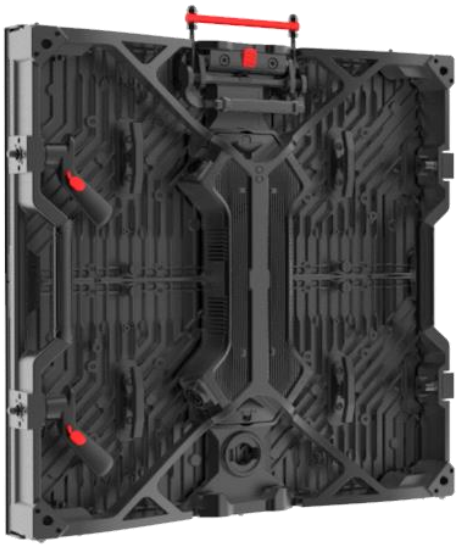
ROE
CREATIVE DISPLAY

Ruby Series
User Manual



Version: 2.7
Updated: 2022-01-24

Copyright ©

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, rented, lost, stolen or discarded.
6. Any software, including but not limited to the operating system.
7. Damage, deterioration or malfunction from:

(1) 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.

(2) Repair or attempted repair by anyone other than ROE Visual, a ROE certified repair center, or a ROE certified engineer.

(3) Any damage to the product due to shipment.

(4) Any damage during the installation, removal, disassembly, or reassembly of the product by Customer or others.

(5) Causes external to the product, such as electric power fluctuations or failure, exposure to aggressive environments such as seaside, swimming pool, etc.

Contact Information

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

ROE CHINA

OFFICE: Bldg 7, ZhongYuntai Technology Industrial Park, Baoan, Shenzhen, China

Tel: +86-0755-83924892

Email: roe@roevisual.com
service@roevisual.com

ROE EUROPE

OFFICE: Zernikelaan 2a, 9351 VA Leek, The Netherlands

WAREHOUSE: Industriepark 9-1, 9351 PA Leek, The Netherlands

Tel: +31 5 0211 0990

Email: europe@roevisual.com
support@roevisual.eu

ROE UNITED STATES

OFFICE: 9232 Eton Ave. Chatsworth, CA 91311

WAREHOUSE:21800 Nordhoff St., Chatsworth, CA 91311

Tel: +1 747 229 9190

Technical support: +1-833-4-ROE-TECH

Email: roe@roevisual.com
usservice@roevisual.com

Contents

Copyright © 2
Warranty Policy....2
Contact Information 3
1 Safety....6
1.1 Safety Guidelines....6
1.2 Safety Instructions 8
1.3 Consignes de sécurité....9
1.4 Consignes de sécurité....11
2 General Introduction....12
2.1 Features....12
2.2 Specifications....13
3 Components....14
3.1 Overview 14
3.2 Module 15
3.3 Accessory Information....16
3.4 Cables 20
4 Package 21
4.1 Ruby2.3 Flight Case 21
5 Installation 23
5.1 Precautions for Installation....23
5.2 Hanging System....25
5.3 Stacking System....28
5.4 Ballast Calculation....35
5.5 Installation 36
6 Cabling 37
6.1 Power Cabling....37
6.2 Data Cabling....38
6.3 Others....38
7 Control System....39
8 Service Manual....40
8.1 Cleaning Tiles....40
9 Ruby 2.3 Right Angle 43

9.1 Components....43
9.2 Specifications....45
9.3 Accessories....46
9.4 Flight case....48

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 tiles 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.

Waterproof & Dehumidification

The maximum relative humidity of the work should be less than 90%.

When an LED screen is not in use, the LEDs will start absorbing moisture from the air, no matter if it is an indoor or outdoor screen. The longer the time and the higher the humidity of the air, the more moisture will be absorbed by the LED. When the LED contains moisture, there is a risk to damage the LED when the LED heats up too aggressively.

Therefore, ROE recommends that if you have not used a screen for a prolonged time and/or the screen was stored in a very humid environment, you slowly heat up the screen.

In our manuals we have a 12 steps recommendation for heating up the screen (and thus drying out the LED's):

Step	Gray Scale	Brightness	Power-on hours
1	10	5%	2 hours
2	20	8%	2 hours
3	30	10%	2 hours
4	40	15%	2 hours
5	50	20%	2 hours
6	70	25%	2 hours
7	90	35%	2 hours
8	120	45%	2 hours
9	150	60%	2 hours
10	180	70%	2 hours
11	200	80%	2 hours
12	255	100%	2 hours

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.

(11) Modules only can be removed after the tiles cools down

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.

Étanche et déshumidification

L'humidité relative maximale du travail doit être inférieure à 90%.

Lorsqu'un écran LED n'est pas utilisé, les LED commenceront à absorber l'humidité de l'air, qu'il s'agisse d'un écran intérieur ou extérieur. Plus le temps est long et plus l'humidité de l'air est élevée, plus l'humidité sera absorbée par la LED. Lorsque la LED contient de l'humidité, il y a un risque d'endommager la LED lorsque la LED chauffe trop agressivement.

Par conséquent, ROE recommande que si vous n'avez pas utilisé un écran pendant une période prolongée et / ou que l'écran a été stocké dans un environnement très humide, vous chauffez lentement l'écran.

Dans nos manuels, nous avons une recommandation en 12 étapes pour chauffer l'écran (et ainsi sécher les LED):

Step	Gray Scale	Brightness	Power-on hours
1	10	5%	2 hours
2	20	8%	2 hours
3	30	10%	2 hours
4	40	15%	2 hours
5	50	20%	2 hours
6	70	25%	2 hours
7	90	35%	2 hours
8	120	45%	2 hours
9	150	60%	2 hours
10	180	70%	2 hours
11	200	80%	2 hours
12	255	100%	2 hours

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

The lightweight Ruby small-pitch LED tile incorporates the magnesium alloy frame design for an easy-to-assembly solution. It's available in both flat and curved configurations. The Ruby is the ideal cost-effective LED display solution for rental, stage and fixed applications.

2.1.1 Ultra-lightweight

The Ruby is 500 x 500 mm, but its weight is less than 8.5 kg per tile. The lightweight magnesium alloy frame ensures the extreme durability.

2.1.2 Superb Visual

The sleek design with black LEDs highlights its high contrast and brightness for a vivid visual effect.

2.1.3 Curving Options

Concave and convex curving options enable you to realize the unique and creative stage design.

2.1.4 Magnet-assisted Assembly

Magnets are integrated into the tile frame, enabling the easy setup in both hanging and stacking systems.

2.1.5 Easy Maintenance

With both front and rear module service, the Ruby panels are easy to maintain. The integrated PSU and Hub unit make repair and replacement of spare parts easy and cost-effective.

2.2 Specifications

Items	Ruby 1.5	Ruby1.5F	Ruby 2.3
Pixel Pitch	1.56mm	1.56mm	2.31mm
Max Brightness Calibrated	800nits	1000nits	1500nits
Panel Dimension	500 x 500 x 73mm 19.7"" x 19.7"" x 2.87"	500 x 500 x 71mm 19.7"" x 19.7"" x 2.8"	500 x 500 x 68mm 19.7" x 19.7" x 2.68"
Panel Resolution (H x V)	320 x 320	320 x 320	216 x 216
Weight Per Panel	8.16kg; 17.99lbs	8.46kg; 18.65lbs	8.16kg; 17.99lbs
Voltage	100~240VAC, 50/60Hz		
Power Consumption Max/Average	210W (common cathode)/105W	250W (common anode) / 125W	180W / 90W
Transparency	Solid		
Serviceability	Front/Rear		
Processing Platform	MVR/Brompton		
Curving (Concave & Convex)	Concave ~Convex 3°	Concave ~Convex 3°	Concave ~Convex 5°
Max. Hanging (panels)	20		
Max. Stacking (panels)	10	10	12
LED Configuration	4 in 1 common cathode	1010 flip chip	4 in 1 common cathode
Viewing Angle Vertical	140°		
Viewing Angle Horizontal	140°		
Scan Ratio	1/16	1/10	1/12
Refresh Rate	3840HZ	7680Hz	3840Hz
Gray Scale	14bit	16bit	14bit
Frame Material	Magnesium Alloy		
Operating Temp / Humidity	-20°~ 45°C, 10~90% RH/-4°~113°F, 10~90% RH		△
Storage Temp / Humidity	-40°~ 60°C, 10~90% RH/-40°~140°F, 10~90% RH		
IP Rating	Indoor		
Certifications	CE, ETL, FCC, RoHS		
Lifetime	≥50,000hours		
BTU Max/AVG	696/320	829/381	614/282

Note:

△ For the operating temperature, the panel will keep working to -20 degrees, but it can't start up reliably below 0 degrees.

3 Components

3.1 Overview

A Ruby tile consists of modules, tile frame and power box.

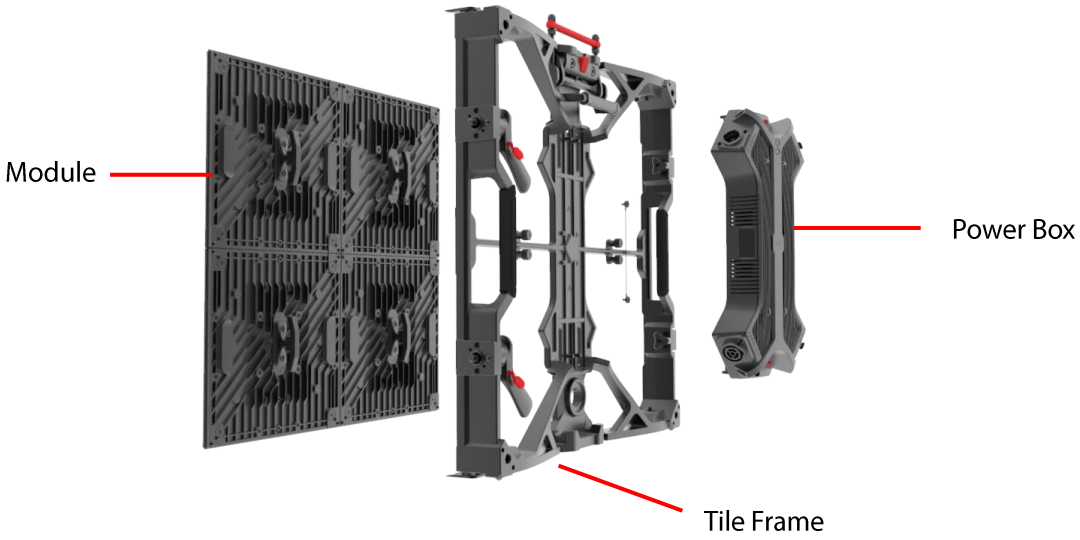


Figure 3-1. Ruby Series Components

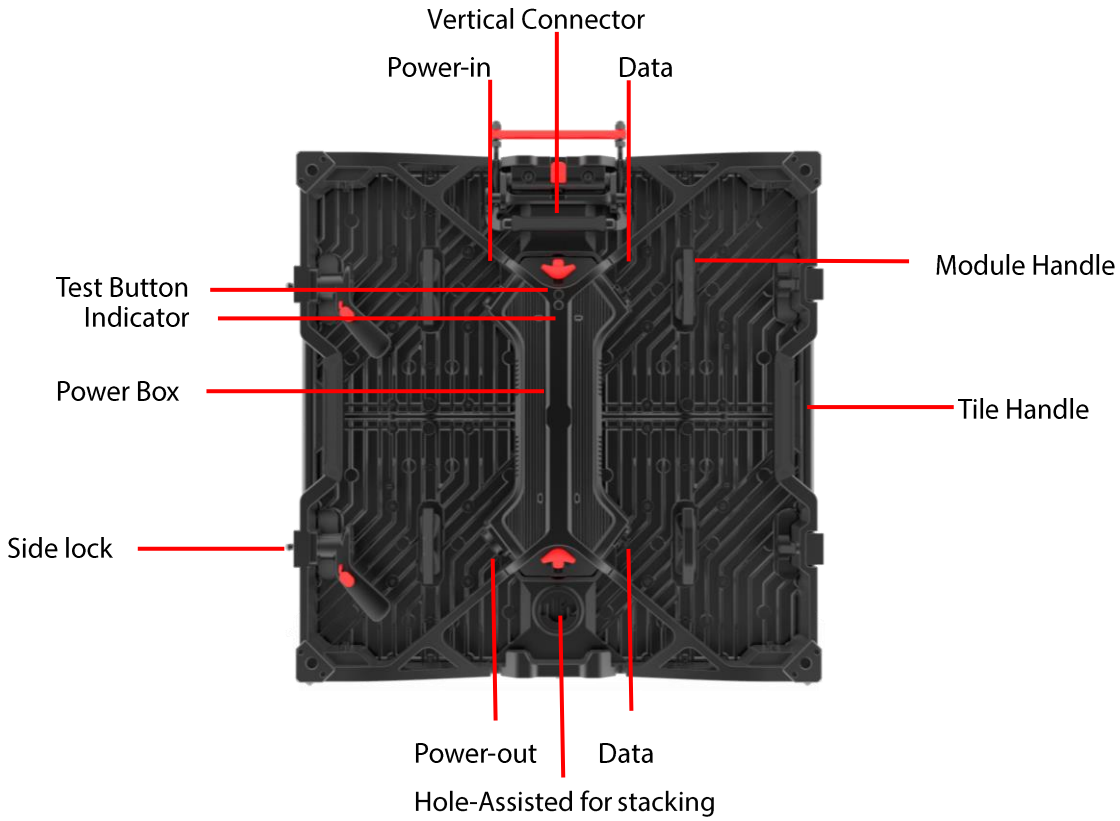


Figure 3-2.Ruby Parts Information

3.2 Module

A Ruby tile consists of 4 pcs modules.

