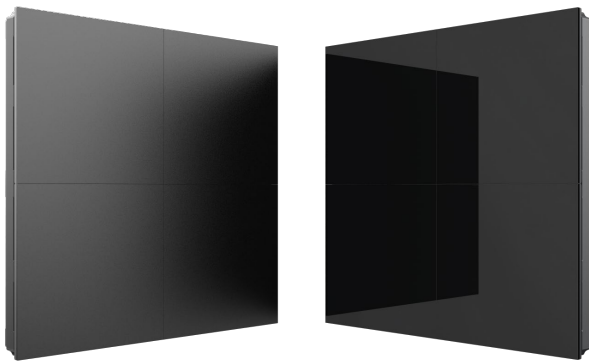


Black Marble 2&4 User Manual



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Warranty Policy

The standard warranty period for the Products is 2 years after shipment from ROE Visual for rental applications and 3 years for fixed install applications. The contract will specify the application. This warranty includes all accessories, spare parts, and components shipped at the time of the original purchase.

Any spare parts sent later are only warranted for 90 days and will in no means extend the original warranty period of the Products.

Any replacements or repairs provided by ROE Visual will not extend the original warranty period of the Products.

If the sales contract provides an extended warranty coverage, the sales contract will supersede the standard period for original purchase. Any other stipulations for the warranty period in this document stay valid.

Extended warranty will be charged at 5% per year, with a maximum total warranty period of 3 years for rental and 5 years for fixed installation applications. If a longer warranty period is required, the details coverage will be agreed on with the Customer and detailed in the sales contract.

The warranty provided by ROE Visual does not include, or is limited by, the following:

1. Products not purchased from ROE Visual.
2. Labor or travel costs for installation, set-up, repair, adjusting, removal, re-installation and other costs incurred by the Customer.
3. Rental cost incurred by the Customer.
4. Any product on which the serial number has been defaced, modified or removed.
5. Product that has been resold, transferred, lost, stolen or discarded.
6. Any software, including but not limited to the operating system.
7. Damage, deterioration or malfunction from:
 - a. Accident, abuse, misuse, neglect, improper ventilation and cooling, fire, water, disaster, lightning, or other acts of nature, smoke exposure (cigarette, fireworks, or other), unauthorized modification, or failure to follow instructions supplied with the product.
 - b. Repair or attempted repair by anyone other than ROE Visual, a ROE certified repair center, or a ROE certified engineer.
 - c. Any damage to the product due to shipment.
 - d. Any damage during the installation, removal, disassembly, or reassembly of the product by Customer or others.
 - e. Causes external to the product, such as electric power fluctuations or failure, exposure to aggressive environments such as seaside, swimming pool, fireworks, etc.

- f. Use of parts not meeting ROE Visual's specifications.
- g. Normal wear and tear.
- h. Customer caused defects, including but not limited to damaged LED's resulting from physical interaction with the display.
- i. Any non-uniformity caused by long-term 24-7 operation of the video wall with heavily contrasting static content.
- j. Failure to follow procedures as outlined in the product's User Guide.
- k. Operating the display outside the suggested normal usage conditions stated in the User Guide.
- l. Software or accessory malfunction.
- m. Any other cause not related to a defect in materials or workmanship.

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If you have any questions about this document, please feel free to contact with ROE technical service team.

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1 Safety

1.1 Safety Guidelines

Personal Protection



CAUTION: Risk of electric shock.



CAUTION: Be aware of flammable materials.



WARNING: Ensure you understand and follow all safety guidelines, instructions, warnings, and cautions mentioned in this manual.



WARNING: Read this manual before the installation and keep this manual.



WARNING: Be careful of hazardous emission.



WARNING: Mind your fingers when working with heavy loads.



WARNING: Pay attention to the hot surface.

Installation Personnel

The installation must be performed by authorized and qualified technical personnel only.

Product Care

Do not place LED panels in a dusty environment and clean the surface regularly.

All components should be kept dry, clean, lubricated (only of recommended), coated properly, and otherwise maintained in a manner consistent with the part design. ROE products must be used in a manner consistent with their design and inspected on a routine basis for security, wear, deformation, corrosion and any other circumstances that may affect the loading capacity.

It's recommended that users conduct regular safety and visual inspections on all products, checking whether the cables and LEDs are damaged or not. The damaged parts should be repaired or replaced in time.

1.2 Safety Instructions

- (1) The product is only for professional use.
- (2) Please read the User Manual carefully and understand all safety information mentioned before installing, powering, operating or servicing the product.
- (3) Please follow all instructions of the User Manual during installing, powering, operating or servicing the product.
- (4) The installation should be performed after you are thoroughly familiar with all safety guidelines, instructions, warnings and cautions. Otherwise, it may increase risks of hazards and injury to the user.
- (5) Please install and / or keep this product away from flammable materials, heat sources, water, high-power electrical devices and dangerous chemicals.
- (6) Please use and / or store this product in proper temperature and humidity.
- (7) Please earth this product against the risk of electric shock.
- (8) Please make sure power and data cables are in a sound condition.
- (9) Please do not use the product near the sea and / or other places with corrosive environment.
- (10) The installation must be performed by authorized and qualified technical personnel only.

1.3 Consignes de sécurité

Protection personnelle



ATTENTION: Risque d'électrocution.



ATTENTION: Faites attention aux matériaux inflammables.



AVERTISSEMENT: assurez-vous de comprendre et de respecter toutes les consignes de sécurité, instructions, avertissements et précautions mentionnés dans ce manuel.



AVERTISSEMENT: Lisez ce manuel avant l'installation et conservez-le.



AVERTISSEMENT: Faites attention aux émissions dangereuses.



AVERTISSEMENT: Faites attention à vos doigts lorsque vous travaillez avec de lourdes charges.



AVERTISSEMENT: Faites attention à la surface chaude.

Personnel d'installation

L'installation doit être effectuée uniquement par un personnel technique autorisé et qualifié.

Produit

Ne placez pas les dalles LED dans un environnement poussiéreux et nettoyez la surface régulièrement.

Tous les composants doivent être maintenus au sec, propres, lubrifiés (uniquement de ceux recommandés), revêtus correctement et entretenus d'une manière compatible avec la conception de la pièce. Les produits ROE doivent être utilisés conformément à leur conception et inspectés régulièrement pour vérifier leur sécurité, leur usure, leur déformation, leur corrosion et toute autre circonstance pouvant affecter leur capacité de chargement.

Il est recommandé aux utilisateurs d'effectuer des inspections visuelles et de sécurité régulières sur tous les produits, en vérifiant si les câbles et les voyants sont endommagés ou non. Les pièces endommagées doivent être réparées ou remplacées à temps.

1.4 Consignes de sécurité

- (1) Le produit est uniquement destiné à un usage professionnel.
- (2) Veuillez lire attentivement le manuel d'utilisation et comprendre toutes les informations de sécurité mentionnées avant d'installer, de mettre en marche, d'utiliser ou de réparer le produit.
- (3) Veuillez suivre toutes les instructions du manuel d'utilisation lors de l'installation, de l'alimentation, de l'utilisation ou de la maintenance du produit.
- (4) L'installation doit être effectuée après que vous vous êtes familiarisé avec toutes les consignes de sécurité, les instructions, les avertissements et les précautions. Sinon, cela pourrait augmenter les risques de dangers et de blessures pour l'utilisateur.
- (5) Veuillez installer et / ou garder ce produit à l'écart de matières inflammables, de sources de chaleur, d'eau, d'appareils électriques à haute puissance et de produits chimiques dangereux.
- (6) Veuillez utiliser et / ou stocker ce produit à une température et à une humidité appropriées.
- (7) Veuillez mettre ce produit à la terre contre le risque de choc électrique.
- (8) Assurez-vous que les câbles d'alimentation et de données sont en bon état.
- (9) Veuillez ne pas utiliser le produit près de la mer et / ou d'autres lieux exposés à un environnement corrosif.
- (10) L'installation doit être effectuée par du personnel technique autorisé et qualifié.

2 General Introduction

2.1 Features

Specially designed solution for concert stages, TV studios, commercial stands, and a variety of other creative applications.

•Award-Winning LED Floor

ROE Visual's Red Dot award-winning Black Marble high-end floor panel brings creativity to your feet. Available with a high-contrast glass or matte finish, these floor panels are suited for a wide range of creative uses.

•Fashionable Finishes

The Black Marble panels are deliverable in various high-end finishes, suited for different environments and applications. The High-contrast, Mirror and Matte finishes all have a strong, anti-scratch surface.

•Magnetic Modules

Built-in magnets enable you to quickly swap the modules on-site.

•Support Options

The Black Marble support options are easy and quick to install. They leave room for maximum creativity, while guaranteeing a safe and sturdy floor support.

•Eye-catching LED Staircase

Brilliant | Robust | Durable

Create impactful visual effects with ROE's easy-to-install LED staircase.

•Black Marble Triangle

Add more creative oomph to Black Marble LED floors with new triangle design option. Round LED video floor is configured with standard BM4 and triangular tiles nicely bordered with an easy-to remove shading mask.

•Black Marble Video Wall

Black Marble LED panels can be easily hung or stacked using a specially-designed video wall.

2.2 Specifications

2.2.1 BM2 Specifications

Items	BM2- Matte
Pixel Pitch	2.82 mm
Pixel Density	125550 pixels / m ²
Resolution (H x V)	216 x 216 pixels
LED Configuration	SMD 1515 Black
Max. Brightness (Calibrated)	800nits
Gray Scale (Input to Output)	14 bits
Refresh Rate	3840 Hz
Scan Ratio	1/12
Viewing Angle (Hor.)	140°
Dimensions (W x H x D)	609.6 x 609.6 x 130 mm / 24" x 24" x 5.1"
Cabinet Material	Magnesium Alloy
Weight / Tile	18.1kg; 39.9lbs
Serviceability	Front
Power Consumption Max/Average	270W/135W
BTU Max/Average	921/424
Transparency	Solid
IP Rating	Outdoor
Lifetime	≥ 50,000 hours
Control System	Brompton / Evision / MVR
Operating Temperature	0 °C to 45 °C / 32 °F to 113 °F
Storage Temperature	-40 °C to 60 °C / 40 °F to 140 °F
Operating / Storage Humidity	10 – 90% RH
Certification	CE, ETL, FCC
3D Ready	No

2.2.2 BM4 Specifications

Items	BM4-Mirror	BM4-Glass	BM4- Matte
Pixel Pitch	4.76 mm		
Pixel Density	44058 pixels / m ²		
Resolution (H x V)	128 x 128 pixels		
LED Configuration	SMD 1921 White		
Max. Brightness (Calibrated)	1300nits	800nits	2000nits/800nits (Deep Black Matte)
Gray Scale (Input to Output)	16 bits		
Refresh Rate	3840 Hz		
Scan Ratio	1/8		
Viewing Angle (Hor.)	140°		
Dimensions (W x H x D)	609.6 x 609.6 x 130 mm / 24" x 24" x 5.1"		
Cabinet Material	Magnesium Alloy		
Weight / Tile	21.65kg; 47.73lbs	21.65kg; 47.73lbs	16kg; 35.27lbs
Bearing Load	2000kg / m ² (Distributed load) 600kg (Point load at 100x100 mm)		
Serviceability	Front		
Power Consumption Max/Average	290W/145W		
BTU Max/Average	989/455		
Transparency	Solid		
IP Rating	Outdoor		
Lifetime	≥ 50,000 hours		
Control System	Brompton / Evision / MVR		
Operating Temperature	0 °C to 45 °C / 32 °F to 113 °F		
Storage Temperature	-40 °C to 60 °C / 40 °F to 140 °F		
Operating / Storage Humidity	10 – 90% RH		
Certification	CE, ETL, FCC		
3D Ready	No		

3 Installation Requirements

3.1 Mechanical Requirements

3.1.1 Weight

Do not underestimate the weight of tiles and frames. Please make sure the floor or truss on which ROE tiles and frames will be installed is capable of handling the complete weight of tiles and frames.

3.1.2 Levelling

The surface on which tiles and frames will be installed must be levelled. Never install ROE tiles and frames on an inclined surface.

3.2 Electrical Requirements

3.2.1 Power

ROE tiles require 100-240 VAC, 50-60 Hz and 16A.

This equipment **MUST** be earthed. To protect against risk of electric shock, the installation should be properly grounded. Defeating the purpose of the grounding type plug will expose you to the risk of electric shock.

3.3 System Requirements

3.3.1 Operating System

ROE tiles support Mac OS and Windows.

3.3.2 Control System

Generally, ROE tiles support Brompton, Evision and Nova. Please refer to the supported control system in the specification for specific LED tiles.

Black Marble 4 also supports BrightLogic control system for interactive applications.


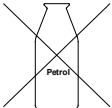
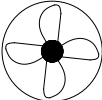
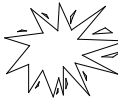

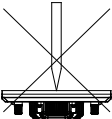


3.4 Do's and Don'ts

For matte mask, avoid being rubbed by the objects with a hardness of more than 3H (including 3H)!

For glassy mask, avoid being rubbed by the objects with a hardness of more than 7H (including 7H)!

Avoid dragging contact!

Avoid direct contact with metal objects especially the metal wheels with a narrow contact area!

 <p>Clean the masks if they are dirty.</p>	 <p>To clean the masks, use mild detergent. Don't use petrol, acid or alkali.</p>	 <p>Keep good ventilation under the tiles.</p>	 <p>Keep away from explosive materials.</p>
 <p>Don't use broken cables.</p>	 <p>Avoid direct contact with pointed end.</p>	 <p>Keep away from inflammable materials.</p>	 <p>Keep away from naked lights.</p>

4 Components

4.1 Overview

A BM tile consists of modules, tile frame and power box. BM Matte version has four modules. And each of the four modules has a separate mask. BM4 glassy version also has four modules. But all the four modules share one big mask. Because of the extra glassy layer, the BM4 glassy version is around 10mm thicker than the matte version.

