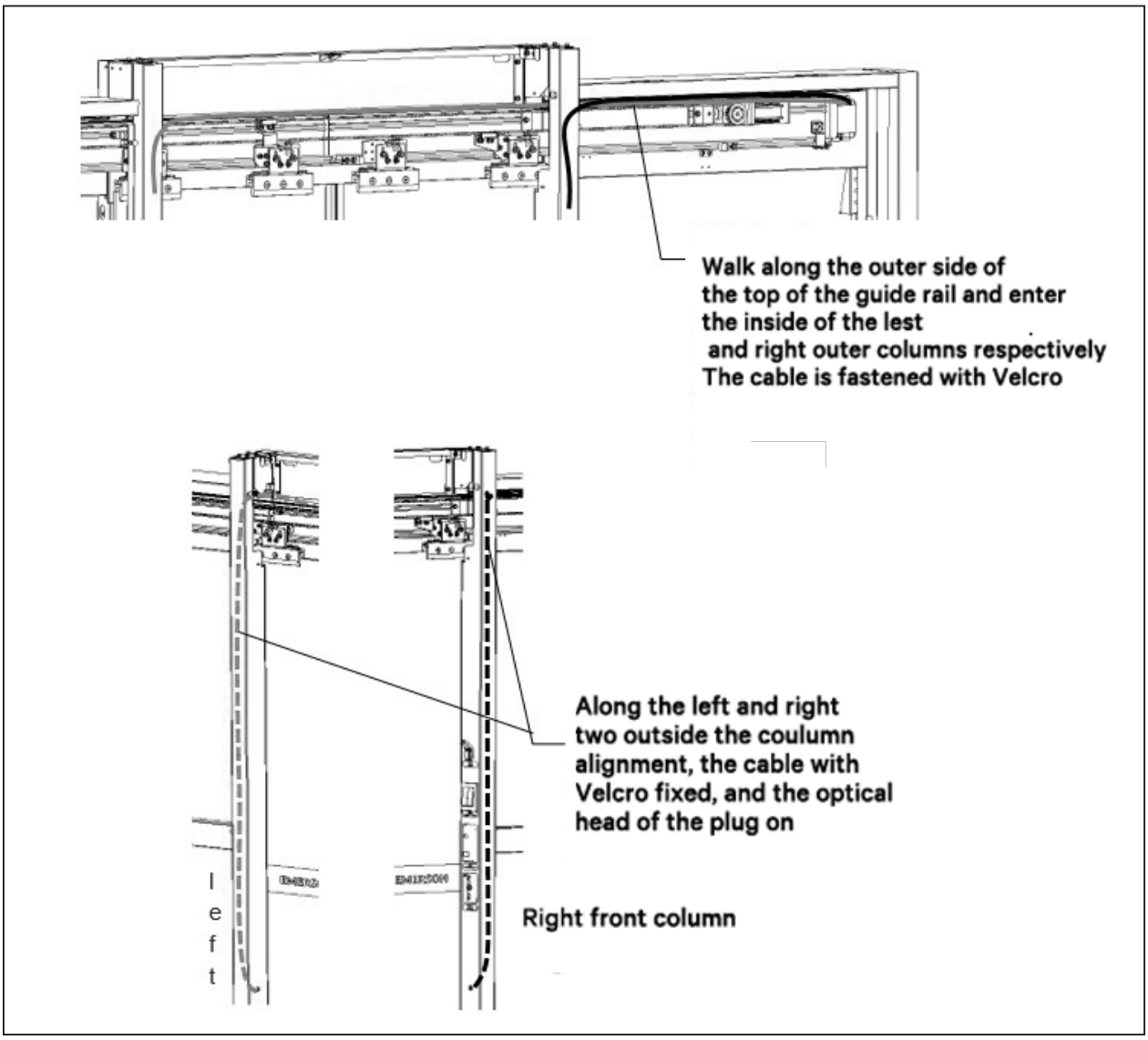


NOTE: Ensure the wiring is inserted in the end accurately as an incorrect connection can cause malfunction.

NOTE: Do not err in the wiring order; else, a wrong connection will result in no action.

NOTE: While installing the auxiliary light probe, prevent it from falling, collision, or external shocks as it leads to malfunction.

Figure 2-58 Auxiliary light path traces



NOTE: Ensure that the auxiliary light cable and door belt do not rub against each other.

NOTE: The connection between the safety light transmitter and the receiver can not be reversed, otherwise the safety light will not work normally.

11. Control wire is connected to:

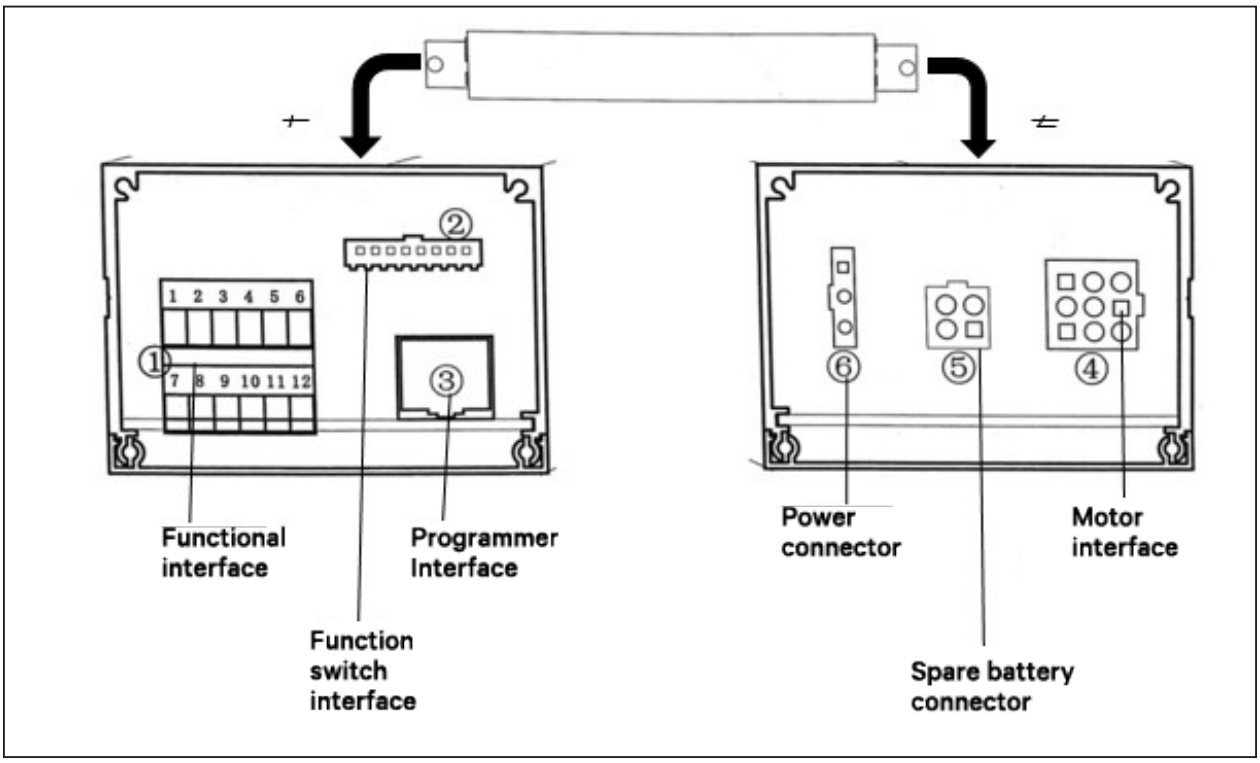
a. Connect the motor unit connector securely.The terminal station device must be securely mounted and properly connected to the control device with a fixed wire line card.

b. Securely install the power switch so that it is firmly connected to the control unit.

c. Use the supplied line card to secure the wire.

d. Fixed control device.

Figure 2-59 Schematic diagram of an interface control device



NOTE: Lead wire from above through the motor device

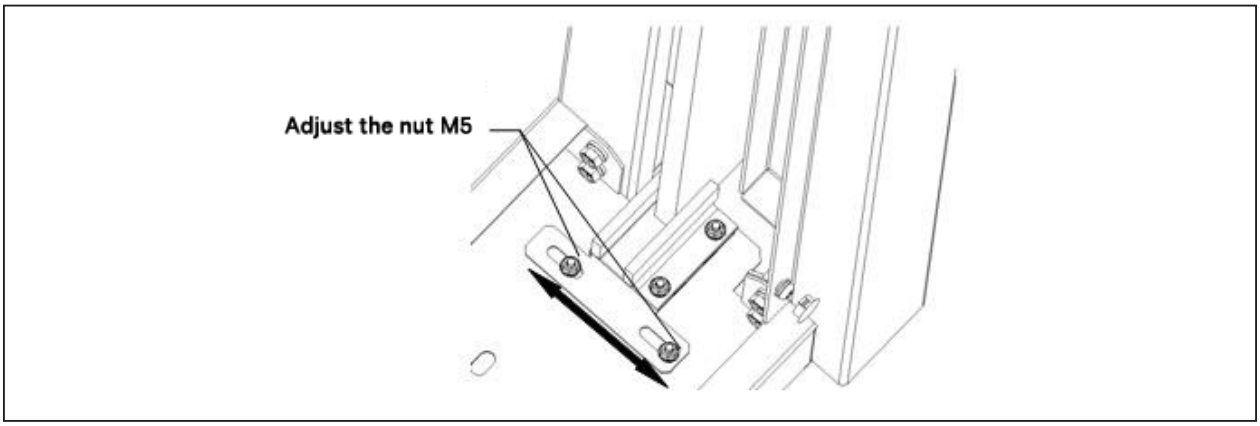
NOTE: Careless connections in the above locations can lead to malfunction.

NOTE: When connecting, the control device needs to be loosened to adjust the position. After the connection is completed, attention should be paid to fixing the control device.

12. F is set to stop the pendulum adjusted

Loosen the adapter nut in the F position and adjust the position of the F position before and after, so that the front and rear positions of the glass door are centered, and there is no obvious friction between the top and the top of the column. After the adjustment, the nut is tightened tightly..

Figure 2-60 F-position pendulum adjustment

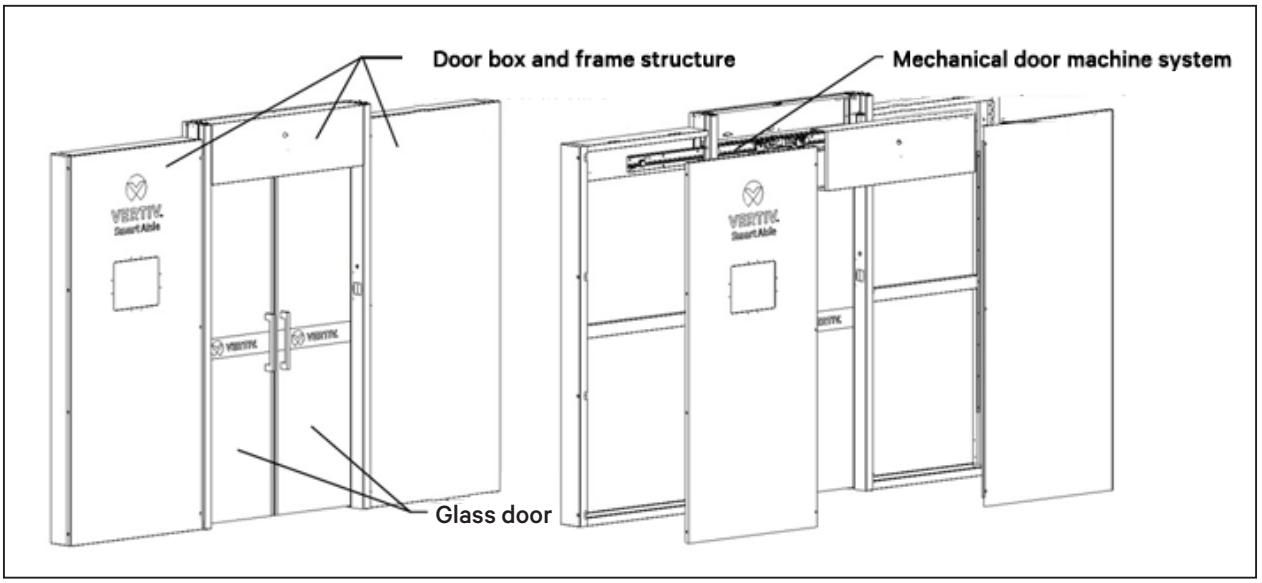


13. Do not install the side door panels, wait for the installation of the electric door and control panel along with the electrical installation and then fix the side panel after commissioning.

2.7.3 Installing the mechanical door

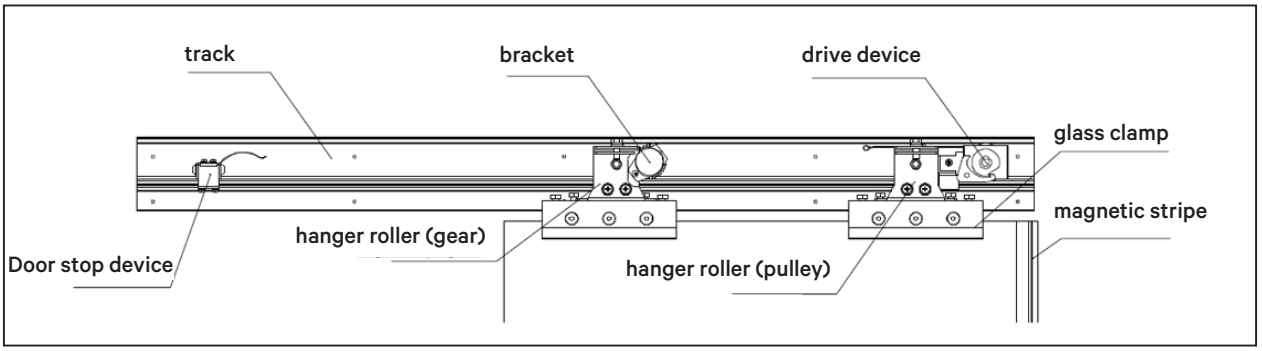
1. The Mechanical sliding door configuration comprises of a mechanical door, glass door (Pre-installed hanging clamp & magnetic stripe), door box, and the frame structure as configuration illustrated in the following diagram:

Figure 2-61 Mechanical sliding door configuration



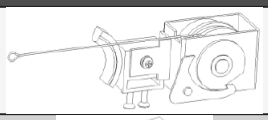
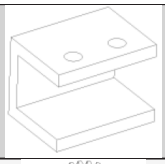
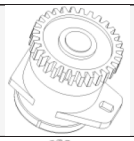
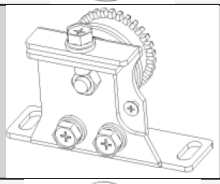
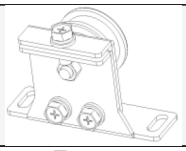
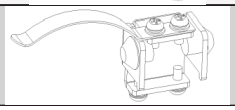
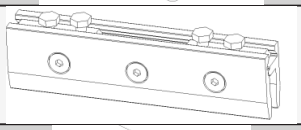
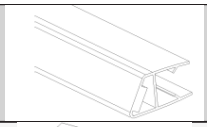
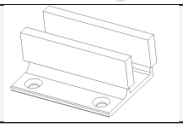
2. The mechanical door system is a semi-automatic door which requires two sets of door rails. The door opening is by manual operation and the closure of the door is automatically done. The door glasses have exterior and interior handles with a glass thickness of 12mm which have handle mounting holes.

Figure 2-62 Mechanical sliding door configuration



Semi-automatic door components are listed in the following table (refer Table 2-3):

Table 2-4

NO.	Part Name	Icon	Number (1 set)
1	Door Closing Spring		1
2	Tension lock plate		1
3	Hydraulic retarder		1
4	Gear wheels hanging		1
5	Hanging round group		1
6	Normally open sheet		1
7	Glass hanging folders (pre-installed)		2
8	Glass stripe (pre)		1
9	Decoration system preventing the (pre)		1

3. Mechanical sliding door frame and frame structure of the installation

a. Structure to be disassembled: The left and right door frame are all incoming materials (with a cover and a base) which helps prevent deformation during transportation. Before the installation, remove the cover of the left and right door boxes and the front silver outer column; Lintels also have to remove the cover.

Figure 2-63 Remove the structural member

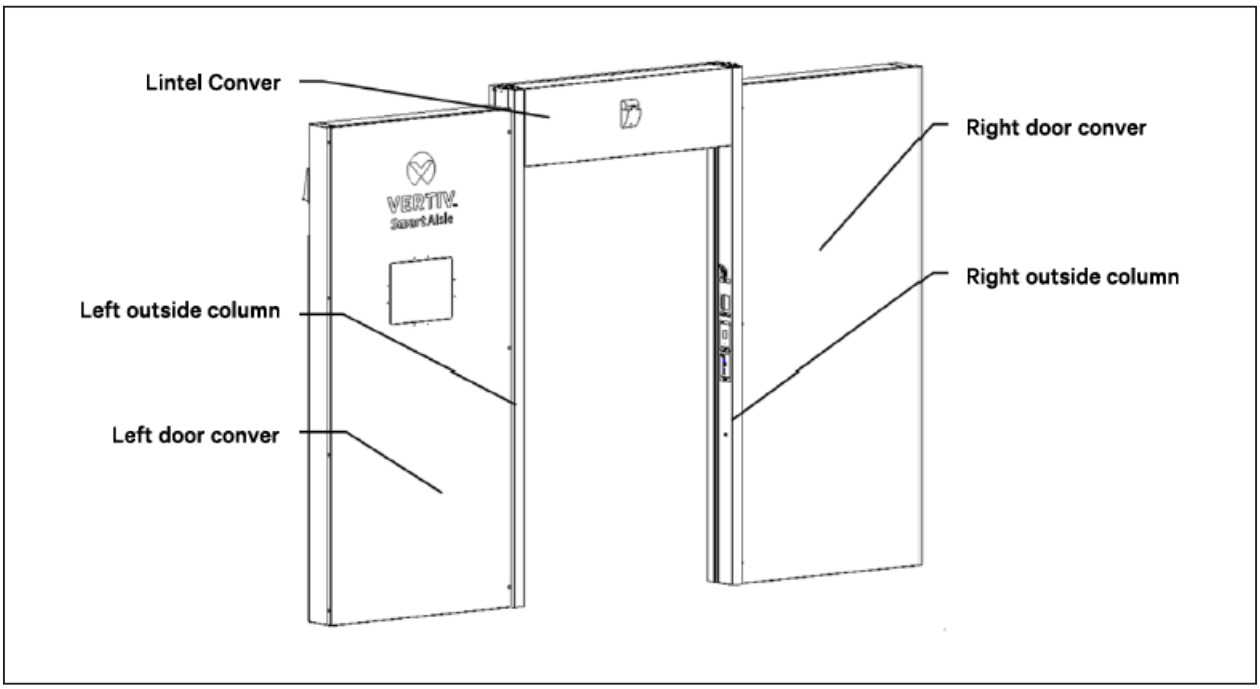


Figure 2-64 Remove door cover

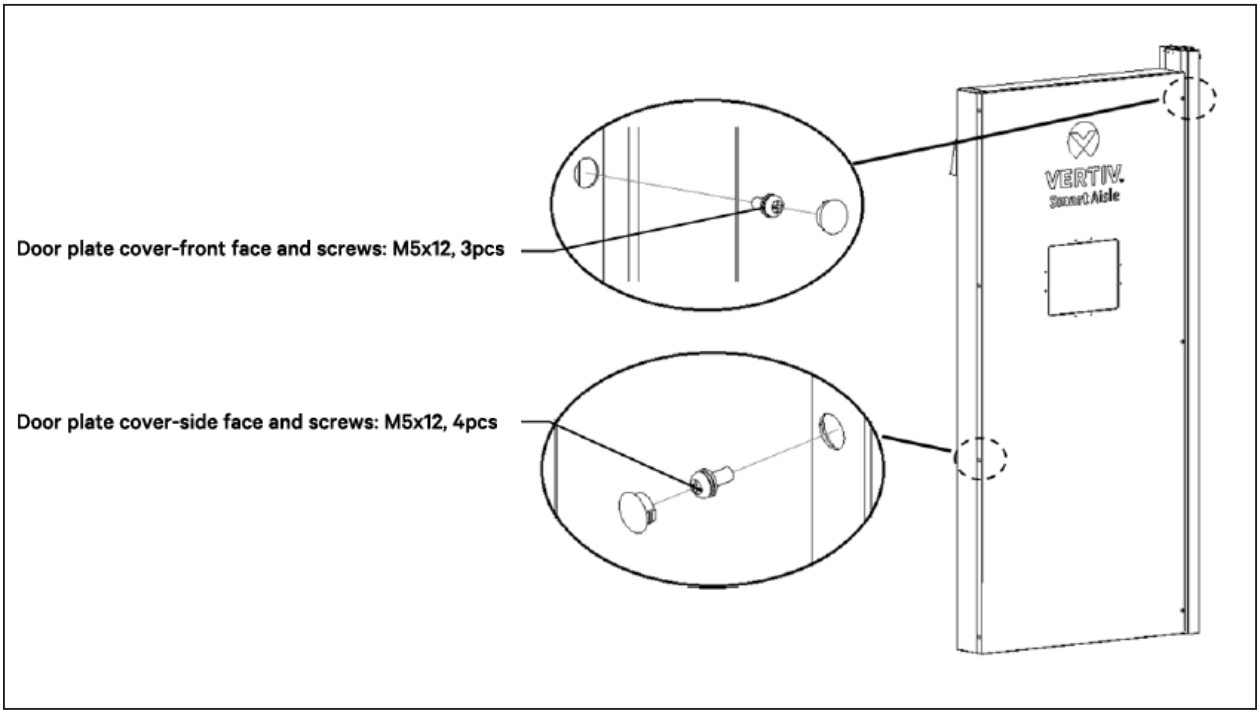


Figure 2-65 Removing the outer column

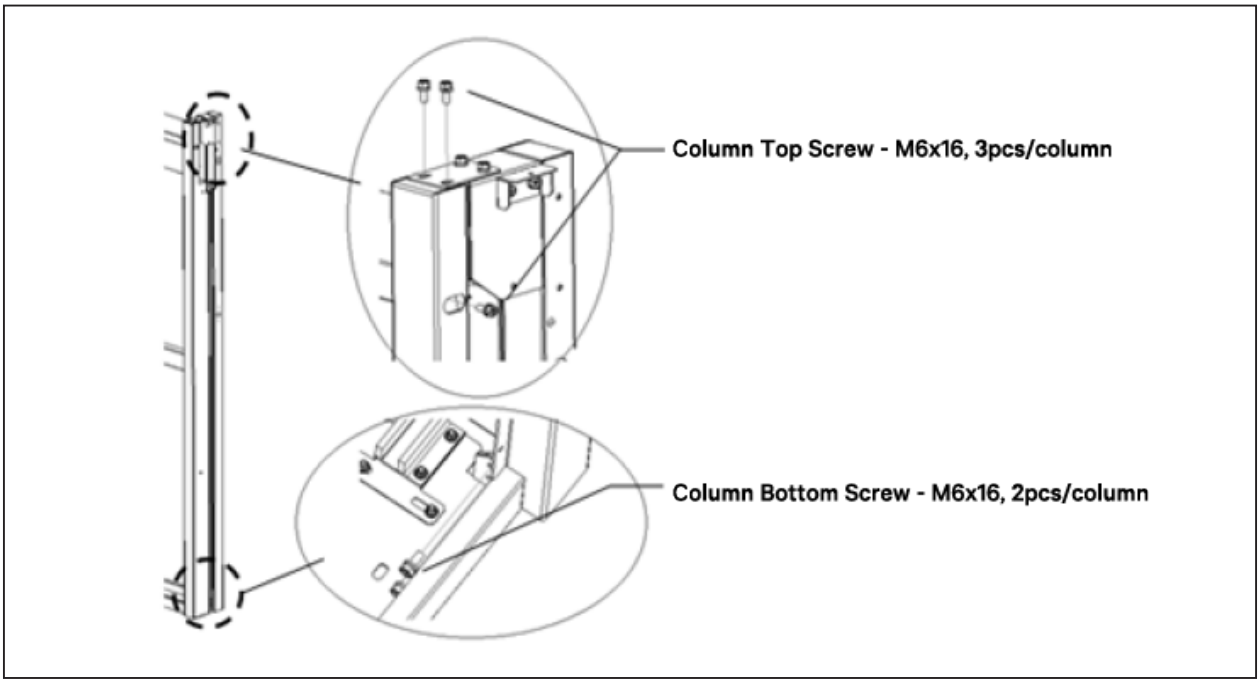
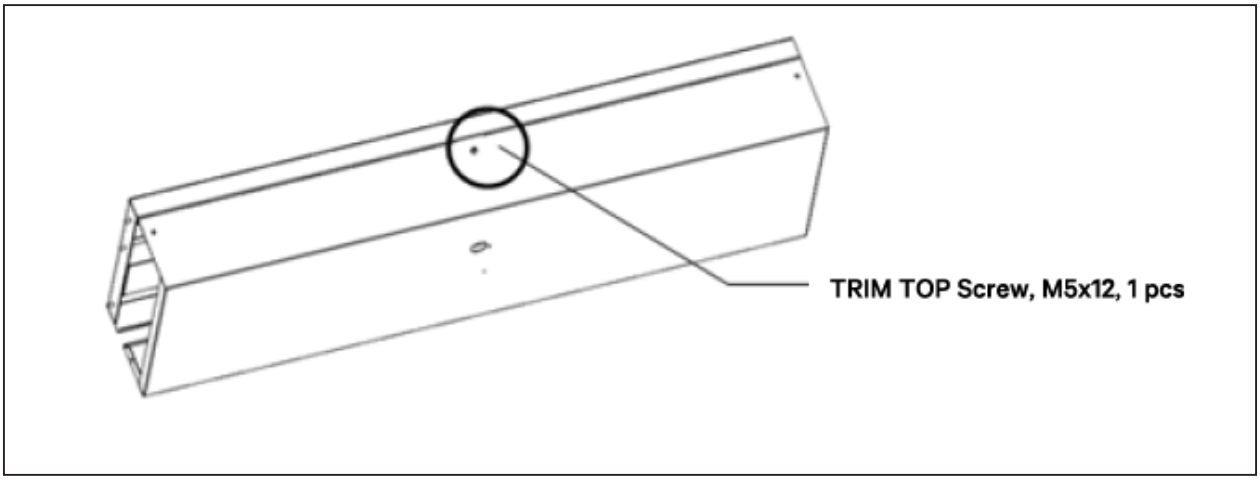
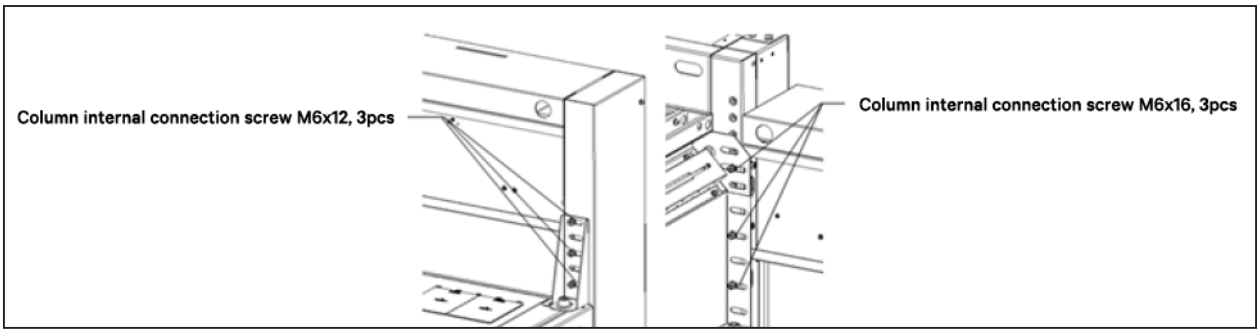


Figure 2-66 Remove the Lintel Cover



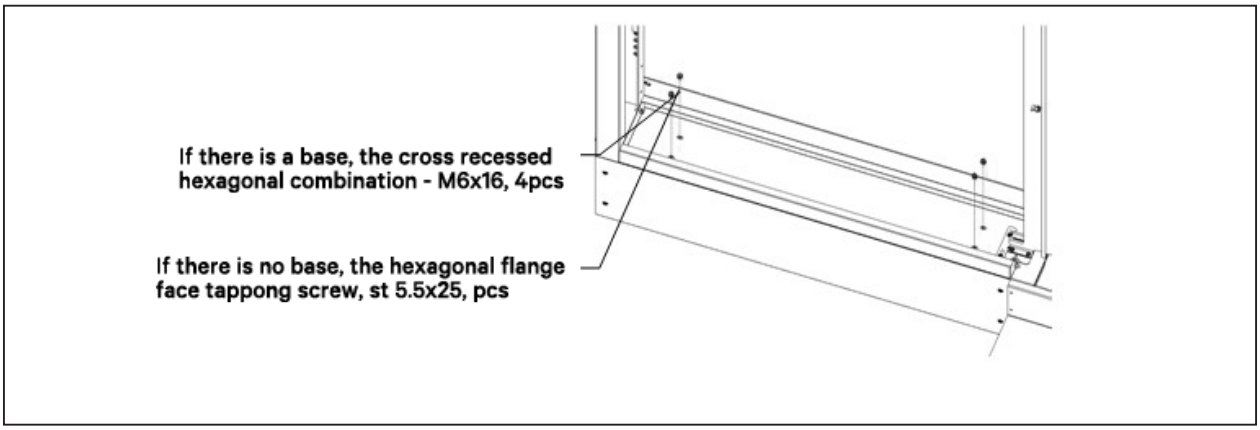
b. The door frame connects with the cabinet and the top board. The top of the door box is connected with the top of the cabinet via the adapter. The inside of the top is connected with the section of the skylight support. At least 3 M6 bolts are installed on the connecting surface.

Figure 2-67 Top of the door box is connected and fixed



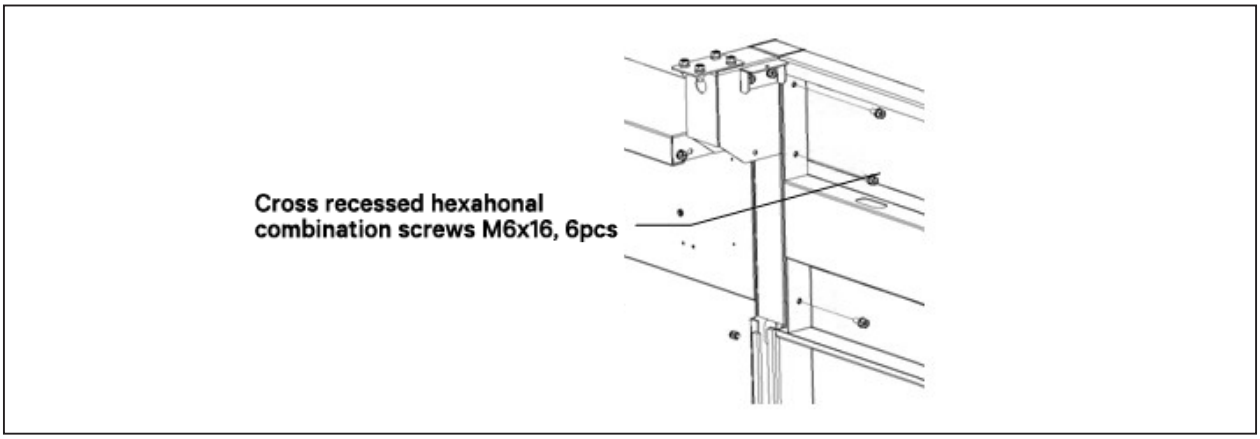
c. Door frame with the door base / floor connection: The door base and the bottom of the door frame are connected to the base with M6x16 screws; door base and the bottom of the door frame are directly connected to the floor with the use of a hexagonal flange. If there is no base, the Self tapping screws st5.5x25 are used.