Dimensions: 250 x 250 mm

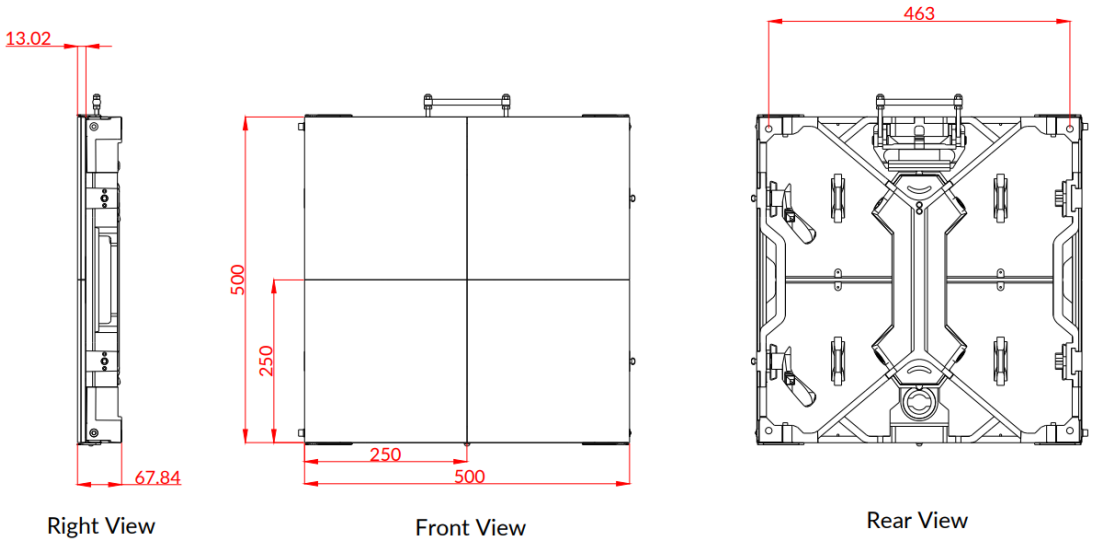


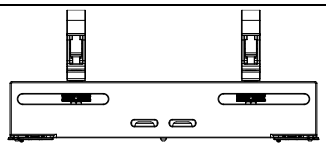
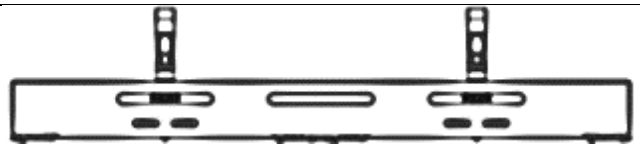
Figure 3-3. Ruby Module Dimensions

3.3 Accessory Information

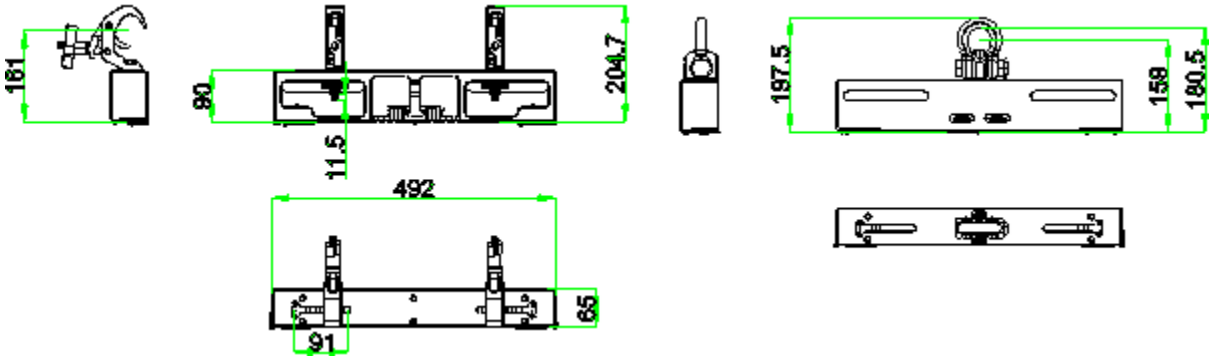
Ruby support both hanging and stacking installation.

3.3.1 Hanging System

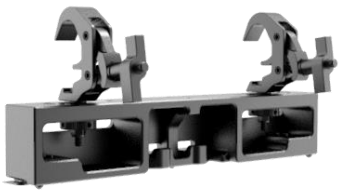
General view of Ruby hanging system.

 Hanging bar Clamp 0.5m	 Hanging bar Clamp 1m

Basic dimensions of Ruby hanging bar, 0.5m.



Hanging bars for Ruby.

	**RB hanging bar, 1W, clamp** SAP: 207002S0437 Weight: 5.5kg±3%kg Dimensions: 492 x 90 x65 mm
	**RB hanging bar, 2W, clamp** SAP: 207002S0436 Weight: 10.1±3%kg Dimensions: 991.7 x 90 x 65mm

3.3.2 Stacking System

General view of Ruby stacking system.

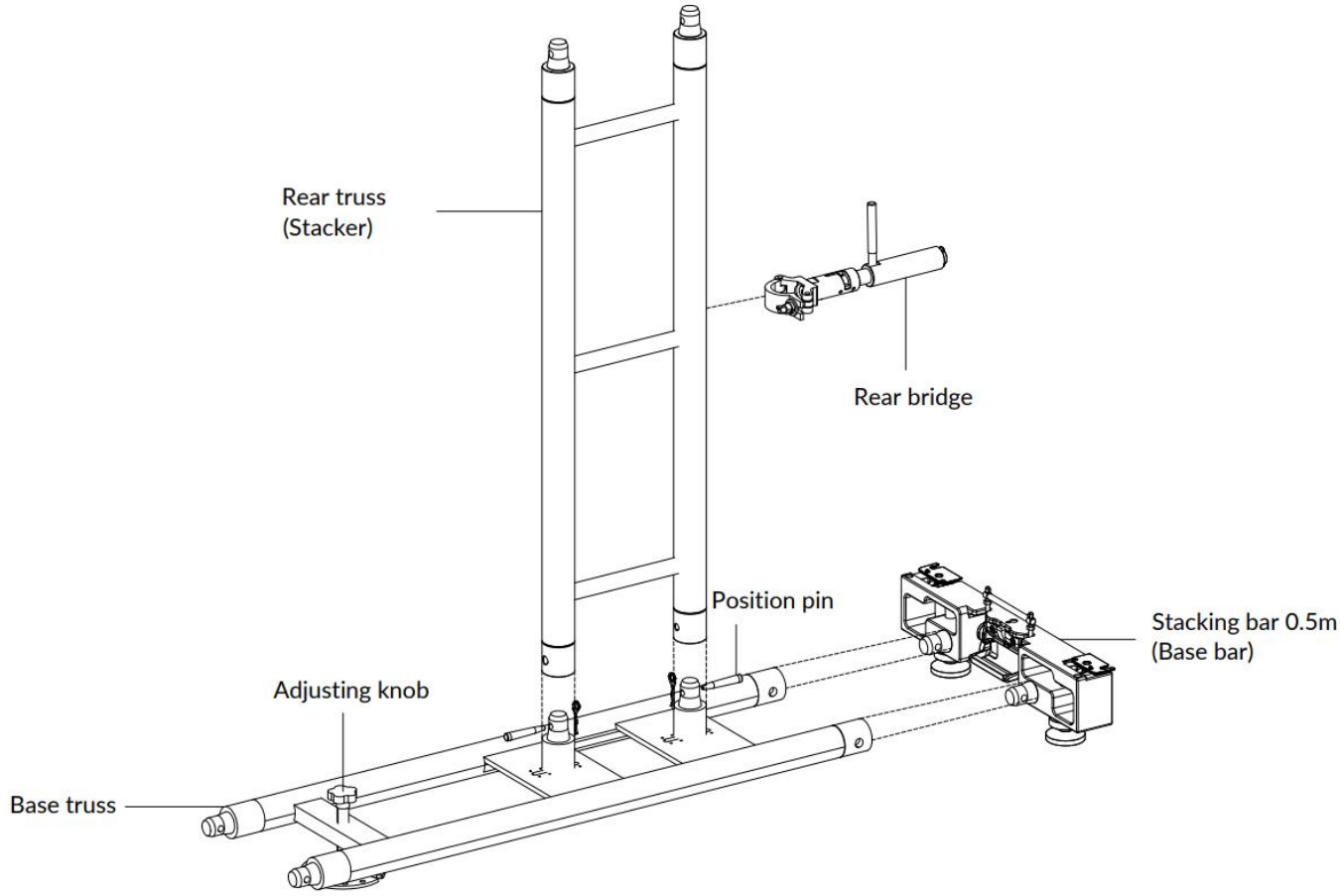
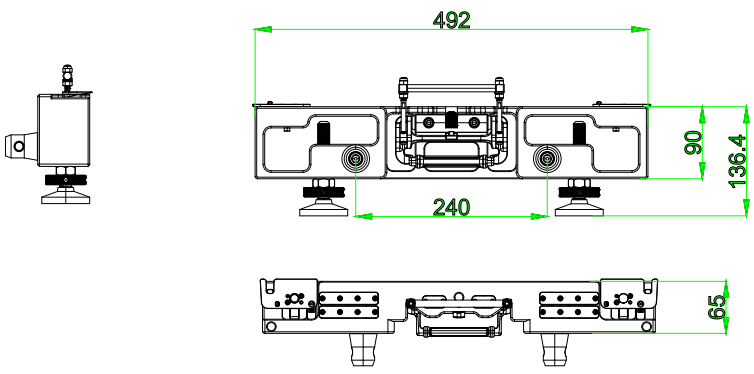


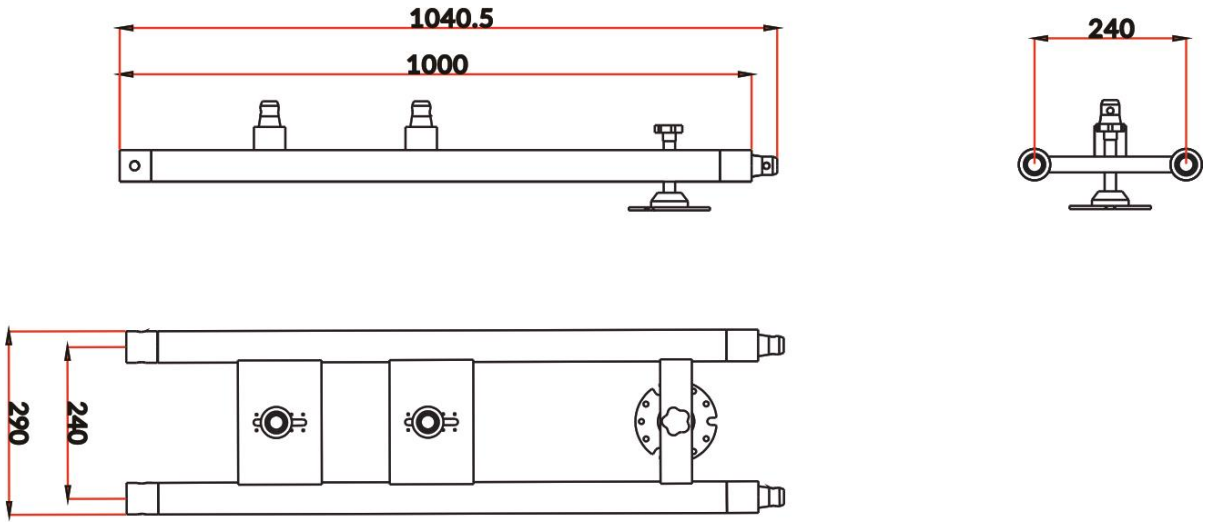
Figure 3-4 Ruby Stacking System

Note: The stacking system should be used every two-tile wide at least and it's will be better to be used every one-tile wide when necessary.

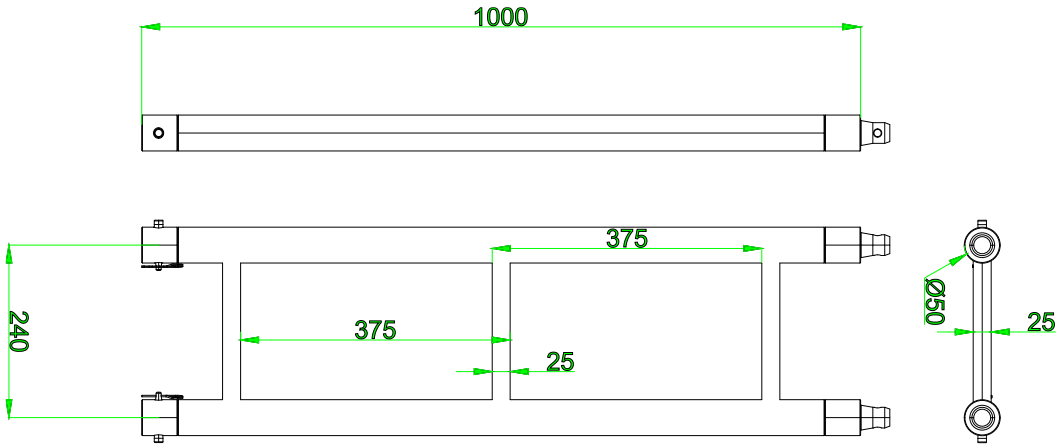
Basic dimensions of Ruby stacking bar, 0.5m.



Basic dimensions of Ruby base truss.



Basic dimensions of Ruby rear truss.



Basic dimensions of Ruby rear bridge.

Mechanical accessories for Ruby stacking.