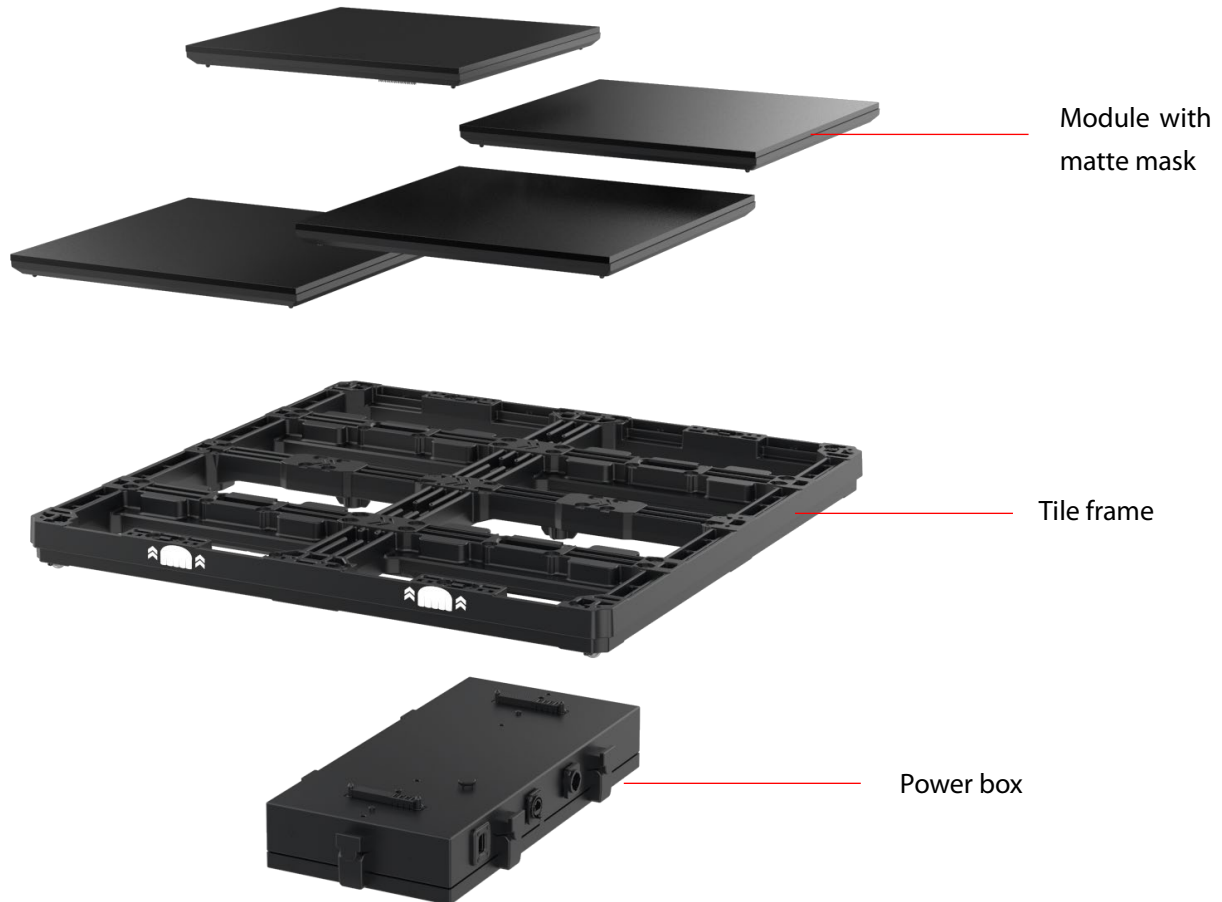


Figure 4-1. BM (Matte) Components

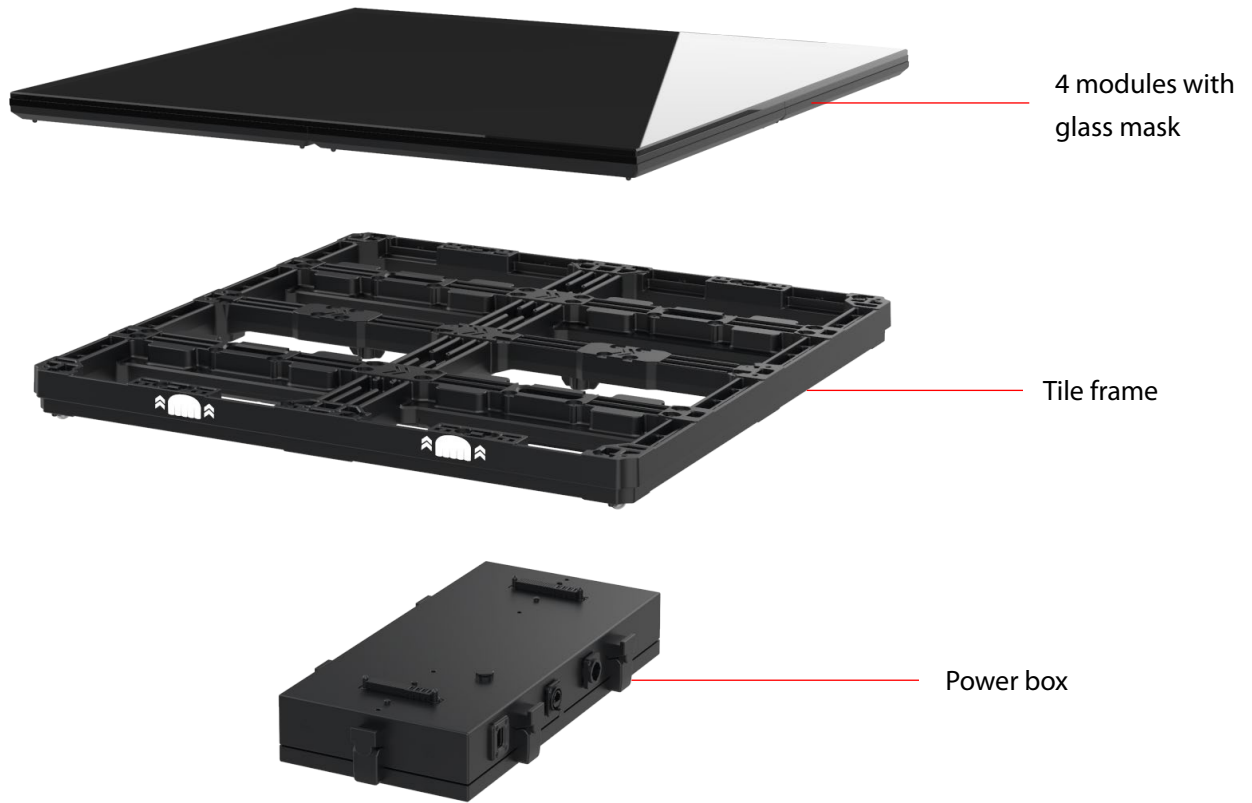


Figure 4-2. BM (Glassy/Mirror) Components

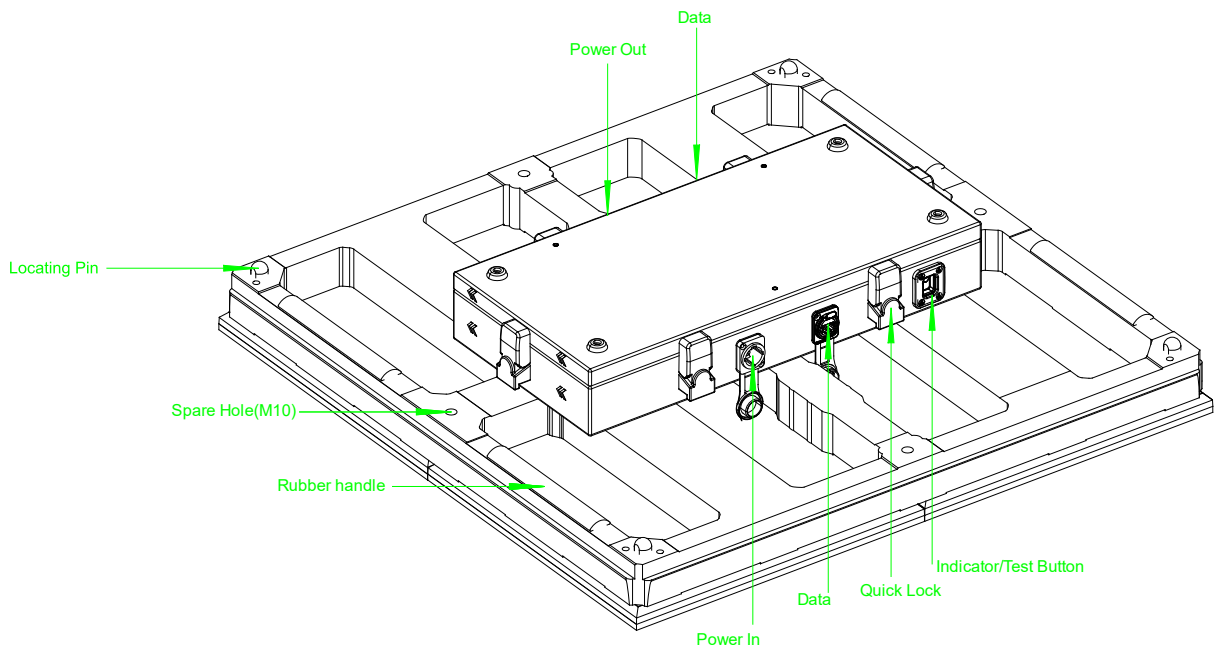


Figure 4-3. BM Parts Information

4.2 Module

A BM tile consists of 4 pcs modules.

Dimensions: 304.6 x 304.6 mm

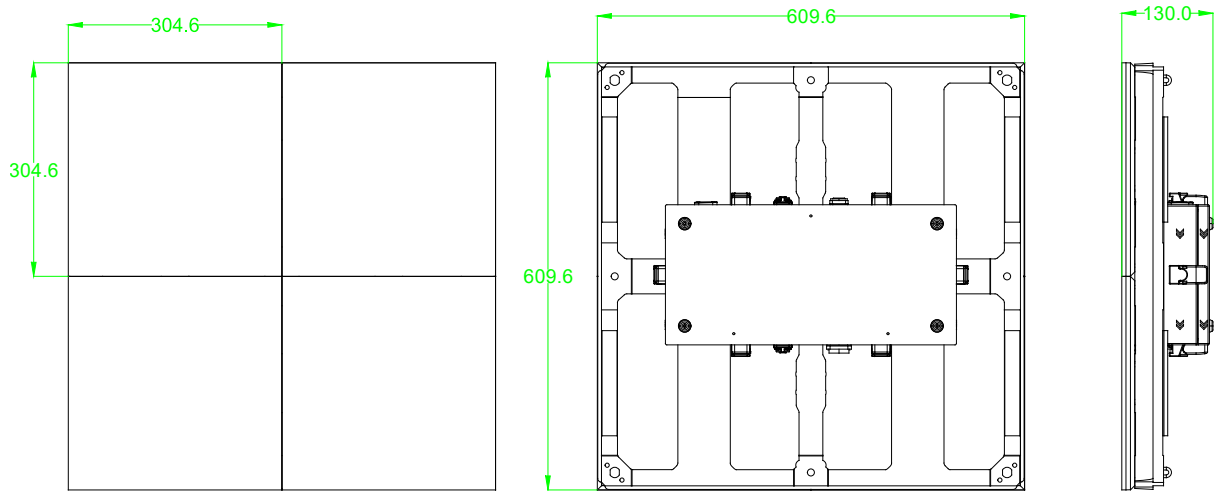


Figure 4-4. Module Dimensions

4.3 Power Box

Dimensions: 448 x 233 x 84.52 mm

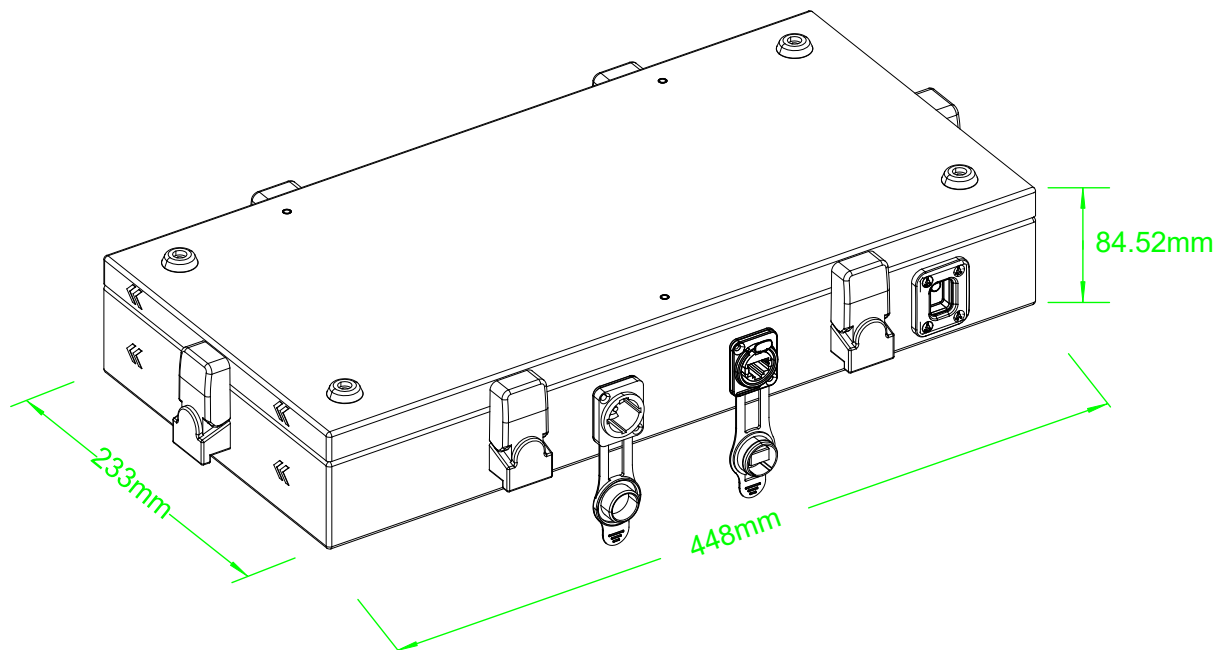
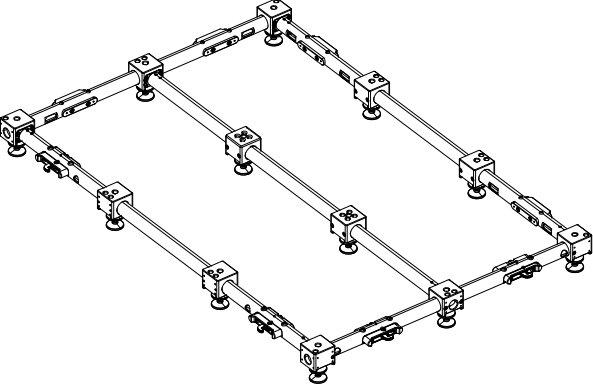
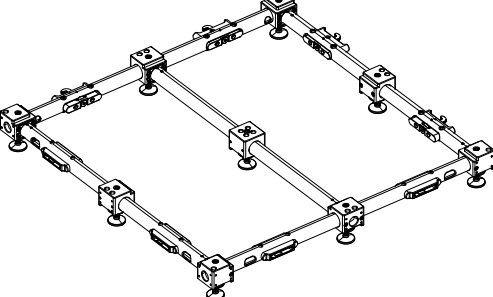
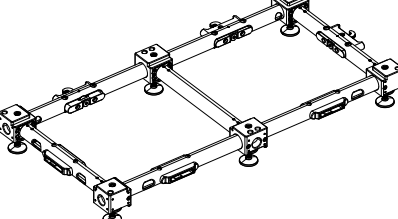
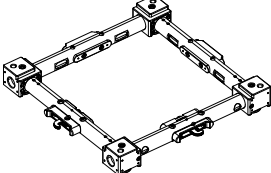


Figure 4-5. Power Box Dimensions

5 Accessories

5.1 Sub Framing System(V2)

	<p>BM base frame, 2x3, V4.0 SAP: 315001-00146 Weight: 25.84±3% kg Dimensions: 1838.4 x 1218.8 x 90 mm</p>
	<p>BM base frame, 2x2, V2.0 SAP: 315001-00145 Weight: 14.18±3% kg Dimensions: 1228.8 x 1228.8 x 90mm</p>
	<p>BM base frame, 2x1, V2.0 SAP: 315001-00143 Weight: 11.66±3% kg Dimensions: 1228.8 x 619.2 x 90mm</p>
	<p>BM base frame, 1x1, V2.0 SAP: 315001-00144 Weight: 9.68±3% kg Dimensions: 619.2x619.2x90mm</p>

	<p>Floor Levelling Tool SAP: 219001S0001</p>
	<p>BM suction tool SAP: 304012-01698 Weight: 369 g</p>

5.2 Service tools

5.3 Cables

5.3.1 Cable Types

	<p>Power cable, 10m, 16A, Weipu CEE-True 1, V3.0</p> <p>SAP: 208001S1525 Weight: 0.7 kg Weipu_Neutrik (Female) Connectors</p>
	<p>Power cable, 10m, 16A, True 1-True 1, V3.0</p> <p>SAP: 208001S1511 Weight: 0.7 kg Neutrik (male)_Neutrik (female) connectors Connect the power and tiles.</p>
	<p>Power cable, 0.9m, 16A, True 1-True 1, V3.0</p> <p>SAP: 208001S1485 Weight: 160±5 g Neutrik_Neutrik Connectors Connect neighboring tiles (vertical).</p>
	<p>Data cable, 30m, etherCON-etherCON, V2.0</p> <p>SAP: 208004S0675 Weight: 7±3% kg Neutrik_Neutrik Connectors Connect the processor and tiles.</p>
	<p>Data cable, 0.9m, etherCON-etherCON, V2.0</p> <p>SAP: 208004S0667 Weight: 100±5 g Neutri_Neutrik Connectors Connect neighboring tiles (vertical).</p>

5.3.2 Power Cable Operation

Plug in the power cable, turn the power cable clockwise until you feel a "click".



Pull back the button on the plug, turn the power cable anti-clockwise and plug it out.



5.3.3 Data Cable Operation

Plug in the data cable and you feel a "click".



Press the button on the socket and plug the data cable out.



6 Package

6.1 Flight Case

SAP: 309003-00519

Dimensions: 1500 x 760 x 880 mm

Capacity: One flight case can load 8 pcs tiles.

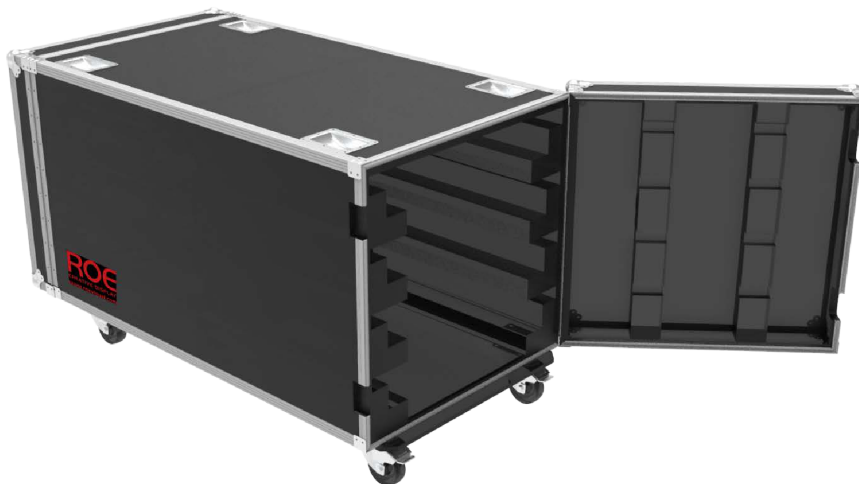
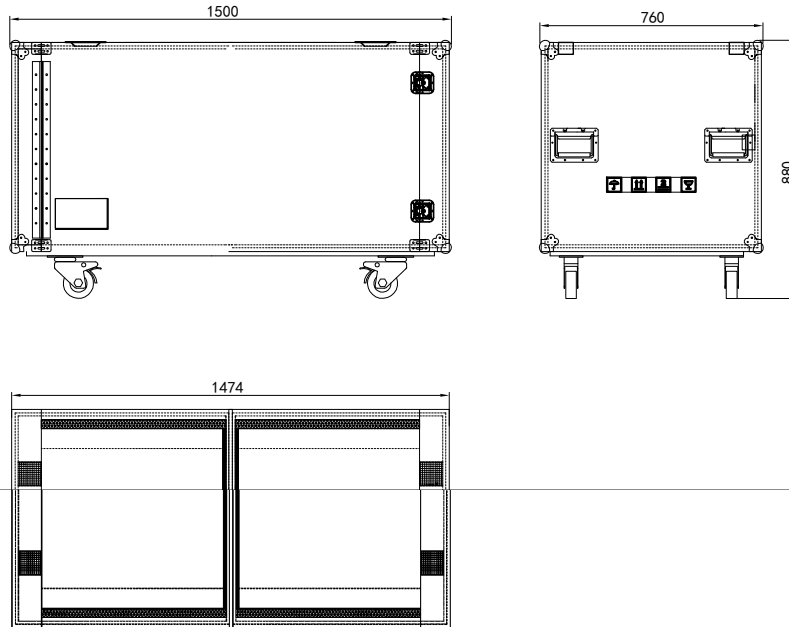


Figure 6-1. BM Flight Case

6.2 Dolly for sub frame(V2)

Dolly for sub frame(V2):

SAP:206002S0855

Capacity: One Dolly can load 8 pcs(2x3) sub frames.