Figure 2-68 The bottom of the door box is connected and fixed



d. Lintel and the door frame connection frame: lintel and the door column are connected to the left and right sides by 3 M6x16 screws, a total of six.

Figure 2-69 The bottom of the door box is connected and fixed

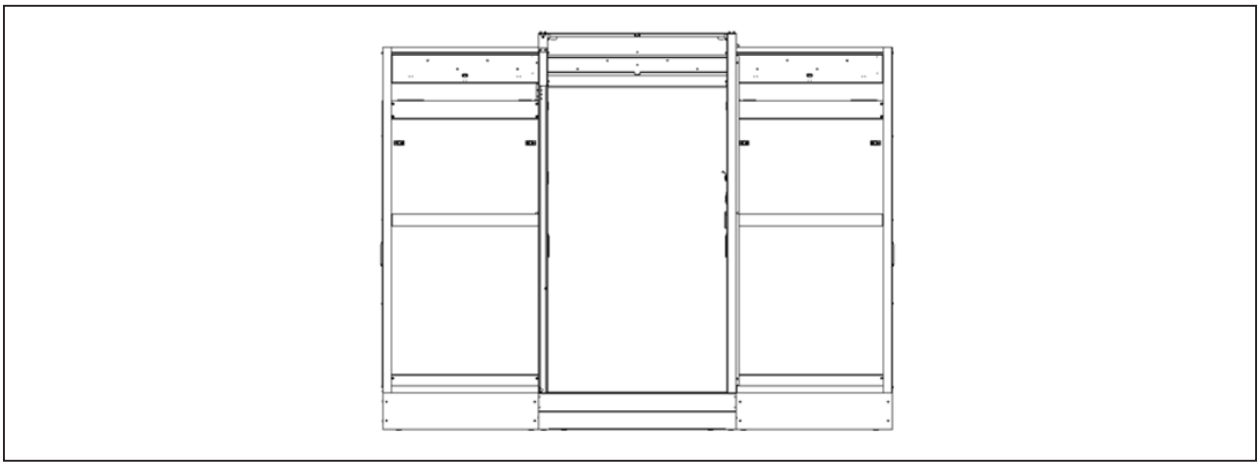


NOTE: Disassembled structural parts should be properly preserved to avoid scratches after disassembly.

NOTE: Disassembled fasteners are classified according to the structural components to avoid loss or confusion.

NOTE: The Door box frame and door base connection screws, and the door box frame and the floor screws are not the same, so utmost care must be taken with this installation point,.

Figure 2-70 End door frame mounted state of the cartridge



The total length of the rail is 2400mm. Actually two rails each of 1200mm length constitute the total length. The rail is drilled to the frames using self tapping screws ST5.5X22 starting from both sides of the guide rail during installation. The upper and lower row is pressed so that it is mounted and fixed firmly.

Figure 2-71 A schematic rail mounting

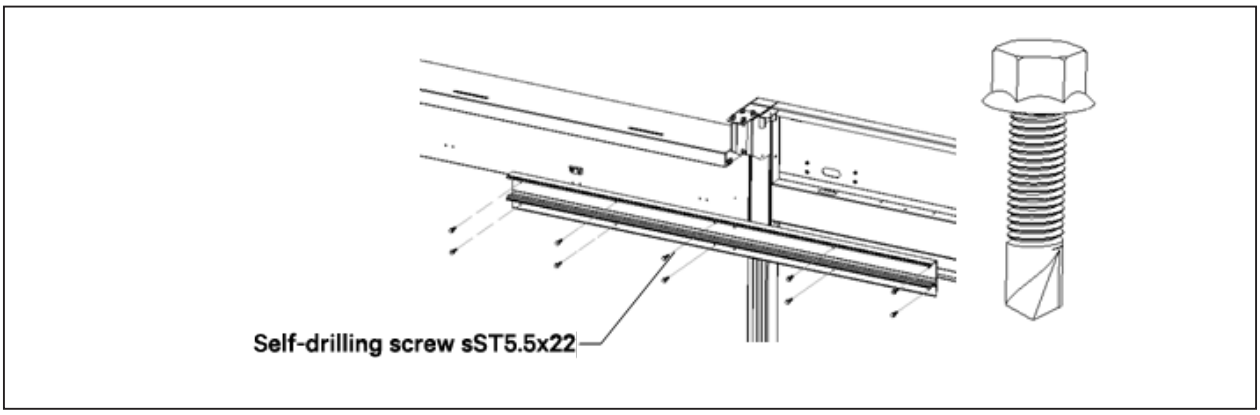
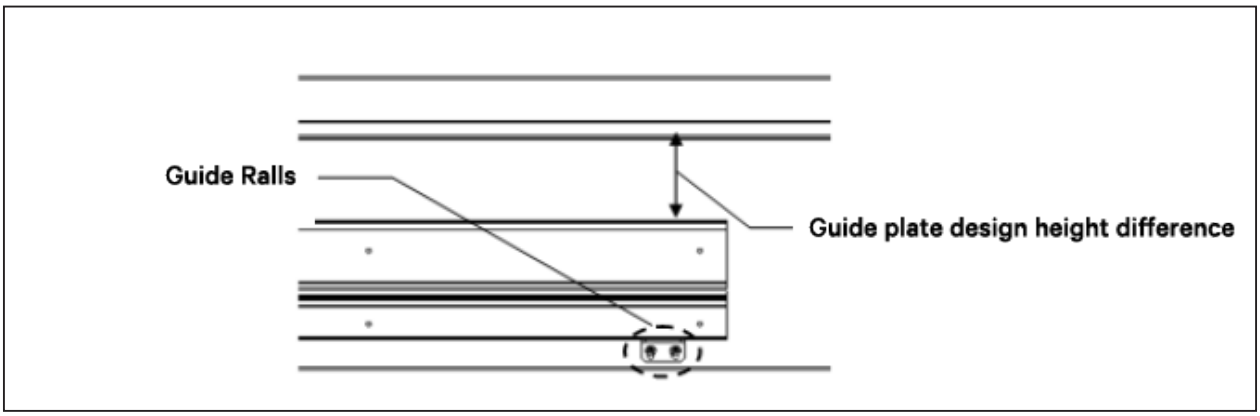


Figure 2-72 Positioning and levelling the rail



NOTE: The design of the guide edge is at a height difference of 67.9 mm from the mounting plate of the upper rail edge. Ensure that the mounting rail is in a horizontal state using a positioning member carrying the cassette door. The preliminary positioning is done by reusing the levelling method. The position is adjusted to the exact match-point of the positioning member by connected screws. Remove the positioning member after the positioning process to avoid interference with the subsequent installation of the glass door.

NOTE: Prevent any damage to the rail during track installation, else it will adversely affect the performance and pulley/belt life.

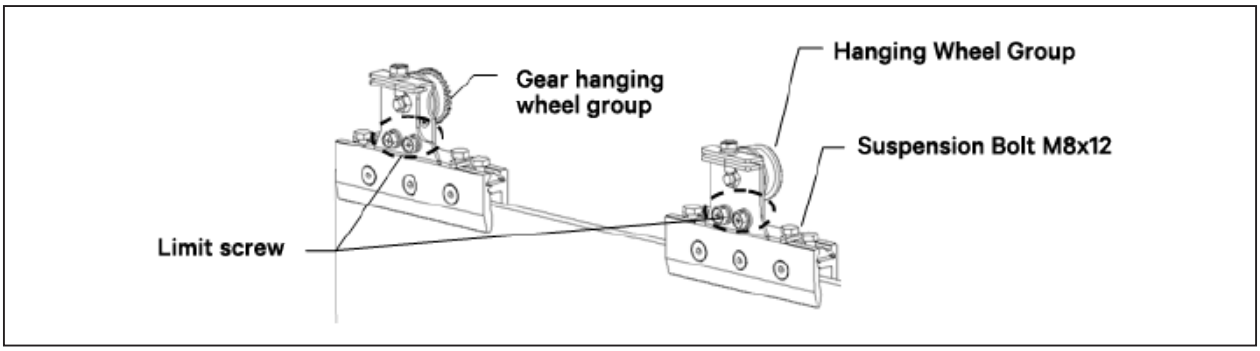
NOTE: The adjustment of both the tracks should be at the center position of the door while the two tracks should be kept at the same level; it should be in a horizontal position and the gap in docking must be less than 5mm

1) Installation and adjustment of the glass door

The magnetic strip come pre-installed on the glass door. The distance is 50mm from one edge to the other edge of the glass door. The doors must be checked before assembly and should be in a reliable and accurate position. By correctly positioning the magnetic strip, it can be determined whether the mounting direction is correct.

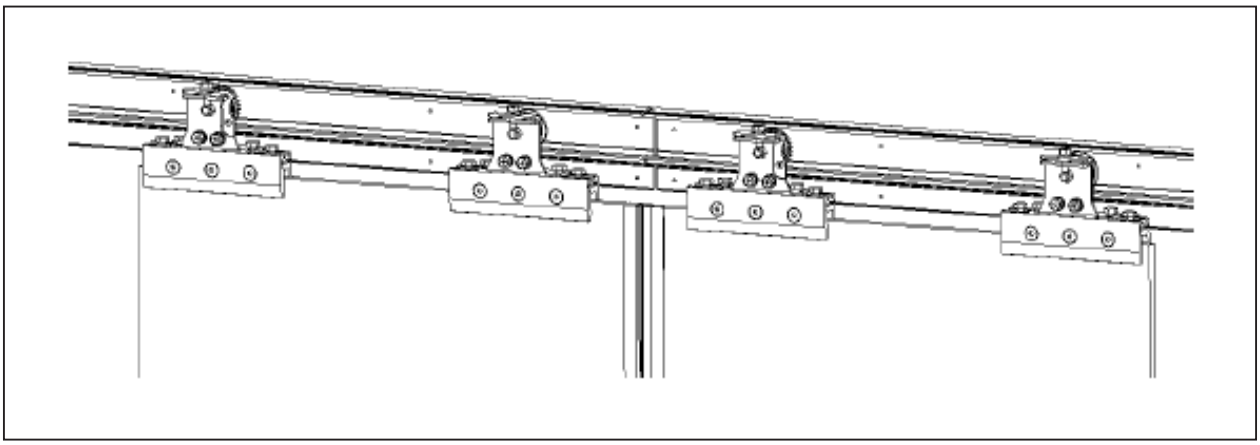
Glass doors are connected to the gear wheel and set suspension using suspension bolts. The gear wheel set on the left side hanging glass doors should be mounted on the right of the wheel set suspension.

Figure 2-73 Hanger installation



When the glass door is mounted, first the limit screw and a hanging gear wheel are removed; the glass door of the lift rails are mounted the limit screw is replaced.

Figure 2-74 Glass door hanging



NOTE: Prior to installation, ensure that the glass is connected to the glass door firmly and accurately, else it will result in the glass falling off.

NOTE: On unscrewing the suspension bolt, the glass door slider within the holder may slip and fall.

NOTE: Both the left door and right door along with the lifting gear are mounted on the left wheel set and the right hanging wheel assembly for each door; else it will result in erratic assembly.

The following steps must be adhered after the door hanging horizontal adjustment:

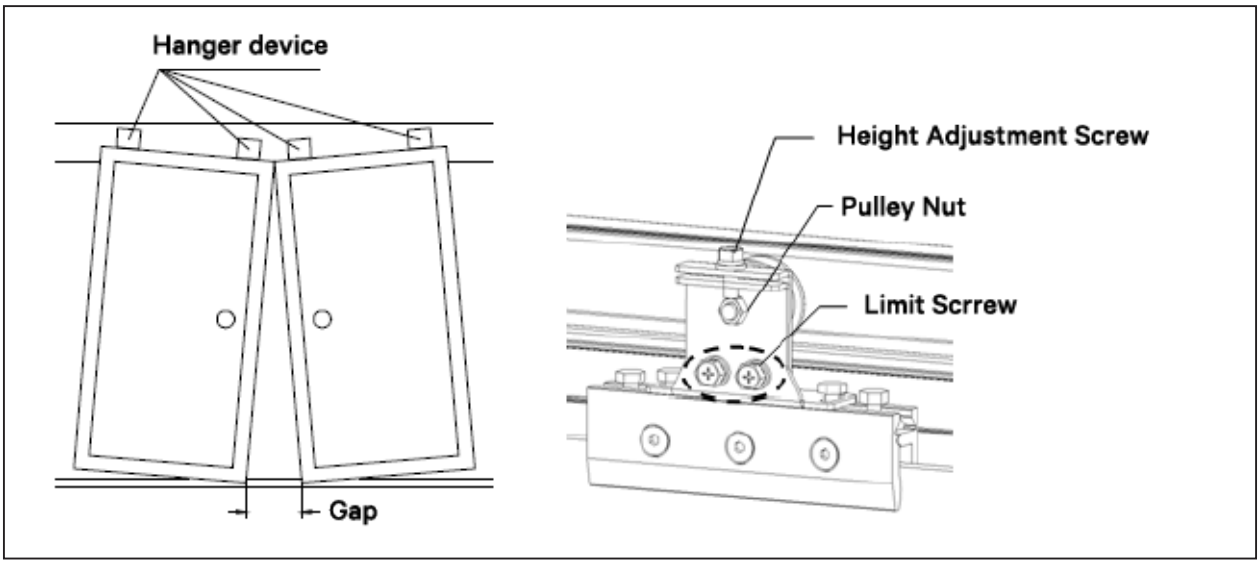
a. Loosen the nut and the limit screw of the Pulleys.

b. Use a height adjustment screw for adjusting the height Remember that the door rises during clockwise direction whereas the door drops in a counter-clockwise direction.

c. The pulley and stopper nut screw must be fitted tightly.

d. Confirm the travel resistance with the index finger and check the movement of the door. It should slide smoothly when supspended by the hanger means on the rails.Glass door hangin

Figure 2-75 Glass door adjustment



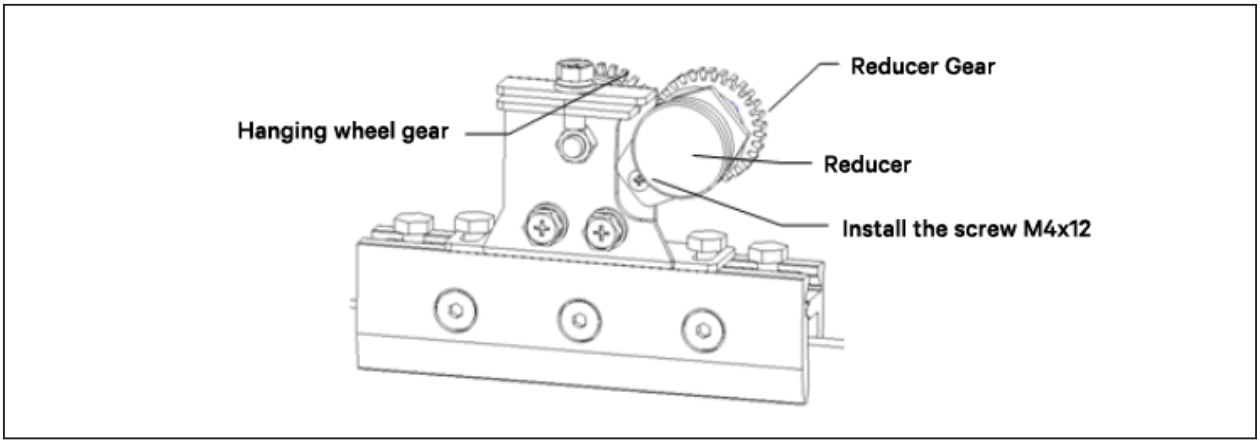
NOTE: For leaf movement, check the following points:
1. Whether the hanger device is mounted vertically on the door;
2. Is there any friction between the lower part of the door leaf and the bottom of the door leaf?
3. Is there any friction between the hanger stopper and the engine case?
4. Whether there is friction between the hanger device and the horizontal frame.
5. Is there any friction between the door leaf and the door frame?

2) Installing the gear unit

Mount the gear based on the gear position wherein it is fixed hanging from the front wheel.

Adjusting the angle of the gear unit so that the gear position can be fully engaged with gear wheel suspension.

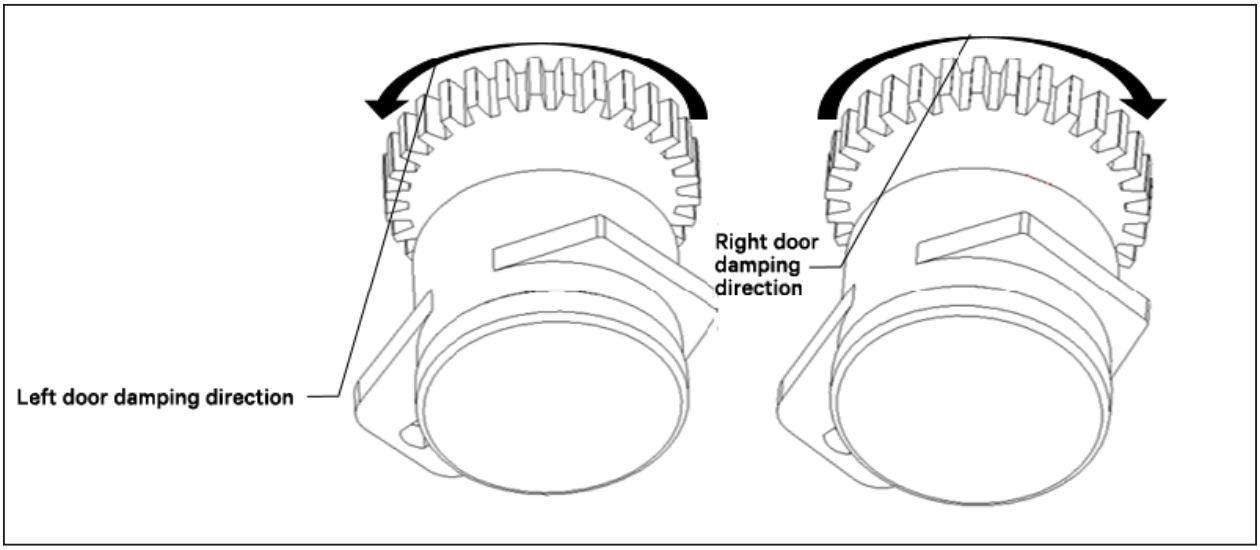
Figure 2-76 Installing the gear unit



When the left door and right door gear unit is mounted, the gear dampers are in different directions. The gear unit mounting of the left door is done by reducing the speed of the gear on the left side of the door front face.

The gear unit for the right door is installed on the right face of the front side of the door. If in opposite directions, rotate the hanging wheel to remove the installed gear unit.

Figure 2-77 Installing the gear unit



NOTE: Gear doors must be mounted in the direction respective to the requirements. If installed backwards the normal operation will not result in the proper closure of the door leaf.

3) Mounting tension

The tensile force in the mounting rail lock plate is due to the pulling force.

The position adjustment of the tension and the door hanging wheel being in full contact closed state, the tension is fixed at the current position.

Slightly loosen screws to increase the wheel suspension; the tension of the rope is fixed to the screw collar hanging wheel. The contractional direction of the door is closed in the direction of the rope.

Figure 2-78 Mounting tension

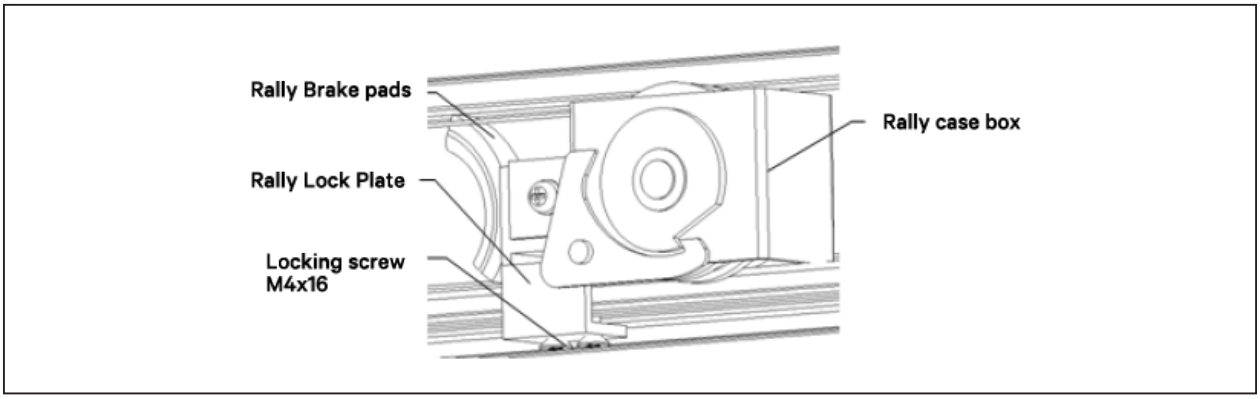


Figure 2-79 Rally adjustment

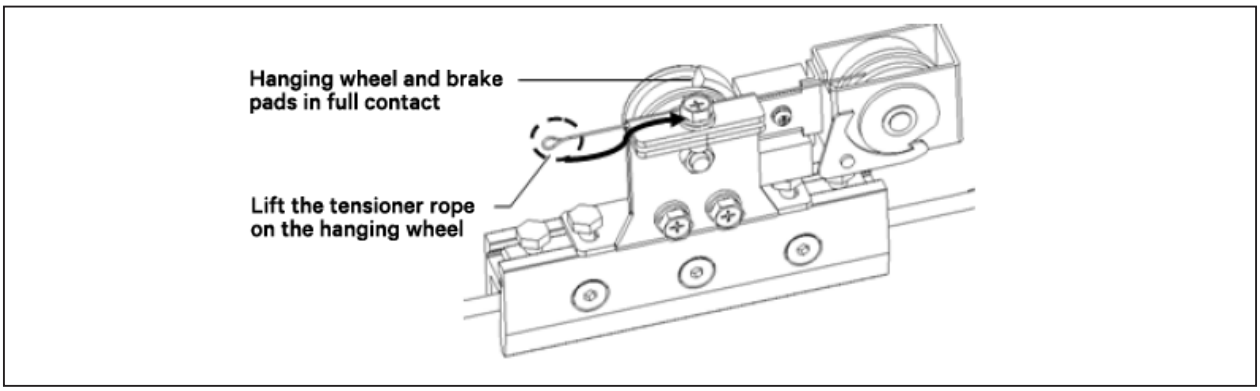
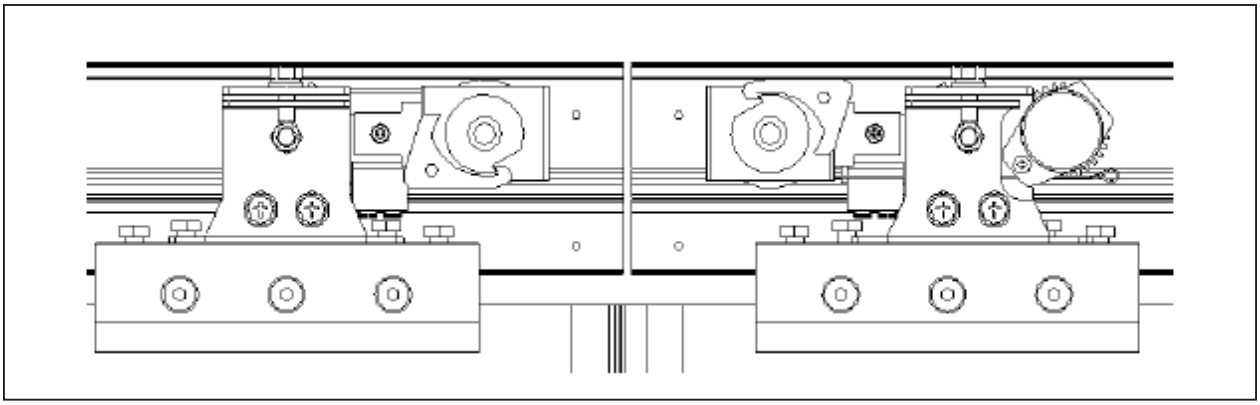


Figure 2-80 Schematic installation of the rally



NOTE: The adjustment screw must be slightly loosened when the tension wheel suspension is being installed. Refer to the next step on the leaf levelling adjustment if the door is offset.

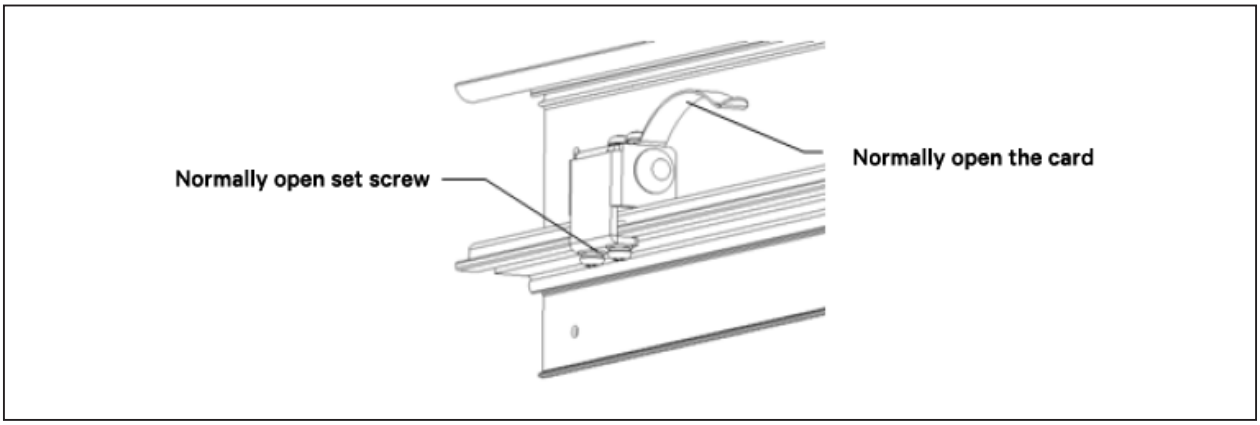
4) Open Mounting

The direction of the card is normally open towards the door closing end portion of the mounted guide rail.

Normally Open (NO) defines a maximum opening degree of the sliding door, the adjustment plate is usually open and plays a role in limiting the hanging wheel.

When the door is open normally, the card can be smoothly opened in the card sheet, with the door opening to adjust the range of the open position of the sheet.

Figure 2-81 Normally open mounting plate



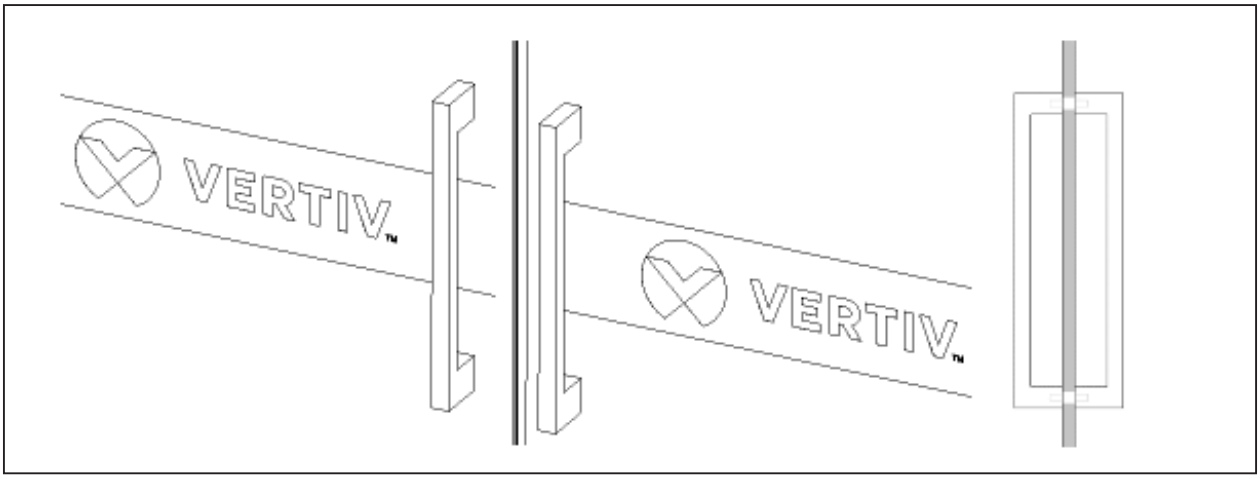
NOTE: The NO card is elastic in nature. The card may be manually bent appropriately and adjusted to the correct position for an non-effective jammed door.

5) Handle installation

For installation of the front door handle, a front handle is fixed by a shoulder screw. A washer that penetrates the back surface of the glass is sandwiched between the screw head and the handle.