	**Stacking Bar_0.5m** SAP: 207002S0429 Weight: 4.5 kg Dimensions: 493 x 80 x 110
	**Stacking Bar_1.0m** SAP: 207002S0438 Weight: 8.3 kg Dimensions: 993 x 80 x 110 mm
	**Base Stablizer(Universal Base Truss)** SAP: 315002-00002 Weight: 8.0 kg Dimensions: 1040.5 x 293 x 90 mm
	**Stacker(Rear truss)** SAP: 304012-00504 Weight: 4.65 kg Dimensions: 1040.5 x 290 x 50 mm
	**Rear Bridge** SAP: 215002S0108 (Only for Ruby) Weight: 1.02 kg Dimensions: 327 x 106 x 30 mm

3.4 Cables

3.4.1 Cable Types

	**Power cable, 10m, 16A, Weipu CEE-True 1, V3.0** SAP: 208001S1792 Weight: 0.7 kg Weipu _ Neutrik (Female) Connectors Connect the power source and panels.
	**Power cable, 10m, 16A, True 1-True 1, V3.0** SAP: 208001S1511 Weight: 0.7 kg Neutrik _ Neutrik Connectors Connect the power source and panels.
	**Power cable, 0.4m, 16A, True 1-True 1, V2.0** SAP: 208001S1526 Weight: 0.12 kg Neutrik _ Neutrik Connectors Connect neighboring panels vertically.
	**Power cable, 5m, 16A, True 1-True 1, V3.0 (Optional)** SAP: 208001S1809 Weight: 0.2 kg Neutrik _ Neutrik Connectors Connect panels in neighboring columns.
	**Data cable, 30m, etherCON-etherCON, V2.0** SAP: 208004S0675 Weight: 7±3% kg Neutrik _ Neutrik Connectors Connect the processor and panels.
	**Data cable, 0.4m, etherCON-etherCON, V3.0** SAP: 208004S0685 Weight: 0.08 kg Neutrik _ Neutrik Connectors Connect neighboring panels vertically.
	**Data cable, 0.9m, etherCON-etherCON, V2.0** SAP: 208004S0667 Weight: 100±5 g Neutrik _ Neutrik Connectors Connect panels in neighboring columns.

4 Package

4.1 Ruby2.3 Flight Case

Dimensions: 1170 x 620 x 840 mm

Capacity: Every flight case can carry 10 pcs Ruby2.3 tiles.

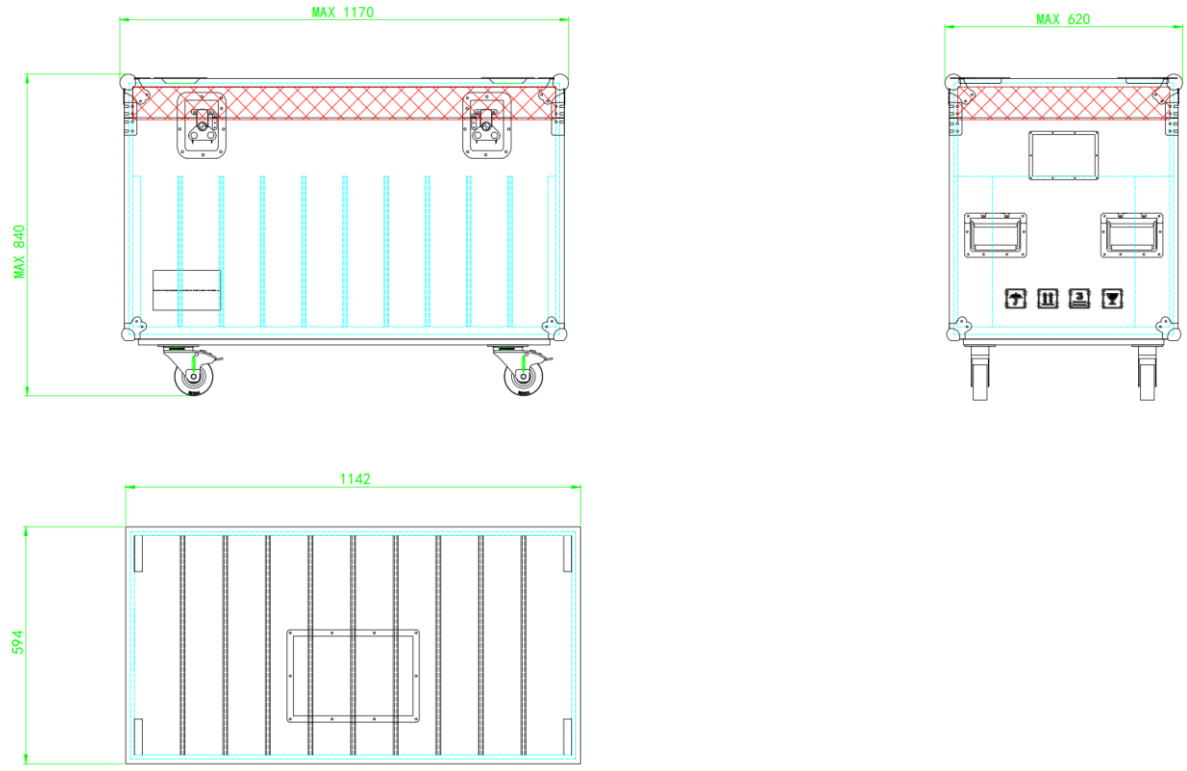


Figure 4-1. Ruby2.3 Flight Case Dimensions

4.1.1 Labels on the Flight Case

	**Warning:** Indoor use.
	**Warning:** Keep the flight case upwards.
	**Warning:** Maximum stack 3 flight cases.
	**Warning:** Fragile

5 Installation

5.1 Precautions for Installation

5.1.1 Mechanical Requirements

5.1.1.1 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 five times the complete weight of tiles and frames. Do not forget to take into consideration the ballast weight required by the stacking system.

5.1.1.2 Levelling

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

5.1.1.3 Ballast

In consideration of the expected wind load, the height and position of the LED wall upon the stacking system, the additional weight (ballast) should be required. The detailed information how to calculate the ballast weight refers to Ballast Weight Calculation.

5.1.2 Electrical Requirements

5.1.2.1 Power

Ruby require 100~240 VAC, 50/60 Hz and should be less than or equal to 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.

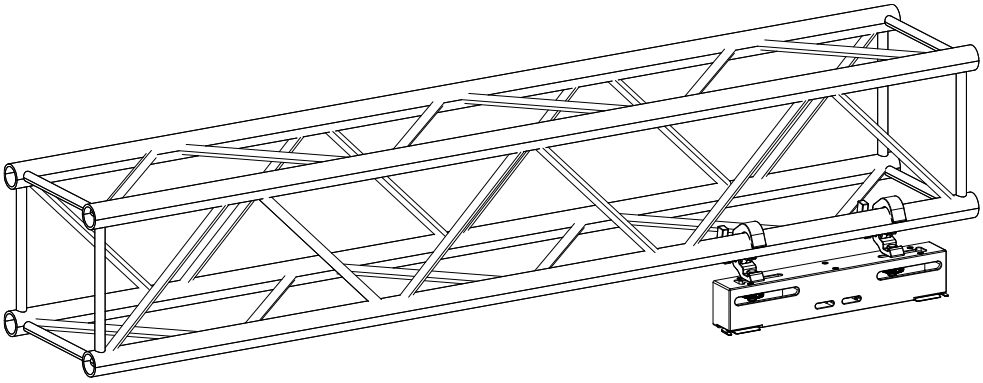
5.1.3 System Requirements

5.1.3.1 Control System

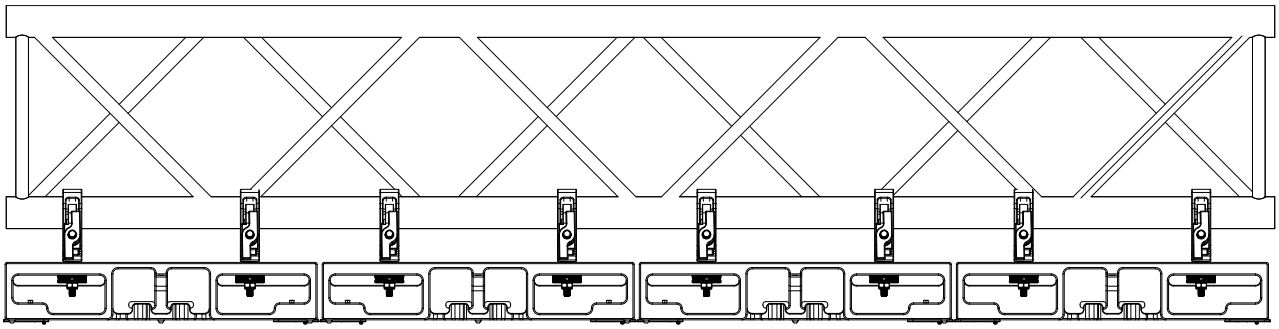
Generally, ROE LED tiles can support Brompton, Evision, Nova and MVR processing. An additional inquiry is needed for the control system information of a specific order.

5.2 Hanging System

1. Attach the hanging bar onto the truss, move the clamps horizontally to avoid interference with the truss.



2. Attach all hanging bars onto the truss. Leave around 8mm gap between hanging bars. Fix more hanging bars and keep them at the same horizontal level through the adjustment wheel.

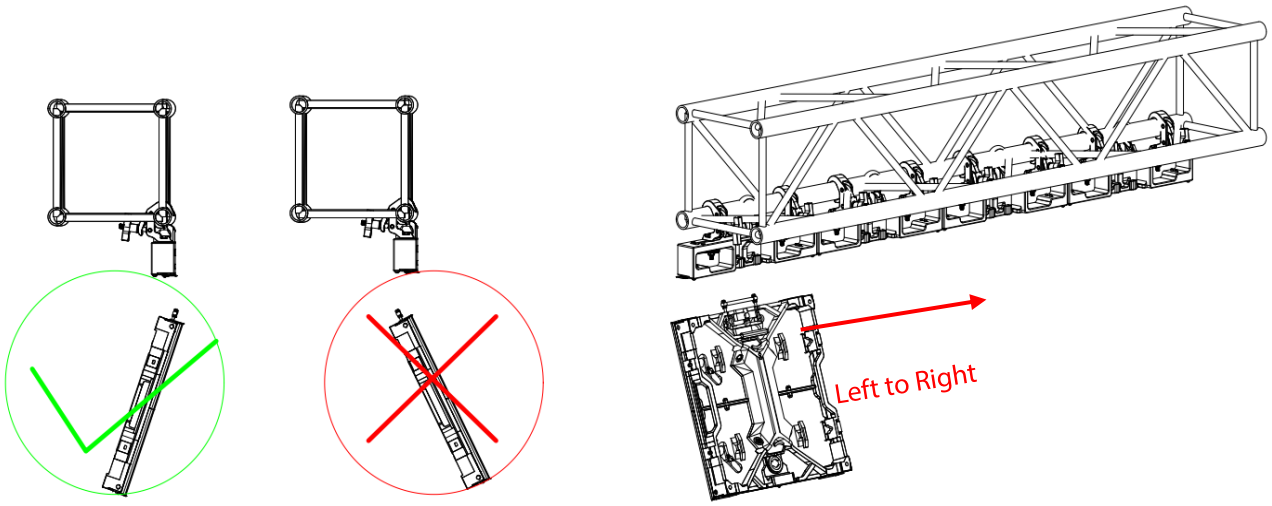


Notes:

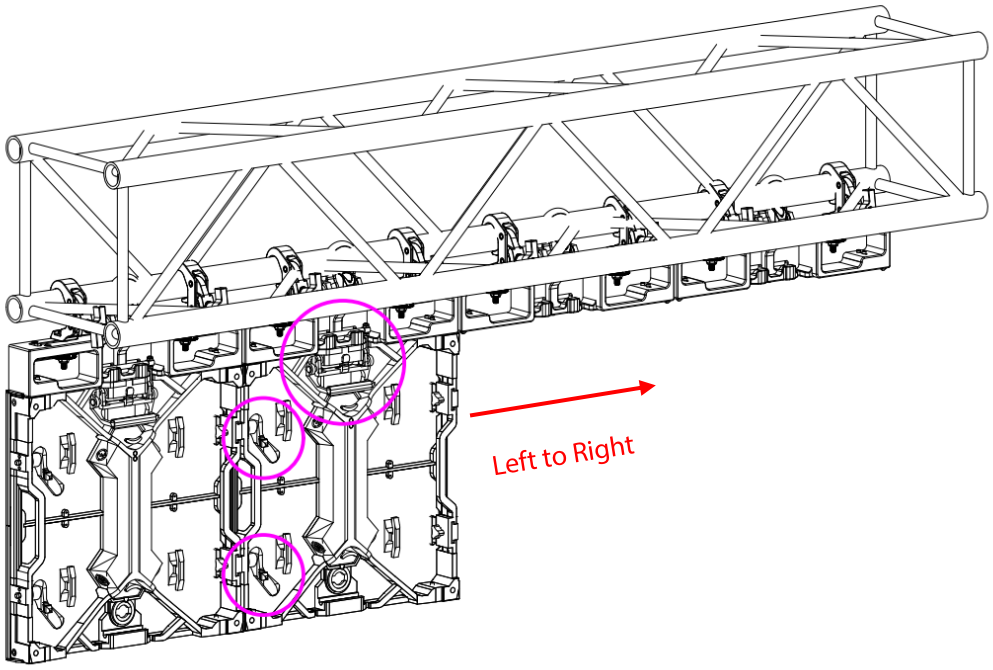
1) The adjusting range of the adjustment wheel is about 11.5 mm (vertical) and 91 mm (horizontal) respectively.
2) Please note that there is a 8 mm gap between neighboring hanging bars.

3. Install tiles on hanging bars. Hanging bars will attract tiles to correct target position automatically with magnets. After aligning all hanging bars horizontally, rotate the lever of the clamps to fix the clamps to the truss.