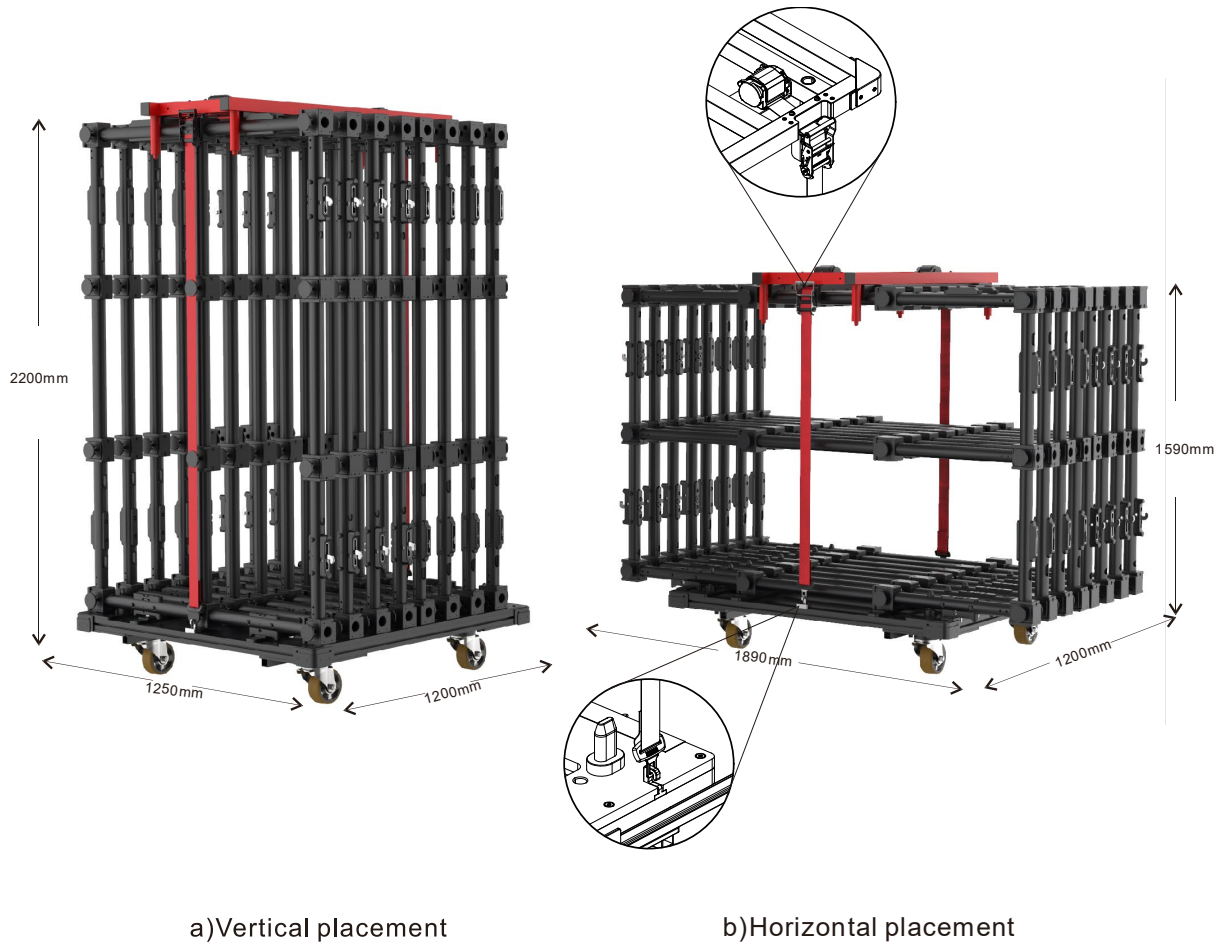


Figure 6-2. BM Dolly(2x3)

- 1) BM Dolly supports both horizontal and vertical placement.
- 2) No need side plates, frames are tied by two side belts.
- 3) The empty dolly is stackable.

7 Installation Overview

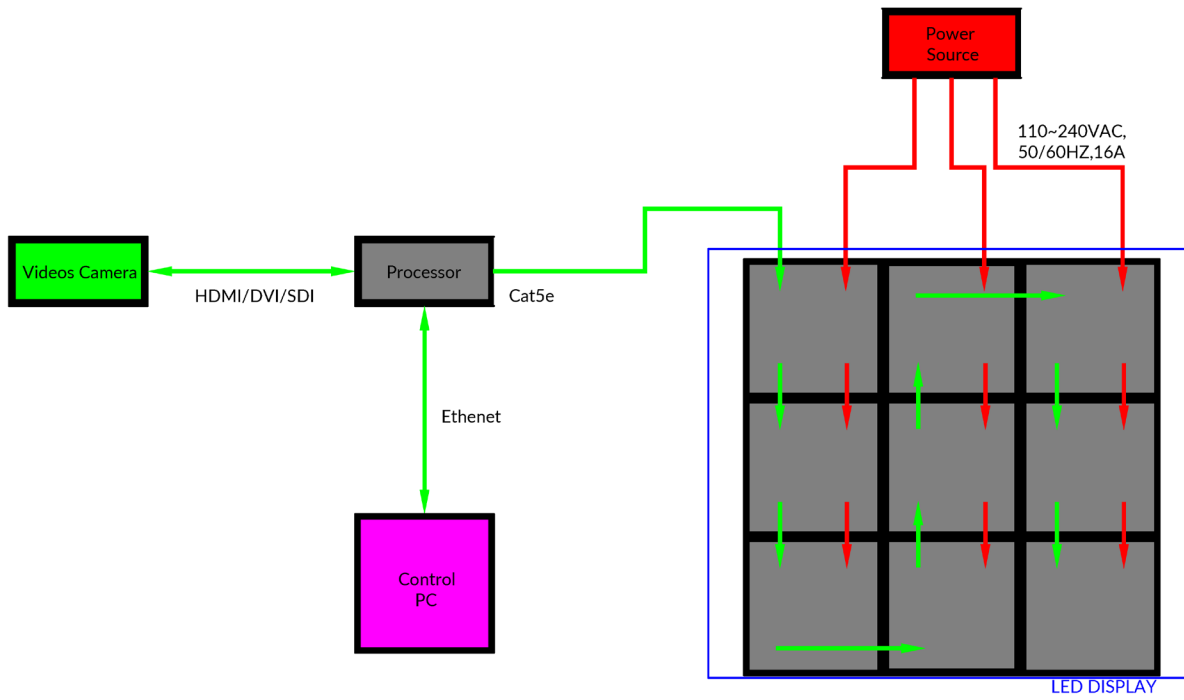


Figure 7-1. System Overview

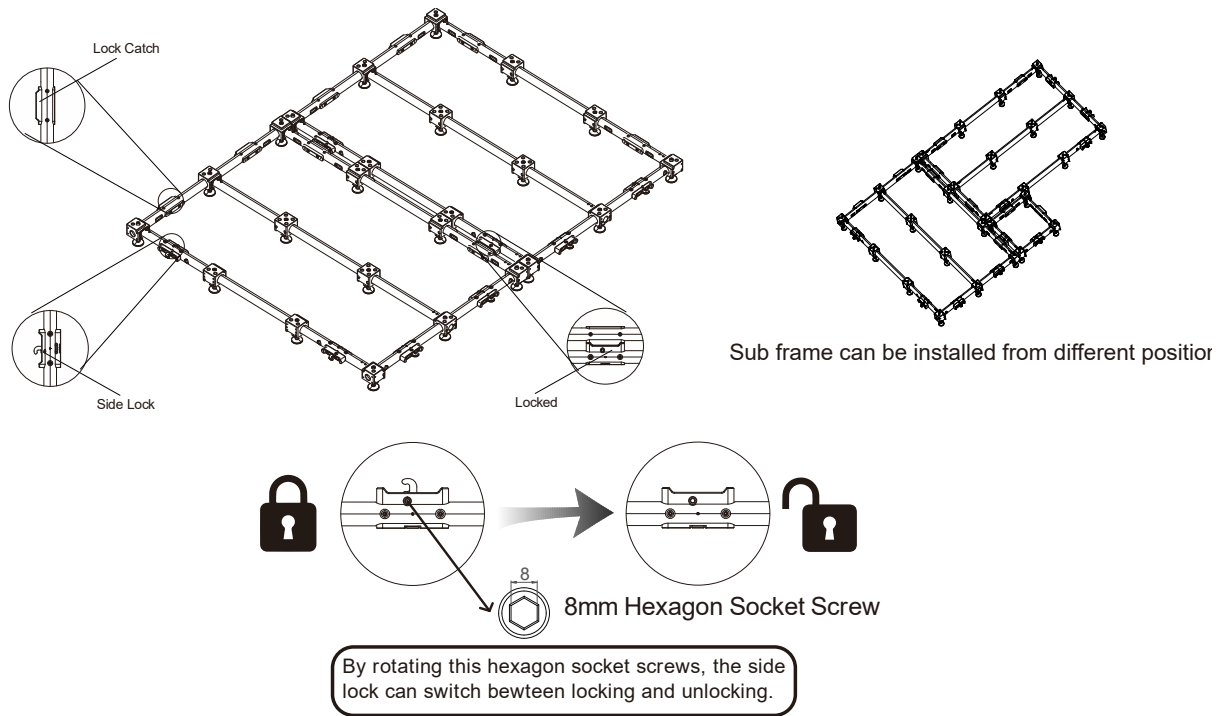
8 Quick-start Guide

ROE BM tiles support sub framing system to provide a quick installation.

8.1 Sub Framing System(V2)

Sub Framing System(V2) is the second-generation framing system for ROE LED floor. It provides faster installation, and the frame doesn't stick out at the edge.

- (1) According to your project, please prepare a structure layout drawing before you start the installation.
- (2) Use the side locks to connect the neighboring frames.

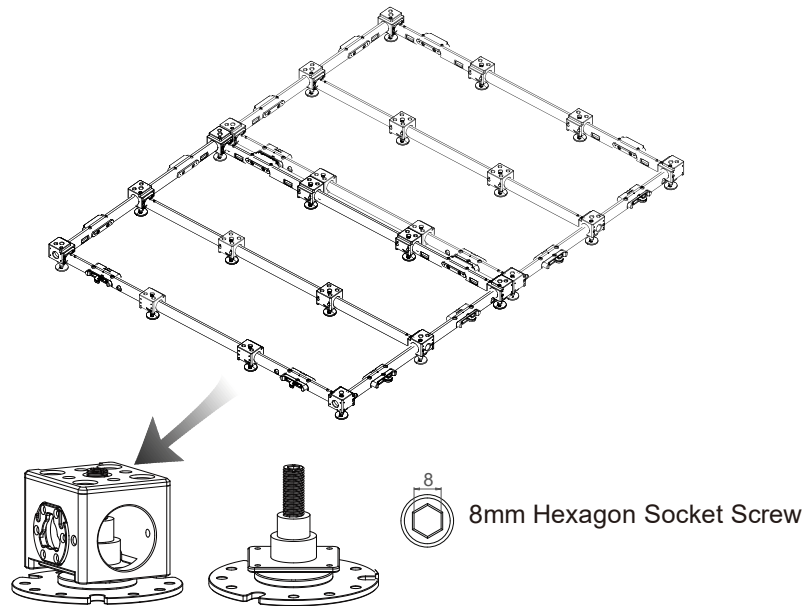


(3) Leveling

Adjust the Hexagon Socket Screw's relative height to make all base frames in the same horizontal plane. (it can be rotated by an electric screw driver)

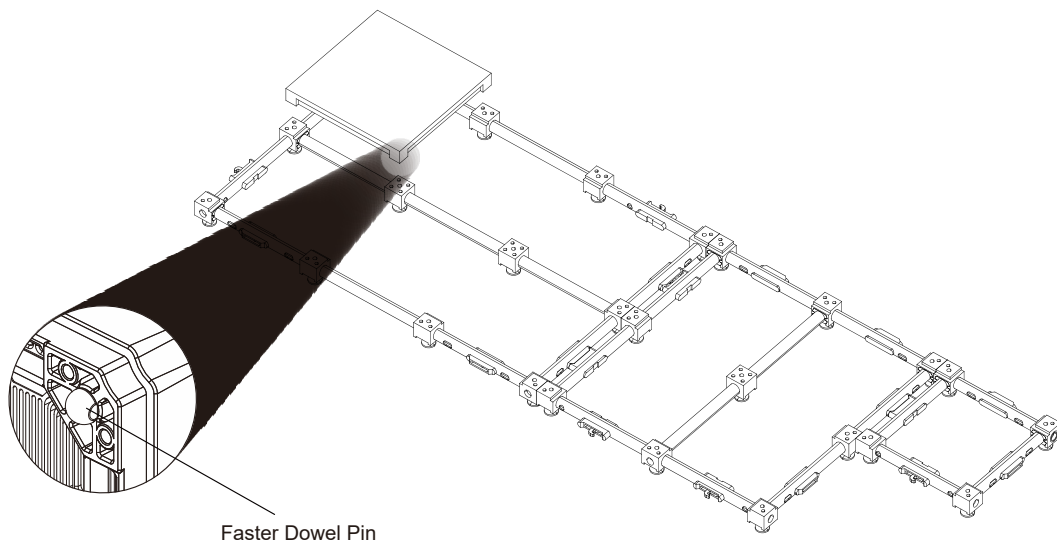
The adjustable range of each support block is around 45mm.

A set of levelling tool can be used, see the attached separate user manual for more information.

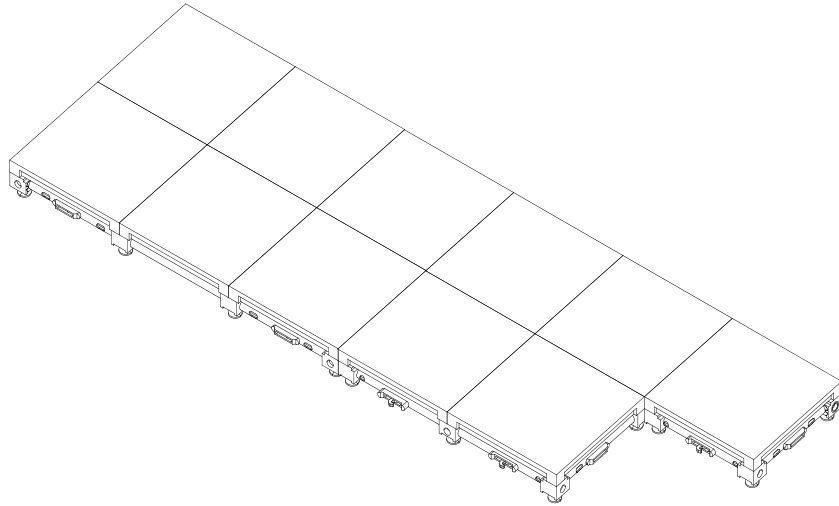


(4) Cabling and floor building

Connect the BM4 tiles with power and data cables, then put them on the sub frames. The tiles can be aligned well by the frame.



(5) Build the floor while cabling and finish the whole floor screen.



Note: Please make sure all the tiles have a same direction after they are placed on the sub frames. The tile direction can be seen at the side of the cabinet.

9 Cabling

9.1 Power Cabling

Connect neighboring tiles (in the vertical direction) with 1m power cables from the power-in port to the power-out port.

Note: Please do the cabling while building the BM4 floor.