Mounting the back surface of the handle includes extending the handle into the stepped head of the screw mounting hole, and locking the screw against the bottom of the stepped portion of the screw,

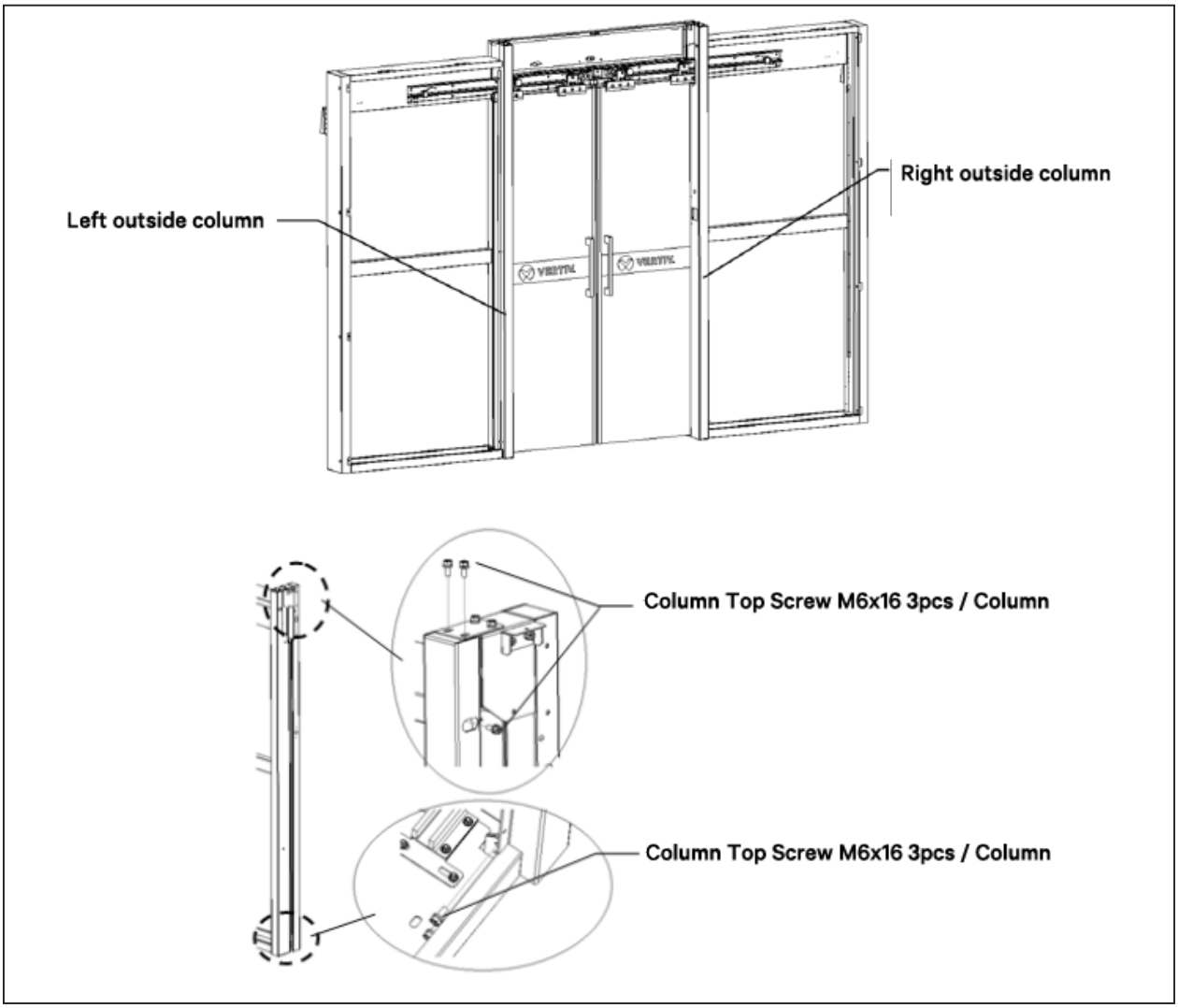
Figure 2-82 Normally open mounting plate



6) Installation of the outside column

An outer vertical pillar screws total 5 in number, which is about the same as the outer column fixation. The inner and outer side of the glass clip has paste on the pre-column tops. During installation, the pillar tops should be taken off to prevent it from falling over.

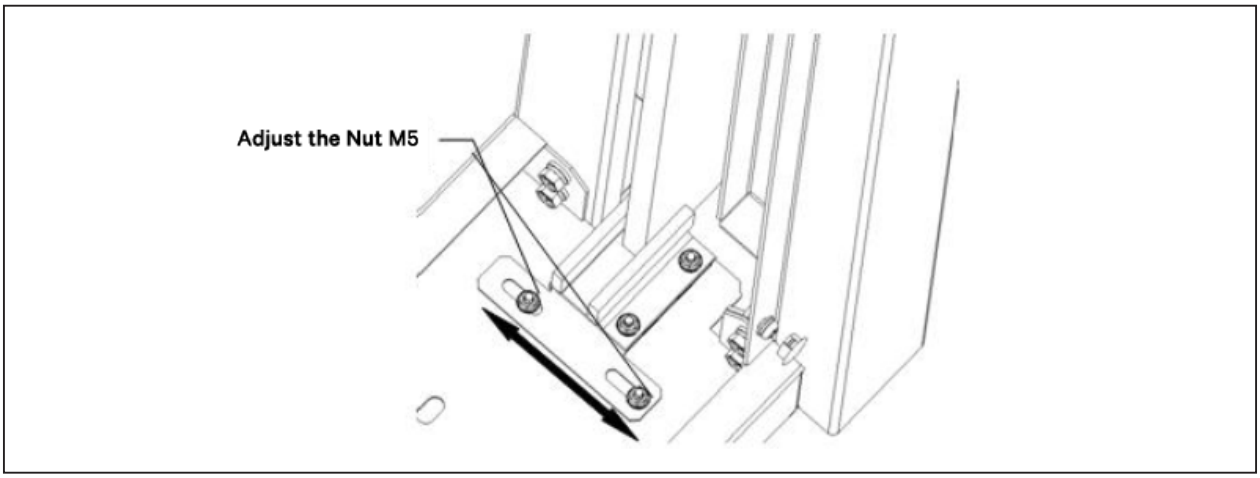
Figure 2-83 Column installation



7) F is set to adjust the pendulum stoppers.

The transfer pine nut opposite to F helps adjust the longitudinal center position of the glass door, without significant friction with the tops on the front and rear columns.

Figure 2-84 Column installation

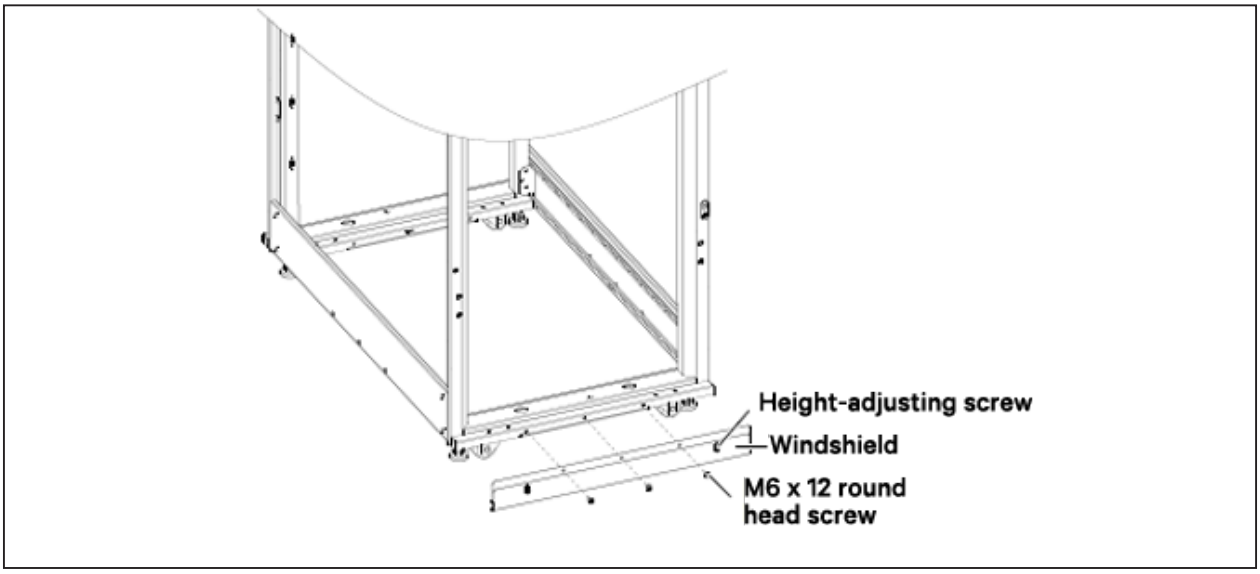


8) Do not install the side door pocket; wait for the control panel electrical installation following which the side panel is fixed after the commissioning process.

2.7.4 Wind shield installation at the bottom without dismantling the feet

Loosen the height-adjustable screws; Fix the windshield on the rack beam as shown in **Figure 2-85**.

Figure 2-85 Mounting the windshield



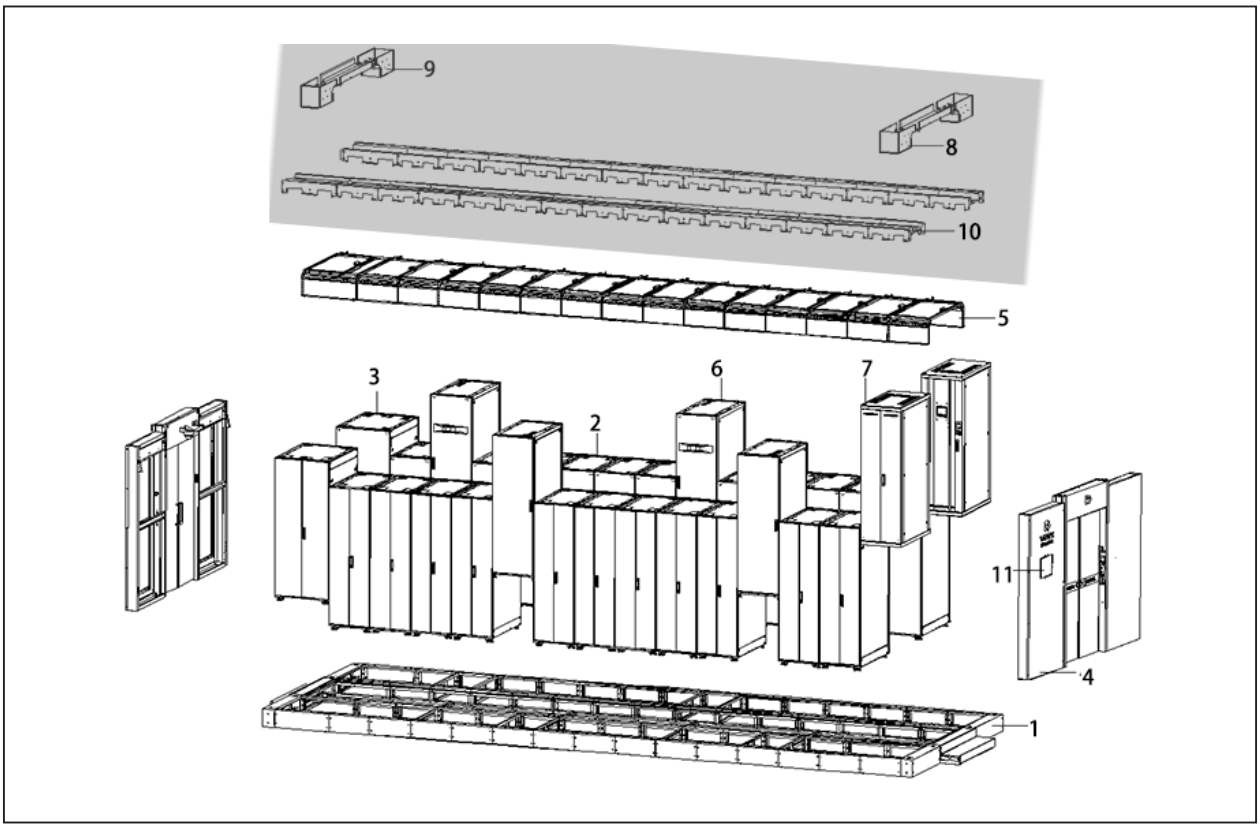
NOTE: On installing the wind deflector, the windshield falls to the lowest position and the height has to be adjusted by tightening the screws.

NOTE: Only supports the cabinet and a bottom mounting the CRV series windshield.

NOTE: The bottom of the windshield are of three types-300mm wide at the bottom spoiler (for a 300mm wide cabinet), 600mm wide at the bottom spoiler (for 600mm wide cabinet), and the bottom of the windshield which is 800mm (pertaining to a 800mm wide cabinet). Mount it in the same way as the bottom of the three types of the windshield.

2.8 Installation of the Bridge system

Figure 2-86



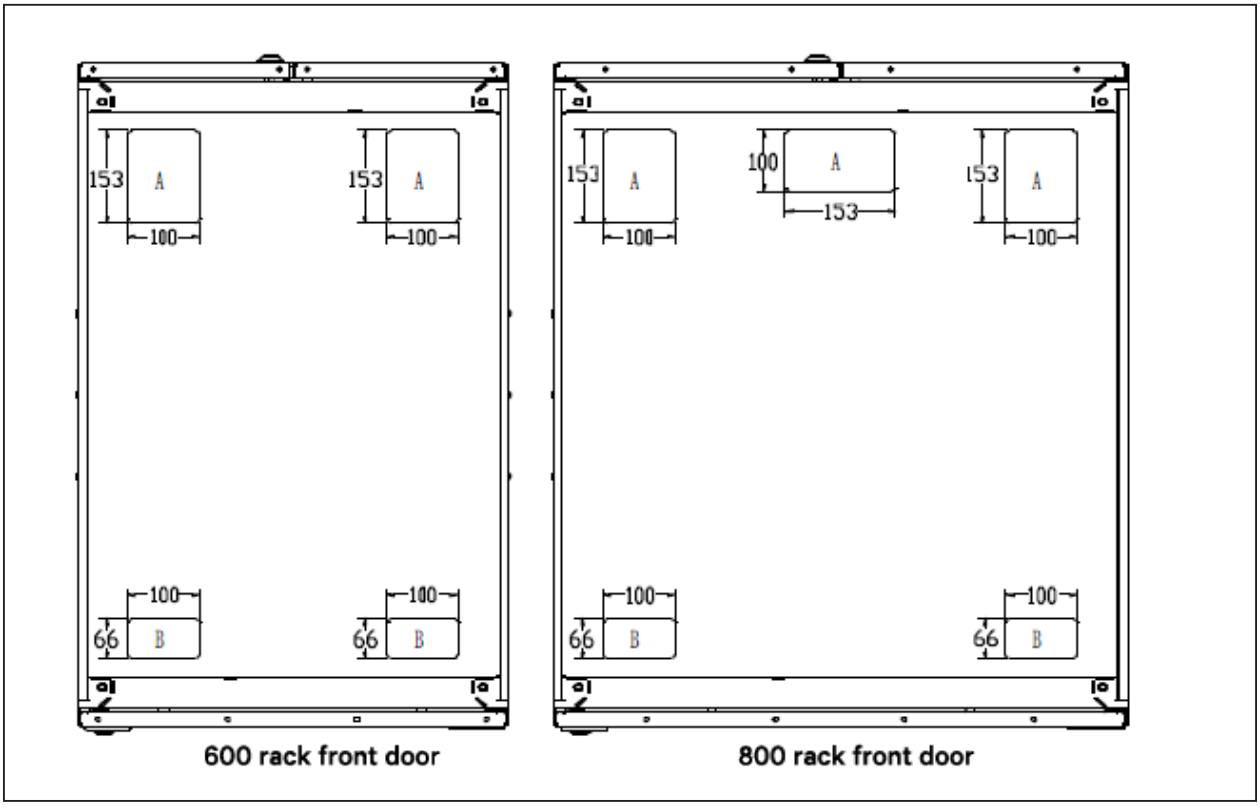
S.No	Details of equipment
1	Base
2	Server Cabinet
3	Network Cabinet
4	Access door
5	Top Plate
6	A/C Column
7	Distribution Cabinet
8	Strong wire passage groove
9	Power cable trunking; copper and fibre cable tray
10	Cabinet top wire groove
11	Control panel

The Bridge system installation comprises the IT racks entry holes, roof installation trunking, and the installation of the cross channel trunking.

2.8.1 IT Racks entry holes

The IT racks entry holes are depicted in **Figure 2-87**.

Figure 2-87 Entry holes



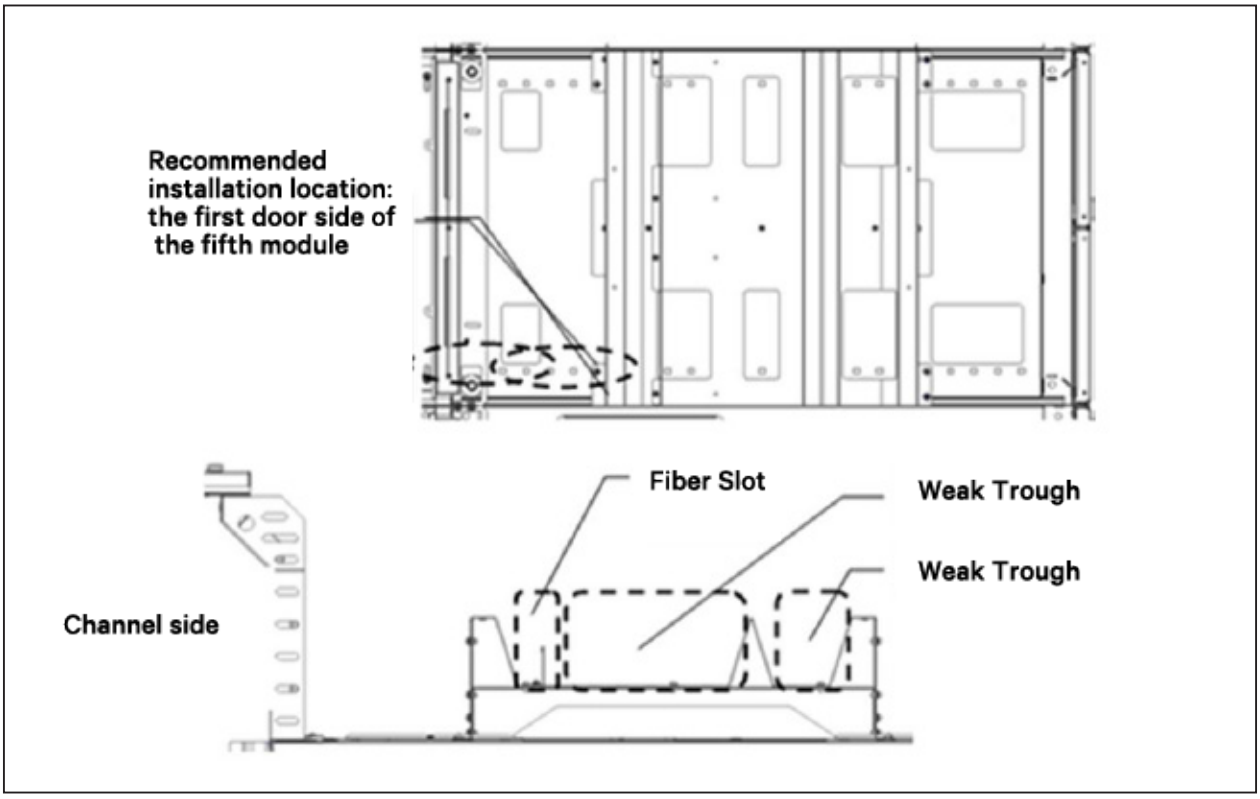
NOTE: Region A is for reference trace cable Cat6 156 and Region B is for reference trace the actual cables in the wiring process.

2.8.2 Roof Trunking installation

Top line slot cabinet and the connection:

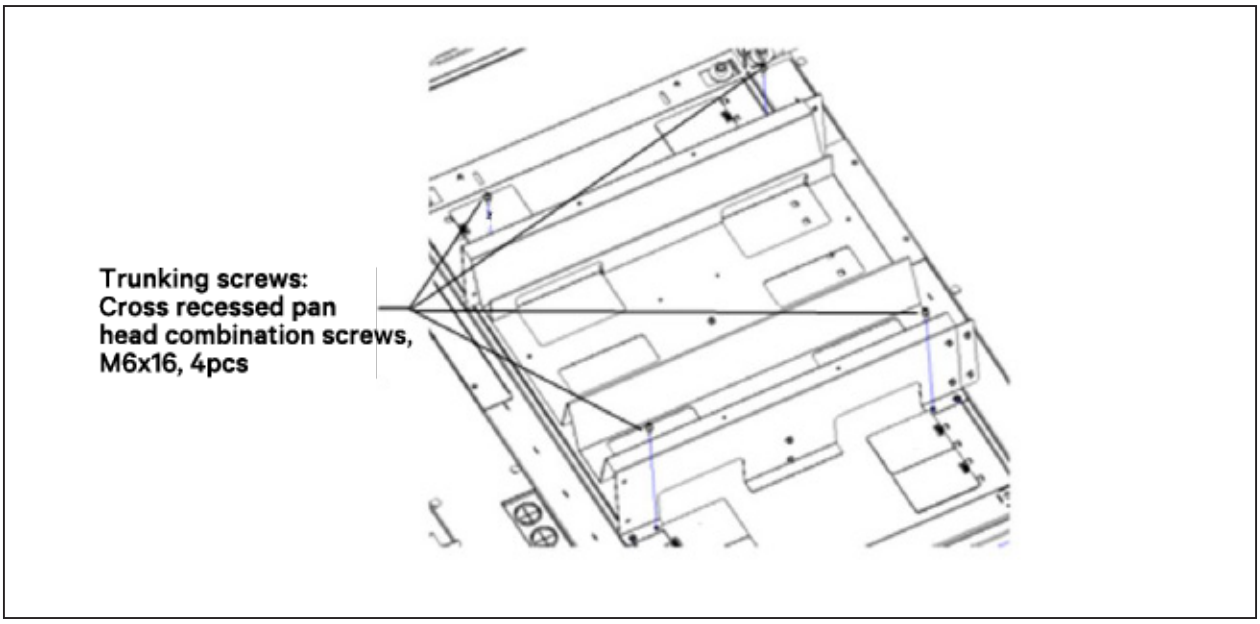
The recommended installation position is from the front door to the rear door number with the fifth module hole as the starting point of the installation position; the recommended installation direction is the weak wire groove (wide wire groove end) close to the channel side.

Figure 2-88 Recommended installation trunking Process



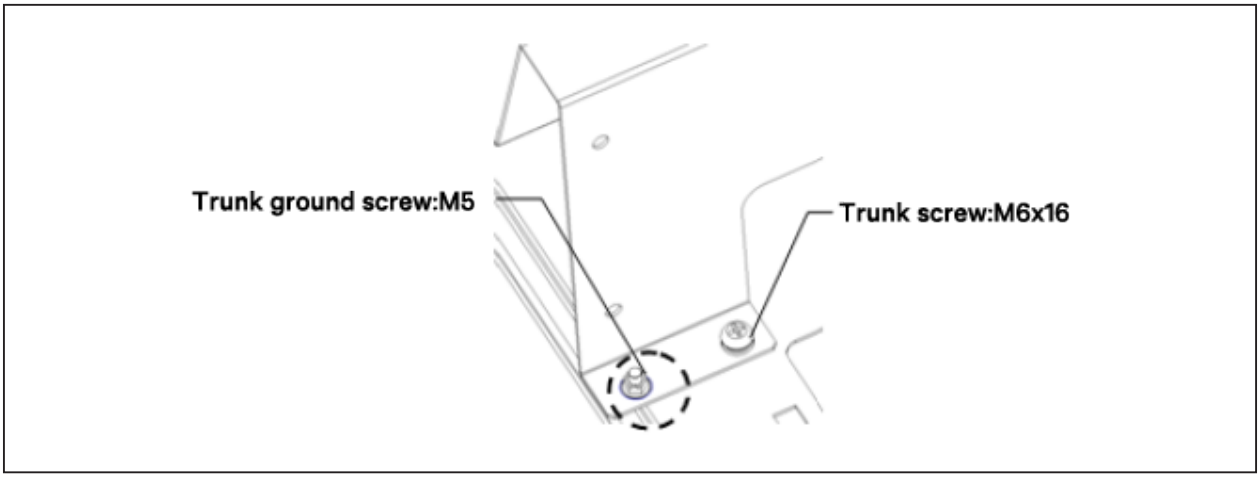
Mounting cage nuts (floating nut) are installed on the top of the square mold holes; place the trunking on the top of the cabinet. Fix the four conners of the trunking.

Figure 2-89 Roof installation trunking



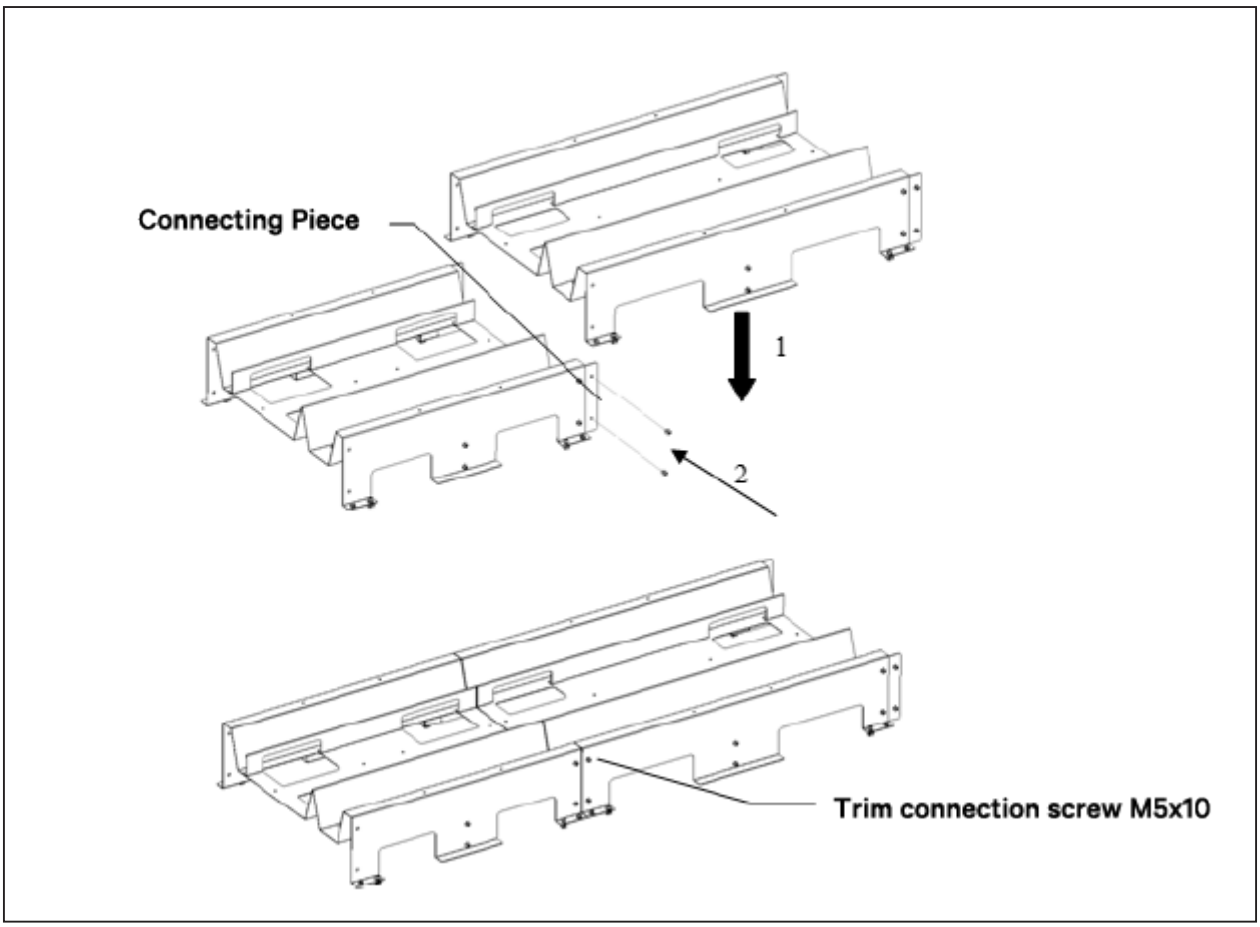
There are grounding screws in the four corners of the top line slot. Choose the grounding position based on the actual situation. The grounding screw size is M5.

Figure 2-90 Trough ground point and fixed point



The connection between the roof trunking: Trunking from one end of the channel to the other end of the passage is done from the groove; the roof trunking connector is fixed in the installed trunking on the adjacent trough from the top to the bottom placed in the adjacent roof. So trunking along the cover connecting piece, the mounting screw is fixed.

Figure 2-91 The connection between the trough



NOTE: The channel remains in the same direction during the installation trunking process.

NOTE: During installation trunking, If the top of the cabinet is without holes on the modulus, the trunking is secured only by the connecting piece of an adjacent trunking.

NOTE: The number of high-power channel reference routing is about 25 cables (3-core 6 square sheath cable); copper channel reference routing is about 300 (Cat6); The Fiber Channel reference routing is about 20 cables.

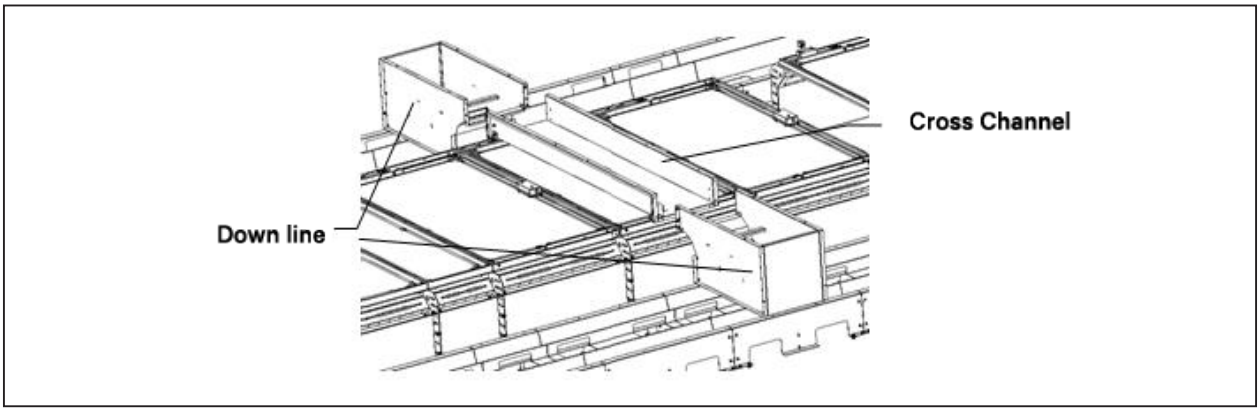
NOTE: The actual amount of wiring affected by the wiring process will fluctuate.

2.8.3 Cross-channel trunking installation

1. Cross-channel trunking structure

The cross-channel trunking is composed of a 1 cross-channel channel and 2 lower-line ports. The cross-channel is installed above the skylight roof and the lower line-line is installed above the roof trunking.

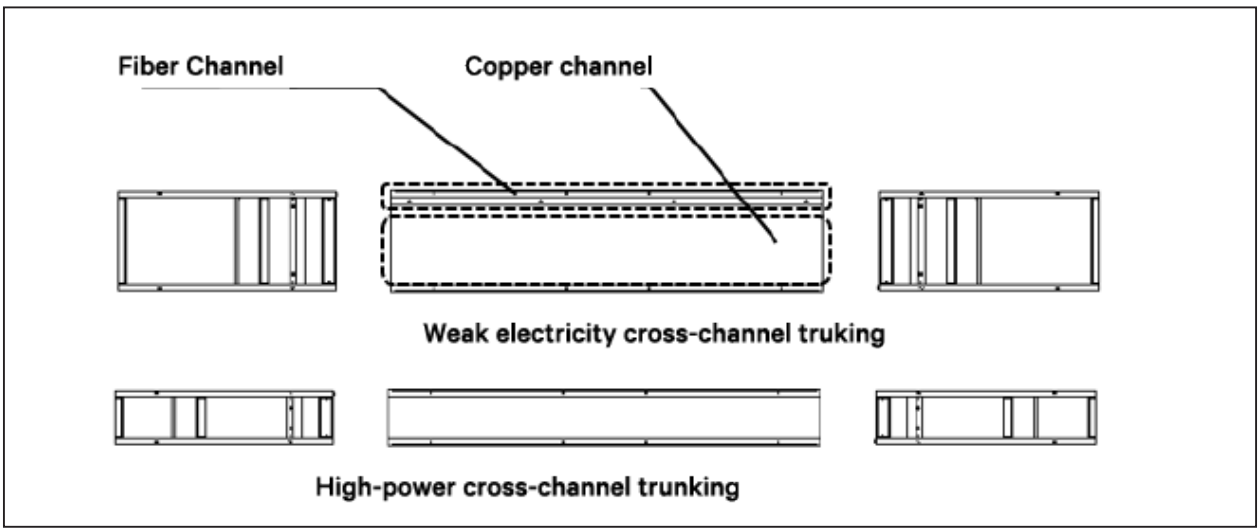
Figure 2-92 Cross-channel trunking constitute



NOTE: Distinguish between the strength of the wire troughs of the trough across the channel. There are two major differences – The weak trough has a width of about 300mm, the central channel has a partition separating the copper channel and the fibre channel; the strong trough has a width of 120mm without any central channel partition.