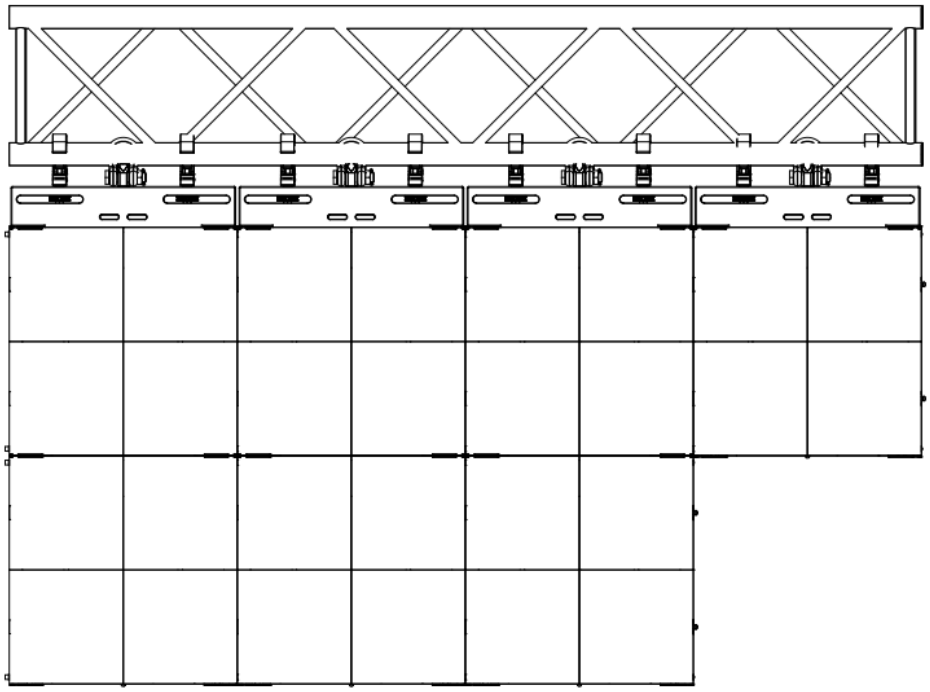
4. Take out the panel from the flight case and remove the protective EVA cover.
Keep panels at an angle to avoid damage to LEDs when magnets attract panels. Then press the red button and lock the tiles by vertical connector.



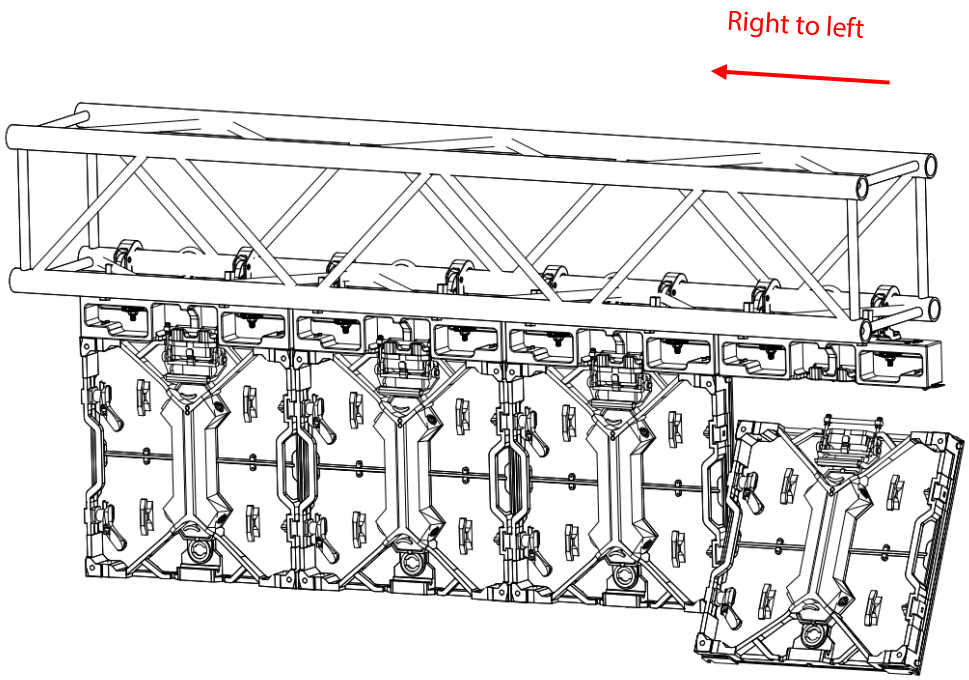
5. Lock the panel and hanging bar and install the second panel. Lock neighboring panels.



6. Repeat above steps until all panels are installed.



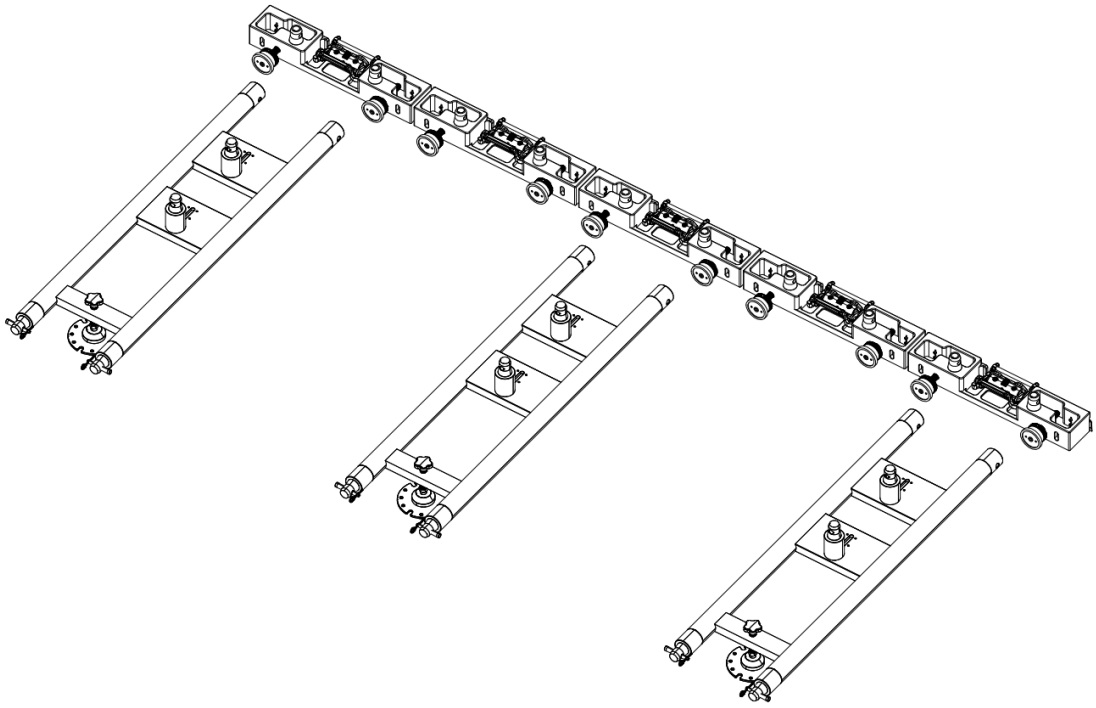
7. It is recommended to uninstall from right to left when uninstall tiles.



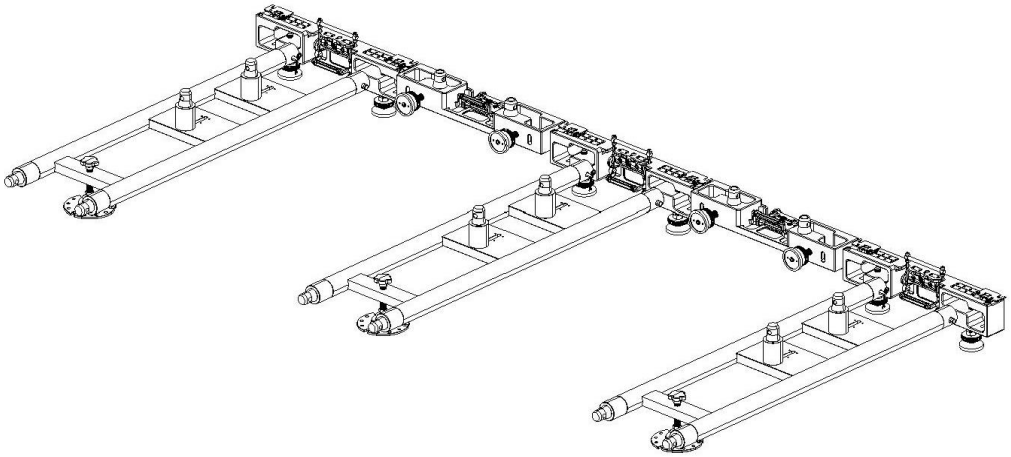
5.3 Stacking System

1. Take stacking accessories from the flight case and put them at the target place.

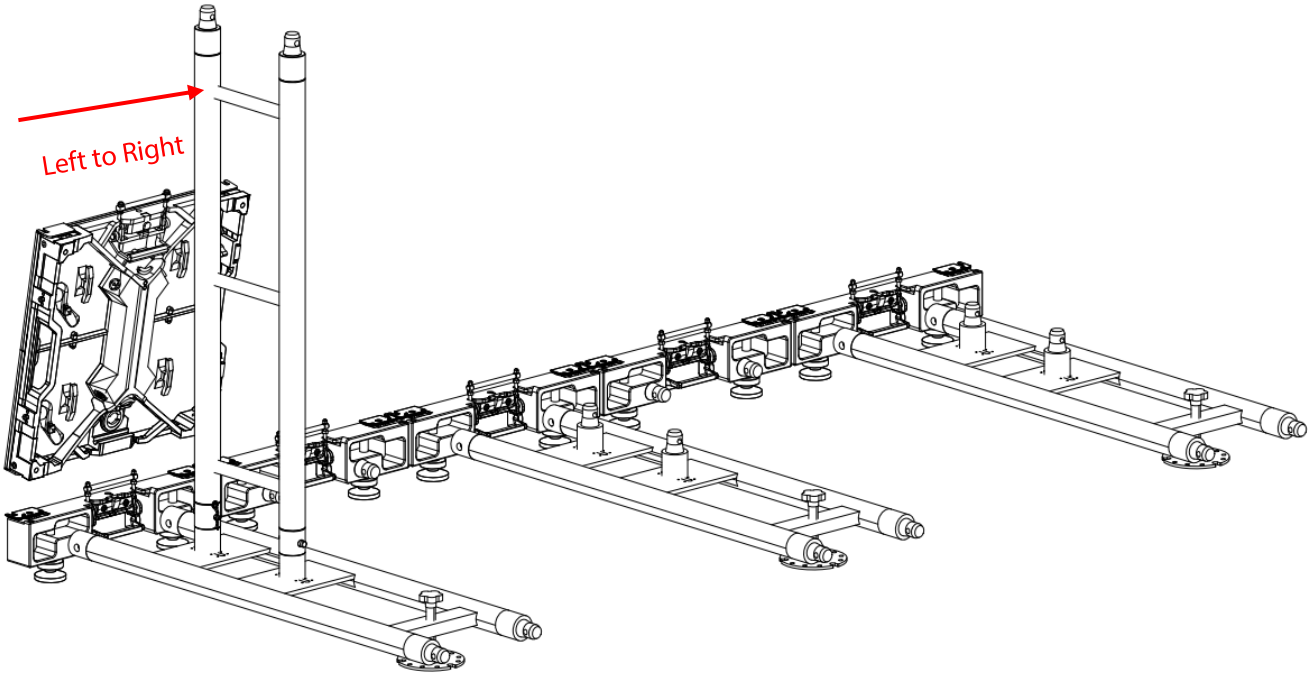
The base truss and rear support truss should be used every second row at least. If it's even rows, there should be used at both ends.



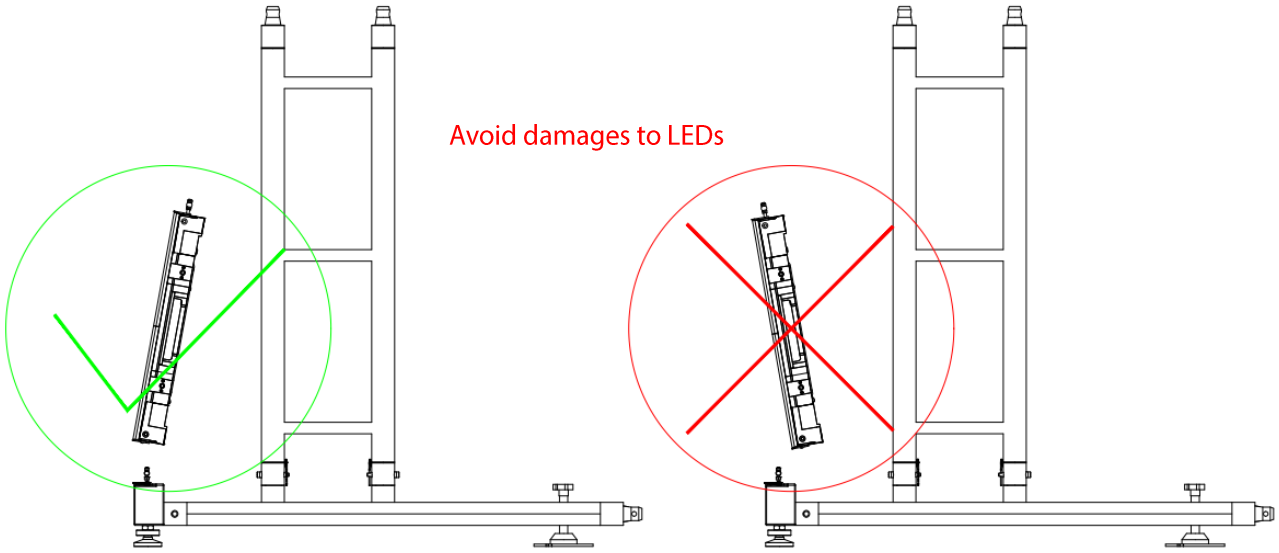
2. Assemble stacking bars with base trusses.



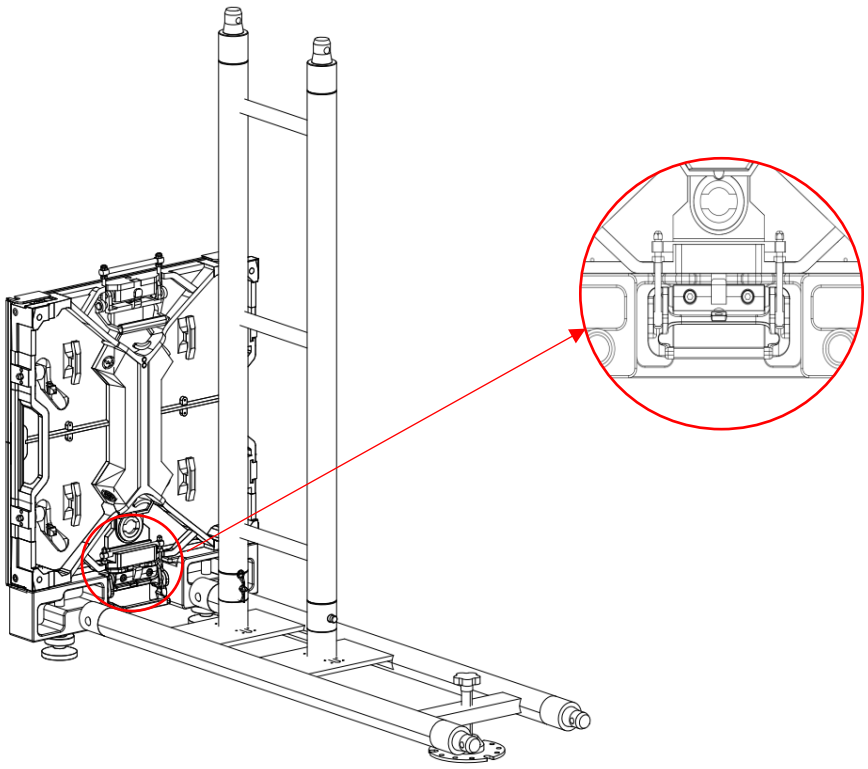
3. Put the rear support truss onto the base truss. Install the first panel on the stacking bar, which will attract panels to the target position automatically with magnets.