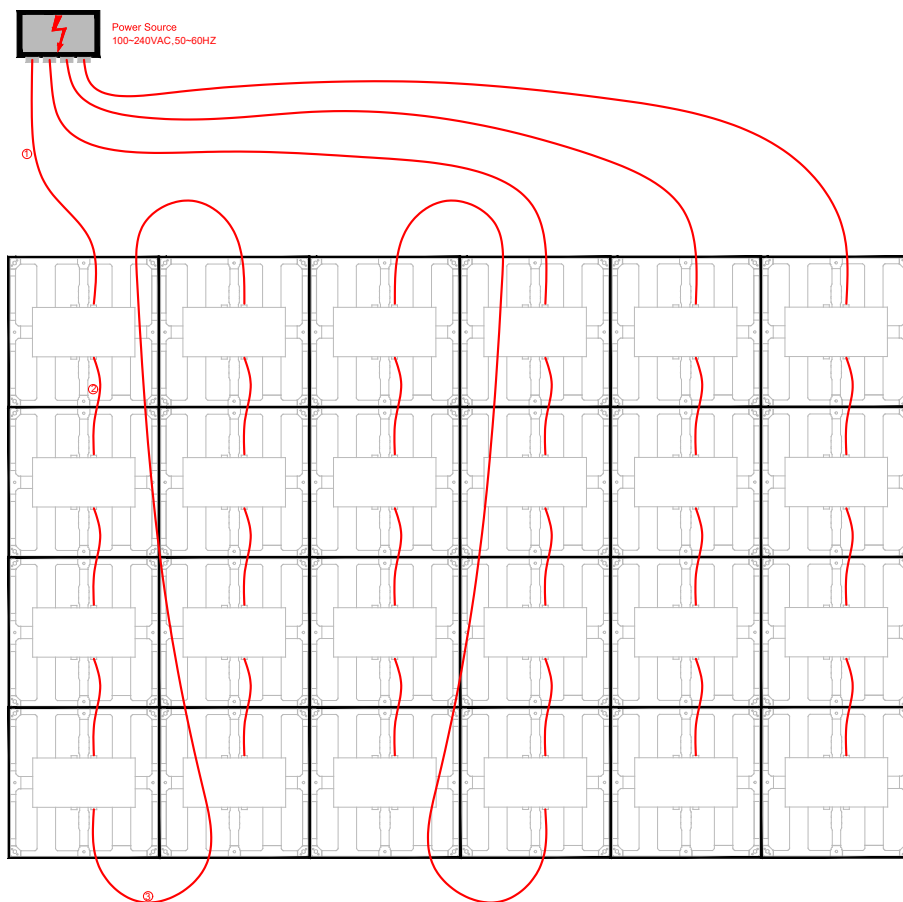
Connect the first power-in port and power source with one 10m main power cable.

How to calculate the power cable capacity




Formula: Voltage * Current / Power

If the voltage is 220V, one power cable can load 12 pcs BM4 tiles.

If the voltage is 110V, one power cable can load 6 pcs BM4 tiles.



NOTES:

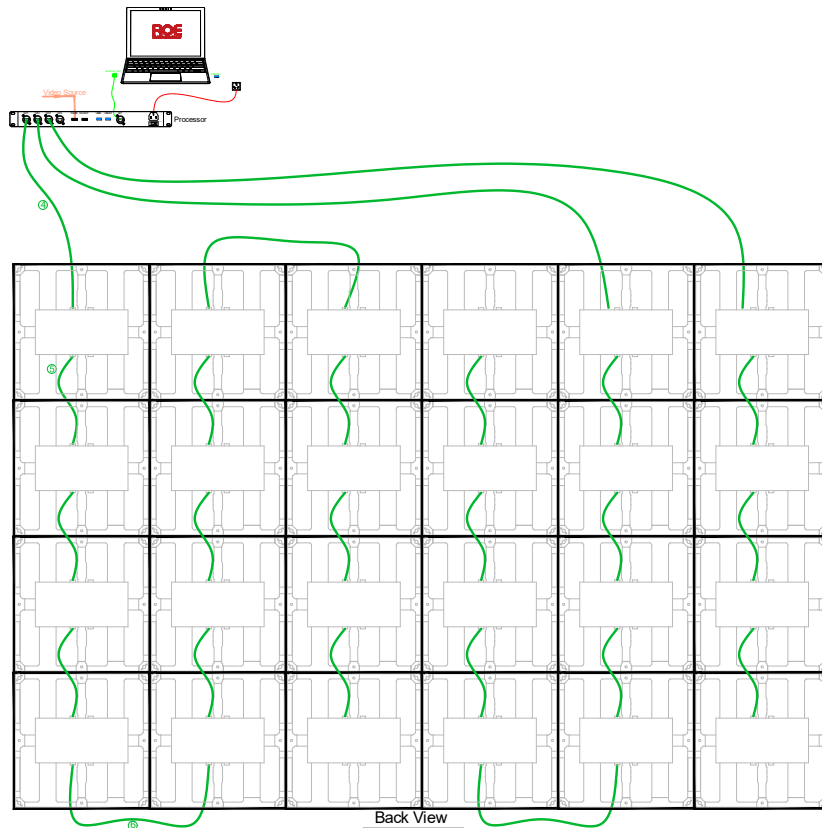
-  1. Power Cable_10m_Neutrik-Neutrik/Weipu-Neutrik
-  2. Power Cable_1m_Neutrik-Neutrik
-  3. Power Cable_4m_Neutrik-Neutrik

9.2 Data Cabling

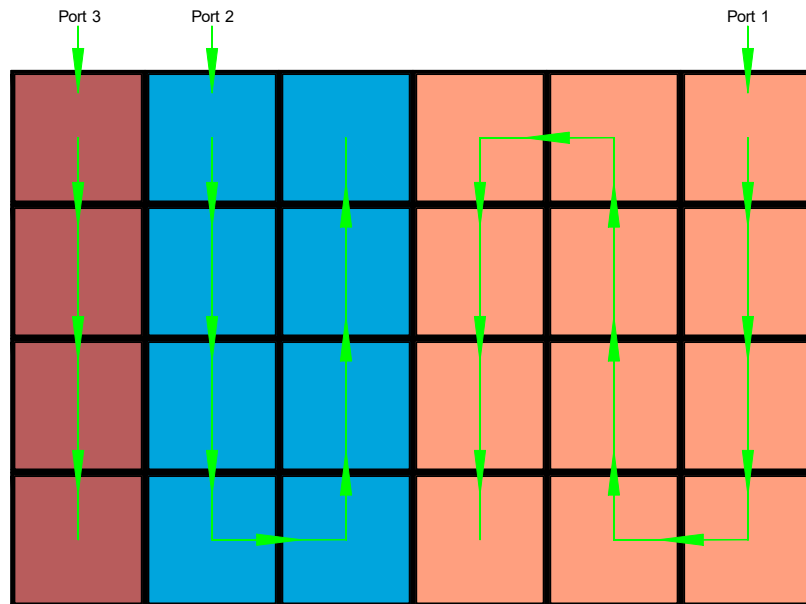
Connect neighboring (vertical) tiles with 0.9m data cables.

Connect tiles with the processor through 30m data cables.

Connect the processor with a PC / laptop via the Ethernet/USB port. Connect the video source.






Back View



Front View

NOTES:

-  4. Main Data Cable_30m_Neutrik_Neutrik
-  5. Data Cable_0.93m_Neutrik_Neutrik
-  6. Data Cable_2m_Neutrik_Neutrik

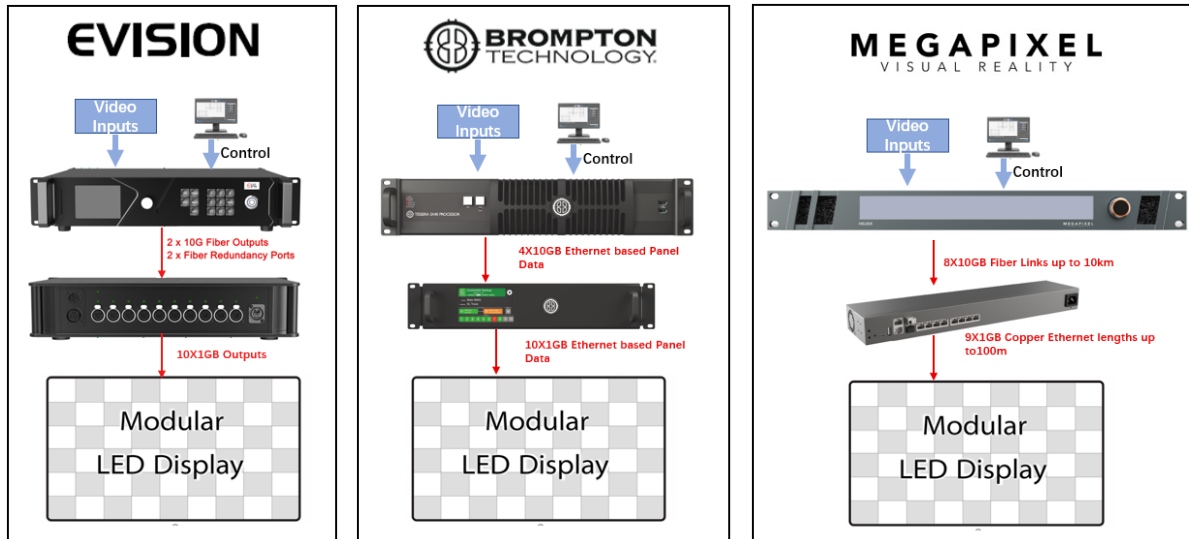
Notes:

- (1) The front view is for the mapping setting in the control system.
- (2) The cascade control data cables should not be more than 100 meters. When it's over 100 meters, please switch to fiber cables.
- (3) Please refer to the manuals of the control systems for setup details.

10 Control System

ROE provides three different control systems: Megapixel VR Helios, Brompton Tessera and ROE Evision. For more information about system operation, please check the corresponding control system user manual.

1. *ROE Evision Control System User Manual*
2. *Brompton Tessera Control System User Manual*
3. *Megapixel VR Helios Control System User Manual*



11 BM4 Triangle

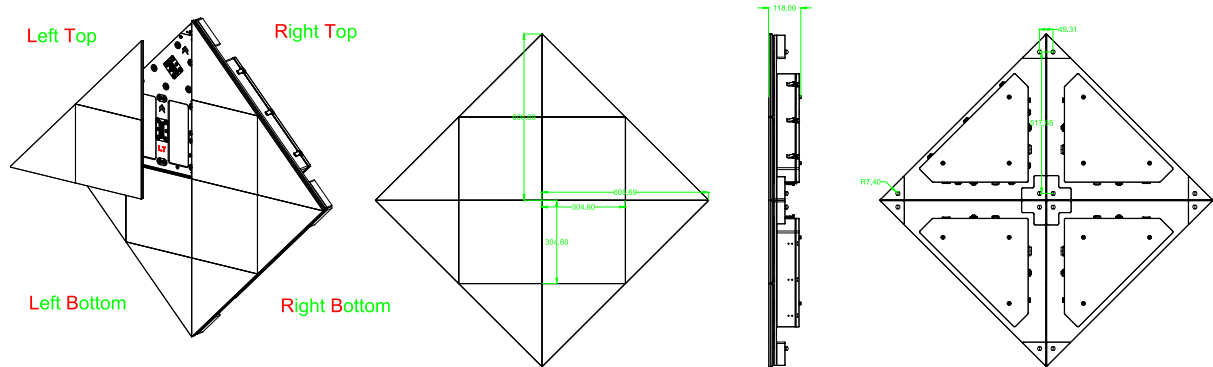
11.1 Specifications

Items	Matte	Glassy
Pixel Pitch	4.76 mm	
Pixel Density	44058 pixels / m ²	
Resolution (H x V)	128 x128 (H x V) /2 pixels	
LED Configuration	SMD 1921	
Max. Brightness (Calibrated)	2000nits	1200nits
Gray Scale (Input to Output)	16 bit	
Refresh Rate	3840 Hz	
Scan Ratio	1/8	
Viewing Angle (Hor.)	140°	
Panel Dimension	(609.6mm x 609.6mm)/2 x 118mm (24" x 24")/2 x 5.1"	
Cabinet Material	Aluminum Alloy	
Weight / Tile	11.35kg; 25.02lbs	14.5kg; 31.97lbs
Serviceability	Front	
Power Consumption Max/Average	160W / 80W	
BTU Max/Average	546/251	
Transparency	Solid	
IP Rating	Outdoor	
Lifetime	≥ 50,000 hours	
Control System	Brompton / Evision / MVR	
Operating Temperature	-20° to 45°C / -4° to 113°F	
Storage Temperature	-40 °C to 60 °C / -40° to 140°F	
Operating / Storage Humidity	10 – 90% RH	
Certifications	CE, ETL, FCC	
3D Ready	No	

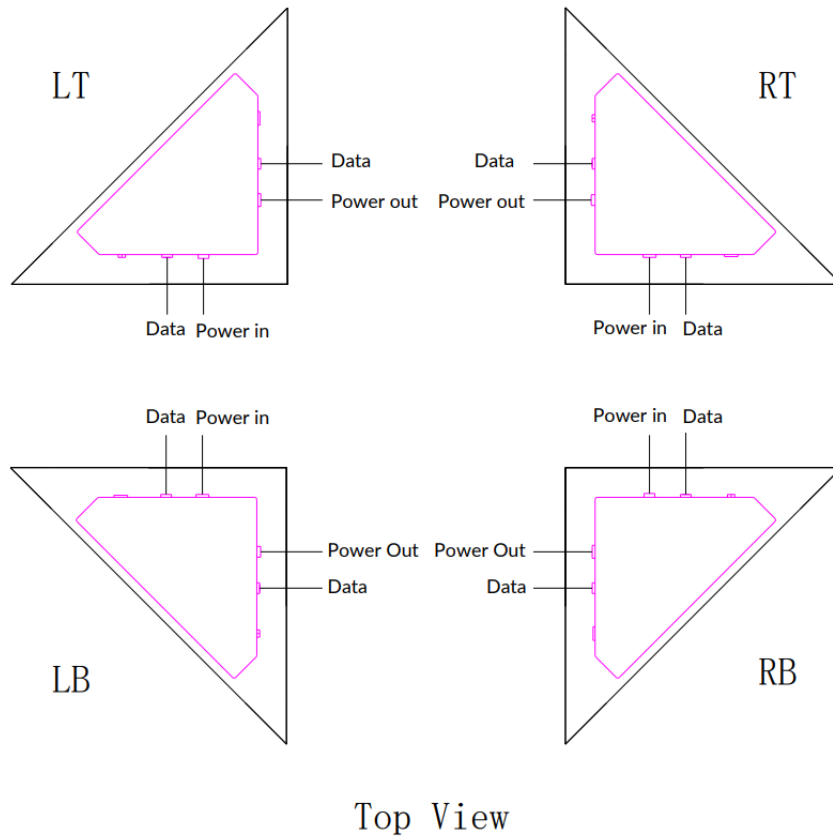
11.2 Overview

11.2.1 Dimensions:

Unit: mm



11.2.2 Power&Data connectors



11.3 Accessories

11.3.1 BM4 Triangle Sub Frame

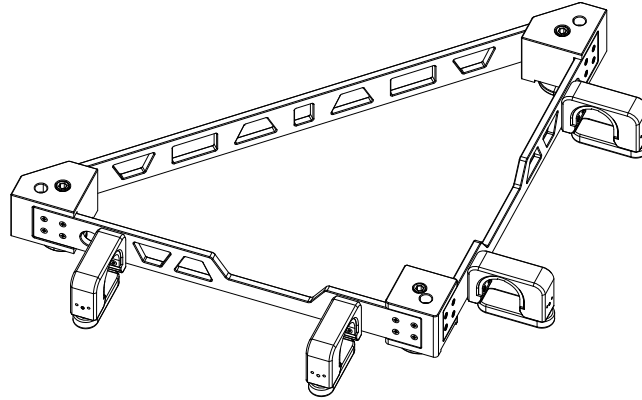
BM4 Triangle Sub Frame is designed for Sub Framing System(V2).

Sub Frame(V2) _BM4_Triangle

SAP: 304012-02299

Weight: 5.17 kg

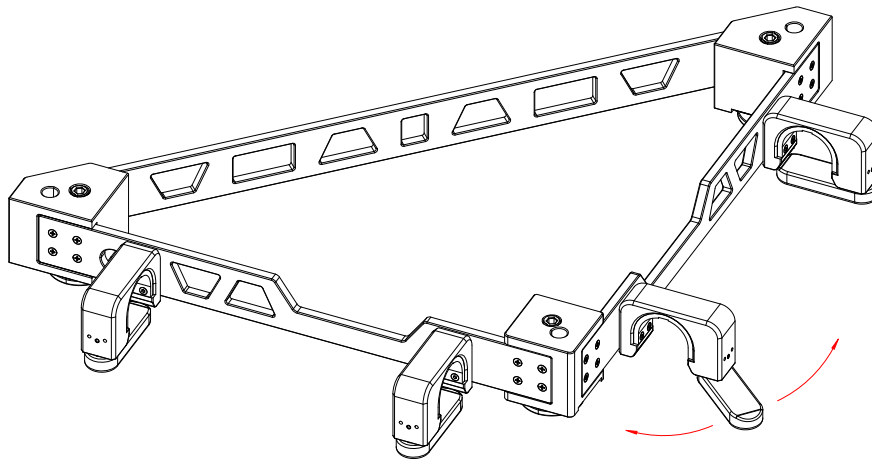
Dimensions: 573.7x573.7x88 mm



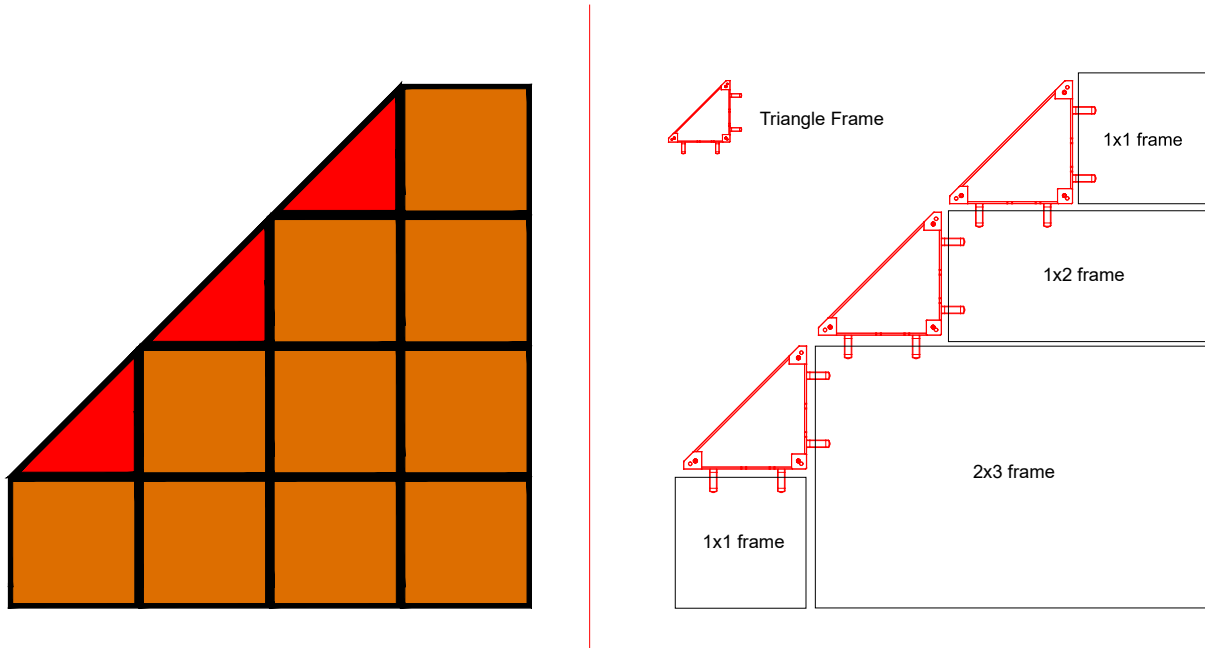
11.4 Operation Guide

11.4.1 BM4 Triangle Sub Frame

The Basic operation is the same as the Sub Framing System(V2). Rotate the locking blocks to attach or detach the triangle frame to the beams of the neighboring frames.