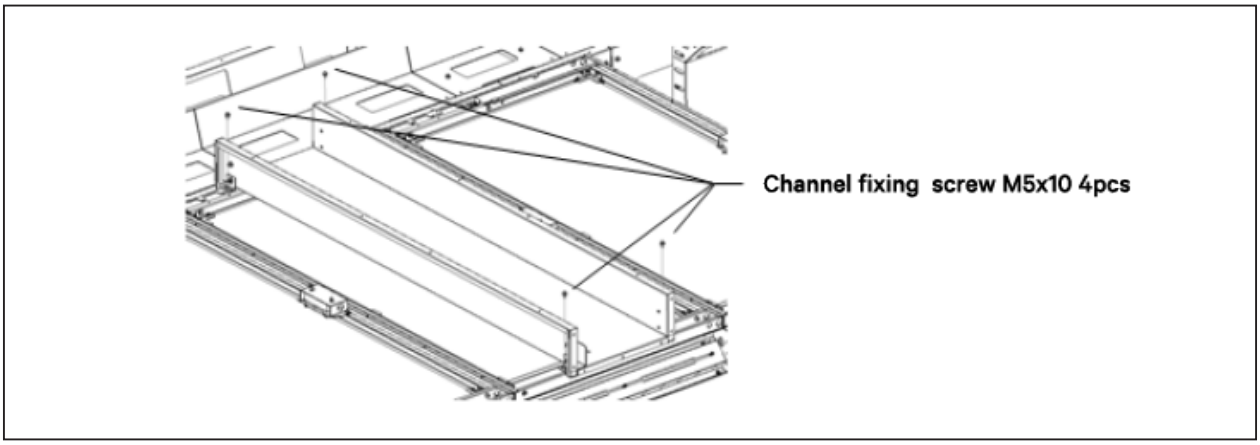
NOTE: The number of the high-power channel reference routing is about 25 (3-core 6 square sheath cable); the copper channel reference routing is about 300 (Cat6); Fiber Channel reference routing is about 20. The actual amount of wiring affected by the wiring process will fluctuate.

Figure 2-93 The strength of electrical trunking cross-channel difference



2. Cross channel mounting channel – the cross channel is connected to the skylight roof by means of 4 M5X10 fixing screws.

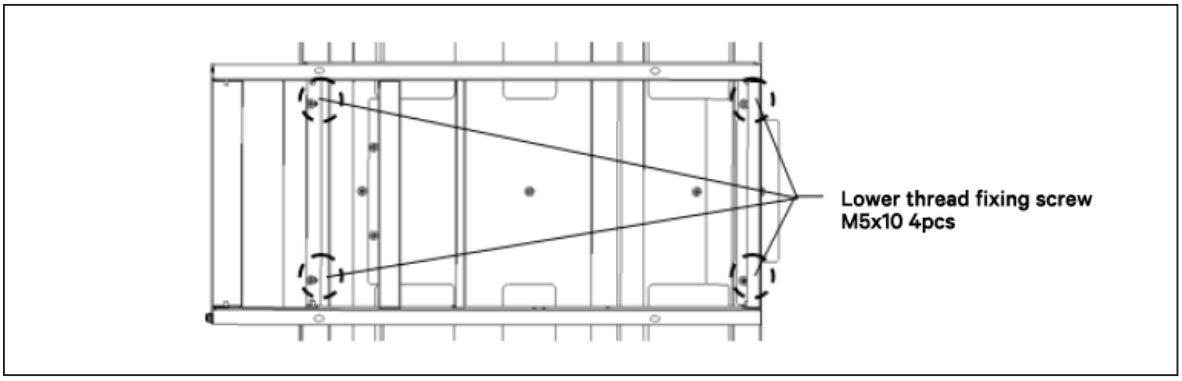
Figure 2-94 Cross-channel mounting channel



3. Mounting opening offline

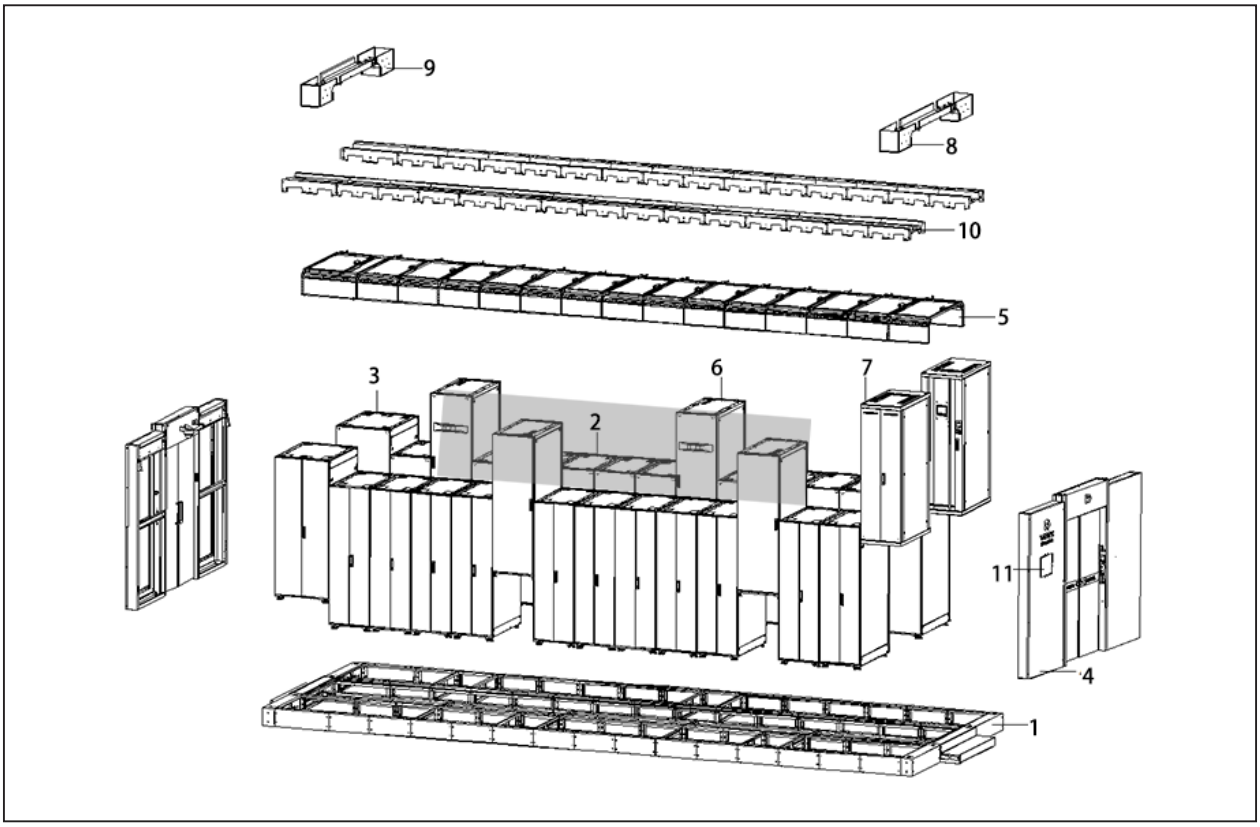
Offline port is directly placed on the groove of the counter tops and connected to the Roof duct with the position of the screws on the offline port is at the inner wall of the bent edge.

Figure 2-95 Cross-channel mounting channel



2.9 Installation of the Air conditioning System

Figure 2-96



S.No	Details of equipment
1	Base
2	Server Cabinet
3	Network Cabinet
4	Access door
5	Top Plate
6	A/C Column
7	Distribution Cabinet
8	Strong wire passage groove
9	Power cable trunking; copper and fibre cable tray
10	Cabinet top wire groove
11	Control panel

In this section, the overall layout of refrigeration, air conditioning, and the mechanical installation method is explained in detail.

NOTE: To ensure safety of the front-line of the repaired welding joints, the pressure release system in the air conditioning system should release clean nitrogen emissions.

2.9.1 Installation of the air conditioning pipes

The air conditioning pipe can be connected in three ways, namely- indoor unit condensate drain, inlet pipe of the electrode humidifier, and the copper pipe connection (pipe and liquid pipe) between the indoor and outdoor unit.

NOTE: All the refrigerant pipe joints must be silver-brazed.

NOTE: Selected pipe, arranged and fixed in the system, should be evacuated and the refrigerant charging operation must adhere to the industry standards.

NOTE: Design and construction process should take into consideration the pressure drop piping, compression oil return, reduce noise and vibration

NOTE: Brass need for thermal insulation – When the copper pipe passes through the wall or other obstacles, it is necessary to avoid direct contact with the walls of the copper tube through the other cushion isolation measures and prevent dust, water vapor, and solid particles into the copper pipe.

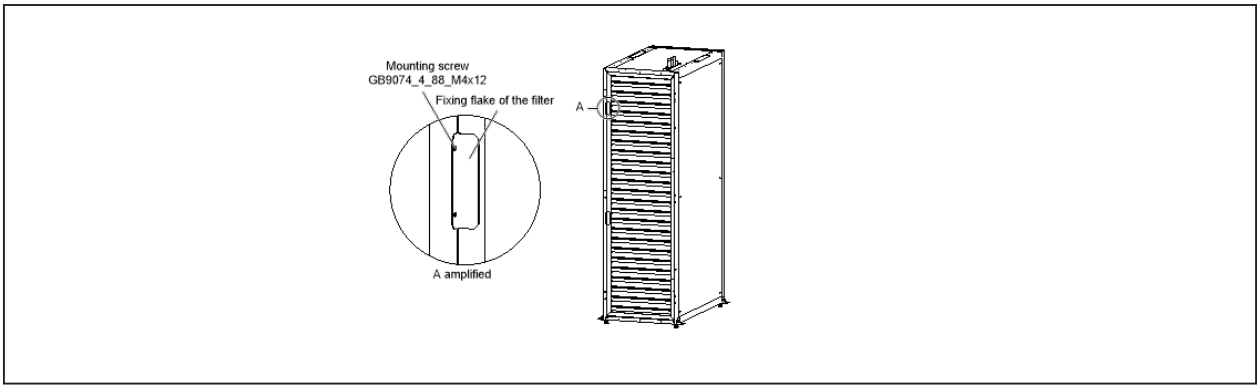
NOTE: To ensure the quality of the welding, the use of high silver-based soldering pipe joints is required. Also, welded line charge nitrogen is needed for the welding process.

1. Air filters

On opening the Cabinet rear door, Two vertical filters can be seen.

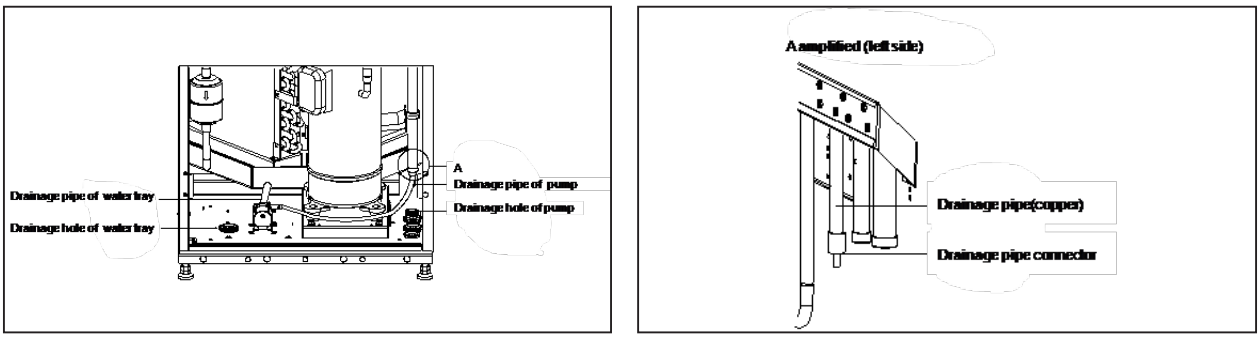
Initially, loosen the screw fixing the filter on the fixing piece. The fixing piece is removed on the filter and and taken out in the same manner under the filter as shown in the following **Figure 2-97**.

Figure 2-97 Air Filters



2. The indoor unit condensate drain, the electrode humidifier, the condensate drain from the drain tray is discharged after the drain pump of the water tray by aggregation. The drainage hose with the drainage holes piercing from the water pump and hose clamps with fixed delivery accessories brass fittings is then connected to a drain pipe. **Figure 2-98** shows an illustration of the same:

Figure 2-98 Drain Connections



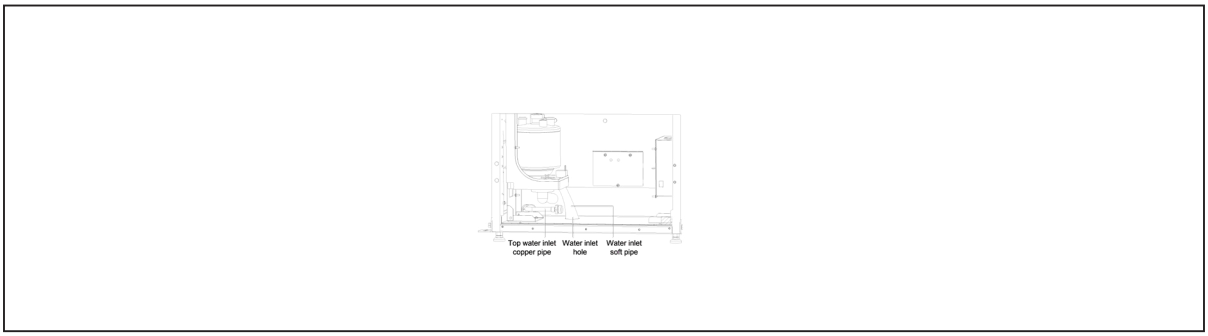
NOTE: High temperature by the water flow of the electrode humidifier and the heat resistance must be used over 90°C pipes.

NOTE: Consider security and IT equipment roof installation trunking, recommendation of underwater condensate drainage are explained in detail in the Liebert CRV+ series of PACs.

3. Humidifier inlet connection electrode

Electrode humidifiers need connection pipes for water supply. Humidifier tank inlet hose connection(connected to the copper pipe 3/4" dia) is unscrewed from the plug through the hole near the humidifier. A water inlet pipe connected to the external water supply source when tightened into the threaded joint is fastened on the inlet connection pipe can. The project can also choose any other connection but the connection must be sealed to prevent leakage as per the needs detailed in the Liebert CRV user manual.

Figure 2-99 The lower electrode humidifier inlet connection

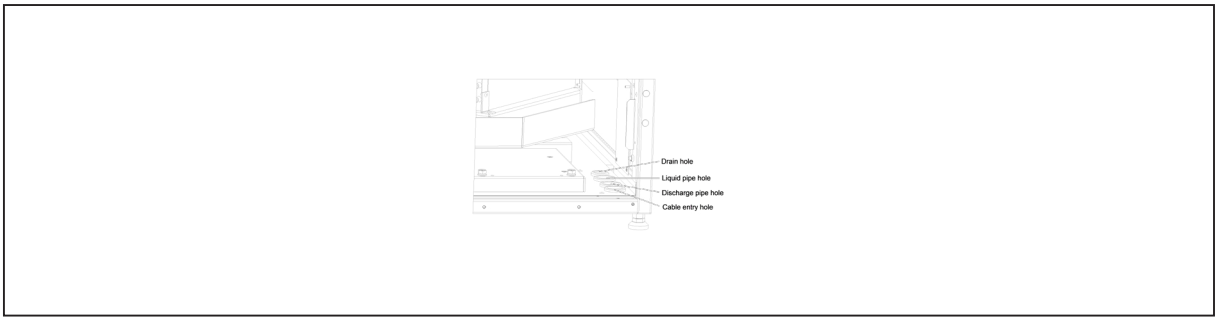


NOTE: Consider security and IT equipment roof installation trunking, recommendation of underwater condensate drainage are explained in detail in the Liebert CRV series of PACs.

4. Connection between the indoor unit and the outdoor unit connected brass (hot gas and and the liquid pipe – Indoor and the outdoor unit are connected by the soldering brass. Taking into account the impact of the system pressure drop and the inter-connecting length, for selecting the diameter of the connecting pipe for the indoor and outdoors, refer to the Liebert CRV series of PACs user manual or contact the local Vertiv representative.

Refrigerant piping connections from the bottom of the unit are shown in **Figure 2-95**. Welding the corresponding indoor unit connection pipe and a liquid pipe passage is carried out in accordance with label instructions with utmost care to prevent burning of the label. Horizontal portion of the piping tilt and insulation requirements are explained in depth in the CRV series of PACs user manual.

Figure 2-100 Bottom Line Connection



NOTE: When the pipes are laid down, before welding the exhaust pipe and the liquid pipe of the small compressor oil overflow) the copper welding sealing off to protect (not directly) to prevent an oil fire when exposed to heat in the copper tube.

NOTE: Do not open the time line for more than 15 minutes; else it will affect the operation of the compressor lubricant life stability of critical components and systems due to moisture absorption. Consider the roof installation trunking, and for the recommendations of the laid down tube and the tube method, refer to the CRV Series of PACs user manual.

5. Refrigerant charging

NOTE: Do not use Inferior refrigerants or low quality refrigerant as it may severely damage the system. In case of any use of a low quality or inferior refrigerant, the warranty will be void.

Liebert CRV air conditioning at the factory is charged with 56itrogen 2 bar packing. For recommended amount of refrigerant charge and filling process, refer to the Liebert CRV series of PACs user manual.

6. Additional refrigerant oil

NOTE:If poor quality refrigerant oil or the incorrect type of oil is used, it will result in damaging the refrigeration system. Warranty will be void as the customer will be solely responsible for using degraded oil.

Adding the refrigerant will cause dilution of the refrigerant oil of the system. For lubricating and for cooling effects of refrigerant oil, add refrigerant oil. For a detailed procedure, refer to the user manual on the CRV series of PACs.

2.9.2 Removal transportation fixtures, the damping material

To prevent the transport member from receving portion bumps, shocks, resonance deformation, and damage, a fastener is added at the factory. Installation fixtures must be installed in the air conditioner and the damping should be disassembled before commissioning.

a. Removal of the stoppage plate electrical box

To avoid sliding during transportation of the electric box, a limiting sheet is mounted on the electrical box at the factory.

b. Removal of piping fixtures

To avoid the long copper tube near the sheet metal, lead brass is clamped for split vibration along with vibration damping foam at the factory. Prior to commissioning, the materials must be cleaned and removed.

c. Adjust the guide grille

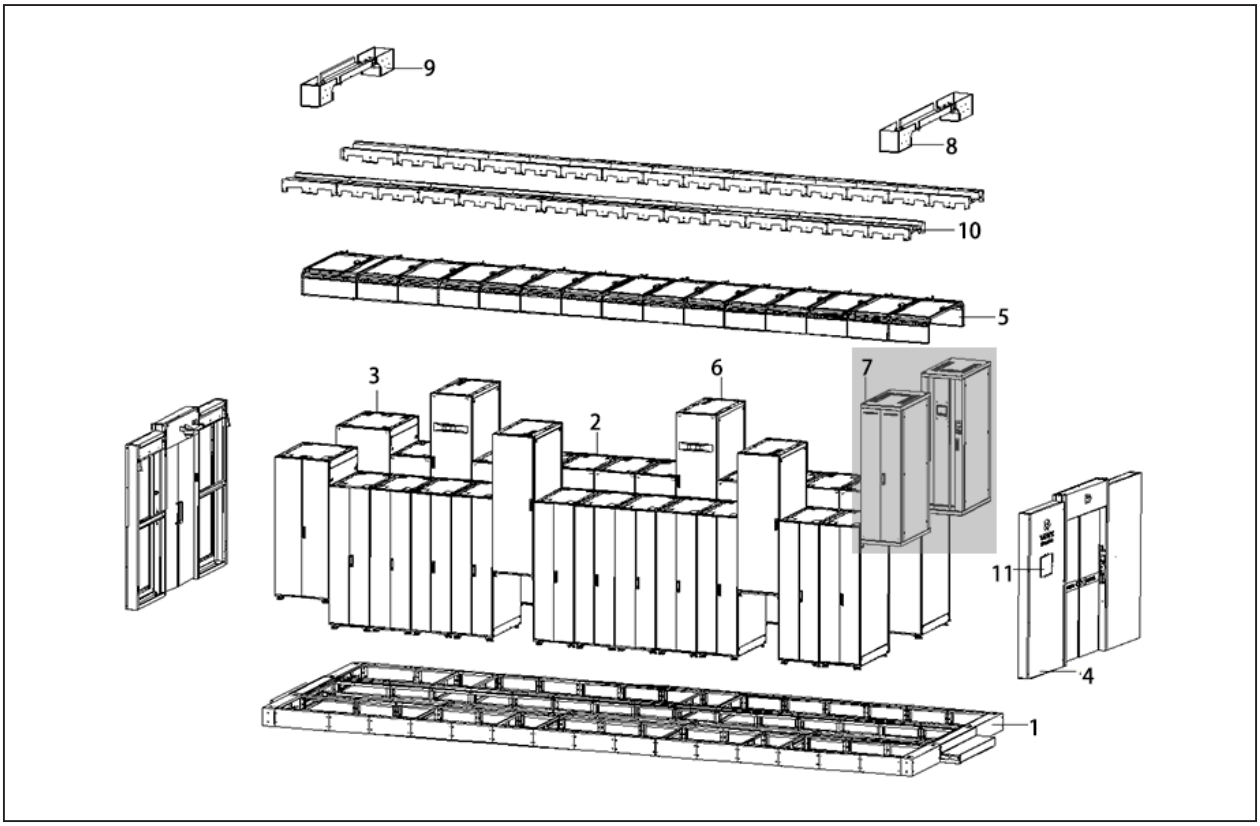
The Liebert CRV air conditioning installation position in the field can be adjusted in the mounting direction of the guiding grille to the left or right of the wind guide. For adjustment mode, refer to the Liebert CRV user manual

d. Plugging holes in the roof of the air conditioner

To facilitate the onsite installation of the air conditioner, small holes pre-positioned on the roof must be closed; use a stopper present in the delivered accessories and block the remaining bolt holes to prevent the water from entering the cabinet. Operation methods for doing so are listed in detail in the CRV series of PACs user manual.

2.10 Supply and Distribution system installation

Figure 2-101



S.No	Details of equipment
1	Base
2	Server Cabinet
3	Network Cabinet
4	Access door
5	Top Plate
6	A/C Column
7	Distribution Cabinet

8	Strong wire passage groove
9	Power cable trunking; copper and fibre cable tray
10	Cabinet top wire groove
11	Control panel

In this section, the general layout of the electrical distribution cabinet and a rear equipment mounting method is explained in detail.

NOTE: Always disconnect the power supply system, cabinet switchgear, and all output switches prior to installation, else it may lead to serious injury and even amount to fatality. Any consequences resulting from improper operation is the responsibility of the customer alone.

NOTE: All power lines, connectors, and grounding must comply with the local electrical codes and local protocols supersede everything else.
NOTE: See the name plate for info related to the full load current. The cable should match the size of the local wiring rules.

NOTE: Electrical installation and maintenance work must be carried out by authorized professionals.

2.10.1 Electrical installation air conditioning

Air conditioning circuit to be connected in several ways, namely- the indoor power line, outdoor unit power supply line, a condenser, a start and stop signal cable.

Indoor unit connected to the power supply line

The distribution cabinet cable drawn from the top into the line from the penetrated hole leaves a margin on the cable retaining clip fixed inside the air conditioner board. **Figure 2-96** shows an illustration of the top access hole. The full rated current of Air conditioning is 46.6A and the cable model must be selected accordingly.

Figure 2-102 Electrical box and the user wiring diagram (opening the tailgate 120°)

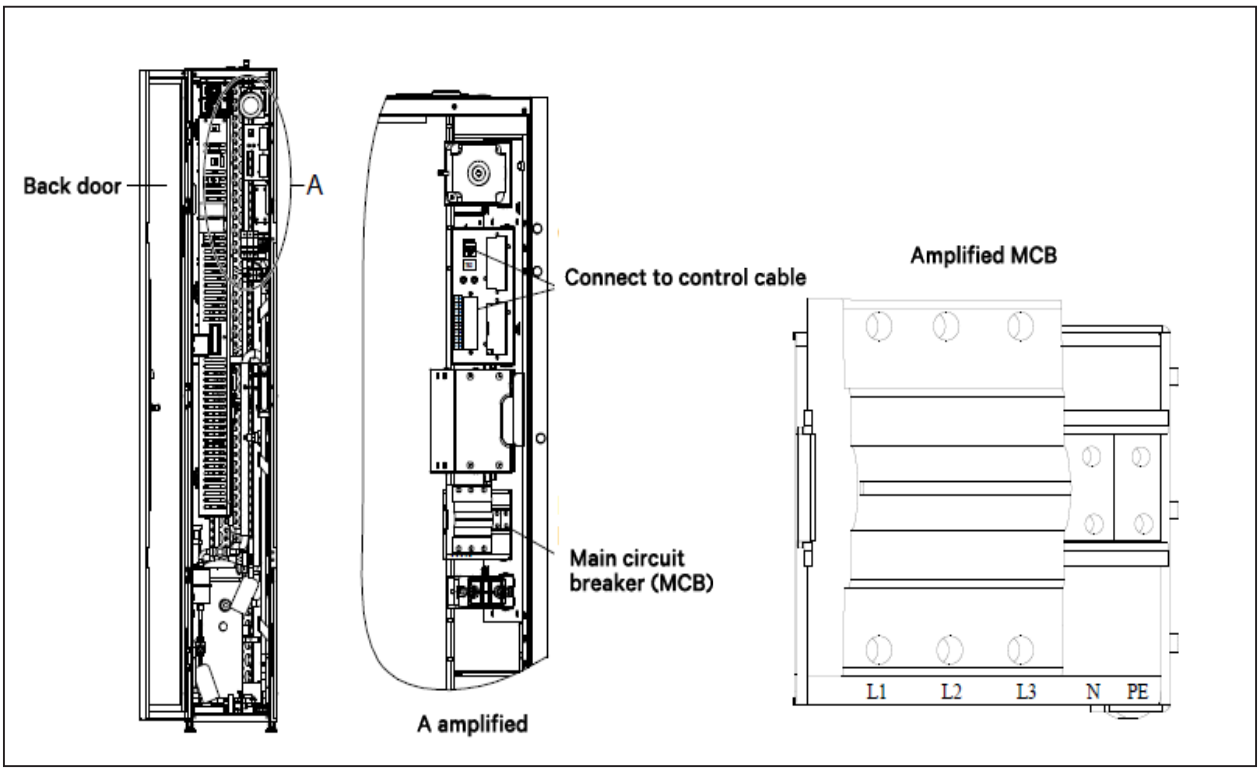
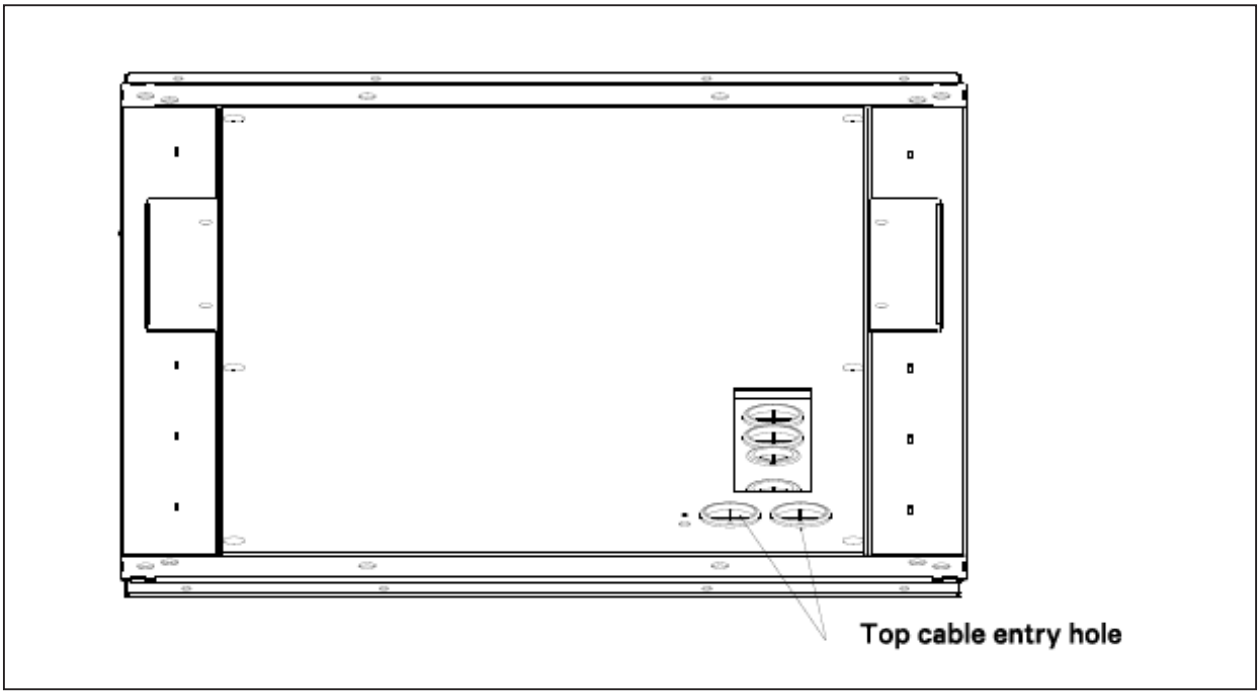


Figure 2-103 Top access hole



Power line connecting the outdoor unit

1. Determine the cable specifications

Select the start and stop power supply cables and signal cables of the condenser in accordance with the specifications of the rated current of the fan and the distance field installation factors.

Table 2-5 The fan is running at 380V volts

Condenser Model	Rated current (A)
LSF42- R3, LSF52- R3	3.2
LSF76- R3	6.4

NOTE: The recommended specifications of the condenser start-stop signal cable are 20 AWG (0.52 sq. mm)

NOTE: The indoor unit and the outdoor section of the cable line connects the condenser with protective tubes or shielded wire.