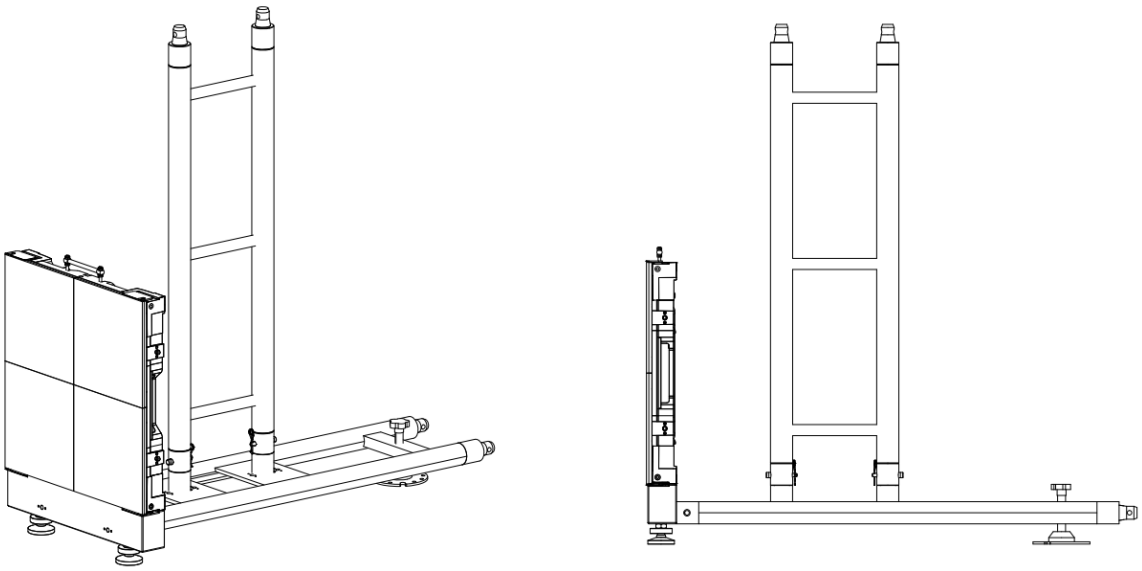
Note: It's recommended to install panel from left to right based on the rear view. Keep panels at an angle to avoid damage to LEDs when magnets attract panels.



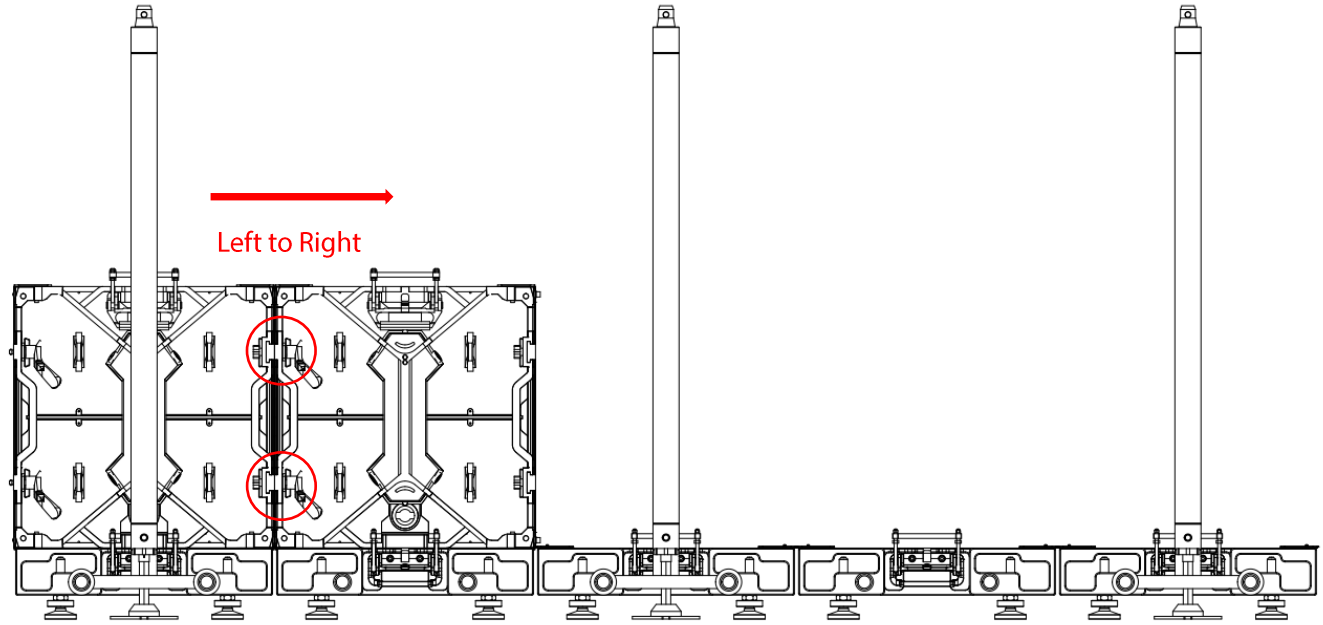
4. Lock the panel with the stacking bar. Connect the rear support truss with the panel by the rear bridge.



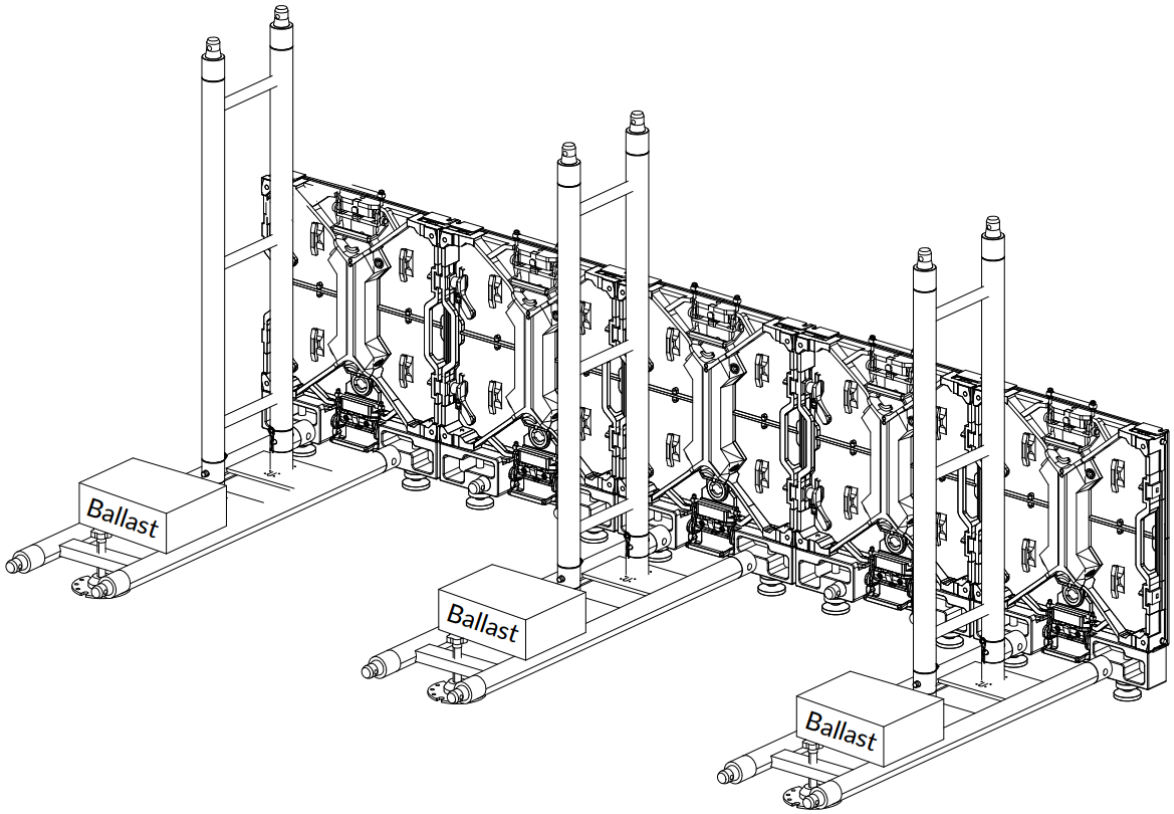
5. Adjust the stacking bar and the base truss to make the panel stand upright.



6. Lock the second panel with the stacking bar by the top lock and the first panel by the left lock.



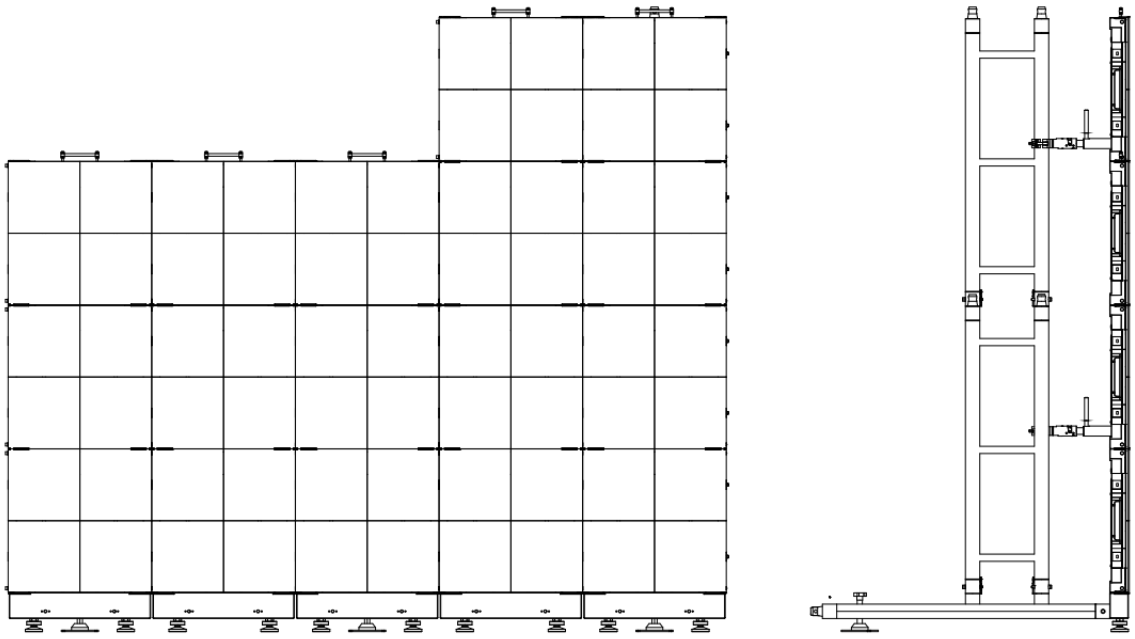
7. Start to add the ballast on base trusses after installing the first row of panels. The ballast weight should be distributed evenly to every base truss.



Note: The certain ballast weight please refer to 5.4 Ballast Weight Calculation.

8. Install more panels and fix them with locks. When the second row of panels are installed, connect

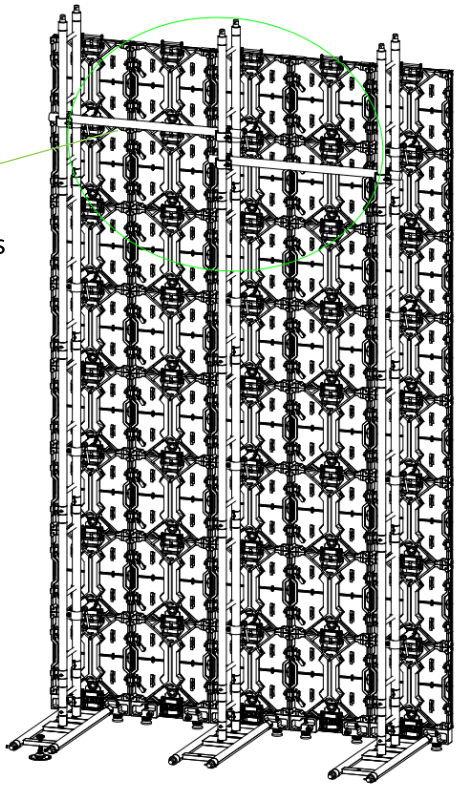
the rear bridge and rear support truss. (Rear bridge should be used every other row and start from 2nd row)