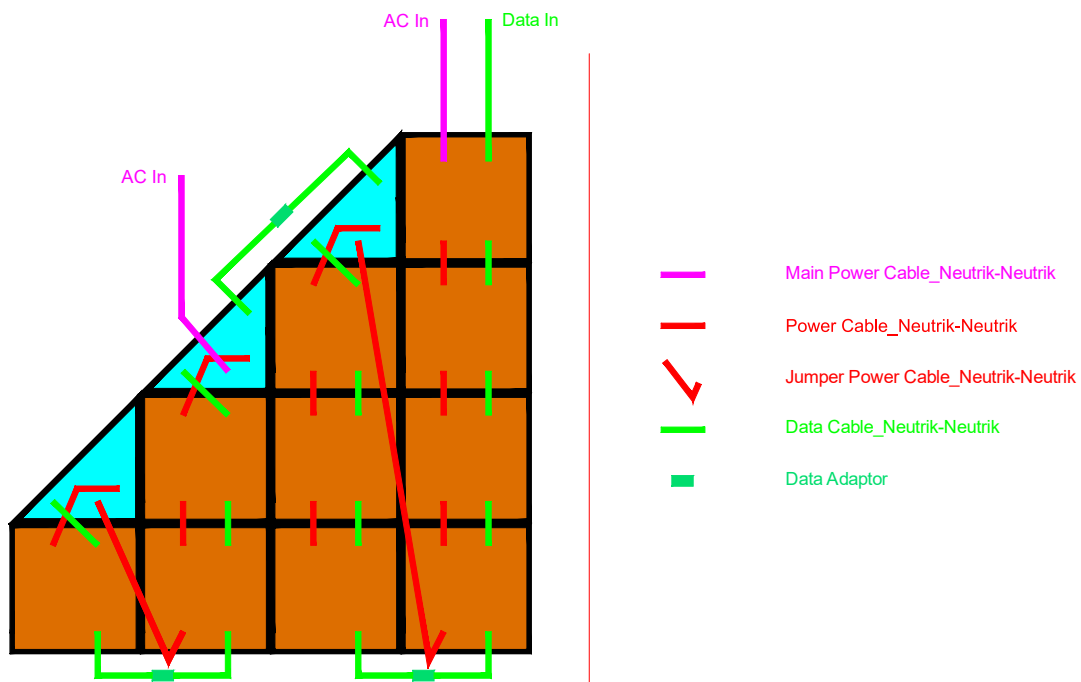


All the 4 kinds of BM4 triangle tiles share the same triangle frame. The picture below shows an example use case of the triangle frame. One BM4 triangle tile needs one triangle frame.



11.5 Cabling

The picture below shows an example cabling diagram for BM4 triangle tiles. Some places need data adaptors. The length of the jumper power cable depends on the real distance on site.



Front View

11.6 Control System

BM4 triangle tiles support Brompton, Evision and MVR system. For more detailed information, please refer to the user manual for control system.

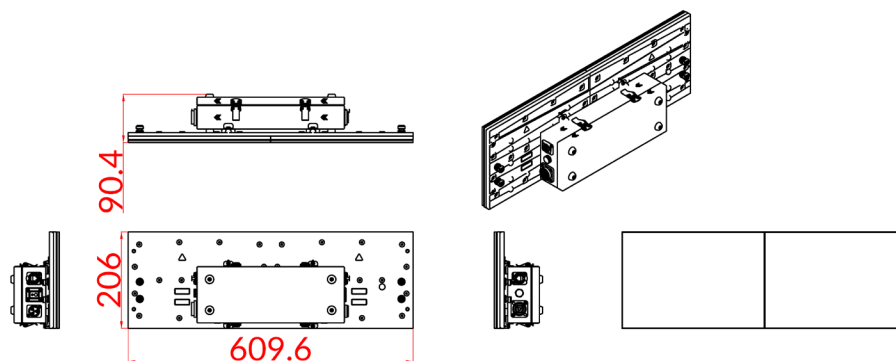
12 BM4 Stair (Matte only)

12.1 Specifications

Pixel Pitch	4.76 mm
Pixel Density	44058 pixels / m ²
Resolution (H x V)	128 x 42 pixels
LED Configuration	SMD 1921 White
Max. Brightness (Calibrated)	2000 nits (Matte only)
Gray Scale (Input to Output)	16 bit
Refresh Rate	3,840 Hz
Scan Ratio	1/8
Viewing Angle (Hor.)	140°
Dimensions (W x H x D)	609.6 x 206 x 90.4mm / 24" x 8.11" x 3.6"
Housing Material	Magnesium Alloy
Weight / Tile	4.7 kg / 10.36 lbs.
Max. Stacking Height	1.22m / 4'
Serviceability	Front
Power Consumption Max/Average	140W / 70W
BTU Max/Average	478/220
Transparency	Solid
IP Rating	Outdoor
Lifetime	≥ 50,000 hours
Control System	Brompton / Evision / MVR
Operating Temperature	-20 °C to 45 °C / -4 °F to 113 °F
Storage Temperature	-40 °C to 60 °C / -40 °F to 140 °F
Operating / Storage Humidity	10 – 90% RH
Certifications	CE, ETL, FCC
3D Ready	No

Dimensions:

Unit: mm

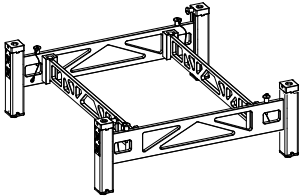
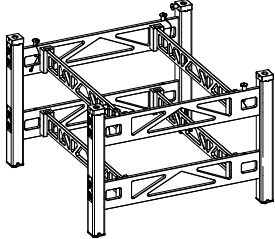
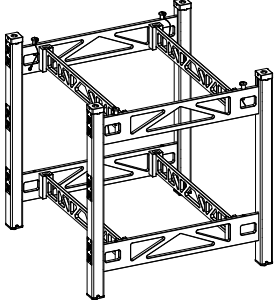
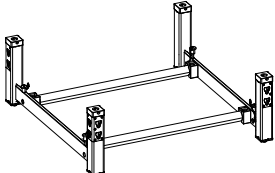
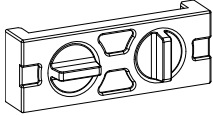

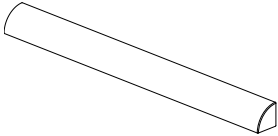


12.2 Accessories

BM4 Stair (Matte only) tiles are designed to be attached to the special BM4 Stair Frame. The BM4 Stair

Frames must be placed on the levelled BM4 Sub Frames.

The accessories in the table below are specially designed for BM4 Stair tiles.

	<p>BM4 stair support frame, 1U, V1.1 SAP: 206002S0858 Weight: 5.5 kg Dimensions: 559.6 x 559.6 x 208.5 mm</p>
	<p>BM4 stair support frame, 2U, V1.0 SAP: 206002S0850 Weight: 7.3 kg Dimensions: 559.6 x 559.6 x 417 mm</p>
	<p>BM4 stair support frame, 3U, V1.0 SAP: 206002S0851 Weight: 8.9 kg Dimensions: 559.6 x 559.6 x 625.5 mm</p>
	<p>BM4 stair support frame, dual side, 1U, V2.0 SAP: 206002S0910 Dimensions: 559.6 x 559.6 x 208.5 mm</p>
	<p>Connector for BM4 Stair Frame SAP: 304012-02008 Weight: 148.6 g Dimensions: 110 x 40 x 30 mm</p>
	<p>Rubber Hammer SAP: 304012-02066 Weight: 300 g Dimensions: 290 x 48 x 80 mm</p>
	<p>Decorative Bar (Optional) SAP: 304012-02260 Weight: 38.6 g Dimensions: 15 x 15 x 206 mm</p>

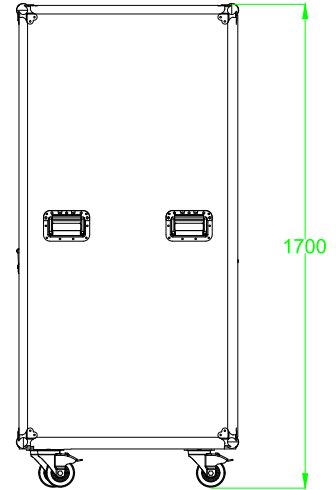
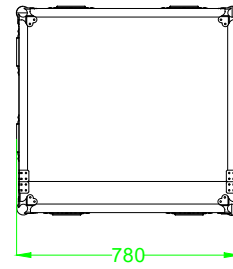
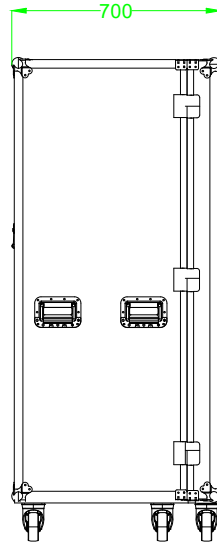
12.3 Package

Flight case for BM4 Stair (Matte only) tile

SAP: 309003-00468

Dimensions: 780 x 700 x 1700 mm

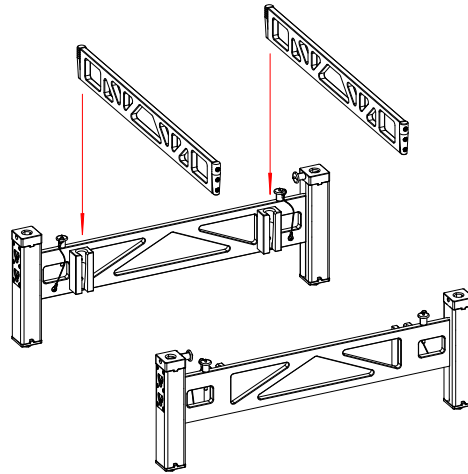
Loading Capacity: 30 pcs



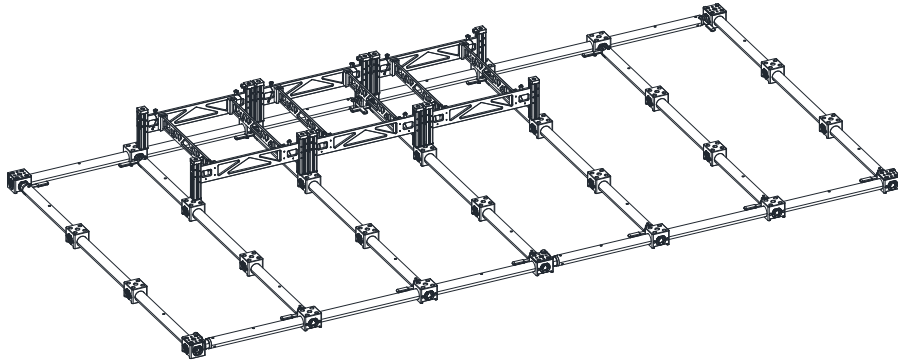
12.4 Operation Guide

Install the Sub Frames according to the project design and finish the levelling.

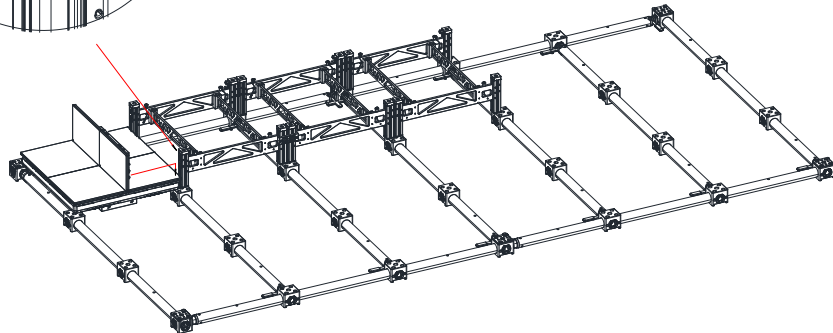
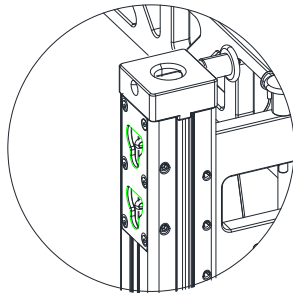
Assemble the modular BM4 Stair Frame. A rubber hammer is needed to force the plates assembled.



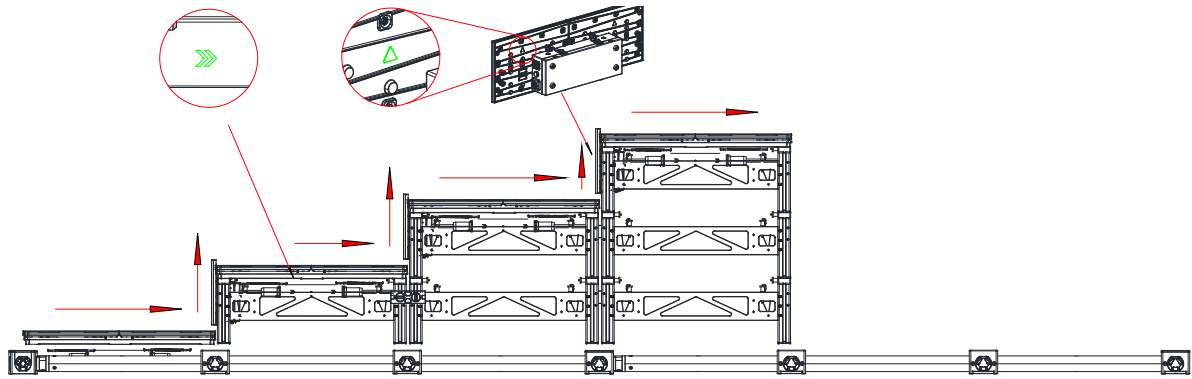
Put the Stair Frame on the Sub Frame. Please be careful of the directions.



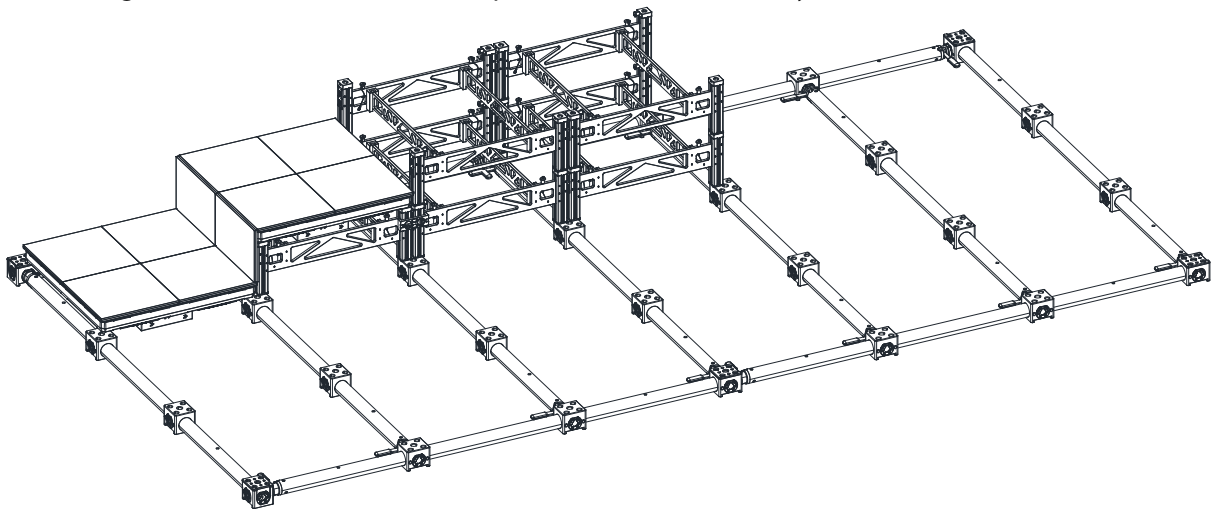
Put the regular BM4 tile on the first step. Then attach the BM4 Stair tile to the side of the BM4 Stair Frame.