NOTE: The cable is not an object with a high temperature (for example no brass pipe insulation, pipe, etc.) on contact. This prevents damaging the insulating layer.

2. Connecting cables

Refer to **Figure 2-105** and **Figure 2-106** for the external power cable connections:

Figure 2-104 Fan single external power supply wiring

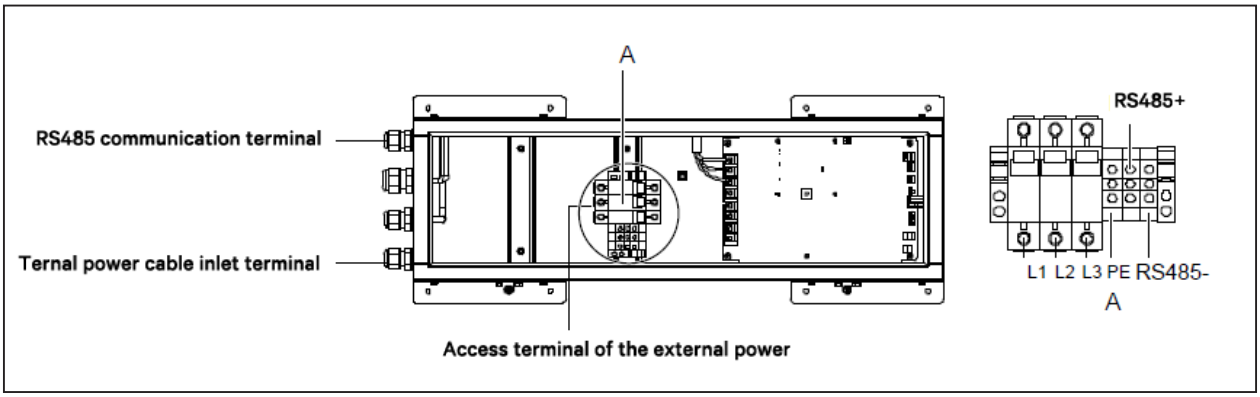
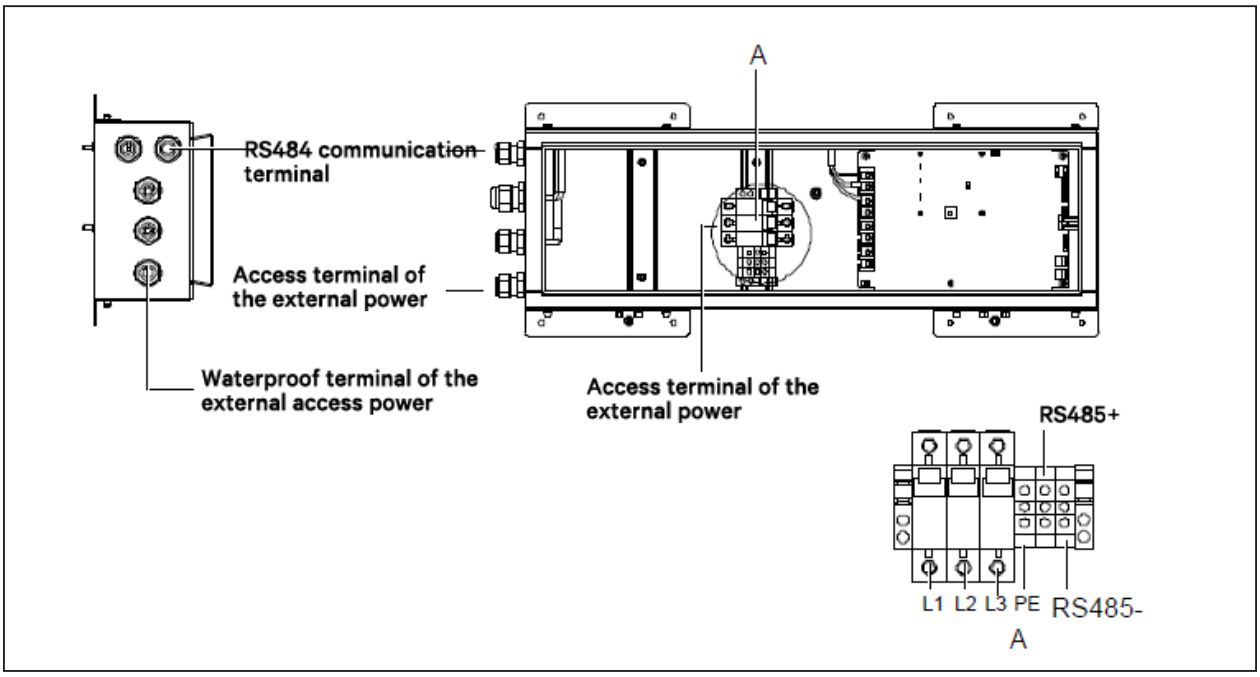


Figure 2-105 Dual blower external power supply wiring



NOTE: Need to go through an external power line when the waterproof connector of the external power line is connected to the electrical box. The inner diameter of the joint is ø 10mm

NOTE: Need to go through an external power line, when the waterproof connector of the signal line is connected to the electrical box of the compressor. The inner diameter of the joint is ø 6mm

NOTE: To ensure the high waterproof performance of the electrical box, use a waterproof glue for the joints after the external power source is connected.

NOTE: The indoor units start and stop signal lines lead directly to the condenser.

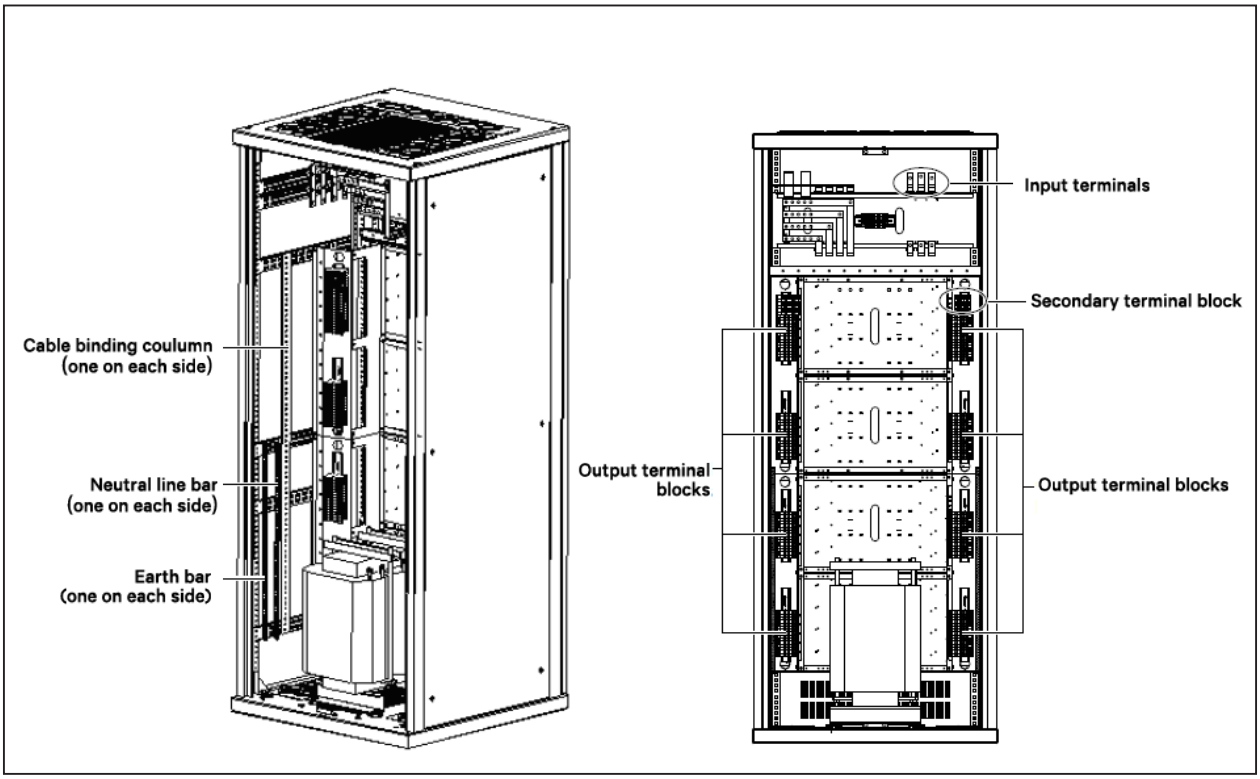
NOTE: To prevent the infiltration of the water droplets along the electrical control box of the cable, all the user must wire the clamp and then lead it to the electrical box.

2.10.2 Distribution cabinet Electrical Installation

1. Row from the output terminal of the distribution terminal cabinet, row zero line, and the ground are connected with the discharge branch output line, neutral and ground respectively.

2. The left and right sides of the cable tie beam line along the inside of the enclosure banding lines go up piercing the distribution cabinet

Figure 2-106 Tie beams and terminal position (rear view)



NOTE: For branch cable maintenance or issues related to this installation, quickly find traces on the recommendations laid down line methods listed in the SPM user manual.

2.10.3 Electrical connection of the Rack PDUs

Distribution cabinet to one side of the line must be female and rack PDU to one side of the line must be male; remember to take utmost care as any faulty connection may lead to serious injury or fatality. In case of any equipment damage or severe injury or death, the customer is to be held accountable if the connections are improper.

a. The PDU rack cabinet power line should lead upwardly through the left inlet duct counter tops through holes piercing from bobbin ferro-electric groove.

b. Industrial male connector is mounted in a cabinet PDU cable termination

c. Industrial female connector is mounted at the output branch cable distribution cabinet ends.

d. Industrial male connector must be connected to the female plug.

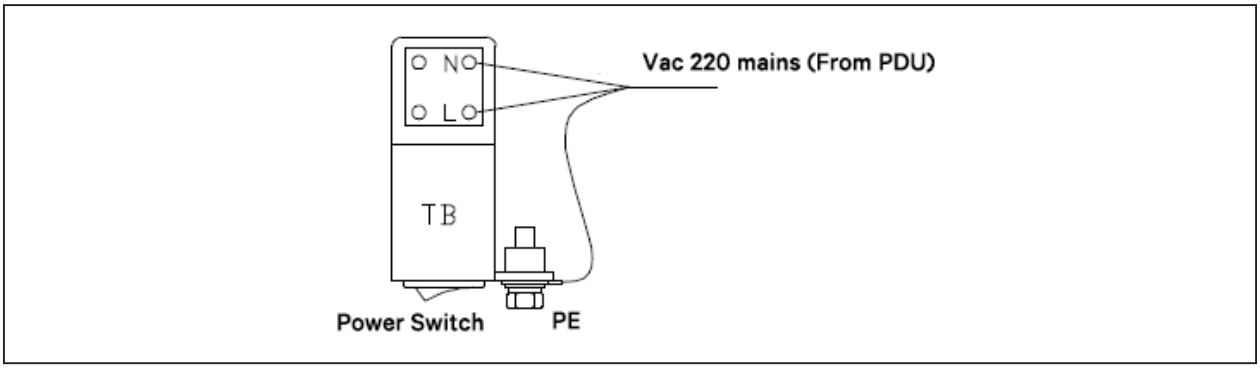
2.10.4 Electrical connection of the electric gate

NOTE: The cable is taken from the power supply and the rack PDU is fixed to the terminal block.

NOTE: If the power cord is incorrectly connected into the 220V AC terminal it will damage the electric gate and the warranty in this will get void and the customer is fully accountable for it.

NOTE: PDU draws the Electric power from the cabinet door

Figure 2-107 Electric gate terminal block



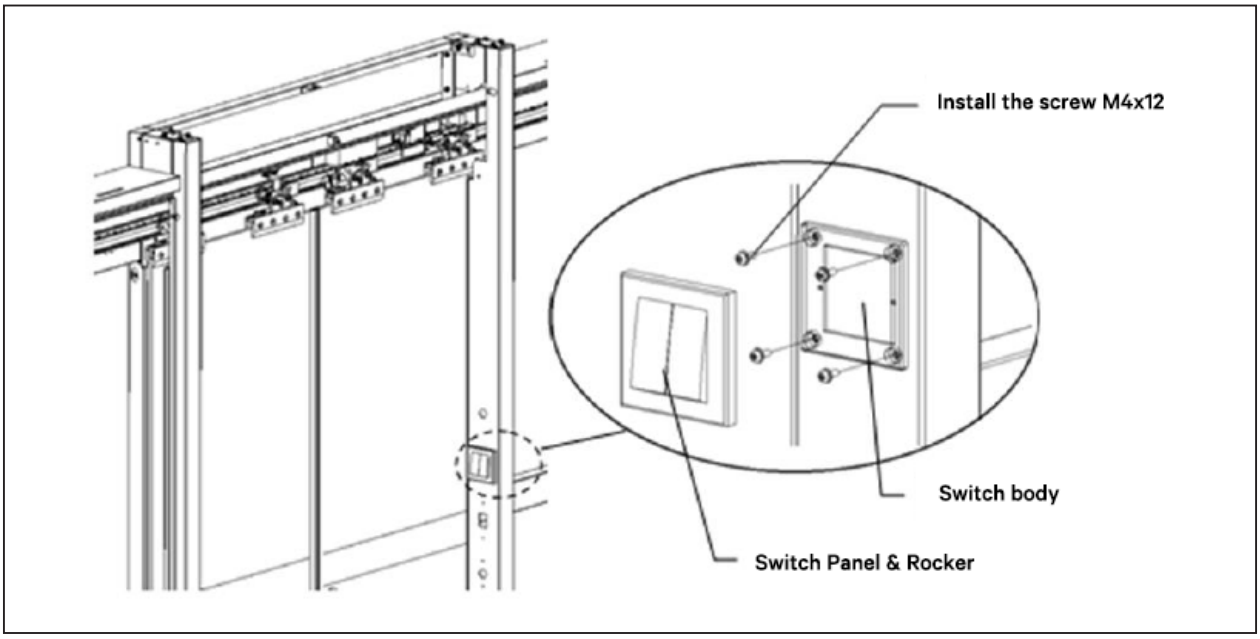
2.11 Installation of Lighting system

In this section, the installation of the Lighting system will be explained in detail.

2.11.1 Installing the Lighting switch

The lighting switch is mounted on the outer side of the right access door pillar. It has a rocker cover. Open the switch. The switch body is fixed upright with screws.

Figure 2-108 Light switch installed



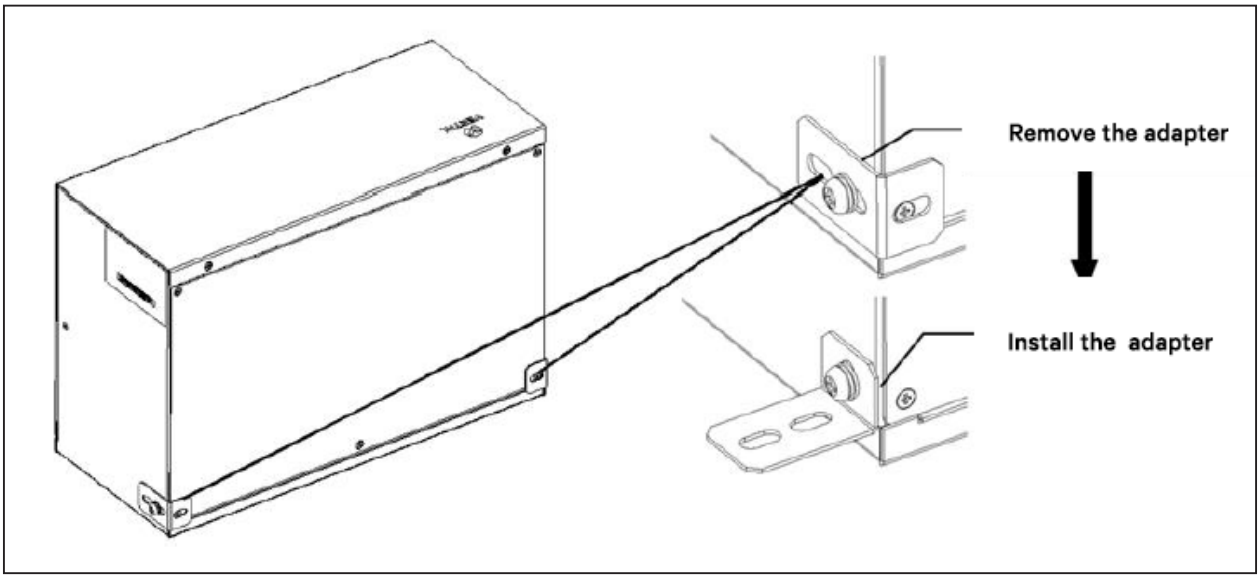
NOTE: Ensure that the rocker switch plate is not upside down during mounting.

NOTE: Different rocker switch fixing methods will be different, for example, use 86 boxes of left and right screw fixing methods, subject to the actual object.

2.11.2 Installing the lighting controller

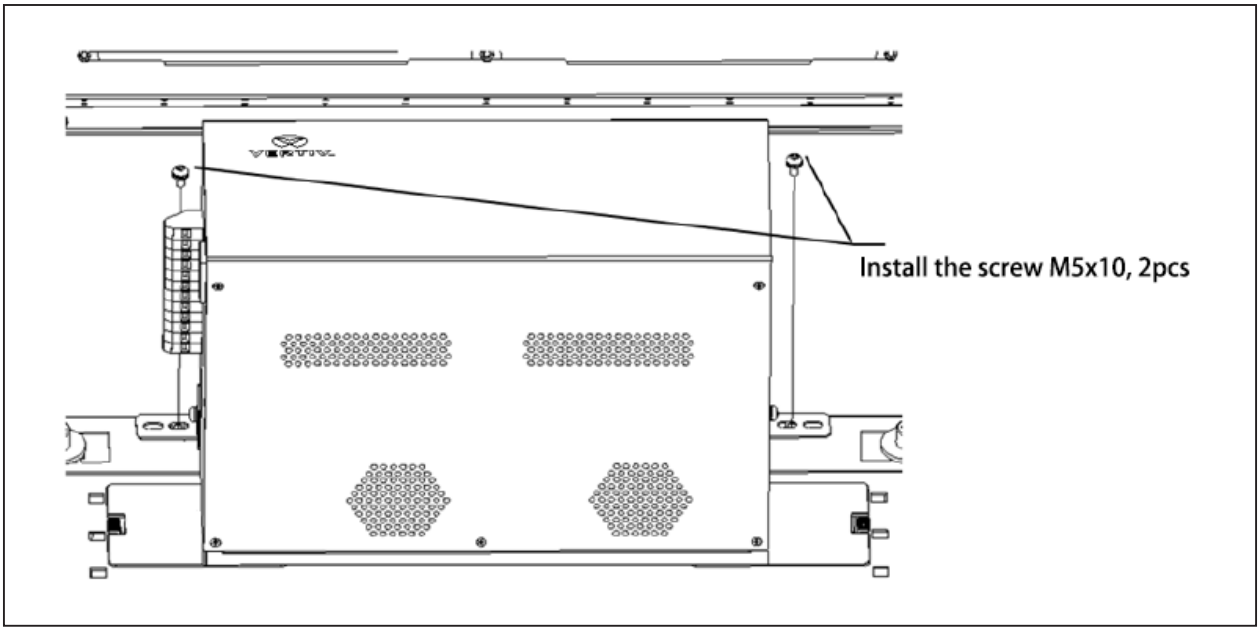
Remove the adapter lighting controller following which the control is mounted on both sides of the cartridge by using nuts and screws.

Figure 2-109 Control cartridge mounting adapter



The control box is placed in the rear roof support. It has a height adjustment adapter and an adapter fastening screw. The screw helps in the connection between the control box and roof support.

Figure 2-110 Mounting the lighting controller



NOTE: The lighting controller cooling holes face outwards.

NOTE: It is recommended that the lighting controller is mounted on the top of the channel near the side of the second lighting switch cabinets,.

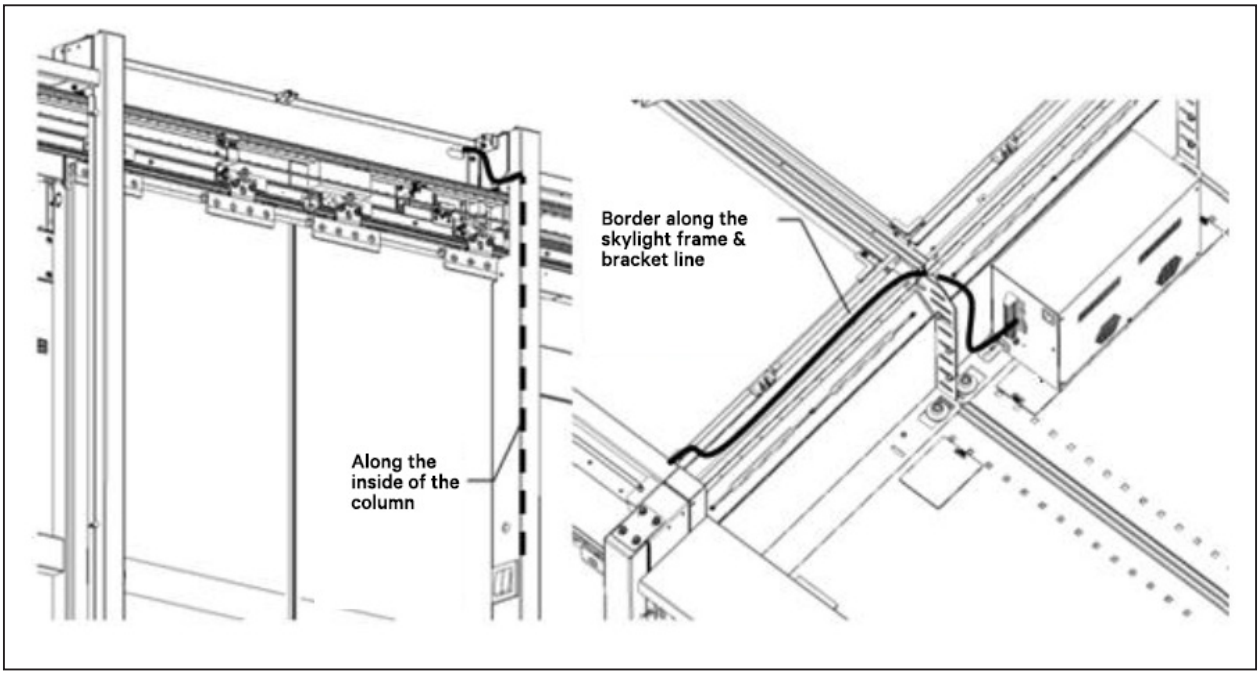
NOTE: If the lighting controller and the lighting switch are on the same side (on the side of the control box and not the cabinet roof), it will affect the connection.

2.11.3 Lighting system wiring

The Appendix has an illustration of the connector for illumination.

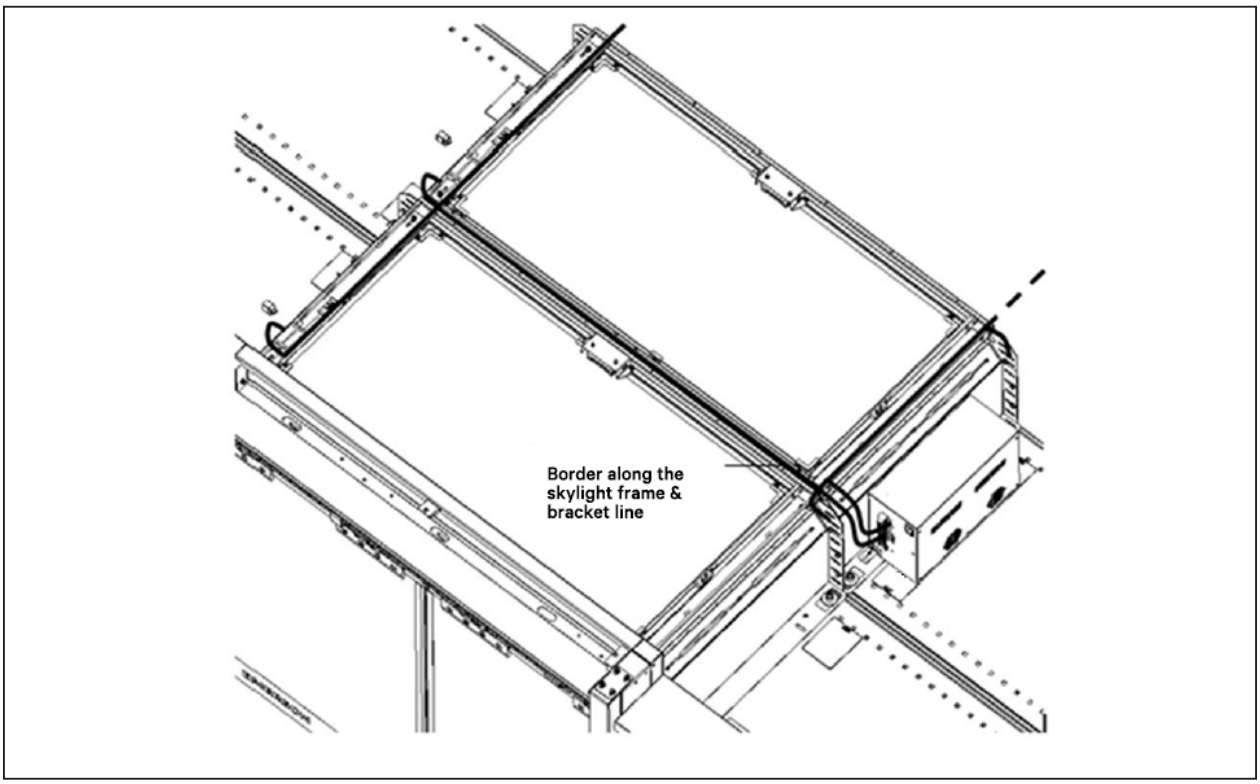
Route the lighting controller and lighting switch wiring as depicted in the **Figure 2-111**. The wiring should be upright and over the lintel passing through the aperture, along the room frame to the top of the cabinet frame.

Figure 2-111 Routing the wiring for the lighting controller and switch



Lead the wiring to the lamp lighting controller as shown in **Figure 2-112**. The wire should be routed from the cable enclosure along the roof frame at the top of the row lines.

Figure 2-112 Route to a lighting controller lighting



NOTE: PDU enclosure is supplied along with the lighting controller.

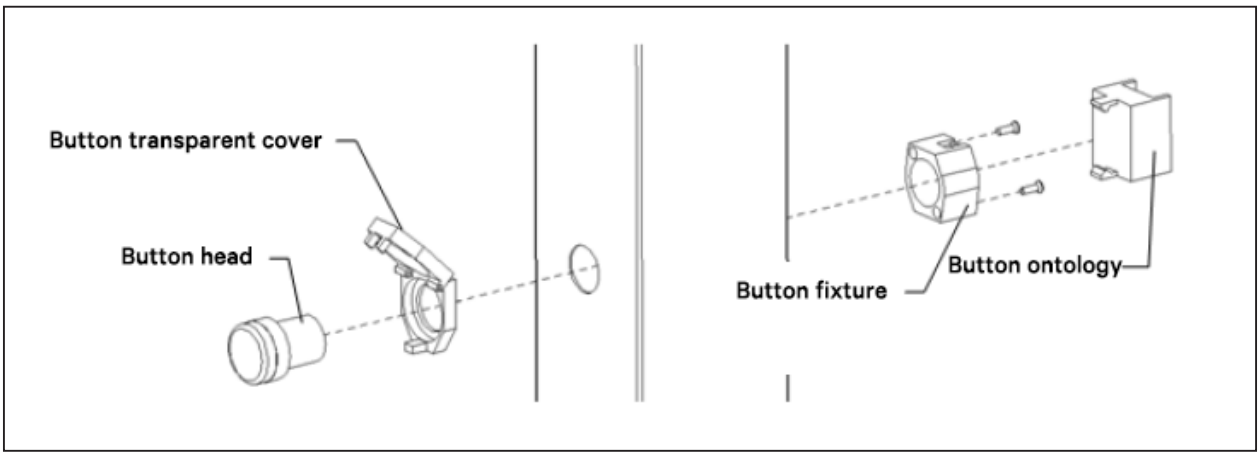
NOTE: Route the cables accurately and in a firm, yet organized manner.

2.12 Roof opening system installation

2.12.1 Installation of roof opening button

Using a flathead screwdriver to gently prize the side snap button. The button body is removed. On removing the screws, loosen the fastening member fixing the button, the button and the head through the transparent cover panel. Tighten the screw of the button fastener sleeve following which the button body of the card holder needs to be tightened.

Figure 2-113 Button to open the roof installation



NOTE: The transparent cover opens in the upward direction.

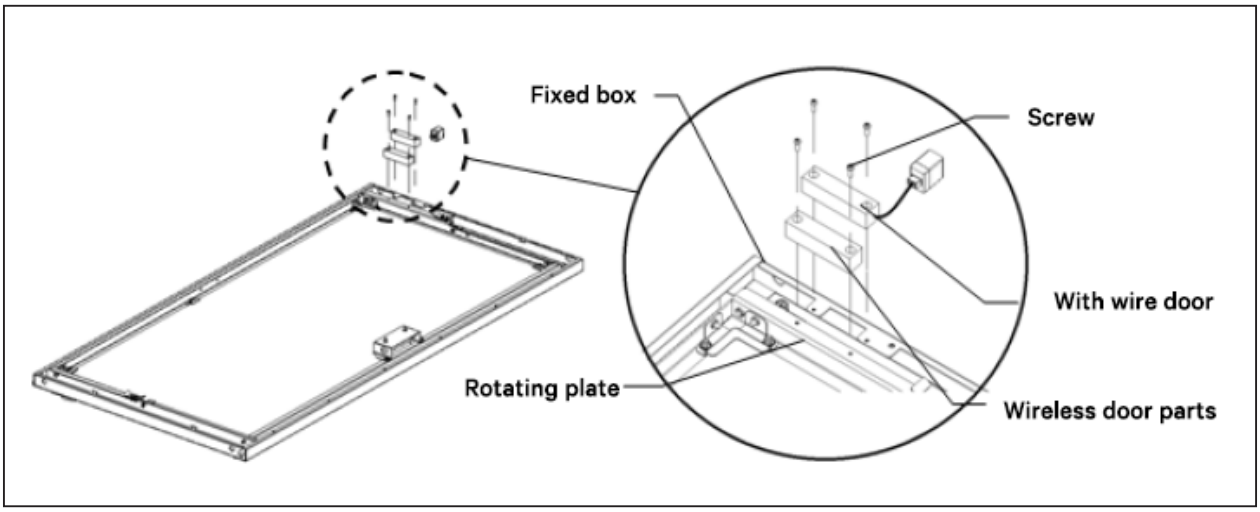
NOTE: Put the fixing member by using the screws.

NOTE: The sliding door open button is inside the channel on the column and has the same mounting method and is inclusive of a swing door.

2.12.2 Magnetic roof installation

Screw the door sensor cable with the top plate fixing frame firmly fixed to the cross member, and the other side door is fixed to the rotary magnetic plate.