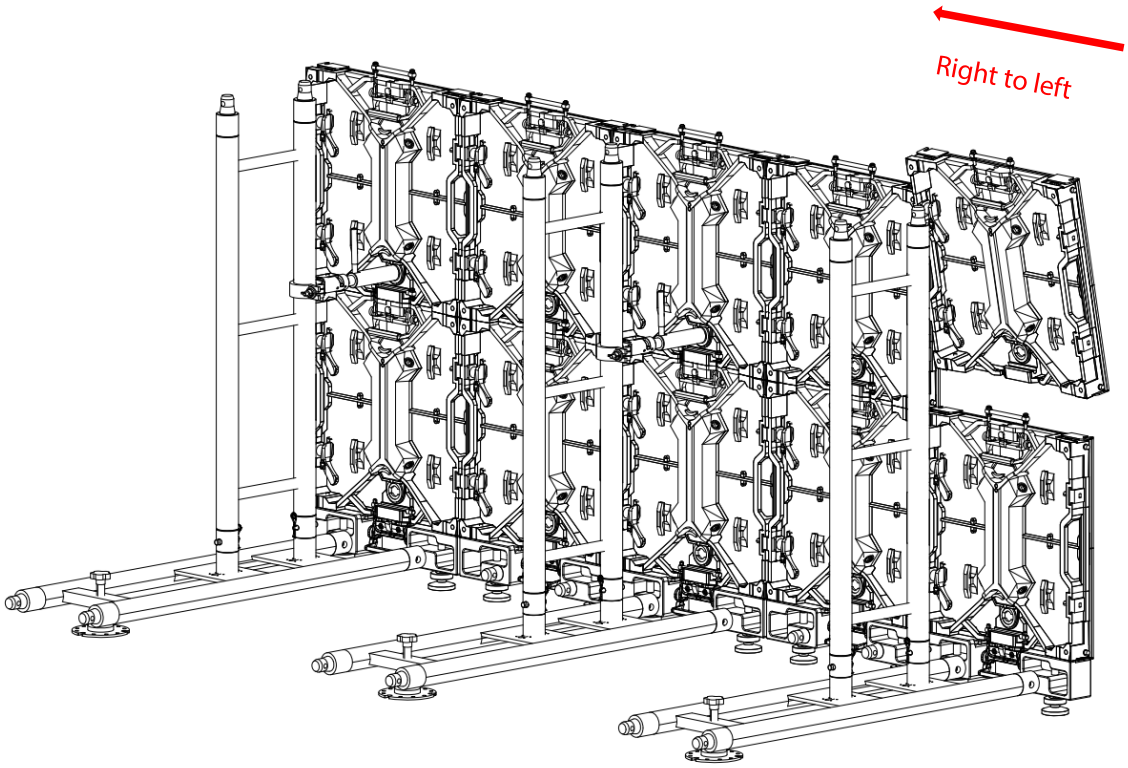
9. Conditions of using stacking system:

Version	Stacking Limits
Global Truss 1m	Up to 4m height you can use rear trusses on alternating columns. Higher, up to 6m, you need to use rear trusses on every column.
Global Truss Reinforced 1m	Up to 4.5m height you can use rear trusses on alternating columns. Higher, up to 6m, you need to use rear trusses on every column.
Prolyte 0.91m	Up to 6m you can use rear trusses on alternating columns without problem.
Note: -Within a complete screen the LED panels need a rear bridge connector on every 2nd row, including the top row. -LED screens that are only 2 panels wide need 2 rear support trusses and bases. -The first and the last column in a screen always needs to be connected to a stacking system. -Above 4m height the rear truss needs extra lateral support. -For more options, you can check the Ballast Calculation on 35th page.	

Above 4m height the rear truss needs extra lateral support.



10. It is recommended to uninstall from right to left based on the rear view when uninstall tiles.



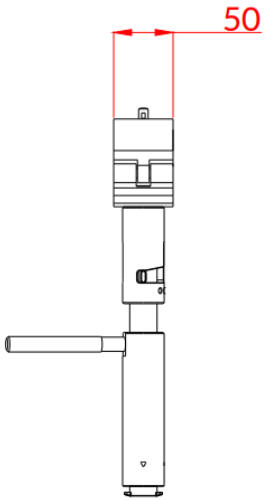
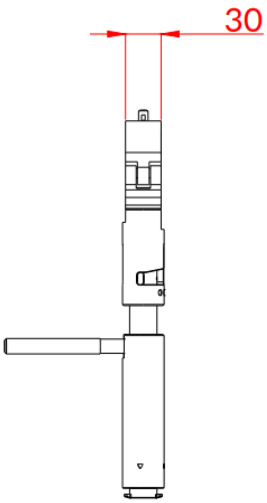
Notes:

(1) The adjusting range of the feet (stacking bar) is 48mm.

(2) The rear bridge should be used in even rows. (Except the first row)

(3) Comparison of old and new version of rear bridges.

There's an important update on Ruby's rear bridge.

SAP	Clamp Thickness	Need **Offset Truss** or NOT
215002S0001 Old Version		**YES.** It sometimes necessary for us to add an offset truss at the very bottom of each fully stacked column to avoid interference. **Only when:** 1. Rear bridges need to be used at every row. 2. The number of rows are odd.
215002S0108 (215002S0106) New Version		**NO.** For the new version, whose clamp is thinner than before, no need to use offset truss.

5.4 Ballast Calculation

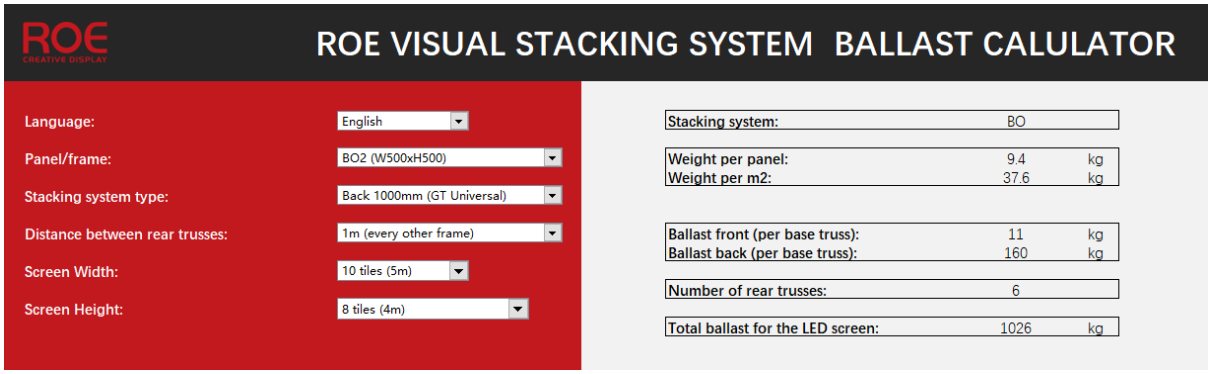
In order to confirm the correct total ballast weight for your LED screen, we created the stacking system ballast calculator based on the ROE stacking system structural analysis reports.

To use, select the corresponding options in the left of the calculator according to the wall build.
The results will be shown on the right side of the calculator.

The calculator will not allow you to select a height that is higher than the setup you plan to use. If you cannot reach your height, the first step is to reduce your distance between your vertical trusses by adding additional trusses to the wall.

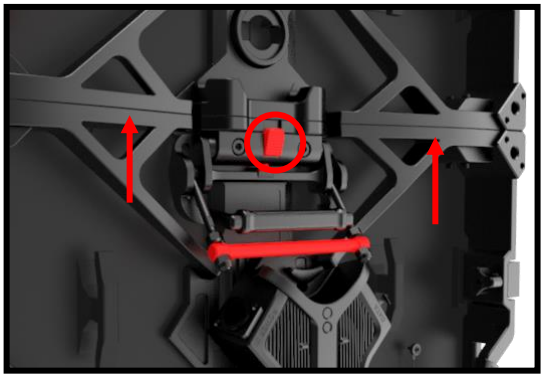
If you want to go higher you should contact an engineering consulting company. In most cases the height limitation is due to the limitations of the stacking system.

Please download the ballast calculator at https://www.roevisual.com/news/news-blog/build-your-led-screen-safe-using-the-roe-visual-ballast-calculator.html or contact the customer service.

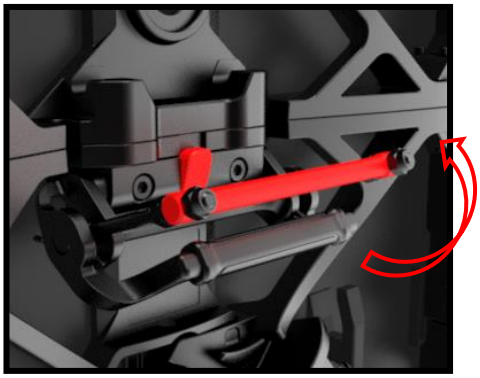


5.5 Installation

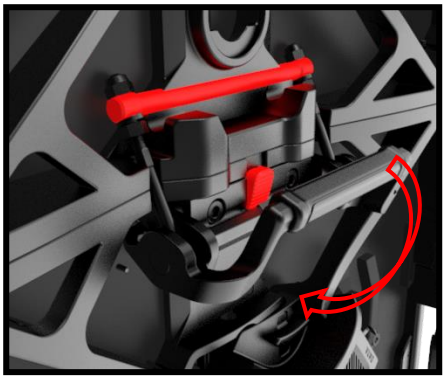
5.5.1 Vertical connector operation



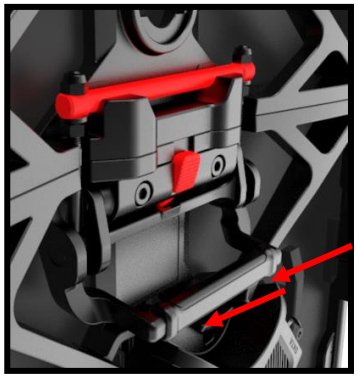
Pic 1



Pic 2



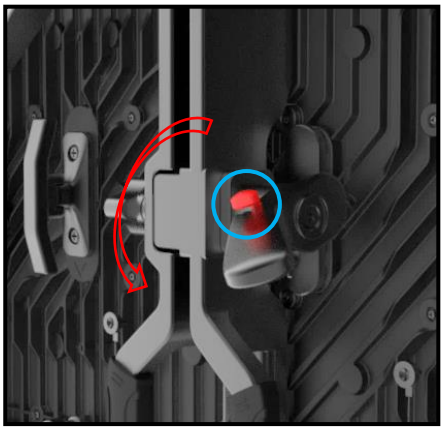
Pic 3

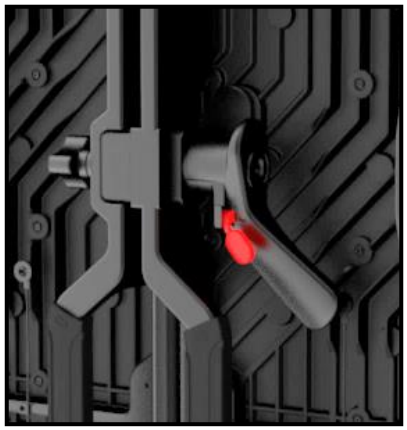


Pic 4

1) Tiles will be attached together by magnets automatically. Press the vertical red button to loosen the handle. (pic 1)
2) Pull the handle to turn the connecting bar. (pic 2)
3) Connect two tiles and align them. (pic 3)
4) Push handle back for locking. (pic 4)

5.5.2 Side lock operation





Press the button in the blue circle and then rotate side lock down for locking.

6 Cabling

6.1 Power Cabling

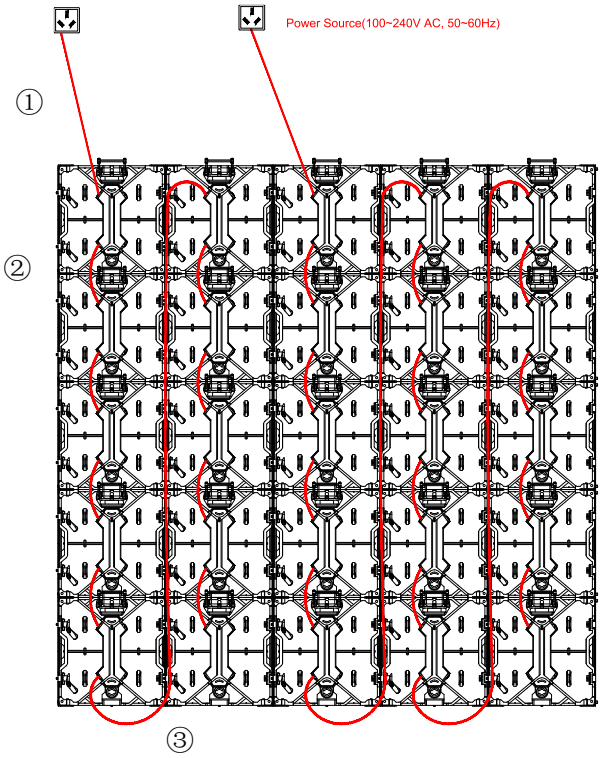
Connect neighboring tiles (in the vertical direction) with 0.43m power cables from the power-in port to the power-out port.

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 / Max Power Consumption

For example: The voltage is 220V, one power cable can load 19 pcs Ruby2.3 tiles.