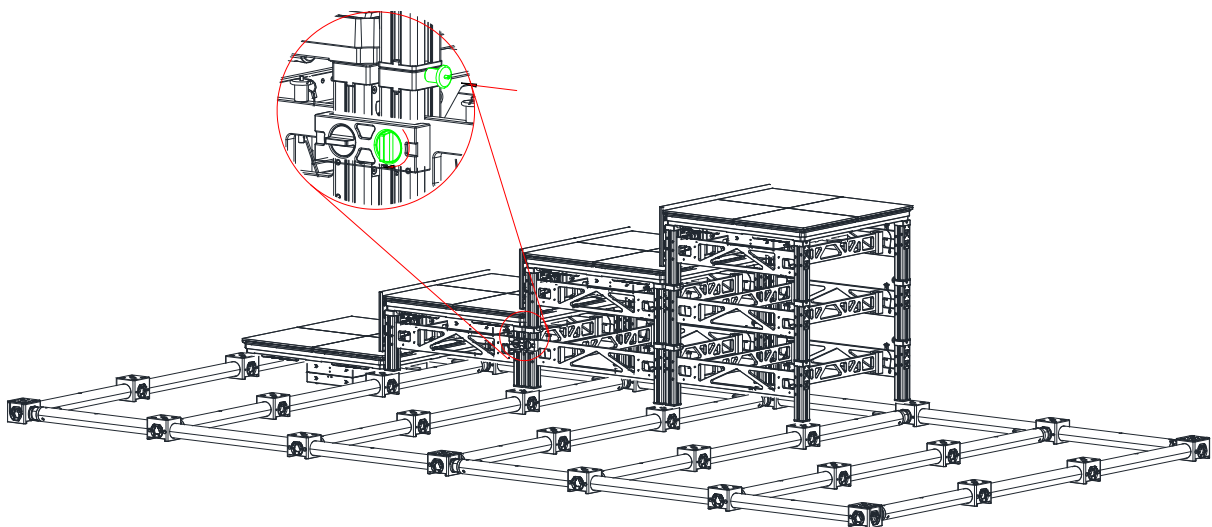
Please make sure the tiles are placed with the directions below.



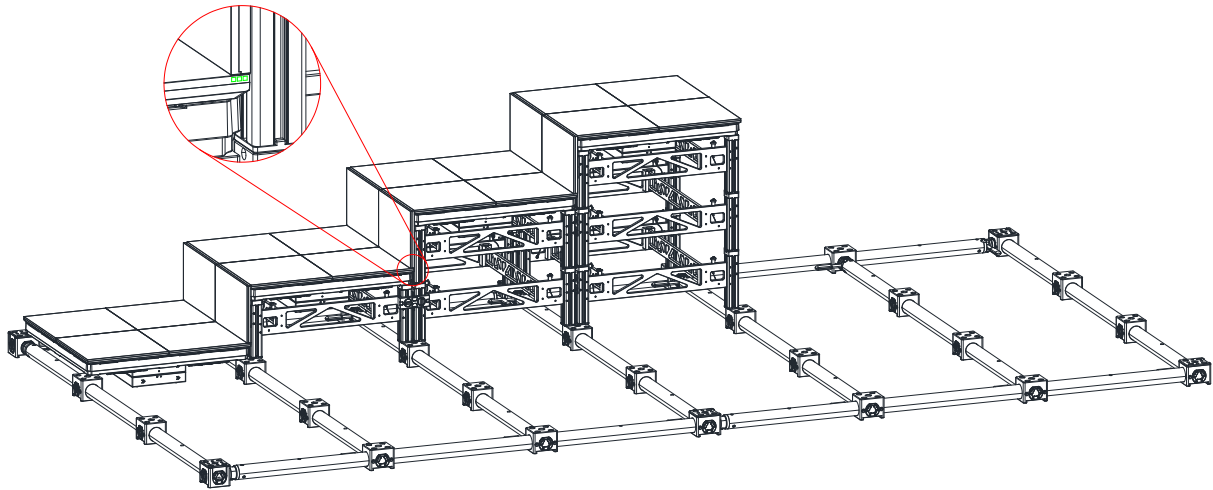
Put the regular BM4 tile on the second step. Then start the second layer of the stair frame.



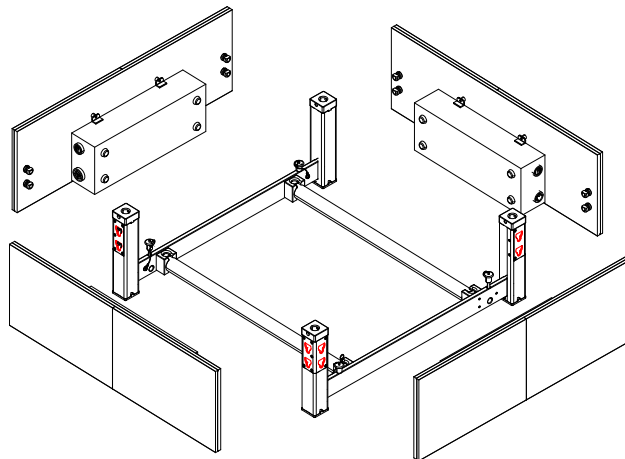
Latch the support feet in vertical direction and lock the support feet in horizontal direction. Then repeat the steps above to finish the rest of the installation.



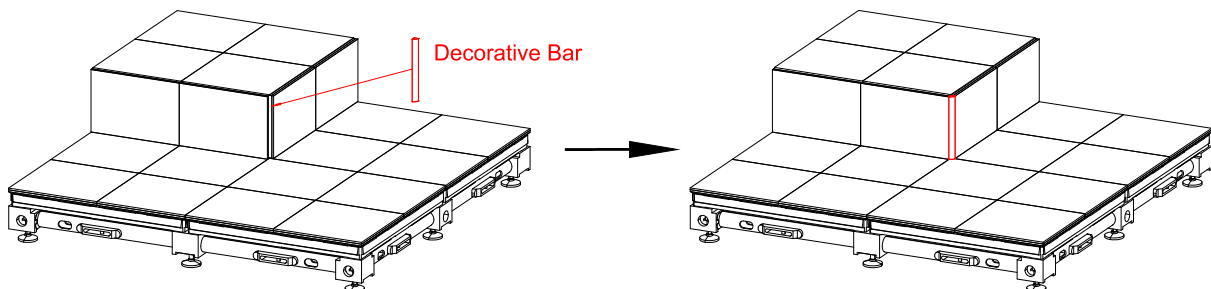
Please note that there are 3 lines of pixels on the regular tiles hidden by the riser face tiles. Keep in mind of the hidden pixels when doing the mapping.



The BM4 Stair Corner Frame can fix BM4 Stair tiles at 4 sides. It's designed to make the stair corner.

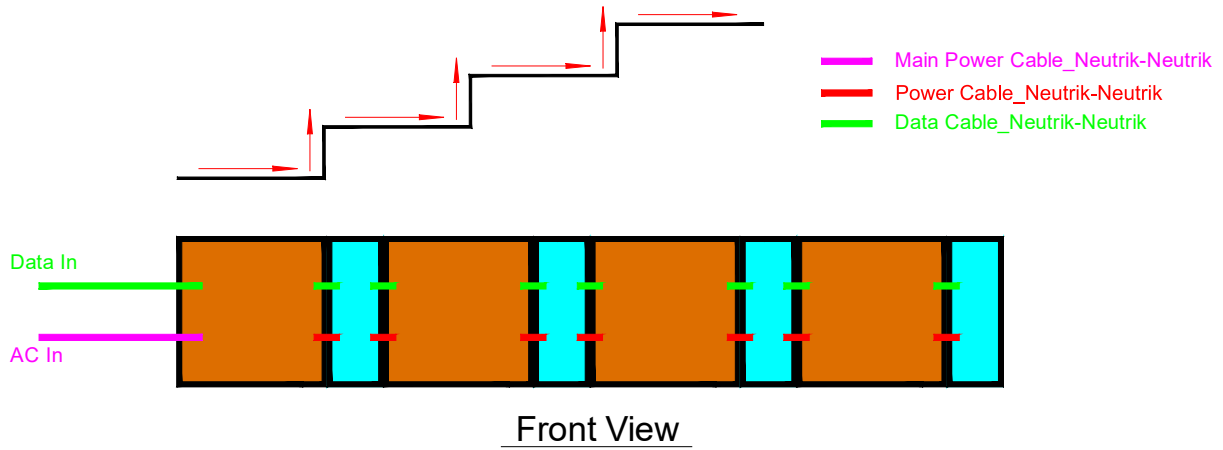


The decorative bar is an optional accessory to decorate the stair corner. It can be stuck at the corner by the glue on it.



12.5 Cabling

The cabling for BM4 stairs should start from the bottom. Do the cabling while building the stairs.



12.6 Control System

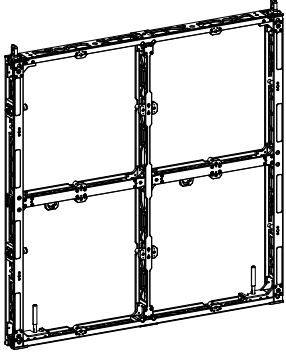
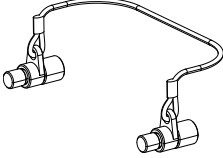
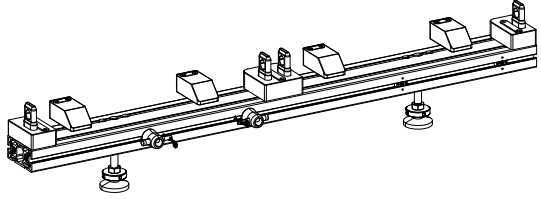
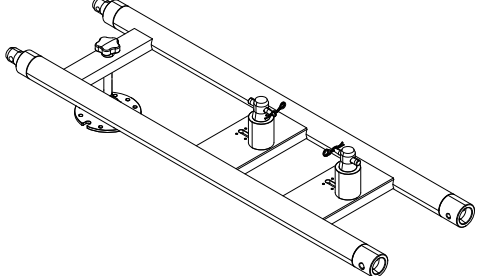
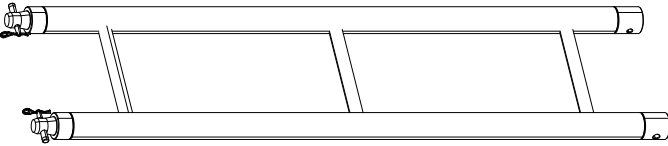
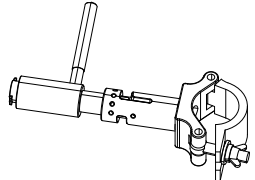
BM4 stair tiles support Brompton, Evision and MVR system. For more detailed information, please refer to the user manual for control system.

13 BM4 Video Wall

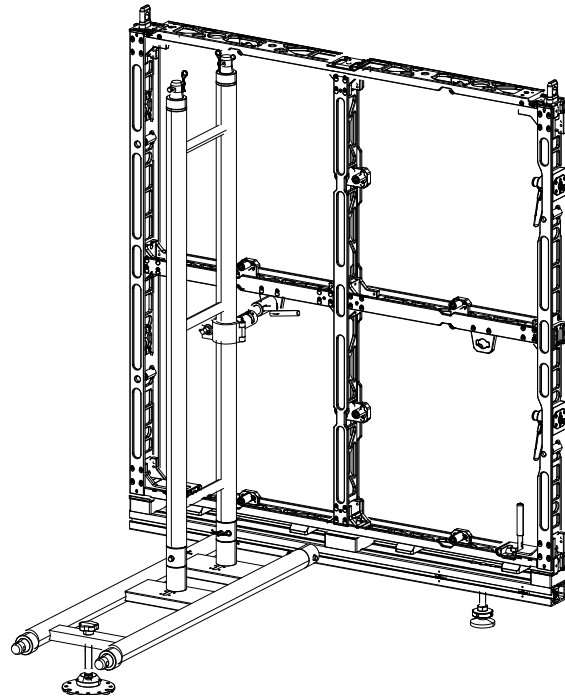
13.1 Specifications

BM4 provides a creative use to make video wall by standard BM4 tiles. The specifications are the same with BM4 regular version. The maximum stacking height is 6 tiles high.

13.2 Accessories

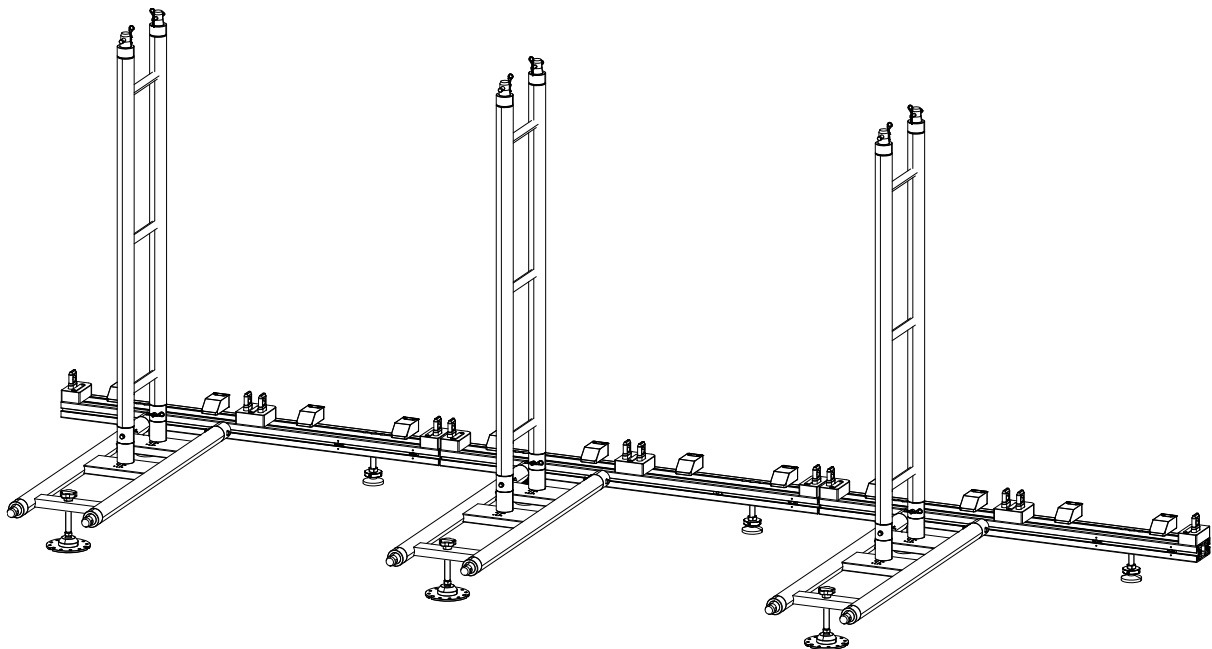
	<p>BM4 video wall stacking frame, 2x2, V1.1 SAP: 215000S0001 Dimensions: 1225.2 x 1270.2 x80 mm</p>
	<p>BM4 video wall steel wire, fixed on module SAP: 304012-02230 Weight: 10.5 g</p>
	<p>BM4 video wall base bar, V3.0 SAP: 304010-00322 Dimensions: 1213.6 x 144.5 x239 mm</p>
	<p>Base Stabilizer (Base Truss)_BM4 SAP: 304012-02427 Dimensions: 1020 x 290 x245 mm</p>
	<p>BM4 video wall rear truss SAP: 304012-02195 Dimensions: 1260.5 x 309.38 x50 mm</p>
	<p>Rear bridge SAP: 206002S0178 Weight: 0.93 kg Dimensions: 265.71 x 177 x50 mm</p>

The drawing below shows how the accessories are assembled together when building a BM4 video wall.



13.3 Operation Guide

Put the stacking bars, base stabilizers (base trusses) levelled on the ground. The installation should start from the middle for easy levelling.



To ensure the safety of the stacking system, some ballast must be loaded on the base stabilizers (base trusses). The ballast must be heavy enough to resist against the Hallenwind. The moment caused by the Hallenwind is equal to the moment caused by the ballast.