Figure 2-114 Magnetic roof installation



NOTE: The magnetic tape cable must be installed on the ceiling beams; Remember it should not be installed on the rotating plate; else it will affect the roof opening function.

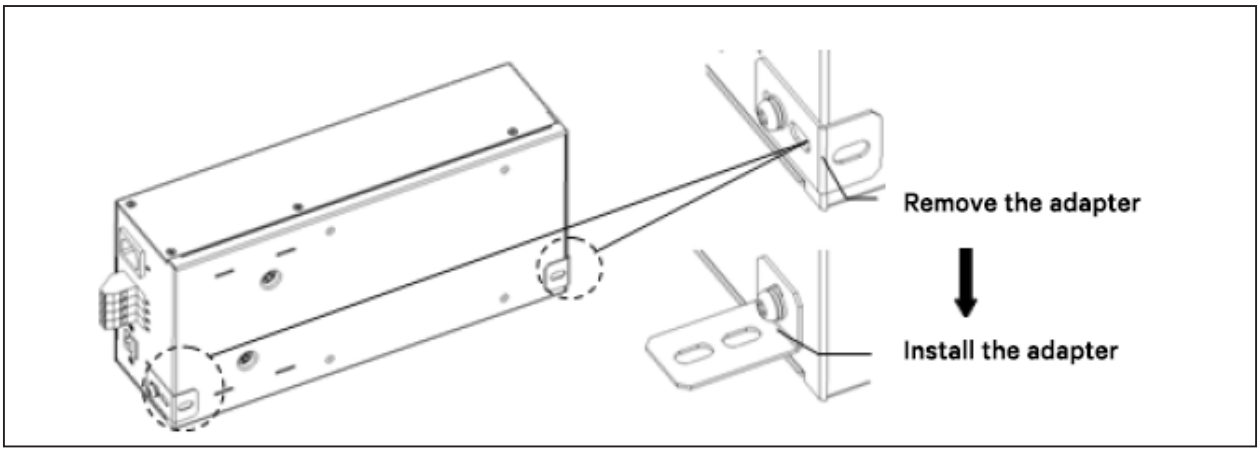
NOTE: Vertiv recommends installation of the door sensor and the reduction of high altitude operations prior to installing the roof.

NOTE: Preferably, magnetic installation should be in the channel next to the door of the first open roof.

2.12.3 Installation of top open controller

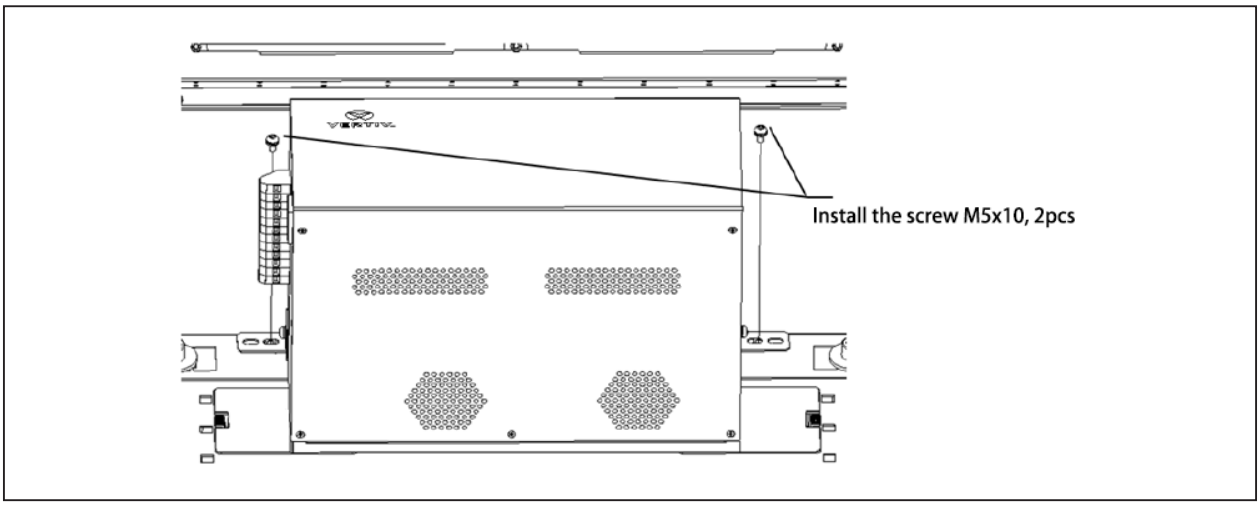
Remove the open sides of the adapter controller and both of the sides must be mounted on the control box; press the sides and do not insert a screw.

Figure 2-115 An adapter mounted control box



The control box is placed in the rear roof support. It has a height adjustment adapter and an adapter fastening screw. The screw helps in the connection between the control box and roof support.

Figure 2-116 Installation control box



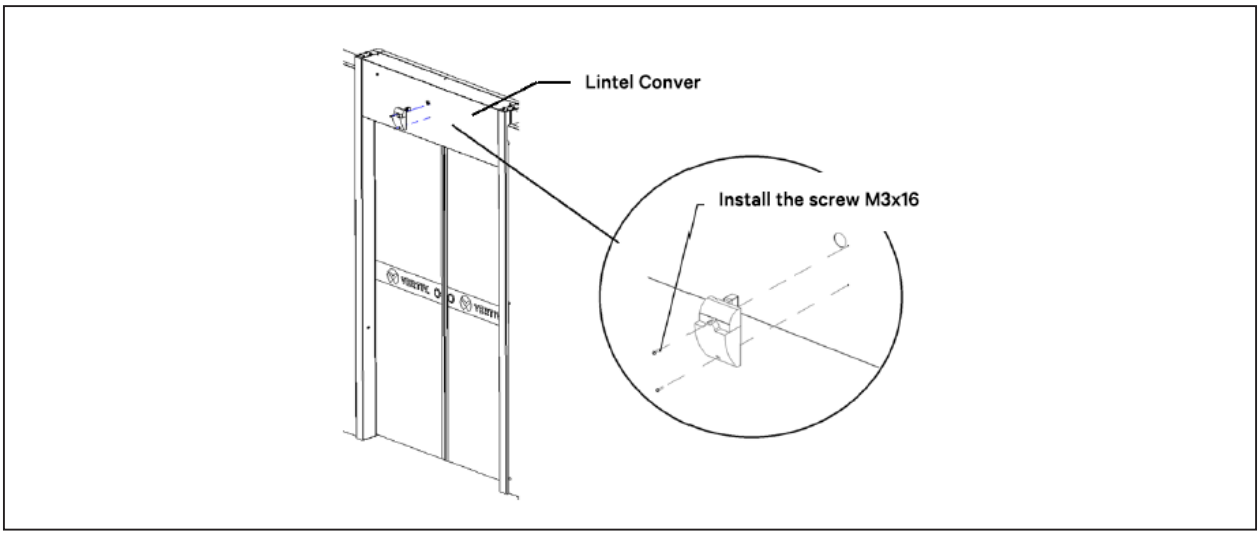
NOTE: Open the controller cooling holes facing in the outward direction

NOTE: Vertiv recommends to start from the first side of the top chassis and the button controller for opening should be mounted near the passage.

2.12.4 Installation of Sound and alarm lights

NOTE: Sound and light alarm lamp are mounted on the lintel and not on the access door followed by complete module wiring. Finally, install the lintel casing.

Figure 2-117 Sound and light warning light installation

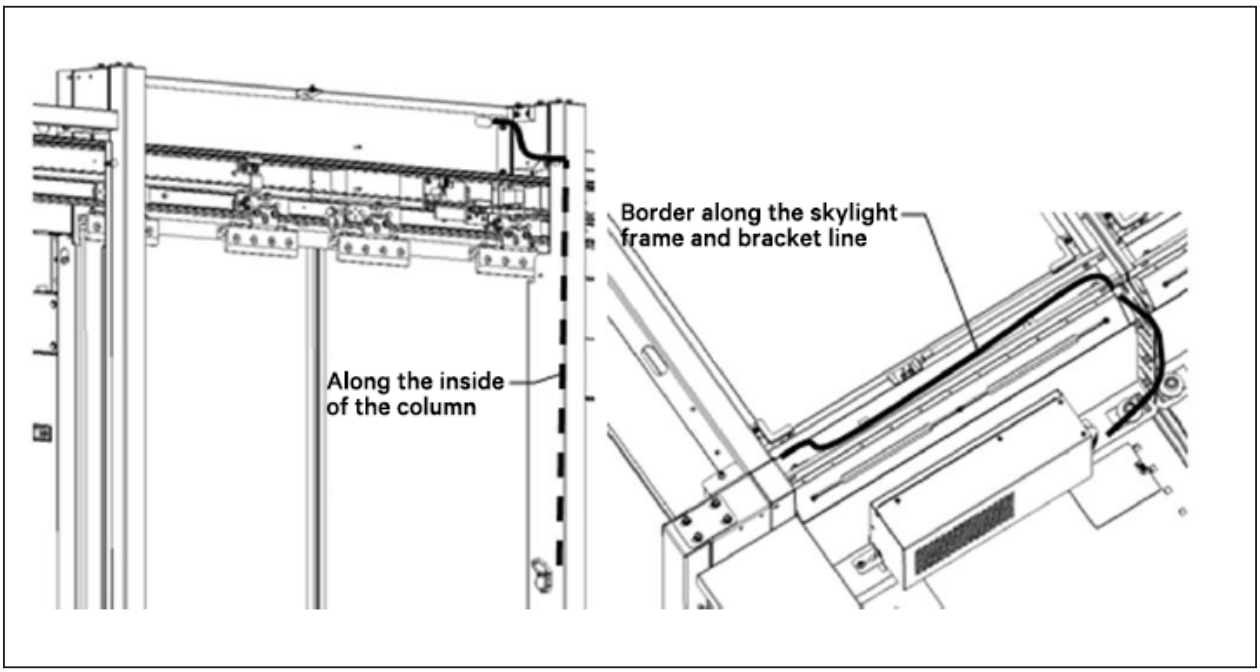


2.12.5 Top open wiring

The Appendix shows the open top connected to two open connections.

1. The opening button is used to switch on the controller wiring routing as shown in **Figure 2-118**. It should be upright over the lintel with the line passing through the aperture, along the roof frame to the top of the cabinet row lines.

Figure 2-118 Opening button to open the wiring routing controller

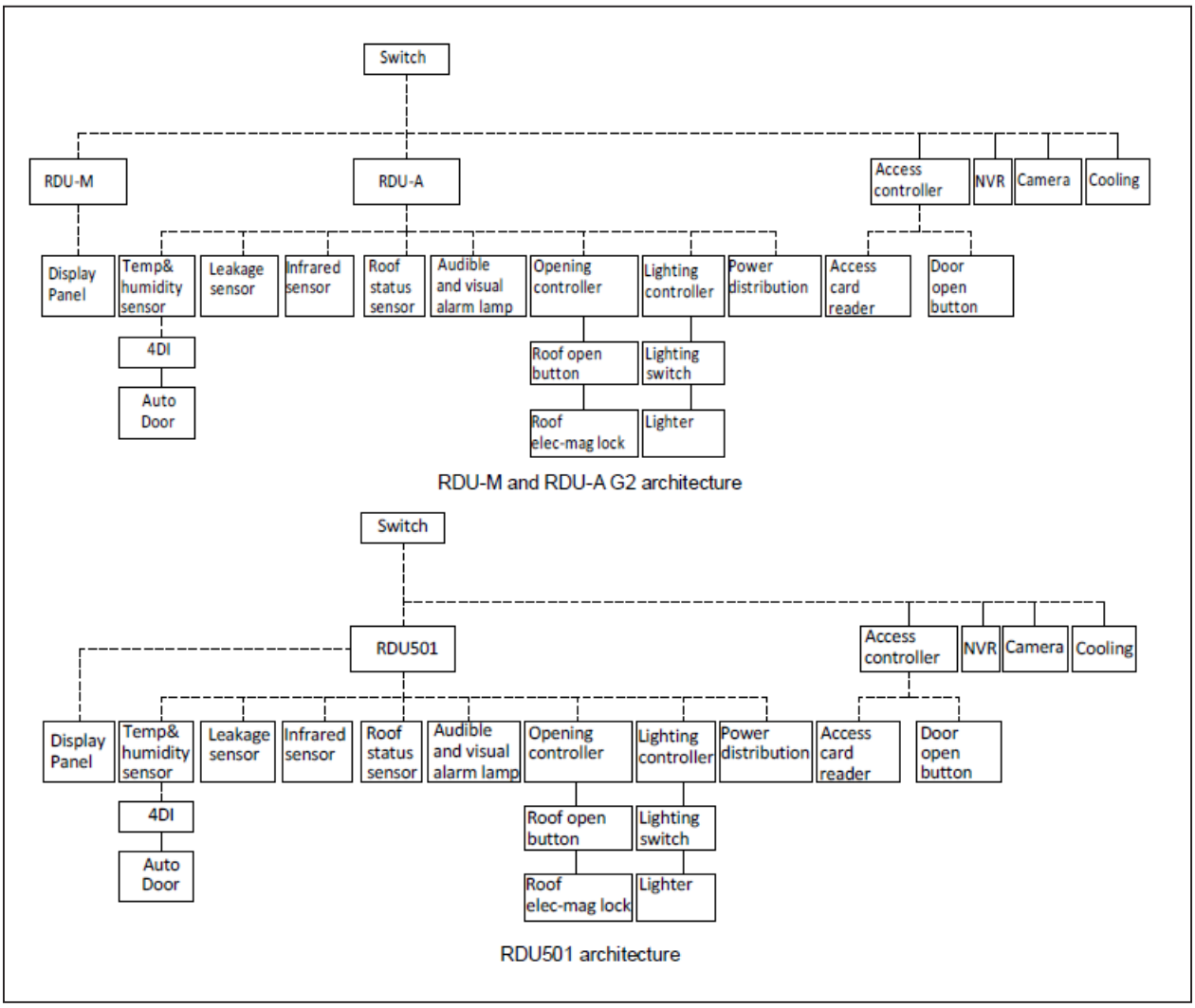


The electromagnetic lock wiring is routed to the controller opening the top plate as shown in **Figure 2-118**. The cable is led across the cable enclosure along the roof frame at the top of the row lines.

2.13 Installation of the Monitoring System

2.13.1 Monitoring Architecture

Figure 2-119 Monitoring Architecture



2.13.2 Installation RDU-M

RDU-M is fitted with a control panel on the nearest side of the IT Racks.

NOTE: The RDU-M 39U is mounted on the second host in the recommended space. The layout of the equipment within the enclosure may be selected in the first upper space 37U to 41U based on the area.

NOTE: For the RDU-M installation, refer to the specific user manual.

2.13.3 Installing the Switch

The switch is mounted in the IT rack space where the RDU-M is placed; Refer to the Switch user manual for the installation methods.

2.13.4 RDU-A G2 and installing the expansion cards

RDU-A G2 is mounted in the IT Racks where the RDU-M is placed with a 4 COM card insertion slot 1; 8DO/AO card is inserted in the slot 2.

NOTE: RDU –A G2 at the host is recommended to be installed in the 40U space; 37U may be the first region to an upper space of 41U for the cabinet apparatus based on the selected layout.

NOTE: Detailed installation requirements for RDU-A G2 can be referred to the user manual on RDU-A G2 wherein things are explained in great detail to enable users to get to grips with the installation process.

2.13.5 RDU501 and installing the expansion cards

RDU501 is fitted with a control panel on the nearest side of the IT Racks; 8DO/AO card is inserted in the slot 1.

NOTE: RDU501 at the host is recommended to be installed in the 40U space; 37U may be the first region to an upper space of 41U for the cabinet apparatus based on the selected layout.

NOTE: Detailed installation requirements for RDU501 can be referred to the user manual on RDU501 wherein things are explained in great detail to enable users to get to grips with the installation process.

2.13.6 Installation of NVR & the monitor hard disk

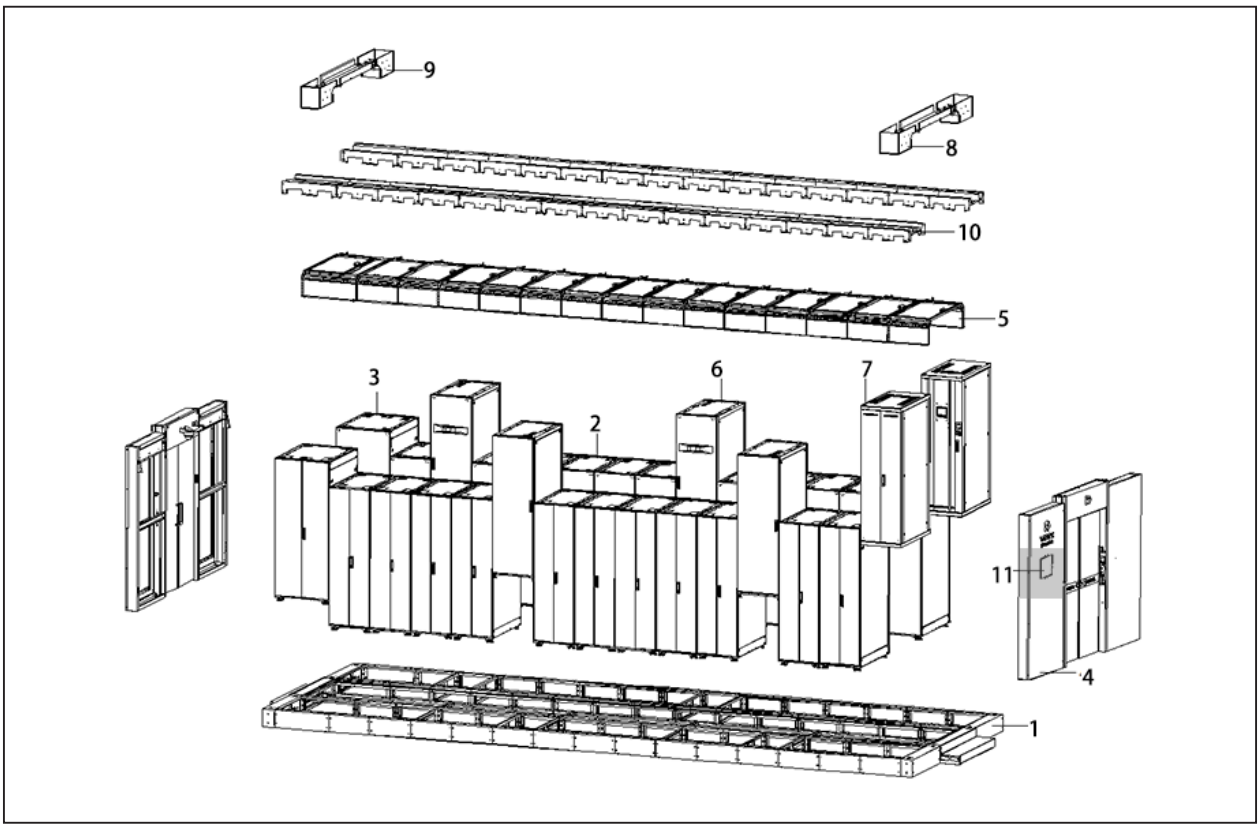
The NVR open cover, a hard disk installed monitor, a fixed cover NVR, and the NVR is installed in the same IT racks where the RDU-M is placed. For an in-depth installation, refer to the NVR installation manual.

2.13.7 Install Access Controller

Access Controller is mounted on the same RDU-M IT racks of the tray and comprises an access card and a door opening button; For more information, refer to the Access Controller user manual.

2.13.8 Supply and Distribution system installation

Figure 2-120

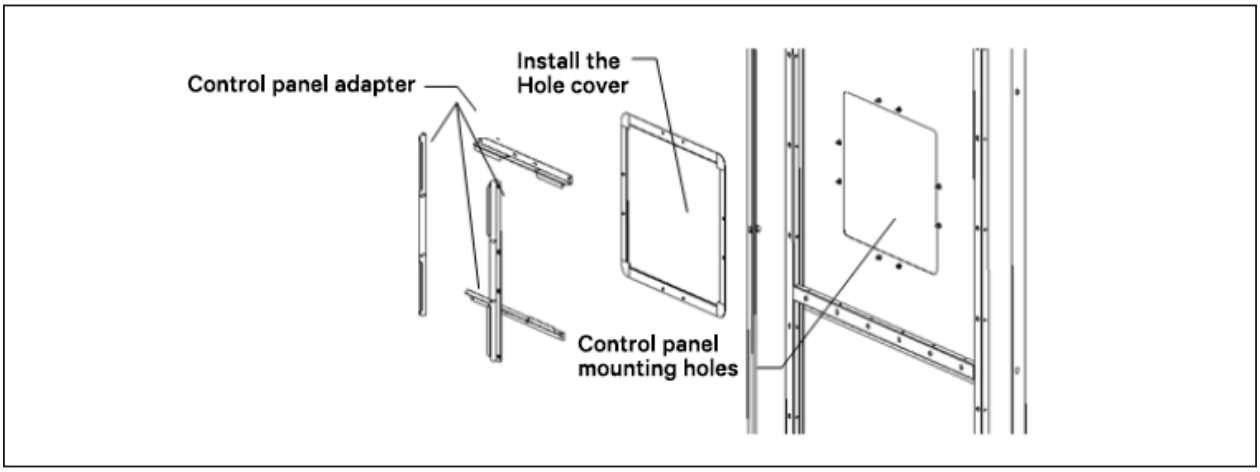


S.No	Details of equipment
1	Base
2	Server Cabinet
3	Network Cabinet
4	Access door
5	Top Plate
6	A/C Column
7	Distribution Cabinet
8	Strong wire passage groove
9	Power cable trunking; copper and fibre cable tray
10	Cabinet top wire groove
11	Control panel

Mounting of the Control Panel

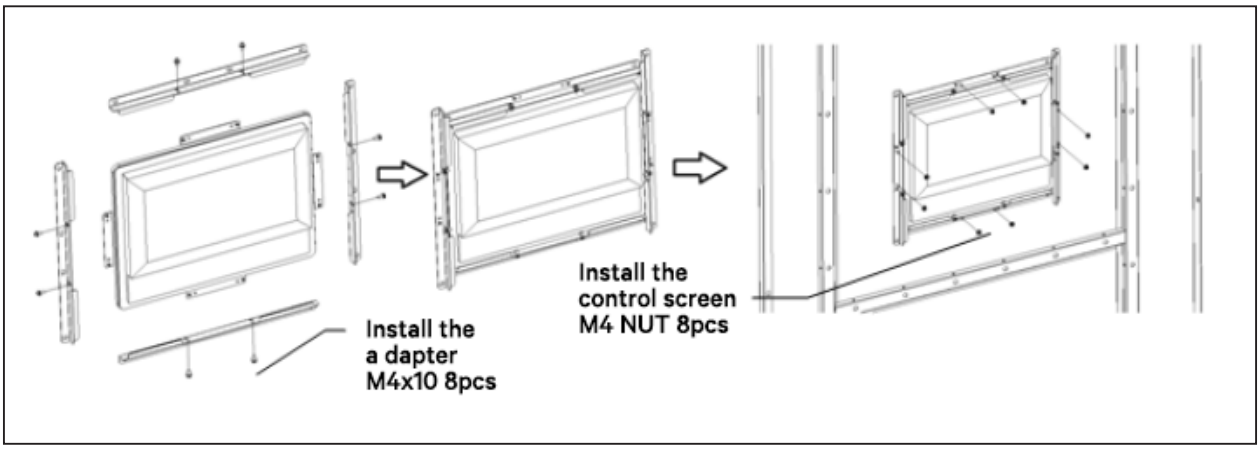
Prior to installing the Control panel mounted on the left door pocket, a configuration is to be removed by means of these structural elements M4 nut on the back cover of the door.

Figure 2-121 Removing the structure



The control panel member and the adapter with the screw connection is mounted between the control panel mounting holes, adjusting the control panel member and the adapter to the pre-determined location. The adapter screw nut between the lid and the door must flush to the door to ensure that the gap between the lid and the door is equal on all the four sides.

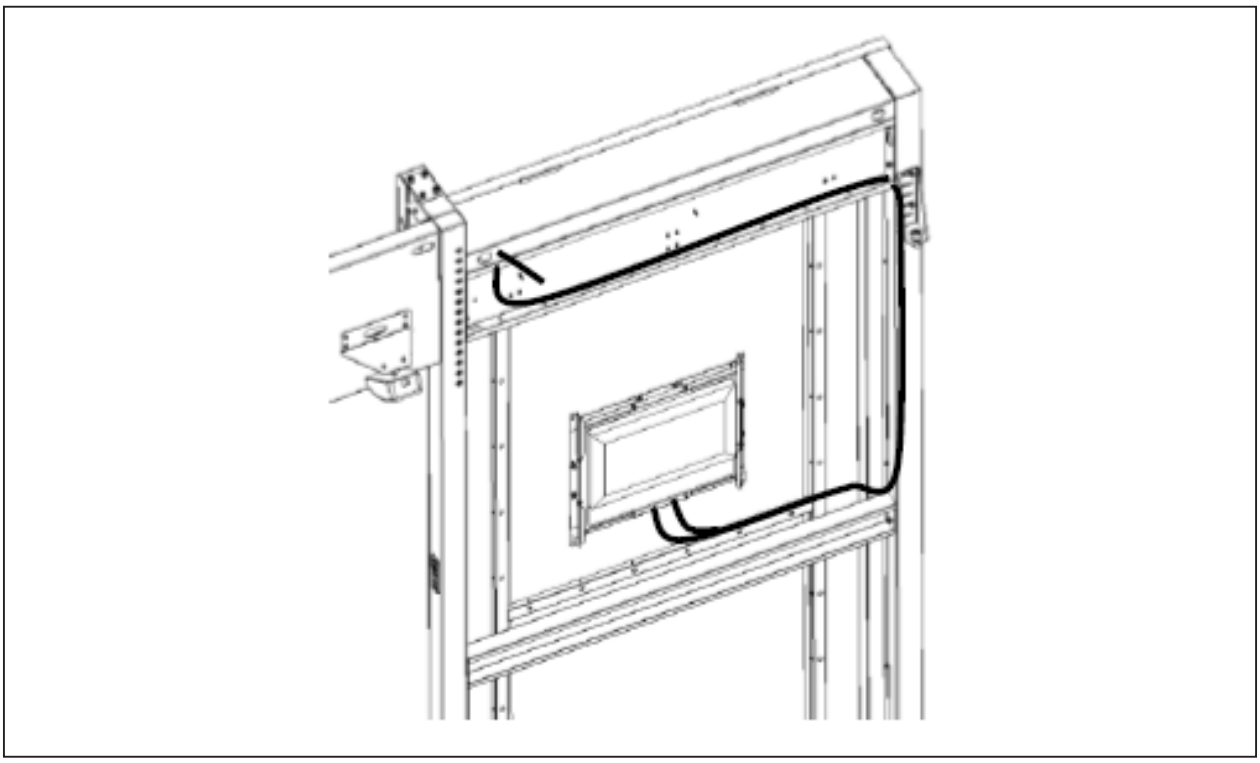
Figure 2-122 Control panel installation



Wiring the Control panel

The wiring control panel is shown in Figure 2-118.

Figure 2-123 Wiring of the control panel



NOTE: When the terminal box covers the door near the door of the cartridge frame post completion of adjustment of the cable length and cable binding, the door cover sheet cartridge frame is hanging on the door.

NOTE: The cover plate to the door frame between the door pockets across the cable section helps reserve a certain length to prevent the cable-operated door being subjected to extreme stress when the cover is removed.

2.13.9 Install the sensor

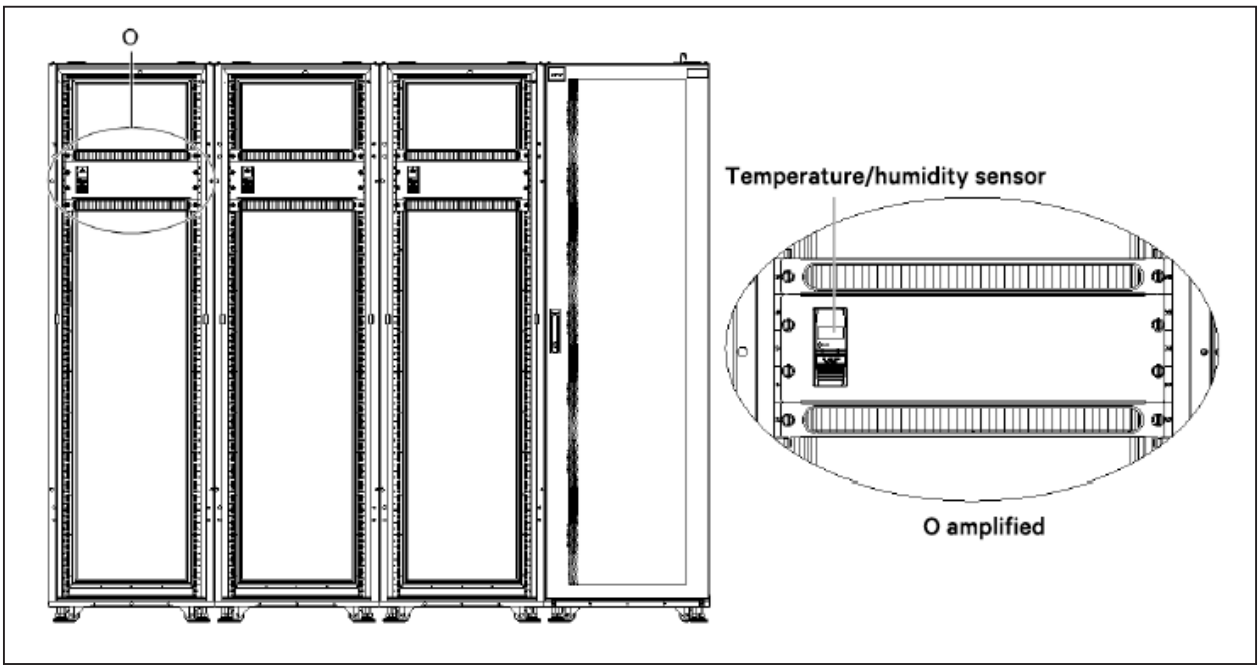
NOTE: For detailed installation instructions on the respective sensors, refer to the IRM-S02TH intelligent temperature and humidity sensor user manual, IRM-S011N Phoenix smart digital sensor interface input user manual, IRM-S01W-belt type water sensor user manual, the IRM-S011N infrared sensors user manual, ES-HND200-E1 definition hemispherical camera installation manual, and the JTY-GD-S832 photo-electric smoke type fire detector user manual.

Mounted Temperature and Humidity Sensors

IRM-S02TH temperature and humidity sensor is installed in the upper portion of the magnet channel region within the closed cabinet door frame assembly as shown in Figure 2-118.

6 Nos. of standard temperature and humidity sensors are fitted uniformly on both sides of the inner channel in the cabinet. This is to ensure the accuracy of measurement of the temperature and humidity throughout the enclosed channel.