Notes:

1. Main Power Cable_10m_Weipu_Neutrik
   (Main Power Cable_10m_Neutrik_Neutrik)
2. Power Cable_0.43m_Neutrik_Neutrik
3. Power Cable_2.7m_Neutrik_Neutrik
4. Main Data Cable_30m_Neutrik_Neutrik
5. Data Cable_0.43m_Neutrik_Neutrik
6. Data Cable_0.75m_Neutrik_Neutrik

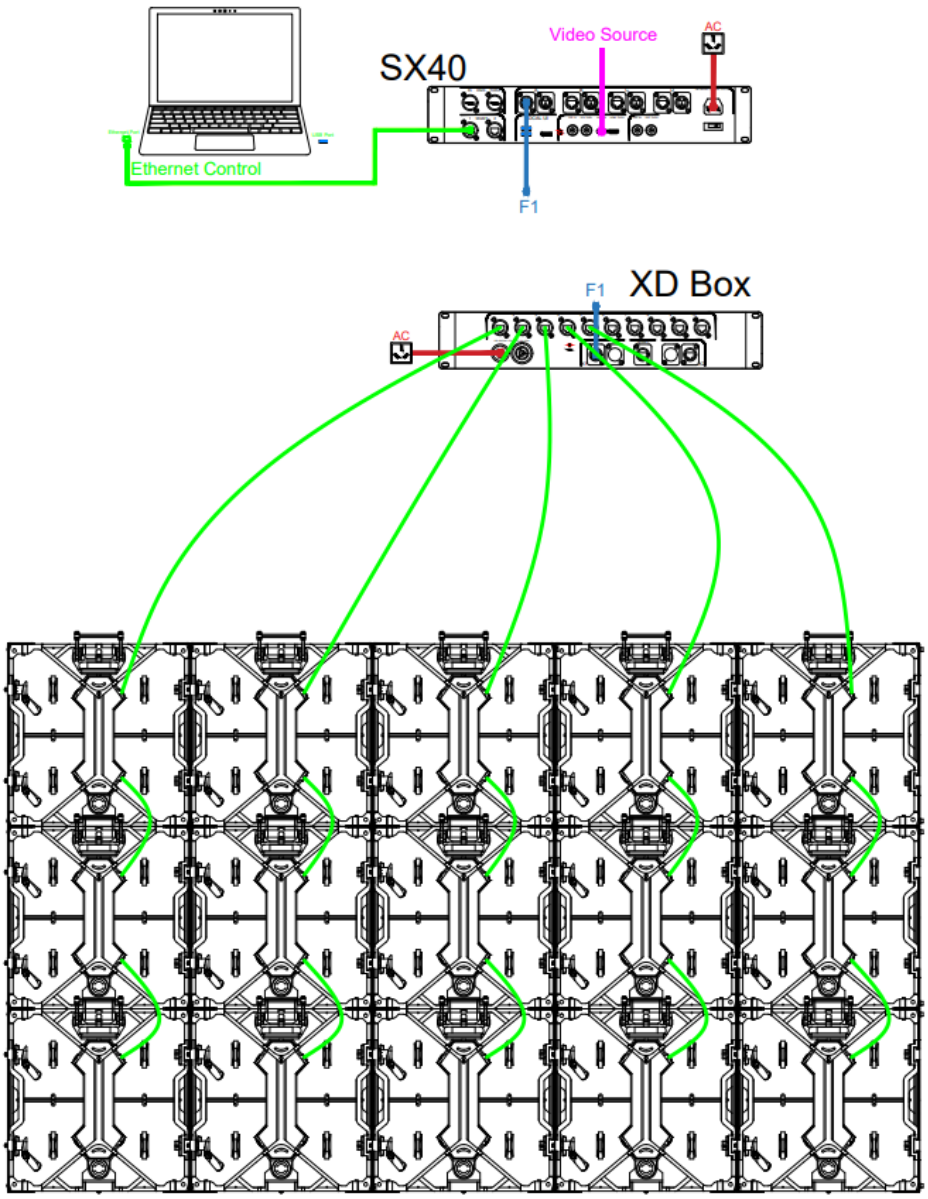
Note: The number in cabling is in line with that of in cables. (See 5.4 Cables.)

6.2 Data Cabling

Connect neighboring (vertical) tiles with 0.43m data cables.

6.3 Others

Connect tiles with the processor through 30m data cables.
Connect the processor with a PC / laptop via the Ethernet port.
Connect the video source.
Take Brompton system for example, the data cabling are below:



Notes:

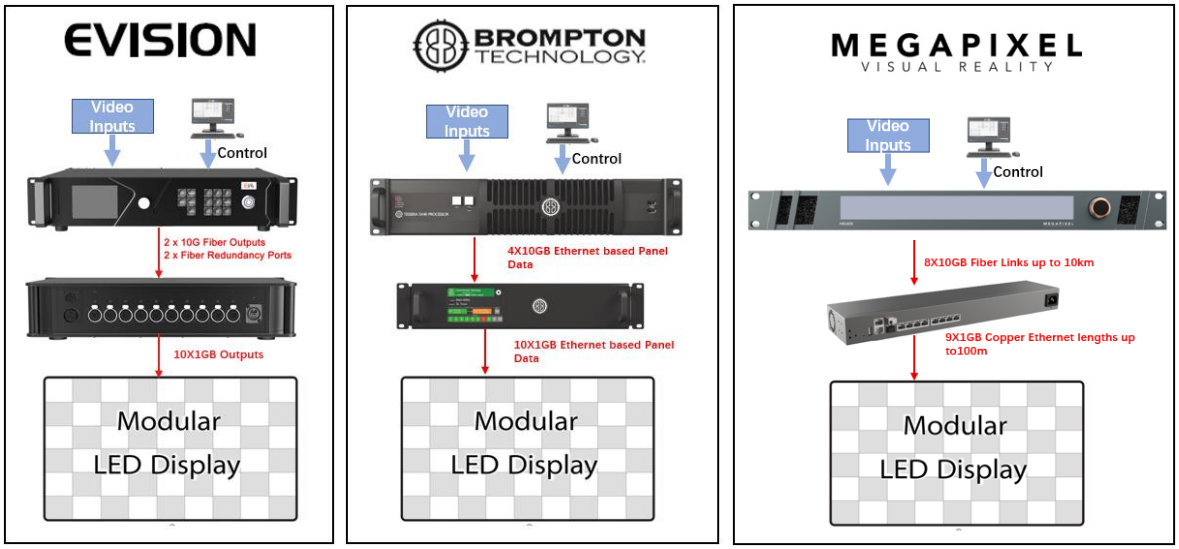
(1) For example: One main data cable can load at most 3 pcs Ruby1.5 tiles (12 bit, 60Hz).

(2) The cascade control data cables should not be more than 100 meters. When it's over 100 meters, please switch to fiber cables.

7 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***



8 Service Manual

8.1 Cleaning Tiles

As a small-pitch product, Ruby tile can be cleaned by the following methods.

8.1.1 Wiping with Dust-free Cloth for LEDs

Tools needed:

	**Detergent -- Pow-R-Wash PR** You can buy it from ROE or from the supplier. https://www.chemtronics.com/pow-r-wash-pr
	**Dust-free Cloth for LEDs**

Step 1: Spray a little detergent on the cloth and clean the tile gently.

Step 2: Spray more and keep cleaning until the tile is clean.

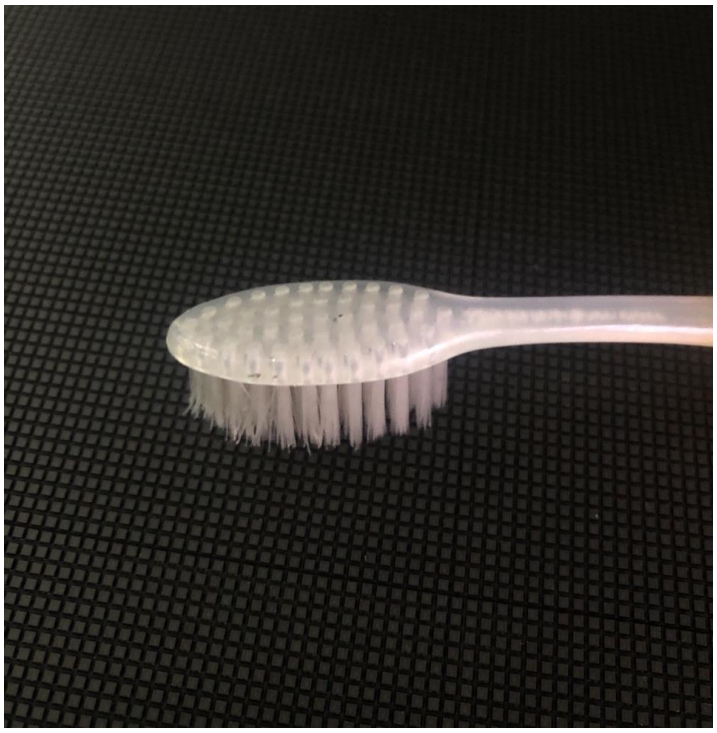
Note:

1：In terms of the cleaning frequency, it depends on the actual situation.

2：This method only suits for small area cleaning.

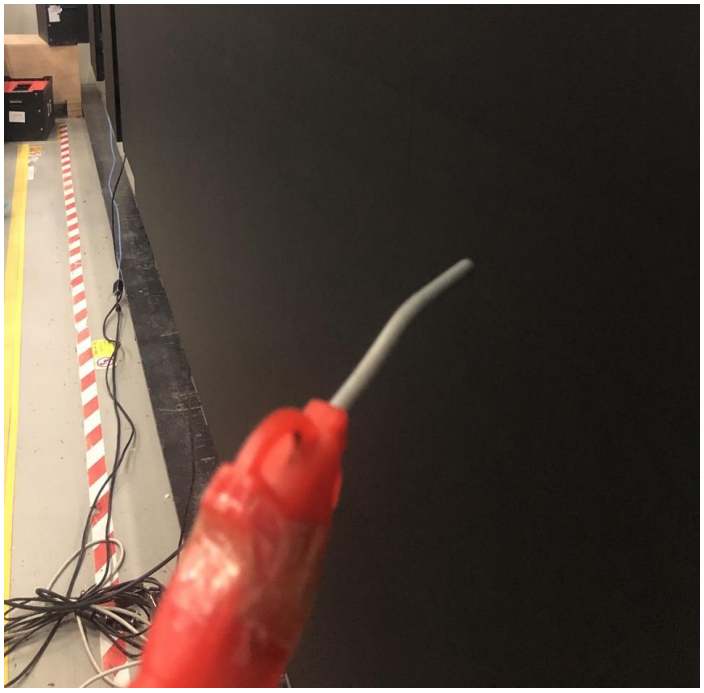
8.1.2 Wiping with Soft Toothbrush

Wipe off dust and dirt with a soft toothbrush gently.



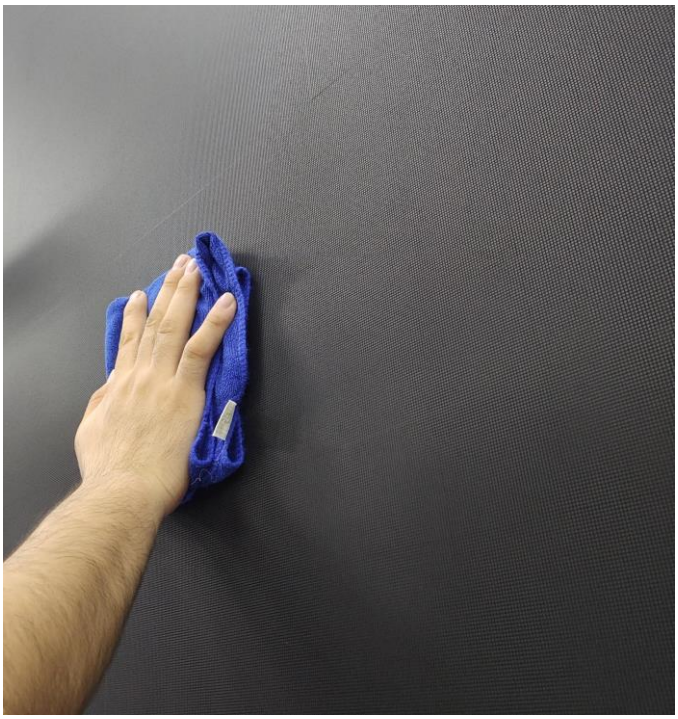
8.1.3 Air compressor

Aim the air gun at the spot where you want to clean, then start to blow the dirt away.



8.1.4 Large area cleaning

You can use a wrung-out rag to clean large area of panels (the rag should be wet with pure water)



9 Ruby 2.3 Right Angle

Compatible with Ruby2.3, Ruby 2.3 right-angle is the ideal solution for building a right-angle LED screen with highly accuracy.

9.1 Components

9.1.1 Overview

A ruby2.3 right-angel panel consists of 4 modules 1 tile frame and 1 power box.