Hallenwind: $F=125\text{N/m}^2$

G: The gravity of the ballast

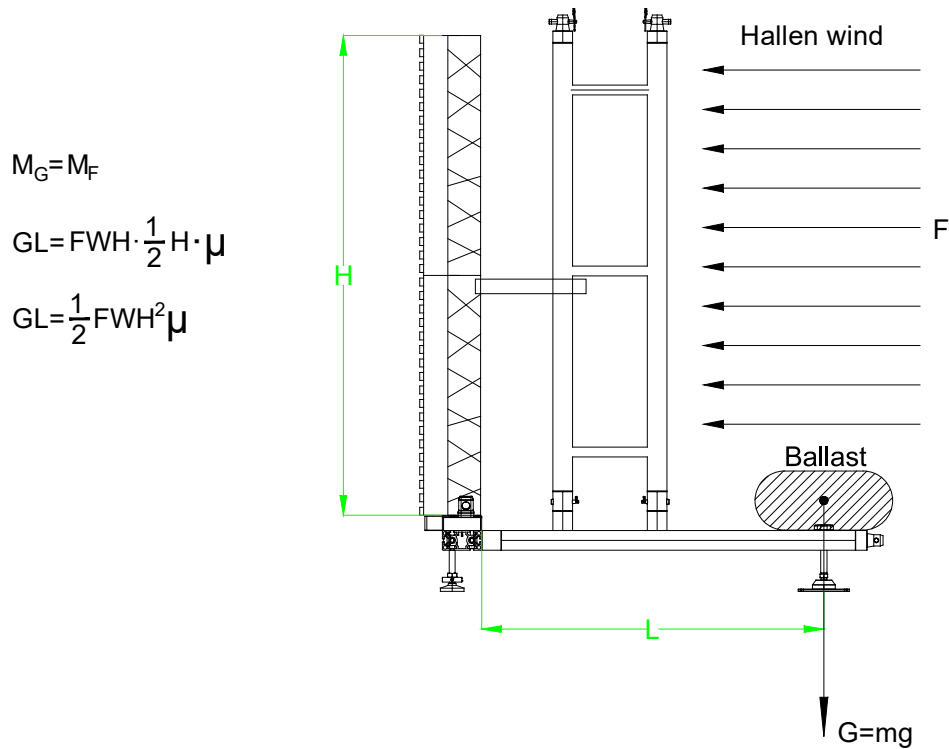
m: The mass of the ballast

g: The gravitational acceleration, $g=9.8\text{N/kg}$

W: The width of the LED screen

H: The height of the LED screen, $H\leq 6*0.6096\text{m}$

μ : The safety factor, $\mu=1.5$



$$M_G = M_F$$

$$GL = FWH \cdot \frac{1}{2} H \cdot \mu$$

$$GL = \frac{1}{2} FWH^2 \mu$$

According to the formulas above, the mass of the total ballast can be calculated as:

$$m = \frac{FWH^2 \mu}{2gL}$$

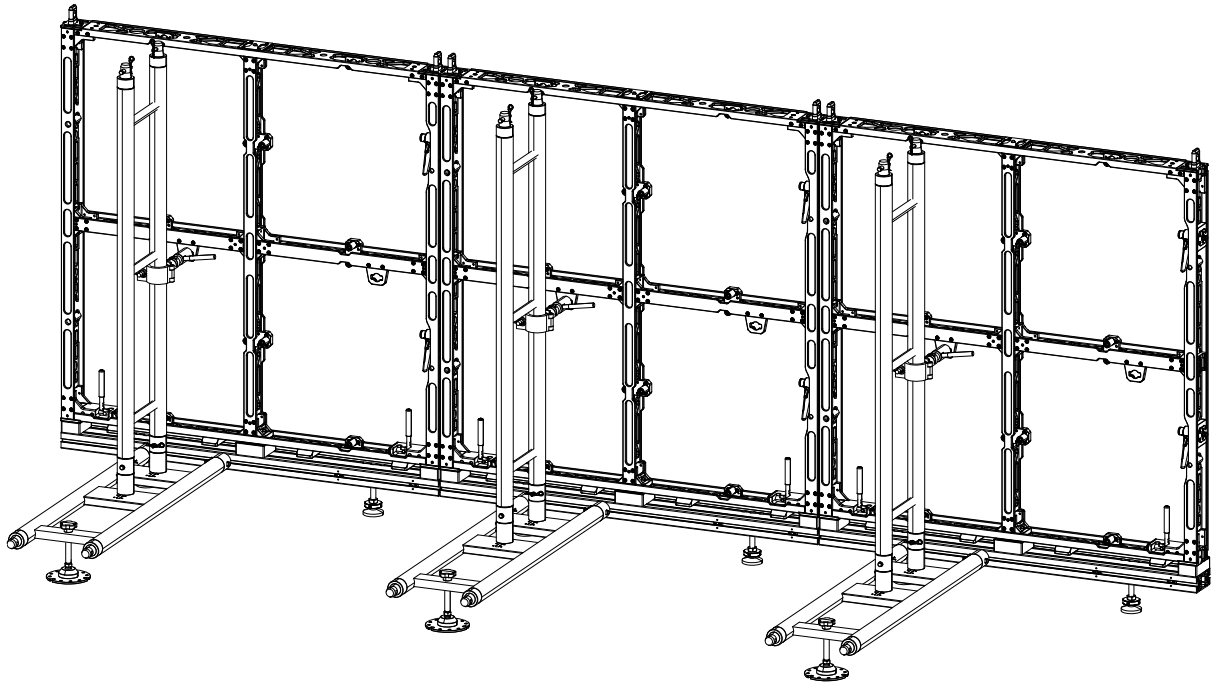
For example, if the screen size is 10 tiles(W) x 6 tiles(H), the mass of the total ballast must be at least:

$$m = \frac{125 * 10 * 0.6096 * (6 * 0.6096)^2 * 1.5}{2 * 9.8 * 0.87} = 896.7\text{kg}$$

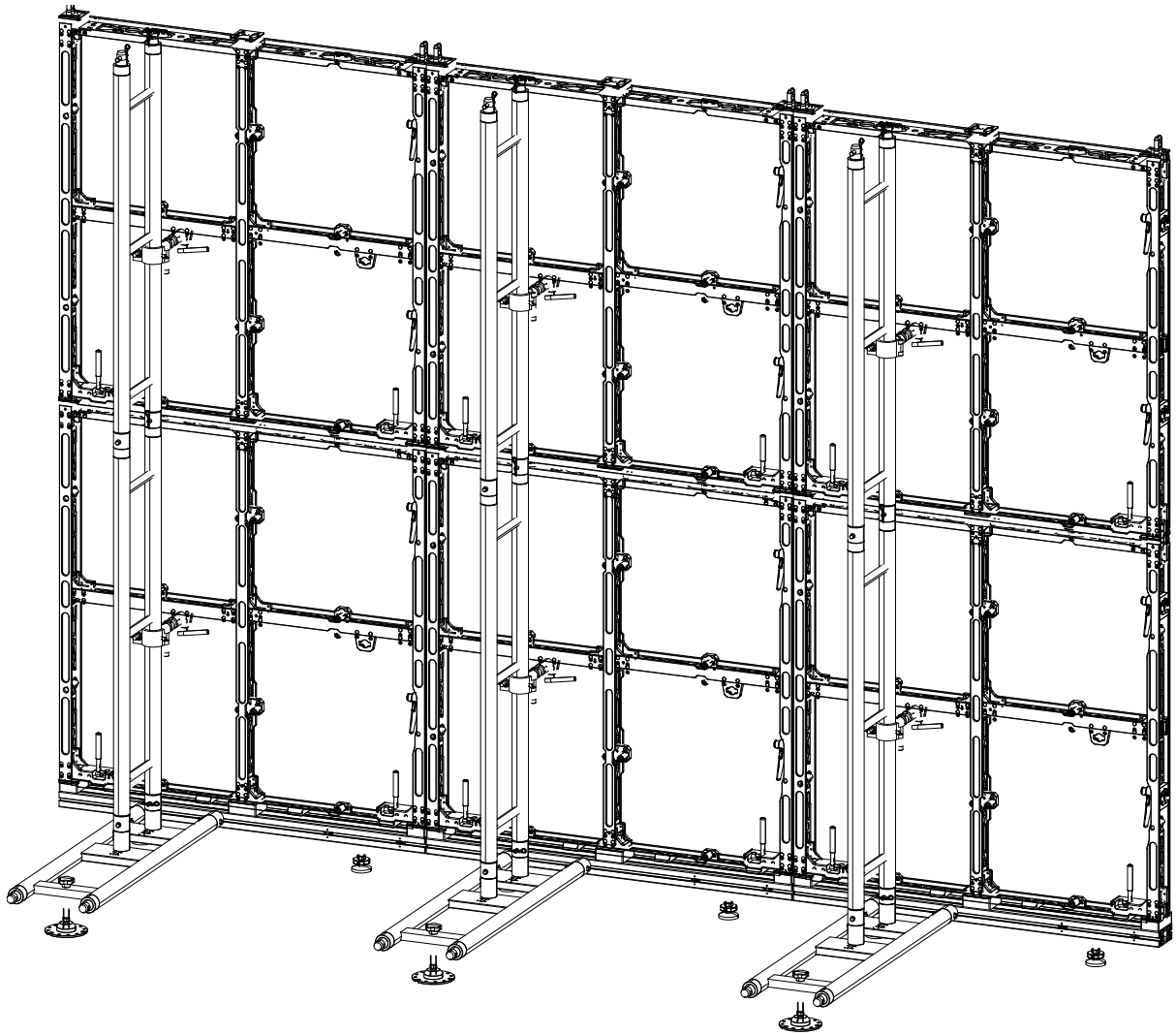
If every two columns use one set of stacking system, the whole screen will use 5 sets of stacking system. So, each base stabilizer needs:

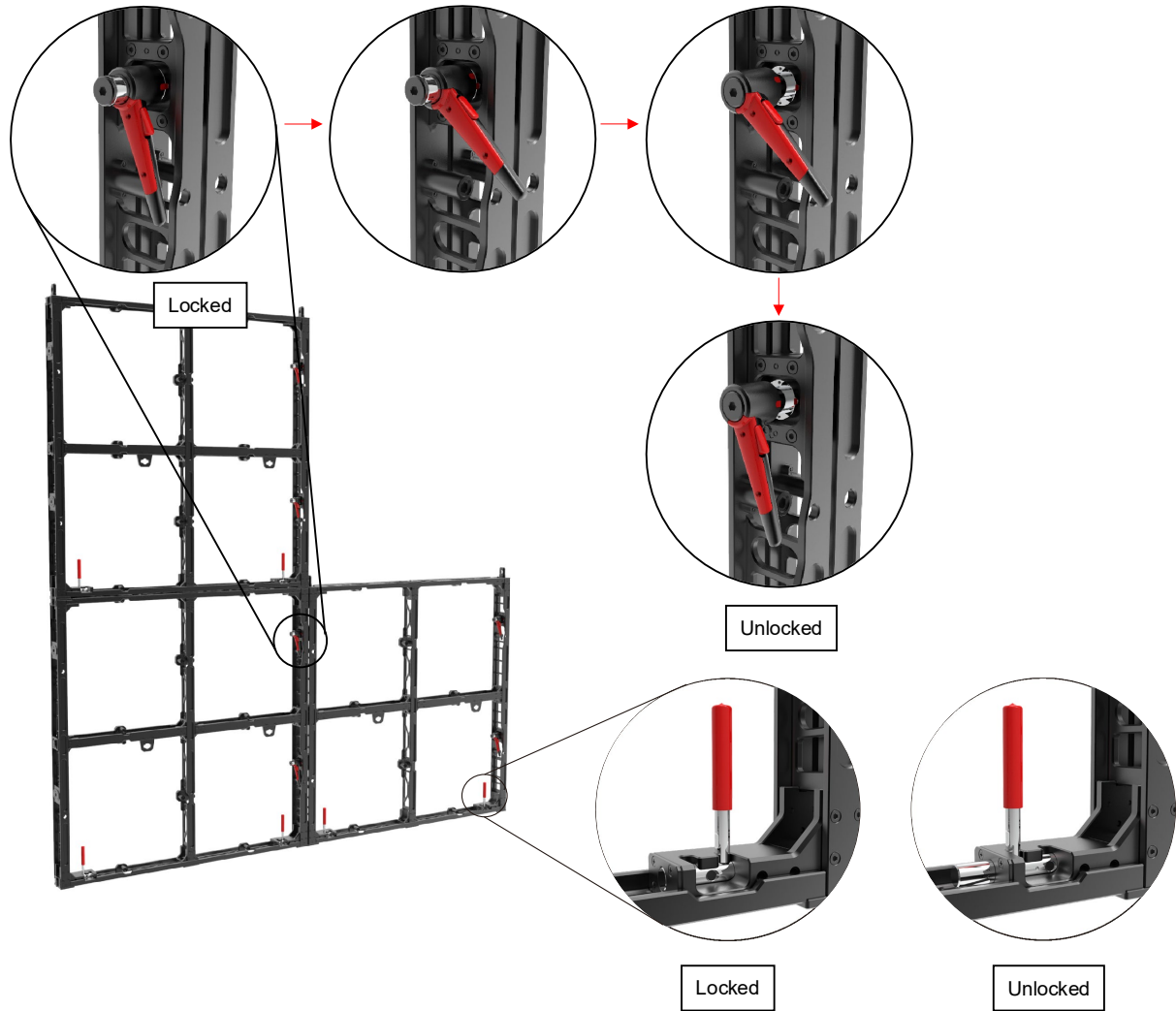
$$m_0 = \frac{896.7}{5} = 179.34\text{kg}$$

Put the stacking frames onto the stacking bars and connect the stacker (rear truss) to the stacking hole of the frame. Adjust the feet of the stacking bars and base stabilizers to make the frames aligned well. Lock the frames horizontally.

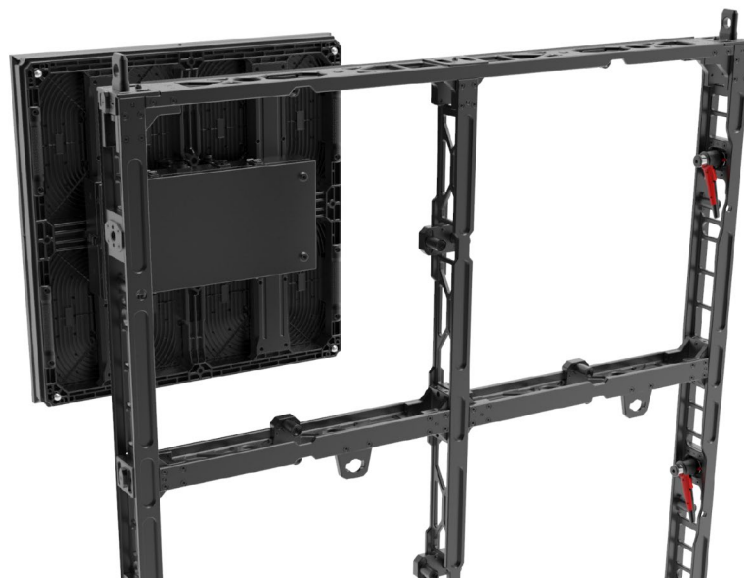


Finish the rest of the frames.





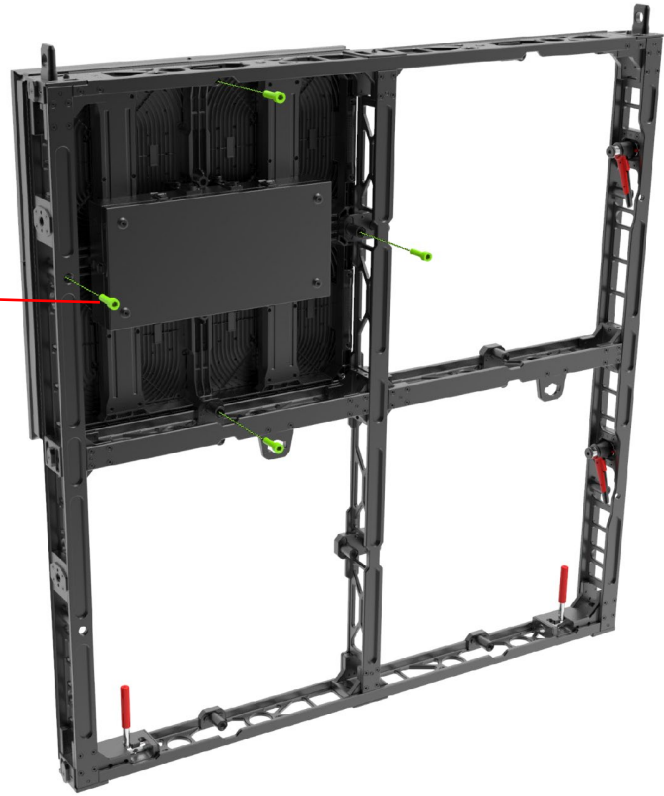
Attach the BM4 tiles to the stacking frame.