Figure 2-124 Mounted temperature and humidity sensors



Sensors mounted 4DI

The magnet is installed for the IRM-S04DIF sensor on the door frame. The process for installation is the same as that of the Temperature and Humidity sensor. It should be placed in the cabinet housing the RDU-A G2 preferably.

Installation of the water sensor

Water sensor mounting directions and instructions can be found in the IRM-S01W-belt type water sensor user manual.

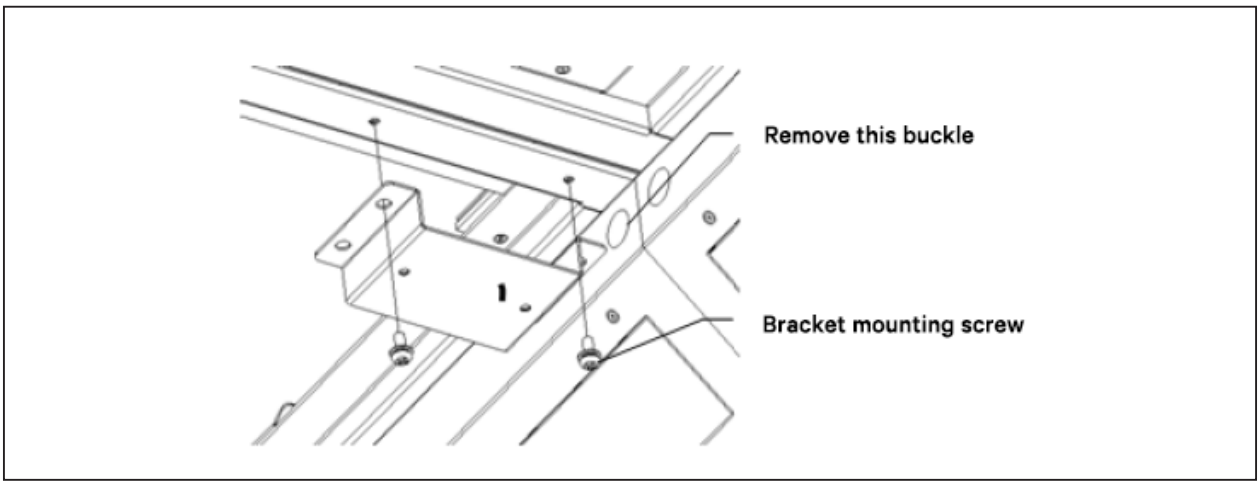
Vertiv recommends the installation in the bottom of the air conditioning.

Flooding test strip connector should be pasted to the accompanying cable tie holder along with the detection lashing belt in a firm and organized manner.

Installation of smoke sensors

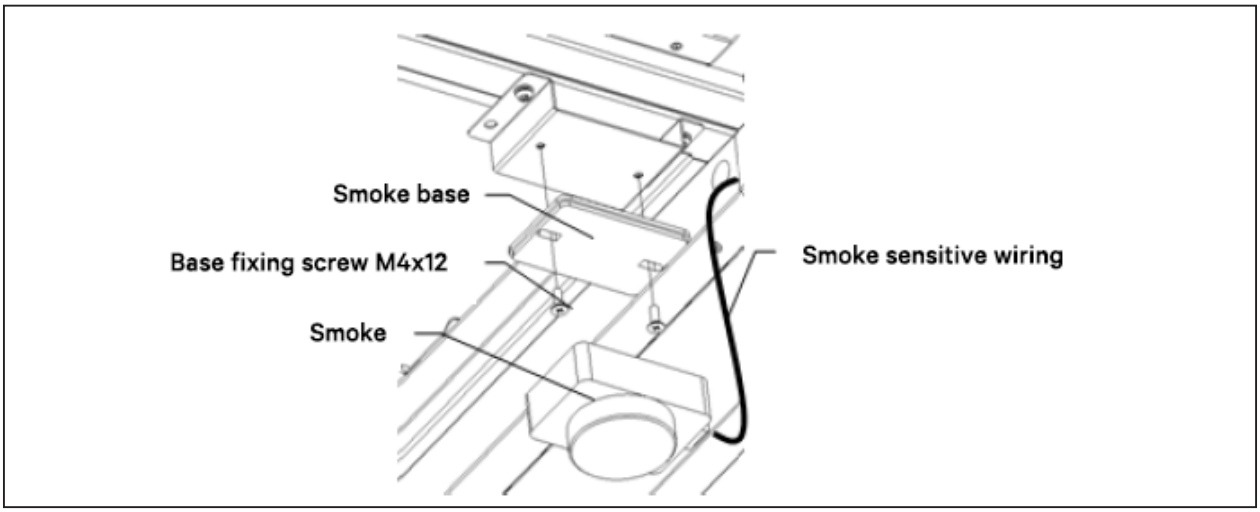
Remove the plug buckle skylightroof support The cable that detects smoke from over the line passes through the hole where the holder is mounted in the frame of the skylight roof.

Figure 2-125 Installation of a smoke bracket



The smoke detector device is mounted on the smoke face by the base fixing screws. The smoke detector wiring is then connected to the detector from the hole next to the smoke base.

Figure 2-126 Smoke installation



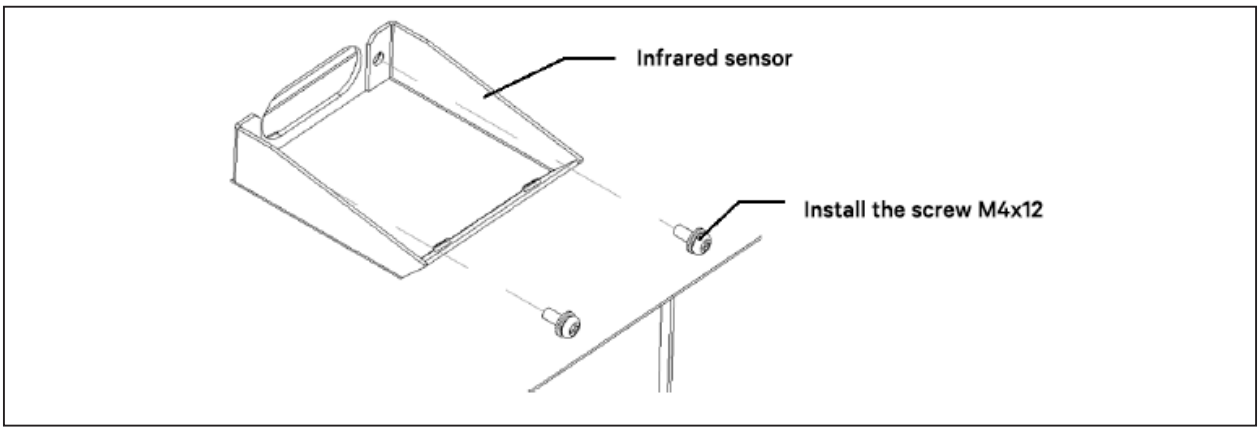
NOTE: Remove the plug buckle for the passage of cable.

NOTE: Excess cable line is drawn through the hole to minimize the improved aesthetics of the exposed cable.

Installation of infrared sensors

The infrared sensor holder is mounted inside the access door lintel at the top right over the line hole with a fixing screw.

Figure 2-127 Infrared bracket installation



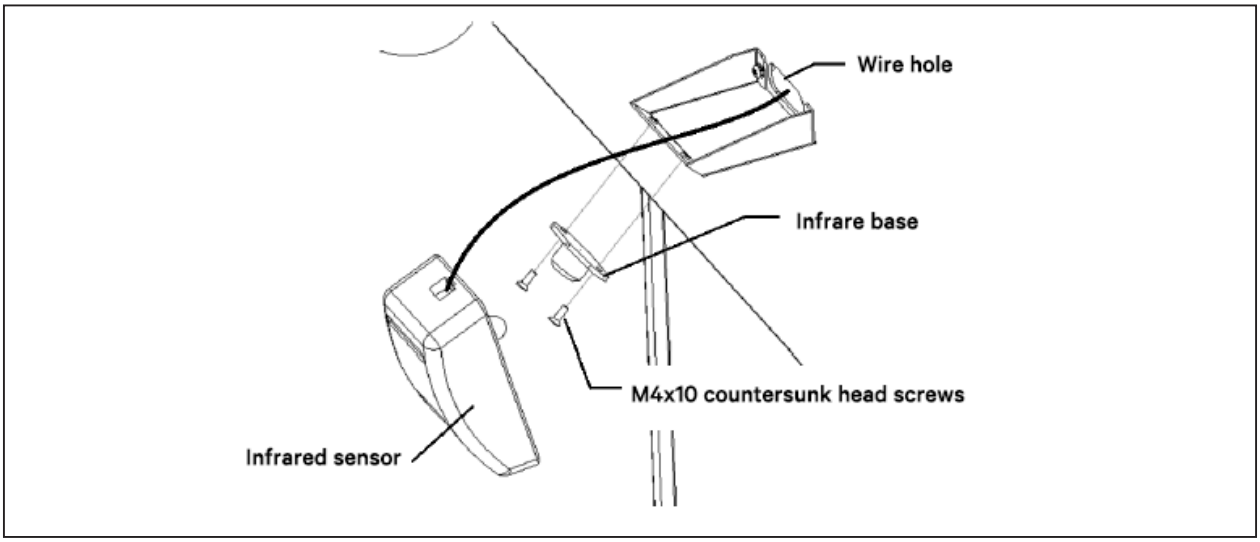
NOTE: While installing the trapezoidal face, remember it should not be upside down.

NOTE: The mounted position of the infrared sensor can be interchanged with the hemisphere where the recommended right infrared sensors are mounted in position.

NOTE: Infrared stent should be within the channel box door.

Initially, with the base open, the cable passes through the cable hole through the lintel, and an infrared sensor is installed in the infrared base with screws while the infrared card which is mounted on the base, is connected with the network cable.

Figure 2-128 Install infrared sensors



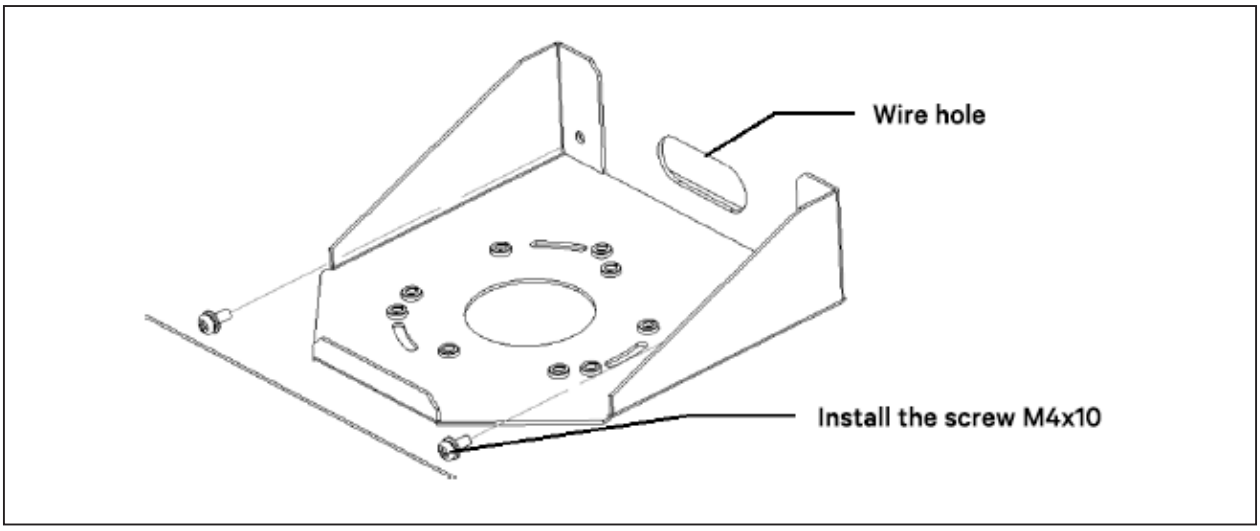
NOTE: After the outer mounting, the angle needs to be adjusted to meet the appropriate monitoring range.

NOTE: Finally, the excess cable line is drawn through the hole to minimize the exposed cable improved aesthetics.

2.13.10 Installation of the Dome Camera

The hemisphere holder is mounted inside the access door lintel through a central line via a hole with the fixing screws.

Figure 2-129 Installation hemisphere Bracket

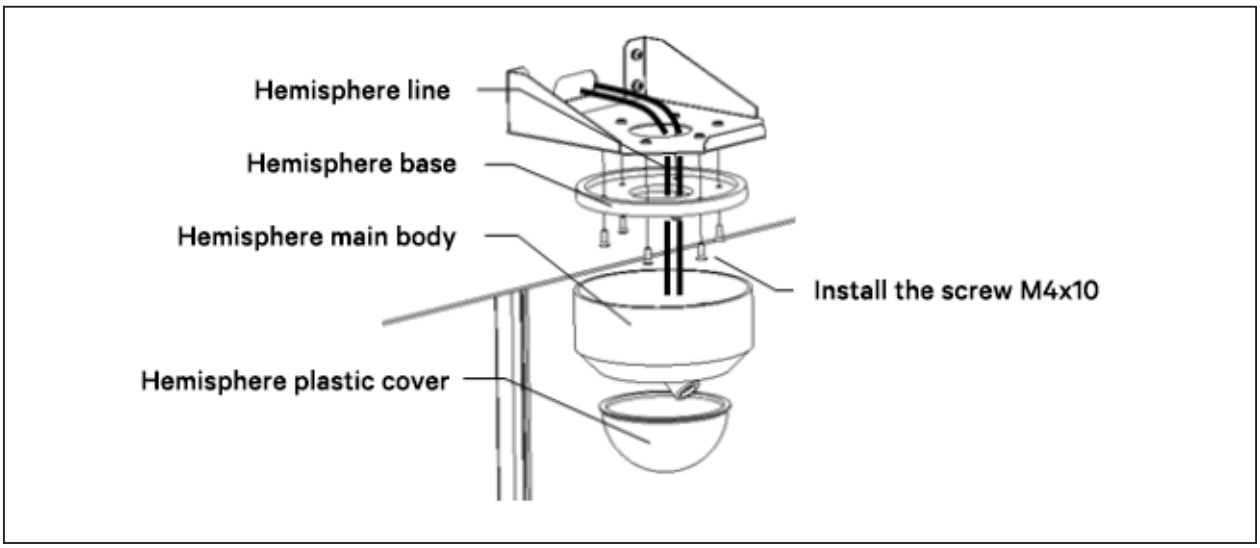


NOTE: The hemisphere mounting position of the infrared sensor can be predetermined where the dome is installed in a central location preferably.

NOTE: Hemisphere stent is within the channel box door.

First, the plastic base and the cover hemisphere apart, video cables and power cables are led to the base through the bracket and the lintel central hole over the line, the chassis with screws, and the cover snaps into the plastic base.

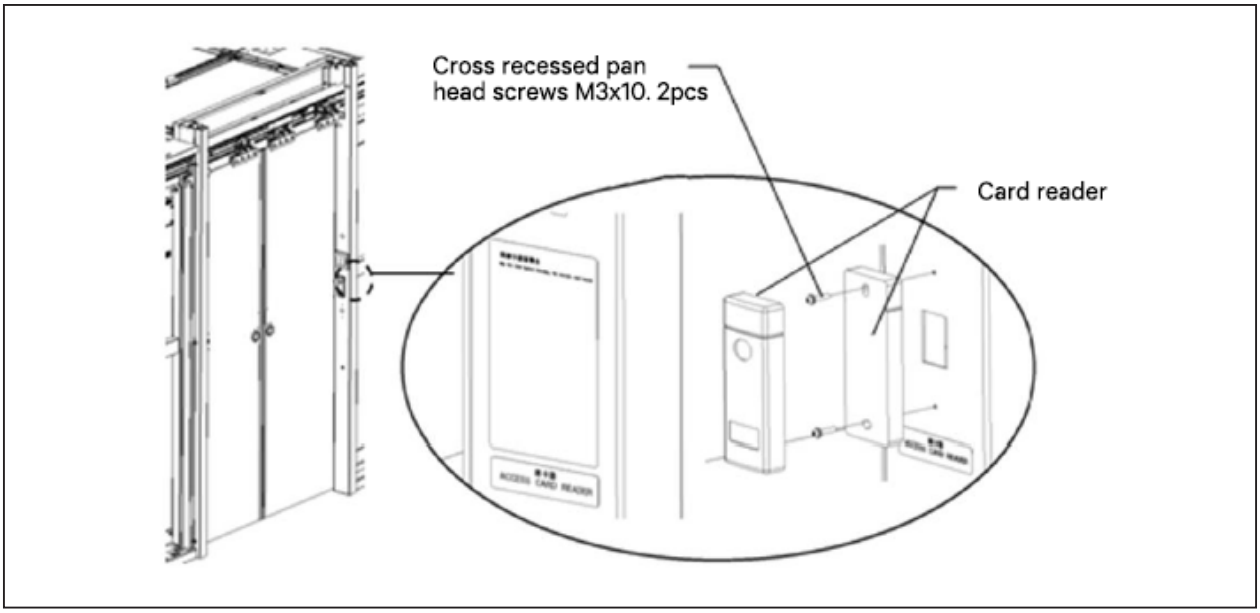
Figure 2-130 Installation hemisphere Bracket



2.13.11 Installation of the swipe card reader

Card mounting hole blocks the door button , based on the installation card as shown in **Figure 2-131**.

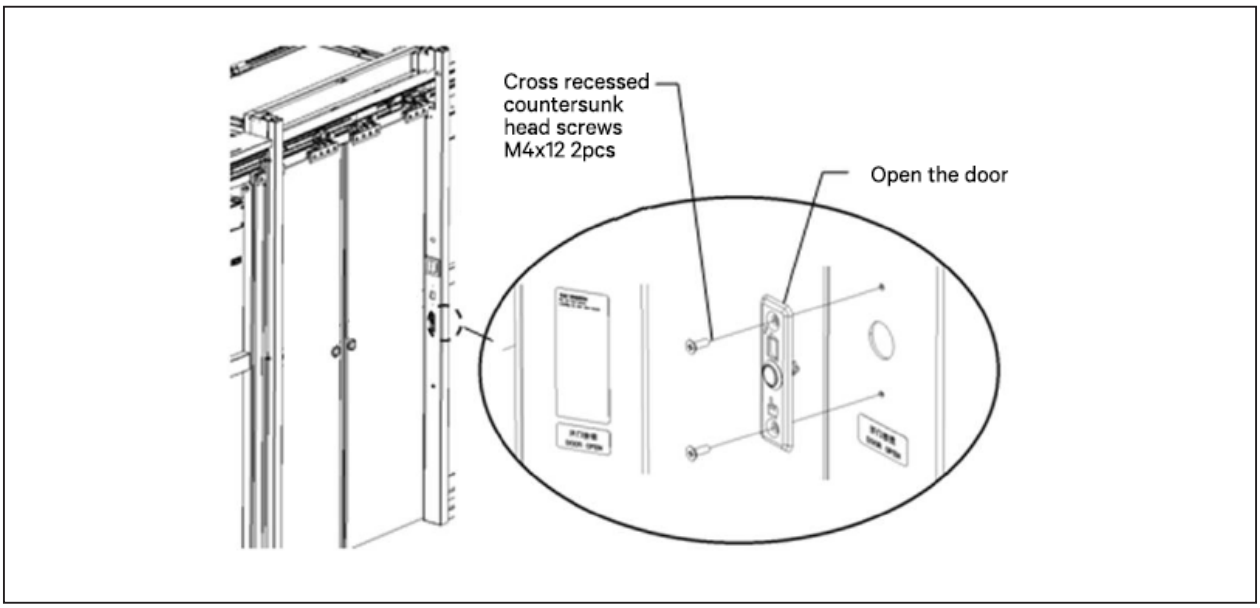
Figure 2-131 Mounting the swipe card



2.13.12 Installation of the Door button

Remove the tab shutter mounting hole of the button- the installation is depicted in **Figure 2-132**.

Figure 2-132 Button to open the door installation



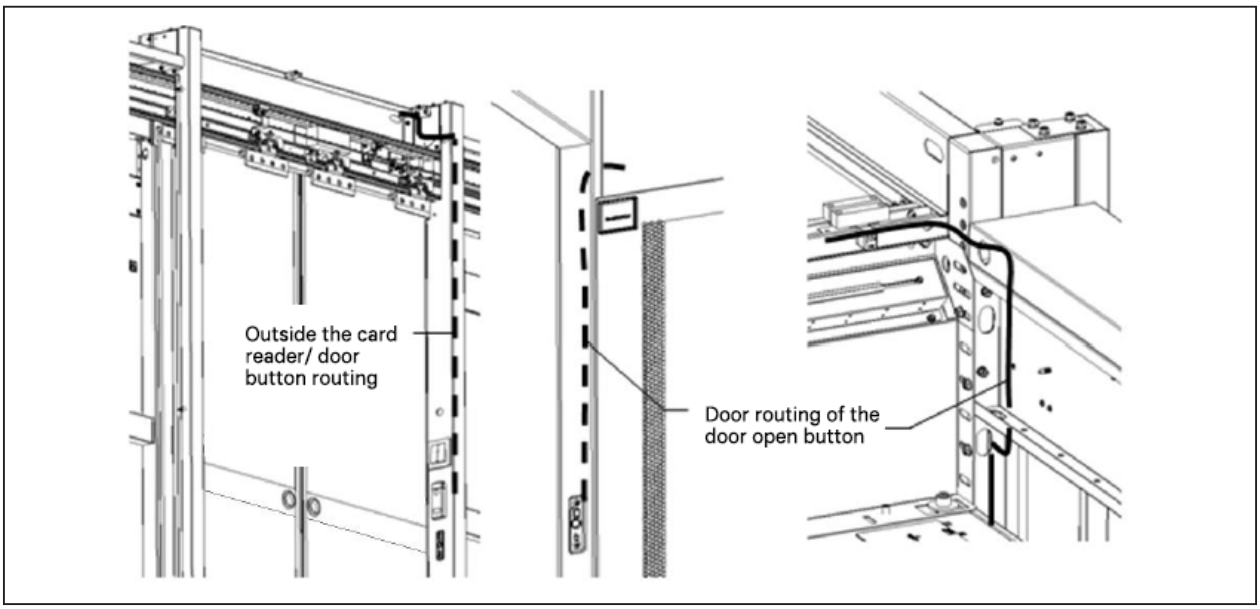
NOTE: Each channel contains a door opening button inside and outside the mounting position;

NOTE: Do not open the door button installed where an anti-finger sign is printed on the button which indicates an upward direction.

2.13.13 Wiring card reader / door opening button

Wiring route outside the card reader is similar to the illumination switch button of the door. It is passed through the column upwardly along through the wire hole and lintel over the line hole and edge banding along the roof at the upper rack rows. Refer to the light switch wirings section as the process is similar to it. Routing the wires through the door open button – a wiring along the column, pass via the through hole and an upright mounting plate through the guide holes in the bottom line, and edge banding along the roof line Roof rack rows.

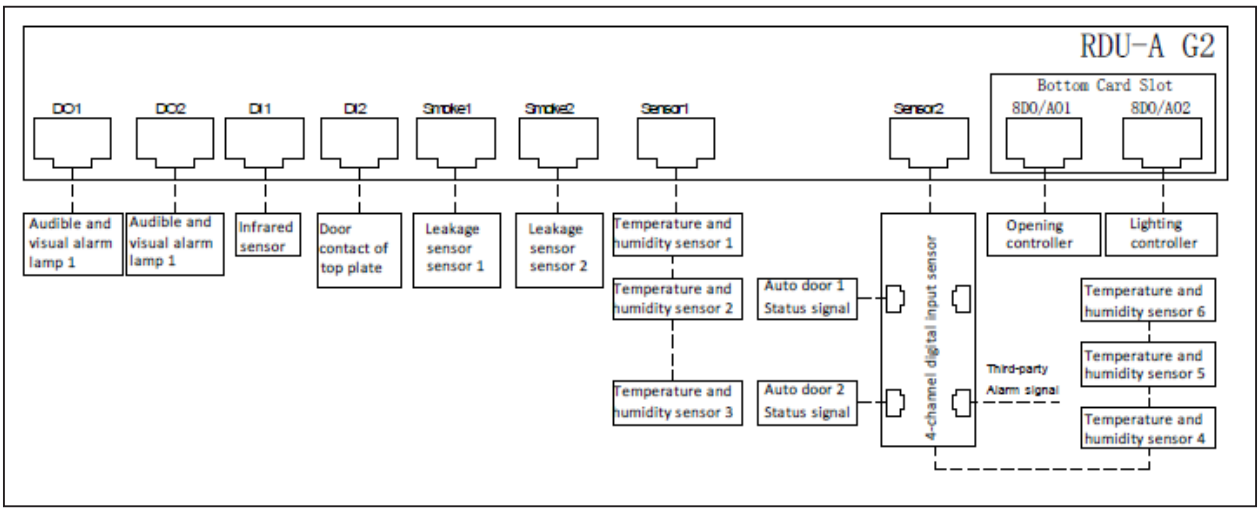
Figure 2-133 Brush wiring spreaders / door button



2.13.14 Monitor connection diagram

RDU-A G2

Figure 2-134 RDU-A G2 monitor network connectivity



NOTE: Use the straight-through cable connection between the sensor and monitoring unit RDU-A G2.

NOTE: Requires a series of adjacent sensor network cable, network cable should be preferably black. Use the correct network cable tester to check the cable line sequence.

NOTE: The temperature and humidity sensors are set to address TH1, 2, 3, 11, 21, 31; TH4 4,5,6 address are set to 12, 22, the address is set to 4DIF sensor 10. The address setting mode can be found by

3 Operation & Display Panel

In this chapter the power before checking, power, system debugging and shutdown will be explained in detail for Vertiv™ SmartAisle 2

3.1 Checks prior to Start

The following checklist needs to be screened through to confirm if all the following items and parameters are met:

Table 3-1 Checklist prior to Start

Types of parameters	Checklist items	Test result
Mechanical	All cables, circuit connectors tightened, no loosening of the fastening screw	
	And base building has been a reliable connection	
	Fasteners for transportation have been removed	
	After installation is complete, or debris inside the device have been removed around (e.g., shipping materials, construction materials, tools, etc.)	
Cooling	Follow the instructions on the label at the valve, opening all the valves in the refrigerant circuit	
	The Cooling pipe system has been qualified pressure leak test and confirm	
	The humidification system for drainage pipe system and is firmly connected to the material in accordance with claim leak	
	Ensure proper refrigerant	
	Compressor plus tropical warm-up has been more than 12 hours	
	It located above the room temperature and 18 °C has a certain heat load. If not provided, preferably by using other heating means or manual operation of the unit itself and force the adjacent heater equipment (sure to follow the method of operation "Liebert.CRV Series User Manual precision air conditioning air"), while preheating to the room environment, to ensure heat load necessary debugging	
	Confirmation level switch cable is connected and the float rod may work level	
	Outdoor air-cooled condenser power isolation switch has been closed	
Supply and distribution	Measured with a multi-meter voltage feed line is normal, and the same equipment nameplate rated voltage	
	The system does not open electrical circuit, short circuit	
	Verify that all electrical wiring or control properly tighten all electrical control connectors.	
	Each sub-closing operation switch, each switch test the mechanical properties of normal	
	Industrial rack PDU male female connector installed properly	
Illumination	Lighting controller power is properly connected	
Electric door	Line resistance and no bump manual door	
	Cable lashing rails in the firm, cannot be involved in the drive gears, belts	
	Remove metallic debris from the rail	
Roof open	The power switch on the controller is properly connected	
	Removing the need to open the top plate fixing screws	
	Ensure electromagnetic lock suction plate locking screws does not ensure fluctuation absorbing plate may have activity	
Monitor	Check to make sure the entire communications network lines correct line sequence	

NOTE: The authorized technicians check all the conditions that prohibit the power user. Input switching points before the closing operation – ensure that the input power is completely disconnected SPM .

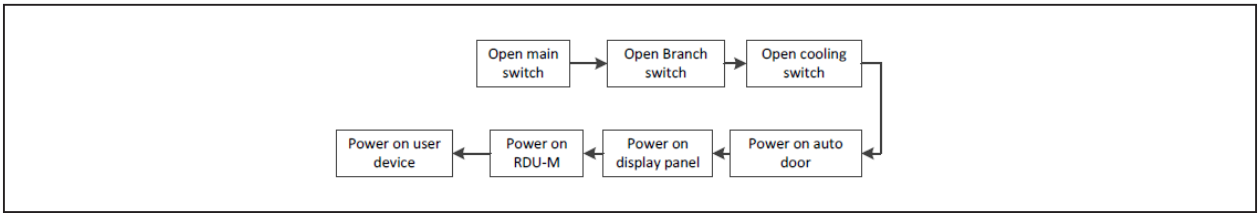
3.2 Power

NOTE: The display automatically powers off to conserve power. Press any button quickly to wake the display.

To power up a SmartAisle 2 refer the flowchart in **Figure 3-1**.

Before booting up the SmartAisle, kindly contact the customer service telephone (#400) to initiate boot authorization and carry out the following steps:

Figure 3-1 Power Flowchart



Following steps need to be adhered as per the power flow:

1. External input power switch of the distribution cabinet must be closed; the operation display panel lights of the power distribution cabinet should be lit.
2. Closing arm switching the air conditioner distribution cabinet; able to switch rack PDU too.
3. The main switch is closed and at the lower stage switching the air conditioning indoor unit and the outdoor unit switch occurs to confirm If the air conditioner is operating normally.
4. Electric door switch is close and the electric door self-test is performed to observe if the operation observed is normal.
5. Open the control panel power button to ascertain if normal operation is observed.
6. Open the power button RDU-M in the running state of the control system to check if normal operation is observed.

NOTE: If the control panel is powered and there exists an external operation panel, turn on the power is first applied and refer to the control panel.

NOTE: For detailed notes on the distribution of the cabinet boot process, see the SPM server power management system user manual.

NOTE: Power distribution cabinet comprising the lighting protection module and ensures the SPD SmartAisle breaker is closed on a running electrical system.

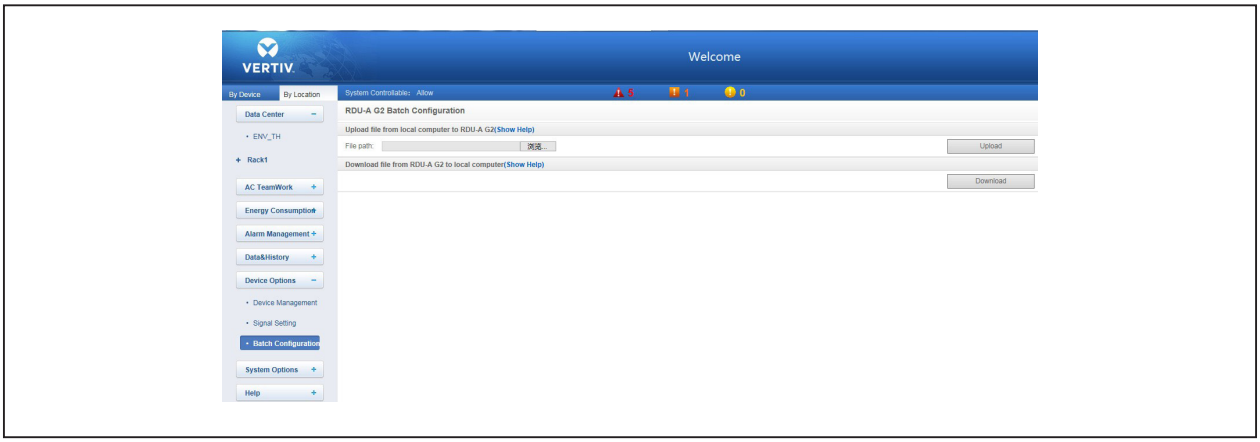
NOTE: The SmartAisle system boot up must be completed by authorized and trained technicians and certified personnel at the customer service center.