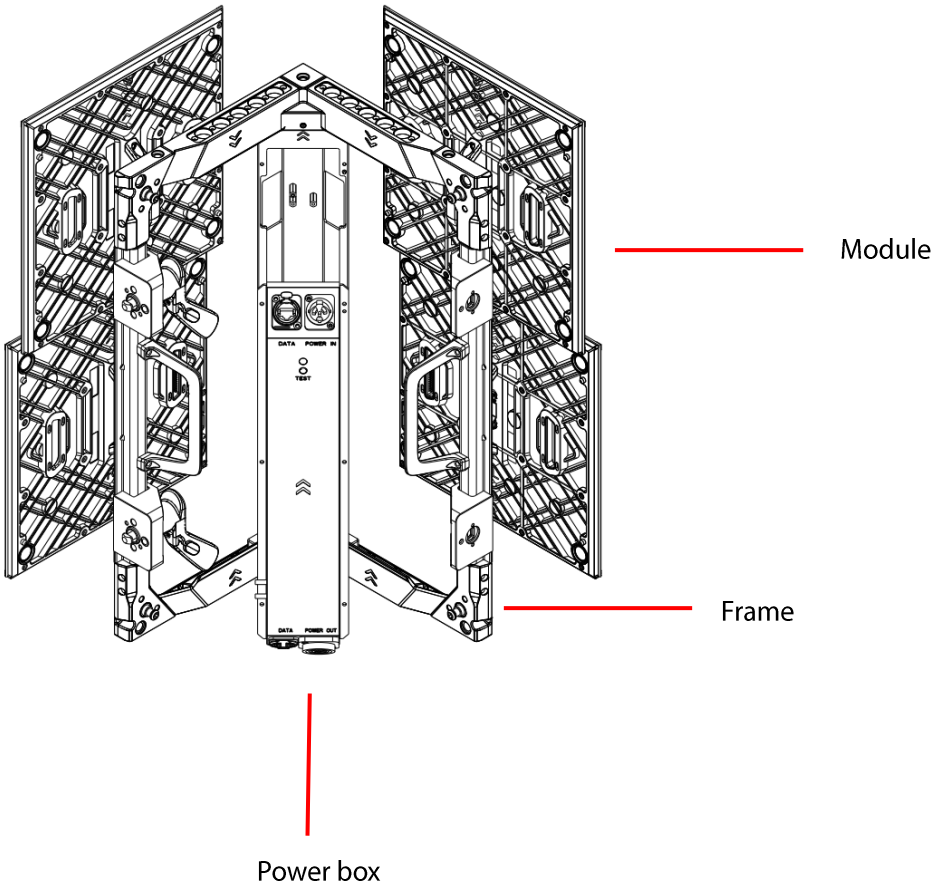


Figure 9-1. Ruby2.3 right-angle components

9.1.2 Dimensions

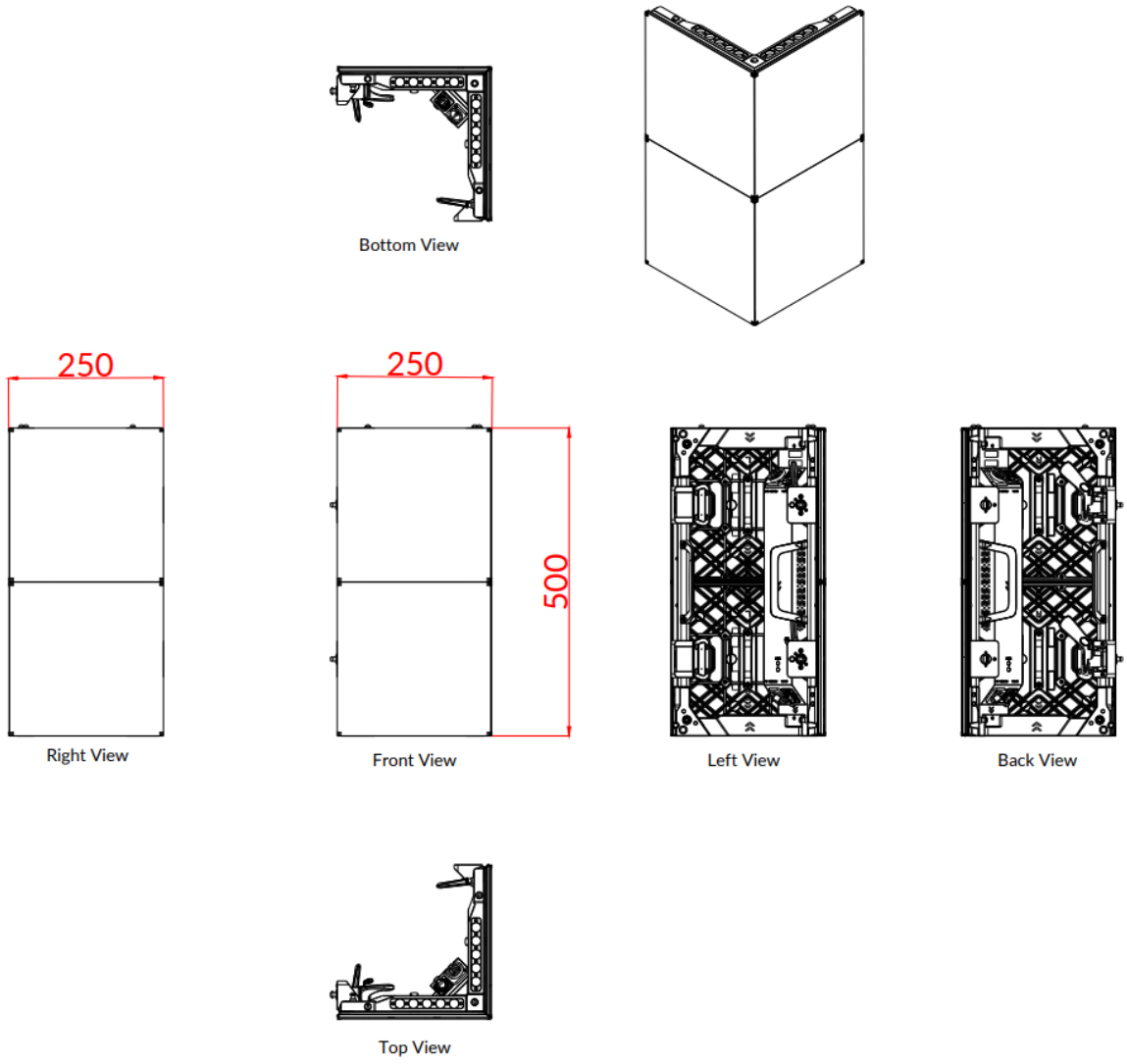


Figure 9-2. Ruby right-angle dimensions

9.2 Specifications

Items	Ruby 2.3-Right angle
Pixel Pitch	2.31mm
Max Brightness Calibrated	1500nits
Panel Dimension	500 x 500 x 73mm 19.7" x 19.7" x 2.87"
Panel Resolution (H x V)	216 x 216
Weight Per Panel	8.10kg
Voltage	100~240VAC, 50/60Hz
Power Consumption Max/Average	162W / 80W
Transparency	Solid
Serviceability	Front/Rear
Processing Platform	Brompton/MVR
Max. Hanging (panels)	20
Max. Stacking (panels)	12
LED Configuration	M4123BBA
Viewing Angle Vertical	140°
Viewing Angle Horizontal	140°
Multiplexing	1/12
Refresh Rate	3840Hz
Gray Scale	14bit
Frame Material	Magnesium alloy
Operating Temp / Humidity	-20°~ 45°C, 10~90% RH/ -4°~113°F, 10~90% RH △
Storage Temp / Humidity	-40°~ 60°C, 10~90% RH/ -40°~140°F, 10~90% RH
IP Rating	Indoor
Certifications	CE, ETL, FCC, RoHS
Lifetime	≥50,000hours
BTU Max/AVG	553/254

Note:

△ For the operating temperature, the panel will keep working to -20 degrees, but it can't start up reliably below 0 degrees.

9.3 Accessories

Ruby2.3 right-angle panel has exclusive stacking&hanging accessories, which are different from the normal ones.

Below is the diagram indicating how to install the right-angle panels with normal panel.

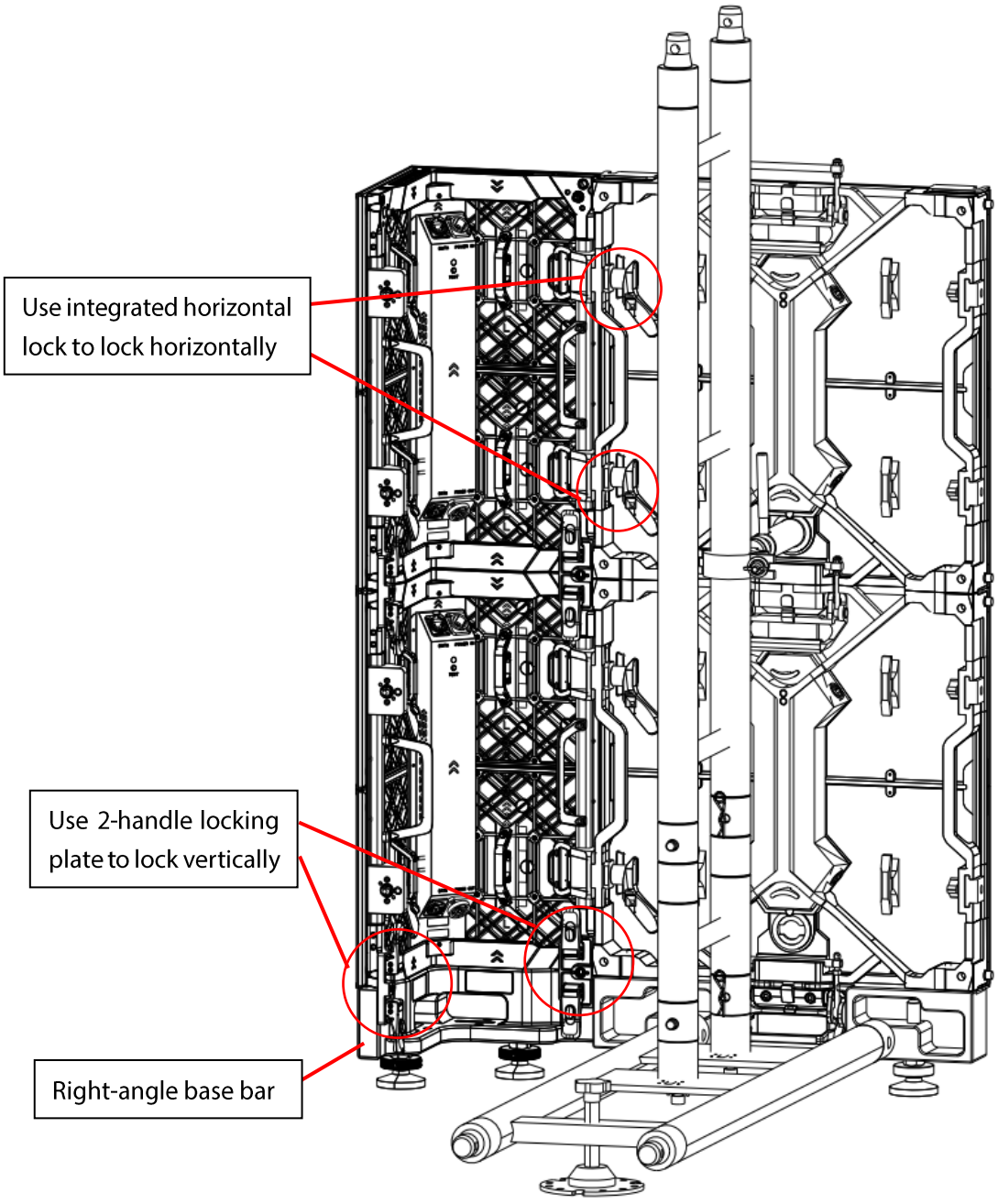


Figure 9-3. install with normal panel

The accessories below are specially designed for right-angle tiles.

	**DM right angle hanging&stacking bar, with shackle and clamp and 2 feet, V1.0** SAP: 207002S0240 Weight: 5.19kg±3%kg
	**DM right angle base bar, V1.0** SAP: 304010-00329 Weight:4.25±3%kg Dimensions: 260 x 260 x80 mm
	**CB/DM lock plate, G3, 2 handles, yellow button, V2.0** SAP: **304014-00010** Weight:125g

9.4 Flight case

Dimensions: 1142 x 594 x 821 mm

Capacity: Every flight case can carry 8 pcs Ruby2.3 right-angle tiles.

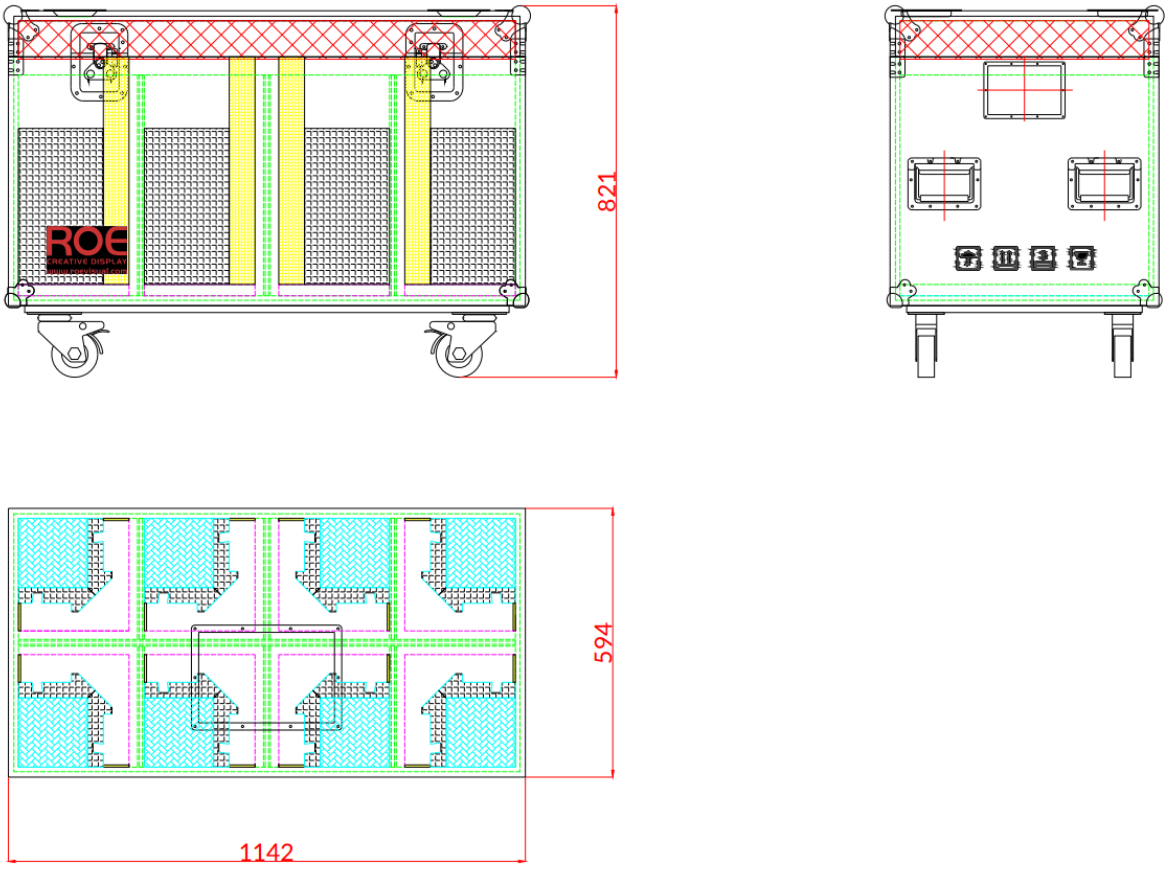


Figure 9-4. Ruby2.3 right-angle Flight Case Dimensions

Revision history

Revision	Update date	Remarks	Editor
1.5	2020-10-22	Update specification, Update French safety instructions, Add ballast calculator	Zary
1.6	2020-11-10	Update SAP number of accessories	Zary
1.7	2020-11-27	Update hanging system& stacking system	Zary
1.8	2021-01-28	Update control system	Zary
1.9	2021-02-22	Update specification (voltage)	Zary
2.0	2021-03-08	Update stacking system and service manual	Zary
2.1	2021-03-25	Add specification of Ruby1.9F	Zary
2.2	2021-05-24	Update the contact information	Zary
2.3	2021-06-02	Update SAP number of accessories	Zary
2.4	2021-06-22	Add condition of using stacking system	Zary
2.5	2021-08-23	Update control system	Zary
2.6	2021-12-27	Add comparison of new and old rear bridge	Zary
2.7	2022-01-24	Add Ruby2.3 Right Angle	Zary