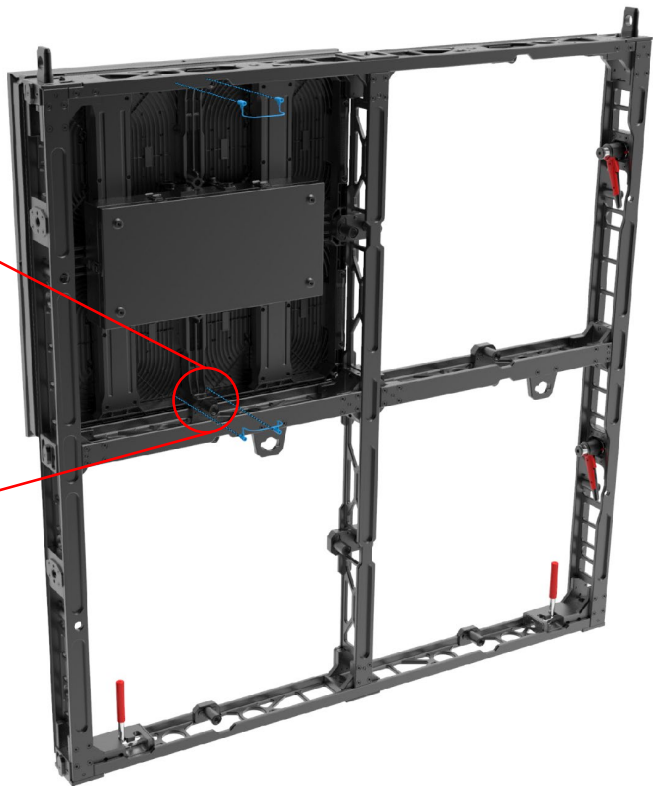
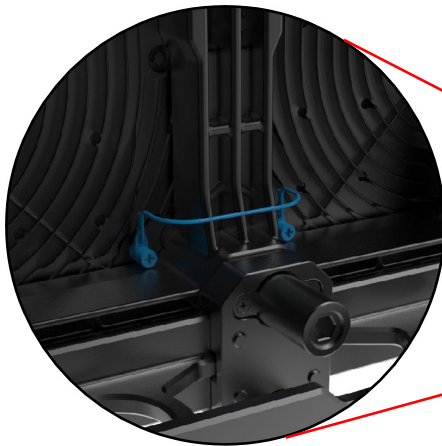
Fix the BM4 tiles using the captive screws on the stacking frame.



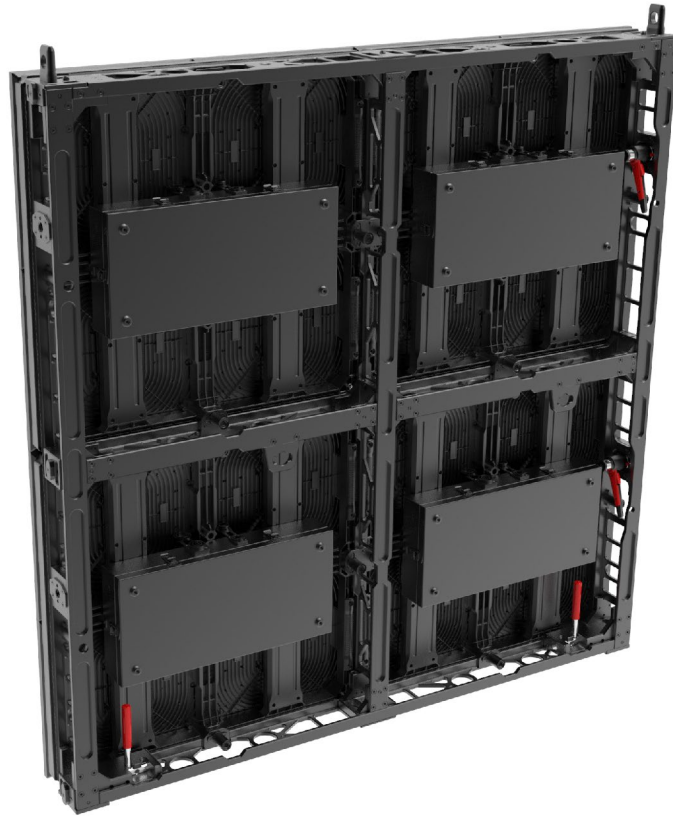
M10 x 35mm Hexagonhead captive-screws are on the frame
An 8mm Hexagon Key can be used



Fix the steel wires for safety.



Repeat the steps above to install more BM4 tiles.



14 Service Manual

14.1 Cleaning Tiles



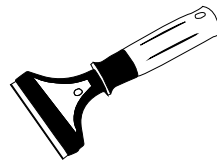
14.1.1 Needed Tools



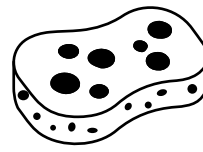
Mild detergent



Mop



Glass scraper



Sponge



Soft cloth

Glass Floor

Hardness: 7H

Regular cleaning:

- Use lukewarm water with mild detergent or any glass cleaning product.
- A mop can be used for a quick cleaning.

Remove stubborn stains:

- Use product for cleaning bathrooms/kitchens or ceramic cooking plates.
- Glass scraper can be used to remove stains.

Caution: Pay attention to sand, stones and other hard objects when cleaning, they will scratch the glass

Matte Floor (Plastic)

Hardness: 3H

Regular cleaning:

- Use lukewarm water with mild detergent.
- Use only clean tools with soft materials, like sponge and soft cloth.
- A mop can be used for a quick cleaning.

Remove stubborn stains:

- Special plastic cleaners can be used but need to be tested on a small area on the mat floor first.
- Even if it is to remove stains, use only clean tools with soft materials.
- Eraser can be used to clean some marks.




Caution: The surface of mat floor has texture, be very careful when cleaning.

14.2 Swapping masks

Anti-static gloves are needed to operate on BM4 tiles.



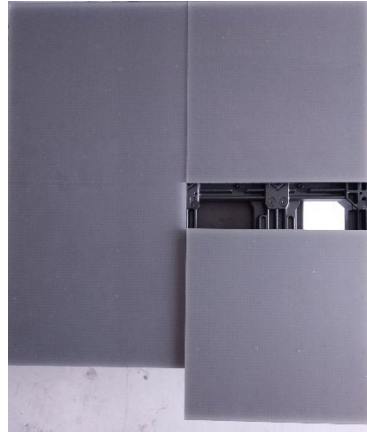
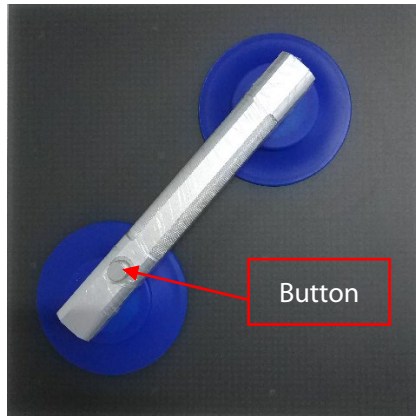
Materials needed:

Items	Picture
Suction Plate	
Electric Screwdriver	
Electric Screwdriver Set Head (5mm)	

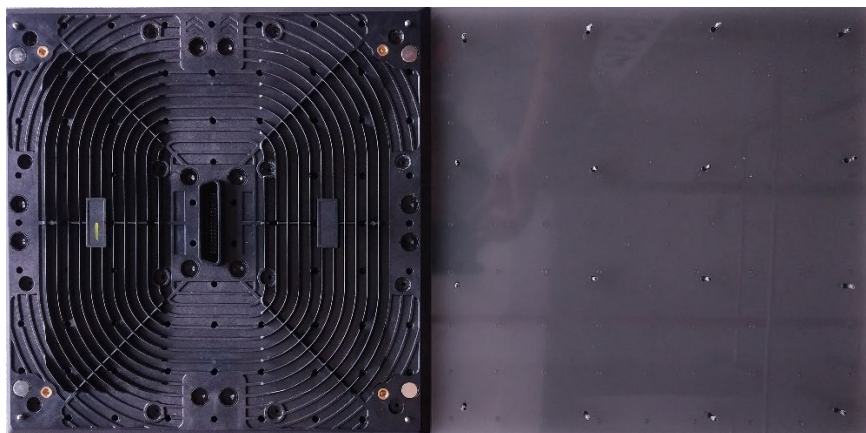
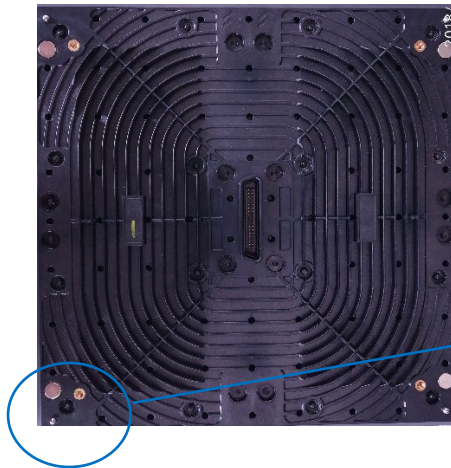
14.2.1 Changing the plastic mask to the glassy mask

Step 1: Press the suction plate on the module and remove the module from the tile frame.

Note: Please make sure that the suction plate is not parallel with the tile, which will be easier for you to take down modules. Press the button to release the suction plate.



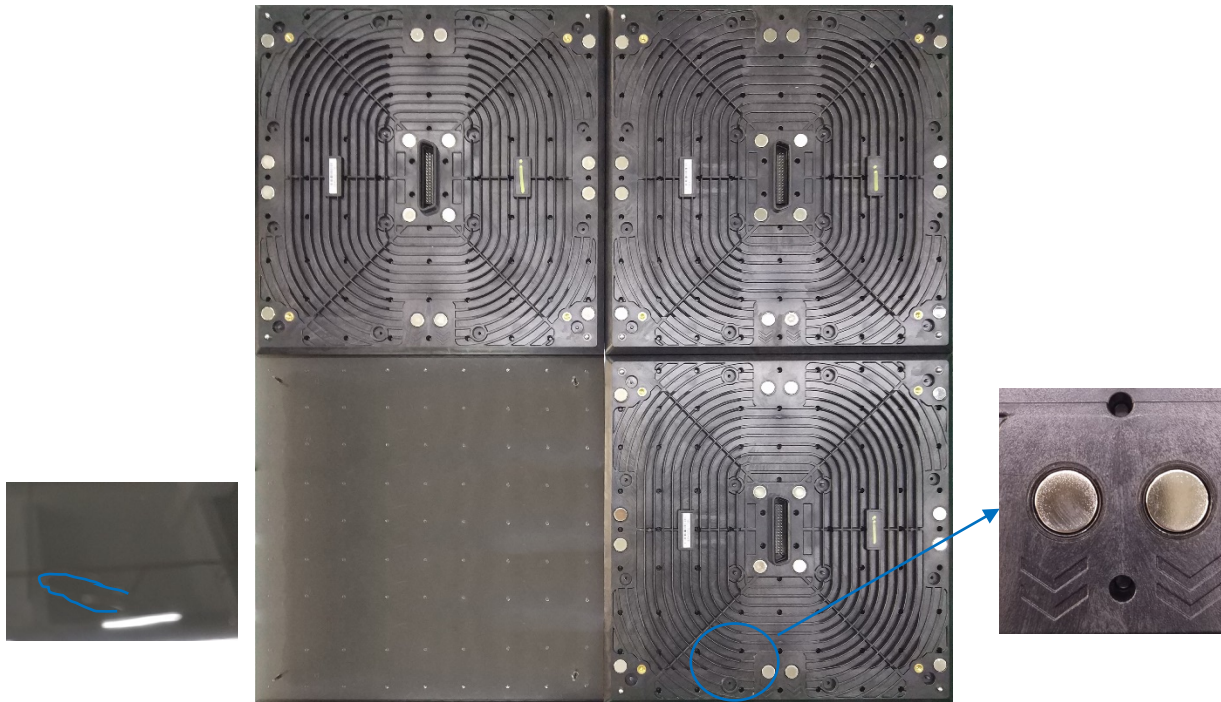
Step 2: Unscrew 16 screws and take down the plastic mask.



Step 3: Place a glass mask on the table and place modules on it. Make sure marks on the glass mask are vertical to arrows on modules.

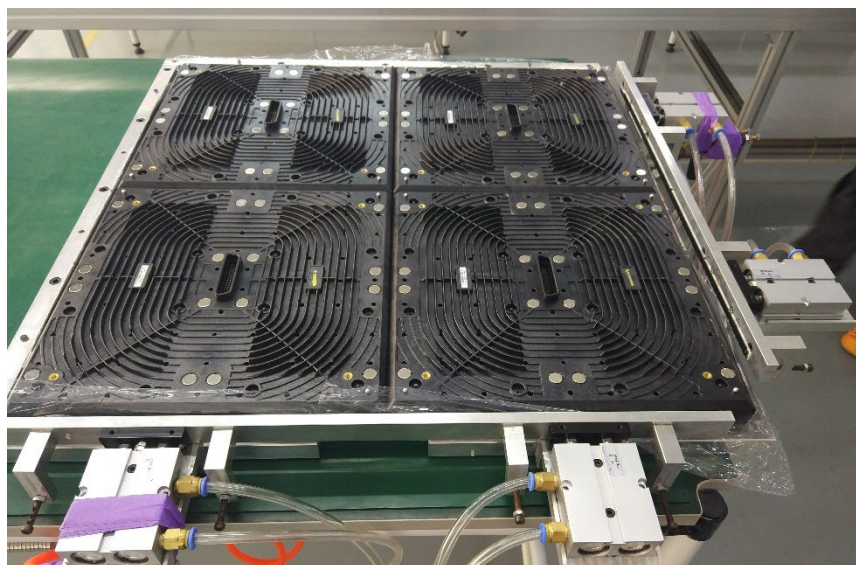
Notes:

- (1) The moment of force to tighten screws should be 3 to 4, otherwise screws will be broken.
- (2) Do not hit against LEDs when placing modules.



Step 4: Place the glass mask and modules on the workbench carefully.

Note: It's recommended to operate it by two people.



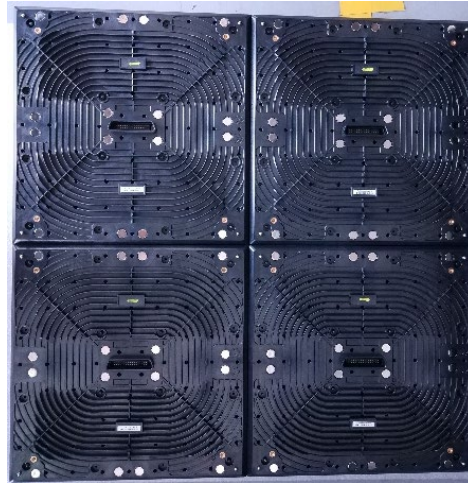
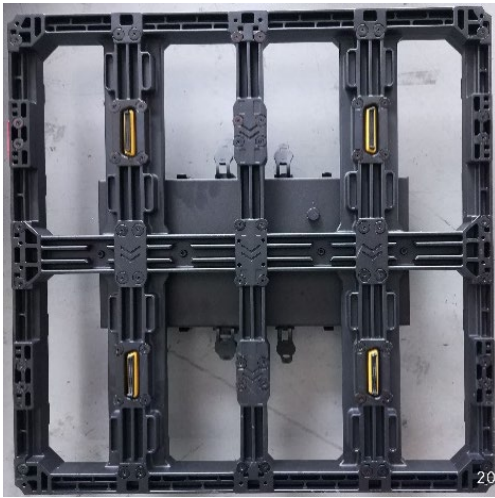
Step 5: Fix modules on the glass mask with 32 screws.

Step 6: Place a frame on the table first and then put the glass mask and modules on the frame, which will be attracted by magnets to the target position.

Note: Please pay attention to the sequence, because the frame is heavy, which may do harm to fragile LEDs.

14.2.2 Changing the glassy mask to the plastic mask

Step 1: Separate the tile frame from modules with the glass mask.



Step 2: Unscrew 32 screws and remove modules from the glass mask.

Note: The moment of force to unscrew screws should be 3 to 4.



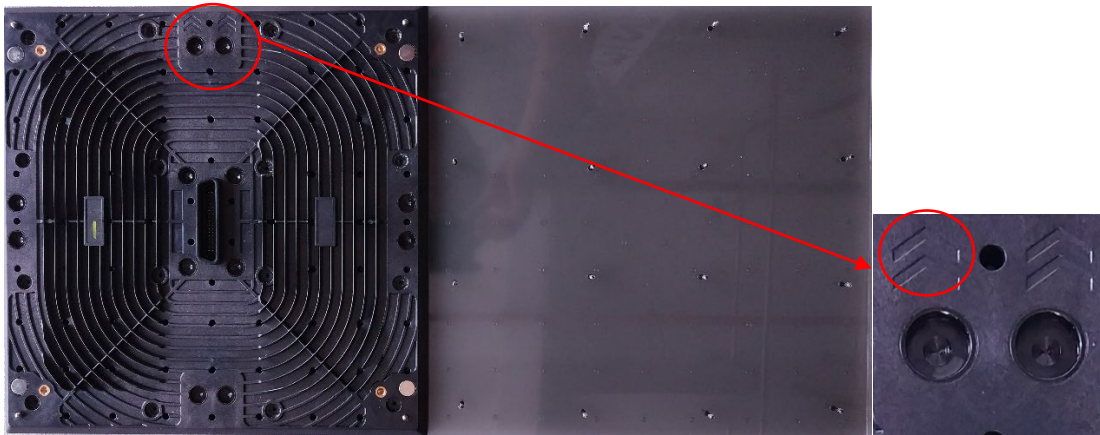
Step 3: Place plastic masks and modules respectively on the workbench.

Step 4: Fix plastic masks and modules with screws.

Step 5: Place a frame on the table first and then put the plastic mask and modules on the frame, which will be attracted by magnets to the target position.

Notes:

- (1) Do not hit against LEDs when fixing the mask.
- (2) Please make sure the direction of arrows on the module and the tile frame is the same.



15 Revision History

Revision	Update date	Remarks	Editor
3.5	2020.11.11	Update specification and SAP number, deleting Sub frame V1	Lance
3.6	2021.09.24	Update control system	Zary
3.7	2022.03.28	Add BM2, Update specifications	Zary
3.8	2023.04.18	Update the BM4 bearing load and contact info	Loki