NOTE: There is no RDU-M when using the RDU501 monitoring kit.

3.3 System Debugging

1. On starting up the RDU- AG2, the commissioning personnel need to record the scene by their mobile phones to call the hotline 4008876510 and follow the instructions. The Application must be turned on and a copy obtained of the software configuration package batch update.
2. The page of the device contains the application boot signature, customer name, address equipment installation, customer contact (including Telephone and Email) and other factual information to call the customer center for the record, for the quality of a return visit. After commissioning, the #400 power-on password is received by the mobile phone text messages or email provided by completion of the commissioning work.
3. Locally modify the software upgrade configuration package batch file named SystemBatchConfiguration + date.iru; update the configuration file in the configuration options package through the bulk configuration management page RDU-A G2 software as shown in **Figure 3-2**.

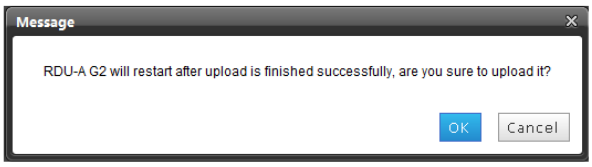
Figure 3-2 RDU-A G2 batch system configuration page



4. From the local computer to upload the files to the RDU- AG2, Select the uploaded file type (for example, “Profile”). Click the Browse button.

5. Select the required files to upload followed by clicking on the OK button as shown in the confirmation dialog box in **Figure 3-3**.

Figure 3-3 Confirmation Dialog box



6. Click the OK button following which the user authentication box will pop up. Enter the user login password and click OK to upload the file to RDU- AG2.

NOTE: Only the admin user can perform an upload operation- the operation should be performed under the guidance of professionals.

NOTE: Configuration file name must be SystemBatchConfiguration + date.iru or the upload will fail

NOTE: In case of an optional device access control system, ensure that bulk configurations operations are performed after the implementation of optional equipment configuration, else the original configuration information will be lost.

NOTE: Refer to the RDU- AG2 intelligent monitoring user manual to understand the functionality.

NOTE: Monitoring by the RDU- AG2 supervision platform of each device to confirm it is in an operational state.

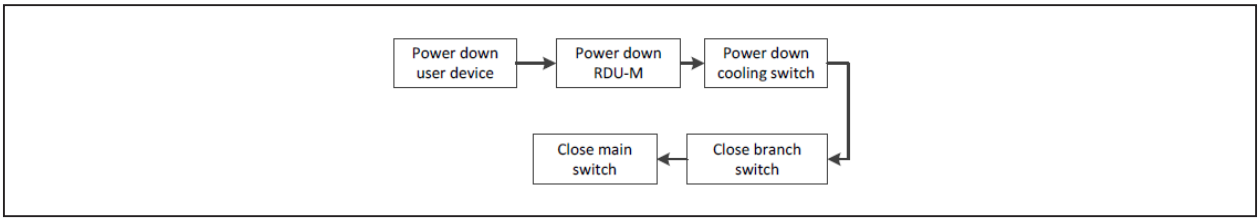
NOTE: The equipment must be functioning correctly before users can open servers and other IT equipment.

NOTE: When using the RDU501 monitoring package, the above debugging is performed on the RDU501, see "RDU501 Intelligent Monitoring Unit User Manual".

3.4 Shutdown

The product flow chart is shown in **Figure 3-4**:

Figure 3-4 Shutdown flow chart



Following steps need to be adhered to implement the shutdown:

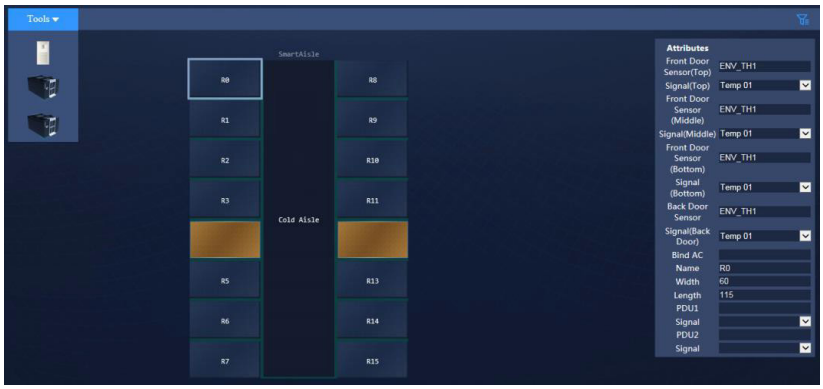
1. Ensure that all the users of IT equipment have powered off.
2. Press the OFF button on the RDU-M(No RDU-M when using RDU501 monitoring kit).
3. Press the air conditioning off key on the front panel display.
4. After stopping the flow of the cold air conditioner, the indoor unit is disconnected and the lower main breaker switch is also switched off.
5. Switch off the outdoor unit
6. Disconnect the power distribution cabinet input and branch output MCB open space.
7. Check and confirm that all the electrical equipment has been powered off completely.
8. Finally, close all the doors.

3.5 Display Panel Operations

In this section, various aspects related to the operations such as system capacity, temperature, alarm and PUE and their subsequent display on the Display panel will be explained in brief.

3.5.1 Data Modeling

Figure 3-5 Data Modeling



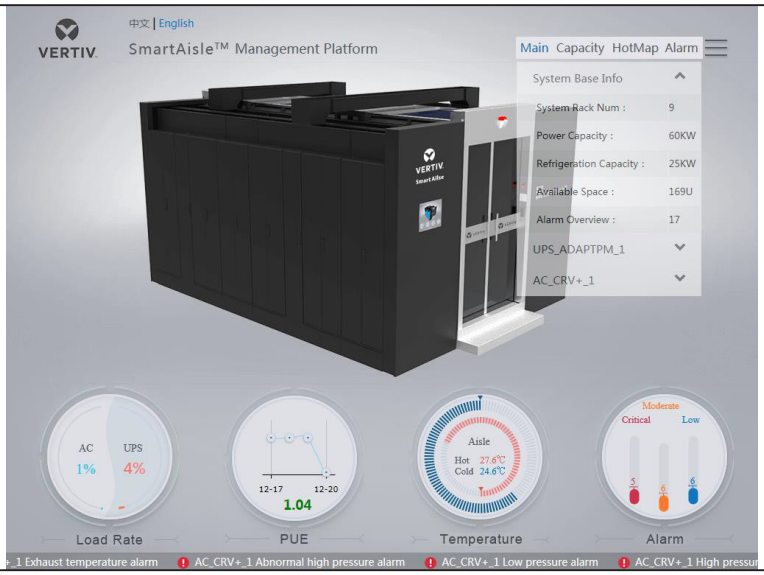
NOTE: Modeling methods are detailed in "RDU-M Room Management User Manual"

NOTE: When using the RDU501 monitoring kit, the modeling is performed on the RDU501, see "RDU501 Intelligent Monitoring Unit User Manual"

3.5.2 Standard Basic Page

This page displays the SmartAisle 2 product model, the air conditioning/UPS load rate dial, PUE dial, Ambient Temperature dial, and the Alarm Dial.

Figure 3-6 Standard Page



The nav icon on the top right corner of the page needs to be clicked following which the number of cabinets, total capacity of the power supply, total cooling capacity, free space, and the system alarms will be displayed.

NOTE: Click the dropdown menu to hide the blank page

NOTE: To go back to the home page, click the Vertiv icon.

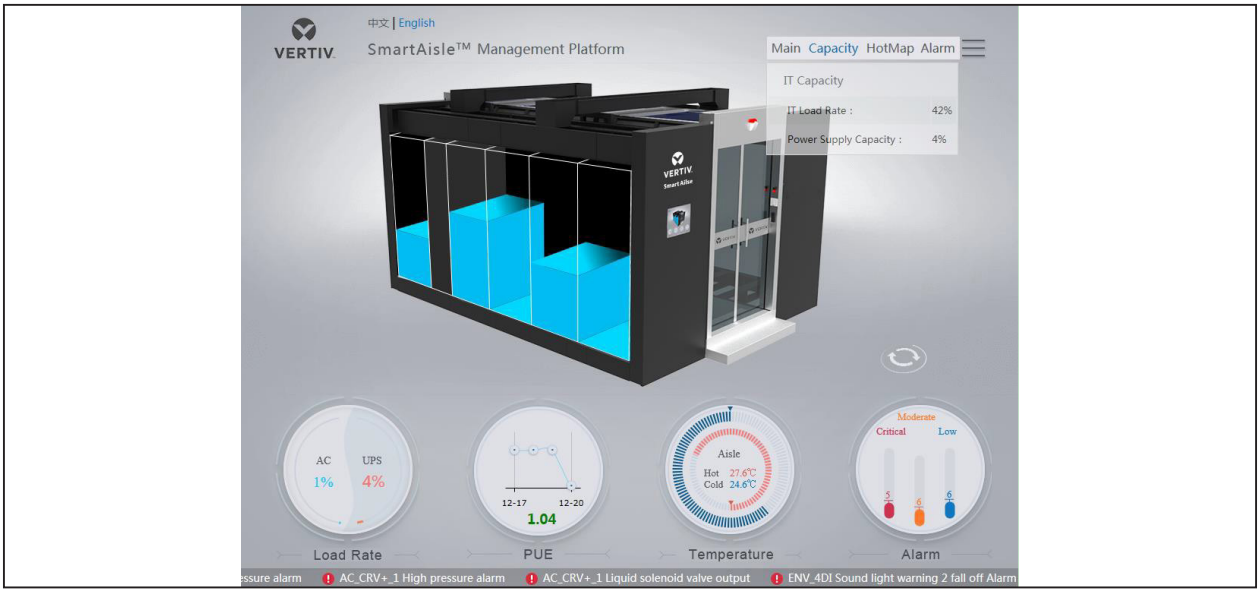
NOTE: The PUE dial displays the historial PUE Curve and is based on the aggregate information starting from five days prior to the current date

NOTE: Clicking on the Dials for the Load Factor, PUE, Ambient Temperature, and Alarms will take the user to their respective pages.

3.5.3 Capacity page

Clicking on the navigation icon will show the three icons related to Capacity, Temperature, and Alarm options. Click the Capacity option. It shows the capacity of the cabinet, the IT load rate and Power Supply capacity. Clicking on the IT Capacity will show the IT device capacity of each cabinet.

Figure 3-7 Capacity Page



NOTE: The Capacity Information of Power is showed rather than U Bits of space.

NOTE: The rack power capacity of the power consumption (PDU signal or a signal of the distribution cabinet or cabinets) and the ratio of power capacity of the cabinet depending on the user configuration is shown.

NOTE: The IT load shows the load of a single cabinet and a ratio of the total number of the power capacity of the cabinet apart from the power supply capacity rather than that of the total number of power capacity of the cabinets

NOTE: On clicking the top of the rotary dial , the alarm arrow buttons and a 8 clockwise angle perspective is displayed.

NOTE: If the capacity display, other refrigerants, and the power distribution is displayed in black, it means there is no capacity information.

3.5.4 Wen Field page

On clicking the navicon, click the Hotmap option displayed in the menu. This shows the Maximum and Minimum temperature of the outside ambience in addition to the maximum and minimum temperature inside the cabinet.

Figure 3-8 Temperature page

Click on the Field temperature module to see temperature at the top, center, and bottom of the different rows of the cabinet.

Figure 3-9 Temperature page

NOTE: Click on the front and back door icon on the temperature field in the channel to see the temperature outside the cabinet doors and inside the cabinet doors respectively.

NOTE: The three temperature sensors in the distribution cabinet, rear door, and the intermediate position in the cabinet need to be configured.

NOTE: The integrity and continuity of the temperature field, cooling, and temperature of the distribution cabinet can be configured.

3.5.5 Alarm page

After clicking the navicon, the menu can be seen from which the Alarm link needs to be clicked. The user can view the critical, moderate and low alarms based on their intensity.

Figure 3-10 Alarm Page

NOTE: Green color indicates that there is no alarm.

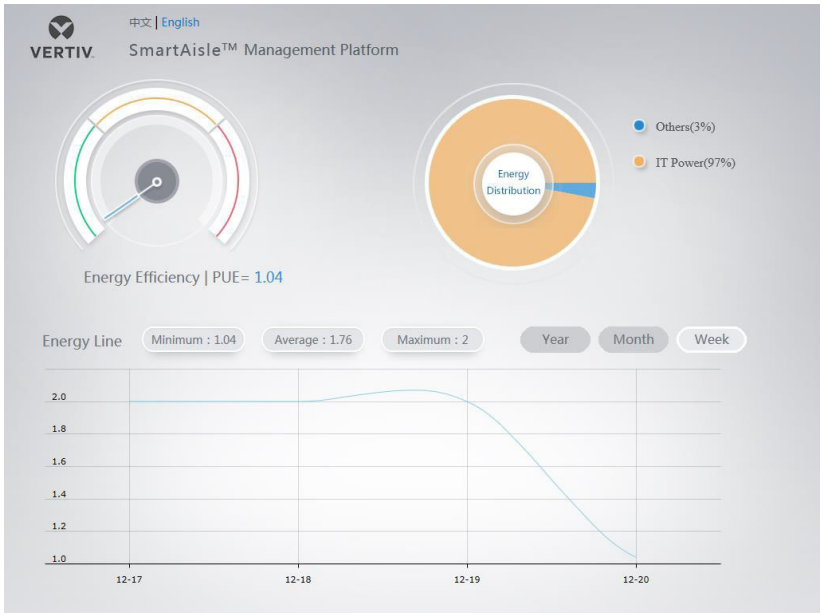
NOTE: If the refrigeration section and distribution section shows black, no alarm is there.

NOTE: In case of a multi-level alert, the most critical alarm color is displayed.

3.5.6 PUE page

Clicking the PUE dial shows the energy efficiency, power distribution pie chart, and the historical PUE curve.

Figure 3-11 PUE page



NOTE: The PUE power mode can be configured, for more detailed info, refer to the RDU-M user manual. The different classifications of the energy pie charts can be configured and the same RDU-M user manual needs to be referred as same.

NOTE: The PUE Curve is based on the data for the last seven days whereas the historical data for the last 30 days is shown.

4 General Maintenance

In this section, the Vertiv™ SmartAisle 2 product basic safety precautions, instructions, the maintenance life cycle, checklists, decomposition, and troubleshooting are explained from a customer perspective.

4.1 Safety Measures

Following are the safety guidelines that need to be adhered:

1. Equipment maintenance should disconnect the power input; power off the device unless the debugging project requires a power supply,
2. Even after disconnecting the power supply, air conditioning, indoor fan, outdoor fan still have potential voltage; therefore, disconnect the power switch of the air conditioner
3. System Maintenance must be completed by trained and authorized service personnel.
4. All maintenance operations must be strictly be in accordance with local protocols and laws as local regulations supersede everything else.
5. All trouble shooting is subjected to the manufacturers maintenance – otherwise the warranty is void.
6. Ignoring safety guidance can put the human life and environment at risk.
7. Inappropriate parts can lead to reduced performance or equipment downtime., Therefore, original components and recommended parts must be used.

4.2 Main components of periodic maintenance & inspection table

Routine maintenance and checking of equipment must be done on a regular basis.

Power distribution system maintenance

1. Fan Maintenance

Under the continuous operation, the fan of the lighting controller has an expected life-cycle of 20,000 to 40,000 hours. The higher the temperature, the shorter the life of the fan.

Every six months (bi-annual) periodic checks must be carried out to ensure the correct operations of all fans. Confirm that the air blowing is through the vent panel of the lighting controller.

2. Inspect the electrical cabinet status

The working status and functionality of the power distribution equipment must be checked every six months.

Check the distribution cabinet for errors or faults. If the fault light is on, there is a default alarm.

If the switch fails, contact the nearest Vertiv dealer or customer service for replacement or repair.

NOTE: Additional details regarding the maintenance and replacement instructions can be obtained by referring to SPM user manual.

4.3 Air Conditioning System Maintenance

The maintenance inspection checklist for air conditioners is given in the following **Table 4-1**.

Turn off and unplug the UPS before cleaning the air conditioning.

Table 4-1 Upkeep checklist for Air conditioners

part	Check item	Remark
Filter	Check if the filter is damaged, clogged	
	Check the filter clogging switch	
	Clean the filter	
Fan	Fan Ye Lun without deformation	
	Bearings for wear	
Air-cooled condenser (air-cooled units)	Check for leaks	
	Listen to the sound operation, observe the operation shock case	
	Condenser fins cleanliness	
	Fan mounting base is solid	
	Fan cushion whether damaged	
	Whether lightning plate still valid (if there is lightning protection board. For the thunderstorm-prone season is best to check once a week)	
	Appropriate refrigerant line support	
Refrigeration cycle system	Check the suction pressure	
	Check exhaust pressure	
	Check refrigerant line	
	The inspection system water containing case (viewed through the sight glass)	
	Inspection of the electronic expansion valve	
Heating system	Then check the operation of the heating element system	
	Check by corrosion element	

NOTE: Refer to the CRV series user manual for more general maintenance details.

4.4 Breakdown and Disposal

Vertiv™ SmartAisle 2 contains substances that are harmful to the environment and the components. At the end of product or service life, the disposal must be done by trained professionals. It must be sent to the authorized center as per the local protocols and laws of the country or region.

4.5 Troubleshooting

Question 1: Roof don't close.

Answer: First makesure electromagnetic lock armature can move by loose screw a little; second makesure lock connector pin insert in house correctly.

Question 2: Roof don't open

Answer: First remove roof rotable plate fix screw used for transportion; second check whether rotable plate impact roof frame.

Question 3: Light don't work, color is wrong

Answer: First makesure light connector pin insert in house correctly; second check wire connector sequence.

Question 4: HMI display "out of range", display is abnormal

Answer: First makesure video source resolution is 1024*768; second use auto adjusting by HMI OSD.

Question 5: Electrcal door don't move, move too slow, have friction noise

Answer: Remove chipping in rail, adjust glass hang to have gap between glass and metal column and F guide.

Question 6: Electrcal door remain open don't close

Answer: Makesure left door belt fixture fixed on top belt, right door belt fixture fixed on bottom belt, nothing block safe beem sensor.

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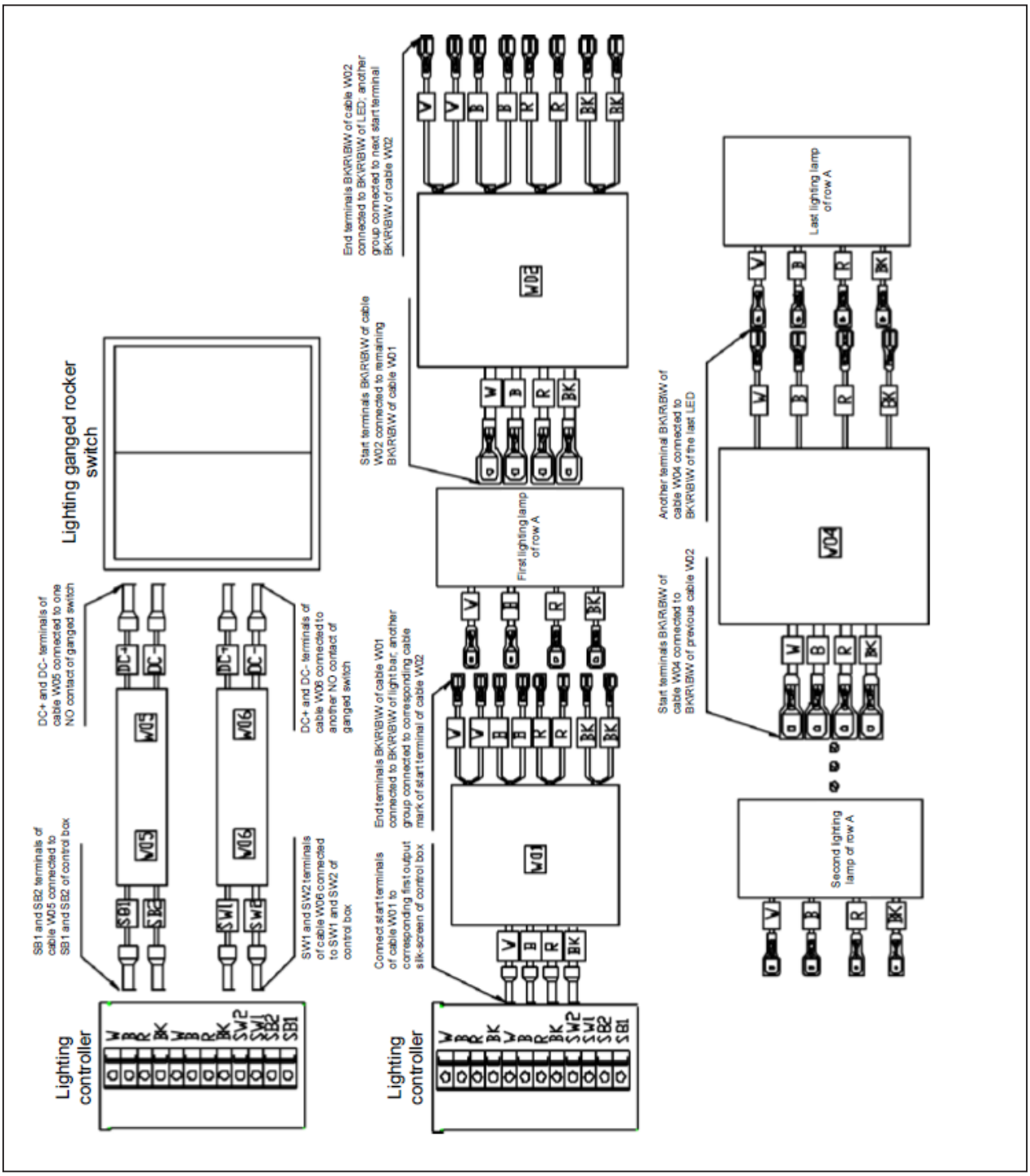
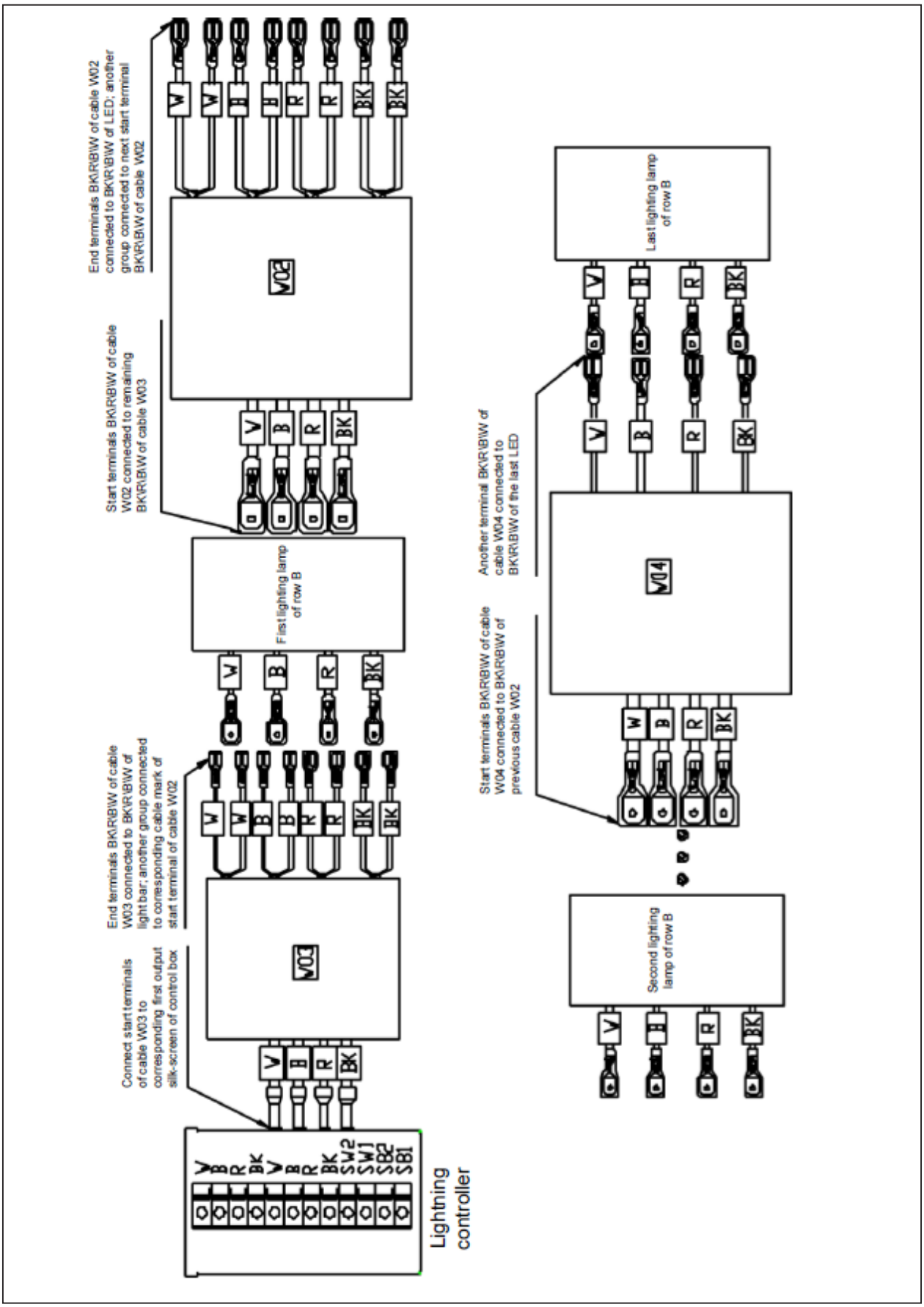
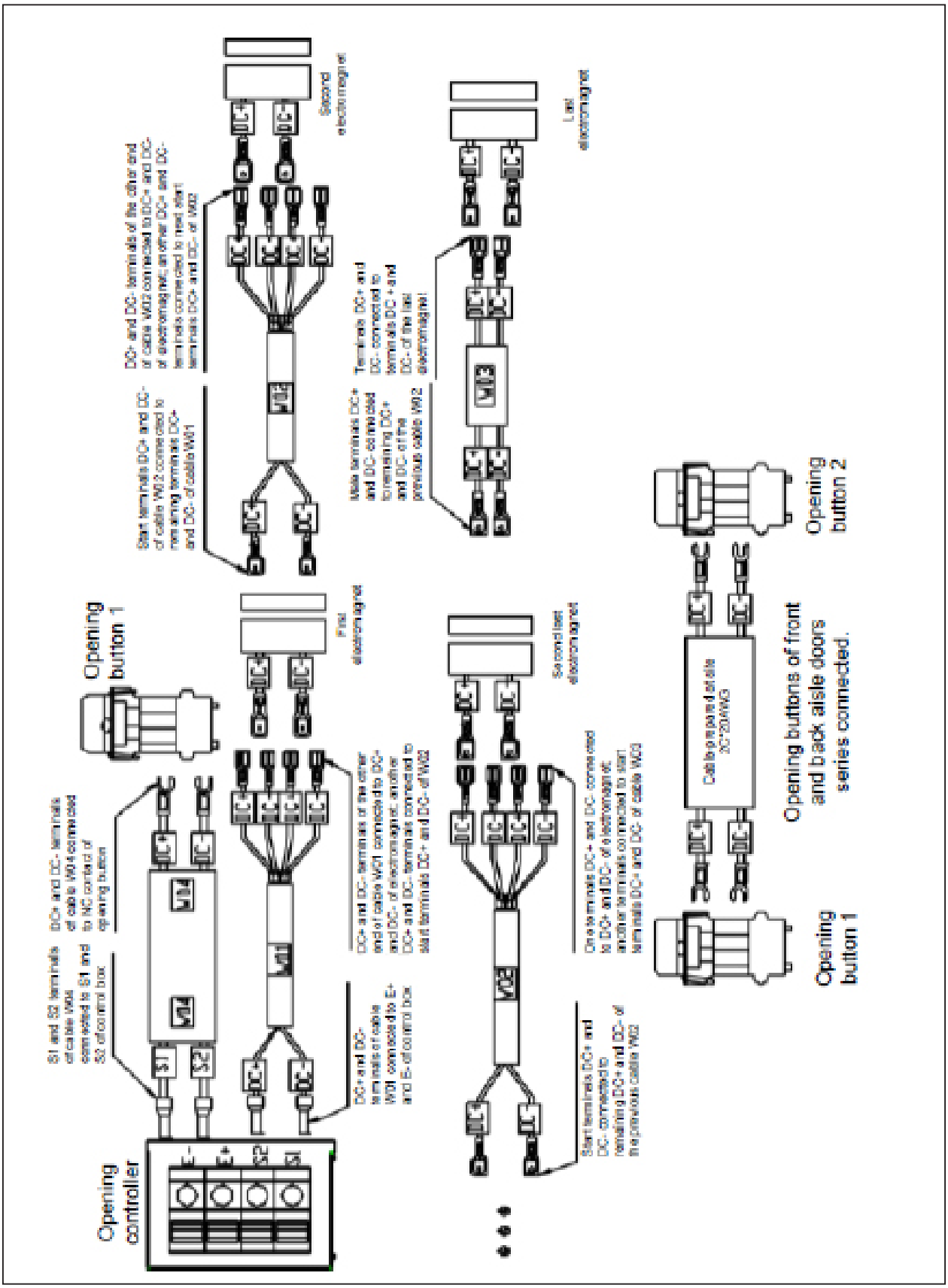
Appendix I Lighting Connector




Lightning controller
V B R BK V B R BK SW2 SW1 SB2 SB1
Connect start terminals of cable W03 to corresponding first output silk-screen of control box
End terminals BK\R\B\W of cable W03 connected to BK\R\B\W of light bar; another group connected to corresponding cable mark of start terminal of cable W02
W03
First lighting lamp of row B
Start terminals BK\R\B\W of cable W02 connected to remaining BK\R\B\W of cable W03
W02
End terminals BK\R\B\W of cable W02 connected to BK\R\B\W of LED; another group connected to next start terminal BK\R\B\W of cable W02
Start terminals BK\R\B\W of cable W04 connected to BK\R\B\W of previous cable W02
Another terminal BK\R\B\W of cable W04 connected to BK\R\B\W of the last LED
W04
Second lighting lamp of row B
Last lighting lamp of row B

Appendix II Open Connection diagram



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